

# Find-It-In-Front: Dr. Pinball Section

The inside cover & the front pages  
DR. ① thru DR. ⑩ covers the basics

Alot of questions get answered here...



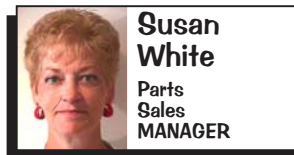
The Portals™ Service Menu,  
Section 3, is your Technical Friend...



<http://www.SternPinball.com>  
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## Your Parts Sales & Technical Support Team

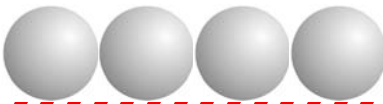


Please call us at 1-800-542-5377 or  
1-708-345-7700 for Technical Support.  
Visit us at our Web Site [www.SternPinball.com](http://www.SternPinball.com).

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SPI PN<sup>o</sup>:  
780-5076-00





FOR PROPER OPERATION OF PLAYBOY PINBALL, FOUR (4) PINBALLS MUST BE INSTALLED!



This Game is equipped with 3 Sets of Photo Inserts (1 installed on the game).

Find the "Additional Photo Inserts" Kit (SPI Part Number: 502-5010-00)

with the spare Photo Inserts, Instructions, and other Important Information!

Please Read All Cautions in this manual to prevent injury and/or damage to parts.

PLAYBOY PINBALL ADDITIONAL PHOTO INSERTS REPLACEMENT INSTRUCTION SHEET

Your Pinball Game comes with 3 Photo Insert Sets. 1 Set has already been installed in your game, and the other 2 Sets are contained in the Kit Bags. Choose the Photo Inserts Set to suit your needs or mix-n-match as you please!

CAUTION! To change the Photo Inserts in the Centerfold Mechanism, use the Centerfold Motor Test in the Diagnostics Menu (see opposite page for more info on Portals). DO NOT FORCE THE CENTERFOLD MECHANISM OPEN WITH YOUR HANDS! THIS WILL CAUSE DAMAGE TO THE MOTOR and UNIT.

Diagram of the game cabinet with various photo insert locations labeled: NO NUDITY, NUDITY FACTORY SUGGESTED, SOME FULL NUDITY, TEASE SCREEN, CENTERFOLD MECHANISM, MIRROR PANEL, BEAD CURTAIN, MAGAZINE, TRIANGLE BILLBOARD. Includes instructions for each location and a central diagram of the game board with photo insert positions T1 through T10.

READ CAUTION! WHEN REPLACING THE PHOTO INSERTS IN THE CENTERFOLD! DO NOT USE HANDS TO PRY OPEN!



CAUTION: When changing the Photo Inserts in the Centerfold Mechanism (see inside page), DO NOT FORCE OPEN BY HAND, use the Centerfold Motor Test via Portals! Select the RUN Icon (ensure the Power Interlock Switch is pulled out).

Navigation diagram for the Centerfold Motor Test: DING AUD ADJ INST RESET TOUR QUIT -> MAIN GO TO DIAGNOSTICS MENU MAIN -> MORE BURN TEST RE FUSES DR. MORE -> DING GO TO PLAYBOY TESTS DING -> CENTERFOLD MOTOR TEST -> CENTERFOLD MOTOR TEST STOPPED -> CENTERFOLD #1 (514.43) -> CENTERFOLD #2 (514.43) -> PULSE RUN PREV QUIT

PLAYBOY PINBALL CONTAINS ADULT CONTENT

Instructions for turning off adult content. Includes a diagram of the Portals menu navigation: SERVICE QUILTS SET (RED, GREEN & BLACK BUTTONS) ACCESS & USE -> PORTALS -> FUNCTION 1, VOLUME MENU -> FUNCTION 2, SERVICE CREDITS MENU -> FUNCTION 3, PORTALS SERVICE MENU. Includes a note: Note: After any Factory Reset, you must enter the Portals Service Menu and rechange this adjustment back to "NO".

New to Portals! The INSTALLS MENU! Read over Section 3, Chapter 5, Pages 47-50.

Customize your game with ease without having to go through many Adjustments... You can now FACTORY RESET all Adjustments WITHOUT affecting the AUDITS!

Navigation diagram for the Installs Menu: MAIN GO TO INSTALLS MENU MAIN -> INST INSTALL EXTRA EASY INST (Select any Installs...) -> INST INSTALL FACTORY INST (Reset all Adjustments & Installs)

New to our Pinball Games?

Don't forget to go over Section 3, Chapter 1, Portals Service Menu Introduction. If using Diagnostics...very useful! Got confused? Comments? Questions? Call Technical Support at 800-542-5377 or 708-345-7700 (Option 1).

# ▼ BACKBOX LAYOUT LOCATIONS: Fuses, Bridges, Relays & ROMs ▼

**CAUTION:** For continued protection against risk of fire, replace only with same type of fuse having the same electrical rating!

## QUICK REFERENCE FUSE CHART

### Backbox Fuses

#### LOC: DISPLAY POWER SUPPLY (P.S.) BOARD

F1	3/4A 250v S.B.	90v DC	High Voltage Display
----	----------------	--------	----------------------

#### LOC: 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	Magnet
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. Lamps (BRN-WHT to WHT-BRN)
F25	5A 250v S.B.	6.3v AC	G.I. Lamps (YEL to WHT-YEL)
F26	5A 250v S.B.	6.3v AC	G.I. Lamps (GRN to WHT-GRN)
F27	5A 250v S.B.	6.3v AC	G.I. Lamps (VIO to WHT-VIO)
F28	3A 250v S.B.	24v AC	Not Used / Spare

### Cabinet Fuses

#### LOC: SERVICE (AC) OUTLET BOX (Cabinet Bottom)

n/a	8A 250v S.B.	115v AC	Main Fuse Line (Domestic or USA)
n/a	5A 250v S.B.	220v AC	Main Fuse Line (International)

### Playfield Fuses

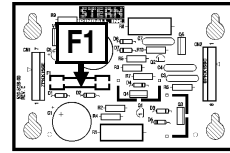
#### LOC: UNDER PLAYFIELD (near Flippers)

n/a	3A 250v S.B.	50v DC	Rt. Flipper (BLU-YEL ↔ RED-YEL)
n/a	3A 250v S.B.	50v DC	Lt. Flipper (GRY-YEL ↔ RED-YEL)
n/a	3A 250v S.B.	50v DC	Upr. Flipper (GRY-YEL ↔ RED-YEL)

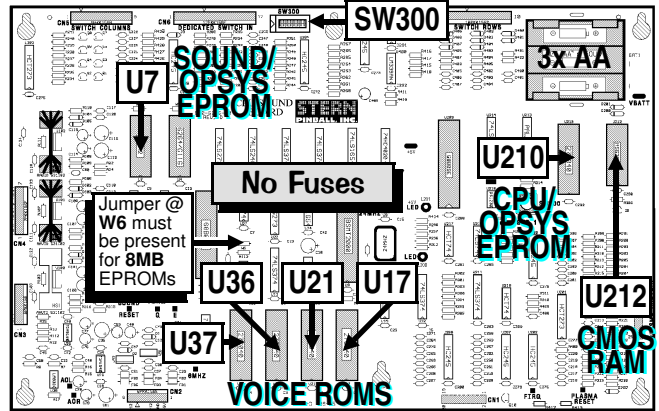
For locations & more information on fuses, see Sec. 5, Chp. 2.

For Backbox & Cabinet General Parts, review Section 4, Chapter 1, Parts Identification & Location (The Pink Pages).  
For Schematics and/or Component Parts on PC Boards shown, review Section 5, Chapter 4, Printed Circuit Boards (The Yellow Pages).

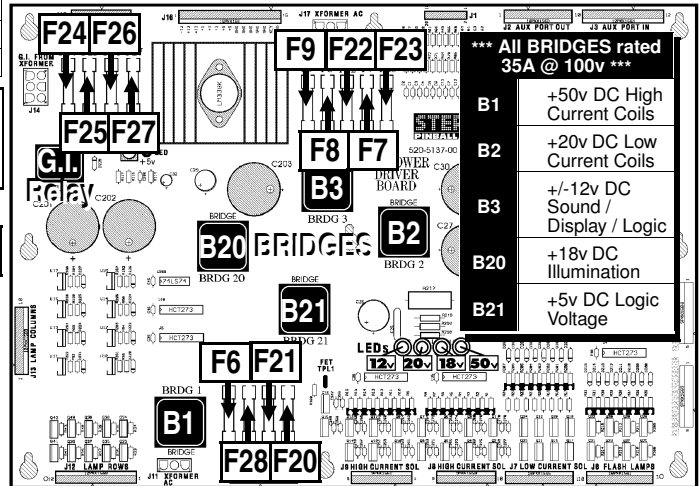
## Display Power Supply Board



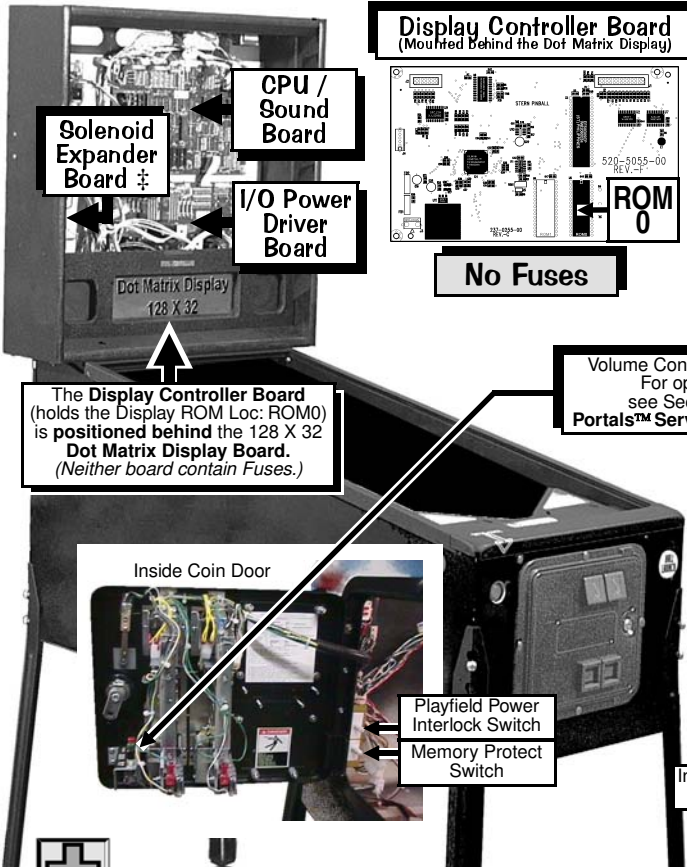
## CPU / Sound Board



## I/O Power Driver Board

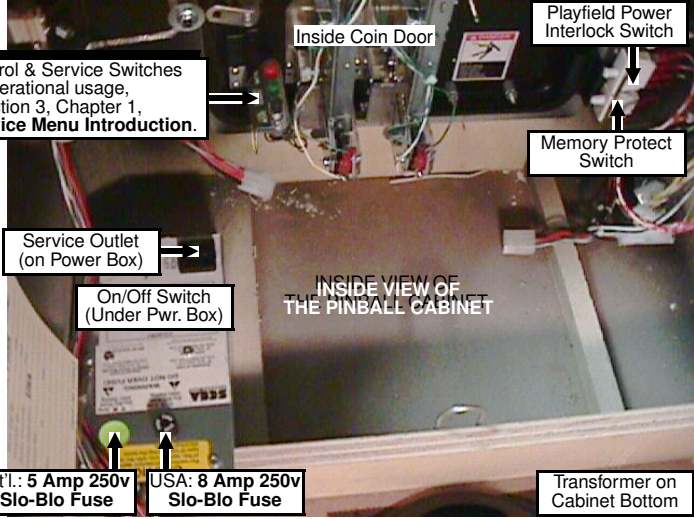


- \*\*\* All BRIDGES rated 35A @ 100v \*\*\*
- B1 +50v DC High Current Coils
  - B2 +20v DC Low Current Coils
  - B3 +/-12v DC Sound / Display / Logic
  - B20 +18v DC Illumination
  - B21 +5v DC Logic Voltage



The Display Controller Board (holds the Display ROM Loc: ROM0) is positioned behind the 128 X 32 Dot Matrix Display Board. (Neither board contain Fuses.)

Volume Control & Service Switches For operational usage, see Section 3, Chapter 1, Portals™ Service Menu Introduction.



Find-It-In-Front:  
Dr. Pinball

# PLAYBOY



# ////// FIND-IT-IN-FRONT: Dr. Pinball Section Explained ////

The key technical data from various parts of the manual were extracted and combined into the "Find-It-In-Front: Dr. Pinball Section." This section (pages DR. ① - ⑩) will assist the technician in locating important technical information needed to troubleshoot the Pinball Machine. **Dr. Pinball** is also available in a Flow Chart Help Format in the Game Display. To access, enter the **Portals™ Service Menu**.

## ////// How It Works ////

First, the operator / technician must enter the **Service Menu Mode** (for a complete description of the **Portals™ Service Menu** and **ICONS Read!** Section 3, Chapter 1). To get into the **Service Menu Mode**, power-up the game (if not already) and open the **Coin Door**. On the **Coin Door** is the **Portals™ Service Switch Set** (Red, Green & Black Buttons).

**Step 1:** Push down the **Black "BEGIN TEST" Button**. Looking at the Video Display you will momentarily see the introductory screen followed by the **MAIN MENU**.

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



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

While in the **Portals™ Service Menu**, the **Start Button** can be used in lieu of the **Black Button**; the **Left & Right Flipper Buttons** can be used in lieu of the **Red & Green Buttons**. However, in *Switch or Active Switch Tests* **only** the **Red & Green Buttons** can be used.



In our **Portals™ Service Menu**, selecting the "DR." *Icon* will bring the operator/technician into **DR. PINBALL (Flow Chart Menus)**, the "on-screen" diagnostic aide. This is a feature that will allow you to utilize the power of the micro-processor assisting in troubleshooting a problem with the machine in a **Flow Chart** format (*follow the questions & answer by using the Mini-Icons in the display*).



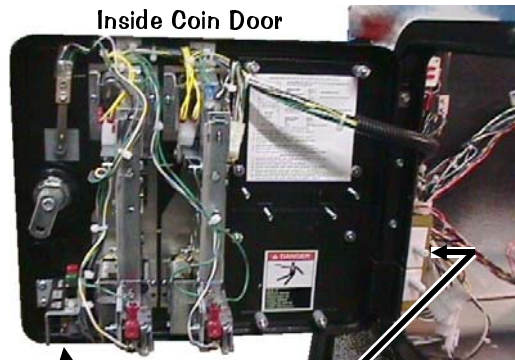
After entering **Portals™**, the **MAIN MENU** now appears with the "DIAG" *Icon* (GO TO DIAGNOSTICS MENU) flashing; press the **Black "ENTER" Button** to activate this **ICON**. The **DIAGNOSTICS MENU** now appears with the "SW" *Icon* (GO TO SWITCH MENU) flashing; use the **Red "LEFT"** or **Green "RIGHT"** Buttons, until the "DR." *Icon* (DR. PINBALL) is flashing:



Press the **Black "ENTER" Button** to activate this **ICON**. The **DR. PINBALL MENU (Flow Chart Menus)** now appears with the **COIL "DR." Icon** flashing. Three (3) *Icons*, Coil "DR.", Switch "DR." and Lamp "DR." are available for selection. Selecting a particular *Icon* will give you a choice of which specific **Coil** (*any and all coil assemblies such as Flippers, VUKs, Magnets, etc.*), **Switch** or **Lamp Circuit** needs to be diagnosed. After selection, *Dr. Pinball* will now display a question or a procedure to follow such as "Does the lamp turn on?" or "Check bridge rectifier BR-20, if short replace." When *Dr. Pinball* displays a question or requests a procedure, *Dr. Pinball* will expect a response such as "NO" or "YES". You the operator/technician must respond by using the **Red** or **Green Buttons** to "SELECT" a *Mini-Icon* and the **Black Button** to "ACTIVATE or ENTER" your selection.



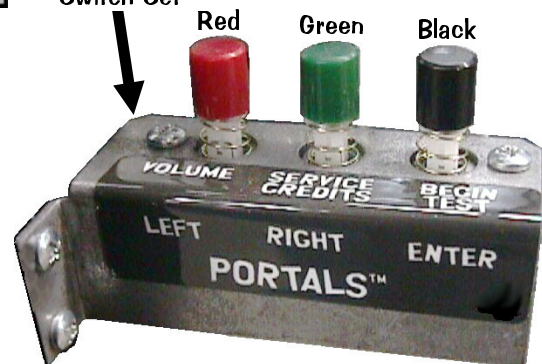
For *Mini-Icons* explanations & details, see the end of Section 3, Chapter 2, **GO TO DIAGNOSTICS MENU, Dr. Pinball**.



Inside Coin Door

Portals™ Service Switch Set

If Coil & Flashlamp Testing, the Playfield Power Interlock Switch must be pulled out.





# DIAGNOSTIC AIDS

## OPEN THE DOOR

Check battery voltage at VBATT Test Point on the CPU/Sound Bd. (more details in Sec. 5, Chp. 4, PCBs).

If this **display flashes**, the game is indicating that **CMOS RAM** memory (CPU Loc. U212) 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 (Reset)**, by opening the **Memory Protect Switch**.

## OPERATOR ALERT! #2 AUTO LAUNCH COIL MALFUNCTION

appear if a switch associated with a coil (e.g. #16 Shooter Lane & #2 Auto Launch) is stuck closed (caused by a switch jam or stuck ball); the CPU/Sound Board will activate the coil approximately ten times and if the switch remains closed, the game will report this switch in **Technician Alerts** & will indicate the following display warning:

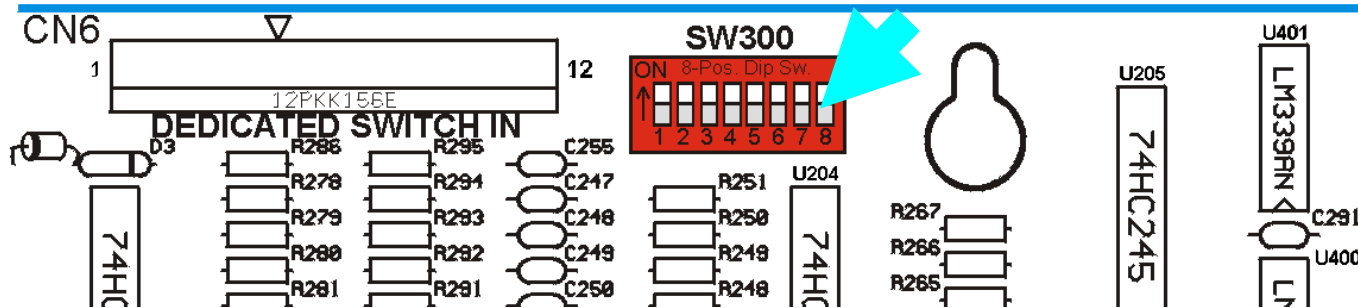
This **display** is shown momentarily during **Game Mode** or **Power-Up** to alert the operator of a coil malfunction (coil doesn't energize or coil fires a multiple number of times). **OPERATOR ALERT!** works by monitoring any switch activated coil that has the potential to trap a ball when disabled (e.g. in the Auto Launch, Scoop, Eject, etc.). This alert can also

## PLEASE CHECK TECH REPORT PORTALS->DIAG->TECH

If this **display flashes** (along with an audible sound), the game has detected faulty switches and/or missing pinballs. To check, enter the **Portals™ Service Menu System**, select the **"DIAG" Icon (GO TO DIAGNOSTICS MENU)** from the **MAIN MENU** and select the **"TECH" Icon** (more details in Sec. 3, Chp. 2, GO TO DIAGNOSTICS MENU).

# CPU DIP SWITCH SETTINGS

Location of Dip Switch [SW300] is on the CPU/Sound Board (Right of CN6, Top Middle)

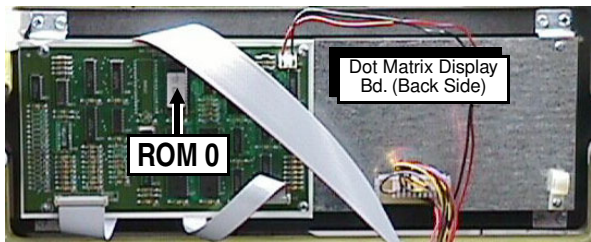


CPU COUNTRY SETTING:	Pos:	1	2	3	4	5	6	7	8
<b>Austria</b>	ON	▲	▼	▼	▼	▼	▼	▼	▼
	OFF	▼	▼	▼	▼	▼	▼	▼	▼
CPU COUNTRY SETTING:	Pos:	1	2	3	4	5	6	7	8
<b>Australia</b>	ON	▲	▲	▲	▼	▼	▼	▼	▼
	OFF	▼	▼	▼	▼	▼	▼	▼	▼
CPU COUNTRY SETTING:	Pos:	1	2	3	4	5	6	7	8
<b>Belgium</b>	ON	▲	▼	▼	▼	▼	▼	▼	▼
	OFF	▼	▼	▼	▼	▼	▼	▼	▼
CPU COUNTRY SETTING:	Pos:	1	2	3	4	5	6	7	8
<b>Canada</b>	ON	▲	▲	▲	▼	▼	▼	▼	▼
	OFF	▼	▼	▼	▼	▼	▼	▼	▼
CPU COUNTRY SETTING:	Pos:	1	2	3	4	5	6	7	8
<b>Denmark</b>	ON	▲	▼	▼	▼	▼	▼	▼	▼
	OFF	▼	▼	▼	▼	▼	▼	▼	▼
CPU COUNTRY SETTING:	Pos:	1	2	3	4	5	6	7	8
<b>Finland</b>	ON	▲	▲	▼	▼	▼	▼	▼	▼
	OFF	▼	▼	▼	▼	▼	▼	▼	▼

CPU COUNTRY SETTING:	Pos:	1	2	3	4	5	6	7	8
<b>USA</b>	ON	▼	▼	▼	▼	▼	▼	▼	▼
	OFF	▼	▼	▼	▼	▼	▼	▼	▼
CPU COUNTRY SETTING:	Pos:	1	2	3	4	5	6	7	8
<b>France</b>	ON	▼	▲	▲	▼	▼	▼	▼	▼
	OFF	▼	▼	▼	▼	▼	▼	▼	▼
CPU COUNTRY SETTING:	Pos:	1	2	3	4	5	6	7	8
<b>Germany</b>	ON	▲	▲	▲	▼	▼	▼	▼	▼
	OFF	▼	▼	▼	▼	▼	▼	▼	▼
CPU COUNTRY SETTING:	Pos:	1	2	3	4	5	6	7	8
<b>Greece</b>	ON	▲	▲	▲	▲	▼	▼	▼	▼
	OFF	▼	▼	▼	▼	▼	▼	▼	▼
CPU COUNTRY SETTING:	Pos:	1	2	3	4	5	6	7	8
<b>Italy</b>	ON	▼	▼	▼	▼	▼	▼	▼	▼
	OFF	▼	▼	▼	▼	▼	▼	▼	▼
CPU COUNTRY SETTING:	Pos:	1	2	3	4	5	6	7	8
<b>Netherlands</b>	ON	▼	▼	▼	▼	▼	▼	▼	▼
	OFF	▼	▼	▼	▼	▼	▼	▼	▼
CPU COUNTRY SETTING:	Pos:	1	2	3	4	5	6	7	8
<b>New Zealand</b>	ON	▼	▼	▼	▼	▼	▼	▼	▼
	OFF	▼	▼	▼	▼	▼	▼	▼	▼

CPU COUNTRY SETTING:	Pos:	1	2	3	4	5	6	7	8
<b>Norway</b>	ON	▼	▲	▲	▼	▼	▼	▼	▼
	OFF	▼	▼	▼	▼	▼	▼	▼	▼
CPU COUNTRY SETTING:	Pos:	1	2	3	4	5	6	7	8
<b>Portugal</b>	ON	▲	▼	▼	▼	▼	▼	▼	▼
	OFF	▼	▼	▼	▼	▼	▼	▼	▼
CPU COUNTRY SETTING:	Pos:	1	2	3	4	5	6	7	8
<b>Spain</b>	ON	▼	▼	▼	▼	▼	▼	▼	▼
	OFF	▼	▼	▼	▼	▼	▼	▼	▼
CPU COUNTRY SETTING:	Pos:	1	2	3	4	5	6	7	8
<b>Sweden</b>	ON	▲	▲	▼	▼	▼	▼	▼	▼
	OFF	▼	▼	▼	▼	▼	▼	▼	▼
CPU COUNTRY SETTING:	Pos:	1	2	3	4	5	6	7	8
<b>Switzerland</b>	ON	▼	▼	▼	▼	▼	▼	▼	▼
	OFF	▼	▼	▼	▼	▼	▼	▼	▼
CPU COUNTRY SETTING:	Pos:	1	2	3	4	5	6	7	8
<b>UK</b>	ON	▼	▲	▲	▲	▼	▼	▼	▼
	OFF	▼	▼	▼	▼	▼	▼	▼	▼

# ROM SUMMARY TABLE



The Display Controller Board (holds the Display ROM Loc: ROM0) is positioned behind the 128 X 32 Dot Matrix Display Board.

I.C. NAME	TYPE	BD. NAME	LOC.	PART N°
Game ROM	1MB	CPU / Sound Bd.	U210	965-0367-76
Sound EPROM	512K	CPU / Sound Bd.	U7	965-0368-76
Display EPROM	4MB	Display Cntrl. Bd.	ROM 0	965-0369-76
Display EPROM	N/C	Display Cntrl. Bd.	ROM 1	N/A
Voice ROM 1	8MB	CPU / Sound Bd.	U17	965-0370-76
Voice ROM 2	8MB	CPU / Sound Bd.	U21	965-0371-76
Voice ROM 3	8MB	CPU / Sound Bd.	U36	965-0372-76
Voice ROM 4	8MB	CPU / Sound Bd.	U37	965-0373-76

For Game, Sound & Voice ROM Locations see **DR. ①**.



Find-It-In-Front:  
Dr. Pinball

# PLAYBOY

DR. ③



In SWITCH MENU also select:

ACTIVE and DEDICATED SWITCH TESTS

## SWITCH MATRIX GRID & DEDICATED SWITCHES

D iode O n T ermal S trip :

Column (Drive)	1: Q1	2: Q2	3: Q3	4: Q4	5: Q5	6: Q6	7: Q7	8: Q8	0ND	Ground
Row (Return)	GRN-BRN CN5-P1	GRN-RED CN5-P3	GRN-ORG CN5-P4	GRN-YEL CN5-P5	GRN-BLK CN5-P6	GRN-BLU CN5-P7	GRN-VIO CN5-P8	GRN-GRY CN5-P9	IC U206 INPUT 8	BLK CN6-P1, -P11
1: U400	LEFT BUTTON (UK ONLY) on Cabinet side 1	SKILL SHOT Under Playfield 9	RIGHT RAMP ENTER On Ramp Assy. 17	POP BUMPER EXIT Under Playfield 25	SURPRISE PACKAGE TARGET On Assembly 33	LEFT RAMP ENTER On Ramp Assy. 41	LEFT BUMPER On Assembly 49	LEFT OUTLANE Under Playfield 57	1: U206 GRY-BRN CN6-P2	#1 LEFT FLIPPER BUTTON in Cabinet side D8-1
2: U400	4TH COIN SLOT On Coin Door 2	RIGHT ORBIT Under Playfield 10	RIGHT RAMP EXIT On Ramp Assy. 18	DROP TARGET On Assembly 26	GROTTO EJECT Under Playfield 34	LEFT RAMP EXIT On Ramp Assy. 42	RIGHT BUMPER On Assembly 50	LEFT RETURN LANE Under Playfield 58	2: U206 GRY-RED CN6-P3	#2 LEFT FLIPPER E.O.S (End-of-Stroke) in Cabinet side D8-2
3: U400	6TH COIN SLOT On Coin Door 3	4-BALL TROUGH #1 (LEFT) On Assembly 11	CENTER LANE Under Playfield 19	LEFT ORBIT Under Playfield 27	VUK On Assembly 35	CENTERFOLD 1 (CLOSED) On Assembly 43	BOTTOM BUMPER On Assembly 51	LEFT SLINGSHOT On Assembly 59	3: U206 GRY-ORG CN6-P4	#3 RIGHT FLIPPER BUTTON in Cabinet side D8-3
4: U400	RIGHT COIN SLOT On Coin Door 4	4-BALL TROUGH #2 On Assembly 12	NOT USED 20	NOT USED 28	NOT USED 36	CENTERFOLD 2 (OPEN) On Assembly 44	TEASE SCREW LIMIT On Assembly 52	RIGHT OUTLANE Under Playfield 60	4: U206 GRY-YEL CN6-P6	#4 RIGHT FLIPPER E.O.S (End-of-Stroke) in Cabinet side D8-4
5: U401	CENTER COIN SLOT / DBA On Coin Door 5	4-BALL TROUGH #3 On Assembly 13	CENTER RAMP EXIT On Ramp Assy. 21	TRIANGLE MECH 1 (RIGHT) On Assembly 29	NOT USED 37	NOT USED 45	TOURNAMENT BUTTON Cabinet Front 53	RIGHT RETURN LANE Under Playfield 61	5: U206 NOT USED GRY-GRN CN6-P7	#5 NOT USED D8-5
6: U401	LEFT COIN SLOT On Coin Door 6	4-BALL TROUGH VUK OPTO On Assembly 14	LEFT TOP LANE Under Playfield 22	TRIANGLE MECH 2 (LEFT) On Assembly 30	RAMP BALL LOCK 3 On Ramp Assy. 38	NOT USED 46	START BUTTON Cabinet Front 54	RIGHT SLINGSHOT On Assembly 62	6: U206 GRY-BLU CN6-P8	#6 VOLUME (RED BUTTON) (In Test: LEFT) on Coin Door D8-6
7: U401	5TH COIN SLOT On Coin Door 7	4-BALL STACKING OPTO On Assembly 15	MIDDLE TOP LANE Under Playfield 23	NOT USED 31	RAMP BALL LOCK 1 On Ramp Assy. 39	NOT USED 47	NOT USED 55	NOT USED 63	7: U206 GRY-VIO CN6-P9	#7 SERV. CRED. (GREEN BUTTON) (In Test: RIGHT) on Coin Door D8-7
8: U401	RIGHT BUTTON (UK ONLY) on Cabinet side 8	SHOOTER LANE Under Playfield 16	RIGHT TOP LANE Under Playfield 24	PEEK-A-BOO TARGET On Assembly 32	RAMP BALL LOCK 2 On Ramp Assy. 40	NOT USED 48	PLUMB BOB TILT Inside Cabinet 56	NOT USED 64	8: U206 GRY-BLK CN6-P10	#8 BEGIN TEST (BLACK BUTTON) (In Test: ENTER) on Coin Door D8-8



In LAMP MENU also select:

TEST ALL LAMPS, ROW & COLUMN LAMP TESTS

## LAMP MATRIX GRID

D iode O n T ermal S trip :

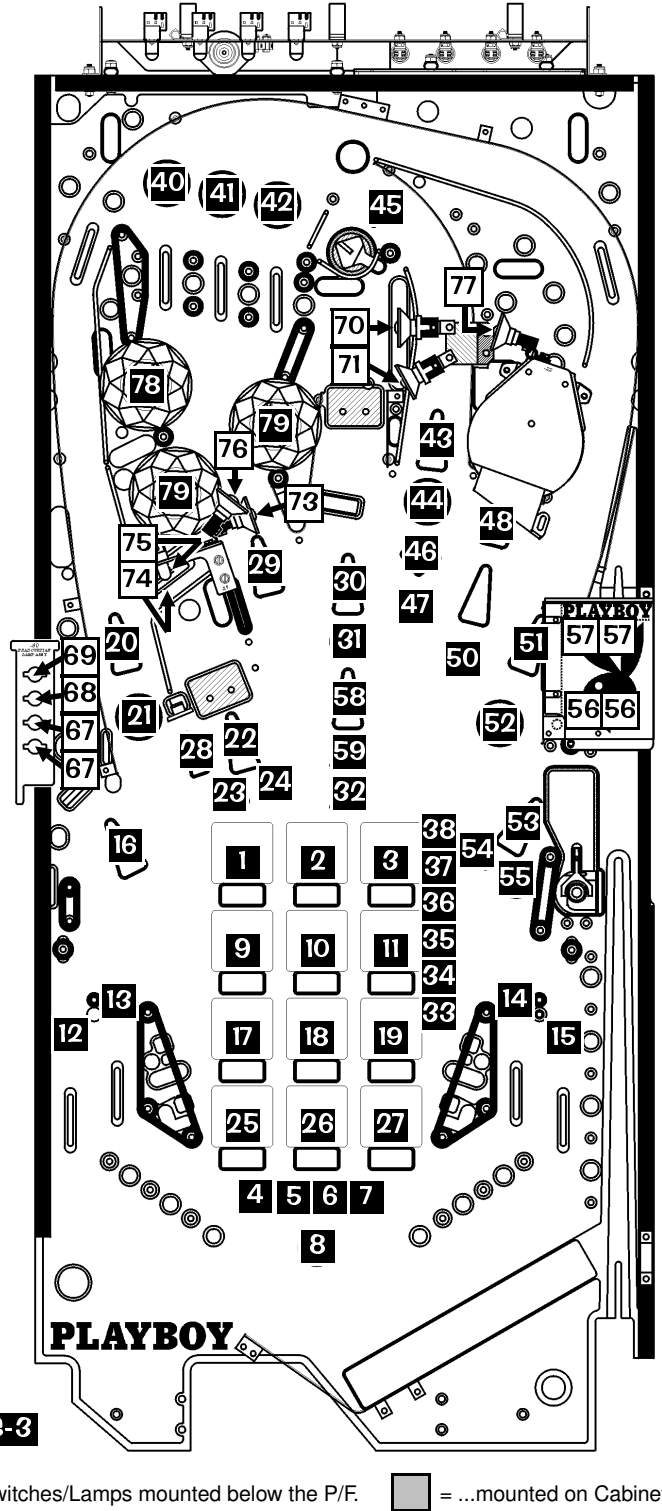
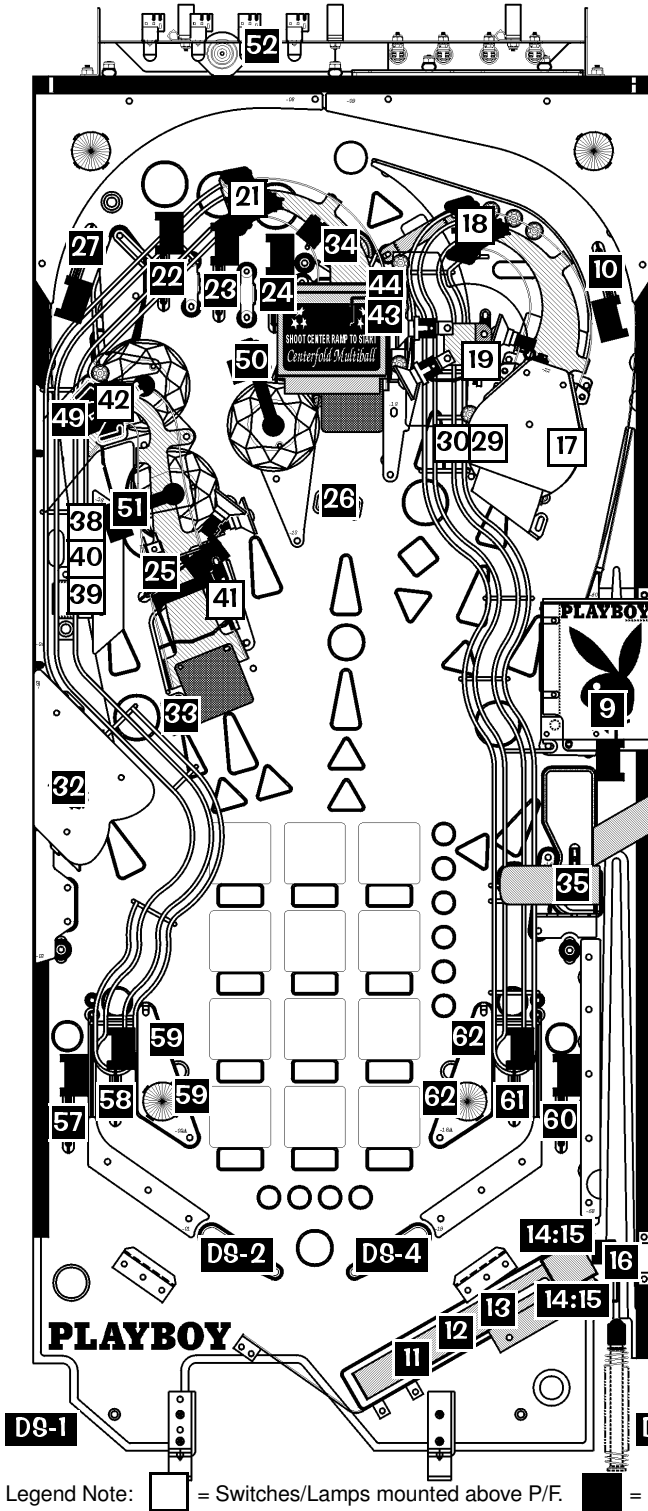
Column (18v)	1: U17	2: U16	3: U15	4: U14	5: U13	6: U12	7: U11	8: U10
Row (GND)	YEL-BRN J13-P9	YEL-RED J13-P8	YEL-ORG J13-P7	YEL-BLK J13-P6	YEL-GRN J13-P5	YEL-BLU J13-P4	YEL-VIO J13-P3	YEL-GRY J13-P1
1: Q33	JANUARY #555 Bulb 1	FEBRUARY #555 Bulb 2	MARCH #555 Bulb 3	MANSION 1 (LT) #555 Bulb 4	MANSION 2 #555 Bulb 5	MANSION 3 #555 Bulb 6	MANSION 4 (RT) #44 Bulb 7	SHOOT AGAIN #555 Bulb 8
2: Q34	APRIL #555 Bulb 9	MAY #555 Bulb 10	JUNE #555 Bulb 11	LEFT OUTLANE #555 Bulb 12	LEFT RETURN LANE #555 Bulb 13	RIGHT RETURN LANE #555 Bulb 14	RIGHT OUTLANE #555 Bulb 15	PEEK-A-BOO #555 Bulb 16
3: Q35	JULY #555 Bulb 17	AUGUST #555 Bulb 18	SEPTEMBER #555 Bulb 19	PHOTO SHOOT (LT ORBIT) #555 Bulb 20	BUNNY (LT ORBIT) #555 Bulb 21	PHOTO SHOOT (LT RAMP) #555 Bulb 22	SPLASH (LT RAMP) #555 Bulb 23	JACKPOT (LT RAMP) #555 Bulb 24
4: Q36	OCTOBER #555 Bulb 25	NOVEMBER #555 Bulb 26	DECEMBER #555 Bulb 27	SURPRISE PACKAGE #555 Bulb 28	TEASE #555 Bulb 29	DROP TARGET #555 Bulb 30	MULTIBALL #555 Bulb 31	PAJAMA PARTY MULTIBALL #555 Bulb 32
5: Q37	BUNNY #1 (BOTTOM) #555 Bulb 33	BUNNY #2 #555 Bulb 34	BUNNY #3 #555 Bulb 35	BUNNY #4 #555 Bulb 36	BUNNY #5 #555 Bulb 37	BUNNY #10 #555 Bulb 38	NOT USED 39	LEFT TOP LANE #555 Bulb 40
6: Q38	MIDDLE TOP LANE #555 Bulb 41	RIGHT TOP LANE #555 Bulb 42	PHOTO SHOOT (CENTER) #555 Bulb 43	EXTRA BALL #555 Bulb 44	GROTTO ARROW #555 Bulb 45	PAJAMA PARTY HURRY-UP #555 Bulb 46	MYSTERY #555 Bulb 47	PHOTO SHOOT (RT RAMP) #555 Bulb 48
7: Q39	NOT USED 49	SPLASH (RT RAMP) #555 Bulb 50	PHOTO SHOOT (RT ORBIT) #555 Bulb 51	BUNNY (RT ORBIT) #555 Bulb 52	PHOTO SHOOT (VUK) #555 Bulb 53	JACKPOT HURRY-UP #555 Bulb 54	SPECIAL #555 Bulb 55	MAGAZINE 1 & 2 #555 Bulb 56
8: Q40	MAGAZINE 3 & 4 #555 Bulb 57	DOUBLE JACKPOT #555 Bulb 58	JACKPOT #555 Bulb 59	NOT USED 60	NOT USED 61	NOT USED 62	NOT USED 63	NOT USED 64
9: Q41	NOT USED 65	NOT USED 66	PEEK-A-BOO 1 & 2 #555 Bulb 67	PEEK-A-BOO 3 #555 Bulb 68	PEEK-A-BOO 4 #555 Bulb 69	CTRFOLD SPOTLITE (RT #1) #555 Bulb 70	CTRFOLD SPOTLITE (RT #2) #555 Bulb 71	START BUTTON #555 Bulb 72
10: Q42	CTRFOLD SPOTLITE (LT #2) #555 Bulb 73	STRIP POKER (LT RAMP) #555 Bulb 74	COLLECT PLAY-MATES #555 Bulb 75	CTRFOLD SPOTLITE (LT #1) #555 Bulb 76	CTRFOLD SPOTLITE (RT #3) #555 Bulb 77	LEFT BUMPER #555 Bulb 78	RIGHT & BOTTOM BUMPERS #555 Bulb 79	TOURNAMENT BUTTON #555 Bulb 80





**SWITCH MATRIX GRID LOCATIONS**

**LAMP MATRIX GRID LOCATIONS**

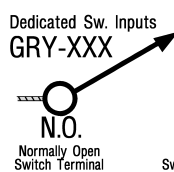
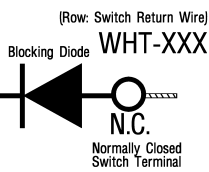
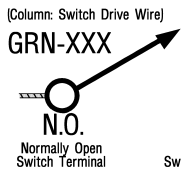


Legend Note:  = Switches/Lamps mounted above P/F.  = Switches/Lamps mounted below the P/F.  = ...mounted on Cabinet.

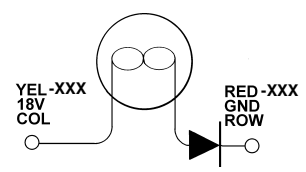
**TYPICAL SWITCH SCHEMATIC**

**DEDICATED SWITCH SCHEMATIC**

**TYPICAL LAMP SCHEMATIC**



Ground  
BLK



Note: All Switch, Lamp & Coil assemblies require diodes. Some diodes are located under the playfield on Terminal Strips or Diode Boards and not on the assemblies. Diode Qn Iterminal Strip or Diode Qn Diode Board



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**PLAYBOY**



In COIL MENU  
also select:

CYCLING  
COIL  
TEST

## 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 DC	26-1200 090-5044-00T
#2	AUTO LAUNCH	Q2	I/O Pwr. Drvr.	BRN-RED	J8-P3	YEL-VIO	J10-P4/5	50v DC	23-700 090-5022-00T
#3	BALL LOCK POST	Q3	I/O Pwr. Drvr.	BRN-ORG	J8-P4	BRN	J7-P1	20v DC	27-1500 090-5004-00T
#4	LEFT ORBIT POST	Q4	I/O Pwr. Drvr.	BRN-YEL	J8-P5	BRN	J7-P1	20v DC	26-1200 090-5044-00T
#5	DROP TARGET	Q5	I/O Pwr. Drvr.	BRN-GRN	J8-P6	YEL-VIO	J10-P4/5	50v DC	27-1500 090-5004-00B
#6	CENTER LANE POST	Q6	I/O Pwr. Drvr.	BRN-BLU	J8-P7	BRN	J7-P1	20v DC	26-1200 090-5044-00T
#7	BEAD SCREEN LEFT	Q7	I/O Pwr. Drvr.	BRN-VIO	J8-P8	YEL-VIO	J10-P4/5	50v DC	26-1200 090-5044-00T
#8	BEAD SCREEN RIGHT	Q8	I/O Pwr. Drvr.	BRN-GRY	J8-P9	YEL-VIO	J10-P4/5	50v DC	26-1200 090-5044-00T

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
#9	LEFT BUMPER	Q9	I/O Pwr. Drvr.	BLU-BRN	J9-P1	YEL-VIO	J10-P4/5	50v DC	26-1200 090-5044-00T
#10	RIGHT BUMPER	Q10	I/O Pwr. Drvr.	BLU-RED	J9-P2	YEL-VIO	J10-P4/5	50v DC	26-1200 090-5044-00T
#11	BOTTOM BUMPER	Q11	I/O Pwr. Drvr.	BLU-ORG	J9-P4	YEL-VIO	J10-P4/5	50v DC	26-1200 090-5044-00T
#12	GROTTO EJECT	Q12	I/O Pwr. Drvr.	BLU-YEL	J9-P5	YEL-VIO	J10-P4/5	50v DC	26-1200 090-5044-00T
#13	VUK	Q13	I/O Pwr. Drvr.	BLU-GRN	J9-P6	YEL-VIO	J10-P4/5	50v DC	26-1200 090-5044-00T
#14	MAGAZINE POST	Q14	I/O Pwr. Drvr.	BLU-BLK	J9-P7	BRN	J7-P1	20v DC	24-940 090-5036-00B
#15	LEFT FLIPPER (50v RED/YEL)	Q15	I/O Pwr. Drvr.	ORG-GRY	J9-P8	RED-YEL GRY-YEL	J10-P1/2	50v DC	23-1100 090-5030-00T
#16	RIGHT FLIPPER (50v RED/YEL)	Q16	I/O Pwr. Drvr.	ORG-VIO	J9-P9	RED-YEL BLU-YEL	J10-P1/2	50v DC	23-1100 090-5030-00T

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 Meter #
#17	LEFT SLINGSHOT	Q17	I/O Pwr. Drvr.	VIO-BRN	J7-P2	BRN	J7-P1	20v DC	23-800 090-5001-00T
#18	RIGHT SLINGSHOT	Q18	I/O Pwr. Drvr.	VIO-RED	J7-P3	BRN	J7-P1	20v DC	23-800 090-5001-00T
#19	DROP SCREEN STEPPER #1	<sup>D019</sup> Q19	I/O Pwr. Drvr.	RED	J7-P4	GRY-RED to WHT	J16-P3	20v DC	Stepr. Mtr. 041-5062-00
#20	DROP SCREEN STEPPER #2	<sup>D019</sup> Q20	I/O Pwr. Drvr.	GRN	J7-P6	GRY-RED to WHT	J16-P3	20v DC	Stepr. Mtr. 041-5062-00
#21	DROP SCREEN STEPPER #3	<sup>D019</sup> Q21	I/O Pwr. Drvr.	BLK	J7-P7	GRY-RED to WHT	J16-P3	20v DC	Stepr. Mtr. 041-5062-00
#22	TRIANGLE BILLBOARD	Q22	I/O Pwr. Drvr.	VIO-BLU	J7-P8	BRN	J7-P1	20v DC	Relay Bd. 520-5010-00
#23	DROP SCREEN STEPPER #4	<sup>D019</sup> Q23	I/O Pwr. Drvr.	BLU	J7-P9	GRY-RED to WHT	J16-P3	20v DC	Stepr. Mtr. 041-5062-00
#24	OPTIONAL COIN METER	Q24	I/O Pwr. Drvr.	VIO-GRY	J7-P10	RED	J16-P7	5v DC	Meter 5v 091-5000-00

<sup>D</sup>iode <sup>O</sup>n <sup>T</sup>erminal <sup>S</sup>trip (if noted)

Low 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	Bulb Type
#25	FLASH: TRIANGLE X1	Q25	I/O Pwr. Drvr.	BLK-BRN	J6-P1	ORG	J6-P10	20v DC	#89 Bulb 165-5000-89
#26	FLASH: MIRROR X4	Q26	I/O Pwr. Drvr.	BLK-RED	J6-P2	ORG	J6-P10	20v DC	#906 Bulb 165-5004-00
#27	FLASH: BACK LT X1 BACK RT X1	Q27	I/O Pwr. Drvr.	BLK-ORG	J6-P3	ORG	J6-P10	20v DC	#906 Bulb 165-5004-00
#28	FLASH: LT SLINGSHOT X1	Q28	I/O Pwr. Drvr.	BLK-YEL	J6-P4	ORG	J6-P10	20v DC	#906 Bulb 165-5004-00
#29	FLASH: RT SLINGSHOT X1	Q29	I/O Pwr. Drvr.	BLK-GRN	J6-P5	ORG	J6-P10	20v DC	#906 Bulb 165-5004-00
#30	FLASH: TRIPLE JACPOT X1	Q30	I/O Pwr. Drvr.	BLK-BLU	J6-P6	ORG	J6-P10	20v DC	#89 Bulb 165-5000-89
#31	CENTERFOLD ON/OFF	Q31	I/O Pwr. Drvr.	BLK-VIO	J6-P7	BRN	J7-P1	20v DC	DC Relay 520-5066-00
#32	CENTERFOLD OPEN/CLOSE	Q32	I/O Pwr. Drvr.	BLK-GRY	J6-P8	BRN	J7-P1	20v DC	(Motor) 041-5075-04

Note: In Test Flash Lamps Menu ("Flash" Icon), Flashers tested are all Flash Lamps located between Q1-Q32 (This Game: Q25-Q30)

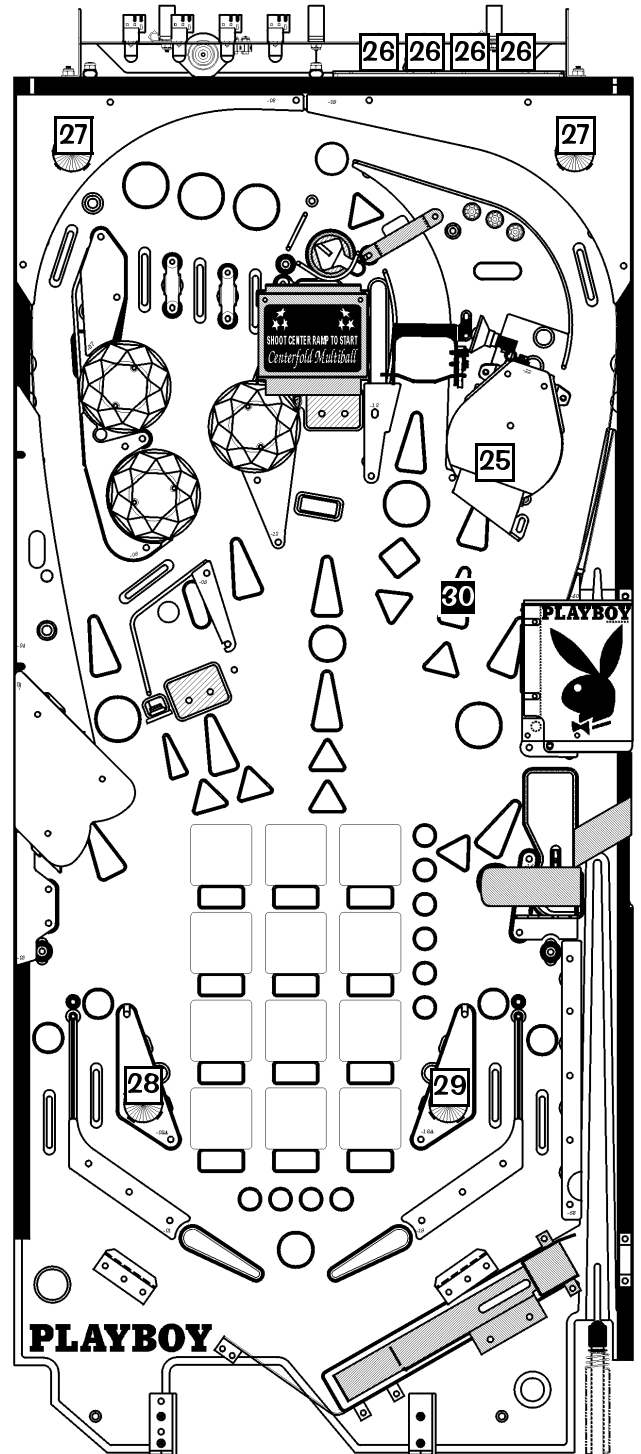
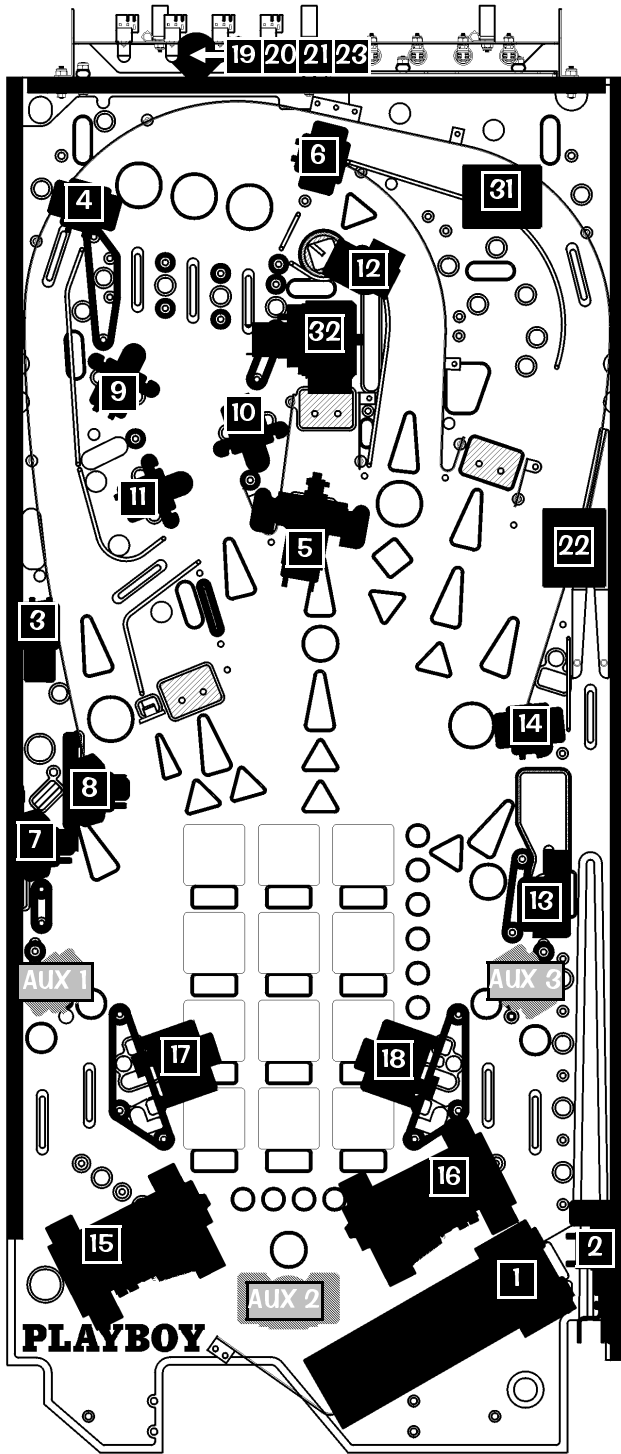
Auxilliary (UK ONLY)		Drive Transistor (D.T.)	Driver Output Board	D.T. Control Line Color	D.T. Control Line Connect	Power Line Color	Power Line Connection	Power Voltage	Coil GA-Turn
AUX 1: LEFT UP/DOWN POST	Q1	Sol. Expander (Aux. Board)	WHT	CN2-P5	BRN	J7-P1	20v DC	26-1200 090-5044-00T	
AUX 2: CENTER UP/DOWN POST	Q2	Sol. Expander (Aux. Board)	RED	CN2-P4	BRN	J7-P1	20v DC	23-1100 090-5030-00T	
AUX 3: RIGHT UP/DOWN POST	Q3	Sol. Expander (Aux. Board)	ORG	CN2-P3	BRN	J7-P1	20v DC	26-1200 090-5044-00T	





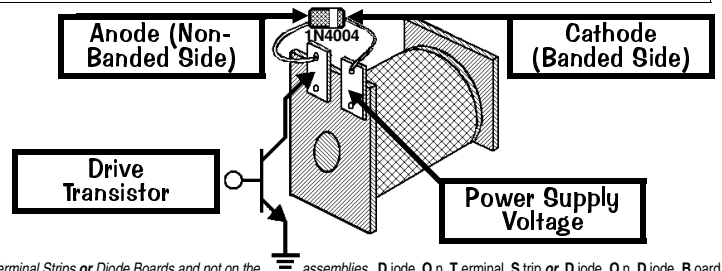
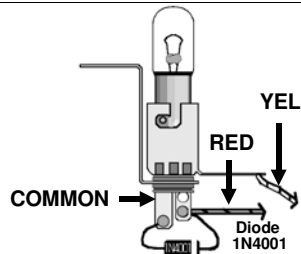
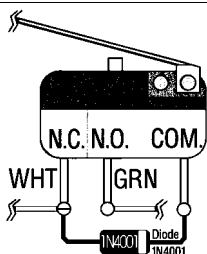
**COIL LOCATIONS**

**FLASH LAMP LOCATIONS**



Legend Note:  = Coils/Flashers mounted above P/F.  = Coils/Flashers mounted below the P/F.  = ...mounted in/on Cabinet.

**TYPICAL SWITCH, LAMP & COIL WIRING**



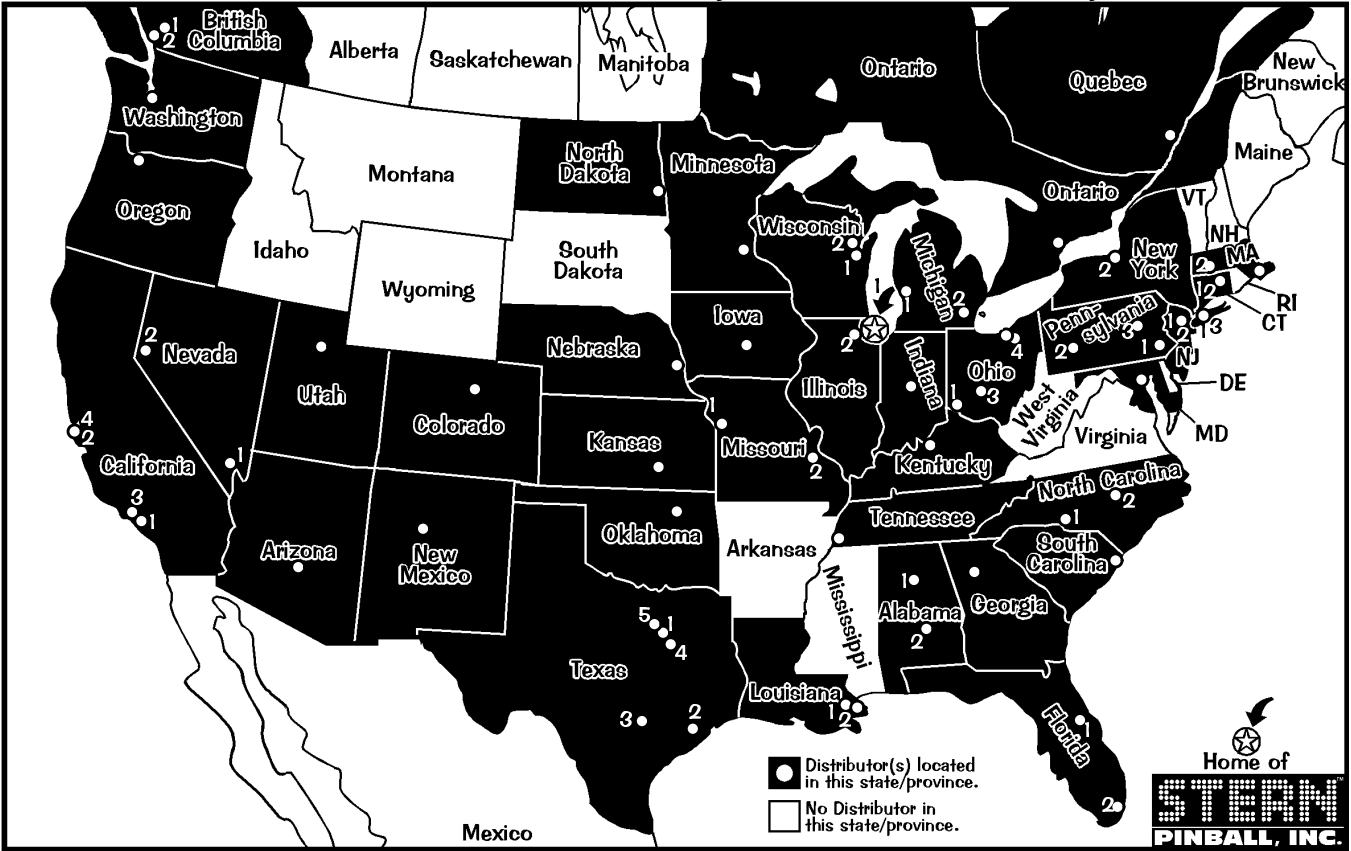
Note: All Switch, Lamp & Coil assemblies require diodes. Some diodes are located under the playfield on Terminal Strips or Diode Boards and not on the assemblies.  $\square$  Diode  $\square$  Terminal  $\square$  Trip or Diode  $\square$  Diode Board.



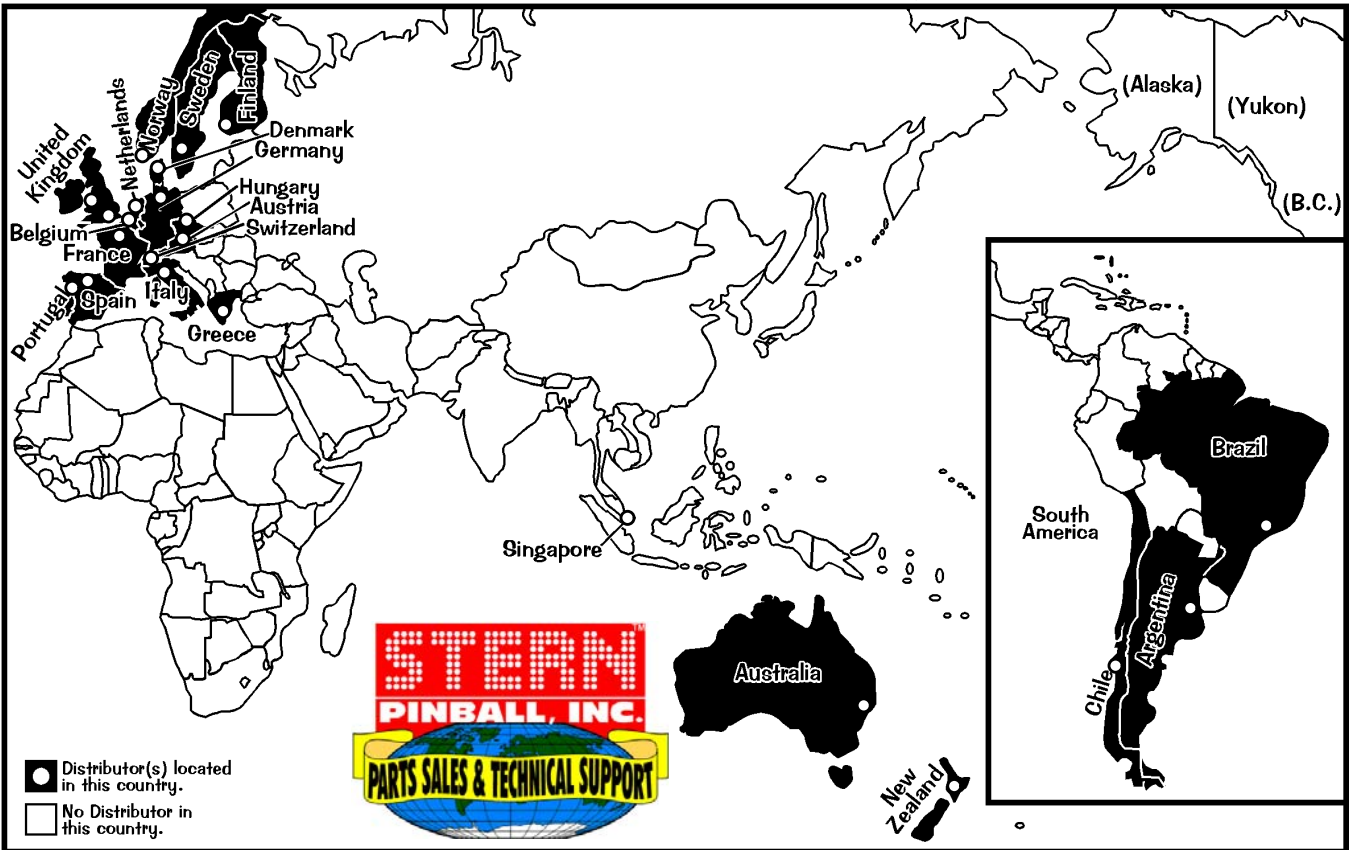
Dr. Pinball  
Find-It-In-Front:

**PLAYBOY**

# Domestic Pinball & Redemption Distributors Map



# International Distributors Map



For *Parts & Service*, call your nearest Distributor. View the above maps & the directories on the next page to locate your closest Distributor in your state, province, or country. Distributors and phone numbers are subject to change. Call **Stern™ Pinball, Inc. (Parts Sales & Technical Support)** with any questions or if your Distributor cannot help you: 1-800-542-5377 (in USA or Canada) or 1-708-786-5466. Visit us at [www.SternPinball.com](http://www.SternPinball.com) for current Distributor Information & other pinball news.





# Domestic Pinball & Redemption Distributors Directory

<p><b>ALABAMA</b></p> <p>Birmingham Vending Birmingham (1) 1-205-324-7526</p> <p>Franco Distributing Montgomery (2) 1-334-834-3455</p> <p><b>ARIZONA</b></p> <p>Mountain Coin Phoenix 1-602-269-7596</p> <p><b>CALIFORNIA</b></p> <p>Betson West Buena Park (1) 1-714-228-7500</p> <p>So. San Francisco (2) 1-650-952-4220</p> <p>C.A. Robinson Los Angeles (3) 1-323-735-3001</p> <p>San Francisco (4) 1-650-871-4280</p> <p><b>COLORADO</b></p> <p>Mountain Coin Denver 1-303-427-2133</p> <p><b>CONNECTICUT</b></p> <p>Betson Enterprises Milford (1) 1-203-878-6966</p> <p>TDM Distributing Williamantic (2) 1-860-423-1403</p> <p><b>FLORIDA</b></p> <p>Birmingham Vending Orlando (1) 1-407-425-1505</p> <p>Brady Distributing Miami [Miramar] (2) 1-954-874-1100</p> <p>Orlando (1) 1-407-872-1666</p> <p><b>GEORGIA</b></p> <p>Greater Southern Dist. Smyrna 1-770-803-3040</p> <p><b>ILLINOIS</b></p> <p>American Vending Elk Grove Village (1) 1-847-439-9400</p> <p>Atlas Distributing Elk Grove Village (1) 1-847-952-7500</p> <p>World Wide Distributing Chicago (2) 773-384-2300</p>	<p><b>IOWA</b></p> <p>Greater America Dist. Johnston 1-515-278-4455</p> <p>Moss Distributing Des Moines 1-515-266-6422</p> <p><b>INDIANA</b></p> <p>Atlas Distributing Indianapolis 1-317-786-6892</p> <p>Cleveland Coin Indianapolis 1-317-895-4270</p> <p>Shaffer Distributing Indianapolis 1-317-899-2530</p> <p><b>KANSAS</b></p> <p>United Dist., Inc. Wichita 1-316-263-6181</p> <p><b>KENTUCKY</b></p> <p>Atlas Distributing Louisville 1-502-966-5266</p> <p><b>LOUISIANA</b></p> <p>AMA Distributors, Inc. Metairie (1) 1-504-835-3232</p> <p>New Orleans Novelty New Orleans (2) 1-504-888-3500</p> <p><b>MARYLAND</b></p> <p>Betson Enterprises Baltimore 1-410-646-4100</p> <p>Weiner Distributing Baltimore 1-410-525-2600</p> <p><b>MASSACHUSETTS</b></p> <p>Betson Ent. (NECO) Norwood (1) 1-781-769-9760</p> <p>Gekay Sales E. Longmeadow (2) 1-413-525-2700</p> <p><b>MICHIGAN</b></p> <p>Atlas Distributing Wyoming (1) 1-616-241-1472</p> <p>Cleveland Coin Livonia (2) 1-734-432-1040</p>	<p><b>MINNESOTA</b></p> <p>Lieberman Music Minneapolis 1-612-887-5299</p> <p><b>MISSOURI</b></p> <p>Greater America Dist. Kansas City (1) 1-816-531-4300</p> <p>Shaffer Distributing St. Louis (2) 1-314-645-3393</p> <p><b>NEBRASKA</b></p> <p>Central Dist. Omaha 1-402-493-5600</p> <p>Greater America Dist. Omaha 1-402-553-2812</p> <p><b>NEVADA</b></p> <p>Mountain Coin Las Vegas (1) 1-702-798-0900</p> <p>Reno Game Sales Reno (2) 1-775-829-2080</p> <p><b>NEW JERSEY</b></p> <p>Betson Enterprises Carlstadt (1) 1-201-438-1300</p> <p>Carter (2) 1-732-750-2700</p> <p>Jack Guarnieri Service Co., Inc. (Pinballsales.com) Lakewood 1-732-364-9900</p> <p><b>NEW MEXICO</b></p> <p>Mountain Coin Albuquerque 1-505-345-7706</p> <p><b>NEW YORK</b></p> <p>Betson Enterprises New Hyde Park (1) 1-516-354-4647</p> <p>Syracuse (2) 1-315-455-5400</p> <p>Deith Distributing Roslyn Heights (3) 1-516-621-1234</p> <p><b>NORTH CAROLINA</b></p> <p>Brady Distributing Charlotte (1) 1-704-357-6284</p> <p>Operators Distributing Archdale (2) 1-336-884-5714</p>	<p><b>NORTH DAKOTA</b></p> <p>M.H. Associates, Inc. Fargo 1-701-282-7877</p> <p><b>OHIO</b></p> <p>Atlas Distributing Cincinnati (1) 1-513-851-4100</p> <p>Cleveland Coin Cleveland (2) 1-216-692-0960</p> <p>Shaffer Distributing Columbus (3) 1-614-421-6800</p> <p>Macedonia (4) 1-330-467-4850</p> <p><b>OKLAHOMA</b></p> <p>Galaxy Distributing Tulsa 1-918-835-1166</p> <p><b>OREGON</b></p> <p>Mountain Coin Portland 1-503-234-5491</p> <p>Specialty Coin Products Portland 1-800-987-4946</p> <p><b>PENNSYLVANIA</b></p> <p>Betson Enterprises King Of Prussia (1) 1-610-265-1155</p> <p>Pittsburgh (2) 1-412-331-8703</p> <p>Cleveland Coin Pittsburgh (2) 1-412-323-8400</p> <p>Green Coin Pittsburgh (2) 1-412-881-8804</p> <p>Roth Novelty (Superior) Wilkes-Barre (3) 1-570-824-9994</p> <p><b>SOUTH CAROLINA</b></p> <p>Green Coin Myrtle Beach 1-843-626-1900</p> <p><b>TENNESSEE</b></p> <p>Brady Distributing Memphis 1-901-345-7811</p> <p>Green G.A.M.E.S. Memphis 1-901-353-1000</p>	<p><b>TEXAS</b></p> <p>Commercial Music Dallas (1) 1-214-741-6381</p> <p>H.A. Franz, &amp; Co. Houston (2) 1-713-523-7366</p> <p>San Antonio (3) 1-210-226-6322</p> <p>Master Sales Corsicana (4) 1-903-874-4740</p> <p>Southgate Amusement Houston (2) 1-713-691-7335</p> <p>San Antonio (3) 1-210-225-3844</p> <p>Southgate/Moss Dist. Irving (5) 1-972-721-4600</p> <p><b>UTAH</b></p> <p>Mountain Coin Salt Lake City 1-801-262-5494</p> <p>Struve Distributing Salt Lake City 1-801-328-1636</p> <p><b>WASHINGTON</b></p> <p>Mountain Coin Seattle 1-206-682-5700</p> <p><b>WISCONSIN</b></p> <p>Pioneer Sales &amp; Svc. Green Bay (1) 1-920-336-5800</p> <p>Menomonee Falls (2) 1-262-781-1420</p> <p>Lieberman/Viking Vend. Menomonee Falls (2) 1-262-255-6580</p>	<p><b>CANADA</b></p> <p><b>ONTARIO</b></p> <p>Starburst Coin Mach. Toronto 1-416-251-2122</p> <p>Parts &amp; Service Only:</p> <p><b>BRITISH COLUMBIA</b></p> <p>Can. Coin Machine Burnaby (1) 1-604-420-4008</p> <p>Pacific Vending Vancouver (2) 1-604-324-2164</p> <p><b>QUEBEC</b></p> <p>Laniel Automatic Mach. Montreal 1-514-731-8571</p>
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*Note: For states and Canadian Provinces which do not have Distributors, call the neighboring state or province with the city closest to you (indicated with a white dot). States or Provinces with more than 1 city containing a distributor are numbered. View the map on the previous page.*

**Note: Distributors are subject to change. Visit us at [www.SternPinball.com](http://www.SternPinball.com) for current Distributor Information.**

# International Distributors Directory

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**Find-It-In-Front:  
Dr. Pinball**

# PLAYBOY

## POWER REQUIREMENTS

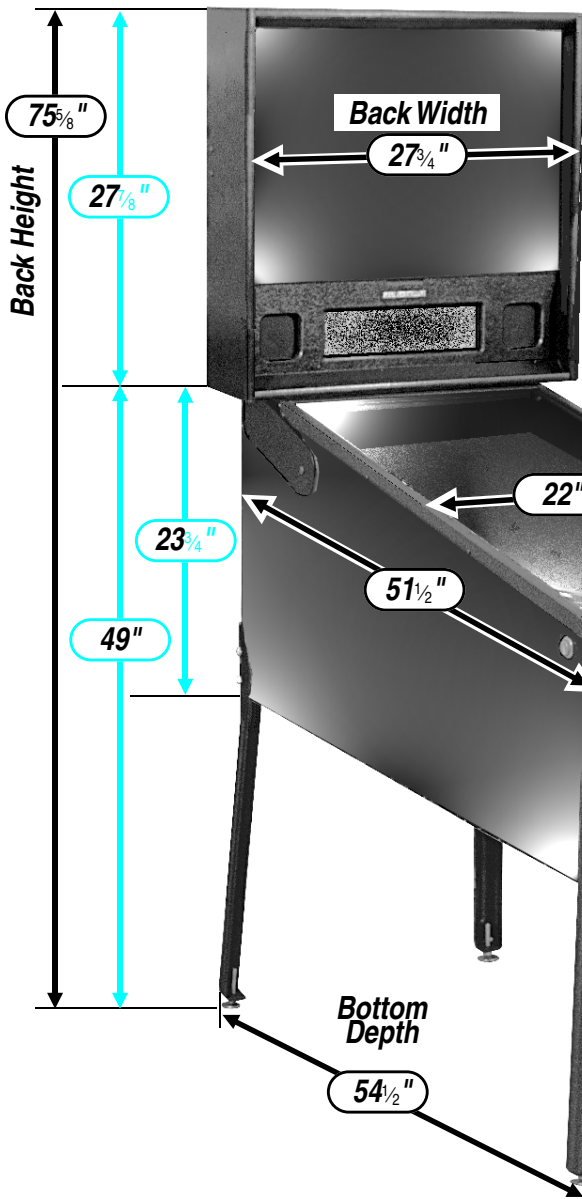


This game **must be connected to a properly grounded outlet to reduce shock hazard** & insure proper game operation. See Sec. 5, Schematics & Troubleshooting, Chp. 3, Cabinet Wiring (Transformer Power Wiring), for transformer connections required for **Normal, High, and Low Line** conditions.



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

## TRANSPORTATION



### BEFORE TRANSPORTING



To reduce the possibility of damage, observe **ALL** precautions whenever transporting the game. **Read & follow Section 1, Chapter 1, Pinball Game Set-Up Procedures, & How to Secure the Backbox for Transporting.** Remove the legs & secure the game within the transporting vehicle.

*Save and retain all printed information on the game.*

The overall **Front** (37") & **Back** (75<sup>5</sup>/<sub>8</sub>") dimensions reflect the **ADDED +1<sup>1</sup>/<sub>4</sub>"** height with the **Leg Levelers** turned all the way in.

The Cabinet is **designed** to give the recommended **6.5° pitch to the Playfield** when all four (4) **Legs** are installed with the **Leg Levelers** turned all the way in.

With the **Leg Levelers** turned all the way **out**, an additional **1<sup>1</sup>/<sub>4</sub>" MORE** to the overall height should be added to the dimensions.

**Shipping Box Dimensions**

Height: 56"  
Width: 31"  
Depth: 31"  
Approximate Unboxed Weight:

**Wt. 260lbs. (+/- 10)**

**CAUTION**

At least 2 people are required to move and maneuver this game. Use proper moving equipment & extreme care while handling!

## GAME DIMENSIONS





**Pinball Game Service Manual General Table of Contents**  
*See Sections 3 & 5, Table Of Contents, for details of that Section and it's Chapters.*

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- ▶ Find-It-In-Front: Dr. Pinball Section Explained ▶ How It Works ..... DR. ②
- ▶ Diagnostic Aids ▶ CPU DIP Switch Setting ▶ ROM Summary Table ..... DR. ③
- ▶ Switch Matrix Grid & Dedicated Switches ▶ Lamp Matrix Grid ..... DR. ④
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- ▶ Domestic Pinball & Redemption and International Distributors Maps..... DR. ⑧
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## After Set-Up

## Pinball Game Set-Up Procedures

...after reading the Pinball Game Set-Up Instruction Sheet (SPI Part N<sup>o</sup> 755-5310-00) included with your New Pinball Game, continue with the below procedures:

## With the Back Glass Removed:

1. 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, and the Display Power Bd. to check that they are properly seated.** Ensure Fluorescent Light Tube is seated correctly. Check that all fuses are seated properly. **Close and lock the Backbox and secure its' keys back inside the Coin Door.**

## With the Playfield Glass Removed:

2. Make sure the proper amount of pinballs were installed (*Amount of balls are always specified on decal attached to the lock down assembly and at the top of the inside cover.*)

3. Remove all shipping tie downs, shipping blocks, packing foam, shipping instruction pages, etc. (if any) from the game. **READ ALL PRINTED INFORMATION!** Shipping instructions, labels and/or decals describe warnings, cautions, and/or important information specific to the game. **SAVE ALL PRINTED INFORMATION.**

4. Raise the playfield and support it, by lifting the **Prop Rod** (*located on the left, inside the cabinet*). The end of the Prop Rod should be placed into the hole under playfield. See the illustration "**Easy Access Service System - 3 Positions**" on Page 4.

5. Visually inspect all cabinet cables and connector terminations; ensure no wires or cables are pinched and that cable harnesses are not pulled tight.

6. Lower the playfield and ensure game is **level side-to-side** by adjusting Leg Levelers, if required. See the illustration "**Leg Leveler Adjustment**" on Page 4. Start with the Leg Levelers turned all the way in (1.25" from floor to bottom of leg), depending on the condition of the floor, adjust the Leg Levelers as required until the **game pitch is 6.5°**, determined by the Bubble Level.

**USE THE BUBBLE LEVEL ON THE WOOD RAIL (LOWER RIGHT) TO DETERMINE IF LEVEL IS ACHIEVED. BUBBLE SHOULD APPEAR BETWEEN THE 2 BLACK LINES. SEE PAGE 4 FOR AN ILLUSTRATION.**

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

## With the Coin Door Open:

7. If desired, perform any self tests at this time (*see Section 3, Chapter 1, Portals™ Service Menu Introduction, and Chapter 2, GO TO DIAGNOSTICS MENU, for instructions on how to enter "Begin Play Test" and "Game Name Test" Menus to test components on the game.*)

8. If desired, adjust **Game Pricing, Standard and/or Custom** (*see Section 3, Chapter 4, GO TO ADJUSTMENTS MENU and Section 3, Chapter 5, GO TO INSTALLS MENU to adjust Game Difficulty, 3- or 5-Ball Play, Home or Tournament Settings, Novelty, Add-A-Ball, etc.*).

**CE** Per CE: "The appliance has to be placed in a horizontal position."  
"This appliance is not to be cleaned by a Water Jet."

After Set-Up

**PLAYBOY**

Section 1, Chapter 1

Page 1

### PINBALL GAME SET-UP

**CAUTION:** At least 2 people are required to move and maneuver game. Use proper moving equipment & extreme care while handling. Pinball game is 200lbs (+/- 10). Refer to Game Manual for further Game Set-Up Procedures (Sec. 1, Chp. 1) and other important information!

**TOOLS REQUIRED:** 5/8" Socket Wrench & Utility Knife

1. Before opening box, lay the box flat on its side with "FRONT THIS SIDE ONLY" facing the floor.
2. Slide game out using the Black Nylon Strapping as a handle.
3. Remove the Four (4) Identical Legs with Levelers from the cabinet and set aside. (SAVE! all packing materials and information sheets related to this pinball until Set-Up is complete)
4. At this point **DO NOT CUT STRAPPING!** (You want to keep the Backbox secured in the down position). Loosen and remove the 4 Leg Bolts (Use 5/8" Socket Wrench) and set aside.
5. Lift game into an UPRIGHT POSITION (Coin Door Facing Up).
6. Install FRONT LEGS using the bolts removed from Step 4. Secure tightly. Take care not to scratch the Back Finish on any of the Legs.
7. Carefully set the game down on the FRONT LEGS. Care should be taken. Game is heavy; two (2) people are recommended for this and the following step.
8. Using supports or two (2) people, prop the rear of the cabinet up and install REAR LEGS. Secure tightly.
9. CUT BLACK NYLON STRAPPING. CAUTION: Strapping will SNAP! protect your eyes! Use extreme care when using a utility knife or scissors.
10. Lift the Backbox into the UPRIGHT POSITION (Ensure the cables do not get pinched).
11. After the BACKBOX is in the UPRIGHT POSITION, locate the SPIE™ HEX KEY. While inserted, rotate KEY with a 3/4" turn until latched & locked.
12. The next step you will remove the PLAYFIELD GLASS & BACK GLASS to access the inside of the cabinet & Backbox.
13. Open the Coin Door and pull the YELLOW HANDLE to the LEFT and at the same time pull upon the FRONT TOP MOLDING and remove. The GLASS can now be pulled out towards you and removed. TAKE CARE while moving; set glass on a safe surface.
14. Through the open Coin Door remove the RETAINING RING at the rear of the CASH BOX and open. Remove the PINBALLS & the PLUMB BOB from the SPARE PARTS BAG. (Save the other spare parts in cabinet). Install the PINBALLS by placing them on the playfield so they can roll into the Outside Ball Trough.
15. Install the PLUMB BOB on the Hanger Wire & tighten the Thumb Screw. Loosening the Thumb Screw & lowering or raising the PLUMB BOB makes the Games Tilt Function more or less sensitive.

**NOTE:** KEYS are tied to the Shooter Rod\* (if equipped) or tied to the Playfield Glass (if equipped with Auto Plunger Button). Remove keys. One (1) set of keys belongs to the Coin Door; the other set is used to unlock the Back Glass to gain access to the White Star Board System.

**REMOVE THE PINBALL GAME MANUAL** (adapted to size of the left side of the cabinet). Review Section 1, Chapter 1, which describes how to lift the playfield to access the Plumb Bob Tilt Assembly. The manual gives you all the important information you need to prepare for final setup and other important information (such as Parts, Diagnostics, Schematics and more...).

**ALWAYS STORE THE MANUAL & INFORMATION SHEETS INSIDE THE CABINET WHEN NOT USING.**

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# Pinball Game Set-Up Future Reference

Open up the Printable Version in both 8-1/2 X 11 & 11 X 17.

**CAUTION:** At least 2 people are required to move and maneuver game.

Use proper moving equipment & extreme care while handling. Pinball game is 260lbs (+/- 10).

Refer to Game Manual for further Game Set-Up Procedures (Sec. 1, Chp. 1) and other important information!

**TOOLS REQUIRED:** 5/8" Socket Wrench & Utility Knife

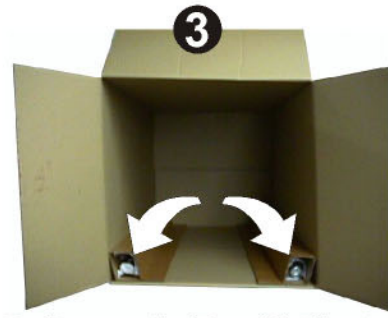
Sec. 1: After Set-Up



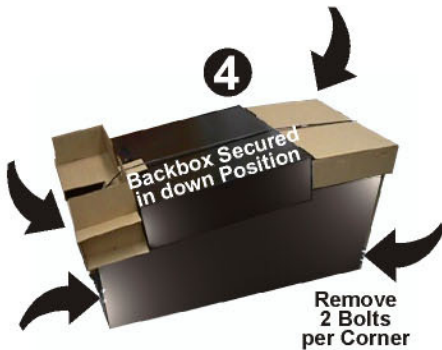
1. Before opening box, lay the box flat on its side with "TRUCK THIS SIDE ONLY" facing the floor.



2. Slide game out using the **Black Nylon Strapping** as a handle.



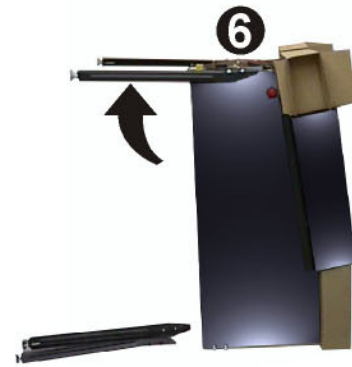
3. Remove the **Four (4) Identical Legs with Levelers** from the carton and set aside. (**SAVE!** all packing materials and information sheets related to this pinball until Set-Up is complete.)



4. At this point **DO NOT CUT STRAPPING** (You want to keep the Backbox secured in the down position). Loosen and remove the 8 Leg Bolts (use 5/8" Socket Wrench) and set aside.



5. Lift game into an **UPRIGHT POSITION** (Coin Door Facing Up).



6. Install **FRONT LEGS** using the bolts removed from **Step 4**. Secure tightly. **Take care not to scratch the Black Finish on any of the Legs.**



7. Carefully set the game down on the **FRONT LEGS**. Care should be taken...Game is heavy, two (2) people are recommended for this and the following step.



8. Using supports or two (2) people, prop the rear of the cabinet up and install **REAR LEGS**. Secure tightly.



9. Cut **BLACK NYLON STRAPPING**. **CAUTION:** Strapping will **SNAP**, protect your eyes! Use extreme care when using a utility knife or scissors.





# Pinball Game Set-Up Future Reference Continued



10. Lift the Backbox into the **UPRIGHT POSITION** (Ensure the cables do not get pinched).

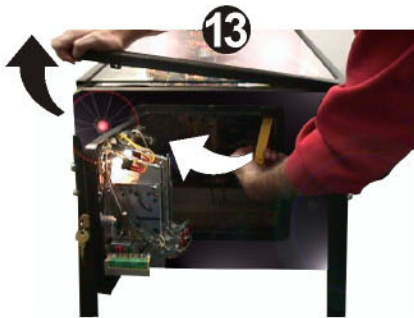


11. After the **BACKBOX** is in the **UPRIGHT POSITION**, locate the **5/16" HEX KEY**. While inserted, rotate **KEY** with a **3/4 turn** until latched & locked.



12. The next step you will remove the **PLAYFIELD GLASS & BACK GLASS** to access the inside of the cabinet & Backbox.

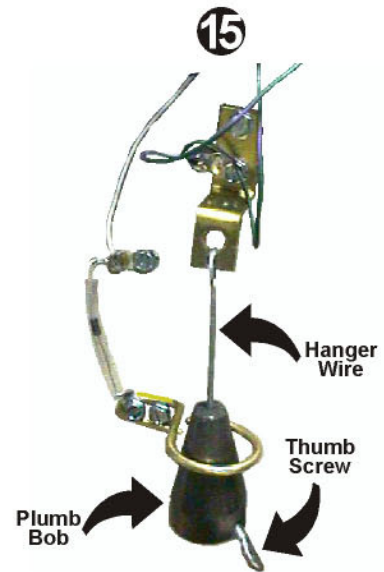
**NOTE: KEYS** are tied to the **Shooter Rod\*** (if equipped) or taped to the **Playfield Glass** (if equipped with **Auto Plunger Button**). Remove keys. One (1) set of keys opens the **Coin Door**, the other set is used to unlock the **Back Glass** to gain access to the **White Star Board System**.



13. Open the **Coin Door** and pull the **YELLOW HANDLE** to the **LEFT** and at the same time pull up on the **FRONT TOP MOLDING** and remove. The **GLASS** can now be pulled out towards you and removed. **TAKE CARE** while moving; set glass on a safe surface.



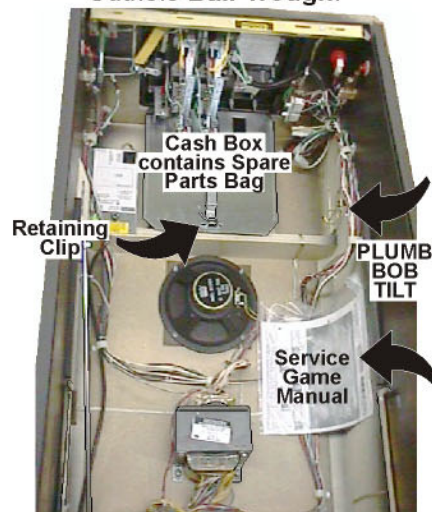
14. Through the open **Coin Door**, remove the **RETAINING RING** at the rear of the **CASH BOX** and open. Remove the **PINBALLS & the PLUMB BOB** from the **SPARE PARTS BAG**. (Save the other spare parts in cabinet). Install the **PINBALLS** by placing them on the playfield so they can roll into the **Outhole Ball Trough**.



15. Install the **PLUMB BOB** on the **Hanger Wire** & tighten the **Thumb Screw**. Loosening the **Thumb Screw** & lowering or raising the **PLUMB BOB** makes the **Games Tilt Function** more or less sensitive.



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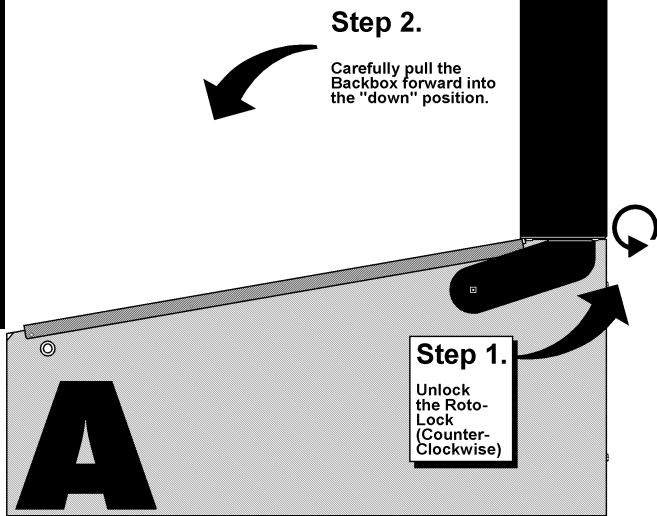
Remove the **PINBALL GAME MANUAL** (stapled to side of the left wall of the cabinet). Review **Section 1, Chapter 1**, which describes how to lift the playfield to access the **Plumb Bob Tilt Assembly**. The manual gives you all the important information you need to prepare for final set-up and other important information (such as Parts, Diagnostics, Schematics and more...).

**ALWAYS STORE THE MANUAL & INFORMATION SHEETS INSIDE THE CABINET WHEN NOT USING.**

# How to Secure the Backbox for Transporting

For more Backbox details & part numbers, see Section 4, Chapter 1, **Backbox Assembly**, Pages 56-57.

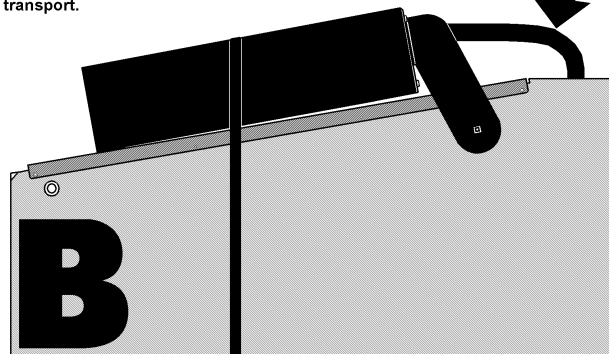
Sec. 1: After Set-Up



## Step 3.

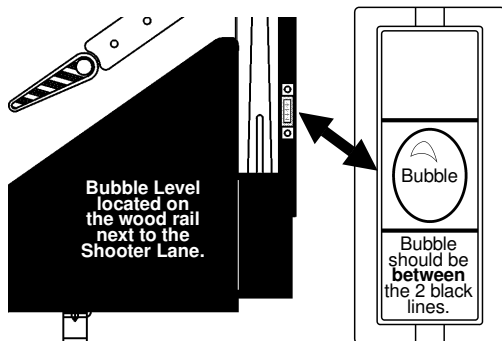
The top of the Backbox will rest on the Pinball Side Armor. Strap or tie down the Backbox to keep from "bouncing" during transport.

Ensure Cables do not bind, pinch or are being pulled tight. Hand-Feed out with Backbox so Cables are not tight.



## Leg Leveler Adjustment

Attach the four (4) Leg Assemblies to cabinet corners with the eight (8) leg bolts provided .



Start adjustment with the leg levelers *turned all the way in*.

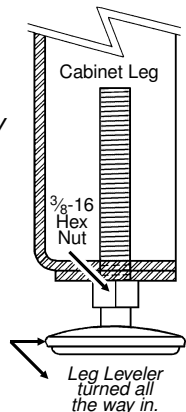
View the *bubble* in the level provided on the right side wood rail.

Adjust the front or rear levelers as necessary to cause the bubble to float between the two (2) black lines.

Use a pinball to roll down the center of the playfield for side-to-side leveling.

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

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

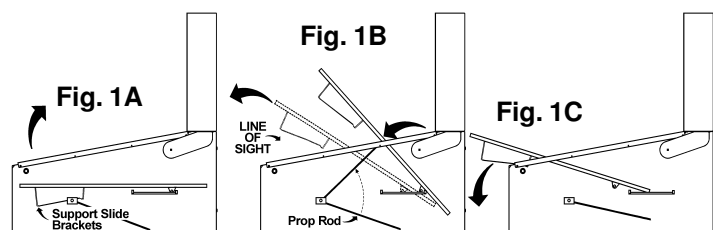


## Easy Access Service System - 3 Positions

With the front molding & glass removed, carefully lift the playfield (take care when using the Bottom Arch to hoist).

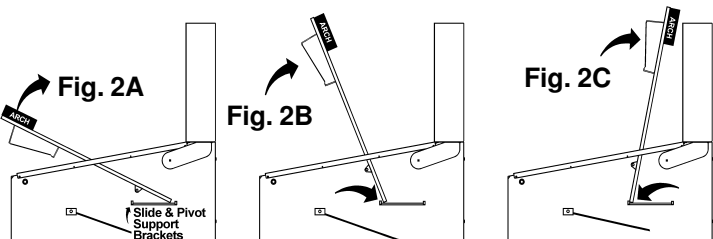
### Positions 1 & 2

When lifted high enough, the **Playfield Support Slide Brackets** (Fig. 1A) can be seen & can clear the cabinet front. At this time, pull the playfield toward the front of the cabinet, checking that the mechanical components clear the cabinet front, then rest the playfield on the **Playfield Support Slide Brackets** at the front channel of cabinet (Fig. 1C); Or, the **Prop Rod** (located on the right inside of cabinet) can be used by positioning the **Prop Rod** end into the receiving playfield hole (Fig. 1B).



### Position 3

With the playfield at rest, hold the sides & pull toward the front of the cabinet (approx. 6" to 8"), until resistance is felt from **Edge Slide Brackets** stopping against the **Slide & Pivot Support Brackets** located on either side of the cabinet (Fig. 2A). At this time, swivel the playfield toward the Backbox, then rest on the top edge (Fig. 2B & 2C).





## 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 with the display indicating the number of credits posted. Press the **Start Button** and a start-up sound is produced, and the posted credits are reduced by one. Subsequent players can be added (**up to 4 can play!**) by pressing the **Start Button** before the end of ball 1 (with sufficient credit in the game).

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 and/or instructions. 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 partial 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 only works in a 4-Player game. In all other cases, the individual scores are shown.

#### Starting League 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.

### During Game Features

#### Feature Mode & Combination Shots

Features are lit on the playfield and started by completing *certain shots* (e.g. completion of Target Banks, Orbit(s), Ramp(s) and/or any combination of the shots).

#### Multiball

Multiball is started after completion of certain features. Multiball may vary with the amount of balls used depending on game style.

#### Replay Feature

Replay awards are given as the player exceeds a High Score Level during game play. This can be adjusted with **Adj. 3, Replay Awards** (Default = **CREDIT**). Players exceeding the High Score Levels can receive: **CREDIT, 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 Balls), the game ends. If power is interrupted during the course of a game, it will end that game (**see Starting a Normal Game**). Closure of the Plumb Bob Tilt Switch according to the number of tilts set, **Adj. 09, Tilt Warnings** (Default = **01**) or prolonged closure, will end the current 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 2 digits of the player's score with this number awards a credit. In **Adj. 07, Match Percentage** (Default = **8%**) 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 nor award anything. Changing this adjustment to **OFF** will **not display** the "Match Animation" nor award anything.

#### Entering Initials/Name

If player achieved a new high score in a game or achieved a special feature (if given) the player may enter 3 Initials. In **Adj. 24, High Score Initials** (Default = **3 Initials**) can also be changed to **10-Letter Name**. Use the **Flipper Buttons** to choose a letter or character as seen on the Dot Display. Hitting the **Start Button** locks in the letter or character and proceeds to the next letter. The game then proceeds into the *Game-Over Mode* and then to the *Attract Mode*.

**Note: Adj. 26, Custom Message** (Default = **ON**) can be displayed during the *Attract Mode*; enter letters in the same fashion.

For more details with Adjustments, see Sec. 3, Chp. 4.

Continued Next Page.



# Auto Percentaging

This game is equipped with Auto Percentaging, **Adj. 01, Replays: Fixed/Auto** (Default = **12%**, adjustable). The *Replay Percent* is automatically adjusted or you can set a *Fixed Replay Score*. Four levels may be selected. Adjustments allow awarding of a "CREDIT" (or your setting) as each level is exceeded. This can be adjusted with, **Adj. 03, Replay Award** (Default = **CREDIT**). With the **Autopercentage Feature**, if the actual replay percentage is higher or lower than that desired, the game will automatically adjust for the new recommended percentage score(s). You may choose to make a different "score-to-beat" adjustment; this is done by utilizing **Adj. 02, Replay Levels**. For more details with **Adjustments**, see **Section 3, Chapter 4, GO TO ADJUSTMENTS MENU**; also, see **Section 3, Chapter 5, GO TO INSTALLS MENU** for further customization of your Pinball Game.

## Instruction Card

Below is a **COPY** of the Game Instruction Card (SPI N<sup>o</sup>: 755-5176-10 USA) which is included with every game. If your 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.

(Hint: **COPY & CUT** along the dotted line and fold in the center to keep the "COPY" sturdy.)


COPY & CUT

# PLAYBOY

For more detailed game rules, visit our website @ [www.SternPinball.com](http://www.SternPinball.com) and click on the "PLAYBOY" or "Game Archive" Pop Bumper Link.

FOLD HERE

## PLAYBOY

<b>OBJECTIVE</b>	Collect <b>Playmates</b> to start <i>Mansion Mania</i> . <b>25</b>  <b>Rabbit Heads = 1 Playmate.</b>
<b>SKILL SHOT</b>	To open the <b>MAGAZINE</b> for a <b>Skill Shot</b> , plunge the ball lightly.
<b>EXTRA BALL &amp; SPECIAL</b>	Collecting <b>Playmates</b> will light <b>Extra ball</b> and <b>Special</b> .
<b>CENTERFOLD MULTIBALL</b>	Shoot <b>Center Ramp</b> four times to open the <b>CENTERFOLD</b> . Keep <b>all three balls</b> in play to light the <b>TRIPLE JACKPOT TOY</b> .

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

SPI PART N<sup>o</sup>: 755-5176-10 USA  
© 2002 Playboy PLAYBOY, RABBIT HEAD DESIGN, BUNNY COSTUME and FEMIN DESIGN are marks of Playboy and used under license by Stern Pinball, Inc. Mfg. Stern Pinball, Inc. © 2002. Made in the USA.





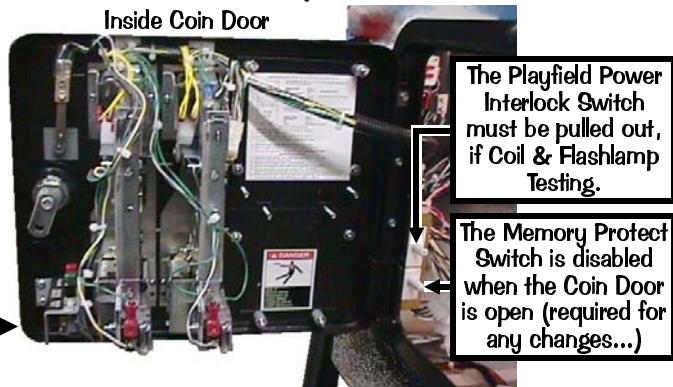
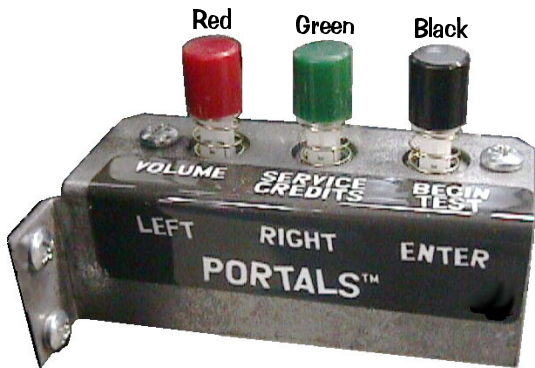
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**Sec. 3: ...Menu Intro.**

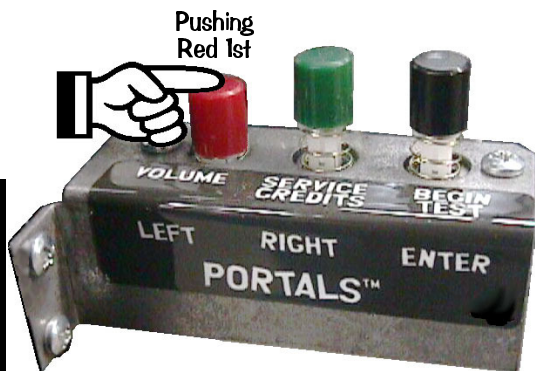
# Service Switch Set (Red, Green & Black Buttons) Access & Use

The **Service Switch Set** provides access for **three (3) functions** available for your use. They are **Volume Menu**, **Service Credits Menu** and **Portals™ Service Menu**. All are accessed separately depending on which colored button (**Red**, **Green** or **Black**) is **pushed first**.



To access any of these **three (3) functions** you must first open the **Coin Door** (see pictorial above) with the Game in the **Attract Mode** (not already in any Function or Menu stated below).

Sec. 3: ...Menu Intro.

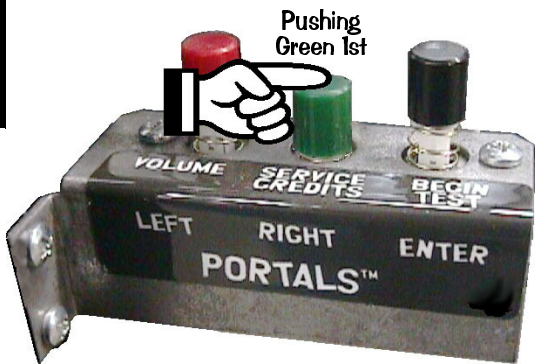


## Function 1, Volume Menu

**Pushing the Red Button** first, enters the **Volume Menu**. While in this Mode, to **DECREASE** the volume, hold down or depress the **Red "LEFT" Button** until desired the volume is achieved; to **INCREASE** the volume, hold down or depress the **Green "RIGHT" Button** until the desired volume is achieved.

**Note:** Pushing the **Left or Right Flipper Buttons** operates the same as the **Red or Green Buttons** of the Service Switch Set, while in this Volume Mode.

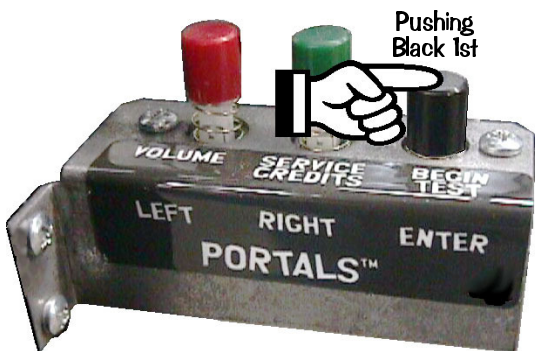
Set between **0** and **31**; **15** is the **Factory Default**. Once your adjustments are made, this menu will **automatically exit** a few seconds after the last button depression.



## Function 2, Service Credits Menu

**Pushing the Green Button** first, adds **Service Credits** (will not affect your audits as "paid" credits). This is useful for the technician to test the game in regular play without affecting the game audits. Each depression adds **1 credit**; up to **50 credits** can be applied. **Adjustment 11, Credit Limit**, (Default = **30**) determines this, however, it can be changed from **04-50**; see Chapter 4 of this Section for details). Once your credits are added, this menu will **automatically exit** a few seconds after the last button depression.

**Note:** This function is disabled if **Adjustment 25, Free Play**, is set to **YES**. The **Service Credits** are limited to the **Credit Limit** in addition to any paid credits present in the game (e.g. If the **Credit Limit** is **30**, and there are **8 paid credits** present, only **22 Service Credits** can be applied.).



## Function 3, Portals™ Service Menu

**Pushing the Black Button** first, enters the **Portals™ Service Menu**. Once in, move through the menus and sub-menus by pushing down or depressing the **Red "LEFT"** or **Green "RIGHT"** Buttons.

**Note:** Pushing the **Left or Right Flipper Buttons** operates the same as the **Red or Green Buttons** of the Service Switch Set, while in this Service Mode.

Select or activate the **Icon** chosen (the **Icon** will be "flashing") by pushing down or depressing the **Black "ENTER"** Button.

**Note:** Pushing the **Start Button** operates the same as the **Black Button** of the Service Switch Set, while in this Service Mode.

**Please read** the remainder of this Chapter for more information on the **Portals™ Service Menu**. The remaining six (6) Chapters of this Section explains all **Icons & Menus** in detail. **Read! Read! Read!**





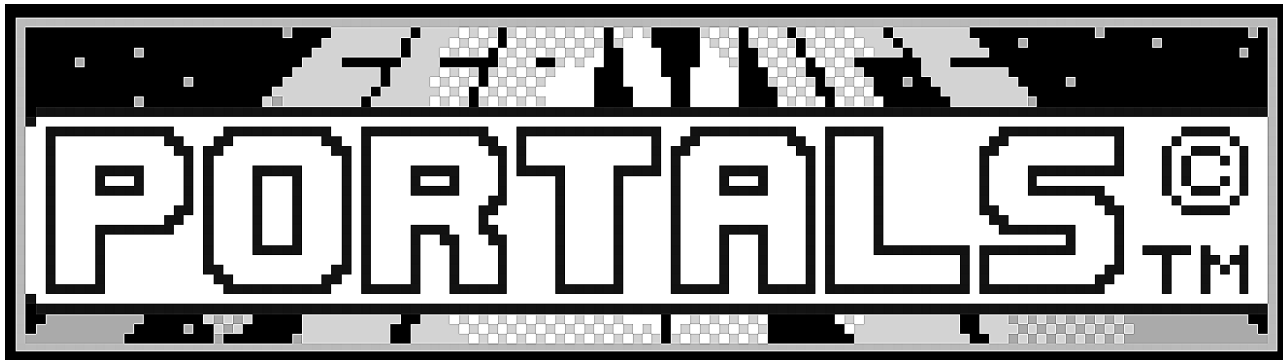
## Portals™ Service Menu Introduction

**Important:** The *Dual Switch Bracket* holds the *Playfield Power Interlock & Memory Protect Switches*. It is located just inside the Coin Door frame (see pictorial of the *Coin Door* on the previous page). The Button Switch at the top is the *Playfield Power Interlock Switch*. It must be pulled out for electro-mechanical device testing or diagnostic purposes (this is required). If this button is pushed in, the *Playfield Power* is disabled while the *Coin Door* is **OPEN**. The Button Switch at the bottom is the *Memory Protect Switch*. It is enabled while the *Coin Door* is **CLOSED**; meaning any adjustment changes that are made **will not be written to memory**. If changing adjustments is required, ensure the *Coin Door* is **OPEN** to disable this switch, thus allowing for desired changes.

### How to Use This Section

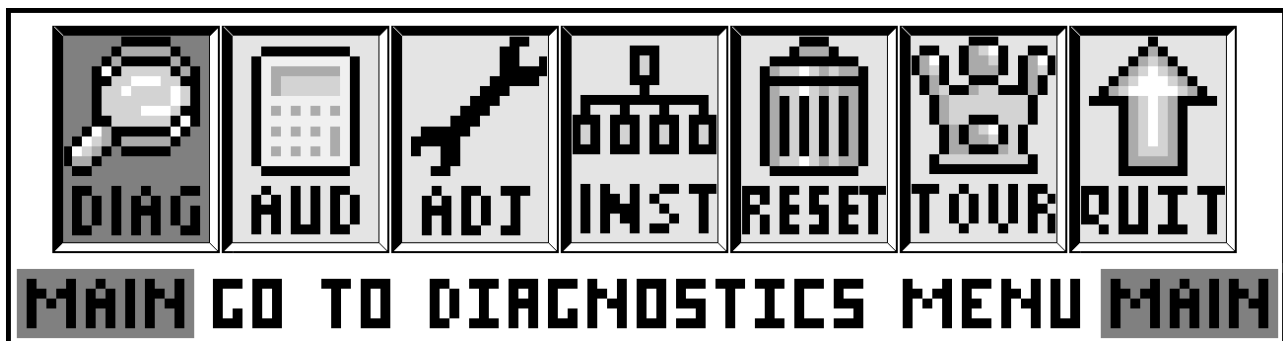
This section will cover all functions available in the **Portals™ Service Menu** in a *Step-By-Step* process. This section is divided into chapters which coincide with the **MAIN MENU**. The previous and following pages in this Chapter will instruct the operator on how to move through the Menus. It's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

To get into the **Service Menu Mode** review "**Function 3, Portals™ Service Menu**" on the previous page. After Power-Up, push down the **Black "BEGIN TEST" Button** to begin. Looking at the display you will momentarily see "**Service Menu**" with a *satellite flying from right to left pulling a banner "Portals©™"* followed by the **MAIN MENU**:



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.

The **MAIN MENU** now appears with the "**DIAG**" *Icon* (**GO TO 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. The "**HELP**" *Icon* & "**?**" *Mini-Icon* provide explanation of **ICON** usage in the Menu where the "**HELP**" *Icon* or "**?**" *Mini-Icon* was selected. View **QUIT THIS SESSION (Exiting the Portals™ Service Menu)** at the end of this chapter (reference **Section 3, Chapter 1, Portals™ Service Menu Introduction**).

The **chapters** in this **section**, which coincide with the **MAIN MENU**, will also provide more detailed information. **Use both the manual and the display to help customize, troubleshoot and/or diagnose faults, if any.**

# Portals™ Service Menu Icon Tree for **PLAYBOY** Pinball Game

Note: In Sub-Menu Tests or Displays, further action is required: select & activate the appropriate Mini-Icon(s).

Read the following chapters in this section:



Chp. 2



Chp. 3

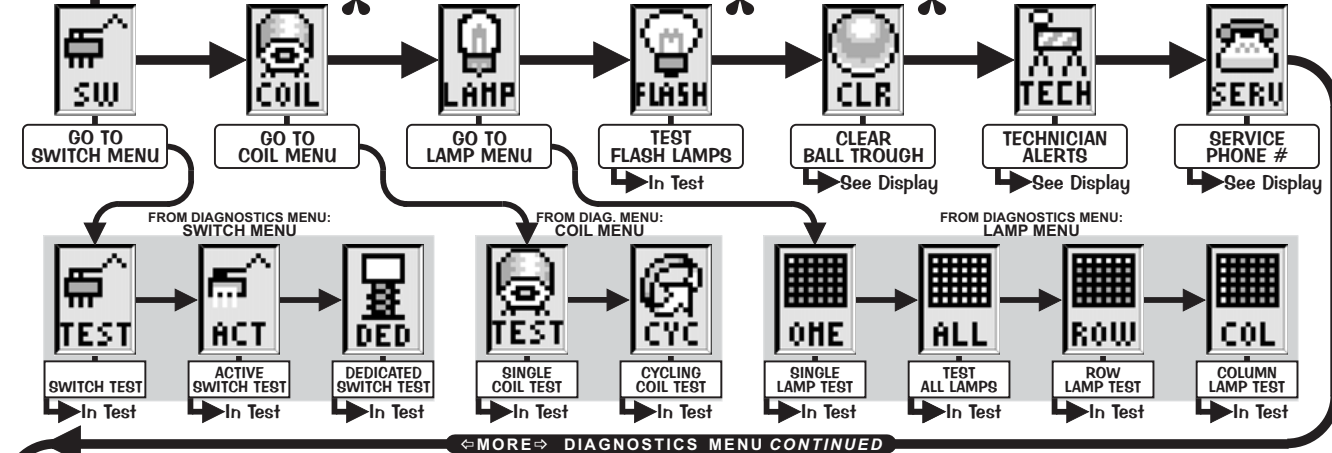


Chp. 4

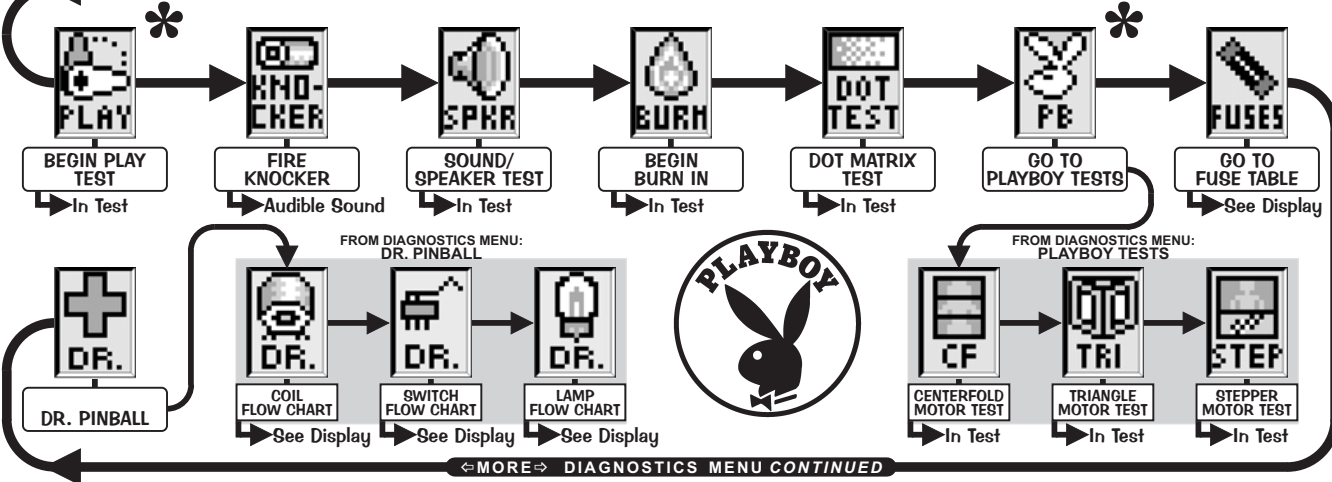
for more detailed information on these Menus.



## DIAGNOSTICS MENU



← MORE → DIAGNOSTICS MENU CONTINUED



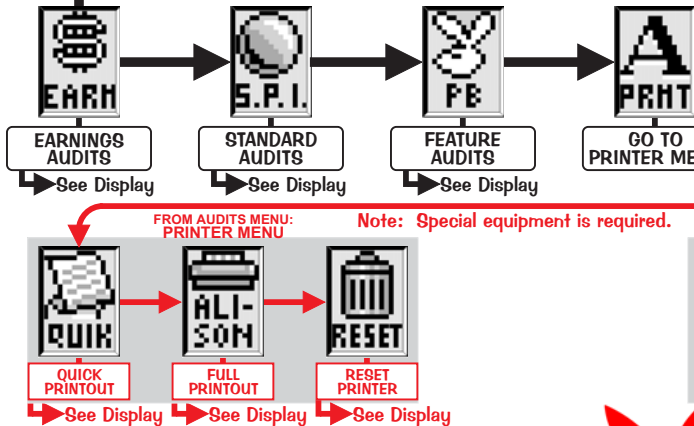
← MORE → DIAGNOSTICS MENU CONTINUED

Sec. 3: ...Menu Intro.

Note: In Sub-Menu Displays, further action is required: select & activate the appropriate Mini-Icon(s).



