STAR TREK™



PREMIUM



LE

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WARNING

Important Health Warning: PHOTOSENSITIVE SEIZURES

A very small percentage of people may experience a seizure when exposed to certain visual images, including flashing lights or patterns. Even people with no history of seizures of epilepsy may have an undiagnosed condition that can cause "photosensitive epileptic seizures" due to certain visual images, flashing lights or patterns. Symptoms can include light-headedness, altered vision, eye or face twitching, jerking or shaking of arms or legs, disorientation, confusion, momentary loss of awareness, and loss of consciousness or convulsions that can lead to injury from falling down or striking nearby objects.

IMMEDIATELY STOP PLAYING AND CONSULT A DOCTOR IF YOU EXPERIENCE ANY OF THESE SYMPTOMS.

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

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

Pinball Service Game Manual

Please call, email, or visit us online for technical support,
questions or comments regarding this pinball game.
Go to **www.sternpinball.com** and click **SERVICE & SUPPORT**.
Find **Service Game Manual** (with updates), **Coin Cards, Game Code Library**,
Appendixes, Care & Maintenance, Service Bulletins and much more!
• Toll-Free: **1-800-KICKERS (542-5377)** or **1-708-345-7700** • Email: **parts.service@sternpinball.com**

Stern® Pinball, Inc.
All Rights Reserved.
Printed in the U.S.A.
NOVEMBER 2013

SPI Part Number
780-50E6-00

STERN® PINBALL, INC. LIMITED WARRANTY

Stern® Pinball, Inc., *("seller")* warrants only to the initial purchaser of its products that the items listed below are free from defects in material and workmanship under normal use and service for the ***warranty period specified:***

Printed Circuit Boards PCBs (game logic):	**2 months**
Dot Matrix Display PCB:	**9 months**

No other parts of seller's product are warranted. Warranty periods are effective from the initial date of shipment from seller to its authorized distributors.

Seller's sole liability shall be, at its option, to repair or replace products which are returned to seller during the warranty periods specified, provided:

1. *Seller is notified promptly upon discovery by purchaser that stated products are defective.*
2. *Such products are properly packaged and then returned freight prepaid, to seller's plant.*

This warranty does not apply to any parts damaged during shipment and/or due to improper handling, or due to improper installation or usage, or alteration. In no event shall the seller be liable for any anticipated profits, loss of profits, loss of use, accidental or consequential damages or any other losses incurred by the customer in connection with the purchase of a Stern® Pinball, Inc. product.

WARRANTY DISCLAIMER

Except as specifically provided in a written contract between seller and purchaser, there are no other warranties, express or implied, including any implied warranties of merchantability or fitness for a particular purpose..

CAUTIONS, WARNINGS & NOTICES

For safety and reliability, substitute parts and equipment modifications are not recommended *(and may void any warranties)*. Use of non-Stern® Pinball Inc. parts or modifications of game circuitry, may adversely affect game play, or may cause injuries. Transport pinball games with hinged backbox in the down position only! Always take great care when servicing any game. Always read the service manual before replacing or servicing components. **SUBSTITUTIONS OF PARTS OR EQUIPMENT MODIFICATIONS** may void FCC Type acceptance.

Always disconnect the line voltage before servicing. Some parts may still hold current when unplugged.

WARNING

This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a class a computing device pursuant to SUBPART J OF PART 15 OF FCC RULES, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

RF INTERFERENCE NOTICE: Cable harness placements and ground strap routing on this game have been designed to keep RF radiation and conduction within levels accepted by the FCC rules. To maintain these levels, reposition harnesses and reconnect ground straps to their original placements, if they become disconnected during maintenance.

(a) "The appliance has to be placed in a horizontal position."
(b) "This appliance is not to be cleaned by a *Water Jet*."

603335-7.12.1 (i) "Do not locate this appliance in an area where a *Water Jet* is used." **(ii)** "Do not clean this appliance with a *Water Jet*." **60335-7.12.5 (b)** If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.

IEC 60825-1 2ND EDITION AND WAS ISSUED IN 2007

NOTICES

THIS DOCUMENT AND THE DATA DISCLOSED HEREIN OR HEREWITH IS NOT TO BE REPRODUCED (EXCEPT WHERE NOTED), USED OR OTHERWISE DISCLOSED IN WHOLE OR IN PART TO ANYONE WITHOUT WRITTEN CONSENT OF STERN® PINBALL, INC. ***WARNING:*** PRODUCTS IN THIS MANUAL, THE COMPANY NAME AND DEVICES AND THE DESIGN OF THE MANUAL ITSELF, ARE PROTECTED BY FEDERAL PATENTS *(AND PATENTS PENDING)*, DESIGN REGISTRATIONS, TRADEMARKS AND COPYRIGHTS. ACTION WILL BE TAKEN IN THE EVENT OF INFRINGEMENT OR IMITATION. THE RIGHT IS RESERVED TO CHANGE SPECIFICATIONS WITHOUT PRIOR NOTICE.

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PCB Schematics *(Section 5, Chapter 4)* ©1995-2008 by CES (Creative Electronics & Software, Inc.) where noted.

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Stern Pinball, Inc. is the only coin-op pinball manufacturer on the planet!

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Technical Support & Parts Sales

2002, 2003 (2-Disc Set) 2004 (2-Disc Set) & 2005 (2-Disc Set) & 2006 (3-Disc Set) CD-ROMs are now available! *Click year for more info!*

STERN PINBALL, INC. PARTS SALES & TECHNICAL SUPPORT

We at STERN Pinball continuously strive to provide our distributors, operators, and game owners with the best technical support possible. We, therefore, have provided you with the service options listed below. If your game requires parts and/or service, please contact your nearest STERN Pinball distributor (See our Distribution List). For any additional assistance, contact our technical service staff at 800-KICKERS (800-542-5377) or by e-mail (parts.service@sternpinball.com).

If your STERN Pinball is in need of repair, please contact your nearest STERN Distributor.

Pinball Game Parts
- **2006+** Complete Pinball Service Game Manuals in PDF Format available *(includes parts and schematics).*
- **2004 — 2005** Select Pinball Service Game Manual Excerpts only : Parts Identification & Location (The Pink Pages), Drawings for Major Assemblies & Ramps (The Blue Pages)
- Appendixes **A — J** *(updated with each game)*

Schematics, Theory of Operation and Troubleshooting Tips
- Current S.A.M. System Games complete Schematic Section
- Archived Drawings for the White Star Board System™

Service Bulletins
- Detailing Technical Information, Tips, FYIs, Notices and Updates

NTE Semi-Conductor Cross Reference

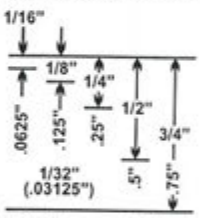
Game Code Library
- Offering S.A.M. System Game Code
- Offering archived White Star Game Code for all Data East®, Sega™ and STERN® Pinballs *(EPROM Programmer required)*

Coinage Cards
- Offering a range of Coinage Cards for download
- Country Setting, Pricing Scheme, Dip Switch Setting *(opens a pop-up window)*
- Custom Pricing Demonstration *(for S.A.M. System)*

Tricks & Tips
- *Pinball Machine Foam Cushion Packing*
- *1st Time Pinball Set-Up & Preventative Maintenance*
- *Pinball Location Maintenance*
- *How to Update Your Game Code (S.A.M. System)*

Track Your Order Via UPS Non-USA skilled operation
Radio Shack Component Catalogue

Metric Conversion



1" = 2.54 cm or **25.4 mm**
1 cm = .3937"
1 mm = .03937"

For metric, multiply the inch value by the metric value:
e.g.: **5" X 2.54 cm = 12.7 cm or 127 mm**

For US, multiply the metric value by the inch value:
e.g.: **13 cm X .3937" = 5.1181"**

Visit our website **www.sternpinball.com** for Pinball & Redemption game information!

Click Tech Support & Parts Sales *to view, print or download all of the above!*

HELP US, HELP YOU! *If you have any suggestions, questions, need technical advice, find errors or have comments, contact us through our website or call!*

This Game Service Manual and all other documents relating to this product, playfield components, features, rules, programming and operation are subject to change without notice (Service Bulletins, if applicable, available through our website).

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

800-KICKERS
5 4 2 5 3 7 7



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

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

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

STYLE, COLOR, SIZE AND MANUFACTURER SUBJECT TO CHANGE.

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

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



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

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

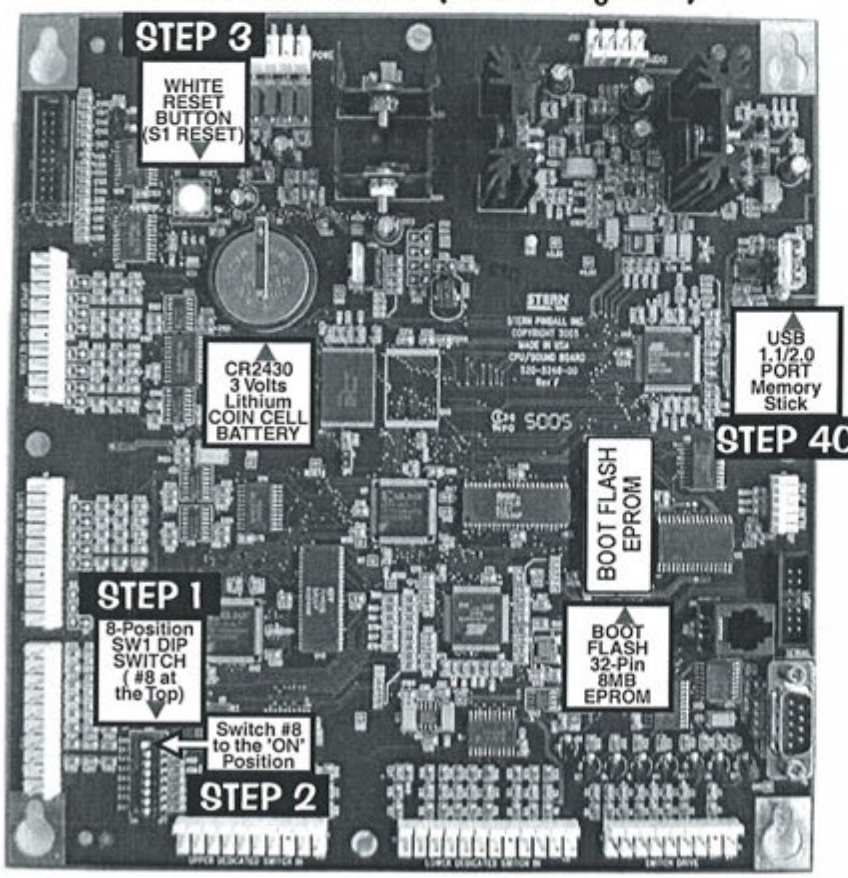
STEP 2 Switch Dip Switch **#8** to **'ON'**.
*(***BOOT FLASH EPROM** must be installed.)*

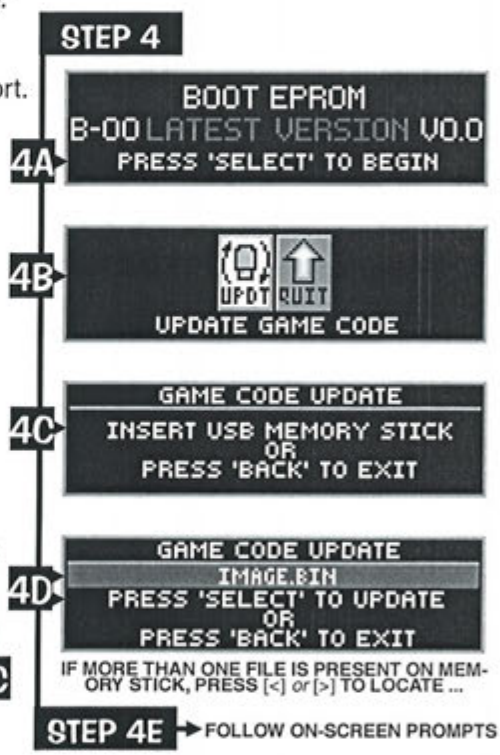
STEP 3 Press the **White Reset Button** *(S1 RESET on the CPU/Sound Board) or* Power Cycle the game **OFF/ON** *(ON/OFF Switch is located on the outside of the cabinet bottom, front right).*

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

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

CPU/Sound Board (S.A.M. System)





You can also retrieve your latest code from another game! From the **USB MENU** via the **UTILITIES MENU**, select the "BKUP" *Icon instead* and download to your Data Storage Device.

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

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

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 STAR TREK LE Pinball) **502-6002-E6**

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

Pinball Location Maintenance Deluxe Kit (for STAR TREK LE Pinball) **502-6003-E6**

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 ▲

Plastic*Kit (for STAR TREK PRO Pinball) **803-5000-E4**

Plastic Kit includes: Plastic Sets (830-6193-XX,830-6194-XX,830-6931-XX,830-6935-XX)

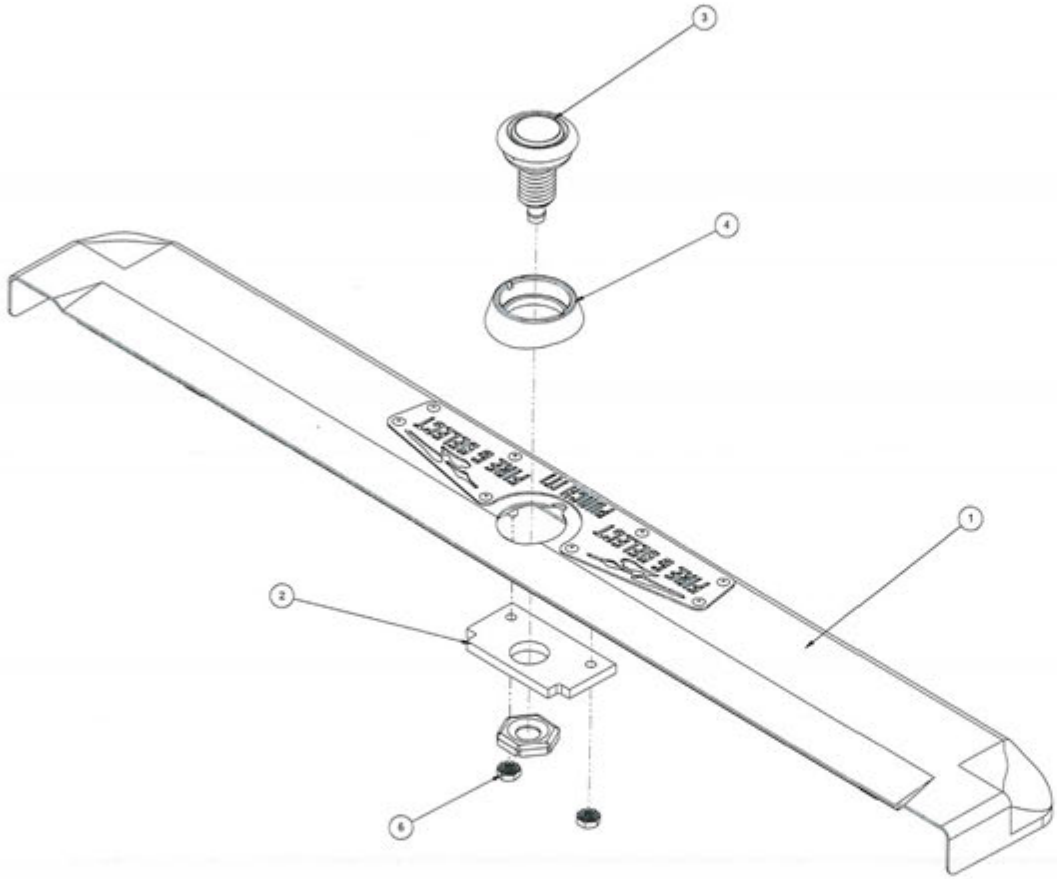
Plastics*Kit (for STAR TREK LE Pinball) **803-5000-E6**

Plastics Kit includes: *Plastic Set (830-6194-XX,830-6929-XX,830-6931-XX,830-6935-XX,)*

Decals*Kit (for STAR TREK LE,PRE,Pro Pinball) **802-5000-E4**

Decals Kit includes: *Decal Set (820-7016-XX,820-8026-00,820-8027-XX,820-8025-XX,820-8028-XX,820-8031-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.*

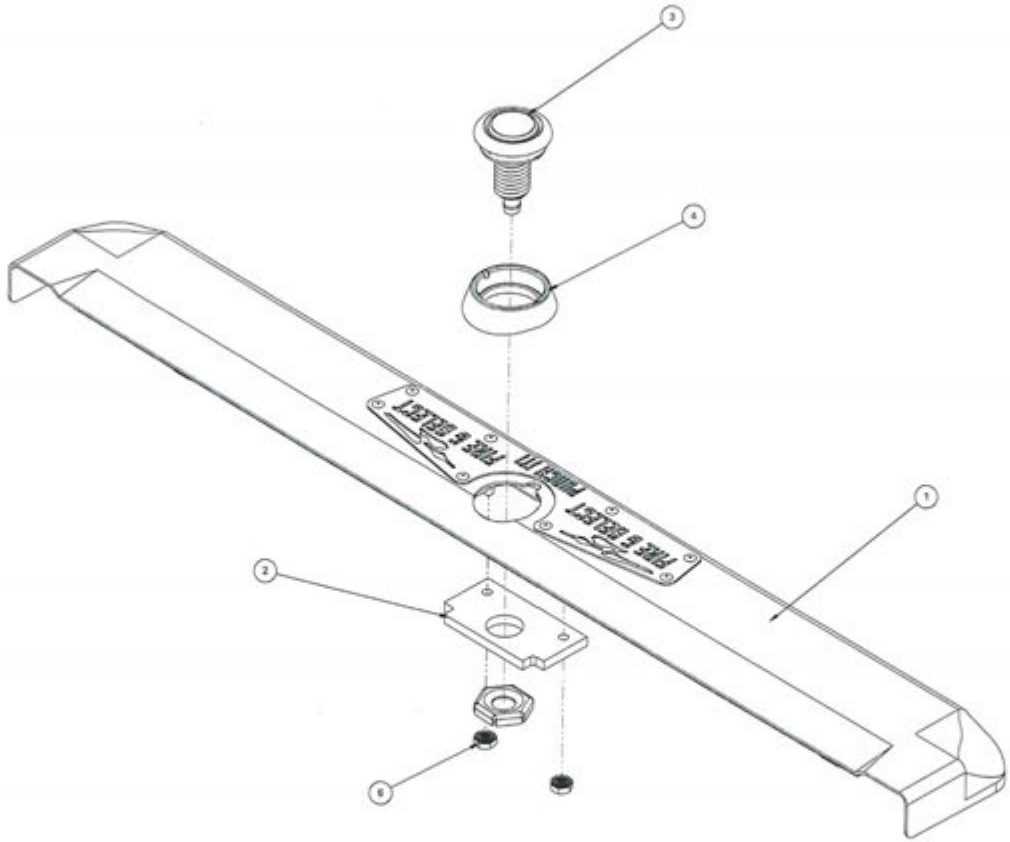


ITEM #	QTY	PART #	DESCRIPTION
1	1	500-7283-58	FRONT MOLD ASSEMBLY - LOCKDOWN - CENTER BUTTON
2	1	545-7291-00	TOP BUTTON BAR
3	1	515-7791-00	BUTTON ASSY - CLEAR
4	1	545-7292-10	TOP BUTTON SPACER-MOLDED
5	1	240-5003-01	PAL NUT
6	2	240-5104-00	8-32 KEPS NUT

FRT MOLD FINAL ASSY - LOCKDOWN - CENTER BUTTON

500-9838-58

B2



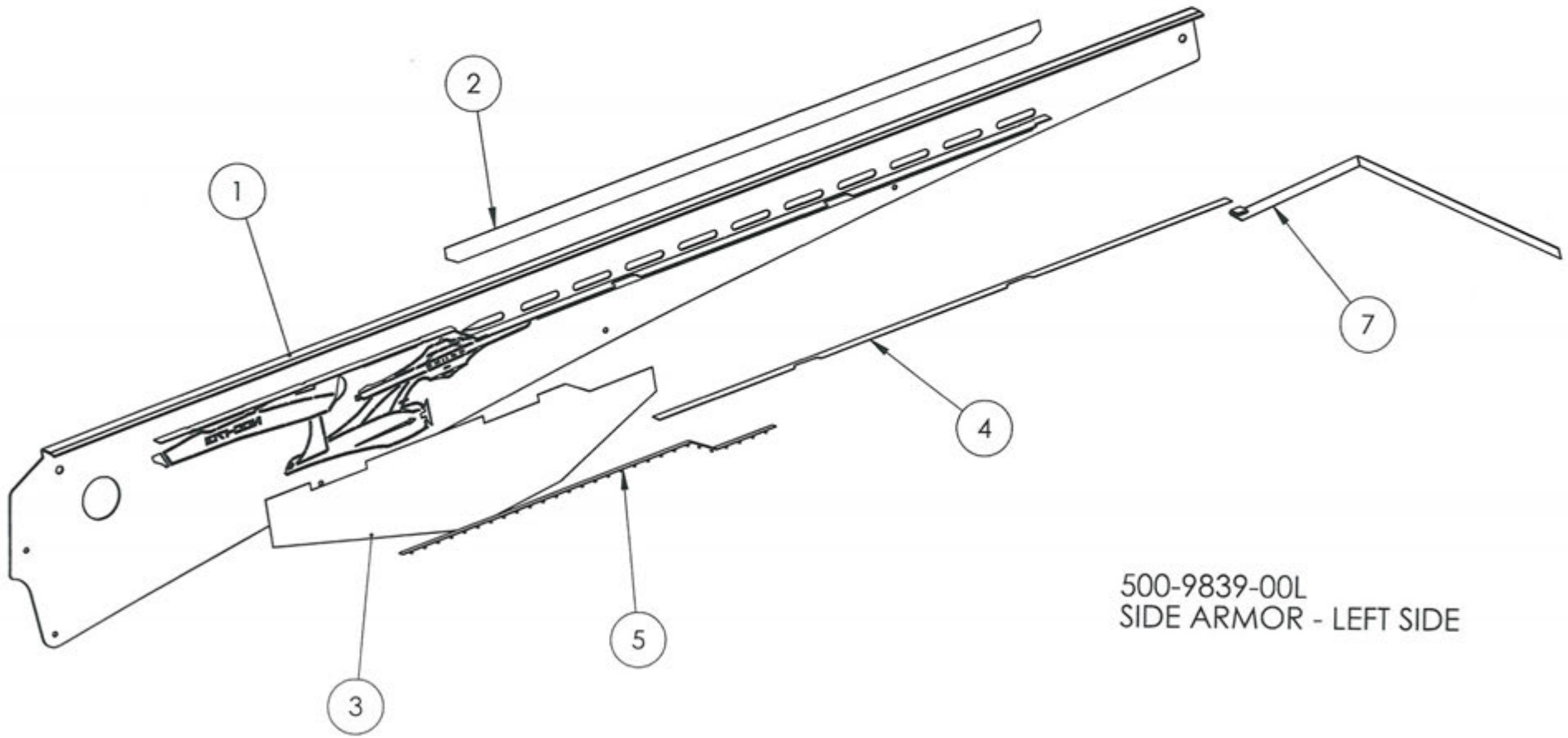
ITEM #	QTY	PART #	DESCRIPTION
1	1	500-7283-22	FRONT MOLD ASSEMBLY - LOCKDOWN - CENTER BUTTON
2	1	545-7291-00	TOP BUTTON BAR
3	1	515-7791-00	BUTTON ASSY - CLEAR
4	1	545-7292-10	TOP BUTTON SPACER-MOLDED
5	1	240-5003-01	PAL NUT
6	2	240-5104-00	8-32 KEPS NUT

FRT MOLD FINAL ASSY - LOCKDOWN - CENTER BUTTON

500-9838-22

B3

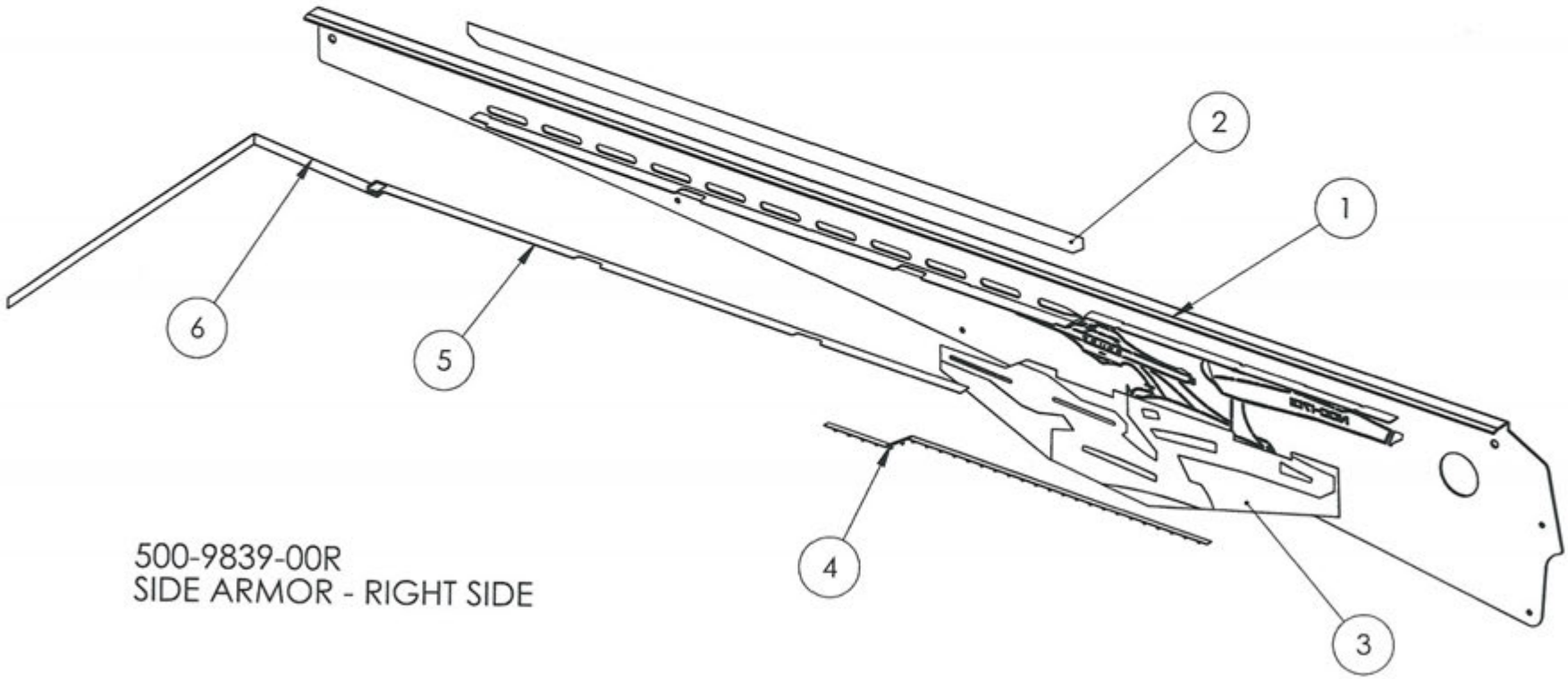
ITEM	QTY.	PART NUMBER	DESCRIPTION
1	1	535-0678-00L	SIDE ARMOR, BILL
2	1	830-6932-00	PHASER LENS, BILL ARMOR
3	1	830-6934-00L	SHIP LENS, BILL ARMOR
4	1	520-6809-02	PHASER LEDs, BILL
5	1	520-6809-03	BLUE LEDs SIDE ARMOR, BILL
6	6	040-5001-00B	4.0" CABLE TIE, BLACK
7	1	604-5002-08-18L	FLAT RIBBON CABLE



500-9839-00L
SIDE ARMOR - LEFT SIDE

B4

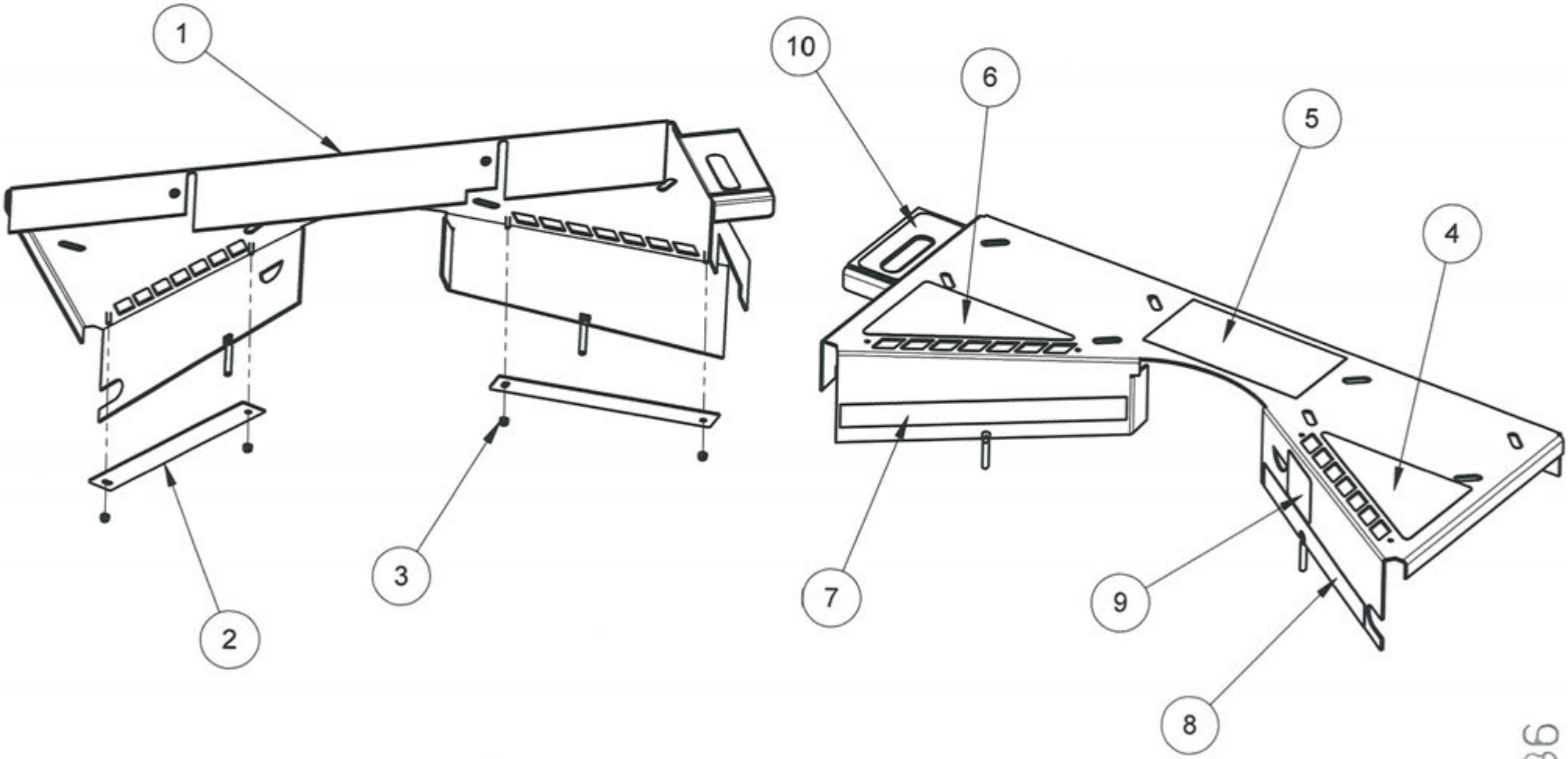
ITEM	QTY.	PART NUMBER	DESCRIPTION
1	1	535-0678-00R	SIDE ARMOR, BILL
2	1	830-6932-00	PHASER LENS, BILL ARMOR
3	1	830-6934-00R	SHIP LENS, BILL ARMOR
4	1	520-6809-03	BLUE LEDs SIDE ARMOR, BILL
5	1	520-6809-01	PHASER LEDs, BILL
6	1	604-5002-08-18	FLAT RIBBON CABLE
7	6	040-5001-00B	4.0" CABLE TIE, BLACK



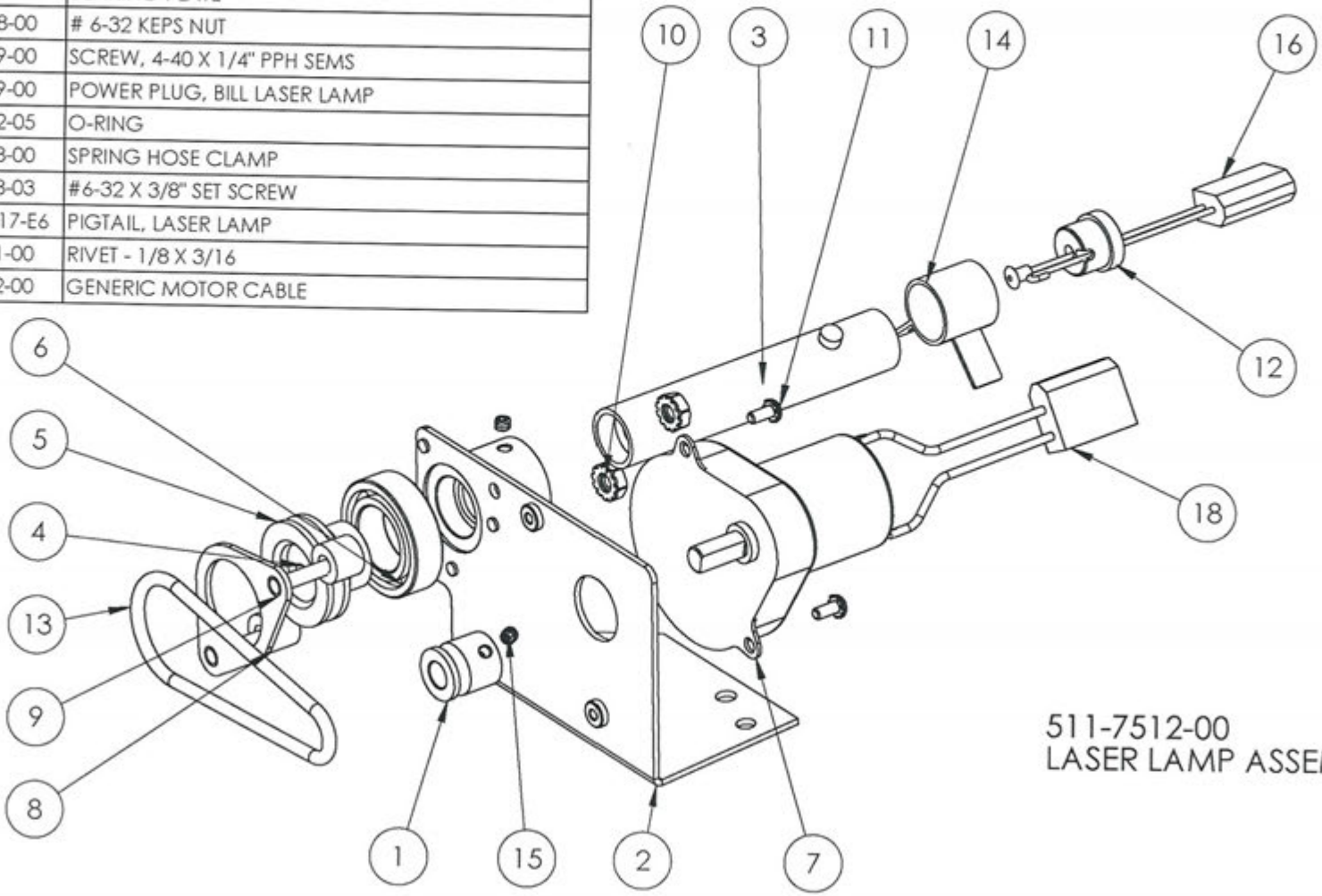
500-9839-00R
SIDE ARMOR - RIGHT SIDE

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	510-7477-01	BOTTOM ARCH, STEEL W/ SPADE BOLTS - GLOSS BLACK	1
2	545-7304-01	PLASTIC SCREEN, ARCH, BILL LE	2
3	240-5303-00	4-40 NYLON LOCK NUT	4
4	820-7016-07	DECAL #7, ARCH LEFT, BILL LE	1
5	820-7016-08C	DECAL #8, ARCH CENTER, BILL LE	1
6	820-8036-00	DECAL, PHOTOSENSITIVE SEIZURE WARNING, BILL LE	1
7	545-5212-04	MYLAR PROTECT STRIP 7-5/8"	1
8	545-7879-00	MYLAR PROTECT STRIP, BILL LE	1
9	820-8034-01	DECAL, LASER WARNING (SMALL), BILL LE	1
10	820-7016-06	DECAL #6, SHOOTER GUIDE, BILL LE	1

ASSEMBLY, ARCH W/ SCREENS
STAR TREK LE / PREMIUM
500-6005-E6/-E5

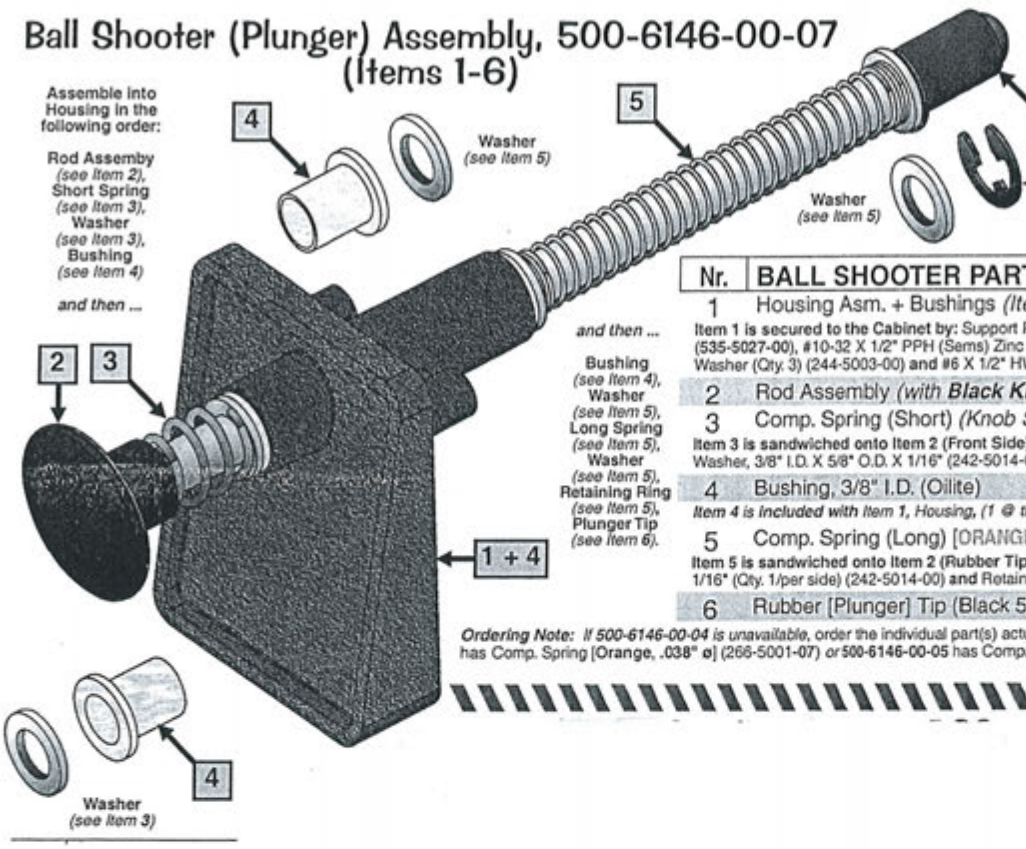


ITEM	QTY.	PART NUMBER	DESCRIPTION
1	1	530-7857-00	DRIVE PULLY
2	1	515-0189-00	MTG BRKT, BILL LASER LAMP
3	1	560-0001-01	LASER TUBE, BILL LE
4	1	560-0001-02	LENS 1-BILL LE
5	1	530-7858-00	LENS PULLY
6	1	283-5013-00	ROLLER BEARING
7	1	041-5111-00	MOTOR, 24 VDC, 12 RPM - CLUTCHED
8	2	254-5000-20	NYLON SPACER - BLACK - 3/8 OD X .175 ID X 5/16"
9	1	515-0188-00	BEARING PLATE
10	2	240-5008-00	# 6-32 KEPS NUT
11	2	237-5909-00	SCREW, 4-40 X 1/4" PPH SEMS
12	1	530-7859-00	POWER PLUG, BILL LASER LAMP
13	1	545-7862-05	O-RING
14	1	270-5408-00	SPRING HOSE CLAMP
15	2	237-5838-03	#6-32 X 3/8" SET SCREW
16	1	036-5605-17-E6	PIGTAIL, LASER LAMP
17	1	249-5001-00	RIVET - 1/8 X 3/16
18	1	036-5552-00	GENERIC MOTOR CABLE



511-7512-00
LASER LAMP ASSEMBLY

Ball Shooter (Plunger) Assembly, 500-6146-00-07 (Items 1-6)

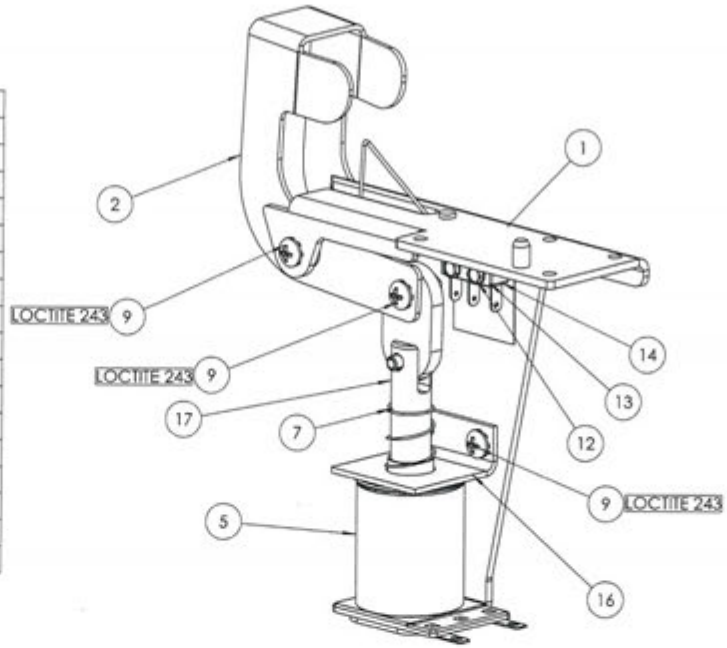


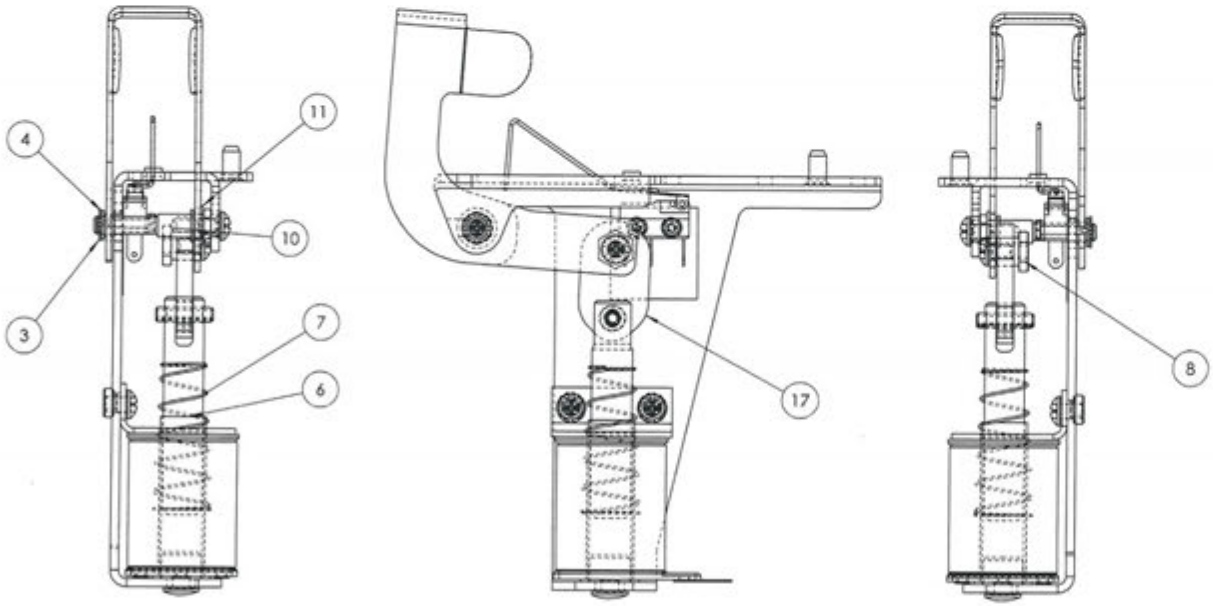
Securing Hardware for Items 3 & 5 are also shown separated from the Ball Shooter (Plunger) Assembly for clarity.

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	515-6557-00
3	Comp. Spring (Short) *(Knob Side)*	1	266-5010-00
	Item 3 is sandwiched onto Item 2 (Front Side) between the knob and by: Washer, 3/8" I.D. X 5/8" O.D. X 1/16" (242-5014-00)		
4	Bushing, 3/8" I.D. (Oilite)	2	280-5010-00
	Item 4 is included with Item 1, Housing, (1 @ the front; 1 @ the back) as shown.		
5	Comp. Spring (Long) [ORANGE, .035"]	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" ø Shaft (270-5012-00)		
6	Rubber [Plunger] Tip (Black 50 Duro)	1	545-5276-00

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

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	515-9689-00	MAIN BRKT: AUTO-PLUNGER
2	1	535-0728-00	KICKER ARM, AUTO-PLUNGER
3	1	270-5001-00	RETAINING E-RING, 3/16" SHAFT OD
4	1	545-5352-00	NYLINER, 3/16" SHAFT
5	1	090-5001-ND	COIL - 23-800, NO DIODE
6	1	545-5411-00	COIL SLEEVE
7	1	266-5020-00	COMPRESSION SPRING-CONICAL
8	1	530-7834-00	PIN: KICKER ARM, AUTO-PLUNGER
9	4	232-5300-00	SCREW, 8-32 X 1/4" PPH SEMS
10	1	530-7835-00	PIVOT, AUTO-PLUNGER
11	1	545-5423-00	NYLINER, 1/4" SHAFT, 4L1-FF
12	2	237-5937-02	SCREW, 2-56 X 1/2" HWH MS
13	1	535-6539-00	SWITCH BODY PROTECT PLATE
14	1	180-5157-01	P/F ROLLOVER SWITCH - LITE
15	1	545-6268-00	FISCHE PAPER
16	1	535-9959-00	STOP BRKT
17	1	515-6304-03	PLUNGER / LINK ASSEMBLY





AUTO-PLUNGER

500-9818-00

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

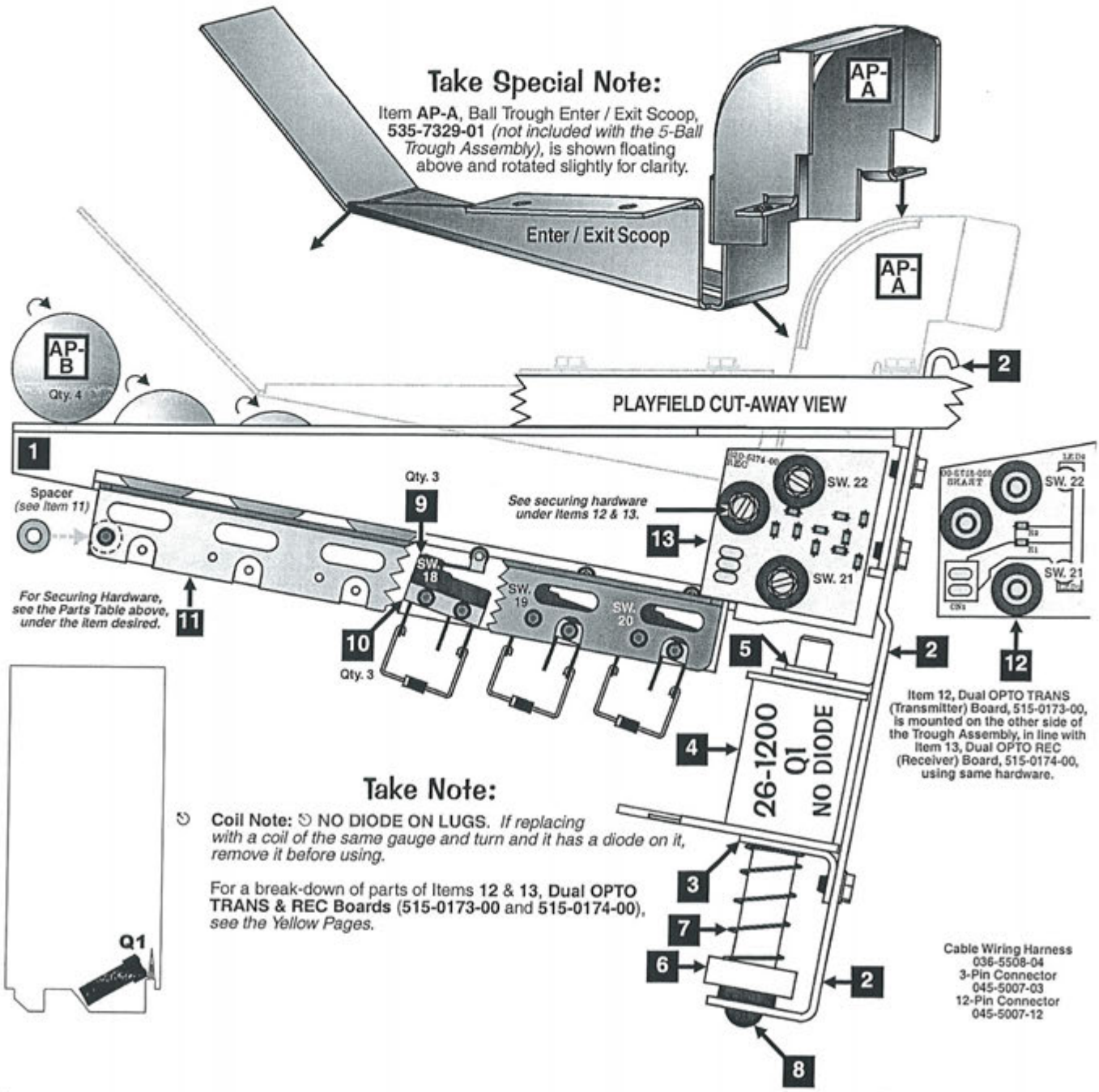
Ordering Note: Identical to 500-6318-14 with exceptions, see note below Item 13 (Parts Table).

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

Nr.	4-BALL TROUGH PARTS	QTY.	SPI PART Nr.
11	Trough Ball Guide Plate	1	535-7801-00
	Item 11 is secured to Item 1 by: 1/4" X 5/16" X .144" I.D. Spacer Tap. (Qty. 1) (254-5014-03) and #2-56 X 1/2" HWH (Ser) UNS #4HD TR3 BO (Qty. 4) (237-5937-02)		
12	Dual OPTO TRANS Board Assembly	1	515-0173-00
13	Dual OPTO REC Board Assembly	1	515-0174-00
	Items 12 & 13 are secured by: #6-32 X 5/8" HWH Swg (Ser) Zc (Qty. 3/per) (237-5976-04) *For Individual Items use :* Dual OPTO Transmitter Board (Qty. 1) (**520-5173-00**), Dual OPTO Receiver Board (Qty. 1) (**520-5174-00**), OPTO PCB Tube Spacer (Brass) (Qty. 3/per) (**530-5308-02**) and OPTO PCB Rubber Grommet (Qty. 3/per) (**545-5518-00**)		
	Ordering Note: If 500-6318-24-ND is unavailable, order the individual part(s) actually required. This assembly is identical to 500-6318-14-ND, -15 or -25 except for the quantity of Items 9 & 10 (Qty. 4/per on 5-Ball Trough) and Item 11, required when a Magnet Mech. is used in the game. -ND means no diode on Item 4, Coil, 26-1200.		

ASSOCIATED PARTS ARE NOT INCLUDED WITH THE ABOVE ASSEMBLY.

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

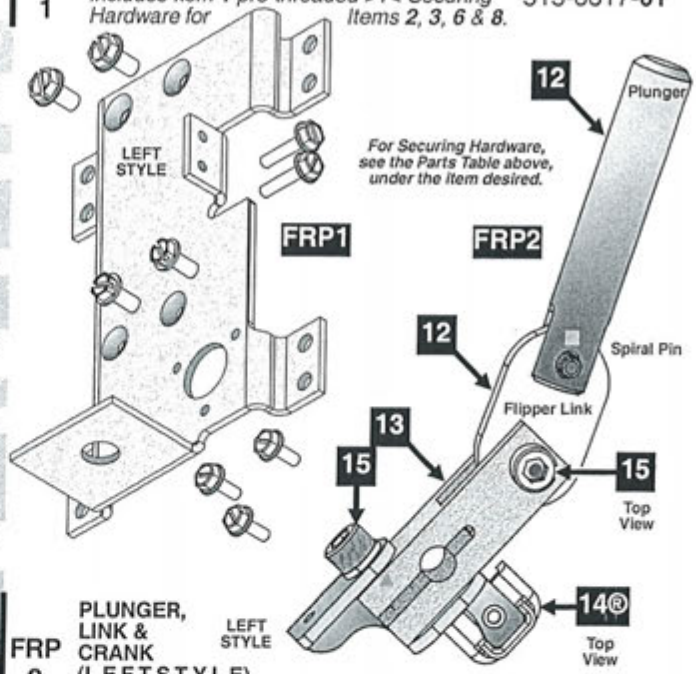


Flipper (Left) Assembly, 500-6543-12-ND (Items 1-15)
and Associated Parts: White Flipper Bat & Shaft Asm., 515-5133-08-06 (Items AP-A / AP-B)

Nr.	FLIPPER (LEFT) PARTS	QTY.	SPI PART Nr.
1	Flipper Base Plate (**LEFT**)	1	*See FRP1*
	Item 1 is secured below by: #8 X 1/2" SHWH AB (Zinc) (Qty. 8) (234-5101-00) *Ordering Note : Individual Part (535-7275-01) is not prethreaded, see Item FRP1.*		
2	Flipper Bat Bushing (White Plastic) .25" ø I.D.	1	545-5070-00
	Item 2 is secured to Item 1 by: #6-32 X 3/8" HWH Swage (Ser.) Zc. (Qty. 3) (237-5976-02)		
3	Power (EOS / End-of-Stroke) Switch	1	180-5149-00
	Item 3 is secured to Item 1 by: #6-32 X 5/8" HWH Swage (Ser.) Zc. (Qty. 2) (237-5976-04)		
4	Sw. Plate/Spring Return Brkt. (**LEFT**)	1	535-7354-**01**
5	Flipper Return Spring	1	265-5035-00
6	Coil Stop Bracket Sub-Assembly	1	515-6308-01
	Item 6 is secured to Item 1 by: #10-32 X 3/8" SHWH Swage (Serr) Zinc (Qty. 2) (237-5985-00) and #10 Split Lock Washer (Qty. 2) (244-5003-00)		
7	Spring Washer (17/32" ID X 3/4" X 1")	1	269-5002-00
8	Coil Support Bracket	1	535-7356-00
	Item 8 is secured to Item 1 by: #8-32 X 3/8" HWH Swage (Ser.) Zc. (Qty. 2) (237-5975-00)		
9	Coil, 22-1080 [NO DIODE] YEL-GRN	1	090-5032-ND
	COIL DOES NOT REQUIRE A DIODE. SEE ↻ COIL NOTE BELOW FOR DETAILS.		
10	Coil Sleeve	1	545-5388-00
11	Deflector Pad (Bumper)	1	545-5428-00
12	Flipper Plunger & Link Sub-Assy.	1	515-6304-03
	For Individual Items use : Flipper Plunger (**530-5349-01**) and Plunger "Flipper" Link (**545-5611-01**) and is secured to the Plunger by: Bushing, .16" ø ID X .281" ø OD X .187" (Qty. 1) (530-5532-00) and Spiral Pin ø 5/32" X 3/4" Lg. (Qty. 1) (251-5015-02)		
13	Crank Bar (Pawl)	1	530-5070-02
	Item 13 requires: Bushing, .192" ø ID X .312" ø OD X .195" (Qty. 1) (530-5139-00)		
14®	Switch Actuator (**LEFT**) Sub-Assy.	1	515-7257-**01**
	For Individual Items use : Actuator & Spring Bracket (**LEFT**) (**535-9038-01**) and ® Switch Actuator (White Plastic) (**545-5612-00**) and is secured to the Bracket by: Rivet, 1/8" ø X 1/4" Lg. (Qty. 1) (249-5003-00)		
15	Set Screw: #10-32 X 3/4" Socket Hd.	2	237-6144-00
	Item 15 requires: #10-32 Nylon Stop Nut (Qty. 1) ***Flipper Link Side Only*** (240-5203-00) and #10 Split Lock Washer (Qty. 1) ***Switch Actuator Side Only*** (244-5003-00) *Tool required for Item 15:* **5/32"** *or* **4mm Allen Wrench**		

Flipper Rebuild Parts for Easier Installation, $ave $:

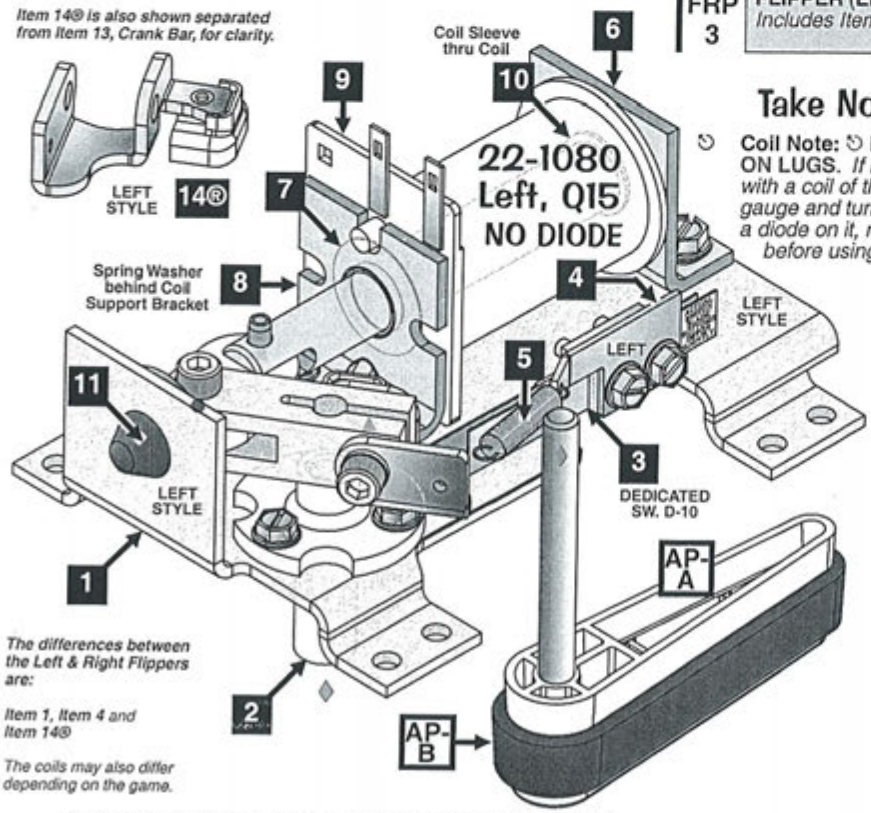
FRP 1 — **FLIPPER BASE PLATE KIT (LEFT) :** *Includes Item **1** pre-threaded >+< Securing Hardware for Items **2, 3, 6 & 8.*** 515-6617-**01**



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

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

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



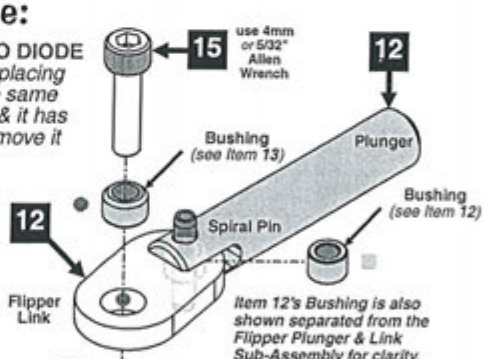
The differences between the Left & Right Flippers are:

Item 1, Item 4 and Item 14®

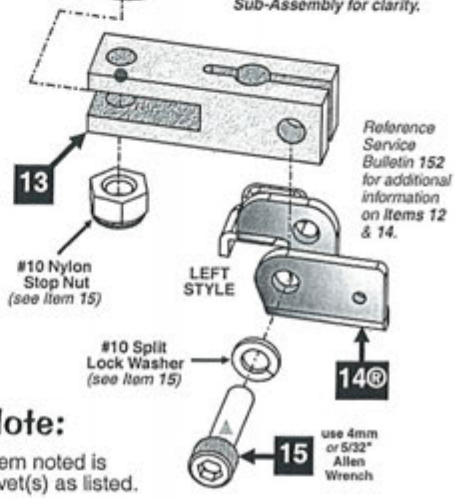
The coils may also differ depending on the game.

Take Note:

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



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



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

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

Nr.	ASSOCIATED PART(S)	QTY.	SPI PART Nr.
AP-A	**WHITE** Flipper Bat & Shaft Assembly (Non-Knurled End) ***without*** *Rubber Ring*	3	515-5133-**08**-06
AP-B	Large Flipper **RED** Rubber Ring	3	545-5277-22

Take Note:

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

Flipper (Right) Assembly, 500-6543-02-ND (Items 1-15)
and Associated Parts: White Flipper Bat & Shaft Asm., 515-5133-08-06 (Items AP-A / AP-B)

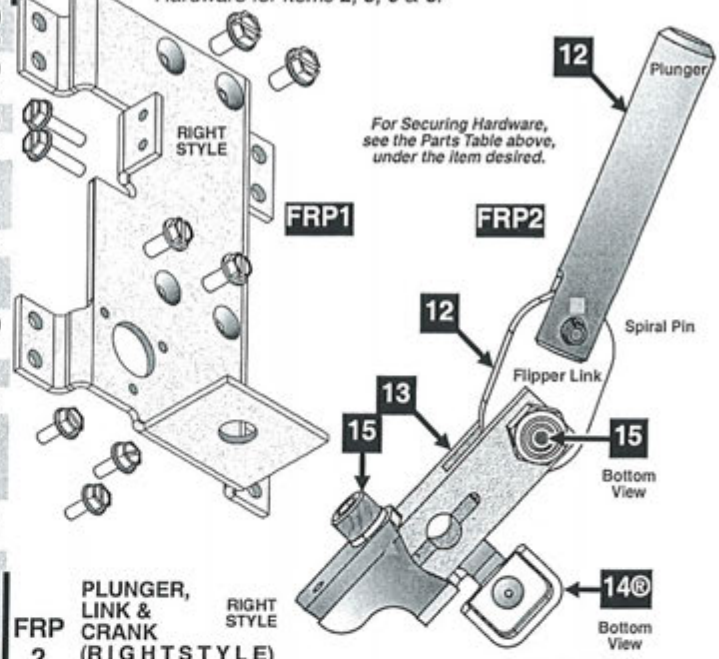
Nr.	FLIPPER (RIGHT) PARTS	QTY.	SPI PART Nr.
1	Flipper Base Plate (**RIGHT**)	1	*See FRP1*
	Item 1 is secured below by: #8 X 1/2" SHWH AB (Zinc) (Qty. 8) (234-5101-00) *Ordering Note : Individual Part (535-7275-00) is not prethreaded, see Item FRP1.*		
2	Flipper Bat Bushing (White Plastic) .25" ø I.D.	1	545-5070-00
	Item 2 is secured to Item 1 by: #6-32 X 3/8" HWH Swage (Ser.) Zc. (Qty. 3) (237-5976-02)		
3	Power (EOS / End-of-Stroke) Switch	1	180-5149-00
	Item 3 is secured to Item 1 by: #6-32 X 5/8" HWH Swage (Ser.) Zc. (Qty. 2) (237-5976-04)		
4	Sw. Plate/Spring Return Brkt. (**RIGHT**)	1	535-7354-**00**
5	Flipper Return Spring	1	265-5035-00
6	Coil Stop Bracket Sub-Assembly	1	515-6308-01
	Item 6 is secured to Item 1 by: #10-32 X 3/8" SHWH Swage (Serr) Zinc (Qty. 2) (237-5985-00) and #10 Split Lock Washer (Qty. 2) (244-5003-00)		
7	Spring Washer (17/32" ID X 3/4" X 1")	1	269-5002-00
8	Coil Support Bracket	1	535-7356-00
	Item 8 is secured to Item 1 by: #8-32 X 3/8" HWH Swage (Ser.) Zc. (Qty. 2) (237-5975-00)		
9	Coil, 22-1080 [NO DIODE] YEL-GRN	1	090-5032-ND
	COIL DOES NOT REQUIRE A DIODE. SEE ↻ COIL NOTE PREV. PAGE FOR DETAILS.		
10	Coil Sleeve	1	545-5388-00
11	Deflector Pad (Bumper)	1	545-5428-00
12	Flipper Plunger & Link Sub-Assy.	1	515-6304-03
	For Individual Items use : Flipper Plunger (**530-5349-01**) and Plunger "Flipper" Link (**545-5611-01**) and **is secured to the Plunger by:** Bushing, .16" ø ID X .281" ø OD X .187" (Qty. 1) (530-5532-00) and Spiral Pin ø 5/32" X 3/4" Lg. (Qty. 1) (251-5015-02)		
13	Crank Bar (Pawl)	1	530-5070-02
	Item 13 requires: Bushing, .192" ø ID X .312" ø OD X .195" (Qty. 1) (530-5139-00)		
14®	Switch Actuator (**RIGHT**) Sub-Assy.	1	515-7257-**00**
	For Individual Items use : Actuator & Spring Bracket (**LEFT**) (**535-9038-01**) and ® Switch Actuator (White Plastic) (**545-5612-00**) and **is secured to the Bracket by:** Rivet, 1/8" ø X 1/4" Lg. (Qty. 1) (249-5003-00)		
15	Set Screw: #10-32 X 3/4" Socket Hd.	2	237-6144-00
	Item 15 requires: #10-32 Nylon Stop Nut (Qty. 1) *Flipper Link Side Only* (240-5203-00) and #10 Split Lock Washer (Qty. 1) *Switch Actuator Side Only* (244-5003-00) *Tool required for Item 15:* **5/32"** *or* **4mm Allen Wrench**		

Flipper Rebuild Parts for Easier Installation, Save $:

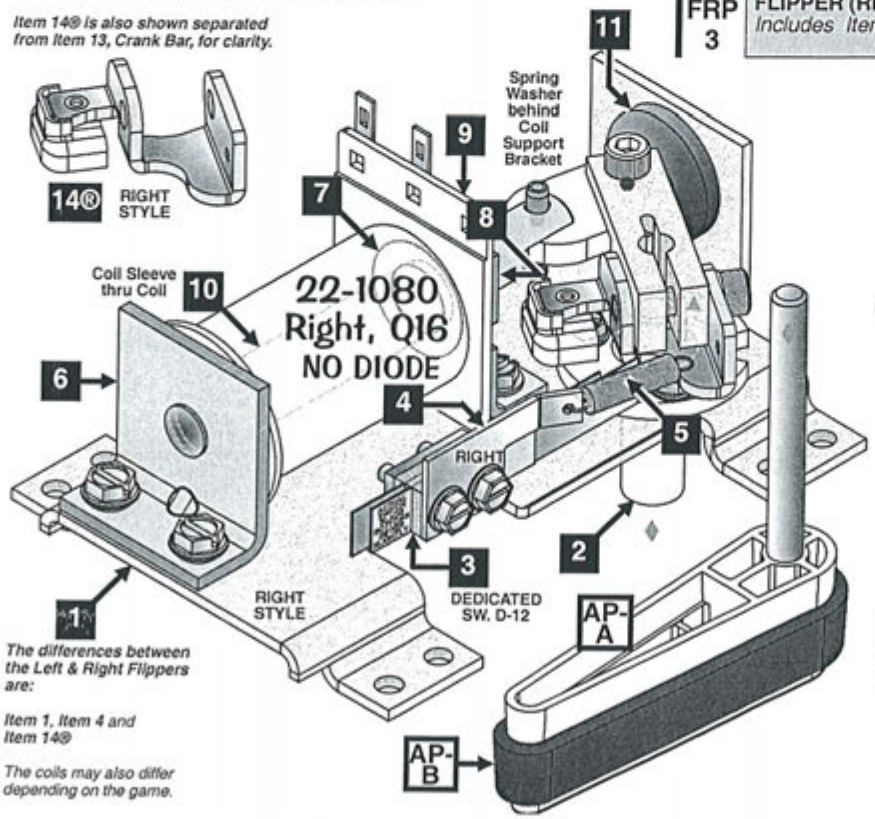
FRP 1 FLIPPER BASE PLATE KIT (R I G H T) : *Includes Item 1 pre-threaded >+< Securing Hardware for Items 2, 3, 6 & 8.* — 515-6617-**00**

FRP 2 PLUNGER, LINK & CRANK (R I G H T S T Y L E) ASSEMBLY : *Includes Items 12, 13, 14 & 15 (comes assembled).* — 515-7203-**00**

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



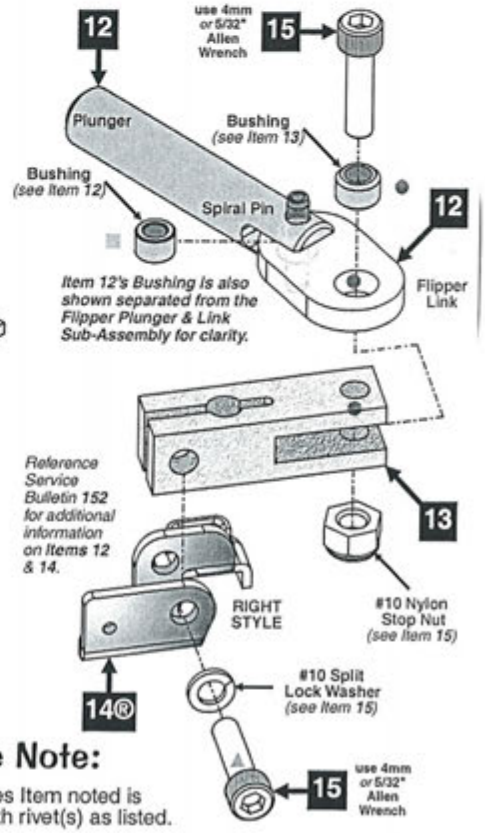
Item 14® is also shown separated from Item 13, Crank Bar, for clarity.



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	**WHITE** Flipper Bat & Shaft Assembly (Non-Knurled End) ***without*** *Rubber Ring*	3	515-5133-**08**-06
AP-B	Large Flipper **RED** Rubber Ring	3	545-5277-00

Take Note:

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

Flipper (Upper Right) Asm., 500-6543-22-ND (Items 1-15)
and Associated Parts: White Flipper Bat & Shaft Asm., 515-5133-08-06 (Items AP-A / AP-B)

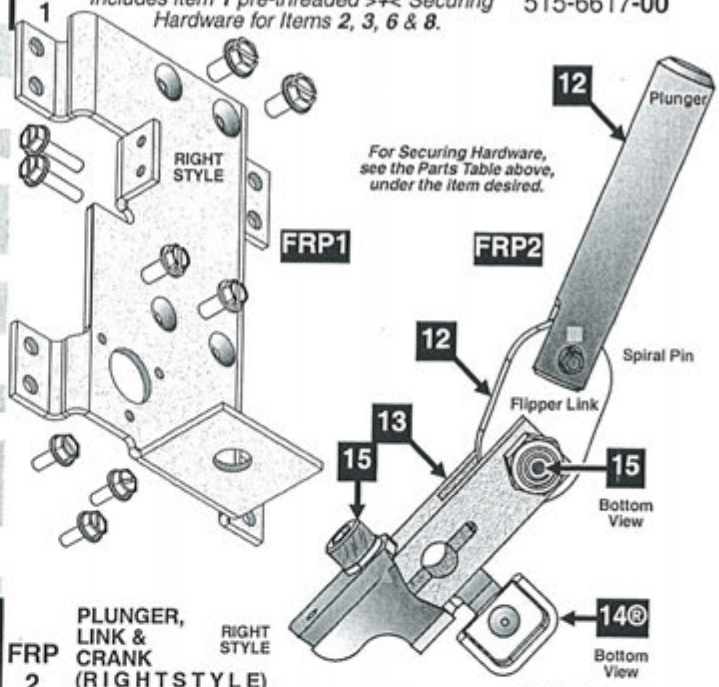
Nr.	FLIPPER (RIGHT) PARTS	QTY.	SPI PART Nr.
1	Flipper Base Plate (**RIGHT**)	1	*See FRP1*
	Item 1 is secured below by: #8 X 1/2" SHWH AB (Zinc) (Qty. 8) (234-5101-00) ***Ordering Note : Individual Part (535-7275-00) is not prethreaded, see Item FRP1.***		
2	Flipper Bat Bushing (White Plastic) .25" ø I.D.	1	545-5070-00
	Item 2 is secured to Item 1 by: #6-32 X 3/8" HWH Swage (Ser.) Zc. (Qty. 3) (237-5976-02)		
3	Power (EOS / End-of-Stroke) Switch	1	180-5149-00
	Item 3 is secured to Item 1 by: #6-32 X 5/8" HWH Swage (Ser.) Zc. (Qty. 2) (237-5976-04)		
4	Sw. Plate/Spring Return Brkt. (**RIGHT**)	1	535-7354-**00**
5	Flipper Return Spring	1	265-5035-00
6	Coil Stop Bracket Sub-Assembly	1	515-6308-01
	Item 6 is secured to Item 1 by: #10-32 X 3/8" SHWH Swage (Serr) Zinc (Qty. 2) (237-5985-00) and #10 Split Lock Washer (Qty. 2) (244-5003-00)		
7	Spring Washer (17/32" ID X 3/4" X 1")	1	269-5002-00
8	Coil Support Bracket	1	535-7356-00
	Item 8 is secured to Item 1 by: #8-32 X 3/8" HWH Swage (Ser.) Zc. (Qty. 2) (237-5975-00)		
9	Coil, 22-1080 [NO DIODE] YEL-GRN WRAP	1	090-5032-ND
	COIL DOES NOT REQUIRE A DIODE. SEE ⟲ COIL NOTE BELOW FOR DETAILS.		
10	Coil Sleeve	1	545-5388-00
11	Deflector Pad (Bumper)	1	545-5428-00
12	Flipper Plunger & Link Sub-Assy.	1	515-6304-03
	For Individual Items use : Flipper Plunger (**530-5349-01**) and Plunger "Flipper" Link (**545-5611-01**) **and is secured to the Plunger by:** Bushing, .16" ø ID X .281" ø OD X .187" (Qty. 1) (530-5532-00) **and** Spiral Pin ø 5/32" X 3/4" Lg. (Qty. 1) (251-5015-02)		
13	Crank Bar (Pawl)	1	530-5070-02
	Item 13 requires: Bushing, .192" ø ID X .312" ø OD X .195" (Qty. 1) (530-5139-00)		
14®	Switch Actuator (**RIGHT**) Sub-Assy.	1	515-7257-**00**
	For Individual Items use : Actuator & Spring Bracket (LEFT) (**535-9038-01**) and ® Switch Actuator (White Plastic) (**545-5612-00**) **and is secured to the Bracket by:** Rivet, 1/8" ø X 1/4" Lg. (Qty. 1) (249-5003-00)		
15	Set Screw: #10-32 X 3/4" Socket Hd.	2	237-6144-00
	Item 15 requires: #10-32 Nylon Stop Nut (Qty. 1) ***Flipper Link Side Only*** (240-5203-00) **and** #10 Split Lock Washer (Qty. 1) ***Switch Actuator Side Only*** (244-5003-00) ***Tool required for Item 15:*** **5/32"** *or* **4mm Allen Wrench**		

Flipper Rebuild Parts for Easier Installation, Save $:

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

FRP 2 **PLUNGER, LINK & CRANK (R I G H T S T Y L E) ASSEMBLY :** *Includes Items 12, 13, 14 & 15 (comes assembled).* 515-7203-**00**

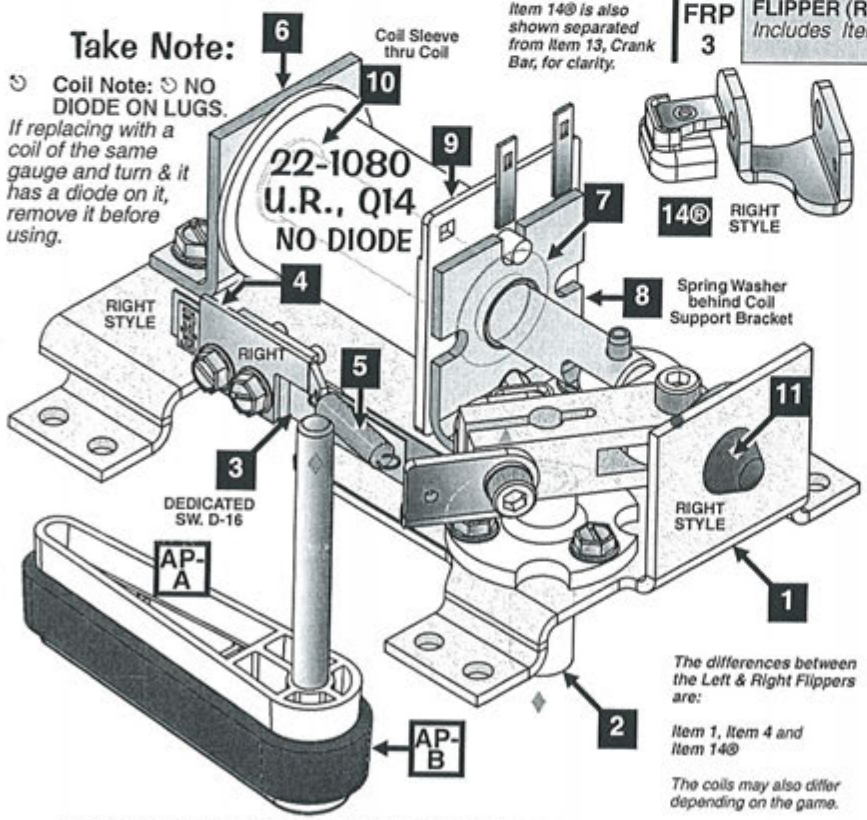
FRP 3 **FLIPPER (RIGHT) R E B U I L D K I T :** *Includes Items 6, 10 AND above FRP2* 500-6307-**00**



Take Note:

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

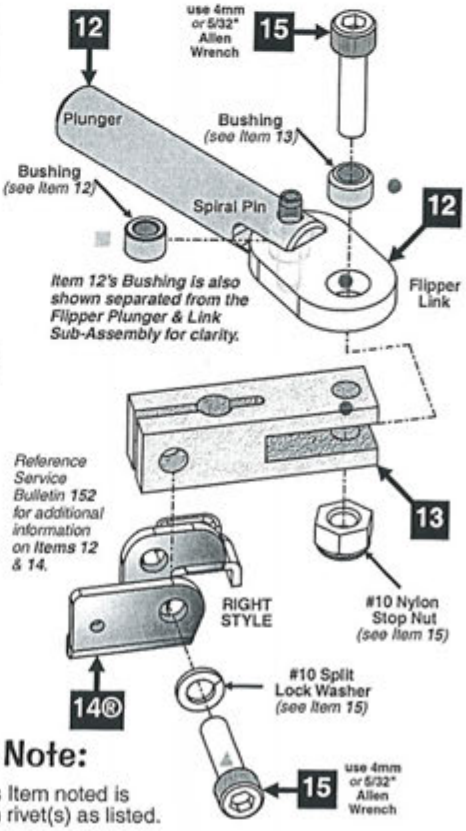
Item 14® is also shown separated from Item 13, Crank Bar, for clarity.



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	**WHITE** Flipper Bat & Shaft Assembly (Non-Knurled End) ***without*** *Rubber Ring*	3	515-5133-**08**-06
AP-B	Large Flipper **RED** Rubber Ring	1	545-5277-22

Take Note:

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

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

Nr.	SLINGSHOT PARTS	QTY.	SPI PART Nr.
1	Slingshot Bracket Assembly	1/per	515-5339-01
	Item 1 is secured below the playfield by: #8 X 1/2" SHWH AB (Zc.) (Qty. 3) (234-5101-00)		
2	Coil Retaining Bracket	1/per	535-5203-03
	Item 2 is secured to Item 1 by: #8-32 X 3/8" PPH MS (Sems) (Qty. 2) (232-5301-00)		
3	Coil, 26-1200 [NO DIODE]	1/per	090-5044-ND
	COIL DOES NOT REQUIRE A DIODE. SEE ⟲ COIL NOTE BELOW FOR DETAILS.		
4	Coil Sleeve	1/per	545-5031-00
5	Plunger & Link Assembly	1/per	515-5338-00
	For Individual Items use : Plunger 2" Lg. (**530-5025-01**), Plunger Link (**545-5293-00**) and Roll Pin 1/8" ø x 5/8" Lg. (**251-5008-00**) **The Plunger Link is secured to the Riveted Arm by:** Retaining Ring, 1/4" ø Shaft (Qty. 1) (270-5002-00)		
	Ordering Note: If 515-5338-00 is unavailable, order the individual part(s) actually required.		

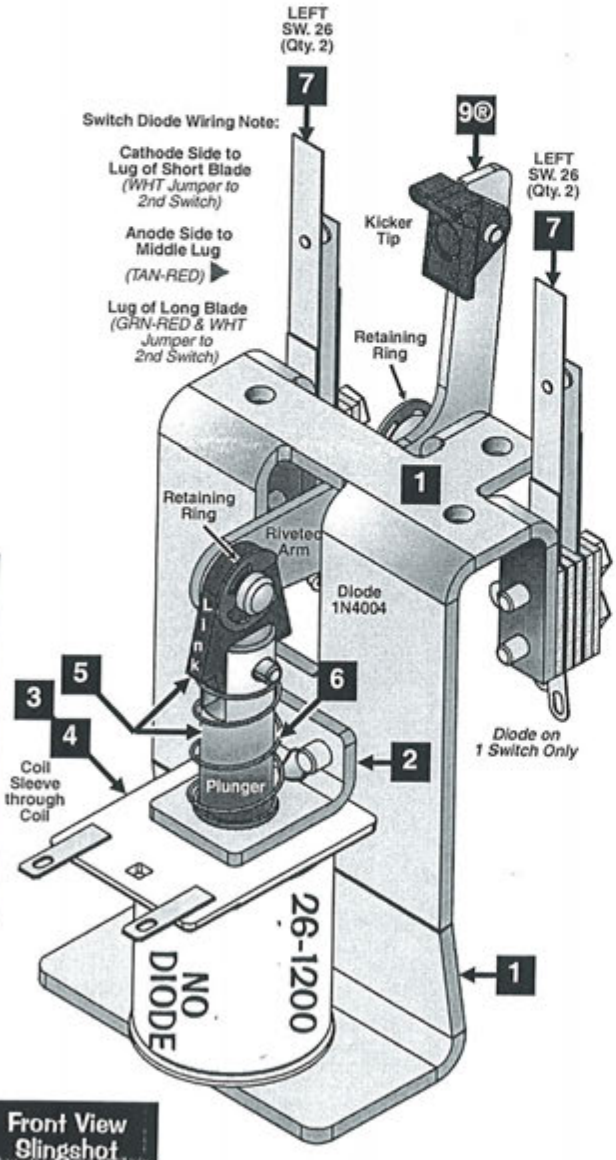
Nr.	SLINGSHOT PARTS	QTY.	SPI PART Nr.
6	Compression (Return) Spring	1/per	266-5020-00
7	Slingshot Stack (Blade) Switch	2/per	180-5054-00
	Only 1 of the 2 Switches has a Diode (1N4004) (112-5003-00). *See Note Below on Drawing. Can be replaced with (1N4001) (112-5001-00).*		
8	Switch Body Protect Plate	2/per	535-5045-00
	Items 7 & 8 are secured to Item 1 by: #6-32 X 5/8" HWH Swage (Qty. 4) (237-5976-04)		
9®	Riveted Arm & Tip Assembly	1/per	515-5340-01
	For Individual Parts use (requires drilling out rivet & rereviting) : Arm (**515-5341-01**), Kicker Tip (**545-5216-01**) and Rivet, 1/8" ø x 1/4" Lg. (**249-5003-00**) **The Riv. Arm is secured to Item 1 by:** Retaining Ring, 1/4" ø Shaft (Qty. 1) (270-5002-00)		
	Ordering Note: If 515-5340-01 is unavailable, order the individual part(s) actually required.		

Ordering Note: If 500-5849-00-ND 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.

