

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 X-MEN LE Pinball) 502-6002-D2

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: Quantities, sizes and contents subject to change without notice.

Pinball Location Maintenance Deluxe Kit (for X-MEN LE Pinball) 502-6003-D2

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 X-MEN LE Pinball) 803-5000-D2

Plastics Kit includes: Plastic Sets (830-6161-XX)

Decals*Kit (for X-MEN LE Pinball) 802-5000-D2

Decals Kit Includes: Decal Set (820-6901-XX),(820-6912-XX),(820-6913-XX),(820-6914-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.*

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

Assemble into Housing in the following order:

Rod Assembly (see Item 2), Short Spring (see Item 3), Washer (see Item 3), Bushing (see Item 4) and then ...

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



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	515-2657-00
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 (1/8" I.D. O.D.)	2	280-5010-00
Item 4 is included with Item 1, Housing, (1 @ the front; 1 @ the back) as shown.			
5	Comp. Spring (Long) [GREEN, .035" @]	1	266-5001-04
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" @ Shaft (270-5012-00)			
6	Coil Assembly (Blue)	1	545-5031-00

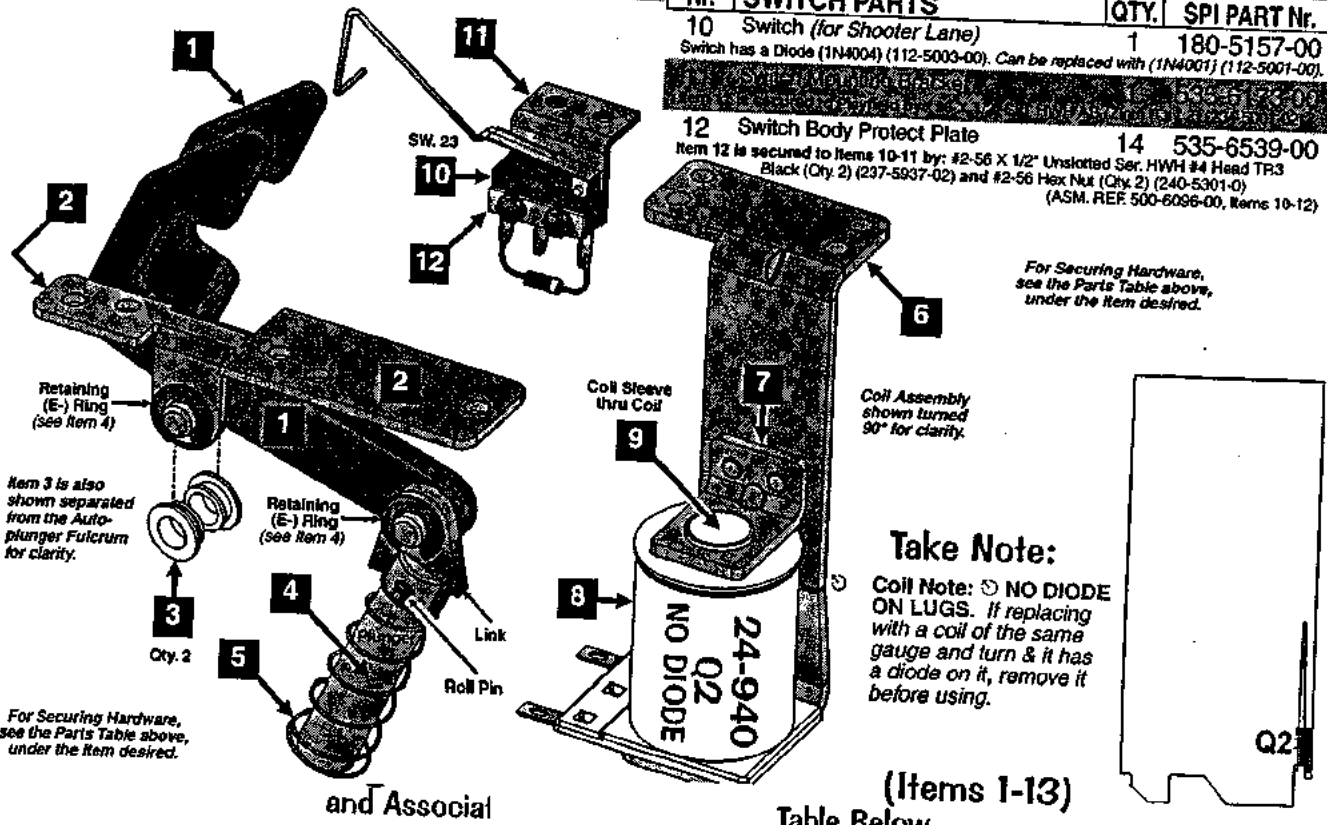
Ordering Note: If 500-6146-00-04 is unavailable, order the individual part(s) actually required. ... Identical to 500-6146-00-07 has Comp. Spring [Orange, .038" @] (266-5001-07) or 500-6146-00-05 has Comp. Spring [Blue, .031" @] (266-5001-05).

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	Autoplunger Fulcrum	1	535-7697-00
4	Plunger & Link Assembly	0	511-5183-00
Item 4 is secured to Item 1 by: Retaining Ring, 1/4" @ 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" @ x 5/8" Lg. (251-5008-00)			
5	Compression Return Spring	1	266-5020-00

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)			
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 Thru Coil	1	545-5031-00

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).			
12	Switch Body Protect Plate	14	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)			



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

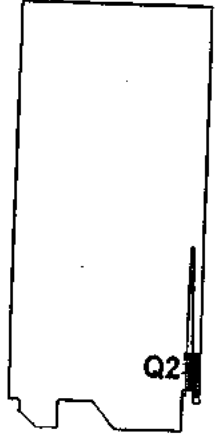
Item 3 is also shown separated from the Autoplunger Fulcrum for clarity.

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

Coil Assembly shown turned 90° for clarity.

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.

(Items 1-13) Table Below.

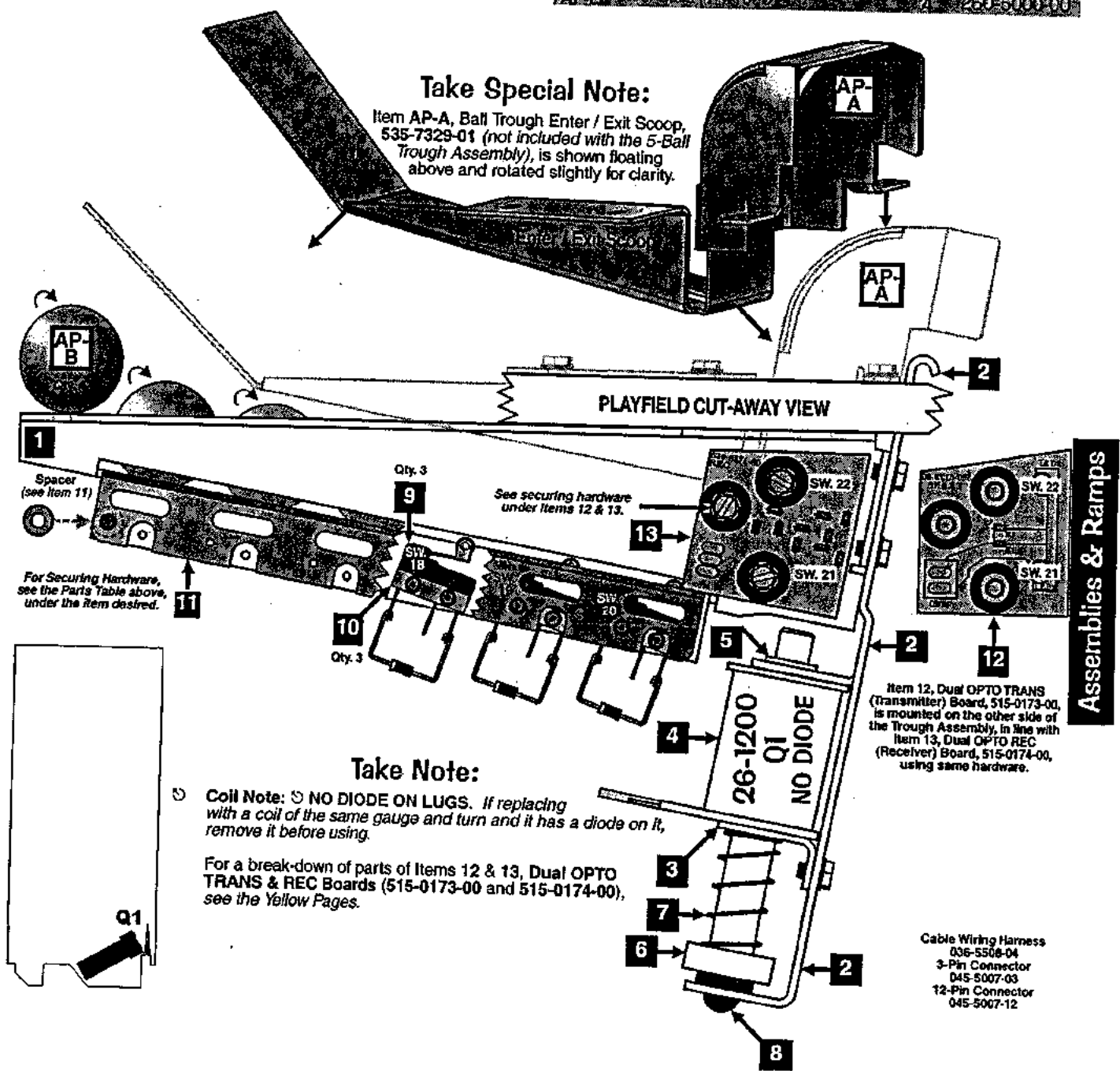


Assemblies & Ramps

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 Guide's Mounting Bracket	1	515-6580-01	11	Trough Ball Guide Plate	1	535-7801-00
2	Coil Mounting Bracket	1	535-7330-01	12	Dual OPTO TRANS Board Assembly	1	515-0173-00
3	Coil Mounting Bracket	1	535-5203-01	13	Dual OPTO REC Board Assembly	1	515-0174-00
4	Coil, 26-1200 [NO DIODE]	1	090-5044-ND	<i>Item 12 & 13 are secured by: Item 11, Ball Trough Guide Plate (535-7801-00) Item 10, Micro Switch (180-5119-02) Item 9, Compression (Return) Spring (266-5020-00) Item 8, Rubber Bumper (Grommet) (545-5105-00) Item 7, Steel & Nylon Plunger Asm. (3.57") (515-7309-01) Item 6, Coil Sleeve (Short) (545-5076-01) Item 5, Ball Trough Guide's Mounting Bracket (515-6580-01) Item 4, Coil Mounting Bracket (535-7330-01) Item 3, Coil Mounting Bracket (535-5203-01) Item 2, Coil Mounting Bracket (535-7330-01) Item 1, Ball Trough Guide's Mounting Bracket (515-6580-01)</i>			
5	Coil Sleeve (Short)	1	545-5076-01	<i>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.</i>			
6	Steel & Nylon Plunger Asm. (3.57")	1	515-7309-01	ASSOCIATED PARTS ARE NOT INCLUDED WITH THE ABOVE ASSEMBLY.			
7	Compression (Return) Spring	1	266-5020-00	Nr.	ASSOCIATED PART(S)	QTY.	SPI PART Nr.
8	Rubber Bumper (Grommet)	1	545-5105-00	AP-A	Ball Trough Enter / Exit Scoop	1	535-7329-01
9	Micro Switch (Return)	3	180-5119-02	<i>Item AP-A secured to the playfield by: #8 X 1/2" SHWH AB (Zinc) (Qty. 4) (234-5101-00).</i>			
10	Switch Body Protect Plate	3	535-6539-00	AP-B	Steel Balls	4	260-5000-00

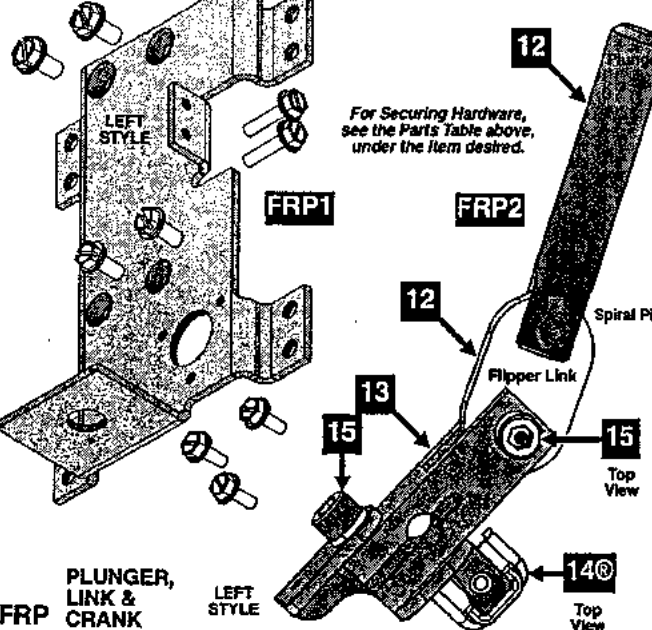


Flipper (Left) Assembly, 500-6543-12-ND (Items 1-15) and Associated Parts: YELLOW Flipper Bat & Shaft Asm., 515-5133-06-06 (Items AP-A / AP-B)

Nr.	FLIPPER (LEFT) PARTS	QTY.	SPI PART Nr.
1	Flipper Base Plate (LEFT) 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.	1	See FRP1
3	Power (EOS / End-of-Stroke) Switch Item 3 is secured to Item 1 by: #6-32 X 5/8" HWH Swage (Ser.) Zc. (Qty. 2) (237-5976-04)	1	180-5149-00
5	Flipper Return Spring	1	265-5035-00
7	Spring Washer (17/32" ID X 3/4" X 1")	1	269-5002-00
9	Coil, 22-1080 [NO DIODE] YEL-GRN COIL DOES NOT REQUIRE A DIODE. SEE COIL NOTE BELOW FOR DETAILS.	1	090-5032-ND
10	Deflector Pad (Bumper)	1	545-5428-00
13	Crank Bar (Pawf) Item 13 requires: Bushing, .192" ID X .312" OD X .195" (Qty. 1) (530-5139-00)	1	530-5070-02
15	Set Screw: #10-32 X 3/4" Socket Hd. 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	2	237-6144-00

Flipper Rebuild Parts for Easier Installation. Save \$!

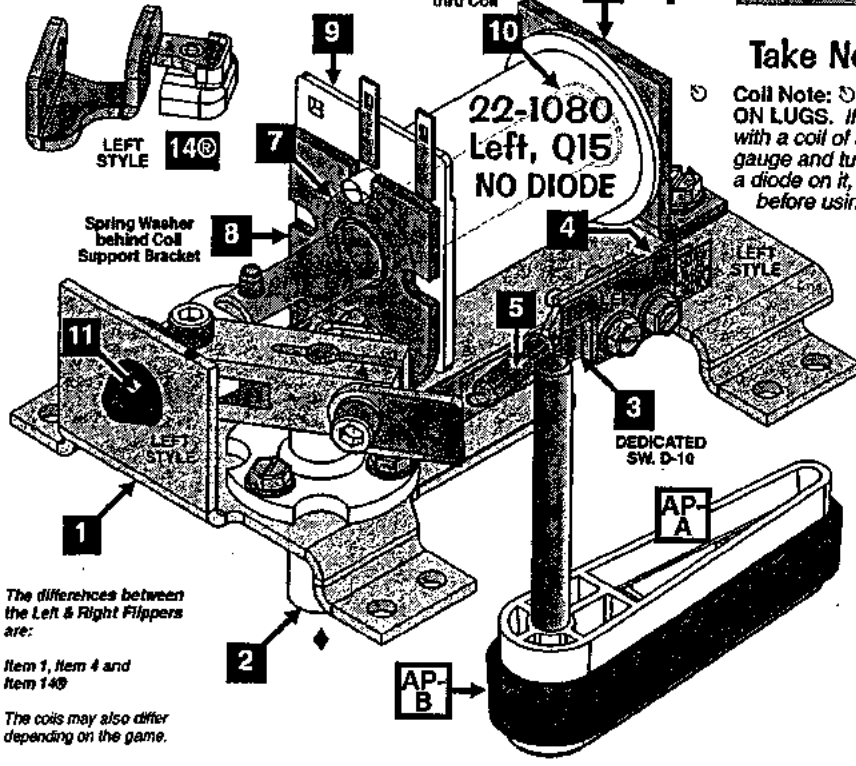
FRP 1 FLIPPER BASE PLATE KIT (LEFT):
Includes Item 1 pre-threaded >+< Securing Hardware for Items 2, 3, 6 & 8. **515-6617-01**



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, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100. **515-6607-10**

Item 149 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 149

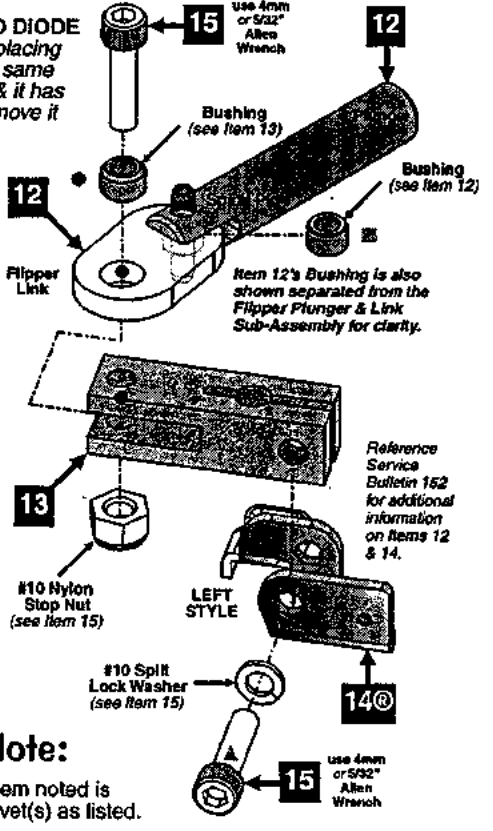
The coils may also differ depending on the game.

ASSOCIATED PARTS ARE NOT INCLUDED WITH THE ABOVE ASSEMBLY.

Nr.	ASSOCIATED PART(S)	QTY.	SPI PART Nr.
AP-A	YEL. Flipper Bat & Shaft Assembly (Non-Knotted End) Without Rubber Ring	1	515-5133-06-06
AP-B	Large Flipper BLACK Rubber Ring	3	545-5277-00

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.

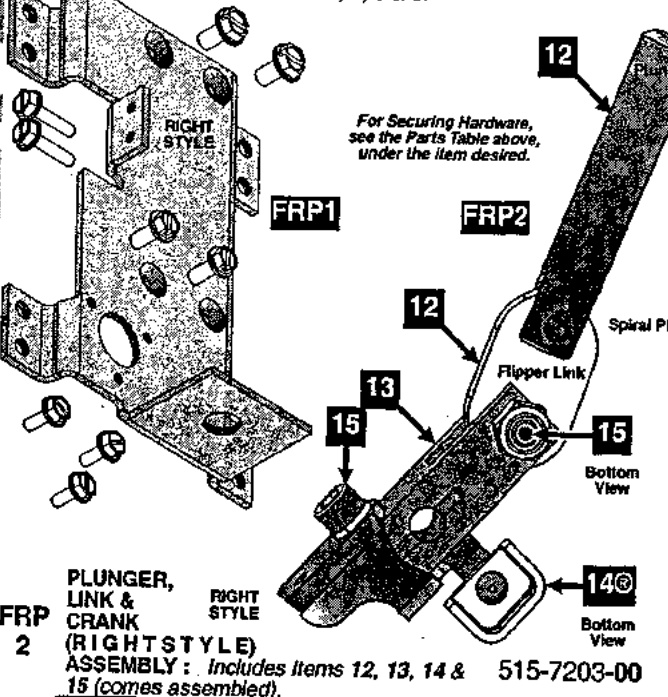
Sec. 4: Drawings ...

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

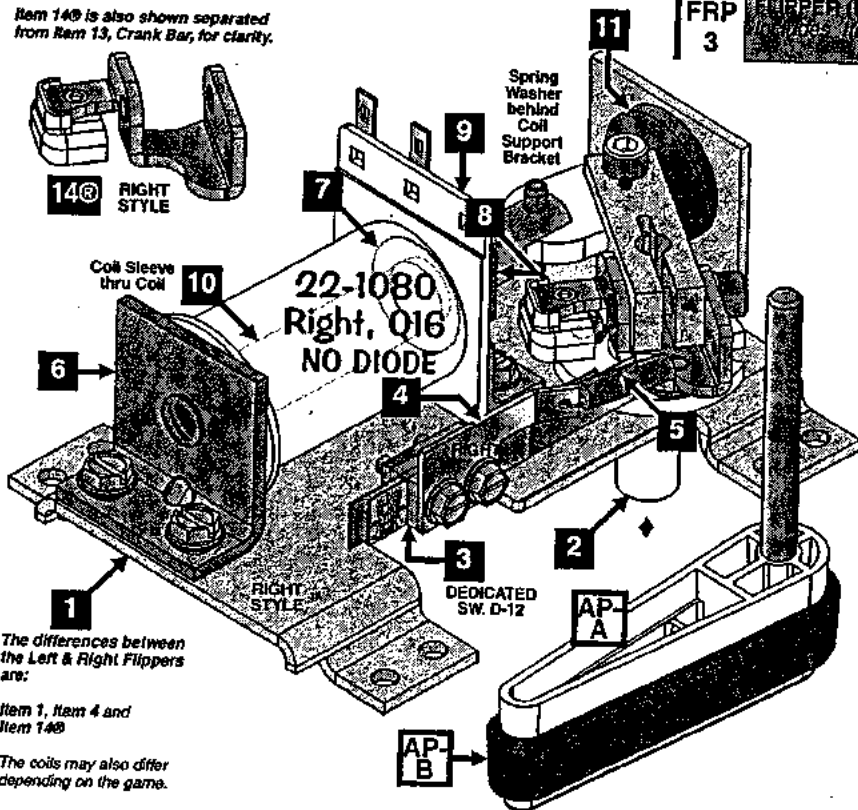
Nr.	FLIPPER (RIGHT) PARTS	QTY.	SPI PART Nr.
1	Flipper Base Plate (RIGHT)	1	See FRP1
Item 1 is secured below by: #8 X 1/2" SHWH AB (Zinc) (Qty. 8) (234-5101-00) Ordering Note: Individual Part (535-7275-00) is not prethreaded, see Item FRP1.			
2	Coil Bushing (White Plastic)	25	535-5077-00
Item 2 is secured to Item 1 by: #10 X 3/4" SHWH AB (Zinc) (Qty. 8) (234-5101-00)			
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 Bkt. (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 X 3/4" SHWH AB (Zinc) (Qty. 8) (234-5101-00)			
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: #10 X 3/4" SHWH AB (Zinc) (Qty. 8) (234-5101-00)			
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	545-5288-00
11	Deflector Pad (Bumper)	1	545-5428-00
13	Crank Bar (Pawl)	1	530-5070-02
Item 13 requires: Bushing, 192" ID X .312" OD X .195" (Qty. 1) (530-5139-00)			
14	Plunger, Link & Crank (RIGHT STYLE)	1	515-7203-00
Item 14 is secured to Item 13 by: #10 X 3/4" SHWH AB (Zinc) (Qty. 1) (234-5101-00) 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			
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			

Flipper Rebuild Parts for Easier Installation Save \$

FRP 1 FLIPPER BASE PLATE KIT (RIGHT):
Includes Item 1 pre-threaded >-< Securing Hardware for Items 2, 3, 6 & 8. 515-6617-00



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



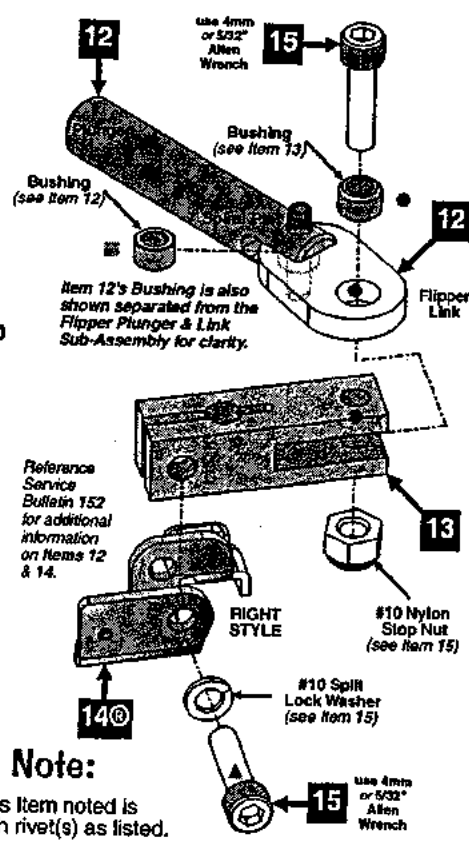
The differences between the Left & Right Flippers are:

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	YEL. Flipper Bat & Shaft Assembly (Non-Knurled End) Without Rubber Ring	1	515-5133-06-06
AP-B	Large Flipper BLACK Rubber Ring	3	545-5277-00



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

Sec. 4: Drawings ...

Slingshot (Left & Right) Assemblies, 500-5849-01-ND (Qty. 2) (Items 1-9)

Nr.	SLINGSHOT PARTS	QTY.	SPI PART Nr.	Nr.	SLINGSHOT PARTS	QTY.	SPI PART Nr.
1	Slingshot Bracket Assembly	1/per	515-5389-01	6	Compression (Return) Spring	1/per	266-5020-00
2	Coil Retaining Bracket	1/per	535-5203-03	7	Slingshot Stack (Blade) Switch	2/per	180-5054-00
3	Coil 26-1200 [NO DIODE]	1/per	090-5004-ND	8	Switch Body Protect Plate	2/per	535-5045-00
4	Coil Sleeve	1/per	545-5031-00	9a	Biveted Arm & Tip Assembly	1/per	515-5340-01
5	Plunger & Link Assembly	1/per	515-5838-00				

Item 1 is secured below the plunger by #8 X 1/2 SHWN AS (Qty. 3) (232-5301-00)

Item 2 is secured to Item 1 by: #8-32 X 3/8" PPH MS (Sems) (Qty. 2) (232-5301-00)

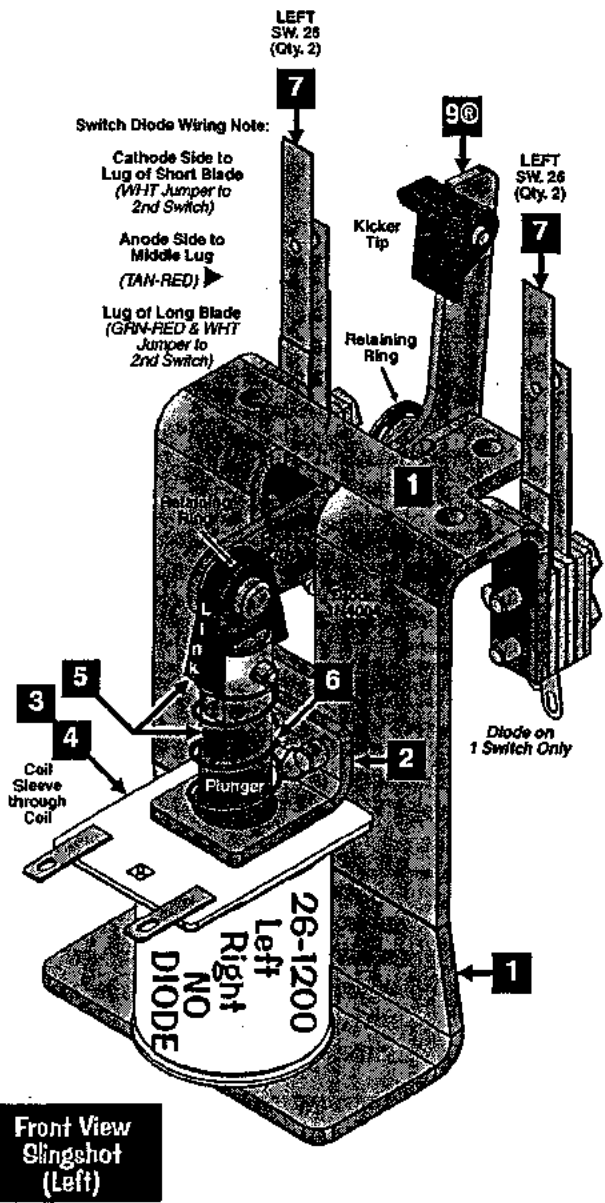
COIL DOES NOT REQUIRE A DIODE. SEE COIL NOTE BELOW FOR DETAILS.

For individual parts use (requires drawing out first & measuring):
 Item 1 (515-5341-01), Item 2 (545-5215-01) and Item 3 (245-5003-00)
 The Riv Arm is secured to Item 1 by Rivets (Qty. 1) (232-5301-00)

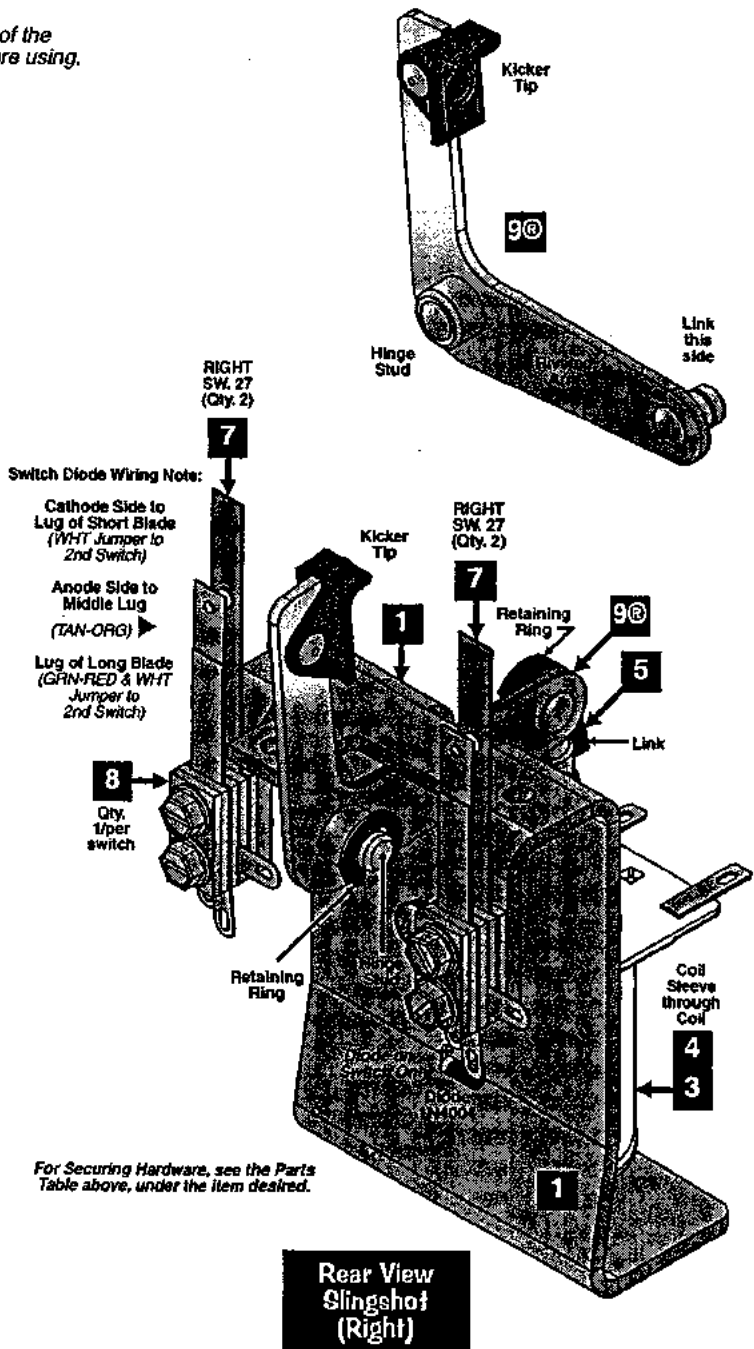
Ordering Note: If 515-5340-01 is unavailable, order the individual part(s) actually required. This assembly is identical to 500-5849-02-ND with the exception of item 3, which uses a Coil, 27-1500 [NO DIODE] (090-5004-ND) instead.

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



Front View Slingshot (Left)



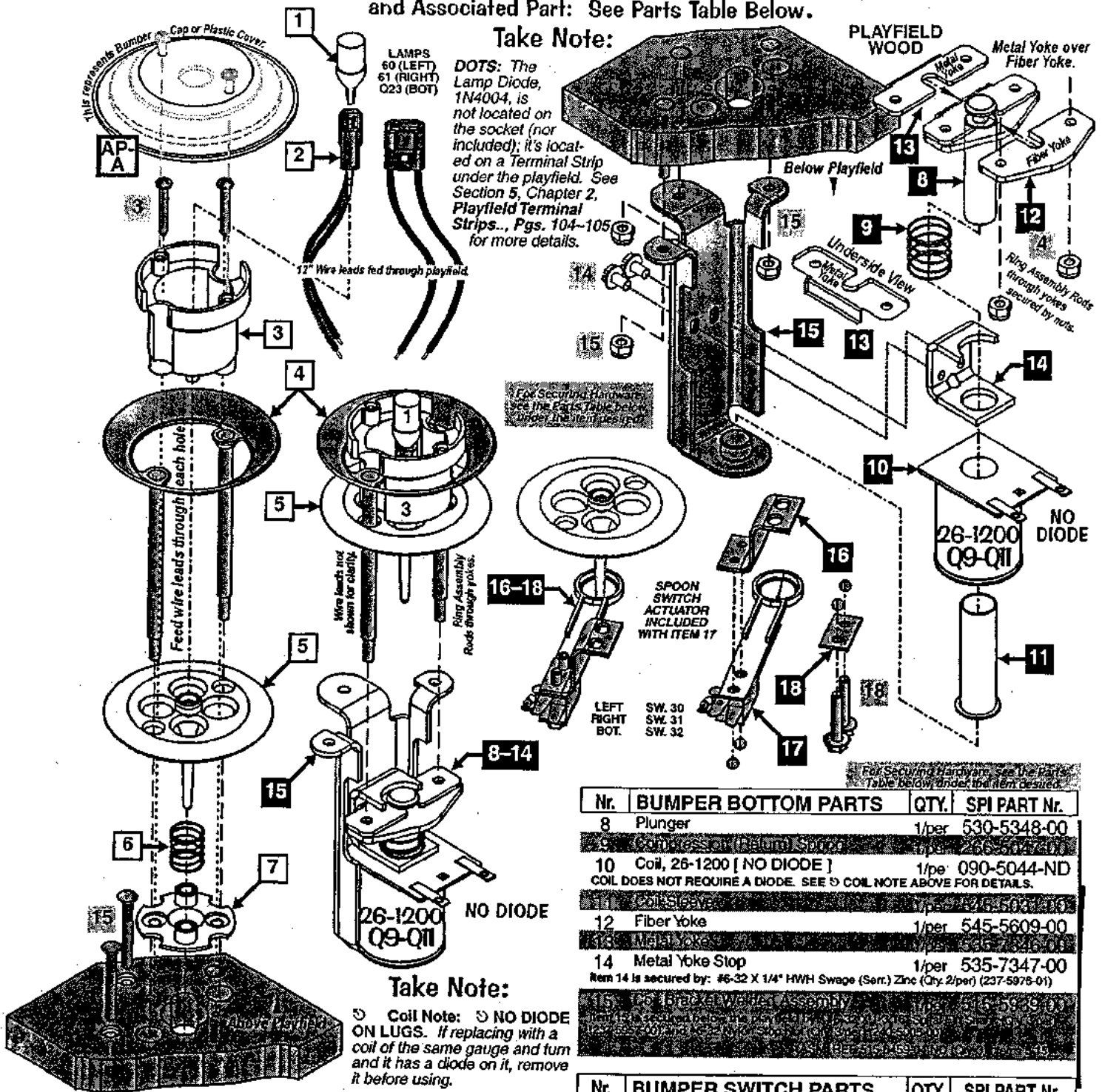
Rear View Slingshot (Right)

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

Assemblies & Ramps

Left, Right & Bottom Bumper & Switch Individual Parts Only (Items 1-18)

and Associated Part: See Parts Table Below.



Nr.	BUMPER TOP PARTS	QTY.	SPI PART Nr.
1	LED Module (WHT) (w/ Wedge Base)	2	162-5024-00
	#906 Wedge Base Bulb (Clear)	1	165-5004-00
2	Wedge Base Socket	3	077-5206-00
3	Bumper Body	1/pe	645-5197-00
4	Ring Assembly	1/pe	515-5085-00
	Item 4 is secured by: #6-32 Nylon Stop Nut (Qty. 2/pe) (240-5005-00)		
5	Bumper Skirt (Switch Actuator)	1/pe	545-5607-00
6	Bumper Skirt Compression Spring	1/pe	266-5048-00
7	Bumper Base	1/pe	545-5195-00
	ASM REF: 515-0197-00 (Items 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18)		

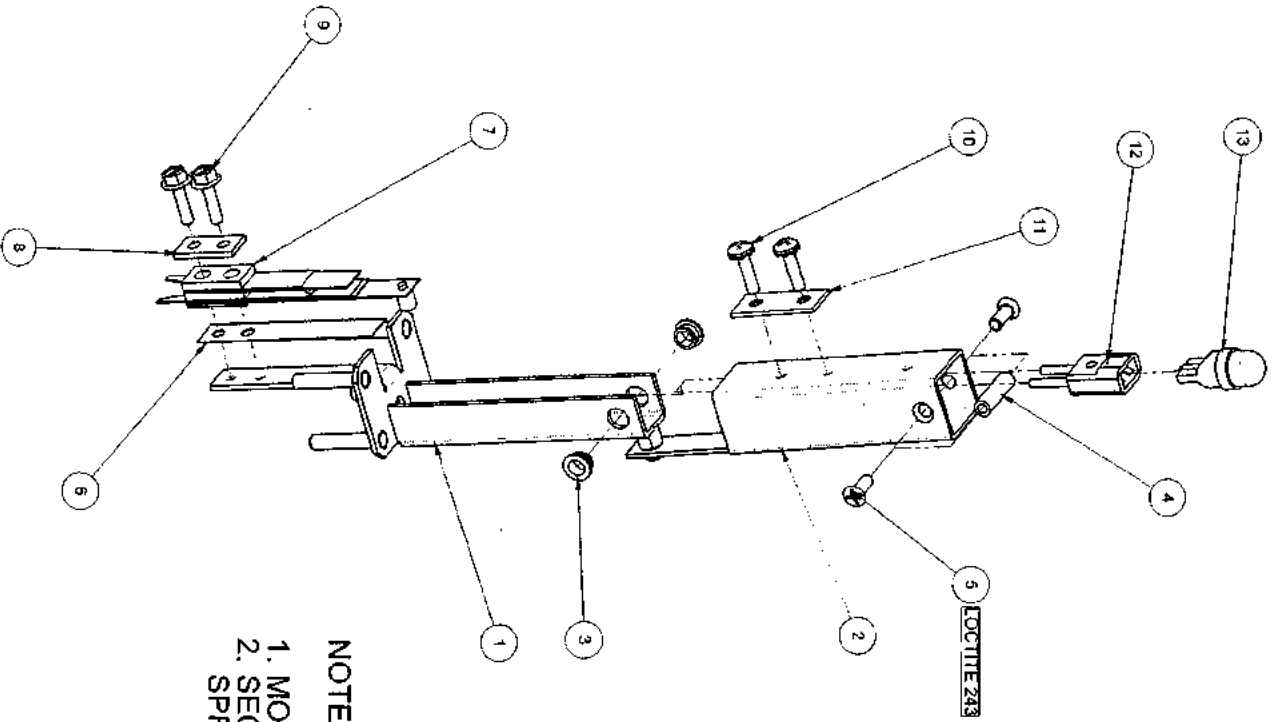
The Top & Bottom Assemblies are secured together by hardware noted in item 4.

Nr.	BUMPER BOTTOM PARTS	QTY.	SPI PART Nr.
8	Plunger	1/pe	530-5348-00
9	Compression (Return) Spring	1/pe	266-5048-00
10	Coil, 26-1200 [NO DIODE]	1/pe	090-5044-ND
	COIL DOES NOT REQUIRE A DIODE. SEE COIL NOTE ABOVE FOR DETAILS.		
11	Coil Sleeve	1/pe	645-5038-00
12	Fiber Yoke	1/pe	545-5609-00
13	Metal Yoke	1/pe	535-7346-00
14	Metal Yoke Stop	1/pe	535-7347-00
	Item 14 is secured by: #6-32 X 1/4" HWH Swage (Ser.) Zinc (Qty. 2/pe) (237-5976-01)		
15	Bracket with Hardware	1/pe	535-7348-00

Nr.	BUMPER SWITCH PARTS	QTY.	SPI PART Nr.
16	Switch Bracket	1/pe	535-7342-00
	Item 16 is secured by: #8 X 1/2" HWH AB (Zinc) (Qty. 2/pe) (234-5101-00)		
17	Bumper Stack (Blade) Switch Ass.	1/pe	180-5015-00
	Included with Item 17: Spoon Switch (ASM REF: 515-5100-00) Spoon Switch (ASM REF: 515-5100-00) Spoon Switch (ASM REF: 515-5100-00) Spoon Switch (ASM REF: 515-5100-00)		
18	Switch Body Protect Plate	1/pe	535-7344-00
	Items 17 & 18 are secured by: #6-32 X 3/4" HWH Swage (Ser.) Zc. (Qty. 2) (237-5976-05) Can substitute Item 17 with 180-5015-05 (ASM. REF. 515-6459-09/R (Qty. 3), Items 16-18)		

ASSOCIATED PARTS ARE NOT INCLUDED WITH THE ABOVE ASSEMBLIES.

Nr.	ASSOCIATED PART(S)	QTY.	SPI PART Nr.
AP-A	KIT Plastic (w/ 209-102-00)	1	803-5000-07
	Note: Kit includes: (Qty. 1) #6-32 X 1/4" HWH Swage (Ser.) Zinc (Qty. 2/pe) (237-5976-01) (Qty. 1) #6-32 X 1/4" HWH Swage (Ser.) Zinc (Qty. 2/pe) (237-5976-01) (Qty. 1) #6-32 X 1/4" HWH Swage (Ser.) Zinc (Qty. 2/pe) (237-5976-01)		
	Item AP-A is secured by: #8 X 1/2" HWH AB (Zinc) (Qty. 2/pe) (234-5101-00)		



ITEM #	QTY	PART #	DESCRIPTION
1	1	515-9620-00	SUPPORT BRACKET
2	1	511-7225-00	MOUNTING TUBE ASSEMBLY
3	2	545-5352-00	NYLONER 3/16" SHAFT
4	1	530-7905-00	PIVOT SHAFT
5	2	237-5871-00	SCREW 6-32 X 3/8 PPH 82-DEG U/C ZINC
6	1	545-7310-00	FICHE PAPER
7	1	180-5218-00	SINGLE FLIPPER SWITCH/ w NYLON LIFTER
8	1	535-5045-00	SWITCH PLATE
9	2	237-5976-03	6-32 X 1/2" HWH MS
10	2	232-5202-00	SCREW 6-32 X 1/2" PPH MS SEMS
11	1	535-9648-00	BUMPER HOLDER - FASTENED
12	1	077-5206-00	LAMP SOCKET - POP BUMPER
13	1	112-5093-01	DOUBLE LED WEDGE BASE CLEAR
NOT SHN	1	045-5004-02	2-PIN CONNECTOR
NOT SHN	1	545-7312-00	WOLVERINE - TRIMMED
NOT SHN	1	036-5583-10-D1	CABLE ASSEMBLY

NOTES:

1. MOUNT TO PLAYFIELD TOP.
2. SECURE TO PLAYFIELD BOTTOM WITH SPRING RETAINER 535-0616-00, SPRING 266-5077-00, 2X WASHER 242-5005-00 & 4X STOP NUT 240-5102-00.

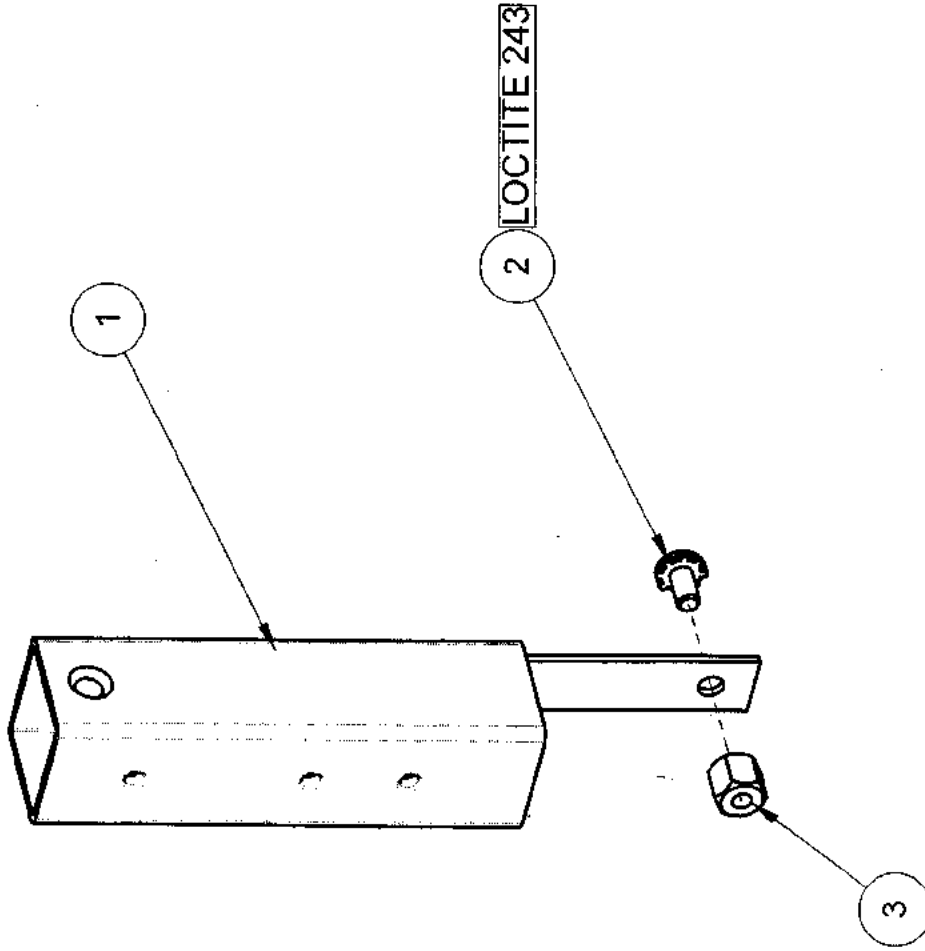
WOLVERINE ASSEMBLY

LE

500-7258-01



ITEM #	QTY	PART #	DESCRIPTION
1	1	515-9621-00	MOUNTING TUBE
2	1	232-5200-00	SCREW, 6-32 X 1/4" PPH SEMS
3	1	254-5008-00	HEX SPACER - 1/4"

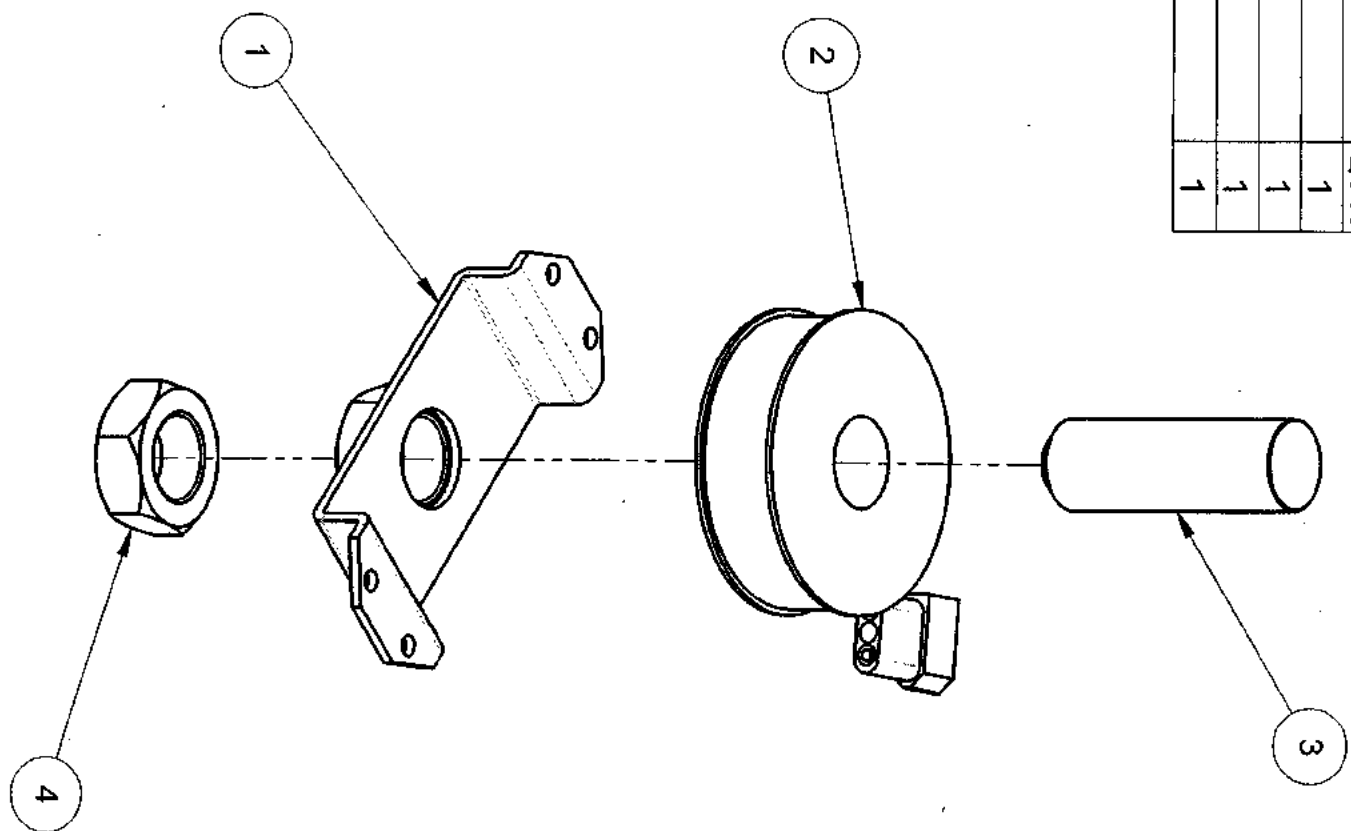
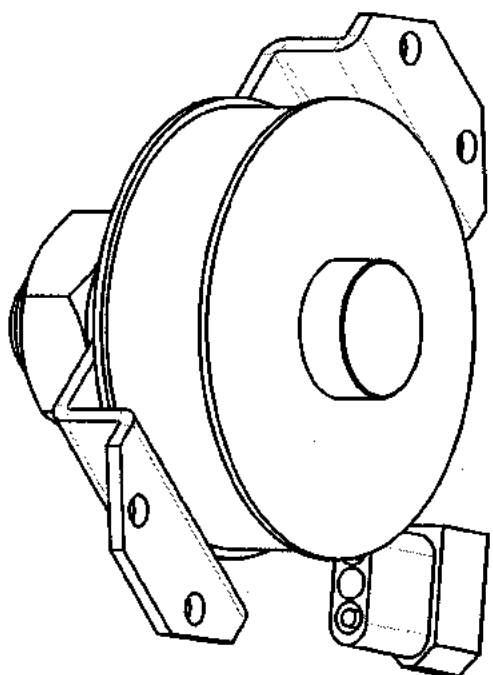


MOUNTING TUBE ASSEMBLY

511-7225-00

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	515-6141-03	THREADED CORE WELD ASSY	1
2	511-5065-ND	MAGNET & CONN ASSY, 22-650	1
3	530-5320-00	THREADED CORE PLUG	1
4	240-5315-00	3/4-16 HEX JAM NUT	1

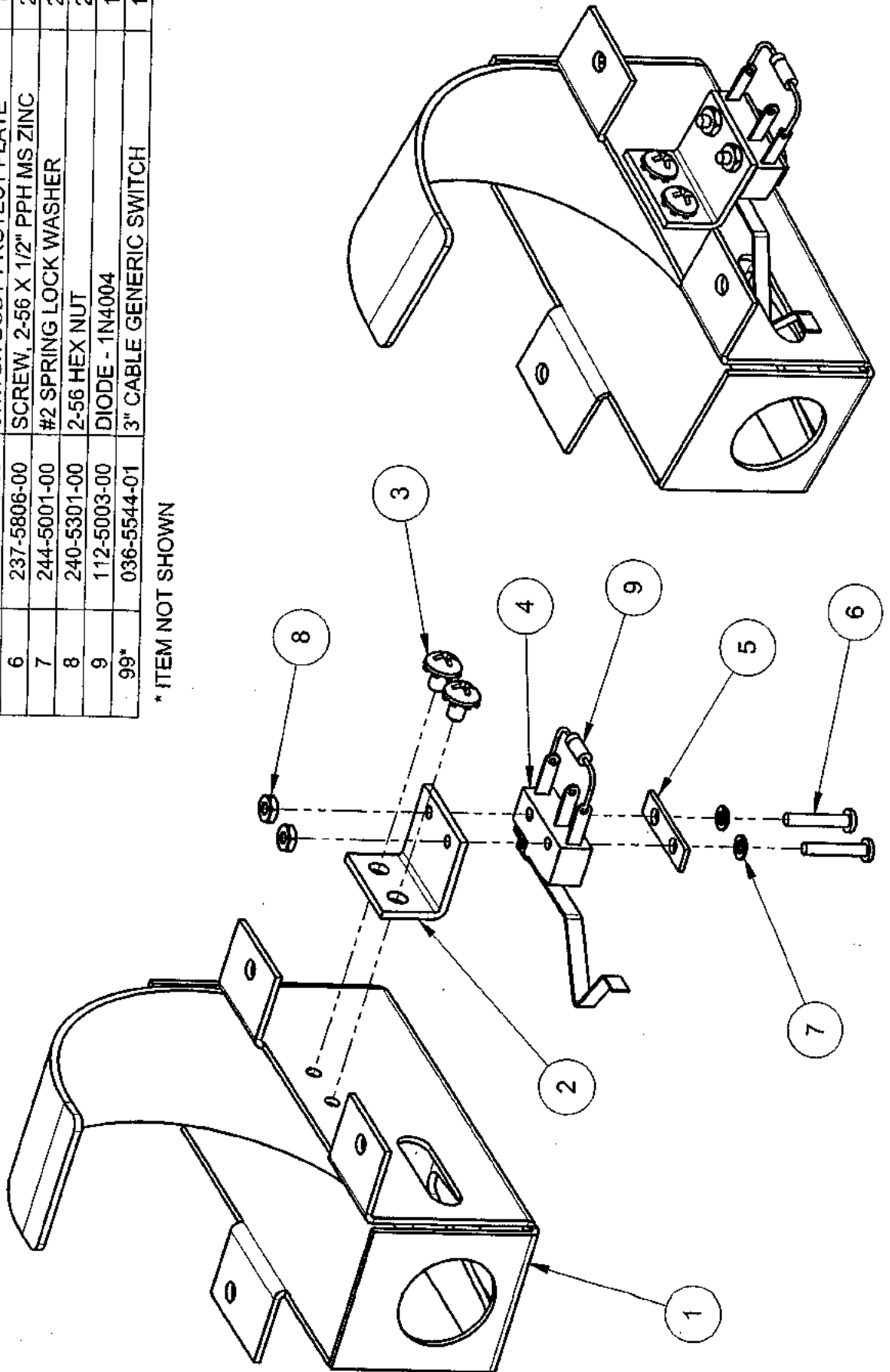
MAGNET ASSEMBLY



ASSEMBLY, POWER SCOOP W/ CABLE 500-5809-01

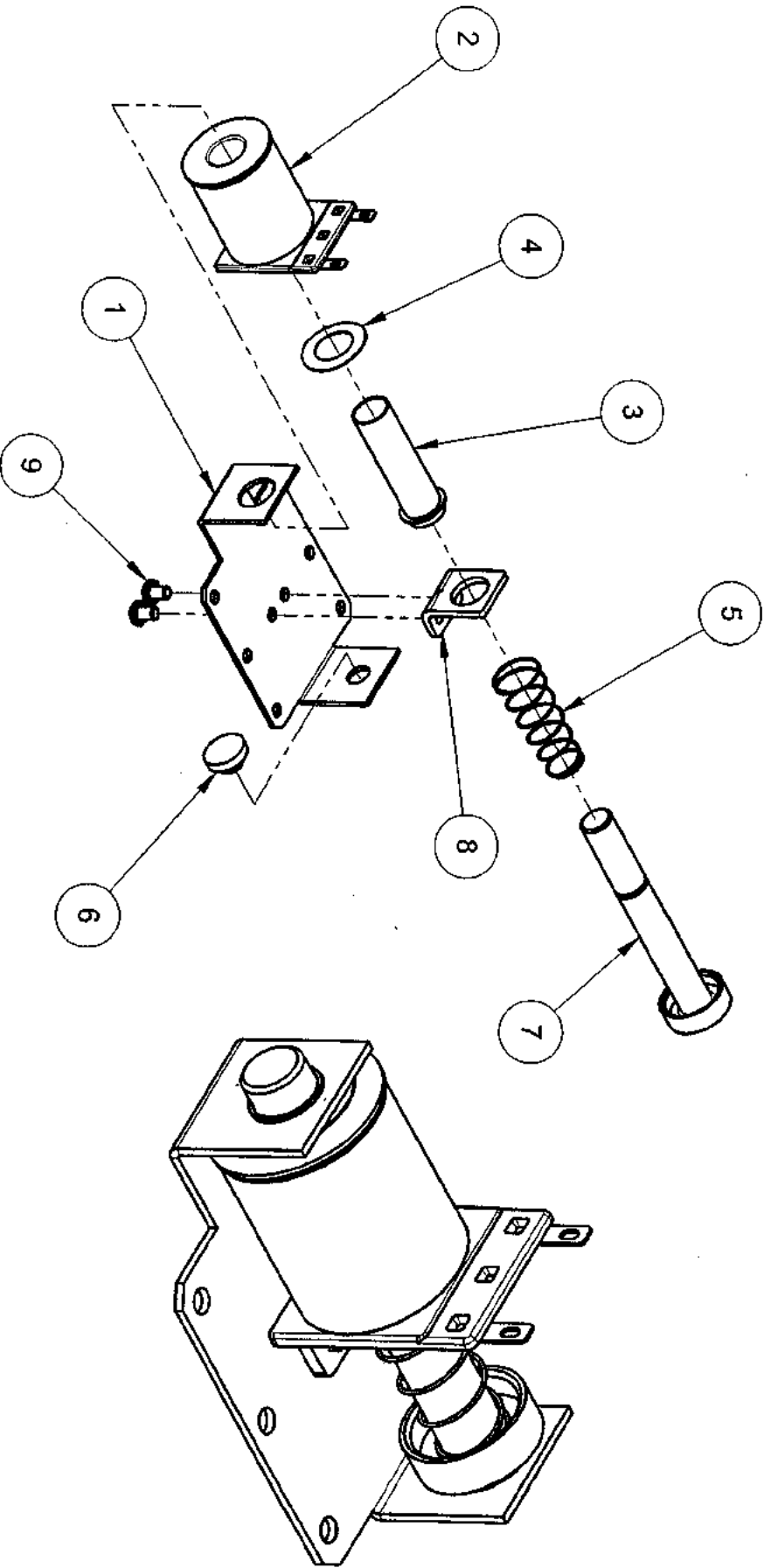
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	515-6022-00	POWER SCOOP WELDING ASSY	1
2	535-6173-00	MICRO-SWITCH BRACKET	1
3	232-5209-00	SCREW, 6-32 X 3/16" PPH SEMS	2
4	180-5057-00	SWITCH	1
5	535-6539-00	SWITCH BODY PROTECT PLATE	1
6	237-5806-00	SCREW, 2-56 X 1/2" PPH MS ZINC	2
7	244-5001-00	#2 SPRING LOCK WASHER	2
8	240-5301-00	2-56 HEX NUT	2
9	112-5003-00	DIODE - 1N4004	1
99*	036-5544-01	3" CABLE GENERIC SWITCH	1