## AUDITS MENU

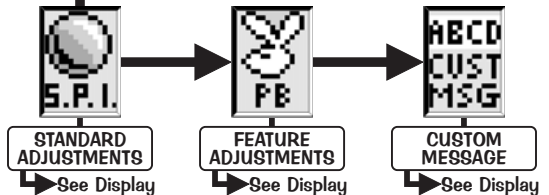


FROM AUDITS MENU: PRINTER MENU Note: Special equipment is required.

Note: In Sub-Menu Displays, further action is required: select & activate the appropriate Mini-Icon(s).



## ADJUSTMENTS MENU



WHEN ENTERING THESE NOTED MENUS, YOU MUST PULL OUT the Power Interlock Switch for operation with the Coin Door open.

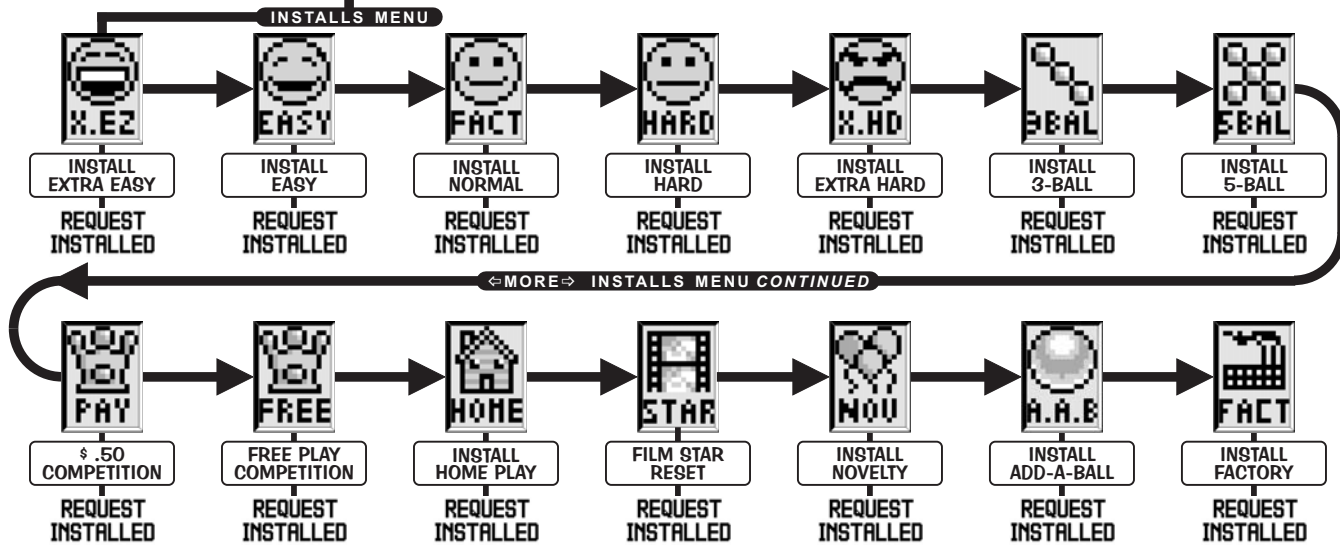


COIN DOOR IS OPEN  
 PLAYFIELD HIGH POWER  
 DISABLED BY  
 COIN DOOR INTERLOCK

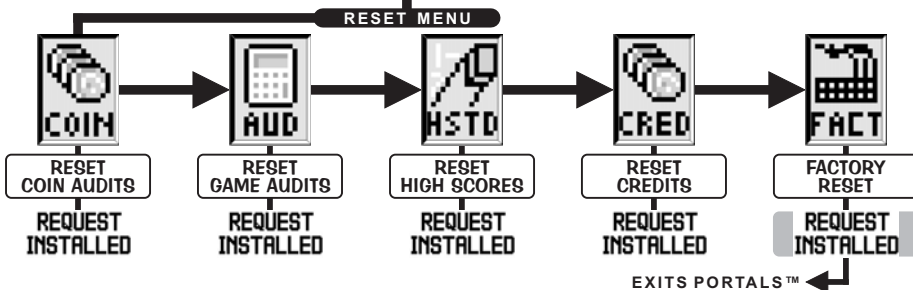


# Portals™ Service Menu Icon Tree for **PLAYBOY** Pinball Game Continued

Note: After selection of any of the Install Icons, the request is installed and returns to the Install Menu. The last icon activated before exiting this menu will supersede any previous icon selected in the group.



Note: After selection of any of the 1st four Reset Icons, the request is installed and returns to the Reset Menu. Selecting the "FACT" icon, the request is installed and exits the Portals™ Service Menu System.



## TOURNAMENT MENU

**FUTURE EXPANSION**  
 Note: At time of printing, this Menu was not available. When this Menu becomes activated with updated Game Code or Special Tournament Game Code, look for a Manual Addendum and / or Service Bulletin outlining this feature (available through your Distributor when completed). This Menu will allow a simple method of setting up the game for Prize Tournaments. Optional equipment will be required.



EXITS PORTALS™

## EXPLANATION & USAGE OF COMMON LARGE & MINI-ICONS USED IN VARIOUS MENUS & SUB-MENUS:



These non-selectable icons appear in the selected Menu only when there are MORE icons to the LEFT or to the RIGHT available for selection.



Select and activate to return to the PREVIOUS Menu.



Select and activate to QUIT, exits & returns to the Attract Mode.



Select and activate to view HELP Screens of the current Menu.



Select and activate to:  
 Move LEFT or RIGHT, select previous / next or move backwards / forwards.  
 DECREMENT (-) or INCREMENT (+) displayed value or select previous / next.  
 RUN (or activate) selected test or coil.  
 PULSE coil.



View the schematic (DRAWING) of current display. Select while current switch, lamp or coil is viewed.



Answer NO or YES for Flow Chart Menu questions in the Dr. Pinball Menus.



END current coil selection to select a new coil for diagnosing in the Dr. Pinball Menus.

Note: If a new MINI-ICON is used for a specific function, select the "?" icon for more information.

Read the following chapters in this section:



Chp. 5



Chp. 6



Chp. 7

for more detailed information on these Menus.

Sec. 3: ...Menu Intro.



## 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, and Sub-Menu 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 on Button Usage, select & *activate* the "HELP" *Icon* or "?" *Mini-Icons*.

### EXPLANATION & USAGE OF COMMON LARGE & MINI-ICONS USED IN VARIOUS MENUS & SUB-MENUS:

Select and activate to:



These non-selectable *Icons* appear in the selected *Menu* only when there are **MORE** *Icons* to the **LEFT** or to the **RIGHT** available for selection.



Select and activate to return to the **PREVIOUS** *Menu*.



Select and activate to **QUIT**, exits & returns to the **Attract Mode**.



Select and activate to view **HELP** Screens of the current *Menu*\*.



Move **LEFT** or **RIGHT**, select previous / next or move backwards / forwards.

**DECREMENT (-)** or **INCREMENT (+)** displayed value or select previous / next.

**RUN** (or activate) selected test or coil  
**PULSE** coil.

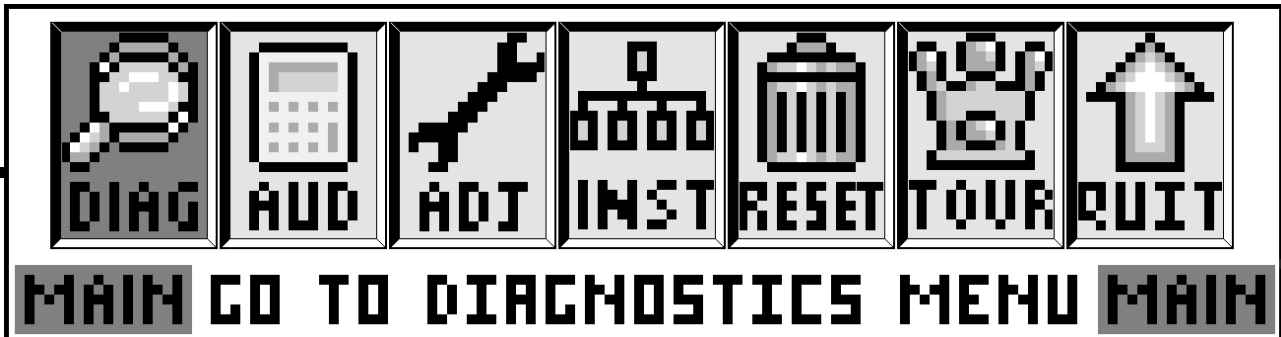
**DRAW** View the schematic (**DRAW**ing) of current display. Select while current switch, lamp or coil is viewed.

\* **Help Note:** An explanation of each *Mini-Icon* at that *menu level* will cycle continuously. To exit a display where no *Mini-Icons* are available for selection, pressing any button will exit the display.

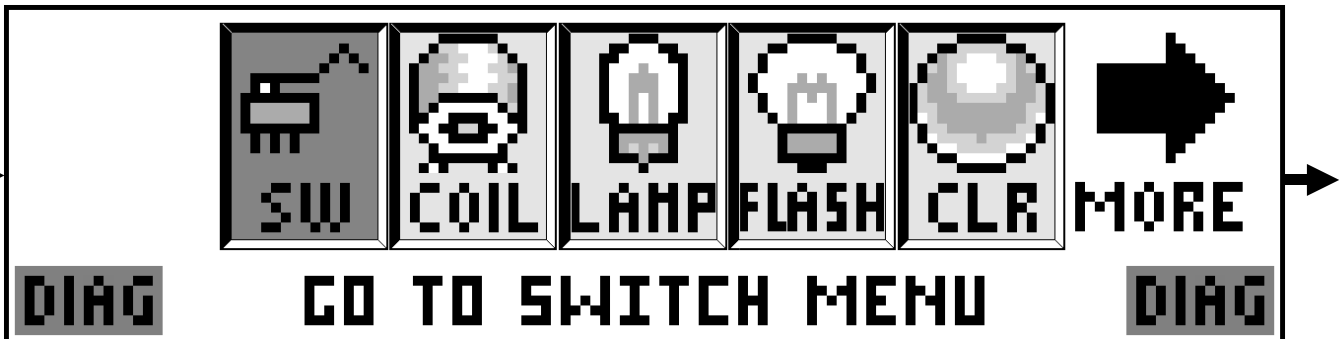
Sec. 3: ...Menu Intro.

### Example:

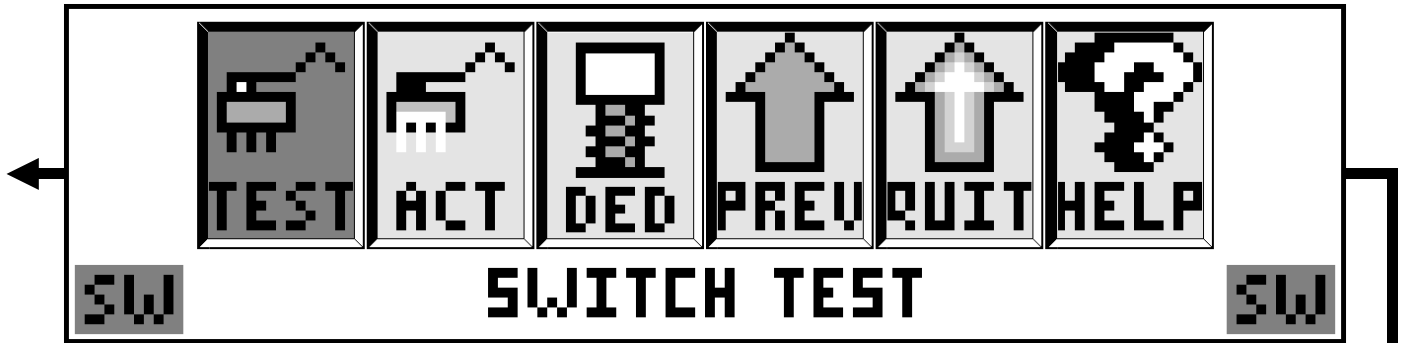
After entering **Portals™**, the **MAIN MENU** now appears with the "DIAG" *Icon* (**GO TO DIAGNOSTICS MENU**) flashing:



Press the **Black "ENTER" Button** to *activate* this **ICON**. The **DIAGNOSTICS MENU** now appears with the "SW" *Icon* (**GO TO SWITCH MENU**) flashing:



Press the **Black Button** to *activate* this **ICON**. The **SWITCH TEST MENU** now appears with the "TEST" *Icon* (**SWITCH TEST**) flashing:

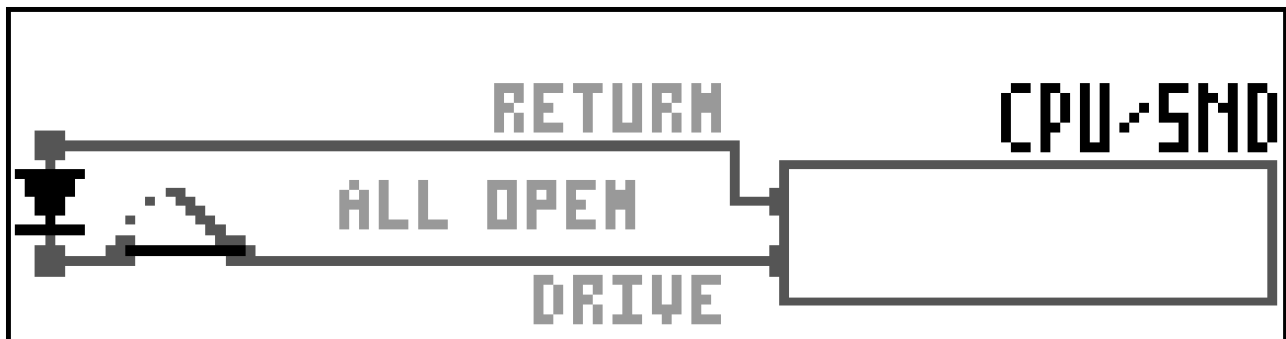


Press the **Black "ENTER" Button** to *activate* this icon. The **Switch Test Display** now appears.



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 either the **Red** or **Green Button** to select the "DRAW" *Mini-Icon*. Press the **Black Button** to *activate* this *Mini-Icon*; do so while the switch is momentarily closed. This will bring up the **Switch Schematic Display**. 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, and the "Pin-Outs" from the CPU/Sound Board. *Activating* the "DRAW" *Icon* when a switch is not closed, will give the generic switch schematic as shown below.



To **exit any display where there are no Mini-Icons** (Schematics or Help Displays), **press any button** to return to the previous Menu.

While in **Switch Test** or **Active Switch Test**, the **Flipper & Start Buttons** are deactivated (because they can be part of these tests). 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 "<<" or ">>" *Mini-Icon* is *activated*, the display will go to (slip between) the previous tests (*Active & Dedicated Switch Tests*). Use either the **Red** or **Green Button** to select the "PREV" *Mini-Icon*. Press the **Black "ENTER" Button** to return to **Switch Test Menu**. To exit out of this Sub-Menu, select and *activate* the "PREV" *Icon* in the Menu. The **DIAGNOSTICS MENU** now appears with the "SW" *Icon* (**GO TO SWITCH MENU**) flashing. Go through other **Diagnos**tics selections or exit.

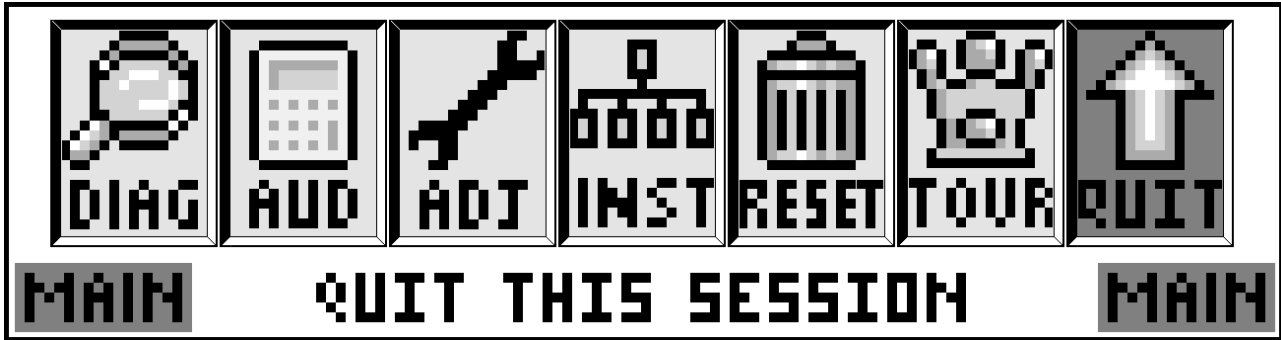
To exit the **Portals™ Service Menu**, select & *activate* the "QUIT" *Icon* (see the next page).

Sec. 3: ...Menu Intro.



# QUIT THIS SESSION (Exiting the Portals™ Service Menu)

In the **MAIN MENU** and in all **SUB-MENUS**, if the "QUIT" *Icon* or "QUIT" *Mini-Icon* is selected and *activated*, the **Portals™ Service Menu Session** will be exited and returned to the **Attract Mode**.



The game will go into the same *Power-Up Routine* as if turning on the game. Upon **Power-Up**, the CPU Game Code & Display Code versions with Check-Sums are shown, followed by the Location ID & Game ID Numbers and Alerts, if any (see *Section 3, Chapter 2, GO TO DIAGNOSTICS MENU, Technician Alerts*).

The below **Problem / Solution Table** was designed to answer some common problems frequently asked.

## Problem / Solution Table

PROBLEM	SOLUTION
Will not enter the <b>Service Mode</b> after depressing the <b>Black "BEGIN TEST" Button</b> .	<ul style="list-style-type: none"> <li>• Check the Service Switch(es) (<b>Red, Green &amp; Black Buttons</b>) for loose connections or bad Ground.</li> <li>• Check the associated wiring harness to/from the CPU/Sound Board, Connector <b>CN6</b>.</li> <li>• Check CPU/Sound Board for possible failure.</li> </ul>
All Service Buttons ( <b>Red, Green and Black</b> ) appear nonfunctional.	<ul style="list-style-type: none"> <li>• Check the Service Switches wiring harness for poor or no connection and/or broken wires.</li> </ul>
The <b>Green Service Button</b> in the Attract Mode will not enter the <b>SERVICE CREDITS MENU</b> to add Service Credits.	<ul style="list-style-type: none"> <li>• Check to make sure the Game is not in "<b>Free Play</b>." <i>If the game is set to Free Play, adding Service Credits is not required.</i></li> <li>• Check the Service Switches wiring harness for poor or no connection and/or broken wires.</li> </ul>
The <b>Display</b> "blanks out."	<ul style="list-style-type: none"> <li>• Check the Dot Matrix Display for loose wiring harness for poor or no connection and/or broken wires.</li> <li>• Check <b>F1 (3/4A Fuse)</b> on the Display Power Supply Board. Refer to <b>Sec. 5, Chp. 4, SCHEMATICS &amp; TROUBLESHOOTING</b>.</li> </ul>
Icons " <i>scroll</i> " along continuously in the <b>MAIN MENU</b> .	<ul style="list-style-type: none"> <li>• Check for a stuck switch on the <b>Green Button</b>.</li> <li>• If the Service Switch Set and/or the Coin Door was replaced, ensure the Locking Mechanism on the <b>Green Button</b> was removed. If the Green Button "clicks" and locks into an up/down position, the <b>Green Button</b> has this lock switch. Remove it. (Ref. to Svc. Bulletin #74.)</li> </ul>
The <b>Start and Flipper Buttons</b> do not select or activate <i>Icons</i> in the <b>SWITCH TEST MENU</b> .	<ul style="list-style-type: none"> <li>• This is normal. These switches are deactivated, as they are a part of the Switch Test. Use the <b>Red "LEFT"</b> or <b>Green "RIGHT" &amp; Black "ENTER" Buttons</b> in this Sub-Menu. Refer to <b>Section 3, Chapter 2, GO TO DIAGNOSTICS MENU, Switch Test</b>.</li> </ul>
Can't move selection of <i>Icon</i> with the <b>Left and/or Right Flipper Buttons</b> .	<ul style="list-style-type: none"> <li>• Check the <b>Flipper Buttons</b> for loose connections or bad Ground and refer to <b>Section 5, Chapter 2, Playfield Wiring, #-Flipper Circuit Wiring Diagram</b>.</li> <li>• This is normal <i>only</i> in <b>Diagnostic's Switch &amp; Active Switch Tests</b> (see <i>previous Problem</i>).</li> </ul>
Some <i>Icons</i> appear non-functional in the <b>PRINTER MENU(S)</b> .	<ul style="list-style-type: none"> <li>• If no printing equipment is connected, the <b>"-" Icon, "+" Icon</b> and <b>"RUN" Icon</b> will appear not to function. Refer <b>Section 3, Chapter 3, GO TO PRINTER MENU</b>.</li> </ul>
Some <i>Icons</i> appear non-functional in the <b>GAME SPECIFIC MENU</b> under the <b>DIAGNOSTICS MENU</b> .	<ul style="list-style-type: none"> <li>• If there is no other test under this Menu, the <b>"&lt;&lt;" &amp; "&gt;&gt;" Mini-Icons</b> will appear not to function. The remaining <i>Icons</i> should function as normal. <b>Note:</b> <i>If there is no "Go To (Game Name) Test(s), the "GAME NAME" Icon will not invoke another display.</i></li> </ul>
The display returns to the <b>ATTRACT MODE</b> exiting the Service Session after a <b>FACTORY RESET</b> .	<ul style="list-style-type: none"> <li>• This is normal. After a <b>FACTORY RESET</b>, the Service Session is automatically exited. Refer to <b>Sec. 3, Chp. 6, GO TO RESET MENU, Factory Reset</b>.</li> </ul>
In <b>COIL TEST MENU</b> , the coils and flashlamps <i>do not</i> fire after activating the <b>"RUN" Icon</b> .	<ul style="list-style-type: none"> <li>• Ensure the <b>POWER INTERLOCK SWITCH is pulled out</b> (see the start of this Chapter).</li> </ul>
In <b>ADJUSTMENTS MENU</b> , with the Coin Door <b>CLOSED</b> , adjustments are not getting changed as desired (using the <b>Flipper &amp; Start Buttons</b> ).	<ul style="list-style-type: none"> <li>• This is normal. The <b>Memory Protect Switch</b> is enabled when the Coin Door is <b>CLOSED</b>. Changes can be made with the Coin Door <b>OPEN</b> only.</li> </ul>
In <b>Portals™ Service Menu</b> , the volume cannot be adjusted with the <b>Red or Green Buttons</b> .	<ul style="list-style-type: none"> <li>• The Volume adjustment can only be made when in the <b>Attract Mode</b>. The <b>Volume Mode</b> is entered by pressing the <b>Red "VOLUME" Button</b>. Then use the <b>Red "LEFT"</b> to decrease / decrement (-) or <b>Green "RIGHT" Button</b> to increase / increment (+) the volume.</li> </ul>
In <b>Portals™ Service Menu</b> , the display seems to lock up, or the Help Display appears to be non-functional.	<ul style="list-style-type: none"> <li>• If you cannot clear the situation by exiting back one Menu, exit completely out of the <b>Portals™ Service Menu</b>, and re-enter. If the problem persists, call Technical Support for additional help.</li> </ul>





# Go To Diagnostics Menu

## 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). The automatic tests (e.g. **Cycling Coils**, **Test Flash Lamps**) may be used for a quick verification of automatic test functions and the manual tests (**Begin Play Test**, **Single Lamp / All / Row / Column Tests**, and **'Game Name' Tests**) may be used for troubleshooting. All *Icons* and their usages are explained throughout this chapter in order.

**Important:** Upon **Power-up**, opening the **Coin Door** or exiting **Portals™**, watch the **Display** for any **Alerts**.



If this **display flashes**, the game is indicating that **CMOS RAM** memory (CPU Loc. U212) 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 (Reset)**, by opening the **Memory Protect Switch**.

Check battery voltage at **VBATT Test Point** on the **CPU/Sound Bd.** (more details in **Sec. 5, Chp. 4, PCBs**).



This **flashing display** is shown immediately upon opening the **Coin Door** as a reminder that **20v/50v DC** power to the playfield is **disabled**. All electro-mechanical devices (such as **Coils**) **cannot be tested** with the switch pushed in. **PULL OUT** the **Power Interlock Switch ONLY** if you're in a **Testing Menu** requiring power. See **Access & Use** in Chapter 1 of this Section for the location of this switch. **Closing the Coin Door** will automatically reset this switch.



This **display** is shown momentarily during **Game Mode** or **Power-Up** to alert the operator of a coil malfunction (*coil doesn't energize or coil fires a multiple number of times*). **OPERATOR ALERT!** works by monitoring any **switch activated coil** that has the potential to trap a ball when disabled (more details in this Chapter, **Technician Alerts, Pages 24-25**).



If this **display flashes** (along with an audible sound), the game has detected faulty switches and/or missing pinballs. To check, enter the **Portals™ Service Menu System**, select the **"DIAG" Icon (GO TO DIAGNOSTICS MENU)** from the **MAIN MENU** and select the **"TECH" Icon** (more details in this Chapter, **Technician Alerts, Pages 24-25**).

**CAUTION:** Remove pinballs from the Ball Trough prior to lifting the playfield for servicing. This can easily be done in the **Portals™ Service Menu System**. Select the **"DIAG" Icon** from the **MAIN MENU** to go to the **DIAGNOSTICS MENU**, then select the **"CLR" Icon** to enter the **CLEAR BALL TROUGH MENU**. Select the **"RUN" Mini-Icon** & press the **Start Button** to remove one ball at a time. This is also useful to retrieve one ball for game testing in **Begin Play Test** & **'Game Name' Tests**. **PULL OUT** the **Power Interlock Switch** for operation.

Sec. 3: ... Diagnostics



### EXPLANATION & USAGE OF COMMON LARGE & MINI-ICONS USED IN VARIOUS MENUS & SUB-MENUS:

Select and activate to:

					Move <b>LEFT</b> or <b>RIGHT</b> , select previous / next or move backwards / forwards.
<b>MORE MORE</b>	<b>PREV</b>	<b>QUIT</b>	<b>HELP</b>		<b>DECREMENT (-)</b> or <b>INCREMENT (+)</b> displayed value or select previous / next.
<small>These non-selectable icons appear in the selected Menu only when there are MORE icons to the LEFT or to the RIGHT available for selection.</small>	<small>Select and activate to return to the PREVIOUS Menu.</small>	<small>Select and activate to QUIT, exits &amp; returns to the Attract Mode.</small>	<small>Select and activate to view HELP Screens of the current Menu*.</small>		<b>RUN</b> (or activate) selected test or coil PULSE coil.
					View the schematic ( <b>DRAWING</b> ) of current display. Select while current switch, lamp or coil is viewed.

\* Help Note: An explanation of each Mini-Icon at that menu level will cycle continuously. To exit a display where no Mini-Icons are available for selection, pressing any button will exit the display.

## GO TO DIAGNOSTICS MENU

After entering **Portals™**, the **MAIN MENU** now appears. To initiate, from the **MAIN MENU**, select the **"DIAG" Icon** with either the **Red "LEFT"** or **Green "RIGHT" Buttons** (the **Flipper Buttons** operates in the same manner) and press the **Black "ENTER" Button** (the **Start Button** operates in the same manner). The **DIAGNOSTICS MENU** appears. Continue through this chapter for the explanation & usage of the **Icons** in the **DIAGNOSTICS MENU**. **Usage Note:** Only in **Switch & Active Switch Tests**, the **Flipper & Start Buttons cannot be used** as the alternate navigation buttons as they are a part of these tests. After exiting these tests, the **Left & Right Flipper** and **Start Buttons** can once again be used. Continue through this chapter for the explanation & usage of the **Icons** in the **DIAGNOSTICS MENU**.



# Go To Switch Menu

To initiate, from the **DIAGNOSTICS MENU**, select the "SW" *Icon* with either the **Red "LEFT"** or **Green "RIGHT"** **Buttons** 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** possible switches. The **SWITCH TEST MENU** consists of three (3) parts: **Switch Test, Active Switches & Dedicated Switch Test**. **Reminder:** *The Flipper & Start Buttons (part of Switch Tests) cannot be used as navigation buttons during these test(s)*



# Switch Test

To initiate, from the **SWITCH MENU**, select the "TEST" *Icon* with either the **Red or Green Buttons** & 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 and the "Pin-Outs" from the **CPU/Sound Board**. When the switch is closed, the information is displayed momentarily. To view the schematic for the switch selected, press either the **Red or Green Button** to select the "DRAW" *Mini-Icon*. Press the **Black Button** to *activate* this *Mini-Icon*; do so while the switch is momentarily closed. To return to **Switch Test**, press the **Black Button** again.



# Active Switch Test

To initiate, from the **SWITCH MENU**, select the "ACT" *Icon* with either the **Red or Green Buttons** & press the **Black Button**. If still in a previous test, select the "PREV" *Mini-Icon* to return to **SWITCH MENU** or select either of the "<<" or ">>" *Mini-Icons* to move through the tests. In **Active Switch Test**, 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 Number and the "Pin-Outs" from the **CPU/Sound Board**. This cycle continues until all switches are cleared or until the test is exited.



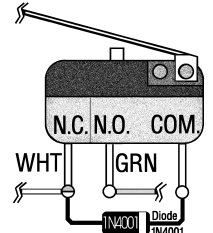
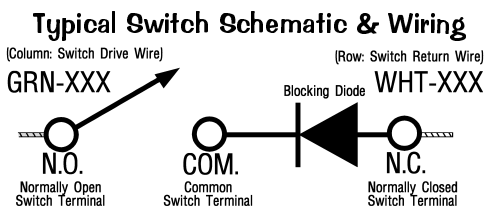
# Dedicated Switch Test

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.*). In **Dedicated Switch Test**, the display will describe the switch which includes the Switch Name, Return (Row) Wire, Drive (Column) Wire, Part Number and the "Pin-Outs" from the **CPU/Sound Board**.

Sec. 3: ... Diagnostics

## SWITCH MATRIX GRID & DEDICATED SWITCHES

Column (Drive)	1: Q1	2: Q2	3: Q3	4: Q4	5: Q5	6: Q6	7: Q7	8: Q8	GND	Ground
Row (Return)	GRN-BRN CN5-P1	GRN-RED CN5-P3	GRN-ORG CN5-P4	GRN-YEL CN5-P5	GRN-BLK CN5-P6	GRN-BLU CN5-P7	GRN-VIO CN5-P8	GRN-GRY CN5-P9	IC U206 INPUTS	BLK CN6-P1, -P11
1: U400	LEFT BUTTON (UK ONLY) on Cabinet side	SKILL SHOT Under Playfield	RIGHT RAMP ENTER On Ramp Assy.	POP BUMPER EXIT Under Playfield	SURPRISE PACKAGE TARGET On Assembly	LEFT RAMP ENTER On Ramp Assy.	LEFT BUMPER On Assembly	LEFT OUTLANE Under Playfield	1: U206	#1 LEFT FLIPPER BUTTON in Cabinet side
2: U400	4TH COIN SLOT On Coin Door	RIGHT ORBIT Under Playfield	RIGHT RAMP EXIT On Ramp Assy.	DROP TARGET On Assembly	GROTTO EJECT Under Playfield	LEFT RAMP EXIT On Ramp Assy.	RIGHT BUMPER On Assembly	LEFT RETURN LANE Under Playfield	2: U206	#2 LEFT FLIPPER E.O.S (End-of-Stroke) in Cabinet side
3: U400	6TH COIN SLOT On Coin Door	4-BALL TROUGH #1 (LEFT) On Assembly	CENTER LANE Under Playfield	LEFT ORBIT Under Playfield	VUK On Assembly	CENTERFOLD 1 (CLOSED) On Assembly	BOTTOM BUMPER On Assembly	LEFT SLINGSHOT On Assembly	3: U206	#3 RIGHT FLIPPER BUTTON in Cabinet side
4: U400	RIGHT COIN SLOT On Coin Door	4-BALL TROUGH #2 On Assembly	NOT USED	NOT USED	NOT USED	CENTERFOLD 2 (OPEN) On Assembly	TEASE SCREW LIMIT On Assembly	RIGHT OUTLANE Under Playfield	4: U206	#4 RIGHT FLIPPER E.O.S (End-of-Stroke) in Cabinet side
5: U401	CENTER COIN SLOT / DBA On Coin Door	4-BALL TROUGH #3 On Assembly	CENTER RAMP EXIT On Ramp Assy.	TRIANGLE MECH 1 (RIGHT) On Assembly	NOT USED	NOT USED	TOURNAMENT BUTTON Cabinet Front	RIGHT RETURN LANE Under Playfield	5: U206	#5 NOT USED
6: U401	LEFT COIN SLOT On Coin Door	4-BALL TROUGH VUK OPTO On Assembly	LEFT TOP LANE Under Playfield	TRIANGLE MECH 2 (LEFT) On Assembly	RAMP BALL LOCK 3 On Ramp Assy.	NOT USED	START BUTTON Cabinet Front	RIGHT SLINGSHOT On Assembly	6: U206	#6 VOLUME (RED BUTTON) (In Test: LEFT) on Coin Door
7: U401	5TH COIN SLOT On Coin Door	4-BALL STACKING OPTO On Assembly	MIDDLE TOP LANE Under Playfield	NOT USED	RAMP BALL LOCK 1 On Ramp Assy.	NOT USED	NOT USED	NOT USED	7: U206	#7 SERV. CRED. (GREEN BUTTON) (In Test: RIGHT) on Coin Door
8: U401	RIGHT BUTTON (UK ONLY) on Cabinet side	SHOOTER LANE Under Playfield	RIGHT TOP LANE Under Playfield	PEEK-A-BOO TARGET On Assembly	RAMP BALL LOCK 2 On Ramp Assy.	NOT USED	PLUMB BOB TILT Inside Cabinet	NOT USED	8: U206	#8 BEGIN TEST (BLACK BUTTON) (In Test: ENTER) on Coin Door

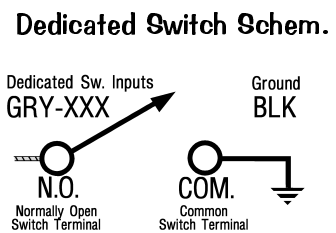


**Note:**  
All Switch, Lamp & Coil assemblies require diodes. Some diodes are located under the playfield on Terminal Strips or Diode Boards and not on the assemblies.

Diode on Terminal Strip

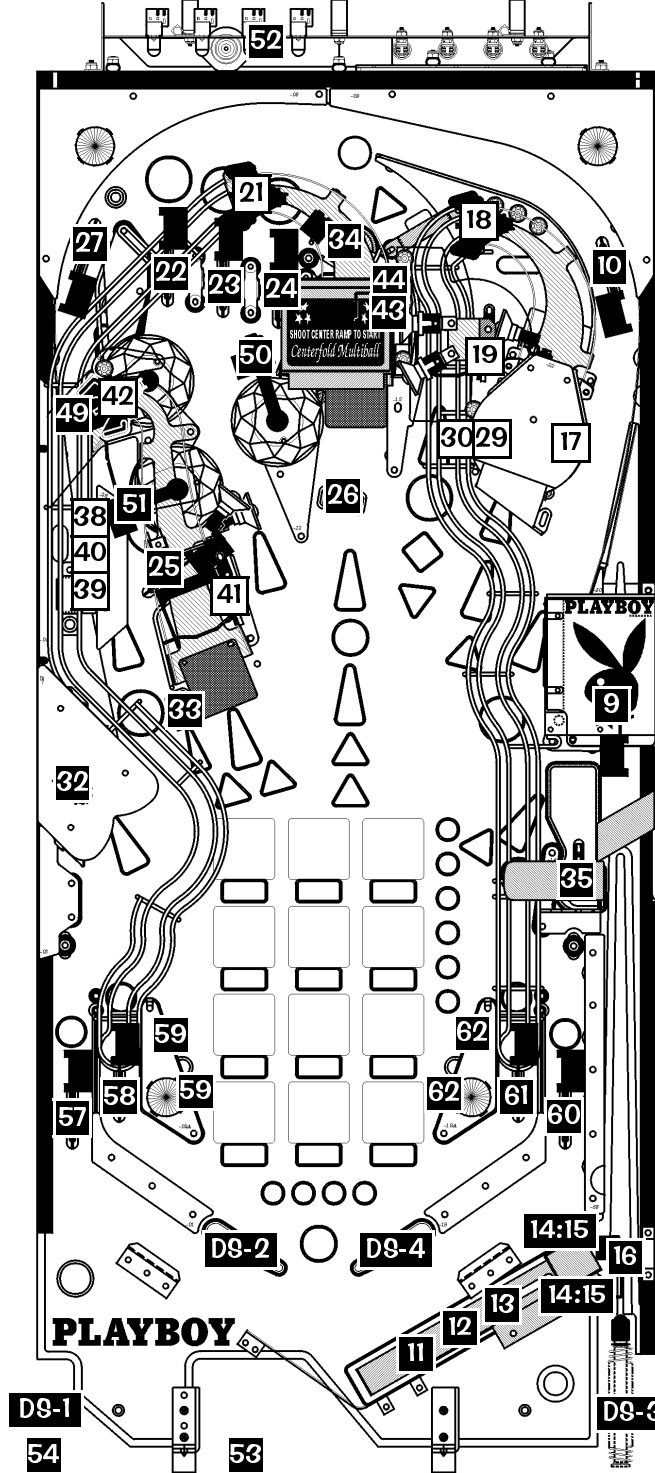
or

Diode on Diode Board



# Switch Matrix Grid Descriptions with Part Numbers and Locations

The Switch locations correspond with the Switch N<sup>o</sup> in the Part Number Table shown & the Switch Matrix Grid (previous page).



## Legend Note:

□ = Switches mounted above playfield.

■ = Switches mounted below playfield.

**DOTS:** Diode On Terminal Strip or **DODB:** Diode On Diode Board.

**Note 1:** Sw. 14 / Sw. 15 have both REC/TRANS on same board.

**Note 2:** For more details, see Sec. 4, Chp. 1, Playfield - Gen. Parts...

**Note 3:** Switch sold only with Bracket and/or Target.

**Note 4:** Switch Only. For entire Button Assembly, see Sec. 4, Chp. 1, Cabinet - General Parts & Switches.

**Note 5:** Switch located in/on Cabinet.

**Note 6:** Future Use.

**Note 7:** UK Only.

Sw. N <sup>o</sup>	Col. N <sup>o</sup>	Row N <sup>o</sup>	See Notes:	Switch Matrix Description	Part N <sup>o</sup>
<i>Note: The ¥ Coin Switch (for Japan) is 180-5091-00</i>					
1	1	1	5,7	LEFT BUTTON (UK ONLY)	180-5160-00
2	1	2	5	4TH COIN SLOT	180-5024-00
3	1	3	5,6	6TH COIN SLOT	(Future Use)
4	1	4	5	RIGHT COIN SLOT	
5	1	5	5	CENTER COIN SLOT / DBA	180-5024-00
6	1	6	5	LEFT COIN SLOT	
7	1	7	5,6	5TH COIN SLOT	(UK Only)
8	1	8	5,7	RIGHT BUTTON (UK ONLY)	180-5160-00
9	2	1		SKILL SHOT	500-6227-02
10	2	2		RIGHT ORBIT	
11	2	3		4-BALL TROUGH #1 (LEFT)	
12	2	4		4-BALL TROUGH #2	180-5119-02
13	2	5		4-BALL TROUGH #3	
14	2	6	1	4-BALL TROUGH VUK OPTO	BOT TRANS: 515-5173-00 BOT REC: 515-5174-00
15	2	7	1	4-BALL STACKING OPTO	TOP TRANS: 515-5173-00 TOP REC: 515-5174-00
16	2	8		SHOOTER LANE	180-5157-00
17	3	1		RIGHT RAMP ENTER	180-5190-28
18	3	2		RIGHT RAMP EXIT	180-5190-48
19	3	3		CENTER LANE	180-5190-28
20	3	4		NOT USED	
21	3	5		CENTER RAMP EXIT	180-5190-48
22	3	6	2,3	LEFT TOP LANE	
23	3	7	2,3	MIDDLE TOP LANE	
24	3	8	2,3	RIGHT TOP LANE	500-6227-02
25	4	1	2,3	POP BUMPER EXIT	
26	4	2	D018	DROP TARGET	180-5158-00
27	4	3	2,3	LEFT ORBIT	500-6227-01
28	4	4		NOT USED	
29	4	5		TRIANGLE MECH 1 (RIGHT)	
30	4	6		TRIANGLE MECH 2 (LEFT)	180-5189-00
31	4	7		NOT USED	
32	4	8	2,3	PEEK-A-BOO TARGET	500-6148-01
33	5	1	2,3	SURPRISE PACKAGE TARGET	515-5967-02
34	5	2		GROTTO EJECT	180-5186-00
35	5	3	D018	VUK	180-5116-01
36	5	4		NOT USED	
37	5	5		NOT USED	
38	5	6		RAMP BALL LOCK 3	
39	5	7		RAMP BALL LOCK 1	
40	5	8		RAMP BALL LOCK 2	180-5119-02
41	6	1		LEFT RAMP ENTER	180-5190-28
42	6	2		LEFT RAMP EXIT	180-5190-48
43	6	3		CENTERFOLD 1 (CLOSED)	
44	6	4		CENTERFOLD 2 (OPEN)	180-5119-00
45	6	5		NOT USED	
46	6	6		NOT USED	
47	6	7		NOT USED	
48	6	8		NOT USED	
49	7	4		LEFT BUMPER	
50	7	2		RIGHT BUMPER	180-5015-03
51	7	3		BOTTOM BUMPER	
52	7	4		TEASE SCREW LIMIT	180-5190-48
53	7	5	4,5	TOURNAMENT BUTTON	Switch Only
54	7	6	4,5	START BUTTON	Switch Only
55	7	7		NOT USED	
56	7	8	5	PLUMB BOB TILT	HANGER 535-5319-00 CONTACT 535-7563-01
57	8	1	2,3	LEFT OUTLANE	on Rt. Mount R/O
58	8	2	2,3	LEFT RETURN LANE	on Rt. Mount R/O
59	8	3	2	LEFT SLINGSHOT	Leaf Sw. X2 180-5054-00
60	8	4	2,3	RIGHT OUTLANE	on Rt. Mount R/O
61	8	5	2,3	RIGHT RETURN LANE	on Rt. Mount R/O 500-6227-02
62	8	6	2	RIGHT SLINGSHOT	Leaf Sw. X2 180-5054-00
63	8	7		NOT USED	
64	8	8		NOT USED	

**DS:** Dedicated Switches descriptions on previous page.

Sec. 3: ... Diagnostics





## Go To Coil Menu

To initiate, from the **DIAGNOSTICS MENU**, select the "COIL" *Icon* with either the **Red "LEFT"** or **Green "RIGHT" Buttons** and press the **Black "ENTER" Button**. The coils are listed in groups. Coils **01-16** are typically High Current Coils (*although Low Current Coils may be used in these positions & will be noted*). Coils **17-32** are typically Low Current Coils. Flash Lamps are typically used in positions **26-32** (*although may be used in any position & will be noted*).

COIN DOOR IS OPEN  
PLAYFIELD HIGH POWER  
DISABLED BY  
COIN DOOR INTERLOCK

**PULL OUT** the Power Interlock Switch for operation with the Coin Door open.

**Important:** For more on troubleshooting & diagnosing, see Section 5, Chapter 4, **Printed Circuit Boards**.



## Single Coil Test

To initiate, from the **COIL MENU**, select the "TEST" *Icon* with either the **Red** or **Green Buttons** and press the **Black Button**. Ensure the **Power Interlock Switch** is pulled out. Select either the "-" or "+" *Mini-Icons*. Start with the "+" *Mini-Icon* to start the manual **Single Coil Test** from #1 (*the test runs through all Coils and Flash Lamps #1-#32 & Optional UK Only Auxilliary Positions AUX 1-3*). Press the **Black Button** on the "+" *Mini-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" *Mini-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 the **Red** or **Green Buttons** and press the **Black Button**. If still in a previous test, select the "PREV" *Mini-Icon* to return to **COIL MENU** or select either of the "<<" or ">>" *Mini-Icons* to 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 in the Backbox (*if Coils are used*). The display indicates **CYCLING COILS**.

Sec. 3: ... Diagnostics

## Coil & Flash Lamp Descriptions

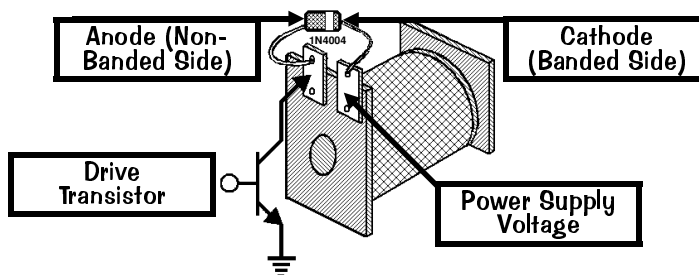
#	Type	Coil / Flash Lamp Descriptions
1	Coil	TROUGH UP-KICKER (VUK) (26-1200)
2	Coil	AUTO LAUNCH (23-700)
3	Coil	BALL LOCK POST (27-1500)
4	Coil	LEFT ORBIT POST (26-1200)
5	Coil	DROP TARGET (27-1500)
6	Coil	CENTER LANE POST (26-1200)
7	Coil	BEAD SCREEN LEFT (26-1200)
8	Coil	BEAD SCREEN RIGHT (26-1200)
9	Coil	LEFT BUMPER (26-1200)
10	Coil	RIGHT BUMPER (26-1200)
11	Coil	BOTTOM BUMPER (26-1200)
12	Coil	GROTTO EJECT (26-1200)
13	Coil	VUK (26-1200)
14	Coil	MAGAZINE POST (24-940)
15	Coil	LEFT FLIPPER [50V RED/YEL] (23-1100)
16	Coil	RIGHT FLIPPER [50V RED/YEL] (23-1100)

#	Type	Coil / Flash Lamp Descriptions
17	Coil	LEFT SLINGSHOT (23-800)
18	Coil	RIGHT SLINGSHOT (23-800)
19	Coil	DROP SCREEN STEPPER #1 (Stepper Motor)
20	Coil	DROP SCREEN STEPPER #2 (Stepper Motor)
21	Coil	DROP SCREEN STEPPER #3 (Stepper Motor)
22	Coil	TRIANGLE BILLBOARD (Relay Board)
23	Coil	DROP SCREEN STEPPER #4 (Stepper Motor)
24	Coil	(OPTIONAL COIN METER)
25	Flash	FLASH: TRIANGLE X1 (#89 Bulb)
26	Flash	FLASH: MIRROR X4 (#906 Bulb)
27	Flash	FLASH: BACK LT X1 BACK RT X1 (#906 Bulb)
28	Flash	FLASH: LT SLINGSHOT X1 (#906 Bulb)
29	Flash	FLASH: RT SLINGSHOT X1 (#906 Bulb)
30	Coil	FLASH: TRIPLE JACKPOT X1 (#89 Bulb)
31	Coil	CENTERFOLD ON/OFF (DC Relay Board)
32	Coil	CENTERFOLD OPEN/CLOSE (DC Relay Bd.)

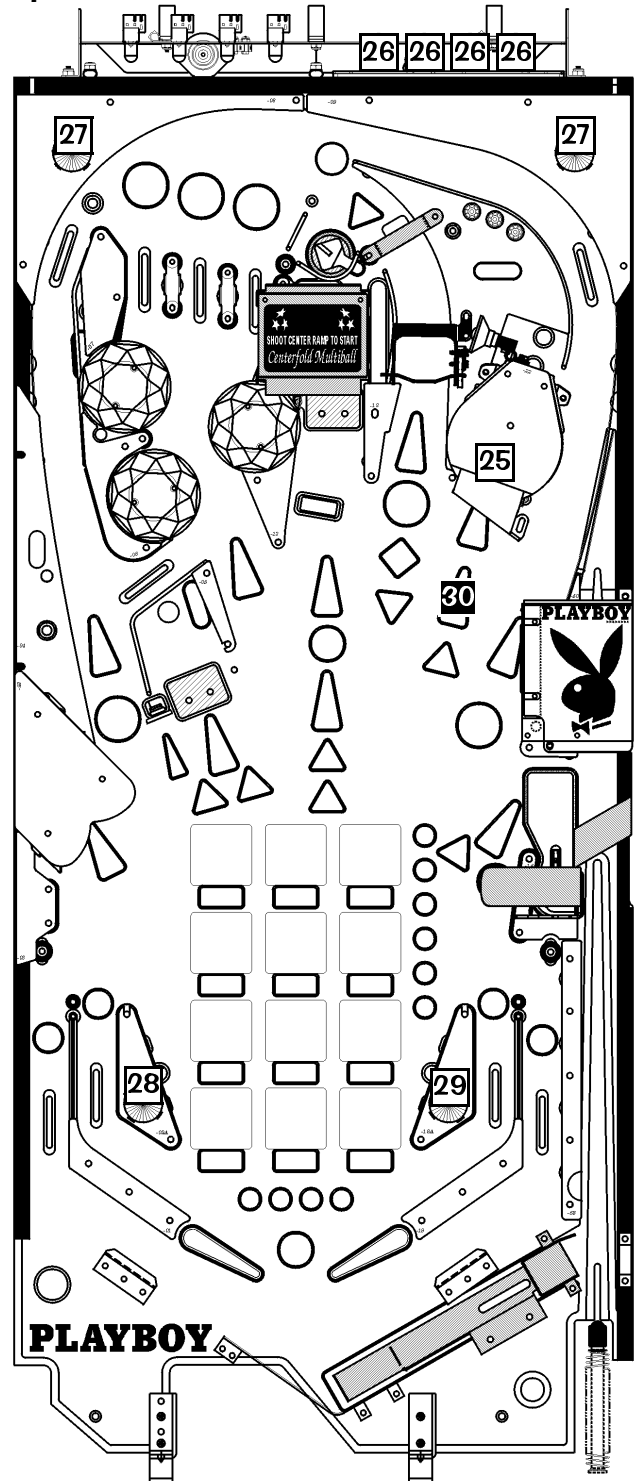
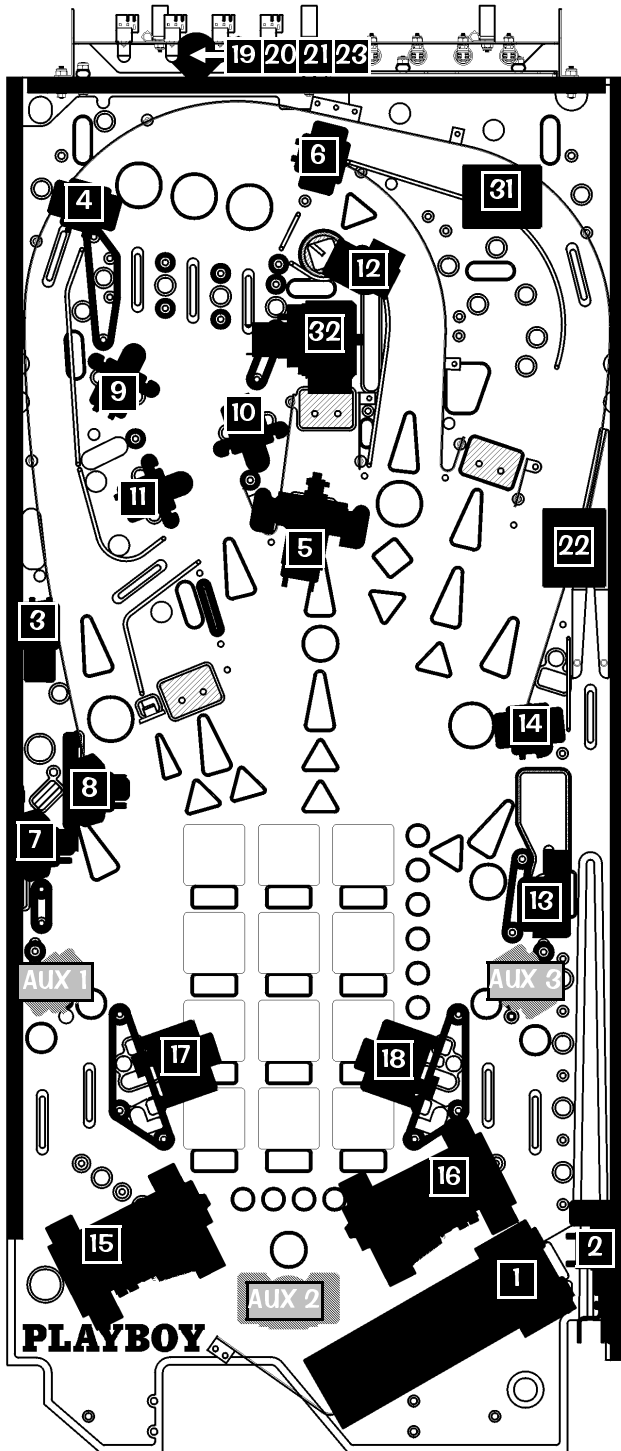
See the next three (3) pages for the **Coil & Flash Lamp Location Maps** (corresponds to above tables), **Coils Detailed Chart Table** & the **Backbox I/O Power Driver Board Detailed Wiring Diagram**.

Note: All Switch, Lamp & Coil assemblies require diodes. Some diodes are located under the playfield on Terminal Strips or Diode Boards and not on the assemblies.  $\square$  diode  $\square$  n Terminal  $\square$  trip or  $\square$  diode  $\square$  n  $\square$  diode  $\square$  board

### Typical Coil Wiring



## Coil & Flash Lamp Locations



Use the previous page and the following two (2) pages in conjunction with above **Coil** and **Flash Lamp** Maps.

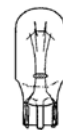
**Legend Note:**

- = Coils and Flash Lamps mounted above playfield.
- = Coils and Flash Lamps mounted below playfield.

*The following Bulb Types are used for Flash Lamps:*



**#89 Bulb**  
(Bayonet)  
165-5000-89



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

*The following Coil is optional:*

**24**

*The following Coils are for UK Only:*

**Aux. 1** **Aux. 2** **Aux. 3**

*All Coil Positions are used.*



In COIL MENU  
also select:

CYCLING  
COIL  
TEST

## 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 DC	26-1200 090-5044-00T
#2	AUTO LAUNCH	Q2	I/O Pwr. Drvr.	BRN-RED	J8-P3	YEL-VIO	J10-P4/5	50v DC	23-700 090-5022-00T
#3	BALL LOCK POST	Q3	I/O Pwr. Drvr.	BRN-ORG	J8-P4	BRN	J7-P1	20v DC	27-1500 090-5004-00T
#4	LEFT ORBIT POST	Q4	I/O Pwr. Drvr.	BRN-YEL	J8-P5	BRN	J7-P1	20v DC	26-1200 090-5044-00T
#5	DROP TARGET	Q5	I/O Pwr. Drvr.	BRN-GRN	J8-P6	YEL-VIO	J10-P4/5	50v DC	27-1500 090-5004-00B
#6	CENTER LANE POST	Q6	I/O Pwr. Drvr.	BRN-BLU	J8-P7	BRN	J7-P1	20v DC	26-1200 090-5044-00T
#7	BEAD SCREEN LEFT	Q7	I/O Pwr. Drvr.	BRN-VIO	J8-P8	YEL-VIO	J10-P4/5	50v DC	26-1200 090-5044-00T
#8	BEAD SCREEN RIGHT	Q8	I/O Pwr. Drvr.	BRN-GRY	J8-P9	YEL-VIO	J10-P4/5	50v DC	26-1200 090-5044-00T

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
#9	LEFT BUMPER	Q9	I/O Pwr. Drvr.	BLU-BRN	J9-P1	YEL-VIO	J10-P4/5	50v DC	26-1200 090-5044-00T
#10	RIGHT BUMPER	Q10	I/O Pwr. Drvr.	BLU-RED	J9-P2	YEL-VIO	J10-P4/5	50v DC	26-1200 090-5044-00T
#11	BOTTOM BUMPER	Q11	I/O Pwr. Drvr.	BLU-ORG	J9-P4	YEL-VIO	J10-P4/5	50v DC	26-1200 090-5044-00T
#12	GROTTO EJECT	Q12	I/O Pwr. Drvr.	BLU-YEL	J9-P5	YEL-VIO	J10-P4/5	50v DC	26-1200 090-5044-00T
#13	VUK	Q13	I/O Pwr. Drvr.	BLU-GRN	J9-P6	YEL-VIO	J10-P4/5	50v DC	26-1200 090-5044-00T
#14	MAGAZINE POST	Q14	I/O Pwr. Drvr.	BLU-BLK	J9-P7	BRN	J7-P1	20v DC	24-940 090-5036-00B
#15	LEFT FLIPPER (50v RED/YEL)	Q15	I/O Pwr. Drvr.	ORG-GRY	J9-P8	RED-YEL GRY-YEL	J10-P1/2	50v DC	23-1100 090-5030-00T
#16	RIGHT FLIPPER (50v RED/YEL)	Q16	I/O Pwr. Drvr.	ORG-VIO	J9-P9	RED-YEL BLU-YEL	J10-P1/2	50v DC	23-1100 090-5030-00T

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 Meter #
#17	LEFT SLINGSHOT	Q17	I/O Pwr. Drvr.	VIO-BRN	J7-P2	BRN	J7-P1	20v DC	23-800 090-5001-00T
#18	RIGHT SLINGSHOT	Q18	I/O Pwr. Drvr.	VIO-RED	J7-P3	BRN	J7-P1	20v DC	23-800 090-5001-00T
#19	DROP SCREEN STEPPER #1	Q19	I/O Pwr. Drvr.	RED	J7-P4	GRY-RED to WHT	J16-P3	20v DC	Stepr. Mtr. 041-5062-00
#20	DROP SCREEN STEPPER #2	Q20	I/O Pwr. Drvr.	GRN	J7-P6	GRY-RED to WHT	J16-P3	20v DC	Stepr. Mtr. 041-5062-00
#21	DROP SCREEN STEPPER #3	Q21	I/O Pwr. Drvr.	BLK	J7-P7	GRY-RED to WHT	J16-P3	20v DC	Stepr. Mtr. 041-5062-00
#22	TRIANGLE BILLBOARD	Q22	I/O Pwr. Drvr.	VIO-BLU	J7-P8	BRN	J7-P1	20v DC	Relay Bd. 520-5010-00
#23	DROP SCREEN STEPPER #4	Q23	I/O Pwr. Drvr.	BLU	J7-P9	GRY-RED to WHT	J16-P3	20v DC	Stepr. Mtr. 041-5062-00
#24	OPTIONAL COIN METER	Q24	I/O Pwr. Drvr.	VIO-GRY	J7-P10	RED	J16-P7	5v DC	Meter 5v 091-5000-00

Diode On Terminal Strip (if noted)

Low 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	Bulb Type
#25	FLASH: TRIANGLE X1	Q25	I/O Pwr. Drvr.	BLK-BRN	J6-P1	ORG	J6-P10	20v DC	#89 Bulb 165-5000-89
#26	FLASH: MIRROR X4	Q26	I/O Pwr. Drvr.	BLK-RED	J6-P2	ORG	J6-P10	20v DC	#906 Bulb 165-5004-00
#27	FLASH: BACK LT X1 BACK RT X1	Q27	I/O Pwr. Drvr.	BLK-ORG	J6-P3	ORG	J6-P10	20v DC	#906 Bulb 165-5004-00
#28	FLASH: LT SLINGSHOT X1	Q28	I/O Pwr. Drvr.	BLK-YEL	J6-P4	ORG	J6-P10	20v DC	#906 Bulb 165-5004-00
#29	FLASH: RT SLINGSHOT X1	Q29	I/O Pwr. Drvr.	BLK-GRN	J6-P5	ORG	J6-P10	20v DC	#906 Bulb 165-5004-00
#30	FLASH: TRIPLE JACPOT X1	Q30	I/O Pwr. Drvr.	BLK-BLU	J6-P6	ORG	J6-P10	20v DC	#89 Bulb 165-5000-89
#31	CENTERFOLD ON/OFF	Q31	I/O Pwr. Drvr.	BLK-VIO	J6-P7	BRN	J7-P1	20v DC	DC Relay 520-5066-00
#32	CENTERFOLD OPEN/CLOSE	Q32	I/O Pwr. Drvr.	BLK-GRY	J6-P8	BRN	J7-P1	20v DC	(Motor) 041-5075-04

Note: In Test Flash Lamps Menu ("Flash" Icon), Flashers tested are all Flash Lamps located between Q1-Q32 (This Game: Q25-Q30)

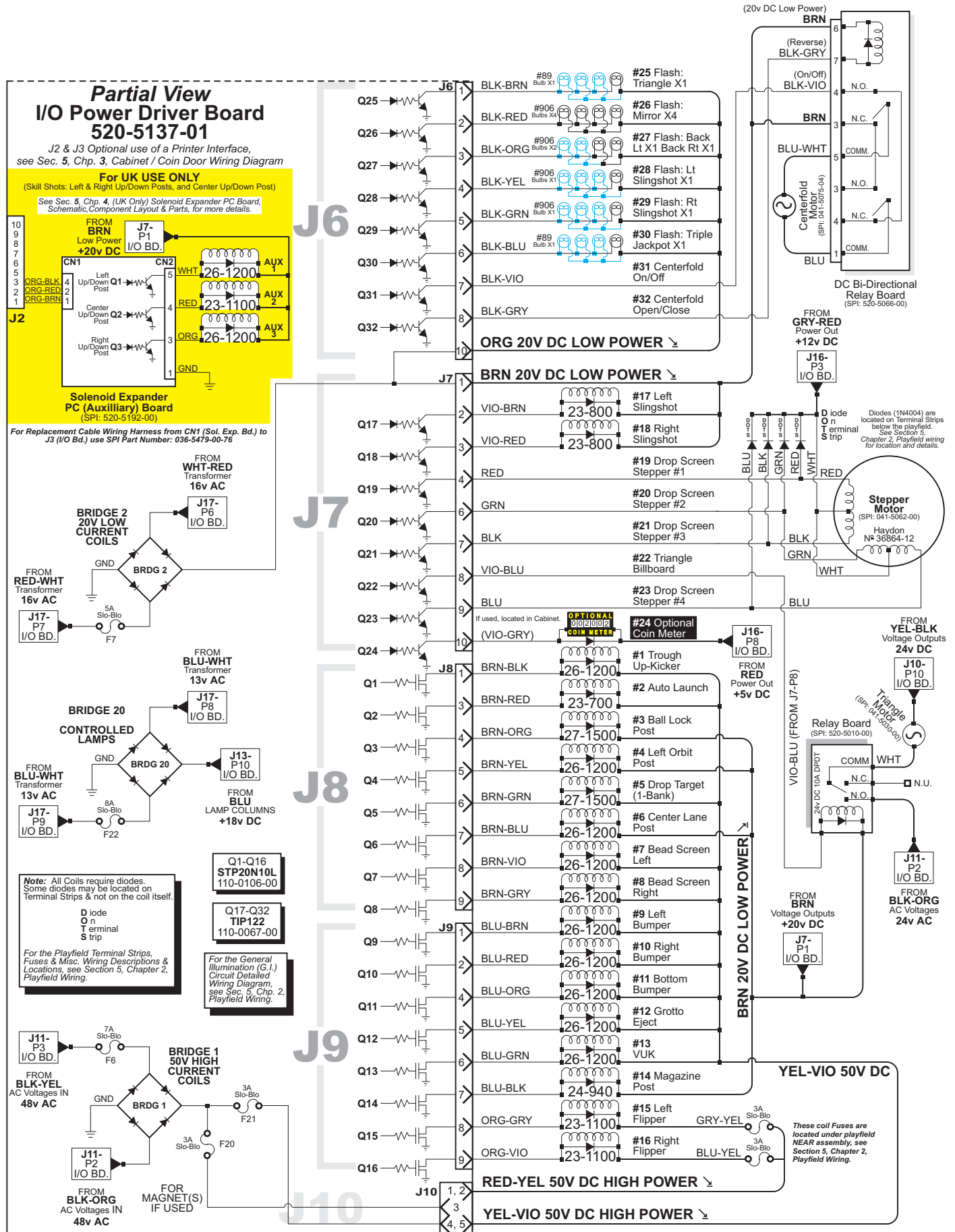
Auxiliary (UK ONLY)		Drive Transistor (D.T.)	Driver Output Board	D.T. Control Line Color	D.T. Control Line Connect	Power Line Color	Power Line Connection	Power Voltage	Coil GA-Turn
AUX 1: LEFT UP/DOWN POST	Q1	Sol. Expander (Aux. Board)	WHT	CN2-P5	BRN	J7-P1	20v DC	26-1200 090-5044-00T	
AUX 2: CENTER UP/DOWN POST	Q2	Sol. Expander (Aux. Board)	RED	CN2-P4	BRN	J7-P1	20v DC	23-1100 090-5030-00T	
AUX 3: RIGHT UP/DOWN POST	Q3	Sol. Expander (Aux. Board)	ORG	CN2-P3	BRN	J7-P1	20v DC	26-1200 090-5044-00T	

Sec. 3: ... Diagnostics





# Backbox I/O Power Driver Board Detailed Wiring Diagram





# Go To Lamp Menu

To initiate, from the **DIAGNOSTICS MENU**, select the "LAMP" *Icon* with either the **Red "LEFT"** or **Green "RIGHT"** Buttons 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 (4) parts: **Single Lamp Test**, **Test All Lamps**, **Row Lamp Test** & **Column Lamp Test**.



## Single Lamp Test

To initiate, from the **LAMP MENU**, select the "ONE" *Icon* with either the **Red or Green Buttons** and press the **Black Button**. Select either the "-" or "+" *Mini-Icons*. Start with the "+" *Mini-Icon* to start the manual **Single Lamp Test** from Column 1, Row 1, Lamp 1. Press the **Black Button** on the "+" *Mini-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" *Mini-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 the **Red or Green Buttons** and press the **Black Button**. If still in **Single Lamp Test** (or any 1 of the 4 tests), select the "PREV" *Mini-Icon* to return to **LAMP MENU** or select either of the "<<" or ">>" *Mini-Icons* to 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 Grid.



## Row & Column Lamp Tests

To initiate, from the **LAMP MENU**, select the "ROW" or "COL" *Icon* with either the **Red or Green Buttons** and press the **Black Button**. If still in a previous test, select the "PREV" *Mini-Icon* to return to **LAMP MENU** or select either of the "<<" or ">>" *Mini-Icons* to 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 Grid (respective to each test) will light-up on the playfield and is indicated in the display.



Sec. 3: ... Diagnostics

### LAMP MATRIX GRID

D iode O n T ermin al S trip :		Column (18v)	1: U17	2: U16	3: U15	4: U14	5: U13	6: U12	7: U11	8: U10
Row (GND)		YEL-BRN J13-P9	YEL-RED J13-P8	YEL-ORG J13-P7	YEL-BLK J13-P6	YEL-GRN J13-P5	YEL-BLU J13-P4	YEL-VIO J13-P3	YEL-GRY J13-P1	
1: Q33	RED-BRN J12-P1	JANUARY #555 Bulb 1	FEBRUARY #555 Bulb 2	MARCH #555 Bulb 3	MANSION 1 (LT) #555 Bulb 4	MANSION 2 #555 Bulb 5	MANSION 3 #555 Bulb 6	MANSION 4 (RT) #44 Bulb 7	SHOOT AGAIN #555 Bulb 8	
2: Q34	RED-BLK J12-P2	APRIL #555 Bulb 9	MAY #555 Bulb 10	JUNE #555 Bulb 11	LEFT OUTLANE #555 Bulb 12	LEFT RETURN LANE #555 Bulb 13	RIGHT RETURN LANE #555 Bulb 14	RIGHT OUTLANE #555 Bulb 15	PEEK-A-BOO #555 Bulb 16	
3: Q35	RED-ORG J12-P3	JULY #555 Bulb 17	AUGUST #555 Bulb 18	SEPTEMBER #555 Bulb 19	PHOTO SHOOT (LT ORBIT) #555 Bulb 20	BUNNY (LT ORBIT) #555 Bulb 21	PHOTO SHOOT (LT RAMP) #555 Bulb 22	SPLASH (LT RAMP) #555 Bulb 23	JACKPOT (LT RAMP) #555 Bulb 24	
4: Q36	RED-YEL J12-P4	OCTOBER #555 Bulb 25	NOVEMBER #555 Bulb 26	DECEMBER #555 Bulb 27	SURPRISE PACKAGE #555 Bulb 28	TEASE #555 Bulb 29	DROP TARGET #555 Bulb 30	MULTIBALL #555 Bulb 31	PAJAMA PARTY MULTIBALL #555 Bulb 32	
5: Q37	RED-GRN J12-P5	BUNNY #1 (BOTTOM) #555 Bulb 33	BUNNY #2 #555 Bulb 34	BUNNY #3 #555 Bulb 35	BUNNY #4 #555 Bulb 36	BUNNY #5 #555 Bulb 37	BUNNY #10 #555 Bulb 38	NOT USED 39	LEFT TOP LANE #555 Bulb 40	
6: Q38	RED-BLU J12-P6	MIDDLE TOP LANE #555 Bulb 41	RIGHT TOP LANE #555 Bulb 42	PHOTO SHOOT (CENTER) #555 Bulb 43	EXTRA BALL #555 Bulb 44	GROTTO ARROW #555 Bulb 45	PAJAMA PARTY HURRY-UP #555 Bulb 46	MYSTERY #555 Bulb 47	PHOTO SHOOT (RT RAMP) #555 Bulb 48	
7: Q39	RED-VIO J12-P8	NOT USED 49	SPLASH (RT RAMP) #555 Bulb 50	PHOTO SHOOT (RT ORBIT) #555 Bulb 51	BUNNY (RT ORBIT) #555 Bulb 52	PHOTO SHOOT (VUK) #555 Bulb 53	JACKPOT HURRY-UP #555 Bulb 54	SPECIAL #555 Bulb 55	MAGAZINE 1 & 2 #555 Bulb 56	D018
8: Q40	RED-GRY J12-P9	MAGAZINE 3 & 4 #555 Bulb 57	DOUBLE JACKPOT #555 Bulb 58	JACKPOT #555 Bulb 59	NOT USED 60	NOT USED 61	NOT USED 62	NOT USED 63	NOT USED 64	
9: Q41	RED-WHT J12-P10	NOT USED 65	NOT USED 66	PEEK-A-BOO 1 & 2 #555 Bulb 67	PEEK-A-BOO 3 #555 Bulb 68	PEEK-A-BOO 4 #555 Bulb 69	CTRFOLD SPOTLITE (RT #1) #555 Bulb 70	CTRFOLD SPOTLITE (RT #2) #555 Bulb 71	START BUTTON #555 Bulb 72	D018
10: Q42	RED J12-P11	CTRFOLD SPOTLITE (LT #2) #555 Bulb 73	STRIP POKER (LT RAMP) #555 Bulb 74	COLLECT PLAY-MATES #555 Bulb 75	CTRFOLD SPOTLITE (LT #1) #555 Bulb 76	CTRFOLD SPOTLITE (RT #3) #555 Bulb 77	LEFT BUMPER #555 Bulb 78	RIGHT & BOTTOM BUMPERS #555 Bulb 79	TOURNAMENT BUTTON #555 Bulb 80	D018





## Lamp Matrix Grid Locations

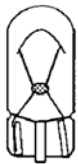
The lamp locations correspond with the Lamp N<sup>o</sup> in the Lamp Matrix Grid on the previous page.

Legend Note:

□ = Lamps mounted above playfield.

■ = Lamps mounted below playfield.

The following Bulbs are used in the Lamp Matrix Grid (See Table Grid on previous page for details):

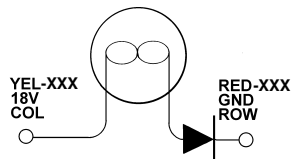


#555 Bulb (Wedge)  
165-5002-00

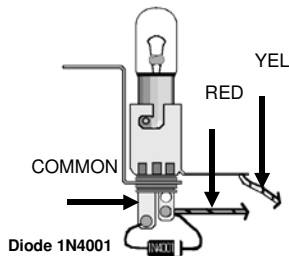


#44 Bulb (Bayonet)  
165-5000-44

### Typical Lamp Schematic



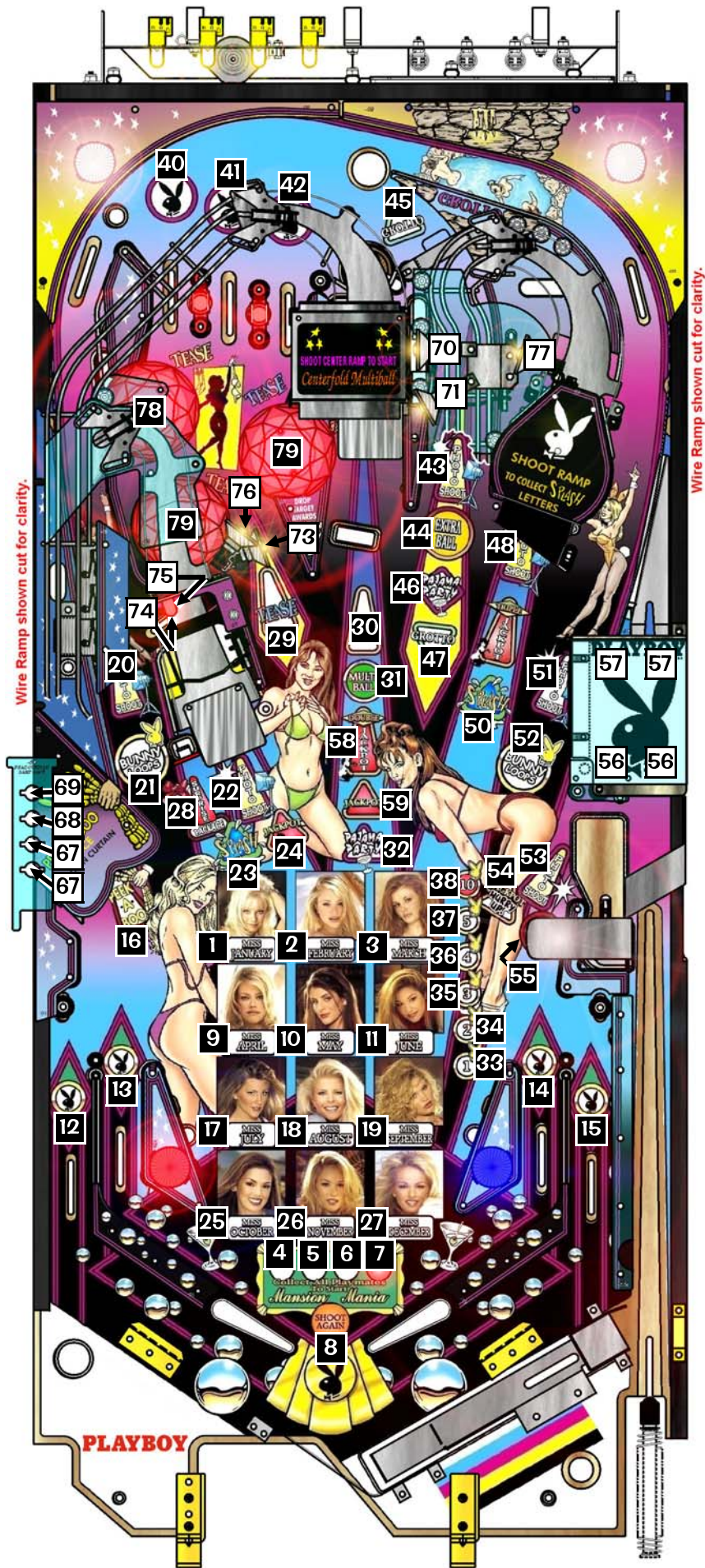
### Typical Lamp Wiring



**Note:**

All Switch, Lamp & Coil assemblies require diodes. Some diodes are located under the playfield on Terminal Strips or Diode Boards and not on the assemblies.

Diode Q.n Terminal Strip or Diode Q.n Diode Board



Wire Ramp shown cut for clarity.

Wire Ramp shown cut for clarity.

Sec. 3: ... Diagnostics





## Test Flash Lamps

To initiate, from the **DIAGNOSTICS MENU**, select the "FLASH" *Icon* with either the **Red "LEFT"** or **Green "RIGHT" Buttons** and press the **Black "ENTER" Button**. After selecting this *Icon* the display will indicate **CYCLING FLASHERS**. The Flash Lamps will cycle continuously until the test is exited. This test allows the technician to easily spot any burned-out bulbs and replace them. Flashers tested are Flash Lamps in Positions: **Q1-Q32** and in this game Flash Lamp(s) are in Position(s): **Q25-Q29**.

COIN DOOR IS OPEN  
PLAYFIELD HIGH POWER  
DISABLED BY  
COIN DOOR INTERLOCK

**PULL OUT** the Power Interlock Switch for operation with the Coin Door open.



## Clear Ball Trough

To initiate, from the **DIAGNOSTICS MENU**, select the "CLR" *Icon* with either the **Red "LEFT"** or **Green "RIGHT" Buttons** and press the **Black "ENTER" Button**. This Menu 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" *Mini-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**.

COIN DOOR IS OPEN  
PLAYFIELD HIGH POWER  
DISABLED BY  
COIN DOOR INTERLOCK

**PULL OUT** the Power Interlock Switch for operation with the Coin Door open.

**CAUTION:** Continuous use of above test may overheat the Trough Up-Kicker Coil. **▲**



## Technician Alerts

To initiate, from the **DIAGNOSTICS MENU**, select the "TECH" *Icon* with either the **Red "LEFT"** or **Green "RIGHT" Buttons** and press the **Black "ENTER" Button**. This Menu is provided to show any switch problems and/or missing pinballs. After selecting this *Icon*, the display will indicate *any or all* of the following categories: **POSSIBLY BROKEN SWITCH**, **CHECK SWITCHES** or **HYPER-SENSITIVE SWITCH** (Sw. #16, Shooter Lane, is used as an example). If more than one switch is reported, the Switch Number and Name will cycle within the category, and then will cycle the categories. To return to the **DIAGNOSTICS MENU**, select & *activate* the "PREV" *Mini-Icon*.

PLAYFIELD STATUS  
POSSIBLY BROKEN SWITCH  
#02 SHOOTER LANE  
PREV QUIT ?

PLAYFIELD STATUS  
CHECK SWITCHES  
#02 SHOOTER LANE  
PREV QUIT ?

PLAYFIELD STATUS  
HYPERSENSITIVE SWITCH  
#02 SHOOTER LANE  
PREV QUIT ?

### Switch Detection

During game play, activation of switches and operation of coils with associated switches are monitored. In programming, every switch is given a minimum & maximum value based on the game. The switches are monitored every 5 minutes of game play with a "sliding window" of 15 minutes. If a switch is determined to be faulty, game play is compensated. Switches noted as **POSSIBLY BROKEN SWITCH** should be checked, then adjusted or replaced. **Important:** A switch reported as "possibly broken" may actually be an unused switch due to **lack of usage** and **not because they're broken**. This can happen, if a switch is located in a "hard" shot position, and the players are not making the shot. Game programming will still compensate for this unplayed switch. Switches noted as **CHECK SWITCHES** are determined to be stuck closed or open depending on switch usage. Free up the switch actuator; adjust or replace if necessary. Switches noted as **HYPERSENSITIVE SWITCH** means just that, the switch should be readjusted or replace if necessary.

Determination of switch usage can be check in **Audits** (review Section 3, Chapter 3, **GO TO AUDITS MENU**). Find the associated Audit with the switch in question and check usage; compare it to commonly used switches for comparison. After any switch is checked and repaired or replaced, it's suggested to test the switch in the **PLAY TEST MENU** (see the **next page**) or **Single Coil Test** (reviewed earlier in this chapter, **Page 18**) where the associated coil to the switch can be tested as well. After correcting the problem, the switch will still be reported until the game is played and the switch is again monitored as specified above. *Only you can determine if a switch getting reported is bad or if the switch is currently not getting actuated during game play.*

Coils **are not reported** in **Technician Alerts**, however, if a faulty switch is the culprit, the switch will then be reported. This **display** is shown momentarily during **Game Mode** or **Power-Up** to alert the operator of a coil malfunction (coil doesn't energize or coil fires a multiple number of times). **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.). This alert can also appear if a switch associated with a coil (e.g. #16 Shooter Lane & #2 Auto Launch) is stuck closed (caused by a switch jam or stuck ball); the **CPU/Sound Board** will *activate* the coil approximately ten times and if the switch remains closed, the game will report this switch in **Technician Alerts** as **CHECK SWITCHES**. The display alert **PLEASE CHECK TECH REPORT** will be shown.

OPERATOR ALERT!  
#2 AUTO LAUNCH  
COIL MALFUNCTION

PLEASE CHECK  
TECH REPORT  
PORTALS->DIAG->TECH

**Technicians Alerts continued on the next page.**





## Technician Alerts Continued

While in **Technician Alerts** Menu, if the following is displayed, the game has detected 1 or more pinball(s) missing and has compensated for the lost pinball(s) to provide normal game play



**Important:** Determine where the pinball is! **Do not add pinball(s)** until it is determined the pinball(s) are indeed missing and not just stuck. If pinball(s) are added, and if the original stuck pinball has freed itself, the pinball game will not operate properly with the extra pinball(s). When the pinball is recovered, the above display will not appear the next time **Technician Alerts** is visited (a game must be played for the pinball to be determined as found).

## Pinball Detection

During game play, a ball can get trapped or stuck. If after approximately 15 seconds of inactivity or "no scoring," **Ball Search** is started. **Note:** If the pinball is in the *Plunger Lane* or "held" on the flipper, no **Ball Search** will be performed. The game will perform one **Ball Search** in an attempt to "find" or free-up the pinball. If the game does not see a switch closure (indicating the pinball has not been found), the following display will appear with a count-down timer of 20 seconds, during which **Ball Search** will continue until the timer runs out (*this feature will not happen if the game is in Competition Mode; Ball Search will continue until the pinball is found, unstuck and/or replaced manually*). The display will momentarily acknowledge the missing pinball(s). The game will provide another pinball into play and will compensate for the lost pinball. Game play will appear normal. **Note:** This detection and compensation will happen with every pinball, if each suffers the same fate of a ball trap. If **all** balls get trapped, the game cannot be played or started until the situation is rectified.



Until any missing pinball is returned to play, the game upon **Power-up**, opening the **Coin Door** or exiting **Portals™**, will continue to momentarily display the following (along with an audible sound):



## Service Phone #

To initiate, from the **DIAGNOSTICS MENU**, select the "SERV" *Icon* with either the **Red "LEFT"** or **Green "RIGHT"** **Buttons** and press the **Black "ENTER"** **Button**. After selecting this *Icon* the display will indicate a phone number to call if technical assistance is required (*In USA Code: 1-800-KICKERS*).



## Begin Play Test

To initiate, from the **DIAGNOSTICS MENU**, select the "PLAY" *Icon* with either the **Red "LEFT"** or **Green "RIGHT"** **Buttons** 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 Shooter Lane switch, the Autoplunger should fire. If it kicks too 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 "Ejects", Slingshots, Vertical Up-Kickers, Pop Bumpers, etc. in the game. For unique Play Test functions, select the "GAME NAME" **TEST(S)** *Icon* in the **DIAGNOSTICS MENU**.



**PULL OUT** the Power Interlock Switch for operation with the Coin Door open.



## Fire Knocker

To initiate, from the **DIAGNOSTICS MENU**, select the "KNOCKER" *Icon* with either the **Red "LEFT"** or **Green "RIGHT"** **Buttons** and press the **Black "ENTER"** **Button**. The digitally mastered "Knocker" is sounded.



## Sound / Speaker Test

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

**Note:** During Sound Tests, the display shows the speaker identification and the corresponding sound(s). The sound functions allow verification that both channels are functioning properly & that the speaker connections are correct.

*Sound / Speaker Test continued on the next page.*



# Sound / Speaker Test Continued

## Speaker Phase Testing

Connections to each of 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 one, bass frequencies will not be produced properly and the overall sound quality will be poor. To test for proper speaker phasing, use the sound test to cycle through the Backbox & Cabinet, and Backbox Sine (repeated) functions. If the Cabinet Sine produces more volume and bass than the Left Sine, 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 Backbox Speaker **RED-WHT** Wire and the Cabinet Speaker **YEL-WHT** Wire 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-3 (**RED-BLK**) or Pin-6 (**YEL-BLK**)) each time. As the connection is made, check speaker cone movement; proper connections are indicated by outward movement.

Auto / Manual Tests	Sounds Produced
<b>Speaker Test</b>	<b>Tone</b>
<b>Sound/OPSYS EPROM (Loc. U7)</b>	<b>Level 1-3+ (Music Test)</b>
<b>Voice ROMs: 1 (U17) 2 (U21) 3 (U36) 4 (U37)</b>	<b>Speech Pattern 1-3+</b>

**Note:** For ROM Locations, see Page DR. ❶. For ROM Usage (Summary Table) see Page DR. ❸ in the "Find-It-In-Front: Dr. Pinball Section". Voice ROMs (U17, U21, U36 & U37) which are 8MB must have a Jumper at W6 on the CPU/Sound Board to function properly.

Sec. 3: ... Diagnostics



## Begin Burn In

To initiate, from the **DIAGNOSTICS MENU**, select the "BURN" *Icon* with either the **Red "LEFT"** or **Green "RIGHT"** Buttons 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. **Note:** To reset Burn-In minutes to **00** see Section 3, Chapter 6, **GO TO RESET MENU, Factory Reset**. **Caution:** Performing a Factory Reset will reset all other information as well.



## Dot Matrix Test

To initiate, from the **DIAGNOSTICS MENU**, select the "DOT TEST" *Icon* with either the **Red "LEFT"** or **Green "RIGHT"** Buttons and press the **Black "ENTER"** Button. After selecting this *Icon* the **Dot Matrix Test** immediately begins. The display will immediately illuminate & cycle for 1 pass of each test continuously for each of the following tests:

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.

**Note:** Pressing any button will exit the test & return to **DIAGNOSTICS MENU**.

## Dot Matrix Display Explained

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







## Go To Playboy Tests

To initiate, from the **DIAGNOSTICS MENU**, select the "PB" *Icon* with either the **Red "LEFT"** or **Green "RIGHT" Buttons** and press the **Black "ENTER" Button**. After selecting the "PB"

COIN DOOR IS OPEN  
PLAYFIELD HIGH POWER  
DISABLED BY  
COIN DOOR INTERLOCK



Display indicates Mech. is "Closed":



... indicates Mech. is "Inbetween Limits":



Display indicates Mech. is "Open":



Icon, the **PLAYBOY TESTS MENU** appears, with the "CF" *Icon* flashing. This Sub-Menu is used to test the operation of the **Centerfold Motor & Switches** ("CF" *Icon*), **Triangle Motor & Switches** ("TRI" *Icon*) and **Stepper Motor & Switch** ("STEP" *Icon*) (Detailed on the next page). To initiate, from the **MONOPOLY TESTS MENU**, select one of the 3 *Icons* with either the **Red** or **Green Buttons** and press the **Black Button**. After finishing the selected Test, select the "PREV" *Mini-Icon* to return to **PLAYBOY TESTS MENU** or select either of the "<<" or ">>" *Mini-Icons* to slip between the 3 Testing Sub-Menus.

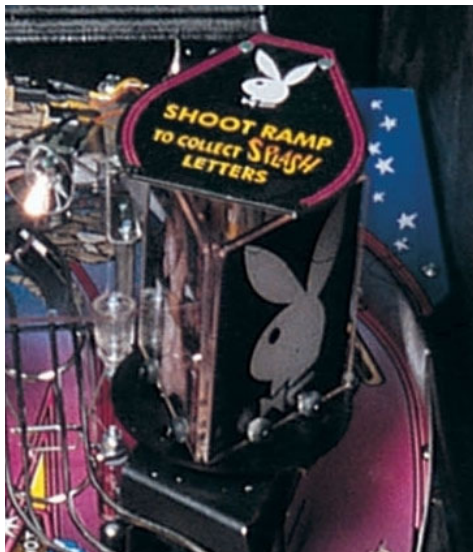


**CAUTION: Please be aware of any MOVING PARTS!**

**Note:** Upon Power-Up (quitting Portals™ initiates the "Power-Up Mode"), the all mechanisms will return to it's home position as shown.

### Centerfold Motor Test

Selecting the "CF" *Icon* will bring up the **CENTERFOLD MOTOR TEST MENU**. This test is provided to allow a method of testing the **Centerfold Motor (Open/Close) (Q32)** in conjunction with the **Motor Relay Board (On/Off) (Q31)** and the **Centerfold (Motor) Switches (Sw. 43 & Sw. 44)**. Upon entering the test, the display will indicate the status of the Relay Board (either **STOPPED** or **OPENING**) and indicated the status of either **Switch** (the "RUN" *Mini-Icon* will be flashing). Select either the "RUN" or "PULSE" *Mini-Icons*. Activating the "RUN" *Mini-Icon* will cycle the motor until the Centerfold Assembly is completely **OPEN** or **CLOSED**. Activating the "PULSE" *Mini-Icon* will pulse the motor. Watch the display, as the Centerfold **OPENS** or **CLOSES**, the switches will close (the  box will turn solid ).



### Triangle Motor Test

Selecting the "TRI" *Icon* will bring up the **TRIANGLE MOTOR TEST MENU**. This test is provided to allow a method of testing the **Triangle Billboard Motor (Rotating)** via the **Motor Relay Bd. (Q22)** & the **Triangle Mech Switches (Sw. 29 & Sw. 30)**. Upon entering the test, the display will indicate the status of either/both **Switches** (the "RUN" *Mini-Icon* will be flashing). Select the "RUN" *Mini-Icon*. Activating the "RUN" *Mini-Icon* will cycle the motor to the next switch closure state (either to the Left or Right). Watch the display, as the Triangle Billboard Assy. **ROTATES LEFT** or **RIGHT**, the **Triangle Mech #1 Switch (Sw. 29)** and/or **#2 Switch (Sw. 30)** will close (the  box will turn solid ).

**Note:** During Normal Operation, when the CPU registers the desired state change on the switches, it will turn-off the motor. There will be "overtravel" so the switches in Diagnostics will not show the proper state, though the unit is in the correct position.



... "Triple Jackpot" faces Front.



... Inbetween Positions.



... "Rabbit Head" faces Front.



... "Splash" faces Front.



Go To Playboy Tests continued on the next page.

Sec. 3: ... Diagnostics

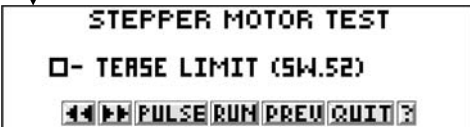
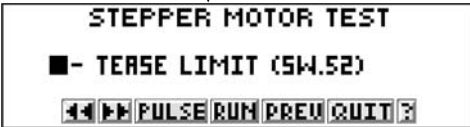


# Go To Playboy Tests Continued



**CAUTION:** Please be aware of **MOVING PARTS!**

Continued



COIN DOOR IS OPEN  
PLAYFIELD HIGH POWER  
DISABLED BY  
COIN DOOR INTERLOCK

## Stepper Motor Test

**PULL OUT** the Power Interlock Switch for operation with the Coin Door open.

Selecting the "STEP" *Icon* will bring up the **STEPPER MOTOR TEST MENU**. This test is provided to allow a method of testing the Drop Screen (Tease) Stepper Motor (Drop Screen Stepper #1: Q19, Drop Screen Stepper #2: Q20, Drop Screen Stepper #3: Q21 & Drop Screen Stepper #4: Q23) and the Tease Screw Limit Switch (Sw. 52). Upon entering the test, the display will indicate the status of the Switch (the "RUN" *Mini-Icon* will be flashing). Select either the "RUN" or "PULSE" *Mini-Icons*. Activating the "RUN" *Mini-Icon* will cycle the motor until the Drop Screen (Tease) Assembly is completely **DOWN** or **UP**. Activating the "PULSE" *Mini-Icon* will pulse the motor. Watch the display, as the Drop Screen (Tease) Assembly moves **DOWN**, the Tease Screw Limit Switch (Sw. 52) will open (the  box will turn ).

**Note:** Upon Power-Up (quitting *Portals™* initiates the "Power-Up Mode"), the mechanism will return to it's home position as shown.

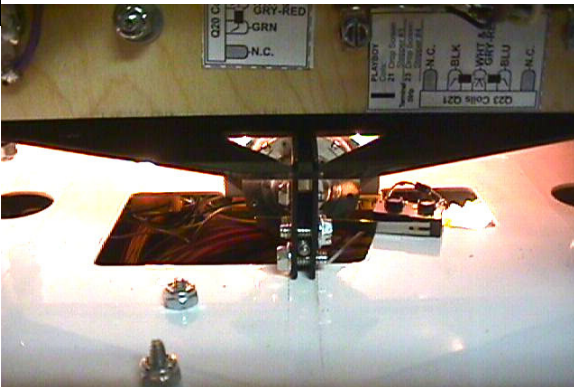
Sec. 3: ... Diagnostics



Above: Front view - Tease Screen closed.



Above: Front view - Tease Screen opening.



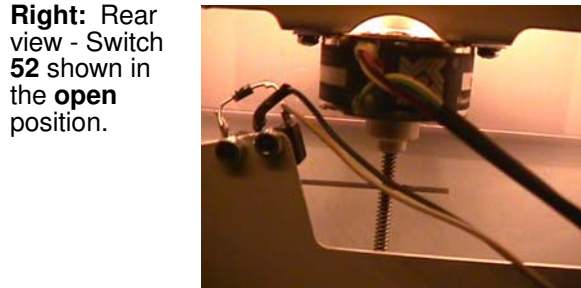
Above: Under playfield view - Tease Screen closed.



Above: Under playfield view - Tease Screen opened.



**Left:** Rear view - Switch 52 shown in the **closed** position.



**Right:** Rear view - Switch 52 shown in the **open** position.







## Go To Fuse Table

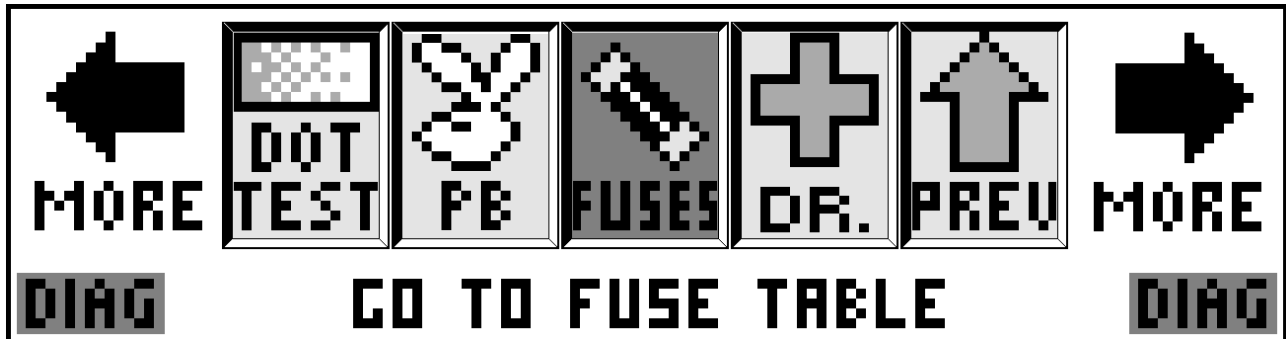
To initiate, from the **DIAGNOSTICS MENU**, select the "FUSES" *Icon* with either the Red "LEFT" or Green "RIGHT" Buttons and press the Black "ENTER" Button. The **FUSE TABLE MENU** now appears. This provides the technician with the current **Fuse Table** for this game (also noted on decal in the Backbox). The fuses are located in the Backbox (on the **Display Power Supply Board** and the **I/O Power Driver Board**), and also in the Cabinet (under the playfield by the Flippers and/or by any unique assembly requiring an additional fuse, such as magnets). For the complete **Fuse List** in the Quick Reference Fuse Chart & Pictorials, see the next page or Page DR. ❶ (front of this manual).

### Example:

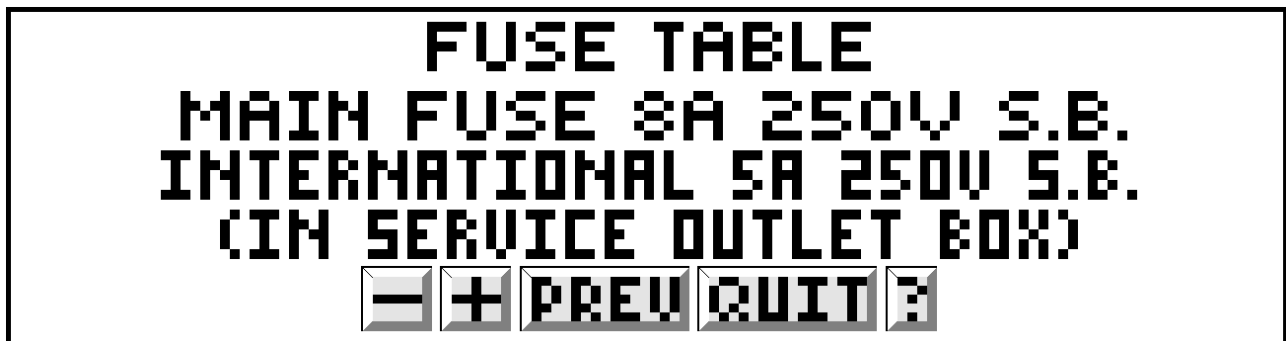
After entering **Portals™**, the **MAIN MENU** now appears with the "DIAG" *Icon* (GO TO DIAGNOSTICS MENU) flashing:



Press the Black "ENTER" Button to *activate* this **ICON**. The **DIAGNOSTICS MENU** now appears with the "SW" *Icon* (GO TO SWITCH MENU) flashing; use the Red "LEFT" or Green "RIGHT" Buttons, until the "FUSES" *Icon* (GO TO FUSE TABLE) is flashing:



Press the Black Button to *activate* this **ICON**. The **FUSE TABLE** now appears.

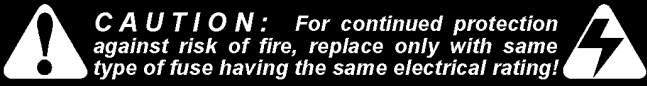


Select and *activate* the "+" *Mini-Icon* to view the next fuse in the group. Continue to select either the "+" or "-" *Mini-Icons* to view each fuse one at a time. The display will describe the fuse identification number (e.g. Main, F1, F6, F7, etc.), rating of fuse (e.g. 5A 250v S.B. - i.e. 5 Amp, 250 volt, Slo-Blo), location of fuse (i.e. Backbox: Board Name located on; or Cabinet: Under the playfield or in Service Outlet), and 'use of fuse' (e.g. 90v DC High Voltage Power, etc.). The current fuse listed will remain in the display until the next fuse is chosen or when the Sub-Menu is exited by selecting & *activating* the "PREV" or "QUIT" *Mini-Icons*.

*Go To Fuse Table continued on the next page.*



# ▼ BACKBOX LAYOUT LOCATIONS: Fuses, Bridges, Relays & ROMs ▼



## QUICK REFERENCE FUSE CHART

### Backbox Fuses

#### LOC: DISPLAY POWER SUPPLY (P.S.) BOARD

F1 3/4A 250v S.B. 90v DC High Voltage Display

#### LOC: 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	Magnet
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. Lamps (BRN-WHT to WHT-BRN)
F25	5A 250v S.B.	6.3v AC	G.I. Lamps (YEL to WHT-YEL)
F26	5A 250v S.B.	6.3v AC	G.I. Lamps (GRN to WHT-GRN)
F27	5A 250v S.B.	6.3v AC	G.I. Lamps (VIO to WHT-VIO)
F28	3A 250v S.B.	24v AC	Not Used / Spare

### Cabinet Fuses

#### LOC: SERVICE (AC) OUTLET BOX (Cabinet Bottom)

n/a 8A 250v S.B. 115v AC Main Fuse Line (Domestic or USA)

n/a 5A 250v S.B. 220v AC Main Fuse Line (International)

### Playfield Fuses

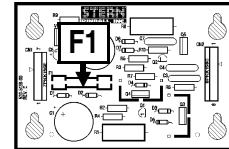
#### LOC: UNDER PLAYFIELD (near Flippers)

n/a	3A 250v S.B.	50v DC	Rt. Flipper (BLU-YEL ↔ RED-YEL)
n/a	3A 250v S.B.	50v DC	Lt. Flipper (GRY-YEL ↔ RED-YEL)
n/a	3A 250v S.B.	50v DC	Upr. Flipper (GRY-YEL ↔ RED-YEL)

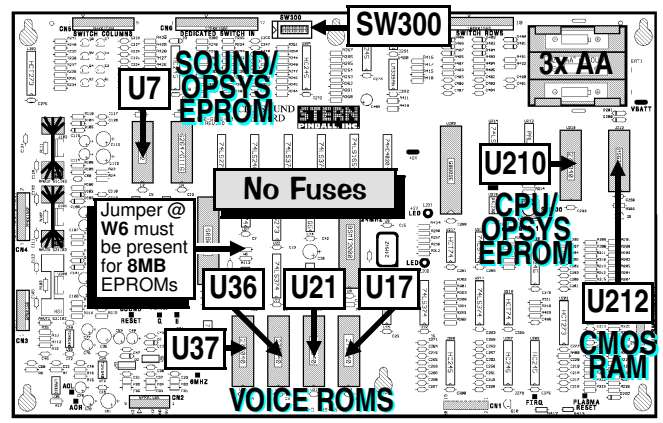
For locations & more information on fuses, see Sec. 5, Chp. 2.

For Backbox & Cabinet General Parts, review Section 4, Chapter 1, Parts Identification & Location (The Pink Pages).  
For Schematics and/or Component Parts on PC Boards shown, review Section 5, Chapter 4, Printed Circuit Boards (The Yellow Pages).

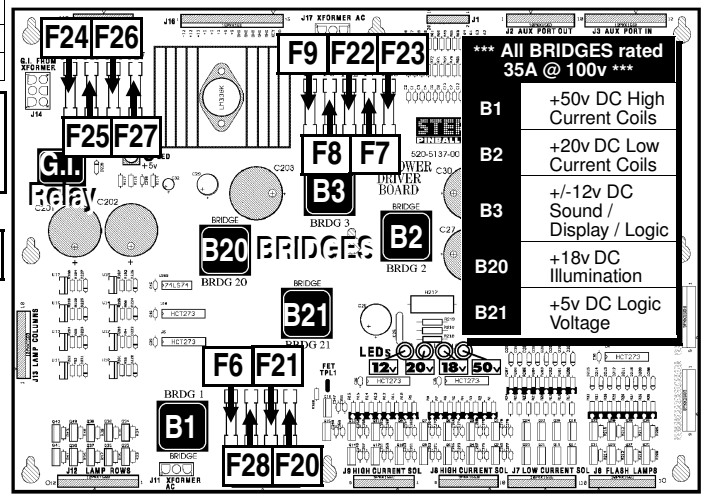
## Display Power Supply Board



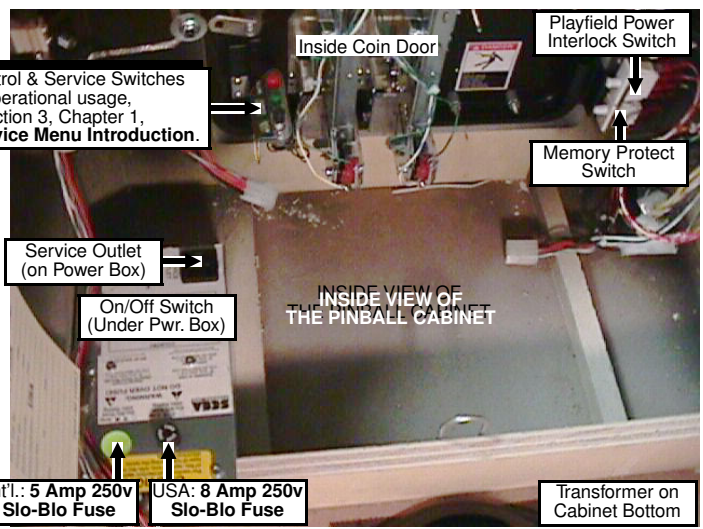
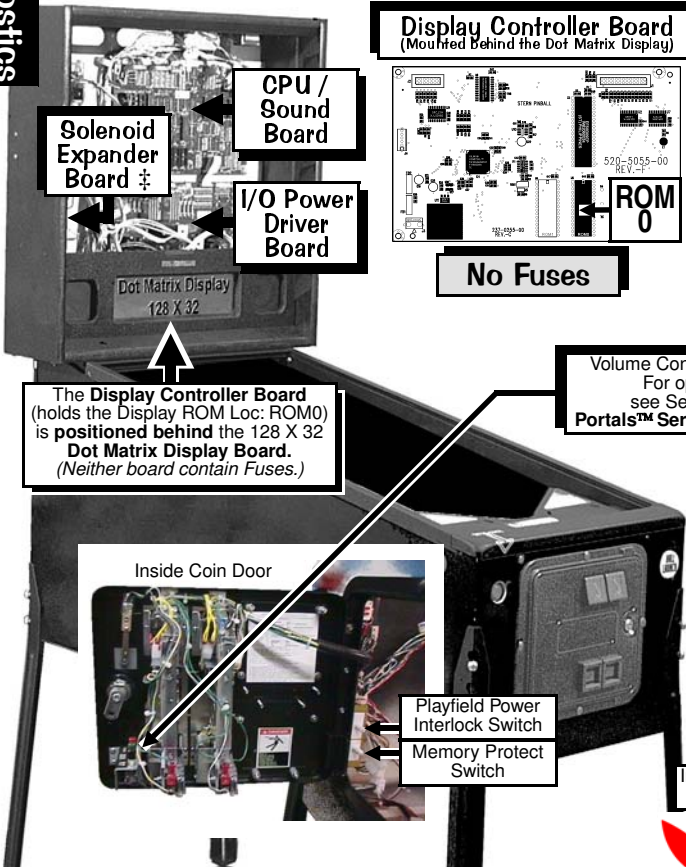
## CPU / Sound Board



## I/O Power Driver Board



Sec. 3: ... Diagnostics





## Dr. Pinball

To initiate, from the **DIAGNOSTICS MENU**, select the Cross "DR." *Icon* with either the **Red "LEFT"** or **Green "RIGHT" Buttons** 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 three (3) *Icons*: Coil "DR.", Switch "DR." and Lamp "DR." *Icons*. Selecting a particular *Icon* will give you a choice of which specific Coil (*any and all coil assemblies such as Flippers, VUKs, Magnets, etc.*), Switch or Lamp circuit needs to be diagnosed. *Dr. Pinball* will now display 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* displays a question or requests a procedure, *Dr. Pinball* 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 the **Red or Green Buttons** to "SELECT" a *Mini-Icon* and the **Black Button** to "ACTIVATE or ENTER" your selection.



## Coil Flow Chart

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

The following are the *Mini-Icons* with explanations for the **DR. PINBALL** Sub-Menus:



Select and *activate* either the "-" or "+" *Mini-Icons* to diagnose a Coil, Lamp or Switch. Select and *activate* the "RUN" *Mini-Icon* to test selected item. The "PREV" *Mini-Icon* allows you to go back to previous question. Select the "QUIT" *Mini-Icon* to exit **Portals™** completely. Select the "?" *Mini-Icon* (Help) to see directions on button usage.



Select and *activate* either the "NO" or "YES" *Mini-Icons* to answer a question given. Select and *activate* the "END" *Mini-Icon* to change to a new item to test. The "PREV" *Mini-Icon* allows you to go back to previous question. Select the "QUIT" *Mini-Icon* to exit **Portals™** completely. Select the "?" *Mini-Icon* (Help) to see directions on button usage.



After a diagnosis is given, select and *activate* the "END" *Mini-Icon* to change to a new item to test. The "PREV" *Mini-Icon* allows you to go back to previous display. Select the "QUIT" *Mini-Icon* to exit **Portals™** completely. Select the "?" *Mini-Icon* (Help) to see directions on button usage.



In **COIL FLOW CHART MENU**, select and *activate* the "PULSE" *Mini-Icon* to pulse the coil selected. Select and *activate* the "END" *Mini-Icon* to change to a new item to test. The "PREV" *Mini-Icon* allows you to go back to previous question. Select the "QUIT" *Mini-Icon* to exit **Portals™** completely. Select the "?" *Mini-Icon* (Help) to see directions on button usage.

# PHENOMY AUDIT TABLE

MAIN GO TO AUDITS MENU MAIN

VOLUME SETTING:   GAME LOCATION NAME:

STARTING METER Reading:  STARTING METER Date (MM/DD/YR):  AUDITOR'S NAME:

CURRENT METER Reading:  AUDIT Date (MM/DD/YR):  CPU Version:  DISPLAY Version:

EARNINGS AUDITS  
**01-14**

TOTAL PAID CREDITS	AVERAGE GAME TIME	COINS THRU CENTER SLOT	COINS THRU 6TH SLOT	METER CLICKS
01: <input type="text"/>	04: <input type="text"/>	07: <input type="text"/>	10: <input type="text"/>	13: <input type="text"/>
FREE GAME PERCENTAGE	COINS THRU LEFT SLOT	COINS THRU 4TH SLOT	TOTAL COINS	SOFTWARE METER
02: <input type="text"/>	05: <input type="text"/>	08: <input type="text"/>	11: <input type="text"/>	14: <input type="text"/>
AVERAGE BALL TIME	COINS THRU RIGHT SLOT	COINS THRU 5TH SLOT	TOTAL EARNINGS	
03: <input type="text"/>	06: <input type="text"/>	09: <input type="text"/>	12: <input type="text"/>	

STANDARD AUDITS  
**15-68**

TOTAL FREE PLAYS	7M - 7.5M SCORES	20M+ SCORES	TILTS	PROPRIETARY (63)
27: <input type="text"/>	36: <input type="text"/>	45: <input type="text"/>	54: <input type="text"/>	<input type="text"/>
TOTAL PLAYS	7.5M - 8M SCORES	AVERAGE SCORES	TOTAL BALLS SAVED	BASE REPLAY
28: <input type="text"/>	37: <input type="text"/>	46: <input type="text"/>	55: <input type="text"/>	64: <input type="text"/>
0 - 3M SCORES	8M - 8.5M SCORES	SERVICE CREDITS	PROPRIETARY (56)	LEFT FLIPPER USED
29: <input type="text"/>	38: <input type="text"/>	47: <input type="text"/>	<input type="text"/>	65: <input type="text"/>
3M - 4M SCORES	8.5M - 9M SCORES	BALL SEARCH STARTED	PROPRIETARY (57)	RIGHT FLIPPER USED
30: <input type="text"/>	39: <input type="text"/>	48: <input type="text"/>	<input type="text"/>	66: <input type="text"/>
4M - 5M SCORES	9M - 9.5M SCORES	LOST BALL FEEDS	PROPRIETARY (58)	PROPRIETARY (67)
31: <input type="text"/>	40: <input type="text"/>	49: <input type="text"/>	<input type="text"/>	<input type="text"/>
5M - 5.5M SCORES	9.5M - 10M SCORES	LOST BALL GAME STARTS	PROPRIETARY (59)	PROPRIETARY (68)
32: <input type="text"/>	41: <input type="text"/>	50: <input type="text"/>	<input type="text"/>	<input type="text"/>
5.5M - 6M SCORES	10M - 12M SCORES	LEFT DRAINS	PROPRIETARY (60)	<input type="text"/>
33: <input type="text"/>	42: <input type="text"/>	51: <input type="text"/>	<input type="text"/>	<input type="text"/>
6M - 6.5M SCORES	12M - 15M SCORES	CENTER DRAINS	PROPRIETARY (61)	<input type="text"/>
34: <input type="text"/>	43: <input type="text"/>	52: <input type="text"/>	<input type="text"/>	<input type="text"/>
6.5M - 7M SCORES	15M - 20M SCORES	RIGHT DRAINS	PROPRIETARY (62)	<input type="text"/>
35: <input type="text"/>	44: <input type="text"/>	53: <input type="text"/>	<input type="text"/>	<input type="text"/>

FEATURE AUDITS  
**69-172**

P'MATES LIT (PH. SHOOT)	PJ PARTY MBALL AWARDS	STRIP POKER LOSSES	EX. BALL LIT (GROTTO)	LEFT ORBITS
95: <input type="text"/>	111: <input type="text"/>	126: <input type="text"/>	142: <input type="text"/>	158: <input type="text"/>
P'MATES LIT (PEEK-A-B)	BONUS X MAXED	STRIP POKER FOLDS	SURPRISE PACKAGE LIT	RIGHT ORBITS
96: <input type="text"/>	112: <input type="text"/>	127: <input type="text"/>	143: <input type="text"/>	159: <input type="text"/>
P'MATES LIT (TEASE)	BONUS X AWARDS	2WAY COMBO (PHOTO LIT)	TOTAL SP PKG AWARDS	LEFT RAMPS
97: <input type="text"/>	113: <input type="text"/>	128: <input type="text"/>	144: <input type="text"/>	160: <input type="text"/>
P'MATES LIT (RABBIT HD)	TEASE STARTED	PHOTO SHOOT STARTS	SP PKG CTRFOLD AWDS	CENTER RAMPS
98: <input type="text"/>	114: <input type="text"/>	129: <input type="text"/>	145: <input type="text"/>	161: <input type="text"/>
P'MATES (MANSION)	2+ TEASE STARTED	2+ PHOTO SHOOT STARTS	SP PKG SPLASH AWDS	RIGHT RAMPS
99: <input type="text"/>	115: <input type="text"/>	130: <input type="text"/>	146: <input type="text"/>	162: <input type="text"/>
5 P'MATES COLLECTED	TEASE COMPLETED	PHOTO SHOOT AWARDS	SP PKG PH. SHOOT AWDS	PEEK-A-BOO HITS
100: <input type="text"/>	116: <input type="text"/>	131: <input type="text"/>	147: <input type="text"/>	163: <input type="text"/>
6/7 P'MATES COLLECTED	PEEK-A-BOO HITS	PHOTO SHOOT COMPLETED	SP PKG TEASE AWDS	BALL LOCK ARRIVALS
101: <input type="text"/>	117: <input type="text"/>	132: <input type="text"/>	148: <input type="text"/>	164: <input type="text"/>
8/9 P'MATES COLLECTED	PEEK-A-BOO COMP.	SPLASH LETTERS	SP PKG JPOT HURRY-UP	LEFT RETURN LANES
102: <input type="text"/>	118: <input type="text"/>	133: <input type="text"/>	149: <input type="text"/>	165: <input type="text"/>
10/11 P'MATES COLLECTED	2+ PEEK-A-BOO COMP.	SPLASH STARTS	SP PKG PJ MBALL AWDS	RIGHT RETURN LANES
103: <input type="text"/>	119: <input type="text"/>	134: <input type="text"/>	150: <input type="text"/>	166: <input type="text"/>
12+ P'MATES COLLECTED	PEEK-A-BOO AWARDS	2+ SPLASH STARTS	SP PKG PJ H-U AWDS	DROP TARGET HITS
104: <input type="text"/>	120: <input type="text"/>	135: <input type="text"/>	151: <input type="text"/>	167: <input type="text"/>
MANSION MANIA STARTS	STRIP POKER CARDS	SPLASH AWARDS	BUNNY LOOPS LIT	POP BUMPER HITS
105: <input type="text"/>	121: <input type="text"/>	136: <input type="text"/>	152: <input type="text"/>	168: <input type="text"/>
2+ MANSION MANIA STARTS	STRIP POKER LIT	NOT USED	BUNNY LOOP AWARDS	SURPRISE TARGET HITS
106: <input type="text"/>	122: <input type="text"/>	137: <input type="text"/>	153: <input type="text"/>	169: <input type="text"/>
MANSION MANIA JACKPOTS	STRIP POKER STARTS	GROTTO LIT	SKILL SHOTS MADE	GROTTO ARRIVALS
107: <input type="text"/>	123: <input type="text"/>	138: <input type="text"/>	154: <input type="text"/>	170: <input type="text"/>
PJ PARTY H-U STARTS	2+ STRIP POKER STARTS	GROTTO AWARDS	JPOT H-U STARTS	VUK ARRIVALS
108: <input type="text"/>	124: <input type="text"/>	139: <input type="text"/>	155: <input type="text"/>	171: <input type="text"/>
2+ PJ PARTY H-U STARTS	STRIP POKER WINS	NOT USED	2+ JPOT H-U STARTS	TOP LANE ARRIVALS
109: <input type="text"/>	125: <input type="text"/>	140: <input type="text"/>	156: <input type="text"/>	172: <input type="text"/>
PJ PARTY H-U AWARDS		EX. BALL LIT (P'MATES)	JPOT H-U AWARDS	
110: <input type="text"/>		141: <input type="text"/>	157: <input type="text"/>	





# Go To Audits Menu


## Overview

The **Portals™ Service Menu System** provides **172 Audits** for accounting purposes and for evaluation of *Game Programming*. The Audits are divided into 3 groups: • **Earnings Audits** (Audits **01-14**), • **Standard Audits** (Audits **15-68**) and • **Feature Audits (Programming Use Only)** (Audits **69-172**). Audits which are named **Proprietary** are also for *Future Expansion or Programming*. Game code may get upgraded during production; compare all Audits in the display with the manual and make any corrections to the Audit Table (*previous page*), as necessary. Audits are subject to change (with or without notice). To view Audits in the display, enter the **Portals™ Service Menu System**. For how to **RESET Audits**, see **Section 3, Chapter 6, GO TO RESET MENU**.




### EXPLANATION & USAGE OF COMMON LARGE & MINI-ICONS USED IN VARIOUS MENUS & SUB-MENUS:

*Select and activate to:*




**MORE MORE**

These non-selectable icons appear in the selected Menu only when there are MORE icons to the LEFT or to the RIGHT available for selection.




**PREU**

Select and activate to return to the PREVIOUS Menu.




**QUIT**

Select and activate to QUIT, exits & returns to the Attract Mode.