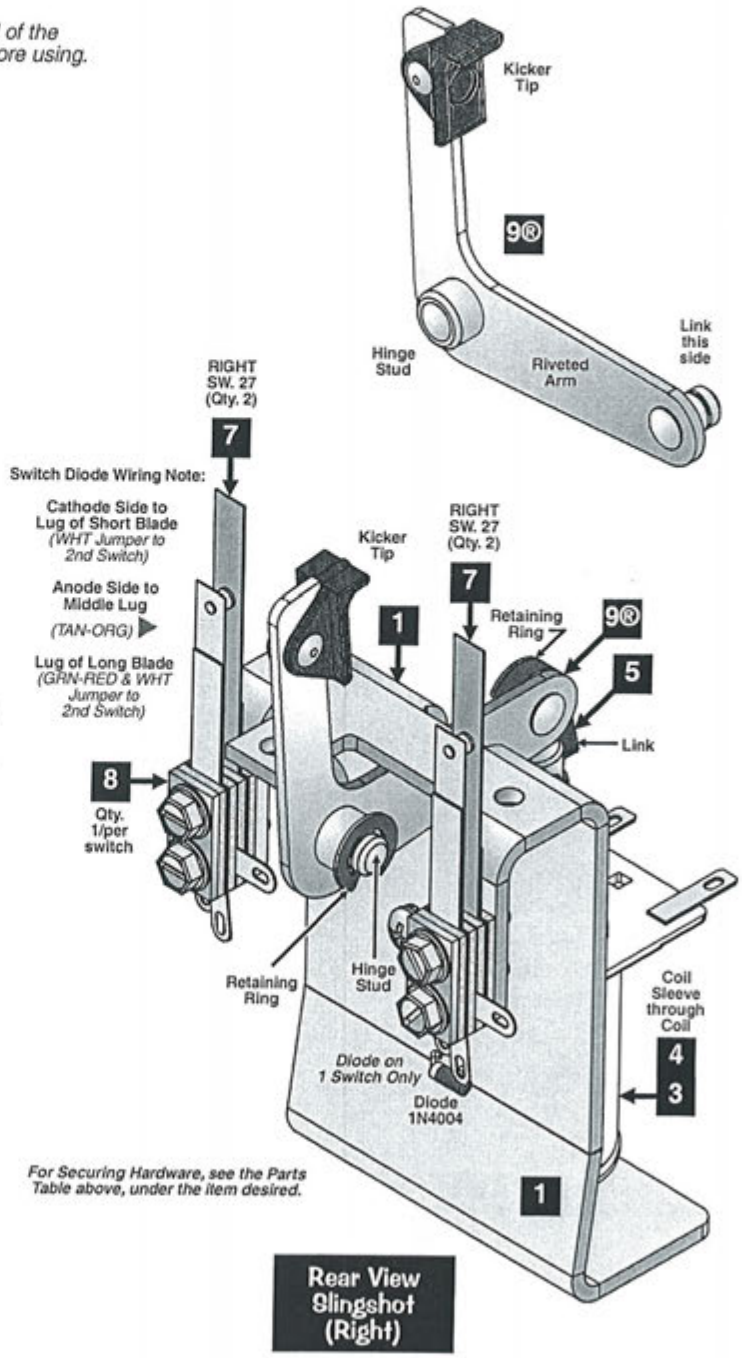
Take Note:

⟲ **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)

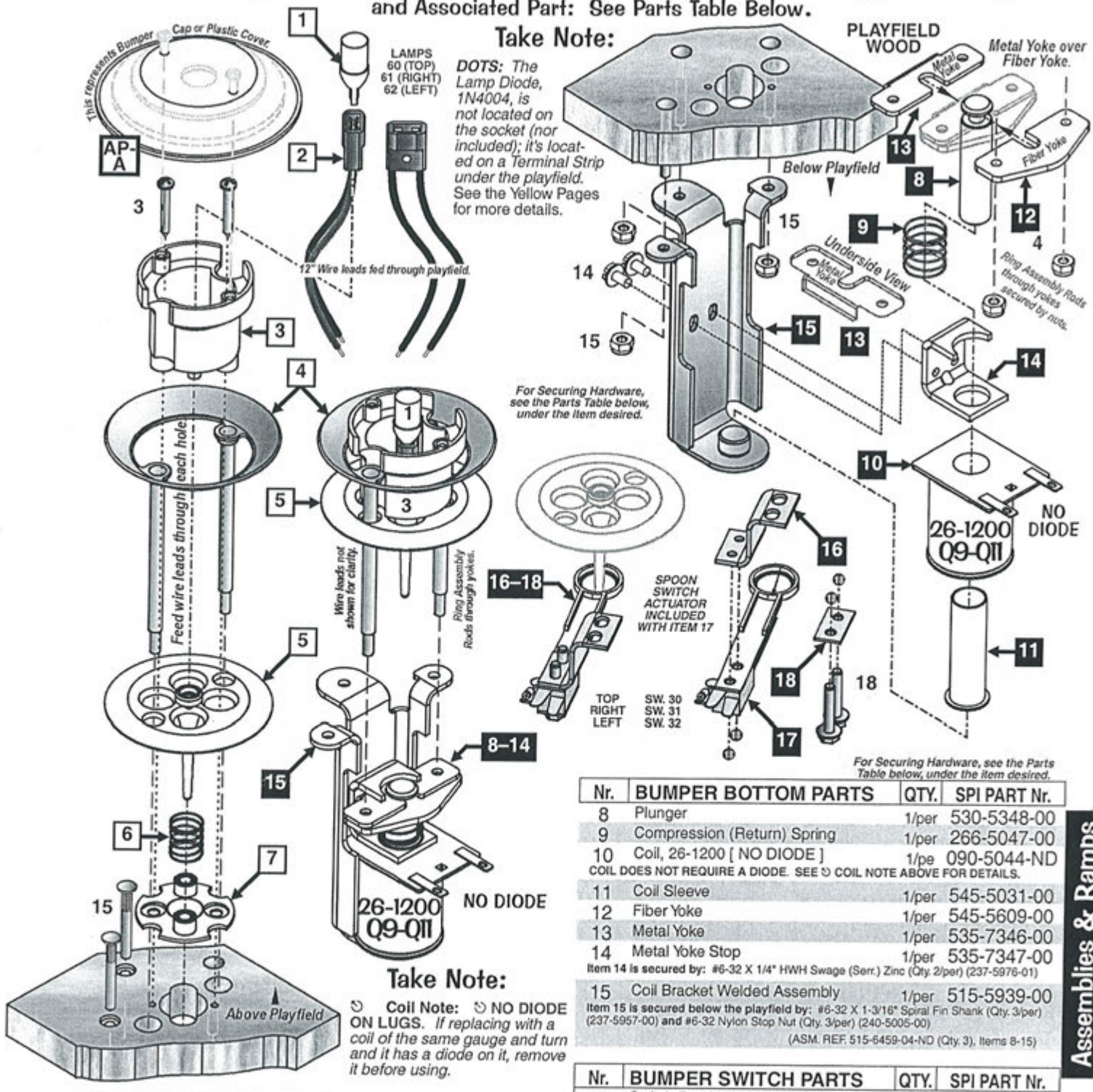


For Securing Hardware, see the Parts Table above, under the item desired.

Rear View Slingshot (Right)

Assemblies & Ramps

Left, Right & Bottom Bumper & Switch Individual Parts Only (Items 1-18) and Associated Part: See Parts Table Below.



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.*

Nr.	BUMPER TOP PARTS	QTY.	SPI PART Nr.
1	LED Module (WHT) (6.3v) Wedge Base	1/per	112-5024-08
2	Wedge Base Socket	1/per	077-5206-00
3	Bumper Body	1/per	545-5197-00
	Item 3 is secured above the P/F by: #5 X 7/8" PRH AB (Zinc) (Qty. 2/per) (237-5826-00)		
4	Ring Assembly	1/per	515-5085-00
	Item 4 is secured by: #6-32 Nylon Stop Nut (Qty. 2/per) (240-5005-00)		
5	Bumper Skirt (Switch Actuator)	1/per	545-5607-00
6	Bumper Skirt Compression Spring	1/per	266-5048-00
7	Bumper Base	1/per	545-5195-00
	(ASM. REF. 515-6459-01L (Qty. 3), Items 1-7		

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

Nr.	BUMPER BOTTOM PARTS	QTY.	SPI PART Nr.
8	Plunger	1/per	530-5348-00
9	Compression (Return) Spring	1/per	266-5047-00
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/per	545-5031-00
12	Fiber Yoke	1/per	545-5609-00
13	Metal Yoke	1/per	535-7346-00
14	Metal Yoke Stop	1/per	535-7347-00
	Item 14 is secured by: #6-32 X 1/4" HWH Swage (Serr.) Zinc (Qty. 2/per) (237-5976-01)		
15	Coil Bracket Welded Assembly	1/per	515-5939-00
	Item 15 is secured below the playfield by: #6-32 X 1-3/16" Spiral Fin Shank (Qty. 3/per) (237-5957-00) **and** #6-32 Nylon Stop Nut (Qty. 3/per) (240-5005-00)		
	(ASM. REF. 515-6459-04-ND (Qty. 3), Items 8-15)		

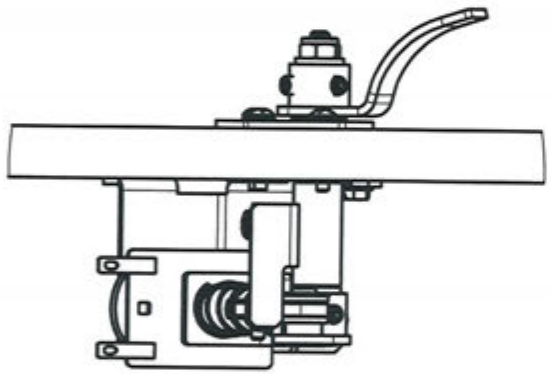
Nr.	BUMPER SWITCH PARTS	QTY.	SPI PART Nr.
16	Switch Bracket	1/per	535-7342-00
	Item 16 is secured by: #8 X 1/2" HWH AB (Zinc) (Qty. 2/per) (234-5101-00)		
17	Bumper Stack (Blade) Switch Assy.	1/per	180-5015-04
	Included with Item 17 : Spoon Switch Actuator (**545-5610-02**). Switch has a Diode (1N4004) (112-5003-00). *Can be replaced with (1N4001) (112-5001-00).*		
18	Switch Body Protect Plate	1/per	535-7344-00
	Items 17 & 18 are secured by: #6-32 X 3/4" HWH Swage (Serr) 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)		

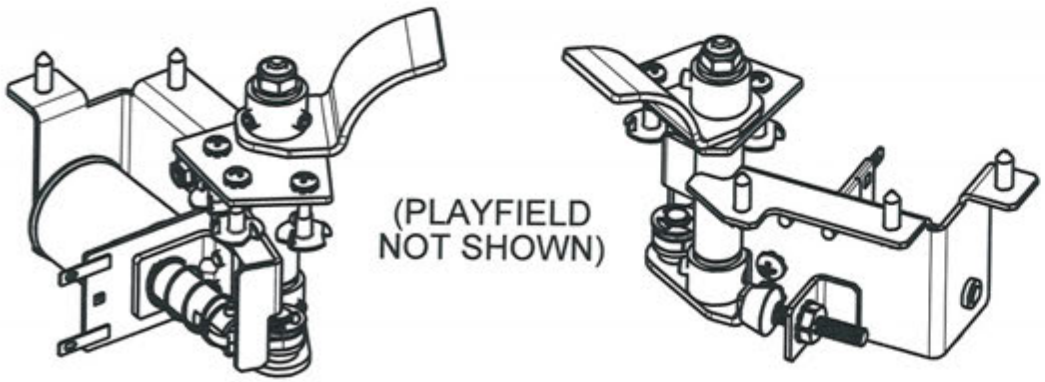
ASSOCIATED PARTS **ARE NOT INCLUDED** WITH THE ABOVE ASSEMBLIES.

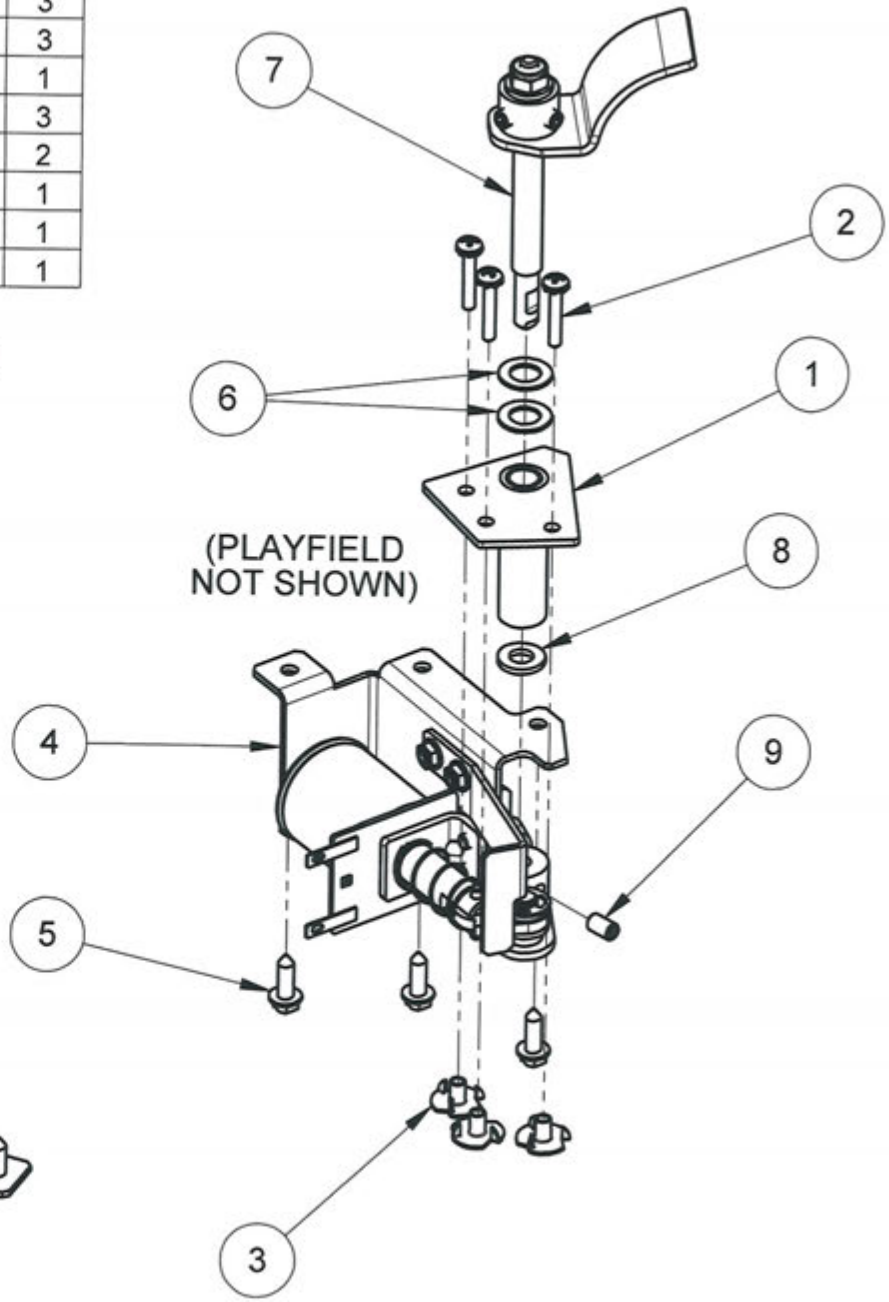
Nr.	ASSOCIATED PART(S)	QTY.	SPI PART Nr.
AP-A	Kit: Plastics *(includes -10, -11 & -12)*	1	803-5000-E6
	Note: Individual Plastics (830-6071-XX) are not available individually, ordering of kit is required.		
	Item AP-A is secured Item 3 by: #5 X 7/8" PRH AB (Zinc) (Qty. 2/per) (237-5826-00)		

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	515-9722-00	SUPPORT TUBE, DEFLECTOR, BILL LE	1
2	232-5204-00	SCREW, 6-32 X 3/4" PPH SEMS	3
3	240-5002-00	6-32 T-NUT	3
4	500-9831-00	ASSEMBLY, DEFLECTOR COIL, BILL LE	1
5	234-5101-00	SCREW, #8 X 1/2" SLT HWH AB ZINC	3
6	242-5100-00	WASHER, .328 ID X .562 OD X .031 ACETAL	2
7	500-9833-00	ASSY, DEFLECTOR & SHAFT, BILL LE	1
8	242-5008-00	WASHER, 1/4" ID X 1/2" OD X 1/16" THICK	1
9	237-6092-00	SET SCREW, 10-32 X 5/16, SOCKET CUP PT	1

DEFLECTOR ASSEMBLY, STAR TREK LE / PREMIUM

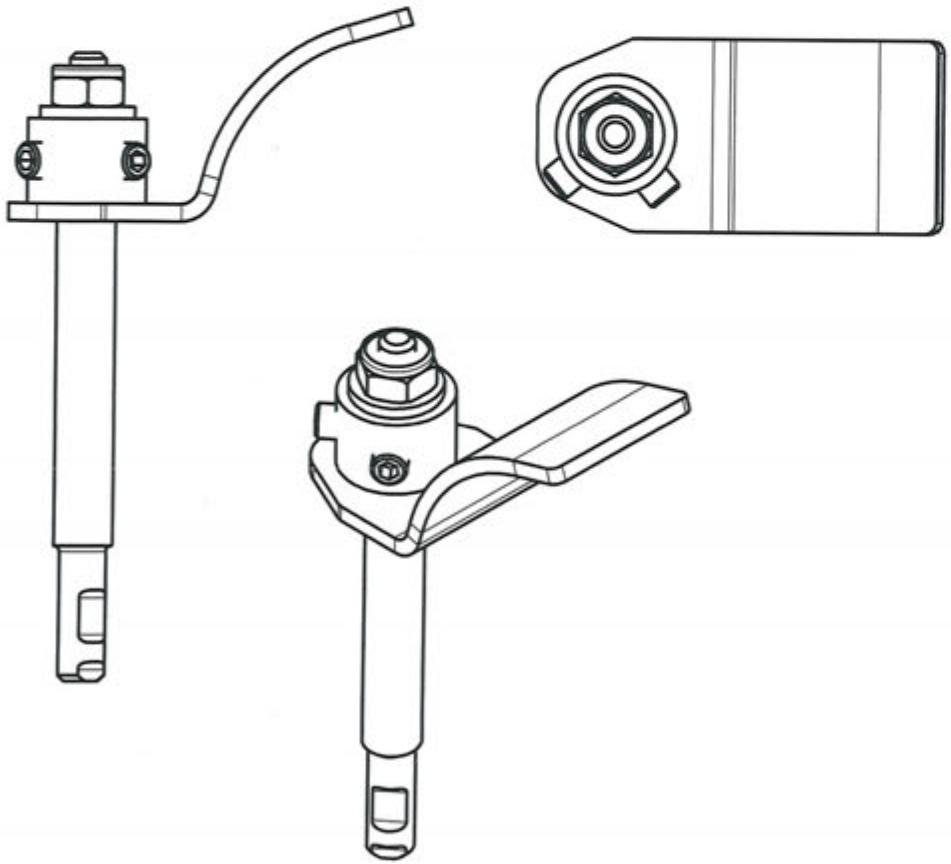


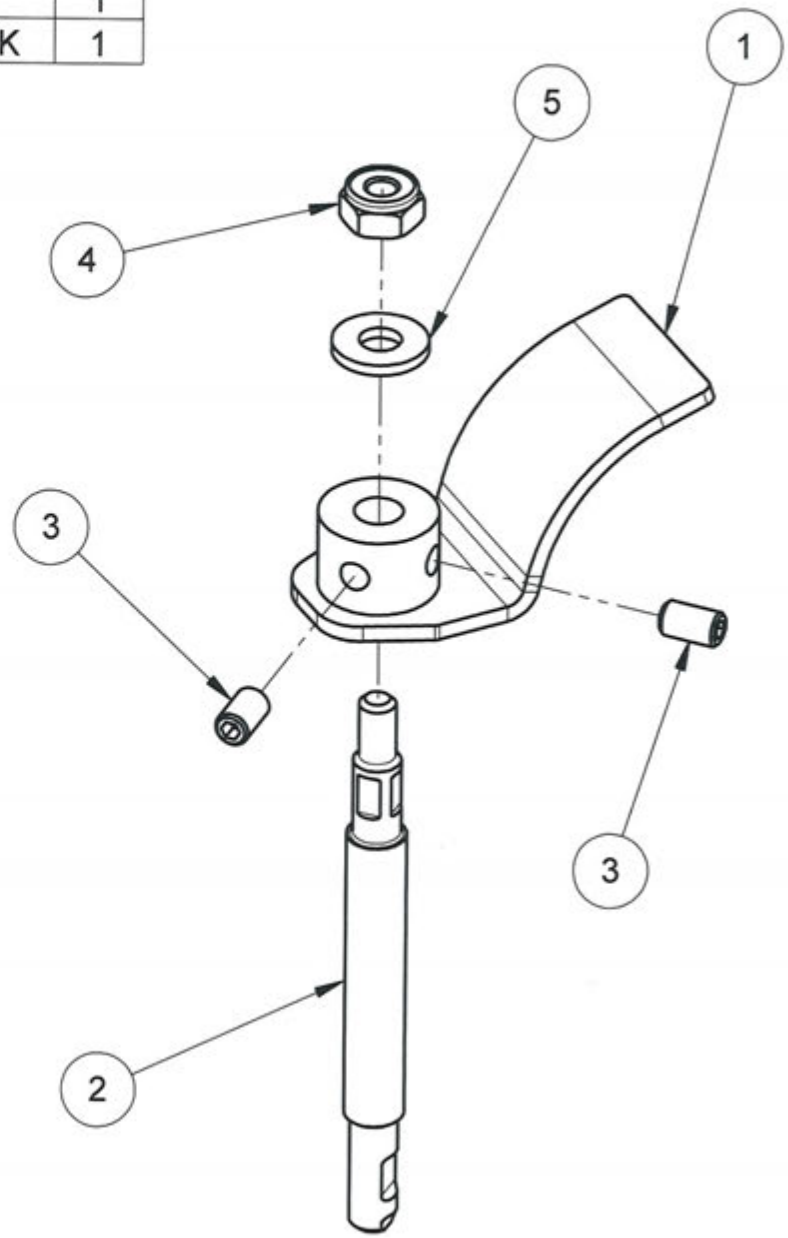




ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	515-9721-00	WELDMENT, DEFLECTOR, BILL LE	1
2	530-7849-00	PIVOT SHAFT, DEFLECTOR, BILL LE	1
3	237-6092-00	SET SCREW, 10-32 X 5/16, SOCKET CUP PT	2
4	240-5206-00	#10-24 NYLON LOCK NUT	1
5	242-5003-00	#10 FLAT WASHER - 1/2" O.D. X .062 THICK	1

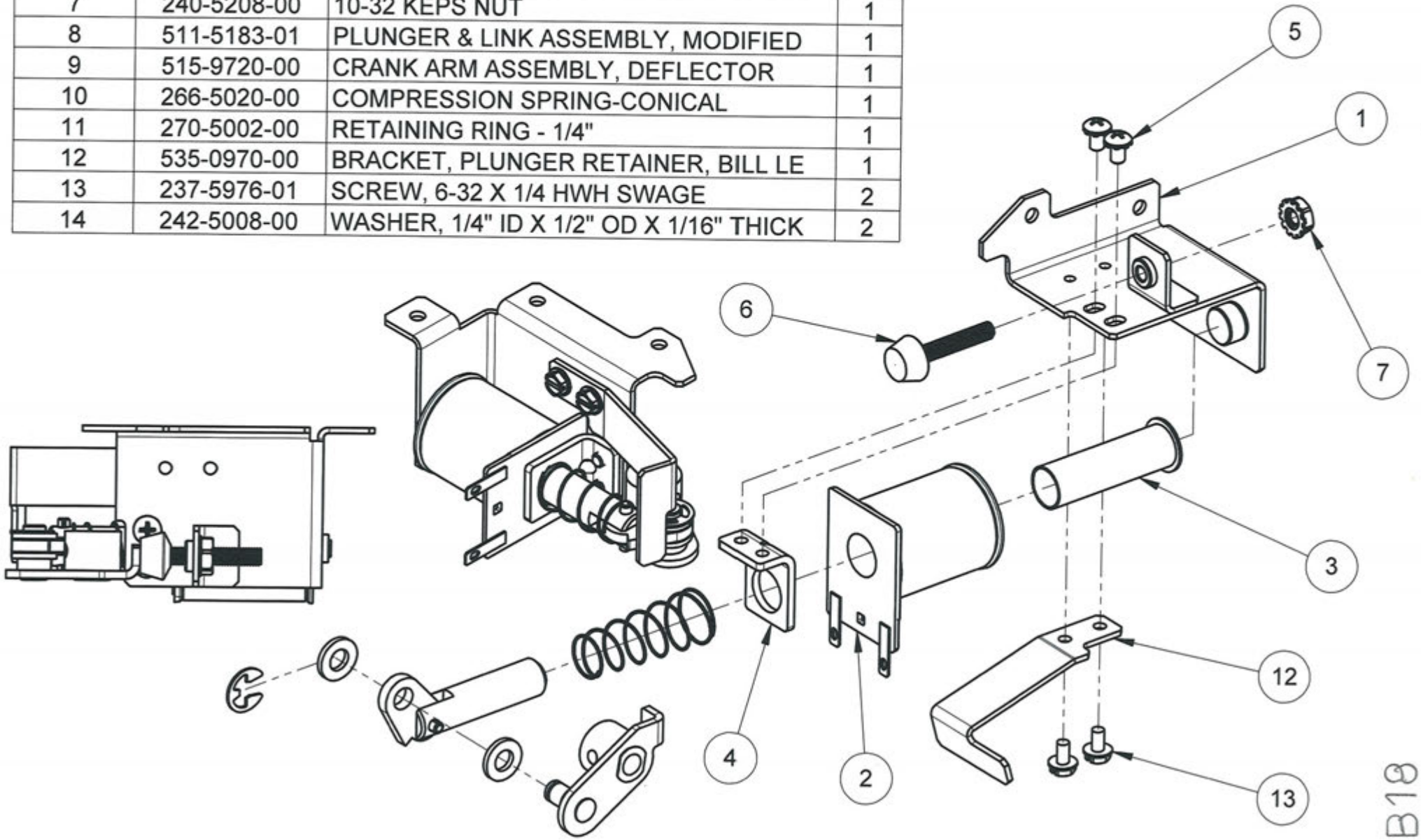
ASSEMBLY, DEFLECTOR & SHAFT
STAR TREK LE / PREMIUM
500-9833-00





ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	515-9719-00	BRACKET ASSEMBLY, DEFLECTOR COIL	1
2	090-5036-ND	COIL - 24-940, NO DIODE	1
3	545-5031-00	COIL SLEEVE	1
4	535-5203-03	COIL RETAINING BRACKET	1
5	232-5300-00	SCREW, 8-32 X 1/4" PPH SEMS	2
6	280-5014-00	ADJUSTABLE BUMPER/STOP	1
7	240-5208-00	10-32 KEPS NUT	1
8	511-5183-01	PLUNGER & LINK ASSEMBLY, MODIFIED	1
9	515-9720-00	CRANK ARM ASSEMBLY, DEFLECTOR	1
10	266-5020-00	COMPRESSION SPRING-CONICAL	1
11	270-5002-00	RETAINING RING - 1/4"	1
12	535-0970-00	BRACKET, PLUNGER RETAINER, BILL LE	1
13	237-5976-01	SCREW, 6-32 X 1/4 HWH SWAGE	2
14	242-5008-00	WASHER, 1/4" ID X 1/2" OD X 1/16" THICK	2

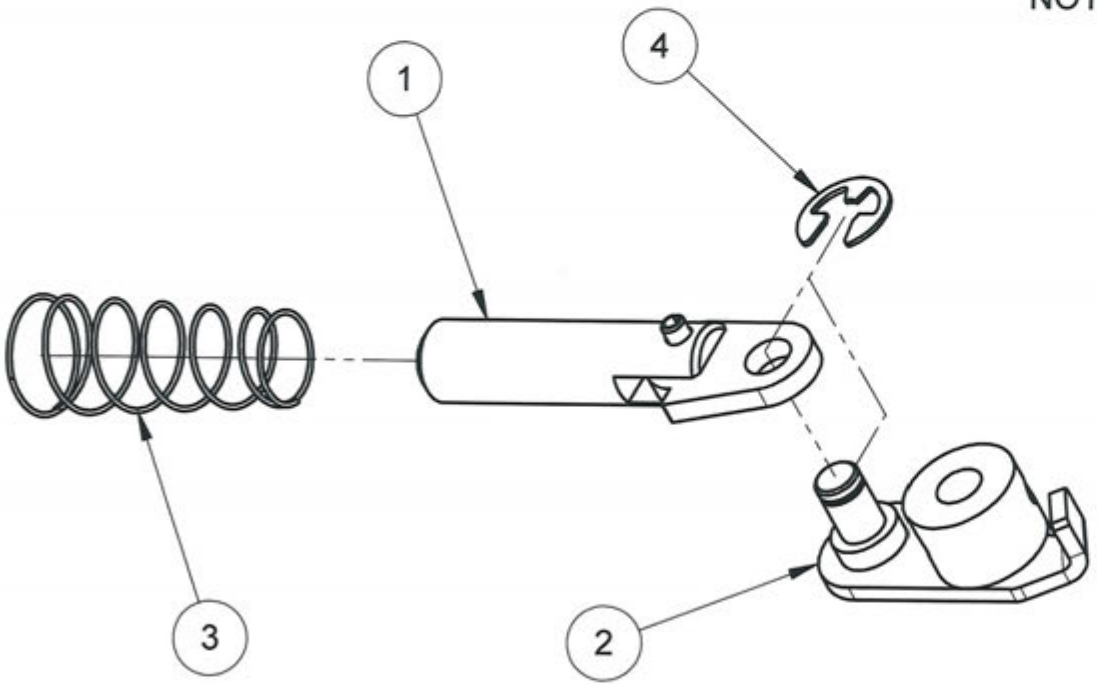
ASSEMBLY, DEFLECTOR COIL
STAR TREK LE / PREMIUM
500-9831-00



B18

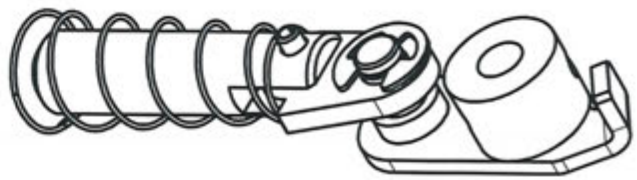
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	511-5183-01	PLUNGER & LINK ASSEMBLY, MODIFIED	1
2	515-9720-00	CRANK ARM ASSEMBLY, DEFLECTOR	1
3	266-5020-00	COMPRESSION SPRING-CONICAL	1
4	270-5002-00	RETAINING RING - 1/4"	1

ASSEMBLY, DEFLECTOR PLUNGER, STAR TREK LE / PREMIUM
500-9832-00

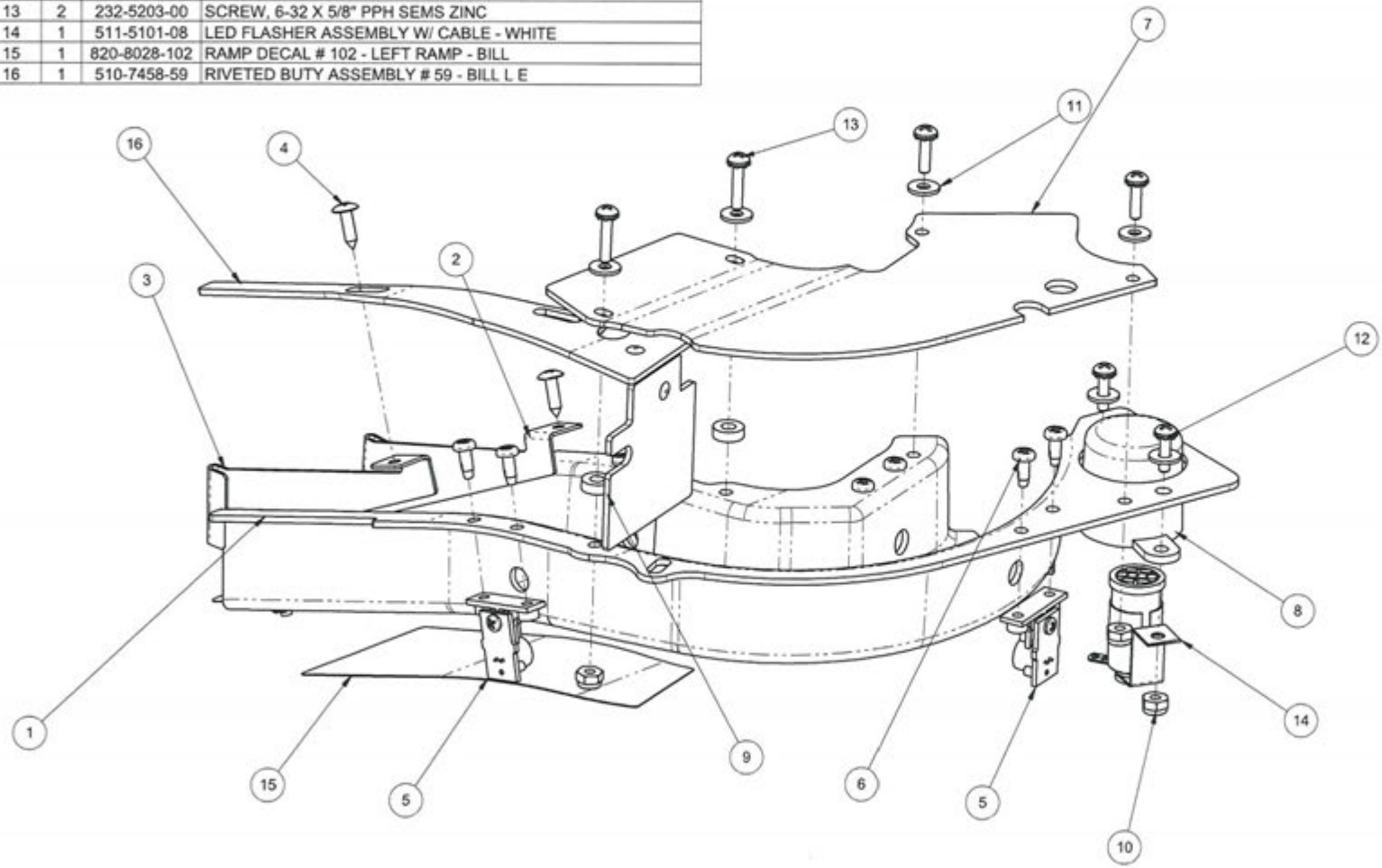


NOTE: FLAT FACE MUST BE ORIENTED AS SHOWN.





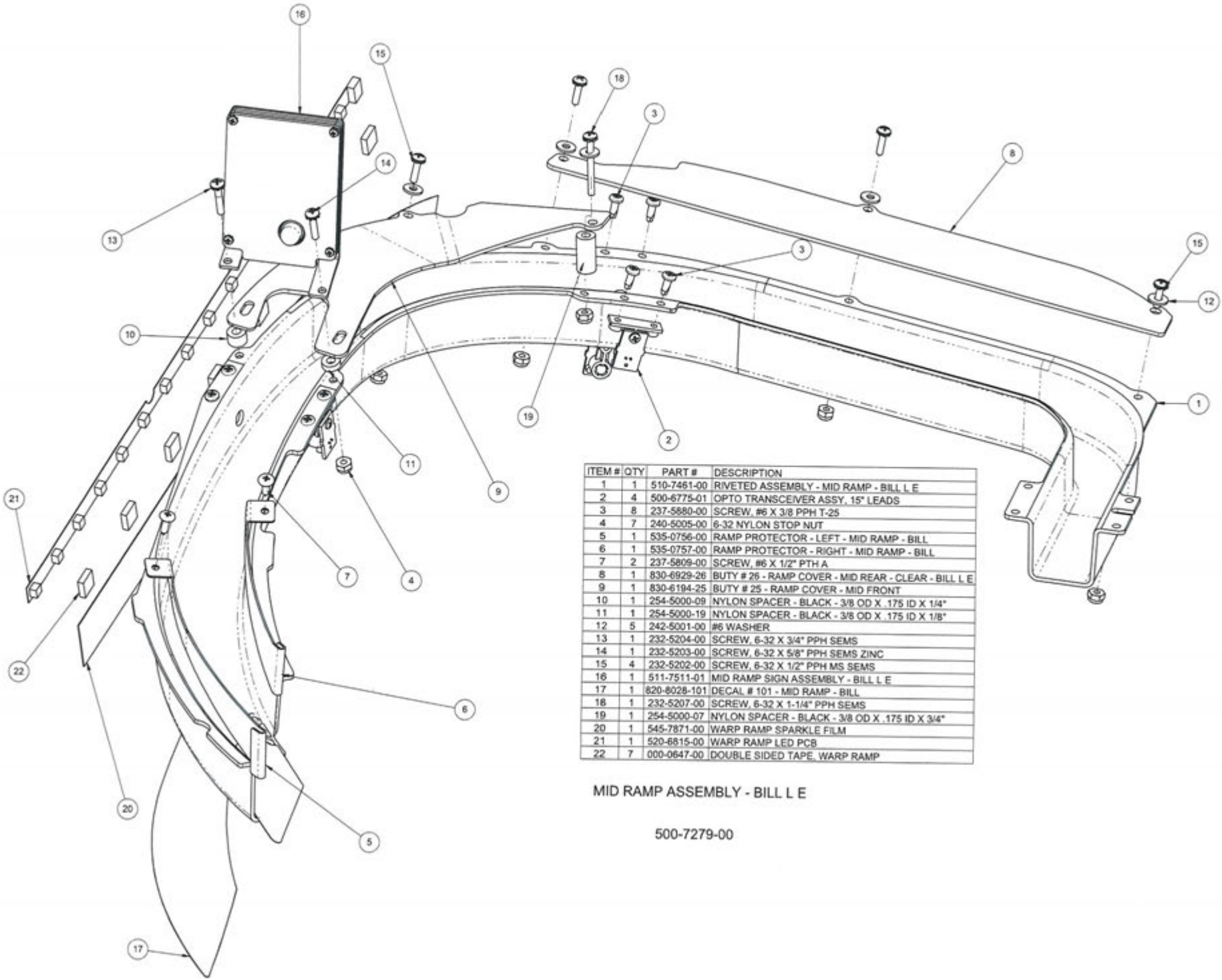
ITEM #	QTY	PART #	DESCRIPTION
1	1	510-7459-00	RIVETED ASSEMBLY - LEFT RAMP - BILL L E
2	1	535-0754-01	RAMP PROTECTOR - LEFT - LEFT RAMP - BILL
3	1	535-0755-00	RAMP PROTECTOR - RIGHT - LEFT & RIGHT RAMP - BILL
4	2	237-5809-00	SCREW, #6 X 1/2" PTH A
5	4	500-6775-01	OPTO TRANSCEIVER ASSY, 15" LEADS
6	8	237-5880-00	SCREW, #6 X 3/8 PPH T-25
7	1	830-6194-23	BUTY # 23 - RAMP COVER - LEFT - CLEAR
8	1	550-5031-02	MINI MARS W/ EARS - RED SB
9	2	254-5000-19	NYLON SPACER - BLACK - 3/8 OD X .175 ID X 1/8"
10	6	240-5005-00	6-32 NYLON STOP NUT
11	6	242-5001-00	#6 WASHER
12	4	232-5202-00	SCREW, 6-32 X 1/2" PPH MS SEMS
13	2	232-5203-00	SCREW, 6-32 X 5/8" PPH SEMS ZINC
14	1	511-5101-08	LED FLASHER ASSEMBLY W/ CABLE - WHITE
15	1	820-8028-102	RAMP DECAL # 102 - LEFT RAMP - BILL
16	1	510-7458-59	RIVETED BUTY ASSEMBLY # 59 - BILL L E



LEFT RAMP ASSEMBLY - BILL L E

500-7276-00

B20

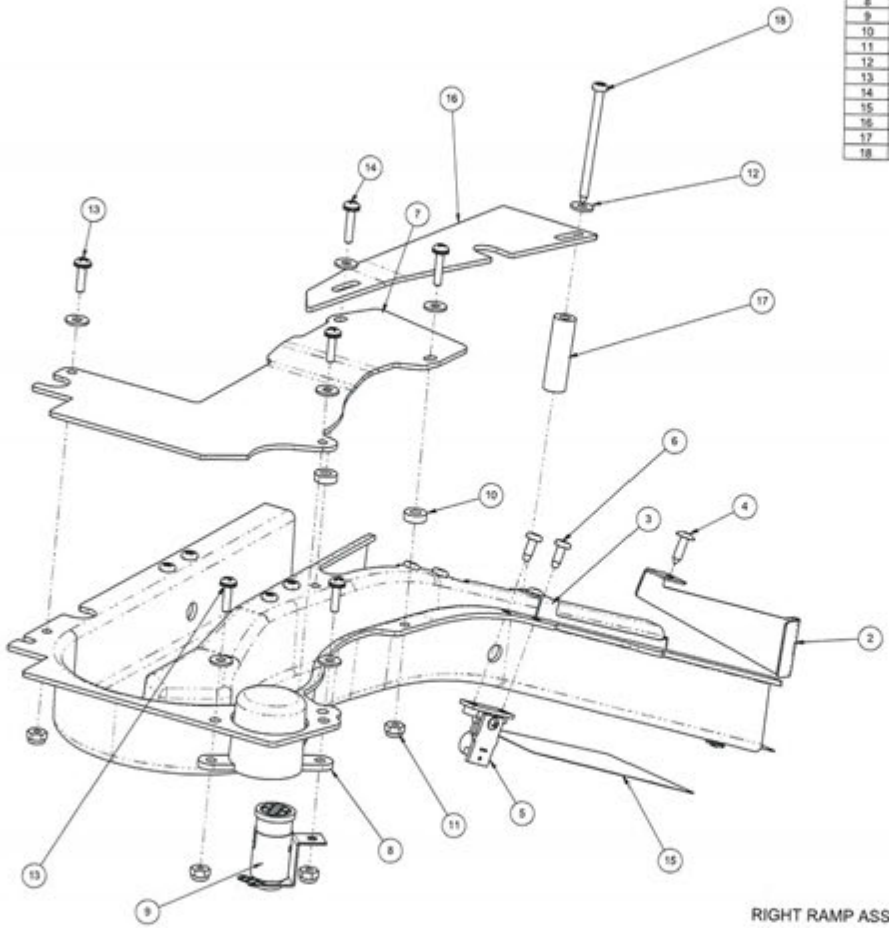


ITEM #	QTY	PART #	DESCRIPTION
1	1	510-7461-00	RIVETED ASSEMBLY - MID RAMP - BILL L E
2	4	500-6775-01	OPTO TRANSCEIVER ASSY, 15" LEADS
3	8	237-5680-00	SCREW, #6 X 3/8 PPH T-25
4	7	240-5005-00	6-32 NYLON STOP NUT
5	1	535-0756-00	RAMP PROTECTOR - LEFT - MID RAMP - BILL
6	1	535-0757-00	RAMP PROTECTOR - RIGHT - MID RAMP - BILL
7	2	237-5809-00	SCREW, #6 X 1/2" PTH A
8	1	830-6929-26	BUTY # 26 - RAMP COVER - MID REAR - CLEAR - BILL L E
9	1	830-6194-25	BUTY # 25 - RAMP COVER - MID FRONT
10	1	254-5000-09	NYLON SPACER - BLACK - 3/8 OD X .175 ID X 1/4"
11	1	254-5000-19	NYLON SPACER - BLACK - 3/8 OD X .175 ID X 1/8"
12	5	242-5001-00	#6 WASHER
13	1	232-5204-00	SCREW, 6-32 X 3/4" PPH SEMS
14	1	232-5203-00	SCREW, 6-32 X 5/8" PPH SEMS ZINC
15	4	232-5202-00	SCREW, 6-32 X 1/2" PPH MS SEMS
16	1	511-7511-01	MID RAMP SIGN ASSEMBLY - BILL L E
17	1	820-6028-101	DECAL # 101 - MID RAMP - BILL
18	1	232-5207-00	SCREW, 6-32 X 1-1/4" PPH SEMS
19	1	254-5000-07	NYLON SPACER - BLACK - 3/8 OD X .175 ID X 3/4"
20	1	545-7871-00	WARP RAMP SPARKLE FILM
21	1	520-6815-00	WARP RAMP LED PCB
22	7	000-0647-00	DOUBLE SIDED TAPE, WARP RAMP

MID RAMP ASSEMBLY - BILL L E

500-7279-00

ITEM #	QTY	PART #	DESCRIPTION
1	1	510-7460-00	RIVETED ASSEMBLY - RIGHT RAMP - BILL L E
2	1	535-0754-00	RAMP PROTECTOR - LEFT - RIGHT RAMP - BILL
3	1	535-0755-00	RAMP PROTECTOR - RIGHT - LEFT & RIGHT RAMP - BILL
4	2	237-5809-00	SCREW, #6 X 1/2" PTH A
5	4	500-6775-01	OPTO TRANSCEIVER ASSY, 15" LEADS
6	8	237-5880-00	SCREW, #6 X 3/8 PPH T-25
7	1	830-6194-24	BUTY # 24 - RAMP COVER - RIGHT - CLEAR
8	1	550-5031-06	MINI MARS W/ EARS - YELLOW S/B
9	1	511-5101-08	LED FLASHER ASSEMBLY W/ CABLE - WHITE
10	2	254-5000-19	NYLON SPACER - BLACK - 3/8 OD X .175 ID X 1/8"
11	6	240-5005-00	6-32 NYLON STOP NUT
12	7	242-5001-00	#6 WASHER
13	4	232-5202-00	SCREW, 6-32 X 1/2" PPH MS SEMS
14	2	232-5203-00	SCREW, 6-32 X 5/8" PPH SEMS ZINC
15	1	820-8028-103	RAMP DECAL # 103 - RIGHT RAMP - BILL
16	1	830-6929-75	BUTY # 75 - BILL L E
17	1	254-5000-05	NYLON SPACER - BLACK - 3/8 OD X .175 ID X 1-1/4"
18	1	237-5807-00	#6 x 2" PPH AB ZINC

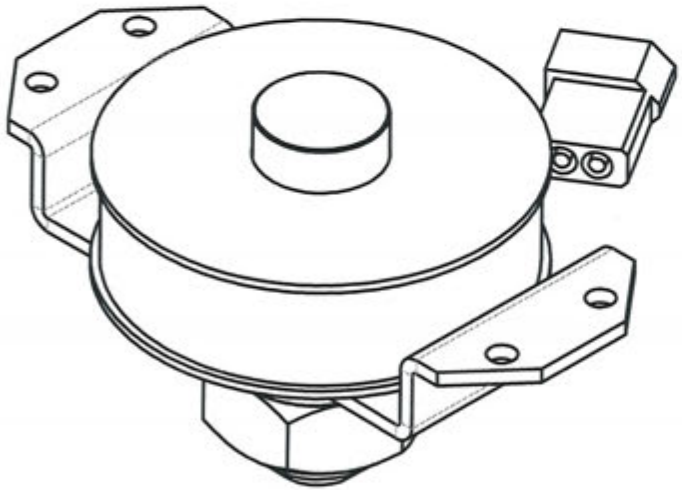


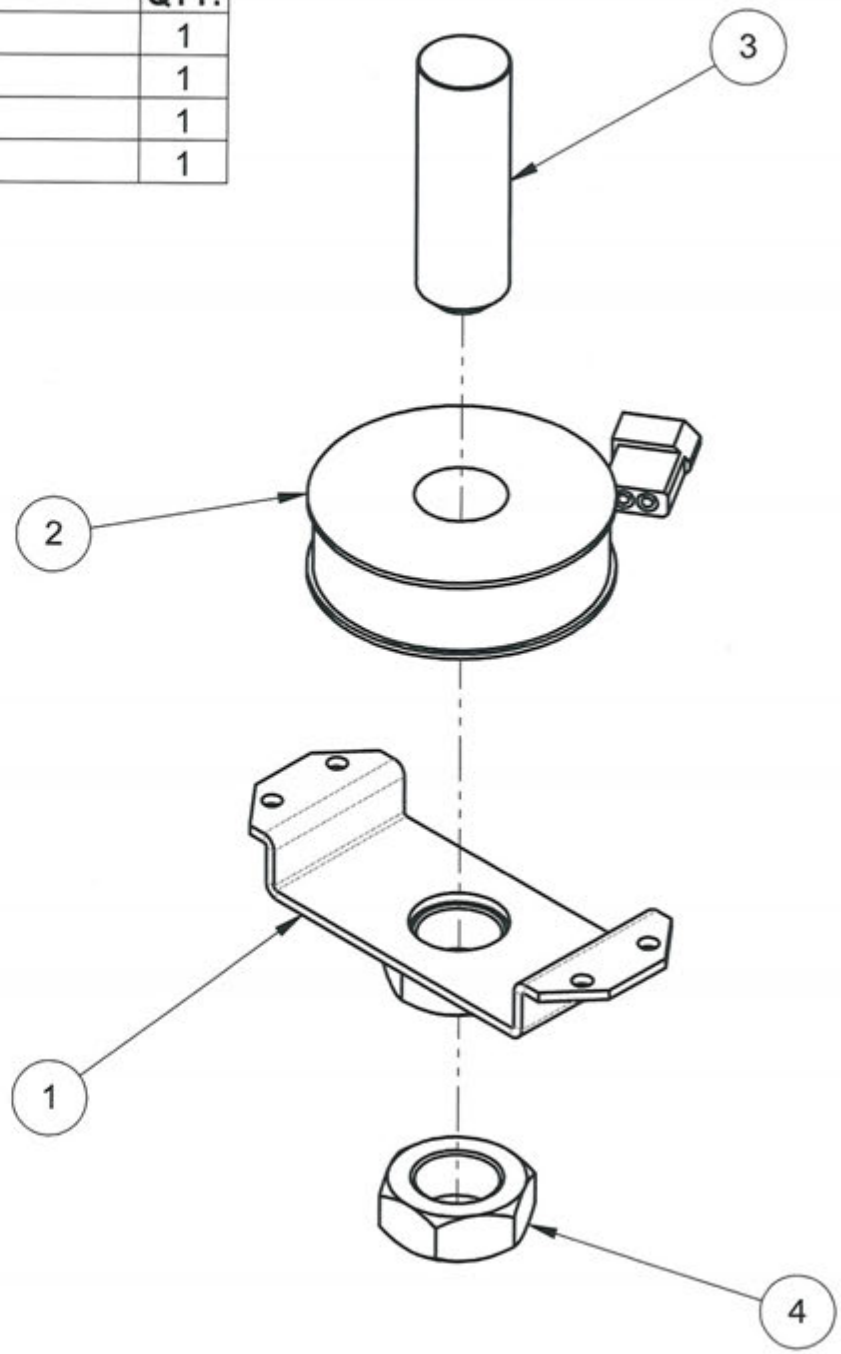
RIGHT RAMP ASSEMBLY - BILL L E

500-7277-00

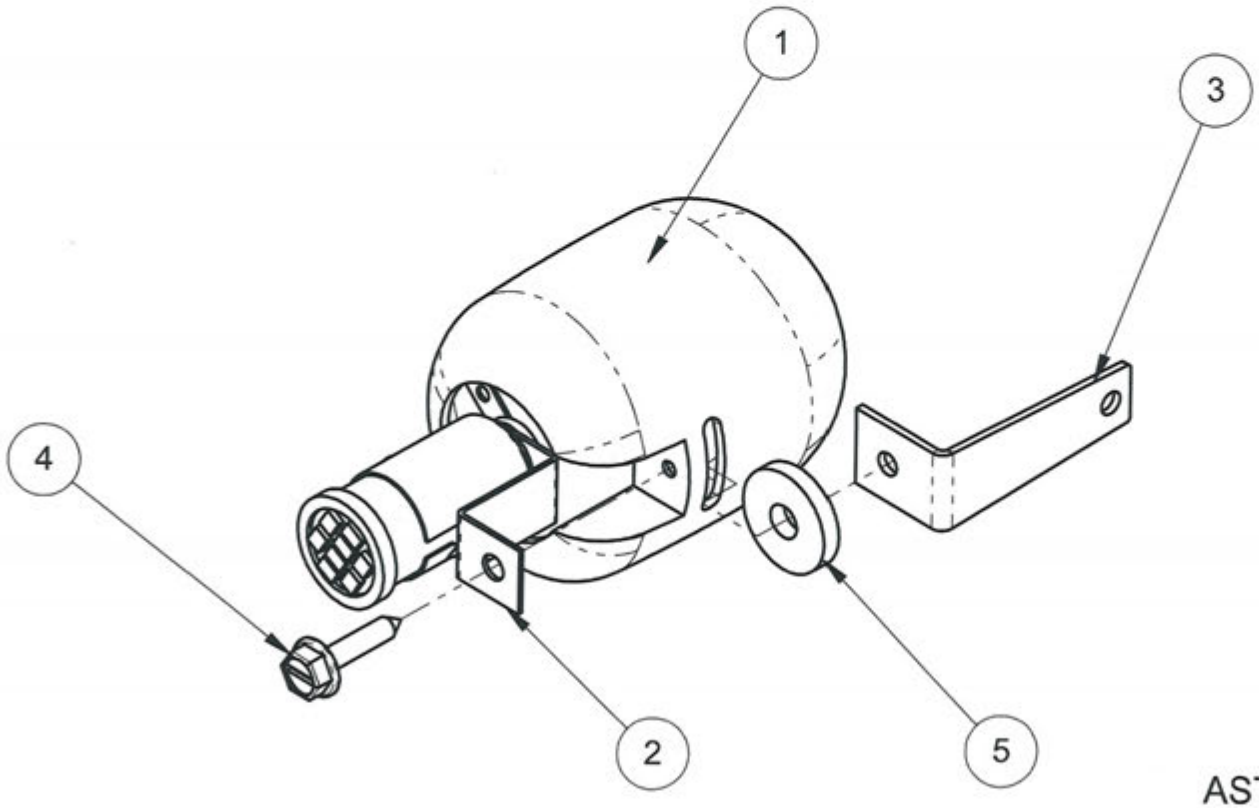
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	515-6141-03	THREADED CORE WELD ASSY	1
2	511-5065-00	MAGNET & CONN ASSY, S-M	1
3	530-5320-00	THREADED CORE PLUG	1
4	240-5315-00	3/4-16 HEX JAM NUT	1

MAGNET PRIME ASSEMBLY





ITEM #	QTY	PART #	DESCRIPTION
1	1	545-7850-00	ASTEROID - BILL L E
2	1	511-5101-08	LED FLASHER ASSEMBLY W/ CABLE - WHITE
3	1	535-0856-00	BRACKET - ASTEROID
4	1	234-5002-00	SCREW, #6 X 5/8" HWH
5	1	242-5039-00	WASHER - 13/64 ID X5/8 OD X .105



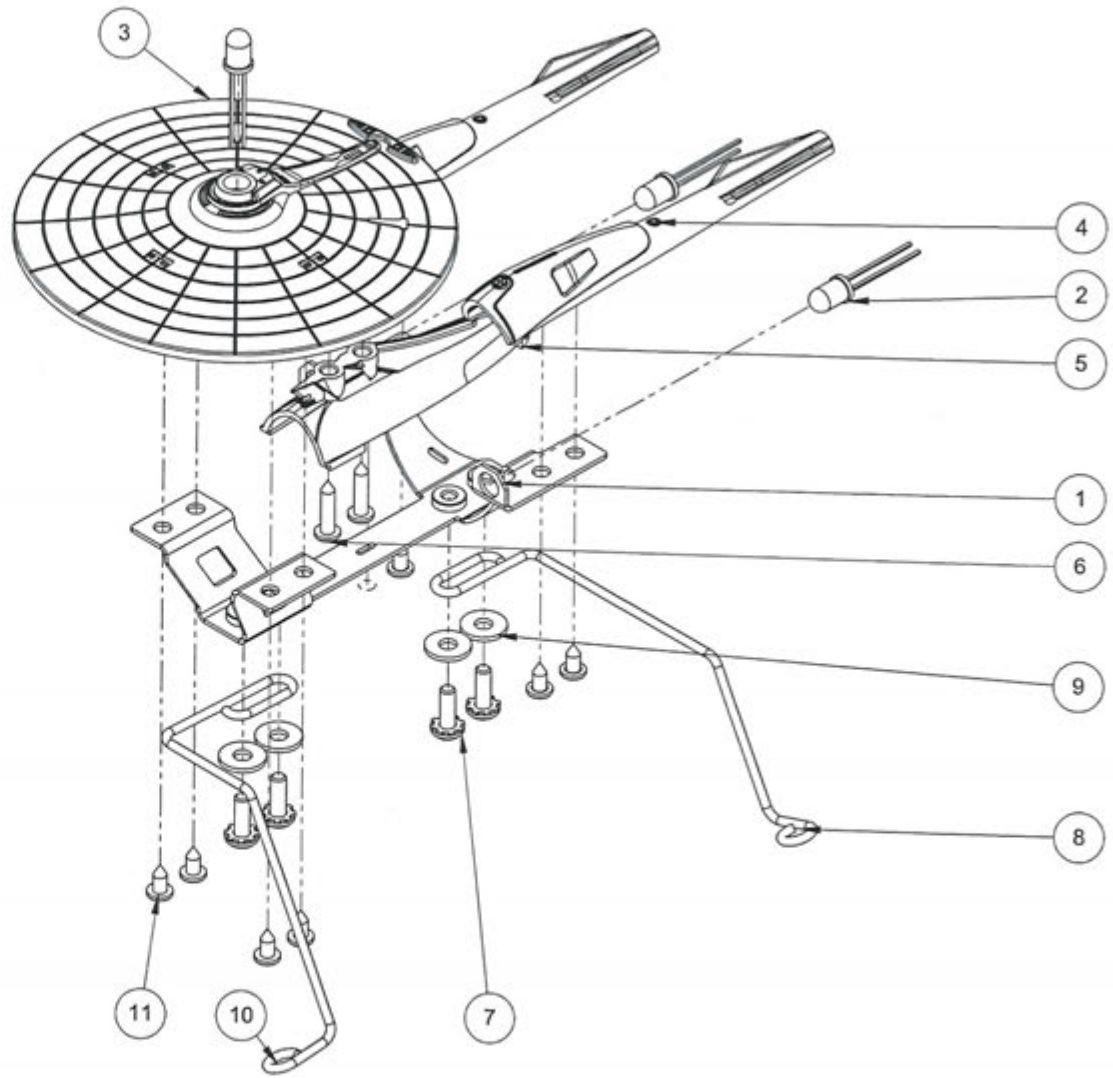
ASTEROID ASSEMBLY

511-7519-00

B24

ITEM NO.	PART NUMBER	DESCRIPTION	Default/ QTY.
1	515-9713-00	ENTERPRISE TOY BRACKET	1
2	112-5048-05	T 1 3/4 / 5mm ROUND LED w/RESISTOR-BLUE	3
3	550-7358-00	ENTERPRISE-MAIN BODY	1
4	550-7359-00	NACELLE-ENTERPRISE	2
5	550-7360-00	ENTERPRISE-CENTER BODY	1
6	237-6304-00	SCREW, #4 X 1/2" PPH AB	2
7	232-5201-00	SCREW, 6-32 X 3/8" PPH MS SEMS	4
8	535-0821-00	ENTERPRISE WIRE SUPPORT-BACK	1
9	242-5001-00	#6 WASHER	4
10	535-0822-00	ENTERPRISE WIRE SUPPORT-FRONT	1
11	237-5886-00	SCREW, #4 X 1/4" PPH AB	8
12	*036-5605-12-E4	ENTERPRISE CABLE ASSY.	SEE BOM

NOTE:
*NOT SHOWN



ENTERPRIISE ASSEMBLY

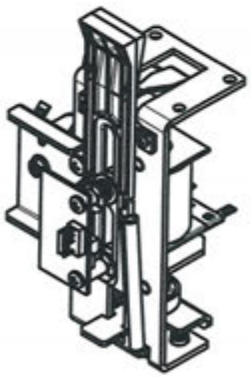
500-9830-00

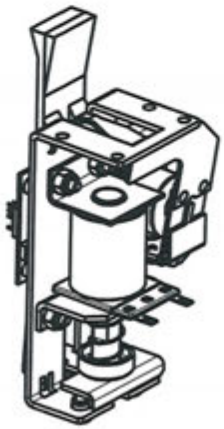
ASSEMBLY, 1-BANK DROP TARGET W/ TRIP COIL

500-9826-01

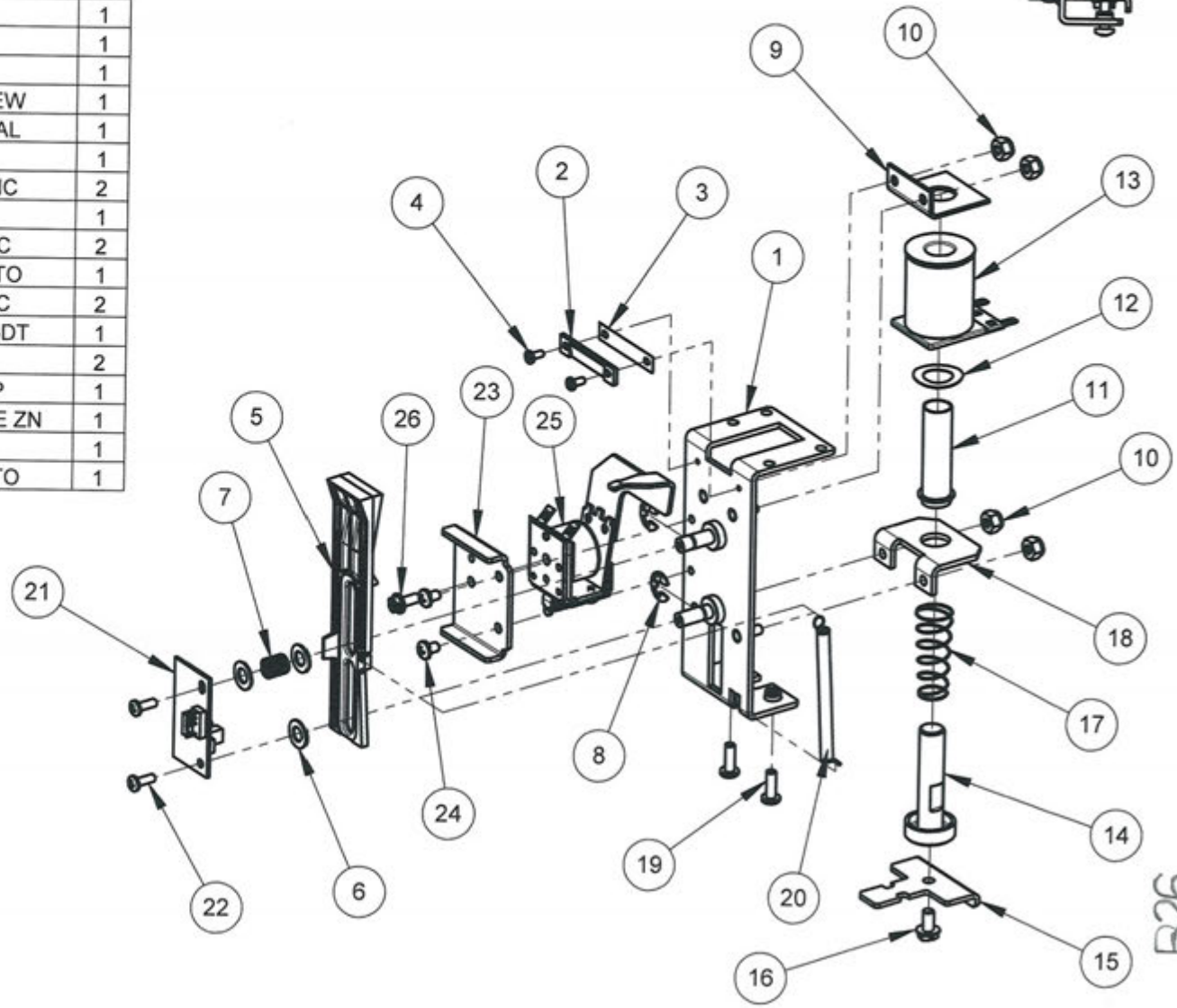
ITEM NO.	PART NUMBER	DESCRIPTION	QTY
1	515-0183-00	FRAME ASSY, 1-BANK DT W/ TRIP	1
2	545-6163-01	LEDGE, 1-BANK DROP TARGET	1
3	545-6798-00	SHIM - FICHE PAPER - D.T. SINGLE	1
4	237-6169-00	SCREW, 4-40 X 1/4 PPH MS	2
5	545-6305-00	TARGET - ROLLOVER - BLACK	1
6	242-5091-00	WASHER, 1/2 X 17/64 X .03 - DT	3
7	266-5089-00	SPRING COMPRESSION - DT	1
8	270-5002-00	RETAINING RING - 1/4"	2
9	535-9959-00	STOP BRKT	1
10	240-5102-00	8-32 NYLON LOCK NUT	4
11	545-5076-01	COIL SLEEVE	1
12	269-5002-00	SPRING WASHER	1
13	090-5034-ND	COIL 25-1240 - NO DIODE	1
14	530-5757-00	PLUNGER - D.T. ASSY.	1
15	535-9760-01A	LIFT BRKT - 1 BANK	1
16	237-5985-00	10-32 X 3/8 SHWH SWAGE SCREW	1
17	266-5020-00	COMPRESSION SPRING-CONICAL	1
18	535-9777-01	COIL BRACKET-DT-OD	1
19	237-5602-00	SCREW, 8-32 X 1/2" PPH MS, ZINC	2
20	265-5003-03	TARGET RESET SPRING	1
22	237-5501-00	SCREW, 6-32 X 3/8" PPH MS ZINC	2
21	520-5252-01	1 BANK DROP TARGET PCB-OPTO	1
22	237-5501-00	SCREW, 6-32 X 3/8" PPH MS ZINC	2
23	535-0789-00	BRACKET, TRIP COIL MOUNT, 1-DT	1
24	232-5300-00	SCREW, 8-32 X 1/4" PPH SEMS	2
25	515-9702-00-ND	COIL ASSEMBLY, TARGET DROP	1
26	237-5975-00	SCREW, 8-32 X 3/8" HWH SWAGE ZN	1
99*	036-5605-07-E4	CABLE, DT W/ TRIP	1
21	520-5252-01	1 BANK DROP TARGET PCB-OPTO	1

* ITEM NOT SHOWN





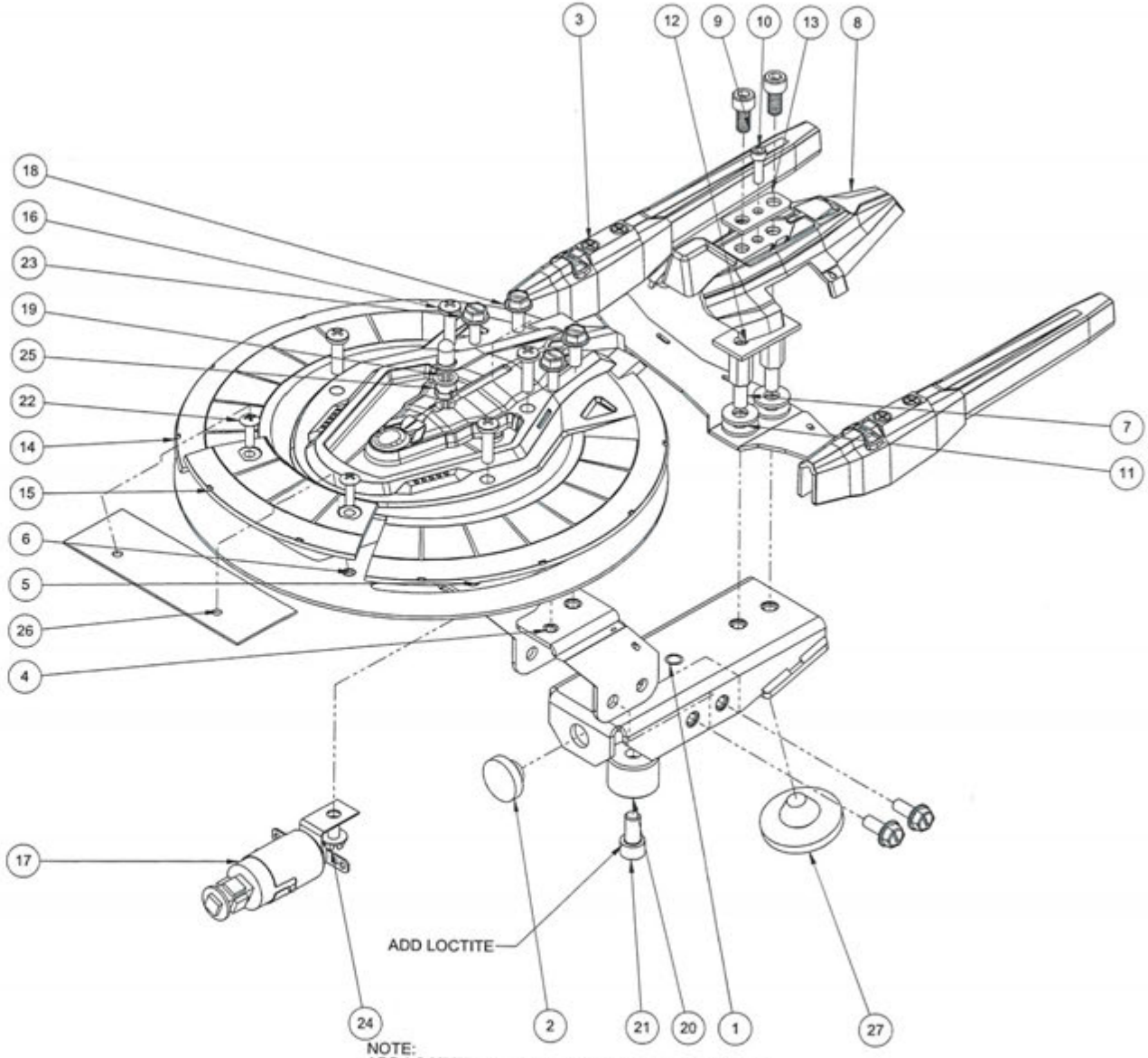




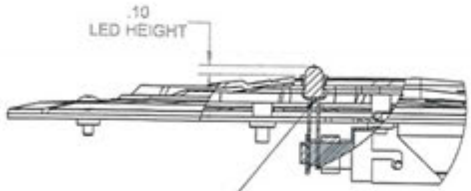
B26

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	515-9723-00	VENGEANCE MOUNTING BRACKET-LE	1
2	545-5105-00	RUBBER BUMPER	1
3	511-7522-00	VENGEANCE NACELLE ASSEMBLY	1
4	515-9707-00	VENGEANCE SAUCER MTG. BRACKET	1
5	515-9707-01	VENGEANCE SAUCER MTG. BRACKET	1
6	515-9706-00	VENGEANCE SAUCER BRACKET	1
7	254-5063-08	1/4 HEX POST, M-F, 8-32 THREAD	2
8	550-7356-00	CENTER BODY-VENGEANCE	1
9	237-5897-01	SCREW, 8-32 X 3/8" SHCS BLACK	2
10	237-6303-00	4-40 x 3/8 LG. SOCKET HD CAP SCREW, BLACK OXIDE	1
11	242-5005-00	#8 WASHER	4
12	515-9708-00	NUT PLATE-VENGEANCE	1
13	535-0809-00	WASHER PLATE-VENGEANCE	1
14	550-7352-00	MAIN BODY-VENGEANCE	1
15	550-7353-00	FLIP PANEL INTACT-VENGEANCE	1
16	237-5502-03	SCREW, 6-32 X 1/2 PPH MS BLACK	4
17	519-5100-WW-LED	MULTI FLASHER LED ASSEMBLY-WARM WHITE	1
18	237-5903-00	SCREW, 8-32 X 3/8" HWH	6
19	112-5048-05	T 1 3/4 / 5mm ROUND LED w/RESISTOR-BLUE	1
20	530-7181-00	HUB-SPRING RETAINER	1
21	237-5845-00	SCREW, 10-32 X 3/8" SHCS ZINC	1
22	237-6154-01	SCREW, 4-40 X 3/8" PTH MS - BLACK	2
23	237-5976-02	SCREW, 6-32 X 3/8 HWH SWAGE	2
24	237-5976-01	SCREW, 6-32 X 1/4 HWH SWAGE	1
25	254-5073-XX	LED CLIP, RICHCO LEDCR-174	1
26	545-7870-00	MATTE RIGID VINYL	1
27	545-5428-00	RUBBER BUMPER	1
28	*036-5605-05-E6	VENGEANCE LE CABLE ASSY	SEE BOM

NOTE:
*NOT SHOWN



NOTE:
ADD LOCTITE TO ALL FASTENERS ON VENGEANCE

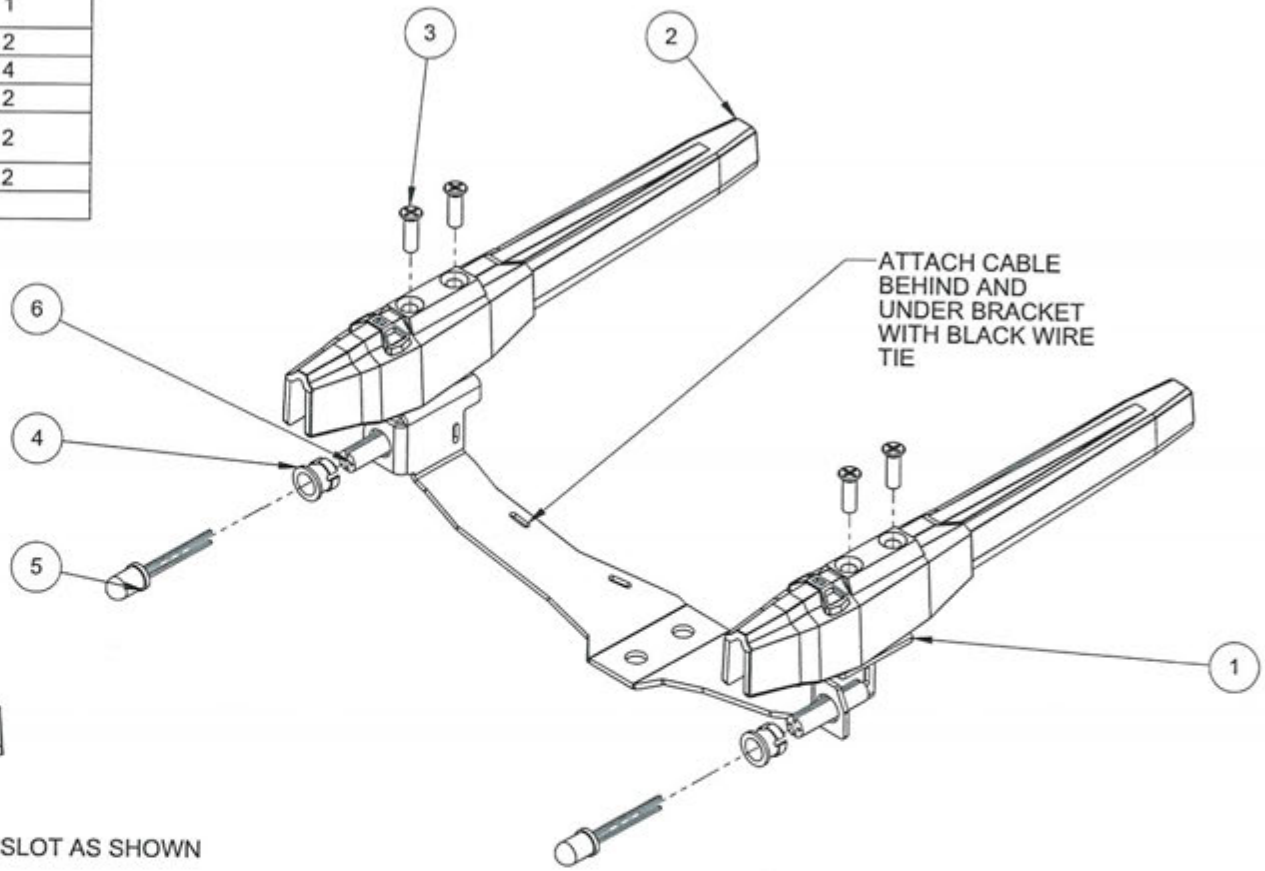


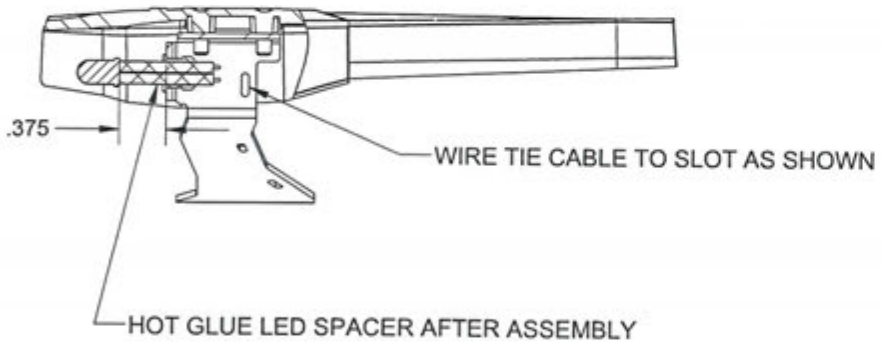
HOT GLUE LED AFTER ASSEMBLY. SUPPORT LED ATOP MULTI FLASHER LED

VENGEANCE SHIP ASSEMBLY-LE

511-7523-01

ITEM NO.	PART NUMBER	DESCRIPTION	Default/QTY.
1	535-0806-00	NACELLE MOUNTING BRACKET	1
2	550-7355-00	NACELLE-VENGEANCE	2
3	237-5983-01	SCREW, 4-40 X 3/8 PFH MS, SS	4
4	254-5073-XX	LED CLIP, RICHCO LEDCR-174	2
5	112-5040-05	T 1 3/4 / 5mm LED w/RESISTOR-BLUE	2
6	254-5082-02	LED SPACER, T 1 3/4(5mm)	2
7	036-5605-05-E4	SHIP LED CABLE	





NOTE:
ADD LOCTITE TO ALL FASTENERS

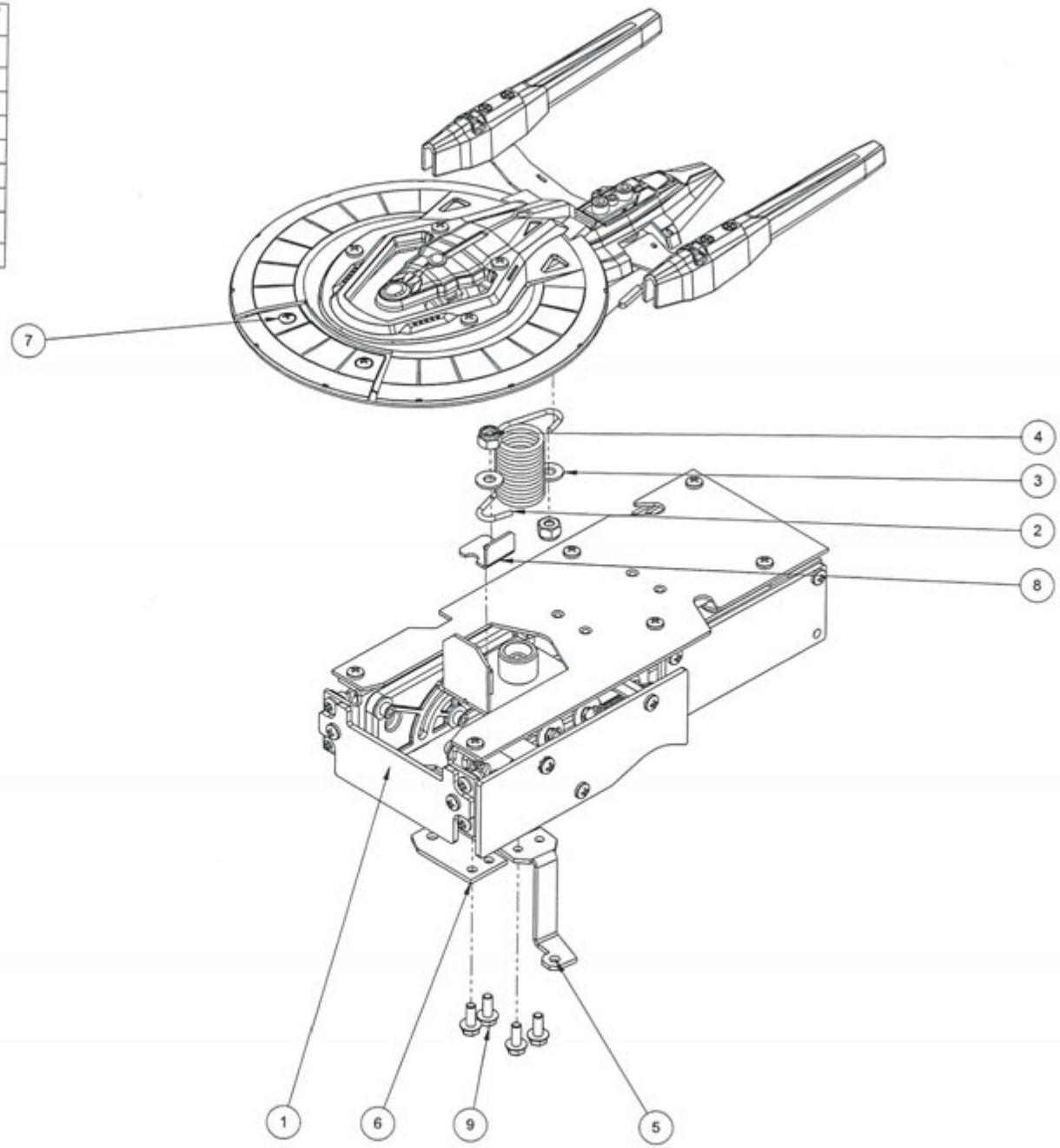
VENGEANCE NACELLE ASSEMBLY

511-7522-01

B28

ITEM NO.	PART NUMBER	DESCRIPTION	Default/ QTY.
1	511-7524-00	VENGEANCE SHIP MAIN ASSEMBLY-LE	1
2	266-5101-00	BUCKLING SPRING	1
3	242-5005-00	#8 WASHER	2
4	240-5102-00	8-32 NYLON LOCK NUT	2
5	535-0811-00	VENGEANCE SUPPORT BRACKET	1
6	535-0864-00	VENGEANCE LE MTG. PLATE	1
7	511-7523-01	VENGEANCE SHIP ASSEMBLY-LE	1
8	535-0865-00	VENGEANCE LE OPTO FLAG/WASHER PLATE	1
9	237-5903-00	SCREW, 8-32 X 3/8" HWH	4

NOTE:
ADD LOCTITE TO ALL FASTENERS ON VENGEANCE



B29

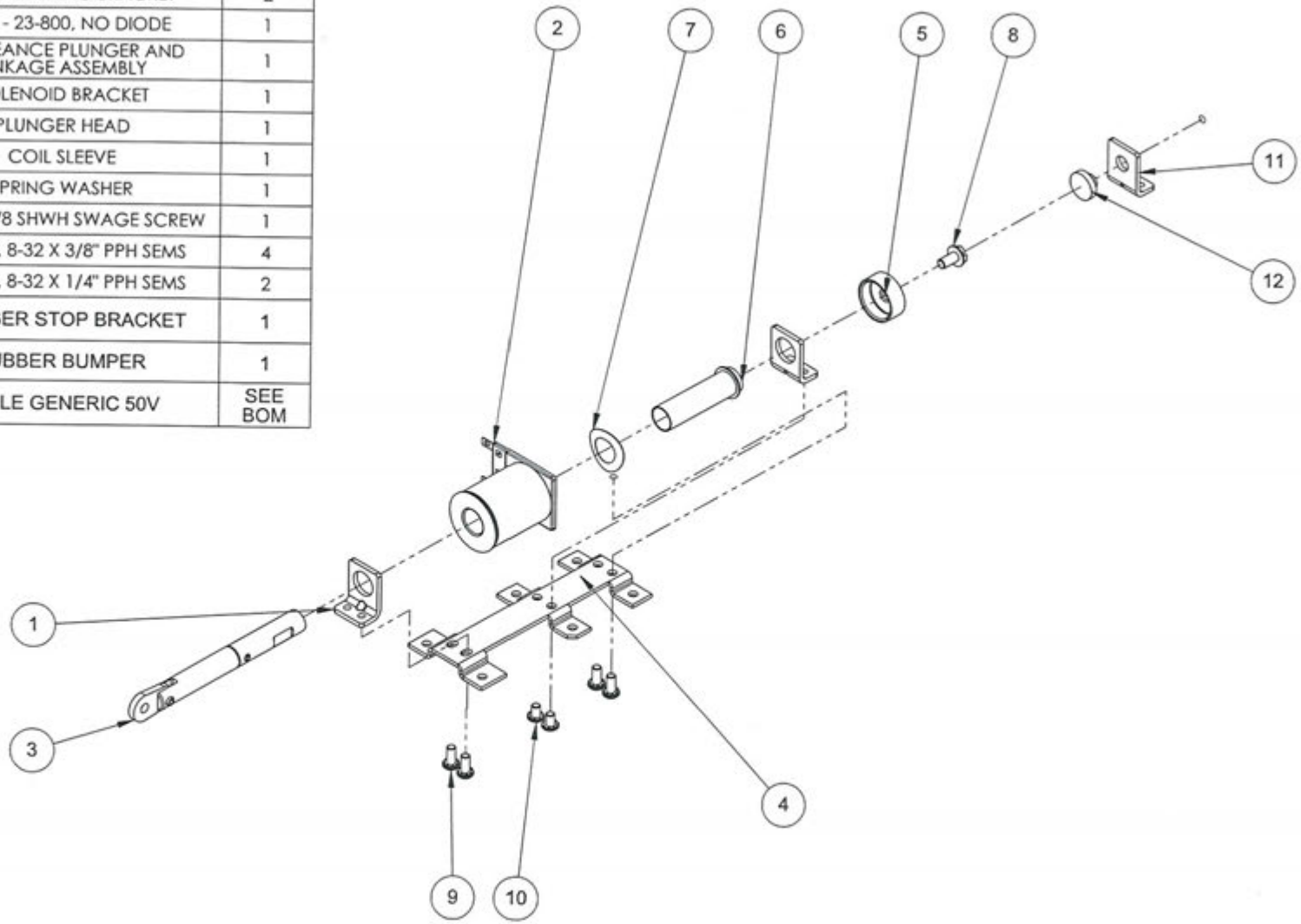
1) ASSEMBLE SPRING LOOSE TO ALIGN 511-7523-01 TO 511-7524-00
2) AFTER FINDING PROPER SPRING ALIGNMENT, TIGHTEN SPRING TO 511-7523-01
3) USE OPEN WRENCH TO TIGHTEN SPRING TO 511-7524-00

