

STAR WARS™

FALL OF THE EMPIRE

SERVICE AND OPERATION MANUAL



WARNING

IMPORTANT HEALTH WARNING: PHOTSENSITIVE 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 lightheadedness, 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.

ATTENTION! IMPORTANT WARRANTY INFORMATION

The electronics system, node network architecture, mechanical devices and associated software control systems in this pinball machine are designed to work with genuine Stern Pinball accessories and devices.

Installation of non-authorized accessories, lamps, LED's, motors or other devices or modification of electro-mechanical devices may damage the system and may void your warranty.

Stern Pinball machines are assembled in Elk Grove Village, Illinois, USA. Stern Pinball has inspected each game element to ensure it meets our quality standards.

Each pinball machine has unique characteristics that make it a one-of-a-kind American made product. Each will have variations in appearance resulting from differences in the machine's particular wood parts, individual printed art and mechanical assemblies. No playfield is perfectly flat and varies depending on the season. Game play will result in playfield dimpling as the harder steel ball contacts the wood and coating; over time multiple dimples will blend to make them less noticeable. Normal plastic insert crazing (tiny stress cracks) and ghosting (small cloudy areas around insert edges) are often seen in pinball machines, due to a combination of plastic mold stress, pushing of inserts into purposely undersized holes, and heating and breaking of inserts' plastic "skin" when the playfield is sanded.

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Games configured for North America operate on 60 cycle electricity only. These games will not operate in countries with 50 cycle electricity (Europe, UK, Australia).

LIMITED EDITION MANUAL #755-8058-01

STAR WARS FALL OF THE EMPIRE LE #500-55Z2-01



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www.sternpinball.com - facebook.com/sternpinball

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1. SETUP AND MOVING

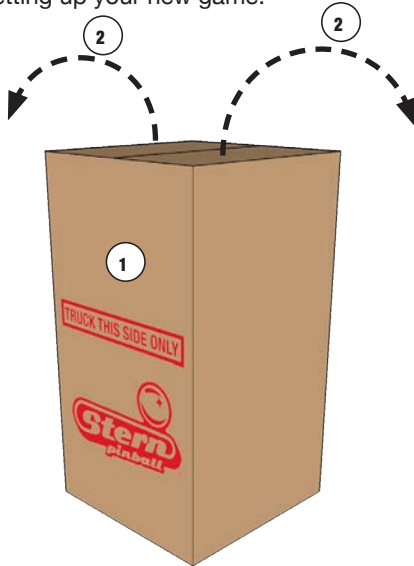
1.1 FIRST-TIME SETUP INSTRUCTIONS

Your brand new Stern Pinball Machine is carefully packed for safety and security. For your safety, exercise caution and use the correct tools and sufficient help when setting up your new game.

TOOLS REQUIRED

- 5/8" Socket Wrench
- Utility Knife
- Snips
- An Assistant

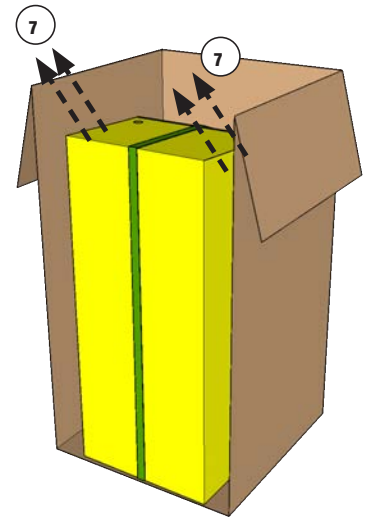
CAUTION: AT LEAST TWO (2) PEOPLE ARE REQUIRED TO MOVE AND MANEUVER THE GAME. USE PROPER MOVING EQUIPMENT AND EXTREME CARE WHILE HANDLING. STERN PINBALL MACHINES WEIGH OVER 250LBS BOXED.



