Major Assemblies & Ramps   The Blue Pages

Optional Kits available through your Distributor:

Flipper Rebuild Kit (Left) 500-6307-10

Flipper Base Plate Kit (Left) 515-6617-01

Kit includes: Flipper Base Plate (Left) pre-threaded with securing hardware; see the Flipper Drawing for view.

Flipper Rebuild Kit (Right) 500-6307-00

Flipper Base Plate Kit (Right) 515-6617-00

Kit includes: Flipper Base Plate (Left) pre-threaded with securing hardware; see the Flipper Drawing for view.

Pinball Location Maintenance Standard Kit (for AC/DC Premium Pinball) 502-6002-C7

Standard Kit includes : 8 oz. Novus Wax #2 Fine (Red) (675-0003-01), Cloth, Rubber Rings (used above playfield), Bulbs (Bulb quantities vary and is limited to 25 per type), Fuses (1/per type) and 4 Pinballs. *Note:* Quanties, sizes and contents subject to change without notice.

Pinball Location Maintenance Deluxe Kit (for AC/DC Premium Pinball) 502-6003-C7

Deluxe Kit includes : Pinball Location Maintenance Standard Kit as described above plus a quantity of Flipper Rebuild Kits. *Note:* Quantity varies which equals the same quantity of flippers used in this game.
▲ THIS GAME KIT INCLUDES (2) FLIPPER REBUILD KITS ▲

Plastics*Kit (for AC/DC Premium Pinball) 803-5000-C7

Plastics Kit includes: Plastic Sets (830-6125-XX)

Decals*Kit (for AC/DC Premium Pinball) 802-5000-C4

Decals Kit includes: Decal Set (820-7000-XX)

Attention: No individual Plastic or Decal can be ordered separately, unless noted otherwise. Plastics & Decals are subject to change without notice during and / or after production. Key Fobs subject to availability and may or may not be included in the plastic set. All designs, shapes & pieces used subject to change without notice. Kit contents subject to change. Service Bulletin(s) will announce any critical changes, if warranted. The last 2-digits shown on plastics or decals are for reference only.

b1

Ball Shooter (Plunger) Assembly, 500-6146-00-04 (Items 1-6)

Assemble into Housing in the following order:

Rod Assemby
(see Item 2),
Short Spring
(see Item 3),
Washer
(see Item 3),
Bushing
(see Item 4)

and then ...

Washer *(see Item 5)*

Washer *(see Item 5)*

Securing Hardware for Items 3 & 5 are also shown separated from the Ball Shooter (Plunger) Assembly for clarity.

Retaining (E-) Ring *(see Item 5)*

and then ...

Bushing
(see Item 4),
Washer
(see Item 5),
Long Spring
(see Item 5),
Washer
(see Item 5),
Retaining Ring
(see Item 5),
Plunger Tip
(see Item 6).

1 + 4

Washer *(see Item 3)*

Nr.	BALL SHOOTER PARTS	QTY.	SPI PART Nr.
1	Housing Asm. + Bushings *(Item 4)*	1	535-5067-02
	Item 1 is secured to the Cabinet by: Support Plate [not included with Item 1 *or Assembly*] (535-5027-00), #10-32 X 1/2" PPH (Sems) Zinc TF (Qty. 3) (237-6033-00), #10 Split Lock Washer (Qty. 3) (244-5003-00) and #6 X 1/2" HWH AB (Zinc) Red (Qty. 2) (234-5001-02)		
2	Rod Assembly *(with Black Knob)*	1	515-6557-00
3	Comp. Spring (Short) *(Knob Side)*	1	266-5010-00
	Item 3 is sandwiched onto Item 2 (Front Side) between the knob and by: Washer, 3/8" I.D. X 5/8" O.D. X 1/16" (242-5014-00)		
4	Bushing, 3/8" I.D. (Oilite)	2	280-5010-00
	Item 4 is included with Item 1, Housing, (1 @ the front; 1 @ the back) as shown.		
5	Comp. Spring (Long) [ORANGE, .035" ø]	1	266-5001-07
	Item 5 is sandwiched onto Item 2 (Rubber Tip Side) by: Washer, 3/8" I.D. X 5/8" O.D. X 1/16" (Qty. 1/per side) (242-5014-00) and Retaining Ring, 3/8" ø Shaft (270-5012-00)		

Ordering Note: If *500-6146-00-04* is unavailable, order the individual part(s) actually required. ... Identical to *500-6146-00-07* has Comp. Spring [Orange, .038" ø] (266-5001-07) or *500-6146-00-05* has Comp. Spring [Blue, .031" ø] (266-5001-05).

Autoplunger Arm Weld Asm., 500-6091-00 (Items 1-5), Autoplunger Coil Assembly, 500-6092-02-ND (Items 6-9) and Shooter Lane Switch Assembly, 500-6096-00 (Items 10-12)

Nr.	AUTOPL. ARM WELD PARTS	QTY.	SPI PART Nr.
1	Arm Weld Assembly	1	515-6526-00
	Item 1 is secured to Item 2 by: Retaining Ring: 1/4" ø Shaft (Qty. 1) (270-5002-00)		
2	Autoplunger Fulcrum	1	535-7697-00
3	Nyliner, 1/4" (Thomson #4I1-FF)	2	545-5423-00
4	Plunger & Link Assembly	1	511-5183-00
	Item 4 is secured to Item 1 by: Retaining Ring, 1/4" ø Shaft (Qty. 1) (270-5002-00) *For Individual Items use :* Plunger 1.81" Lg. (530-5025-05), Plunger Link (545-5293-00) and Roll Pin 1/8" ø x 5/8" Lg. (251-5008-00)		
5	Compression (Return) Spring	1	266-5020-00
	(ASM. REF. 500-6091-00, Items 1-5)		

Nr.	AUTOPLNGR. COIL PARTS	QTY.	SPI PART Nr.
6	Autoplunger Coil Bracket Assembly	1	515-6527-00
	Items 1 & 6 are secured below the P/F by: #8 X 1/2" SHWH AB (Zc.) (Qty. 9) (234-5101-00)		
7	Coil Retainer Bracket	1	535-5203-03
	Item 7 is secured to Item 6 by: #8-32 X 1/4" PPH MS (Sems) Zinc (Qty. 2) (232-5300-00)		
8	Coil, 24-940 [NO DIODE]	1	090-5036-ND
	COIL DOES NOT REQUIRE A DIODE. SEE ↻ COIL NOTE BELOW FOR DETAILS.		
9	Coil Sleeve	1	545-5031-00
	(ASM. REF. 500-6092-02-ND, Items 6-9)		

Nr.	SWITCH PARTS	QTY.	SPI PART Nr.
10	Switch *(for Shooter Lane)*	1	180-5157-00
	Switch has a Diode (1N4004) (112-5003-00). *Can be replaced with* (1N4001) (112-5001-00).		
11	Switch Mounting Bracket	1	535-6173-00
	Item 11 is secured to Playfield by: #6 X 1/2" SLT HWH AB (Zinc) (Qty. 2) (234-5001-02)		
12	Switch Body Protect Plate	1	535-6539-00
	Item 12 is secured to Items 10-11 by: #2-56 X 1/2" Unslotted Ser. HWH #4 Head TR3 Black (Qty. 2) (237-5937-02) and #2-56 Hex Nut (Qty. 2) (240-5301-0) (ASM. REF. 500-6096-00, Items 10-12)		

SW. 23

Retaining (E-) Ring *(see Item 4)*

Item 3 is also shown separated from the Auto-plunger Fulcrum for clarity.

Retaining (E-) Ring *(see Item 4)*

Qty. 2

For Securing Hardware, see the Parts Table above, under the item desired.

Plunger

Link

Roll Pin

Coil Sleeve thru Coil

Coil Assembly shown turned 90° for clarity.

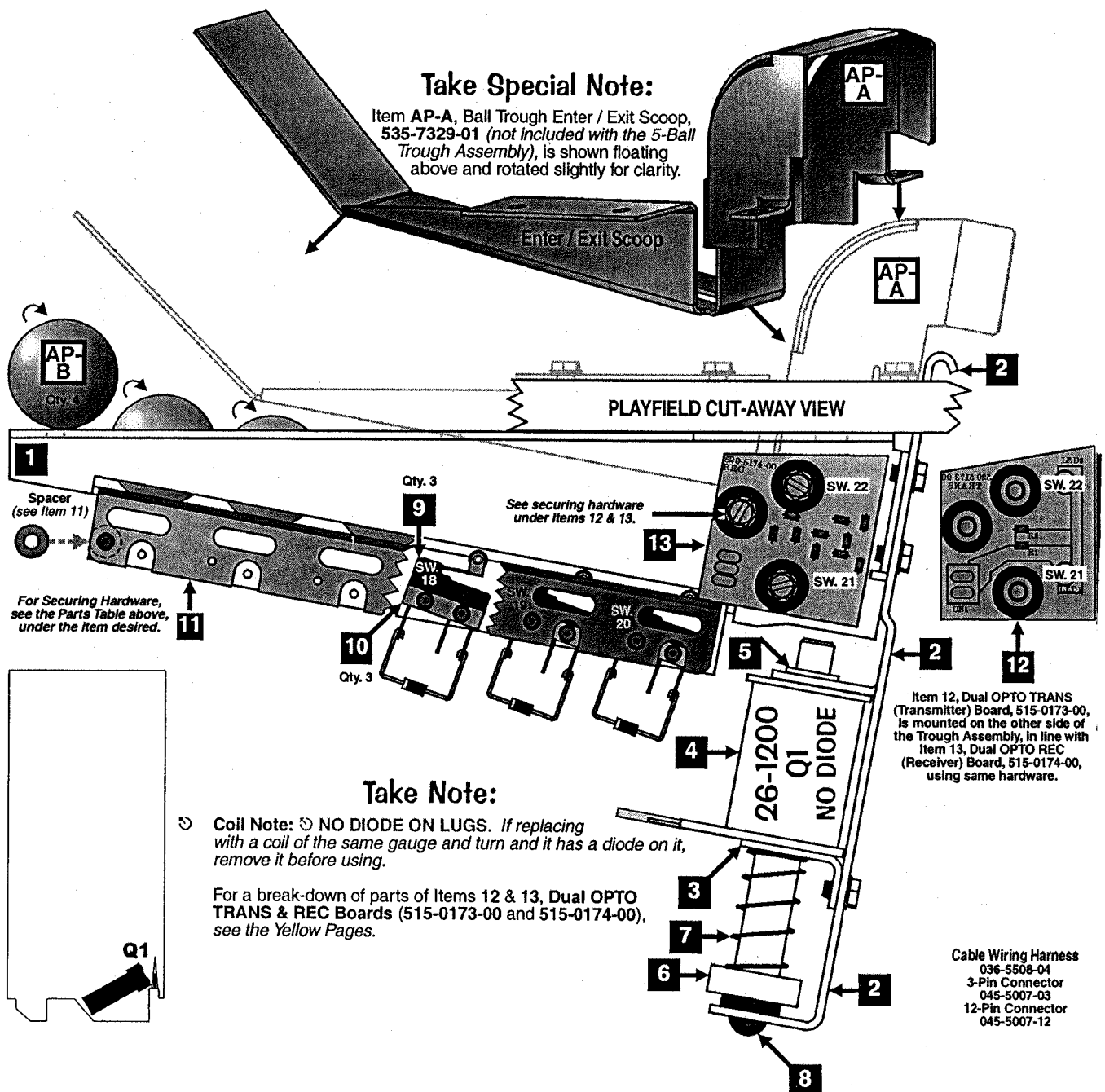**For Securing Hardware, see the Parts Table above, under the item desired.**

24-940
02
NO DIODE

↻

Take Note:

Coil Note: ↻ **NO DIODE ON LUGS.** *If replacing with a coil of the same gauge and turn & it has a diode on it, remove it before using.*

Q23

b2

4-Ball Trough Assembly, 500-6318-24-ND (Items 1-13)
and Associated Parts: See Parts Table Below.

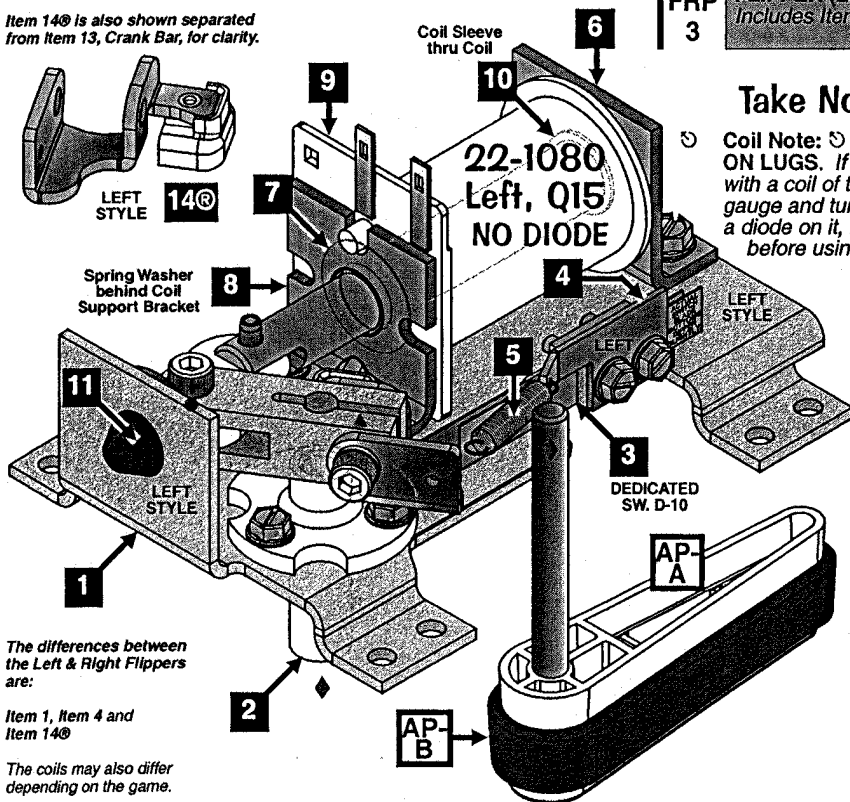Ordering Note: Identical to 500-6318-14 with exceptions, see note below Item 13 (Parts Table).

Nr.	4-BALL TROUGH PARTS	QTY.	SPI PART Nr.	Nr.	4-BALL TROUGH PARTS	QTY.	SPI PART Nr.
1	Ball Trough Outhole Mounting Bracket	1	515-6580-01	11	Trough Ball Guide Plate	1	535-7801-00
	Item 1 is secured below the playfield by: #8 X 1/2" SHWH AB (Zc.) (Qty. 4) (234-5101-00)				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)		
2	Coil Mounting Bracket	1	535-7330-01	12	Dual OPTO TRANS Board Assembly	1	515-0173-00
	Item 2 is secured to Item 1 by: #8-32 X 3/8" HWH Swage (Sr.) Zinc (Qty. 4) (237-5975-00)			13	Dual OPTO REC Board Assembly	1	515-0174-00
3	Coil Retaining Bracket	1	535-5203-03		Items 12 & 13 are secured by: #6-32 X 5/8" HWH Swg (Ser) Zc (Qty. 3/per) (237-5976-04) For Individual Items use: Dual OPTO Transmitter Board (Qty. 1) (520-5173-00), Dual OPTO Receiver Board (Qty. 1) (520-5174-00), OPTO PCB Tube Spacer (Brass) (Qty. 3/per) (530-5308-02) and OPTO PCB Rubber Grommet (Qty. 3/per) (545-5518-00)		
	Item 3 is secured to Item 2 by: #8-32 X 1/4" SHWH (Serr) Zinc (Qty. 2) (237-5975-04)						
4	Coil, 26-1200 [NO DIODE]	1	090-5044-ND				
	COIL DOES NOT REQUIRE A DIODE. SEE ↻ COIL NOTE BELOW FOR DETAILS.						
5	Coil Sleeve (Short) (Formost #10-7077)	1	545-5076-01				
6	Steel & Nylon Plunger Asm. (3.57")	1	515-7309-01				
7	Compression (Return) Spring	1	266-5020-00				
8	Rubber Bumper (Grommet)	1	545-5105-00				
9	Micro Switch (Roller Actuator, Lite-Force)	3	180-5119-02				
	Item 9 requires: Heat Shrink Tubing 1/8" ø PUI-24 (Qty. 1"/per) (605-5006-00) Switch has a Diode (1N4004) (112-5003-00). Can be replaced with (1N4001) (112-5001-00)						
10	Switch Body Protect Plate	3	535-6539-00				

Ordering Note: If 500-6318-24-ND is unavailable, order the individual part(s) actually required. This assembly is identical to 500-6318-14-ND, -15 or -25 except for the quantity of Items 9 & 10 (Qty. 4/per on 5-Ball Trough) and Item 11, required when a Magnet Mech. is used in the game. -ND means no diode on Item 4, Coil, 26-1200.

ASSOCIATED PARTS ARE NOT INCLUDED WITH THE ABOVE ASSEMBLY.

Nr.	ASSOCIATED PART(S)	QTY.	SPI PART Nr.
AP-A	Ball Trough Enter / Exit Scoop	1	535-7329-01
	Item AP-A secured to the playfield by: #8 X 1/2" SHWH AB (Zinc) (Qty. 4) (234-5101-00).		
AP-B	Steel Balls (1-1/16" ø)	4	260-5000-00

Take Special Note:

Item **AP-A**, Ball Trough Enter / Exit Scoop, **535-7329-01** (not included with the 5-Ball Trough Assembly), is shown floating above and rotated slightly for clarity.

Enter / Exit Scoop

PLAYFIELD CUT-AWAY VIEW

Spacer (see Item 11)

For Securing Hardware, see the Parts Table above, under the Item desired.

Qty. 3

See securing hardware under Items 12 & 13.

SW. 22

SW. 21

SW. 18

SW. 19

SW. 20

Qty. 3

26-1200 Q1 NO DIODE

Item 12, Dual OPTO TRANS (Transmitter) Board, 515-0173-00, is mounted on the other side of the Trough Assembly, in line with Item 13, Dual OPTO REC (Receiver) Board, 515-0174-00, using same hardware.

Take Note:

↻ **Coil Note:** ↻ NO DIODE ON LUGS. *If replacing with a coil of the same gauge and turn and it has a diode on it, remove it before using.*

For a break-down of parts of Items **12 & 13, Dual OPTO TRANS & REC Boards** (515-0173-00 and 515-0174-00), see the Yellow Pages.

Q1

Cable Wiring Harness
036-5508-04
3-Pin Connector
045-5007-03
12-Pin Connector
045-5007-12

b3

Flipper (Left) Assembly, 500-6543-12-ND (Items 1-15)
and Associated Parts: Yellow Flipper Bat & Shaft Asm., 515-5133-06-06 (Items AP-A / AP-B)

Nr.	FLIPPER (LEFT) PARTS	QTY.	SPI PART Nr.
1	Flipper Base Plate (**LEFT**)	1	*See FRP1*
	Item 1 is secured below by: #8 X 1/2" SHWH AB (Zinc) (Qty. 8) (234-5101-00) *Ordering Note : Individual Part (535-7275-01) is not prethreaded, see Item FRP1.*		
2	Flipper Bat Bushing (White Plastic) .25" ø I.D.	1	545-5070-00
	Item 2 is secured to Item 1 by: #6-32 X 3/8" HWH Swage (Ser.) Zc. (Qty. 3) (237-5976-02)		
3	Power (EOS / 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	Sw. Plate/Spring Return Brkt. (**LEFT**)	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 (Sem) 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: #8-32 X 3/8" HWH Swage (Ser.) Zc. (Qty. 2) (237-5975-00)		
9	Coil, 22-1080 [NO DIODE] YEL-GRN	1	090-5032-ND
	COIL DOES NOT REQUIRE A DIODE. SEE ↻ COIL NOTE BELOW FOR DETAILS.		
10	Coil Sleeve	1	545-5388-00
11	Deflector Pad (Bumper)	1	545-5428-00
12	Flipper Plunger & Link Sub-Assy.	1	515-6304-03
	For Individual Items use : Flipper Plunger (530-5349-01) and Plunger "Flipper Link" (545-5611-01) and is secured to the Plunger by: Bushing .16" ø ID X .281" ø OD X .167" (Qty. 1) (530-5532-00) and Spiral Pin ø 5/32 X 3/4" Lg. (Qty. 1) (251-5015-02)		
13	Crank Bar (Pawl)	1	530-5070-02
	Item 13 requires: Bushing, .192" ø ID X .312" ø OD X .195" (Qty. 1) (530-5139-00)		
14®	Switch Actuator (**LEFT**) Sub-Assy.	1	515-7257-01
	For Individual Items use : Actuator & Spring Bracket (**LEFT**) (535-9038-01) and ® Switch Actuator (White Plastic) (545-5612-00) and is secured to the Bracket by: Rivet, 1/8" ø X 1/4" Lg. (Qty. 1) (249-5003-00)		
15	Set Screw: #10-32 X 3/4" Socket Hd.	2	237-6144-00
	Item 15 requires: #10-32 Nylon Stop Nut (Qty. 1) Flipper Link Side Only (240-5203-00) and #10 Split Lock Washer (Qty. 1) Switch Actuator Side Only (244-5003-00) *Tool required for Item 15: 5/32" or 4mm Allen Wrench*		

Item 14® is also shown separated from Item 13, Crank Bar, for clarity.

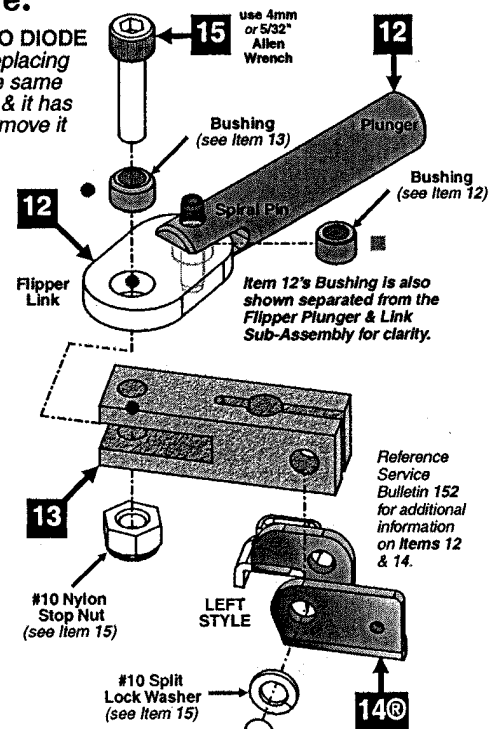### Flipper Rebuild Parts for Easier Installation, Save $:

FRP 1 — FLIPPER BASE PLATE KIT (LEFT) : *Includes Item 1 pre-threaded >+< Securing Hardware for Items 2, 3, 6 & 8.* — 515-6617-01

FRP 2 — PLUNGER, LINK & CRANK (**LEFT STYLE**) ASSEMBLY : *Includes Items 12, 13, 14 & 15 (comes assembled).* — 515-7203-01

FRP 3 — FLIPPER (LEFT) REBUILD KIT : *Includes Items 6, 10 AND above FRP2* — 500-6307-10

For Securing Hardware, see the Parts Table above, under the item desired.

Take Note:

↻ **Coil Note:** ↻ NO DIODE ON LUGS. *If replacing with a coil of the same gauge and turn & it has a diode on it, remove it before using.*
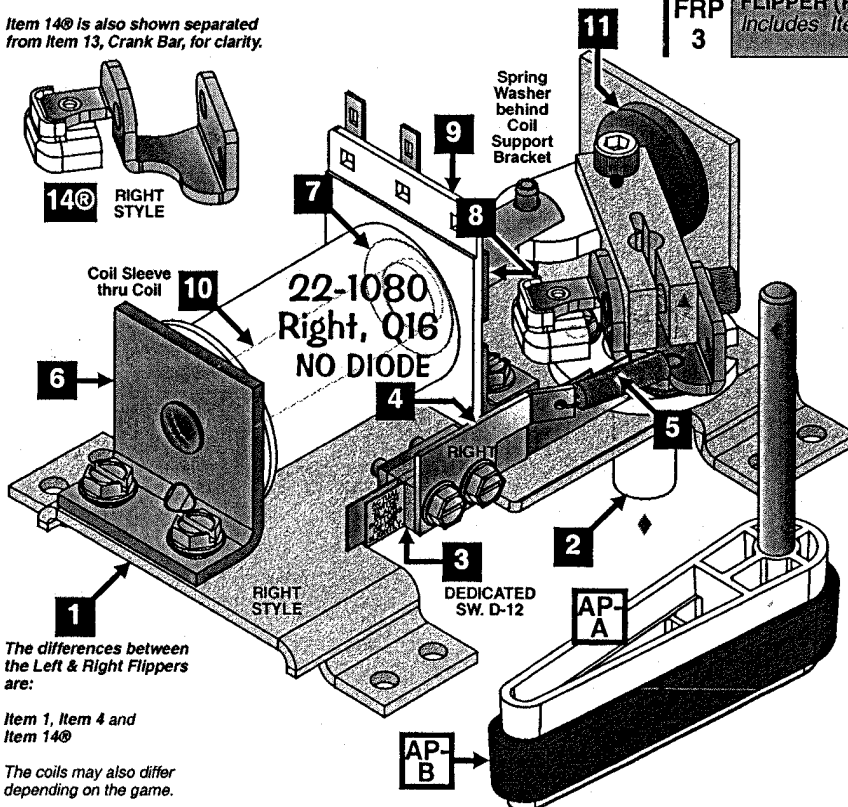
Item 12's Bushing is also shown separated from the Flipper Plunger & Link Sub-Assembly for clarity.

Reference Service Bulletin 152 for additional information on Items 12 & 14.

Take Note:

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

The differences between the Left & Right Flippers are:
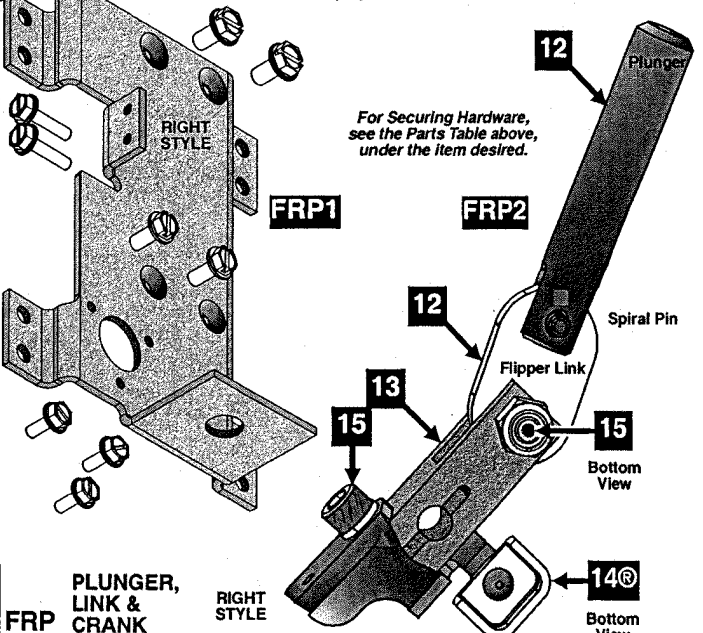
Item 1, Item 4 and Item 14®

The coils may also differ depending on the game.

ASSOCIATED PARTS **ARE NOT INCLUDED** WITH THE ABOVE ASSEMBLY.

Nr.	ASSOCIATED PART(S)	QTY.	SPI PART Nr.
AP-A	**Yellow** Flipper Bat & Shaft Assembly (Non-Knurled End) *without Rubber Ring*	1	515-5133-06-06
AP-B	Large Flipper RED Rubber Ring	1	545-5277-22

Flipper (Right) Assembly, 500-6543-02-ND (Items 1-15)
and Associated Parts: Yellow Flipper Bat & Shaft Asm., 515-5133-06-06 (Items AP-A / AP-B)

Nr.	FLIPPER (RIGHT) PARTS	QTY.	SPI PART Nr.
1	Flipper Base Plate (RIGHT)	1	*See FRP1*

Item 1 is secured below by: #8 X 1/2" SHWH AB (Zinc) (Qty. 8) (234-5101-00)
Ordering Note : Individual Part (535-7275-00) is not prethreaded, see Item FRP1.

Nr.	FLIPPER (RIGHT) PARTS	QTY.	SPI PART Nr.
2	Flipper Bat Bushing (White Plastic) .25" ø I.D.	1	545-5070-00

Item 2 is secured to Item 1 by: #6-32 X 3/8" HWH Swage (Ser.) Zc. (Qty. 3) (237-5976-02)

Nr.		QTY.	SPI PART Nr.
3	Power (EOS / 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)

Nr.		QTY.	SPI PART Nr.
4	Sw. Plate/Spring Return Brkt. (RIGHT)	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 (Ser) Zinc (Qty. 2) (237-5985-00) and #10 Split Lock Washer (Qty. 2) (244-5003-00)

Nr.		QTY.	SPI PART Nr.
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: #8-32 X 3/8" HWH Swage (Ser.) Zc. (Qty. 2) (237-5975-00)

Nr.		QTY.	SPI PART Nr.
9	Coil, 22-1080 [NO DIODE] YEL-GRN	1	090-5032-ND

COIL DOES NOT REQUIRE A DIODE. SEE ↻ COIL NOTE PREV. PAGE FOR DETAILS.

Nr.		QTY.	SPI PART Nr.
10	Coil Sleeve	1	545-5388-00
11	Deflector Pad (Bumper)	1	545-5428-00
12	Flipper Plunger & Link Sub-Assy.	1	515-6304-03

For Individual items use : Flipper Plunger (530-5349-01) and Plunger "Flipper Link" (545-5611-01) and is secured to the Plunger by: Bushing, 16" ø ID X .281" ø OD X .187" (Qty. 1) (530-5532-00) and Spiral Pin ø 5/32" X 3/4" Lg. (Qty. 1) (251-5015-02)

Nr.		QTY.	SPI PART Nr.
13	Crank Bar (Pawl)	1	530-5070-02

Item 13 requires: Bushing, .192" ø ID X .312" ø OD X .195" (Qty. 1) (530-5139-00)

Nr.		QTY.	SPI PART Nr.
14®	Switch Actuator (RIGHT) Sub-Assy.	1	515-7257-00

For individual items use : Actuator & Spring Bracket (LEFT) (535-9038-01) and ® Switch Actuator (White Plastic) (545-5612-00) and is secured to the Bracket by: Rivet, 1/8" ø X 1/4" Lg. (Qty. 1) (249-5003-00)

Nr.		QTY.	SPI PART Nr.
15	Set Screw: #10-32 X 3/4" Socket Hd.	2	237-6144-00

Item 15 requires: #10-32 Nylon Stop Nut (Qty. 1) *Flipper Link Side Only* (240-5203-00) and #10 Split Lock Washer (Qty. 1) *Switch Actuator Side Only* (244-5003-00)
Tool required for Item 15: 5/32" or 4mm Allen Wrench

Item 14® is also shown separated from Item 13, Crank Bar, for clarity.

Flipper Rebuild Parts for Easier Installation, Save $:

FRP 1	**FLIPPER BASE PLATE KIT (R I G H T):** *Includes Item 1 pre-threaded >+< Securing Hardware for Items 2, 3, 6 & 8.*		515-6617-00

For Securing Hardware, see the Parts Table above, under the item desired.

FRP 2	**PLUNGER, LINK & CRANK** RIGHT STYLE **(R I G H T S T Y L E) ASSEMBLY:** *Includes Items 12, 13, 14 & 15 (comes assembled).*		515-7203-00
FRP 3	**FLIPPER (RIGHT) R E B U I L D K I T:** *Includes Items 6, 10 AND above FRP2*		500-6307-00

FRP1

FRP2

RIGHT STYLE

PLUNGER, LINK & CRANK RIGHT STYLE

Plunger

Spiral Pin

Flipper Link

Bottom View

14®

Bottom View

Spring Washer behind Coil Support Bracket

Coil Sleeve thru Coil

22-1080 Right, Q16 NO DIODE

RIGHT STYLE

DEDICATED SW. D-12

AP-A

AP-B

use 4mm or 5/32" Allen Wrench

Plunger

Bushing (see Item 13)

Bushing (see Item 12)

Spiral Pin

Flipper Link

Item 12's Bushing is also shown separated from the Flipper Plunger & Link Sub-Assembly for clarity.

Reference Service Bulletin 152 for additional information on Items 12 & 14.

RIGHT STYLE

#10 Nylon Stop Nut (see Item 15)

#10 Split Lock Washer (see Item 15)

use 4mm or 5/32" Allen Wrench

The differences between the Left & Right Flippers are:

Item 1, Item 4 and Item 14®

The coils may also differ depending on the game.

ASSOCIATED PARTS ARE NOT INCLUDED WITH THE ABOVE ASSEMBLY.

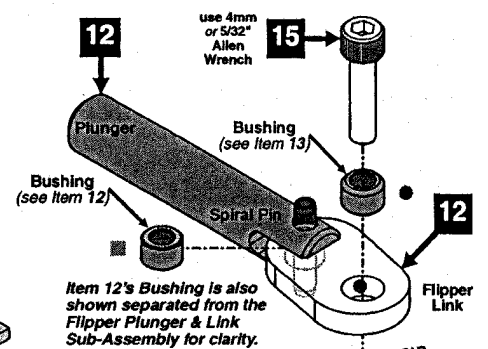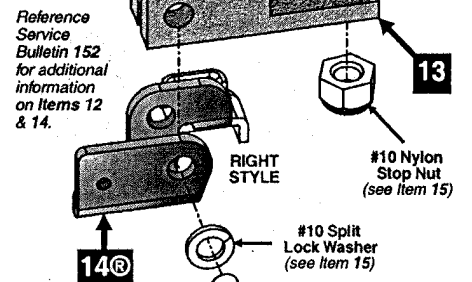| Nr.	ASSOCIATED PART(S)	QTY.	SPI PART Nr.
AP-A	**Yellow** Flipper Bat & Shaft Assembly (Non-Knurled End) *without Rubber Ring*	1	515-5133-06-06
AP-B	Large Flipper Red Rubber Ring	1	545-5277-22

Take Note:

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

b5

Flipper (Left) Assembly, 500-6543-12-ND (Items 1-15)
and Associated Parts: Yellow Flipper Bat & Shaft Asm., 515-6275-06 (Items AP-A / AP-B)

Nr.	FLIPPER (LEFT) PARTS	QTY.	SPI PART Nr.
1	Flipper Base Plate (**LEFT**)	1	See **FRP1**

Item 1 is secured below by: #8 X 1/2" SHWH AB (Zinc) (Qty. 8) (234-5101-00)
Ordering Note : Individual Part (535-7275-01) is not prethreaded, see Item FRP1.

Nr.	FLIPPER (LEFT) PARTS	QTY.	SPI PART Nr.
2	Flipper Bat Bushing (White Plastic) .25" ø I.D.	1	545-5070-00

Item 2 is secured to Item 1 by: #6-32 X 3/8" HWH Swage (Ser.) Zc. (Qty. 3) (237-5976-02)

Nr.	FLIPPER (LEFT) PARTS	QTY.	SPI PART Nr.
3	Power (EOS / 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)

Nr.	FLIPPER (LEFT) PARTS	QTY.	SPI PART Nr.
4	Sw. Plate/Spring Return Brkt. (LEFT)	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)

Nr.	FLIPPER (LEFT) PARTS	QTY.	SPI PART Nr.
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: #8-32 X 3/8" HWH Swage (Ser.) Zc. (Qty. 2) (237-5975-00)

Nr.	FLIPPER (LEFT) PARTS	QTY.	SPI PART Nr.
9	Coil, 22-1080 [NO DIODE] YEL-GRN	1	090-5032-ND

COIL DOES NOT REQUIRE A DIODE. SEE ↻ COIL NOTE BELOW FOR DETAILS.

Nr.	FLIPPER (LEFT) PARTS	QTY.	SPI PART Nr.
10	Coil Sleeve	1	545-5388-00
11	Deflector Pad (Bumper)	1	545-5428-00
12	Flipper Plunger & Link Sub-Assy.	1	515-6304-03

For Individual Items use : Flipper Plunger (530-5349-01) and Plunger "Flipper" Link (545-5611-01) and is secured to the Plunger by: Bushing, .16" ø ID X .281" ø OD X .187" (Qty.1) (530-5532-00) and Spiral Pin ø .5/32" X 3/4" Lg. (Qty. 1) (251-5015-02)

Nr.	FLIPPER (LEFT) PARTS	QTY.	SPI PART Nr.
13	Crank Bar (Pawl)	1	530-5070-02

Item 13 requires: Bushing, .192" ø ID X .312" ø OD X .195" (Qty. 1) (530-5139-00)

Nr.	FLIPPER (LEFT) PARTS	QTY.	SPI PART Nr.
14®	Switch Actuator (LEFT) Sub-Assy.	1	515-7257-01

For Individual Items use : Actuator & Spring Bracket (LEFT) (535-9038-01) and ® Switch Actuator (White Plastic) (545-5612-01) and is secured to the Bracket by: Rivet, 1/8" ø X 1/4" Lg. (Qty. 1) (249-5003-00)

Nr.	FLIPPER (LEFT) PARTS	QTY.	SPI PART Nr.
15	Set Screw: #10-32 X 3/4" Socket Hd.	2	237-6144-00

Item 15 requires: #10-32 Nylon Stop Nut (Qty. 1) *Flipper Link Side Only* (240-5203-00)
and #10 Split Lock Washer (Qty. 1) *Switch Actuator Side Only* (244-5003-00)
Tool required for Item 15: 5/32" or 4mm Allen Wrench

Item 14® is also shown separated from Item 13, Crank Bar, for clarity.

The differences between the Left & Right Flippers are:

Item 1, Item 4 and Item 14®

The coils may also differ depending on the game.

ASSOCIATED PARTS **ARE NOT INCLUDED** WITH THE ABOVE ASSEMBLY.

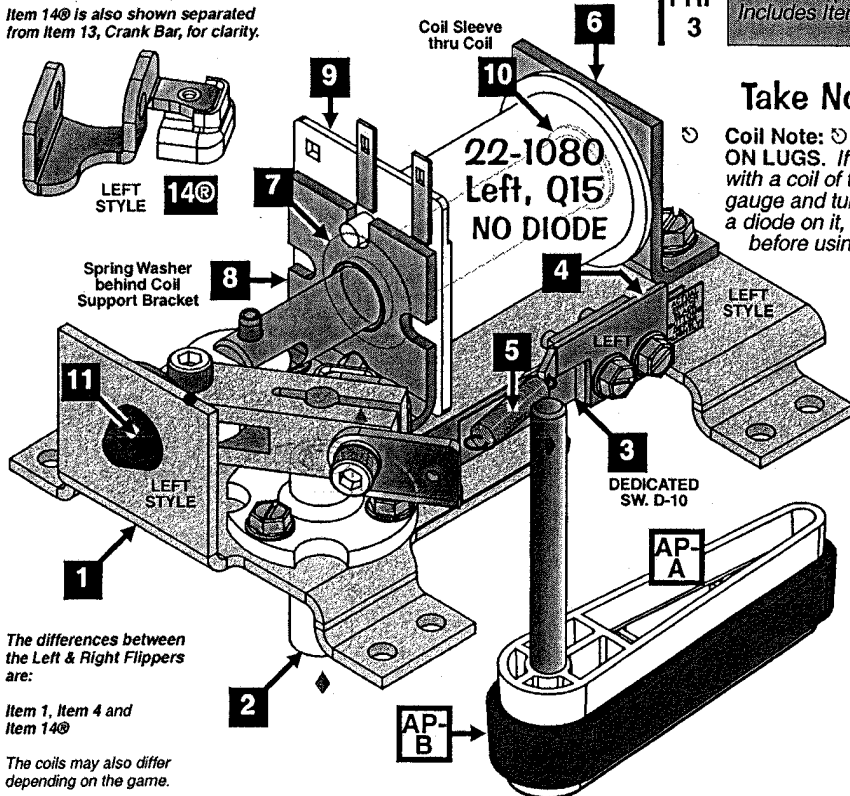| Nr.	ASSOCIATED PART(S)	QTY.	SPI PART Nr.
AP-A	Yellow Mini Flp Bat & Shaft Assembly (Non-Knurled End) *without Rubber Ring*	1	515-6275-06
AP-B	Small Flp RED Rubber Ring	1	545-5207-22

Flipper Rebuild Parts for Easier Installation, Save $:

FRP 1	FLIPPER BASE PLATE KIT (LEFT) : Includes Item 1 pre-threaded >+< Securing Hardware for Items 2, 3, 6 & 8.	515-6617-01

For Securing Hardware, see the Parts Table above, under the item desired.

FRP 2	PLUNGER, LINK & CRANK (LEFT STYLE) ASSEMBLY : Includes Items 12, 13, 14 & 15 (comes assembled).	515-7203-01

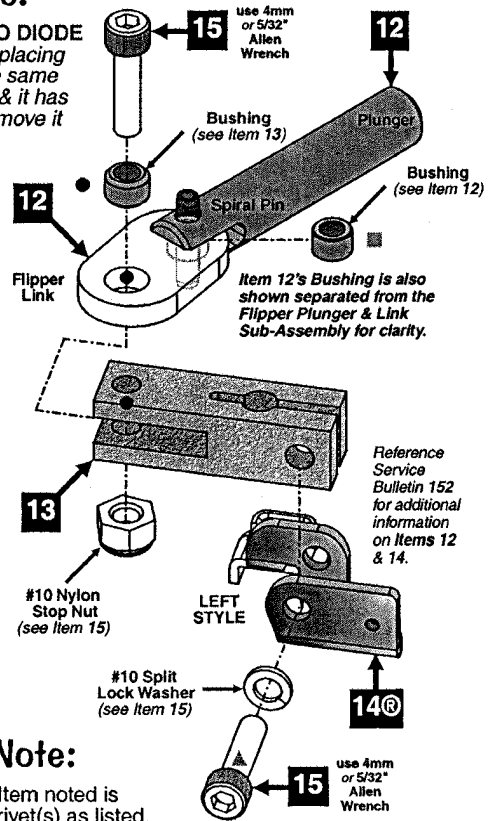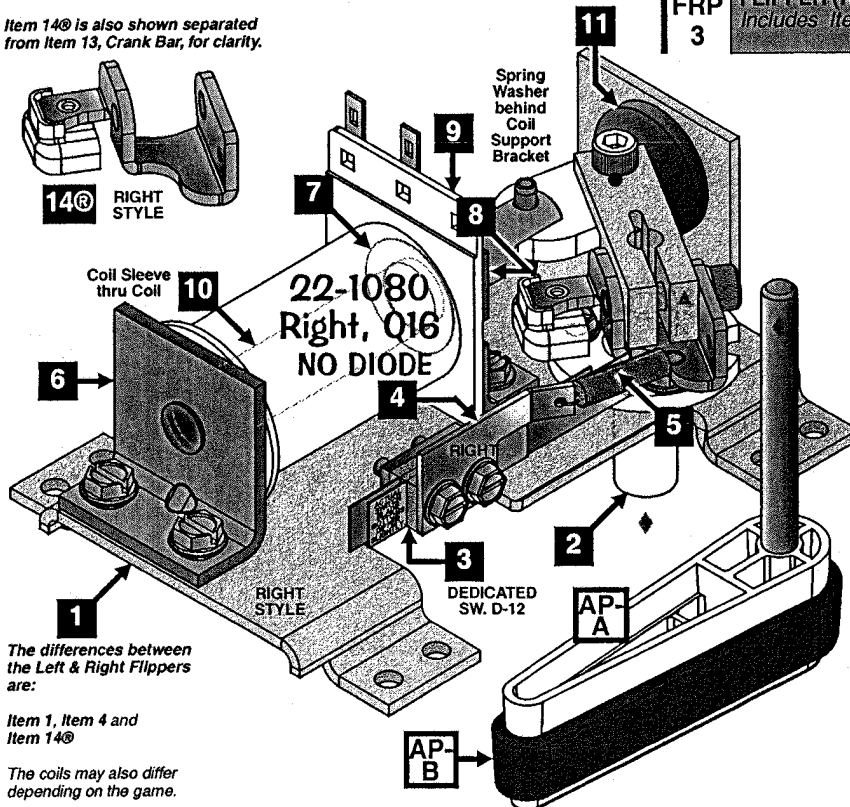| FRP 3	FLIPPER (LEFT) REBUILD KIT: Includes Items 6, 10 AND above FRP2	500-6307-10

Take Note:

↻ **Coil Note:** ↻ **NO DIODE ON LUGS.** *If replacing with a coil of the same gauge and turn & it has a diode on it, remove it before using.*

Take Note:

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

Sec. 4: Drawings ...

Flipper (Right) Assembly, 500-6543-02-ND (Items 1-15)
and Associated Parts: Yellow Mini Flipper Bat & Shaft Asm., 515-6275-06 (Items AP-A / AP-B)

Nr.	FLIPPER (RIGHT) PARTS	QTY.	SPI PART Nr.
1	Flipper Base Plate (RIGHT)	1	See FRP1
	Item 1 is secured below by: #8 X 1/2" SHWH AB (Zinc) (Qty. 8) (234-5101-00) *Ordering Note : Individual Part (535-7275-00) is not prethreaded, see Item FRP1.*		
2	Flipper Bat Bushing (White Plastic) .25" ø I.D.	1	545-5070-00
	Item 2 is secured to Item 1 by: #6-32 X 3/8" HWH Swage (Ser.) Zc. (Qty. 3) (237-5976-02)		
3	Power (EOS / 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	Sw. Plate/Spring Return Brkt. (RIGHT)	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: #8-32 X 3/8" HWH Swage (Ser.) Zc. (Qty. 2) (237-5975-00)		
9	Coil, 22-1080 [NO DIODE] YEL-GRN	1	090-5032-ND
	COIL DOES NOT REQUIRE A DIODE. SEE ♪ COIL NOTE PREV. PAGE FOR DETAILS.		
10	Coil Sleeve	1	545-5388-00
11	Deflector Pad (Bumper)	1	545-5428-00
12	Flipper Plunger & Link Sub-Assy.	1	515-6304-03
	For Individual Items use : Flipper Plunger (530-5349-01) and Plunger "Flipper Link (545-5611-01) and is secured to the Plunger by: Bushing, .16" ø ID X .281" ø OD X .187" (Qty. 1) (530-5532-00) and Spiral Pin ø 5/32" X 3/4" Lg. (Qty. 1) (251-5015-02)		
13	Crank Bar (Pawl)	1	530-5070-02
	Item 13 requires: Bushing, .192" ø ID X .312" ø OD X .195" (Qty. 1) (530-5139-00)		
14®	Switch Actuator (RIGHT) Sub-Assy.	1	515-7257-00
	For Individual Items use : Actuator & Spring Bracket (LEFT) (535-9038-01) and ® Switch Actuator (White Plastic) (545-5612-00) and is secured to the Bracket by: Rivet, 1/8" ø X 1/4" Lg. (Qty. 1) (249-5003-00)		
15	Set Screw: #10-32 X 3/4" Socket Hd. 2		237-6144-00
	Item 15 requires: #10-32 Nylon Stop Nut (Qty. 1) *Flipper Link Side Only* (240-5203-00) and #10 Split Lock Washer (Qty. 1) *Switch Actuator Side Only* (244-5003-00) *Tool required for Item 15: 5/32" or 4mm Allen Wrench*		

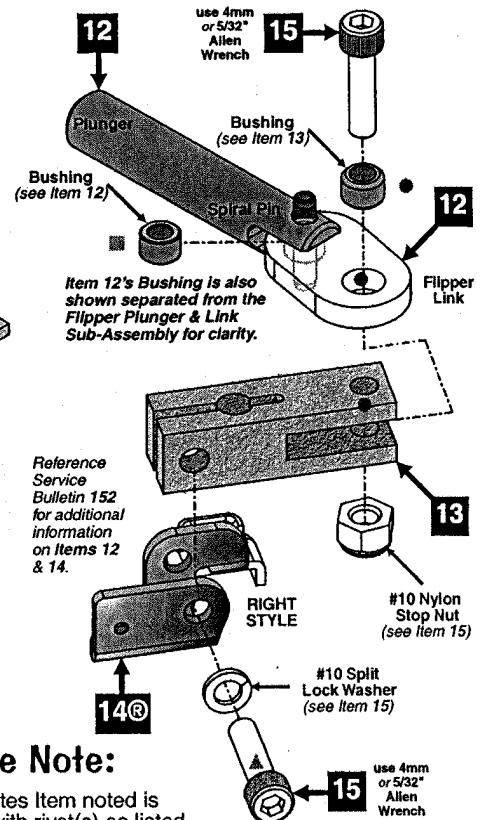*Item 14® is also shown separated from Item 13, Crank Bar, for clarity.*

Flipper Rebuild Parts for Easier Installation, Save $:

FRP 1 — FLIPPER BASE PLATE KIT (R I G H T) : Includes Item 1 pre-threaded >+< Securing Hardware for Items 2, 3, 6 & 8.   **515-6617-00**

For Securing Hardware, see the Parts Table above, under the item desired.

FRP1   **FRP2**

FRP 2 — PLUNGER, LINK & CRANK (RIGHT STYLE) ASSEMBLY : Includes Items 12, 13, 14 & 15 (comes assembled).   RIGHT STYLE   **515-7203-00**

FRP 3 — FLIPPER (RIGHT) R E B U I L D KIT: Includes Items 6, 10 AND above FRP2.   **500-6307-00**

Reference Service Bulletin 152 for additional information on Items 12 & 14.

The differences between the Left & Right Flippers are:

Item 1, Item 4 and Item 14®

The coils may also differ depending on the game.

ASSOCIATED PARTS ARE NOT INCLUDED WITH THE ABOVE ASSEMBLY.

| Nr.	ASSOCIATED PART(S)	QTY.	SPI PART Nr.
AP-A	Yellow Mini Flp Bat & Shaft Assembly (Non-Knurled End) *without Rubber Ring*	1	515-6275-06
AP-B	Small Flp RED Rubber Ring	1	545-5207-22

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

Sec. 4: Drawings ...

b7

Vertical Up-Kicker (VUK) Asm. (Right Style), 500-7078-01 (Items 1-9)

ITEM #	QTY	PART #	DESCRIPTION
1	1	535-9590-03	VUK BRACKET - R.H. - NO ACTUATOR
2	1	090-5001-ND	COIL - 23-800, NO DIODE
3	1	515-5941-01	PLUNGER ASSEMBLY
4	1	545-5076-01	COIL SLEEVE
5	1	545-5105-00	RUBBER BUMPER
6	1	180-5209-00	SUB MINIATURE SWITCH - SIM. ROLLER
7	1	535-5203-03	COIL RETAINING BRACKET
8	1	535-6539-00	SWITCH BODY PROTECT PLATE
SH-8	2	237-5937-02	SCREW, 2-56 X 1/2" HWH MS
SH-7	2	232-5300-00	SCREW, 8-32 X 1/4" PPH SEMS
9	1	266-5020-00	COMPRESSION SPRING-CONICAL

b10
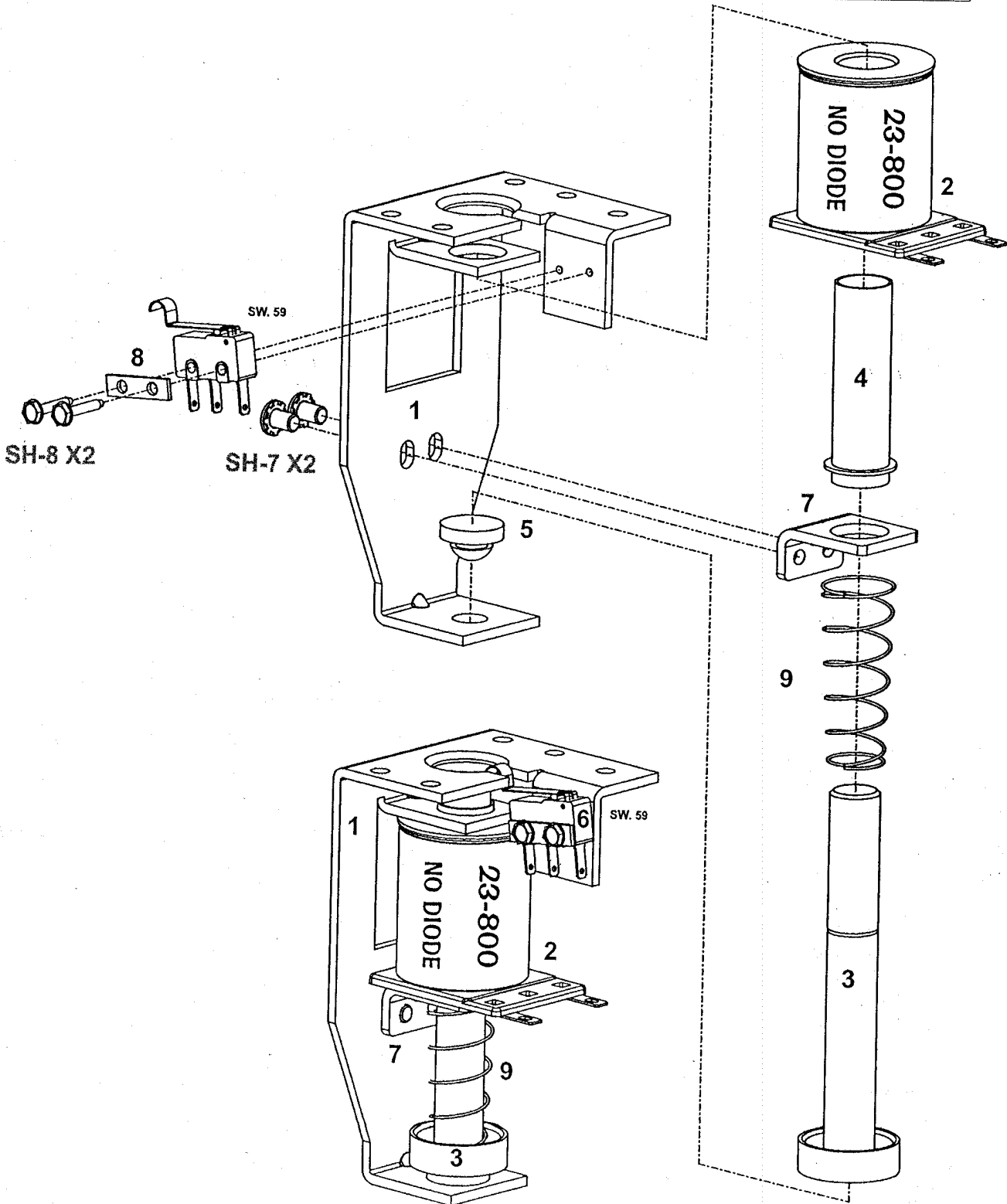
ASSEMBLY, CANNON / SHAFT, AC/DC
500-7214-00
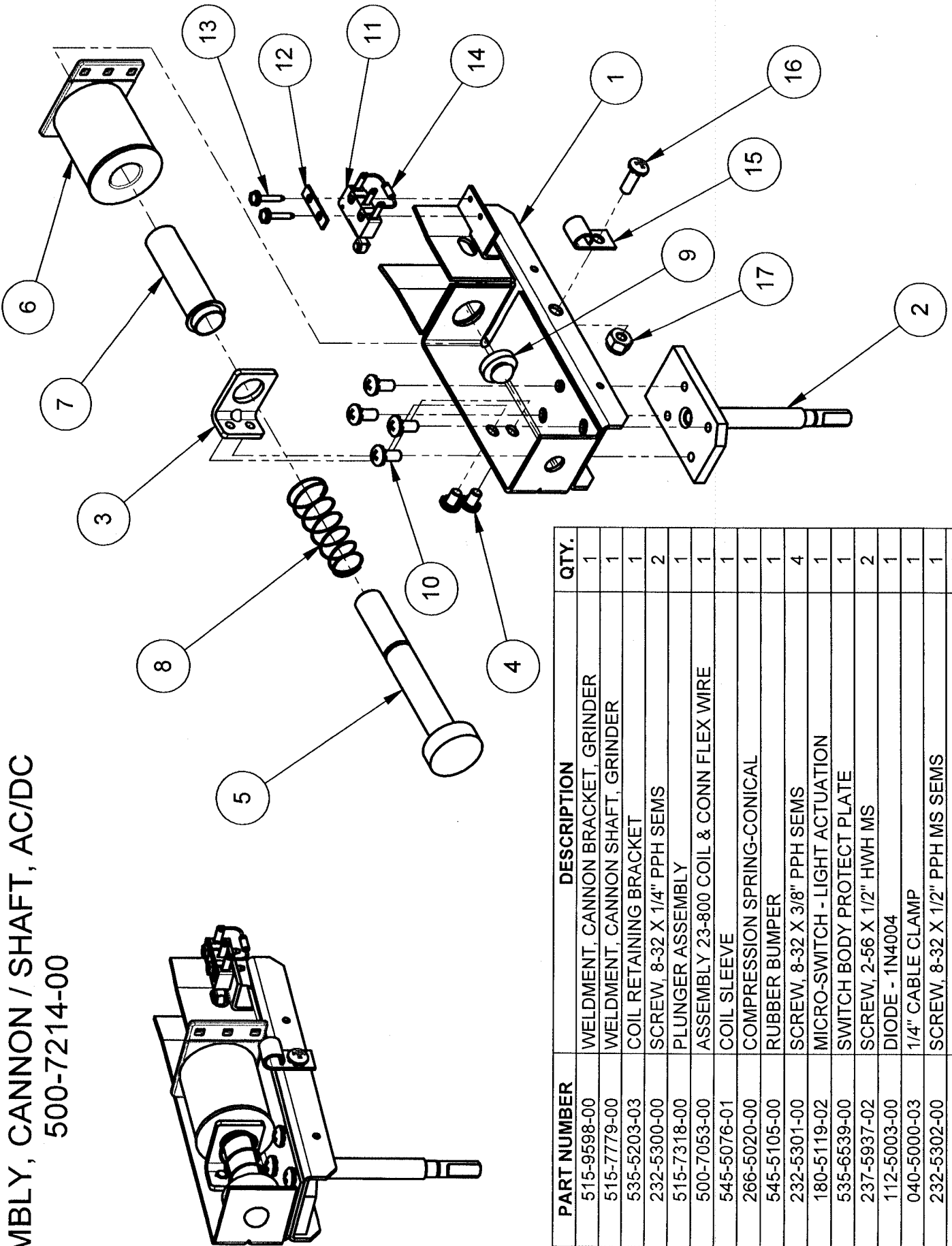
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	515-9598-00	WELDMENT, CANNON BRACKET, GRINDER	1
2	515-7779-00	WELDMENT, CANNON SHAFT, GRINDER	1
3	535-5203-03	COIL RETAINING BRACKET	1
4	232-5300-00	SCREW, 8-32 X 1/4" PPH SEMS	2
5	515-7318-00	PLUNGER ASSEMBLY	1
6	500-7053-00	ASSEMBLY 23-800 COIL & CONN FLEX WIRE	1
7	545-5076-01	COIL SLEEVE	1
8	266-5020-00	COMPRESSION SPRING-CONICAL	1
9	545-5105-00	RUBBER BUMPER	1
10	232-5301-00	SCREW, 8-32 X 3/8" PPH SEMS	4
11	180-5119-02	MICRO-SWITCH - LIGHT ACTUATION	1
12	535-6539-00	SWITCH BODY PROTECT PLATE	1
13	237-5937-02	SCREW, 2-56 X 1/2" HWH MS	2
14	112-5003-00	DIODE - 1N4004	1
15	040-5000-03	1/4" CABLE CLAMP	1
16	232-5302-00	SCREW, 8-32 X 1/2" PPH MS SEMS	1
17	240-5102-00	8-32 NYLON LOCK NUT	1
99*	036-5573-21-C7	CABLE CANNON FIRE SW	1

* ITEM NOT SHOWN

CANNON REFERENCE ASSEMBLY, AC/DC

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	515-7780-00	SUPPORT TUBE, CANNON, GRINDER	1
2	232-5205-00	SCREW, 6-32 X 7/8" PPH SEMS	3
3	535-0490-00	PLATE, CANNON TUBE MNT, GRINDER	1
4	234-5101-00	SCREW, #8 X 1/2" SLT HWH AB ZINC	6
5	500-7214-00	ASSEMBLY, CANNON / SHAFT, GRINDER	1
6	242-5105-00	WASHER, CANNON BEARING, GRINDER	1
7	242-5106-00	SHIM WASHER, 13/16 X 11/32 X .048	1
8	242-5008-00	WASHER, 1/4" ID X 1/2" OD X 1/16" THICK	1
9	270-5002-00	RETAINING RING - 1/4"	1
10	500-7213-00	ASSY, CANNON MOTOR / SWITCH, GRINDER	1
11	237-6092-00	SET SCREW, 10-32 X 5/16, SOCKET CUP PT	1
12	510-5146-33	RIVETED ASSY, CANNON COVER, GRINDER LE	1
13	237-5909-00	SCREW, 4-40 X 1/4" PPH SEMS	4
14	242-5001-00	#6 WASHER	4

ASSY, CANNON MOTOR / SWITCH, AC/DC
500-7213-00
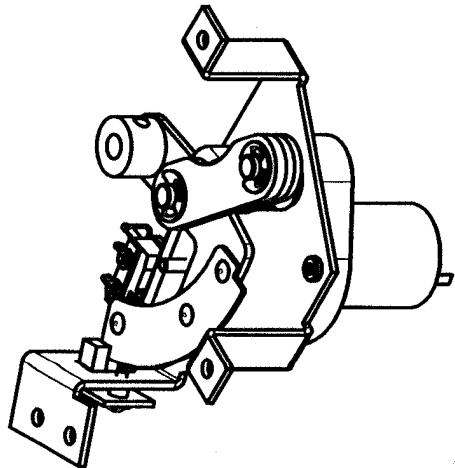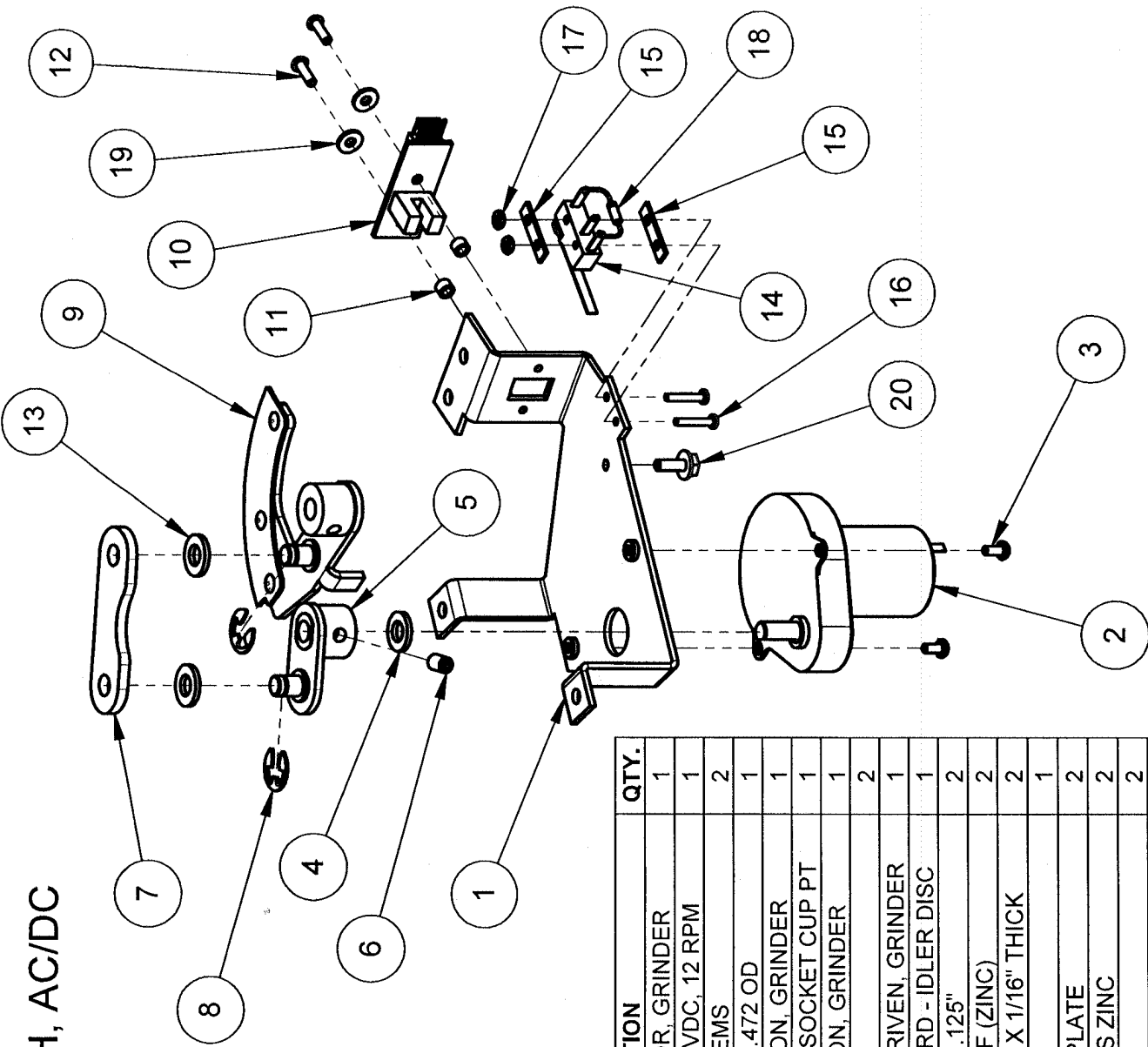
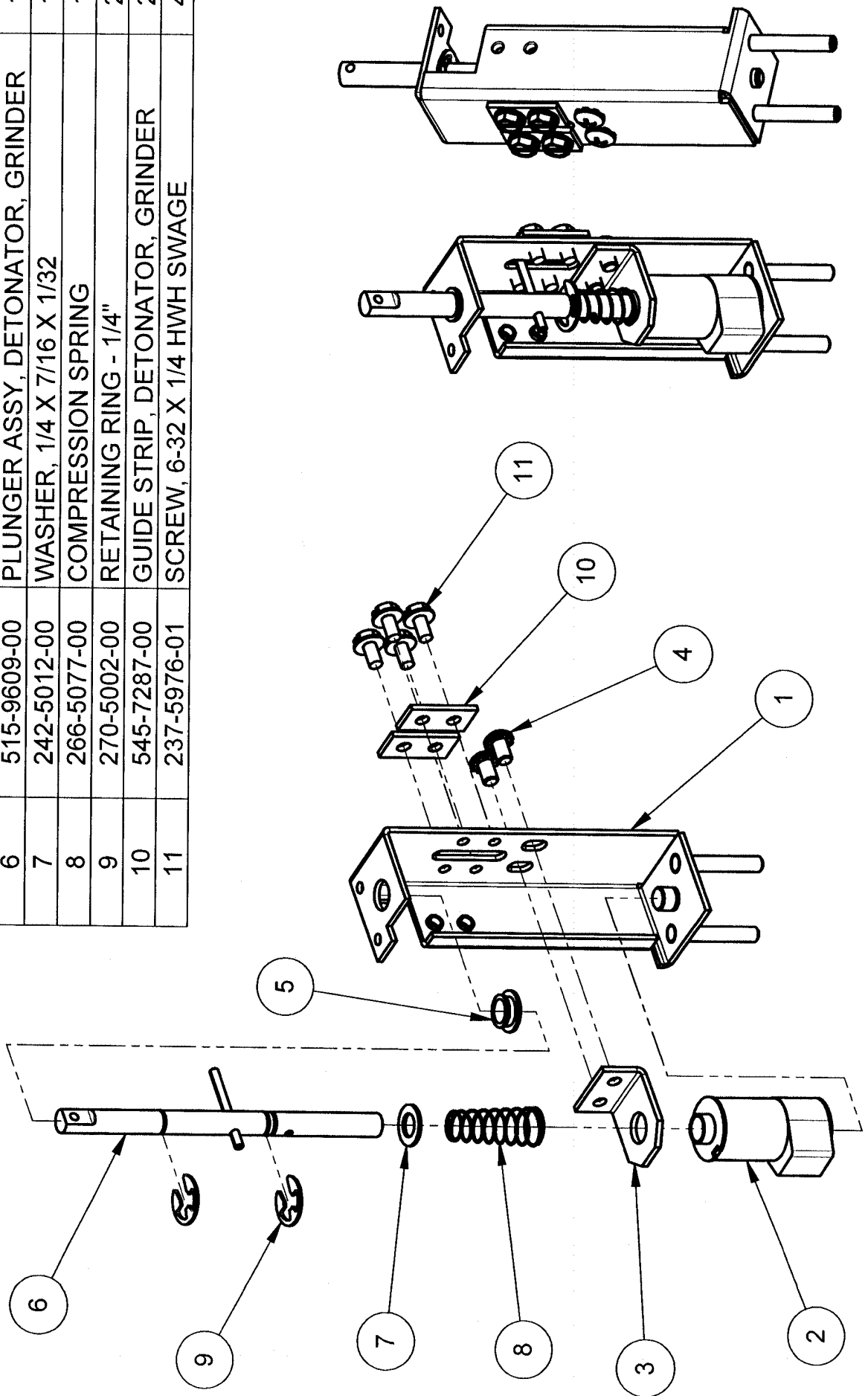| ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	515-7781-00	BRACKET, CANNON MOTOR, GRINDER	1
2	511-6968-00	MOTOR & CONN ASSY, 24 VDC, 12 RPM	1
3	237-5909-00	SCREW, 4-40 X 1/4" PPH SEMS	2
4	242-5072-01	NYLON WASHER .252 ID X .472 OD	1
5	515-7777-00	CRANK ASSEMBLY, CANNON, GRINDER	1
6	237-6092-00	SET SCREW, 10-32 X 5/16, SOCKET CUP PT	1
7	545-7280-00	CONNECTOR ARM, CANNON, GRINDER	1
8	270-5002-00	RETAINING RING - 1/4"	2
9	510-5152-00	RIVET ASSEM, CANNON DRIVEN, GRINDER	1
10	520-5292-00	OPTO INTERRUPTOR BOARD - IDLER DISC	1
11	254-5062-02	SPACER, #4 ID, 3/16" OD X .125"	2
12	237-5979-00	SCREW, 4-40 X 3/8", PPH TF (ZINC)	2
13	242-5008-00	WASHER, 1/4" ID X 1/2" OD X 1/16" THICK	2
14	180-5010-04	MICRO-SWITCH	1
15	535-6539-00	SWITCH BODY PROTECT PLATE	2
16	237-5806-00	SCREW, 2-56 X 1/2" PPH MS ZINC	2
17	240-5301-00	2-56 HEX NUT	2
18	112-5003-00	DIODE - 1N4004	1
19	242-5002-00	#4 FLAT WASHER - 5/16" O.D.	2
20	237-5976-02	SCREW, 6-32 X 3/8 HWH SWAGE	1
99*	036-5573-18-C7	CABLE CANNON MOTOR SW	1

* ITEM NOT SHOWN

┡13
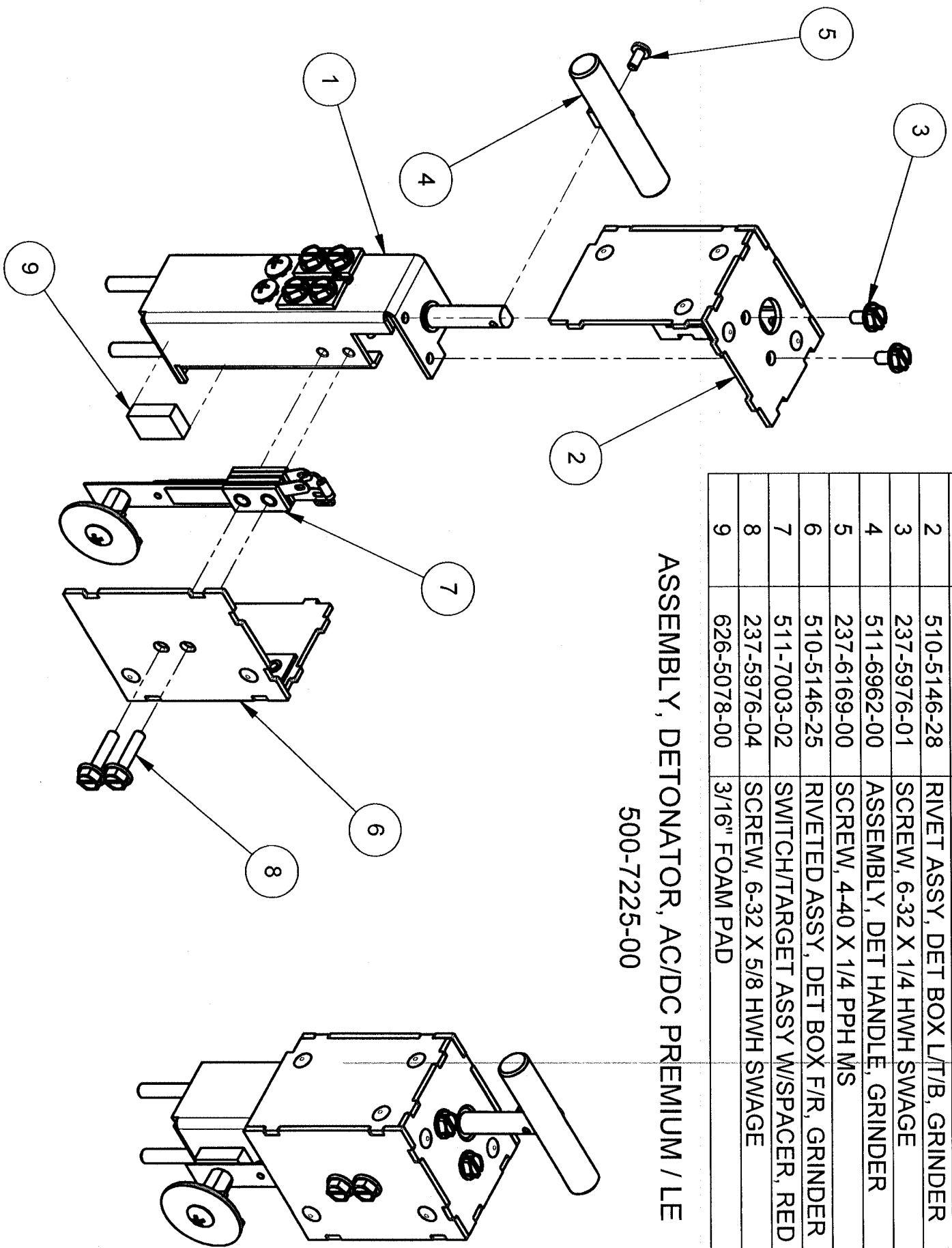
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	511-6961-00	ASSY, DET COIL / PLUNGER, GRINDER LE	1
2	510-5146-28	RIVET ASSY, DET BOX L/T/B, GRINDER	1
3	237-5976-01	SCREW, 6-32 X 1/4 HWH SWAGE	2
4	511-6962-00	ASSEMBLY, DET HANDLE, GRINDER	1
5	237-6169-00	SCREW, 4-40 X 1/4 PPH MS	1
6	510-5146-25	RIVETED ASSY, DET BOX F/R, GRINDER	1
7	511-7003-02	SWITCH/TARGET ASSY W/SPACER, RED	1
8	237-5976-04	SCREW, 6-32 X 5/8 HWH SWAGE	2
9	626-5078-00	3/16" FOAM PAD	1

ASSEMBLY, DETONATOR, AC/DC PREMIUM / LE

500-7225-00

b14

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	515-9608-00	BRACKET ASSY, DETONATOR, GRINDER	1
2	500-6818-00-ND	COIL AND 2-PIN ASSEMBLY, NO DIODE	1
3	535-0540-00	COIL BRACKET, DETONATOR, GRINDER	1
4	232-5300-00	SCREW, 8-32 X 1/4" PPH SEMS	2
5	545-5423-00	NYLINER, 1/4" SHAFT, 4L1-FF	1
6	515-9609-00	PLUNGER ASSY, DETONATOR, GRINDER	1
7	242-5012-00	WASHER, 1/4 X 7/16 X 1/32	1
8	266-5077-00	COMPRESSION SPRING	1
9	270-5002-00	RETAINING RING - 1/4"	2
10	545-7287-00	GUIDE STRIP, DETONATOR, GRINDER	2
11	237-5976-01	SCREW, 6-32 X 1/4 HWH SWAGE	4

ASSEMBLY, DETONATOR
COIL / PLUNGER
AC/DC PREMIUM / LE
511-6961-00

b15

3-BANK DROP TARGET ASSEMBLY
500-7216-03
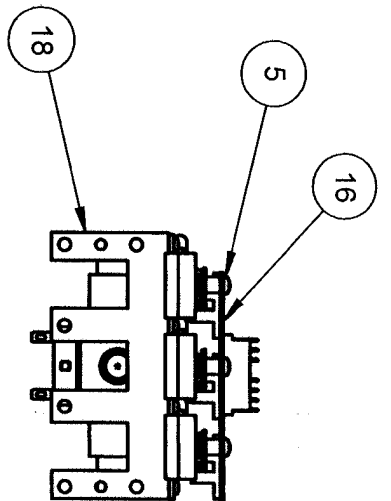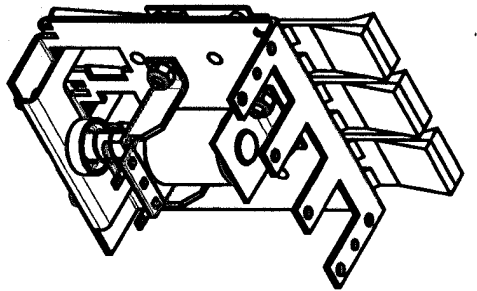
ITEM #	PART NUMBER	DESCRIPTION	QTY.
1	545-6163-03	LEDGE, 3-BANK DROP TARGET	1
2	242-5091-00	WASHER, 1/2 X 17/64 X .03 - DT	9
3	266-5089-00	SPRING COMPRESSION - DT	3
4	545-6305-00	TARGET - ROLLOVER - BLACK	3
5	237-5501-00	SCREW, 6-32 X 3/8" PPH MS ZINC	6
6	240-5102-00	8-32 NYLON LOCK NUT	4
7	269-5002-00	SPRING WASHER	1
8	270-5002-00	RETAINING RING - 1/4"	6
9	266-5020-00	COMPRESSION SPRING-CONICAL	1
10	265-5003-02	TARGET RESET SPRING	3
11	535-9959-00	STOP BRKT	1
12	237-5602-00	SCREW, 8-32 X 1/2 PPH MS, ZINC	2
13	237-6169-00	SCREW, 4-40 X 1/4 PPH MS	4
14	530-5757-00	PLUNGER - D.T. ASSY.	1
15	545-5076-01	COIL SLEEVE	1
16	520-5252-03	3 BANK DROP TARGET PCB-OPTO	1
17	090-5034-ND	COIL 25-1240 - NO DIODE	1
18	515-7784-03	DROP TARGET FRAME ASSY -3-BANK	1
19	535-9996-03	LIFT BRACKET - 3 BANK	1
20	535-9995-01	COIL BRACKET	1
21	237-5985-00	10-32 X 3/8 SHWH SWAGE SCREW	1
22	545-6798-00	SHIM - FICHE PAPER - D.T. SINGLE	2
98*	036-5542-00	DROP TARGET CABLE	1
99*	605-5006-00	1/8" PVC TUBING	.1 FT

* ITEM NOT SHOWN

b16

5-BANK DROP TARGET ASSEMBLY
500-7216-05
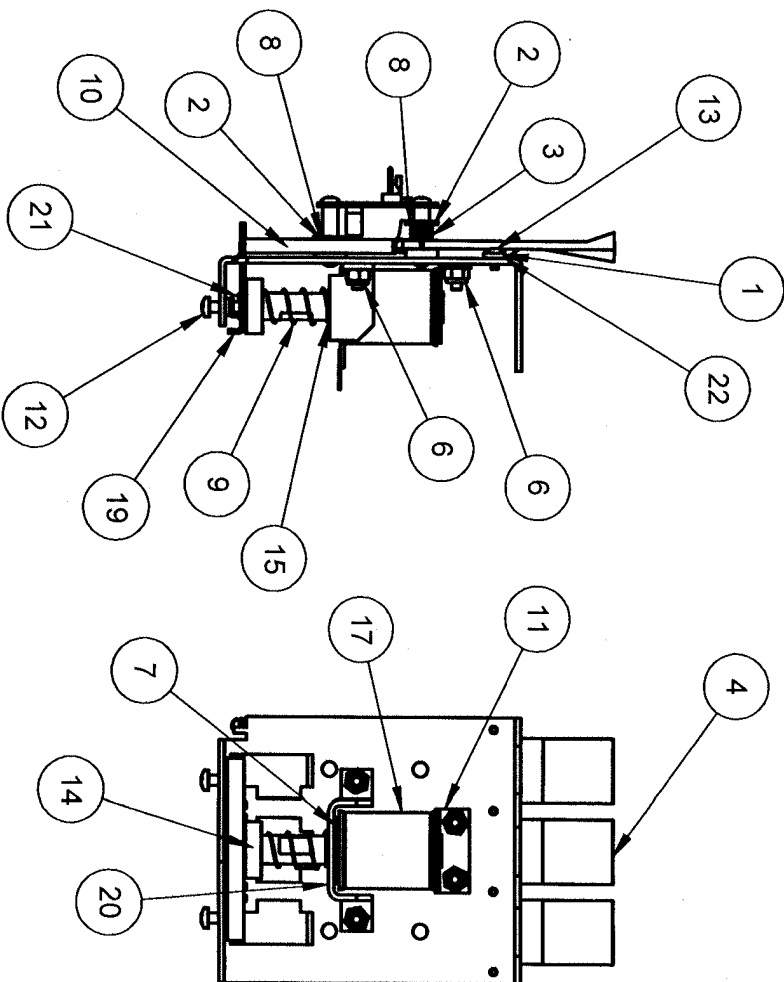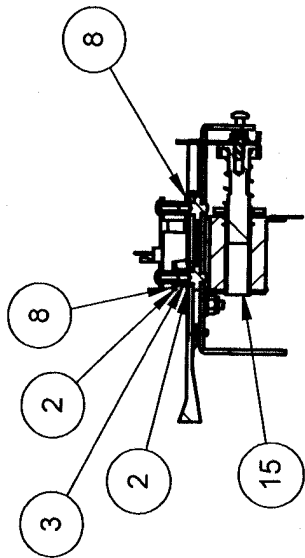
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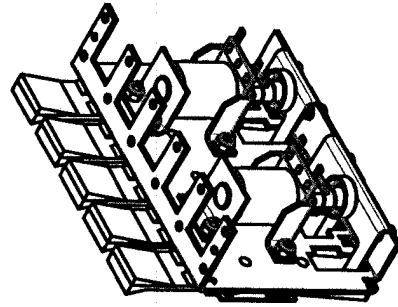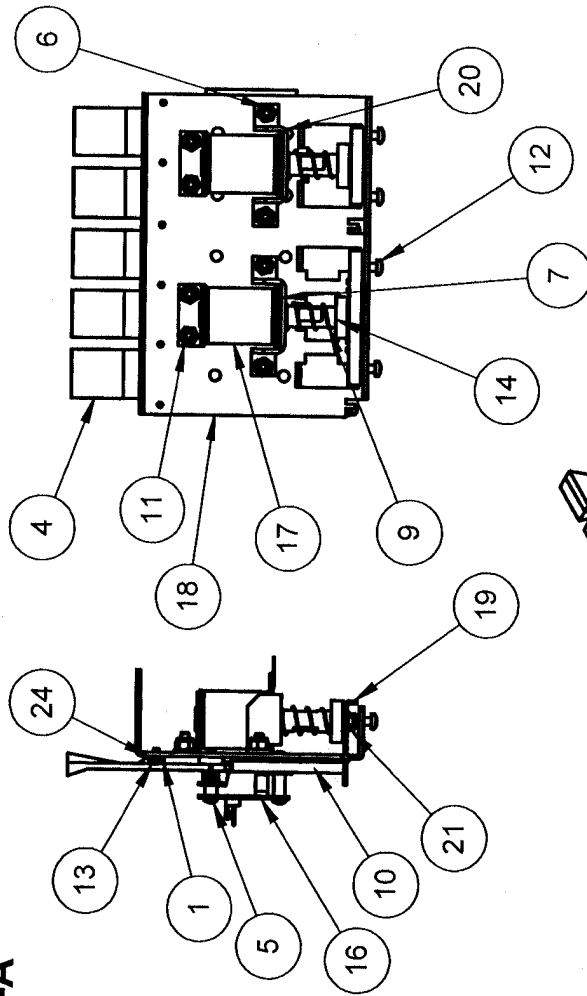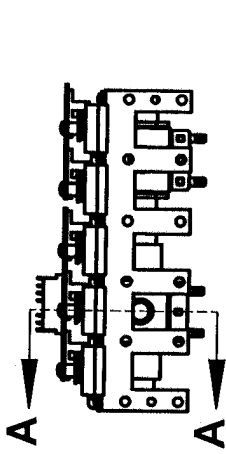
ITEM #	PART NUMBER	DESCRIPTION	QTY.
1	545-6163-05	LEDGE, 5-BANK DROP TARGET	1
2	242-5091-00	WASHER, 1/2 X 17/64 X .03 - DT	15
3	266-5089-00	SPRING COMPRESSION - DT	5
4	545-6305-00	TARGET - ROLLOVER - BLACK	5
5	237-5501-00	SCREW, 6-32 X 3/8" PPH MS ZINC	10
6	240-5102-00	8-32 NYLON LOCK NUT	8
7	269-5002-00	SPRING WASHER	2
8	270-5002-00	RETAINING RING - 1/4"	10
9	266-5020-00	COMPRESSION SPRING-CONICAL	2
10	265-5003-02	TARGET RESET SPRING	5
11	535-9959-00	STOP BRKT	2
12	237-5602-00	SCREW, 8-32 X 1/2 PPH MS, ZINC	4
13	237-6169-00	SCREW, 4-40 X 1/4 PPH MS	6
14	530-5757-00	PLUNGER - D.T. ASSY.	2
15	545-5076-01	COIL SLEEVE	2
16	520-5252-03	3 BANK DROP TARGET PCB-OPTO	1
17	090-5034-ND	COIL 25-1240 - NO DIODE	2
18	515-7784-05	DROP TARGET FRAME ASSY - 5-BANK	1
19	535-9996-03	LIFT BRACKET - 3 BANK	1
20	535-9995-01	COIL BRACKET	2
21	237-5985-00	10-32 X 3/8 SHWH SWAGE SCREW	2
22	520-5252-02	2 BANK DROP TARGET PCB-OPTO	1
23.	535-9996-02	LIFT BRACKET - 2 BANK	1
23	535-9996-02	LIFT BRACKET - 2 BANK	1
24	545-6798-01	SHIM - FICHE PAPER - D.T. DOUBLE	2
98*	036-5542-00	DROP TARGET CABLE	2
99*	605-5006-00	1/8" PVC TUBING	.2 FT