VENGEANCE ASSEMBLY-LE

500-9828-00

ITEM NO.	PART NUMBER	DESCRIPTION	Default/ QTY.
1	535-5203-03	COIL RETAINING BRACKET	2
2	090-5001-ND	COIL - 23-800, NO DIODE	1
3	515-9725-00	VENGEANCE PLUNGER AND LINKAGE ASSEMBLY	1
4	535-0801-00	SOLENOID BRACKET	1
5	530-5511-00	PLUNGER HEAD	1
6	545-5076-01	COIL SLEEVE	1
7	269-5002-00	SPRING WASHER	1
8	237-5985-00	10-32 X 3/8 SHWH SWAGE SCREW	1
9	232-5301-00	SCREW, 8-32 X 3/8" PPH SEMS	4
10	232-5300-00	SCREW, 8-32 X 1/4" PPH SEMS	2
11	535-0692-01	PLUNGER STOP BRACKET	1
12	545-5105-00	RUBBER BUMPER	1
13	*036-5542-02L	CABLE GENERIC 50V	SEE BOM

NOTE:
*NOT SHOWN



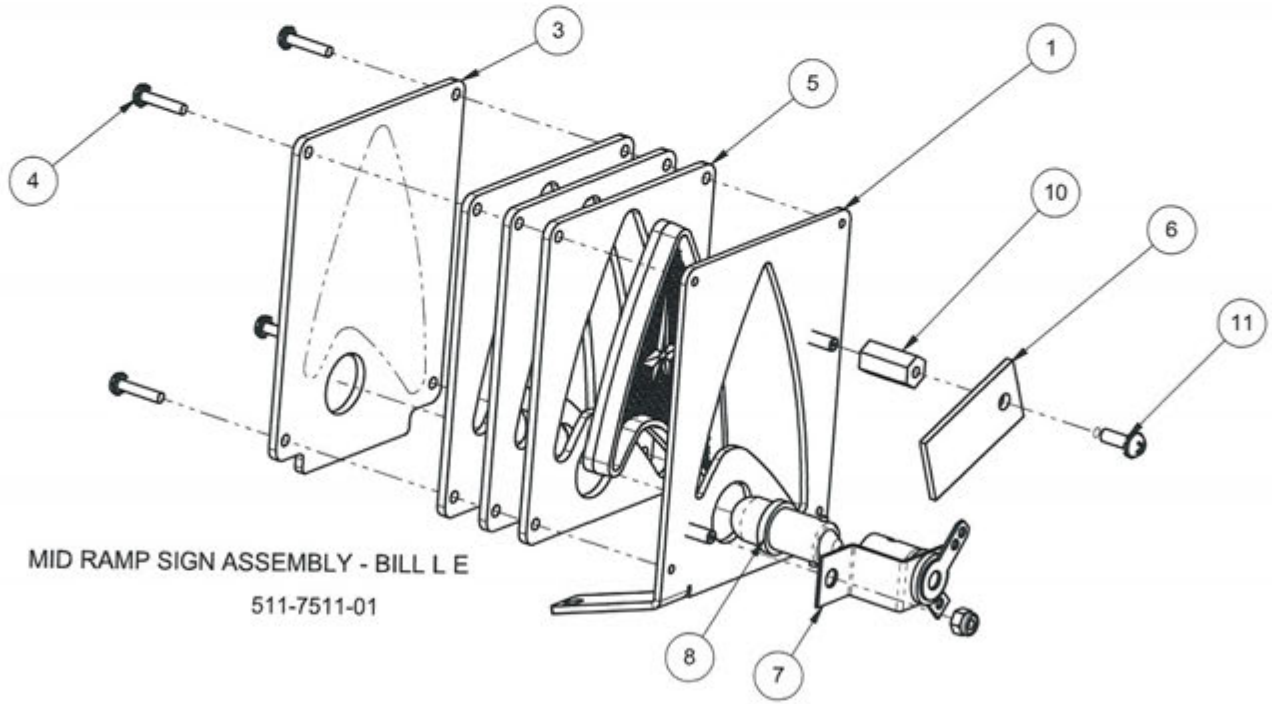
NOTE:
ADD LOCTITE TO ALL FASTENERS ON VENGEANCE

VENGEANCE SOLENOID ASSEMBLY-LE

511-7520-01

B30

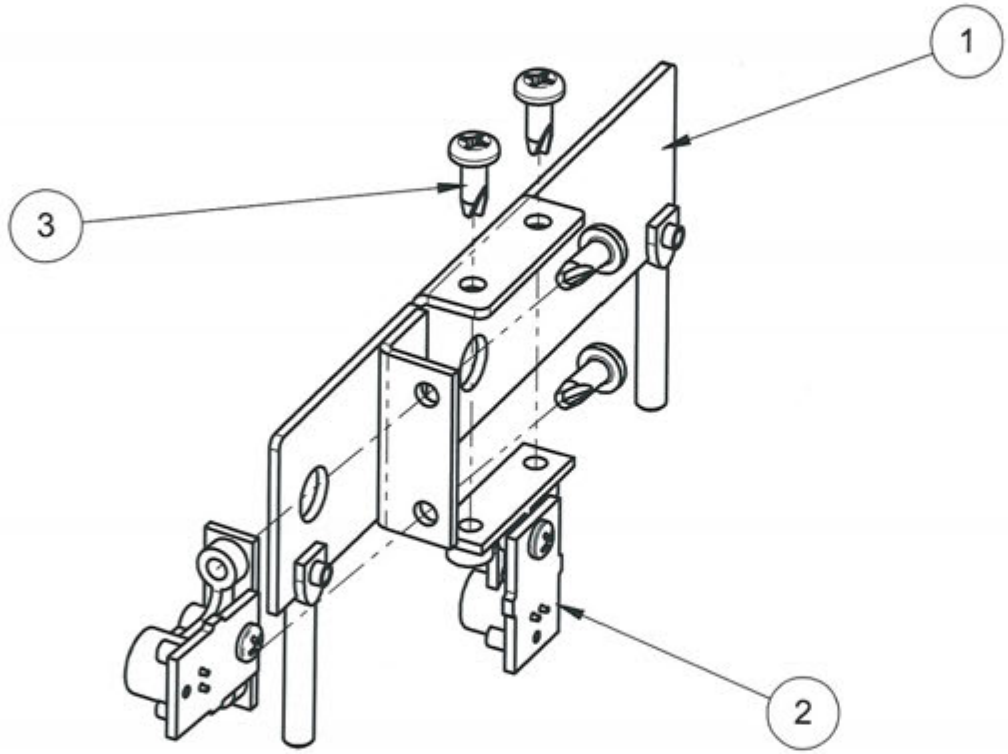
ITEM #	QTY	PART #	DESCRIPTION
1	1	535-0799-00	BRACKET - MID RAMP SIGN
2	1	550-5101-00	INSERT-STAR TREK BADGE
3	1	830-6929-42	ARTED BUTY # 42 - MID RAMP SIGN COVER - BILL L E
4	4	237-5872-01	SCREW, 2-56 X 7/16" PPH SEMS
5	3	830-6929-43	CLEAR BUTY # 43 - MIDRAMP SIGN COVER BILL L E
6	1	520-5333-00	PCB - TRI-COLOR LED
7	1	077-5002-00	SOCKET - SHORT STAND-UP 2-LUG
8	1	112-5034-02	DOUBLE LED, BAYONET BASE - RED
10	1	254-5083-01	HEX SPACER - FEMALE/FEMALE - 4-40
9	1	240-5303-00	4-40 NYLON LOCK NUT
NOT SHN	1	036-5548-02	GENERIC LAMP CABLE
NOT SHN	1	036-5605-08-E4	TRICOLOR LED CABLE
11	1	237-5882-00	SCREW, #4-40 X 5/16 PRH SEMS



MID RAMP SIGN ASSEMBLY - BILL L E

511-7511-01

ITEM #	QTY	PART #	DESCRIPTION
1	1	535-0681-06	BALL GUIDE # 6 - BILL
2	2	500-6775-01	OPTO TRANSCEIVER ASSY, 15" LEADS
3	4	237-5880-00	SCREW, #6 X 3/8 PPH T-25

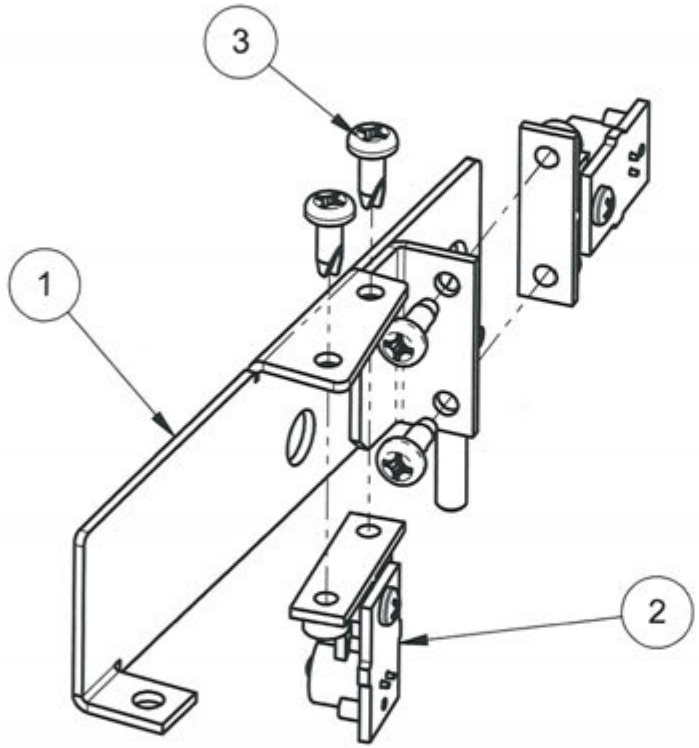


BALL GUIDE ASSEMBLY # 6 - BILL

511-7492-06

B32

ITEM #	QTY	PART #	DESCRIPTION
1	1	535-0681-07	BALL GUIDE # 7 - BILL
2	2	500-6775-01	OPTO TRANSCEIVER ASSY, 15" LEADS
3	4	237-5880-00	SCREW, #6 X 3/8 PPH T-25

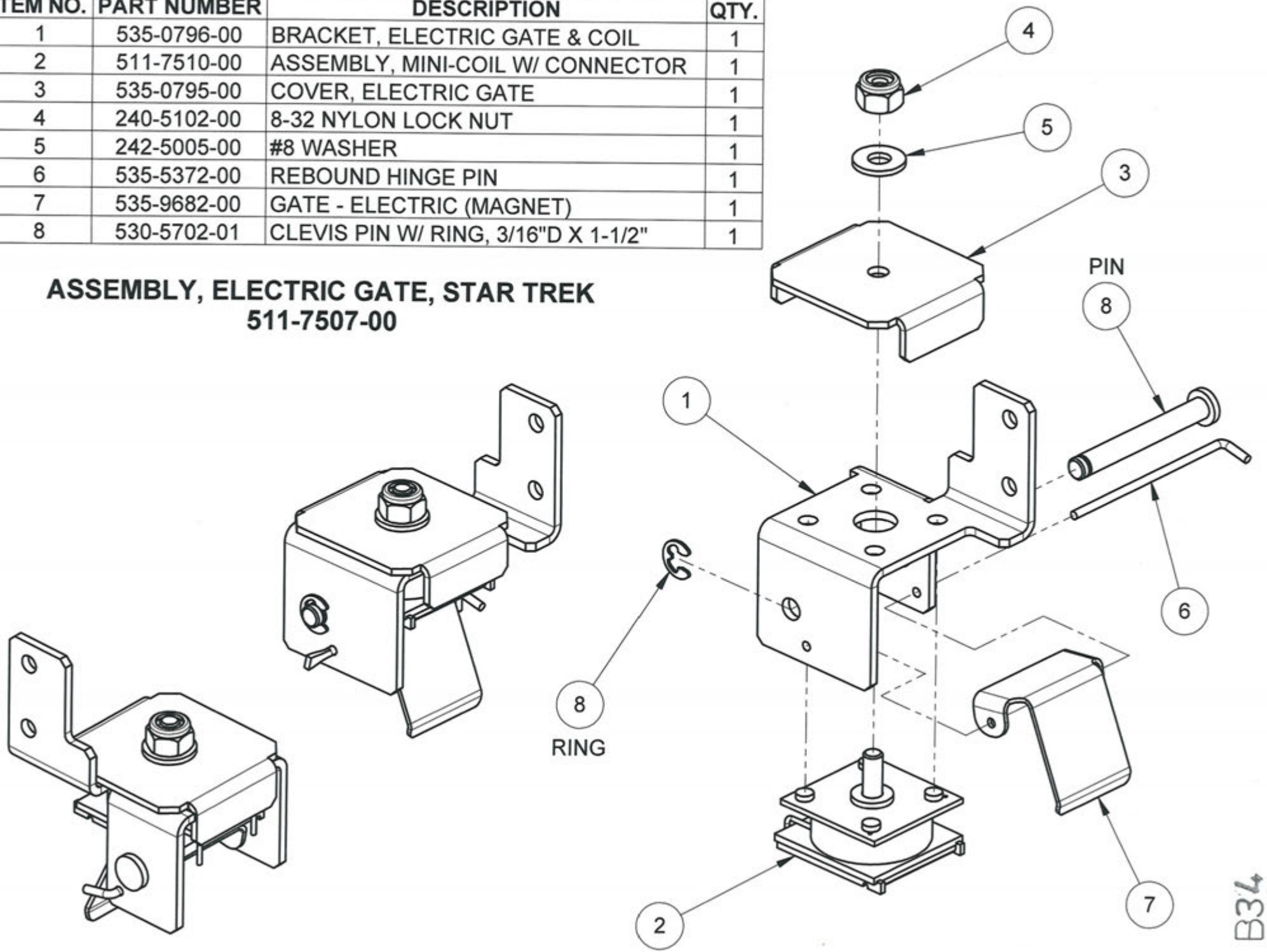


BALL GUIDE ASSEMBLY # 7 - BILL

511-7492-07

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	535-0796-00	BRACKET, ELECTRIC GATE & COIL	1
2	511-7510-00	ASSEMBLY, MINI-COIL W/ CONNECTOR	1
3	535-0795-00	COVER, ELECTRIC GATE	1
4	240-5102-00	8-32 NYLON LOCK NUT	1
5	242-5005-00	#8 WASHER	1
6	535-5372-00	REBOUND HINGE PIN	1
7	535-9682-00	GATE - ELECTRIC (MAGNET)	1
8	530-5702-01	CLEVIS PIN W/ RING, 3/16"D X 1-1/2"	1

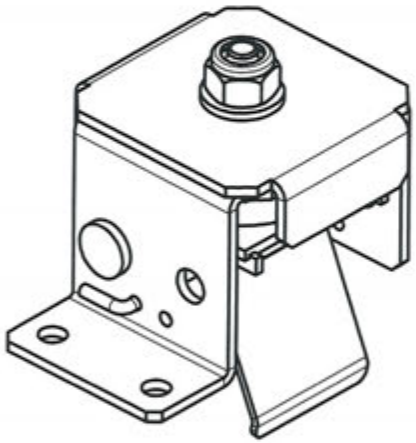
ASSEMBLY, ELECTRIC GATE, STAR TREK
511-7507-00



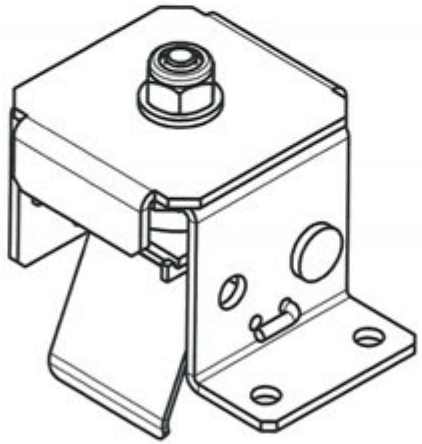
B34

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	535-9847-00	BRACKET, ELEC GATE, RAIL MOUNT	1
2	511-7510-00	ASSEMBLY, MINI-COIL W/ CONNECTOR	1
3	535-0795-00	COVER, ELECTRIC GATE	1
4	242-5005-00	#8 WASHER	1
5	240-5102-00	8-32 NYLON LOCK NUT	1
6	535-5372-00	REBOUND HINGE PIN	1
7	535-9682-00	GATE - ELECTRIC (MAGNET)	1
8	530-5702-01	CLEVIS PIN W/ RING, 3/16"D X 1-1/2"	1

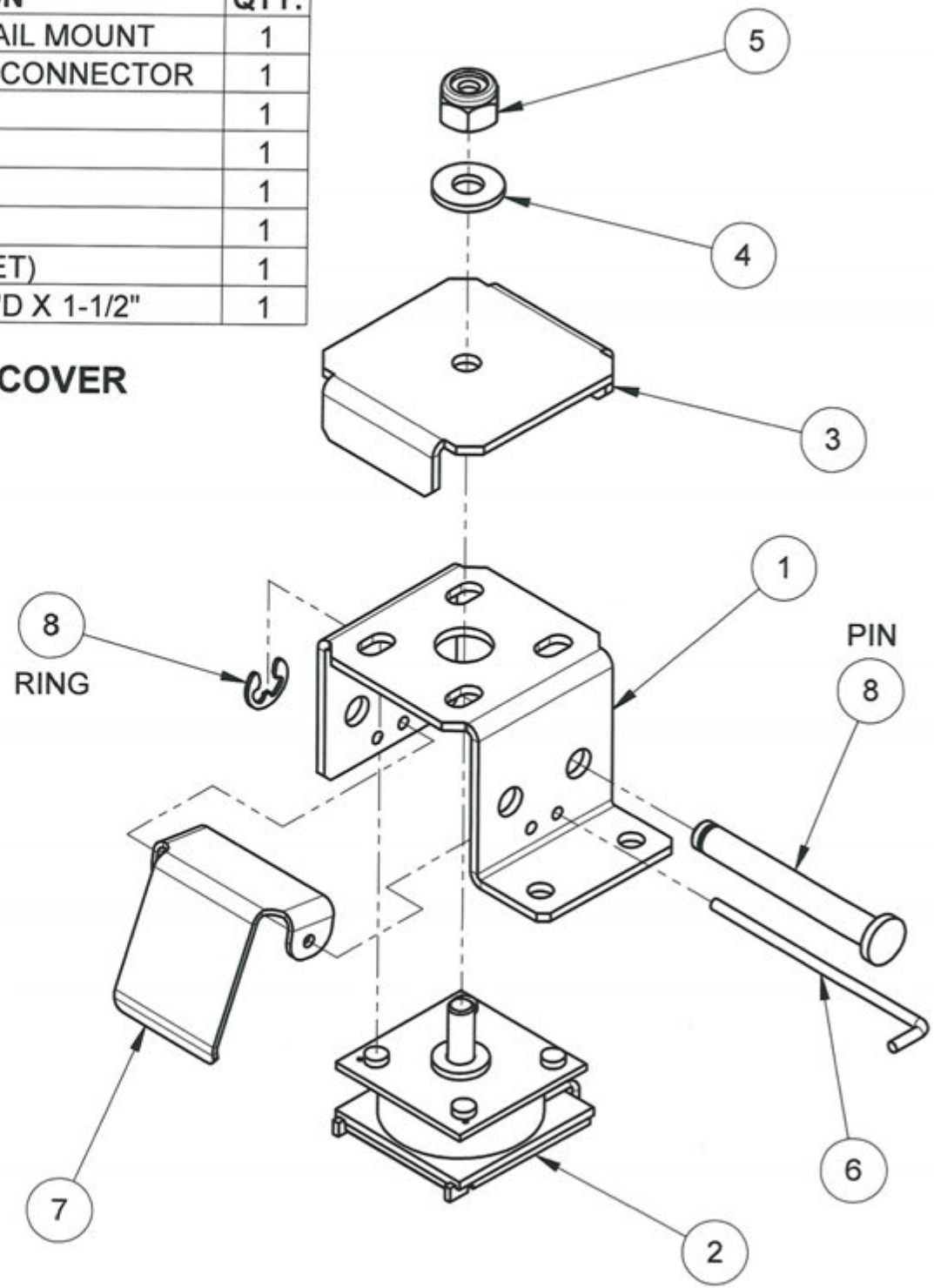
ASSEMBLY, ELECTRIC GATE, SMALL COVER
511-7506-00/-01

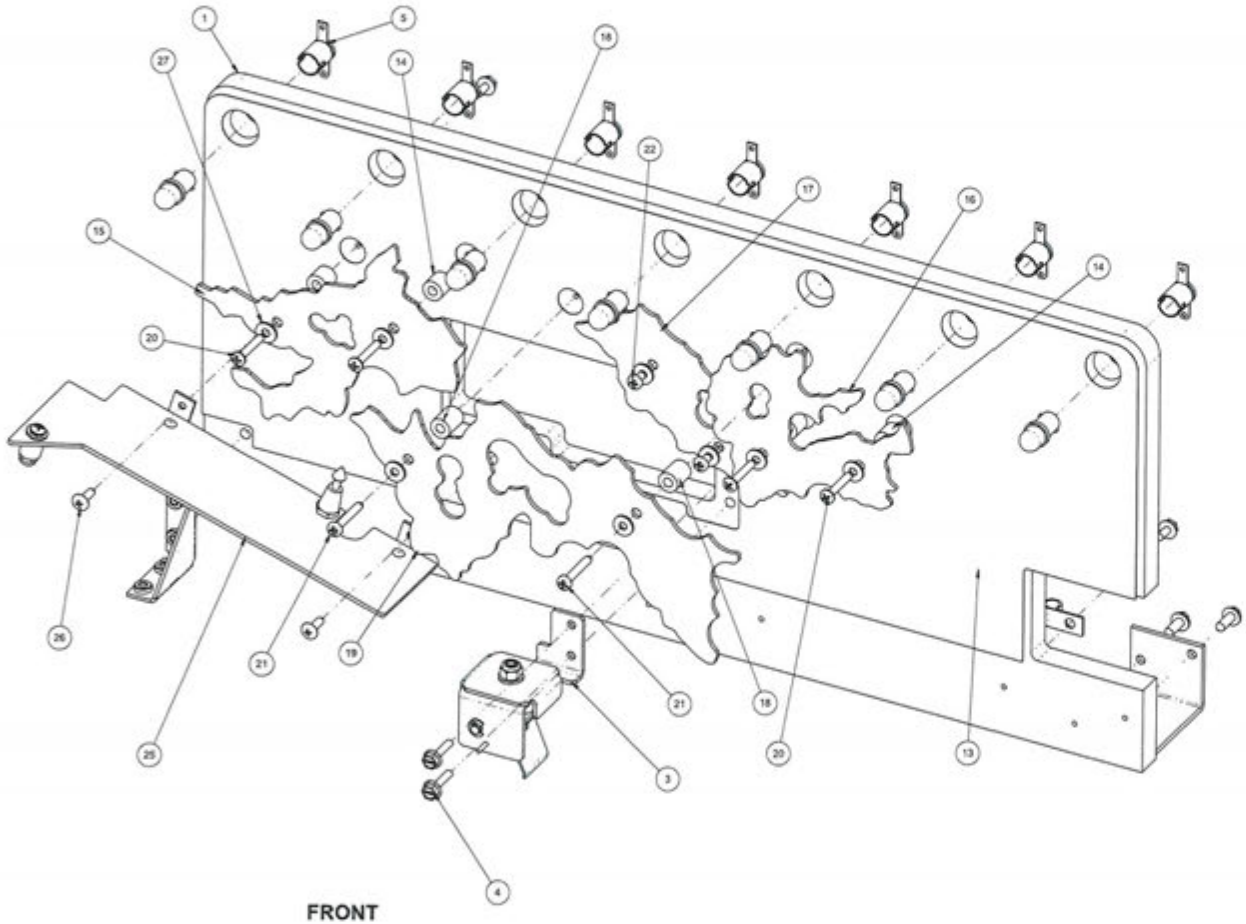


511-7506-01



511-7506-00

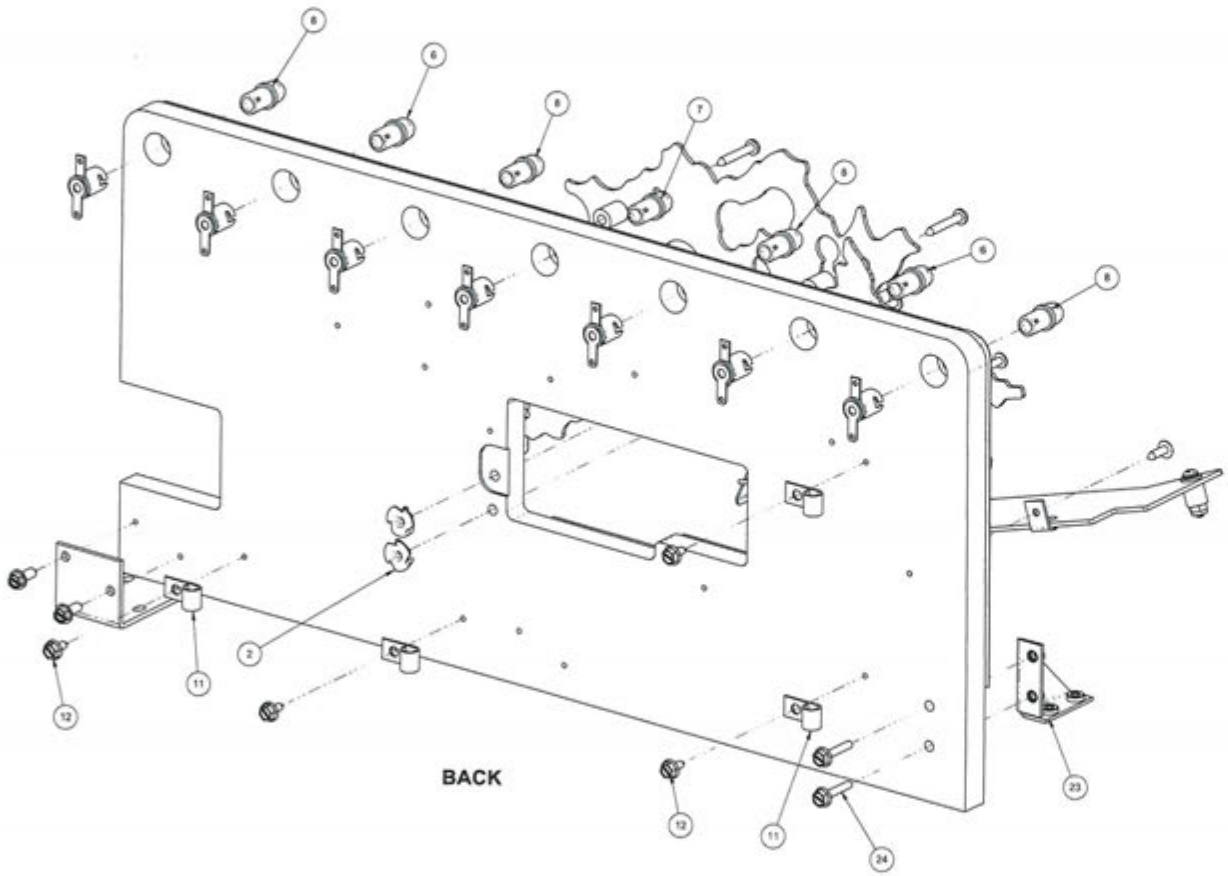




ITEM #	QTY.	PART #	DESCRIPTION
1	1	525-5830-01	BACK PANEL - BILL PRO
2	2	240-5002-00	6-32 T-NUT
3	1	511-7507-00	ASSEMBLY, ELECTRIC GATE, BILL
4	2	237-5976-04	SCREW, 6-32 X 5/8" HWH SWAGE
5	7	077-5000-00	SOCKET - STAPLED - 2 LUGS
6	2	112-5034-05	DOUBLE LED, BAYONET BASE - RED
7	1	112-5034-02	DOUBLE LED, BAYONET BASE - RED
8	4	112-5034-08	DOUBLE LED, BAYONET BASE - CLEAR
9	1	535-8964-00	BRACKET - BACK PANEL SUPPORT
10	2	234-5101-00	SCREW, #8 X 1/2" SLT HWH AB ZINC
11	4	040-5000-03	1/4" CABLE CLAMP
12	4	234-5000-00	SCREW, #6 X 3/8" HWH
13	1	820-7016-108	DECAL - BACK PANEL - BILL
14	4	254-5000-12	NYLON SPACER - BLACK - 3/8 OD X .175 ID X 3/8"
15	1	830-6931-67	BUTY # 67 - NEBULA - LEFT
16	1	830-6931-65	BUTY # 65 - NEBULA - RIGHT
17	1	830-6931-66	BUTY # 66 - NEBULA - CENTER LOW
18	2	254-5000-01	NYLON SPACER - BLACK - 3/8 OD X .175 ID X 1/2"
19	1	830-6931-64	BUTY # 64 - NEBULA - CENTER UP
20	4	237-5003-00	SCREW, #6 X 7/8" PPH
21	2	232-5004-00	SCREW, #6 X 1 PPH AB ZINC
22	2	232-5000-00	SCREW, #6 X 3/8 PPH AB ZINC
23	1	535-0587-00	BACK PANEL BRACE
24	2	237-5975-02	8-32 X 3/4 HWH SWAGE
25	1	511-7493-48	BUTY ASSEMBLY # 48 - BILL L E
26	2	237-5809-00	SCREW, #6 X 1/2" PTH A
27	8	242-5001-00	#6 WASHER
NOT SHN	14	631-5000-00	STAPLE - 5/16
NOT SHN	3'	600-5003-00	BRAIDED WIRE - 20 GA.
NOT SHN	1	036-5605-04-E4	CABLE - BACK PANEL - BILL PRO

BACK PANEL ASSEMBLY - BILL L E

500-7275-00



ITEM #	QTY	PART #	DESCRIPTION
1	1	525-5830-01	BACK PANEL - BILL PRO
2	2	240-5002-00	6-32 T-NUT
3	1	511-7507-00	ASSEMBLY, ELECTRIC GATE, BILL
4	2	237-5978-04	SCREW, 6-32 X 5/8" HWH SWAGE
5	7	077-5000-00	SOCKET - STAPLED - 2 LUGS
6	2	112-5034-05	DOUBLE LED, BAYONET BASE - RED
7	1	112-5034-02	DOUBLE LED, BAYONET BASE - RED
8	4	112-5034-08	DOUBLE LED, BAYONET BASE - CLEAR
9	1	535-8964-00	BRACKET - BACK PANEL SUPPORT
10	2	234-5101-00	SCREW, #8 X 1/2" SLT HWH AB ZINC
11	4	040-5000-03	1/4" CABLE CLAMP
12	4	234-5000-00	SCREW, #6 X 3/8" HWH
13	1	820-7016-108	DECAL - BACK PANEL - BILL
14	4	254-5000-12	NYLON SPACER - BLACK - 3/8 OD X .175 ID X 3/8"
15	1	830-6931-67	BUTY # 67 - NEBULA - LEFT
16	1	830-6931-65	BUTY # 65 - NEBULA - RIGHT
17	1	830-6931-66	BUTY # 66 - NEBULA - CENTER LOW
18	2	254-5000-01	NYLON SPACER - BLACK - 3/8 OD X .175 ID X 1/2"
19	1	830-6931-64	BUTY # 64 - NEBULA - CENTER UP
20	4	237-5003-00	SCREW, #6 X 7/8" PPH
21	2	232-5004-00	SCREW, #6 X 1 PPH AB ZINC
22	2	232-5000-00	SCREW, #6 X 3/8 PPH AB ZINC
23	1	535-0587-00	RACK PANEL BRACE
24	2	237-5975-02	8-32 X 3/4 HWH SWAGE
25	1	511-7493-48	BUTY ASSEMBLY # 48 - BILL L E
26	2	237-5809-00	SCREW, #6 X 1/2" PTH A
27	8	242-5001-00	#6 WASHER
NOT SHN	14	631-5000-00	STAPLE - 5/16
NOT SHN	3'	600-5003-00	BRAIDED WIRE - 20 GA.
NOT SHN	1	036-5605-04-E4	CABLE - BACK PANEL - BILL PRO

BACK PANEL ASSEMBLY - BILL L E

500-7275-00

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Optional Kits available through your Distributor:

Pinball Location Maintenance Standard Kit (for STAR TREK LE Pinball).....502-6002-E6

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

Pinball Location Maintenance Deluxe Kit (for STAR TREK LE Pinball)..... 502-6003-E6

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 STAR TREK Pro. Pinball) 803-5000-E4

Plastics Kit includes: Plastic Sets (830-6193-XX,830-6194-XX,830-6931-XX,830-6935-XX)

Plastics*Kit (for STAR TREK LE/PRE.Pinball).....803-5000-E6

Plastics Kit includes: Plastic Sets (830-6194-XX,830-6929-XX,830-6931-XX,830-6935-XX)

Decals*Kit (for STAR TREK LE,Pre.Pro Pinball) 802-5000-E4

Decals Kit includes: Decal Set (820-7016,820-8025-XX,820-8026-XX,820-8027-XX820-8028-XX,820-8031-XX,) for Pro/Premium/LE

***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.

STAR TREK LE Parts available through your Distributor:

Flipper Button Assy White 500-5026-38

Leg Assy Assy Tiger Drylac Blue.....500-5921-58

Front MoldingTiger Drylac Blue.....515-8646-58

Left Side Armor Tiger Drylac Blue.....535-0678-01-05

Right Side Armor Tiger Drylac Blue.....535-0678-02-05

Pivot Hinge Right Tiger Drylac Blue.....535-7999-58R

Pivot Hinge Left Tiger Drylac Blue.....535-7999-58L

Bottom Arch Steel Gloss Black.....535-0861-01

STAR TREK LE Mirror Backglass.....830-52E6-00

Cabinet & Back-box Decals sold as a complete set.....802-5001-E6
part#820-66E6-01 left back-box,820-66E6-02 right side back-box,820-66E6-03 left side cabinet,820-66E6-04 right side cabinet,820-66E6-05 front cabinet

STAR TREK Premium Parts available through your Distributor:

Flipper Button Assy White.....500-5026-38

Leg Assy Assy CandyRed..... 500-5921-22

Front Molding Candy Red.....515-8646-22

Left Side Armor Candy Red.....535-0862-22

Right Side ARmor Candy Red.....535-0862-23

Pivot Hinge Right Candy Red.....535-7999-23

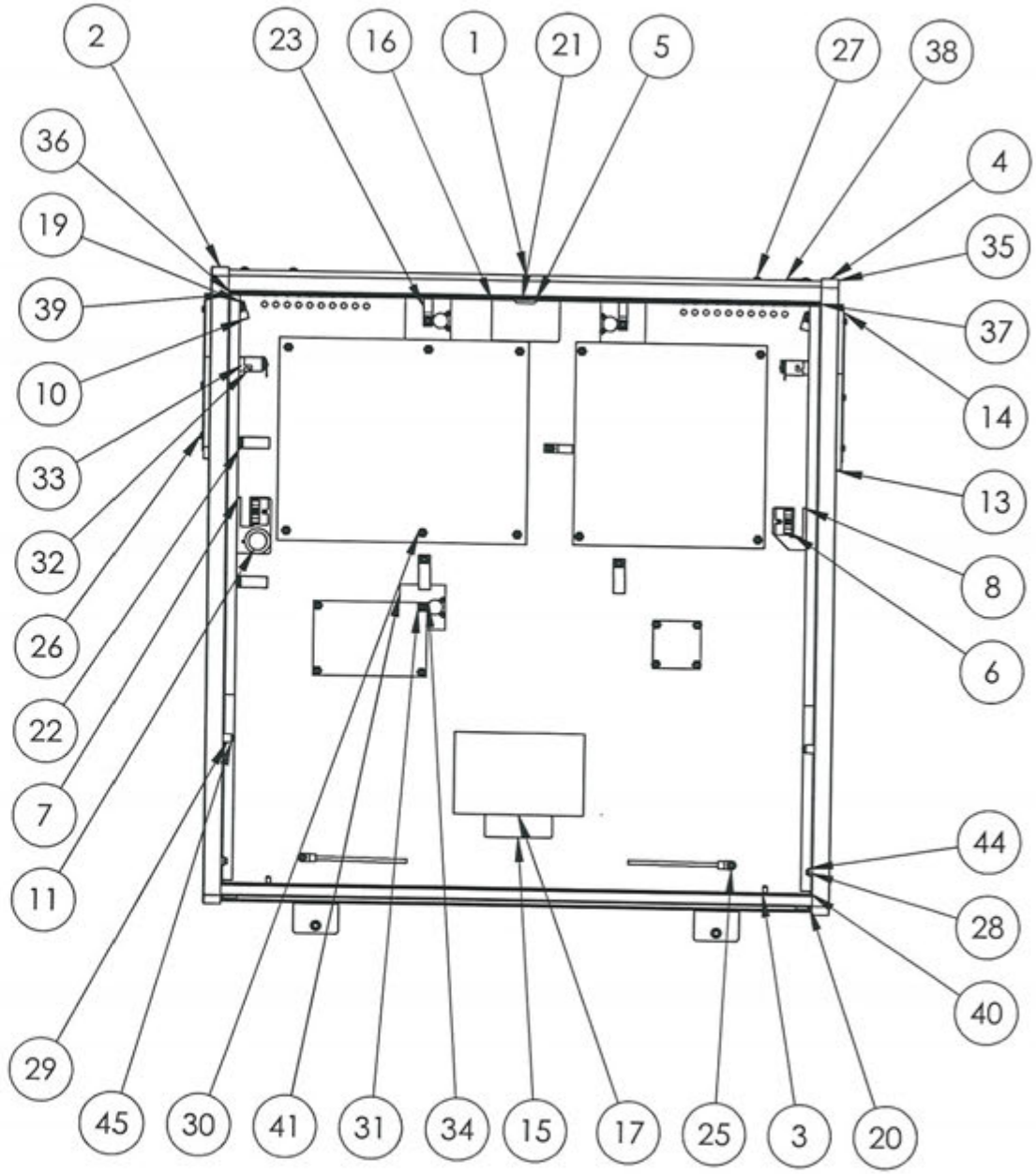
Pivot Hinge Left Candy Red.....535-7999-22

Bottom Arch Candy Red.....545-5995-02

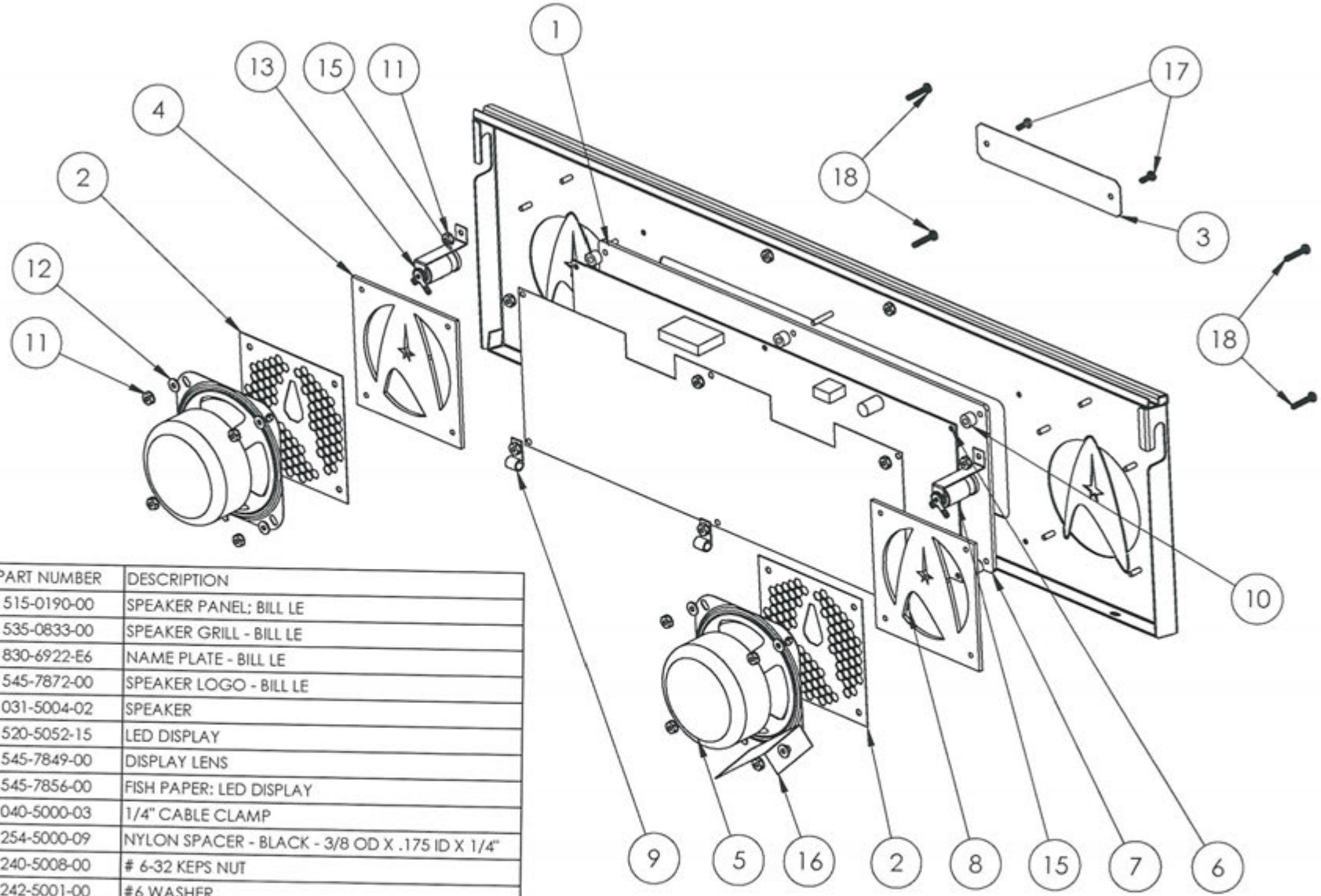
Star Trek PremiumBackglass.....830-52E5-01

Cabinet & Back-box Decals sold as a complete set.....802-5001-E5
Consist of the following parts: 820-66E5-01 left back-box,820-66E5-02 right side back-box,820-66E5-03 left side cabinet,820-66E5-04 right side cabinet,820-66E5-05 front cabinet.

ITEM	QTY.	PART NUMBER	DESCRIPTION
1	1	515-9695-00	BACK, BACK BOX
2	1	525-5831-03-17	SIDE PANEL-LEFT, LE BACK BOX
3	1	515-9694-00	BOTTOM BRKT; BACK BOX
4	1	525-5831-04-17	SIDE PANEL, RIGHT, BILL LE
5	1	355-6158-00	LOCK BB BLACK, Short
6	2	077-5214-01	FLUORESCENT BULB SOCKET - ROHS COMPLIANT
7	1	535-7739-00	FLUOR. LIGHT MTG BRKT, LEFT
8	1	535-7739-01	FLUOR. LIGHT MTG BRKT, RIGHT
9	2	254-5080-00	SPACER, #8-1/4"
10	2	040-5000-23	WIRE CLAMP, 1/4" CLOSED TAB
11	1	165-5011-01	STARTER: FLUORESCENT
12	2	535-0828-00	FLUOR ADAPTOR BRKT
13	2	545-7867-00	LOGO PLATE - BB
14	2	535-0829-00	SHIELD PLATE, BILL BB
15	1	820-6082-00	CAUTION HIGH VOLTAGE LABEL
16	1	820-6266-02	CAUTION, BALLAST LABEL
17	1	820-6384-00	BACKBOX FUSE LABEL
18	1	010-5015-00	BALLAST CU452-W
19	20	240-5104-00	8-32 KEPS NUT
20	17	232-5301-00	SCREW, 8-32 X 3/8" PPH SEMS
21	1	237-5805-00	SCREW, #6 X 1/2" PPH AB B/O
22	4	040-5000-09	WIRE CLIP, 1" OPEN TAB
23	3	040-5000-06	1/2" CABLE CLAMP
24	4	237-5602-00	SCREW, 8-32 X 1/2 PPH MS, ZINC
25	2	040-5005-00	CABLE TIE - SCREW ON
26	6	237-6307-20	#6-32 TORX STAINLESS STEEL SCREW
27	8	232-5301-01	# 8-32 X 3/8" PPH MS SEMS SCREW - BLACK
28	12	254-5000-19	NYLON SPACER - BLACK - 3/8 OD X .175 ID X 1/8"
29	2	254-5000-12	NYLON SPACER - BLACK - 3/8 OD X .175 ID X 3/8"
30	28	240-5102-00	8-32 NYLON LOCK NUT
31	3	077-5106-00	2-LUG STAND-UP REV. MOUNT SHORT SOCKET
32	2	077-5102-00	STAND-UP SOCKET, #89 - LONG
33	2	113-5034-05	LAMP - #89; BLUE LED
34	3	113-5034-08	LAMP - #89; WHITE LED
35	2	820-66E6-XX	DECAL: BILL LE BB SIDE
36	1	535-0834-00	REAR GLASS CHANNEL: BILL LE
37	1	535-0835-00	GLASS CHANNEL FRONT, BILL LE
38	1	545-7876-00	7/8" HOLE PLUG, PLASTIC, BLACK
39	2	545-7878-01	"L" EXTRUSION
40	2	545-7878-02	"L" EXTRUSION
41	3	545-0745-00	FISH PAPER: BULB MOUNT
42	6	240-5008-00	# 6-32 KEPS NUT
43	6	242-5001-00	#6 WASHER
44	14	234-5001-02	SCREW, #6 X 1/2" HWH
45	2	237-6010-00	#8-32 X 3/4" HWH MS
46	8	234-5101-00	SCREW, #8 X 1/2" SLT HWH AB ZINC
47	1	500-9824-01	SPEAKER PANEL - BILL LE
48	1	520-5337-01	I/O BOARD
49	1	520-5352-01	CPU BOARD
50	1	520-5326-01	DRIVER BOARD 12 TRANS NO SINKS
51	1	520-5351-00	PCB SAM COM BRIDGE



500-9823.03
BACK BOX ASSEMBLY
STAR TREK LE



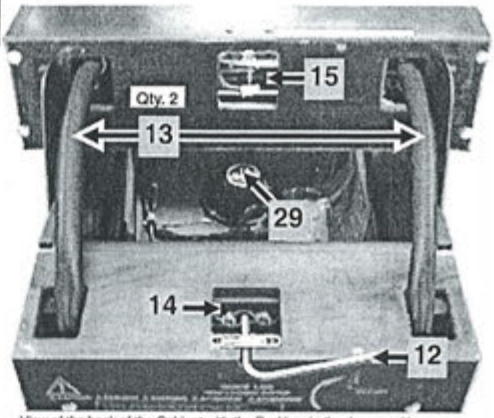
ITEM	QTY.	PART NUMBER	DESCRIPTION
1	1	515-0190-00	SPEAKER PANEL; BILL LE
2	2	535-0833-00	SPEAKER GRILL - BILL LE
3	1	830-6922-E6	NAME PLATE - BILL LE
4	2	545-7872-00	SPEAKER LOGO - BILL LE
5	2	031-5004-02	SPEAKER
6	1	520-5052-15	LED DISPLAY
7	1	545-7849-00	DISPLAY LENS
8	1	545-7856-00	FISH PAPER: LED DISPLAY
9	3	040-5000-03	1/4" CABLE CLAMP
10	6	254-5000-09	NYLON SPACER - BLACK - 3/8 OD X .175 ID X 1/4"
11	18	240-5008-00	# 6-32 KEPS NUT
12	8	242-5001-00	#6 WASHER
13	2	077-5102-00	STAND-UP SOCKET, #89 - LONG
14	1	600-5006-12	GND CABLE - 12" LONG
15	2	113-5034-05	LAMP - #89: BLUE LED
16	1	545-7877-00	FISCHE PAPER
17	2	237-6307-06	#6-32 TORX STAINLESS STEEL SCREW
18	4	237-6307-12	#6-32 TORX STAINLESS STEEL SCREW
19	1	036-5260-33	14 PIN RIBBON
20	1	036-5452-02	2 SPKR IN SERIES
21	1	036-5520-00	LED DISPLAY 5V
22	1	036-5605-14-E6	LE SPEAKER FLASH LAMP

500-9824-01
SPEAKER PANEL

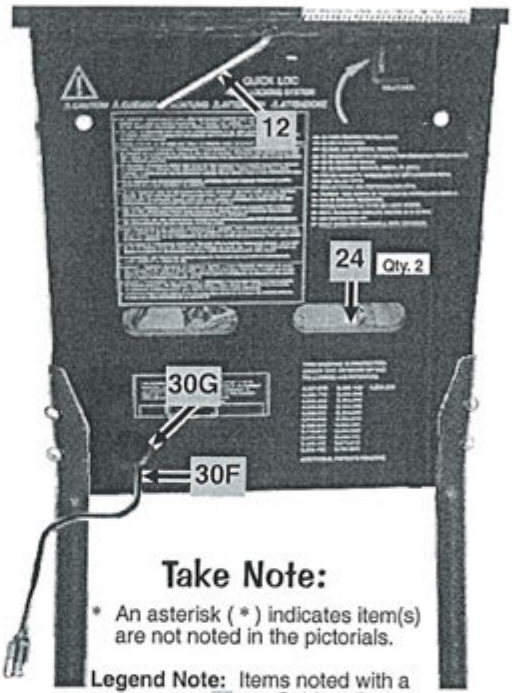
Cabinet - Parts ■ & Switches □

For Backbox Parts see the previous two pages.





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



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

30D

Qty. 4

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

View of the Coin Door (item 17) open.

Take Note:

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

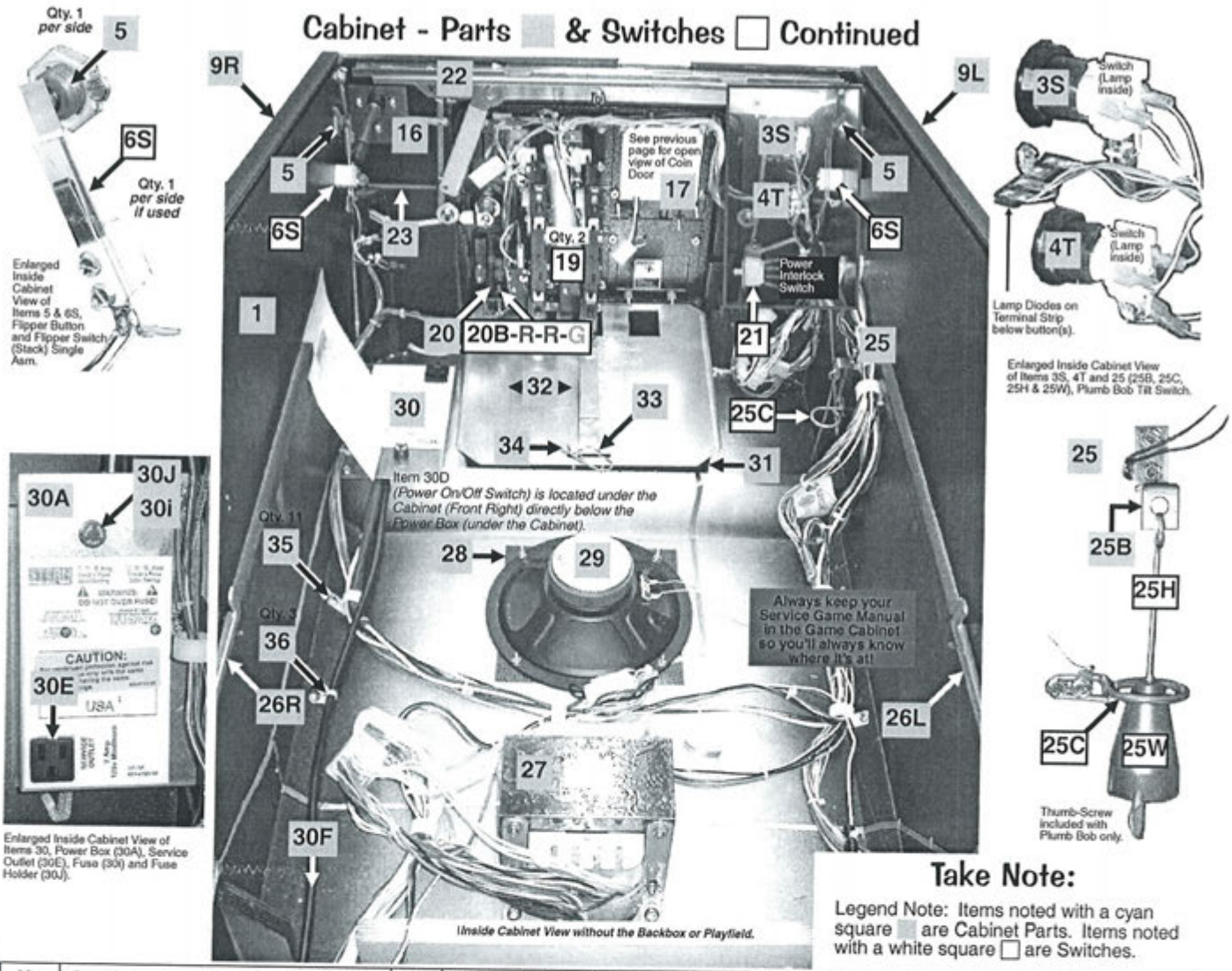
Legend Note: Items noted with a cyan square ■ are Cabinet Parts. Items noted with a white square □ are Switches.

Parts Identification

Nr.	CAB. PARTS & SWITCHES	QTY.	SPI PART Nr.
1	Screened Cabinet Star Trek™ (No Parts)		525-5834-00
2	Tiger Drylac Blue Legs with leveler	4	500-5921-58
	Item 2 is secured by: Leg Bolt Back Plate (535-5703-00) and Leg Bolt 3/8" X 16 X 2-1/2" Hex 5/8" Hd. (2/per) (231-5001-01) *Leg Leveler ONLY (3/8"-16 X 3") (500-5017-00).*		
3S	Start Button (Green Round) with Sw. + Lamp	1	500-6388-44-LED
4T	Tournament Button (Yel. Sq.), w/Sw. + Lamp		500-6587-06-TL
	Item 3S & 4T includes the Switch & Lamp (No Wiring; desolder old wiring where required). Switch or Bulb replacement: ↻ TWIST ↺ LOCK (-TL) >> not snap-in << **Assembly** *Parts Included :* Microswitch (180-5174-00); #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.)*		
5	Flipper Button (white) Assy (No Sw.)	2	500-5026-38
	Item 5 is secured by: Pal Nut for Flipper Button (Metal) (Qty. 2/per) (240-5003-01) ***Pal Nut inside cabinet secured by:*** #8 X 1/2" SHWH AB (Zinc) (Qty. 1/per) (234-5101-00) and Washer (Zinc), .187" ID X .875" OD X .048" Thick (Qty. 1/per) (242-5059-00)		
6S	Flipper Switch Single Assembly	1	500-6889-01
	Assembly Parts Included : Flipper Switch Stack Single *(Paliney Contact)* (180-5160-01) and Capacitor - Ceramic .05 Mfd 25 volt (130-5001-00) **Item 6S/6D are secured to Cab. by:** #6 X 1-1/4 SHWH AB (Zinc) (Qty. 2/per) (237-5959-00)		
6D	Flipper Switch Double Assembly	1	500-6890-01
	Assembly Parts Included : Flipper Switch Stack Double *(Paliney Contact)* (180-5164-01) and Capacitor - Ceramic .05 Mfd 25 volt (130-5001-00) **Item 6S/6D are secured to Cab. by:** #6 X 1-1/4 SHWH AB (Zinc) (Qty. 2/per) (237-5959-00)		

Nr.	CAB. PARTS & SWITCHES	QTY.	SPI PART Nr.
7	Rear Glass Channel 20-3/8" Length	1	545-5038-00
8	Plastic Channel 42-5/8" Lg. (Left/Rt.)	2	545-5017-00
9L	Side Armor (Left)	1	535-0678-01
9R	Side Armor (Right)	1	535-0678-02
	Items 9L & 9R are secured @ front & side by: Pem Stud 1/4 X 1" Flange Head Black (Qty. 1/per) (237-6116-01), 1/4-20 Flange Nut (Qty. 1/per) (240-5300-00) and #8 X 1/2" T20 Tamper Proof Black (Qty. 5/per) (237-6173-05); **@ rear (backbox) by:** #10-24 X 1" Sq. Neck Carrg. Bolt Black (Qty. 1/per) (231-5021-00) and #10-24 Hex Nut (Qty. 1/per) (240-5202-00)		
10	Front Molding (Tigar Drylac Blue) < W/Button Hole >	1	515-8646-58
	Item 10 includes: Self-Adhesive Foam Rubber 3/8" X 3/16" X 20-3/8" (3') (626-5001-00) *Items 10 works with Item 22 (next page) ONLY.*		
11	Playfield Glass (Tempered) 21" X 43" X 3/16"	1	660-5001-00
12	Hex Key Allen Wrench 5/16"	1	777-0001-00
13	Corrugated Tubing Black 1"ø X 2.6' Lg.	1	605-5008-03
	Above Item 13 covers the Cable Wiring Harnesses going into the Backbox from the Cabinet.		
14	Roto Lock Male (R2-0055-02)	1	355-5006-01
	Item 14 is secured by: #10-24 X 1-3/4" Carriage Bolt Square Neck (Qty. 2) (231-5022-00), #10-24 Nylon Stop Nut (Qty. 2) (240-5206-00) and #10 Washer, 7/32" ID X 1/2" OD X 1/16" Thick (Qty. 2) (242-5003-00)		
15	Roto Lock Female *(on Backbox)*	*1*	*355-5006-02*
16	Ball Shooter (Plunger) Assembly	1	500-6146-00-07

Cabinet - Parts ▩ & Switches ☐ Continued



Take Note:

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

Nr.	CAB. PARTS & SWITCHES	QTY.	SPI PART Nr.
	◄ *PARTS TABLE & VIEWS CONTINUED FROM THE PREVIOUS PAGE.*		
17	Coin Door 2-Cht $V Up-Stk. 4-Button Bracket	1	501-5018-172
	Item 17 is secured by: 1/4"-20 X 1-1/4" Carriage Bolt Square Neck (Qty. 4) (231-5003-00) 1/4"-20 Flange Nut (Qty. 4) (240-5300-00) **and** Fend Washer 1/4" I.D. X 1" O.D. (Qty. 3) (242-5009-00) ***Note:** For Coin Door other than USA call Technical Support for SPI Part Nr.*		
18	Lock 5/8" Barrel, 3/4, Flt. Cam	1	355-5055-00
19	Coin Door Switch (USA) (Happ)	2	180-5024-01
	ALT. SW.: 19C: Coin Door Switch (USA) (Coin Control) (**180-5024-00**)		
	ALT. SW.: 19J: Coin Door Switch (¥ Japan) (**180-5091-00**)		
20	4-Button Bracket *(for Service Menu Buttons)*	1	535-6860-04
	SWITCH: 20B: Push-Button Service Switch (**Black**) (**180-5192-00**)		
	SWITCH: 20R: Push-Button Service Switch (Red) (Qty. 2) (**180-5192-02**)		
	SWITCH: 20G: Push-Button Service Switch (Green) (**180-5192-04**)		
	***Ordering Note:** Securing hardware for switches included. Decal in kit sold separately.*		
21	Power Interlock-Memory Protect Switch Asm.	1	500-5808-05
	Assembly Parts Included : Mounting Bracket (**535-9794-00**), Power Interlock (Playfield) Switch (**180-5136-00**) **and secured by:** #8 X 1/2" SHWH AB (Zinc) (Qty. 2) (234-5101-00)		
22	Front Molding Lockdown Asm.	1	500-7237-00
	Item 22 is secured by: #10-24 X 1-1/4" Carr. Bolt (Qty. 2) (231-5012-00) **and** #10-24 Keps Nut (Qty. 2) (240-5207-00)		
23	Lockdown Spring *(connected to handle)*	1	265-5008-00
	Item 23 is secured by: #8 X 1/2" SHWH AB (Zinc) (Qty. 1) (234-5101-00) **and** #10 Washer, 7/32" ID X 1/2" OD X 1/16" Thick (Qty. 1) (242-5003-00)		
24	Grills 2-1/2" X 18" *(on Back & Bottom)*	3	545-5072-02
	Plumb Bob Tilt Switch *Indivual Parts Only*		***Ind. Parts Only***
25	**SWITCH:** 25B: Bracket for Hanger Wire (**535-5221-00**)		
	25C: Contact Wire Form (**535-7563-01**)		
	25H: Hanger Wire (**535-5319-02**)		
	25W: Plumb Bob Weight (**535-5029-00**) *(includes Thumb-Screw)*		
	Item 25B is secured to Cabinet by: #6 X 5/8" SHWH AB (Zinc) (Qty. 4) (234-5002-00)		
26L	Slide & Pivot Support Bracket (Left)	1	535-5989-00
26R	Slide & Pivot Support Bracket (Right)	1	535-5990-00
	Items 26L & 26R are secured by: #10-24 X 1-1/4" Carriage Bolt Square Neck Black (3/per) (231-5012-00) **and** #10-24 KEPS Nut (3/per) (240-5207-00)		

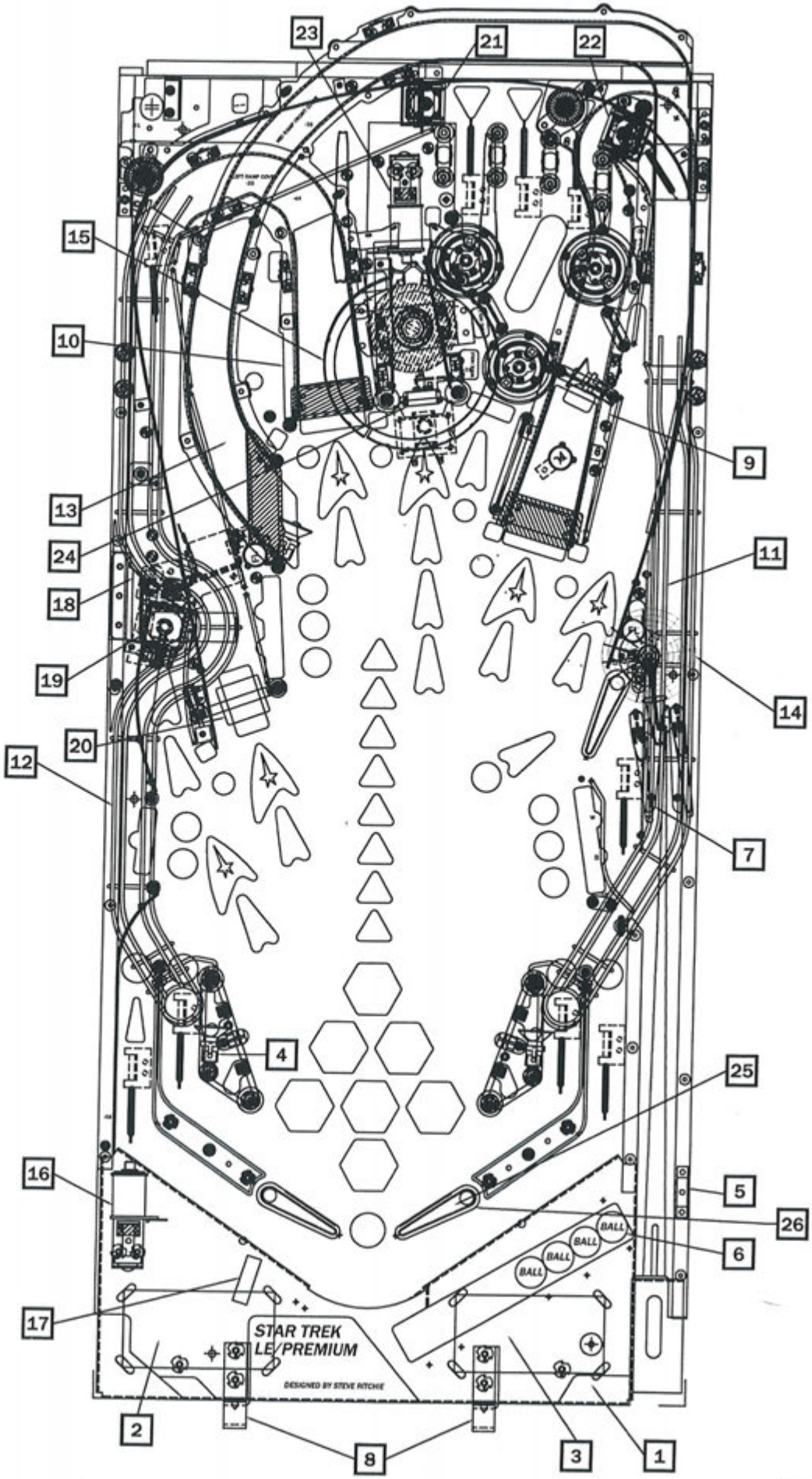
Nr.	CAB. PARTS & SWITCHES	QTY.	SPI PART Nr.
27	Transformer 5.7VAC *(with Ballast Winding)*	1	010-5012-01
	Item 27 is secured by: 1/4"-20 X 5/8" PPH MS (Zinc) (Qty. 4) (237-5854-00) **and** 1/4" Split Lock Washer (Qty. 4) (244-5000-00)		
28	Woofer (Speaker) Grill 7" X 7"	1	545-5072-03
29	Woofer 8" ø Round 8010 4Ω	1	031-5007-01
	Items 28 & 29 are secured by: #6-32 X 1-1/4" Fin Shank Screw (Qty. 4) (237-5883-00) **and** #6-32 Keps Nut (Qty. 4) (240-5008-00)		
30	Power Input Box Asm. + Univ. Cable	1	515-5360-08
	30A: Power Box *(No Parts)* Mounting Frame (**535-5932-00**)		
	30B*: Line Filter (**150-5000-00**)		
	30C*: Varistor* TNR159211KM (Domestic) (**150-5001-00**)		
	or Varistor TRM15G431KM (Euro) (**150-5002-00**)		
	SWITCH: **30D:** On/Off Rocker Switch + Bracket Assembly (**515-7085-00**)		
	30D incl.: Switch, APEM R2101C5NBB (**180-5001-03**) + Bracket (**535-8318-00**)		
	30E: Service Outlet (3-Prong / US) (**180-5008-01**) / International N/A		
	30F: Line Cord 10' ROJ 3* + Ring Terminal Asm. (**515-6566-00**)		
	30G: Recessed (Black) Cup *(rear of Cabinet)* (**545-5122-00**)		
	30H*: Snap Bushing 9/16" (White) (**280-5001-01**)		
	30i: Fuse 8 Amp 250V Slo-Blo (Domestic) (**200-5000-05**)		
	or Fuse 5 Amp 250V Slo-Blo (International) (Qty. 2) (**200-5003-00**)		
	30J: Fuse Holder (**205-5001-00**)		
	***Universal Cable & Jumper Caps** (all voltage variations): See the Yellow Pages, Page y 10.*		
31	Cash Box Plastic Bottom	1	545-5090-00
32	Cash Box Cover (Validator)	1	535-5013-03
33	Cash Box Lock Bracket (U-Wire)	1	535-7562-00
	Item 33 is secured by: #8 X 5/8" HWH AB (Green) (Qty. 2) (234-5102-04)		
34	Large Hair-Pin Clip	1	535-7772-00
35	Clamps [Multiple Sizes]	36	040-5000-XX
	Item 35 is secured to Item 1 by: #8 X 1/2" SHWH AB (Zinc) (Qty. 1/per) (234-5101-00)		
	For following sizes, replace -XX with: 3/4" Single = -08 (Qty. 9); 1-1/2" Single = -10 (Qty. 3)		
36	Zip Cable Tie (Screw Down Style)	6	040-5005-00
	Item 36 is secured by: #8 X 1/2" SHWH AB (Zinc) (Qty. 1/per) (234-5101-00)		
37†	Meter +12VDC *with Bracket Optional*		*opt.* G-0053-013-102
	*† Meters (Diode included) are optional and were not included in this Pinball Machine. Order without the bracket use **G-0053-013-102A**. More information or Qs? Call Technical Support.*		

Parts Identification

Main Playfield Top Parts

PART NAME	QTY	PART NUMBER
P/F Playfield Screened w/Inserts & No Parts	1	830-5100-E6
P/F Playfield Complete w/Inserts & All Parts	1	505-6004-E6
1. Metal Arch Assy.	1	535-0861-01
2. Instruction Card	1	755-5134-12-Y
3. Coin Card	1	755-5420-12-Y
4. Chrome Lamp Reflector	3	545-5409-01
5. Bubble level Assy.	1	516-0036-00
6. Pinball, Steel 1-1/16"	4	260-5000-00
7. Shooter Lane Ramp	1	535-8145-00
8. Playfield Hanger Brackets	2	535-8385-00
9. Right Plastic Ramp	1	545-7833-00
10. Left Plastic Ramp	1	545-7832-00
11. Right Wire Ramp	1	515-0181-00
12. Left Wire Ramp	1	515-0182-00
13. Warp Plastic Ramp	1	545-7835-00
14. Molded Enterprise Toy Assy.	1	500-9830-00
15. Molded Vengeance Toy Assy.	1	500-9828-00
16. Ball Saver Kickback Assy.	1	500-6697-01-ND
17. Star Field Laser Assy.	1	511-7512-00
18. Slinger Scoop	1	511-7525-00
19. Rotating Deflector	1	500-6867-02
20. Spinning Target Assy.	1	500-7079-00
21. Left Electric Gate	1	511-7507-00
22. Right Electric Gate	1	511-7506-01
23. Vengeance Kickback	1	500-6697-03-ND
24. Resettable Memory Drop Target Assy.	1	500-7282-02-01
25. Flipper Bat White	3	515-5133-08-06
26. Black Flipper Rubber	3	545-5277-00

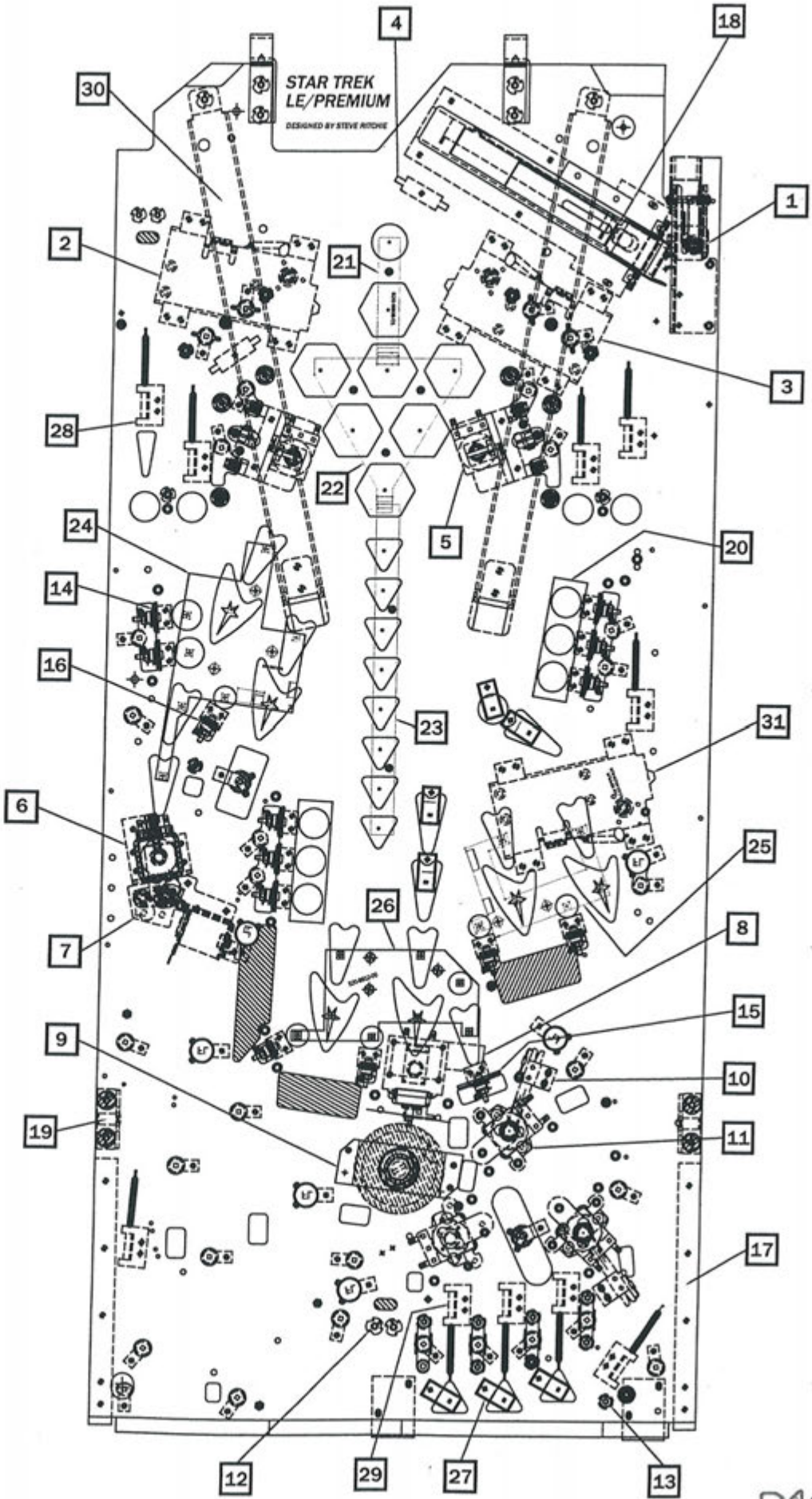
Playfield Top Parts



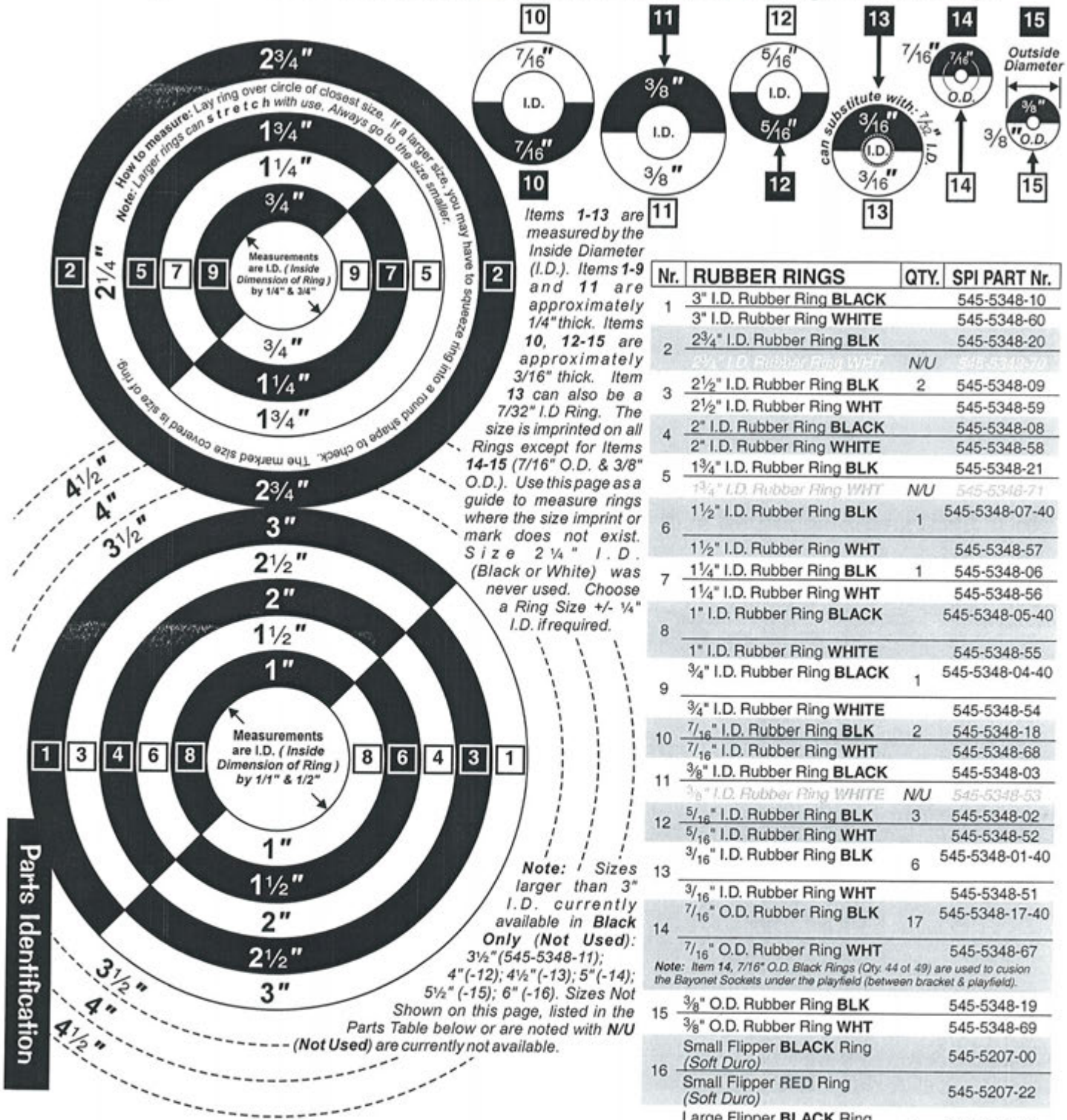
Main Playfield Bottom Parts

PART NAME	QTY	PART NUMBER
1. New Unitized Autoplunger	1	500-9819-00
2. Flipper Assembly (Left)	1	500-6543-12-ND
3. Flipper Assembly (Right)	2	500-6543-02-ND
4. Fuse Holder Clip Socket	3	516-0031-00
5. Slingshot Assembly	2	500-5849-01-ND
6. VUK Assembly	1	500-6867-02-E6
7. Rotating Deflector Assembly	1	500-6867-02
8. Drop Target, Resettable & Memory	1	500-9826-01
9. Vengeance Magnet Assembly	1	516-0018-00
10. Pop Bumper Switch Assembly	3	515-6459-09
11. Pop Bumper Bottom Assembly	1	515-6459-04-ND
12. 8-32 T-Nut	20	240-5101-00
13. 6-32 T-Nut	35	240-5002-00
14. Stand Up Target Assembly 1" Square	8	500-5232-XX
15. Stand Up Target Assembly 1-½" Rectangular	1	500-7282-02-01
16. Stand Up Target Assembly ½" Rectangular	5	500-6985-XX
17. Edge Slide Bracket	2	535-5988-01
18. 4 Ball Trough Assembly	1	500-6318-24-ND
19. Pivot Slide Bracket Assembly	2	500-5329-03
20. LED Lamp PCB, 3 Bank Stand Up Targets	2	520-6813-00
21. LED Lamp PCB, 2 Position	1	520-6808-01
22. LED Lamp PCB, Hex Inserts	1	520-6808-00
23. LED Lamp PCB, 8 Position Strip	1	520-6808-02
24. LED Lamp PCB, Lower Left	1	520-6811-00
25. LED Lamp PCB, Lower Right	1	520-6812-01
26. LED Lamp PCB, Upper Center	1	520-6812-00
27. LED Lamp PCB, Tricolor	12	520-5333-00
28. Rollover Switch Assembly, Left	3	500-6227-03
29. Rollover Switch Assembly, Right	7	500-6227-04
30. Playfield Support Slide Bracket	2	535-6862-05
31. Flipper Assembly (Upper Right)	1	500-6543-22-ND

Playfield Bottom Parts



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) was 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**		545-5348-10
	3" I.D. Rubber Ring **WHITE**		545-5348-60
2	2 3/4" I.D. Rubber Ring **BLK**		545-5348-20
	2 3/4" I.D. Rubber Ring **WHT**	N/U	545-5348-70
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**		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**	1	545-5348-07-40
	1 1/2" I.D. Rubber Ring **WHT**		545-5348-57
7	1 1/4" I.D. Rubber Ring **BLK**	1	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**	1	545-5348-04-40
	3/4" I.D. Rubber Ring **WHITE**		545-5348-54
10	7/16" I.D. Rubber Ring **BLK**	2	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**	3	545-5348-02
	5/16" I.D. Rubber Ring **WHT**		545-5348-52
13	3/16" I.D. Rubber Ring **BLK**	6	545-5348-01-40
	3/16" I.D. Rubber Ring **WHT**		545-5348-51
14	7/16" O.D. Rubber Ring **BLK**	17	545-5348-17-40
	7/16" O.D. Rubber Ring **WHT**		545-5348-67
	Note: Item 14, 7/16" O.D. Black Rings (Qty. 44 of 49) are used to cusion the Bayonet Sockets under the playfield (between bracket & playfield).		
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
17	Large Flipper **YELLOW** Ring *(50 Duro) (use -06 40 Duro)*		545-5277-04
	Large Flipper **WHITE** Ring *(50 Duro)*		545-5277-08
	Large Flipper **RED** Ring *(Soft Duro)*		545-5277-22

Take Note:

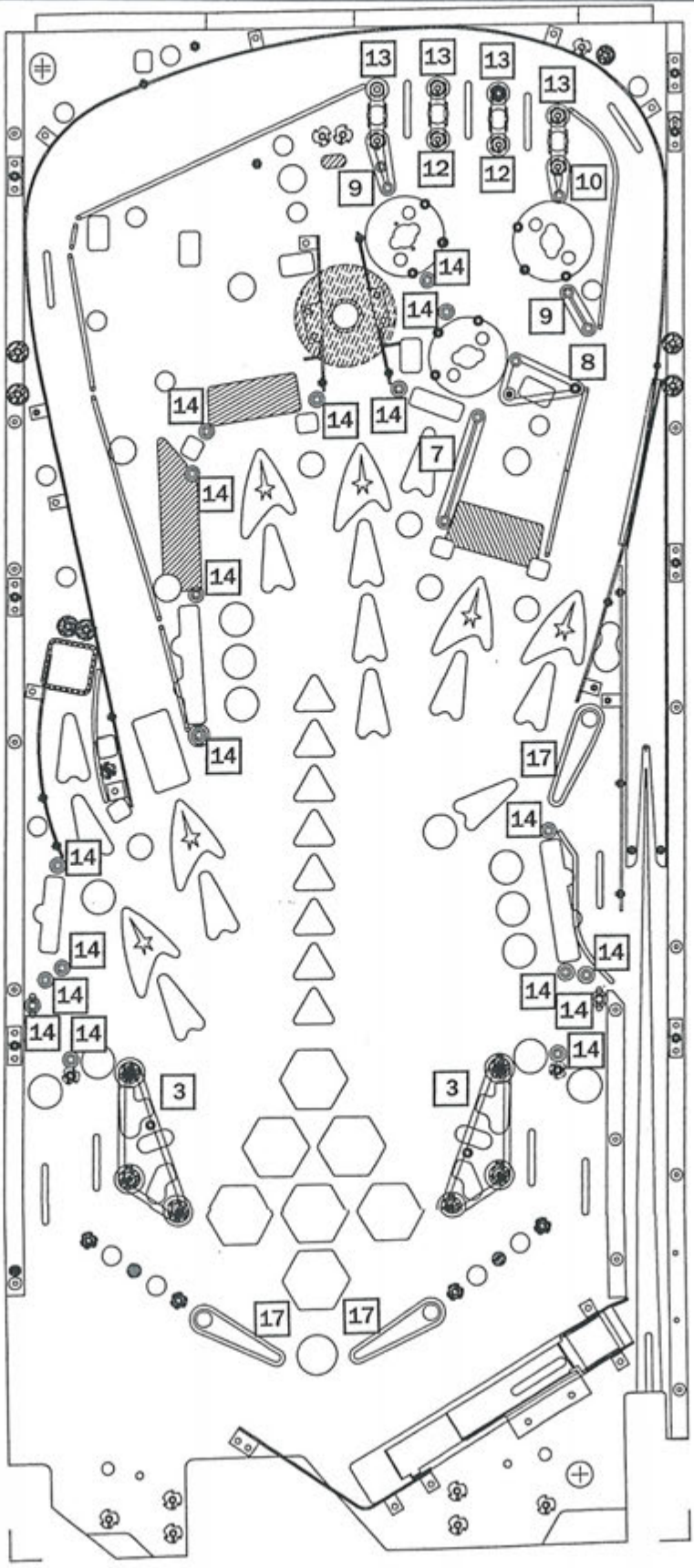
For Blue Rubber Pads, see the next page and/or the Blue Pages for the assembly the pads are found on for the part number.