* ITEM NOT SHOWN



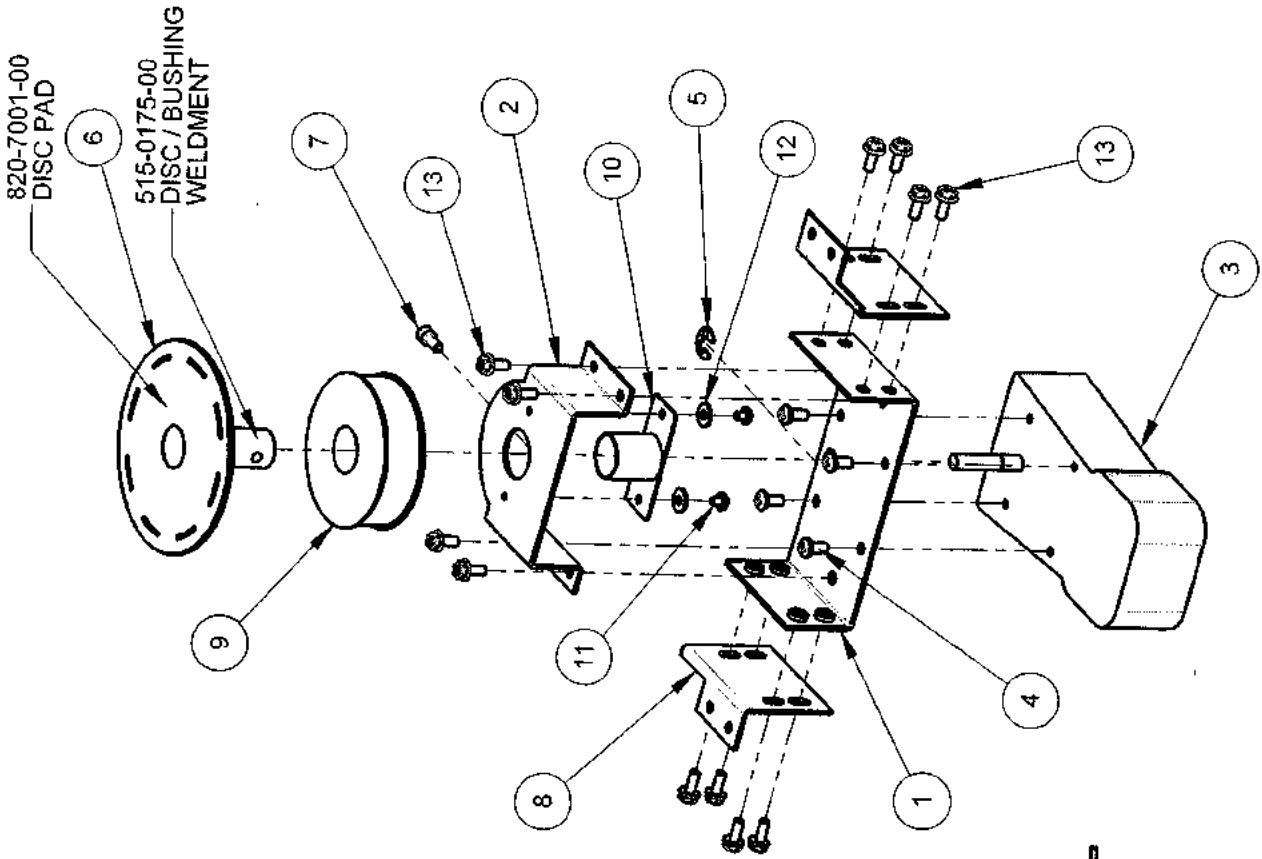
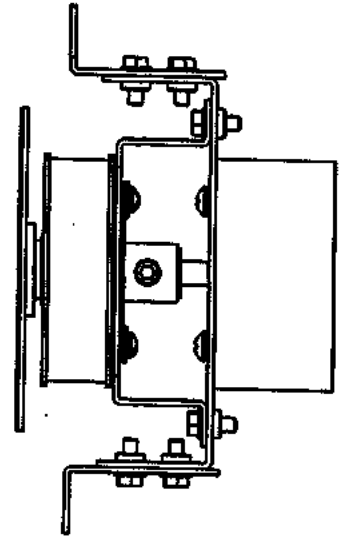
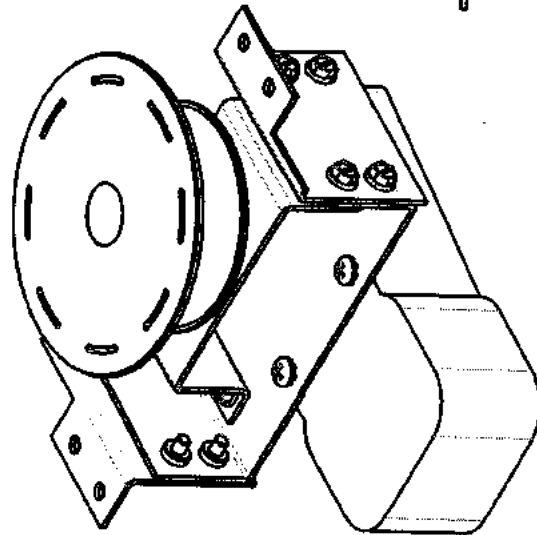
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	535-8575-00	KICK BIG MTG. BRKT.	1
2	090-5001-ND	COIL - 23-800, NO DIODE	1
3	545-5076-01	COIL SLEEVE	1
4	269-5002-00	SPRING WASHER	1
5	266-5020-00	COMPRESSION SPRING-CONICAL	1
6	545-5105-00	RUBBER BUMPER	1
7	515-7318-00	PLUNGER ASSEMBLY	1
8	535-5203-03	COIL RETAINING BRACKET	1
9	232-5300-00	SCREW, 8-32 X 1/4" PPH SEMS	2

ASSEMBLY, BIG KICKER
500-6398-01



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	535-5526-00	BRACKET, MOTOR MOUNTING	1
2	535-5524-00	BRACKET, MAGNET MOUNTING	1
3	511-5250-01	MOTOR, AC	1
4	232-5301-00	SCREW, 8-32 X 3/8" PPH SEMS	4
5	270-5002-00	RETAINING RING - 1/4"	1
6	515-9613-00	DISC / PAD ASSEMBLY	1
7	237-5897-00	SCREW, 8-32 X 3/8" SHCS ZINC	1
8	535-5525-01	MOUNTING FOOT	2
9	511-5065-ND	MAGNET / CONNECTOR ASSY, 22-650	1
10	545-5626-00	SLEEVE (MAGNETIC COIL)	1
11	232-5209-00	SCREW, 6-32 X 3/16" PPH SEMS	2
12	242-5001-00	#6 WASHER	2
13	237-5903-00	SCREW, 8-32 X 3/8" HWH	12

ASSEMBLY, MOTORIZED MAGNETIC DISC, LE
500-7234-01

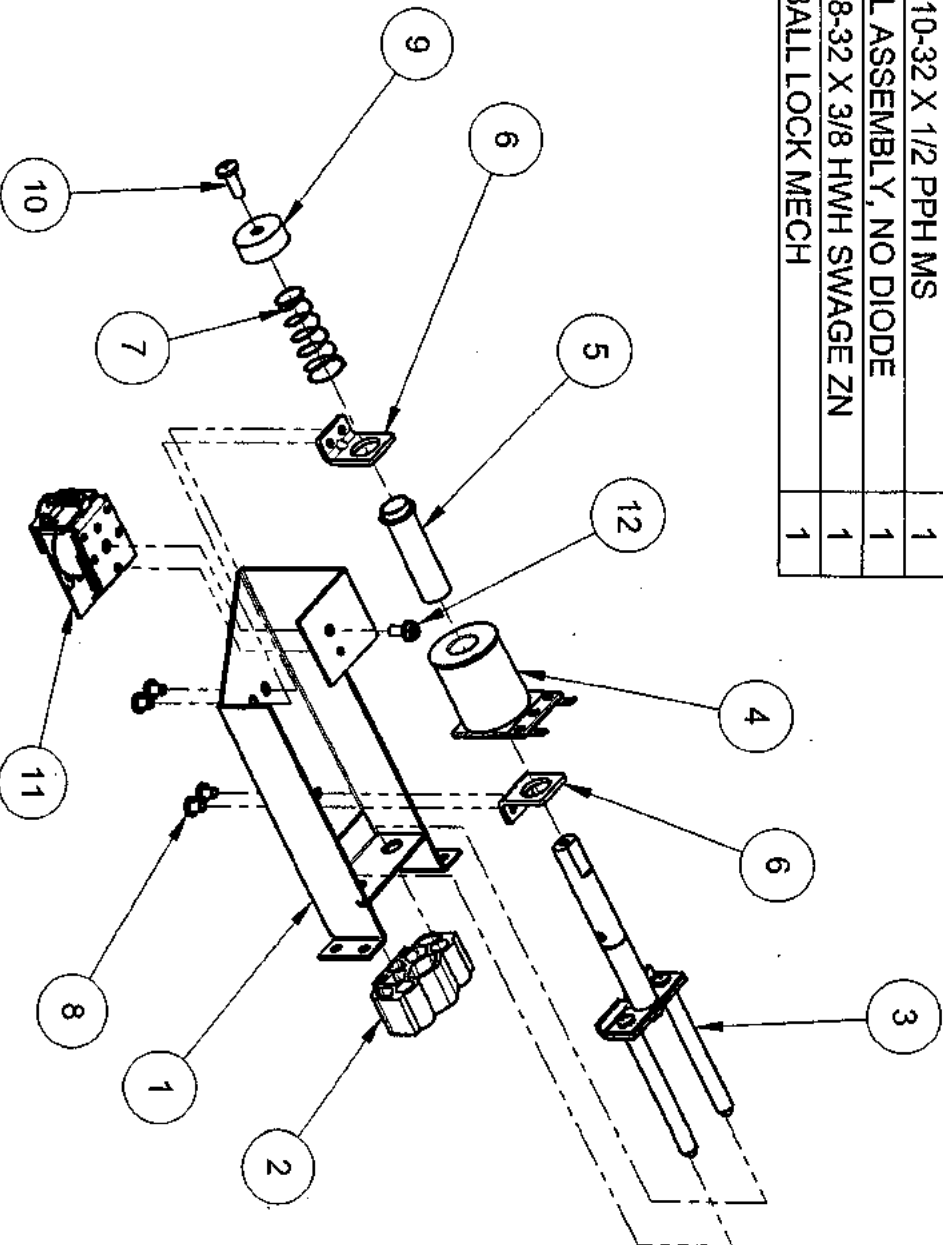
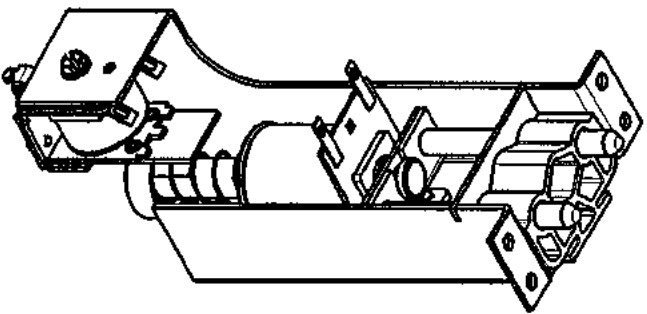


ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	515-7734-00	WELDMENT, BALL LOCK BRACKET	1
2	545-6816-01	BEARING BLOCK - BALL LOCK	1
3	511-6769-00	ASSY, BALL LOCK PLUNGER & BARS	1
4	090-5044-ND	COIL 26-1200 - NO DIODE	1
5	545-5076-01	COIL SLEEVE	1
6	535-5203-03	COIL RETAINING BRACKET	2
7	266-5020-00	COMPRESSION SPRING-CONICAL	1
8	232-5300-00	SCREW, 8-32 X 1/4" PPH SEMS	4
9	530-5511-00	PLUNGER HEAD	1
10	237-5702-00	SCREW, 10-32 X 1/2 PPH MS	1
11	515-7595-00-ND	MINI-COIL ASSEMBLY, NO DIODE	1
12	237-5975-00	SCREW, 8-32 X 3/8 HWH SWAGE ZN	1
99*	036-5539-10-B1	CABLE, BALL LOCK MECH	1

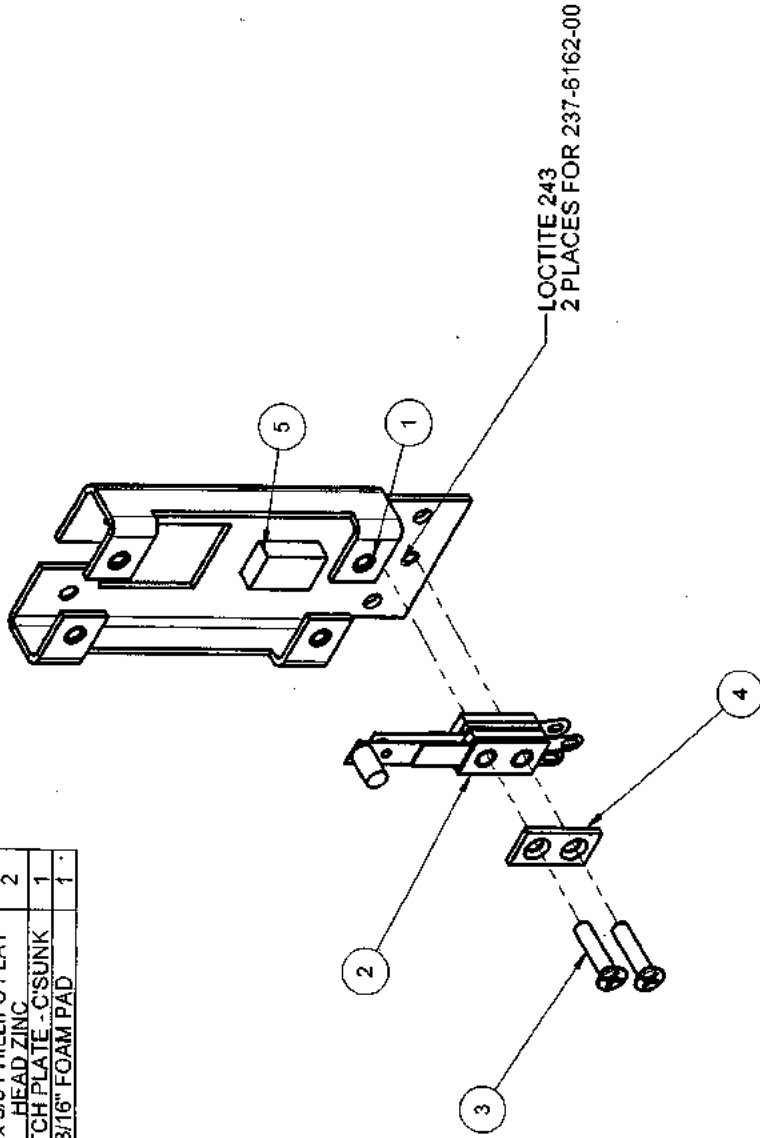
* ITEM NOT SHOWN

ASSEMBLY, LATCHING BALL LOCK

511-6770-00

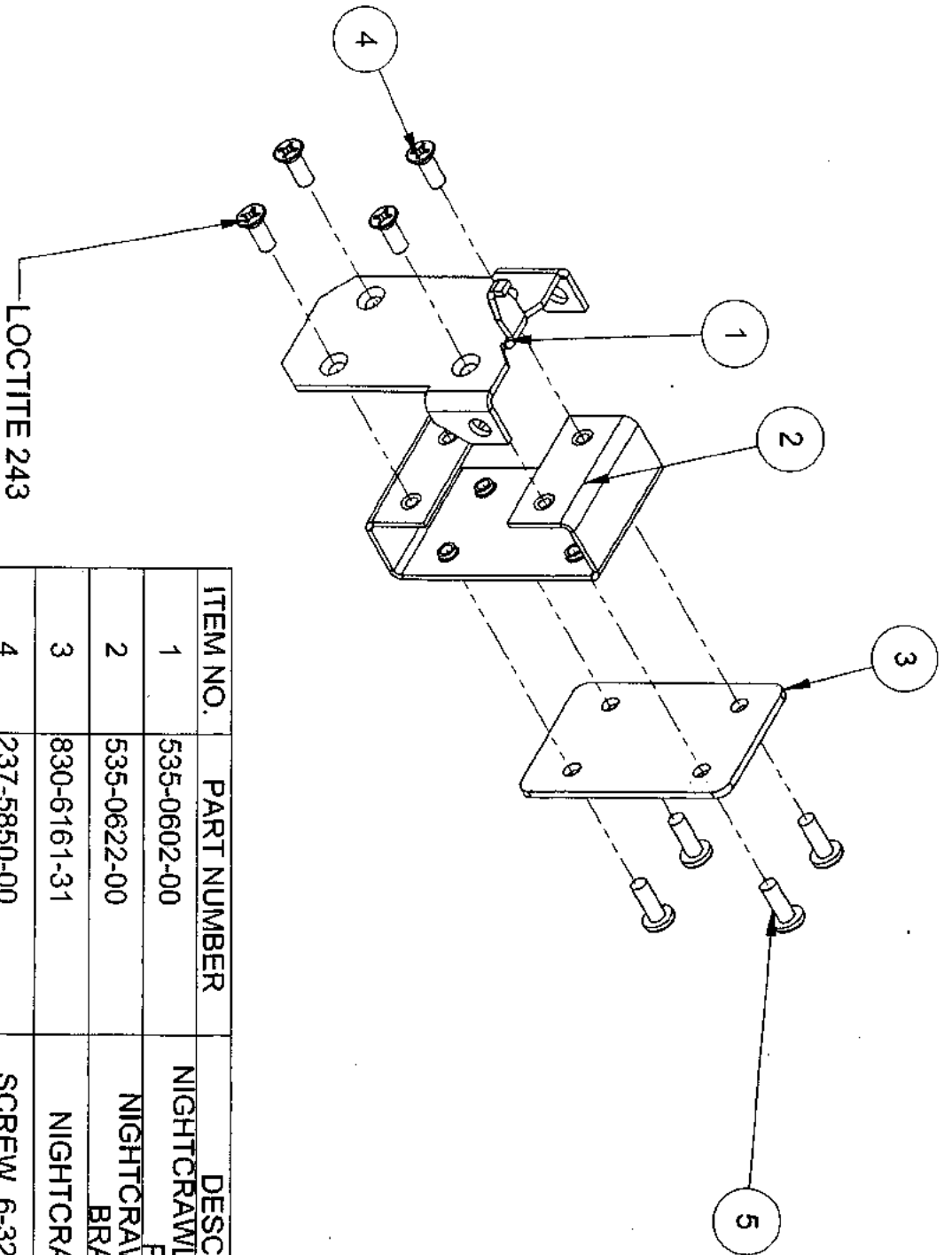


ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	535-0604-00	NIGHTCRAWLER SWITCH BRACKET	1
2	180-5220-00	SWITCH, 5/16" STANDOFF - STANDARD LUGS	1
3	237-6172-00	6-32 x 5/8" PHILLIPS FLAT HEAD ZINC	2
4	535-5045-01	SWITCH PLATE - C'SUNK	1
5	626-5078-00	3/16" FOAM PAD	1



NIGHTCRAWLER SWITCH ASSEMBLY

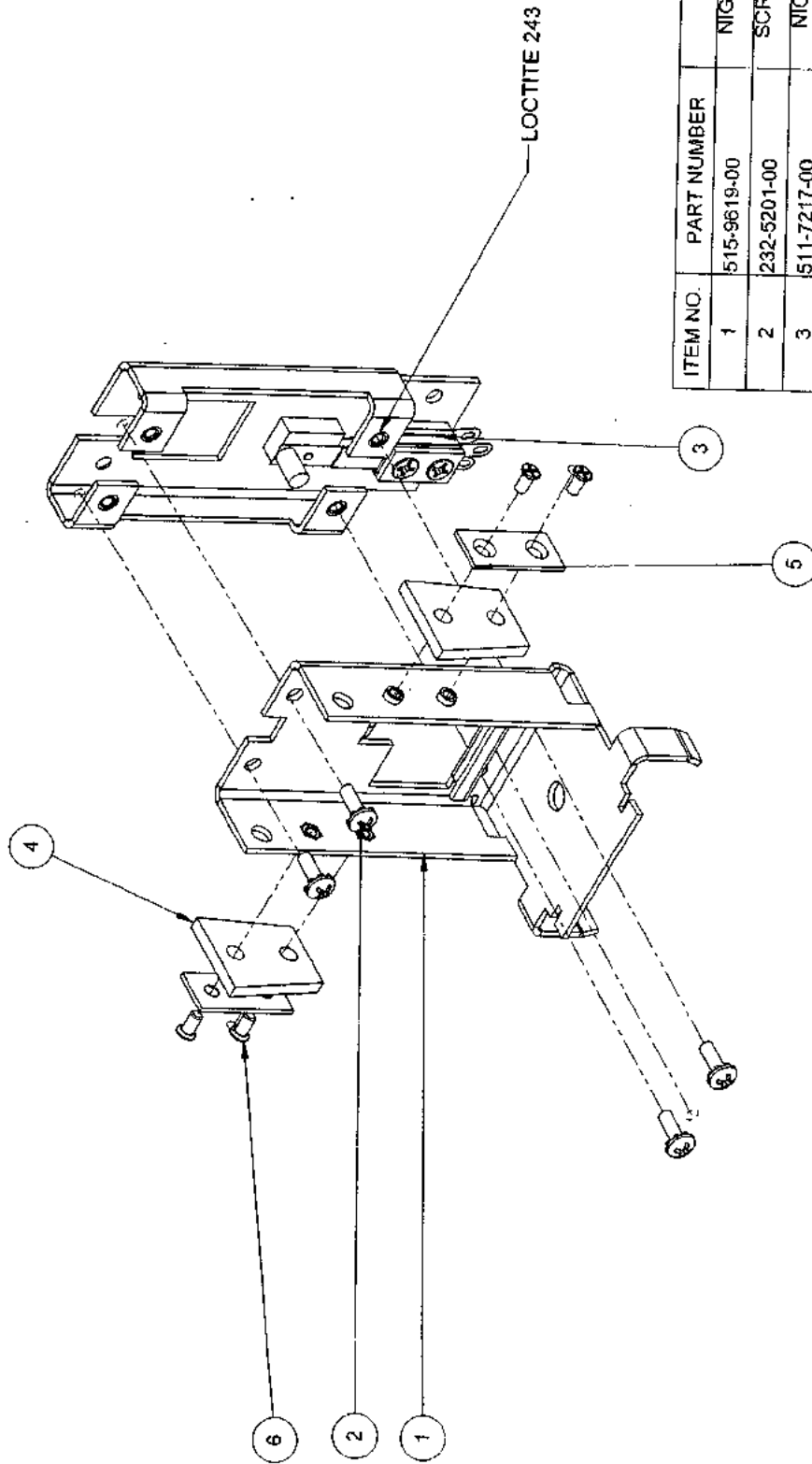
511-7217-00



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	535-0602-00	NIGHTCRAWLER ACTUATOR-PUG	1
2	535-0622-00	NIGHTCRAWLER SWITCH BRACKET	1
3	830-6161-31	NIGHTCRAWLER BUTY	1
4	237-5850-00	SCREW, 6-32 x 3/8 PFH ZINC	4
5	237-5012-00	SCREW, 6-32 X 3/8 PPH BLACK OXIDE18-8	4

NIGHTCRAWLER ACTUATOR ASSEMBLY

500-7255-00



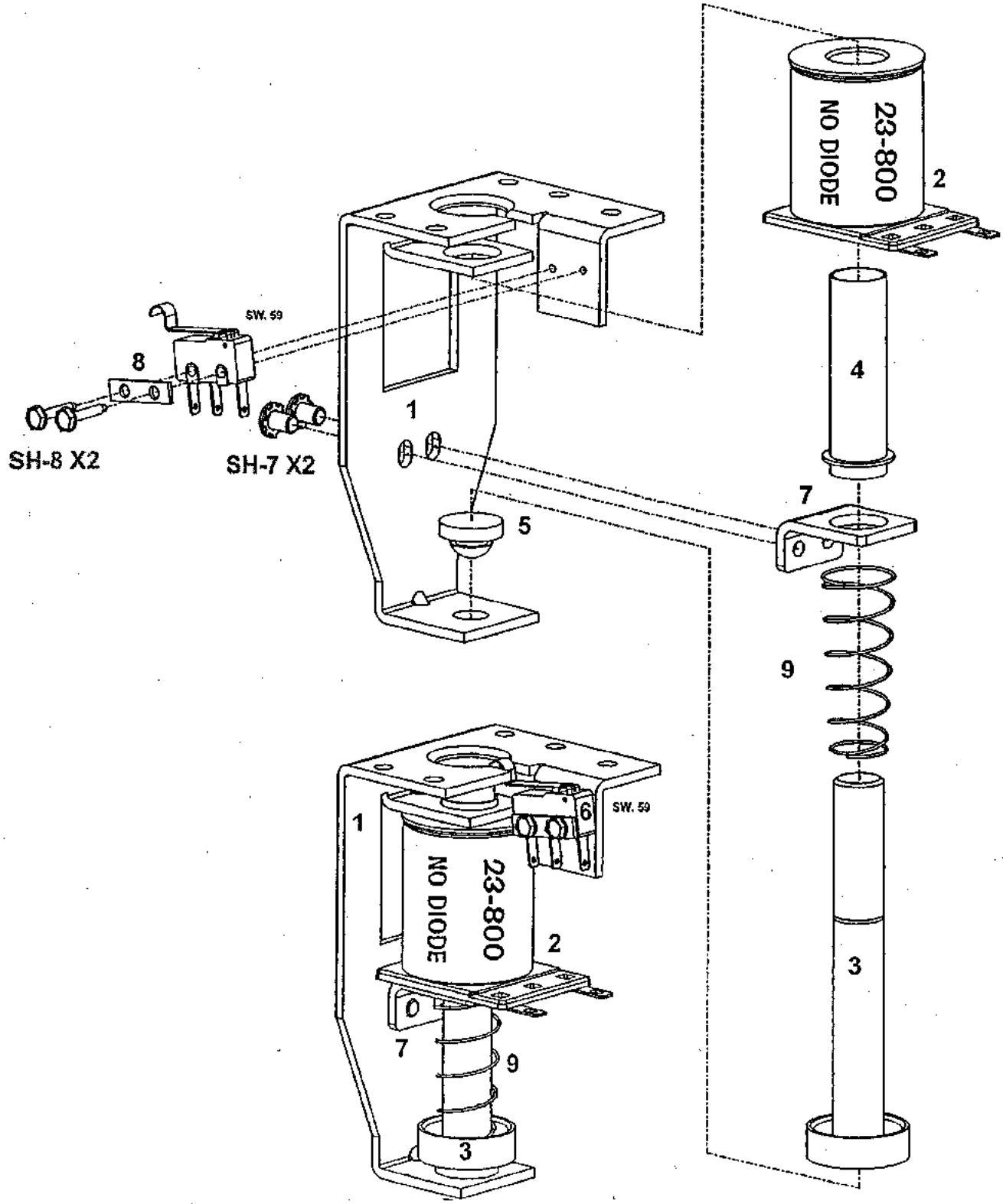
ITEM NO.	PART NUMBER	DESCRIPTION	Default Qty.
1	515-9619-00	NIGHTCRAWLER HOUSING	1
2	232-5201-00	BACKPLATE SCREW, 6-32 X 3/8" PPH MS	4
3	511-7217-00	NIGHTCRAWLER SWITCH	1
4	626-5067-00	RUBBER BUMPER - BLUE - FASTENED	2
5	535-9648-00	BUMPER HOLDER - FASTENED	2
6	237-5983-04	SCREW, 4-40 X 1/4 PPH - BLACK - 82° UC	4

NIGHTCRAWLER FIGURE MOUNT-VUK

511-7224-00

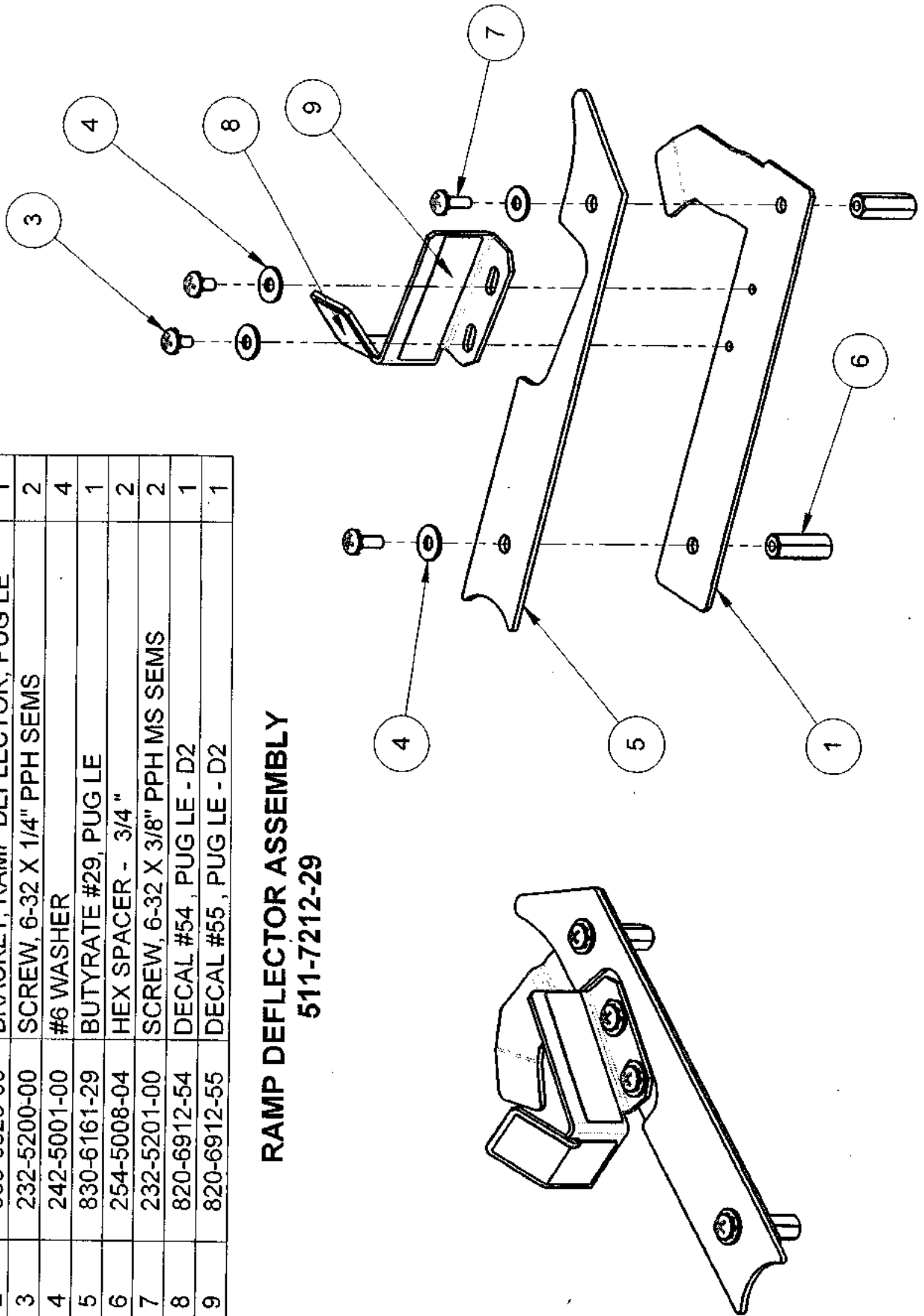
Vertical Up-Kicker (VUK) Asm. (Right Style), 500-7078-01 (Items 1-9)

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	160-5209-00	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

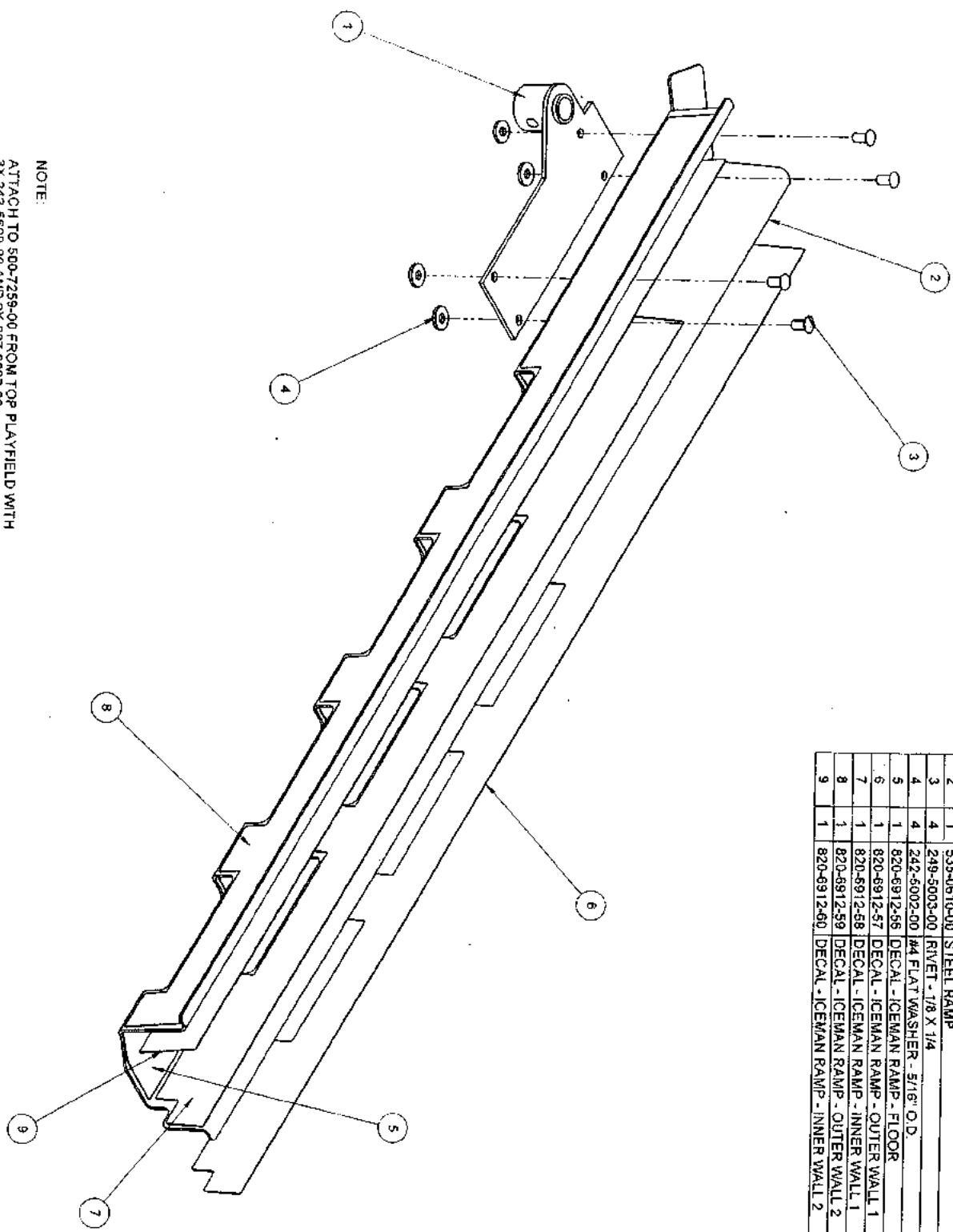


ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	535-0627-00	BRACKET, DEFL MOUNT, PUG LE	1
2	535-0628-00	BRACKET, RAMP DEFLECTOR, PUG LE	1
3	232-5200-00	SCREW, 6-32 X 1/4" PPH SEMS	2
4	242-5001-00	#6 WASHER	4
5	830-6161-29	BUTYRATE #29, PUG LE	1
6	254-5008-04	HEX SPACER - 3/4"	2
7	232-5201-00	SCREW, 6-32 X 3/8" PPH MS SEMS	2
8	820-6912-54	DECAL #54, PUG LE - D2	1
9	820-6912-55	DECAL #55, PUG LE - D2	1

RAMP DEFLECTOR ASSEMBLY
511-7212-29



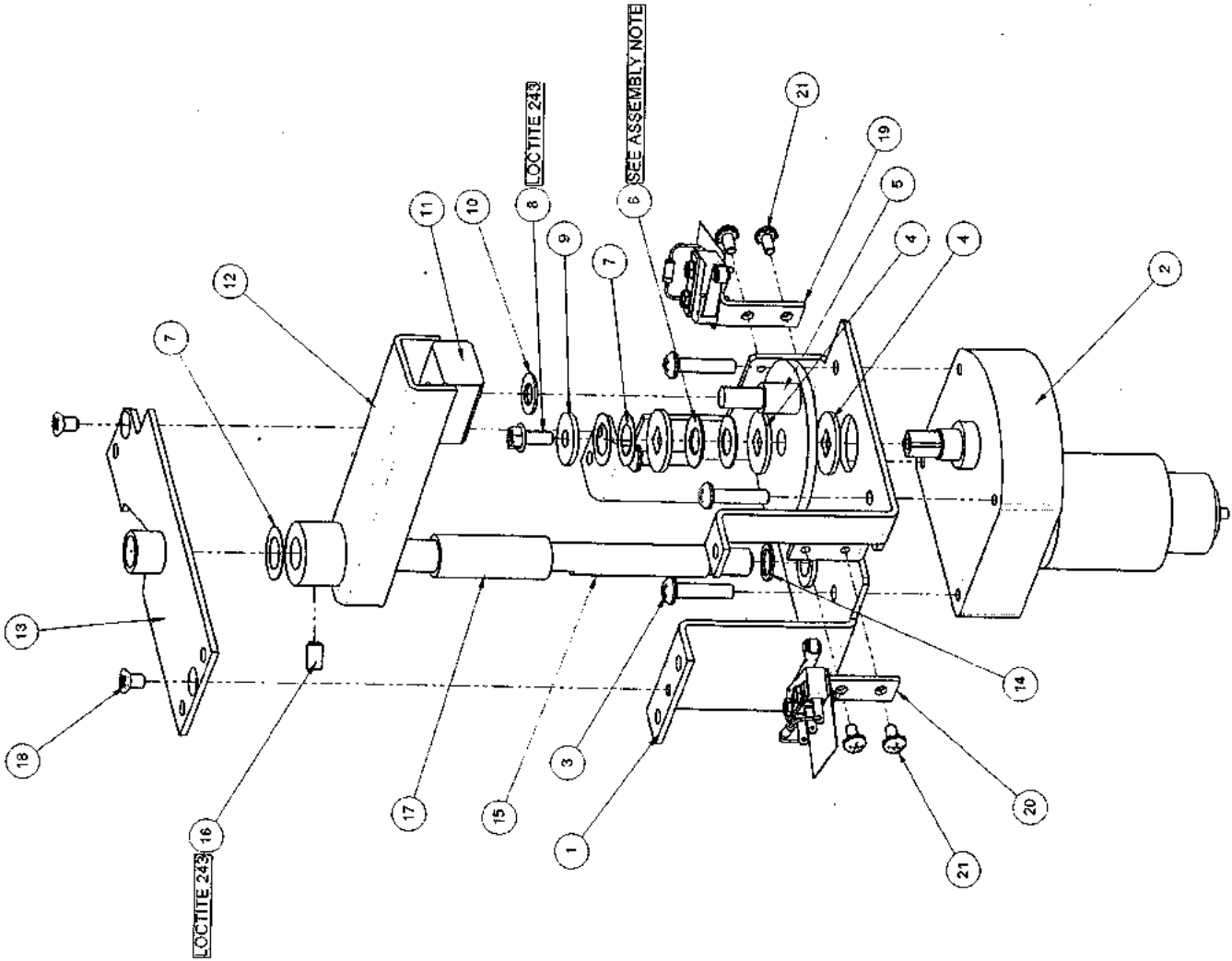
ITEM #	QTY	PART #	DESCRIPTION
1	1	515-7803-00	SUPPORT PLATE - SWING RAMP
2	1	535-0610-00	STEEL RAMP
3	4	219-5003-00	RIVET - 1/8 X 1/4
4	4	242-5002-00	#4 FLAT WASHER - 5/16" O.D.
5	1	820-6912-56	DECAL - ICEMAN RAMP - FLOOR
6	1	820-6912-57	DECAL - ICEMAN RAMP - OUTER WALL 1
7	1	820-6912-58	DECAL - ICEMAN RAMP - INNER WALL 1
8	1	820-6912-59	DECAL - ICEMAN RAMP - OUTER WALL 2
9	1	820-6912-60	DECAL - ICEMAN RAMP - INNER WALL 2



NOTE:
ATTACH TO 500-7259-00 FROM TOP PLAYFIELD WITH
3X 242-5002-00 AND 2X 237-6092-00

SWING RAMP ASSEMBLY
510-5776-00

ITEM #	QTY	PART #	DESCRIPTION
1	1	515-7801-00	MOTOR BRACKET ASSEMBLY
2	1	511-7233-00	MOTOR AND CABLE ASSEMBLY
3	4	232-5304-00	SCREW, #8-32 X 3/4" PPH MS SEMS
4	3	535-0612-00	DRIVE PLATE
5	1	515-9623-00	DRIVE WHEEL
6	2	269-5007-00	BELLEVILLE DISC SPRING
7	3	242-5606-00	1.010 SHIM WASHER
8	1	237-5903-00	SCREW, 8-32 X 3/8" HWH
9	1	242-5038-00	WASHER, 13/64 ID X 5/8 OD X 1/16
10	1	242-5091-00	WASHER, 1/2 X 17/64 X .03 - DT
11	1	545-7311-00	GLIDE BLOCK
12	1	515-9622-00	LOWER ACTUATOR
13	1	515-7802-00	SHAFT BRACKET ASSEMBLY
14	1	242-5609-00	.314 ID X .438 OD X .030 THRUST WASHER
15	1	530-7806-00	SHAFT - SWING RAMP
16	2	237-6092-00	SET SCREW, 10-32 X 5/16, SOCKET CUP PT
17	1	530-7807-00	TUBULAR SPACER
18	2	237-6030-02	SCREW, 8-32 X 1/4 PPH 82° L/C MS
19	1	511-7219-00	SWITCH BRACKET ASSEMBLY - RIGHT
20	1	511-7220-00	SWITCH BRACKET ASSEMBLY - LEFT
21	4	232-5200-00	SCREW, 8-32 X 1/4" PPH SEMS

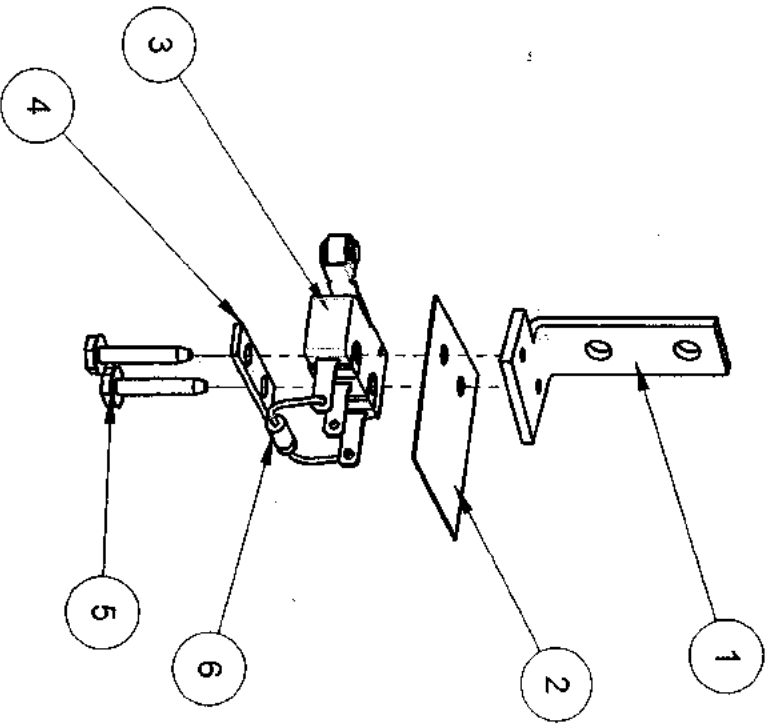


ASSEMBLE 2X ITEM 6 AS SHOWN

MOTOR ASSEMBLY - SWING RAMP

500-7259-00

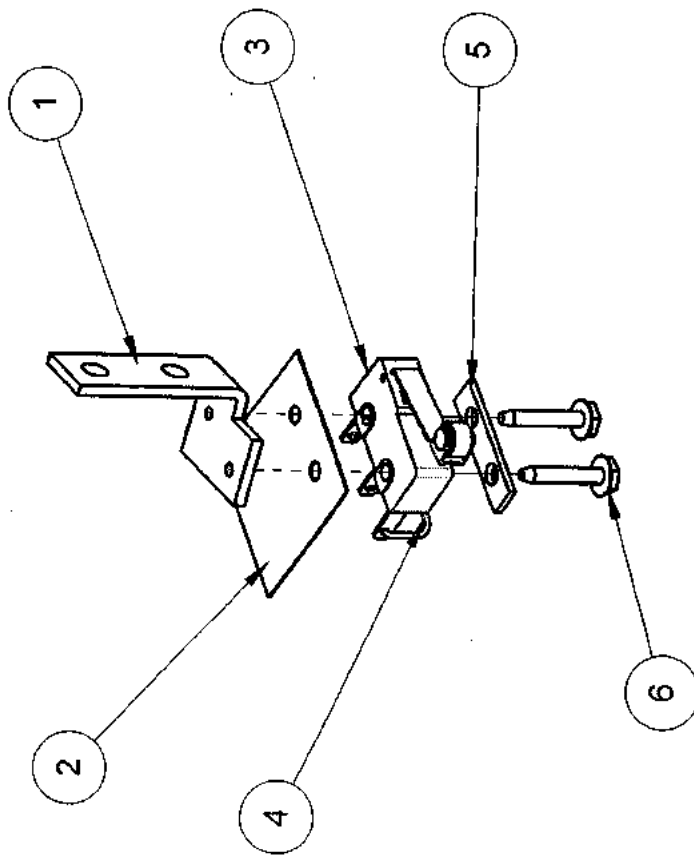
ITEM #	QTY	PART #	DESCRIPTION
1	1	535-0615-00	SWITCH BRACKET - LEFT - SWING RAMP
2	1	545-6268-00	FISCHE PAPER
3	1	180-5119-02	MICRO-SWITCH - LIGHT ACTUATION
4	1	535-6539-00	SWITCH BODY PROTECT PLATE
5	2	237-5937-02	SCREW, 2-56 X 1/2" HWH MS
6	1	112-5003-00	DIODE - 1N4004



SWITCH BRACKET ASSEMBLY - LEFT

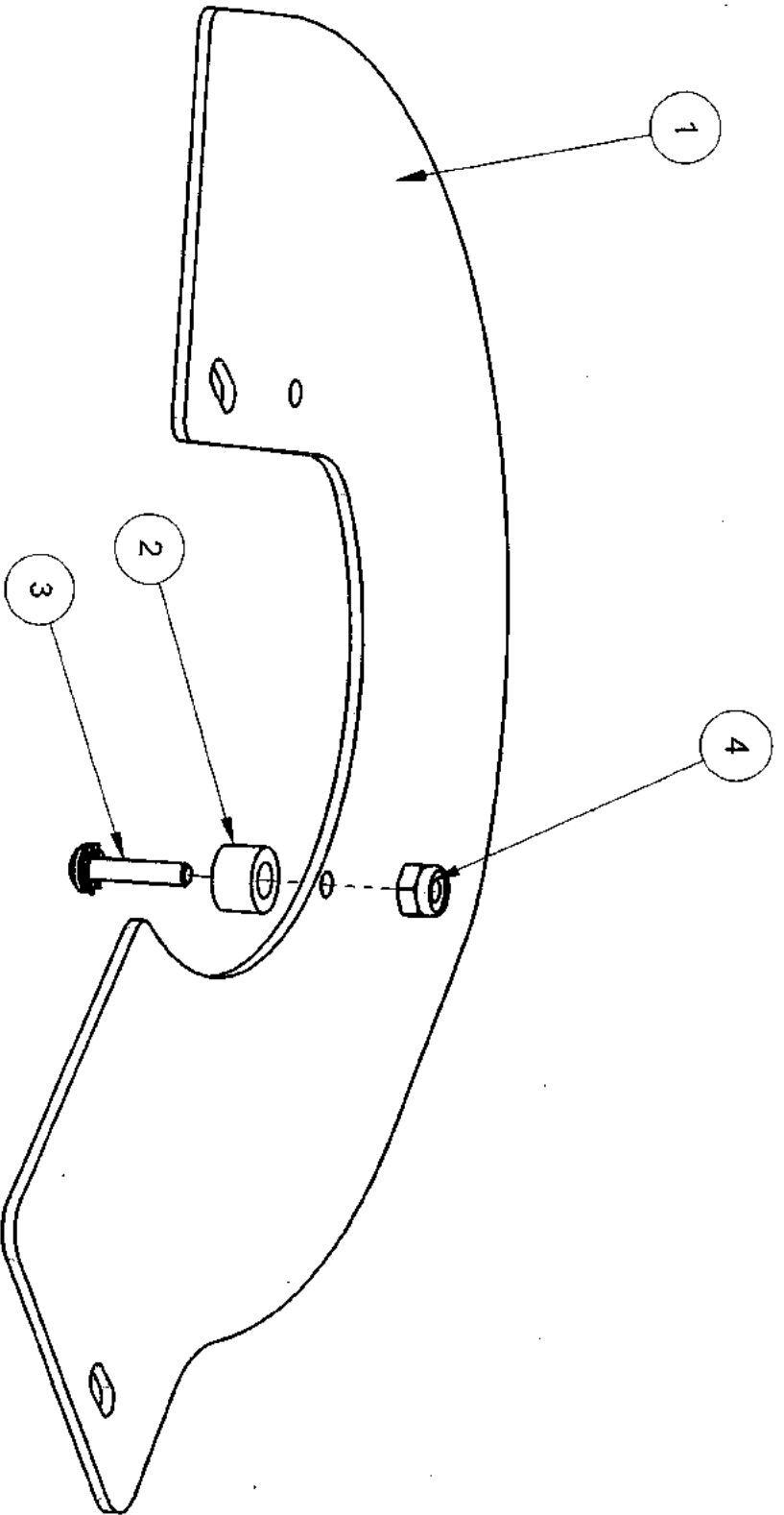
511-7220-00

ITEM #	QTY	PART #	DESCRIPTION
1	1	535-0614-00	SWITCH BRACKET - RIGHT - SWING RAMP
2	1	545-6268-00	FISCHE PAPER
3	1	180-5119-02	MICRO-SWITCH - LIGHT ACTUATION
4	1	112-5003-00	DIODE - 1N4004
5	1	535-6539-00	SWITCH BODY PROTECT PLATE
6	2	237-5937-02	SCREW, 2-56 X 1/2" HWH MS



SWITCH BRACKET ASSEMBLY - RIGHT

511-7219-00

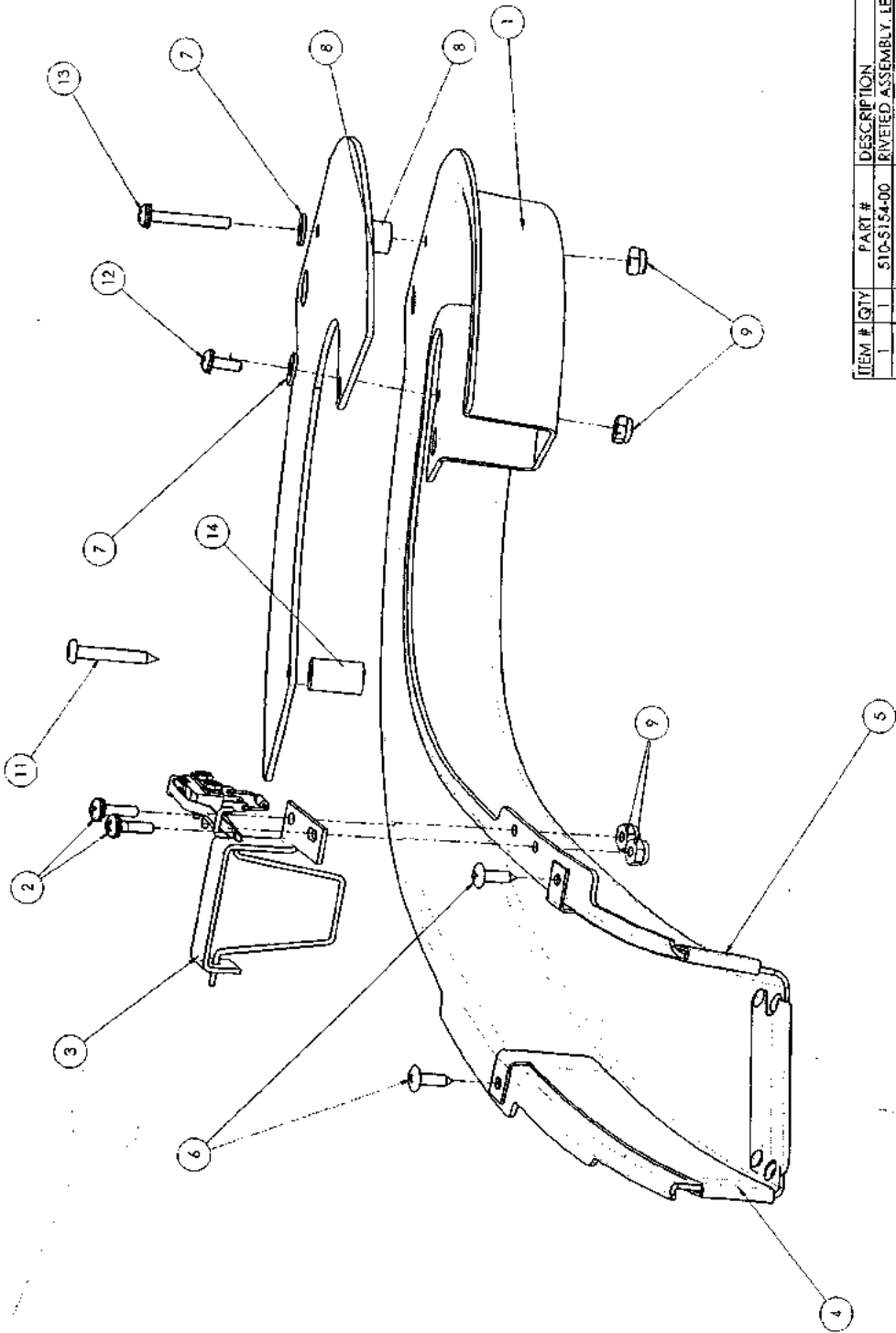


ITEM #	QTY	PART #	DESCRIPTION
1	1	830-6161-26	BUTY #26
2	1	254-5000-02	NYLON SPACER - BLACK - 3/8 OD X .200 ID X 1/4"
3	1	232-5203-00	SCREW, 6-32 X 5/8 PPH SEMS ZINC
4	1	240-5005-00	6-32 NYLON STOP NUT

BUTY ASSEMBLY #26 - . LE

511-7212-26

926



ITEM #	QTY	PART #	DESCRIPTION
1	1	510-5154-00	RIVETED ASSEMBLY - LEFT ENTRANCE RAMP, PUG (PRO)
2	2	232-5202-00	SCREW, 6-32 X 1/2" PPH MS SEMS
3	1	515-5555-01-GE	R/U SWITCH ASSEMBLY -01 W/ GENERIC C.A.B.L.E
4	1	535-0572-00	LEFT RAMP PROTECTOR-LEFT
5	1	535-0607-00	LEFT RAMP PROTECTOR-RIGHT
6	2	237-5809-00	SCREW, #6 X 1/2" PPH A
7	2	242-5001-00	#6 WASHER
8	1	254-5000-12	NYLON SPACER - BLACK - 3/8" OD X .175" ID X 3/8"
9	4	240-5005-00	NYLON SPACER - BLACK - 3/8" OD X .175" ID X 3/8"
10	1	630-6161-27	BUSH, # 27
11	1	232-5004-00	SCREW, #6 X 1" PPH AR ZINC
12	1	232-5201-00	SCREW, 6-32 X 3/8" PPH MS SEMS
13	1	232-5206-00	SCREW, 6-32 X 1" PPH SEMS
14	1	254-5000-14	NYLON SPACER - BLACK - 3/8" OD X .175" ID X 5/8"

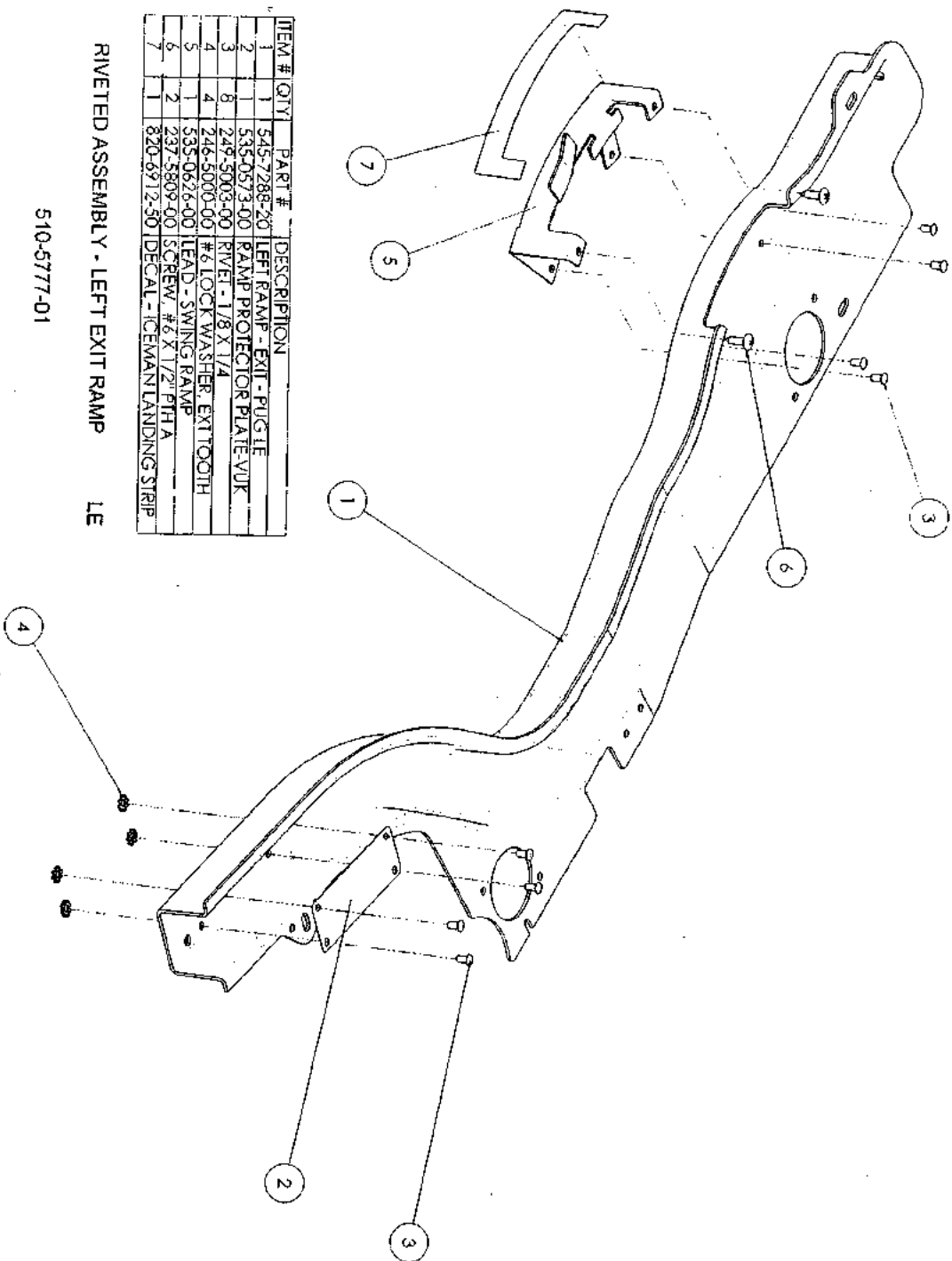
LEFT RAMP ENTRANCE ASSEMBLY - LE

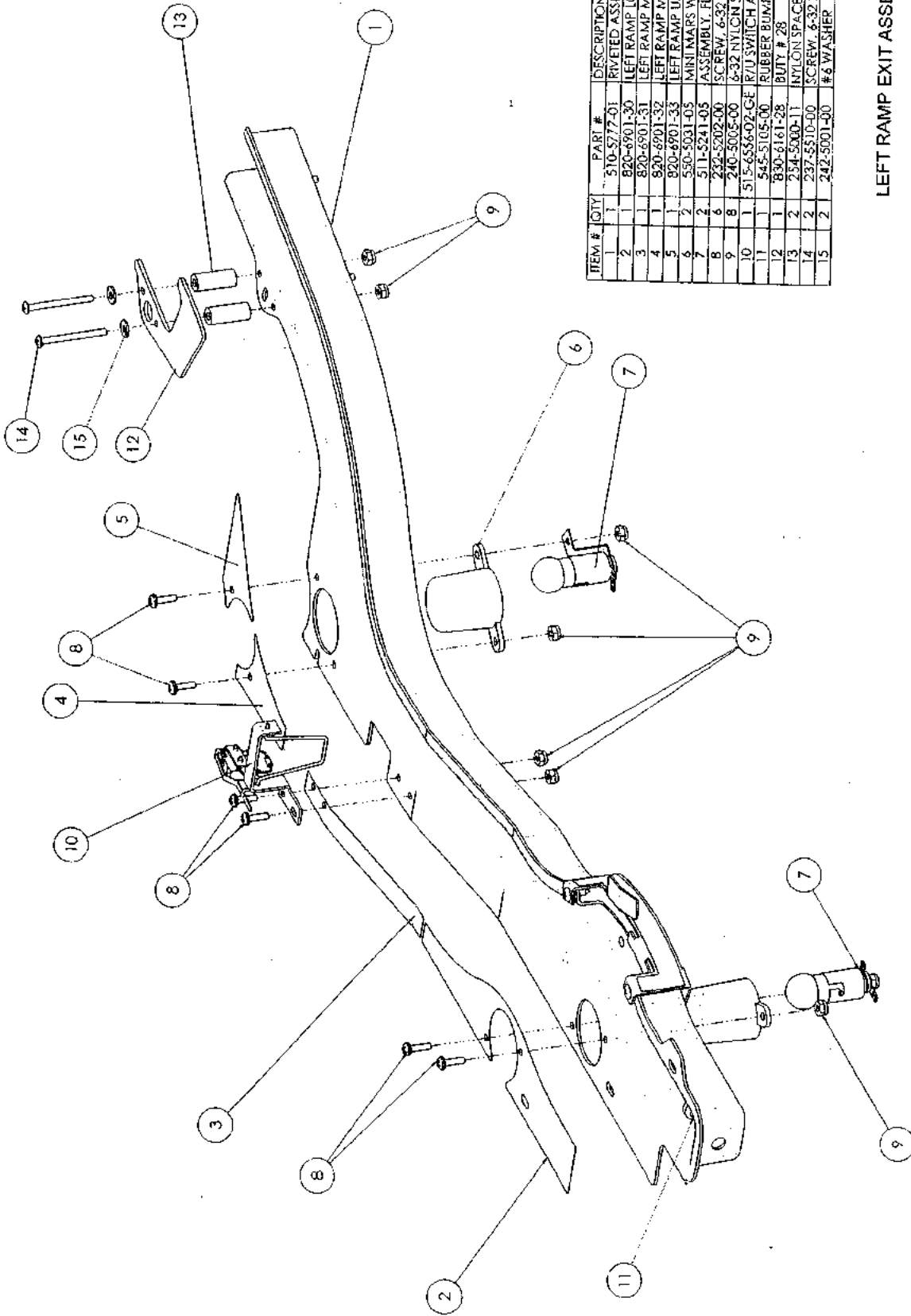
511-6996-01

ITEM #	QTY	PART #	DESCRIPTION
1	1	545-7286-20	LEFT RAMP - EXIT - PUGLE
2	1	535-0573-00	RAMP PROTECTOR PLATE-VUK
3	6	245-5003-00	RIVET - 1/8" X 1/4"
4	4	246-5000-00	#6 LOCK WASHER- EXT TOOTH
5	1	535-0626-00	LEAD - SWING RAMP
6	2	237-5809-00	SCREW - #6 X 1/2" FTH A
7	1	820-6912-50	DECAL - ICEMAN LANDING STRIP