**HELP**

Select and activate to view HELP Screens of the current Menu\*.



Move LEFT or RIGHT, select previous / next or move backwards / forwards.

\* Help Note: An explanation of each Mini-Icon at that menu level will cycle continuously. To exit a display where no Mini-Icons are available for selection, pressing any button will exit the display.

## GO TO AUDITS MENU

After entering **Portals™**, the **MAIN MENU** now appears. Select the "AUD" *Icon* in the **MAIN MENU** with either the **Red "LEFT"** or **Green "RIGHT"** Buttons (the **Flipper Buttons** operates in the same manner) and press the **Black "ENTER"** Button (the **Start Button** operates in the same manner). The **AUDITS MENU** appears. Continue through this chapter for the explanation & usage of the *Icons* in the **AUDITS MENU**.

## Earnings Audits (01-14)

To initiate, from the **AUDITS MENU**, select the "EARN" *Icon* with either the **Red "LEFT"** or **Green "RIGHT"** Buttons and press the **Black "ENTER"** Button. Select and *activate* either of the ">>" *Mini-Icons* to view the next or previous Audit in this group. The display will describe the Audit Number, Audit Name and the current 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.

Aud. №	Audit Name	Audit Definition
01	<b>TOTAL PAID CREDITS</b>	Provides the total number of paid credits.
02	<b>FREE GAME PERCENTAGE</b>	Provides the percentage total by dividing Audit 27, <b>TOTAL FREE PLAYS</b> , by Audit 28, <b>TOTAL PLAYS</b> .
03	<b>AVERAGE BALL TIME</b>	In seconds, the average ball time is derived from the total play time divided by Audit 15, <b>TOTAL BALLS PLAYED</b> .
04	<b>AVERAGE GAME TIME</b>	The average game time is expressed in minutes and seconds (0:00).
05	<b>COINS THRU LEFT SLOT</b>	Provides the total number of times Coin Mech. Switch 06 was closed.
06	<b>COINS THRU RIGHT SLOT</b>	Provides the total number of times Coin Mech. Switch 04 was closed.
07	<b>COINS THRU CENTER SLOT</b>	Provides the total number of times Coin Mech. Switch 05 was closed.
08	<b>COINS THRU 4TH SLOT</b>	Provides the total number of times Coin Mech. Switch 02 was closed.
09	<b>COINS THRU 5TH SLOT</b>	Provides the total number of times Coin Mech. Switch 07 was closed.
10	<b>COINS THRU 6TH SLOT</b>	Provides the total number of times Coin Mech. Switch 03 was closed.
11	<b>TOTAL COINS</b>	Provides the total amount of coins registered through all the slots.
12	<b>TOTAL EARNINGS</b>	The total cash value accumulated since the last Factory Reset occurred. See <b>Sec. 3, Chp. 6, GO TO RESET MENU, Reset Coin Audits</b> .
13	<b>METER CLICKS</b>	Provides the total number of money clicks accumulated. Based on the country's lowest coin denomination used for the game credit.
14	<b>SOFTWARE METER</b>	Provides the continuing total of Meter Clicks. This audit cannot be reset; the display shows the constant addition of Meter Clicks.

Sec. 3: Go To Audits



# Standard Audits (15-68)

To initiate, from the **AUDITS MENU**, select the "S.P.I." *Icon* with either the **Red "LEFT"** or **Green "RIGHT" Buttons** and press the **Black "ENTER" Button**. Select and *activate* either of the ">>" *Mini-Icons* to view the next or previous Audit in this group. The display will describe the Audit Number, Audit Name and the current 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.

Aud. N <sup>o</sup>	Audit Name	Audit Definition
15	<b>TOTAL BALLS PLAYED</b>	Provides the total number of <i>Regular</i> and <i>Extra Balls</i> .
16	<b>TOTAL EXTRA BALLS</b>	Provides the total number of <i>Extra Balls</i> awarded.
17	<b>EXTRA BALLS PERCENT</b>	Provides the percentage total by dividing Audit 16, <b>TOTAL EXTRA BALLS</b> , by Audit 28, <b>TOTAL PLAYS</b> .
18	<b>REPLAY 1 AWARDS</b>	Provides the total awards ( <i>Credits, Extra Balls or Scores</i> ) for Level 1.
19	<b>REPLAY 2+ AWARDS</b>	Provides the total awards ( <i>Credits, Extra Balls or Scores</i> ) for Level 2 or higher.
20	<b>TOTAL REPLAYS</b>	Provides the total awards ( <i>Credits, Extra Balls or Scores</i> ) for exceeding replay score levels.
21	<b>REPLAY PERCENT</b>	Provides the percentage total from dividing Audit 20, <b>TOTAL REPLAYS</b> , by Audit 28, <b>TOTAL PLAYS</b> . The percentage reflects replay total awards for exceeding replay score levels.
22	<b>TOTAL SPECIALS</b>	Provides the total Awards ( <i>Credits, Extra Balls, or Scores</i> ) for making <i>Specials</i> .
23	<b>SPECIAL PERCENT</b>	Provides the percentage total by dividing Audit 22, <b>TOTAL SPECIALS</b> , by Audit 28, <b>TOTAL PLAYS</b> .
24	<b>TOTAL MATCHES</b>	Provides the total <i>Credits</i> awarded for matching the last two digits of the score with the <i>System-Generated Match Number</i> at the end of the game. Percentage of <i>Match Credits</i> is adjustable from <b>0%</b> to <b>10%</b> by Adjustment 07, <b>MATCH PERCENTAGE</b> , if enabled. See Section 3, Chapter 4, <b>GO TO ADJUSTMENTS MENU, Standard Adjustments</b> .
25	<b>HIGH SCORE AWARDS</b>	Provides the total ( <i>Credits, Extra Balls, or Scores</i> ) awarded for exceeding the High-Score-To-Date scores.
26	<b>HIGH SCORE PERCENT</b>	Provides the percentage total by dividing Audit 25, <b>HIGH SCORE AWARDS</b> , by Audit 28, <b>TOTAL PLAYS</b> .
27	<b>TOTAL FREE PLAYS</b>	Provides the total <i>Free Credits</i> for <i>Replays, High-Score-To-Date, Specials and Match</i> .
28	<b>TOTAL PLAYS</b>	This total is derived by adding the sum of Audit 01, <b>TOTAL PAID CREDITS</b> , and Audit 27, <b>TOTAL FREE PLAYS</b> . ( <i>Note that Free Credits are not recorded in the Audit until they are actually used.</i> )
29	<b>0 - 3M SCORES</b>	Provides the total number of games the Player's final score was between <b>0</b> and <b>2,999,990</b> points.
30	<b>3M - 4M SCORES</b>	Provides the total number of games the Player's final score was between <b>3,000,000</b> and <b>3,999,990</b> points.
31	<b>4M - 5M SCORES</b>	Provides the total number of games the Player's final score was between <b>4,000,000</b> and <b>4,999,990</b> points.
32	<b>5M - 5.5M SCORES</b>	Provides the total number of games the Player's final score was between <b>5,000,000</b> and <b>5,499,990</b> points.
33	<b>5.5M - 6M SCORES</b>	Provides the total number of games the Player's final score was between <b>5,500,000</b> and <b>5,999,990</b> points.
34	<b>6M - 6.5M SCORES</b>	Provides the total number of games the Player's final score was between <b>6,000,000</b> and <b>6,499,990</b> points.
35	<b>6.5M - 7M SCORES</b>	Provides the total number of games the Player's final score was between <b>6,500,000</b> and <b>6,999,990</b> points.
36	<b>7M - 7.5M SCORES</b>	Provides the total number of games the Player's final score was between <b>7,000,000</b> and <b>7,499,990</b> points.
37	<b>7.5M - 8M SCORES</b>	Provides the total number of games the Player's final score was between <b>7,500,000</b> and <b>7,999,990</b> points.
38	<b>8M - 8.5M SCORES</b>	Provides the total number of games the Player's final score was between <b>8,000,000</b> and <b>8,499,990</b> points.

Standard Audits 39-68 continued on the next page.

Sec. 3: Go To Audits





# Standard Audits Continued.

Audit Name		Audit Definition
39	<b>8.5M - 9M SCORES</b>	Provides the total number of games the Player's final score was between <b>8,500,000</b> and <b>8,999,990</b> points.
40	<b>9M - 9.5M SCORES</b>	Provides the total number of games the Player's final score was between <b>9,000,000</b> and <b>9,499,990</b> points.
41	<b>9.5M - 10M SCORES</b>	Provides the total number of games the Player's final score was between <b>9,500,000</b> and <b>9,999,990</b> points.
42	<b>10M - 12M SCORES</b>	Provides the total number of games the Player's final score was between <b>10,000,000</b> and <b>11,999,990</b> points.
43	<b>12M - 15M SCORES</b>	Provides the total number of games the Player's final score was between <b>12,000,000</b> and <b>14,999,990</b> points.
44	<b>15M - 20M SCORES</b>	Provides the total number of games the Player's final score was between <b>15,000,000</b> and <b>19,999,990</b> points.
45	<b>20M+ SCORES</b>	Provides the total number of games the Player's final score was <b>20,000,000</b> points and over.
46	<b>AVERAGE SCORES</b>	This total is derived from adding the <i>Final Score</i> of each game to a table and dividing this sum by Audit <b>28, TOTAL PLAYS</b> .
47	<b>SERVICE CREDITS</b>	Provides the total number of times the <b>Portals™ Green Button</b> (Dedicated Switch 7) was pushed in <b>Attract Mode</b> . <i>Note: For how to receive Service Credits, see Sec. 3, Chp. 1, Service Switch Set Access &amp; Use. For how to delete Service (and Paid Credits), see Section 3, Chapter 6, GO TO RESET MENU, Reset Credits.</i>
48	<b>BALL SEARCH STARTED</b>	Provides the total number of times the game performed a <i>Ball Search</i> .
49	<b>LOST BALL FEEDS</b>	Provides the total number of times the game added a pinball to play when it could not find a pinball after <i>Ball Search</i> . <i>See Sec. 3, Chp. 2, GO TO DIAGNOSTICS MENU, Technicians Alert [Pinball Detection].</i>
50	<b>LOST BALL GAME STARTS</b>	Provides the total number of times the game started with a pinball missing from the ball trough at the start of a game. <i>See Sec. 3, Chp. 2, GO TO DIAGNOSTICS MENU, Technicians Alert [Pinball Detection].</i>
51	<b>LEFT DRAINS</b>	Provides the total number of times Rollover Switch 57 was closed.
52	<b>CENTER DRAINS</b>	Provides the total number of times the pinball had drained when the last switch closed was not Switch 57 or Switch 60.
53	<b>RIGHT DRAINS</b>	Provides the total number of times Rollover Switch 60 was closed.
54	<b>TILTS</b>	Provides the total number of times Contact Switch 56 was closed.
55	<b>TOTAL BALLS SAVED</b>	Provides the total number of times this feature was used ( <i>this feature can be turned ON or OFF, see Adj. 37, FREEZE TIME in Section 3, Chp. 4, GO TO ADJUSTMENTS MENU, Standard Adjustments</i> ). This feature is enabled at the start of each pinball and is disabled as soon as a predetermined number of switches are "closed" <b>or</b> the allocated time has expired.
56-63	<b>PROPRIETARY</b>	Proprietary Audits are used for <b>Future Expansion</b> or <b>Programming</b> .
64	<b>BASE REPLAY</b>	Provides the current base <i>Replay Level Score</i> .
65	<b>LEFT FLIPPER USED</b>	Provides the total number of times the <b>Left Flipper Button</b> (Dedicated Switch 1) was pushed in <b>Game Mode</b> .
66	<b>RIGHT FLIPPER USED</b>	Provides the total number of times the <b>Right Flipper Button</b> (Dedicated Switch 3) was pushed in <b>Game Mode</b> .
67-68	<b>PROPRIETARY</b>	Proprietary Audits are used for <b>Future Expansion</b> or <b>Programming</b> .

Sec. 3: Go To Audits

Comments or Notes:

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# Feature Audits (Programming Use Only) (69-172)

To initiate, from the **AUDITS MENU**, select the "PB" Icon with either the Red "LEFT" or Green "RIGHT" Buttons and press the Black "ENTER" Button. Select and activate either of the ">>" Mini-Icons to view the next or previous Audit in this group. The display will describe the Audit Number, Audit Name and the current 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. **Audits Definition: Programming Use Only.** *The proprietary information provides the total number of times a feature was started, awarded, lit, played and/or completed (awarded); also, the total number of Switch Closures during certain modes or features are tracked (a predetermined single/multiple variations of switch closures are used to determine the lighting and/or completion of the feature stated).*

Aud. N <sup>o</sup>	Audit Name	Aud. N <sup>o</sup>	Audit Name
69	ADV. TOWARDS CTRFOLD MB	121	STRIP POKER CARDS
70	CTRFOLD MB LIT	122	STRIP POKER LIT
71	CTRFOLD MB STARTS	123	STRIP POKER STARTS
72	2+ CTRFOLD MB STARTS	124	2+ STRIP POKER STARTS
73	CTRFOLD MB JACKPOTS	125	STRIP POKER WINS
74	CTRFOLD MB 2X JPOT LIT	126	STRIP POKER LOSSES
75	CNTFOLD MB 2X JPOTS	127	STRIP POKER FOLDS
76	CTRFOLD MB 3X JPOT LIT	128	2 WAY COMBO (PHOTO LIT)
77	CTRFOLD MB 3X JPOTS	129	PHOTO SHOOT STARTS
78	RABBIT HEADS (LOOPS)	130	2+ PHOTO SHOOT STARTS
79	RABBIT HEADS (RT RAMP)	131	PHOTO SHOOT AWARDS
80	RABBIT HEADS (T. LANES)	132	PHOTO SHOOT COMPLETED
81	RABBIT HEADS (B. LANES)	133	SPLASH LETTERS
82	TOTAL RABBIT HEADS	134	SPLASH STARTS
83	0-50 RABBIT HEADS	135	2+ SPLASH STARTS
84	51-75 RABBIT HEADS	136	SPLASH AWARDS
85	76-100 RABBIT HEADS	137	N O T U S E D
86	101-150 RABBIT HEADS	138	GROTTO LIT
87	151-200 RABBIT HEADS	139	GROTTO AWARDS
88	201-250 RABBIT HEADS	140	N O T U S E D
89	251-300 RABBIT HEADS	141	EX. BALL LIT (P'MATES)
90	301-350 RABBIT HEADS	142	EX. BALL LIT (GROTTO)
91	351-400 RABBIT HEADS	143	SURPRISE PACKAGE LIT
92	401-500 RABBIT HEADS	144	TOTAL SP PKG AWARDS
93	501+ RABBIT HEADS	145	SP PKG CTRFOLD AWDS
94	P'MATES LIT (SPLASH)	146	SP PKG SPLASH AWDS
95	P'MATES LIT (PH. SHOOT)	147	SP PKG PH. SHOOT AWDS
96	P'MATES LIT (PEEK-A-B)	148	SP PKG TEASE AWDS
97	P'MATES LIT (TEASE)	149	SP PKG JPOT HURRY-UP
98	P'MATES LIT (RABBIT HD)	150	SP PKG PJ MBALL AWDS
99	P'MATES (MANSION MANIA)	151	SP PKG PJ H-U AWDS
100	5 P'MATES COLLECTED	152	BUNNY LOOPS LIT
101	6/7 P'MATES COLLECTED	153	BUNNY LOOP AWARDS
102	8/9 P'MATES COLLECTED	154	SKILL SHOTS MADE
103	10/11 6 P'MATES COLLECTED	155	JPOT H-U STARTS
104	12+ P'MATES COLLECTED	156	2+ JPOT H-U STARTS
105	MANSION MANIA STARTS	157	JPOT H-U AWARDS
106	2+ MANSION MANIA STARTS	158	LEFT ORBITS
107	MANSION MANIA JACKPOTS	159	RIGHT ORBITS
108	PJ PARTY H-U STARTS	160	LEFT RAMPS
109	2+ PJ PARTY H-U STARTS	161	CENTER RAMPS
110	PJ PARTY H-U AWARDS	162	RIGHT RAMPS
111	PJ PARTY MBALL AWARDS	163	PEEK-A-BOO HITS
112	BONUS X MAXED	164	BALL LOCK ARRIVALS
113	BONUS X AWARDS	165	LEFT RETURN LANES
114	TEASE STARTED	166	RIGHT RETURN LANES
115	2+ TEASE STARTED	167	DROP TARGET HITS
116	TEASE COMPLETED	168	POP BUMPER HITS
117	PEEK-A-BOO HITS	169	SURPRISE TARGET HITS
118	PEEK-A-BOO COMP.	170	GROTTO ARRIVALS
119	2+ PEEK-A-BOO COMP.	171	VUK ARRIVALS
120	PEEK-A-BOO AWARDS	172	TOP LANE ARRIVALS

Sec. 3: Go To Audits





## Go To Printer Menu (OPTIONAL USE ONLY)

**Operational Usage Note:** The use of the following Sub-Menus are **OPTIONAL** and provided as a convenience only. **No special equipment or unique software (mentioned below) was included with your Pinball Game.** To initiate, from the **AUDITS MENU**, select the "PRNT" *Icon* with either the **Red "LEFT"** or **Green "RIGHT"** **Button** and press the **Black "ENTER"** **Button**. The **PRINTER MENU** appears. A **Printer Interface Board, "Hand-Held" Printer & the Alison Interface Program** are required for proper operation of these Sub-Menus. *Entering the menus & selecting/activating the Icons without the equipment mentioned, will not affect the Pinball Game nor the operation of the Portals™ Service Menu System in any way.* For information or details on the required equipment in this Menu, call or eMail Technical Support (*contact info on the back cover*).



### Quick Printout

To initiate, from the **PRINTER MENU**, select the "QUIK" *Icon* with either the **Red** or **Green Button** and press the **Black Button**. Select either the "-" or "+" *Mini-Icon* and press the **Black Button** to start the printout. Per the display instruction, the **Start Button** can also be pressed to start the printout. Only the **Earnings Audits** can be retrieved and/or printed for further processing.



### Full Printout

To initiate, from the **PRINTER MENU**, select the "ALISON" *Icon* with either the **Red** or **Green Button** and press the **Black Button**. Select either the "-" or "+" *Mini-Icon* and press the **Black Button** to start the download. Per the display instruction, the **Start Button** can also be pressed to start the download. All **Earnings, Standard & Feature Audits** can be retrieved and/or printed for further processing.



### Reset Printer

To initiate, from the **PRINTER MENU**, select the "RESET" *Icon* with either the **Red** or **Green Button** and press the **Black Button**. Select either the "-" or "+" *Mini-Icon* and press the **Black Button** to clear the "Nº of copies printed" count total appearing in the display. **Operational Usage Note:** *Activating the "QUIK" Icon (in the previous Quick Printout) without the special equipment and unique software, will still provide a "count total" in this Reset Printer Menu, which does not affect the operation of the Portals™ Service Menu System in any way.* Activating this "RESET" *Icon* will reset the "count total" in the display to **00**.

Sec. 3: Go To Audits



## AUDIT ABBREVIATIONS USED IN THIS CHAPTER:

<b>AWDS:</b> Awards	<b>COMP.:</b> Completed	<b>CTRFOLD:</b> Centerfold	<b>EX.:</b> Extra	<b>H-U:</b> Hurry-Up	<b>JPOTS:</b> Jackpots
<b>K:</b> Thousand	<b>M:</b> Million	<b>MB or MBALL:</b> Multiball	<b>P'MATES:</b> Playmates	<b>PEEK-A-B:</b> Peek-A-Boo	<b>PH.:</b> Photo
<b>PJ:</b> Pajama	<b>MANSION MANIA:</b> Playmate of the Year	<b>SH.:</b> Shot	<b>SP PKG:</b> Surprise Package		



For how to **RESET Audits**, see **Section 3, Chapter 6, GO TO RESET MENU.**





# ADJUSTMENT TABLE **PLAYBOY**

## STANDARD ADJUSTMENTS 01-46

ADJUSTMENT NAME		ADJUSTMENT NAME		ADJUSTMENT NAME	
USA DEFAULT	YOUR SETTING	USA DEFAULT	YOUR SETTING	USA DEFAULT	YOUR SETTING
01	REPLAYS: FIXED/AUTO ‡ ... 12% ...	16	HIGH SCORE #4 AWARDS 00	31	EXTRA BALL PERCENTAGE 20%
02	REPLAY LEVELS ‡ 1	17	HIGH SCORE #5 AWARDS 00	32	EXTRA BALL MEMORY ON
03	REPLAY AWARD CREDIT	18	DEFAULT HIGH SCORE #1 50,000,000	33	SPECIAL PERCENTAGE 2%
04	FREE GAME LIMIT 05	19	DEFAULT HIGH SCORE #2 40,000,000	34	SPECIAL MEMORY ON
05	EXTRA BALL LIMIT 09	20	DEFAULT HIGH SCORE #3 30,000,000	35	BILL VALIDATOR NO
06	GAME PRICING ‡ USA 5	21	DEFAULT HIGH SCORE #4 20,000,000	36	BKGRND MUSIC VOLUME 01
07	MATCH PERCENTAGE 8%	22	DEFAULT HIGH SCORE #5 10,000,000	37	FREEZE TIME AUTO
08	BALLS PER GAME 03	23	HSTD RESET COUNT 2,000	38	UK POST SAVE ENABLED † NO
09	TILT WARNINGS 01	24	HIGH SCORE INITIALS 3 INITIALS	39	TIMED PLUNGER OFF
10	REPLAY BOOST YES	25	FREE PLAY NO	40	FLIPPER BALL LAUNCH DISABLED
11	CREDIT LIMIT 30	26	CUSTOM MESSAGE ON	41	COINDOOR BALL SAVER NO
12	ALLOW HIGH SCORES YES	27	FLASH LAMP POWER NORMAL	42	COMPETITION MODE NO
13	HIGH SCORE #1 AWARDS 01	28	COIL PULSE POWER NORMAL	43	CONSOLATION BALL YES
14	HIGH SCORE #2 AWARDS 00	29	KNOCKER VOLUME NORMAL	44	PROPRIETARY
15	HIGH SCORE #3 AWARDS 00	30	GAME RESTART YES	45	LOCATION ID 01
				46	GAME ID 00

‡ Adj. 01, 02 & 06 have a "Drop-Down" Table for further customization.  
† Adj. 38 is utilized only for the UK (UK Dip Sw. Option Setting 2).

**Note:** If Game & Display ROMs other than USA are installed, along with the proper Dip Switch Settings, different Defaults will appear. If changes are made (or your Defaults are not USA), enter them with pencil in the **YOUR SETTING** spaces provided for reference.



## FEATURE ADJUSTMENTS 47-64

ADJUSTMENT NAME		ADJUSTMENT NAME		ADJUSTMENT NAME	
USA DEFAULT	YOUR SETTING	USA DEFAULT	YOUR SETTING	USA DEFAULT	YOUR SETTING
47	CENTERFOLD DIFFICULTY MODERATE	53	PHOTO SHOOT DIFFICULTY MODERATE	59	MAGAZINE ENABLED YES
48	PLAYMATES DIFFICULTY MODERATE	54	STRIP POKER DIFFICULTY MODERATE	60	PEEK-A-BOO ENABLED YES
49	PJ PARTY DIFFICULTY MODERATE	55	MANSION MANIA DIFF. MODERATE	61	ADULT CONTENT ENABLED DOTS&SOUNDSON
50	TEASE DIFFICULTY MODERATE	56	STEPPER MOTOR ENABLED YES	62	# PLAYMATES FOR EB 09
51	SPLASH DIFFICULTY MODERATE	57	CTR FOLD MOTOR ENABLED YES	63	FAST BONUS COUNTDOWN NO
52	PEEK-A-BOO DIFFICULTY MODERATE	58	TRIANGLE MTR ENABLED YES	64	PROPRIETARY 00

Shortcut to Standard Adjustment 26.





# Go To Adjustments Menu

## Overview

The **Portals™ Service Menu System** provides **64** Adjustments to vary Game Functions to customize for your particular needs. The Adjustments are divided into 2 groups: • **Standard Adjustments (01-46)** and • **Feature Adjustments (47-64)**. Adjustments which are named **Proprietary** are also for **Future Expansion** or **Programming**. Game code may get upgraded during production; compare all Adjustments in the display with the manual and make any corrections to the Adjustment Table (*previous page*), as necessary. Adjustments are subject to change (*with or without notice*). To view Adjustments in the display, enter the **Portals™ Service Menu System**. When a change is made and then the next / previous Adjustment is selected (*or the Sub-Menu is exited*), the display will momentarily flash **REQUEST INSTALLED**. For **further customization of Game Play Difficulty or Game Play Type** or how to **RESET ONLY the Adjustments**, see **Sec. 3, Chp. 5, GO TO INSTALLS MENU**.



**Important:** The **Coin Door** must be **OPEN** allowing the **Memory Protect Switch** to be disabled, so any Adjustment changes can be made.



### EXPLANATION & USAGE OF COMMON LARGE & MINI-ICONS USED IN VARIOUS MENUS & SUB-MENUS:



These *non-selectable icons* appear in the selected Menu only when there are MORE icons to the LEFT or to the RIGHT available for selection.



Select and activate to return to the PREVIOUS Menu.



Select and activate to QUIT, exits & returns to the Attract Mode.



Select and activate to view HELP Screens of the current Menu\*.



Select and activate to: Move LEFT or RIGHT, select previous / next or move backwards / forwards.



DECREMENT (-) or INCREMENT (+) displayed value or select previous / next.

\* Help Note: An explanation of each Mini-Icon at that menu level will cycle continuously. To exit a display where no Mini-Icons are available for selection, pressing any button will exit the display.



## GO TO ADJUSTMENTS MENU

After entering **Portals™**, the **MAIN MENU** now appears. Select the "ADJ" Icon in the **MAIN MENU** with either the **Red "LEFT"** or **Green "RIGHT"** Buttons (the **Flipper Buttons** operates in the same manner) and press the **Black "ENTER"** Button (the **Start Button** operates in the same manner). The **ADJUSTMENTS MENU** appears. Continue through this chapter for the explanation & usage of the *Icons* in the **ADJUSTMENTS MENU**.



## Standard Adjustments (01-46)

To initiate, from the **ADJUSTMENTS MENU**, select the "S.P.I." Icon with either the **Red "LEFT"** or **Green "RIGHT"** Buttons and press the **Black "ENTER"** Button. Select and activate either of the ">>" *Mini-Icons* to view the next or previous Adjustment in this group. Select and activate either of the "-" or "+" *Mini-Icons* to change the setting, if desired (*the Default Setting is noted in the definitions below*). The display will describe the Adjustment Number, the Adjustment Name and the current Adjustment Setting. The current Adjustment will remain in the display until the next Adjustment is chosen or when the Sub-Menu is exited.

Adj. N <sup>o</sup>	Adjustment Name	Adjustment Definition
01	REPLAYS: FIXED / AUTO	Set between <b>01% - 50%</b> and <b>Fixed (0%)</b> for Replay Levels. Default is <b>12%</b> . Four levels may be selected. Adjustments allow awarding of a credit or an extra ball as each level is exceeded. With the <b>Autopercentage Feature</b> , if the actual replay percentage is higher or lower than that desired, the game will automatically adjust for the new recommended percentage score(s).
02	REPLAY LEVELS	Set between <b>1 - 4</b> or <b>NONE</b> for the number of replay levels to be active. Default is <b>1</b> . A "Drop-Down" Table appears (after selection of number of replay levels) showing Replay Level 1. Adjust Replay Level 1 between 10M - 9.99B. Adjust Replay Level 2, 3 and/or 4 respectively.
03	REPLAY AWARD	Set to <b>CREDIT, EXTRA BALL, NONE</b> or <b>SPECIAL</b> . Default is <b>CREDIT</b> .
04	FREE GAME LIMIT	Set between <b>01 - 09</b> or <b>NO FREE GAMES</b> . Default is <b>05</b> . Set the maximum number of <i>Free Games</i> that may be accumulated per game.
05	EXTRA BALL LIMIT	Set between <b>01 - 09</b> or <b>NO EXTRA BALLS</b> . Default is <b>09</b> . Set the maximum number of <i>Extra Balls</i> that may be accumulated per game.

*Standard Adjustment 06 continued on the next page.*



# Standard Adjustments Continued.

Adjustment Name	Adjustment Definition
-----------------	-----------------------

## 06 GAME PRICING

There are two (2) methods available for *Coin Switch Programming: Standard & Custom*. Set between **USA 1** thru **EURO 12** or **CUSTOM**. *USA Factory Default Setting is USA 5.*

The Dip Switch Settings for the Country, which **must be changed on the CPU/Sound Board for correct operation**. For a **Standard** Selection (USA or International): Select & *activate* either of the "-" or "+" *Mini-Icons* to move backward or forward in the Display; With your choice appearing in the display, select & *activate* the ">>" *Mini-Icon* (to advance to **Adj. 7**) to "lock-in" change (*display will momentarily flash REQUEST INSTALLED*).

If **CUSTOM** is selected (*appears in display*), after selecting & *activating* any *Mini-Icon* (except for "-" or "+"), the display will momentarily flash **REQUEST INSTALLED** with the display "**LEFT COIN: 0 PULSE**" appearing. Use the "<<" or ">>" *Mini-Icons* to **select** the next choice (*see Table Examples below*) and the "-" or "+" *Mini-Icons* to **customize** the PULSES, CREDITS & CLICKS from **0** to **99**.

The prescribed number of **PULSES** required for **1 CREDIT** must be set according to the **Pricing Scheme** desired. Some simple calculations are required to get the proper set-up. After customizing, **test the set-up** with appropriate Coins or Bills and adjust, if necessary. **Note:** *Clicks can be changed if an optional Coin Meter is installed.*

				Example 1				LEFT COIN:	CENTER COIN:	RIGHT COIN:	FOURTH COIN:	ONE CREDIT:	BONUS 1:	BONUS 2:	BONUS 1:	BONUS 2:	LEFT COIN:	CENTER COIN:	RIGHT COIN:	FOURTH COIN:
25c	\$1.00	25c	Not Used	1 /50c	2 /75c	3 / \$1.00	3	12	3	1	4	0	0	0	0	1	4	1	1	
<b>Coin Mechanisms Used</b>				<b>Pricing Scheme Desired</b>				PULSES	PULSES	PULSES	PULSE	PULSES	PULSES	PULSES	CREDITS	CREDITS	CLICK	CLICKS	CLICK	CLICK

In **Example 1**, note the **LEFT (and RIGHT) COIN: 3 PULSES** and **ONE CREDIT: 4 PULSES**. Since every Coin inserted produces 3 Pulses and every Credit requires 4 Pulses, 2 Coins (50c) will produce 6 Pulses (4 Pulses for the 1st Credit + 2 Pulses remains in "escrow"). The third Coin (75c) provides another 3 Pulses for a total of 5 Pulses (4 Pulses for the 2nd Credit + 1 Pulse remains in "escrow"). The fourth Coin (\$1.00) provides another 3 Pulses for a total of 4 Pulses (4 Pulses for the 3rd Credit + 0 Pulses remain). The **CENTER COIN: 12 PULSES** is set this way, because the Center Coin has a Bill Validator; every \$1 Bill inserted produces 12 Pulses or 3 Credits.

Sec. 3: Adjustments

				Example 2				LEFT COIN:	CENTER COIN:	RIGHT COIN:	FOURTH COIN:	ONE CREDIT:	BONUS 1:	BONUS 2:	BONUS 1:	BONUS 2:	LEFT COIN:	CENTER COIN:	RIGHT COIN:	FOURTH COIN:
25c	\$1.00	25c	Not Used	1 /50c	2 /75c	7 / \$2.00	3	12	3	1	4	24	0	1	0	1	4	1	1	
<b>Coin Mechanisms Used</b>				<b>Pricing Scheme Desired</b>				PULSES	PULSES	PULSES	PULSE	PULSES	PULSES	PULSES	CREDIT	CREDITS	CLICK	CLICKS	CLICK	CLICK

In **Example 2**, similar to **Example 1**, however, **BONUS CREDITS** are implemented. In addition to receiving 3 plays for every \$1.00, the player is awarded an extra Credit for every 2nd dollar inserted before game start.

				Example 3				LEFT COIN:	CENTER COIN:	RIGHT COIN:	FOURTH COIN:	ONE CREDIT:	BONUS 1:	BONUS 2:	BONUS 1:	BONUS 2:	LEFT COIN:	CENTER COIN:	RIGHT COIN:	FOURTH COIN:
25c	\$1.00	25c	Not Used	1 /25c	6 / \$1.00	13 / \$2.00	5	20	5	0	4	20	40	1	0	1	4	1	1	
<b>Coin Mechanisms Used</b>				<b>Pricing Scheme Desired</b>				PULSES	PULSES	PULSES	PULSES	PULSES	PULSES	PULSES	CREDIT	CREDITS	CLICK	CLICKS	CLICK	CLICK

In **Example 3**, a **Pricing Scheme** for a cheaper game is shown. An extra Pulse is put in escrow for every 25c, thus at 4X 25c inserted, another Credit is given, and the **BONUS 1: 20 PULSES** threshold is also met, so 6 / \$1.00 is achieved. **BONUS 2: 40 PULSES** is set, so when this threshold is met with \$2.00, 13 Credits are produced.

				Example 4				LEFT COIN:	CENTER COIN:	RIGHT COIN:	FOURTH COIN:	ONE CREDIT:	BONUS 1:	BONUS 2:	BONUS 1:	BONUS 2:	LEFT COIN:	CENTER COIN:	RIGHT COIN:	FOURTH COIN:
10p	50p	£1	20p	1 /30p	2 /50p	5 / £1	1	6	15	2	3	0	0	0	0	1	4	1	1	
<b>Coin Mechanisms Used</b>				<b>Pricing Scheme Desired</b>				PULSE	PULSES	PULSES	PULSES	PULSES	PULSES	PULSES	CREDITS	CREDITS	CLICK	CLICKS	CLICK	CLICK

In **Example 4**, a **Pricing Scheme** using a different currency (British Sterling) is shown to provide another way coins (or tokens) can be utilized to custom tailor to your own needs.

**WARNING: Changes made in any Adjustments will be lost after a FACTORY RESET or removal of the CPU/Sound Board Batteries.**

The **USA Standard Pricing Select Table** (*shown below*) and the **International Standard Pricing Select Table** (*shown next page*), details the following: 1. **Dip Switch** (Sw. 300) Setting **required** on the CPU/Sound Board. 2. **Country Setting Option(s)** 3. **Coin Mechanisms:** Money values which are typically used in the Left, Center, Right and 4th Coin Slot Switches. 4. **Pricing Scheme:** Number of plays or credits for the price amount shown.

### USA Standard Pricing Select Table

CPU/SOUND BOARD DIP SWITCH 300 SETTING	COUNTRY SETTING OPTION(S)	COIN MECHANISMS (SWITCHES)				PRICING SCHEME				Requires SPI Coin Card(s) Part Number
		COINS THRU ... SLOT:				Number of Plays (Credits) for Price Amount Shown				
Pos.		LEFT	CENTER	RIGHT	4TH	See "Appendix J" for Coin Cards Examples & Info!				
ON	USA 1					1 / \$.25				755-5400-01
OFF	USA 2					1 / \$.50	2 / \$.75	3 / \$1.00		755-5400-02
	USA 3					1 / \$.50				755-5400-02
	USA 4					1 / \$.50				755-5400-02
	USA 5	»	\$ .25	\$ 1.00	\$ .25	»	1 / \$.50	5 / \$2.00	755-5400-02	755-5400-00
	USA 6					»	1 / \$.50	2 / 4 X 25c	3 / \$1.00 Bill	◀ Used to promote the Bill Validator.
	USA 7					»	1 / \$.50	4 / \$1.50	6 / \$2.00	
	USA 8					»	1 / \$.50	3 / \$1.00		755-5400-00

**Note:** The Country Setting Option for USA noted with "«" & "»" denotes the Factory Default Setting (subject to change).



# International Standard Pricing Scheme Table

CPU/SOUND BOARD DIP SWITCH 300 SETTING		COUNTRY SETTING OPTION(S)	COIN MECHANISMS (SWITCHES) COINS THRU ... SLOT:					PRICING SCHEME			Requires SPI Coin Card(s) Part Number
			LEFT	CENTER	RIGHT	4TH	5TH	Number of Plays (Credits) for Price Amount Shown See "Appendix J" for Coin Cards Examples & Info!			
For different Euro Pricing Scheme (other than below default), go to Adjustment 06 and scroll through Euro 1-12 for new setting (see end of table Euro 1-12).											
Pos. 1 2 3 4 5 6 7 8	ON	Austria Euro 9	€ .20 <i>optional</i>	€ .50	€ 1.00	€ 2.00	1 /€1.00	2 /€1.50	3 /€2.00	755-5401-09	
OFF	▼▼▼▼▼▼▼▼										
Pos. 1 2 3 4 5 6 7 8	ON	Australia 1 Australia 2	« 20¢	\$A1	\$A2	»	1 /\$A1	3 /\$A2		755-5406-00	
OFF	▼▼▼▼▼▼▼▼						1 /\$A1				
For different Euro Pricing Scheme (other than below default), go to Adjustment 06 and scroll through Euro 1-12 for new setting (see end of table Euro 1-12).											
Pos. 1 2 3 4 5 6 7 8	ON	Belgium Euro 2	€ .20 <i>optional</i>	€ .50	€ 1.00	€ 2.00	1 /€ .50	5 /€ 2.00		755-5401-02	
OFF	▼▼▼▼▼▼▼▼										
Pos. 1 2 3 4 5 6 7 8	ON	Canada	« Can\$.25	Can\$.25	Can\$1	Can\$2	»	1 /50¢	2 /75¢	3 / Can\$1	755-5400-00 or -01 or -02
OFF	▼▼▼▼▼▼▼▼										
Pos. 1 2 3 4 5 6 7 8	ON	Denmark 1 Denmark 2	« 1 DKr	5 DKr	10 DKr	20 DKr	»	1 /3 DKr	2 /5 DKr		755-5402-00
OFF	▼▼▼▼▼▼▼▼							1 /2 DKr	3 /5 DKr	7 /10 DKr	
For different Euro Pricing Scheme (other than below default), go to Adjustment 06 and scroll through Euro 1-12 for new setting (see end of table Euro 1-12).											
Pos. 1 2 3 4 5 6 7 8	ON	Finland Euro 11	€ .20 <i>optional</i>	€ .50	€ 1.00	€ 2.00	1 /€1.00	4 /€2.00		755-5401-11	
OFF	▼▼▼▼▼▼▼▼										
For different Euro Pricing Scheme (other than below default), go to Adjustment 06 and scroll through Euro 1-12 for new setting (see end of table Euro 1-12).											
Pos. 1 2 3 4 5 6 7 8	ON	France Euro 10	€ .20 <i>optional</i>	€ .50	€ 1.00	€ 2.00	1 /€1.00	3 /€2.00	7 /€3.00	755-5401-10	
OFF	▼▼▼▼▼▼▼▼										
For different Euro Pricing Scheme (other than below default), go to Adjustment 06 and scroll through Euro 1-12 for new setting (see end of table Euro 1-12).											
Pos. 1 2 3 4 5 6 7 8	ON	Germany Euro 2	€ .20 <i>optional</i>	€ .50	€ 1.00	€ 2.00	1 /€ .50	5 /€ 2.00		755-5401-02	
OFF	▼▼▼▼▼▼▼▼										
For different Euro Pricing Scheme (other than below default), go to Adjustment 06 and scroll through Euro 1-12 for new setting (see end of table Euro 1-12).											
Pos. 1 2 3 4 5 6 7 8	ON	Greece Euro 6	€ .20 <i>optional</i>	€ .50	€ 1.00	€ 2.00	2 /€ .50			755-5401-06	
OFF	▼▼▼▼▼▼▼▼										
Italy & Portugal Only: For different Euro Pricing Scheme (other than below settings), go to Adjustment 06 and scroll to Custom for this Unique Coin Door & Mech.											
Pos. 1 2 3 4 5 6 7 8	ON	Italy 1 Italy 2	« € .50		€ .50	»	1 /€ .50			755-5401-01 & 755-5401-08	
OFF	▼▼▼▼▼▼▼▼						1 /€ .50	3 /€ 2.00			
For different Euro Pricing Scheme (other than below default), go to Adjustment 06 and scroll through Euro 1-12 for new setting (see end of table Euro 1-12).											
Pos. 1 2 3 4 5 6 7 8	ON	Netherlands Euro 3	€ .20 <i>optional</i>	€ .50	€ 1.00	€ 2.00	1 /€ .50	3 /€ 1.00		755-5401-03	
OFF	▼▼▼▼▼▼▼▼										
Pos. 1 2 3 4 5 6 7 8	ON	New Zealand 1 New Zealand 2	« \$NZ1		\$NZ2	»	1 /\$NZ1			755-5406-00	
OFF	▼▼▼▼▼▼▼▼						1 /\$NZ1	3 /\$NZ2			
Pos. 1 2 3 4 5 6 7 8	ON	Norway 1 Norway 2	« 10 NKr	5 NKr	20 NKr	»	1 /5 NKr			755-5403-00	
OFF	▼▼▼▼▼▼▼▼						1 /10 NKr	3 /20 NKr			
Italy & Portugal Only: For different Euro Pricing Scheme (other than below settings), go to Adjustment 06 and scroll to Custom for this Unique Coin Door & Mech.											
Pos. 1 2 3 4 5 6 7 8	ON	Portugal	€ .50		€ .50		1 /€ .50			755-5401-01	
OFF	▼▼▼▼▼▼▼▼										
For different Euro Pricing Scheme (other than below default), go to Adjustment 06 and scroll through Euro 1-12 for new setting (see end of table Euro 1-12).											
Pos. 1 2 3 4 5 6 7 8	ON	Spain Euro 3	€ .20 <i>optional</i>	€ .50	€ 1.00	€ 2.00	1 /€ .50	3 /€ 1.00		755-5401-03	
OFF	▼▼▼▼▼▼▼▼										
Pos. 1 2 3 4 5 6 7 8	ON	Sweden 1 Sweden 2	« 1 SKr	5 SKr	10 SKr	»	1 /10 SKr	2 /15 SKr	3 /20 SKr	755-5404-00	
OFF	▼▼▼▼▼▼▼▼						1 /5 SKr				
Pos. 1 2 3 4 5 6 7 8	ON	Switzerland 1 Switzerland 2	« 1 SwF	2 SwF	5 SwF	»	1 /1 SwF	6 /5 SwF		755-5405-00	
OFF	▼▼▼▼▼▼▼▼						1 /1 SwF	3 /2 SwF	9 /5 SwF		

**Note:** The Country Setting Option for Non-Euro Countries above noted with "«" & "»" denotes the Factory Default Setting (subject to change).

Pos.	1	2	3	4	5	6	7	8	LEFT	CENTER	RIGHT	4TH	5TH	UK also utilizes the 5th Coin Slot Switch (not available with Custom Pricing).		
ON	▲	▲	▲											3 /£1	7 /£2	755-5407-00
OFF	▼													4 /£1		755-5407-01*
									10p	50p	£1	20p	£2	1 /50p	5 /£2	755-5407-01
														1 /30p	4 /£1	755-5407-01*
														1 /£1	3 /£2	755-5407-00
														3 /£2	<i>*use blank side</i>	755-5407-01*

**Note:** The Country Setting Option for Non-Euro Countries above noted with "«" & "»" denotes the Factory Default Setting (subject to change).

Pos.	1	2	3	4	5	6	7	8	Alternate Settings	LEFT	CENTER	RIGHT	4TH				
ON	S	E	E	A	B	O	V	E	Euro 1					1 /€ .50	755-5401-01		
OFF	S	E	T	T	I	N	G	S	Euro 2					1 /€ .50	5 /€ 2.00	755-5401-02	
									Euro 3					1 /€ .50	3 /€ 1.00	755-5401-03	
									Euro 4					1 /€ .50	6 /€ 2.00	755-5401-04	
									Euro 5					1 /€ .50	3 /€ 1.00	7 /€ 2.00	755-5401-05
									Euro 6	€ .20 <i>optional</i>	€ .50	€ 1.00	€ 2.00	2 /€ .50		755-5401-06	
									Euro 7					1 /€ 1.00	5 /€ 4.00	755-5401-07	
									Euro 8					1 /€ 1.00	3 /€ 2.00	755-5401-08	
									Euro 9					1 /€ 1.00	2 /€ 1.50	3 /€ 2.00	755-5401-09
									Euro 10					1 /€ 1.00	3 /€ 2.00	7 /€ 3.00	755-5401-10
									Euro 11					1 /€ 1.00	4 /€ 2.00		755-5401-11
									Euro 12					2 /€ 1.00	9 /€ 4.00		755-5401-12

Euro 1-12 are alternate settings for above countries using the Euro:  
If choosing an alternate Euro Setting other than your Country's Default, please remember to use your above noted Country Dip Switch Setting.

**Standard Adj. 07-26 continued on the next page.**





# Standard Adjustments Continued.

Adjustment Name	Adjustment Definition
07 <b>MATCH PERCENTAGE</b>	Set between <b>0%</b> - <b>10%</b> or <b>OFF</b> . Default is <b>8%</b> . At <b>0%</b> the match display occurs at the end of the game but never awards a credit.
08 <b>BALLS PER GAME</b>	Set between <b>02</b> - <b>05</b> . Default is <b>03</b> . Set the number of balls per game.
09 <b>TILT WARNINGS</b>	Set to <b>00</b> , <b>01</b> or <b>03</b> . Default is <b>01</b> . Set the number of plumb bob tilt switch closures before the ball in play is tilted.
10 <b>REPLAY BOOST</b>	Set to <b>YES</b> or <b>NO</b> . Default is <b>YES</b> . When set to <b>YES</b> , 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 ( <i>when the replay was awarded</i> ) plus 50M for each following game, until the replays have all been played ( <i>then the previous level is resumed</i> ).
11 <b>CREDIT LIMIT</b>	Set between <b>04</b> - <b>50</b> . Default is <b>30</b> . Set the maximum credits allowed.
12 <b>ALLOW HIGH SCORES</b>	Set to <b>YES</b> or <b>NO</b> . Default is <b>YES</b> . When set to <b>YES</b> if a player exceeds any 1 of the 4 High Scores, the player may receive an award ( <i>depending on Adj. 03, Replay Award</i> ). Set to <b>NO</b> to disable this feature. There are 5 High Scores that will allow the player to enter their initials ( <i>or name</i> ) ( <i>see Adj. 24, High Score Initials</i> ).
13 <b>HIGH SCORE #1 AWARDS</b>	Set between <b>00</b> - <b>05</b> . Default is <b>01</b> . Set the number of awards, awarded for exceeding Level 1 ( <i>the highest of the five (5) Levels</i> ).
14 <b>HIGH SCORE #2 AWARDS</b>	Set between <b>00</b> - <b>03</b> . Default is <b>00</b> . Set the number of awards, awarded for exceeding Level 2.
15 <b>HIGH SCORE #3 AWARDS</b>	Set between <b>00</b> - <b>02</b> . Default is <b>00</b> . Set the number of awards, awarded for exceeding Level 3.
16 <b>HIGH SCORE #4 AWARDS</b>	Set between <b>00</b> - <b>01</b> . Default is <b>00</b> . Set the number of awards, awarded for exceeding Level 4.
17 <b>HIGH SCORE #5 AWARDS</b>	Set between <b>00</b> - <b>01</b> . Default is <b>00</b> . Set the number of awards, awarded for exceeding Level 5.
18 <b>DEFAULT HIGH SCORE #1</b>	Set between <b>1,000,000</b> - <b>9,999,000,000</b> or <b>00</b> ( <i>increments of 1M</i> ). Default is <b>50,000,000</b> . Set the desired <b>High Score Level</b> to which Level 1 may be achieved ( <i>not affected by Adj. 23, HSTD Reset Count</i> ).
19 <b>DEFAULT HIGH SCORE #2</b>	Set between <b>1,000,000</b> - <b>9,999,000,000</b> or <b>00</b> ( <i>increments of 1M</i> ). Default is <b>40,000,000</b> . Set the desired <b>High Score Level</b> to which Level 2 may be achieved ( <i>not affected by Adj. 23, HSTD Reset Count</i> ).
20 <b>DEFAULT HIGH SCORE #3</b>	Set between <b>1,000,000</b> - <b>9,999,000,000</b> or <b>00</b> ( <i>increments of 1M</i> ). Default is <b>30,000,000</b> . Set the desired <b>High Score Level</b> to which Level 3 may be achieved ( <i>not affected by Adj. 23, HSTD Reset Count</i> ).
21 <b>DEFAULT HIGH SCORE #4</b>	Set between <b>1,000,000</b> - <b>9,999,000,000</b> or <b>00</b> ( <i>increments of 1M</i> ). Default is <b>20,000,000</b> . Set the desired <b>High Score Level</b> to which Level 4 may be achieved ( <i>not affected by Adj. 23, HSTD Reset Count</i> ).
22 <b>DEFAULT HIGH SCORE #5</b>	Set between <b>1,000,000</b> - <b>9,999,000,000</b> or <b>00</b> ( <i>increments of 1M</i> ). Default is <b>10,000,000</b> . Set the desired <b>High Score Level</b> to which Level 5 may be achieved ( <i>not affected by Adj. 23, HSTD Reset Count</i> ).
23 <b>HSTD RESET COUNT</b>	Set between <b>100</b> - <b>9,900</b> or <b>OFF</b> ( <i>increments of 100</i> ). Default is <b>2,000</b> . <b>HSTD</b> ( <i>High Score To Date</i> ). Set the number of games between "automatic resets of high score levels" to "backup settings" and "ball time average" adjustments. Set to <b>OFF</b> for "no reset or adjustment".
24 <b>HIGH SCORE INITIALS</b>	Set to <b>3 INITIALS</b> or <b>10 LETTER</b> . Default is <b>3 INITIALS</b> . When set to <b>3 INITIALS</b> , the player is allowed only 3 initials to input. When set to <b>10 LETTER NAME</b> , the player is allowed to enter 10 initials to input.
25 <b>FREE PLAY</b>	Set to <b>YES</b> or <b>NO</b> . Default is <b>NO</b> . When set to <b>YES</b> , no coins are required for <i>Game Play</i> .
26 <b>CUSTOM MESSAGE</b> <i>View the Custom Message Shortcut summary (end of this chapter) for how to enter text or symbols.</i>	Set to <b>ON</b> , <b>CHANGE</b> or <b>OFF</b> . Default is <b>ON</b> . When set to <b>CHANGE</b> ( <i>select the "+" Mini-Icon to change settings until "CHANGE" appears in the display, then select the "&gt;&gt;" Mini-Icon to access.</i> ) This adjustment can be accessed in two (2) ways by either selecting the "S.P.I." <i>Icon</i> and advancing to this Adjustment, <b>or</b> can be directly accessed by selecting the "ABCD CUST MSG" <i>Icon</i> in the <b>ADJUSTMENTS MENU</b> .

Sec. 3: Adjustments

Standard Adjustments 27-41 continued on the next page.





# Standard Adjustments Continued.

Adjustment Name	Adjustment Definition
27 FLASH LAMP POWER	Set to <b>NORMAL</b> , <b>DIM</b> or <b>OFF</b> . Default is <b>NORMAL</b> . When set to <b>DIM</b> , the Flash Lamps impulse power is reduced by <b>25%</b> and when set to <b>OFF</b> the Flash Lamps will not flash.
28 COIL PULSE POWER	Set to <b>NORMAL</b> , <b>HARD</b> or <b>SOFT</b> . Default is <b>NORMAL</b> . When set to <b>HARD</b> , the coil pulse power is <i>increased</i> by <b>12.5%</b> of the normal pulse rate. When set to <b>SOFT</b> the coil pulse power is <i>decreased</i> by <b>12.5%</b> of the normal pulse rate. This adj. is provided to compensate for <i>Low Line</i> or <i>High Line voltage</i> conditions where the solenoids (coils) appear to <i>kicking too weak or too hard</i> . Adjust as required.
29 KNOCKER VOLUME	Set to <b>NORMAL</b> , <b>LOW</b> or <b>OFF</b> . Default is <b>NORMAL</b> . When set to <b>LOW</b> , the volume is decreased 50%. When set to <b>OFF</b> , no sound is heard when the "knocker" is sounded.
30 GAME RESTART	Set to <b>YES</b> or <b>NO</b> . Default is <b>YES</b> . When set to <b>YES</b> , a new game may be started during any ball after the first ball is completed ( <i>if credits are available</i> ). Pressing the <b>Start Button</b> during the first ball will add additional players. When set to <b>NO</b> , the game disables the <b>Start Button</b> after the first ball until the final ball is in play. <i>Review Section 2, Chapter 1, Game Operations &amp; Features for details.</i>
31 EXTRA BALL PERCENTAGE	Set between <b>0% - 50%</b> . Default is <b>20%</b> . This adjustment allows the operator to adjust how frequently the <b>Extra Ball Feature</b> is made available to the player.
32 EXTRA BALL MEMORY	Set to <b>ON</b> or <b>OFF</b> . Default is <b>ON</b> . When set to <b>ON</b> , this feature bonus will be retained in memory from ball-to-ball for the same player. When set to <b>OFF</b> , this feature will go out at the end of each ball.
33 SPECIAL PERCENTAGE	Set between <b>0% - 5%</b> . Default is <b>2%</b> . This adjustment allows the operator to adjust how frequently the <b>Special Feature</b> is made available to the player.
34 SPECIAL MEMORY	Set to <b>ON</b> or <b>OFF</b> . Default is <b>ON</b> . When set to <b>ON</b> , this feature bonus will be retained in memory from ball-to-ball for the same player. When set to <b>OFF</b> , this feature will go out at the end of each ball.
35 BILL VALIDATOR	Set to <b>YES</b> or <b>NO</b> . Default is <b>NO</b> . When set to <b>YES</b> , in <i>Game Attract Mode</i> the Display will show an " <i>Insert Bill Animation</i> ." When set to <b>NO</b> , the Display will show an " <i>Insert Coin Animation</i> ."
36 BKGRND (BACKGROUND) MUSIC VOLUME	Set between <b>01 - 15</b> . Default is <b>01</b> . After volume is set via Portals Service Buttons ( <i>see Sec. 3, Chp. 1,...Intro</i> ) this adjustment can be utilized to adjust the background music ( <i>1 all the way on, 15 all the way off</i> ) while keeping the Special Sound FX the same level.
37 FREEZE TIME (BALL SAVE)	Set to <b>OFF</b> , <b>0:01-0:15</b> or <b>AUTO</b> . Default is <b>AUTO</b> . When set to <b>OFF</b> this feature is unavailable. Set between <b>0:01</b> through <b>0:15</b> ( <i>single increments</i> ) for the ball to be sent back into play if the time set is not met ( <i>per ball</i> ). Set to <b>AUTO</b> to automatically adjust the Freeze Timer based on the average ball time.
38 UK POST SAVE ENABLED	<b>////////// UK Only Dip Switch Must Be Set //////////</b> Set to <b>YES</b> or <b>NO</b> . Default is <b>NO</b> , ( <i>UK Default is YES</i> ). When set to <b>YES</b> this feature is available when lit. Set to <b>NO</b> to disable this feature. ( <i>UK Games have Outlane/Center Post Save Devices which are accessed in differently; Non-UK Games cannot adjust this setting.</i> )
39 TIMED PLUNGER	Set to <b>OFF</b> or <b>0:15 - 1:00</b> . Default is <b>OFF</b> . When set to <b>0:15</b> to <b>1:00</b> , the plunger will "Autoplunge" the ball ( <i>at the time set</i> ) when the ball is at the beginning of play, awaiting the skill shot by the player.
40 FLIPPER BALL LAUNCH	Set to <b>DISABLED</b> , <b>LEFT FLIPPER</b> , <b>RIGHT FLIPPER</b> , <b>EITHER FLIPPER</b> or <b>BOTH FLIPPERS</b> . Default is <b>DISABLED</b> . This feature allows the player to operate the <i>Auto Ball Launch</i> with the <b>FLIPPER BUTTON(S)</b> depending on which setting is chosen.
41 COINDOOR BALL SAVER	Set to <b>YES</b> or <b>NO</b> . Default is <b>NO</b> . When set to <b>NO</b> , this feature is not available. When set to <b>YES</b> , this feature allows the <b>Coin Door</b> to be opened during game play; the ball will drain but the game will be placed "on hold". When the <b>Coin Door</b> is closed, the pinball will return to the Shooter Lane, and the game will resume.

Sec. 3: Adjustments

*Standard Adjustments 42-46 continued on the next page.*



## Standard Adjustments Continued.

Adjustment Name	Adjustment Definition
42 COMPETITION MODE	Set to <b>YES</b> or <b>NO</b> . Default is <b>NO</b> . When set to <b>NO</b> , this feature is not available. If an <b>Install</b> of either <b>\$.50</b> or <b>Free Play Competition</b> was made ( <i>changing the default to YES</i> ), and was changed back to <b>NO</b> , the <b>COMPETITION MODE</b> will be turned <b>OFF</b> ( <i>see Sec. 3, Chp. 5, GO TO INSTALLS MENU, \$. 50 or Free Play Competition</i> ). Set to <b>YES</b> , this feature is available ( <i>required for Competition Modes</i> ); this feature will equalize random game features and global score values during multi-player games.
43 CONSOLATION BALL	Set to <b>YES</b> or <b>NO</b> . Default is <b>YES</b> . When set to <b>YES</b> , the <b>EXTRA BALL</b> ( <i>Playfield Light Insert</i> ) will be lit on the last ball in play, if certain programming criteria is met.
44 PROPRIETARY	Proprietary Adjustments are used for <b>Future Expansion</b> or <b>Programming</b> .
45 LOCATION ID	Set between <b>00</b> to <b>9999</b> . Default is <b>00</b> . This adjustment allows the operator to assign a location identification number to the audit print-out sheet. ( <i>Will not be affected by Factory Reset.</i> )
46 GAME ID	Set between <b>00</b> to <b>9999</b> . Default is <b>00</b> . This adjustment allows the operator to assign a game identification number to the audit print-out sheet. ( <i>Will not be affected by Factory Reset.</i> )



## Feature Adjustments (47-64)

To initiate, from the **ADJUSTMENTS MENU**, select the "PB" *Icon* with either the **Red "LEFT"** or **Green "RIGHT" Buttons** and press the **Black "ENTER" Button**. Select and *activate* either of the ">>" *Mini-Icons* to view the next or previous Adjustment in this group. Select and *activate* either of the "-" or "+" *Mini-Icons* to change the setting, if desired (*the Default Setting is noted in the definitions below*). The display will describe the Adjustment Number, the Adjustment Name and the current Adjustment Setting. The current Adjustment will remain in the display until the next Adjustment is chosen or when the Sub-Menu is exited.

Adj. N <sup>o</sup>	Adjustment Name	Adjustment Definition
47	CENTERFOLD DIFFICULTY	
48	PLAYMATES DIFFICULTY	
49	PJ PARTY DIFFICULTY	
50	TEASE DIFFICULTY	
51	SPLASH DIFFICULTY	Set to <b>EXEASY</b> , <b>EASY</b> , <b>MODERATE</b> , <b>HARD</b> or <b>EXHARD</b> . Default is <b>MODERATE</b> . Determines how this Feature is started and played.
52	PEEK-A-BOO DIFFICULTY	
53	PHOTO SHOOT DIFFICULTY	
54	STRIP POKER DIFFICULTY	
55	MANSION MANIA DIFF.	
56	STEPPER MOTOR ENABLED (BACKPANEL DROP SCREEN)	Set to <b>YES</b> or <b>NO</b> . Default is <b>YES</b> . When set to <b>YES</b> , the <b>Drop Screen Stepper Motor (Q19, Q20, Q21 &amp; Q22)</b> is operational. When set to <b>NO</b> , the <b>Stepper Motor</b> is disabled. Change setting to <b>NO</b> if any of the following is malfunctioning or is awaiting service and/or repair: <b>Stepper Motor (Q19, Q20, Q21 &amp; Q22)</b> and/or <b>Switch 52</b> . <i>Game programming is automatically changed to accomodate player.</i>

Feature Adjustments 57-64 continued on the next page.







# Feature Adjustments Continued.

Adjustment Name	Adjustment Definition
57 <b>CTRFOLD (CENTERFOLD) MOTOR ENABLED</b>	Set to <b>YES</b> or <b>NO</b> . Default is <b>YES</b> . When set to <b>YES</b> , the <b>DC Bi-Directional Relay Board (Q31 &amp; Q32)</b> for the <b>Centerfold Motor</b> is operational. When set to <b>NO</b> , the <b>Bi-Directional Relay Board</b> is disabled. Change setting to <b>NO</b> if any of the following is malfunctioning or is awaiting service and/or repair: <b>Bi-Directional Relay Board (Q31 &amp; Q32)</b> , <b>Centerfold Motor</b> and/or <b>Sw. 43 &amp; 44</b> . <i>Game programming is automatically changed to accomodate player.</i>
58 <b>TRIANGLE MTR (MOTOR) ENABLED (ROTATING TRIANGLE BILLBOARD)</b>	Set to <b>YES</b> or <b>NO</b> . Default is <b>YES</b> . When set to <b>YES</b> , the <b>Relay Board (Q22)</b> for the <b>Rotating Triangle Billboard Motor</b> is operational. When set to <b>NO</b> , the <b>Relay Board</b> is disabled. Change setting to <b>NO</b> if any of the following is malfunctioning or is awaiting service and/or repair: <b>Relay Board (Q22)</b> , <b>Rotating Triangle Billboard Motor</b> and/or <b>Switches 29 &amp; 30</b> . <i>Game programming is automatically changed to accomodate player.</i>
59 <b>MAGAZINE ENABLED</b>	Set to <b>YES</b> or <b>NO</b> . Default is <b>YES</b> . When set to <b>YES</b> , the <b>Magazine Assembly (Q14)</b> is operational. When set to <b>NO</b> , the <b>Coil (Q14)</b> is disabled. Change setting to <b>NO</b> if any of the following is malfunctioning or is awaiting service and/or repair: <b>Coil (Q14)</b> . <i>Game programming is automatically changed to accomodate player.</i>
60 <b>PEEK-A-BOO ENABLED (BEADED SCREEN)</b>	Set to <b>YES</b> or <b>NO</b> . Default is <b>YES</b> . When set to <b>YES</b> , the <b>Peek-A-Boo Beaded Assembly (Q7 &amp; Q8)</b> is operational. When set to <b>NO</b> , the <b>Coils (Q7 &amp; Q8)</b> are disabled. Change setting to <b>NO</b> if any of the following is malfunctioning or is awaiting service and/or repair: <b>Coil (Q7)</b> and/or <b>Coil (Q8)</b> . <i>Game programming is automatically changed to accomodate player.</i>
61 <b>ADULT CONTENT ENABLED</b>	Set to <b>DOTS &amp; SOUNDS OFF</b> , <b>DOTS &amp; SOUNDS ON</b> , <b>DOTS ON</b> or <b>SOUNDS ON</b> . Default is <b>DOTS &amp; SOUNDS ON</b> . Set to <b>DOTS &amp; SOUNDS OFF</b> to disable "adult content" in both audible (sounds and/or words) & visual (dot display graphics). To disable only the visual, select <b>DOTS OFF</b> . To disable only the sounds, select <b>SOUNDS OFF</b> .
62 <b># PLAYMATES FOR EB (EXTRA BALL)</b>	Set to <b>02</b> through <b>11</b> . Default is <b>09</b> . The <i>Extra Ball Feature</i> will be turned off after the amount set ( <i>equals the number of Game Modes Played</i> ) is achieved.
63 <b>FAST BONUS COUNTDOWN</b>	Set to <b>YES</b> or <b>NO</b> . Default is <b>NO</b> . When set to <b>NO</b> , this feature is not available. When set to <b>YES</b> , this feature is available.
64 <b>PROPRIETARY</b>	Proprietary Adjustments are used for <i>Future Expansion</i> or <i>Programming</i> .

Sec. 3: Adjustments



For further customization of Game Play Difficulty or Game Play Type or how to RESET ONLY the Adjustments, see Section 3, Chapter 5, GO TO INSTALLS MENU.



Go To Adjustments Menu

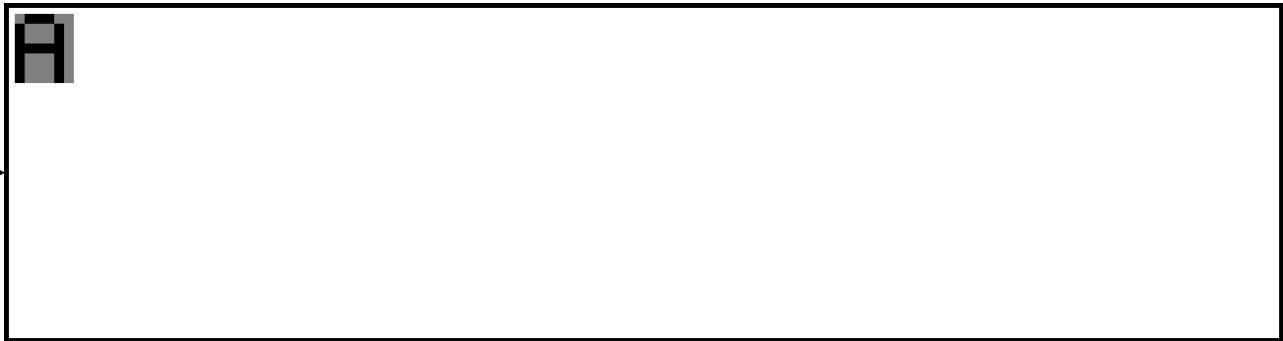
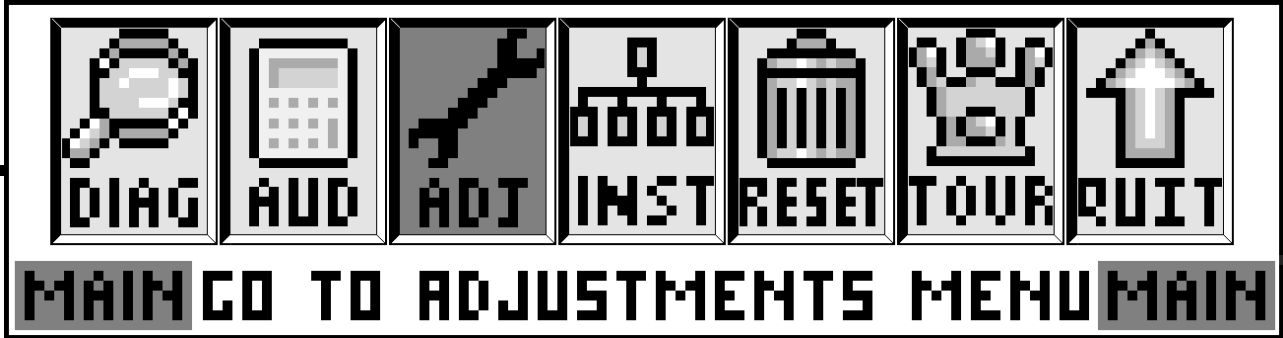


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# Custom Message

To go directly to **Adjustment 26, Custom Message**, from the **ADJUSTMENT MENU**, select the "CUST MSG" *Icon* either the **Red "LEFT"** or **Green "RIGHT" Buttons** and press the **Black "ENTER" Button**. At the top left corner of the Display, the letter **A** is indicated (*blinking*) in the first available position (*Thirty-Six (36) characters including spaces are available*). Vary the letter(s) by operating the Left and Right Flipper Buttons (or **"RED"** or **"GREEN"** Buttons). 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. Select the "<" or ">" characters to back-space (*erase*) and/or to move forward in an already typed message. After completion, press the **"BLACK" Button**, **"REQUEST INSTALLED"** is indicated and then exits this sub-menu.



Sec. 3: Adjustments



For further customization of Game Play Difficulty or Game Play Type or how to **RESET ONLY** the Adjustments, see **Section 3, Chapter 5, GO TO INSTALLS MENU**.



# Go To Installs Menu

## Overview

The Portals™ Service Menu System provides **14 Installs** to vary **Game Play Difficulty** or **Game Play Type** and **Install Factory**.



**Important:** The **Coin Door** must be **OPEN** allowing the **Memory Protect Switch** to be disabled, so any **Install** changes can be made.



For **detailed customization** or to check current **Adjustments Defaults** (either changed by **YOU** in the **Adjustments Menu** or by this **Installs Menu** or for **Factory Default Settings**), see **Section 3, Chapter 4, GO TO ADJUSTMENTS MENU**. **Important: Before preceding**, write down any **previously changed Adjustment Defaults**. After completing one or more of the **Installs** in this Chapter, go back to the **ADJUSTMENTS MENU** to see which **Standard and/or Feature Adjustments** have changed (*Feature Adjustment and/or settings are subject to change during production, and may differ than what is described in the tables below each Install explanation*). If the settings are not to your liking, perform one of the following:

- 1.: **Manually** change the **Standard & Feature Adjustments** Settings (*perform task in the Adjustments Menu*).
- or
- 2.: **Install Factory** to reset all of the **Standard & Feature Adjustments** back to the *Factory Default Settings*, (*see the end of this chapter*).

Multiple **Installs** can be set to vary game play; however, for **Installs** that have *one or more* Adjustments in common, the **last** "Install" selected & **activated**, will **supersede** any previously changed Adjustment(s) from any prior **Installs**.

For example, if you want a **5-BALL Game** set to **EXTRA EASY**: Select and **activate** the "5BAL" *Icon first* (which will typically change any **Feature** Difficulty Adjustments to **HARD**), then select & **activate** the "X.EZ" *Icon* to **change back** the Difficulty Adjustments to **EXTRA EASY**. However, if the "X.EZ" *Icon* was selected & **activated** first, then the "5BAL" *Icon* was selected & **activated**, the game will be set to a **5-BALL Game** set to **HARD**.



### EXPLANATION & USAGE OF COMMON LARGE ICONS USED IN THIS MENU:



These **non-selectable Icons** appear in the **selected Menu** only when there are **MORE** Icons to the **LEFT** or to the **RIGHT** available for selection.



Select and **activate** to return to the **PREVIOUS** Menu.



Select and **activate** to **QUIT**, exits & returns to the **Attract Mode**.



Select and **activate** to view **HELP** Screens of the current Menu\*.

**⚠ WARNING: ⚠**

**Selection & activation of the "Install Factory" Icon, will change all Adjustments & Installs to the Factory Default!**

\* **Help Note:** An explanation of each Icon at that menu level will cycle continuously. To exit a display where no Icons are available for selection, pressing any button will exit the display.



## GO TO INSTALLS MENU

After entering **Portals™**, the **MAIN MENU** now appears. Select the "INST" *Icon* in the **MAIN MENU** with either the **Red "LEFT"** or **Green "RIGHT"** Buttons (the **Flipper Buttons** operates in the same manner) and press the **Black "ENTER"** Button (the **Start Button** operates in the same manner). The **INSTALLS MENU** appears. Continue through this chapter for the explanation & usage of the *Icons* in the **INSTALLS MENU**.



## Install Extra Easy

To initiate, from the **INSTALLS MENU**, select the "X.EZ" *Icon* with either the **Red "LEFT"** or **Green "RIGHT"** Buttons and press the **Black "ENTER"** Button. **Game Play Difficulty** is set to **EXTRA EASY**. "REQUEST INSTALLED" is indicated and returns to the **INSTALLS MENU** with the "X.EZ" *Icon* flashing.

### STANDARD ADJUSTMENT(S) NEW SETTINGS:

NONE		
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### FEATURE ADJUSTMENTS NEW SETTINGS\*:

47-55	... DIFFICULTY	EXTRA EASY
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\* *Feature Adjustments and/or settings are subject to change.*





## Install Easy

To initiate, from the **INSTALLS MENU**, select the "EASY" *Icon* with either the **Red "LEFT"** or **Green "RIGHT" Buttons** and press the **Black "ENTER" Button**. **Game Play Difficulty** is set to **EASY**. "REQUEST INSTALLED" is indicated and returns to the **INSTALLS MENU** with the "EASY" *Icon* flashing.

### STANDARD ADJUSTMENT(S) NEW SETTINGS:

NONE		
------	--	--

### FEATURE ADJUSTMENTS NEW SETTINGS\*:

47-55	... DIFFICULTY	EASY
-------	----------------	------

\* Feature Adjustments and/or settings are subject to change.



## Install Normal

To initiate, from the **INSTALLS MENU**, select the "FACT" *Icon* with either the **Red "LEFT"** or **Green "RIGHT" Buttons** and press the **Black "ENTER" Button**. **Game Play Difficulty** is set to **MODERATE**. "REQUEST INSTALLED" is indicated and returns to the **INSTALLS MENU** with the "FACT" *Icon* flashing.

### STANDARD ADJUSTMENT(S) NEW SETTINGS:

NONE		
------	--	--

### FEATURE ADJUSTMENTS NEW SETTINGS\*:

47-55	... DIFFICULTY	MODERATE
-------	----------------	----------

\* Feature Adjustments and/or settings are subject to change.



## Install Hard

To initiate, from the **INSTALLS MENU**, select the "HARD" *Icon* with either the **Red "LEFT"** or **Green "RIGHT" Buttons** and press the **Black "ENTER" Button**. **Game Play Difficulty** is set to **HARD**. "REQUEST INSTALLED" is indicated and returns to the **INSTALLS MENU** with the "HARD" *Icon* flashing.

### STANDARD ADJUSTMENT(S) NEW SETTINGS:

NONE		
------	--	--

### FEATURE ADJUSTMENTS NEW SETTINGS\*:

47-55	... DIFFICULTY	HARD
-------	----------------	------

\* Feature Adjustments and/or settings are subject to change.



## Install Extra Hard

To initiate, from the **INSTALLS MENU**, select the "X.HD" *Icon* with either the **Red "LEFT"** or **Green "RIGHT" Buttons** and press the **Black "ENTER" Button**. **Game Play Difficulty** is set to **EXTRA HARD**. "REQUEST INSTALLED" is indicated and returns to the **INSTALLS MENU** with the "X.HD" *Icon* flashing.

### STANDARD ADJUSTMENT(S) NEW SETTINGS:

NONE		
------	--	--

### FEATURE ADJUSTMENTS NEW SETTINGS\*:

47-55	... DIFFICULTY	EXTRA HARD
-------	----------------	------------

\* Feature Adjustments and/or settings are subject to change.



## Install 3-Ball

To initiate, from the **INSTALLS MENU**, select the "3BAL" *Icon* with either the **Red "LEFT"** or **Green "RIGHT" Buttons** and press the **Black "ENTER" Button**. **Game Play Type** is set to **3-BALL PLAY**. "REQUEST INSTALLED" is indicated and returns to the **INSTALLS MENU** with the "3BAL" *Icon* flashing.

### STANDARD ADJUSTMENT(S) NEW SETTINGS:

08	BALLS PER GAME	03
----	----------------	----

### FEATURE ADJUSTMENTS NEW SETTINGS\*:

47-55	... DIFFICULTY	MODERATE
-------	----------------	----------

\* Feature Adjustments and/or settings are subject to change.





## Install 5-Ball

To initiate, from the **INSTALLS MENU**, select the "5BAL" *Icon* with either the **Red "LEFT"** or **Green "RIGHT" Buttons** and press the **Black "ENTER" Button**. **Game Play Type** is set to **5-BALL PLAY**. "REQUEST INSTALLED" is indicated and returns to the **INSTALLS MENU** with the "5BAL" *Icon* flashing.

### STANDARD ADJUSTMENT(S) NEW SETTINGS:

08	BALLS PER GAME	05
----	----------------	----

### FEATURE ADJUSTMENTS NEW SETTINGS\*:

47-55	... DIFFICULTY	HARD
-------	----------------	------

\* Feature Adjustments and/or settings are subject to change.



## \$ .50 Competition (a.k.a. IFPA)

To initiate, from the **INSTALLS MENU**, select the "PAY" *Icon* with either the **Red "LEFT"** or **Green "RIGHT" Buttons** and press the **Black "ENTER" Button**. **Game Play Type** is set to **TOURNAMENT PAY MODE**. "REQUEST INSTALLED" is indicated and returns to the **INSTALLS MENU** with the "PAY" *Icon* flashing.

### STANDARD ADJUSTMENT(S) NEW SETTINGS:

06	GAME PRICING	USA 5
09	TILT WARNINGS	02
25	FREE PLAY	NO
30	GAME RESTART	NO
41 (Note 1)	COINDOOR BALL SAVER	(YES) (Note 1)
42 (Note 2)	COMPETITION MODE	YES (Note 2)

### FEATURE ADJUSTMENTS NEW SETTINGS\*:

NONE		
------	--	--

Note 1: Adjustment 41 Default **will not change**; Installing \$ .50 Competition will override this Adjustment regardless of the setting.

Note 2: If Adjustment 42 is changed back to NO after this Install, the Competition Mode Install will be canceled (turned off).

If Competition Mode was set, it is suggested to "Install Factory" to restore all Adjustments (Factory Default); then to recustomize, if desired.



## Free Play Competition (a.k.a. EXPO or PAPA)

To initiate, from the **INSTALLS MENU**, select the "FREE" *Icon* with either the **Red "LEFT"** or **Green "RIGHT" Buttons** and press the **Black "ENTER" Button**. **Game Play Type** is set to **TOURNAMENT FREE MODE**. "REQUEST INSTALLED" is indicated and returns to the **INSTALLS MENU** with the "FREE" *Icon* flashing.

### STANDARD ADJUSTMENT(S) NEW SETTINGS:

09	TILT WARNINGS	02
25	FREE PLAY	YES
30	GAME RESTART	NO
41 (Note 1)	COINDOOR BALL SAVER	(YES) (Note 1)
42 (Note 2)	COMPETITION MODE	YES (Note 2)

### FEATURE ADJUSTMENTS NEW SETTINGS:

NONE		
------	--	--

Note 1: Adjustment 41 Default **will not change**; Installing \$ .50 Competition will override this Adjustment regardless of the setting.

Note 2: If Adjustment 42 is changed back to NO after this Install, the Competition Mode Install will be canceled (turned off).

If Competition Mode was set, it is suggested to "Install Factory" to restore all Adjustments (Factory Default); then to recustomize, if desired.



## Install Home Play

To initiate, from the **INSTALLS MENU**, select the "HOME" *Icon* with either the **Red "LEFT"** or **Green "RIGHT" Buttons** and press the **Black "ENTER" Button**. **Game Play Type** is set to **NORMAL HOME PLAY**. "REQUEST INSTALLED" is indicated and returns to the **INSTALLS MENU** with the "HOME" *Icon* flashing.

### STANDARD ADJUSTMENT(S) NEW SETTINGS:

05	EXTRA BALL LIMIT	09
07	MATCH PERCENTAGE	10%
25	FREE PLAY	YES
31	EXTRA BALL PERCENTAGE	30%
41	COINDOOR BALL SAVER	YES

### FEATURE ADJUSTMENTS NEW SETTINGS:

NONE		
------	--	--



## Film Star Reset

To initiate, from the **INSTALLS MENU**, select the "STAR" *Icon* with either the **Red "LEFT"** or **Green "RIGHT" Buttons** and press the **Black "ENTER" Button**. **Game Play Type** is set to **EASY HOME PLAY**. **"REQUEST INSTALLED"** is indicated and returns to the **INSTALLS MENU** with the "STAR" *Icon* flashing.

### STANDARD ADJUSTMENT(S) NEW SETTINGS:

05	EXTRA BALL LIMIT	09
25	FREE PLAY	YES
41	COINDOOR BALL SAVER	YES

### FEATURE ADJUSTMENTS NEW SETTINGS\*:

47-55	... DIFFICULTY	EASY
-------	----------------	------

\* Feature Adjustment and/or settings are subject to change.



## Install Novelty

This setting is recommended where **local laws restrict certain game features**.

To initiate, from the **INSTALLS MENU**, select the "NOV" *Icon* with either the **Red "LEFT"** or **Green "RIGHT" Buttons** and press the **Black "ENTER" Button**. **Game Play Type** is set to **RESTRICTED PLAY**. **"REQUEST INSTALLED"** is indicated and returns to the **INSTALLS MENU** with the "NOV" *Icon* flashing.

### STANDARD ADJUSTMENT(S) NEW SETTINGS:

01	REPLAYS: FIXED/AUTO	FIXED (0%)
02	REPLAY LEVELS	NONE
03	REPLAY AWARD	NONE
04	FREE GAME LIMIT	NO FREE GAMES
05	EXTRA BALL LIMIT	NO EXTRA BALLS
07	MATCH PERCENTAGE	OFF
10	REPLAY BOOST	NO
13-17	HIGH SCORE ... AWARDS	00

### FEATURE ADJUSTMENTS NEW SETTINGS\*:

NONE		
------	--	--

Sec. 3: Go To Installs



## Install Add-A-Ball

This setting is recommended where **local laws restrict certain game features**.

To initiate, from the **INSTALLS MENU**, select the "A.A.B" *Icon* with either the **Red "LEFT"** or **Green "RIGHT" Buttons** and press the **Black "ENTER" Button**. **Game Play Type** is set to **RESTRICTED PLAY**. **"REQUEST INSTALLED"** is indicated and returns to the **INSTALLS MENU** with the "A.A.B" *Icon* flashing.

### STANDARD ADJUSTMENT(S) NEW SETTINGS:

03	REPLAY AWARD	EXTRA BALL
04	FREE GAME LIMIT	NO FREE GAMES
05	EXTRA BALL LIMIT	09
07	MATCH PERCENTAGE	OFF
13-17	HIGH SCORE ... AWARDS	00

### FEATURE ADJUSTMENTS NEW SETTINGS\*:

NONE		
------	--	--



## Install Factory (ONLY affects all Adjustments/Installs)

To initiate, from the **INSTALLS MENU**, select the "FACT" *Icon* with either the **Red "LT"** or **Green "RT" Buttons** and press the **Black "ENT" Button**. **All Installs** will be reset to the **Factory Default Settings**. **"REQUEST INSTALLED"** is indicated and the **Service Menu** is exited, returning to the **Attract Mode**.

### STANDARD ADJUSTMENT(S) NEW SETTINGS:

01-46	ALL STANDARD ADJ.	FACTORY DEFAULTS
-------	-------------------	------------------

### FEATURE ADJUSTMENTS NEW SETTINGS\*:

47-64	ALL FEATURE ADJ.	FACTORY DEFAULTS
-------	------------------	------------------

If Competition Mode was set, it is suggested to "Install Factory" to restore all Adjustments (Factory Default); then to recustomize, if desired.



For how to **RESET Audits** (also can **RESET High Scores, Credits or Reset All Adjustments**) see **Section 3, Chapter 6, GO TO RESET MENU**.





## Go To Reset Menu

### Overview

The Portals™ Service Menu System provides five (5) functions to reset **Coin & Game Audits, High Scores, Credits** or to reset **ALL AUDITS, ADJUSTMENTS & INSTALLS** back to the **Factory Default Settings**.



**Important:** The **Coin Door** must be **OPEN** allowing the **Memory Protect Switch** to be disabled, so any **Reset** changes can be made.



#### EXPLANATION & USAGE OF COMMON LARGE ICONS USED IN THIS MENU:



These **non-selectable** icons appear in the selected Menu only when there are **MORE** icons to the **LEFT** or to the **RIGHT** available for selection.



Select and activate to return to the **PREVIOUS** Menu.



Select and activate to **QUIT**, exits & returns to the **Attract Mode**.



Select and activate to view **HELP** Screens of the current Menu\*.

**WARNING:**  
As soon as any **Reset Icon** is selected & activated, the information associated with the **Reset Icon**, is lost!

\* **Help Note:** An explanation of each icon at that menu level will cycle continuously. To exit a display where no icons are available for selection, pressing any button will exit the display.



### GO TO RESET MENU

After entering **Portals™**, the **MAIN MENU** now appears. Select the "**RESET**" icon in the **MAIN MENU** with either the **Red "LEFT"** or **Green "RIGHT"** Buttons (the **Flipper Buttons** operates in the same manner) and press the **Black "ENTER"** Button (the **Start Button** operates in the same manner). The **RESET MENU** appears. Continue below for the explanation & usage of the **Icons** in the **RESET MENU**.



### Reset Coin Audits

To initiate, from the **RESET MENU**, select the "**COIN**" icon with either the **Red** or **Green Buttons** and press the **Black Button**. **ONLY** the **Coin Audits (05-13)** will be reset to zero (0), **Factory Default Settings**. "**REQUEST INSTALLED**" is indicated and returns to the **RESET MENU** with the "**COIN**" icon flashing.



### Reset Game Audits

To initiate, from the **RESET MENU**, select the "**AUD**" icon with either the **Red** or **Green Buttons** and press the **Black Button**. **ONLY** the **Game Audits (01-04 and 15-Last Audit)** will be reset to zero (0), **Factory Default Settings**. **Note: Coin Audits (05-13) & Software Meter Audit (14) will not be reset.** "**REQUEST INSTALLED**" is indicated and returns to the **RESET MENU** with the "**AUD**" icon flashing.  
**Tournament Note:** *Tourn. Audits can only be reset if a new Tournament is started or a **Factory Reset** is done.*



### Reset High Scores

To initiate, from the **RESET MENU**, select the "**HSTD**" icon with either the **Red** or **Green Buttons** and press the **Black Button**. **ONLY** the **High Scores** will be reset to the current values. **Note: If these five (5) adjustments were not personally changed by you, the Factory Default Settings will be used (see Section 3, Chapter 4, GO TO ADJUSTMENTS MENU, Standard Adjustments 18-22).** "**REQUEST INSTALLED**" is indicated and returns to the **RESET MENU** with the "**HSTD**" icon flashing.



### Reset Credits

To initiate, from the **RESET MENU**, select the "**CRED**" icon with either the **Red** or **Green Buttons** and press the **Black Button**. **All Credits** will be reset to zero (0), **Factory Default Settings**. "**REQUEST INSTALLED**" is indicated and returns to the **RESET MENU** with the "**CRED**" icon flashing.

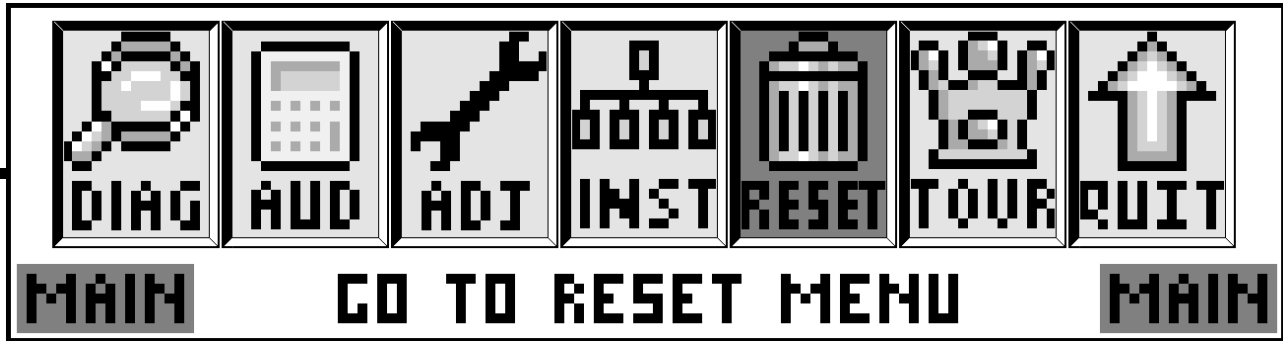


### Factory Reset

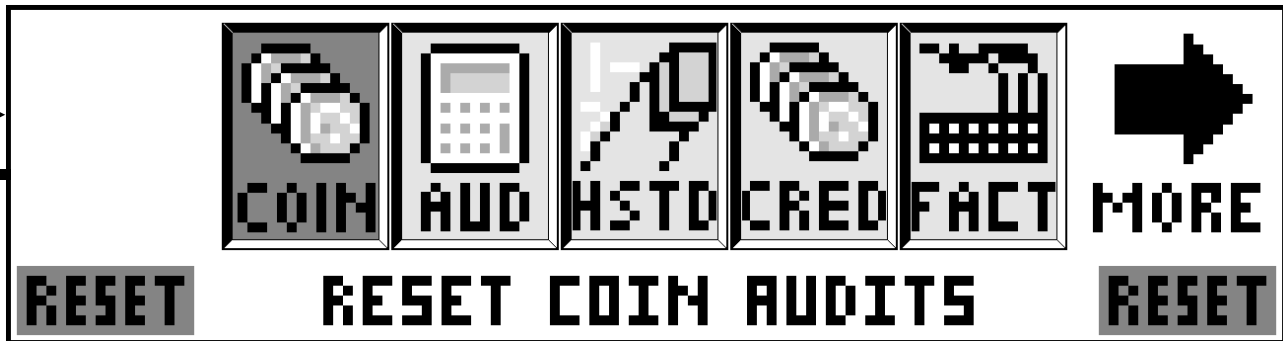
To initiate, from the **RESET MENU**, select the "**FACT**" icon with either the **Red** or **Green Buttons** and press the **Black Button**. **All Audits (except for Audit 14, Software Meter), Adjustments, Installs, Tournament Audits** and all **Tournament Adjustments (including Sign Messages A-B)**, will be reset to the **Factory Default Settings**. **Note: To RESET ONLY the ADJUSTMENTS & INSTALLS (leaving all the Regular Audits alone), see Section 3, Chapter 5, GO TO INSTALLS MENU, Install Factory.** "**REQUEST INSTALLED**" is indicated and the **Service Menu** is exited, returning to the **Attract Mode**.

**Example:**

After entering **Portals™**, the **MAIN MENU** now appears. Use the Red "LEFT" or Green "RIGHT" Buttons to select the "RESET" *Icon* (**GO TO RESET MENU**).



Press the **Black "ENTER" Button** to *activate* this **ICON**. The **RESET MENU** now appears with the "COIN" *Icon* (**RESET COIN AUDITS**) flashing:



From the **RESET MENU**, select any of the *Icons* ("COIN", "AUD", "HSTD", "CRED") with either the **Red or Green Buttons** and press the **Black Button** to *activate* the **ICON** chosen. After the **ICON** is selected & *activated*, "**REQUEST INSTALLED**" is indicated and is returned to the **RESET MENU** with the previously selected *Icon* flashing.

**Important:**



AT THIS TIME, **DO NOT** PRESS THE **START BUTTON** OR **BLACK BUTTON** AFTER SELECTING ANY OF THE FIVE (5) **ICONS** UNLESS THIS IS WHAT IS DESIRED. **THE INFORMATION ASSOCIATED WITH THE RESET ICON WILL BE LOST!** PLEASE READ THE PREVIOUS PAGE FOR EXACTLY WHAT WILL HAPPEN IF ANY OF THESE FIVE (5) **ICONS** ARE **SELECTED & ACTIVATED**.



Before performing any **RESET**, write down your **last Audit Totals** (see **Section 3, Chapter 3, GO TO AUDITS MENU**) and any **personalized Adjustment changes** you may have made (see **Section 3, Chapter 4, GO TO ADJUSTMENTS MENU**).

**REQUEST  
INSTALLED**

If the "FACT" *Icon* is select and *activated*, "**REQUEST INSTALLED**" is indicated and the **Service Menu** is exited, returning to the **Attract Mode**. See the previous page for explanation & usage of the *Icons* in the **RESET MENU**.

Sec. 3: Go To Reset





# Go To Tournament Menu

## Overview

The **Portals™ Service Menu System** provides **6 Steps** necessary to **SET-UP, START, MONITOR** and **END** Pinball Tournaments on your *Tournament Pinball System Ready Pinball Game*. **OPTIONAL EQUIPMENT & HARDWARE (SOLD SEPARATELY) ARE REQUIRED FOR PROPER OPERATION AND USE OF THIS MENU.**

Game code may get upgraded during production; compare all Tournament Adjustments & Audits in the display with the manual and make any corrections to the Tournament Adjustments and/or Audits Tables (*next page*), as necessary. Tournament Adjustments & Audits are subject to change (*with or without notice*). To view Tournament Adjustments & Audits in the display, enter the **Portals™ Service Menu System**. When any change is made and then the next / previous item is selected (*or the Sub-Menu is exited*), the display will momentarily flash **REQUEST INSTALLED**. For details on **Earnings, Standard & Feature Audits**, see Section 3, Chapter 3, **GO TO AUDITS MENU**. For details on **Standard & Feature Adjustments**, see Section 3, Chapter 4, **GO TO ADJUSTMENTS MENU**.

For more details on the equipment & hardware required, Installation and Set-up, read the **ToPS™ Tournament Pinball System Kit Installation Manual** (SPI Part Number: 780-6011-00) provided in the **Optional Tournament Kit** (SPI Part Number: 500-5011-00), not included with this *ToPS™ Ready Pinball Game*.

The equipment & hardware consists of: **BETAbrite™ Electronic 7 X 80 Multi-Color Dot Display** (secured above the Backbox), **Tournament Serial Interface (TSI) Board** (secured in the Backbox), **Tournament Button + Lamp** (secured onto the Front Molding) and all necessary wiring, hardware and documentation (*which also provides suggestions and Tips for ToPS™*).

To order, contact your local Distributor (*view Pages DR. 8 & 9 in the Find-It-In-Front: Dr. Pinball*). You can also call Technical Support or visit our website (*details on the back cover of this manual*).



**Important:** The **Coin Door** must be **OPEN** allowing the **Memory Protect Switch** to be disabled, so any **Tournament changes** can be made.



### EXPLANATION & USAGE OF COMMON LARGE & MINI-ICONS USED IN VARIOUS MENUS & SUB-MENUS:



These **non-selectable icons** appear in the selected Menu only when there are **MORE** icons to the **LEFT** or to the **RIGHT** available for selection.



Select and activate to return to the **PREVIOUS** Menu.



Select and activate to **QUIT**, exits & returns to the **Attract Mode**.



Select and activate to view **HELP** Screens of the current Menu\*.



Select and activate to: Move **LEFT** or **RIGHT**, select previous / next or move backwards / forwards.



**DECREMENT (-)** or **INCREMENT (+)** displayed value or select previous / next.

\* **Help Note:** An explanation of each **Mini-Icon** at that menu level will cycle continuously. To exit a display where no **Mini-Icons** are available for selection, pressing any button will exit the display.



## GO TO TOURNAMENT MENU (OPTIONAL USE ONLY)

After entering **Portals™**, the **MAIN MENU** now appears. Select the **"TOUR"** icon in the **MAIN MENU** with either the **Red "LEFT"** or **Green "RIGHT"** Buttons (the **Flipper Buttons** operates in the same manner) and press the **Black "ENTER"** Button (the **Start Button** operates in the same manner). The **TOURNAMENT MENU** appears. Continue through this chapter for the explanation & usage of the **Icons** in the **TOURNAMENT MENU**.

Tournament Adjustment & Audit Tables on the next page.



Sec. 3: Tournament ...





# TOURNAMENT ADJUSTMENT TABLES

## TOURNAMENT ADJUSTMENTS 69-77

ADJUSTMENT NAME		ADJUSTMENT NAME		ADJUSTMENT NAME	
USA DEFAULT	YOUR SETTING	USA DEFAULT	YOUR SETTING	USA DEFAULT	YOUR SETTING
<b>CREDITS PER PLAY</b>		<b>JACKPOT MAX.</b>		<b># OF PRIZES</b>	
69	02	72	\$2,500.00	75	03
<b>JACKPOT BASE</b>		<b>START DATE</b>		<b>PRIZE TYPE</b>	
70	\$20.00	73	JANUARY 1	76	CASH
<b>JACKPOT INCREMENT</b>		<b>END DATE</b>		<b>SHOW PLAYER'S CASH</b>	
71	\$00.50	74	FEBRUARY 1	77	YES

**Note:** The above adjustments must be set just before selecting and activating the "STRT" icon (START TOURNAMENT). See the following pages for explanation and more details.



## SIGN MESSAGES A-B (ADJUSTMENTS 78-79)

ADJUSTMENT NAME		ADJUSTMENT NAME	
USA DEFAULT	YOUR SETTING	USA DEFAULT	YOUR SETTING
<b>LOCATION MESSAGE</b>		<b>PRIZE MESSAGE</b>	
78	ON	79	ON



Sec. 3: Tournament ...



STARTING METER Reading :	STARTING METER Date (MM/DD/YR) :	AUDITOR'S NAME :	CURRENT VOLUME SETTING:
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
CURRENT METER Reading :	AUDIT Date (MM/DD/YR) :	CPU Version :	DISPLAY Version :
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
			GAME LOCATION NAME :
<input type="text"/>			

See Adj. 78 & 79 above >>

TOURNAMENT START DATE :	TOURNAMENT END DATE :
<input type="text"/>	<input type="text"/>

## TOURNAMENT AUDIT TABLE



## TOURNAMENT AUDITS 173-184

Audit definitions follow in this Chapter.

TOTAL PLAYS	TOTAL TOUR. EARNINGS	ACCUM. TOTAL PLAYS	ACCUM. TOUR EARNINGS	
173:	176:	179:	182:	
TOURNAMENT PLAYS	JACKPOT	ACCUM. TOUR. PLAYS	ACCUM. JACKPOT	
174:	177:	180:	183:	
TOTAL GAME EARNINGS	NET EARNINGS	ACCUM. EARNINGS	# TOURNAMENTS	
175:	178:	181:	184:	

Copy this page for Field Audit Tracking Performance





# Tournament Adjustments (01-10)

To initiate, from the **TOURNAMENT MENU**, select the "SET UP" *Icon* with either the **Red "LEFT"** or **Green "RIGHT" Buttons** and press the **Black "ENTER" Button**. Select and *activate* either of the ">>" *Mini-Icons* to view the next or previous Tournament Adjustment in this group. Select and *activate* either of the "-" or "+" *Mini-Icons* to change the setting, if desired (*the Default Setting is noted in the definitions below*). The display will describe the **Tournament Adjustment Number**, **Tournament Adjustment Name** and the **Current Tournament Adjustment Setting**. The current Tournament Adjustment will remain in the display until the next Tournament Adjustment is viewed or when this Menu is exited.

**IMPORTANT FOR TOURNAMENT USERS:** *Select the settings carefully. For Tips for ToPS™ (different Tournament Sample Set-Ups, etc.), view the ToPS™ Tournament Pinball System Kit Installation Manual (SPI Part Number: 780-6011-00) provided in the Optional Tournament Kit (SPI Part Number: 502-5011-00). Before allowing players to begin after you've started a Tournament, double-check the Normal Mono-Color Dot Display and Top Multi-Color Dot (Beta Brite®) Display to ensure everything you want is displayed correctly. Once a Tournament is started, no adjustments can be made until you end the Tournament (by selecting the "END" Icon). Allowing players to qualify, then ending a Tournament prematurely to make corrections will affect the outcome of the Tournament. View the ToPS™ Manual for more details.*

**WARNING: Changes made in any Adjustments will be lost after a FACTORY RESET or removal of the CPU/Sound Board Batteries.**

Nr.	TOURNAMENT ADJUSTMENT NAME: Definition
01	<b>CREDITS PER PLAY:</b> Set between <b>01 - 10</b> . Default is <b>02</b> . Set the maximum number of <i>Credits</i> that may be accumulated per game.
02	<b>JACKPOT BASE:</b> Set between <b>\$00.00 - \$999,999.00</b> ( <i>increments of \$1</i> ). Default is <b>\$20.00</b> . Set the initial <i>Prize Pool Amount</i> to be offered for the Tournament. <b>Note:</b> <i>The displays will present the words "PRIZE POOL" in lieu of the word "JACKPOT".</i>
03	<b>JACKPOT INCREMENT:</b> Set between <b>\$00.00 - \$999,999.99</b> ( <i>increments of 1¢</i> ). Default is <b>\$00.50</b> . Set the <i>Prize Pool Increment</i> which will increase the <i>Prize Pool Amount</i> with each Tournament Game played.
04	<b>JACKPOT MAX.:</b> Set between <b>\$00.00 - \$999,999.00</b> ( <i>increments of \$1</i> ). Default is <b>\$2,500.00</b> . Set the maximum cap to be placed on the <i>Prize Pool</i> during a Tournament. <b>Note:</b> <i>The displays will present the words "PRIZE POOL" in lieu of "JACKPOT".</i>
05	<b>CURRENT DATE/TIME:</b> Set the current date and time. After setting the Start and End Dates in Tournament Adjustments 6 & 7, the Tournament will then start automatically*. <i>*Requires the TIMEKEEPER™ IC (included in this kit) installed in Location U212 on the CPU/Sound Board.</i>
06	<b>START DATE:</b> Set between <b>JANUARY</b> through <b>DECEMBER</b> . Default is <b>JANUARY</b> . After the month desired is set, a <b>valid day</b> must be set. To <b>Start a Tournament</b> , go back to the <b>TOURNAMENT MENU</b> and select the "STRT" <i>Icon</i> ( <i>see the next page</i> ).
07	<b>END DATE:</b> Set between <b>JANUARY</b> through <b>DECEMBER</b> . Default is <b>FEBRUARY</b> . After the month desired is set, a <b>valid day</b> must be set. To <b>End a Tournament</b> , go back to the <b>TOURNAMENT MENU</b> and select the "END" <i>Icon</i> ( <i>see the next page</i> ).
08	<b># OF PRIZES:</b> Set between <b>01 - 05</b> . Default is <b>03</b> . Set the maximum number of <i>Prize Positions</i> to be awarded during a Tournament. Selections ( <i>cannot be changed</i> ) are as follows: Set to <b>01</b> , the Tournament Winner is awarded <b>100%</b> of the Prize Pool. Set to <b>02</b> , the 1st & 2nd place winners are awarded <b>70% / 30%</b> , respectively. Set to <b>03</b> , the 1st, 2nd & 3rd place winners are awarded <b>50% / 30% / 20%</b> , respectively. Set to <b>04</b> , the 1st, 2nd, 3rd & 4th place winners are awarded <b>50% / 25% / 15% / 10%</b> , respectively. Set to <b>05</b> , the 1st, 2nd, 3rd, 4th & 5th place winners are awarded <b>50% / 20% / 15% / 10% / 5%</b> , respectively.
09	<b>PRIZE TYPE:</b> Set to <b>CASH</b> , <b>POINTS</b> , <b>TICKETS</b> or <b>OTHER</b> . Default is <b>CASH</b> .  <i>This adjustment determines how the Prize Pool is to be represented in the Attract Mode on both the Normal and top Beta-Brite® Displays.</i> Select <b>CASH</b> for the displays to represent the Prize Pool amount ( <i>based on Jackpot Base and Max.</i> ) in <b>\$Dollars</b> . Select <b>POINTS</b> for the displays to represent the Prize Pool amount in <b>Points</b> . Select <b>TICKETS</b> for the display to represent the Prize Pool amount in <b>Tickets</b> . Select <b>OTHER NOT TO</b> represent the Prize Pool amount ( <i>if prize(s) to be awarded are not Cash, Points or Tickets</i> ).
10	<b>SHOW PLAYER'S CASH:</b> Set to <b>YES</b> or <b>NO</b> . Default is <b>YES</b> . When set to <b>YES</b> , both the <b>Beta- Brite® Multi-Color Dot Display</b> and the <b>Normal Mono-Color Display</b> exhibit the Cash amount in the <b>Attract Mode</b> .




Sec. 3: Tournament ...



# Tournament Adjustments (69-77)

To initiate, from the **TOURNAMENT MENU**, select the "SET UP" *Icon* with either the **Red "LEFT"** or **Green "RIGHT" Buttons** and press the **Black "ENTER" Button**. Select and *activate* either of the ">>" *Mini-Icons* to view the next or previous Tournament Adjustment in this group. Select and *activate* either of the "-" or "+" *Mini-Icons* to change the setting, if desired (*the Default Setting is noted in the definitions below*). The display will describe the **Tournament Adjustment Number**, **Tournament Adjustment Name** and the **Current Tournament Adjustment Setting**. The current Tournament Adjustment will remain in the display until the next Tournament Adjustment is viewed or when this Menu is exited.

**IMPORTANT FOR TOURNAMENT USERS:** *Select the settings carefully. For Tips for ToPS™ (different Tournament Sample Set-Ups, etc.), view the ToPS™ Tournament Pinball System Kit Installation Manual (SPI Part Number: 780-6011-00) provided in the Optional Tournament Kit (SPI Part Number: 500-5011-00). Before allowing players to begin after you've started a Tournament, double-check the Normal Mono-Color Dot Display and Top Multi-Color Dot (Beta Brite®) Display to ensure everything you want is displayed correctly. Once a Tournament is started, no adjustments can be made until you end the Tournament (by selecting the "END" Icon). Allowing players to qualify, then ending a Tournament prematurely to make corrections will affect the outcome of the Tournament. View the ToPS™ Manual for more details.*

Adj. N <sup>o</sup>	Tournament Adjustment Name	Tournament Adjustment Definition
 69	<b>CREDITS PER PLAY</b>	Set between <b>01 - 10</b> . Default is <b>02</b> . Set the maximum number of <i>Credits</i> that may be accumulated per game.
70	<b>JACKPOT BASE</b>	Set between <b>\$00.00 - \$999,99.00</b> ( <i>increments of \$1</i> ). Default is <b>\$20.00</b> . Set the initial <i>Prize Pool Amount</i> to be offered for the Tournament. <b>Note:</b> <i>The displays will present the words "PRIZE POOL" in lieu of the word "JACKPOT".</i>
71	<b>JACKPOT INCREMENT</b>	Set between <b>\$00.00 - \$999,99.99</b> ( <i>increments of 1¢</i> ). Default is <b>\$00.50</b> . Set the <i>Prize Pool Increment</i> which will increase the <i>Prize Pool Amount</i> with each Tournament Game played.
72	<b>JACKPOT MAX.</b>	Set between <b>\$00.00 - \$999,99.00</b> ( <i>increments of \$1</i> ). Default is <b>\$2,500.00</b> . Set the maximum cap to be placed on the <i>Prize Pool</i> during a Tournament. <b>Note:</b> <i>The displays will present the words "PRIZE POOL" in lieu of "JACKPOT".</i>
73	<b>START DATE</b>	Set between <b>JANUARY</b> through <b>DECEMBER</b> . Default is <b>JANUARY</b> . After the month desired is set, a <b>valid day</b> must be set. To <b>Start a Tournament</b> , go back to the <b>TOURNAMENT MENU</b> and select the "STRT" <i>Icon</i> ( <i>see the next page</i> ).
74	<b>END DATE</b>	Set to <b>JANUARY</b> through <b>DECEMBER</b> . Default is <b>FEBRUARY</b> . After the month desired is set a <b>valid day</b> must be set. To <b>end a Tournament</b> , go back to the <b>TOURNAMENT MENU</b> and select the "END" <i>Icon</i> ( <i>see the next page</i> ).
75	<b># OF PRIZES</b>	Set between <b>01 - 05</b> . Default is <b>03</b> . Set the maximum number of <i>Prize Positions</i> to be awarded during a Tournament. Selections ( <i>cannot be changed</i> ) are as follows: Set to <b>01</b> , the Tournament Winner is awarded <b>100%</b> of the Prize Pool. Set to <b>02</b> , the 1st & 2nd place winners are awarded <b>70% / 30%</b> , respectively. Set to <b>03</b> , the 1st, 2nd & 3rd place winners are awarded <b>50% / 30% / 20%</b> , respectively. Set to <b>04</b> , the 1st, 2nd, 3rd & 4th place winners are awarded <b>50% / 25% / 15% / 10%</b> , respectively. Set to <b>05</b> , the 1st, 2nd, 3rd, 4th & 5th place winners are awarded <b>50% / 20% / 15% / 10% / 5%</b> , respectively.
76	<b>PRIZE TYPE</b>	Set to <b>CASH, POINTS, TICKETS</b> or <b>OTHER</b> . Default is <b>CASH</b> .  <b><i>This adjustment determines how the Prize Pool is to be represented in the Attract Mode on both the Normal and top Beta-Brite® Displays.</i></b>
77	<b>SHOW PLAYER'S CASH</b>	Select <b>CASH</b> for the displays to represent the Prize Pool amount ( <i>based on Jackpot Base and Max.</i> ) in <b>\$Dollars</b> . Select <b>POINTS</b> for the displays to represent the Prize Pool amount in <b>Points</b> . Select <b>TICKETS</b> for the display to represent the Prize Pool amount in <b>Tickets</b> . Select <b>OTHER</b> <b>NOT TO</b> represent the Prize Pool amount ( <i>if prize(s) to be awarded are not Cash, Points or Tickets</i> ).  Set to <b>YES</b> or <b>NO</b> . Default is <b>YES</b> . When set to <b>YES</b> , both the <b>Beta-Brite® Multi-Color Dot Display</b> and the <b>Normal Mono-Color Display</b> exhibit the Cash amount in the <b>Attract Mode</b> .

Sec. 3: Tournament ...





## Start Tournament (select only after Set-Up is completed)

To initiate, from the **TOURNAMENT MENU**, select the "STRT" *Icon* with either the **Red "LEFT"** or **Green "RIGHT" Buttons** and press the **Black "ENTER" Button**. The "START TOURNAMENT?" MENU appears with the "NO" *Mini-Icon* flashing.

If **Set-Up (Tournament Adjustments)** was not completed **OR** the **Tournament Audits were not recorded from the prior Tournament**, exit this Menu by activating the "NO" *Mini-Icon*. If **Set-Up** was completed and the **Tournament Audits** were recorded, select and activate the "YES" *Mini-Icon*.

The Pinball Game is set to **Tournament Ready Mode**

(the **Flashing Tournament Button** must be depressed for a *Tournament Game* after the proper credit is inserted). "REQUEST INSTALLED" is indicated and returns to the **TOURNAMENT MENU** with the "STRT" *Icon* flashing. **Note:** If the "STRT" *Icon* appears to be non-functioning, it is because a *Tournament* is in progress. The *Tournament* must first be stopped (select and activate the "END" *Icon* in the **TOURNAMENT MENU**).



## Stop Tournament (select only after a Tournament is started)

To initiate, from the **TOURNAMENT MENU**, select the "END" *Icon* with either the **Red "LEFT"** or **Green "RIGHT" Buttons** and press the **Black "ENTER" Button**. The "END TOURNAMENT?" MENU appears with the "NO" *Mini-Icon* flashing. If the

**Tournament** was not completed, exit this Menu by activating the "NO" *Mini-Icon*. If the **Tournament** was completed (the **End Date** set has passed), select and activate the "YES" *Mini-Icon*. The Pinball Game is taken out of **Tournament Ready Mode** (to readjust any *Tournament Adjustments*, the *Tournament* must be "stopped"). "REQUEST INSTALLED" is indicated and returns to the **TOURNAMENT MENU** with the "END" *Icon* flashing.

**Record your Tournament Audits at this time as they will be reset (except for the "Accumulative Audits") if another Tournament is started!**



Sec. 3: Tournament ...



## Tournament Prizes

To initiate, from the **TOURNAMENT MENU**, select the "PRIZ" *Icon* with either the **Red "LEFT"** or **Green "RIGHT" Buttons** and press the **Black "ENTER" Button**. Select and *activate* either of the ">>" *Mini-Icons* to view the next or previous Leader in this group. The display will describe the **Leader Placement (1st, 2nd, 3rd, 4th & 5th)**, **Leader Name**, **4-Digit Pin-Code**, and **Prize Pool** portion for the *Current and Previous Tournaments*. The current Leader (and related information) will remain in the display until the next Leader is chosen or when the Sub-Menu is exited.



## Tournament Audits (173-184)

To initiate, from the **TOURNAMENT MENU**, select the "AUD" *Icon* with either the **Red "LEFT"** or **Green "RIGHT" Buttons** and press the **Black "ENTER" Button**. Select and *activate* either of the ">>" *Mini-Icons* to view the next or previous *Tournament Audit* in this group. The display will describe the **Tournament Audit Number**, **Tournament Audit Name** and the **Current Tournament Audit Total** (Value). The current *Tournament Audit* will remain in the display until the next *Tournament Audit* is viewed or when this Menu is exited.

**IMPORTANT FOR TOURNAMENT USERS:** >>>> **A L L** of the *Tournament Audits 140-151* are **RESET O N L Y** if a **Factory Reset** is done (see Section 3, Chapter 6, **GO TO RESET MENU**). >>>> **Tournament Audits 140-145** are **RESET ONLY** if a **new Tournament** is started. >>>> **Tournament Audits 146-151** are **NOT RESET\***, they're *accumulative* (totals accumulate since the first *Tournament* was played). \*if no **Factory Reset** is done.

Aud. N <sup>o</sup>	Tournament Audit Name	Tournament Audit Definition
173	TOTAL PLAYS	Provides the total number of <i>Regular</i> and <i>Tournament Games</i> played while a <i>Tournament</i> is active (in progress). This total is derived by adding <i>Tournament Audit 174</i> , <b>TOURNAMENT PLAYS</b> , with <b>Regular Plays</b> .
174	TOURNAMENT PLAYS	Provides the total number of <i>Tournament Games</i> played while a <i>Tournament</i> is active (in progress).
175	TOTAL GAME EARNINGS	Provides the total <i>Gross Earnings accepted</i> , while a <i>Tournament</i> is active (in progress).
176	TOTAL TOUR. EARNINGS	Provides the total <i>Tournament Earnings (Audit 175 less Regular Game Earnings)</i> while a <i>Tournament</i> is active (in progress).

**Tournament Audits 177-184 continued on the next page.**





## Tournament Audits Continued.

	Tournament Audit Name	Tournament Audit Definition
177	<b>JACKPOT (PRIZE POOL TOTAL)</b>	Provides the total Prize Pool ( <i>Jackpot</i> ) Amount to be paid out while a <i>Tournament is active (in progress)</i> .
178	<b>NET EARNINGS</b>	Provides the total Net Earnings ( <i>Gross Earnings less Prize Pool</i> ) while a <i>Tournament is active (in progress)</i> .
<b>The following Tournament Audits WILL NOT BE RESET if a new Tournament is started. ALL AUDITS can be reset if a Factory Reset is done!</b>		
179	<b>ACCUM. TOTAL PLAYS</b>	Provides the accumulative total amount of <i>Regular &amp; Tournament Games</i> played since the first Tournament was played.
180	<b>ACCUM. TOUR. PLAYS</b>	Provides the accumulative total amount of <i>Tournament Games</i> played since the first Tournament was played.
181	<b>ACCUM. EARNINGS</b>	Provides the total Gross Earnings <i>accepted</i> , since the first Tournament was played.
182	<b>ACCUM. TOUR EARNINGS</b>	Provides the accumulative total Tournament Game Earnings since the first Tournament was played.
183	<b>ACCUM. JACKPOT</b>	Provides the accumulative total of Prize Pool ( <i>Jackpot</i> ) Amounts paid out since the first Tournament was played.
184	<b># TOURNAMENTS</b>	Provides the number of Tournaments ( <i>not individual Tournament Games</i> ) since the first Tournament was played.



## Sign Messages A-B (Tournie Adj. 78-79)

To initiate, from the **TOURNAMENT MENU**, select the "A-B TEXT" *Icon* with either the **Red "LEFT"** or **Green "RIGHT" Buttons** and press the **Black "ENTER" Button**. Select and *activate* either of the ">>" *Mini-Icons* to view the next or previous Tournament Adjustment in this group. Select and *activate* either of the "-" or "+" *Mini-Icons* to change the setting, if desired (*the Default Setting is noted in the definitions below*). The display will describe the **Tournament Adjustment Number**, **Tournament Adjustment Name** and the **Current Tournament Adjustment Setting**. The current Tournament Adjustment will remain in the display until the next Tournament Adjustment is viewed or when this Menu is exited.

Adj. N <sup>o</sup>	Tournament Adjustment Name	Tournament Adjustment Definition
78	<b>LOCATION MESSAGE</b>	Set to <b>ON, CHANGE</b> or <b>OFF</b> . Default is <b>ON</b> . When set to <b>CHANGE</b> , a new message can be set or the old one can be edited ( <i>select the "+" Mini-Icon to change settings until "CHANGE" appears in the display, then select the "&gt;&gt;" Mini-Icon to access.</i> ). At the top left corner of the Display, the letter <b>A</b> is indicated ( <i>blinking</i> ) in the first available position. Vary the letter(s) by operating the Left and Right Flipper Buttons ( <i>or "RED" or "GREEN" Buttons</i> ). With the desired letter indicated, depress the <b>Start Button</b> to lock in the letter and advance to the next character. Repeat this procedure until the desired message is completed in the display. Select the "<" or ">" characters to back-space ( <i>erase</i> ) and/or to move forward in an already typed message. After completion, press the <b>"BLACK" Button</b> , <b>"REQUEST INSTALLED"</b> is indicated and then exits this sub-menu.
79	<b>PRIZE MESSAGE</b>	

The **DEFAULT LOCATION MESSAGE** is:

STERN PINBALL PROUDLY PRESENTS...

The **DEFAULT PRIZE MESSAGE** is:

YOU CAN BE THE NEXT BIG WINNER!



### IMPORTANT FOR TOURNAMENT USERS:

**2 additional messages can be added** by using the **Beta Brite® Remote**. More details in the **ToPS™ Tournament Pinball System Kit Installation Manual** (*SPI Part Number: 780-6011-00*) provided in the **Optional Tournament Kit** (*SPI Part Number: 500-5011-00*).





Sec. 4: Parts Id. ...