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

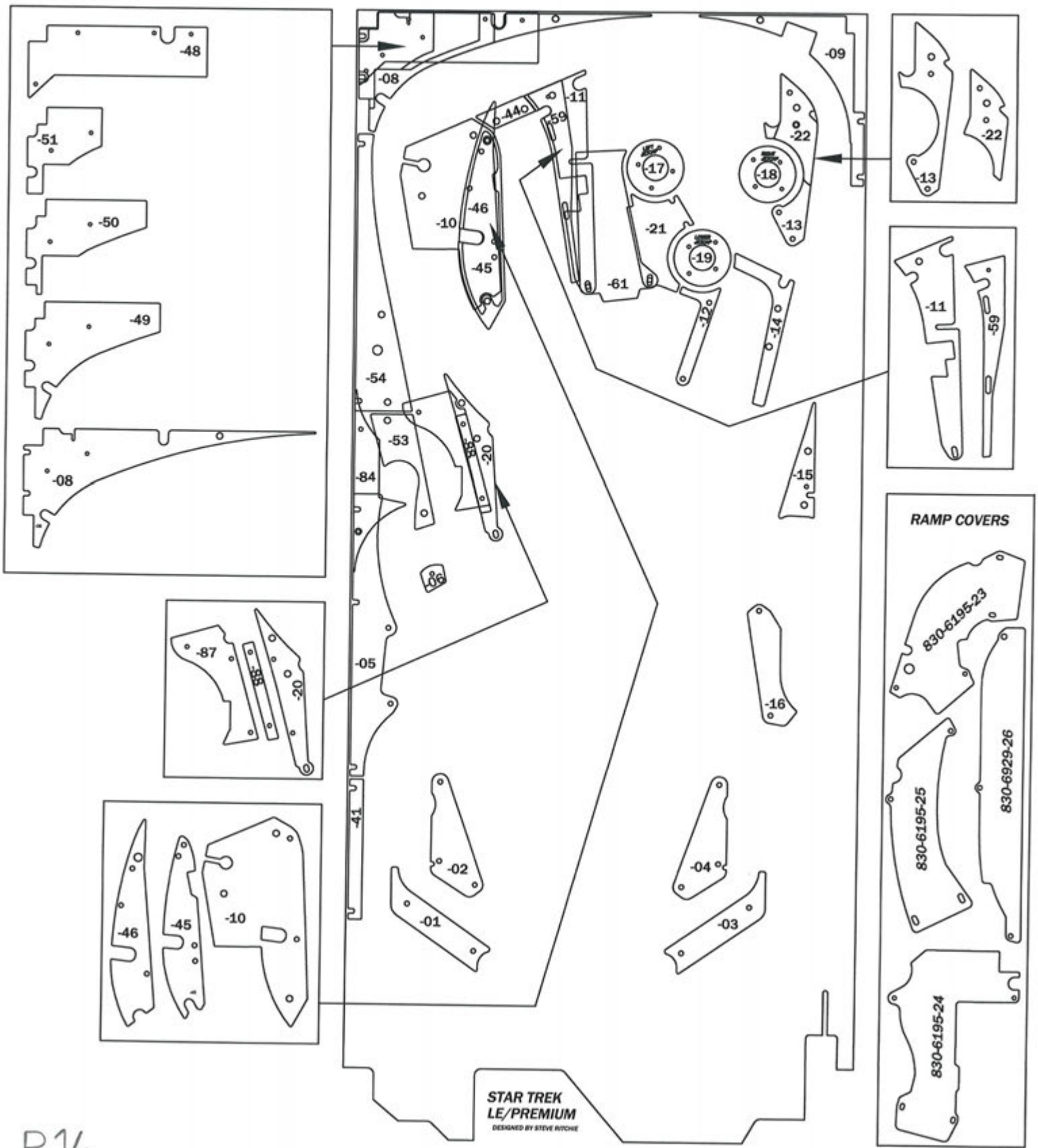
Parts Identification

Playfield Rubber Parts



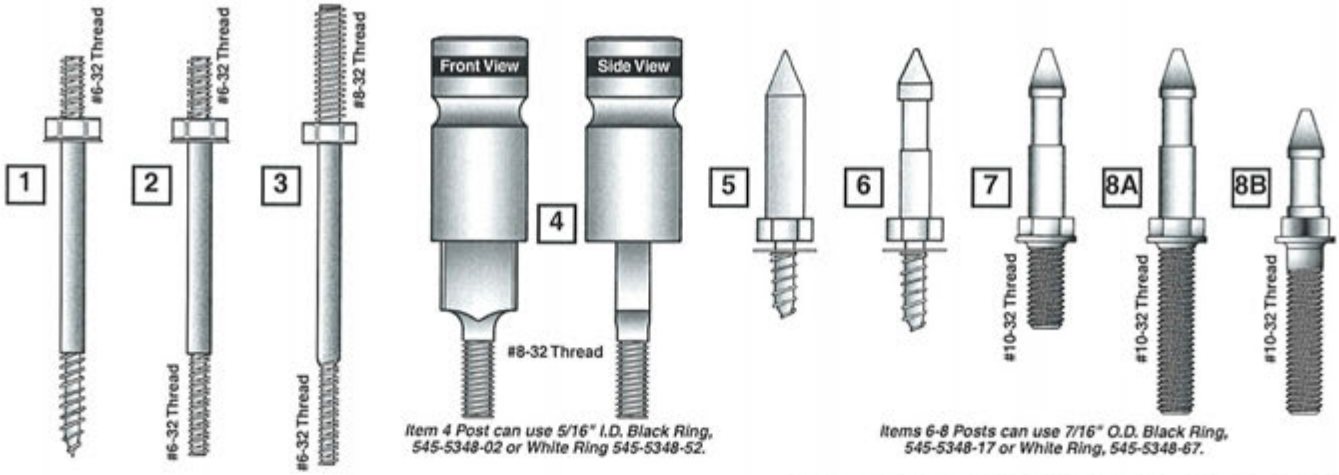
PLAYFIELD PLASTICS MAP

830-6929-XX



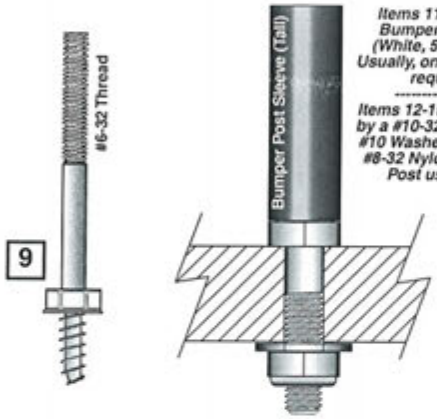
P14

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 (Tall), 545-5308-00 (White, 545-5308-08 or Red, 545-5308-22) Usually, only Posts which are in the ball path require a Bumper Post Sleeve.

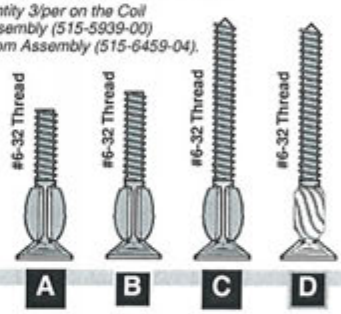
Items 12-15 & 18 Posts are typically secured by a #10-32 Nylon Stop Nut, 240-5203-00 and #10 Washer, 242-5010-00 (Item 11 Post use a #8-32 Nylon Stop Nut, 240-5102-00; Item 16 Post use a #8-32 T-Nut, 240-5101-00).

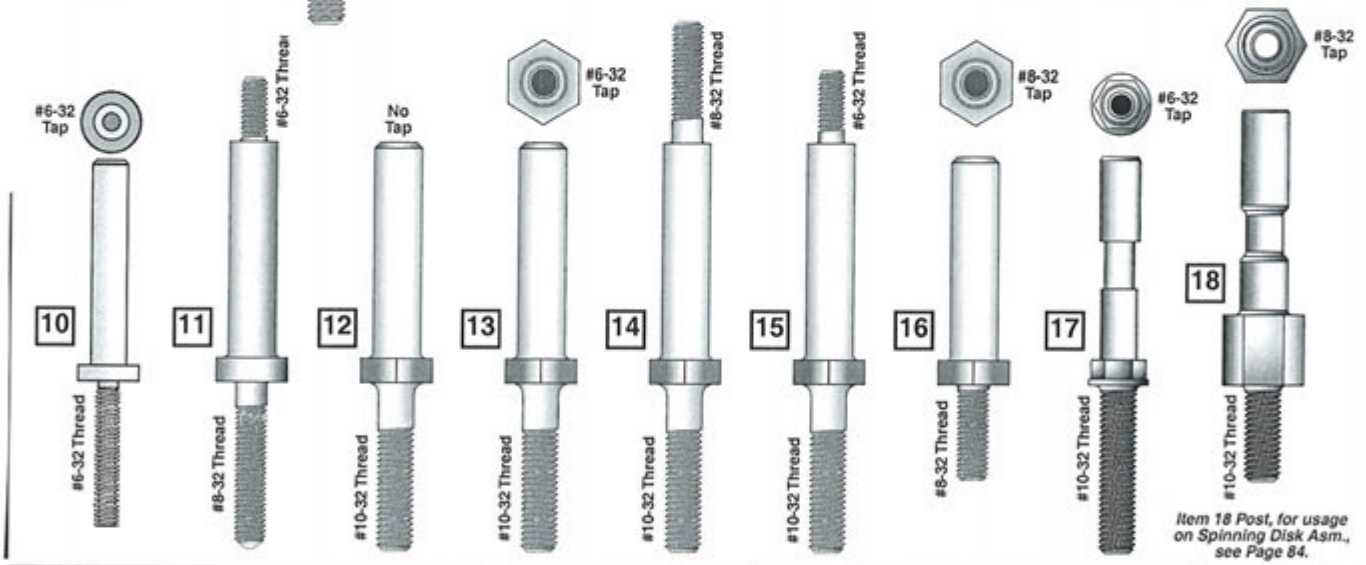
A & B *Items A & B Note: Typically used to secure Hex Spacers onto the Playfield Wood or Back Panel.*

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

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

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





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

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

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

Nr.	FIN SHANK SCREWS	SPI PART Nr.
A	#6-32 X 3/4" Fin Shank Screw	237-5921-02
B	#6-32 X 7/8" Fin Shank Screw	237-5921-04
C	#6-32 X 1¼" Fin Shank Screw	237-5883-00
D	#6-32 X 1 3/16" Spiral Fin Shank Screw	237-5957-00

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

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

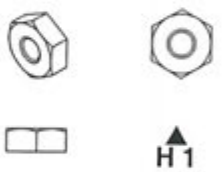
Nr.	NYLON STOP NUTS*	SPI PART Nr.
N1	#6-32 Nylon Stop Nut	240-5005-00
N2	#6-32 N.S. Nut *(with 1/4" Hex Body)*	240-5010-00
N3	#8-32 Nylon Stop Nut	240-5102-00
N4	#10-32 Nylon Stop Nut	240-5203-00
N5	#10-24 Nylon Stop Nut	240-5206-00
	Item N5 used with #10-24 X 1-3/4" Carriage Bolt Square Neck Black (231-5022-00) located in the Cabinet for the Roto Lock (Male) (355-5006-01).	
N6	#4-40 Nylon Stop Nut	240-5303-00
N7	#4-40 *(18/8 Stainless)* Nylon Stop Nut	240-5303-01
N8	5/16"-18 Nylon Stop Nut	240-5316-00



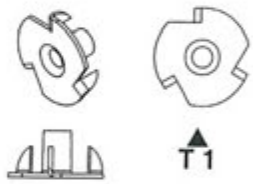
Nr.	KEPS NUTS*	SPI PART Nr.
K1	#6-32 Keps Nut *(with Star Washer)*	240-5008-00
K2	#6-32 Keps Nut *(with 1/4" Hex Body)*	240-5011-00
K3	#8-32 Keps Nut	240-5104-00
K4	#10-32 Keps Nut	240-5208-00
K5	#10-24 Keps Nut	240-5207-00
K6	#4-40 Keps Nut	240-5318-00



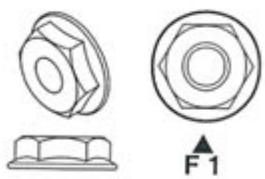
Nr.	HEX NUTS*	SPI PART Nr.
H1	#6-32 Hex Nut *(No Star Washer)*	240-5004-00
H2	#8-32 Hex Nut	240-5103-00
H3	#10-32 Hex Nut	240-5201-00
H4	#10-24 Hex Nut	240-5202-00
	Item H4 used with #10-24 X 1" Carriage Bolt Square Neck Black (231-5021-00) located in the Cabinet for the Side Armor Rear (towards Backbox).	
H5	#10-32 X 3/8" Hex Nut	240-5209-00
H6	3/4-16 Hex Nut	240-5315-00
H7	#2-56 Hex Nut	240-5301-00
H8	7/8"-14 Hex Nut	240-5317-00



Nr.	T-NUTS*	SPI PART Nr.
T1	#6-32 T-Nut	240-5002-00
T2	#6-32 T-Nut *(with Side Cut Off)*	240-5002-01
T3	#8-32 T-Nut	240-5101-00
T4	#10-32 *(Black Oxide)* T-Nut	240-5007-00
T5	#10-32 T-Nut *(with Side Cut Off)*	240-5205-00
T6	#10-32 X 5/16" 3-Prong T-Nut	240-5204-00
T7	#10-24 T-Nut	240-5200-00



Nr.	FLANGE NUT*	SPI PART Nr.
F1	1/4" X 20 Flange Nut	240-5300-00
	Item F1 used with 1/4-20 X 1-1/4 Sq. Neck Carriage Bolt Black (231-5003-00) located in the Cabinet for the Side Armor (Front) and Pivot Hinges.	



Nr.	PAL NUTS*	SPI PART Nr.
P1	Plastic Pal Nut *(on Flipper Buttons)*	240-5003-00
P2	Metal Pal Nut *(on Flipper Buttons)*	240-5003-01

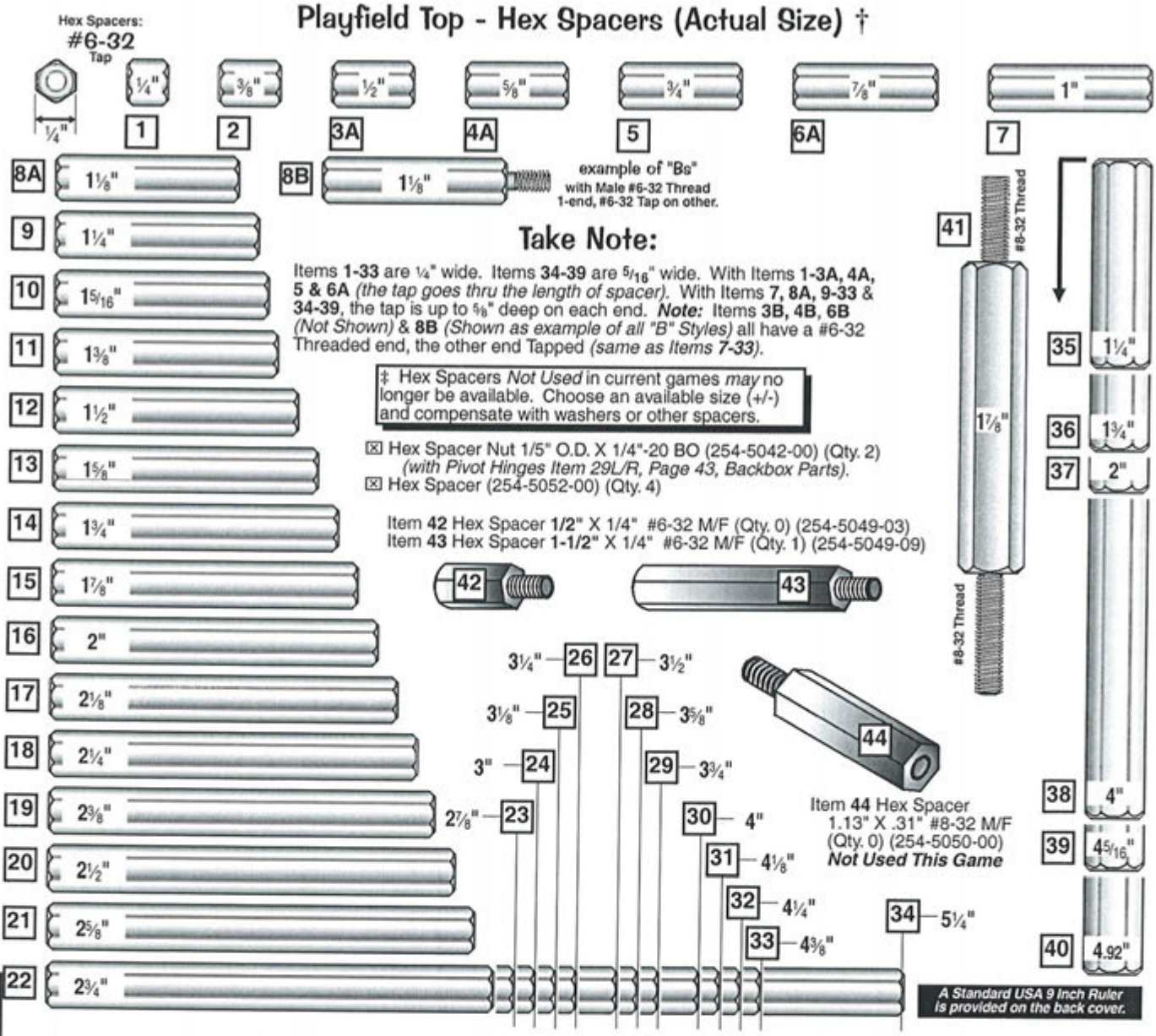
* *Not Shown*

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

* *Not Shown*

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

Playfield Top - Hex Spacers (Actual Size) †



Take Note:

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

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

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

Item **42** Hex Spacer **1/2"** X 1/4" #6-32 M/F (Qty. 0) (254-5049-03)
Item **43** Hex Spacer **1-1/2"** X 1/4" #6-32 M/F (Qty. **1**) (254-5049-09)

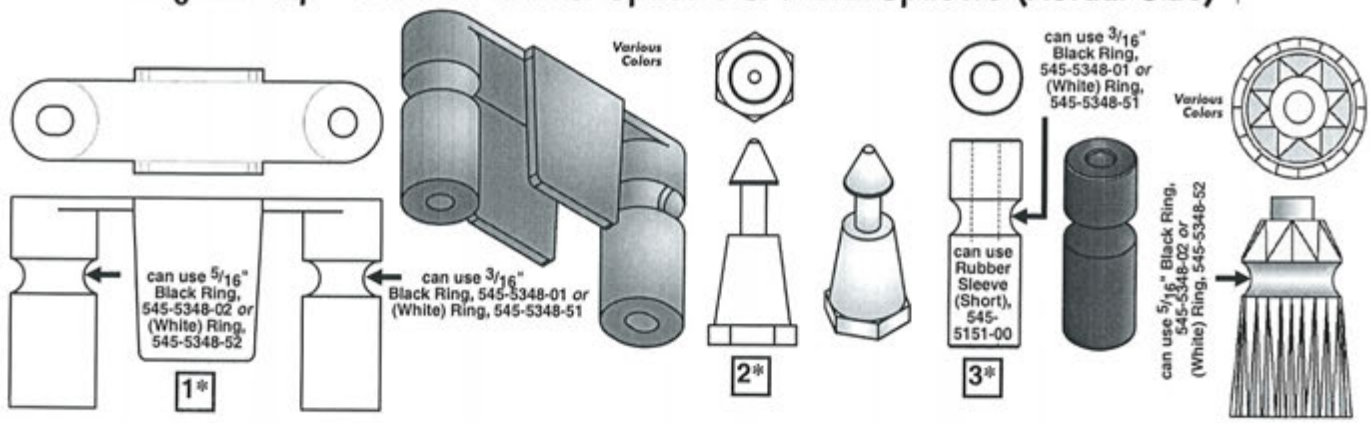
Item **44** Hex Spacer 1.13" X .31" #8-32 M/F (Qty. 0) (254-5050-00) ***Not Used This Game***

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

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

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.

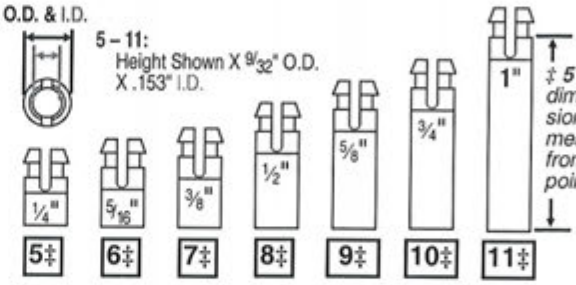
Playfield Top - Plastic Posts & Spacers & Metal Spacers (Actual Size) †



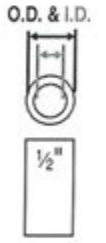
PLASTIC PART COLOR CHART

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		

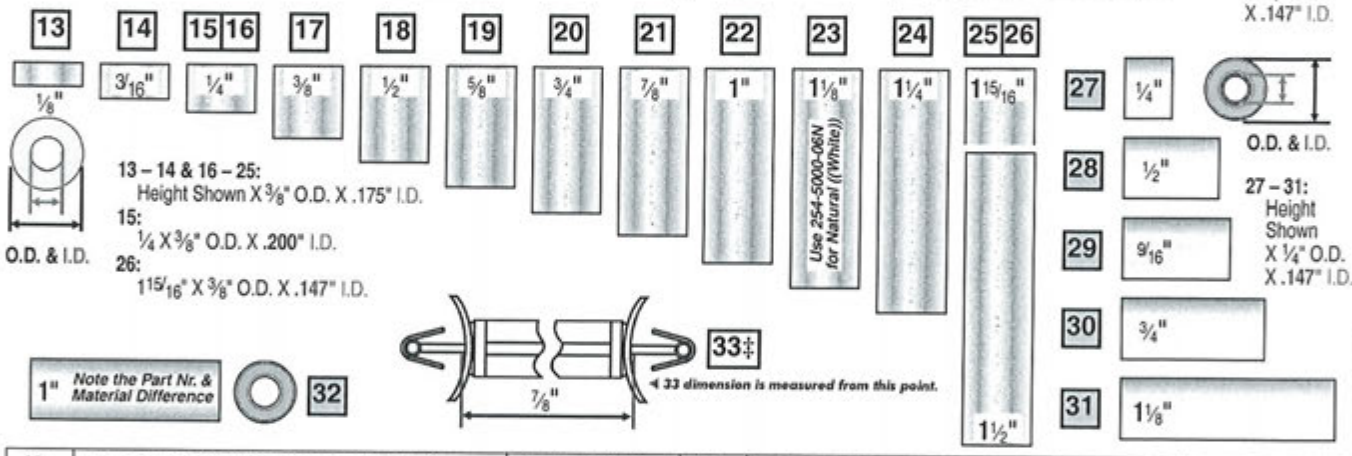
* Items **1 & 5** come in various colors. *The "**-XX**" (the last 2-Digits in the Part Number)*, should be replaced with the desired 2-Digit number from the above Color Chart *(may not be available in every color; other colors used in prior games may no longer be available.) Call for availability.*



‡ *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**.*



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



Nr.	PLASTIC POSTS & SPACERS	SPI PART Nr.
1**	Top Lane Plastic Mini-Lite Hood (XX-Color)	550-5061-XX
2**	Mini-Jewel Plastic Post (XX-Color)	550-5052-XX
3**	1 1/16" 1-Groove Plastic Post (XX-Color)	550-5059-XX
	*Item 3 Only : Use Part Number (550-5059-00) for color **Black**.*	
4**	1-Groove Jewel Plastic Post (XX-Color)	550-5034-XX
	Items 3 & 4 typically sec'd by: Post Fastening Scr. #6-32 Top / #6-32 Bot. (530-5012-02). ***Use Color Chart above for last 2-digits. Not all colors are available.***	
	Items 1–4 Note: Use Color Chart above for last 2-digits. Not all colors are available.	
5 ‡	1/4" Self Retain. Plastic Spacer (White)	254-5007-02
6 ‡	9/16" Self Retain. Plastic Spacer (White)	254-5007-05
7 ‡	3/8" Self Retain. Plastic Spacer (White)	254-5007-01
8 ‡	1/2" Self Retain. Plastic Spacer (White)	254-5007-04
9 ‡	5/8" Self Retain. Plastic Spacer (White)	254-5007-00
10 ‡	3/4" Self Retain. Plastic Spacer (White)	254-5007-03
11 ‡	1" Self Retain. Plastic Spacer (White)	254-5007-06
12	1/2" X 1/4" O.D. X .147" I.D. Pls. Spacer (White)	254-5000-03
13	1/8" X 3/8" O.D. X .175" I.D. Pls. Spacer (Gray)	254-5000-19
14	3/16" X 3/8" O.D. X .175" I.D. Pls. Spcr. (Gray)	254-5000-18
15	1/4" X 3/8" O.D. X **.200"** I.D. Pls. Spcr. (Gray)	254-5000-02
16	1/4" X 3/8" O.D. X .175" I.D. Pls. Spacer (Gray)	254-5000-09
17	3/8" X 3/8" O.D. X .175" I.D. Pls. Spacer (Gray)	254-5000-12
18	1/2" X 3/8" O.D. X .175" I.D. Pls. Spacer (Gray)	254-5000-01
19	5/8" X 3/8" O.D. X .175" I.D. Pls. Spacer (Gray)	254-5000-14
20	3/4" X 3/8" O.D. X .175" I.D. Pls. Spacer (Gray)	254-5000-07

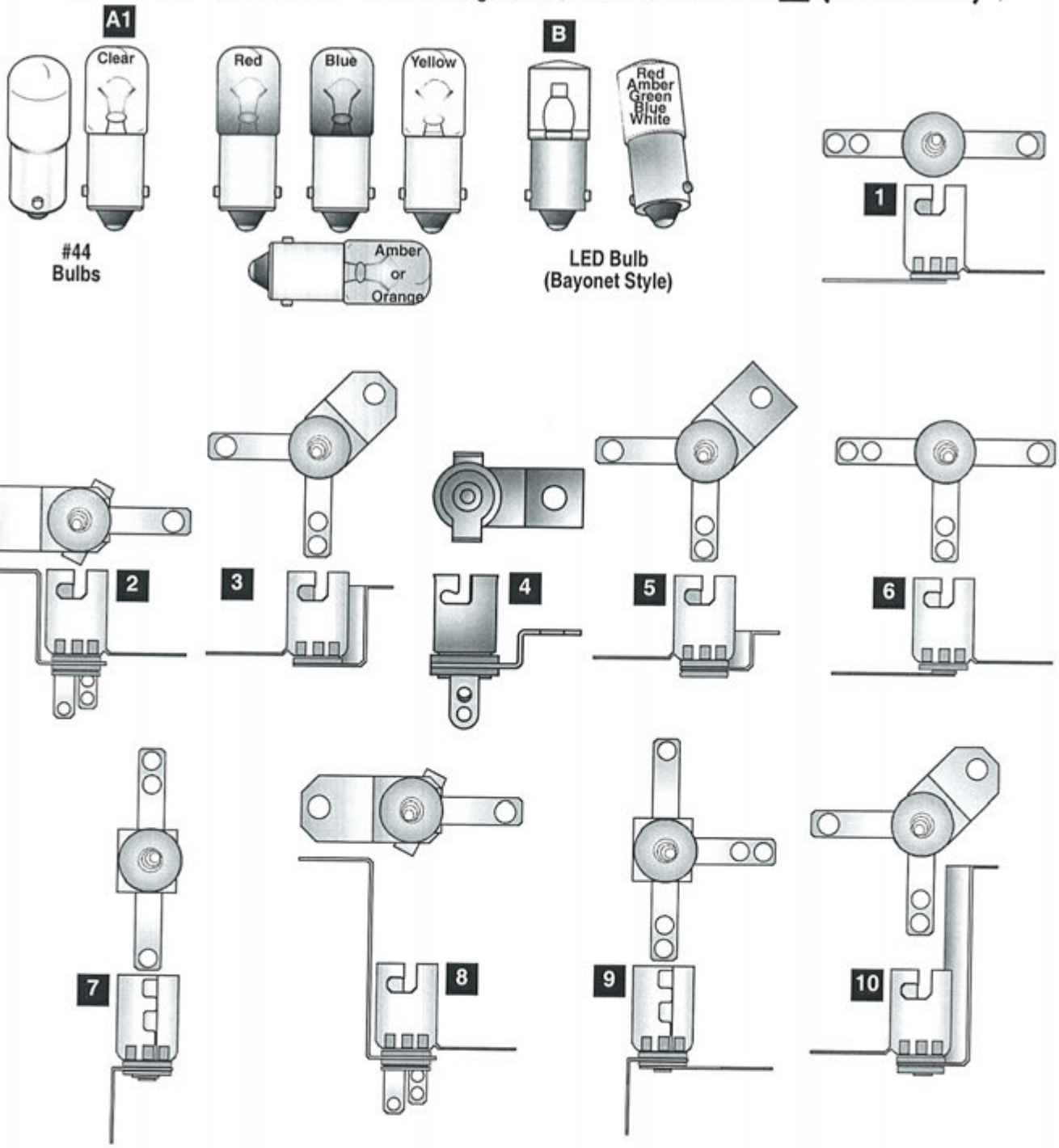
Nr.	PLASTIC POSTS & SPACERS	SPI PART Nr.
21	7/8" X 3/8" O.D. X .175" I.D. Pls. Spacer (Gray)	254-5000-11
22	1" X 3/8" O.D. X .175" I.D. Pls. Spacer (Gray)	254-5000-04
23	1 1/8" X 3/8" O.D. X .175" I.D. Pls. Spcr. (Gray)	254-5000-06
	*Item 23 Only : Add the letter " **N** " for color Natural (if available) or " **B** " for color Black.*	
24	1 1/4" X 3/8" O.D. X .175" I.D. Pls. Spcr. (Gray)	254-5000-05
25	1 1/2" X 3/8" O.D. X .175" I.D. Pls. Spcr. (Gray)	254-5000-08
26	1 15/16" X 3/8" O.D. X .147" I.D. Plastic Spacer (Gray)	254-5000-15
	Items 13-26 Only : Spacers may also be Black in color (random from vendor).	
	Not Shown and listed for reference only : 254-5000-10: 2 1/2" X 3/8" O.D. X .175" I.D. -13: 5/16" X 1/4" X .147"; -16: 5/16" X 5/16" X .190"; -17: 1 3/4" X 3/8" O.D. X .175" I.D.	
27	1/4" X 5/16" O.D. X .144" I.D. Metal Spacer	254-5014-03
28	1/2" X 5/16" O.D. X .144" I.D. Metal Spacer	254-5014-00
29	9/16" X 5/16" O.D. X .144" I.D. Metal Spacer	254-5014-04
30	3/4" X 5/16" O.D. X .144" I.D. Metal Spacer	254-5014-01
31	1 1/8" X 5/16" O.D. X .144" I.D. Metal Spacer	254-5014-02
32	1" X 5/16" O.D. X .144" I.D. Metal Spacer	254-5001-00
33‡	7/8" Plastic Spacer Support *(Dual-Locking)*	254-5039-14
34	Plastic Spacer, .5" Plastic Mounting	254-5054-00
35	Plastic Spacer, 1.13" Plastic Mounting	254-5054-01



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

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

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

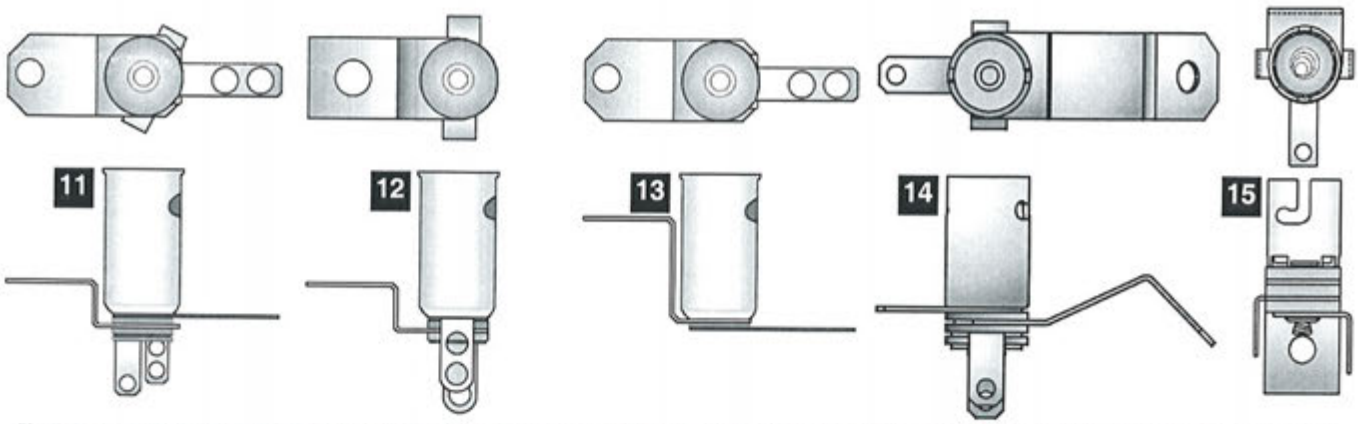
Item B Note: Different Colors may be available – Red (112-5023-02); Amber (112-5023-03); Green (112-5023-04); Blue (112-5023-05);

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

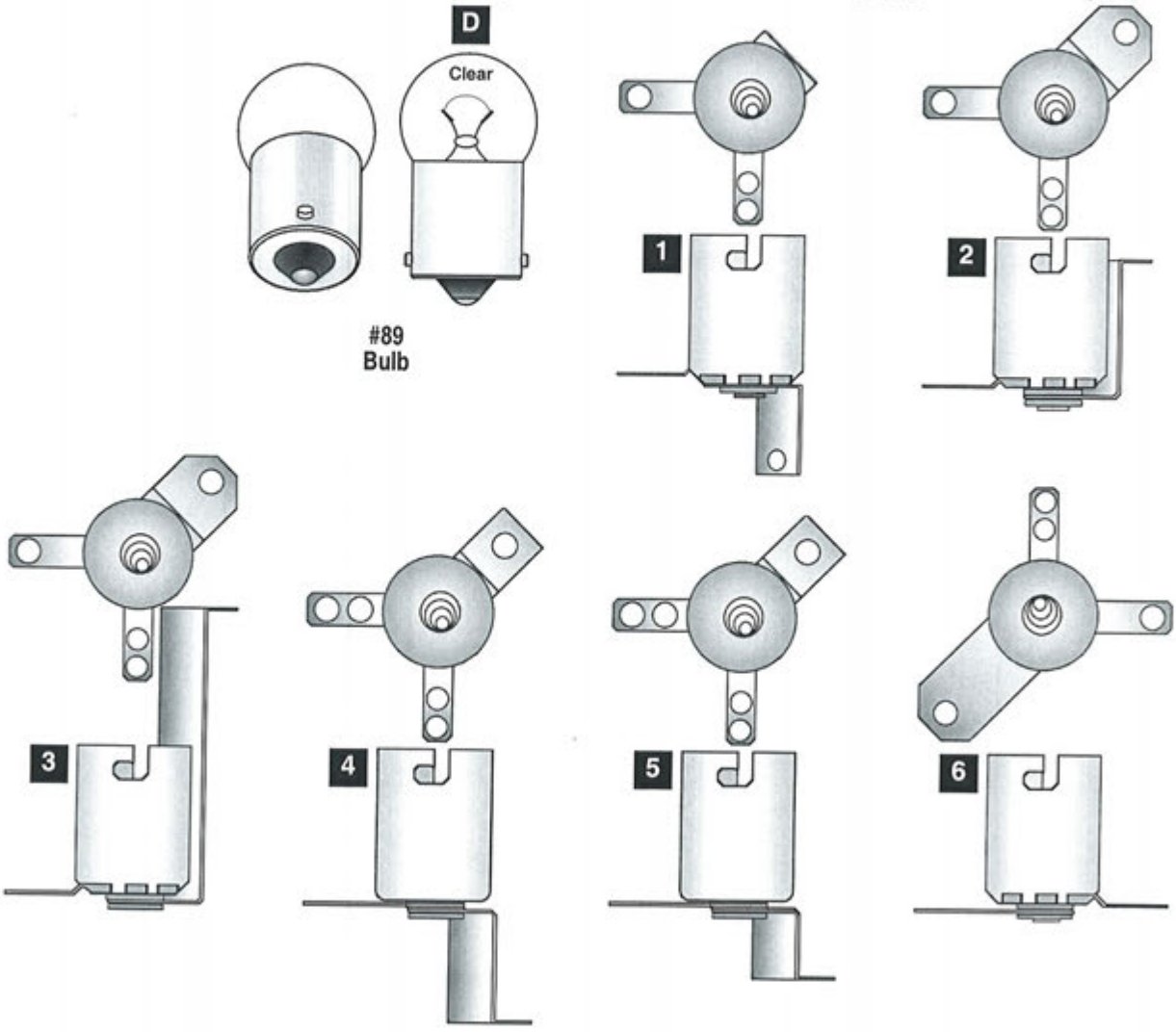
Nr.	SMALL BAYONET SOCKETS	SPI PART Nr.
9	3-Lug Laydown Socket (3 Lugs Flat)	077-5006-00
10	2-Lug Stand-Up Socket (Tall Bracket)	077-5005-00
11	3-Lug Stand-Up Long Shell Socket	077-5013-00
12	2-Lug Stand-Up Lg. Shell Socket (Gls)	077-5031-00
13	1-Lug S-U Lg. Shell Sckt. (Med. Brkt.)	077-5012-00
14	3-Lug S-U Lg. Shell Sckt. (45° Brkt.)	077-5035-00
15	3-Lug Laydown Socket (2 Lugs Bent)	077-5032-00

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

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



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



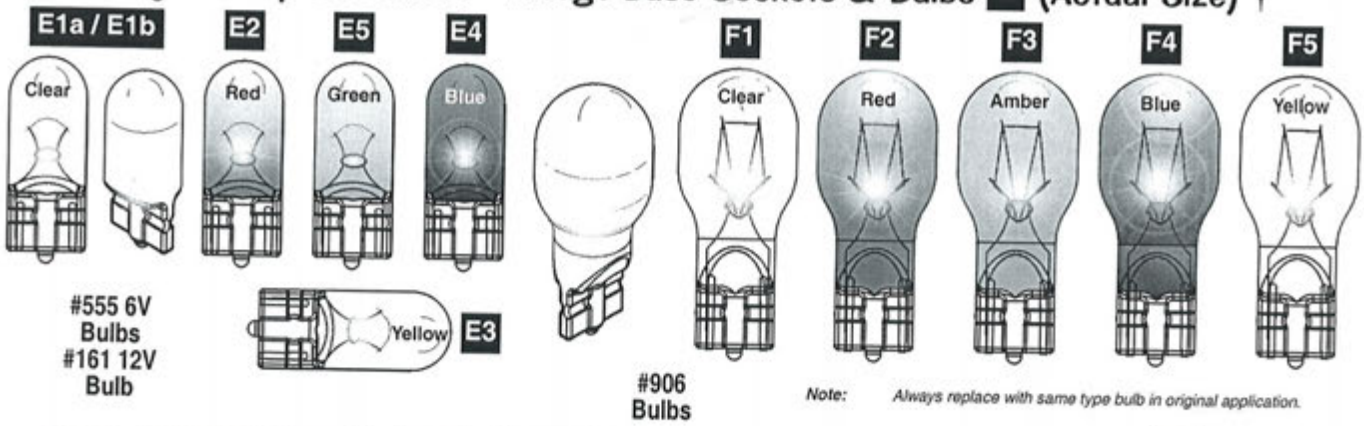
Nr.	BULBS (#89)	SPI PART Nr.
D	#89 Bulb *Heavy Filament*	165-5000-89-HF

Nr.		
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

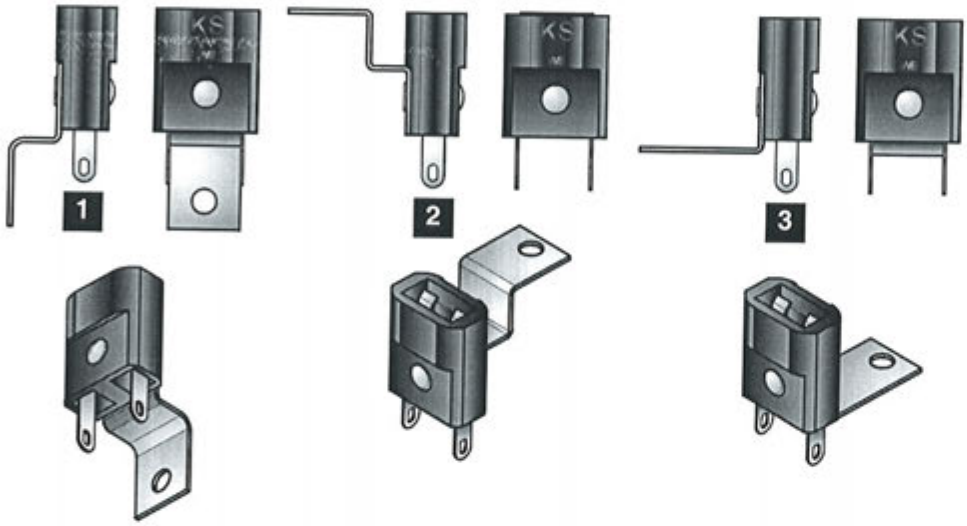
Nr.	LARGE BAYONET SOCKETS	SPI PART Nr.

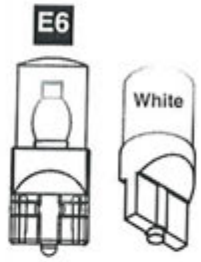
NOT ALL PARTS LISTED ABOVE ARE USED ON THIS GAME (QUANTITIES PER GAME WILL DIFFER). COMPARE ACTUAL PART ON GAME TO ABOVE DRAWINGS TO IDENTIFY THE PART NUMBER REQUIRED.

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

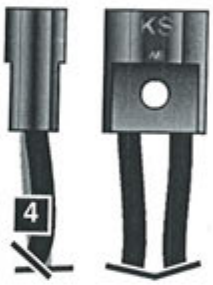


Note: Always replace with same type bulb in original application.

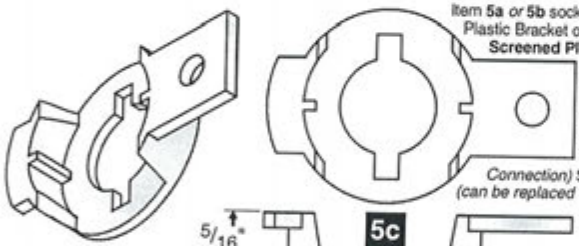




LED Bulb (Wedge Base)

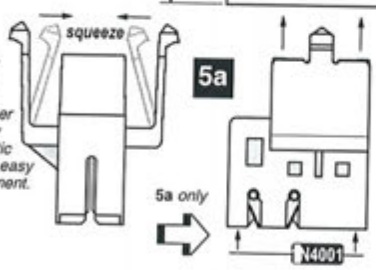


Item 4 Socket does not require brackets. Old stock may include "L" style brackets (each side); do not secure to assembly. Black Wires (Qty. 2) are 12" each.

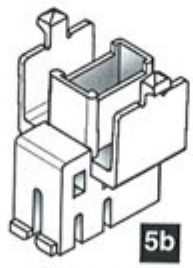


Item **5a** *or* **5b** sockets are secured to the playfield or assembly by Item **5c** Plastic Bracket *or may* also be snapped into specially cut **Clear and / or Screened Plastic Pieces** *or* **Metal Brackets** *(used for multiple mounting of sockets when positioned closely together or in tight areas).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

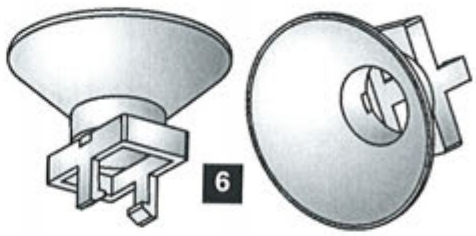
Item **5a** is a solderless **IDC** *(Insulation Displacement Connection)* Socket with a built-in Diode, 1N4003 (112-5003-00) *(can be replaced with 1N4001 Diode, 112-5001-00).* Item **5b** Socket (Yellow) is identical to **5a** (Socket) *except* it does ***NOT REQUIRE*** a diode *(Flash Lamp usage).*



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



5b *is Yellow with* **No Diode**



Parts Identification

Nr.	BULBS (#555)	SPI PART Nr.
E1a	#555 Wedge Base Bulb (Clear)	165-5002-00
E2-E5	#555 Wedge Base Bulb (Multi-Color)	165-5054-XX
	Item E2-E5 Bulb Note: *Different Colors available (not used in this game) –* **Red (165-5054-02); Green (165-5054-04); Blue (165-5054-05); Yellow (165-5054-06);**	
E1b	#161 12V Wedge Base Bulb (Clear)	165-5032-00

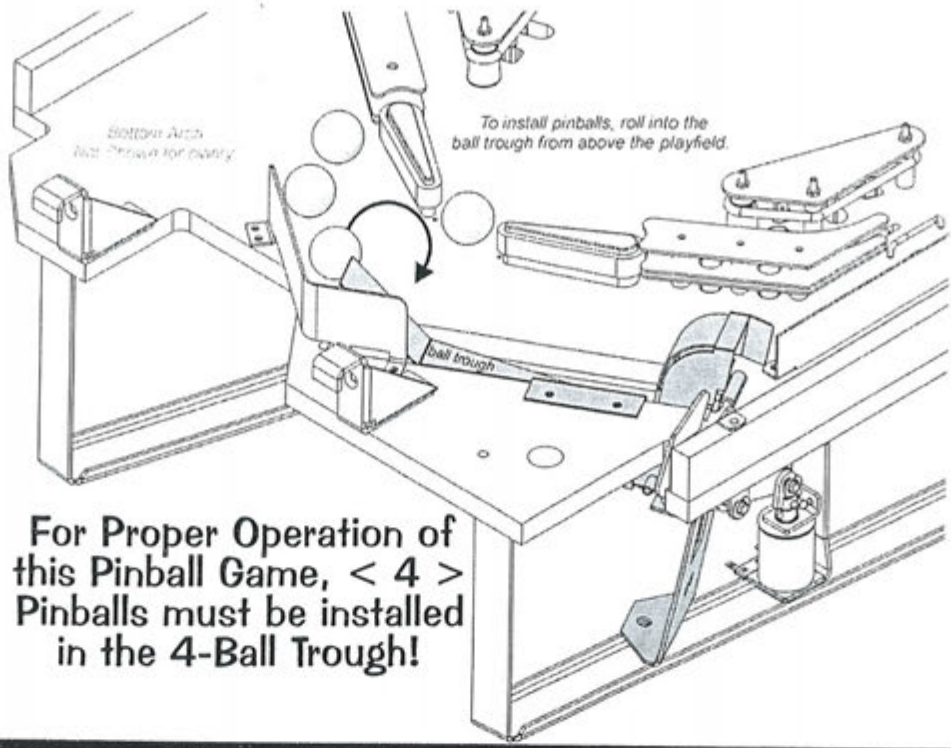
Nr.	BULBS (LED & #906)	SPI PART Nr.
E6	LED Module (WHT) **(5v - 6.3v) Wedge Base**	112-5024-08
	Item E6 Bulb Note : *Typically used with Item 4 Socket in Pop Bumpers.*	
F	#906 Wedge Base Bulb (Clear)	165-5004-00
	Item F Note: *Different Colors available (not used in this game) –* **Red (165-5004-02); Amber (165-5004-03); Blue (165-5004-05); Yellow (165-5004-06)**	

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

Nr.	WEDGE BASE SOCKETS	SPI PART Nr.
5a	IDC Snap-On Socket (Biege)	077-5216-00
5b	IDC Snap-On Socket ***No Diode*** (Yel.)	077-5216-**01**
5c	$^{5}/_{16}$" Ht. Bracket (White)	545-5760-18
6	Light Reflector (Silver Plst.) REF540N	545-5409-01
	Note Item 6 : *Typically used with Item 1 (but will fit on any similiar Wedge Base Socket).*	

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

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

QUICK REFERENCE FUSE CHART

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

BACKBOX FUSES

I/O POWER DRIVER BOARD

*with **RED LED STATUS INDICATORS** (if any **RED LED** is **OFF**, check the fuse)*

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

CABINET FUSES

POWER (SERVICE OUTLET) BOX

(Access through Coin Door inside cabinet, front bottom.)

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

PLAYFIELD FUSES

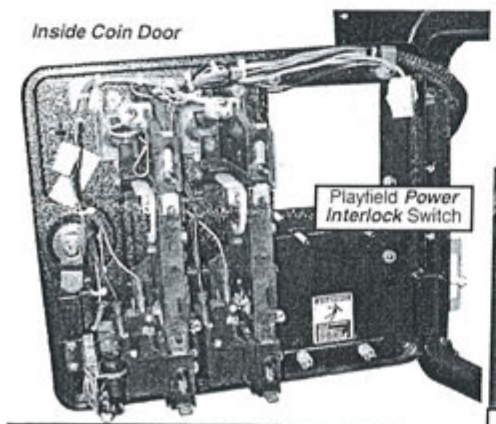
FLIPPER OR SPECIAL APPLICATION

(Coil Fuses are located under the playfield near assembly.)

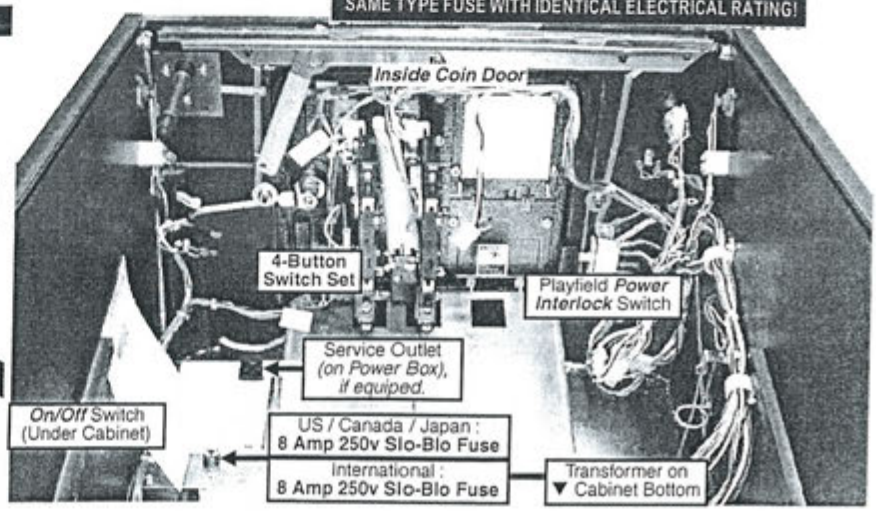
3A S.B.	50VDC R. Flipper [BLU-YEL⇆RED-YEL]
3A S.B.	50VDC L. Flipper [GRY-YEL⇆RED-YEL]
3A S.B.	50VDC *Additional Flipper Coil, if used.*
3A S.B.	50VDC *Spcl. Application Coil, if used.*

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

ALL FUSES ARE 250V S.B. (SLO-BLO)
SEE FUSE OR TABLES FOR AMP RATING
CAUTION **: FOR CONTINUED PROTECTION AGAINST RISK OF FIRE, REPLACE ONLY WITH SAME TYPE FUSE WITH IDENTICAL ELECTRICAL RATING!**



4-Button Switch Set:

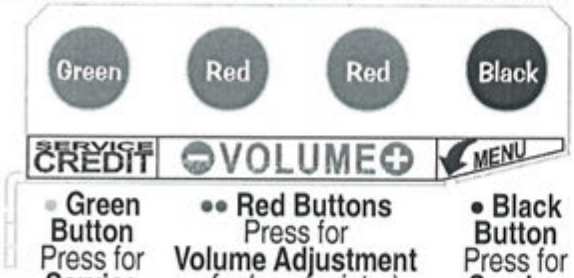


OPEN THE COIN DOOR TO ACCESS THE SERVICE SWITCH X4 SET.

● ● ● ● 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

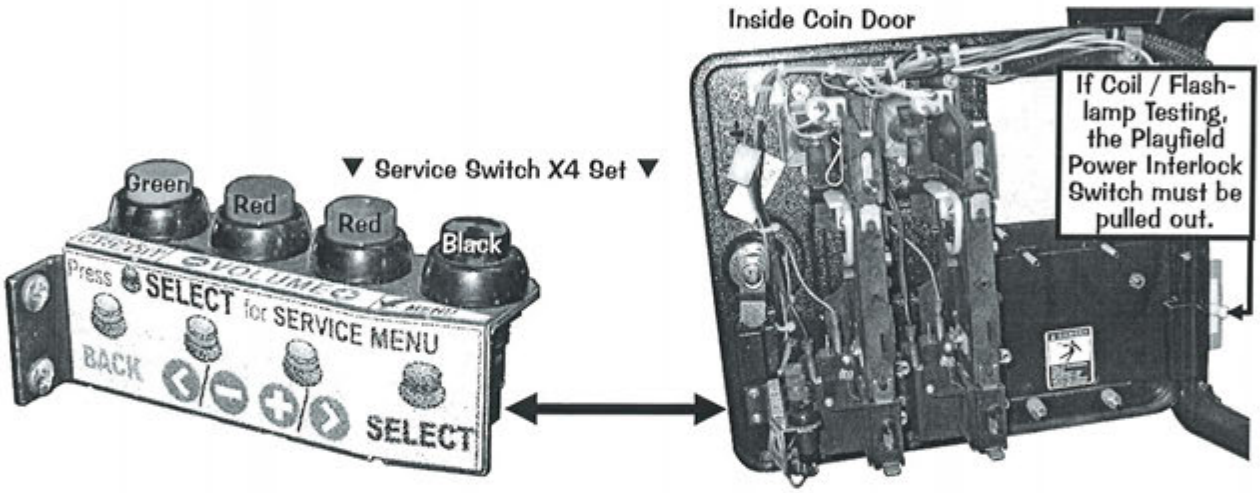


● Green Button	●● Red Buttons	● Black Button
Press for **Service Credit(s).**	Press for **Volume Adjustment** – *for less (quieter),* + *for more (louder)*	Press for **Service Menu** *entry.*

Functions in the Service Menu



● Green Button	●● Red Buttons	● Black Button
Press to **Escape Back** *(or* ***Exit****).*	Press to move **< Left , Right >.** Press to **– Decrease** *or* **+ Increase** values *or* to change settings.	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 out website with a USB Data Storage Device (64MB min., recommendation 128MB or higher). See the inside front cover for directions or in the Service Menu "Go To Utilities Menu" then "Go To USB Menu" and follow prompts.

DIAGNOSTIC AIDS



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).*



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**.



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)

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

CPU COUNTRY SETTING:	Pos.	1	2	3	4	5	6	7	8
Australia	ON	▲		▲	▲				
	OFF		▼			▼	▼	▼	▼

CPU COUNTRY SETTING:	Pos.	1	2	3	4	5	6	7	8
Austria	ON	▲							
	OFF		▼	▼	▼	▼	▼	▼	▼

CPU COUNTRY SETTING:	Pos.	1	2	3	4	5	6	7	8
Belgium	ON		▲						
	OFF	▼		▼	▼	▼	▼	▼	▼

CPU COUNTRY SETTING:	Pos.	1	2	3	4	5	6	7	8
Canada 1	ON	▲	▲						
	OFF			▼	▼	▼	▼	▼	▼

CPU COUNTRY SETTING:	Pos.	1	2	3	4	5	6	7	8
Canada 2	ON		▲		▲	▲			
	OFF	▼		▼			▼	▼	▼

CPU COUNTRY SETTING:	Pos.	1	2	3	4	5	6	7	8
Croatia	ON		▲	▲		▲			
	OFF	▼			▼		▼	▼	▼

CPU COUNTRY SETTING:	Pos.	1	2	3	4	5	6	7	8
Denmark	ON	▲			▲				
	OFF		▼	▼		▼	▼	▼	▼

CPU COUNTRY SETTING:	Pos.	1	2	3	4	5	6	7	8
Finland	ON	▲		▲					
	OFF		▼		▼	▼	▼	▼	▼

CPU COUNTRY SETTING:	Pos.	1	2	3	4	5	6	7	8
France	ON		▲	▲					
	OFF	▼			▼	▼	▼	▼	▼

CPU COUNTRY SETTING:	Pos.	1	2	3	4	5	6	7	8
Germany	ON	▲	▲	▲					
	OFF				▼	▼	▼	▼	▼

CPU COUNTRY SETTING:	Pos.	1	2	3	4	5	6	7	8
Greece	ON	▲	▲	▲	▲				
	OFF					▼	▼	▼	▼

CPU COUNTRY SETTING:	Pos.	1	2	3	4	5	6	7	8
Italy	ON				▲				
	OFF	▼	▼	▼		▼	▼	▼	▼

CPU COUNTRY SETTING:	Pos.	1	2	3	4	5	6	7	8
Japan	ON	▲		▲		▲			
	OFF		▼		▼		▼	▼	▼

CPU COUNTRY SETTING:	Pos.	1	2	3	4	5	6	7	8
Lithuania	ON	▲	▲		▲	▲			
	OFF			▼			▼	▼	▼

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

CPU COUNTRY SETTING:	Pos.	1	2	3	4	5	6	7	8
Netherlands	ON			▲					
	OFF	▼	▼		▼	▼	▼	▼	▼

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

CPU COUNTRY SETTING:	Pos.	1	2	3	4	5	6	7	8
Norway	ON		▲		▲				
	OFF	▼		▼		▼	▼	▼	▼

CPU COUNTRY SETTING:	Pos.	1	2	3	4	5	6	7	8
Portugal	ON	▲				▲			
	OFF		▼	▼	▼		▼	▼	▼

CPU COUNTRY SETTING:	Pos.	1	2	3	4	5	6	7	8
Russia	ON	▲			▲	▲			
	OFF		▼	▼			▼	▼	▼

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

CPU COUNTRY SETTING:	Pos.	1	2	3	4	5	6	7	8
Spain	ON		▲			▲			
	OFF	▼		▼	▼		▼	▼	▼

CPU COUNTRY SETTING:	Pos.	1	2	3	4	5	6	7	8
Sweden	ON	▲	▲		▲				
	OFF			▼		▼	▼	▼	▼

CPU COUNTRY SETTING:	Pos.	1	2	3	4	5	6	7	8
Switzerland	ON			▲	▲				
	OFF	▼	▼			▼	▼	▼	▼

CPU COUNTRY SETTING:	Pos.	1	2	3	4	5	6	7	8
Taiwan	ON				▲	▲			
	OFF	▼	▼	▼			▼	▼	▼

CPU COUNTRY SETTING:	Pos.	1	2	3	4	5	6	7	8
UK	ON		▲	▲	▲				
	OFF	▼				▼	▼	▼	▼

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

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

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

CPU/ Sound Board	01 IC-U22A RETURN▲ WHT-BRN J6-P9	02 IC-U22B RETURN▲ WHT-RED J6-P8	03 IC-U22C RETURN▲ WHT-ORG J6-P7	04 IC-U22D RETURN▲ WHT-YEL J6-P6	05 IC-U16A RETURN▲ WHT-GRN J6-P5	06 IC-U16B RETURN▲ WHT-BLU J6-P3	07 IC-U16C RETURN▲ WHT-VIO J6-P2	08 IC-U16D RETURN▲ WHT-GRY J6-P1	09 IC-U36A RETURN▲ TAN-BLK J12-P9	10 IC-U36B RETURN▲ TAN-RED J12-P8	11 IC-U36C RETURN▲ TAN-ORG J12-P7	12 IC-U36D RETURN▲ TAN-YEL J12-P6	13 IC-U40A RETURN▲ TAN-GRN J12-P4	14 IC-U40B RETURN▲ TAN-BLU J12-P3	15 IC-U40C RETURN▲ TAN-VIO J12-P2	16 IC-U40D RETURN▲ TAN-WHT J12-P1
01 Q1 DRIVE ▶ GRN-BRN J1-P1	S.W. #1 (BEAM) ME UP 500-6227-03 BELOW P.F	S.W. #2 BEAM (ME)UP 500-6227-04 BELOW P.F.	S.W. #3	S.W. #4 BEAM ME (UP) 500-6227-03 BELOW P.F	S.W. #5	S.W. #6	S.W. #7 RT. 3 BANK TARGET (TOP) 515-7568-05 BELOW P.F	S.W. #8 RT. 3 BANK TARGET (CENTER) 515-7568-05 BELOW P.F.	S.W. #9 RT. 3 BANK TARGET (BOTTOM) 515-7568-05 BELOW P.F	S.W. #10 LEFT EJECT 180-5209-00 BELOW P.F.	S.W. #11 CENTER DROP TARGET 520-5252-01 BELOW P.F.	S.W. #12 SPINNER 180-5010-02 ABOVE P.F.	S.W. #13 WARP RAMP ENTER 500-6775-01 ABOVE P.F.	S.W. #14 LEFT RAMP ENTER 500-6775-01 ABOVE P.F.	S.W. #15 TOURN START 180-5174-00 IN CABINET	S.W. #16 START 180-5174-00 IN CABINET
02 Q2 DRIVE ▶ GRN-RED J1-P3	S.W. #17	S.W. #18 TROUGH # 4 (L) 180-5119-02 BELOW P.F	S.W. #19 TROUGH # 3 180-5119-02 BELOW P.F	S.W. #20 TROUGH # 2 180-5119-02 BELOW P.F	S.W. #21 TROUGH # 1 (R) 515-0173-00 515-0174-00	S.W. #22 TROUGH JAM 515-0173-00 515-0174-00	S.W. #23 SHOOTER LANE 180-5157-00 BELOW P.F	S.W. #24 (T)REK 500-6227-04 BELOW P.F	S.W. #25 T(R)EK 500-6227-04 BELOW P.F	S.W. #26 LEFT SLINGSHOT 180-5054-00 BELOW P.F	S.W. #27 RIGHT SLINGSHOT 180-5054-00 BELOW P.F	S.W. #28 TR(E)K 500-6227-04 BELOW P.F	S.W. #29 TRE(K) 500-6227-04 BELOW P.F	S.W. #30 LEFT POP BUMPER 180-5015-04 BELOW P.F	S.W. #31 RIGHT POP BUMPER 180-5015-04 BELOW P.F	S.W. #32 BOTTOM POP BUMPER 180-5015-04 BELOW P.F
03 Q3 DRIVE ▶ GRN-ORG J1-P4	S.W. #33 CENTER LOCK (BOT) 500-6775-01 ABOVE P.F.	S.W. #34 CENTER LOCK (TOP) 500-6775-01 ABOVE P.F.	S.W. #35 LEFT RAMP EXIT 500-6775-01 ABOVE P.F	S.W. #36 WARP RAMP EXIT 500-6775-01 ABOVE P.F.	S.W. #37 RIGHT RAMP ENTRANCE 500-6775-01 ABOVE	S.W. #38 RIGHT RAMP EXIT 500-6775-01 ABOVE P.F.	S.W. #39 C. 3-BANK TARGET (TOP) 515-7568-02 BELOW P.F.	S.W. #40 C. 3-BANK TARGET (CEN) 515-7568-02 BELOW P.F.	S.W. #41 C. 3-BANK TARGET (BOT) 515-7568-02 BELOW P.F	S.W. #42 L. 2-BANK TARGET (TOP) 515-7568-08 BELOW P.F.	S.W. #43 L. 2-BANK TARGET (BOT) 515-7568-08 BELOW P.F.	S.W. #44 BEHIND UPPER FLIPPER 500-6227-04 BELOW P.F	S.W. #45 RED TARGET 1 515-7561-02 BELOW P.F.	S.W. #46 RED TARGET 2 515-7561-02 BELOW P.F.	S.W. #47 RED TARGET 3 515-7561-02 BELOW P.F.	S.W. #48 BIG RED TARGET 515-7498-02 BELOW P.F.
04 Q4 DRIVE ▶ GRN-YEL J1-P5	S.W. #49 RED TARGET 5 515-7581-02 BELOW P.F.	S.W. #50 RED TARGET 6 515-7581-02 BELOW P.F.	S.W. #51 RIGHT ORBIT 500-6227-03 BELOW P.F.	S.W. #52 LEFT ORBIT 500-6227-04 BELOW P.F.	S.W. #53 SHIP CRASH 500-6775-01 ABOVE P.F.	S.W. #54	S.W. #55	S.W. #56	S.W. #57	S.W. #58	S.W. #59	S.W. #60	S.W. #61	S.W. #62	S.W. #63	S.W. #64

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

Wire Color Abbreviations used: ▲▼ BLK Black · BLU Blue · BRN Brown · GRY Gray · GRN Green · LGN Light Grn.n · ORG Orange · PNK Pink · RED Red · TAN Tan · VIO Violet · WHT White · YEL Yellow

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

CPU/SND Board	IC-U2 PNK-BRN J2-P2	IC-U2 PNK-RED J2-P3	IC-U2 PNK-ORG J2-P4	IC-U2 PNK-YEL J2-P5	IC-U2 PNK-GRN J2-P7	IC-U2 PNK-BLU J2-P8	IC-U2 PNK-VIO J2-P9	IC-U2 PNK-GRY J2-P10	IC-U4 GRY-BRN J3-P1	IC-U4 GRY-RED J3-P2	IC-U4 GRY-ORG J3-P4	IC-U4 GRY-YEL J3-P5	IC-U4 GRY-GRN J3-P6	IC-U4 GRY-BLU J3-P7	IC-U4 GRY-VIO J3-P8	IC-U4 GRY-BLK J3-P9
GROUND (BLK) J2-P1/11 & J3-P10	S.W. D-1 LEFT COIN SLOT 180-5204-00 COIN DOOR	S.W. D-2 CENTER COIN SLOT DBA COIN DOOR	S.W. D-3 RIGHT COIN SLOT 180-5204-00 COIN DOOR	S.W. D-4 FORTH COIN SLOT 180-5204-00 COIN DOOR	S.W. D-5 FIFTH COIN SLOT IF USED	S.W. D-6	S.W. D-7 FIRE BUTTON 180-5218-00 CABINET	S.W. D-8	S.W. D-9 LEFT FLIPPER BUTTON 500-6889-01 CABINET	S.W. D-10 LEFT FLIPPER E.O.S. 180-5149-00 FLIP ASSY.	S.W. D-11 RIGHT FLIPPER BUTTON 500-6890-01 CABINET	S.W. D-12 RIGHT FLIPPER E.O.S. 180-5149-00 FLIP ASSY.	S.W. D-13	S.W. D-14	S.W. D-15 U.R. FLIPPER BUTTON CABINET	S.W. D-16

CPU/SND Board	IC-I1 LGN-BRN J13-P1	IC-I1 LGN-RED J13-P3	IC-I1 LGN-ORG J13-P4	IC-I1 LGN-YEL J13-P5	IC-I1 LGN-BLK J13-P6	IC-I1 LGN-BLU J13-P7	IC-I1 LGN-VIO J13-P8	IC-I1 LGN-GRY J13-P19
GROUND (BLK) J13-P10	S.W. D-17 TILT PENDULUM CABINET	S.W. D-18 SLAM TILT IF USED	S.W. D-19 TICKET NOTCH IF USED	S.W. D-20	S.W. D-21 BACK (GREEN) 180-5192-04 COIN DOOR	S.W. D-22 MINUS (RED) 180-5192-02 COIN DOOR	S.W. D-23 PLUS (RED) 180-5192-02 COIN DOOR	S.W. D-24 SELECT (BLACK) 180-5192-00 COIN DOOR

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

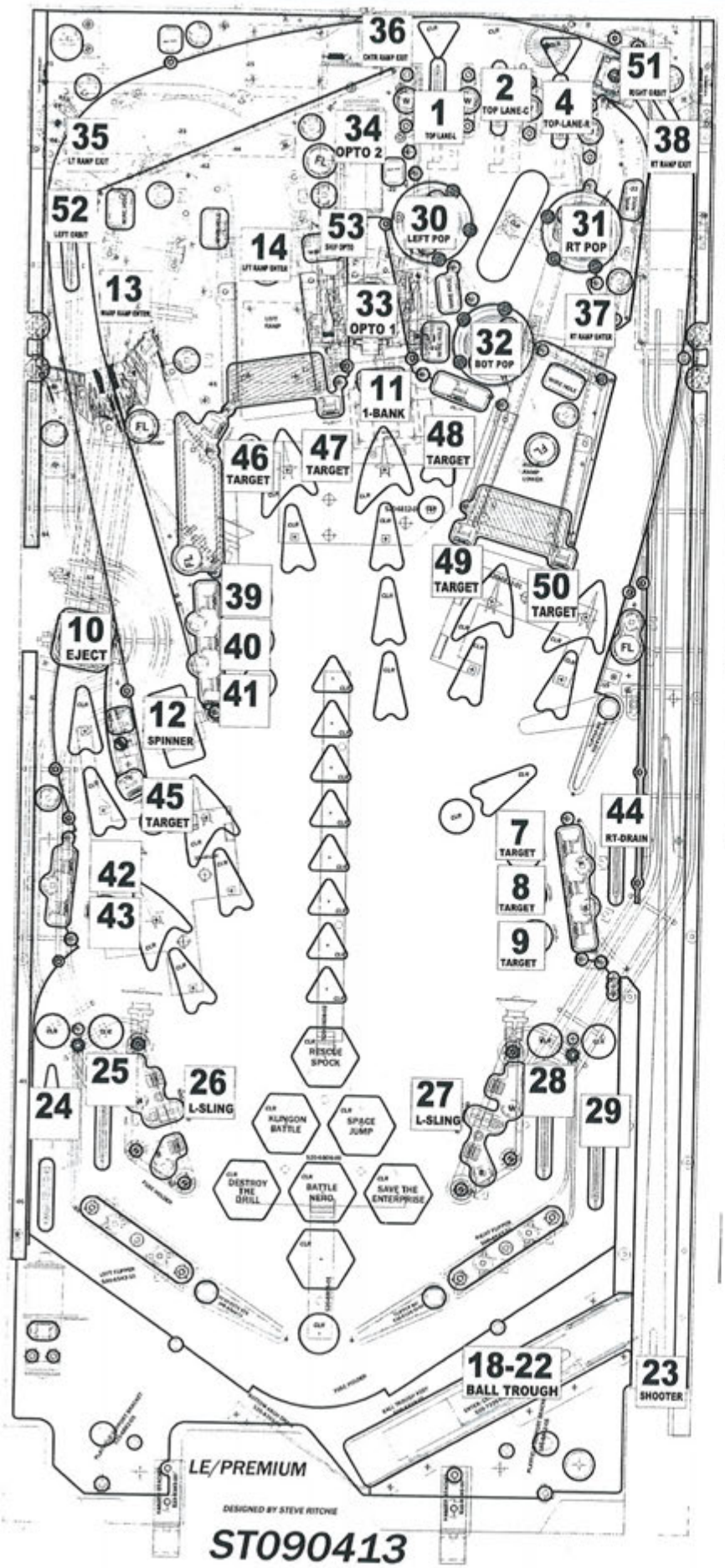
S.W. D-25	S.W. D-26	S.W. D-27	S.W. D-28	S.W. D-29	S.W. D-30	S.W. D-31	S.W. D-32
DIP (1)2345678	DIP 1(2)345678	DIP 12(3)45678	DIP 123(4)5678	DIP 1234(5)678	DIP 12345(6)78	DIP 123456(7)8	DIP 1234567(8)
S.W. POS. #1 ON	S.W. POS. #2 ON	S.W. POS. #3 ON	S.W. POS. #4 ON	S.W. POS. #5 ON	S.W. POS. #6 ON	S.W. POS. #7 ON	S.W. POS. #8 ON



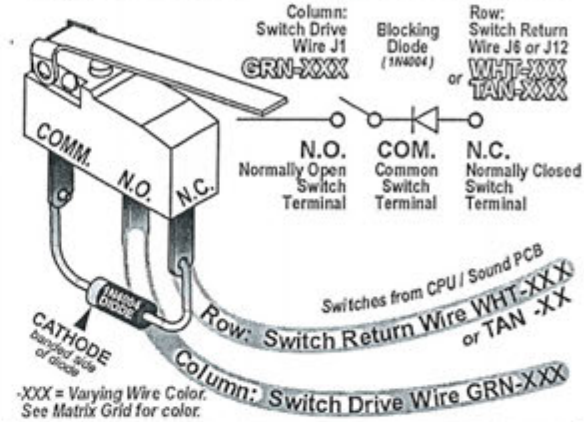




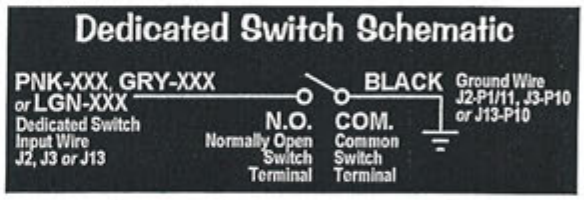
SWITCH MENU: SWITCH, ACTIVE, SINGLE & SERVICE



Typical Switch Wiring & Schematic

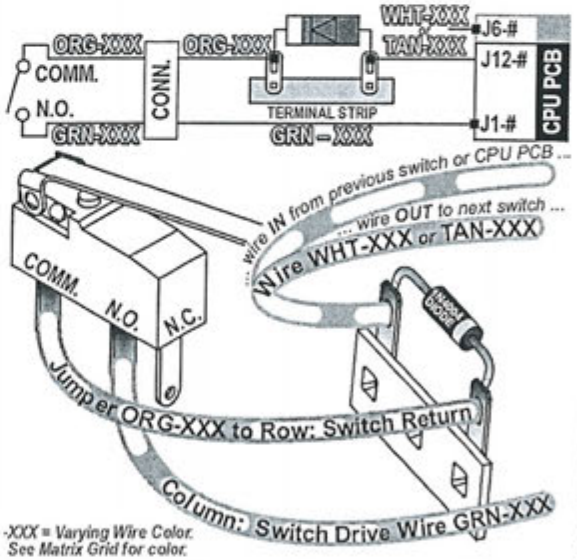


Dedicated Switch Schematic



Typical Switch Wiring & Schematic

... with Switch Diode on a Terminal Strip (DOTS)

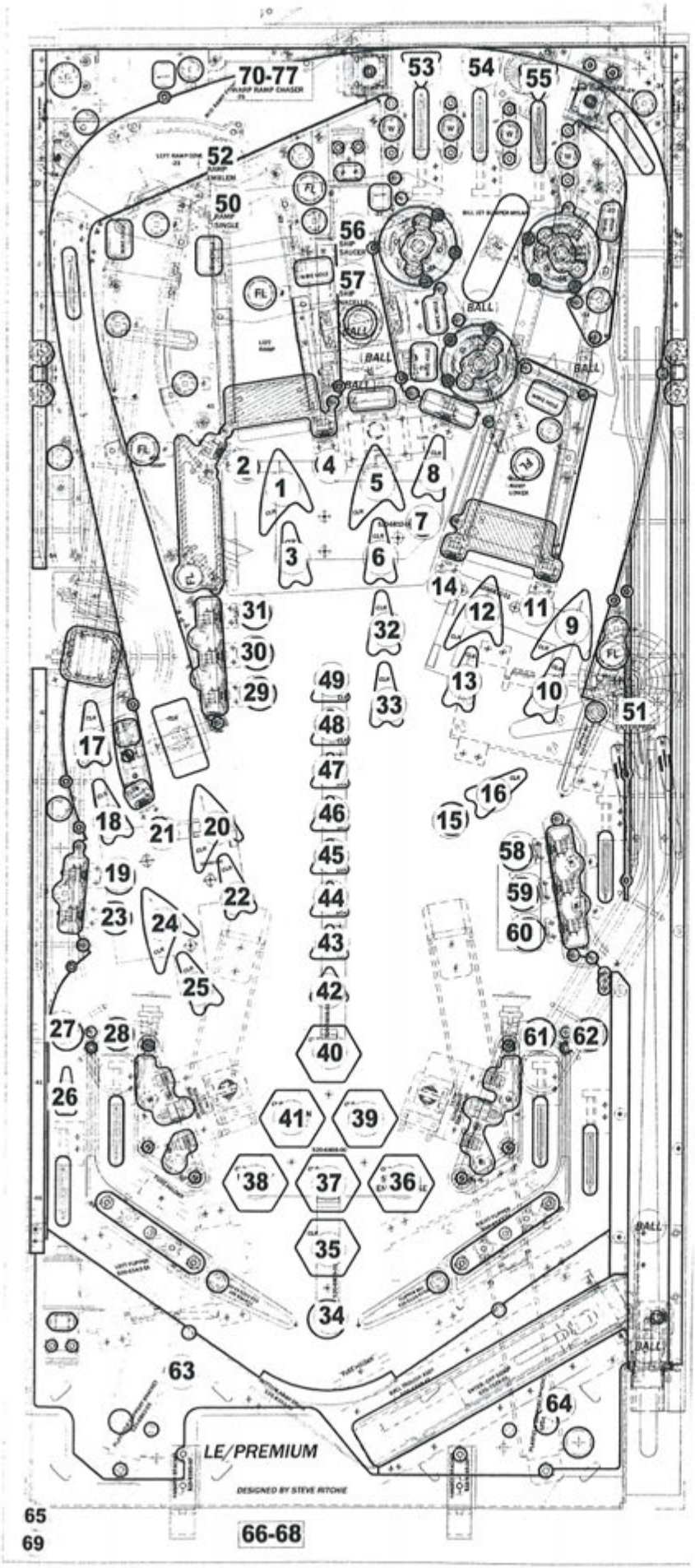


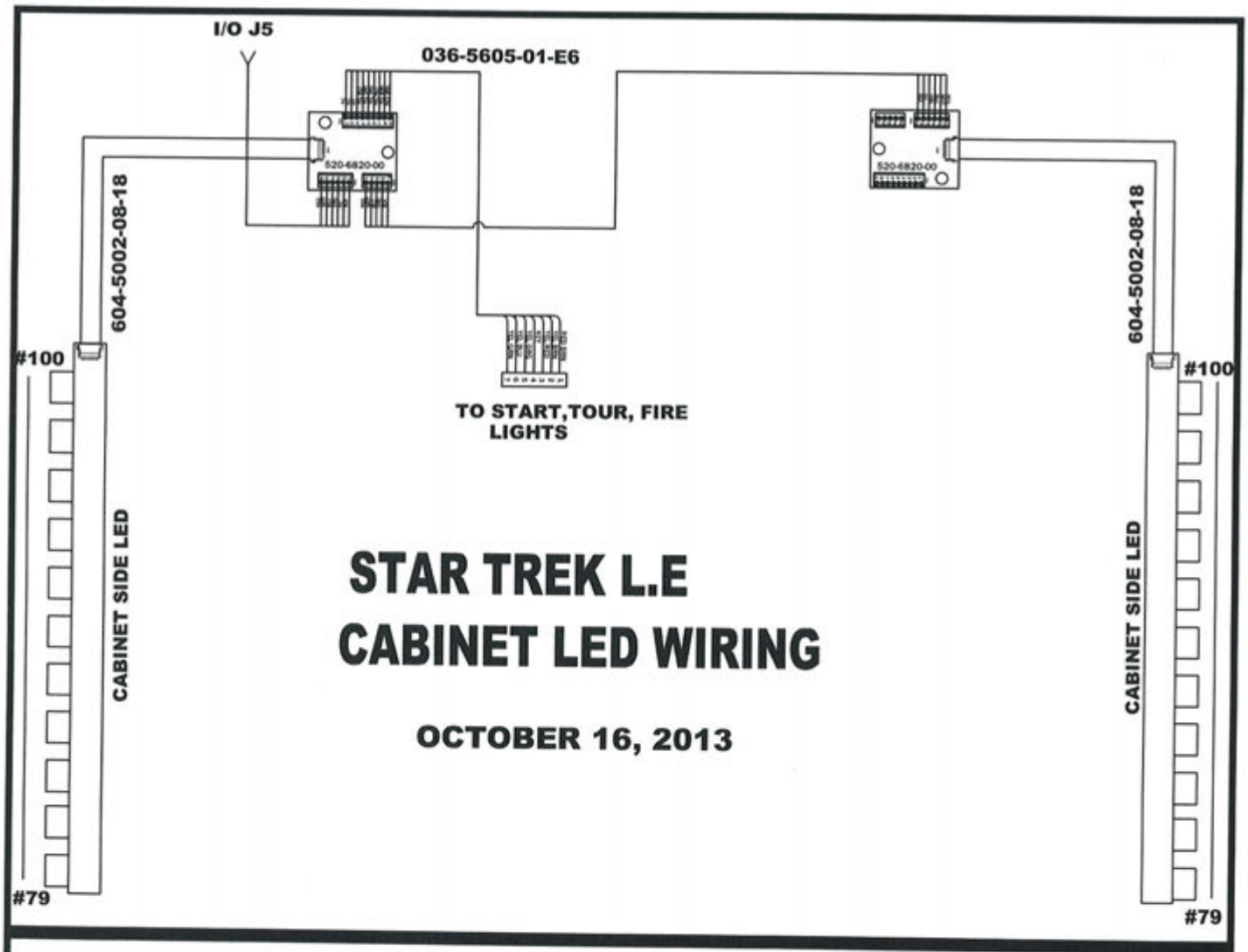
LAMP	NAME	BOARD	COMPONENT	TYPE	LOCATION	BOARD PART#
1	LEFT RAMP EMBLEM	5	D25	RGB	PF	520-6812-00
2	RED TARGET 2	5	D24	RGB	PF	520-6812-00
3	LEFT RAMP ENTERPRISE ARROW	5	D26	RGB	PF	520-6812-00
4	RED TARGET 3	5	D27	RGB	PF	520-6812-00
5	CENTER LANE EMBLEM	5	D28	RGB	PF	520-6812-00
6	CENTER LANE ENTERPRISE ARROW	5	D29	RGB	PF	520-6812-00
7	RED TARGET 4	5	D34	RGB	PF	520-6812-00
8	BLACK HOLE ARROW	5	D35	RGB	PF	520-6812-00
9	RIGHT ORBIT EMBLEM	5A	D1	RGB	PF	520-6812-01
10	RIGHT ORBIT ENTERPRISE ARROW	5A	D2	RGB	PF	520-6812-01
11	RED TARGET 6	5A	D3	RGB	PF	520-6812-01
12	RIGHT RAMP EMBLEM	5A	D4	RGB	PF	520-6812-01
13	RIGHT RAMP ENTERPRISE ARROW	5A	D5	RGB	PF	520-6812-01
14	RED TARGET 5	5A	D6	RGB	PF	520-6812-01
15	SPECIAL	5A	CN2-P2-4	RGB	PF	520-5333-00
16	AWAY TEAM	5A	CN2-P5-7	RGB	PF	520-5333-00
17	LEFT EJECT LOCK	6	D24	RGB	PF	520-6811-00
18	MISSION START	6	D25	RGB	PF	520-6811-00
19	LEFT 2 BANK (TOP)	6	D26	RGB	PF	520-6811-00
20	LEFT ORBIT EMBLEM	6	D27	RGB	PF	520-6811-00
21	RED TARGET 1	6	D28	RGB	PF	520-6811-00
22	LEFT ORBIT ENTERPRISE ARROW	6	D29	RGB	PF	520-6811-00
23	LEFT 2 BANK (BOTTOM)	6	D23	RGB	PF	520-6811-00
24	LEFT EJECT EMBLEM	6	D31	RGB	PF	520-6811-00
25	LEFT EJECT ENTERPRISE ARROW	6	D32	RGB	PF	520-6811-00
26	KICKBACK	6	CN13-P8-10	RGB	PF	520-5333-00
27	(T)REK	6	CN13-P5-7	RGB	PF	520-5333-00
28	T(R)EK	6	CN13-P2-4	RGB	PF	520-5333-00
29	CENTER 3 BANK (BOTTOM)	6A	D1	RGB	PF	520-6813-00
30	CENTER 3 BANK (CENTER)	6A	D2	RGB	PF	520-6813-00
31	CENTER 3 BANK (TOP)	6A	D3	RGB	PF	520-6813-00
32	CENTER LANE LOCK	6A	CN2-P2-4	RGB	PF	520-6813-00
33	EXTRA BALL	6A	CN2-P5-7	RGB	PF	520-6813-00
34	SHOOT AGAIN	7A	D23	RGB	PF	520-6808-01
35	THE CAPTAIN'S CHAIR	7A	D22	RGB	PF	520-6808-01
36	SAVE THE ENTERPRISE	7	D24	RGB	PF	520-6808-00
37	NERO	7	D25	RGB	PF	520-6808-00
38	DESTROY THE DRILL	7	D26	RGB	PF	520-6808-00
39	SPACE JUMP	7	D27	RGB	PF	520-6808-00
40	PRIME DIRECTIVE	7	D28	RGB	PF	520-6808-00
41	KLINGON BATTLE	7	D29	RGB	PF	520-6808-00
42	STATUS 1 (BOTTOM)	7B	D1	RGB	PF	520-6808-02
43	STATUS 2	7B	D2	RGB	PF	520-6808-02
44	STATUS 3	7B	D3	RGB	PF	520-6808-02
45	STATUS 4	7B	D4	RGB	PF	520-6808-02
46	STATUS 5	7B	D5	RGB	PF	520-6808-02