* ITEM NOT SHOWN

b17
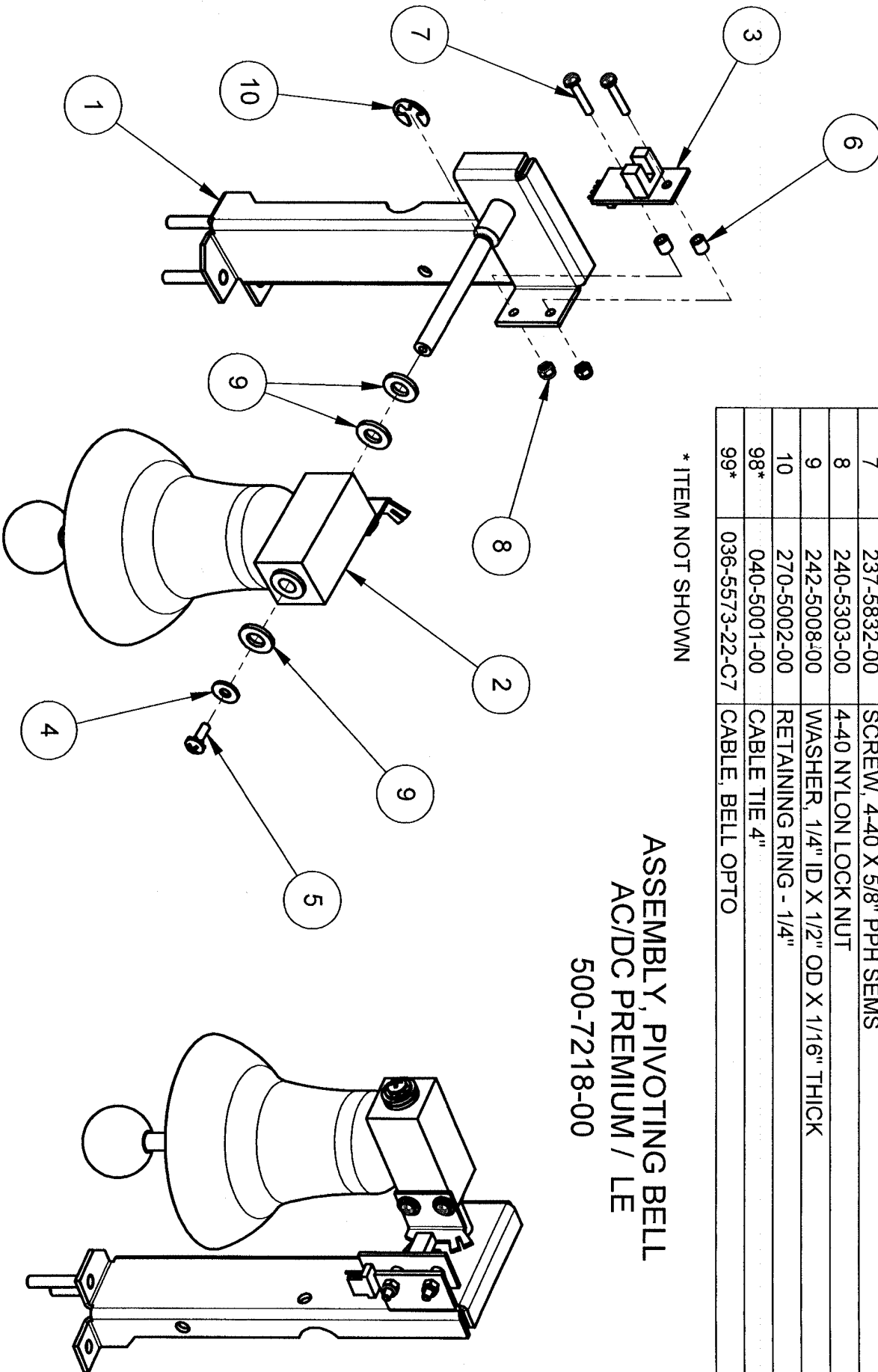
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	515-0123-00	WELDMENT, BELL MOUNT, GRINDER LE	1
2	511-6950-00	ASSEMBLY, BELL & BLOCK, GRINDER LE	1
3	520-5292-00	OPTO INTERRUPTOR BOARD - RIGHT ANGLE CONNECTOR	1
4	242-5001-00	#6 WASHER	1
5	232-5201-00	SCREW, 6-32 X 3/8" PPH MS SEMS	1
6	254-5062-03	SPACER, #4 ID, 3/16" OD X .187"	2
7	237-5832-00	SCREW, 4-40 X 5/8" PPH SEMS	2
8	240-5303-00	4-40 NYLON LOCK NUT	2
9	242-5008-00	WASHER, 1/4" ID X 1/2" OD X 1/16" THICK	3
10	270-5002-00	RETAINING RING - 1/4"	1
98*	040-5001-00	CABLE TIE 4"	2
99*	036-5573-22-C7	CABLE, BELL OPTO	1

* ITEM NOT SHOWN

ASSEMBLY, PIVOTING BELL
AC/DC PREMIUM / LE
500-7218-00

b18

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	515-9600-00	BELL PIVOT BLOCK, GRINDER LE	1
2	530-7756-00	CLAPPER ROD, BELL, GRINDER LE	1
3	260-5013-00	BALL, CARBON, THREADED	1
4	545-7283-00	MOLDED BELL, GRINDER	1
5	237-5882-00	SCREW, #4-40 X 5/16 PRH SEMS	2
6	535-0512-00	OPTO BRACKET, BELL, GRINDER LE	1
7	237-5909-00	SCREW, 4-40 X 1/4" PPH SEMS	2
8	242-5002-00	#4 FLAT WASHER - 5/16" O.D.	2

ASSEMBLY, BELL & BLOCK
GRINDER PREMIUM / LE
511-6950-00

b19
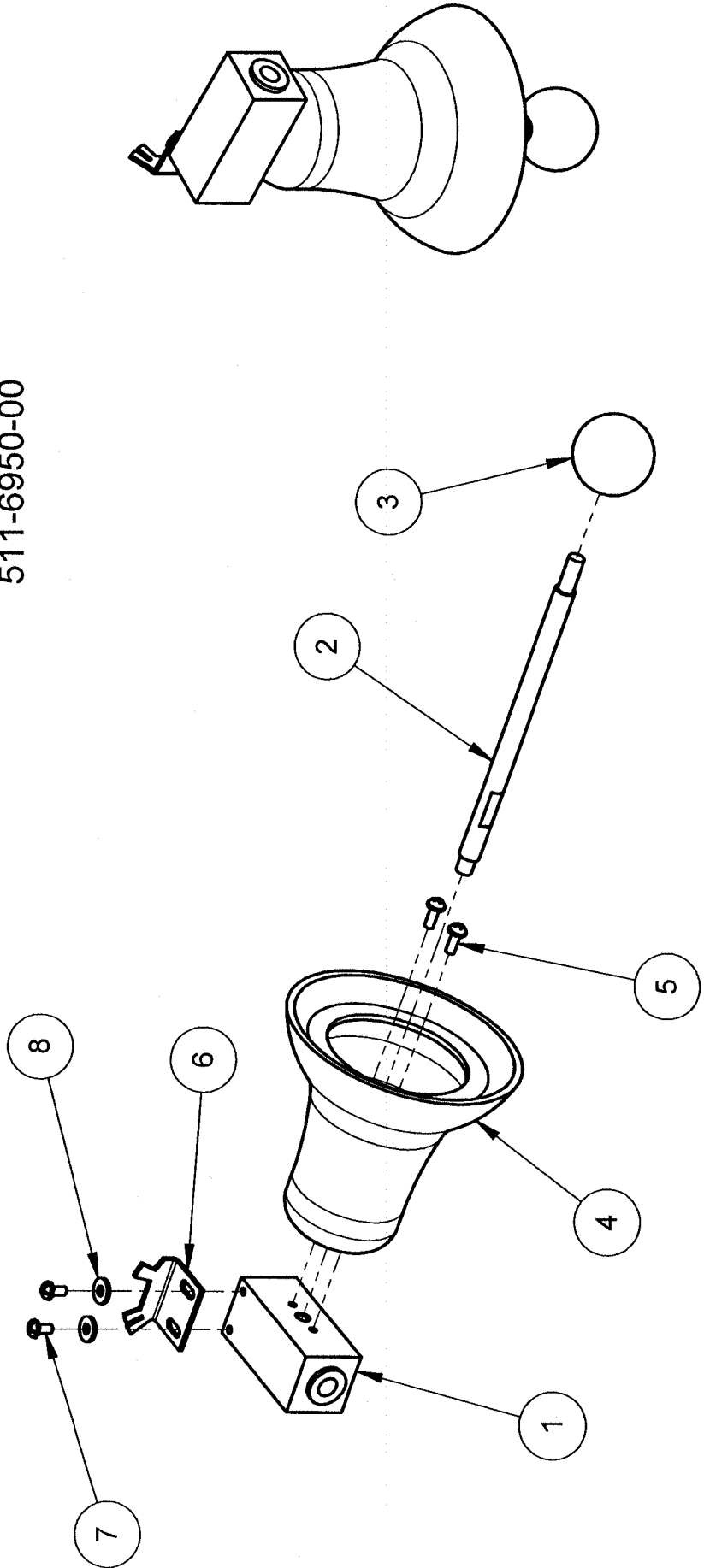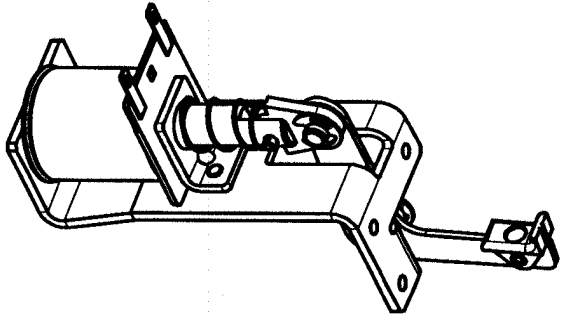
ASSEMBLY, KICKER ARM
AC/DC PREMIUM / LE
500-7217-00
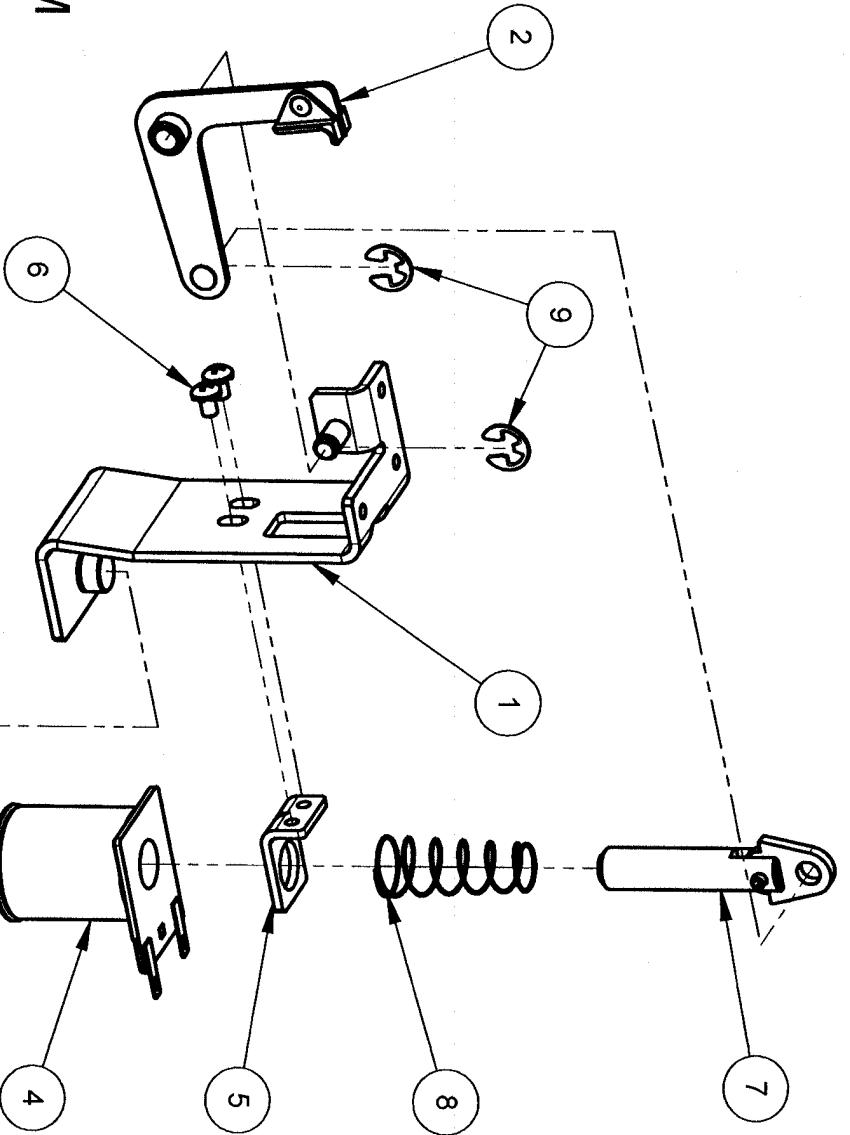
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	515-7785-00	KICKER BRACKET ASSEMBLY	1
2	515-5340-01	ARM & TIP ASSY	1
3	545-5411-00	COIL SLEEVE	1
4	090-5044-ND	COIL 26-1200 - NO DIODE	1
5	535-5203-03	COIL RETAINING BRACKET	1
6	232-5300-00	SCREW, 8-32 X 1/4" PPH SEMS	2
7	515-5338-00	PLUNGER & LINK ASSEMBLY	1
8	266-5020-00	COMPRESSION SPRING-CONICAL	1
9	270-5002-00	RETAINING RING - 1/4"	2

b20

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	530-5266-01	MAGNET CORE	1
2	090-5042-00	MAGNET, 22-650 COIL	1
3	535-6637-01	MAGNET BRACKET	1
4	232-5201-00	SCREW, 6-32 X 3/8" PPH MS SEMS	1

b21

b22

ASSEMBLY, LEFT PLASTIC RAMP
AC/DC PREMIUM / LE
500-7208-00
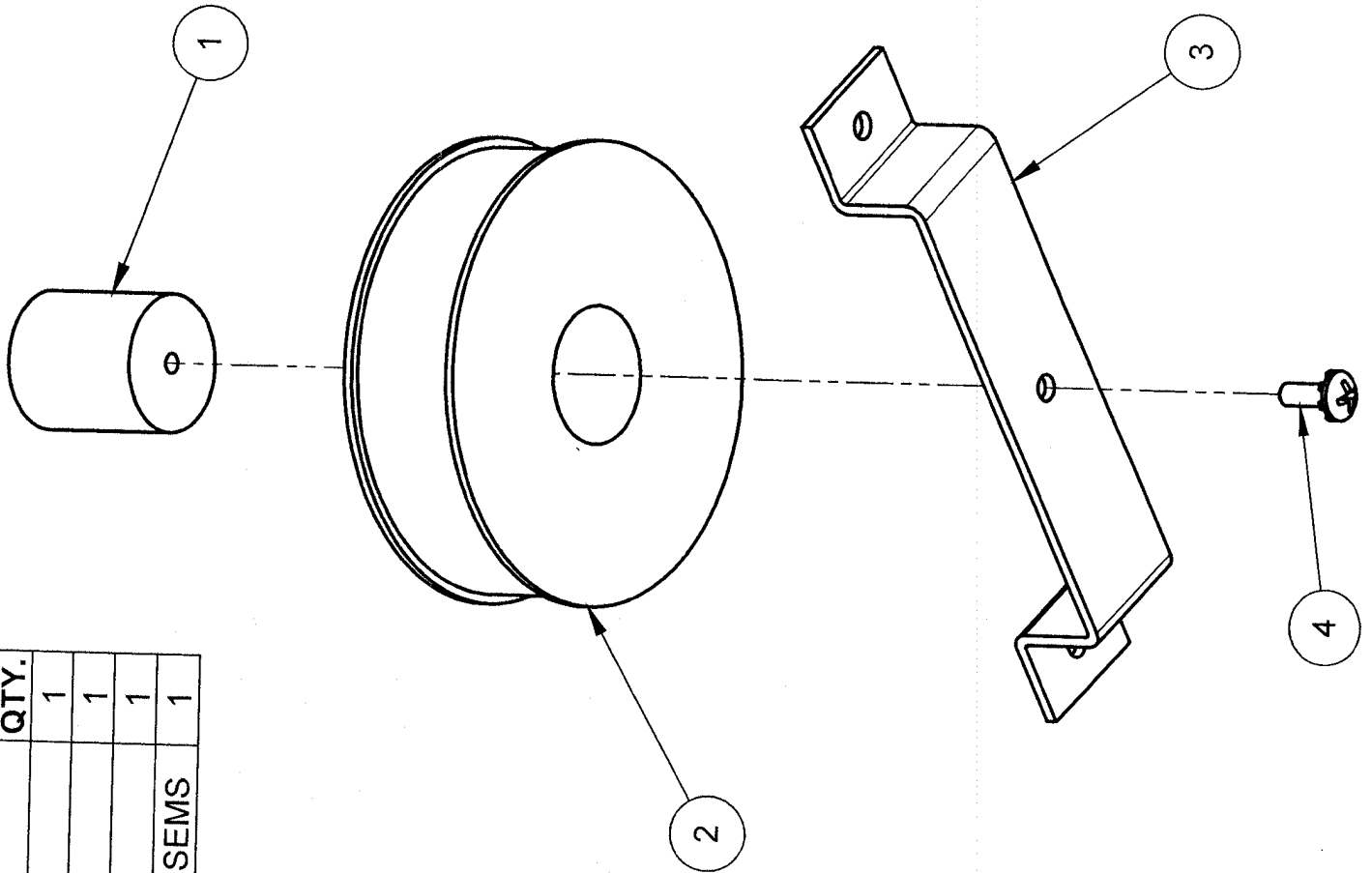
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	510-5147-00	RIVETED ASSY, LEFT RAMP, GRINDER	1
2	515-6556-03-GE	R/U SWITCH ASSEMBLY -03 W/ GENERIC CABLE	1
3	515-6556-02-GE	R/U SWITCH ASSEMBLY -02 W/ GENERIC CABLE	1
4	232-5202-00	SCREW, 6-32 X 1/2" PPH MS SEMS	11
5	240-5005-00	6-32 NYLON STOP NUT	13
6	545-5105-00	RUBBER BUMPER	1
7	550-5031-06	FLASH LAMP ASSY, GENERIC	1
8	511-5241-00	MINI MARS W/ EARS - YELLOW SB	1
9	515-6596-00-GE	COIL/BRKT/CABLE ASSY, LEFT	1
10	232-5302-00	SCREW, 8-32 X 1/2" PPH MS SEMS	2
11	240-5102-00	8-32 NYLON LOCK NUT	2
12	511-6987-00	ASSEMBLY, TRAIN W/ LED, GRINDER LE	1
13	234-5100-00	#8 X 3/8" HWH SLOT AB	1
14	511-5241-01	ASSY FLASH LAMP	1
15	510-5146-41	RIVET ASSY, BUTY #41, GRINDER LE	1
16	237-5976-01	SCREW, 6-32 X 1/4 HWH SWAGE	2
17	830-6125-64	BUTYRATE #64, GRINDER LE	1
18	242-5001-00	#6 WASHER	3
19	830-6125-66	BUTYRATE #66, GRINDER LE	1
20	535-0579-00	LEFT RAMP PROTECT, L WALL, GRINDER LE	1
21	535-0579-01	LEFT RAMP PROTECT, R WALL, GRINDER LE	1
22	237-5809-00	SCREW, #6 X 1/2" PTH A	2

ITEM #	PART NUMBER	DESCRIPTION	QTY.
1	510-5148-00	RIVET ASSY, RIGHT RAMP, GRINDER LE	1
2	515-6556-02-GE	R/U SWITCH ASSEMBLY -02 W/ GENERIC CABLE	2
3	232-5202-00	SCREW, 6-32 X 1/2" PPH MS SEMS	9
4	240-5005-00	6-32 NYLON STOP NUT	8
5	545-5105-00	RUBBER BUMPER	1
6	550-5031-02	MINI MARS W/ EARS - RED SB	1
7	511-5241-00	FLASH LAMP ASSY, GENERIC	1
8	515-6596-01-GE	COIL/BRKT/CABLE ASSY, RIGHT	1
9	232-5302-00	SCREW, 8-32 X 1/2" PPH MS SEMS	2
10	240-5102-00	8-32 NYLON LOCK NUT	2
11	511-6988-00	ASSEMBLY, FLAME PCB, GRINDER LE	1
12	510-5146-41	RIVET ASSY, BUTY #41, GRINDER LE	1
13	237-5976-01	SCREW, 6-32 X 1/4 HWH SWAGE	2
14	830-6125-65	BUTYRATE #65, GRINDER LE	1
15	242-5001-00	#6 WASHER	1
16	535-0580-00	RIGHT RAMP PROTECT, L WALL, GRINDER LE	1
17	535-0580-01	RIGHT RAMP PROTECT, R WALL, GRINDER LE	1
18	237-5809-00	SCREW, #6 X 1/2" PTH A	2

ASSY, RIGHT PLASTIC RAMP
AC/DC LE
500-7209-00

b23

BACK VIEW

FRONT VIEW
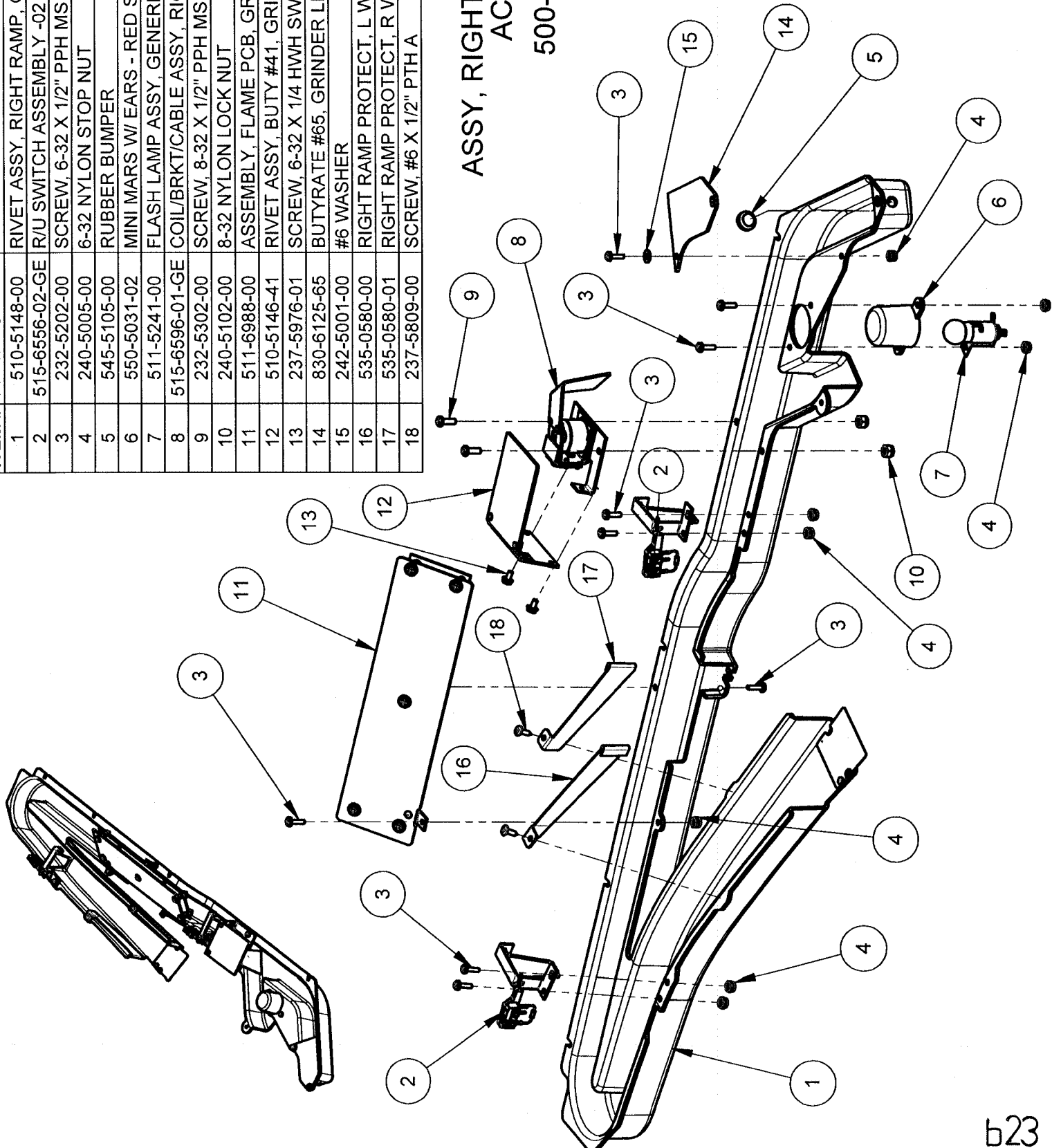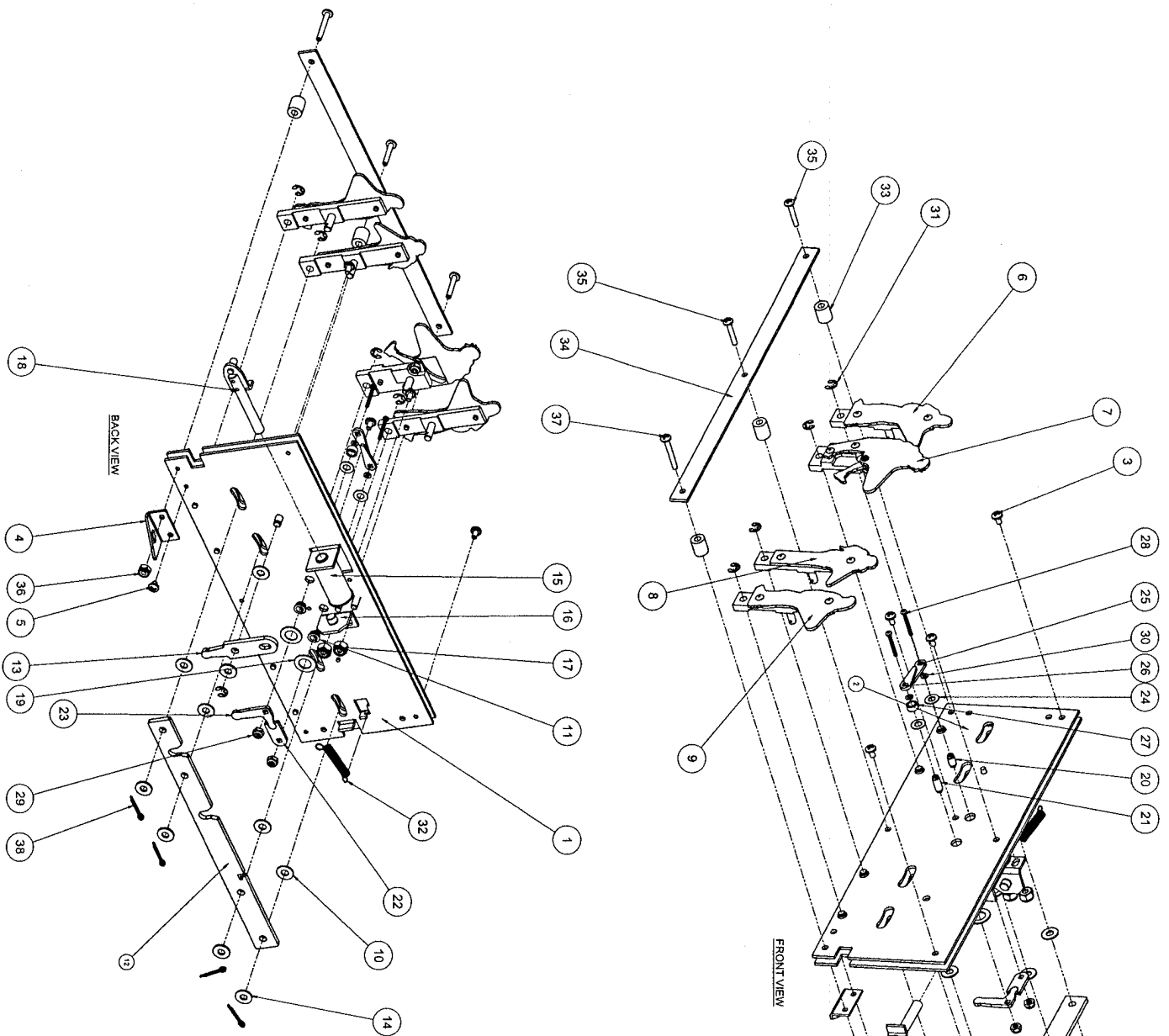
ITEM #	QTY	PART #	DESCRIPTION
1	1	515-7796-00	BAND MTG. PLATE
2	1	830-6125-05	BUTY # 5 - BAND STAGE
3	4	232-5200-00	SCREW, 6-32 X 1/4" PPH SEMS
4	1	535-0582-00	MOUNTING BRACKET - RIGHT
5	1	232-5209-00	SCREW, 6-32 X 3/16" PPH SEMS
6	1	510-5765-00	MALCOLM ASSEMBLY
7	1	510-5766-00	ANGUS ASSEMBLY
8	1	510-5767-00	BRIAN ASSEMBLY
9	1	510-5768-00	CLIFF ASSEMBLY
10	5	242-5088-00	NYLON WASHER .195" X .437" X .031"
11	1	545-5352-00	NYLINER, 3/16" SHAFT
12	1	545-7299-00	MAIN LINK ACTUATOR
13	1	545-7302-00	COIL ACTUATOR
14	5	242-5005-00	#8 WASHER
15	1	090-5072-03	MINIATURE COIL - 29-1400 - 10520424
16	2	515-7797-00	COIL STOP ASSEMBLY
17	2	240-5102-00	8-32 NYLON LOCK NUT
18	1	511-6986-00	PLUNGER ASSEMBLY
19	2	242-5100-00	WASHER .328 ID X .562 OD X .031 ACETAL
20	1	530-7799-00	PIVOT PIN - RIGHT ARM
21	1	530-7800-00	PIVOT PIN - LEFT ARM
22	1	545-7301-00	ARM LINK - RIGHT
23	1	545-7300-00	ARM LINK - LEFT
24	2	242-5606-00	3/16 X 3/8 x 1/64 FIBER WASHER - GRAY
25	1	830-6125-45	BUTY # 45 - RIGHT ARM - PHIL
26	1	830-6125-46	BUTY # 46 - LEFT ARM - PHIL
27	1	254-5070-00	NYLON SPACER
28	2	237-6064-00	2-56 x 3/4 PHILLIPS PAN HEAD ZINC
29	2	240-5321-00	2-56 NYLON LOCK NUT
30	2	242-5605-00	#2 FLAT WASHER - NARROW
31	5	270-5001-00	RETAINING E-RING, 3/16" SHAFT OD
32	1	265-5003-02	TARGET RESET SPRING
33	3	254-5000-22	NYLON SPACER - BLACK - 3/8 OD X .175 ID X 7/16"
34	2	830-6125-49	BUTY # 49 - BAND STAGE BOTTOM COVER
35	2	237-5504-00	SCREW, 6-32 X 3/4" PPH MS
36	1	240-5005-00	6-32 NYLON STOP NUT
37	1	237-5506-00	SCREW, 6-32 X 1" PPH MS
38	4	251-5006-00	1/16 X 1/2 COTTER PIN

ROCKING BAND ASSEMBLY

500-7240-00
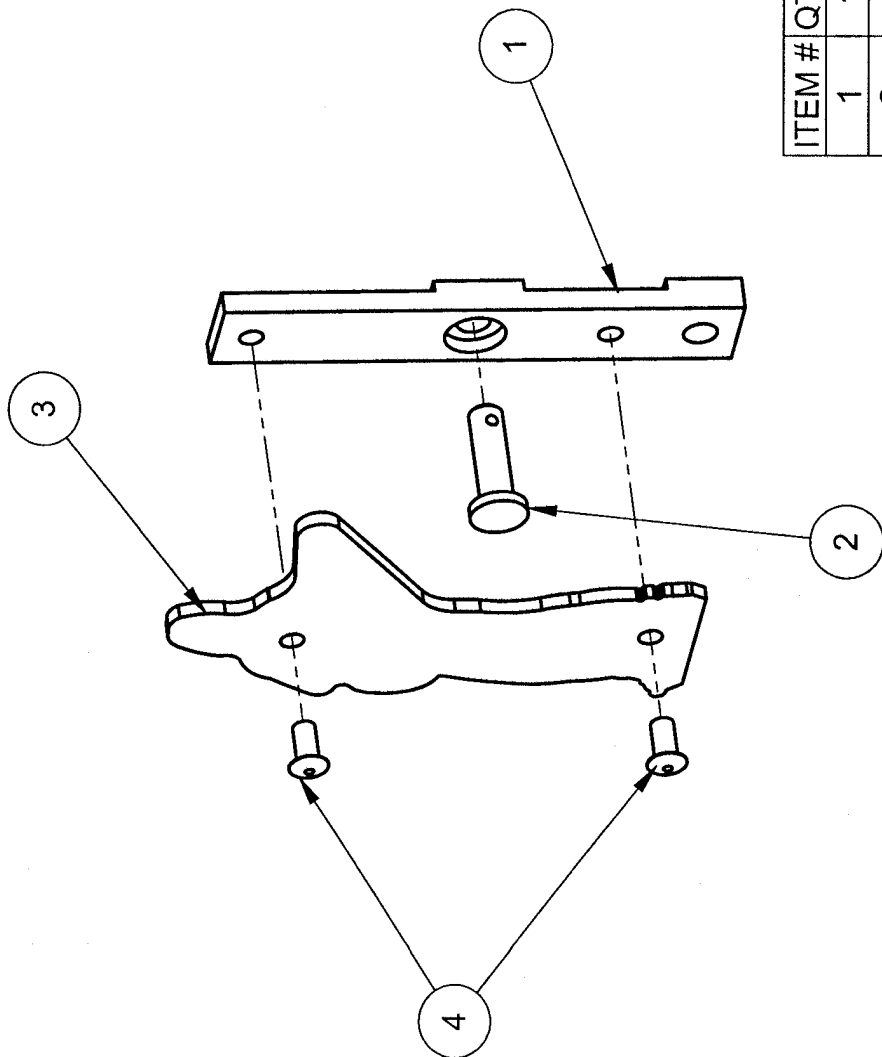
ITEM #	QTY	PART #	DESCRIPTION
1	1	545-7297-00	BUTY MOUNT - STAND UP
2	1	530-7798-00	3/16 DIA. X 5/8" CLEVIS PIN
3	1	830-6125-43	BUTY # 43 - MALCOLM
4	2	249-5003-00	RIVET - 1/8 X 1/4

MALCOLM ASSEMBLY

510-5765-00

b25

APPLY ITEM 9
AS SHOWN
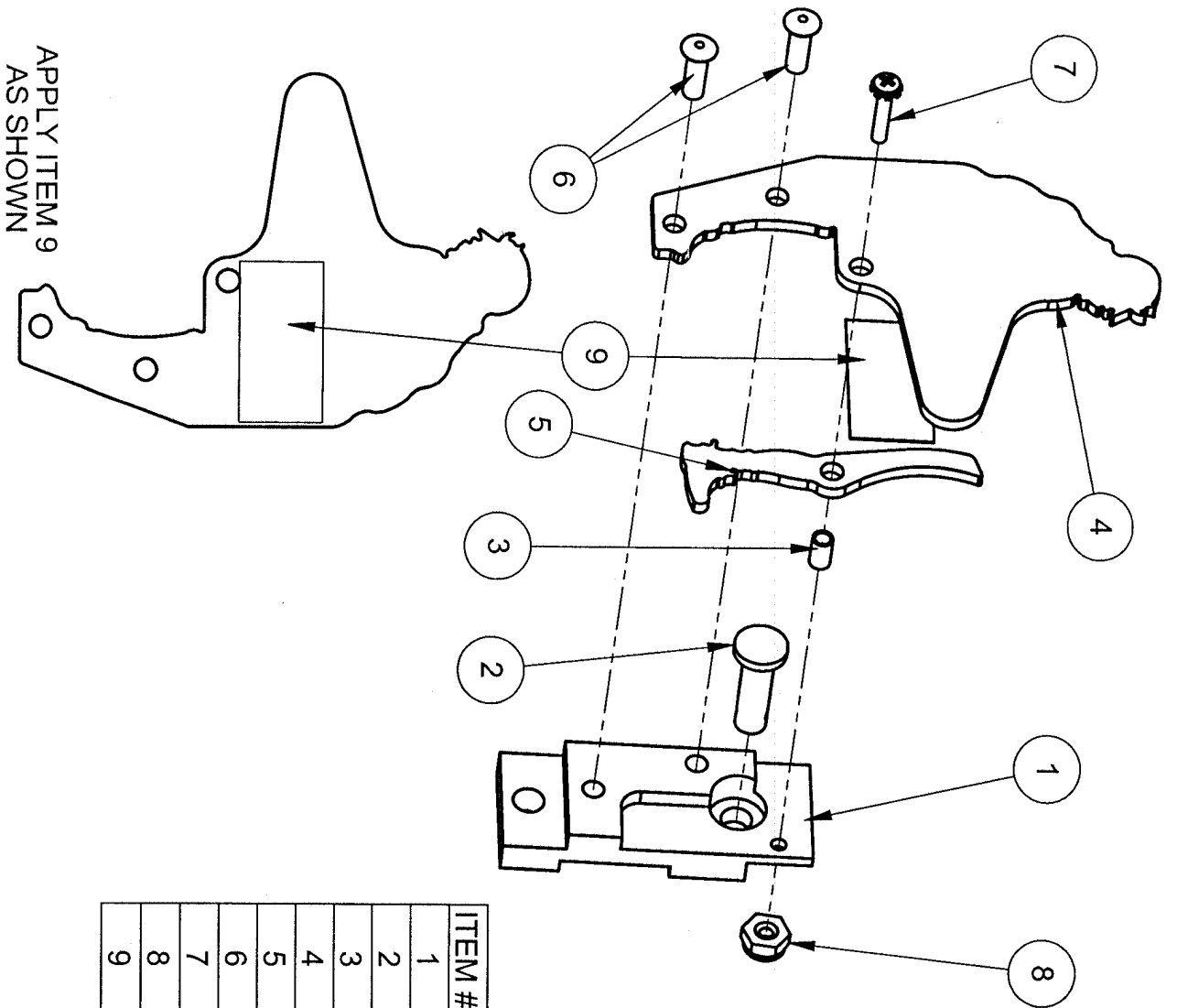
ITEM #	QTY	PART #	DESCRIPTION
1	1	545-7298-00	BUTY MOUNT - ANGUS
2	1	530-7798-00	3/16 DIA. X 5/8" CLEVIS PIN
3	1	254-5071-00	TUBULAR SPACER
4	1	830-6125-44	BUTY # 44 - ANGUS BODY
5	1	830-6125-50	BUTY # 50 - ANGUS LEG
6	2	249-5014-00	RIVET - 1/8 X 3/8
7	1	237-5872-01	SCREW, 2-56 X 7/16" PPH SEMS
8	1	240-5321-00	2-56 NYLON LOCK NUT
9	1	626-5095-01	ADHESIVE TEFLON STRIP

ANGUS ASSEMBLY

510-5766-00
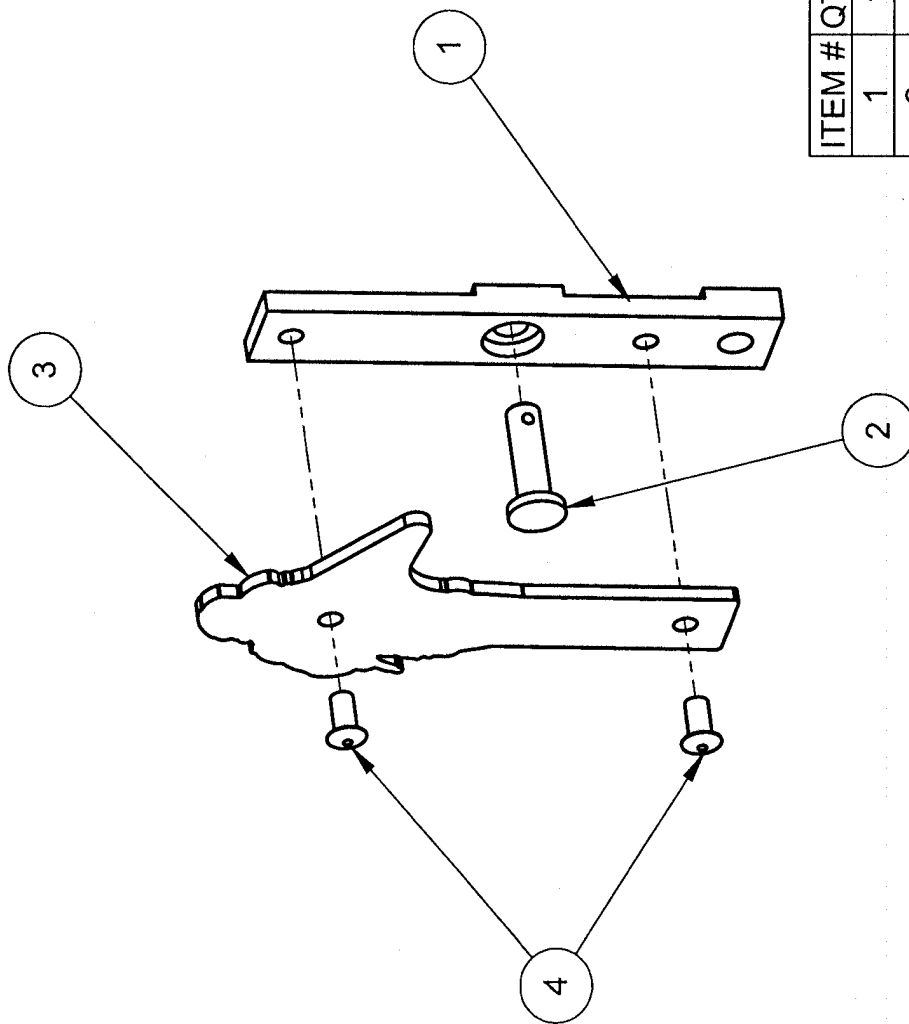
b26

ITEM #	QTY	PART #	DESCRIPTION
1	1	545-7297-00	BUTY MOUNT - STAND UP
2	1	530-7798-00	3/16 DIA. X 5/8" CLEVIS PIN
3	1	830-6125-47	BUTY # 47 - BRIAN
4	2	249-5003-00	RIVET - 1/8 X 1/4

BRIAN ASSEMBLY

510-5767-00
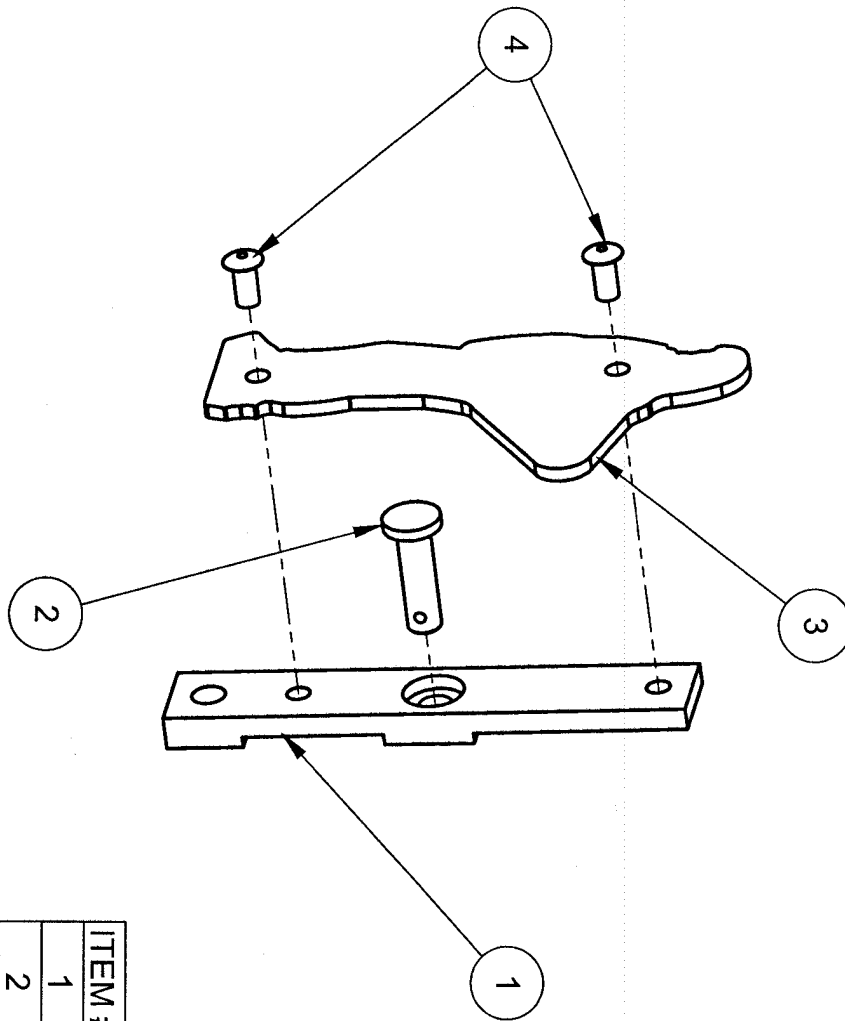
b27

ITEM #	QTY	PART #	DESCRIPTION
1	1	545-7297-00	BUTY MOUNT - STAND UP
2	1	530-7798-00	3/16 DIA. X 5/8" CLEVIS PIN
3	1	830-6125-48	BUTY # 48 - CLIFF
4	2	249-5003-00	RIVET - 1/8 X 1/4

CLIFF ASSEMBLY

510-5768-00

b28
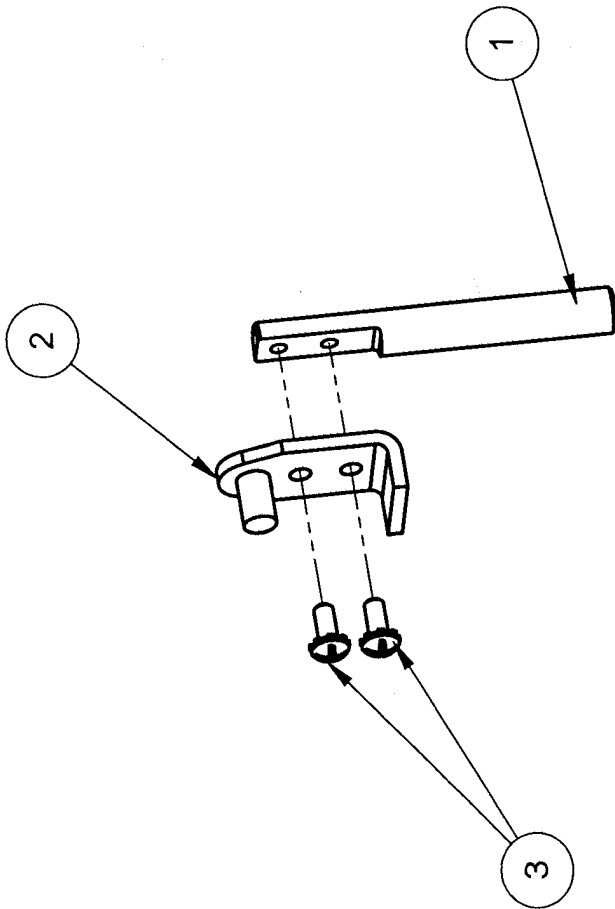
ITEM #	QTY	PART #	DESCRIPTION
1	1	530-7801-00	PLUNGER
2	1	515-7798-00	PLUNGER BRACKET
3	2	237-5909-00	SCREW, 4-40 X 1/4" PPH SEMS

PLUNGER ASSEMBLY

511-6986-00

629
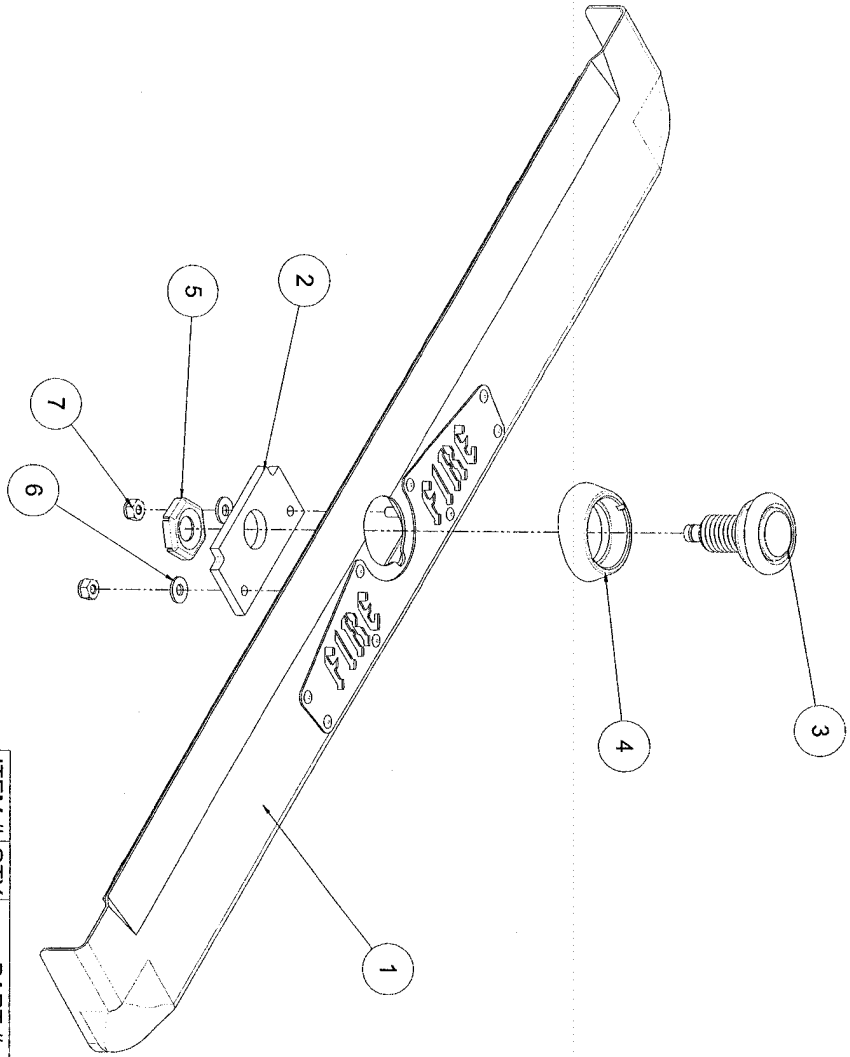
ITEM #	QTY	PART #	DESCRIPTION
1	1	500-7249-02-25	FRONT MOLD ASSEMBLY - LOCKDOWN - CENTER BUTTON - BIB
2	1	545-7291-00	TOP BUTTON BAR
3	1	515-7791-00	BUTTON ASSY - CLEAR
4	1	545-7292-10	TOP BUTTON SPACER-MOLDED
5	1	240-5003-01	PAL NUT
6	2	242-5005-00	#8 WASHER
7	2	240-5102-00	# 8-32 NYLON LOCK NUT

FRT MOLD FINAL ASSY - LOCKDOWN - CENTER BUTTON - BIB

500-7250-25

b30
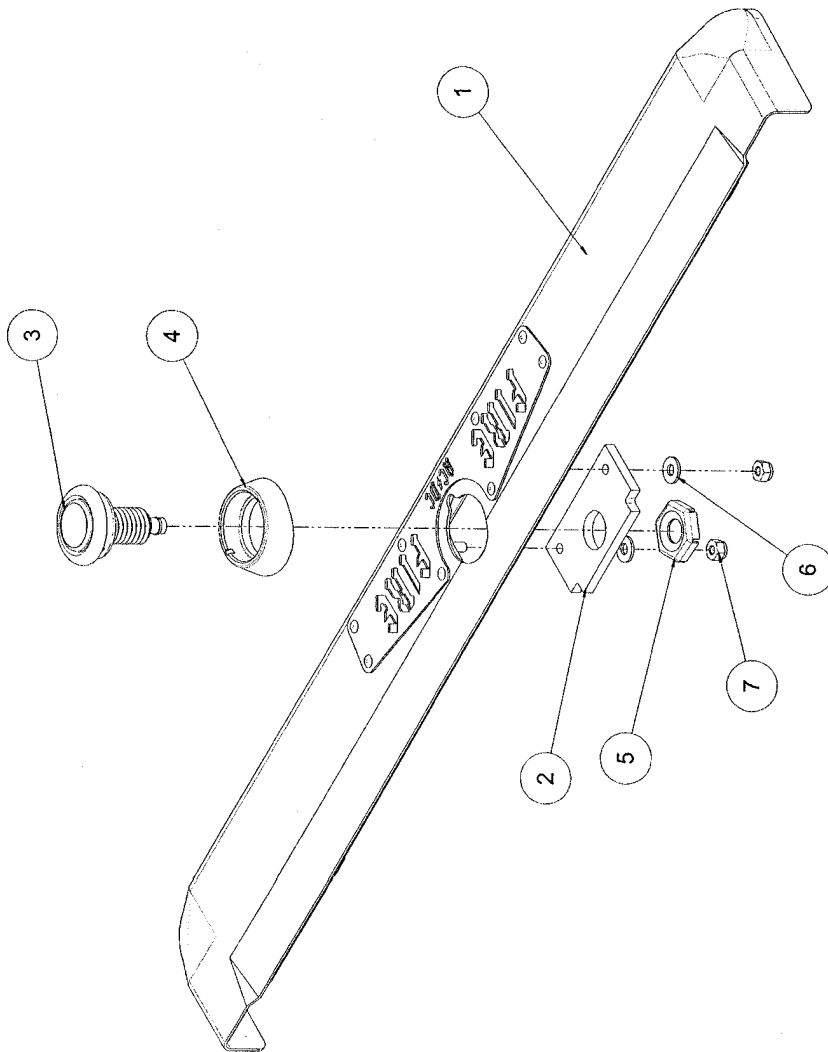
ITEM #	QTY	PART #	DESCRIPTION
1	1	500-7235-02-23	FRONT MOLD ASSEMBLY - LOCKDOWN - CENTER BUTTON
2	1	545-7291-00	TOP BUTTON BAR
3	1	515-7791-00	BUTTON ASSY - CLEAR
4	1	545-7292-10	TOP BUTTON SPACER-MOLDED
5	1	240-5003-01	PAL NUT
6	2	242-5005-00	#8 WASHER
7	2	240-5102-00	# 8-32 NYLON LOCK NUT

FRT MOLD FINAL ASSY - LOCKDOWN - CENTER BUTTON - LTBR/PREM

500-7241-23

b.31
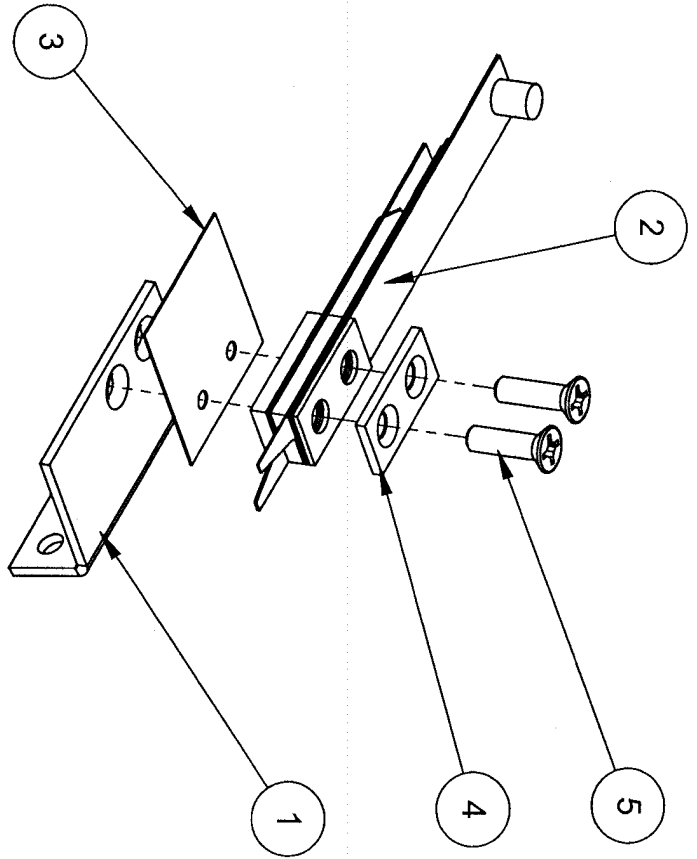
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	535-0559-00	SWITCH BRACKET	1
2	180-5218-00	SINGLE FLIPPER SWITCH/ w NYLON LIFTER	1
3	545-6268-00	FISCHE PAPER	1
4	535-5045-01	SWITCH PLATE - C'SUNK	1
5	237-5918-00	6-32 x 1/2 PHILLIPS FLAT HEAD ZINC	2

TOP BUTTON SWITCH ASSEMBLY

511-6971-00

b32
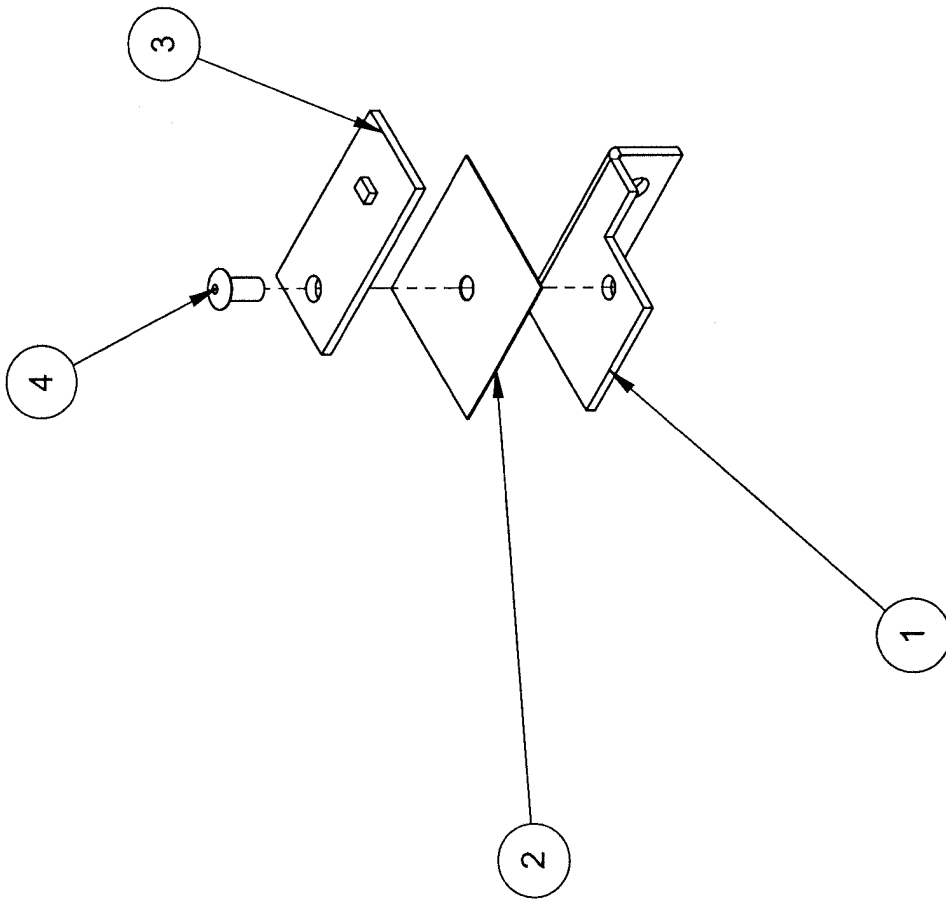
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	535-0368-00	TOP BUTTON LED BRACKET	1
2	545-6268-01	FISCHE PAPER	1
3	520-5333-00	PCB - TRI-COLOR LED	1
4	249-5003-00	RIVET - 1/8 X 1/4	1

LED BOARD ASSEMBLY

511-6980-00

b33

BACK PANEL ASSEMBLY, AC/DC PREMIUM / LE
500-7207-00

b34
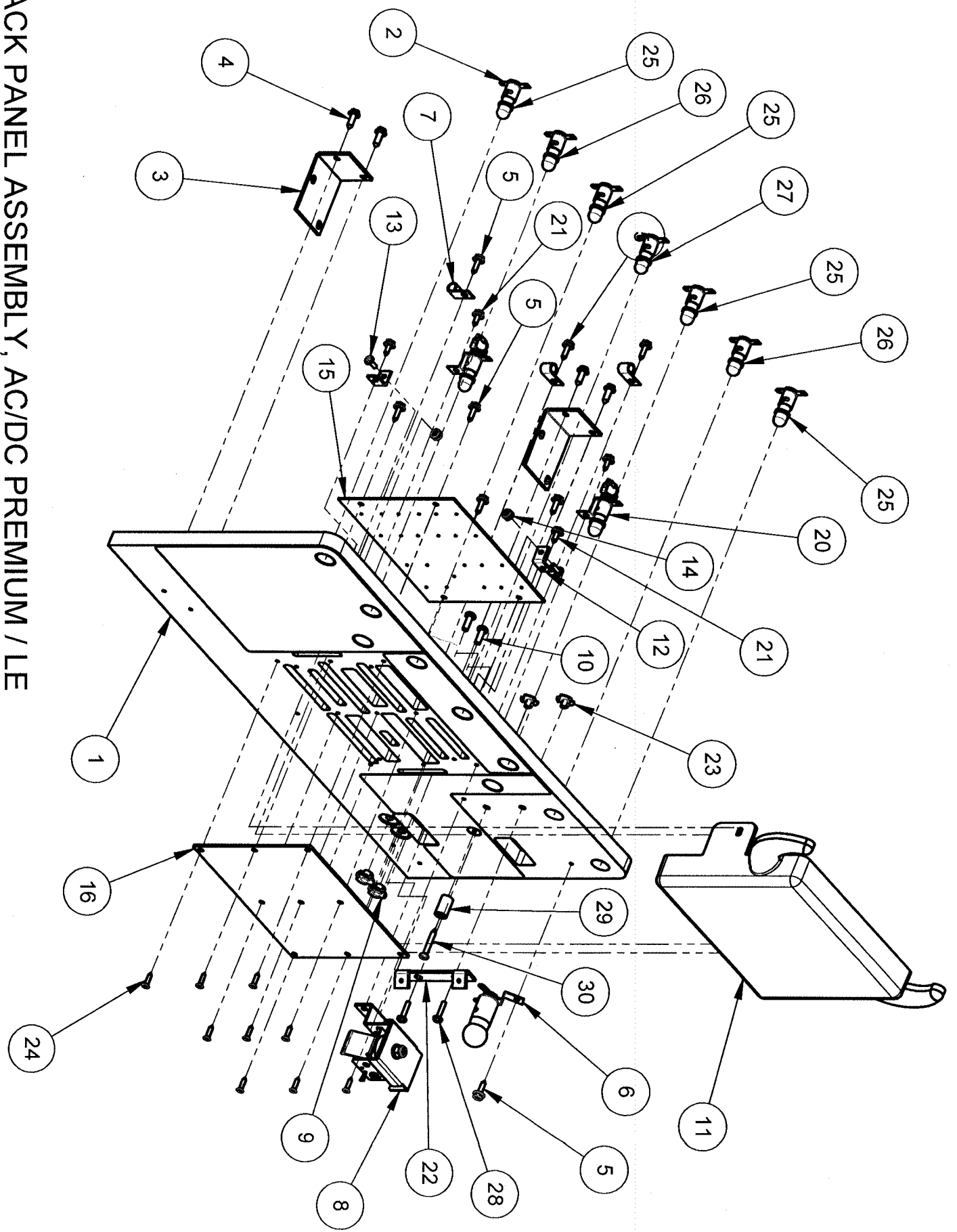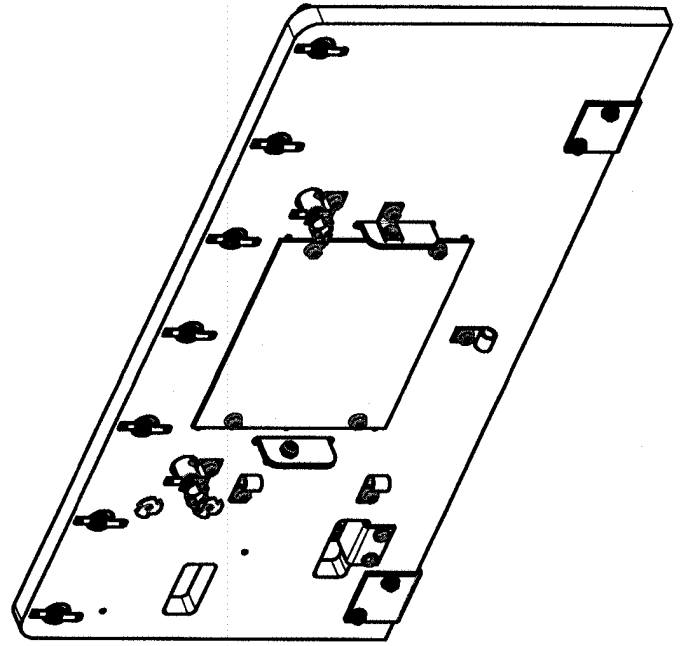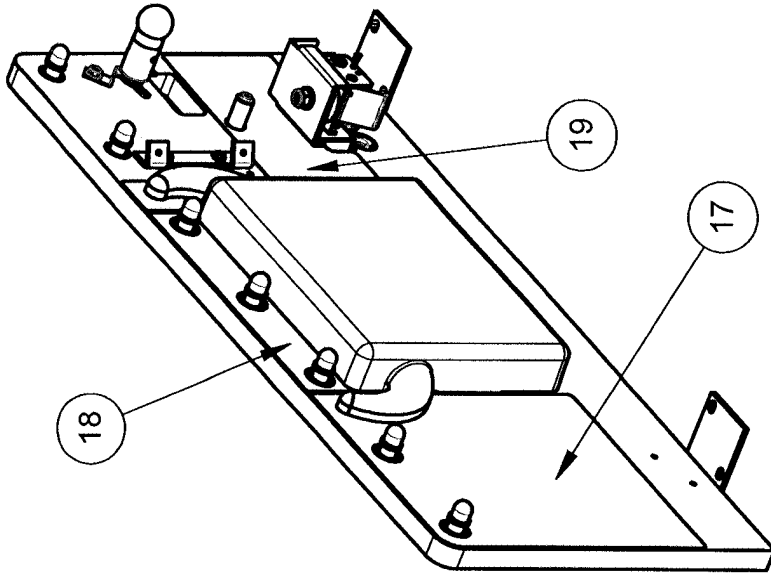
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	525-5713-00	BACK PANEL, GRINDER LE	1
2	077-5000-00	SOCKET - STAPLED - 2 LUGS	7
3	535-8964-00	BRACKET - BACK PANEL SUPPORT	2
4	234-5101-00	SCREW, #8 X 1/2" SLT HWH AB ZINC	4
5	234-5001-02	SCREW, #6 X 1/2" HWH	8
6	519-5106-00-HF	SOCKET/#89 BULB ASSY - RVRS MNT - HEAVY FIL	1
7	040-5000-03	1/4" CABLE CLAMP	3
8	511-5096-01	ASSY, ELEC GATE RIGHT, RAIL MT	1
9	240-5101-00	8-32 T-NUT	2
10	232-5302-00	SCREW, 8-32 X 1/2" PPH MS SEMS	2
11	545-6845-00	JUKEBOX COVER, GRINDER	1
12	535-8941-04	BRACKET - PLASTIC MTG	2
13	232-5201-00	SCREW, 6-32 X 3/8" PPH MS SEMS	2
14	240-5005-00	6-32 NYLON STOP NUT	2
15	520-5324-02	LED PCB ONLY, BACK PANEL, GRINDER	1
16	830-6125-32	BUTY #32, BACK PANEL, GRINDER LE	1
17	820-7000-12	DECAL #12, BACK PANEL LEFT, GRINDER	1
18	820-7000-14	DECAL #14, BACK PANEL CENTER, GRINDER	1
19	820-7000-13	DECAL #13, BACK PANEL RIGHT, GRINDER	1
20	519-5008-02-LED	SOCKET/BULB/DIODE, RED - LED	2
21	234-5000-00	SCREW, #6 X 3/8" HWH	4
22	535-0583-00	MOUNTING BRACKET - BP	1
23	240-5002-00	6-32 T-NUT	2
24	237-5840-00	SCREW, #4 X 1/2" PFH AB	9
25	112-5034-08	DOUBLE LED, BAYONET BASE - CLEAR	4
26	112-5034-05	DOUBLE LED, BAYONET BASE - RED	2
27	112-5034-02	DOUBLE LED, BAYONET BASE - RED	1
28	232-5203-00	SCREW, 6-32 X 5/8 PPH SEMS ZINC	2
29	254-5000-14	NYLON SPACER - BLACK - 3/8 OD X .175 ID X 5/8"	1
30	232-5004-00	SCREW, #6 X 1 PPH AB ZINC	1
97*	036-5549-30	FLASH CABLE 10"	1
98*	631-5000-00	STAPLE - 5/16	14
99*	036-5573-04-C7	BACK PANEL CABLE ASSEMBLY	1

* ITEM NOT SHOWN

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b36

Parts Identification   The Pink Pages

Optional Kits available through your Distributor:

Pinball Location Maintenance <u>Standard</u> Kit (for AC/DC Premium Pinball) 502-6002-C7

Standard Kit includes : *8 oz. Novus Wax #2 Fine (Red)* **(675-0003-01)***, Cloth, Rubber Rings (used above playfield), Bulbs (Bulb quantities vary and is limited to 25 per type), Fuses (1/per type) and 4 Pinballs.* **Note:** *Quanties, sizes and contents subject to change without notice.*

Pinball Location Maintenance <u>Deluxe</u> Kit (for AC/DC Premium Pinball) 502-6003-C7

Deluxe Kit includes : *Pinball Location Maintenance* <u>Standard</u> *Kit as described above plus a quantity of Flipper Rebuild Kits.* **Note:** *Quantity varies which equals the same quantity of flippers used in this game.*
▲ THIS GAME KIT INCLUDES (2) FLIPPER REBUILD KITS ▲

Plastics*Kit (for AC/DC Premium Pinball).. 803-5000-C7

Plastics Kit includes: *Plastic Sets (830-6125-XX)*

Decals*Kit (for AC/DC Premium Pinball) 802-5000-C7

Decals Kit includes: *Decal Set (820-7000-XX)*

*Attention: *No individual Plastic or Decal can be ordered separately, unless noted otherwise. Plastics & Decals are subject to change without notice during and / or after production. Key Fobs subject to availability and may or may not be included in the plastic set. All designs, shapes & pieces used subject to change without notice. Kit contents subject to change. Service Bulletin(s) will announce any critical changes, if warranted. The last 2-digits shown on plastics or decals are for reference only.*

Parts Identification

Parts Identification   The Pink Pages

AC/DC L.T.B.R Parts available through your Distributor:

Leg Assy Gloss Red...500-5921-23

Start Button Assy...515-7791-00

Front Molding Weldment Glossy Red...515-8646-23

Glossy Red Left Side Armor..535-0530-20

Glossy Red Right Side Armor..535-0530-21

Pivot Pin Right Arm..530-7799-00

Pivot Pin Left Arm..530-7800-00

Pivot Hinge Left Glossy Red...535-7999-20-C7

Pivot Hinge Right Glossy Red...535-7999-21-C7

Mirrored Back Glass...830-52C7-03

Left Yellow Back Plate...535-0584-60

Right Yellow Back PLate...535-0584-61

Bottom Arch Plastic Red..545-5995-118

Parts Identification

P2

Parts Identification   The Pink Pages

AC/DC Back In Black Parts available through your Distributor:

Leg Assy Glossy Black..500-5921-23

Start Button Assy..515-7791-00

Front Molding Weldment Glossy Black......................................515-8646-25

Glossy Black Left Side Armor..535-0530-00

Glossy Black Right Side Armor..535-0530-01

Pivot Hinge Left Glossy Black..535-7999-00-C7

Pivot Hinge Right Glossy Black..535-7999-01-C7

Mirrored Back Glass Back & Black...830-52C7-02

Left Backing Plate...535-0528-00

Right Backing Plate..535-0528-01

Bottom Arch Plastic Red...545-5995-118

Parts Identification

Backbox [S.A.M. System] - Parts ☐

The Backglass is *Not Shown in this* Front View for clarity.
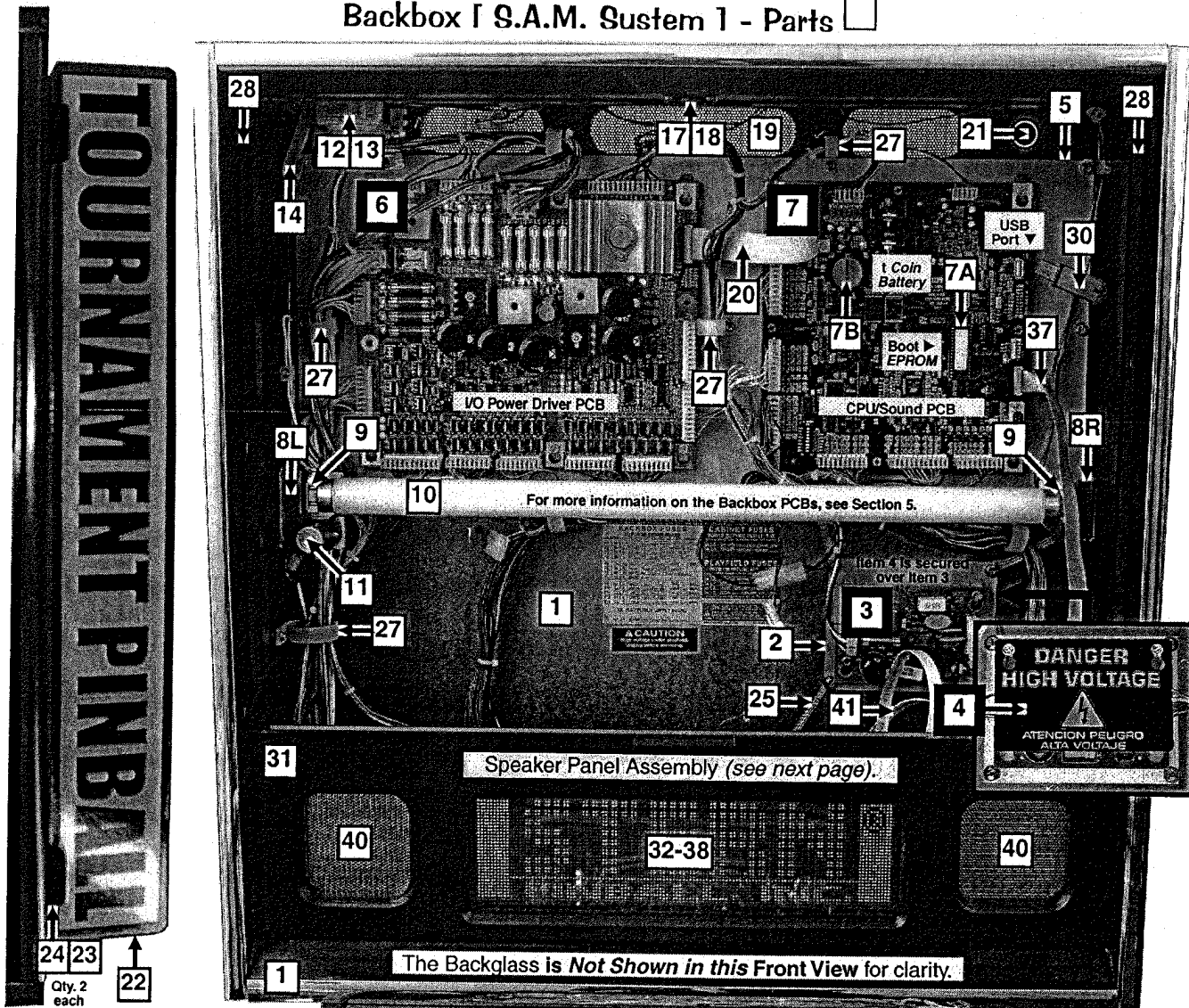
Parts Identification

Nr.	BACKBOX PARTS	QTY.	SPI PART Nr.
1	Backbox ACDC ™ (No Parts)	1	525-5631-17-C7
	Item 1 Note: *Chrome T-Molding is installed and cannot be ordered separately.* Fuse Description (820-6384-00) and High Voltage Caution (uL) (820-6082-01 & -02) Decals.		
2	PCB Metal Mounting Plate [Display]	1	535-9769-00
3	Display Power Supply PCB	1	520-5138-00
	Item 3 is secured to @ bottom by: #8-32 X 3/8" SHWH Swg. (Zinc) (Qty. 2) (237-5975-00)		
4	Plastic Cover [DANGER HIGH VOLTAGE]	1	830-6053-00
	Items 3 & 4 are secured to @ top by: 1-1/4" X 3/8" Plastic Spacer Gray (Qty. 2) (254-5000-05) and #8-32 X 1-3/4" SHWH Ser. (Zinc) (Qty. 2) (237-5975-28)		
5	PCB Metal Mounting Plate [I/O+CPU]	1	535-9664-00
	Items 2 & 5 are secured to Item 1 by: #8 X 1/2" SHWH AB (Zinc) (Qty. 1/hole) (234-5101-00) and #10 Washer 7/32" I.D. X .5" O.D. X 1/16" Thick (Qty. 1/hole) (242-5003-00) *Note: Where a Wire Clamp (Item 27) is mounted, a #10 Washer is not required.*		
6	I/O Power Driver LED	1	520-5317-00
7	CPU/Sound PCB LE GAMES NEW USB	1	520-5337-00
	7A: 8MB EPROM #M27C801-100F1 (960-5016-00) *Ordering Note: Programmed EPROM (965-BOOT-SAM)* 7B: Coin Cell Battery (CR2430 3V) (000-0644-01) *For USB Memory Stick Information, see Item 30 on the next page.*		
	Items 6 & 7 are secured to Item 5 by: #8-32 X 3/8" SHWH Swage (Zinc) (Qty. 10) (237-5975-00) and 1/4" Slf. Rtn. Spacer White (Qty. 5 [I/O] / Qty. 4 [CPU]) (254-5007-05)		
8L	Fluorescent Light Bracket *(Left Style)*	1	535-7739-00
8R	Fluorescent Light Brckt. *(Right Style)*	1	535-7739-01
	Items 8L & 8R are secured to Item 1 by: #10-24 X 1-1/4" Carriage Bolt Square 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" length only) (626-5040-00)		
9	Fluorescent Lamp Holder (Socket)	2	077-5214-01
	Item 9 is secured to Items 8L *and* 8R by: #6-32 X 5/8" PPH MS (Sems) Zinc (Qty. 1/per) (232-5203-00) Lock-In Fluor. Bulb with Yellow Socket Clip (Qty. 1/per) (545-6271-00)		
10	Fluorescent Tube 24" (F18T8CW)	1	165-5061-00

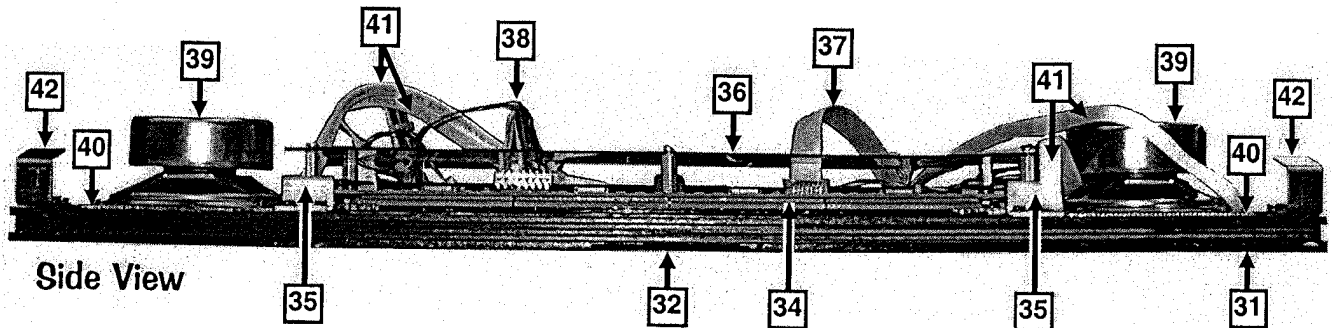| Nr.	BACKBOX PARTS	QTY.	SPI PART Nr.
11	Starter - Fluorescent (FS2 Light)	1	165-5011-01
	Starter Base *(with leads)* [on Item 8L]	1	077-5213-00
	Item 11 is secured to Item 8L by: #4-40 X 1/2" PPH MS (Sems) Zc. (Qty. 2) (237-5813-00)		
12	Ballast Mounting Plate	1	535-8657-00
13	Ballast CU452-W 1/2" Core 120v 60 Hz 13W	1	010-5015-00
	Items 12 & 13 are secured to Item 1 by: #8 X 1/2" SHWH AB (Zinc) (Qty. 2) (234-5101-00) >>> CAUTION - VERY HOT" Decal (820-6266-00) *EU / UK Only : Ballast, 5/8" Core 50/60 Hz (010-5015-01)*		
14	Ground Strap	1	600-5006-05
15*	Roto Lock Male *(on Cabinet)*	1	355-5006-01
16	Roto Lock Female *(R2-0002-02)*	1	355-5006-02
	Item 16 is secured by: #10-24 X 1-3/4" CBSN (231-5022-00), #10-24 Keps Nut (Qty. 2) (240-5207-00), #10-24 X 2" CBSN (231-5045-00) and #10 Washer 7/32" I.D. X .5" O.D. X 1/16" (Qty. 5) (242-5003-00). See opposite next page.		
17	Lock Mounting Plate	1	535-0072-00
18	Lock 5/8" Barrel, 3/4"ø, 1.5" Flat Cam	1	355-5055-00
	Items 17 & 18 are secured by: #8 X 1/2" TP Torx T20 Black (Qty. 2) (237-6173-05)		
19	Back Vent Grill 2-1/2" X 18"	3	545-5072-02
20	Ribbon Cable, 20-Pin (3.5")		036-5000-350
	Item 20 connects the I/O Pwr Drvr. PCB to the CPU/Sound PCB. For 14-Pin see next page.		
21	Button Hole Plug (Blk) (Happ #52-6214-00)	1	500-6566-00
	Item 21 plugs the Access Hole required if using optional BETAbrite Sign or Data cables.		
22	Header Sign TOURNAMENT PINBALL	1	545-6133-00
23	Bracket, Tournament Sign (Black)	2	535-0081-02
	Item 22 is mounted to item 23 with #8-32 x 3/8 PPA screw (Qty 2/per) (232-5303-01) & #8-32 Nylock Nut (Qty 2/per) (240-5102-00). Item 23 is secured to Item 1 by: #8 X 5/8" PPH (Qty 2/per) (232-5101-01)		

P4

Backbox [S.A.M. System] - Parts ☐

Front View
(Broken View)

Speaker Panel [S.A.M. System] - Parts ☐

Side View

Nr.	BACKBOX PARTS	QTY.	SPI PART Nr.
	† PARTS TABLE & VIEWS CONTINUED FROM THE PREVIOUS PAGE.		
25	Braided Wire (1-1/2 Feet)	1	600-5001-00
	Item 25 is secured by: Staple 5/16" (Qty. 23) (631-5000-00)		
26*	Zip Cable Tie (Screw Down Style)	4	040-5005-00
	Item 26 is secured @ inside bot. by: #8 X 1/2" SHWH AB (Zinc) (Qty. 1/per) (234-5101-00)		
27	Clamps [Multiple Sizes]	31	040-5000-XX
	Item 27 secured by: #8 X 1/2" SHWH AB (Zinc) (Qty. 1/per) (234-5101-00) For the following sizes, replace -XX with: .1/4" Double = -23 (Qty. 5); 1/2" Single = -06 (Qty. 3); 3/4" Single = -08 (Qty. 4); 1" Single = -09 (Qty. 1); 1-1/4" Double = -30 (Qty. 1)		
28	Foam 3/16" Thick X 1/4" Wide X 12"	6	626-5026-00
	Above Item 28 is self-adhesive. 17.5" strip on each side. Sold in 12" Lengths only.		
29L	Pivot Hinge Red (Left Style)	1	535-7999-22
29R	Pivot Hinge Red (Right Style)	1	535-7999-23
	Items 29L-29R are secured to Backbox by: 1/4"-20 X 1-1/4" C.B. Sq. Neck (Qty. 4) (231-5003-00) and 1/4"-20 Flange Nut (Qty. 4) (240-5300-00) Items 29L-29R are secured to Cabinet by: Spacer Hex Nut 1/2" O.D. - 1/4-20 X 1/2" TD (Black) (Qty. 1/per) (254-5042-00), Nylon Spacer (Black) (Qty. 1/per) (242-5084-00), 1/4-20 X 1/2" Carriage Bolt Square Neck (Black) (Qty. 1/per) (231-5072-00) and Washer 1" O.D. X 1/2" I.D. X 1/16" (Black) (Qty. 1/per side, only if required) (242-5087-00)		
30*	Memory Stick USB 1.1+ [Generic] 64MB		970-0064-00
	Memory Stick USB 1.1+ [Generic] 128MB		970-0128-00
	Item 30 was not included with your game. Read the inside cover or go on-line for more info. To order with the latest game code copied onto it, add -A3 to the Part Nr. (970-0128-00-A3). File(s) can be downloaded from our website (Files are 25MB or larger, DSL or Fast Modem recommended). Not all manufacturers of Memory Sticks are compatible with our system. Test it out, if it doesn't work properly, return your purchase and order the memory stick through you local pinball distributor (Stern Pinball Memory Sticks guaranteed compatible).		
	(ASM. REF. 505-6002-A3-A3, Items 1-42 Only, [29-30 not included in assembly])		

Take Note:

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

Nr.	SPEAKER PANEL PARTS	QTY.	SPI PART Nr.
31	Speaker Panel (Black Wood)	1	525-5515-00
32	Plastic Shield (Display Front Cover)	1	545-5884-00
	Item 33 is secured to inside Item 31 by: #6 X 3/8" SHWH AB (Zinc) (Qty. 8) (234-5000-00)		
33*	Foam 3/16" Thick X 1/4" Wide X 12"	6	626-5026-00
	Above Item 33 is self-adhesive. Located between Items 32-34. Sold in 12" Lengths only.		
34	128 X 32 Dot Matrix Display PCB	1	520-5052-15
	// EURO ONLY RoHS // 128 X 32 DM PCB		520-5052-15
	// EURO ONLY RoHS // Dot Matrix Bezel		545-6281-00
	Item 34 is secured to Item 35 by (at corners): 3/16" X 3/8" Spacer Gray (Qty. 4) (254-5000-18) and #6-32 X 1/2" SHWH Swage (Serr) Zinc (Qty. 4) (237-5976-00)		
35	Dot Matrix Display Mounting Bracket	2	535-8368-01
	Item 35 is secured to Item 31 by: #8 X 1/2" SHWH AB (Zinc) (Qty. 4/per) (234-5101-00)		
36	Plastic Shield (Display Back Cover)	1	830-6040-00
	Item 36 is secured to Item 34 by: 1/2" X 1/4" Hex Spacer #6-32 Tap (Qty. 4) (254-5008-03), 3/4" X 1/4" Hex Spacer #6-32 Tap (Qty. 2) (254-5008-04), #6-32 X 1/4" PPH MS (Sems) Zinc (Qty. 2) (232-5200-00) and #6-32 X 3/8" PPH (Qty. 6) (232-5201-00)		
37	Ribbon Cable, 14-Pin (33")	1	036-5260-33
	// EURO ONLY RoHS // LED Ribbon Cable Filter PCB		520-5259-00
	Item 37 (14-Pin) connects the 128 X 32 Dot Matrix Display PCB to the CPU/Sound PCB.		
38	Display Cable (Wiring Harness)	1	036-5454-01
	// EURO ONLY RoHS // LED Display Adapter Harness		036-5520-00
39	Speaker (Shld.) 4 x 4" 8Ω OHM MG ELE 4060SH	2	031-5004-02
40	Speaker Grill (Chrome w/Artwork)	2	535-8081-04
	Items 39-40 are secured by: #8 X 1/2" SHWH AB (Black) (Qty. 4/per) (234-5101-01)		
41	Ground Strap (25") [2 per : Items 35 & 39]	4	600-5006-25
42	Speaker Panel Hook Bracket	2	535-7009-02
	Item 42 is secured by: #8 X 1/2" SHWH AB (Zinc) (Qty. 2/per) (234-5101-00)		

Parts Identification

Nr.	BACKGLASS PARTS	QTY.	SPI PART Nr.
i*	Glass (Tempered) 25.906" X 19.187" X .125"	1	660-5038-02
ii*	ACDC™ Film Art (#C7) (PRE)	1	830-52C7-00
iii*	Top Plastic Channel - 26"	1	545-5018-15

Nr.	BACKGLASS PARTS	QTY.	SPI PART Nr.
iv*	Bottom Plastic Lift Channel - 26"	1	545-6313-01
v*	Plastic Edging (Left/Right) - 18-1/8"	2	545-5018-14
	Items i-v are secured to Item i by: 3M Tape (Double-Sided), 12" (Qty. 1) (626-5080-00) Note: Only 6" required, sold in 12" lengths only.		