RIVETED ASSEMBLY - LEFT EXIT RAMP LE

510-6777-01

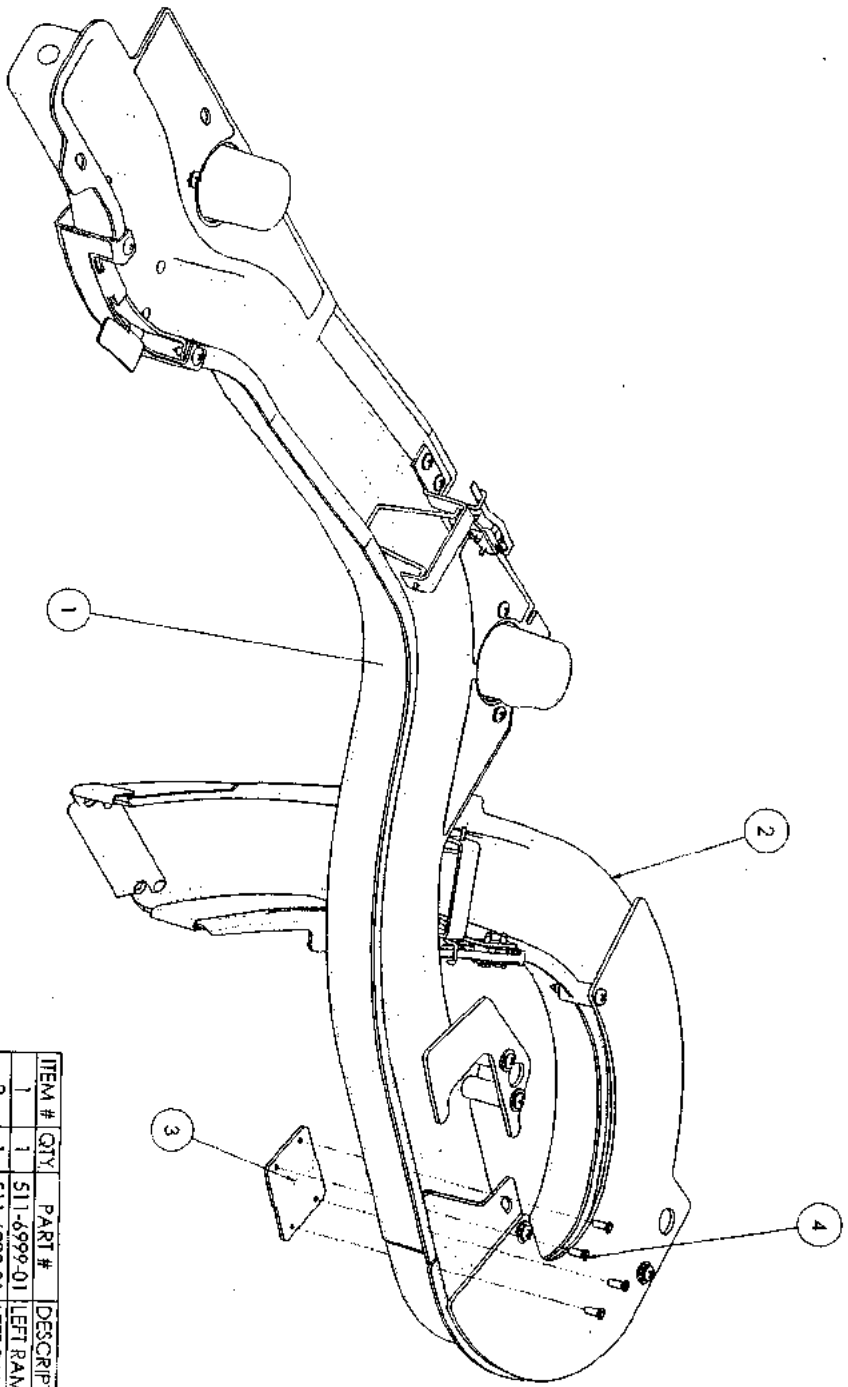




ITEM #	QTY	PART #	DESCRIPTION
1	1	510-5777-01	RIVETED ASSEMBLY - LEFT EXIT RAMP - PLUG LE
2	1	820-6901-30	LEFT RAMP LOWER DECAL
3	1	820-6901-31	LEFT RAMP MID DECAL
4	1	820-6901-32	LEFT RAMP UPPER TOP DECAL
5	1	820-6901-33	LEFT RAMP UPPER TOP DECAL
6	2	530-5031-05	MINI NUTS W/ EARS - BLUE 3/8
7	2	511-5241-05	ASSEMBLY FLASH LAMP BULB
8	6	232-5202-00	SCREW 6-32 X 1/2" PH #MS SEMS
9	8	240-5005-00	6-32 NYLON STOP NUT
10	1	515-6556-02-GE	R/U SWITCH ASSEMBLY -02 W/ GENERIC CABLE
11	1	545-5105-00	RUBBER BUMPER
12	1	830-6161-28	BUTY # 28
13	2	254-5000-11	NYLON SPACER - BLACK - 3/8 OD X .175 ID X .775
14	2	237-5510-00	SCREW 6-32 X 1-1/2" PH
15	2	242-5001-00	#6 WASHER

LEFT RAMP EXIT ASSEMBLY LE

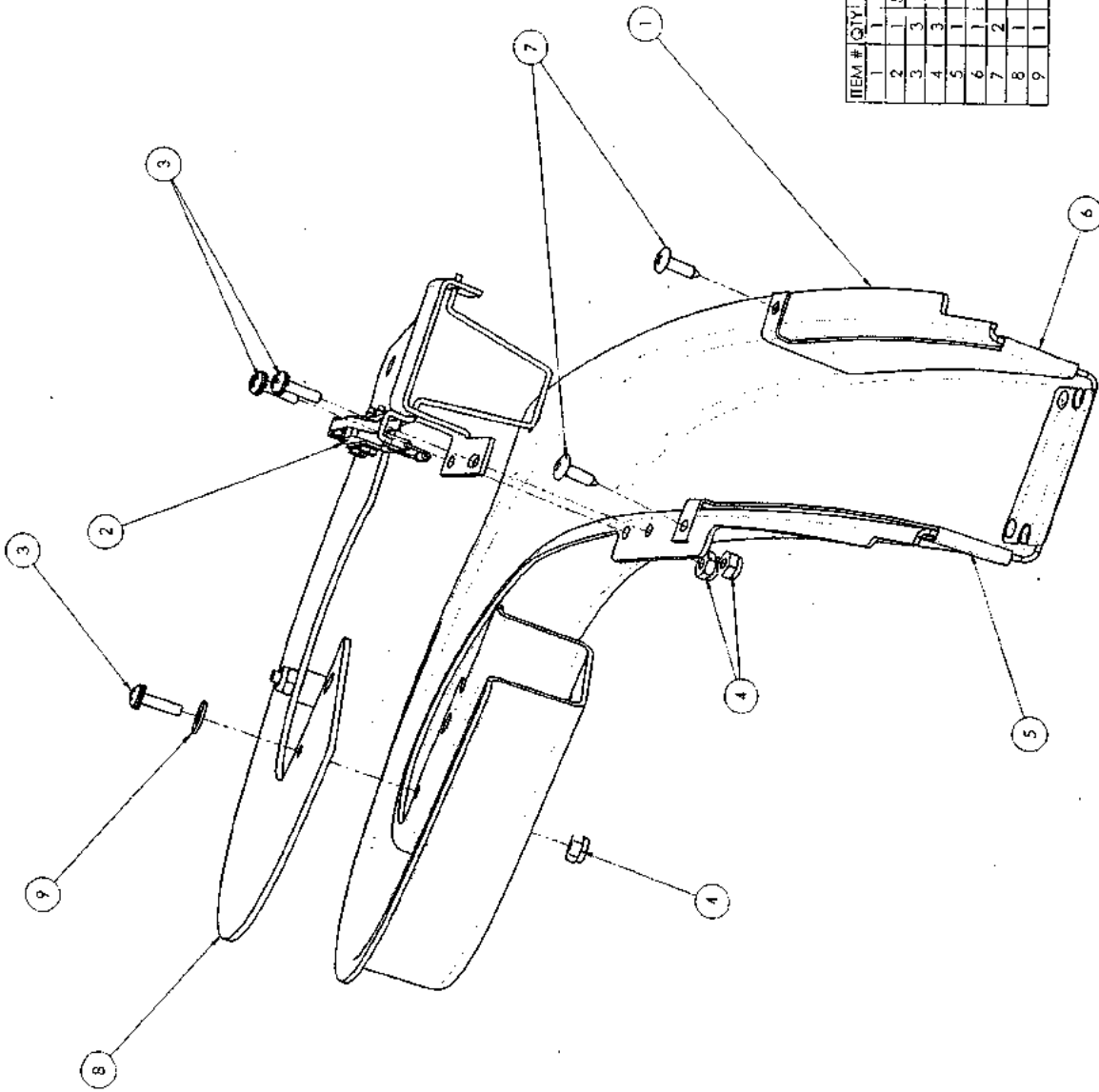
511-6999-01



ITEM #	QTY	PART #	DESCRIPTION
1	1	511-6999-01	LEFT RAMP EXIT ASSEMBLY - PUG LE
2	1	511-6998-01	LEFT RAMP ENTRANCE ASSEMBLY-PUG LE
3	1	535-0546-00	RAMP BRIDGE PLATE
4	4	237-6151-00	4-40 X 5/16 PPH U/C MS

LEFT PLASTIC RAMP ASSEMBLY LE

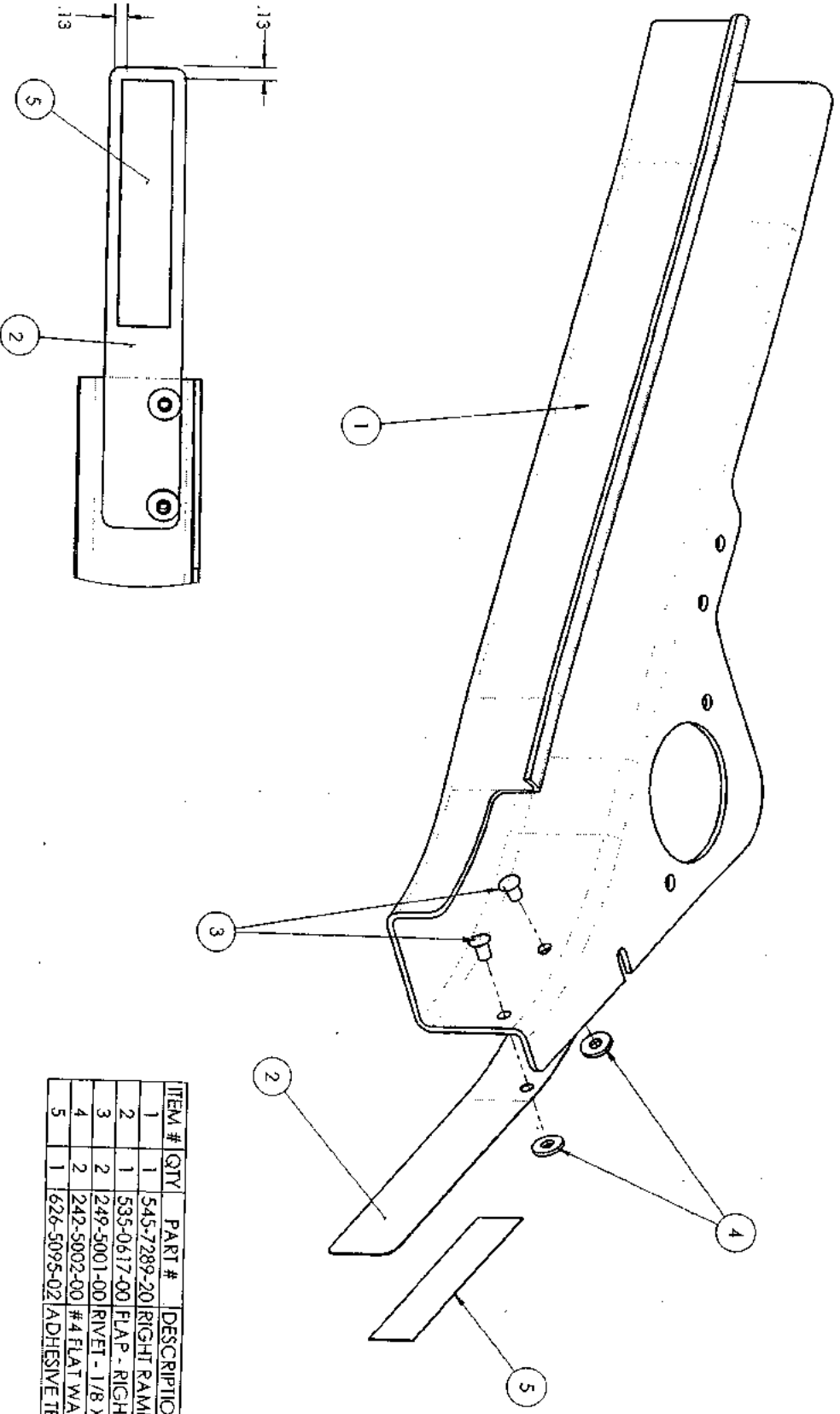
500-7224-01



ITEM #	QTY.	PART #	DESCRIPTION
1	1	510-5155-00	RIVETED ASSEMBLY, RIGHT ENTRANCE RAMP, PUG (PRO)
2	1	515-6556-02-GE	R7U SWITCH ASSEMBLY -02 W/ GENERIC CABLE
3	3	232-5202-00	SCREW, 6-32 X 1/2" PPH MS SEMS
4	3	240-9005-00	6-32 NYLON STOP NUT
5	1	535-0808-00	RIGHT RAMP PROTECTOR-LEFT
6	1	535-0609-00	RIGHT RAMP PROTECTOR-RIGHT
7	2	237-5809-00	SCREW, #6 X 1/2" PTH A
8	1	511-7212-26	BUTY ASSEMBLY #26 - PUG LE
9	1	242-5001-00	#6 WASHER

RIGHT RAMP ENTRANCE ASSEMBLY LE

511-7000-01

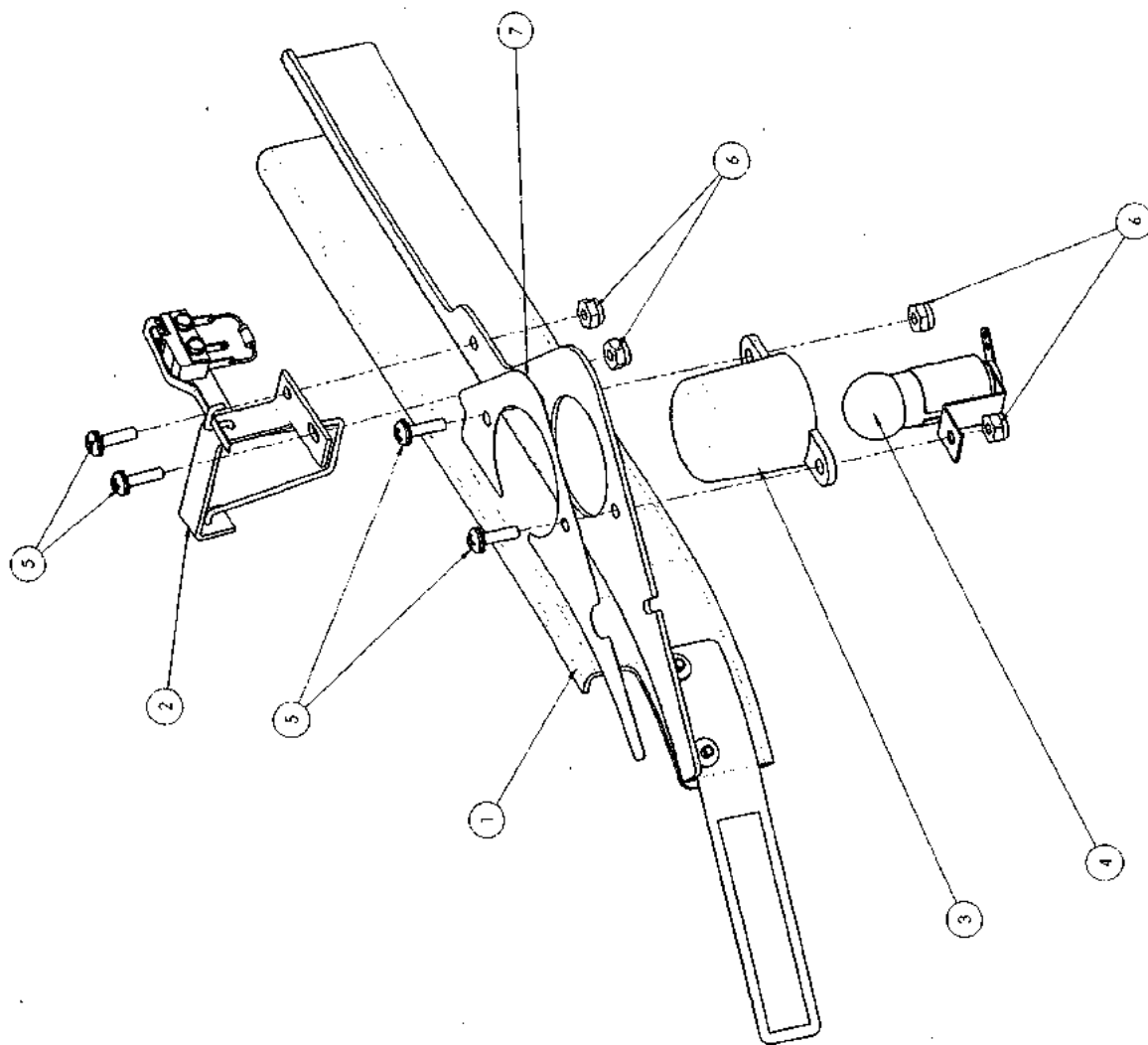


ITEM #	QTY	PART #	DESCRIPTION
1	1	545-7289-20	RIGHT RAMP - EXIT - PUG LE
2	1	535-0617-00	FLAP - RIGHT RAMP EXIT
3	2	249-5001-00	RIVET - 1/8 X 3/16
4	2	242-5002-00	#4 FLAT WASHER - 5/16" O.D.
5	1	626-5095-02	ADHESIVE TEFLON STRIP

TEFLON STRIP APPLICATION

RIVETED ASSEMBLY - RIGHT EXIT RAMP - LE

510-5778-01

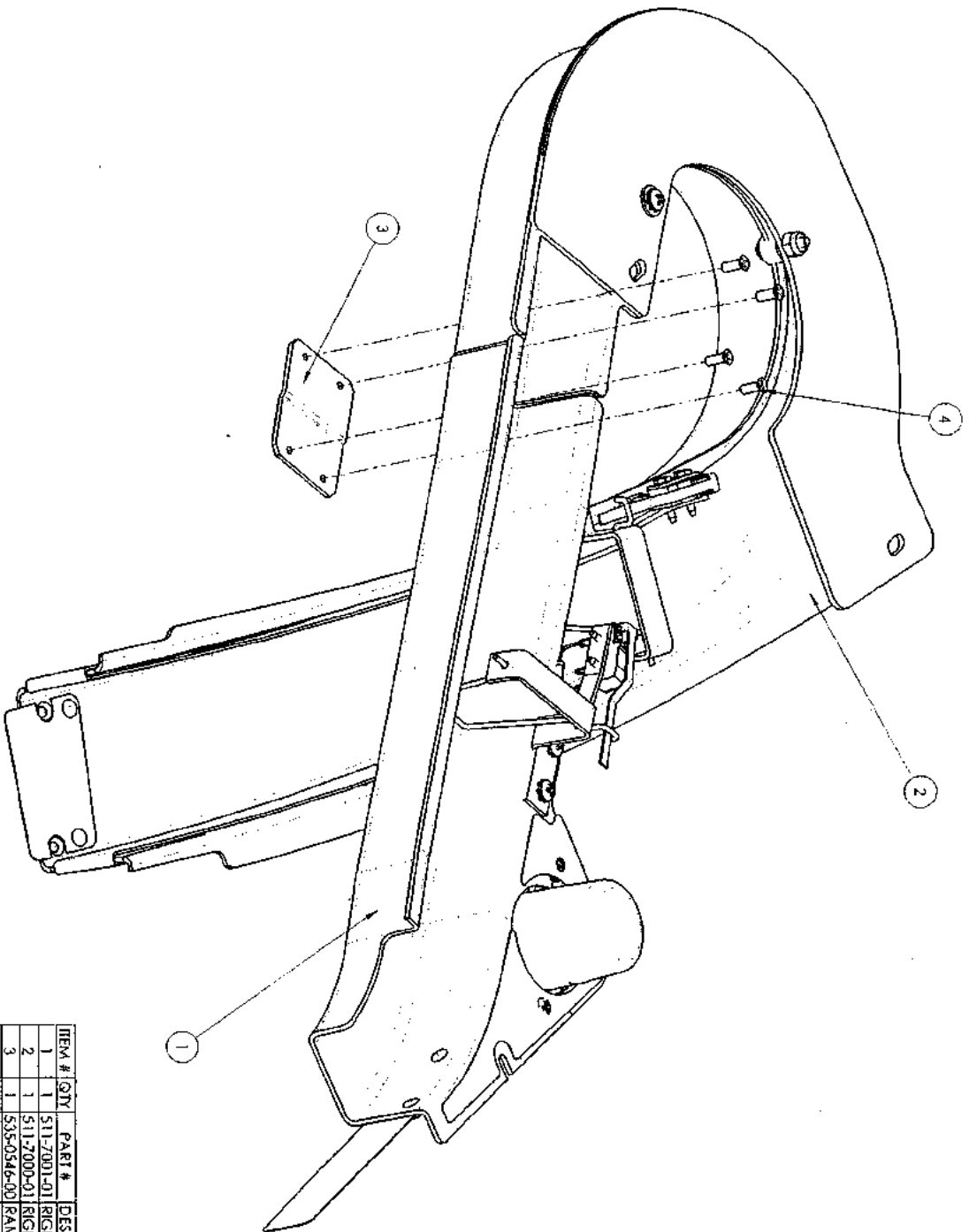


ITEM #	QTY	PART #	DESCRIPTION
1	1	510-5278-01	RIVETED ASSEMBLY - RIGHT EXIT RAMP - PUG LE
2	1	515-6556-01-GE	R/U SWITCH ASSEMBLY-01 W/ GENERIC CABLE
3	1	550-5031-05	MINI MARS W/ EARS - YELLOW SB
4	1	511-5241-00	FLASH LAMP ASSY. GENERIC
5	4	232-5202-00	SCREW, 6-32 X 1/2" PPH MS SEMS
6	4	240-5005-00	6-32 NYLON STOP NUT
7	1	820-6901-29	RIGHT RAMP UPPER DECAL

b33

RIGHT RAMP EXIT ASSEMBLY - LE

511-7001-01



ITEM #	QTY	PART #	DESCRIPTION
1	1	511-2001-01	RIGHT RAMP EXT ASSEMBLY - PUG LE
2	1	511-2000-01	RIGHT RAMP ENTRANCE ASSEMBLY - PUG LE
3	1	535-0546-00	RAMP BRIDGE PLATE
4	4	237-6131-00	4-40 X 5/16 PH U/C MS

RIGHT PLASTIC RAMP ASSEMBLY

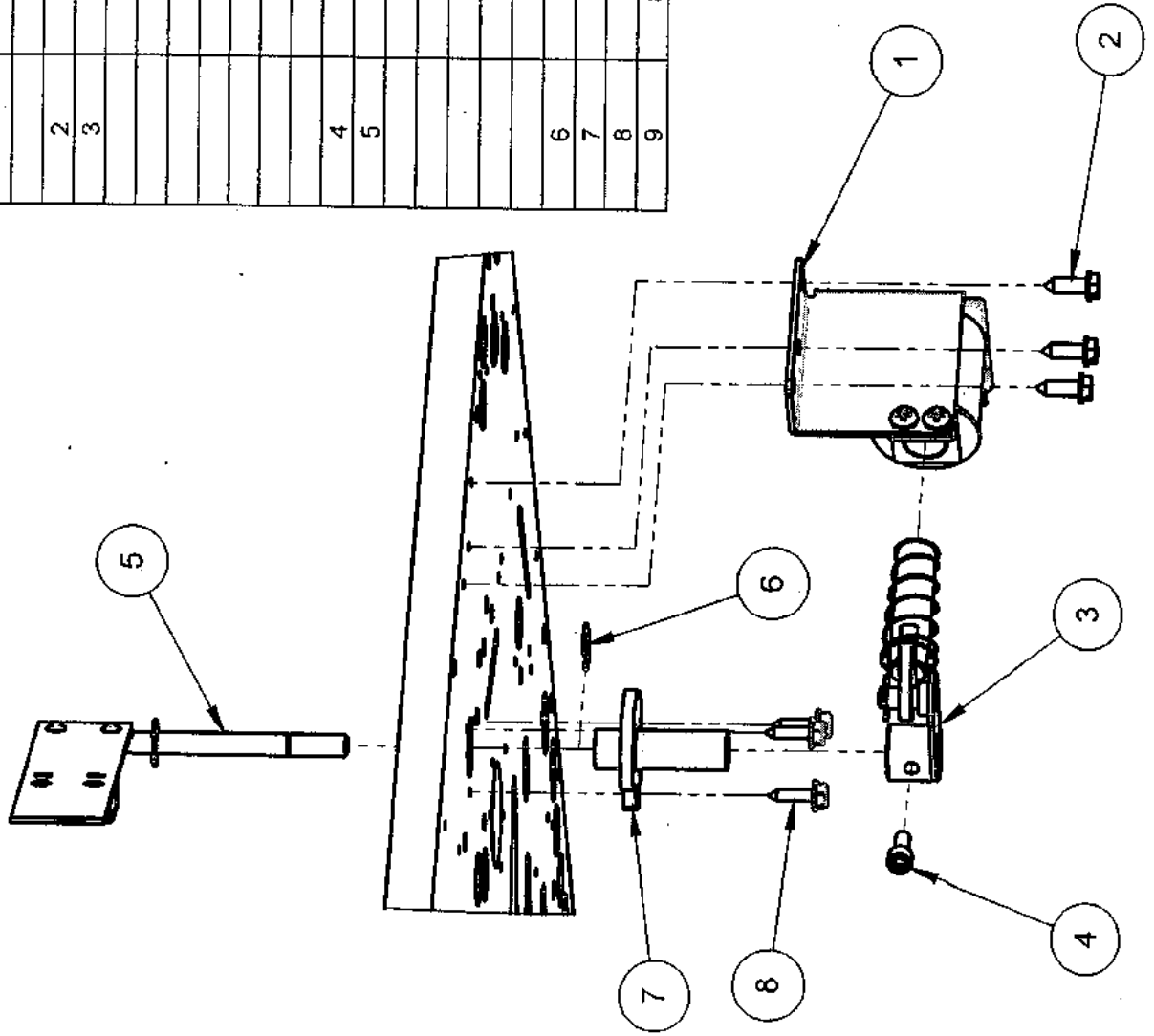
LE

500-7223-01

b34

DIVERTER ASSEMBLY

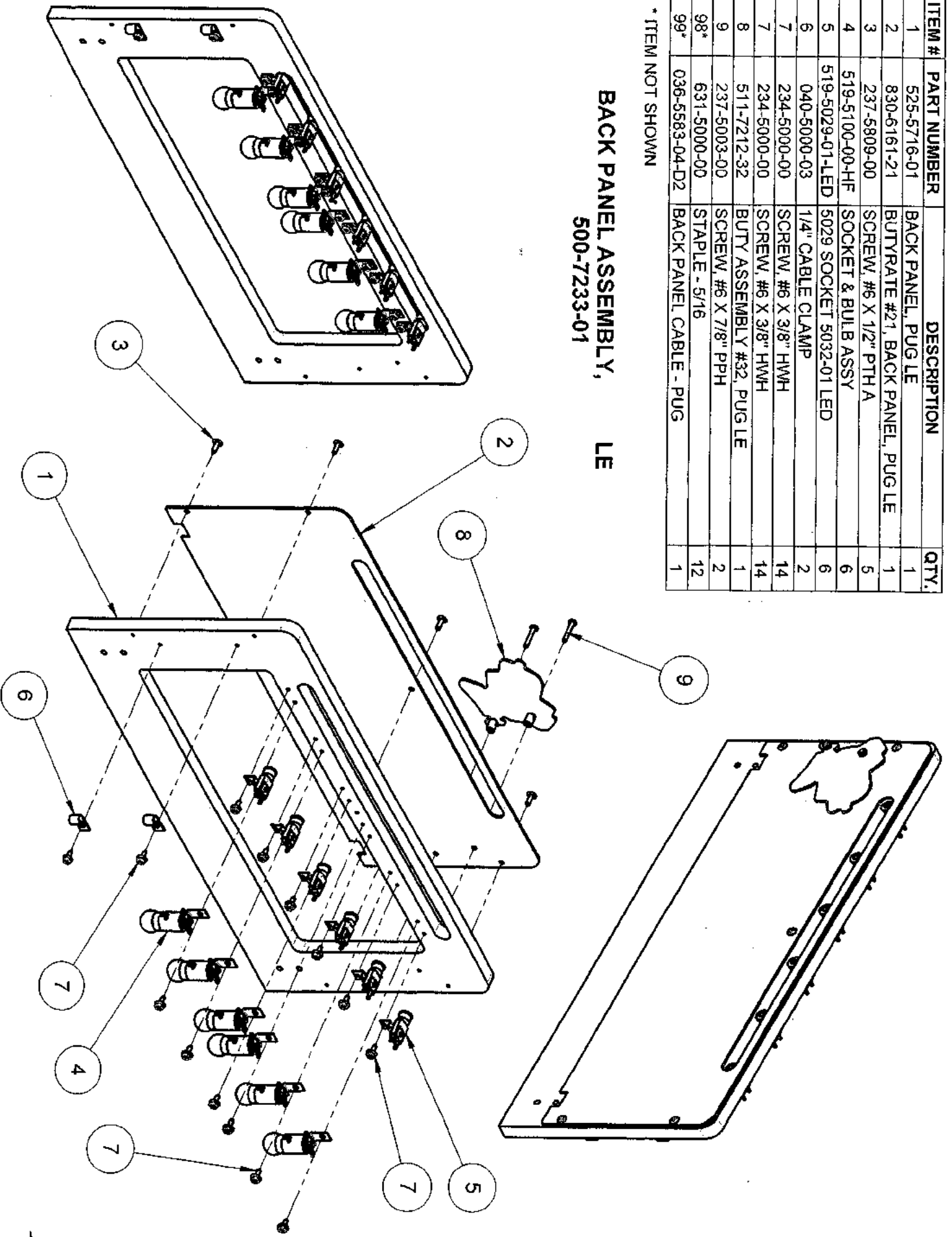
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	500-2456-00	ASSEMBLY, DIVERT COIL	1
	515-9603-00	COIL DIVERT BRACKET	1
	090-5036-ND	COIL - 24-940, NO DIODE	1
	545-5031-00	COIL SLEEVE	1
	535-5203-03	COIL RETAINING BRACKET	1
2	232-5300-00	SCREW, 8-32 X 1/4" PPH SEMS	2
3	234-5101-00	SCREW, #8 X 1/2" SLT HWH AB ZINC	3
	500-7245-00	CRANK ARM & PLUNGER SHAFT ASSY	1
	511-5183-00	PLUNGER & LINK ASSEMBLY	1
	530-5025-05	STEEL PLUNGER	1
	251-5008-00	ROLL PIN, 1/8 X 5/8	1
	545-5293-00	PLUNGER LINK	1
	515-9618-00	CRANK ARM ASSEMBLY	1
	266-5020-00	COMPRESSION SPRING-CONICAL	1
	270-5002-00	RETAINING RING - 1/4"	1
4	237-5897-00	SCREW, 8-32 X 3/8" SHCS ZINC	1
5	511-7005-00	DIVERT PADDLE ASSEMBLY	1
	510-5764-00	DIVERT PADDLE & SHAFT ASSY	1
	626-5057-01	RUBBER BUMPER - BLUE	1
	535-9366-01	BUMPER HOLDER	1
	237-6151-00	SCREW, 4-40 X 5/16" PFH U/C MS	2
6	270-5002-00	RETAINING RING - 1/4"	1
7	270-5002-00	RETAINING RING - 1/4"	1
	545-5070-00	FLIPPER BUSHING	1
8	234-5001-02	SCREW, #6 X 1/2" HWH	3
9	830-51D2-00	PLAYFIELD-SCREENED, PUG LE (#D2)	1



ITEM #	PART NUMBER	DESCRIPTION	QTY.
1	525-5716-01	BACK PANEL, PUG LE	1
2	830-6161-21	BUTYRATE #21, BACK PANEL, PUG LE	1
3	237-5809-00	SCREW, #6 X 1/2" PTH A	5
4	519-5100-00-HF	SOCKET & BULB ASSY	6
5	519-5029-01-LED	5029 SOCKET 5032-01 LED	6
6	040-5000-03	1/4" CABLE CLAMP	2
7	234-5000-00	SCREW, #6 X 3/8" HWH	14
7	234-5000-00	SCREW, #6 X 3/8" HWH	14
8	511-7212-32	BUTY ASSEMBLY #32, PUG LE	1
9	237-5003-00	SCREW, #6 X 7/8" PPH	2
98*	631-5000-00	STAPLE - 5/16	12
99*	036-5583-04-D2	BACK PANEL CABLE - PUG	1

* ITEM NOT SHOWN

BACK PANEL ASSEMBLY, LE
500-7233-01



Optional Kits available through your Distributor:

Pinball Location Maintenance Standard Kit (for X-Men LE Pinball) 502-6002-D2

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: Quantities, sizes and contents subject to change without notice.

Pinball Location Maintenance Deluxe Kit (for X-Men LE Pinball) 502-6003-D2

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 X-Men LE Pinball) 803-5000-D2

Plastics Kit includes: Plastic Sets (830-6161-XX)

Decals*Kit (for X-Men LE Pinball) 802-5000-D2

Decals Kit includes: Decal Set (820-6901-XX), (820-6912-XX), (820-6913-XX), (820-6914-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.

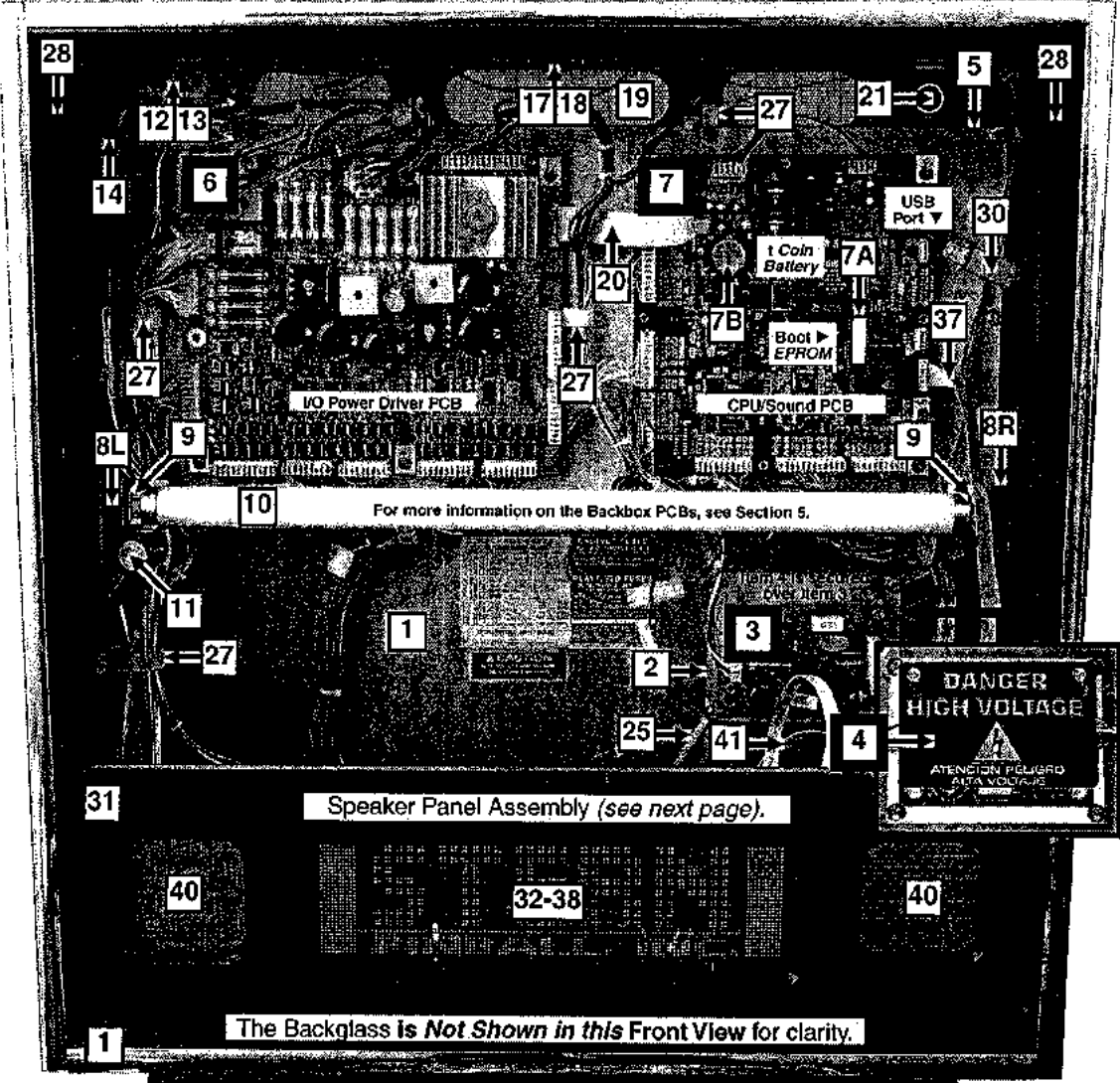
X-MEN LE WOVERINE Parts available through your Distributor:

Leg Assy Blue Streak.....	500-5921-06
Flip Button Assy Yellow.....	500-5026-36
Front Molding New No Hole Blue Streak.....	500-6882-02-06
Blue Streak LeftSide Armor.....	535-9596-06L
Blue Streak Right Side Armor.....	535-9596-06R
Pivot Hinge Left Blue Streak.....	535-7999-66L
Pivot Hinge Right Blue Streak.....	535-7999-66R
Mirrored Back Glass X-Men LE.....	830-5202-02
Bottom Arch Steel W/Windows - Blue.....	535-0415-05

X-MEN LE Magento Parts available through your Distributor:

Leg Assy Glossy Red.....500-5921-23
Flip Button Assy Blue (Solid).....500-5026-35
Front Molding New Style No Hole Glossy-Red.....500-6882-02-22G
Glossy Red Left Side Armor.....535-9596-22G
Glossy Red Right Side Armor.....535-9596-23G
Pivot Hinge LT Glossy Red.....535-7999-22G
Pivot Hinge RT. Glossy Red.....535-7999-23G
Mirrored Back Glass X-Men LE Magento.....830-52D2-00M
Bottom Arch Steel W/Windows - Red.....535-0415-22

TOURNAMENT PINBALL



For more information on the Backbox PCBs, see Section 5.

Speaker Panel Assembly (see next page).

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

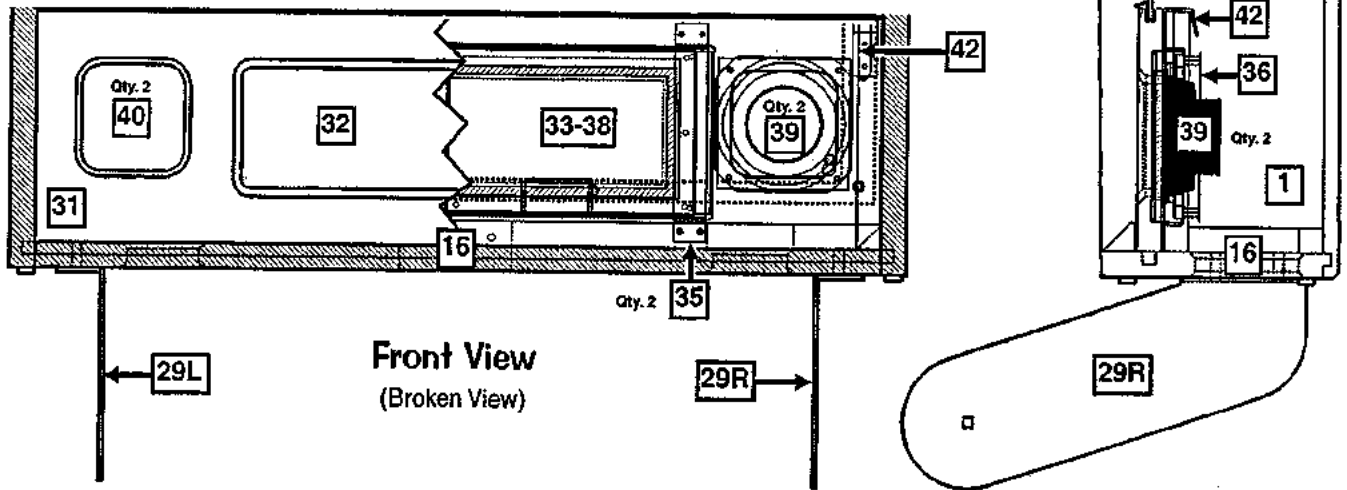
Parts Identification

Nr.	BACKBOX PARTS	QTY.	SPI PART Nr.	Nr.	BACKBOX PARTS	QTY.	SPI PART Nr.
1	Backbox X-Men™ (No Parts)	1	525-5631-17-D2	11	Starter - Fluorescent (FS2 Light)	1	165-5011-01
<small>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.</small>				<small>Item 11 is secured to Item 8L by: #4-40 X 1/2" PPH MS (Sems) Zc. (Qty. 2) (237-5813-00)</small>			
3	Display Power Supply PCB	1	520-5138-00	12	Ballast Mounting Plate	1	535-8657-00
<small>Item 3 is secured to bottom by: #8-32 X 3/8" SHWH Swg. (Zinc) (Qty. 2) (237-5975-00)</small>				<small>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)</small>			
4	Plastic Cover (DANGER HIGH VOLTAGE)	1	830-6053-00	13	Ballast CU452-W 1/2" Core 120v 60 Hz 13W	1	010-5015-00
<small>Items 3 & 4 are secured to Item 1 by: #10-24 X 1/2" Plastic Spacer (Qty. 2) (234-5003-00) and #10-24 X 1/4" SH Washer (Qty. 2) (237-5975-00)</small>				<small>Item 13 is 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)</small>			
5	PCB Metal Mounting Plate [I/O+CPU]	1	535-9664-00	14	Ground Strap (5)	1	600-5006-05
<small>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.</small>				<small>15* Roto Lock Male (on Cabinet)</small>			
6	I/O Power Driver PCB	1	520-5317-00	16	Roto Lock Female (F2-0062-02)	1	355-5006-02
7	CPU/Sound PCB LE GAMES NEW USB	1	520-5307-00	<small>Item 16 is secured to Item 1 by: #10-24 X 1/2" GRSN (Qty. 2) (234-5003-00) and #10-24 X 1/4" SH Washer (Qty. 2) (237-5975-00) and #10 Washer 7/32" I.D. X 5" O.D. X 1/16" Thick (Qty. 1) (242-5003-00) See assembly manual.</small>			
<small>7A 5MB EPROM (M37C-801) (Qty. 1) (820-5011-00) CPU/Sound PCB LE GAMES NEW USB (Qty. 1) (520-5307-00) 7B Coin Counter (Qty. 1) (820-6082-01) 7C Coin Return (Qty. 1) (820-6082-02) 7D USB Memory Stick (Qty. 1) (820-6082-03)</small>				<small>17 Lock Mounting Plate</small>			
<small>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" Sil. Fltn. Spacer White (Qty. 5 [I/O] / Qty. 4 [CPU]) (254-5007-05)</small>				<small>18 Lock Cap Barrel 3/4" x 15 Flt. Cam</small>			
8L	Fluorescent Light Bracket (Left Style)	1	535-7739-01	<small>Items 17 & 18 are secured by: #8 X 1/2" SHWH AB (Zinc) (Qty. 2) (234-5101-00)</small>			
8R	Fluorescent Light Brkt. (Right Style)	1	535-7739-01	19	Back Vent Grill 2-1/2" X 18"	3	545-5072-02
<small>Items 8L & 8R are secured to Item 1 by: #10-24 X 1/4" Carriage Bolt Socket Head Neck (Qty. 2/per) (241-5012-00) #10-24 Key Nut (Qty. 2/per) (242-5003-00) and #10-24 X 1/4" SH Washer (Qty. 2) (237-5975-00)</small>				<small>20 Ribbon cable 20 Pin (3.5")</small>			
9	Fluorescent Lamp Holder (Socket)	2	077-5214-01	<small>Item 20 connects the I/O Power PCB to the CPU/Sound PCB. See assembly manual.</small>			
<small>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)</small>				<small>21 Button Hole Plug (Blk) (Happ #52-6214-00)</small>			
10	Fluorescent Tube 24" (F18T8CW)	1	165-5061-00	<small>Item 21 plugs the Access Hole required if using optional BETAbrite Sign or Data cables.</small>			
<small>Item 10 is mounted to Item 23 with #8-32 X 3/8" PPH MS (Sems) Zinc (Qty. 2) (237-5813-00) and #8-32 Nylon Nut (Qty. 2/per) (240-5102-00) Item 21 is secured to Item 1 by: #4 X 5/8" PPH (Qty. 2/per) (232-5101-01)</small>				<small>22 Header Sign TOURNAMENT PINBALL</small>			

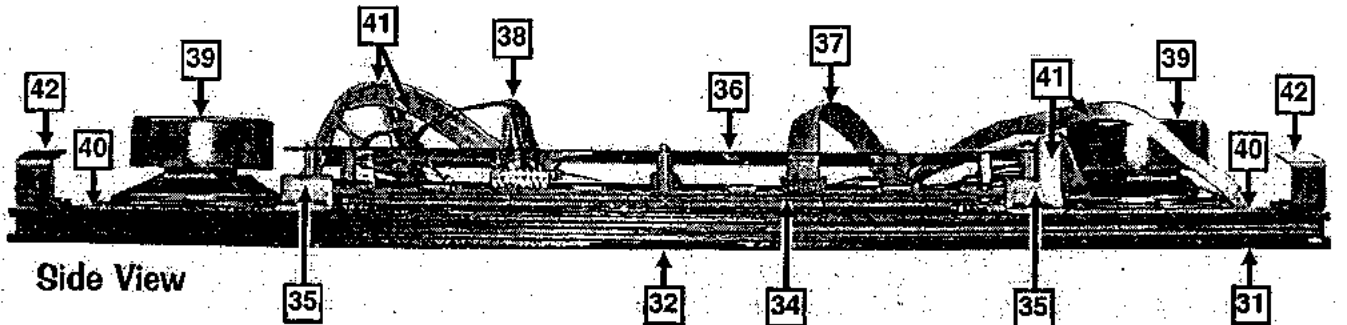
PARTS TABLE & VIEWS CONTINUED ON THE NEXT PAGE ▶

104

Backbox [S.A.M. System] - Parts



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



Nr.	BACKBOX PARTS	QTY.	SPI PART Nr.	Nr.	SPEAKER PANEL PARTS	QTY.	SPI PART Nr.		
<i>4 PARTS TABLE & VIEWS CONTINUED FROM THE PREVIOUS PAGE.</i>									
25	Braided Wire (1-1/2 Feet)	1	600-5001-00	31	Speaker Panel (Black Wood)	1	525-5515-00		
Rem 25 is secured by: Staple 5/16" (Qty. 23) (631-5000-00)				32	Plastic Shield (Display Top Cover)	1	525-5518-00		
26	Zinc AB	6	040-5005-00	33*	Foam 3/16" Thick X 1/4" Wide X 12"	6	626-5026-00		
Rem 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)				// EURO ONLY RoHS // 128 X 32 DM CES PCB				1	520-5052-15
27	Clamps [Multiple Sizes]	27	040-5000-XX	// EURO ONLY RoHS // Dot Matrix Bezel				1	545-6281-00
28	ADP	6	626-5026-00	35	Dot Matrix Display Mounting Bracket	2	535-8368-01		
Rem 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)				Item 35 is secured to Item 31 by: #8 X 1/2" SHWH AB (Zinc) (Qty. 4/per) (234-5101-00)				2	535-8368-01
29L	Pivot Hinge Red & Blue (Left Style)	1	535-7999-XX	36	Plastic Shield (Display Bezel)	1	830-6010-00		
29R	Pivot Hinge Red & Blue (Right Style)	1	535-7999-XX	37	Ribbon Cable, 14-Pin (33")	1	036-5260-33		
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)				Item 37 (14-Pin) connects the 128 X 32 Dot Matrix Display PCB to the CPU/Sound PCB.				1	036-5260-33
40	Memory Stick USB 1.1+ [Generic] 128MB	1	970-0064-00	38	Display Cable (With Harness)	1	036-5454-01		
Item 40 is secured to Backbox by: 1/4"-20 X 1/2" C.B. Sq. Neck (Qty. 4) (231-5003-00) and 1/4"-20 Flange Nut (Qty. 4) (240-5300-00)				// EURO ONLY RoHS // LED Display Adapter Harness				1	036-5520-00
(ASM. REF. 505-6002-A3-A3, Items 1-42 Only, [29-30 not included in assembly])				39	Speaker (Shld.) 4 x 4" 8Ω OHM MG ELE 4060SH	2	031-5004-02		
				40	Speaker (6d)	2	535-808-04		
				41	Ground Strap (25") [2 per : Items 35 & 39]	4	600-5006-25		
				42	Speaker Panel Hinge (Black)	2	535-7999-02		

Take Note:

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

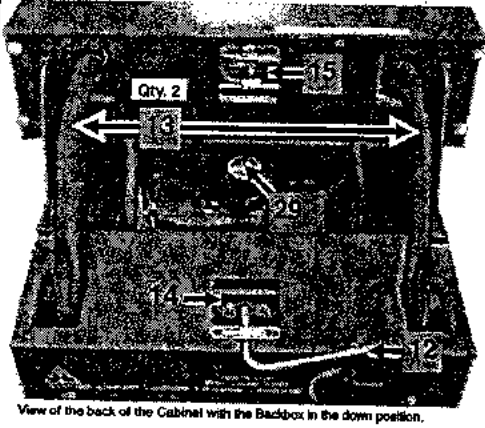
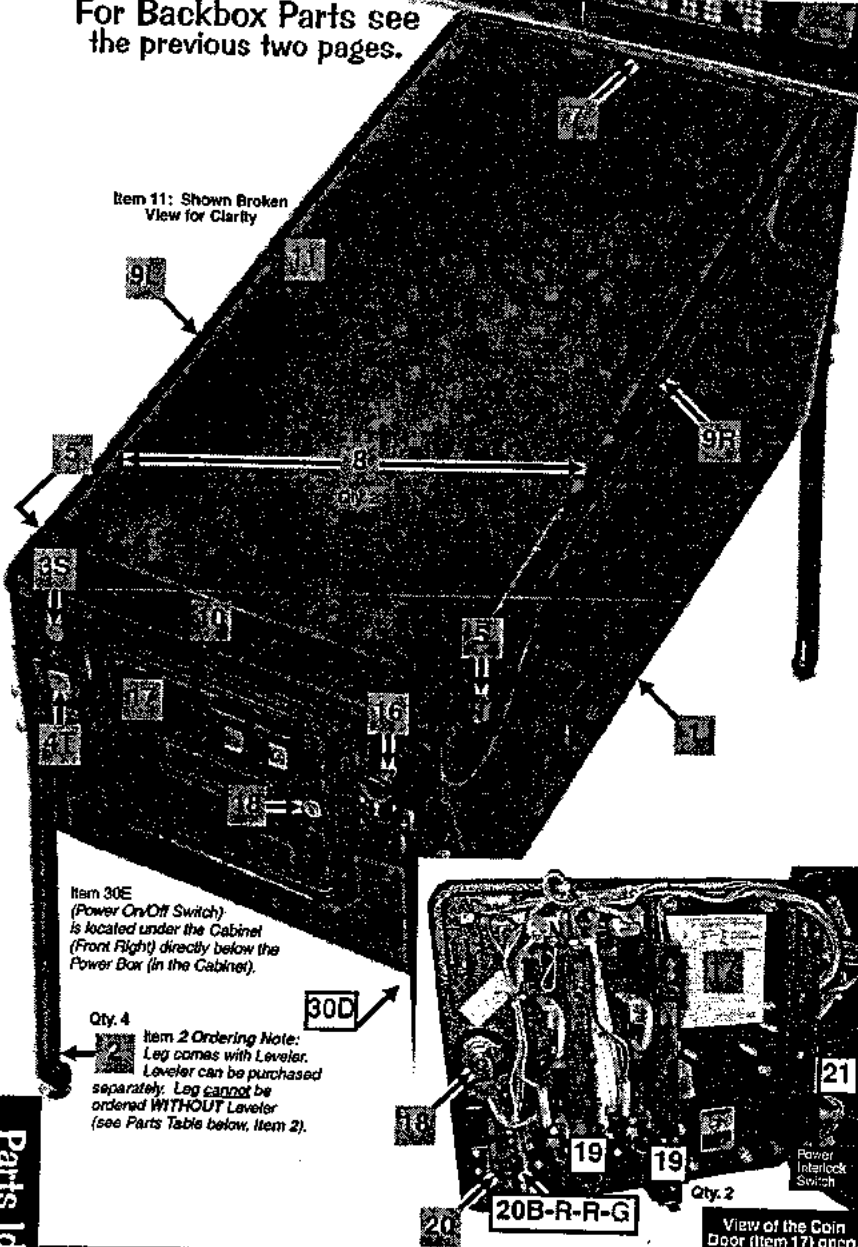
Nr.	BACKGLASS PARTS	QTY.	SPI PART Nr.	Nr.	BACKGLASS PARTS	QTY.	SPI PART Nr.
ii*	X-Men™ Film Art (#D2)	1	830-52D2-00	iv*	Bottom Plastic Lift Channel - 28"	1	545-6313-01
iii*	Top Plastic Channel	2	545-5018-15	v*	Plastic Edge (1.5" x 1.5")	2	545-5018-14
Item 40 is secured to Backbox by: 1/4"-20 X 1/2" C.B. Sq. Neck (Qty. 4) (231-5003-00) and 1/4"-20 Flange Nut (Qty. 4) (240-5300-00)				Item 42 is secured to Backbox by: 1/4"-20 X 1/2" C.B. Sq. Neck (Qty. 4) (231-5003-00) and 1/4"-20 Flange Nut (Qty. 4) (240-5300-00)			

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

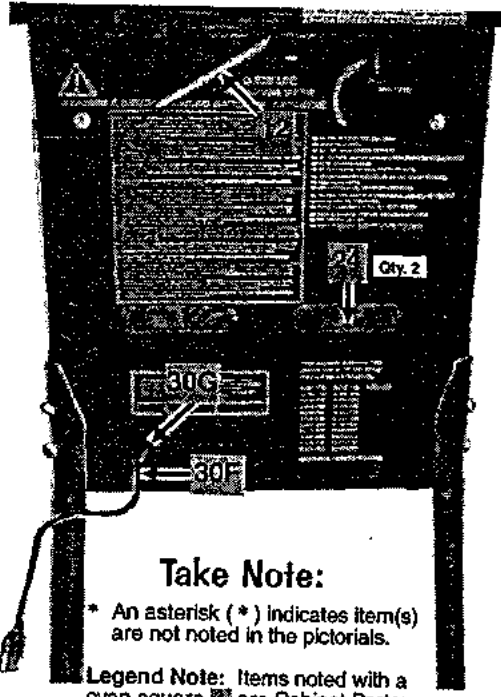
Parts Identification

Cabinet - Parts & Switches

For Backbox Parts see the previous two pages.



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



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.

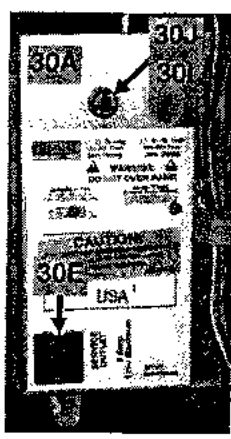
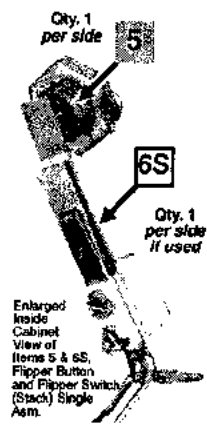
Parts Identification

Nr.	CAB. PARTS & SWITCHES	QTY.	SPI PART Nr.
2	Red Leg with Leveler Asm. Blue leg with Leveler Asm. 500-5921-06 <i>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).</i>	1	500-5921-06
4T	Tournament Button (Yel. Sq.), w/Sw. + Lamp <i>Item 3S & 4T includes the Switch & Lamp (No Wiring; desolder old wiring where required). Switch or Bulb replacement: TWIST LOCK (-TL) >> 001.5032-in << Assembly Parts Included: Microswitch (180-5174-00); #555 Wedge Base Clear Bulb (165-5002-00); 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.)</i>	1	500-6587-06-TL
6S	Flipper Button (Blue/Yellow Assy) (No Sw.) <i>Item 5 is secured by: Hex Nut for Flipper Button (Metal) (Qty. 2/per) (240-5003-01) Pad Nut (Metal) (Qty. 2/per) (240-5003-01) Pad Nut (Plastic) (Qty. 2/per) (240-5003-01) and Washer (240-5003-01) ID X 3/8" OD X 1/4" Thick (Qty. 2/per) (242-5003-00)</i>	2	500-5026-XX
6S	Flipper Switch Single Assembly <i>Assembly Parts Included: Flipper Switch Stack Single (Painey 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)</i>	1	500-6889-01
6D	Flipper Switch Double Assembly	1	500-6890-01

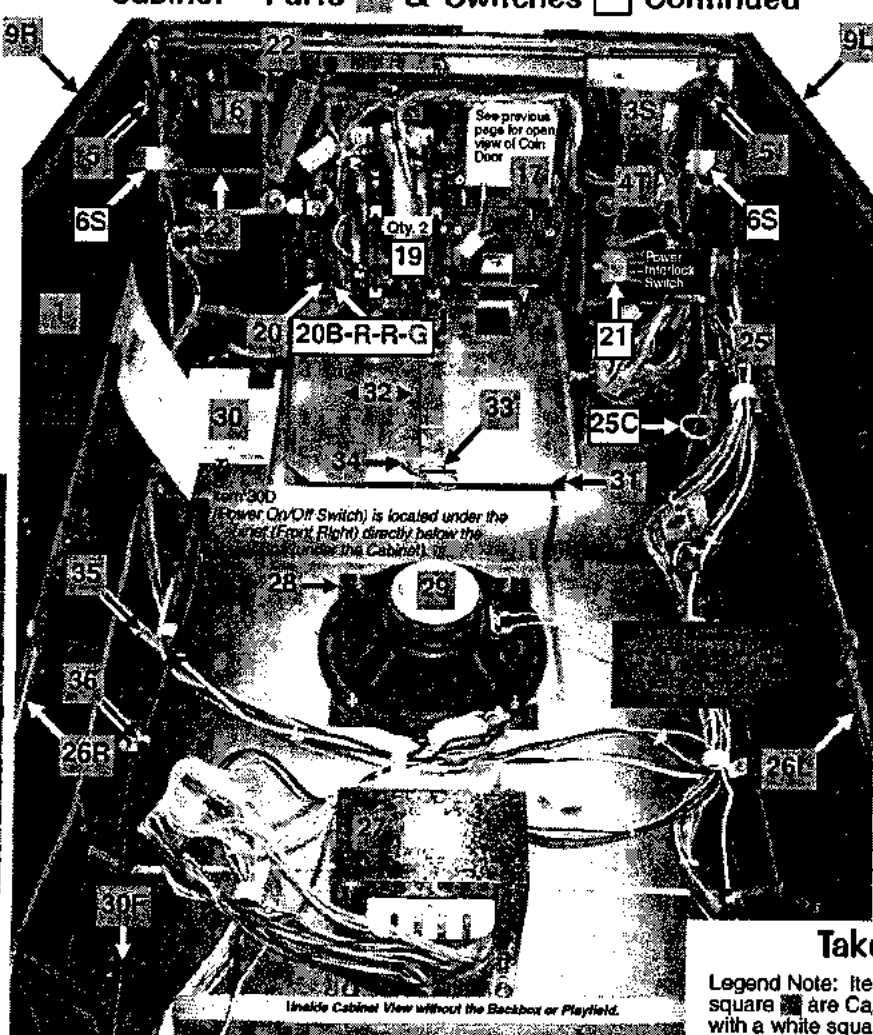
Assembly Parts Included: Flipper Switch Stack Double (Painey Contact) (180-5164-01) and Capacitor - Ceramic .05 Mfd 25 volt (130-5001-00)
 Item 6S/6D are secured to Cab. by: #6 X 1-1/4 SHWH AB (Zinc) (Qty. 2/per) (237-5959-00)

Nr.	CAB. PARTS & SWITCHES	QTY.	SPI PART Nr.
7	Rear Glass Channel 20-3/8" Length	1	525-5038-00
8	Plastic Channel 42-5/8" Lg. (Left/Rt.)	2	545-5017-00
9L	Side Armor (Left) Red & Blue	1	535-7297-XX
9R	Side Armor (Right) Red & Blue	1	535-7297-XX
10	Front Molding (Red & Blue) < NO BUTTON HOLE > <i>Item 10 includes: Self-Adhesive Foam Rubber 3/8" X 3/16" X 20-3/8" (3) (626-5001-00) Item 10 works with Item 22 (next page) ONLY.</i>	1	515-7495-XX
12	Hex Key Allen Wrench 5/16"	1	777-0001-00
13	Corrugated Tubing Black 1/2" X 1/4" Lg.	1	605-5008-03
14	Roto Lock Male (R2-0055-02) <i>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)</i>	1	355-5006-01

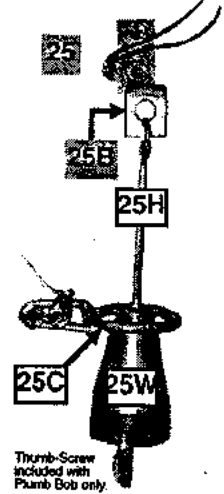
Cabinet - Parts & Switches Continued



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



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



Take Note:

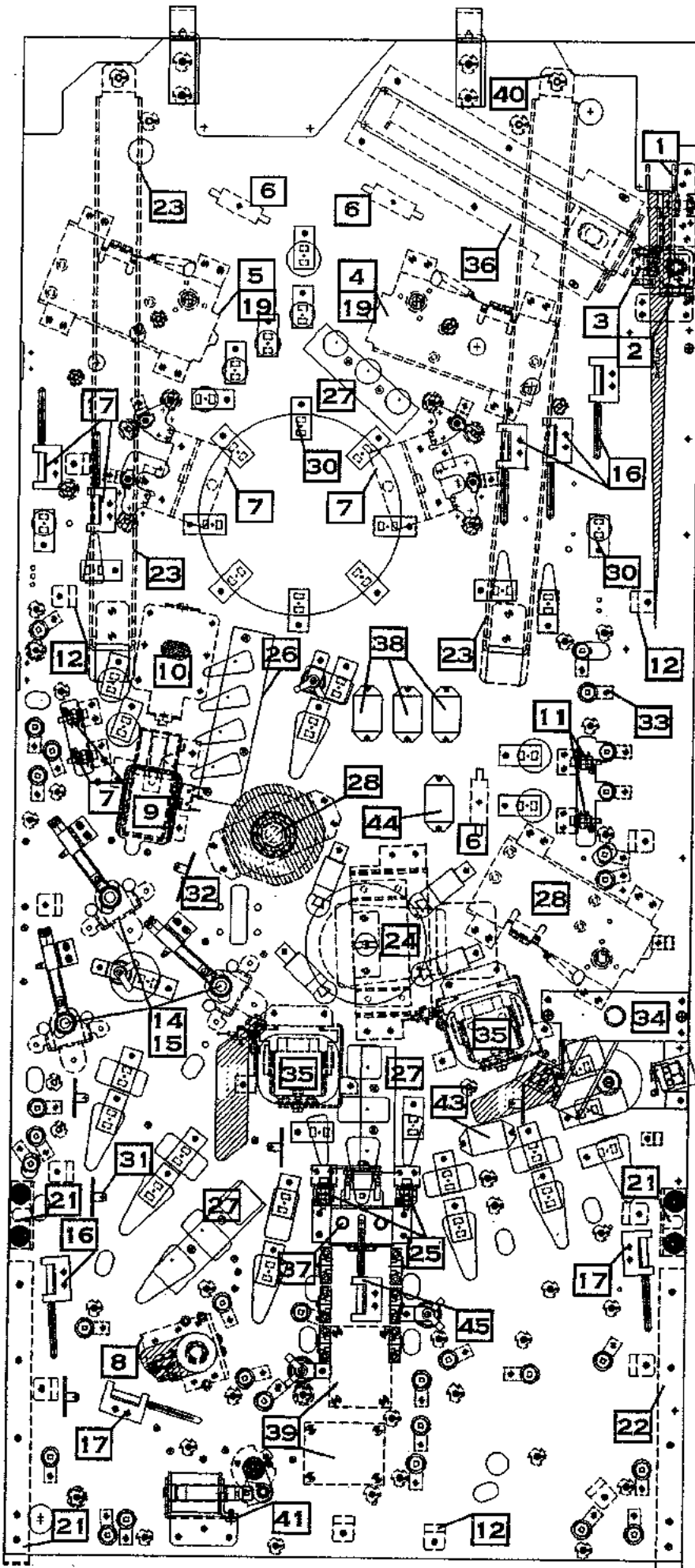
Legend Note: Items noted with a cyan square are Cabinet Parts. Items noted with a white square are Switches.