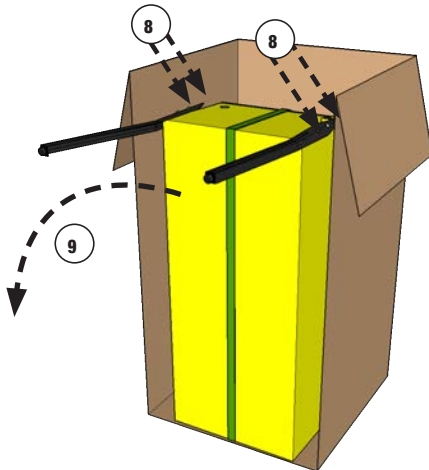
1. Locate the side labeled "TRUCK THIS SIDE ONLY". The bottom of the game faces this side.
2. Open the top box flaps by pulling hard in an upward motion on each flap. If the flaps are taped, cut the tape first, taking care to avoid the box staples.



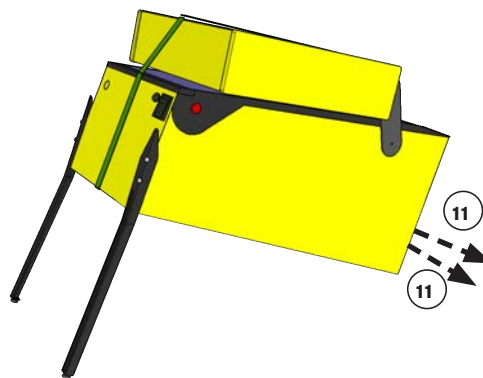
3. Remove the four (4) foam pieces and two (2) narrow box tubes which contain the four (4) identical legs with levelers.
4. DO NOT CUT STRAPPING YET. Keep backbox secured in the down position.
5. With the utility knife, carefully cut down the left and right corners of the box.



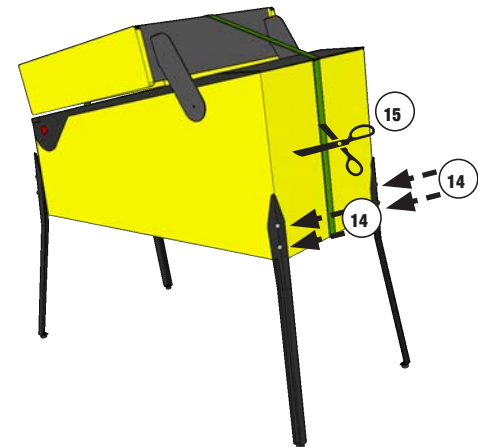
6. Let the face fall forward and remove the entire side by carefully cutting the bottom.
7. With the game still in its folded position, use a 5/8" wrench to loosen and remove the 2 leg bolts on each side of the front cabinet. Ensure the leg levelers are screwed all the way into the legs.



8. Install front legs using the bolts removed from the cabinet. Secure tightly.
9. Have someone help you carefully set the game down on the front legs.



10. Set aside the open box.
11. With a 5/8" socket wrench, loosen and remove the 2 leg bolts on each side of the rear cabinet, 4 total.

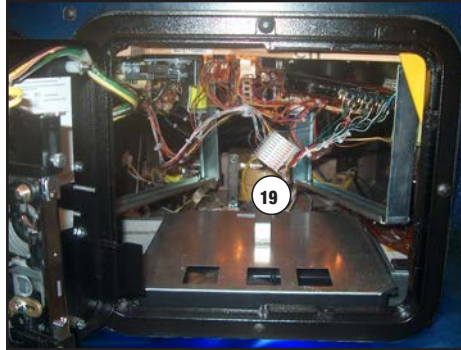


12. Using supports or two people, prop the rear of the cabinet up.
13. Ensure the rear leg levelers are screwed all the way into the legs.
14. Install rear legs using the 4 bolts removed from step 11.