(ASM. REF. 515-5450-00-A9, Items i-v)

P5

Cabinet - Parts ▦ & Switches ☐

For Backbox Parts see the previous two pages.

Item 11: Shown Broken View for Clarity

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

Item 30E (Power On/Off Switch) is located under the Cabinet (Front Right) directly below the Power Box (in the Cabinet).

Qty. 4

Item 2 Ordering Note: Leg comes with Leveler. Leveler can be purchased separately. Leg *cannot* be ordered WITHOUT Leveler (see Parts Table below, Item 2).

View of the Coin Door (Item 17) open.

Take Note:

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

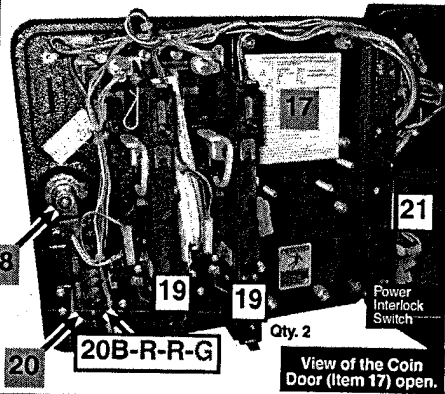**Legend Note:** Items noted with a cyan square ▦ are Cabinet Parts. Items noted with a white square ☐ are Switches.
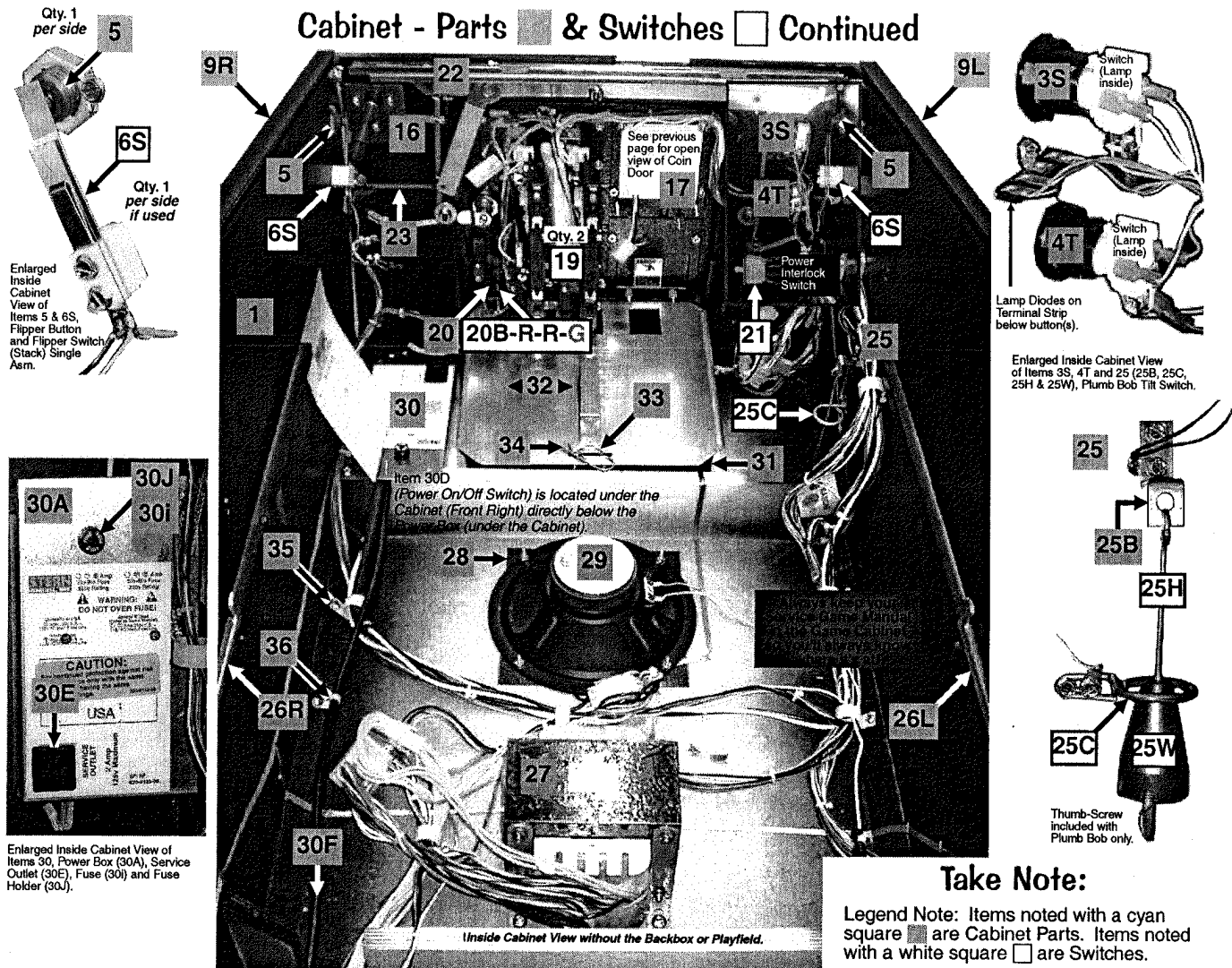
Nr.	CAB. PARTS & SWITCHES	QTY.	SPI PART Nr.
1	Screened Cabinet ACDC™ (No Parts)		525-5395-15P-C7
2	Red Glossy Leg with Leveler Asm	4	500-5921-23

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) Leg Leveler ONLY (3/8"-16 X 3") (500-5017-00).

Nr.	CAB. PARTS & SWITCHES	QTY.	SPI PART Nr.
3S	Start Button (Green Round) with Sw. + Led	1	500-6388-44-LED
4T	Tournament Button (Yel. Sq.), w/Sw. + Led		500-6587-06-LED

Item 3S & 4T includes the Switch & Lamp (No Wiring; desolder old wiring where required). Switch or Bulb replacement: ↻ TWIST ↻ LOCK (-TL) >> *not snap-in* << Assembly *Parts Included* : Microswitch (180-5174-00); Led Hi Int White 106W-WB (112-5024-08); If *4T* is not desired, use optional Button Plug Black (500-6566-00). Requires 3-Lug Terminal Strip (055-5204-03) and Diodes, 1N4004 (Qty. 2) (112-5003-00) inside cabinet under button(s) for Lamp Operation (Diode for Switch, located on Switch.)

5	Flipper Button (Yellow) Assy (No Sw.)	2	500-5026-36

Item 5 is secured by: Pal Nut for Flipper Button (Metal) (Qty. 2/per) (240-5003-01) *Pal Nut inside cabinet secured by:* #8 X 1/2" SHWH AB (Zinc) (Qty. 1/per) (234-5101-00) and Washer (Zinc) .187" ID X .875" OD X .048" Thick (Qty. 1/per) (242-5059-00)

6S	Flipper Switch Single Assembly		500-6889-01

Assembly *Parts Included* : Flipper Switch Stack Single (Paliney Contact) (180-5160-01) and Capacitor - Ceramic .05 Mfd 25 volt (130-5001-00) Item 6S/6D are secured to Cab. by: #6 X 1-1/4 SHWH AB (Zinc) (Qty. 2/per) (237-5959-00)

6D	Flipper Switch Double Assembly	2	500-6890-01

Assembly *Parts Included* : Flipper Switch Stack Double (Paliney Contact) (180-5164-01) and Capacitor - Ceramic .05 Mfd 25 volt (130-5001-00) Item 6S/6D are secured to Cab. by: #6 X 1-1/4 SHWH AB (Zinc) (Qty. 2/per) (237-5959-00)

Nr.	CAB. PARTS & SWITCHES	QTY.	SPI PART Nr.
7	Rear Glass Channel 20-3/8" Length	1	545-5038-00
8	Plastic Channel 42-5/8" Lg. (Left/Rt.)	2	545-5017-00
9L	Side Armor (Left) Glossy Red	1	535-0585-20
9R	Side Armor (Right) Glossy Red	1	535-0585-21

Items 9L & 9R are secured @ front & side by: Pem Stud 1/4 X 1" Flange Head Black (Qty. 1/per) (237-6116-01); 1/4-20 Flange Nut (Qty. 1/per) (240-5300-00) and #8 X 1/2" T20 Tamper Proof Black (Qty. 5/per) (237-6173-05); @ rear (backbox) by: #10-24 X 1" Sq. Neck Carrg. Bolt Black (Qty. 1/per) (231-5021-00) and #10-24 Hex Nut (Qty. 1/per) (240-5202-00)

10	Front Molding (Glossy Red) < BUTTON HOLE >	1	515-8646-23

Item 10 includes: Self-Adhesive Foam Rubber 3/8" X 3/16" X 20-3/8" (3') (626-5001-00) Items 10 works with Item 22 (next page) ONLY.

11	Playfield Glass (Tempered) 21" X 43" X 3/16"	1	660-5001-00
12	Hex Key Allen Wrench 5/16"	1	777-0001-00
13	Corrugated Tubing Black 1"ø X 2.6" Lg.	1	605-5008-03

Above Item 13 covers the Cable Wiring Harnesses going into the Backbox from the Cabinet.

14	Roto Lock Male (R2-0055-02)	1	355-5006-01

Item 14 is secured by: #10-24 X 1-3/4" Carriage Bolt Square Neck (Qty. 2) (231-5022-00), #10-24 Nylon Stop Nut (Qty. 2) (240-5206-00) and #10 Washer. 7/32" ID X 1/2" OD X 1/16" Thick (Qty. 2) (242-5003-00)

P6

Cabinet - Parts ▦ & Switches ☐ Continued

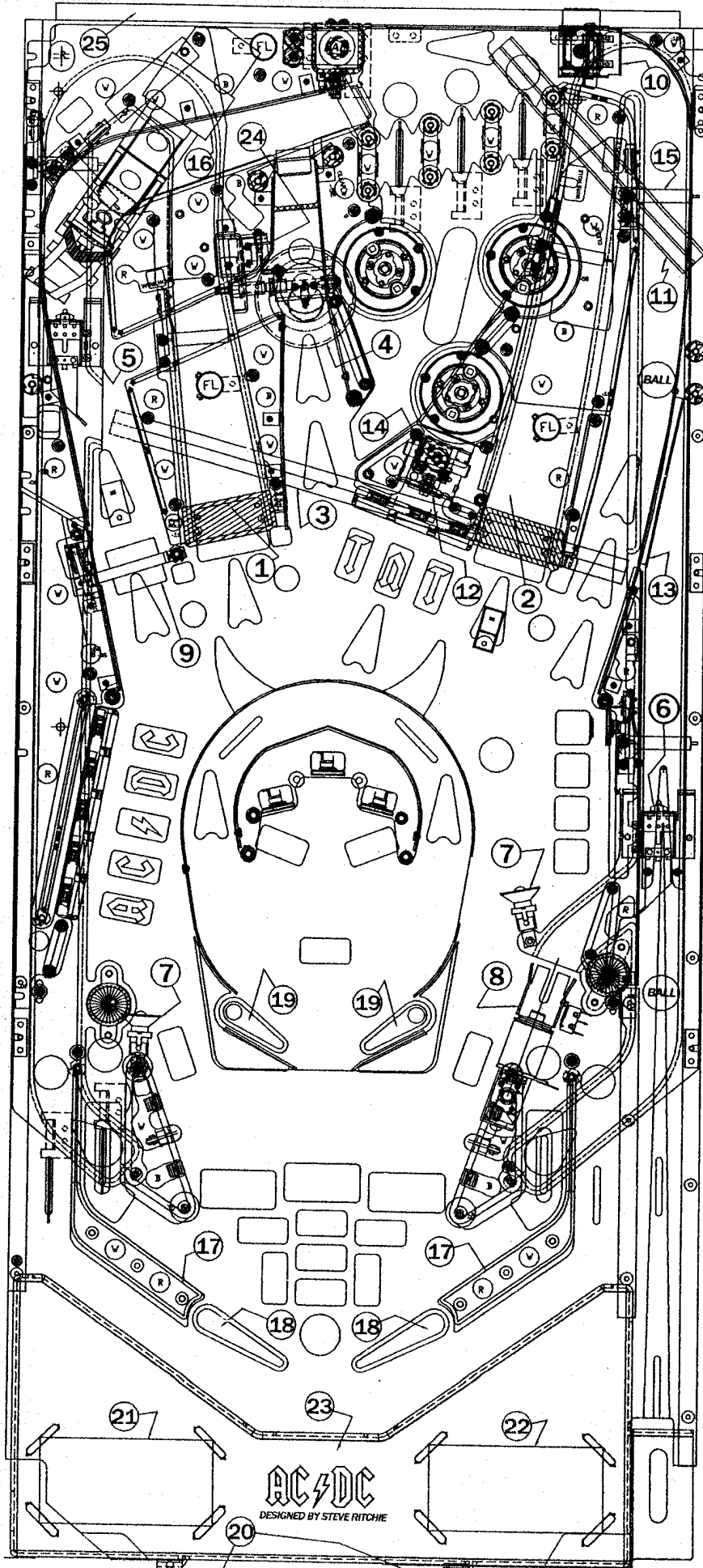Qty. 1
per side **5**

6S

Qty. 1
per side
if used

Enlarged
Inside
Cabinet
View of
Items 5 & 6S,
Flipper Button
and Flipper Switch
(Stack) Single
Asm.

9R **22** **16** **5** **6S** **23** Qty. 2 **19** **1** **20** **20B-R-R-G** **30** ◀**32**▶ **33** **34** Item 30D *(Power On/Off Switch) is located under the Cabinet (Front Right) directly below the Power Box (under the Cabinet).* **28**➤ **29** **27** **30F**

See previous
page for open
view of Coin
Door
17

9L **3S** **5** **4T** **6S** Power Interlock Switch **21** **25** **25C** **31** **26L**

3S Switch (Lamp inside)

4T Switch (Lamp inside)

Lamp Diodes on
Terminal Strip
below button(s).

Enlarged Inside Cabinet View
of Items 3S, 4T and 25 (25B, 25C,
25H & 25W), Plumb Bob Tilt Switch.

25 **25B** **25H** **25C** **25W**

Thumb-Screw
included with
Plumb Bob only.

30J **30A** **30I** **30E** **30** USA **35** **36** **26R**

Enlarged Inside Cabinet View of
Items 30, Power Box (30A), Service
Outlet (30E), Fuse (30i) and Fuse
Holder (30J).

Inside Cabinet View without the Backbox or Playfield.

Take Note:

Legend Note: Items noted with a cyan
square ▦ are Cabinet Parts. Items noted
with a white square ☐ are Switches.

Nr.	CAB. PARTS & SWITCHES	QTY.	SPI PART Nr.
† *PARTS TABLE & VIEWS CONTINUED FROM THE PREVIOUS PAGE.*			
17	Coin Door 2-Cht $V Up-Stk. 4-Button Bracket	1	501-5018-172
	Item 17 is secured by: 1/4"-20 X 1-1/4" Carriage Bolt Square 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 Nr.*		
18	Lock 5/8" Barrel, 3/4, Flt. Cam	1	355-5055-00
19	Coin Door Switch (USA) (Happ)	2	180-5024-01
	ALT. SW.: 19C: Coin Door Switch (USA) (Coin Control) (180-5024-00) ALT. SW.: 19J: Coin Door Switch (¥ Japan) (180-5091-00)		
20	4-Button Bracket *(for Service Menu Buttons)*	1	535-6860-04
	SWITCH: 20B: Push-Button Service Switch (Black) (180-5192-00) SWITCH: 20R: Push-Button Service Switch (Red) (Qty. 2) (180-5192-02) SWITCH: 20G: Push-Button Service Switch (Green) (180-5192-04)		
	Ordering Note: Securing hardware for switches included. Decal in kit sold separately.		
21	Power Interlock-Memory Protect Switch Asm.	1	500-5808-05
	Assembly Parts Included : Mounting Bracket (535-9794-00), Power Interlock (Playfield) Switch (180-5136-00) and secured by: #8 X 1/2" SHWH AB (Zinc) (Qty. 2) (234-5101-00)		
22	Front Molding Lockdown Asm.	1	500-7237-00
	Item 22 is secured by: #10-24 X 1-1/4" Carr. Bolt (Qty. 2) (231-5012-00) and #10-24 Keps Nut (Qty. 2) (240-5207-00)		
23	Lockdown Spring *(connected to handle)*	1	265-5008-00
	Item 23 is secured by: #8 X 1/2" SHWH AB (Zinc) (Qty. 1) (234-5101-00) and #10 Washer, 7/32" ID X 1/2" OD X 1/16" Thick (Qty. 1) (242-5003-00)		
24	Grills 2-1/2" X 18" *(on Back & Bottom)*	3	545-5072-02
25	Plumb Bob Tilt Switch *Indivual Parts Only*		*Ind. Parts Only*
	SWITCH: 25B: Bracket for Hanger Wire (535-5221-00) 25C: Contact Wire Form (535-7563-01) 25H: Hanger Wire (535-5319-02) 25W: Plumb Bob Weight (535-5029-00) *(includes Thumb-Screw)*		
	Item 25B is secured to Cabinet by: #6 X 5/8" SHWH AB (Zinc) (Qty. 4) (234-5002-00)		
26L	Slide & Pivot Support Bracket (Left)	1	535-5989-00
26R	Slide & Pivot Support Bracket (Right)	1	535-5990-00
	Items 26L & 26R are secured by: #10-24 X 1-1/4" Carriage Bolt Square Neck Black (3/per) (231-5012-00) and #10-24 KEPS Nut (3/per) (240-5207-00)		

| Nr.	CAB. PARTS & SWITCHES	QTY.	SPI PART Nr.
27	Transformer 5.7VAC *(with Ballast Winding)*	1	010-5012-01
	Item 27 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)		
28	Woofer (Speaker) Grill 12" X 12"		535-0547-00
29	Woofer 12" ø Round 8Ω	1	031-5009-00
	Items 28 & 29 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)		
30	Power Input Box Asm. + Univ. Cable	1	515-5360-08
	30A: Power Box *(No Parts)* Mounting Frame (535-5932-00) 30B*: Line Filter (150-5000-00) 30C*: Varistor* TNR159211KM (Domestic) (150-5001-00) *or* Varistor TRM15G431KM (Euro) (150-5002-00) SWITCH: 30D: On/Off Rocker Switch + Bracket Assembly (515-7085-00) 30D incl.: Switch, APEM R2101C5NBB (180-5001-03) + Bracket (535-8318-00) 30E: Service Outlet (3-Prong / US) (180-5008-01) / International N/A 30F: Line Cord 10' ROJ 3* + Ring Terminal Asm. (515-6566-00) 30G: Recessed (Black) Cup *(rear of Cabinet)* (545-5122-00) 30H*: Snap Bushing 9/16" (White) (280-5001-01) 30i: Fuse 8 Amp 250V Slo-Blo (Domestic) (200-5000-05) *or* Fuse 5 Amp 250V Slo-Blo (International) (Qty. 2) (200-5003-00) 30J: Fuse Holder (205-5001-00)		
	Universal Cable & Jumper Caps (all voltage variations): See the Yellow Pages, Page y 10.		
31	Cash Box Plastic Bottom	1	545-5090-00
32	Cash Box Cover (Validator)	1	535-5013-03
33	Cash Box Lock Bracket (U-Wire)	1	535-7562-00
	Item 33 is secured by: #8 X 5/8" HWH AB (Green) (Qty. 2) (234-5102-04)		
34	Large Hair-Pin Clip	1	535-7772-00
35	Clamps [Multiple Sizes]	31	040-5000-XX
	Item 35 is secured to Item 1 by: #8 X 1/2" SHWH AB (Zinc) (Qty. 1/per) **For following sizes, replace -XX with:** *3/4" Single = -08 (Qty. 9), 1-1/2" Single = -10 (Qty. 3)*		
36	Zip Cable Tie (Screw Down Style)	4	040-5005-00
	Item 36 is secured by: #8 X 1/2" SHWH AB (Zinc) (Qty. 1/per) (234-5101-00)		
37†	Meter +12VDC *with Bracket Optional*	opt.	G-0053-013-102
	† *Meters (Diode included) are optional and were not included in this Pinball Machine. Order without the bracket use G-0053-013-102A. More information or Qs? Call Technical Support.*		

Parts Identification

P7

Main Playfield Top Parts

AC/DC
DESIGNED BY STEVE RITCHIE

P8

Main Playfield Top Parts

PART NAME	QTY	PART NUMBER
1.) LEFT RAMP ASSEMBLY	1	511-7208-00
2.) RIGHT RAMP ASSEMBLY	1	511-7209-00
3.) CROSSOVER TRACK	1	535-0509-00
4.) HELLS BELL ASSEMBLY	1	500-7218-00
5.) LEFT DIVERTER ASSEMBLY	1	515-6596-00-GE
6.) RIGHT DIVERTER ASSEMBLY	1	515-6596-01-GE
7.) SPOTLIGHT REFLECTOR	2	511-6949-02
8.) ROTATING CANNON ASSEMBLY	1	500-7214-00
9.) SPINNING TARGET	1	500-7242-C7
10.) ELECTRIC BALL GATE	1	511-5096-01
11.) ANIMATED BAND ASEEMBLY	1	500-7240-00
12.) DETONATOR SLAM TARGET	1	511-7003-02
13.) SHOOTER RAMP	1	535-9051-00
14.) ANIMATED DETONATOR	1	500-7225-00
15.) ROLLUNDER SWITCH	6	515-6556-03A
16.) MOLDED TRAIN TOY	1	511-6987-00
17.) RETURN GUIDE CLEAR	2	550-5037-01
18.) FLIPPER BAT YELLOW	2	515-5133-06-06
19.) SMALL FLIPPER BAT YELLOW	2	515-6275-06
20.) PLAYFIELD HANGER BRACKET	2	535-8385-00
21.) INSTRUCTION CARD	1	755-51C7-12-Y
22.) COIN CARD	1	755-5400-02-Y
23.) PLASTIC ARCH RED	1	545-7307-02
24.) BELL OPTO SWITCH	1	520-5292-00
25.) BACK PANEL ASSEMBLY	1	500-7207-00

P9

Main Playfield Bottom Parts
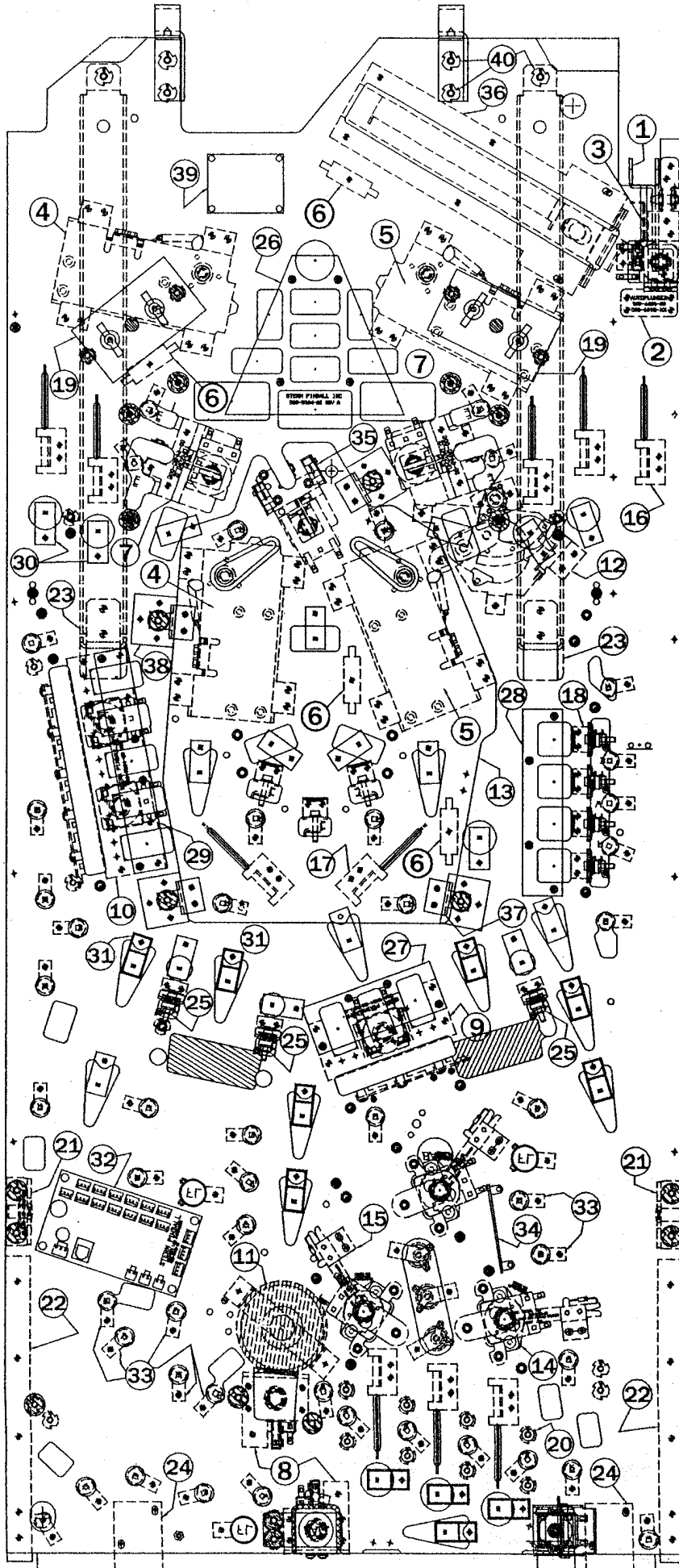
P10

Main Playfield Bottom Parts

|		
1.) AUTOPLUNGER ARM WELD ASSEMBLY	1	500-6091-00
2.) AUTOPLUNGER COIL ASSEMBLY	1	500-6092-02-ND
3.) SHOOTER LANE SWITCH ASSEMBLY	1	500-6096-00
4.) FLIPPER ASSEMBLY (LEFT)	2	500-6543-12-ND
5.) FLIPPER ASSEMBLY (RIGHT)	2	500-6543-XX-ND
6.) FUSE CLIP HOLDER SOCKET	4	205-5000-01
USE 200-5000-08 3AMP SLO BLOW FUSE	4	
7.) SLINGSHOT ASSEMBLY	2	500-5849-01-ND
8.) VUK/POSI-LOCK ASSEMBLY	2	500-7078-01
9.) 3-BANK DROP TARGET ASSEMBLY	1	500-7216-03
10.) 5-BANK DROP TARGET ASSEMBLY	1	500-7216-05
11.) BELL MAGNET ASSEMBLY	1	516-0059-00
12.) CANNON MOTOR ASEEMBLY	1	500-7213-00
13.) LOWER PLAYFIELD	1	500-5022-00
14.) POP BUMPER BOTTOM ASSEMBLY	3	515-6459-04-ND
15.) POP BUMPER SWITCH ASSEMBLY	3	515-6459-09
16.) ROLLOVER SWITCH ASSEMBLY (LEFT)	4	500-6227-03
17.) ROLLOVER SWITCH ASSEMBLY (RIGHT)	6	500-6227-04
18.) STAND UP TARGET ASSEMBLY 1" SQUARE	4	500-6984-06
19.) FLIPPER BASE INSULATOR	2	545-5721-00
20.) 6-32 T-NUT	30	240-5002-00
21.) PIVOT SLIDE BRACKET ASSEMBLY	2	500-5329-03
22.) EDGE SLIDE BRACKET	2	535-5988-01
23.) PLAYFIELD SUPPORT SLIDE BRACKET	2	535-6862-05
24.) BACK PANEL MOUNTING BRACKET	2	535-8964-00
25.) STAND UP TARGET ASSEMBLY 1/2"	3	500-6985-05
26.) LED LAMP PCB LOWER CENTER AREA	1	520-5324-01
27.) LED LAMP PCB 3-BANK	1	520-5324-03
28.) LED LAMP PCB "ROCK" TRAGETS	1	520-5324-04
29.) LED LAMP PCB 5-BANK	1	520-5324-05
30.) LED LAMP PCB SINGLE	14	520-5307-00
31.) LED LAMP PCB MULTICOLOR	16	520-5333-00
32.) LED GI DRIVER PCB	1	520-5331-00
33.) SOCKET WEDGE BASE GI	52	077-5030-00
34.) TERMINAL STRIP 5 POSITION	1	055-5204-05
35.) LOWER PLAYFIELD KICKER ARM ASSEMBLY	1	500-7217-00
36.) 4 BALL TROUGH ASSEMBLY	1	500-6318-14-ND
37.) LOWER PLAYFIELD HANGER BRACKET	4	535-0527-00
38.) LOWER PLAYFIELD MOUNTING BLOCK	4	511-6976-00
39.) OPTO SWITCH PCB	1	520-5239-01
40.) 8-32 T-NUT	24	240-5101-00

P11

Playfield - Metal Posts & Fin Shank Screws (Actual Size) †

1 #6-32 Thread

2 #6-32 Thread / #6-32 Thread

3 #8-32 Thread / #6-32 Thread

4 Front View / Side View / #8-32 Thread
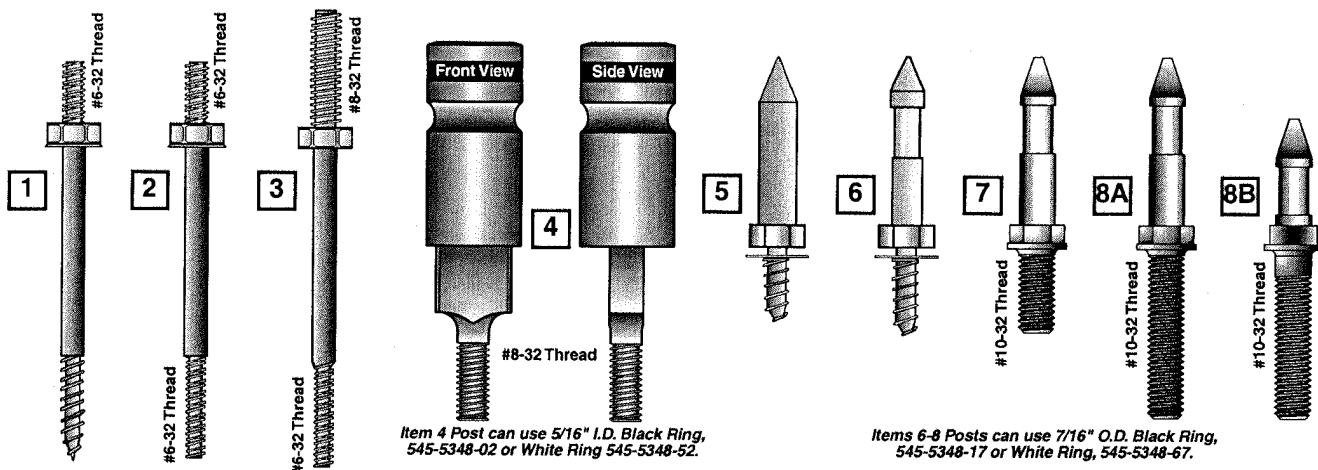
Item 4 Post can use 5/16" I.D. Black Ring, 545-5348-02 or White Ring 545-5348-52.

5 / **6** / **7** #10-32 Thread / **8A** #10-32 Thread / **8B** #10-32 Thread

Items 6-8 Posts can use 7/16" O.D. Black Ring, 545-5348-17 or White Ring, 545-5348-67.
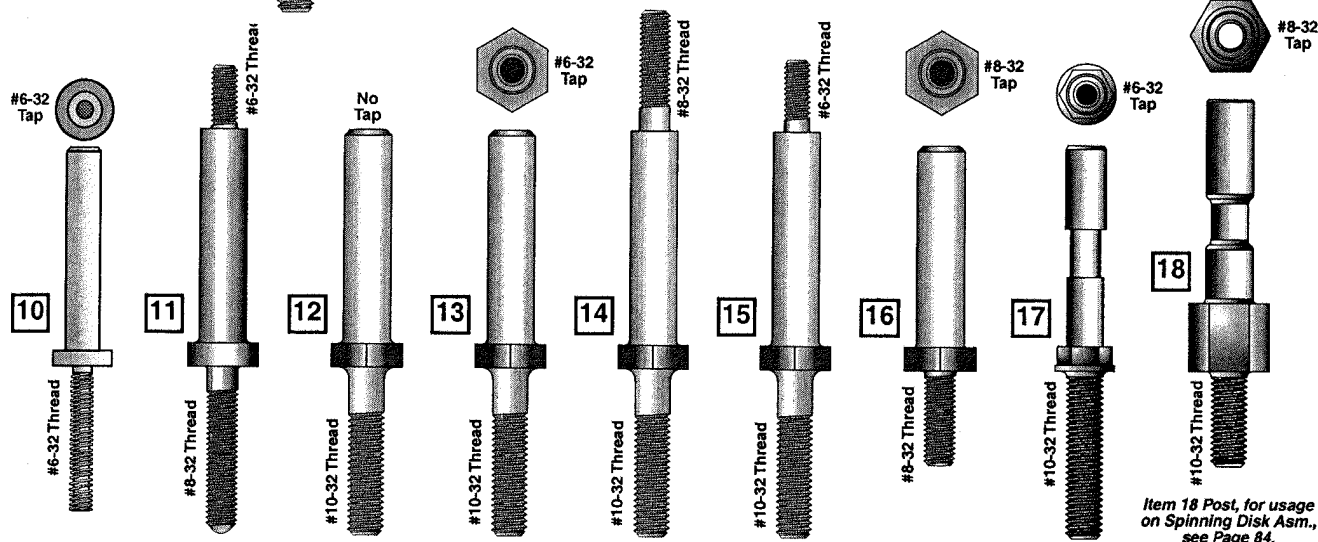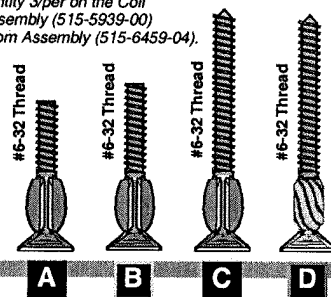
9 #6-32 Thread
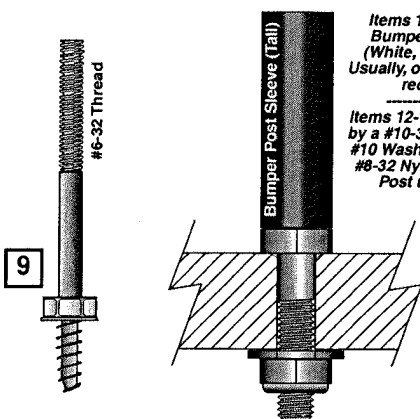
Items 11-16 & 18 Posts can use a Black Bumper Post Sleeve (Tall), 545-5308-00 (White, 545-5308-08 or Red, 545-5308-22) Usually, only Posts which are in the ball path require a Bumper Post Sleeve.

Items 12-15 & 18 Posts are typically secured by a #10-32 Nylon Stop Nut, 240-5203-00 and #10 Washer, 242-5010-00 (Item 11 Post use a #8-32 Nylon Stop Nut, 240-5102-00; Item 16 Post use a #8-32 T-Nut, 240-5101-00).

Bumper Post Sleeve (Tall)

A & B Items A & B Note: Typically used to secure Hex Spacers onto the Playfield Wood or Back Panel.

C Item C Note: Quantity 4 on bottom Cabinet Speaker Grill (Qty. 4) (also requires #6-32 Nylon Stop Nut, 240-5005-00).

D Item D Note: Quantity 3/per on the Coil Bracket Welded Assembly (515-5939-00) in the Bumper Bottom Assembly (515-6459-04).

A - D Items A-D Note: The "Fins" keep the screw from turning inside the wood hole.

A #6-32 Thread / **B** #6-32 Thread / **C** #6-32 Thread / **D** #6-32 Thread

10 #6-32 Tap / #6-32 Thread

11 #6-32 Thread / #8-32 Thread

12 No Tap / #10-32 Thread

13 #6-32 Tap / #10-32 Thread

14 #8-32 Thread / #10-32 Thread

15 #6-32 Thread / #10-32 Thread

16 #8-32 Tap / #8-32 Thread

17 #6-32 Tap / #10-32 Thread

18 #8-32 Tap / #10-32 Thread

Item 18 Post, for usage on Spinning Disk Asm., see Page 84.

Nr.	METAL POSTS	SPI PART Nr.
1	Post [Fasten] #6-32 Thread // Wood Screw	530-5010-02
2	Post [Fasten] #6-32 Thread // #6-32 Thread	530-5012-02
3	Post [Fasten] #8-32 Thread // #6-32 Thread	530-5008-00
4	Post Brass [Adjustable, Sliding] #8-32 Thread	530-5621-00
5	Mini-Post Wood Screw (no cut-away)	530-5004-01
6	Mini-Post Wood Screw	530-5004-00
7	Mini-Post Machine Scr. // #10-32 .4" Thread	530-5005-01
8A	Mini-Post MS // #10-32 .875" Thread	530-5005-00
8B	Mini-Post Short MS // #10-32 .875" Thread	530-5749-00
9	Post [Fasten] #6-32 Thread // Wood Screw	530-5263-01
10	Post #6-32 Tap // #6-32 Thread	530-5127-00
11	Post [Fasten] #6-32 Thread // #8-32 Thread	530-5007-00

Nr.	METAL POSTS	SPI PART Nr.
12	Post [Hex Base] NO TAP // 10-32 Thread	530-5332-00
13	Post [Hex Bs.] #6-32 TAP // #10-32 Thread	530-5332-01
14	Post [Hex Bs.] #8-32 Thread // #10-32 Thr.	530-5332-02
15	Post [Hex Bs.] #6-32 Thread // #10-32 Thr.	530-5332-03
16	Post [Hex Bs.] #8-32 TAP // #8-32 Thread	530-5332-04
17	Post [Hex Bs.+Groove] #6-32 TAP // #10-32 Thr.	530-5679-00
18	Post [Hex Bs.+Groove] #8-32 TAP // #10-32 Thr.	530-5753-00

Nr.	FIN SHANK SCREWS	SPI PART Nr.
A	#6-32 X 3/4" Fin Shank Screw	237-5921-02
B	#6-32 X 7/8" Fin Shank Screw	237-5921-04
C	#6-32 X 1¼" Fin Shank Screw	237-5883-00
D	#6-32 X 13/16" Spiral Fin Shank Screw	237-5957-00

NOT ALL PARTS LISTED ABOVE ARE USED ON THIS GAME (QUANTITIES PER GAME WILL DIFFER). COMPARE ACTUAL PART ON GAME TO ABOVE DRAWINGS TO IDENTIFY THE PART NUMBER REQUIRED.
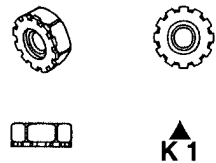
Parts Identification

P14

Playfield - Nylon Stop, KEPS, Hex, T-, Flange, Pal* & Wing Nuts* (Actual Size) †

Nr.	NYLON STOP NUTS*	SPI PART Nr.
N1	#6-32 Nylon Stop Nut	240-5005-00
N2	#6-32 N.S. Nut (with 1/4" Hex Body)	240-5010-00
N3	#8-32 Nylon Stop Nut	240-5102-00
N4	#10-32 Nylon Stop Nut	240-5203-00
N5	#10-24 Nylon Stop Nut	240-5206-00

Item N5 used with #10-24 X 1-3/4" Carriage Bolt Square Neck Black (231-5022-00) located in the Cabinet for the Roto Lock (Male) (355-5006-01).

| Nr.		
N6	#4-40 Nylon Stop Nut	240-5303-00
N7	#4-40 (18/8 Stainless) Nylon Stop Nut	240-5303-01
N8	5/16"-18 Nylon Stop Nut	240-5316-00
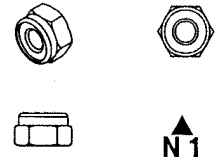
Nr.	KEPS NUTS*	SPI PART Nr.
K1	#6-32 Keps Nut (with Star Washer)	240-5008-00
K2	#6-32 Keps Nut (with 1/4" Hex Body)	240-5011-00
K3	#8-32 Keps Nut	240-5104-00
K4	#10-32 Keps Nut	240-5208-00
K5	#10-24 Keps Nut	240-5207-00
K6	#4-40 Keps Nut	240-5318-00

Nr.	HEX NUTS*	SPI PART Nr.
H1	#6-32 Hex Nut (No Star Washer)	240-5004-00
H2	#8-32 Hex Nut	240-5103-00
H3	#10-32 Hex Nut	240-5201-00
H4	#10-24 Hex Nut	240-5202-00

Item H4 used with #10-24 X 1" Carriage Bolt Square Neck Black (231-5021-00) located in the Cabinet for the Side Armor Rear (towards Backbox).

Nr.		
H5	#10-32 X 3/8" Hex Nut	240-5209-00
H6	3/4-16 Hex Nut	240-5315-00
H7	#2-56 Hex Nut	240-5301-00
H8	7/8"-14 Hex Nut	240-5317-00
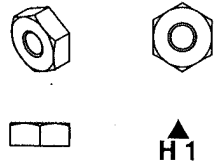
Nr.	T-NUTS*	SPI PART Nr.
T1	#6-32 T-Nut	240-5002-00
T2	#6-32 T-Nut (with Side Cut Off)	240-5002-01
T3	#8-32 T-Nut	240-5101-00
T4	#10-32 (Black Oxide) T-Nut	240-5007-00
T5	#10-32 T-Nut (with Side Cut Off)	240-5205-00
T6	#10-32 X 5/16" 3-Prong T-Nut	240-5204-00
T7	#10-24 T-Nut	240-5200-00
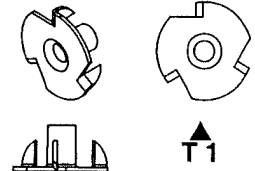
Nr.	FLANGE NUT*	SPI PART Nr.
F1	1/4" X 20 Flange Nut	240-5300-00

Item F1 used with 1/4-20 X 1-1/4 Sq. Neck Carriage Bolt Black (231-5003-00) located in the Cabinet for the Side Armor (Front) and Pivot Hinges.
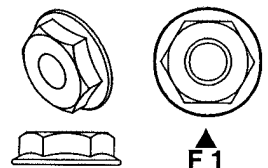
Nr.	PAL NUTS*	SPI PART Nr.
P1	Plastic Pal Nut (on Flipper Buttons)	240-5003-00
P2	Metal Pal Nut (on Flipper Buttons)	240-5003-01

* Not Shown

Nr.	WING NUTS*	SPI PART Nr.
W1	#6-32 Wing Nut	240-5001-00
W2	#8-32 Wing Nut	240-5100-00
W3	#10-24 Wing Nut	240-5211-00
W4	1/4"-20 Wing Nut	240-5302-00
W5	1/4"-20 Toggle Wing	240-5324-00

* Not Shown

NOT ALL PARTS LISTED ABOVE ARE USED ON THIS GAME (QUANTITIES PER GAME WILL DIFFER). COMPARE ACTUAL PART ON GAME TO ABOVE DRAWINGS TO IDENTIFY THE PART NUMBER REQUIRED.

P15

Playfield Top - Hex Spacers ☐ (Actual Size) †

Hex Spacers:
#6-32 Tap

¼" [1]	⅜" [2]	½" [3A]	⅝" [4A]	¾" [5]	⅞" [6A]	1" [7]		

[8A] 1⅛"
[8B] 1⅛"

example of "Bs"
with Male #6-32 Thread
1-end, #6-32 Tap on other.

[9] 1¼"
[10] 1⁵⁄₁₆"
[11] 1⅜"
[12] 1½"
[13] 1⅝"
[14] 1¾"
[15] 1⅞"
[16] 2"
[17] 2⅛"
[18] 2¼"
[19] 2⅜"
[20] 2½"
[21] 2⅝"
[22] 2¾"
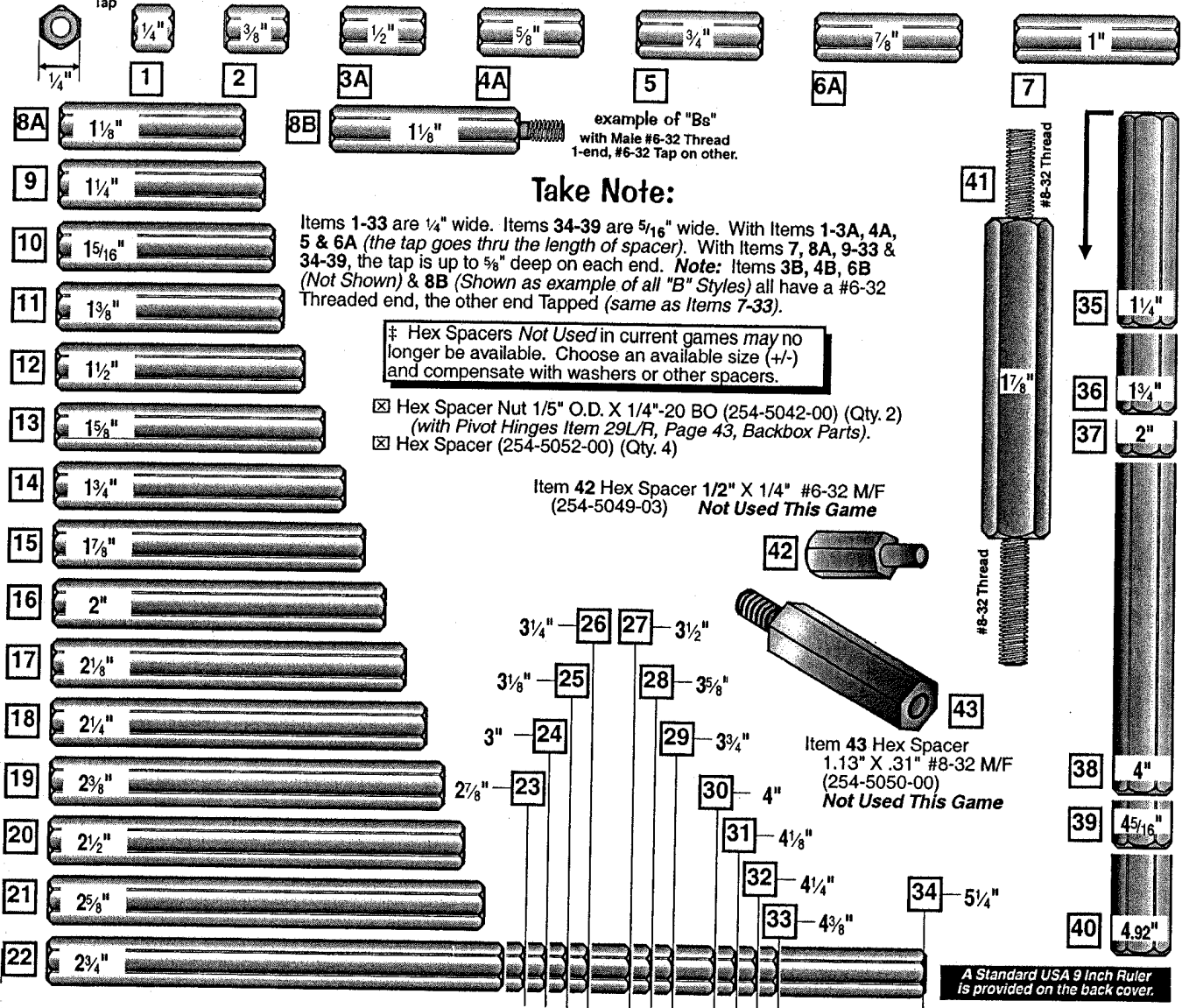
Take Note:

Items **1-33** are ¼" wide. Items **34-39** are ⁵⁄₁₆" wide. With Items **1-3A, 4A, 5 & 6A** *(the tap goes thru the length of spacer)*. With Items **7, 8A, 9-33 & 34-39**, the tap is up to ⅝" deep on each end. *Note:* Items **3B, 4B, 6B** *(Not Shown)* & **8B** *(Shown as example of all "B" Styles)* all have a #6-32 Threaded end, the other end Tapped *(same as Items 7-33).*

‡ Hex Spacers *Not Used* in current games *may* no longer be available. Choose an available size (+/-) and compensate with washers or other spacers.

☒ Hex Spacer Nut 1/5" O.D. X 1/4"-20 BO (254-5042-00) (Qty. 2) *(with Pivot Hinges Item 29L/R, Page 43, Backbox Parts).*
☒ Hex Spacer (254-5052-00) (Qty. 4)

Item 42 Hex Spacer 1/2" X 1/4" #6-32 M/F (254-5049-03) *Not Used This Game*
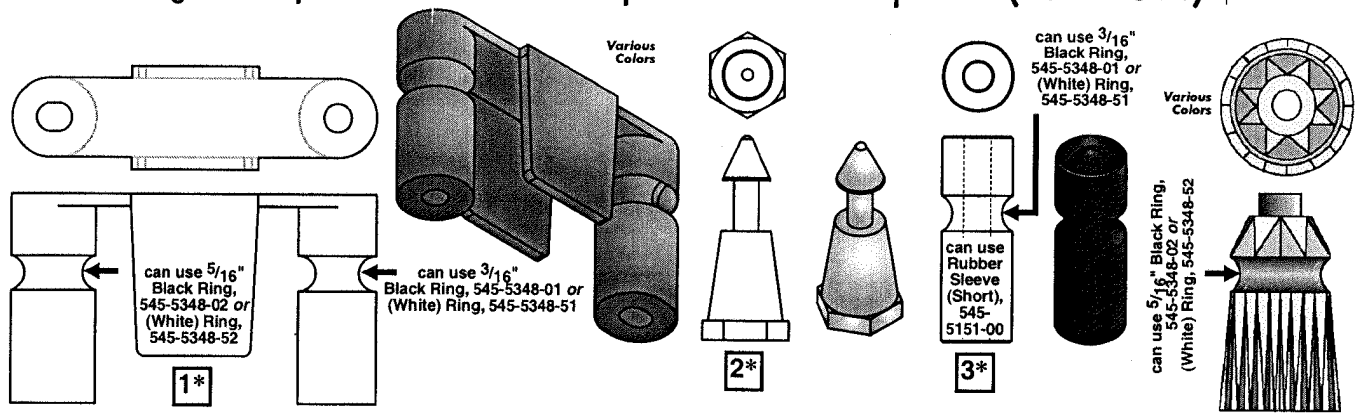
[42]

3¼"—[26] [27]—3½"
3⅛"—[25] [28]—3⅝"
3"—[24] [29]—3¾"
2⅞"—[23] [30]—4"
[31]—4⅛"
[32]—4¼"
[33]—4⅜"
[34]—5¼"

Item 43 Hex Spacer 1.13" X .31" #8-32 M/F (254-5050-00) *Not Used This Game*

[43]

[41] 1⅞" #8-32 Thread

[35] 1¼"
[36] 1¾"
[37] 2"
[38] 4"
[39] 4⁵⁄₁₆"
[40] 4.92"

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

† The item type (size / description), the quantity and/or location used, are subject to change without notice. Service Bulletins will announce any changes, if warranted.

Nr.	HEX SPACERS	QTY.	SPI PART Nr.	Nr.	HEX SPACERS	QTY.	SPI PART Nr.
1	¼" X ¼" : #6-32 Tap *(both ends)*		254-5008-00	19	2⅜" X ¼" : #6-32 Tap *(both ends)*		254-5008-28
2	⅜" X ¼" : #6-32 Tap *(both ends)*		254-5008-12	20	2½" X ¼" : #6-32 Tap *(both ends)*	1	254-5008-16
3A	½" X ¼" : #6-32 Tap *(both ends)*	4	254-5008-03	21	2⅝" X ¼" : #6-32 Tap *(both ends)*		254-5008-08
3B*	Identical to 3A with #6-32 Thread end		254-5024-03	22	2¾" X ¼" : #6-32 Tap *(both ends)*	2	254-5008-15
4A	⅝" X ¼" : #6-32 Tap *(both ends)*		254-5008-02	23	2⅞" X ¼" : #6-32 Tap *(both ends)*		254-5008-31
4B*	Identical to 4A with #6-32 Thread end	2	254-5024-02	24	3" X ¼" : #6-32 Tap *(both ends)*		254-5008-14
5	¾" X ¼" : #6-32 Tap *(both ends)*	2	254-5008-04	25	3⅛" X ¼" : #6-32 Tap *(both ends)*		254-5008-19
6A	⅞" X ¼" : #6-32 Tap *(both ends)*		254-5008-05	26	3¼" X ¼" : #6-32 Tap *(both ends)*		254-5008-26
6B*	Identical to 6A with #6-32 Thread end		254-5024-05	27	3½" X ¼" : #6-32 Tap *(both ends)*		254-5008-27
7	1" X ¼" : #6-32 Tap *(both ends)*		254-5008-06	28	3⅝" X ¼" : #6-32 Tap *(both ends)*		254-5008-25
8A	1⅛" X ¼" : #6-32 Tap *(both ends)*		254-5008-17	29	3¾" X ¼" : #6-32 Tap *(both ends)*		254-5008-36
8B	Identical to 8A with #6-32 Thread end		254-5024-17	30	4" X ¼" : #6-32 Tap *(both ends)*	3	254-5008-21
9	1¼" X ¼" : #6-32 Tap *(both ends)*	4	254-5008-11	31	4⅛" X ¼" : #6-32 Tap *(both ends)*	1	254-5008-23
10	1⁵⁄₁₆" X ¼" : #6-32 Tap *(both ends)*	2	254-5008-34	32	4¼" X ¼" : #6-32 Tap *(both ends)*		254-5008-30
11‡	1⅜" X ¼" : #6-32 Tap *(both ends)*	3	254-5008-33	33	4⅜" X ¼" : #6-32 Tap *(both ends)*		254-5008-29
12	1½" X ¼" : #6-32 Tap *(both ends)*	3	254-5008-09	34	5¼" X ¼" : #6-32 Tap *(both ends)*		254-5008-35
13‡	1⅝" X ¼" : #6-32 Tap *(both ends)*		254-5008-13	35	1¼" X ⁵⁄₁₆" : #6-32 Tap *(both ends)*		254-5018-09
14	1¾" X ¼" : #6-32 Tap *(both ends)*	1	254-5008-10	36	1¾" X ⁵⁄₁₆" : #6-32 Tap *(both ends)*		254-5018-06
15‡	1⅞" X ¼" : #6-32 Tap *(both ends)*	2	254-5008-20	37	2" X ⁵⁄₁₆" : #6-32 Tap *(both ends)*		254-5018-07
16	2" X ¼" : #6-32 Tap *(both ends)*	1	254-5008-07	38	4" X ⁵⁄₁₆" : #6-32 Tap *(both ends)*		254-5018-03
17	2⅛" X ¼" : #6-32 Tap *(both ends)*		254-5008-32	39	4⁵⁄₁₆" X ⁵⁄₁₆" : #6-32 Tap *(both ends)*		254-5018-00
18	2¼" X ¼" : #6-32 Tap *(both ends)*		254-5008-18	40	4.92" X ⁵⁄₁₆" : #6-32 Tap *(both ends)*		254-5018-04
				41	1⅞" X ⅜" : #8-32 *Thread (both ends)*		530-5285-00

P 16

Playfield Top - Plastic Posts & Spacers & Metal Spacers (Actual Size) †

Various Colors

can use 3/16" Black Ring, 545-5348-01 or (White) Ring, 545-5348-51

Various Colors

can use 5/16" Black Ring, 545-5348-02 or (White) Ring, 545-5348-52

can use 5/16" Black Ring, 545-5348-02 or (White) Ring, 545-5348-52

can use 3/16" Black Ring, 545-5348-01 or (White) Ring, 545-5348-51

can use Rubber Sleeve (Short), 545-5151-00

1* **2*** **3*** **4***

PLASTIC PART COLOR CHART

Nr.	Color	Nr.	Color	Nr.	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. Org.	-16	Gold
-05	Blue	-11	Fluor. Green		

* Items 1 & 5 come in various colors. *The "-XX" (the last 2-Digits in the Part Number), should be replaced with the desired 2-Digit number from the above Color Chart (may not be available in every color; other colors used in prior games may no longer be available.) Call for availability.*
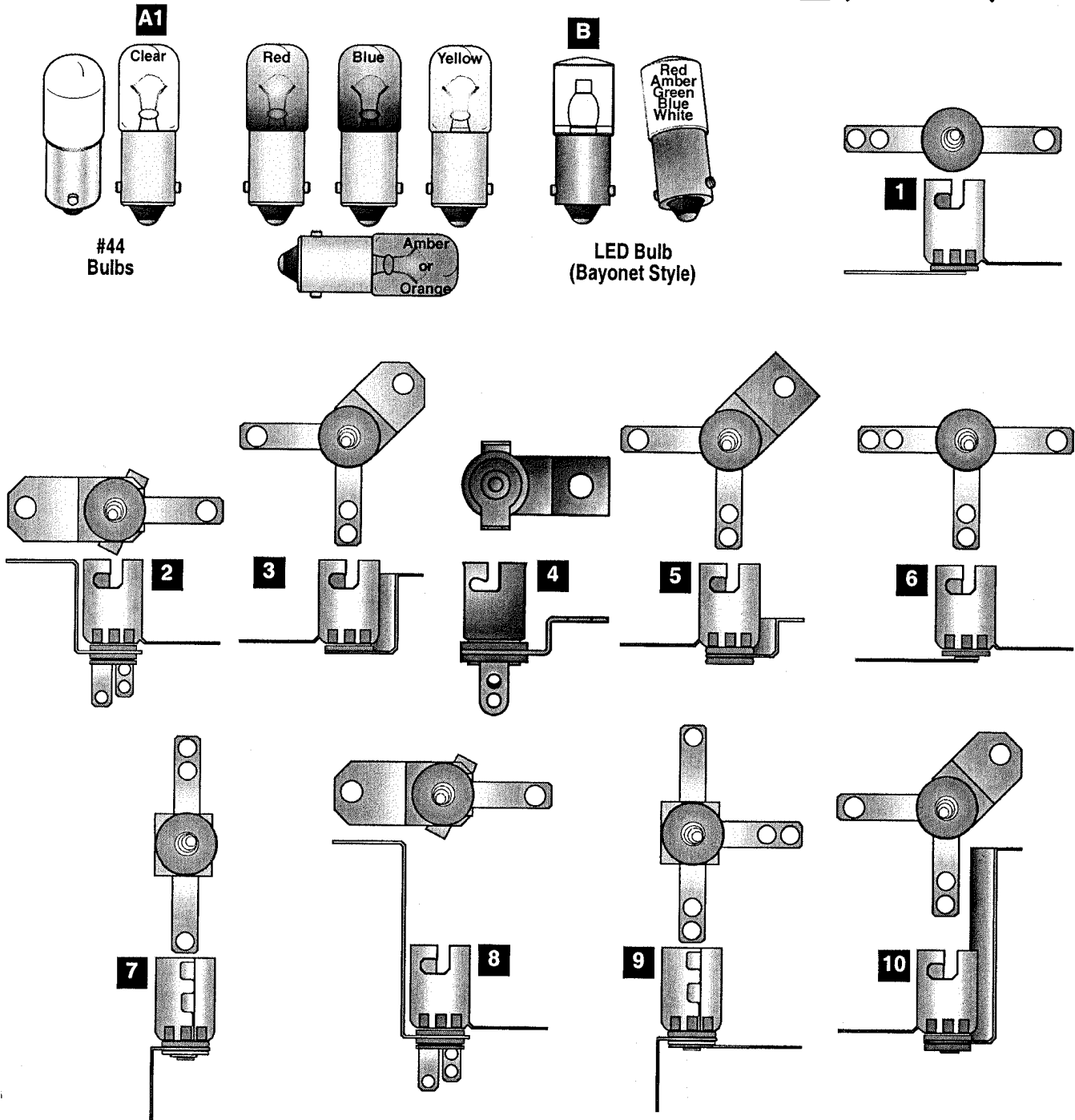
O.D. & I.D.

5 – 11: Height Shown X 9/32" O.D. X .153" I.D.

5‡ 1/4"
6‡ 5/16"
7‡ 3/8"
8‡ 1/2"
9‡ 5/8"
10‡ 3/4"
11‡ 1"

‡ *Items 5 through 11 dimensions are measured from bottom to just under the cut-away. Item 33 dimension is measured from top-to-top of curve. See pictorials with Items 11 & 33.*

‡ **5 – 11** dimension is measured from this point.

O.D. & I.D. 1/2"

12: 1/2 X 1/4" O.D. X .147" I.D. **12**

13 1/8"
14 3/16"
15 **16** 1/4"
17 3/8"
18 1/2"
19 5/8"
20 3/4"
21 7/8"
22 1"
23 1 1/8" Use 254-5000-06N for Natural ((White))
24 1 1/4"
25 **26** 1 15/16"

O.D. & I.D.

13 – 14 & 16 – 25: Height Shown X 3/8" O.D. X .175" I.D.
15: 1/4 X 3/8" O.D. X .200" I.D.
26: 1 15/16" X 3/8" O.D. X .147" I.D.

27 1/4"
28 1/2"
29 9/16"
30 3/4"
31 1 1/8"

O.D. & I.D.

27 – 31: Height Shown X 1/4" O.D. X .147" I.D.

1" Note the Part Nr. & Material Difference **32**

33‡ 7/8"

◄ 33 dimension is measured from this point.

1 1/2"

Nr.	PLASTIC POSTS & SPACERS	SPI PART Nr.
1**	Top Lane Plastic Mini-Lite Hood (XX-Color)	550-5061-XX
2**	Mini-Jewel Plastic Post (XX-Color)	550-5052-XX
3**	1 1/16" 1-Groove Plastic Post (XX-Color)	550-5059-XX

Item 3 Only : Use Part Number (550-5059-00) for color Black

Nr.	PLASTIC POSTS & SPACERS	SPI PART Nr.
4**	1-Groove Jewel Plastic Post (XX-Color)	550-5034-XX

Items 3 & 4 typically sec'd by: Post Fastening Scr. / #6-32 Top / #6-32 Bot. (530-5012-02). Use Color Chart above for last 2-digits. Not all colors are available.

Items 1–4 Note: Use Color Chart above for last 2-digits. Not all colors are available.

Nr.	PLASTIC POSTS & SPACERS	SPI PART Nr.
5‡	1/4" Self Retain. Plastic Spacer (White)	254-5007-02
6‡	9/16" Self Retain. Plastic Spacer (White)	254-5007-05
7‡	3/8" Self Retain. Plastic Spacer (White)	254-5007-01
8‡	1/2" Self Retain. Plastic Spacer (White)	254-5007-04
9‡	5/8" Self Retain. Plastic Spacer (White)	254-5007-00
10‡	3/4" Self Retain. Plastic Spacer (White)	254-5007-03
11‡	1" Self Retain. Plastic Spacer (White)	254-5007-06
12	1/2" X 1/4" O.D. X .147" I.D. Pls. Spacer (White)	254-5000-03
13	1/8" X 3/8" O.D. X .175" I.D. Pls. Spacer (Gray)	254-5000-19
14	3/16" X 3/8" O.D. X .175" I.D. Pls. Spcr. (Gray)	254-5000-18
15	1/4" X 3/8" O.D. X .200" I.D. Pls. Spcr. (Gray)	254-5000-02
16	1/4" X 3/8" O.D. X .175" I.D. Pls. Spacer (Gray)	254-5000-09
17	3/8" X 3/8" O.D. X .175" I.D. Pls. Spacer (Gray)	254-5000-12
18	1/2" X 3/8" O.D. X .175" I.D. Pls. Spacer (Gray)	254-5000-01
19	5/8" X 3/8" O.D. X .175" I.D. Pls. Spacer (Gray)	254-5000-14
20	3/4" X 3/8" O.D. X .175" I.D. Pls. Spacer (Gray)	254-5000-07

Nr.	PLASTIC POSTS & SPACERS	SPI PART Nr.
21	7/8" X 3/8" O.D. X .175" I.D. Pls. Spacer (Gray)	254-5000-11
22	1" X 3/8" O.D. X .175" I.D. Pls. Spacer (Gray)	254-5000-04
23	1 1/8" X 3/8" O.D. X .175" I.D. Pls. Spcr. (Gray)	254-5000-06

Item 23 Only : Add the letter " N " for color Natural (if available) or " B " for color Black.

Nr.	PLASTIC POSTS & SPACERS	SPI PART Nr.
24	1 1/4" X 3/8" O.D. X .175" I.D. Pls. Spcr. (Gray)	254-5000-05
25	1 1/2" X 3/8" O.D. X .175" I.D. Pls. Spcr. (Gray)	254-5000-08
26	1 15/16" X 3/8" O.D. X .147" I.D. Plastic Spacer (Gray)	254-5000-15

Items 13-26 Only : Spacers may also be Black in color (random from vendor).

Not Shown and listed for reference only : 254-5000-10: 2 1/2" X 3/8" O.D. X .175" I.D. -13: 5/16" X 1/4" X .147"; -16: 5/16" X 5/16" X .190"; -17: 1 3/4" X 3/8" O.D. X .175" I.D.

Nr.	PLASTIC POSTS & SPACERS	SPI PART Nr.
27	1/4" X 5/16" O.D. X .144" I.D. Metal Spacer	254-5014-03
28	1/2" X 5/16" O.D. X .144" I.D. Metal Spacer	254-5014-00
29	9/16" X 5/16" O.D. X .144" I.D. Metal Spacer	254-5014-04
30	3/4" X 5/16" O.D. X .144" I.D. Metal Spacer	254-5014-01
31	1 1/8" X 5/16" O.D. X .144" I.D. Metal Spacer	254-5014-02
32	1" X 5/16" O.D. X .144" I.D. Metal Spacer	254-5001-00
33‡	7/8" Plastic Spacer Support (Dual-Locking)	254-5039-14
34	Plastic Spacer, .5" Plastic Mounting	254-5054-00
35	Plastic Spacer, 1.13" Plastic Mounting	254-5054-01

34 **35**

NOT ALL PARTS LISTED ABOVE ARE USED ON THIS GAME (QUANTITIES PER GAME WILL DIFFER). COMPARE ACTUAL PART ON GAME TO ABOVE DRAWINGS TO IDENTIFY THE P/N REQUIRED.

Parts Identification

P-17
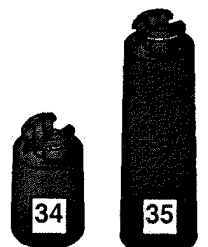
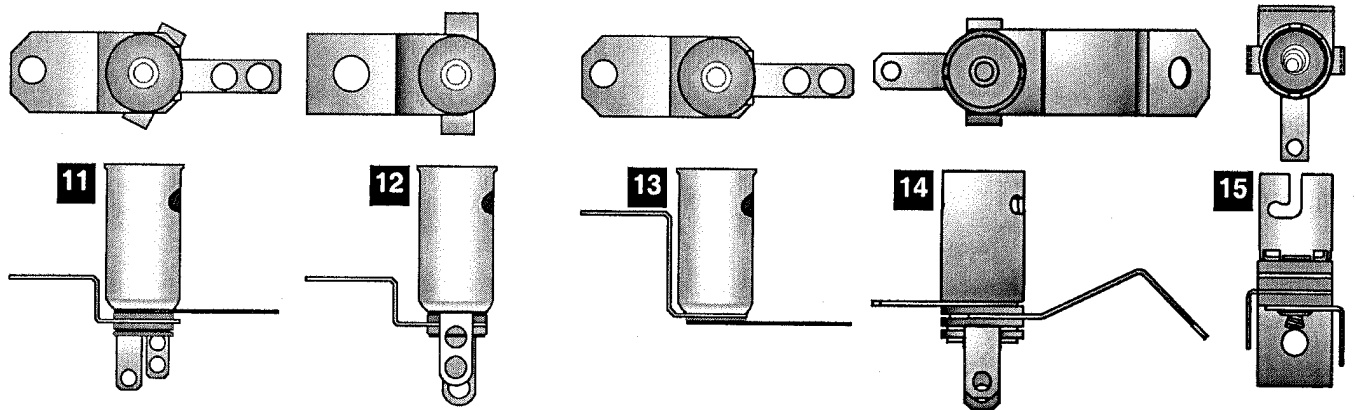## Playfield Top & Bottom - Small Bayonet Sockets & Bulbs ■ (Actual Size) †

#44
Bulbs

Amber
or
Orange

LED Bulb
(Bayonet Style)

Nr.	BULBS (#44)	SPI PART Nr.
A	#44 Bulb (Clear) *Heavy Filament*	165-5000-44-HF
	#44 Bulb *(replace -XX w/color below)*	165-5053-XX-HF

Item A Note: Amber (165-5053-03-HF); Green (165-5053-04-HF); Yellow (165-5053-06-HF); Red (165-5053-02-HF); Blue (165-5053-05-HF); Orange (165-5053-07-HF)

Nr.	BULBS (LED & #455)	SPI PART Nr.
B	LED Module (WHT) (12.8v 20-25mA) Bynt.	112-5023-08

Item B Note: Different Colors may be available ~
Red (112-5023-02); Amber (112-5023-03); Green (112-5023-04); Blue (112-5023-05);

Nr.	SMALL BAYONET SOCKETS	SPI PART Nr.
1	2-Lug Staple Down Socket	077-5000-00
2	3-Lug Stand-Up Socket (Med. Brkt.)	077-5008-00
3	2-Lug Stand-Up Socket (Med. Brkt.)	077-5002-00
4	2-Lug Stand-Up Socket (Short Brkt.)	077-5223-00
5	2-Lug Stand-Up Sckt. (Short Bracket)	077-5002-31
6	3-Lug Staple Down Socket	077-5001-00
7	2-Lug Laydown Socket	077-5003-00
8	3-Lug Stand-Up Socket (Tall Bracket)	077-5009-00

Nr.	SMALL BAYONET SOCKETS	SPI PART Nr.
9	3-Lug Laydown Socket (3 Lugs Flat)	077-5006-00

10	2-Lug Stand-Up Socket (Tall Bracket)	077-5005-00
11	3-Lug Stand-Up Long Shell Socket	077-5013-00
12	2-Lug Stand-Up Lg. Shell Socket (Gls)	077-5031-00
13	1-Lug S-U Lg. Shell Sckt. (Med. Brkt.)	077-5012-00
14	3-Lug S-U Lg. Shell Sckt. (45° Brkt.)	077-5035-00
15	3-Lug Laydown Socket (2 Lugs Bent)	077-5032-00

**NOT ALL PARTS LISTED ABOVE ARE USED ON THIS GAME (QUANTITIES PER GAME WILL DIFFER).
COMPARE ACTUAL PART ON GAME TO ABOVE DRAWINGS TO IDENTIFY THE PART NUMBER REQUIRED.**

P18

Playfield Top & Bot. - Small Bayonet Sockets & Bulbs ■ (Actual Size) † Continued

11 **12** **13** **14** **15**

Playfield Bottom - Large Bayonet Sockets & Bulbs ■ (Actual Size) †

D

Clear

#89
Bulb

1 **2**

3 **4** **5** **6**
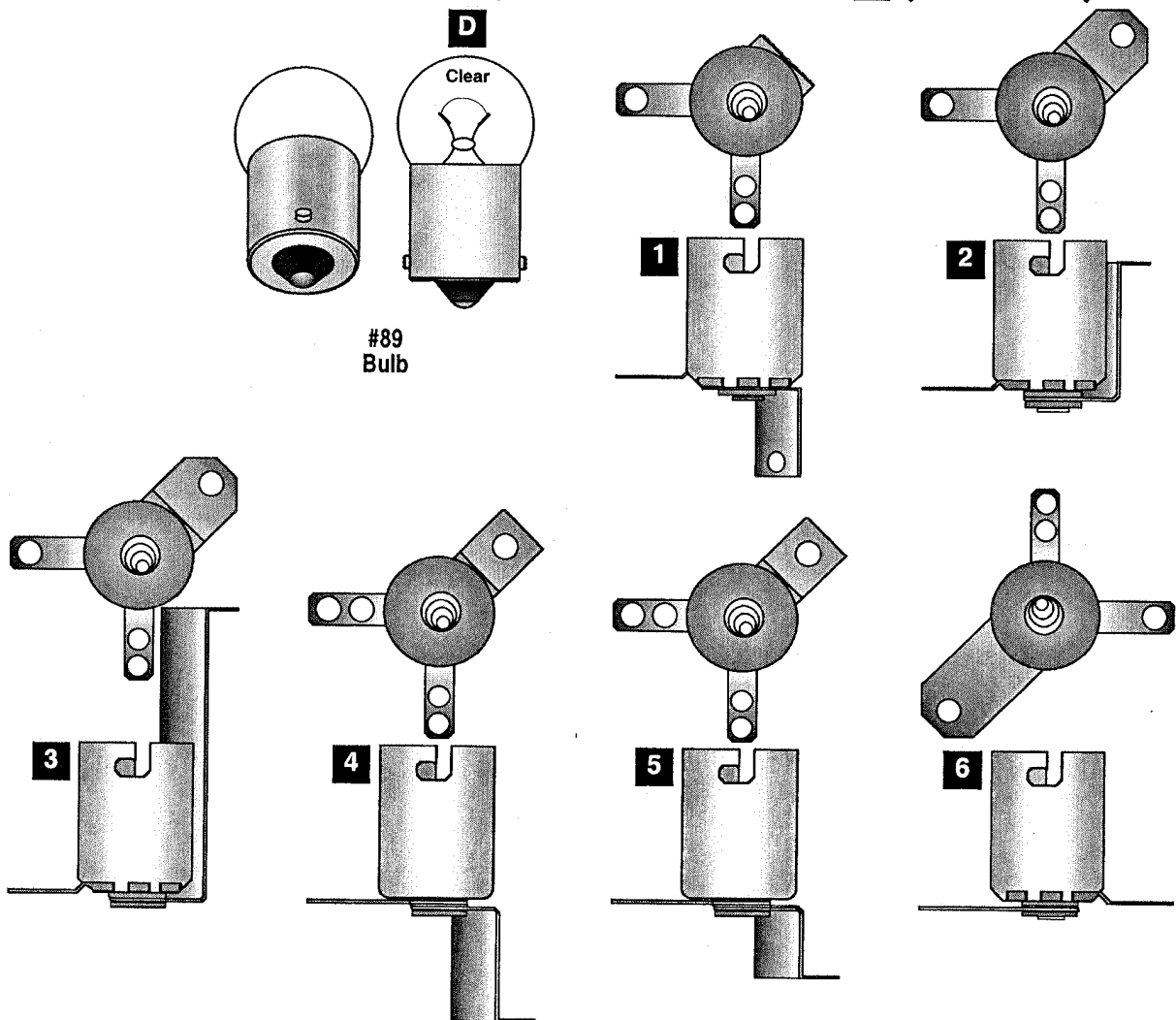
Nr.	BULBS (#89)	SPI PART Nr.
D	#89 Bulb *Heavy Filament*	165-5000-89-HF

1	2-Lug Laydown Standard Socket	077-5100-00
2	2-Lug Stand-Up Short Socket	077-5101-00
3	2-Lug Stand-Up Long Socket	077-5102-00
4	2-Lug Stand-Up Rev. Mount Socket	077-5103-00
5	2-Lug Stand-Up Rv. Mnt. Short Socket	077-5106-00
6	2-Lug Straight Leg Socket	077-5107-00

Nr.	LARGE BAYONET SOCKETS	SPI PART Nr.

NOT ALL PARTS LISTED ABOVE ARE USED ON THIS GAME (QUANTITIES PER GAME WILL DIFFER). COMPARE ACTUAL PART ON GAME TO ABOVE DRAWINGS TO IDENTIFY THE PART NUMBER REQUIRED.

P19

Playfield Top & Bottom - Wedge Base Sockets & Bulbs ■ (Actual Size) †

E1a / E1b — Clear

E2 — Red

E5 — Green

E4 — Blue

#555 6V Bulbs
#161 12V Bulb

E3 — Yellow

F1 — Clear

F2 — Red

F3 — Amber

F4 — Blue

F5 — Yellow

#906 Bulbs

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

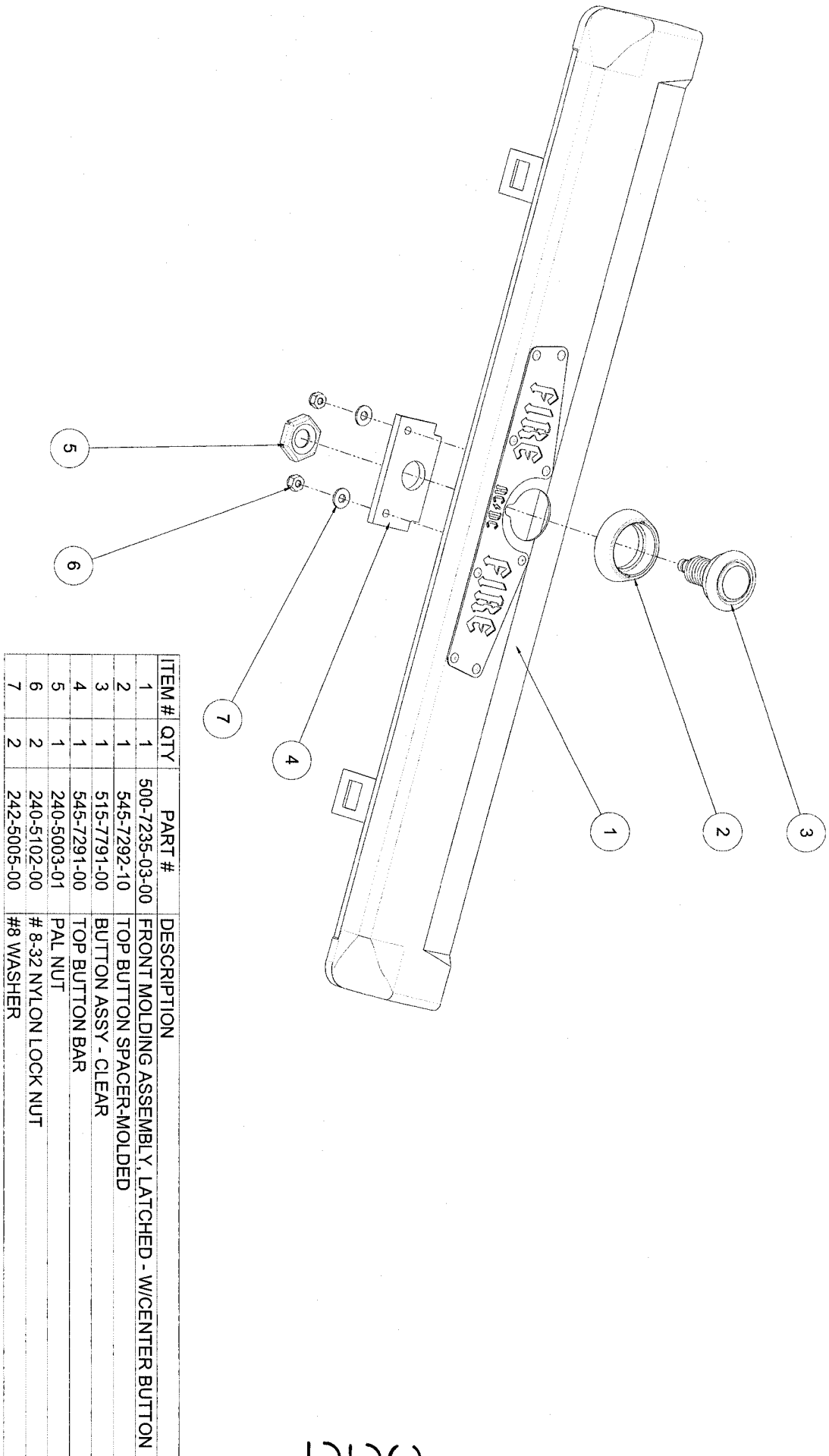**E6** — White

LED Bulb (Wedge Base)

1

2

3
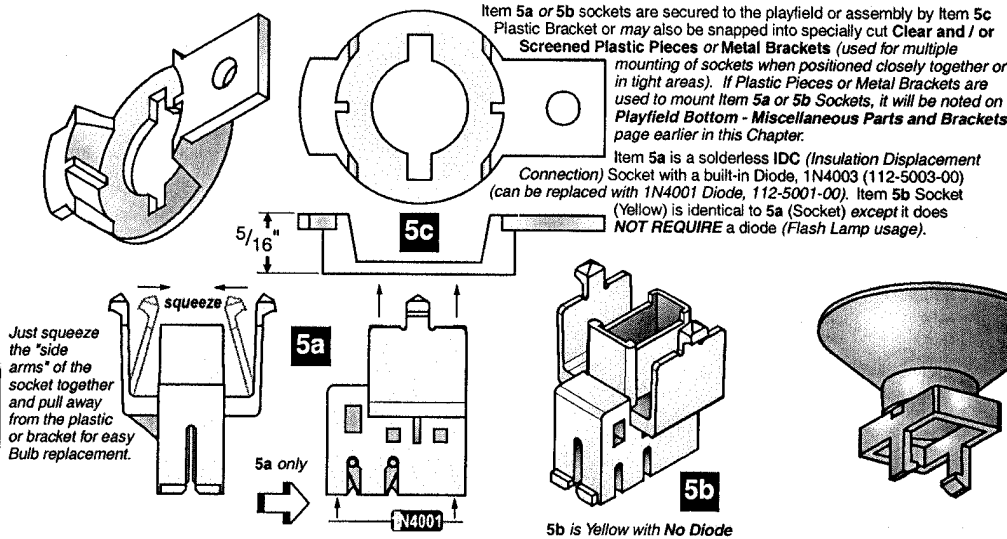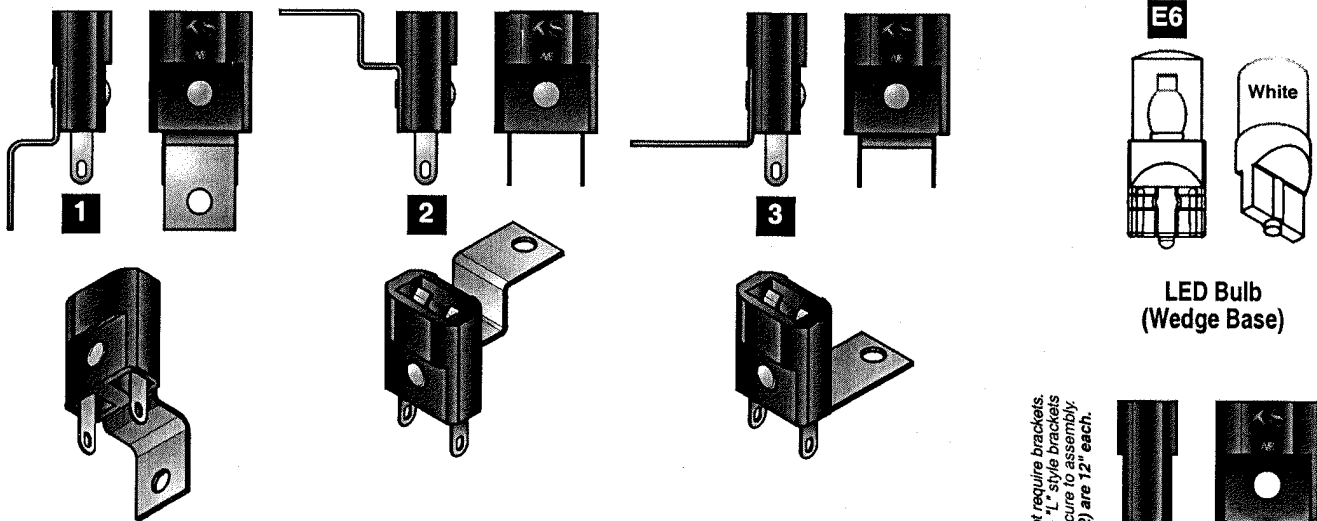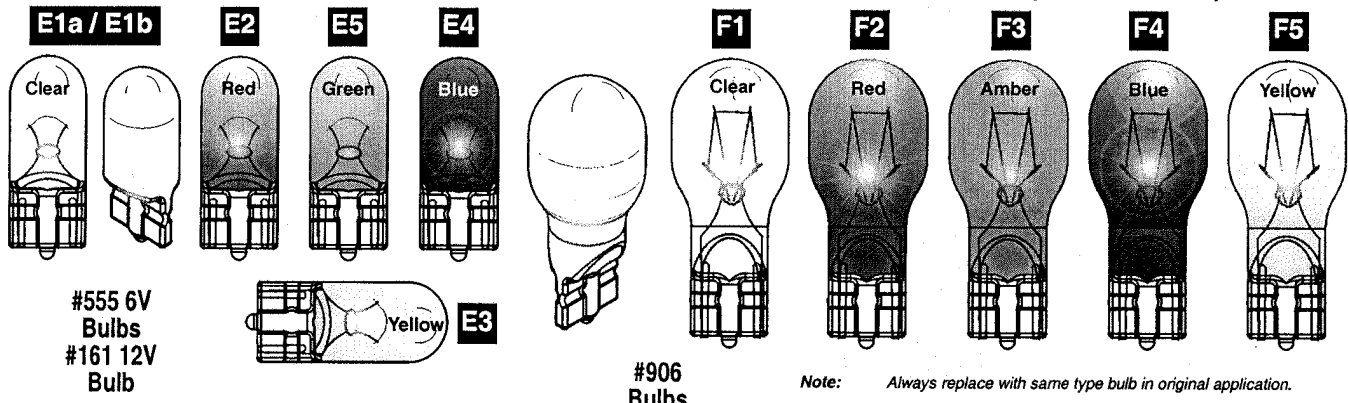
Item 4 Socket does not require brackets. Old stock may include "L" style brackets (each side); do not secure to assembly. Black Wires (Qty. 2) are 12" each.