Nr.	CAB. PARTS & SWITCHES	QTY.	SPI PART Nr.
PARTS TABLE & VIEWS CONTINUED FROM THE PREVIOUS PAGE.			
17	Coin Door 2-Button Switch 4-Button Bracket	1	501-5018-172
18	Lock 5/8" Barrel, 3/4, Fit. Cam	1	355-5055-00
19	Coin Door Switch (USA) (Happ) ALT. SW. 19C Coin Door Switch (USA) (Coin Control) (180-5024-00) ALT. SW. 19L Coin Door Switch (Japan) (180-5081-00)	2	180-5024-01
20	4-Button Bracket (for Service Menu Buttons) SWITCH: 20B SWITCH: 20P SWITCH: 20C	1	535-6860-04
21	Power Interlock-Memory Protected Switch Asm. Assembly Parts Included: Mounting Bracket (535-5944-00), Power Plug (231-5012-00), Switch (180-5125-00) and secured by: #8 X 1/2" SHWH AB (Zinc) (Qty. 2) (234-5101-00)	1	500-6808-05
22	Front Molding Lockdown Asm. 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)	1	500-6881-00
23	Lockdown Spring Item 23 is secured by: #8 X 1/2" SHWH AB (Zinc) (Qty. 1) (234-5101-00) and #1/4 Washer (752-10-1/4) (Qty. 1) (240-5003-00)	1	265-5008-00
24	Grills 2-1/2" X 18" (on Back & Bottom) Plumb Bob Tilt Switch (Individual Parts Only) Ind. Parts Only	3	545-5072-02
25	SWITCH: 25B: Bracket for Hanger Wire (535-6221-00) 25C: Contact Wire Form (535-7583-01) 25H: Hanger Wire (535-6319-02) 25W: Plumb Bob Weight (535-5029-00) (includes Thumb-Screw)	1	535-5989-00
26L	Slide & Pivot Support Bracket (Left)	1	535-5990-00
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 Item 27 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)	1	010-5012-00
28	Woofler (Speaker) Grill 7" X 7"	1	545-5072-03
29	Woofler 8" Round 80/10/40 Items 28 & 29 are 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)	1	031-5007-00
30	Power Input Box Asm. + Univ. Cable 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 R2101CSNB8 (180-5001-83) + Bracket (535-8318-00) 30E: Service Outlet (3-Prong / US) (180-5008-01) / International N/A 30F: Line Cord 10' RCJ 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 (205-3001-00)	0	515-5360-08
*Universal Cable & Jumper Caps (all voltage variations): See the Yellow Pages, Page y.10.			
31	Cash Box Plastic Bottom	1	545-6090-00
32	Cash Box Cover (Validator)	1	535-5013-03
33	Cash Box Lock Bracket (U-Wire) Item 33 is secured by: #8 X 1/2" SHWH AB (Zinc) (Qty. 2) (234-5101-00)	1	535-7562-00
34	Large Hair-Pin Clip	1	535-7772-00
35	Clamps (Multiple Sizes) 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 1X with: 2X Single = 48 (Qty. 9) (117-5001-00), 3X	30	040-5000-XX
36	Zip Cable Tie (Screw Down Style) Item 36 is secured by: #8 X 1/2" SHWH AB (Zinc) (Qty. 1/per) (234-5101-00)	4	040-5005-00
37	Mezors 12VDC with Bracket (Optional) Opt. G-0053-013-102 † Mezers (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

PF
BOTTOM

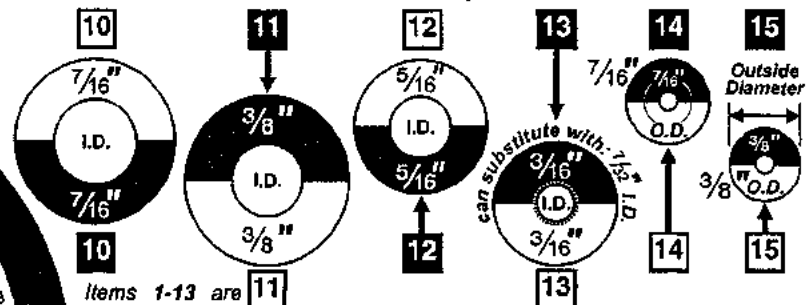
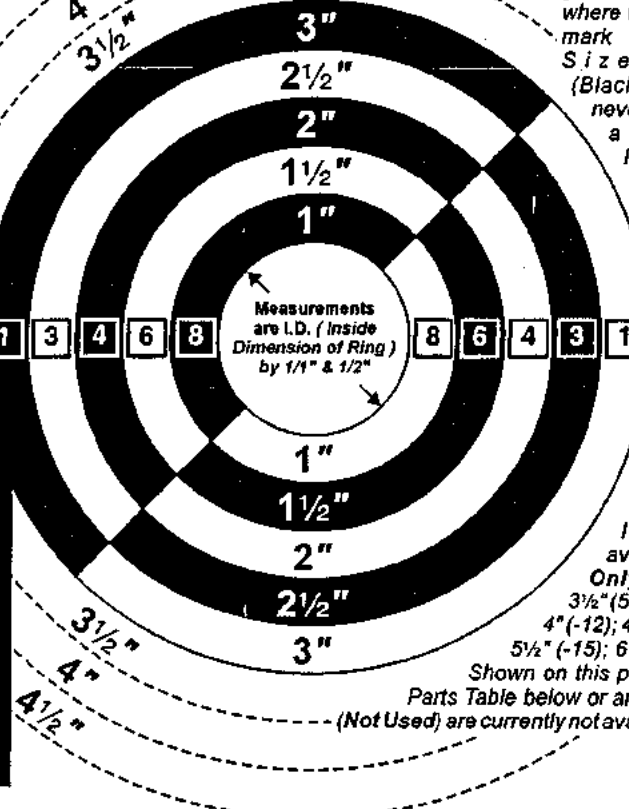
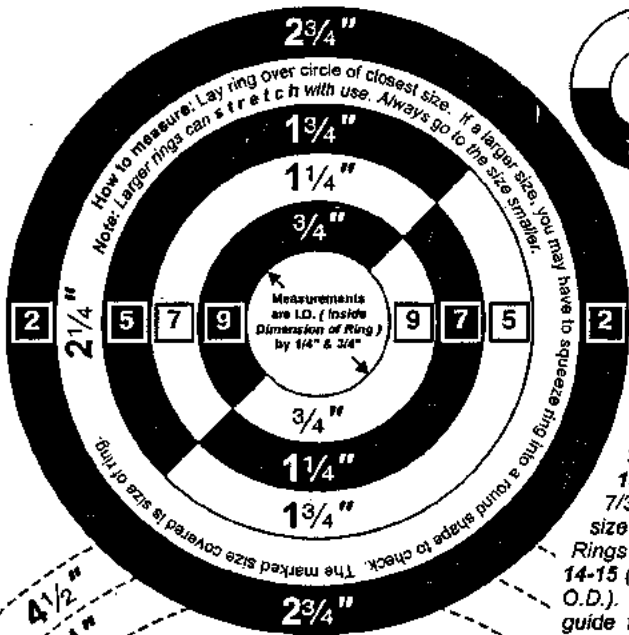


P10

MAIN PLAYFIELD PARTS (BOTTOM)

<u>PART NAME</u>	<u>PART NUMBER</u>
1.) AUTOPLUNGER ARM WELD ASSY	500-6091-00
2.) AUTOPLUNGER ARM WELD ASSY	500-6092-02-ND
3.) SHOOTER LANE SWITCH ASSY	500-6096-00
4.) FLIPPER ASSY (LEFT)	500-6543-12-ND
5.) FLIPPER ASSY (RIGHT)	500-6543-02-ND
6.) FUSE CLIP HOLDER SOCKET	205-5000-01
7.) SLINGSHOT ASSY	500-5849-01-ND
8.) VERTICLE UP KICKER ASSY	500-7078-01
9.) POWER SCOOP ASSY	500-5809-01
10.) KICK BIG ASSY (POWER SCOOP)	500-6398-01
11.) STAND UP TARGET 1 1/2	500-5321-08
12.) TIE POST	545-5253-01
13.) MAGNETIC DISC ASSY	500-7234-01
14.) POP BUMPER BOTTOM ASSY	515-6459-04-ND
15.) POP BUMPER SWITCH ASSY	515-6459-09
16.) ROLLOVER SWITCH ASSY (LEFT)	500-6227-03
17.) ROLLOVER SWITCH ASSY (RIGHT)	500-6227-04
18.) STANDUP TARGET ASSY 1" SQUARE	500-6984-08
19.) FLIPPER BASE INSULATOR	545-5721-00
20.) 6-32 T-NUT	240-5002-00
21.) PIVOT SLIDE BRACKET ASSY	500-5329-03
22.) EDGE SLIDE BRACKET	535-5988-01
23.) PLAYFIELD SUPPORT SLIDE BRACKET	535-6862-05
24.) MAGNETIC SPINNING DISC ASSY	500-7234-01
25.) STANDUP TARGET ASSY 1/2"	500-6985-04
26.) LED LAMP PCB MOTHER BOARD (AT SCOOP)	520-6779-03
27.) LED LAMP PCB	520-6779-01
28.) FLIPPER ASSY (UPPER)	500-6543-22-ND
29.) MAGNET ASSY	516-0018-00
30.) LED MAP PCB (SINGLE)	520-5307-00
31.) TERMINAL STRIP (2 POSITION)	055-5203-00
32.) TERMINAL STRIP (3 POSITION)	055-5204-03
33.) SOCKET WEDGE BASE GI	077-5030-00
34.) ICEMAN DRIVE ASSY	500-7259-00
35.) NIGHTCRAWLER LIFT ASSY	500-7256-00
36.) 4 BALL TROUGH ASLSY	500-6318-14-ND
37.) DOUBLE UP POST ASSY	511-6770-00
38.) RELAY ASSY	511-7226-00
39.) OPTO SWITCH PCB	520-5239-01
40.) 8-32 T-NUT	240-5101-00
41.) DIVERT COIL & BRACKET ASSY	500-2456-00
42.) CRANK ARM & PLUNGER ASSY	500-7245-00
43.) RELAY (DC MOTOR) (ICEMAN RAMP DRIVE)	511-7234-00
44.) RELAY (AC MOTOR) (SPINNING DISC DRIVE)	511-5249-01
45.) ROLLOVER SWITCH ASSY (RIGHT)	500-6227-04A

Playfield - Rubber Parts Black ■, White □ & Blue ■ (Rings Actual Size) †



Items 1-13 are measured by the Inside Diameter (I.D.). Items 1-9 and 11 are approximately 1/4" thick. Items 10, 12-15 are approximately 3/16" thick. Item 13 can also be a 7/32" I.D. Ring. The size is imprinted on all Rings except for Items 14-15 (7/16" O.D. & 3/8" O.D.). Use this page as a guide to measure rings where the size imprint or mark does not exist. Size 2 1/4" I.D. (Black or White) is never used. Choose a Ring Size +/- 1/4" I.D. if required.

Note: Sizes larger than 3" I.D. currently available in Black Only (Not Used): 3 1/2" (545-5348-11); 4" (-12); 4 1/2" (-13); 5" (-14); 5 1/2" (-15); 6" (-16). Sizes Not Shown on this page, listed in the Parts Table below or are noted with N/U (Not Used) are currently not available.

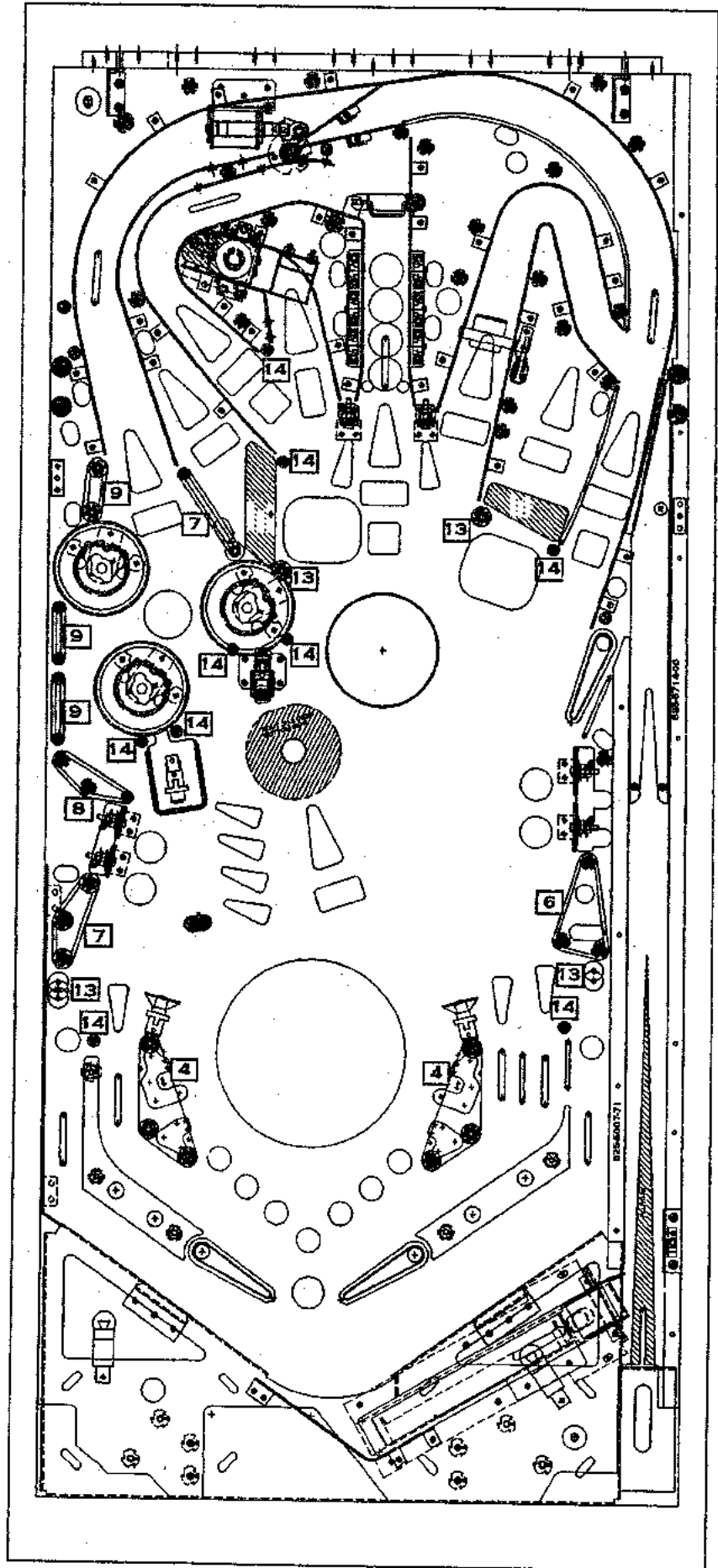
Nr.	RUBBER RINGS	QTY.	SPI PART Nr.
1	3" I.D. Rubber Ring BLACK	1	545-5348-10
	3" I.D. Rubber Ring WHITE		545-5348-60
2	2 3/4" I.D. Rubber Ring BLK	2	545-5348-20
			N/U
3	2 1/2" I.D. Rubber Ring BLK	2	545-5348-09
	2 1/2" I.D. Rubber Ring WHT		545-5348-59
4	2" I.D. Rubber Ring BLACK	2	545-5348-08
	2" I.D. Rubber Ring WHITE		545-5348-58
5	1 3/4" I.D. Rubber Ring BLK		545-5348-21
	1 3/4" I.D. Rubber Ring WHT	N/U	545-5348-71
6	1 1/2" I.D. Rubber Ring BLK		545-5348-07-40
	1 1/2" I.D. Rubber Ring WHT		545-5348-57
7	1 1/4" I.D. Rubber Ring BLK	2	545-5348-06
	1 1/4" I.D. Rubber Ring WHT		545-5348-56
8	1" I.D. Rubber Ring BLACK		545-5348-05-40
	1" I.D. Rubber Ring WHITE		545-5348-55
9	3/4" I.D. Rubber Ring BLACK	3	545-5348-04-40
	3/4" I.D. Rubber Ring WHITE		545-5348-54
10	7/16" I.D. Rubber Ring BLK		545-5348-18
	7/16" I.D. Rubber Ring WHT		545-5348-68
11	3/8" I.D. Rubber Ring BLACK		545-5348-03
	3/8" I.D. Rubber Ring WHITE	N/U	545-5348-53
12	5/16" I.D. Rubber Ring BLK		545-5348-02
	5/16" I.D. Rubber Ring WHT		545-5348-62
13	3/16" I.D. Rubber Ring BLK	4	545-5348-01-40
	3/16" I.D. Rubber Ring WHT		545-5348-51
14	7/16" O.D. Rubber Ring BLK	10	545-5348-17-40
	7/16" O.D. Rubber Ring WHT		545-5348-67
15	3/8" O.D. Rubber Ring BLK		545-5348-19
	3/8" O.D. Rubber Ring WHT		545-5348-69
16	Small Flipper BLACK Ring (Soft Duro)		545-5207-00
	Small Flipper RED Ring (Soft Duro)		545-5207-22
	Large Flipper BLACK Ring (50 Duro)	3	545-5277-00
	Large Flipper YELLOW Ring (50 Duro) (use -06 40 Duro)		545-5277-04
17	Large Flipper WHITE Ring (50 Duro)		545-5277-08
	Large Flipper RED Ring (Soft Duro)		545-5277-22

Take Note:

For Blue Rubber Parts, see the next page and/or the Blue Pages for the assembly the pads are found on for the part number.

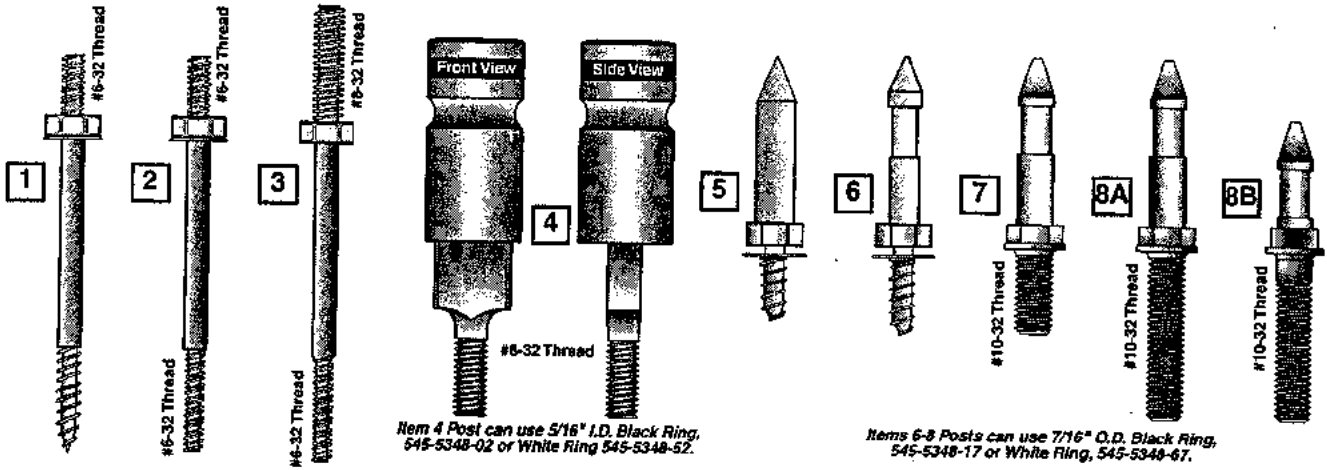
Nr.	RUBBER BUMPER PADS	QTY.	SPI PART Nr.
A*	Bumper BLK Pad (Lg. w/ grommet)	3	545-5428-00
	Item A are located on Flipper Assemblies. See next page for location.		
B*	Bumper BLK Pad (Sm. w/ grommet)	4	545-5105-00
	Item B are located on multiple assemblies. See next page for location.		

Nr.	RBR. BUMPER POST SLVS.	QTY.	SPI PART Nr.
D*	Bumper BLACK Post Sleeve (Tall)		545-5308-65
	Item D in RED use 545-5308-22; Item D in WHITE use 545-5308-08.		
E*	Bumper Post Sleeve (Short)		545-5151-00



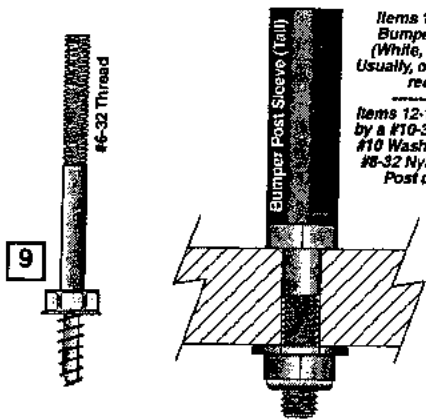
1012

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



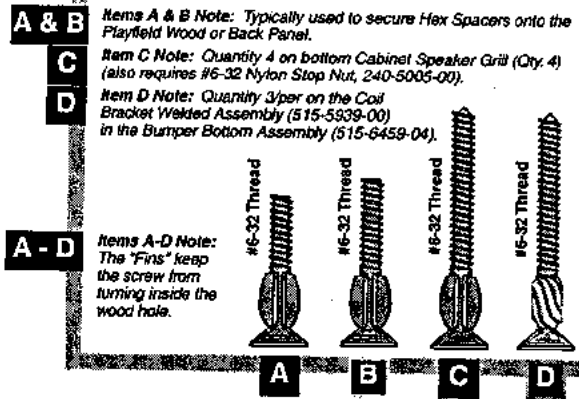
Item 4 Post can use 5/16" I.D. Black Ring, 545-5348-02 or White Ring 545-5348-52.

Items 6-8 Posts can use 7/16" O.D. Black Ring, 545-5348-17 or White Ring, 545-5348-67.



Items 11-16 & 18 Posts can use a Black Bumper Post Sleeve (Tail), 545-5308-00 (White, 545-5308-06 or Red, 545-5308-22) Usually, only Posts which are in the ball path require a Bumper Post Sleeve.

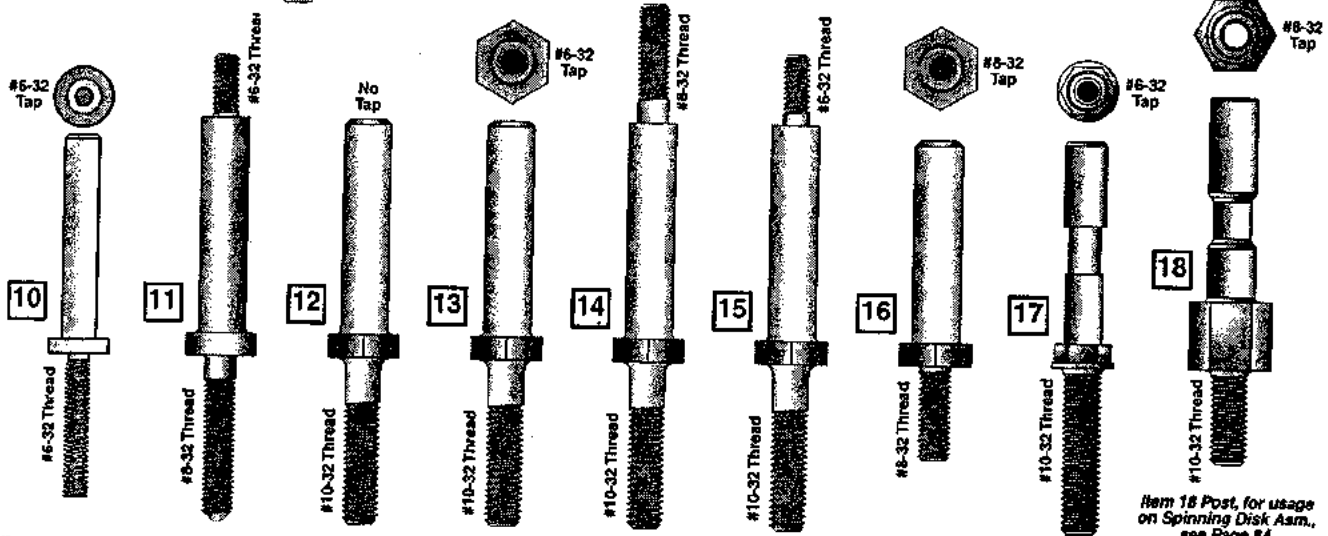
Items 12-15 & 18 Posts are typically secured by a #10-32 Nylon Stop Nut, 240-5203-00 and #10 Washer, 242-5010-00 (Item 11 Post use a #8-32 Nylon Stop Nut, 240-5162-00; Item 16 Post use a #6-32 T-Nut, 240-5101-00).



A & B
C
D
A - D

Items A & B Note: Typically used to secure Hex Spacers onto the Playfield Wood or Back Panel.
Item C Note: Quantity 4 on bottom Cabinet Speaker Grill (Qty. 4) (also requires #6-32 Nylon Stop Nut, 240-5005-00).
Item D Note: Quantity 3/per on the Coil Bracket Welded Assembly (515-5839-00) in the Bumper Bottom Assembly (515-6459-04).

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



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

Parts Identification

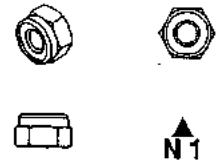
Nr.	METAL POSTS	SPI PART Nr.	Nr.	METAL POSTS	SPI PART Nr.
1	Post [Fasten] #6-32 Thread // Wood Screw	530-5010-02	12	Post [Hex Base] NO TAP // #10-32 Thread	530-5332-00
2	Post [Fasten] #6-32 Thread // #6-32 Thread	530-5012-02	13	Post [Hex Bs.] #6-32 TAP // #10-32 Thread	530-5332-01
3	Post [Fasten] #8-32 Thread // #6-32 Thread	530-5008-00	14	Post [Hex Bs.] #8-32 Thread // #10-32 Thr.	530-5332-02
4	Post Brass (Adjustable, sliding) #8-32 Thread	530-5621-00	15	Post [Hex Bs.] #6-32 Thread // #10-32 Thr.	530-5332-03
5	Mini-Post Wood Screw (no cut-away)	530-5004-01	16	Post [Hex Bs.] #8-32 TAP // #8-32 Thread	530-5332-04
6	Mini-Post Wood Screw	530-5004-00	17	Post [Hex Bs. + Groove] #6-32 TAP // #10-32 Thr.	530-5679-00
7	Mini-Post Machine Scr. // #10-32 .4" Thread	530-5005-01	18	Post [Hex Bs. + Groove] #8-32 TAP // #10-32 Thr.	530-5753-00
8A	Mini-Post MS // #10-32 .875" Thread	530-5749-00			
8B	Mini-Post Short MS // #10-32 .875" Thread	530-5263-01	Nr.	FIN SHANK SCREWS	SPI PART Nr.
9	Post [Fasten] #6-32 Thread // Wood Screw	530-5127-00	A	#6-32 X 3/4" Fin Shank Screw	237-5921-02
10	Post #6-32 Tap // #6-32 Thread	530-5127-00	B	#6-32 X 7/8" Fin Shank Screw	237-5921-04
11	Post [Fasten] #6-32 Thread // #8-32 Thread	530-5007-00	C	#6-32 X 1 1/4" Fin Shank Screw	237-5883-00
			D	#6-32 X 1 3/8" 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.

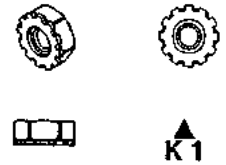
014

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

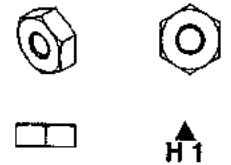
Nr.	NYLON STOP NUTS*	SPI PART Nr.
N1	#6-32 Nylon Stop Nut	240-5005-00
N2	#6-32 N.S. Nut (with 1/4" Hex Body)	240-5010-00
N3	#8-32 Nylon Stop Nut	240-5102-00
N4	#10-32 Nylon Stop Nut	240-5203-00
N5	#10-24 Nylon Stop Nut <small>Item N5 used with #10-24 X 1 1/4" Carriage Bolt Square Neck Black (231-5022-00) located in the Cabinet for the Rear Legs (Model 231-5006-00)</small>	240-5206-00
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



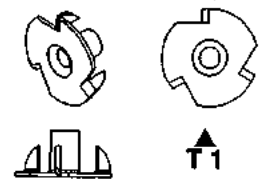
Nr.	KEPS NUTS*	SPI PART Nr.
K1	#6-32 Keps Nut (with Star Washer)	240-5008-00
K2	#6-32 Keps Nut (with 1/4" Hex Body)	240-5011-00
K3	#8-32 Keps Nut	240-5104-00
K4	#10-32 Keps Nut	240-5208-00
K5	#10-24 Keps Nut	240-5207-00
K6	#4-40 Keps Nut	240-5318-00



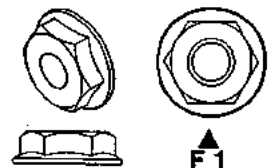
Nr.	HEX NUTS*	SPI PART Nr.
H1	#8-32 Hex Nut (No Star Washer)	240-5004-00
H2	#8-32 Hex Nut	240-5103-00
H3	#10-32 Hex Nut	240-5201-00
H4	#10-24 Hex Nut <small>Item H4 used with #10-24 X 1" Carriage Bolt Square Neck Black (231-5021-00) located in the Cabinet for the Side Armor Flare (towards Backbox)</small>	240-5202-00
H5	#10-32 X 3/8" Hex Nut	240-5209-00
H6	3/4-16 Hex Nut	240-5315-00
H7	1/2-20 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 <small>Item F1 used with 1/4-20 X 1-1/4 Sq. Neck Carriage Bolt Black (231-5009-00) located in the Cabinet for the Side Armor (Front) and Pivot Hinges.</small>	240-5300-00



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

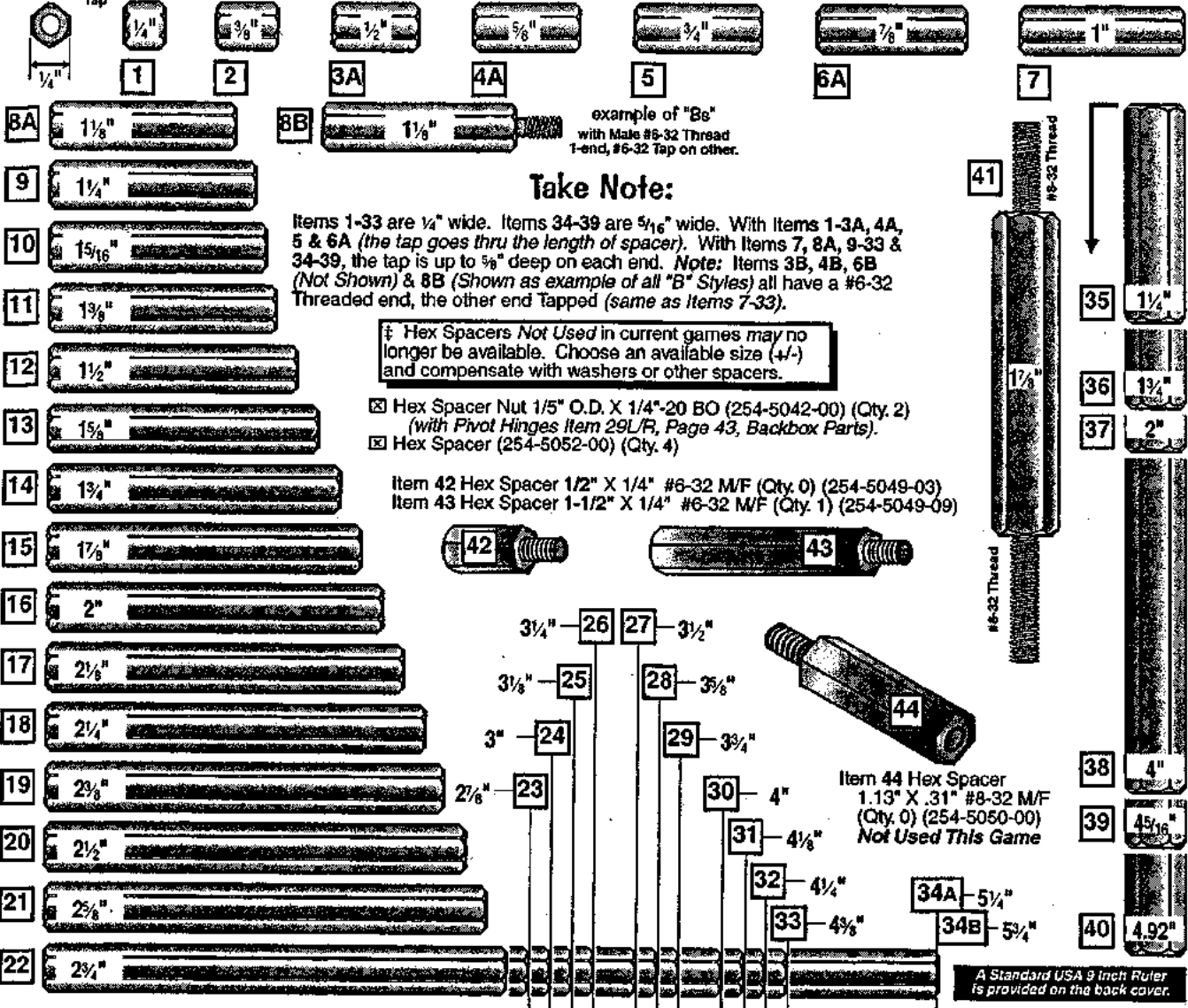
* Not Shown

Parts Identification

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.

Hex Spacers:
#6-32
Tap

Playfield Top - Hex Spacers (Actual Size) †



Take Note:

Items 1-33 are 1/4" 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 5/8" 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 (4/-) 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 (Qty. 0) (254-5049-03)
Item 43 Hex Spacer 1-1/2" X 1/4" #6-32 M/F (Qty. 1) (254-5049-09)

Item 44 Hex Spacer
1.13" X .31" #8-32 M/F
(Qty. 0) (254-5050-00)
Not Used This Game

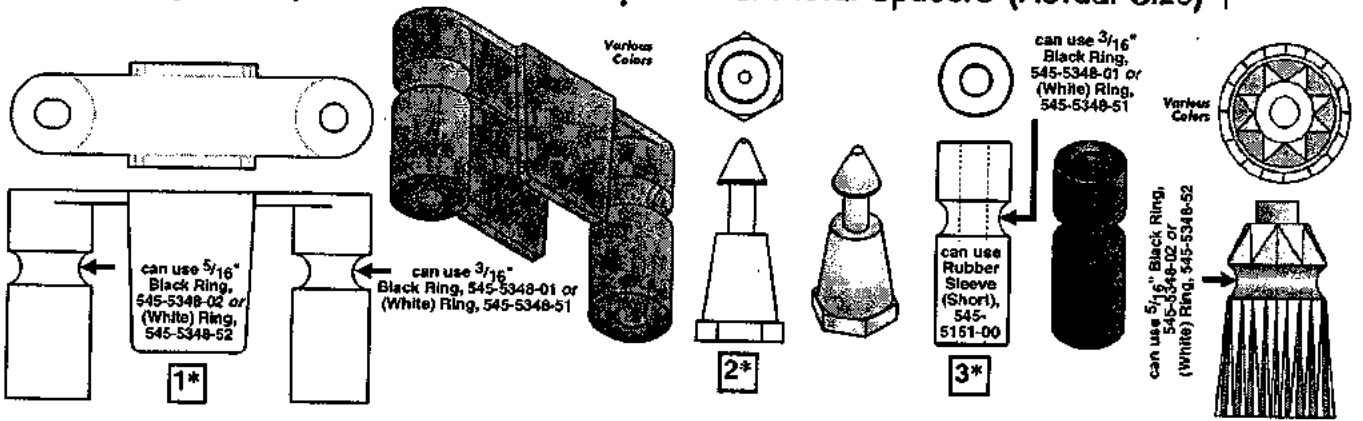
A Standard USA 9 inch Ruler is provided on the back cover.

Sec. 4: Parts Id. ...

Nr.	HEX SPACERS	QTY.	SPI PART Nr.	Nr.	HEX SPACERS	QTY.	SPI PART Nr.
1	1/4" X 1/4" : #6-32 Tap (both ends)	254-5008-00		20	2 1/2" X 1/4" : #6-32 Tap (both ends)	254-5008-16	
2	3/8" X 1/4" : #6-32 Tap (both ends)	254-5008-12		21	2 3/4" X 1/4" : #6-32 Tap (both ends)	254-5008-08	
3	1/2" X 1/4" : #6-32 Tap (both ends)	254-5008-03		22	2 3/4" X 1/4" : #6-32 Tap (both ends)	254-5008-15	
3A	Identical to 3A with #6-32 Thread end	254-5024-03		23	2 3/4" X 1/4" : #6-32 Tap (both ends)	254-5008-09	
4A	5/8" X 1/4" : #6-32 Tap (both ends)	254-5008-02		24	3" X 1/4" : #6-32 Tap (both ends)	254-5008-14	
4B*	Identical to 4A with #6-32 Thread end	254-5024-02		25	3 1/8" X 1/4" : #6-32 Tap (both ends)	254-5008-19	
5	3/4" X 1/4" : #6-32 Tap (both ends)	254-5008-07		26	3 1/4" X 1/4" : #6-32 Tap (both ends)	254-5008-26	
6A	7/8" X 1/4" : #6-32 Tap (both ends)	254-5008-05		27	3 1/2" X 1/4" : #6-32 Tap (both ends)	254-5008-27	
6B*	Identical to 6A with #6-32 Thread end	254-5024-05		28	3 3/8" X 1/4" : #6-32 Tap (both ends)	254-5008-25	
7	1" X 1/4" : #6-32 Tap (both ends)	254-5008-06		29	3 3/4" X 1/4" : #6-32 Tap (both ends)	254-5008-36	
8A	1 1/8" X 1/4" : #6-32 Tap (both ends)	254-5008-17		30	4" X 1/4" : #6-32 Tap (both ends)	254-5008-21	
8B	Identical to 8A with #6-32 Thread end	254-5024-17		31	4" X 1/4" : #6-32 Tap (both ends)	254-5008-23	
9	1 1/4" X 1/4" : #6-32 Tap (both ends)	254-5008-11		32	4 1/4" X 1/4" : #6-32 Tap (both ends)	254-5008-30	
10	1 5/16" X 1/4" : #6-32 Tap (both ends)	254-5008-34		33	4 1/2" X 1/4" : #6-32 Tap (both ends)	254-5008-29	
11	1 3/8" X 1/4" : #6-32 Tap (both ends)	254-5008-33		34A	5 1/4" X 1/4" : #6-32 Tap (both ends)	254-5008-35	
12	1 1/2" X 1/4" : #6-32 Tap (both ends)	254-5008-09		34B	5 3/4" X 1/4" : #6-32 Tap (both ends)	254-5008-38	
13	1 5/8" X 1/4" : #6-32 Tap (both ends)	254-5008-13		35	1 3/4" X 5/16" : #6-32 Tap (both ends)	254-5018-09	
14	1 3/4" X 1/4" : #6-32 Tap (both ends)	254-5008-10		36	1 3/4" X 5/16" : #6-32 Tap (both ends)	254-5018-06	
15	1 7/8" X 1/4" : #6-32 Tap (both ends)	254-5008-20		37	1 7/8" X 5/16" : #6-32 Tap (both ends)	254-5018-07	
16	2" X 1/4" : #6-32 Tap (both ends)	254-5008-07		38	4" X 5/16" : #6-32 Tap (both ends)	254-5018-03	
17	2 1/8" X 1/4" : #6-32 Tap (both ends)	254-5008-32		39	4 5/16" X 5/16" : #6-32 Tap (both ends)	254-5018-00	
18	2 1/4" X 1/4" : #6-32 Tap (both ends)	254-5008-18		40	4.92" X 5/16" : #6-32 Tap (both ends)	254-5018-04	
19	2 3/8" X 1/4" : #6-32 Tap (both ends)	254-5008-38				530-5285-00	

† 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.

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



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		

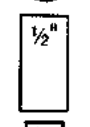
* Items 1 & 5 come in various colors. The "XX" (the last 2-Digits in the Part Number), should be replaced with the desired 2-Digit number from the above Color Chart (may not be available in every color; other colors used in prior games may no longer be available.) Call for availability.

O.D. & I.D.

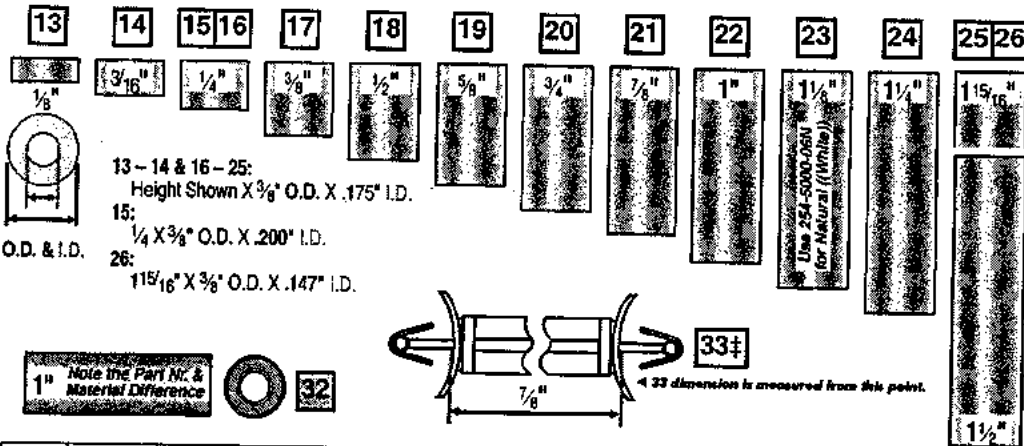


‡ Items 5 through 11 dimensions are measured from bottom to just under the cut-away. Item 33 dimension is measured from top-to-top of curve. See pictorials with Items 11 & 33.

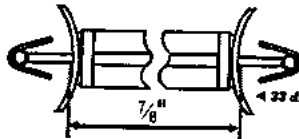
O.D. & I.D.



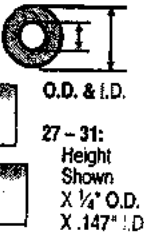
12: 1/2" X 1/4" O.D. X .147" I.D.



1" Note the Part Nr. & Material Difference



‡ 33 dimension is measured from this point.

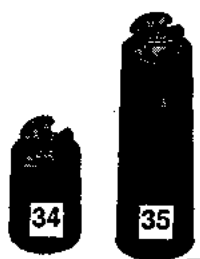


O.D. & I.D.

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

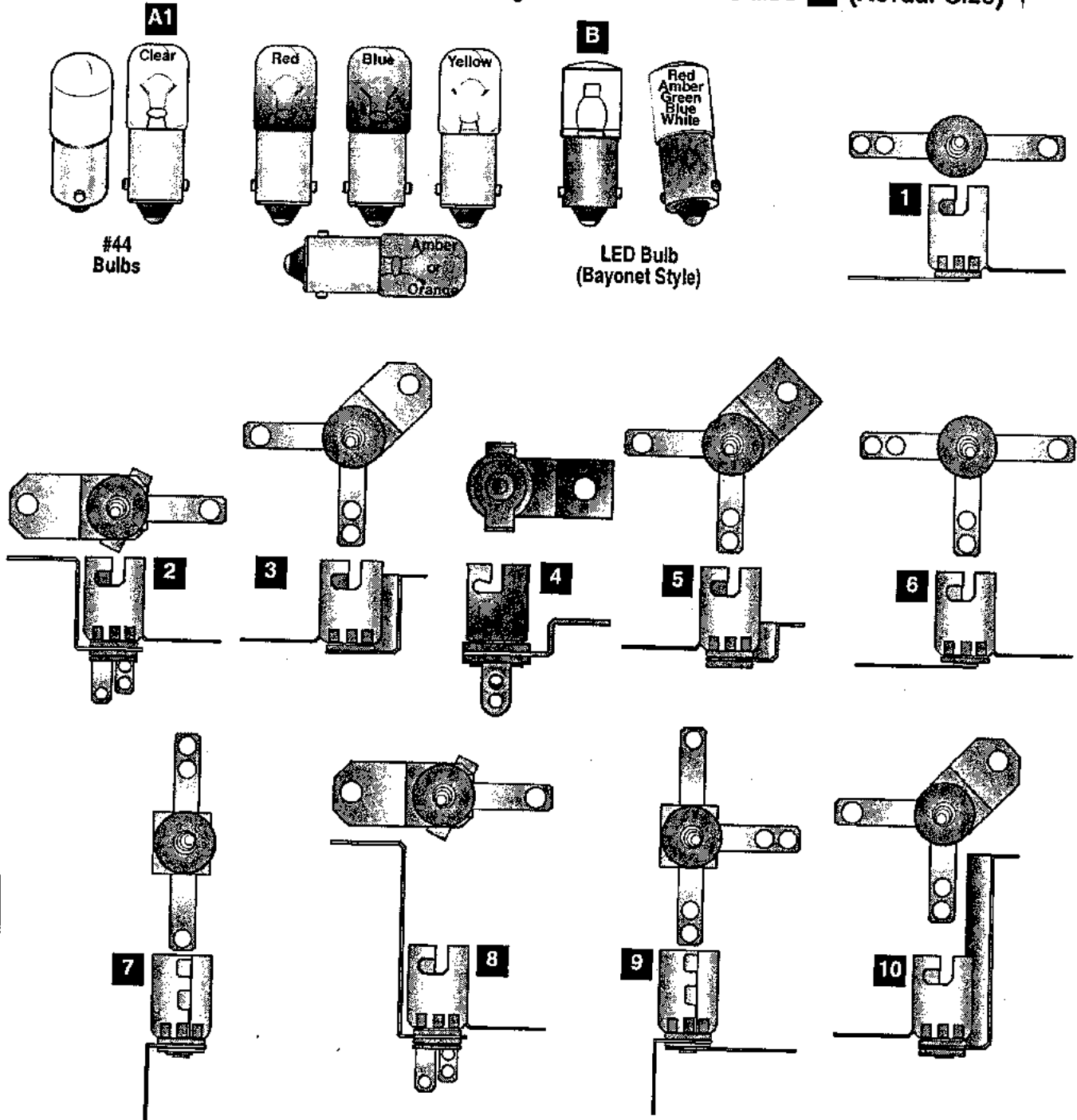
Nr.	PLASTIC POSTS & SPACERS	SPI PART Nr.	Nr.	PLASTIC POSTS & SPACERS	SPI PART Nr.
1*	Top-Lane Plastic Mini-Jewel Post (XX-Color)	550-5061-XX	21	1 1/2" X 3/8" O.D. X .76" I.D. Pls. Spacer (Gray)	254-5000-04
2**	Mini-Jewel Plastic Post (XX-Color)	550-5052-XX	22	1" X 3/8" O.D. X .175" I.D. Pls. Spacer (Gray)	254-5000-04
3**	1-Groove Plastic Post (XX-Color)	550-5059-XX	23	1 1/4" X 3/8" O.D. X .175" I.D. Pls. Spcr. (Gray)	254-5000-06
4**	1-Groove Jewel Plastic Post (XX-Color)	550-5034-XX	24	1 1/4" X 3/8" O.D. X .175" I.D. Pls. Spcr. (Gray)	254-5000-05
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.			25	1 1/2" X 3/8" O.D. X .175" I.D. Pls. Spcr. (Gray)	254-5000-08
Items 1-4 Note: Use Color Chart above for last 2-digits. Not all colors are available.			26	1 15/16" X 3/8" O.D. X .147" I.D. Plastic Spacer (Gray)	254-5000-15
5‡	1/2" Self Retain. Plastic Spacer (White)	254-5007-02	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.		
6‡	3/16" Self Retain. Plastic Spacer (White)	254-5007-05	27	1 1/2" X 3/8" O.D. X .144" I.D. Metal Spacer	254-5014-03
7‡	1/4" Self Retain. Plastic Spacer (White)	254-5007-01	28	1/2" X 5/16" O.D. X .144" I.D. Metal Spacer	254-5014-00
8‡	1/2" Self Retain. Plastic Spacer (White)	254-5007-04	29	1/2" X 5/16" O.D. X .144" I.D. Metal Spacer	254-5014-04
9‡	3/8" Self Retain. Plastic Spacer (White)	254-5007-00	30	3/4" X 5/16" O.D. X .144" I.D. Metal Spacer	254-5014-01
10‡	3/4" Self Retain. Plastic Spacer (White)	254-5007-03	31	1 1/4" X 3/16" O.D. X .144" I.D. Metal Spacer	254-5014-02
11‡	1" Self Retain. Plastic Spacer (White)	254-5007-06	32	1" X 5/16" O.D. X .144" I.D. Metal Spacer	254-5001-00
12	1/2" X 1/4" O.D. X .147" I.D. Pls. Spacer (White)	254-5000-03	33‡	7/8" Plastic Spacer Support (Dual-Locking)	254-5039-14
13	1/8" X 3/8" O.D. X .175" I.D. Pls. Spacer (Gray)	254-5000-19	34	Plastic Spacer, .5"	254-5054-00
14	3/16" X 3/8" O.D. X .175" I.D. Pls. Spcr. (Gray)	254-5000-18	35	Plastic Mounting	254-5054-01
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	3/4" 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			

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

Playfield Top & Bottom - Small Bayonet Sockets & Bulbs (Actual Size) †



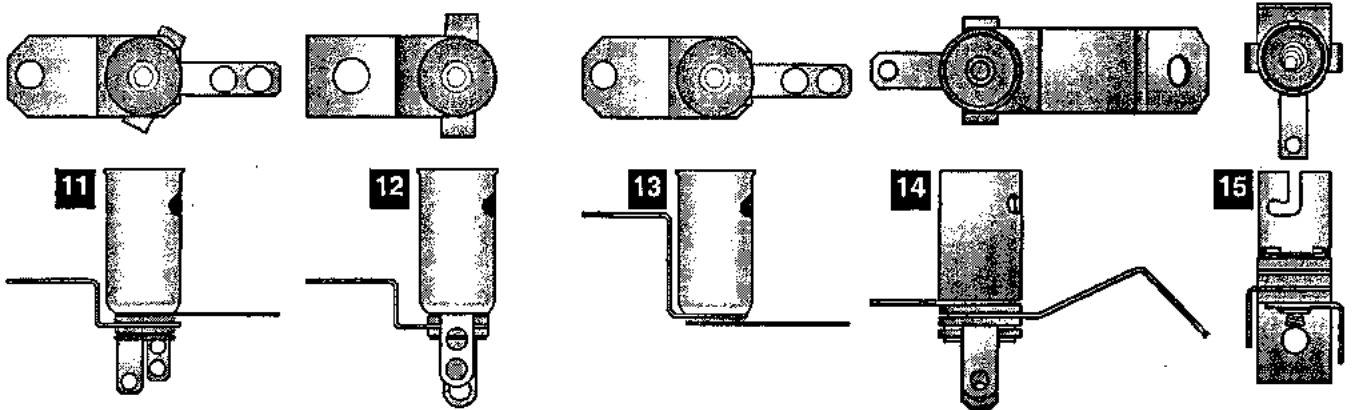
Parts Identification

Nr.	BULBS (#44)	SPI PART Nr.	Nr.	BULBS (LED & #455)	SPI PART Nr.
1	#44 Bulb (Clear) Heavy Filament	(165-5000-00)	B	LED Module (W/Flt) (12.8v 20-25mA) BynL	112-5023-08
2	#44 Bulb (replace) (X) w/color below	(165-5053-XX) (F)		Item B Note: Different Colors may be available -	
3	Red (165-5053-02) (F)	(165-5053-02) (F)		Red (112-5023-02); Amber (112-5023-03); Green (112-5023-04); Blue (112-5023-05);	
4	Amber (165-5053-03) (F)	(165-5053-03) (F)			
5	Green (165-5053-04) (F)	(165-5053-04) (F)			
6	Yellow (165-5053-05) (F)	(165-5053-05) (F)			

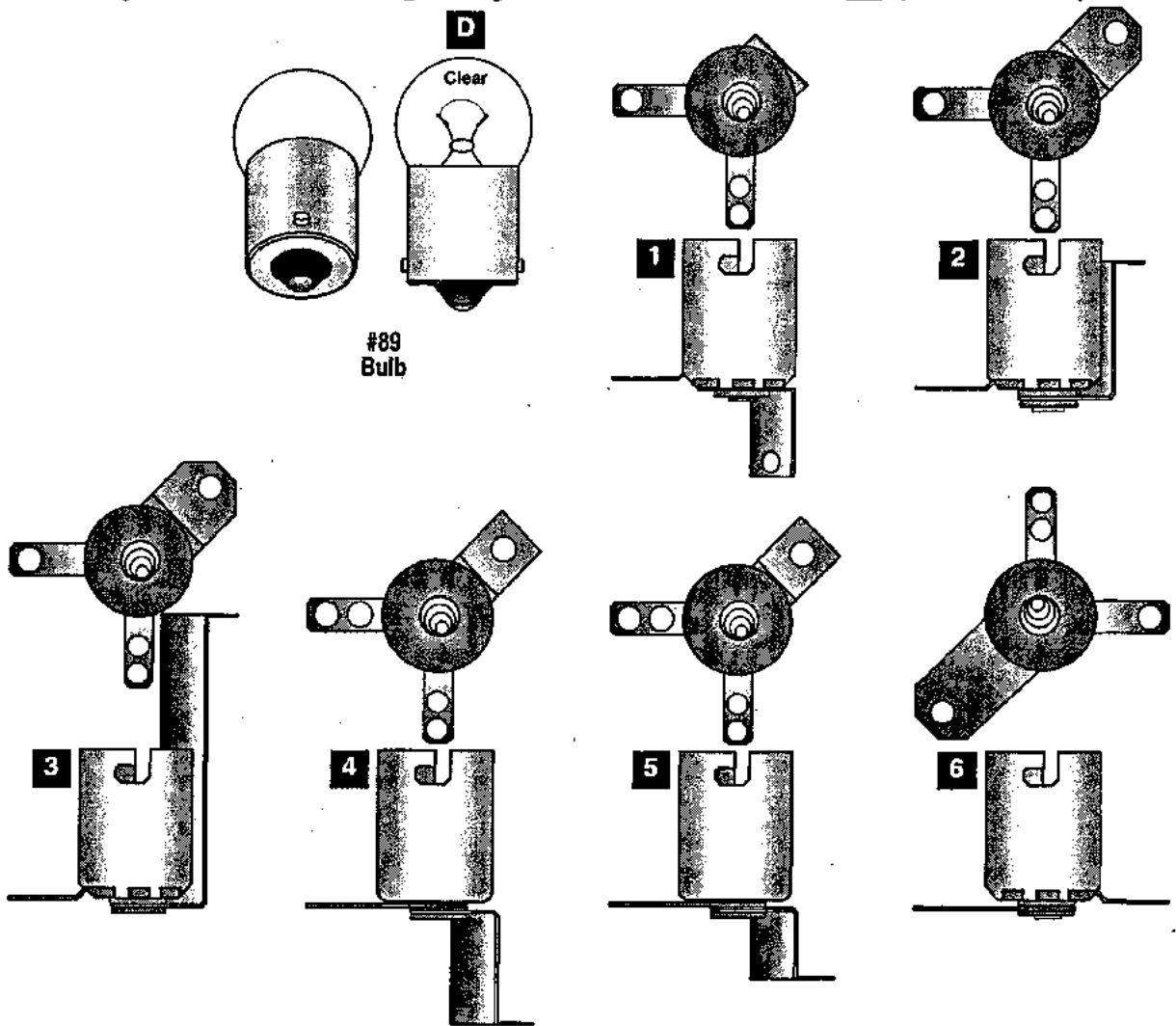
Nr.	SMALL BAYONET SOCKETS	SPI PART Nr.	Nr.	SMALL BAYONET SOCKETS	SPI PART Nr.
1	2-Lug Staple Down Socket	077-5000-00	10	2-Lug Stand-Up Socket (Tall Bracket)	077-5005-00
2	3-Lug Stand-Up Socket (Med. Brkt.)	077-5008-00	11	2-Lug Stand-Up Long Shell Socket	077-5013-00
3	2-Lug Stand-Up Socket (Med. Brkt.)	077-5002-00	12	2-Lug Stand-Up Lg. Shell Socket (Gls)	077-5031-00
4	2-Lug Stand-Up Socket (Short Brkt.)	077-5223-00	13	1-Lug S-U Lg. Shell Sckt. (Med. Brkt.)	077-5012-00
5	2-Lug Stand-Up Sckt. (Short Bracket)	077-5002-31	14	3-Lug S-U Lg. Shell Sckt. (45° Brkt.)	077-5035-00
6	3-Lug Staple Down Socket	077-5001-00	15	3-Lug Laydown Socket (2 Lugs Bent)	077-5002-00
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			

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.