47	STATUS 6	7B	D6	RGB	PF	520-6808-02
48	STATUS 7	7B	D7	RGB	PF	520-6808-02
49	STATUS 8 (TOP)	7B	D8	RGB	PF	520-6808-02
50	WARP RAMP RED	8	CN2-P4	R	PF	520-5322-00E
51	ENTERPRISE (X2)	8	CN2-P5-7	B	PF	520-5322-00E
52	WARP RAMP EMBLEM	8	CN2-P6-8	RGB	PF	520-5322-00E
53	(BEAM) ME UP	8	CN2-P9-11	RGB	PF	520-5322-00E
54	BEAM (ME) UP	8	CN4-P4-6	RGB	PF	520-5322-00E
55	BEAM ME (UP)	8	CN4-P7-9	RGB	PF	520-5322-00E
56	VENGEANCE SAUCER	8	CN4	B	PF	520-5322-00E
57	VENGEANCE NACELLES (X2)	8	CN4	B	PF	520-5322-00E
58	RIGHT 3 BANK (TOP)	8A	D1	RGB	PF	520-6813-00
59	RIGHT 3 BANK (CENTER)	8A	D2	RGB	PF	520-6813-00
60	RIGHT 3 BANK (BOTTOM)	8A	D3	RGB	PF	520-6813-00
61	TR(E)K	8A	CN2-P2-4	RGB	PF	520-6813-00
62	TRE(K)	8A	CN2-P5-7	RGB	PF	520-6813-00
63	LEFT APRON (X2)	8	CN6-P4-6	RGB	PF	520-5322-00E
64	RIGHT APRON (X2)	8	CN6-P7-9	RGB	PF	520-5322-00E
65	START BUTTON	IO	CN4-P8	White	CAB	112-5033-08
66	FIRE (RED)	IO	CN4-P6	R (RGB)	CAB	520-5333-00
67	FIRE (GREEN)	IO	CN4-P5	G (RGB)	CAB	520-5333-00
68	FIRE (BLUE)	IO	CN4-P4	B (RGB)	CAB	520-5333-00
69	TOURNAMENT START BUTTON	IO	CN4-P7	White	CAB	112-5033-08
70	WARP CHASER 1 (LE)	8	CN6	B	PF (LE)	520-5322-00E
71	WARP CHASER 2 (LE)	8	CN6	B	PF (LE)	520-5322-00E
72	WARP CHASER 3 (LE)	8	CN6	B	PF (LE)	520-5322-00E
73	WARP CHASER 4 (LE)	8	CN6	B	PF (LE)	520-5322-00E
74	WARP CHASER 5 (LE)	8	CN6	B	PF (LE)	520-5322-00E
75	WARP CHASER 6 (LE)	8	CN6	B	PF (LE)	520-5322-00E
76	WARP CHASER 7 (LE)	8	CN6	B	PF (LE)	520-5322-00E
77	WARP CHASER 8 (LE)	8	CN6	B	PF (LE)	520-5322-00E
78	CABINET SIDE ENTERPRISE (X2) (LE)	IO		B	CAB (LE)	520-6809-03
79	ABINET SIDE PHASER 1 (X2) (FRONT) (LE	IO		R	CAB (LE)	520-6809-0X
80	CABINET SIDE PHASER 2 (X2) (LE)	IO		R	CAB (LE)	520-6809-0X
81	CABINET SIDE PHASER 3 (X2) (LE)	IO		R	CAB (LE)	520-6809-0X
82	CABINET SIDE PHASER 4 (X2) (LE)	IO		R	CAB (LE)	520-6809-0X
83	CABINET SIDE PHASER 5 (X2) (LE)	IO		R	CAB (LE)	520-6809-0X
84	CABINET SIDE PHASER 6 (X2) (LE)	IO		R	CAB (LE)	520-6809-0X
85	CABINET SIDE PHASER 7 (X2) (LE)	IO		R	CAB (LE)	520-6809-0X
86	CABINET SIDE PHASER 8 (X2) (LE)	IO		R	CAB (LE)	520-6809-0X
87	CABINET SIDE PHASER 9 (X2) (LE)	IO		R	CAB (LE)	520-6809-0X
88	CABINET SIDE PHASER 10 (X2) (LE)	IO		R	CAB (LE)	520-6809-0X
89	CABINET SIDE PHASER 11 (X2) (LE)	IO		R	CAB (LE)	520-6809-0X
90	CABINET SIDE PHASER 12 (X2) (LE)	IO		R	CAB (LE)	520-6809-0X
91	CABINET SIDE PHASER 13 (X2) (LE)	IO		R	CAB (LE)	520-6809-0X
92	CABINET SIDE PHASER 14 (X2) (LE)	IO		R	CAB (LE)	520-6809-0X
93	CABINET SIDE PHASER 15 (X2) (LE)	IO		R	CAB (LE)	520-6809-0X

94	CABINET SIDE PHASER 16 (X2) (LE)	IO		R	CAB (LE)	520-6809-0X
95	CABINET SIDE PHASER 17 (X2) (LE)	IO		R	CAB (LE)	520-6809-0X
96	CABINET SIDE PHASER 18 (X2) (LE)	IO		R	CAB (LE)	520-6809-0X
97	CABINET SIDE PHASER 19 (X2) (LE)	IO		R	CAB (LE)	520-6809-0X
98	CABINET SIDE PHASER 20 (X2) (LE)	IO		R	CAB (LE)	520-6809-0X
99	CABINET SIDE PHASER 21 (X2) (LE)	IO		R	CAB (LE)	520-6809-0X
100	ABINET SIDE PHASER 22 (X2) (BACK) (LE	IO		R	CAB (LE)	520-6809-0X

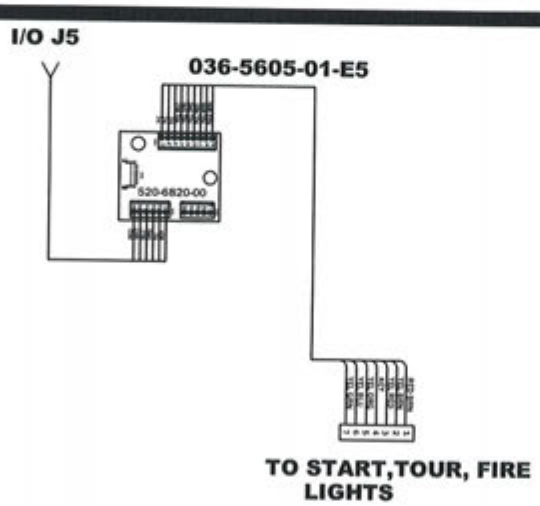

DIAG
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GO TO DIAGNOSTICS MENU
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ALL
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LAMP MENU: ONE, ALL,


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BALL
LE/PREMIUM
DESIGNED BY STEVE RITCHIE
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66-68



STAR TREK L.E CABINET LED WIRING

OCTOBER 16, 2013



STAR TREK PREMIUM CABINET LED WIRING

OCTOBER 16, 2013

COILS DETAILED CHART TABLE

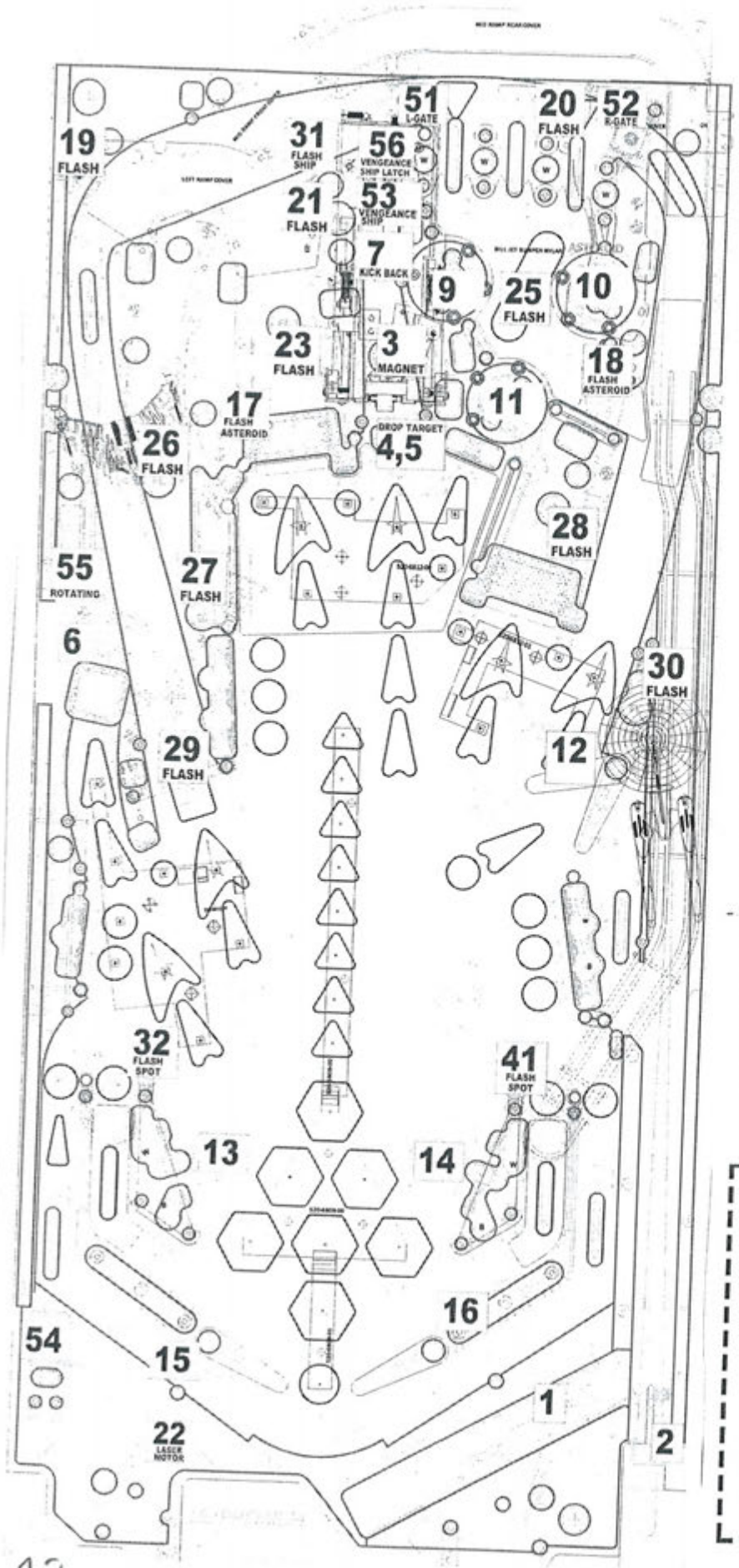
	High Current Coils Group 1	Drive Transistor	Driver Output PCB	Power Line Color	Power Line Connection	Power Voltage	Drive Transistor Control Line Color	D.T. Control Line Connect	Coil GA-Turn or Bulb Type
#1	TROUGH UP-KICKER	Q1	▲ I/O Power Driver ▼	YEL-VIO	J10-P9/10	50VDC	BRN-BLK	J8-P1	26-1200 090-5044-ND
#2	AUTO LAUNCH	Q2		YEL-VIO	J10-P9/10	50VDC	BRN-RED	J8-P3	23-900 090-5001-ND
#3	MAGNET	Q3		VIO-YEL	J10-P8	50VDC	BRN-ORG	J8-P4	22-850 511-5065-ND
#4	CENTER DROP TARGET UP	Q4		YEL-VIO	J10-P8	50VDC	BRN-YEL	J8-P5	25-1240 090-5034-ND
#5	CENTER DROP TARGET DOWN	Q5		YEL-VIO	J10-P9/10	50VDC	BRN-GRN	J8-P6	32-1800 090-5031-00 ND
#6	LEFT EJECT	Q6		YEL-VIO	J10-P9/10	50VDC	BRN-BLU	J8-P7	27-1500 090-5004-ND
#7	VENGEANCE KICK BACK	Q7		YEL-VIO	J10-P9/10	50VDC	BRN-VIO	J8-P8	23-800 090-5001-ND
#8	SHAKER MOTOR (OPTIONAL)	Q8		RED-WHT	J17-P7	16VAC	BRN-GRY	J8-P9	502-5027-00

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

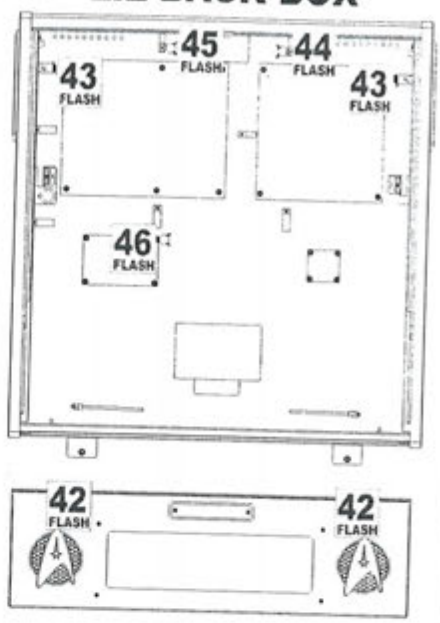
	Low Current Coils Group 1	Drive Transistor	Driver Output PCB	Power Line Color	Power Line Connection	Power Voltage	Drive Transistor Control Line Color	D.T. Control Line Connect	Coil GA-Turn or Bulb Type
#17	FLASH: ASTEROID (LEFT)	Q17	▲ I/O Power Driver ▼	ORG	J6-P10	20VDC	VIO-BRN	J7-P2	LED 113-5034-08
#18	FLASH: ASTEROID (RIGHT)	Q18		ORG	J6-P10	20VDC	VIO-RED	J7-P3	LED 113-5034-08
#19	FLASH: LEFT RAMP (TOP)	Q19		ORG	J6-P10	20VDC	VIO-ORG	J7-P4	LED 113-5034-08
#20	FLASH: RIGHT RAMP (TOP)	Q20		ORG	J6-P10	20VDC	VIO-YEL	J7-P6	LED 113-5034-08
#21	FLASH: KICK BACK	Q21		ORG	J6-P10	20VDC	VIO-GRN	J7-P7	LED 113-5034-08
#22	LASER MOTOR	Q22		BRN	J7-P1	20VDC	VIO-BLU	J7-P8	MOTOR 041-5111-00
#23	FLASH: RAMP (LEFT)	Q23		ORG	J6-P10	20VDC	VIO-BLK	J7-P9	LED 113-5034-08
#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 BUMPERS	Q25	▲ I/O Power Driver ▼	ORG	J6-P10	20VDC	BLK-BRN	J6-P1	LED 113-5034-08
#26	FLASH: WARP RAMP ENTRANCE	Q26		ORG	J6-P10	20VDC	BLK-RED	J6-P2	LED 113-5034-08
#27	FLASH: CENTER THREE BANK	Q27		ORG	J6-P10	20VDC	BLK-ORG	J6-P3	LED 113-5034-08
#28	FLASH: RAMP (RIGHT)	Q28		ORG	J6-P10	20VDC	BLK-YEL	J6-P4	LED 113-5034-08
#29	FLASH: LEFT LOOP	Q29		ORG	J6-P10	20VDC	BLK-GRN	J6-P5	LED 113-5034-05
#30	FLASH: UPPER RIGHT FLIPPER	Q30		ORG	J6-P10	20VDC	BLK-BLU	J6-P6	LED 113-5034-08
#31	FLASH: VENGEANCE SHIP	Q31		ORG	J6-P10	20VDC	BLK-VIO	J6-P7	LED 112-5044-08
#32	FLASH: BOTTOM SPOT (LEFT)	Q32		ORG	J6-P10	20VDC	BLK-GRY	J6-P8	LED 112-5041-08

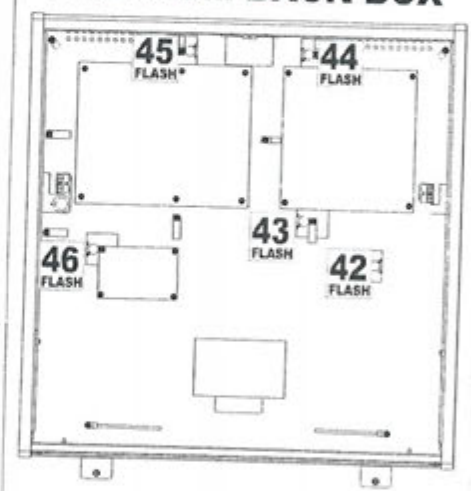




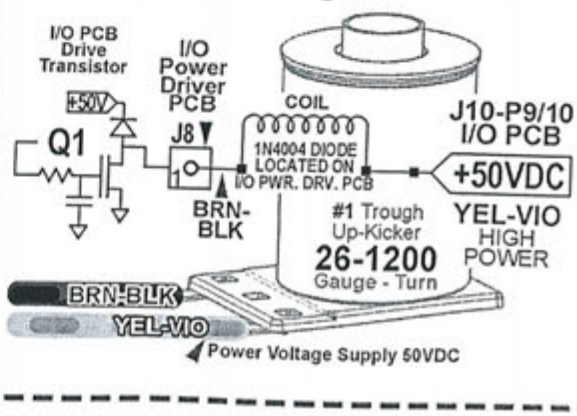
L.E BACK BOX



PREMIUM BACK BOX



Typical Coil Wiring & Schematic



12- TRANSISTOR DRIVER BOARD COIL/FLASHER CHART.

L/E

Driver N.O	Assembly Name	Drive Transistor	PWR line color	PWR voltage	Control line color	Coil Type
#41	FLASH: BOTTOM SPOT (RT)	Q41	ORG	20VDC	ORG-BRN	LED (112-5041-08)
#42	FLASH: BACKBOX (X2)	Q42	ORG	20VDC	ORG-RED	LED (113-5034-05)
#43	FLASH: BACKBOX (X2)	Q43	ORG	20VDC	ORG-BLK	LED (113-5034-05)
#44	FLASH: BACKBOX	Q44	ORG	20VDC	ORG-YEL	LED (113-5034-08)
#45	FLASH: BACKBOX	Q45	ORG	20VDC	ORG-GRN	LED (113-5034-08)
#46	FLASH: BACKBOX	Q46	ORG	20VDC	ORG-BLU	LED (113-5034-08)
#51	Orbit control gate (LEFT)	Q51	YEL-VIO	50VDC	YEL-BRN	32-1250 (090-5060-01)
#52	Orbit control gate (RIGHT)	Q52	YEL-VIO	50VDC	YEL-GRY	32-1250 (090-5060-01)
#53	VENGEANCE SHIP	Q53	YEL-VIO	50VDC	YEL-ORG	23-800 (090-5001-ND)
#54	KICK BACK (BOTTOM)	Q54	YEL-VIO	50VDC	YEL-BLK	23-800 (090-5001-ND)
#55	ROTATING VUK (RIGHT)	Q55	YEL-VIO	50VDC	YEL-GRN	24-940 (090-5036-ND)
#56	VENGEANCE SHIP LATCH	Q56	YEL-VIO	50VDC	YEL-BLU	32-1800 (090-5031-00)

PREMIUM

#41	FLASH: BOTTOM SPOT (RT)	Q41	ORG	20VDC	ORG-BRN	LED (112-5041-08)
#42	FLASH: BACKBOX	Q42	ORG	20VDC	ORG-RED	LED (113-5034-08)
#43	FLASH: BACKBOX	Q43	ORG	20VDC	ORG-BLK	LED (113-5034-08)
#44	FLASH: BACKBOX	Q44	ORG	20VDC	ORG-YEL	LED (113-5034-08)
#45	FLASH: BACKBOX	Q45	ORG	20VDC	ORG-GRN	LED (113-5034-08)
#46	FLASH: BACKBOX	Q46	ORG	20VDC	ORG-BLU	LED (113-5034-08)
#51	Orbit control gate (LEFT)	Q51	YEL-VIO	50VDC	YEL-BRN	32-1250 (090-5060-01-FC)
#52	Orbit control gate (RIGHT)	Q52	YEL-VIO	50VDC	YEL-GRY	32-1250 (090-5060-01-FC)
#53	VENGEANCE SHIP	Q53	YEL-VIO	50VDC	YEL-ORG	23-800 (090-5001-ND)
#54	KICK BACK (BOTTOM)	Q54	YEL-VIO	50VDC	YEL-BLK	23-800 (090-5001-ND)
#55	ROTATING VUK (RIGHT)	Q55	YEL-VIO	50VDC	YEL-GRN	24-940 (090-5036-ND)
#56	VENGEANCE SHIP LATCH	Q56	YEL-VIO	50VDC	YEL-BLU	32-1800 (090-5031-00-ND)



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.

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]

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

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

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

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



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]**.

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 – #+]

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

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

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

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



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

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

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

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.*

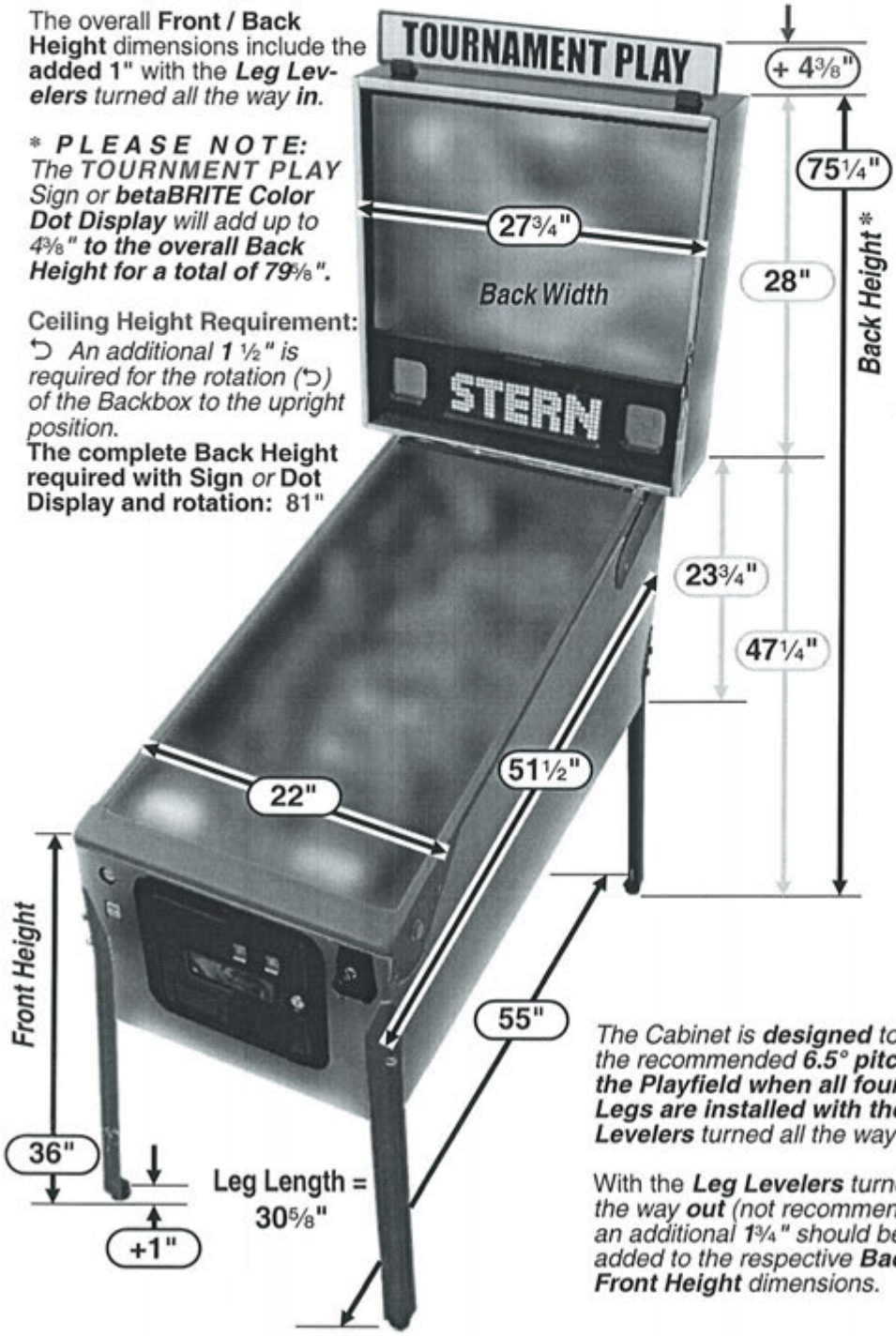
Normal Line:	110v AC - 125v AC @ 60Hz	
Domestic use an 8AMP 250v Slo-Blo Fuse.	**AVG OPERATION**	**MAX OPERATION**
	CURRENT: **2.8AMP**	CURRENT: **8AMP**
	WATTAGE: **329W**	WATTAGE: **940W**
High Line:	218v AC - 240v AC @ 50Hz	
Export use 2x 5AMP 250v Slo-Blo Fuses. (*England & Hong Kong use an 8AMP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

GAME DIMENSIONS

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

* ***PLEASE NOTE:*** *The TOURNMENT PLAY Sign or* ***betaBRITE Color Dot Display*** *will add up to 4⅜" to the overall Back Height for a total of 79⅝".*

Ceiling Height Requirement:
↻ *An additional* ***1 ½"*** *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* ***1¾"*** *should be added to the respective* ***Back*** *or* ***Front Height*** *dimensions.*

TRANSPORTATION

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)

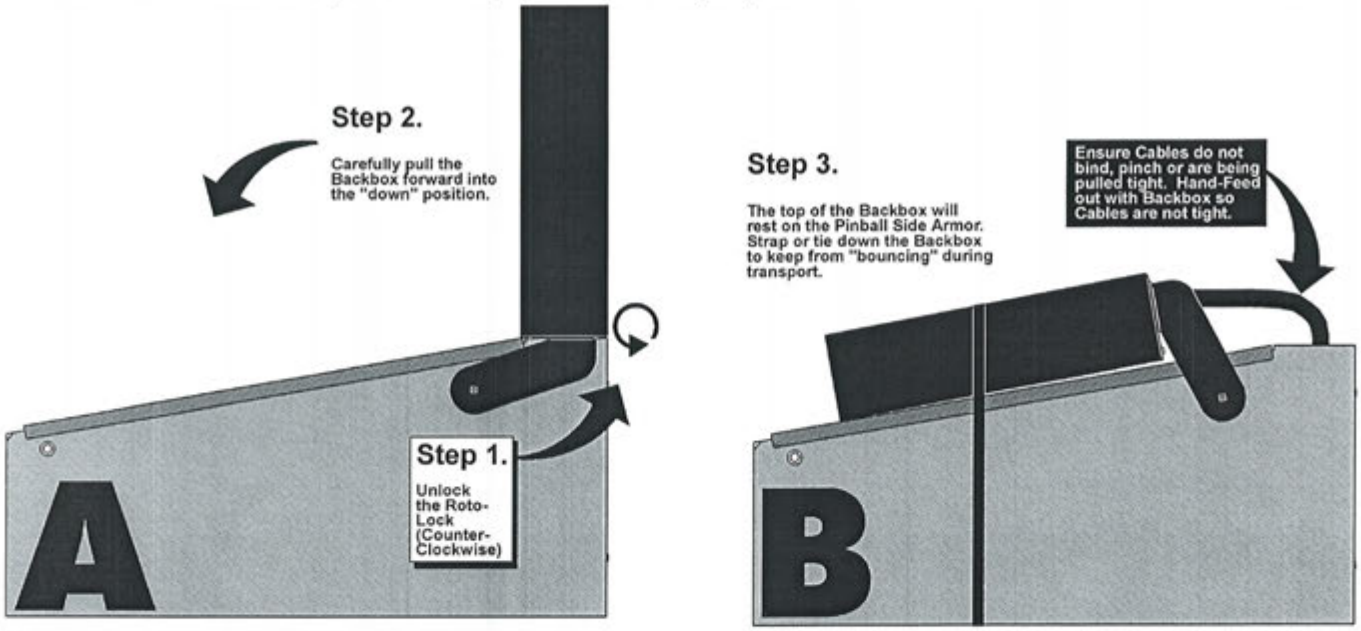
CAUTION



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

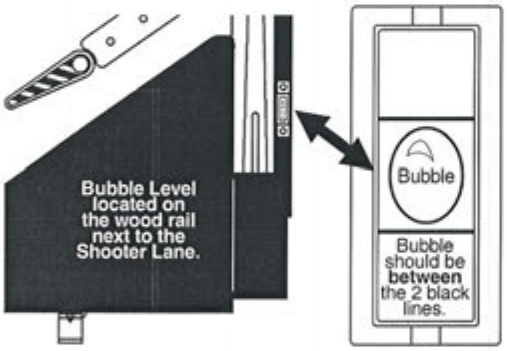
How to Secure the Backbox for Transporting

*For more Backbox details & part numbers, see the Pink Pages (**Parts Identification & Location, Backbox ...**).*



Leg Leveler Adjustment

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

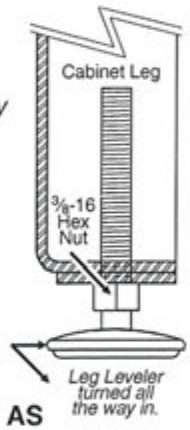


Start adjustment with the leg levelers *turned all the way in.*

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

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

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



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

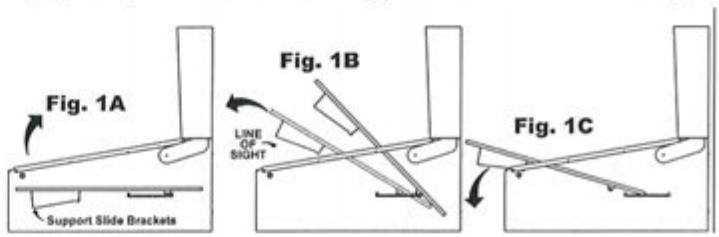
Note:** For custom adjustment greater than >6.5° can be achieved by turning out the rear leg leveler(s), however, **it is not recommended.

Easy Access Service System - 2 Positions

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

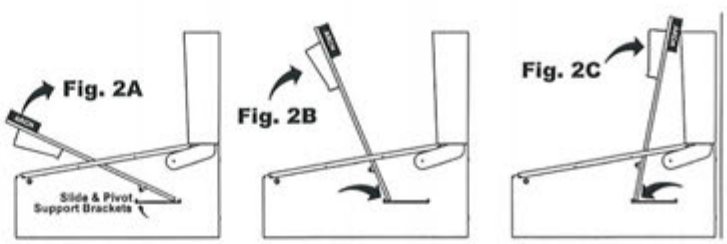
Position 1

When lifted high enough, the ***Playfield Support Slide Brackets*** (**Fig. 1A**) can be seen and can clear the cabinet front (**Fig. 1B**). At this time, pull the playfield toward the front of the cabinet, checking that the mechanical components clear the cabinet front, then rest the playfield on the ***Playfield Support Slide Brackets*** at the front channel of cabinet (**Fig. 1C**);



Position 2

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



Service Menu Introduction

Important: *The **Switch Bracket** holds the **Playfield Power Interlock**. It is located just inside the Coin Door frame (see pictorial of the **Coin Door** on the previous page). The Button Switch for the **Playfield Power Interlock Switch** must be pulled out for electro-mechanical device testing or diagnostic purposes (this is required). If this button is pushed in, the **Playfield Power** is disabled while the **Coin Door** is **OPEN**.*

To get into the **SERVICE MENU MODE** review **"Function 3: SERVICE MENU"** on the next page. After Power-Up, push down the **Black [SELECT] Button** to begin. Looking at the display you will momentarily see **"SERVICE MENU"** followed by the **MAIN MENU**:



Service Menu Intro.

Use the **Red [< / –] / [+ / >] Buttons** to move the selected ***Icon*** left or right, and the **Black [SELECT] Button** fto activate the selected ***Icon***.

The **MAIN MENU** now appears with the "DIAG" *Icon* (**GO TO DIAGNOSTICS MENU**) highlighted:



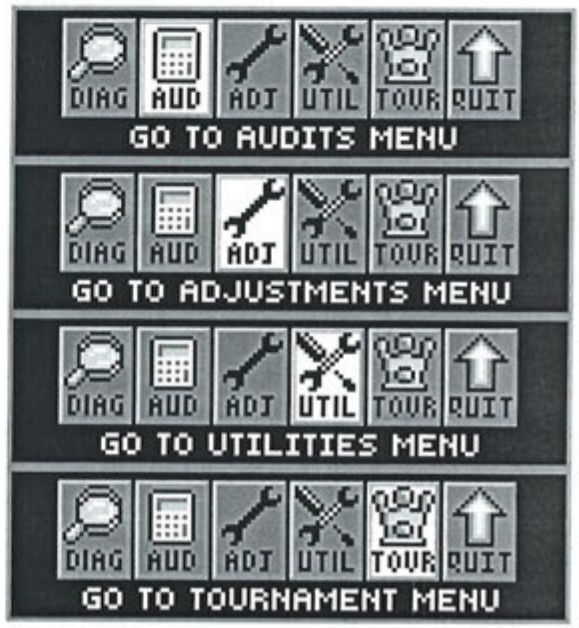
As the operator views the Menu Screen(s), the MORE MORE symbols indicates that there are more *Icons* to select in each direction. The *Icon* selected will blink. Pushing the **Black [SELECT] Button** will select the *Icon* and the Menu Screen will change to the menu selected. Select the **Green [BACK]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

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

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

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

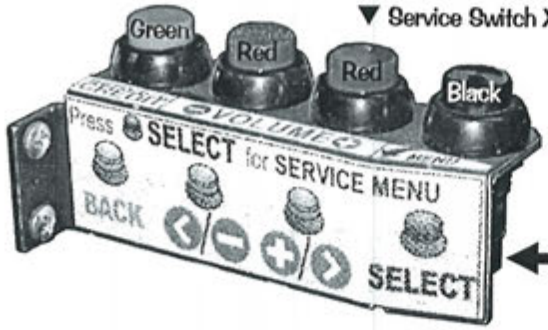
Use both the manual and the display to help customize, troubleshoot and/or diagnose faults, if any.



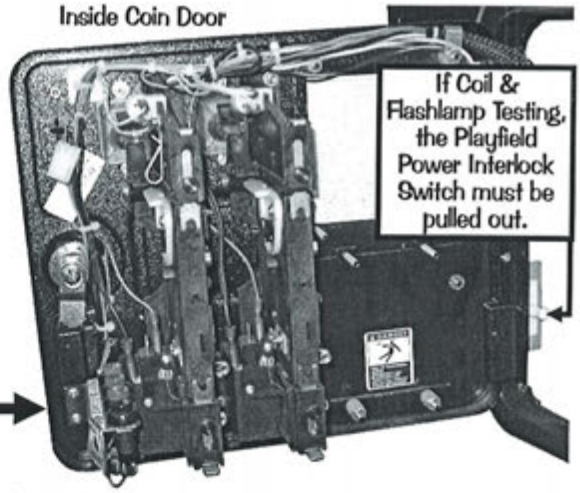
Service Switch X4 Set Access & Use

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**.

▼ Service Switch X4 Set ▼

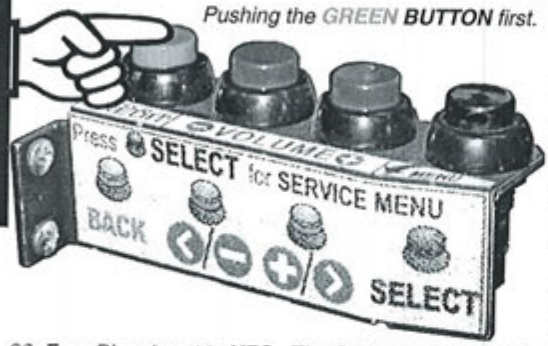


Inside Coin Door



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

Pushing the GREEN ***BUTTON*** *first.*

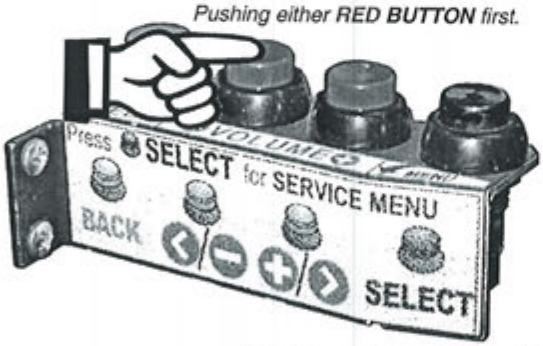


◀ Function 1: SERVICE CREDITS MENU

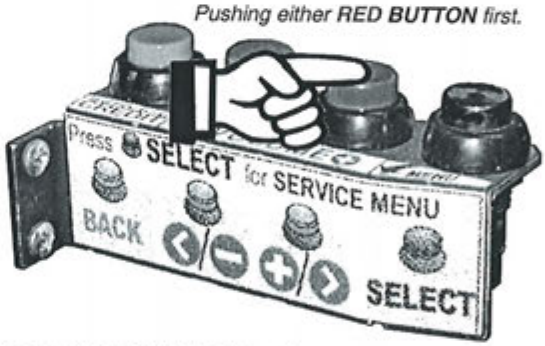
Pushing the **Green [SERVICE CREDIT] Button** first, adds a ***Service Credit*** per push *(will not affect your audits as "paid" credits)*. This is useful for the technician to test games in regular play without affecting the game audits. Each depression adds **1 credit**; up to **50 credits** can be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

Note: *Once your credits are added, this menu will* ***automatically exit*** *a few seconds after the last button depression or when the* **Green [BACK]** *or* **Black [SELECT] Button** *is pushed. This function is disabled if* ***Standard Adjustment 38, Free Play,*** *is set to* ***YES****. The Service Credits are limited to the Credit Limit in addition to any paid credits present in the game (e.g. If the Credit Limit is 30, with 8 paid credits present, only 22 Credits can be applied.).*

Pushing either ***RED BUTTON*** *first.*



Pushing either ***RED BUTTON*** *first.*

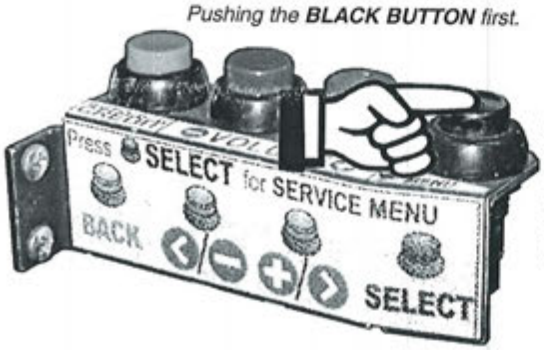


▲ Function 2: VOLUME MENU ▲

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

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

Pushing the ***BLACK BUTTON*** *first.*

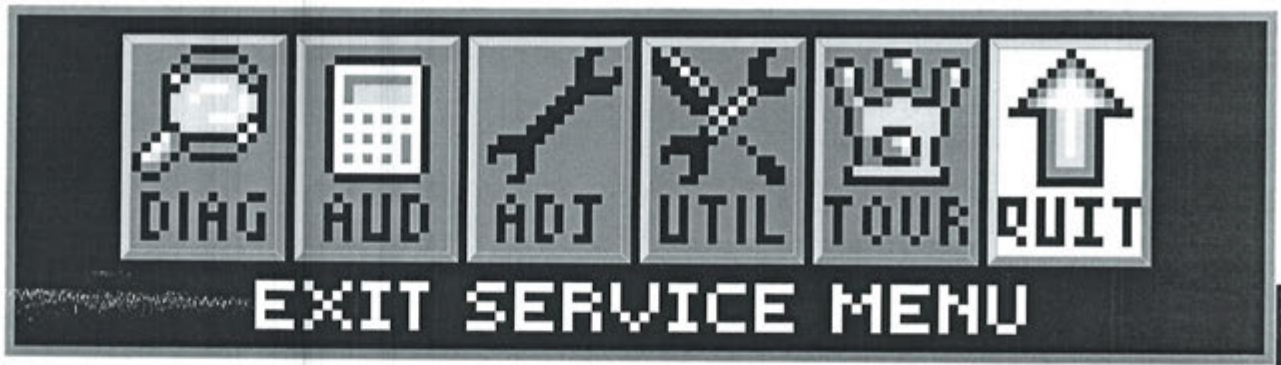


◀ Function 3: SERVICE MENU

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

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***.



LOOK

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.

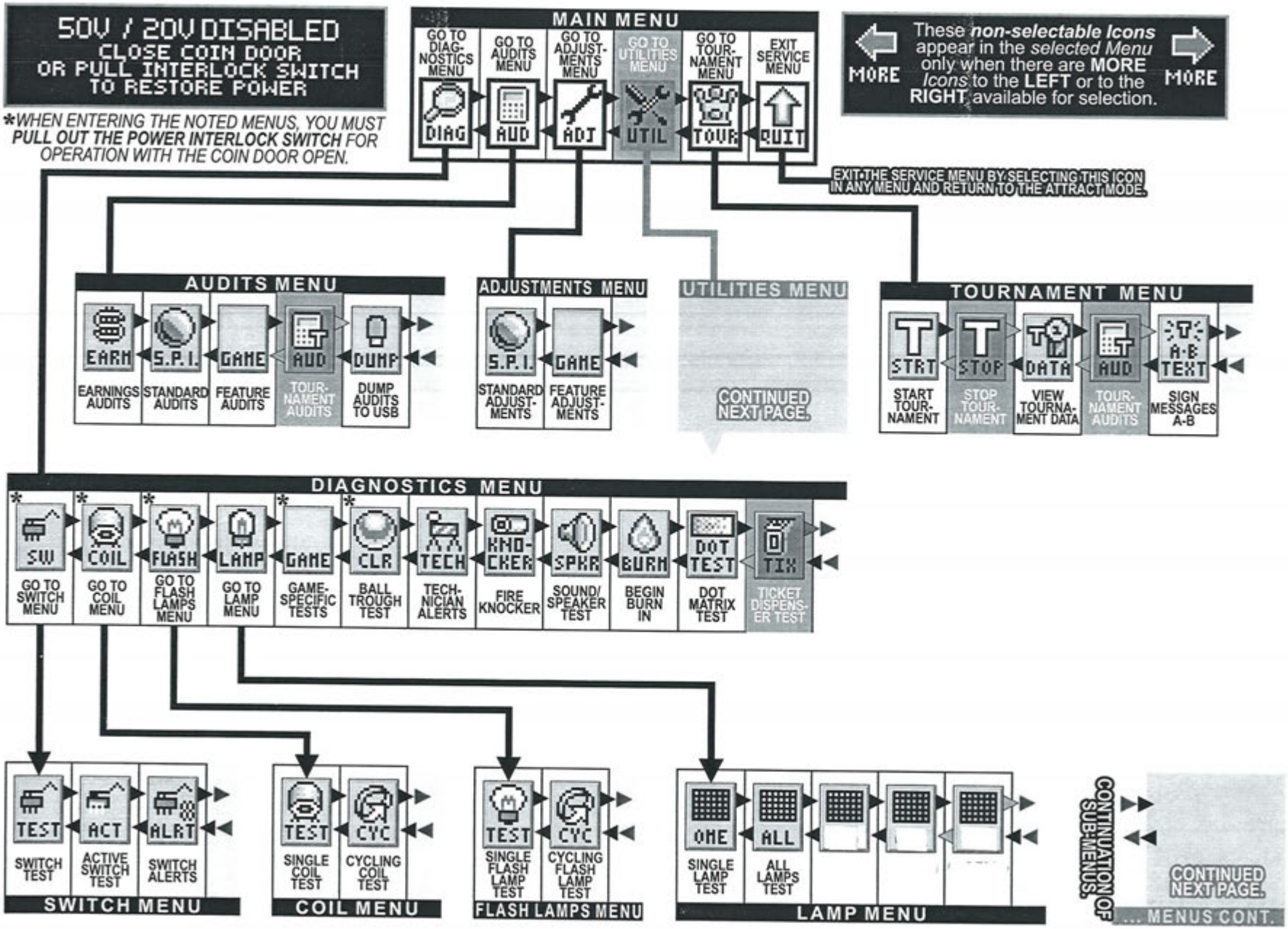
LOOK

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

Problem / Solution Table

PROBLEM	SOLUTION
Will not enter the **SERVICE MENU** after depressing the **Black [SELECT] Button**.	• Check the Service Switches [GREEN, RED (X2) & **BLACK Buttons**] for loose connections or bad ground. • Check the associated wiring harness to/from the CPU/Sound Board, Connector **J13**. • Check CPU/Sound Board for possible failure.
All **Service Buttons [• • • • Buttons]** appear nonfunctional.	• Check the Service Switches wiring harness for poor or no connection and/or broken wires.
The **Green Button** in the Attract Mode will not enter the **SERVICE CREDITS MENU** to add Service Credits.	• Check to make sure the Game is not in **"Free Play."** *If the game is set to Free Play, adding Service Credits is not required.* • Check the Service Switches wiring harness for poor or no connection and/or broken wires.
The **Display** "blanks out."	• Check the Dot Matrix Display for loose wiring harness for poor or no connection and/or broken wires. • Check **F1** (3/4A Fuse) on the Display Power Supply Board. *Refer to the Yellow Pages (**SCHEMATICS & TROUBLESHOOTING**).*
Icons *"scroll"* along continuously in the **MAIN MENU**.	• Check for a stuck switch on either of the **Red Buttons**.
The **Start** and **Flipper Buttons** do not select or activate *Icons* in the **SWITCH TEST MENU**.	• This is normal. These switches are deactivated, as they are a part of the Switch Test. *Refer to the Diagnostics Section (**GO TO DIAGNOSTICS MENU, Switch Test**).*
Can't move selection of *Icon* with the **Left** and/or **Right Flipper Buttons**.	• Check the **Flipper Buttons** for loose connections or bad Ground and refer to Section **5**, Chapter **2**, Playfield Wiring, #-Flipper Circuit Wiring Diagram. • This is normal ***only*** in ***Diagnostic's Switch & Active Switch Tests*** *(see previous Problem).*
Some *Icons* appear non-functional in the **MENU** or missing.	• Some functionality of the Service Menu may not have been completed during development. If exists, it should only be a non-critical function, such as the "HELP" *Icon*, which will explain the usage of icons. When completed, a software update will correct the problem. Software updates are announced via Service Bulletins (if critical) and on our website **http://www.sternpinball.com/GAME-code.shtml**; view the Game Code Library Message Board Marquee or click **Previous Messages** for past announcements.
In **COIL TEST MENU**, the coils and flashlamps ***do not*** fire after pressing the **Black [SELECT] Button**.	• Ensure the **POWER INTERLOCK SWITCH** ***is pulled out*** *(see the start of this Chapter).*
In the **SERVICE MENU**, the volume cannot be adjusted with either of the **Red Buttons**.	• The Volume adjustment can only be made when in the **Attract Mode** *(see the start of this Chapter).*
In the **SERVICE MENU**, the display seems to lock up, or the Help Display appears to be non-functional.	• If you cannot clear the situation by exiting back one Menu, exit completely out of the **SERVICE MENU**, and re-enter. If the problem persists, call Technical Support for additional help.

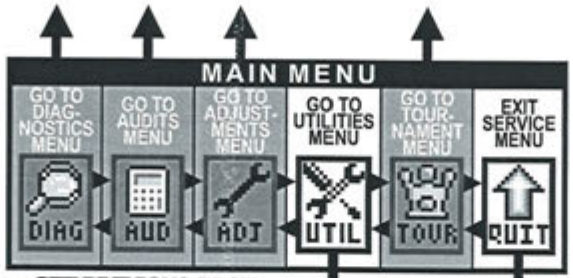
IF YOU NOTE ANY OTHER PROBLEMS or HAVE ANY SYMPTOMS NOT DESCRIBED ABOVE, PLEASE CALL TECHNICAL SUPPORT 800-542-5377 (708-345-7700 OPTION #1), SO WE MAY ASSIST YOU.


50V / 20V DISABLED
CLOSE COIN DOOR
OR PULL 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.
MAIN MENU
GO TO DIAG-NOSTICS MENU
GO TO AUDITS MENU
GO TO ADJUST-MENTS MENU
GO TO UTILITIES MENU
GO TO TOUR-NAMENT MENU
EXIT SERVICE MENU
DIAG
AUD
ADJ
UTIL
TOUR
QUIT
MORE
These non-selectable Icons appear in the selected Menu only when there are MORE Icons to the LEFT or to the RIGHT available for selection.
MORE
EXIT THE SERVICE MENU BY SELECTING THIS ICON IN ANY MENU AND RETURN TO THE ATTRACT MODE.
AUDITS MENU
EARN
S.P.I.
GAME
AUD
DUMP
EARNINGS AUDITS
STANDARD AUDITS
FEATURE AUDITS
TOUR-NAMENT AUDITS
DUMP AUDITS TO USB
ADJUSTMENTS MENU
S.P.I.
GAME
STANDARD ADJUST-MENTS
FEATURE ADJUST-MENTS
UTILITIES MENU
CONTINUED NEXT PAGE.
TOURNAMENT MENU
STRT
STOP
DATA
AUD
A-B TEXT
START TOUR-NAMENT
STOP TOUR-NAMENT
VIEW TOURNA-MENT DATA
TOUR-NAMENT AUDITS
SIGN MESSAGES A-B
DIAGNOSTICS MENU
SW
COIL
FLASH
LAMP
GAME
CLR
TECH
KNO-CKER
SPKR
BURN
DOT TEST
TIX
GO TO SWITCH MENU
GO TO COIL MENU
GO TO FLASH LAMPS MENU
GO TO LAMP MENU
GAME-SPECIFIC TESTS
BALL TROUGH TEST
TECH-NICIAN ALERTS
FIRE KNOCKER
SOUND/ SPEAKER TEST
BEGIN BURN IN
DOT MATRIX TEST
TICKET DISPENS-ER TEST
TEST
ACT
ALRT
SWITCH TEST
ACTIVE SWITCH TEST
SWITCH ALERTS
SWITCH MENU
TEST
CYC
SINGLE COIL TEST
CYCLING COIL TEST
COIL MENU
TEST
CYC
SINGLE FLASH LAMP TEST
CYCLING FLASH LAMP TEST
FLASH LAMPS MENU
ONE
ALL
SINGLE LAMP TEST
ALL LAMPS TEST
LAMP MENU
CONTINUATION OF SUB-MENUS.
CONTINUED NEXT PAGE.
... MENUS CONT.

Chapter 2 Chapter 3 Chapter 4 Chapter 5 Chapter 6

*For more detailed information on the Menus and, Sub-Menus, review Section **3**, Chapters **2—6**.*

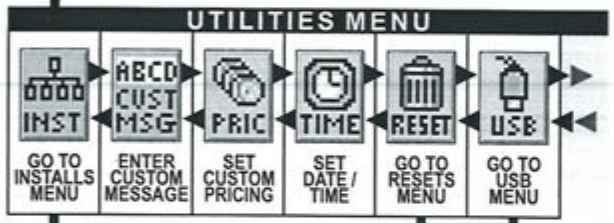




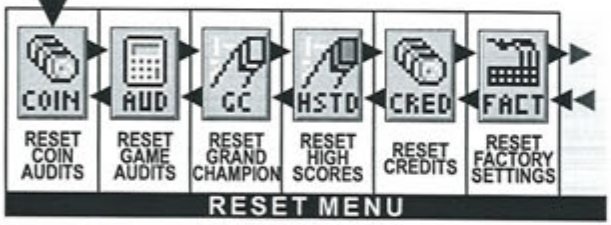
SEE PREVIOUS PAGE.



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

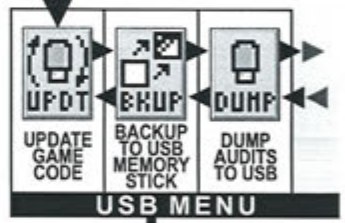


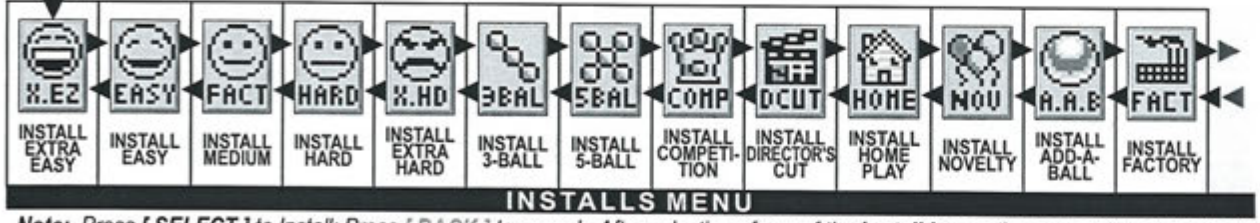
NOTE: Depending on Game Type, Version, selections made, Dip Switch settings, location and/or areas, some *Icons* may appear non-functional *or* may not appear at all. Some *Icons* change depending on selections *(e.g. Selecting and activating the "STRT" Icon [Start Tournament] will be replaced with the "STOP" Icon [Stop Tournament]).* 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 or as 'OK' / 'ENTER'.

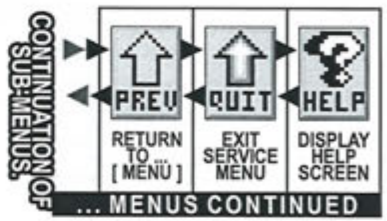




TO UPDATE GAME CODE, **MOVE DIP SWITCH #8** TO **'ON'** *(on CPU/SND PCB).* PERFORM CPU / SND PCB RESET ***PRESS THE WHITE BUTTON.*** FOLLOW ON-SCREEN PROMPTS *(REVIEW INSIDE COVER).*







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 supercede 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

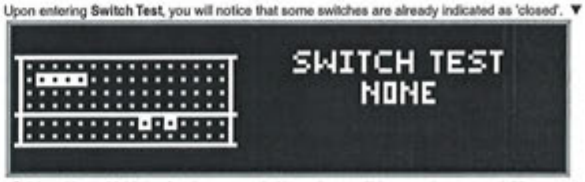
To initiate, from the **DIAGNOSTICS MENU**, select the "SW" *Icon.* Switches are configured in an 4 X 16 Matrix of Rows [Switch Drives] and Columns [Sw. Returns] with up to **64** possible switches. Dedicated Switches are configured in a 2 X 16 Matrix of Rows [Dedicated Sw. Drives / Ground] and Column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

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

Switch Test

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

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



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



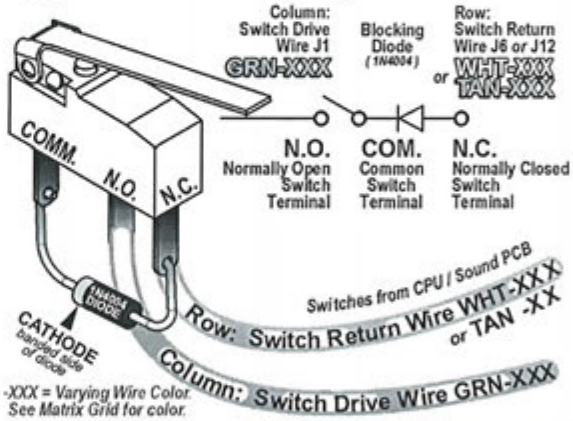
After pressing the switch *(to make it close)*, the display will indicate the last switch number. ▼



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

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

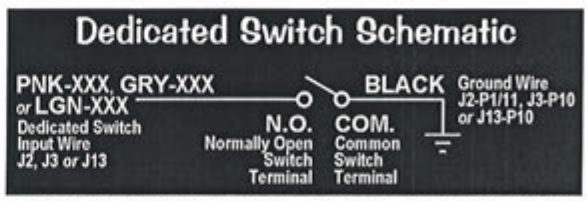
Typical Switch Wiring & Schematic



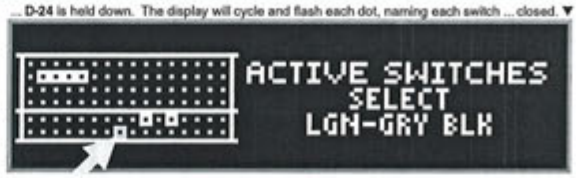
Active Switch Test

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 pin-ball(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.

Dedicated Switch Schematic



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



Switch Alerts

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

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**.

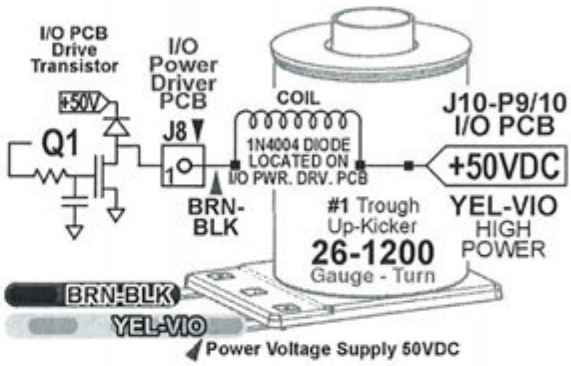
Remember, use the **GREEN Button** to go **[BACK]**, exit *or* escape, the **RED Buttons** to [< / –] GO BACK [+ / >] GO FORWARD, and the **BLACK Button** to **[SELECT]** ENERGIZE the coil *(solenoid)* or flash lamp.

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)*.

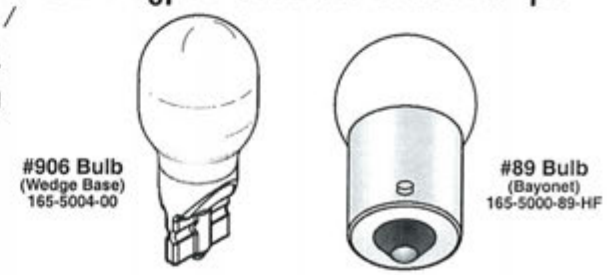
Remember, use the **GREEN Button** to go **[BACK]**, exit *or* escape, the **RED Buttons** to [< / –] GO BACK / [+ / >] GO FORWARD, and the **BLACK Button** to **[SELECT]** ENERGIZE the flash lamp.

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 and 8 X 10 Matrix of Rows [Lamp Returns / Ground] and Columns [Lamp Drives / 18VDC] with up to **80** lamps possible. The **LAMP TEST MENU** consists of five (5) parts: **Single Lamp Test**, **Test All Lamps**, **Row Lamps Test**, **Column Lamps Test** and **Ordered Lamps Test*** to test ***all*** lamps.

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

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



Single Lamp Test

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

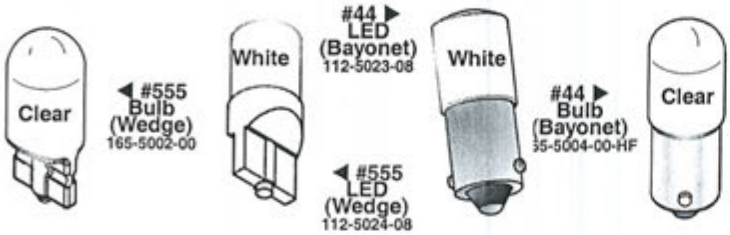
Upon entering **All Lamps Test**, ... the Dot Matrix Display is flashing "ALL LAMPS ON" ... ▶



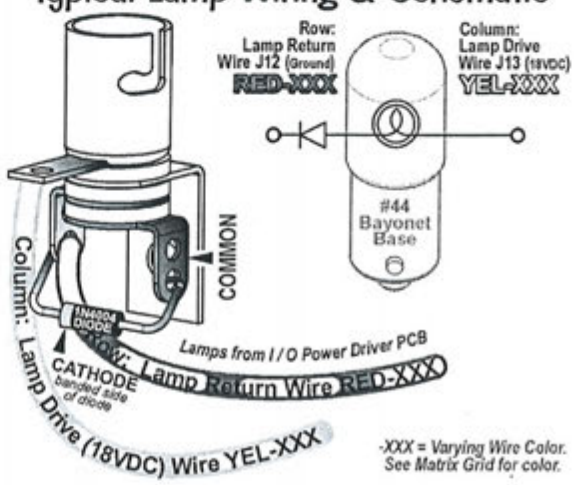
All Lamps Test

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.

Bulb Types used for Control Lamps



Typical Lamp Wiring & Schematic



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

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

Ordered Lamps Test

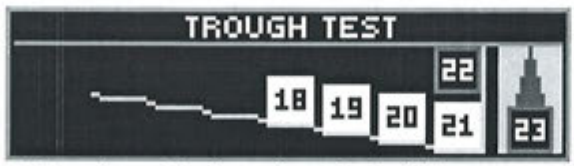
To initiate, from the **LAMP MENU**, select the "ORD" *Icon*. *If required, this Icon will appear in the* ***LAMP MENU***. Identical to **Single Lamp Test**, however, the lamps lit are not in the Lamp Matrix numeric order, but ordered *or* arranged in separate localized grouping(s) for easier lamp checking.

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.

If the game does not see a switch closure *(indicating the pinball has not been found),* the Dot Matrix Display may indicate **[LOCATING PINBALLS PLEASE WAIT ...]**, during which **Ball Search** will continue until the timer runs out *(this feature will not happen if the game is in Competition Mode; Ball Search will continue until the pinball is found, unstuck and/or replaced manually).* The display will momentarily acknowledge the missing pinball(s). The game will provide another pinball into play and will compensate for the lost pinball. Game play will appear normal.

Note: *This detection and compensation will happen with every pinball, if each suffers the same fate of a ball trap. If* ***all*** *balls get trapped, the game cannot be played or started until the situation is rectified.*

Important: *Determine where the pinball is!* ***Do not add pinball(s)*** *until it is determined the pinball(s) are indeed missing and not just stuck. The most common places for a pinball to be stuck is in device holes (ejects and VUKs) or* ball troughs. Determine that all devices are functionally properly. Check around plastic pieces and ramps to see if the pinball got jammed *or* stuck.

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

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



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

Knocker Test



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

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

Sound / Speaker Test



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





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

Speaker Phase Testing

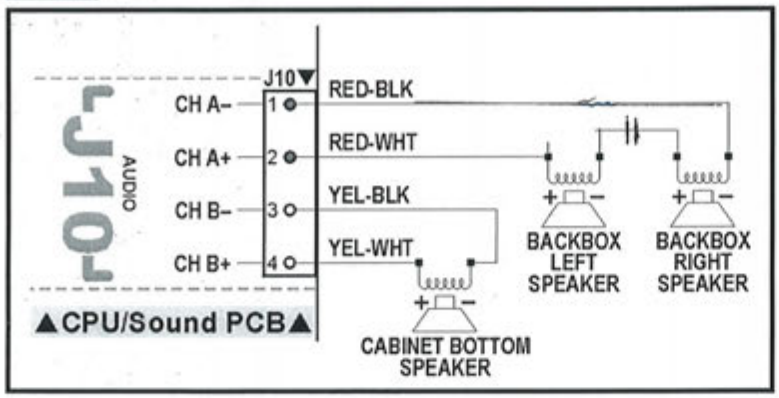
Connections to each of speakers are polarized and each must be connected appropriately for the best quality sound. If one speaker has the positive and negative connections reversed with respect to the other one, bass frequencies will not be produced properly and the overall sound quality will be poor.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

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

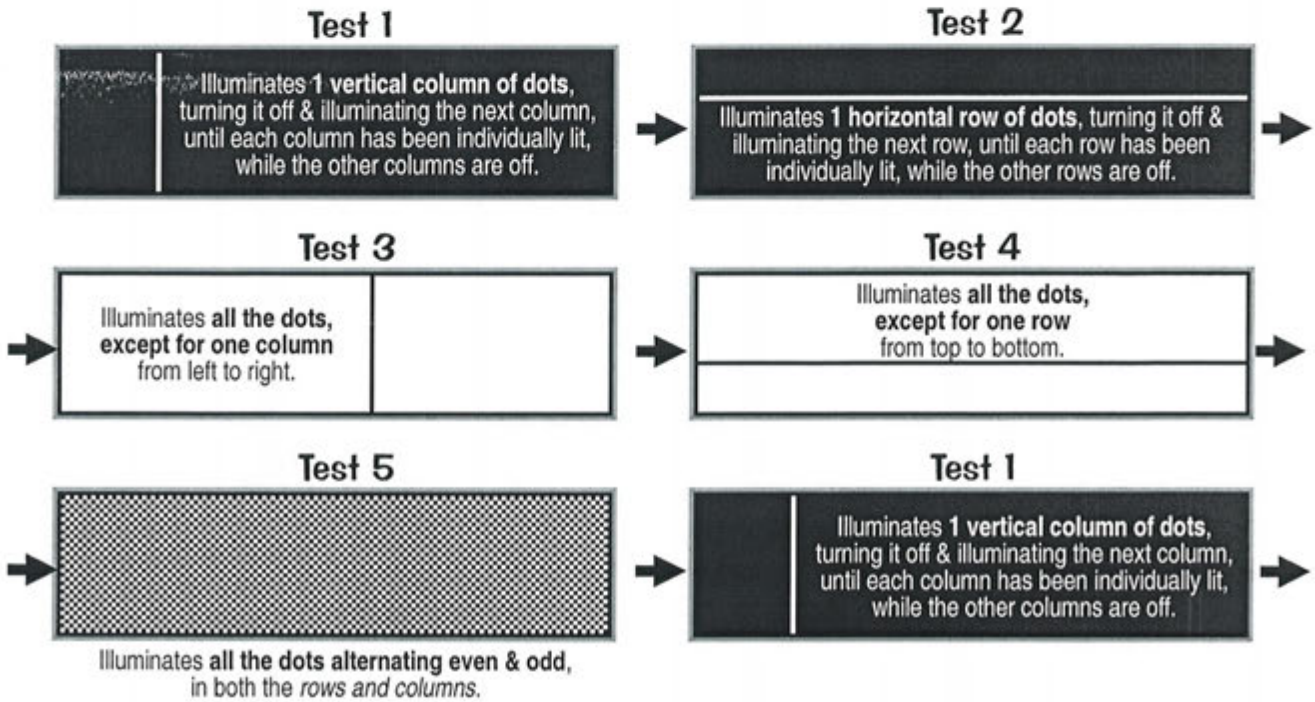
To initiate, from the **DIAGNOSTICS MENU**, select the "BURN" *Icon*. After selecting this *Icon*, press the **Black [SELECT] Button** to begin (initiate) the ***Burn-In Test***. Ensure the **Power Interlock Switch** is pulled out if testing with the Coin Door open *(required for coil function)*. Upon 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**.





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 *(reveiw the Utilities Section (**GO TO RESET MENU**), **Reset Coin Audits**)*.

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

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

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.

#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.*

Feature Audits [#1 – #+]

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

Feature Audits Definition: Programming Use Only. *The proprietary information Total number of times a feature was started, awarded, lit, played and/or completed (awarded); also, the total number of Switch Closures during certain modes or features are tracked (a predetermined single/multiple variations of switch closures are used to determine the lighting and/or completion of the feature stated). SEE THE DOT MATRIX DISPLAY FOR CURRENT FEATURE AUDITS.*

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

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

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

Dump Audits To USB (Memory Stick)

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

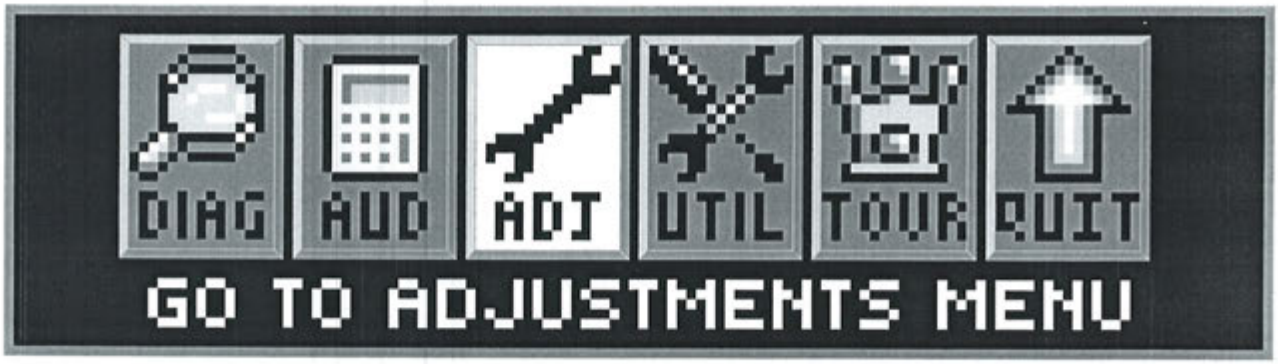


Step 1 Insert your **USB Compatible Memory Stick** into the USB port on the CPU/Sound Board (S.A.M. System). If the Memory Stick has space available and is free of errors, a dated file* is generated *(* ensure your Date & Time is set prior to selecting or the dated file will have the default date of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

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

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

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



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

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

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

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



Standard Adjustments [#1 – #63]

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

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

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

Standard Adjustments 3-18 continued on the next page.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

CPU/SOUND PCB DIP SWITCH SW1 SETTING	COUNTRY SETTING OPTION(S)	COIN MECHANISMS (SWITCHES) COINS THRU ... SLOT: LEFT	CENTER	RIGHT	4TH	PRICING SCHEME *Number of Plays (Credits) for Price Amount Shown* *See "Appendix J" for Coin Cards Examples & Info!*	Requires SPI Coin Card(s) Part Number
Pos. 1 2 3 4 5 6 7 8 / ON / OFF ▼▼▼▼▼▼▼▼	Default Highlighted: USA 1	0.25	1.00	0.25		USD // UNITED STATES DOLLAR // [$] 1/0.25	755-5400-01-Y
HIGHLIGHTED = Factory Default	USA 2					1/0.50 | 2/0.75 | 3/1.00	755-5400-09-Y
HIGHLIGHTED = Not Shown on Coin Card	USA 3					1/0.50 — For USA 6 and USA 7 use: 755-5400-02-Y. USA 6 Note: If player uses X4 25¢ quarters = 2 plays. However, $1 bill = 3 plays!	755-5400-02-Y
	USA 4					1/0.50	755-5400-02-Y
	USA 5					1/0.50 | 2/1.00 | 3/1.50 | 5/2.00	755-5400-08-Y
	USA 6					1/0.50 | 2 / 4 X 25¢' | 3 /$ 1.00 Bill	◀ Used to promote the Bill Validator.
	USA 7					1/0.50 | 2/1.00 | 4/1.50 | 6/2.00	
	USA 8					1/0.50 | 3/1.00	755-5400-00-Y
	USA 9					1/1.00	755-5400-07-Y
	USA 10					1/0.75 | 2/1.50 | 3/2.00	755-5400-11-Y
	USA 11					1/1.00 | 3/2.00	
Pos. 1 2 3 4 5 6 7 8 / ON / OFF	Default Highlighted: AUSTRALIA 1	0.20	1.00	2.00		AUD // AUSTRALIAN DOLLARS // [$AUS] 1/1.00 | 3/2.00	755-5406-00-Y (1 Side)
	AUSTRALIA 2					1/1.00	
	AUSTRALIA 3					1/2.00	
	AUSTRALIA 4					1/2.00 | 2/4.00 | 3/5.00	
	AUSTRALIA 5					1/3.00 | 2/5.00 | 3/8.00	5/10.00
	AUSTRALIA 6					1/2.00 | 2/3.00	
Pos. 1 2 3 4 5 6 7 8 / ON / OFF	Default Highlighted: CANADA 1 [25¢ door]	0.25	0.25	1.00	2.00	CAD // CANADIAN DOLLARS // [$CAN] 1/0.50 | 2/0.75 | 3/1.00	755-5400-00-Y -01-Y or -02-Y
	CANADA 2 [dollar door]	1.00		2.00		1/1.00 | 3/2.00	755-5400-10-Y
Pos. 1 2 3 4 5 6 7 8 / ON / OFF	Default Highlighted: CROATIA	1	2	5		HRK // CROATIAN KUNA // [kuna] 1/3 | 2/5	755-5410-00-Y (2-Sided)
Pos. 1 2 3 4 5 6 7 8 / ON / OFF	Default Highlighted: DENMARK 1	1	5	10	20	DKK // DANISH KRONER // [Kr] 1/3 | 2/5	755-5402-00-Y (2-Sided)
	DENMARK 2					1/2 | 2/4 | 3/5 | 4/7 | 5/9 | 7/10	
Pos. 1 2 3 4 5 6 7 8 / ON / OFF	Default Highlighted: JAPAN 1	100		100		JPY // JAPANESE YEN // [¥] 1/100	755-5408-01-Y (2-Sided)
	JAPAN 2					1/100 | 3/200	
Pos. 1 2 3 4 5 6 7 8 / ON / OFF	Default Highlighted: LITHUANIA	1	2	5		LTL // LITHUANIA LITAI // [Lt] 1/2	755-5416-00-Y (1 Side)
Pos. 1 2 3 4 5 6 7 8 / ON / OFF	Default Highlighted: MIDDLE EAST	token		token		TOKEN // *Middle East currency used to buy token* // [TOKEN] 1/1	755-5416-00-Y (use Side 1)
Pos. 1 2 3 4 5 6 7 8 / ON / OFF	Default Highlighted: NEW ZEALAND 1	1		2		NZD // NEW ZEALAND DOLLAR // [$NZD] 1/1	755-5406-00-Y (Side 2)
	NEW ZEALAND 2					1/1 | 3/2	
Pos. 1 2 3 4 5 6 7 8 / ON / OFF	Default Highlighted: NORWAY 1	10	5	20		NOK // NORWEGIAN KRONE // [Kr] 1/10	755-5403-01-Y or -02-Y / (2-Sided)
	NORWAY 2					1/10 | 3/20	
	NORWAY 3					1/20	755-5403-03-Y (2-Sided)
	NORWAY 4					1/20 | 3/40	
	NORWAY 5					1/.10	
	NORWAY 6					1/.10 | 3/.20	
	NORWAY 7					1/.20	
	NORWAY					1/.20 | 3/.40	
Pos. 1 2 3 4 5 6 7 8 / ON / OFF	Default Highlighted: RUSSIA	▼ LEFT SWITCH CAN BE WIRED TO BILL ACCEPTOR ▼ 10	5	1		RUB // RUSSIAN RUBLE // [Ruble] 1/5	755-5411-00-Y (2-Sided)
Pos. 1 2 3 4 5 6 7 8 / ON / OFF	Default Highlighted: SO. AFRICA 1	0.50	1.00	2.00	5.00	ZAR // SOUTH AFRICAN RAND // [R] 1/2.00 | 2/5.00	755-5409-01-Y (2-Sided)
	SO. AFRICA 2					1/3.00	
Pos. 1 2 3 4 5 6 7 8 / ON / OFF	Default Highlighted: SWEDEN 1	1	5	10		SEK // SWEDISH KRONOR // [kr] 1/10 | 2/15 | 3/20	755-5404-00-Y (2-Sided)
	SWEDEN 2					1/5	
Pos. 1 2 3 4 5 6 7 8 / ON / OFF	Default Highlighted: SWITZERLAND 1	1	2	5		CHF // SWISS FRANCS // [$f] 1/1 | 2/2 | 3/3 | 4/4 | 6/5	755-5405-00-Y (2-Sided)
	SWITZERLAND 2					1/1 | 3/2 | 5/3 | 7/4 | 9/5	
Pos. 1 2 3 4 5 6 7 8 / ON / OFF	Default Highlighted: TAIWAN	10		10		TWD // TAIWANESE DOLLAR // [TWD] 1/10	755-5412-00-Y (use Side 1)
Pos. 1 2 3 4 5 6 7 8 / ON / OFF	Default Highlighted: UK 1	▼ 5TH COIN SLOT NOT AVAILABLE WITH CUSTOM PRICING ▼ LEFT: 0.10	CENTER: 0.50	RIGHT: 1.00	4TH: 0.20	5TH: 2£ ▲ Coin Only	GPB // UNITED KINGDOM POUNDS // [£] 3/1.00 | 7/2.00	755-5407-00-Y
	UK 2					4/1.00	755-5407-01-Y*
ATTENTION: UK 5TH COIN SLOT TIED TO 6TH CHANNEL ON ELEC. COIN MECH	UK 3					1/0.50 | 2/1.00 | 3/1.50 | 5/2.00	755-5407-01
	UK 4					1/0.30 | 2/0.60 | 3/0.90 | 4/1.00	755-5407-01-Y*
	UK 5					1/1.00 | 3/2.00	755-5407-01
	UK 6					3/2.00 — * use blank side	755-5407-01-Y*

Adjustments

Euro 1-12 Summary & International (Euro) Standard Pricing Select Table

CPU/SOUND PCB DIP SWITCH SW1 SETTING	COUNTRY SETTING OPTION(S)	COIN MECHANISMS (SWITCHES) COINS THRU ... SLOT: LEFT	CENTER	RIGHT	4TH	PRICING SCHEME *Number of Plays (Credits) for Price Amount Shown See "Appendix J" for Coin Cards Examples & Info!* EUR // EUROPEAN UNION EUROS // [€]			Requires SPI Coin Card(s) Part Number
Pos. 1 2 3 4 5 6 7 8	Default Highlighted								
ON S E E B E L O W	Euro 1	0.50	1.00	2.00	optional 0.20 optional	1/0.50			755-5401-01-Y
OFF S E T T I N G S	Euro 2					1/0.50	2/1.00	3/1.50	5/2.00	755-5401-02-Y
Euro 1-12 are alternate settings for countries using the Euro.	Euro 3					1/0.50	3/1.00			755-5401-03-Y
	Euro 4					1/0.50	2/1.00	3/1.50	6/2.00	755-5401-04-Y
HIGHLIGHTED = Factory Default	Euro 5					1/0.50	3/1.00	4/1.50	7/2.00	755-5401-05-Y
	Euro 6					2/0.50				755-5401-06-Y
HIGHLIGHTED = Not Shown on Coin Card	Euro 7					1/1.00	2/2.00	3/3.00	5/4.00	755-5401-07-Y
	Euro 8					1/1.00		3/2.00		755-5401-08-Y
	Euro 9					1/1.00		2/1.50	3/2.00	755-5401-09-Y
	Euro 10					1/1.00		3/2.00	7/3.00	755-5401-10-Y
	Euro 11					1/1.00		4/2.00		755-5401-11-Y
	Euro 12					2/1.00	4/2.00	6/3.00	9/4.00	755-5401-12-Y

*For a different **Euro Pricing Scheme** (other than Factory Default listed below), scroll through **Standard Adjustment 18**: Euro 1-12 or CUSTOM* for new setting (reference above Euro 1-12 Summary). Keep the Country Dip Switch Setting the same as listed below.*

Pos. 1 2 3 4 5 6 7 8	Default Highlighted					EUR // EUROPEAN UNION EUROS // [€]			
ON ▲	AUSTRIA Euro 9	0.50	1.00	2.00		1/1.00	2/1.50	3/2.00	755-5401-09-Y
OFF ▼ ▼ ▼ ▼ ▼ ▼ ▼									
Pos. 1 2 3 4 5 6 7 8	Default Highlighted								
ON ▲	BELGIUM Euro 1	0.50	1.00	2.00		1/0.50			755-5401-01-Y
OFF ▼ ▼ ▼ ▼ ▼ ▼ ▼									
Pos. 1 2 3 4 5 6 7 8	Default Highlighted								
ON ▲ ▲	FINLAND Euro 8	0.50	1.00	2.00		1/1.00	3/2.00		755-5401-08-Y
OFF ▼ ▼ ▼ ▼ ▼ ▼									
Pos. 1 2 3 4 5 6 7 8	Default Highlighted								
ON ▲ ▲	FRANCE Euro 10	0.50	1.00	2.00		1/1.00	3/2.00	7/3.00	755-5401-10-Y
OFF ▼ ▼ ▼ ▼ ▼ ▼ ▼									
Pos. 1 2 3 4 5 6 7 8	Default Highlighted								
ON ▲ ▲ ▲	GERMANY 1	0.50	1.00	2.00		1/0.50			755-5401-01-Y
OFF ▼ ▼ ▼ ▼ ▼ ▼	GERMANY 2					1/0.50	2/1.00	3/1.50	5/2.00	755-5401-02-Y
	GERMANY 3					1/0.50	2/1.00	3/1.50	6/2.00	755-5401-04-Y
Pos. 1 2 3 4 5 6 7 8	Default Highlighted								
ON ▲ ▲ ▲ ▲	GREECE Euro 8	0.50	1.00	2.00		1/1.00	3/2.00		755-5401-08-Y
OFF ▼ ▼ ▼ ▼									
Pos. 1 2 3 4 5 6 7 8	Default Highlighted								
ON ▲	ITALY 1	0.50		0.50		1/0.50			755-5401-01-Y
OFF ▼ ▼ ▼ ▼ ▼ ▼ ▼	ITALY 2					1/1.00	3/2.00		755-5401-08-Y
Pos. 1 2 3 4 5 6 7 8	Default Highlighted								
ON ▲	NETHERLANDS Euro 3	0.50	1.00	2.00		1/0.50	3/1.00		755-5401-03-Y
OFF ▼ ▼ ▼ ▼ ▼ ▼ ▼									
Pos. 1 2 3 4 5 6 7 8	Default Highlighted								
ON ▲	PORTUGAL Euro 1	0.50		0.50		1/0.50			755-5401-01-Y
OFF ▼ ▼ ▼ ▼ ▼ ▼ ▼									
Pos. 1 2 3 4 5 6 7 8	Default Highlighted								
ON ▲	SPAIN Euro 8	0.50	1.00	2.00		1/1.00	3/2.00		755-5401-08-Y
OFF ▼ ▼ ▼ ▼ ▼ ▼ ▼									

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 acheived. If awarding a ***CREDIT***, ***TICKET*** *or* ***TOKEN*** is prohibited in your area, install **NO** in **Allow High Scores** (Standard Adjustment **24**). *This adjustment is 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.

#37 **HSTD (HIGH SCORE TO DATE) RESET COUNT:** Set between **100 – 9900** *or* **OFF** *(increments of 100).* Factory Default = **2000**. Set the number of games between "automatic resets" of High Scores back to the Factory Defaults for ***ONLY*** Standard Adj. **32 – 35, High Score #1 – #4**. *The High Score will revert to the Factory Default Scores when the number of games stated is reached.* ***Reset High Scores*** *can be performed in the* ***RESET MENU*** *(via the* ***UTILITIES MENU****) anytime or if the game is without power for more than 12 hours after the CPU/Sound PCB Coin Cell Battery is expired or removed. This adjustment is not shown if* ***NO*** *is installed in* ***Allow High Scores*** *(Standard Adj.* ***24****).*

#38 **FREE PLAY:** Set to **YES** or **NO**. Factory Default = **NO**. When set to **YES**, no coins are required for *Game Play.*

#39 **LANGUAGE:** Set to **ENGLISH, GERMAN, FRENCH, SPANISH** *or* **ITALIAN**. Factory Default = **ENGLISH**. Set the language for the game. Language of game is also shown in the Dot Display *(along with the Game Title and code version)* at the start-up routine which follows a game reset *or* power-up.

#40 **PLAYER LANGUAGE SELECT:** Set to **YES** *or* **NO**. Factory Default = **YES**. When set to **YES**, after the player presses the **Start Button** *(to start a game with adequate credit)*, the player has the option to choose a language by pressing either **Flipper Button** before game start *(options of languages installed are shown on the Dot Display).* ***Note:*** *If set to* ***NO*** *or if only one langauge is installed and the setting is set to* ***YES****, the game will start immediately after the* ***Start Button*** *press. Language(s) available are dependent on game destination from the factory. Other languages may be available on-line for download and installed on your game. With the proper dip switch installed, the langauge option(s) can be changed. For more information or help, call Technical Support at 800-542-5377 (708-345-7700).*

#41 **CUSTOM MESSAGE:** Set to **ON, CHANGE** *or* **OFF**. Factory Default = **ON**. *Shortcut:* ***Enter Custom Message*** *and instructions, review the Utilities Section,* ***Enter Custom Message****.*

#42 **FLASH LAMP POWER:** Set to **NORMAL, OFF** *or* **DIM**. Factory Default = **NORMAL**. When set to **DIM**, the Flash Lamps impulse power is reduced by **25%** and when set to **OFF** the Flash Lamps will not flash. For Flash Lamps used in this game, **Go To Flash Lamps Menu** via the **DIAGNOSTICS MENU** *(see the Diagnostics Section).*

#43 **COIL PULSE POWER:** Set to **NORMAL, HARD** *or* **SOFT**. Factory Default = **NORMAL**. When set to **HARD**, the coil pulse power is ***increased*** by **12.5%** of the normal pulse rate. When set to **SOFT** the coil pulse power is ***decreased*** by **12.5%** of the normal pulse rate. This adjustment is provided to compensate for *Low Line* or *High Line voltage* conditions where the solenoids (coils) appear to *kicking too weak or too hard.* Adjust as required.