**PLAYBOY**  
 OBJECTIVE Collect 12 Playmates to Start Mansion Mania  
 25 Playmates = 1 Playmate  
 EXTRA BALL & SPECIAL Collecting Playmates will light Extra Ball and Special  
 TRIPLE JACKPOT Triple Jackpot lights during Centerfold  
 JACKPOT Modified also collecting Double Jackpot and 1000 Points will flash Balls in play

Collect All Playmates to Start  
**Mansion Mania**  
 SHOOT AGAIN

**PLAYBOY**

50¢ = x1  
**SUPER VALUE**  
 \$2.00 = x5





# Parts Identification & Location (The Pink Pages)

## Overview

This section provides the Part N<sup>o</sup>s and locations of all the components in this pinball machine. The parts are arranged in three groups: **BACKBOX, CABINET & PLAYFIELD**. Generic parts which may change as production continues (quantity and/or size) are listed together. Quantities greater than 0 indicates that the 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 & Rubber Rings* are drawn actual size). Major Assemblies & Ramps are detailed in the Blue Pages, Chapter 2. **Important:** Read all "Take Note:" items.

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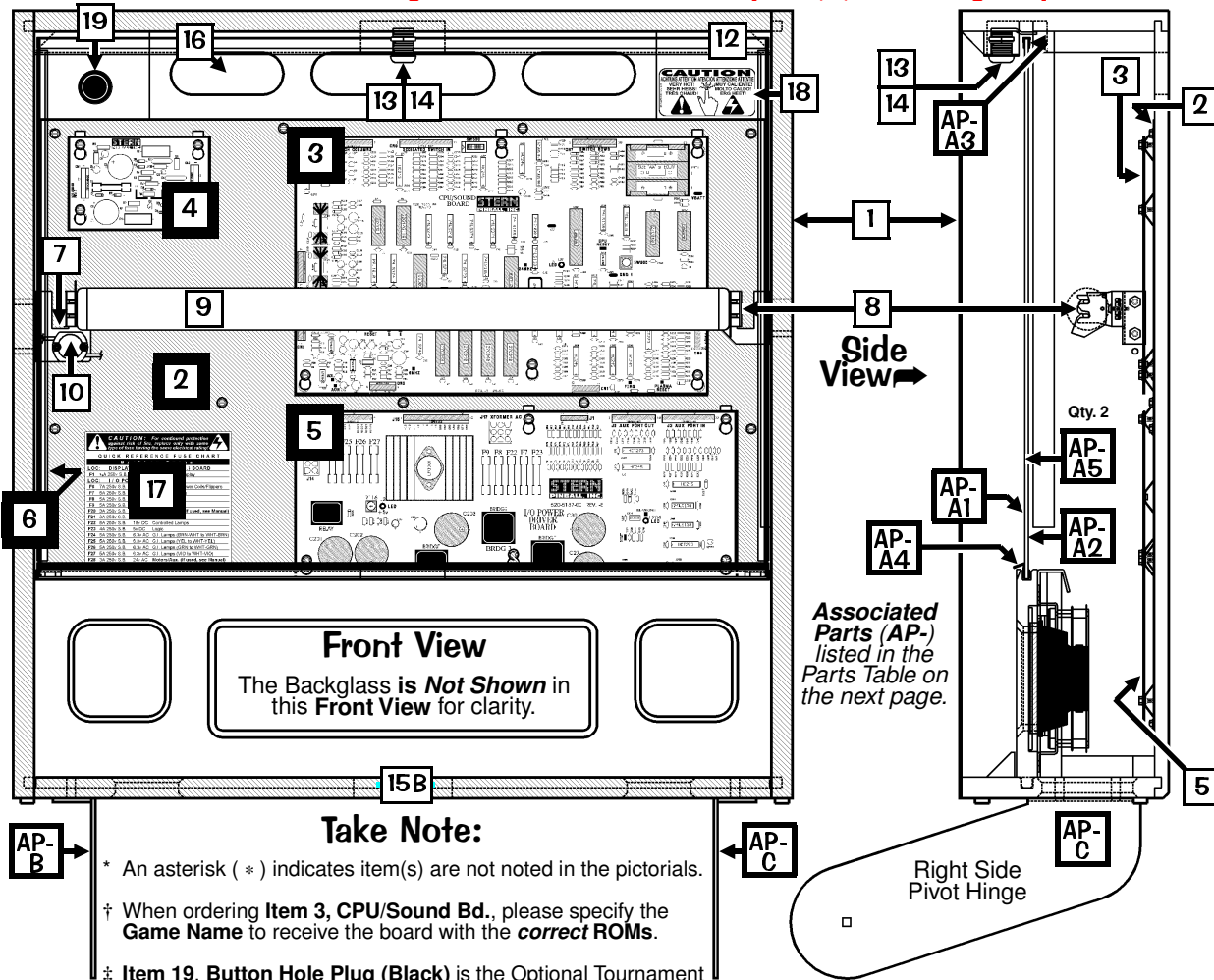
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Sec. 4: Parts Id. ...



**PLAYBOY** Backbox Assembly, 505-6002-76-76 (Items 1-27)  
 Not sold as an assembly, order the individual part(s) actually required.



**Take Note:**

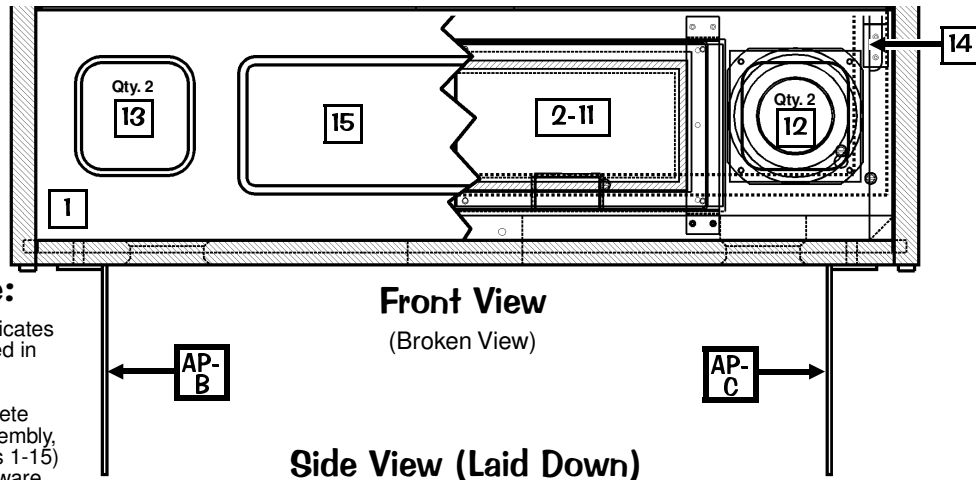
- \* An asterisk ( \* ) indicates item(s) are not noted in the pictorials.
- † When ordering **Item 3, CPU/Sound Bd.**, please specify the **Game Name** to receive the board with the **correct ROMs**.
- ‡ **Item 19, Button Hole Plug (Black)** is the Optional Tournament Header Access Hole. *If removing for the Optional Tournament Header, save with the game.*

Sec. 4: Parts Id. ...

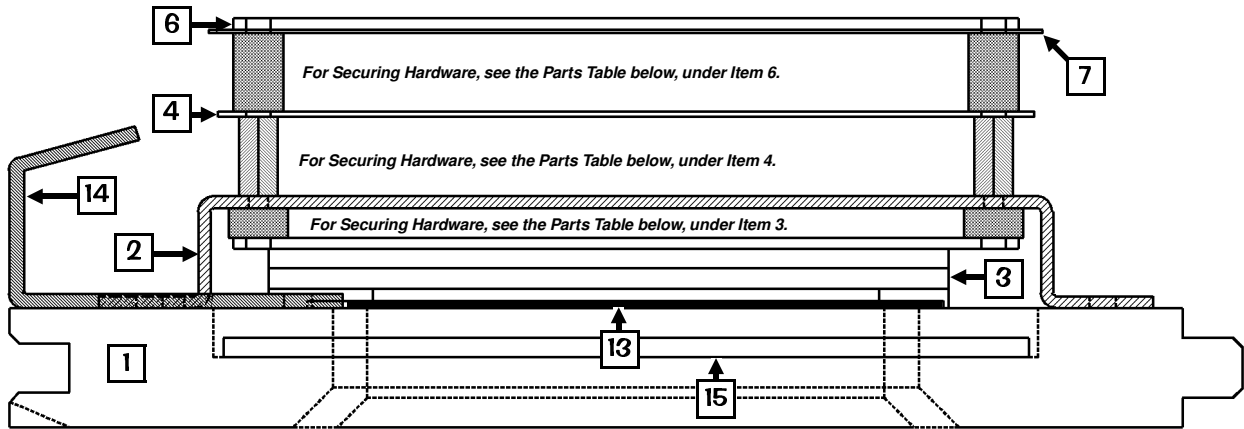
Nº	BACKBOX PART NAME	QTY.	SPI PART Nº	Nº	BACKBOX PART NAME	QTY.	SPI PART Nº
1	Backbox (PLAYBOY)	1	525-5558-76	10*	Ground Strap (5") (by Item 12)	1	600-5006-05
<i>Item 1 Note: Black Textured T-Molding is installed and cannot be ordered separately.</i>							
2	PCB Metal Mounting Plate	1	535-5809-04	11	Starter - Fluorescent (FS2 Light)	1	165-5011-01
<i>Item 2 is secured to Item 1 by: #8 X 1/2" HWH AB (Zinc) (Qty. 13) (234-5101-00) and #10 Washer 7/32" I.D. X .5" O.D. X 1/16" Thick (Qty. 4) (242-5003-00)</i>							
3 †	CPU/Sound Board (Mono) FCC-FEB98	1	520-5136-16	12	Ballast CU45Z-W 1/2" Core 120v 50/60 Hz 13W	1	010-5015-00
4	Display Power Supply Board	1	520-5138-00	12	Ballast Mounting Plate	1	535-8657-00
5	I/O Power Driver Board	1	520-5137-01	<i>Item 12 is secured to Item 1 by: #6 X 5/8" HWH AB (Zinc) (Qty. 2) (234-5102-04)</i>			
<i>Items 3, 4 &amp; 5 are secured to Item 2 by: #8-32 X 3/8" HWH MS (Qty. 19) (237-5903-00)</i>							
6	Solenoid Expander Board (UK Only)	1	520-5192-00	13	Lock Mounting Plate (2001)	1	535-8128-01
<i>Item 6 is required for UK Games Only to support the Left &amp; Right Outlane Ball Deflectors &amp; Center Up/Down Post Assemblies not supported in the Normal Coil Matrix of Q1-Q32.</i>							
7	Fluorescent Light Bracket Assy. Left	1	515-6545-00	14	Camlock/Key (N23078A•CAM•2K•SF2400)	1	355-5018-02
<i>Items 13-14 are secured by: #8 X 5/8" TP Torx T20 (Qty. 4) (237-5947-00)</i>							
<b>ORDERING ABOVE (ITEM 7) SUB-ASSY. PART Nº WILL INCLUDE:</b>							
7A	Fluorescent Light Bracket Left	1	535-7739-00	15A	#1 Roto Lock Male (on Cabinet)	1	355-5006-01
7B	Lamp Holder (Self-Locking)	1	077-5214-00	15B	#1 Roto Lock Female (R2-0002-02)	1	355-5006-02
7C	#6-32 X 5/8" PPH MS (Sems) Zinc	1	232-5203-00	<i>Item 15B is secured by: #10-24 X 1-3/4" CBSN (Qty. 2) (231-5022-00), #10-24 Keps Nut (Qty. 2) (240-5207-00) and #10 Washer 7/32" ID X .5" OD X 1/16" (Qty. 2) (242-5003-00)</i>			
7D	Starter Base (with Leads)	1	077-5213-00	16	Back Vent Grill 2-1/2" X 18"	1	545-5072-02
7E	#4-40 X 1/2" PPH MS (Sems) Zinc	2	237-5813-00	<i>Item 16 is secured by: Staple 5/16" (Qty. 24) (631-5000-00)</i>			
<i>Ordering Note: If 515-6545-00 is unavailable, order the individual part(s) actually required.</i>							
8	Fluorescent Light Bracket Assy. Right	1	515-6545-01	17	Fuse Description Decal (Generic)	1	820-6152-01
<b>ORDERING ABOVE (ITEM 8) SUB-ASSY. PART Nº WILL INCLUDE:</b>							
8A	Fluorescent Light Bracket Right	1	535-7739-01	18	"CAUTION - VERY HOT" Decal	1	820-6266-00
8B-8C	Identical to Items 7B-7C above.	See 7B-7C		19 ‡	Button Hole Plug (Blk) (Happ #52-6214-00)	1	500-6566-00
<i>Items 7 &amp; 8 are secured by: #10-24 X 1-1/4" Carriage Bolt Sq. Neck (Qty. 2/per) (231-5012-00), #10-24 Keps Nut (Qty. 2/per) (240-5207-00) and 3/4" X 3" Reinforced Strapping Tape (Qty. 1, Sold in 12" Lengths only) (626-5040-00)</i>							
<i>Ordering Note: If 515-6545-01 is unavailable, order the individual part(s) actually required.</i>							
9	Fluorescent Tube 24" (F18T8CW)	1	165-5061-00	20*	Fuse Label (UL)	1	820-6143-00
				21*	Backbox Date Label	1	820-5091-00
				22*	Ribbon Cable, 20-Pin (4")	1	036-5000-04
				23*	Ribbon Cable, 26-Pin (40")	1	036-5001-40
				24*	1/4" Clamp (Double)	3	040-5000-23
				25*	1/2" Clamp (Single)	1	040-5000-06
				26*	3/4" Clamp (Single)	2	040-5000-08
				27*	1" Clamp (Single)	6	040-5000-09
<i>Items 24-27 are secured to Item 1 by: #8 X 1/2" HWH AB (Zinc) (Qty. 13) (234-5101-00)</i>							



# PLAYBOY Speaker Panel Assy. for the Backbox, 515-6888-03 (Items 1-15) and Assoc. Parts: Backglass Assembly & Pivot Hinges (Left & Right) (Items AP- A - AP-C) Not sold as an assembly, order the individual part(s) actually required.



For clarity, the below drawing **does not show** the speaker(s).



Nº	SPEAKER PANEL PART NAME	QTY.	SPI PART Nº
1	Speaker Panel (Black Wood)	1	525-5515-00
2	Dot Matrix Disp. Bd. Mounting Bracket	2	535-8368-01
Item 2 is secured to Item 1 by: #8 X 3/4" HWH AB (Zinc) (Qty. 4/per) (234-5103-00)			
3	Dot Matrix Display Board 128 X 32	1	520-5052-00
Item 3 is secured to Item 2 by (at corners): 3/16" X 3/8" Spacer Gray (Qty. 4) (254-5000-18) and #6-32 X 1/2" HWH Swage (Serr) Zinc (Qty. 4) (237-5976-03)			
Item 3 is secured to Item 4 (at the top center) by: 3/4" X 1/4" Hex Spacer #6-32 Tap (Qty. 1) (254-5008-04) and #6-32 X 1/4" PPH MS (Sems) Zinc (Qty. 1) (232-5200-00)			
4	Static Shield (Steel Plate)	1	535-6437-00
Item 4 is secured to Item 2 by: 1/2" X 1/4" Hex Spacer #6-32 Tap (Qty. 4) (254-5008-03) and #6-32 X 1/2" PPH MS (Sems) Zinc (Qty. 2, on Left Side only) (232-5202-00)			
5*	Edge Protector (on Item 4)	2	545-5592-01
6	Display Controller Board FCC-FEB98	1	520-5055-03
Item 6 is secured to Item 4 by: 1/2" X 5/16" X .144 ID Spacer Tap (Qty. 3) (254-5014-00), #6-32 X 3/4" PPH MS (Sems) Zinc (Qty. 3) (237-5504-00), 1/2" X 1/4" Hex Spacer #6-32 Tap (Qty. 1) (254-5008-03) and #6-32 X 1/4" PPH MS (Sems) Zinc (Qty. 2) (232-5200-00)			
7	RF Shield	1	820-5092-00
Item 7 is secured inbetween: "Item 6" and its' mounting hardware described.			
8*	Ground Strap (25") (on Items 4, 6, 12)	4	600-5006-25
9*	1/2" Clamp (Single) (on Item 4)	1	040-5000-06
10*	Ribbon Cable, 14-Pin	1	036-5260-00
Item 10 Note: The 14-Pin cable connects the Dot Matrix Disp. Bd. to the Disp. Controller Bd.			
11*	Foam 3/16" Thk. X 1/4" X 36"	6	626-5026-00
Above Item 11 is self-adhesive. Located between Items 3 & 17. Sold in 12" Lengths only.			
12	Speaker (Shld.) 4" 8Ω MG Elec #4060SH	2	031-5004-01
13	Speaker Grill (Black w/no Artwork)	2	535-8081-01
14	Speaker Panel Hook Bracket	2	535-7009-02
Items 12, 13 & 14 are secured by: #8 X 3/4" HWH AB (Zinc) (Items 12/13: Qty. 4/per; Item 14: Qty. 2/per) (234-5103-00)			

Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
15	Plastic Shield (Display Cover)	1	545-5884-00
Item 15 is secured to Item 2 by: #6 X 3/8" HWH AB (Zinc) (Qty. 8) (234-5000-00)			

The Associated Parts AP-A thru AP-C are also noted in the Backbox Assembly drawings on the previous page.

ASSOC. PARTS ARE NOT INCLUDED WITH BACKBOX/SPKR. PANEL ASSY'S.

Nº	ASSOC. BACKBOX PART NAME	QTY.	SPI PART Nº
AP-A	Backglass Assembly (Game Nº 76)	1	See Parts Below
<b>ORDER ONLY INDIVIDUAL PART(S) NEEDED:</b>			
AP-A1	Clear Backglass 25.906" X 19.187"	1	660-5038-02
AP-A2	Playboy Film Art w/Hologram (#76)	1	515-7252-76
<b>NOTE: The Playboy Backglass Film Art must have the Official Playboy Hologram Logo affixed. It cannot be displayed without it!</b>			
AP-A3	Top Plastic Channel - 26"	1	545-5018-15
AP-A4	Bottom Plastic Lift Channel - 26-1/16"	1	545-5021-01
AP-A5	Plastic Edging (Left/Right) - 18-1/8"	2	545-5018-14
AP-A6*	Tape (double-sided) (12" Length)	1	626-5005-00
Note: AP-A6 secures AP-A3--A5 to AP-A1 (only 6" required)			
AP-B	Pivot Hinge Left	1	535-7999-00
AP-C	Pivot Hinge Right	1	535-7999-01
Items AP-B & AP-C are secured to Backbox by: 1/4"-20 X 1-1/4" C.B. Sq. Neck (Qty. 4) (231-5003-00), 1/4"-20 Flange Nut (Qty. 4) (240-5300-00) and Fend Washer 1/4" I.D. X 1" O.D. (Qty. 1) (242-5009-00)			
Items AP-B & AP-C are secured to Cabinet by: 1/4"-20 X 7/8" Carriage Bolt Sq. Neck (Qty. 2) (231-5014-00), Hinge Spacer (Qty. 2) (530-5099-00), Washer 1/4" I.D. X 7/8" O.D. X 1/8" Yellow (Qty. 1/per) (242-5016-01), Fend Washer 1/4" I.D. X 1" O.D. (Qty. 1/per) (242-5009-00) and 1/4"-20 Flange Nut (Qty. 1/per) (240-5300-00)			
Note: Inside cabinet holes are covered by BLACK MYLAR COVER DISCS (QTY. 2) (820-5041-00) to hide securing hardware (AP-B & AP-C above) from player view.			



# Cabinet - General Parts & Switches

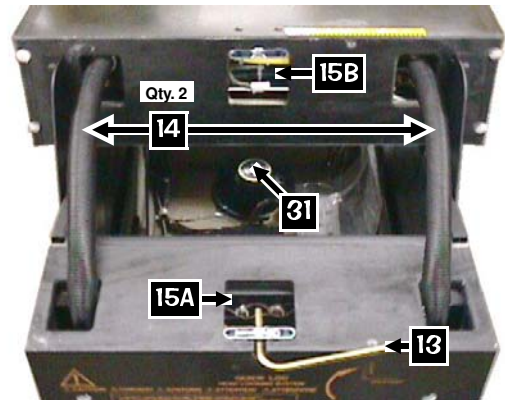
For Backbox Parts see the previous two pages.



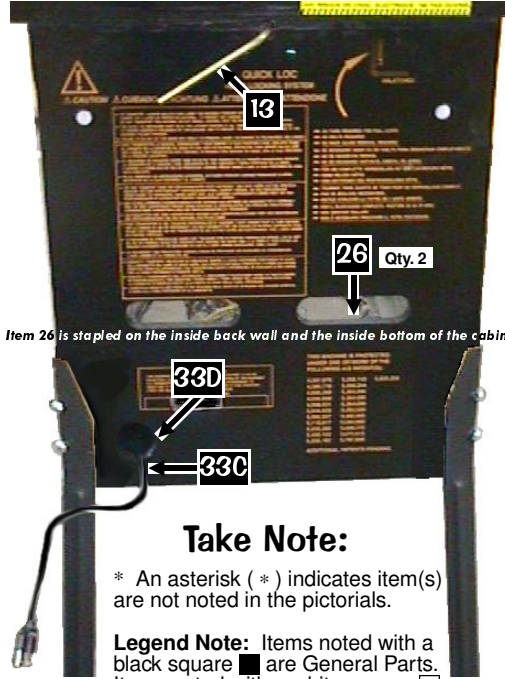
Enlarged View of Item 18 inside the Coin Door, Item 16. For usage, see Section 3, Chapter 1, Portals Service Menu Intro., Pg. 8

## Take Note:

Item 11, Button Hole Plug (Blk) is the Optional Tournie Button Access Hole. If removing for the Optional Tournament Button, save with the game.



View of the back of the Cabinet with the Backbox in the down position.



Item 26 is stapled on the inside back wall and the inside bottom of the cabinet.

## Take Note:

\* An asterisk ( \* ) indicates item(s) are not noted in the pictorials.

**Legend Note:** Items noted with a black square  are General Parts. Items noted with a white square  are Switches.

Sec. 4: Parts Id. ...

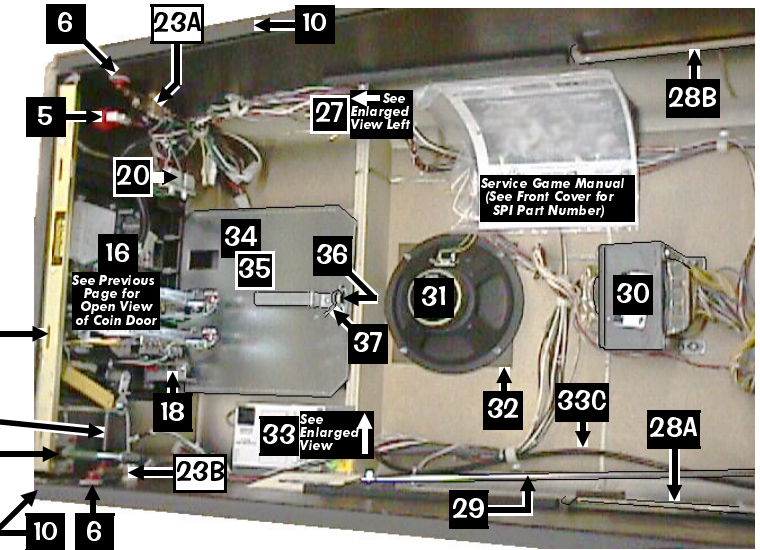
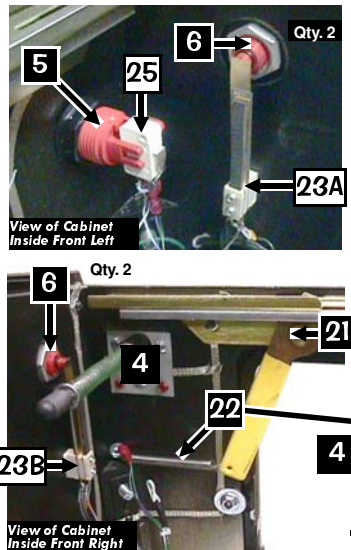
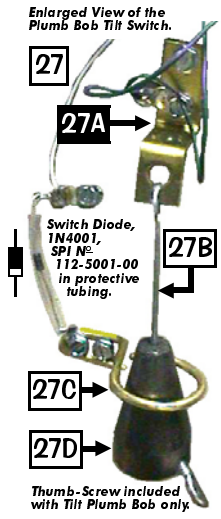
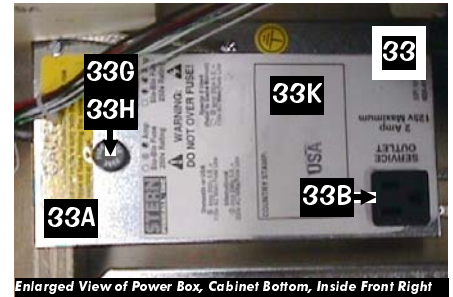
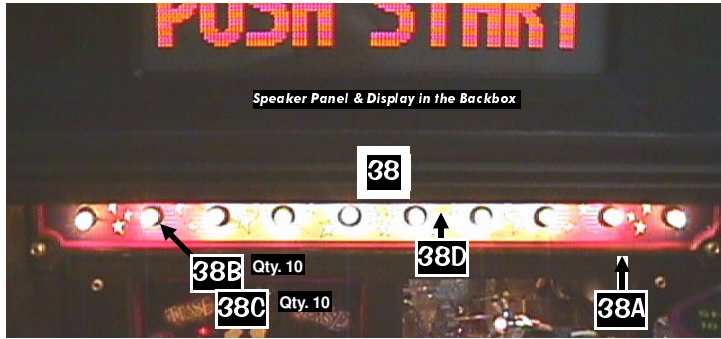
Nº	CABINET PART NAME	QTY.	SPI PART Nº	Nº	CABINET PART NAME	QTY.	SPI PART Nº
1	Game Nº 76 Screened Cabinet (Plain)	1	525-6000-76	12*	P/F Glass (Tmprd.) 21" X 43" X 3/16"	1	660-5001-00
2	Black Leg & Leveler Assembly	4	500-5921-50	13	Hex Key Allen Wrench 5/16"	1	777-0001-00
Item 2 is secured by: Leg Bolt Back Plate (535-5703-00) and Leg Bolt 3/8" X 16 X 2-1/2" Hex 5/8" Hd. (2/per) (231-5001-01) To order just a Leg Leveler (3/8" - 16 X 3") use SPI Nº: 500-5017-00. A Leg "without" a Leg Leveler is not available.				14	Corrugated Tubing Black 1 1/4" X 2.6' Lg.	2	605-5008-00
3*	Start Button Assembly ("Flipper" Style)	0	Not Used	Above Item 14 covers the Cables Wiring Harnesses going into the Backbox from the Cab.			
Item 3 includes the Switch. FOR SWITCH ONLY see Item 25 on the Next Page.				15A	#1 Roto Lock Male (R2-0055-02)	1	355-5006-01
4	Ball Shooter (Plunger) Assembly	1	500-6146-00-04	15B	#1 Roto Lock Female (on Backbox)	1	355-5006-02
Item 4 is secured by: Support Plate (Qty. 1) (535-5027-00), #10-32 X 3/8" SHWH (Serr) Swage (Qty. 3) (237-5985-00) and #6 X 5/8" HWH AB (Zinc) (Qty. 2) (234-5002-00). FOR A BREAKDOWN OF PARTS SEE: Sec. 4, Chp. 2, Drawings for ... Assemblies...				Item 15A is secured by: #10-24 X 1-3/4" Carr. Bolt Sq. Neck (Qty. 2) (231-5022-00), #10-24 Nylon Stop Nut (Qty. 2) (240-5206-00) and #10 Washer 7/32" X .5" X 1/16" (Qty. 2) (242-5003-00)			
5	1"Ø Button (Red) with Lamp (#555 WB)	1	500-6388-02	16	Coin Door (with Validator) USA only	1	500-5018-172
Item 5 includes the Switch. FOR SWITCH ONLY see Item 25 on the Next Page.				Item 16 is secured by: 1/4"-20 X 1-1/4" Carriage Bolt Sq. Neck (Qty. 4) (231-5003-00) 1/4"-20 Flange Nut (Qty. 4) (240-5300-00) and Fend Washer 1/4" I.D. X 1" O.D. (Qty. 3) (242-5009-00) NOTE: For Coin Door other than USA call Technical Support for SPI Part Nº.			
6	Flipper Button (Red) Assembly	2	500-5026-32	17	Coin Door Switch (USA)	2	180-5024-00
Item 6 is secured by: Pal Nut for Flipper Button (Metal) (Qty. 2) (240-5003-01) and is fitted with: O-Ring 1 1/32" X 7/32" X 1/16" (Qty. 1/per) (545-5850-00) Item 6 DOES NOT include the Switch. FOR SWITCHES ONLY see Items 23A/B on the Next Page.				FYI: Coin Door Switch ( ¥ Japan) 0 180-5091-00			
7	Rear Glass Channel 20-3/8" Length	1	545-5038-00	18	Diagnostics Service Switches (X3)	1	180-5012-03
8	Plastic Channel 42-5/8" Lg. (Lt. & Rt.)	2	545-5017-00	Item 18 is secured to Coin Door by: Diagnostics Sw. Bracket (Qty. 1) (535-6860-01)			
9	Side Armor "with holes" (Lt. & Rt.)	2	535-7297-02	19	Slam Tilt Sw. (No Longer Required)	0	Not Used
Item 9 is secured by: #10-24 X 1" Carriage Bolt Sq. Neck (2/per) (231-5021-00), #10-24 Hex Nut (2/per) (240-5202-00) and #8 X 5/8" PPH Black (2/per) (232-5101-01)				20	Dual Switch Assembly	1	500-5808-00
10	Front Molding - Black	1	500-5757-02-00	ORDERING ABOVE (ITEM 20) ASSEMBLY PART Nº WILL INCLUDE:			
Item 10 requires: Self-Adhesive Foam Rubber 3/8" X 3/16" X 20-3/8" (626-5001-00).				20A	Mounting Bracket	1	535-6958-00
11‡	Button Hole Plug (Blk) (Happ #52-6214-00)	1	500-6566-00	20B	Playfield Power Interlock Sw. (Top)	1	180-5136-00
				20C	Memory Protect Switch (Bottom)	1	180-5000-01
				Item 20 is secured to Cabinet by: #8 X 1/2" HWH AB (Zinc) (Qty. 2) (234-5101-00)			

Parts Table & Views continue on the next page.





# Cabinet - General Parts ■ & Switches □ Continued



## Take Note:

\* An asterisk (\*) indicates item(s) are not noted in the pictorials.

**Legend Note:** Items noted with a black square ■ are General Parts. Items noted with a white square □ are Switches.

Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº	Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
<i>Parts Table &amp; Views continue on the previous page.</i>							
21	Front Molding Lockdown Assembly	1	500-6509-00	32	Speaker Grill 7" X 7"	1	545-5072-03
Item 21 is secured by: #10-24 X 1-1/4" Carr. Bolt (Qty. 2) (231-5012-00), #10-24 Keps Nut (Qty. 2) (240-5207-00), #8 X 5/8" HWH AB Zinc (Qty. 4) (234-5102-04) and #10 Washer 7/32" ID X 1/2" OD X 1/16" (Qty. 2) (242-5003-00)				Items 31 & 32 are secured by: #6-32 X 1-1/4" Fin Shank Screw (Qty. 4) (237-5883-00) and #6-32 Keps Nut (Qty. 4) (240-5008-00)			
22	Lockdown Spring (connected to handle)	1	265-5008-00	33	Power Input Box Sub-Assy.	1	515-5360-07
23A	Flipper Switch - Self-Cleaning	2	180-5160-00	<b>ORDERING ABOVE (ITEM 33) SUB-ASSY. PART Nº WILL INCLUDE:</b>			
23B	Flipper Sw. - X2 Stack for Lwr./Upr. Flipper(s)	0	180-5164-00	33A	Power Box (Plain)	1	535-5932-00
24*	Foam Strip (2 on 23A; 1 on 23B)	3	626-5042-00	33B	Service Outlet (for USA)	1	180-5008-01
25	Start Button Switch (ONLY)	1	180-5174-00	33C	Line Cord 10' ROJ 3" Max.	1	034-5000-10
26	Grills 2-1/2" X 18" (on Back & Bottom)	2	545-5072-02	33D	Recessed Cup for Line Cord	1	545-5122-00
27	Cabinet Plumb Bob Tilt Switch	1	See Parts Below	33E*	Line Filter	1	150-5000-00
<b>ORDER ONLY INDIVIDUAL PART(S) NEEDED:</b>				33F*	Varistor TNR159211KM	1	150-5001-00
27A	Bracket for Hanger Wire	1	535-5221-00	33G	Fuse 8 Amp 250v Slo-Blo (Domestic)	1	200-5000-05
27B	Hanger Wire	1	535-5319-00	33H	Fuse Holder	1	205-5001-00
27C	Contact Wire Form	1	535-7563-01	33J*	On/Off Switch Bracket	1	535-8318-00
27D	Plumb Bob Weight (includes Thumb-Screw)	1	535-5029-00	33K	On/Off Rocker Sw. (Arcoelectric C1350AB)	1	180-5001-01
Items 27A & 27C are secured by: #8 X 1/2" HWH AB (Zinc) (Qty. 4) (234-5101-00)				33L	Power Box Decal	1	820-6123-03
28A	Slide & Pivot Support Bracket - Right	1	535-5990-00	34	Cash Box Plastic Bottom	1	545-5090-00
28B	Slide & Pivot Support Bracket - Left	1	535-5989-00	35	Cash Box Cover (Validator)	1	535-5013-03
Items 28A & 28B are secured by: #10-24 X 1-1/4" Carriage Bolt Sq. Neck (3/per) (231-5012-00) and #10-24 KEPS Nut (3/per) (240-5207-00)				36	Cash Box Lock Bracket (wire)	1	535-7562-00
29	Prop Rod	1	535-7553-00	37	Large Hair-Pin Clip	1	535-7772-00
Item 29 is secured by: #10-24 X 1-3/4" Carriage Bolt Sq. Neck (Qty. 1) (231-5022-00), Washer #10 7/32" ID X .5" OD X 1/16" Thk (Qty. 1) (242-5003-00) and #10-24 Nylon Stop Nut (Qty. 1) (240-5206-00)				38	Cabinet Light Bd. Assy. PLAYBOY	1	500-6558-00
30	Transformer 5.7v AC (with Ballast Winding)	1	010-5012-01	<b>ORDERING ABOVE (ITEM 38) ASSEMBLY PART Nº WILL INCLUDE:</b>			
Item 30 is secured by: 1/4"-20 X 5/8" PPH MS (Zinc) (Qty. 4) (237-5854-00) and 1/4" Split Lock Washer (Qty. 4) (244-5000-00)				38A	Cabinet Light Board Plain (Generic)	1	525-5609-00
31	Speaker 8" ø Rd. 8010 4Ω	1	031-5007-00	38B	2-Lug Staple Down Socket	10	077-5000-00
				38C	#44 Bulb Yellow (Small Bayonet Type)	10	165-5053-06
				38D	Decal "-10" of Playboy Decal Set	1	from 820-6305-XX
				<i>Note: Individual Decals from a Decal Set cannot be ordered separately.</i>			
				Item 38B is secured to Item 38A by: Staple (5/16") (Qty. 2/per) (631-5000-00)			
				Item 38 is secured to the Cabinet by: #8-32 X 1 1/2" HWH MS (Ser) Zinc (Qty. 2) (237-5946-00) and #8 Washer (Qty. 2) (242-5005-00)			
<b>Ordering Note:</b> If 500-6558-00 is unavailable, order the individual part(s) actually required.							

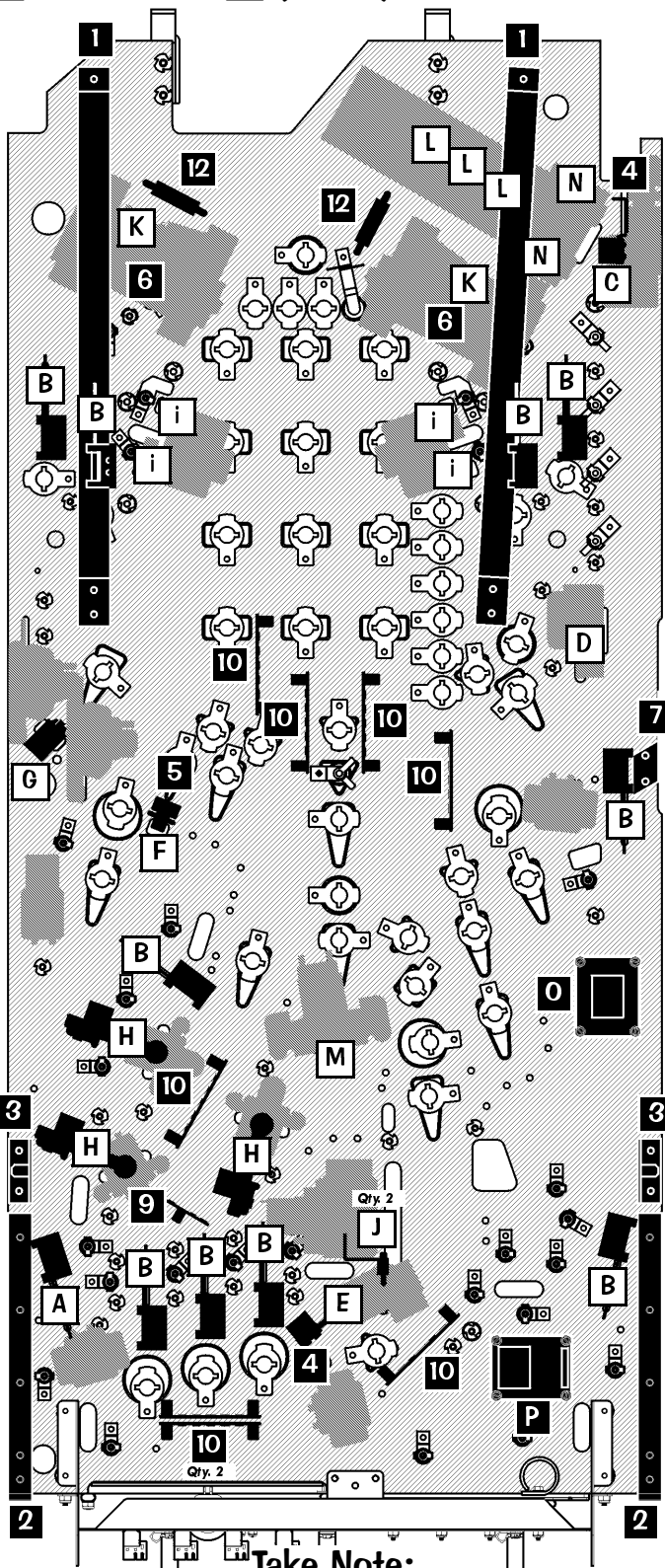
Sec. 4: Parts Id. ...

# Playfield - General Parts & Switches (Below)

Nº	BELOW PLAYFIELD PART NAME	QTY.	SPI PART Nº
1	Playfield Support Slide Bracket	2	535-6862-02
Item 1 is secured by: #8 X 1/2" HWH AB (Zinc) (Qty. 2/per) (234-5101-00) and #8-32 X 5/8" HWH Swage (Serr) Zinc (Qty. 1/per) (237-5975-03)			
2	Edge Slide Bracket (Extended)	2	535-5988-01
Item 2 is secured by: #4 X 1/2" PFH (Zinc) (Qty. 5/per) (237-5840-00)			
3	Pivot Pin Bracket Welded Assembly	2	500-5329-03
4	Switch Bracket (Shooter Lane / Eject Hole)	2	535-6173-00
Item 4 is secured by: #6 X 1/2" HWH AB (Zinc) Red (Qty. 2/per) (234-5001-02)			
5	Switch Back Plate (Stand-Up Target) Target (Stand-Up) Bracket	1	535-6452-00 535-6896-00
Item 5 requires: Foam Pad (Qty. 1) (626-5029-00) on Target Bracket.			
6	Insulation Fiche Paper (under Lwr. Flips)	2	545-5721-00
7	Gate Bracket (Rt.) Assy. (see next page)	1	500-6515-00
Item 7 is secured by: #8 X 1/2" HWH AB (Zinc) (Qty. 2/per) (234-5101-00)			
8*	Diode Terminal Strip 2-Lug (810) Isolated	0	055-5203-00
However, Item 8 (Qty. 1) is located in the Cabinet on the Coin Door.			
9	Diode Terminal Strip 3-Lug (813) Isolated	1	055-5204-03
10	Diode Terminal Strip 5-Lug (824) Isolated	8	055-5204-05
11*	Diode Terminal Strip 7-Lug Isolated	0	055-5204-07
Items 9-10 are secured by: #6 X 3/8 HWH AB Zinc (Qty. 1-2/per) (234-5000-00). Note: 1N4004 Diodes (112-5003-00) are used in all Diode applications. 1N4001 Diodes can be used for Switches and/or Lamps. See Sec. 5, Chp. 2, Playfield Diode Terminal Strip...			
12	3A 250v Slo-Blo Fuse Fuse Clip Holder (Socket)	2	200-5000-08 205-5000-01
Item 12 is secured by: #6 X 1/2" PPH AB (Qty. 1/per) (237-5805-00) Note: Item 12, Fuse Clip Holder (Socket) 205-5000-01 is part of a set of 12 (205-5000-12). You can order them as individuals (...-01) or a set of 12 (...-12).			
13*	Diode Terminal Strip/Fuse Decals A-I	1	820-6221-76
Note: For Decal Descriptions & Locations, see Sec. 5, Chp. 2, Playfield Wiring, Page 101.			
14*	#8 Solder Lug	0	055-5140-08
However, Item 14 (Qty. 4) is located in the Cabinet on the Coin Door & Power Box.			

Nº	BELOW SWITCHES PART NAME	QTY.	SPI PART Nº
A	Micro Sw. Roll-Over Left Brkt. Assy.	1	500-6227-01
B	Micro Sw. Roll-Over Right Brkt. Assy.	10	500-6227-02
Items A & B are secured by: #8 X 1/2" HWH AB (Zinc) (Qty. 2/per) (234-5101-00)			
C	Micro Switch (at Shooter Lane)	1	180-5157-00
D	Micro Sw. (Heavy Duty "Y" Flat Actuator)	1	180-5116-01
E	Micro Switch (Long Flat+Bent End Actuator)	1	180-5186-00
Items C-E require a Switch Body Protect Plate (535-6539-00) which is secured by: #2-56 X 1/2" HWH Serr (Qty. 2) (237-5937-02) and #2-56 Hex Nut (Qty. 2) (240-5301-00).			
F	Switch & Target Assy. Narrow (Red)	1	515-5967-02
Item F is secured by: #8 X 1/2" HWH AB (Zinc) (Qty. 2) (234-5101-00) For better view or entire assembly, see Appendix I, (end of manual).			
G	Modular S-U Target Square (Clear)	1	500-6139-01R
Item G is secured by: #8 X 3/4" HWH AB (Zinc) (Qty. 2) (234-5103-00) For better view or alternate colors, see Appendix I, (end of manual).			
H	Micro Switch (on Pop Bumpers)	3	180-5015-03
i	Stack (Blade) Switch (on Slingshots)	4	180-5054-00
J	Micro Switch (Roller Actuator, Reg. Force)	2	180-5119-00
Note: For how Item J can be replaced with 180-5119-02 if -00 is no longer available.			
K	EOS Switch Flipper (on Flippers)	2	180-5149-00
L	Micro Sw. (Roller Actuator, Lite Force)	3	180-5119-02
M	Micro Switch (on Drop Target)		180-5158-00
Note: For how Items H-M are secured or for a better view, see Section 4, Chapter 2, Drawings for Major Assemblies & Ramps, on the individual assemblies noted above.			

Nº	BELOW MISC. PCB PART NAME	QTY.	SPI PART Nº
N	Dual OPTO TRANS Bd. (on Ball Trough) Dual OPTO REC Board (on Ball Trough)		520-5173-00 520-5174-00
Note: For more details on Item N and a break-down of parts, see Section 5, Chapter 4, Printed Circuit Boards, Page 105. For how Item N is secured or for a better view, see Section 4, Chapter 2, Drawings for Major Assemblies & Ramps, Page 73.			
O	Relay PC Board w/Soldered Harness	1	520-5010-00-76
Item O is secured by: #6 X 3/4" HWH AB (Zinc) (Qty. 4) (234-5003-00) and 3/8" Sif. Rtn. Spacer White (Qty. 4) (254-5007-01) Note: To order the Relay Board without the Soldered Harness (036-5161-00) attached, use 520-5010-00.			
P	DC Relay (Bi-Directional) PC Board	1	520-5066-00
Item P is secured by: #6 X 3/4" HWH AB (Zinc) (Qty. 4) (234-5003-00) and 3/8" Sif. Rtn. Spacer White (Qty. 4) (254-5007-01)			



## Take Note:

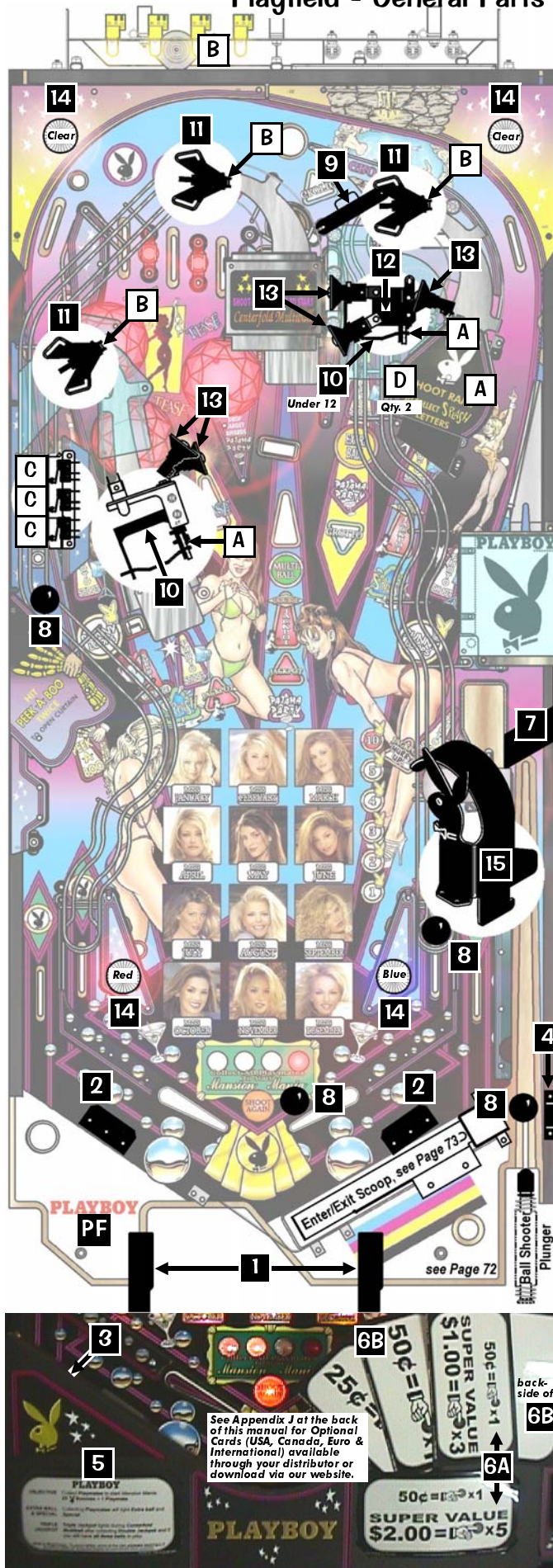
- \* An asterisk ( \* ) indicates item(s) are not noted in the pictorials.
- 1. For Sockets & Bulbs (drawings & part numbers) see Pgs. 68-70.
- 2. Some items or parts may be included with or associated with a Major Assembly or Ramp Assembly; see the Blue Pages, Sec. 4, Chp. 2, for parts required not appearing on this page. If you still cannot find the part required, Call Stern™ Pinball Technical Support, 1-800-542-5377 or 1-708-345-7700 (Opt. 1).
- 3. Legend Note: Items noted with a black square ■ are General Parts. Items noted with a white square □ are Switches, OPTO Boards, or Misc. PC Boards.

Sec. 4: Parts Id. ...





# Playfield - General Parts & Switches (Above)



Nº	ABOVE PLAYFIELD PART NAME	QTY.	SPI PART Nº
PF	P/F Screened w/ Inserts & NO Parts	1	830-5176-00
1	P/F Complete w/ Inserts & ALL Parts	1	505-6004-76-76
1	Playfield Hanger Bracket	2	535-8385-00
Item 1 is secured to the P/F by: #8-32 X 7/8" HWH MS Zinc (Qty. 2/per) (237-5890-00)			
2	Arch Retaining (Hold-Down) Brackets	2	535-8394-00
Item 2 is secured to the Playfield by: #8 X 1/2" HWH AB (Zinc) (Qty. 3/per) (234-5101-00)			
3	Bottom Arch (Black Metal) w/o Forks	1	535-8392-01
Item 3 is secured to the playfield by: #10-32 X 5/16" PH FL U/C MS STL Zinc (Qty. 2) (237-6013-00). <b>Usage Note:</b> 535-8392-01 is used on games with a <b>Ball Shooter Plunger</b> ; 535-8392-00 is used on games with an <b>Auto Launch Button</b> . When replacing the Bottom Arch, order new replacement <b>Nelson Protect Strips</b> (not included) (Qty. 2) (545-5212-02). <b>Note:</b> Item 3 doesn't include Decals. For Decals, see Playfield - Plastics & Decals, Page 63.			
4	Level Assembly	1	515-7214-00
<b>For Individual Items use :</b> .882" 8MM Vial Mtg. Flange (545-6027-00), Level .8mm Empire #0224 (545-6001-01) or Level Bracket (535-9010-00). <b>Flange secured by:</b> #6-32 X 1/4" PPH MS (no Sems) Zinc (Qty. 1) (237-5500-00) and #6-32 Keps Nut (Qty. 1) (240-5008-00). <b>Item 4 is secured to the wood rail by:</b> #6 X 1/2" HWH AB Zinc Red (Qty. 2) (234-5001-02)			
5	Instruction Card (USA) Playboy	1	755-5176-10
<b>Note:</b> Visit <a href="http://www.sternpinball.com">www.sternpinball.com</a> for a PDF copy of the Game Instruction Card which will also have any translated Instruction Cards made for this game. Find Game Link or Archives. <b>Spanish</b> 755-5176-02; <b>German</b> 755-5176-13; <b>Italian</b> 755-5176-14; <b>French</b> 755-5176-15.			
6A	Coin Card (2-Sided) New for 2002	1	755-5400-00
<b>Note:</b> This New Style Coin Card supercedes 755-5087-01/05 which is no longer available. <b>Usage Note:</b> Use Item 6A (Back: 1 Play 50¢ - 5 Plays \$2) for Adj. 6, Game Pricing, USA 5 Setting, or (Front: 1 Play 50¢ - 3 Plays \$1) for Adj. 6, Game Pricing, USA 8 Setting.			
6B	Coin Card (2-Sided) New for 2002	1	755-5400-02
<b>Note:</b> This New Style Coin Card supercedes 755-5087-01 which are no longer available. <b>Usage Note:</b> 1 Play 50¢ for Adj. 6, Game Pricing, USA 2-7 Setting, (Back: is Blank) for Custom Settings.			
<b>Availability:</b> See Appendix J at the back of this manual for more or optional Coin Cards (USA, Canada, Euro & other International) available through your distributor or download via our website <a href="http://www.sternpinball.com/coinagecards.htm">www.sternpinball.com/coinagecards.htm</a> (PDF Format). Coin Cards provided with this game depends on where the game was originally shipped from the factory.			
7	Gate Bracket (Right) Assembly	1	500-6515-00
<b>Includes:</b> Bracket RT (535-8977-00), RT Flap (535-8979-00), Hinge Pin RT (535-8982-00) and Nylon Washer (#90295A010) .065" ID X .179" OD X .078" (Zinc) (242-5069-00)			
Item 7 is secured under the Playfield by: #8 X 1/2" HWH AB Zinc (Qty. 2) (234-5101-00)			
8	Pinball (Steel) 1 1/8" ø	4	260-5000-00
9	1-Way Gate Mounting Bracket (Large)	1	535-9079-00
10	Wire Gate (for above)	1	535-8441-01
10	Roll-Under Gate & Switch Assembly	2	515-7206-00
<b>For Individual Items use :</b> Roll-Under Switch Mounting Bracket (Black) (535-9041-00), Wire Gate (535-9043-48) and Micro Switch (180-5190-28).			
11	Cross-Under Gate & Switch Assembly	3	515-7231-00
<b>For Individual Items use :</b> Roll-Under Switch Mounting Bracket (Black) (535-9077-00) and Micro Switch (180-5190-48).			
Item 11 is secured by: #8-32 X 3/8" HWH Swage (Ser) Zinc (Qty. 2/per) (237-5975-00)			
12	Bracket, Dual Light Mounting (No Parts)	1	535-9138-00
Item 12 is secured to Clear Plastic -69 by: #6-32 X 3/8" PPH MS (Sems) Zinc (Qty. 2) (232-5201-00) onto 2" X 1/4" Hex Spacer #6-32 Tap (Qty. 1/per) (254-5008-07)			
13	Light Reflector (Silver Plastic)	5	545-5409-01
14	Mini-Mars Light Cover (Snap-In) Clear	2	550-5030-01
14	Mini-Mars Light Cover (Snap-In) Red	1	550-5030-02
14	Mini-Mars Light Cover (Snap-In) Blue	1	550-5030-05
<b>For Light Socket &amp; Bulbs, see Page 70.</b>			
15	VUK Exit Scoop, Playboy Bunny	1	535-9097-01
Item 15 is secured by: #8-32 X 1" HWH (Zinc) (Qty. 2) (237-6003-00)			
16	Back Panel Black Wood (No Parts)	1	525-5608-00
17*	Plug-Cap (3/16") Black Plastic	1	545-5232-01
<b>Note:</b> Item 17 should plug hole if a Center Post (@ Drain) is used, then removed.			

Nº	ABOVE SWITCHES PART NAME	QTY.	SPI PART Nº
A	Micro Switch (Short Flat Actuator)	3	180-5190-28
Item A requires a Switch Body Protect Plate (Qty. 1/ea.) (535-6539-00) which is secured by: #2-56 X 1/2" HWH Sr (Qty. 2) (237-5937-02) and #2-56 Hex Nut (Qty. 2) (240-5301-00)			
B	Micro Switch (Long Flat Actuator)	4	180-5190-48
C	Micro Switch (Roller Actuator, Lite Force)	3	180-5119-02
D	Micro Switch (Short Flat/Mid Bend Actuator)	2	180-5189-00
Items B-D are secured by: #2-56 X 1/2" HWH Serr (Qty. 2) (237-5937-02)			

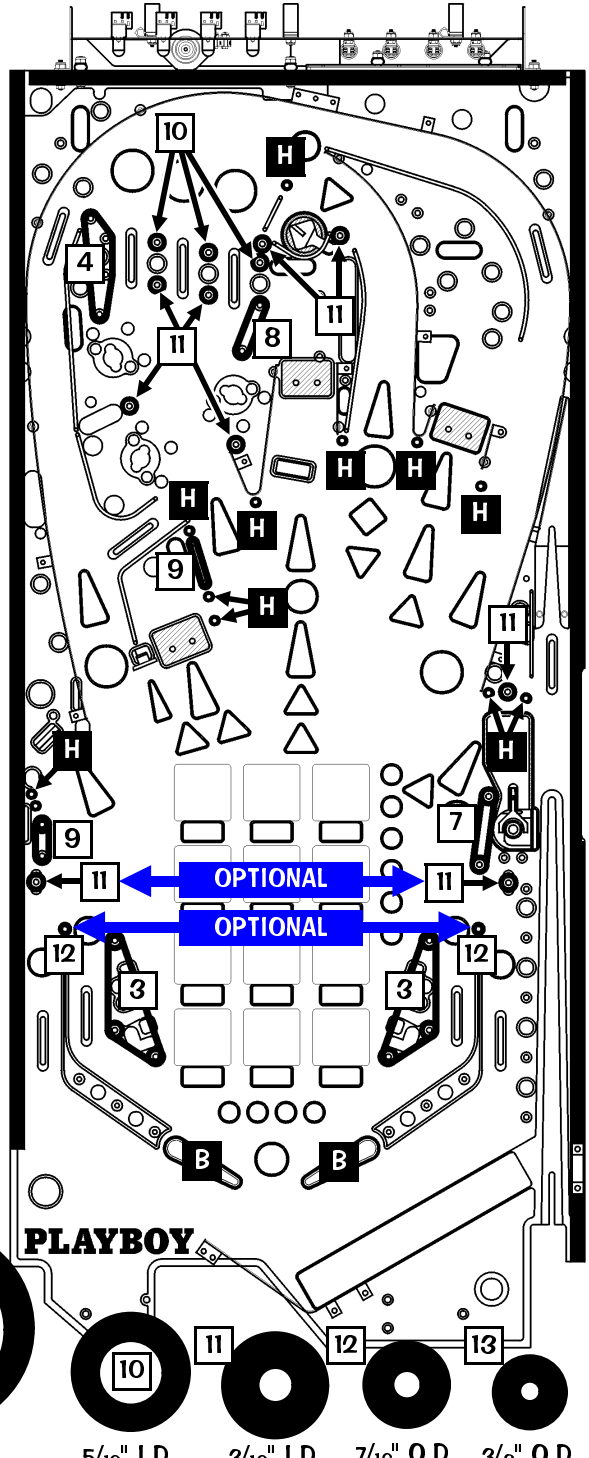
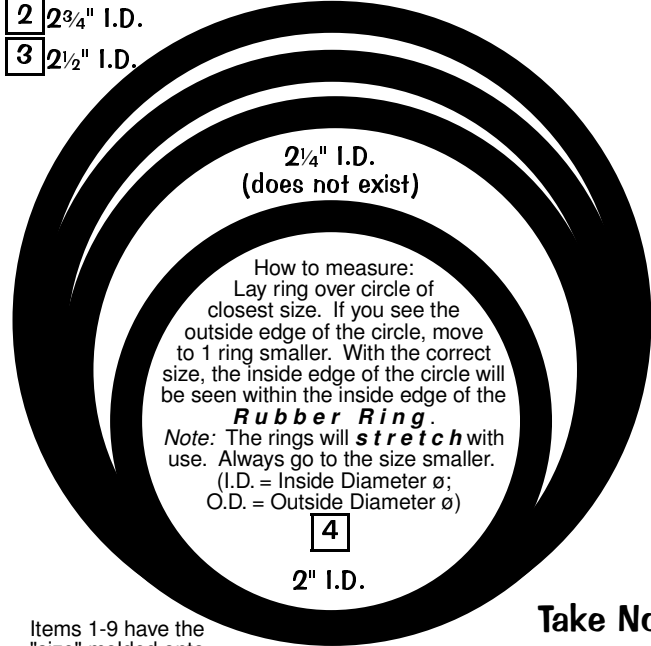
## Take Note:

- Some items or parts may be included with or associated with a Major Assembly or Ramp Assembly; see the Blue Pages, Sec. 4, Chp. 2. for parts required not appearing on this page. If you still cannot find the part required, Call Stern™ Pinball Technical Support, 1-800-542-5377 or 1-708-345-7700 (Opt. 1).
- Legend Note:** Items noted with a black square ■ are General Parts. Items noted with a white square □ are Switches.

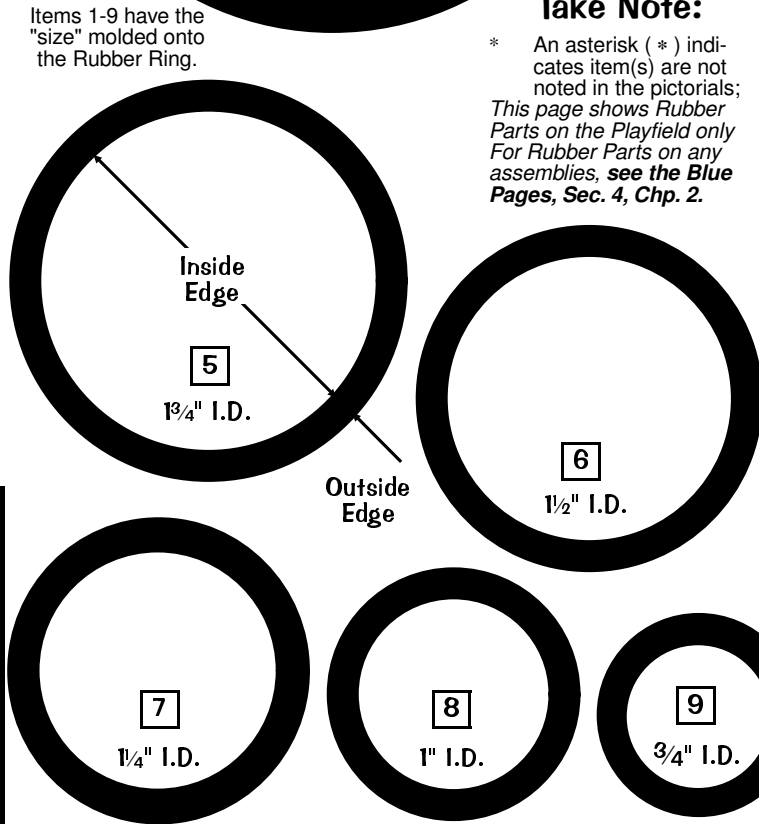
Sec. 4: Parts Id. ...

- 1 3" I.D.
- 2 2¾" I.D.
- 3 2½" I.D.

# Playfield - Rubber Parts ■ □ (Rings Actual Size) †



**Take Note:**  
 \* An asterisk ( \* ) indicates item(s) are not noted in the pictorials; This page shows Rubber Parts on the Playfield only For Rubber Parts on any assemblies, see the Blue Pages, Sec. 4, Chp. 2.



Sec. 4: Parts Id. ...

Nº	RUBBER PART NAME	QTY.	SPI PART Nº	Nº	RUBBER PART NAME	QTY.	SPI PART Nº
A	Small Flipper BLACK Rubber Ring	0	545-5207-00	4	2" I.D. BLACK Rubber Ring	1	545-5348-08
B	Large Flipper BLACK Rubber Ring	2	545-5277-00	5	1¾" I.D. BLACK Rubber Ring	0	545-5348-21
C*	Rubber Bumper (Deflector Pad)	2	545-5428-00	6	1½" I.D. BLACK Rubber Ring	0	545-5348-07
D*	Rubber Bumper (Grommet)	3	545-5105-00	7	1¼" I.D. BLACK Rubber Ring	1	545-5348-06
E	Rubber Bumper (Post)	0	545-5009-00	8	1" I.D. BLACK Rubber Ring	1	545-5348-05
F	Rubber Bumper (Flange)	0	545-5965-00	9	¾" I.D. BLACK Rubber Ring	2	545-5348-04
G	Rubber Bumper (Post Sleeve, Short)	0	545-5151-00	10	5/16" I.D. BLACK Rubber Ring	5*	545-5348-02
H	Rubber Bumper (Post Sleeve, Tall)	11	545-5308-00	11	3/16" I.D. BLACK Rubber Ring	9	545-5348-01
1	3" I.D. BLACK Rubber Ring	0	545-5348-10	12	7/16" O.D. BLACK Rubber Ring	2	545-5348-17
2	2¾" I.D. BLACK Rubber Ring	0	545-5348-20	13*	3/8" O.D. BLACK Rubber Ring	11	545-5348-19
3	2½" I.D. BLACK Rubber Ring	2	545-5348-09	14*	O-Ring 11/32" X 7/32" X 1/16" (on Flip Button)	2	545-5850-00

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





# Playfield - Plastics (Screened & Clear), Photo Inserts & Decals (Not Shown)\*

in Back Panel, behind Drop Screen  
-52 T9



for Centerfold  
-61 T4  
Top

for Centerfold  
-62 T5  
Middle

-63 T6  
Bottom  
for Centerfold

in Back Panel, behind Mirror  
-51 T8

Mirror  
820-6297-00  
can be ordered separately.

PLAYBOY PLASTICS PART NAME	SPI PART N <sup>o</sup>
Screened Plastic Set -01 thru -28 (Not Used: -14, -15, -20, -21 -24)	1 830-5988-XX
Clear Plastic Set -50 thru 70 (Not Used: -58)	1 830-5989-XX

**Attention:** Individual Plastic Pieces are not available. The entire Plastic Sheet Set must be ordered.

## Take Note:

- To order the entire Plastic Sheet Set (Screened &/or Clear), use the above Part N<sup>o</sup> with the "-XX" ending.
- The following Plastics require riveting, if replaced: -27 (Left Ramp Sign), and -65 (X2), -66 & -67 (Magazine Assembly), see the **Blue Pages** (Section 4, Chapter 2, Drawings for ... Assemblies & Ramps) for securing hardware.

in Triangle  
-55 T2  
goes in front of -56

in Triangle  
-56 T2  
goes behind of -55

in Triangle  
-53 T3  
goes in front of -54

in Triangle  
-54 T3  
goes behind of -53

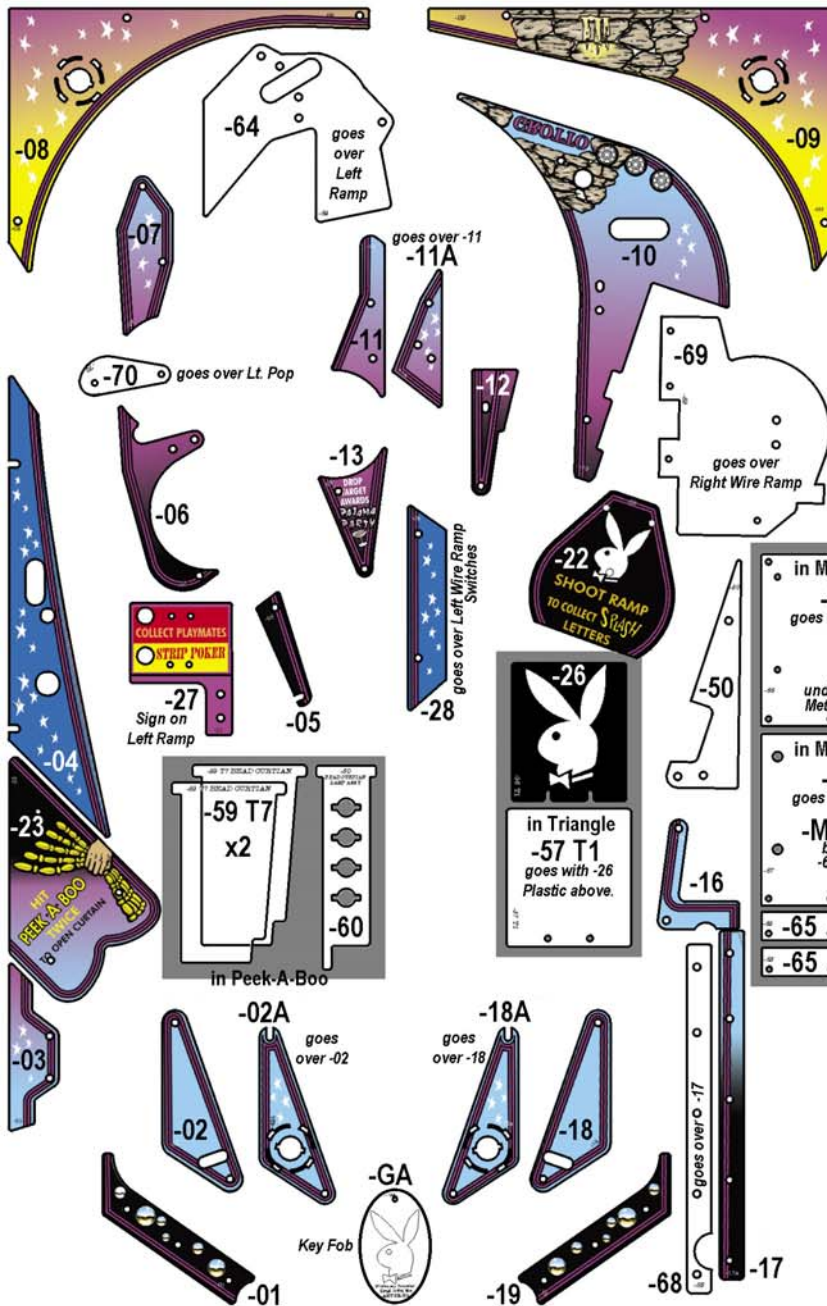
- GA (Key Fob) is provided for collecting (Not Used on game).
- If Clear Plastic -60 (Lamp Board in the Peek-A-Boo Assy.) requires replacement, **mark the socket and the corresponding hole with numbers as to not mix up the lamps.** See Pages 22-23 to verify that the Lamps were put back in the correct order per the Lamp Matrix.

## REPLACING TRANSLITES:

To replace the **Translites**, match the "T#" on the Clear Plastics with the T# on the **Translites**.

**Example:** If replacing the picture on one side of the Triangle Mechanism, between Clear Plastics -53 & -54, note it has "T3" listed next to the 2-Digits. Find the matching shape Translite with "T3" and swap the pictures.

Screws securing the Clear Plastics together merely need to be loosened, not removed. This game was provided with two (2) additional sets of different Models & poses.



**P'BOY MIRROR** SPI PART N<sup>o</sup>  
Plastic Mirror 820-6297-00

**PHOTO INSERTS** SPI PART N<sup>o</sup>  
\* Photo Inserts 830-5654-XX  
\* Photo Inserts Kit 502-5010-00

**Attention:** Individual Pieces are not available. The entire Set must be ordered. Using the Kit Part Number will include the Instruction Placement Sheet.

**PLAYBOY DECALS** SPI PART N<sup>o</sup>  
\* Decal Set 820-6305-XX

**Attention:** Individual Decals are not available. The entire Set must be ordered.

- 01 Portals; -02 SPI Tech Sp; -03 Install 4 Balls;
- 04 Bubble Level; -05 Shooter Lane; -06 SPI Coin Door;
- 07 Center Up/Down Post (required for UK Only);
- 08 / -09 Flipper Bats; -10 Cabinet Light Board;
- 11 Arch Left; -12 Arch Center; -13 Arch Right;
- 14 Magazine Inst.; -15 Skill Shot on Gate;
- 16 /-18 Lt. & Bot. Pops; -17 Right Pop;
- 19 White Panel Cover Up; -20 Drop Target;
- T4 X3 Text Side affixed to back of T4 Translite;
- T6 X3 Bunny Logo Side affixed to back of T6 Translite.

**OPTIONAL MYLAR** SPI PART N<sup>o</sup>  
Optional Clear Playfield Set 820-5095-00  
(Not Included with game)



# Playfield - Rails , Wire Forms and Ball Guides and Misc. Ramp †

Nº	WOOD RAIL PART NAME	QTY.	SPI PART Nº
1	Wood Rail 38" (Left Side Playfield)	1	525-5007-03
2	Wood Rail (Right Side Playfield)	1	525-5607-00

Items 1 & 2 are secured by: #6 X 1-1/4" PFH A (Zinc) (Qty. 5/per) (237-5804-00)

Nº	METAL RAIL PART NAME	QTY.	SPI PART Nº
3	Metal Rail (Center Drain under Arch)	1	535-8393-00
4	Metal Rail (Full Orbit Loop)	1	535-8954-00
5	Metal Rail (Left of Drop Target/Center Ramp)	1	535-8958-00
6	Metal Rail (Right of Center Ramp)	1	535-8955-00
7	Metal Rail (Left of Middle Lane, Right Ramp)	1	535-8957-00
8	Metal Rail (Right of Right Ramp Enter)	1	535-9116-00

Items 3-8 are secured at Tabs by: #8 X 1/2" HWH AB (Zc.) (Qty. 1/per tab) (234-5101-00)

Nº	WIRE FORM PART NAME	QTY.	SPI PART Nº
A	Snubber Wire (Left of Eject Hole)	1	535-5373-02
B	Wire Form 3" (Left of Shooter Lane Ramp)	1	535-5300-02
<i>Items A-B are secured by the ends tapped into the playfield. Take care if removing.</i>			
C	Wire Form (on Ball Guide Rail)	2	535-5642-00
<i>Item C is secured at the top "loop" with the top screw of Item D below.</i>			

Nº	PLASTIC BALL GUIDE PART NAME	QTY.	SPI PART Nº
D	Plastic Ball Guide (Return Lane)	2	550-5307-01

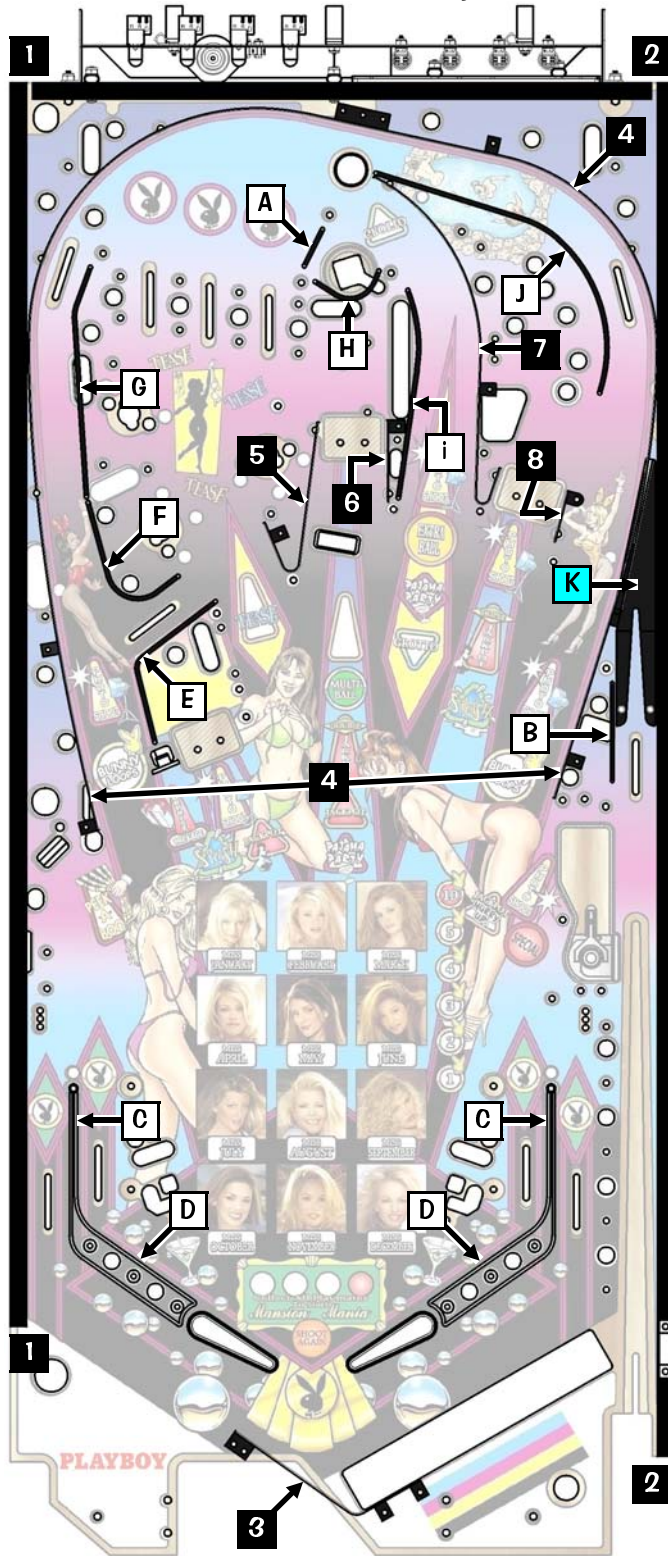
Item D is secured by: #6-32 X 3/4" PPH MS (Zinc) (Qty. 4/per) (237-5511-00)

Nº	METAL BALL GUIDE PART NAME	QTY.	SPI PART Nº
E	Metal Ball Guide (Bottom Pop Exit Lane)	1	535-8959-00
F	Metal Ball Guide (Left Orbit, Lower)	1	535-8960-00
G	Metal Ball Guide (Left Orbit, Upper)	1	535-8962-00
H	Metal Ball Guide (Under Eject Hole)	1	535-9075-00
i	Metal Ball Guide (Right of Center Ramp)	1	535-9098-00
J	Metal Ball Guide (Upper Right Orbit)	1	535-9099-00

Items E-J are secured by the ends tapped into the playfield. Take care if removing.

Nº	MISC. RAMP PART NAME	QTY.	SPI PART Nº
K	Shooter Lane Ramp	1	535-9051-00

Item K is secured by: #4 X 1/2" PFH (Zinc) (Qty. 2) (237-5840-00)



Sec. 4: Parts Id. ...



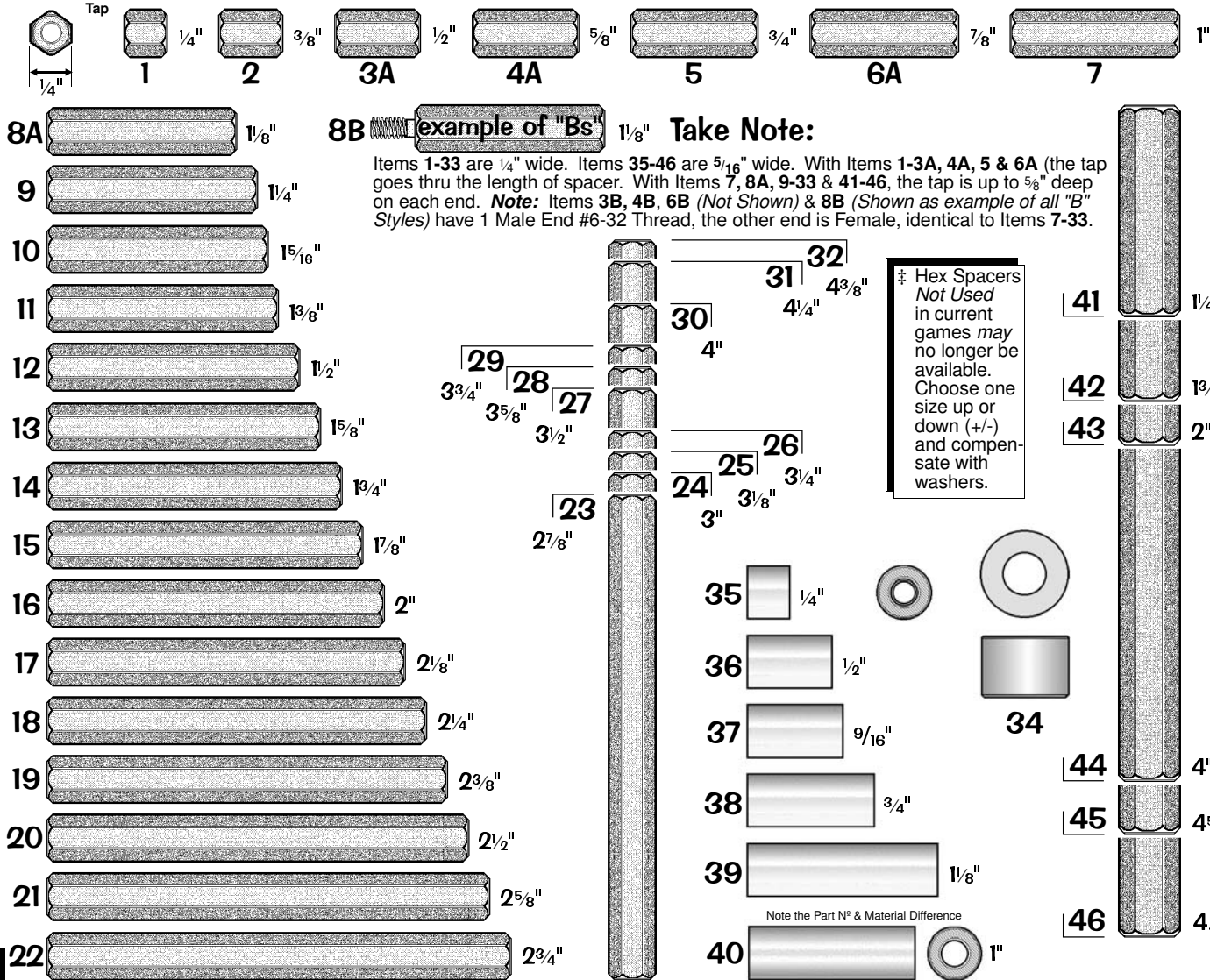




# Playfield - Metal Spacers (Actual Size) †

A Standard USA 9 Inch Ruler is provided on the back cover.

Hex Spacers:  
#6-32  
Tap



Sec. 4: Parts Id. ...

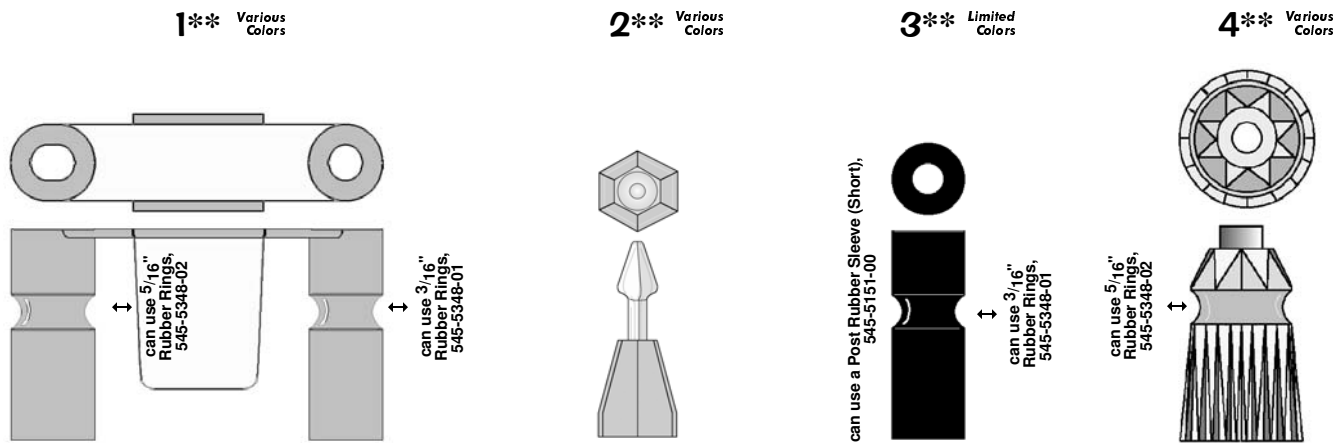
Nº	METAL SPACER NAME	QTY.	SPI PART Nº	Nº	METAL SPACER NAME	QTY.	SPI PART Nº
1	1/4" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-00	22	2 3/4" X 1/4" Hex Spacer #6-32 Tap	1	254-5008-15
2	3/8" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-12	23	2 7/8" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-31
3A	1/2" X 1/4" Hex Spacer #6-32 Tap	7	254-5008-03	24	3" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-14
3B	Same as 3A but with Male End #6-32	0	254-5024-03	25	3 1/8" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-19
4A	5/8" X 1/4" Hex Spacer #6-32 Tap	2	254-5008-02	26	3 1/4" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-26
4B*	Same as 4A but with Male End #6-32	0	254-5024-02	27	3 1/2" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-27
5	3/4" X 1/4" Hex Spacer #6-32 Tap	1	254-5008-04	28	3 5/8" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-25
6A	7/8" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-05	29	3 3/4" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-36
6B*	Same as 6A but with Male End #6-32	0	254-5024-05	30	4" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-21
7	1" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-06	31	4 1/4" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-30
8A	1 1/8" X 1/4" Hex Spacer #6-32 Tap	1	254-5008-17	32	4 3/8" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-29
8B	Same as 8A but with Male End #6-32	0	254-5024-17	33*	5 1/4" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-35
9	1 1/4" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-11	34	3/8" X 1/2" Spacer (Used with Backbox)	2	530-5099-00
10	1 5/16" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-34	35	1/4" X 5/16" X .144" I.D. Spacer Tap	1	254-5014-03
11 ‡	1 3/8" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-33	36	1/2" X 5/16" X .144" I.D. Spacer Tap	3	254-5014-00
12	1 1/2" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-09	37	9/16" X 5/16" X .144" I.D. Spacer Tap	0	254-5014-04
13 ‡	1 5/8" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-13	38	3/4" X 5/16" X .144" I.D. Spacer Tap	0	254-5014-01
14	1 3/4" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-10	39	1 1/8" X 5/16" X .144" I.D. Spacer Tap	0	254-5014-02
15 ‡	1 7/8" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-20	40	1" X 5/16" X .144" I.D. Spacer Tap	0	254-5001-00
16	2" X 1/4" Hex Spacer #6-32 Tap	2	254-5008-07	41	1 1/4" X 5/16" Hex Spacer #6-32 Tap	0	254-5018-09
17	2 1/8" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-32	42	1 3/4" X 5/16" Hex Spacer #6-32 Tap	0	254-5018-06
18	2 1/4" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-18	43	2" X 5/16" Hex Spacer #6-32 Tap	0	254-5018-07
19	2 3/8" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-28	44	4" X 5/16" Hex Spacer #6-32 Tap	0	254-5018-03
20	2 1/2" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-16	45	4 5/16" X 5/16" Hex Spacer #6-32 Tap	0	254-5018-00
21	2 5/8" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-08	46	4.92" X 5/16" Hex Spacer #6-32 Tap	0	254-5018-04

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





# Playfield - Plastic Posts and Spacers (Actual Size) †

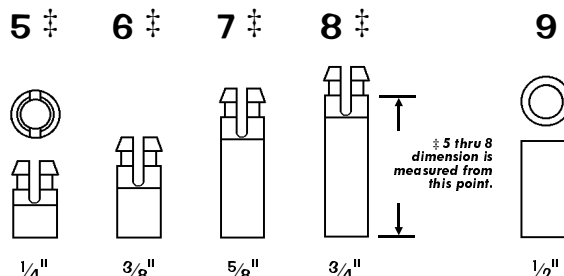


## Take Note:

PLASTIC PART COLOR CHART					
Nº	Color	Nº	Color	Nº	Color
-00	Black	-06	Yellow	-12	Fluor. Blue
-01	Clear	-07	Orange	-13	Teal Green
-02	Red	-08	White	-14	Gray
-03	Amber	-09	Purple	-15	Luminescent
-04	Green	-10	Fluor. Orange	-16	Gold
-05	Blue	-11	Fluor. Green		

\*\* Items 1, 2 & 4 come in various colors (may not be available in every color). Item 3 is currently only available in the color stated in this game manual (other colors used in prior games may no longer be available). The "-XX" in Part N<sup>o</sup>s which may come in various colors should be replaced with the desired 2-Digit N<sup>o</sup>. corresponding to the color desired. Some colors may no longer be available for desired item.

Items 3-4 Posts used in pairs can use 3/4" through 3" Rubber Rings, (See Rubber Parts for Part N<sup>o</sup>s).

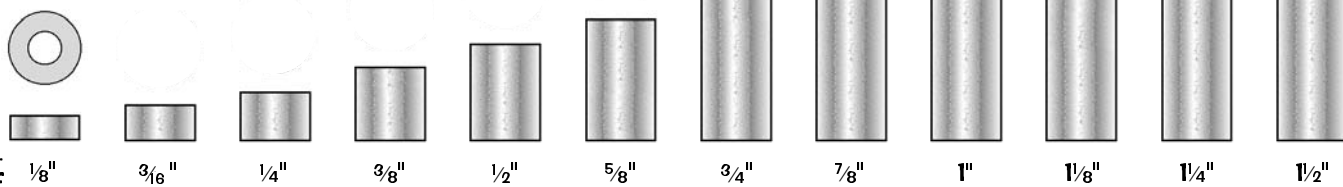


‡ Items 5 through 8 (Board Spacers) dimensions are measured from bottom to just under cut-away (see pictorial with Item 8 above).

- 10
- 11
- 12
- 13
- 14
- 15
- 16
- 17
- 18
- 19
- 20
- 21

## Take Note:

If any one of Items 10-21 Spacers is not available in the size required, order the smaller sized spacers required to stack sizes together until appropriate size is achieved (e.g. If 1 1/8" is needed but unavailable, order a 1/2" + 5/8" & stack to = 1 1/8").

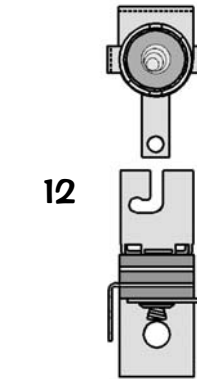
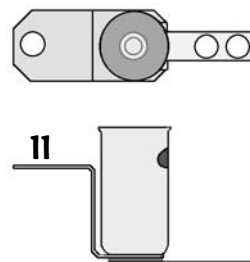
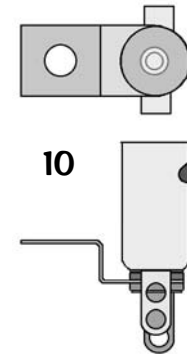
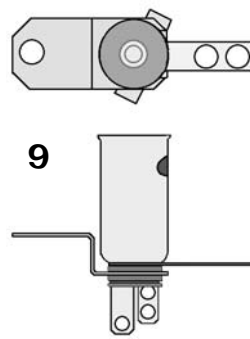
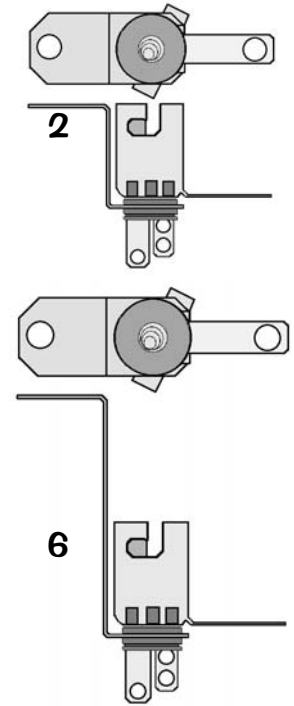
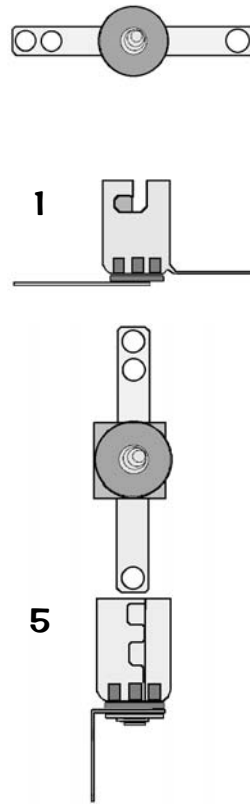
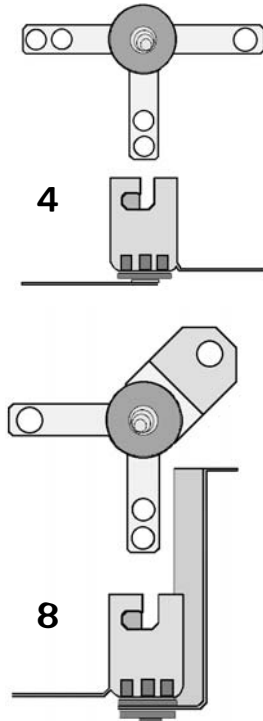
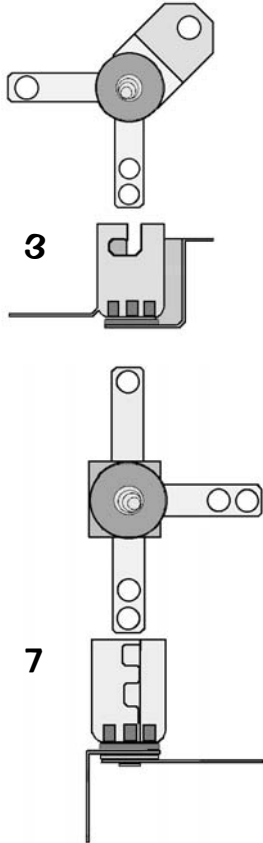
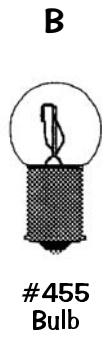
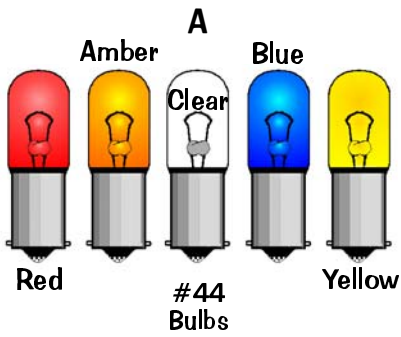


† Items with a Zero Qty. are not used in this game. Size and/or quantities may change during production.

Nº	PLASTIC POST/SPACER NAME	QTY.	SPI PART Nº	Nº	PLASTIC POST/SPACER NAME	QTY.	SPI PART Nº
1**	Top Lane Mini-Light Hood (Red)	3	550-5061-02	10	1/8" X 3/8" Spacer Gray	0	254-5000-19
Item 1 typically secured by: #6-32 X 1-3/4" PPH MS (Zinc) (Qty. 2/per) (237-5511-00) and Washer 9/64" X 5/16" OD X 1/32" (Qty. 2/per) (242-5017-00)				11	3/16" X 3/8" Spacer Gray (4 for Dot Display)	6	254-5000-18
2**	Mini-Jewel Post Clear	0	550-5052-01	12	1/4" X 3/8" Spacer Gray	0	254-5000-02
Item 2 typically secured by: #6 X 3/8" HWH AB (Zinc) (Qty. 1/per) (234-5000-00)				13	3/8" X 3/8" Spacer Gray	17	254-5000-12
3**	1 1/16" Single Groove Post (Black)	46	550-5059-00	14	1/2" X 3/8" Spacer Gray	0	254-5000-01
4**	Single Groove Jewel Post (Clear)	11	550-5034-01	15	5/8" X 3/8" Spacer Gray	0	254-5000-14
Items 3 & 4 typically secured by: Post Fastening Screw #6-32 Top / #6-32 Bottom (Qty. 1/per) (530-5012-02, Item 7 Page 59)				16	3/4" X 3/8" Spacer Gray	5	254-5000-07
5 ‡	1/4" Slf. Rtn. Spacer White	0	254-5007-02	17	7/8" X 3/8" Spacer Gray	0	254-5000-11
6 ‡	3/8" Slf. Rtn. Spacer White	4	254-5007-01	18	1" X 3/8" Spacer Gray/Black	0	254-5000-04
7 ‡	5/8" Slf. Rtn. Spacer White	0	254-5007-00	19	1 1/8" X 3/8" Spacer Gray	0	254-5000-06
8 ‡	3/4" Slf. Rtn. Spacer White	0	254-5007-03	20	1 1/4" X 3/8" Spacer Gray	0	254-5000-05
9	1/2" X 1/4" Spacer White (Narrow)	0	254-5000-03	21	1 1/2" X 3/8" Spacer Gray	3	254-5000-08

Sec. 4: Parts Id. ...

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



Sec. 4: Parts Id. ...

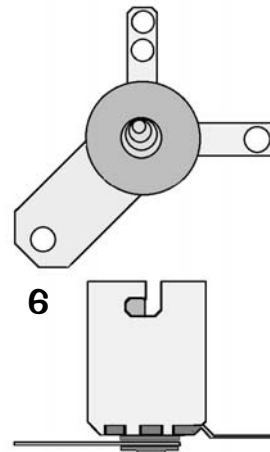
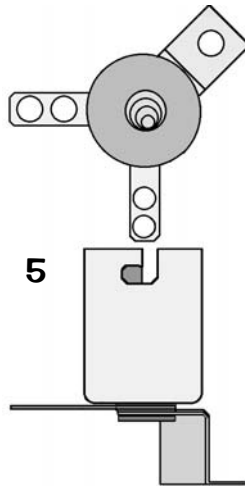
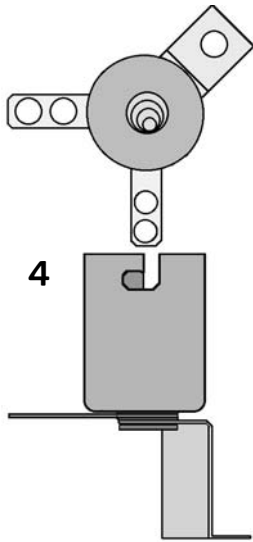
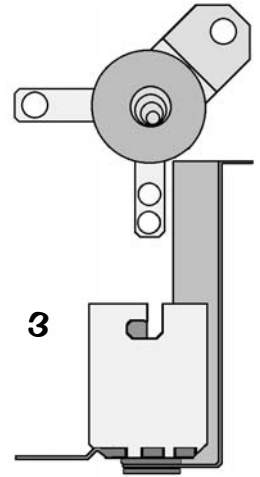
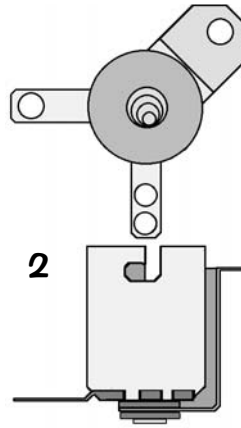
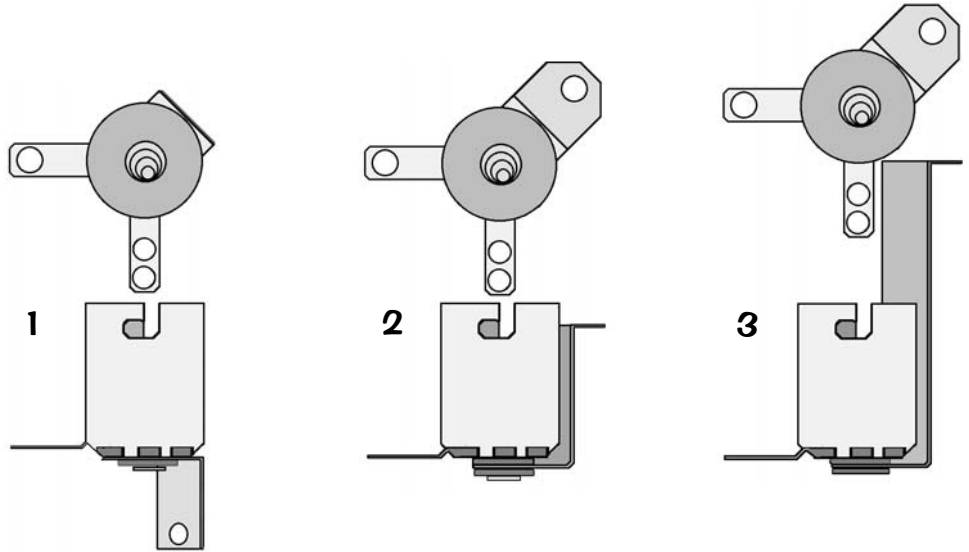
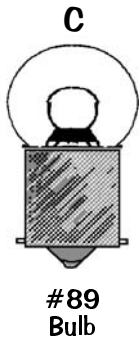
Nº	SMALL BULB & SOCKET NAME	QTY.	SPI PART Nº
A	#44 Bulb (Clear)	30	165-5000-44
A	#44 Bulb (Red)	0	165-5053-02
A	#44 Bulb (Amber)	0	165-5053-03
A	#44 Bulb (Blue)	0	165-5053-05
A	#44 Bulb (Yellow)	10	165-5053-06
B	#455 Twinkle Bulb	0	165-5003-00
1	2-Lug Staple Down Socket	13	077-5000-00
2	3-Lug Stand-Up Short Socket	0	077-5008-00
3	2-Lug Stand-Up Short Socket	4	077-5002-00
4	3-Lug Staple Down Socket	0	077-5001-00
5	2-Lug Laydown Socket	0	077-5003-00
6	3-Lug Stand-Up Long Socket	0	077-5009-00
7	3-Lug Laydown Socket (3 Lugs Flat)	1	077-5006-00
8	2-Lug Stand-Up Long Socket	0	077-5005-00
9	3-Lug Stand-Up Long Shell Socket	0	077-5013-00
10	2-Lug Stand-Up Lg. Shell Socket (Gls)	22	077-5031-00

Nº	SMALL BULB & SOCKET NAME	QTY.	SPI PART Nº
11	1-Lug Stand-Up Long Shell Socket	0	077-5012-00
12	3-Lug Laydown Socket (2 Lugs Bent)	0	077-5032-00

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



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



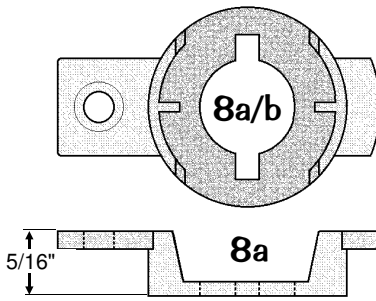
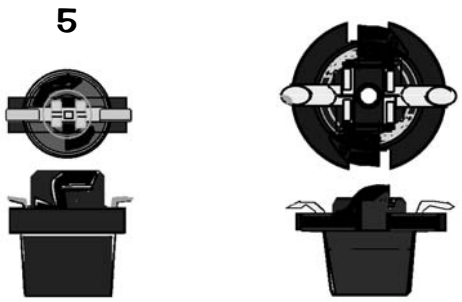
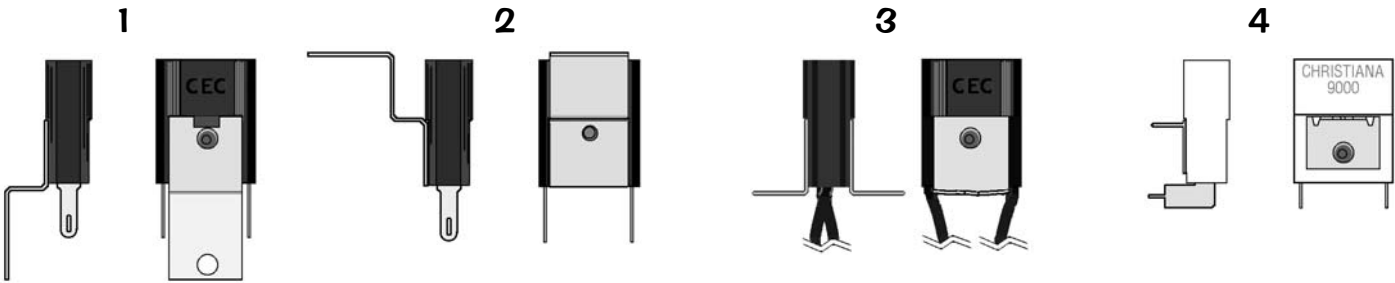
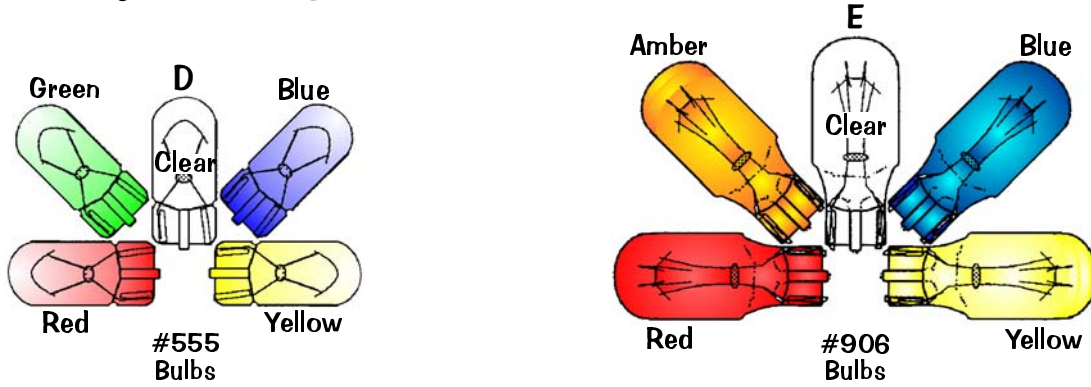
† Items with a Zero Qty. are not used in this game. Size and/or quantities may change during production.

Nº	LARGE BULB & SOCKET NAME	QTY.	SPI PART Nº	Nº	LARGE BULB & SOCKET NAME	QTY.	SPI PART Nº
C	#89 Bulb	2	165-5000-89	4	Stand-Up Socket Rev. Short	0	077-5103-00
1	Laydown Standard Socket	0	077-5100-00	5	2-Lug Stand-Up Small Socket	1	077-5106-00
2	2-Lug Stand-Up Short Socket	0	077-5101-00	6	Straight Leg Socket	0	077-5107-00
3	2-Lug Stand-Up Long Socket	1	077-5102-00				

Sec. 4: Parts Id. ...



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



### Take Special Note

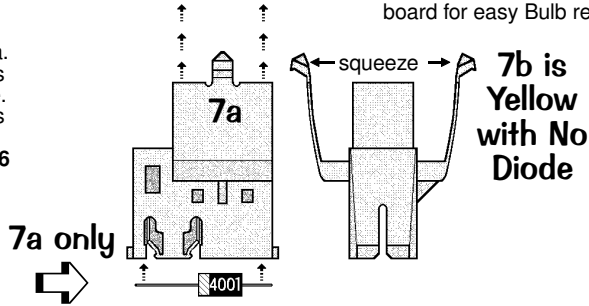
Item 7a is an IDC (Insulation Displacement Connection) Style Socket (this style is solderless). This socket is secured to the playfield or component by Items 8a or 8b Snap-On Socket Brackets, or may also be snapped into Item 9 Socket Mounting Plastic Board (used only when sockets are positioned closely together or in a special application).

Just squeeze the "side arms" of the socket together and pull away from the bracket or mounting board for easy Bulb replacement.

### Take Note:

- \* An asterisk ( \* ) indicates item(s) are not noted in the pictorials.
- 1. Item 3 Socket has 2 Wires attached are approximately 12" ea.
- 2. Item 4 Socket **was** used on PC Light Boards to position bulbs horizontally; Item 4 Socket is secured by soldering into place.
- 3. Item 5 Socket **was** used on PC Light Boards to position bulbs vertically; Item 5 Socket is secured by "twisting" into place.
- 4. Item E Bulb (#906) is normally used in conjunction with Item 6 Socket, but **can** be used with Items 1, 2, 4 or 7a/b.
- 5. Item 7a Socket is equipped with a *built-in* Diode, 1N4003 (112-5003-00), however, replacement can be made with a 1N4001 Diode (112-5001-00).  
Item 7b Socket is **NOT** equipped with a diode (not required).

Note: Always replace with same type bulb in original application.



7b is Yellow with No Diode

Sec. 4: Parts Id. ...

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

Nº	WEDGE BULB & SOCKET NAME	QTY.	SPI PART Nº	Nº	WEDGE BULB & SOCKET NAME	QTY.	SPI PART Nº
D	#555 Wedge Base Bulb (Clear)	79	165-5002-00	1	#555 Wedge Base Socket (Laydown)	13	077-5026-01
D	#555 Wedge Base Bulb (Red)	1	165-5054-02	2	#555 Wedge Base Socket (Offset)	2	077-5029-00
D	#555 Wedge Base Bulb (Green)	0	165-5054-04	3	#555 W.B. Socket (for Pop Bumper)	3	077-5206-00
D	#555 Wedge Base Bulb (Blue)	0	165-5054-05	4	#555 W.B. Socket (Solder Type)	0	077-5207-00
D	#555 Wedge Base Bulb (Yellow)	1	165-5054-06	5	#555 Wedge Base Socket (Twist)	0	077-5007-00
E	#906 Wedge Base Bulb (Clear)	9	165-5004-00	6	#906 Wedge Base Socket (Twist)	0	077-5016-00
E	#906 Wedge Base Bulb (Red)	0	165-5004-02	7a	#555 IDC Snap-On Socket	59	077-5216-00
E	#906 Wedge Base Bulb (Amber)	0	165-5004-03	7b	#555 IDC Snap-On Socket <b>No Diode</b>	13	077-5216-01
E	#906 Wedge Base Bulb (Blue)	0	165-5004-05	8a	5/16" Ht. Snap-On Socket Bracket	57	545-5760-18
E	#906 Wedge Base Bulb (Yellow)	0	165-5004-06	8b*	19/32" Ht. Snap-On Socket Bracket	0	545-5760-19
				9a*	Clear Plastic Socket Mtg. Bd. (4/per)	1	(830-5989-XX)

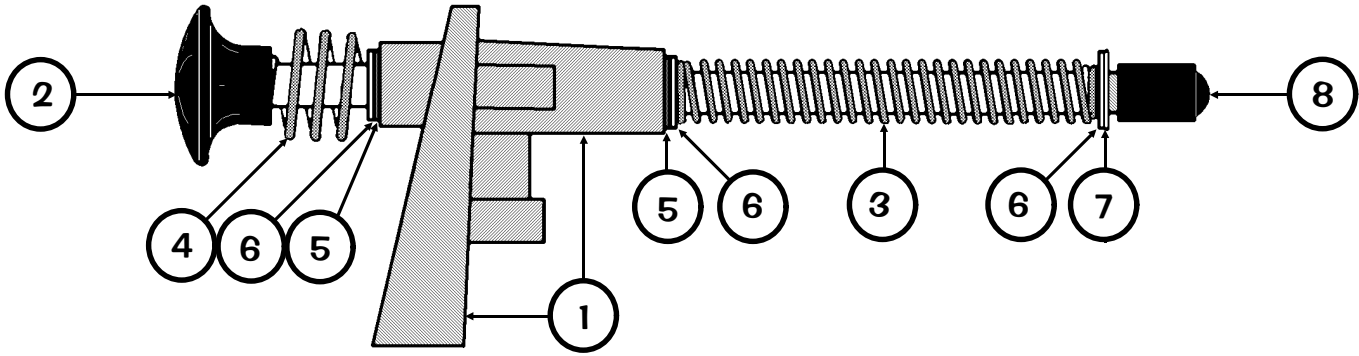






## Ball Shooter (Plunger) Assembly, 500-6146-00-04 (Items 1-8)

Manually launch the ball into play.



Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº	Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
1	Housing (Shooter Assembly)	1	535-5067-02	4	Compression Spring (Short Plunger)	1	266-5010-00
<small>Item 1 is secured to the Cabinet by: Support Plate (Qty. 1) (535-5027-00), #10-32 X 1/2" PPH (Sems) Zinc TF (Qty. 3) (237-6033-00), #10 Split Lock Washer (Qty. 3) (234-5003-00) and #6 X 5/8" HWH AB (Zinc) (Qty. 2) (234-5002-00)</small>				5	Bushing, 3/8" I.D. (Oilite)	2	280-5010-00
2	Rod Assembly (w/Black Knob)	1	515-6557-00	6	Washer, 3/8" I.D. X 5/8" O.D. X 1/16"	3	242-5014-00
3	Comp. (Return) Spring (GRN, .035" ø)	1	266-5001-04	7	Retaining Ring, 3/8" ø Shaft	1	270-5012-00
				8	Plunger Tip (Black 50 Duro)	1	545-5276-00

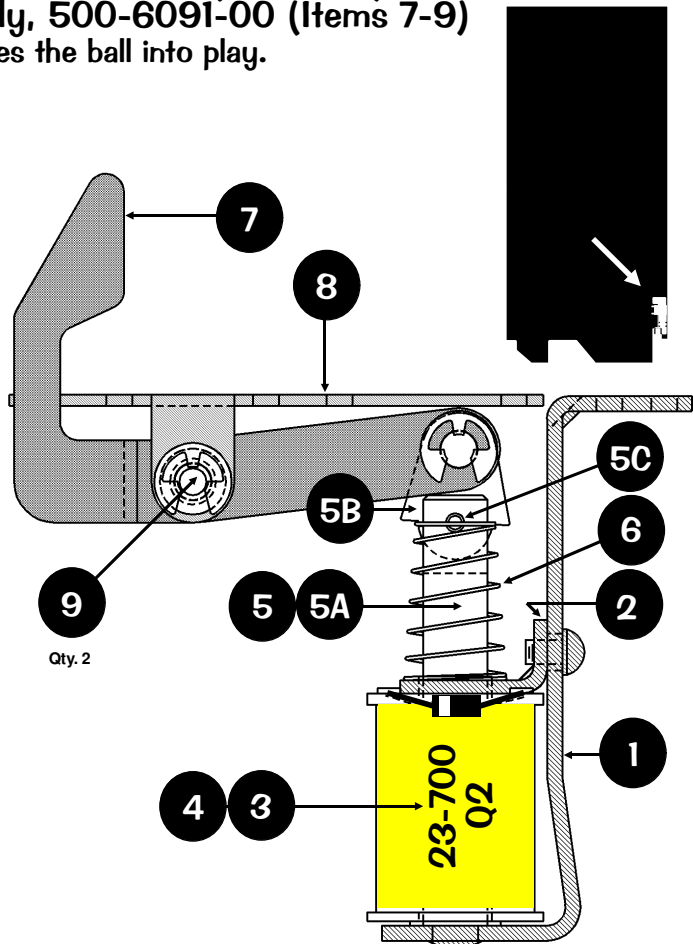
## Autoplunger Coil Assembly, 500-6092-05 (Items 1-6) with Autoplunger Arm Weld Assembly, 500-6091-00 (Items 7-9)

Automatically launches the ball into play.

Sec. 4: Drawings ...

Nº	'PLUNGER COIL PART NAME	QTY.	SPI PART Nº
1	Autoplunger Coil Bracket Assembly	1	515-6527-00
<small>Item 1 is secured below the playfield by: #8 X 1/2" HWH AB (Zinc) (Qty. 9) (234-5101-00)</small>			
2	Coil Retainer Bracket	1	535-5203-03
<small>Item 2 is secured to Item 1 by: #8-32 X 1/4" PPH MS (Sems) Zinc (Qty. 2) (232-5300-00)</small>			
3	Coil, 23-700	1	090-5022-00T
<small>ORDERING ABOVE (ITEM 3) COIL PART Nº WILL INCLUDE:</small>			
—	Diode, 1N4004 (positioned at top)	1	112-5003-00
4	Coil Sleeve	1	545-5031-00
5	Plunger & Link Assembly	1	515-5338-00
<small>ORDERING ABOVE (ITEM 5) SUB-ASSY. PART Nº WILL INCLUDE:</small>			
5A	Plunger 2"	1	530-5025-01
5B	Plunger Link	1	545-5293-00
5C	Roll Pin, 1/8" ø X 5/8" Lg.	1	251-5008-00
<small>Item 5B is secured to Item 7 by: Retaining Ring, 1/4" ø Shaft (Qty. 1) (270-5002-00)</small>			
<small>Ordering Note: If 515-5338-00 is unavailable, order the individual part(s) actually required.</small>			
6	Compression (Return) Spring	1	266-5020-00

Nº	... ARM WELD PART NAME	QTY.	SPI PART Nº
7	Arm Weld Assembly	1	515-6526-00
<small>Item 7 is secured to Item 8 by: Retaining Ring, 1/4" ø Shaft (Qty. 1) (270-5002-00)</small>			
8	Autoplunger Fulcrum	1	535-7697-00
9	Nyliner, 1/4" (Thomson #411-FF)	2	545-5423-00





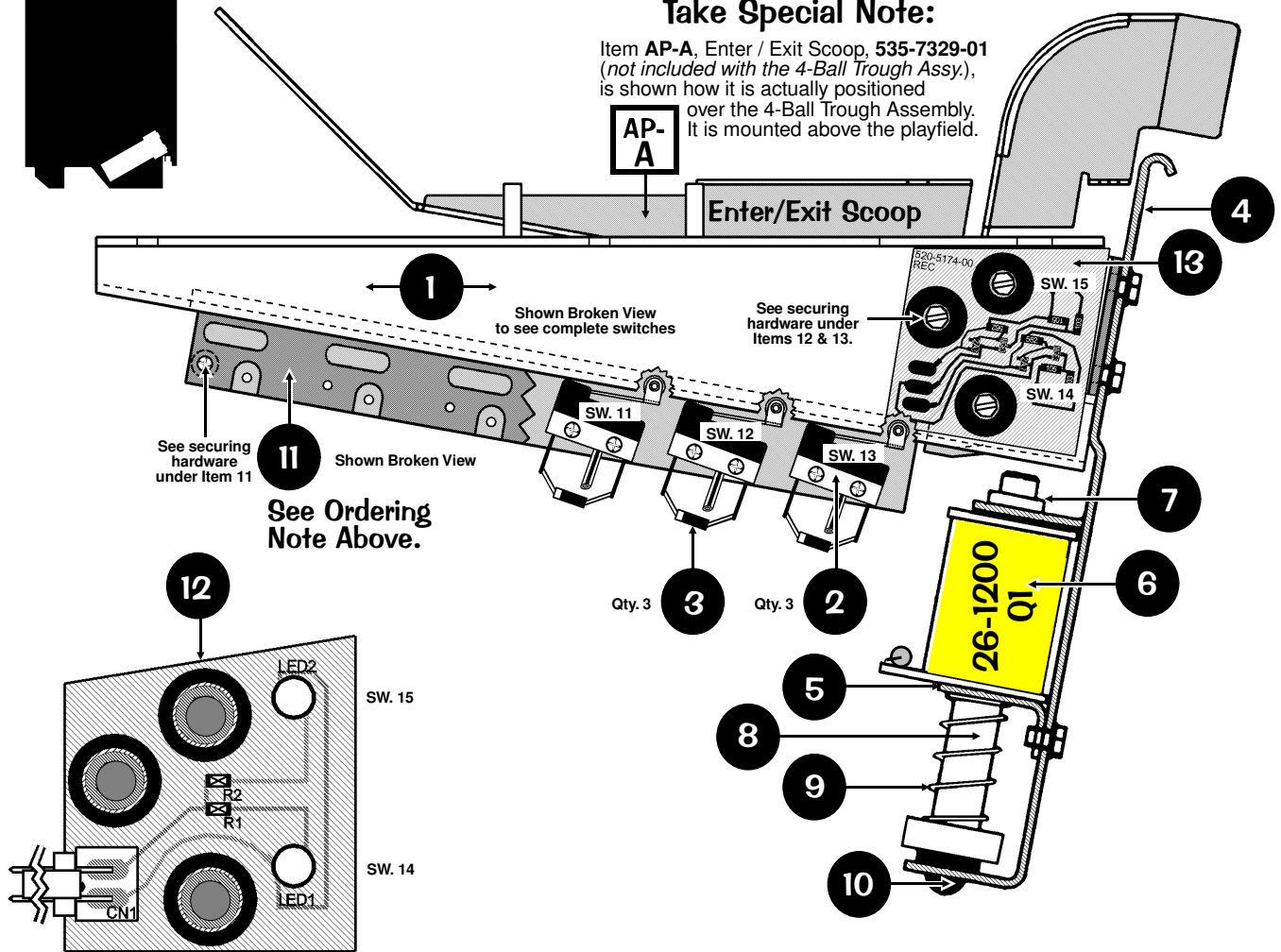
# 4-Ball Trough Assembly, 500-6318-24 (Items 1-13)

and Associated Parts: See Parts Table below.