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



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

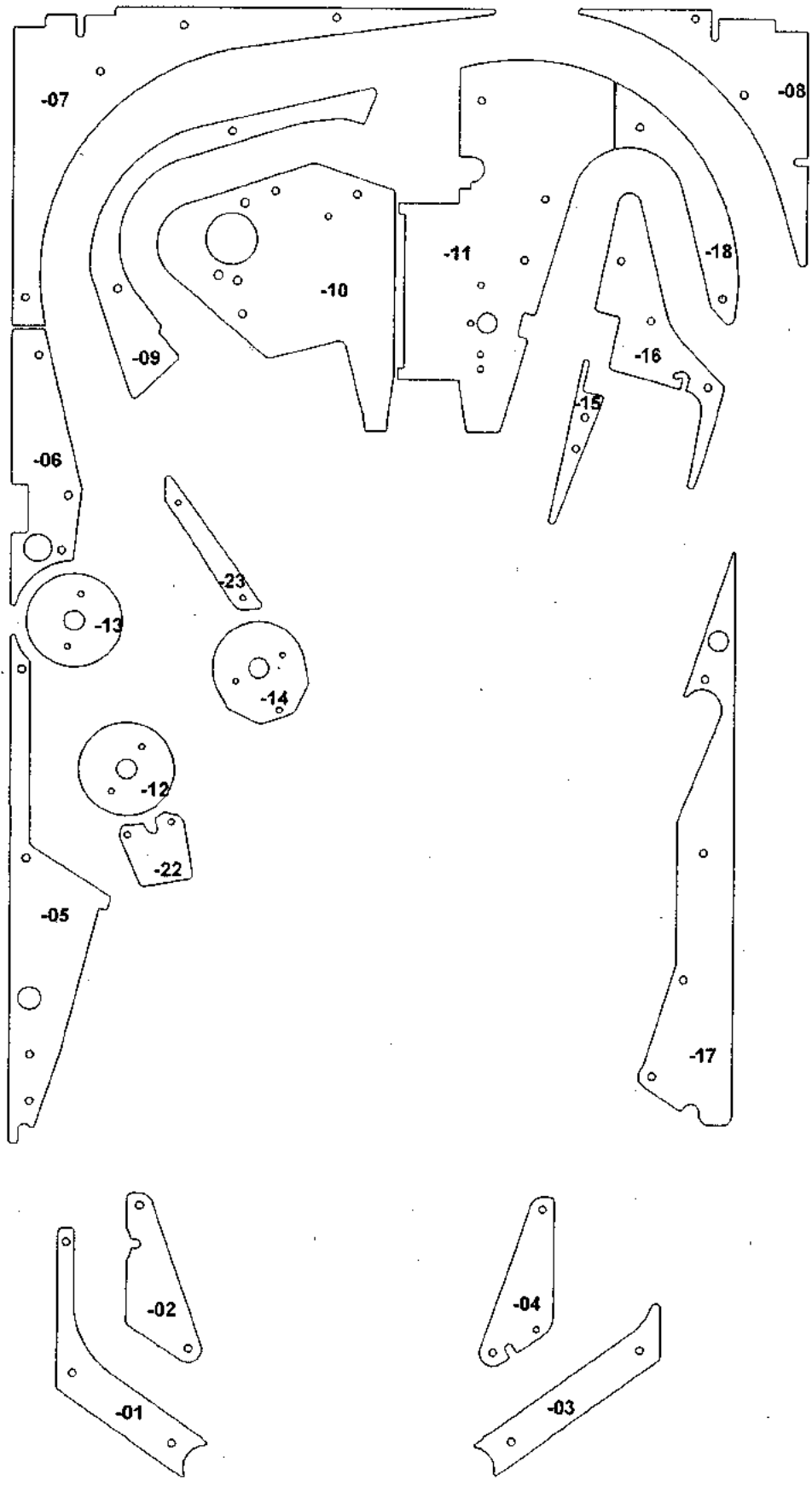


Parts Identification

Nr.	BULBS (#89)	SPI PART Nr.		
D	#89 Bulb (Heavy Filament)	165-5000-89-1F	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

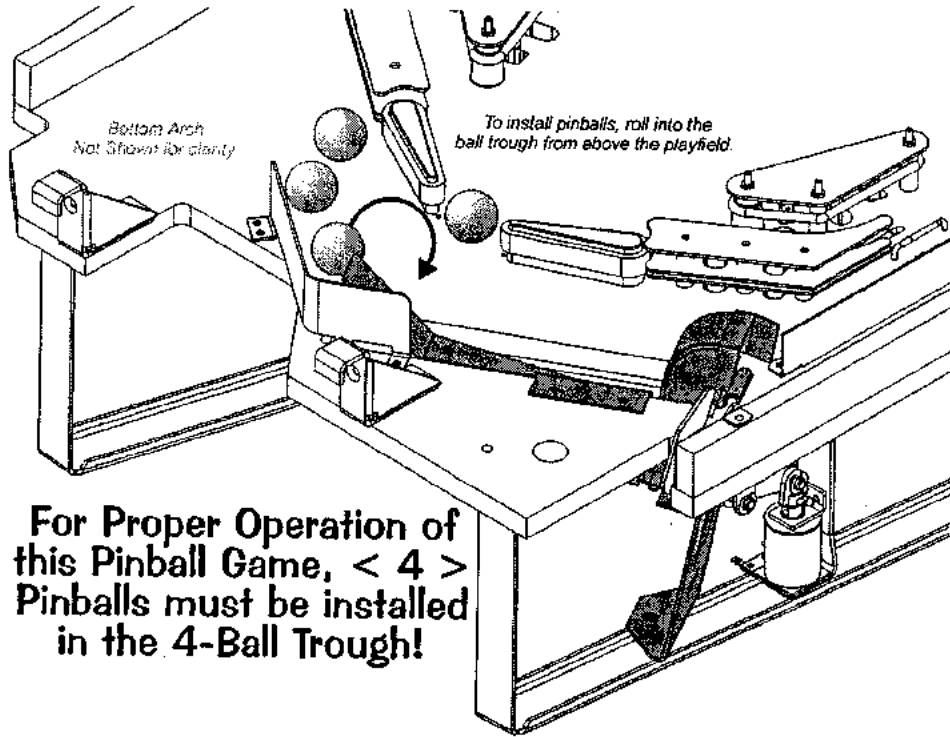
Nr.	LARGE BAYONET SOCKETS	SPI PART Nr.
-----	-----------------------	--------------

**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.**



PLASTICS - LOWER LAYER

P22



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



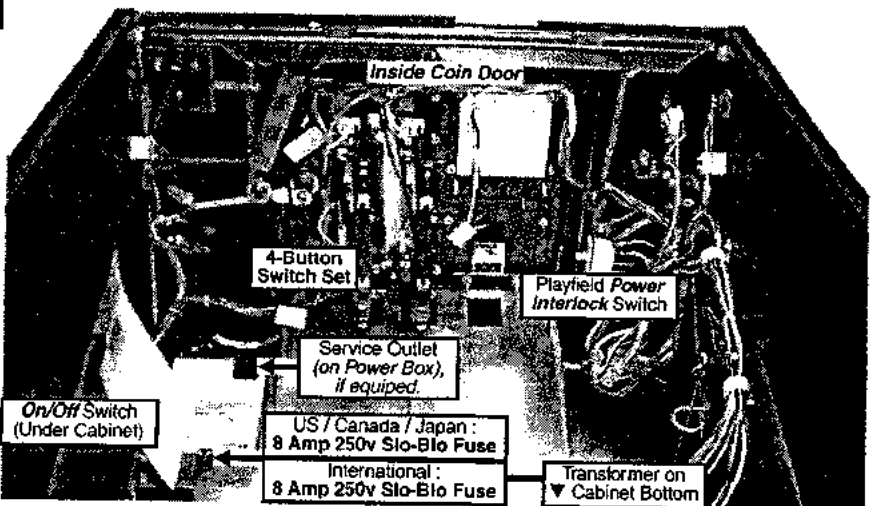
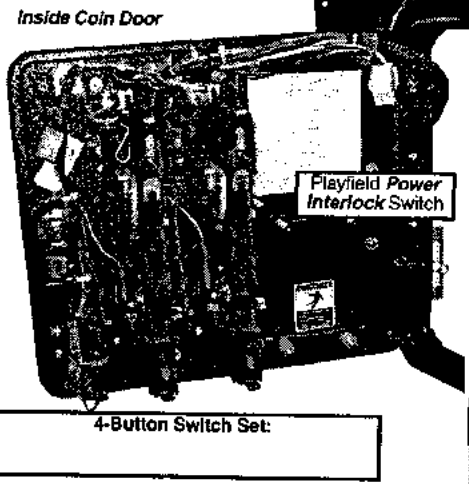
Backbox Fuses*, Cabinet Fuses, Playfield Fuses and Cabinet Switches

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

QUICK REFERENCE FUSE CHART			
3/4A S.B. 200-5000-17 1A S.B. 200-5000-03 1.4A S.B. 200-5000-03 1.6A S.B. 200-5000-01 7A S.B. 200-5300-03 8A S.B. 200-5000-05			
BACKBOX FUSES		CABINET 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 Circuit]
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	8A S.B.	18VDC Control Lamps	[13VAC feed to BRDG 4]
F10	5A S.B.	20VDC Coils / Flashers	[16VAC feed to BRDG 2]
F11	4A S.B.	5VDC Logic Power	[8VAC feed to BRDG 5]
F12	5A S.B.	12VDC Audio	[19VAC feed to BRDG 3]
F13	5A S.B.	12VDC Audio	[19VAC feed to BRDG 3]
DISPLAY POWER SUPPLY BOARD		PLAYFIELD FUSES	
F1	3/4A S.B.	90VDC High Voltage Dot Display Board	
		FLIPPER OR SPECIAL APPLICATION	
[Coin Fuses are applied to the playfield near assembly]			
		3A S.B.	50VDC R Flipper [BROWN-YEL-GRN-YEL]
		3A S.B.	50VDC L Flipper [GRY-YEL-RED-YEL]
		3A S.B.	50VDC Additional Flipper Coil, if used
		3A S.B.	50VDC Spot Application Coil, if used
[For location & mount details on fuses, see Exp. 3 Exp. 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!

Stem Pinball, Inc. ©2008 #20-6384-00 Rev C

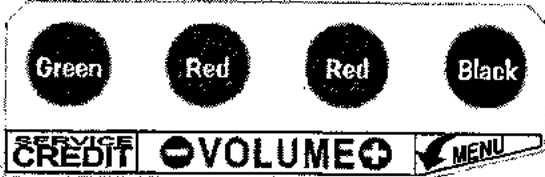


OPEN THE COIN DOOR TO ACCESS THE SERVICE SWITCH X4 SET.

● ● ● ● Service Switch X4 Set Overview

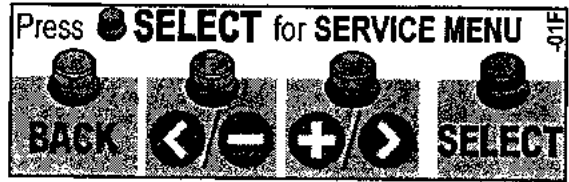
The four buttons (inside Coin Door) have dual functions depending if you have entered the Service Menu or not.

Functions in Game or Attract Mode

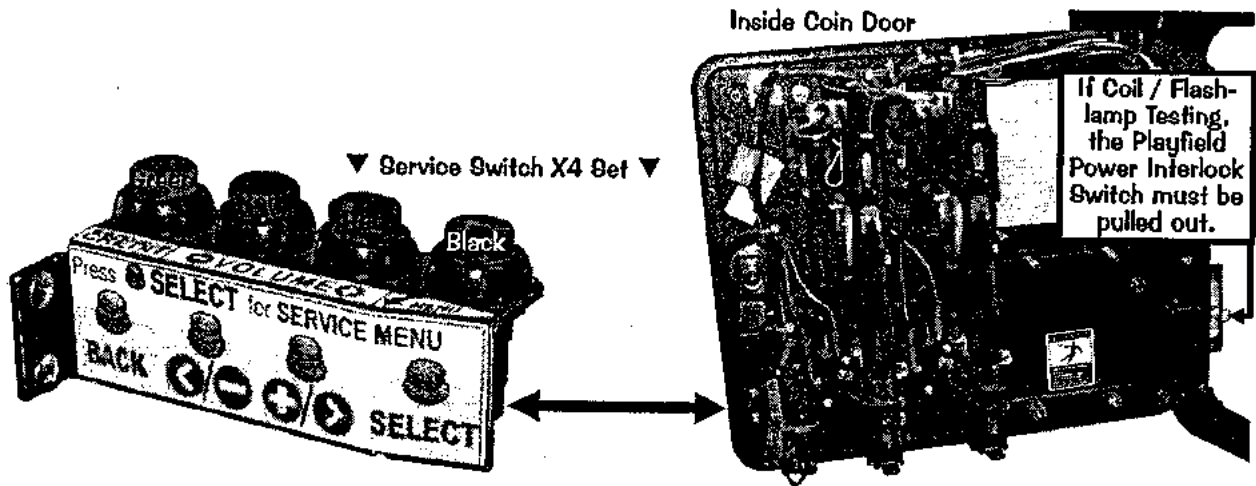


- Green Button Press for Service Credit(s).
- Red Buttons Press for Volume Adjustment - for less (quieter), + for more (louder).
- Black Button Press for Service Menu entry.

Functions in the Service Menu



- 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').



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.



The Service Menu is subject to change. Update this game with the latest code downloaded from our 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.

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
00.00 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)

<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td colspan="9">CPU COUNTRY SETTING: Pos. 1 2 3 4 5 6 7 8</td></tr> <tr><td style="text-align: center;">USA</td><td>ON</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td>OFF</td><td>▼</td><td>▼</td><td>▼</td><td>▼</td><td>▼</td><td>▼</td><td>▼</td></tr> </table>	CPU COUNTRY SETTING: Pos. 1 2 3 4 5 6 7 8									USA	ON									OFF	▼	▼	▼	▼	▼	▼	▼	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td colspan="9">CPU COUNTRY SETTING: Pos. 1 2 3 4 5 6 7 8</td></tr> <tr><td style="text-align: center;">Germany</td><td>ON</td><td>▲</td><td>▲</td><td>▲</td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td>OFF</td><td>▼</td><td>▼</td><td>▼</td><td>▼</td><td>▼</td><td>▼</td><td>▼</td></tr> </table>	CPU COUNTRY SETTING: Pos. 1 2 3 4 5 6 7 8									Germany	ON	▲	▲	▲						OFF	▼	▼	▼	▼	▼	▼	▼	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td colspan="9">CPU COUNTRY SETTING: Pos. 1 2 3 4 5 6 7 8</td></tr> <tr><td style="text-align: center;">Russia</td><td>ON</td><td>▲</td><td></td><td></td><td>▲</td><td>▲</td><td></td><td></td></tr> <tr><td></td><td>OFF</td><td>▼</td><td>▼</td><td>▼</td><td>▼</td><td>▼</td><td>▼</td><td>▼</td></tr> </table>	CPU COUNTRY SETTING: Pos. 1 2 3 4 5 6 7 8									Russia	ON	▲			▲	▲				OFF	▼	▼	▼	▼	▼	▼	▼
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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.

SWITCH MATRIX GRID I #1 - #64 (Switch Locations : next page)

CPU/SND Board	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
01 DRIVE GRN-BRN J1-P1	S.W. #1 L. 2 BANK TARGET (BOT)	S.W. #2 L. 2 BANK TARGET (TOP)	S.W. #3 L. 2 BANK TARGET (BOT)	S.W. #4 EJECT	S.W. #5	S.W. #6	S.W. #7 R. 2 BANK TARGET (TOP)	S.W. #8 R. 2 BANK TARGET (BOT)	S.W. #9	S.W. #10 L. RAMP EXIT	S.W. #11 L. RAMP EXIT	S.W. #12 L. RAMP DOWN	S.W. #13 L. RAMP ENTRANCE	S.W. #14 LEFT ORBIT	S.W. #15 TOURN START	S.W. #16 RIGHT ORBIT START
02 DRIVE GRN-BRN J1-P3	S.W. #17 TROUGH #4 LEFT	S.W. #18 TROUGH #3	S.W. #19 TROUGH #2	S.W. #20 TROUGH #1 RIGHT	S.W. #21 TROUGH JAM	S.W. #22 TROUGH JAM	S.W. #23 SHOOTER LANE	S.W. #24 LEFT OUTLANE	S.W. #25 LEFT RETURN LANE	S.W. #26 LEFT SLINGSHOT	S.W. #27 RIGHT SLINGSHOT	S.W. #28 RIGHT RETURN LANE (L)	S.W. #29 RIGHT OUTLANE	S.W. #30 LEFT POP BURNER	S.W. #31 RIGHT POP BURNER	S.W. #32 BOTTOM POP BURNER
03 DRIVE GRN-BRN J1-P4	S.W. #33 RIGHT RETURN LANE (R)	S.W. #34 ICE MAN HOME	S.W. #35 ICE MAN AWAY	S.W. #36 VOLVINE TARGET	S.W. #37 CENTER LOCK 1	S.W. #38 CENTER LOCK 2	S.W. #39 CENTER LOCK 3	S.W. #40 CENTER LOCK 4 (TOP)	S.W. #41 LEFT LOCK TARGET (L)	S.W. #42 LEFT LOCK TARGET (R)					S.W. #43 RIGHT SPINNER	S.W. #44 R. RAMP ENTRANCE
04 DRIVE GRN-YEL J1-P5	S.W. #49 RIGHT ORBIT	S.W. #50 NIGHTCRAW HIT	S.W. #51 NIGHTCRAW HIT	S.W. #52 R. RAMP EXIT	S.W. #53 CENTER LOCK 1 (BOTTOM)	S.W. #54 L. INNER LOOP	S.W. #55 LEFT IP KICKER DOWN	S.W. #56 R. NIGHTCRAW DOWN	S.W. #57	S.W. #58	S.W. #59	S.W. #60	S.W. #61	S.W. #62	S.W. #63	S.W. #64

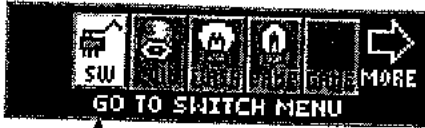
Wire Color Abbreviations used:
 BLK Black
 BRN Brown
 GRN Green
 GRN-YEL Green/Yellow
 YEL Yellow

Dedicated Switches I #D-1 - #D-32 (Dedicated Switch Locations : next page)

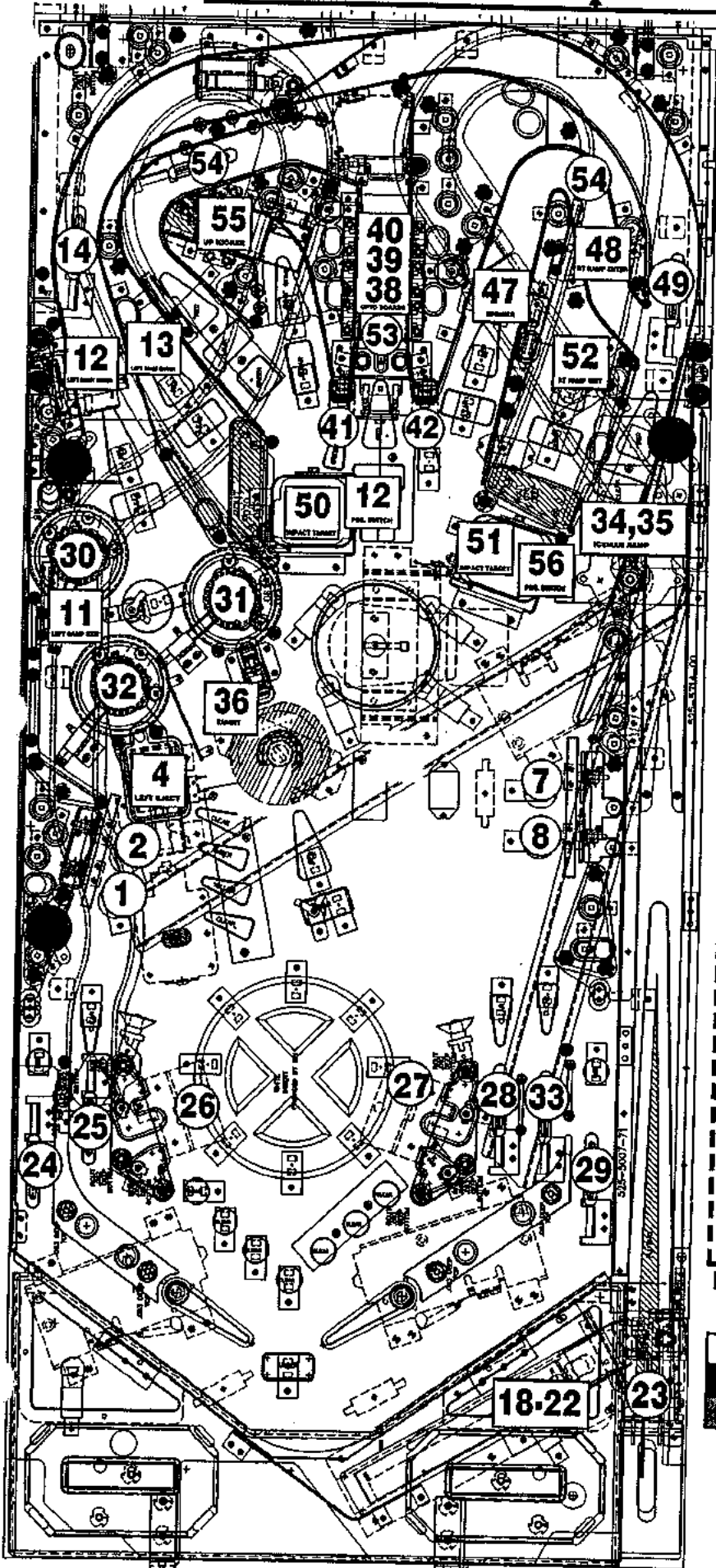
CPU/SND Board	S.W. #D-1	S.W. #D-2	S.W. #D-3	S.W. #D-4	S.W. #D-5	S.W. #D-6	S.W. #D-7	S.W. #D-8	S.W. #D-9	S.W. #D-10	S.W. #D-11	S.W. #D-12	S.W. #D-13	S.W. #D-14	S.W. #D-15	S.W. #D-16
01 CPU/SND Board	LEFT COM COIN SLOT	CENTER COM SLOT	RIGHT COM COIN SLOT	FORTH COM SLOT	FIRTH COM SLOT	IF USED										
02 CPU/SND Board	LEFT COM COIN DOOR	CENTER COM COIN DOOR	RIGHT COM COIN DOOR	FORTH COM COIN DOOR	FIRTH COM COIN DOOR	IF USED										
03 CPU/SND Board	LEFT COM COIN DOOR	CENTER COM COIN DOOR	RIGHT COM COIN DOOR	FORTH COM COIN DOOR	FIRTH COM COIN DOOR	IF USED										

CPU/SOUND BD. SW1 DIP SWITCH (located between Connectors J3/J19)

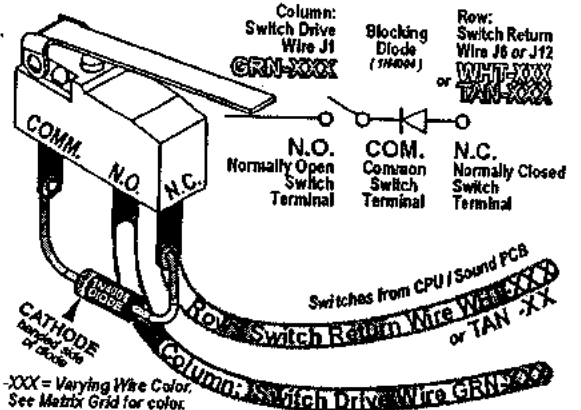
CPU/SND Board	S.W. #D-17	S.W. #D-18	S.W. #D-19	S.W. #D-20	S.W. #D-21	S.W. #D-22	S.W. #D-23	S.W. #D-24	S.W. #D-25	S.W. #D-26	S.W. #D-27	S.W. #D-28	S.W. #D-29	S.W. #D-30	S.W. #D-31	S.W. #D-32
01 CPU/SND Board	TILT PENDULUM CABINET	SLAM TILT	TICKET NOTCH F USED		BACK (GREEN)	MINUS (RED)	PLUS (RED)	SELECT (BLACK)	DIP #1 ON	DIP #2 ON	DIP #3 ON	DIP #4 ON	DIP #5 ON	DIP #6 ON	DIP #7 ON	DIP #8 ON



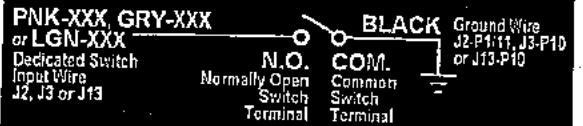
SWITCH MENU: SWITCH, ACTIVE, SINGLE & SERVICE



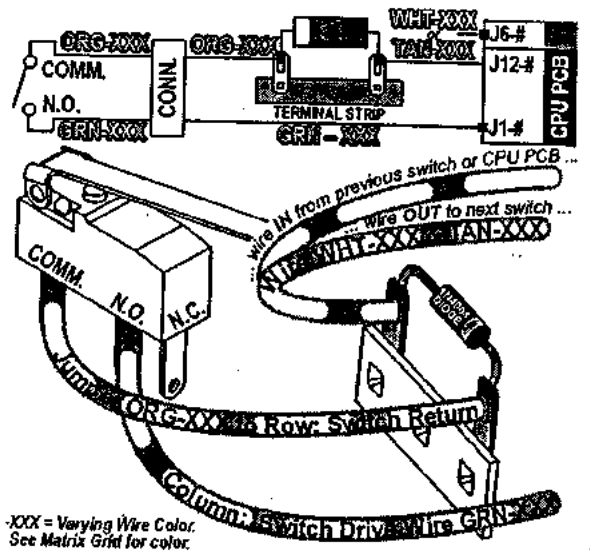
Typical Switch Wiring & Schematic



Dedicated Switch Schematic



Typical Switch Wiring & Schematic ... with Switch Diode on a Terminal Strip (DOT9)



For more about Diode on Terminal Strips (DOT9), see the Yellow Pages (Schematics & Wiring).

- = Switches above Playfield.
- = Switches below Playfield.
- = OPTO Switch Pairs above.

Switch Part Notes: Y Yen Coin Switch is 180-5091-00. Part Numbers which start with 515- or 500- include the bracket, target, and/or housing.

Sw. D-17 Part Note: The Switch is comprised of a Hanger Bracket (535-5319-00) and Contact Wire (535-7563-01) located in the Cabinet.

LAMP MATRIX GRID [#1 - #80] (Lamp Locations : next page)

LP #1	LP #2	LP #3	LP #4	LP #5	LP #6	LP #7	LP #8
LED BD. L.P. #17 OMEGA RED	LED BO. L.P. #18 SENTINELS	LED BO. L.P. #19 BROTHERHOOD	LED BO. L.P. #20 ROGUE	LED BO. L.P. #21 ICEMAN	LED BO. L.P. #22 WOLVERINE	LED BO. L.P. #23 XAVIER	LED BO. L.P. #24 STORM
LED BO. L.P. #25 PHOENIX	LED BO. L.P. #26 CYCLOPS	LED BO. L.P. #27 BEAST	LED BO. L.P. #28 SABERTOOTH	LED BO. L.P. #29 SHADOW KING	LED BO. L.P. #30 HELLFIRE CLUB	LED BO. L.P. #31 JUGGERNAUT	LED BO. L.P. #32 SHOOT AGAIN
LED BO. L.P. #33 LEFT SPECIAL	LED BO. L.P. #34 LEFT RETURN LANE	LED BO. L.P. #35 LEFT 2 BANK (BOTTOM)	LED BO. L.P. #36 LEFT 2 BANK (TOP)	LED BO. L.P. #37 WOLVERINE	LED BO. L.P. #38 WOLVERINE (RED)	LED BO. L.P. #39 START BUTTON	LED BO. L.P. #40 TOURNEY START
LED BO. L.P. #41 BOTTOM BUMPER	LED BO. L.P. #42 RIGHT BUMPER	LED BO. L.P. #43 LEFT BUMPER	LED BO. L.P. #44	LED BO. L.P. #45 DARK PHOENIX	LED BO. L.P. #46 EXTRA BALL	LED BO. L.P. #47 DANGER ROOM	LED BO. L.P. #48 VILLIAN
LED BO. L.P. #49 LEFT INNER LOOP (GREEN)	LED BO. L.P. #50 ROGUE	LED BO. L.P. #51 LEFT INNER LOOP (RED)	LED BO. L.P. #52 GAMBIT	LED BO. L.P. #53 BEAST	LED BO. L.P. #54 LEFT ORBIT (RED)	LED BO. L.P. #55 LEFT RAMP (RED)	LED BO. L.P. #56 STORM
LED BO. L.P. #57 UP KICKER (RED)	LED BO. L.P. #58 XAVIER	LED BO. L.P. #59 LEFT EJECT (TOP)	LED BO. L.P. #60 LIGHT LOCK (LEFT)	LED BO. L.P. #61	LED BO. L.P. #62 WOLVERINE HEAD	LED BO. L.P. #63 WOLVERINE HEAD	LED BO. L.P. #64
LED BO. L.P. #65 MAGNETO (GREEN)	LED BO. L.P. #66 MAGNETO	LED BO. L.P. #67 MAGNETO (RED)	LED BO. L.P. #68 RIGHT RETURN LANE (LEFT)	LED BO. L.P. #69 RIGHT RETURN LANE (RIGHT)	LED BO. L.P. #70 RIGHT SPECIAL	LED BO. L.P. #71 RIGHT 2 BANK TARGET (BOTTOM)	LED BO. L.P. #72 RIGHT 2 BANK TARGET (TOP)
LED BO. L.P. #73 ICEMAN	LED BO. L.P. #74 RIGHT RAMP (RED)	LED BO. L.P. #75 RIGHT INNER LOOP (RED)	LED BO. L.P. #76 CYCLOPS	LED BO. L.P. #77 LIGHT LOCK (RIGHT)	LED BO. L.P. #78 RIGHT ORBIT (RED)	LED BO. L.P. #79 PHOENIX	LED BO. L.P. #80 RIGHT ORBIT (GREEN)







DIAG
 GO TO DIAGNOSTICS MENU








LAMP
 GO TO LAMP MENU

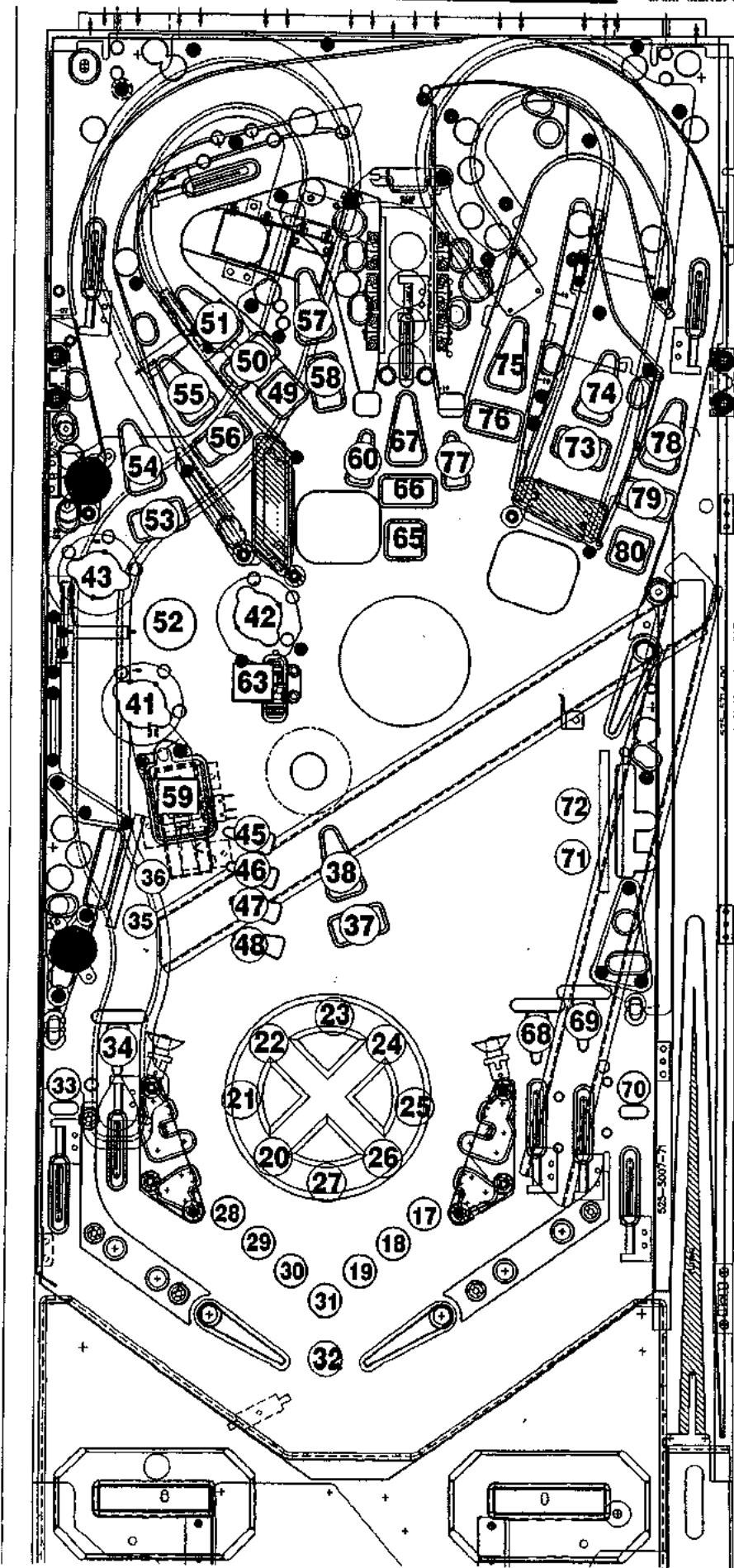






ONE
 SINGLE LAMP TEST

LAMP MENU: ONE, ALL, ROW, COLUMN & ORDERED



COILS DETAILED CHART TABLE

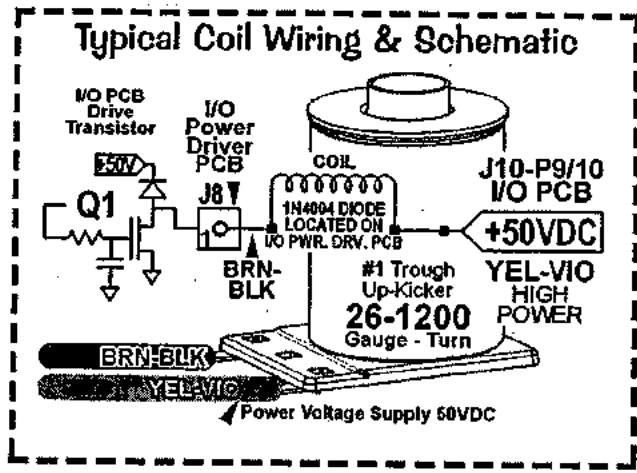
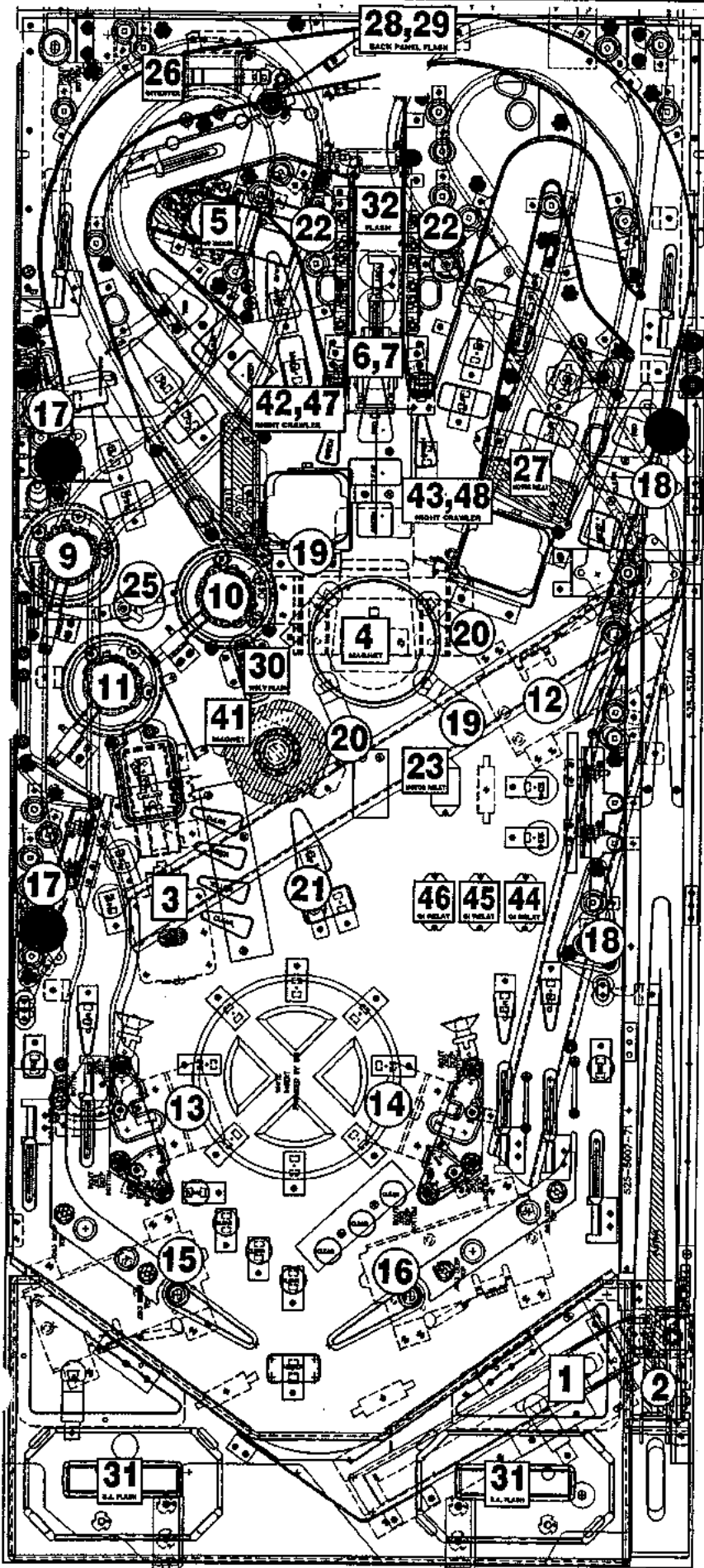
High Current Coils Group 1		Drive Transistor	Driver Output PCB	Power Line Color	Power Line Connection	Power Voltage	Drive Transistor Control Line Color	D.T. Control Line Connect	Coil GA-Turn or Bulb Type
#1	TROUGH UP-KICKER	Q1	▲ I/O Power Driver ▼	YEL-VIO	J10-P9/10	50VDC	BRN-BLK	J8-P1	28-1200 090-5044-ND
#2	AUTO LAUNCH	Q2		YEL-VIO	J10-P9/10	50VDC	BRN-RED	J8-P3	24-840 090-5036-ND
#3	LOWER LEFT EJECT	Q3		YEL-VIO	J10-P9/10	50VDC	BRN-ORG	J8-P4	23-800 090-5001-ND
#4	MAGNETO MAGNET	Q4		VIO-YEL	J10-P8	50VDC	BRN-YEL	J8-P5	22-600 090-5078-00
#5	LEFT UP KICKER	Q5		YEL-VIO	J10-P9/10	50VDC	BRN-GRN	J8-P6	23-800 090-5001-ND
#6	CENTER LOCKUP UP	Q6		YEL-VIO	J10-P9/10	50VDC	BRN-BLU	J8-P7	28-1200 090-5044-ND
#7	CENTER LOCKUP LATCH	Q7		YEL-VIO	J10-P9/10	50VDC	BRN-VIO	J8-P8	32-1800 515-7885-00
#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	▲ I/O Power Driver ▼	YEL-VIO	J10-P9/10	50VDC	BLU-BRN	J8-P1	28-1200 090-5044-ND
#10	RIGHT POP BUMPER	Q10		YEL-VIO	J10-P9/10	50VDC	BLU-RED	J8-P2	28-1200 090-5044-ND
#11	BOTTOM POP BUMPER	Q11		YEL-VIO	J10-P9/10	50VDC	BLU-ORG	J8-P4	28-1200 090-5044-ND
#12	UPPER RIGHT FLIPPER	Q12		GRY-YEL 3A Fuse-RED-YEL	J10-P6/7	50VDC	BLU-YEL	J8-P5	22-1080 090-5032-ND
#13	LEFT SLINGSHOT	Q13		YEL-VIO	J10-P9/10	50VDC	BLU-GRN	J8-P6	28-1200 090-5044-ND
#14	RIGHT SLINGSHOT	Q14		YEL-VIO	J10-P9/10	50VDC	BLU-BLU	J8-P7	28-1200 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	FLASH: LEFT SIDE (X2)	Q17	▲ I/O Power Driver ▼	ORG	J6-P10	20VDC	VIO-BRN	J7-P2	# 80 BULB 165-5000-88
#18	FLASH: RIGHT SIDE	Q18		ORG	J6-P10	20VDC	VIO-RED	J7-P3	# 80 BULB 165-5000-88
#19	FLASH: DISC CLEAR (X2)	Q19		ORG	J6-P10	20VDC	VIO-ORG	J7-P4	# 80 BULB 165-5000-88
#20	FLASH: DISC BLUE (X2)	Q20		ORG	J6-P10	20VDC	VIO-YEL	J7-P6	# 80 BULB 165-5000-88
#21	FLASH: WOLVERINE	Q21		ORG	J6-P10	20VDC	VIO-GRN	J7-P7	# 80 BULB 165-5000-88
#22	FLASH: MAGNETO (LEFT/RIGHT) (X2)	Q22		ORG	J6-P10	20VDC	VIO-BLU	J7-P8	# 80 BULB 165-5000-88
#23	DISC MOTOR POWER	Q23		BRN	J7-P1	20VDC	VIO-BLK	J7-P9	RELAY 190-5004-00
#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	FLASH: POP BUMPER	Q25	▲ I/O Power Driver ▼	ORG	J6-P10	20VDC	BLK-BRN	J6-P1	# 80 BULB 165-5000-88
#26	ORBIT DIVERTER	Q26		BRN	J7-P1	20VDC	BLK-RED	J6-P2	24-840 090-5036-ND
#27	ICEMAN MOTOR	Q27		BRN	J7-P1	20VDC	BLK-ORG	J6-P3	MOTOR 041-5113-00
#28	FLASH: BACKPANEL (LEFT) (X3)	Q28		ORG	J6-P10	20VDC	BLK-YEL	J6-P4	# 80 BULB 165-5000-88
#29	FLASH: BACKPANEL (RIGHT) (X3)	Q29		ORG	J6-P10	20VDC	BLK-GRN	J6-P5	# 80 BULB 165-5000-88
#30	FLASH: MAGNETO SPOT LIGHT	Q30		ORG	J6-P10	20VDC	BLK-BLU	J6-P6	# 181 BULB 165-5032-00
#31	FLASH: BOTTOM ARCH (X2)	Q31		ORG	J6-P10	20VDC	BLK-VIO	J6-P7	# 80 BULB 165-5000-88
#32	FLASH: MAGNETO FIGURE	Q32		ORG	J10-P8	20VDC	BLK-GRY	J6-P8	# 181 BULB 165-5032-00

GO TO DIAGNOSTICS MENU

GO TO COIL MENU

SINGLE COIL TEST

COIL MENU: SINGLE COIL & CYCLING COIL



- Color = Color of Mini-Mars or Flash Lamp Bulb.
- = Coils / Flash Lamps above Playfield.
 - = Coils / Flash Lamps below Playfield.
 - = Coils / Flash Lamps on Back Panel.
- # [Flash]
 Coil Q24 is Optional. If either a Coin Meter, Token Dispenser or Kicker (all optional equipment) is required, call Technical Support for more information, 1-800-542-5377 or 1-708-345-7700.

COILS DETAILED CHART TABLE

	HIGH CURRENT COILS GROUP 1	Drive Transistor	Power Line Color	Power Line Connection	Power Voltage	Driver Transistor Control Line Color	Coil GA-Turn or Bulb Type
#41	WOLVERINE MAGNET	Q41	VIO-YEL	J2-P8	50VDC	ORG-BRN	22-650
#42	LEFT NIGHTCRAWLER UP	Q42	VIO	J2-P7	50VDC	ORG-RED	090-5076-00 23-1100
#43	RIGHT NIGHTCRAWLER UP	Q43	VIO	J2-P6	50VDC	ORG-BLK	090-5030-ND 23-1100
#44	RELAY (WHITE)	Q44	BRN	J2-P5	20VDC	ORG-YEL	090-5030-ND RELAY
#45	RELAY (RED)	Q45	BRN	J2-P4	20VDC	ORG-GRN	190-5004-00 RELAY
#46	RELAY (BLUE)	Q46	BRN	J2-P3	20VDC	ORG-BLU	190-5004-00 RELAY
#47	LEFT NIGHTCRAWLER LATCH	Q47	VIO	J2-P2	50VDC	ORG-VIO	190-5004-00 ASSY.
#48	RIGHT NIGHTCRAWLER LATCH	Q48	VIO	J2-P1	50VDC	ORG-GRY	515-7595-00-ND ASSY. 515-7595-00-ND



CHOOSE EARNINGS or STANDARD AUDITS

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

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.

Audit Number →
Audit Name →
Audit Result →



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.

EARNINGS AUDITS [#1 - #13] ▼

Nr.	EARNINGS AUDIT NAME	YOUR RESULT
1	TOTAL PAID CREDITS	
2	FREE GAME PERCENTAGE	
3	AVERAGE BALL TIME	
4	AVERAGE GAME TIME	
5	COINS THROUGH LEFT SLOT	
6	COINS THROUGH RIGHT SLOT	
7	COINS THROUGH CENTER SLOT	

Nr.	EARNINGS AUDIT NAME	YOUR RESULT
8	COINS THROUGH FOURTH SLOT	
9	COINS THROUGH FIFTH SLOT	
10	TOTAL COINS	
11	TOTAL EARNINGS	
12	METER CLICKS	
13	SOFTWARE METER	

STANDARD AUDITS [#1 - #59] ▼

Nr.	STANDARD AUDIT NAME	YOUR RESULT
1	TOTAL BALLS PLAYED	
2	TOTAL EXTRA BALLS	
3	EXTRA BALL PERCENTAGE	
4	REPLAY 1 AWARDS	
5	REPLAY 2 AWARDS	
6	REPLAY 3 AWARDS	
7	REPLAY 4 AWARDS	
8	TOTAL REPLAYS	
9	REPLAY PERCENTAGE	
10	TOTAL SPECIALS	
11	SPECIAL PERCENTAGE	
12	TOTAL MATCHES	
13	HIGH SCORE AWARDS	
14	HIGH SCORE PERCENT	
15	TOTAL FREE PLAYS	
16	TOTAL PLAYS	
17	0.0M - 1.99M SCORES	
18	2.0M - 3.99M SCORES	
19	4.0M - 5.99M SCORES	
20	6.0M - 7.99M SCORES	

Nr.	STANDARD AUDIT NAME	YOUR RESULT
21	8.0M - 9.99M SCORES	
22	10.0M - 12.49M SCORES	
23	12.5M - 14.99M SCORES	
24	15.0M - 17.49M SCORES	
25	17.5M - 19.99M SCORES	
26	20.0M - 24.99M SCORES	
27	25.0M - 29.99M SCORES	
28	30.0M - 39.99M SCORES	
29	40.0M - 49.99M SCORES	
30	50.0M - 74.99M SCORES	
31	75.0M - 99.99M SCORES	
32	100.0M - 149.99M SCORES	
33	150.0M+ SCORES	
34	AVERAGE SCORES	
35	SERVICE CREDITS	
36	BALL SEARCH STARTED	
37	LOST BALL FEEDS	
38	LOST BALL GAME STARTS	
39	LEFT DRAINS	
40	CENTER DRAINS	

Nr.	STANDARD AUDIT NAME	YOUR RESULT
41	RIGHT DRAINS	
42	TILTS	
43	TOTAL BALLS SAVED	
44	LEFT FLIPPER USED	
45	RIGHT FLIPPER USED	
46	0 - 1 MINUTE GAMES	
47	1 - 1.5 MINUTE GAMES	
48	1.5 - 2 MINUTE GAMES	
49	2 - 2.5 MINUTE GAMES	
50	2.5 - 3 MINUTE GAMES	
51	3 - 3.5 MINUTE GAMES	
52	3.5 - 4 MINUTE GAMES	
53	4 - 5 MINUTE GAMES	
54	5 - 6 MINUTE GAMES	
55	6 - 8 MINUTE GAMES	
56	8 - 10 MINUTE GAMES	
57	10 - 15 MINUTE GAMES	
58	15+ MINUTE GAMES	
59	RECENT REPLAY PERCENT	

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



GO TO ADJUSTMENTS MENU: STANDARD ADJUSTMENTS [#1 - #63]

Perform 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**].



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
1	REPLAY TYPE	AUTO	
2	‡ REPLAY PERCENTAGE	10%	
3	‡ REPLAY AWARD	CREDIT	
4	‡ REPLAY LEVELS	1	
5	‡ AUTO REPLAY START	___,000,000	
6	‡ DYNAMIC REPLAY START	60,000,000	
7	‡ REPLAY LEVEL #1	15,000,000	
8	‡ REPLAY LEVEL #2	30,000,000	
9	‡ REPLAY LEVEL #3	45,000,000	
10	‡ REPLAY LEVEL #4	60,000,000	
11	‡ REPLAY BOOST	YES	
12	SPECIAL LIMIT	1	
13	‡ SPECIAL PERCENTAGE	10%	
14	SPECIAL AWARD	CREDIT	
15	FREE GAME LIMIT	5	
16	EXTRA BALL LIMIT	5	
17	‡ EXTRA BALL PERCENTAGE	25%	
18	GAME PRICING	USA 10	
19	MATCH PERCENTAGE	9%	
20	MATCH AWARD	CREDIT	
21	BALLS PER GAME	3	
22	TILT WARNINGS	2	
23	CREDIT LIMIT	30	
24	ALLOW HIGH SCORES	YES	
25	HIGH SCORE AWARD	CREDIT	
26	GRAND CHAMPION AWARDS	1	
27	HIGH SCORE #1 AWARDS	1	
28	HIGH SCORE #2 AWARDS	0	
29	HIGH SCORE #3 AWARDS	0	
30	HIGH SCORE #4 AWARDS	0	
31	GRAND CHAMPION SCORE	___,000,000	

Nr.	STANDARD ADJUSTMENT NAME	USA DEFAULT	YOUR SETTING
32	HIGH SCORE #1	___,000,000	
33	HIGH SCORE #2	___,000,000	
34	HIGH SCORE #3	___,000,000	
35	HIGH SCORE #4	___,000,000	
36	HSTD INITIALS	3 INITIALS	
37	HSTD RESET COUNT	2000	
38	FREE PLAY	NO	
39	LANGUAGE	ENGLISH	
40	PLAYER LANGUAGE SELECT	YES	
41	CUSTOM MESSAGE	ON	
42	FLASH LAMP POWER	NORMAL	
43	COIL PULSE POWER	NORMAL	
44	KNOCKER VOLUME	NORMAL	
45	GAME RESTART	YES	
46	BILL VALIDATOR	NO	
47	MUSIC VOLUME	1	
48	BALL SAVE TIME	0:05	
49	TIMED PLUNGER	OFF	
50	FLIPPER BALL LAUNCH	OFF	
51	COINDOOR BALL SAVER	NO	
52	COMPETITION MODE	NO	
53	CONSOLATION BALL	YES	
54	FAST BOOT	YES	
55	Q24 OPTION	COIN METER	
56	TICKET DISPENSER	NO	
57	PLAYER COMPETITION	YES	
58	TEAM SCORES	NO	
59	LOCATION ID	0	
60	GAME ID	0	
61	TIME FORMAT	12-HOUR	
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.



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].

Audit Number
Audit Name
Audit Result



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

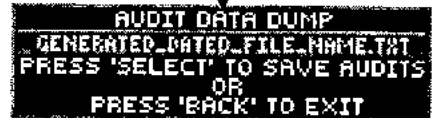
Step 4 Press [<] [>] to move between audits.

% = 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 - #+]

Perform 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].

Adjustment Number
Adjustment Name
Adjustment Setting
Adjustment Comment



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

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/FACORY 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.

POWER REQUIREMENTS



This game *must* be connected to a properly grounded outlet to reduce shock hazard and insure proper game operation. See the Yellow Pages (Schematics & Wiring), for transformer connections required for Normal, High, and Low Line conditions.



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

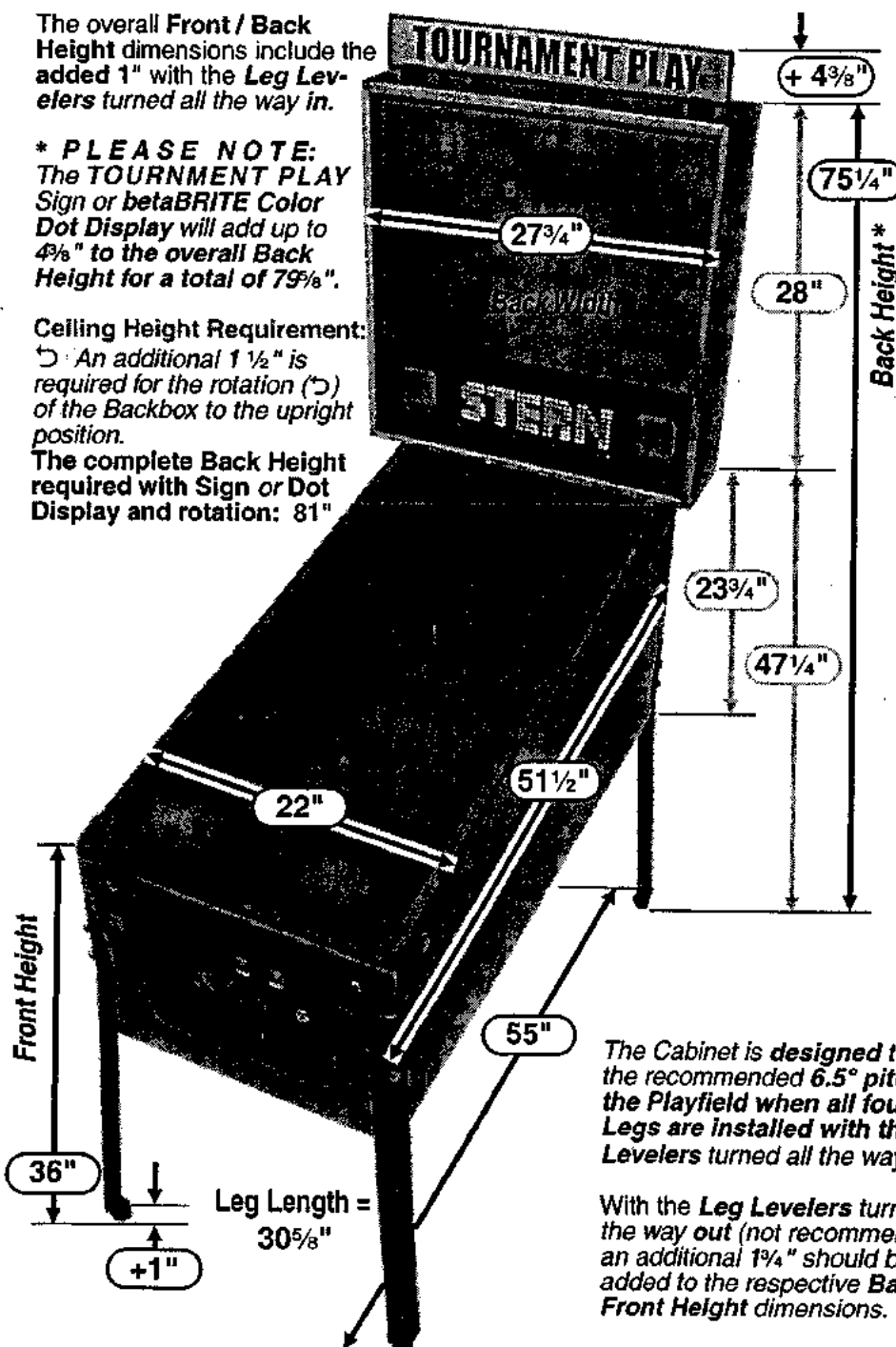
GAME DIMENSIONS

TRANSPORTATION

The overall Front / Back Height dimensions include the added 1" with the Leg Levelers turned all the way in.

*** PLEASE NOTE:** The TOURNAMENT PLAY Sign or betaBRITE Color Dot Display will add up to 4 3/8" to the overall Back Height for a total of 79 1/4".

Ceiling Height Requirement:
 ☞ An additional 1 1/2" is required for the rotation (☞) of the Backbox to the upright position.
 The complete Back Height required with Sign or Dot Display and rotation: 81"



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

With the Leg Levelers turned all the way out (not recommended), an additional 1 1/4" should be added to the respective Back or Front Height dimensions.

BEFORE TRANSPORTING



To reduce the possibility of damage, observe ALL precautions whenever transporting the game.

Read & follow the next page on **How to Secure the Backbox for Transporting.** Remove the legs and secure the game within the transporting vehicle.

SAVE AND RETAIN ALL PRINTED INFORMATION INSIDE THE CABINET!

Shipping Box Dimensions

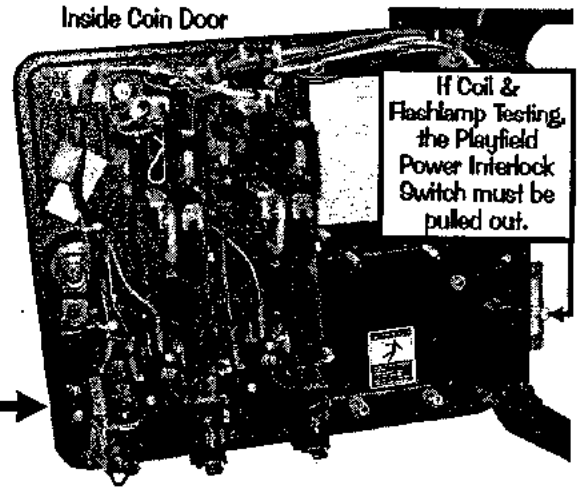
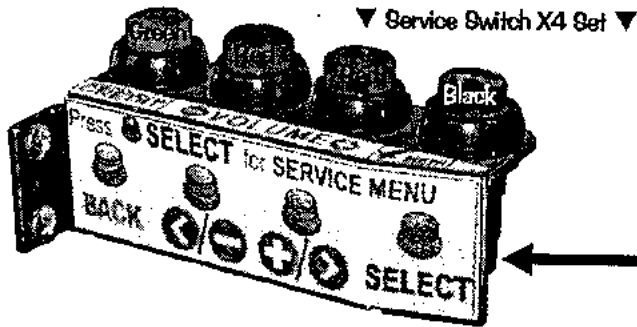
Height 56" Width 31"
 Depth 31"
 Approx. Unboxed Weight: 260lbs. (+/- 10)
 Boxed Weight:
 Wt. 290lbs. (+/- 15)

CAUTION

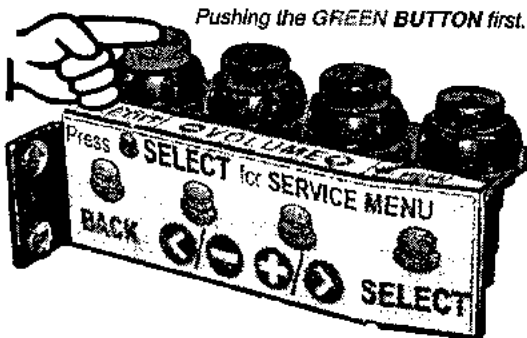
At least 2 people are required to move and maneuver this game. Use proper moving equipment & extreme care while handling!

Service Switch X4 Set Access & Use

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**.



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.

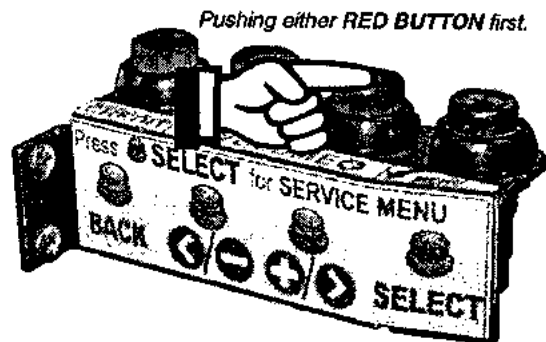
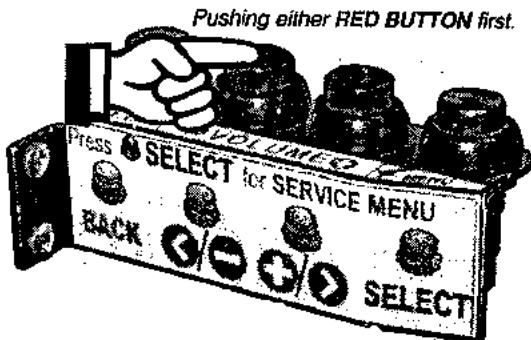


◀ Function 1: SERVICE CREDITS MENU

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

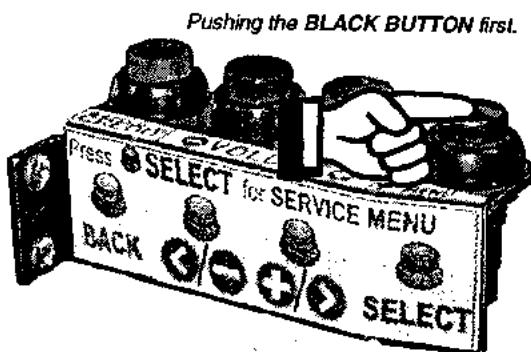
38, **Free Play**, is set to **YES**. The Service Credits are limited to the **Credit Limit** in addition to any paid credits present in the game (e.g. If the **Credit Limit** is 30, with 8 paid credits present, only 22 Credits can be applied.).



▲ 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.



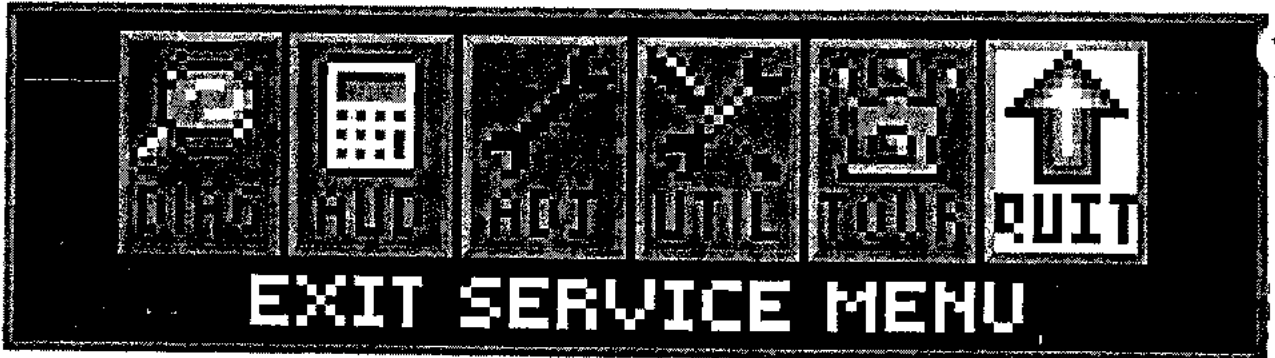
◀ Function 3: SERVICE MENU

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 / DECREASE** an adjustment (setting). Use the Black [**SELECT**] Button to select a highlighted **Icon**, move to the next line of text or to answer "OK" where applicable. Use the Green [**BACK**] Button to exit or escape back.



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**.



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.