#44 **KNOCKER VOLUME:** Set to **NORMAL, OFF** *or* **LOW**. Factory Default = **NORMAL**. When set to **LOW**, the volume is decreased 50%. When set to **OFF**, no sound is heard when the "knocker" is sounded. Test the knocker sound in the **Fire Knocker** Test via the **DIAGNOSTICS MENU** *(see Section* ***3****, Chapter* ***2****,* ***GO TO DIAGNOSTICS MENU****, Page* ***19****).*

#45 **GAME RESTART:** Set to **YES** *or* **NO**. Factory Default = **YES**. When set to **YES**, a new game may be started during any ball after the first ball is completed *(if credits allow).* Pressing the Start Button during the first ball will add additional players *(up to 4, if credits allow).* When set to **NO**, the game disables the Start Button after the first ball until the final ball is in play.

#46 **BILL VALIDATOR:** Set to **YES** *or* **NO**. Factory Default = **NO**. When set to **YES**, in ***Game Attract Mode*** an "Insert Bill Animation" is shown in the display *(or just the absense of the Coin Animation).* When set to **NO**, an "Insert Coin Animation" is shown. ***(This adjustment will appear when implemented).***

#47 **MUSIC VOLUME:** Set between **1 – 15**. Factory Default = **1**. After volume is set via Service Buttons this adjustment can be utilized to adjust the background music *(1 all the way on, 15 all the way off)* while keeping the Special Sound Effects at the same level.

#48 **BALL SAVE TIME:** Set between **0:01 – 0:15, AUTO** *or* **NO BALL SAVES**. Factory Default = **0:05**. When set to **NO BALL SAVES** this feature is unavailable. Set between **0:01** through **0:15** *(single increments)* for the ball to be sent back into play if the time set is not met *(per ball).* Set to **AUTO** to automatically adjust the Ball Save Timer based on the average ball time.

#49 **TIMED PLUNGER:** Set to **OFF** *or* **0:01 – 1:00**. Factory Default = **OFF**. The plunger will "Autoplunge" the ball *(at the time set)* when the ball is at the beginning of play, waiting for the player.

#50 **FLIPPER BALL LAUNCH:** Set to **OFF, LEFT FLIPPER, RIGHT FLIPPER, EITHER FLIPPER** *or* **BOTH FLIPPERS**. Default is **OFF**. This feature allows the player to operate the Auto Ball Launch with the Flipper Button(s) depending on which setting is chosen.

Standard Adjustments 51-63 continued on the next page.

#51 **COINDOOR BALL SAVER:** Set to **YES** *or* **NO**. Factory Default = **NO**. When set to **NO**, this feature is not available. When set to **YES**, this feature allows the Coin Door to be opened during game play; the ball will drain but the game will be placed "on hold". When the Coin Door is closed, the pinball will return to the Shooter Lane, and the game will resume. *Useful at locations where technicians change the cash box regularly at exact times of the day where players can be on the game.*

#52 **COMPETITION MODE:** Set to **YES** *or* **NO**. Factory Default = **NO**. When set to **NO**, this feature is not available. Set to **YES**, this feature will equalize random game features and global score values during multi-player games by predetermined competition rules set by programming. If an **Install Competition** was made via the **INSTALLS MENU** *(which automatically changes this setting to **YES**)*, and this setting was changed back to **NO**, the ***Competition Mode*** will be turned **OFF** *(cancelled)*.

#53 **CONSOLATION BALL:** Set to **YES** *or* **NO**. Factory Default = YES. When set to **YES**, the ***EXTRA BALL*** *(lamp insert, location varies)* will be lit on the last ball in play, if certain programming criteria is met.

#54 **FAST BOOT:** Set to **YES** *or* **NO**. Factory Default = **YES**. When set to **NO** or if you hold both **Flipper Buttons** during Power-Up, this feature is not available and will display all normal Power-Up screens. When set to **YES**, the game will not display the normal informative Power-Up screens, specifically the CPU Version screen and the Location/Game ID screen. Regardless of the setting, normal Power-Up safety checks are still performed. ***(This adjustment will appear when implemented).***

#55 **Q24 OPTION:** Set to **COIN METER**, **TOKEN DISPENSER** *or* **KNOCKER**. Factory Default = **COIN METER**. This Coil (Solenoid) Location is left "open" at the Factory to allow for these optional Mechanisms to be added to the game. If selecting **TOKEN DISPENSER**, Standard Adjustments 3, 14, 20 & 25 should be changed to **TOKEN**. *Call Tech. Support at 1-800-542-5377 if more information is required on this option.*

#56 **TICKET DISPENSER:** Set to **YES** *or* **NO**. Factory Default = **NO**. *This adjustment is required only for games which have an optional Deltronics (DL-1275-2 PCB Style, SPI Part Nr. 515-7275-00) Ticket Dispenser installed. Unique CPU Sound Bd. Dip Switch Setting required, changes the Default to **YES**.*

#57 **PLAYER COMPETITION:** Set to **YES** *or* **NO**. Factory Default = **YES**. ***Competition Mode*** unrandomizes feature events, and standardizes game play and rule sets *(varies from game to game)* for fair competitions. With at least one credit posted, *or* with the game set for 'FREE PLAY', during the game-over Attract Mode, press the **Left Flipper Button** and hold it in for approximately one second. The following message will appear on the display for approximately 10 seconds: '**COMPETITION MODE READY ... PRESS START NOW**'. If a game is started *(either by pressing the 'START' button for a regular game, or by pressing the 'TOURNAMENT START' button for a tournament game)* while this message appears on the display, then competition mode will be enabled for all players during the game. General rules are covered in the Instruction Card. Other *Hints and/or Rules* can be made known on this game either visually *(the Dot Display or Flashing Light Inserts) or* can be audible.

#58 **TEAM SCORES:** Set to **YES** *or* **NO**. Factory Default = **NO**. Set to **YES**, then Team Play will be made available. ***Team Play only works in a 4-Player Game.*** The totals for Players 1 / 3 (Team 1) & Players 2 / 4 (Team 2) are then displayed individually ***as well as*** the combined score for **BOTH TEAMS** to enable **Team Play (Doubles)**. ***(This adjustment will appear when implemented).***

#59 **LOCATION ID:** Set between **0** to **9999**. Factory Default = **0**. This adjustment allows the operator to assign a location identification number to the audit print-out sheet. *(Will not be affected by a Factory Reset.)*

#60 **GAME ID:** Set between **0** to **9999**. Factory Default = **0**. This adjustment allows the operator to assign a game identification number to the audit print-out sheet. *(Will not be affected by a Factory Reset.)*

#61 **TIME FORMAT:** Set to **12-HOUR** *or* **24-HOUR**. Factory Default = **12-HOUR**. This adjustments determines how the time is displayed. *Time used for Tournament and Data Dumps where a time stamp is required.*

#62 **COIN INPUT DELAY:** Set between **30** to **60** *or* **OFF**. Factory Default = **30**. This adjustment creates a short time delay between the moment the coin is inserted into the **Coin Slot** to the moment the CPU/Sound PCB registers the coin *(30 = approxiamately 1/2 second).*

#63 **LOST BALL RECOVERY:** Set to **YES** *or* **NO**. Factory Default = **NO**. Set to **YES**, at the start of the 5th consecutive ball search *(with no scoring between searches),* the game will consider any balls in play to be permanently lost and will attempt to recover from this situation by serving a new ball into play from the ball trough. Set to **NO** *(to suppress this adjustment behavior)* for the game to perform the "ball search" indefinitely until the lost balls are found or replaced.

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	__,000,000	
7	‡ REPLAY LEVEL #1	__,000,000	
8	‡ REPLAY LEVEL #2	__,000,000	
9	‡ REPLAY LEVEL #3	__,000,000	
10	‡ REPLAY LEVEL #4	__,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.*

Feature Adjustments [#1 – #+]

GAME

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

>>> **FACTORY RESET** *or* **CODE UPDATE NOTE:** Don't forget, any changes you make to your adjustments will revert back to the Factory Default settings if you perform a Factory Reset or update your Game Code. *See Utilities Section (**GO TO RESETS MENU** and **GO TO USB MENU**).*

View the Coils Detailed Chart Menu to see if this game is Shaker Motor Enabled. *If it is, set the options in the Feature Adjustment as seen below. (typically the last one).*

\# **SHAKER MOTOR (OPTIONAL) :** Set to **NONE**, **MINIMAL USE**, **MODERATE USE** *or* **MAXIMAL USE**. Factory Default = **MODERATE USE**. *Set to any of the varying "**... USES**" if an Optional Shaker Motor Kit (SPI Part Number **502-5027-00**) was installed correctly in this pinball machine. See the assembly (kit) on the last page of Blue Pages (Major Assemblies). Also see Shaker Motor Coil (Q8) in the Coils Detailed Chart Table at the begining of this Service Game Manual or the beginning of the Yellow Pages.*



To initiate, from the **MAIN MENU**, select the "UTIL" *Icon*. The **UTILITIES MENU** provides ways to quickly and easily customize your game with **Installs** *(pre-sets for game Standard & Feature Adjustments)*, set-up a **Custom Message** *(short-cut to Standard Adjustment **41, Custom Message**)*, set-up **Custom Pricing** *(short-cut to Standard Adjustment **18**, to the **Custom Pricing Sub-Menu**)*, set-up the **Date and Time** *(required if the date and time is needed to be accurate for data dumps and for tournaments)*, reset certain particular game data *or* perform a complete **Factory Reset** and to download game data, update or backup game code in the **USB MENU**.

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

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



Go To Installs Menu

To initiate, from the **UTILITIES MENU**, select the "INST" *Icon*. The **INSTALLS MENU** provides 13 **Installs** to vary **Game Play Difficulty** *(set with Feature Adjustments) or* **Game Play Type** and **Install Factory** *(restores all adjustments to Factory Defaults).*

For **detailed customization** *or* to check current **Adjustments Defaults** *(either changed by YOU in the Adjustments Menu or by this* **INSTALLS MENU** *or for Factory Default Settings), see Section **3**, Chapter **4, GO TO ADJUSTMENTS MENU**.* After completing one or more of the **Installs** in this chapter, go back to the **ADJUSTMENTS MENU** to see which **Standard** *and/or* **Feature Adjustments** have changed *(Feature Adjustments and/or settings are subject to change during production, and may differ than what is described in the tables at the end of this chapter). The Dot Display will indicate if a setting is a Factory Default or not. If the settings are not to your liking, perform **one** of the following:*

1.: **Manually** change the **Standard & Feature Adjustments** Settings *(perform this task in the **ADJUSTMENTS MENU**, see the Adjustments Section).*

2.: **Install Factory** *(see the last install)* on how to reset all of the **Standard & Feature Adjustments** back to the *Factory Default Settings.*

Multiple **Installs can be set** to vary game play; however, for **Installs** that have *one or more* Adjustments in common, the ***last*** "Install" selected & *activated*, will **supersede** any previously changed Adjustment(s) from any prior **Installs**. Any adjustments which you changed and are not affected by the Install will remain as set.

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

Remember, use the **GREEN Button** to go **[BACK]**, exit *or* escape and the **BLACK Button** to **[SELECT]** to INSTALL your new setting(s).



Install Extra Easy

To initiate, from the **INSTALLS MENU**, select the "X.EZ" *Icon*. The Dot Matrix Display will indicate the **INSTALL EXTRA EASY**. Follow the on-screen prompts to perform the **Install**. Set the **Game Play Difficulty** level.

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**).*

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'.*

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.



Step 2 Press **[SELECT]** to + INCREASE to **$0.50.**
Press [+ / >] to + INCREASE to **1 CREDIT AT:**



Step 3 Press **[SELECT]** to + INCREASE to **$1.00.**
Press [+ / >] to + INCREASE to **2 CREDITS AT:**



Step 4 Press **[SELECT]** to + INCREASE to **$2.00.**
Press [+ / >] to + INCREASE to **4 CREDITS AT:**



Step 5 Press **[SELECT]** to + INCREASE the amount once *(example = $2.25).*



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

Step 6 Press **[SELECT]** to INSTALL.
Press [< / –] / [+ / >] *or* [BACK] to edit.



Step 7 Press **[SELECT]**, press [BACK] twice to exit the **SERVICE MENU** with your **Custom Pricing** installed.



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.



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:

Set to **01**	1 Winner	**100%** (1) Prize Pool
Set to **02**	2 Winners	**65%** (1) **35%** (2)
Set to **03**	3 Winners	**50%** (1) **30%** (2) **20%** (3)
Set to **04**	4 Winners	**50%** (1) **25%** (2) **15%** (3) **10%** (4)
Set to **05**	5 Winners	**50%** (1) **20%** (2) **15%** (3) **10%** (4) **5%** (5)

BUMP N' WIN :

Cannot set to 01. Minimum of 2 winners required.

Set to **02**	2 Winners	**65%** (1) **35%** (2)
Set to **03**	3 Winners	**50%** (1) **25%** (2) **25%** (3)
Set to **04**	4 Winners	**40%** (1) **20%** (2) **20%** (3) **20%** (4)
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 *Regular* and *Tournament Games* played while a *Tournament is in progress.* This total is derived by adding the below Tournament Audit 02 with ***Regular Plays.***
02	**TOURNAMENT PLAYS :** Total number of *Tournament Games* played while a *Tournament is in progress.*
03	**TOTAL QUALIFYING PLAYS :** Total number of times a player qualified *(invited to enter name).*
04	**TOTAL GAME EARNINGS :** Total Gross Earnings *accepted*, while a *Tournament is active (in progress).*
05	**TOTAL TOUR. EARNINGS :** Earnings *(Audit 04 less Reg. Game Earnings)* while a *Tournament is in progress.*
06	**PRIZE POOL TOTAL :** Total Prize Pool *(Jackpot)* Amount to be paid out while a *Tournament is in progress.*
07	**NET EARNINGS :** Provides the total Net Earnings *(Gross Earnings less Prize Pool)* while a *Tournament is active.*
08	**ACCUM. TOTAL PLAYS :** Accumulative total amount of *Regular & Tournament Games* played since the first Tournament was played.
09	**ACCUM. TOUR. PLAYS :** Accumulative total amount of *Tourn. Games* played since 1st Tournament was played.
10	**ACCUM. QUALIFYING PLAYS :** Accumulative total number of times a player qualified *(invited to enter name).*
11	**ACCUM. EARNINGS :** Total Gross Earnings *accepted*, since the first Tournament was played.
12	**ACCUM. TOUR EARNINGS :** Accumulative total Tournament Game Earnings since the first Tournament was played.
13	**ACCUM. JACKPOT :** Accumulative total of Prize Pool Amounts paid out since the first Tournament was played.
14	**# TOURNAMENTS :** Number of Tournaments *(not individual Games)* since the first Tournament 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'.*

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
Avengers	520-5246-02	520-5249-00	V2.0
Avengers L/E	520-5303-04	520-5317-00	V2.0
Metallica	520-5337-01	520-5249-00	V1.0
Metallica L/E	520-5337-00	520-5317-00	V1.0
Star Trek	520-5352-00	520-5249-00 (REV. D)	V1.0 (64M)
Star Trek L/E	520-5352-01	520-5317-00	V1.0 (64M)
Batman (Standard)	520-5303-00	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

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 Translator	Driver Output PCB	Power Line Color	Power Line Connection	Power Voltage	Drive Translator 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	26-1200 090-5044-ND
#2	AUTO LAUNCH	Q2		YEL-VIO	J10-P9/10	50VDC	BRN-RED	J8-P3	23-900 090-5001-ND
#3	MAGNET	Q3		VIO-YEL	J10-P8	50VDC	BRN-ORG	J8-P4	22-850 511-5065-ND
#4	CENTER DROP TARGET UP	Q4		YEL-VIO	J10-P8	50VDC	BRN-YEL	J8-P5	25-1240 090-5034-ND
#5	CENTER DROP TARGET DOWN	Q5		YEL-VIO	J10-P9/10	50VDC	BRN-GRN	J8-P6	32-1800 090-5031-00 ND
#6	LEFT EJECT	Q6		YEL-VIO	J10-P9/10	50VDC	BRN-BLU	J8-P7	27-1500 090-5004-ND
#7	VENGEANCE KICK BACK	Q7		YEL-VIO	J10-P9/10	50VDC	BRN-VIO	J8-P8	23-800 090-5001-ND
#8	SHAKER MOTOR (OPTIONAL)	Q8		RED-WHT	J17-P7	16VAC	BRN-GRY	J8-P9	502-5027-00

	High Current Coils Group 2	Drive Translator	Driver Output PCB	Power Line Color	Power Line Connection	Power Voltage	Drive Translator 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	26-1200 090-5044-ND
#10	RIGHT POP BUMPER	Q10		YEL-VIO	J10-P9/10	50VDC	BLU-RED	J8-P2	26-1200 090-5044-ND
#11	BOTTOM POP BUMPER	Q11		YEL-VIO	J10-P9/10	50VDC	BLU-ORG	J8-P4	26-1200 090-5044-ND
#12	UPPER RIGHT FLIPPER	Q12		GRY	J10-P9/10	50VDC	BLU-YEL	J8-P5	22-1080 090-5032-ND
#13	LEFT SLINGSHOT	Q13		YEL-VIO	J10-P9/10	50VDC	BLU-GRN	J8-P6	26-1200 090-5044-ND
#14	RIGHT SLINGSHOT	Q14		YEL-VIO	J10-P9/10	50VDC	BLU-BLU	J8-P7	26-1200 090-5044-ND
#15	**LEFT FLIPPER (50V RED/YEL)**	Q15		GRY-YEL-3A Fuse-RED-YEL	J10-P6/7	50VDC	ORG-GRY	J8-P8	22-1080 090-5032-ND
#16	**RIGHT FLIPPER (50V RED/YEL)**	Q16		BLU-YEL-3A Fuse-RED-YEL	J10-P6/7	50VDC	ORG-VIO	J8-P9	22-1080 090-5032-ND

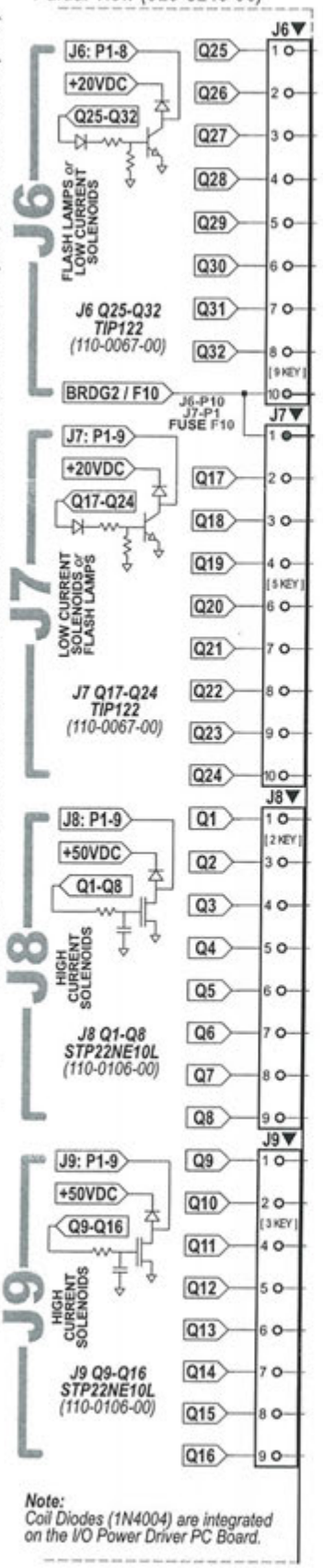
	Low Current Coils Group 1	Drive Translator	Driver Output PCB	Power Line Color	Power Line Connection	Power Voltage	Drive Translator Control Line Color	D.T. Control Line Connect	Coil GA-Turn or Bulb Type
#17	FLASH: ASTEROID (LEFT)	Q17	▲ I/O Power Driver ▼	ORG	J6-P10	20VDC	VIO-BRN	J7-P2	LED 113-5034-08
#18	FLASH: ASTEROID (RIGHT)	Q18		ORG	J6-P10	20VDC	VIO-RED	J7-P3	LED 113-5034-08
#19	FLASH: LEFT RAMP (TOP)	Q19		ORG	J6-P10	20VDC	VIO-ORG	J7-P4	LED 113-5034-08
#20	FLASH: RIGHT RAMP (TOP)	Q20		ORG	J6-P10	20VDC	VIO-YEL	J7-P6	LED 113-5034-08
#21	FLASH: KICK BACK	Q21		ORG	J6-P10	20VDC	VIO-GRN	J7-P7	LED 113-5034-08
#22	LASER MOTOR	Q22		BRN	J7-P1	20VDC	VIO-BLU	J7-P8	MOTOR 041-5111-00
#23	FLASH: RAMP (LEFT)	Q23		ORG	J6-P10	20VDC	VIO-BLK	J7-P9	LED 113-5034-08
#24	OPTIONAL (e.g. COIN METER)	Q24		RED	J16-P4-8	5VDC	VIO-GRY	J7-P10	COIN METER

	Low Current Coils Group 2	Drive Translator	Driver Output PCB	Power Line Color	Power Line Connection	Power Voltage	Drive Translator Control Line Color	D.T. Control Line Connect	Coil GA-Turn or Bulb Type
#25	FLASH: POP BUMPERS	Q25	▲ I/O Power Driver ▼	ORG	J6-P10	20VDC	BLK-BRN	J6-P1	LED 113-5034-08
#26	FLASH: WARP RAMP ENTRANCE	Q26		ORG	J6-P10	20VDC	BLK-RED	J6-P2	LED 113-5034-08
#27	FLASH: CENTER THREE BANK	Q27		ORG	J6-P10	20VDC	BLK-ORG	J6-P3	LED 113-5034-08
#28	FLASH: RAMP (RIGHT)	Q28		ORG	J6-P10	20VDC	BLK-YEL	J6-P4	LED 113-5034-08
#29	FLASH: LEFT LOOP	Q29		ORG	J6-P10	20VDC	BLK-GRN	J6-P5	LED 113-5034-05
#30	FLASH: UPPER RIGHT FLIPPER	Q30		ORG	J6-P10	20VDC	BLK-BLU	J6-P6	LED 113-5034-08
#31	FLASH: VENGEANCE SHIP	Q31		ORG	J6-P10	20VDC	BLK-VIO	J6-P7	LED 112-5044-08
#32	FLASH: BOTTOM SPOT (LEFT)	Q32		ORG	J6-P10	20VDC	BLK-GRY	J6-P8	LED 112-5041-08

Backbox I/O Power Driver Board
(Coils Q1-Q32)
Detailed Wiring Diagram

Partial View (520-5249-00)

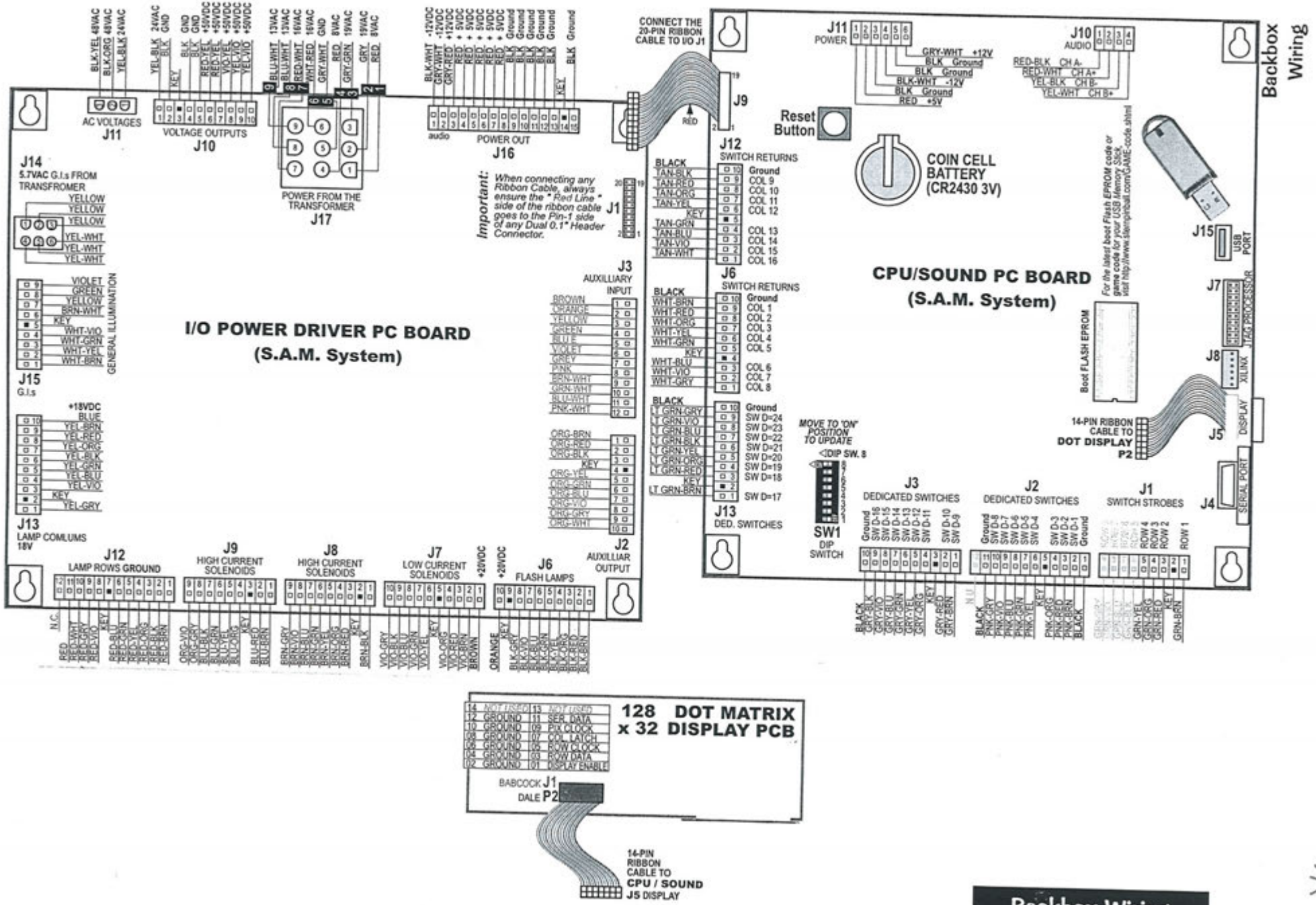
ALL FUSES RATED 250V SLO-BLO
I/O FUSE CHART INFO IN BACKBOX & PAGE DR. 1



*For complete and detailed schematics of the Connectors, Coils, Flash Lamps, Bridges and Fuses noted below, see the I/O Power Driver PCB (Sheets **1** & **2** of **4**) in Section **5**, Chapter **4**, Printed Circuit Boards (PCBs).*

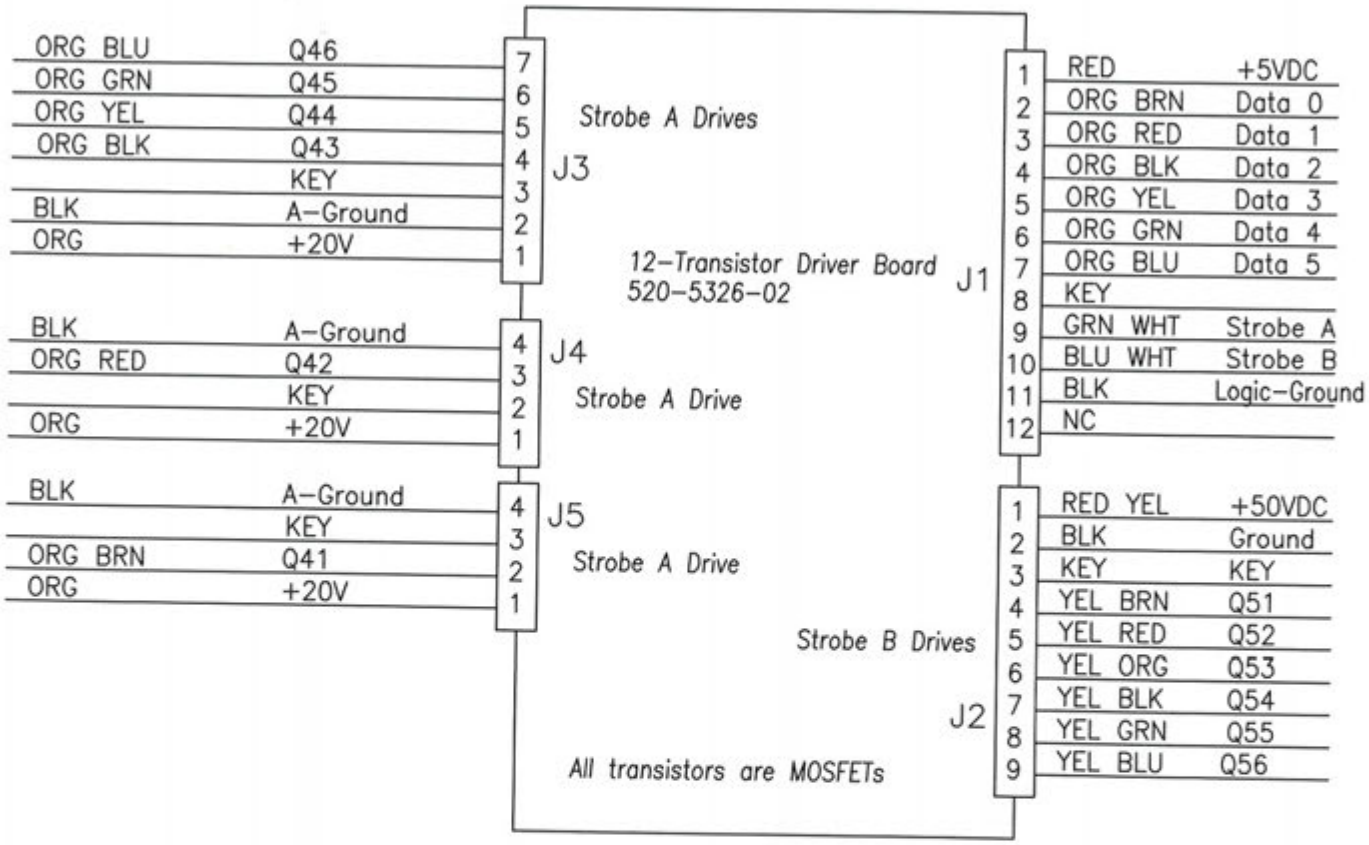
Note:
Coil Diodes (1N4004) are integrated on the I/O Power Driver PC Board.

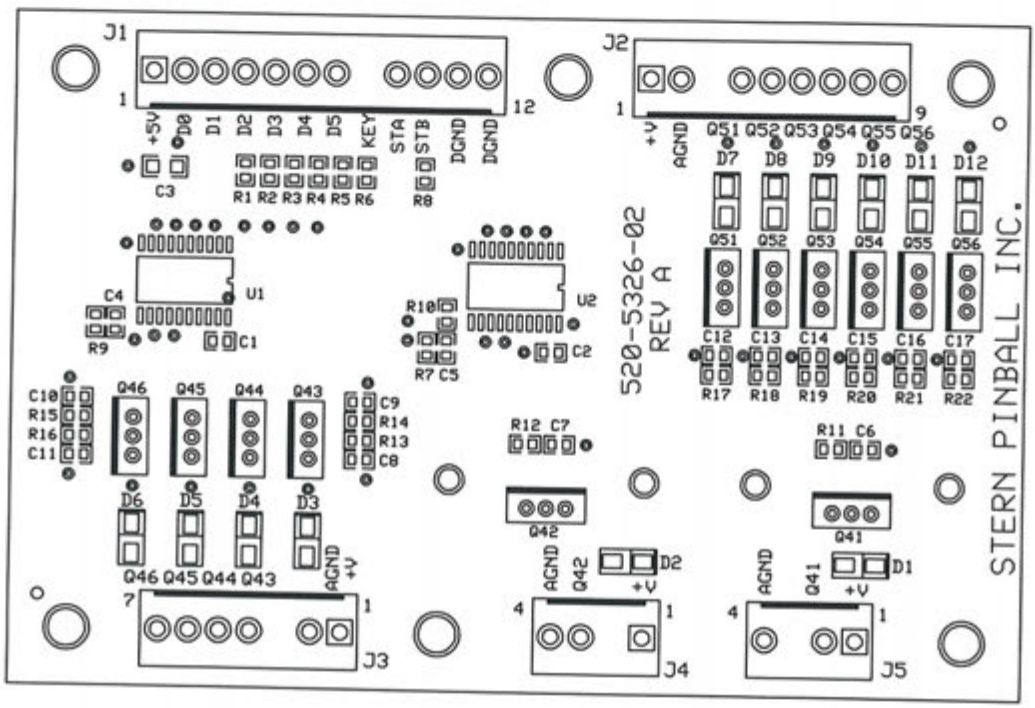
#33 – #35 Note: *If this game is equiped with an optional Ticket Dispenser & Meter, see the end of Sec. **5**, Chapter **4** for wiring information. Ensure Std. Adj. **56**, **Ticket Dispenser = YES**.*

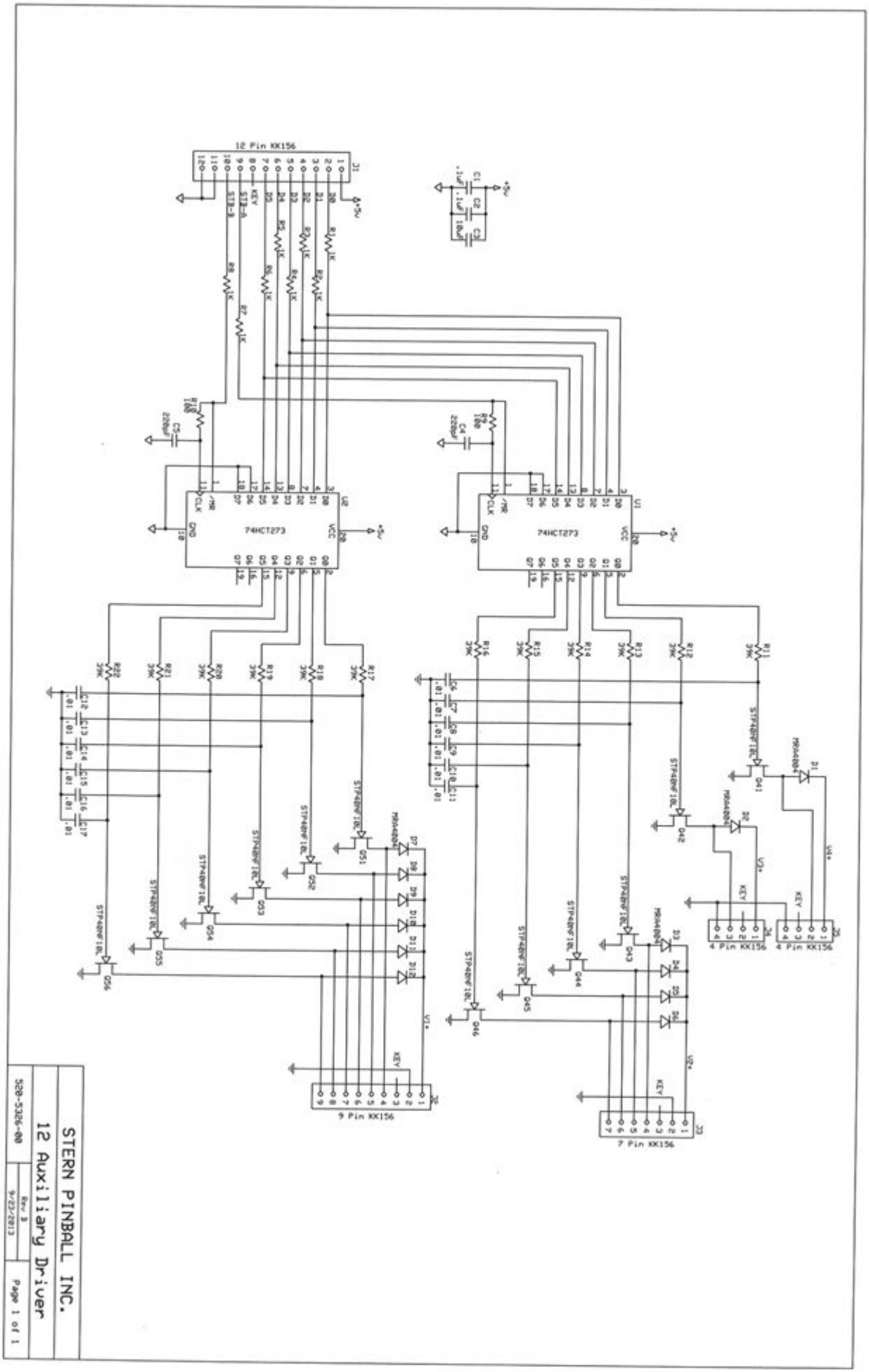

I/O POWER DRIVER PC BOARD
(S.A.M. System)
CPU/SOUND PC BOARD
(S.A.M. System)
128 DOT MATRIX
x 32 DISPLAY PCB
Backbox Wiring
AC VOLTAGES
J11
VOLTAGE OUTPUTS
J10
POWER FROM THE TRANSFORMER
J17
POWER OUT
J16
CONNECT THE 20-PIN RIBBON CABLE TO I/O J1
J14
5.7VAC G.I.s FROM TRANSFROMER
J15
G.I.s
GENERAL ILLUMINATION
J13
LAMP COMLUMS
18V
J12
LAMP ROWS GROUND
J9
HIGH CURRENT SOLENOIDS
J8
HIGH CURRENT SOLENOIDS
J7
LOW CURRENT SOLENOIDS
+20VDC
+28VDC
J6
FLASH LAMPS
J2
AUXILLIAR OUTPUT
J3
AUXILLIARY INPUT
J1
Important: When connecting any Ribbon Cable, always ensure the " Red Line " side of the ribbon cable goes to the Pin-1 side of any Dual 0.1" Header Connector.
J11
POWER
J10
AUDIO
Reset Button
COIN CELL BATTERY (CR2430 3V)
J12
SWITCH RETURNS
J6
SWITCH RETURNS
J13
DED. SWITCHES
MOVE TO 'ON' POSITION TO UPDATE
DIP SW. 8
SW1
DIP SWITCH
J3
DEDICATED SWITCHES
J2
DEDICATED SWITCHES
J1
SWITCH STROBES
J15
USB PORT
J7
JTAG PROCESSOR
J8
XILINX
J5
DISPLAY
J4
SERIAL PORT
Boot FLASH EPROM
For the latest boot Flash EPROM code or game code for your USB Memory Stick, visit http://www.stempinball.com/GAME-code.shtml
14-PIN RIBBON CABLE TO DOT DISPLAY P2
BABCOCK J1
DALE P2
14-PIN RIBBON CABLE TO CPU / SOUND J5 DISPLAY
Backbox Wiring
74

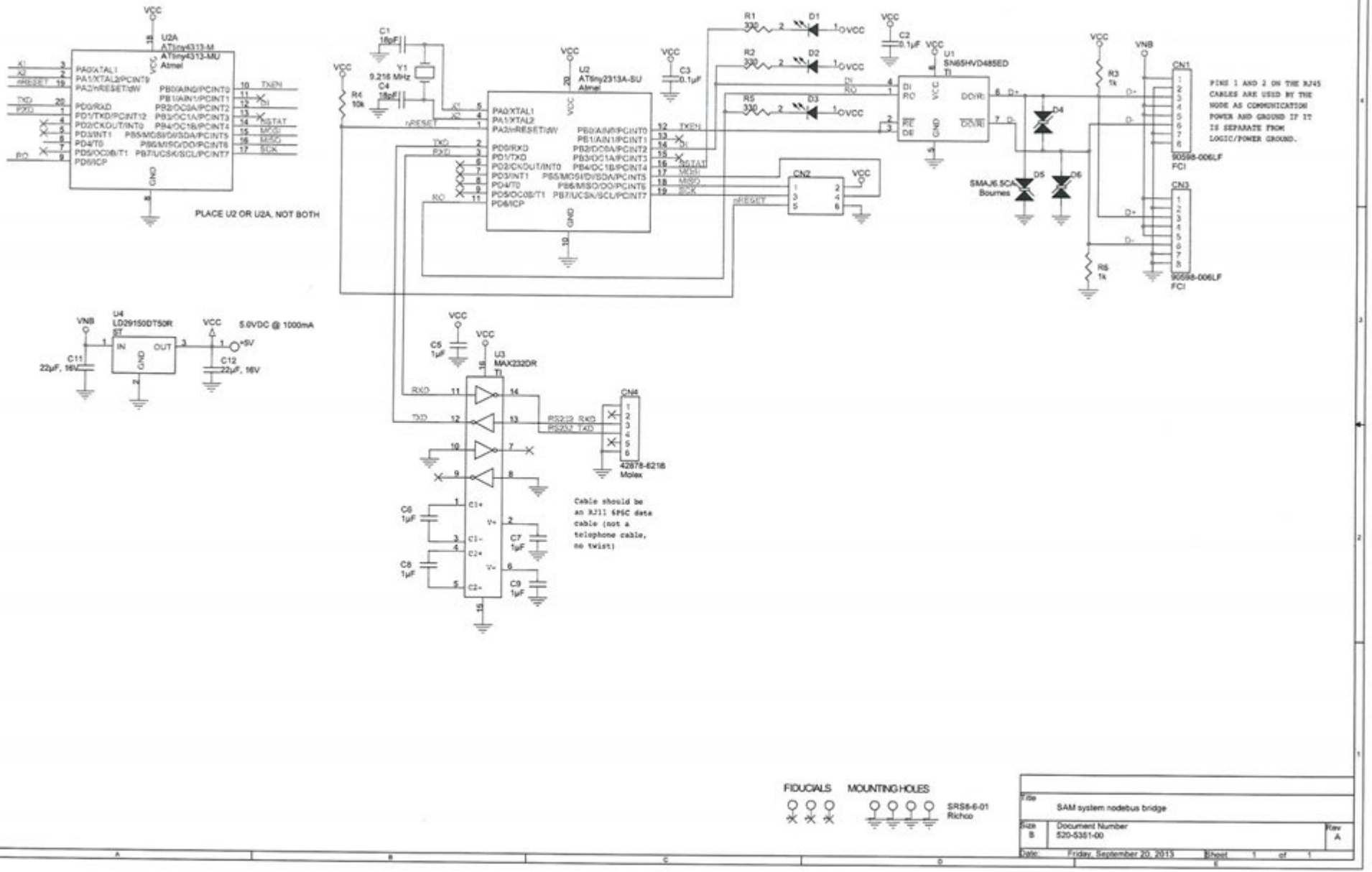
STAR TREK L.E GAMES

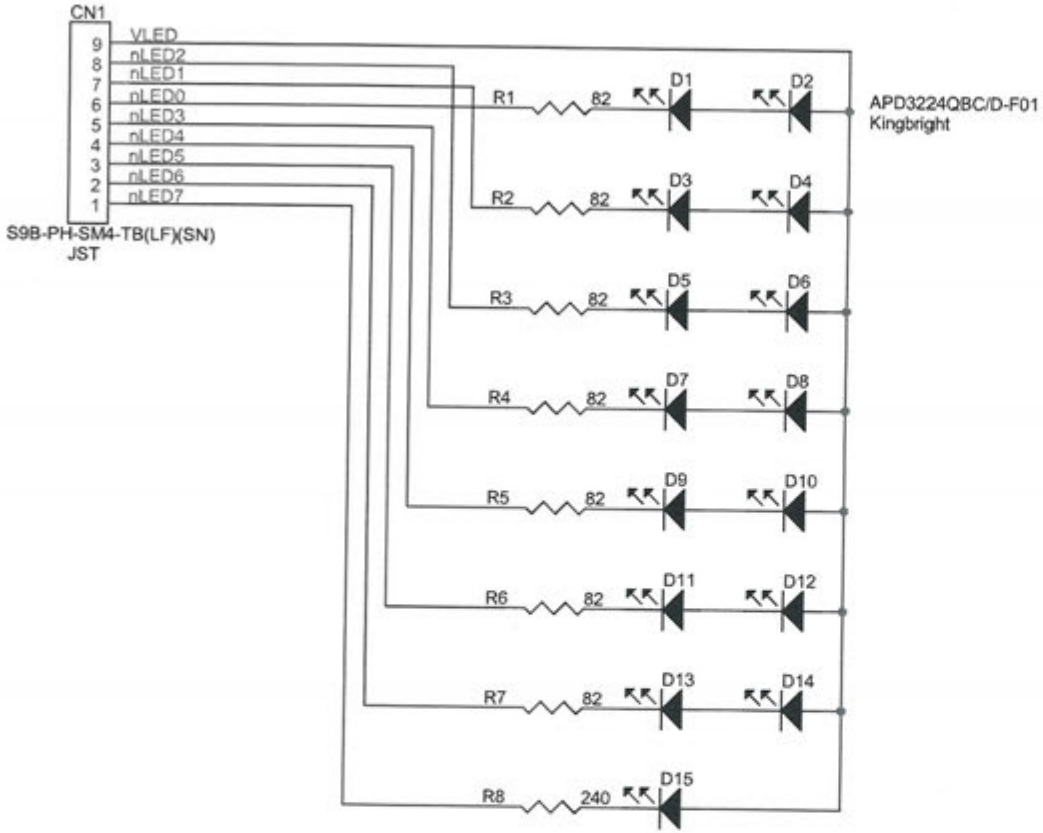
Wiring for the 12-Transistor driver board, 520-5326-02






STERN PINBALL INC.
12 Auxiliary Driver
520-5326-00
Rev. B
9/27/2013
Page 1 of 1
12 Pin KK156
9 Pin KK156
7 Pin KK156
4 Pin KK156
74HCT273

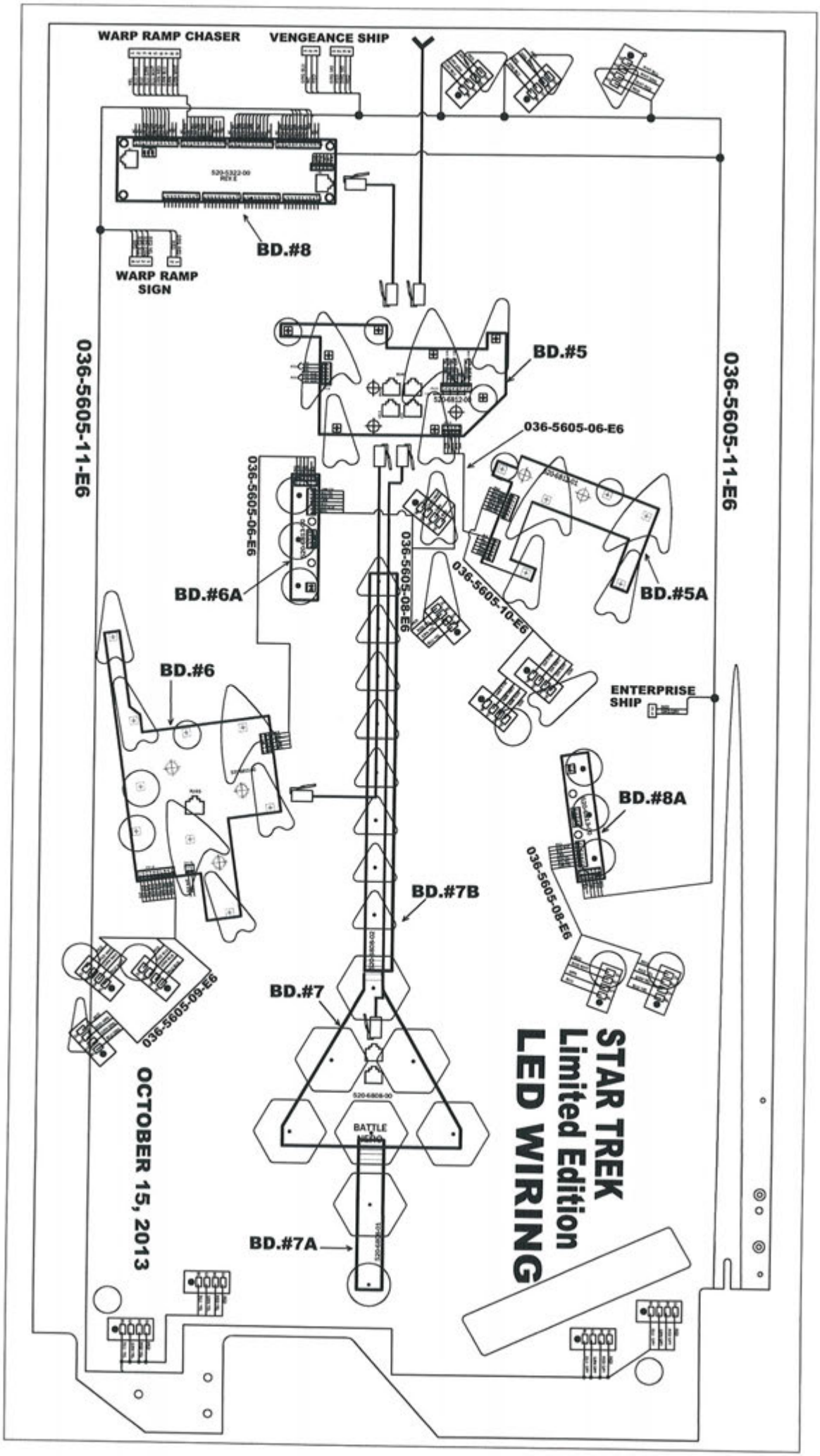

U2A
ATtiny4313-M
ATtiny4313-MU
Atmel
PLACE U2 OR U2A, NOT BOTH
U2
ATtiny2313A-SU
Atmel
Y1
9.216 MHz
U1
SN65HVD485ED
TI
U3
MAX232DR
TI
U4
LD29150DT50R
ST
5.0VDC @ 1000mA
CN1
CN2
CN3
CN4
90598-006LF
FCI
SMAJ6.5CA
Bourns
42878-6218
Molex
Cable should be an RJ11 6P6C data cable (not a telephone cable, no twist)
PINS 1 AND 2 ON THE RJ45 CABLES ARE USED BY THE NODE AS COMMUNICATION POWER AND GROUND IF IT IS SEPARATE FROM LOGIC/POWER GROUND.
FIDUCIALS
MOUNTING HOLES
SRS8-6-01
Richco
SAM system nodebus bridge
Document Number
520-5351-00
Friday, September 20, 2013

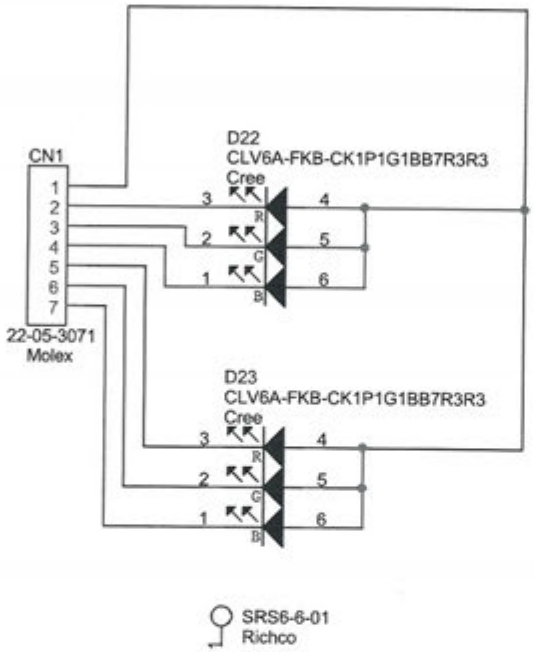


VLED = 8V
Vf = 3.2V
If = 20mA
(8V - 3.2V - 3.2V)/20mA = 80 ohms
(8V - 3.2V)/20mA = 240 ohms

Title: Bill LE Warp Ramp		
Size: A	Document Number: 520-6815-00	Rev: 0
Date: Wednesday, September 18, 2013	Sheet 1 of 1	

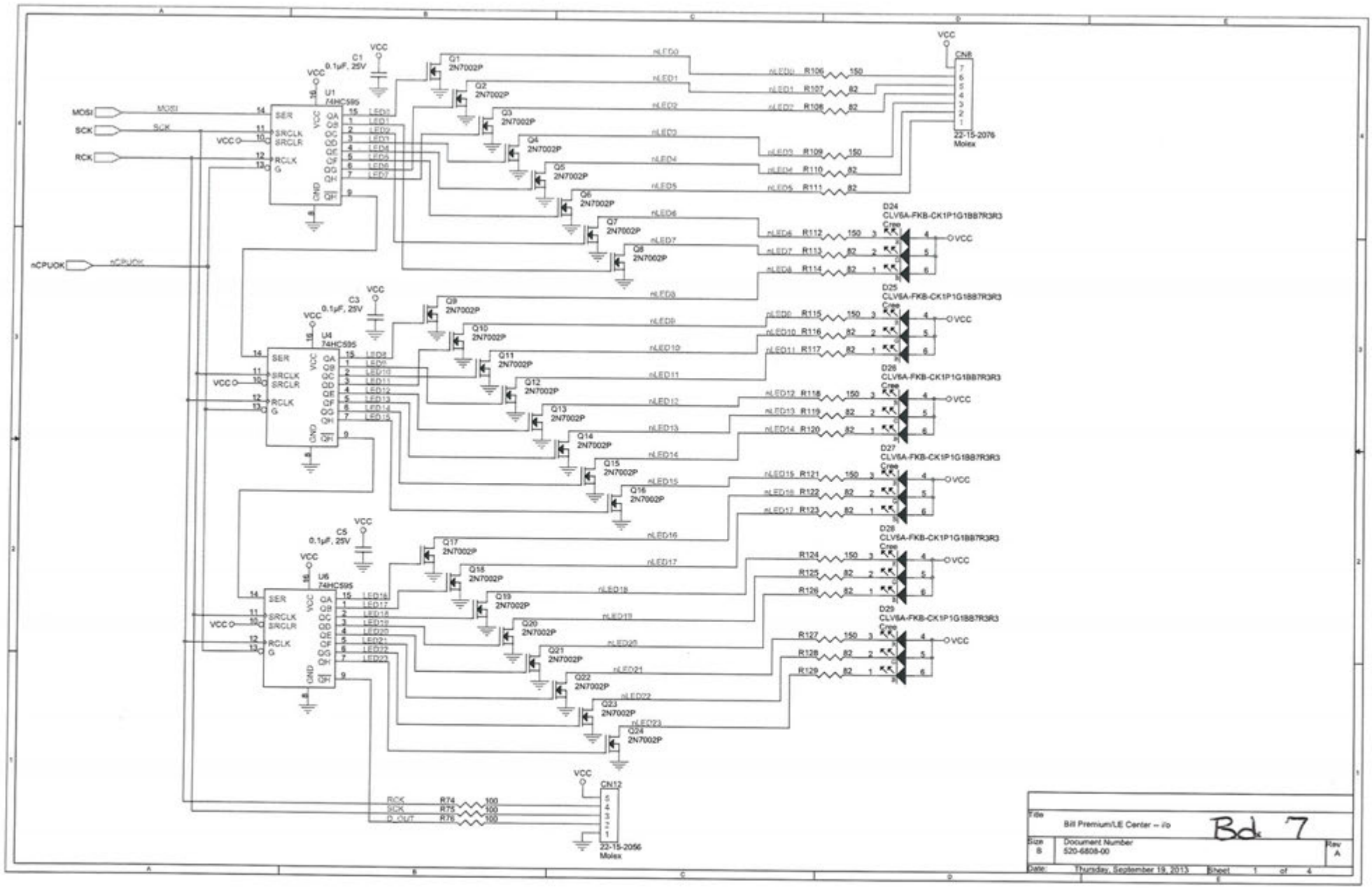
8K


WARP RAMP CHASER
VENGEANCE SHIP
BD.#8
WARP RAMP SIGN
BD.#5
036-5605-11-E6
036-5605-11-E6
036-5605-06-E6
036-5605-06-E6
BD.#6A
036-5605-08-E6
036-5605-10-E6
BD.#5A
BD.#6
ENTERPRISE SHIP
BD.#8A
036-5605-08-E6
BD.#7B
BD.#7
036-5605-09-E6
BATTLE
BD.#7A
OCTOBER 15, 2013
STAR TREK
Limited Edition
LED WIRING

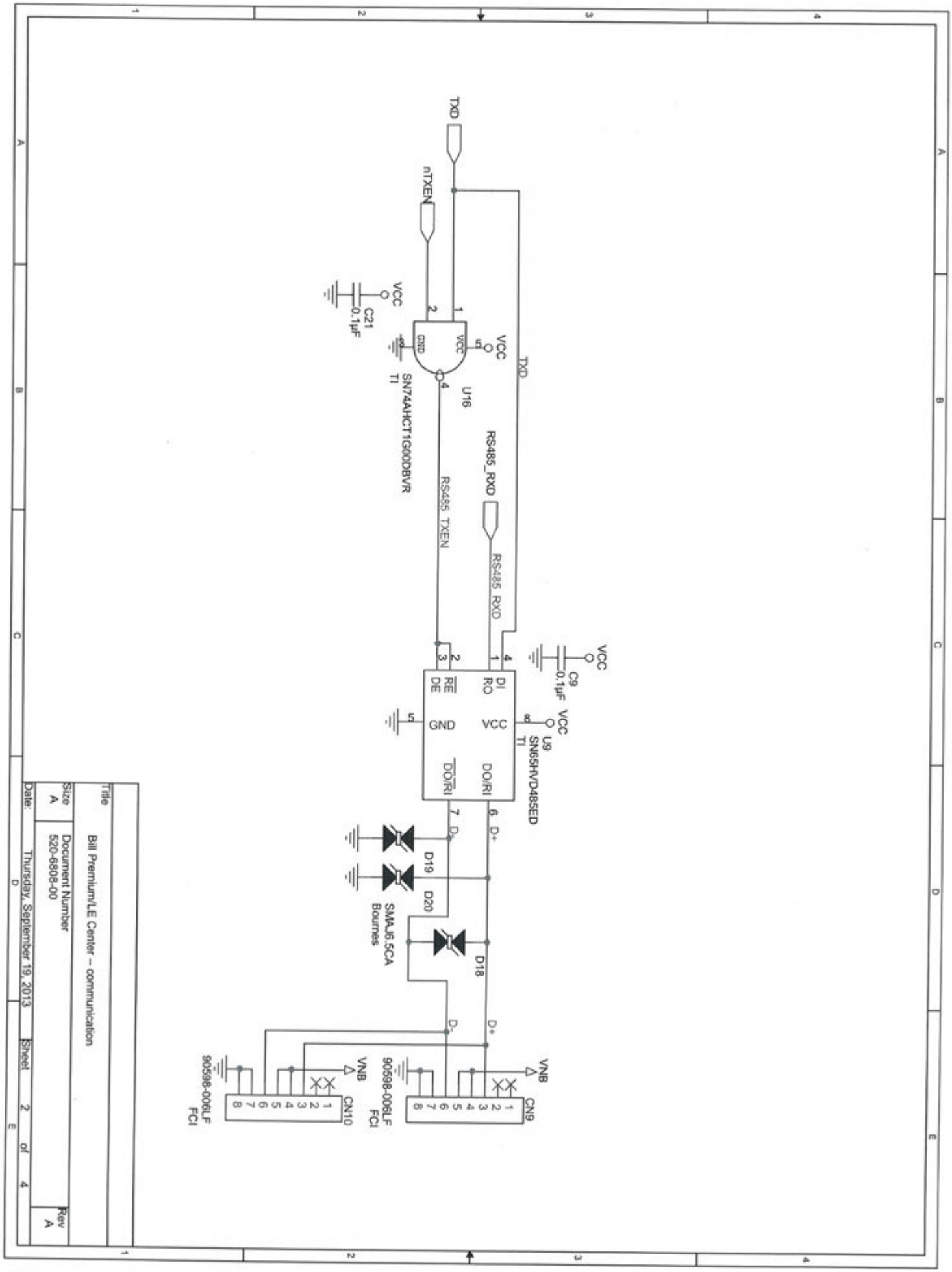


Title	BILL LE Lower Center LED	Bd. 7A
Size A	Document Number 520-6808-01	Rev 0
Date: Thursday, July 25, 2013	Sheet 1 of 1	

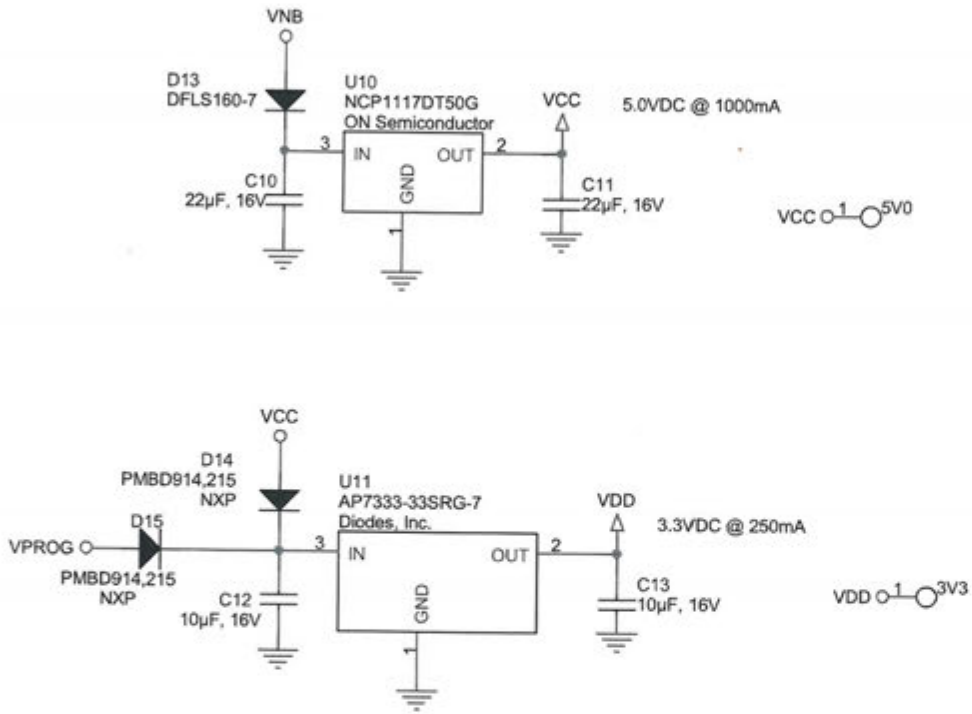
Y10


MOSI
SCK
RCK
nCPUOK
VCC
U1 74HC595
U4 74HC595
U6 74HC595
C1 0.1µF, 25V
C3 0.1µF, 25V
C5 0.1µF, 25V
SER
SRCLK
SRCLR
RCLK
G
GND
Q1 2N7002P
Q2 2N7002P
Q3 2N7002P
Q4 2N7002P
Q5 2N7002P
Q6 2N7002P
Q7 2N7002P
Q8 2N7002P
Q9 2N7002P
Q10 2N7002P
Q11 2N7002P
Q12 2N7002P
Q13 2N7002P
Q14 2N7002P
Q15 2N7002P
Q16 2N7002P
Q17 2N7002P
Q18 2N7002P
Q19 2N7002P
Q20 2N7002P
Q21 2N7002P
Q22 2N7002P
Q23 2N7002P
Q24 2N7002P
CN8
22-15-2076
Molex
D24 CLV6A-FKB-CK1P1G1BB7R3R3
D25 CLV6A-FKB-CK1P1G1BB7R3R3
D26 CLV6A-FKB-CK1P1G1BB7R3R3
D27 CLV6A-FKB-CK1P1G1BB7R3R3
D28 CLV6A-FKB-CK1P1G1BB7R3R3
D29 CLV6A-FKB-CK1P1G1BB7R3R3
R106 150
R107 82
R108 82
R109 150
R110 82
R111 82
R112 150
R113 82
R114 82
R115 150
R116 82
R117 82
R118 150
R119 82
R120 82
R121 150
R122 82
R123 82
R124 150
R125 82
R126 82
R127 150
R128 82
R129 82
CN12
22-15-2056
Molex
R74 100
R75 100
R76 100
RCK
SCK
D_OUT
Title
Bill Premium/LE Center – i/o
Bd. 7
Size B
Document Number 520-6808-00
Rev A
Date: Thursday, September 19, 2013
Sheet 1 of 4

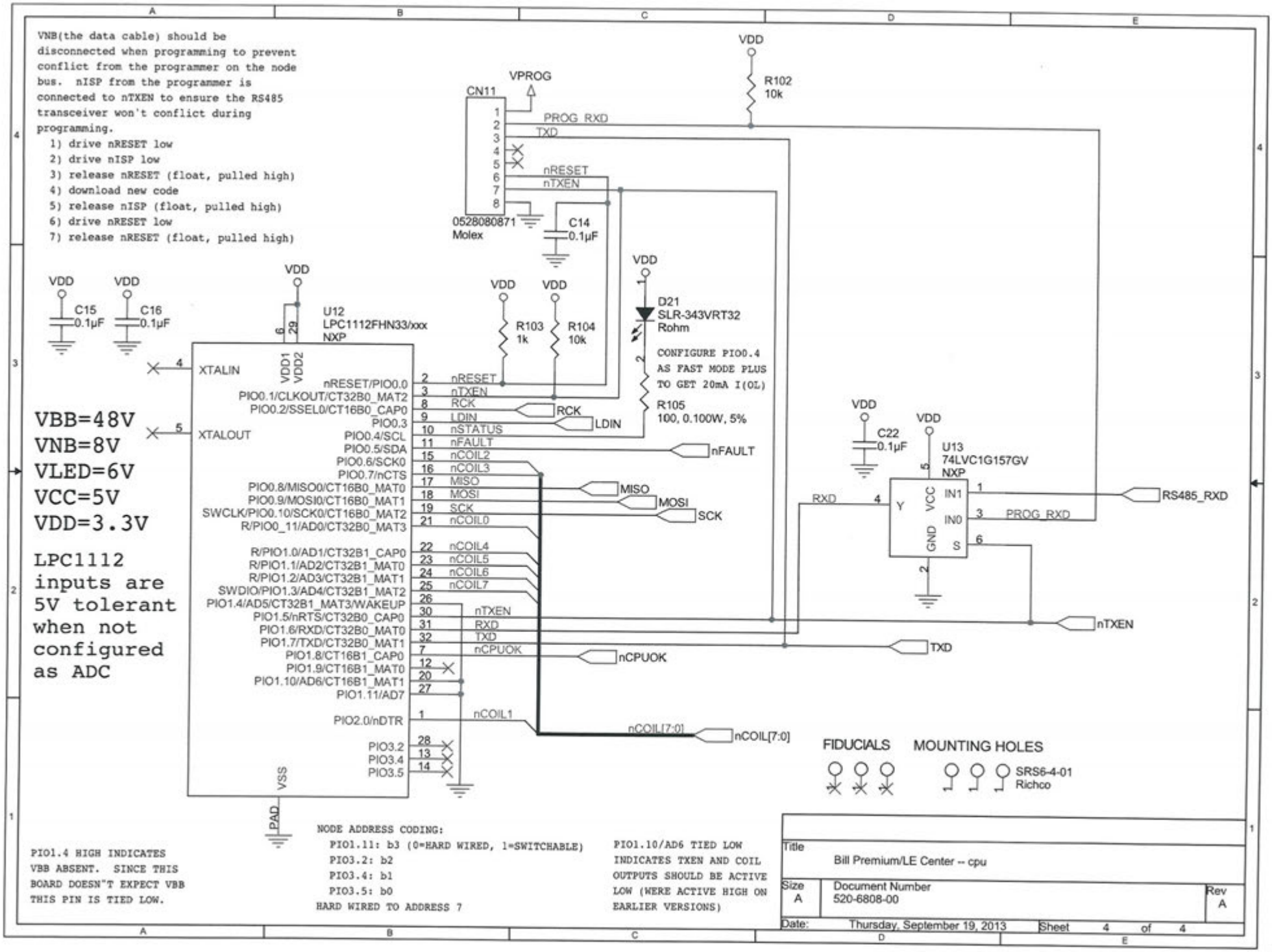
Y11

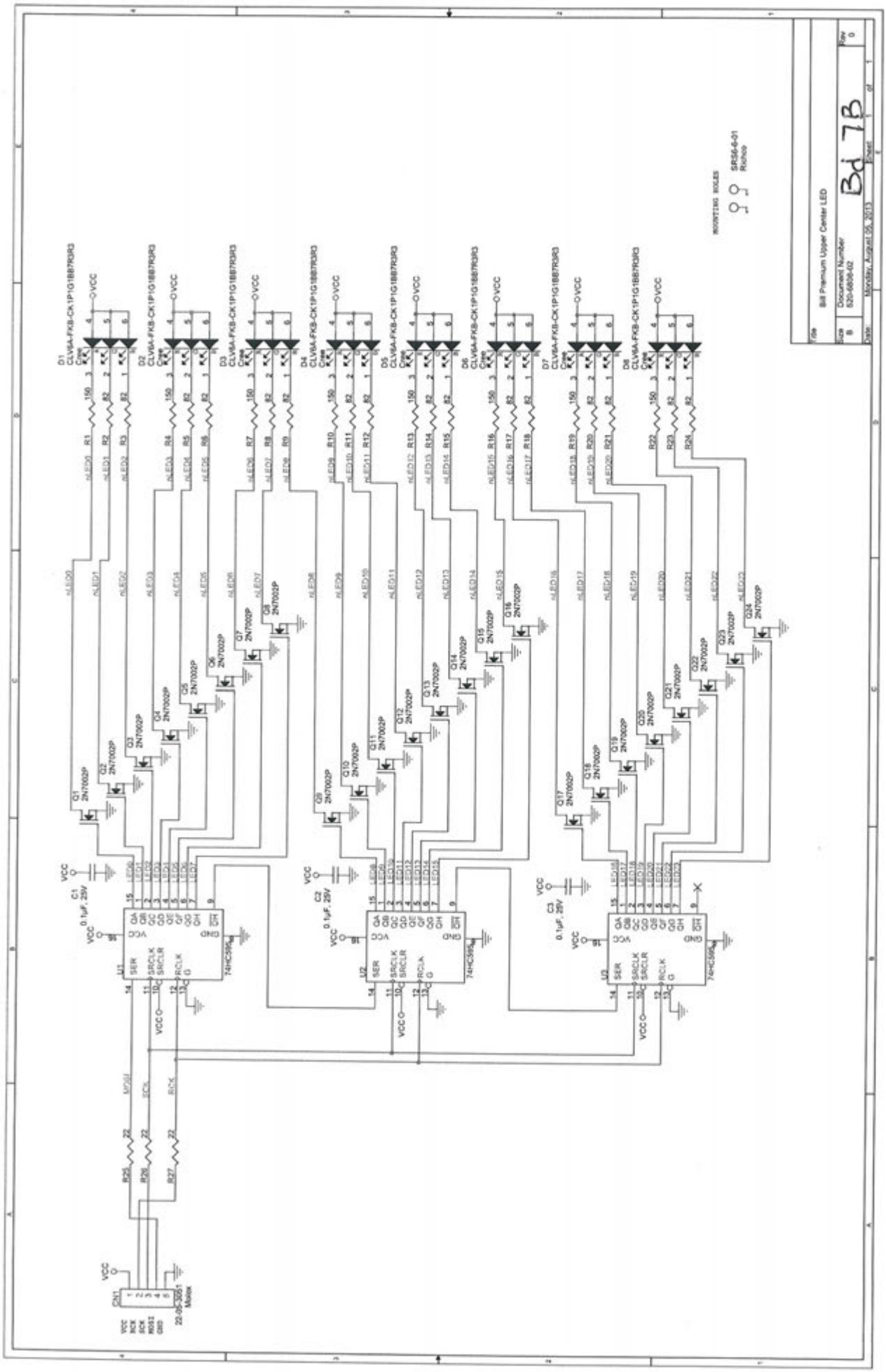

TXD
nTXEN
VCC
C21
0.1µF
GND
VCC
TI
SN74AHCT1G00DBVR
U16
RS485_RXD
RS485 TXEN
RS485 RXD
C9
0.1µF
RE
DE
DI
RO
GND
VCC
DO/RI
U9
SN65HVD485ED
D19
D20
SMAJ6.5CA
Bourns
D18
D+
D-
VNB
90598-006LF
FCI
CN10
CN9
Title
Bill Premium/LE Center – communication
Size
A
Document Number
520-6808-00
Rev
A
Date:
Thursday, September 19, 2013
Sheet
2
of
4

y12



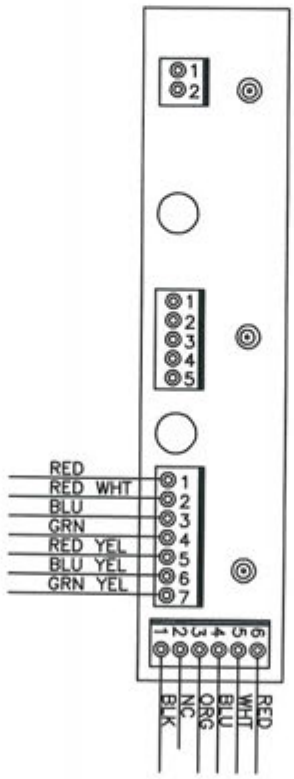
Title	Bill Premium/LE Center -- power supply	
Size A	Document Number 520-6808-00	Rev A
Date: Thursday, September 19, 2013	Sheet 3 of 4	

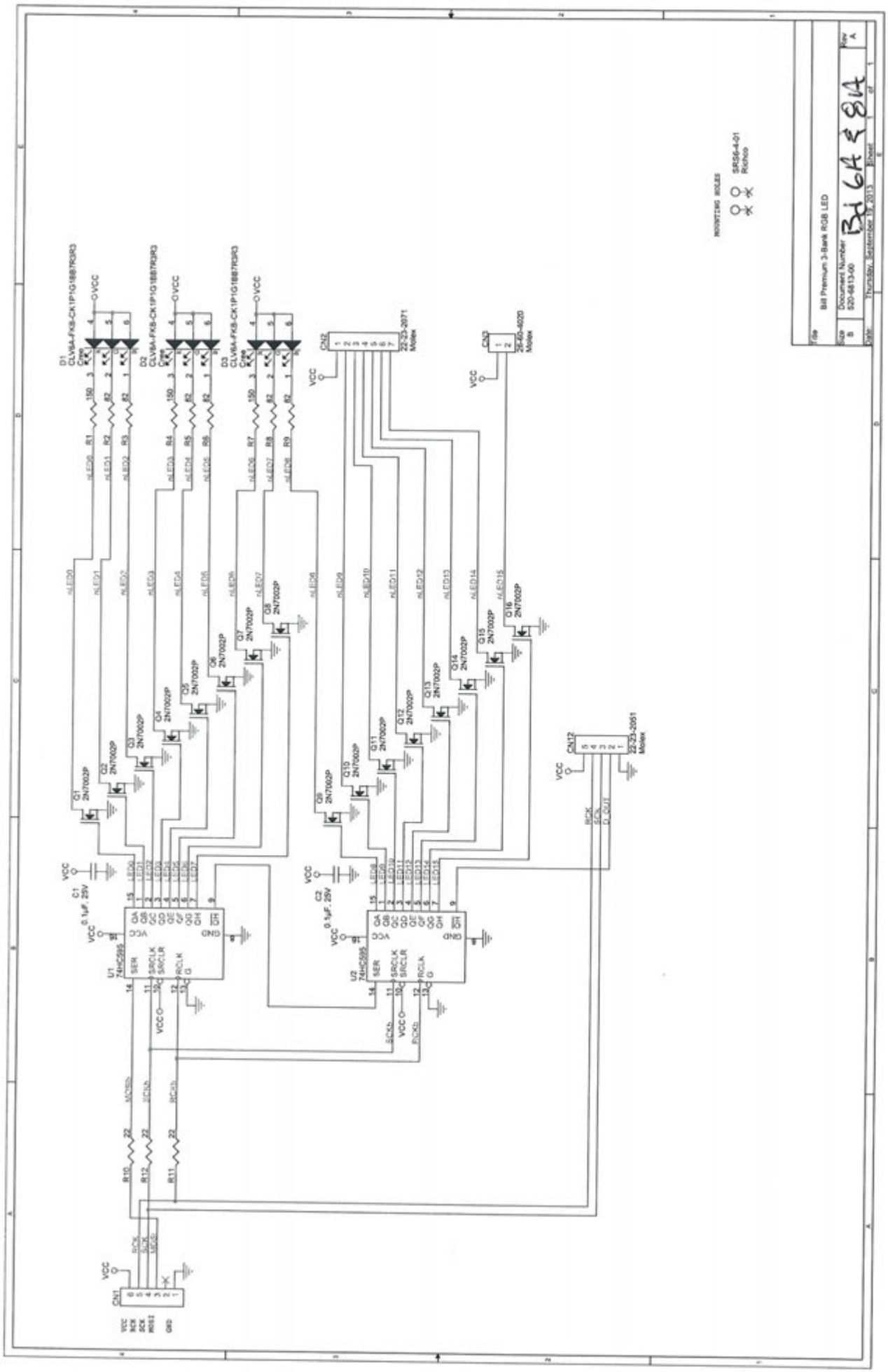

VNB(the data cable) should be disconnected when programming to prevent conflict from the programmer on the node bus. nISP from the programmer is connected to nTXEN to ensure the RS485 transceiver won't conflict during programming.
1) drive nRESET low
2) drive nISP low
3) release nRESET (float, pulled high)
4) download new code
5) release nISP (float, pulled high)
6) drive nRESET low
7) release nRESET (float, pulled high)
VBB=48V
VNB=8V
VLED=6V
VCC=5V
VDD=3.3V
LPC1112 inputs are 5V tolerant when not configured as ADC
VDD
VPROG
CN11
R102
10k
PROG_RXD
TXD
nRESET
nTXEN
0528080871
Molex
C14
0.1µF
C15
0.1µF
C16
0.1µF
U12
LPC1112FHN33/xxx
NXP
R103
1k
R104
10k
D21
SLR-343VRT32
Rohm
CONFIGURE PIO0.4 AS FAST MODE PLUS TO GET 20mA I(OL)
R105
100, 0.100W, 5%
C22
0.1µF
U13
74LVC1G157GV
NXP
RS485_RXD
nTXEN
TXD
nCPUOK
nFAULT
MISO
MOSI
SCK
RCK
LDIN
nCOIL[7:0]
XTALIN
XTALOUT
VDD1
VDD2
VSS
PAD
nRESET/PIO0.0
PIO0.1/CLKOUT/CT32B0_MAT2
PIO0.2/SSEL0/CT16B0_CAP0
PIO0.3
PIO0.4/SCL
PIO0.5/SDA
PIO0.6/SCK0
PIO0.7/nCTS
PIO0.8/MISO0/CT16B0_MAT0
PIO0.9/MOSI0/CT16B0_MAT1
SWCLK/PIO0.10/SCK0/CT16B0_MAT2
R/PIO0_11/AD0/CT32B0_MAT3
R/PIO1.0/AD1/CT32B1_CAP0
R/PIO1.1/AD2/CT32B1_MAT0
R/PIO1.2/AD3/CT32B1_MAT1
SWDIO/PIO1.3/AD4/CT32B1_MAT2
PIO1.4/AD5/CT32B1_MAT3/WAKEUP
PIO1.5/nRTS/CT32B0_CAP0
PIO1.6/RXD/CT32B0_MAT0
PIO1.7/TXD/CT32B0_MAT1
PIO1.8/CT16B1_CAP0
PIO1.9/CT16B1_MAT0
PIO1.10/AD6/CT16B1_MAT1
PIO1.11/AD7
PIO2.0/nDTR
PIO3.2
PIO3.4
PIO3.5
nCOIL0
nCOIL1
nCOIL2
nCOIL3
nCOIL4
nCOIL5
nCOIL6
nCOIL7
PIO1.4 HIGH INDICATES VBB ABSENT. SINCE THIS BOARD DOESN"T EXPECT VBB THIS PIN IS TIED LOW.
NODE ADDRESS CODING:
PIO1.11: b3 (0=HARD WIRED, 1=SWITCHABLE)
PIO3.2: b2
PIO3.4: b1
PIO3.5: b0
HARD WIRED TO ADDRESS 7
PIO1.10/AD6 TIED LOW INDICATES TXEN AND COIL OUTPUTS SHOULD BE ACTIVE LOW (WERE ACTIVE HIGH ON EARLIER VERSIONS)
FIDUCIALS
MOUNTING HOLES
SRS6-4-01
Richco
Title
Bill Premium/LE Center -- cpu
Size A
Document Number 520-6808-00
Rev A
Date: Thursday, September 19, 2013
Sheet 4 of 4


Bill Premium Upper Center LED
Document Number
820-06506-02
Bd 7B
Rev 0
Sheet 1 of 1
Monday, August 05, 2013
MOUNTING HOLES
SR56-6-01
Richco
74HC595
2N7002P
CLV6A-FKB-CK1P1G1BB7R3R3
0.1µF, 25V
22-05-3051
Molex