**Ordering Note: Identical to 500-6318-14 except it does require Item 11, Trough Ball Guide Plate (used only when magnets are present in the game).**

## Take Special Note:

Item AP-A, Enter / Exit Scoop, 535-7329-01 (not included with the 4-Ball Trough Assy.), is shown how it is actually positioned over the 4-Ball Trough Assembly. It is mounted above the playfield.



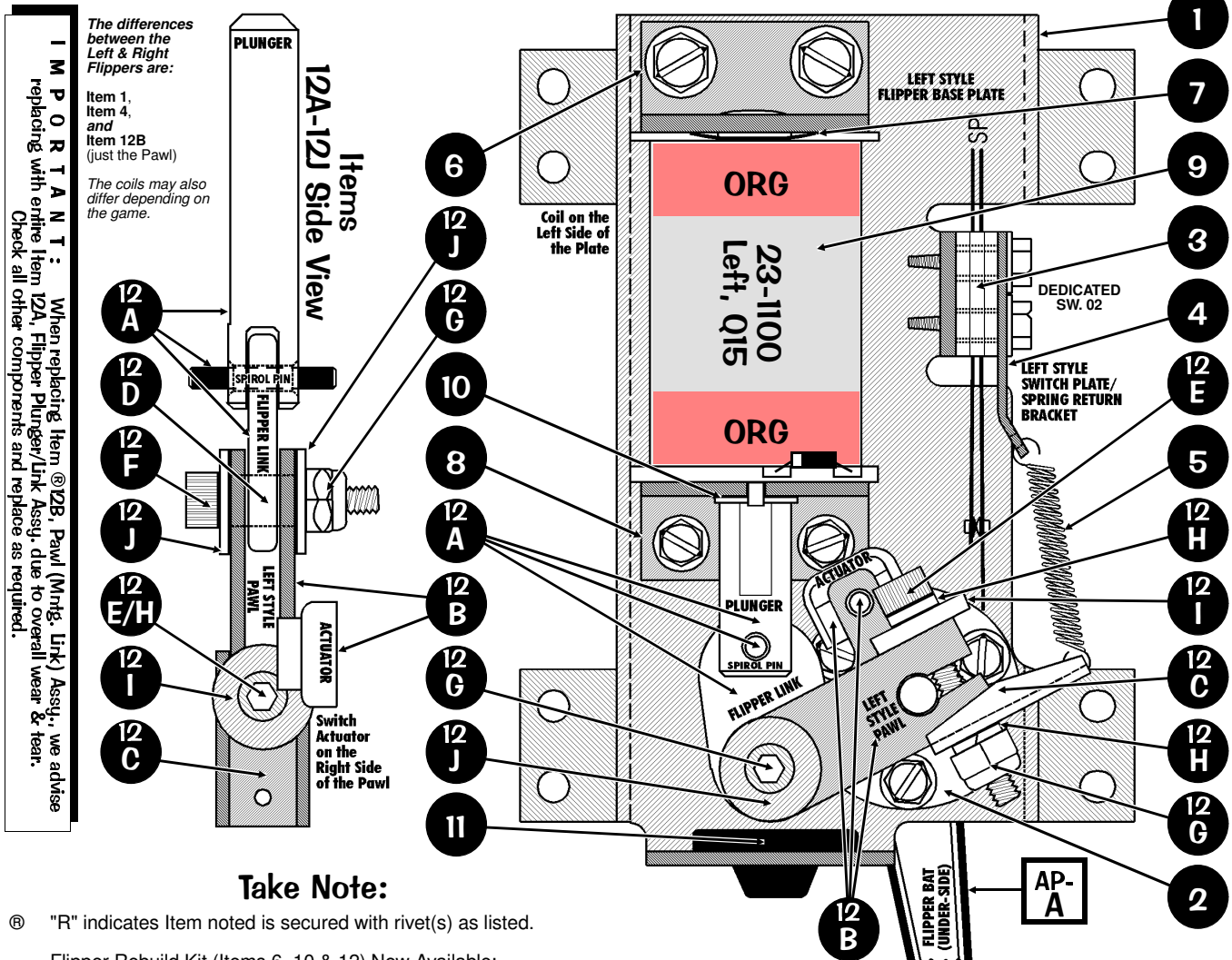
## Take Note:

\* An asterisk (\*) indicates item(s) are not noted in the pictorials.

For a break-down of parts of Items 12 & 13, OPTO Boards (515-0173-00 & 515-0174-00), see Section 5, Chapter 4, Trough Up-Kicker Dual OPTO Boards Theory of Operation & Schematic, Component Layout & Parts.

Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº	Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
1	Ball Trough Outhole Mounting Bracket	1	515-6580-01	10	Rubber Bumper (Grommet)	1	545-5105-00
Item 1 is secured below the playfield by: #8 X 1/2" HWH AB (Zinc) (Qty. 6) (234-5101-00)				11	Trough Ball Guide Plate	1	535-7801-00
2	Micro Switch (Roller Actuator, Lite-Force)	3	180-5119-02	Item 11 is secured to Item 1 by: 1/4" X 5/16" X .144" I.D. Spacer Tap. (Qty. 1) (254-5014-03) and #2-56 X 1/2" HWH (Ser) UNS #4HD TR3 BO (Qty. 4) (237-5937-02)			
Item 2 is secured to Item 1 by: #2-56 X 1/2" HWH (Sr) UNS #4HD TR3 BO (Qty. 6) (237-5937-02)				12	Dual OPTO TRANS Board Assembly	1	515-0173-00
Item 2 requires: Heat Shrink Tubing 1/8" ø PUI-24 (Qty. 1"/per) (605-5006-00)				13	Dual OPTO REC Board Assembly	1	515-0174-00
3	Switch Diode, 1N4001	3	112-5001-00	Items 12 & 13 are by: #6-32 X 5/8" HWH Swage (Serr) Zinc (Qty. 3/per) (237-5976-04)			
4	Coil Mounting Bracket	1	535-7330-01	For Individual Items use: Dual OPTO TRANS Bd. (Qty. 1) (520-5173-00), Dual OPTO REC Bd. (Qty. 1) (520-5174-00), OPTO PCB Tube Spacer (Brass) (Qty. 3/per) (530-5308-02) or OPTO PCB Rubber Grommet (Qty. 3/per) (545-5518-00)			
Item 4 is secured to Item 1 by: #8-32 X 3/8" HWH Swage (Sr.) Zinc (Qty. 4) (237-5975-00)				ASSOCIATED PARTS ARE NOT INCLUDED WITH THE ABOVE ASSEMBLY.			
5	Coil Retaining Bracket	1	535-5203-03	Nº	ASSOCIATED PART NAME	QTY.	SPI PART Nº
Item 5 is secured to Item 4 by: #8-32 X 1/4" HWH MS (Serr) Zinc (Qty. 2) (237-5964-01)				AP-A	Ball Trough Enter / Exit Scoop	1	535-7329-01
6	Coil, 26-1200	1	090-5044-00T	Item AP-A secured to the playfield by: #8 X 1/2" HWH AB (Zinc) (Qty. 4) (234-5101-00).			
ORDERING ABOVE (ITEM 6) COIL PART Nº WILL INCLUDE:				AP-B*	Steel Balls (1-1/16" ø)	4	260-5000-00
—	Diode, 1N4004 (positioned at top)	1	112-5003-00				
7	Coil Sleeve (Short) (Formost #10-7077)	1	545-5076-01				
8	Plunger Assembly	1	515-5941-01				
9	Compression (Return) Spring	1	266-5020-00				

## Flipper (Left) Assembly, 500-5944-14 (Items 1-12) and Associated Part: White Flipper Bat & Shaft Assy., 515-5133-08-06 (Item AP-A)



**IMPORTANT:** When replacing Item 12B, Pawl (Mntg. Link) Assy., we advise replacing with entire Item 12A, Flipper Plunger/Link Assy. due to overall wear & tear. Check all other components and replace as required.

The differences between the Left & Right Flippers are:  
Item 1, Item 4, and Item 12B (just the Pawl)  
The coils may also differ depending on the game.

Sec. 4: Drawings ...

### Flipper Rebuild Kit (Items 6, 10 & 12) Now Available: **Flipper (Left) Rebuild Kit: 500-6307-10**

Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
1	Flipper Base Plate Kit (Left)	1	515-6617-01
ORDERING ABOVE (ITEM 1) KIT (LEFT) PART Nº WILL INCLUDE:			
<b>Note:</b> Flipper Base Plate (Left) comes threaded with all securing hardware (Thread Forming Screws) as listed under each of the Items which will get secured to it (Items 2, 3, 6 & 8).			
Item 1 is secured below the playfield by: #10 X 1/2" HWH MS (Serr) Zinc ST (Qty. 8) (237-5949-00)			
2	Flipper Bat Bushing	1	545-5594-00
Item 2 is secured to Item 1 by: #6-32 X 3/8" HWH Swage (Ser.) Zc. (Qty. 3) (237-5976-02)			
3	Power (End of Stroke) Switch	1	180-5149-00
Item 3 is secured to Item 1 by: #6-32 X 5/8" HWH Swage (Ser.) Zc. (Qty. 2) (237-5976-04)			
4	Switch Plate/Spring Return Lt. Brkt.	1	535-7354-01
5	Flipper Return Spring	1	265-5035-00
6	Coil Stop Bracket Sub-Assembly	1	515-6308-01
Item 6 is secured to Item 1 by: #10-32 X 3/8" SHWH Swage (Serr) Zinc (Qty. 2) (237-5985-00) and #10 Split Lock Washer (Qty. 2) (244-5003-00)			
7	Spring Washer (17/32" ID X 3/4" X 1")	1	269-5002-00
8	Coil Support Bracket	1	535-7356-00
Item 8 is secured to Item 1 by: #6-32 X 3/8" HWH Swage (Ser.) Zc. (Qty. 2) (237-5975-00)			
9	Coil, 23-1100 (ORANGE) (Left)	1	090-5030-00T
ORDERING ABOVE (ITEM 9) COIL PART Nº WILL INCLUDE:			
—	Diode, 1N4004 (positioned at top)	1	112-5003-00
10	Coil Sleeve	1	545-5388-00
11	Deflector Pad (Bumper)	1	545-5428-00

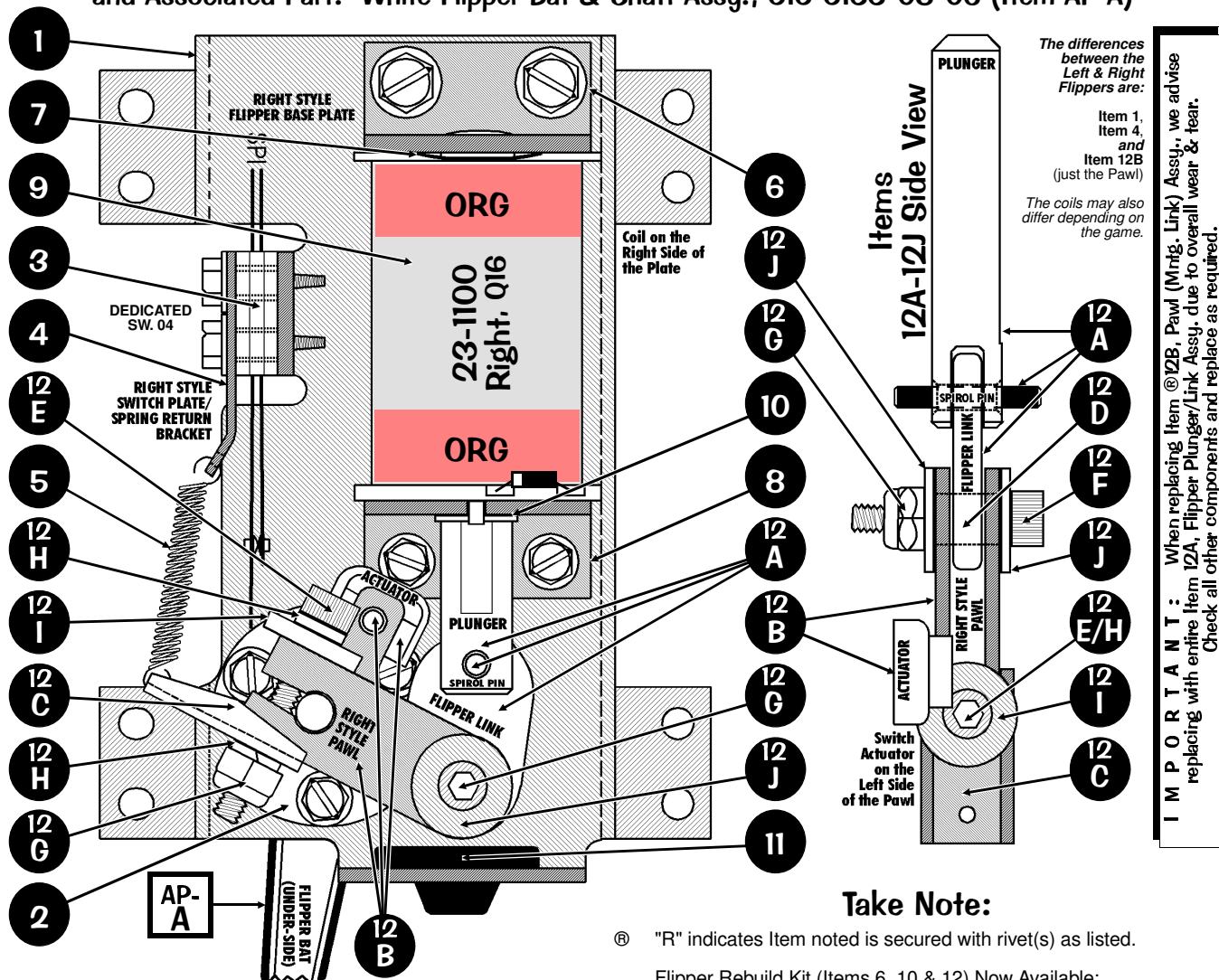
Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
12	Plunger, Link & Pawl (Left) Sub-Assy.	1	515-6518-01
ORDERING ABOVE (ITEM 12) SUB-ASSY. PART Nº WILL INCLUDE:			
12A	Flipper Plunger/Link Sub-Assy.	1	515-6304-01
includes: Plunger "Flipper" Link 1 545-5611-00			
includes: Spirol Pin ø 5/32" X 3/4" Lg. 1 251-5015-02			
includes: Flipper Plunger with "Flat" 1 530-5349-01			
12B	Pawl (Mntg. Link) (Left) Sub-Assy.	1	515-6305-01
includes: Pawl (Mounting Link) (Left) Plain @ Switch Actuator 1 535-7271-01			
includes: Rivet, 1/8" ø X 1/4" Lg. 1 249-5003-00			
12C	Return Bracket	1	535-7353-00
12D	Flipper Link Bushing (Metal, Ext.) (.385" Lg. X .192" ID X .312" OD)	1	530-5139-01
12E	#10-32 X 1-1/4" Lg. Socket Head	1	237-5950-01
12F	#10-32 X 7/8" Lg. Socket Head	1	237-5966-00
12G	#10-32 Nylon Stop Nut	2	240-5203-00
12H	#10 Split Lock Washer	2	244-5003-00
12I	Washer .203" ID X .63" OD X .105" Thk W/Cut	1	242-5039-01
12J	Washer .203" ID X .63" OD X .062" Thk	2	242-5038-00

**SAVE MONEY!** and order the **FLIPPER (LT) REBUILD KIT** now AVAILABLE:  
Includes Items 6, 10 & 12 Ask your Distributor for Part Number **500-6307-10** (for the LEFT)  
ASSOCIATED PARTS ARE NOT INCLUDED WITH THE ABOVE ASSEMBLY.

Nº	ASSOCIATED PART NAME	QTY.	SPI PART Nº
AP-A	WHITE Flipper Bat & Shaft (Plain) (Non-Knurled End) Assembly	1	515-5133-08-06
	Large Flipper BLACK Rubber Ring	1	545-5277-00



## Flipper (Right) Assembly, 500-5944-04 (Items 1-12) and Associated Part: White Flipper Bat & Shaft Assy., 515-5133-08-06 (Item AP-A)



### Take Note:

® "R" indicates Item noted is secured with rivet(s) as listed.

### Flipper Rebuild Kit (Items 6, 10 & 12) Now Available: Flipper (Right) Rebuild Kit: 500-6307-00

Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
1	Flipper Base Plate Kit (Right)	1	515-6617-00
ORDERING ABOVE (ITEM 1) KIT (RIGHT) PART Nº WILL INCLUDE:			
<b>Note:</b> Flipper Base Plate (Right) comes threaded with all securing hardware (Thread Forming Screws) as listed under each of the Items which will get secured to it (Items 2, 3, 6 & 8).			
Item 1 is secured below the playfield by: #10 X 1/2" HWH MS (Serr) Zinc ST (Qty. 8) (237-5949-00)			
2	Flipper Bat Bushing	1	545-5594-00
Item 2 is secured to Item 1 by: #6-32 X 3/8" HWH Swage (Ser.) Zc. (Qty. 3) (237-5976-02)			
3	Power (End of Stroke) Switch	1	180-5149-00
Item 3 is secured to Item 1 by: #6-32 X 5/8" HWH Swage (Ser.) Zc. (Qty. 2) (237-5976-04)			
4	Switch Plate/Spring Return Rt. Brkt.	1	535-7354-00
5	Flipper Return Spring	1	265-5035-00
6	Coil Stop Bracket Sub-Assembly	1	515-6308-01
Item 6 is secured to Item 1 by: #10-32 X 3/8" SHWH Swage (Serr) Zinc (Qty. 2) (237-5985-00) and #10 Split Lock Washer (Qty. 2) (244-5003-00)			
7	Spring Washer (17/32" ID X 3/4" X 1")	1	269-5002-00
8	Coil Support Bracket	1	535-7356-00
Item 8 is secured to Item 1 by: #6-32 X 3/8" HWH Swage (Ser.) Zc. (Qty. 2) (237-5975-00)			
9	Coil, 23-1100 (ORANGE) (Right)	1	090-5030-00T
ORDERING ABOVE (ITEM 9) COIL PART Nº WILL INCLUDE:			
—	Diode, 1N4004 (positioned at top)	1	112-5003-00
10	Coil Sleeve	1	545-5388-00
11	Deflector Pad (Bumper)	1	545-5428-00

Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
12	Plunger, Link & Pawl (Rt.) Sub-Assy.	1	515-6518-00
ORDERING ABOVE (ITEM 12) SUB-ASSY. PART Nº WILL INCLUDE:			
12A	Flipper Plunger/Link Sub-Assy.	1	515-6304-01
includes: Plunger "Flipper" Link 1 545-5611-00			
includes: Spirol Pin ø 5/32" X 3/4" Lg. 1 251-5015-02			
includes: Flipper Plunger with "Flat" 1 530-5349-01			
12B	Pawl (Mntg. Link) (Rt.) Sub-Assy.	1	515-6305-00
includes: Pawl (Mounting Link) (Rt.) Plain 1 535-7271-00			
includes: Switch Actuator 1 545-5612-00			
includes: Rivet, 1/8" ø X 1/4" Lg. 1 249-5003-00			
12C	Return Bracket	1	535-7353-00
12D	Flipper Link Bushing (Metal, Ext.) (.385" Lg. X .192" ID X .312" OD)	1	530-5139-01
12E	#10-32 X 1-1/4" Lg. Socket Head	1	237-5950-01
12F	#10-32 X 7/8" Lg. Socket Head	1	237-5966-00
12G	#10-32 Nylon Stop Nut	2	240-5203-00
12H	#10 Split Lock Washer	2	244-5003-00
12I	Washer .203" ID X .63" OD X .105" Thk W/Cut	1	242-5039-01
12J	Washer .203" ID X .63" OD X .062" Thk	2	242-5038-00

**SAVE MONEY!** and order the **FLIPPER (RT) REBUILD KIT** now AVAILABLE:  
Includes Items 6, 10 & 12 Ask your Distributor or Part Number **500-6307-00** (for the RIGHT)  
ASSOCIATED PARTS ARE NOT INCLUDED WITH THE ABOVE ASSEMBLY.

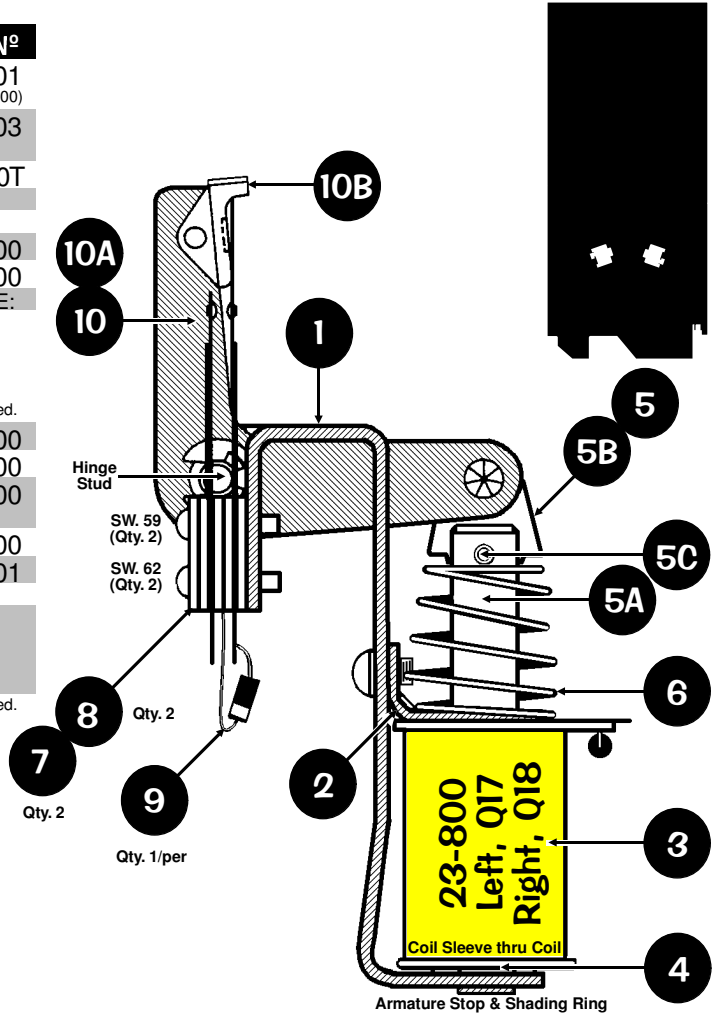
Nº	ASSOCIATED PART NAME	QTY.	SPI PART Nº
AP-A	WHITE Flipper Bat & Shaft (Plain) (Non-Knurled End) Assembly	1	515-5133-08-06
	Large Flipper BLACK Rubber Ring	1	545-5277-00

Sec. 4: Drawings ...



# Slingshot Assemblies, 500-5849-00 (Qty. 2) (Items 1-10)

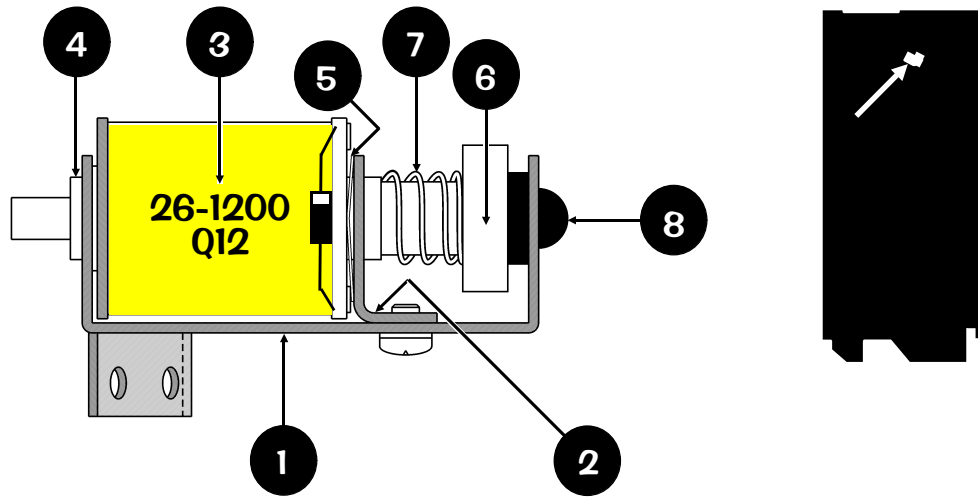
Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
1	Slingshot Bracket Assembly	1	515-5339-01
Item 1 is secured below the playfield by: #8 X 1/2" HWH AB (Zinc) (Qty. 3) (234-5101-00)			
2	Coil Retaining Bracket	1	535-5203-03
Item 2 is secured to Item 1 by: #8-32 X 3/8" PPH MS (Sems) (Qty. 2) (232-5301-00)			
3	Coil, 23-800	1	090-5001-00T
ORDERING ABOVE (ITEM 3) COIL PART Nº WILL INCLUDE:			
— Diode, 1N4004 (positioned at top)			
4	Coil Sleeve	1	545-5031-00
5	Plunger & Link Assembly	1	515-5338-00
ORDERING ABOVE (ITEM 5) SUB-ASSY. PART Nº WILL INCLUDE:			
5A	Plunger 2" Lg.	1	530-5025-01
5B	Plunger Link	1	545-5293-00
5C	Roll Pin 1/8" ø x 5/8" Lg.	1	251-5008-00
Item 5B is secured to Item 10A by: Retaining Ring, 1/4" ø Shaft (Qty. 1) (270-5002-00)			
<b>Ordering Note:</b> If 515-5338-00 is unavailable, order the individual part(s) actually required.			
6	Compression (Return) Spring	1	266-5020-00
7	Slingshot Stack (Blade) Switch	2	180-5054-00
8	Switch Body Protect Plate	2	535-5045-00
Items 7 & 8 are secured to Item 1 by: #6-32 X 5/8" HWH Swage (Qty. 4) (237-5976-04)			
9	Switch Diode, 1N4001	2	112-5001-00
10®	Riveted Arm & Tip Assembly	1	515-5340-01
ORDERING ABOVE ® RIVETED ASSY. PART Nº WILL INCLUDE:			
10A	Arm	1	515-5341-01
10B®	Kicker Tip (secured to 1A by 1C)	1	545-5216-01
10C*	Rivet, 1/8" ø x 1/4" Lg.	1	249-5003-00
Item 10A is secured to Item 1 by: Retaining Ring, 1/4" ø Shaft (Qty. 1) (270-5002-00)			
<b>Ordering Note:</b> If 515-5340-01 is unavailable, order the individual part(s) actually required.			



## Take Note:

- \* An asterisk (\*) indicates item(s) are not noted in the pictorials.
- ® "R" indicates Item noted is secured with rivet(s) as listed.

# 30° Eject Assembly, 500-6511-01 (Items 1-8)

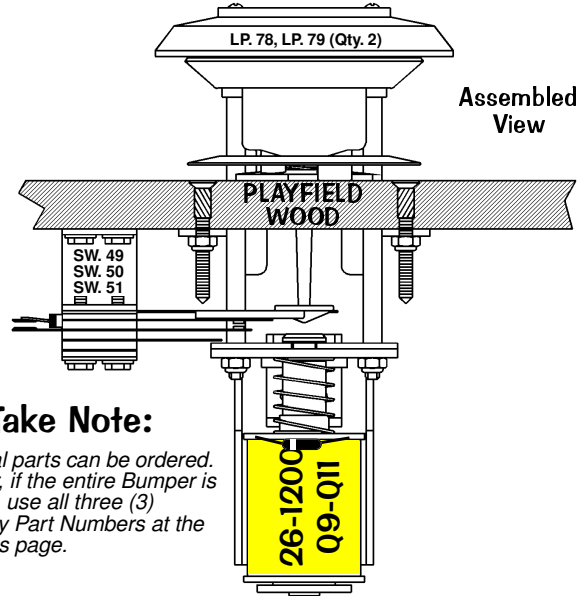
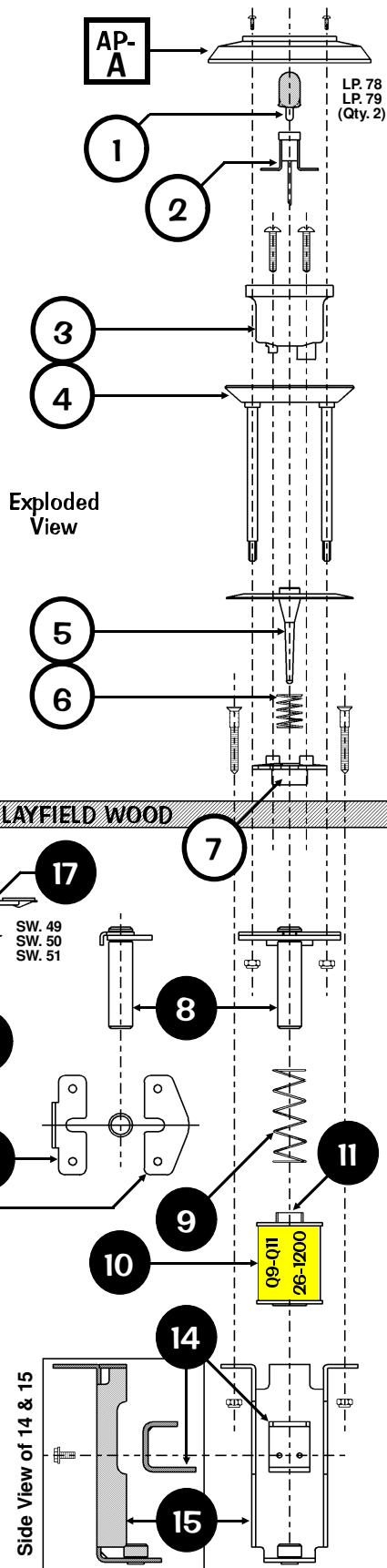
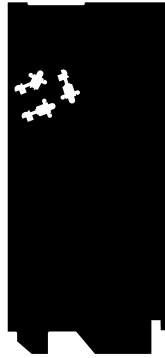


Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº	Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
1	Mounting Bracket 30° Bend (Frame)	1	535-8932-00	4	Coil Sleeve (Short) (Formost #10-7077)	1	545-5076-01
Item 1 is secured below the playfield by: #8 X 1/2" HWH AB (Zinc) (Qty. 2) (234-5101-00)				5	Spring Washer (17/32" ID X 3/4" X 1")	1	269-5002-00
2	Coil Retaining Bracket	1	535-5203-03	6	Plunger Assembly	1	515-7197-00
Item 2 is secured to Item 1 by: #8-32 X 1/4" PPH MS (Sems) (Qty. 2) (232-5300-00)				7	Compression (Return) Spring	1	266-5020-00
3	Coil, 26-1200	1	090-5044-00T	8	Rubber Bumper (Grommet)	1	545-5105-00
ORDERING ABOVE (ITEM 3) COIL PART Nº WILL INCLUDE:				<b>Ordering Note:</b> If 500-6511-01 is unavailable, order the individual part(s) actually required or try -00 and change the coil to 26-1200 (090-5044-00T).			
— Diode, 1N4004 (positioned at top)							

Sec. 4: Drawings ...



**Bumper Top Assemblies, 515-6459-01 (Qty. 3) (Items 1-7),  
Bumper Bottom Assemblies, 515-6459-04 (Qty. 3) (Items 8-15),  
Bumper Switch Assemblies, 515-6459-03 (Qty. 3) (Items 16-20)  
and Associated Part(s): See Table Below (Item AP-A)**



**Take Note:**

*Individual parts can be ordered. However, if the entire Bumper is required, use all three (3) Assembly Part Numbers at the top of this page.*

Nº	BUMPER TOP PART NAME	QTY.	SPI PART Nº
1	#555 Wedge Base Bulb	1	165-5002-00
2	#555 Wedge Base Socket	1	077-5206-00
3	Bumper Body	1	545-5197-00
Item 3 is secured by: #5 X 7/8" PRH AB (Zinc) (Qty. 2) (237-5826-00)			
4	Ring Assembly	1	515-5085-00
Item 4 is secured by: #6-32 Nylon Stop Nut (Qty. 2) (240-5005-00)			
5	Bumper Skirt	1	545-5607-00
6	Bumper Skirt Compression Spring	1	266-5048-00
7	Bumper Base	1	545-5195-00

Nº	BUMPER BOTTOM PART NAME	QTY.	SPI PART Nº
8	Plunger	1	530-5348-00
9	Compression (Return) Spring	1	266-5047-00
10	Coil, 26-1200	1	090-5044-00T
ORDERING ABOVE (ITEM 10) COIL PART Nº WILL INCLUDE:			
—	Diode, 1N4004 (positioned at top)	1	112-5003-00
11	Coil Sleeve	1	545-5031-00
12	Fiber Yoke	1	545-5609-00
13	Metal Yoke	1	535-7346-00
14	Metal Yoke Stop	1	535-7347-00
Item 14 is secured by: #6-32 X 1/4" HWH Swage (Serr.) Zinc (Qty. 2) (237-5976-01)			
15	Coil Bracket Welded Assembly	1	515-5939-00
Item 15 is secured by: #6-32 X 1-3/16" Spiral Fin Shank (Qty. 3) (237-5957-00) and #6-32 Nylon Stop Nut (Qty. 3) (240-5005-00)			

Nº	BUMPER SWITCH PART NAME	QTY.	SPI PART Nº
16	Switch Bracket	1	535-7342-00
Item 16 is secured by: #8 X 1/2" SHWH AB (Zinc) (Qty. 2) (234-5101-00)			
17	Spoon Switch Actuator	1	545-5610-01
18	Bumper Stack (Blade) Switch	1	180-5015-03
19	Switch Body Protect Plate	1	535-7344-00
Items 18 & 19 are secured by: #6-32 X 3/4" HWH Swage (Serr.) Zc. (Qty. 2) (237-5976-05)			
20	Switch Diode, 1N4001	1	112-5001-00

*The Top & Bottom Assemblies are secured together by hardware included in assemblies.*

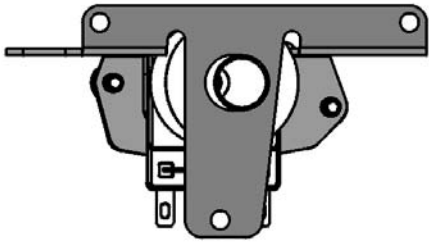
ASSOCIATED PART IS NOT INCLUDED WITH THE ABOVE ASSEMBLY.

Nº	ASSOCIATED PART NAME	QTY.	SPI PART Nº
AP-A	Bumper Cap (Red)	3	550-5057-02
Item AP-A is secured to Item 4 by: #4 X 3/4" PRH (Zinc) T-25 (Qty. 2/per) (237-5873-00)			

**Sec. 4: Drawings ...**

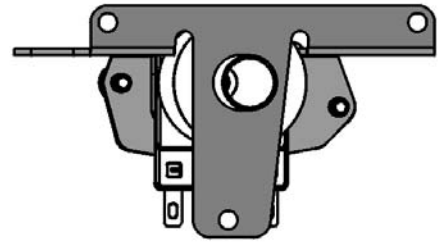
**Bead Curtain Bottom Left (515-7216-00) & Right (515-7216-01) Assy. (Items 1-5)**  
**Not sold as an assembly, order the individual part(s) actually required.**

**Top View Left -00**



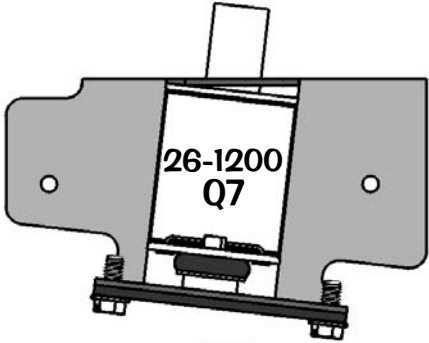
This Assembly works in conjunction with the Bead Curtain Top Assembly (Next Page).

**Top View Right -01**



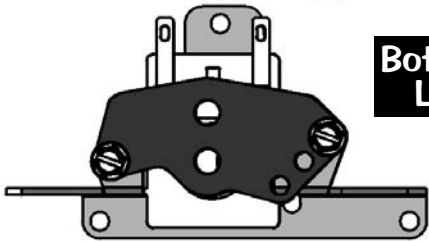
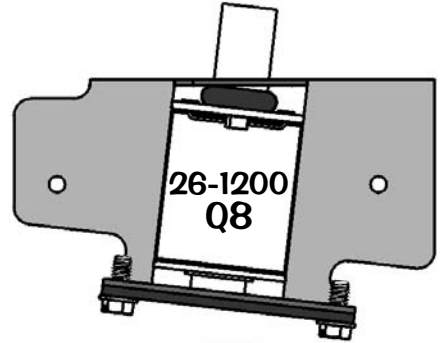
**Take Note:**

The only difference between these 2 assemblies is *how the coil is mounted (180° Rotated)*. Note the Position of the Coil Lugs in the Side & 3D Views.



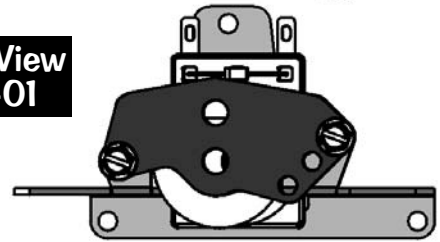
**Side View Left -00**

**Side View Right -01**

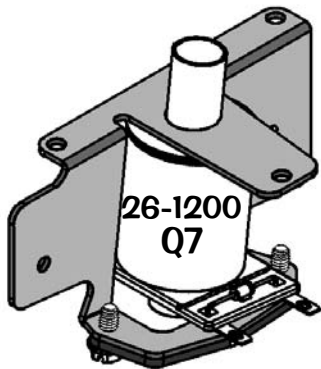


**Bottom View Left -00**

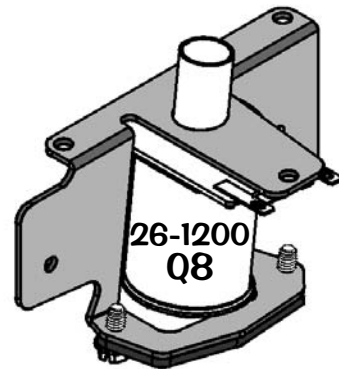
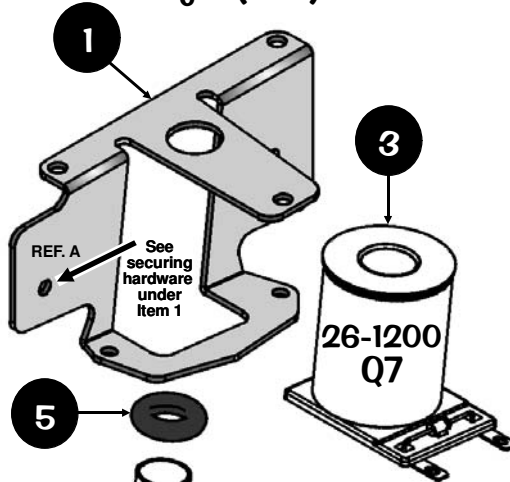
**Bottom View Right -01**



**Exploded View Left Style (-00) Shown**

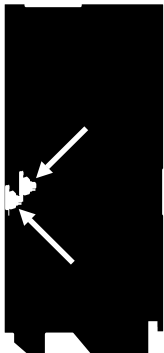


**3D View Left -00**



**3D View Right -01**

Sec. 4: Drawings ...



See securing hardware under Item 2

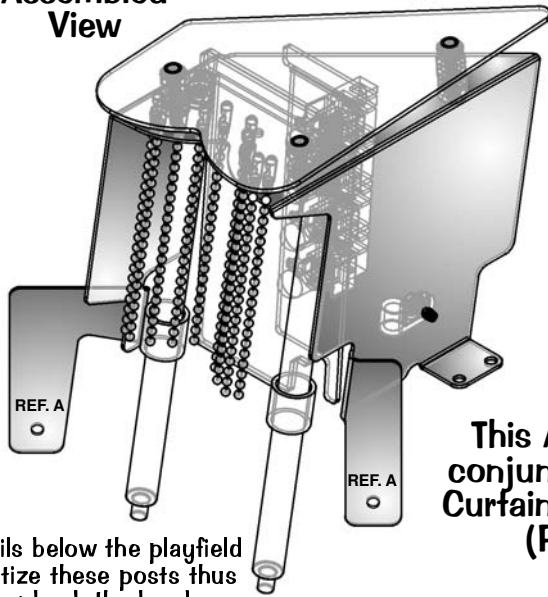


Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
1	Coil Mounting Bracket	2	535-9048-00
Item 1 is secured below the playfield by: #8 X 1/2" HWH AB (Zc) (Qty. 3/per) (234-5101-00)			
Item 1 (Ref. A) is secured to the Bead Curtain Frame (Item 1, Next Page) by: #6-32 X 3/8" HWH Swage (Ser) Zinc (Qty. 1/per: 1 side only) (237-5976-02) and #6-32 Nylon Stop Nut (Qty. 1/per: 1 side only) (240-5005-00)			
2	Mounting Bracket	2	535-9049-00
Item 2 is secured to Item 1 by: #8-32 X 3/8" HWH MS (Zinc) (Qty. 2/per) (237-5903-00)			
3	Coil, 26-1200	2	090-5044-00T
ORDERING ABOVE (ITEM 3) COIL PART Nº WILL INCLUDE:			
—	Diode, 1N4004 (positioned at top)	1/per	112-5003-00
4	Coil Sleeve (with extension)	2	545-5847-00
5	5/16" I.D. BLACK Rubber Ring	2	545-5348-02



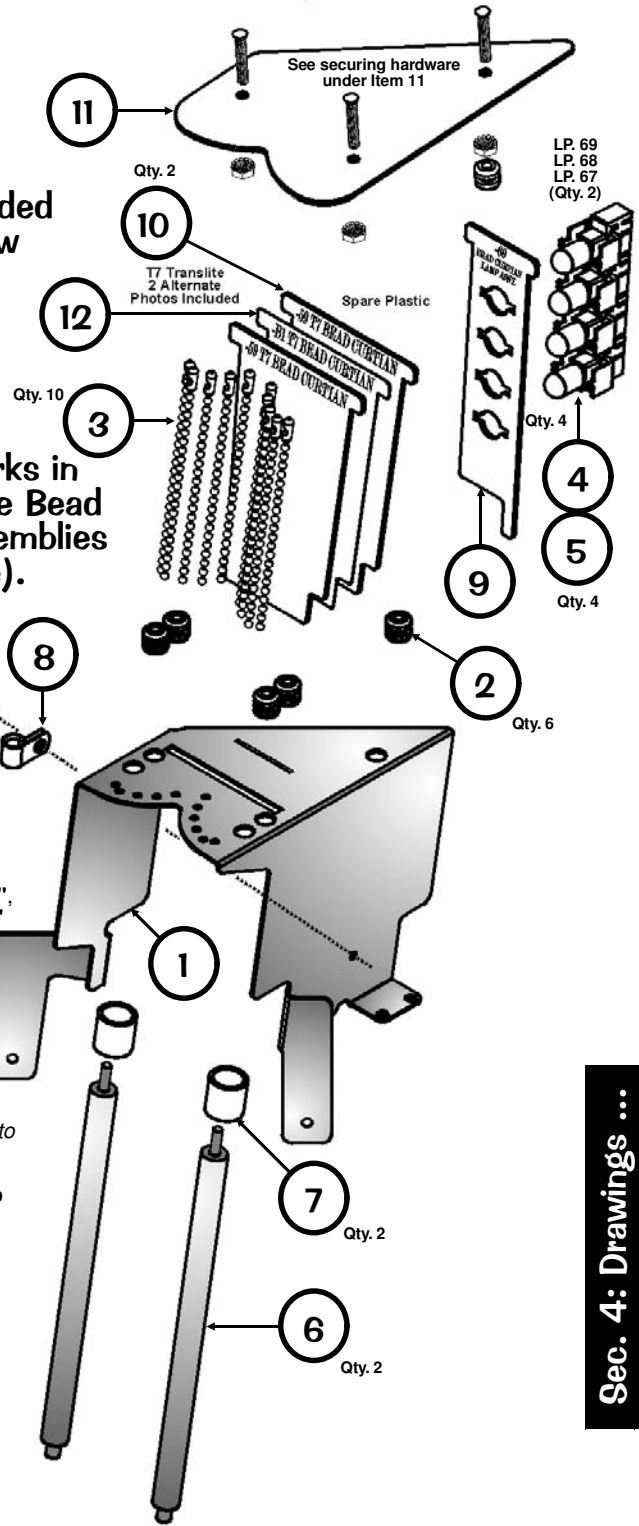
**Bead Curtain Top Assembly (515-7215-00) (Items 1-12)**  
**Not sold as an assembly, order the individual part(s) actually required.**

**Assembled View**



The Coils below the playfield magnetize these posts thus pulling back the beads.

**Exploded View**



**This Assembly works in conjunction with the Bead Curtain Bottom Assemblies (Previous Page).**



**Pull up the Plastic Cover straight up and set aside. Replace the Photo Insert behind the hanging Plastic & place the cover back on.**

**Please Note: 1 Spare Clear Plastic (830-5989-59 T7) is provided in the Spare Parts Bag.**



**Availability Note:**

This game is supplied with 3 Set of Photo Inserts. **A: "No Nudity"**, **B: "Nudity Factory Suggested"** and **C: "Some Full Nudity"**. 1 Set was installed at the Factory and the other 2 Sets are packed with the game. **Read the Instruction Sheet (756-5009-00)** which is provided with the Photo Insert Kit inside this game. For the same 3 Sets, order Kit **502-5010-00**, no other style Photo Inserts are available.

**Items 9-12: Plastics and Photo Inserts**, are not available individually. The entire Set(s) and/or Kit(s) must be ordered. See Section 4, Chapter 1, Page 63 for Plastics & Decals.

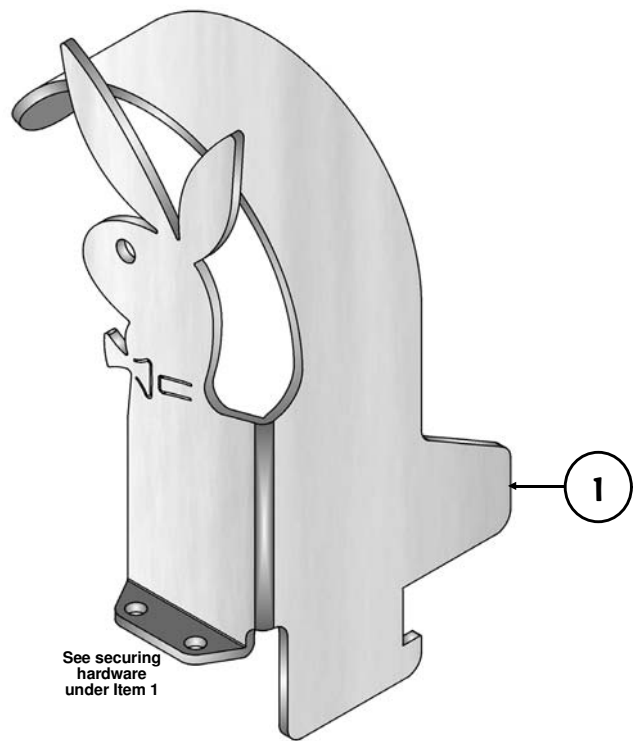
Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
1	Bead Curtain Frame	1	535-9047-00
Item 1 is secured above the playfield by: #8 X 1/2" HWH AB (Zc) (Qty. 2) (234-5101-00)			
Item 1 (Ref. A) is secured to the Coil Mounting Brackets (Item 1, Previous Page) by: #6-32 X 3/8" HWH Swage (Ser) Zinc (Qty. 1/per: 1 side only) (237-5976-02) and #6-32 Nylon Stop Nut (Qty. 1/per: 1 side only) (240-5005-00)			
2	Rubber Grommet (Double-Edge)	6	280-5015-00
3	Ball (Bead) Chain, 4" Brass (#6 4PBS)	10	880-5056-00
4	#555 IDC Snap-On Socket	4	077-5216-00
5	#555 Wedge Base Bulb (Clear)	4	165-5002-00
6	Post (Magnetized with Coils)	2	530-5603-01
7	Nylon Post Sleeve	2	545-6028-16
8	1/4" Clamp (Double)	1	040-5000-23
Item 8 is secured to Item 1 by: #8-32 X 3/8" HWH MS Type C (Qty. 1) (237-5903-00) and #8 Washer (Qty. 1) (242-5005-00)			

Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
9	Clear Plastic -60 (Light Board)	1	from 830-5989-XX
10	Clear Plastic -59 T7	2	from 830-5989-XX
11	Screened Plastic -23	1	from 830-5988-XX
Item 11 is secured into Item 2 on Item 1 by: #8-32 X 1" Pem Self-Clinching Stud (Qty. 3) (237-5867-16), #8-32 Keps Nut (Qty. 3) (240-5104-00) and Item 2 (Qty. 1) at rear.			
12	Photo Insert -T7 (3 Styles A, B & C)	1	from 502-5010-00
Items 9-12: READ "Availability Note" above on ordering availability.			

## Exit Scoop (Playboy Rabbit Head), 535-9097-01 (Item 1) Guides ball from VUK into the Right Wire Ramp.

Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
1	Exit Scoop (Playboy Rabbit Head)	1	535-9097-01

Item 1 is secured above the playfield by: #8-32 X 1" HWH (Zinc) (Qty. 2) (237-6003-00)  
For view of this screw, see identical part used on the 1-Bank Drop Target, Item 20.



## VUK (Vertical Up-Kicker, Left Style) Assembly, 500-6290-00 (Items 1-12) Ball launches into the scoop above onto the Right Wire Ramp.

Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
1	VUK Coil Mounting Bracket (Left Style)	1	535-8296-00

Item 1 is secured under the playfield by: #8 X 1/2" HWH AB (Zinc) (Qty. 3) (234-5101-00)

2	Micro Sw. (Heavy Duty "Y" Flat Actuator)	1	180-5116-01
3	Switch Lug Insulator (Fiche Paper)	1	545-5759-00
4	Switch Body Protect Plate	1	535-6539-00

Items 2-4 are secured by: #2-56 X 1/2" HWH MS (Serr) Zc TF 3/16" (Qty. 2) (237-5937-02)

5	Coil Retaining Bracket	1	535-5203-03
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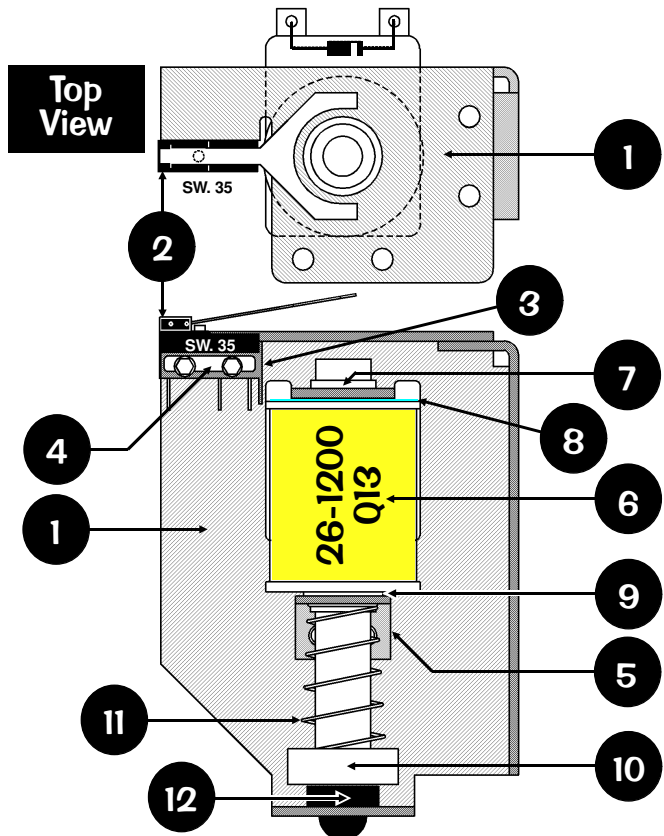
Item 5 is secured by: #8-32 X 1/4" PPH MS (Sems) Zinc (Qty. 2) (232-5300-00)

6	Coil, 26-1200	1	090-5044-00T
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ORDERING ABOVE (ITEM 6) COIL PART Nº WILL INCLUDE:

—	Diode, 1N4004 (positioned at top)	1	112-5003-00
7	Coil Sleeve (Short) (Formost #10-7077)	1	545-5076-01
8	Coil Lug Insulator (Fiche Paper)	1	545-5431-00
9	Spring Washer, 17/32" ID X 3/4" X 1"	1	269-5002-00
10	Plunger Assembly	1	515-5941-01
11	Compression (Relay) Spring	1	266-5020-00
12	Rubber Bumper (Grommet)	1	545-5105-00

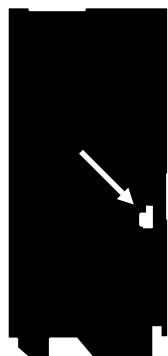
Sec. 4: Drawings ...



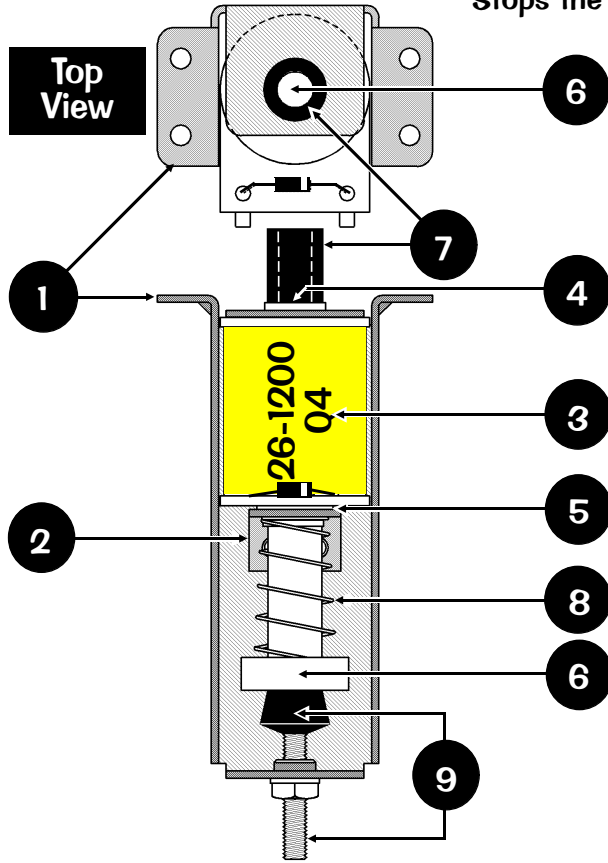
### Take Note:

\* An asterisk (\*) indicates item is *Not Shown* in pictorial.

The Switch Diode, 1N4001, is not located on this assembly (nor included); it's located on a *Terminal Strip* under the playfield. See *Section 5, Chapter 2, Playfield Terminal Strips...*, **Page 101**.



## Ball Deflector Assembly, 500-6433-00 (Items 1-9) Stops the ball in the Left Orbit.

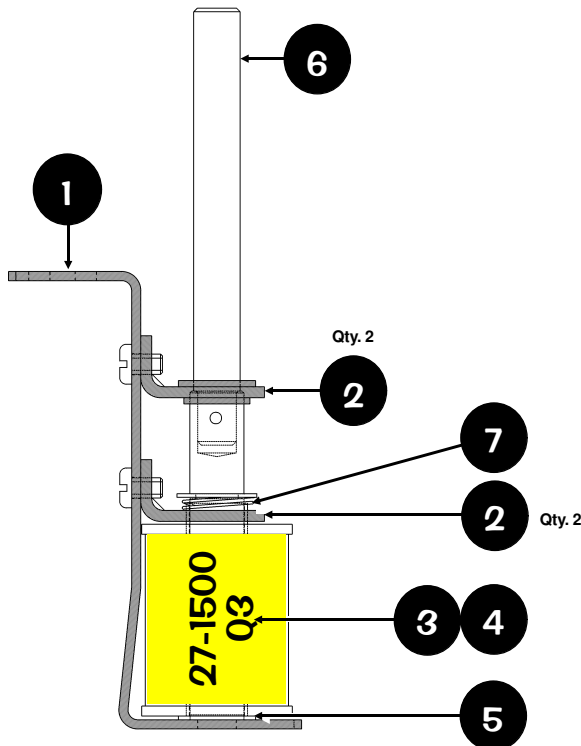


Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
1	Ball Deflector Coil Mounting Bracket	1	535-6857-02
Item 1 is secured below the playfield by: #8 X 1/2" HWH AB (Zinc) (Qty. 4) (234-5101-00)			
2	Coil Retaining Bracket	1	535-5203-03
Item 2 is secured to Item 1 by: #8-32 X 1/4" PPH MS (Sems) (Qty. 2) (232-5300-00)			
3	Coil, 26-1200	1	090-5044-00T
ORDERING ABOVE (ITEM 3) COIL PART Nº WILL INCLUDE:			
—	Diode, 1N4004 (positioned at top)	1	112-5003-00
4	Coil Sleeve (Short) (Formost #10-7077)	1	545-5076-01
5	Spring Washer (17/32" ID X 3/4" X 1")	1	269-5002-00
6	Solid Plunger Assembly (Tapered Top)	1	515-7089-00
7	Post Black Rubber (Sleeve Tall)	1	545-5308-00
8	Compression (Relay) Spring	1	266-5022-01
9	#10-32 Adj. Spindle Stop w/Rubber Tip	1	280-5014-00
Item 9 is secured by: #10-32 Keps Nut (Qty. 1) (240-5208-00)			

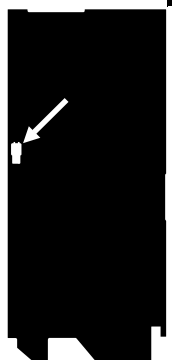
**Ordering Note:** If 500-6433-00 is unavailable, order the individual part(s) actually required or try 500-5788-XX and change it's Solid Plunger with above Solid Plunger (515-7089-00) and ORDER the Post Rubber Sleeve (545-5308-00) to add to the tip. The Rubber Sleeve is not included with the Solid Plunger. **PERIODICALLY CHECK THIS RUBBER FOR WEAR.**



## Ball Lock (Long Plunger) Assembly, 500-5867-04 (Items 1-8) Locks and releases the ball(s) on the Left Wire Ramp.



Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
1	Ball Lock Mounting Bracket Assy.	1	515-7132-00
Item 1 is secured below the playfield by: #8 X 1/2" HWH AB (Zinc) (Qty. 4) (234-5101-00)			
2	Coil Retaining Bracket	2	535-5203-03
Item 2 is secured by: #8-32 X 1/4" PPH MS (Sems) Zinc (Qty. 2/per) (232-5300-00)			
3	Coil, 27-1500	1	090-5004-00T
ORDERING ABOVE (ITEM 3) COIL PART Nº WILL INCLUDE:			
—	Diode, 1N4004 (positioned at top)	1	112-5003-00
4	Coil Sleeve	1	545-5411-00
5	Spring Washer (17/32" ID X 3/4" X 1")	1	269-5002-00
6	Solid Plunger Assy. (5.53" ID X .375" OD)	1	515-6119-04
7	Compression (Relay) Spring	1	266-5020-00
Item 7 is secured by: Retaining Ring, 7/16" ø Shaft (Qty. 1) (270-5005-00)			
8	Nyliner 7/16" Shaft (7L2-FF)	1	545-5418-01
<b>Ordering Note:</b> If 500-5867-04 is unavailable, order the individual part(s) actually required or try 500-5867-00 (4.9" Plunger) -01 (4.87" Plunger) -02 (3.81" Plunger) or -03 (5.81" Plunger) and change it's Solid Plunger with above Solid Plunger (515-6119-04).			



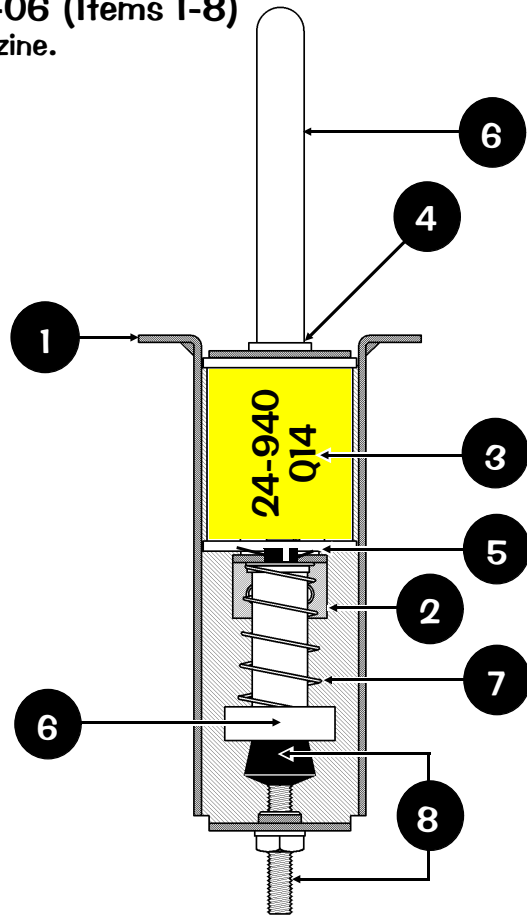
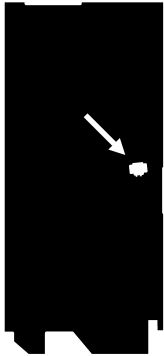
Sec. 4: Drawings ...



## Up/Down Post Assy., 500-5788-06 (Items 1-8) Open & Closes the Magazine.

Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
1	Ball Deflector Coil Mounting Bracket	1	535-6857-02
Item 1 is secured below the playfield by: #8 X 1/2" HWH AB (Zinc) (Qty. 4) (234-5101-00)			
2	Coil Retaining Bracket	1	535-5203-03
Item 2 is secured by: #8-32 X 1/4" PPH MS (Sems) Zinc (Qty. 2) (232-5300-00)			
3	Coil, 24-940	1	090-5036-00B
ORDERING ABOVE (ITEM 3) COIL PART Nº WILL INCLUDE:			
— Diode, 1N4004 (positioned at top) 1 112-5003-00			
4	Coil Sleeve (Short) (Formost #10-7077)	1	545-5076-01
5	Spring Washer (17/32" ID X 3/4" X 1")	1	269-5002-00
6	Solid Plunger (Long) Assembly	1	515-7223-00
7	Compression (Relay) Spring	1	266-5022-01
8	#10-32 Adj. Spindle Stop w/Rubber Tip	1	280-5014-00
Item 8 is secured by: #10-32 Keps Nut (Qty. 1) (240-5208-00)			

**Ordering Note:** If 500-5788-06 is unavailable, order the individual part(s) actually required or try 500-5788-XX and changes it's Solid Plunger with above Solid Plunger (515-7223-00). **PERIODICALLY CHECK THE NYLON PLUNGER TOP FOR WEAR.**

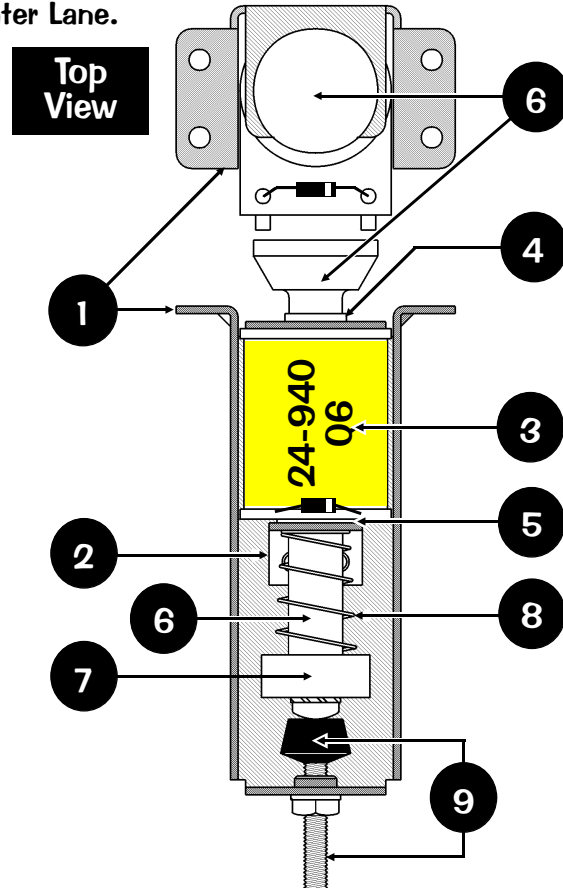
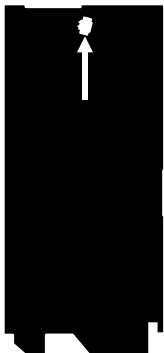


## Ball Deflector (Wide Plunger Top) Assembly, 500-5788-07 (Items 1-9) Stops the ball in the Center Lane.

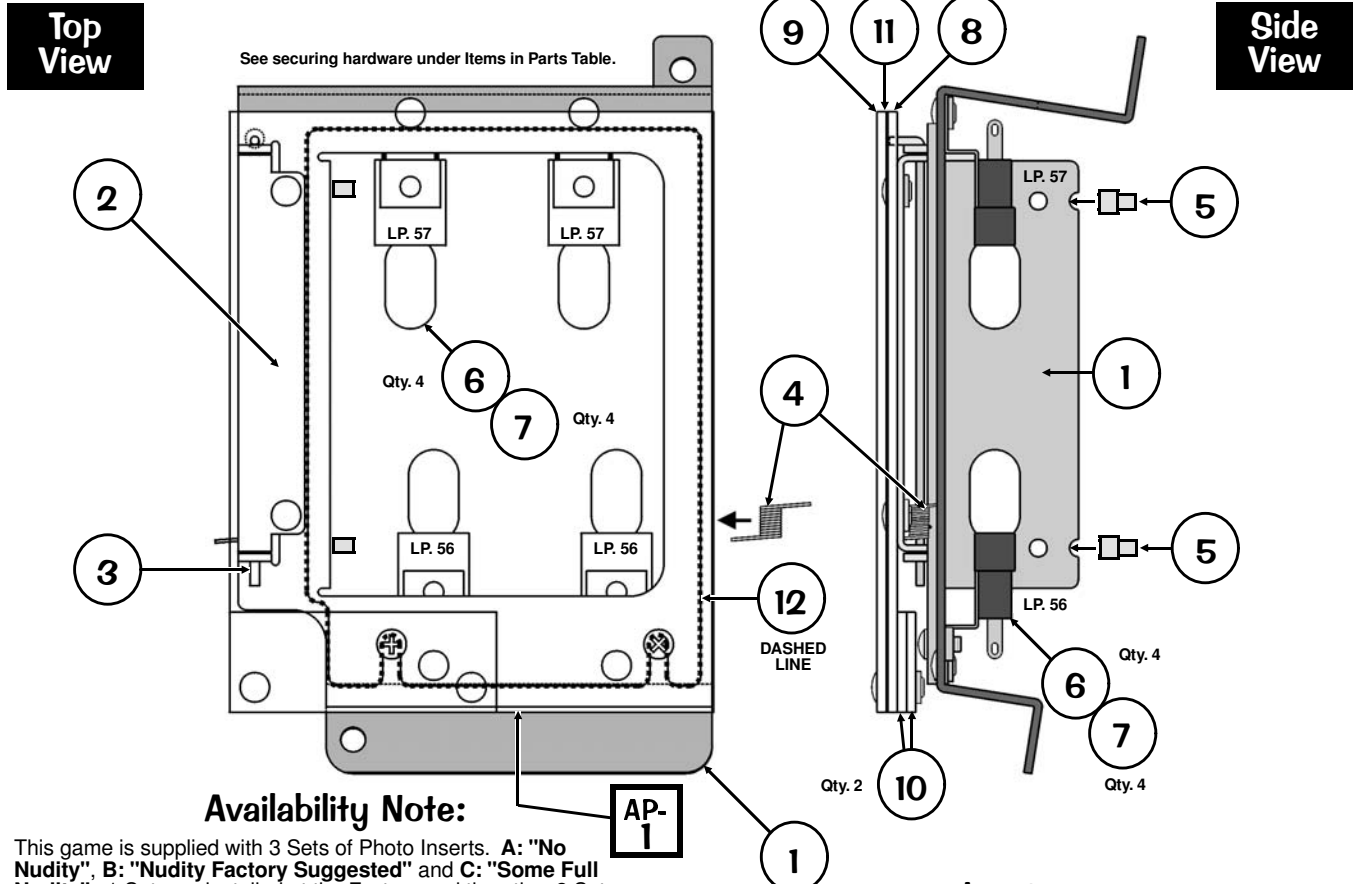
Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
1	Ball Deflector Coil Mounting Bracket	1	535-6857-02
Item 1 is secured below the playfield by: #8 X 1/2" HWH AB (Zinc) (Qty. 4) (234-5101-00)			
2	Coil Retaining Bracket	1	535-5203-03
Item 2 is secured by: #8-32 X 1/4" PPH MS (Sems) Zinc (Qty. 2) (232-5300-00)			
3	Coil, 26-1200	1	090-5044-00T
ORDERING ABOVE (ITEM 3) COIL PART Nº WILL INCLUDE:			
— Diode, 1N4004 (positioned at top) 1 112-5003-00			
4	Coil Sleeve (Short) (Formost #10-7077)	1	545-5076-01
5	Spring Washer (17/32" ID X 3/4" X 1")	1	269-5002-00
6	Solid Plunger Assembly	1	515-7230-00
7	Shaft Head (Removable)	1	530-5511-00
Item 7 is secured by: #10-32 X 3/8" PPH MS (Sems) (Qty. 1) (232-5401-00)			
8	Compression (Relay) Spring	1	266-5022-01
9	#10-32 Adj. Spindle Stop w/Rubber Tip	1	280-5014-00
Item 9 is secured by: #10-32 Keps Nut (Qty. 1) (240-5208-00)			

**Ordering Note:** If 500-5788-07 is unavailable, order the individual part(s) actually required or try 500-5788-XX and changes it's Solid Plunger with above Solid Plunger (515-7230-00) and ORDER the "Removable" Shaft Head (530-5511-00) & #10-32 X 3/8" Screw (232-5401-00) to add to the bottom. The Shaft Head is not included with the Solid Plunger. **PERIODICALLY CHECK THE NYLON PLUNGER TOP FOR WEAR.**

Sec. 4: Drawings ...



**Magazine Assembly (500-6556-00) (Items 1-13)**  
**Not sold as an assembly, order the individual part(s) actually required.**



**Availability Note:**

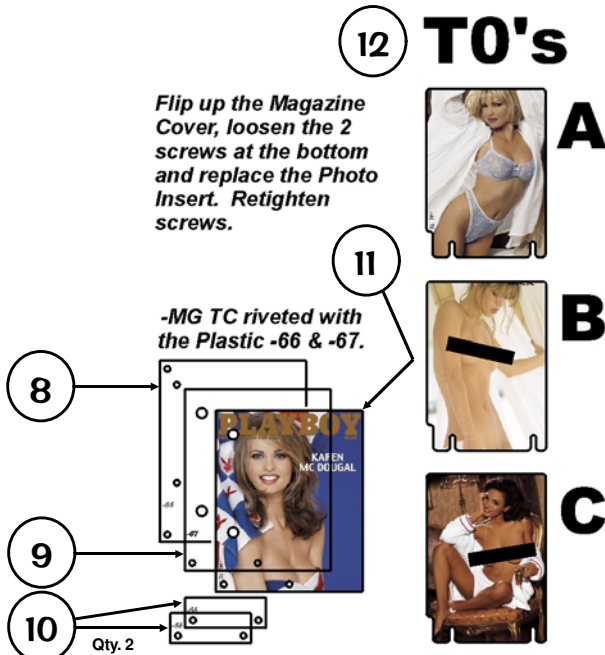
This game is supplied with 3 Sets of Photo Inserts. **A: "No Nudity"**, **B: "Nudity Factory Suggested"** and **C: "Some Full Nudity"**. 1 Set was installed at the Factory and the other 2 Sets are packed with the game. **Read the Instruction Sheet (756-5009-00)** which is provided with the Photo Insert Kit inside this game. For the same 3 Sets, order Kit **502-5010-00**, no other style Photo Inserts are available.

**Items 8-12, & AP-1: Plastics, Photo Inserts & Decal**, are not available individually. The entire Set(s) and/or Kit(s) must be ordered. See Section 4, Chapter 1, Page 63 for Plastics & Decals.

**Take Note:**

\* An asterisk (\*) indicates item(s) are not noted in the pictorials.

Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
1	Magazine Frame (Bracket)	1	535-9073-00
Item 1 is secured above the playfield onto Post by: #6-32 Nylon Stop Nut (Qty. 1) (240-5005-00) and onto the Wood Rail by: #6 X 1/2" PTH A (Zinc) (Qty. 1) (237-5809-00)			
2	Magzine Hinge	1	535-9072-00
3	Magazine Hinge Pin	1	535-9071-00
4	Spring (Torsion)	1	267-5000-00
5	4" Cable Tie (secures Wiring to Frame)	2	040-5001-01
6	#555 Wedge Base Socket (Laydown)	4	077-5026-01
7	#555 Wedge Base Bulb (Clear)	4	165-5002-00
Items 6 & 7 are secured to Item 1 above by: Rivet, 1/8" ø X .39" Zinc (Qty. 1/per) (249-5018-00)			
8	Clear Plastic -66 TO	1	from 830-5989-XX
9	Clear Plastic -67 TO	1	from 830-5989-XX
Items 8 & 9 are secured to Item 2 above by: Rivet, 1/8" ø X 3/16" Zinc (Qty. 2) (249-5001-00) and #6 Lock Washer (Qty. 2) (246-5000-00)			
10	Clear Plastic -65 (used as Impact Pads)	2	from 830-5989-XX
Item 10 is secured onto Items 8 & 9 by: Pop Rivet, 1/8" ø X .515" Lg. (Qty. 2) (249-5018-01) and #4 Washer (Qty. 2) (242-5002-00)			
11	Photo Insert -MC TC (1 Style Only)	1	from 502-5010-00
Item 11 is secured inbetween Items 8 & 9 by: See securing hardware under Item 9.			
12	Photo Insert -TO (3 Styles A, B & C)	1	from 502-5010-00
Item 12 is secured on Item 1 above by: #4-40 X 3/8" PPH MS (Qty. 2) (237-5997-00) and #4 Washer (Qty. 2) (242-5002-00). Ensure Photo Insert is under the Washers.			
Items 8-12: READ "Availability Note" above Photo Inserts on ordering availability.			
13*	Wiring Harness & 4-Pin Connector	1	036-5477-09-76
If replacing sockets, desolder wiring (use above # if new wiring is required). Don't forget to ADD the lug insulators (Shrink Tubing, 605-5004-01 sold in 12" Lengths).			



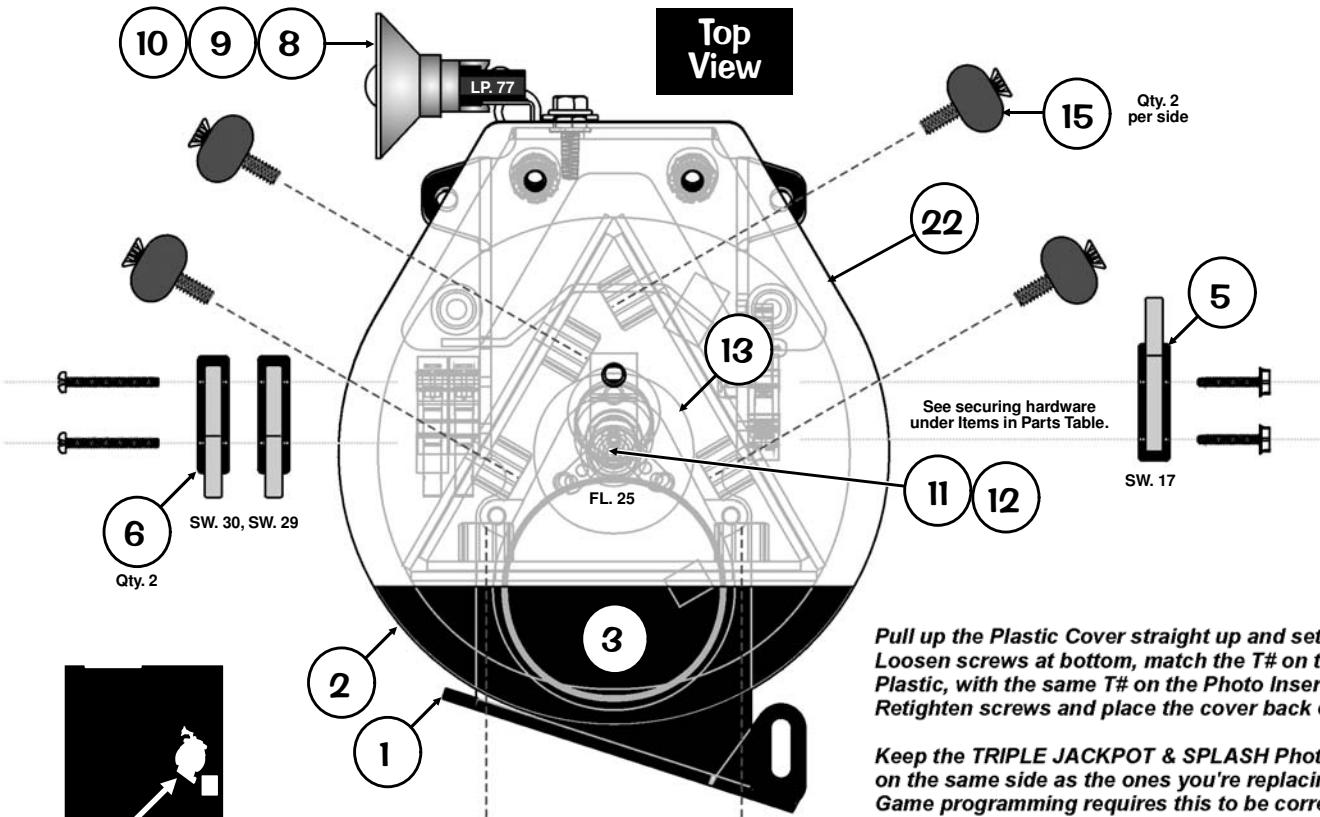
**Sec. 4: Drawings ...**

Nº	ASSOCIATED PART NAME	QTY.	SPI PART Nº
AP-1*	Decal -14 (Skill Shot Opens Magazine)	1	from 820-6305-00
Items AP-1: READ "Availability Note" above Photo Inserts on ordering availability.			

# Rotating Triangular Billboard Assembly (500-6546-00) (Items 1-25)

Another View & Parts Table continues on the next page.

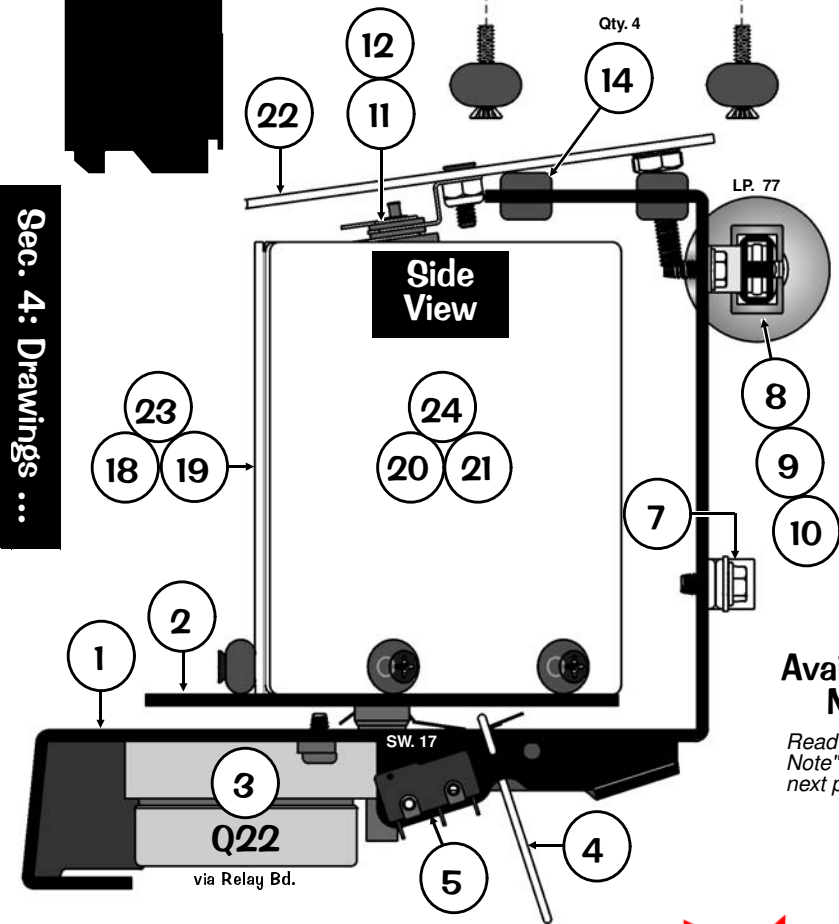
**Not sold as an assembly, order the individual part(s) actually required.**



*Pull up the Plastic Cover straight up and set aside. Loosen screws at bottom, match the T# on the Plastic, with the same T# on the Photo Insert. Retighten screws and place the cover back on.*

*Keep the TRIPLE JACKPOT & SPLASH Photo Inserts on the same side as the ones you're replacing. Game programming requires this to be correct.*

Sec. 4: Drawings ...



**Availability Note:**  
Read "Availability Note" on the next page.

**A** **A**

**B** **B**

**C** **C**



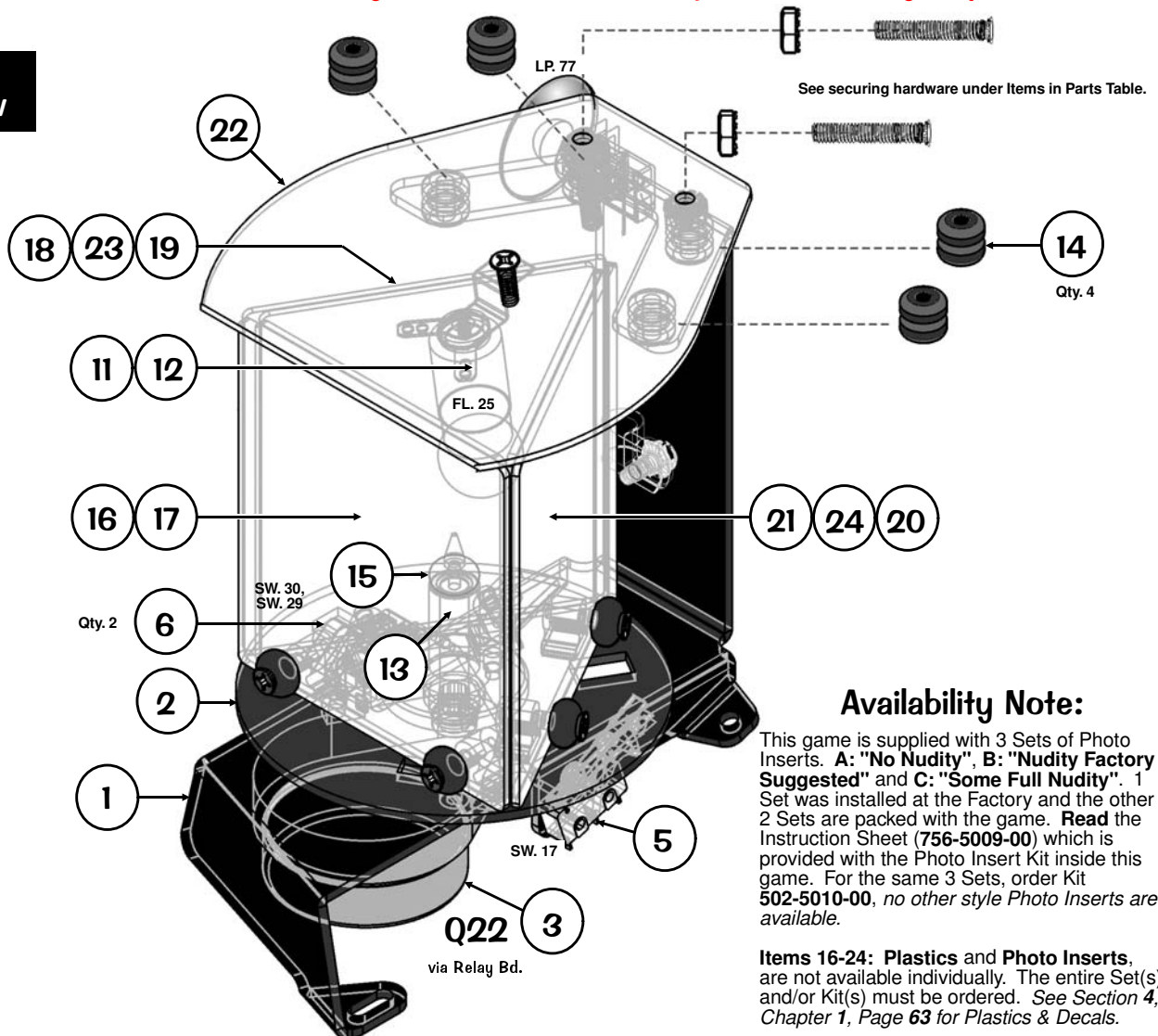


# Rotating Triangular Billboard Assembly (500-6546-00) (Items 1-25) Continued

Different Views on the previous page.

**Not sold as an assembly, order the individual part(s) actually required.**

**3D View**



### Availability Note:

This game is supplied with 3 Sets of Photo Inserts. **A: "No Nudity"**, **B: "Nudity Factory Suggested"** and **C: "Some Full Nudity"**. 1 Set was installed at the Factory and the other 2 Sets are packed with the game. **Read the Instruction Sheet (756-5009-00)** which is provided with the Photo Insert Kit inside this game. For the same 3 Sets, order Kit **502-5010-00**, no other style Photo Inserts are available.

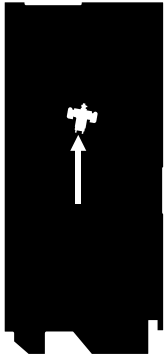
**Items 16-24: Plastics and Photo Inserts.** are not available individually. The entire Set(s) and/or Kit(s) must be ordered. See Section 4, Chapter 1, Page 63 for Plastics & Decals.

Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº	Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº		
1	Motor Platform Frame (Bracket) Black	1	535-9040-00	13	White Nylon Bushing	1	545-5192-00		
Item 1 is secured above the playfield in the front by: #6-32 X 1/2" HWH Swage (Ser) Zinc (Qty. 1) (237-5976-03) and #6 Washer (Qty. 1) (242-5001-00) and secured in the rear by: #8-32 X 3/8" HWH TF (Qty. 2) (237-5903-00)				Item 13 is secured to Item 2 by: #6-32 X 3/8" HWH Swage (Ser) Zinc (Qty. 3) (237-5976-02)					
2	Rotor Platform Assy. (w/Shaft & "Barrels")	1	515-7206-00	14	Rubber Grommet (Double Edged)	4	280-5015-00		
3	Motor 24v AC 50/60 Hz 12 RPM PB2 w/Conn.	1	041-5086-02	15	3/8" O.D. BLACK Rubber Ring	7	545-5348-19		
Item 3 is secured to Item 1 by: #6-32 X 5/16" PPH TF (Zinc) (Qty. 2) (237-6096-00)				16	Clear Plastic -57 T1	1	from 830-5989-XX		
4	Wire Gate	1	535-9043-48	17	Screened Plastic -26 T1	1	from 830-5988-XX		
5	Micro Switch (Short Flat Actuator)	1	180-5190-28	18	Clear Plastic -55 T2	1	from 830-5989-XX		
Item 5 is secured to Item 1 by: #2-56 X 1/2" HWH Ser UNS #4HD TR3 BLK (Qty. 2) (237-5937-02) and #2-56 Nylon Stop Nut (Qty. 2) (240-5321-00)				19	Clear Plastic -56 T2	1	from 830-5989-XX		
6	Micro Switch (Short Flat/Mid Bend Actuator)	2	180-5189-00	20	Clear Plastic -53 T3	1	from 830-5989-XX		
Item 6 is secured to Item 1 by: #2-56 X 3/4" PPH (Zinc) (Qty. 2) (237-6064-00) and #2-56 Nylon Stop Nut (Qty. 2) (240-5321-00)				21	Clear Plastic -54 T3	1	from 830-5989-XX		
7	1/4" Clamp (Double)	1	040-5000-23	Items 16-21 are secured into Item 2 by: #6-32 X 3/4" PFH Black Oxide (Qty. 2/per) (237-5836-01) with Item 15 (Qty. 1/per)					
Item 7 is secured to Item 1 by: #8-32 X 3/8" HWH MS Type C (Qty. 1) (237-5903-00) and #8 Washer (Qty. 1) (242-5005-00)				22	Screened Plastic -22	1	from 830-5988-XX		
8	#555 Wedge Base Socket (Laydown)	1	077-5026-01	Item 22 is secured into Item 14 on Item 1 by: #8-32 X 1" Pem Self-Clinching Stud (Qty. 2) (237-5867-16) and #8-32 Keps Nut (Qty. 2) (240-5104-00)					
9	Light Reflector (Silver Plastic)	1	545-5409-01	23	Photo Insert -T2 (3 Styles A, B & C)	1	from 502-5010-00		
10	#555 Wedge Base Bulb (Clear)	1	165-5002-00	24	Photo Insert -T3 (3 Styles A, B & C)	1	from 502-5010-00		
Items 8, 9 & 10 are secured to Item 1 by: #6-32 X 3/8" HWH Swage (Ser) Zinc (Qty. 1) (237-5976-02)				Item 23 is secured inbetween Items 18-19; Item 24 is secured inbetween Items 20-21.					
11	#89 2-Lug Stand-Up Small Socket	1	077-5106-00	Items 16-24: READ "Availability Note" above on ordering availability.					
12	#89 Bulb (Bayonet)	1	165-5000-89	25*	Wiring Harness & 2-Pin + 9-Pin C.N.S.	1	036-5477-16-76		
Items 11 & 12 are secured to Item 22 by: #6-32 X 1/2" PFH Black Oxide (Qty. 1) (237-5843-00) and #6-32 Nylon Stop Nut (Qty. 1) (240-5005-00)				If replacing sockets and/or switches, desolder wiring (use above # if new wiring is required). Don't forget to ADD the lug insulators (Shrink Tubing, 605-5004-01 sold in 12" Lengths).					

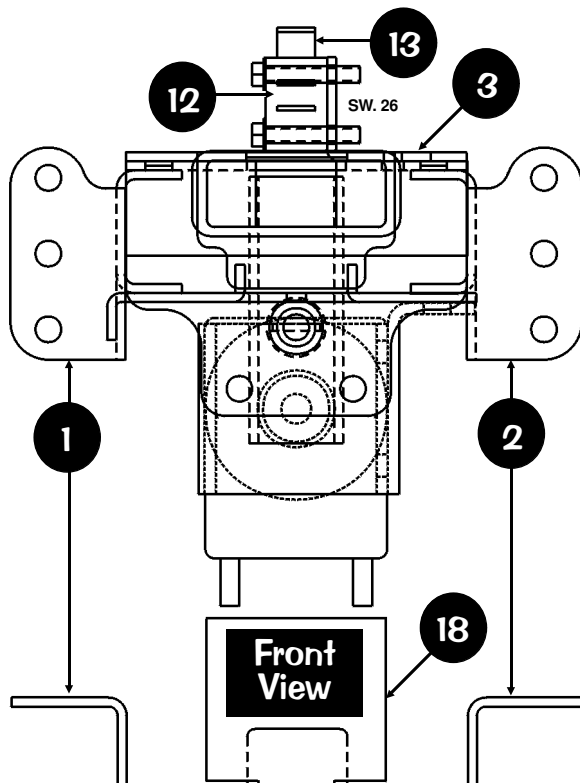
Sec. 4: Drawings ...

# 1-Bank Drop Target Assembly, 500-6440-11 (Items 1-20)

Another View & Parts Table continues on the next page.

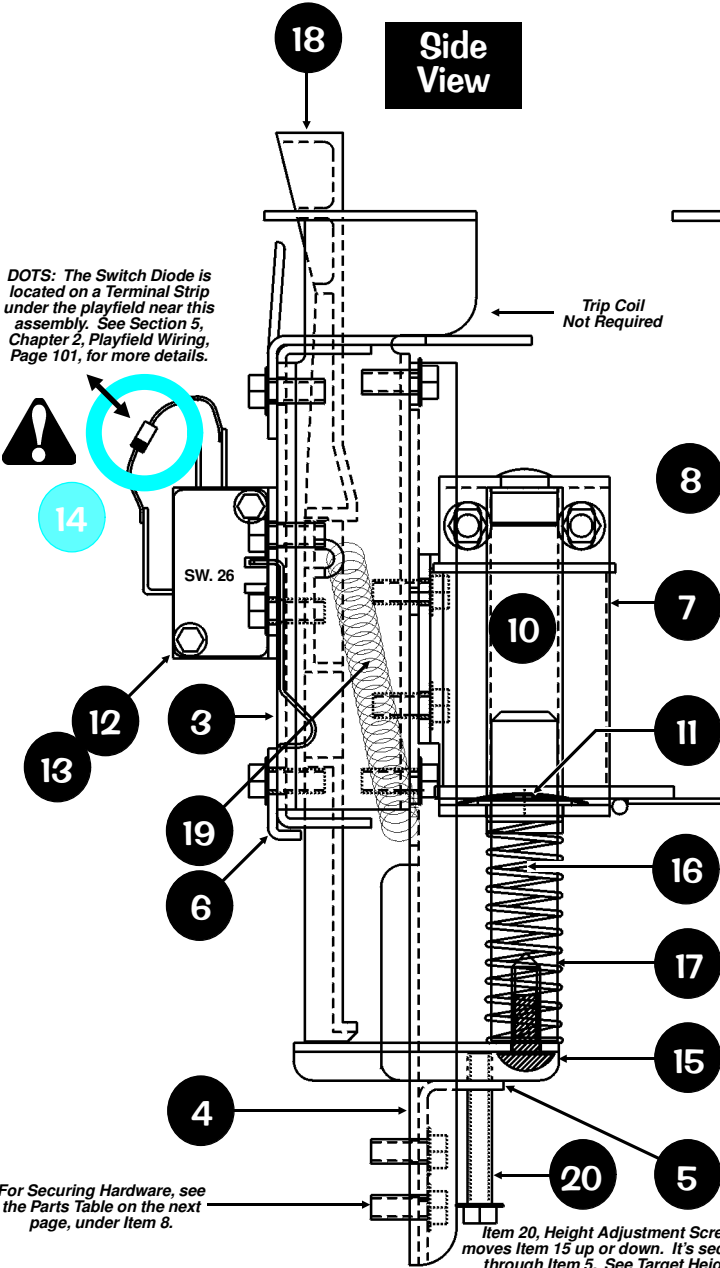


**Top View**



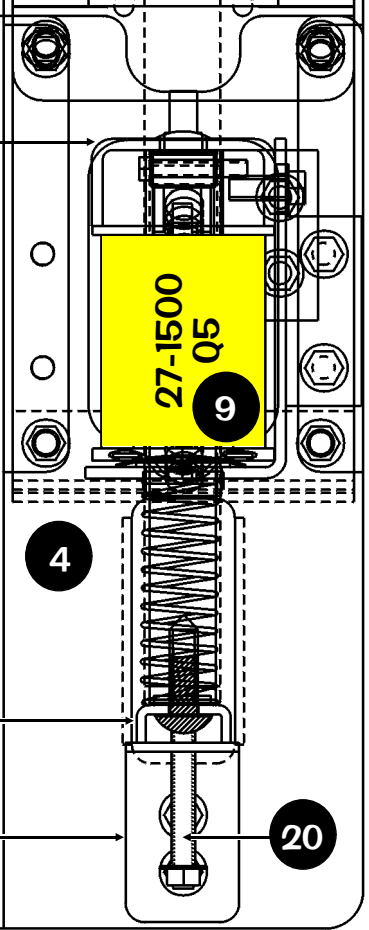
For Securing Hardware, see the Parts Table on the next page, under Item desired.

**Side View**



**DOTS:** The Switch Diode is located on a Terminal Strip under the playfield near this assembly. See Section 5, Chapter 2, Playfield Wiring, Page 101, for more details.

**Front View**



Sec. 4: Drawings ...

For Securing Hardware, see the Parts Table on the next page, under Item 8.

Item 20, Height Adjustment Screw, moves Item 15 up or down. It's secured through Item 5. See Target Height Adjustment Procedure on the next page.



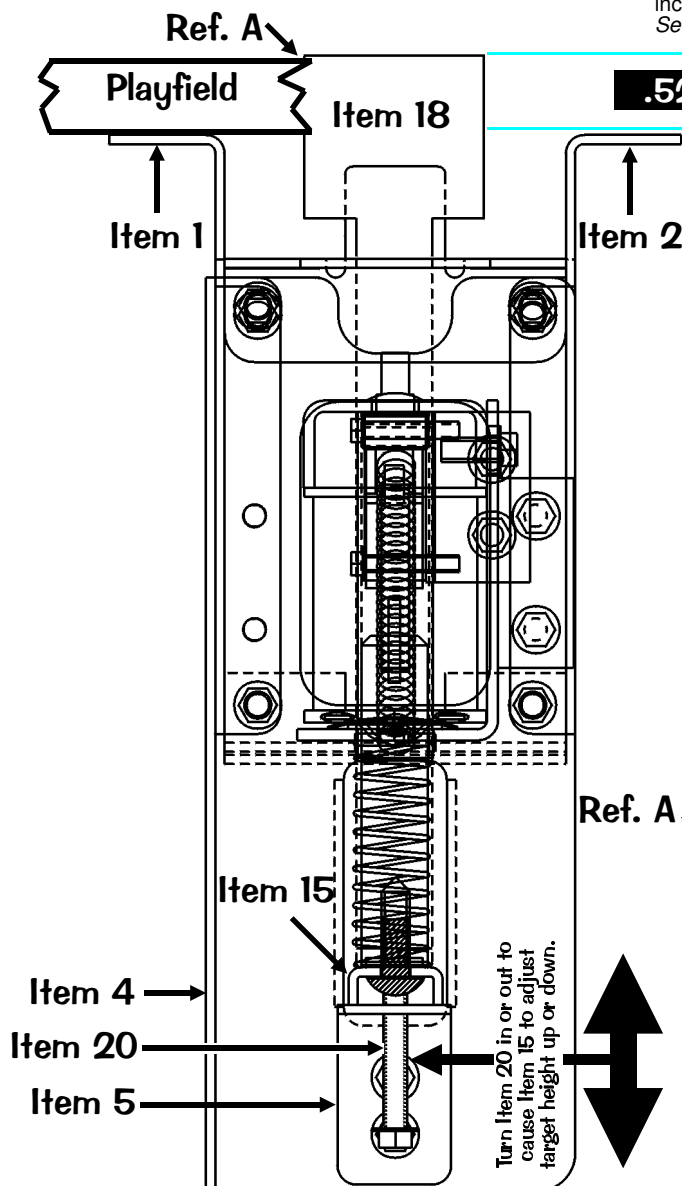
# 1-Bank Drop Target Assembly, 500-6440-11 (Items 1-20) Continued

Different Views on the previous page.

Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº	Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
1	Bracket Drop Target (Left Side)	1	535-8746-00	12	Bracket, Switch (1-Bank D/T)	1	535-7710-00
2	Bracket Drop Target (Right Side)	1	535-8746-01	13	Switch (D/T)	1	180-5158-00
Items 1 & 2 are secured below the playfield by: #8 X 1/2" HWH AB (Zinc) (Qty. 3/per) (234-5101-00)				Item 13 is secured to Item 12 by: #4-40 X 5/8" HWH TF (Qty. 2) (237-5945-00)			
3	Back Plate (1-Bank Drop Target)	1	535-7713-00	14	Switch Diode, 1N4001	0	112-5001-00
See "Take Note" below.							
4	Bracket, Support (1-Bank D/T)	1	535-7712-00	15	Bracket, Target Lift (1-Bank D/T)	1	535-7706-01
5	Bracket, Height Adjustment	1	535-7709-01	16	Plunger (Drive Coil)	1	530-5410-00
6	Bracket, Target Retainer (1-Bank D/T)	1	535-7728-00	Item 16 is secured to Item 15 by: #10-32 X 3/8" PPH (Sems) (Qty. 1) (232-5401-00)			
7	Bracket, Coil Housing	1	535-7707-00	To order Items 15-16 assembled with securing hardware, use SPI Nº: 515-6537-00.			
8	Bracket Cap, Coil Housing	1	515-6533-00	17	Compression (Return) Spring	1	266-5020-00
Items 1-3, 5, 7-8 are secured to Item 4 by: #8-32 X 3/8" HWH Swg. (Qty. 16) (237-5975-00)				18	Drop Target White (Rollover Target)	1	545-5533-01
9	Coil, 27-1500	1	090-5004-00B	Note: Individual Decal Not Available. The entire decal sheet must be ordered for replacement. See Page 57 for part number.			
ORDERING ABOVE (ITEM 9) COIL PART Nº WILL INCLUDE:							
—	Diode, 1N4004 (positioned at bottom)	1	112-5003-00	19	Spring, Target Reset	1	265-5003-00
10	Coil Sleeve	1	545-5709-00	20	Height Adj. Screw (#8-32 X 1" HWH)	1	237-6003-00
11	Spring Washer (17/32" ID X 3/4" X 1")	1	269-5002-00	Ordering Note: If 500-6440-11 is unavailable, order the individual part(s) actually required or try 500-6440-01 and remove the Trip Coil & Bracket from Item 4 (Note: Item 5, Height Adj. Bracket may differ slightly). Also, ensure the diode on the switch is soldered correctly.			
To order Items 7-11 assembled with securing hardware, use SPI Nº: 515-6535-01.							

## Take Note:

The Switch Diode, 1N4001, is not located on this assembly (nor included); it's located on a Terminal Strip under the playfield. See Section 5, Chapter 2, Playfield Terminal Strips..., Page 101.



## Target Height Adjustment Procedure:

1. Adjust the height of the top of **Item 18** (Rollover Target) at .52" (+/- .01"), relative to **Items 1 & 2** (Left & Right Side Brackets), as shown left. Adjustment should be made with **Item 18** (Drop Target) in the **DOWN POSITION**.

**Keep in Mind:** This adjustment procedure should have the **TOP SIDE** of **Item 18** (Drop Target) "flush to slightly above" the playfield surface after reinstalling to the underside of the Playfield. This will ensure a **BALL TRAP** is not created where the ball can rest in the target hole above the playfield.

2. Using a Flat Head Screwdriver or a 1/4" Nut Driver, loosen or tighten (turn in or out) **Item 20** (Height Adjustment Screw) through **Item 5** (Height Adjustment Bracket) to raise or lower **Item 15** (Target Lift Bracket) causing **Item 18** (Drop Target) to reach desired height as stated above.

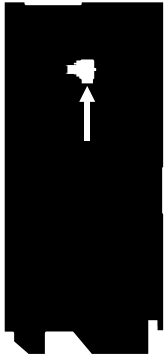
Sec. 4: Drawings ...



# Centerfold Lower Assembly (515-7224-00) (Items 1-10)

This Assembly works in conjunction with the Centerfold Upper Assembly (Next Page).

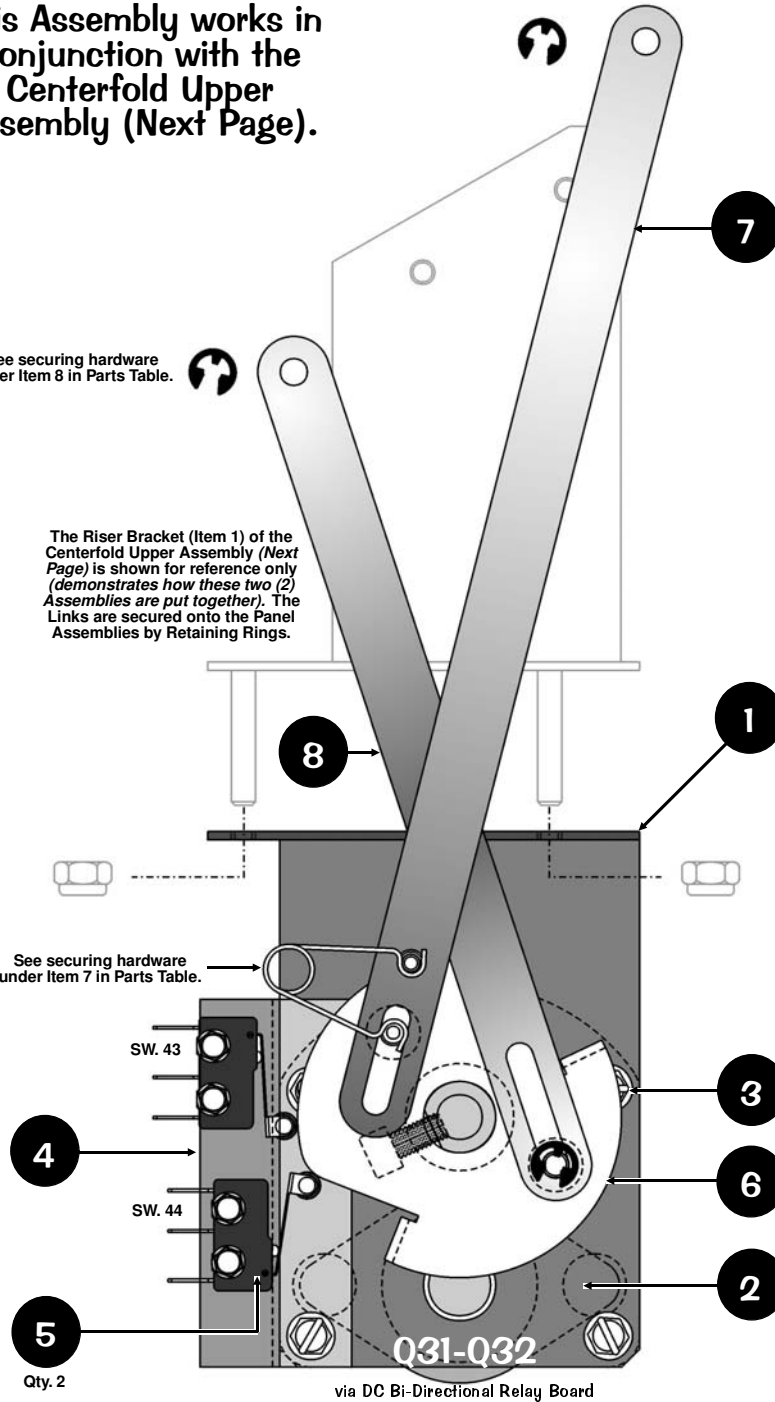
**Not sold as an assembly, order the individual part(s) actually required.**



See securing hardware under Item 8 in Parts Table.

The Riser Bracket (Item 1) of the Centerfold Upper Assembly (Next Page) is shown for reference only (demonstrates how these two (2) Assemblies are put together). The Links are secured onto the Panel Assemblies by Retaining Rings.

See securing hardware under Item 7 in Parts Table.



Sec. 4: Drawings ...

Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº	Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
1	Motor Mounting Bracket	1	535-9062-00	7	Link, Slotted (9/8" w/Post Stud) Assy.	1	515-7226-00
Item 1 is secured below the playfield onto Item 1, Riser Bracket of the Upper Assembly (Next Page) by: #8-32 Nylon Stop Nut (Qty. 2) (240-5102-00)				Item 7 is secured onto the Cam Pin on Item 6 by: Link Spring (Qty. 1) (266-5070-00)			
2	Motor 12v DC 10-12RPM	1	041-5075-04	8	Link, Slotted (7/8")	1	535-9061-00
Item 2 is secured to Item 1 by: #8-32 X 5/8" HWH MS (Serr) Zc TF (Qty. 1) (237-5951-00)				Item 8 is secured onto the Picture Link Pivot on Item 6 by: Retaining Ring, 3/16" ø Shaft (Qty. 1) (270-5001-00)			
3	Stop Pin (8-32 X 15/16")	1	530-5609-00	9*	Wiring Harness & 2-Pin Cn. (for Motor)	1	036-5477-10-76
Item 3 is secured to Item 1 by: #8-32 X 1 1/2" HWH (Serr) Zinc (Qty. 1) (237-5946-00)				If replacing motor, desolder wiring (use above # if new wiring is required). Don't forget to ADD the lug insulators (Shrink Tubing, 605-5004-01 sold in 12" Lengths).			
4	Dual Switch Bracket	1	535-9063-00	10*	Wiring Harness & 4-Pin Cn. (for Sws.)	1	036-5477-11-76
Item 4 is secured by: #8-32 X 5/8" HWH MS (Serr) Zinc TF (Qty. 2) (237-5951-00)				If replacing motor, desolder wiring (use above # if new wiring is required). Don't forget to ADD the lug insulators (Shrink Tubing, 605-5004-01 sold in 12" Lengths).			
5	Micro Switch (Roller Actuator, Lite-Force)	2	180-5119-02				
Item 5 is secured to Item 1 by: #2-56 X 1/2" HWH (St) UNS #4HD TR3 BO (Qty. 6) (237-5937-02)							
6	Cam Assembly	1	515-7225-00				
Item 6 is secured onto Motor Shaft by: #10-32 X 3/8" Soc. Hd. Cap Screw (Zinc) (Qty. 1) (237-5845-00) Includes: Cam Hub (530-5606-00), Cam Pin (530-5607-00), Picture Link Pivot (530-5610-00) and Cam Blade (535-9059-00).							

### Take Note:

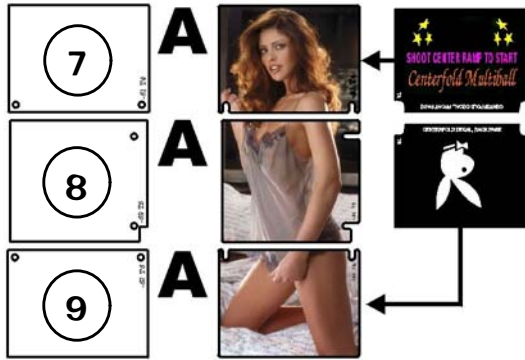
\* An asterisk (\*) indicates item(s) are not noted in the pictorials.



**Centerfold Upper Assembly (515-7227-00) (Items 1-14)**  
**Not sold as an assembly, order the individual part(s) actually required.**

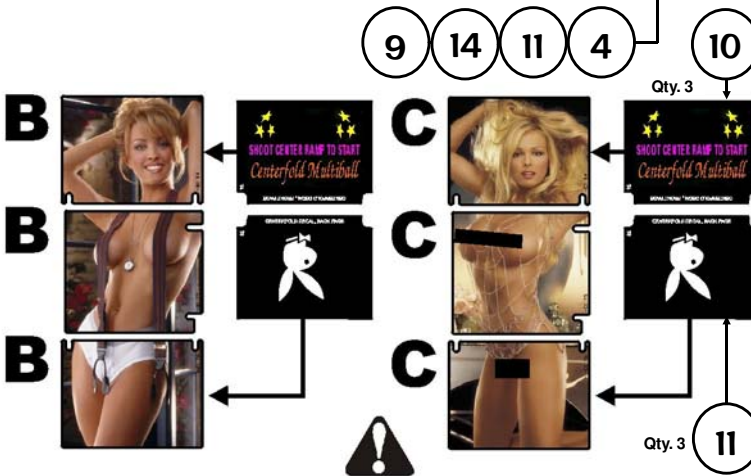
**T4's, T5's & T6's** (12) (13) (14)

This Assembly works in conjunction with the Centerfold Lower Assembly (Previous Page).



**Do Not Open This Assembly with your Hands!**  
 Enter Diagnostics!  
 See Page 27.

Ensure Back Page Decals -T4 & -T6 are affixed to the rear of all T4 & T6 Photo Inserts.

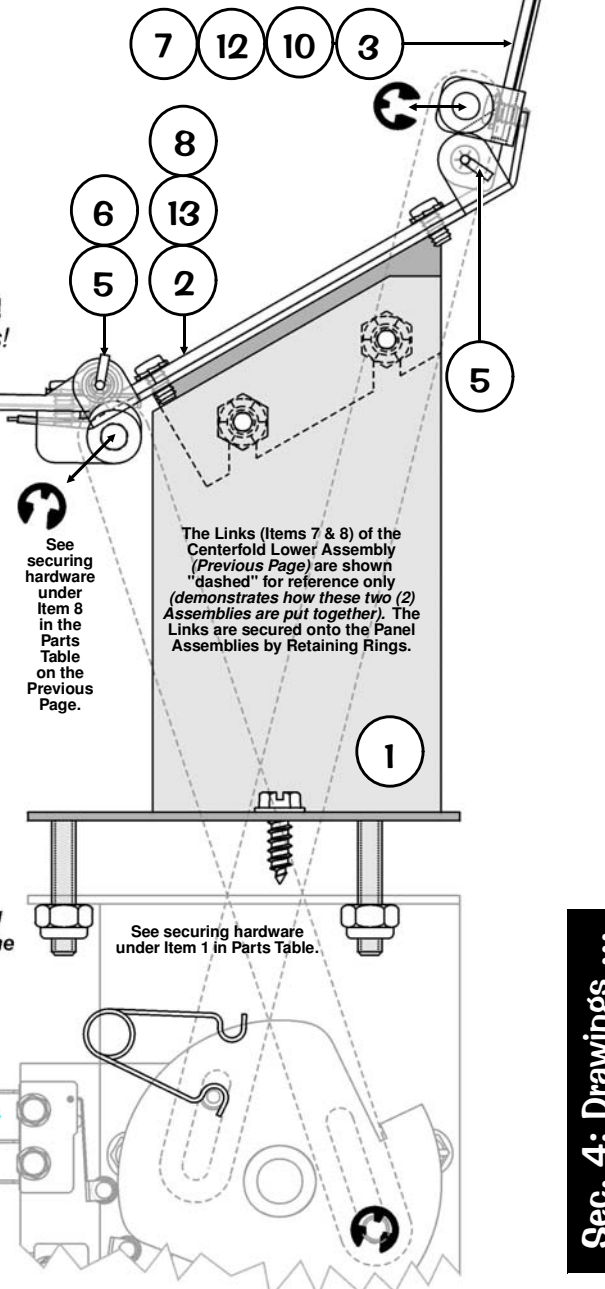


Please note the Caution above! Enter Diagnostics, Playboy Test, Centerfold Motor Test (see Pgs. 8 & 27 for details on entering). Loosen screws, match the T# on the Plastic, with the same T# on the Photo Insert. Retighten screws and exit Diagnostics.

**Availability Note:**

This game is supplied with 3 Sets of Photo Inserts. A: "No Nudity", B: "Nudity Factory Suggested" and C: "Some Full Nudity". 1 Set was installed at the Factory and the other 2 Sets are packed with the game. Read the Instruction Sheet (756-5009-00) which is provided with the Photo Kit inside this game. For the same 3 Sets, order Kit 502-5010-00, no other style Photo Inserts are available.

Items 7-14: Plastics, Photo Inserts & Decals, are not available individually. The entire Set(s) and/or Kit(s) must be ordered. (Decals T4 & T6 are provided with the Photo Insert Kit Set.) See Section 4, Chapter 1, Page 63 for Plastics & Decals.