4

Item 5a or 5b sockets are secured to the playfield or assembly by Item 5c Plastic Bracket or may also be snapped into specially cut Clear and / or Screened Plastic Pieces or Metal Brackets (used for multiple mounting of sockets when positioned closely together or in tight areas). If Plastic Pieces or Metal Brackets are used to mount Item 5a or 5b Sockets, it will be noted on Playfield Bottom - Miscellaneous Parts and Brackets, page earlier in this Chapter.

Item 5a is a solderless IDC (Insulation Displacement Connection) Socket with a built-in Diode, 1N4003 (112-5003-00) (can be replaced with 1N4001 Diode, 112-5001-00). Item 5b Socket (Yellow) is identical to 5a (Socket) except it does NOT REQUIRE a diode (Flash Lamp usage).

5/16"

5c

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

5a

5a only

1N4001

5b

5b is Yellow with No Diode

6

Nr.	BULBS (#555)	SPI PART Nr.
E1a	#555 Wedge Base Bulb (Clear)	165-5002-00
E2-E5	#555 Wedge Base Bulb (Multi-Color)	165-5054-XX

Item E2-E5 Bulb Note: Different Colors available (not used in this game) – Red (165-5054-02); Green (165-5054-04); Blue (165-5054-05); Yellow (165-5054-06);

Nr.	BULBS (#555)	SPI PART Nr.
E1b	#161 12V Wedge Base Bulb (Clear)	165-5032-00

Nr.	BULBS (LED & #906)	SPI PART Nr.
E6	LED Module (WHT) (5v - 6.3v) Wedge Base	112-5024-08

Item E6 Bulb Note : Typically used with Item 4 Socket in Pop Bumpers.

Nr.	BULBS (LED & #906)	SPI PART Nr.
F	#906 Wedge Base Bulb (Clear)	165-5004-00

Item F Note: Different Colors available (not used in this game) – Red (165-5004-02); Amber (165-5004-03); Blue (165-5004-05); Yellow (165-5004-06)

Nr.	WEDGE BASE SOCKETS	SPI PART Nr.
1	Wedge Base Socket (Laydown)	077-5026-01
2	Wedge Base Socket (Offset)	077-5029-00
3	Wedge Base Socket (Laydown GI)	077-5030-00
4	W.B. Socket (Bumpers/Special App.)	077-5206-00

Nr.	WEDGE BASE SOCKETS	SPI PART Nr.
5a	IDC Snap-On Socket (Biege)	077-5216-00
5b	IDC Snap-On Socket No Diode (Yel.)	077-5216-01
5c	5/16" Ht. Bracket (White)	545-5760-18
6	Light Reflector (Silver Plst.) REF540N	545-5409-01

Note Item 6 : Typically used with Item 1 (but will fit on any similiar Wedge Base Socket).

NOT ALL PARTS LISTED ABOVE ARE USED ON THIS GAME (QUANTITIES PER GAME WILL DIFFER). COMPARE ACTUAL PART ON GAME TO ABOVE DRAWINGS TO IDENTIFY THE PART NUMBER REQUIRED.

P20

ITEM #	QTY	PART #	DESCRIPTION
1	1	500-7235-03-00	FRONT MOLDING ASSEMBLY, LATCHED - W/CENTER BUTTON
2	1	545-7292-10	TOP BUTTON SPACER-MOLDED
3	1	515-7791-00	BUTTON ASSY - CLEAR
4	1	545-7291-00	TOP BUTTON BAR
5	1	240-5003-01	PAL NUT
6	2	240-5102-00	# 8-32 NYLON LOCK NUT
7	2	242-5005-00	#8 WASHER

FRONT MOLDING ASSEMBLY - CENTER BUTTON - PRO

500-7238-00

ITEM #	PART NUMBER	DESCRIPTION	QTY.
1	510-5762-00	RIVETED ASSEMBLY - BELL BRACKET	1
2	545-7283-00	MOLDED BELL, GRINDER	1
3	237-5909-00	SCREW, 4-40 X 1/4" PPH SEMS	2
4	535-0570-00	BELL BRACKET SUPPORT	1
5	237-5513-00	SCREW, 6-32 X 2" PPH MS	2
6	254-5000-17	NYLON SPACER - BLACK - 3/8 OD X .175 ID X 1-3/4"	2

BELL ASSEMBLY - STATIONARY
AC/DC PRO
511-6983-00
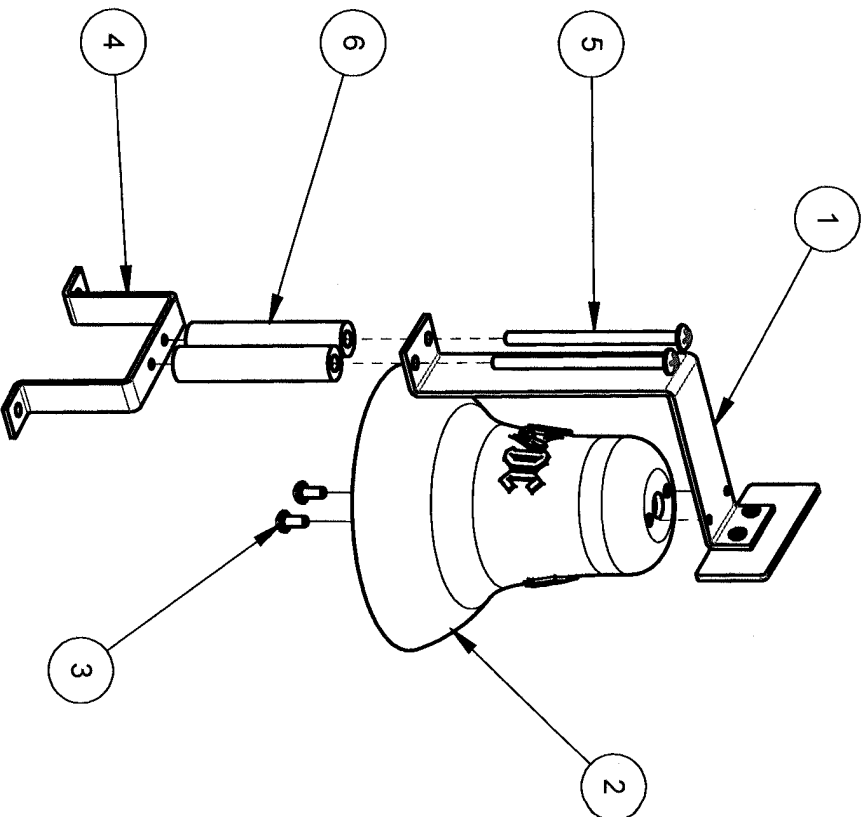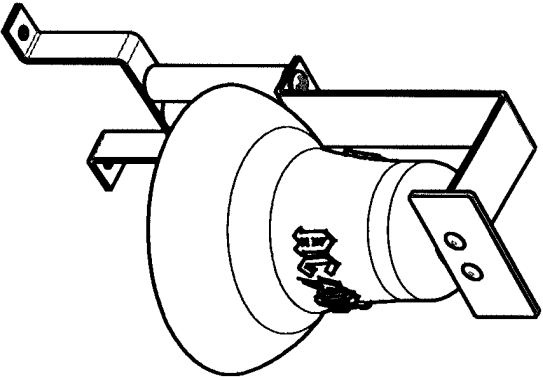
PRO
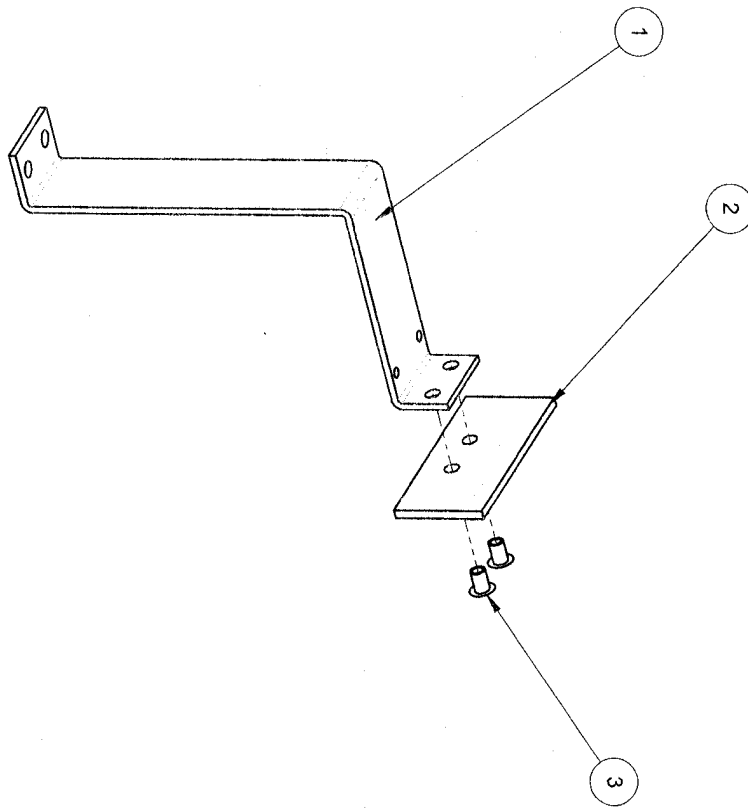
ITEM #	QTY	PART #	DESCRIPTION
1	1	535-0569-00	BELL BRACKET
2	1	830-BELL PLASTIC	BUTY # ?
3	2	249-5001-00	RIVET - 1/8 X 3/16

RIVETED ASSEMBLY - BELL BRACKET

510-5762-00

SHEET

PRO

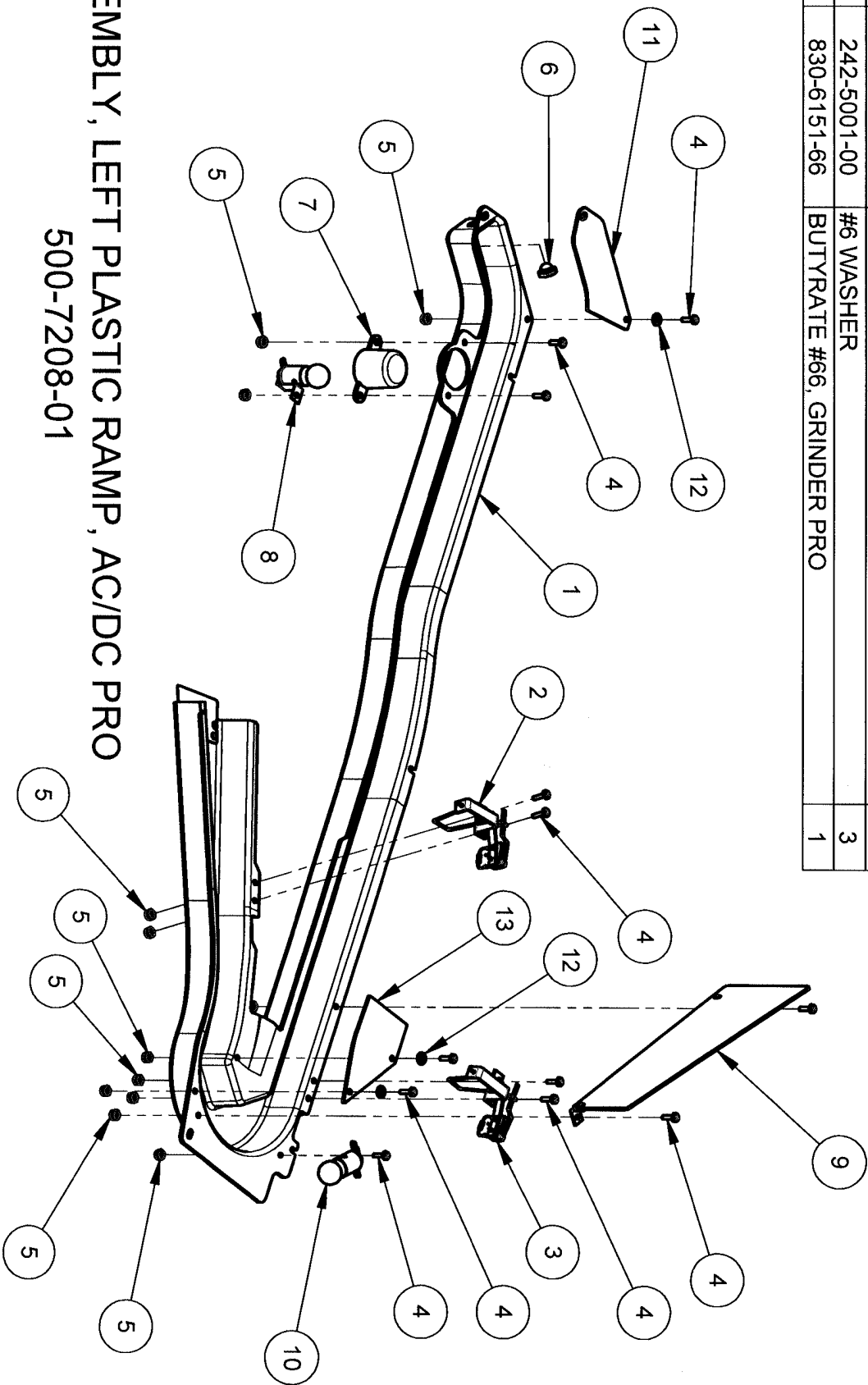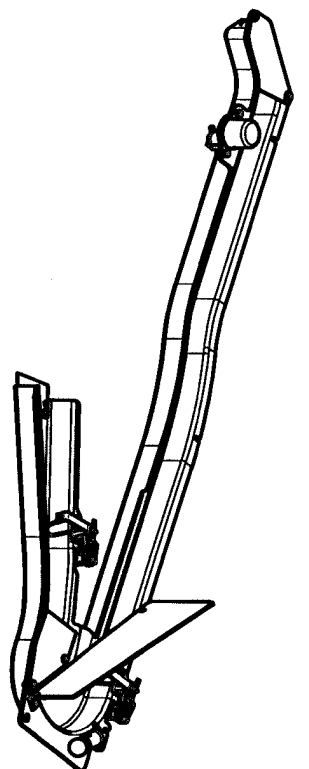| ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	525-5815-00	BLOCK, DETONATOR, GRINDER PRO	1
2	830-6151-28	BUTY #28, DET TOP, GRINDER PRO	1
3	830-6151-25	BUTY #25, DET FRONT, GRINDER PRO	1
4	830-6151-24	BUTY #24, DET LEFT, GRINDER PRO	1
5	830-6151-26	BUTY #26, DET RIGHT, GRINDER PRO	1
6	830-6151-27	BUTY #27, DET BACK, GRINDER PRO	1
7	234-5000-00	SCREW, #6 X 3/8" HWH	9
8	530-7762-01	PLUNGER, DETONATOR, GRINDER PRO	1
9	237-5863-00	SCREW, 4-40 X 3/4 PRH	1
10	242-5002-00	#4 FLAT WASHER - 5/16" O.D.	1
11	511-6962-00	ASSEMBLY, DET HANDLE, GRINDER	1
12	237-6169-00	SCREW, 4-40 X 1/4 PPH MS	1
13	036-5579-00	CABLE, DET RED WIRE, GRINDER	1
14	036-5579-01	CABLE, DET BLACK WIRE, GRINDER	1

ASSEMBLY, DETONATOR, AC/DC PRO

500-7225-01

PRO

ASSEMBLY, LEFT PLASTIC RAMP, AC/DC PRO

500-7208-01

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	510-5147-01	RIVET ASSY, LEFT RAMP, GRINDER PRO	1
2	515-6556-03-GE	R/U SWITCH ASSEMBLY -03 W/ GENERIC CABLE	1
3	515-6556-02-GE	R/U SWITCH ASSEMBLY -02 W/ GENERIC CABLE	1
4	232-5202-00	SCREW, 6-32 X 1/2" PPH MS SEMS	12
5	240-5005-00	6-32 NYLON STOP NUT	12
6	545-5105-00	RUBBER BUMPER	1
7	550-5031-06	MINI MARS W/ EARS - YELLOW SB	1
8	511-5241-00	FLASH LAMP ASSY, GENERIC	1
9	510-5163-06	RIVETED ASSY, BUTY #6, GRINDER PRO	1
10	511-5241-01	ASSY FLASH LAMP	1
11	830-6151-64	BUTYRATE #64, GRINDER PRO	1
12	242-5001-00	#6 WASHER	3
13	830-6151-66	BUTYRATE #66, GRINDER PRO	1

PRO

ASSY, RIGHT PLASTIC RAMP
AC/DC PRO
500-7209-01

ITEM #	PART NUMBER	DESCRIPTION	QTY.
1	510-5148-01	RIVET ASSY, RT RAMP, GRINDER PRO	1
2	515-6556-02-GE	R/U SWITCH ASSEMBLY -02 W/ GENERIC CABLE	2
3	232-5202-00	SCREW, 6-32 X 1/2" PPH MS SEMS	10
4	240-5005-00	6-32 NYLON STOP NUT	10
5	545-5105-00	RUBBER BUMPER	1
6	550-5031-02	MINI MARS W/ EARS - RED SB	1
7	511-5241-00	FLASH LAMP ASSY, GENERIC	1
8	515-6596-01-GE	COIL/BRKT/CABLE ASSY, RIGHT	1
9	232-5302-00	SCREW, 8-32 X 1/2" PPH MS SEMS	2
10	240-5102-00	8-32 NYLON LOCK NUT	2
11	510-5163-05	RIVETED ASSY, BUTY #5, GRINDER PRO	1
12	511-5240-01	ASSY VIO GI SPOTLIGHT	1
13	510-5163-41	RIVET ASSY, BUTY #41, GRINDER PRO	1
14	237-5976-01	SCREW, 6-32 X 1/4 HWH SWAGE	2
15	830-6151-65	BUTYRATE #65, GRINDER PRO	1
16	242-5001-00	#6 WASHER	1
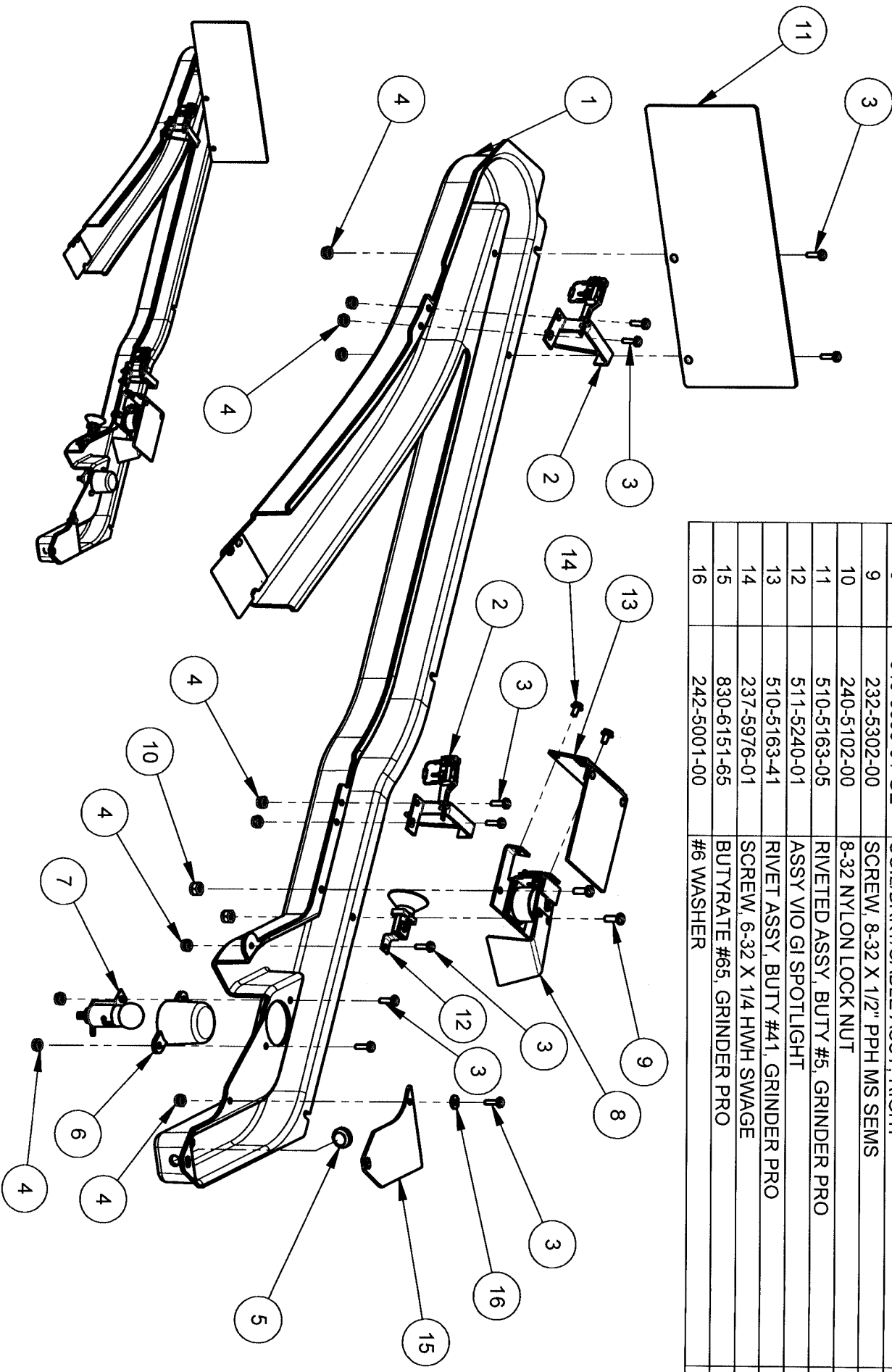
PRO
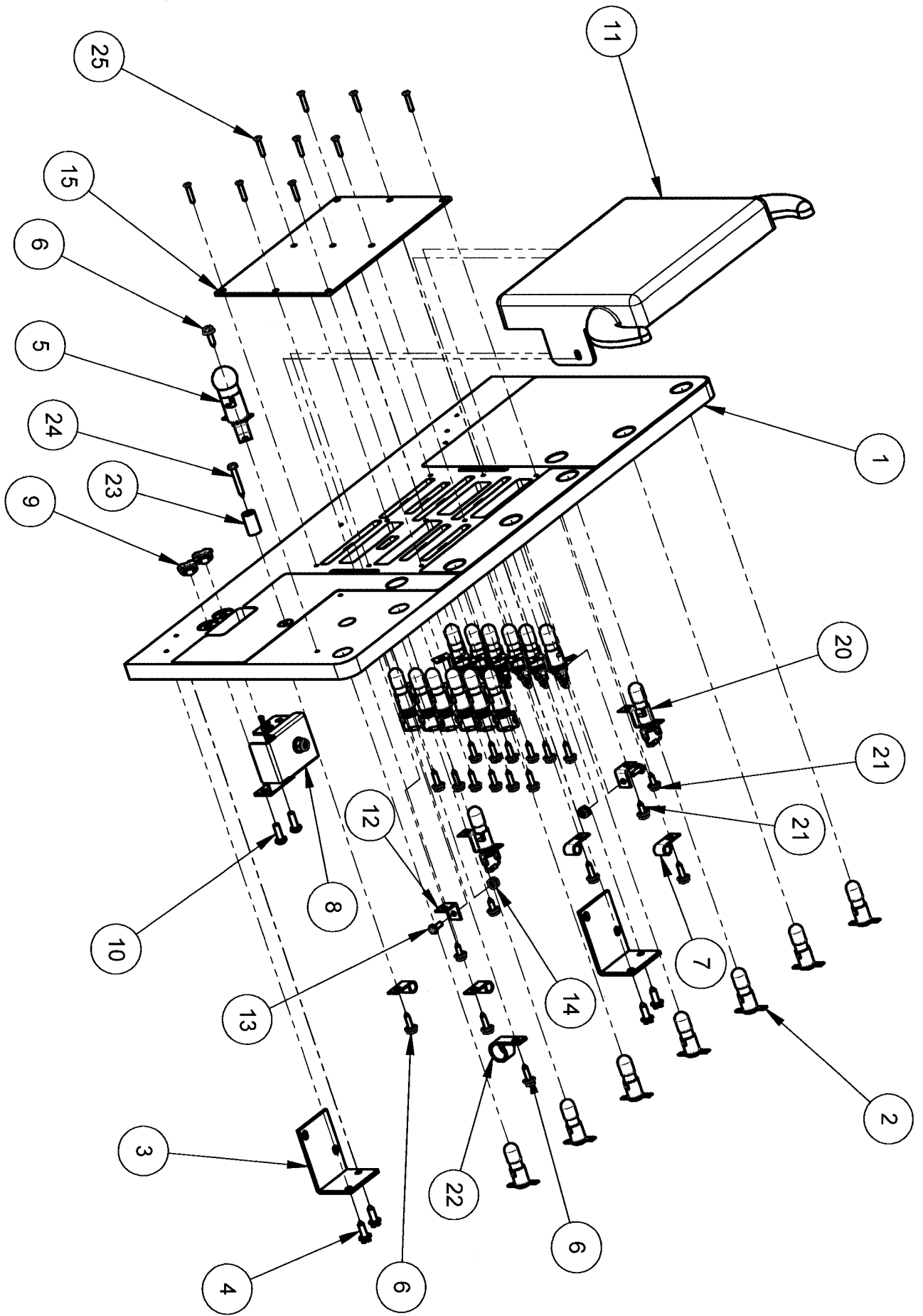
BACK PANEL ASSEMBLY, AC/DC PRO

500-7207-01

25

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6

14

PRO

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	525-5713-01	BACK PANEL, GRINDER PRO	1
2	519-5000-00-HF	SOCKET & BULB ASSY, CLEAR	7
3	535-8964-00	BRACKET - BACK PANEL SUPPORT	2
4	234-5101-00	SCREW, #8 X 1/2" SLT HWH AB ZINC	4
5	519-5106-00-HF	SOCKET/#89 BULB ASSY - RVRS MNT - HEAVY FIL	1
6	234-5001-02	SCREW, #6 X 1/2" HWH	18
7	040-5000-03	1/4" CABLE CLAMP	4
8	511-5096-01	ASSY, ELEC GATE RIGHT, RAIL MT	1
9	240-5101-00	8-32 T-NUT	2
10	232-5302-00	SCREW, 8-32 X 1/2" PPH MS SEMS	2
11	545-6845-00	JUKEBOX COVER, GRINDER	1
12	535-8941-04	BRACKET - PLASTIC MTG	2
13	232-5201-00	SCREW, 6-32 X 3/8" PPH MS SEMS	2
14	240-5005-00	6-32 NYLON STOP NUT	2
15	830-6151-32	BUTY #32, BACK PANEL, GRINDER PRO	1
16	820-7000-12	DECAL #12, BACK PANEL LEFT, GRINDER	1
17	820-7000-14	DECAL #14, BACK PANEL CENTER, GRINDER	1
18	820-7000-13	DECAL #13, BACK PANEL RIGHT, GRINDER	1
19	519-5008-00-HF	SOCKET/BULB/DIODE, CLEAR - HEAVY FIL	12
20	519-5008-02-HF	SOCKET/BULB/DIODE, RED - HEAVY FIL	2
21	234-5000-00	SCREW, #6 X 3/8" HWH	4
22	040-5000-06	1/2" CABLE CLAMP	1
23	254-5000-14	NYLON SPACER - BLACK - 3/8 OD X .175 ID X 5/8"	1
24	232-5004-00	SCREW, #6 X 1 PPH AB ZINC	1
25	237-5833-00	SCREW, #4 X 5/8" PFH - BLACK	9
96*	036-5639-15-C5	BACK PANEL LAMPS CABLE ASSEMBLY	1
97*	600-5003-00	BRAIDED WIRE - 20GA.	3 FT.
98*	631-5000-00	STAPLE - 5/16	18
99*	036-5639-04-C5	BACK PANEL CABLE ASSEMBLY	1

* ITEM NOT SHOWN

PRO

Backbox [S.A.M. System] - Parts ☐

TOURNAMENT PINBALL

28 | 28 | 5
12 13 | 17 18 19 | 27 | 21
14 | 6 | 7 | USB Port ▼ | 30
20 | ‡ Coin Battery | 7A
7B | 37
Boot ▶ EPROM
27 | 27 | CPU/Sound PCB | 8R
I/O Power Driver PCB
8L | 9 | 9
10 | For more information on the Backbox PCBs, see Section 5.
11 | Item 4 is secured over Item 3
27 | 1 | 3 | DANGER HIGH VOLTAGE
2 | ATENCION PELIGRO ALTA VOLTAJE
25 | 41 | 4
31 | Speaker Panel Assembly *(see next page)*.
40 | 32-38 | 40
The Backglass **is** *Not Shown in this* **Front** View for clarity.
24 23 | 1
Qty. 2 each | 22

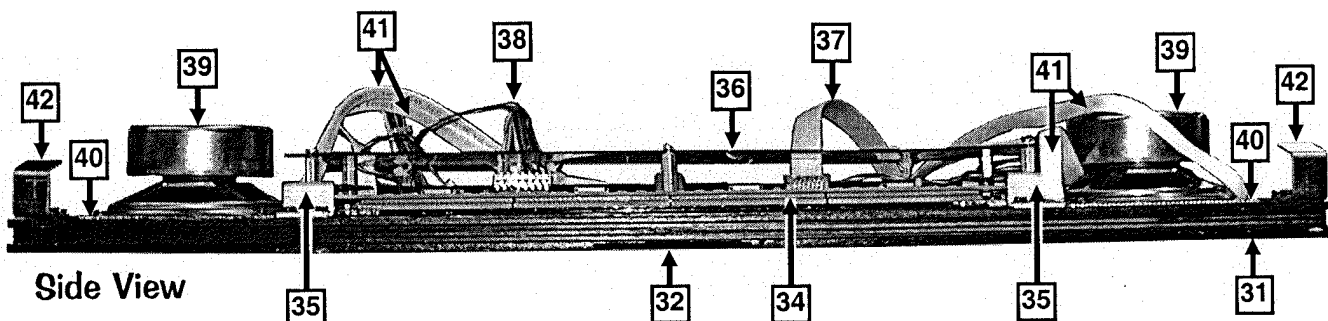| Nr.	BACKBOX PARTS	QTY.	SPI PART Nr.
1	Backbox ACDC ™ (No Parts)	1	525-5631-17-C5
	Item 1 Note: *Chrome T-Molding is installed and cannot be ordered separately.* Fuse Description **(820-6384-00)** and High Voltage Caution (uL) **(820-6082-01 & -02)** Decals.		
2	PCB Metal Mounting Plate [Display]	1	535-9769-00
3	Display Power Supply PCB	1	520-5138-00
	Item 3 is secured to @ bottom by: #8-32 X 3/8" SHWH Swg. (Zinc) (Qty. 2) (237-5975-00)		
4	Plastic Cover [DANGER HIGH VOLTAGE]	1	830-6053-00
	Items 3 & 4 are secured to @ top by: 1-1/4" X 3/8" Plastic Spacer Gray (Qty. 2) (254-5000-05) and #8-32 X 1-3/4" SHWH Scr. (Zinc) (Qty. 2) (237-5975-28)		
5	PCB Metal Mounting Plate [I/O+CPU]	1	535-9664-00
	Items 2 & 5 are secured to Item 1 by: #8 X 1/2" SHWH AB (Zinc) (Qty. 1/hole) (234-5101-00) and #10 Washer 7/32" I.D. X .5" O.D. X 1/16" Thick (Qty. 1/hole) (242-5003-00) *Note: Where a Wire Clamp (Item 27) is mounted, a #10 Washer is not required.*		
6	I/O Power Driver LED	1	520-5317-00
7	CPU/Sound PCB LE GAMES NEW USB	1	520-5337-01
	7A: 8MB EPROM #M27C801-100F1 (960-5016-00) *Ordering Note: Programmed EPROM (965-BOOT-SAM)* **7B:** Coin Cell Battery (CR2430 3V) (000-0644-01) *For USB Memory Stick Information, see Item 30 on the next page.*		
	Items 6 & 7 are secured to Item 5 by: #8-32 X 3/8" SHWH Swage (Zinc) (Qty. 10) (237-5975-00) and 1/4" Slf. Rtn. Spacer White (Qty. 5 [I/O] / Qty. 4 [CPU]) (254-5007-05)		
8L	Fluorescent Light Bracket *(Left Style)*	1	535-7739-00
8R	Fluorescent Light Brckt. *(Right Style)*	1	535-7739-01
	Items 8L & 8R are secured to Item 1 by: #10-24 X 1-1/4" Carriage Bolt Square 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" length only) (626-5040-00)		
9	Fluorescent Lamp Holder (Socket)	2	077-5214-01
	Item 9 is secured to Items 8L *and* 8R by: #6-32 X 5/8" PPH MS (Sems) Zinc (Qty. 1/per) (232-5203-00) Lock-In Fluor. Bulb with Yellow Socket Clip (Qty. 1/per) (545-6271-00)		
10	Fluorescent Tube 24" (F18T8CW)	1	165-5061-00

Nr.	BACKBOX PARTS	QTY.	SPI PART Nr.
11	Starter - Fluorescent (FS2 Light)	1	165-5011-01
	Starter Base *(with leads)* [on Item 8L]	1	077-5213-00
	Item 11 is secured to Item 8L by: #4-40 X 1/2" PPH MS (Sems) Zc. (Qty. 2) (237-5813-00)		
12	Ballast Mounting Plate	1	535-8657-00
13	Ballast *CU452-W 1/2" Core 120v 60 Hz 13W*	1	010-5015-00
	Items 12 & 13 are secured to Item 1 by: #8 X 1/2" SHWH AB (Zinc) (Qty. 2) (234-5101-00) >>> CAUTION - VERY HOT" Decal (820-6266-00) *EU / UK Only : Ballast, 5/8" Core 50/60 Hz (010-5015-01)*		
14	Ground Strap (5")	1	600-5006-05
15*	Roto Lock Male *(on Cabinet)*	1	355-5006-01
16	Roto Lock Female *(R2-0002-02)*	1	355-5006-02
	Item 16 is secured by: #8-32 X 3/8" SHWH AB (Zinc) (234-5022-00), #10-24 Keps Nut (Qty. 2) (240-5207-00), #10-24 X 2" CBSN (231-5045-00) and #10 Washer 7/32" I.D. X .5" O.D. X 1/16" (Qty. 5) (242-5003-00); *See opposite next page.*		
17	Lock Mounting Plate	1	535-0072-00
18	Lock 5/8" Barrel, 3/4"ø, 1.5" Flat Cam	1	355-5055-00
	Items 17 & 18 are secured by: #8 X 1/2" TP Torx T20 Black (Qty. 2) (237-6173-05)		
19	Back Vent Grill 2-1/2" X 18"	3	545-5072-02
20	Ribbon Cable, 20-Pin (3.5")		036-5000-350
	Item 20 connects the I/O Pwr. Drvr. PCB to the CPU/Sound PCB; For 14-Pin see next page.		
21	Button Hole Plug (Blk) (Happ #52-6214-00)	1	500-6566-00
	Item 21 plugs the Access Hole required if using optional BETAbrite Sign or Data cables.		
22	Header Sign TOURNAMENT PINBALL	1	545-6133-00
23	Bracket, Tournament Sign (Black)	2	535-0081-02
	Item 22 is mounted to Item 23 with #8-32 x 3/8 PPA screw (Qty 2/per) (232-5303-01) & #8-32 Nylock Nut (Qty 2/per) (240-5102-00). Item 23 is secured to Item 1 by: #8 X 5/8" PPH (Qty. 2/per) (232-5101-01)		

PARTS TABLE & VIEWS CONTINUED ON THE NEXT PAGE. ▶

Parts Identification

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Backbox [S.A.M. System] - Parts ☐

Front View
(Broken View)

Speaker Panel [S.A.M. System] - Parts ☐

Side View

Nr.	BACKBOX PARTS	QTY.	SPI PART Nr.
	† PARTS TABLE & VIEWS CONTINUED FROM THE PREVIOUS PAGE.		
25	Braided Wire (1-1/2 Feet)	1	600-5001-00
	Item 25 is secured by: Staple 5/16" (Qty. 23) (631-5000-00)		
26*	Zip Cable Tie (Screw Down Style)	4	040-5005-00
	Item 26 is secured @ inside bot. by: #8 X 1/2" SHWH AB (Zinc) (Qty. 1/per) (234-5101-00)		
27	Clamps [Multiple Sizes]	31	040-5000-XX
	Item 27 secured by: #8 X 1/2" SHWH AB (Zinc) (Qty. 1/per) (234-5101-00) **For the** *following sizes, replace -XX with:* .1/4" Double = -23 (Qty. 5); 1/2" Single = -06 (Qty. 3); 3/4" Single = -08 (Qty. 4); 1" Single = -09 (Qty. 1); 1-1/4" Double = -30 (Qty. 1)		
28	Foam 3/16" Thick X 1/4" Wide X 12"	6	626-5026-00
	Above Item 28 is self-adhesive. 17.5" strip on each side. Sold in 12" Lengths only.		
29L	Pivot Hinge Red *(Left Style)*	1	535-7999-22
29R	Pivot Hinge Red *(Right Style)*	1	535-7999-23
	Items 29L-29R are secured to Backbox by: 1/4"-20 X 1-1/4" C.B. Sq. Neck (Qty. 4) (231-5003-00) and 1/4"-20 Flange Nut (Qty. 4) (240-5300-00) **Items 29L-29R are secured to Cabinet by:** Spacer Hex Nut 1/2" O.D. - 1/4-20 X 1/2" TD (Black) (Qty. 1/per) (254-5042-00), Nylon Spacer (Black) (Qty. 1/per) (242-5084-00), 1/4-20 X 1/2" Carriage Bolt Square Neck (Black) (Qty. 1/per) (231-5072-00) and Washer 1" O.D. X 1/2" I.D. X 1/16" (Black) (Qty. 1/per side, only if required) (242-5087-00)		
30*	Memory Stick USB 1.1+ [Generic] 64MB		970-0064-00
	Memory Stick USB 1.1+ [Generic] 128MB		970-0128-00
	Item 30 was not included with your game. Read the inside cover or go on-line for more info. To order with the latest game code copied onto it, add -A3 to the Part Nr. (970-0128-00-A3). File(s) can be downloaded from our website (Files are 25MB or larger, DSL or Fast Modem recommended). Not all manufacturers of Memory Sticks are compatible with our system. Test it out, if it doesn't work properly, return your purchase and order the memory stick through you local pinball distributor (Stern Pinball Memory Sticks guaranteed compatible).		
	(ASM. REF. 505-6002-A3-A3, Items 1-42 Only, [29-30 not included in assembly])		

Take Note:

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

Nr.	SPEAKER PANEL PARTS	QTY.	SPI PART Nr.
31	Speaker Panel (Black Wood)	1	525-5515-00
32	Plastic Shield (Display Front Cover)	1	545-5884-00
	Item 33 is secured to inside Item 31 by: #6 X 3/8" SHWH AB (Zinc) (Qty. 8) (234-5000-00)		
33*	Foam 3/16" Thick X 1/4" Wide X 12"	6	626-5026-00
	Above Item 33 is self-adhesive. Located between Items 32-34. Sold in 12" Lengths only.		
34	128 X 32 Dot Matrix Display PCB	1	520-5052-15
	// EURO ONLY RoHS // 128 X 32 DM PCB		520-5052-15
	// EURO ONLY RoHS // Dot Matrix Bezel		545-6281-00
	Item 34 is secured to Item 35 by (at corners): 3/16" X 3/8" Spacer Gray (Qty. 4) (254-5000-18) and #6-32 X 1/2" SHWH Swage (Serr) Zinc (Qty. 4) (237-5976-03)		
35	Dot Matrix Display Mounting Bracket	2	535-8368-01
	Item 35 is secured to Item 31 by: #8 X 1/2" SHWH AB (Zinc) (Qty. 4/per) (234-5101-00)		
36	Plastic Shield (Display Back Cover)	1	830-6040-00
	Item 36 is secured to Item 34 by: 1/2" X 1/4" Hex Spacer #6-32 Tap (Qty. 4) (254-5008-03), 3/4" X 1/4" Hex Spacer #6-32 Tap (Qty. 2) (254-5008-04), #6-32 X 1/4" PPH MS (Sems) Zinc (Qty. 2) (232-5200-00) and #6-32 X 3/8" PPH (Qty. 6) (232-5201-00)		
37	Ribbon Cable, 14-Pin (33")	1	036-5260-33
	// EURO ONLY RoHS // LED Ribbon Cable Filter PCB		520-5259-00
	Item 37 (14-Pin) connects the 128 X 32 Dot Matrix Display PCB to the CPU/Sound PCB.		
38	Display Cable *(Wiring Harness)*	1	036-5454-01
	// EURO ONLY RoHS // LED Display Adapter Harness		036-5520-00
39	Speaker (Shld.) 4 x 4" 8Ω OHM MG ELE 4060SH	2	031-5004-02
40	Speaker Grill *(Chrome w/Artwork)*	2	535-8081-04
	Items 39-40 are secured by: #8 X 1/2" SHWH AB (Black) (Qty. 4/per) (234-5101-01)		
41	Ground Strap (25") [2 per : Items 35 & 39]	4	600-5006-25
42	Speaker Panel Hook Bracket	2	535-7009-02
	Item 42 is secured by: #8 X 1/2" SHWH AB (Zinc) (Qty. 2/per) (234-5101-00)		

Parts Identification

Nr.	BACKGLASS PARTS	QTY.	SPI PART Nr.	Nr.	BACKGLASS PARTS	QTY.	SPI PART Nr.
i*	Glass (Tempered) 25.906" X 19.187" X .125"	1	660-5038-02	iv*	Bottom Plastic Lift Channel - 26"	1	545-6313-01
ii*	ACDC™ PRO Film Art (#C5)	1	830-52C5-00	v*	Plastic Edging (Left/Right) - 18-1/8"	2	545-5018-14
iii*	Top Plastic Channel - 26"	1	545-5018-15		Items i-v are secured to Item i by: 3M Tape (Double-Sided), 12" (Qty. 1) (626-5080-00) Note: Only 6" required, sold in 12" lengths only.		

(ASM. REF. 515-5450-00-A9 , Items i-v)

Cabinet - Parts ▨ & Switches ☐
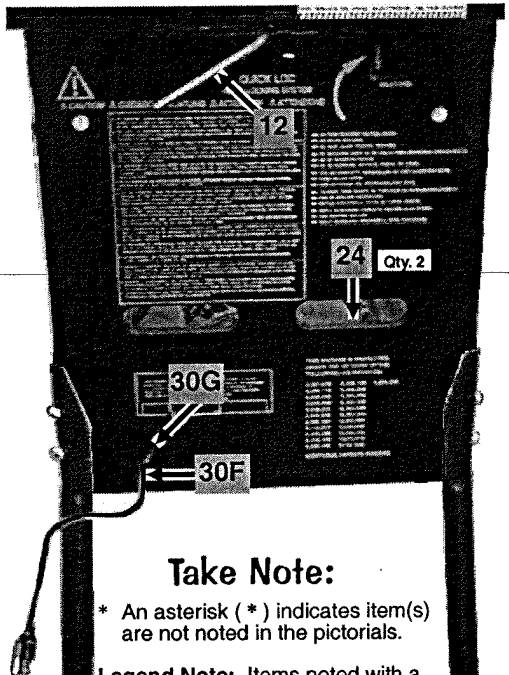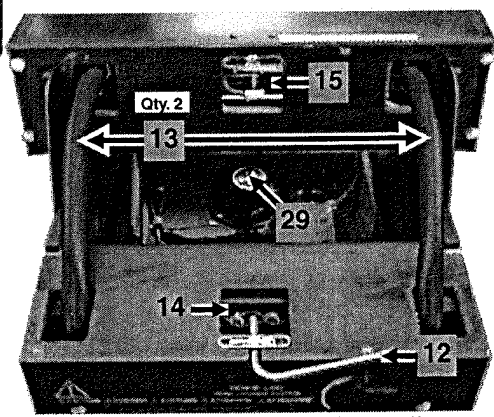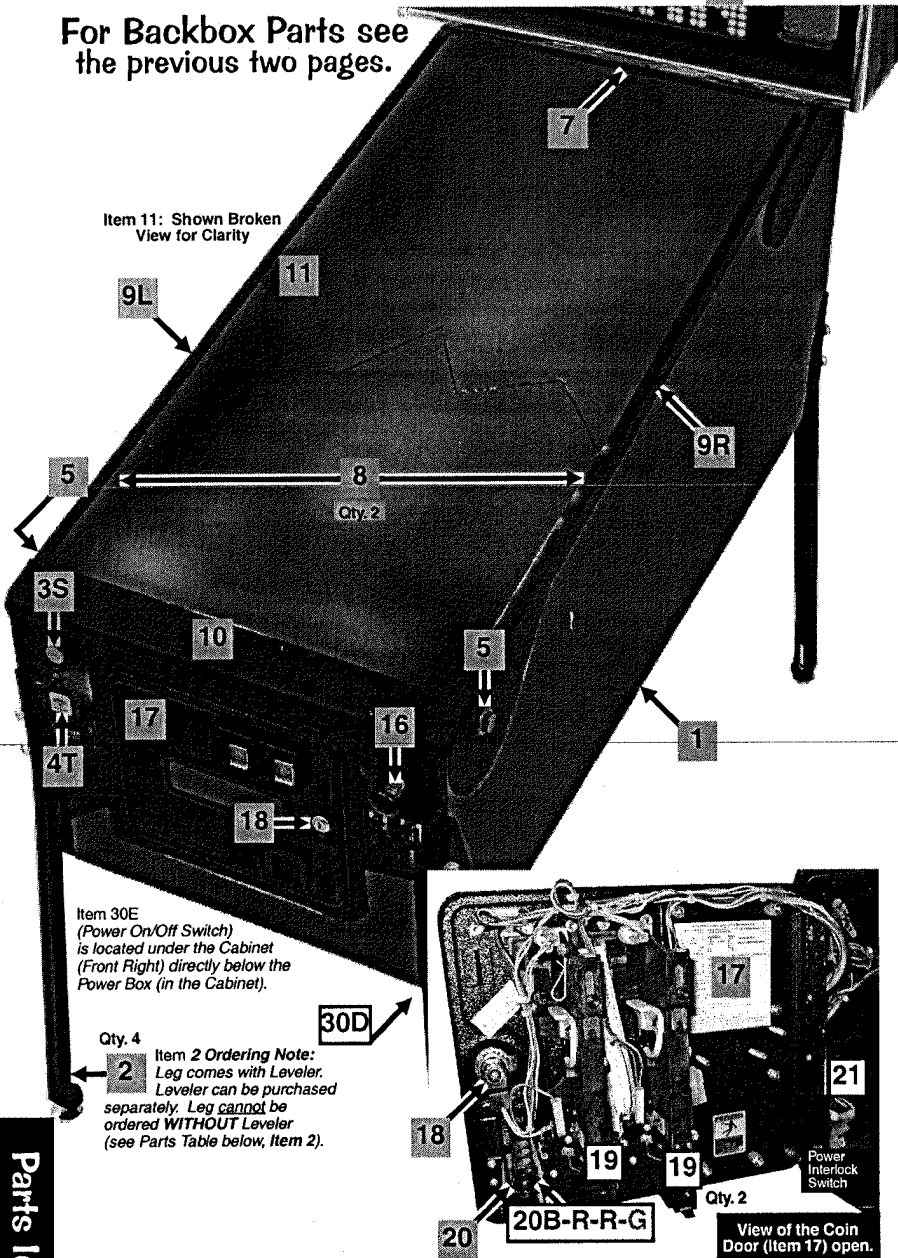
For Backbox Parts see the previous two pages.

Item 11: Shown Broken View for Clarity

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

Item 30E
(Power On/Off Switch)
is located under the Cabinet
(Front Right) directly below the
Power Box (in the Cabinet).

Qty. 4

Item *2 Ordering Note:*
Leg comes with Leveler.
Leveler can be purchased
separately. Leg cannot be
ordered WITHOUT Leveler
(see Parts Table below, Item 2).

Power
Interlock
Switch

View of the Coin Door (Item 17) open.

Take Note:

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

Legend Note: Items noted with a cyan square ▨ are Cabinet Parts. Items noted with a white square ☐ are Switches.

Nr.	CAB. PARTS & SWITCHES	QTY.	SPI PART Nr.
1	Screened Cabinet ACDC™ (No Parts)		525-5395-15P-C5
2	Black Leg with Leveler Asm	4	500-5921-50

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) *Leg Leveler ONLY (3/8"-16 X 3") (500-5017-00).*

3S	Start Button (Green Round) with Sw. + Led	1	500-6388-44-TL
4T	Tournament Button (Yel. Sq.), w/Sw. + Led		500-6587-06-LED

Item 3S & 4T includes the Switch & Lamp (No Wiring; desolder old wiring where required).
Switch or Bulb replacement: ↺ *TWIST* ↺ *LOCK (-TL)* >> *not snap-in* <<
Assembly Parts Included : Microswitch (180-5174-00); Led Hi Int White 106W-WB
(112-5024-08); If 4T is not desired, use optional Button Plug Black (500-6566-00).
Requires 3-Lug Terminal Strip (055-5204-03) and Diodes, 1N4004 (Qty. 2) (112-5003-00)
inside cabinet under button(s) for **Lamp Operation** *(Diode for Switch, located on Switch.)*

5	Flipper Button (Yellow) Assy (No Sw.)	2	500-5026-36

Item 5 is secured by: Pal Nut for Flipper Button (Metal) (Qty. 2/per) (240-5003-01)
Pal Nut inside cabinet secured by: #8 X 1/2" SHWH AB (Zinc) (Qty. 1/per) (234-5101-00)
and Washer (Zinc) .187" ID X .875" OD X .048" Thick (Qty. 1/per) (242-5059-00)

6S	Flipper Switch Single Assembly	2	500-6889-01

Assembly *Parts Included :* Flipper Switch Stack Single *(Paliney Contact)* (180-5160-01)
and Capacitor - Ceramic .05 Mfd 25 volt (130-5001-00)
Item 6S/6D are secured to Cab. by: #6 X 1-1/4 SHWH AB (Zinc) (Qty. 2/per) (237-5959-00)

6D	Flipper Switch Double Assembly		500-6890-01

Assembly *Parts Included :* Flipper Switch Stack Double *(Paliney Contact)* (180-5164-01)
and Capacitor - Ceramic .05 Mfd 25 volt (130-5001-00)
Item 6S/6D are secured to Cab. by: #6 X 1-1/4 SHWH AB (Zinc) (Qty. 2/per) (237-5959-00)

Nr.	CAB. PARTS & SWITCHES	QTY.	SPI PART Nr.
7	Rear Glass Channel 20-3/8" Length	1	545-5038-00
8	Plastic Channel 42-5/8" Lg. (Left/Rt.)	2	545-5017-00
9L	Side Armor (Left) Blac kW/Hole	1	535-7297-02
9R	Side Armor (Right) Black W/Hole	1	535-7297-02

Items 9L & 9R are secured @ front & side by: Pem Stud 1/4 X 1" Flange Head Black
(Qty. 1/per) (237-6116-01), 1/4-20 Flange Nut (Qty. 1/per) (240-5300-00) and #8 X 1/2" T20
Tamper Proof Black (Qty. 5/per) (237-6173-05), @ rear (backbox) by: #10-24 X 1" Sq. Neck
Carrg. Bolt Black (Qty. 1/per) (231-5021-00) and #10-24 Hex Nut (Qty. 1/per) (240-5202-00)
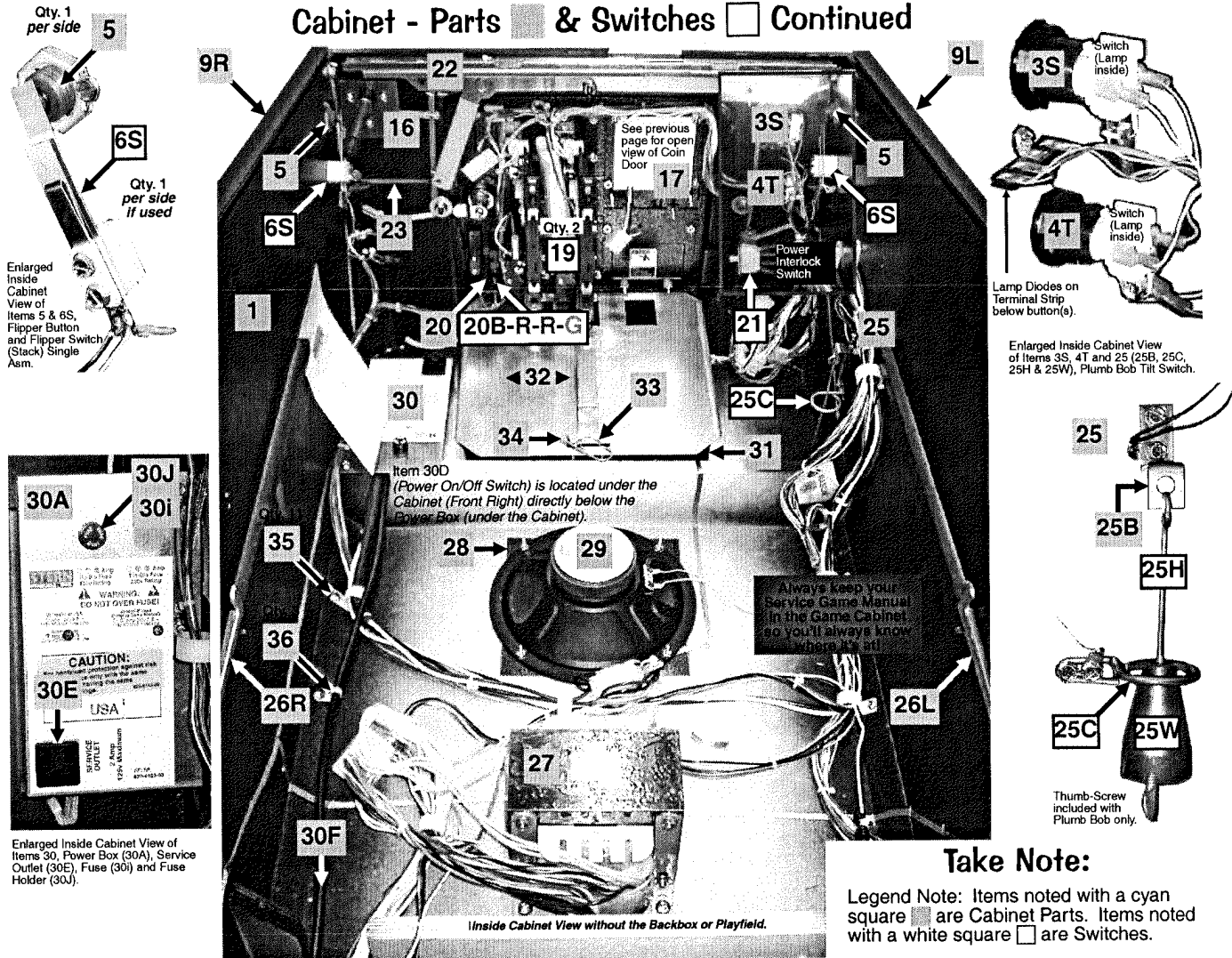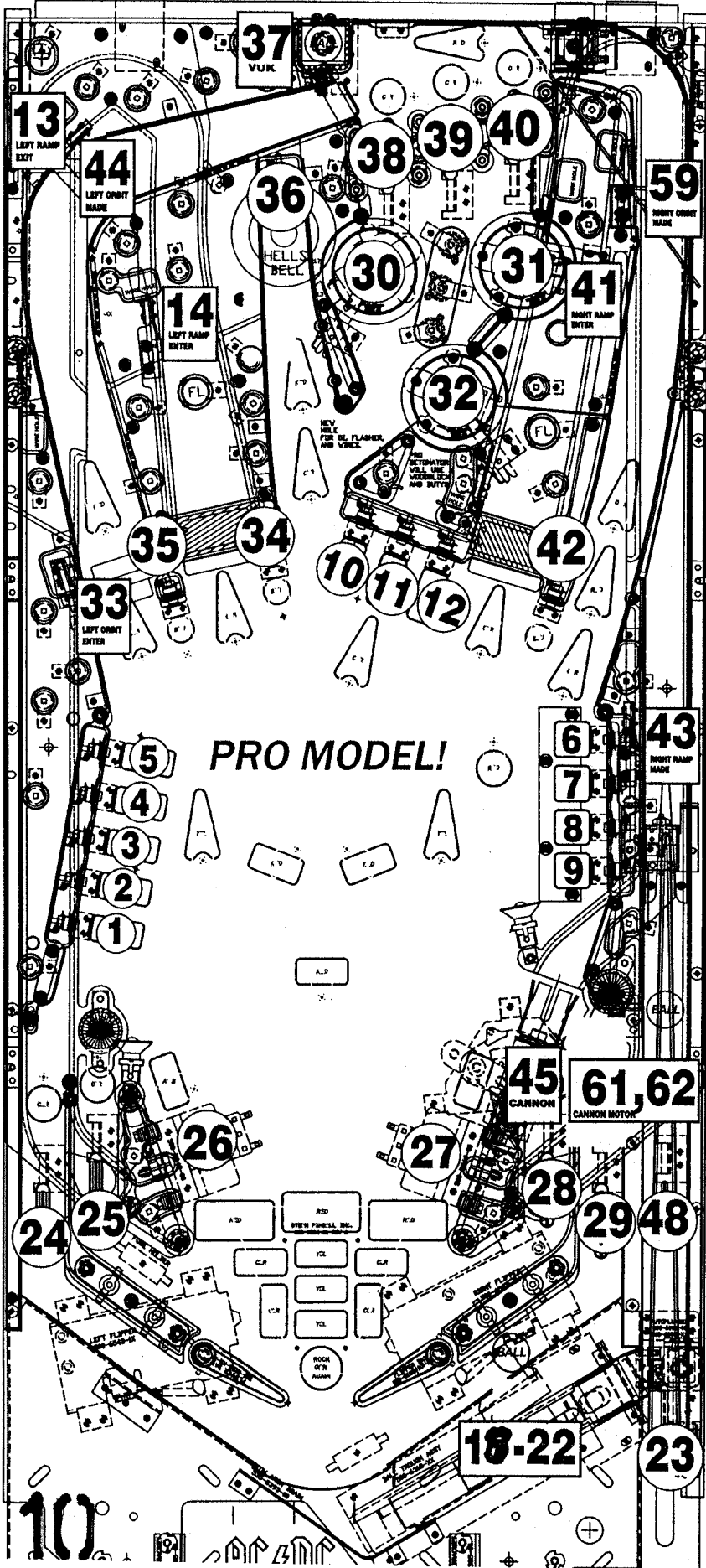
10	Front Molding Assy/Latch-W/Cntr. Button	1	500-7235-03-00

Item 10 includes: Self-Adhesive Foam Rubber 3/8" X 3/16" X 20-3/8" (3') (626-5001-00)
Items 10 works with Item 22 *(next page) ONLY.*

11	Playfield Glass (Tempered) 21" X 43" X 3/16"	1	660-5001-00
12	Hex Key Allen Wrench 5/16"	1	777-0001-00
13	Corrugated Tubing Black 1"ø X 2.6' Lg.	1	605-5008-03

Above Item *13 covers the Cable Wiring Harnesses going into the Backbox from the Cabinet.*

14	Roto Lock Male (R2-0055-02)	1	355-5006-01

Item 14 is secured by: #10-24 X 1-3/4" Carriage Bolt Square Neck (Qty. 2) (231-5022-00),
#10-24 Nylon Stop Nut (Qty. 2) (240-5206-00) and
#10 Washer, 7/32" ID X 1/2" OD X 1/16" Thick (Qty. 2) (242-5003-00)

15	Roto Lock Female *(on Backbox)*	1	355-5006-02
16	Ball Shooter (Plunger) Assembly	1	500-6146-00-04

p 4

Parts Identification

Cabinet - Parts ■ & Switches □ Continued

Qty. 1 per side **5**

6S Qty. 1 per side if used

Enlarged Inside Cabinet View of Items 5 & 6S, Flipper Button and Flipper Switch (Stack) Single Asm.

9R **22** **16** **5** **6S** **23** **19** Qty. 2 **1** **20** **20B-R-R-G** **30** **32** **33** **34** **31**

See previous page for open view of Coin Door **17**

3S **5** **4T** **6S** Power Interlock Switch **21** **25C** **25** **9L**

Item 30D (Power On/Off Switch) is located under the Cabinet (Front Right) directly below the Power Box (under the Cabinet).

28 **29** **35** **36** **26R** **27** **30F** **26L**

Always keep your Service Game Manual in the Game Cabinet so you'll always know where it's at!

Inside Cabinet View without the Backbox or Playfield.

3S Switch (Lamp inside)
4T Switch (Lamp inside)

Lamp Diodes on Terminal Strip below button(s).

Enlarged Inside Cabinet View of Items 3S, 4T and 25 (25B, 25C, 25H & 25W), Plumb Bob Tilt Switch.

25 **25B** **25H** **25C** **25W**

Thumb-Screw included with Plumb Bob only.

30A **30J** **30i** **30E** USA CAUTION: WARNING: DO NOT OVER FUSE!

Enlarged Inside Cabinet View of Items 30, Power Box (30A), Service Outlet (30E), Fuse (30i) and Fuse Holder (30J).

Take Note:

Legend Note: Items noted with a cyan square ■ are Cabinet Parts. Items noted with a white square □ are Switches.
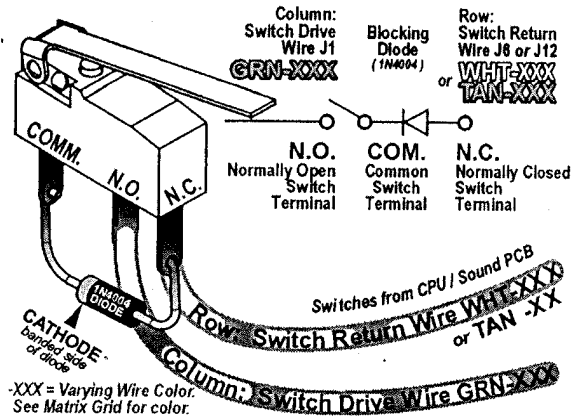
Nr.	CAB. PARTS & SWITCHES	QTY.	SPI PART Nr.
† PARTS TABLE & VIEWS CONTINUED FROM THE PREVIOUS PAGE.			
17	Coin Door 2-Cht $V Up-Stk. 4-Button Bracket	1	501-5018-172
	Item 17 is secured by: 1/4"-20 X 1-1/4" Carriage Bolt Square Neck (Qty. 4) (231-5003-00) 1/4"-20 Flange Nut (Qty. 4) (240-5300-00) and 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 Nr.		
18	Lock 5/8" Barrel, 3/4, Flt. Cam	1	355-5055-00
19	Coin Door Switch (USA) (Happ)	2	180-5024-01
	ALT. SW.: 19C: Coin Door Switch (USA) (Coin Control) (180-5024-00) ALT. SW.: 19J: Coin Door Switch (¥ Japan) (180-5091-00)		
20	4-Button Bracket (for Service Menu Buttons)	1	535-6860-04
	SWITCH: 20B: Push-Button Service Switch (Black) (180-5192-00) SWITCH: 20R: Push-Button Service Switch (Red) (Qty. 2) (180-5192-02) SWITCH: 20G: Push-Button Service Switch (Green) (180-5192-04)		
	Ordering Note: Securing hardware for switches included. Decal in kit sold separately.		
21	Power Interlock-Memory Protect Switch Asm.	1	500-5808-05
	Assembly Parts Included : Mounting Bracket (535-9794-00), Power Interlock (Playfield) Switch (180-5136-00) and secured by: #8 X 1/2" SHWH AB (Zinc) (Qty. 2) (234-5101-00)		
22	Front Molding Lockdown Asm.	1	500-7237-00
	Item 22 is secured by: #10-24 X 1-1/4" Carr. Bolt (Qty. 2) (231-5012-00) and #10-24 Keps Nut (Qty. 2) (240-5207-00)		
23	Lockdown Spring (connected to handle)	1	265-5008-00
	Item 23 is secured by: #8 X 1/2" SHWH AB (Zinc) (Qty. 1) (234-5101-00) and #10 Washer, 7/32" ID X 1/2" OD X 1/16" Thick (Qty. 1) (242-5003-00)		
24	Grills 2-1/2" X 18" (on Back & Bottom)	3	545-5072-02
25	Plumb Bob Tilt Switch Indivual Parts Only		Ind. Parts Only
	SWITCH: 25B: Bracket for Hanger Wire (535-5221-00) 25C: Contact Wire Form (535-7563-01) 25H: Hanger Wire (535-5319-02) 25W: Plumb Bob Weight (535-5029-00) (includes Thumb-Screw)		
	Item 25B is secured to Cabinet by: #6 X 5/8" SHWH AB (Zinc) (Qty. 4) (234-5002-00)		
26L	Slide & Pivot Support Bracket (Left)	1	535-5989-00
26R	Slide & Pivot Support Bracket (Right)	1	535-5990-00
	Items 26L & 26R are secured by: #10-24 X 1-1/4" Carriage Bolt Square Neck Black (3/per) (231-5012-00) and #10-24 KEPS Nut (3/per) (240-5207-00)		

Nr.	CAB. PARTS & SWITCHES	QTY.	SPI PART Nr.
27	Transformer 5.7VAC (with Ballast Winding)	1	010-5012-01
	Item 27 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)		
28	Woofer (Speaker) Grill 12" X 12"		535-0547-00
29	Woofer 12" ø Round 8Ω	1	031-5009-00
	Items 28 & 29 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)		
30	Power Input Box Asm. + Univ. Cable	1	515-5360-08
	30A: Power Box (No Parts) Mounting Frame (535-5932-00) 30B*: Line Filter (150-5000-00) 30C*: Varistor® TNR159211KM (Domestic) (150-5001-00) or Varistor TRM15G431KM (Euro) (150-5002-00) SWITCH: 30D: On/Off Rocker Switch + Bracket Assembly (515-7085-00) 30D incl.: Switch, APEM R2101C5NBB (180-5001-03) + Bracket (535-8318-00) 30E: Service Outlet (3-Prong / US) (180-5008-01) / International N/A 30F: Line Cord 10' ROJ 3" + Ring Terminal Asm. (515-6566-00) 30G: Recessed (Black) Cup (rear of Cabinet) (545-5122-00) 30H*: Snap Bushing 9/16" (White) (280-5001-01) 30I: Fuse 8 Amp 250V Slo-Blo (Domestic) (200-5000-05) or Fuse 5 Amp 250V Slo-Blo (International) (Qty. 2) (200-5003-00) 30J: Fuse Holder (205-5001-00)		
	Universal Cable & Jumper Caps (all voltage variations): See the Yellow Pages, Page y 10.		
31	Cash Box Plastic Bottom	1	545-5090-00
32	Cash Box Cover (Validator)	1	535-5013-03
33	Cash Box Lock Bracket (U-Wire)	1	535-7562-00
	Item 33 is secured by: #8 X 5/8" HWH AB (Green) (Qty. 2) (234-5102-04)		
34	Large Hair-Pin Clip	1	535-7772-00
35	Clamps [Multiple Sizes]	31	040-5000-XX
	Item 35 is secured to Item 1 by: #8 X 1/2" SHWH AB (Zinc) (Qty. 1/per) (234-5101-00) For following sizes, replace -XX with: 3/4" Single = -08 (Qty. 9); 1-1/2" Single = -10 (Qty. 3)		
36	Zip Cable Tie (Screw Down Style)	4	040-5005-00
	Item 36 is secured by: #8 X 1/2" SHWH AB (Zinc) (Qty. 1/per) (234-5101-00)		
37†	Meter +12VDC with Bracket Optional		opt. G-0053-013-102
	† Meters (Diode included) are optional and were not included in this Pinball Machine. Order without the bracket use G-0053-013-102A. More information or Qs? Call Technical Support.		

Parts Identification

p 5

SWITCH MATRIX GRID [#1 - #64] {Switch Locations : next page}

CPU / Sound Board

	01 GRN-BRN J6-P9	02 WHT-BRN J6-P8	03 WHT-RED J6-P7	04 WHT-ORG J6-P6	05 WHT-YEL J6-P5	06 WHT-GRN J6-P3	07 WHT-BLU J6-P2	08 WHT-VIO J6-P1
01 DRIVE GRN-BRN J7-P1 RETURN	S.W. #1 (A)C/DC	S.W. #2 A(C)/DC	S.W. #3 AC(/)DC	S.W. #4 AC(/D)C	S.W. #5 AC(/D)C	S.W. #6 R(O)CK	S.W. #7 RO(C)K	S.W. #8 RO(C)K
02 DRIVE GRN-RED J7-P3 RETURN	S.W. #17 TROUGH #4 LEFT BELOW P.F.	S.W. #18 TROUGH #3 BELOW P.F.	S.W. #19 TROUGH #2 BELOW P.F.	S.W. #20 TROUGH #1 RIGHT BELOW P.F.	S.W. #21 TROUGH JAM BELOW P.F.	S.W. #22 SHOOTER LANE BELOW P.F.	S.W. #23 LEFT OUTLANE BELOW P.F.	S.W. #24 LEFT RETURN LANE BELOW P.F.
03 DRIVE GRN-ORG J7-P4 RETURN	S.W. #33 L. LOOP SPINNER BELOW P.F.	S.W. #34 L. RAMP STANDUP (L) BELOW P.F.	S.W. #35 L. RAMP STANDUP (R) BELOW P.F.	S.W. #36 BELL STANDUP BELOW P.F.	S.W. #37 TOP EJECT BELOW P.F.	S.W. #38 LEFT TOP LANE BELOW P.F.	S.W. #39 CENTER TOP LANE BELOW P.F.	S.W. #40 RIGHT TOP LANE BELOW P.F.
04 DRIVE GRN-YEL J7-P5 RETURN	S.W. #49 BELOW P.F.	S.W. #50 BELOW P.F.	S.W. #51 BELOW P.F.	S.W. #52 BELOW P.F.	S.W. #53 BELOW P.F.	S.W. #54 BELOW P.F.	S.W. #55 BELOW P.F.	S.W. #56 BELOW P.F.

	09 TAN-BLK J12-P9	10 TAN-RED J12-P8	11 TAN-ORG J12-P6	12 TAN-YEL J12-P4	13 TAN-GRN J12-P3	14 TAN-BLU J12-P2	15 TAN-VIO J12-P2	16 TAN-WHT J12-P1
01 RETURN	S.W. #9 (T.)N.T.	S.W. #10 T.(N.)T.	S.W. #11 T.N.(T.)	S.W. #12	S.W. #13	S.W. #14	S.W. #15 L. RAMP TOURN START	S.W. #16
02 RETURN	S.W. #25 LEFT SLINGSHOT BELOW P.F.	S.W. #26 RIGHT SLINGSHOT BELOW P.F.	S.W. #27 RIGHT RETURN LANE BELOW P.F.	S.W. #28 RIGHT OUTLANE BELOW P.F.	S.W. #29 LEFT POP BUMPER BELOW P.F.	S.W. #30 RIGHT POP BUMPER BELOW P.F.	S.W. #31 BOTTOM POP BUMPER BELOW P.F.	S.W. #32
03 RETURN	S.W. #41 R. RAMP STANDUP ABOVE P.F.	S.W. #42 R. RAMP ENTER ABOVE P.F.	S.W. #43 R. RAMP EXIT ABOVE P.F.	S.W. #44 CANNON EXIT BELOW P.F.	S.W. #45 CANNON EJECT BELOW P.F.	S.W. #46 BELOW P.F.	S.W. #47 BELOW P.F.	S.W. #48 BELOW P.F.
04 RETURN	S.W. #57 ABOVE P.F.	S.W. #58 RIGHT LOOP ABOVE P.F.	S.W. #59 LEFT LOOP ABOVE P.F.	S.W. #60 CANNON HOME	S.W. #61 CANNON MARK	S.W. #62	S.W. #63 FIRE BUTTON IN CABINET	S.W. #64 SKILL SHOT IN CABINET

« FOR MORE ABOUT DIODE ON TERMINAL STRIPS «D.O.T.S.», SEE SECTION 5, CHAPTER 2, PAGES 104-105 »

Wire Color Abbreviations used:

BLK Black	BRN Brown	LGN Light Green	RED Red
BLU Blue	GRY Gray	ORG Orange	TAN Tan
	GRN Green	PNK Pink	VIO Violet
			WHT White
			YEL Yellow

Dedicated Switches [#D-1 - #D-32] {Dedicated Switch Locations : next page}

CPU/SND Board

IC-U2 PNK-BRN J2-P2	IC-U2 PNK-RED J2-P3	IC-U2 PNK-ORG J2-P4	IC-U2 PNK-YEL J2-P6	IC-U2 PNK-GRN J2-P7	IC-U2 PNK-BLU J2-P9	IC-U2 PNK-VIO J2-P10
S.W. D-1 LEFT COIN SLOT	S.W. D-2 CENTER COIN SLOT	S.W. D-3 RIGHT COIN SLOT	S.W. D-4 FORTH COIN SLOT	S.W. D-5 FIFTH COIN SLOT	S.W. D-6	S.W. D-7

IC-U4 GRY-BRN J3-P1	IC-U4 GRY-RED J3-P2	IC-U4 GRY-ORG J3-P4	IC-U4 GRY-YEL J3-P5	IC-U4 GRY-GRN J3-P6	IC-U4 GRY-BLU J3-P7	IC-U4 GRY-VIO J3-P8	IC-U4 GRY-BLK J3-P9
S.W. D-8 LEFT FLIPPER BUTTON	S.W. D-9 LEFT FLIPPER E.O.S.	S.W. D-10 RIGHT FLIPPER BUTTON	S.W. D-11 RIGHT FLIPPER E.O.S.	S.W. D-12	S.W. D-13	S.W. D-14	S.W. D-15
							S.W. D-16

CPU/SND Board

IC-401 LGN-BRN J13-P1	IC-401 LGN-RED J13-P3	IC-401 LGN-ORG J13-P4	IC-401 LGN-YEL J13-P5	IC-401 LGN-BLK J13-P6	IC-401 LGN-BLU J13-P7	IC-401 LGN-VIO J13-P8	IC-401 LGN-GRY J13-P10
S.W. D-17 TILT PENDULUM	S.W. D-18 SLAM TILT	S.W. D-19 TICKET NOTCH	S.W. D-20 BACK (GREEN)	S.W. D-21 MINUS (RED)	S.W. D-22 PLUS (RED)	S.W. D-23 SELECT (BLACK)	S.W. D-24

S.W. D-25	S.W. D-26	S.W. D-27	S.W. D-28	S.W. D-29	S.W. D-30	S.W. D-31	S.W. D-32

CPU/SOUND BD. SW1 DIP SWITCH (located between Connectors J3/J13)

	DIP (1)2345678	DIP 1(2)345678	DIP 12(3)45678	DIP 123(4)5678	DIP 1234(5)678	DIP 12345(6)78	DIP 123456(7)8	DIP 1234567(8)
	S.W. POS. #1 ON	S.W. POS. #2 ON	S.W. POS. #3 ON	S.W. POS. #4 ON	S.W. POS. #5 ON	S.W. POS. #6 ON	S.W. POS. #7 ON	S.W. POS. #8 ON

GROUND (BLK) J2-P1/17 & J3-P10

CABINET		
IF USED		

GROUND (BLK) J13-P1o

CABINET	
IF USED	

PRO

9

GO TO DIAGNOSTICS MENU

GO TO SWITCH MENU

SWITCH TEST

SWITCH MENU: SWITCH, ACTIVE, SINGLE & SERVICE

37 VUK

13 LEFT RAMP EXIT

44 LEFT ORBIT MADE

36

38 **39** **40**

59 RIGHT ORBIT MADE

HELLS BELL

30 **31**

14 LEFT RAMP ENTER

41 RIGHT RAMP ENTER

32

35 **34**

33 LEFT ORBIT ENTER

10 11 12

42

5

4

3

2

1

PRO MODEL!

6

7

8

9

43 RIGHT RAMP MADE

26

27

45 CANNON

61,62 CANNON MOTOR

28

24 **25**

29 48

18-22

23

Typical Switch Wiring & Schematic

Column: Switch Drive Wire J1 **GRN-XXX**	Blocking Diode (1N4004)	Row: Switch Return Wire J6 or J12 **WHT-XXX** or **TAN-XXX**
N.O. Normally Open Switch Terminal	COM. Common Switch Terminal	N.C. Normally Closed Switch Terminal

COMM. N.O. N.C.

1N4004 DIODE

CATHODE banded side of diode

Switches from CPU / Sound PCB

Row: Switch Return Wire WHT-XXX or TAN -XX

Column: Switch Drive Wire GRN-XXX

-XXX = Varying Wire Color. See Matrix Grid for color.

Dedicated Switch Schematic

PNK-XXX, GRY-XXX or LGN-XXX Dedicated Switch Input Wire J2, J3 or J13

BLACK Ground Wire J2-P1/11, J3-P10 or J13-P10

N.O. Normally Open Switch Terminal

COM. Common Switch Terminal

Typical Switch Wiring & Schematic
... with Switch Diode on a Terminal Strip (DOTS)

ORG-XXX COMM. N.O.

ORG-XXX CONN. GRN-XXX

ORG-XXX

WHT-XXX TAN-XXX

TERMINAL STRIP GRN-XXX

J6-#

J12-#

J1-#

CPU PCB

COMM. N.O. N.C.

wire IN from previous switch or CPU PCB ...

wire OUT to next switch ...

Wire WHT-XXX or TAN-XXX

1N4004 DIODE

Jumper ORG-XXX to Row: Switch Return

Column: Switch Drive Wire GRN-XXX

-XXX = Varying Wire Color. See Matrix Grid for color.

PRO

10

COILS DETAILED CHART TABLE

	High Current Coils Group 1	Drive Transistor	Driver Output PCB	Power Line Color	Power Line Connection	Power Voltage	Drive Transistor Control Line Color	D.T. Control Line Connect	Coil GA-Turn or Bulb Type
#1	TROUGH UP-KICKER	Q1		YEL-VIO	J10-P9/10	50VDC	BRN-BLK	J8-P1	26-1200 090-5044-ND
#2	AUTO LAUNCH	Q2		YEL-VIO	J10-P9/10	50VDC	BRN-RED	J8-P3	24-940 090-5036-ND
#3	CANNON EJECT	Q3	▲ I/O Power Driver ▼	YEL-VIO	J10-P9/10	50VDC	BRN-ORG	J8-P4	23-800 090-5001-ND
#4	RIGHT RAMP DIVERTER	Q4		YEL-VIO	J10-P9/10	50VDC	BRN-YEL	J8-P5	23-800 090-5001-ND
#5	RIGHT CONTROL GATE	Q5		YEL-VIO	J10-P9/10	50VDC	BRN-GRN	J8-P6	32-1800 515-6595-01 ND
#6		Q6				50VDC	BRN-BLU	J8-P7	
#7		Q7					BRN-VIO	J8-P8	
#8	SHAKER MOTOR (OPTIONAL)	Q8		RED-WHT	J17-P7	16VAC	BRN-GRY	J8-P9	502-5027-00

	High Current Coils Group 2	Drive Transistor	Driver Output PCB	Power Line Color	Power Line Connection	Power Voltage	Drive Transistor Control Line Color	D.T. Control Line Connect	Coil GA-Turn or Bulb Type
#9	LEFT POP BUMPER	Q9		YEL-VIO	J10-P9/10	50VDC	BLU-BRN	J8-P1	26-1200 090-5044-ND
#10	RIGHT POP BUMPER	Q10		YEL-VIO	J10-P9/10	50VDC	BLU-RED	J8-P2	26-1200 090-5044-ND
#11	BOTTOM POP BUMPER	Q11	▲ I/O Power Driver ▼	YEL-VIO	J10-P9/10	50VDC	BLU-ORG	J8-P4	26-1200 090-5044-ND
#12	TOP EJECT	Q12		YEL/VIO	J10-P9/10	50VDC	BLU-YEL	J8-P5	26-1200 090-5044-ND
#13	LEFT SLINGSHOT	Q13		YEL-VIO	J10-P9/10	50VDC	BLU-GRN	J8-P6	26-1200 090-5044-ND
#14	RIGHT SLINGSHOT	Q14		YEL-VIO	J10-P9/10	50VDC	BLU-BLU	J8-P7	26-1200 090-5044-ND
#15	**LEFT FLIPPER (50V RED/YEL)**	Q15		GRY-YEL~3A Fuse~RED-YEL	J10-P6/7	50VDC	ORG-GRY	J8-P8	22-1080 090-5032-ND
#16	**RIGHT FLIPPER (50V RED/YEL)**	Q16		GRY-YEL~3A Fuse~RED-YEL	J10-P6/7	50VDC	ORG-VIO	J8-P9	22-1080 090-5032-ND

	Low Current Coils Group 1	Drive Transistor	Driver Output PCB	Power Line Color	Power Line Connection	Power Voltage	Drive Transistor Control Line Color	D.T. Control Line Connect	Coil GA-Turn or Bulb Type
#17	TRAIN FLASHER	Q17		ORG	J6-P10	20VDC	VIO-BRN	J7-P2	# 89 BULB 165-5000-89
#18		Q18					VIO-RED	J7-P3	
#19		Q19	▲ I/O Power Driver ▼				VIO-ORG	J7-P4	
#20	LEFT RAMP FLASHER	Q20		ORG	J6-P10	20VDC	VIO-YEL	J7-P6	#89 BULB 165-5000-89
#21	LEFT SIDE FLASHER	Q21		ORG	J6-P10	20VDC	VIO-GRN	J7-P7	# 89 BULB 165-5000-89
#22	BACK PANEL FLASHER	Q22		ORG	J6-P10	20VDC	VIO-BLU	J7-P8	# 89 BULB 165-5000-89
#23	TOP EJECT FLASHER	Q23		ORG	J6-P10	20VDC	VIO-BLK	J7-P9	# 89 BULB 165-5000-89
#24	OPTIONAL (e.g. COIN METER)	Q24		RED	J16-P4-8	5VDC	VIO-GRY	J7-P10	COIN METER

	Low Current Coils Group 2	Drive Transistor	Driver Output PCB	Power Line Color	Power Line Connection	Power Voltage	Drive Transistor Control Line Color	D.T. Control Line Connect	Coil GA-Turn or Bulb Type
#25	POP BUMPERS FLASH (X3)	Q25		ORG	J6-P10	20VDC	BLK-BRN	J6-P1	# 89 BULB 165-5000-89
#26	BELL ARROW FLASHER	Q26		ORG	J6-P10	20VDC	BLK-RED	J6-P2	# 89 BULB 165-5000-89
#27	LEFT RAMP LEFT SIDE FLASHER	Q27	▲ I/O Power Driver ▼	ORG	J6-P10	20VDC	BLK-ORG	J6-P3	# 89 BULB 165-5000-89
#28	LEFT RAMP RIGHT SIDE FLASHER	Q28		ORG	J6-P10	20VDC	BLK-YEL	J6-P4	# 89 BULB 165-5000-89
#29	RIGHT RAMP RIGHT SIDE FLASHER	Q29		ORG	J6-P10	20VDC	BLK-GRN	J6-P5	# 89 BULB 165-5000-89
#30	RIGHT RAMP FLASHER	Q30		ORG	J6-P10	20VDC	BLK-BLU	J6-P6	# 89 BULB 165-5000-89
#31	RIGHT SIDE FLASHER	Q31		ORG	J6-P10	20VDC	BLK-VIO	J6-P7	# 89 BULB 165-5000-89
#32	CANNON MOTOR	Q32		BRN	J7-P1	20VDC	BLK-GRY	J6-P8	MOTOR 041-5111-00

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PRO

GO TO DIAGNOSTICS MENU

GO TO COIL MENU

SINGLE COIL TEST

COIL MENU: SINGLE COIL & CYCLING COIL

23 **12** VUK

17 TRAIN FLASH

5 ELEC GATE

HELLS BELL

9

10

25

26

11

30

20

BALL

27 FLASH

28 FLASH

29 FLASH

31 SPOT FLASH

4 DIVERTER

PRO MODEL!