STAR TREK L.E.
LED Board 520-6813-00 Detail

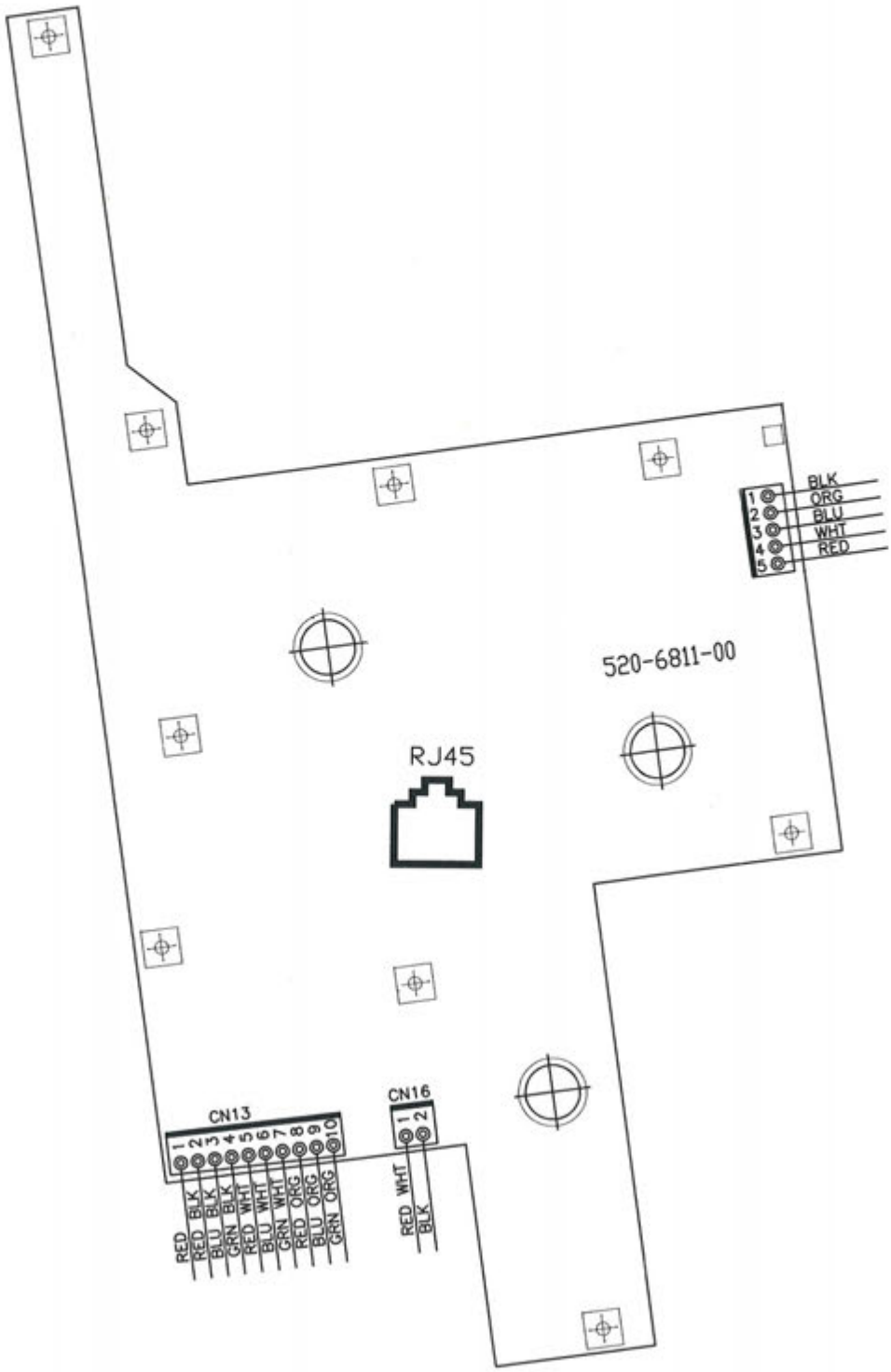
X2

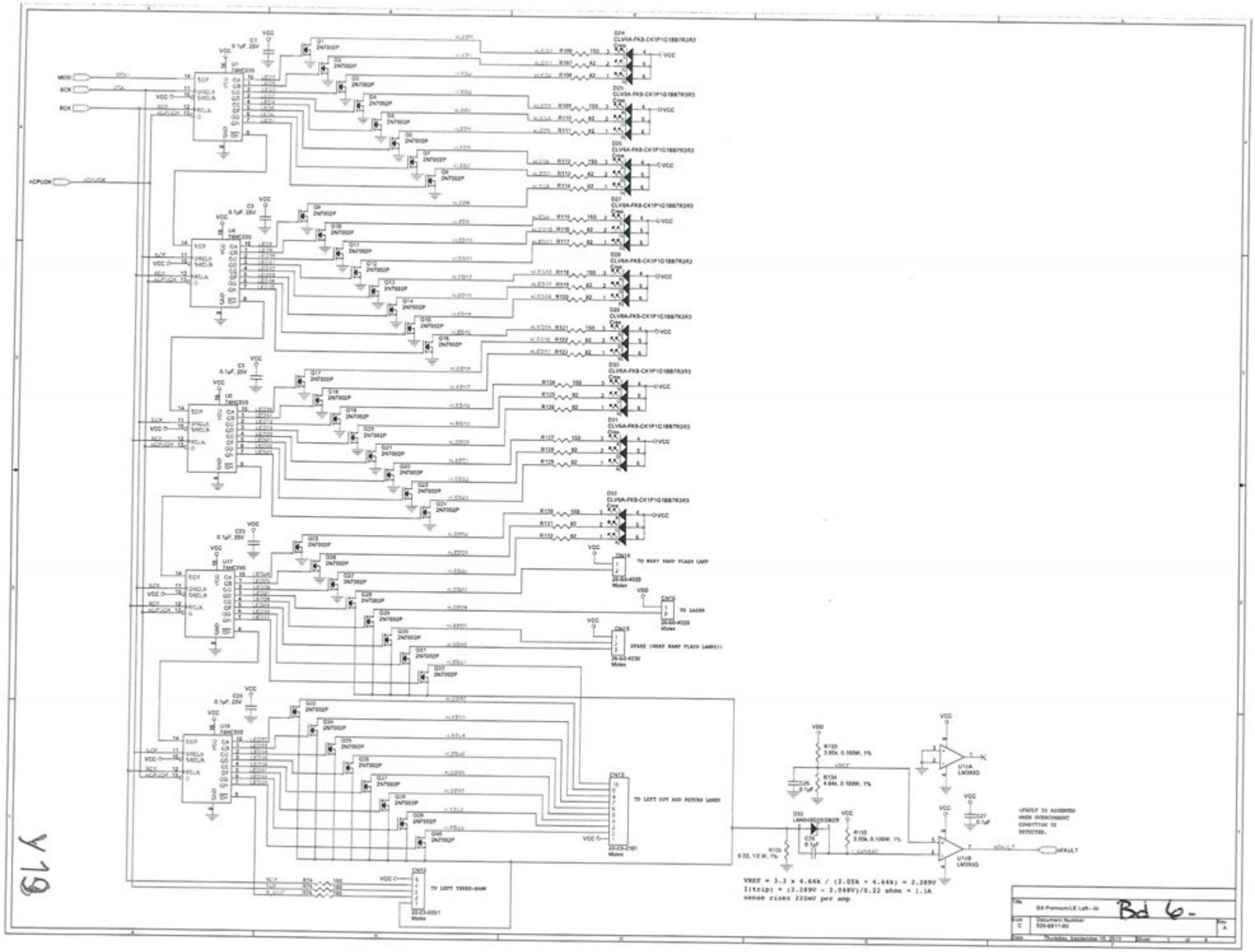


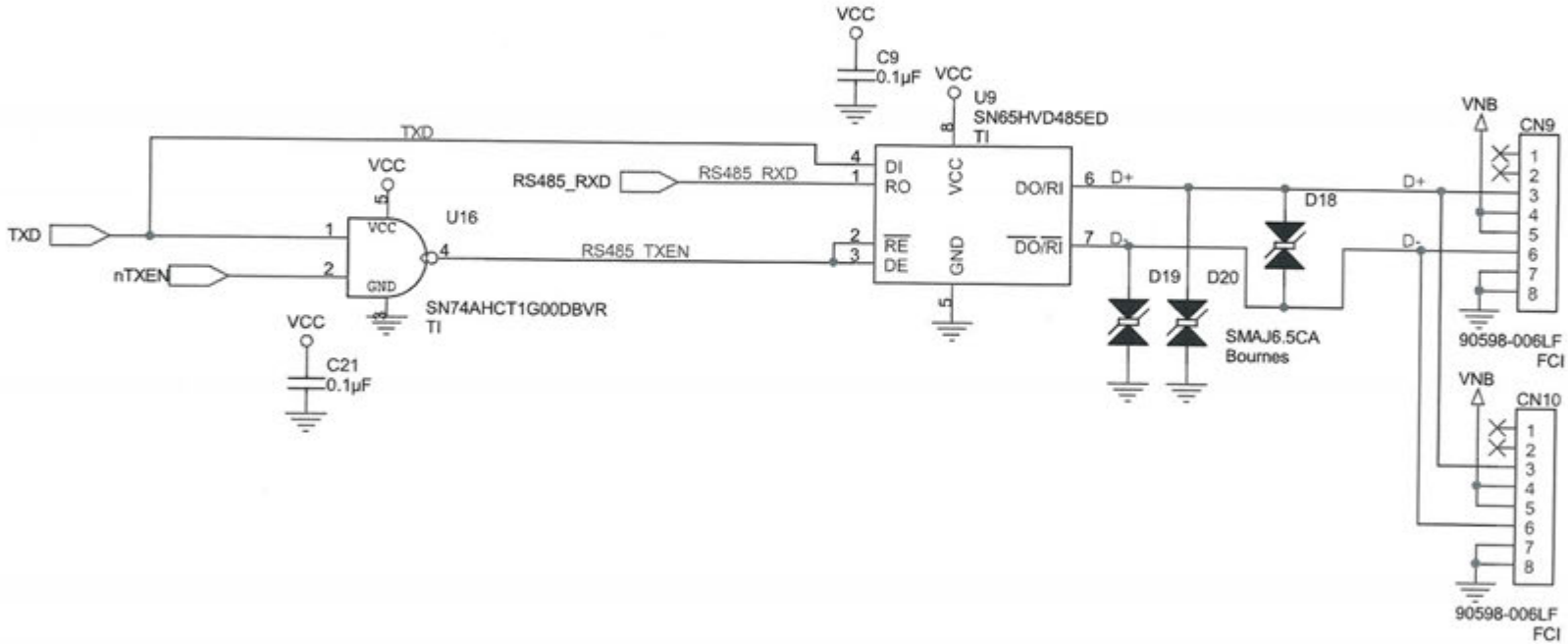

Bill Premium 3-Bank RGB LED
Document Number
520-6813-00
Rev
A
Size
B
Date: Thursday, September 19, 2013
Sheet 1 of 1
MOUNTING HOLES
SR56-4-01
Richco
VCC
GND
SCK
SDA
MOSI
MISO
74HC595
2N7002P
CLV6A-FKB-CK1P1G1BB7R3R3
22-23-2071
Molex
26-48-4020
Molex

y 17

STAR TREK L.E.
LED Board 520-6811-00

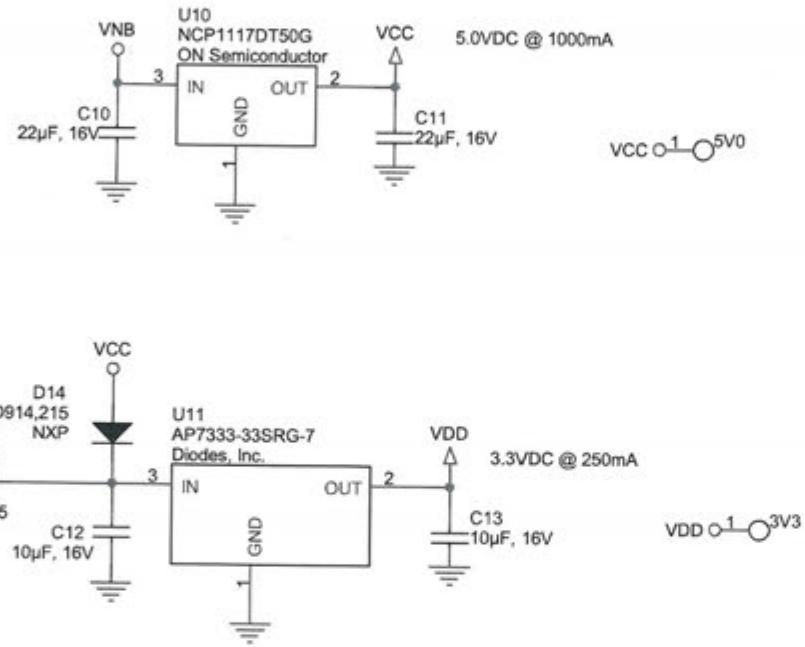



MOSI
SCK
RCK
nCPUCK
VCC
VDD
74HC595
2N7002P
CLV6A-FKB-CK1P1G1BB7R3(R3)
0.1uF, 25V
TO RIGHT TURN FLASH LAMP
TO LASER
SPARE (REAR RAMP FLASH LAMP)
TO LEFT OUT AND REVERSE LAMPS
TO LEFT TURN/E-BRAKE
LM393D
nFAULT
VREF = 3.3 x 4.64k / (2.05k + 4.64k) = 2.289V
I(trip) = (2.289V - 2.048V)/0.22 ohms = 1.1A
sense rises 220mV per amp
B4 Premium/LE Left-Side
Document Number
520-6811-00
Rev A
Bd 6-
V19

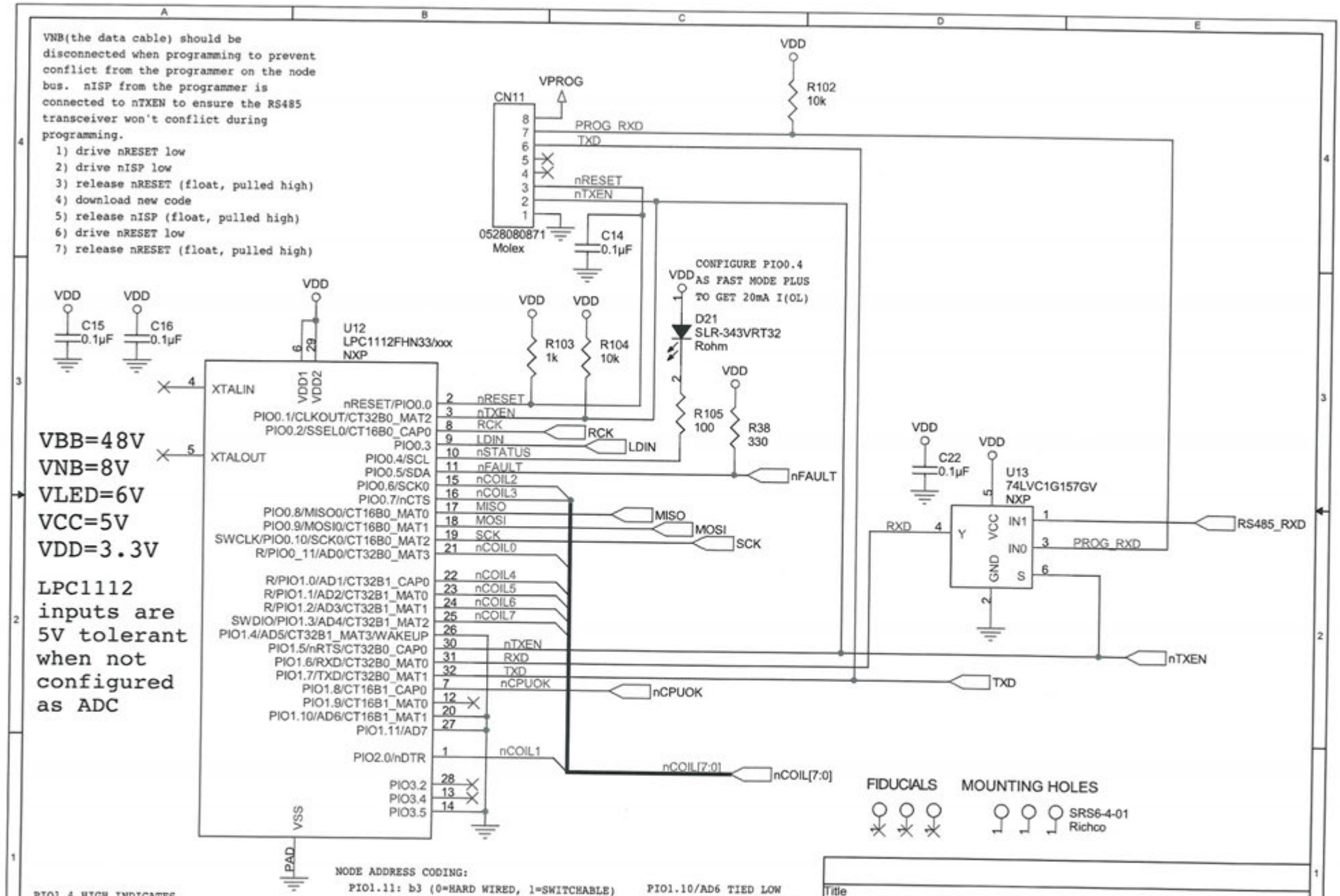


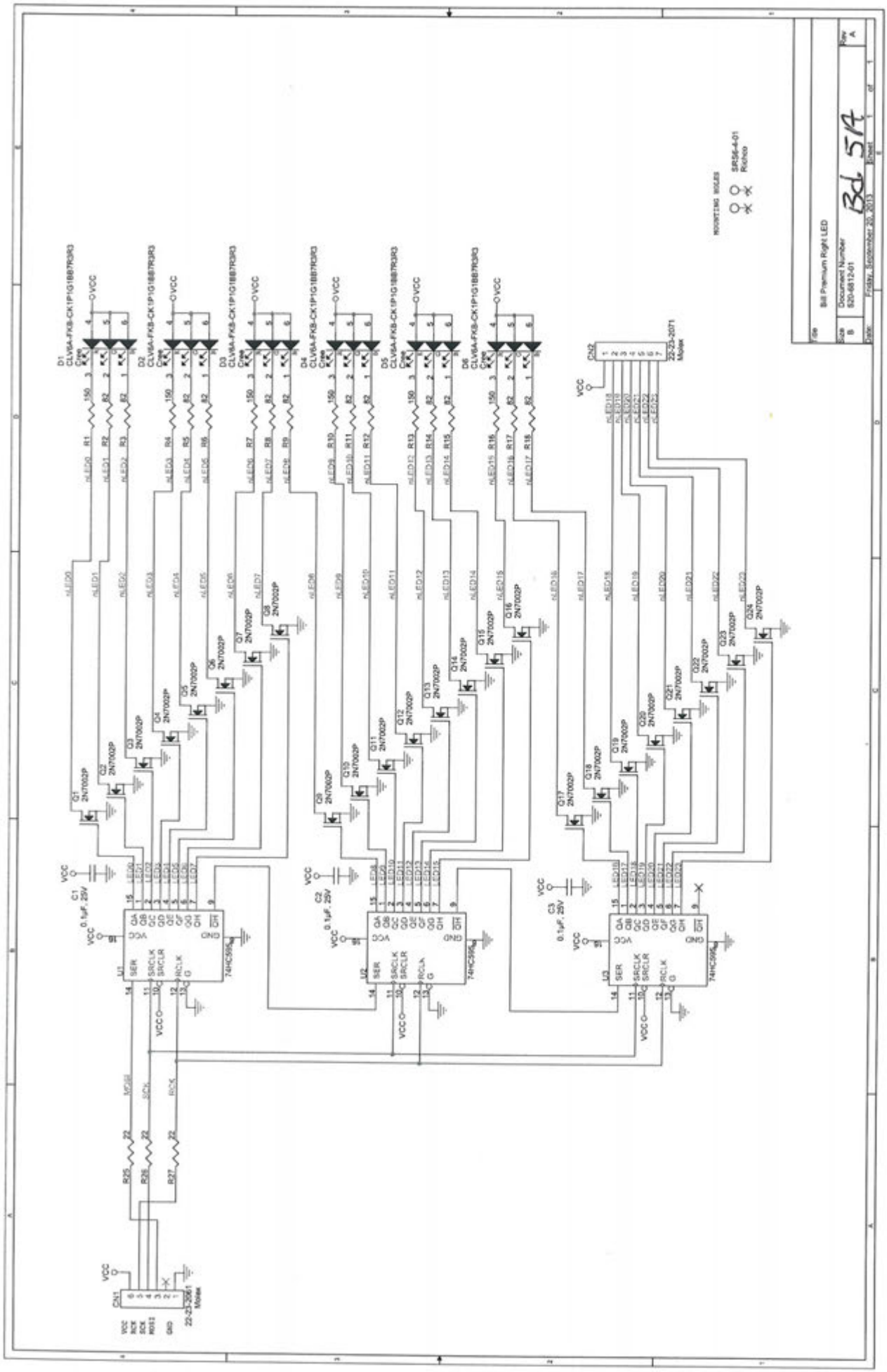
Title	Bill Premium/LE Left-- communication	
Size A	Document Number 520-6811-00	Rev A
Date: Thursday, September 19, 2013	Sheet 2 of 4	

Y20

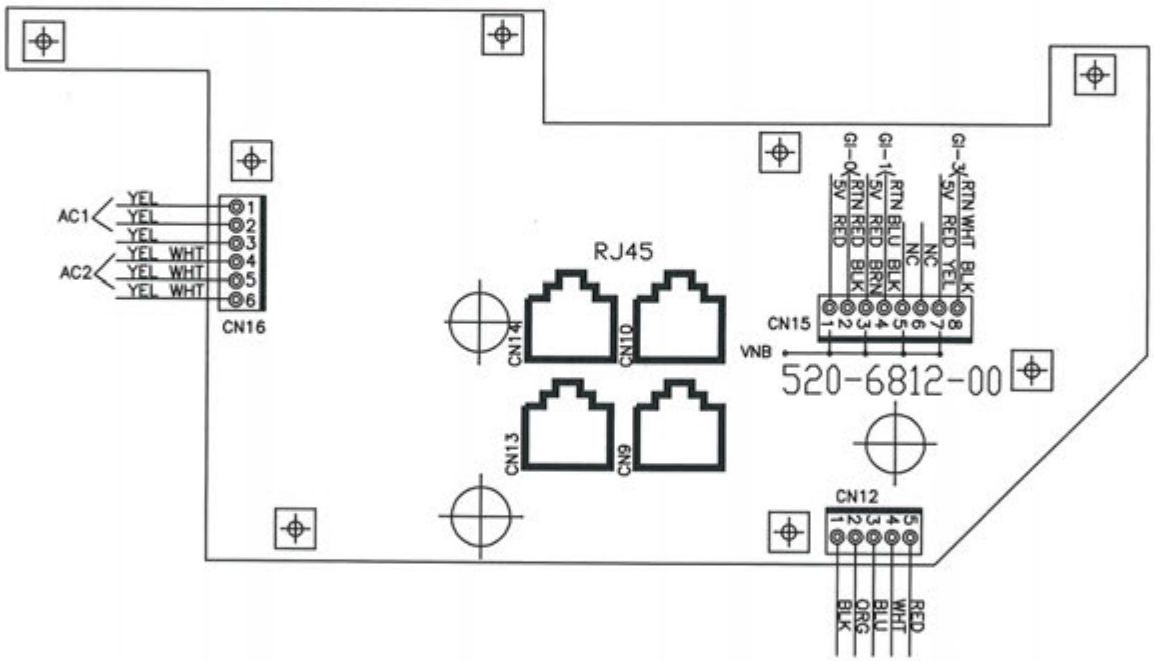


Title	Bill Premium/LE Left-- power supply	
Size A	Document Number 520-6811-00	Rev A
Date: Thursday, September 19, 2013	Sheet 3 of 4	

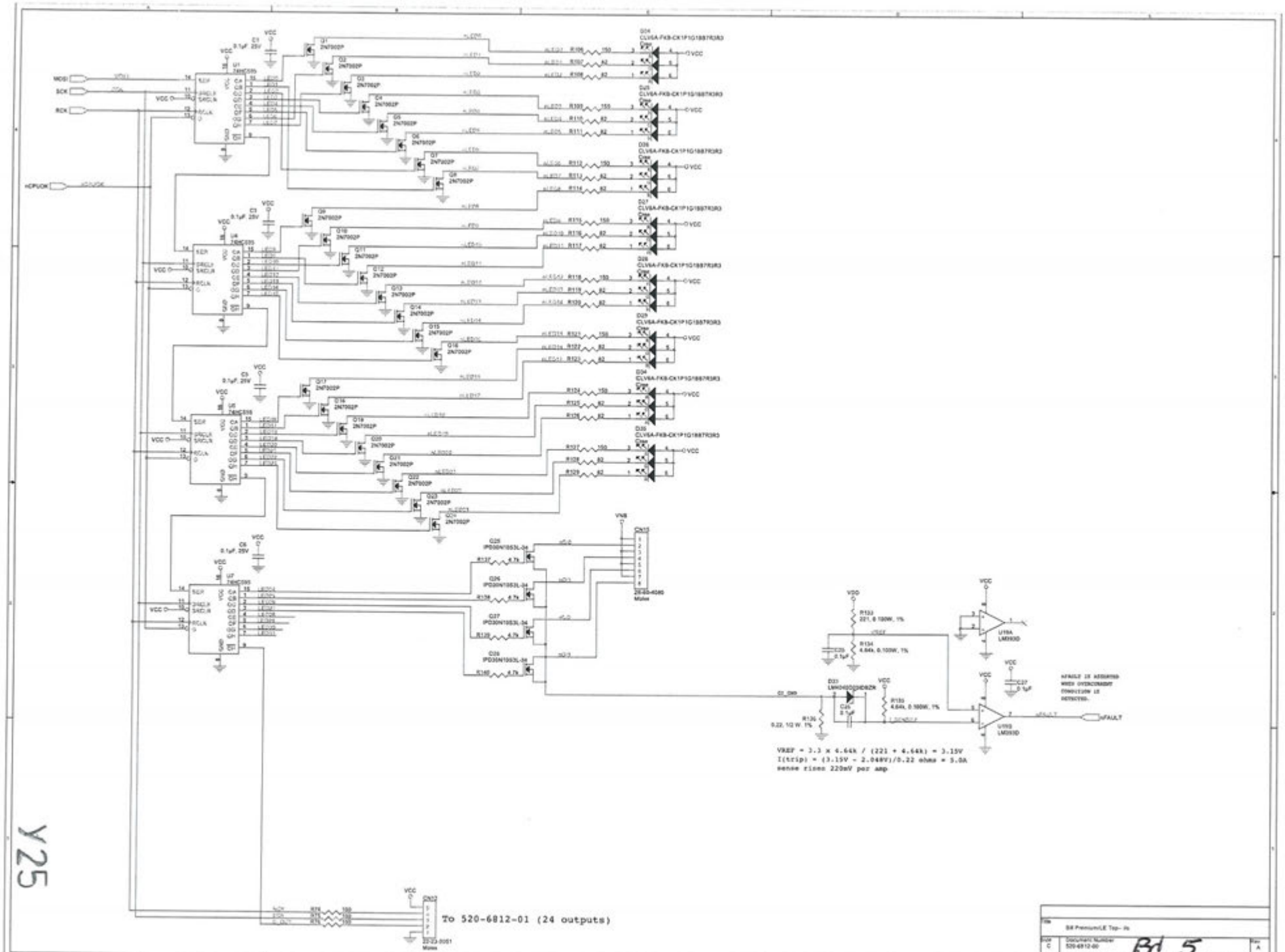

VNB(the data cable) should be disconnected when programming to prevent conflict from the programmer on the node bus. nISP from the programmer is connected to nTXEN to ensure the RS485 transceiver won't conflict during programming.
1) drive nRESET low
2) drive nISP low
3) release nRESET (float, pulled high)
4) download new code
5) release nISP (float, pulled high)
6) drive nRESET low
7) release nRESET (float, pulled high)
VBB=48V
VNB=8V
VLED=6V
VCC=5V
VDD=3.3V
LPC1112 inputs are 5V tolerant when not configured as ADC
CN11
0528080871
Molex
VPROG
PROG_RXD
TXD
nRESET
nTXEN
C14
0.1µF
R102
10k
CONFIGURE PIO0.4 AS FAST MODE PLUS TO GET 20mA I(OL)
D21
SLR-343VRT32
Rohm
R103
1k
R104
10k
R105
100
R38
330
C15
0.1µF
C16
0.1µF
U12
LPC1112FHN33/xxx
NXP
XTALIN
XTALOUT
VDD1
VDD2
VSS
PAD
nRESET/PIO0.0
PIO0.1/CLKOUT/CT32B0_MAT2
PIO0.2/SSEL0/CT16B0_CAP0
PIO0.3
PIO0.4/SCL
PIO0.5/SDA
PIO0.6/SCK0
PIO0.7/nCTS
PIO0.8/MISO0/CT16B0_MAT0
PIO0.9/MOSI0/CT16B0_MAT1
SWCLK/PIO0.10/SCK0/CT16B0_MAT2
R/PIO0_11/AD0/CT32B0_MAT3
R/PIO1.0/AD1/CT32B1_CAP0
R/PIO1.1/AD2/CT32B1_MAT0
R/PIO1.2/AD3/CT32B1_MAT1
SWDIO/PIO1.3/AD4/CT32B1_MAT2
PIO1.4/AD5/CT32B1_MAT3/WAKEUP
PIO1.5/nRTS/CT32B0_CAP0
PIO1.6/RXD/CT32B0_MAT0
PIO1.7/TXD/CT32B0_MAT1
PIO1.8/CT16B1_CAP0
PIO1.9/CT16B1_MAT0
PIO1.10/AD6/CT16B1_MAT1
PIO1.11/AD7
PIO2.0/nDTR
PIO3.2
PIO3.4
PIO3.5
nRESET
RCK
LDIN
nSTATUS
nFAULT
nCOIL2
nCOIL3
MISO
MOSI
SCK
nCOIL0
nCOIL4
nCOIL5
nCOIL6
nCOIL7
nTXEN
RXD
TXD
nCPUOK
nCOIL1
nCOIL[7:0]
C22
0.1µF
U13
74LVC1G157GV
NXP
RS485_RXD
PIO1.4 HIGH INDICATES VBB ABSENT. SINCE THIS BOARD DOESN"T EXPECT VBB THIS PIN IS TIED LOW.
NODE ADDRESS CODING:
PIO1.11: b3 (0=HARD WIRED, 1=SWITCHABLE)
PIO3.2: b2
PIO3.4: b1
PIO3.5: b0
HARD WIRED TO ADDRESS 6
PIO1.10/AD6 TIED LOW INDICATES TXEN AND COIL OUTPUTS SHOULD BE ACTIVE LOW (WERE ACTIVE HIGH ON EARLIER VERSIONS)
FIDUCIALS
MOUNTING HOLES
SRS6-4-01
Richco
Title
Bill Premium/LE Left-- cpu
Size A
Document Number 520-6811-00
Rev A
Date: Thursday, September 19, 2013
Sheet 4 of 4


Bill Premium Right LED
Document Number
820-68812-01
Bd 514
Friday, September 20, 2013
Rev A
MOUNTING HOLES
SR56-4-01
Richco
74HC595
2N7002P
CLV6A-FKB-CK1P1G1BB7R3R3
Cree
VCC
GND
SER
SRCLK
SRCLR
RCLK
G
MOSI
SCK
RCK

STAR TREK L.E
LED Board 520-6812-00

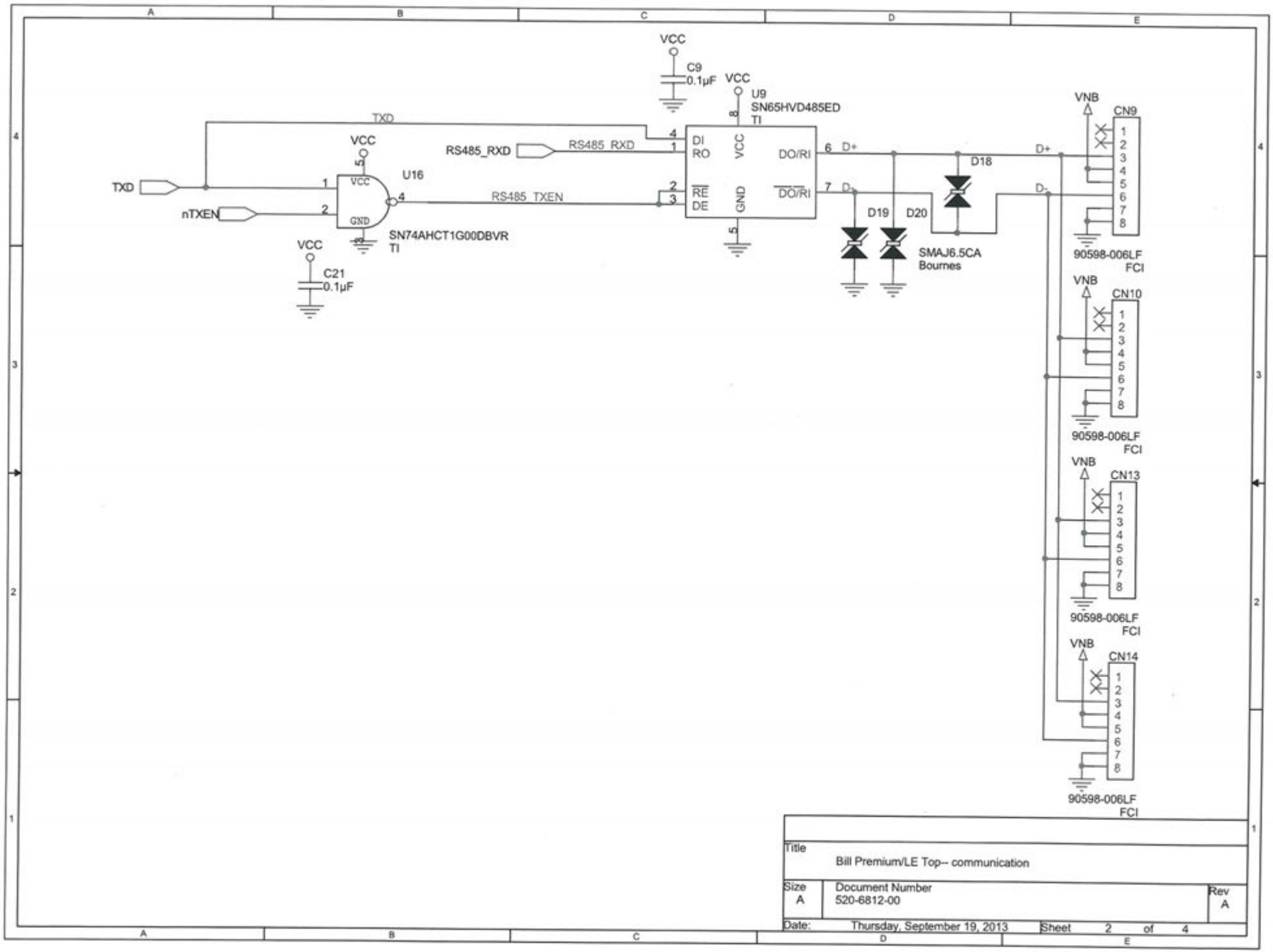


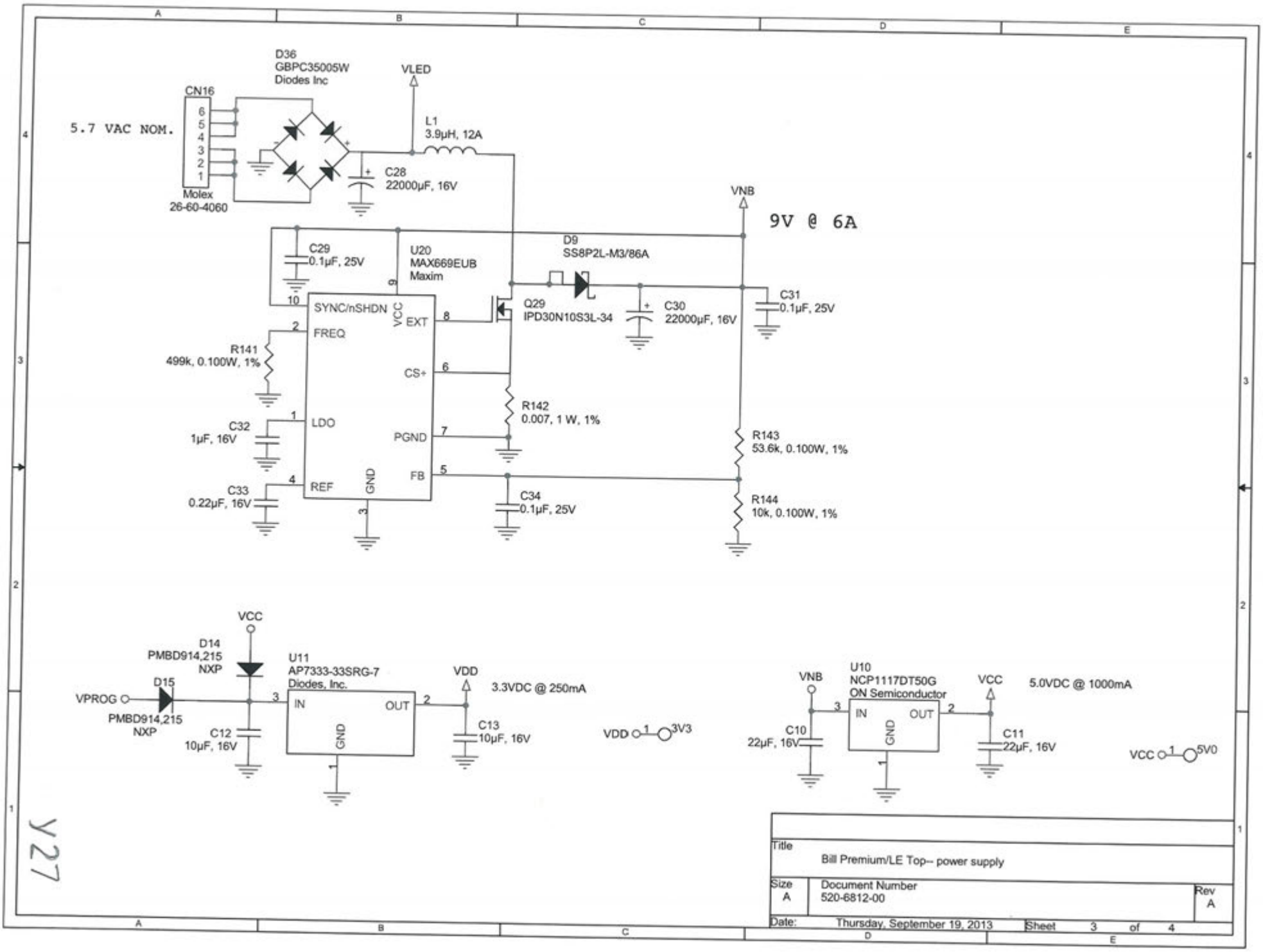
Y24

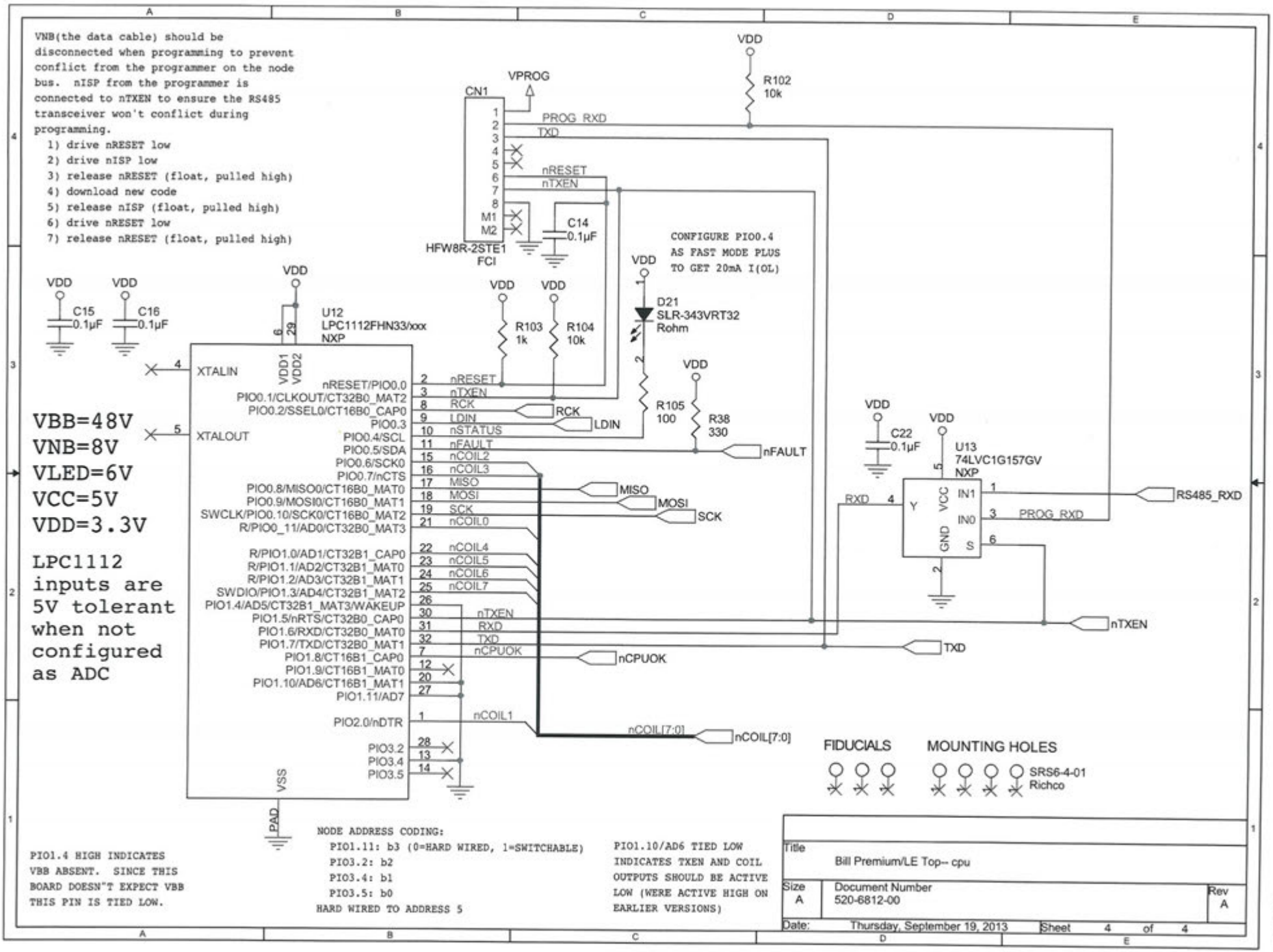

MOSI
SCK
RCK
nCPUOK
To 520-6812-01 (24 outputs)
VREF = 3.3 x 4.64k / (221 + 4.64k) = 3.15V
I(trip) = (3.15V - 2.048V)/0.22 ohms = 5.0A
sense rises 220mV per amp
nFAULT

Y25

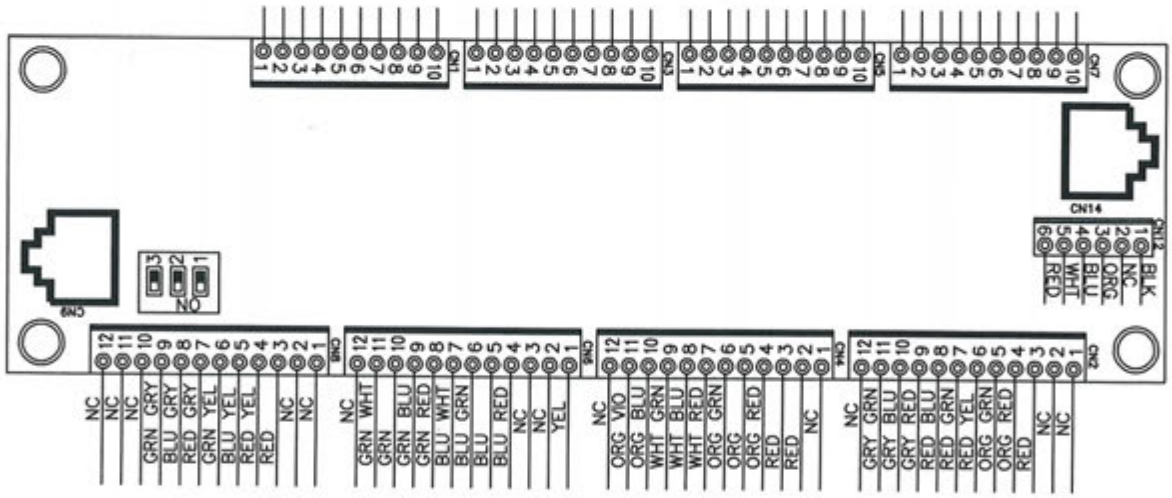
Rd 5

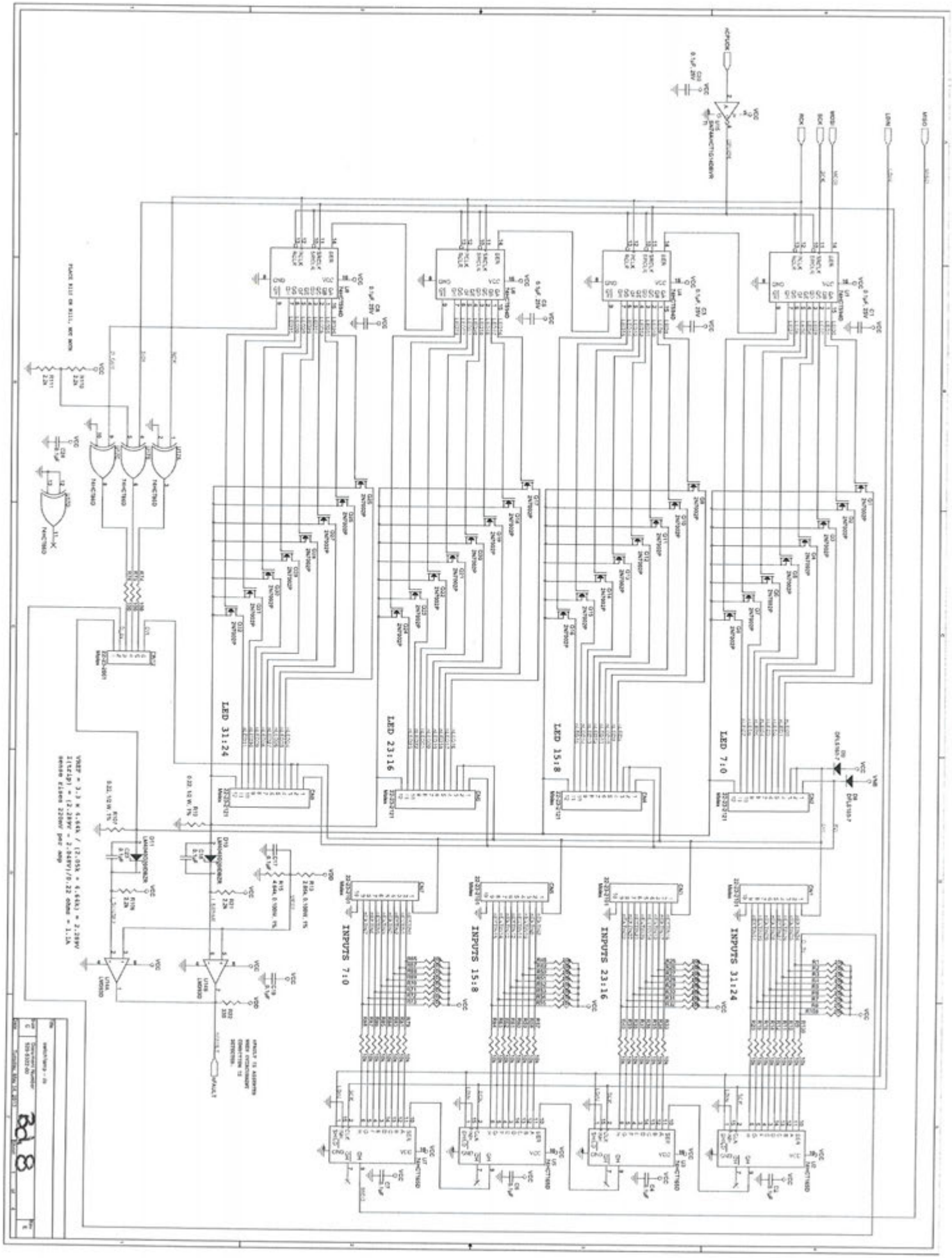

VCC
C9
0.1µF
VCC
U9
SN65HVD485ED
TI
TXD
VCC
RS485_RXD
RS485_RXD
DI
RO
VCC
DO/RI
6 D+
7 D-
RE
DE
GND
DO/RI
TXD
U16
VCC
GND
nTXEN
RS485_TXEN
SN74AHCT1G00DBVR
TI
VCC
C21
0.1µF
D18
D19
D20
SMAJ6.5CA
Bourns
VNB
CN9
CN10
CN13
CN14
90598-006LF
FCI
Title
Bill Premium/LE Top-- communication
Size
A
Document Number
520-6812-00
Rev
A
Date:
Thursday, September 19, 2013
Sheet
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4

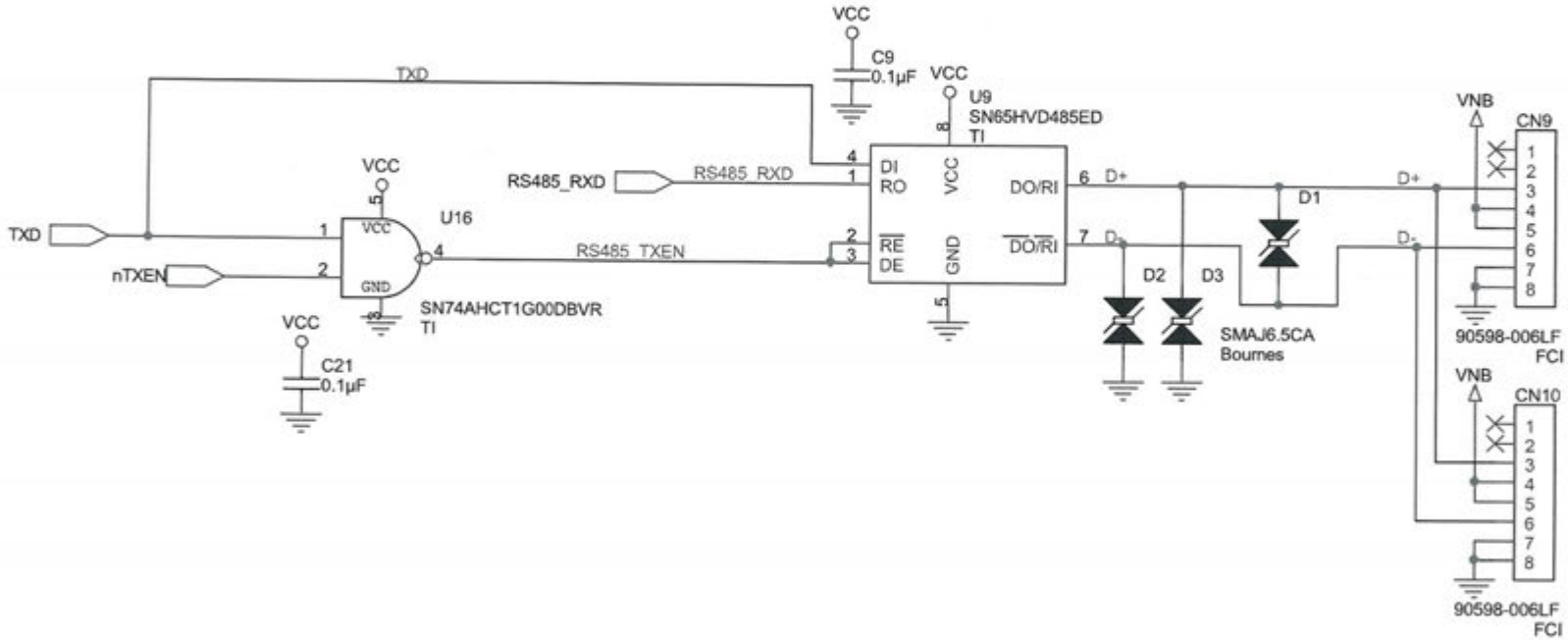

D36
GBPC35005W
Diodes Inc
VLED
CN16
5.7 VAC NOM.
Molex
26-60-4060
L1
3.9µH, 12A
C28
22000µF, 16V
VNB
9V @ 6A
C29
0.1µF, 25V
U20
MAX669EUB
Maxim
D9
SS8P2L-M3/86A
C31
0.1µF, 25V
Q29
IPD30N10S3L-34
C30
22000µF, 16V
SYNC/nSHDN
VCC
EXT
FREQ
CS+
LDO
PGND
REF
GND
FB
R141
499k, 0.100W, 1%
C32
1µF, 16V
C33
0.22µF, 16V
R142
0.007, 1 W, 1%
R143
53.6k, 0.100W, 1%
R144
10k, 0.100W, 1%
C34
0.1µF, 25V
VCC
D14
PMBD914,215
NXP
D15
PMBD914,215
NXP
VPROG
U11
AP7333-33SRG-7
Diodes, Inc.
IN
OUT
GND
VDD
3.3VDC @ 250mA
C12
10µF, 16V
C13
10µF, 16V
VDD 1 3V3
VNB
U10
NCP1117DT50G
ON Semiconductor
VCC
5.0VDC @ 1000mA
C10
22µF, 16V
C11
22µF, 16V
VCC 1 5V0
V27
Title
Bill Premium/LE Top-- power supply
Size
A
Document Number
520-6812-00
Rev
A
Date:
Thursday, September 19, 2013
Sheet
3
of
4


VNB(the data cable) should be disconnected when programming to prevent conflict from the programmer on the node bus. nISP from the programmer is connected to nTXEN to ensure the RS485 transceiver won't conflict during programming.
1) drive nRESET low
2) drive nISP low
3) release nRESET (float, pulled high)
4) download new code
5) release nISP (float, pulled high)
6) drive nRESET low
7) release nRESET (float, pulled high)
VPROG
CN1
HFW8R-2STE1
FCI
PROG_RXD
TXD
nRESET
nTXEN
M1
M2
C14
0.1µF
VDD
R102
10k
CONFIGURE PIO0.4 AS FAST MODE PLUS TO GET 20mA I(OL)
D21
SLR-343VRT32
Rohm
R103
1k
R104
10k
R105
100
R38
330
C15
0.1µF
C16
0.1µF
U12
LPC1112FHN33/xxx
NXP
XTALIN
XTALOUT
VDD1
VDD2
VSS
PAD
nRESET/PIO0.0
PIO0.1/CLKOUT/CT32B0_MAT2
PIO0.2/SSEL0/CT16B0_CAP0
PIO0.3
PIO0.4/SCL
PIO0.5/SDA
PIO0.6/SCK0
PIO0.7/nCTS
PIO0.8/MISO0/CT16B0_MAT0
PIO0.9/MOSI0/CT16B0_MAT1
SWCLK/PIO0.10/SCK0/CT16B0_MAT2
R/PIO0_11/AD0/CT32B0_MAT3
R/PIO1.0/AD1/CT32B1_CAP0
R/PIO1.1/AD2/CT32B1_MAT0
R/PIO1.2/AD3/CT32B1_MAT1
SWDIO/PIO1.3/AD4/CT32B1_MAT2
PIO1.4/AD5/CT32B1_MAT3/WAKEUP
PIO1.5/nRTS/CT32B0_CAP0
PIO1.6/RXD/CT32B0_MAT0
PIO1.7/TXD/CT32B0_MAT1
PIO1.8/CT16B1_CAP0
PIO1.9/CT16B1_MAT0
PIO1.10/AD6/CT16B1_MAT1
PIO1.11/AD7
PIO2.0/nDTR
PIO3.2
PIO3.4
PIO3.5
nRESET
nTXEN
RCK
LDIN
nSTATUS
nFAULT
nCOIL2
nCOIL3
MISO
MOSI
SCK
nCOIL0
nCOIL4
nCOIL5
nCOIL6
nCOIL7
nCPUOK
nCOIL1
nCOIL[7:0]
VBB=48V
VNB=8V
VLED=6V
VCC=5V
VDD=3.3V
LPC1112 inputs are 5V tolerant when not configured as ADC
C22
0.1µF
U13
74LVC1G157GV
NXP
RXD
RS485_RXD
FIDUCIALS
MOUNTING HOLES
SRS6-4-01
Richco
PIO1.4 HIGH INDICATES VBB ABSENT. SINCE THIS BOARD DOESN"T EXPECT VBB THIS PIN IS TIED LOW.
NODE ADDRESS CODING:
PIO1.11: b3 (0=HARD WIRED, 1=SWITCHABLE)
PIO3.2: b2
PIO3.4: b1
PIO3.5: b0
HARD WIRED TO ADDRESS 5
PIO1.10/AD6 TIED LOW INDICATES TXEN AND COIL OUTPUTS SHOULD BE ACTIVE LOW (WERE ACTIVE HIGH ON EARLIER VERSIONS)
Title
Bill Premium/LE Top-- cpu
Size A
Document Number 520-6812-00
Rev A
Date: Thursday, September 19, 2013
Sheet 4 of 4

STAR TREK L.E
LED Board 520-5322-00

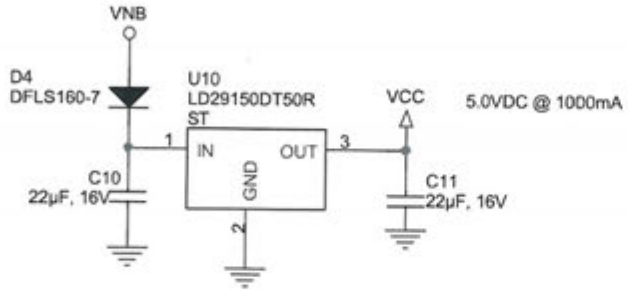


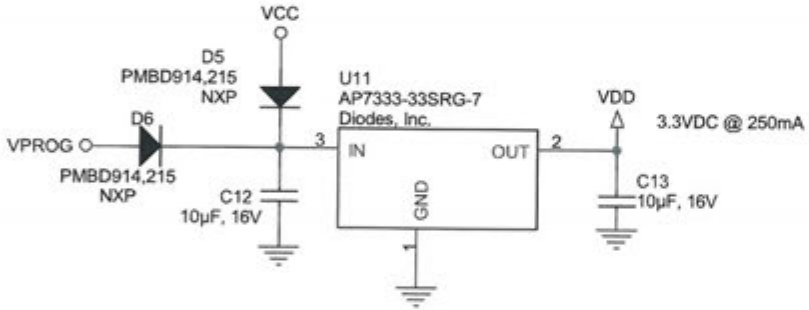

LED 31:24
LED 23:16
LED 15:8
LED 7:0
INPUTS 7:0
INPUTS 15:8
INPUTS 23:16
INPUTS 31:24



V31

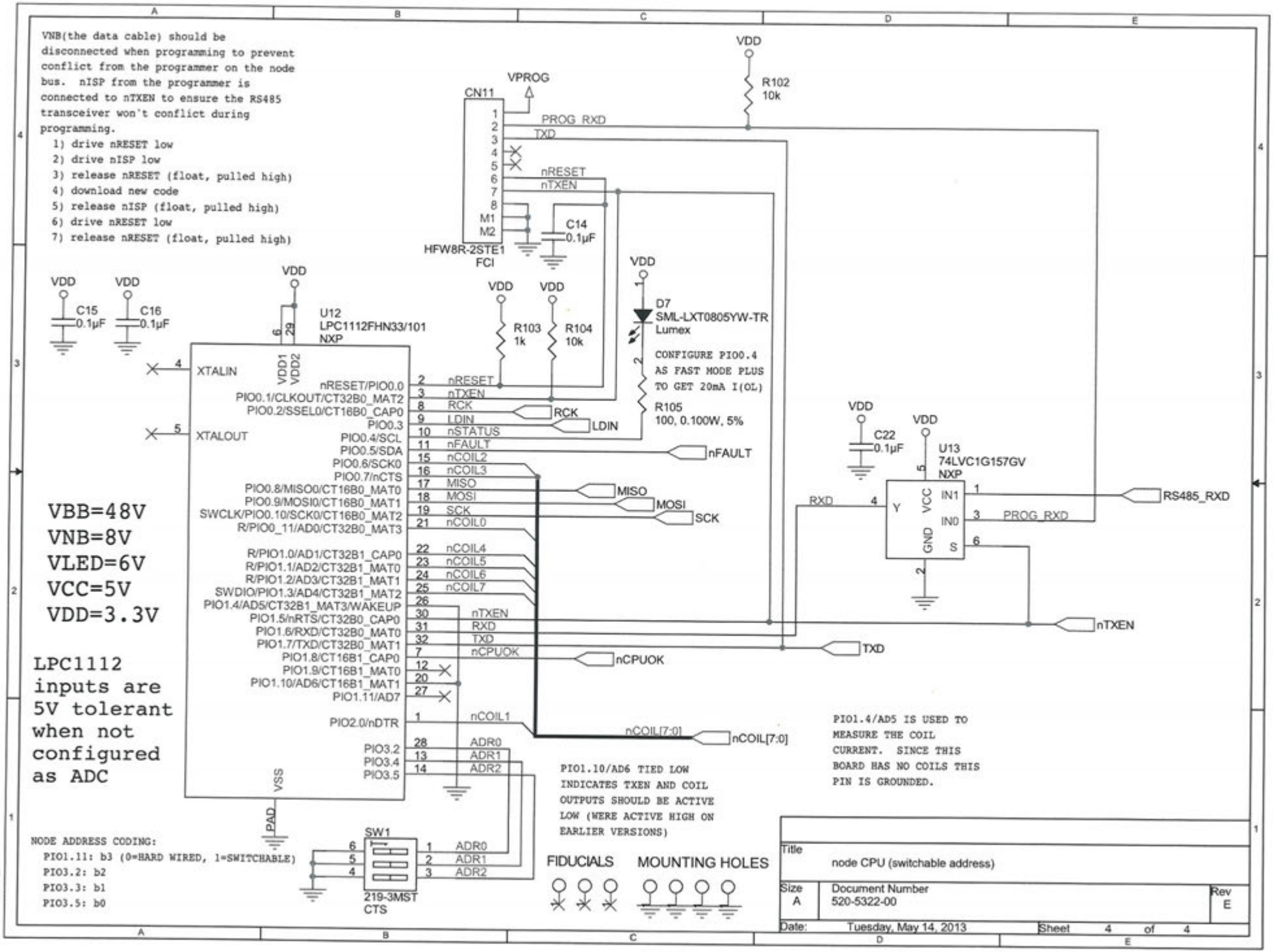
Title	switch/lamp -- communication	
Size A	Document Number 520-5322-00	Rev E
Date: Tuesday, May 14, 2013	Sheet 2 of 4	

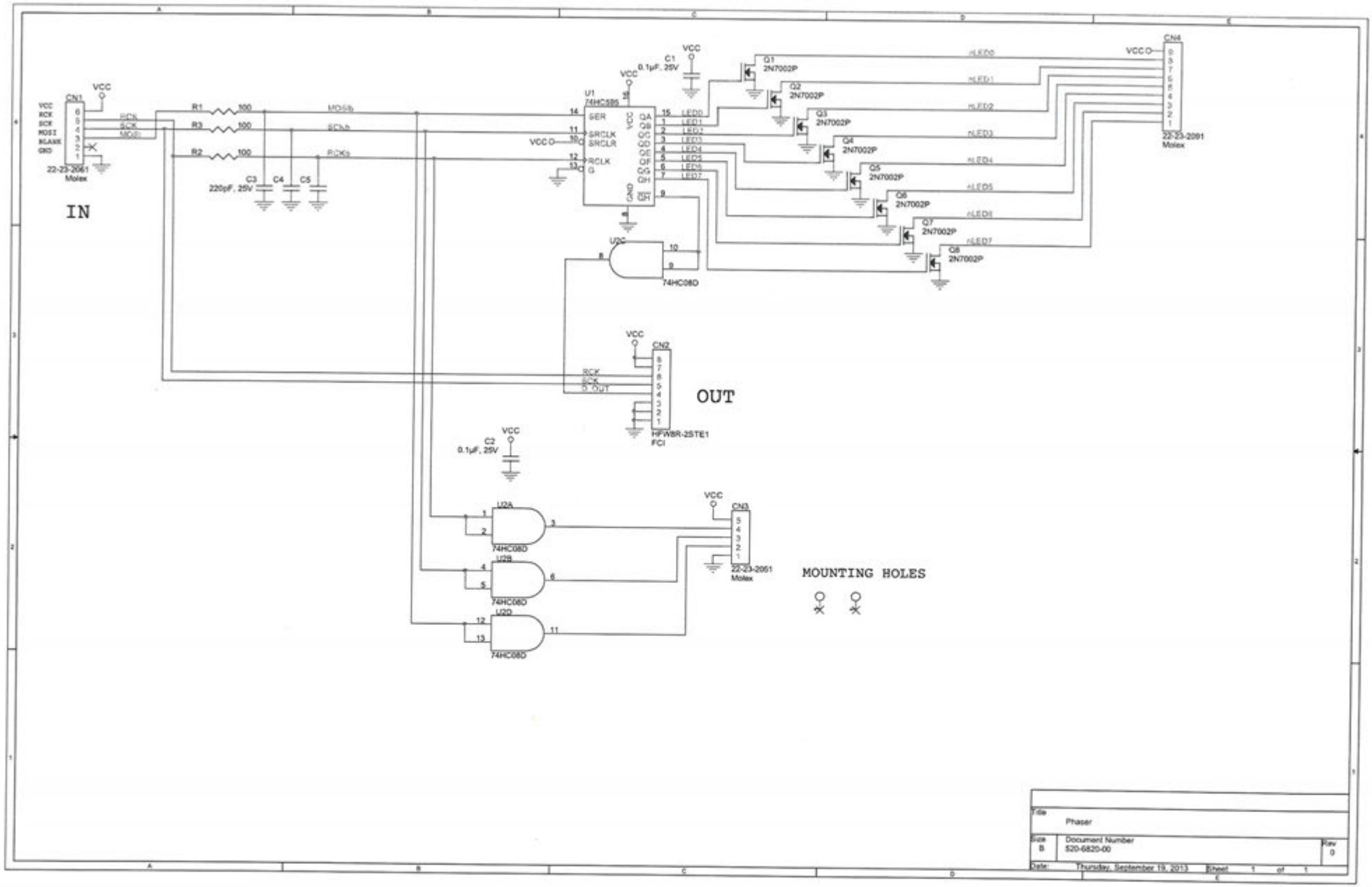




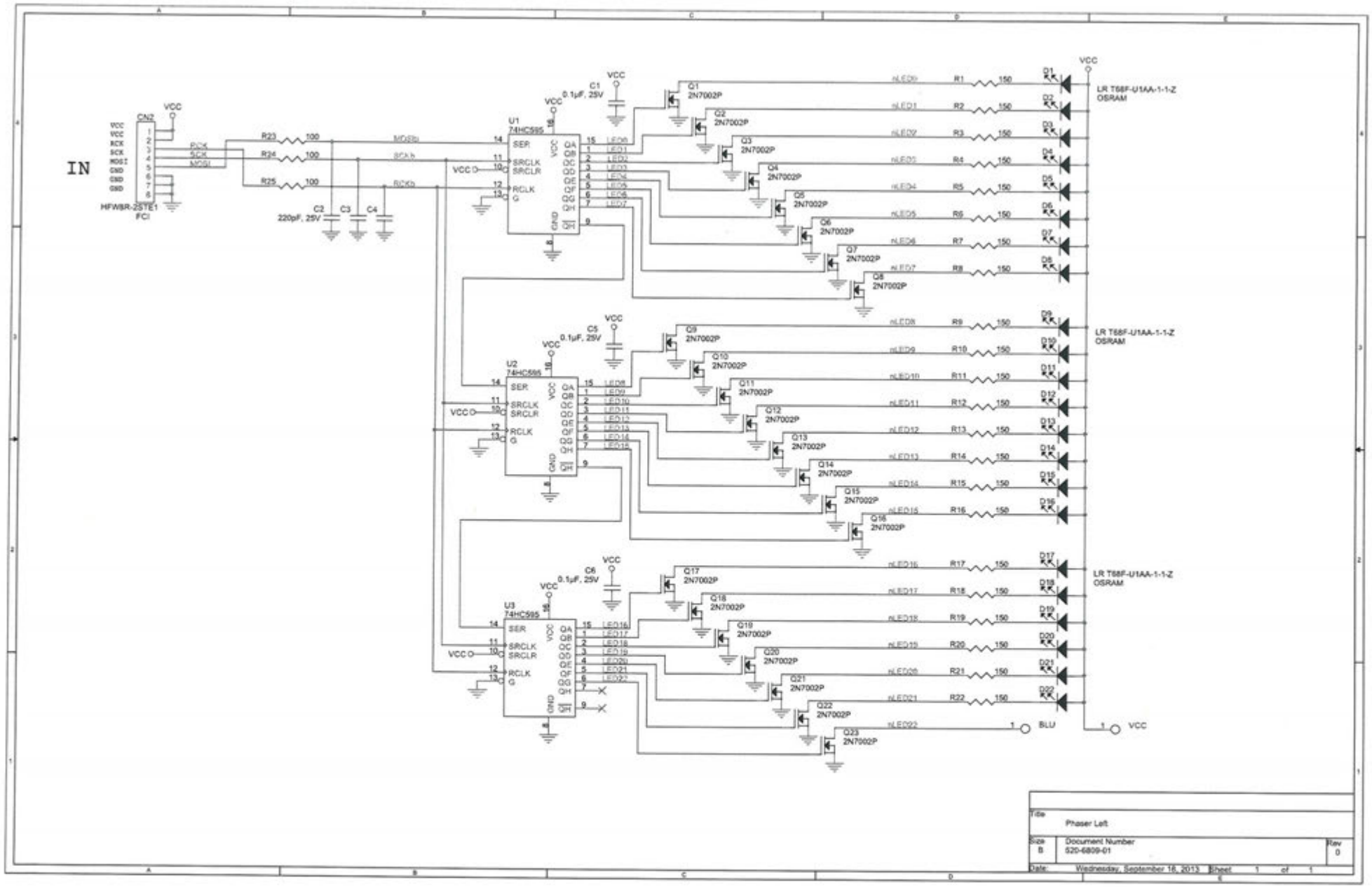
Title	switch/lamp -- power supply	
Size A	Document Number 520-5322-00	Rev E
Date: Tuesday, May 14, 2013	Sheet 3 of 4	

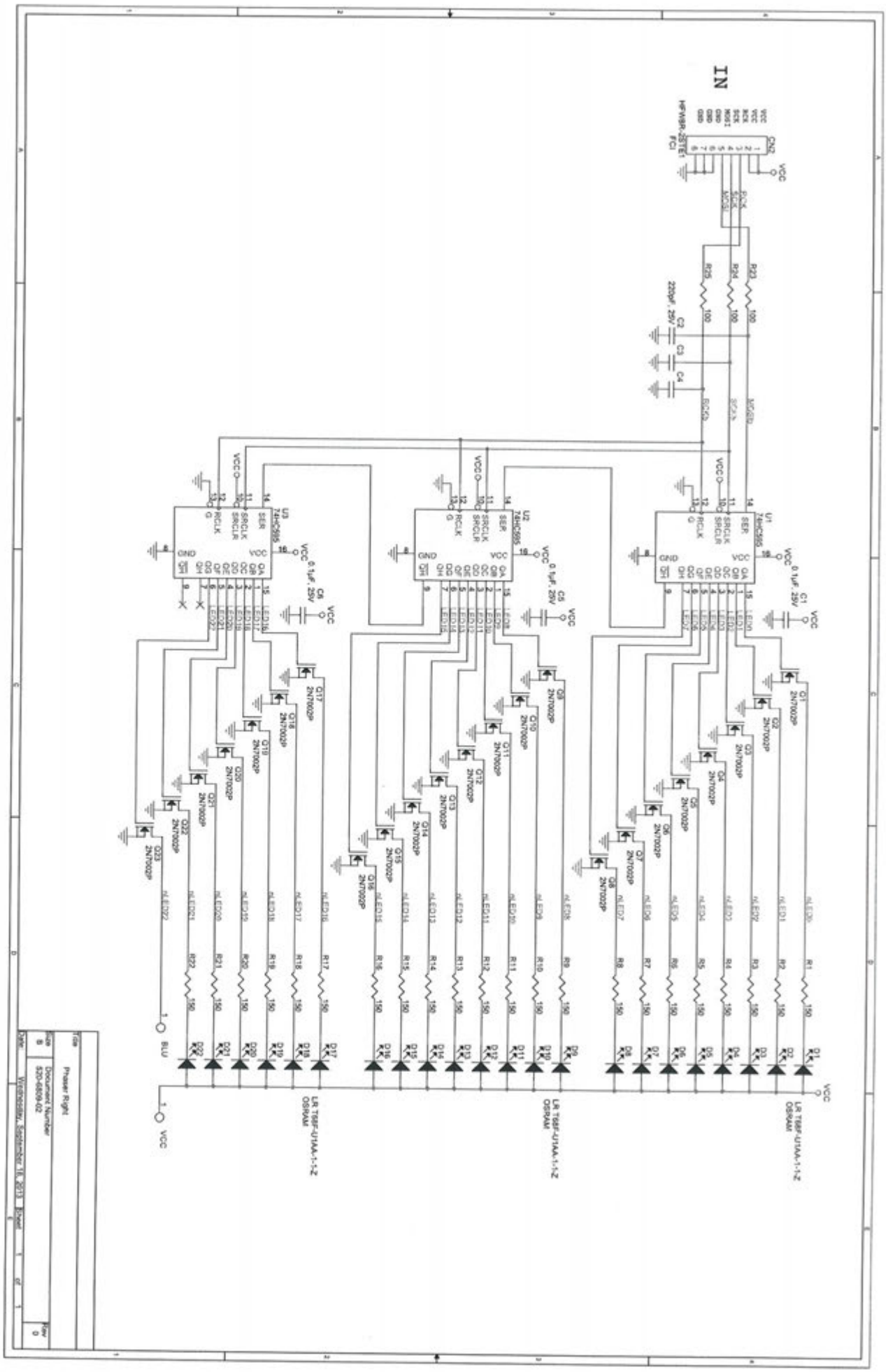
y32

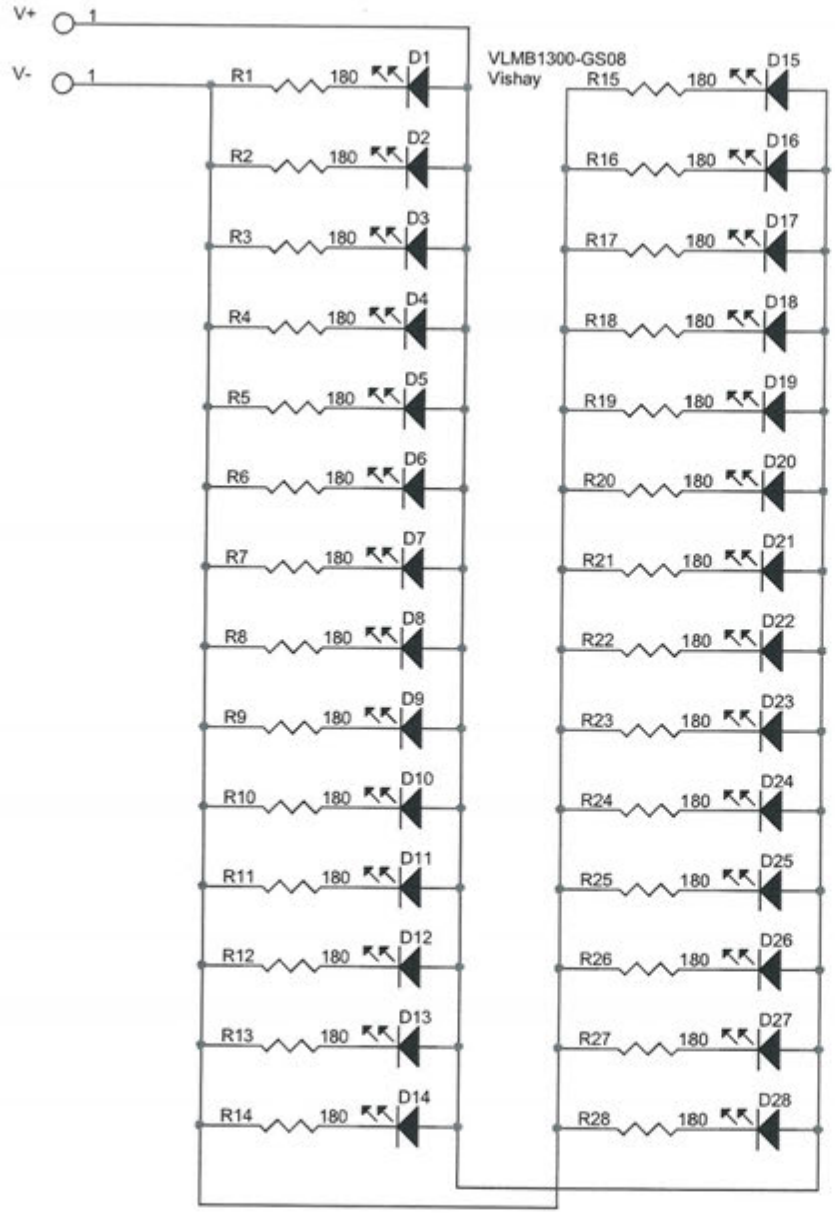

VNB(the data cable) should be disconnected when programming to prevent conflict from the programmer on the node bus. nISP from the programmer is connected to nTXEN to ensure the RS485 transceiver won't conflict during programming.
1) drive nRESET low
2) drive nISP low
3) release nRESET (float, pulled high)
4) download new code
5) release nISP (float, pulled high)
6) drive nRESET low
7) release nRESET (float, pulled high)
VDD
VPROG
CN11
R102
10k
PROG_RXD
TXD
nRESET
nTXEN
C14
0.1µF
HFW8R-2STE1
FCI
C15
0.1µF
C16
0.1µF
U12
LPC1112FHN33/101
NXP
R103
1k
R104
10k
D7
SML-LXT0805YW-TR
Lumex
CONFIGURE PIO0.4 AS FAST MODE PLUS TO GET 20mA I(OL)
R105
100, 0.100W, 5%
C22
0.1µF
U13
74LVC1G157GV
NXP
XTALIN
XTALOUT
nRESET/PIO0.0
PIO0.1/CLKOUT/CT32B0_MAT2
PIO0.2/SSEL0/CT16B0_CAP0
PIO0.3
PIO0.4/SCL
PIO0.5/SDA
PIO0.6/SCK0
PIO0.7/nCTS
PIO0.8/MISO0/CT16B0_MAT0
PIO0.9/MOSI0/CT16B0_MAT1
SWCLK/PIO0.10/SCK0/CT16B0_MAT2
R/PIO0_11/AD0/CT32B0_MAT3
R/PIO1.0/AD1/CT32B1_CAP0
R/PIO1.1/AD2/CT32B1_MAT0
R/PIO1.2/AD3/CT32B1_MAT1
SWDIO/PIO1.3/AD4/CT32B1_MAT2
PIO1.4/AD5/CT32B1_MAT3/WAKEUP
PIO1.5/nRTS/CT32B0_CAP0
PIO1.6/RXD/CT32B0_MAT0
PIO1.7/TXD/CT32B0_MAT1
PIO1.8/CT16B1_CAP0
PIO1.9/CT16B1_MAT0
PIO1.10/AD6/CT16B1_MAT1
PIO1.11/AD7
PIO2.0/nDTR
PIO3.2
PIO3.4
PIO3.5
nRESET
nTXEN
RCK
LDIN
nSTATUS
nFAULT
nCOIL2
nCOIL3
MISO
MOSI
SCK
nCOIL0
nCOIL4
nCOIL5
nCOIL6
nCOIL7
nTXEN
RXD
TXD
nCPUOK
nCOIL1
ADR0
ADR1
ADR2
nCOIL[7:0]
RS485_RXD
PROG_RXD
VBB=48V
VNB=8V
VLED=6V
VCC=5V
VDD=3.3V
LPC1112 inputs are 5V tolerant when not configured as ADC
PIO1.10/AD6 TIED LOW INDICATES TXEN AND COIL OUTPUTS SHOULD BE ACTIVE LOW (WERE ACTIVE HIGH ON EARLIER VERSIONS)
PIO1.4/AD5 IS USED TO MEASURE THE COIL CURRENT. SINCE THIS BOARD HAS NO COILS THIS PIN IS GROUNDED.
NODE ADDRESS CODING:
PIO1.11: b3 (0=HARD WIRED, 1=SWITCHABLE)
PIO3.2: b2
PIO3.3: b1
PIO3.5: b0
SW1
219-3MST
CTS
FIDUCIALS
MOUNTING HOLES
Title
node CPU (switchable address)
Size A
Document Number 520-5322-00
Rev E
Date: Tuesday, May 14, 2013
Sheet 4 of 4


IN
OUT
MOUNTING HOLES
CN1
22-23-2061
Molex
R1 100
R3 100
R2 100
MOSIb
SCKb
RCKb
C3 220pF, 25V
C4
C5
U1
74HC595
SER
SRCLK
SRCLR
RCLK
G
VCC
GND
QA
QB
QC
QD
QE
QF
QG
QH
LED0
LED1
LED2
LED3
LED4
LED5
LED6
LED7
C1 0.1µF, 25V
Q1 2N7002P
Q2 2N7002P
Q3 2N7002P
Q4 2N7002P
Q5 2N7002P
Q6 2N7002P
Q7 2N7002P
Q8 2N7002P
nLED0
nLED1
nLED2
nLED3
nLED4
nLED5
nLED6
nLED7
CN4
22-23-2091
Molex
U2C
74HC08D
CN2
HFW8R-2STE1
FCI
C2 0.1µF, 25V
U2A
U2B
U2D
CN3
Title
Phaser
Size B
Document Number 520-6820-00
Rev 0
Date: Thursday, September 19, 2013
Sheet 1 of 1

y34


IN
CN2
HFWBR-2STE1
FCI
VCC
R23 100
R24 100
R25 100
MOSIb
SCKb
RCKb
C2 220pF, 25V
C3
C4
U1 74HC595
U2 74HC595
U3 74HC595
C1 0.1µF, 25V
C5 0.1µF, 25V
C6 0.1µF, 25V
SER
SRCLK
SRCLR
RCLK
G
QA
QB
QC
QD
QE
QF
QG
QH
GND
Q1 2N7002P
Q2 2N7002P
Q3 2N7002P
Q4 2N7002P
Q5 2N7002P
Q6 2N7002P
Q7 2N7002P
Q8 2N7002P
Q9 2N7002P
Q10 2N7002P
Q11 2N7002P
Q12 2N7002P
Q13 2N7002P
Q14 2N7002P
Q15 2N7002P
Q16 2N7002P
Q17 2N7002P
Q18 2N7002P
Q19 2N7002P
Q20 2N7002P
Q21 2N7002P
Q22 2N7002P
Q23 2N7002P
R1 150
R2 150
R3 150
R4 150
R5 150
R6 150
R7 150
R8 150
R9 150
R10 150
R11 150
R12 150
R13 150
R14 150
R15 150
R16 150
R17 150
R18 150
R19 150
R20 150
R21 150
R22 150
D1
D2
D3
D4
D5
D6
D7
D8
D9
D10
D11
D12
D13
D14
D15
D16
D17
D18
D19
D20
D21
D22
LR T68F-U1AA-1-1-Z
OSRAM
BLU
VCC
Title
Phaser Left
Size B
Document Number
520-6809-01
Rev 0
Date: Wednesday, September 18, 2013
Sheet 1 of 1


IN
Phaser Right
Document Number
520-6809-02
Rev
0
Size
B
Date:
Wednesday, September 16, 2020
Sheet
1
of
1
LR T68F-UTAA-1-1-Z
OSRAM
BLU
VCC



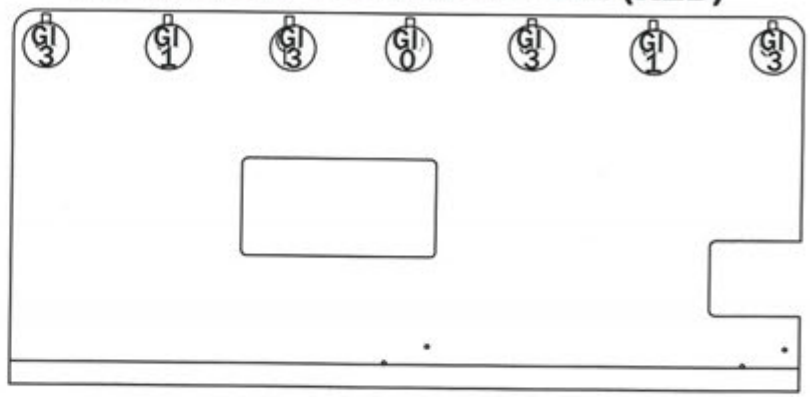
VCC = 5V
Vf = 3.3V
R = 180 ohms
I = (5 - 3.3)/180 = 9.4 mA

Title: Blue Strip		
Size: A	Document Number: 520-6809-03	Rev: 0
Date: Monday, September 23, 2013	Sheet 1 of 1	