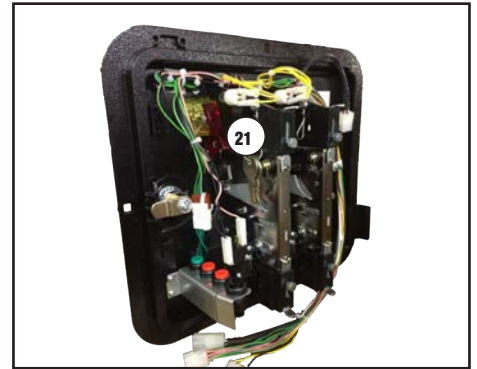
FIRST-TIME SETUP CONTINUED



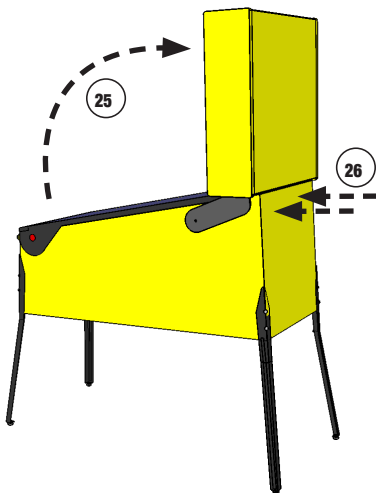
15. Cut nylon strapping and remove protective strap corner guards.
16. Locate the factory keys, either on the shooter rod or taped to the playfield glass.
17. Using snips, cut the tie-wrap securing the keys if required. One set of keys is for the front coin door, the other set of keys is for accessing components in the backbox.



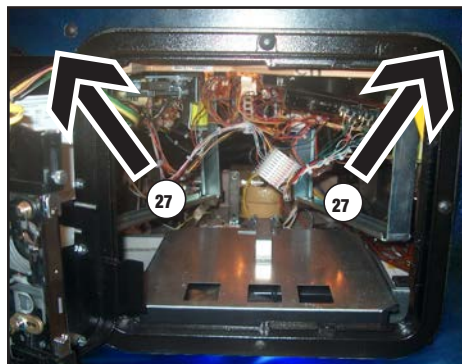
18. Open the front coin door.
19. Reach into the game and remove the retaining clip at the rear of the cash box.
20. Remove the cash box lid by sliding it toward you.



21. Store the backbox keys, if desired, on the metal hook located in the coin door.
22. Locate and remove the pinballs, plumb bob, and backbox bolts from the cash box.
23. Replace the cash box lid and retaining clip for future use.



24. Locate the two (2) backbox bolts in the cash box.
25. Carefully raise backbox to upright position while ensuring that cables are not pinched.
26. Use the 5/8" wrench to install the two (2) backbox bolts to secure the backbox as indicated on the back of the cabinet.



27. Reach inside the cabinet and lift the two latches located on either side of the coin door.
28. Remove the front top molding.



29. Remove the playfield glass by sliding it toward you and carefully place it in a safe location. Remove all playfield shipping tie downs, shipping blocks, and packing foam, and follow any game-specific unpacking instructions included in the playfield, if present.

CAUTION: PLAYFIELD GLASS IS MADE FROM HIGH-STRENGTH TEMPERED GLASS. TEMPERED GLASS IS SENSITIVE TO EXTREME TEMPERATURE SHIFTS AND CORNER NICKS, WHICH CAN CAUSE THE GLASS TO FAIL CATASTROPHICALLY. TAKE CARE TO STORE THE GLASS ON A SOFT, ROOM-TEMPERATURE SURFACE AND PREVENT THE CORNERS FROM BEING DAMAGED.



FIRST-TIME SETUP CONTINUED

30. If pinballs were already installed into the lower ball trough, remove them before lifting the playfield.
31. Grasp the lower arch between the flippers, and firmly but gently pull directly up to raise the playfield 8 to 12 inches.
32. While holding the playfield up, pull the playfield toward you until the two playfield supports are over the front edge of the cabinet.
33. Rest the playfield on the front edge of the cabinet.
34. Raise the playfield and rest it against the backbox.
35. Visually inspect all cabinet cables and connector terminations; ensure no wires or cables are pinched and that cable harnesses are not pulled tight.
36. Locate the plumb bob in the parts bag in the cash box.
37. Slide plumb bob onto the hanger wire. Note: the vertical position of the plumb bob affects tilt sensitivity - higher makes the game more sensitive to tilting.
38. Tighten the thumb screw finger-tight.
39. Install the correct number of pinballs. Refer to the decal on the lock down assembly for the correct number of pinballs.