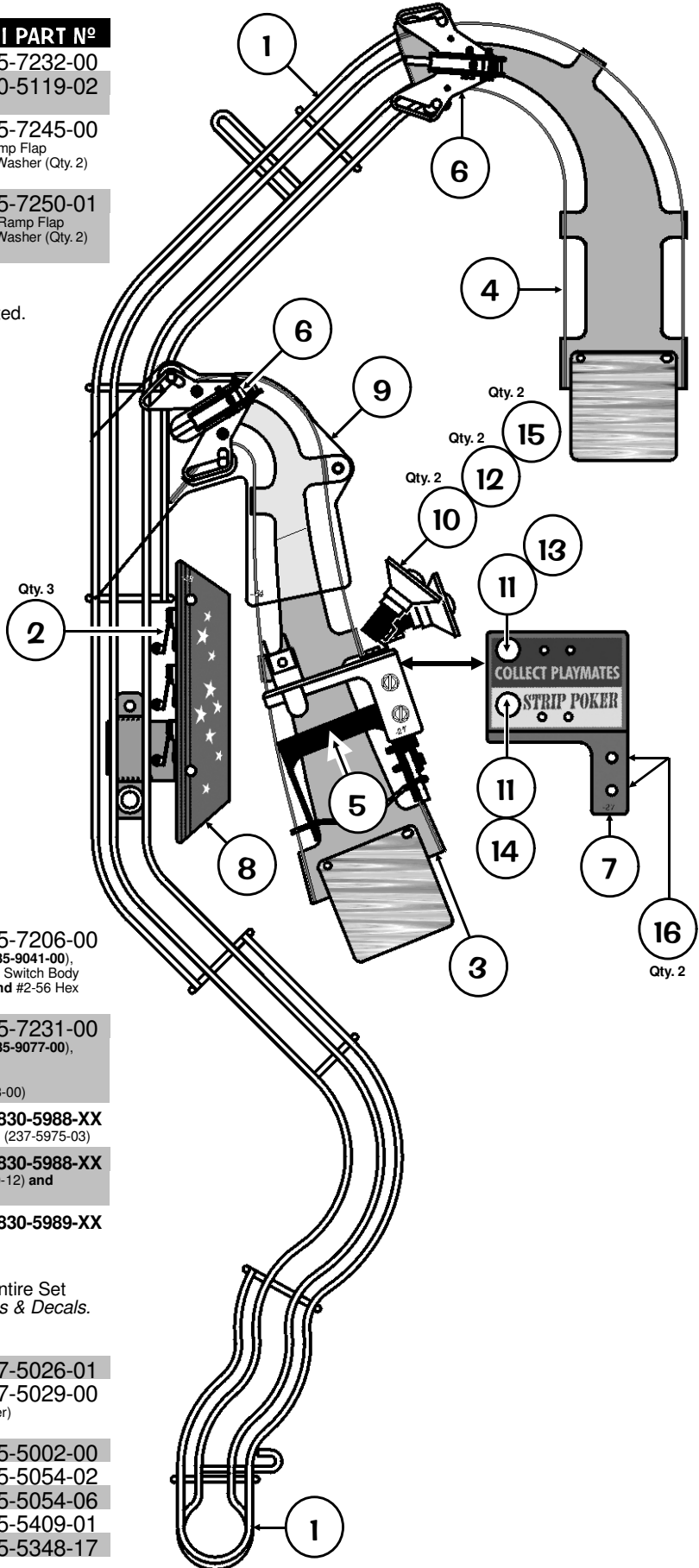
Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº	Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
1	Riser Bracket	1	535-9068-00	8	Clear Plastic -62 T5	1	from 830-5989-XX
Item 1 is secured above the playfield by: #8 X 1/2" HWH AB (Zinc) (Qty. 1) (234-5101-00) and is secured below the playfield onto Item 1, Motor Mounting Bracket of the Lower Assembly (Previous Page) by: #8-32 Nylon Stop Nut (Qty. 2) (240-5102-00)				9	Clear Plastic -63 T6	1	from 830-5989-XX
2	Panel (Middle) Mounting Bracket	1	535-9069-00	Items 7-9 are secured by: #6-32 X 1/4" PPH (Sems) Zinc (Qty. 2/per) (232-5200-00)			
Item 2 is secured onto Item 1 by: #8-32 Nylon Stop Nut (Qty. 2) (240-5102-00)				10	Decal -T4 (... Centerfold Multiball)	3	from 820-6305-XX
3	Panel (Top) Mounting Assembly	1	515-7228-00	Item 10 is affixed to the back side of Item 12 as shown above.			
4	Panel (Bottom) Mounting Assembly	1	515-7229-00	11	Decal -T6 (... White Rabbit Head on Black)	3	from 820-6305-XX
5	Hinge Pin	2	535-9074-00	Item 11 is affixed to the back side of Item 14 as shown above.			
Item 5 is secured at left by: Pushnut, 1/16" Tinnerman PS 062032 (Qty. 1/per) (240-5334-00) and Optional #4 Nylon Washer (Qty. 1) (242-5068-00) on lower Hinge Pin Right Side.				12	Photo Insert -T4 (3 Styles A, B & C)	1	from 502-5010-00
6	Panel Spring	1	266-5071-00	13	Photo Insert -T5 (3 Styles A, B & C)	1	from 502-5010-00
7	Clear Plastic -61 T4	1	from 830-5989-XX	14	Photo Insert -T6 (3 Styles A, B & C)	1	from 502-5010-00
				Items 12-14 are secured under Items 7-9 above respectively.			
				Items 7-14: READ "Availability Note" above on ordering availability.			

# Left Wire Ramp, Left & Middle Ramps & Individual Parts (Items 1-16)

Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
1	Left Wire Ramp	1	515-7232-00
2	Micro Switch (Roller Actuator, Lite Force)	3	180-5119-02
Item 2 is secured by: #2-56 X 1/2" HWH Serr (Qty. 2/per) (237-5937-02)			
3®	Steel Ramp (Left) Riveted Sub-Assy.	1	515-7245-00
For Individual Items use : Steel Ramp (Left, No Parts) (515-7196-00), Ramp Flap (535-8986-00), Rivet, 1/8"ø X 3/16" Lg. (Qty. 2) (249-5001-00) and #6 Lock Washer (Qty. 2) (246-5000-00).			
4®	Steel Ramp (Cntr.) Riveted Sub-Assy.	1	515-7250-01
For Individual Items use : Steel Ramp (Center, No Parts) (515-7184-01), Ramp Flap (535-8986-00), Rivet, 1/8"ø X 3/16" Lg. (Qty. 2) (249-5001-00) and #6 Lock Washer (Qty. 2) (246-5000-00).			

### Take Note:

® "R" indicates Item noted is secured with rivet(s) as listed.



5	Roll-Under Gate & Switch Assembly	1	515-7206-00
For Individual Items use : Roll-Under Switch Mounting Bracket (Black) (535-9041-00), Wire Gate (535-9043-48), Micro Switch (Short Flat Actuator) (180-5190-28), Switch Body Protect Plate (535-6539-00), #2-56 X 1/2" HWH Sr (Qty. 2) (237-5937-02) and #2-56 Hex Nut (Qty. 2) (240-5301-00).			
6	Cross-Under Gate & Switch Assembly	2	515-7231-00
For Individual Items use : Roll-Under Switch Mounting Bracket (Black) (535-9077-00), Micro Switch (Long Flat Actuator) (180-5190-48).			
Item 6 is secured by: #8-32 X 3/8" HWH MS Type C (Qty. 2/per) (237-5903-00)			
7	Screened Plastic -27	1	from 830-5988-XX
Item 7 is secured to Item 5 by: #8-32 X 5/8" HWH Swage (Ser) Zc. (Qty. 2) (237-5975-03)			
8	Screened Plastic -28	1	from 830-5988-XX
Item 8 is secured to Item 1 by: 3/8" X 3/8" Spacer Gray (Qty. 2) (254-5000-12) and #6-32 X 3/4" PPH MS (Sems) Zinc (Qty. 2) (232-5204-00)			
9	Clear Plastic -64	1	from 830-5989-XX

### Availability Note:

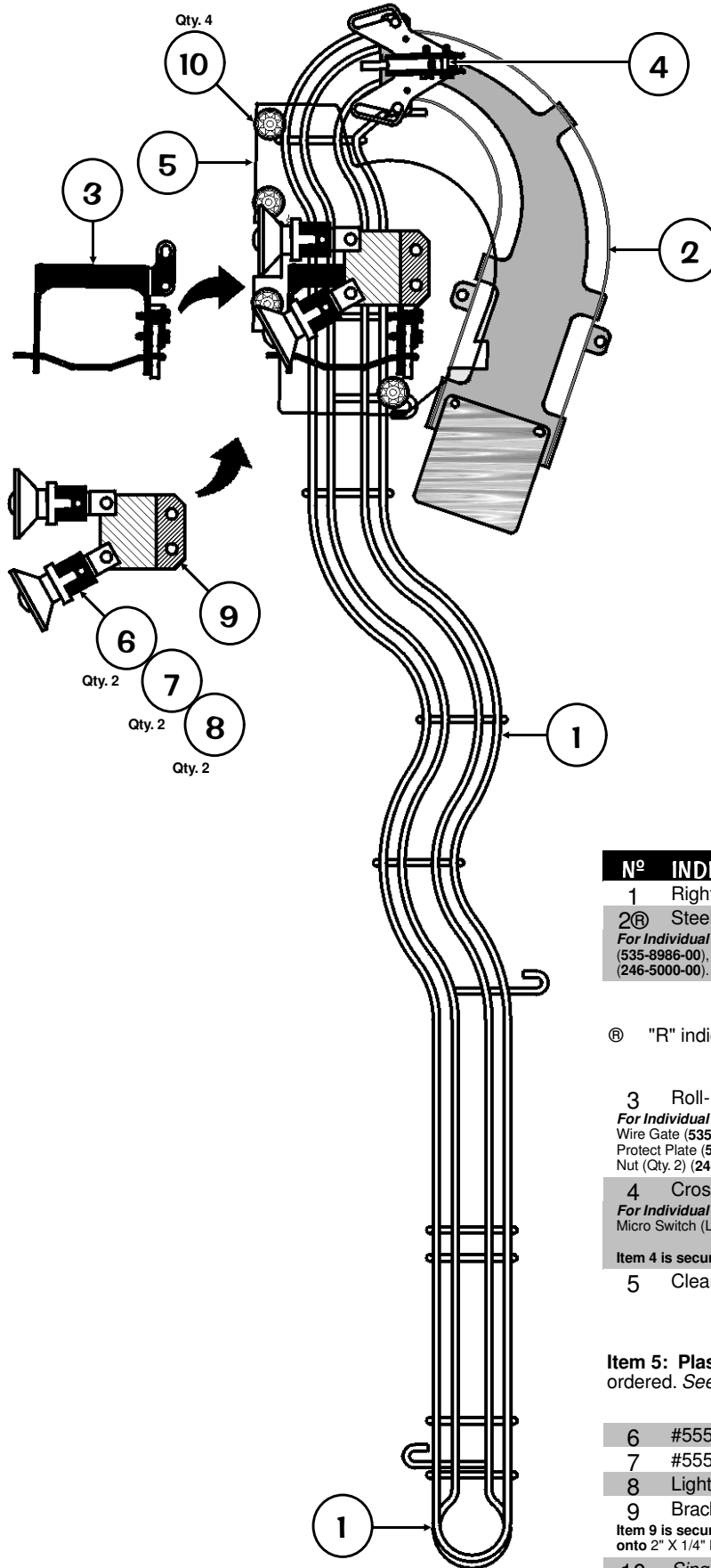
Items 7-9: **Plastics**, are not available individually. The entire Set must be ordered. See Sec. 4, Chp. 1, Page 63 for Plastics & Decals.

10	#555 Wedge Base Socket (Laydown)	2	077-5026-01
11	#555 Wedge Base Socket (Offset)	2	077-5029-00
Items 10 & 11 are secured to Item 7 by: Rivet, 1/8"ø X 3/16" Lg. (Qty. 1/per) (249-5001-00) and #6 Lock Washer (Qty. 1/per) (246-5000-00).			
12	#555 Wedge Base Bulb (Clear)	2	165-5002-00
13	#555 Wedge Base Bulb (Red)	1	165-5054-02
14	#555 Wedge Base Bulb (Yellow)	1	165-5054-06
15	Light Reflector (Silver Plastic)	2	545-5409-01
16	7/16" O.D. BLACK Rubber Ring	2	545-5348-17





## Right Wire Ramp, Right Ramp & Individual Parts (1-10)



Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
1	Right Wire Ramp	1	515-7194-00
2®	Steel Ramp (Right) Riveted Sub-Assy.	1	515-7250-00
<i>For Individual Items use :</i> Steel Ramp (Left, No Parts) (515-7184-00), Ramp Flap (535-8986-00), Rivet, 1/8"ø X 3/16" Lg. (Qty. 2) (249-5001-00) and #6 Lock Washer (Qty. 2) (246-5000-00).			

### Take Note:

® "R" indicates Item noted is secured with rivet(s) as listed.

3	Roll-Under Gate & Switch Assembly	1	515-7206-00
<i>For Individual Items use :</i> Roll-Under Switch Mounting Bracket (Black) (535-9041-00), Wire Gate (535-9043-48), Micro Switch (Short Flat Actuator) (180-5190-28), Switch Body Protect Plate (535-6539-00), #2-56 X 1/2" HWH Sr (Qty. 2) (237-5937-02) and #2-56 Hex Nut (Qty. 2) (240-5301-00).			
4	Cross-Under Gate & Switch Assembly	1	515-7231-00
<i>For Individual Items use :</i> Roll-Under Switch Mounting Bracket (Black) (535-9077-00), Micro Switch (Long Flat Actuator) (180-5190-48).			
Item 4 is secured by: #8-32 X 3/8" HWH MS Type C (Qty. 2/per) (237-5903-00)			
5	Clear Plastic -69	1	from 830-5989-XX

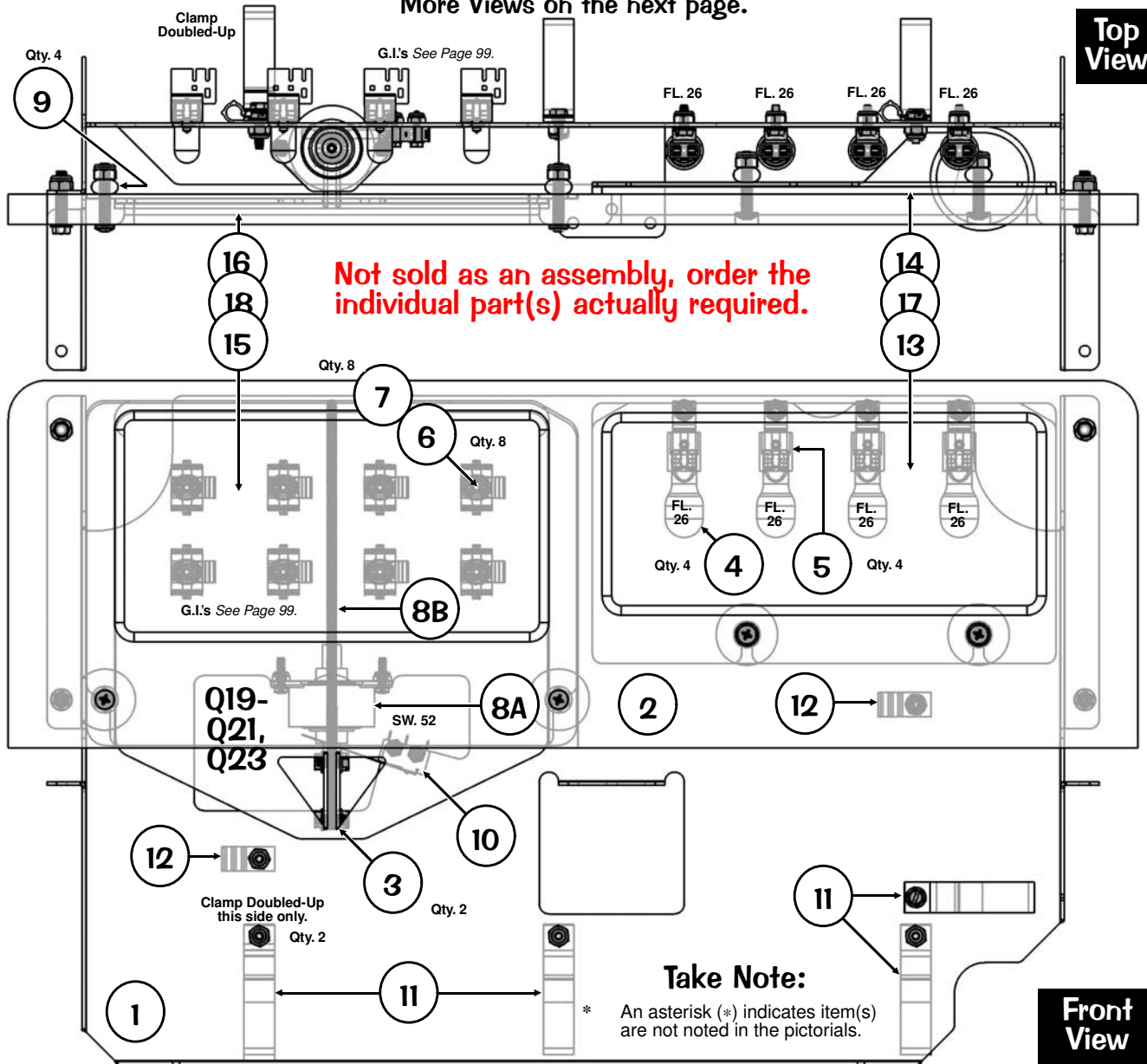
### Availability Note:

**Item 5: Plastic**, is not available individually. The entire Set must be ordered. See Section 4, Chapter 1, Page 63 for Plastics & Decals.

6	#555 Wedge Base Socket (Laydown)	2	077-5026-01
7	#555 Wedge Base Bulb (Clear)	2	165-5002-00
8	Light Reflector (Silver Plastic)	2	545-5409-01
9	Bracket, Dual Light Mounting (No Parts)	1	535-9138-00
Item 9 is secured to Item 5 by: #6-32 X 3/8" PPH MS (Sems) Zinc (Qty. 2) (232-5201-00) onto 2" X 1/4" Hex Spacer #6-32 Tap (Qty. 1/per) (254-5008-07)			
10	Single Groove Jewel Post (Clear)	4	550-5034-01
Item 10 is secured to Item 5 by: #6-32 X 1 1/2" PPH MS Zinc (Qty. 1/per) (232-5510-00) and #6-32 Nylon Stop Nut (Qty. 4) (240-5005-00)			

# Back Panel Display & Stepper Motor Assembly (500-6552-00) (Items 1-19)

More Views on the next page.



Sec. 4: Drawings ...

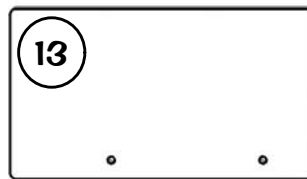
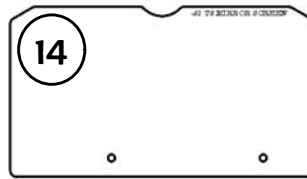
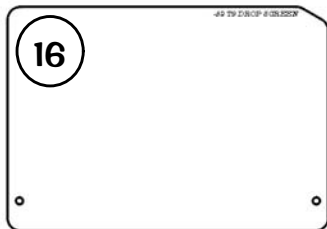
Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº	Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
1	Display Frame (Painted White)	1	535-9052-00	10	Micro Switch (Long Flat Actuator)	1	180-5190-48
Item 1 is secured below the playfield in the middle by: #8 X 1/2" HWH AB (Zinc) (Qty. 2) (234-5101-00) and at sides by: #8-32 X 5/8" HWH MS (Serr) Zinc TF (Qty. 4) (237-5951-00)				Item 10 is secured by: #2-56 X 1/2" HWH Ser UNS #4HD TR3 BLK (Qty. 2) (237-5937-02) and #2-56 Nylon Stop Nut (Qty. 2) (240-5321-00)			
2	Back Panel Black Wood (No Parts)	1	525-5608-00	11	1 1/2" Clamp (Harness Clip Open Tab)	5	040-5000-10
Item 2 is secured to Item 1 at the top by: #8-32 X 7/8" HWH MS (Zinc) (Qty. 2) (237-5890-00) and at the bottom sides by: #8 X 1/2" HWH AB (Zinc) (Qty. 2) (234-5101-00) and bottom middle by: #8 X 1" HWH (Serr) Zinc (Qty. 1) (234-5105-00)				Item 12 is secured on Item 1 by: #6-32 X 3/8" HWH Swage (Ser) Zinc (Qty. 1/per) except where Item 10 is doubled-up used: #6-32 X 5/8" HWH Swage (Ser) Zinc (Qty. 1) and #6-32 Nylon Stop Nut (Qty. 1/per) (240-5005-00)			
3	Mounting Plate	2	535-9053-00	13	Plastic Mirror	1	820-6297-00
Item 3 secures Motor Shaft & Screened Plastic -25 and is secured by: #8-32 X 3/8" HWH MS Type-C (Qty. 4) (237-5903-00)				Item 14 is secured inbetween Items 13-14; Item 18 is secured inbetween Items 13-14.			
4	#555 Wedge Base Socket (Laydown)	4	077-5026-01	15	Screened Plastic -25 T9	1	from 830-5988-XX
5	#906 Wedge Base Bulb (Clear)	4	165-5004-00	16	Clear Plastic -52 T9	1	from 830-5989-XX
Items 4 & 5 are secured to Item 1: #6-32 X 3/8" HWH Swage (Serr) Zinc (Qty. 1/per) and #6-32 Nylon Stop Nut (Qty. 1/per) (240-5005-00)				Items 13-16 are secured into Item 2 by: #8-32 X 1" PPH MS (Zinc) (Qty. 4) with Item 9 (Qty. 1/per)			
6	#555 IDC Snap-On Socket <b>No Diode</b>	8	077-5216-01	17	Photo Insert -T8 (3 Styles A, B & C)	1	from 502-5010-00
7	#555 Wedge Base Bulb (Clear)	8	165-5002-00	18	Photo Insert -T9 (3 Styles A, B & C)	1	from 502-5010-00
8A	HSI Stepper Motor Assembly	1	515-6794-00	Item 17 is secured inbetween Items 13-14; Item 18 is secured inbetween Items 13-14.			
Item 8 includes the Cable Wiring Harness & Connector. Item 8 is secured by Item 3 (onto shaft) and at sides by: #4-40 X 1/2" PPH (Sems) Zinc (Qty. 2) (237-5813-00) and #4-40 Nylon Stop Nut (Qty. 2) (240-5303-00) Motor Spec: (041-5062-00) 1.4"ø (Non-Captive Shaft) HSI #36864-12 (Unipolar) / Travel per Step = .004 Step Angle - 15° / 12v D.C. / 4.6W				Items 14-18; READ "Availability Note" above on ordering availability.			
8B	Shaft 7"	1	530-5503-00	19*	Wiring Harness & 7-Pin + 12-Pin CNS	1	036-5477-02-76
9	3/8" O.D. BLACK Rubber Ring	4	545-5348-19	If replacing sockets, desolder wiring (use above # if new wiring is required). Don't forget to ADD the lug insulators (Shrink Tubing, 605-5004-01 sold in 12" Lengths). If replacing IDC sockets, ensure the wires are reinserted correctly with proper contact.			



Not sold as an assembly, order the individual part(s) actually required.

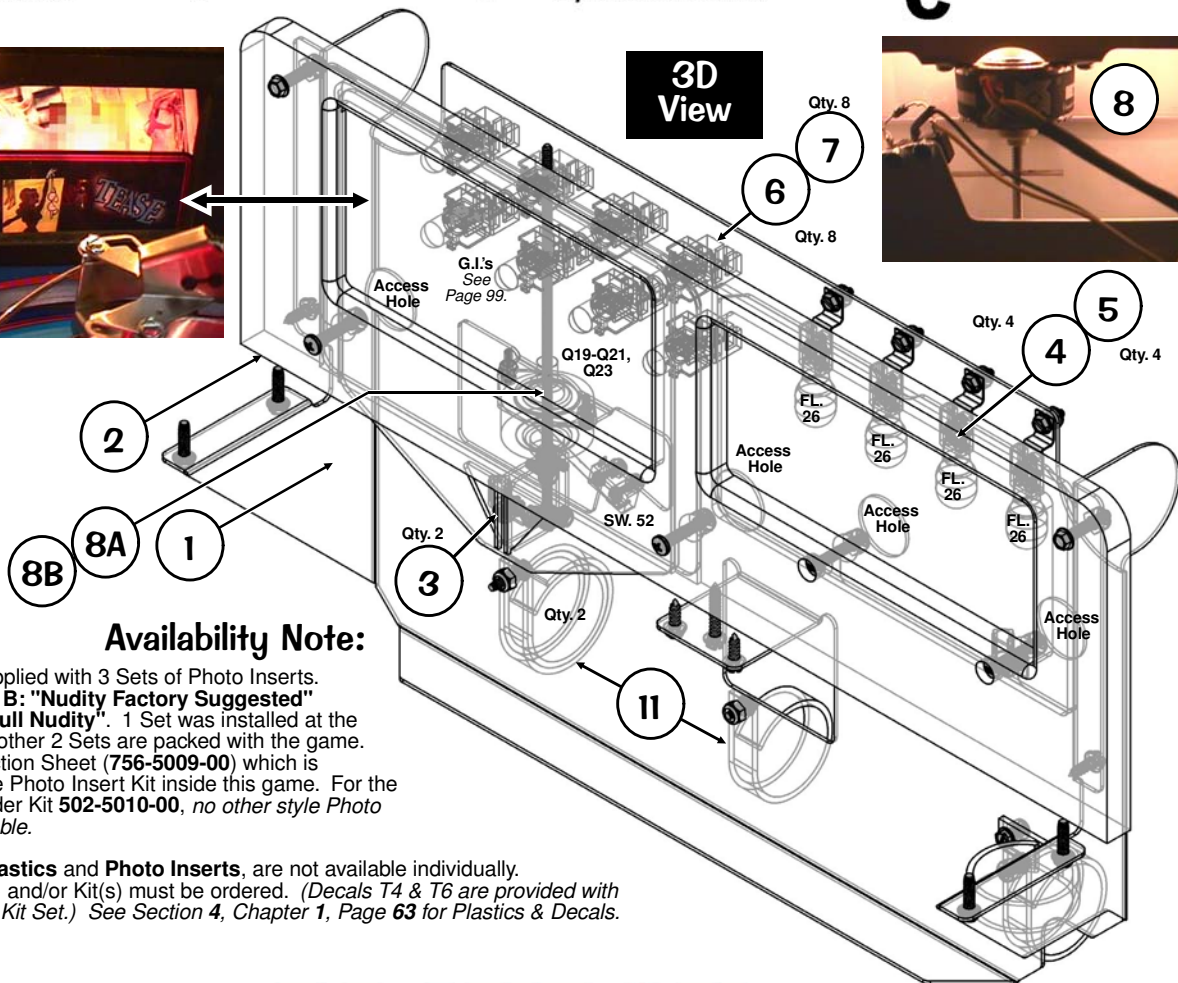
18 T9's

17 T8's



Pull the Playfield forward and rest the brackets at the front of the cabinet to hold steady. Pull the Photo Insert out from the top and replace with another.

Pull the Playfield forward and rest the brackets at the front of the cabinet to hold steady. Pull the Photo Insert out from the top and replace with another.



Availability Note:

This game is supplied with 3 Sets of Photo Inserts. A: "No Nudity", B: "Nudity Factory Suggested" and C: "Some Full Nudity". 1 Set was installed at the Factory and the other 2 Sets are packed with the game. Read the Instruction Sheet (756-5009-00) which is provided with the Photo Insert Kit inside this game. For the same 3 Sets, order Kit 502-5010-00, no other style Photo inserts are available.

Items 14-18: Plastics and Photo Inserts, are not available individually. The entire Set(s) and/or Kit(s) must be ordered. (Decals T4 & T6 are provided with the Photo Insert Kit Set.) See Section 4, Chapter 1, Page 63 for Plastics & Decals.

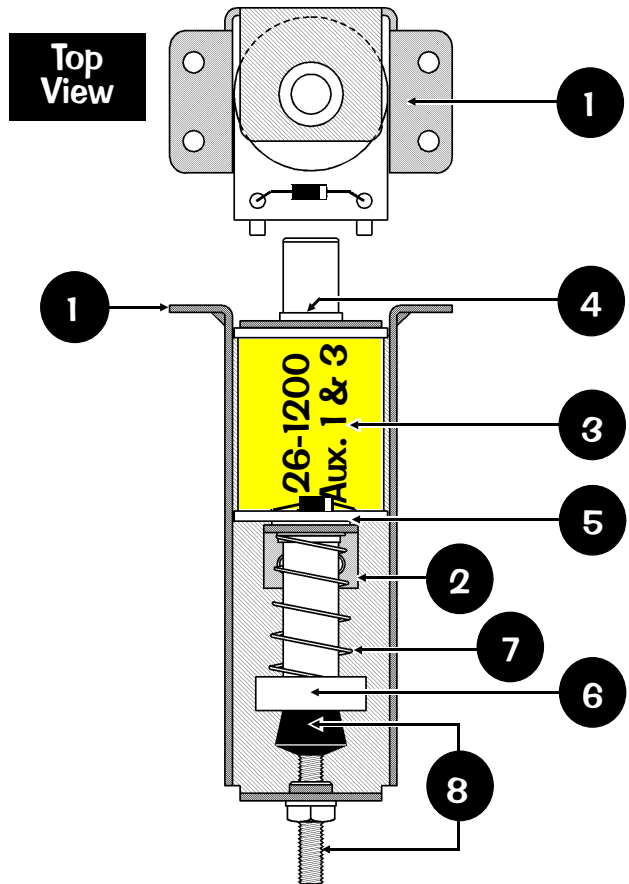
Sec. 4: Drawings ...



**UK ONLY OPTIONAL**  
**Ball Deflector Assemblies, 500-5788-02 (Qty. 2) (Items 1-8)**

Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
1	Ball Deflector Coil Mounting Bracket	1	535-6857-02
Item 1 is secured below the playfield by: #8 X 1/2" HWH AB (Zinc) (Qty. 4) (234-5101-00)			
2	Coil Retaining Bracket	1	535-5203-03
Item 2 is secured by: #8-32 X 1/4" PPH MS (Sems) Zinc (Qty. 2) (232-5300-00)			
3	Coil, 26-1200	1	090-5044-00T
ORDERING ABOVE (ITEM 3) COIL PART Nº WILL INCLUDE:			
—	Diode, 1N4004 (positioned at top)	1	112-5003-00
4	Coil Sleeve (Short) (Formost #10-7077)	1	545-5076-01
5	Spring Washer (17/32" ID X 3/4" X 1")	1	269-5002-00
6	Solid Plunger Assembly	1	515-6858-00
7	Compression (Relay) Spring	1	266-5022-01
8	#10-32 Adj. Spindle Stop w/Rubber Tip	1	280-5014-00
Item 8 is secured by: #10-32 Keps Nut (Qty. 1) (240-5208-00)			

Ordering Note: If 500-5788-02 is unavailable, order the individual part(s) actually required.



**UK ONLY OPTIONAL**  
**Up/Down Post Assembly, 500-6293-00 (Items 1-9)**

Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
1	Up/Down Post Coil Mounting Bracket	1	515-6840-00
Item 1 is secured below the playfield by: #8 X 1/2" HWH AB (Zinc) (Qty. 6) (234-5101-00)			
2	Adjustment Spindle Stop Bracket	1	535-8303-00
3	Coil Retaining Bracket	2	535-7356-00
Items 2 & 3 are secured by: #8-32 X 3/8" Swage (Serr) Zinc (Qty. 2/per) (237-5975-00)			
4	Coil, 23-1100 (ORG)	1	090-5030-00T
ORDERING ABOVE (ITEM 4) COIL PART Nº WILL INCLUDE:			
—	Diode, 1N4004 (positioned at top)	1	112-5003-00
5	Coil Sleeve (with extension)	1	545-5847-00
6	Spring Washer, 17/32" ID X 3/4" X 1"	1	269-5002-00
7	Plunger & Shaft Assembly	1	515-6844-00
ORDERING ABOVE (ITEM 7) SUB-ASSY. PART Nº WILL INCLUDE:			
7A	Ball Bumper Plastic (Top) Red	1	550-5029-02
7B*	Roll Pin, 3/32" ø X 1/2" Long	1	251-5002-00
7C*	Retaining Ring, 1/4" ø Shaft	1	270-5002-00
7D	Plunger & Shaft Sub-Assembly	1	515-6841-00
7E	Plunger Head	1	530-5511-00
7F	#10-32 X 3/8" PPH MS (Sems) Zinc	1	232-5401-00

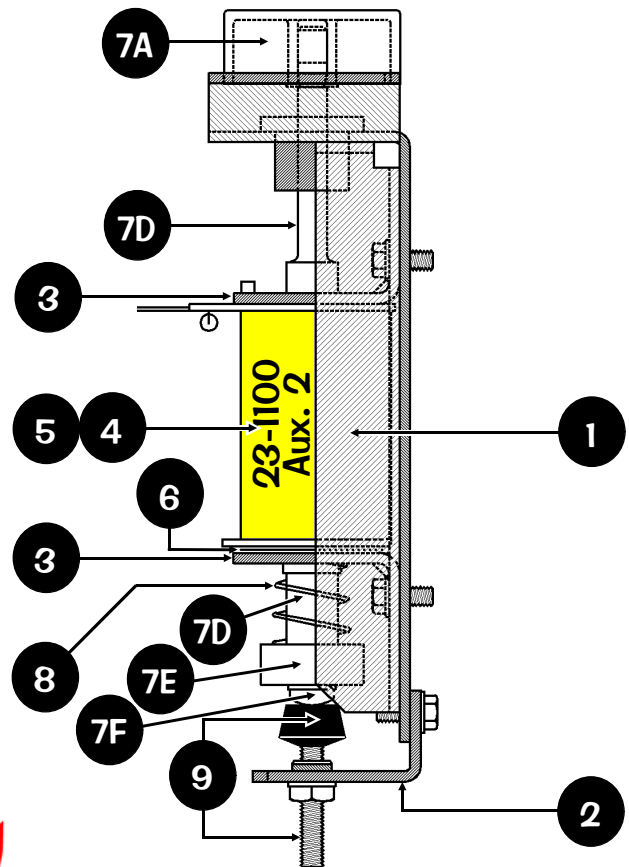
Ordering Note: If 515-6844-00 is unavailable, order the individual part(s) actually required. Item 7D, part of Item 7, Plunger & Shaft Sub-Assembly, is 1 piece and cannot be ordered separated.

8	Compression (Relay) Spring	1	266-5022-01
9	#10-32 Adj. Spindle Stop w/Rubber Tip	1	280-5014-00
Item 9 is secured by: #10-32 Keps Nut (Qty. 1) (240-5208-00)			

Ordering Note: If 500-6293-00 is unavailable, order the individual part(s) actually required.

**Take Note:**

\* An asterisk (\*) indicates item(s) are not noted in the pictorials.



Sec. 4: Drawings ...



## Playboy Flipper Part Updates

If your Playboy Pinball Game has Flippers which match the ones shown on Pages 74-75 in this Game Manual, the following replacement parts are required (review the following additional pages with the new Flippers):

### For entire Flippers:

Replace **500-5944-14** with **500-6543-14** (Left)

Replace **500-5944-04** with **500-6543-04** (Right)

### For individual parts:

Replace **Item 2**, Flipper Bat Bushing (White Plastic), **545-5594-00** with **new Item 2**, Flipper Bat Bushing (White Plastic), **545-5070-00\***

\* *Note: The new plastic bushing has notch cut-outs and is slightly shorter in height on the bottom shaft end.*

Replace **Item 12**, Plunger, Link & Pawl (Left), **515-6518-01** with **new Item FRP 2**, Plunger, Link & Crank (Left) Assembly, **515-7203-01**

Replace **Item 12**, Plunger, Link & Pawl (Right), **515-6518-00** with **new Item FRP2**, Plunger, Link & Crank (Right) Assembly, **515-7203-00†**

† *Note: Use FRP2 to replace the entire assembled parts of 515-6518-00.*

Replace **Item 12A**, Flipper Plunger/Link Sub-Assy., **515-6304-01** with **new Item 12**, Flipper Plunger & Link Sub-Assy., **515-6304-03\*\***

\*\* *Note: The new sub-assembly contains the new Plunger "Flipper" Link (old 545-5611-00, new 545-5611-01).*

Replace **Item 12B**, Pawl (Mntg. Link) (Left) Sub-Assy., **515-6305-01** with

**new Item 13**, Crank Bar, **530-5070-02\*\*\*** and **new Item 14**, Switch Actuator (LEFT) Sub-Assy., **515-7257-01\*\*\***

\*\*\* *Note: The new Crank Bar 530-5070-02 replaces the old Pawl (Left) 535-7271-01 contained in 515-6305-01.*

Replace **Item 12B**, Pawl (Mntg. Link) (Right) Sub-Assy., **515-6305-00** with

**new Item 13**, Crank Bar, **530-5070-02\*\*\*** and **new Item 14**, Switch Actuator (RIGHT) Sub-Assy., **515-7257-00\*\*\***

\*\*\* *Note: The new Crank Bar 530-5070-02 replaces the old Pawl (Right) 535-7271-00 contained in 515-6305-00.*

**Item 12C**, Return Bracket, **535-7353-00** **is no longer required** as the new replacement is a part of the new **Item 14** (**535-9038-00** for Right and **535-9038-01** for Left).

Replace **Item 12D**, Flipper Link Bushing, **530-5139-01** with

shorter Bushing, **530-5139-00**, used with **Item 13** Crank Bar where the Set Screw joins it with the Flipper Link.

**Item 12E**, #10-32 X 1-1/4" Lg. Socket Head (Set Screw), **237-5950-01** **is no longer required.**

**Item 12I**, Washer, **242-5039-01** **is no longer required.**

**Item 12J**, Washer, **242-5038-00** **is no longer required.**

**Item 12F**, #10-32 X 7/8" Lg. Socket Hd (Set Screw), **237-5966-00** is **now a quantity of 2.**

All other flipper parts (and kits) are identical and can use the same part numbers.

Order the following **Flipper Rebuild Parts** for **Easier Installation and \$ave \$:**

When new parts for your **500-5944-14** Left Flipper become necessary, order the Flipper (Left) Rebuild Kit, **500-6307-10**, which includes **Item 6, 10, 12, 13, 14 & 15** of the new Left Flipper, **500-6543-14.**

When new parts for your **500-5944-04** Right Flipper become necessary, order the Flipper (Right) Rebuild Kit, **500-6307-00**, which includes **Item 6, 10, 12, 13, 14 & 15** of the new Right Flipper, **500-6543-04.**

Any questions, please call Technical Support at **1-800-542-5377** or eMail us at **parts.service@sternpinball.com**

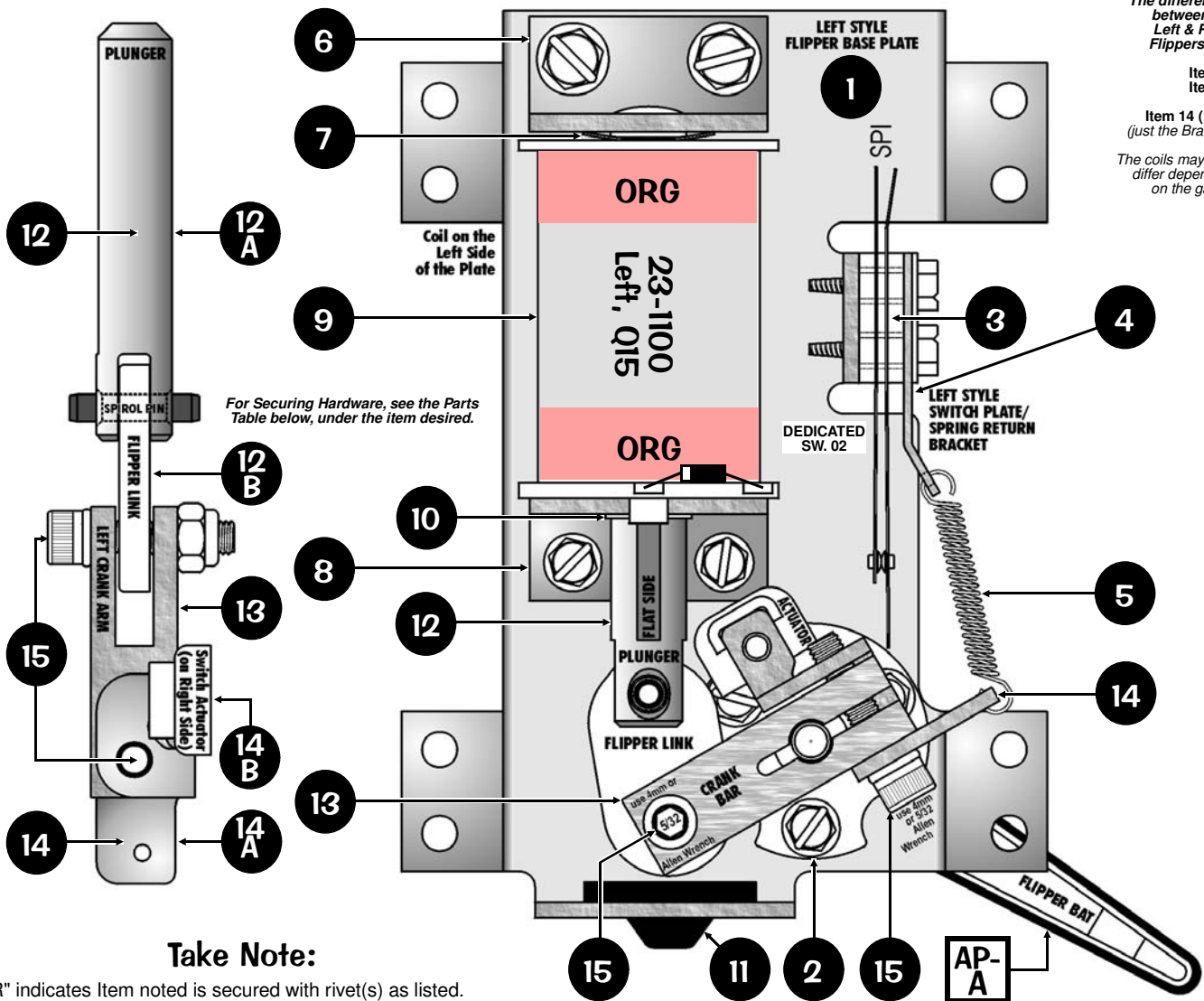
# Flipper (Left) Assembly, 500-6543-14 (Items 1-15) and Associated Part: White Flipper Bat & Shaft Assy., 515-5133-08-06 (Item AP-A)

The differences between the Left & Right Flippers are:

Item 1, Item 4, and Item 14 (14A) (just the Bracket)

The coils may also differ depending on the game.

\* To Order the Flipper (Left) Rebuild Kit ask for Part Nr.: 500-6307-10 (includes Items 6, 10, 12, 13, 14 & 15)



### Take Note:

® "R" indicates Item noted is secured with rivet(s) as listed.

Sec. 4: Drawings ...

Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº	Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
1	Flipper Base Plate (LEFT)	1	See FRP1	13*	Crank Bar	1	530-5070-02
Item 1 is secured below the playfield by: #10 X 1/2" HWH MS (Serr) Zinc ST (Qty. 8) (237-5949-00) <b>Ordering Note:</b> Use Item FRP1, see the end of this Parts Table.				Item 13 requires: Bushing, .192" ø ID X .312" ø OD X .195" (Qty. 1) (530-5139-00)			
2	Flipper Bat Bushing (White Plastic)	1	545-5070-00	14*	® Switch Actuator (LEFT) Sub-Assy.	1	515-7257-01
Item 2 is secured to Item 1 by: #6-32 X 3/8" HWH Swage (Ser.) Zc. (Qty. 3) (237-5976-02)				ORDERING ABOVE (ITEM 14) SUB-ASSY. PART Nº WILL INCLUDE:			
3	Power (End of Stroke) Switch	1	180-5149-00	14A	Actuator & Spring Bracket (LEFT)	1	535-9038-01
Item 3 is secured to Item 1 by: #6-32 X 5/8" HWH Swage (Ser.) Zc. (Qty. 2) (237-5976-04)				14B	® Switch Actuator (White Plastic)	1	545-5612-00
4	Sw. Plate/Spring Return Brkt. (LEFT)	1	535-7354-01	Item 14B is secured to 14A by: Rivet, 1/8" ø X 1/4" Lg. (Qty. 1) (249-5003-00)			
5	Flipper Return Spring	1	265-5035-00	15*	Set Screw: #10-32 X 7/8" Socket Hd.	2	237-5966-00
6*	Coil Stop Bracket Sub-Assembly	1	515-6308-01	Item 15 requires: #10 Split Lock Washer (Qty. 1/per) (244-5003-00) and #10-32 Nylon Stop Nut (Qty. 1/per) (240-5203-00) <b>Tool Required for Item 15:</b> 5/32" or 4mm Allen Wrench			
Item 6 is secured to Item 1 by: #10-32 X 3/8" SHWH Swage (Serr) Zinc (Qty. 2) (237-5985-00) and #10 Split Lock Washer (Qty. 2) (244-5003-00)				<b>Flipper Rebuild Parts for Easier Installation, Save \$:</b>			
7	Spring Washer (17/32" ID X 3/4" X 1")	1	269-5002-00	<b>FRP1 Flipper Base Plate Kit (LEFT)</b>			
8	Coil Support Bracket	1	535-7356-00	FRP1 Includes Item 1 pre-threaded, with the Securing Hardware for Items 2, 3, 6 & 8. 515-6617-01			
Item 8 is secured to Item 1 by: #8-32 X 3/8" HWH Swage (Ser.) Zc. (Qty. 2) (237-5975-00)				<b>FRP2 Plunger, Link &amp; Crank (LEFT) Assy.</b>			
9	Coil, 23-1100 (ORANGE) (Left)	1	090-5030-00T	FRP2 Includes above Items 12, 13, 14 and 15 and is pre-assembled. 515-7203-01			
ORDERING ABOVE (ITEM 9) COIL PART Nº WILL INCLUDE:							
10*	Coil Sleeve	1	545-5388-00	<b>FRP3 Flipper (LEFT) Rebuild Kit</b>			
11	Deflector Pad (Bumper)	1	545-5428-00	FRP3 Same as FRP2, but also includes above Items 6 & 10. 500-6307-10			
12*	Flipper Plunger & Link Sub-Assy.	1	515-6304-03	ASSOCIATED PARTS ARE NOT INCLUDED WITH THE ABOVE ASSEMBLY.			
ORDERING ABOVE (ITEM 12) SUB-ASSY. PART Nº WILL INCLUDE:							
12A	Flipper Plunger with "Flat"	1	530-5349-01	Nº	ASSOCIATED PART NAME	QTY.	SPI PART Nº
12B	Plunger "Flipper" Link	1	545-5611-01	AP-A	WHITE Flipper Bat & Shaft (Plain) (Non-Knurled End) Assembly	1	515-5133-08-06
Item 12B is secured to 12A by: Bushing, .16" ø ID X .281" ø OD X .187" (Qty. 1) (530-5532-00) and Spirol Pin ø 5/32" X 3/4" Lg. (Qty. 1) (251-5015-02)				AP-A	Large Flipper BLACK Rubber Ring	1	545-5277-00

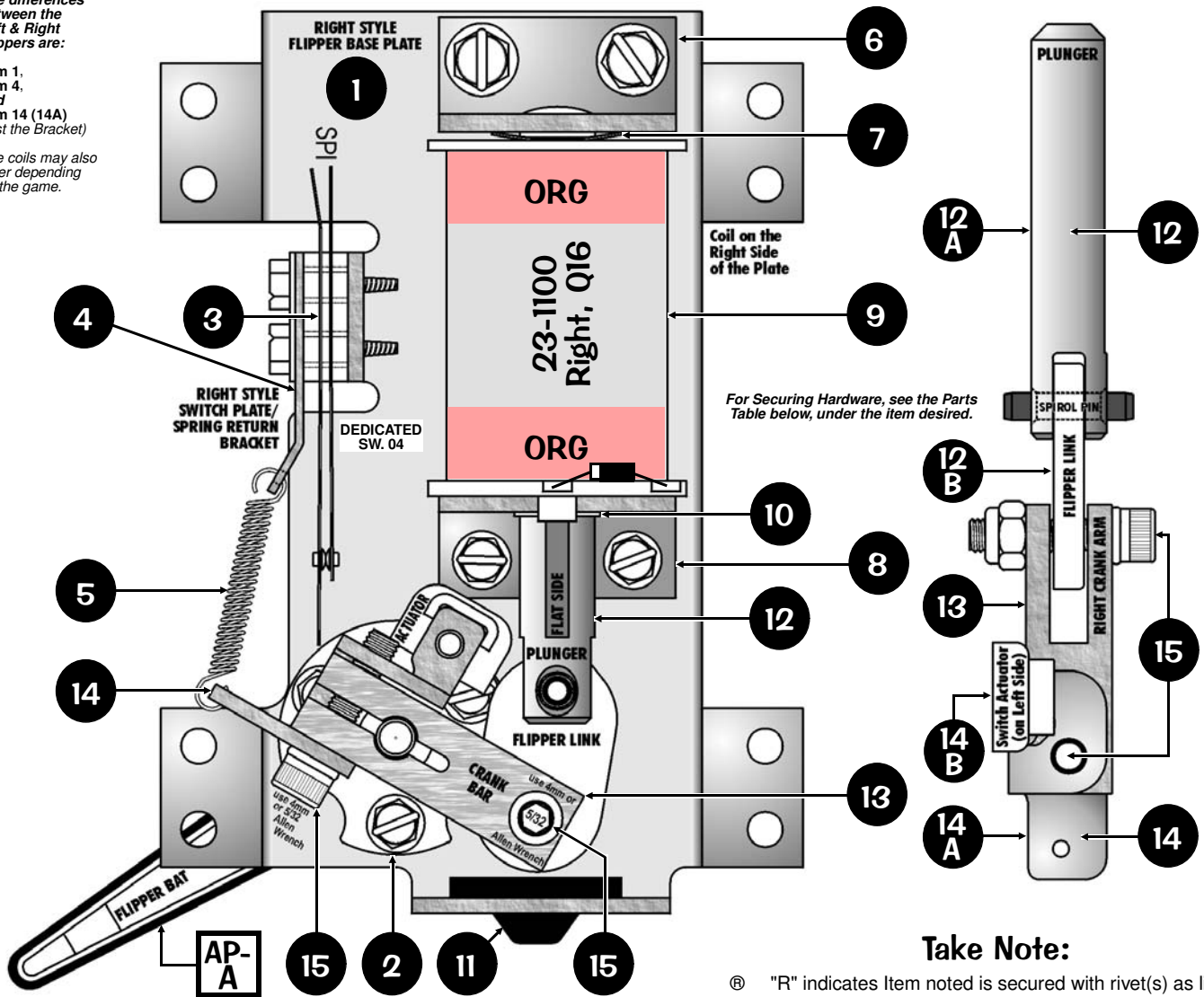


# Flipper (Right) Assembly, 500-6543-04 (Items 1-15) and Associated Part: White Flipper Bat & Shaft Assy., 515-5133-08-06 (Item AP-A)

The differences between the Left & Right Flippers are:

Item 1, Item 4, and Item 14 (14A) (just the Bracket)

The coils may also differ depending on the game.



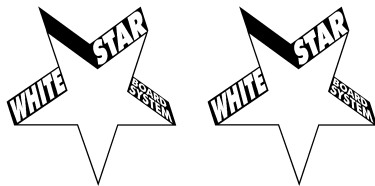
\* To Order the Flipper (Right) Rebuild Kit ask for Part Nr.: 500-6307-00 (includes Items 6, 10, 12, 13, 14 & 15)

### Take Note:

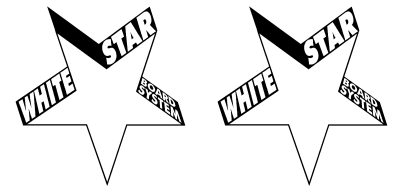
® "R" indicates Item noted is secured with rivet(s) as listed.

Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº	Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
1	Flipper Base Plate (RIGHT)	1	See FRP1	13*	Crank Bar	1	530-5070-02
Item 1 is secured below the playfield by: #10 X 1/2" HWH MS (Serr) Zinc ST (Qty. 8) (237-5949-00) <b>Ordering Note:</b> Use Item FRP1, see the end of this Parts Table.				Item 13 requires: Bushing, .192" ø ID X .312" ø OD X .195" (Qty. 1) (530-5139-00)			
2	Flipper Bat Bushing (White Plastic)	1	545-5070-00	14*	® Switch Actuator (RIGHT) Sub-Assy.	1	515-7257-00
Item 2 is secured to Item 1 by: #6-32 X 3/8" HWH Swage (Ser.) Zc. (Qty. 3) (237-5976-02)				ORDERING ABOVE (ITEM 14) SUB-ASSY. PART Nº WILL INCLUDE:			
3	Power (End of Stroke) Switch	1	180-5149-00	14A	Actuator & Spring Bracket (RIGHT)	1	535-9038-00
Item 3 is secured to Item 1 by: #6-32 X 5/8" HWH Swage (Ser.) Zc. (Qty. 2) (237-5976-04)				14B	® Switch Actuator (White Plastic)	1	545-5612-00
4	Sw. Plate/Spring Return Brkt. (RIGHT)	1	535-7354-00	Item 14B is secured to 14A by: Rivet, 1/8" ø X 1/4" Lg. (Qty. 1) (249-5003-00)			
5	Flipper Return Spring	1	265-5035-00	15*	Set Screw: #10-32 X 7/8" Socket Hd.	2	237-5966-00
6*	Coil Stop Bracket Sub-Assembly	1	515-6308-01	Item 15 requires: #10 Split Lock Washer (Qty. 1/pcr) (244-5003-00) and #10-32 Nylon Stop Nut (Qty. 1/pcr) (240-5203-00) <b>Tool Required for Item 15:</b> 5/32" or 4mm Allen Wrench			
Item 6 is secured to Item 1 by: #10-32 X 3/8" SHWH Swage (Serr) Zinc (Qty. 2) (237-5985-00) and #10 Split Lock Washer (Qty. 2) (244-5003-00)				<b>Flipper Rebuild Parts for Easier Installation, \$ave \$:</b>			
7	Spring Washer (17/32" ID X 3/4" X 1")	1	269-5002-00	<b>FRP1 Flipper Base Plate Kit (RIGHT)</b> Includes Item 1 pre-threaded, with the Securing Hardware for Items 2, 3, 6 & 8. 515-6617-00			
8	Coil Support Bracket	1	535-7356-00	<b>FRP2 Plunger, Link &amp; Crank (RIGHT) Assy.</b> Includes above Items 12, 13, 14 and 15 and is pre-assembled. 515-7203-00			
Item 8 is secured to Item 1 by: #8-32 X 3/8" HWH Swage (Ser.) Zc. (Qty. 2) (237-5976-00)				<b>FRP3 Flipper (RIGHT) Rebuild Kit</b> Same as FRP2, but also includes above Items 6 & 10. 500-6307-00			
9	Coil, 23-1100 (ORANGE) (Right)	1	090-5030-00T	ASSOCIATED PARTS ARE NOT INCLUDED WITH THE ABOVE ASSEMBLY.			
ORDERING ABOVE (ITEM 9) COIL PART Nº WILL INCLUDE:							
—	Diode, 1N4004 (positioned at top)	1	112-5003-00	Nº	ASSOCIATED PART NAME	QTY.	SPI PART Nº
10*	Coil Sleeve	1	545-5388-00	AP-A	WHITE Flipper Bat & Shaft (Plain) (Non-Knurled End) Assembly	1	515-5133-08-06
11	Deflector Pad (Bumper)	1	545-5428-00		Large Flipper BLACK Rubber Ring	1	545-5277-00
12*	Flipper Plunger & Link Sub-Assy.	1	515-6304-03	ORDERING ABOVE (ITEM 12) SUB-ASSY. PART Nº WILL INCLUDE:			
ORDERING ABOVE (ITEM 12) SUB-ASSY. PART Nº WILL INCLUDE:							
12A	Flipper Plunger with "Flat"	1	530-5349-01				
12B	Plunger "Flipper" Link	1	545-5611-01				
Item 12B is secured to 12A by: Bushing, .16" ø ID X .281" ø OD X .187" (Qty. 1) (530-5532-00) and Spirol Pin ø 5/32" X 3/4" Lg. (Qty. 1) (251-5015-02)							

Sec. 4: Drawings ...



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Visit [www.SternPinball.com/schematics.htm](http://www.SternPinball.com/schematics.htm) for the latest 11" X 17" Schematics (or "Split 8-1/2" X 11") for the Display Power Supply, Display Controller, I/O Power Driver & CPU/Sound Boards (White Star System Only). Along with the schematics you'll find the component layout and theory of operation. Keep visiting as these files are updated. If you find a link that is broken, please let us know. Inside the schematics you can utilize internal links where addresses may direct you to another sheet in this schematic set (further instructions within documents). To "download" once open, in your browser click "File" "Send" "Page by eMail". It will be sent to your eMail Address, where there you can save the file to your hardrive.

Use the below **Coils Detailed Chart Table** in conjunction with *Sec. 5, Chp. 1, Backbox I/O Power Driver Board Detailed Wiring Diagram (I/O Board Connectors J6, J7, J8 & J9) and Backbox Board Layout Wiring Diagram:*

## 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 DC	26-1200 090-5044-00T
#2	AUTO LAUNCH	Q2	I/O Pwr. Drvr.	BRN-RED	J8-P3	YEL-VIO	J10-P4/5	50v DC	23-700 090-5022-00T
#3	BALL LOCK POST	Q3	I/O Pwr. Drvr.	BRN-ORG	J8-P4	BRN	J7-P1	20v DC	27-1500 090-5004-00T
#4	LEFT ORBIT POST	Q4	I/O Pwr. Drvr.	BRN-YEL	J8-P5	BRN	J7-P1	20v DC	26-1200 090-5044-00T
#5	DROP TARGET	Q5	I/O Pwr. Drvr.	BRN-GRN	J8-P6	YEL-VIO	J10-P4/5	50v DC	27-1500 090-5004-00B
#6	CENTER LANE POST	Q6	I/O Pwr. Drvr.	BRN-BLU	J8-P7	BRN	J7-P1	20v DC	26-1200 090-5044-00T
#7	BEAD SCREEN LEFT	Q7	I/O Pwr. Drvr.	BRN-VIO	J8-P8	YEL-VIO	J10-P4/5	50v DC	26-1200 090-5044-00T
#8	BEAD SCREEN RIGHT	Q8	I/O Pwr. Drvr.	BRN-GRY	J8-P9	YEL-VIO	J10-P4/5	50v DC	26-1200 090-5044-00T

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
#9	LEFT BUMPER	Q9	I/O Pwr. Drvr.	BLU-BRN	J9-P1	YEL-VIO	J10-P4/5	50v DC	26-1200 090-5044-00T
#10	RIGHT BUMPER	Q10	I/O Pwr. Drvr.	BLU-RED	J9-P2	YEL-VIO	J10-P4/5	50v DC	26-1200 090-5044-00T
#11	BOTTOM BUMPER	Q11	I/O Pwr. Drvr.	BLU-ORG	J9-P4	YEL-VIO	J10-P4/5	50v DC	26-1200 090-5044-00T
#12	GROTTO EJECT	Q12	I/O Pwr. Drvr.	BLU-YEL	J9-P5	YEL-VIO	J10-P4/5	50v DC	26-1200 090-5044-00T
#13	VUK	Q13	I/O Pwr. Drvr.	BLU-GRN	J9-P6	YEL-VIO	J10-P4/5	50v DC	26-1200 090-5044-00T
#14	MAGAZINE POST	Q14	I/O Pwr. Drvr.	BLU-BLK	J9-P7	BRN	J7-P1	20v DC	24-940 090-5036-00B
#15	LEFT FLIPPER (50v RED/YEL)	Q15	I/O Pwr. Drvr.	ORG-GRY	J9-P8	RED-YEL GRY-YEL	J10-P1/2	50v DC	23-1100 090-5030-00T
#16	RIGHT FLIPPER (50v RED/YEL)	Q16	I/O Pwr. Drvr.	ORG-VIO	J9-P9	RED-YEL BLU-YEL	J10-P1/2	50v DC	23-1100 090-5030-00T

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 Meter #
#17	LEFT SLINGSHOT	Q17	I/O Pwr. Drvr.	VIO-BRN	J7-P2	BRN	J7-P1	20v DC	23-800 090-5001-00T
#18	RIGHT SLINGSHOT	Q18	I/O Pwr. Drvr.	VIO-RED	J7-P3	BRN	J7-P1	20v DC	23-800 090-5001-00T
#19	DROP SCREEN STEPPER #1	<sup>D018</sup> Q19	I/O Pwr. Drvr.	RED	J7-P4	GRY-RED to WHT	J16-P3	20v DC	Stepr. Mtr. 041-5062-00
#20	DROP SCREEN STEPPER #2	<sup>D018</sup> Q20	I/O Pwr. Drvr.	GRN	J7-P6	GRY-RED to WHT	J16-P3	20v DC	Stepr. Mtr. 041-5062-00
#21	DROP SCREEN STEPPER #3	<sup>D018</sup> Q21	I/O Pwr. Drvr.	BLK	J7-P7	GRY-RED to WHT	J16-P3	20v DC	Stepr. Mtr. 041-5062-00
#22	TRIANGLE BILLBOARD	Q22	I/O Pwr. Drvr.	VIO-BLU	J7-P8	BRN	J7-P1	20v DC	Relay Bd. 520-5010-00
#23	DROP SCREEN STEPPER #4	<sup>D018</sup> Q23	I/O Pwr. Drvr.	BLU	J7-P9	GRY-RED to WHT	J16-P3	20v DC	Stepr. Mtr. 041-5062-00
#24	OPTIONAL COIN METER	Q24	I/O Pwr. Drvr.	VIO-GRY	J7-P10	RED	J16-P7	5v DC	Meter 5v 091-5000-00

D iode O n T ermi n al S tri p (if noted)

Low 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	Bulb Type
#25	FLASH: TRIANGLE X1	Q25	I/O Pwr. Drvr.	BLK-BRN	J6-P1	ORG	J6-P10	20v DC	#89 Bulb 165-5000-89
#26	FLASH: MIRROR X4	Q26	I/O Pwr. Drvr.	BLK-RED	J6-P2	ORG	J6-P10	20v DC	#906 Bulb 165-5004-00
#27	FLASH: BACK LT X1 BACK RT X1	Q27	I/O Pwr. Drvr.	BLK-ORG	J6-P3	ORG	J6-P10	20v DC	#906 Bulb 165-5004-00
#28	FLASH: LT SLINGSHOT X1	Q28	I/O Pwr. Drvr.	BLK-YEL	J6-P4	ORG	J6-P10	20v DC	#906 Bulb 165-5004-00
#29	FLASH: RT SLINGSHOT X1	Q29	I/O Pwr. Drvr.	BLK-GRN	J6-P5	ORG	J6-P10	20v DC	#906 Bulb 165-5004-00
#30	FLASH: TRIPLE JACPOT X1	Q30	I/O Pwr. Drvr.	BLK-BLU	J6-P6	ORG	J6-P10	20v DC	#89 Bulb 165-5000-89
#31	CENTERFOLD ON/OFF	Q31	I/O Pwr. Drvr.	BLK-VIO	J6-P7	BRN	J7-P1	20v DC	DC Relay 520-5066-00
#32	CENTERFOLD OPEN/CLOSE	Q32	I/O Pwr. Drvr.	BLK-GRY	J6-P8	BRN	J7-P1	20v DC	(Motor) 041-5075-04

Note: In Test Flash Lamps Menu ("Flash" Icon), Flashers tested are all Flash Lamps located between Q1-Q32 (This Game: Q25-Q30)

Auxilliary (UK ONLY)		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
AUX 1:	LEFT UP/DOWN POST	Q1	Sol. Expander (Aux. Board)	WHT	CN2-P5	BRN	J7-P1	20v DC	26-1200 090-5044-00T
AUX 2:	CENTER UP/DOWN POST	Q2	Sol. Expander (Aux. Board)	RED	CN2-P4	BRN	J7-P1	20v DC	23-1100 090-5030-00T
AUX 3:	RIGHT UP/DOWN POST	Q3	Sol. Expander (Aux. Board)	ORG	CN2-P3	BRN	J7-P1	20v DC	26-1200 090-5044-00T

Sec. 5: Schematics ...



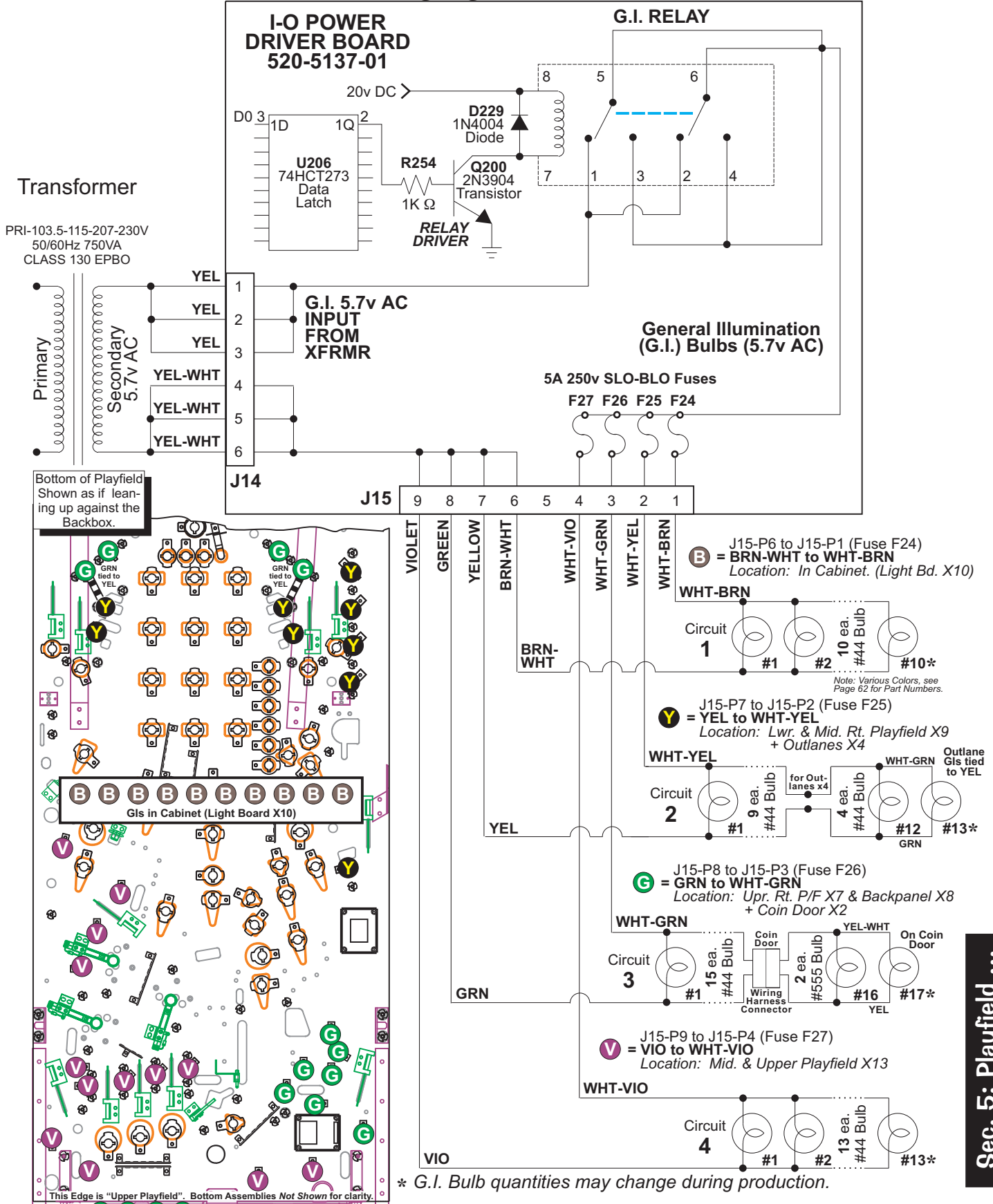






# Playfield Wiring

## General Illumination Circuit Detailed Wiring Diagram



Sec. 5: Playfield ...



# Playfield Switch Wiring Diagram

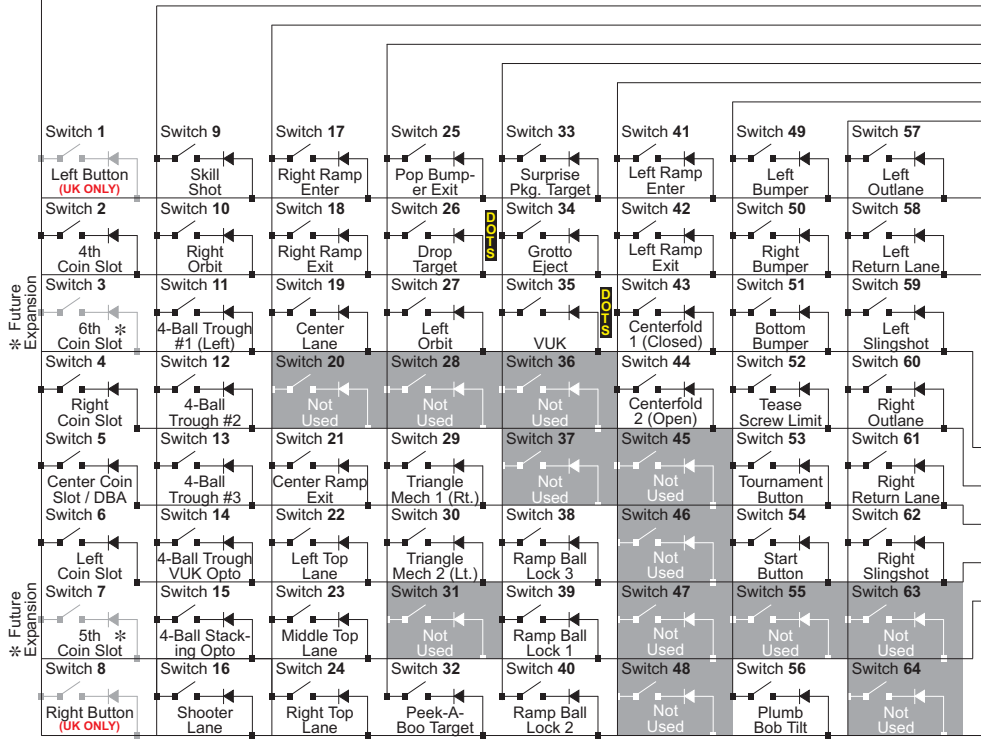
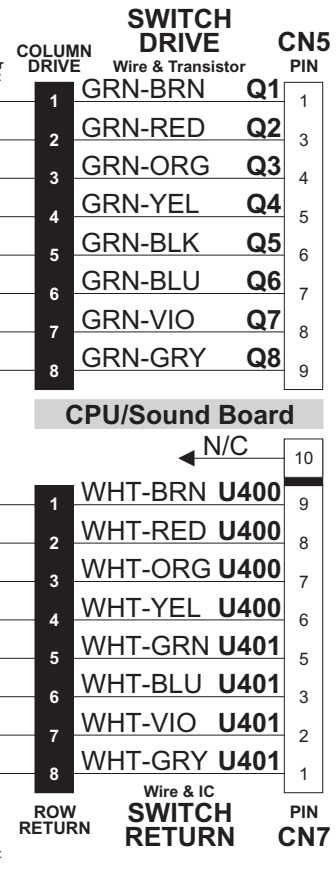
Note: All Switch, Lamp & Coil assemblies require diodes. Some diodes are located under the playfield on Terminal Strips or Diode Boards and not on the assemblies.

For Switch(es): 26 & 35

Diode On Terminal Strip

Diode On Board

Switch Drive Transistor Source N#: 2N3904



# Playfield Lamp Wiring Diagram

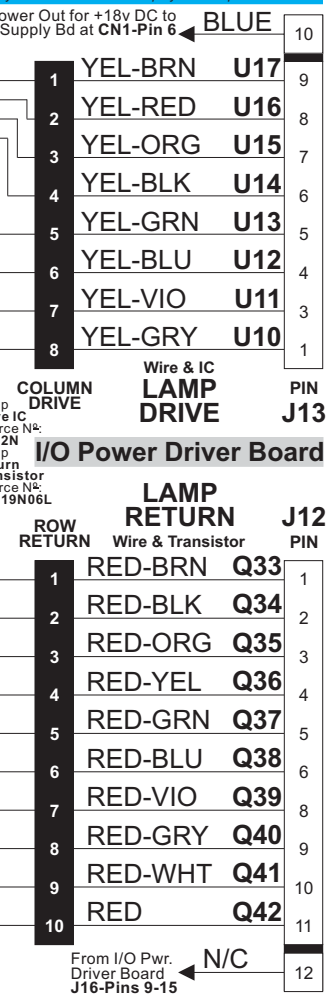
Note: All Switch, Lamp & Coil assemblies require diodes. Some diodes are located under the playfield on Terminal Strips or Diode Boards and not on the assemblies.

For Lamp(s): 56-57 & 73-79

Diode On Terminal Strip

Diode On Board

J13-Pin 10 is Power Out for +18v DC to the Display Power Supply Bd at CN1-Pin 6



Sec. 5: Playfield ...

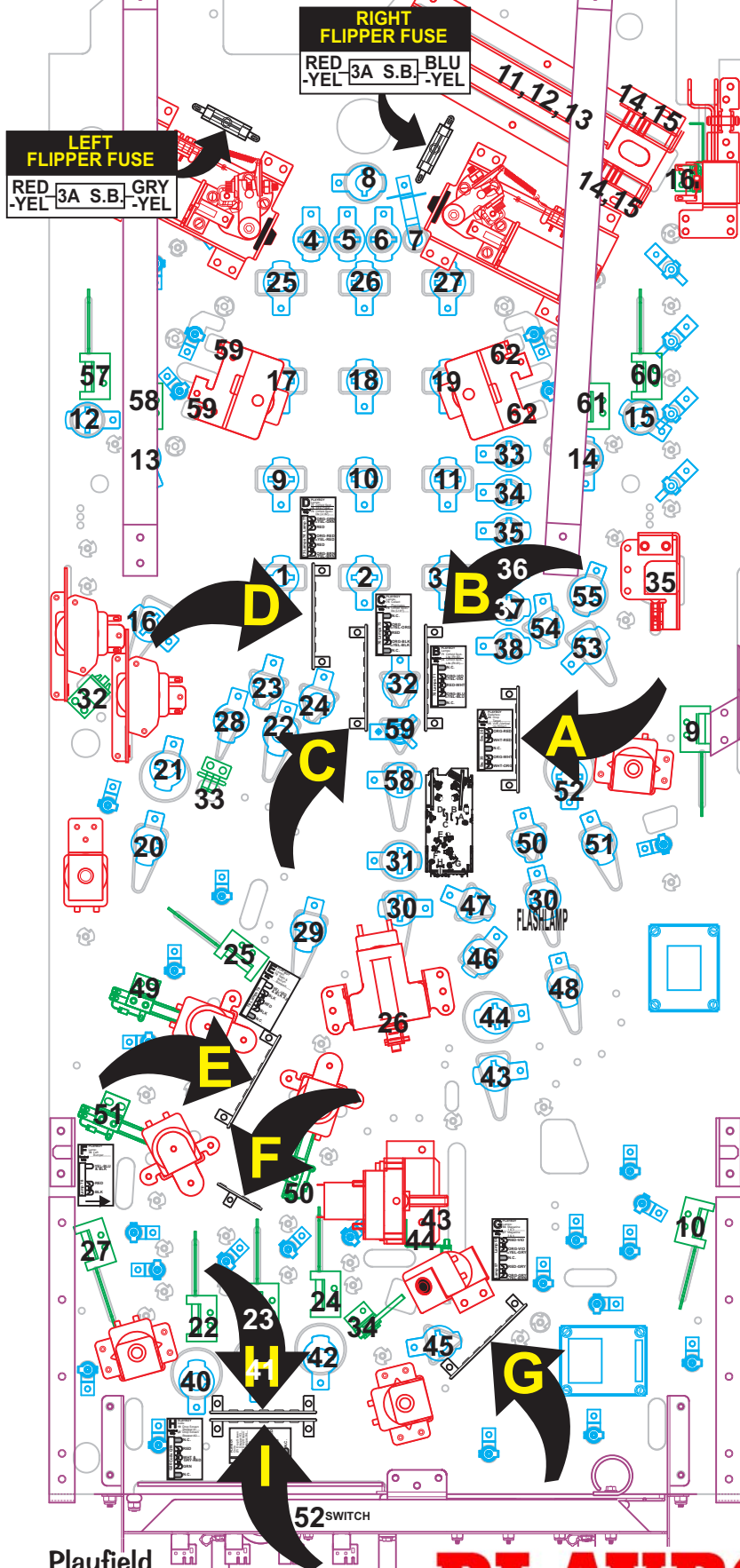


# Playfield Terminal Strips, Fuses & Misc. Wiring Descriptions & Locations

Please Note: Terminal Strip(s), Diode Board(s) and/or Fuse Holder(s) locations shown, represent the general location (your game may differ slightly).

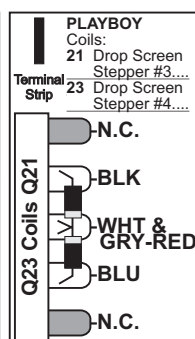
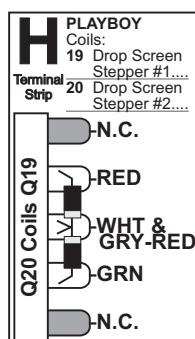
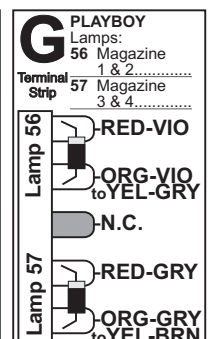
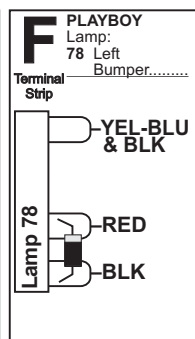
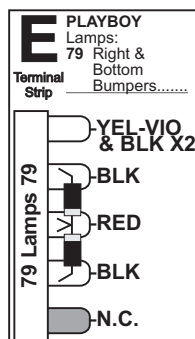
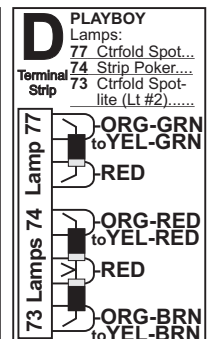
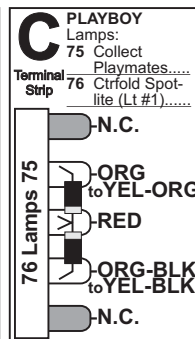
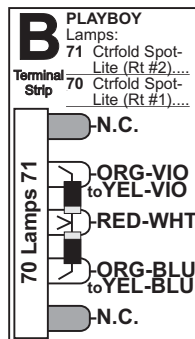
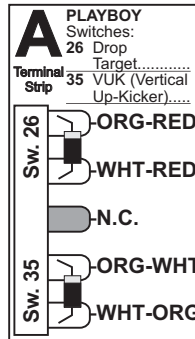
Bottom of Playfield Shown as if leaning up against the Backbox.

All fuses are rated:  
**3A 250v Slo-Blo**  
Do Not Over-Fuse



## Explanation:

All Switch, Lamp & Coil assemblies require diodes. Some diodes are **located under the playfield** on Terminal Strips **or** Diode Boards and not on the assemblies. The Switch and Lamp Matrix Grids also note which Switch or Lamp has a diode on a Terminal Strip (noted by **"DOTS"** meaning: **"Diode On Terminal Strip"**) or on a Diode Board (noted by **"DODB"** meaning: **"Diode On Diode Board"**).

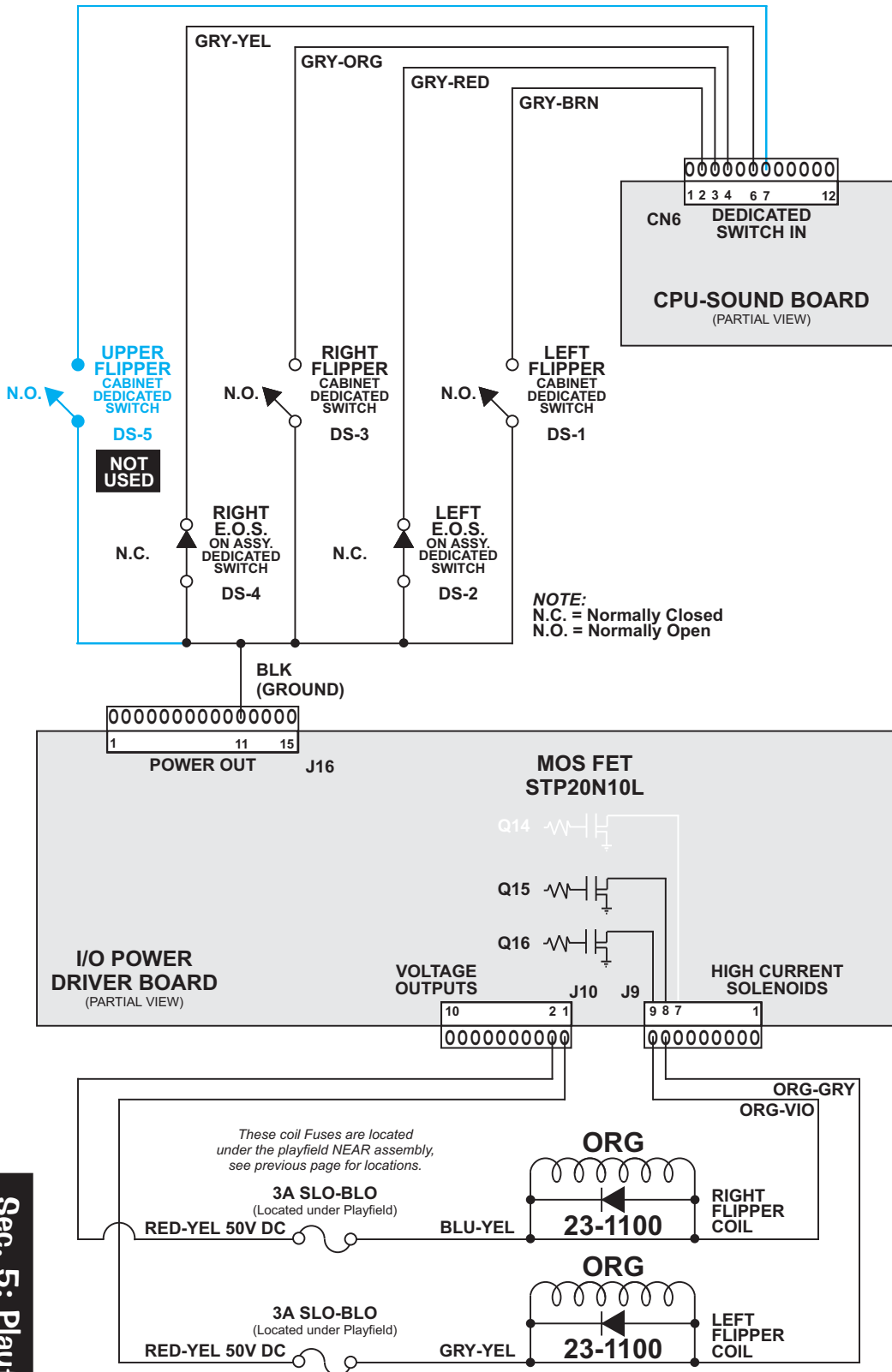


See the Pink Pages, Playfield - General Parts (Below) (Pg. 60) for Terminal Strips, Diodes, Fuses and Fuse Holders Part N's.

Sec. 5: Playfield ...

## 2-Flipper Circuit Wiring Diagram

The **White Star Board System™** has allowed us to *simplify* the *Flipper Circuit* to the point where we have *eliminated* the *Flipper Board* all together. The *Flipper Circuit* is now configured the same as any other Solenoid Drive Circuit.



### Technical Overview

Our **Flipper System** uses one supply voltage (50v DC) for both **kick & hold**. Once the **Game CPU** detects a Flipper Cabinet Switch closure (during game play) it applies a 40msec pulse to the gate of the Flipper Drive Transistor (STP-20N10L). If it continues to detect a Flipper Cabinet Switch closure (*the player holding the button in*) it will continue to pulse the flipper drive transistor 1msec every 12msecs for the duration of the hold cycle.

The **E.O.S. (End-Of-Stroke) Switch** serves the same function as before as it prevents foldback when the player has the flipper energized to capture balls. The **E.O.S. Switch** is a normally closed switch which opens approximately 1/16" when the flipper is energized. The **Game CPU** will detect a switch closure if the flipper bat is forced back by a high velocity shot or rebound on the playfield and will apply another 40msec pulse of 50v DC to the coil.

**Note:** If an Upper Flipper is used, the Flipper Button (on the same side of the cabinet as the Upper Flipper) will have a **"Double-Stacked" E.O.S. Switch**. This allows the player to push the Flipper Button either half-way down to energize only the Lower Flipper or pushing the Flipper Button all the way down to energize both the Lower & Upper Flippers.

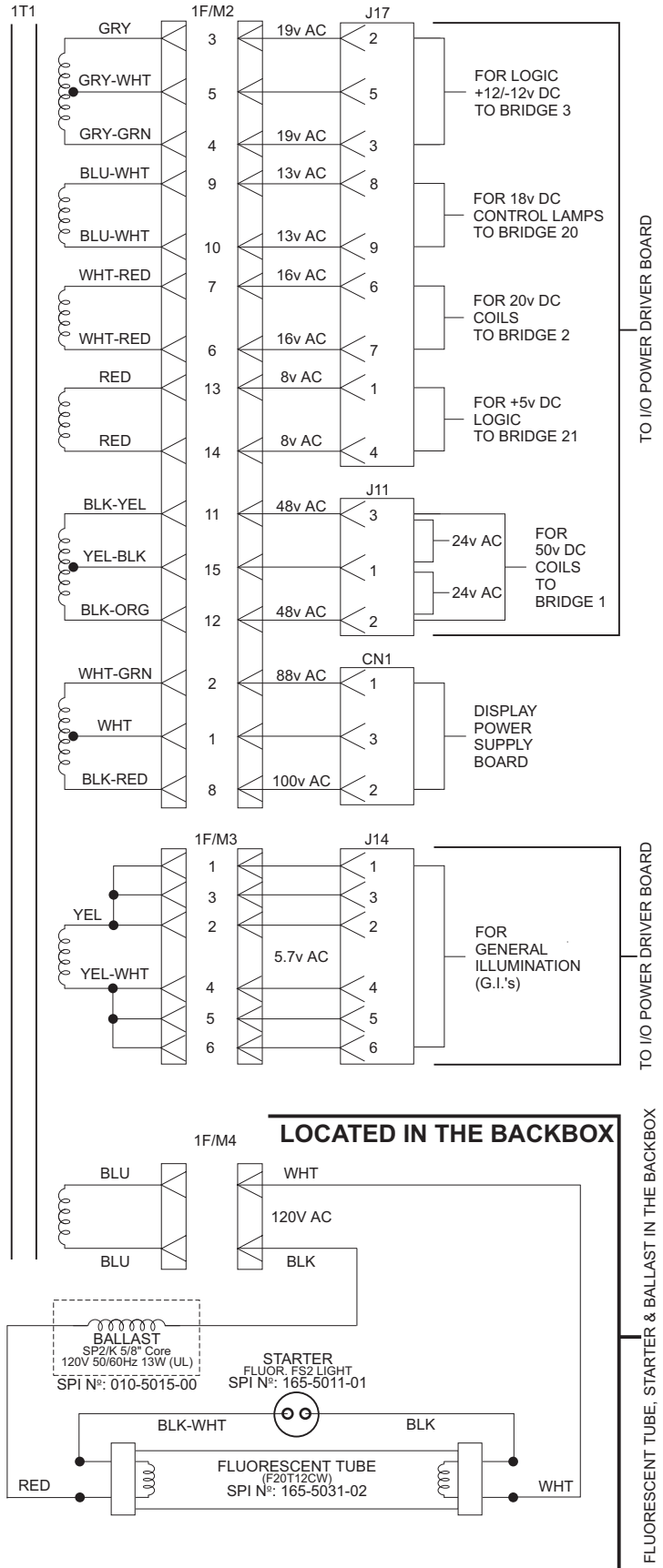
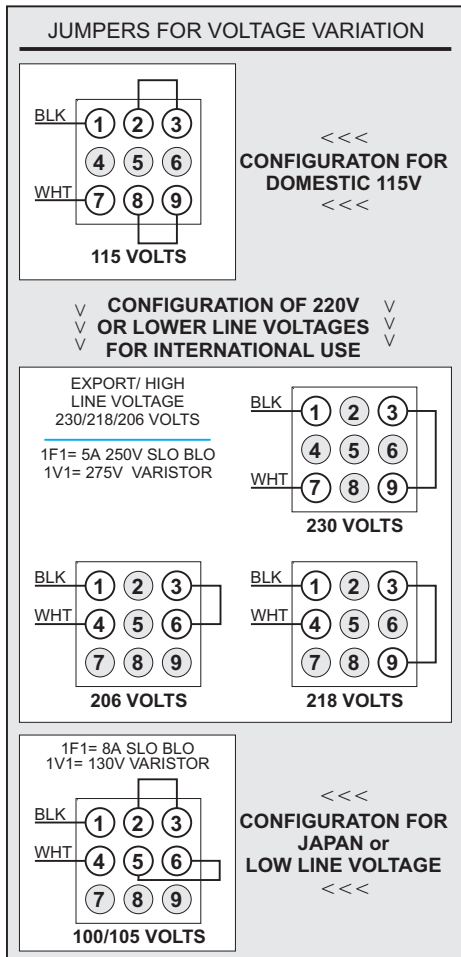
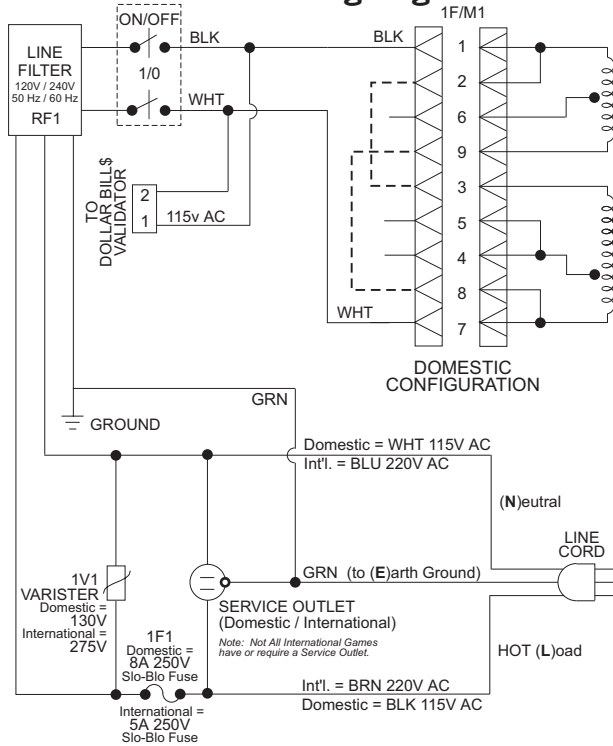
Sec. 5: Playfield ...



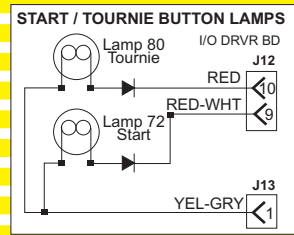
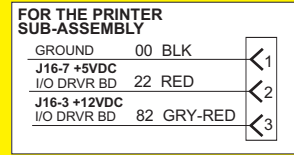
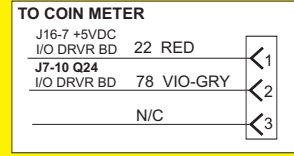
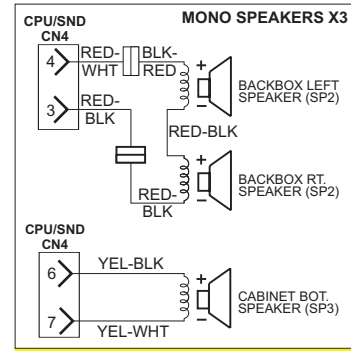
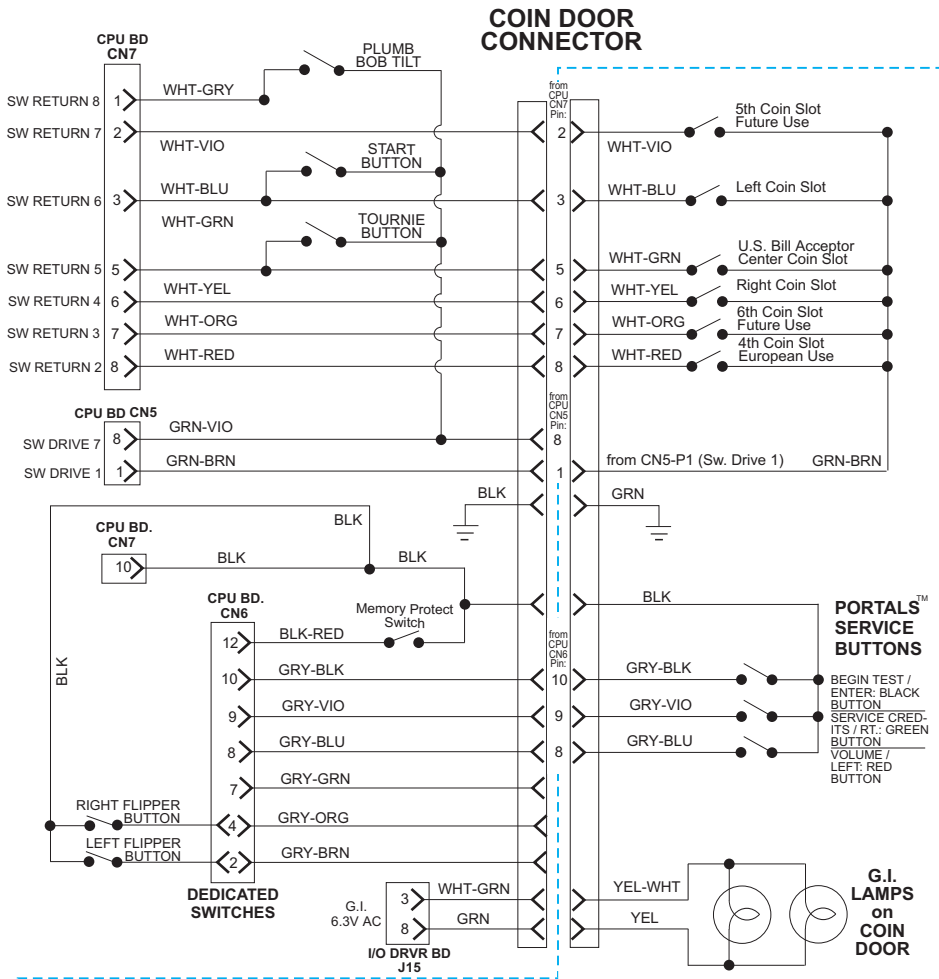


# Cabinet Wiring

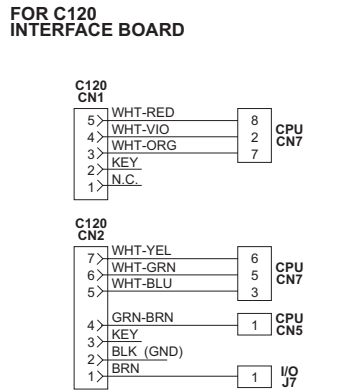
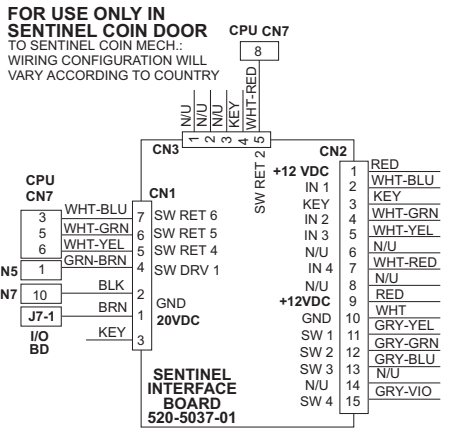
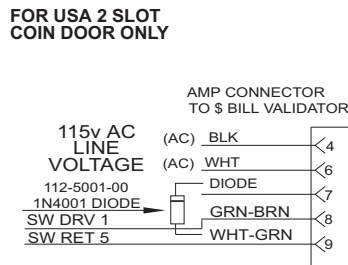
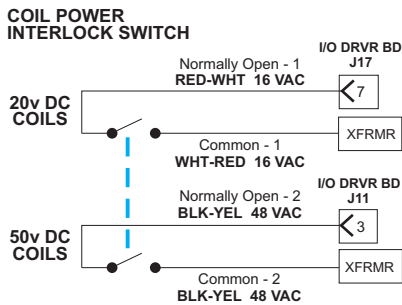
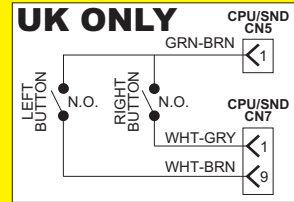
## Transformer Power Wiring Diagram



# Cabinet / Coin Door Wiring Diagram

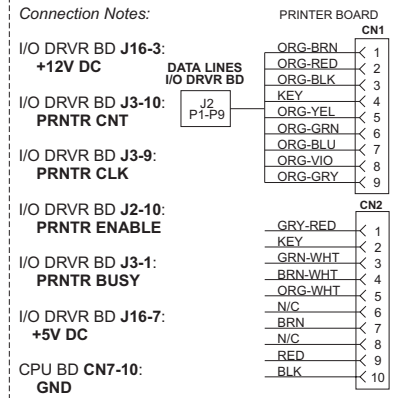


**UK ONLY:** 2 Extra Cabinet Buttons for the Post Save™ Feature are used. The Left Button operates the Left Outline Ball Deflector. The Right Button operates the Right Outline Ball Deflector. Both buttons pushed together operate the Center Up/Down Post. Both buttons are located under the Flipper Buttons.



**PRINTER INTERFACE OPTIONAL**

Cable Wiring Harness SPI Part N°:  
036-5408-00  
RS-232 Printer Interface Board SPI Part N°:  
520-5069-00



Sec. 5: Cabinet ...

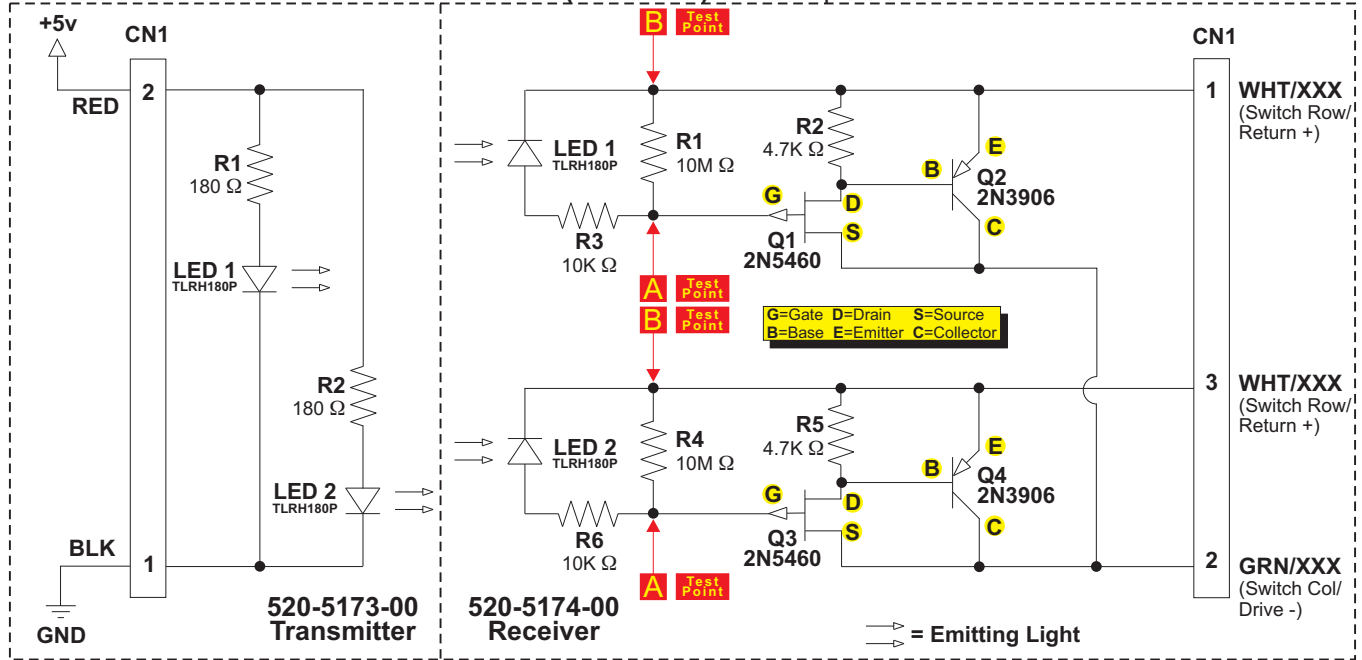
**COIN DOOR**



# Printed Circuit Boards (PCBs)

## Trough Up-Kicker Dual OPTO Boards Theory of Operation & Schematic

As light from the **Transmitter LED1** falls on the **Receiver LED1**, it generates a Positive Bias Voltage (0.7v to 1.5v) which is applied to the **Gate (G)** of **Q1 (Fet 2N5460)** turning **Q1** off. When **Q1** is held off, no current flows through **Q2's (2N3906) Base (B)**. With no *base current*, **Q2** is off and acts as an **OPEN SWITCH**. When the light is interrupted (**BLOCKED**) **R1 (Rec. Bd.)** bleeds the gate voltage off of **Q1** allowing it to conduct, switching **Q2** on, which acts as a **CLOSED SWITCH**. The **LED2 (Trans/Rec) Circuit** operates identical as the **LED1 Circuit**.

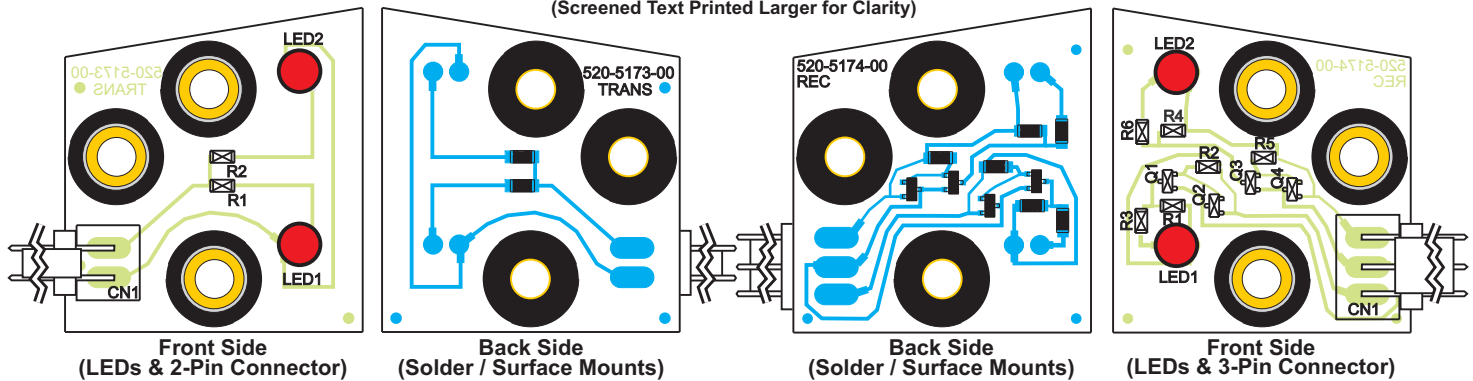


## Trough Up-Kicker Dual OPTO Boards Component Layout & Parts

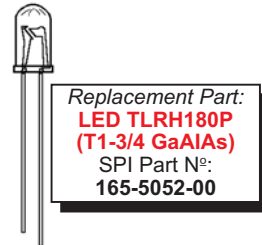
520-5173-00 (TRANS)

Boards Actual Size  
(Screened Text Printed Larger for Clarity)

520-5174-00 (REC)



ITEM	QTY	PART NUMBER	REF-DESIGNATOR	DESCRIPTION
A	1	515-0173-00	Dual-OPTO Trans. Bd. Assy.	PCB Assy. (with all Items 1-5) PCB Assy. (with Items 1-3 only) 2X, .156" Rt. Angle (26-60-5020) Conn. <b>LED TLRH180P (Ultra Bright Red)</b> 180 Ω 1/8W Chip Res. (CRCW) OPTO PCB Brass Tube Spacer OPTO PCB Rubber Grommet
—	1	520-5173-00	Dual-OPTO Trans. Board	
01	1	045-5111-02	CN1	
02	2	165-5052-00	LED1, LED2	
03	2	121-5067-00	R1, R2	
04	3	530-5308-02	n/a	
05	3	545-5518-00	n/a	
B	1	515-0174-00	Dual-OPTO Rec. Bd. Assy.	
—	1	520-5174-00	Dual-OPTO Rec. Board	
01	1	045-5111-03	CN1	
02	2	165-5052-00	LED 1, LED 2	PCB Assy. (with all Items 1-9) PCB Assy. (with Items 1-7 only) 3X, .156" Rt. Angle (26-60-5030) Conn. <b>LED TLRH180P (Ultra Bright Red)</b> 2N5460, Transistor (P-FET SOT-23) <b>2N3906</b> , Transistor 10M Ω 1/8W Chip Res. (CRCW) 4.7K Ω 1/8W Chip Res. (CRCW) 10K Ω 1/8W Chip Res. (CRCW) OPTO PCB Brass Tube Spacer OPTO PCB Rubber Grommet
03	2	110-5006-00	Q1, Q3	
04	2	110-0086-00	Q2, Q4	
05	2	121-5082-00	R1, R4	
06	2	121-5083-00	R2, R5	
07	2	121-5011-00	R3, R6	
08	3	530-5308-02	n/a	
09	3	545-5518-00	n/a	





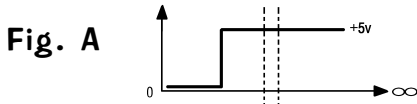
# OPTO Troubleshooting

## 1. Volt Meter Test (indicates normal operating condition):

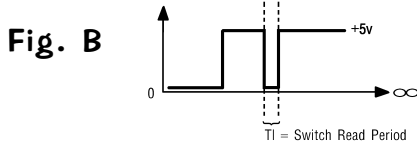
A. **OPEN OPTO** (Light Falling on LED) = *SWITCH OPEN*. Place meter leads across points **A** and **B** on the **LED1 Circuit** (Refer to Schematic Drawing on previous page, 520-5174-00 Receiver Side). It should read approximately 0.8 - 1.2v DC. The **LED2 Circuit** operates the same.

B. **CLOSED OPTO** (Light Blocked) = *SWITCH CLOSED*. Place meter leads across points **A** and **B** on the **LED1 Circuit** (Refer to Schematic Drawing on previous page, 520-5174-00 Receiver Side). It should read approximately 0.0 - 0.1v DC. The **LED2 Circuit** operates the same.

## 2. Oscilloscope Test (indicates normal operating condition):



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



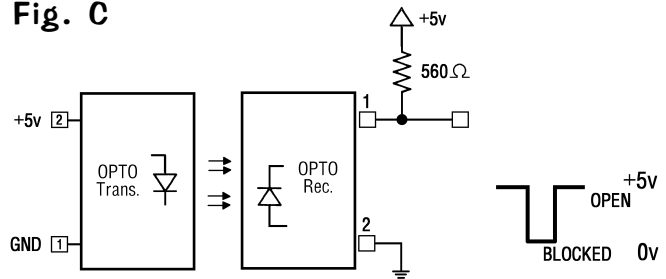
B. **CLOSED OPTO** (Light Blocked) = *SWITCH CLOSED*. Place Scope lead at **Pin-1** of OPTO Rec. Board with Scope Grounded (see Schematic). The Scope should display a **PULSE STREAM** indicating **Q2** has switched "On" as shown in **Fig. B**, Wave Form Diagram. This is your Switch Drive Pulse.

## 3. Bench Test (See Fig. C):

*Please Note: To perform this test you must use a spare 560Ω Pull-Up Resistor, SPI N<sup>o</sup>: 121-5047-00*

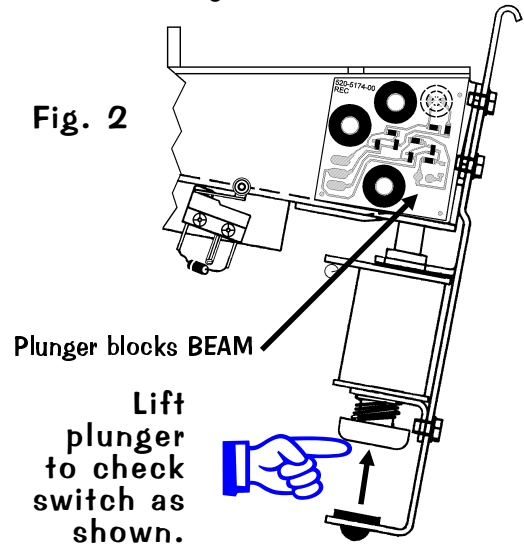
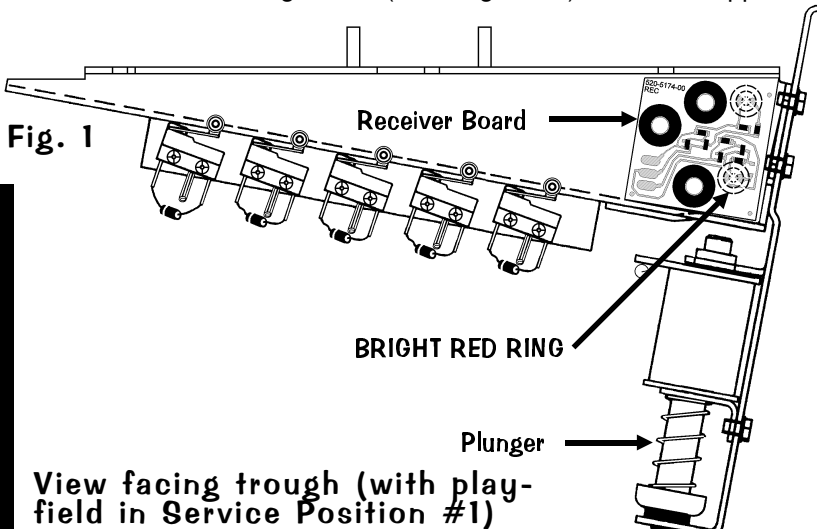
Disconnect the OPTO Transmitter / Receiver Board from the circuit. Connect one side of a 560Ω Pull-Up Resistor to **Pin-1** of the OPTO Receiver Bd. and the other side of the resistor to a 5v DC source. Connect **Pin-2** to GND. Connect a +5v DC source to **Pin-1** of the Transmitter & GND to **Pin-2**. Align with the Receiver OPTO approx. 3" distance. Using your Volt-Meter or an Oscilloscope, monitor **Pin-1** while **BLOCKING** and **UNBLOCKING** the **BEAM** from the Trans. The output will be approx. +5v DC when the **BEAM IS NOT BLOCKED** and approx. 0v when the **BEAM IS BLOCKED**.

Fig. C



## Trough Dual OPTO Boards Alignment / Test for LED1

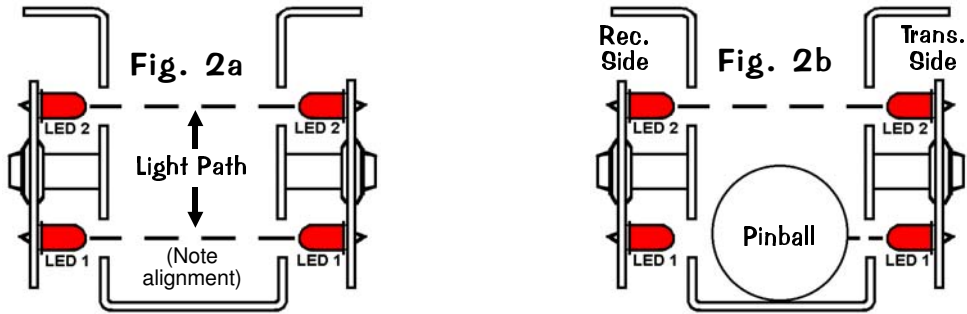
When a working **OPTO** is installed and connected in a game, the transmitter should light (LED1 lower & LED2 upper) when the power is switched on. With the playfield in Service Position #1 (playfield lifted up in the half-way position resting on the Prop Rod or edge slide support brackets) and the game on, the LED lights should show up as a **BRIGHT RED RINGS** through the back of the Receiver Board around the **Receivers LED1 & LED2** (See **Fig. 1**). Testing only **LED1**: With the game in **Switch Test Mode**, lifting the Trough Plunger with a fingertip should block the **BEAM** and cause the Switch Position to trigger (See **Fig. 2**). View **Fig. 2a & 2b** (on the next page) for a sectional view of the Light Path (note alignment) and what happens as a ball breaks the light beam.



Sec. 5: PCBs

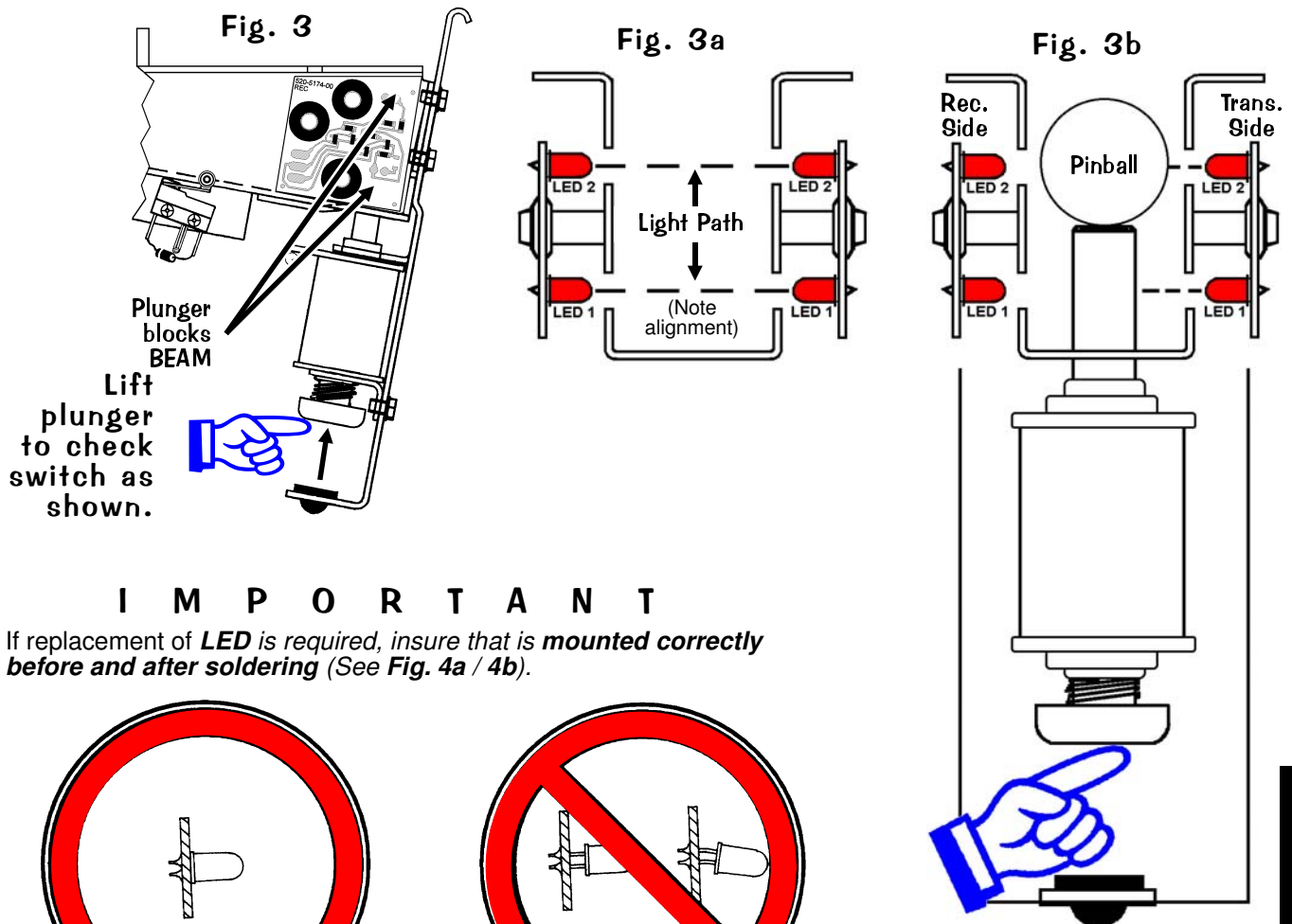


## Sectional view from right (Fig. 2a & 2b)



### Trough Dual OPTO Boards Alignment / Test for LED2

When a working **OPTO** is installed and connected in a game, the transmitter should light (LED1 lower & LED2 upper) when the power is switched on. With the playfield in Service Position #1 (playfield lifted up in the half-way position resting on the Prop Rod or edge slide support brackets) and the game on, the LED lights should show up as a **BRIGHT RED RINGS** through the back of the Receiver Board around the **Receivers LED1 & LED2** (See Fig. 1, previous page). Testing only **LED2**: *TO PERFORM THIS TEST, A PINBALL MUST BE IN THE BALL TROUGH.* With the game in **Switch Test Mode**, lifting the Trough Plunger with a finger tip should block the **BEAM** on LED2 and cause the Switch Position to trigger (See Fig. 3). View Fig. 3a & 3b for a sectional view of the Light Path (note alignment) and what happens as a "double-stacked" ball scenario breaks the light beam.