137

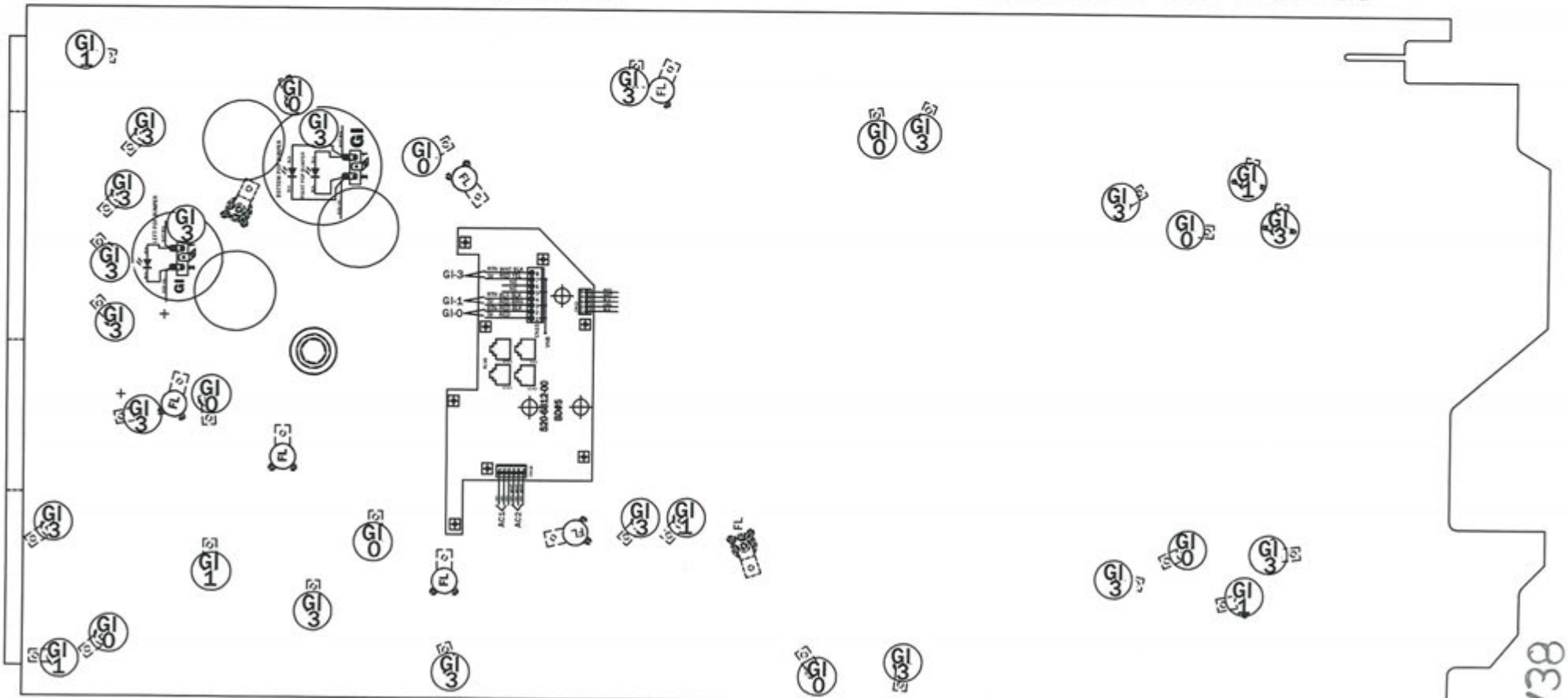
GI STAR TREK L.E

4 BAYONET 112-5034-08 LED(WHT)
2 BAYONET 112-5034-05 LED(BLU)
1 BAYONET 112-5034-02 LED(RED)

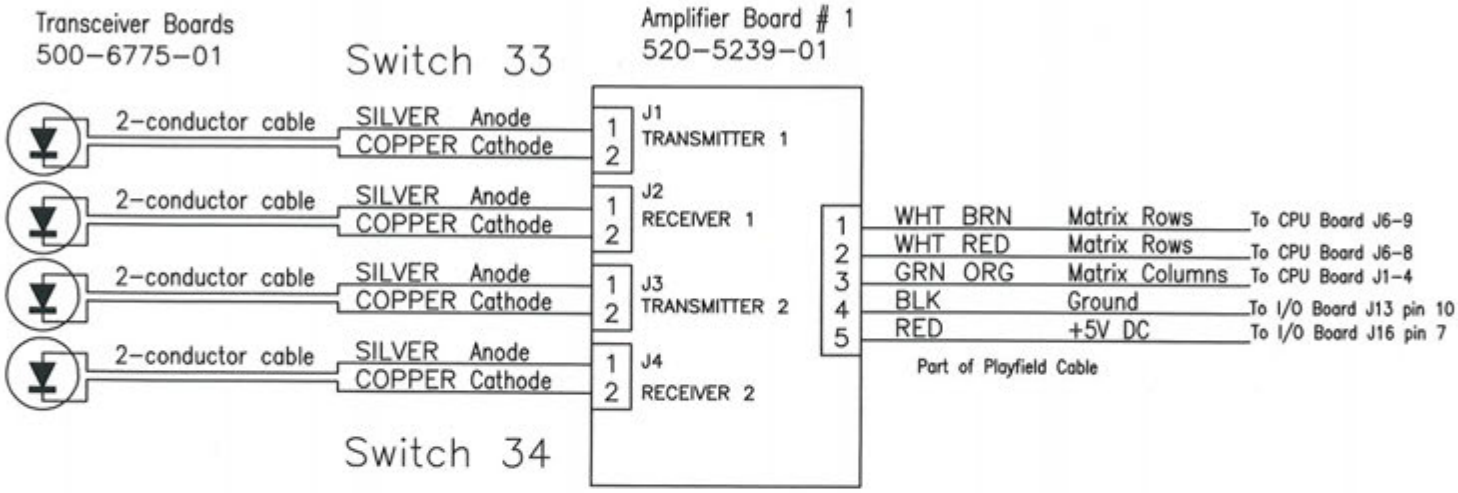


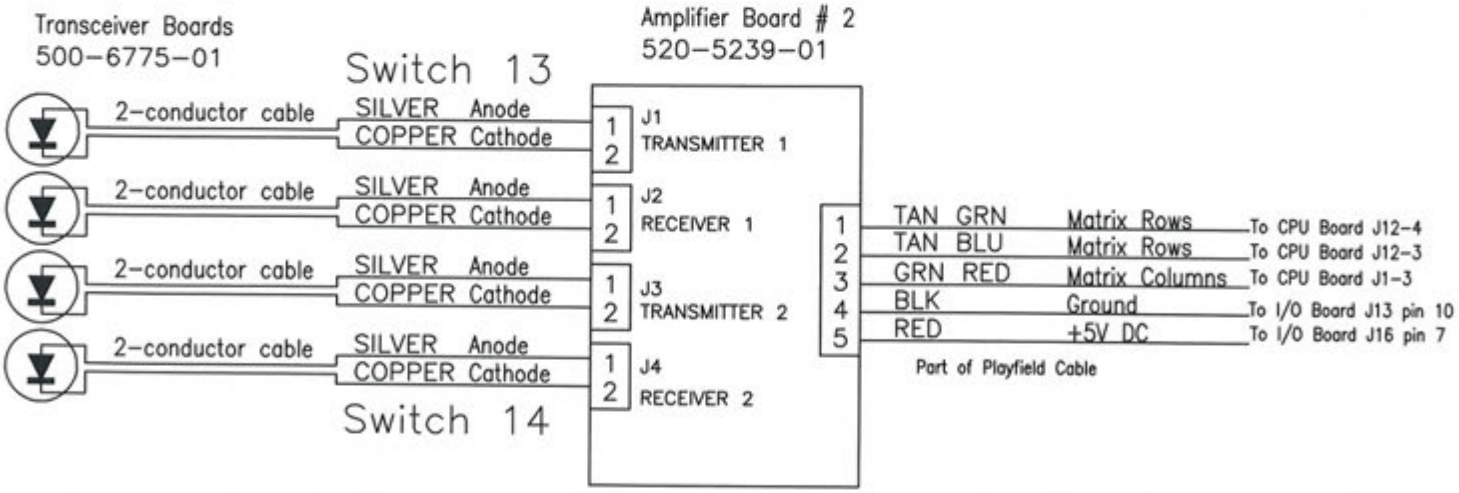
27 WEDGE BASE 112-5033-08
4 BAYONET 112-5034-08

3 POP BUMPER 112-5024-08



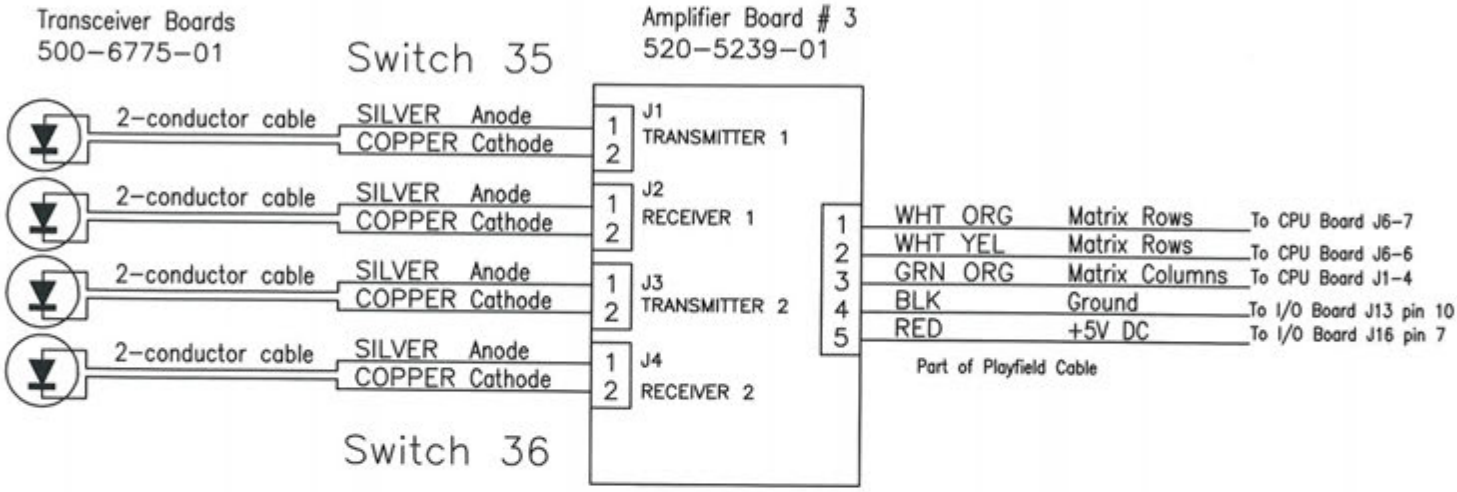
STAR TREK PRO/LE
Opto Amplifier Board 1 and 2 Wiring Configuration

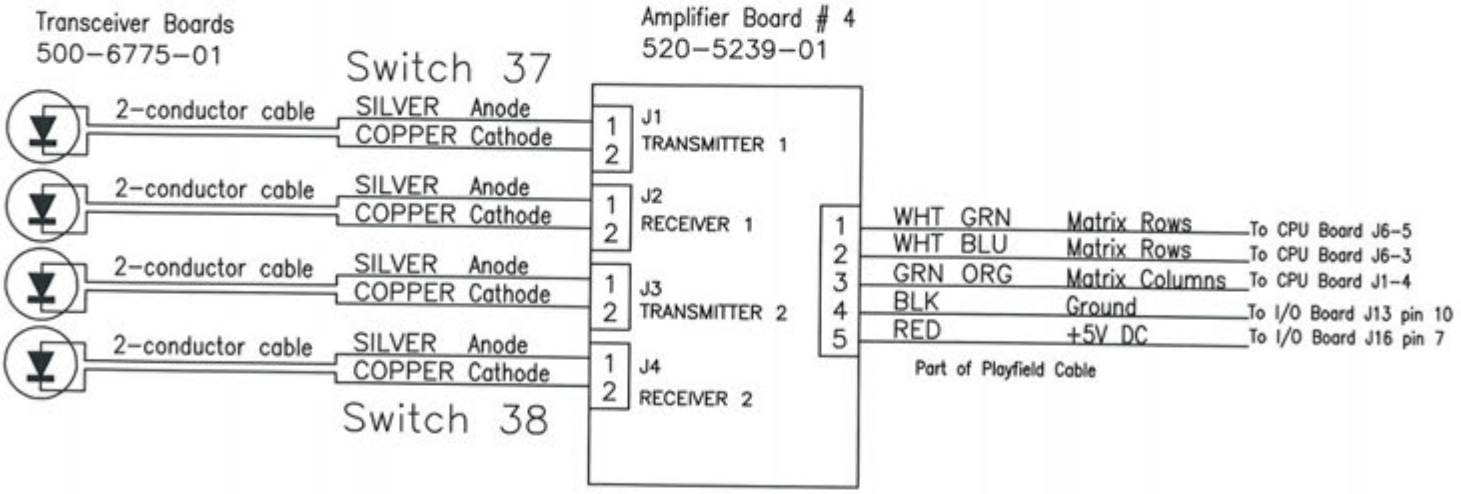




Date: 06-25-13		TITLE: Opto Amplifier Board 1 & 2 Wiring
Scale: N/S	Rev: -	
STERN PINBALL, INC.	DWN. REYNA 1st USE STAR TREK	Y39

STAR TREK PRO/L.E
Opto Amplifier Board 3 & 4 Wiring Configuration

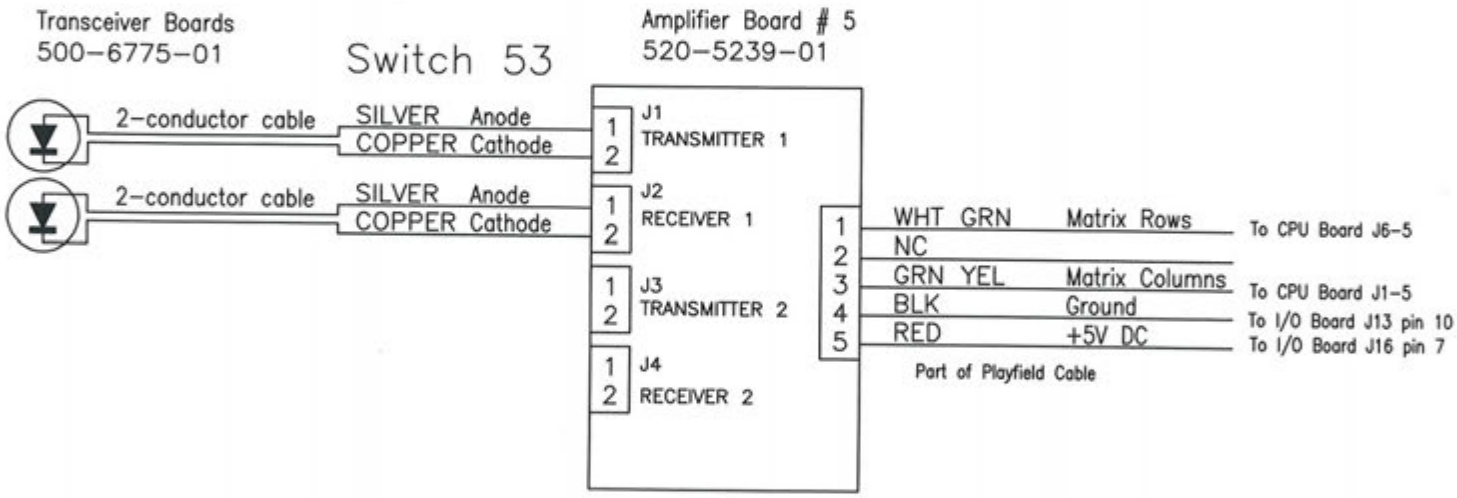




Date: 06-25-13	TITLE	Opto Amplifier Board 3 & 4 Wiring
Scale: N/S	Rev: -	
STERN PINBALL, INC.	DWN. REYNA	PART NO.
	1st USE STAR TREK	

Y40

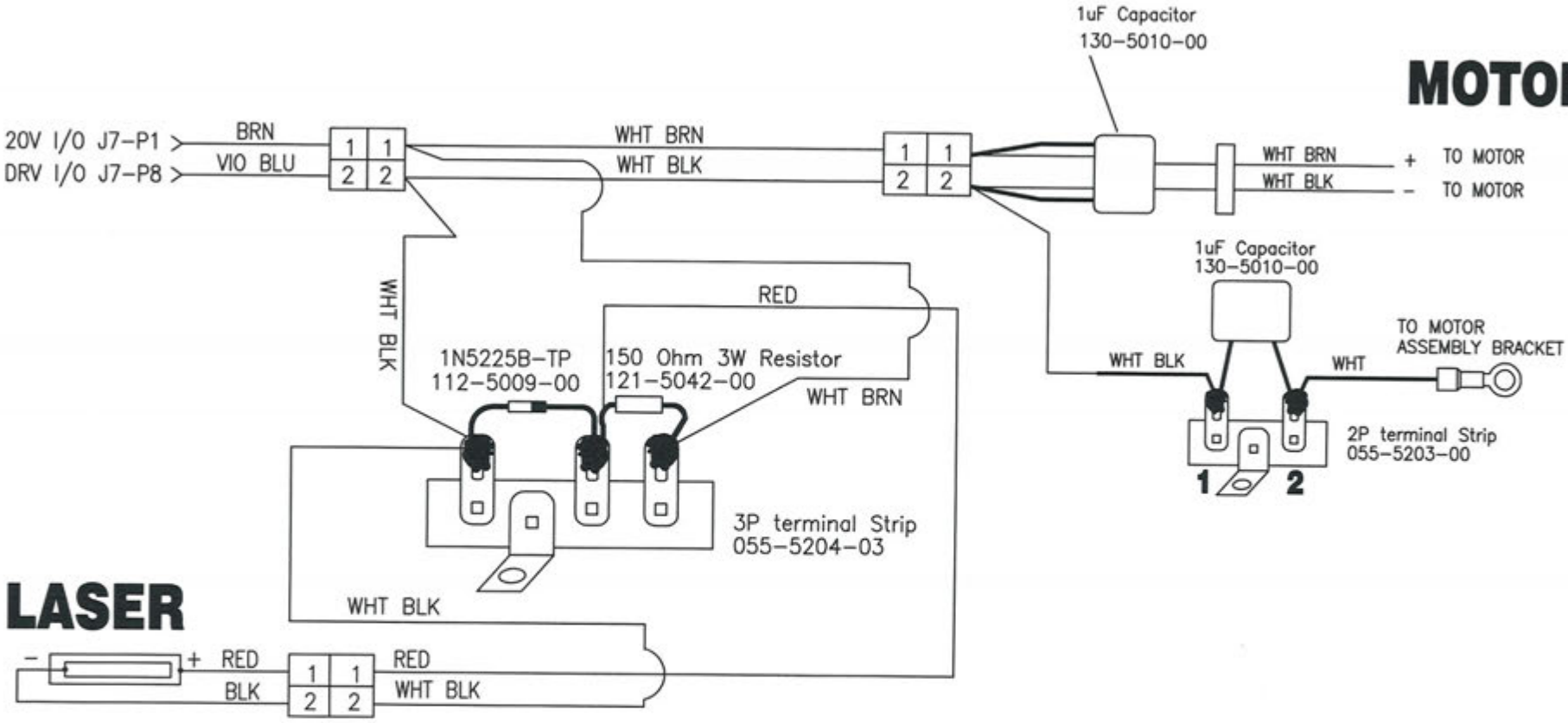
STAR TREK L.E
Opto Amplifier Board 5
Wiring Configuration



Date: 09-30-13		TITLE: Opto Amplifier Board 5 Wiring
Scale: N/S	Rev: -	
STERN PINBALL, INC.	DWN. REYNA 1st USE STAR TREK L.E	Y41

DTS Assembly STAR TREK L.E

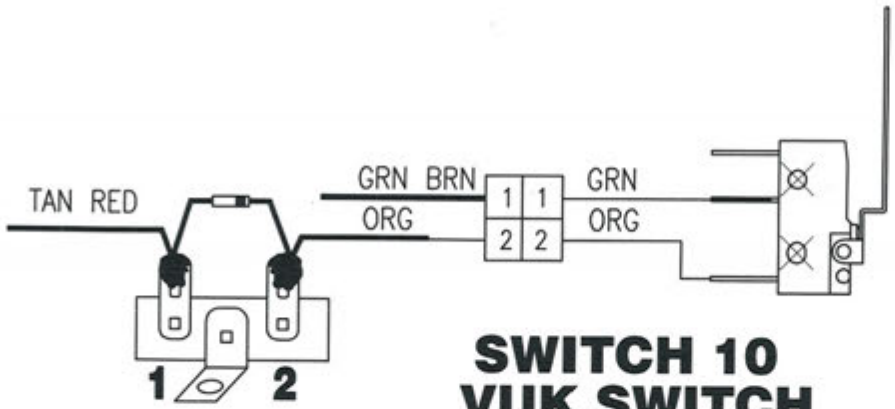
LASER



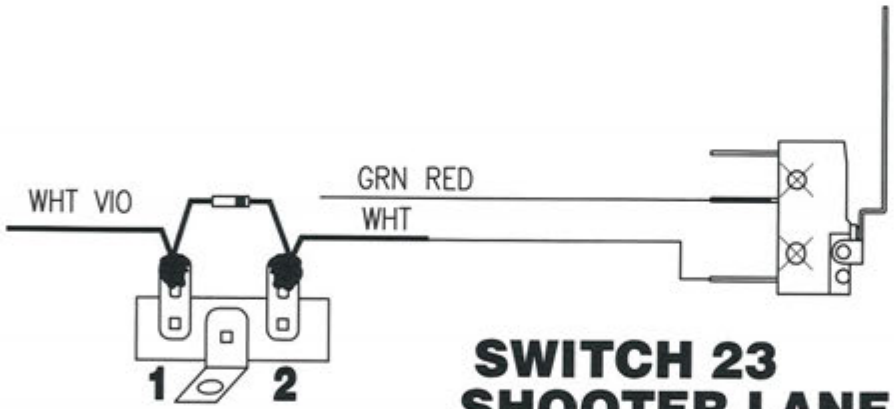
Item	Part Number	Description	Qty
1	055-5204-03	3-Pos terminal strip	1
2	112-5009-00	Diode 1N5225B-TP	1
3	121-5042-00	Resistor 150ohm 3watt	1

DWN.	DATE 10-22-13	TITLE DTS Assy
1st USE Bill LE	SCALE - / REV A	
Stern Pinball, Inc 2020 JANICE AVE., MELROSE PARK, IL. 60160		PART NO. 511-7528-00

YL2



SWITCH 10
VUK SWITCH



SWITCH 23
SHOOTER LANE SWITCH

DWN. REYNA	DATE 06-25-13		TITLE DTS Confirguration STAR TREK (PRO/L.E)
1st USE	SCALE 1:1	REV -	
Stern Pinball, Inc 2020 JANICE AVE., MELROSE PARK, IL. 60160			PART NO. DTS-MAP

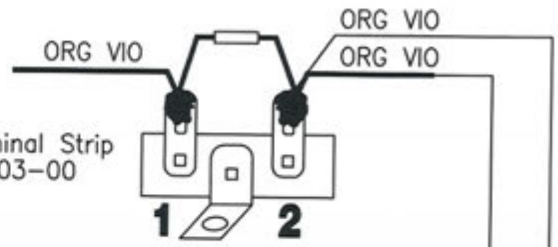
YL3

DTS Assembly STAR TREK L.E
VENGEANGE SHIP



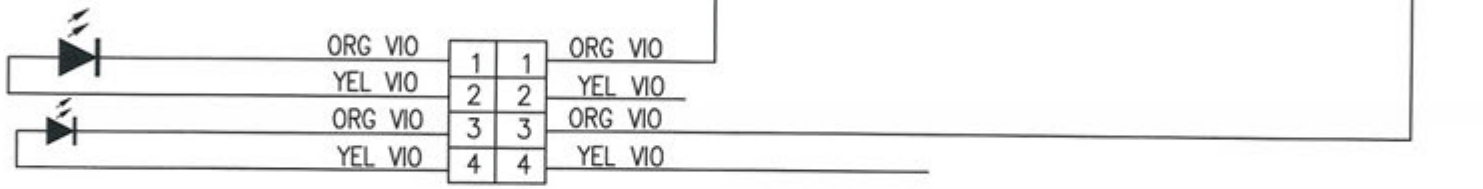
605-5002-00-Cover W/Shrink Tubing 1/8"

100 Ohm Resistor
121-5007-00

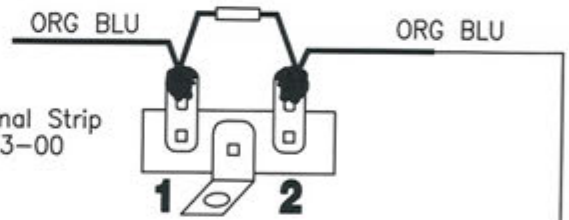


NACELLE

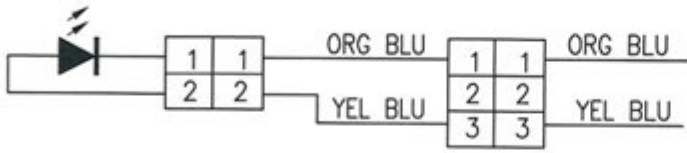
(X2)



130 Ohm Resistor
121-5099-00



SAUCER



DWN.	DATE 07-15-13		TITLE DTS Assy
1st USE Bill L.E	SCALE -	REV A	
Stern Pinball, Inc 2020 JANICE AVE., MELROSE PARK, IL. 60160			PART NO. X

YLL

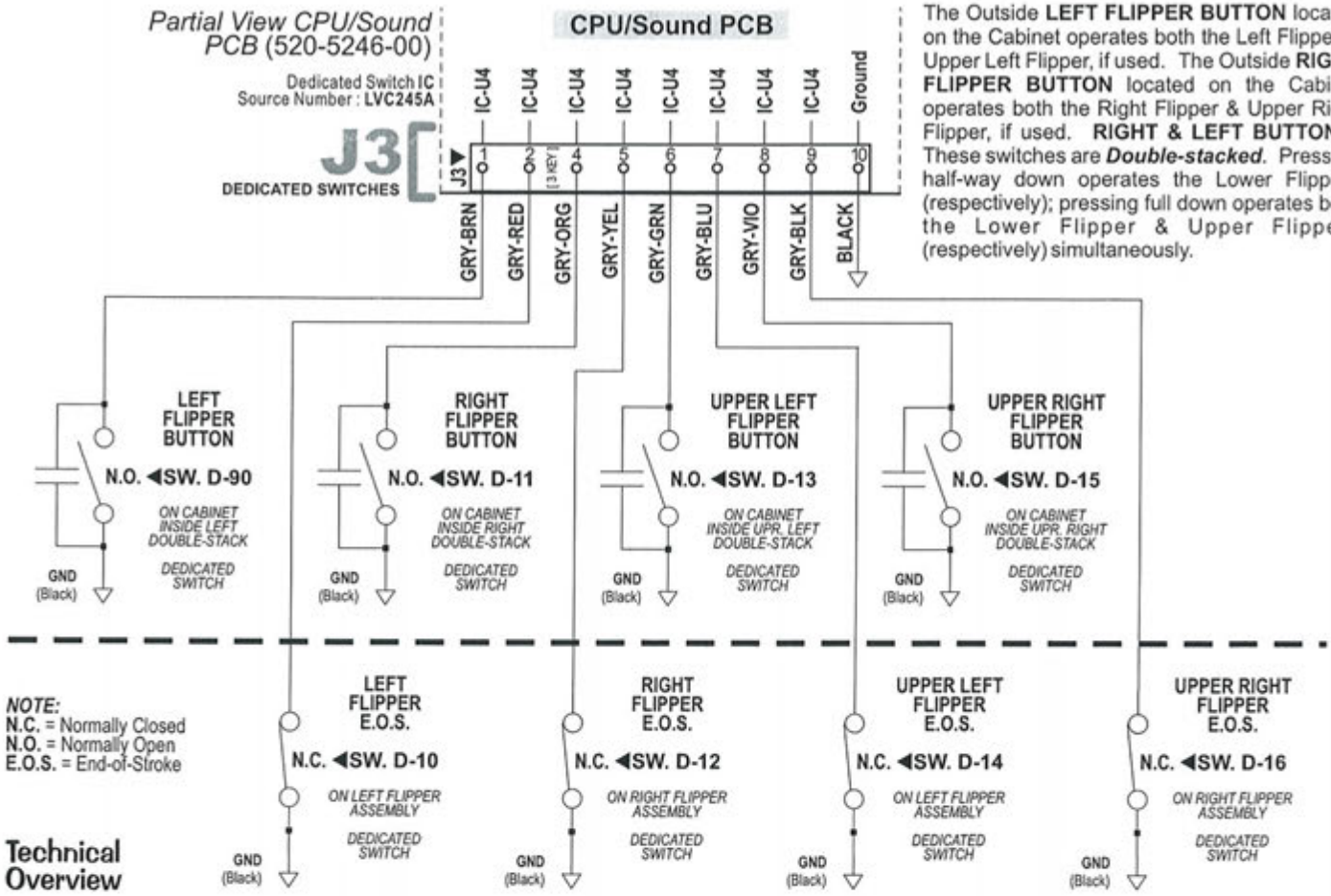
Playfield Switch Wiring Diagram

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

Please NOTE: Switch 47 is not used in Dracula

Playfield Wiring

#-Flipper Circuit Wiring Diagram

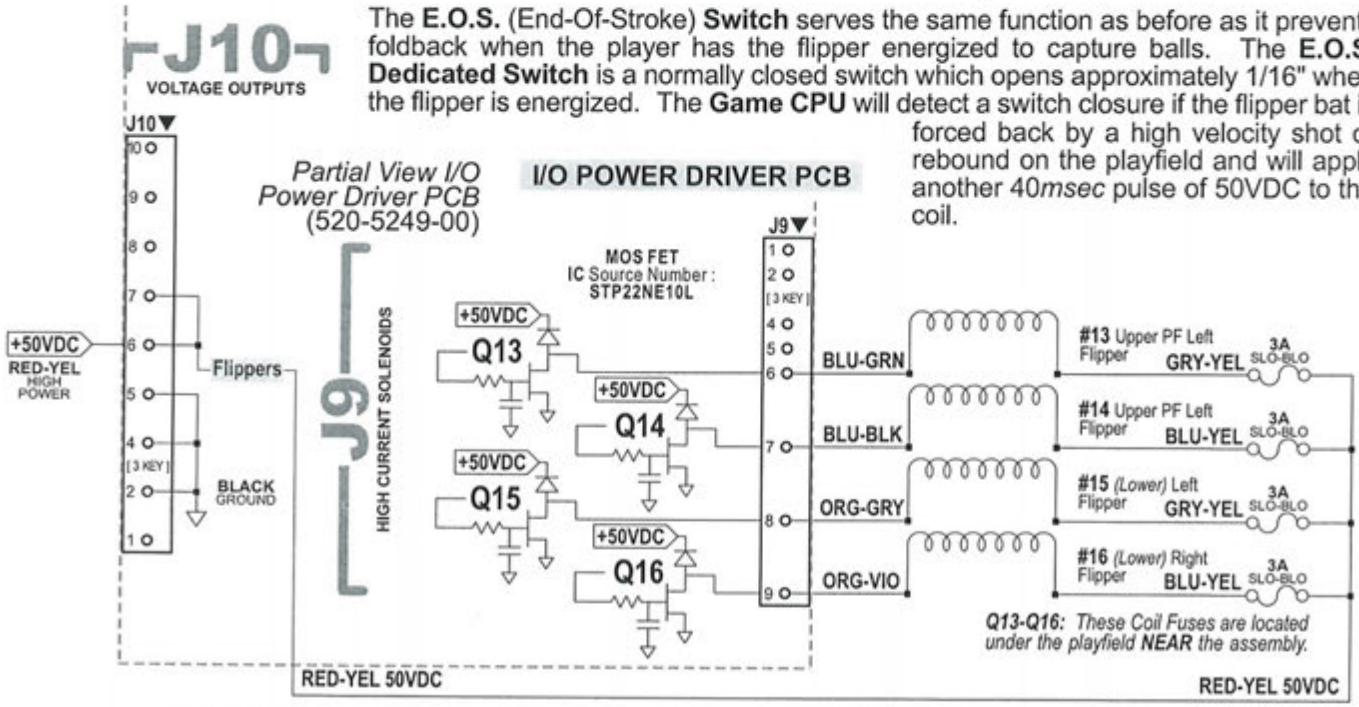


The Outside **LEFT FLIPPER BUTTON** located on the Cabinet operates both the Left Flipper & Upper Left Flipper, if used. The Outside **RIGHT FLIPPER BUTTON** located on the Cabinet operates both the Right Flipper & Upper Right Flipper, if used. **RIGHT & LEFT BUTTONS:** These switches are ***Double-stacked***. Pressing half-way down operates the Lower Flippers (respectively); pressing full down operates both the Lower Flipper & Upper Flippers (respectively) simultaneously.

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 40*msec* pulse to the gate of the Flipper Drive Transistor (STP22NE10L). If it continues to detect a Flipper Cabinet Switch closure *(the player holding the button in)* it will continue to pulse the flipper drive transistor 1*msec* every 12*msecs* for the duration of the hold cycle.

The **E.O.S.** (End-Of-Stroke) **Switch** serves the same function as before as it prevents foldback when the player has the flipper energized to capture balls. The **E.O.S. Dedicated Switch** is a normally closed switch which opens approximately 1/16" when the flipper is energized. The **Game CPU** will detect a switch closure if the flipper bat is forced back by a high velocity shot or rebound on the playfield and will apply another 40*msec* pulse of 50VDC to the coil.



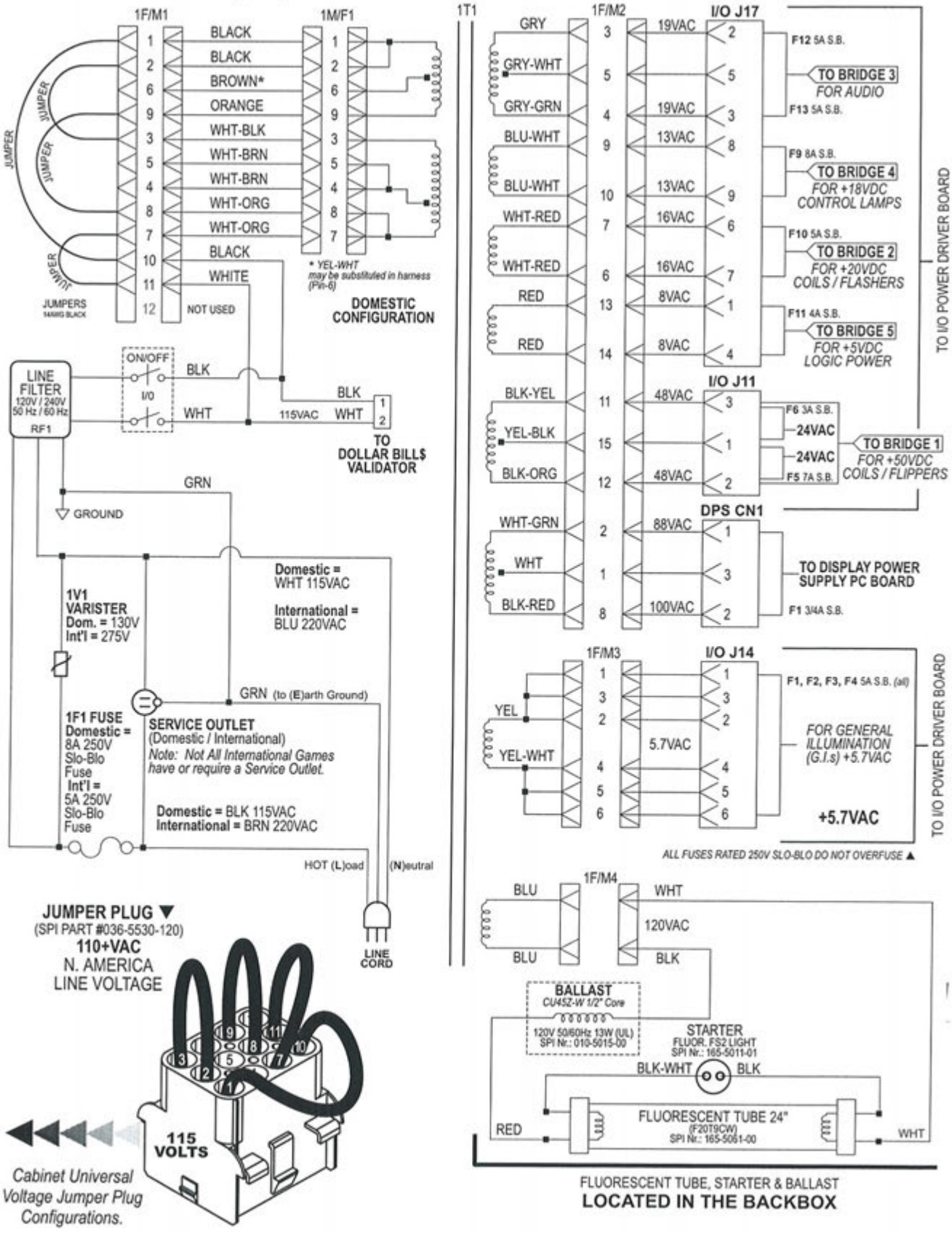
Typical Under-Playfield Fuses are rated:
3A 250v Slo-Blo
Do Not Over-Fuse

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.

YL6

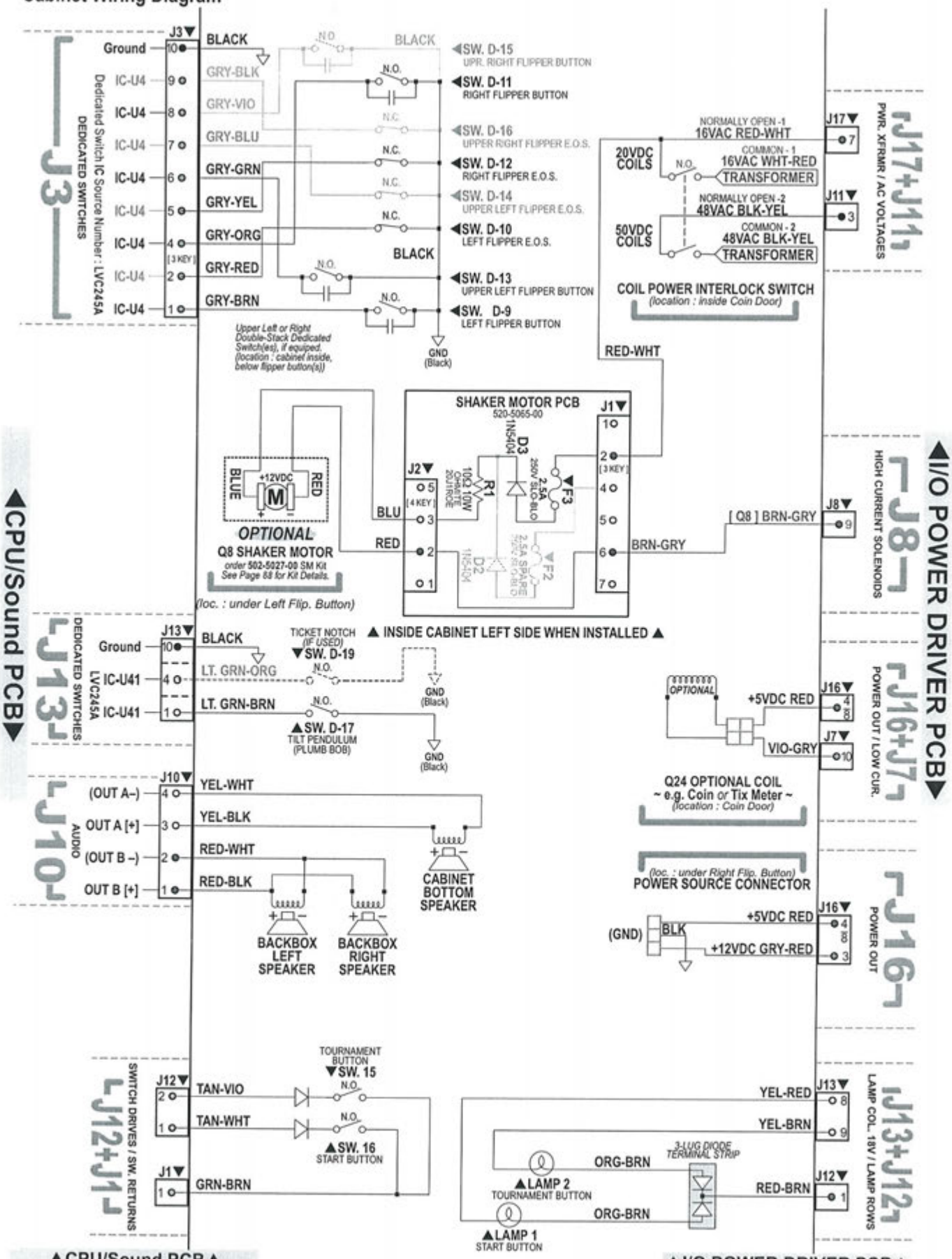
Playfield Wiring

Transformer Power Wiring Diagram



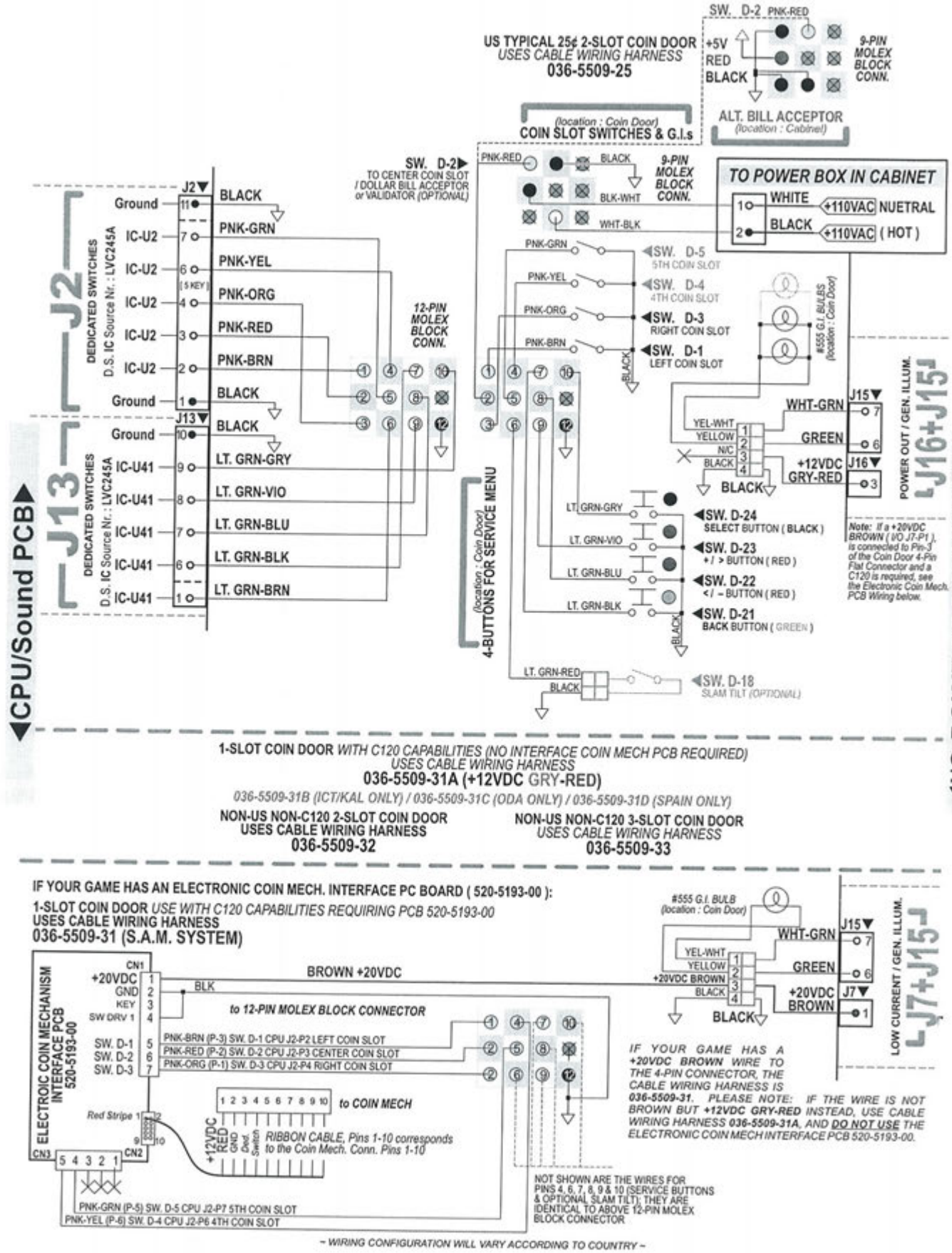
Cabinet and Coin Door Wiring

Cabinet Wiring Diagram



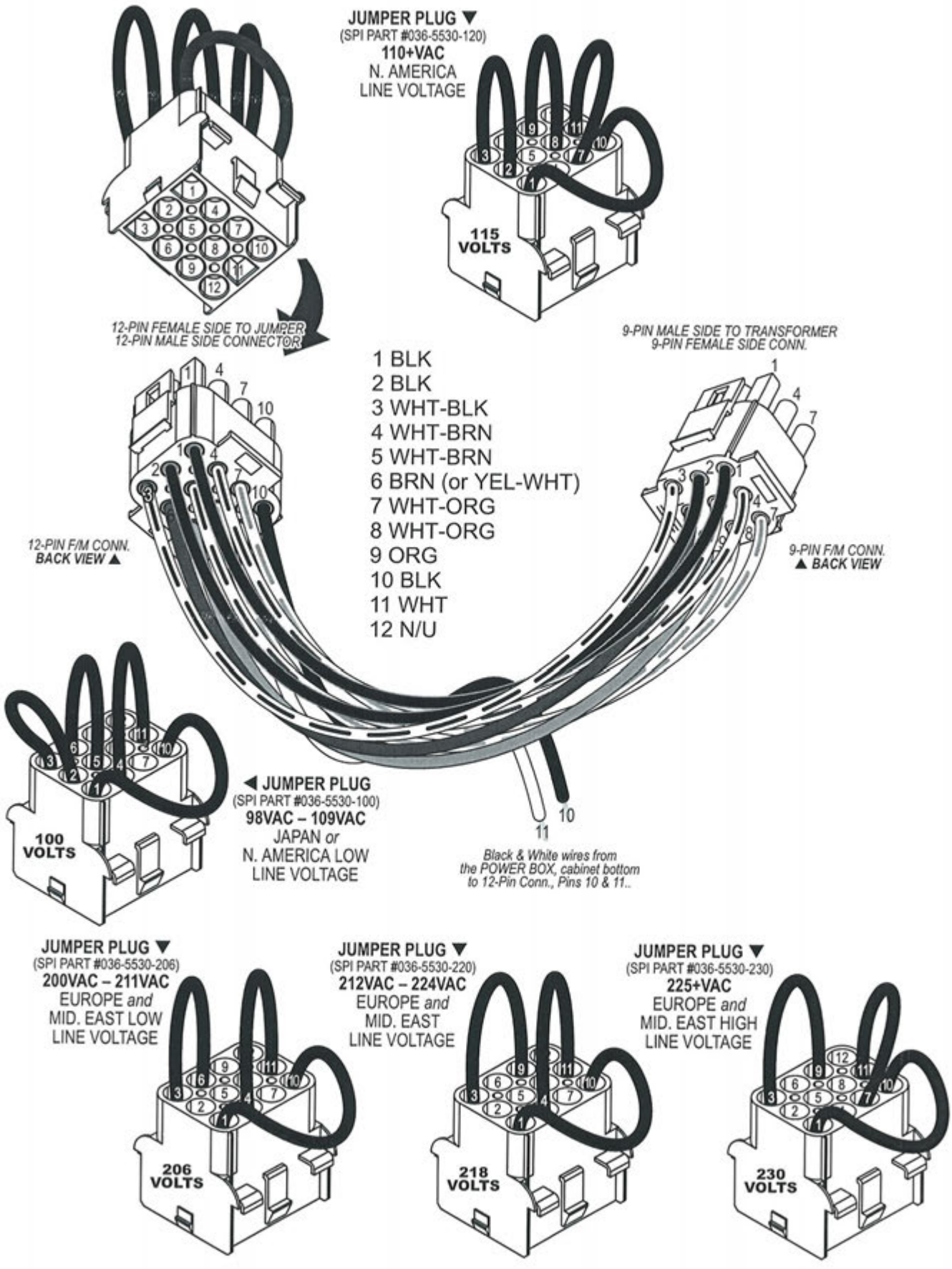
Cabinet and Coin Door Wiring

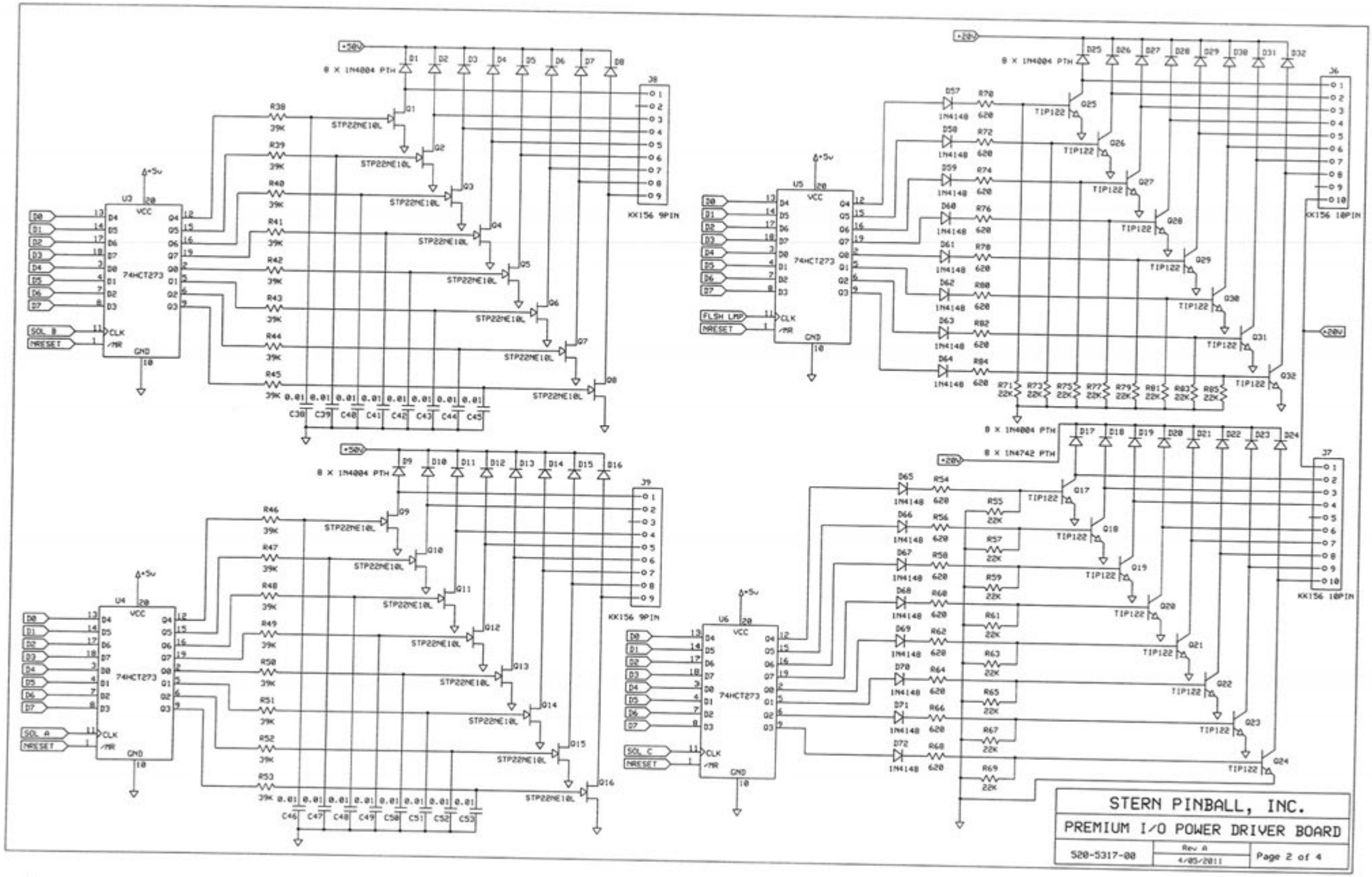
Coin Door Wiring Diagram

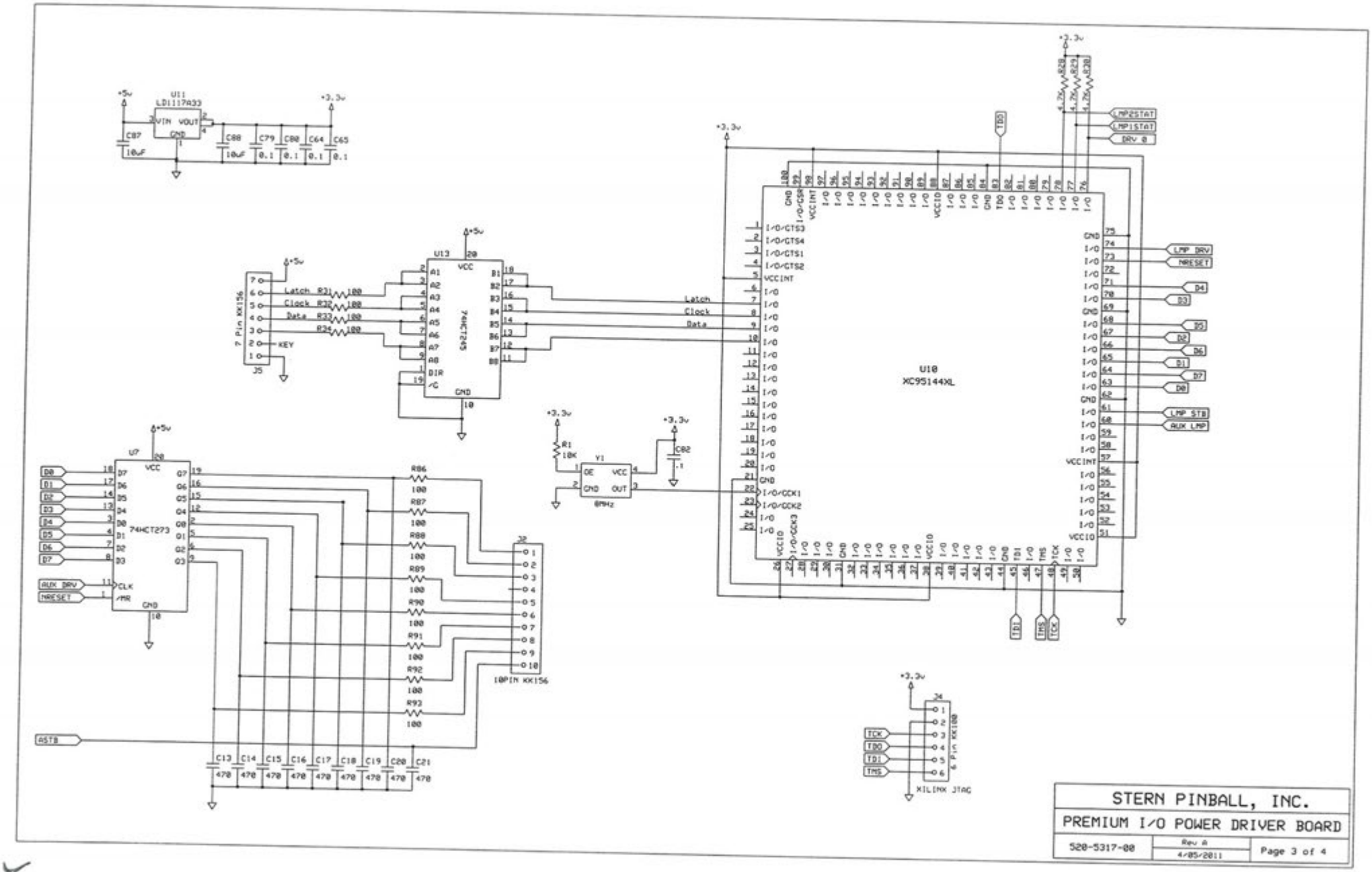


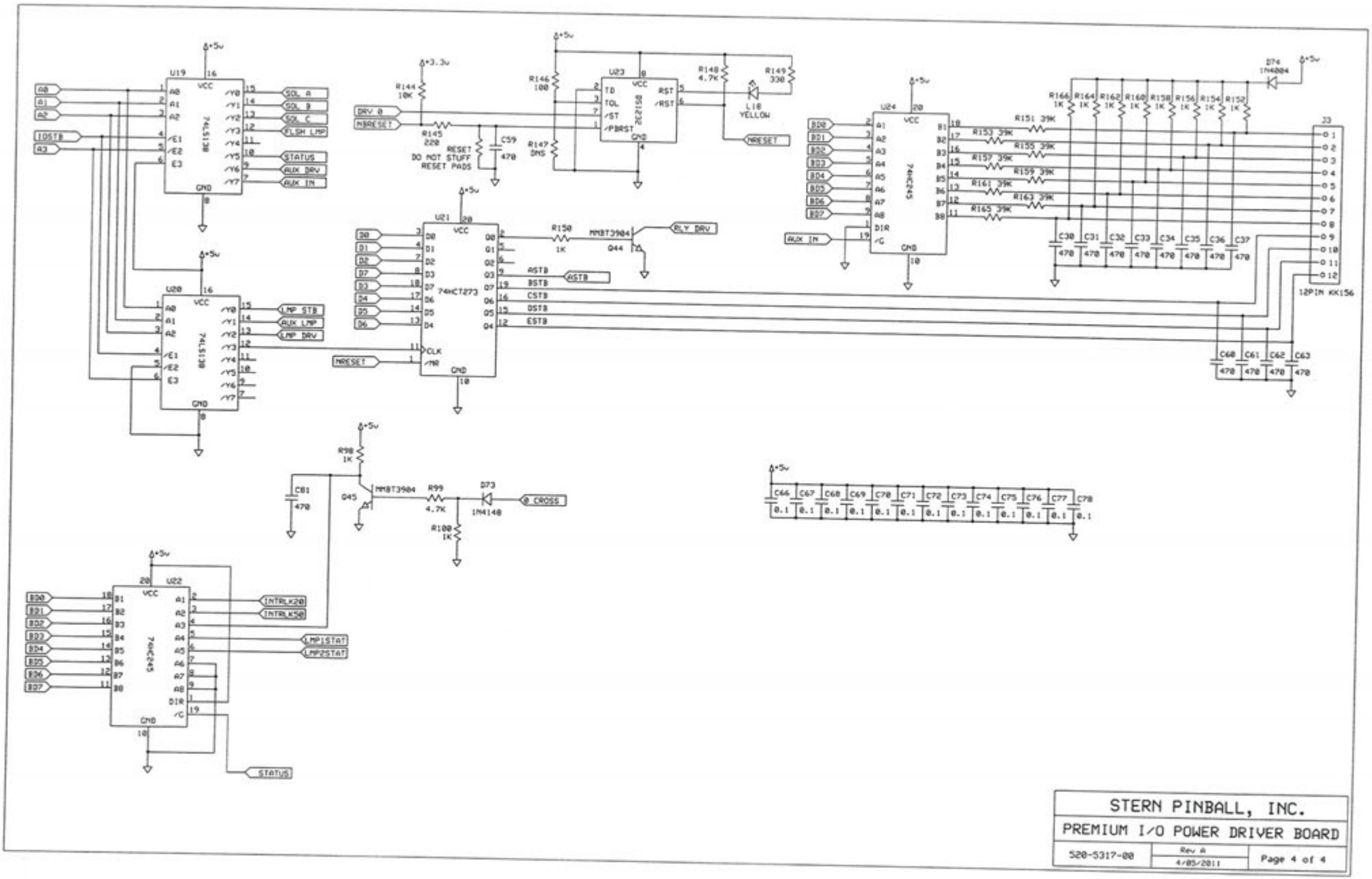
Cabinet and Coin Door Wiring

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

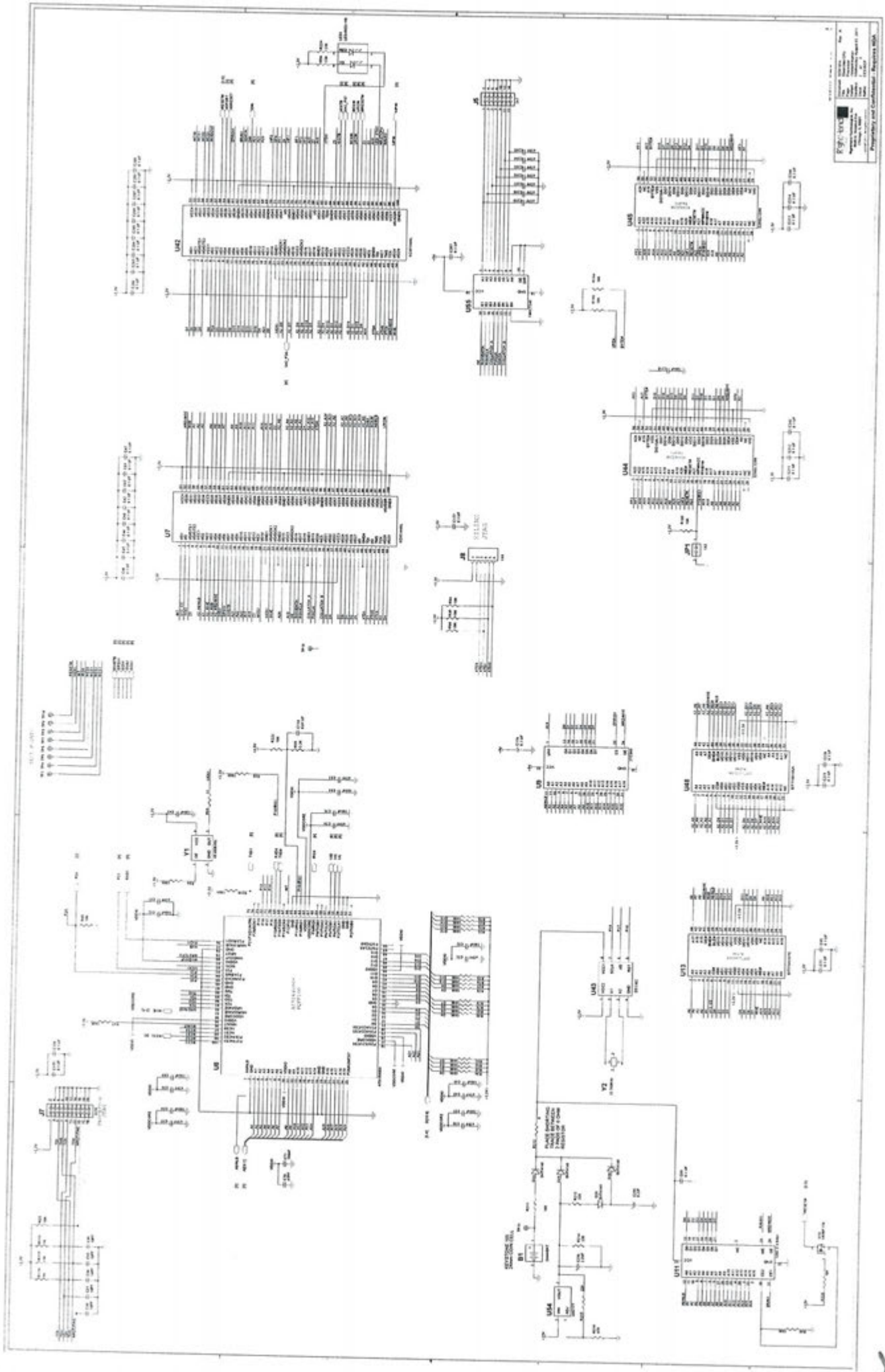


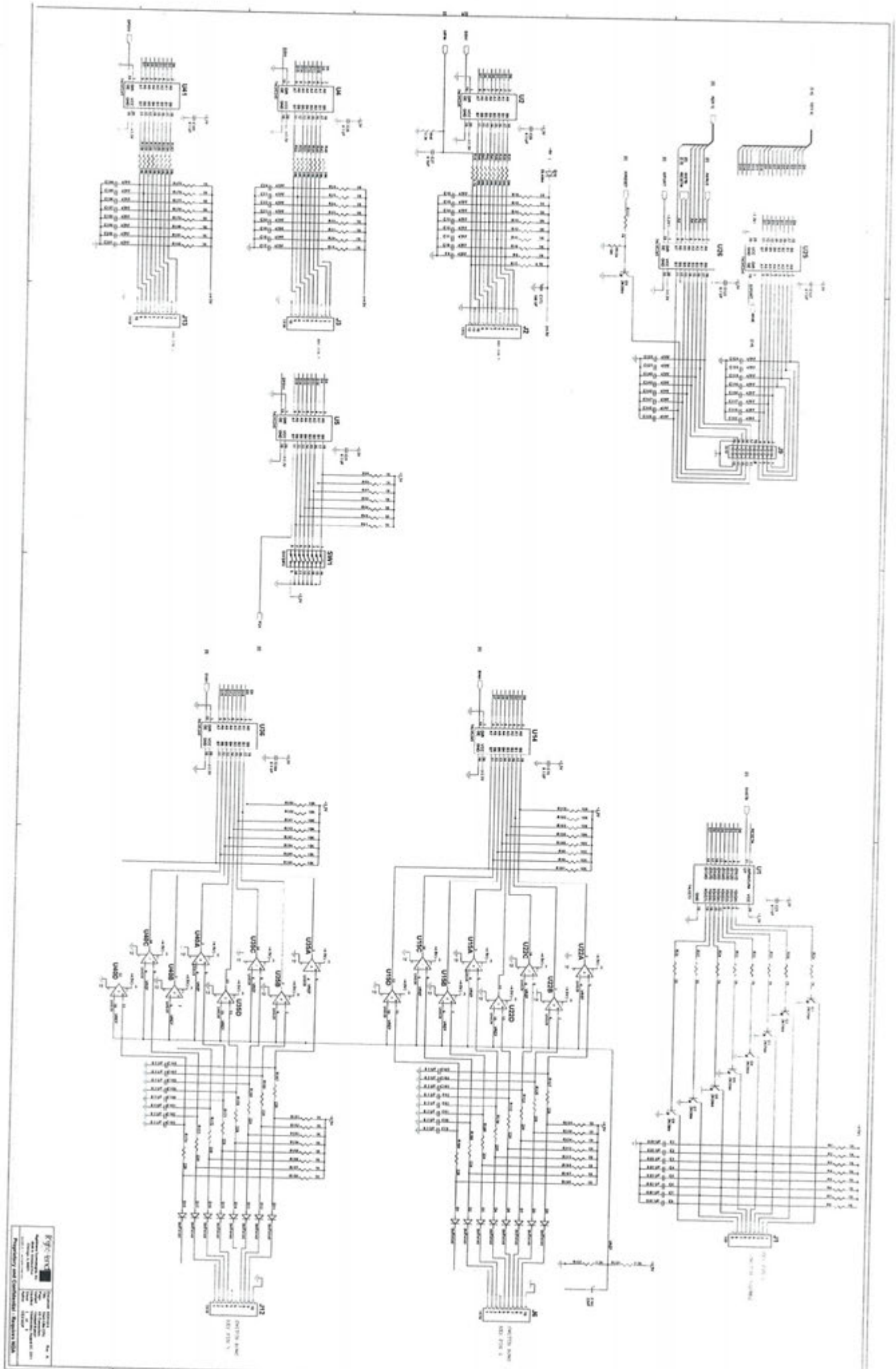

STERN PINBALL, INC.
PREMIUM I/O POWER DRIVER BOARD
520-5317-00
Rev A
4/05/2011
Page 2 of 4


U11
LD1117A33
VIN
VOUT
GND
C87
10uF
C88
10uF
C79
0.1
C80
0.1
C64
0.1
C65
0.1
+5v
+3.3v
U13
74HC245
VCC
GND
DIR
/G
A1
A2
A3
A4
A5
A6
A7
A8
B1
B2
B3
B4
B5
B6
B7
B8
Latch R21 100
Clock R32 100
Data R33 100
R34 100
KEY
J5
7 Pin KK156
Latch
Clock
Data
U10
XC95144XL
I/O/GTS3
I/O/GTS4
I/O/GTS1
I/O/GTS2
VCCINT
I/O/GCK1
I/O/GCK2
I/O/GCK3
GND
VCCIO
TDO
TDI
TMS
TCK
LMP2STAT
LMP1STAT
DRV @
LMP DRV
NRESET
D4
D3
D5
D2
D6
D1
D7
D0
LMP STB
AUX LMP
U7
74HCT273
D0
D1
D2
D3
D4
D5
D6
D7
CLK
/MR
AUX DRV
NRESET
R86 100
R87 100
R88 100
R89 100
R90 100
R91 100
R92 100
R92 100
R92 100
J2
10PIN KK156
ASTB
C13 470
C14 470
C15 470
C16 470
C17 470
C18 470
C19 470
C20 470
C21 470
R1 10K
Y1
8MHz
C82 .1
OE
VCC
GND
OUT
R828 4.7K
R829 4.7K
R830 4.7K
J4
TCK
TDO
TDI
TMS
6 Pin KK100
XILINX JTAG
STERN PINBALL, INC.
PREMIUM I/O POWER DRIVER BOARD
520-5317-00
Rev A
4/05/2011
Page 3 of 4

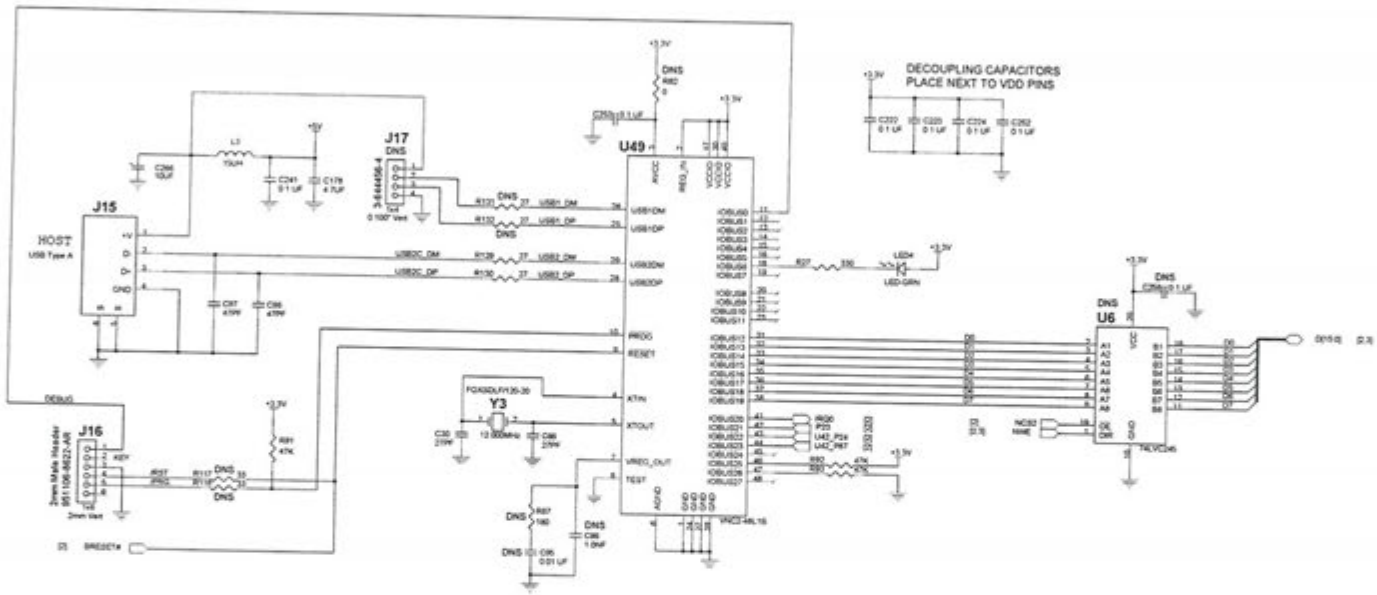

U19
74ACT138
SOL A
SOL B
SOL C
FLSH LMP
STATUS
AUX DRV
AUX IN
U20
LMP STB
AUX LMP
LMP DRV
U21
74HCT273
ASTB
BSTB
CSTB
DSTB
ESTB
R150 1K
MMBT3904
Q44
RLY DRV
U23
PS2152
R144 10K
R145 220
RESET
DO NOT STUFF
RESET PADS
C59 470
R146 100
R147 DNS
R148 4.7K
R149 330
L18
YELLOW
MRESET
DRV B
U24
74HC245
R151 39K
R153 39K
R155 39K
R157 39K
R159 39K
R161 39K
R163 39K
R165 39K
R166 1K
R164 1K
R162 1K
R160 1K
R158 1K
R156 1K
R154 1K
R152 1K
D74
1N4004
J3
12PIN KK156
C30 C31 C32 C33 C34 C35 C36 C37 470
C60 C61 C62 C63 470
C66 C67 C68 C69 C70 C71 C72 C73 C74 C75 C76 C77 C78 0.1
R98 1K
C81 470
Q45
MMBT3904
R99 4.7K
D73
1N4148
@ CROSS
R100 1K
U22
INTRLK20
INTRLK50
LMP1STAT
LMP2STAT
STATUS
STERN PINBALL, INC.
PREMIUM I/O POWER DRIVER BOARD
520-5317-00
Rev A
4/05/2011
Page 4 of 4

y54



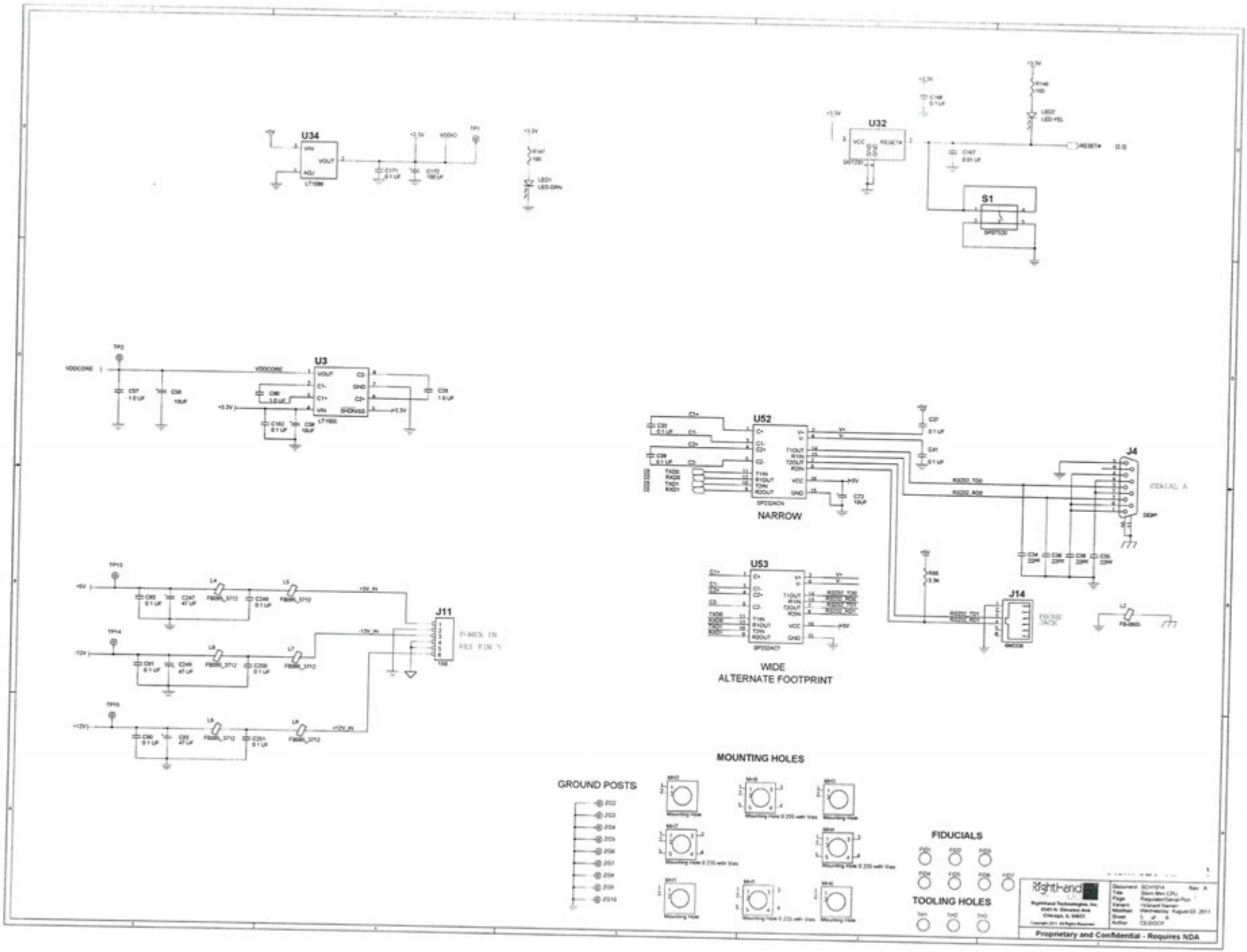


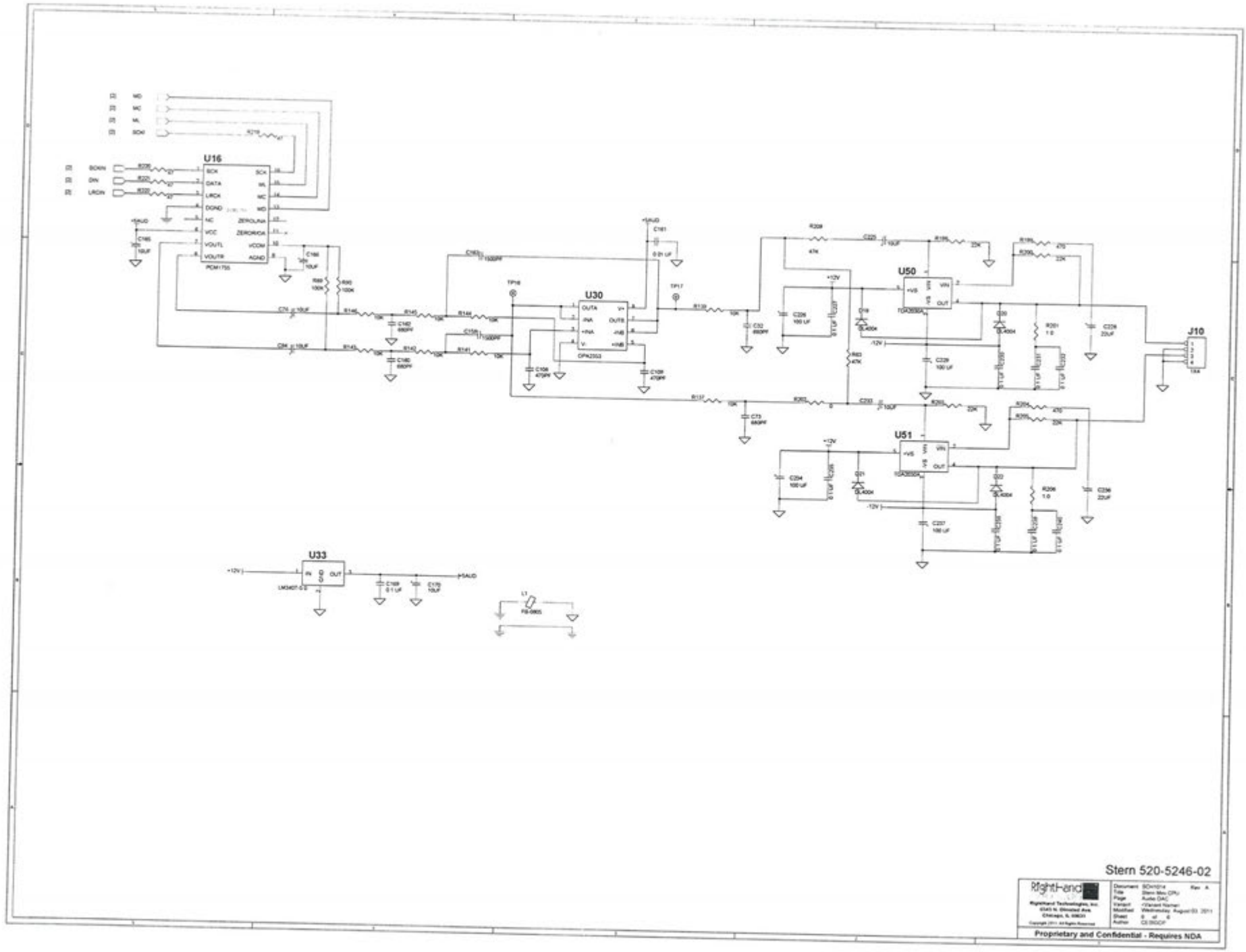
У56



Proprietary and Confidential - Requires NDA

957


U34
U32
S1
U3
U52
NARROW
U53
WIDE
ALTERNATE FOOTPRINT
J4
J14
J11
GROUND POSTS
MOUNTING HOLES
FIDUCIALS
TOOLING HOLES
Proprietary and Confidential - Requires NDA


U16
PCM1755
U30
OPA2353
U50
TDA2030A
U51
TDA2030A
U33
LM340T-5.0
J10
Stern 520-5246-02
Proprietary and Confidential - Requires NDA

LASER SUPPLEMENTAL INFORMATION

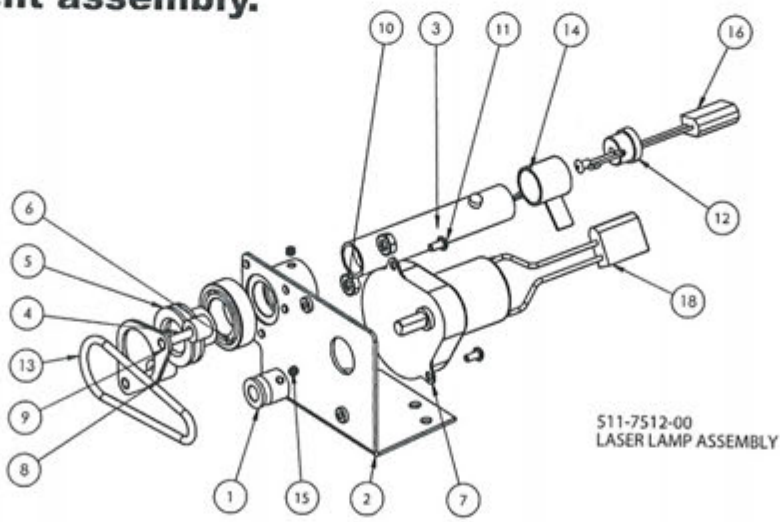
The laser lamp in assembly 511-7512-00 has no serviceable components.

NOTE: The laser emits radiation in accordance with Class 2M. With the playfield glass in place, the laser emits radiation consistent with a Class 1 laser. The laser should never be operated with the playfield glass removed from the machine. Proper safety and handling precautions should be followed at all times.

All laser radiation external to the game is in accordance with Laser Class 1.

Laser class 1
Laser wavelength = 650nm
Laser power output = 390µW

After the coin door has been opened and the glass has been removed, disconnect item 16 (laser power plug) before activating the service switch and performing any maintenance or repair to the game. Items 3, 4, 5, 6, 9, 10,12 should never be removed from the assembly. If your laser lamp requires replacement, remove the entire assembly (511-7512-00) and return to Stern Pinball, Inc. for a replacement assembly.



511-7512-00
LASER LAMP ASSEMBLY

CAUTION: Use of controls or adjustments or performance of procedures other than those specified herein may result in exposure to hazardous laser radiation.

CAUTION –
CLASS 2M LASER RADIATION WHEN OPEN. DO NOT STARE INTO THE BEAM OR VIEW DIRECTLY WITH OPTICAL INSTRUMENTS. 820-8331-00

Complies with FDA performance standards for laser products except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007 820-8330-00



Patrick Powers
Director of Technical Support



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Part Sales Supervisor



Chas Siddiqi
Technical Support Engineer



Angel Hernandez
Shipping Clerk

SERVICE & SUPPORT



Service Bulletins

Click Here to view Our Service Bulletins

• Cautions, Warnings & Notices (Image file from the last page in Service Game Manual.)

Care & Maintenance

Click Here to view Our Full List of Schematics, Theory of Operation and Troubleshooting Tips

• Current S.A.M. System Games complete Schematic Section

• Archived Drawings for the White Star Board System™

Manuals & Coincards

Click Here to view Our Coin Card Charts

• Offering a range of Coinage Cards for download

• Country Setting, Pricing Scheme, Dip Switch Setting

• New Default Pricing to USA 10 (for USA Games ONLY)

• Custom Pricing Demonstration (for S.A.M. System)

Game Code Library

Click Here to view Our Game Code Library

• Offering S.A.M. System Game Code

• Offering archived White Star Game Code for all Data East®, Sega™ and STERN® Pinballs (EPROM Programmer required)

Parts

Click Here to view Our Parts Information

• 2006 – 2008+ Complete Pinball Service Game Manuals in PDF Format available (includes parts and schematics).

• 2004 – 2005 Select Pinball Service Game Manual Excerpts only : Parts Identification & Location (The Pink Pages), Drawings for Major Assemblies & Ramps (The Blue Pages)

• Appendixes A – J (updated with each game)

Repair

• NTE Semi-Conductor Cross Reference

• Radio Shack Component Catalogue

Warranty

Check Here to fill out our online warranty card.

Tricks & Tips

Click Here to view Our Full List of Tricks & Tips

• Pinball Machine Foam Cushion Packing

• 1st Time Pinball Set-Up & Preventative Maintenance

• Pinball Location Maintenance

• How to Update Your Game Code (S.A.M. System)

U.S. Customary Inch Ruler

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

800-KICKERS
5 4 2 5 3 7 7

SPI Part Number
780-5OE6-00

STERN® PINBALL, INC. LIMITED WARRANTY

Stern® Pinball, Inc., *("seller")* warrants only to the initial purchaser of its products that the items listed below are free from defects in material and workmanship under normal use and service for the ***warranty period specified:***

Printed Circuit Boards PCBs (game logic):	**2 months**
Dot Matrix Display PCB:	**9 months**

No other parts of seller's product are warranted. Warranty periods are effective from the initial date of shipment from seller to its authorized distributors.

Seller's sole liability shall be, at its option, to repair or replace products which are returned to seller during the warranty periods specified, provided:

1. *Seller is notified promptly upon discovery by purchaser that stated products are defective.*
2. *Such products are properly packaged and then returned freight prepaid, to seller's plant.*

This warranty does not apply to any parts damaged during shipment and/or due to improper handling, or due to improper installation or usage, or alteration. In no event shall the seller be liable for any anticipated profits, loss of profits, loss of use, accidental or consequential damages or any other losses incurred by the customer in connection with the purchase of a Stern® Pinball, Inc. product.

WARRANTY DISCLAIMER

Except as specifically provided in a written contract between seller and purchaser, there are no other warranties, express or implied, including any implied warranties of merchantability or fitness for a particular purpose..

CAUTIONS, WARNINGS & NOTICES

For safety and reliability, substitute parts and equipment modifications are not recommended *(and may void any warranties)*. Use of non-Stern® Pinball Inc. parts or modifications of game circuitry, may adversely affect game play, or may cause injuries. Transport pinball games with hinged backbox in the down position only! Always take great care when servicing any game. Always read the service manual before replacing or servicing components. **SUBSTITUTIONS OF PARTS OR EQUIPMENT MODIFICATIONS** may void FCC Type acceptance.

Always disconnect the line voltage before servicing. Some parts may still hold current when unplugged.

WARNING

This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a class a computing device pursuant to SUBPART J OF PART 15 OF FCC RULES, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

RF INTERFERENCE NOTICE: Cable harness placements and ground strap routing on this game have been designed to keep RF radiation and conduction within levels accepted by the FCC rules. To maintain these levels, reposition harnesses and reconnect ground straps to their original placements, if they become disconnected during maintenance.

(a) "The appliance has to be placed in a horizontal position."
(b) "This appliance is not to be cleaned by a *Water Jet*."

603335-7.12.1 (i) "Do not locate this appliance in an area where a *Water Jet* is used." **(ii)** "Do not clean this appliance with a *Water Jet*." **60335-7.12.5 (b)** If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.

IEC 60825-1 2ND EDITION AND WAS ISSUED IN 2007

NOTICES

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