21 SPOT FLASH

3 CANNON

32 AC MOTOR

13

14

15

16

1

2

ROCK CITY ALARM

AC/DC
DESIGNED BY STEVE RITCHIE

PRO   13

IF YOU SHOOK ME ALL NIGHT LONG
HIGHWAY TO HELL
ROCK N ROLL TRAIN
BACK IN BLACK
WHOLE LOTTA ROSIE
FOR THOSE ABOUT TO ROCK
HELLS BELLS
WAR MACHINE
THUNDERSTRUCK
T.N.T.
HELL AIN'T A BAD PLACE TO BE
LET THERE BE ROCK

THESE LEDS TO BE CONNECTED TO BAND STAND

22 FLASH

Typical Coil Wiring & Schematic

I/O PCB Drive Transistor

I/O Power Driver PCB

+50V

Q1

J8

BRN-BLK

COIL

1N4004 DIODE LOCATED ON I/O PWR. DRV. PCB

J10-P9/10 I/O PCB

+50VDC

YEL-VIO HIGH POWER

#1 Trough Up-Kicker
26-1200
Gauge - Turn

BRN-BLK

YEL-VIO

Power Voltage Supply 50VDC

LAMP MATRIX GRID [#1 - #80] {Lamp Locations : next page}

I/O Power Driver Board (row drivers, left side):

#	Transistor		Wire	Conn.
01	Q33	GROUND	RED-BRN	J12-P1
02	Q34	GROUND	RED-BLK	J12-P2
03	Q35	GROUND	RED-ORG	J12-P3
04	Q36	GROUND	RED-YEL	J12-P4
05	Q37	GROUND	RED-GRN	J12-P5
06	Q38	GROUND	RED-BLU	J12-P6
07	Q39	GROUND	RED-VIO	J12-P8
08	Q40	GROUND	RED-GRY	J12-P9
09	Q41	GROUND	RED-WHT	J12-P10
10	Q42	GROUND	RED	J12-P11

Column drive (top header):

Col	IC	Wire	Conn.	Supply
01	IC-U17	YEL-BRN	J13-P9	18VDC
02	IC-U16	YEL-RED	J13-P8	18VDC
03	IC-U15	YEL-ORG	J13-P7	18VDC
04	IC-U14	YEL-BLK	J13-P6	18VDC
05	IC-U13	YEL-GRN	J13-P5	18VDC
06	IC-U12	YEL-BLU	J13-P4	18VDC
07	IC-U11	YEL-VIO	J13-P3	18VDC
08	IC-U10	YEL-GRY	J13-P1	18VDC

Lamp matrix (#1–#80):

Driver \ Col	01 IC-U17	02 IC-U16	03 IC-U15	04 IC-U14	05 IC-U13	06 IC-U12	07 IC-U11	08 IC-U10
Q33	#1 START	#2 TOURNAMENT START	#3 LEFT OUTLANE	#4 LEFT RETURN LANE	#5 2X	#6 (LED BD.)	#7 RIGHT RETURN LANE	#8 RIGHT OUTLANE
Q34	#9 AC/D(C)	#10 AC(/D)C	#11 L. RAMP STANDUP (L)	#12 A(C)	#13 3X	#14 FACE LEFT EYE	#15 FACE RIGHT EYE	#16 —
Q35	#17 FACE MOUTH	#18 L. LOOP ARROW (WHT./NOTE)	#19 L. RAMP STANDUP (L)	#20 L. RAMP ARROW (WHT./NOTE)	#21 L. RAMP STANDUP (R)	#22 (T).N.T.	#23 FACE RIGHT EYE	#24 —
Q36	#25 T.N.T. ARROW (WHT./NOTE)	#26 R. RAMP ARROW (WHT./NOTE)	#27 EXTRA BALL	#28 R. LOOP ARROW (RED/HORNS)	#29 R. LOOP ARROW (WHT./NOTE)	#30 T.(N.)T.	#31 (R)OCK	#32 R(O)CK
Q37	#33 ROC(K)	#34 SPECIAL	#35 BELL ARROW (RED/HORNS)	#36 BELL ARROW (WHT./NOTE)	#37 CENTER TOP LANE	#38 T.N.(T.)	#39 RO(C)K / RIGHT TOP LANE	#40 RO(C)K / TUNES N STUFF
Q38	#41 JAM MULTIBALL	#42 SUPER TARGETS	#43 SUPER LANES	#44 ALBUM MULTIBALL	#45 CANNON FODDER	#46 CANNON VOLLEY	#47 CANNON CHAOS	#48 ROCK AGAIN
Q39	#49 TOUR MULTIBALL	#50 SUPER COMBO	#51 SUPER LOOPS	#52 YOU SHOOK ME ALL NIGHT LONG	#53 HIGHWAY TO HELL	#54 ROCK-N-ROLL TRAIN	#55 ROCK	#56 WHOLE LOTTA ROSIE
Q40	#57 JUKE BOX HORN (L)	#58 JUKE BOX HORN (R)	#59 (LED)	#60 LEFT BUMPER	#61 RIGHT BUMPER	#62 BOTTOM BUMPER	#63 FIRE BUTTON	#64 R. RAMP STANDUP
Q41	#65 HELLS BELLS	#66 THUNDERSTRUCK	#67 BACK IN BLACK	#68 WAR MACHINE	#69 FOR THOSE ABOUT TO ROCK	#70 HELL AIN'T A BAD PLACE TO BE	#71 LET THERE BE ROCK	#72 —
Q42	#73 —	#74 —	#75 —	#76 —	#77 —	#78 T.N.T.	#79 —	#80 —

Bulb / part-number notes: #555 CLEAR L.P. = 165-5002-00 · #44 CLEAR L.P. = 165-5000-44-HF (bottom rows 185-5000-44-HF) · LED BD. = 520-5307-00 / 520-5333-00 · Bumpers = 112-5024-08.

Wire Color Abbreviations used:

Abbr.	Color
BLK	Black
BLU	Blue
BRN	Brown
GRY	Gray
GRN	Green
ORG	Orange
RED	Red
VIO	Violet
WHT	White
YEL	Yellow

PRO

15

DIAG AUD ADJ UTIL TOUR OUT?
GO TO DIAGNOSTICS MENU

MORE COIL MECH LAMP GAME CLR MORE
GO TO LAMP MENU

ONE ALL ROW COL ORD MORE
SINGLE LAMP TEST
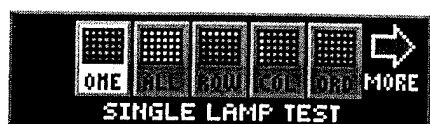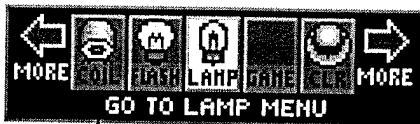
LAMP MENU: ONE, ALL, ROW, COLUMN & ORDERED

HELLS BELL

Typical Lamp Wiring & Schematic

Row:
Lamp Return
Wire J12 (Ground)
RED-XXX

Column:
Lamp Drive
Wire J13 (18VDC)
YEL-XXX

#44
Bayonet
Base

COMMON

Column: Lamp Drive (18VDC) Wire YEL-XXX

1N4004 DIODE

CATHODE
banded side
of diode

Row: Lamp Return Wire RED-XXX

Lamps from I/O Power Driver PCB

-XXX = Varying Wire Color.
See Matrix Grid for color.

Typical Lamp Wiring & Schematic

... with Lamp Diode on a Terminal Strip (DOTS)
Usually when an LED Module is used as a Controlled Lamp for a Pop Bumper.

BLACK
LED
Wedge
Base
BLACK
RED-XXX
J12-#
TERMINAL STRIP
YEL-XXX
J13-#
I/O PCB

... with Lamp Diode on a Terminal Strip (DOTS)
Usually when a #555 Bulb is used as a Controlled Lamp for a Spot Light.

ORG-XXX **ORG-XXX** **RED-XXX**
#555
Wedge
Base
CONN.
TERMINAL STRIP
YEL-XXX
YEL-XXX
J12-#
J13-#
I/O PCB

... wire IN from previous lamp or I/O PCB ...
... wire OUT to next lamp ...
Wi **RED-XXX**
1N4004 DIODE

Jumper ORG-XXX to Row: Lamp Return

Column: Lamp Drive Wire YEL-XXX

-XXX = Varying Wire Color.
See Matrix Grid for color.

YOU SHOOK ME ALL NIGHT LONG — BACK IN BLACK
HIGHWAY TO HELL — WAR MACHINE
ROCK 'N ROLL TRAIN — FOR THOSE ABOUT TO ROCK
WHOLE LOTTA ROSIE — T.N.T.
HELLS BELLS — HELL AIN'T A BAD PLACE TO BE
THUNDERSTRUCK — LET THERE BE ROCK

AC/DC
DESIGNED BY STEVE RITCHIE

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PRO

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Please visit www.sternpinball.com
For part numbers and mechanical drawings.

Stern Pinball machines are assembled in Melrose Park, Illinois, USA; each pinball machine has unique characteristics that make it a one of a kind American made product. Each machine will have variations in appearance resulting from differences in the machine's particular wood parts, individual silk screened art and mechanical assemblies. Stern Pinball has inspected each game element to insure it meets our quality standards.

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HOW TO UPDATE YOUR GAME CODE FOR S.A.M. SYSTEM MACHINES

///

USB Compatible Data Storage Device (Thumb, Flash or Jump Drives) required to copy game code into system. S.A.M. System compatible, tested & SPI approved USB Data Storage Devices 128MB+ available through your local distributor: Ask for **SPI Part Number 970-0128-00**

* to get the Data Storage Device with the latest *Game Code* copied to it, add *"game title"* to above part number.

STYLE, COLOR, SIZE AND MANUFACTURER SUBJECT TO CHANGE.

///

Game Code is subject to change. Update this game with the latest code downloaded from our website, from another game *or* order through your local distributor *(use SPI PN + name above).*

*Upon power-up the display will describe the version of code installed in your game. When directed to do so (via Service Bulletin or website announcement) you will need to update your code ... with the **BOOT FLASH EPROM*** installed, here's how:*

Press ● **SELECT** for **SERVICE MENU**

BACK ◁ ⊖ ⊕ ▷ **SELECT**

• Green Button Press to **Escape Back** (or *Exit*).	**••** Red Buttons Press to move < Left , Right >. Press to – **Decrease** or + **Increase** values or to change settings.	**●** Black Button Press to **Enter Select** (or *'OK'*).

STEP 1 Open the Back Box and locate the **8-Position Dip Switch** *(SW1 on the CPU/Sound Board).*

STEP 2 Switch Dip Switch #8 to 'ON'. *(*BOOT FLASH EPROM must be installed.)*

STEP 3 Press the **White Reset Button** *(S1 RESET on the CPU/Sound Board)* or Power Cycle the game **OFF/ON** *(ON/OFF Switch is located on the outside of the cabinet bottom, front right).*

STEP 4 Using the **4-Button Service Switch Set** *(inside the Coin Door):*

4A } Press [SELECT] to begin.
4B } With the "UPDT" *Icon highlighted*, press [SELECT].
4C } Insert the Data Storage Device [w/latest file(s)] into the USB Port.
4D } *If more than one file is present on the Data Storage Device, press* [<] *or* [>] *to locate your file.* Press [SELECT] to update.
4E } Follow on-screen prompts.
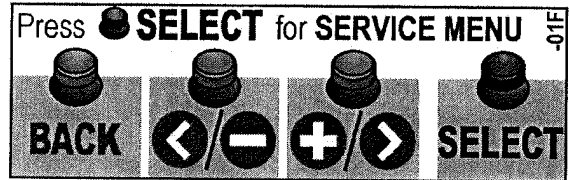
CPU/Sound Board (S.A.M. System)

STEP 4

4A BOOT EPROM
B-00 LATEST VERSION V0.0
PRESS 'SELECT' TO BEGIN

4B UPDT QUIT
UPDATE GAME CODE

4C GAME CODE UPDATE
INSERT USB MEMORY STICK
OR
PRESS 'BACK' TO EXIT

4D GAME CODE UPDATE
IMAGE.BIN
PRESS 'SELECT' TO UPDATE
OR
PRESS 'BACK' TO EXIT

IF MORE THAN ONE FILE IS PRESENT ON MEMORY STICK, PRESS [<] or [>] TO LOCATE ...

STEP 4E ➔ FOLLOW ON-SCREEN PROMPTS

STEP 3
WHITE RESET BUTTON (S1 RESET)

CR2430 3 Volts Lithium COIN CELL BATTERY

USB 1.1/2.0 PORT Memory Stick

STEP 4C

BOOT FLASH EPROM

STEP 1
8-Position SW1 DIP SWITCH (#8 at the Top)

Switch #8 to the 'ON' Position

STEP 2

BOOT FLASH 32-Pin 8MB EPROM
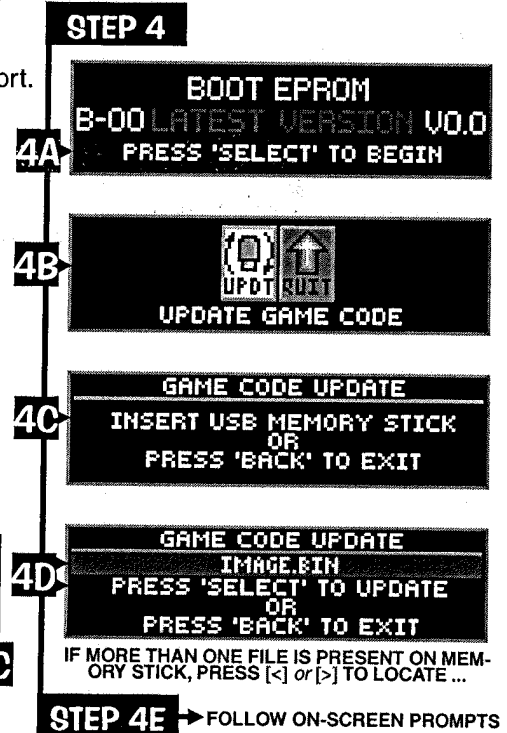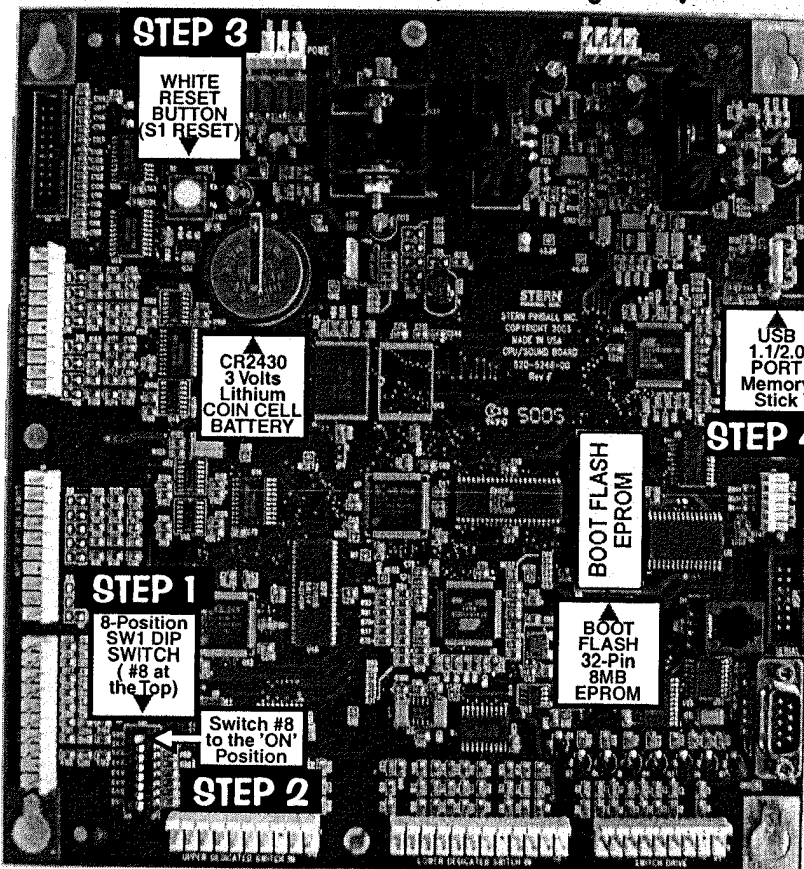
You can also retrieve your latest code from another game! From the **USB MENU** via the **UTILITIES MENU**, select the "BKUP" *Icon instead* and download to your Data Storage Device.

BKUP

///

! Quick Tip ~ *Try backing up your current code prior to installing your new code, just in case your Data Storage Device file was corrupted by a computer glitch while you were copying /*

Got confused? Comments? Questions? Call Technical Support at 800-542-5377 or 708-345-7700 (Option 1).

Bottom Arch
Not Shown for clarity.

To install pinballs, roll into the
ball trough from above the playfield.
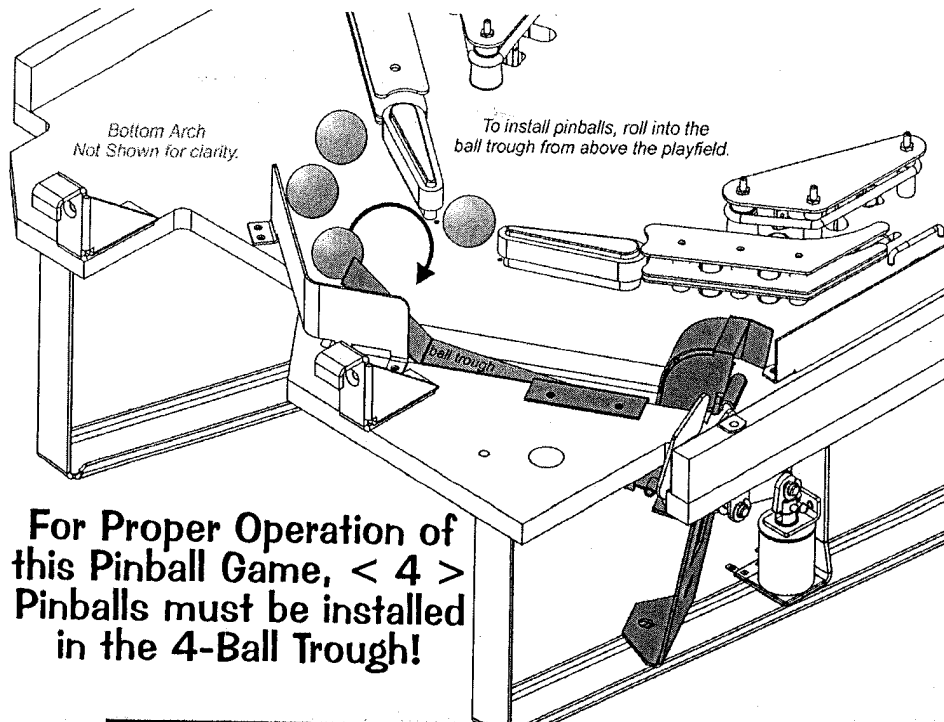
ball trough

For Proper Operation of this Pinball Game, < 4 > Pinballs must be installed in the 4-Ball Trough!

//////////////////

Backbox Fuses*, Cabinet Fuses, Playfield Fuses and Cabinet Switches

*Note: The CPU/Sound PCB does not have fuses.

QUICK REFERENCE FUSE CHART

3/4A S.B. 200-5000-17 | 3A S B 200-5000-08 | 4A S B 200-5000-06 | 5A S B 200-5000-01 | 7A S.B. 200-5000-03 | 8A S B 200-5000-05

BACKBOX FUSES
I/O POWER DRIVER BOARD
with RED LED STATUS INDICATORS (if any RED LED is OFF, check the fuse)

F1	5A S.B.	5.7VAC~ G.I. Lamps	[BROWN-WHITE⇆WHT-BRN]
F2	5A S.B.	5.7VAC~ G.I. Lamps	[YELLOW⇆WHITE-YEL Circuit]
F3	5A S.B.	5.7VAC~ G.I. Lamps	[GREEN⇆WHITE-GRN Circuit]
F4	5A S.B.	5.7VAC~ G.I. Lamps	[VIOLET⇆WHITE-VIO Circuit]
F5	7A S.B.	50VDC Coils / Flippers	[48VAC feed to BRDG 1]
F6	3A S.B.	24VAC~ Motor or *Special Application*	
F7	4A S.B.	50VDC Magnet(s) or *Special Application*	
F8	3A S.B.	50VDC Coils	
F9	5A S.B.	5VDC Logic Power	[13VAC feed to BRDG 4]
F10	5A S.B.	20VDC Coils / Flashers	[16VAC feed to BRDG 2]
F12	5A S.B.	12VDC Audio	[19VAC feed to BRDG 3]
F13	5A S.B.	12VDC Audio	[19VAC feed to BRDG 3]

CABINET FUSES
POWER (SERVICE OUTLET) BOX
(Access through Coin Door inside cabinet, front bottom.)

8A S.B.	110-120V Main Line US / Canada / Japan
5A S.B.	220-240V Main Line International

PLAYFIELD FUSES
FLIPPER OR SPECIAL APPLICATION
(Coil Fuses are located under the playfield near assembly.)

3A S.B.	50VDC R. Flipper [BLU-YEL⇆RED-YEL]
3A S.B.	50VDC L. Flipper [GRY-YEL⇆RED-YEL]
3A S.B.	50VDC *Additional Flipper Coil, if used.*
3A S.B.	50VDC *Spcl. Application Coil, if used.*

For location & more details on fuses, see Sec. 5, Chp. 2

ALL FUSES ARE 250V S.B. (SLO-BLO)
SEE FUSE OR TABLES FOR AMP RATING

⚠ *CAUTION* : FOR CONTINUED PROTECTION AGAINST RISK OF FIRE, REPLACE ONLY WITH SAME TYPE FUSE WITH IDENTICAL ELECTRICAL RATING! ⚠

Stern Pinball®, Inc. ©2012   820-8020-00

Inside Coin Door

Playfield *Power Interlock* Switch

Inside Coin Door

4-Button Switch Set

Playfield *Power Interlock* Switch

Service Outlet
(on Power Box),
if equiped.

On/Off Switch
(Under Cabinet)

4-Button Switch Set:

US / Canada / Japan :
8 Amp 250v Slo-Blo Fuse

International :
8 Amp 250v Slo-Blo Fuse

Transformer on
▼ Cabinet Bottom

1
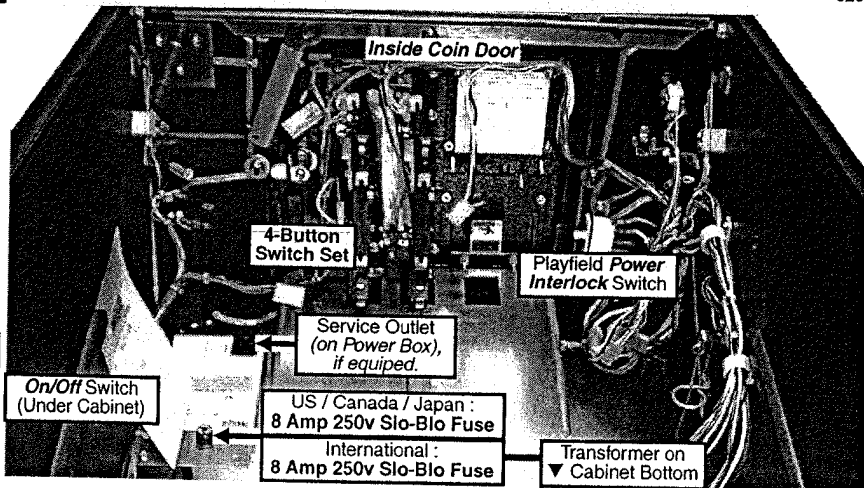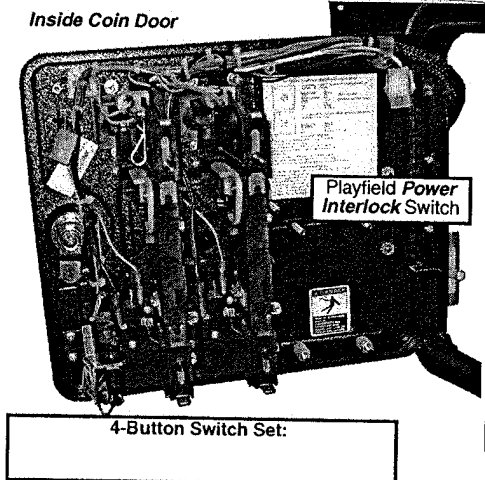
OPEN THE COIN DOOR TO ACCESS THE SERVICE SWITCH X4 SET.

● ● ● ● Service Switch X4 Set Overview

The four buttons *(inside Coin Door)* have dual functions depending if you have entered the **Service Menu** or not.

Functions in Game or Attract Mode

Green	Red	Red	Black

SERVICE CREDIT	⊖VOLUME⊕	MENU

● Green Button Press for Service Credit(s).	●● Red Buttons Press for Volume Adjustment – for less (quieter), + for more (louder)	● Black Button Press for Service Menu entry.
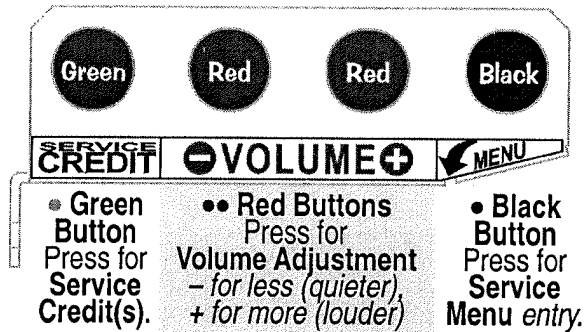
Functions in the Service Menu

Press ● **SELECT** for SERVICE MENU -01F

BACK	◁/⊖	⊕/▷	SELECT

● Green Button Press to Escape Back (or *Exit*).	●● Red Buttons Press to move < Left, Right >. Press to – Decrease or + Increase values or to change settings.	● Black Button Press to Enter Select (or 'OK').

Inside Coin Door

▼ Service Switch X4 Set ▼

If Coil / Flash-lamp Testing, the Playfield Power Interlock Switch must be pulled out.
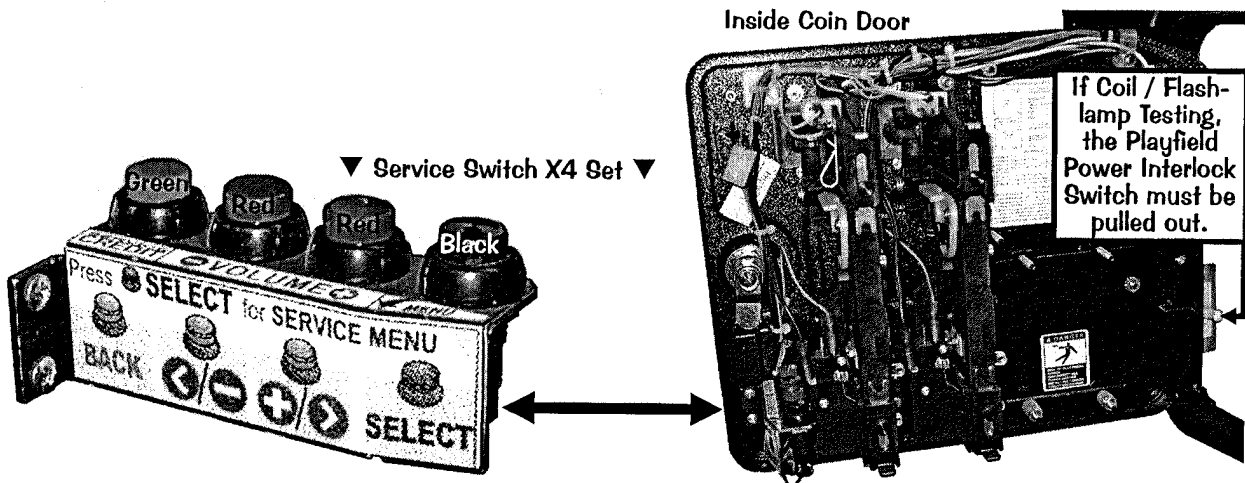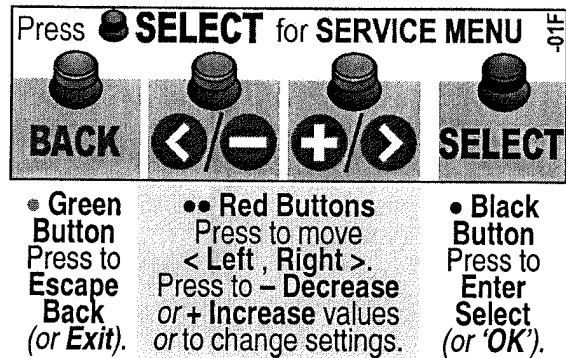
EXAMPLE:

To enter the **SERVICE MENU**, then enter the **SWITCH TEST MENU** via the **DIAGNOSTIC MENU**, perform the below steps.

Step 1 Press [SELECT].

Step 2 With the "DIAG" *Icon* highlighted, press [SELECT].

Step 3 With the "SW" *Icon* highlighted, press [SELECT].

Step 4 With the "TEST" *Icon* highlighted, press [SELECT].

Press any switch. If wired correctly, the information in the display will match the information in the Switch Matrix (see DR. 4).

Press [<] or [>] to move left or right through the menus.

Press [BACK] to go back a menu, exit or escape at any time.

Continue through the other menus.

GAME NAME
V0.00   SYS. 0.00   HDW. 0
SERVICE MENU
PRESS 'SELECT' TO CONTINUE

| DIAG | AUD | ADJ | UTIL | TOUR | QUIT |

GO TO DIAGNOSTICS MENU

| SW | COIL | FLASH | LAMP | GAME | MORE |

GO TO SWITCH MENU

| TEST | ACT | ALRT | PREV | QUIT | HELP |

SWITCH TEST

The Service Menu is subject to change. Update this game with the latest code downloaded from out website with a USB Data Storage Device (64MB min., recommendation 128MB or higher). See the inside front cover for directions or in the Service Menu "Go To Utilities Menu" then "Go To USB Menu" and follow prompts.

2

///////////// DIAGNOSTIC AIDS /////////////

```
50V / 20V DISABLED
CLOSE COIN DOOR
OR PULL INTERLOCK SWITCH
TO RESTORE POWER
```

This **audible / visual alert display** is shown when the 50V / 20V Power is disabled *(by opening the Coin Door)*. PULL OUT THE INTERLOCK SWITCH ONLY WHILE IN THE SERVICE MENU FOR COIL, SWITCH OR PLAY TESTING WHEN THE COIN DOOR IS REQUIRED TO STAY OPEN FOR SERVICE BUTTON USE! Pulling out the Power Interlock Switch or pressing the 'escape' **Green [BACK] Button** will remove the alert display. Initial display presentation is accompanied by 3 audible tones *(the bright display warning will go dim after approximately 30 seconds)*.

```
OPERATOR ALERT!
AUTO PLUNGER
DEVICE MALFUNCTION
```

This **alert display** is shown momentarily during **Game Mode** or **Power-Up** to alert the operator of a device malfunction *(device or mechanism doesn't energize or is energized repeatedly)*. **OPERATOR ALERT!** works by monitoring any *switch activated device* that has the potential to trap a ball when disabled *(e.g. in the Shooter Lane, Scoop or Eject Holes, etc.)*. This alert can also appear if a switch associated with a device *(e.g. Ball Trough, Auto Plunger, etc.)* is stuck closed *(caused by a switch jam or stuck ball)*; the game will activate the device a predetermined number of times and if the problem is still detected, this device *or* switch will be noted in **Switch Alerts** *and/or* **Technician Alerts**.

```
GAME NAME
V0.00      SYS. 0.00      HDW. 0
SERVICE MENU *
USE -/+ TO VIEW TECH. ALERTS
```

Upon entering the **SERVICE MENU**, if an asterisk " * " is displayed after the words "SERVICE MENU," the game has detected possible faulty devices, switches and/or missing pinballs. Press the either of the **Red Buttons** *(short-cut to the TECHNICIAN ALERTS MENU)* or continue into the **SERVICE MENU** *(press the Black Button again)*, select the "DIAG" *Icon* and "TECH" *Icon* for the **Technician Alerts** information.

\\\\\\\\\\ CPU DIP SWITCH SETTINGS \\\\\\\\\\

The 8-Pos. Dip Switch [SW1] is on the CPU/Sound Board (between Conn. J3 & J13, lower left corner)

USA
Pos.	1	2	3	4	5	6	7	8
ON								
OFF	▼	▼	▼	▼	▼	▼	▼	▼

Australia
Pos.	1	2	3	4	5	6	7	8
ON	▲		▲	▲				
OFF		▼			▼	▼	▼	▼

Austria
Pos.	1	2	3	4	5	6	7	8
ON	▲							
OFF		▼	▼	▼	▼	▼	▼	▼

Belgium
Pos.	1	2	3	4	5	6	7	8
ON		▲						
OFF	▼		▼	▼	▼	▼	▼	▼

Canada 1
Pos.	1	2	3	4	5	6	7	8
ON	▲	▲						
OFF			▼	▼	▼	▼	▼	▼

Canada 2
Pos.	1	2	3	4	5	6	7	8
ON		▲		▲	▲			
OFF	▼		▼			▼	▼	▼

Croatia
Pos.	1	2	3	4	5	6	7	8
ON		▲	▲		▲			
OFF	▼			▼		▼	▼	▼

Denmark
Pos.	1	2	3	4	5	6	7	8
ON	▲			▲				
OFF		▼	▼		▼	▼	▼	▼

Finland
Pos.	1	2	3	4	5	6	7	8
ON	▲		▲					
OFF		▼		▼	▼	▼	▼	▼

France
Pos.	1	2	3	4	5	6	7	8
ON		▲	▲					
OFF	▼			▼	▼	▼	▼	▼

Germany
Pos.	1	2	3	4	5	6	7	8
ON	▲	▲	▲					
OFF				▼	▼	▼	▼	▼

Greece
Pos.	1	2	3	4	5	6	7	8
ON	▲	▲	▲	▲				
OFF					▼	▼	▼	▼

Italy
Pos.	1	2	3	4	5	6	7	8
ON					▲			
OFF	▼	▼	▼			▼	▼	▼

Japan
Pos.	1	2	3	4	5	6	7	8
ON	▲		▲	▲				
OFF		▼			▼	▼	▼	▼

Lithuania
Pos.	1	2	3	4	5	6	7	8
ON	▲	▲		▲	▲			
OFF			▼			▼	▼	▼

Middle East
Pos.	1	2	3	4	5	6	7	8
ON	▲	▲	▲		▲			
OFF				▼		▼	▼	▼

Netherlands
Pos.	1	2	3	4	5	6	7	8
ON			▲					
OFF	▼	▼		▼	▼	▼	▼	▼

New Zealand
Pos.	1	2	3	4	5	6	7	8
ON						▲		
OFF	▼	▼	▼	▼	▼		▼	▼

Norway
Pos.	1	2	3	4	5	6	7	8
ON			▲	▲				
OFF	▼	▼			▼	▼	▼	▼

Portugal
Pos.	1	2	3	4	5	6	7	8
ON	▲				▲			
OFF		▼	▼	▼		▼	▼	▼

Russia
Pos.	1	2	3	4	5	6	7	8
ON	▲			▲	▲			
OFF		▼	▼			▼	▼	▼

So. Africa
Pos.	1	2	3	4	5	6	7	8
ON			▲		▲			
OFF	▼	▼		▼		▼	▼	▼

Spain
Pos.	1	2	3	4	5	6	7	8
ON		▲			▲			
OFF	▼		▼	▼		▼	▼	▼

Sweden
Pos.	1	2	3	4	5	6	7	8
ON	▲	▲		▲				
OFF			▼		▼	▼	▼	▼

Switzerland
Pos.	1	2	3	4	5	6	7	8
ON			▲	▲				
OFF	▼	▼			▼	▼	▼	▼

Taiwan
Pos.	1	2	3	4	5	6	7	8
ON				▲	▲			
OFF	▼	▼	▼			▼	▼	▼

UK
Pos.	1	2	3	4	5	6	7	8
ON			▲	▲	▲			
OFF	▼	▼				▼	▼	▼

UPDATE CODE *(CPU/SND PCB SETTING)*
Pos.	1	2	3	4	5	6	7	8
ON								▲
OFF	▼	▼	▼	▼	▼	▼	▼	

Note: Slide Dip Switch 8 to Position **ON** (with Dip Switches 1-7 in the **OFF** Position) only to reboot the game with the latest version BOOT EPROM installed at U9 on the CPU/Sound Board (S.A.M. System only). Currently, this is also the procedure to update your game with the latest software code update file. For the latest version, visit our website. If you have questions about updating your game code, call Technical Support for assistance.

3

SWITCH MATRIX GRID [#1 - #64] {Switch Locations : next page}

	01 IC-U22A	02 IC-U22B	03 IC-U22C	04 IC-U22D	05 IC-U16A	06 IC-U16B	07 IC-U16C	08 IC-U16D	09 IC-U36A	10 IC-U36B	11 IC-U36C	12 IC-U36D	13 IC-U40A	14 IC-U40B	15 IC-U40C	16 IC-U40D
	WHT-BRN RETURN ▲ J6-P9	WHT-RED RETURN ▲ J6-P8	WHT-ORG RETURN ▲ J6-P7	WHT-YEL RETURN ▲ J6-P5	WHT-GRN RETURN ▲ J6-P3	WHT-BLU RETURN ▲ J6-P2	WHT-VIO RETURN ▲ J6-P1	WHT-GRY RETURN ▲ J12-P9	TAN-BRN RETURN ▲ J12-P8	TAN-RED RETURN ▲ J12-P7	TAN-ORG RETURN ▲ J12-P6	TAN-YEL RETURN ▲ J12-P4	TAN-GRN RETURN ▲ J12-P3	TAN-BLU RETURN ▲ J12-P2	TAN-VIO RETURN ▲ J12-P1	TAN-WHT RETURN ▲ J12-P1
01 DRIVE ▼ GRN-BRN J1-P1	S.W. #1 (A)C/DC 520-5252-03 BELOW PF	S.W. #2 AC(/)DC 520-5252-03 BELOW PF	S.W. #3 AC(/)DC 520-5252-02 BELOW PF	S.W. #4 AC/D(C) 520-5252-02 BELOW PF	S.W. #5 (R)OCK 180-5207-00 BELOW PF	S.W. #6 R(O)CK 180-5207-00 BELOW P.F	S.W. #7 RO(C)K 180-5207-00 BELOW P.F	S.W. #8 ROC(K) 180-5207-00 BELOW P.F	S.W. #9 (T.)N.T. T.(N.)T.	S.W. #10 T.N(.T.)	S.W. #11 T.N.(T.)	S.W. #12 L. RAMP EXIT 180-5087-00 ABOVE P.F.	S.W. #13 L. RAMP ENTER 180-5087-00 ABOVE P.F.	S.W. #14 TOURN START 180-5174-00 IN CABINET	S.W. #15 TOURN START 180-5174-00 IN CABINET	S.W. #16 180-5218-00 BELOW P.F.
02 DRIVE ▼ GRN-RED J1-P3	S.W. #17 BELOW PF	S.W. #18 TROUGH #4 LEFT 180-5119-02 BELOW PF	S.W. #19 TROUGH #3 180-5119-02 BELOW PF	S.W. #20 TROUGH #2 180-5119-02 BELOW PF	S.W. #21 TROUGH #1 RIGHT	S.W. #22 TROUGH JAM	S.W. #23 SHOOTER LANE 180-5157-00 BELOW P.F.	S.W. #24 LEFT OUTLANE 500-6227-03 BELOW P.F.	S.W. #25 LEFT SLINGSHOT 180-5054-00 BELOW P.F.	S.W. #26 RIGHT SLINGSHOT 180-5054-00 BELOW P.F.	S.W. #27 RIGHT RETURN LANE 500-6227-03 BELOW P.F.	S.W. #28 RIGHT OUTLANE 180-5119-02 BELOW PF.	S.W. #29 LEFT POP BUMPER 180-5015-04 BELOW P.F.	S.W. #30 RIGHT POP BUMPER 180-5015-04 BELOW P.F.	S.W. #31 BOTTOM POP BUMPER 180-5015-04 BELOW P.F.	S.W. #32 BELOW P.F.
03 DRIVE ▼ GRN-ORG J1-P4	S.W. #33 L. LOOP SPINNER 180-5087-00 ABOVE P.F.	S.W. #34 L. RAMP STANDUP (L) 180-5208-00 BELOW PF.	S.W. #35 L. RAMP STANDUP (R) 180-5208-00 BELOW PF.	S.W. #36 BELL EJECT 180-5208-00 BELOW PF.	S.W. #37 TOP LEFT TOP LANE 500-6227-03 BELOW P.F.	S.W. #38 CENTER TOP LANE 500-6227-03 BELOW P.F.	S.W. #39 RIGHT TOP LANE 500-6227-03 BELOW P.F.	S.W. #40 R. RAMP R. RAMP STANDUP 180-5087-00 ABOVE P.F.	S.W. #41 R. RAMP EXIT 180-5087-00 ABOVE P.F.	S.W. #42 LEFT LOOP EJECT 180-5119-02 ABOVE P.F.	S.W. #43 CANNON DETONATOR TARGET 511-7003-02 ABOVE P.F.	S.W. #44 BELL OPTO 520-5292-00 ABOVE P.F.	S.W. #45 FIRE BUTTON 800-4221-03 BELOW P.F.			
04 DRIVE ▼ GRN-YEL J1-P5	S.W. #49 LOWER P.F. KICKER OPTO 180-8775-01 BELOW P.F.	S.W. #50 LOWER P.F. S/U TARGET (LEFT) 180-5207-00 BELOW P.F.	S.W. #51 LOWER P.F. S/U TARGET (CENTER) 180-5207-00 BELOW P.F.	S.W. #52 LOWER P.F. S/U TARGET (RIGHT) 180-5207-00 BELOW P.F.	S.W. #53 LOWER P.F. LOOP (L) 500-6227-04 BELOW P.F.	S.W. #54 LOWER P.F. LOOP (R.) 500-6227-04 BELOW P.F.	S.W. #55 500-6227-03 BELOW P.F.	S.W. #56	S.W. #57	S.W. #58 180-5087-00 ABOVE P.F.	S.W. #59 RIGHT LOOP 520-5292-00 BELOW P.F.	S.W. #60 CANNON HOME 520-5292-00 BELOW P.F.	S.W. #61 CANNON MARK 500-6890-01 CABINET	S.W. #62 BELL OPTO	S.W. #63 SKILL SHOT	S.W. #64

Wire Color Abbreviations used:

BLK Black	BLU Blue	BRN Brown	GRY Gray	GRN Green	LGN Light Grn.n	ORG Orange
	PNK Pink	RED Red	TAN Tan	VIO Violet	WHT White	YEL Yellow

◄ FOR MORE ABOUT DIODE ON TERMINAL STRIPS «DOTS», SEE SECTION 5, CHAPTER 2, PAGES 104-105 »

Dedicated Switches [#D-1 - #D-32] {Dedicated Switch Locations : next page}

CPU/SND Board	IC-U2 PNK-BRN J2-P2	IC-U2 PNK-RED J2-P3	IC-U2 PNK-ORG J2-P4	IC-U2 PNK-YEL J2-P5	IC-U2 PNK-GRN J2-P6	IC-U2 PNK-BLU J2-P8	IC-U2 PNK-VIO J2-P9	IC-U2 PNK-GRY J2-P10
	S.W. D-1 LEFT COIN SLOT	S.W. D-2 CENTER COIN SLOT	S.W. D-3 RIGHT COIN SLOT	S.W. D-4 FORTH COIN SLOT	S.W. D-5 FIFTH COIN SLOT	S.W. D-6	S.W. D-7	S.W. D-8
GROUND (BLK) J2-P1/11 & J3-P10	S.W. D-9 LEFT FLIPPER BUTTON 500-6898-01 FLIP ASSY.	S.W. D-10 LEFT FLIPPER E.O.S. 500-5149-00 CABINET	S.W. D-11 RIGHT FLIPPER BUTTON 500-6898-01 FLIP ASSY.	S.W. D-12 RIGHT FLIPPER E.O.S. 500-5149-00 CABINET	S.W. D-13 U.L. FLIPPER BUTTON 500-6890-01 CABINET	S.W. D-14 U.R. FLIPPER BUTTON 500-6890-01 CABINET		

IC-U4 GRY-BRN J3-P2	IC-U4 GRY-RED J3-P4	IC-U4 GRY-ORG J3-P5	IC-U4 GRY-YEL J3-P6	IC-U4 GRY-GRN J3-P7	IC-U4 GRY-BLU J3-P9	IC-U4 GRY-VIO J3-P1	IC-U4 GRY-BLK J3-P1
S.W. D-25	S.W. D-26	S.W. D-27	S.W. D-28	S.W. D-29	S.W. D-30	S.W. D-31	S.W. D-32

CPU/SOUND BD. SW1 DIP SWITCH (located between Connectors J3/J13)

DIP (1)2345678	DIP 1(2)345678	DIP 12(3)45678	DIP 123(4)5678	DIP 1234(5)678	DIP 12345(6)78	DIP 123456(7)8	DIP 1234567(8)
S.W. POS. #1 ON	S.W. POS. #2 ON	S.W. POS. #3 ON	S.W. POS. #4 ON	S.W. POS. #5 ON	S.W. POS. #6 ON	S.W. POS. #7 ON	S.W. POS. #8 ON

CPU/Sound Board	IC-01 LGN-BRN J13-P1	IC-01 LGN-RED J13-P3	IC-01 LGN-ORG J13-P4	IC-01 LGN-YEL J13-P5	IC-01 LGN-BLK J13-P6	IC-01 LGN-BLU J13-P7	IC-01 LGN-VIO J13-P8	IC-01 LGN-GRY J13-P9
	S.W. D-17 TILT PENDULUM	S.W. D-18 SLAM TILT	S.W. D-19 TICKET NOTCH	S.W. D-20 BACK (GREEN) (RED)	S.W. D-21 MINUS (RED)	S.W. D-22 PLUS (RED)	S.W. D-23 SELECT (BLACK)	S.W. D-24
GROUND (BLK) J13-P10	IF USED			180-5192-04 COIN DOOR	180-5192-02 COIN DOOR	180-5192-02 COIN DOOR	180-5192-00 COIN DOOR	
CABINET	IF USED							

GROUND (BLK) J2-P11	180-5204-00 COIN DOOR	180-5204-00 COIN DOOR	180-5204-00 COIN DOOR	IF USED			
	DBA COIN DOOR						

GO TO DIAGNOSTICS MENU

GO TO SWITCH MENU

SWITCH TEST

SWITCH MENU: SWITCH, ACTIVE, SINGLE & SERVICE

37 VUK

13 LEFT RAMP EXIT

44 LEFT ORBIT MADE

38

39

40

36

59 RIGHT ORBIT MADE

30

31

41 RIGHT RAMP ENTER

14 LEFT RAMP ENTER

47 BELL OPTO

32

46

10-12

42

34

35

33 LEFT ORBIT ENTER

53

54

5

51

4

50

52

3

2

1

6

7

8

9

43 RIGHT RAMP MADE

49 OPTO

45 CANNON

61,62 CANNON MOTOR

26

27

28

24

25

29

48

18-22

23

ROCK AGAIN

Typical Switch Wiring & Schematic

Column: Switch Drive Wire J1 **GRN-XXX**	Blocking Diode (1N4004)	Row: Switch Return Wire J6 or J12 **WHT-XXX** or **TAN-XXX**
N.O. Normally Open Switch Terminal	**COM.** Common Switch Terminal	**N.C.** Normally Closed Switch Terminal

COMM. N.O. N.C.

1N4004 DIODE

CATHODE banded side of diode

Switches from CPU / Sound PCB

Row: Switch Return Wire WHT-XXX or TAN -XX

Column: Switch Drive Wire GRN-XXX

-XXX = Varying Wire Color. See Matrix Grid for color.

Dedicated Switch Schematic

PNK-XXX, GRY-XXX or **LGN-XXX** Dedicated Switch Input Wire J2, J3 or J13

N.O. Normally Open Switch Terminal

COM. Common Switch Terminal

BLACK Ground Wire J2-P1/11, J3-P10 or J13-P10

Typical Switch Wiring & Schematic
... with Switch Diode on a Terminal Strip (DOTS)

ORG-XXX COMM. N.O. GRN-XXX

CONN.

ORG-XXX

TERMINAL STRIP GRN-XXX

WHT-XXX or TAN-XXX J6-#

J12-#

J1-#

CPU PCB

wire IN from previous switch or CPU PCB ...

wire OUT to next switch ...

Wire WHT-XXX or TAN-XXX

COMM. N.O. N.C.

1N4004 DIODE

Jumper ORG-XXX to Row: Switch Return

Column: Switch Drive Wire GRN-XXX

-XXX = Varying Wire Color. See Matrix Grid for color.

For more about Diode on Terminal Strips (DOTS), see the Yellow Pages (Schematics & Wiring).

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LAMP MATRIX GRID [#1 - #80] {Lamp Locations : next page}

I/O Power Driver Board — J5

LP#	Lamp	LP#	Lamp	LP#	Lamp	LP#	Lamp	LP#	Lamp	LP#	Lamp	LP#	Lamp	LP#	Lamp
#1	JAM MULTIBALL (520-5324-01)	#2	SUPER TARGETS (520-5324-01)	#3	SUPER LANES (520-5324-01)	#4	ALBUM MULTIBALL (520-5324-01)	#5	CANNON FODDER (520-5324-01)	#6	CANNON VOLLEY (520-5324-01)	#7	CANNON CHAOS (520-5324-01)	#8	ROCK AGAIN (520-5324-01)
#9	SUPER LOOPS	#10	SUPER COMBO	#11	TOUR MULTIBALL (520-5324-01)	#12	LEFT OUTLANE (520-5307-00)	#13	LEFT RETURN LANE (520-5307-00)	#14	2X	#15		#16	
#17	L. LOOP ARROW / LOWER PLFD. (520-5307-00)	#18	AC/D(C) (520-5324-05)	#19	AC/(D)C (520-5324-05)	#20	AC/()DC (520-5324-05)	#21	LEFT RETURN LANE (520-5307-00)	#22	L. RAMP STANDUP (L.) (520-5307-00)	#23	L. RAMP STANDUP (R.) (520-5307-00)	#24	T.N.T. ARROW (WHT./NOTE) (520-5307-00)
#25		#26	A(C)/DC (520-5324-05)	#27	A(C)/DC (520-5324-05)	#28	(A)C/DC (520-5324-05)	#29	(520-5307-00)	#30	2X (520-5307-00)	#31	(520-5307-00)	#32	
#33	ROC(K) (520-5324-04)	#34	RO(C)K (520-5324-04)	#35	R(O)CK (520-5324-04)	#36	(R)OCK (520-5324-04)	#37	LOWER PLFD. R. LOOP ARROW (520-5307-00)	#38	SPECIAL (520-5307-00)	#39		#40	TRAIN (112-5033-05)
#41	R. RAMP STANDUP (520-5307-00)	#42	3X (520-5307-00)	#43	RIGHT RETURN LANE (520-5307-00)	#44	RIGHT OUTLANE (520-5307-00)	#45		#46	EXTRA BALL (520-5307-00)	#47		#48	
#49	(T.)N.T. (520-5324-03)	#50	T.(N.)T. (520-5324-03)	#51	T.N.(T.) (520-5324-03)	#52		#53	JUKE BOX HORN R. (112-5034-02)	#54	JUKE BOX HORN L. (112-5034-02)	#55		#56	
#57	START (112-5024-08)	#58	TOURNEY START (112-5024-08)	#59	FIRE BUTTON (RED) (520-5333-00)	#60	FIRE BUTTON (GREEN) (520-5333-00)	#61	FIRE BUTTON (BLUE) (520-5333-00)	#62	LEFT BUMPER (112-5024-08)	#63	RIGHT BUMPER (112-5024-08)	#64	BOTTOM BUMPER (112-5024-08)
#65	YOU SHOOK ME ALL NIGHT (520-5324-02)	#66	HIGHWAY TO HELL (520-5324-02)	#67	ROCK N ROLL TRAIN (520-5324-02)	#68	WHOLE LOTTA ROSIE (520-5324-02)	#69	HELLS BELLS (520-5324-02)	#70	THUNDERSTRUCK (520-5324-02)	#71	LET THERE BE ROCK (520-5324-02)	#72	(520-5324-02)
#73	T.N.T. (520-5324-02)	#74	FOR THOSE ABOUT TO ROCK (520-5324-02)	#75	WAR MACHINE (520-5324-02)	#76	BACK IN BLACK (520-5324-02)	#77	(520-5324-02)	#78	(520-5324-02)	#79	HELL AINT A BAD PLACE (520-5324-02)	#80	(520-5324-02)

6
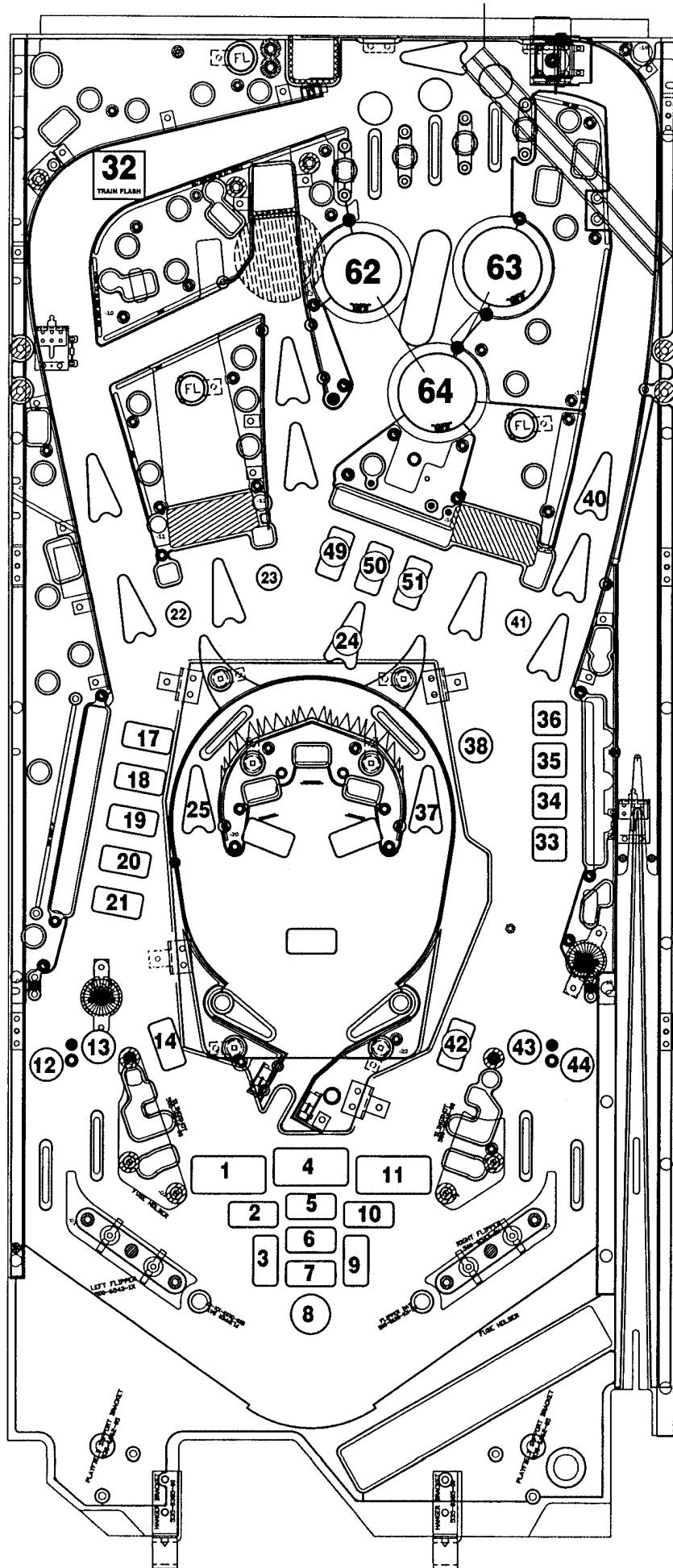
AC-DC PREMIUM
SINGLE LED MAP

57 = Start
56 = Tournamant

59 = Fire: RED
60 = Fire: GRN
61 = Fire: BLU

7
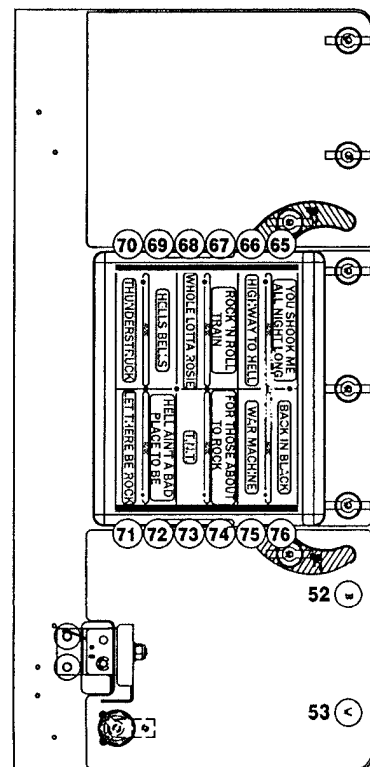
LAMP NUMBER	LAMP NAME	CONNECTOR NUMBER ON DRIVER BD. 520-5331-00
81	FACE LEFT EYE	CN17
82	FACE RIGHT EYE	CN16
84	FACE MOUTH	CN1
85	L. LOOP ARROW (BOT.)	CN12
86	L. RAMP ARROW	CN18
87	BELL ARROW (BOT.)	CN8
88	R. RAMP ARROW	CN11
89	R. LOOP ARROW (BOT.)	CN13
90	L. LOOP ARROW (TOP.)	CN14
91	BELL ARROW (TOP.)	CN3
92	RIGHT LOOP ARROW (MID.)	CN7
93	LEFT TOP LANE	CN9
94	CENTER TOP LANE	CN4
95	RIGHT TOP LANE	CN19
96	TUNES - N - STUFF	CN5

AC-DC PREMIUM
TRI-COLOR LED MAP

CN1 = Connector number on driver board 520-5331-00

84 = Matrix number on Dot Matrix display

96

CN5

CN4 CN19

CN9 94 95

93

CN3

91

CN8

87

CN14

90

CN7

92

CN18

86

CN12 CN11

85 88

CN13

89

CN17 CN16

81 82

CN1

84

YOU SHOOK ME
ALL NIGHT LONG!

HIGHWAY TO HELL BACK IN BL-CK

ROCK N ROLL WAR MACHINE
TRAIN

WHOLE LOTTA ROSIE FOR THOSE ABOUT
TO ROCK

HELLS BELLS HELL AIN'T A BAD
PLACE TO BE

THUNDERSTRUCK T.N.T.

LET THERE BE ROCK

9

COILS DETAILED CHART TABLE

	High Current Coils Group 1	Drive Transistor	Driver Output PCB	Power Line Color	Power Line Connection	Power Voltage	Drive Transistor Control Line Color	D.T. Control Line Connect	Coil GA-Turn or Bulb Type
#1	TROUGH UP-KICKER	Q1		YEL-VIO	J10-P9/10	50VDC	BRN-BLK	J8-P1	26-1200 090-5044-ND
#2	AUTO LAUNCH	Q2		YEL-VIO	J10-P9/10	50VDC	BRN-RED	J8-P3	24-940 090-5036-ND
#3	LOWER PLAYFIELD EJECT	Q3		YEL-VIO	J10-P9/10	50VDC	BRN-ORG	J8-P4	26-1200 090-5044-ND
#4	LOWER PLAYFIELD LEFT FLIPPER	Q4	▲ I/O Power Driver ▼	GRY-YEL	J10-P9/10	50VDC	BRN-YEL	J8-P5	22-1080 090-5032-ND
#5	LOWER PLAYFIELD RIGHT FLIPPER	Q5		BLU-YEL	J10-P9/10	50VDC	BRN-GRN	J8-P6	22-1080 090-5032-ND
#6	LEFT 5- BANK DROP RESET (X2)	Q6		YEL-VIO	J10-P9/10	50VDC	BRN-BLU	J8-P7	25-1240 090-5034-ND
#7	CENTER 3- BANK DROP RESET	Q7		YEL-VIO	J10-P9/10	50VDC	BRN-VIO	J8-P8	25-1240 090-5034-ND
#8	SHAKER MOTOR (OPTIONAL)	Q8		RED-WHT	J17-P7	16VAC	BRN-GRY	J8-P9	502-5027-00
	High Current Coils Group 2	Drive Transistor	Driver Output PCB	Power Line Color	Power Line Connection	Power Voltage	Drive Transistor Control Line Color	D.T. Control Line Connect	Coil GA-Turn or Bulb Type
#9	LEFT POP BUMPER	Q9		YEL-VIO	J10-P9/10	50VDC	BLU-BRN	J8-P1	26-1200 090-5044-ND
#10	RIGHT POP BUMPER	Q10		YEL-VIO	J10-P9/10	50VDC	BLU-RED	J8-P2	26-1200 090-5044-ND
#11	BOTTOM POP BUMPER	Q11		YEL-VIO	J10-P9/10	50VDC	BLU-ORG	J8-P4	26-1200 090-5044-ND
#12	TOP EJECT	Q12	▲ I/O Power Driver ▼	YEL/VIO	J10-P9/10	50VDC	BLU-YEL	J8-P5	23-800 090-5001-ND
#13	LEFT SLINGSHOT	Q13		YEL-VIO	J10-P9/10	50VDC	BLU-GRN	J8-P6	26-1200 090-5044-ND
#14	RIGHT SLINGSHOT	Q14		YEL-VIO	J10-P9/10	50VDC	BLU-BLU	J8-P7	26-1200 090-5044-ND
#15	**LEFT FLIPPER (50V RED/YEL)**	Q15		GRY-YEL~3A Fuse~RED-YEL	J10-P6/7	50VDC	ORG-GRY	J8-P8	22-1080 090-5032-ND
#16	**RIGHT FLIPPER (50V RED/YEL)**	Q16		BLU-YEL~3A Fuse~RED-YEL	J10-P6/7	50VDC	ORG-VIO	J8-P9	22-1080 090-5032-ND
	Low Current Coils Group 1	Drive Transistor	Driver Output PCB	Power Line Color	Power Line Connection	Power Voltage	Drive Transistor Control Line Color	D.T. Control Line Connect	Coil GA-Turn or Bulb Type
#17	TRAIN FLASHER	Q17		ORG	J6-P10	20VDC	VIO-BRN	J7-P2	# 89 BULB 165-5000-89
#18	DETONATOR	Q18		BRN	J7-P1	20VDC	VIO-RED	J7-P3	29-1400 090-5072-03
#19	BOTTOM ARCH FLASHER (X2)	Q19	▲ I/O Power Driver ▼	ORG	J6-P10	20VDC	VIO-ORG	J7-P4	LED BD. 520-5328-00
#20	LEFT RAMP FLASHER	Q20		ORG	J6-P10	20VDC	VIO-YEL	J7-P6	#89 BULB 165-5000-89
#21	LEFT SIDE FLASHER	Q21		ORG	J6-P10	20VDC	VIO-GRN	J7-P7	# 89 BULB 165-5000-89
#22	BACK PANEL FLASHER	Q22		ORG	J6-P10	20VDC	VIO-BLU	J7-P8	# 89 BULB 165-5000-89
#23	TOP EJECT FLASHER	Q23		ORG	J6-P10	20VDC	VIO-BLK	J7-P9	# 89 BULB 165-5000-89
#24	OPTIONAL (e.g. COIN METER)	Q24		RED	J16-P4-8	5VDC	VIO-GRY	J7-P10	COIN METER
	Low Current Coils Group 2	Drive Transistor	Driver Output PCB	Power Line Color	Power Line Connection	Power Voltage	Drive Transistor Control Line Color	D.T. Control Line Connect	Coil GA-Turn or Bulb Type
#25	POP BUMPERS FLASH (X3)	Q25		ORG	J6-P10	20VDC	BLK-BRN	J6-P1	# 89 BULB 165-5000-89
#26	BELL ARROW FLASHER	Q26		ORG	J6-P10	20VDC	BLK-RED	J6-P2	# 89 BULB 165-5000-89
#27	LEFT RAMP LEFT SIDE FLASHER	Q27	▲ I/O Power Driver ▼	ORG	J6-P10	20VDC	BLK-ORG	J6-P3	# 181 BULB 165-5032-00
#28	LEFT RAMP RIGHT SIDE FLASHER	Q28		ORG	J6-P10	20VDC	BLK-YEL	J6-P4	# 181 BULB 165-5032-00
#29	RIGHT RAMP RIGHT SIDE FLASHER	Q29		ORG	J6-P10	20VDC	BLK-GRN	J6-P5	# 181 BULB 165-5032-00
#30	RIGHT RAMP FLASHER	Q30		ORG	J6-P10	20VDC	BLK-BLU	J6-P6	# 89 BULB 165-5000-89
#31	RIGHT SIDE FLASHER	Q31		ORG	J6-P10	20VDC	BLK-VIO	J6-P7	# 89 BULB 165-5000-89
#32	CANNON MOTOR	Q32		BRN	J7-P1	20VDC	BLK-GRY	J6-P8	MOTOR 041-5111-00

10

GO TO DIAGNOSTICS MENU

DIAG AUD ADT UTIL TOUR BUT

GO TO COIL MENU

SW COIL FLASH LAMP GAME MORE

SINGLE COIL TEST

TEST CYC PREV UT HELP

COIL MENU: SINGLE COIL & CYCLING COIL

23 12 VUK 41 BAND MECH 46 ELEC GATE

17 TRAIN FLASH

42 VUK

44 MAGNET

9 10 25 11 30

26

47 DIVERTER

20

18 DETONATOR

6 DROP TARGET

27 FLASH X2 28 FLASH X2 7 DROP TRGT 29 FLASH X2

22 FLASH

21 RAMP FLASH

45 DIVERTER

31 DOME FLASH

3 4 5

43 CANNON

32 AC MOTOR

13 14

15 16

19 ARCH FLASH 19 ARCH FLASH

1 2

Typical Coil Wiring & Schematic

I/O PCB Drive Transistor

I/O Power Driver PCB

COIL

+50V

Q1

J8

1N4004 DIODE LOCATED ON I/O PWR. DRV. PCB

BRN-BLK

#1 Trough Up-Kicker

26-1200 Gauge - Turn

J10-P9/10 I/O PCB

+50VDC

YEL-VIO HIGH POWER

BRN-BLK

YEL-VIO

Power Voltage Supply 50VDC

48 TOP MECH

27-29 3 TARGET FLASHERS

FOR FUTURE OPTIONAL TOP BOX

Coil Q24 is Optional. If either a Coin Meter, Token Dispenser or Knocker (all optional equipment) is required, call Technical Support for more information, 1-800-542-5377 or 1-708-345-7700.

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AUX. COILS 41-48

COILS DETAILED CHART TABLE							
HIGH CURRENT COILS GROUP 1	Drive Transistor	Power Line Color	Power Line Connection	Power Voltage	Driver Transistor Control Line Color	D.T CNTL LINE CON.	Coil GA-Turn or Bulb Type
BAND MEMBER MECH AUX D/D0	Q1 AUX BD.	YEL-VIO	J2-P10	50VDC	**BLU-BRN**	**J2-P8**	29-1400 COIL
							090-5073-03
BELL EJECT	Q2 AUX BD.	YEL-VIO	J2-P10	50VDC	**BRN-BLK**	**J2-P7**	23-800 COIL
							090-5001-ND
CANNON EJECT	Q3 AUX BD.	YEL-VIO	J2-P10	50VDC	**VIO-BRN**	**J2-P6**	23-800 COIL
							090-5001-ND
BELL MAGNET	Q4 AUX BD.	VIO-YEL	J2-P10	50VDC	**BLU-RED**	**J2-P5**	22-600 COIL
							090-5076-00
RIGHT RAMP DIVERTER	Q5 AUX BD.	YEL-VIO	J2-P10	50VDC	**BRN-RED**	**J2-P4**	32-1800 COIL
							515-6595-01-ND
RIGHT CONTROL GATE	Q6 AUX BD.	YEL-VIO	J2-P10	50VDC	**VIO-RED**	**J2-P3**	32-1250
							090-5060-01-ND
LEFT RAMP DIVERTER	Q7 AUX BD.	YEL-VIO	J2-P10	50VDC	BLU-ORG	J2-P2	32-1800 COIL
							515-6595-01-ND

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GO TO DIAGNOSTICS MENU

GO TO COIL MENU

SINGLE COIL TEST

COIL MENU: SINGLE COIL & CYCLING COIL

41 BAND MECH

46 ELEC GATE

42 VUK

44 MAGNET

47 DIVERTER

45 DIVERTER

43 CANNON

Typical Coil Wiring & Schematic

I/O PCB Drive Transistor

I/O Power Driver PCB

+50V

Q1

J8

COIL

1N4004 DIODE LOCATED ON I/O PWR. DRV. PCB

BRN-BLK

#1 Trough Up-Kicker
26-1200
Gauge - Turn

J10-P9/10 I/O PCB
+50VDC

YEL-VIO HIGH POWER

BRN-BLK

YEL-VIO

▲ Power Voltage Supply 50VDC
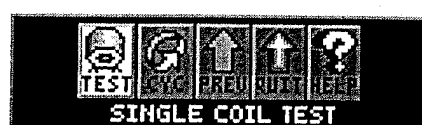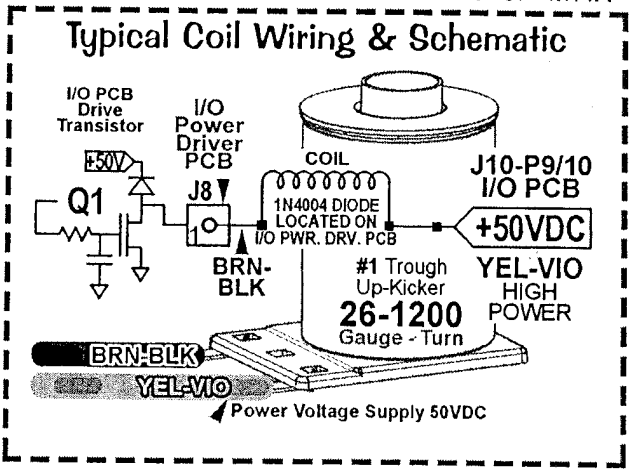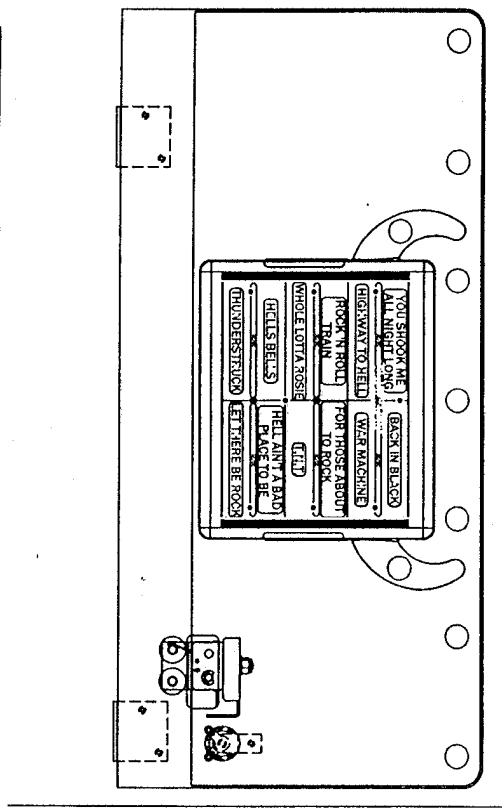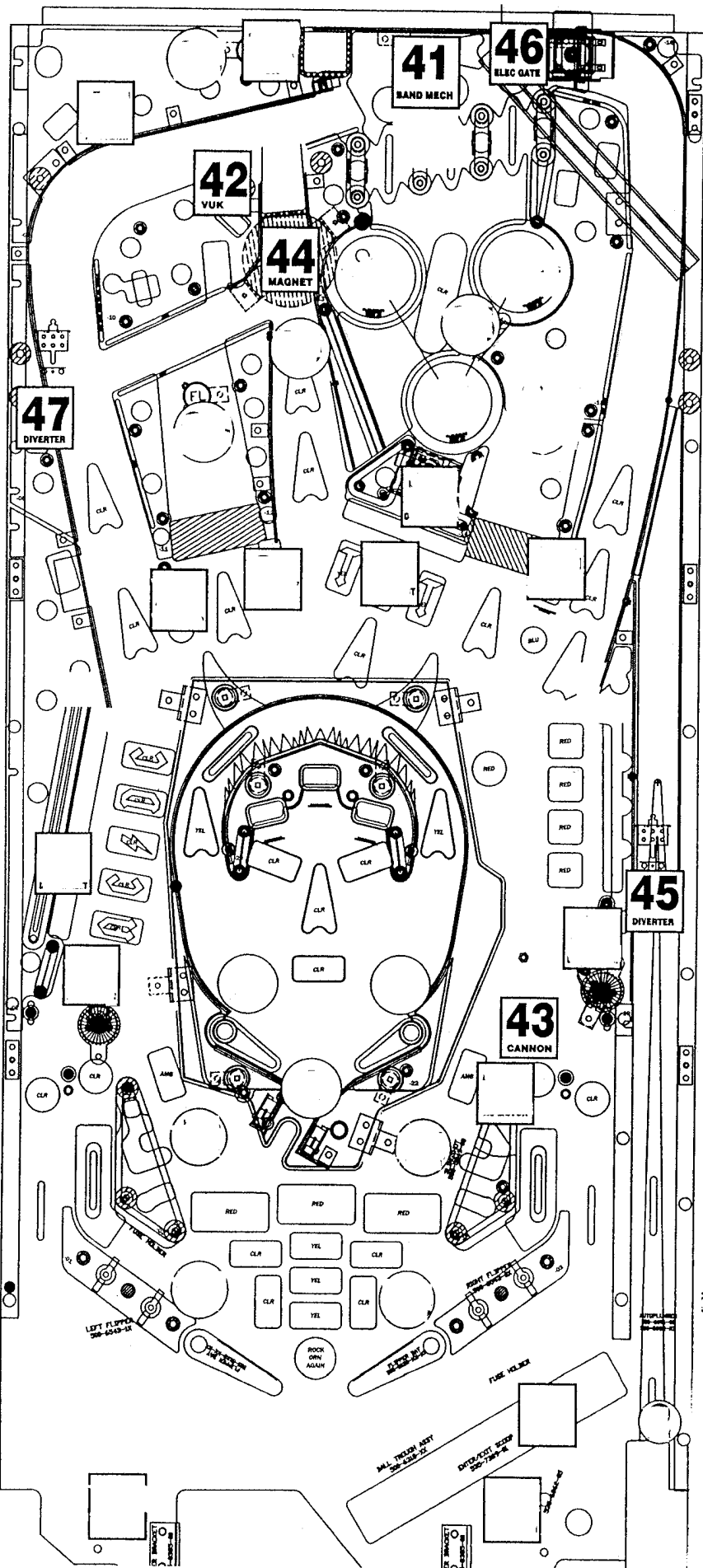
48 TOP MECH

FOR FUTURE OPTIONAL TOP BOX

Coil Q24 is Optional. If either a Coin Meter, Token Dispenser or Knocker (all optional equipment) is required, call Technical Support for more information, 1-800-542-5377 or 1-708-345-7700.

13

GO TO AUDITS MENU: EARNINGS AUDITS [#1 – #13] / STANDARD AUDITS [#1 – #59]

CHOOSE EARNINGS or STANDARD AUDITS

Perform the below steps to review the audits. Enter the **SERVICE MENU**, then enter the **EARNINGS AUDITS** or **STANDARD AUDITS MENUS**. *For audit definitions or summary, review the Audits Section (**GO TO AUDITS MENU**). Try the "DUMP AUDITS TO USB" Feature to create a text file of your audits. Don't forget to set the DATE & TIME in the **UTILITIES MENU**. See the Utilities Section (**GO TO UTILITIES MENU**).*

Step 1 Press [SELECT].
Press [BACK] to exit for escape at any time.

Step 2 Press [>]. Go to the "AUD" *Icon*.
Press [SELECT].

Step 3 Press [>]. Go to the "EARN" *or* "S.P.I." *Icon*.
Press [SELECT].

Step 4 Press [<] [>] to move between audits.

Audit Number →
Audit Name →
Audit Result →

EARNINGS AUDIT #1
TOTAL PAID CREDITS
0

EARNINGS AUDITS [#1 – #13] ▼

Nr.	EARNINGS AUDIT NAME	YOUR RESULT	Nr.	EARNINGS AUDIT NAME	YOUR RESULT
1	TOTAL PAID CREDITS		8	COINS THROUGH FOURTH SLOT	
2	FREE GAME PERCENTAGE		9	COINS THROUGH FIFTH SLOT	
3	AVERAGE BALL TIME		10	TOTAL COINS	
4	AVERAGE GAME TIME		11	TOTAL EARNINGS	
5	COINS THROUGH LEFT SLOT		12	METER CLICKS	
6	COINS THROUGH RIGHT SLOT		13	SOFTWARE METER	
7	COINS THROUGH CENTER SLOT				

STANDARD AUDITS [#1 – #59] ▼

Nr.	STANDARD AUDIT NAME	YOUR RESULT	Nr.	STANDARD AUDIT NAME	YOUR RESULT	Nr.	STANDARD AUDIT NAME	YOUR RESULT
1	TOTAL BALLS PLAYED		21	8.0M – 9.99M SCORES		41	RIGHT DRAINS	
2	TOTAL EXTRA BALLS		22	10.0M – 12.49M SCORES		42	TILTS	
3	EXTRA BALL PERCENTAGE		23	12.5M – 14.99M SCORES		43	TOTAL BALLS SAVED	
4	REPLAY 1 AWARDS		24	15.0M – 17.49M SCORES		44	LEFT FLIPPER USED	
5	REPLAY 2 AWARDS		25	17.5M – 19.99M SCORES		45	RIGHT FLIPPER USED	
6	REPLAY 3 AWARDS		26	20.0M – 24.99M SCORES		46	0 – 1 MINUTE GAMES	
7	REPLAY 4 AWARDS		27	25.0M – 29.99M SCORES		47	1 – 1.5 MINUTE GAMES	
8	TOTAL REPLAYS		28	30.0M – 39.99M SCORES		48	1.5 – 2 MINUTE GAMES	
9	REPLAY PERCENTAGE		29	40.0M – 49.99M SCORES		49	2 – 2.5 MINUTE GAMES	
10	TOTAL SPECIALS		30	50.0M – 74.99M SCORES		50	2.5 – 3 MINUTE GAMES	
11	SPECIAL PERCENTAGE		31	75.0M – 99.99M SCORES		51	3 – 3.5 MINUTE GAMES	
12	TOTAL MATCHES		32	100.0M – 149.99M SCORES		52	3.5 – 4 MINUTE GAMES	
13	HIGH SCORE AWARDS		33	150.0M+ SCORES		53	4 – 5 MINUTE GAMES	
14	HIGH SCORE PERCENT		34	AVERAGE SCORES		54	5 – 6 MINUTE GAMES	
15	TOTAL FREE PLAYS		35	SERVICE CREDITS		55	6 – 8 MINUTE GAMES	
16	TOTAL PLAYS		36	BALL SEARCH STARTED		56	8 – 10 MINUTE GAMES	
17	0.0M – 1.99M SCORES		37	LOST BALL FEEDS		57	10 – 15 MINUTE GAMES	
18	2.0M – 3.99M SCORES		38	LOST BALL GAME STARTS		58	15+ MINUTE GAMES	
19	4.0M – 5.99M SCORES		39	LEFT DRAINS		59	RECENT REPLAY PERCENT	
20	6.0M – 7.99M SCORES		40	CENTER DRAINS				

Note: Audits are subject to change (with or without notice).

14
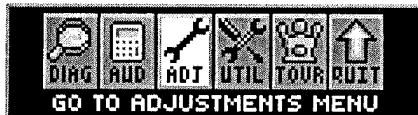
GO TO ADJUSTMENTS MENU: STANDARD ADJUSTMENTS [#1 – #63]

Peform the below steps to review the adjustments. Enter the **ADJUSTMENTS MENU**, then enter the **STANDARD ADJUSTMENTS MENU**. *For adjustment definitions or summary, review the Adjustments Section (GO TO ADJUSTMENTS MENU). See Utilities Section (GO TO INSTALLS MENU), to easily change all adjustments required depending on the Install Type (Easy, Hard, 5-Ball, Home Play, etc.) desired.*

Step 1 Press [**SELECT**]. Press [BACK] to exit *or* escape at any time.

Step 2 Press [>]. Go to the "ADJ" *Icon.* Press [**SELECT**].

Step 3 ... "S.P.I." *Icon.* Press [**SELECT**].

Adjustment Number
Adjustment Name
Adjustment Setting
Adjustment Comment

Step 4 STANDARD ADJUSTMENT #1 appears with the Adjustment Name [**REPLAY TYPE**] flashing. With the Adjustment Name flashing, press [<] [>] to move between adjustments.

Step 5 To change the Adjustment Setting, press [**SELECT**]. With the Adjustment Setting flashing, press [<] [>] repeatedly until the desired setting appears. Press the [**SELECT**] to "install" the change. The Adjustment Comment *(bottom text line)* will indicate [**INSTALLED/FACTORY DEFAULT**], if the Factory Default Setting is selected *or* [**INSTALLED**] if the change is not the Factory Default Setting.