## I M P O R T A N T

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

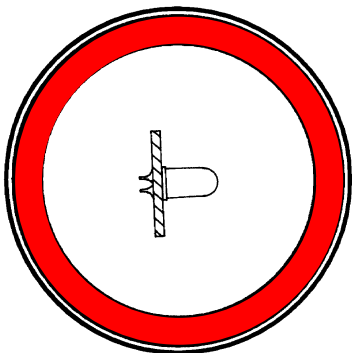


Fig. 4a  
Correct Position

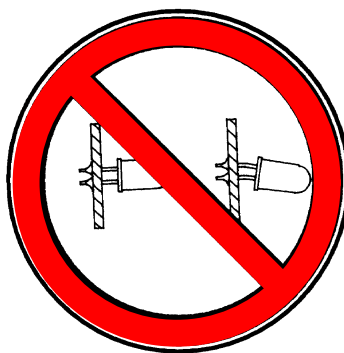
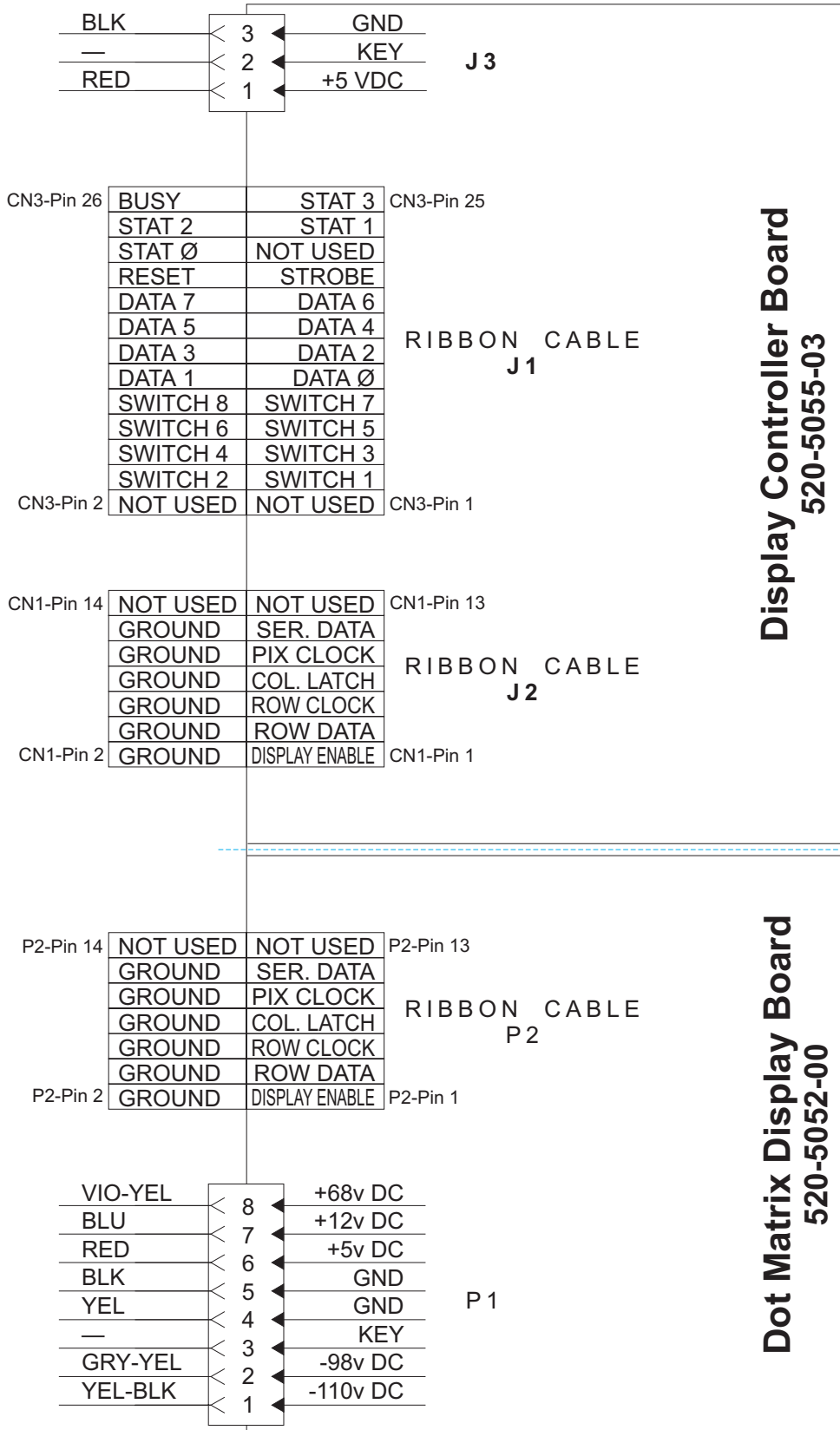


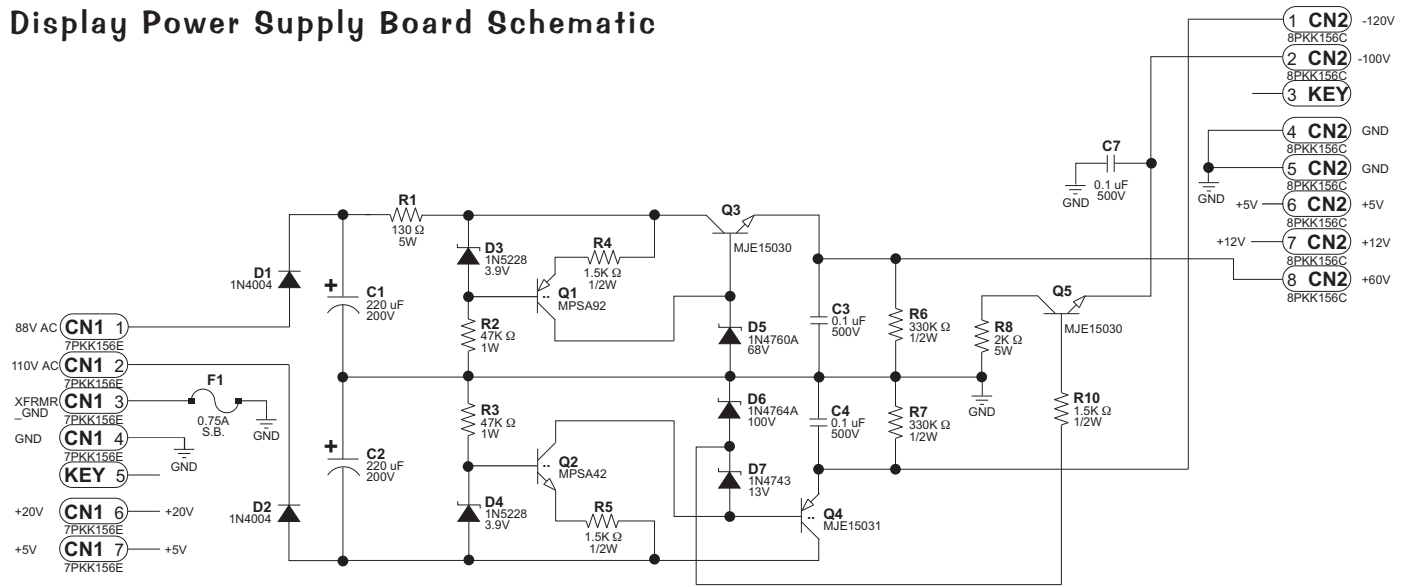
Fig. 4b  
Incorrect Position

Dot Matrix Display / Display Controller Bd. Combined Display Connections

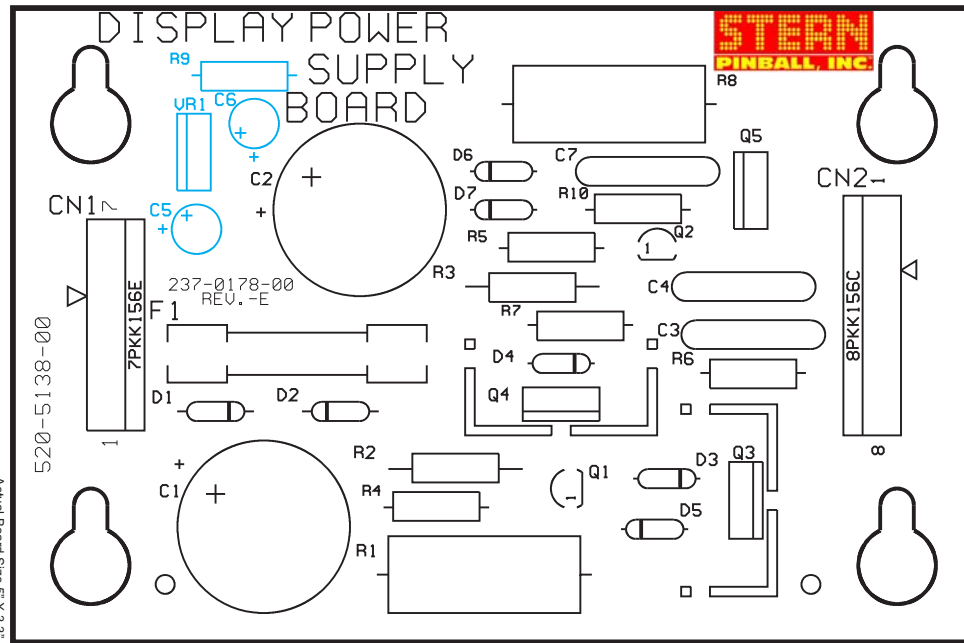




# Display Power Supply Board Schematic

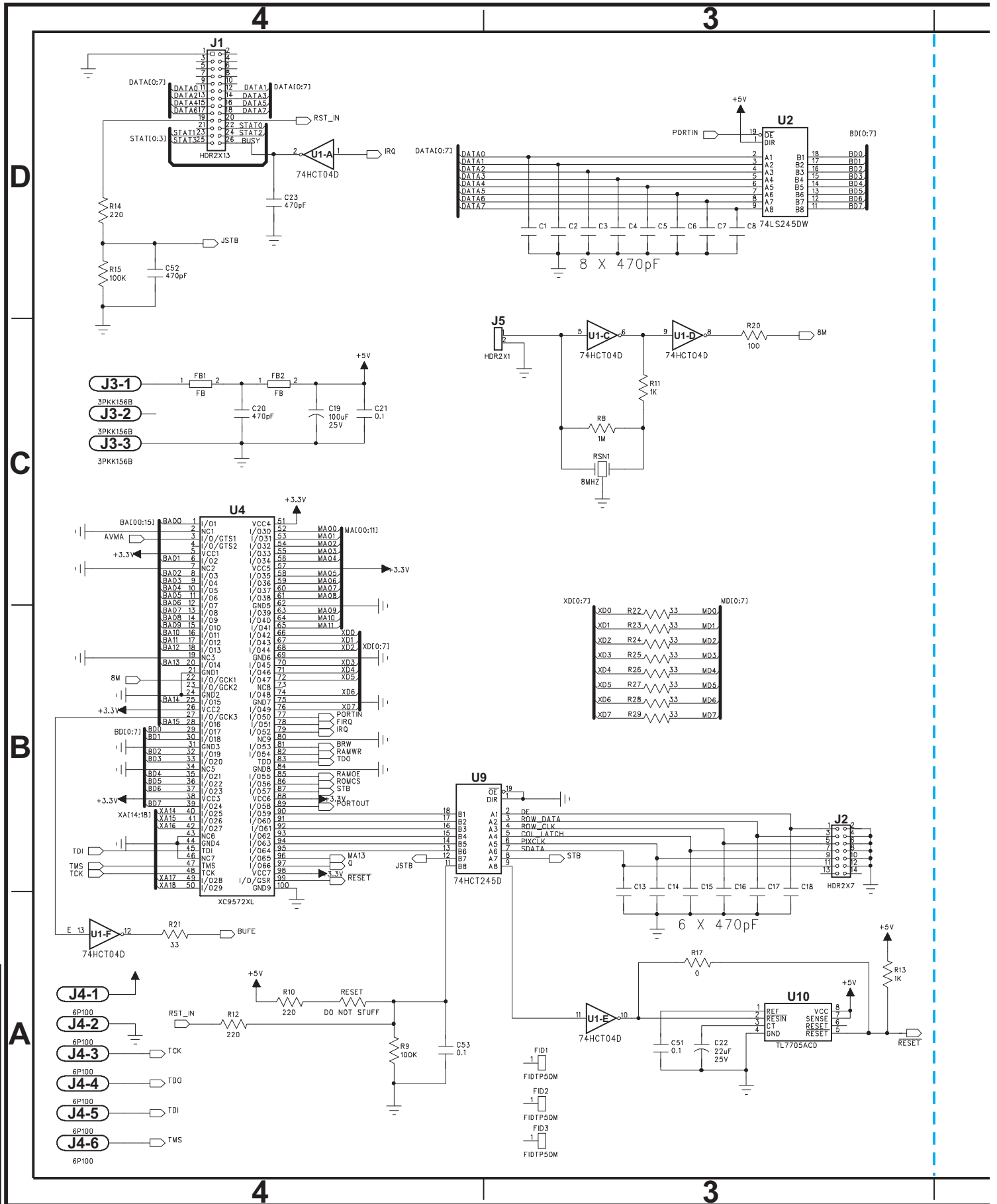


# Display Power Supply Board Component Layout & Parts



ITEM	QTY	PART NUMBER	REF-DESIGNATOR	DESCRIPTION (NS = Not Stuffed)
—	1	<b>520-5138-00</b>	<b>Display Power Supply Board</b>	<b>Complete PCB Assembly</b>
01	2	125-5044-00	C1, C2	220uF, 200v, Radial Lytic Cap.
02	3	125-5035-00	C3, C4, C7	0.1uF, 500v, Ceramic Disk Cap.
03	0	125-5003-00	(C5, C6: NS)	22uF, 35v, Rad Lytic Cap
04	1	045-5015-07	CN1	7PKK156E (PIN5=KEY)
05	1	045-5015-08	CN2	8PKK156E (PIN3=KEY)
06	2	112-5003-00	D1, D2	1N4004, Diode
07	2	112-0053-00	D3, D4	1N5228, 3.9v, Diode
08	1	112-0062-00	D5	1N4760A, 68v, Diode
09	1	112-0049-00A	D6	1N4764A, 100v, Diode
10	1	112-0061-00	D7	1N4743, 13v, Diode
11	1	200-5000-17	F1	3/4A (0.75A) S.B. Fuse
12	2	205-0004-00	F1	Fuse Clip
13	1	110-0100-00	Q1	MPSA92, Transistor
14	1	110-0082-00	Q2	MPSA42, Transistor
15	2	110-0101-00	Q3, Q5	MJE15030, Transistor
16	2	535-5000-11	Q3, Q4	Heatsinks - AAVID #563002
17	2	240-5008-00	Q3, Q4	#6-32 KEPS Nut
18	2	237-5501-00	Q3, Q4	#6-32 X 3/8" PPH Screw
19	1	110-0103-00	Q4	MJE15031, Transistor
20	1	121-5061-00	R1	130 Ω 5W Res.
21	2	121-5060-00	R2, R3	47K Ω 1W Res.
22	3	121-5038-00	R4, R5, R10	1.5K Ω 1/2W Res. (R9: NS)
23	2	121-5059-00	R6, R7	330K Ω 1/2W Res.
24	1	121-5062-00	R8	2K Ω 5W Res.
25	0	124-5003-00	(VR1: NS)	7812CT

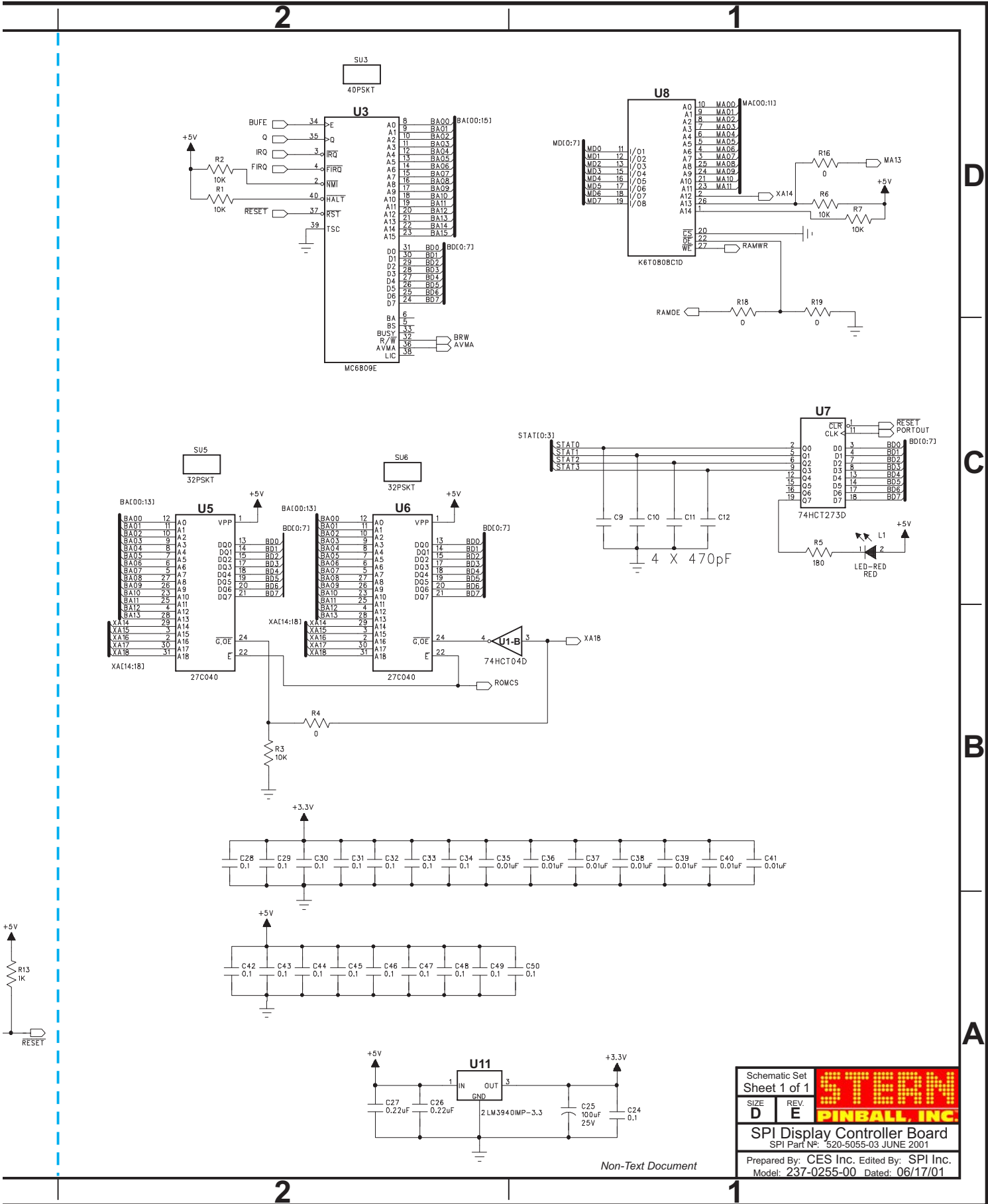
# Display Controller Board Schematic



Sec. 5: PCBs



# Display Controller Board Schematic



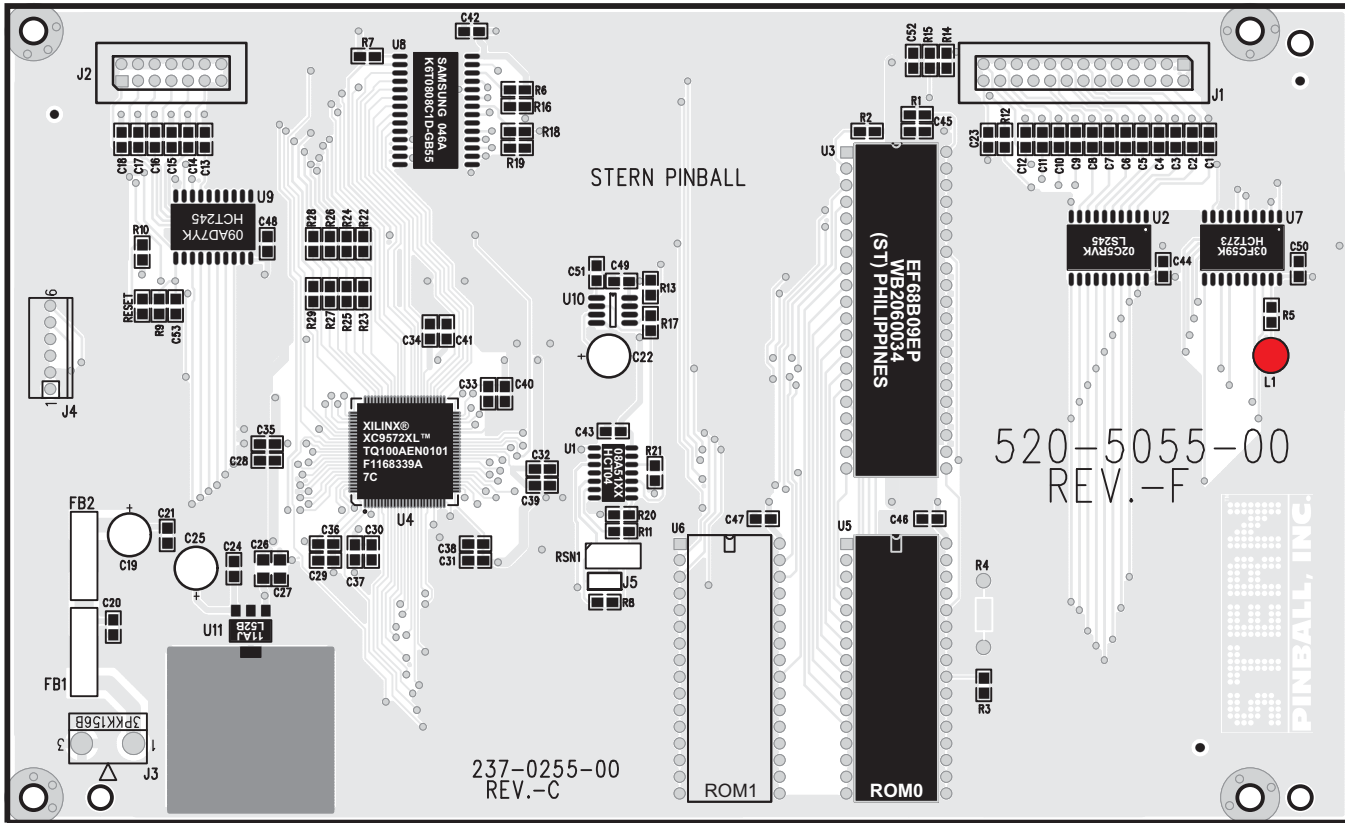
Schematic Set		<b>STERN</b>
Sheet 1 of 1		
SIZE	REV.	<b>PINBALL, INC.</b>
D	E	
SPI Display Controller Board		
SPI Part No: 520-5055-03 JUNE 2001		
Prepared By: CES Inc. Edited By: SPI Inc.		
Model: 237-0255-00 Dated: 06/17/01		

Non-Text Document

Sec. 5: PCBs



# Display Controller Board Component Layout & Parts



Actual Board Size 20.5cm X 12.5cm

ITEM	QTY	PART NUMBER	REF-DESIGNATOR	DESCRIPTION (NS = Not Stuffed)
—	1	<b>520-5055-03</b>	<b>Display Controller Bd. (FCC FEB98) Rev. E June 2001</b>	<b>Complete PCB Assembly</b>
1	2	(See Pg. DR. © Table)	U5 (ROM0) (U6 (ROM1): NS)	4MB ROM 27C040 (M27C401-100)
2	2	077-5217-00	U5 (U6: NS)	32-Pin, IC Dip Socket
3	1	045-5015-03	J3	3-Pin, PKK156B Connector
4A	1	100-0189-01	U3	MC6809E
4B	1		U3	40-Pin, Socket
5	1		J4	6-Pin (6P100)
6	1		U1	74HCT04D (74LS04)
7	1		U9	74HCT245D
8	1		U7	74HCT273D
9	1		U2	74LS245DW
10	1		RSN1	8MHZRSN (8Mhz) Crystal
11	7		C35-C39, C40, C41	0.01uF, 50v Cap.103-0805-X7R
12	20		C21, C24, C28-C32, C33, C34, C42, C43, C44, C45, C46 C47, C48, C49, C50, C53 (C51: NS)	0.1, 50v Cap. 104-0805
13	2		C26, C27	0.22uF, 50v Cap. 224-1206-Z5U
14	21		C1-C12, C13-C18, C20, C23, C52	470pF, 50v Cap. 471-0805
15	2	n/a	FB1, FB2	Ferrite Bead, FB0370
16	3		FID1-3	FIDTP50M
17	1	n/a	(J5: NS)	HDR2X1
18	1		J2	7-Pin, Dual Row .1" Hdr. Conn HDR2X7
19	1		J1	13-Pin, Dual row .1" Hdr. Conn HDR2X13
20	1	100-5045-00	U8	K6T0808C1D-GB55, Int. Samsung 046A
21	1	<b>165-5099-00</b>	<b>L1</b>	<b>LED T1-3/4 DIFFUSER RED</b>
22	1		U11	LM3940IMP-3.3
23	4		R16-R18 (R19: NS)	0Ω 1/10W Resistor 0805
24	1	n/a	RESET	DO NOT STUFF
25	1	n/a	(R4: NS)	RES0E1/4W5CF, 0
26	1		R20	100Ω 1/10W Resistor 0805
27	2		R9, R15	100KΩ 1/10W Resistor 0805
28	5		R1, R2, R3, R7 (R6: NS)	10KΩ 1/10W Resistor 0805
29	1		R5	180Ω 1/10W Resistor 0805
30	2		R11, R13	1KΩ 1/10W Resistor 0805
31	1		R8	1MΩ 1/10W Resistor 0805
32	3		R10, R12, R14	220Ω 1/10W Resistor 0805
33	9		R21, R22-R29	33Ω 1/10W Resistor 0805
34	2	125-5015-00	C19, C25	100uF, 25v TCap.
35	1	n/a	(C22: NS)	22uF, 25v TCap.
36	1	n/a	(U10: NS)	TL7705ACD
37	1	100-5044-00	U4	XC9572XL, Int. Xilinx®

Sec. 5: PCBs



# I/O Power Driver Board Theory of Operation

## 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 11v DC which is inserted into a linear voltage regulator for the output of 5v DC. 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 (Dot Matrix) Display and Plasma (Display) Controller Board. Power for these devices comes off the I/O Board on [J16-(4-8)].

## +5v, +20v, +50v, +18v, & +12v 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.

LED	SUPPLY VOLTAGE
L2	+ 5
L200	+ 20v
L201	+ 50v
L202	+ 18v
L203	+ 12v

**\*\* Note that the +50v & +20v power sources are turned off by the Interlock Switches when the Coin Door is OPEN.**

## Reset Circuitry:

The I/O will reset in three (3) 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 below 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 5v DC is below 4.75v or the CPU/Sound 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/Sound 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 (Coil) 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's (U204 & U205)** (3 of 8 decoder). Both of these must be in operation for the I/O Board to function properly.

## Solenoid (Coil) 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 (coils). 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, R2 controls Q2, et cetera...

## Auxiliary In & Out:

**J2-8 CMOS** Outputs sometimes used for a printer interface.

**J3-8 CMOS** Inputs general purpose inputs.

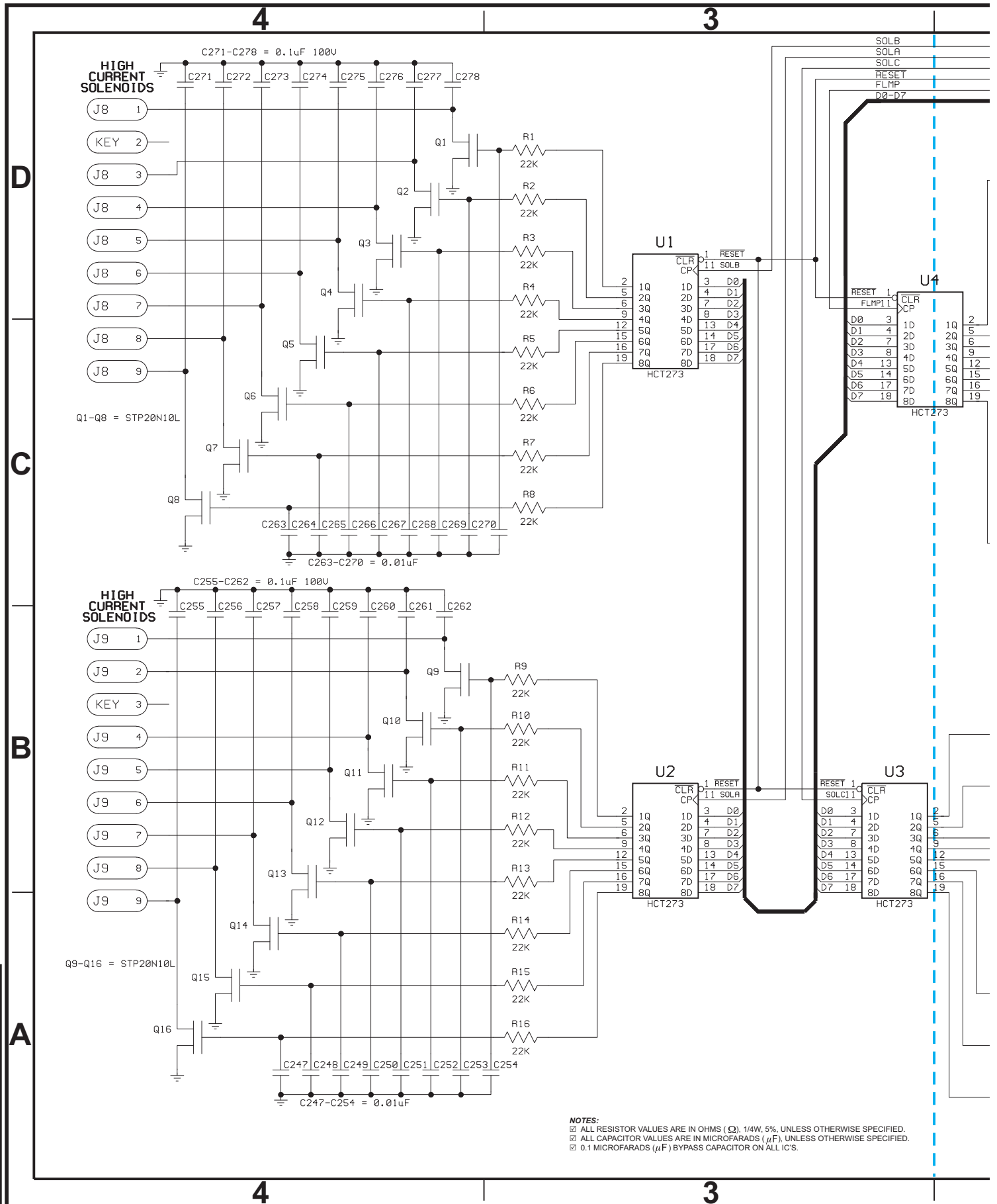
## Lamp Matrix:

**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/Sound Board. 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 6v AC switched on & 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 6v AC source.

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



- NOTES:**
- ☑ ALL RESISTOR VALUES ARE IN OHMS ( $\Omega$ ), 1/4W, 5%, UNLESS OTHERWISE SPECIFIED.
  - ☑ ALL CAPACITOR VALUES ARE IN MICROFARADS ( $\mu$ F), UNLESS OTHERWISE SPECIFIED.
  - ☑ 0.1 MICROFARADS ( $\mu$ F) BYPASS CAPACITOR ON ALL IC'S.

Sec. 5: PCBs



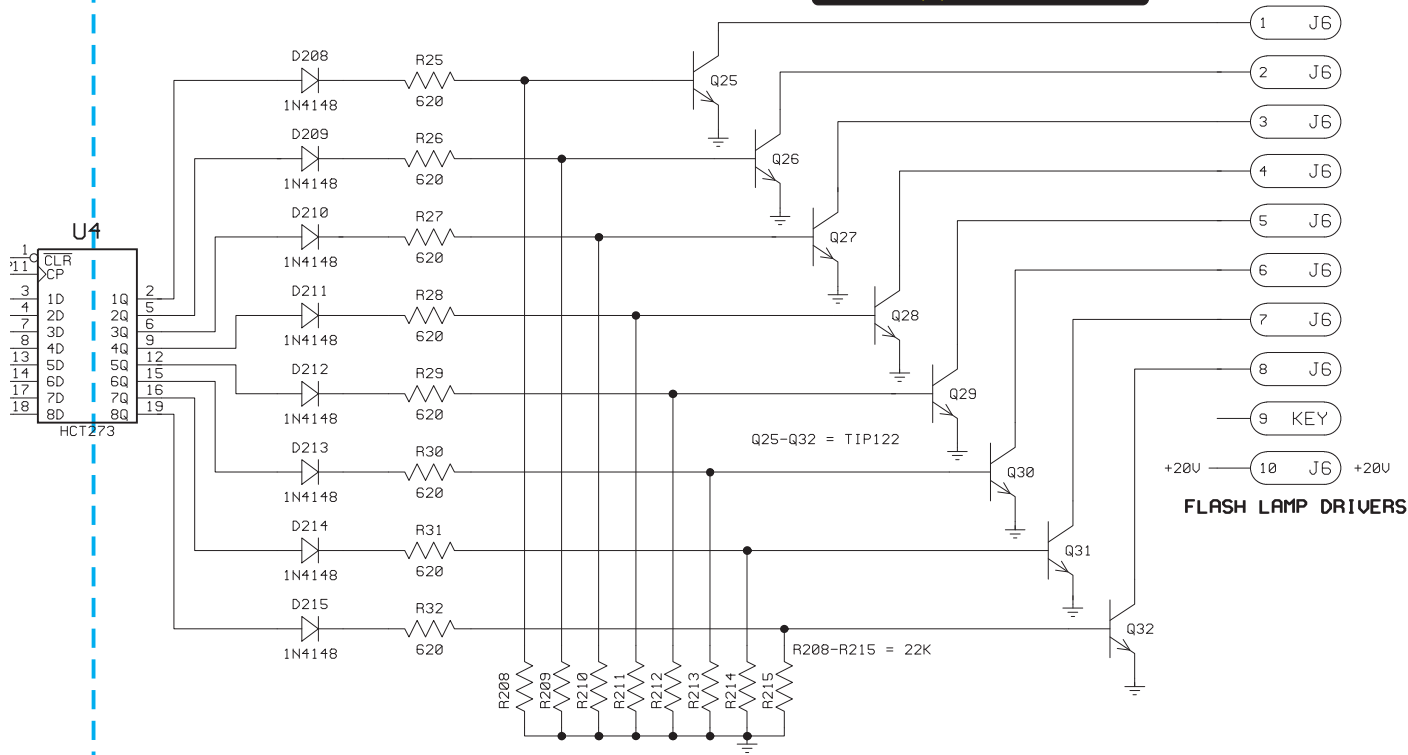


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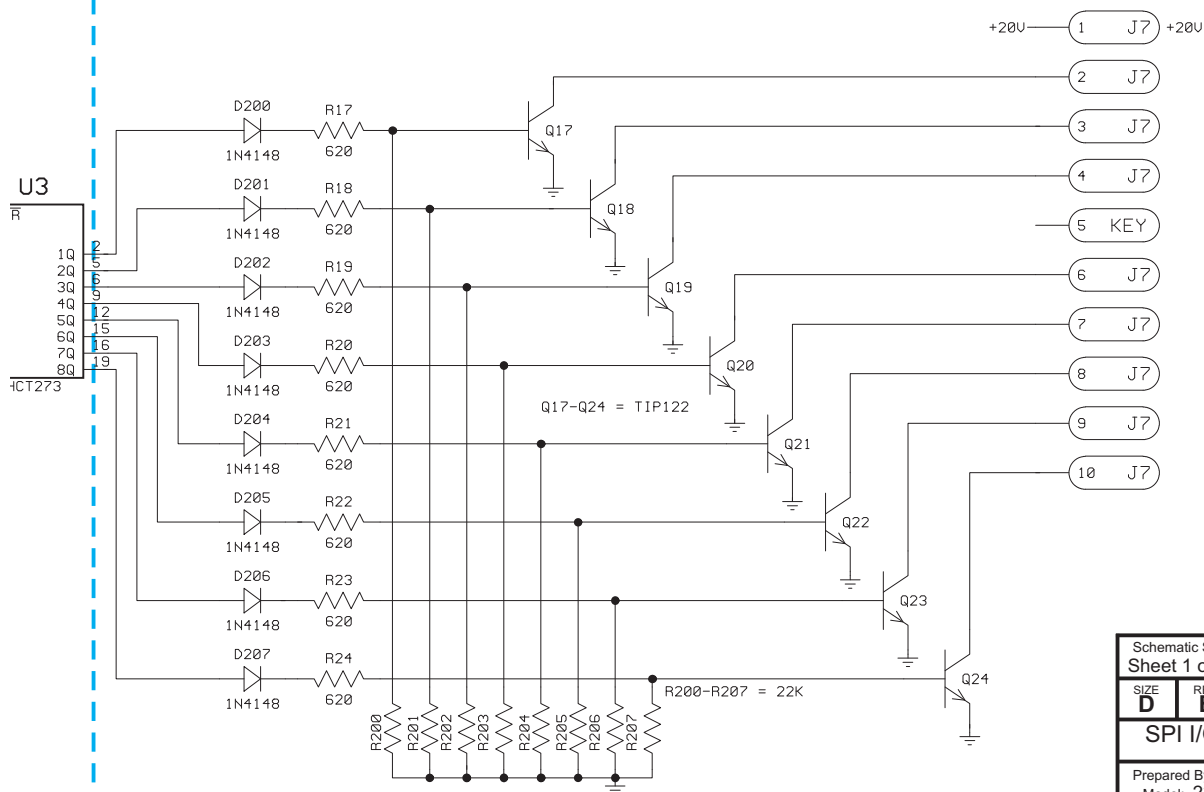
1

SOLB	(4-4D)
SOLA	(4-4D)
SOLC	(4-4D)
RESET	(2-4A, 3-4B, 4-1D)
FLMP	(4-4D)
D0-D7	(2-4A, 3-4B, 4-4B)

The above circuit(s) continue at the address shown (#-XY).  
# = Sheet Number (1-5), X = Column Grid, Y = Row Grid



LOW CURRENT SOLENOIDS



Schematic Set		<b>STERN</b>
Sheet 1 of 5		
SIZE	REV.	<b>PINBALL, INC.</b>
D	E	
SPI I/O Power Driver Board		
SPI Part No: 520-5137-01		
Prepared By: CES Inc. Edited By: SPI Inc.		
Model: 237-0161-00 Dated: 09/05/97		

2

1

D

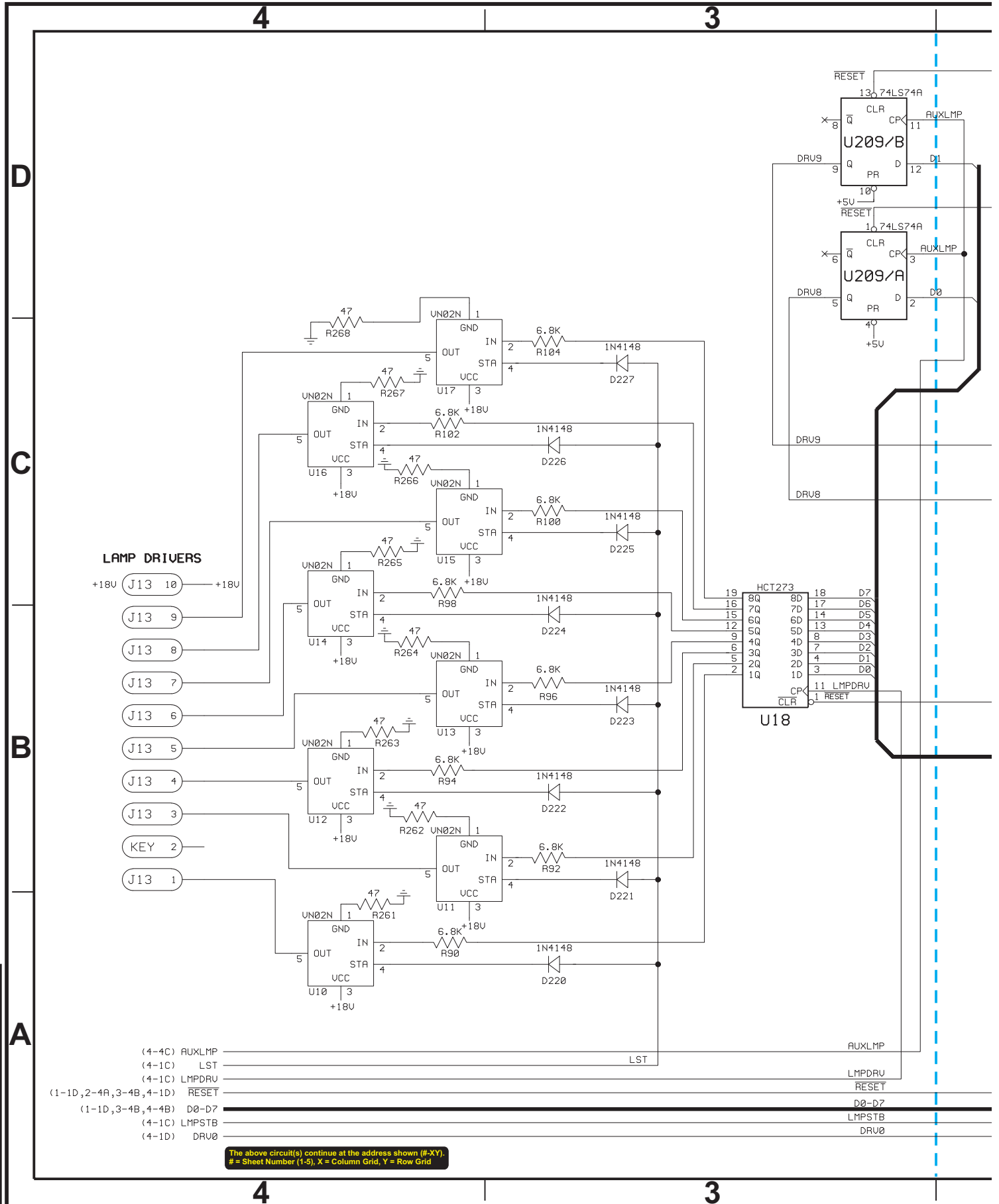
C

B

A

Sec. 5: PCBs

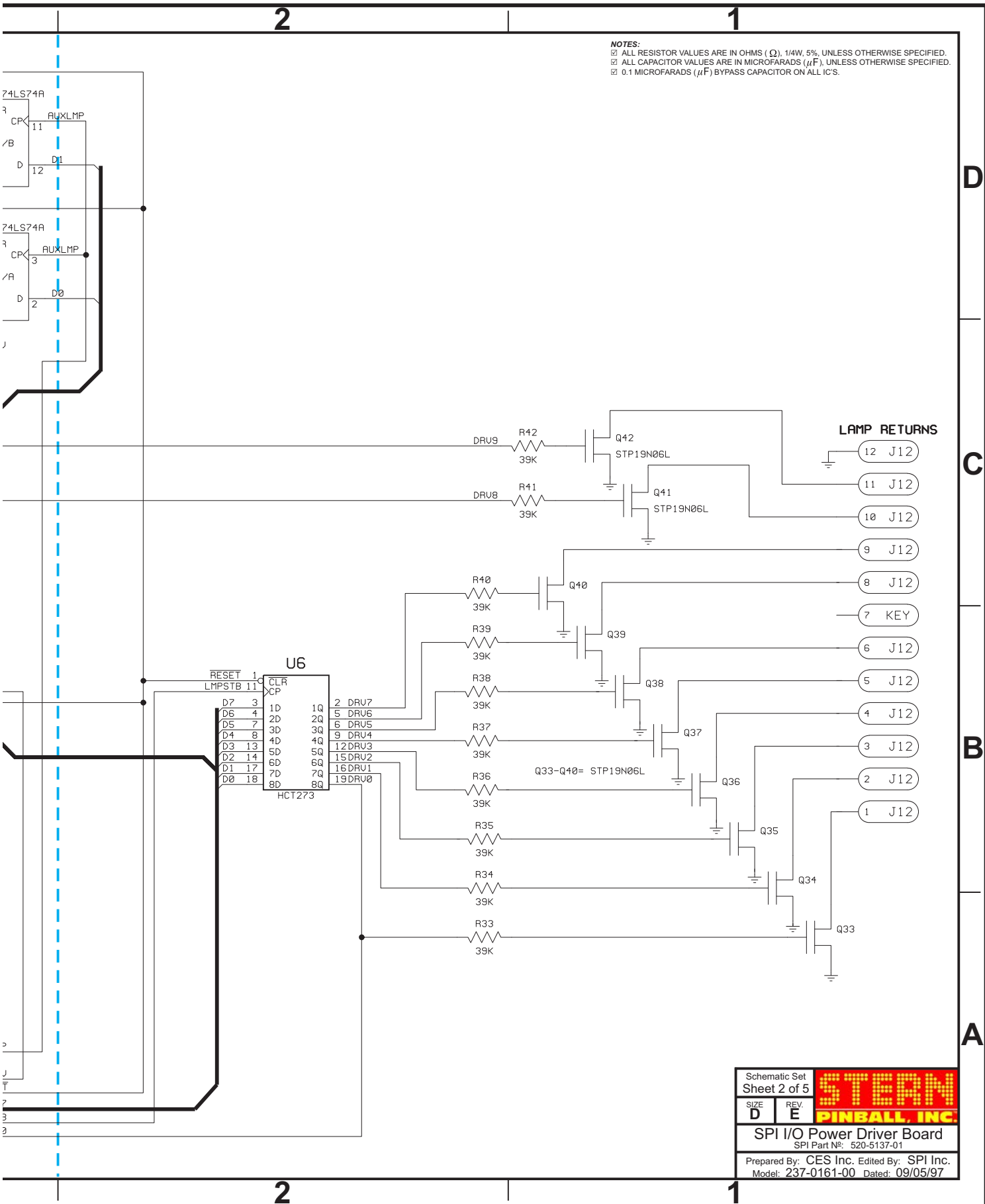
# I/O Power Driver Board Schematic (Sheet 2 of 5)



The above circuit(s) continue at the address shown (#-XY).  
 # = Sheet Number (1-5), X = Column Grid, Y = Row Grid

Sec. 5: PCBs





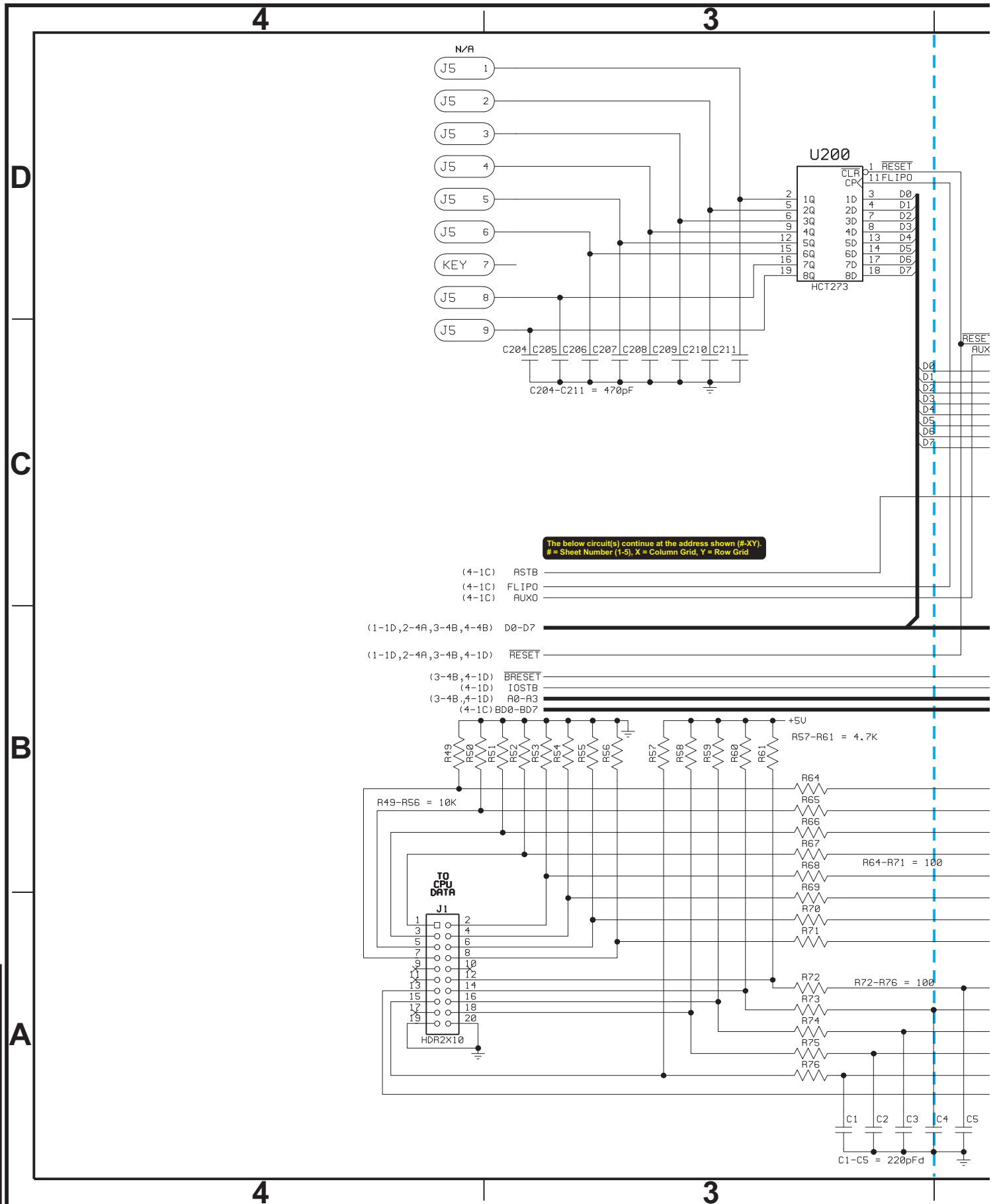
NOTES:  
 [X] ALL RESISTOR VALUES ARE IN OHMS (Ω), 1/4W, 5%, UNLESS OTHERWISE SPECIFIED.  
 [X] ALL CAPACITOR VALUES ARE IN MICROFARADS (μF), UNLESS OTHERWISE SPECIFIED.  
 [X] 0.1 MICROFARADS (μF) BYPASS CAPACITOR ON ALL IC'S.

Schematic Set		<b>STERN</b>	
Sheet 2 of 5			
SIZE	D	REV.	E
SPI I/O Power Driver Board			
SPI Part No: 520-5137-01			
Prepared By: CES Inc. Edited By: SPI Inc.			
Model: 237-0161-00 Dated: 09/05/97			

Sec. 5: PCBs



# I/O Power Driver Board Schematic (Sheet 3 of 5)



The below circuit(s) continue at the address shown (#-XY).  
 # = Sheet Number (1-5), X = Column Grid, Y = Row Grid

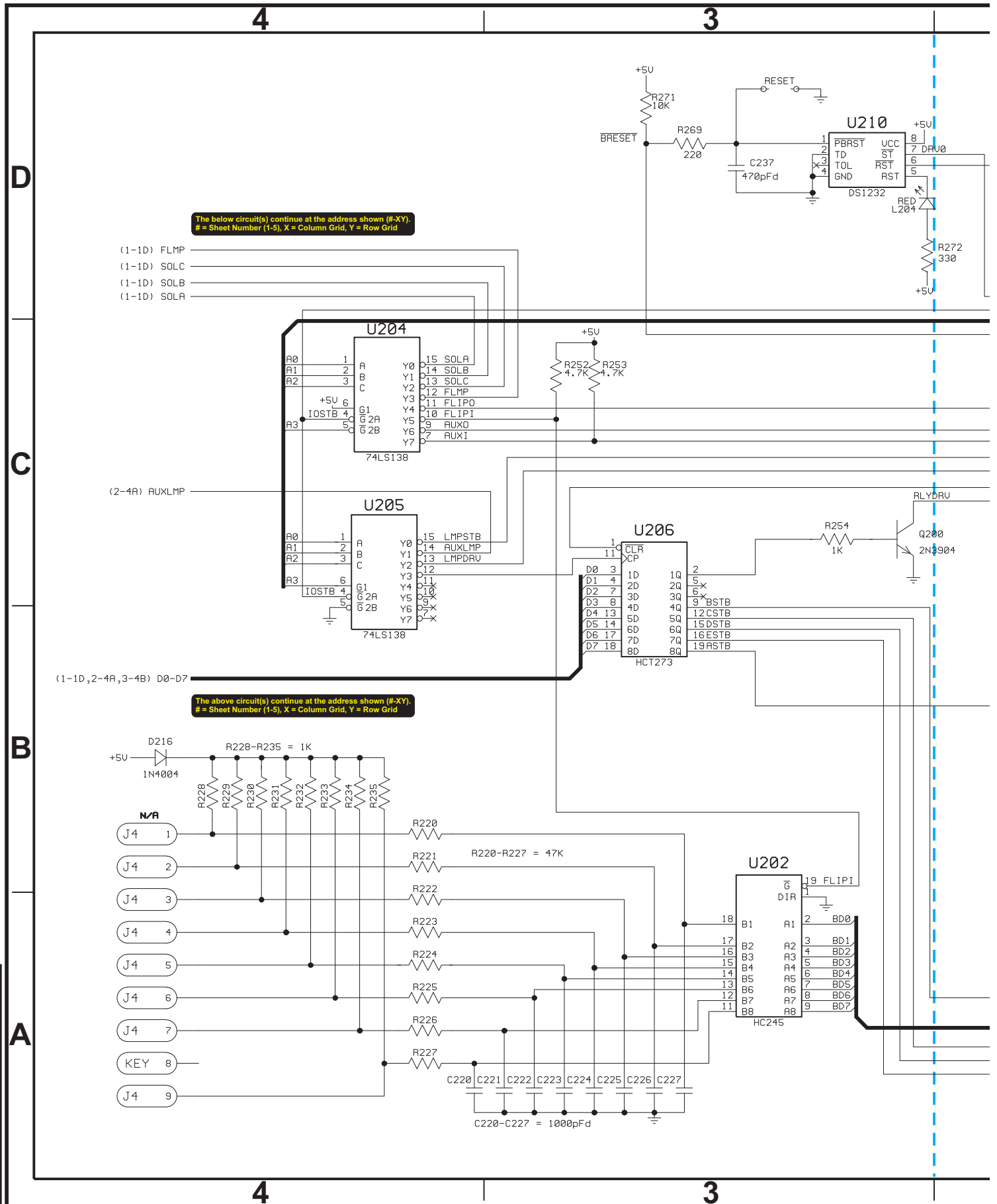
- (4-1C) ASTB
- (4-1C) FLIPO
- (4-1C) AUXD
- (1-1D, 2-4A, 3-4B, 4-4B) D0-D7
- (1-1D, 2-4A, 3-4B, 4-1D) RESET
- (3-4B, 4-1D) BRESET
- (4-1D) IOSTB
- (3-4B, 4-1D) A0-A3
- (4-1C) BD0-BD7

Sec. 5: PCBs





# I/O Power Driver Board Schematic (Sheet 4 of 5)

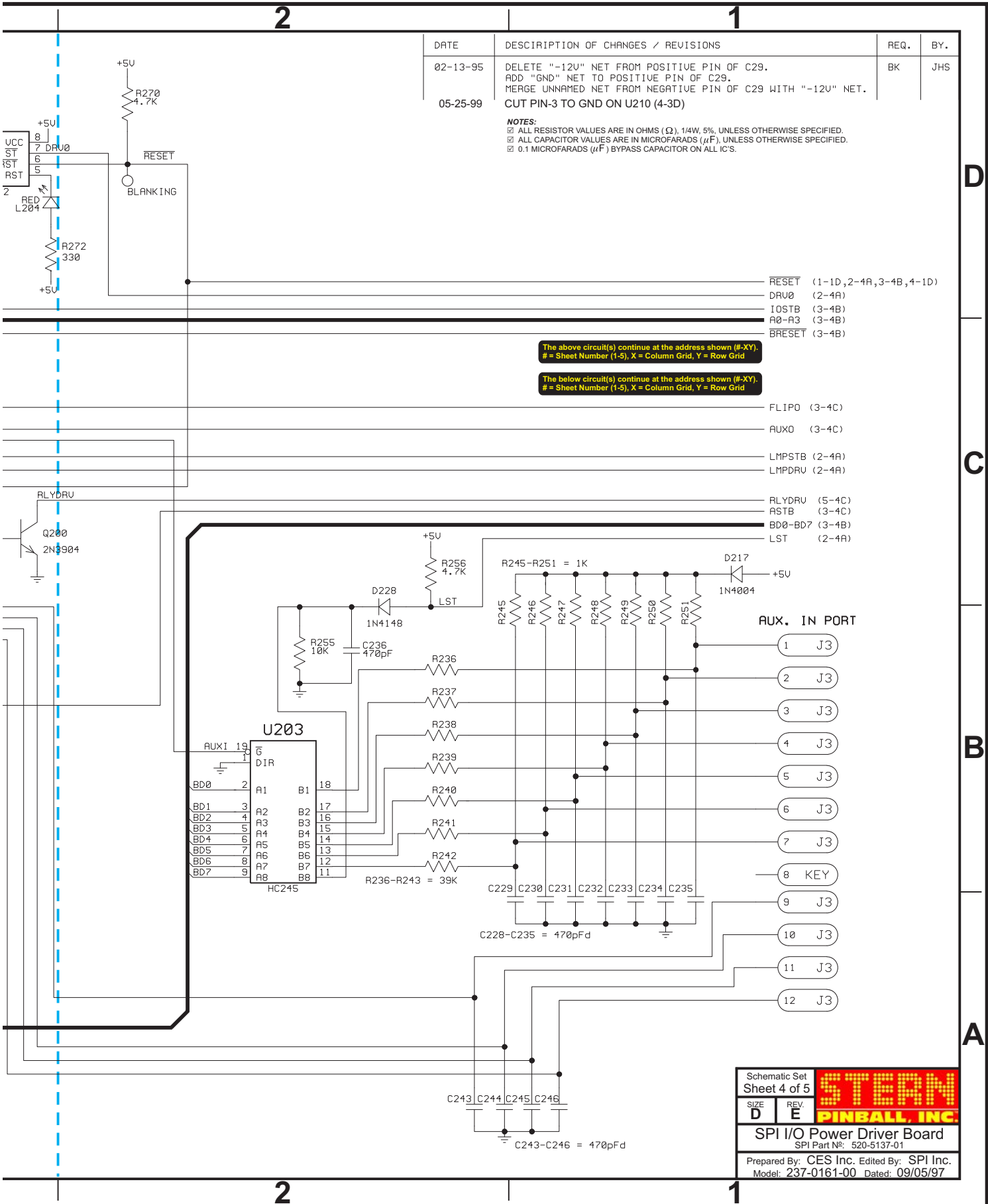


Sec. 5: PCBs





# I/O Power Driver Board Schematic (Sheet 4 of 5)



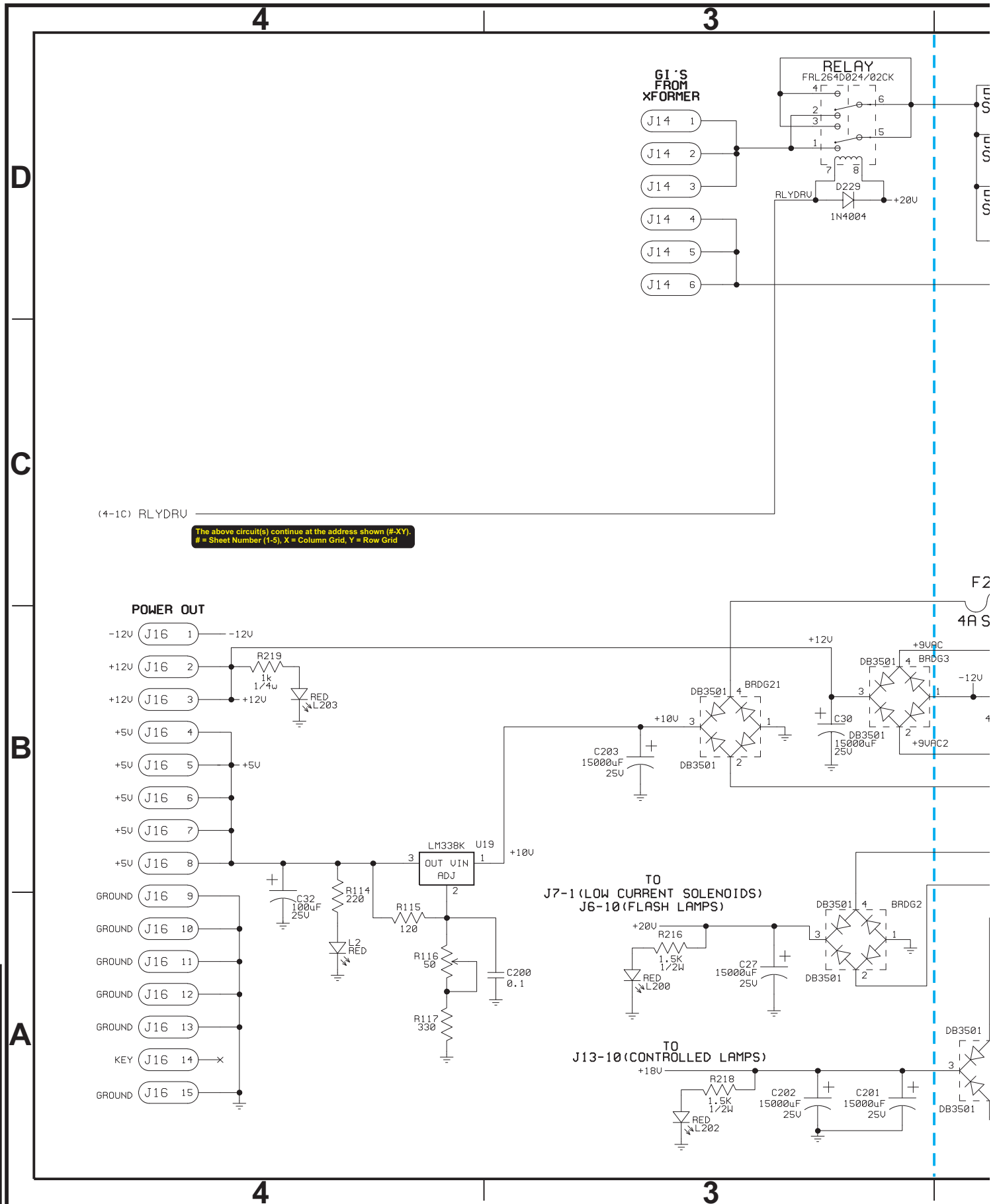
D

C

B

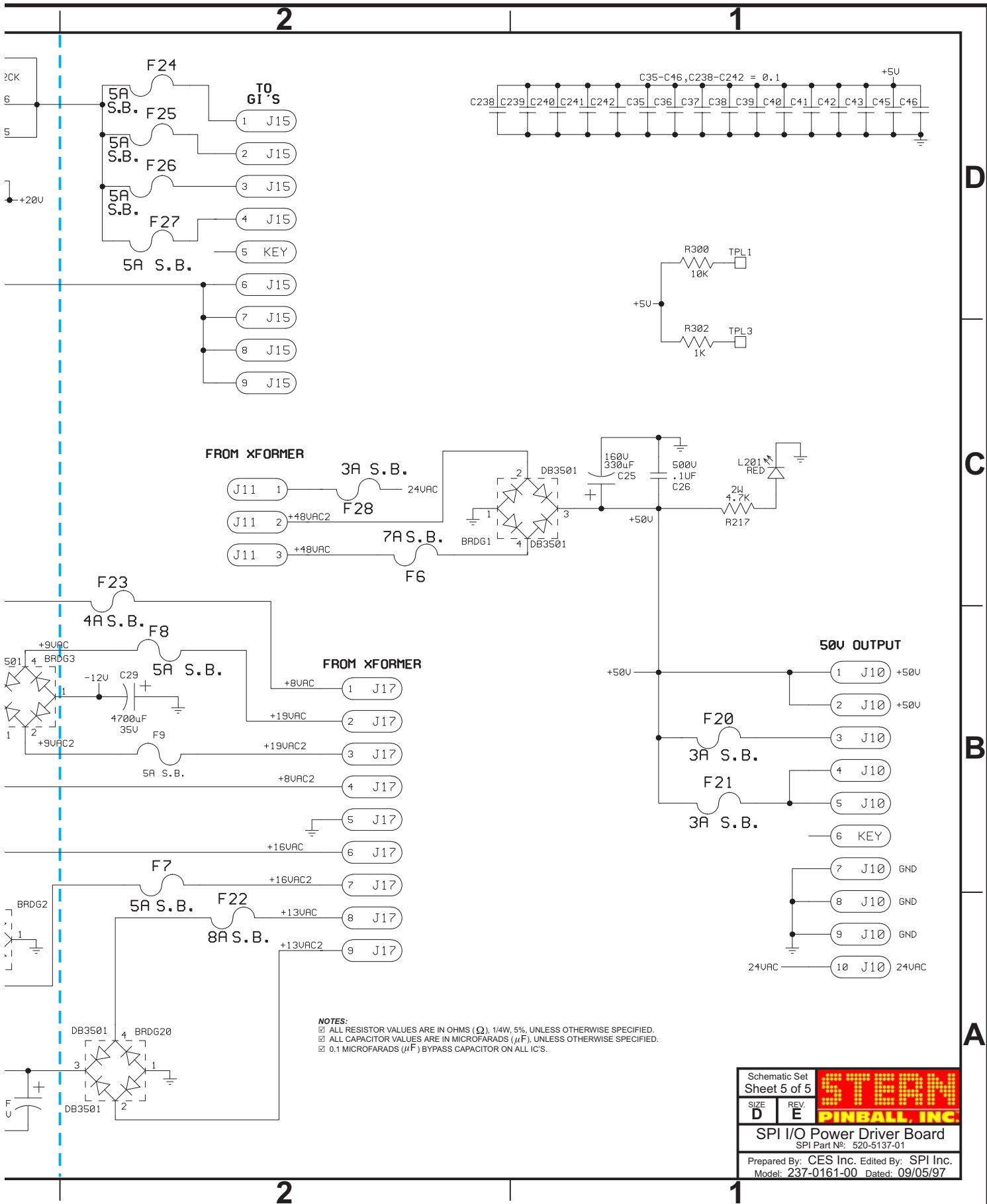
A

Sec. 5: PCBs



Sec. 5: PCBs



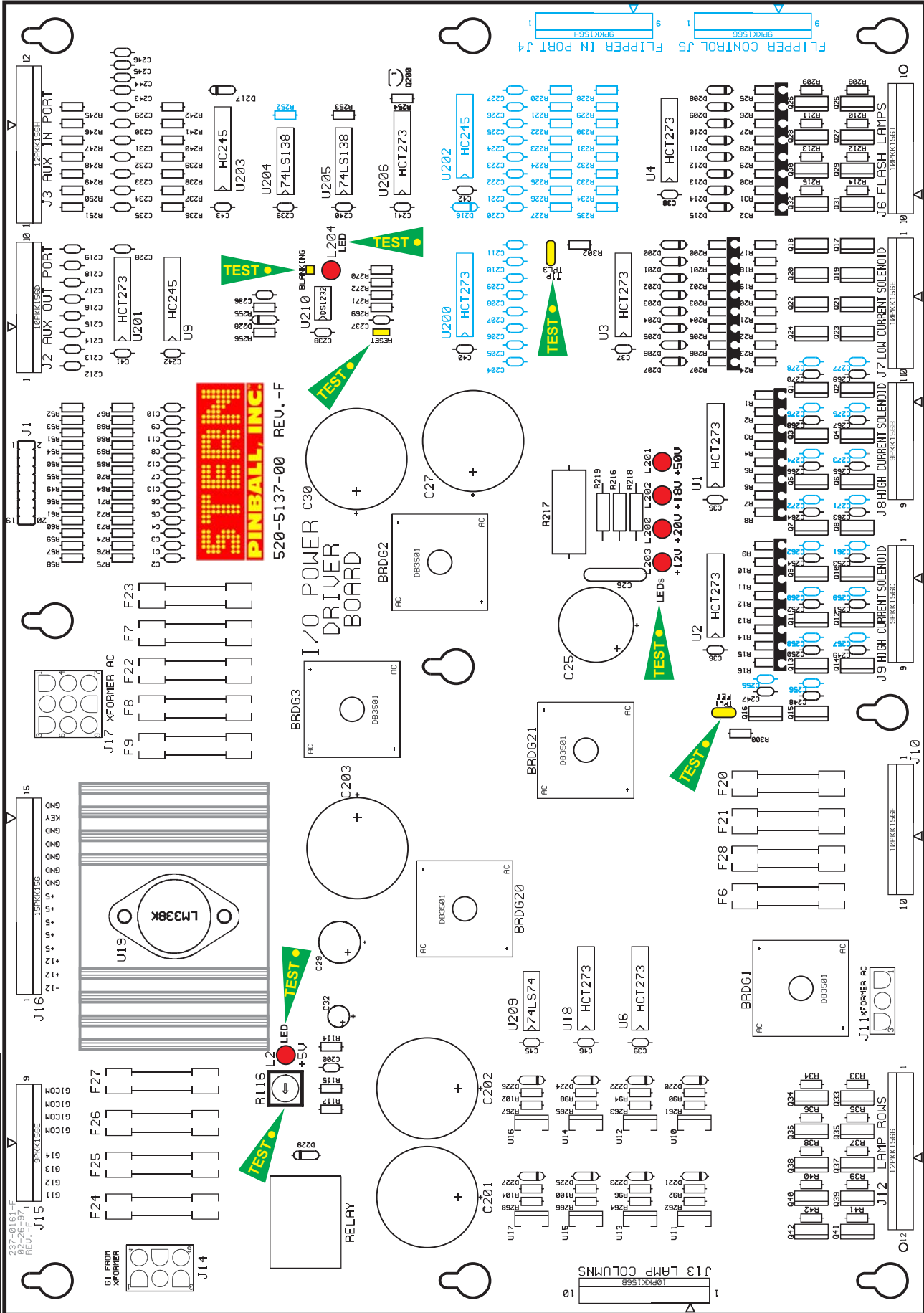


D  
C  
B  
A

Sec. 5: PCBs



# I/O Power Driver Board Component Layout



Test Points:



← TIP TPL3  
← BLANKING  
← L204 LED

← RESET

LEDs :  
← L201+50v  
← L202+18v  
← L200+20v  
← L203+12v

← FET TPL1

LED :  
← L2+5V  
← R116 POT

Actual Board Size 15.698" X 11"



# I/O Power Driver Board Parts

ITEM	QTY	PART NUMBER	REF-DESIGNATOR	DESCRIPTION (NS = Not Stuffed)
—	1	520-5137-01	I/O Power Driver Board	<b>Complete PCB Assembly</b>
01	5	112-5000-00	BRDG1, BRDG2, BRDG3, BRDG20, BRDG21	DB3501
02	13	125-5030-00	C1, C2, C3>C6, C7, C8, C9>C10, C11, C12	220pF, (221), Cap.
03	1	125-5033-00	C25	100uF, 150v, Radial Lytic Cap.
04	1	125-5035-00	C26	.1uF, 500v, Ceramic Disk Cap.
05	5	125-5036-00	C27, C30, C201, C202, C203	15000uF, 25v, Radial Lytic Cap.
06	1	125-5034-00	C29	4700uF, 35v, Radial Lytic Cap.
07	1	125-5032-00	C32	100uF, 25v, Radial Lytic Cap.
08	17	125-5031-00	C35, C36, C37, C38, C39, C40, C41, C42, C43, C45, C46, C200, C238, C239, C240, C241, C242	0.1uF, (104), Cap.
09	22	125-5028-00	C212>C219, C228>C237, C243>C246 (C204-C211: NS)	470pF, (471), Axial Cap.
10	0	n/a	(C220>C227: NS)	
11	16	125-5029-00	C247>C254, C263>C270	0.01uF, (103), 100v Cap.
12	0	125-5027-00	(C255>C262, C271>C278: NS)	0.1uF, (104), 100v, Cap.
13	25	112-0054-00	D200>D207, D208>D215, D220, D221, D222, D223, D224, D225, D226, D227	1N4148, Diode
14	2	112-5003-00	D217, D229 (D216: NS)	1N4004, Diode
15	26	205-0004-00	F6, F7, F8, F9, F20, F21, F22, F23, F24> F27, F28	Fuse Clips
16	1	200-5000-03	F6	7A 250v S.B. Fuse
17	7	200-5000-01	F7, F8, F9, F24>F27	5A 250v S.B. Fuse
18	3	200-5000-08	F21, F20, F28	3A 250v S.B. Fuse
19	1	200-5000-05	F22	8A 250v S.B. Fuse
20	1	200-5000-06	F23	4A 250v S.B. Fuse
21	1	045-5015-01	J1	20-Pin, 0.1 Dual Row Header
22	1	045-5014-01	J2 (Key Pin-4), J6 (Key Pin-9), J7 (Key Pin-5) J10 (Key Pin-6), J13 (Key Pin-2)	10PKK156
23	1	045-5015-00	J3 (Key Pin-8)	12PKK156
	0	n/a	(J4, J5: NS)	
24	1	045-5013-00	J8 (Key Pin-2), J9 (Key Pin-3), J15 (Key Pin-5)	9PKK156
25	1	045-0014-03	J11	10-84-4030 (3-Pin MOLEX)
26	1	045-5015-00	J12 (Key Pin-7)	12PKK156
27	1	045-0014-06	J14	10-84-4060 (6-Pin MOLEX)
28	1	045-5016-00	J16 (Key Pin-14)	15PKK156
29	1	045-0014-09	J17	10-84-4090 (9-Pin MOLEX)
30	6	165-5099-00	L2, L200, L201, L202, L203, L204	<b>LED T1-3/4 DIFFUSER LED</b>
31	16	110-0106-00	Q1>Q16	22NE10L STP, Transistor
32	16	110-0067-00	Q17>Q24, Q25>Q32	TIP122
33	10	110-0088-00	Q33>Q42	19N06L STP, Transistor
34	1	110-0069-00	Q200	2N3904, Transistor.
35	32	121-5042-00	R1>R8, R9>R16, R200>R207, R208>R215	22K $\Omega$ 1/4W Res.
36	16	121-5003-00	R17>R24, R25>R32	620 $\Omega$ 1/4W Res.
37	17	121-5045-00	R33>R42, R236>R242	39K $\Omega$ 1/4W Res.
38	8	121-5021-00	R49, R57>R61, R253, R256, R270 (R252: NS)	4.7K $\Omega$ 1/4W Res.
39	11	121-5011-00	R50>R56, R255, R271, R300	10K $\Omega$ 1/4W Res.
40	13	121-5007-00	R64>R76	100 $\Omega$ 1/4W Res.
			<b>Resistors on Solder Side @ J2-Pins: 1-3 &amp; 5-9</b>	
41	8	121-5029-00	R90, R92, R94, R96, R98, R100, R102, R104	6.8K $\Omega$ 1/4W Res.
42	2	121-5033-00	R114, R269	220 $\Omega$ 1/4W Res.
43	1	121-5030-00	R115	120 $\Omega$ 1/4W Res.
44	1	121-5039-00	R116	50 $\Omega$ Pot
45	2	121-5036-00	R117, R272	330 $\Omega$ 1/4W Res.
46	2	121-5038-00	R216, R218	1.5K $\Omega$ 1/2W Res.
47	1	121-5050-00	R217	4.7K $\Omega$ 2W Res. (SANDBAR)
48	1	121-5009-00	R219	1K $\Omega$ 1/4W Res.
49	0	n/a	(R220>R227: NS)	
50	9	121-5009-00	R245>R251, R254, R302 (R228>R235: NS)	1K $\Omega$ 1/4W Res.
51	8	121-5032-00	R261, R262, R263, R264, R265, R266, R267, R268	47 $\Omega$ 1/4W Res.
52	1	190-5002-00	RELAY	FRL264D024/02CK Relay
53	2	n/a	TPL1, TPL3	<b>Test Point Wire (24ga.) Loops</b>
54	8	100-5012-00	U1, U2, U3, U4, U6, U18, U201, U206 (U200: NS)	74HCT273
55	1	110-0058-00	U9	74LS245
56	1	100-5023-00	U210	DS1232
57	8	110-0089-00	U10, U11, U12, U13, U14, U15, U16, U17	VN02N
58	1	100-0356-00	U19	LM338K
59	1	n/a	U19	Heatsink (5v Reg.)
60	1	100-0338-00	U203 (U202: NS)	74HC245
61	2	100-0148-00	U204, U205	74LS138
62	1	100-0037-00	U209	74LS74
63	1	n/a	BLANKING, RESET	<b>Test Points</b>





## CPU/Sound Board Theory of Operation

### CPU Section:

The CPU is a **68B09E (U209)** with up to 8 MBytes of CPU Code Space (**U210**). The CPU code is bank selected by the use of **U211** and each bank consists of 16 KBytes. 8 KBytes 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 (BAT1)** which have a **TEST POINT VBATT** 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/Sound 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 two (2) **HC245** Chips (**U207 & U208**). The CPU's reset line is buffered by **Q10** and fed over to the I/O through **CN1**. An I/O Strobe Signal is fed through **CN1-15** and is used to notify the I/O that a valid address is being sent.

### Switches:

The Switch Matrix consists of eight (8) **2N3904** Transistors(**Q1-Q8**) which pull one of 8 strobes 'low' to *activate* a Single Column of switches. The *Switch Return Signals* are fed into **CN7** [SWITCH ROWS] 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 Closure*. If *false switches* are appearing, check that none of the **2N3904** Transistors are permanently pulling the *strobe line low*. Only one strobe from **CN5** [SWITCH COLUMNS] should be *low at any time*. **CN6** [DEDICATED SWITCH IN] 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 Board is 8 bits wide. There are separate *Input* and *Output Busses*. The *Input Bus* from the Plasma Controller to the CPU/Sound Board comes in on **CN8** [PLASMA CONTROL]-Pins 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-Pins 11-18**. Status back from the Plasma Controller comes in on **CN8-Pins 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 **CN8-Pin 19** [**PSTB** - *Plasma Strobe*]. The 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 (Voice) 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, U26)*. 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 the 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 U209** to the sound section by latching data into **U5**. The sound section's **CPU 68B09E (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**.

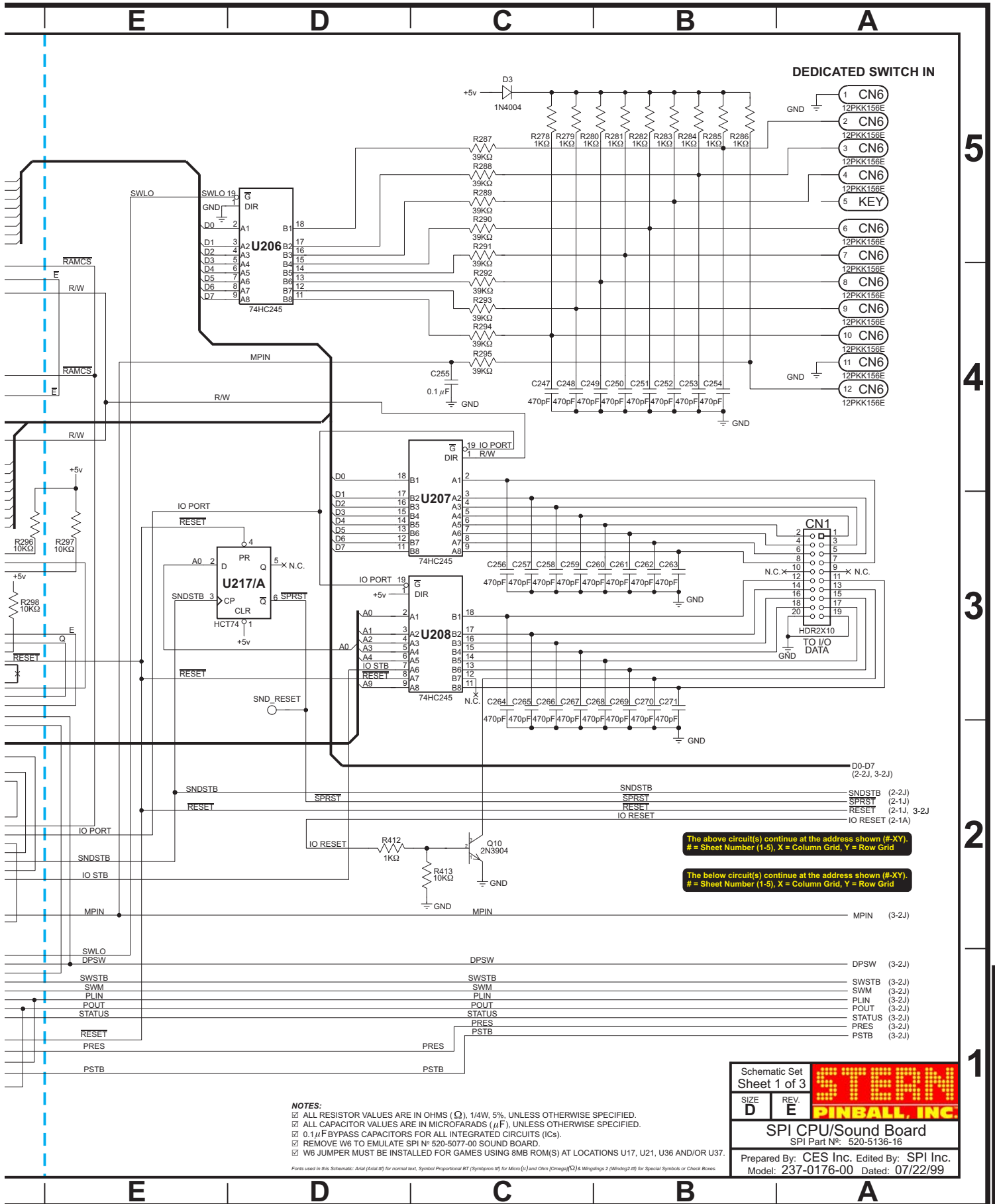
**24Mhz** - The oscillator used for the **BSMT** & derivation of **E & Q**.

**SND-FIRQ** - The sound sections **CPU Interrupt**.

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

**W6 Jumper** - This jumper must be installed for games that use **8MB** Sound EPROMs (**U17 U21 U36 U37**). For games which use **4MB** Sound EPROMs this jumper is not installed but will operate on boards with **W6** installed.





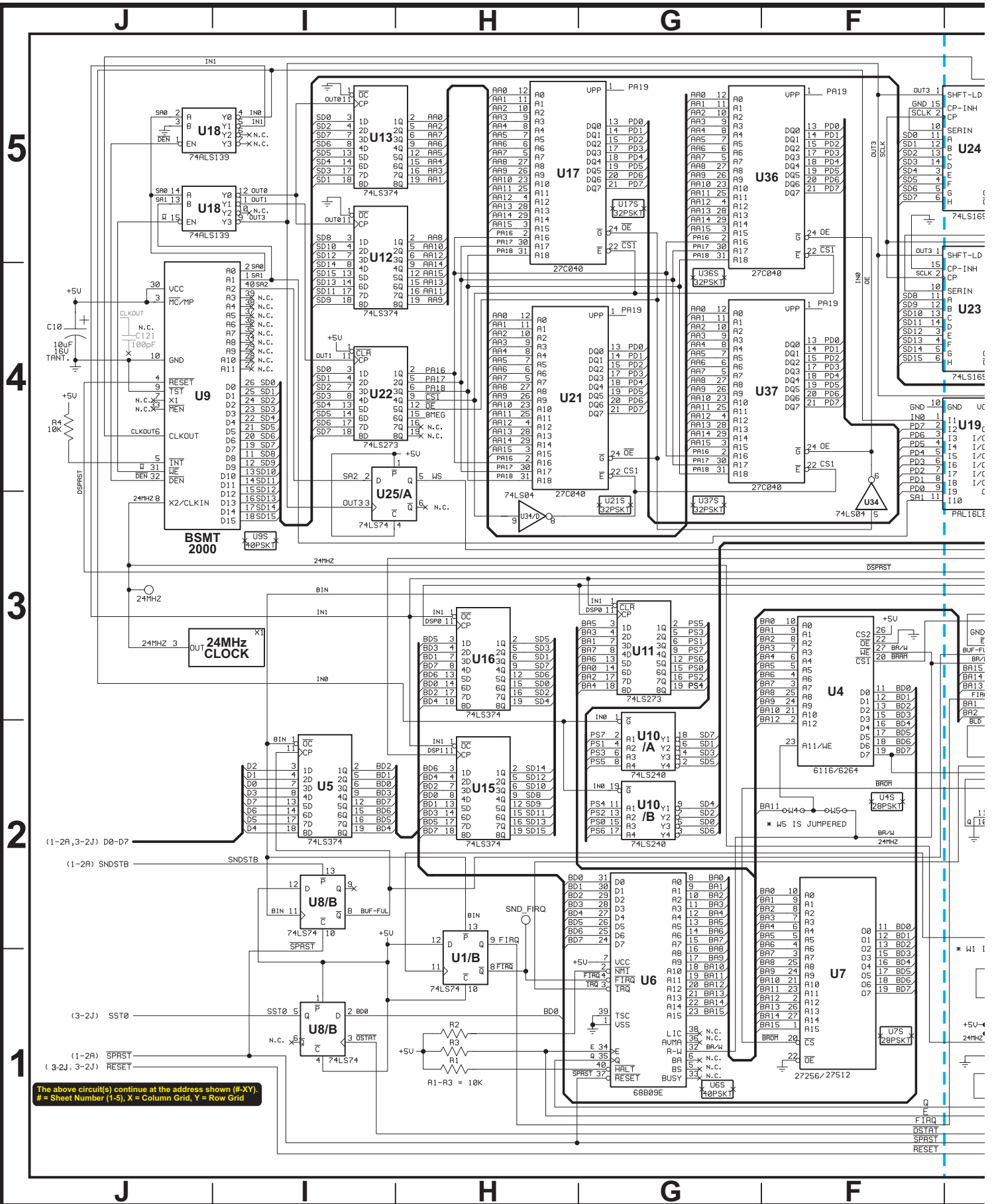
The below circuit(s) continue at the address shown (#-XY).  
# = Sheet Number (1-5), X = Column Grid, Y = Row Grid

- NOTES:**
- ☑ ALL RESISTOR VALUES ARE IN OHMS (Ω), 1/4W, 5%, UNLESS OTHERWISE SPECIFIED.
  - ☑ ALL CAPACITOR VALUES ARE IN MICROFARADS (μF), UNLESS OTHERWISE SPECIFIED.
  - ☑ 0.1 μF BYPASS CAPACITORS FOR ALL INTEGRATED CIRCUITS (ICs).
  - ☑ REMOVE W6 TO EMULATE SPI N° 520-5077-00 SOUND BOARD.
  - ☑ W6 JUMPER MUST BE INSTALLED FOR GAMES USING 8MB ROM(S) AT LOCATIONS U17, U21, U36 AND/OR U37.

Fonts used in this Schematic: Arial (Arial.ttf) for normal text, Symbol Proportional BT (SymbolProportional BT) for Micro (μ) and Ohm (Ω) and Omega (Ω) & Wingsdings 2 (Wingsdings 2) for Special Symbols or Check Boxes.

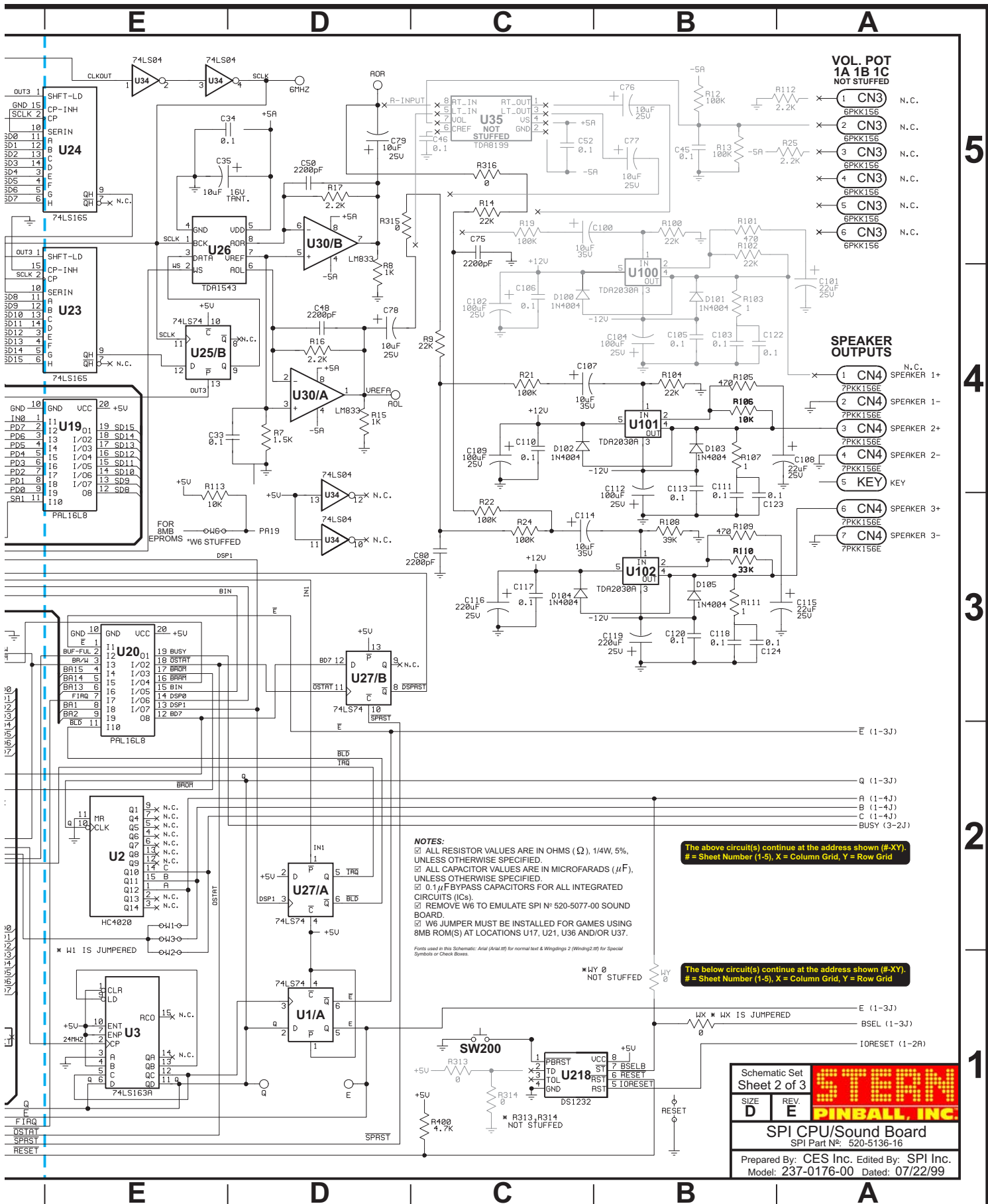
Schematic Set		<b>STERN</b>
Sheet 1 of 3		
SIZE	REV	<b>PINBALL, INC.</b>
D	E	
SPI CPU/Sound Board		
SPI Part N°: 520-5136-16		
Prepared By: CES Inc. Edited By: SPI Inc.		
Model: 237-0176-00 Dated: 07/22/99		





Sec. 5: PCBs





- VOL. POT**  
1A 1B 1C  
NOT STUFFED
- 1 CN3 N.C.
  - 2 CN3 N.C.
  - 3 CN3 N.C.
  - 4 CN3 N.C.
  - 5 CN3 N.C.
  - 6 CN3 N.C.

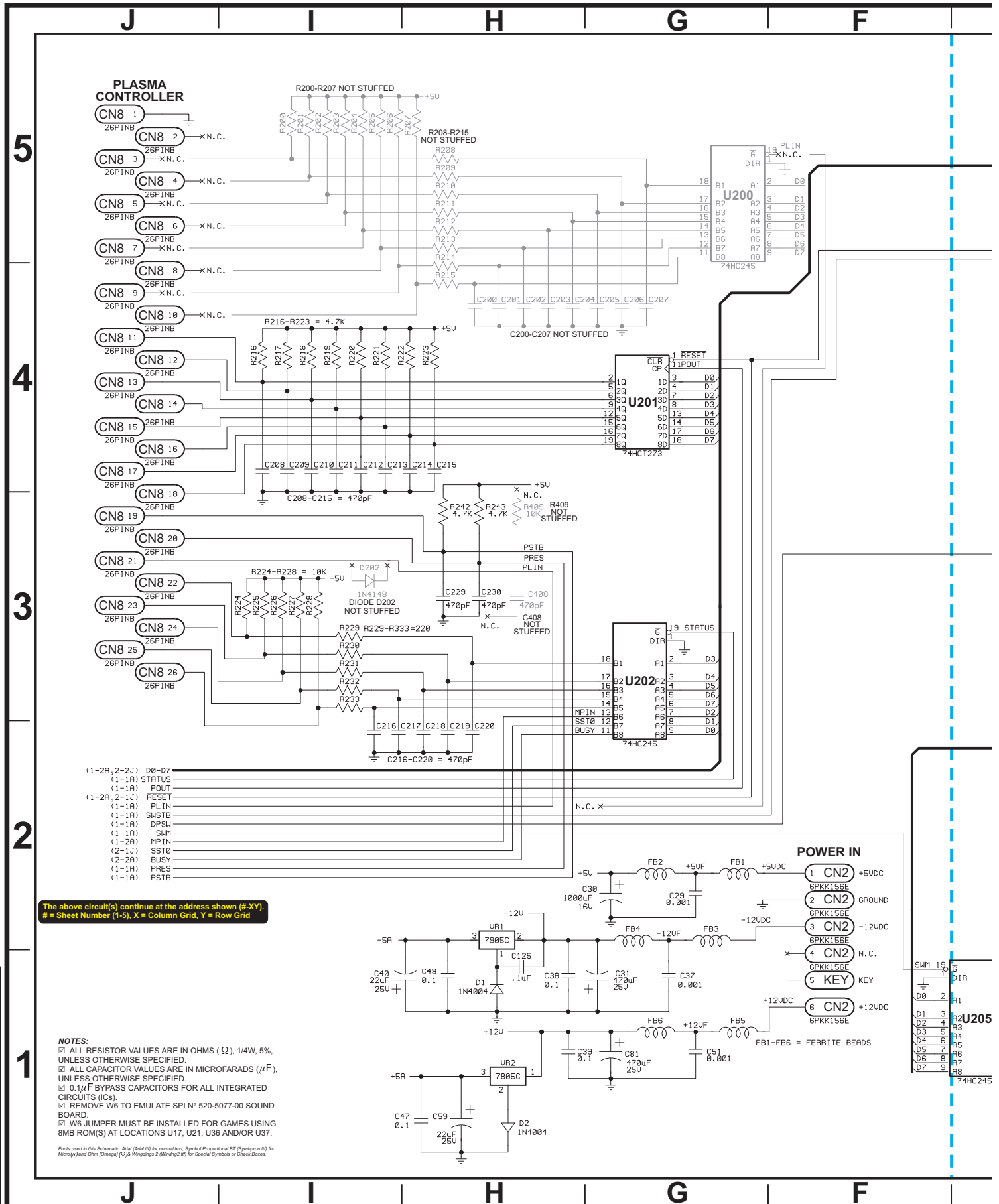
- SPEAKER OUTPUTS**
- 1 CN4 SPEAKER 1+
  - 2 CN4 SPEAKER 1-
  - 3 CN4 SPEAKER 2+
  - 4 CN4 SPEAKER 2-
  - 5 KEY KEY
  - 6 CN4 SPEAKER 3+
  - 7 CN4 SPEAKER 3-

**NOTES:**  
 [X] ALL RESISTOR VALUES ARE IN OHMS (Ω), 1/4W, 5%, UNLESS OTHERWISE SPECIFIED.  
 [μF] ALL CAPACITOR VALUES ARE IN MICROFARADS (μF), UNLESS OTHERWISE SPECIFIED.  
 [0.1μF] BYPASS CAPACITORS FOR ALL INTEGRATED CIRCUITS (ICs).  
 [W6] REMOVE W6 TO EMULATE SPI N° 520-5077-00 SOUND BOARD.  
 [W6] W6 JUMPER MUST BE INSTALLED FOR GAMES USING 8MB ROM(S) AT LOCATIONS U17, U21, U36 AND/OR U37.

The above circuit(s) continue at the address shown (#-XY).  
 # = Sheet Number (1-5), X = Column Grid, Y = Row Grid

The below circuit(s) continue at the address shown (#-XY).  
 # = Sheet Number (1-5), X = Column Grid, Y = Row Grid

Schematic Set		<b>STERN</b>
Sheet 2 of 3		
SIZE	REV	<b>PINBALL, INC.</b>
D	E	
SPI CPU/Sound Board		
SPI Part N°: 520-5136-16		
Prepared By: CES Inc. Edited By: SPI Inc.		
Model: 237-0176-00 Dated: 07/22/99		



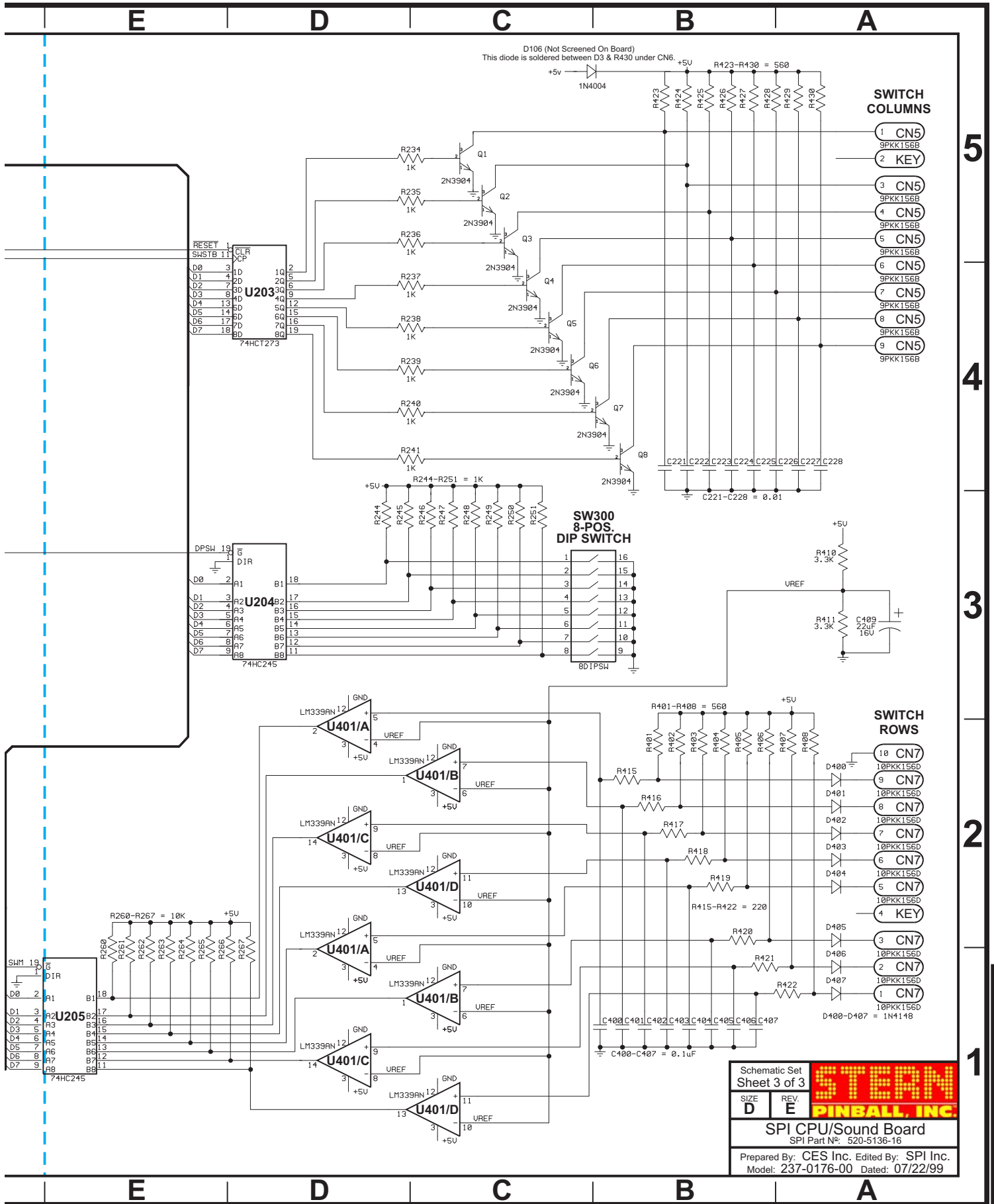
The above circuit(s) continue at the address shown (#-XY), # = Sheet Number (1-5), X = Column Grid, Y = Row Grid

- NOTES:**
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  - ☑ ALL CAPACITOR VALUES ARE IN MICROFARADS (μF), UNLESS OTHERWISE SPECIFIED.
  - ☑ 0.1μF BYPASS CAPACITORS FOR ALL INTEGRATED CIRCUITS (ICs).
  - ☑ REMOVE W6 TO EMULATE SPI N° 520-5077-00 SOUND BOARD.
  - ☑ W6 JUMPER MUST BE INSTALLED FOR GAMES USING 8MB ROM(S) AT LOCATIONS U17, U21, U36 AND/OR U37.
- Fonts used in this Schematic: Arial (Arial.ttf) for normal text, Symbol Proportional BT (Symbolpropn.ttf) for Metric (u) and Open (Open.ttf) (D2k) Webdings 2 (Webdings2.ttf) for Special Symbols or Check Boxes.

Sec. 5: PCBs



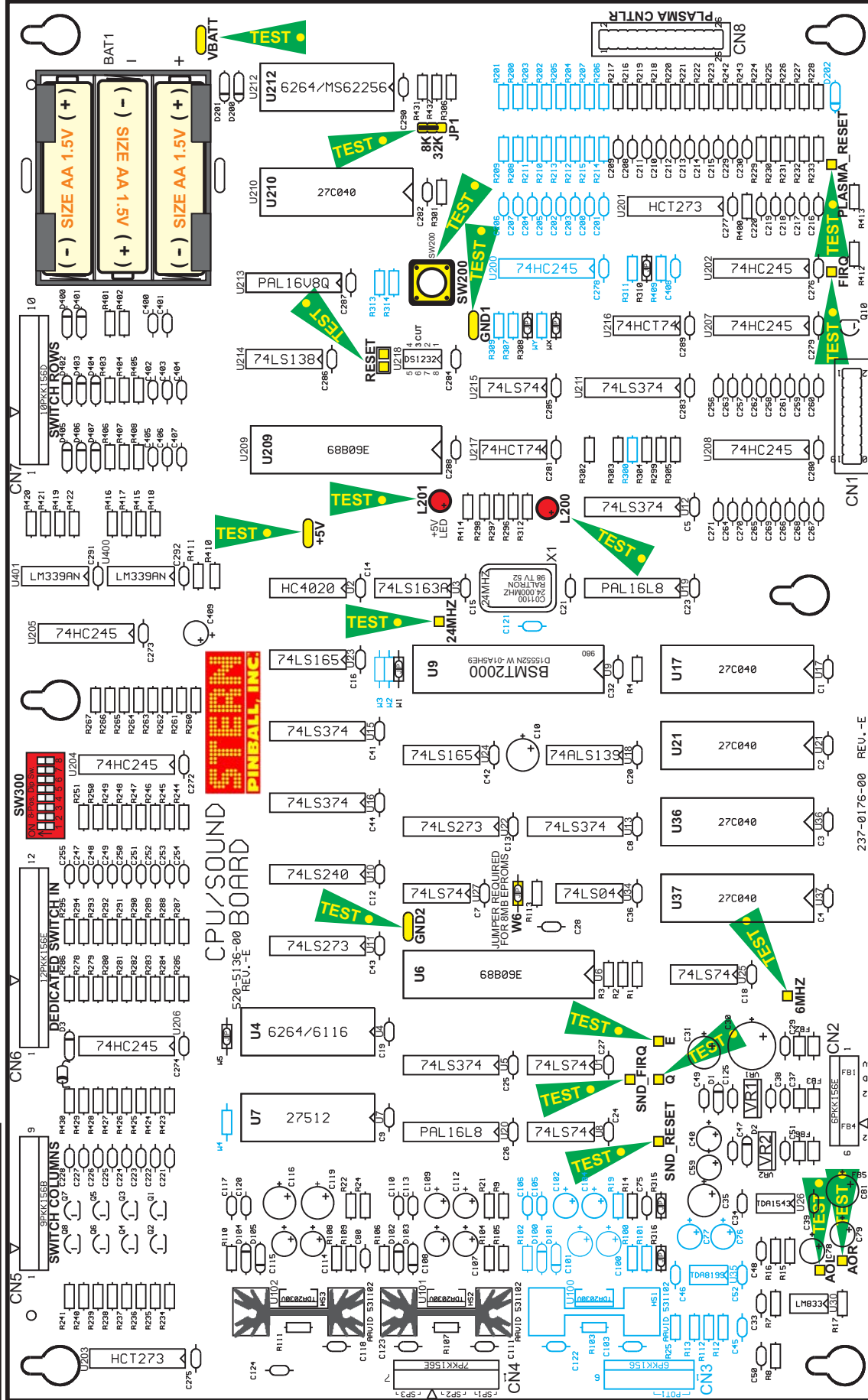




Schematic Set		<b>STERN</b>	
Sheet 3 of 3			
SIZE	REV	<b>PINBALL, INC.</b>	
D	E		
<b>SPI CPU/Sound Board</b> SPI Part No: 520-5136-16			
Prepared By: CES Inc. Edited By: SPI Inc. Model: 237-0176-00 Dated: 07/22/99			

Sec. 5: PCBs

# CPU/Sound Board Component Layout



- Test Points:**
- ← VBATT
  - ← 8K/32K JUMPER JP1
  - ← PLASMA\_RESET
  - ← FIRQ SW200
  - ← GND1
  - ← RESET
  - LEDs :
    - ← L201+5v & L200
    - ← +5V
  - ← 24MHZ
  - ← 237-0176-00 REV.-E
  - REQUIRED FOR 8MB EPROM USE**
  - ← W6 JUMPER
  - ← GND2
  - ← 6MHZ
  - ← E
  - ← SND\_FIRQ & Q
  - ← SND\_RESET
  - ← AOL & AOR

Sec. 5: PCBs



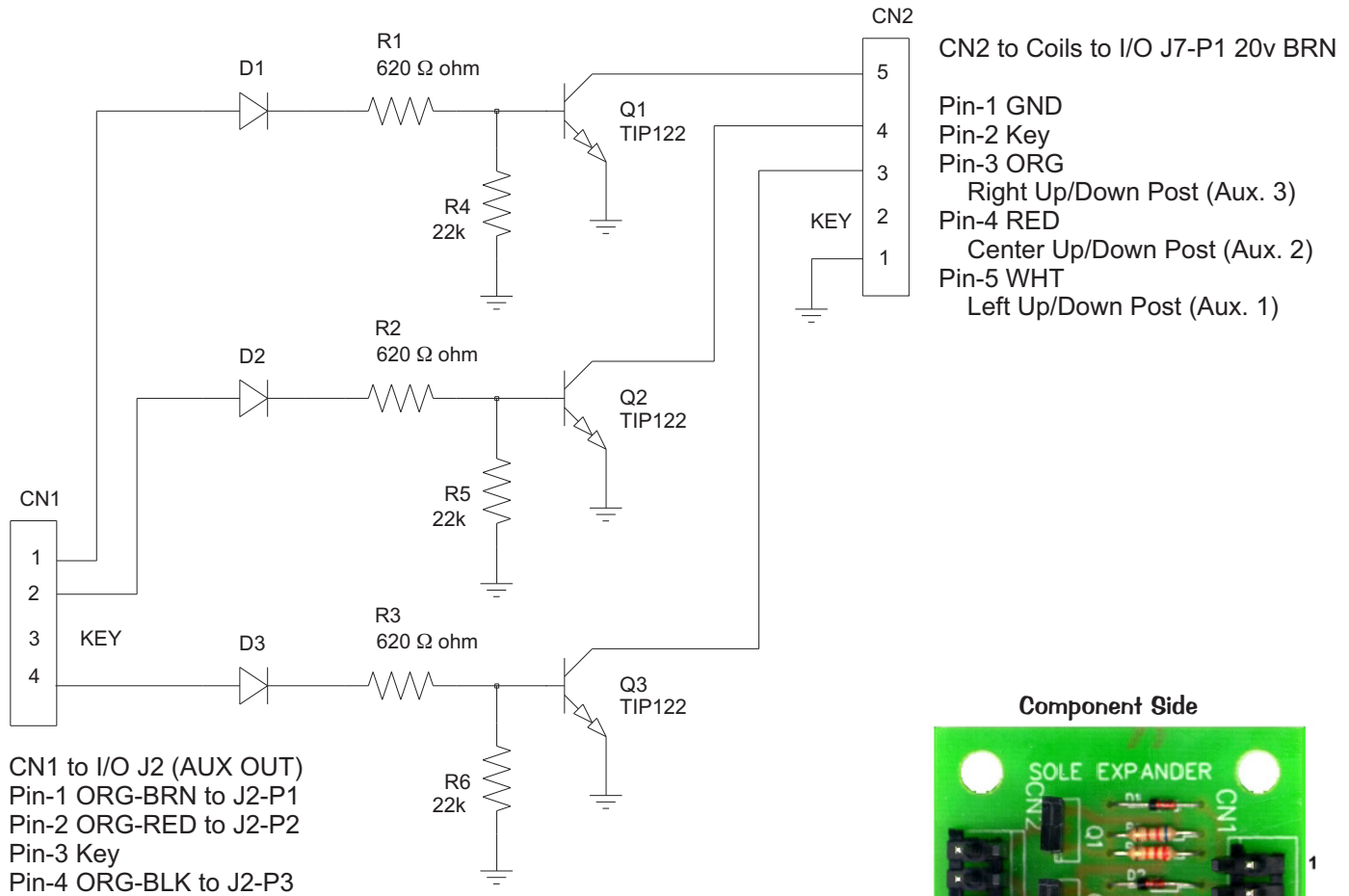
Actual Board Size  
14.67" X 9.125"

# CPU/Sound Board Parts

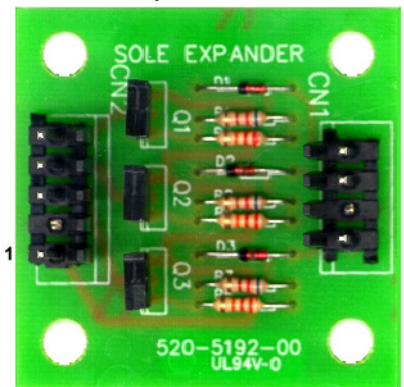
ITEM	QTY	PART NUMBER	REF-DESIGNATOR	DESCRIPTION (NS = Not Stuffed)
—	1	520-5136-16	CPU/Sound Board Mono (FCC FEB98)	Complete PCB Assembly
01	1	545-5685-00	BAT1 HOLDER (Always replace all 3, Size AA 1.5v Cells, with new ones, when required)	
02	79	125-5031-00	C1, C2, C3, C4, C5, C7, C8, C9, C12, C13, C14, C15, C16, C18, C19, C20, C21, C23, C24, C25, C26, C28, C32, C33, C34, C36, C38, C39, C41, C42, C43, C44, C47, C49, C110, C111, C113, C117, C118, C120, C123, C124, C125, C255, C272, C273, C274, C275, C276, C277, C279, C280, C281, C282, C283, C284, C285, C286, C287, C288, C289, C290, C291, C292, C400>C401, C402>C404, C405>C407 (C45, C46, C52, C103, C105, C106, C122: NS)	0.1uF (104), Axial Cer. Cap.
03	2	125-5017-00	C10, C35	10uF, 16v, Radial Tant. Cap.
04	3	125-5043-00	C29, C37, C51	0.001uF, (102), Cap.
05	1	125-5037-00	C30	1000uF, 16v, Radial Lytic Cap.
06	2	125-5019-00	C31, C81	470uF, 25v, Radial Lytic Cap.
07	4	125-5020-00	C40, C59, C108, C115 (C76, C77, C101: NS)	22uF, 25v, Radial Lytic Cap.
08	4	125-5039-00	C48, C50, C75, C80	0.0022uF, (222), Cap.
09	6	125-5017-00	C78, C79, C107, C114 (C100: NS)	10uF, 25v-35v, Radial Lytic Cap.
10	2	125-5015-00	C109, C112 (C102, C104: NS)	100uF, 25v, Rad. Ltc. Cap.
11	2	125-5012-00	C116, C119	220uF, 25v, Radial Lytic Cap.
12	0	125-5038-00	(C121: NS)	100pF (101), Cap.
13	44	125-5028-00	C208>C215, C216>C220, C229, C230, C247>C254, C256>C263, C264>C271 (C200>C207: NS)	470pF, (471), Cer. Cap.
14	8	125-5029-00	C221>C228 (C408: NS)	0.01uF, (103), 100v Cap.
15	1	125-5014-00	C409	22uF, 16v, Radial Lytic Cap.
16	1	045-5015-01	CN1	20-Pin, 0.1 HEADER
17	1	045-5015-06	CN2 (Key Pin-5) (CN3: NS)	6PKK156
18	1	045-5015-07	CN4 (Key Pin-5)	7PKK156
19	1	045-5013-00	CN5 (Key Pin-2)	9PKK156
20	1	045-5015-00	CN6 (Key Pin-5)	12PKK156
21	1	045-5014-01	CN7 (Key Pin-4)	10PKK156
22	1	045-5015-26	CN8	26-Pin, 0.1 HEADER
23	7	112-5003-00	D1, D2, D3, D102, D103, D104, D105 (D100, D101: NS)	1N4004, Diode
24	2	112-5008-00	D200, D201	1N5817, Diode
25	8	112-0054-00	D400, D401, D402>D404, D405>D407 (D202: NS)	1N4148, Diode
26	6	n/a	(FB1)-FB2, FB3-(FB4), (FB5)-FB6	Ferrite Bead (if required, call Tech Support)
27	1	165-5099-00	L200, L201	LED T1-3/4 DIFFUSER LED
28	10	110-0069-00	Q1>Q8, Q10 (Q9 Not Used)	2N3904, Transistor
29	36	121-5011-00	R1>R3, R4, R106, R113, R224>R228, R244>R251, R260>R267, R296>R298, R299, R301, R302>R305, R306, R413, R431>R432 (R200>R207, R409: NS)	10K Ω 1/4W Res.
30	1	121-5018-00	R7	1.5K Ω 1/4W Res.
31	5	121-5023-00	R9, R14, R104, (R100, R102: NS)	22K Ω 1/4W Res.
32	20	121-5009-00	R15, R8, R234>R241, R278>R286, R412	1K Ω 1/4W Res.
33	2	121-5043-00	R16, R17 (R25, R112: NS)	2.2K Ω 1/4W Res.
34	3	121-5051-00	R21, R22, R24 (R12, R13, R19: NS)	100K Ω 1/4W Res.
35	2	121-5046-00	R105, R109 (R101: NS)	470K Ω 1/4W Res.
36	2	121-5009-00	R107, R111 (R103: NS)	1K Ω 1/4W Res.
37	9	121-5045-00	R108, R287>R294	39K Ω Res.
38	11	121-5021-00	R216>R223, R242, R243, R400	4.7K Ω 1/4W Res.
39	15	121-5033-00	R229>R233, R295, R414, R415>R422 (R208>R215: NS)	220 Ω 1/4W Res.
40	5	n/a	R308, R310, R315>R316, WX (R300, R307, R309, R311, R313>R314, WY: NS), 0Ω Jumper Wire (24ga.)	
41	1	121-5036-00	R312	330 Ω 1/4W Res.
42	16	121-5047-00	R401>R402, R403>R405, R406>R408, R423>R430	560 Ω 1/4W Res.
43	2	121-5048-00	R410, R411	3.3K Ω 1/4W Res.
44	1	n/a	SW200	B3F4000
45	1	181-5002-00	SW300	8-Pin, Dip Switch
46	5	100-0037-00	U1, U8, U25, U27, U215	74LS74
47	1	100-0249-00	U2	74HC4020
48	1	100-0049-00	U3	74LS163
49	1	105-0052-05	U4	6116 RAM
50	3	077-5208-00	U4, U7, U212	28-Pin, IC Dip Socket
51	6	100-0064-00	U5, U12, U13, U15, U16, U211	74LS374
52	1	100-0189-01	U6, U209	68B09E
53	3	077-5209-00	U6, U9, U209	40-Pin, IC Socket
54	1	(See Pg. DR. ☺ Table)	U7	27512 EPROM
55	1	105-0116-00	U9	BSMT2000
56	1	100-0149-00	U10	74LS240
57	5	(See Pg. DR. ☺ Table)	U17, U21, U36, U37, U210	27C040 EPROM
58	5	077-5217-00	U17, U21, U36, U37, U210	32-Pin, IC Socket
59	1	100-0043-00	U18	74ALS139
60	1	965-0136-00	U19 - YELLOW DOT	PAL16L8 (Programmed) YELLOW DOT
61	1	965-0137-00	U20 - WHITE DOT	PAL16L8 (Programmed) WHITE DOT
62	2	100-0022-00	U22, U11	74LS273
63	2	100-5008-00	U23, U24	74LS165
64	1	100-5018-00	U26	TDA1543
65	1	100-0375-00	U30	LM833
66	1	100-0027-00	U34	74LS04
67	0	100-5016-00	(U35: NS)	TDA1899
68	2	100-5016-20	U101, U102 (U100 : NS)	TDA2030A
69	3	535-5000-10	U101 (HS2), U102 (HS3) (U100 (HS1): NS)	AAVID 531102 (Heat Sink)
70	2	100-5012-00	U201, U203	74HCT273
71	6	100-0338-00	U202, U204, U205, U206, U207, U208 (U200: NS)	74HC245
72	1	105-5046-00	U212	MS6264A
73	1	965-6504-00	U213 - BLUE DOT	PAL16L8 (Programmed) BLUE DOT
74	1	100-0148-00	U214	74LS138
75	2	100-5015-00	U216, U217	HCT74
76	1	100-5023-00	U218	DS1232
77	2	100-0377-00	U400, U401	LM339AN
78	4	n/a	VBATT, +5v, GND1, GND2	Test Point Wire (24ga.) Loops
79	1	124-5002-00	VR1	LM7905CT -5v Regulator
80	1	124-5001-00	VR2	LM7805CT +5v Regulator
81	6	n/a	W1, W5, W6* (*for 8MB EPROMs) (W2-W3, W4: NS)	0Ω Jumper Wire (24ga.)
82	1	140-0011-00	X1	24Mhz
83	12	n/a	AOR, AOL, SND_RESET, SND_FIRQ, Q, E, 6Mhz, 24Mhz, FIRQ, PLASMA_RESET, RESET (X2)	Test Points
84	1	(call Tech.Support)	R110 (New Rev. Change Feb 02)	33K Ω 1/4W Res.