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

Problem / Solution Table

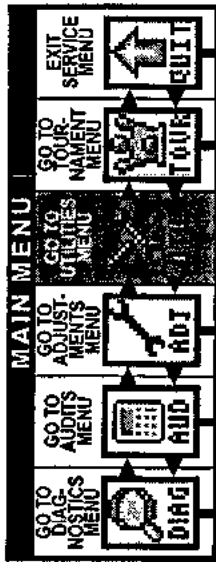
PROBLEM	SOLUTION
Will not enter the SERVICE MENU after depressing the Black [SELECT] Button .	<ul style="list-style-type: none"> • Check the Service Switches [GREEN, RED (x2) & BLACK Buttons] for loose connections or bad ground. • Check the associated wiring harness to/from the CPU/Sound Board, Connector J13. • Check CPU/Sound Board for possible failure.
All Service Buttons [. . . . Buttons] appear nonfunctional.	<ul style="list-style-type: none"> • 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.	<ul style="list-style-type: none"> • Check to make sure the Game is not in "Free Play." <i>If the game is set to Free Play, adding Service Credits is not required.</i> • Check the Service Switches wiring harness for poor or no connection and/or broken wires.
The Display "blanks out."	<ul style="list-style-type: none"> • 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. <i>Refer to the Yellow Pages (SCHEMATICS & TROUBLESHOOTING).</i>
Icons "scroll" along continuously in the MAIN MENU .	<ul style="list-style-type: none"> • 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 .	<ul style="list-style-type: none"> • This is normal. These switches are deactivated, as they are a part of the Switch Test. <i>Refer to the Diagnostics Section (GO TO DIAGNOSTICS MENU, Switch Test).</i>
Can't move selection of icon with the Left and/or Right Flipper Buttons .	<ul style="list-style-type: none"> • 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 <i>only in Diagnostic's Switch & Active Switch Tests (see previous Problem).</i>
Some icons appear non-functional in the MENU or missing.	<ul style="list-style-type: none"> • 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.stempinball.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 <i>do not</i> fire after pressing the Black [SELECT] Button .	<ul style="list-style-type: none"> • 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 .	<ul style="list-style-type: none"> • 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.	<ul style="list-style-type: none"> • 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

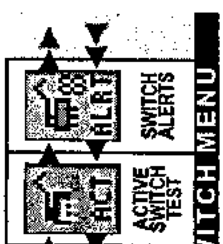
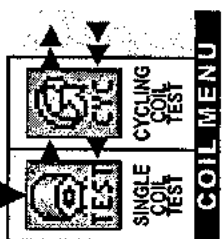
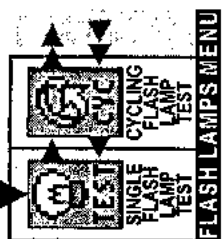
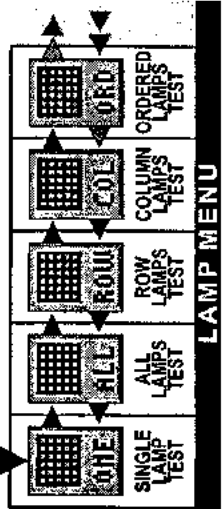
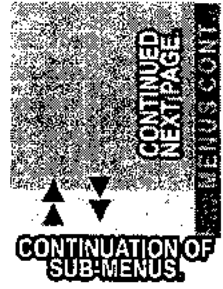
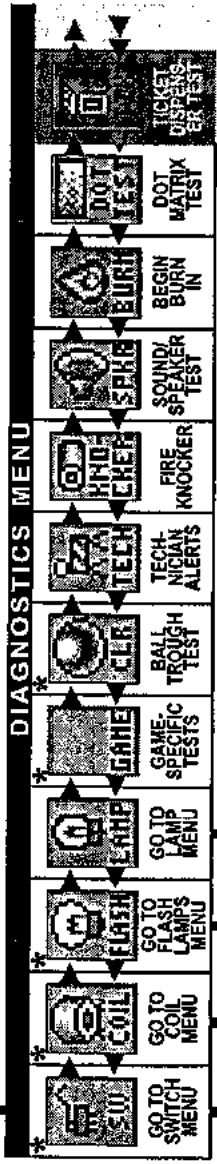
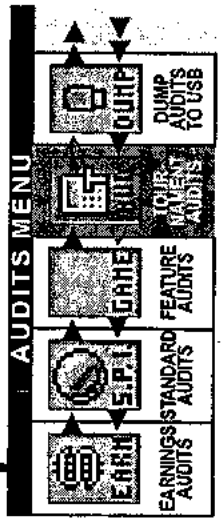
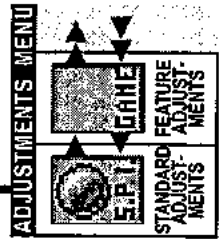
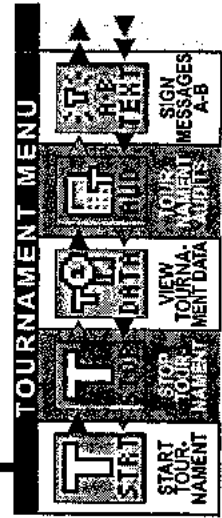
These non-selectable icons appear in the selected Menu only when there are MORE icons to the LEFT or to the RIGHT available for selection.



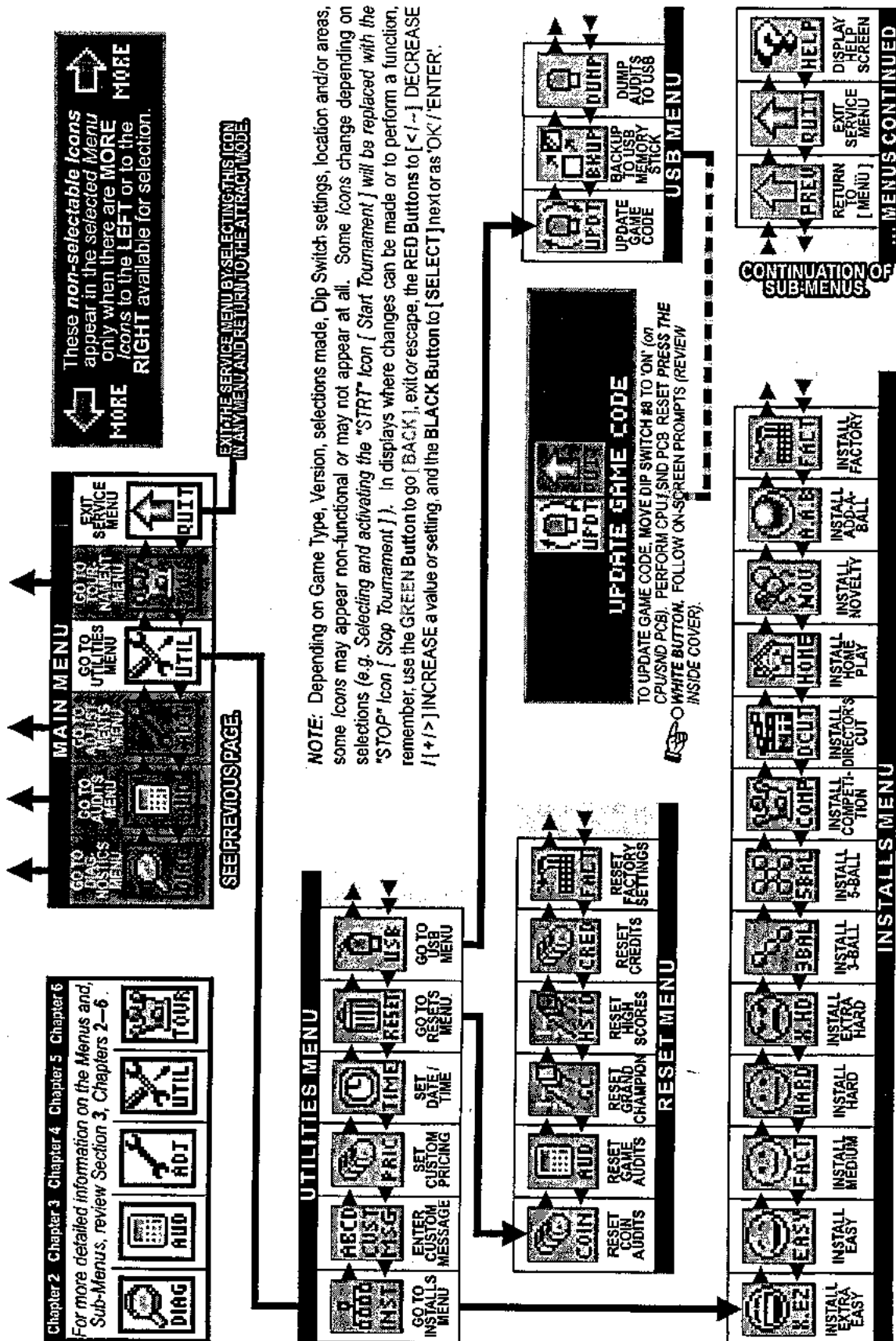
50V / 20V DISABLED
 CLOSE COIN DOOR OR FULL INTERLOCK SWITCH TO RESTORE POWER

*WHEN ENTERING THE NOTED MENUS, YOU MUST PULL OUT THE POWER INTERLOCK SWITCH FOR OPERATION WITH THE COIN DOOR OPEN.

EXIT THE SERVICE MENU BY SELECTING THIS ICON IN ANY MENU AND RETURN TO THE ATTRACT MODE.



Pinball Service Menu Icon Tree Continued



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 "START" icon [Start Tournament] will be replaced with the "STOP" icon [Stop Tournament]). In displays where changes can be made or to perform a function, remember, use the GREEN Button to go [BACK], exit or escape, the RED Buttons to [< / -] DECREASE [/ + / >] INCREASE a value or setting, and the BLACK Button to [SELECT] next as 'OK' / 'ENTER'.

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

EXIT THE SERVICE MENU BY SELECTING THIS ICON IN ANY MENU AND RETURN TO THE ATTRACT MODE.

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



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.



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 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. Pressing 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: Pressing 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 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'.

SWITCH TEST NONE

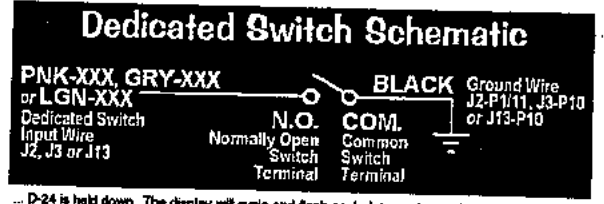
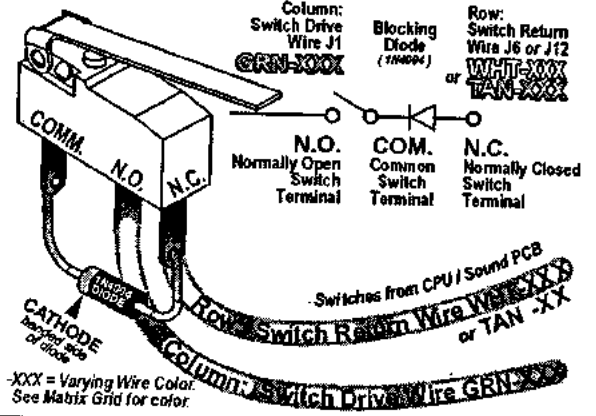
D-24 position is highlighted and accompanied by a short audible tone when pressed.

SWITCH TEST SELECT LAST SW. D-24 LGN-GRY BLK

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

SWITCH TEST NONE LAST SW. D-24

Typical Switch Wiring & Schematic



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

ACTIVE SWITCHES SELECT LGN-GRY BLK



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.

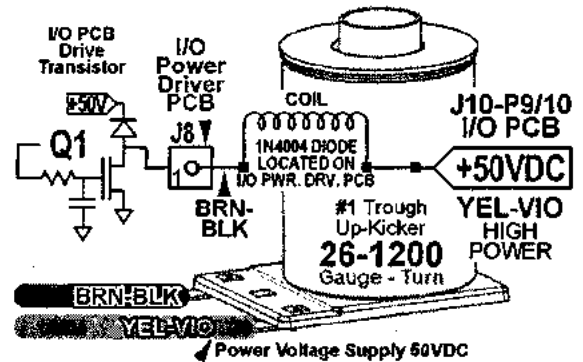


Single Coil Test

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)*.



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.

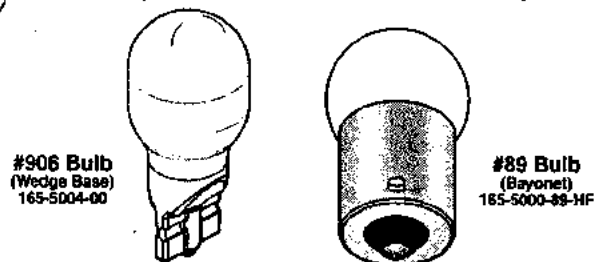


Single Flash Lamp Test

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)*.



Bulb Types used for Flash Lamps



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**.



Go To Lamp Menu

To initiate, from the **DIAGNOSTICS MENU**, select the "LAMP" *Icon*. Controlled lamps are configured in an 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

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

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 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

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 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.

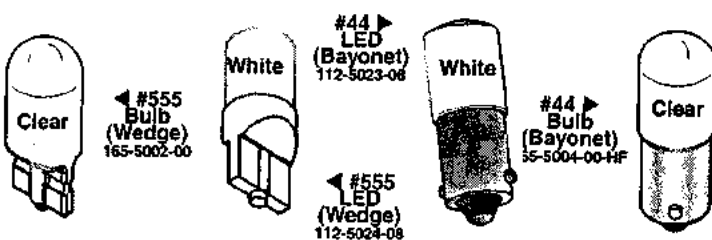


Column Lamps Test

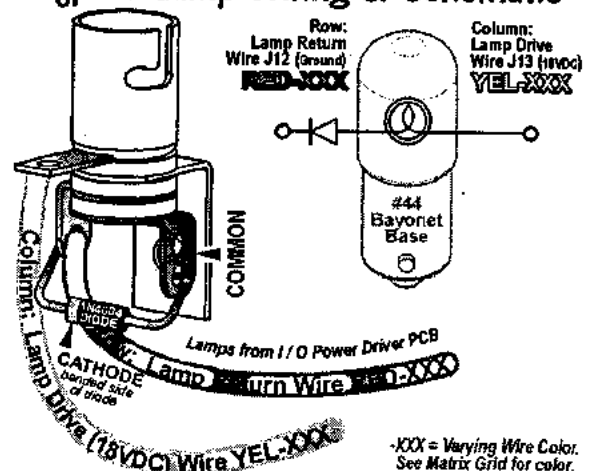
To initiate, from the **LAMP MENU**, select the "COL" *Icon*. As each lamp column is selected, the lamps in the column will light on the playfield as well as the Dot Matrix Display. Upon entering **Column Lamps Test**, you will notice the #1 lamp column is shown. The Dot Matrix Display will light up (*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



Typical Lamp Wiring & Schematic



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



Ordered Lamps Test

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.

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



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.



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.

Technician Alerts continued on the next page.



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 **Technician 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.

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).

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



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.

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.

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

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

Speaker Phase Testing

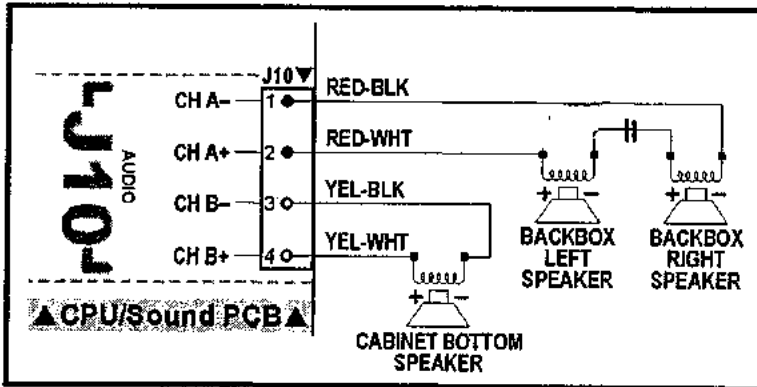
Connections to each of speakers are polarized and each must be connected appropriately for the best quality sound. If one speaker has the positive and negative connections reversed with respect to the other one, bass frequencies will not be produced properly and the overall sound quality will be poor.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

Speaker Phase Testing cont. next page.



Speaker Phase Testing continued from previous page.

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



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

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.

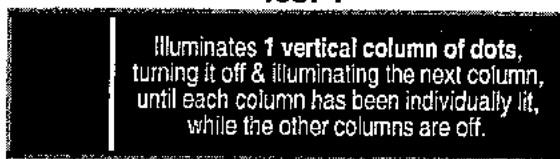
Note: To reset Burn-In minutes back to 0:00, see Section 3, Chapter 5, GO TO RESET MENU (via the UTILITIES MENU), Reset Factory Settings. CAUTION: Performing a FACTORY RESET will reset all other information as well (read the Utilities Section (GO TO RESET MENU), for more information).



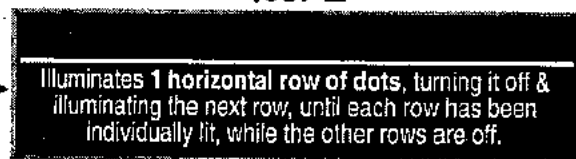
Dot Matrix Test

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.

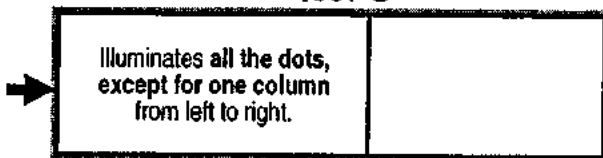
Test 1



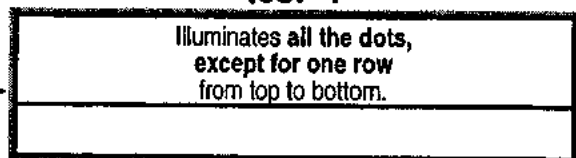
Test 2



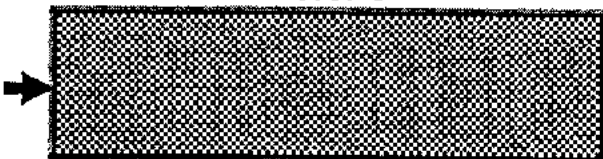
Test 3



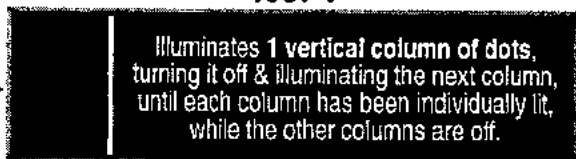
Test 4



Test 5



Test 1





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**.



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 TOURNAMENT 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 (*review 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.



Standard Audits [#1 - #59]

To initiate, from the **AUDITS MENU**, select the "S.P.I." 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 BALLS PLAYED [0]**: Total number of *Regular and Extra Balls*.
- #2 **TOTAL EXTRA BALLS [0]**: Total number of *Extra Balls* awarded.
- #3 **EXTRA BALLS PERCENTAGE [0%]**: Percentage value is 'Total Extra Balls' (Standard Audit 2) divided by 'Total Plays' (Standard Audit 16).
- #4 **REPLAY 1 AWARDS [0]**: Total Awards (*Credits, Extra Balls or Scores*) for Level 1.
- #5 **REPLAY 2 AWARDS [0]**: Total Awards (*Credits, Extra Balls or Scores*) for Level 2.
- #6 **REPLAY 3 AWARDS [0]**: Total Awards (*Credits, Extra Balls or Scores*) for Level 3.
- #7 **REPLAY 4 AWARDS [0]**: Total Awards (*Credits, Extra Balls or Scores*) for Level 4.
- #8 **TOTAL REPLAYS [0]**: Total Awards (*Credits, Extra Balls or Scores*) for exceeding *Replay Score Levels*.
- #9 **REPLAY PERCENTAGE [0%]**: Percentage value is 'Total Replays' (Standard Audit 8) divided by 'Total Plays' (Standard Audit 16). *The percentage reflects replay total awards for exceeding replay score levels.*
- #10 **TOTAL SPECIALS [0]**: Total Awards (*Credits, Extra Balls, or Scores*) for making *Specials*.
- #11 **SPECIAL PERCENTAGE [0%]**: Percentage value is 'Total Specials' (Standard Audit 10) divided by 'Total Plays' (Standard Audit 16).
- #12 **TOTAL MATCHES [0]**: Total *Credits* awarded for matching the last two digits of the score with the *System-Generated Match Number* at the end of the game. Percentage of *Match Credits* is adjustable from **0%** to **10%** or **OFF** by Standard Adjustment 19, *Match Percentage, if enabled (review the Adjustments Section (GO TO ADJUSTMENTS MENU), Standard Adjustments)*.
- #13 **HIGH SCORE AWARDS [0]**: Total Awards (*Credits, Extra Balls, or Scores*) for exceeding the *High-Score-To-Date* scores.
- #14 **HIGH SCORE PERCENT [0%]**: Percentage value is 'High Score Awards' (Standard Audit 13) divided by 'Total Plays' (Standard Audit 16).
- #15 **TOTAL FREE PLAYS [0]**: Total *Free Credits* for *Replays, High-Score-To-Date, Specials and Match*.
- #16 **TOTAL PLAYS [0]**: This total is derived by adding the sum of 'Total Paid Credits' (Earnings Audit 1) and 'Total Free Plays' (Standard Audit 15). *Note: Free credits are not recorded in the Audit until actually used.*
- #17 **0.0M-1.99M SCORES [00]**: Total number of games the Player's final score was between 0 and 1,999,990 points.
- #18 **2.0M-3.99M SCORES [00]**: Total number of games the Player's final score was between 2,000,000 and 3,999,990 points.
- #19 **4.0M-5.99M SCORES [00]**: Total number of games the Player's final score was between 4,000,000 and 5,999,990 points.
- #20 **6.0M-7.99M SCORES [00]**: Total number of games the Player's final score was between 6,000,000 and 7,999,990 points.
- #21 **8.0M-9.99M SCORES [00]**: Total number of games the Player's final score was between 8,000,000 and 9,999,990 points.
- #22 **10.0M-12.49M SCORES [00]**: Total number of games the Player's final score was between 10,000,000 and 12,499,990 points.
- #23 **12.5M-14.99M SCORES [00]**: Total number of games the Player's final score was between 12,500,000 and 14,499,990 points.
- #24 **15.0M-17.49M SCORES [00]**: Total number of games the Player's final score was between 15,000,000 and 17,499,990 points.
- #25 **17.50M-19.99M SCORES [00]**: Total number of games the Player's final score was between 17,500,000 and 19,999,990 points.
- #26 **20.0M-24.99M SCORES [00]**: Total number of games the Player's final score was between 20,000,000 and 24,999,990 points.
- #27 **25.0M-29.99M SCORES [00]**: Total number of games the Player's final score was between 25,000,000 and 29,999,990 points.

Standard Audits 28-59 continued on the next page.



Standard Audits Continued

- #28 **30.0M-39.99M SCORES [00]**: Total number of games the Player's final score was between 30,000,000 and 39,999,990 points.
- #29 **40.0M-49.99M SCORES [00]**: Total number of games the Player's final score was between 40,000,000 and 49,999,990 points.
- #30 **50.0M-74.99M SCORES [00]**: Total number of games the Player's final score was between 50,000,000 and 74,999,990 points.
- #31 **75.0M-99.99M SCORES [00]**: Total number of games the Player's final score was between 75,000,000 and 99,999,990 points.
- #32 **100.0M-149.99M SCORES [00]**: Total number of games the Player's final score was between 100,000,000 and 149,999,990 points.
- #33 **150.0+M SCORES**: Total number of games the Player's final score was 150,000,000 points and over.
- #34 **AVERAGE SCORES [00]**: This total is derived by adding the Final Score of each game to a table and dividing this sum by 'Total Plays' (Standard Audit 16).
- #35 **SERVICE CREDITS [0]**: Total 'Green [SERVICE CREDIT] Button' Dedicated Switch (D-21) closures in **Attract Mode** (not while in the **SERVICE MENU**). See the *Service Menu Section, Service Switch X4 Set Access & Use*, for how to receive Service Credits. See the *Utilities Section (GO TO RESET MENU), Reset Credits*, for how to delete credits.
- #36 **BALL SEARCH STARTED [0]**: Total number of times the game performed a *Ball Search*.
- #37 **LOST BALL FEEDS [0]**: Total number of times the game added a pinball to play when it could not find a pinball after *Ball Search* (review the *Diagnostics Section (GO TO DIAGNOSTICS MENU), Technicians Alert [Pinball Detection]*).
- #38 **LOST BALL GAME STARTS [0]**: Total number of times the game started with a pinball missing from the ball trough at the start of a game (review the *Diagnostics Section (GO TO DIAGNOSTICS MENU), Technicians Alert [Pinball Detection]*).
- #39 **LEFT DRAINS [0]**: Total 'Left Outlane' Switch (24) closures.
- #40 **CENTER DRAINS [0]**: Total number of times the pinball had drained when the last switch closed was not the 'Left Outlane' (24) or the 'Right Outlane' Switch (29).
- #41 **RIGHT DRAINS [0]**: Total 'Right Outlane' Switch (29) closures.
- #42 **TILTS [0]**: Total 'Tilt Pendulum' Dedicated Switch (D-17) closures.
- #43 **TOTAL BALLS SAVED [0]**: Total number of times this feature was used. This feature is adjustable from 0:01-0:15, **AUTO** or **NO BALL SAVES** (review the *Adjustments Section (GO TO ADJUSTMENTS MENU), Standard Adj. 48, Ball Save Time*). This feature is enabled at the start of each pinball and is disabled as soon as a predetermined number of switches are "closed" or the allocated time has expired.
- #44 **LEFT FLIPPER USED [0]**: Total 'Left Flipper Button' Dedicated Switch (D-9) closures in **Game Mode**.
- #45 **RIGHT FLIPPER USED [0]**: Total 'Right Flipper Button' Dedicated Switch (D-11) closures in **Game Mode**.
- #46 **0 - 1 MINUTE GAMES [0]**: Total games in which the total game time was between 0:00 and 1:00 minute.
- #47 **1 - 1.5 MINUTE GAMES [0]**: Total games where play time was between 1:00 and 1:30 minutes.
- #48 **1.5 - 2 MINUTE GAMES [0]**: Total games where play time was between 1:30 and 2:00 minutes.
- #49 **2 - 2.5 MINUTE GAMES [0]**: Total games where play time was between 2:00 and 2:30 minutes.
- #50 **2.5 - 3 MINUTE GAMES [0]**: Total games where play time was between 2:30 and 3:00 minutes.
- #51 **3 - 3.5 MINUTE GAMES [0]**: Total games where play time was between 3:00 and 3:30 minutes.
- #52 **3.5 - 4 MINUTE GAMES [0]**: Total games where play time was between 3:30 and 4:00 minutes.
- #53 **4 - 5 MINUTE GAMES [0]**: Total games where play time was between 4:00 and 5:00 minutes.
- #54 **5 - 6 MINUTE GAMES [0]**: Total games where play time was between 5:00 and 6:00 minutes.
- #55 **6 - 8 MINUTE GAMES [0]**: Total games where play time was between 6:00 and 8:00 minutes.
- #56 **8 - 10 MINUTE GAMES [0]**: Total games where play time was between 8:00 and 10:00 minutes.
- #57 **10 - 15 MINUTE GAMES [0]**: Total games where play time was between 10:00 and 15:00 minutes.
- #58 **15+ MINUTE GAMES [0]**: Total games in which the total game time was 15:00 minutes and over.
- #59 **RECENT REPLAY PERCENT [0%]**: Percent figured with programming thresholds for a determined number of games. The % reflects replay total awards for exceeding replay score levels.



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 achieved. 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 installed 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 installed 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 installed 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 again 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

CPU/SOUND PCB DIP SWITCH SW1 SETTING		COUNTRY SETTING OPTION(S)	COIN MECHANISMS (SWITCHES) COINS THRU... SLOT:				PRICING SCHEME <small>Number of Plays (Coins) for Price Amount Shown See Appendix 7 for Coin Cards Examples & Info</small>	Requires SPI Coin Card(s) Part Number
Pos.	1 2 3 4 5 6 7 8	Default Highlighted	LEFT	CENTER	RIGHT	4TH		
ON	▲	USA 1	0.25	1.00	0.25		USD // UNITED STATES DOLLAR // (1 \$)	
OFF	▼	USA 2						
	▼	USA 3						
	▼	USA 4						
	▼	USA 5						
	▼	USA 6						
	▼	USA 7						
	▼	USA 8						
	▼	USA 9						
	▼	USA 10						
ON	▲	AUSTRALIA 1	0.20	1.00	2.00		AUD // AUSTRALIAN DOLLARS // (1 \$ AUS)	
OFF	▼	AUSTRALIA 2						
ON	▲	CANADA 1 [25¢ door]	0.25	0.25	1.00	2.00	CAD // CANADIAN DOLLARS // (1 \$ CAN)	
OFF	▼	CANADA 2 [dollar door]						
ON	▲	CROATIA	1	2	5		HRK // CROATIAN KUNA // (1 kuna)	
ON	▲	DENMARK 1	1	5	10	20	DKK // DANISH KRONER // (1 Kr)	
OFF	▼	DENMARK 2						
ON	▲	JAPAN 1	100		100		JPY // JAPANESE YEN // (1 ¥)	
OFF	▼	JAPAN 2						
ON	▲	LITHUANIA	1	2	5		LTL // LITHUANIA LITAI // (1 Lt)	
ON	▲	MIDDLE EAST	token		token		TOKEN // Middle East currency used to buy token // (TOKEN)	
ON	▲	NEW ZEALAND 1	1		2		NZD // NEW ZEALAND DOLLAR // (1 \$ NZD)	
OFF	▼	NEW ZEALAND 2						
ON	▲	NORWAY 1	10	5	20		NOK // NORWEGIAN KRONE // (1 Kr)	
OFF	▼	NORWAY 2						
	▼	NORWAY 3						
	▼	NORWAY 4						
ON	▲	RUSSIA	10	5	1		RUB // RUSSIAN RUBLE // (1 Ruble)	
ON	▲	SO. AFRICA 1	0.50	1.00	2.00	5.00	ZAR // SOUTH AFRICAN RAND // (R)	
OFF	▼	SO. AFRICA 2						
ON	▲	SWEDEN 1	1	5	10		SEK // SWEDISH KRONOR // (1 Kr)	
OFF	▼	SWEDEN 2						
ON	▲	SWITZERLAND 1	1	2	5		CHF // SWISS FRANCS // (1 \$)	
OFF	▼	SWITZERLAND 2						
ON	▲	TAIWAN	10		10		TWD // TAIWANESE DOLLAR // (1 TWD)	
ON	▲	UK 1	0.10	0.50	1.00	0.20	2£	
OFF	▼	UK 2						
	▼	UK 3						
	▼	UK 4						
	▼	UK 5						
	▼	UK 6						
							GBP // UNITED KINGDOM POUNDS // (1 £)	

HIGHLIGHTED = Factory Default

HIGHLIGHTED = Not Shown on Coin Card

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



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 OPTIONS(S)	COIN MECHANISMS (SWITCHES) COINS THRU ... SLOT: LEFT CENTER RIGHT 4TH				PRICING SCHEME Number of Flips (Credits) for Price Amount Shown See Appendix 1 for Coin Cards Settings & Price	Requires SPI Coin Card(s) Part Number
Pos. 1-8	ON OFF	Default Highlighted Euro 1 Euro 2 Euro 3 Euro 4 Euro 5 Euro 6 Euro 7 Euro 8 Euro 9 Euro 10 Euro 11 Euro 12	0.50	1.00	2.00	0.20 <i>optional</i>	EUR // EUROPEAN UNION EUROS // (€)	755-5401-01-Y 755-5401-02-Y 755-5401-03-Y 755-5401-04-Y 755-5401-05-Y 755-5401-06-Y 755-5401-07-Y 755-5401-08-Y 755-5401-09-Y 755-5401-10-Y 755-5401-11-Y 755-5401-12-Y

Euro 1-12 are alternate settings for countries using the Euro.

HIGHLIGHTED = Factory Default

HIGHLIGHTED = Not Shown on Coin Card

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.

Pos. 1-8	ON OFF	Default Highlighted AUSTRIA Euro 9	0.50	1.00	2.00		EUR // EUROPEAN UNION EUROS // (€)	755-5401-09-Y	
Pos. 1-8	ON OFF	Default Highlighted BELGIUM Euro 1	0.50	1.00	2.00		1/0.50	755-5401-01-Y	
Pos. 1-8	ON OFF	Default Highlighted FINLAND Euro 8	0.50	1.00	2.00		1/1.00	3/2.00 755-5401-08-Y	
Pos. 1-8	ON OFF	Default Highlighted FRANCE Euro 10	0.50	1.00	2.00		1/1.00	3/2.00	7/3.00 755-5401-10-Y
Pos. 1-8	ON OFF	Default Highlighted GERMANY 1 GERMANY 2 GERMANY 3	0.50	1.00	2.00		1/0.50 1/0.50 2/1.00	3/1.50 5/2.00 6/2.00 755-5401-01-Y 755-5401-02-Y 755-5401-04-Y	
Pos. 1-8	ON OFF	Default Highlighted GREECE Euro 8	0.50	1.00	2.00		1/1.00	3/2.00 755-5401-08-Y	
Pos. 1-8	ON OFF	Default Highlighted 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. 1-8	ON OFF	Default Highlighted NETHERLANDS Euro 3	0.50	1.00	2.00		1/0.50	3/1.00 755-5401-03-Y	
Pos. 1-8	ON OFF	Default Highlighted PORTUGAL Euro 1	0.50		0.50		1/0.50	755-5401-01-Y	
Pos. 1-8	ON OFF	Default Highlighted 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.



- #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 not shown 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 achieved. If awarding a CREDIT, TICKET or TOKEN is prohibited in your area, install NO in Allow High Scores (Standard Adjustment 24). *This adjustment is not shown 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 not shown 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 not shown 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 not shown 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 not shown 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 not shown 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 not shown 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 not shown 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 not shown if NO is installed in Allow High Scores (Standard Adjustment 24).*

Standard Adjustments 37-50 continued on the next page.



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 language 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 language 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 absence 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.

Standard Adjustments 51-63 continued on the next page.



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 = approximately 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.

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.



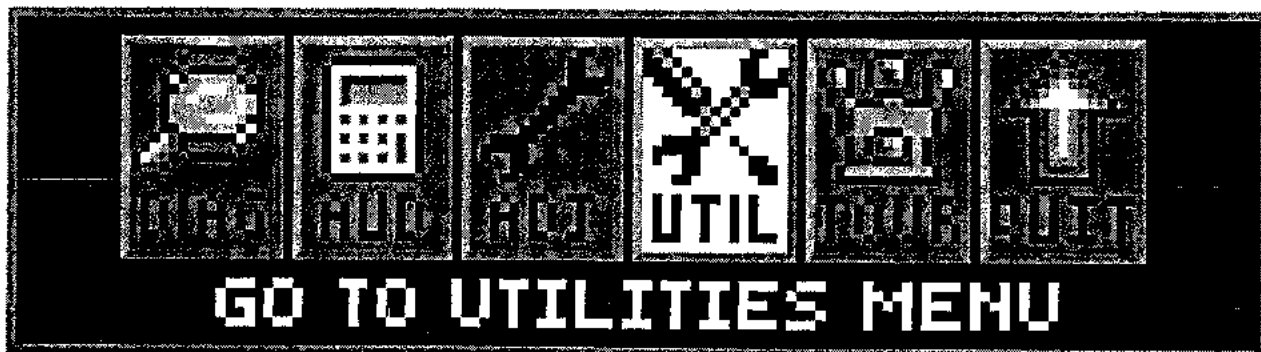
Feature Adjustments [#1 - # +]

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 beginning of this Service Game Manual or the beginning of the Yellow Pages.



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 their 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.

Installs Menu continued on the next page.

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**).



ABCD 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:).

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 :

REMINDER

In these menus:

Press [BACK] to - DECREASE [< \$]

Press [SELECT] to + INCREASE [\$ >]

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'
```

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
```

Press [</-] once or press [+ / >] eleven times until INSTALL appears.

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.



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.



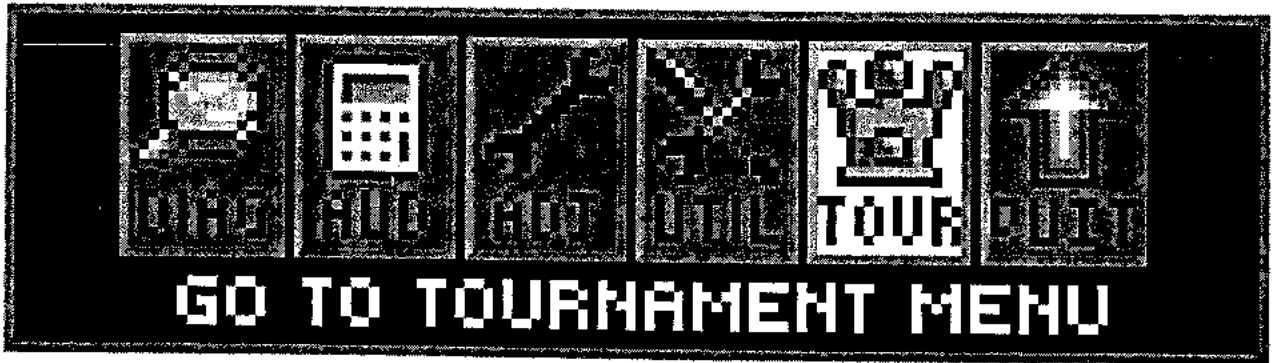
Dump Audits to USB

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.



To initiate, from the **MAIN MENU**, select the "TOUR" *Icon*. The **TOURNAMENT MENU** provides ways to quickly and easily start and stop a tournament. Also, tournament data can be viewed (*audits, prize info, etc.*).

All **TOURNAMENT 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 [< / -] **HIGHLIGHT PREVIOUS** or **DECREASE** / [+ / >] **HIGHLIGHT NEXT** or **INCREASE** to highlight the desired option, and the **BLACK** Button to [**SELECT**] it or activate.

T Start Tournament

To initiate, from the **TOURNAMENT MENU**, select the "STRT" *Icon*. The **START TOURNAMENT MENU** allows the operator to start a tournament. Select **QUICK START** or **CUSTOM** Tournament Start. For the first time Tournament Set-Up, it is recommended to select **CUSTOM**. Follow the on-screen prompts. After completion of all options in **QUICK START** or **CUSTOM**, the Tournament is started, the **START TOURNAMENT MENU** is exited and returns to the **TOURNAMENT MENU**.

QUICK START :

- Increase or decrease the: • **DAYS, HOURS and MINUTES** • **PRIZE POOL \$ (DOLLAR) and ¢ (CENT) AMOUNT**
- **INCREMENT THE PRIZE POOL PER PLAY INCREASES \$ and ¢ AMOUNT**

CUSTOM START :

- Confirm the current date and time (*if it was not set previous via the UTILITIES MENU it can be set-up in this display as well*). Enter the **MONTH, DAY, YEAR** and **TIME**
- Choose the Tournament **Start Date: MONTH, DAY, YEAR** and **TIME**
- Choose the Tournament **End Date: MONTH, DAY, YEAR** and **TIME**
- Choose the **CREDITS** per play desired (01-10). Set the maximum number of *Credits* that may be accumulated per game. *Note: The current pricing is displayed; to change pricing GO TO THE ADJUSTMENTS MENU.*

- Increase or decrease the: • **PRIZE POOL \$ (DOLLAR) and ¢ (CENT) AMOUNT**
- **INCREMENT THE PRIZE POOL PER PLAY INCREASES \$ and ¢ AMOUNT**
- **MAXIMUM (CAP) PRIZE POOL \$ and ¢ AMOUNT.**

- Increase or decrease the number of **PRIZES** (01-05 **HIGH SCORE**; 02-05 **B'N'W**). Set the maximum # of *Prize Positions* to be awarded during a Tournament. *Selections are as follows (% distribution cannot be changed):*

HIGH SCORE:			BUMP N' WIN :		
Set to 01	1 Winner	100% (1) Prize Pool	Cannot set to 01. Minimum of 2 winners required.		
Set to 02	2 Winners	65% (1) 35% (2)	Set to 02	2 Winners	65% (1) 35% (2)
Set to 03	3 Winners	50% (1) 30% (2) 20% (3)	Set to 03	3 Winners	50% (1) 25% (2) 25% (3)
Set to 04	4 Winners	50% (1) 25% (2) 15% (3) 10% (4)	Set to 04	4 Winners	40% (1) 20% (2) 20% (3) 20% (4)
Set to 05	5 Winners	50% (1) 20% (2) 15% (3) 10% (4) 5% (5)	Set to 05	5 Winners	40% (1) 15% (2) 15% (3) 15% (4) 15% (5)

- Select the **AWARD TYPE** (**CASH, POINTS, PRIZE, TICKETS** or **NONE**). Select **CASH** for the displays to represent the Prize Pool amount (*based on Jackpot Base and Max.*) in **\$Dollars**. Select **POINTS** for the display to represent the Prize Pool amount in *Points*. Select **PRIZE**, if applicable. Select **TICKET** for the display to represent the Prize Pool amount in *Tickets*. Select **NONE NOT TO** represent anything.

Custom Start continued on the next page.

CUSTOM START Continued.

The following option is available only if **CASH** was selected as the **AWARD TYPE**.

- Select the option to **SHOW PLAYER CASH** (YES or NO). Select **YES** for the display to represent the >>> **previous** <<< Tournament Winners & Cash amount (or Points, Prizes, etc.) will show in the **Attract Mode**.
- Select the kind of **TOURNAMENT** desired (**BUMP 'N' WIN** or **HIGH SCORE**).

The following options are available only if **BUMP 'N' WIN** was selected as the **TOURNAMENT TYPE**.

- Select or confirm the **BASE POINT AMOUNT** (00 or 1,000,000 – 4,294,967,295 increments of 1,000,000).
- Select or confirm the **RANGE AMOUNT** (00 or 1,000,000 – 4,294,967,295 increments of 1,000,000).
- Select the **BALLS** per game (1 – 10).



STOP TOURNAMENT

To initiate, from the **TOURNAMENT MENU**, select the "STOP" icon. The **STOP TOURNAMENT MENU** allows the operator to stop a tournament. **Note:** This icon only appears if a Tournament was set-up and is running (in place of the Start icon).

STOP TOURNAMENT ARE YOU SURE?

- Use the **BLACK** Button to [**SELECT**] to confirm. Press the **BLACK** Button again to continue.

The **STOP TOURNAMENT MENU** is exited and returns to the **TOURNAMENT MENU**.



VIEW TOURNAMENT DATA

To initiate, from the **TOURNAMENT MENU**, select the "DATA" icon. If no data is available, the display will indicate **NO PREVIOUS DATA**. Press the **GREEN** Button to escape [**BACK**] to the **TOURNAMENT MENU**.



TOURNAMENT AUDITS [#1 - #14]

To initiate, from the **TOURNAMENT MENU**, select the "AUD" 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.

- | | |
|----|--|
| 01 | TOTAL PLAYS : Total number of <i>Regular</i> and <i>Tournament Games</i> played while a <i>Tournament is in progress</i> . This total is derived by adding the below <i>Tournament Audit 02</i> with <i>Regular Plays</i> . |
| 02 | TOURNAMENT PLAYS : Total number of <i>Tournament Games</i> played while a <i>Tournament is in progress</i> . |
| 03 | TOTAL QUALIFYING PLAYS : Total number of times a player qualified (<i>invited to enter name</i>). |
| 04 | TOTAL GAME EARNINGS : Total <i>Gross Earnings accepted</i> , while a <i>Tournament is active (in progress)</i> . |
| 05 | TOTAL TOUR. EARNINGS : <i>Earnings (Audit 04 less Reg. Game Earnings)</i> while a <i>Tournament is in progress</i> . |
| 06 | PRIZE POOL TOTAL : Total <i>Prize Pool (Jackpot) Amount</i> to be paid out while a <i>Tournament is in progress</i> . |
| 07 | NET EARNINGS : Provides the total <i>Net Earnings (Gross Earnings less Prize Pool)</i> while a <i>Tournament is active</i> . |
| 08 | ACCUM. TOTAL PLAYS : Accumulative total amount of <i>Regular & Tournament Games</i> played since the first <i>Tournament</i> was played. |
| 09 | ACCUM. TOUR. PLAYS : Accumulative total amount of <i>Tourn. Games</i> played since 1st <i>Tournament</i> was played. |
| 10 | ACCUM. QUALIFYING PLAYS : Accumulative total number of times a player qualified (<i>invited to enter name</i>). |
| 11 | ACCUM. EARNINGS : Total <i>Gross Earnings accepted</i> , since the first <i>Tournament</i> was played. |
| 12 | ACCUM. TOUR EARNINGS : Accumulative total <i>Tournament Game Earnings</i> since the first <i>Tournament</i> was played. |
| 13 | ACCUM. JACKPOT : Accumulative total of <i>Prize Pool Amounts</i> paid out since the first <i>Tournament</i> was played. |
| 14 | # TOURNAMENTS : Number of <i>Tournaments (not individual Games)</i> since the first <i>Tournament</i> was played. |



SIGN MESSAGES A-B

To initiate, from the **TOURNAMENT MENU**, select the "A-B TEXT" icon. At time of print, menu non-functional. If made available in future code updates, this menu will allow the operator to display "Location" and "Prize" Messages. 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'.

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Backbox Wiring

- ▶ Coils Detailed Chart Table
- ▶ Backbox I/O Power Driver Board Detailed Wiring Diagram
- ▶ Backbox Board Layout Wiring Diagram
 - ▷ 128 X 32 Dot Matrix Display PCB (USA)..... 520-5052-15
 - ▷ 128 X 32 Dot Matrix CES-LED // EURO ONLY RoHS //..... 520-5052-15

Playfield Wiring

- ▶ General Illumination Circuit Detailed Wiring Diagram
- ▶ Playfield Switch Wiring Diagram
- ▶ Playfield Lamp Wiring Diagram
- ▶ Playfield Terminal Strips, Fuses & Misc. Wiring Descriptions & Locations
- ▶ #-Flipper Circuit Wiring Diagram

Cabinet and Coin Door Wiring

- ▶ Transformer Power Wiring Diagram
- ▶ Cabinet Wiring Diagram
- ▶ Coin Door Wiring Diagram
- ▶ Cabinet Universal Voltage Jumper Plugs (for use with Universal AC Cable, 036-5530-00 ONLY)

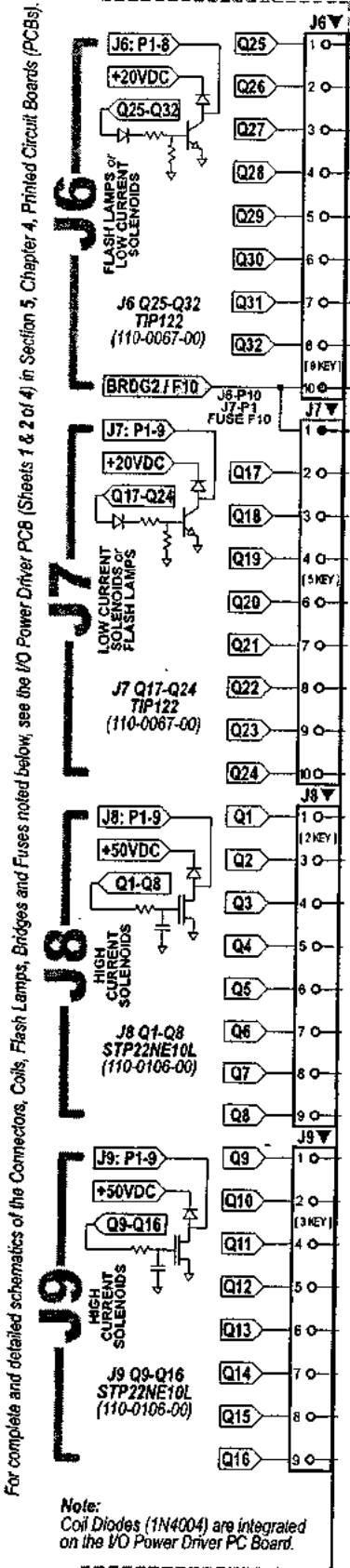
COILS DETAILED CHART TABLE

High Current Coils Group 1			Drive Transistor Output PCB	Power Line Color	Power Line Connection	Power Voltage	Drive Transistor Control Line Color	D.T. Control Line Connect	Coil GA-Turn of Bulb Type
#1	TROUGH UP-KICKER	Q1	I/O Power Driver	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	24-940 090-5038-ND
#3	LOWER LEFT EJECT	Q3		YEL-VIO	J10-P9/10	50VDC	BRN-ORG	J8-P4	23-800 090-5001-ND
#4	MAGNETO MAGNET	Q4		VIO-YEL	J10-P8	50VDC	BRN-YEL	J8-P5	22-900 090-5076-00
#5	LEFT UP KICKER	Q5		YEL-VIO	J10-P9/10	50VDC	BRN-GRN	J8-P6	23-800 090-5001-ND
#6	CENTER LOCKUP UP	Q6		YEL-VIO	J10-P9/10	50VDC	BRN-BLU	J8-P7	28-1200 090-5044-ND
#7	CENTER LOCKUP LATCH	Q7		YEL-VIO	J10-P9/10	50VDC	BRN-VIO	J8-P8	32-1800 515-7885-00
#8	SHAKER MOTOR (OPTIONAL)	Q8		RED-WHT	J17-P7	16VAC	BRN-GRY	J8-P9	502-5027-00
High Current Coils Group 2			Drive Transistor Output PCB	Power Line Color	Power Line Connection	Power Voltage	Drive Transistor Control Line Color	D.T. Control Line Connect	Coil GA-Turn of Bulb Type
#9	LEFT POP BUMPER	Q9	I/O Power Driver	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	28-1200 090-5044-ND
#11	BOTTOM POP BUMPER	Q11		YEL-VIO	J10-P8/10	50VDC	BLU-ORG	J8-P4	28-1200 090-5044-ND
#12	UPPER RIGHT FLIPPER	Q12		GRY-YEL 3A Fuse-RED-YEL	J10-P6/7	50VDC	BLU-YEL	J8-P5	22-1080 090-5032-ND
#13	LEFT SLINGSHOT	Q13		YEL-VIO	J10-P9/10	50VDC	BLU-GRN	J8-P6	28-1200 090-5044-ND
#14	RIGHT SLINGSHOT	Q14		YEL-VIO	J10-P9/10	50VDC	BLU-BLU	J8-P7	28-1200 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 Output PCB	Power Line Color	Power Line Connection	Power Voltage	Drive Transistor Control Line Color	D.T. Control Line Connect	Coil GA-Turn of Bulb Type
#17	FLASH: LEFT SIDE (X2)	Q17	I/O Power Driver	ORG	J6-P10	20VDC	VIO-BRN	J7-P2	#88 BULB 165-5000-88
#18	FLASH: RIGHT SIDE	Q18		ORG	J6-P10	20VDC	VIO-RED	J7-P3	#88 BULB 165-5000-88
#19	FLASH: DISC CLEAR (X2)	Q19		ORG	J6-P10	20VDC	VIO-ORG	J7-P4	#88 BULB 165-5000-88
#20	FLASH: DISC BLUE (X2)	Q20		ORG	J6-P10	20VDC	VIO-YEL	J7-P6	#88 BULB 165-5000-89
#21	FLASH: WOLVERINE	Q21		ORG	J6-P10	20VDC	VIO-GRN	J7-P7	#88 BULB 165-5000-89
#22	FLASH: MAGNETO (LEFT/RIGHT) (X2)	Q22		ORG	J6-P10	20VDC	VIO-BLU	J7-P8	#88 BULB 165-5000-89
#23	DISC MOTOR POWER	Q23		BRN	J7-P1	20VDC	VIO-BLK	J7-P9	RELAY 190-8004-00
#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 Output PCB	Power Line Color	Power Line Connection	Power Voltage	Drive Transistor Control Line Color	D.T. Control Line Connect	Coil GA-Turn of Bulb Type
#25	FLASH: POP BUMPER	Q25	I/O Power Driver	ORG	J6-P10	20VDC	BLK-BRN	J6-P1	#88 BULB 165-5000-89
#26	ORBIT DIVERTER	Q26		BRN	J7-P1	20VDC	BLK-RED	J6-P2	24-940 090-5038-ND
#27	ICEMAN MOTOR	Q27		BRN	J7-P1	20VDC	BLK-ORG	J6-P3	MOTOR 041-5113-00
#28	FLASH: BACKPANEL (LEFT) (X3)	Q28		ORG	J6-P10	20VDC	BLK-YEL	J6-P4	#88 BULB 165-5000-89
#29	FLASH: BACKPANEL (RIGHT) (X3)	Q29		ORG	J6-P10	20VDC	BLK-GRN	J6-P5	#88 BULB 165-5000-89
#30	FLASH: MAGNETO SPOT LIGHT	Q30		ORG	J6-P10	20VDC	BLK-BLU	J6-P6	#1818 BULB 165-5032-00
#31	FLASH: BOTTOM ARCH (X2)	Q31		ORG	J6-P10	20VDC	BLK-VIO	J6-P7	#88 BULB 165-5000-88
#32	FLASH: MAGNETO FIGURE	Q32		ORG	J10-P8	20VDC	BLK-GRY	J6-P8	#1611 BULB 165-5032-00

Y2

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



#33 - #35 Note: If this game is equipped with an optional Ticket Dispenser & Meter, see the end of Sec. 5, Chapter 4 for wiring information. Ensure Sld. Adj. 56, Ticket Dispenser = YES.

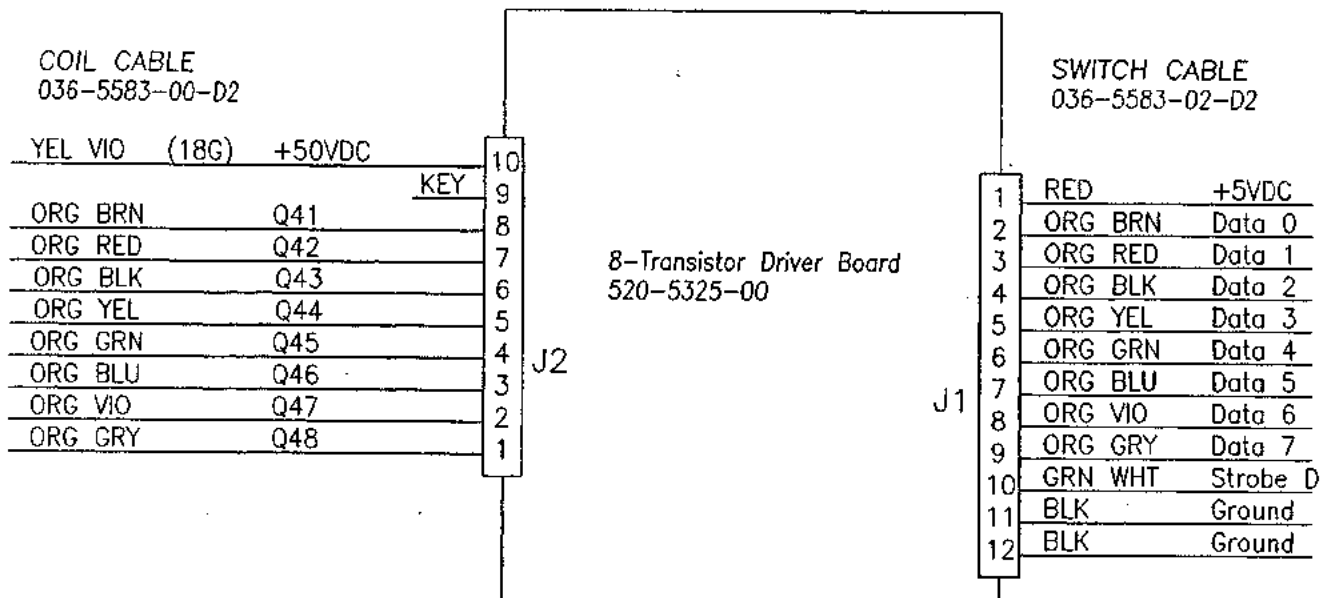
Backbox
Wiring

Y3

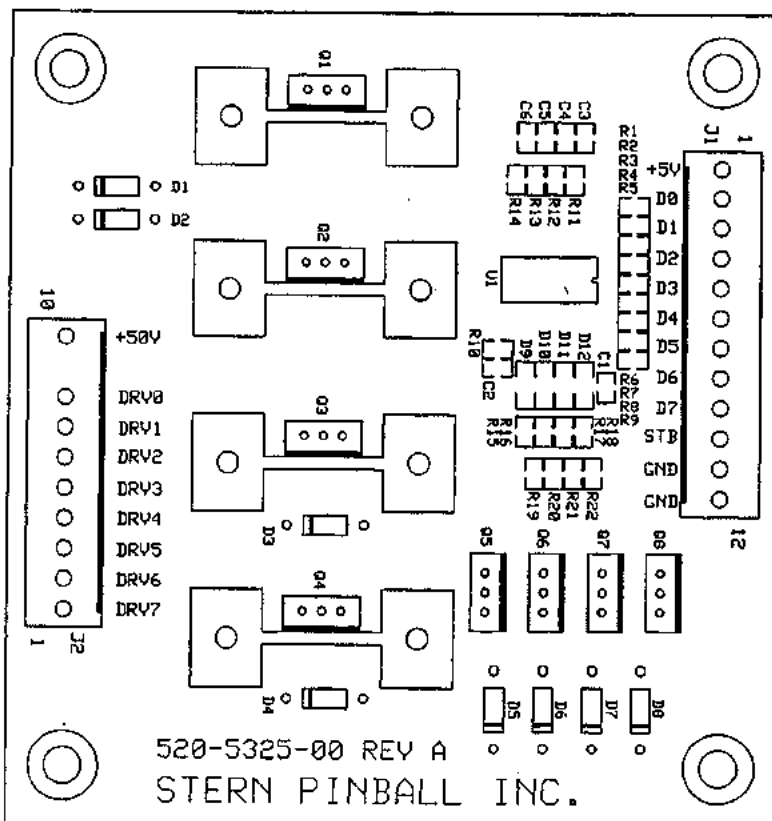
Backbox Wiring

X-MEN PREMIUM

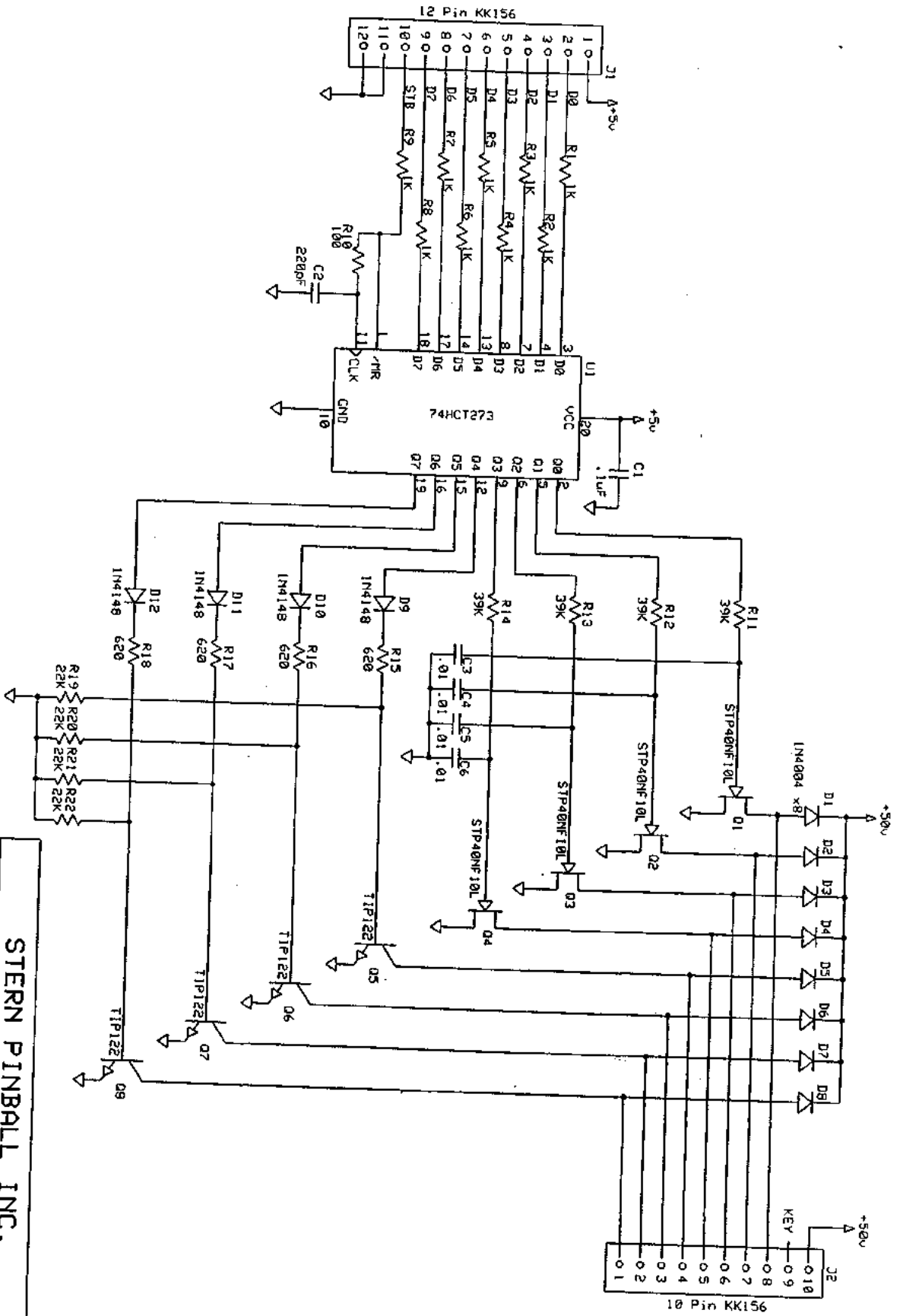
Wiring for the 8-Transistor driver board, 520-5325-00