STANDARD ADJUSTMENTS [#1 – #63] ▼

Nr.	STANDARD ADJUSTMENT NAME	USA DEFAULT	YOUR SETTING	Nr.	STANDARD ADJUSTMENT NAME	USA DEFAULT	YOUR SETTING
1	REPLAY TYPE	AUTO		32	HIGH SCORE #1	__,000,000	
2	‡ REPLAY PERCENTAGE	10%		33	HIGH SCORE #2	__,000,000	
3	‡ REPLAY AWARD	CREDIT		34	HIGH SCORE #3	__,000,000	
4	‡ REPLAY LEVELS	1		35	HIGH SCORE #4	__,000,000	
5	‡ AUTO REPLAY START	__,000,000		36	HSTD INITIALS	3 INITIALS	
6	‡ DYNAMIC REPLAY START	60,000,000		37	HSTD RESET COUNT	2000	
7	‡ REPLAY LEVEL #1	15,000,000		38	FREE PLAY	NO	
8	‡ REPLAY LEVEL #2	30,000,000		39	LANGUAGE	ENGLISH	
9	‡ REPLAY LEVEL #3	45,000,000		40	PLAYER LANGUAGE SELECT	YES	
10	‡ REPLAY LEVEL #4	60,000,000		41	CUSTOM MESSAGE	ON	
11	‡ REPLAY BOOST	YES		42	FLASH LAMP POWER	NORMAL	
12	SPECIAL LIMIT	1		43	COIL PULSE POWER	NORMAL	
13	‡ SPECIAL PERCENTAGE	10%		44	KNOCKER VOLUME	NORMAL	
14	SPECIAL AWARD	CREDIT		45	GAME RESTART	YES	
15	FREE GAME LIMIT	5		46	BILL VALIDATOR	NO	
16	EXTRA BALL LIMIT	5		47	MUSIC VOLUME	1	
17	‡ EXTRA BALL PERCENTAGE	25%		48	BALL SAVE TIME	0:05	
18	GAME PRICING	USA 10		49	TIMED PLUNGER	OFF	
19	MATCH PERCENTAGE	9%		50	FLIPPER BALL LAUNCH	OFF	
20	MATCH AWARD	CREDIT		51	COINDOOR BALL SAVER	NO	
21	BALLS PER GAME	3		52	COMPETITION MODE	NO	
22	TILT WARNINGS	2		53	CONSOLATION BALL	YES	
23	CREDIT LIMIT	30		54	FAST BOOT	YES	
24	ALLOW HIGH SCORES	YES		55	Q24 OPTION	COIN METER	
25	HIGH SCORE AWARD	CREDIT		56	TICKET DISPENSER	NO	
26	GRAND CHAMPION AWARDS	1		57	PLAYER COMPETITION	YES	
27	HIGH SCORE #1 AWARDS	1		58	TEAM SCORES	NO	
28	HIGH SCORE #2 AWARDS	0		59	LOCATION ID	0	
29	HIGH SCORE #3 AWARDS	0		60	GAME ID	0	
30	HIGH SCORE #4 AWARDS	0		61	TIME FORMAT	12-HOUR	
31	GRAND CHAMPION SCORE	__,000,000		62	COIN INPUT DELAY	30	
				63	LOST BALL RECOVERY	YES	

Factory Defaults Settings are subject to change during production (especially Standard Adjustments 2, 4, 5, 13, 16-17, 19, 31-35 & 47).
*‡ Not all Standard Adjustments are shown. Depending on the setting (whether Factory Default or if changed by the operator), associated adjustments do not appear, if not required. **Note:** If Game Dip Switch other than USA is installed, different Defaults will appear.*

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GO TO AUDITS MENU: FEATURE AUDITS [#1 – #+]

Perform the below steps to review the audits. Enter the **AUDITS MENU**, then enter the **FEATURE AUDITS MENU**. *Try the "DUMP AUDITS TO USB" Feature to create a text file of your audits. *Don't forget to set the DATE & TIME in the UTILITIES MENU. See Utilities Section (GO TO UTILITIES MENU), for more information.*

Step 1 Press [**SELECT**]. Press [BACK] to exit *or* escape at any time.

Step 2 Press [>]. Go to the "AUD" *Icon.*
Press [**SELECT**].

Step 3 Press [>]. Go to the "GAME" *Icon.* Press [**SELECT**].

Step 4 Press [<] [>] to move between audits.

Audit Number ➔
Audit Name ➔
Audit Result ➔

% = *AUDIT RESULT DIVIDED BY STANDARD AUDIT 16 (TOTAL PLAYS).*

Feature Audits are subject to change *(with or without notice)*. **View Feature Audits on the Dot Display only.** To export all audits to your memory stick *(creating a text file),* perform the following. Enter the **AUDITS MENU**, then enter the **DUMP AUDITS TO USB**. **Note:** The "DUMP" *Icon can also be accessed in the USB MENU via the UTILITIES MENU (see the Utilities Section (GO TO USB MENU) for details).*
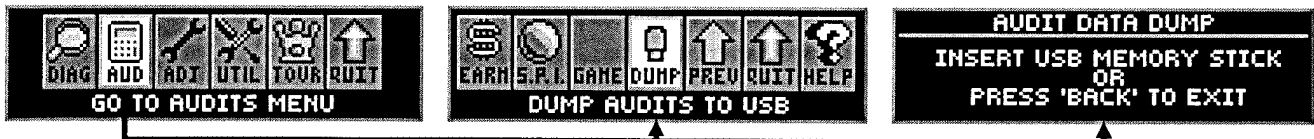
Step 1 Insert your **USB Compatible Memory Stick** into the USB port on the CPU/Sound Board (S.A.M. System). If the Memory Stick has space available and is free of errors, a dated file* is generated *(* ensure your Date & Time is set prior to selecting or the dated file will have the default date of 20XX_01_01; see Section 3, Chapter 5, SET DATE / TIME via the UTILITIES MENU for details).*
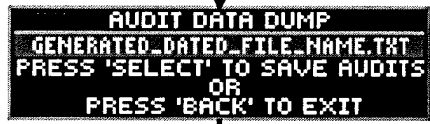
Step 2 Press [**SELECT**] to save the file to your Memory Stick. Press [**SELECT**] again to continue *or* [BACK] to exit *or* escape at any time.

Step 3 Remove the Memory Stick and insert into your PC *or* Mac to save the file *(which can then be copied, printed or emailed).* The audits are numbered sequentially *without* a number restart between the three types of audits *(Earnings, Standard and Feature).*

GO TO ADJUSTMENTS MENU: FEATURE ADJUSTMENTS [#1 – #+]

Peform the below steps to review the adjustments. Enter the **SERVICE MENU**, then enter the **FEATURE ADJUSTMENTS MENU**. *For adjustment definitions or summary, review the Adjustments Section (GO TO ADJUSTMENTS MENU). See Utilities Section (GO TO INSTALLS MENU), to easily change all adjustments required depending on the Install Type (Easy, Hard, 5-Ball, Home Play, etc.) desired.*

Step 1 Press [**SELECT**]. Press [BACK] to exit or escape at any time.

Step 2 Press [>]. Go to the "ADJ" *Icon.*
Press [**SELECT**].

Step 3 Press [>]. Go to the "GAME" *Icon.*
Press [**SELECT**].

Adjustment Number ➔
Adjustment Name ➔
Adjustment Setting ➔
Adjustment Comment ➔

Step 4 **FEATURE ADJUSTMENT #1** appears with the Adjustment Name [**FEATURE ADJ. NAME**] flashing. With the Adjustment Name flashing, press [<] [>] to move between adjustments.

Step 5 To change the Adjustment Setting, press [**SELECT**]. With the Adjustment Setting flashing, press [<] [>] repeatedly until the desired setting appears. Press the [**SELECT**] to "install" the change. The Adjustment Comment *(bottom text line)* will indicate [**INSTALLED/FACTORY DEFAULT**], if the Factory Default Setting is selected *or* [**INSTALLED**] if the change is not the Factory Default Setting.

Feature Adjustments are subject to change *(with or without notice)*. **View Feature Adjustments on the Dot Display only.** Use the Installs Menu *(via the UTILITIES MENU)* to automatically change a select group of Feature Adjustments *(see the Utilities Section) or* adjust them one-by-one.

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Service Menu Introduction

Important: *The **Switch Bracket** holds the **Playfield Power Interlock**. It is located just inside the Coin Door frame (see pictorial of the **Coin Door** on the previous page). The Button Switch for the **Playfield Power Interlock Switch** 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.*

To get into the **SERVICE MENU MODE** review **"Function 3: SERVICE MENU"** on the next page. After Power-Up, push down the **Black [SELECT] Button** to begin. Looking at the display you will momentarily see "SERVICE MENU" followed by the **MAIN MENU:**
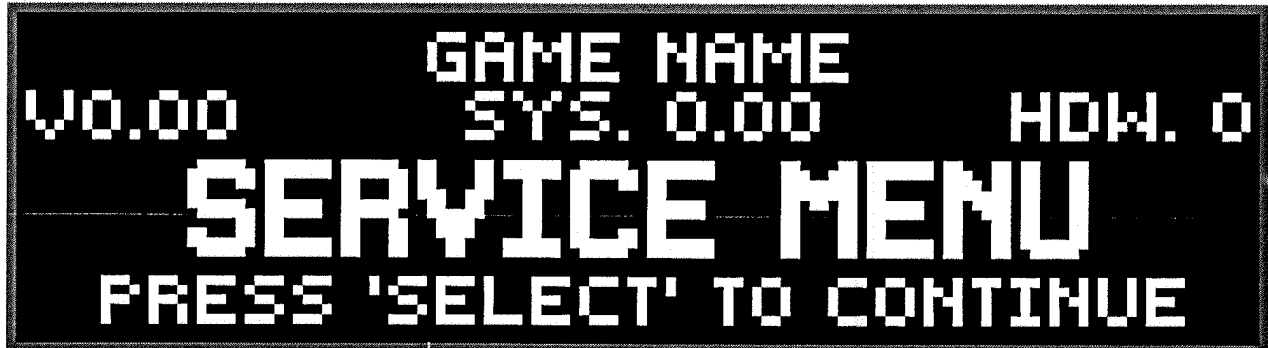
Use the **Red [< / –] / [+ / >] Buttons** to move the selected *Icon* left or right, and the **Black [SELECT] Button** fto activate the selected *Icon*.

The **MAIN MENU** now appears with the "DIAG" *Icon* (**GO TO DIAGNOSTICS MENU**) highlighted:
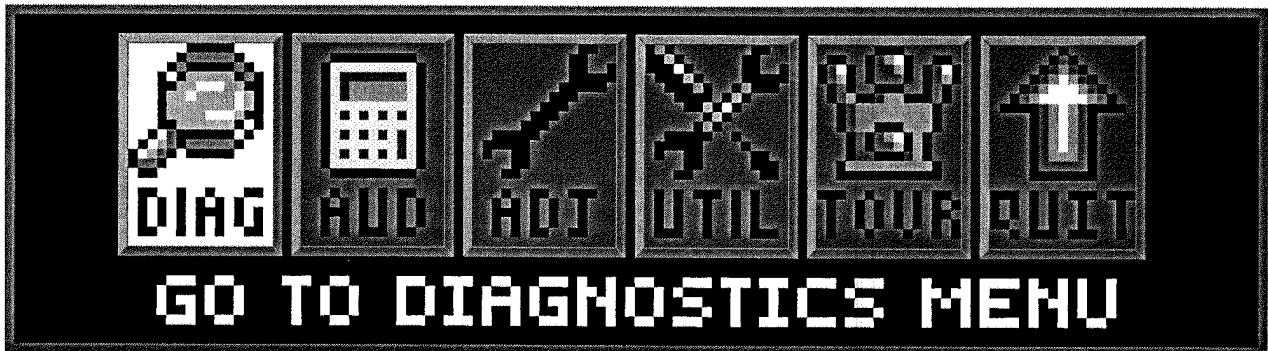
As the operator views the Menu Screen(s), the ◄MORE MORE► symbols indicates that there are more *Icons* to select in each direction. The *Icon* selected will blink. Pushing the **Black [SELECT] Button** will select the *Icon* and the Menu Screen will change to the menu selected. Select the **Green [BACK] Button** to move backwards through the menu levels. Press the **Green [BACK] Button** repeatedly or select the **"QUIT"** *Icon* to completely exit the **SERVICE MENU** Mode.

View the **SERVICE MENU Icon Tree** on the next pages for a complete overview of all menus used in this system.
The "HELP" *Icon* provides an explanation of **ICON** usage *or* any other information in the Menu where the "HELP" *Icon* was selected *(when available).*

DIAG: GO TO DIAGNOSTICS MENU
AUD: GO TO AUDITS MENU
ADJ: GO TO ADJUSTMENTS MENU
UTIL: GO TO UTILITIES MENU
    (INSTALLS, CUSTOM MSG., CUSTOM PRICING,
    SET TIME, RESET & USB)
TOUR: GO TO TOURNAMENT MENU (START TOURNAMENT,
    VIEW TOURNAMENT DATA, SIGN MESSAGES)

>> TO UPDATE THE GAME CODE, REVIEW THE STEPS
    ON THE INSIDE FRONT COVER OF THIS MANUAL.

Use both the manual and the display to help customize, troubleshoot and/or diagnose faults, if any.

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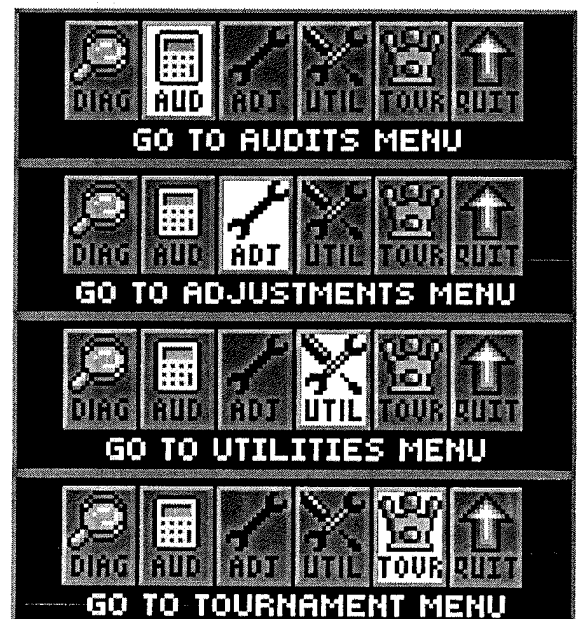
Service Switch X4 Set Access & Use

Inside Coin Door

The **4-Button Service Switch Set** provides access for *three (3) functions* available for your use: **1: SERVICE CREDIT, 2: VOLUME [–] / [+]** and **3: SERVICE MENU.**

▼ Service Switch X4 Set ▼

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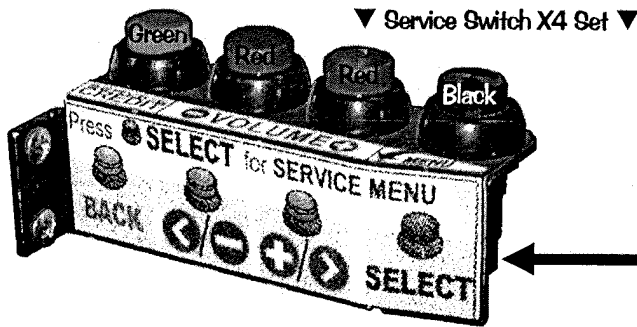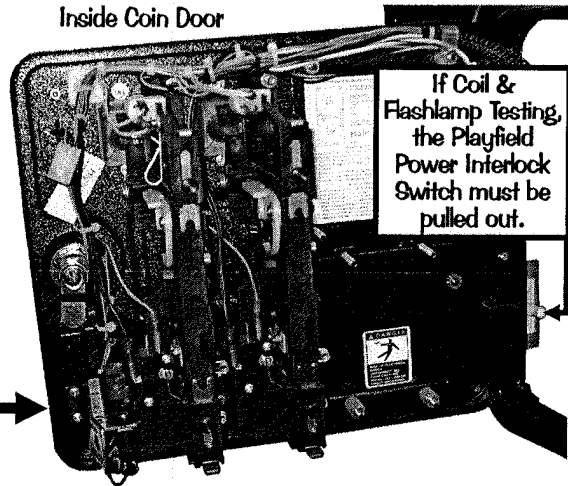
Service Menu Intro.

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)* and then follow below.

Pushing the GREEN BUTTON first.
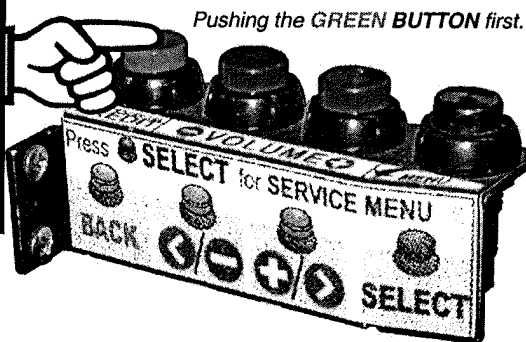
◀ Function 1: SERVICE CREDITS MENU

Pushing the **Green [SERVICE CREDIT] Button** first, adds a *Service Credit* per push *(will not affect your audits as "paid" credits)*. This is useful for the technician to test games in regular play without affecting the game audits. Each depression adds 1 **credit**; up to **50 credits** can be applied. **Standard Adjustment 23, Credit Limit,** determines this, however, it can be changed from 04-50; *for details see the Adjustments Section.*

Note: *Once your credits are added, this menu will **automatically exit** a few seconds after the last button depression or when the **Green [BACK]** or **Black [SELECT] Button** is pushed. This function is disabled if **Standard Adjustment**

38, 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, with 8 paid credits present, only 22 Credits can be applied.).*

Pushing either RED BUTTON first.   Pushing either RED BUTTON first.
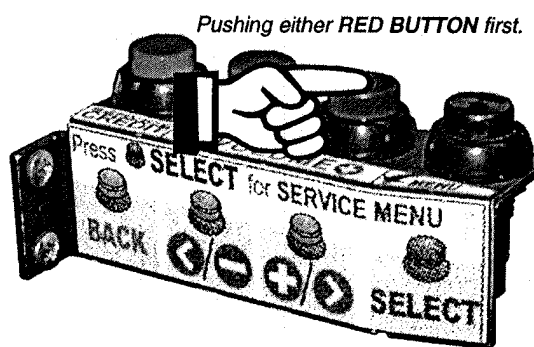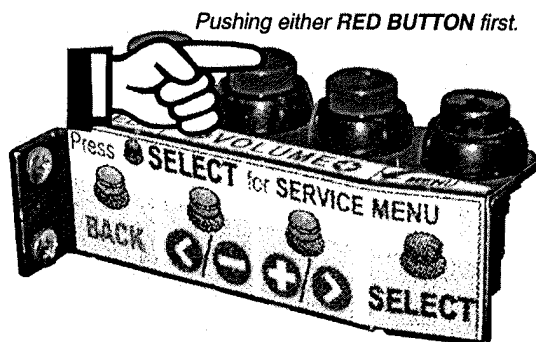
▲ Function 2: VOLUME MENU ▲

Pushing either of the **Red [VOLUME] Buttons** first, enters the *VOLUME MENU.* While in this Mode, to **DECREASE** the volume, hold down or depress the **1st Red [< / –] Button** until desired the volume is achieved; to **INCREASE** the volume, hold down or depress the **2nd Red [+ / >] Button** until the desired volume is achieved.

Note: *The volume can be set between 0-63; Once your adjustments are made, this menu will **automatically exit** a few seconds after the last button depression or when the **Green [BACK]** or **Black [SELECT] Button** is pushed.*

Pushing the BLACK BUTTON first.
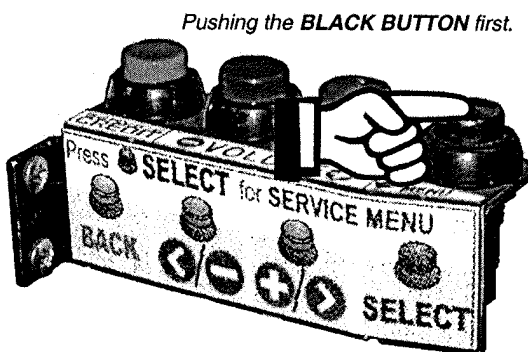
◀ Function 3: SERVICE MENU

Pushing the **Black [SELECT] Button** first, enters the *SERVICE MENU.* Once in, navigate through all menus by depressing the **Service Menu Buttons.** Use the **Red [< / –]** or **[+ / >] Buttons** to move LEFT / RIGHT, NEXT/PREVIOUS *(audits/adjustments)* or to INCREASE / DESCREASE an adjustment (setting). Use the **Black [SELECT] Button** to select a highlighed *Icon,* move to the next line of text *or* to answer "OK" where applicable. Use the **Green [BACK] Button** to exit *or* escape back.

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Exit Service Menu

In the **MAIN MENU** and in all **SUB-MENUS** *(where the "QUIT" Icon is present)*, if the "QUIT" *Icon* is selected and *activated*, or the **Green** [BACK] **Button** is selected repeatedly *(depending on which sub-menu you're in...)*, the **SERVICE MENU Session** will be exited and returned to the *Attract Mode*.

EXIT SERVICE MENU
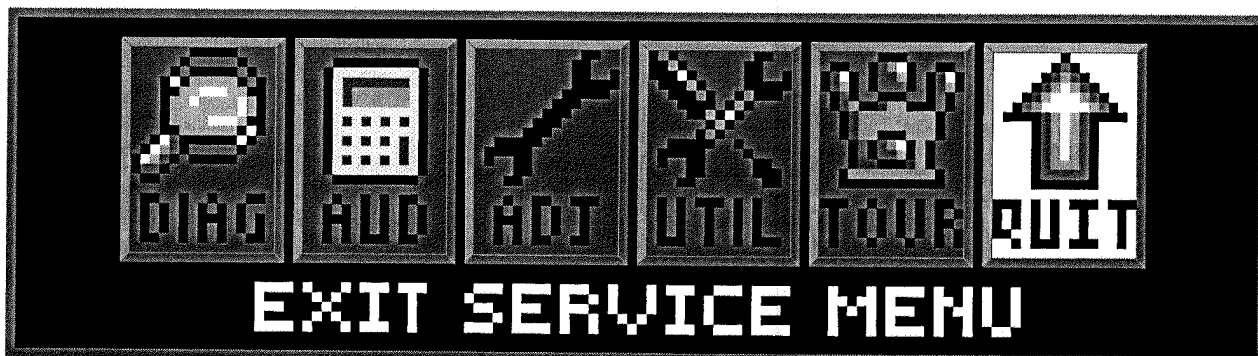
Turning the game on/off will start the *Power-Up Routine.* Upon **Power-Up**, the DISPLAY will indicate the COUNTRY, FILE VERSION and LANGUAGE(S) installed. LANGUAGE/COUNTRY: change via Dip Switch.

Service Menu Intro.

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

Problem / Solution Table

PROBLEM	SOLUTION
Will not enter the **SERVICE MENU** after depressing the **Black [SELECT] Button.**	• Check the Service Switches [GREEN, RED (x2) & BLACK Buttons] for loose connections or bad ground. • Check the associated wiring harness to/from the CPU/Sound Board, Connector **J13**. • Check CPU/Sound Board for possible failure.
All **Service Buttons [• • • • Buttons]** appear nonfunctional.	• Check the Service Switches wiring harness for poor or no connection and/or broken wires.
The **Green Button** in the Attract Mode will not enter the **SERVICE CREDITS MENU** to add Service Credits.	• Check to make sure the Game is not in **"Free Play."** *If the game is set to Free Play, adding Service Credits is not required.* • Check the Service Switches wiring harness for poor or no connection and/or broken wires.
The **Display** "blanks out."	• Check the Dot Matrix Display for loose wiring harness for poor or no connection and/or broken wires. • Check F1 (3/4A Fuse) on the Display Power Supply Board. *Refer to the Yellow Pages (SCHEMATICS & TROUBLESHOOTING).*
Icons *"scroll"* along continuously in the **MAIN MENU.**	• Check for a stuck switch on either of the **Red Buttons.**
The **Start** and **Flipper Buttons** do not select or activate *Icons* in the **SWITCH TEST MENU.**	• This is normal. These switches are deactivated, as they are a part of the Switch Test. *Refer to the Diagnostics Section (GO TO DIAGNOSTICS MENU, Switch Test).*
Can't move selection of *Icon* with the **Left** and/or **Right Flipper Buttons.**	• Check the **Flipper Buttons** for loose connections or bad Ground and refer to Section 5, Chapter 2, Playfield Wiring, #-Flipper Circuit Wiring Diagram. • This is normal *only* in **Diagnostic's Switch & Active Switch Tests** *(see previous Problem).*
Some *Icons* appear non-functional in the **MENU** or missing.	• Some functionality of the Service Menu may not have been completed during development. If exists, it should only be a non-critical function, such as the "HELP" *Icon*, which will explain the usage of icons. When completed, a software update will correct the problem. Software updates are announced via Service Bulletins (if critical) and on our website **http://www.sternpinball.com/GAME-code.shtml**; view the Game Code Library Message Board Marquee or click **Previous Messages** for past announcements.
In **COIL TEST MENU**, the coils and flashlamps *do not* fire after pressing the **Black [SELECT] Button.**	• Ensure the **POWER INTERLOCK SWITCH** *is pulled out (see the start of this Chapter).*
In the **SERVICE MENU**, the volume cannot be adjusted with either of the **Red Buttons.**	• The Volume adjustment can only be made when in the **Attract Mode** *(see the start of this Chapter).*
In the **SERVICE MENU**, the display seems to lock up, or the Help Display appears to be non-functional.	• If you cannot clear the situation by exiting back one Menu, exit completely out of the **SERVICE MENU**, and re-enter. If the problem persists, call Technical Support for additional help.

IF YOU NOTE ANY OTHER PROBLEMS or HAVE ANY SYMPTOMS NOT DESCRIBED ABOVE, PLEASE CALL TECHNICAL SUPPORT 800-542-5377 (708-345-7700 OPTION #1), SO WE MAY ASSIST YOU.
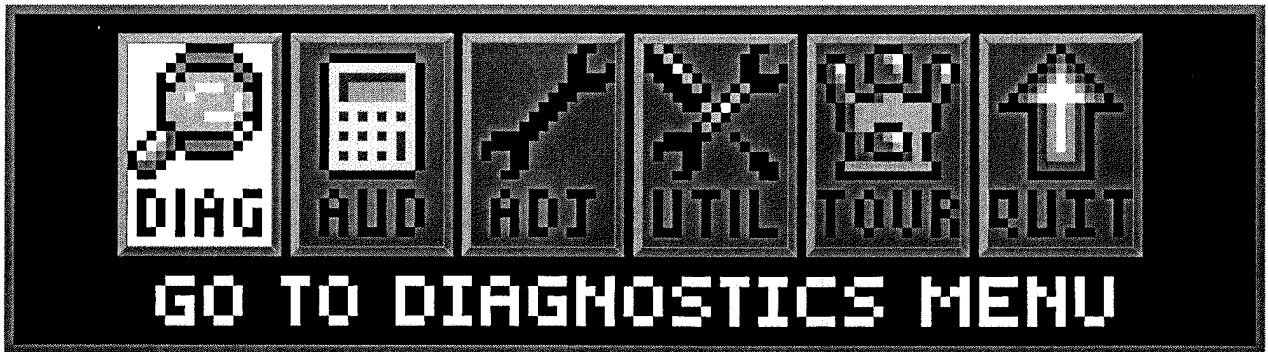
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Pinball Service Menu Icon Tree

22
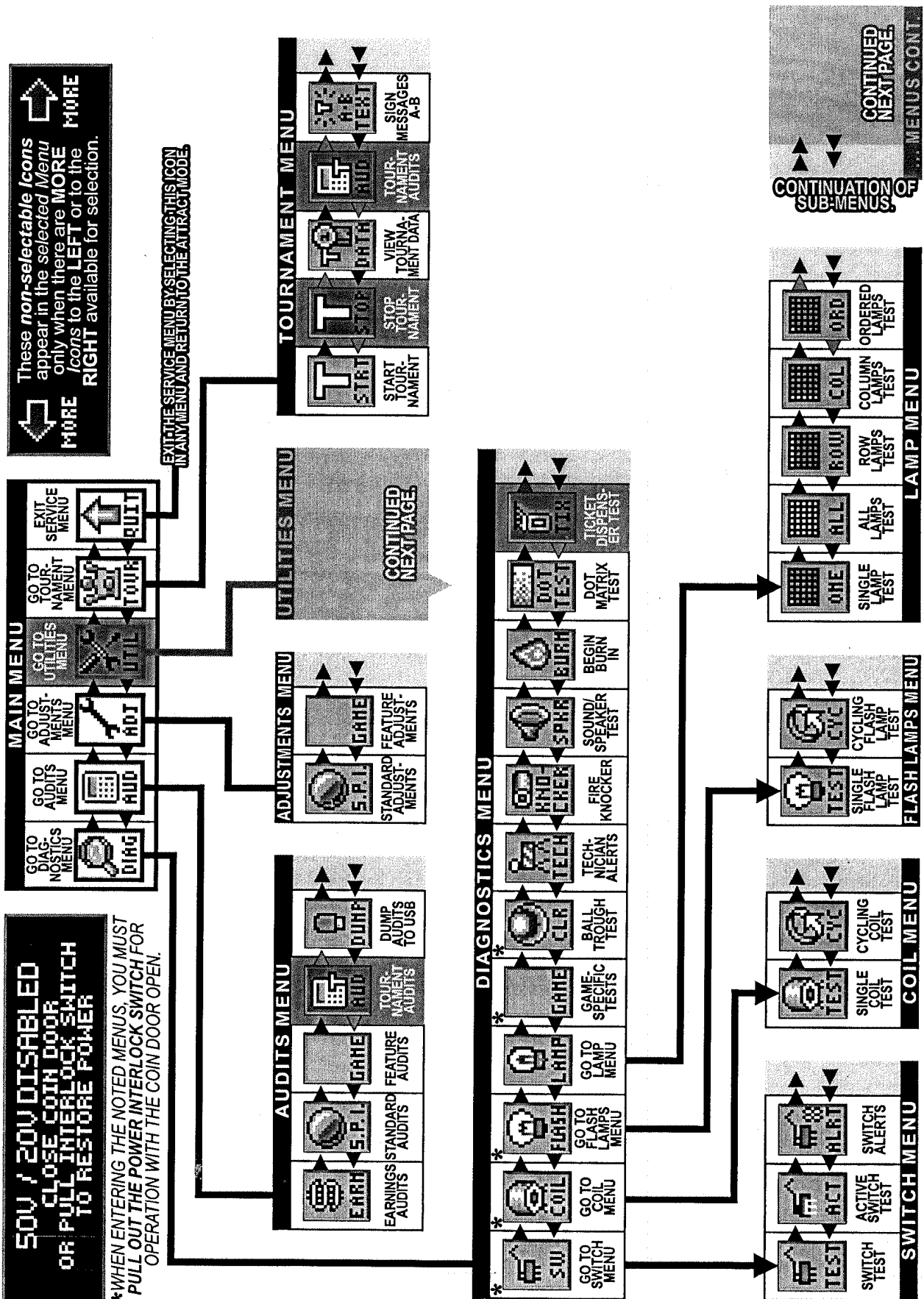
Pinball Service Menu Icon Tree Continued
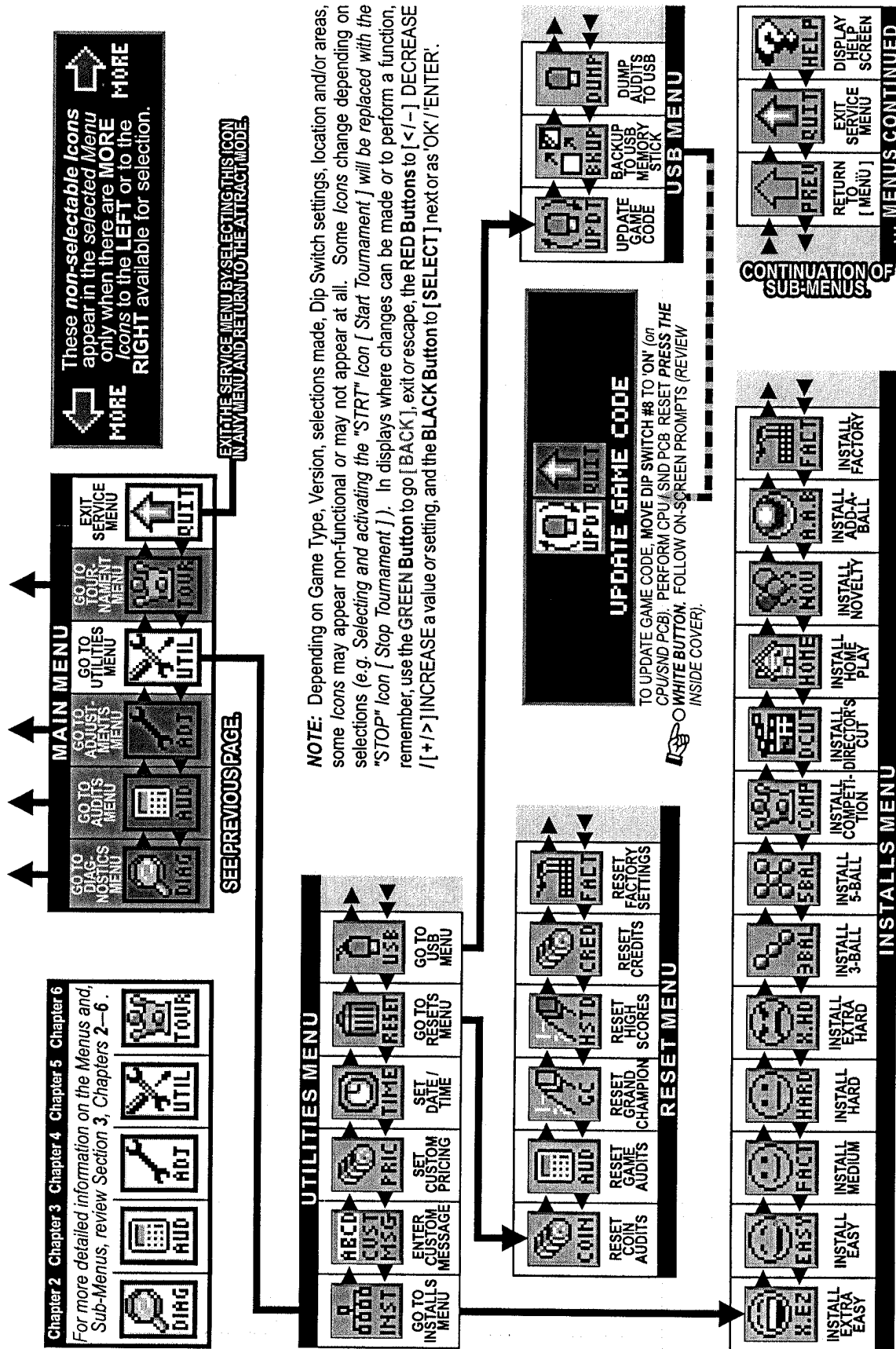
Service Menu | Go To Diagnostics Menu

GO TO DIAGNOSTICS MENU

To initiate, from the **MAIN MENU**, select the "DIAG" *Icon*. The **DIAGNOSTICS MENU** provides tests for switches, coils, flash lamps, lamps, sounds and dots in the Dot Matrix Display. Each feature may be tested manually or automatically after entering the **SERVICE MENU** *(see Service Menu Introduction Section)*.
The **[CYCLING COIL TEST]** / **[FLASH LAMP TEST]** may be used for a quick verification of automatic test functions. The **[SWITCH TEST]** / **[SINGLE COIL TEST]** / **[SINGLE LAMP TEST]** / **[ALL LAMPS TEST]** / **[ROW LAMPS TEST]** / **[COLUMN LAMPS TEST]** / **[FLASH LAMP TEST]** may be used for troubleshooting.

All **DIAGNOSTICS MENU** *Icons* and there usages are explained throughout this chapter in the same order as seen in the Dot Matrix Display. *NOTE:* Depending on Game Type, Version, selections made, Dip Switch settings, location and/or areas, some *Icons* may appear non-functional *or* may not appear at all. Some *Icons* change depending on selections *(e.g. Selecting and activating the "STRT" Icon [Start Tournament] will be replaced with the "STOP" Icon [Stop Tournament])*. **Icons** and/or **functions, order** and **operation are subject to change.**

In displays where changes can be made *or* to perform a function, use the **GREEN Button** to go **[BACK]**, exit *or* escape, the **RED Buttons** to **[< / –]** MOVE BACK / LEFT / DECREASE / **[+ / >]** MOVE FORWARD / RIGHT / INCREASE a value *or* setting, and the **BLACK Button** to **[SELECT]** next *or* as "OK / ENTER / ENERGIZE."

*Important: Upon **Power-Up** (Game CPU Reset) or opening the **Coin Door** watch the **Display** for any **Alerts**.**

This **audible / visual alert display** is shown when the **50V / 20V Power** is disabled *(by opening the Coin Door)*. PULL OUT THE INTERLOCK SWITCH *ONLY* WHILE IN THE SERVICE MENU FOR COIL OR SWITCH TESTING & BURN-IN WHEN THE COIN DOOR IS REQUIRED TO STAY OPEN FOR SERVICE BUTTON USE! Pulling out the Power Interlock Switch or pressing the 'escape' **Green [BACK] Button** will remove the alert display. Initial display presentation is accompanied by 3 audible tones *(the bright display warning will go dim after approximately 30 seconds)*.

This **alert display** is shown momentarily during **Game Mode** or **Power-Up** to alert the operator of a device malfunction *(device or mechanism doesn't energize or is energized repeatedly)*. **OPERATOR ALERT!** works by monitoring any *switch activated device* that has the potential to trap a ball when disabled *(e.g. in the Shooter Lane, Scoop or Eject Holes, etc.)*. This alert can also appear if a switch associated with a device *(e.g. Ball Trough, Auto Plunger, etc.)* is stuck closed *(caused by a switch jam or stuck ball)*; the game will activate the device a predetermined number of times and if the problem is still detected, this device *or* switch will be noted in **Switch Alerts** *(next page)* and/or **Technician Alerts**.

Upon entering the **SERVICE MENU**, if an asterisk " * " is displayed after the words "SERVICE MENU," the game has detected possible faulty devices, switches and/or missing pinballs. Press the either of the **Red Buttons** *(short-cut to the TECHNICIAN ALERTS MENU)* or continue into the **SERVICE MENU** *(press the **Black Button** again)*, select the "DIAG" *Icon* and "TECH" *Icon* for the **Technician Alerts** information.

CAUTION! Remove all pinballs from the Ball Trough prior to lifting the playfield to it's full upright position for servicing. **PULL OUT** the **Power Interlock Switch** for operation. To eject pinballs, select the "DIAG" *Icon* from the **MAIN MENU** to enter the **DIAGNOSTICS MENU**. Select the "CLR" *Icon* to enter the **BALL TROUGH TEST MENU**. Press the **Black [SELECT] Button**. To return to the **DIAGNOSTICS MENU**, press the **Green [BACK] Button**. *This feature also useful to retrieve a pinball for game testing in **Switch** or **Coil Tests**.*

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Go To Switch Menu

To initiate, from the **DIAGNOSTICS MENU**, select the "SW" *Icon*. Switches are configured in an 4 X 16 Matrix of Rows [Switch Drives] and Columns [Sw. Returns] with up to **64** possible switches. Dedicated Switches are configured in a 2 X 16 Matrix of Rows [Dedicated Sw. Drives / Ground] and Column [Ded. Switch Returns] with up to **32** possible dedicated switches *(includes the 8 dip switch positions)*. The **SWITCH TEST MENU** consists of three (3) parts: **Switch & Active Switch Tests** and **Switch Alerts** to test *all* switches.

Reminder: The Flipper & Start Buttons (part of Switch Tests) are temporarily disabled as Service Menu Navigation Buttons during these test(s) so they can be tested and shown on-screen. Pressinng the Green [BACK] Button (Dedicated Switch D-21), Light Green-Black / Black (GND), will exit Switch Test or Active Switch Test.

Switch Test

To initiate, from the **SWITCH MENU**, select the "TEST" *Icon*. Ensure the **Power Interlock Switch** is pulled out if testing with the Coin Door open and the activation of coils is required. Upon entering **Switch Test**, you will notice that some switches are already indicated as closed. In the examples, the 4-Ball Trough Switches #18, #19, #20 & #21 are shown closed *(pinballs at rest in the ball trough)*, along with the Flipper E.O.S. Dedicated Switches **D-10 & D-12** (End-of-Stroke Switches are 'normally closed'). If the game has more flippers with E.O.S. Dedicated Switches, CPU Dip Switch Setting *other than* 1-8 OFF or switches stuck closed, more dots will be indicated *(enter Active Switch Test to reveal the names)*.

In **Switch Test**, close each switch and observe the display *(switch closure is accompanied by a short audible tone)*. In the example, the **Black [SELECT] Button** Dedicated Switch D-24 is pressed. The Dot Matrix Display will light up *(highlight)* the corresponding *dot* in the on-screen matrix, display the *switch name, switch number* and the *Switch Drive / Return wire colors*. When not closing a switch, the display indicates **NONE** and the last switch number closure. For the Switch Matrix Grid and Dedicated Switch Grid, see **Find-It-In-Front: Dr. Pinball, DR. 4** *or* escape out of this test and enter **Active Switch Test** *(described below)* to view the names of the switches closed. *Note: Pressinng the Green [BACK] Button (Ded. Switch D-21), Lt. Green-Black / Black (GND), will exit the Switch Test.*

⚠ **CAUTION! COIL MECHANISMS WHEN ACTIVATED HAVE FAST MOVING PARTS!** While performing **Switch Test** with the Coin Door closed *or* open *(with the Power Interlock Switch is pulled out)*, **DO NOT USE YOUR FINGER** to test switches which are associated with a coil mechanism such as a Vertical Up-Kicker *(hole with a switch)*, Slingshots, Bumpers, etc..

Active Switch Test

To initiate, from the **SWITCH MENU**, select the "ACT" *Icon*. In **Active Switch Test**, if any switches are stuck closed *(or normally closed from the presence of pinball(s) as in the Ball Trough)*, the display will flash the corresponding dot(s) in the on-screen matrix, display the *name* and the *Switch Drive / Return wire colors*. If more than one switch is closed, the switch information will change with each switch. This cycle continues until all switches are cleared *or* until **Active Switch Test** is exited. In the example, the **Black [SELECT] Button** Dedicated Switch **D-24** is pressed and held down. The display will cycle and flash each dot, naming each switch which is closed. To determine the *switch number*, compare the highlighted dot to the same position in the Switch Matrix Grid at the beginning of this manual.

Switch Alerts

To initiate, from the **SWITCH MENU**, select the "ALRT" *Icon*. In **Switch Alerts Menu**, possible inoperable switches are marked with an "X" (OUT OF SERVICE). Mark switches **IN** *or* **OUT OF SERVICE** by pressing the **Black Button** while the intended switch is highlighted and change with either of the **Red Buttons**. Switches which are determined as "OUT OF SERVICE" by the game *or* manually, will be automatically marked as "IN SERVICE" as soon as the game determines a valid switch closure *(after adjusting, fixing or replacing the switch, then testing/actuating the switch)*. *Note: A Factory Reset will also put the switch back "IN SERVICE" in which the game will need to redetermine if the switch should be marked OUT OF SERVICE.*

Upon entering Switch Test, you will notice that some switches are already indicated as 'closed'. ▼
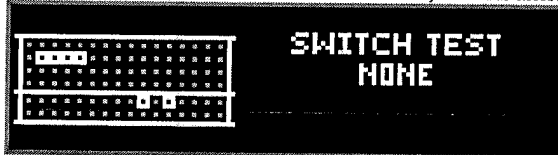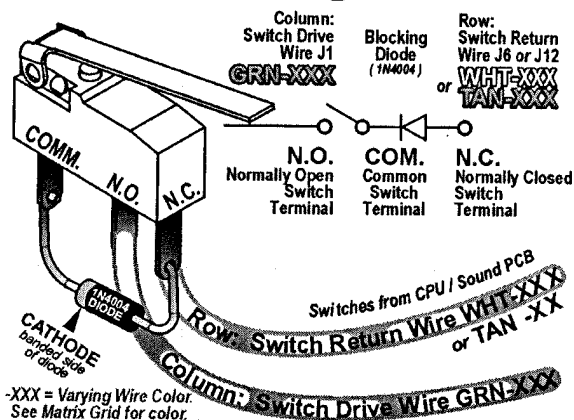

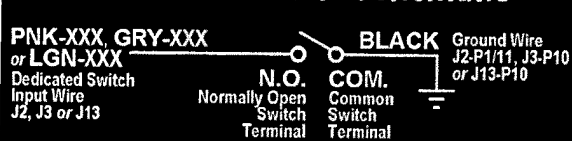*D-24 position is highlighted and accompanied by a short audible tone when pressed. ▼*

After pressing the switch (to make it close), the display will indicate the last switch number. ▼

Typical Switch Wiring & Schematic

Column: Switch Drive Wire J1	Blocking Diode (1N4004)	Row: Switch Return Wire J6 or J12
GRN-XXX		WHT-XXX or TAN-XXX

N.O. Normally Open Switch Terminal	COM. Common Switch Terminal	N.C. Normally Closed Switch Terminal

Switches from CPU / Sound PCB
Row: Switch Return Wire WHT-XX or TAN-XX
Column: Switch Drive Wire GRN-XXX

-XXX = Varying Wire Color. See Matrix Grid for color.

Dedicated Switch Schematic

PNK-XXX, GRY-XXX or LGN-XXX		BLACK	Ground Wire J2-P1/11, J3-P10 or J13-P10
Dedicated Switch Input Wire J2, J3 or J13	N.O. Normally Open Switch Terminal	COM. Common Switch Terminal	

... D-24 is held down. The display will cycle and flash each dot, naming each switch ... closed. ▼

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Go To Coil Menu

To initiate, from the **DIAGNOSTICS MENU**, select the "COIL" *Icon*. 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 #25 – #32 *(although Flash Lamps may be used in any position and will be noted).* Auxiliary Coils may be used in positions #33 – #35.

Remember, use the **GREEN Button** to go **[BACK]**, exit *or* escape, the **RED Buttons** to **[< / –] GO BACK [+ / >]** GO FORWARD, and the **BLACK Button** to **[SELECT]** ENERGIZE the coil *(solenoid)* or flash lamp.

Single Coil Test

To initiate, from the **COIL MENU**, select the "TEST" *Icon*. Ensure the **Power Interlock Switch** is pulled out if testing with the Coin Door open. Upon entering **Single Coil Test**, you will notice the #1 coil is shown. The Dot Matrix Display will indicate the *coil or flash lamp name, coil (solenoid) or flash lamp number* and the *Coil or Flash Lamp Power Line / Drive Transistor Control Line wire colors*. To determine the "Pin-Outs" from the I/O Power Driver Board, the Coil Voltage Gauge-Turns *(e.g. 23-800)* or lamp type *(e.g. #89 or #906 Bulb)*, view the Coils Detailed Chart Table at the beginning of this manual *or* for more on troubleshooting and diagnosing, see the Yellow Pages *(Schematics & Wiring)*.

```
COIL TEST
TROUGH UP-KICKER
#1
YEL-VIO BRN-BLK
```

Typical Coil Wiring & Schematic
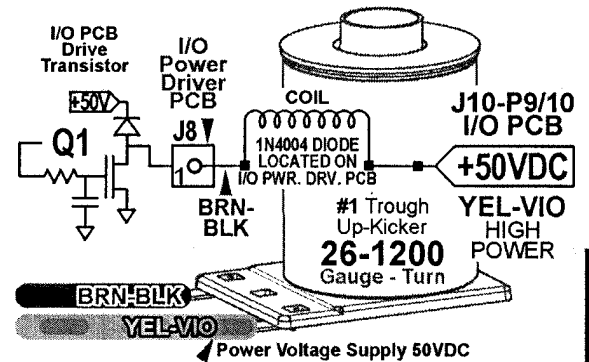
Cycling Coil Test

To initiate, from the **COIL MENU**, select the "CYC" *Icon*. Ensure the **Power Interlock Switch** is pulled out if testing with the Coin Door open. The test pulses each regular coil or flash lamp sequentially *(cycling)* on the Playfield and in the Backbox *(if coils or flash lamps are used)*. The Dot Matrix Display indicates the same information you will find in **Single Coil Test**.

Go To Flash Lamps Menu

To initiate, from the **DIAGNOSTICS MENU**, select the "FLASH" *Icon*. The two tests allows the technician to easily spot any burned-out flash lamps and replace them. Unlike **Single Coil Test**, which tests *all* coil *(solenoids)*, including flash lamps, **Single** and **Cycling Flash Lamp Tests**, test only the flash lamps used in the game. Flash Lamps are typically used in positions #25 – #32 *(although Flash Lamps may be used in any position and will be noted)*.

Remember, use the **GREEN Button** to go **[BACK]**, exit *or* escape, the **RED Buttons** to **[< / –]** GO BACK / **[+ / >]** GO FORWARD, and the **BLACK Button** to **[SELECT]** ENERGIZE the flash lamp.
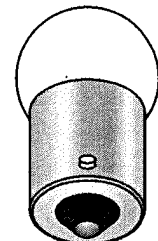
Single Flash Lamp Test

To initiate, from the **FLASH LAMPS MENU**, select the "TEST" *Icon*. Ensure the **Power Interlock Switch** is pulled out if testing with the Coin Door open. Upon entering **Single Flash Lamp Test**, you will notice the first Flash Lamp is shown. The Dot Matrix Display will indicate the *flash lamp name, flash lamp number* and the *Flash Lamp Power Line / Drive Transistor Control Line wire colors*. To determine the "Pin-Outs" from the I/O Power Driver Board or lamp type *(e.g. #89 or #906 Bulb)*, view the Coils Detailed Chart Table at the beginning of this manual *or* for more on troubleshooting and diagnosing, see the Yellow Pages *(Schematics & Wiring)*.

```
FLASH LAMP TEST
FLASH: NAME OF FLASHER
#25
ORG BLK-BRN
```

Bulb Types used for Flash Lamps

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

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

Cycling Flash Lamp Test

To initiate, from the **FLASH LAMPS MENU**, select the "CYC" *Icon* . Ensure the **Power Interlock Switch** is pulled out if testing with the Coin Door open. The test pulses each flash lamp sequentially *(cycling)* on the Playfield and in the Backbox *(if flash lamps are used)*. The Dot Matrix Display indicates the same information you will find in **Single Flash Lamp Test**.

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Go To Lamp Menu

LAMP

To initiate, from the **DIAGNOSTICS MENU**, select the "LAMP" *Icon*. Controlled lamps are configured in and 8 X 10 Matrix of Rows [Lamp Returns / Ground] and Columns [Lamp Drives / 18VDC] with up to 80 lamps possible. The **LAMP TEST MENU** consists of five (5) parts: **Single Lamp Test, Test All Lamps, Row Lamps Test, Column Lamps Test** and **Ordered Lamps Test*** to test *all* lamps.

Remember, use the **GREEN Button** to go [**BACK**], exit *or* escape, the **RED Buttons** to [< / –] GO BACK / LEFT / [+ / >] GO FORWARD / RIGHT, and the **BLACK Button** to [**SELECT**] next *or* as "OK / ENTER."

Upon entering **Single Lamp Test**, ... the #1 lamp is shown. .... Display will light up ... the *dot* ... ▶

Single Lamp Test

ONE

To initiate, from the **LAMP MENU**, select the "ONE" *Icon*. As each lamp is selected, the lamp will light at it's location on the playfield as well as the Dot Matrix

```
SINGLE LAMP TEST
START BUTTON
LAMP #1
YEL-BRN / RED-BRN
```

Display. Upon entering **Single Lamp Test**, you will notice the #1 lamp is shown. The Dot Matrix Display will light up *(highlight)* the corresponding *dot* in the on-screen matrix, display the *lamp name, lamp number* and the *Lamp Return / Drive wire colors*. For the Lamp Matrix Grid, see the beginning section of this Service Game Manual.

Upon entering **All Lamps Test**, ... the Dot Matrix Display is flashing "ALL LAMPS ON" ... ▶

All Lamps Test

ALL

To initiate, from the **LAMP MENU**, select the "ALL" *Icon*. Upon entering **All Lamps Test**, you will notice the Dot Matrix Display is flashing **ALL LAMPS ON** and the

```
ALL LAMPS TEST
ALL LAMPS ON
```

lamps on the playfield will be lit, alternating between the rows in the Lamp Matrix Grid. The Dot Matrix Display will light up *(highlight)* all of the *dots* in the on-screen matrix.

Upon entering **Row Lamps Test**, you will notice the #1 lamp row is shown. ▶

Row Lamps Test

ROW

To initiate, from the **LAMP MENU**, select the "ROW" *Icon*. As each lamp row is selected, the lamps in the row will light on the playfield as well as the Dot Matrix

```
ROW LAMPS TEST
LAMP ROW #1
RED-BRN
J12-P1 / Q33
```

Display. Upon entering **Row Lamps Test**, you will notice the #1 lamp row is shown. The Dot Matrix Display will light up *(highlight)* the corresponding row of *dots* in the on-screen matrix, display the *lamp row number*, the *Lamp Return wire colors*, the *I/O PCB Connector* and *transistor number*.

Upon entering **Column Lamps Test**, you will notice the #1 lamp column is shown. ▶
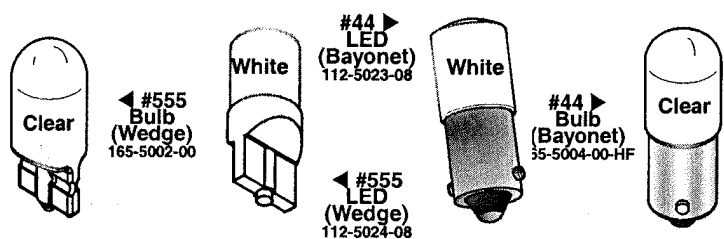
Column Lamps Test

COL

To initiate, from the **LAMP MENU**, select the "COL" *Icon*. As each lamp column is selected, the lamps in the column will light on the playfield as well as the Dot

```
COLUMN LAMPS TEST
LAMP COLUMN #1
YEL-BRN
J13-P9 / U17
```

Matrix Display. Upon entering **Column Lamps Test**, you will notice the #1 lamp column is shown. The Dot Matrix Display will light up *(highlight)* the corresponding row of *dots* in the on-screen matrix, display the *lamp column number, the Lamp Drive (18VDC) wire colors*, the *I/O PCB Connector* and *IC number*.
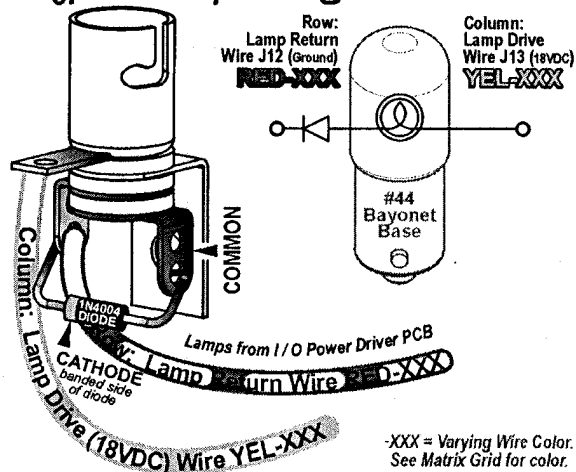
Bulb Types used for Control Lamps

◀ #555 Bulb (Wedge) 165-5002-00

Clear

White

#44 ▶ LED (Bayonet) 112-5023-08

White

◀ #555 LED (Wedge) 112-5024-08

#44 ▶ Bulb (Bayonet) 55-5004-00-HF

Clear

Typical Lamp Wiring & Schematic

Row: Lamp Return Wire J12 (Ground) RED-XXX

Column: Lamp Drive Wire J13 (18VDC) YEL-XXX

#44 Bayonet Base

Lamps from I/O Power Driver PCB

1N4004 DIODE

CATHODE banded side of diode

COMMON

Column: Lamp Drive (18VDC) Wire YEL-XXX

-XXX = *Varying Wire Color. See Matrix Grid for color.*

*** If not required in this game, Icon will not be shown.**

Ordered Lamps Test

ORD

To initiate, from the **LAMP MENU**, select the "ORD" *Icon*. If required, this Icon will appear in the **LAMP MENU**. Identical to **Single Lamp Test**, however, the lamps lit are not in the Lamp Matrix numeric order, but ordered *or* arranged in separate localized grouping(s) for easier lamp checking.

Diagnostics

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Game-Specific Tests

To initiate, from the **DIAGNOSTICS MENU**, select the "GAME" *Icon*. Ensure the **Power Interlock Switch** is pulled out when testing with the Coin Door open. *This Menu is provided to allow the technician a simple method of testing game specific coils and/or switches, if required. If used, select the Icon (and Sub-Menu Icons, if any) and follow on-screen prompts.*

//

Ball Trough Test

To initiate, from the **DIAGNOSTICS MENU**, select the "CLR" *Icon*. Ensure the **Power Interlock Switch** is pulled out if testing with the Coin Door open. 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. Upon entering **Ball Trough Test**, you will notice that four switches are already indicated as closed. In the example, the 4-Ball Trough Switches **#18, #19, #20 & #21** are shown closed *(pinballs at rest in the ball trough)*. To return to the **DIAGNOSTICS MENU**, press the **Green [BACK] Button**.

Press the **Black [SELECT] Button** to eject the ball in the first position Switch #21 (VUK OPTO Trough #1 (R)). Simultaneously, the Dot Matrix Display and the playfield will eject the ball to the Trough Up-Kicker, eject from the Trough Up-Kicker into the Shooter Lane, momentarily closing Switch *#23 (Shooter Lane),* and is ejected onto the playfield where the technician can easily retrieve the pinball or allow the ball(s) to re-enter the trough to continue **Ball Trough Test**. The Dot Matrix Display indicates Switch #18 (4-Ball Trough #4 (L)) as open as the remaining three (3) pinballs shift over one (1) position to the right. If the technician allows the ejected pinball to reenter the ball trough, the Dot Matrix Display will indicate Switch #18 as closed. *REMINDER: Switch #22 is the stacking OPTO switch; If more than five (5) pinballs are used, the additional switches will be noted. Typically, four (4) pinballs are used and required for proper operation; if this amounts differs, it will be noted on the front page of this Service Game Manual.*

⚠ **CAUTION!** *Continuous use off the above test may overheat the Trough Up-Kicker Coil.*

//

Technician Alerts

To initiate, from the **DIAGNOSTICS MENU**, select the "TECH" *Icon*. This Menu is provided to show any switch *or* solenoid problems and/or missing pinballs. If upon entering the **SERVICE MENU** the display indicated an asterisk (*) and "USE –/+ TO VIEW TECH. ALERTS", alerts are present.

```
TECHNICIAN ALERT - (0/0)
NO TECHNICIAN ALERTS
PRESS 'BACK' TO EXIT
```

After pressing either **Red [< / –] / [+ / >] Button** *or* selecting this *Icon* in the **DIAGNOSTICS MENU**, the display will indicate the alert(s). If there are 2 alerts present, the display will indicate (1/2) with the 1st alert on the display. Press the **Red [+ / >] Button** to view the second alert (2/2). The second number in the parenthesis ( ) after the slash (/) indicates how many alerts are present. Refer to the start of this chapter *regarding "Upon entering the* **SERVICE MENU** **"* indication and to **SWITCH ALERTS**. To return to the **DIAGNOSTICS MENU**, press the **Green [BACK] Button**. *Note: While in this menu, an option may be present to jump (short-cut) to the appropriate Testing Menu (e.g. Coil Test, Switch Test, Game Specific Test or Ticket Dispenser Test, if installed).*

NOTE ON SWITCH DETECTION : During game play, activation of switches are continuously monitored. For a switch to be determined as inoperable *or* **OUT OF SERVICE**, up to twenty games *or* so must be played for a switch to be automatically marked as **OUT OF SERVICE**. In programming, if a switch is determined to be faulty, game play is compensated. Switches noted as **OUT OF SERVICE** are determined to be stuck closed *or* open depending on switch usage. Free up the switch actuator, adjust *or* replace, if necessary. Performing a valid switch closure will put the switch back "IN SERVICE."

Determination of switch usage can be checked in **Audits** *(review the Audits Section)*. Find the associated Audit with the switch in question and check usage; compare the numbers to commonly used switches. After any switch is checked and repaired *or* replaced, it's suggested to test the switch in the **Switch Test** *or* **Single Coil Test** *(reviewed earlier in this section)* where the associated coil to the switch can be tested as well. After correcting the problem, the switch will marked "IN SERVICE" and the switch is again monitored as specified above. *Only you can determine if a switch marked OUT OF SERVICE is actually inoperable, or if it is just not getting actuated during game play.*

NOTE ON PINBALL DETECTION : While in **TECHNICIAN ALERTS MENU**, if the following is displayed, the game has detected one (1) *or* more pinball(s) missing and has compensated for the lost pinball(s) to provide normal game play.

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Technician Alerts continued from previous page.

During game play, a pinball 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.

```
TECHNICIAN ALERT - (1/2)
          2
     BALLS MISSING
PRESS 'SELECT' FOR TROUGH TEST
```

If the game does not see a switch closure *(indicating the pinball has not been found)*, the Dot Matrix Display may indicate [**LOCATING PINBALLS PLEASE WAIT ...**], 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.*

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. The most common places for a pinball to be stuck is in device holes (ejects and VUKs) or ball troughs. Determine that all devices are functionally properly. Check around plastic pieces and ramps to see if the pinball got jammed or stuck.*

When the found pinball *or* a replacement pinball is added to the Ball Trough, the **Technican Alert** will immediately clear and will then indicate any remaining alerts *(if present)* or **NO TECHNICIAN ALERTS.**

Enter the **BALL TROUGH TEST** *(review the previous page)* to cycle the pinballs and to check proper switch and coil operation. *If a pinball was added, and the originally stuck pinball has freed itself at a later time, the game will not operate correctly.*

```
TECHNICIAN ALERT - (2/2)
    DEVICE MALFUNCTION
       AUTO PLUNGER
USE -/+ TO VIEW OTHER ALERTS
```

NOTE ON DEVICE MALFUNCTION : While in **TECHNICIAN ALERTS MENU**, if the following is displayed, the game has detected a "device malfunction." Check the device indicated *(coil and/or switch).*

Knocker Test

To initiate, from the **DIAGNOSTICS MENU**, select the "KNO- CKER" *Icon*. The digitally mastered "Knocker" is sounded. The *knocker sound* is used to alert the player if he/she has received a special, replay or a credit from the Match Award feature. Press the **Black [SELECT] Button** to activate the knocker. To return to the **DIAGNOSTICS MENU**, press the **Green [BACK] Button.**

FACTOID: *The knocker got it's name from the 'original knocker' (20th century pinball games), which used a coil and when energized (fired), the plunger would strike a wood panel inside the cabinet.*

Sound / Speaker Test

To initiate, from the **DIAGNOSTICS MENU**, select the "SPKR" *Icon*. This system produces true digital stereo sound from Backbox & Cabinet Speakers or *"Mono"* on the Cabinet Speaker *(when used by itself).* This Menu is provided to allow the technician a simple method of testing the speakers if rewired or replaced.

```
SOUND / SPEAKER TEST
 MUSIC: MAIN PLAY
         #1
  PRESS 'SELECT' TO PLAY
```

```
SOUND / SPEAKER TEST
 MUSIC: MAIN PLAY
         #1
  PLAYING SOUND #1
```

Upon entering **Sound / Speaker Test**, you will notice the Dot Matrix Display indicating the first option of *available* music *and/or* sound(s) in this test. Press the **Red [+ / >] Button** to cycle through the *available* music *and/or* sounds, and press the **Black [SELECT] Button** to play the option shown in the Dot Matrix Display. Press the **Green [BACK] Button** to exit.

Speaker Phase Testing

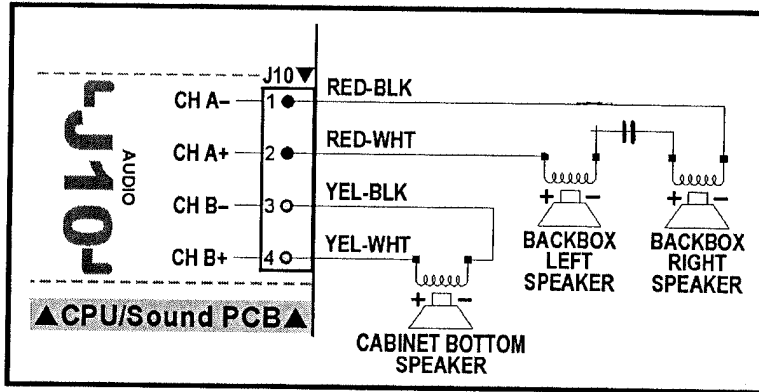Connections to each of speakers are polarized and each must be connected appropriately for the best quality sound. If one speaker has the positive and negative connections reversed with respect to the other one, bass frequencies will not be produced properly and the overall sound quality will be poor. To test for proper speaker phasing, use the **Sound / Speaker Test** to cycle through the available music and sound.

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SPKR

Speaker Phase Testing continued from previous page.

If the sound is not balanced or doesn't sound correct, check the speaker wiring.

J10 AUDIO

J10		
CH A-	1●	RED-BLK
CH A+	2●	RED-WHT
CH B-	3○	YEL-BLK
CH B+	4○	YEL-WHT

▲CPU/Sound PCB▲

BACKBOX LEFT SPEAKER   BACKBOX RIGHT SPEAKER

CABINET BOTTOM SPEAKER

1. Check each speaker for polarity markings. If the speakers have polarity markings, verify that the Backbox Speaker's **RED-BLK** Wires and the Cabinet Speaker **YEL-BLK** Wire(s) are connected to the negative (–) terminal.

2. Disconnect the speaker output **Connector J10 (AUDIO)** from the CPU / Sound PCB *(in the Backbox)* and connect a 1.5-volt battery across each speaker pair one at a time while observing the speakers.

3. Make sure the positive (+) battery terminal is connected to the positive lead [J10, Pin-2, **CH A+**] (**RED-WHT**) *or* [J10, Pin-4, **CH B+**]

(YEL-WHT) each time. As the connection is made, check speaker cone movement; proper connections are indicated by outward movement.

Begin Burn-In

BURN

To initiate, from the **DIAGNOSTICS MENU**, select the "BURN" *Icon*. After selecting this *Icon*, press the **Black [SELECT] Button** to begin (initiate) the *Burn-In Test*. Ensure the **Power Interlock Switch** is pulled out if testing with the Coin Door open *(required for coil function)*. Upon entering **Burn-In Test**, the game will exercise all CPU I/O Functions: **Dot Matrix Display Test, Coil Cycling Testing, All Lamps Test** and **Sound / Speaker Test**. Press the **Green [BACK] Button**, to pause and to view the cumulative Burn-In minutes. Press the **Green [BACK] Button** again to return to the **DIAGNOSTICS MENU**.

Note: To reset Burn-In minutes back to 0:00, see Section 3, Chapter 5, GO TO RESET MENU (via the UTILITIES MENU), Reset Factory Settings. ⚠ *CAUTION: Performing a FACTORY RESET will reset all other information as well (read the Utilities Section (GO TO RESET MENU), for more information).*
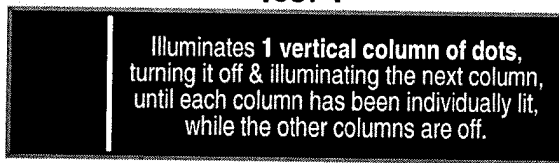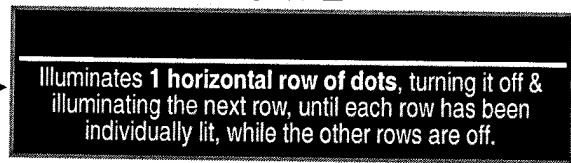
Dot Matrix Test

DOT TEST

To initiate, from the **DIAGNOSTICS MENU**, select the "DOT TEST" *Icon*. After selecting this *Icon* the **Dot Matrix Test** immediately begins. The Dot Matrix Display will immediately and continuously illuminate and cycle each of the *5 Tests for 1 pass each*. To return to the **DIAGNOSTICS MENU**, press the **Green [BACK] Button**.

Diagnostics

Test 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.

➡

Test 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.

➡

Test 3
Illuminates **all the dots**, **except for one column** from left to right.

➡

Test 4
Illuminates **all the dots**, **except for one row** from top to bottom.

➡

Test 5
Illuminates **all the dots alternating even & odd**, in both the *rows and columns*.

➡

Test 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.

➡

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//

Ticket Dispenser Test

To initiate, from the **DIAGNOSTICS MENU**, select the "TIX" *Icon*. This Menu *(Icon) will only appear* if **Standard Adjustment 56, Ticket Dispenser**, is set to **YES** (Default = **NO***). **Note: Some games shipped from the factory with a unique Dip Switch Setting will default to **YES**). To view and/or change your setting, see Adjustments Section (**GO TO ADJUSTMENTS MENU**). Please remember, if you install an optional Ticket Dispenser, and your default setting is "NO," you will have to reset it back to "YES" if a **Factory Reset** is performed.*

After selecting this *Icon*, the **Ticket Dispenser Test** will start. With the Ticket Dispenser properly installed, manually feed your tickets into the dispenser. The dispenser will activate and pull in the first ticket. Press the **Black [SELECT] Button** (which energizes Coil #35, Aux 3: Switched Ground) to advance a ticket. Feeding your Tickets into the dispenser works because Coil #33, Aux 1: Ticket Advance (Enable) is always 'energized'. With a Ticket Meter installed, as one Ticket Passes through the Ticket Dispenser, one 'click' is fired to the Meter (Coil #34, Aux 2: Ticket Meter) for each ticket passing through. Dedicated Switch **D-19, Ticket Notch**, will also be indicated on-screen *(in combination with a audible sound)* as "closing" as the notch between the tickets passes through. In this test you can clear ticket jams and check and/or clear tickets in Escrow, if necessary. To return to the **DIAGNOSTICS MENU**, press the **Green [BACK] Button.**

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Service Menu   Go To Audits Menu
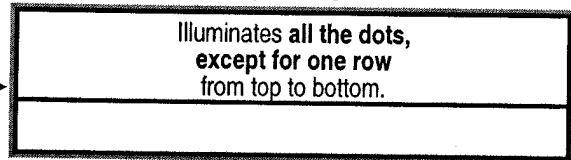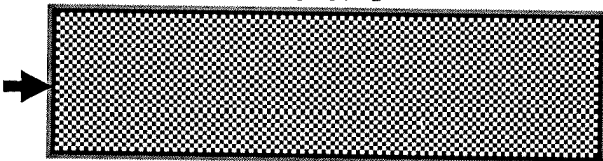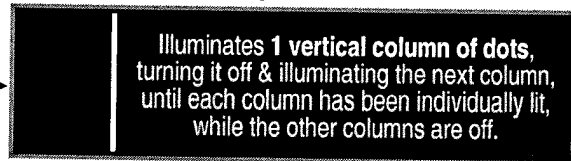

GO TO AUDITS MENU

To initiate, from the **MAIN MENU**, select the "AUD" *Icon*. The **AUDITS MENU** provides 99* Audits for accounting purposes and for evaluation of *Game Programming*. The Audits are divided into 4 groups: • **Earnings Audits** [#1 – #13], • **Standard Audits** [#1 – #59], • **Feature Audits (Programming Use Only)** [#1 – #+] and • Tournament Audits [#1 – #14], "T AUD" *Icon* provided as an alternate access to Tournament Audits *(*if data is available)*. For more information on the **TOURNAMENT MENU**, *review the Tournament Section (**GO TO TOURNA-MENT MENU**). Try the "DUMP AUDITS TO USB" feature to create a text file of your audits. Don't forget to set the DATE & TIME in the **UTILITIES MENU**. See the Utilities Section (**GO TO UTILITIES MENU**), for more information.*

Audits which are named **Proprietary** are also for *Future Expansion* or *Programming*. Game code may get upgraded during production; compare all Audits in the Dot Matrix Display with the manual and make any corrections, as necessary. Audits are subject to change *(with or without notice)*.

All **AUDITS MENU** *Icons* and there usages are explained throughout this chapter in the same order as seen in the Dot Matrix Display. **NOTE:** Depending on Game Type, Version, selections made, Dip Switch settings, location and/or areas, some *Icons* may appear non-functional *or* may not appear at all. *Icons and/or functions, order and operation are subject to change*.

In displays where changes can be made *or* to perform a function, use the **GREEN Button** to go [BACK], exit *or* escape, the **RED Buttons** to [< / –] MOVE BACK / LEFT / [+ / >] MOVE FORWARD / RIGHT to view the next audit in the group, and the **BLACK Button** to [SELECT] the sub-menus.

Earnings Audits [#1 – #13]

To initiate, from the **AUDITS MENU**, select the "EARN" *Icon*. The Dot Matrix Display will indicate the audit number (in this group), audit name and the audit total or value. The current audit will remain on the display until the next audit is viewed or when this sub-menu is exited.

#1 **TOTAL PAID CREDITS [0] :** Total number of *Paid Credits*.

#2 **FREE GAME PERCENTAGE [0%] :** Percentage value is 'Total Free Plays' (Standard Audit 15) divided by 'Total Plays' (Standard Audit 16).

#3 **AVERAGE BALL TIME [0:00] :** In seconds, the average ball time is derived from the total play time divided by Standard Audit 1, Total Balls Played.

#4 **AVERAGE GAME TIME [0:00] :** The average game time is expressed in minutes and seconds.

#5 **COINS THROUGH LEFT SLOT [0] :** Total 'Left Coin Slot' Dedicated Switch (D-1) closures.

#6 **COINS THROUGH RIGHT SLOT [0] :** Total 'Right Coin Slot' Dedicated Switch (D-3) closures.

#7 **COINS THROUGH CENTER SLOT [0] :** Total 'Center Coin Slot' Dedicated Switch (D-2) closures.

#8 **COINS THROUGH FOURTH SLOT [0] :** Total '4th Coin Slot' Dedicated Switch (D-4) closures.

#9 **COINS THROUGH FIFTH SLOT [0] :** Total '5th Coin Slot' Dedicated Switch (D-5) closures.

#10 **TOTAL COINS [0] :** Total amount of coins registered through all the *Coin Slots*.

#11 **TOTAL EARNINGS [USD 0.00] :** Total cash value accumulated since the last Factory Reset occurred (reveiw the Utilities Section (**GO TO RESET MENU**), **Reset Coin Audits**).

#12 **METER CLICKS [0] :** Total number of money clicks accumulated. Based on the country's lowest coin denomination used for the game credit.

#13 **SOFTWARE METER [0] :** Continuing total of Meter Clicks. This audit cannot be reset; the display shows the constant addition of Meter Clicks.

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//

Feature Audits [#1 – #+]

GAME

To initiate, from the **AUDITS MENU**, select the "GAME" *Icon*. The Dot Matrix Display will indicate the *audit number (in this group)*, *audit name* and the *audit total or value*. The current audit will remain on the display until the next audit is viewed or when this sub-menu is exited.

Feature Audits Definition: Programming Use Only. *The proprietary information 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).* **SEE THE DOT MATRIX DISPLAY FOR CURRENT FEATURE AUDITS.**

Feature Audits are subject to change *(with or without notice)*. **View Feature Audits on the Dot Display only.** To export all audits to your memory stick *(creating a text file)*, perform the following. Enter the **AUDITS MENU**, then enter the **DUMP AUDITS TO USB**. *Note:* The "DUMP" *Icon can also be accessed in the* **USB MENU** *via the* **UTILITIES MENU** *(see the Utilities Section (GO TO USB MENU) for details).*

//

Tournament Audits [#1 – #14] subject to change

T AUD

"T AUD" *Icon* provided as an alternate access to Tournament Audits *(if data is available)*. For more information on the **TOURNAMENT MENU,** *review the Tournament Section (GO TO TOURNAMENT MENU).*

//

Dump Audits To USB (Memory Stick)

DUMP

To initiate, from the **USB MENU**, select the "DUMP" *Icon*. Follow the on-screen prompts to perform a **Data Dump** *(download)*. A dated text file will be created on your USB Memory Stick.

Audits

```
GO TO AUDITS MENU        DUMP AUDITS TO USB
```

```
AUDIT DATA DUMP
INSERT USB MEMORY STICK
OR
PRESS 'BACK' TO EXIT
```

```
AUDIT DATA DUMP
GENERATED_DATED_FILE_NAME.TXT
PRESS 'SELECT' TO SAVE AUDITS
OR
PRESS 'BACK' TO EXIT
```

```
AUDIT DUMP
COMPLETE
PRESS 'SELECT' TO CONTINUE
```

Step 1 Insert your **USB Compatible Memory Stick** into the USB port on the CPU/Sound Board (S.A.M. System). If the Memory Stick has space available and is free of errors, a dated file* is generated *(* ensure your Date & Time is set prior to selecting or the dated file will have the default date of 20XX_01_01; see the Utilities Section (SET DATE / TIME) for details).*

Step 2 Press [SELECT] to save the file to your Memory Stick. Press [SELECT] again to continue or [BACK] to exit or escape at any time.

Step 3 Remove the Memory Stick and insert into your PC or Mac to save the file *(which can then be copied, printed or emailed)*. The audits are numbered sequentially **without** a number restart between the three types of audits *(Earnings, Standard and Feature)*.

> *Note:* The "DUMP" *Icon can also be accessed in the* **USB MENU** *via the* **UTILITIES MENU** *(see the Utilities Section (GO TO USB MENU) for details).*

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Service Menu   Go To Adjustments Menu

GO TO ADJUSTMENTS MENU
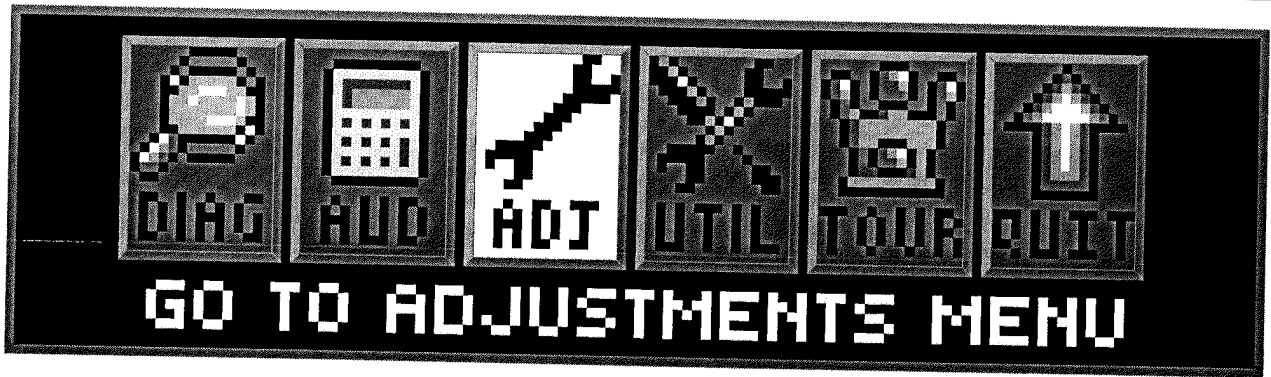
To initiate, from the **MAIN MENU**, select the "ADJ" *Icon*. The **ADJUSTMENTS MENU** provides 64+/- Adjustments to vary Game Functions to customize for your particular needs. The Adjustments are divided into 2 groups:
• **Standard Adjustments [#1 – #63]** and • **Feature Adjustments (Programming Use Only) [#1 – #+].**
*For **quick** and **easy customization** of Game Play Difficulty or Game Play Type or how to RESET ONLY the Adjustments, review the Utilities Section (GO TO INSTALLS MENU). **Shortcut: Enter Custom Message** (Standard Adj. 41)* and **Set Custom Pricing** *(via Standard Adjustment 18, Game Pricing) can be quickly accessed via the **UTILITIES MENU**. See the Utilities Section (GO TO UTILITIES MENU), for more information.*

Adjustments which are named **Proprietary** are also for *Future Expansion* or *Programming*. Game code may get upgraded during production; compare all Adjustments in the Dot Matrix Display with the manual and make any corrections, as necessary. Adjustments are subject to change *(with or without notice)*.

All **ADJUSTMENTS MENU** *Icons* and there usages are explained throughout this chapter in the same order as seen in the Dot Matrix Display. *NOTE:* Depending on Game Type, Version, selections made, Dip Switch settings, location and/or areas, some *Adjustments* may appear non-functional *or* may not appear at all. ***Adjustments and/or functions, order** and **operation are subject to change. If in doubt use the Factory Default Settings.***

In displays where changes can be made *or* to perform a function, use the **GREEN Button** to go **[BACK]**, exit *or* escape, the **RED Buttons** to **[< / –]** SELECT PREVIOUS **[+ / >]** SELECT NEXT when the adjustment name *or* setting is flashing and the **BLACK Button** to **[SELECT]** toggle between the ADJUSTMENT and SETTING.

Standard Adjustments [#1 – #63]

To initiate, from the **ADJUSTMENTS MENU**, select the "S.P.I." *Icon*. The Dot Matrix Display will indicate the *adjustment number (in this group), adjust. name, adjust. setting* and *comment line*. The current adjustment will remain on the display until the next adjustment is viewed or when this sub-menu is exited.

#1   REPLAY TYPE: Set to **AUTO, NONE, FIXED** *or* **DYNAMIC.** Factory Default = **AUTO. AUTO & DYNAMIC** are based on the **Replay Percentage** *(Standard Adjustment 2).* • Select **FIXED** to give the player a **Replay Award** *(Standard Adjustment 3)* as the **Replay Levels** *(Standard Adjustments 7-10)* are reached. The **Replay Level(s)** *(Standard Adjustments 7-10)* will not adjust up or down. • Select **AUTO** to give the player a **Replay Award** *(Standard Adjustment 3)* as the **Auto Replay Start** *(Standard Adjustment 5)* score level is reached. This *score threshold* will automatically adjust up or down based on the **Replay Percentage** chosen *(Standard Adjustment 2).* The game periodically adjusts based upon the Player Base Skill Level. • Select **DYNAMIC** to give the player a **Replay Award** *(Standard Adjustment 3)* as the **Dynamic Replay Start** (Standard Adjustment 6) score level is reached. This *score threshold* will go down every game based on the **Replay Percentage** *(Standard Adjustment 2)* selected. • Select **NONE** to turn off Standard Adjustments 2-11.

#2   REPLAY PERCENTAGE: Set between **1% – 50%.** Factory Default = **10%.** Adjustable only if **AUTO** *or* **DYNAMIC** is installed in Replay Type, Standard Adjustment 1. For **[DYNAMIC]** example, if the *score threshold* is 50,000,00 and the **Replay Percentage** selected is **10%,** every game a player does not reach the *score threshold*, the score to reach will drop by 5,000,000 (10% of 50M). This will continue every game until the *threshold score* is reached. Thus, if the score then drops to 15,000,000 after 7 games and is then achieved, the **Replay Award** *(Standard Adjustment 3)* is given. The original *score threshold* is added to 15,000,000 and is now 65,000,000. It will then take the same player 10 games to reach 15,000,000. *This adjustment is shown only if **AUTO** or **DYNAMIC** is installed in Replay Type (Standard Adjustment 1).*

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Standard Adjustments continued.

#3   REPLAY AWARD: Set to **CREDIT, TICKET*, TOKEN*** or **EXTRA BALL.** Factory Default = **CREDIT.** Set the type of award to be given to the player when the appropriate Replay Score threshold or level is acheived. If awarding a *CREDIT, TICKET or TOKEN* is prohibited in your area, select **EXTRA BALL.** *This adjustment is not shown if NONE is installed in Replay Type (Standard Adjustment 1).*

*Note: If TICKET or TOKEN is selected, the game will require an optional Ticket or Token Dispenser and then Q24 Option (Standard Adj. 55) must be changed accordingly.

#4   REPLAY LEVELS: Set between **1 – 4** for the number of Replay Levels to be active. Factory Default = **1.** *This adjustment is not shown if NONE is installed in Replay Type (Standard Adjustment 1).*

#5   AUTO REPLAY START: Set between **5,000,000 – 150,000,000** *(increments of 1,000,000)* for the Auto Replay Start threshold. Factory Default = __,000,000. *This adjustment is shown only if AUTO is installed in Replay Type (Standard Adjustment 1).*

#6   DYNAMIC REPLAY START: Set between **5,000,000 – 150,000,000** *(increments of 1,000,000)* for the Dynamic Replay Start threshold. Factory Default = __,000,000. *This adjustment is shown only if DYNAMIC is installed in Replay Type (Standard Adjustment 1).*

#7   REPLAY LEVEL #1: Set between **5,000,000 – 150,000,000** *(increments of 1,000,000).* Factory Default = __,000,000. Set the first *or* only Replay Level. *This adjustment is shown only if FIXED is installed in Replay Type (Standard Adjustment 1).*

#8   REPLAY LEVEL #2: Set between **5,000,000 – 150,000,000** *(increments of 1,000,000).* Factory Default = __,000,000. Set the second Replay Level. *This adjustment is shown only if FIXED is installed in Replay Type (Standard Adjustment 1) and 2 is intalled in Replay Levels (Standard Adjustment 4).*

#9   REPLAY LEVEL #3: Set between **5,000,000 – 150,000,000** *(increments of 1,000,000).* Factory Default = __,000,000. Set the third Replay Level. *This adjustment is shown only if FIXED is installed in Replay Type (Standard Adjustment 1) and 3 is intalled in Replay Levels (Standard Adjustment 4).*

#10 REPLAY LEVEL #4: Set between **5,000,000 – 150,000,000** *(increments of 1,000,000).* Factory Default = __,000,000. Set the fourth Replay Level. *This adjustment is shown only if FIXED is installed in Replay Type (Standard Adjustment 1) and 4 is intalled in Replay Levels (Standard Adjustment 4).*

#11 REPLAY BOOST: Set to **YES** *or* **NO.** Factory Default = **YES.** When set to **YES,** while **FIXED** or **AUTO** maintains the Replay Levels, Replay Boost works as follows: If the Replay Level is 7,000,000 *(regardless of the Replay Percentage),* and the Player scores 20M, and receives the Replay Award, the next game the Current Replay Level is added to this base. Thus the next game, the Replay Level is 14,000,000. The Player agains scores 20M. The next game the Player will need to achieve 21,000,000 to earn the Replay Award. If the Player does not achieve 21,000,000, the next game reverts back to the original 7,000,000 or the new adjusted level maintained by the Fixed or Autopercentaging Feature. *This adjustment is shown only if AUTO or FIXED is installed in Replay Type (Standard Adjustment 1).*

#12 SPECIAL LIMIT: Set between **1 – 5, UNLIMITED** *or* **NO SPECIALS.** Factory Default = **1.** Set the maximum number of *Specials* that may be accumulated per game.