# (UK Only) Solenoid Expander PC Board Schematic

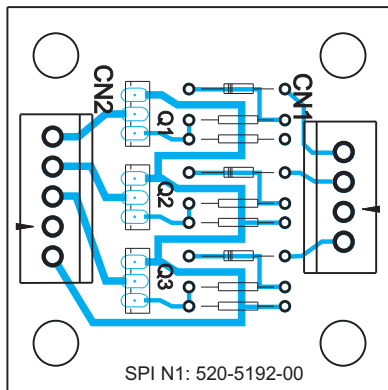


Component Side

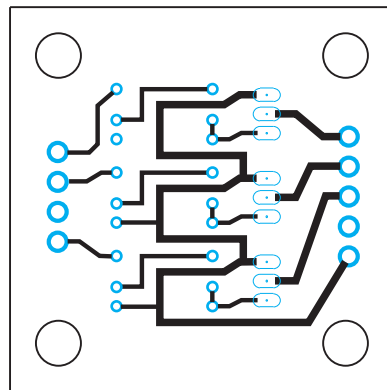


# (UK Only) Solenoid Exp. PCB Component Layout & Parts

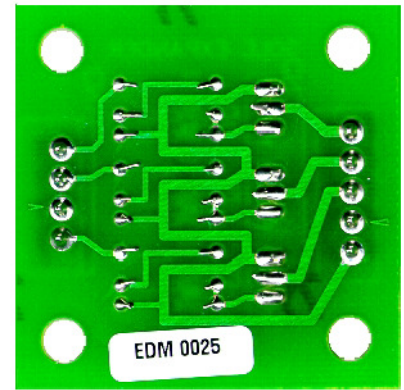
Component Side



Solder Side



Solder Side



Sec. 5: PCBs

ITEM	QTY	PART NUMBER	REF-DESIGNATOR
1	1	520-5192-00	Solenoid Expander PC Board
2	1		CN1
3	1		CN2
4	3	112-5014-00	D1, D2, D3
5	3	121-5003-00	R1, R2, R3
6	3	121-5042-00	R4, R5, R6
7	3	110-0067-00	Q1, Q2, Q3
8	1	036-5479-00-76	Not Shown

**DESCRIPTION**

**Complete PCB Assembly**  
 Connector, 4X .156"  
 Connector, 5X .156"  
 1N914, Signal Diode  
 620Ω 1/4W CF Resistor  
 22KΩ 1/4W CF Resistor  
 Tip122 (NPN Darl. Transistor)  
 UK Post Cable Wiring Harness

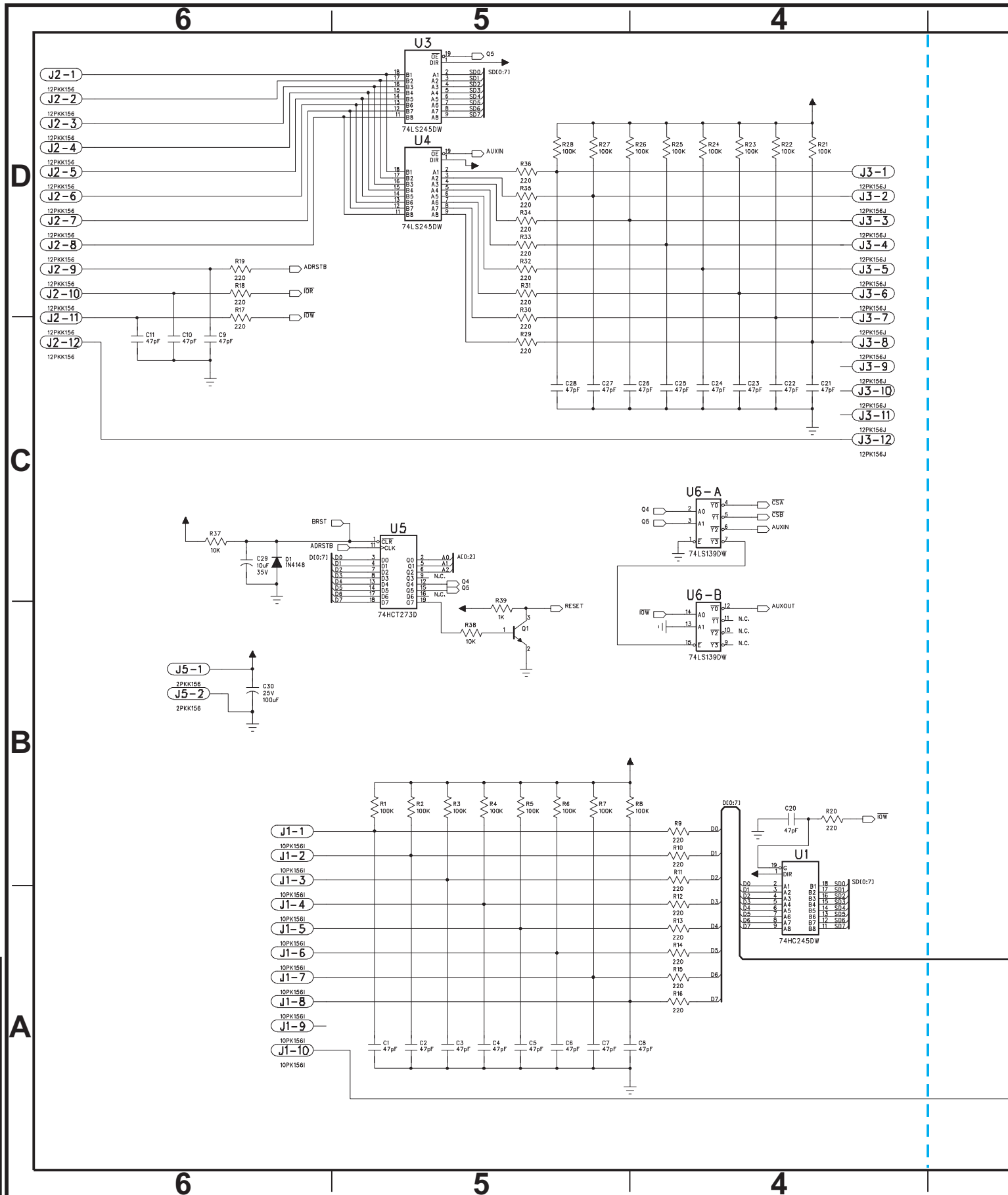


**Order the Optional ToPS™ (Tournament Pinball System) Kit!**  
**Call Technical Support at 1-800-542-5377 for more information**



TOURNAMENT PINBALL SYSTEM

# Tournament Serial Interface Board Schematic (Sheet 1 of 1)

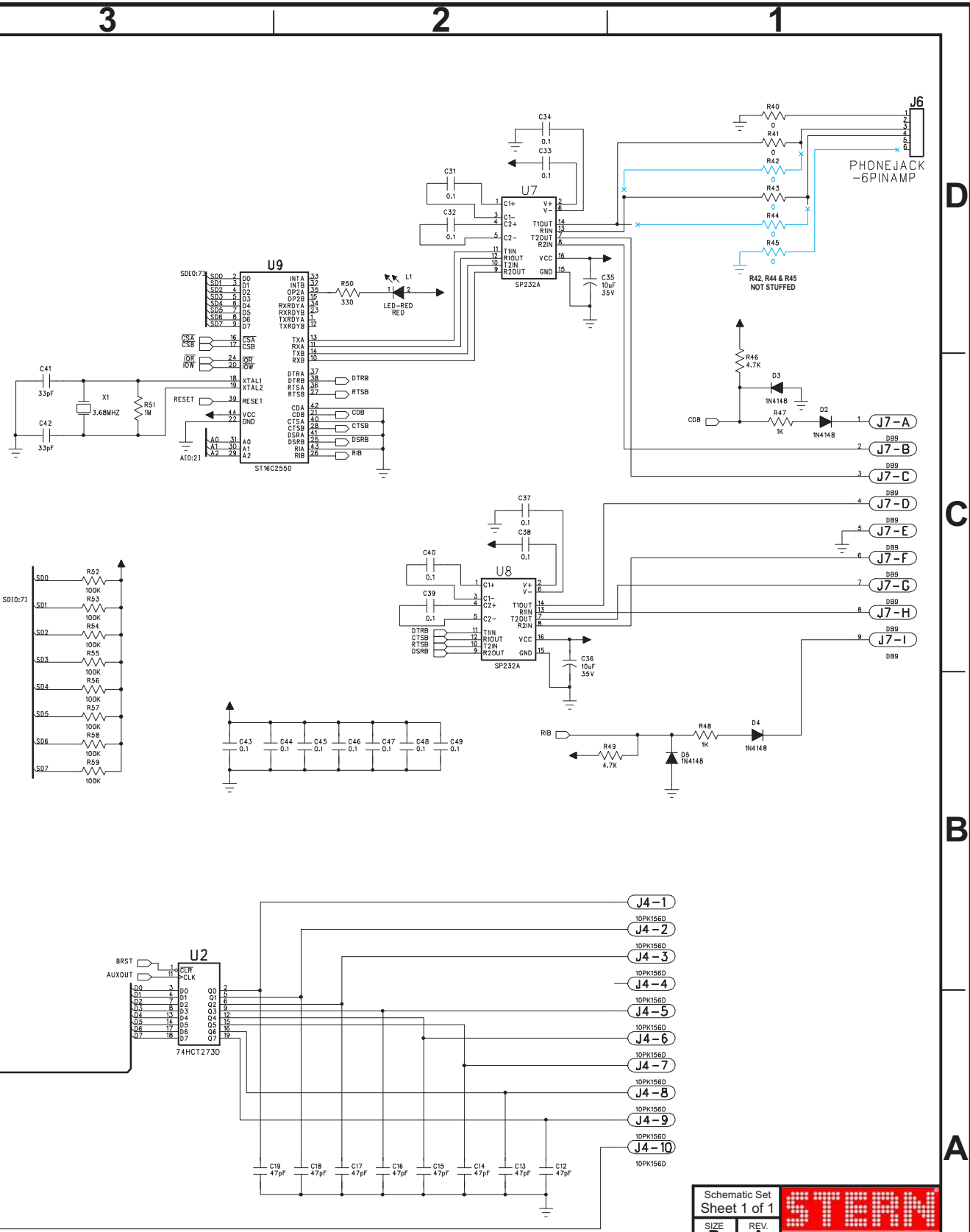


Sec. 5: PCBs





# Tournament Serial Interface Board Schematic (Sheet 1 of 1)



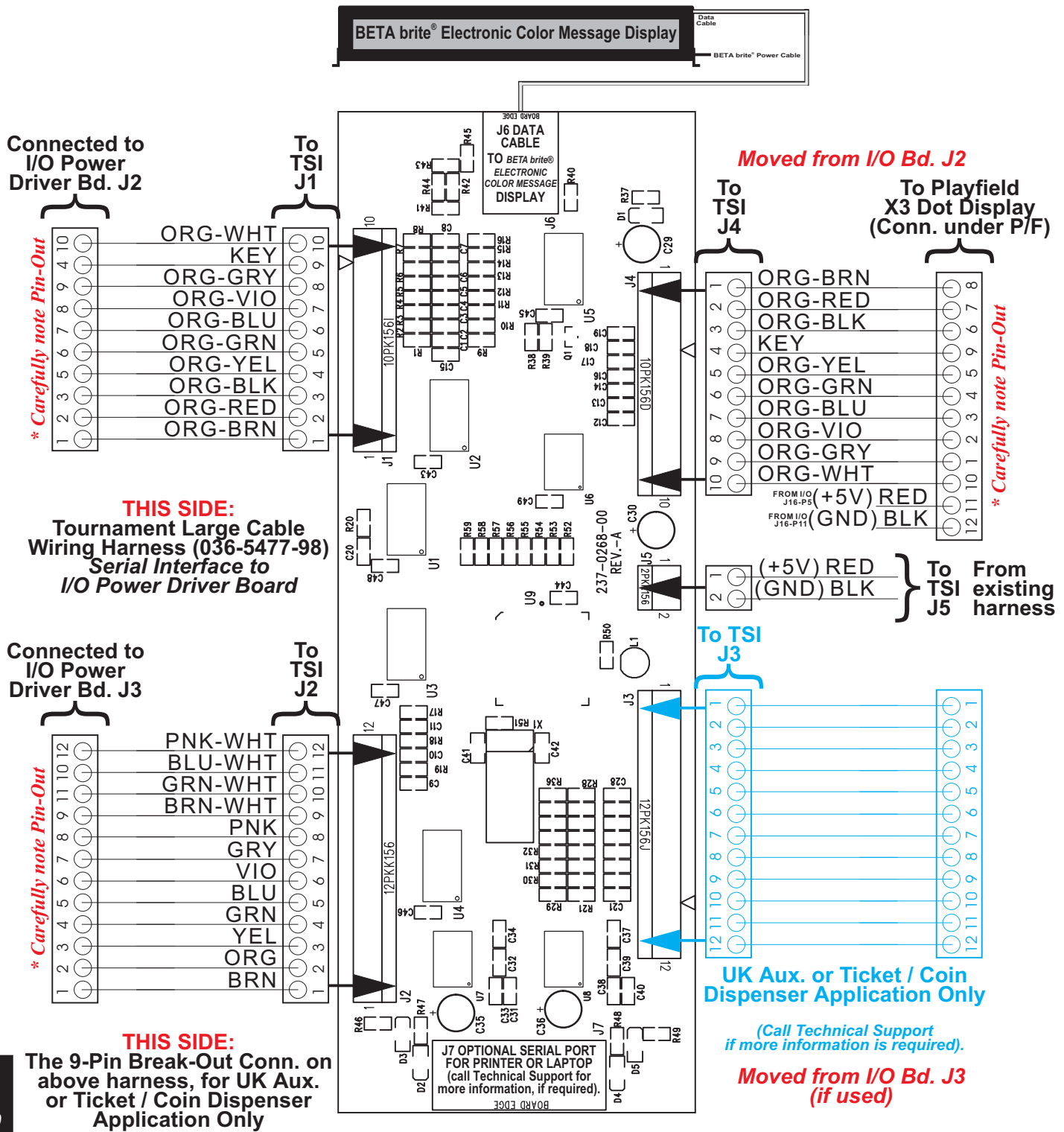
**NOTES:**  
 [ ] ALL RESISTOR VALUES ARE IN OHMS ( $\Omega$ ), 1/4W, 5%, UNLESS OTHERWISE SPECIFIED.  
 [ ] ALL CAPACITOR VALUES ARE IN MICROFARADS ( $\mu$ F), UNLESS OTHERWISE SPECIFIED.  
 [ ] 0.1 MICROFARADS ( $\mu$ F) BYPASS CAPACITOR ON ALL IC'S.

Non-Text Document

Schematic Set Sheet 1 of 1		<b>STERN</b> <b>PINBALL, INC.</b>
SIZE <b>D</b>	REV. <b>A</b>	
SPI Tournament Serial Interface Bd. SPI Part No: 520-5220-00		
Prepared By: CES Inc. Edited By: SPI Inc. Model: 237-0268-00 Dated: 08/2002		

Sec. 5: PCBs

# Tournament Serial Interface Board Component Layout & Parts



Sec. 5: PCBs

ITEM	QTY	PART NUMBER	REF-DESIGNATOR	DESCRIPTION
--	1	520-5220-00	Tournament Serial Interface (TSI) Board	PCB Assembly



# Appendixes A through J

## Appendix Table of Contents

- **Appendix A, Pinball Game Firmware Table ..... A1-A2**  
...describes the EPROM with its chip size, the Stern™ Pinball, Inc. (SPI) Part N<sup>o</sup>, version (if applicable), and CPU Board & CPU/Sound Board Pin location(s).
- **Appendix B, Semi-Conductors / I.C.'s / Relays Cross-Reference Table ..... B1**  
...describes diodes and transistors with Source N<sup>o</sup>, SPI Part N<sup>o</sup>, NTE N<sup>o</sup>, ECG N<sup>o</sup>, Radio Shack N<sup>o</sup> & RCA Part N<sup>o</sup> (If applicable).
- **Appendix C, Game Mfg. Date, Manual Part N<sup>o</sup> & CPU Jumper Table ..... C1**  
...provides the Game Manufactured Date & Manual Part N<sup>o</sup>, the CPU version, the EPROM Position, Jumpers Installed and Jumpers Removed (games specified).
- **Appendix D, Board Type Table ..... D1-D2**  
...provides Board Part N<sup>o</sup>s for Games Laser War through Batman Forever (Flipper, Sound, Power Supply, Dot Matrix Display, Display Controller & OPTOs) and the White Star Board System, Games Apollo 13 through current (Flipper\*, I/O Power Driver, CPU/Sound, Display Power Supply, Dot Matrix Display, Display Controller & OPTOs; \*Flipper Board with the White Star Bd. System for A13 & Golden Eye only.)
- **Appendix E, Generic Coil Cross-Reference Guide & Flipper Coil Table ..... E1-E2**  
...provides the Coils used with Part N<sup>o</sup> and Gauge-Turns (of the coil).
- **Appendix F, Motor Specification Table ..... F1-F2**  
...provides all the Motor Function, Specifications and Part N<sup>o</sup> for Games Laser War through current.
- **Appendix G, Part Number Prefix Classification Codes..... G1**  
...explains how our Part Numbers are developed to help sort parts easier.
- **Appendix H, Playfield Inserts (Plastic Light Covers) ..... H1**  
...gives a pictorial view with the name and Part N<sup>o</sup> of all the inserts used (also gives the Color Code Chart).
- **Appendix I, Stand-Up Targets (Happ Modular & Regular) ..... I1**  
...gives a pictorial view with the name and Part N<sup>o</sup> of all the Single Stand-Up Targets used (also gives the Color Code Chart).
- **Appendix J, Coin Cards (USA & International) ..... J1**  
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- **Glossary of Terms ..... Last Page**  
...gives definitions or explanations of some pinball terms and acronyms.
- **Limited Warranty, Cautions, Warnings & Notices ..... Last Page**



# APPENDIX A

## Pinball Game Firmware Table

EPROM	Chip Size	Program Part N <sup>o</sup>	USA Ver.	Bd. Loc.	Raw Part N <sup>o</sup>	EPROM	Chip Size	Program Part N <sup>o</sup>	USA Ver.	Bd. Loc.	Raw Part N <sup>o</sup>
<b>Laser War</b>						<b>Lethal Weapon 3</b>					
CPU	(256K)	965-0004-00	LWAR.C5	C5	960-5007-00	CPU	(512K)	965-0082-00	A2.08	C5	960-7001-02
Sound (Old)	(256K)	965-0005-00		J5	960-5007-00	Voice 1	(2M)	965-0083-00		U17	960-5010-00
Sound (Old)	(256K)	965-0006-00		J6	960-5007-00	Voice 2	(2M)	965-0084-00		U21	960-5010-00
Sound (Old)	(256K)	965-0007-00		J7	960-5007-00	Sound	(256K)	965-0085-00		U7	960-5007-00
			- OR -			Display	(2M)	965-0086-00	A2.06	ROM 0	960-5010-00
Sound	(256K)	965-0008-00		7F	960-5007-00	Display	(2M)	965-0087-00	A2.06	ROM 1	960-5010-00
Sound 1	(512K)	965-0009-00		6F	960-7001-02			(Used on Display PCB 520-5055-00)			
Sound 2	(512K)	965-0010-00		4F	960-7001-02	Display	(4M)	965-0087-04	-OR- A2.06	ROM 0	960-5015-00
								(Used on Display PCB 520-5055-01)			
<b>Secret Service</b>						<b>Star Wars</b>					
CPU	(256K)	965-0011-00	A4-6	B5	960-5007-00	CPU	(512K)	965-0119-00	A1.03	C5	960-7001-02
CPU	(256K)	965-0012-00	A4-6	C5	960-5007-00	Voice 0	(4M)	965-0132-00		U17	960-5015-00
Voice 1	(512K)	965-0014-00		6F	960-7001-02	Voice 1	(2M)	965-0133-00		U21	960-5010-00
Voice 2	(512K)	965-0015-00		4F	960-7001-02	Sound	(256K)	965-0131-00		U7	960-5007-00
Sound	(256K)	965-0013-00		7F	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)			
						Display	(4M)	965-0122-00	-OR- A1.05	ROM 0	960-5015-00
								(Used on Display PCB 520-5055-01)			
<b>Torpedo Alley</b>						<b>Rocky &amp; Bullwinkle &amp; Friends</b>					
CPU	(256K)	965-0016-00	A2-1	B5	960-5007-00	CPU	(512K)	965-0138-00	A1.30	C5	960-7001-02
CPU	(256K)	965-0017-00	A2-1	C5	960-5007-00	Voice 0	(4M)	965-0139-00		U17	960-5015-00
Voice 1	(512K)	965-0019-00		6F	960-7001-02	Voice 1	(2M)	965-0140-00		U21	960-5010-00
Voice 2	(512K)	965-0020-00		4F	960-7001-02	Sound	(256K)	965-0141-00		U7	960-5007-00
Sound	(256K)	965-0018-00		7F	960-5007-00	Display	(4M)	965-0142-00	A1.30	ROM 0	960-5015-00
<b>Time Machine</b>						<b>Jurassic Park</b>					
CPU	(128K)	965-0021-00	A2-4	B5	960-5006-00	CPU	(512K)	965-0143-00	A5.13	C5	960-7001-02
CPU	(256K)	965-0022-00	A2-4	C5	960-5007-00	Voice 0	(4M)	965-0144-00		U17	960-5015-00
Voice 1	(512K)	965-0024-00		6F	960-7001-02	Voice 1	(2M)	965-0145-00		U21	960-5010-00
Voice 2	(512K)	965-0025-00		4F	960-7001-02	Sound	(256K)	965-0146-00		U7	960-5007-00
Sound	(256K)	965-0023-00		7F	960-5007-00	Display	(4M)	965-0147-00	A5.10	ROM 0	960-5015-00
<b>Playboy 35th Anniversary</b>						<b>Last Action Hero</b>					
CPU	(256K)	965-0046-00	A2-4	B5	960-5007-00	CPU	(512K)	965-0148-00	A1.12	C5	960-7001-02
CPU	(256K)	965-0047-00	A2-4	C5	960-5007-00	Voice 0	(4M)	965-0149-00		U17	960-5015-00
Voice 1	(512K)	965-0049-00		6F	960-7001-02	Voice 1	(2M)	965-0150-00		U21	960-5010-00
Voice 2	(512K)	965-0050-00		4F	960-7001-02	Sound	(256K)	965-0151-00		U7	960-5007-00
Sound	(256K)	965-0048-00		7F	960-5007-00	Display	(4M)	965-0152-00	A1.06	ROM 0	960-5015-00
<b>ABC Monday Night Football</b>						<b>Tales from the Crypt</b>					
CPU	(128K)	965-0031-00	A2-7	B5	960-5006-00	CPU	(512K)	965-0157-00	A3.03	C5	960-7001-02
CPU	(256K)	965-0032-00	A2-7	C5	960-5007-00	Voice 0	(4M)	965-0158-00		U17	960-5015-00
Voice 1	(512K)	965-0034-00		6F	960-7001-02	Voice 1	(2M)	965-0159-00		U21	960-5010-00
Voice 2	(512K)	965-0035-00		4F	960-7001-02	Sound	(256K)	965-0160-00		U7	960-5007-00
Sound	(256K)	965-0033-00		7F	960-5007-00	Display	(4M)	965-0161-00	A3.01	ROM 0	960-5015-00
<b>Robocop</b>						<b>The Who's Tommy</b>					
CPU	(256K)	965-0036-00	A3-4	B5	960-5007-00	CPU	(512K)	965-0162-00	A4.00	C5	960-7001-02
CPU	(256K)	965-0037-00	A3-4	C5	960-5007-00	Voice 1	(4M)	965-0165-00		U17	960-5015-00
Voice 1	(512K)	965-0039-00		6F	960-7001-02	Voice 2	(4M)	965-0166-00		U21	960-5010-00
Voice 2	(512K)	965-0040-00		4F	960-7001-02	Voice 3	(4M)	965-0167-00		U36	960-5015-00
Sound	(256K)	965-0038-00		7F	960-5007-00	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
<b>Phantom of the Opera</b>						<b>WWF Royal Rumble</b>					
CPU	(128K)	965-0026-00	A3-2	B5	960-5006-00	CPU	(512K)	965-0169-00	A1.06	C5	960-7001-02
CPU	(256K)	965-0027-00	A3-2	C5	960-5007-00	Voice 1	(4M)	965-0172-00		U17	960-5015-00
Voice 1	(512K)	965-0029-00		6F	960-7001-02	Voice 2	(4M)	965-0173-00		U21	960-5010-00
Voice 2	(512K)	965-0030-00		4F	960-7001-02	Voice 3	(4M)	965-0174-00		U36	960-5015-00
Sound	(256K)	965-0028-00		7F	960-5007-00	Sound	(512K)	965-0171-00		U7	960-7001-02
						Display	(4M)	965-0170-00	A1.02	ROM 0	960-5015-00
<b>Back to the Future</b>						<b>Guns N' Roses</b>					
CPU	(256K)	965-0041-00	A2-0	B5	960-5007-00	CPU	(512K)	965-0175-00	A3.00	C5	960-7001-02
CPU	(256K)	965-0042-00	A2-0	C5	960-5007-00	Voice 1	(4M)	965-0178-00		U17	960-5015-00
Voice 1	(512K)	965-0044-00		6F	960-7001-02	Voice 2	(4M)	965-0179-00		U21	960-5010-00
Voice 2	(512K)	965-0045-00		4F	960-7001-02	Voice 3	(4M)	965-0180-00		U36	960-5015-00
Sound	(256K)	965-0043-00		7F	960-5007-00	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
<b>The Simpsons</b>						<b>Maverick</b> *					
CPU	(128K)	965-0051-00	A2-7	B5	960-5006-00	CPU	(512K)	965-0182-00	A4.04	C5	960-7001-02
CPU	(256K)	965-0052-00	A2-7	C5	960-5007-00	Voice 1	(4M)	965-0186-00		U17	960-5015-00
Voice 1	(512K)	965-0054-00		6F	960-7001-02	Voice 2	(4M)	965-0187-00		U21	960-5010-00
Voice 2	(512K)	965-0055-00		4F	960-7001-02	Voice 3	(4M)	965-0187-01		U36	960-5015-00
Sound	(256K)	965-0053-00		7F	960-5007-00	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
<b>Checkpoint</b>						<b>Mary Shelley's Frankenstein</b> *					
CPU	(128K)	965-0056-00	A1-7	B5	960-5006-00	CPU	(512K)	965-0188-00	A1.03	C5	960-7001-02
CPU	(256K)	965-0057-00	A1-7	C5	960-5007-00	Voice 1	(4M)	965-0192-00		U17	960-5015-00
Voice 1	(1M)	965-0057-00		F7	960-5009-00	Voice 2	(4M)	965-0193-00		U21	960-5010-00
Voice 2	(1M)	965-0058-00		F5	960-5009-00	Voice 3	(4M)	965-0194-00		U36	960-5015-00
Sound	(256K)	965-0059-00		F4	960-5007-00	Sound	(512K)	965-0191-00		U7	960-7001-02
Display	(512K)	965-0060-00	CP80	U8	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
<b>Teenage Mutant Ninja Turtles</b>						<b>Baywatch</b> *					
CPU	(128K)	965-0061-00	A1.04	B5	960-5006-00	CPU	(512K)	965-0195-00	A4.00	C5	960-7001-02
CPU	(256K)	965-0062-00	A1.04	C5	960-5007-00	Voice 1	(4M)	965-0196-00		U17	960-5015-00
Voice 1	(1M)	965-0063-00		F5/6	960-5009-00	Voice 2	(4M)	965-0197-00		U21	960-5010-00
Voice 2	(1M)	965-0064-00		F4/5	960-5009-00	Sound	(512K)	965-0199-00		U7	960-7001-02
Sound	(256K)	965-0065-00		F7	960-5007-00	Display*	(4M)	965-0200-00	A4.00	ROM 0	960-5015-00
Display	(512K)	965-0066-00	A1.04	U8	960-7001-02	Display*	(4M)	965-0201-00	A4.00	ROM 3	960-5015-00
<b>Batman</b>						<b>Batman Forever</b> *					
CPU	(128K)	965-0067-00	A1.06	B5	960-5006-00	CPU	(512K)	965-0202-00	A3.02	C5	960-7001-02
CPU	(256K)	965-0135-00	A1.06	C5	960-5007-00	Voice 1	(4M)	965-0203-00		U17	960-5015-00
Voice 1	(2M)	965-0068-00		U17	960-5010-00	Voice 2	(4M)	965-0204-00		U21	960-5010-00
Voice 2	(2M)	965-0069-00		U21	960-5010-00	Sound	(512K)	965-0205-00		U7	960-7001-02
Sound	(256K)	965-0070-00		U7	960-5007-00	Display*	(4M)	965-0206-00			



# APPENDIX A

## Pinball Game Firmware (for White Star Board System) Table



ROM	Chip Size	Program Part N <sup>o</sup>	USA Ver. & Check Sum	Bd. Loc.	Raw Part N <sup>o</sup>
<b>Apollo 13 (Note 1)</b>					
Game ROM	(1M)	965-0208-00	A5.01   \$09FF	U210	960-5009-00
Sound	(512K)	965-0212-00		U7	960-7001-02
Display	(4M)	965-0213-00	A5.00   \$B92B	ROM 0	960-5015-01
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)
<b>Golden Eye (Note 1)</b>					
Game ROM	(1M)	965-0214-42	A4.04   \$3FFF	U210	960-5009-00
Sound	(512K)	965-0217-42		U7	960-7001-02
Display	(4M)	965-0218-42	A4.00   \$E6ED	ROM 0	960-5015-01
Voice 1	(4M)	965-0215-42		U17	n/a (masked)
Voice 2	(4M)	965-0216-42		U21	n/a (masked)
<b>Twister (Note 2)</b>					
Game ROM	(1M)	965-0219-41	A4.05   \$E9FF	U210	960-5009-00
Sound	(512K)	965-0221-41		U7	960-7001-02
Display	(4M)	965-0222-41	A4.01   \$FD01	ROM 0	960-5015-01
Voice 1	(4M)	965-0220-41		U17	960-5015-01
Voice 2	(4M)	965-0223-41		U21	960-5015-01
<b>ID4: Independence Day (Note 2)</b>					
Game ROM	(1M)	965-0224-45	A2.02   \$9CFF	U210	960-5009-00
Sound	(512K)	965-0227-45		U7	960-7001-02
Display	(4M)	965-0228-45	A2.00   \$ABF7	ROM 0	960-5015-01
Voice 1	(4M)	965-0225-45		U17	960-5015-01
Voice 2	(4M)	965-0226-45		U21	960-5015-01
<b>Space Jam (Note 2)</b>					
Game ROM	(1M)	965-0229-43	A3.00   \$E6FF	U210	960-5009-00
Sound	(512K)	965-0233-43		U7	960-7001-02
Display	(4M)	965-0234-43	A3.00   \$0057	ROM 0	960-5015-01
Voice 1	(4M)	965-0230-43		U17	960-5015-01
Voice 2	(4M)	965-0231-43		U21	960-5015-01
Voice 3	(4M)	965-0232-43		U36	960-5015-01
<b>The Star Wars Trilogy - Special Edition (S.E.) (Note 2)</b>					
Game ROM	(1M)	965-0235-56	A4.03   \$5EFF	U210	960-5009-00
Sound	(512K)	965-0238-56		U7	960-7001-02
Display	(4M)	965-0239-56	A4.00   \$8817	ROM 0	960-5015-01
Voice 1	(4M)	965-0236-56		U17	960-5015-01
Voice 2	(4M)	965-0237-56		U21	960-5015-01
<b>The Lost World: Jurassic Park (Note 2)</b>					
Game ROM	(1M)	965-0240-53	A2.02   \$C8FF	U210	960-5009-00
Sound	(512K)	965-0243-53		U7	960-7001-02
Display	(4M)	965-0244-53	A2.01   \$7F46	ROM 0	960-5015-01
Voice 1	(4M)	965-0241-53		U17	960-5015-01
Voice 2	(4M)	965-0242-53		U21	960-5015-01
<b>The X-Files (Note 2)</b>					
Game ROM	(1M)	965-0245-46	A3.03   \$A2FF	U210	960-5009-00
Sound	(512K)	965-0248-46		U7	960-7001-02
Display	(4M)	965-0249-46	A3.00   \$66D0	ROM 0	960-5015-01
Voice 1	(4M)	965-0246-46		U17	960-5015-01
Voice 2	(4M)	965-0247-46		U21	960-5015-01
<b>Starship Troopers (Note 3)</b>					
Game ROM	(1M)	965-0250-59	A2.01   \$85FF	U210	960-5009-00
Sound	(512K)	965-0253-59		U7	960-7001-02
Display	(4M)	965-0254-59	A2.00   \$E77B	ROM 0	960-5015-01
Voice 1	(4M)	965-0251-59		U17	960-5015-01
Voice 2	(4M)	965-0252-59		U21	960-5015-01
Voice 3	(4M)	965-0255-59		U36	960-5015-01
<b>Viper Night Drivin' (Note 4)</b>					
Game ROM	(1M)	965-0266-35	A2.01   \$C5FF	U210	960-5009-00
Sound	(512K)	965-0271-35		U7	960-7001-02
Display	(4M)	965-0272-35	A2.01   \$C17D	ROM 0	960-5015-01
Voice 1	(4M)	965-0267-35		U17	960-5015-01
Voice 2	(4M)	965-0268-35		U21	960-5015-01
Voice 3	(4M)	965-0269-35		U36	960-5015-01
Voice 4	(4M)	965-0270-35		U37	960-5015-01
<b>Lost In Space (Note 4)</b>					
Game ROM	(1M)	965-0282-60	A1.01   \$B2FF	U210	960-5009-00
Sound	(512K)	965-0287-60		U7	960-7001-02
Display	(4M)	965-0288-60	A1.02   \$32AB	ROM 0	960-5015-01
Voice 1	(4M)	965-0283-60		U17	960-5015-01
Voice 2	(4M)	965-0284-60		U21	960-5015-01
Voice 3	(4M)	965-0285-60		U36	960-5015-01
Voice 4	(4M)	965-0286-60		U37	960-5015-01
<b>Godzilla (Note 4)</b>					
Game ROM	(1M)	965-0289-40	A2.05   \$B1FF	U210	960-5009-00
Sound	(512K)	965-0294-40		U7	960-7001-02
Display	(4M)	965-0295-40	A2.00   \$C929	ROM 0	960-5015-01
Voice 1	(4M)	965-0290-40		U17	960-5015-01
Voice 2	(4M)	965-0291-40		U21	960-5015-01
Voice 3	(4M)	965-0292-40		U36	960-5015-01
Voice 4	(4M)	965-0293-40		U37	960-5015-01
<b>South Park (Notes 4, 5)</b>					
Game ROM	(1M)	965-0301-71	A1.03   \$58FF	U210	960-5009-00
Sound	(512K)	965-0306-71		U7	960-7001-02
Display	(4M)	965-0307-71	A1.01   \$166F	ROM 0	960-5015-01
Voice 1	(8M)	965-0302-71		U17	960-5016-00
Voice 2	(8M)	965-0303-71		U21	960-5016-00
Voice 3	(8M)	965-0304-71		U36	960-5016-00
Voice 4	(8M)	965-0305-71		U37	960-5016-00
<b>Harley-Davidson® (Notes 4, 5, 6)</b>					
Game ROM	(1M)	965-0319-67	A1.03   \$3EFF	U210	960-5009-00
Sound	(512K)	965-0320-67		U7	960-7001-02
Display	(4M)	965-0321-67	A1.04   \$FC7C	ROM 0	960-5015-01
Voice 1	(8M)	965-0322-67		U17	960-5016-00
Voice 2	(8M)	965-0323-67		U21	960-5016-00
Voice 3	(8M)	965-0324-67		U36	960-5016-00
Voice 4	(4M)	965-0325-67		U37	960-5015-01

ROM	Chip Size	Program Part N <sup>o</sup>	USA Ver. & Check Sum	Bd. Loc.	Raw Part N <sup>o</sup>
<b>Striker Xtreme (Notes 4, 5)</b>					
Game ROM	(1M)	965-0326-68	A1.02   \$E4FF	U210	960-5009-00
Sound	(512K)	965-0327-68		U7	960-7001-02
Display	(4M)	965-0328-68	A1.03   \$1957	ROM 0	960-5015-01
Voice 1	(8M)	965-0329-68		U17	960-5016-00
Voice 2	(8M)	965-0330-68		U21	960-5016-00
Voice 3	(8M)	965-0331-68		U36	960-5016-00
Voice 4	(8M)	965-0332-68		U37	960-5016-00
<b>NFL (Notes 4, 5)</b>					
Game ROM	(1M)	965-0339-73	A1.00   \$D2FF	U210	960-5009-00
Sound	(512K)	965-0340-73		U7	960-7001-02
Display	(4M)	965-0341-73	A1.01   \$845A	ROM 0	960-5015-01
Voice 1	(8M)	965-0342-73		U17	960-5016-00
Voice 2	(8M)	965-0343-73		U21	960-5016-00
Voice 3	(8M)	965-0344-73		U36	960-5016-00
Voice 4	(8M)	965-0345-73		U37	960-5016-00
<b>Sharkey's Shootout (Notes 4, 5)</b>					
Game ROM	(1M)	965-0333-72	A2.11   \$49FF	U210	960-5009-00
Sound	(512K)	965-0334-72		U7	960-7001-02
Display	(4M)	965-0335-72	A2.01   \$6C33	ROM 0	960-5015-01
Voice 1	(8M)	965-0336-72		U17	960-5016-00
Voice 2	(8M)	965-0337-72		U21	960-5016-00
Voice 3	(8M)	965-0338-72		U36	960-5016-00
<b>High Roller Casino (Notes 4, 5)</b>					
Game ROM	(1M)	965-0346-65	A3.00   \$90FF	U210	960-5009-00
Sound	(512K)	965-0347-65		U7	960-7001-02
Display	(4M)	965-0348-65	A3.00   \$74B3	ROM 0	960-5015-01
Voice 1	(8M)	965-0349-65		U17	960-5016-00
Voice 2	(8M)	965-0350-65		U21	960-5016-00
Voice 3	(8M)	965-0351-65		U36	960-5016-00
Voice 4	(8M)	965-0352-65		U37	960-5016-00
<b>Austin Powers™ (Notes 4, 5)</b>					
Game ROM	(1M)	965-0353-74	A3.02   \$5DFF	U210	960-5009-00
Sound	(512K)	965-0354-74		U7	960-7001-02
Display	(4M)	965-0355-74	A3.00   \$6A34	ROM 0	960-5015-01
Voice 1	(8M)	965-0356-74		U17	960-5016-00
Voice 2	(8M)	965-0357-74		U21	960-5016-00
Voice 3	(8M)	965-0358-74		U36	960-5016-00
Voice 4	(8M)	965-0359-74		U37	960-5016-00
<b>Monopoly® (Notes 4, 5)</b>					
Game ROM	(1M)	965-0360-75	A3.03   \$5EFF	U210	960-5009-00
Sound	(512K)	965-0361-75		U7	960-7001-02
Display	(4M)	965-0362-75	A3.01   \$A381	ROM 0	960-5015-01
Voice 1	(8M)	965-0363-75		U17	960-5016-00
Voice 2	(8M)	965-0364-75		U21	960-5016-00
Voice 3	(8M)	965-0365-75		U36	960-5016-00
Voice 4	(8M)	965-0366-75		U37	960-5016-00
<b>Playboy (Notes 4, 5, 7)</b>					
Game ROM	(1M)	965-0367-76	A5.00   \$7DFF	U210	960-5009-00
Sound	(512K)	965-0368-76		U7	960-7001-02
Display	(4M)	965-0369-76	A5.00   \$A5FF	ROM 0	960-5015-01
Voice 1	(8M)	965-0370-76		U17	960-5016-00
Voice 2	(8M)	965-0371-76		U21	960-5016-00
Voice 3	(8M)	965-0372-76		U36	960-5016-00
Voice 4	(8M)	965-0373-76		U37	960-5016-00
<b>RollerCoaster Tycoon™ (Notes 4, 5, 7)</b>					
Sound	(512K)	965-0374-78		U7	960-7001-02
Game ROM	(1M)	965-0375-78	A7.01   \$40FF	U210	960-5009-00
Voice 1	(8M)	965-0377-78		U17	960-5016-00
Voice 2	(8M)	965-0378-78		U21	960-5016-00
Voice 3	(8M)	965-0379-78		U36	960-5016-00
Voice 4	(8M)	965-0380-78		U37	960-5016-00
Display	(4M)	965-0376-78	A7.00   \$8E23	ROM 0	960-5015-01

Current as of:



### footnotes:

- 1 ROMs on CPU/Sound Bd.: 520-5136-00 (Stereo) & Display Cont. Bd.: 520-5055-01
- 2 ROMs on CPU/Sound Bd.: 520-5136-10 (Mono) & Display Cont. Bd.: 520-5055-01
- 3 ROMs on CPU/Sound Board: 520-5136-15\* (Mono) (\*FCC 11-97) & Display Controller Board: 520-5055-02\* (\*FCC 11-97)
- 4 ROMs on CPU/Sound Bd.: 520-5136-16\* (Mono) (\*FCC 02-98) & Display Controller Board: 520-5055-03\* (\*FCC 02-98)
- 5 This game uses 8MB VOICE ROMS at U17, U21, U36 & U37 (if 3 ROMs use U37 will be unused) requiring a Jumper at Loc. W6. Refer to CPU/Snd. Bd. Schematic (2 of 3).
- 6 Harley-Davidson® 2nd Edition: For Game ROM, Sound & Display into (version, check sums, part numbers) call Tech Support. Check our website (see back cover) for current versions or other info. Raw Part numbers are identical to the Harley-Davidson® original.
7. TOPS™ (Tournament Pinball System) READY!

Game Revisions can be updated after the Production Run. This Table is accurate as of the printing of this manual. If any changes occurred, the next game manual will include the updated information. The version stated is USA. If there is a question of as to the latest Code Revision & Check Sum call our Technical Support Department, 1-800-542-5377 or 1-708-345-7700 (Select Option 1). Visit our website www.SternPinball.com where code can be downloaded (an EPROM Burner is required).

# APPENDIX B

## Semi-Conductors / Integrated Circuits (I.C.) / Relays Cross-Reference Table

Table No	Type	Source Number	STERN™ PINBALL	N T E®	E C G®	Radio Shack®	R C A®
<b>RECTIFICATION, BLOCKING, DAMPENING DIODES AND/OR LIGHT EMITTING DIODES (LEDs)</b>							
<b>1</b>	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
	Diode	T6A10L	112-5006-01	NTE5812	ECG5812	-----	-----
	Diode	FR302	112-5009-00	NTE588	ECG588	-----	SK5014
	Diode, Signal	1N914	112-5014-00	-----	-----	-----	-----
	LED	<b>MT5000UR</b> or <b>TLRH180P</b> (T1-3/4 GaAlAs)	165-5052-00 <i>(old SPI Part No: 165-5100-00)</i>	-----	-----	276-066B	-----
<b>ZENER DIODES</b>							
<b>2</b>	Diode	1N4742A 12v	112-0061-00	NTE142A	ECG142A	276-563	SK12V
	Diode	1N4760B 68v	112-0062-00B	NTE5092A	ECG5092A	-----	SK68V
	Diode	1N4764A 100v	112-0049-00A	NTE5096A	ECG5096A	-----	SK100V
	Diode	1N5228 3.9v	112-0053-00	NTE5007A	ECG5007A	-----	SK3A9
	Diode	1N5234B 6.2v	112-0047-00B	NTE5013A	ECG5013A	276-561	SK6A2
	Diode	1N5379 110v	112-0072-00	NTE5157	ECG5157	-----	SK110X
	Diode	1N6267A 6.8v	112-5011-00	NTE4902	ECG4902	-----	-----
	Diode	1N4752A 33v	112-5010-00A	NTE147A	ECG147A	-----	SK33V
	Diode	1N4736 6.8v 1w	112-5007-00	NTE5071A	ECG5071A	-----	-----
<b>TRANSISTORS - TYPE FET, NPN, PNP AND/OR SCR</b>							
<b>3</b>	FET Trans.	STP20N10L	110-0106-00	NTE2987	ECG2987	-----	-----
	FET Trans.	STP19N06L	110-0088-00	NTE2985	ECG2985	-----	-----
	FET Trans.	VN02N	110-0089-00	-----	-----	-----	-----
	NPN Trans.	2N4401	110-0073-00	NTE85	ECG85	276-2009	SK3124A
	NPN Trans.	2N6427	110-0070-00	NTE48	ECG48	-----	SK4906
	NPN Trans.	MJE340	110-0071-00	NTE157	ECG157	-----	SK3747
	NPN Trans.	MPSA42	110-0082-00	NTE287	ECG287	-----	SK3232
	NPN Trans.	2N3904	110-0069-00	NTE123AP	ECG123AP	276-2009	-----
	NPN Trans.	TIP122	110-0067-00	NTE261	ECG261	276-2068	SK3896
	NPN Trans.	MJE15030	110-0101-00	NTE375	ECG375	-----	SK9118
	PNP Trans.	2N5401	110-0078-00	NTE288	ECG288	-----	SK3434
	PNP Trans.	MJE15031	110-0103-00	NTE292	ECG292	-----	SK3441
	PNP Trans.	MJE350	110-0072-00	NTE374	ECG374	-----	SK9042
	PNP Trans.	MPSA92	110-0100-00	NTE288	ECG278	-----	SK3434
	PNP Trans.	TIP42	110-0068-00	NTE332	ECG332	-----	SK9236
	PNP Trans.	TIP32C	110-0081-00	NTE292	ECG292	-----	SK3441
	PNP Trans.	TIP36C	110-0077-00	NTE393	ECG393	-----	SK3961
	SCR Trans.	2N5060	110-0074-00	NTE5400	ECG5400	276-1067	SK3950
SCR Trans.	SCR2800B	110-0083-00	NTE5461-8	ECG5461-8	-----	-----	
<b>BRIDGE RECTIFIERS (BR)</b>				<b>Comments:</b>			
<b>4</b>	BR (Present)	DB3501 or CM3501	112-5000-00	For White Star I/O Bds., BR = 35 Amp @ 100v P.I.V.			
	<b>RELAYS</b>				<b>Comments:</b>		
<b>5</b>	Relay	FRL-264 D024/02CK	190-5002-00	For PPB, Power Supply, & White Star I/O Boards, Relay = 24v DC 10 Amp DPDT			
	Relay	FRL-264 D006/04CV	190-5001-00	For CPU Boards, Relay = 6v DC 5 Amp 4 Pole DT			



## APPENDIX C

### Game Mfg. Date, Manual Part N<sup>o</sup> & CPU Jumper Table†

Game Name	Game Mfg. Date and Manual PN <sup>o</sup>	CPU Ver.	EPROM Position	Jumpers Installed (see Note)	Jumpers Removed (see Note)
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 & Bullwinkle & 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
29. Apollo 13 (A13)	NOV 95 780-5044-00	—	U210	n / a	n / a
30. Golden Eye	FEB 96 780-5042-00	—	U210	n / a	n / a
31. Twister	APR 96 780-5041-00	—	U210	n / a	n / a
32. ID4: Independence Day	JUL 96 780-5045-00	—	U210	n / a	n / a
33. Space Jam	OCT 96 780-5043-00	—	U210	n / a	n / a
34. The Star Wars Trilogy - S.E.	FEB 97 780-5056-00	—	U210	n / a	n / a
35. The Lost World: J.P.	JUN 97 780-5053-00	—	U210	n / a	n / a
36. The X-Files	AUG 97 780-5046-00	—	U210	n / a	n / a
37. Starship Troopers	NOV 97 780-5059-00	—	U210	n / a	n / a
38. Viper Night Drivin'	FEB 98 780-5035-00	—	U210	n / a	n / a
39. Lost In Space	JUN 98 780-5060-00	—	U210	n / a	n / a
40. Godzilla	SEP 98 780-5040-00	—	U210	n / a	n / a
41. South Park	JAN 99 780-5071-00	—	U17 U21 U36 U37	W6 CPU/Snd.	n / a
42a. Harley-Davidson®	AUG 99 780-5067-01	—	U17 U21 U36 U37	W6 CPU/Snd.	n / a
42b. Harley-Davidson® 2nd Ed.	JUN 02 780-5067-10	—	U17 U21 U36 U37	W6 CPU/Snd.	n / a
43a. Striker Xtreme	MAR 00 780-5068-01	—	U17 U21 U36 U37	W6 CPU/Snd.	n/a
43b. NFL	OCT 00 780-5073-00	—	U17 U21 U36 U37	W6 CPU/Snd.	n/a
44. Sharkey's Shootout	OCT 00 780-5072-01	—	U17 U21 U36	W6 CPU/Snd.	n/a
45. High Roller Casino	JAN 01 780-5065-00	—	U17 U21 U36 U37	W6 CPU/Snd.	n/a
46. Austin Powers™	MAY 01 780-5074-00	—	U17 U21 U36 U37	W6 CPU/Snd.	n/a
47. Monopoly®	SEP 01 780-5075-00	—	U17 U21 U36 U37	W6 CPU/Snd.	n/a
48. Playboy	FEB 02 780-5076-00	—	U17 U21 U36 U37	W6 CPU/Snd.	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 14-28, 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.



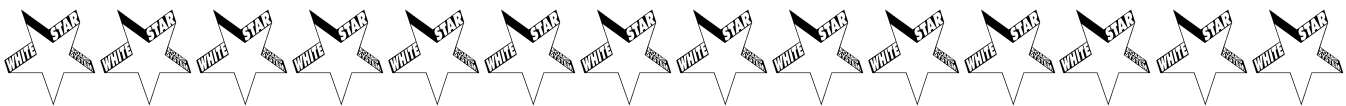
# APPENDIX D

## Board Type Table

Game Name	Flipper	Sound	Power Supply	Display X-Digit
Laser War	2-Flipper Board Not Required	<i>initial:</i> 520-5002-00 <i>replaced with:</i> 520-5002-02 <i>520-5002-01 was not used.</i>	520-5000-00	Master: 520-5004-00 plus: 520-5005-00 (Qty. 2); 7 Digit Alpha/Numeric 520-5006-00 (Qty. 2); 7 Digit Numeric 520-5007-00 (Qty. 1); 4 Digit Numeric
Secret Service	3-Flipper Board Not Required	520-5002-02	520-5000-00	520-5014-01 7 Digit Alpha/Numeric Combined
Torpedo Alley	3-Flipper Board Not Required	520-5002-02	520-5000-00	520-5014-01 7 Digit Alpha/Numeric Combined
Time Machine	2-Flipper Board Not Required	520-5002-02	520-5000-00	520-5014-01 7 Digit Alpha/Numeric Combined
Playboy 35th Anniversary	520-5033-00 2-Flipper (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-Flipper (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	OPTO Transmitter	OPTO Receiver	OPTO Application
Checkpoint	520-5033-00 2-Flipper	520-5002-03	520-5047-00	520-5042-00 128 X 16				
Teenage Mutant Ninja Turtles	520-5033-00 2-Flipper	520-5002-03	520-5047-00	520-5042-00 128 X 16				
Batman	520-5033-00 2-Flipper	520-5050-01	520-5047-00	520-5042-00 128 X 16				
Star Trek 25th Anniversary	520-5033-00 2-Flipper	520-5050-01	520-5047-00	520-5042-00 128 X 16				
Hook	520-5033-00 2-Flipper	520-5050-01	520-5047-00	520-5042-00 128 X 16				
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 / 5080-00 4-Flipper (2X2)	520-5077-00	520-5047-02	520-5052-00 128 X 32	520-5055-01			
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	520-5102-00 Single OPTO	520-5103-00 Single OPTO	Paddle Boat Wheel Enter
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	520-5070 / 5080-00 4-Flipper (2X2)	520-5126-02	520-5047-03	520-5075-00 192 X 64	520-5092-01	520-5124-00 Single OPTO	520-5125-00 Single OPTO	5-Ball Trough over Up-Kicker
Batman Forever	520-5076-00 3-Flipper	520-5126-02	520-5047-03	520-5075-00 192 X 64	520-5092-01	520-5124-00 Single OPTO	520-5125-00 Single OPTO	4-Ball Trough over Up-Kicker

Miscellaneous Boards (Lamp Boards & Relay Boards) not listed above can be found in each individual game manual.



GAMES HEREON USE THE WHITE STAR BOARD SYSTEM™ (with the addition of the I/O Power Driver Board):

Game Name	Flipper	I/O Power Driver	CPU/Sound Stereo	Disp. Power Supply	Dot Matrix Display	Display Controller	OPTO Transmitter	OPTO Receiver	OPTO Application
Apollo 13	520-5080-00 2-Flipper	520-5137-00	520-5136-00	520-5138-00	520-5052-00 128 X 32	520-5055-01	520-5124-00 Single OPTO	520-5125-00 Single OPTO	5-Ball Trough over Up-Kicker
	Miscellaneous PC Boards:	Light Boards 520-5130-01, -04 & -05 Magnet Interface, 7-Segment Display & Light Bd. 520-5130-06 Magnet Driver Board 520-5130-02 Switch Membrane Board 520-5130-03				Relay Board 520-5010-00			
Golden Eye	520-5080-00 2-Flipper	520-5137-00	520-5136-00	520-5138-00	520-5052-00 128 X 32	520-5055-01	520-5124-00 Single OPTO	520-5125-00 Single OPTO	5-Ball Trough over Up-Kicker
	Miscellaneous PC Boards:	Light Boards 520-5128-05 through -08				Mag. Processor X2 Driver Bd. 520-5143-00	Relay Board 520-5010-00		

Table continued on the next page.



# APPENDIX D

## Board Type Table

GAMES HEREON USE THE WHITE STAR BOARD SYSTEM™ (with the deletion of the Flipper Board):

Game Name	I/O Power Driver	CPU/Sound Mono	Disp. Power Supply	Dot Matrix Display	Display Controller	OPTO Transmitter	OPTO Receiver	OPTO Application	Misc OPTO & App.
Twister	520-5137-01	520-5136-10	520-5138-00	520-5052-00 128 X 32	520-5055-01	520-5124-00 Single OPTO	520-5125-00 Single OPTO	5-Ball Trough over Up-Kicker	
	Miscellaneous PC Boards:	Light Boards 520-5145-01 through -07		Mag. Drv. Bd. 520-5143-00	Relay Board 520-5010-00				
Independence Day (ID4)	520-5137-01	520-5136-10	520-5138-00	520-5052-00 128 X 32	520-5055-01	520-5124-00 Single OPTO	520-5125-00 Single OPTO	4-Ball Trough over Up-Kicker	
	Miscellaneous PC Boards:	Light Boards 520-5149-01 through -10		Servo Mtr. Bd. 520-5152-00		520-5082-00 Long Hop OPTO	520-5083-00 Long Hop OPTO	Alien Head Enter	
Space Jam	520-5137-01	520-5136-10	520-5138-00	520-5052-00 128 X 32	520-5055-01	520-5124-00 Single OPTO	520-5125-00 Single OPTO	5-Ball Trough over Up-Kicker	
	Miscellaneous PC Boards:	2X 7-Segment Display Board 520-5153-00							
The Star Wars Trilogy - Special Ed.	520-5137-01	520-5136-10	520-5138-00	520-5052-00 128 X 32	520-5055-01	520-5124-00 Single OPTO	520-5125-00 Single OPTO	4-Ball Trough over Up-Kicker	
	Miscellaneous PC Boards:	Relay Board 520-5010-00							
The Lost World: J.P.	520-5137-01	520-5136-10	520-5138-00	520-5052-00 128 X 32	520-5055-01	520-5124-00 Single OPTO	520-5125-00 Single OPTO	4-Ball Trough over Up-Kicker	520-5162-00 2-Pos. Motor Sensor on Snagger Motor
	Miscellaneous PC Boards:	DC Relay Bd. 520-5066-00	Shaker Mtr. Bd. 520-5065-00						
The X-Files	520-5137-01	520-5136-10	520-5138-00	520-5052-00 128 X 32	520-5055-01	520-5124-00 Single OPTO	520-5125-00 Single OPTO	4-Ball Trough over Up-Kicker	520-5155-00 3-Pos. Motor Sensor on File Cab. Motor
	Miscellaneous PC Boards:					520-5082-00 Long Hop OPTO	520-5083-00 Long Hop OPTO	File Cabinet Enter	
Starship Troopers	520-5137-01	520-5136-15	520-5138-00	520-5052-00 128 X 32	520-5055-02	520-5124-00 Single OPTO	520-5125-00 Single OPTO	4-Ball Trough over Up-Kicker	
	Miscellaneous PC Boards:	4X 7-Segment Display Board 520-5166-00				520-5082-00 Long Hop OPTO	520-5083-01 Long Hop OPTO	L/R Orbit Lane Enter	
Viper Night Drivin'	520-5137-01	520-5136-16	520-5138-00	520-5052-00 128 X 32	520-5055-03	520-5124-00 Single OPTO	520-5125-00 Single OPTO	4-Ball Trough over Up-Kicker	
	Miscellaneous PC Boards:	Relay Board 520-5010-00				520-5082-00 Long Hop OPTO	520-5083-01 Long Hop OPTO	Jump Ramp	
Lost In Space	520-5137-01	520-5136-16	520-5138-00	520-5052-00 128 X 32	520-5055-03	520-5173-00 Dual OPTO	520-5174-00 Dual OPTO	4-Ball Trough over Up-Kicker	
	Miscellaneous PC Boards:	Relay Board 520-5010-00							
Godzilla	520-5137-01	520-5136-16	520-5138-00	520-5052-00 128 X 32	520-5055-03	520-5173-00 Dual OPTO	520-5174-00 Dual OPTO	4-Ball Trough over Up-Kicker	
	Miscellaneous PC Boards:	Shaker Mtr. Bd. 520-5065-00							
South Park	520-5137-01	520-5136-16	520-5138-00	520-5052-00 128 X 32	520-5055-03	520-5173-00 Dual OPTO	520-5174-00 Dual OPTO	5-Ball Trough over Up-Kicker	
	Miscellaneous PC Boards:					520-5082-00 Long Hop OPTO	520-5083-01 Long Hop OPTO	Kenny Under Trough Enter	
Harley-Davidson®	520-5137-01	520-5136-16	520-5138-00	520-5052-00 128 X 32	520-5055-03	520-5173-00 Dual OPTO	520-5174-00 Dual OPTO	4-Ball Trough over Up-Kicker	
	Miscellaneous PC Boards:	Relay Board 520-5010-00	Shaker Mtr. Bd. 520-5065-00	Diode Board 520-5146-00		520-5082-00 Long Hop OPTO	520-5083-01 Long Hop OPTO	Motorcycle Enter	
Striker Xtreme (NFL)	520-5137-01	520-5136-16	520-5138-00	520-5052-00 128 X 32	520-5055-03	520-5173-00 Dual OPTO	520-5174-00 Dual OPTO	4-Ball Trough over Up-Kicker	520-5155-00 3-Pos. Motor Sensor on Goalie Motor
	Miscellaneous PC Boards:	DC Relay Bd. 520-5066-00	Relay Board 520-5010-00	Diode Board 520-5146-00	for UK ONLY> Solenoid Expander Bd. 520-5192-00	520-5082-00 Long Hop OPTO	520-5083-01 Long Hop OPTO	Goalie Under- Trough Enter	
Sharkey's Shootout	520-5137-64	520-5136-64	520-5138-00	520-5052-00 128 X 32	520-5055-03	520-5173-00 Dual OPTO	520-5174-00 Dual OPTO	4-Ball Trough over Up-Kicker	520-5194-00 4-Pos. Motor Sensor on ? -Ball Motor
	Miscellaneous PC Boards:	Relay Board 520-5010-00	Sol. Exp. Bd. 520-5192-00						
High Roller Casino	520-5137-01	520-5136-16	520-5138-00	520-5052-00 128 X 32	520-5055-03	520-5173-00 Dual OPTO	520-5174-00 Dual OPTO	4-Ball Trough over Up-Kicker	520-5194-00 4-Pos. Motor Sensor on Roulette Wheel Motor
	Miscellaneous PC Boards:	Dot Display (5X7) in Slot Mach. 520-5197-00			for UK ONLY> Solenoid Expander Bd. 520-5192-00	520-5082-00 Long Hop OPTO	520-5083-01 Long Hop OPTO	Ball Lock Under Roulette	
Austin Powers™	520-5137-01	520-5136-16	520-5138-00	520-5052-00 128 X 32	520-5055-03	520-5173-00 Dual OPTO	520-5174-00 Dual OPTO	4-Ball Trough over Up-Kicker	520-5212-00 Pulse-Stretcher OPTO on Spini-Me
	Miscellaneous PC Boards:	Relay Bd. (X3) 520-5010-00			for UK ONLY> Solenoid Expander Bd. 520-5192-00				
Monopoly®	520-5137-01	520-5136-16	520-5138-00	520-5052-00 128 X 32	520-5055-03	520-5173-00 Dual OPTO	520-5174-00 Dual OPTO	4-Ball Trough over Up-Kicker	
	Miscellaneous PC Boards:	DC Relay Bd. 520-5066-00	Dot Display (5X7) in Elec. Sign 520-5197-00		for UK ONLY> Solenoid Expander Bd. 520-5192-00	520-5218-00 4-Pos. OPTO	520-5210-00 4-Pos. OPTO	Bank Door	
Playboy	520-5137-01	520-5136-16	520-5138-00	520-5052-00 128 X 32	520-5055-03	520-5173-00 Dual OPTO	520-5174-00 Dual OPTO	4-Ball Trough over Up-Kicker	
	Miscellaneous PC Boards:	DC Relay Bd. 520-5066-00	Relay Bd. 520-5010-00		for UK ONLY> Solenoid Expander Bd. 520-5192-00				

† **Note:** To order Game Specific CPU/Sound Board please specify Game Name.

# APPENDIX E

## Generic Coil Cross-Reference Guide † ‡

STANDARD COILS						FLIPPER COILS			
GA-TURNS	Res. (Ω)	SPI PART N <sup>o</sup>	GA-TURNS	Res. (Ω)	SPI PART N <sup>o</sup>	GAUGE-TURNS	Res. (Ω)	COLOR	SPI PART N <sup>o</sup>
20-400	1.0 Ω	090-5021-00	24-940 †	5.5 Ω	090-5036-00T	21-900 †	<i>not available</i>	RED	090-5020-10T
22-500	1.7 Ω	090-5017-00			090-5036-00B	22-750/30-2600 ‡	2.6 / 92.0 Ω	N/A	090-5011-00
22-600	2.2 Ω	090-5023-00	25-1240	9.3 Ω	090-5034-00	22-900 †	3.4 Ω	YEL	090-5020-20T
23-700	3.1 Ω	090-5022-00			090-5044-00T	22-1080 †	4.3 Ω	YEL/GRN	090-5032-00T
23-750	3.4 Ω	090-5019-00	090-5044-00B	23-620/30-2600 ‡	2.4 / 75.0 Ω				N/A
23-800 †	3.6 Ω	090-5001-00T	27-1300	14.2 Ω	090-5003-00	23-700/30-2600 ‡	3.0 / 83.5 Ω	N/A	090-5006-00
		090-5001-00B	27-1400	14.7 Ω	090-5015-00	23-800/30-2600 ‡	2.8 / 90.5 Ω	N/A	090-5013-00
23-840	4.0 Ω	090-5005-00	27-1500	16.3 Ω	090-5004-00T	23-900	3.8 Ω	GRN	090-5012-00
23-1200	7.1 Ω	090-5008-00			090-5004-00B	23-1100	5.1 Ω	ORG	090-5020-30
23½-765	3.6 Ω	090-5037-03	28-1050	11.5 Ω	090-5046-00	23-1500	4.4 Ω	BLU	090-5030-00
24-900	5.0 Ω	090-5002-00	29-2000	33.6 Ω	090-5016-00	24-1570	9.5 Ω	N/A	090-5062-00T
						25-1800	13.8 Ω	BLU/GRN	090-5025-00
									090-5041-00

NOTE: Ohm values may vary +/- .03 Ω *depending on meter calibration.*

† Coil Part N<sup>o</sup>s ending with a "T" signifies the Diode is on the top of the lug; ...ending with a "B" signifies the Diode is on the bottom of the lug.

‡ These coils are dual-wound. **Also Note:** All Coil Part N<sup>o</sup>s listed **Do Not Include** Coil Sleeves (must be ordered separately).

MAGNET COILS w/12" leads			TRIP COILS (Miniature)						LUGLESS COILS	
GA-TURNS	Res. (Ω)	SPI PART N <sup>o</sup>	GA-TURNS	Res. (Ω)	SPI PART N <sup>o</sup>	GA-TURNS	Res. (Ω)	SPI PART N <sup>o</sup>	GA-TURNS	Res. (Ω)
22-650	4.3 Ω	090-5042-01	29-1000	15.2 Ω	090-5059-00	33-1590	59 Ω	515-6916-00	SPI PART N <sup>o</sup>	
24-780	8 Ω	090-5061-00	31-1500	52.0 Ω	090-5054-00	32-1250	35 Ω	515-6916-01	23-800	3.6 Ω
20½-480	2.9 Ω	090-5064-02	32-1800	50.2 Ω	090-5031-00	Note: 33-1590 WHT & 32-1250 YEL		090-5053-00		

### Flipper Coil Table ‡ ††

GAME NAME	N <sup>o</sup> of Flippers	LOWER FLIPPERS		UPPER FLIPPERS	
		SPI N <sup>o</sup> / GAUGE-TURNS / Color		SPI N <sup>o</sup> / GAUGE-TURNS / Color	
		LEFT	RIGHT	LEFT	RIGHT
Laser War ‡	2	090-5011-00 22-750 / 30-2600	SAME	Not Used	Not Used
Secret Service ‡	3	090-5006-00 23-620 / 30-2600	SAME	Not Used	090-5006-00 23-620 / 30-2600
Torpedo Alley ‡	3	090-5011-00 22-750 / 30-2600	090-5013-00 23-700 / 30-2600	Not Used	090-5012-00 23-800 / 30-2600
Time Machine ‡	2	090-5011-00 22-750 / 30-2600	SAME	Not Used	Not Used
‡ These coils are dual-wound.					
Playboy 35th Anniversary ††	2	090-5020-02 22-900 -YEL-	SAME	Not Used	Not Used
ABC Monday Night Football ††	2	090-5020-02 22-900 -YEL-	SAME	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.					
Robocop	2	090-5020-20 22-900 -YEL-	SAME	Not Used	Not Used
Phantom of the Opera	2	090-5020-20 22-900 -YEL-	SAME	Not Used	Not Used
Back to the Future	2	090-5020-20 22-900 -YEL-	SAME	Not Used	Not Used
The Simpsons	2	090-5020-20 22-900 -YEL-	SAME	Not Used	Not Used
Checkpoint	2	090-5020-20 22-900 -YEL-	SAME	Not Used	Not Used
Teenage Mutant Ninja Turtles	2	090-5020-30 23-900 -GRN-	SAME	Not Used	Not Used
Batman	2	090-5020-30 23-900 -GRN-	SAME	Not Used	Not Used
Star Trek 25th Anniversary	2	090-5020-30 23-900 -GRN-	SAME	Not Used	Not Used
Hook	2	090-5030-00 23-1100 -ORG-	090-5020-30 23-900 -GRN-	Not Used	Not Used
Lethal Weapon 3	2	090-5030-00 23-1100 -ORG-	SAME	Not Used	Not Used

*Table continued on the next page.*



## APPENDIX E

### Flipper Coil Table †

GAME NAME	N <sup>o</sup> of Flippers	LOWER FLIPPERS		UPPER FLIPPERS	
		SPI N <sup>o</sup> / GAUGE-TURNS / Color		SPI N <sup>o</sup> / GAUGE-TURNS / Color	
		LEFT	RIGHT	LEFT	RIGHT
Star Wars	2	090-5032-00 22-1080 -YEL-GRN-	SAME	Not Used	Not Used
Rocky & Bullwinkle & Friends	2	090-5020-30 23-900 -GRN-	SAME	Not Used	Not Used
Jurassic Park	3	090-5020-30 23-900 -GRN-	SAME	Not Used	090-5030-00 23-1100 -ORG-
Last Action Hero	2	090-5020-30 23-900 -GRN-	SAME	Not Used	Not Used
Tales from the Crypt	3	090-5032-00 22-1080 -YEL-GRN-	SAME	Not Used	090-5041-00 25-1800 -BLU-GRN-
The Who's Tommy	3	090-5020-30 23-900 -GRN-	SAME	090-5041-00 25-1800 -BLU-GRN-	Not Used
WWF Royal Rumble	4	090-5032-00 22-1080 -YEL-GRN-	SAME	090-5041-00 25-1800 -BLU-GRN-	SAME
Guns N' Roses	3	090-5032-00 22-1080 -YEL-GRN-	SAME	090-5030-00 23-1100 -ORG-	Not Used
Maverick	3	090-5032-00 22-1080 -YEL-GRN-	SAME	Not Used	090-5032-00 22-1080 -YEL-GRN-
Mary Shelley's Frankenstein	3	090-5030-00 23-1100 -ORG-	SAME	Not Used	090-5030-00 23-1100 -ORG-
Baywatch	4	090-5030-00 23-1100 -ORG-	090-5020-30 23-900 -GRN-	090-5025-00 24-1570 -N/A-	090-5030-00 23-1100 -ORG-
Batman Forever	3	090-5032-00 22-1080 -YEL-GRN-	090-5020-20 22-900 -YEL-	Not Used	090-5020-30 23-900 -GRN-
Apollo 13	2	090-5032-00 22-1080 -YEL-GRN-	SAME	Not Used	Not Used
Golden Eye	2	090-5032-00 22-1080 -YEL-GRN-	SAME	Not Used	Not Used
Twister	2	090-5020-20 22-900 -YEL-	090-5032-00 22-1080 -YEL-GRN-	Not Used	Not Used
ID4: Independence Day	3	090-5032-00 22-1080 -YEL-GRN-	SAME	Not Used	090-5020-30 23-900 -GRN-
Space Jam †	2	090-5032-00T 22-1080 -YEL-GRN-	090-5020-20T 22-900 -YEL-	Not Used	Not Used
The Star Wars Trilogy - Special Edition †	2	090-5032-00T 22-1080 -YEL-GRN-	SAME	Not Used	Not Used
The Lost World: Jurassic Park †	2	090-5032-00T 22-1080 -YEL-GRN-	SAME	Not Used	Not Used
The X-Files †	2	090-5032-00T 22-1080 -YEL-GRN-	SAME	Not Used	Not Used
Starship Troopers †	3	090-5030-00T 23-1100 -ORG-	SAME	Not Used	090-5032-00T 22-1080 -YEL-GRN-
Viper Night Drivin' †	2	090-5030-00T 23-1100 -ORG-	SAME	Not Used	Not Used
Lost In Space †	2	090-5030-00T 23-1100 -ORG-	090-5032-00T 22-1080 -YEL-GRN-	Not Used	Not Used
Godzilla †	2	090-5032-00T 22-1080 -YEL-GRN-	SAME	Not Used	Not Used
South Park †	2	090-5030-00T 23-1100 -ORG-	SAME	Not Used	Not Used
Harley-Davidson® †	2	090-5032-00T 22-1080 -YEL-GRN-	090-5030-00T 23-1100 -ORG-	Not Used	Not Used
Striker Xtreme (NFL) †	3	090-5032-00T 22-1080 -YEL-GRN-	090-5030-00T 23-1100 -ORG-	090-5030-00T 23-1100 -ORG-	Not Used
Sharkey's Shootout †	3	090-5030-00T 23-1100 -ORG-	090-5030-00T 23-1100 -ORG-	090-5030-00T 23-1100 -ORG-	Not Used
High Roller Casino †	2	090-5020-20T 22-900 -YEL-	090-5032-00T 23-1080 -YEL-GRN-	Not Used	Not Used
Austin Powers™ †	2	090-5020-30 23-900 -GRN-	090-5030-00T 23-1100 -ORG-	Not Used	Not Used
Monopoly® †	3	090-5032-00T 22-1080 -YEL-GRN-	090-5032-00T 22-1080 -YEL-GRN-	Not Used	090-5062-00T 23-1500 -BLU-
Playboy †	2	090-5030-00T 23-1100 -ORG-	090-5030-00T 23-1100 -ORG-	Not Used	Not Used

† Coil Part N<sup>o</sup>s ending with a "T" signifies the Diode is on the top of the lug (on the coil-winding side);  
Coil Part N<sup>o</sup>s ending with a "B" signifies the Diode is on the bottom of the lugs.



## APPENDIX F

### Motor Specification Table

The following table only list games that used motors. Part Numbers starting with "515-" will include the Wiring Harness & Connector.

Game Name	Function	Specifications	Part N <sup>o</sup>
<b>ABC Monday Night Football</b>	Goal Post Up/Down Movement	Motor 24v A.C. 60 RPM CW	515-5222-00
<b>Phantom of the Opera</b>	Organ Up/Down Movement	Bowman Motor 24v 60Hz 3W 11 RPM CCW	515-5256-00
<b>Checkpoint</b>	Mag Wheel (in Backbox)	Motor D.C. (KEN)	041-5005-00
	Shaker	Johnson Motor (Vibrator)	041-5002-00
<b>Teenage Mutant Ninja Turtles</b>	Spinning Pizza Ball Deflector	Gear Motor 24v A.C. 325 RPM CW	515-5397-00
<b>Batman</b>	Bar Target Up/Down Movement	Bowman Motor 24v 60Hz 3W 11 RPM CCW	515-5256-00
<b>Star Trek 25th Anniversary</b>	Swinging Target	Bowman Motor 24v 22½ RPM	515-5534-00
	Transporter F/X	Gear Motor 24v A.C. 3½ RPM	500-5421-00
	Cooling Fan (for Transporter F/X)	4½" Motor 12v	041-5014-00
<b>Lethal Weapon 3</b>	Spinning Light	Motor 2½ v A.C. 4000 RPM CCW	041-5017-00
<b>Star Wars</b>	Bar Target Up/Down Movement	Bowman Motor 24v 60hz 3W 11 RPM CCW	515-5256-00
	R2D2 Robot Left/Right 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
<b>Rocky &amp; Bullwinkle &amp; Friends</b>	Nell Log "Cutting Blade" Forward/Back Movement	Autotrol Model E Motor 24v 60hz 4W 3 RPM CCW	041-5023-00
<b>Jurassic Park</b>	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
	Shaker	Johnson Motor (Vibrator)	041-5002-00
<b>Last Action Hero</b>	Crane Left/Right Movement	Multi Products Motor 12v D.C. #3312 OSC	041-5027-00
	Shaker	Johnson Motor (Vibrator) 10.5v D.C. 10 AMP 2950 RPM CW	041-5029-00
<b>Tales from the Crypt</b>	Tombstone Up/Down Movement	Bowman Motor 24v A.C. 6 RPM CCW	515-5900-00
	Shaker	Johnson Motor (Vibrator) 10.5v D.C. 10 AMP 2950 RPM CW	041-5029-00
<b>The Who's Tommy</b>	Mirror Up/Down Movement	Bowman Motor 24v A.C. 6 RPM CCW	515-5900-00
	Flipper Blinders	Servo Motor (94102)	041-5032-00
	Spinning Airplane Propellers	Motor D.C.	041-5033-00
<b>WWF Royal Rumble</b>	Shaker	Johnson Motor (Vibrator) 10.5v D.C. 10 AMP 2950 RPM CW	041-5029-00
<b>Maverick, The Movie</b>	Turning Paddle Wheel	Motor 24v A.C. 10 RPM	041-5036-00
<b>Mary Shelley's Frankenstein</b>	Creature Head Left/Right Movement	Servo Motor (94102)	041-5032-00
<b>Batman Forever</b>	Cannon Left/Right Movement	Bowman Motor 24v A.C. 60Hz 3W 6 RPM CCW	515-6383-00
<b>Apollo 13</b>	Rocket Up/Down Movement	Bowman Motor 24v A.C. 60Hz 3W 6 RPM CCW	515-6383-00
	Moon Unit Rotational Orbit	Multi Products Motor 24v A.C. 50/60Hz 3W 6 RPM CCW	515-6487-00
	Shaker	Johnson Motor (Vibrator) 10.5v D.C. 10 AMP 2950 RPM CW	041-5029-00
<b>Golden Eye</b>	Satellite Left/Right Movement	Bowman Motor 24v A.C. 60Hz 3W 6 RPM CW	515-6528-00

*Table continued on the next page.*



## APPENDIX F

### Motor Specification Table

*The following table only list games that used motors. Part Numbers starting with "515-" will include the Wiring Harness & Connector.*

Game Name	Function	Specifications	Part №
<b>Twister</b>	Spinning Disc with Magnet	Multi Products Motor 24v A.C. (041-5026-00) 50/60Hz 3W 325 RPM CCW	515-6347-00
	Backbox Fan (Tornado Wind)	Multi Products Motor 24v A.C. (041-5052-00) 50/60Hz 3W 3600 RPM CW	515-6531-00
<b>ID4: Independence Day</b>	Alien Head Open/Close Movement	Servo Motor (94322)	041-5045-00
<b>The Star Wars Trilogy - S.E.</b>	X-Wing Left/Right Movement	Bowman Motor 24v A.C. (041-5058-00) 60Hz 3W 10 RPM CCW	515-6383-01
<b>The Lost World: J.P.</b>	Snagger & Center Link Lift Up/Down Movement	Multi Products Motor 20v D.C. (041-5059-03) 9 RPM Non-Directional	515-6715-03
	Shaker	Johnson Motor (Vibrator) 10.5v D.C. 10 AMP 2950 RPM CW	041-5029-00
<b>The X-Files</b>	X-File Cabinet Lift Up/Down Movement	Multi Products Motor 20v D.C. 9 RPM CCW	041-5057-00
<b>Starship Troopers</b>	Warrior Bug Forward/Reverse Movement	Haydon Switch & Instrument, Inc. Stepper Motor 12v D.C. 4.6W (041-5062-00), Series 36000: 1.4"ø (Non-Captive Shaft not incl.) HSI #36864-12 (Unipolar) Travel per Step: .004 Step Angle: 15°	515-6794-00 Requires 7" Shaft: 530-5503-00
<b>Lost In Space</b>	Spinning Disc with Magnet	Multi Products Motor 24v A.C. (041-5046-00) 50/60Hz 3W 325 RPM CCW	515-6347-00
<b>Godzilla</b>	Shaker	Johnson Motor (Vibrator) 10.5v D.C. 10 AMP 2950 RPM CW ‡	041-5029-01
<b>Harley-Davidson®</b>	Shaker	Johnson Motor (Vibrator) 10.5v D.C. 10 AMP 2950 RPM CW ‡	041-5029-01
	Motorcycle Lift Up/Down Movement	Autotrol 24v A.C. (041-5072-01) 20 RPM CCW	515-7025-00
<b>Striker Xtreme (NFL)</b>	Goalie (Linebacker) Left to Right Movement	Multi #3590 12v D.C. (041-5075-00) 60 RPM	515-7071-00
<b>Sharkey's Shootout</b>	Mystery Ball Rotating Movement	Hankscraft Motor Model-E 24v A.C. (041-5076-00) 50/60Hz 3W 20 RPM CW	515-7095-00
<b>High Roller Casino</b>	Roulette Wheel Rotating Movement	Multi Products Motor 20V D.C. (041-5078-00) 17 RPM CCW	515-7153-00
	Up/Dn. Ramp in Slot Mach. Lift Up/Down Movement	Haydon Switch & Instrument, Inc. Stepper Motor 12v D.C. 4.6W (041-5062-00), Series 36000: 1.4"ø (Non-Captive Shaft not incl.) HSI #36864-12 (Unipolar) Travel per Step: .004 Step Angle: 15°	515-6794-00 Requires Shaft 4 1/4": 530-5503-01
<b>Austin Powers™</b>	Time Machine Rotating Movement	Multi Products Motor 24v A.C. (041-5079-00) 50/60Hz 20RPM CCW	515-7141-00
	Laser Beam Left to Right Directional	Autotrol Motor 24V A.C. (041-5081-00) 50/60Hz 4W 10RPM Bi-Directional	515-7171-00
	Dr. Evil Target Lift Up/Down Movement	Hankscraft Motor Model-E 24v A.C. (041-5030-00) 50/60Hz 6RPM CCW	515-5900-00
<b>Monopoly®</b>	Mini-Flipper (Waterworks) Rotating Movement	Multi Prod. Motor & Gear Box #7000 EX00159A 20v D.C. 50/60Hz 85RPM CC/CW	041-5083-00
<b>Playboy</b>	Triangular Billboard Rotating Movement	Autotrol Motor (BD511 150-1387) 24v A.C. 50/60Hz 12RPM Bi-Directional	041-5086-02
	Centerfold Mechanism Open/Close Movement	Multi Products (3680) Motor 12v DC 10/12 RPM CC/CW	041-5075-04
	Tease Drop Screen Lift Up/Down Movement	Haydon Switch & Instrument, Inc. Stepper Motor 12v D.C. 4.6W (041-5062-00), Series 36000: 1.4"ø (Non-Captive Shaft not incl.) HSI #36864-12 (Unipolar) Travel per Step: .004 Step Angle: 15°	515-6794-00 Requires 7" Shaft: 530-5503-00

**No motors were used on the following games:** Laser War, Secret Service, Torpedo Alley, Time Machine, Playboy 35th Anniversary, Robocop, Back to the Future, The Simpsons, Hook, Guns N' Roses, Baywatch, Space Jam, Viper Night Drivin', South Park.

‡ **Please Note:** "-01" Shaker Motor is **Not Compatible** with old Shaker Motor 041-5029-00 (Shaker Motor Assy. 515-5893-00). THIS NEW MOTOR CAN ONLY BE USED IN NEW SHAKER MOTOR ASSY. 515-5893-01.

# APPENDIX G

## Part Number Prefix Classification Codes








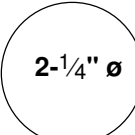
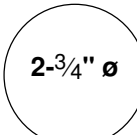




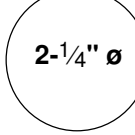
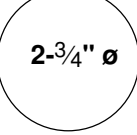




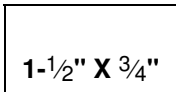
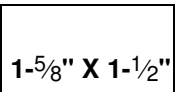
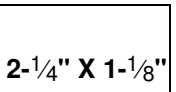
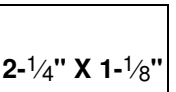
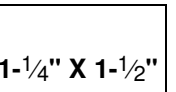
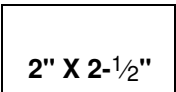


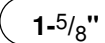



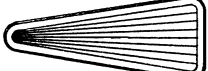
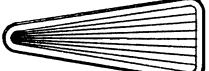
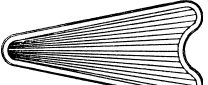
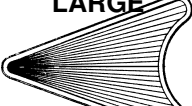
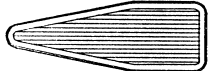

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- I. Electrical Source, Energy & Signal Converters**
  - 010- Transformers
  - 031- Speakers
  - 090- Solenoids (Coils)
- II. Conductors, Connectors & Insulators**
  - 034- Line Cords
  - 036- Cable and Harness Assemblies
  - 041- Motors
  - 045- Connectors (All Types)
  - 077- Lamp Sockets
- III. Circuits & Circuit Elements**
  - 100- ICs
  - 110- Transistors
  - 112- Diodes
  - 121- Resistors
  - 123- Resistors (Variable & Adjustable)
  - 124- Regulators & Bridge Rectifiers
  - 125- CAPS
  - 140- Crystals
  - 165- Light Bulbs
  - 180- Switches
  - 190- Relays
- IV. Bolts, Screws, Nuts & Washers**
  - 231- Bolts
  - 232- Screws (Pan Head)
  - 234- Screws (HWH)
  - 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- Printed Circuit Boards (PCBs)
  - 522- Display Glass
  - 525- Wood Parts
  - 530- Screw Machined Parts
  - 535- Fabricated Parts
  - 545- Molded (Extruded) Plastic/Rubber Parts
  - 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.)
  - 830- Butyrate (Plastic Pieces)
  - 900- Game Posters
  - 960- EPROM (Raw Part)
  - 965- EPROM (Programmed Part)



## APPENDIX H

### Playfield Inserts (Plastic Light Covers)

<b>Patterns:</b> <b>STARBURST</b>  <b>STIPPLE</b> 	<b>STARBURST CIRCULAR</b>  <b>550-5000-XX</b>	<b>STARBURST CIRCULAR</b>  <b>550-5001-XX</b>	<b>STARBURST CIRCULAR</b>  <b>550-5002-XX</b>	<b>STARBURST CIRCULAR</b>  <b>550-5003-XX</b>	<b>STARBURST CIRCULAR</b>  <b>550-5004-XX</b>
<b>STARBURST CIRCULAR</b>  <b>550-5005-XX</b>	<b>STARBURST CIRCULAR</b>  <b>550-5006-XX</b>	<b>PLAIN CIRCULAR</b>  <b>550-5007-XX</b>	<b>PLAIN CIRCULAR</b>  <b>550-5008-XX</b>	<b>PLAIN CIRCULAR</b>  <b>550-5009-XX</b>	<b>PLAIN CIRCULAR</b>  <b>550-5010-XX</b>
<b>PLAIN CIRCULAR</b>  <b>550-5011-XX</b>	<b>PLAIN CIRCULAR</b>  <b>550-5012-XX</b>	<b>STIPPLE CIRCULAR</b>  <b>550-5048-XX</b>	<b>STIPPLE 1" SQUARE</b>  <b>550-5019-XX</b>	<b>ROLLOVER BUTTON BASE</b>  <b>550-5026-XX</b>	<b>WHITE STAR (only in white)</b>  <b>545-5015-00</b>
<b>STIPPLE RECTANGULAR</b>  <b>550-5018-XX</b>	<b>STIPPLE RECTANGULAR</b>  <b>550-5051-XX</b>	<b>STARBURST RECTANGULAR</b>  <b>550-5044-XX</b>	<b>PLAIN RECTANGULAR</b>  <b>550-5049-XX</b>	<b>PLAIN RECTANGULAR</b>  <b>550-5050-XX</b>	<b>PLAIN RECTANGULAR</b>  <b>550-5063-XX</b>
<b>STARBURST MINI SHIELD</b>  <b>550-5024-XX</b>	<b>STARBURST LARGE SHIELD</b>  <b>550-5025-XX</b>	<b>MINI HOT DOG</b>  <b>550-5020-XX</b>	<b>BEVEL HOT DOG</b>  <b>550-5021-XX</b>	<b>PLAIN HOT DOG</b>  <b>550-5022-XX</b>	<b>BANANA</b>  <b>550-5023-XX</b>
<b>STARBURST ARROW-SMALL</b>  <b>550-5013-XX</b>	<b>STARBURST ARROW-LARGE</b>  <b>550-5070-XX</b>	<b>STARBURST ARROW-HEAD SMALL</b>  <b>550-5014-XX</b>	<b>STARBURST ARROW-HEAD LARGE</b>  <b>550-5015-XX</b>	<b>STARBURST BULLET</b>  <b>550-5016-XX</b>	<b>STARBURST TRIANGLE</b>  <b>550-5017-XX</b>

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

**Instructions:** Parts which may come in various colors (i.e. targets, some posts, playfield inserts, etc.) end in a 2-digit N<sup>o</sup> which correspond to the color of that part. The "-XX" in Part N<sup>o</sup>s which may come in various colors should be replaced with the desired 2-Digit N<sup>o</sup>. corresponding to the color desired. *Not all colors may be available.*

PLASTIC PART COLOR CHART											
N <sup>o</sup>	Color	N <sup>o</sup>	Color	N <sup>o</sup>	Color	N <sup>o</sup>	Color	N <sup>o</sup>	Color	N <sup>o</sup>	Color
-00	Black or Solid Clear	-03	Amber	-06	Yellow	-09	Purple	-12	Fluor. Blue	-15	Luminescent
-01	Clear	-04	Green	-07	Orange	-10	Fluor. Orange	-13	Teal Green	-16	Gold
-02	Red	-05	Blue	-08	White	-11	Fluor. Green	-14	Gray	-17	Trans. Brown



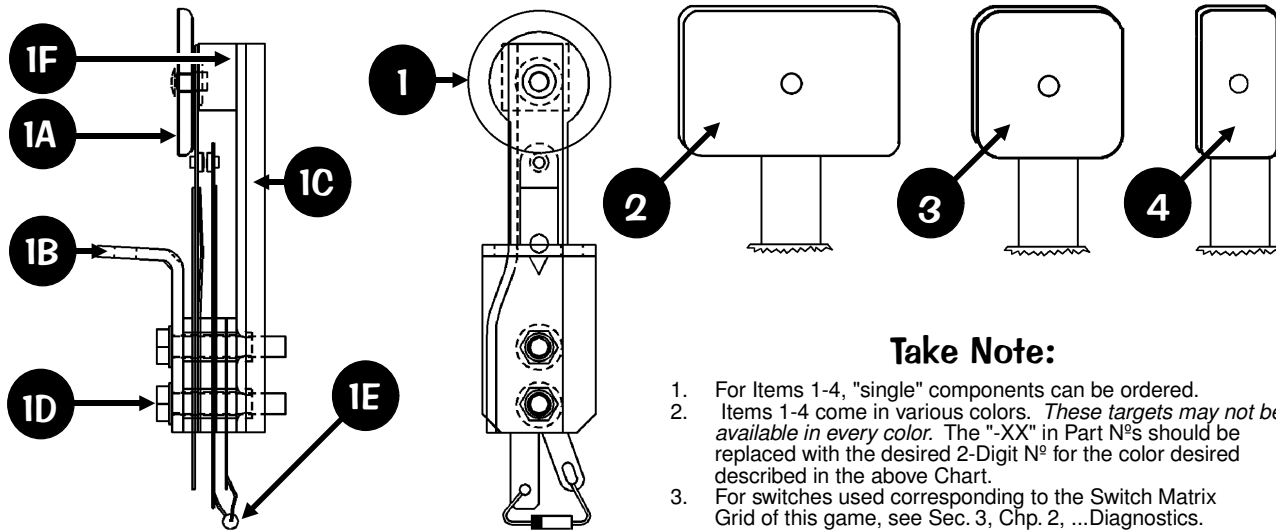
# APPENDIX I

## Stand-Up Targets

PLASTIC PART COLOR CHART	
Nº	Color
-00	Black
-01	Clear
-02	Red
-03	Amber
-04	Green
-05	Blue
-06	Yellow
-07	Orange
-08	White
-09	Purple
-10	Fluor. Orange
-11	Fluor. Green
-12	Fluor. Blue
-13	Teal Green
-14	Gray
-15	Luminescent
-16	Gold



Nº	STAND-UP TARGET NAME	SPI PART Nº	Nº	STAND-UP TARGET NAME	SPI PART Nº
A	Modular Stand-Up Target Narrow Assy.	500-6138-XX	D	Modular Stand-Up Target Round Assy.	500-6075-XX
	Stand-Up Target Narrow (Insert)	545-6138-XX		Stand-Up Target Round (Insert)	545-6075-XX
B	Modular Stand-Up Target Square Assy.	500-6139-XX	E	Mod. Stand-Up Target 1" Spherical Assy.	500-6189-XX
	Stand-Up Target Square (Insert)	545-6139-XX		Stand-Up Target 1" Spherical (Insert)	545-6189-XX
C	Modular Stand-Up Target Rectangle Assy.	500-6228-XX	<b>Note:</b> To receive the Target Assembly with the «Target Insert» «Reversed» simply add a "R" at the end of the Part Nº. See Side View picture above to compare (dashed line shows target reversed).		
	Stand-Up Target Rectangle (Insert)	545-6228-XX			





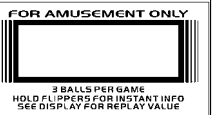









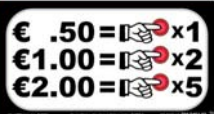
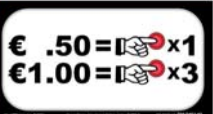
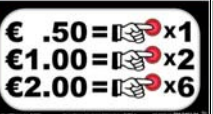
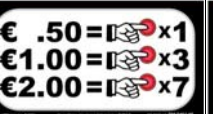

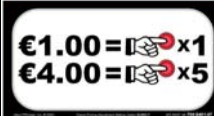
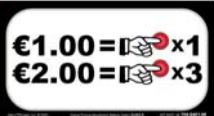
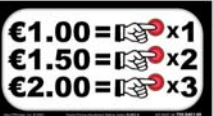
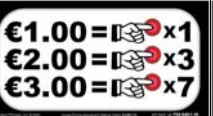
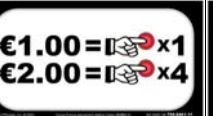
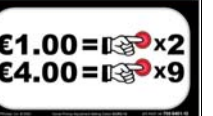

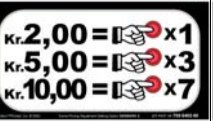
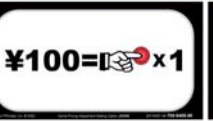


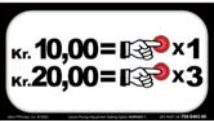
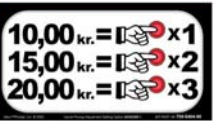
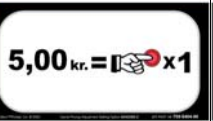
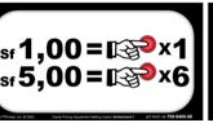
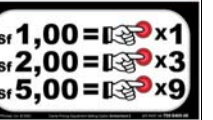



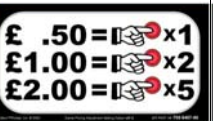
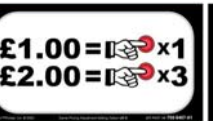

Nº	STAND-UP (FLAT) TARGET NAME	SPI PART Nº	Nº	STAND-UP (FLAT) TARGET NAME	SPI PART Nº
1	1" Round Stand-Up Target Assy.	500-5835-XX	<b>Note:</b> Item 2A, is a riveted Sub-Assy, which includes the following items for reference: A1— Stack Switch Radius End (180-5133-00), A2— Washer 5/16" (242-5017-00), A3— Rivet 1/8" ø X 3/16" (249-5001-00) and A4— 1" Round Target (545-5456-XX).		
<b>ORDERING ABOVE (ITEM 1) ASSY. PART Nº WILL INCLUDE:</b>			3	1" Sq. Stand-Up Target Assy.	500-5232-XX
1A‡	Switch & Target Assy. 1" Round	515-5966-XX	<b>ORDERING ABOVE (ITEM 3) ASSY. PART Nº WILL INCLUDE:</b>		
1B	Mounting Bracket	535-6896-00	3A‡	Sw. & Target Assy. 1" Square	515-5162-XX
1C	Switch Back Plate	535-6452-00	Items 3B-F are identical to 1B-F		
1D	6-32 X 3/4 HWH Swage (Qty. 2)	237-5976-05	<b>Note:</b> Item 3A, is a riveted Sub-Assy, which includes the following items for reference: A1— Stack Switch Radius End (180-5133-00), A2— Washer 5/16" (242-5017-00), A3— Rivet 1/8" ø X 3/16" (249-5001-00) and A4— 1" Square Target (545-5470-XX).		
1E	Switch Diode, 1N4001	112-5001-00	4	Narrow Stand-Up Target Assy.	500-5857-XX
1F	Foam Pad	626-5029-00	<b>ORDERING ABOVE (ITEM 4) ASSY. PART Nº WILL INCLUDE:</b>		
<b>Note:</b> Item 1A, is a riveted Sub-Assy, which includes the following items for reference: A1— Stack Switch Radius End (180-5133-00), A2— Washer 5/16" (242-5017-00), A3— Rivet 1/8" ø X 3/16" (249-5001-00) and A4— 1" Round Target (545-5456-XX).			4A‡	Sw. & Target Assy. Narrow	515-5967-XX
2	1" X 1 1/2" Stand-Up Rect. Target Assy.	500-5321-XX	Items 4B-F are identical to 1B-F		
<b>ORDERING ABOVE (ITEM 2) ASSY. PART Nº WILL INCLUDE:</b>			<b>Note:</b> Item 4A, is a riveted Sub-Assy, which includes the following items for reference: A1— Stack Switch Square End (180-5132-00), A2— Washer 5/16" (242-5017-00), A3— Rivet 1/8" ø X 3/16" (249-5001-00) and A4— Narrow Target (545-5210-XX).		
2A‡	Sw. & Target Assy. 1" X 1 1/2" Rect.	515-6027-XX			
Items 2B-F are identical to 1B-F					

Item 2 Table Note continued in the next column.



## APPENDIX J

### Coin Cards (USA & International)

<b>Pricing Default:</b> (note):	USA 8 or Canada (used prior 03/2002)	USA 2-7 or Canada (used prior 03/2002)	USA or International (used prior Mar. 02)	USA 1* (optional) (used prior Mar. 02)	USA 5 (used prior Mar. 02)
See Section 3, Chapter 4, Go To Adjustments Menu, Adj. 6. Game Pricing, USA & International Standard Pricing Select Table, to view Custom or Standard Pricing Schemes these Coin Cards correspond to.					
<b>Description:</b> SPI Part N°:	<b>Front</b> 755-5087-01	<b>Back</b> 755-5087-01	<b>for Custom Pricing</b> 755-5087-02	<b>1-Sided</b> 755-5087-03	<b>1-Sided</b> 755-5087-05
<b>USA 8 or Canada</b> (supercedes 755-5087-01)	<b>USA 5 or Canada</b> (supercedes 755-5087-05)	<b>USA 1* (optional)</b> (supercedes 755-5087-03)	<b>Custom Pricing†</b> (supercedes 755-5087-02)	<b>USA 2-7 or Canada</b> (supercedes 755-5087-01)	<b>Custom Pricing†</b> (supercedes 755-5087-02)
					
<b>Front</b> 755-5400-00	<b>Back</b> 755-5400-00	<b>Front</b> 755-5400-01	<b>Back</b> 755-5400-01	<b>Front</b> 755-5400-02	<b>Back</b> 755-5400-02
<b>EURO 1</b>	<b>EURO 2</b>	<b>EURO 3</b>	<b>EURO 4</b>	<b>EURO 5</b>	<b>EURO 6</b>
					
<b>1-Sided</b> 755-5401-01	<b>1-Sided</b> 755-5401-02	<b>1-Sided</b> 755-5401-03	<b>1-Sided</b> 755-5401-04	<b>1-Sided</b> 755-5401-05	<b>1-Sided</b> 755-5401-06
<b>EURO 7</b>	<b>EURO 8</b>	<b>EURO 9</b>	<b>EURO 10</b>	<b>EURO 11</b>	<b>EURO 12</b>
					
<b>1-Sided</b> 755-5401-07	<b>1-Sided</b> 755-5401-08	<b>1-Sided</b> 755-5401-09	<b>1-Sided</b> 755-5401-10	<b>1-Sided</b> 755-5401-11	<b>1-Sided</b> 755-5401-12
<b>Note:</b> You can download any Coin Card (in PDF Format*) from our website <a href="http://www.sternpinball.com/coinagecards.htm">www.sternpinball.com/coinagecards.htm</a> . Only the Coin Cards shown on this page are available. Older styles (foreign or domestic), if no longer available through your distributor, cannot be replaced.		<b>DENMARK 1</b>	<b>DENMARK 2</b>	<b>JAPAN</b>	<b>JAPAN Custom</b>
					
		<b>Front</b> 755-5402-00	<b>Back</b> 755-5402-00	<b>Front</b> 755-5408-00	<b>Back</b> 755-5408-00
<b>NORWAY 1</b>	<b>NORWAY 2</b>	<b>SWEDEN 1</b>	<b>SWEDEN 2</b>	<b>SWITZERLAND 1</b>	<b>SWITZERLAND 2</b>
					
<b>Front</b> 755-5403-00	<b>Back</b> 755-5403-00	<b>Front</b> 755-5404-00	<b>Back</b> 755-5404-00	<b>Front</b> 755-5405-00	<b>Back</b> 755-5405-00
<b>AUSTRALIA 1</b>	<b>AUSTRALIA 2</b>	<b>UK 1</b>	<b>UK 3</b>	<b>UK 5</b>	<b>UK Custom</b>
					
<b>Front</b> 755-5406-00	<b>Back</b> 755-5406-00	<b>Front</b> 755-5407-00	<b>Back</b> 755-5407-00	<b>Front</b> 755-5407-01	<b>Back</b> 755-5407-01

† International can use the back side of this card for Custom Pricing.

\* Optional Card not included with this game, but available.



# GLOSSARY OF TERMS

- A** Followed after a number means "Amp." or Ampage in an expression relating to an electrical object. (e.g. **8A**).
- AC** (Acronym) **Alternating Current**.
- Adj.** (Abbreviation) Adjustment(s).
- Assy.** (Abbreviation) Assembly.
- Au.** (Abbreviation) Audit(s).
- Bd.** (Abbreviation) Board.
- BOT** (Abbreviation) Bottom.
- Brkt.** (Abbreviation) Bracket.
- 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 or I, Plastic Part Color Chart or Section 4, Chapter 1, Playfield - Plastic Posts & Spacers.
- Combination (Combo) [Shot]** Any variable pinball shot(s) made successively.
- Conn.** (Abbreviation) Connector.
- CMOS** Short for COSMOS (Complementary Symmetry M.O.S.); Complementary Metal-Oxide Semi-Conductor.
- CN** (Abbreviation) Connector (e.g. **CN5-P3**).
- CT** (Abbreviation) Center.
- DC** (Abbreviation) Direct Current.
- DT** (Abbreviation) Drop Target(s).
- DOTS** (Acronym) **Diode On Terminal Strip**.
- EB** (Abbreviation) Extra Ball.
- Eject** Playfield surface device to kick ball back into play; Saucer.
- EPROM** (Acronym) **Erasable Programmable Read Only Memory**. Can be erased using UV Light and re-programmed.
- e.g.** (Abbreviation) Latin- Exempla gratia. For Example.
- EOS** (Acronym) **End-Of-Stroke** (i.e. Switch for flipper).
- F** (Abbreviation) Fuse (i.e. **F23**).
- GA-Turn** Gauge & Turn describing the windings on a coil (e.g. 23-800, 23 is the gauge of wire and 800 is the amount of windings).
- G.I.** (Abbreviation) General Illumination (Lamps).
- HWH** (Abbreviation) Hex Washer Head.
- IC** (Acronym) **Integrated Circuit** (As in after 24-Pin IC).
- ID or I.D.** (Acronym) **Inside Dimension**.
- i.e.** (Abbreviation) Latin- Id est. That is.
- IO or I/O** (Abbreviation) Input / Output (e.g. I/O Power Driver Bd.)
- LT, Lt. or L.** (Abbreviation) Left.
- Laser Kick** A coil/plunger used above the playfield to kick pinball back into play.
- LED** (Acronym) **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** (Abbreviation) Magnet Board.
- M-BALL or MBALL** (Abbreviation) Multiball™ More than 1 ball in game play.
- MID** (Abbreviation) Middle
- Non-Reflexive** See Reflexive.
- No. or N° or #** (Abbreviation) Number
- NPF** (Acronym) **No Problem Found**.
- N.C. or NC** (Abbreviation) Normally Closed.
- N.O. or NO** (Abbreviation) Normally Open.
- NS** (Abbreviation) Not Stuffed. (Use in Part Listings, Sec. 5)
- OD or O.D.** (Abbreviation) Outside Dimension.
- P** (Abbreviation) Pin (e.g. **CN5-P3**).
- PCB** (Acronym) **Printed Circuit Board**
- P/F** (Abbreviation) Playfield.
- PIA LED** (Acronym) **Peripheral Interface Adapter Light Emitting Diode**. 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.
- PPH** (Abbreviation) Phillips Pan Head.
- Pop(s)** Another term for Turbo Bumper(s).
- PPB** (Acronym) Playfield Power Board ("Popcorn-Popping Bd.").
- PREV** (Abbreviation) Previous.
- PSB** (Abbreviation) Power Supply Board
- RAM** (Acronym) **Random Access Memory**. **RAM can** store input instructions and supply output information.
- Reflexive/Non-Reflexive Reflexive**—Solenoid Drive Transistor is enabled directly by a switch closure on the (Relating to CPU Boards) 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** (Acronym) **Read Only Memory**. **ROM cannot** store input instructions but can supply output information. **ROM can be programmed only once**.
- RMA** (Abbreviation) Return Merchandise Authorization Number
- RT, Rt. or R.** (Abbreviation) Right; ("**R**" at the end of Target Assy. Part N° signifies Target Insert is Reversed.)
- 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 achieved.
- SMB** (Abbreviation) Shaker Motor Board.
- Solenoid** A coil used for Electro Magnetic devices such as relays, flippers, slingshots, etc.
- SSFB** (Abbreviation) Solid State Flipper Board.
- STEP** Refers to the service switches on the coin door.
- Sub-Assy.** (Abbreviation) Sub-Assembly.
- S-U or S/U** (Abbreviation) Stand-Up ( targets).
- TM** (Abbreviation) 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 repetitive manner to bounce the ball to the other side. Skilled players can rebound the ball off the slingshot.
- Tri-Ball** Three balls in play.
- TTL** (Abbreviation) Transistor-Transistor Logic
- Upr.** (Abbreviation) Upper.
- V or v** (Abbreviation) Volt(s).
- Ver.** (Abbreviation) Version.
- VUK** (Acronym) **Vertical Up-Kicker** (Super or Standard).
- X** (Abbreviation) "Times" A multiplier; also used in dimensions.
- X-Ball** An undetermined number of ball(s) during game play.
- Zener Diode** A semi-conductor diode used for voltage regulation. Application depends on reverse break-down voltage.
- "-00B"** "B" at the end of Coil Part Numbers signifies that the diode is attached to the bottom of the lug.
- "-00T"** "T" at the end of Coil Part Numbers signifies that the diode is attached to the top of the lug (the side nearest the coil-winding).



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PRINTED CIRCUIT BOARDS (GAME LOGIC):	2 MONTHS
DOT MATRIX DISPLAY BOARDS:	9 MONTHS

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## CAUTIONS, WARNINGS & NOTICES

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 Always Disconnect The Line Voltage Before Servicing. Some Parts May Still Hold Current When Unplugged.

### 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.

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In SWITCH MENU also select:  
**ACTIVE and DEDICATED SWITCH TESTS**

## SWITCH MATRIX GRID & DEDICATED SWITCHES

D iode O n T ermi n a l S tri p :

Column (Drive)	1: Q1	2: Q2	3: Q3	4: Q4	5: Q5	6: Q6	7: Q7	8: Q8
Row (Return)	GRN-BRN CN5-P1	GRN-RED CN5-P3	GRN-ORG CN5-P4	GRN-YEL CN5-P5	GRN-BLK CN5-P6	GRN-BLU CN5-P7	GRN-VIO CN5-P8	GRN-GRY CN5-P9
1: U400 WHT-BRN CN7-P9	LEFT BUTTON (UK ONLY) on Cabinet side	SKILL SHOT Under Playfield	RIGHT RAMP ENTER On Ramp Assy.	POP BUMPER EXIT Under Playfield	SURPRISE PACKAGE TARGET On Assembly	LEFT RAMP ENTER On Ramp Assy.	LEFT BUMPER On Assembly	LEFT OUTLINE Under Playfield
2: U400 WHT-RED CN7-P8	4TH COIN SLOT On Coin Door	RIGHT ORBIT Under Playfield	RIGHT RAMP EXIT On Ramp Assy.	DROP TARGET On Assembly	GROTTO EJECT Under Playfield	LEFT RAMP EXIT On Ramp Assy.	RIGHT BUMPER On Assembly	LEFT RETURN LANE Under Playfield
3: U400 WHT-ORG CN7-P7	6TH COIN SLOT On Coin Door	4-BALL TROUGH #1 (LEFT) On Assembly	CENTER LANE Under Playfield	LEFT ORBIT Under Playfield	VUK On Assembly	CENTERFOLD 1 (CLOSED) On Assembly	BOTTOM BUMPER On Assembly	LEFT SLINGSHOT On Assembly
4: U400 WHT-YEL CN7-P6	RIGHT COIN SLOT On Coin Door	4-BALL TROUGH #2 On Assembly	NOT USED	NOT USED	NOT USED	CENTERFOLD 2 (OPEN) On Assembly	TEASE SCREW LIMIT On Assembly	RIGHT OUTLINE Under Playfield
5: U401 WHT-GRN CN7-P5	CENTER COIN SLOT / DBA On Coin Door	4-BALL TROUGH #3 On Assembly	CENTER RAMP EXIT On Ramp Assy.	TRIANGLE MECH 1 (RIGHT) On Assembly	NOT USED	NOT USED	TOURNAMENT BUTTON Cabinet Front	RIGHT RETURN LANE Under Playfield
6: U401 WHT-BLU CN7-P3	LEFT COIN SLOT On Coin Door	4-BALL TROUGH VUK OPTO On Assembly	LEFT TOP LANE Under Playfield	TRIANGLE MECH 2 (LEFT) On Assembly	RAMP BALL LOCK 3 On Ramp Assy.	NOT USED	START BUTTON Cabinet Front	RIGHT SLINGSHOT On Assembly
7: U401 WHT-VIO CN7-P2	5TH COIN SLOT On Coin Door	4-BALL STACKING OPTO On Assembly	MIDDLE TOP LANE Under Playfield	NOT USED	RAMP BALL LOCK 1 On Ramp Assy.	NOT USED	NOT USED	NOT USED
8: U401 WHT-GRY CN7-P1	RIGHT BUTTON (UK ONLY) on Cabinet side	SHOOTER LANE Under Playfield	RIGHT TOP LANE Under Playfield	PEEK-A-BOO TARGET On Assembly	RAMP BALL LOCK 2 On Ramp Assy.	NOT USED	PLUMB BOB TILT Inside Cabinet	NOT USED

IC U206 INPUT 8	Ground
1: U206 GRY-BRN CN6-P2	#1 LEFT FLIPPER BUTTON in Cabinet side
2: U206 GRY-RED CN6-P3	#2 LEFT FLIPPER E.O.S (End-of-Stroke) in Cabinet side
3: U206 GRY-ORG CN6-P4	#3 RIGHT FLIPPER BUTTON in Cabinet side
4: U206 GRY-YEL CN6-P6	#4 RIGHT FLIPPER E.O.S (End-of-Stroke) in Cabinet side
5: U206 NOT USED GRY-GRN CN6-P7	#5 NOT USED
6: U206 GRY-BLU CN6-P8	#6 VOLUME (RED BUTTON) (In Test: LEFT) on Coin Door
7: U206 GRY-VIO CN6-P9	#7 SERV. CRED. (GREEN BUTTON) (In Test: RIGHT) on Coin Door
8: U206 GRY-BLK CN6-P10	#8 BEGIN TEST (BLACK BUTTON) (In Test: ENTER) on Coin Door



In LAMP MENU also select:  
**TEST ALL LAMPS, ROW & COLUMN LAMP TESTS**

## LAMP MATRIX GRID

D iode O n T ermi n a l S tri p :

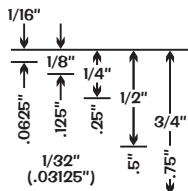
Column (18v)	1: U17	2: U16	3: U15	4: U14	5: U13	6: U12	7: U11	8: U10
Row (GND)	YEL-BRN J13-P9	YEL-RED J13-P8	YEL-ORG J13-P7	YEL-BLK J13-P6	YEL-GRN J13-P5	YEL-BLU J13-P4	YEL-VIO J13-P3	YEL-GRY J13-P1
1: Q33 RED-BRN J12-P1	JANUARY #555 Bulb	FEBRUARY #555 Bulb	MARCH #555 Bulb	MANSION 1 (LT) #555 Bulb	MANSION 2 #555 Bulb	MANSION 3 #555 Bulb	MANSION 4 (RT) #44 Bulb	SHOOT AGAIN #555 Bulb
2: Q34 RED-BLK J12-P2	APRIL #555 Bulb	MAY #555 Bulb	JUNE #555 Bulb	LEFT OUTLINE #555 Bulb	LEFT RETURN LANE #555 Bulb	RIGHT RETURN LANE #555 Bulb	RIGHT OUTLINE #555 Bulb	PEEK-A-BOO #555 Bulb
3: Q35 RED-ORG J12-P3	JULY #555 Bulb	AUGUST #555 Bulb	SEPTEMBER #555 Bulb	PHOTO SHOOT (LT ORBIT) #555 Bulb	BUNNY (LT ORBIT) #555 Bulb	PHOTO SHOOT (LT RAMP) #555 Bulb	SPLASH (LT RAMP) #555 Bulb	JACKPOT (LT RAMP) #555 Bulb
4: Q36 RED-YEL J12-P4	OCTOBER #555 Bulb	NOVEMBER #555 Bulb	DECEMBER #555 Bulb	SURPRISE PACKAGE #555 Bulb	TEASE #555 Bulb	DROP TARGET #555 Bulb	MULTIBALL #555 Bulb	PAJAMA PARTY MULTIBALL #555 Bulb
5: Q37 RED-GRN J12-P5	BUNNY #1 (BOTTOM) #555 Bulb	BUNNY #2 #555 Bulb	BUNNY #3 #555 Bulb	BUNNY #4 #555 Bulb	BUNNY #5 #555 Bulb	BUNNY #10 #555 Bulb	NOT USED	LEFT TOP LANE #555 Bulb
6: Q38 RED-BLU J12-P6	MIDDLE TOP LANE #555 Bulb	RIGHT TOP LANE #555 Bulb	PHOTO SHOOT (CENTER) #555 Bulb	EXTRA BALL #555 Bulb	GROTTO ARROW #555 Bulb	PAJAMA PARTY HURRY-UP #555 Bulb	MYSTERY #555 Bulb	PHOTO SHOOT (RT RAMP) #555 Bulb
7: Q39 RED-VIO J12-P8	NOT USED	SPLASH (RT RAMP) #555 Bulb	PHOTO SHOOT (RT ORBIT) #555 Bulb	BUNNY (RT ORBIT) #555 Bulb	PHOTO SHOOT (VUK) #555 Bulb	JACKPOT HURRY-UP #555 Bulb	SPECIAL #555 Bulb	MAGAZINE 1 & 2 #555 Bulb
8: Q40 RED-GRY J12-P9	MAGAZINE 3 & 4 #555 Bulb	DOUBLE JACKPOT #555 Bulb	JACKPOT #555 Bulb	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED
9: Q41 RED-WHT J12-P10	NOT USED	NOT USED	PEEK-A-BOO 1 & 2 #555 Bulb	PEEK-A-BOO 3 #555 Bulb	PEEK-A-BOO 4 #555 Bulb	CTRFLD SPOTLITE (RT #1) #555 Bulb	CTRFLD SPOTLITE (RT #2) #555 Bulb	START BUTTON #555 Bulb
10: Q42 RED J12-P11	CTRFLD SPOTLITE (LT #2) #555 Bulb	STRIP POKER (LT RAMP) #555 Bulb	COLLECT PLAY-MATES #555 Bulb	CTRFLD SPOTLITE (LT #1) #555 Bulb	CTRFLD SPOTLITE (RT #3) #555 Bulb	LEFT BUMPER #555 Bulb	RIGHT & BOTTOM BUMPERS #555 Bulb	TOURNAMENT BUTTON #555 Bulb



▼ U.S. ▼  
Customary  
Inch Ruler

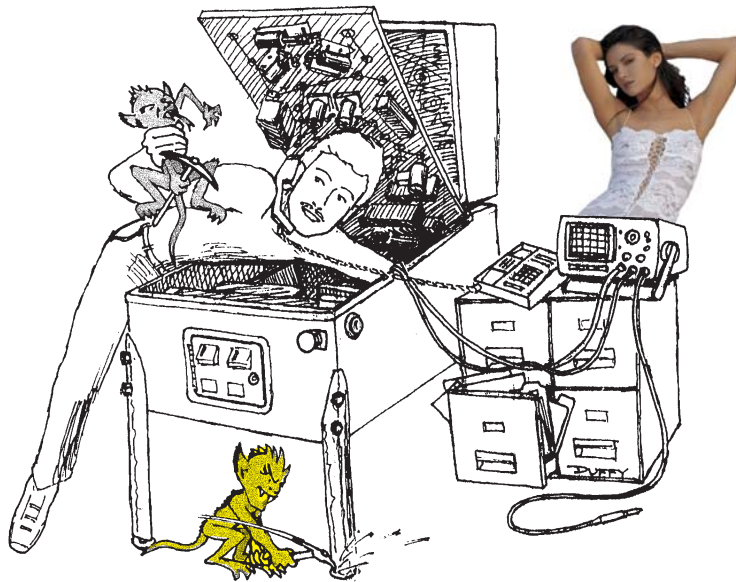


**Metric Conversion**



1" = 2.54cm /25.4mm  
1cm = .3937"  
1mm = .03937"

- For metric, multiply inch value by metric value, e.g. 5" X 2.54cm = 12.7cm or 127mm.
- For US, multiply metric value by inch value, e.g. 13cm X .3937" = 5.1181"



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