Actual Board Layout



Y5

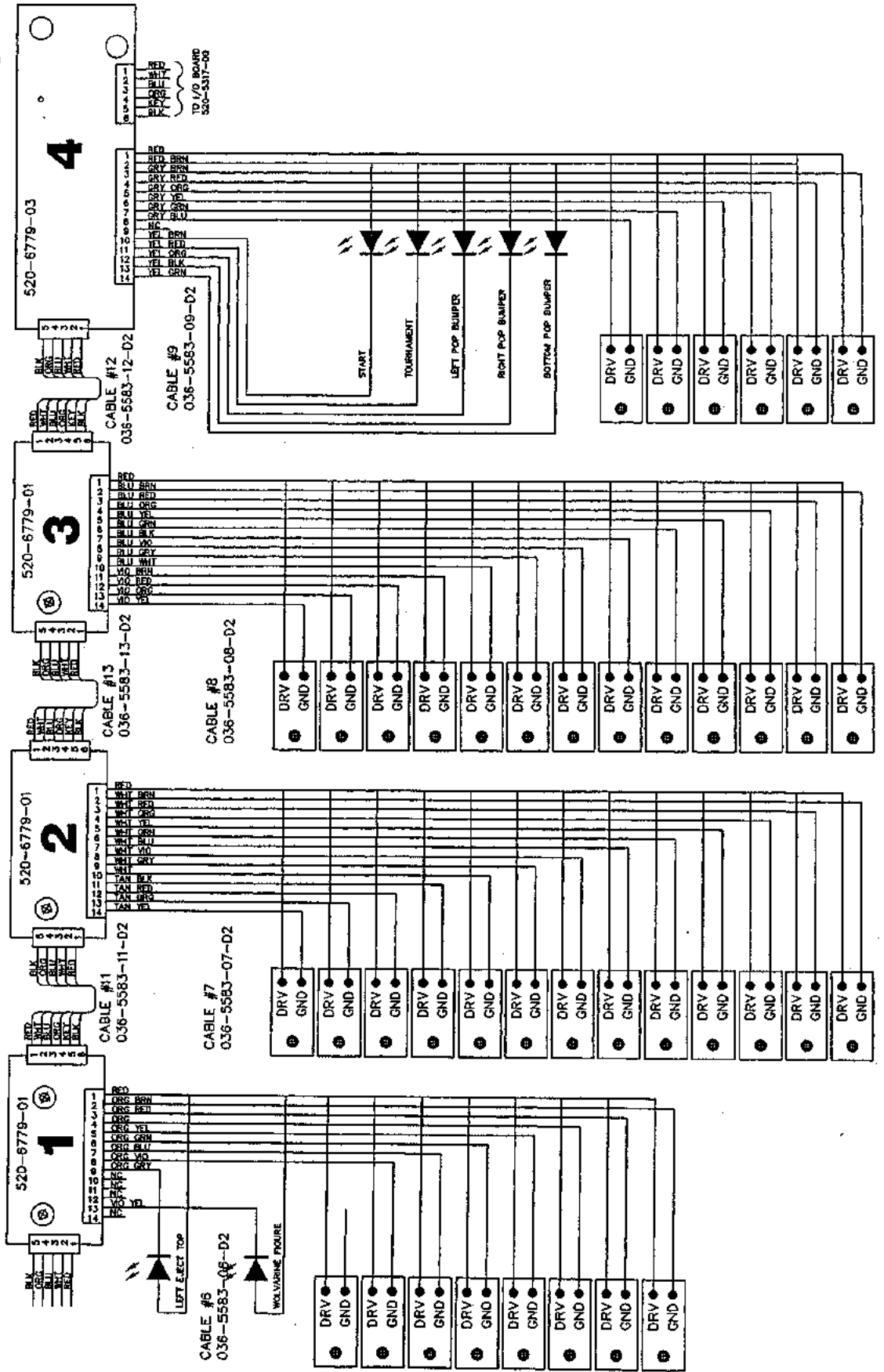


YG

STERN PINBALL INC.
 8 Auxiliary Driver
 Rev A
 520-5325-00
 9/22/2011
 Page 1 of 1

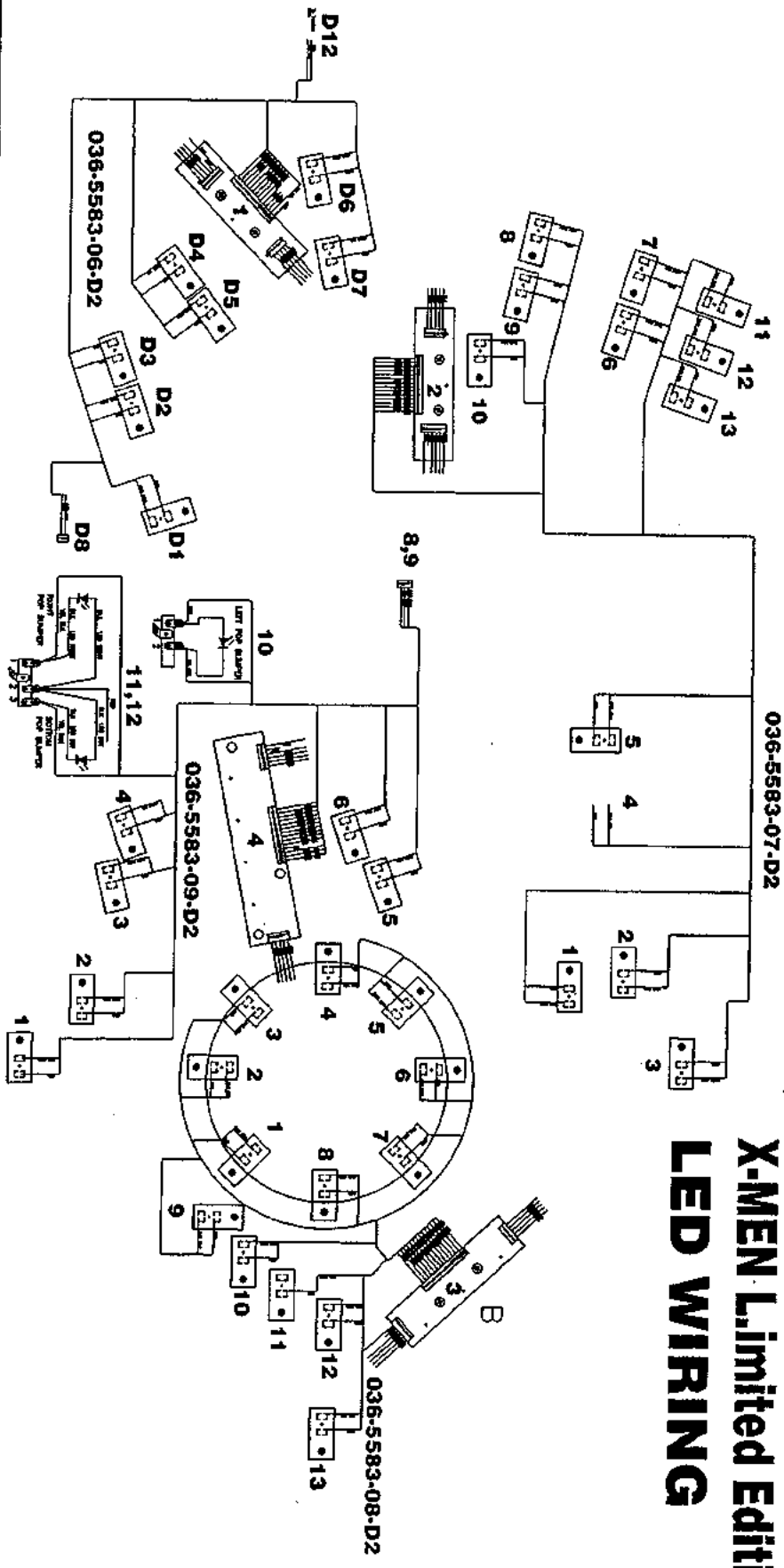
X-MEN Limited Edition

LED Board Wiring



Y7

X-MEN Limited Edition LED WIRING

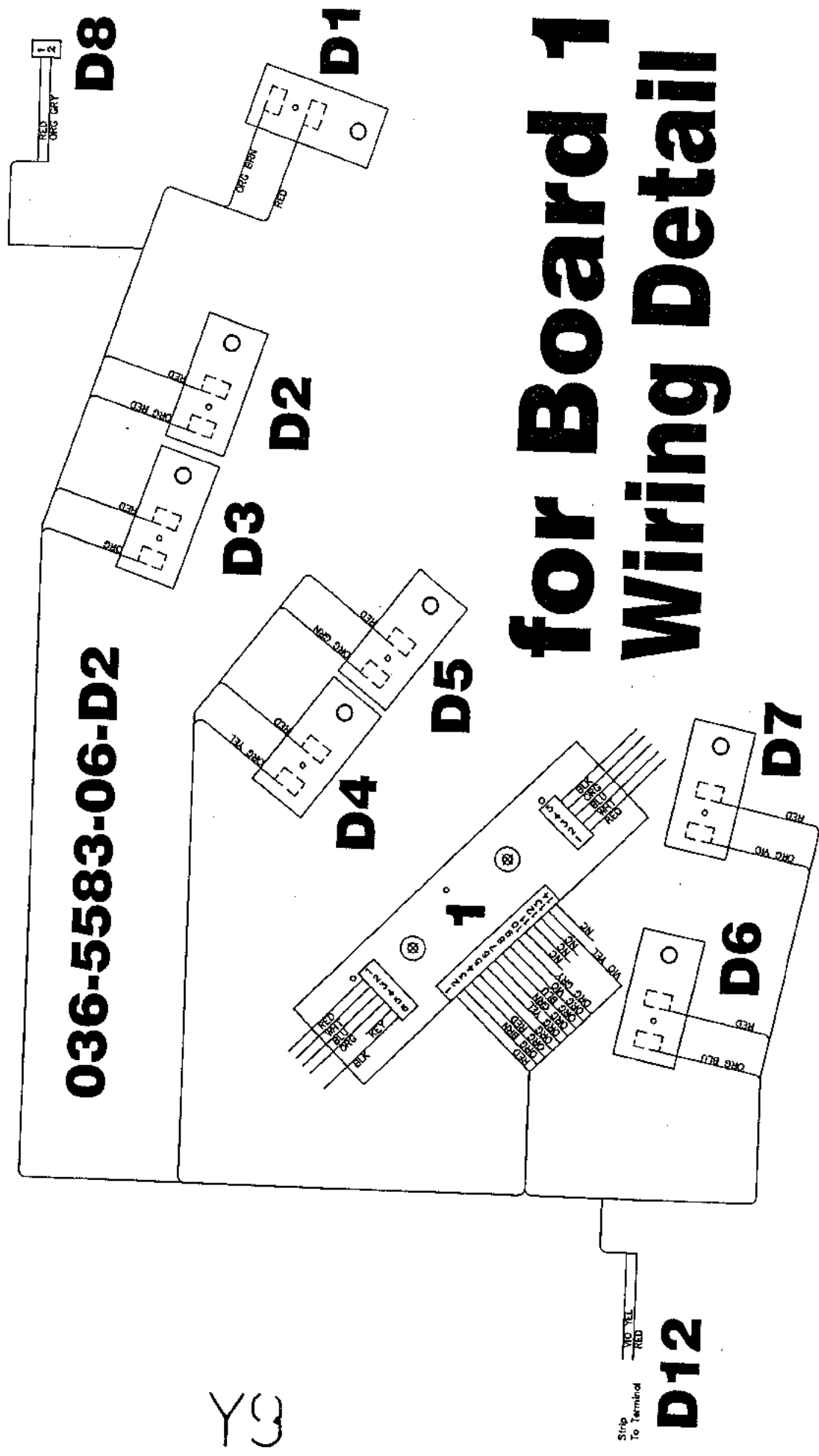


Y33.

Y9

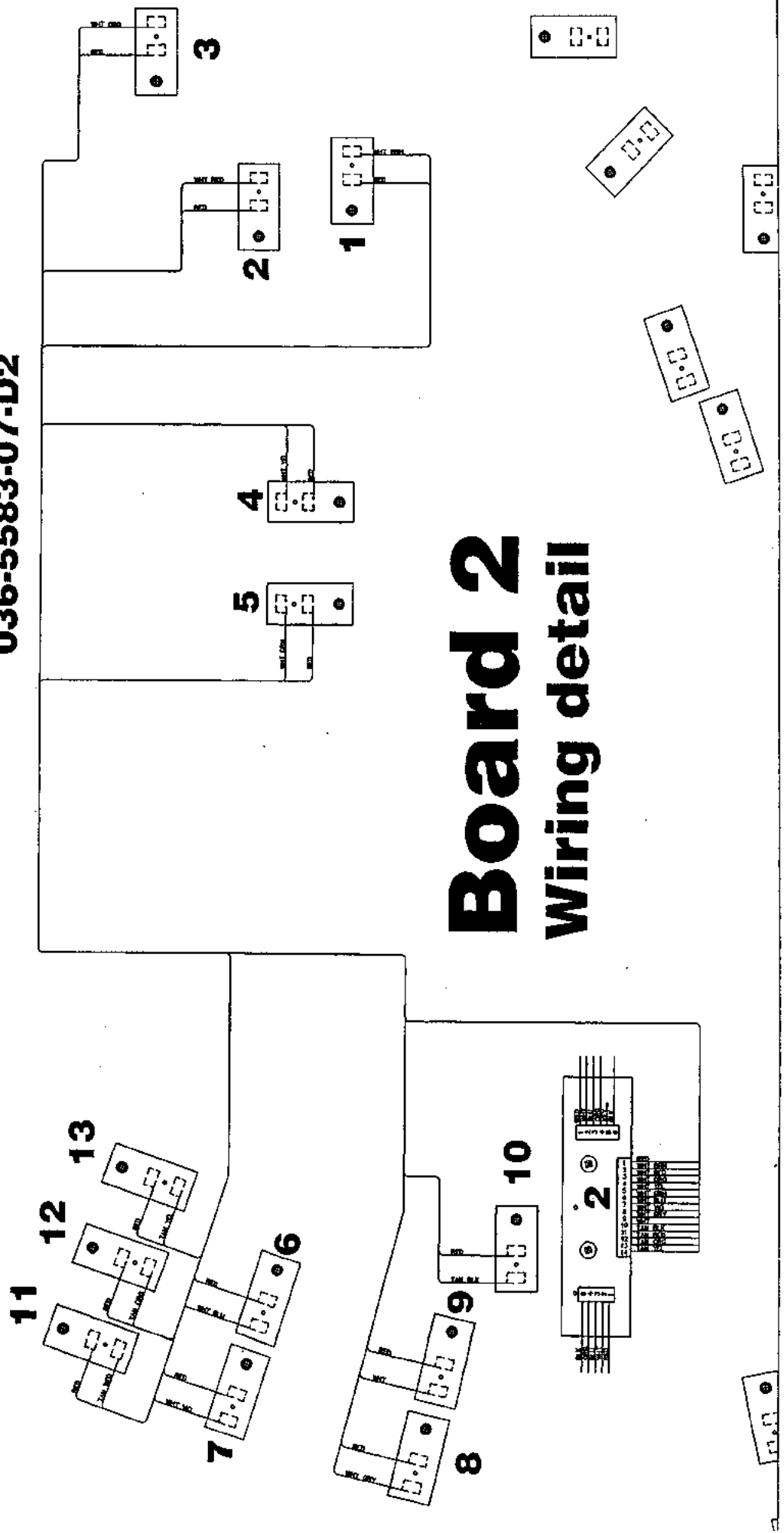
036-5583-06-D2

for Board 1 Wiring Detail



Y101

036-5583-07-D2



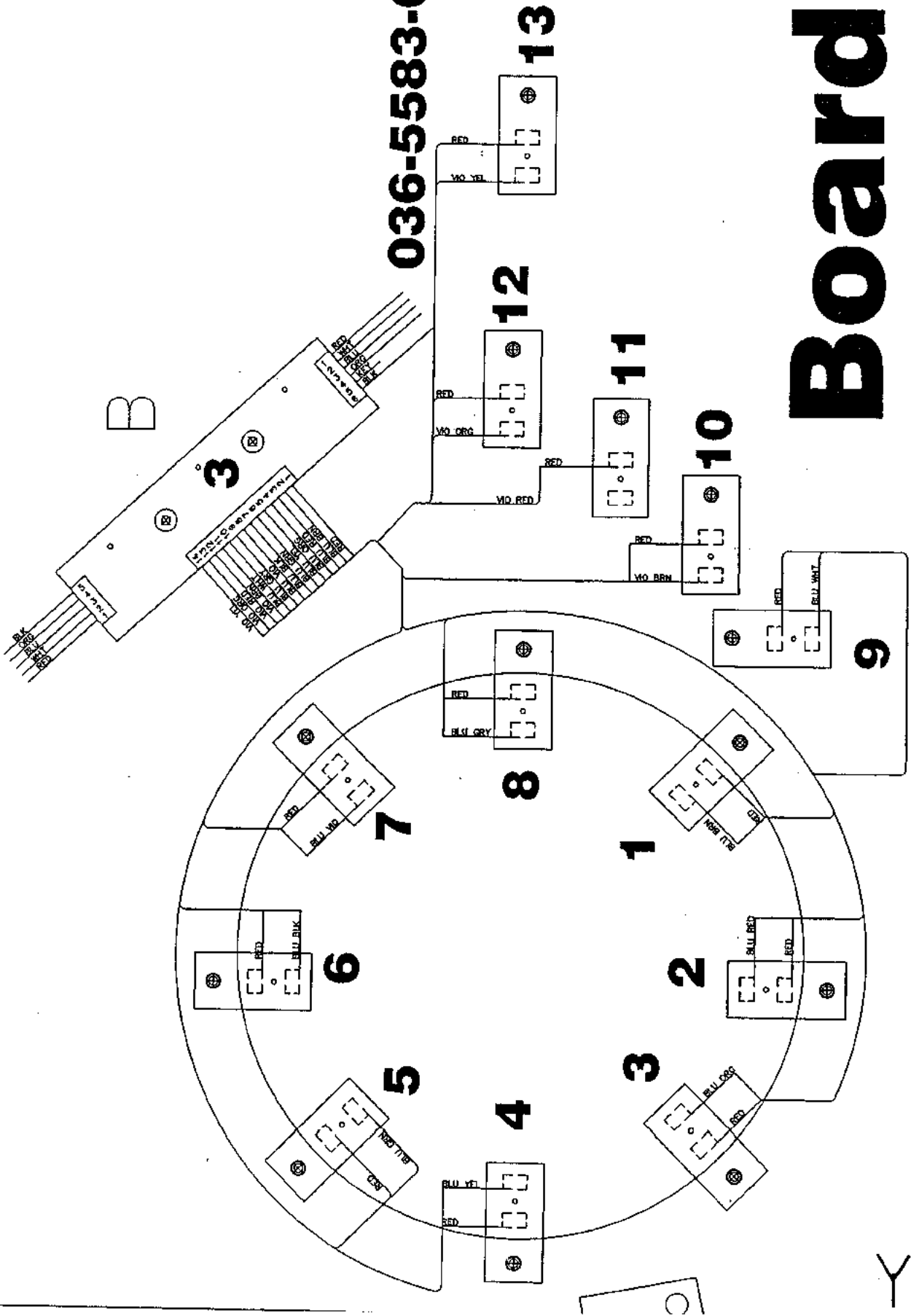
Board 2

Wiring detail

036-5583-08-D2

Board 3

Wiring detail



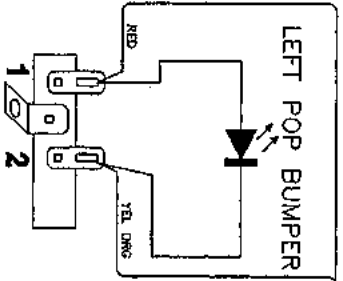
Y11

8,9

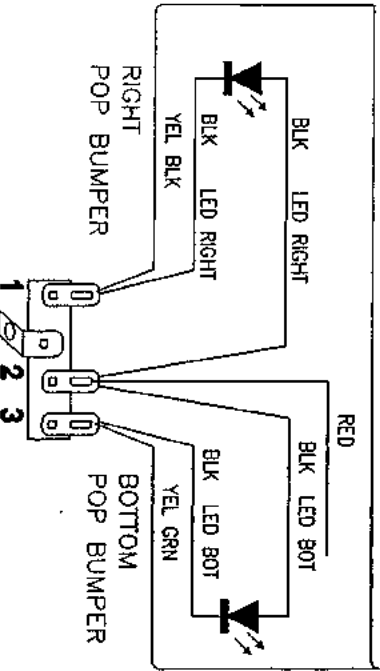


Board 4 Wiring

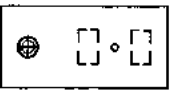
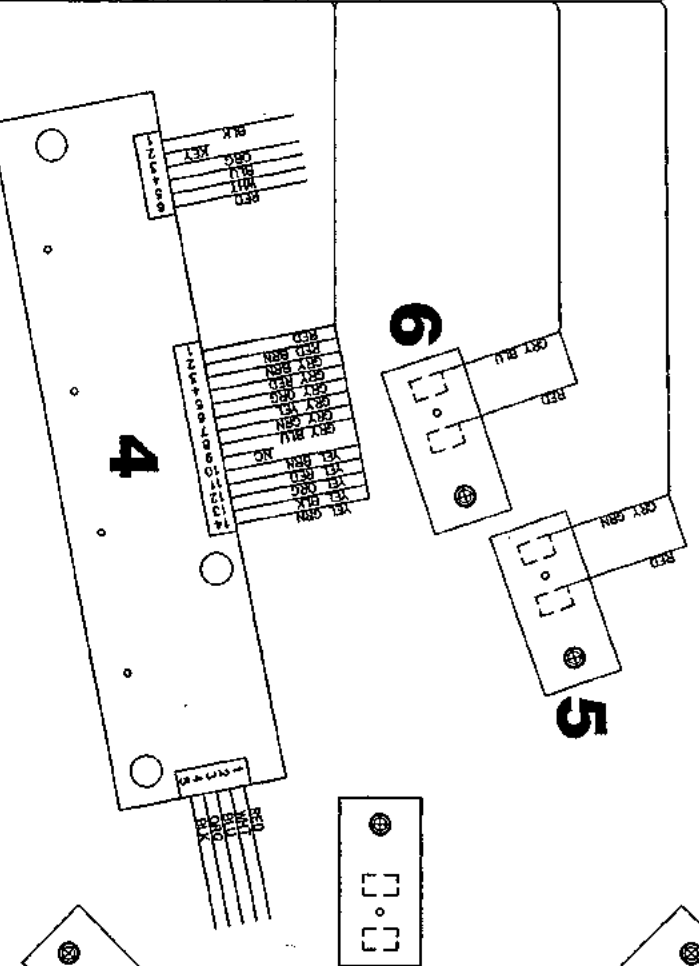
10



11,12

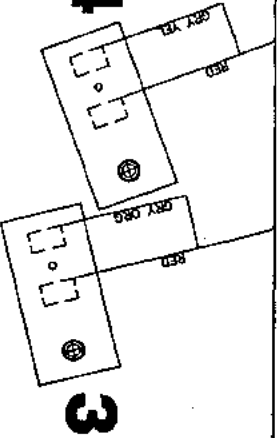


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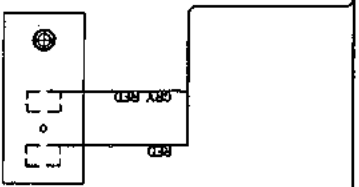
Y12

4

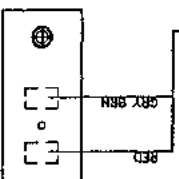


3

2



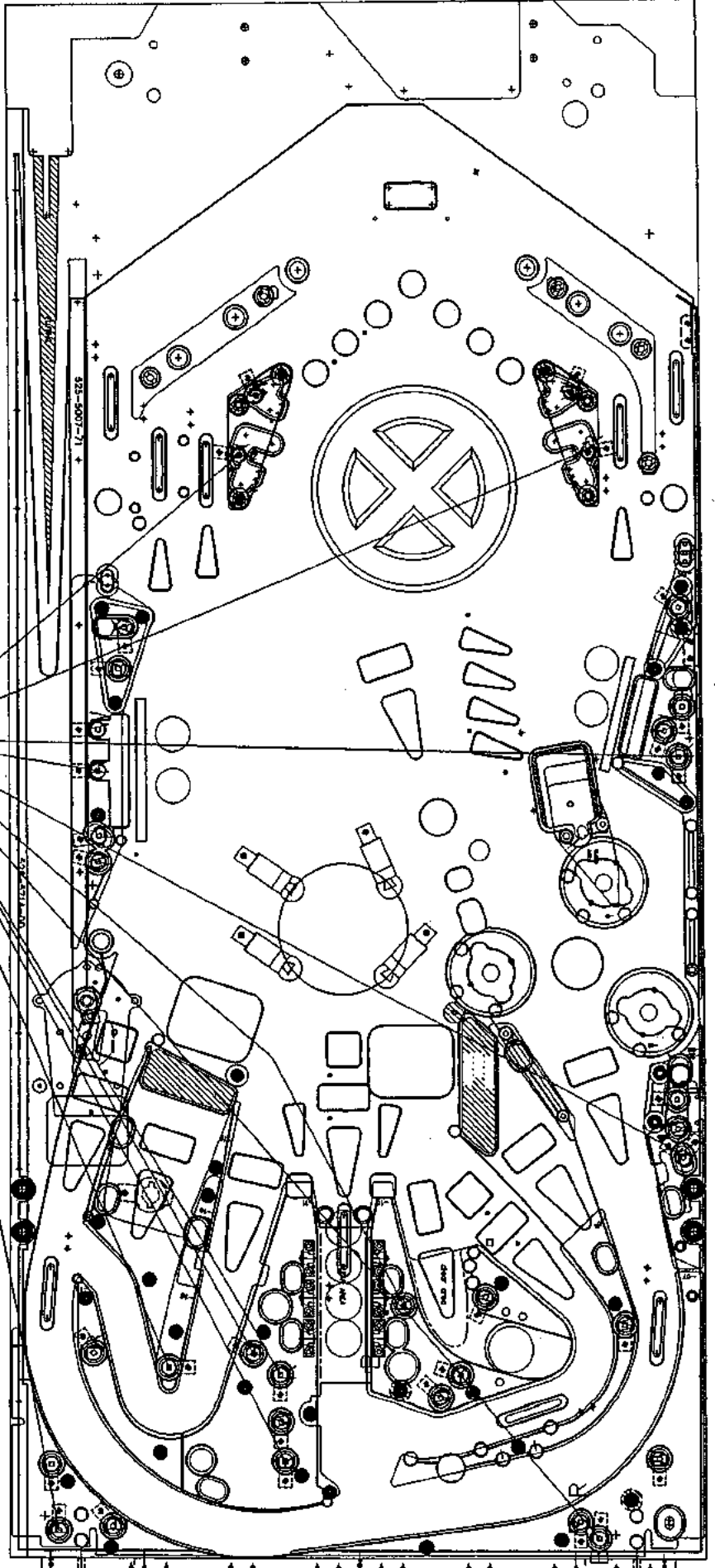
1



**X-MEN L.E.
RED GI MAP**

RED LEDS

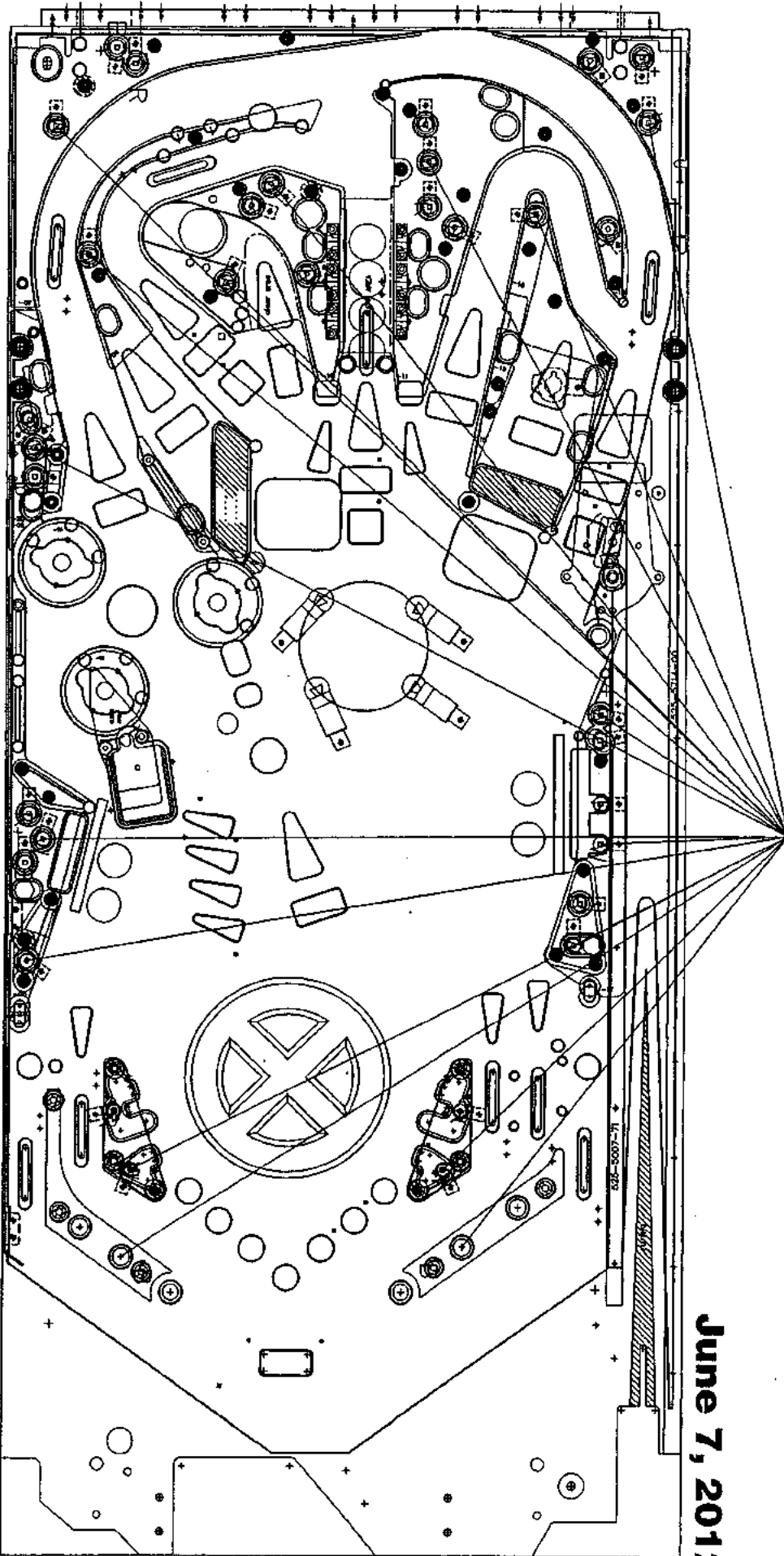
June 7, 2012



V40

**X-MEN L.E.
WHT GI MAP**

WHT LEDS



June 7, 2012

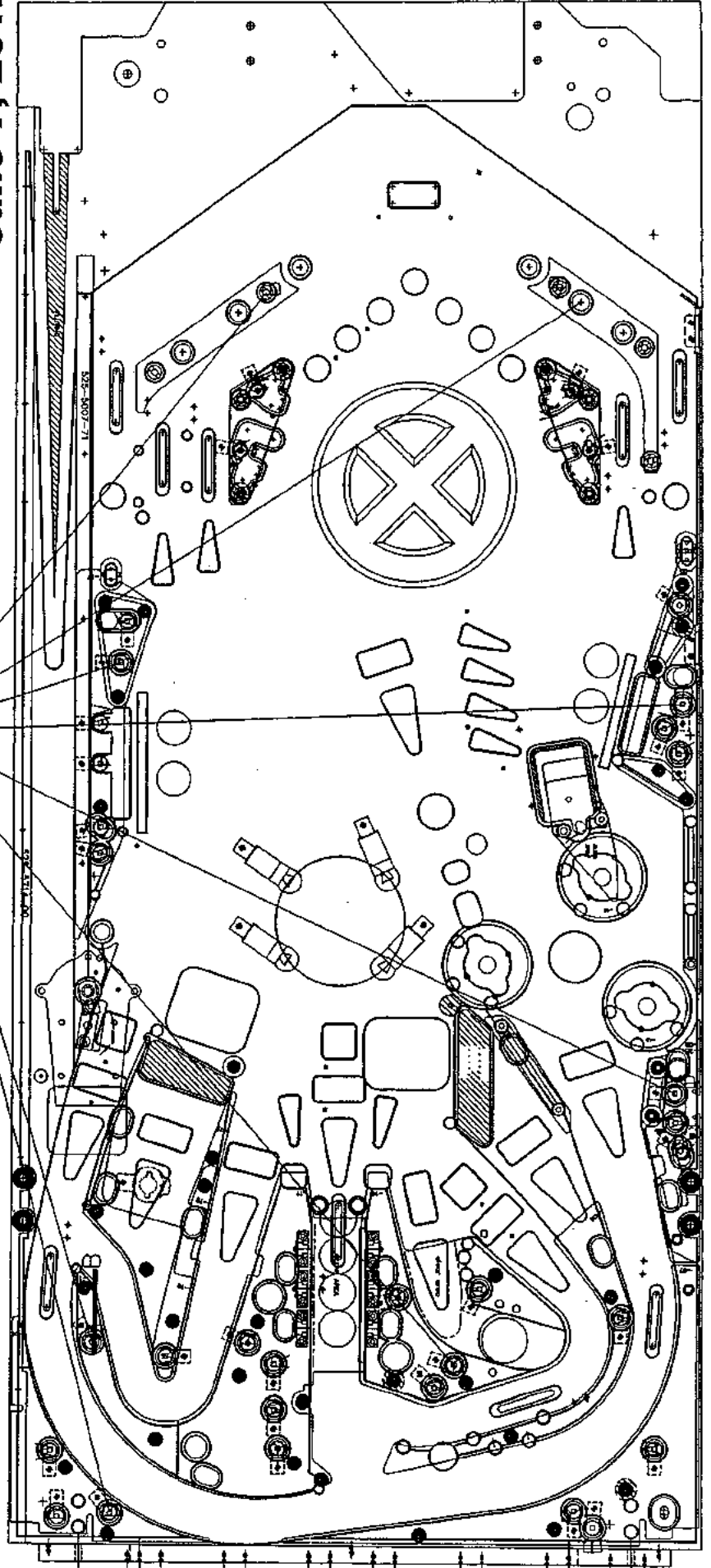
Y14

Y15

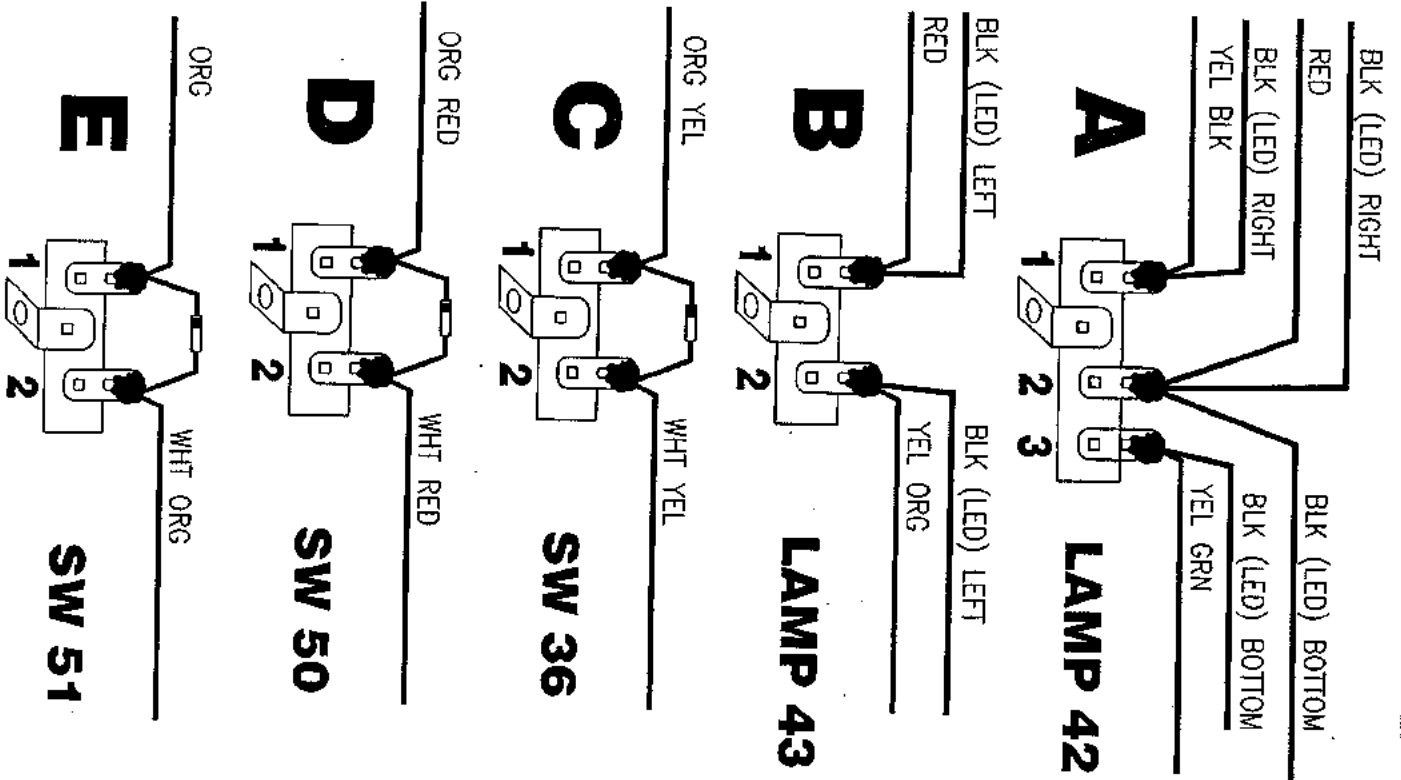
**X-MEN L.E.
BLU GI MAP**

BLU LEDS

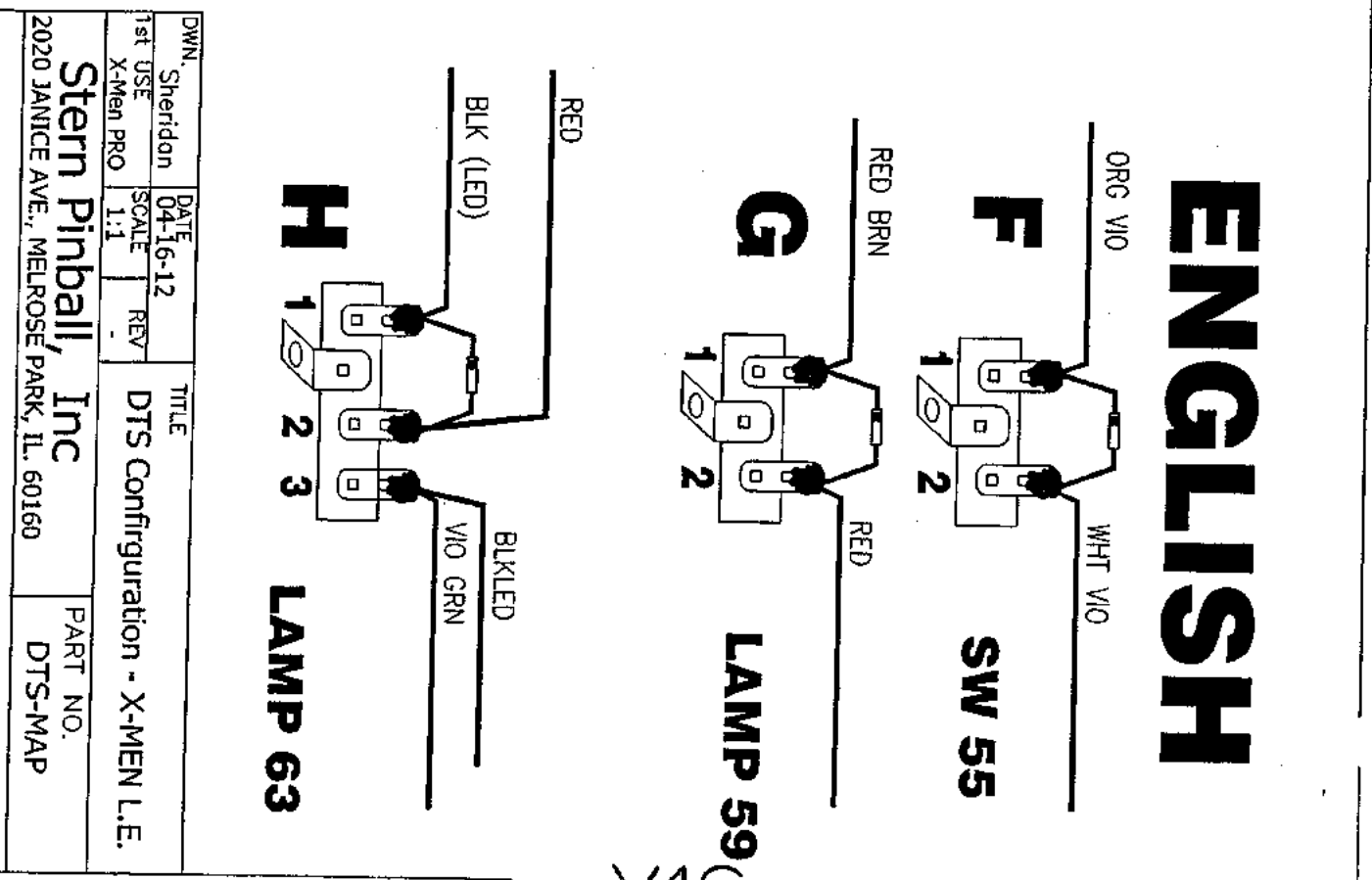
June 7, 2012



LAMP 41



ENGLISH

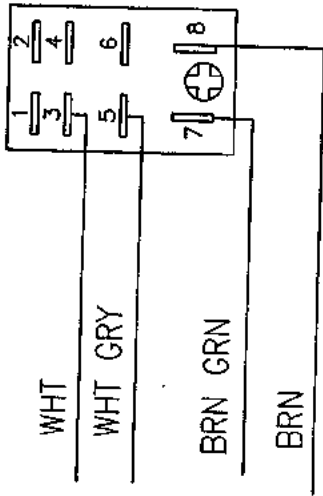


Y1G

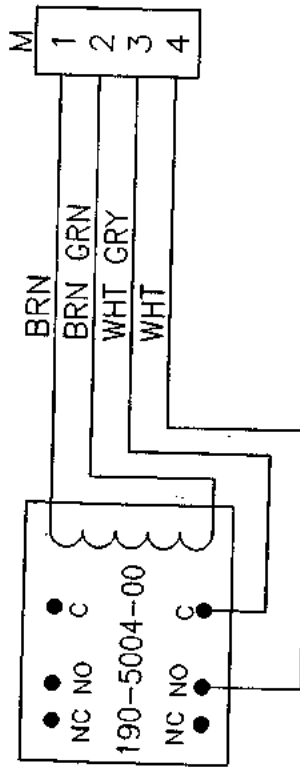
DWVN	DATE	TITLE
Sheridan	04-16-12	DTS Configuration - X-MEN L.E.
1st USE	SCALE	REV
X-MEN PRO	1:1	

Stern Pinball, Inc
 2020 JANICE AVE., MELROSE PARK, IL. 60160
 PART NO. DTS-MAP

RELAY ASSEMBLY X-MEN Limited Edition



Relay Cable: 036-5539-09-B1

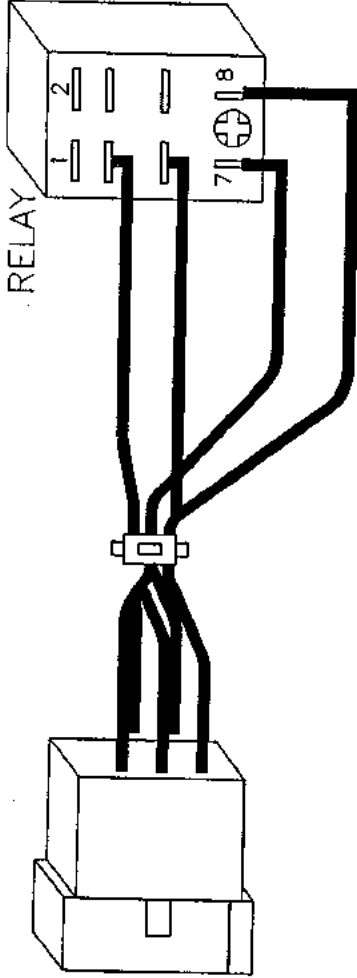


511-5249-01

Y17

Rev	Description	Eng	Date
A	Released	Sheridan	05-24-12

036-5530-09-B1
CABLE
190-5004-00
RELAY



Item	Part Number	Description	Qty
1	190-5004-00	Packard Relay	1
2	036-5539-09-B1	Relay Cable	1

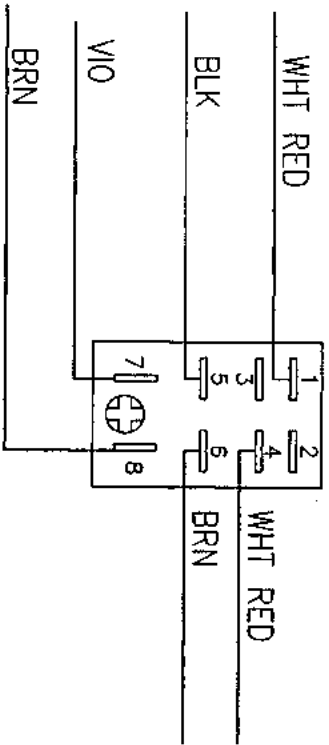
DWN.	DATE	TITLE
Sheridan	05-24-12	Relay and Cable Assembly
1st USE	SCALE	
AVATAR	N/S	

Stern Pinball, Inc
2220 JANICE AVE., MELROSE PARK, IL 60160
PART NO. 511-5249-01

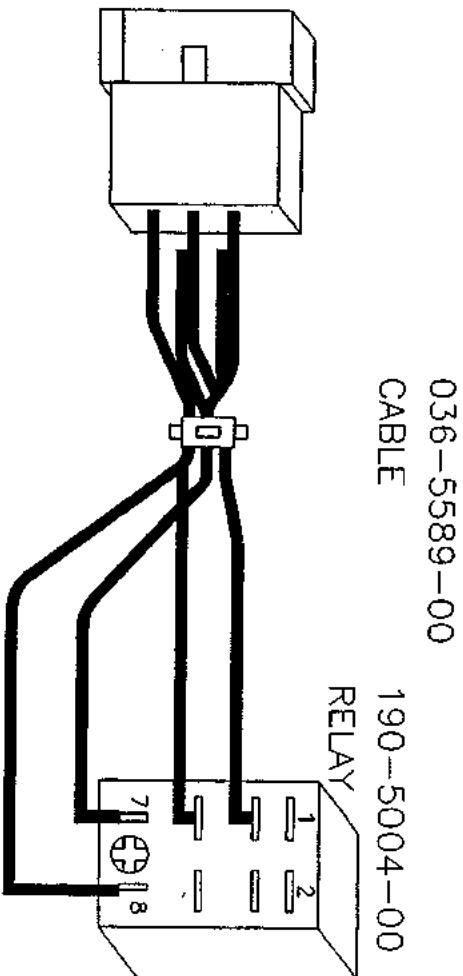
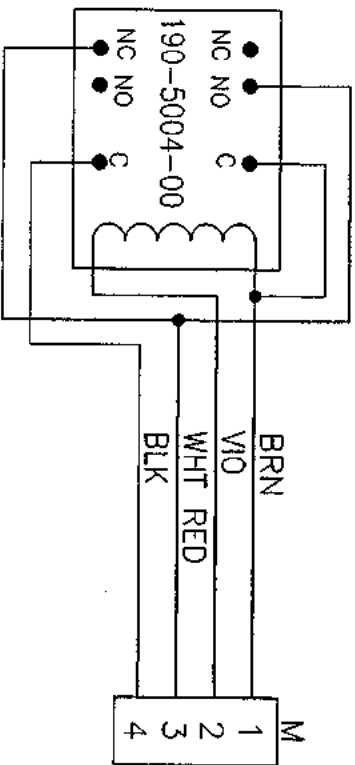
511-5249-01

GENERIC RELAY ASSEMBLY DC MOTOR WITH BRAKING

Rev	Description	Eng	Date
A	Released	Sheridan	05-11-12



Relay Cable 036-5589-00



511-7234-00

Item	Part Number	Description	Qty
1	190-5004-00	Packard Relay	1
2	036-5589-00	Relay Cable	1

DWN.	DATE	TITLE
Sheridan	05-11-12	Relay and Cable Assembly
1st USE		
X-MENUE	N/S	

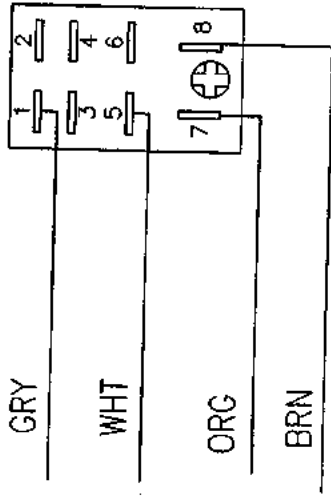
Stern Pinball, Inc
2220 JANICE AVE., MELROSE PARK, IL. 60160

PART NO.
511-7234-00

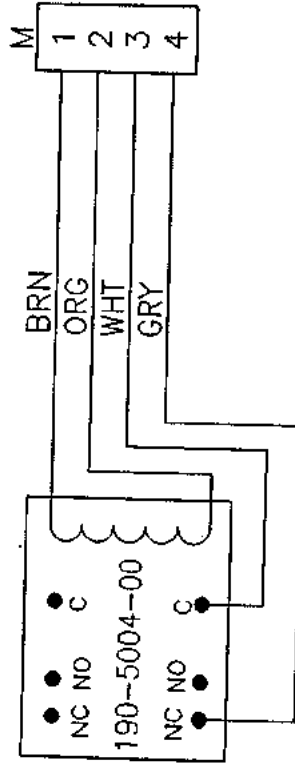
Y152

RELAY ASSEMBLY X-MEN L.E.

(X3)



Relay Cable 036-5583-05-D2

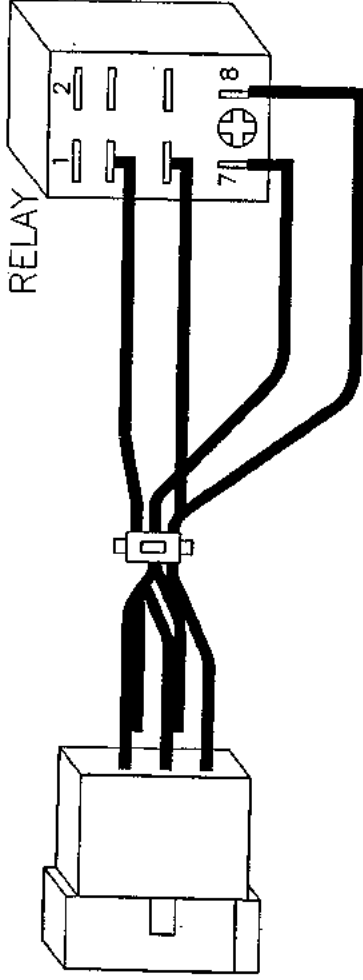


511-7226-00

Rev	Description	Eng	Date
A	Released	Sheridan	04-12-12

036-5583-05-D2
CABLE

190-5004-00
RELAY



Item	Part Number	Description	Qty
1	190-5004-00	Packard Relay	1
2	036-5583-05-D2	Relay Cable	1

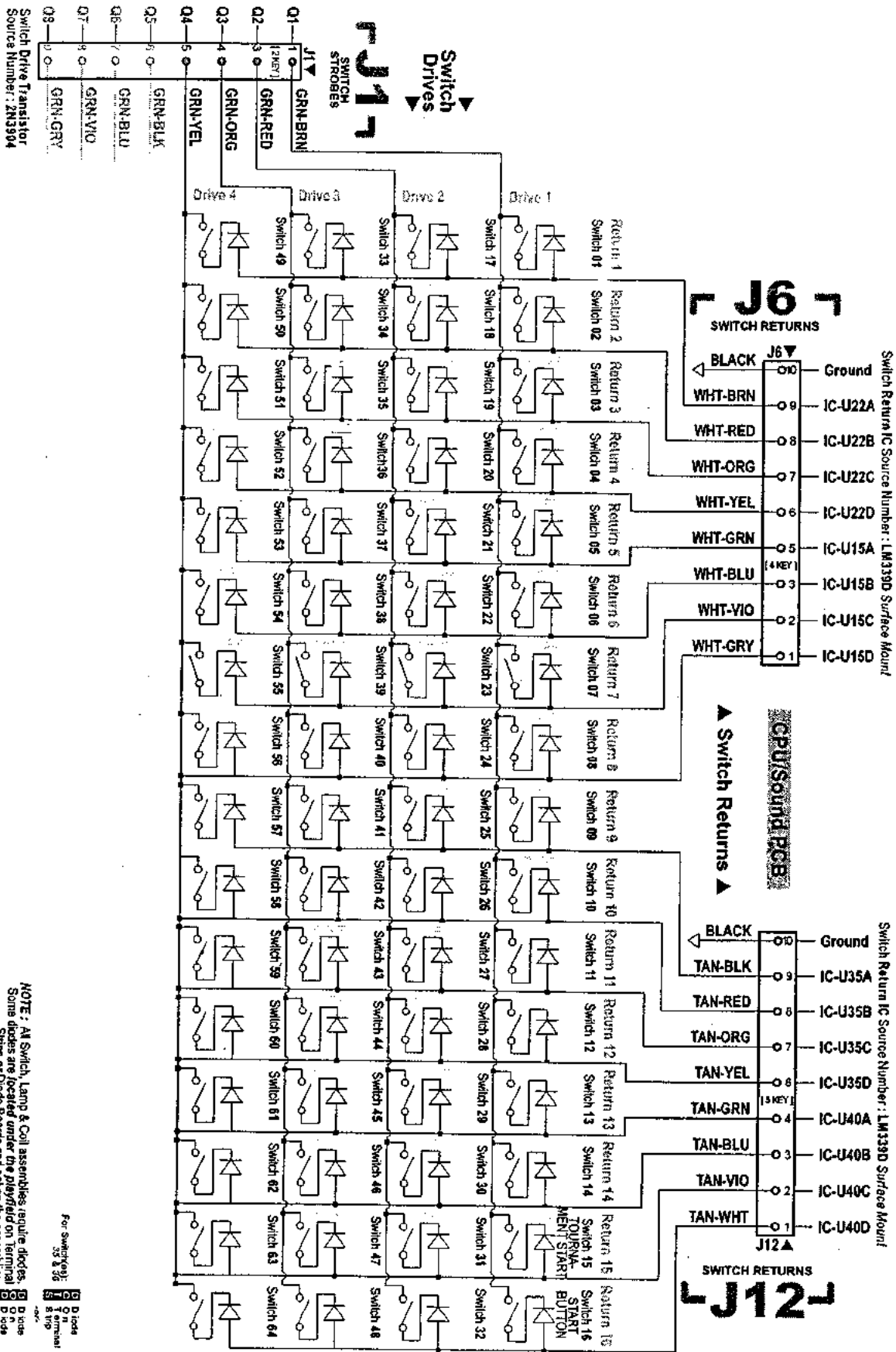
DWN.	DATE	TITLE
Sheridan	04-12-12	Relay and Cable Assembly

1st USE	X-MEN L.E.	N/S	PART NO.
			511-7226-00

Stern Pinball, Inc
2220 JANICE AVE., MELROSE PARK, IL. 60160

Y19

Playfield Switch Wiring Diagram



Playfield Wiring

Y20()

Playfield
Wiring

#-Flipper Circuit Wiring Diagram

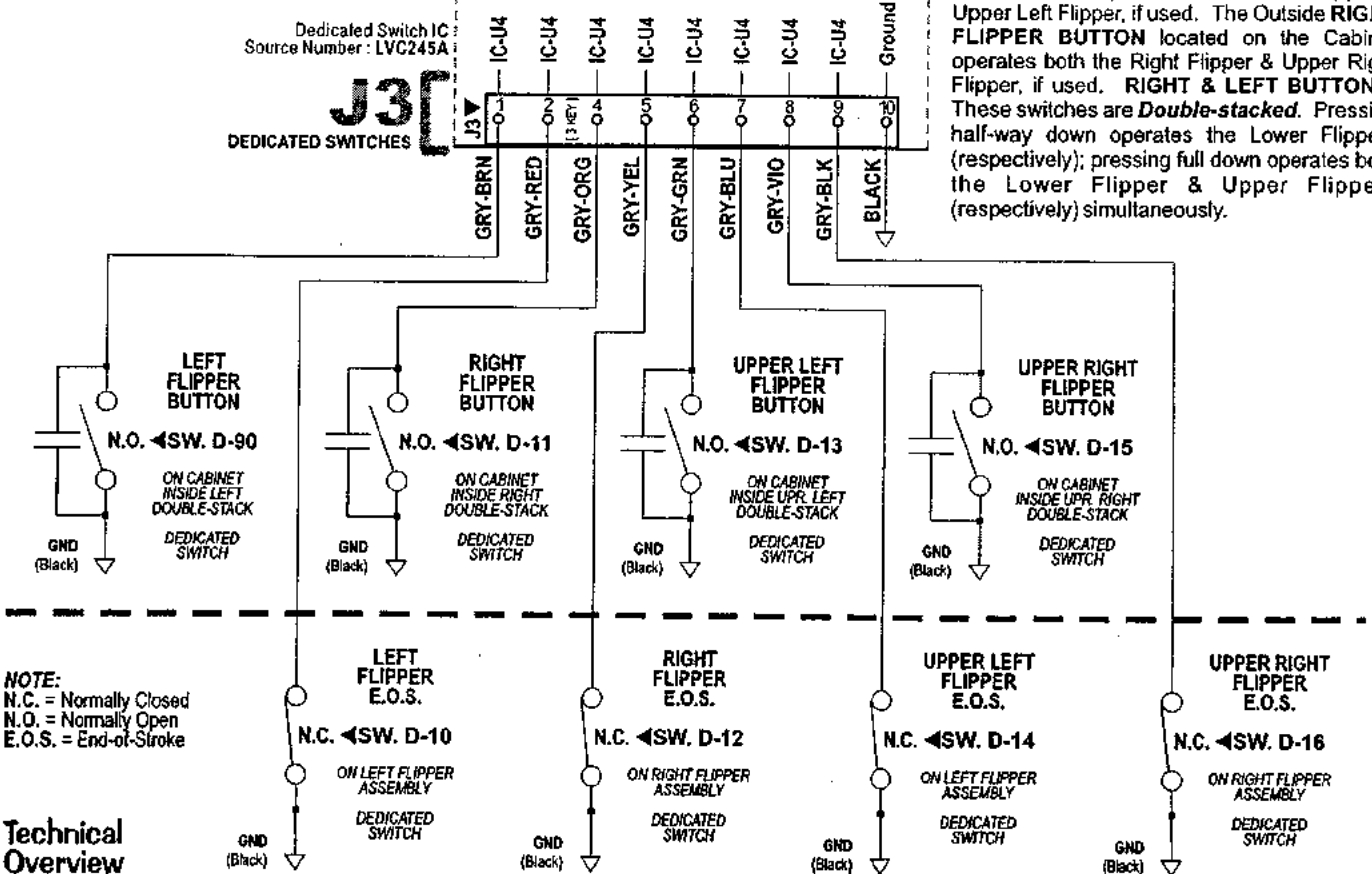
Partial View CPU/Sound

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.

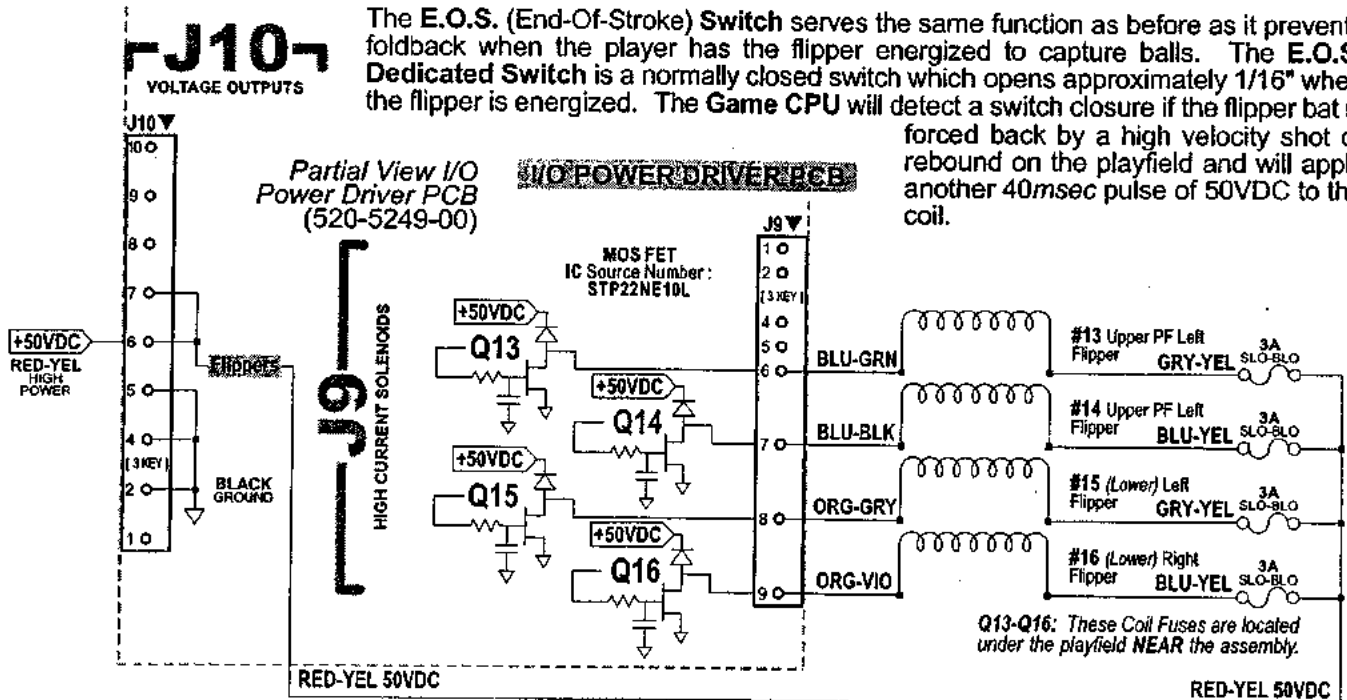


NOTE:
N.C. = Normally Closed
N.O. = Normally Open
E.O.S. = End-of-Stroke

Technical Overview

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 40msec 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 1msec every 12msecs for the duration of the hold cycle.

The **E.O.S. (End-Of-Stroke) Switch** serves the same function as before as it prevents foldback when the player has the flipper energized to capture balls. The **E.O.S. 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 40msec pulse of 50VDC to the coil.



Q13-Q16: These Coil Fuses are located under the playfield NEAR the assembly.