#13 SPECIAL PERCENTAGE: Set between **1% – 50%.** Factory Default = **10%.** This adjustment allows the operator to adjust how frequently the *Special Feature* is made available to the player. *This adjustment is not shown if NO SPECIALS is installed in Special Limit (Standard Adjustment 12).*

#14 SPECIAL AWARD: Set to **CREDIT, TICKET*, TOKEN*, POINTS** *or* **EXTRA BALL.** Factory Default = **CREDIT.** Select **EX. BALL** or **POINTS** if awarding a *CREDIT* or *TICKET / TOKEN* is prohibited in your area. *This adjustment is not shown if NO SPECIALS is installed in Special Limit (Standard Adjustment 12).*

*Note: If TICKET or TOKEN is selected, the game will require an optional Ticket or Token Dispenser and then Q24 Option (Standard Adj. 55) must be changed accordingly.

#15 FREE GAME LIMIT: Set between **1 – 9, UNLIMITED** *or* **NO FREE GAMES.** Factory Default = **5.** Set the maximum number of *Free Games* that may be accumulated per game.

#16 EXTRA BALL LIMIT: Set between **1 – 9, UNLIMITED** *or* **NO EXTRA BALLS.** Factory Default = **5.** Set the number of *Extra Balls* that may be accumulated per game.

#17 EXTRA BALL PERCENTAGE: Set between **1% – 50%.** Factory Default = **25%.** This adjustment allows the operator to adjust how frequently the *Extra Ball Feature* is made available to the player. *This adjustment is not shown if NO EXTRA BALLS is installed in Extra Ball Limit (Standard Adjustment 16).*

#18 GAME PRICING: There are two (2) methods available for *Coin Switch Programming:* **Standard & Custom.** Set between **AUSTRALIA 1 – UK 6** *or* **CUSTOM.** Factory Default = **USA 10.** *Shortcut: Set Custom Pricing and instructions, review the Utilities Section, Set Custom Pricing.* The appropriate Dip Switch Setting (Dip Sw. 1-8 location CPU/Sound PCB SW1) in relationship to the Pricing Scheme selected is important *(view the tables on the following pages for more information).*

Standard Adjustment 18, Game Pricing, continued on the next page.

Standard Adjustment 18, Game Pricing, continued.
USA & International (non-Euro) Standard Pricing Select Table

S.P.I.

CPU/SOUND PCB DIP SWITCH SW1 SETTING	COUNTRY SETTING OPTION(S)	COIN MECHANISMS (SWITCHES) COINS THRU ... SLOT:				PRICING SCHEME — Number of Plays (Credits) for Price Amount Shown — See "Appendix J" for Coin Cards Examples & Info!						Requires SPI Coin Card(s) Part Number
		LEFT	CENTER	RIGHT	4TH							

USA — Default Highlighted

Pos. 1 2 3 4 5 6 7 8 — ON / OFF ▼▼▼▼▼▼▼▼

HIGHLIGHTED = Factory Default
HIGHLIGHTED = Not Shown on Coin Card

Country options: USA 1, USA 2, USA 3, USA 4, USA 5, USA 6, USA 7, USA 8, USA 9, USA 10

Coin mechanisms: LEFT 0.25, CENTER 1.00, RIGHT 0.25

USD // UNITED STATES DOLLAR // [$]

Pricing			Part Number
1/0.25			755-5400-01-Y
1/0.50	2/0.75	3/1.00	755-5400-09-Y
1/0.50	For USA 6 and USA 7 use: 755-5400-02-Y USA 6 Note: If player uses X4 25¢ quarters = 2 plays. However, $1 bill = 3 plays!		755-5400-02-Y
1/0.50			755-5400-02-Y
1/0.50	2/1.00	3/1.50	5/2.00 → 755-5400-08-Y
1/0.50	2 / 4 X 25¢	3 /$ 1.00 Bill	Used to promote the Bill Validator.
1/0.50	2/1.00	4/1.50	6/2.00
1/0.50	3/1.00		755-5400-00-Y
1/1.00			755-5400-07-Y
1/0.75	2/1.50	3/2.00	755-5400-11-Y

AUSTRALIA — Default Highlighted

Pos. 1 2 3 4 5 6 7 8 — ON ▲ ▲▲ / OFF ▼ ▼▼▼

AUSTRALIA 1, AUSTRALIA 2

Coin: LEFT 0.20, CENTER 1.00, RIGHT 2.00

AUD // AUSTRALIAN DOLLARS // [$AUS]

		Part Number
1/1.00	3/2.00	755-5406-00-Y
1/1.00		(1 Side)

CANADA — Default Highlighted

Pos. 1 2 3 4 5 6 7 8 — ON ▲▲ / OFF ▼▼▼▼▼▼
CANADA 1 [25¢ door] — Coin: 0.25, 0.25, 1.00, 2.00

ON ▲ ▲▲ / OFF ▼ ▼ ▼▼▼
CANADA 2 [dollar door] — Coin: 1.00, 2.00

CAD // CANADIAN DOLLARS // [$CAN]

			Part Number
1/0.50	2/0.75	3/1.00	755-5400-00-Y -01-Y or -02-Y
1/1.00	3/2.00		755-5400-10-Y

CROATIA — Default Highlighted

Pos. 1 2 3 4 5 6 7 8 — ON ▲▲ ▲ / OFF ▼ ▼ ▼▼
CROATIA — Coin: 1, 2, 5

HRK // CROATIAN KUNA // [kuna]

		Part Number
1/3	2/5	755-5410-00-Y (2-Sided)

DENMARK — Default Highlighted

Pos. 1 2 3 4 5 6 7 8 — ON ▲ ▲ / OFF ▼▼ ▼▼▼▼
DENMARK 1, DENMARK 2 — Coin: 1, 5, 10, 20

DKK // DANISH KRONER // [Kr]

					Part Number
1/3	2/5				755-5402-00-Y
1/2	2/4	3/5	4/7	5/9	7/10 (2-Sided)

JAPAN — Default Highlighted

Pos. 1 2 3 4 5 6 7 8 — ON ▲ ▲ / OFF ▼ ▼ ▼▼▼
JAPAN 1, JAPAN 2 — Coin: 100, 100

JPY // JAPANESE YEN // [¥]

		Part Number
1/100		755-5408-01-Y
1/100	3/200	(2-Sided)

LITHUANIA — Default Highlighted

Pos. 1 2 3 4 5 6 7 8 — ON ▲▲ ▲▲ / OFF ▼ ▼▼▼
LITHUANIA — Coin: 1, 2, 5

LTL // LITHUANIA LITAI // [Lt]

	Part Number
1/2	755-5416-00-Y (1 Side)

MIDDLE EAST — Default Highlighted

Pos. 1 2 3 4 5 6 7 8 — ON ▲▲▲ ▲ / OFF ▼ ▼▼▼
MIDDLE EAST — Coin: token, token

TOKEN // Middle East currency used to buy token // [TOKEN]

	Part Number
1/1	755-5416-00-Y (use Side 1)

NEW ZEALAND — Default Highlighted

Pos. 1 2 3 4 5 6 7 8 — ON ▲ / OFF ▼▼▼▼ ▼▼▼
NEW ZEALAND 1, NEW ZEALAND 2 — Coin: 1, 2

NZD // NEW ZEALAND DOLLAR // [$NZD]

		Part Number
1/1		755-5406-00-Y
1/1	3/2	(Side 2)

NORWAY — Default Highlighted

Pos. 1 2 3 4 5 6 7 8 — ON ▲ ▲ / OFF ▼ ▼ ▼▼▼▼
NORWAY 1, NORWAY 2, NORWAY 3, NORWAY 4 — Coin: 10, 5, 20

NOK // NORWEGIAN KRONE // [Kr]

		Part Number
1/10		755-5403-01-Y or -02-Y / (2-Sided)
1/10	3/20	
1/20		755-5403-03-Y
1/20	3/40	(2-Sided)

▼ LEFT SWITCH CAN BE WIRED TO BILL ACCEPTOR ▼

RUSSIA — Default Highlighted

Pos. 1 2 3 4 5 6 7 8 — ON ▲ ▲▲ / OFF ▼▼ ▼▼▼
RUSSIA — Coin: 10, 5, 1

RUB // RUSSIAN RUBLE // [Ruble]

	Part Number
1/5	755-5411-00-Y (2-Sided)

SO. AFRICA — Default Highlighted

Pos. 1 2 3 4 5 6 7 8 — ON ▲ ▲ / OFF ▼▼ ▼ ▼▼▼
SO. AFRICA 1, SO. AFRICA 2 — Coin: 0.50, 1.00, 2.00, 5.00

ZAR // SOUTH AFRICAN RAND // [R]

		Part Number
1/2.00		755-5409-01-Y
1/3.00	2/5.00	(2-Sided)

SWEDEN — Default Highlighted

Pos. 1 2 3 4 5 6 7 8 — ON ▲▲ ▲ / OFF ▼ ▼ ▼▼▼▼
SWEDEN 1, SWEDEN 2 — Coin: 1, 5, 10

SEK // SWEDISH KRONOR // [kr]

			Part Number
1/10	2/15	3/20	755-5404-00-Y
1/5			(2-Sided)

SWITZERLAND — Default Highlighted

Pos. 1 2 3 4 5 6 7 8 — ON ▲▲ ▲ / OFF ▼▼ ▼▼▼▼
SWITZERLAND 1, SWITZERLAND 2 — Coin: 1, 2, 5

CHF // SWISS FRANCS // [Sf]

					Part Number
1/1	2/2	3/3	4/4	6/5	755-5405-00-Y
1/1	3/2	5/3	7/4	9/5	(2-Sided)

TAIWAN — Default Highlighted

Pos. 1 2 3 4 5 6 7 8 — ON ▲▲ / OFF ▼▼▼ ▼▼▼
TAIWAN — Coin: 10, 10

TWD // TAIWANESE DOLLAR // [TWD]

	Part Number
1/10	755-5412-00-Y (use Side 1)

UK — Default Highlighted

Pos. 1 2 3 4 5 6 7 8 — ON ▲▲▲ / OFF ▼ ▼▼▼▼
UK 1, UK 2, UK 3, UK 4, UK 5, UK 6

ATTENTION: UK 5TH COIN SLOT TIED TO 6TH CHANNEL ON ELEC. COIN MECH

▼ 5TH COIN SLOT NOT AVAILABLE WITH CUSTOM PRICING ▼

LEFT	CENTER	RIGHT	4TH	5TH
0.10	0.50	1.00	0.20	2£ ▲ Coin Only

GPB // UNITED KINGDOM POUNDS // [£]

				Part Number
3/1.00	7/2.00			755-5407-00-Y
4/1.00				755-5407-01-Y*
1/0.50	2/1.00	3/1.50	5/2.00	755-5407-01
1/0.30	2/0.60	3/0.90	4/1.00	755-5407-01-Y*
1/1.00	3/2.00			755-5407-01
3/2.00		*use blank side		755-5407-01-Y*

HIGHLIGHTED = Factory Default   HIGHLIGHTED = Not Shown on Coin Card

Adjustments

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Standard Adjustment 18, Game Pricing, continued.

Euro 1-12 Summary & International (Euro) Standard Pricing Select Table

CPU/SOUND PCB DIP SWITCH SW1 SETTING	COUNTRY SETTING OPTION(S)	COIN MECHANISMS (SWITCHES) COINS THRU ... SLOT:				PRICING SCHEME Number of Plays (Credits) for Price Amount Shown See "Appendix J" for Coin Cards Examples & Info!				Requires SPI Coin Card(s) Part Number
		LEFT	CENTER	RIGHT	4TH					

Pos. 1 2 3 4 5 6 7 8
ON S E E B E L O W — Euro 1
OFF S E T T I N G S — Euro 2

Euro 1-12 are alternate settings for countries using the Euro.

HIGHLIGHTED = Factory Default

HIGHLIGHTED = Not Shown on Coin Card

Country	LEFT	CENTER	RIGHT	4TH	EUR // EUROPEAN UNION EUROS // [€]				Part Number
Euro 1					1/0.50				755-5401-01-Y
Euro 2					1/0.50 2/1.00	3/1.50	5/2.00		755-5401-02-Y
Euro 3					1/0.50	3/1.00			755-5401-03-Y
Euro 4					1/0.50 2/1.00	3/1.50	6/2.00		755-5401-04-Y
Euro 5	0.50	1.00	2.00	optional	1/0.50 3/1.00	4/1.50	7/2.00		755-5401-05-Y
Euro 6				0.20	2/0.50				755-5401-06-Y
Euro 7					1/1.00 2/2.00	3/3.00	5/4.00		755-5401-07-Y
Euro 8				optional	1/1.00	3/2.00			755-5401-08-Y
Euro 9					1/1.00	2/1.50	3/2.00		755-5401-09-Y
Euro 10					1/1.00	3/2.00	7/3.00		755-5401-10-Y
Euro 11					1/1.00	4/2.00			755-5401-11-Y
Euro 12					2/1.00 4/2.00	6/3.00	9/4.00		755-5401-12-Y

*For a different **Euro Pricing Scheme** (other than Factory Default listed below), scroll through **Standard Adjustment 18**: Euro 1-12 or CUSTOM* for new setting (reference above Euro 1-12 Summary). Keep the Country Dip Switch Setting the same as listed below.*

DIP SWITCH	Country	LEFT	CENTER	RIGHT	4TH	EUR // EUROPEAN UNION EUROS // [€]			Part Number
Pos. 1 2 3 4 5 6 7 8 / ON ▲ / OFF ▼▼▼▼▼▼▼	AUSTRIA Euro 9	0.50	1.00	2.00		1/1.00	2/1.50	3/2.00	755-5401-09-Y
Pos. 1 2 3 4 5 6 7 8 / ON ▲ / OFF ▼ ▼▼▼▼▼▼	BELGIUM Euro 1	0.50	1.00	2.00		1/0.50			755-5401-01-Y
Pos. 1 2 3 4 5 6 7 8 / ON ▲ ▲ / OFF ▼ ▼▼▼▼▼	FINLAND Euro 8	0.50	1.00	2.00		1/1.00	3/2.00		755-5401-08-Y
Pos. 1 2 3 4 5 6 7 8 / ON ▲▲ / OFF ▼ ▼▼▼▼▼	FRANCE Euro 10	0.50	1.00	2.00		1/1.00	3/2.00	7/3.00	755-5401-10-Y
Pos. 1 2 3 4 5 6 7 8 / ON ▲▲▲ / OFF ▼▼▼▼▼	GERMANY 1 GERMANY 2 GERMANY 3	0.50	1.00	2.00		1/0.50 / 1/0.50 2/1.00 / 1/0.50 2/1.00	3/1.50 / 3/1.50	5/2.00 / 6/2.00	755-5401-01-Y / 755-5401-02-Y / 755-5401-04-Y
Pos. 1 2 3 4 5 6 7 8 / ON ▲▲▲▲ / OFF ▼▼▼▼	GREECE Euro 8	0.50	1.00	2.00		1/1.00	3/2.00		755-5401-08-Y
Pos. 1 2 3 4 5 6 7 8 / ON ▲ / OFF ▼▼▼ ▼▼▼▼	ITALY 1 ITALY 2	0.50		0.50		1/0.50 / 1/1.00	3/2.00		755-5401-01-Y / 755-5401-08-Y
Pos. 1 2 3 4 5 6 7 8 / ON ▲ / OFF ▼▼ ▼▼▼▼▼	NETHERLANDS Euro 3	0.50	1.00	2.00		1/0.50	3/1.00		755-5401-03-Y
Pos. 1 2 3 4 5 6 7 8 / ON ▲ ▲ / OFF ▼▼▼ ▼▼▼	PORTUGAL Euro 1	0.50		0.50		1/0.50			755-5401-01-Y
Pos. 1 2 3 4 5 6 7 8 / ON ▲ ▲ / OFF ▼ ▼▼ ▼▼▼	SPAIN Euro 8	0.50	1.00	2.00		1/1.00	3/2.00		755-5401-08-Y

HIGHLIGHTED = Factory Default   HIGHLIGHTED = Not Shown on Coin Card

For the associated **Coinage Card** required *if the Factory Default Setting was changed*, view on-line at:
http://www.sternpinball.com/coinagecards.shtml

You can download and print the replacement card. *Adobe® Reader 5.0 or higher required (links on site)*. Use **Yellow Card Stock: ASTROBRIGHTS® SOLAR YELLOW #65 FROM WAUSAU PAPER PRODUCTS** (Stock #22731)

#19 **MATCH PERCENTAGE:** Set between **0% – 10%** or **OFF**. Factory Default = **9%**. At **0%** the *Match Animation Feature* occurs at the end of the game but never awards the **Match Award** *(Standard Adjustment 20)*. Set to **OFF**, no **Match Animation Feature** is shown.

#20 **MATCH AWARD:** Set to **CREDIT, TICKET*** or **TOKEN***. Factory Default = **CREDIT**. *This adjustment is not shown if **OFF** is installed in **Match Percentage** (Standard Adjustment 19).*

*Note: If TICKET or TOKEN is selected, the game will require an optional Ticket or Token Dispenser and then Q24 Option (Standard Adj. 55) must be changed accordingly.

#21 **BALLS PER GAME:** Set between **1 – 10**. Factory Default = **3**. Set the number of balls per game.

Standard Adjustments 22-36 continued on the next page. Standard Adjustments continued.

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#22 TILT WARNINGS: Set between **0 – 3**. Factory Default = **2**. Set the number of Plumb Bob Tilt Switch closures before the ball in play is tilted. *Each closure generates an audible alert and/or display alert.*

#23 CREDIT LIMIT: Set between **4 – 50**. Factory Default = **30**. Set the maximum credits allowed.

#24 ALLOW HIGH SCORES: Set to **YES** *or* **NO**. Factory Default = **YES**. When set to **YES**, if a player exceeds the Default Grand Champion *or* 1-4 High Scores, the player may receive a **High Score Award** *(Standard Adjustment 25)* and enter their **3 Initials** *or* **10-Letter Name** *(Standard Adjustment 36)*. Set to **NO** to disable this feature. *The following Standard Adjustments 25-37 are* <u>*not shown*</u> *if* **NO** *is installed.*

#25 HIGH SCORE AWARD: Set to **CREDIT, TICKET*** or **TOKEN***. Factory Default = **CREDIT**. Set the type of award to be given to the player when the appropriate **Grand Champion Score** *or* **High Score #1 – #4** threshold *or* level is acheived. If awarding a **CREDIT, TICKET** or **TOKEN** is prohibited in your area, install **NO** in **Allow High Scores** (Standard Adjustment 24). *This adjustment is* <u>*not shown*</u> *if* **NO** *is installed in* **Allow High Scores** *(Standard Adjustment 24).*

*Note: If TICKET or TOKEN is selected, the game will require an optional Ticket or Token Dispenser and then Q24 Option (Standard Adj. 55) must be changed accordingly.

#26 GRAND CHAMPION AWARDS: Set between **0 – 5**. Factory Default = **1**. Set the number of **High Score Award**(s) *(Std. Adj. 25)*, awarded for exceeding the Grand Champion Score *(Standard Adjustment 31)*. *This adjustment is* <u>*not shown*</u> *if* **NO** *is installed in* **Allow High Scores** *(Standard Adjustment 24).*

#27 HIGH SCORE #1 AWARDS: Set between **0 – 3**. Factory Default = **1**. Set the number of **High Score** Award(s) *(Std. Adj. 25)*, awarded for exceeding the High Score #1 *(Standard Adjustment 32)*. *This adjustment is* <u>*not shown*</u> *if* **NO** *is installed in* **Allow High Scores** *(Standard Adjustment 24).*

#28 HIGH SCORE #2 AWARDS: Set between **0 – 2**. Factory Default = **0**. Set the number of **High Score** Award(s) *(Std. Adj. 25)*, awarded for exceeding the High Score #2 *(Standard Adjustment 33)*. *This adjustment is* <u>*not shown*</u> *if* **NO** *is installed in* **Allow High Scores** *(Standard Adjustment 24).*

#29 HIGH SCORE #3 AWARDS: Set between **0 – 1**. Factory Default = **0**. Set the number of **High Score** Award(s) *(Std. Adj. 25)*, awarded for exceeding the High Score #3 *(Standard Adjustment 34)*. *This adjustment is* <u>*not shown*</u> *if* **NO** *is installed in* **Allow High Scores** *(Standard Adjustment 24).*

#30 HIGH SCORE #4 AWARDS: Set between **0 – 1**. Factory Default = **0**. Set the number of **High Score** Award(s) *(Std. Adj. 25)*, awarded for exceeding the High Score #4 *(Standard Adjustment 35)*. *This adjustment is* <u>*not shown*</u> *if* **NO** *is installed in* **Allow High Scores** *(Standard Adjustment 24).*

#31 GRAND CHAMPION SCORE: Set between **1,000,000 – 1,000,000,000** *(increments of 1,000,000)*. Factory Default = **__,000,000**. Set the desired **Grand Champion Score** level a player needs to exceed to earn the **High Score Award** *(Standard Adjustment 25)*. A score higher than the default, cannot be reset by Standard Adjustment **37, HSTD Reset Count**. *The Grand Champion Score will revert to the Factory Default Score ONLY if a* **Reset Grand Champion** *is performed in the* **RESET MENU** *(via the* **UTILITIES MENU***) or if the game is without power for more than 12 hours after the CPU/Sound PCB Coin Cell Battery is expired or removed. This adjustment is* <u>*not shown*</u> *if* **NO** *is installed in* **Allow High Scores** *(Standard Adjustment 24).*

#32 HIGH SCORE #1: Set between **1,000,000 – 1,000,000,000**. Factory Default = **__,000,000**. Set the desired **High Score #1** level a player needs to exceed to earn the **High Score Award** *(Standard Adjustment 25)*. A score higher than the default, will be reset by Standard Adjustment **37, HSTD Reset Count**. *The High Score will revert to the Factory Default Score ONLY if a* **Reset High Scores** *is performed in the* **RESET MENU** *(via the* **UTILITIES MENU***) or if the game is without power for more than 12 hours after the CPU/Sound PCB Coin Cell Battery is expired or removed. This adjustment is* <u>*not shown*</u> *if* **NO** *is installed in* **Allow High Scores** *(Standard Adjustment 24).*

#33 HIGH SCORE #2: Set between **1,000,000 – 1,000,000,000**. Factory Default = **__,000,000**. Set the desired **High Score #2** level a player needs to exceed ... *(continued in Standard Adjustment 32 definition above).*

#34 HIGH SCORE #3: Set between **1,000,000 – 1,000,000,000**. Factory Default = **__,000,000**. Set the desired **High Score #3** level a player needs to exceed ... *(continued in Standard Adjustment 32 definition above).*

#35 HIGH SCORE #4: Set between **1,000,000 – 1,000,000,000**. Factory Default = **__,000,000**. Set the desired **High Score #4** level a player needs to exceed ... *(continued in Standard Adjustment 32 definition above).*

#36 HSTD (HIGH SCORE TO DATE) INITIALS: Set to **3 INITIALS** *or* **10 LETTER NAME**. Factory Default = **3 INITIALS**. When set to **3 INITIALS**, the player is allowed only 3 initials to input. When set to **10 LETTER NAME**, the player is allowed to enter 10 initials to input. *This adjustment is* <u>*not shown*</u> *if* **NO** *is installed in* **Allow High Scores** *(Standard Adjustment 24).*

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Standard Adjustments continued.

#37 HSTD (HIGH SCORE TO DATE) RESET COUNT: Set between **100 – 9900** *or* **OFF** *(increments of 100)*. Factory Default = **2000**. Set the number of games between "automatic resets" of High Scores back to the Factory Defaults for *ONLY* Standard Adj. **32 – 35, High Score #1 – #4**. *The High Score will revert to the Factory Default Scores when the number of games stated is reached.* **Reset High Scores** *can be performed in the* **RESET MENU** *(via the* **UTILITIES MENU***) anytime or if the game is without power for more than 12 hours after the CPU/Sound PCB Coin Cell Battery is expired or removed. This adjustment is* not shown *if* **NO** *is installed in* **Allow High Scores** *(Standard Adj. 24).*

#38 FREE PLAY: Set to **YES** or **NO**. Factory Default = **NO**. When set to **YES**, no coins are required for *Game Play.*

#39 LANGUAGE: Set to **ENGLISH, GERMAN, FRENCH, SPANISH** *or* **ITALIAN**. Factory Default = **ENGLISH**. Set the language for the game. Language of game is also shown in the Dot Display *(along with the Game Title and code version)* at the start-up routine which follows a game reset *or* power-up.

#40 PLAYER LANGUAGE SELECT: Set to **YES** *or* **NO**. Factory Default = **YES**. When set to **YES**, after the player presses the **Start Button** *(to start a game with adequate credit)*, the player has the option to choose a language by pressing either **Flipper Button** before game start *(options of languages installed are shown on the Dot Display)*. **Note:** *If set to* **NO** *or if only one langauge is installed and the setting is set to* **YES**, *the game will start immediately after the* **Start Button** *press. Language(s) available are dependent on game destination from the factory. Other languages may be available on-line for download and installed on your game. With the proper dip switch installed, the langauge option(s) can be changed. For more information or help, call Technical Support at 800-542-5377 (708-345-7700).*

#41 CUSTOM MESSAGE: Set to **ON, CHANGE** *or* **OFF**. Factory Default = **ON**. *Shortcut:* **Enter Custom Message** *and instructions, review the Utilities Section,* **Enter Custom Message**.

#42 FLASH LAMP POWER: Set to **NORMAL, OFF** *or* **DIM**. Factory Default = **NORMAL**. When set to **DIM**, the Flash Lamps impulse power is reduced by **25%** and when set to **OFF** the Flash Lamps will not flash. For Flash Lamps used in this game, **Go To Flash Lamps Menu** via the **DIAGNOSTICS MENU** *(see the Diagnostics Section)*.

#43 COIL PULSE POWER: Set to **NORMAL, HARD** *or* **SOFT**. Factory Default = **NORMAL**. When set to **HARD**, the coil pulse power is *increased* by **12.5%** of the normal pulse rate. When set to **SOFT** the coil pulse power is *decreased* by **12.5%** of the normal pulse rate. This adjustment is provided to compensate for *Low Line* or *High Line* voltage conditions where the solenoids (coils) appear to *kicking too weak or too hard*. Adjust as required.

#44 KNOCKER VOLUME: Set to **NORMAL, OFF** *or* **LOW**. Factory Default = **NORMAL**. When set to **LOW**, the volume is decreased 50%. When set to **OFF**, no sound is heard when the "knocker" is sounded. Test the knocker sound in the **Fire Knocker** Test via the **DIAGNOSTICS MENU** *(see Section 3, Chapter 2, GO TO DIAGNOSTICS MENU, Page 19)*.

#45 GAME RESTART: Set to **YES** *or* **NO**. Factory Default = **YES**. When set to **YES**, a new game may be started during any ball after the first ball is completed *(if credits allow)*. Pressing the Start Button during the first ball will add additional players *(up to 4, if credits allow)*. When set to **NO**, the game disables the Start Button after the first ball until the final ball is in play.

#46 BILL VALIDATOR: Set to **YES** *or* **NO**. Factory Default = **NO**. When set to **YES**, in *Game Attract Mode* an "Insert Bill Animation" is shown in the display *(or just the absense of the Coin Animation)*. When set to **NO**, an "Insert Coin Animation" is shown. *(This adjustment will appear when implemented).*

#47 MUSIC VOLUME: Set between **1 – 15**. Factory Default = **1**. After volume is set via Service Buttons this adjustment can be utilized to adjust the background music *(1 all the way on, 15 all the way off)* while keeping the Special Sound Effects at the same level.

#48 BALL SAVE TIME: Set between **0:01 – 0:15, AUTO** *or* **NO BALL SAVES**. Factory Default = **0:05**. When set to **NO BALL SAVES** this feature is unavailable. Set between **0:01** through **0:15** *(single increments)* for the ball to be sent back into play if the time set is not met *(per ball)*. Set to **AUTO** to automatically adjust the Ball Save Timer based on the average ball time.

#49 TIMED PLUNGER: Set to **OFF** *or* **0:01 – 1:00**. Factory Default = **OFF**. The plunger will "Autoplunge" the ball *(at the time set)* when the ball is at the beginning of play, waiting for the player.

#50 FLIPPER BALL LAUNCH: Set to **OFF, LEFT FLIPPER, RIGHT FLIPPER, EITHER FLIPPER** *or* **BOTH FLIPPERS**. Default is **OFF**. This feature allows the player to operate the Auto Ball Launch with the Flipper Button(s) depending on which setting is chosen.

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S.P.I. Standard Adjustments continued.

#51 COINDOOR BALL SAVER: Set to **YES** or **NO**. Factory Default = **NO**. When set to **NO**, this feature is not available. When set to **YES**, this feature allows the Coin Door to be opened during game play; the ball will drain but the game will be placed "on hold". When the Coin Door is closed, the pinball will return to the Shooter Lane, and the game will resume. *Useful at locations where technicians change the cash box regularly at exact times of the day where players can be on the game.*

#52 COMPETITION MODE: Set to **YES** or **NO**. Factory Default = **NO**. When set to **NO**, this feature is not available. Set to **YES**, this feature will equalize random game features and global score values during multi-player games by predetermined competition rules set by programming. If an **Install Competition** was made via the **INSTALLS MENU** *(which automatically changes this setting to YES)*, and this setting was changed back to **NO**, the *Competition Mode* will be turned **OFF** *(cancelled)*.

#53 CONSOLATION BALL: Set to **YES** or **NO**. Factory Default = **YES**. When set to **YES**, the *EXTRA BALL* *(lamp insert, location varies)* will be lit on the last ball in play, if certain programming criteria is met.

#54 FAST BOOT: Set to **YES** or **NO**. Factory Default = **YES**. When set to **NO** or if you hold both **Flipper Buttons** during Power-Up, this feature is not available and will display all normal Power-Up screens. When set to **YES**, the game will not display the normal informative Power-Up screens, specifically the CPU Version screen and the Location/Game ID screen. Regardless of the setting, normal Power-Up safety checks are still performed. *(This adjustment will appear when implemented).*

#55 Q24 OPTION: Set to **COIN METER, TOKEN DISPENSER** or **KNOCKER**. Factory Default = **COIN METER**. This Coil (Solenoid) Location is left "open" at the Factory to allow for these optional Mechanisms to be added to the game. If selecting **TOKEN DISPENSER**, Standard Adjustments 3, 14, 20 & 25 should be changed to **TOKEN**. *Call Tech. Support at 1-800-542-5377 if more information is required on this option.*

#56 TICKET DISPENSER: Set to **YES** or **NO**. Factory Default = **NO**. *This adjustment is required only for games which have an optional Deltronics (DL-1275-2 PCB Style, SPI Part Nr. 515-7275-00) Ticket Dispenser installed. Unique CPU Sound Bd. Dip Switch Setting required, changes the Default to YES.*

#57 PLAYER COMPETITION: Set to **YES** or **NO**. Factory Default = **YES**. *Competition Mode* unrandomizes feature events, and standardizes game play and rule sets *(varies from game to game)* for fair competitions. With at least one credit posted, or with the game set for 'FREE PLAY', during the game-over Attract Mode, press the **Left Flipper Button** and hold it in for approximately one second. The following message will appear on the display for approximately 10 seconds: '**COMPETITION MODE READY ... PRESS START NOW**'. If a game is started *(either by pressing the 'START' button for a regular game, or by pressing the 'TOURNAMENT START' button for a tournament game)* while this message appears on the display, then competition mode will be enabled for all players during the game. General rules are covered in the Instruction Card. Other *Hints and/or Rules* can be made known on this game either visually *(the Dot Display or Flashing Light Inserts)* or can be audible.

#58 TEAM SCORES: Set to **YES** or **NO**. Factory Default = **NO**. Set to **YES**, then Team Play will be made available. *Team Play only works in a 4-Player Game.* The totals for Players 1 / 3 (Team 1) & Players 2 / 4 (Team 2) are then displayed individually *as well as* the combined score for **BOTH TEAMS** to enable **Team Play (Doubles)**. *(This adjustment will appear when implemented).*

#59 LOCATION ID: Set between **0** to **9999**. Factory Default = **0**. This adjustment allows the operator to assign a location identification number to the audit print-out sheet. *(Will not be affected by a Factory Reset.)*

#60 GAME ID: Set between **0** to **9999**. Factory Default = **0**. This adjustment allows the operator to assign a game identification number to the audit print-out sheet. *(Will not be affected by a Factory Reset.)*

#61 TIME FORMAT: Set to **12-HOUR** or **24-HOUR**. Factory Default = **12-HOUR**. This adjustments determines how the time is displayed. *Time used for Tournament and Data Dumps where a time stamp is required.*

#62 COIN INPUT DELAY: Set between **30** to **60** or **OFF**. Factory Default = **30**. This adjustment creates a short time delay between the moment the coin is inserted into the **Coin Slot** to the moment the CPU/Sound PCB registers the coin *(30 = approxiamately 1/2 second).*

#63 LOST BALL RECOVERY: Set to **YES** or **NO**. Factory Default = **NO**. Set to **YES**, at the start of the 5th consecutive ball search *(with no scoring between searches)*, the game will consider any balls in play to be permanently lost and will attempt to recover from this situation by serving a new ball into play from the ball trough. Set to **NO** *(to suppress this adjustment behavior)* for the game to perform the "ball search" indefinitely until the lost balls are found or replaced.

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STANDARD ADJUSTMENTS [#1 - #63] ▼

Nr.	STANDARD ADJUSTMENT NAME	USA DEFAULT	YOUR SETTING	Nr.	STANDARD ADJUSTMENT NAME	USA DEFAULT	YOUR SETTING
1	REPLAY TYPE	AUTO		32	HIGH SCORE #1	__,000,000	
2	‡ REPLAY PERCENTAGE	10%		33	HIGH SCORE #2	__,000,000	
3	‡ REPLAY AWARD	CREDIT		34	HIGH SCORE #3	__,000,000	
4	‡ REPLAY LEVELS	1		35	HIGH SCORE #4	__,000,000	
5	‡ AUTO REPLAY START	__,000,000		36	HSTD INITIALS	3 INITIALS	
6	‡ DYNAMIC REPLAY START	__,000,000		37	HSTD RESET COUNT	2000	
7	‡ REPLAY LEVEL #1	__,000,000		38	FREE PLAY	NO	
8	‡ REPLAY LEVEL #2	__,000,000		39	LANGUAGE	ENGLISH	
9	‡ REPLAY LEVEL #3	__,000,000		40	PLAYER LANGUAGE SELECT	YES	
10	‡ REPLAY LEVEL #4	__,000,000		41	CUSTOM MESSAGE	ON	
11	‡ REPLAY BOOST	YES		42	FLASH LAMP POWER	NORMAL	
12	SPECIAL LIMIT	1		43	COIL PULSE POWER	NORMAL	
13	‡ SPECIAL PERCENTAGE	10%		44	KNOCKER VOLUME	NORMAL	
14	SPECIAL AWARD	CREDIT		45	GAME RESTART	YES	
15	FREE GAME LIMIT	5		46	BILL VALIDATOR	NO	
16	EXTRA BALL LIMIT	5		47	MUSIC VOLUME	1	
17	‡ EXTRA BALL PERCENTAGE	25%		48	BALL SAVE TIME	0:05	
18	GAME PRICING	USA 10		49	TIMED PLUNGER	OFF	
19	MATCH PERCENTAGE	9%		50	FLIPPER BALL LAUNCH	OFF	
20	MATCH AWARD	CREDIT		51	COINDOOR BALL SAVER	NO	
21	BALLS PER GAME	3		52	COMPETITION MODE	NO	
22	TILT WARNINGS	2		53	CONSOLATION BALL	YES	
23	CREDIT LIMIT	30		54	FAST BOOT	YES	
24	ALLOW HIGH SCORES	YES		55	Q24 OPTION	COIN METER	
25	HIGH SCORE AWARD	CREDIT		56	TICKET DISPENSER	NO	
26	GRAND CHAMPION AWARDS	1		57	PLAYER COMPETITION	YES	
27	HIGH SCORE #1 AWARDS	1		58	TEAM SCORES	NO	
28	HIGH SCORE #2 AWARDS	0		59	LOCATION ID	0	
29	HIGH SCORE #3 AWARDS	0		60	GAME ID	0	
30	HIGH SCORE #4 AWARDS	0		61	TIME FORMAT	12-HOUR	
31	GRAND CHAMPION SCORE	__,000,000		62	COIN INPUT DELAY	30	
				63	LOST BALL RECOVERY	YES	

Factory Defaults Settings are subject to change during production (especially Standard Adjustments 2, 4, 5, 13, 16-17, 19, 31-35 & 47).
‡ Not all Standard Adjustments are shown. Depending on the setting (whether Factory Default or if changed by the operator), associated adjustments do not appear, if not required. **Note:** *If* **Game Dip Switch** *other than USA is installed, different Defaults will appear.*

//

GAME

Feature Adjustments [#1 - # +]

To initiate, from the **ADJUSTMENTS MENU**, select the "GAME" *Icon*. The Dot Matrix Display will indicate the *adjustment number (in this group), adjust. name, adjust. setting* and *comment line.* The current adjustment will remain on the display until the next adjustment is viewed or when this sub-menu is exited.

>>> **FACTORY RESET** *or* **CODE UPDATE NOTE:** Don't forget, any changes you make to your adjustments will revert back to the Factory Default settings if you perform a Factory Reset or update your Game Code. *See Utilities Section (***GO TO RESETS MENU** *and* **GO TO USB MENU**).

View the Coils Detailed Chart Menu to see if this game is Shaker Motor Enabled. *If it is, set the options in the Feature Adjustment as seen below. (typically the last one).*

\# **SHAKER MOTOR (OPTIONAL) :** Set to **NONE, MINIMAL USE, MODERATE USE** *or* **MAXIMAL USE.** Factory Default = **MODERATE USE.** *Set to any of the varying "... USES" if an Optional Shaker Motor Kit (SPI Part Number 502-5027-00) was installed correctly in this pinball machine. See the assembly (kit) on the last page of Blue Pages (Major Assemblies). Also see Shaker Motor Coil (Q8) in the Coils Detailed Chart Table at the begining of this Service Game Manual or the beginning of the Yellow Pages.*

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Service Menu   Go To Installs Menu

GO TO UTILITIES MENU
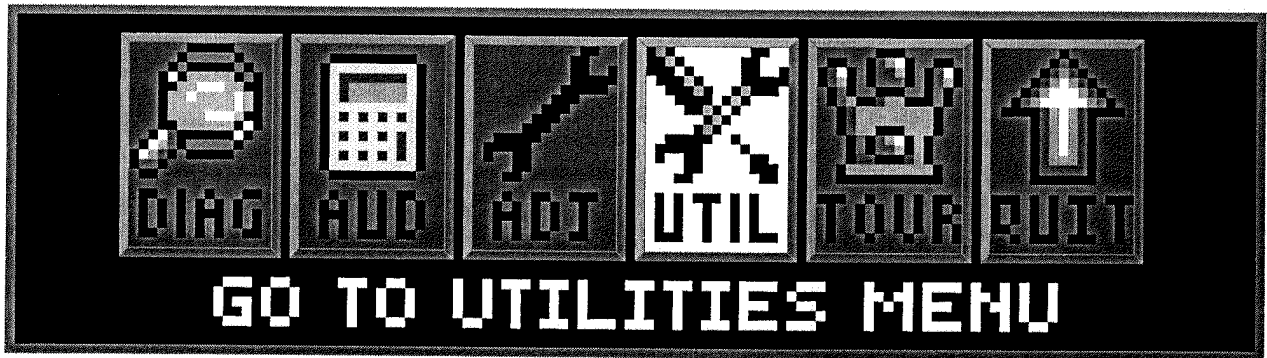
To initiate, from the **MAIN MENU**, select the "UTIL" *Icon*. The **UTILITIES MENU** provides ways to quickly and easily customize your game with **Installs** *(pre-sets for game Standard & Feature Adjustments)*, set-up a **Custom Message** *(short-cut to Standard Adjustment 41, Custom Message)*, set-up **Custom Pricing** *(short-cut to Standard Adjustment 18, to the Custom Pricing Sub-Menu)*, set-up the **Date and Time** *(required if the date and time is needed to be accurate for data dumps and for tournaments)*, reset certain particular game data *or* perform a complete **Factory Reset** and to download game data, update or backup game code in the **USB MENU.**

All **UTILITIES, INSTALLS, RESETS MENU** and **USB MENU** *Icons* and there usages are explained throughout this chapter in the same order as seen in the Dot Matrix Display. *NOTE:* Depending on Game Type, Version, selections made, Dip Switch settings, location and/or areas, some *Icons* may appear non-functional *or* may not appear at all. *Installs (Adjustments), Icons* and/or *functions, order and operation are subject to change. If in doubt use the Factory Default Settings (review Install Factory on the next page).*

In displays where changes can be made *or* to perform a function, use the **GREEN Button** to go **[BACK]**, exit *or* escape, the **RED Buttons** to **[< / –]** MOVE BACK / LEFT / **[+ / >]** MOVE FORWARD / RIGHT to view the next audit in the group, and the **BLACK Button** to **[SELECT]** the sub-menus.

Go To Installs Menu

To initiate, from the **UTILITIES MENU**, select the "INST" *Icon*. The **INSTALLS MENU** provides 13 **Installs** to vary **Game Play Difficulty** *(set with Feature Adjustments)* or **Game Play Type** and **Install Factory** *(restores all adjustments to Factory Defaults)*.

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.* 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 Adjustments and/or settings are subject to change during production, and may differ than what is described in the tables at the end of this chapter). The Dot Display will indicate if a setting is a Factory Default or not. If the settings are not to your liking, perform* **one** *of the following:*

1.:   **Manually** change the **Standard & Feature Adjustments** Settings *(perform this task in the ADJUSTMENTS MENU, see the Adjustments Section)*.

2.: Install Factory *(see the last install)* on how to reset all of the **Standard & Feature Adjustments** back to the Factory Default Settings.

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**. Any adjustments which you changed and are not affected by the Install will remain as set.

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.**

Remember, use the **GREEN Button** to go **[BACK]**, exit *or* escape and the **BLACK Button** to **[SELECT]** to INSTALL your new setting(s).

Install Extra Easy

To initiate, from the **INSTALLS MENU**, select the "X.EZ" *Icon*. The Dot Matrix Display will indicate the **INSTALL EXTRA EASY**. Follow the on-screen prompts to perform the **Install**. Set the **Game Play Difficulty** level.

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Installs Menu continued from previous page.

Install Easy

To initiate, from the **INSTALLS MENU**, select the "EASY" *Icon*. The Dot Matrix Display will indicate the **INSTALL EASY**. Follow the on-screen prompts to perform the **Install**. Set the **Game Play Difficulty** level.

Install Medium (Normal or Factory Settings)

To initiate, from the **INSTALLS MENU**, select the "FACT" *Icon*. The Dot Matrix Display will indicate the **INSTALL MEDIUM**. Follow the on-screen prompts to perform the **Install**. Set the **Game Play Difficulty** level.

Install Hard

To initiate, from the **INSTALLS MENU**, select the "HARD" *Icon*. The Dot Matrix Display will indicate the **INSTALL HARD**. Follow the on-screen prompts to perform the **Install**. Set the **Game Play Difficulty** level.

Install Extra Hard

To initiate, from the **INSTALLS MENU**, select the "X.HD" *Icon*. The Dot Matrix Display will indicate the **INSTALL EXTRA HARD**. Follow the on-screen prompts to perform the **Install**. Set the **Game Play Difficulty** level.

Install 3-Ball or 5-Ball

To initiate, from the **INSTALLS MENU**, select either the "3BAL" or "5BAL" *Icons*. The Dot Matrix Display will indicate the **INSTALL 3-BALL** or **5-BALL** depending on choice. Follow the on-screen prompts to perform the **Install**. Set the **Game Play Type** to 3 Balls per game *(Factory Default is 3 Balls per game, not including extra balls earned by the player, if any).*

Install Competition

To initiate, from the **INSTALLS MENU**, select the "COMP" *Icon*. The Dot Matrix Display will indicate the **INSTALL COMPETITION**. Follow the on-screen prompts to perform the **Install**.
Set the **Game Play Type** to "Tournament" Rules. *Programming varies and is subject to change.*

Install Director's Cut

To initiate, from the **INSTALLS MENU**, select the "DCUT" *Icon*. The Dot Matrix Display will indicate the **INSTALL DIRECTOR'S CUT**. Follow the on-screen prompts to perform the **Install**.
Set the **Game Play Type** to programmer's choice. *Programming varies and is subject to change.*

Install Home Play

To initiate, from the **INSTALLS MENU**, select the "HOME" *Icon*. The Dot Matrix Display will indicate the **INSTALL HOME PLAY**. Follow the on-screen prompts to perform the **Install**.
Set the **Game Play Type** to "Home" Rules. *Programming varies and is subject to change.*

Install Novelty

To initiate, from the **INSTALLS MENU**, select the "NOV" *Icon*. The Dot Matrix Display will indicate the **INSTALL NOVELTY**. Follow the on-screen prompts to perform the **Install**.
********** This setting is recommended where local laws restrict certain game features. **********
Set the **Game Play Type** to "Restricted" Rules. *Programming varies and is subject to change.*

Install Add-A-Ball

To initiate, from the **INSTALLS MENU**, select the "A.A.B." *Icon*. The Dot Matrix Display will indicate the **INSTALL ADD-A-BALL**. Follow the on-screen prompts to perform the **Install**.
********** This setting is recommended where local laws restrict certain game features. **********
Set the **Game Play Type** to "Restricted" Rules. *Programming varies and is subject to change.*

Install Factory

To initiate, from the **INSTALLS MENU**, select the "FACT" *Icon*. The Dot Matrix Display will indicate the **INSTALL FACTORY**. Follow the on-screen prompts to perform the **Install**. ⚠ **CAUTION!** All **Standard** and **Feature Adjustments** which were changed in the **INSTALLS MENU** *or* **ADJUSTMENTS MENU** are returned to the **Factory Defaults** *(as indicated in the Dot Display in the ADJUSTMENTS MENU). Note: To perform a complete Factory Reset, GO TO THE RESETS MENU. Escape back to the UTILITIES MENU, select the "RESET" Icon, then select the "FACT" Icon in the RESETS MENU (review the end of this section, Reset Factory Settings).*

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//

HBCD CUST MSG Enter Custom Message

To initiate, from the **UTILITIES MENU**, select the "ABCD CUST MSG" *Icon*. The **SET CUSTOM MESSAGE** *(a short-cut for Standard Adjustment 41, Custom Message)* provides an opportunity to have a text message appear in the the **Attract Mode**. Follow the on-screen prompts to complete [END].

Remember, use the **GREEN Button** to go **[BACK]**, exit *or* escape, the **RED Buttons** to **[< / –]** MOVE LEFT / CHOOSE NEXT **[+ / >]** MOVE RIGHT / CHOOSE PREVIOUS, and the **BLACK Button** to **[SELECT]** *as 'OK'.*

//

PRIC Set Custom Pricing

To initiate, from the **UTILITIES MENU**, select the "PRIC" *Icon*. The **CUSTOM PRICING MENU** *(a short-cut for Standard Adjustment 18, Game Pricing, and setting selected is CUSTOM)* provides an opportunity to set **Custom Pricing**.

Note ! **MONETARY AMOUNT _MUST BE SELECTED_ FIRST!** Press [BACK] to – DECREASE *or* [SELECT] to + INCREASE the **[< $ >] monetary amount** *(e.g. look at the right side of the display from $0.25 to $0.50)*. Press [< / –] to – DECREASE *or* [+ / >] to + INCREASE the **credit quantity** *(e.g. look at the left side of the display from 0 CREDITS AT: to 1 CREDIT AT:)*.

REMINDER
In these menus:
Press [BACK] to – DECREASE [< $]
Press [SELECT] to + INCREASE [$ >]

IF EXAMPLE CUSTOM PRICING SETTING DESIRED IS :
1 Play for **$0.50**, 3 Plays for **$1.00** and 7 Plays for **$2.00**
THEN YOU WILL NEED TO PERFORM THE FOLLOWING :

Step 1 The starting display appears as below if no prior **Custom Pricing** was installed.

> **CUSTOM PRICING**
> 0 CREDITS AT: $0.25
> USE –/+ TO CHANGE CREDITS

Step 2 Press [SELECT] to + INCREASE to $0.50. Press [+ / >] to + INCREASE to 1 **CREDIT AT:**

> **CUSTOM PRICING**
> 1 CREDIT AT: $0.50
> 1/0.50
> USE –/+ TO 'INSTALL'

Step 3 Press [SELECT] to + INCREASE to $1.00. Press [+ / >] to + INCREASE to 2 **CREDITS AT:**

> **CUSTOM PRICING**
> 2 CREDITS AT: $1.00
> 1/0.50 3/1.00
> USE –/+ TO CHANGE CREDITS

Step 4 Press [SELECT] to + INCREASE to $2.00. Press [+ / >] to + INCREASE to 4 **CREDITS AT:**

> **CUSTOM PRICING**
> 4 CREDITS AT: $2.00
> 1/0.50 3/1.00 7/2.00
> USE –/+ TO CHANGE CREDITS

Step 5 Press [SELECT] to + INCREASE the amount once *(example = $2.25)*.

> **CUSTOM PRICING**
> 0 CREDITS AT: $2.25
> 1/0.50 3/1.00 7/2.00
> USE –/+ TO 'INSTALL'

Press [< / –] once *or* press [+ / >] *eleven times* until INSTALL appears.

Step 6 Press [SELECT] to INSTALL. Press [< / –] / [+ / >] *or* [BACK] to edit.

> **CUSTOM PRICING**
> INSTALL
> 1/0.50 3/1.00 7/2.00
> PRESS 'SELECT' TO INSTALL

Step 7 Press [SELECT], press [BACK] twice to exit the **SERVICE MENU** with your **Custom Pricing** installed.

> **CUSTOM PRICING**
> **INSTALLED**
> PRESS 'SELECT' TO CONTINUE

To correct or make new changes, reenter, which brings you to **Step 6**. Press [BACK] repeatedly until the monetary amount shown is the desired amount and then continue following the above steps with your new or corrected settings. *If you are still having difficulty or if you have any questions, please call Technical Support 800-542-5377 or 708-345-7700, option 1.*

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Set Date / Time

To initiate, from the **UTILITIES MENU**, select the "TIME" *Icon*. The **SET TIME MENU** appears with the **MONTH** flashing. Setting the date and time is required for 'Data Dumps' and Tournament Start and End Dates. If the setting of Standard Adjustment 61, **Time Format**, is set to **12-HOUR** *(Factory Default)* the time will be expressed in the **AM / PM format**. If Standard Adjustment 61, **Time Format**, is set to **24-HOUR** the time will be expressed in the **24-hour format**.

Go To Resets Menu

To initiate, from the **UTILITIES MENU**, select the "RESET" *Icon*. The **RESETS MENU** provides six (6) functions to reset *only the* **Coin Audits**, reset *only the* **Game Audits**, reset *only the* **Grand Champion Score**, reset *only the* **High Score(s)**, reset *only the* paid **Credits** *(includes Service Credits)* or to reset *ALL DATA* back to the **Factory Default Settings**.

Reset Coin Audits

To initiate, from the **RESET MENU**, select the "COIN" *Icon*. ⚠ **ONLY** the **Coin Audits** [Earnings Audits 5–12], will be reset to zero (0), *Factory Default Settings*. Follow the on-screen prompts to perform the **Reset**.

Reset Game Audits

To initiate, from the **RESET MENU**, select the "AUD" *Icon*. ⚠ **ONLY** the **Game Audits** [Earnings Audits 1–4, Standard Audits 1–59 and Feature Audits 1–XX*], will be reset to zero (0), *Factory Default Settings*. Follow the on-screen prompts to perform the **Reset**. *varies per game title.

Reset Grand Champion (Score)

To initiate, from the **RESET MENU**, select the "GC" *Icon* ⚠ **ONLY** the **Grand Champion Score** [adjustable via Standard Adjustment 31], will be reset to *Factory Default Setting*. Follow the on-screen prompts to perform the **Reset**.

Reset High Scores

To initiate, from the **RESET MENU**, select the "HSTD" *Icon*. ⚠ **ONLY** the **High Score(s)** [adjustable via Standard Adjustments 32–35], will be reset to *Factory Default Setting(s)*. Follow the on-screen prompts to perform the **Reset**. *Note: High Scores (but not Grand Champion Score) are reset automatically every 2,000 games (Factory Default Setting) [adjustable via Standard Adjustment 37, HSTD Reset Count].*

Reset Credits

To initiate, from the **RESET MENU**, select the "CRED" *Icon*. ⚠ **ONLY** the **Credits** *(includes Service Credits)* [adjustable via Standard Adjustment 23, **Credit Limit**], will be reset to *zero (0), Factory Default Settings*. Follow the on-screen prompts to perform the **Reset**.

Reset Factory Settings

To initiate, from the **RESET MENU**, select the "FACT" *Icon*. ⚠ **ALL GAME DATA IS RESET!** *(with the exception of Earnings Audit 13, Software Meter)*. *NOTE: IF YOU HAD **SET-UP CUSTOM PRICING** OR HAD CHANGED ANY ADJUSTMENTS OR **PERFORMED INSTALLS**, IT IS SUGGESTED TO WRITE DOWN YOUR CHANGES PRIOR TO THE FACTORY RESET.* Follow the on-screen prompts to perform the **Reset**.

Go To USB Menu

To initiate, from the **UTILITIES MENU**, select the "USB" *Icon*. The **USB MENU** provides three (3) functions to download game data, update your game code or backup your code onto a USB Memory Stick. *Review the inside cover for information on how to update your game code.*

Update Game Code

To initiate, from the **USB MENU**, select the "UPDT" *Icon*. Follow the on-screen prompts *or* review the inside cover for more information.

Dump Audits to USB

To initiate, from the **USB MENU**, select the "DUMP" *Icon*. Follow the on-screen prompts to perform a **Data Dump** (download). *Note: If Icon is not present, access via the Audits Menu, see the Audits Section.*

Backup to USB Memory Stick

To initiate, from the **USB MENU**, select the "BKUP" *Icon*. Follow the on-screen prompts to perform a **Backup** (game code only). This backup feature does not retain adjustments and/or settings changes made.

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Utilities

Wiring
The Yellow Pages

I/O and CPU — SCHEMATICS

Wiring
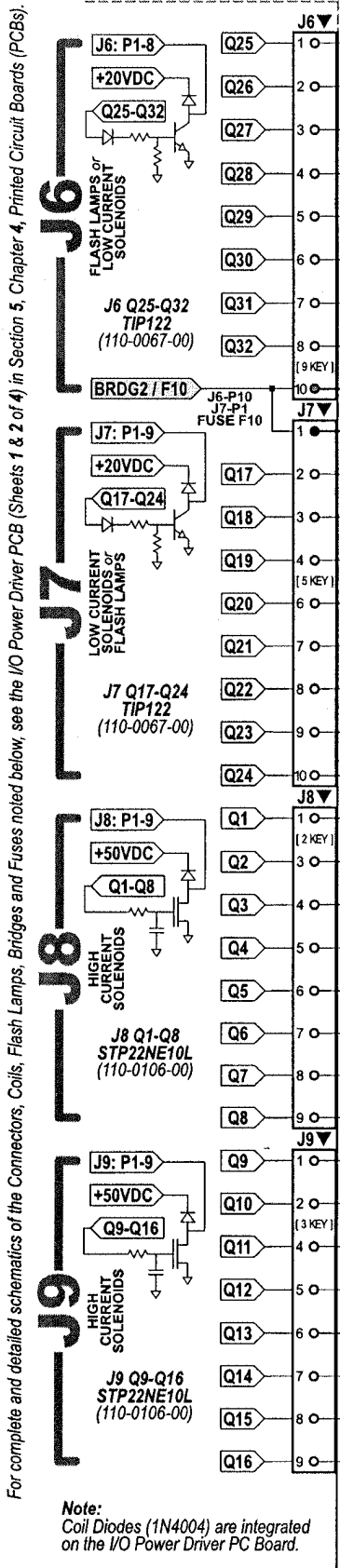
y 1

COILS DETAILED CHART TABLE

	High Current Coils Group 1	Drive Transistor	Driver Output PCB	Power Line Color	Power Line Connection	Power Voltage	Drive Transistor Control Line Color	D.T. Control Line Connect	Coil GA-Turn or Bulb Type
#1	TROUGH UP-KICKER	Q1		YEL-VIO	J10-P9/10	50VDC	BRN-BLK	J8-P1	26-1200 090-5044-ND
#2	AUTO LAUNCH	Q2		YEL-VIO	J10-P9/10	50VDC	BRN-RED	J8-P3	24-940 090-5036-ND
#3	LOWER PLAYFIELD EJECT	Q3	▲	YEL-VIO	J10-P9/10	50VDC	BRN-ORG	J8-P4	26-1200 090-5044-ND
#4	LOWER PLAYFIELD LEFT FLIPPER	Q4	I / O Power Driver	GRY-YEL	J10-P9/10	50VDC	BRN-YEL	J8-P5	22-1080 090-5032-ND
#5	LOWER PLAYFIELD RIGHT FLIPPER	Q5		BLU-YEL	J10-P9/10	50VDC	BRN-GRN	J8-P6	22-1080 090-5032-ND
#6	LEFT 5- BANK DROP RESET (X2)	Q6	▼	YEL-VIO	J10-P9/10	50VDC	BRN-BLU	J8-P7	25-1240 090-5034-ND
#7	CENTER 3- BANK DROP RESET	Q7		YEL-VIO	J10-P9/10	50VDC	BRN-VIO	J8-P8	25-1240 090-5034-ND
#8	SHAKER MOTOR (OPTIONAL)	Q8		RED-WHT	J17-P7	16VAC	BRN-GRY	J8-P9	502-5027-00
	High Current Coils Group 2	Drive Transistor	Driver Output PCB	Power Line Color	Power Line Connection	Power Voltage	Drive Transistor Control Line Color	D.T. Control Line Connect	Coil GA-Turn or Bulb Type
#9	LEFT POP BUMPER	Q9		YEL-VIO	J10-P9/10	50VDC	BLU-BRN	J8-P1	26-1200 090-5044-ND
#10	RIGHT POP BUMPER	Q10		YEL-VIO	J10-P9/10	50VDC	BLU-RED	J8-P2	26-1200 090-5044-ND
#11	BOTTOM POP BUMPER	Q11	▲	YEL-VIO	J10-P9/10	50VDC	BLU-ORG	J8-P4	26-1200 090-5044-ND
#12	TOP EJECT	Q12	I / O Power Driver	YEL/VIO	J10-P9/10	50VDC	BLU-YEL	J8-P5	23-800 090-5001-ND
#13	LEFT SLINGSHOT	Q13		YEL-VIO	J10-P9/10	50VDC	BLU-GRN	J8-P6	26-1200 090-5044-ND
#14	RIGHT SLINGSHOT	Q14	▼	YEL-VIO	J10-P9/10	50VDC	BLU-BLU	J8-P7	26-1200 090-5044-ND
#15	**LEFT FLIPPER (50V RED/YEL)**	Q15		GRY-YEL~3A Fuse~RED-YEL	J10-P6/7	50VDC	ORG-GRY	J8-P8	22-1080 090-5032-ND
#16	**RIGHT FLIPPER (50V RED/YEL)**	Q16		GRY-YEL~3A Fuse~RED-YEL	J10-P6/7	50VDC	ORG-VIO	J8-P9	22-1080 090-5032-ND
	Low Current Coils Group 1	Drive Transistor	Driver Output PCB	Power Line Color	Power Line Connection	Power Voltage	Drive Transistor Control Line Color	D.T. Control Line Connect	Coil GA-Turn or Bulb Type
#17	TRAIN FLASHER	Q17		ORG	J6-P10	20VDC	VIO-BRN	J7-P2	# 89 BULB 165-5000-89
#18	DETONATOR	Q18		BRN	J7-P1	20VDC	VIO-RED	J7-P3	29-1400 090-5072-03
#19	BOTTOM ARCH FLASHER (X2)	Q19	▲	ORG	J6-P10	20VDC	VIO-ORG	J7-P4	LED BD. 520-5328-00
#20	LEFT RAMP FLASHER	Q20	I / O Power Driver	ORG	J6-P10	20VDC	VIO-YEL	J7-P6	# 89 BULB 165-5000-89
#21	LEFT SIDE FLASHER	Q21		ORG	J6-P10	20VDC	VIO-GRN	J7-P7	# 89 BULB 165-5000-89
#22	BACK PANEL FLASHER	Q22	▼	ORG	J6-P10	20VDC	VIO-BLU	J7-P8	# 89 BULB 165-5000-89
#23	TOP EJECT FLASHER	Q23		ORG	J6-P10	20VDC	VIO-BLK	J7-P9	# 89 BULB 165-5000-89
#24	OPTIONAL (e.g. COIN METER)	Q24		RED	J16-P4-8	5VDC	VIO-GRY	J7-P10	COIN METER

	Low Current Coils Group 2	Drive Transistor	Driver Output PCB	Power Line Color	Power Line Connection	Power Voltage	Drive Transistor Control Line Color	D.T. Control Line Connect	Coil GA-Turn or Bulb Type
#25	POP BUMPERS FLASH (X3)	Q25		ORG	J6-P10	20VDC	BLK-BRN	J6-P1	# 89 BULB 165-5000-89
#26	BELL ARROW FLASHER	Q26		ORG	J6-P10	20VDC	BLK-RED	J6-P2	# 89 BULB 165-5000-89
#27	LEFT RAMP LEFT SIDE FLASHER	Q27	▲	ORG	J6-P10	20VDC	BLK-ORG	J6-P3	# 161 BULB 165-5032-00
#28	LEFT RAMP RIGHT SIDE FLASHER	Q28	I / O Power Driver	ORG	J6-P10	20VDC	BLK-YEL	J6-P4	# 161 BULB 165-5032-00
#29	RIGHT RAMP RIGHT SIDE FLASHER	Q29		ORG	J6-P10	20VDC	BLK-GRN	J6-P5	# 161 BULB 165-5032-00
#30	RIGHT RAMP FLASHER	Q30	▼	ORG	J6-P10	20VDC	BLK-BLU	J6-P6	# 89 BULB 165-5000-89
#31	RIGHT SIDE FLASHER	Q31		ORG	J6-P10	20VDC	BLK-VIO	J6-P7	# 89 BULB 165-5000-89
#32	CANNON MOTOR	Q32		BRN	J7-P1	20VDC	BLK-GRY	J6-P8	MOTOR 041-5111-00

Y 2

Backbox I/O Power Driver Board
(Coils Q1-Q32)
Detailed Wiring Diagram
Partial View (520-5249-00)

ALL FUSES RATED 250V SLO-BLO
I/O FUSE CHART INFO IN BACKBOX & PAGE DR. 1

For complete and detailed schematics of the Connectors, Coils, Flash Lamps, Bridges and Fuses noted below, see the I/O Power Driver PCB (Sheets 1 & 2 of 4) in Section 5, Chapter 4, Printed Circuit Boards (PCBs).

J6

J6: P1-8
+20VDC
Q25-Q32
FLASH LAMPS or LOW CURRENT SOLENOIDS
J6 Q25-Q32
TIP122
(110-0067-00)
BRDG2 / F10

J6 ▼
Q25 — 1
Q26 — 2
Q27 — 3
Q28 — 4
Q29 — 5
Q30 — 6
Q31 — 7
Q32 — 8
[9 KEY]
J6-P10 J7-P1 FUSE F10 — 10

J7

J7: P1-9
+20VDC
Q17-Q24
LOW CURRENT SOLENOIDS or FLASH LAMPS
J7 Q17-Q24
TIP122
(110-0067-00)

J7 ▼
— 1
Q17 — 2
Q18 — 3
Q19 — 4
[5 KEY]
Q20 — 6
Q21 — 7
Q22 — 8
Q23 — 9
Q24 — 10

J8

J8: P1-9
+50VDC
Q1-Q8
HIGH CURRENT SOLENOIDS
J8 Q1-Q8
STP22NE10L
(110-0106-00)

J8 ▼
Q1 — 1
[2 KEY]
Q2 — 3
Q3 — 4
Q4 — 5
Q5 — 6
Q6 — 7
Q7 — 8
Q8 — 9

J9

J9: P1-9
+50VDC
Q9-Q16
HIGH CURRENT SOLENOIDS
J9 Q9-Q16
STP22NE10L
(110-0106-00)

J9 ▼
Q9 — 1
Q10 — 2
[3 KEY]
Q11 — 4
Q12 — 5
Q13 — 6
Q14 — 7
Q15 — 8
Q16 — 9

Note:
Coil Diodes (1N4004) are integrated on the I/O Power Driver PC Board.

#33 – #35 Note: *If this game is equiped with an optional Ticket Dispenser & Meter, see the end of Sec. 5, Chapter 4 for wiring information. Ensure Std. Adj. 56, Ticket Dispenser = YES.*

Backbox Wiring

Backbox Wiring

y 3

Backbox Board Layout Wiring Diagram

128 X 32 Dot Matrix Display PCB	1	520-5052-15
// EURO ONLY RoHS // 128 X 32 DM CES PCB		520-5052-15
// EURO ONLY RoHS // Dot Matrix Bezel		545-6281-00
Ribbon Cable, 14-Pin (33")		036-5260-33
// EURO ONLY RoHS // LED Ribbon Cable Filter PCB		520-5259-00
Display Cable *(Wiring Harness)*		036-5454-01
// EURO ONLY RoHS // LED Display Adapter Harness		036-5520-00

**I/O POWER DRIVER PC BOARD
(S.A.M. System)
520-5317-00**

**CPU/SOUND PC BOARD
(S.A.M. System)
520-5337-00**

128 x 32 DOT MATRIX DISPLAY PCB

Important: When connecting any Ribbon Cable, always ensure the "Red Line" side of the ribbon cable goes to the Pin-1 side of any Dual 0.1" Header Connector.

COIN CELL BATTERY (CR2430 3V)

Reset Button

Boot FLASH EPROM

For the latest boot Flash EPROM code or game code for your USB Memory Stick, visit http://www.sternpinball.com/GAME-code.shtml

MOVE TO 'ON' POSITION TO UPDATE ◁ DIP SW. 8

USB PORT

SERIAL PORT   DISPLAY   XILINX   JTAG PROCESSOR

Backbox Wiring

AC-DC PREMIUM
Wiring for the 8-Transistor driver board, 520-5325-00

YEL VIO	(18G)	+50VDC
		NC
YEL BRN		Q41
YEL GRY		Q42
YEL ORG		Q43
YEL BLK		Q44
YEL GRN		Q45
YEL BLU		Q46
YEL VIO		Q47
YEL RED		Q48

J2 — 10, 9, 8, 7, 6, 5, 4, 3, 2, 1

8-Transistor Driver Board
520-5325-00

J1 — 1 through 12

RED		+5VDC
ORG	BRN	Data 0
ORG	RED	Data 1
ORG	BLK	Data 2
ORG	YEL	Data 3
ORG	GRN	Data 4
ORG	BLU	Data 5
ORG	VIO	Data 6
ORG	GRY	Data 7
GRN	WHT	Strobe
NC		NC
BLK		Ground

Actual Board Layout

Q1

D1
D2

Q2

U1

10
+50V
DRV0
DRV1
DRV2
DRV3
DRV4
DRV5
DRV6
DRV7
1 J2

Q3

D3

Q4

D4

C6 C5 C4 C3
R1
R2
R3
R4
R5
R14 R13 R12 R11

R10
D9 D10 D11 D12
C1
C2
R6
R7
R8
R9
R15 R16 R17 R18
R19 R20 R21 R22

J1 1
+5V
D0
D1
D2
D3
D4
D5
D6
D7
STB
GND
GND
12

Q5 Q6 Q7 Q8

D5 D6 D7 D8

520-5325-00 REV A
STERN PINBALL INC.

STERN PINBALL INC.

8 Auxiliary Driver

520-5325-00

Rev A

9/22/2011

Page 1 of 1

Cable Connections to 520-5331-00 Driver Board

Rectifier and Heat Sink Assy 511-7215-00

Rectifier Cable 036-5573-29-C7

GRY WHT 5ASB GRY / KEY / GRY 3 2 1

Connection to AC cabinet cable 8VAC

BLK / KEY / RED 3 2 1
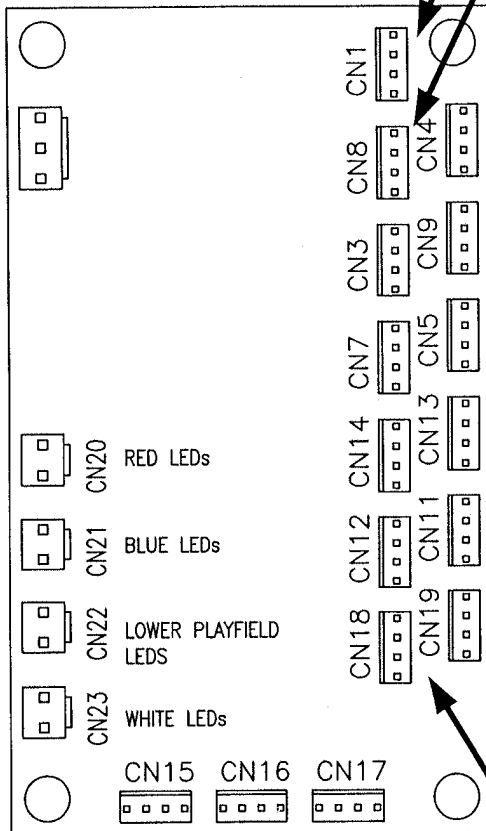
1	RED	22
2	RED YEL	24
3	GRN YEL	54
4	BLU YEL	64

1	RED	22
2	RED GRN	25
3	GRN	55
4	BLU GRN	65
5	KEY	
6	RED	22
7	RED BLU	26
8	GRN BLU	56
9	BLU	66
10	KEY	
11	RED	22
12	RED VIO	27
13	GRN VIO	57
14	BLU VIO	67

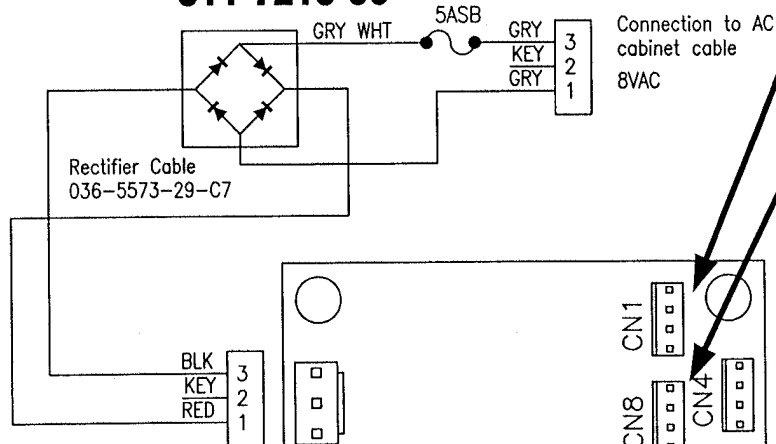|		
1	RED	22
2	PNK RED	P2
3	YEL RED	52
4	VIO RED	72
5	KEY	
6	RED	22
7	PNK ORG	P3
8	YEL ORG	43
9	VIO ORG	73
10	KEY	
11	RED	22
12	PNK YEL	P4
13	YEL	44
14	VIO YEL	74

1	RED	22
2	RED GRY	28
3	GRN GRY	58
4	BLU GRY	68
5	KEY	
6	RED	22
7	RED WHT	29
8	GRN WHT	59
9	BLU WHT	69
10	KEY	
11	RED	22
12	PNK BRN	P1
13	YEL BRN	41
14	VIO BRN	71

1	RED	22
2	PNK GRN	P5
3	YEL GRN	45
4	VIO GRN	75
5	KEY	
6	RED	22
7	PNK BLU	P6
8	YEL BLU	46
9	VIO BLU	76
10	KEY	
11	RED	22
12	PNK VIO	P7
13	YEL VIO	47
14	VIO	77

CN1
CN8 CN4
CN3 CN9
CN7 CN5
CN14 CN13
CN12 CN11
CN18 CN19

CN20 RED LEDs
CN21 BLUE LEDs
CN22 LOWER PLAYFIELD LEDs
CN23 WHITE LEDs

CN15 CN16 CN17

22	RED
20	RED BLK
2 1

21	RED BRN
20	BLU BLK
2 1

23	RED ORG
70	VIO BLK
2 1

24	RED YEL
90	WHT BLK
2 1

1	2	3	4	5	6	7	8	9	10	11	12	13	14
NC	RED ORG	GRN ORG	BLU ORG	KEY	NC	RED BLK	GRN RED	BLU RED	KEY	NC	RED BRN	GRN BRN	BLU BRN
	23	53	63			20	52	62			21	51	61

У7

AC·DC PREMIUM
RED LED GI LAMPS

THESE LEDS
TO BE CONNECTED
TO BAND STAND

YOU SHOOK ME
ALL NIGHT LONG

BACK IN BLACK

WAR MACHINE

FOR THOSE ABOUT
TO ROCK

T.N.T.

HELL AIN'T A BAD
PLACE TO BE

HIGHWAY TO HELL

ROCK 'N' ROLL
TRAIN

WHOLE LOTTA ROSIE

HELLS BELLS

THUNDERSTRUCK

LET THERE BE ROCK

Location of GI
LED controller

TRI-COLOR
LED AND GI
CONTROLLER

AC-DC PREMIUM
WHITE LED GI LAMPS

Location of GI
LED controler

TRI-COLOR
LED AND GI
CONTROLLER

THESE
LEDS
TO BE
CONNECTED
TO BAND STAND

Y 10

AC-DC PREMIUM
BLUE LED GI LAMPS

THESE LEDS
TO BE CONNECTED
TO BAND STAND

YOU SHOOK ME	BACK IN BLACK
ALL NIGHT LONG!	WAR MACHINE
HIGHWAY TO HELL	FOR THOSE ABOUT
ROCK 'N ROLL	TO ROCK
TRAIN	T.N.T.
WHOLE LOTTA ROSIE	HELL AIN'T A BAD
HELLS BELLS	PLACE TO BE
THUNDERSTRUCK	LET THERE BE ROCK

Location of GI
LED controller

TRI-COLOR
LED AND GI
CONTROLLER

SPEAKER PANEL ASSY AC-DC PREMIUM

LEFT SPEAKER

RIGHT SPEAKER

Switch Cable
036-5573-02-C7
February 20, 2012

RED BLK	1	
RED BLK	2	
RED WHT	3	
RED WHT	4	

RED BLK	1	RED BLK –Speaker
RED BLK	2	RED BLK –Speaker
RED WHT	3	RED WHT +Speaker
RED WHT	4	RED WHT +Speaker

Panel Speaker Cable
036-5452-02

RED WHT +Speaker
RED WHT +Speaker

RED YEL
RED YEL

10uF Cap
130-5008-00

RED
RED
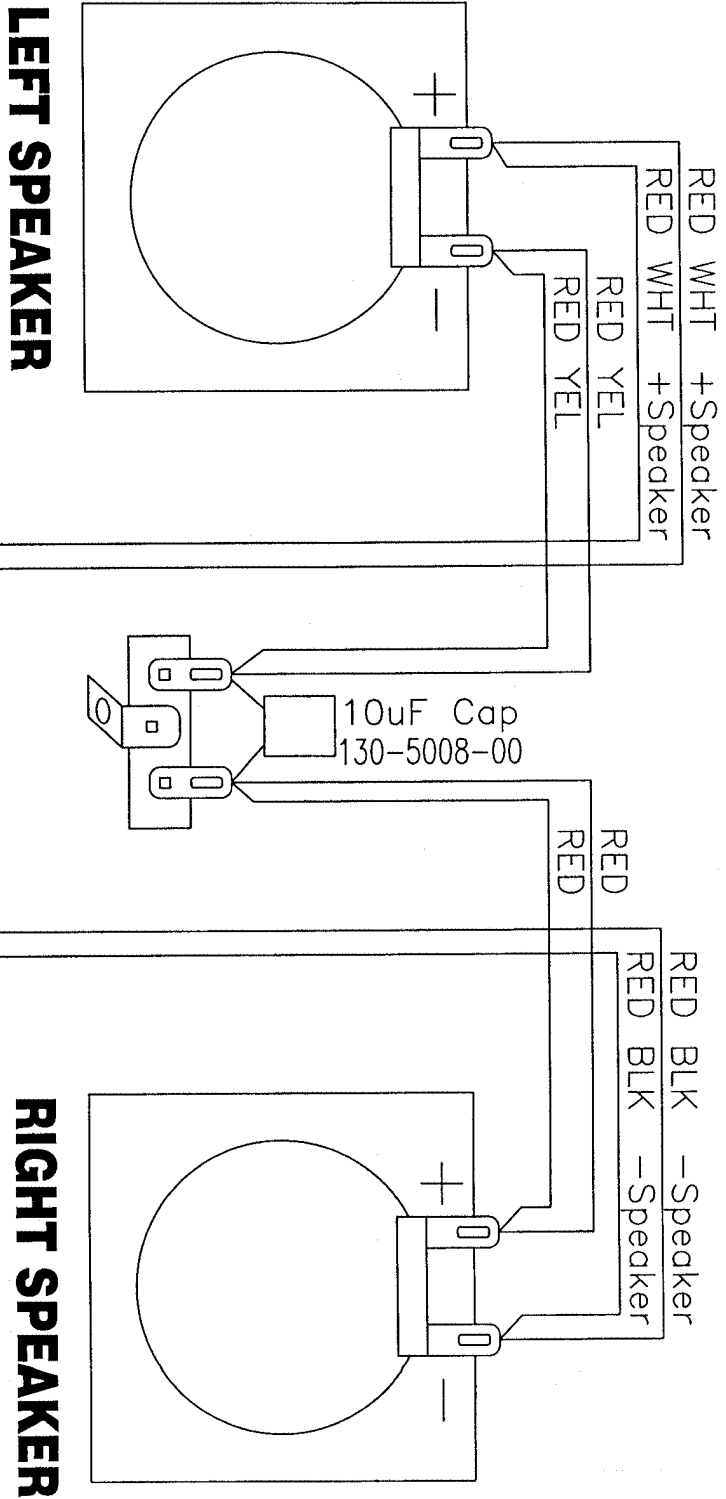
RED BLK –Speaker
RED BLK –Speaker

Playfield Switch Wiring Diagram

Switch Drive Transistor
Source Number : 2N3904

J1▼
SWITCH STROBES

Switch Drives ▼▼▼

Q1	1	GRN-BRN
Q2	3 [2 KEY]	GRN-RED
Q3	4	GRN-ORG
Q4	5	GRN-YEL
Q5	6	GRN-BLK
Q6	7	GRN-BLU
Q7	8	GRN-VIO
Q8	9	GRN-GRY

Drive 4 Drive 3 Drive 2 Drive 1

Switch 49 / Switch 33 / Switch 17 — Switch 01 — Return 1
Switch 50 / Switch 34 / Switch 18 — Switch 02 — Return 2
Switch 51 / Switch 35 / Switch 19 — Switch 03 — Return 3
Switch 52 / Switch 36 / Switch 20 — Switch 04 — Return 4
Switch 53 / Switch 37 / Switch 21 — Switch 05 — Return 5
Switch 54 / Switch 38 / Switch 22 — Switch 06 — Return 6
Switch 55 / Switch 39 / Switch 23 — Switch 07 — Return 7
Switch 56 / Switch 40 / Switch 24 — Switch 08 — Return 8
Switch 57 / Switch 41 / Switch 25 — Switch 09 — Return 9
Switch 58 / Switch 42 / Switch 26 — Switch 10 — Return 10
Switch 59 / Switch 43 / Switch 27 — Switch 11 — Return 11
Switch 60 / Switch 44 / Switch 28 — Switch 12 — Return 12
Switch 61 / Switch 45 / Switch 29 — Switch 13 — Return 13
Switch 62 / Switch 46 / Switch 30 — Switch 14 — Return 14
Switch 63 / Switch 47 / Switch 31 — Switch 15 TOURNA-MENT START — Return 15
Switch 64 / Switch 48 / Switch 32 — Switch 16 START BUTTON — Return 16

J6
SWITCH RETURNS
J6▼

CPU/Sound PCB
▲ Switch Returns ▲

Switch Return IC Source Number : LM339D Surface Mount

	J6	
BLACK	10	Ground
WHT-BRN	9	IC-U22A
WHT-RED	8	IC-U22B
WHT-ORG	7	IC-U22C
WHT-YEL	6	IC-U22D
WHT-GRN	5	IC-U15A
WHT-BLU [4 KEY]	3	IC-U15B
WHT-VIO	2	IC-U15C
WHT-GRY	1	IC-U15D

Switch Return IC Source Number : LM339D Surface Mount

BLACK	10	Ground
TAN-BLK	9	IC-U35A
TAN-RED	8	IC-U35B
TAN-ORG	7	IC-U35C
TAN-YEL	6	IC-U35D
TAN-GRN [5 KEY]	4	IC-U40A
TAN-BLU	3	IC-U40B
TAN-VIO	2	IC-U40C
TAN-WHT	1	IC-U40D

J12▲
SWITCH RETURNS
J12

Playfield 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.

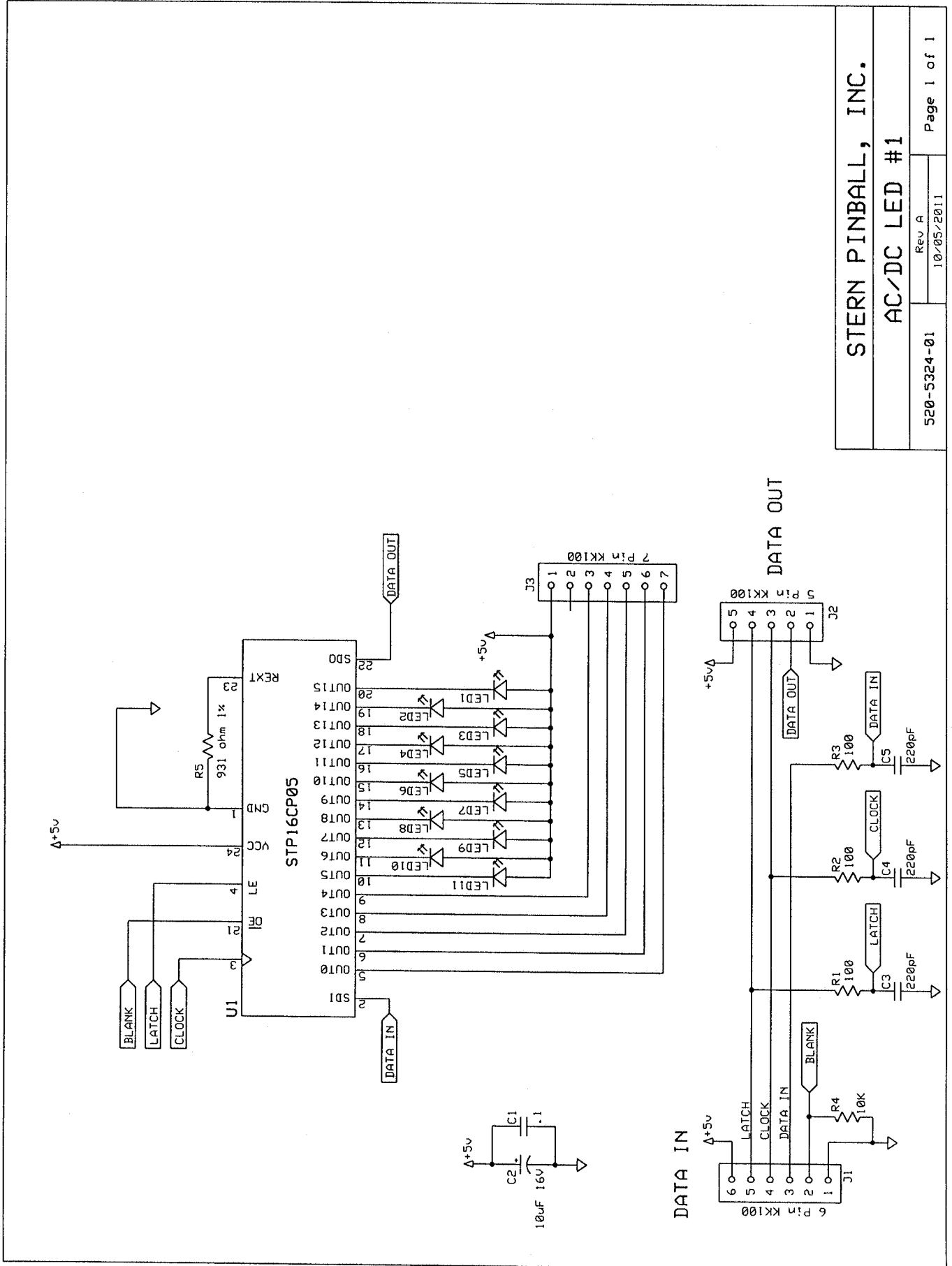For Switch(es): 35 & 36

Diode on Terminal strip -or- Diode on Diode Board

Please NOTE: Switch & Lamp Descriptions may differ slightly than that of the Dot Display, due to space restraints.
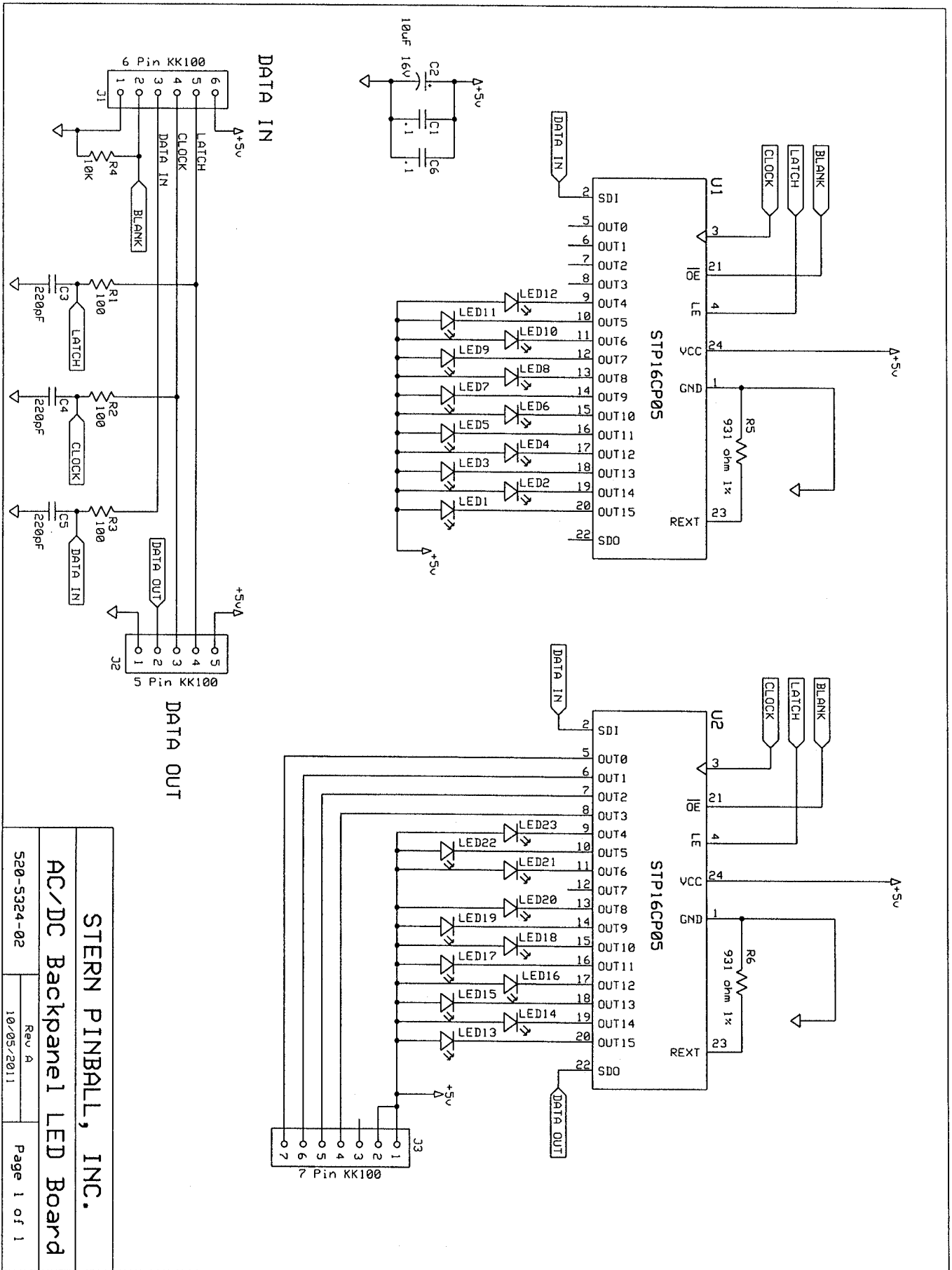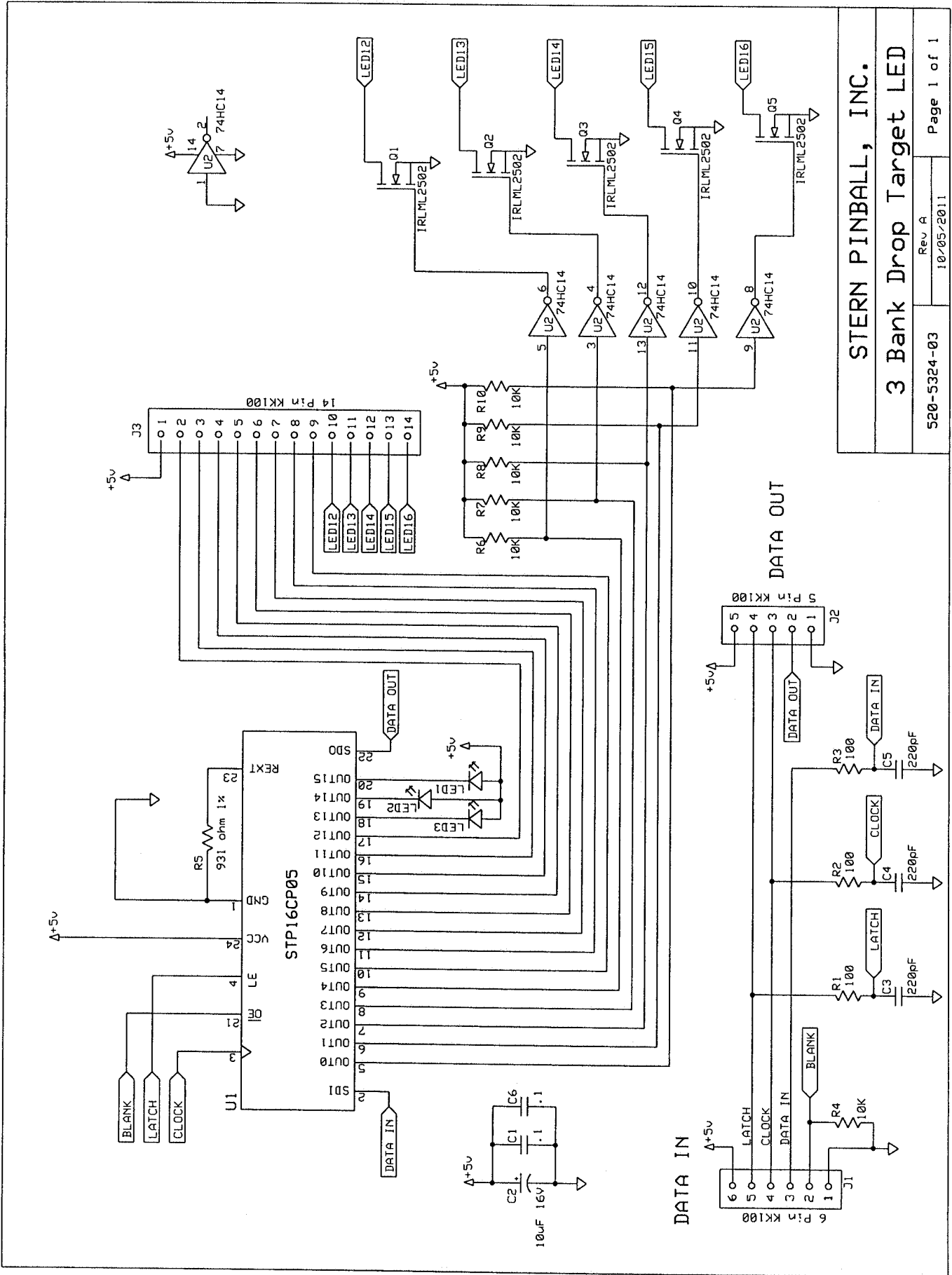
Playfield Wiring
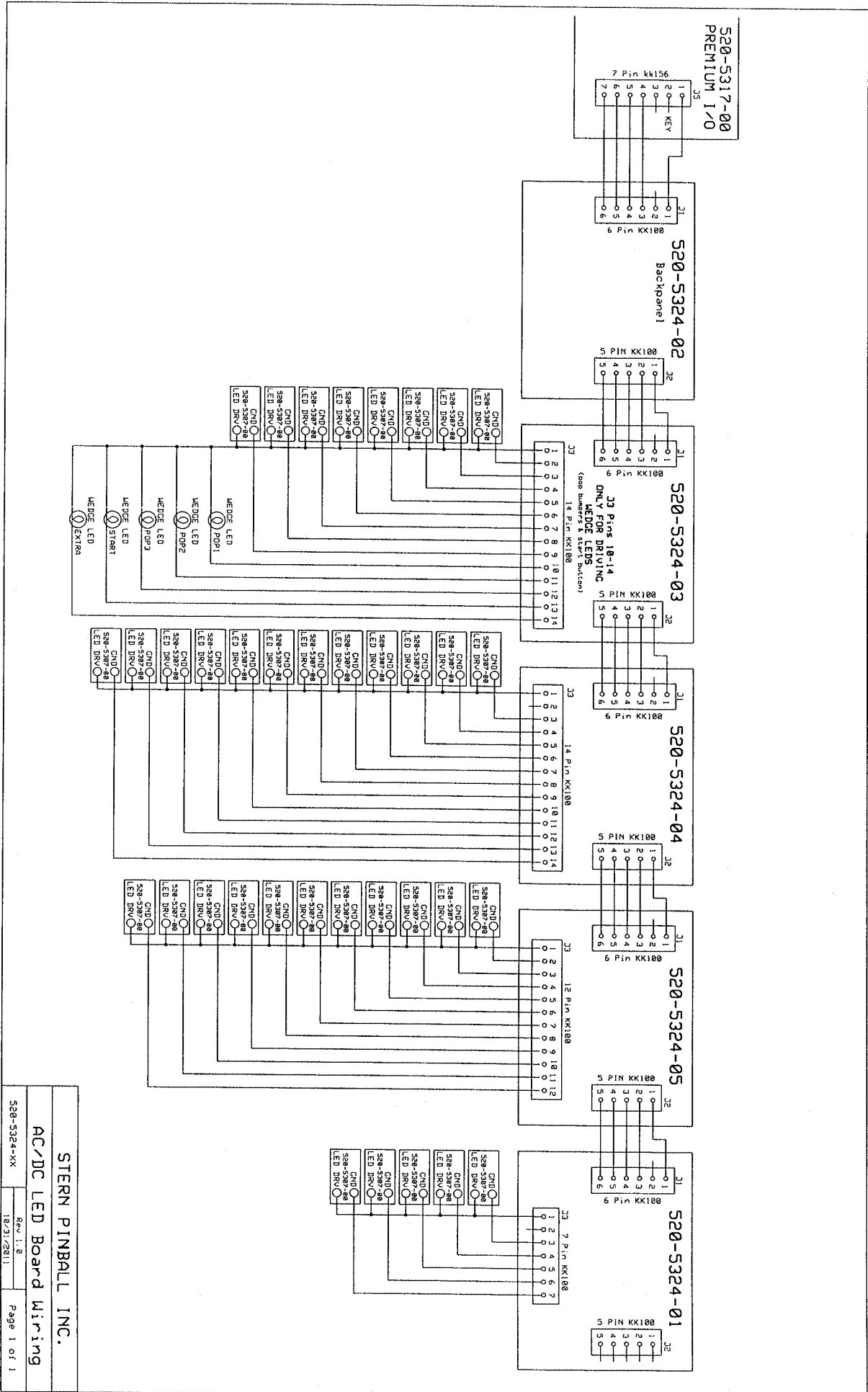
Playfield Wiring

Y13

STERN PINBALL, INC.

AC/DC Backpanel LED Board
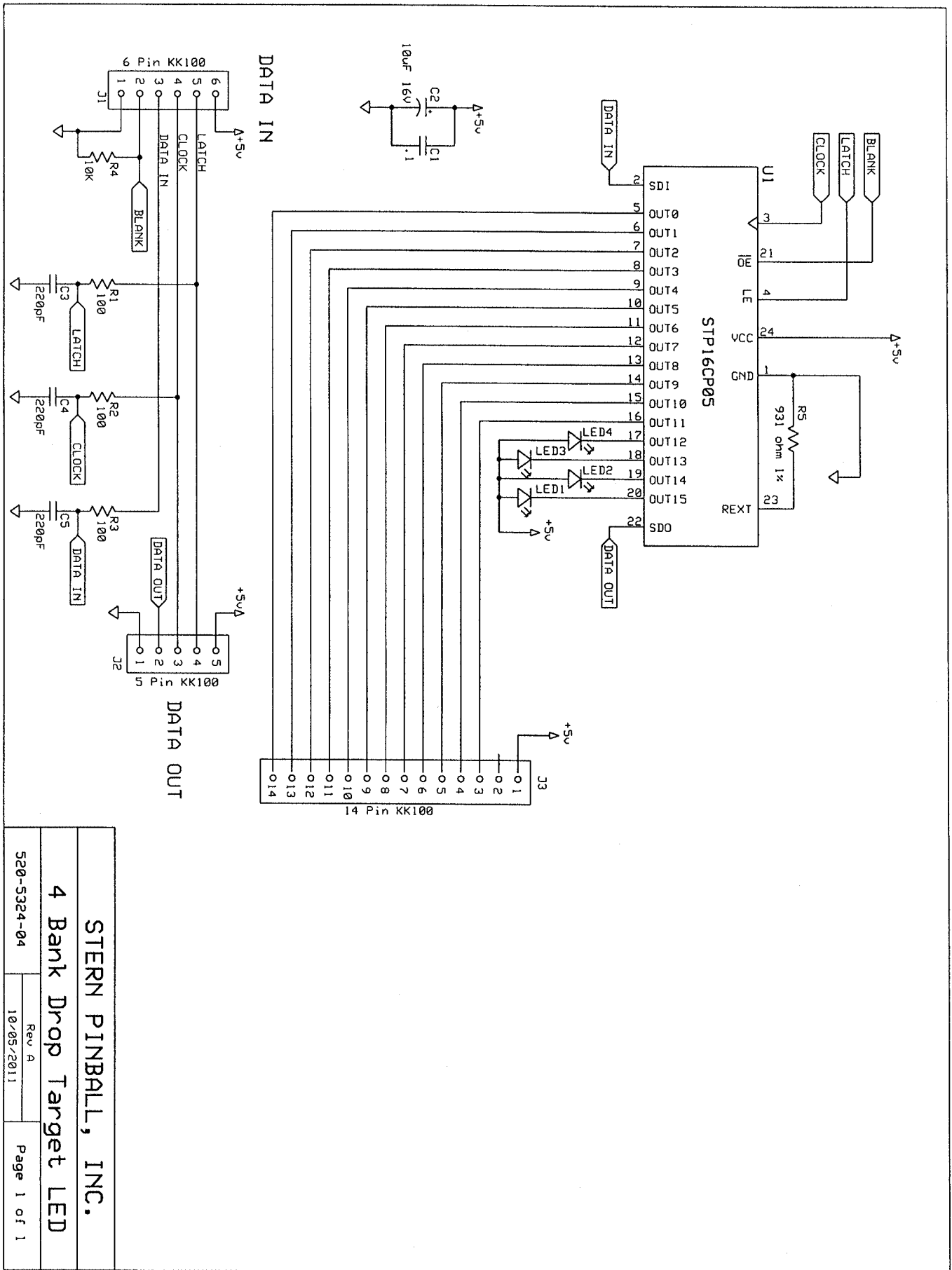
520-5324-02

Rev A

10/05/2011

Page 1 of 1

Y16

STERN PINBALL, INC.

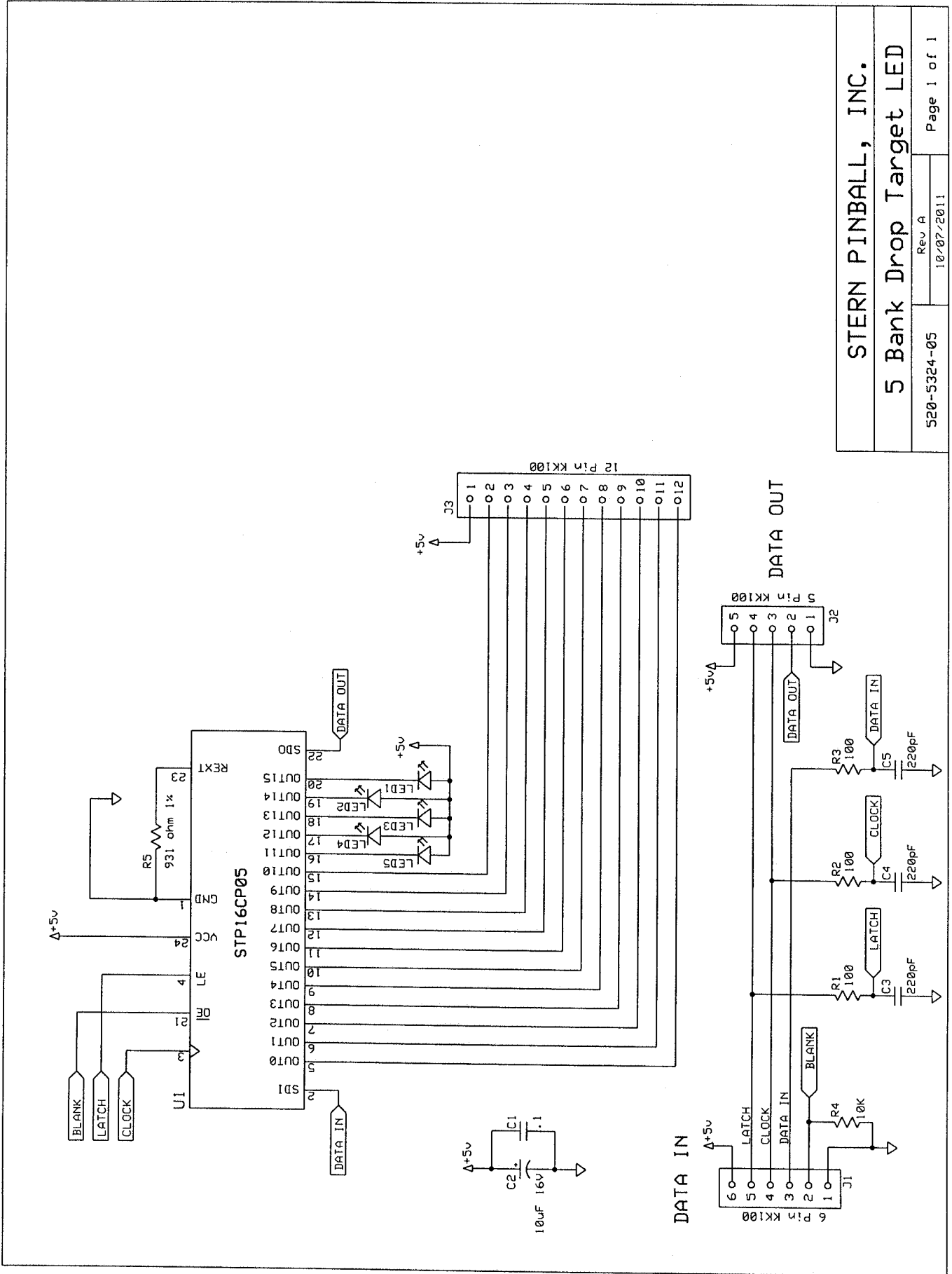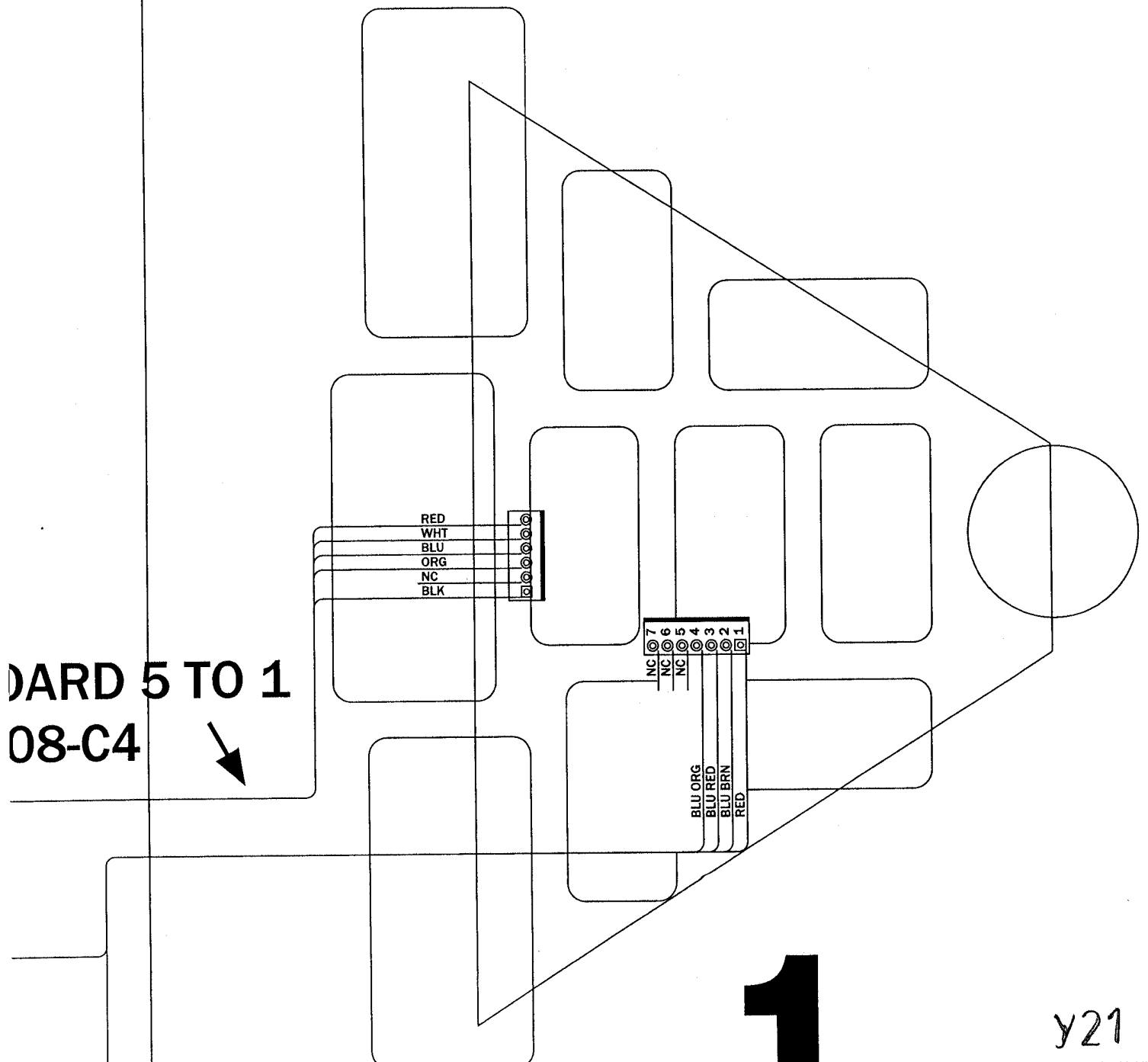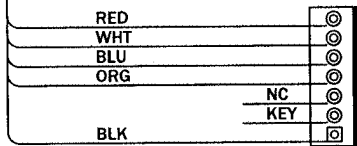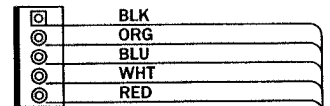3 Bank Drop Target LED

520-5324-03

Rev A
10/05/2011

Page 1 of 1

74HC14

IRLML2502

STP16CP05

14 Pin KK100

5 Pin KK100
DATA OUT

6 Pin KK100
DATA IN

LED12
LED13
LED14
LED15
LED16

Y17

DATA IN

6 Pin KK100

J1
1 2 3 4 5 6

+5v
LATCH
CLOCK
DATA IN
BLANK

R4 10k

10uF 16V
C2
.1
C1
+5v

DATA IN

U1

SDI 2
OUT0 5
OUT1 6
OUT2 7
OUT3 8
OUT4 9
OUT5 10
OUT6 11
OUT7 12
OUT8 13
OUT9 14
OUT10 15
OUT11 16
OUT12 17
OUT13 18
OUT14 19
OUT15 20
SDO 22

OE 3
LE 21
VCC 4
GND 24
REXT 1
23

STP16CP05

CLOCK
LATCH
BLANK

+5v

R5 931 ohm 1%

LED4
LED3
LED2
LED1

+5v

DATA OUT

C3 220pF   R1 100   LATCH
C4 220pF   R2 100   CLOCK
C5 220pF   R3 100   DATA IN

DATA OUT

+5v

J2
1 2 3 4 5

5 Pin KK100

DATA OUT

O14 O13 O12 O11 O10 O9 O8 O7 O6 O5 O4 O3 O2 O1

+5v

J3

14 Pin KK100

STERN PINBALL, INC.

4 Bank Drop Target LED

520-5324-04

Rev A
10/05/2011

Page 1 of 1

Y18

STERN PINBALL, INC.

5 Bank Drop Target LED

520-5324-05

Rev A
10/07/2011

Page 1 of 1

Y19

AC-DC PREMIUM/L.E.
LED CABLE WIRING

February 9, 2012

CABLE- LED BOARD 3 OUTPUTS
036-5572-09-C4

RIGHT POP BUMPER

LEFT POP BUMPER

BOTTOM POP BUMPER

CABLE- LED BOARD 2 TO 3
036-5572-05-C4

CABLE-LED BOARD 5 OUTPUTS
036-5572-11-C4

CABLE- LED BOARD 3 TO 4
036-5572-06-C4

CABLE- LED BOARD 4 OUTPUTS
036-5572-10-C4

CABLE- LED BOARD 5 TO 1
036-5572-08-C4

CABLE- LED BOARD 5 OUTPUTS
036-5572-12-C4

To future optional Topper box
To future optional Topper box
To Cabinet Cable
To Back Panel Cable

2

3

4

5

1

y21

LED BOARD WIRING
Detail of Board 1 Input
and Output wiring

RED
WHT
BLU
ORG
NC
BLK

NC 7
NC 6
NC 5
4
3
2
1

BLU ORG
BLU RED
BLU BRN
RED

)ARD 5 TO 1
08-C4

1

2

	RED
	WHT
	BLU
	ORG
NC	
KEY	
	BLK

BLK	
ORG	
BLU	
WHT	
RED	

LED BOARD WIRING
Detail of Board 2 Input and Output wiring

Y22

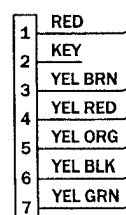# LED BOARD WIRING
Detail of Board 3 Input and Output wiring

3

STERN PINBALL
520-5333-00
+8V

STERN PINBALL
520-5333-00
+8V

LED DRV
+8V
STERN PINBALL
520-5307-00
WHT YEL
RED

RED
WHT GRN

STERN PINBALL
520-5333-00
+8V

YEL VIO
YEL BLU
YEL GRY
YEL GRN
YEL BLK
YEL ORG
YEL RED
YEL BRN
VIO YEL
VIO ORG
VIO RED
VIO BRN

RED

NC

14
13
12
11
10
9
8
7
6
5
4
3
2
1

STERN PINBALL 520-5254-03 REV A INC.

BLK
ORG
BLU
WHT
RED

BLK
NC
ORG
BLU
WHT
RED

LED DRV

STERN PINBALL
520-5333-00
+8V

LED DRV
+8V
STERN PINBALL
520-5307-00

LED BOARD WIRING
Detail of Board 4 Input and Output wiring

CABLE- LED BOARD 4 C
036-5572-10-C4

4

STERN PINBALL INC.

CABLE- LED
BOARD 3 TO 4

y24

5

250-2301-00
STERN PINBALL

+8V
RED DRK

ORG WHT

RED

ORG RED
ORG YEL
ORG BLK
ORG WHT
RED
NC
NC
NC
NC
NC
NC
NC

1
2
3
4
5
6
7
8
9
10
11
12

250-2354-02 REV A
STERN PINBALL INC.

RED
WHT
BLU
ORG
NC
BLK

BLK
YEL
BLU
ORG
RED

LED BOARD WIRING
Detail of Board 5 Input
and Output wiring

y 25

RED
WHT
BLU
ORG

KEY
NC

BLK
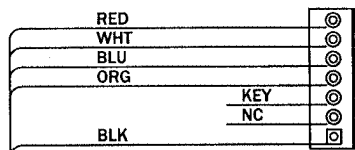
LED BOARD WIRING
Detail of Back panel, cabinet, and topper box connections

To future optional Topper box

1	RED
2	KEY
3	BLU BRN
4	BLU RED
5	BLU ORG
6	BLU YEL

To future optional Topper box

1	RED
2	KEY
3	VIO ORG
4	VIO YEL
5	NC

To Cabinet Cable

1	RED
2	KEY
3	YEL BRN
4	YEL RED
5	YEL ORG
6	YEL BLK
7	YEL GRN

To Back Panel Cable

1	RED
2	KEY
3	VIO BRN
4	VIO RED

+8V
N PINBALL
5333-00

Y26
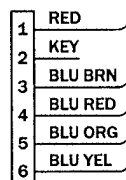
STERN PINBALL INC.

AC/DC Flames PCB Wiring

| 520-5332-00 | Rev 1.0 | Page 1 of 1 |
| | 11/8/2011 | |

520-5332-00
FLAMES PCB

J1

12 Pin KK100

+5V
D0
D1
D2
D3
D4
D5
D6
D7
STB
KEY
GND

O 1
O 2
O 3
O 4
O 5
O 6
O 7
O 8
O 9
O 10
O 11
O 12

Connect to any Strobe

520-5317-00
I/O BOARD

J16
15 Pin KK156

J2
10 Pin KK156

J3
12 Pin KK156

Playfield Terminal Strips

CATHODE SIDE | 1N4004 | ANODE SIDE
112-5003-00
TERMINAL STRIP

Explanation:
All Switches, Lamps & Coils require diodes. Coil diodes are located on the I/O Power Driver PCB *(in Backbox)*. Some diodes from switches *or* lamps are moved onto Terminal Strips (*located under the playfield*). This is done where space constraints *or* excessive vibrations are present. *The Switch & Lamp Matrix Grids also note which Switch or Lamp has a diode on a Terminal Strip, noted by DOTS (Diode On Terminal Strip).*

Note: *Some wires 'appear' to be doubled on the lugs. The switches and lamps are in a series, so you may see 1 or 2 wires depending where the switch or lamp is in the string.*

Typical Switch Wiring & Schematic
... with Switch Diode on a Terminal Strip (DOTS)
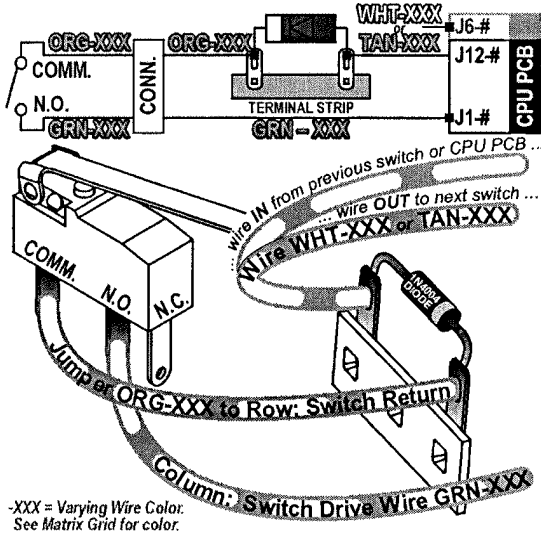
-XXX = Varying Wire Color.
See Matrix Grid for color.

Typical Lamp Wiring & Schematic
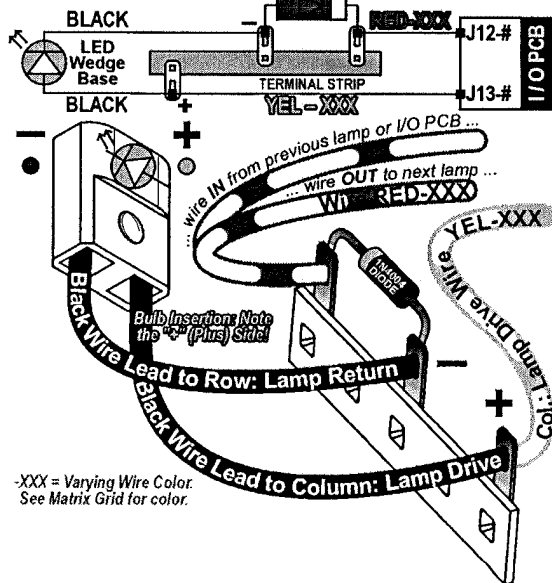### ... with Lamp Diode on a Terminal Strip (DOTS)
Usually when a #555 Bulb is used as a Controlled Lamp for a Spot Light.
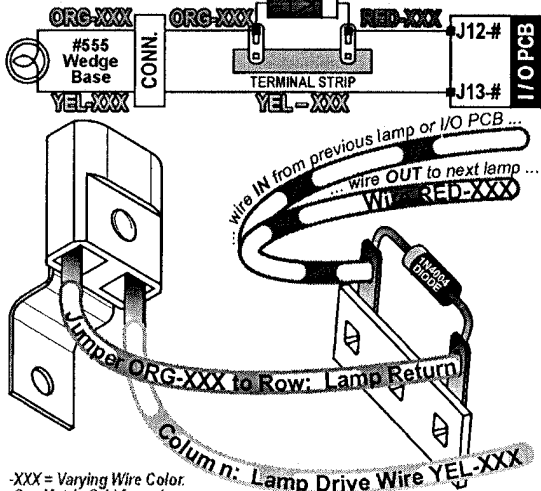
-XXX = Varying Wire Color.
See Matrix Grid for color.

Typical Lamp Wiring & Schematic
... with Lamp Diode on a Terminal Strip (DOTS)
Usually when an LED Module is used as a Controlled Lamp for a Pop Bumper.
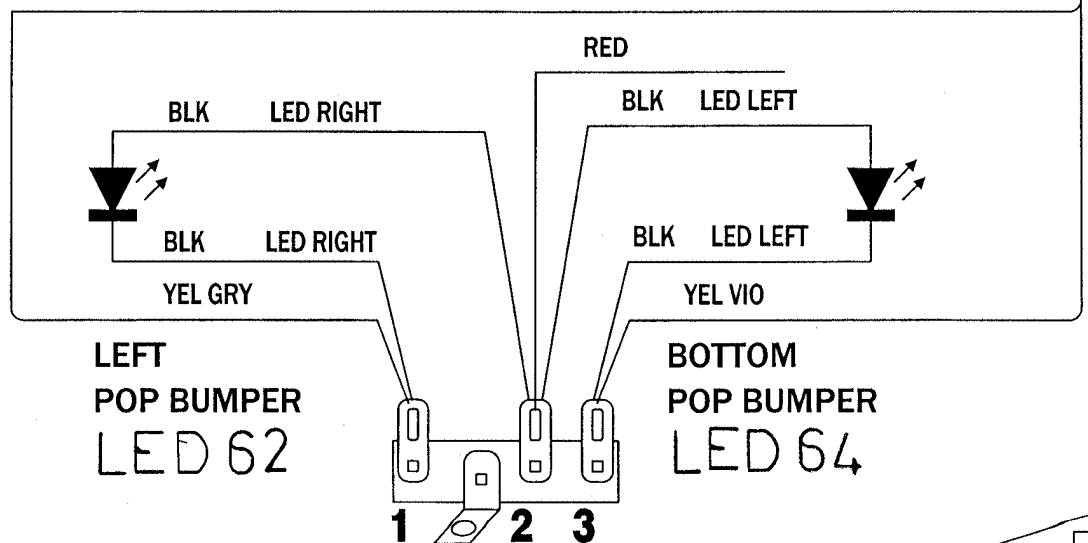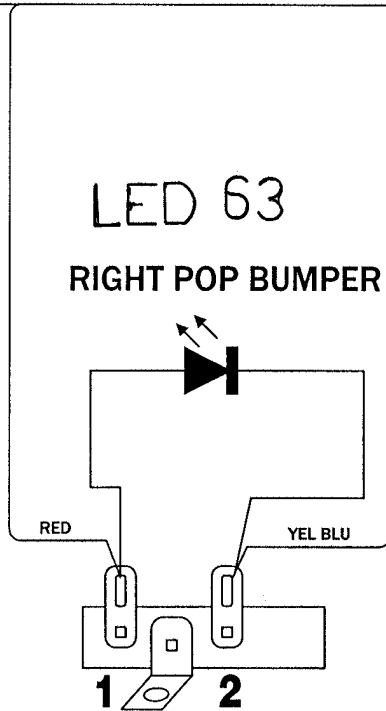

-XXX = Varying Wire Color.
See Matrix Grid for color.

Playfield Wiring

Playfield
Wiring

Y28

CABLE- LED BOARD 3 OUTPUTS
036-5572-09-C4

LED 63

RIGHT POP BUMPER

RED   YEL BLU

1   2

LED BOARD WIRING
Detail of Board Pop
Bumper terminals

RED

BLK   LED RIGHT   BLK   LED LEFT

BLK   LED RIGHT   BLK   LED LEFT

YEL GRY   YEL VIO

LEFT   **BOTTOM**
POP BUMPER   **POP BUMPER**
LED 62   LED 64

1   2   3

STERN P
520-53

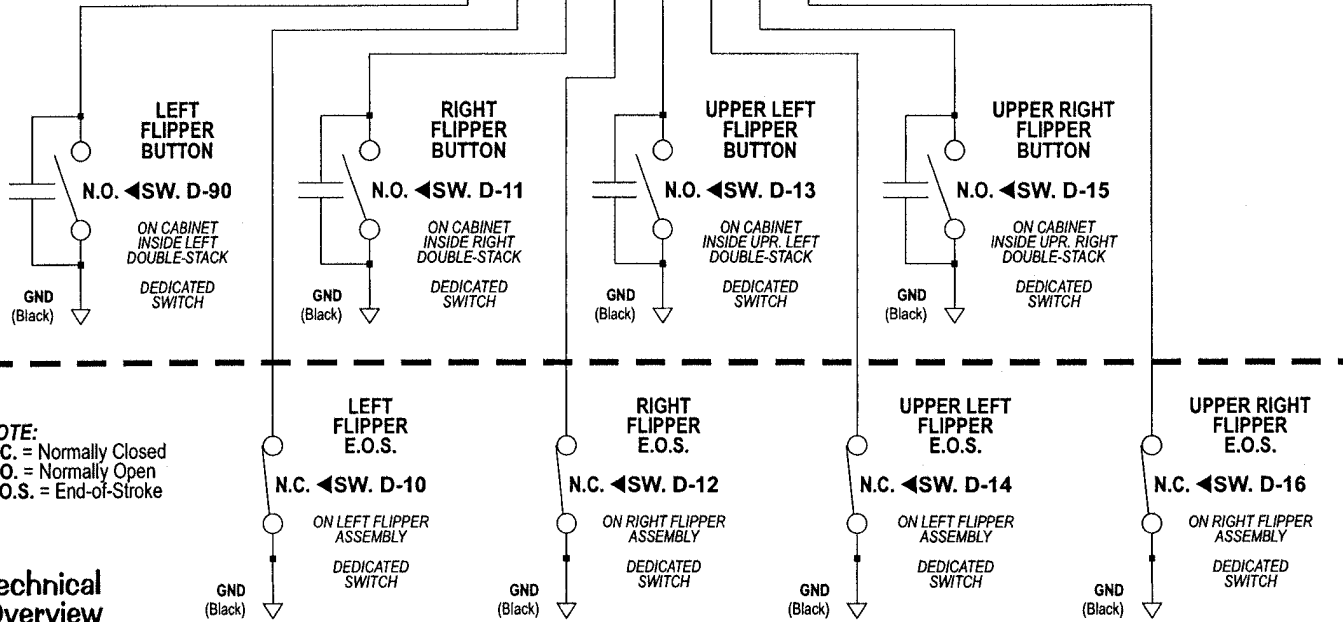# #-Flipper Circuit Wiring Diagram

Partial View CPU/Sound

CPU/Sound PCB

Dedicated Switch IC
Source Number : LVC245A

J3 DEDICATED SWITCHES
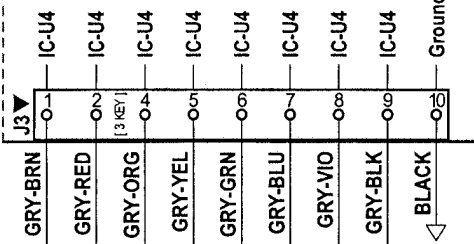
The Outside **LEFT FLIPPER BUTTON** located on the Cabinet operates both the Left Flipper & Upper Left Flipper, if used. The Outside **RIGHT FLIPPER BUTTON** located on the Cabinet operates both the Right Flipper & Upper Right Flipper, if used. **RIGHT & LEFT BUTTONS:** These switches are *Double-stacked*. Pressing half-way down operates the Lower Flippers (respectively); pressing full down operates both the Lower Flipper & Upper Flippers (respectively) simultaneously.

IC-U4 (×9), Ground

J3: 1 2 [3 KEY] 4 5 6 7 8 9 10

GRY-BRN, GRY-RED, GRY-ORG, GRY-YEL, GRY-GRN, GRY-BLU, GRY-VIO, GRY-BLK, BLACK

LEFT FLIPPER BUTTON
N.O. ◄SW. D-90
ON CABINET INSIDE LEFT DOUBLE-STACK
DEDICATED SWITCH
GND (Black)

RIGHT FLIPPER BUTTON
N.O. ◄SW. D-11
ON CABINET INSIDE RIGHT DOUBLE-STACK
DEDICATED SWITCH
GND (Black)

UPPER LEFT FLIPPER BUTTON
N.O. ◄SW. D-13
ON CABINET INSIDE UPR. LEFT DOUBLE-STACK
DEDICATED SWITCH
GND (Black)

UPPER RIGHT FLIPPER BUTTON
N.O. ◄SW. D-15
ON CABINET INSIDE UPR. RIGHT DOUBLE-STACK
DEDICATED SWITCH
GND (Black)

NOTE:
N.C. = Normally Closed
N.O. = Normally Open
E.O.S. = End-of-Stroke

Technical Overview

LEFT FLIPPER E.O.S.
N.C. ◄SW. D-10
ON LEFT FLIPPER ASSEMBLY
DEDICATED SWITCH
GND (Black)

RIGHT FLIPPER E.O.S.
N.C. ◄SW. D-12
ON RIGHT FLIPPER ASSEMBLY
DEDICATED SWITCH
GND (Black)

UPPER LEFT FLIPPER E.O.S.
N.C. ◄SW. D-14
ON LEFT FLIPPER ASSEMBLY
DEDICATED SWITCH
GND (Black)

UPPER RIGHT FLIPPER E.O.S.
N.C. ◄SW. D-16
ON RIGHT FLIPPER ASSEMBLY
DEDICATED SWITCH
GND (Black)

Our *Flipper System* uses one supply voltage (+50VDC) for both *kick* & *hold*. Once the **Game CPU** detects a Flipper Cabinet Switch closure *(during game play)* it applies a 40*msec* pulse to the gate of the Flipper Drive Transistor (STP22NE10L). 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 1*msec* every 12*msecs* for the duration of the hold cycle.
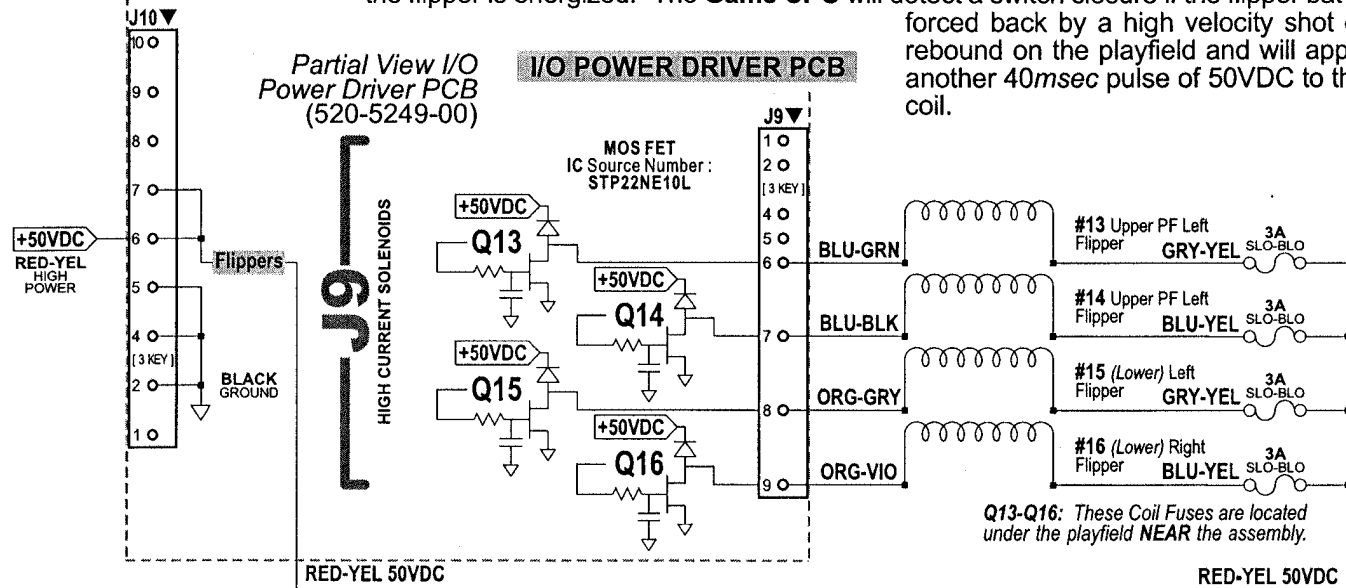
The E.O.S. (End-Of-Stroke) **Switch** serves the same function as before as it prevents foldback when the player has the flipper energized to capture balls. The **E.O.S. Dedicated Switch** is a normally closed switch which opens approximately 1/16" when the flipper is energized. The **Game CPU** will 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 40*msec* pulse of 50VDC to the coil.
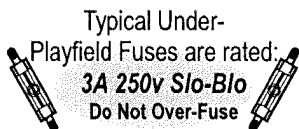
J10 VOLTAGE OUTPUTS

J10: 10 9 8 7 6 5 4 [3 KEY] 2 1

+50VDC RED-YEL HIGH POWER

Flippers
BLACK GROUND

Partial View I/O Power Driver PCB (520-5249-00)

I/O POWER DRIVER PCB

J9
J9: 1 2 [3 KEY] 4 5 6 7 8 9

MOS FET IC Source Number : STP22NE10L

HIGH CURRENT SOLENOIDS

+50VDC Q13
+50VDC Q14
+50VDC Q15
+50VDC Q16

BLU-GRN — #13 Upper PF Left Flipper GRY-YEL 3A SLO-BLO
BLU-BLK — #14 Upper PF Left Flipper BLU-YEL 3A SLO-BLO
ORG-GRY — #15 (Lower) Left Flipper GRY-YEL 3A SLO-BLO
ORG-VIO — #16 (Lower) Right Flipper BLU-YEL 3A SLO-BLO

Q13-Q16: These Coil Fuses are located under the playfield NEAR the assembly.

RED-YEL 50VDC   RED-YEL 50VDC

Typical Under-Playfield Fuses are rated:
3A 250v Slo-Blo
Do Not Over-Fuse

NOTe:
Coil Diodes (1N4004) are integrated on the I/O Power Driver PCB. See Coils Detailed Wiring Diagram for actual number of flippers used on this game.

Playfield Wiring

Y30

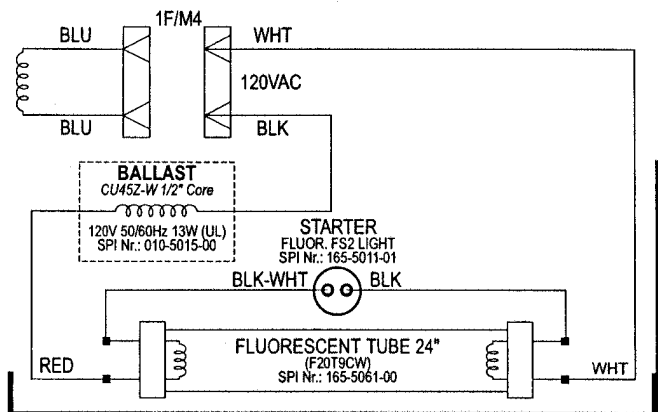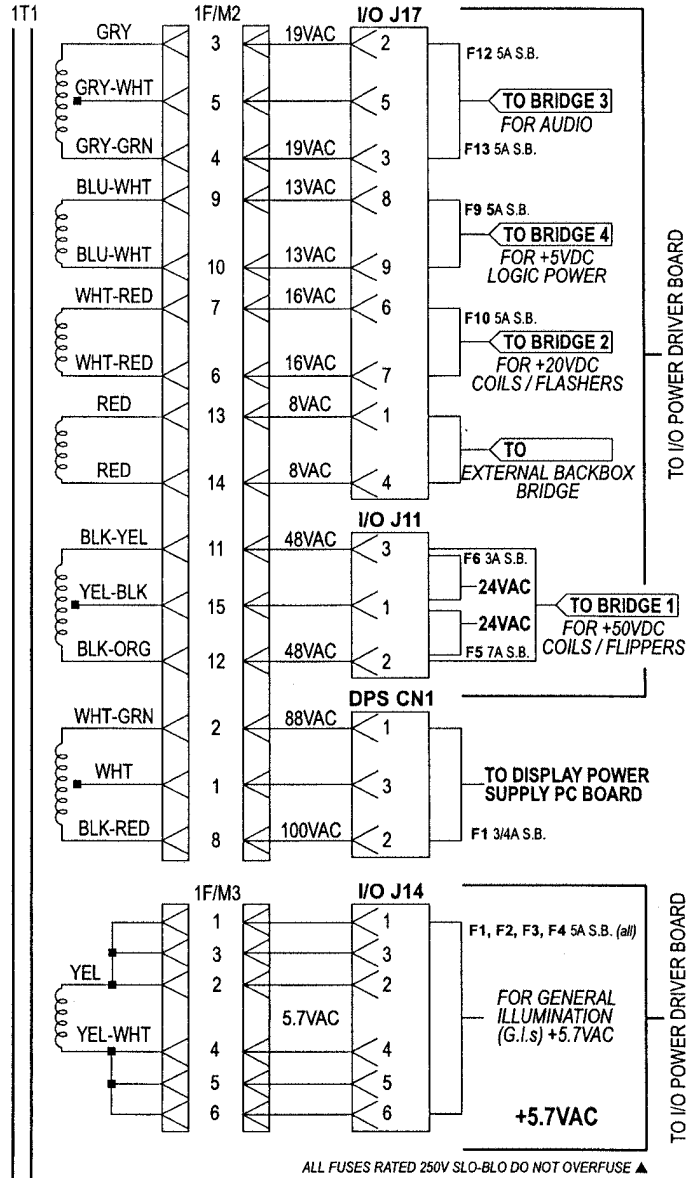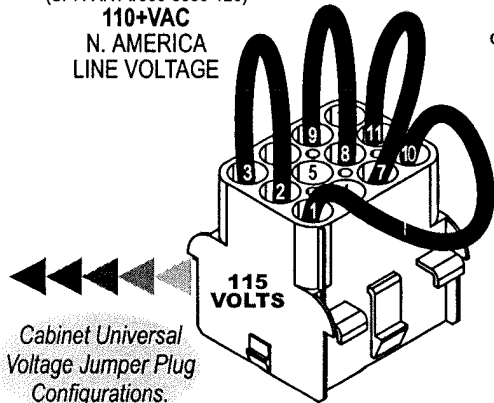**Playfield Wiring**

Cabinet & Coin Door Wiring   The Yellow Pages

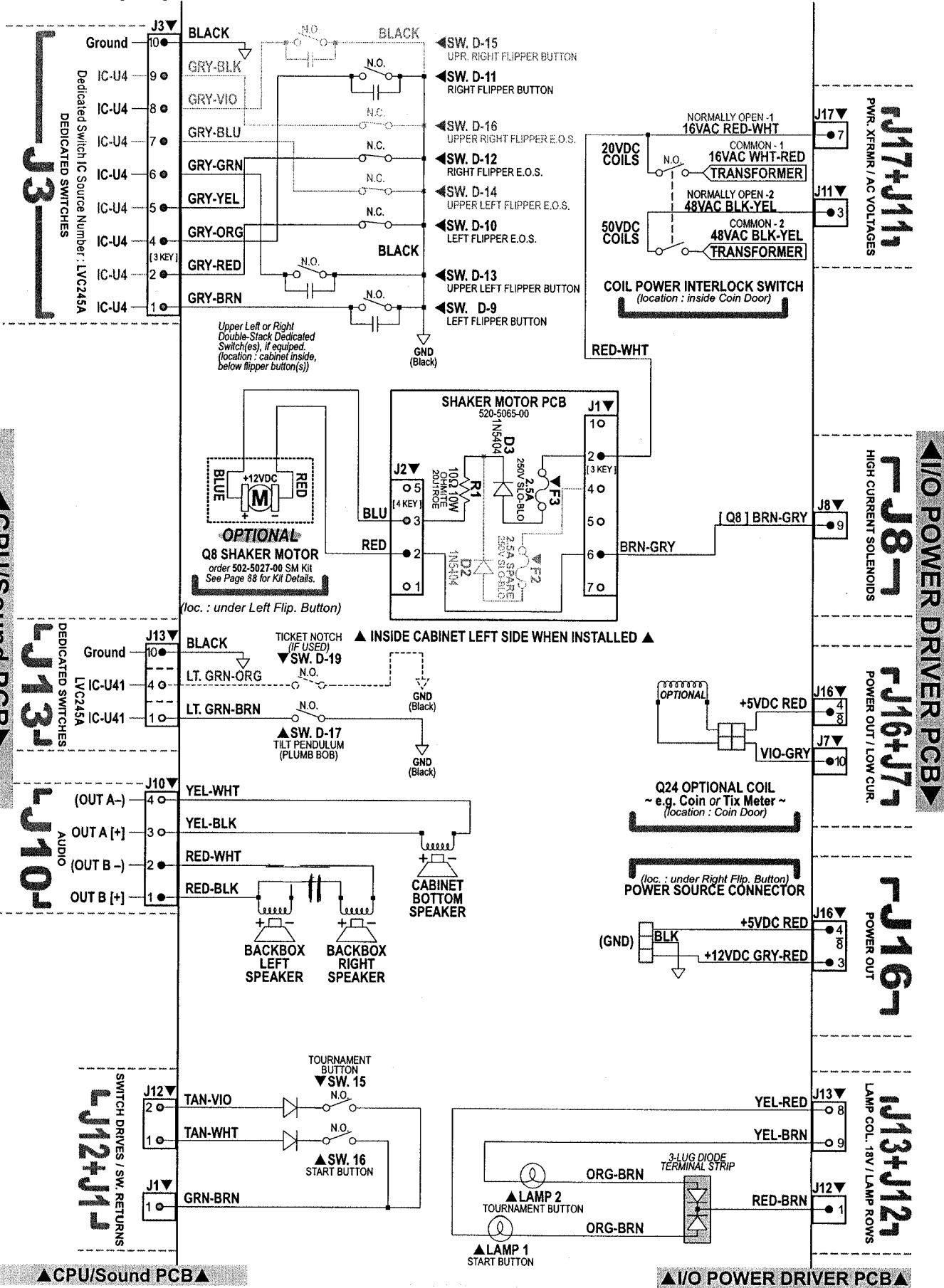### Transformer Power Wiring Diagram

JUMPER PLUG ▼
(SPI PART #036-5530-120)
110+VAC
N. AMERICA
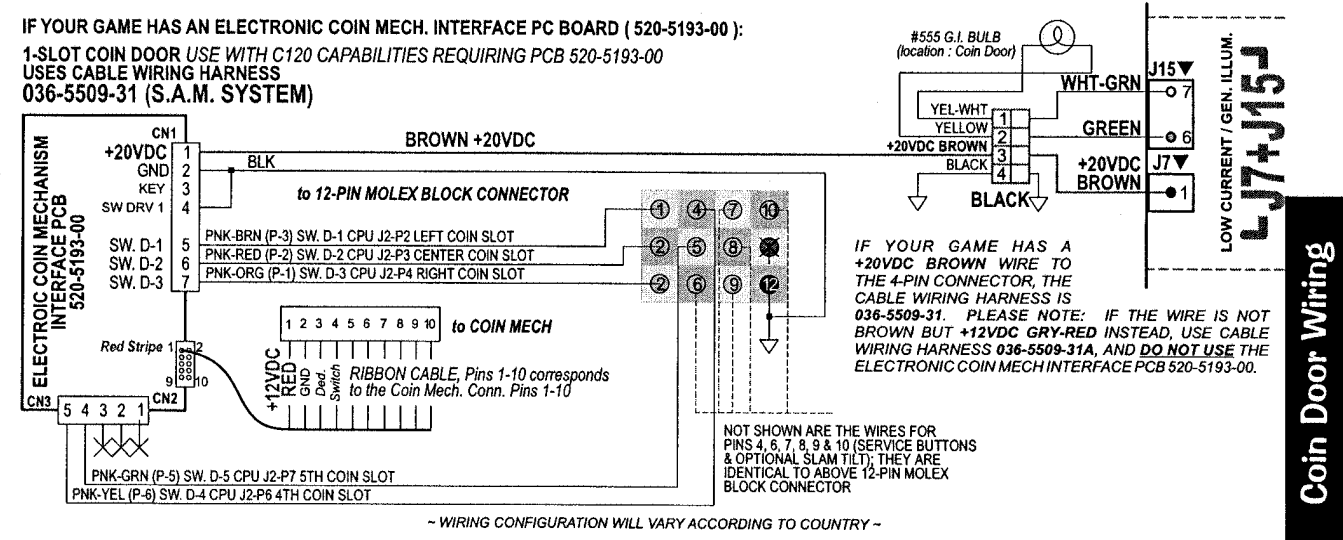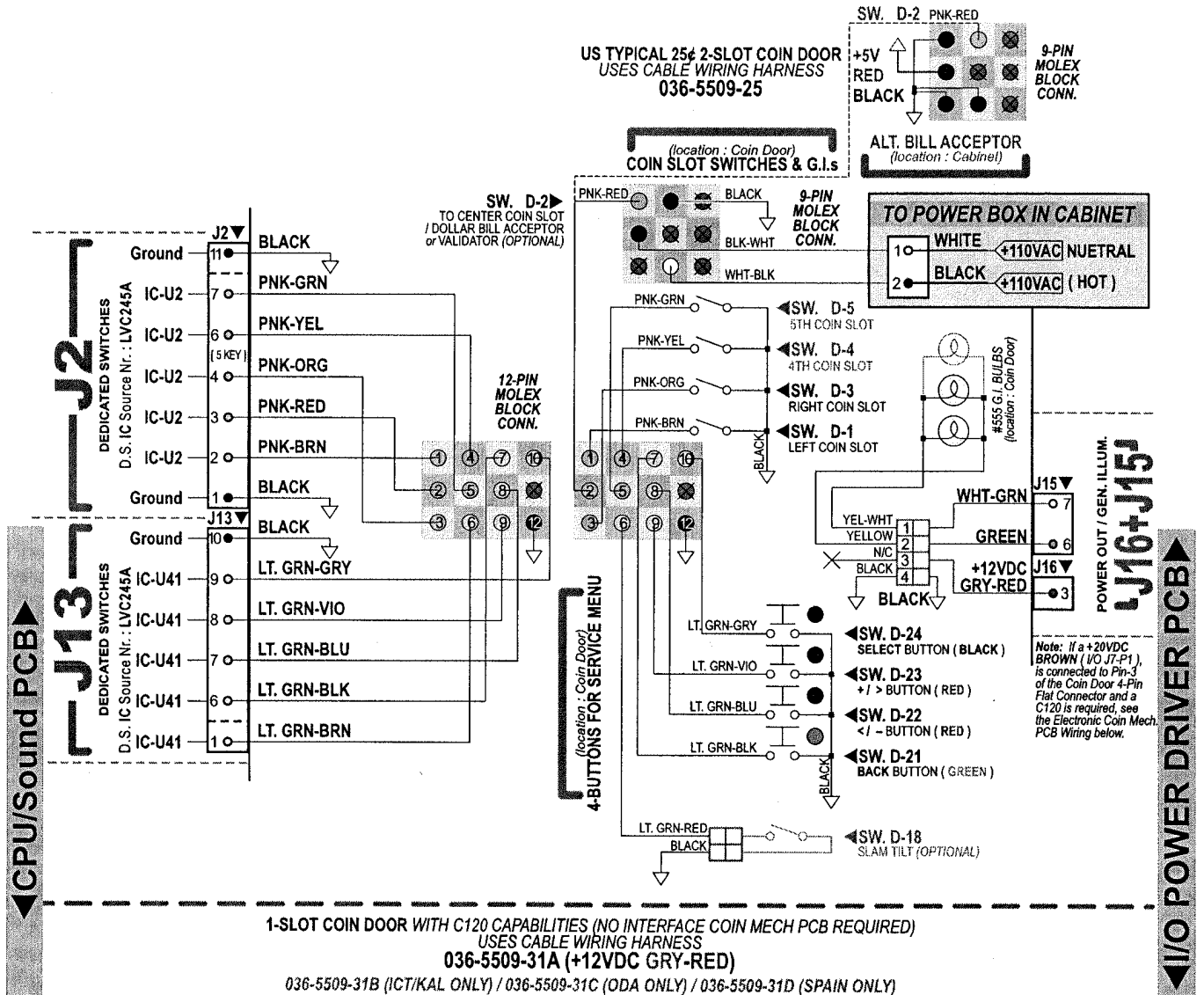LINE VOLTAGE

115 VOLTS

Cabinet Universal
Voltage Jumper Plug
Configurations.

**Cabinet and Coin
Door Wiring**

Cabinet Wiring

Y31

Cabinet Wiring Diagram

J3▼

Pin	Wire	Signal
10	BLACK	Ground
9	GRY-BLK	IC-U4
8	GRY-VIO	IC-U4
7	GRY-BLU	IC-U4
6	GRY-GRN	IC-U4
5	GRY-YEL	IC-U4
4	GRY-ORG	IC-U4
2	GRY-RED	IC-U4 [3 KEY]
1	GRY-BRN	IC-U4

Dedicated Switch IC Source Number : LVC245A
DEDICATED SWITCHES
J3

N.O. BLACK
◄SW. D-15 UPR. RIGHT FLIPPER BUTTON
N.O. ◄SW. D-11 RIGHT FLIPPER BUTTON
N.C. ◄SW. D-16 UPPER RIGHT FLIPPER E.O.S.
N.C. ◄SW. D-12 RIGHT FLIPPER E.O.S.
N.C. ◄SW. D-14 UPPER LEFT FLIPPER E.O.S.
N.C. ◄SW. D-10 LEFT FLIPPER E.O.S.
N.O. ◄SW. D-13 UPPER LEFT FLIPPER BUTTON
N.O. ◄SW. D-9 LEFT FLIPPER BUTTON
BLACK

Upper Left or Right Double-Stack Dedicated Switch(es), if equiped.
(location : cabinet inside, below flipper button(s))

GND (Black)

20VDC COILS
NORMALLY OPEN -1 16VAC RED-WHT
COMMON - 1 16VAC WHT-RED TRANSFORMER
50VDC COILS
NORMALLY OPEN -2 48VAC BLK-YEL
COMMON - 2 48VAC BLK-YEL TRANSFORMER

COIL POWER INTERLOCK SWITCH
(location : inside Coin Door)

J17▼ 7 | **J11▼** 3
J17+J11 PWR. XFRMR / AC VOLTAGES

RED-WHT

SHAKER MOTOR PCB 520-5065-00

J2▼
5 [4 KEY]
3 BLU
2 RED
1

BLUE +12VDC RED
M
OPTIONAL
Q8 SHAKER MOTOR
order 502-5027-00 SM Kit
See Page 88 for Kit Details.
(loc. : under Left Flip. Button)

D3 1N5404
R1 10Ω.10W OHMITE 20J1ROE
F3 2.5A 250V SLO-BLO
F2 2.5A SPARE 250V SLO-BLO
D2 1N5404

J1▼
1
2 [3 KEY]
4
5
6 BRN-GRY
7

[Q8] BRN-GRY
J8▼ 9
J8 HIGH CURRENT SOLENOIDS

▲ INSIDE CABINET LEFT SIDE WHEN INSTALLED ▲

J13▼
10	BLACK	Ground
4	LT. GRN-ORG	IC-U41
1	LT. GRN-BRN	IC-U41

DEDICATED SWITCHES
LVC245A
J13

TICKET NOTCH (IF USED)
▼SW. D-19 N.O.
GND (Black)
▲SW. D-17 N.O. TILT PENDULUM (PLUMB BOB)
GND (Black)

OPTIONAL
+5VDC RED
VIO-GRY
Q24 OPTIONAL COIL
~ e.g. Coin or Tix Meter ~
(location : Coin Door)

J16▼ 4 8
J7▼ 10
J16+J7 POWER OUT / LOW CUR.

J10▼
4	YEL-WHT	(OUT A–)
3	YEL-BLK	OUT A [+]
2	RED-WHT	(OUT B –)
1	RED-BLK	OUT B [+]

AUDIO
J10

CABINET BOTTOM SPEAKER
BACKBOX LEFT SPEAKER
BACKBOX RIGHT SPEAKER

(loc. : under Right Flip. Button)
POWER SOURCE CONNECTOR
(GND) BLK
+5VDC RED
+12VDC GRY-RED
J16▼ 4 8 3
J16 POWER OUT

J12▼
| 2 | TAN-VIO |
| 1 | TAN-WHT |

J1▼
| 1 | GRN-BRN |

SWITCH DRIVES / SW. RETURNS
J12+J1

TOURNAMENT BUTTON
▼SW. 15 N.O.
▲SW. 16 START BUTTON N.O.

YEL-RED
YEL-BRN
ORG-BRN
3-LUG DIODE TERMINAL STRIP
▲LAMP 2 TOURNAMENT BUTTON
ORG-BRN
▲LAMP 1 START BUTTON
RED-BRN

J13▼ 8 9
J12▼ 1
J13+J12 LAMP COL. 18V / LAMP ROWS

▲CPU/Sound PCB▲

▲I/O POWER DRIVER PCB▲

CPU/Sound PCB
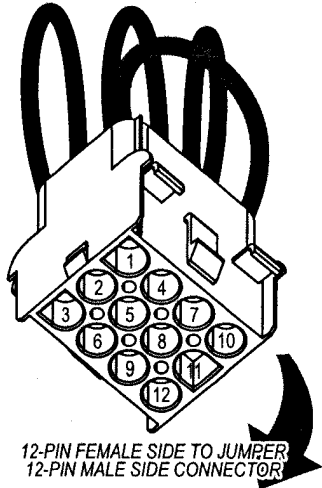I/O POWER DRIVER PCB

Cabinet Wiring

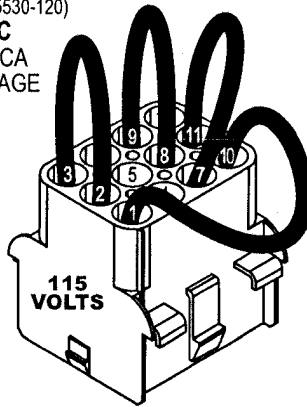Cabinet and Coin Door Wiring

Y32

Coin Door Wiring Diagram

Cabinet and Coin
Door Wiring

y33

Cabinet Universal Voltage Jumper Plugs *(for use with Universal AC Cable, 036-5530-00 ONLY)*

JUMPER PLUG ▼
(SPI PART #036-5530-120)
110+VAC
N. AMERICA
LINE VOLTAGE

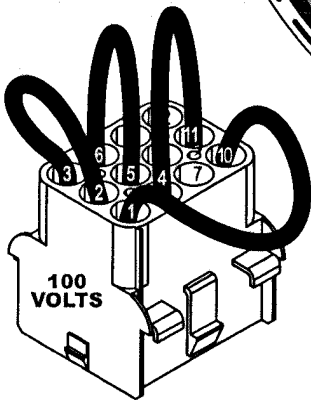**115 VOLTS**

12-PIN FEMALE SIDE TO JUMPER
12-PIN MALE SIDE CONNECTOR

9-PIN MALE SIDE TO TRANSFORMER
9-PIN FEMALE SIDE CONN.

1 BLK
2 BLK
3 WHT-BLK
4 WHT-BRN
5 WHT-BRN
6 BRN (or YEL-WHT)
7 WHT-ORG
8 WHT-ORG
9 ORG
10 BLK
11 WHT
12 N/U

12-PIN F/M CONN.
BACK VIEW ▲

9-PIN F/M CONN.
▲ BACK VIEW

100 VOLTS

◄ **JUMPER PLUG**
(SPI PART #036-5530-100)
98VAC – 109VAC
JAPAN *or*
N. AMERICA LOW
LINE VOLTAGE

Black & White wires from
the POWER BOX, cabinet bottom
to 12-Pin Conn., Pins 10 & 11..

11 10

JUMPER PLUG ▼
(SPI PART #036-5530-206)
200VAC – 211VAC
EUROPE *and*
MID. EAST LOW
LINE VOLTAGE

206 VOLTS
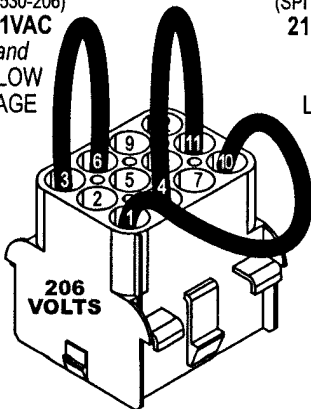
JUMPER PLUG ▼
(SPI PART #036-5530-220)
212VAC – 224VAC
EUROPE *and*
MID. EAST
LINE VOLTAGE

218 VOLTS
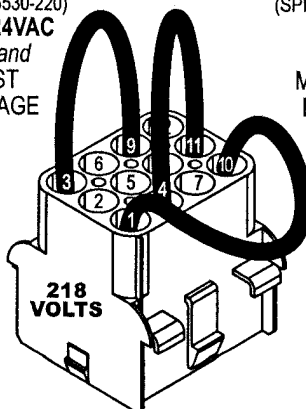
JUMPER PLUG ▼
(SPI PART #036-5530-230)
225+VAC
EUROPE *and*
MID. EAST HIGH
LINE VOLTAGE

230 VOLTS

Cabinet and Coin
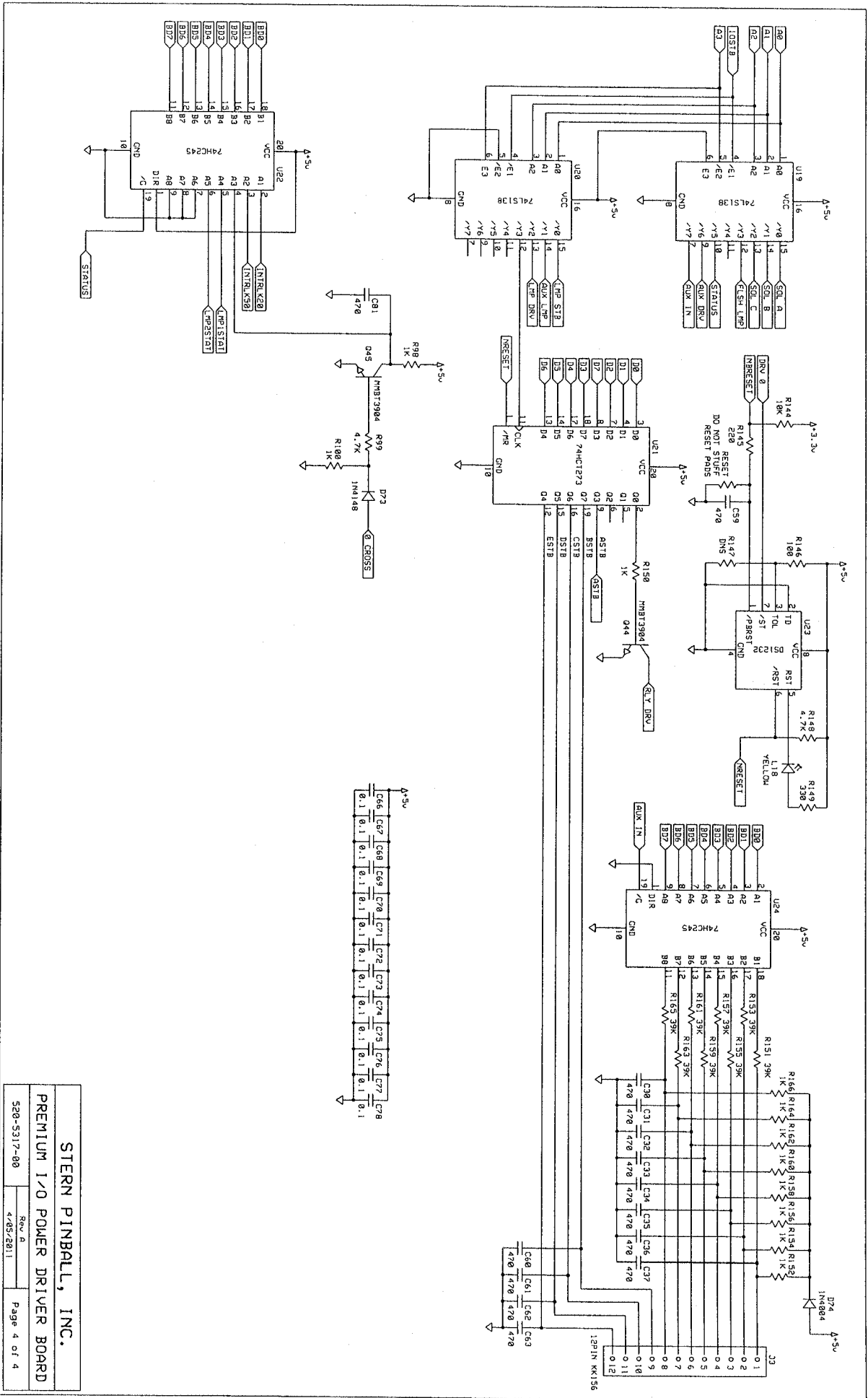Door Wiring

Cabinet Wiring

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STERN PINBALL, INC.

PREMIUM I/O POWER DRIVER BOARD

520-5317-00

Rev A

4-05-2011

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STERN PINBALL, INC.

PREMIUM I/O POWER DRIVER BOARD

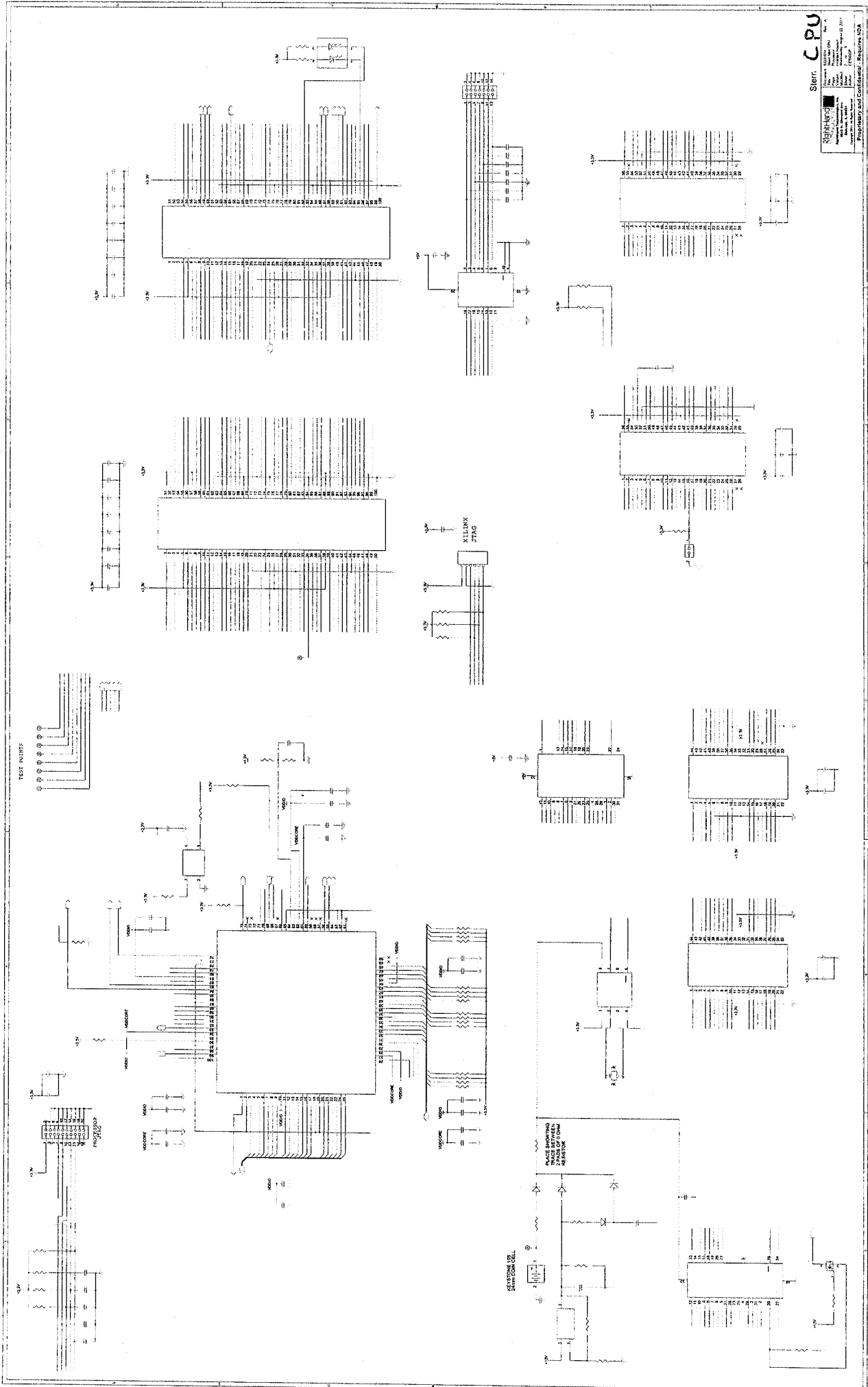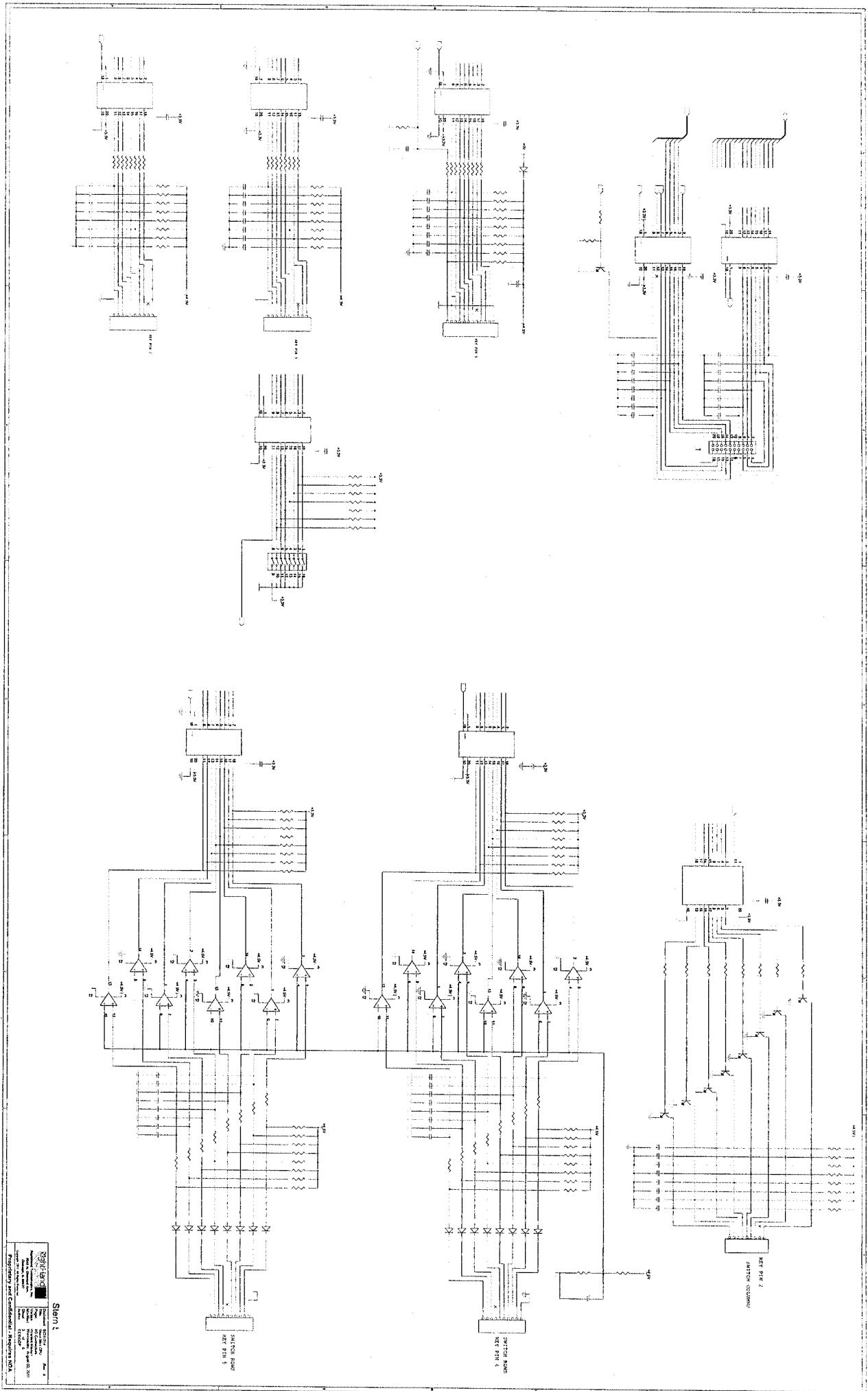| 520-5317-00 | Rev A | Page 3 of 4 |
| | 4/05/2011 | |

Y.37

STERN PINBALL, INC.

PREMIUM I/O POWER DRIVER BOARD
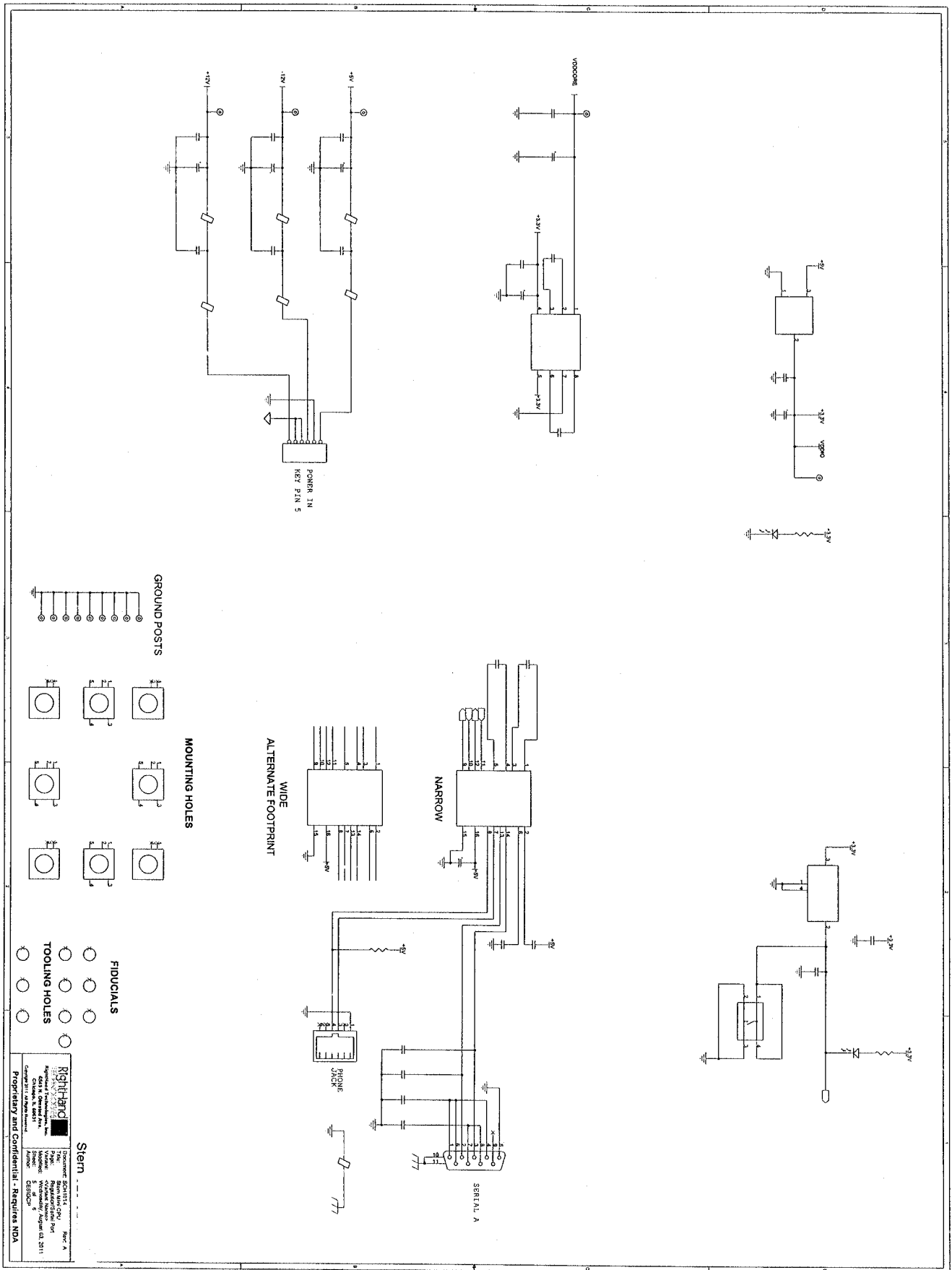
520-5317-00

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VI.2

ATTENTION

REMOVE 3 NUTS MARKED "X" ON BACK OF LOWER PLAYFIELD AND REMOVE BALL EJECTOR UNIT.

INSERT 1 BALL, REPLACE EJECTOR UNIT AND TIGHTEN 3 NUTS CAREFULLY.

VI.1.