Typical Under-Playfield Fuses are rated:
3A 250v Slo-Blo
Do Not Over-Fuse

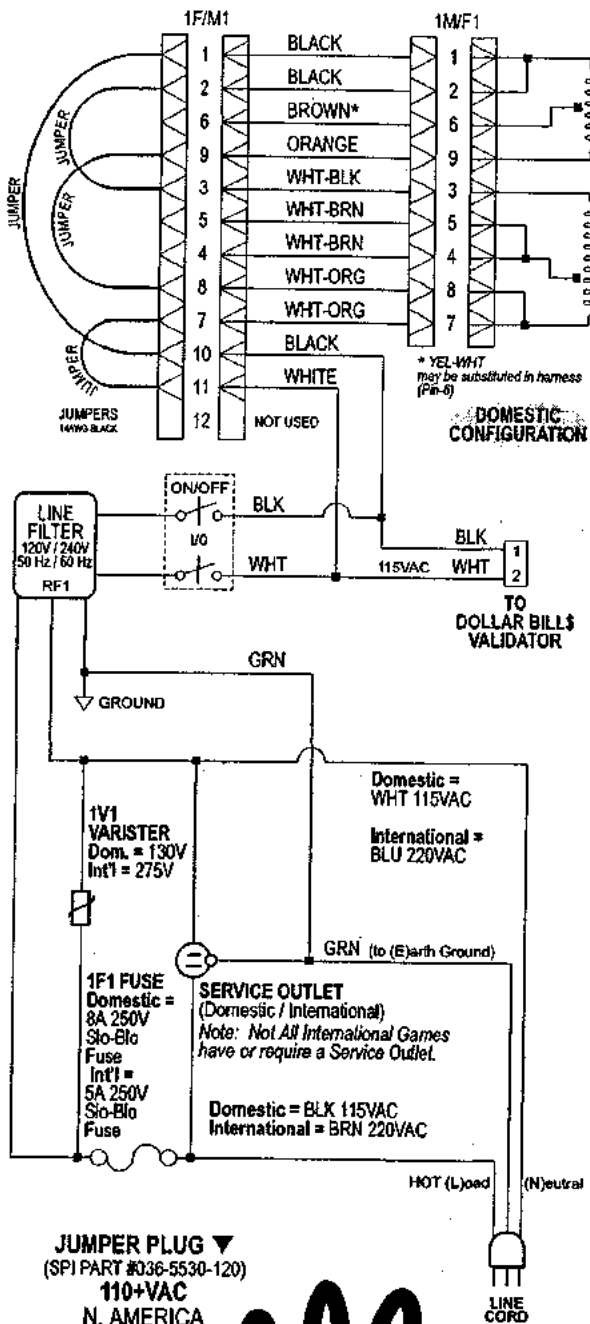
NOTE:
Coil Diodes (1N4004) are integrated on the I/O Power Driver PCB. See Coils Detailed Wiring Diagram for actual number of flippers used on this game.

Playfield Wiring

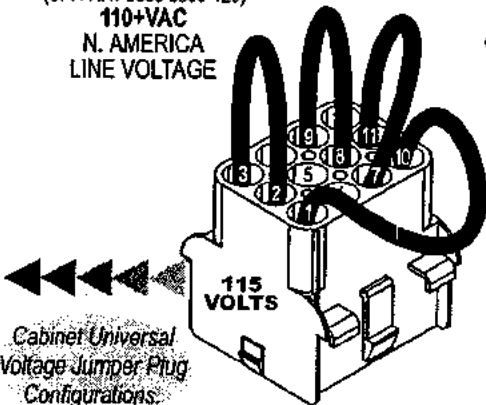
Playfield Wiring

Y21

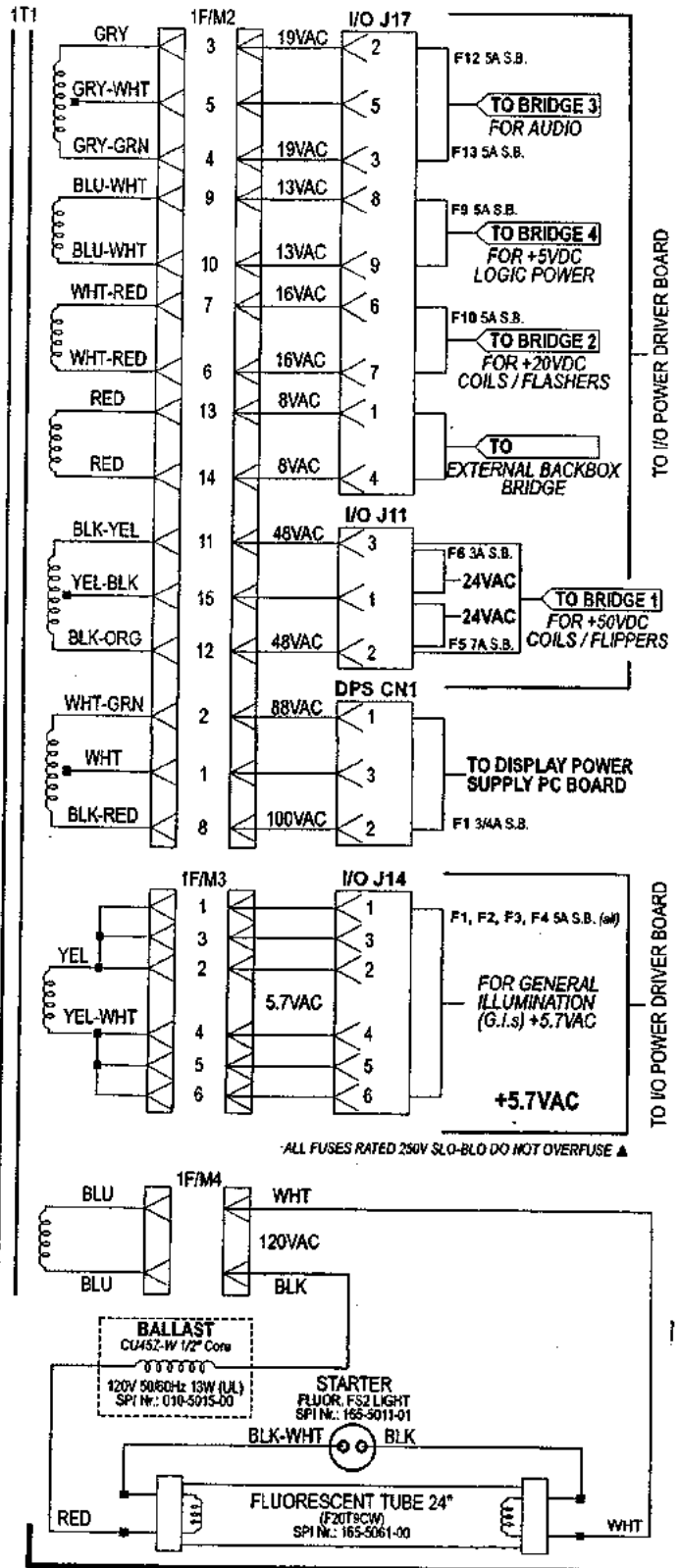
Transformer Power Wiring Diagram



JUMPER PLUG ▼
(SPI PART #036-5530-120)
110+VAC
N. AMERICA
LINE VOLTAGE

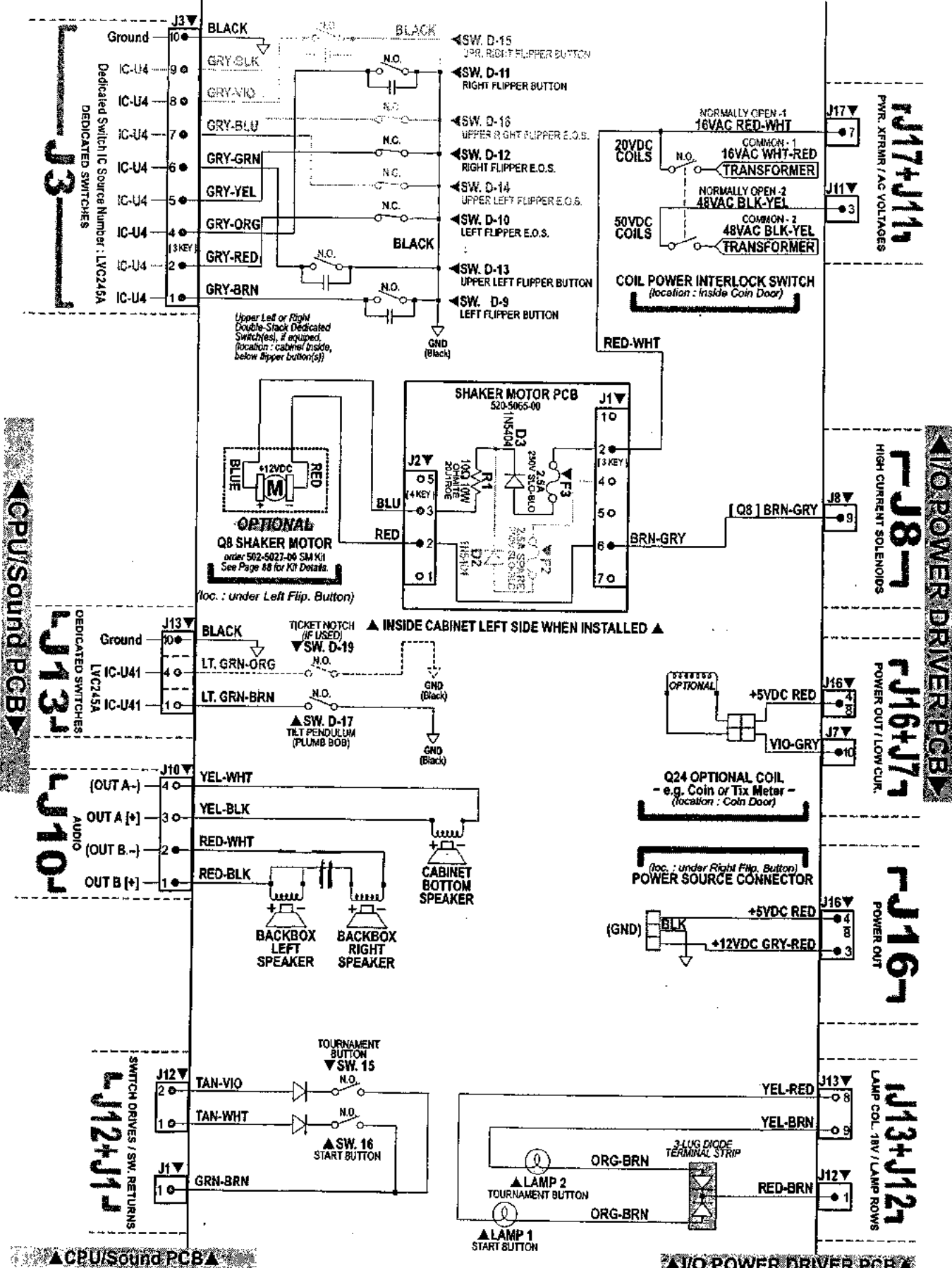


Cabinet Universal Voltage Jumper Plug Configurations:



FLUORESCENT TUBE, STARTER & BALLAST LOCATED IN THE BACKBOX

Cabinet Wiring Diagram



CPU/Sound PCB

I/O POWER DRIVER PCB

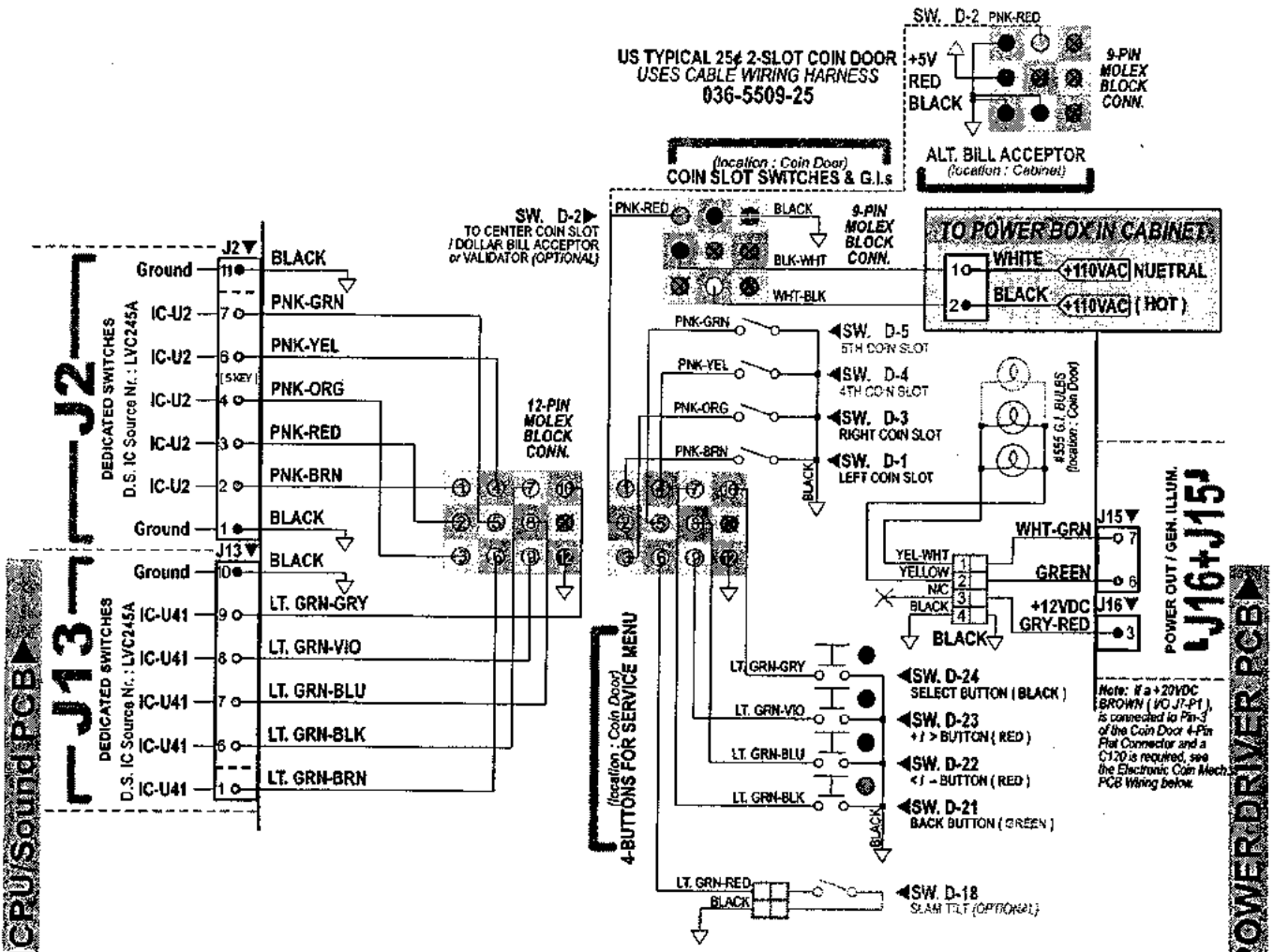
▲ CPU/Sound PCB ▲

▲ I/O POWER DRIVER PCB ▲

Cabinet and Coin Door Wiring

Y23

Coin Door Wiring Diagram



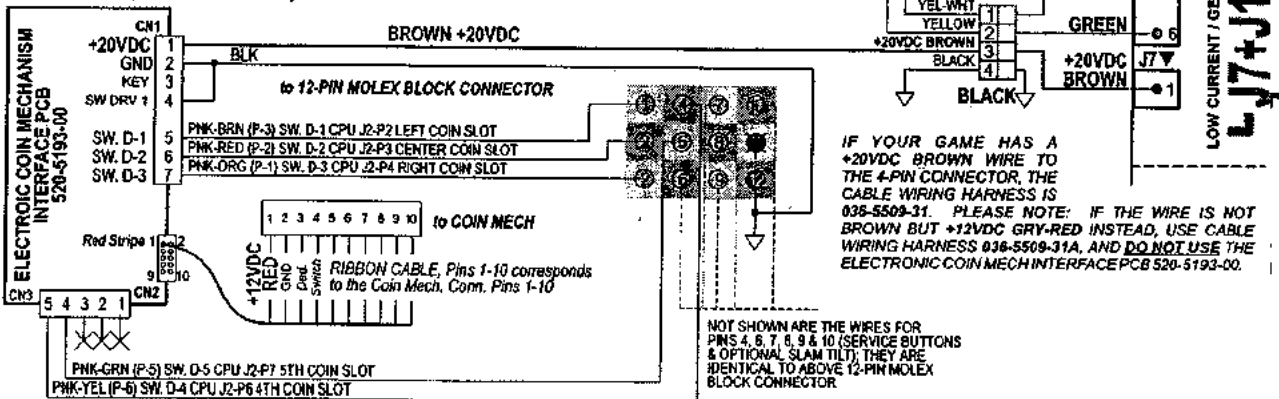
1-SLOT COIN DOOR WITH C120 CAPABILITIES (NO INTERFACE COIN MECH PCB REQUIRED)
 USES CABLE WIRING HARNESS
036-5509-31A (+12VDC GRY-RED)

036-5509-31B (ICT/KAL ONLY) / 036-5509-31C (DDA ONLY) / 036-5509-31D (SPAIN ONLY)

NON-US NON-C120 2-SLOT COIN DOOR
 USES CABLE WIRING HARNESS
036-5509-32

NON-US NON-C120 3-SLOT COIN DOOR
 USES CABLE WIRING HARNESS
036-5509-33

IF YOUR GAME HAS AN ELECTRONIC COIN MECH. INTERFACE PC BOARD (520-5193-00):
 1-SLOT COIN DOOR USE WITH C120 CAPABILITIES REQUIRING PCB 520-5193-00
 USES CABLE WIRING HARNESS
036-5509-31 (S.A.M. SYSTEM)

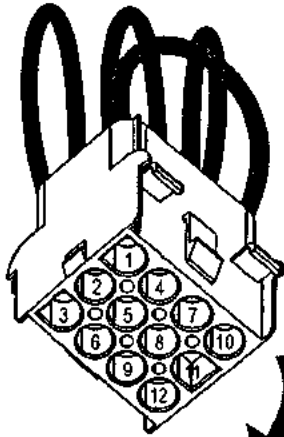


- WIRING CONFIGURATION WILL VARY ACCORDING TO COUNTRY -

Cabinet and Coin Door Wiring

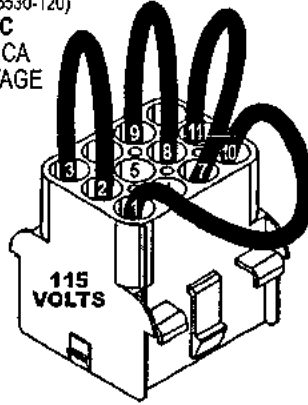
Y24

Cabinet Universal Voltage Jumper Plugs (for use with Universal AC Cable, 036-5530-00 ONLY)

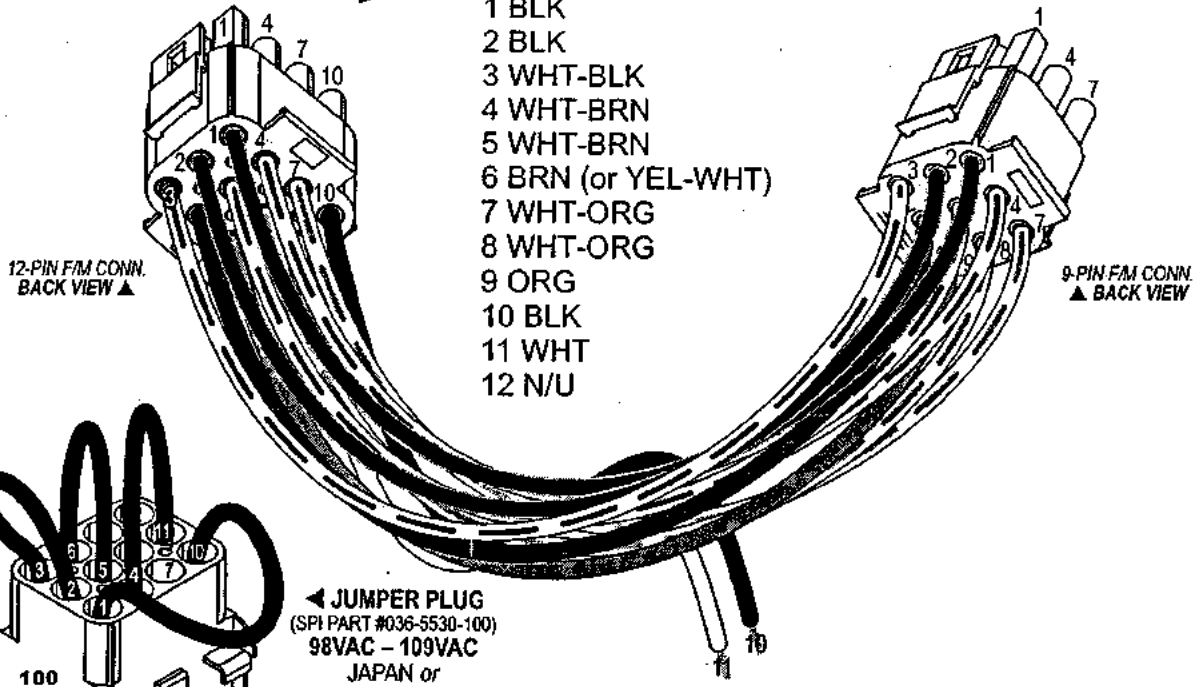


12-PIN FEMALE SIDE TO JUMPER
12-PIN MALE SIDE CONNECTOR

JUMPER PLUG ▼
(SPI PART #036-5530-120)
110+VAC
N. AMERICA
LINE VOLTAGE



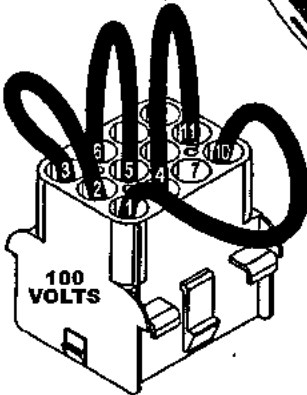
9-PIN MALE SIDE TO TRANSFORMER
9-PIN FEMALE SIDE CONN.



12-PIN F/M CONN.
BACK VIEW ▲

9-PIN F/M CONN.
▲ BACK VIEW

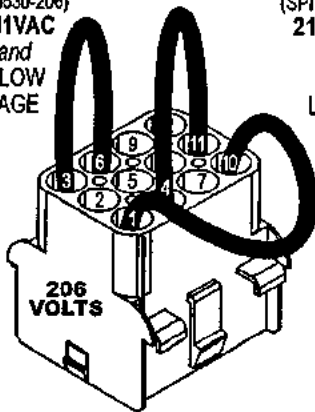
- 1 BLK
- 2 BLK
- 3 WHT-BLK
- 4 WHT-BRN
- 5 WHT-BRN
- 6 BRN (or YEL-WHT)
- 7 WHT-ORG
- 8 WHT-ORG
- 9 ORG
- 10 BLK
- 11 WHT
- 12 N/U



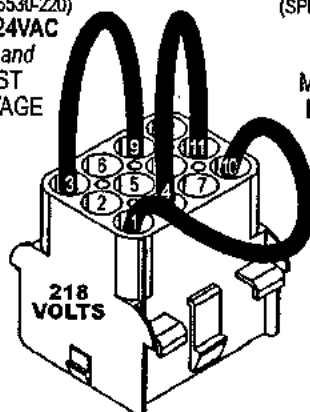
JUMPER PLUG
(SPI PART #036-5530-100)
98VAC - 109VAC
JAPAN or
N. AMERICA LOW
LINE VOLTAGE

Black & White wires from
the POWER BOX, cabinet bottom
to 12-Pin Conn., Pins 10 & 11..

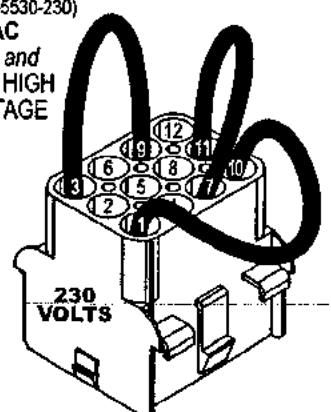
JUMPER PLUG ▼
(SPI PART #036-5530-206)
200VAC - 211VAC
EUROPE and
MID. EAST LOW
LINE VOLTAGE



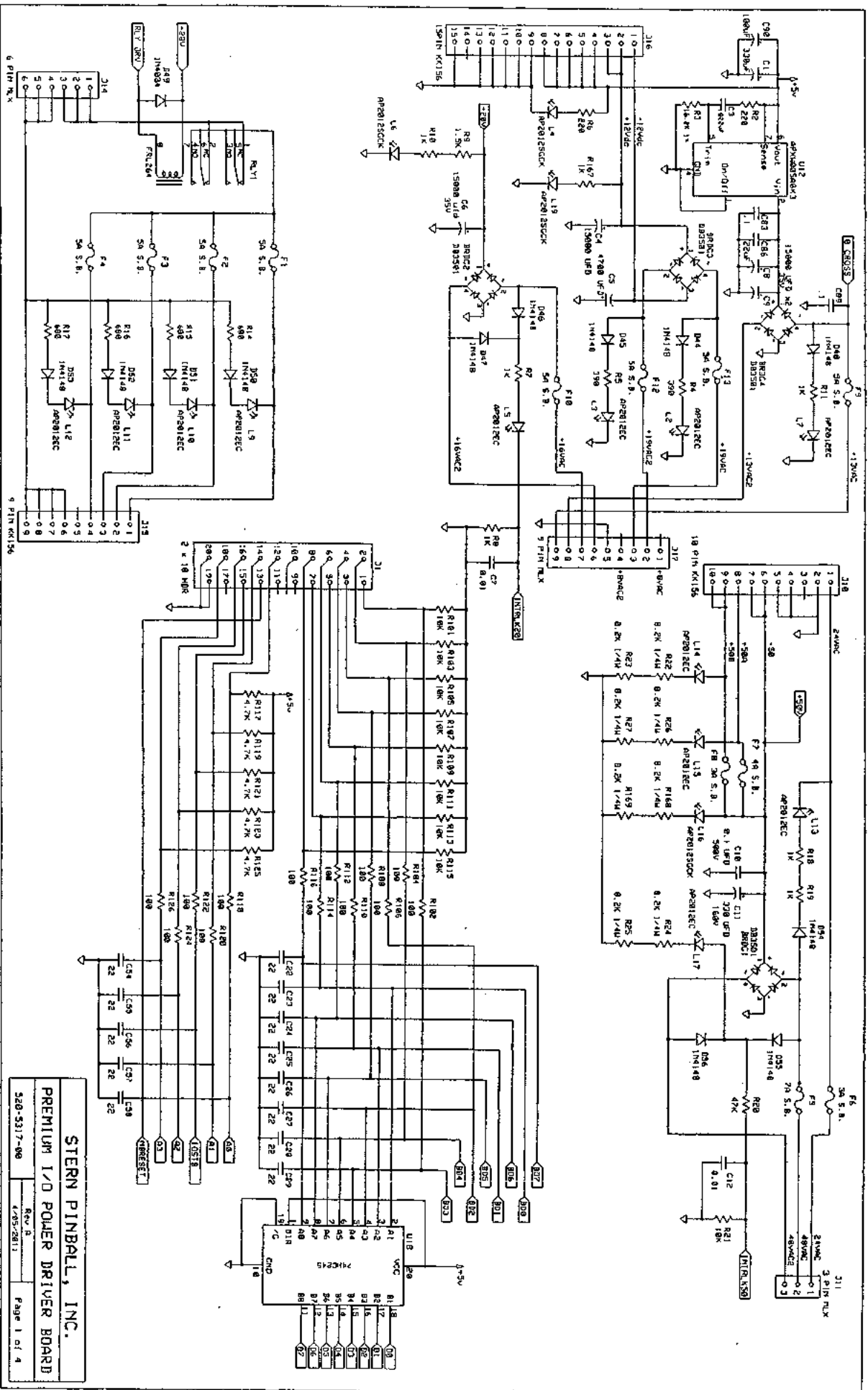
JUMPER PLUG ▼
(SPI PART #036-5530-220)
212VAC - 224VAC
EUROPE and
MID. EAST
LINE VOLTAGE



JUMPER PLUG ▼
(SPI PART #036-5530-230)
225+VAC
EUROPE and
MID. EAST HIGH
LINE VOLTAGE



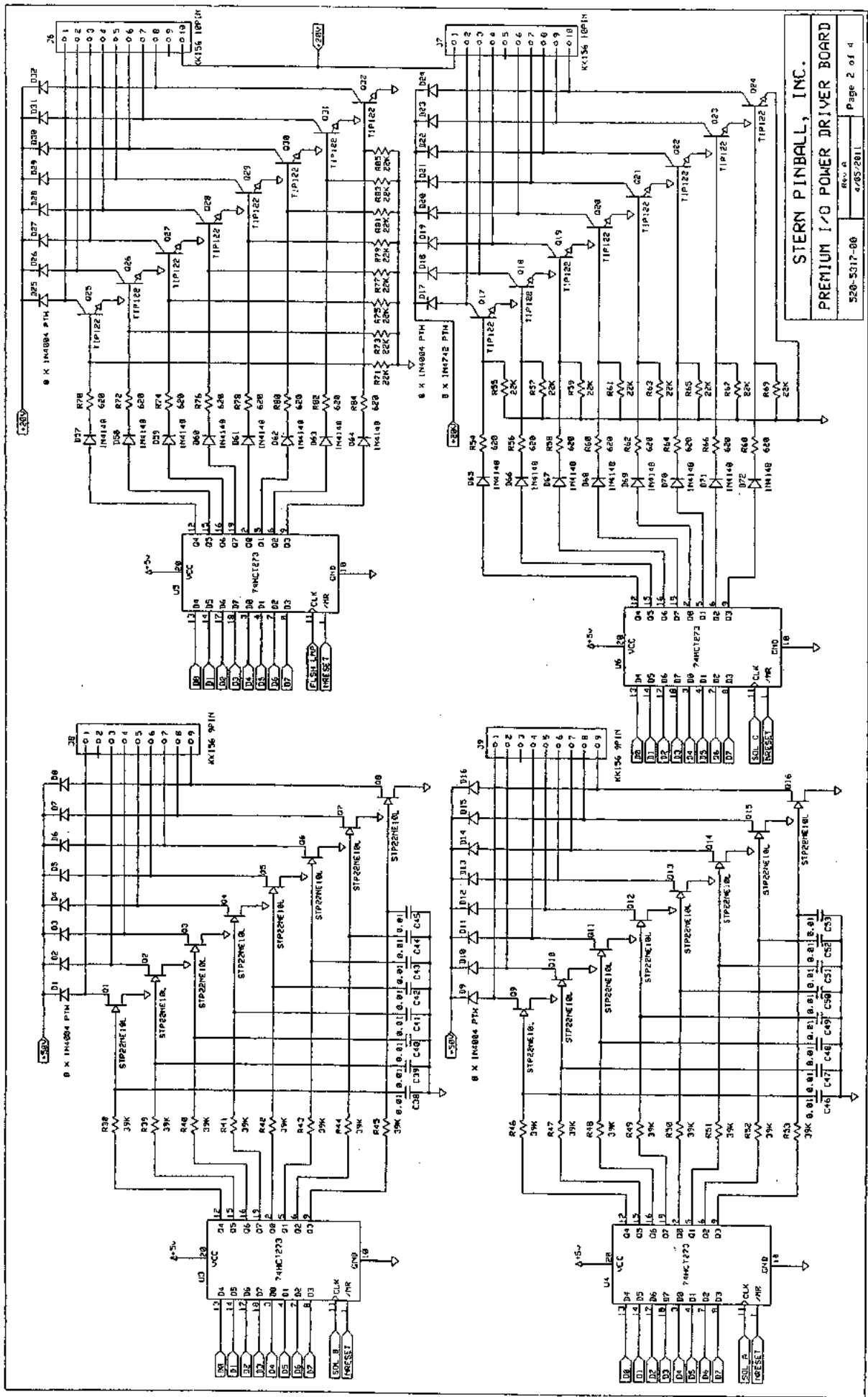
Cabinet and Coin
Door Wiring



STERN PINBALL, INC.
PREMIUM I/O POWER DRIVER BOARD

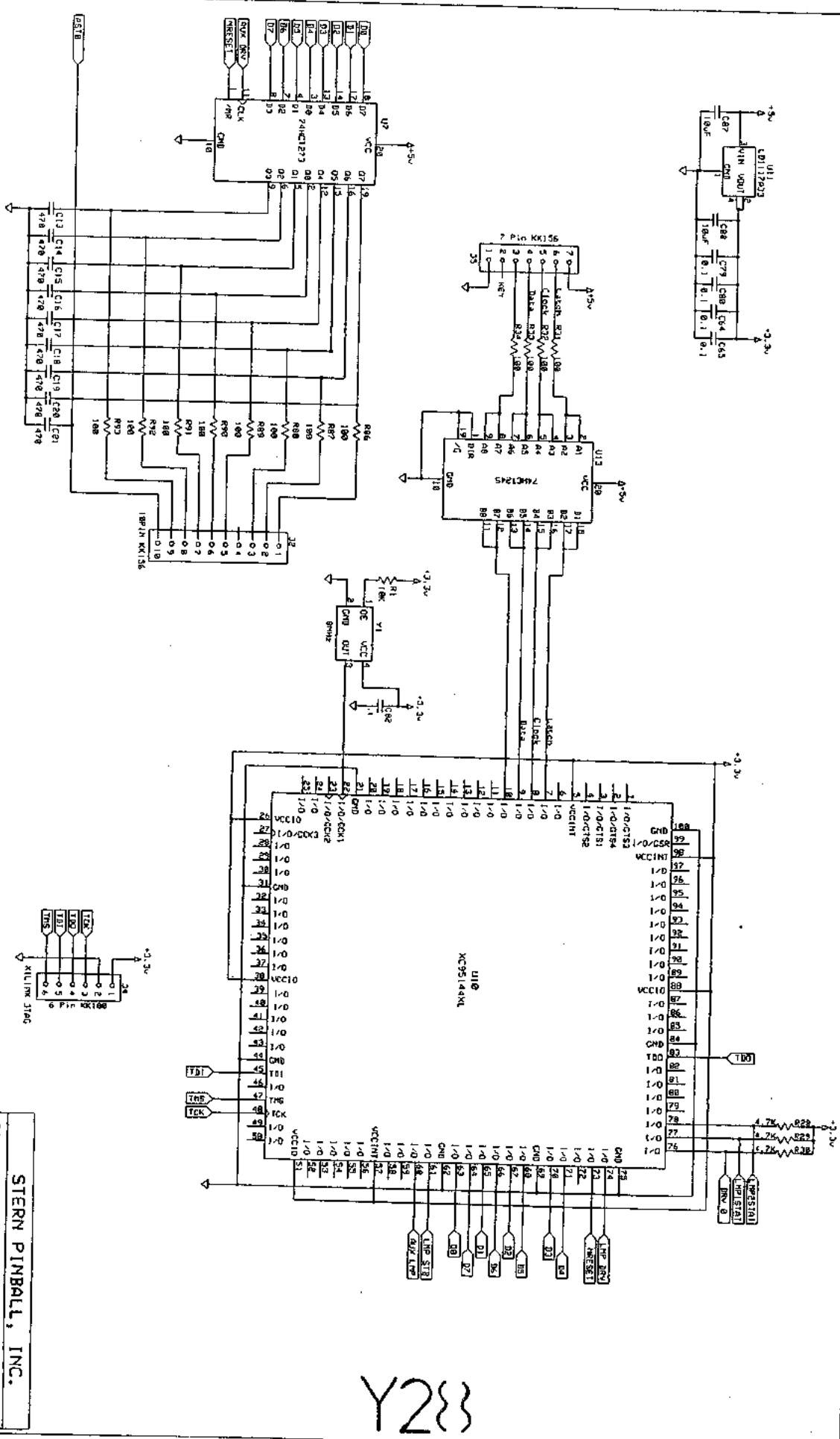
520-5317-00
 Rev. B
 4/85-2811
 Page 1 of 4

Y26



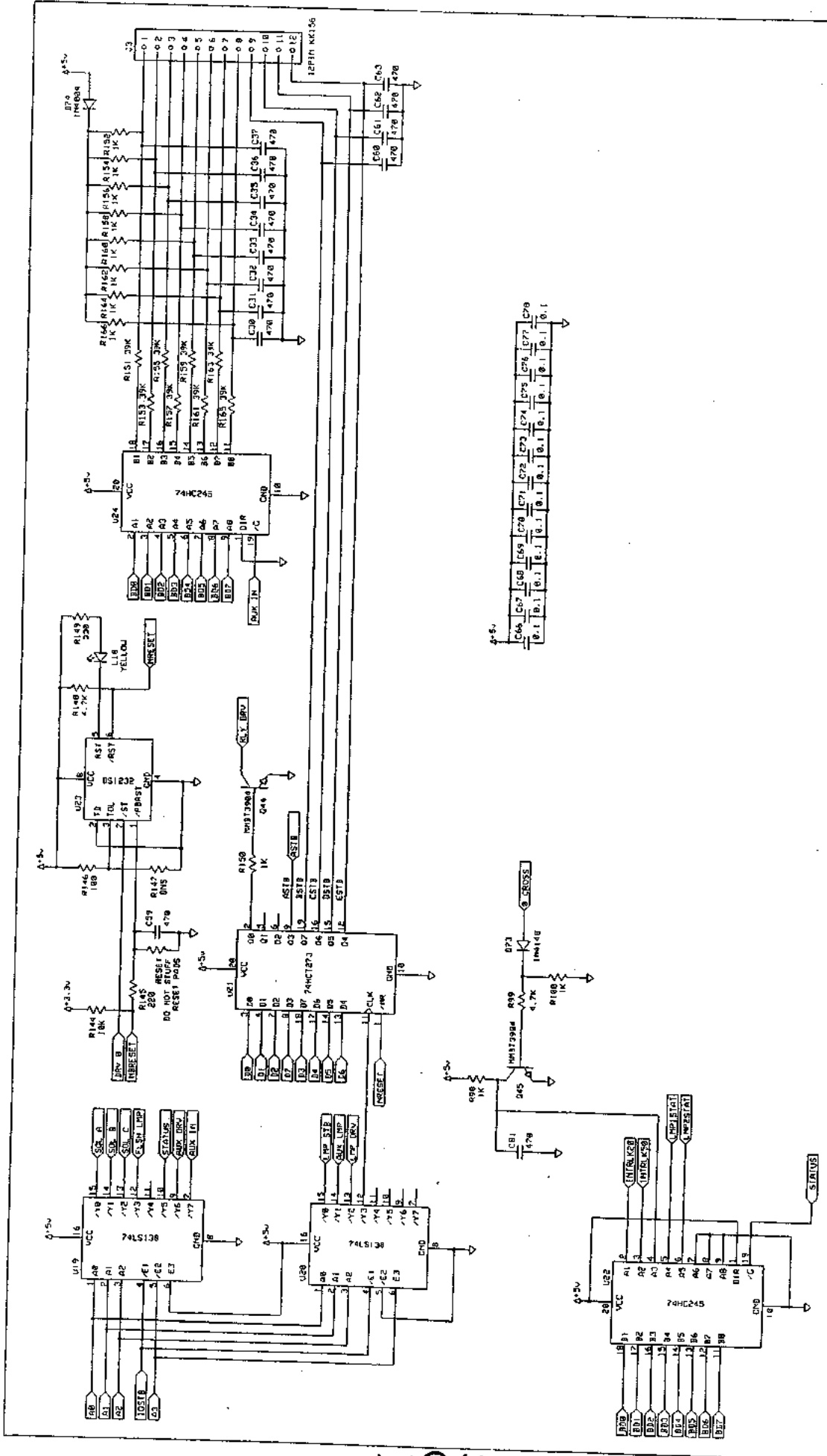
STERN PINBALL, INC.
 PREMIUM I/O POWER DRIVER BOARD
 Rev. A
 4/65-2811
 520-5317-08
 Page 2 of 4

Y27



STERN PINBALL, INC.
PREMIUM I/O POWER DRIVER BOARD
 340-5317-00 Rev. 2
 4-03/2011 Page 3 of 4

Y283



Y29

CES
Creative Electronics and Software

Stern Mini CPU

520-5303-04
Revision A

Table of Contents:

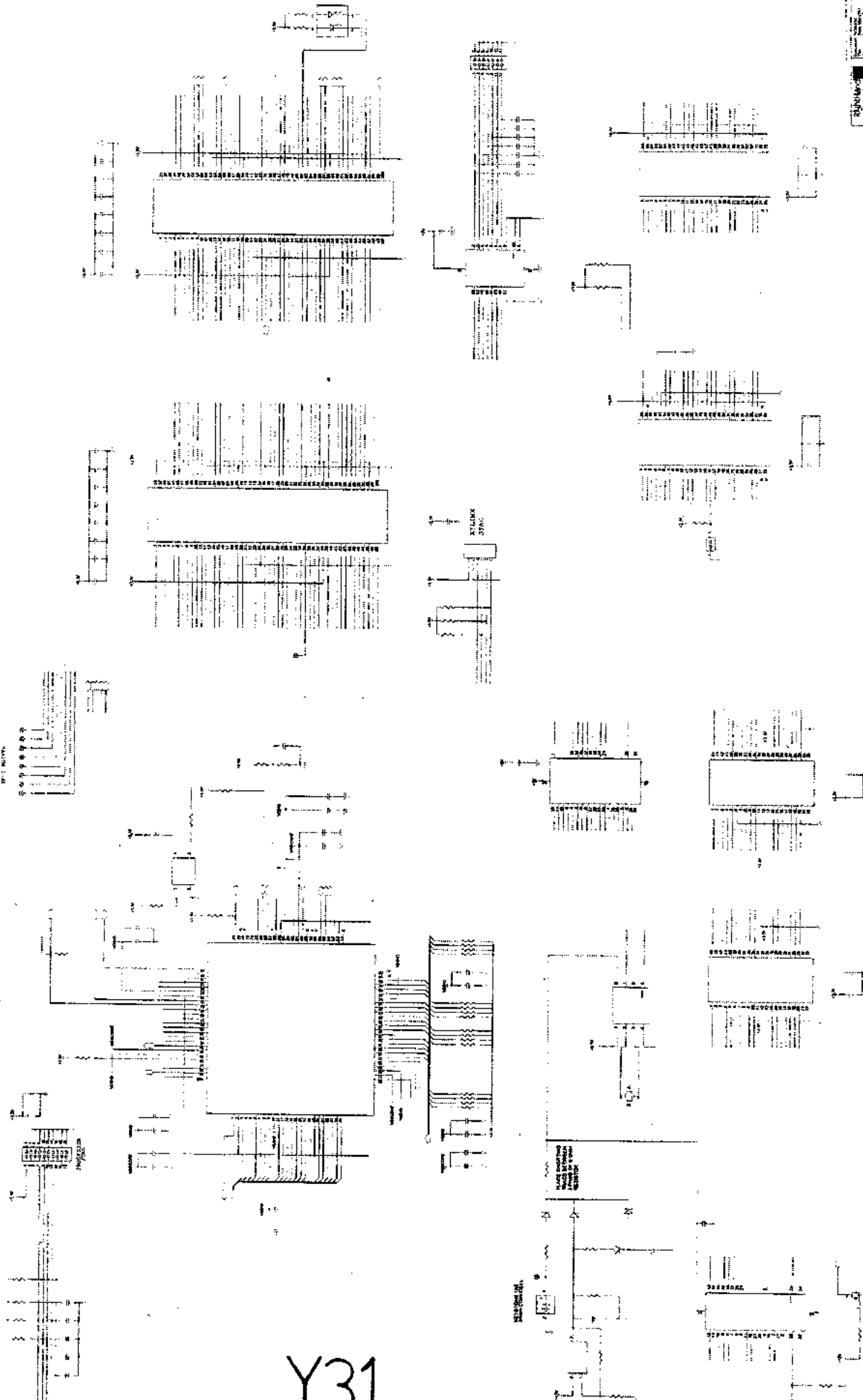
- Page 1: Title Page
- Page 2: Processor
- Page 3: I/O Connectors
- Page 4: USB
- Page 5: Regulator
- Page 6: Audio DAC

100 Series Mini CPU, Rev. 1
100 Series Mini CPU, Rev. 1
100 Series Mini CPU, Rev. 1

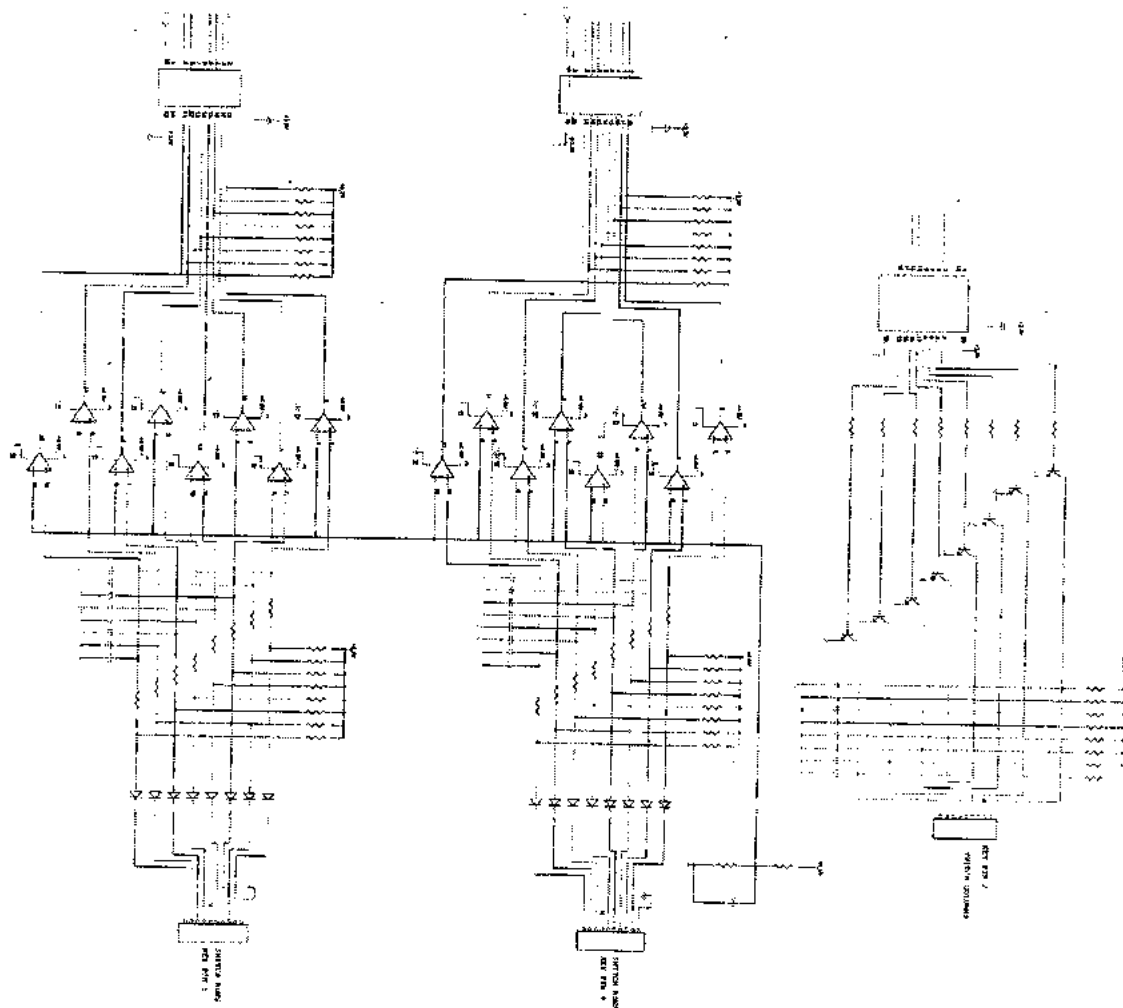
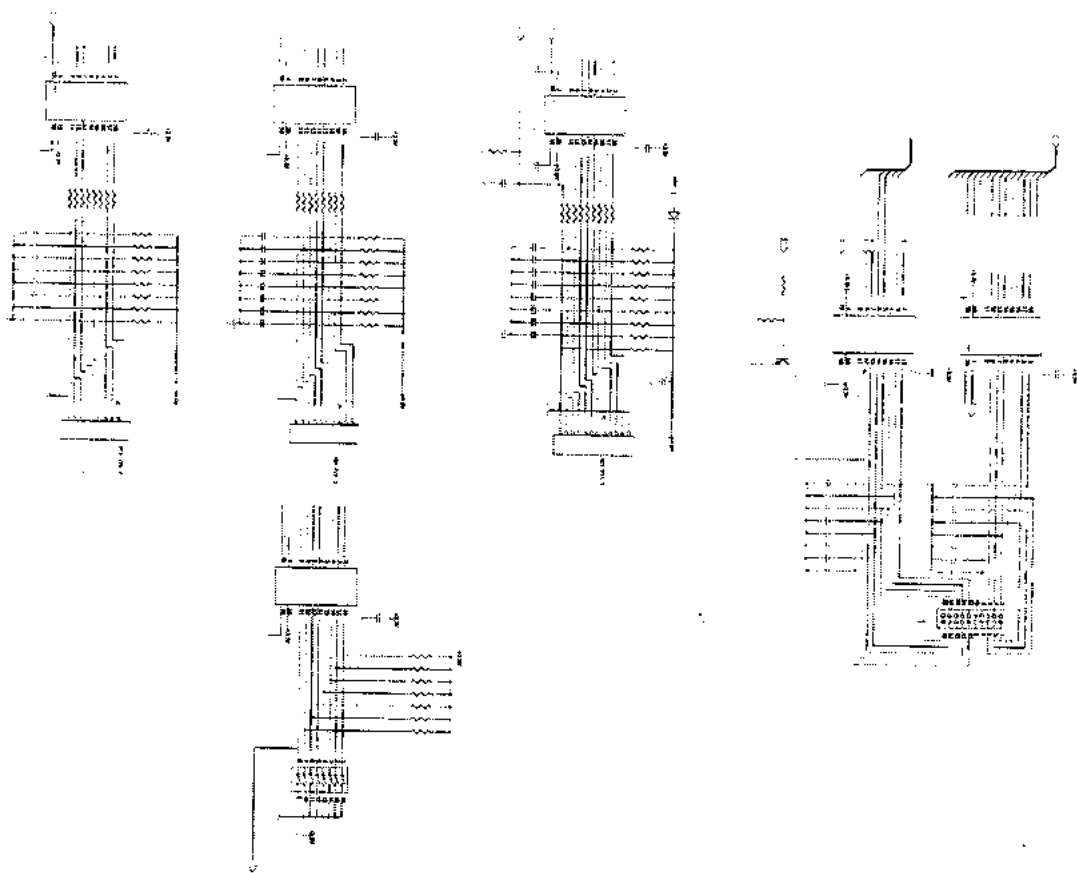
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Y301

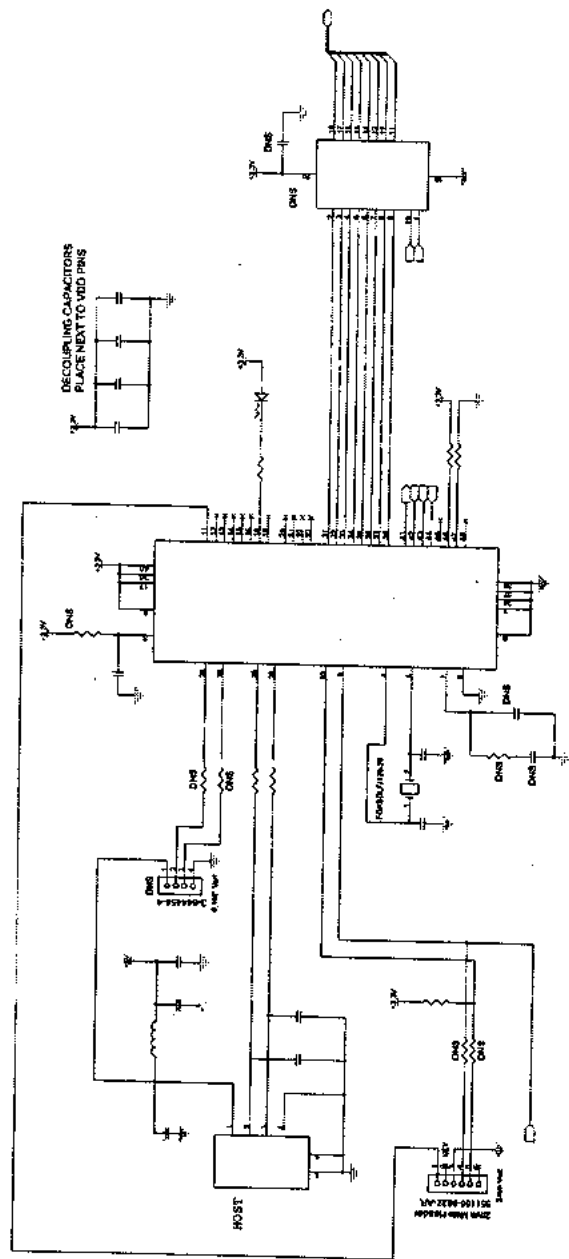
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Y31



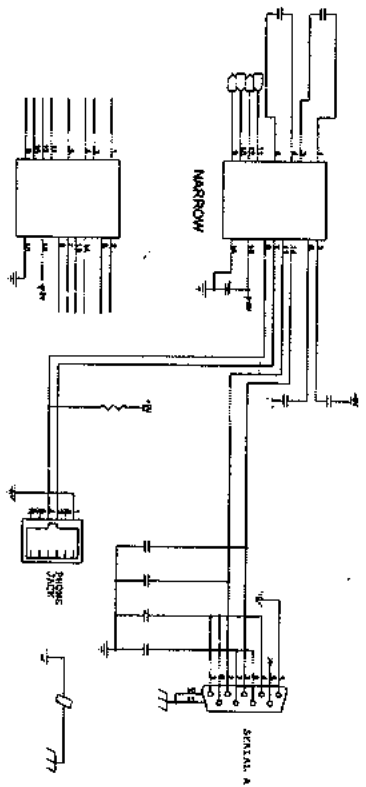
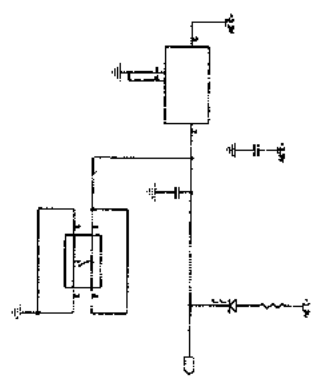
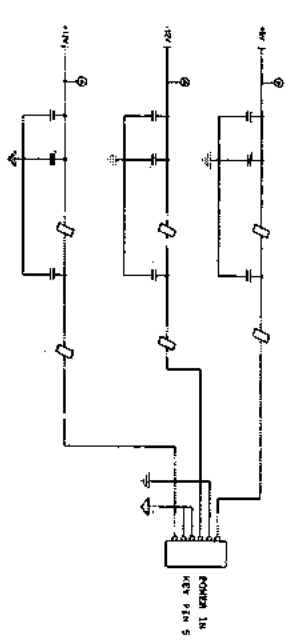
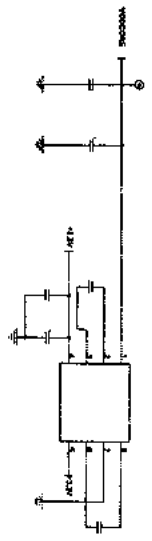
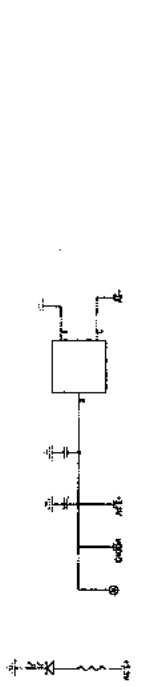
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 10000 University Ave.
 Chula Vista, CA 92011
 Phone: 619-441-1111
 Telex: 58214
 Fax: 619-441-1111

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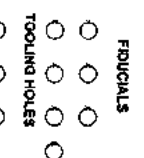
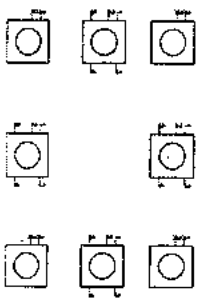
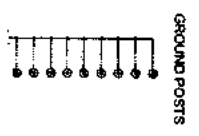
Y33



WIDE
ALTERNATE FOOTPRINT

NARROW

5VDC

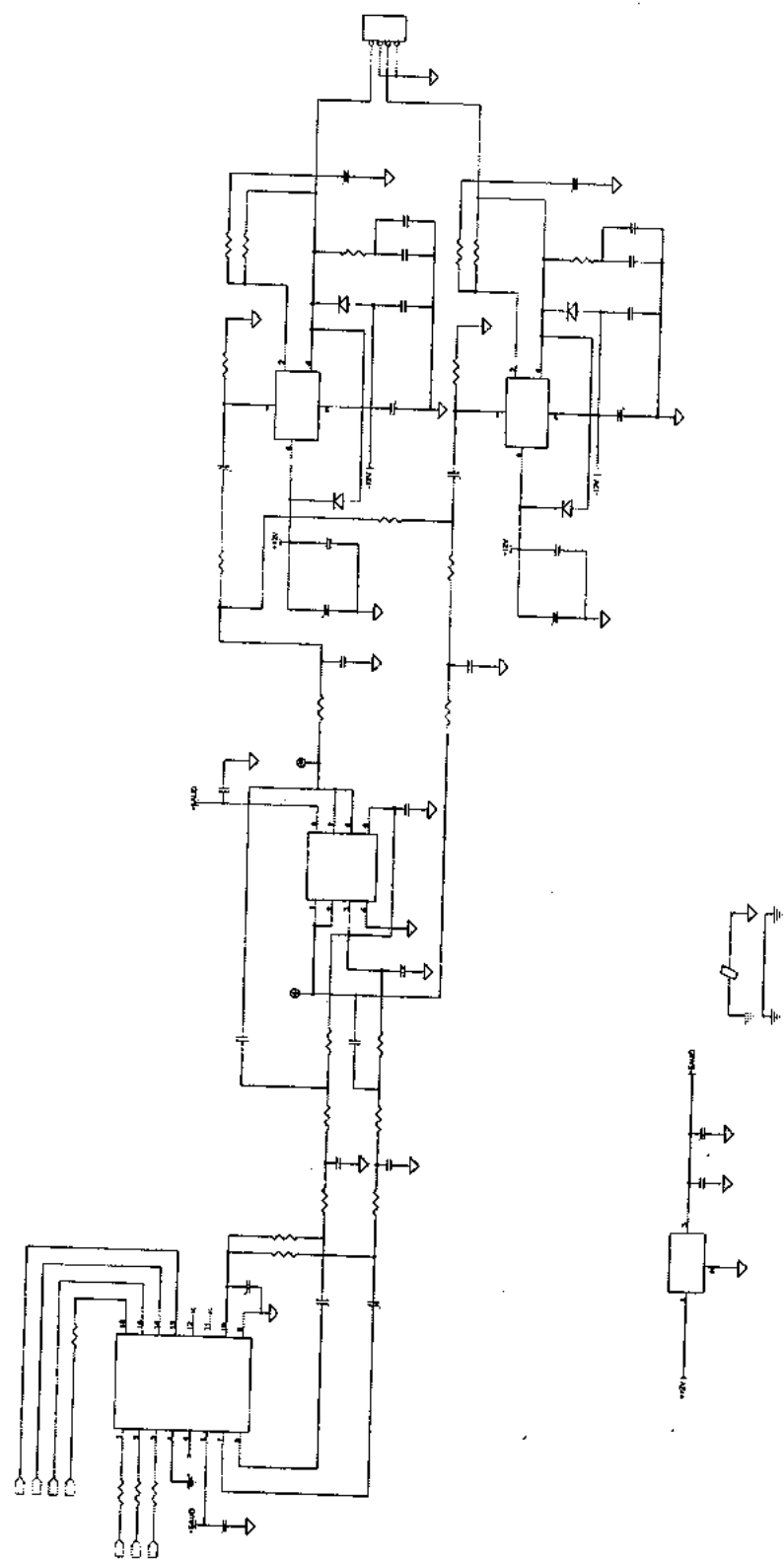


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Y34

Project: [illegible] Rev: A
 Part: [illegible]
 Title: [illegible]
 Author: [illegible]
 Date: [illegible]
 Drawing Project: [illegible]
 Status: [illegible]

Right-hand
 Mechanical Components
 Division
 Proprietary and Confidential - Request NDA



Y35

S.A.M. SYSTEM BOARD TYPE TABLE

| Game Name | CPU Bd. No. | I/O PWR DRV Bd. No. | U9 Pinball Boot ROM |
|-----------------------------------|-------------|---------------------|---------------------|
| World Poker Tour | 520-5246-00 | 520-5249-00 | V3.1 |
| Pirates Of The Caribbean | 520-5246-00 | 520-5249-00 | V3.1 |
| Family Guy | 520-5246-00 | 520-5249-00 | V3.1 |
| Spider-Man | 520-5246-00 | 520-5249-00 | V3.1 |
| Wheel Of Fortune | 520-5246-00 | 520-5249-00 | V3.1 |
| NBA | 520-5246-00 | 520-5249-00 | V3.1 |
| CSI | 520-5246-00 | 520-5249-00 | V3.1 |
| Batman | 520-5246-00 | 520-5249-00 | V3.1 |
| Indiana Jones | 520-5246-00 | 520-5249-00 | V3.1 |
| Shrek | 520-5246-00 | 520-5249-00 | V3.1 |
| 24 | 520-5246-00 | 520-5249-00 | V3.1 |
| Avatar | 520-5246-00 | 520-5249-00 | V3.1 |
| Big Buck Hunter | 520-5246-00 | 520-5249-00 | V3.1 |
| Iron Man | 520-5246-00 | 520-5249-00 | V3.1 |
| The Rolling Stones | 520-5246-00 | 520-5249-00 | V3.1 |
| Tron | 520-5246-00 | 520-5249-00 | V3.1 |
| Avatar L/E | 520-5303-03 | 520-5249-00 | V3.1 |
| The Rolling Stones L/E | 520-5303-03 | 520-5249-00 | V3.1 |
| Tron L/E | 520-5303-03 | 520-5317-00 | V3.1 |
| Transformers | 520-5246-02 | 520-5249-00 | V2.0 |
| Transformers L/E | 520-5303-04 | 520-5317-00 | V2.0 |
| AC/DC | 520-5337-01 | 520-5249-00 | AC/DC 1.0 |
| AC/DC (L/E) | 520-5337-00 | 520-5317-00 | AC/DC 1.0 |
| X-MEN | 520-5246-02 | 520-5249-00 | V2.0 |
| X-MEN (L/E) | 520-5303-04 | 520-5317-00 | V2.0 |
| Batman (Standard) | 520-5303-03 | 520-5249-00 | V3.1 |
| Iron Man (Classic) | 520-5303-01 | 520-5304-00 | Not Used |
| The Simpsons Kooky Carnival (RED) | 520-5246-00 | 520-5249-00 | V3.1 |

Y36