LOCATING, LEVELING, AND FINAL SETUP

1. Select a location that is indoors, out of direct sunlight, and climate controlled. Excessive moisture/humidity can cause long-term damage to your game.
2. Adjust the front or rear levelers as necessary to position the playfield level bubble, located on the front right of the playfield next to the shooter lane, to float between the two (2) black lines. This will place the playfield at the recommended 6.5° pitch. Playfield angles greater than 6.5° can be achieved by turning out the rear leg leveler(s) for increased difficulty and faster gameplay.
3. Use a pinball to roll down the center of the playfield for side-to-side leveling, or use an external bubble level, digital level, or smartphone level app.
4. Plug into a grounded outlet and check for proper operation through DIAGNOSTICS.
5. Check the coin door: With the door closed, insert coins to verify proper operation.
6. Play game: Check for satisfactory operation and adjust game volume (push the Red Buttons inside the Coin Door).
7. If desired, perform any game diagnostics, game adjustments, and pricing settings at this time.

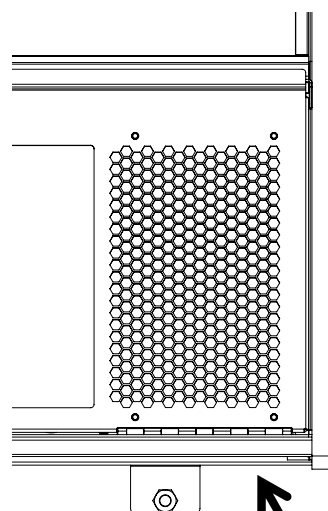
SPIKE PINBALL SOFTWARE UPDATE INSTRUCTIONS



1. Obtain game software update file (filename ends in ".spk") from www.sternpinball.com or from authorized Stern distributor.
2. Place game software update file (".spk") in root directory of a blank FAT32-formatted USB flash drive (NTFS Format will also work)
3. Use backbox power switch to turn off game
4. Plug in USB flash drive to CPU board USB connector (CN9).
5. Turn on game
6. The game will automatically begin software update
7. Select the correct .spk update file from list.
8. Press Enter on the service switches to start update
9. When the display indicates "Update Complete", turn off game
10. Remove USB flash drive from CPU board
11. Turn game on to complete the update and play pinball!
12. Detailed instructions and troubleshooting tips are available in the game manual, www.sternpinball.com and authorized Stern distributors.
13. If the game is connected to the internet, and registered to an Insider Connected account, the software can be automatically downloaded and installed.

POWER SWITCH

The game's power switch is located on the right-hand side underneath the backbox.



ON/OFF Switch

1.2 SERVICE MENU NAVIGATION

The four service buttons (inside Coin Door) have multiple functions. The buttons react differently depending on what state the game is currently in.

FUNCTIONS DURING GAME OR ATTRACT MODE

PRESS  SELECT for SERVICE MENU			
			
BACK	< / -	+ / >	SELECT
Green Press to add service credit(s).	Left Red Press to decrease the volume (quieter).	Right Red Press to increase the volume (louder).	Black Press to enter the Service Menu.

FUNCTIONS DURING SERVICE MENU

PRESS  SELECT for SERVICE MENU			
			
BACK	< / -	+ / >	SELECT
Green Press to go back to the last menu or exit.	Left Red Press to move highlighted option up.	Right Red Press to move highlighted option down.	Black Press to Select the current highlighted option.

FUNCTIONS WHEN MAKING ADJUSTMENTS

PRESS  SELECT for SERVICE MENU			
			
BACK	< / -	+ / >	SELECT
Green Press to cancel change.	Left Red Press to decrease the current adjustment.	Right Red Press to increase the current adjustment.	Black Press to confirm / save the change.

SERVICE MENU



The first screen when entering the Service Menu contains information about your game.

- A. IP Address** - Shows the current IP Address the game is receiving from the network.
- B. Config ID** - Your game's unique identifier to the servers. This comes from the CPU and game version.
- C. Firmware Versions** - This will have two versions shown, they are for the overall software running the game.
- D. Network Status** - Shows the current Wi-Fi signal and network name, or Wired Connection.
- E. Game Title** - Shows the game title and version. This comes from the software installed.
- F. Game Code** - Shows the current software version installed.
- G. QR Code** - Scanning this QR Code will bring you directly to Insider Connected.
- H. Status Symbol** - This is a quick glance to see if the game is registered.



SERVICE MENU CONTINUED



Pressing the Select button will continue to the Main Menu. While in the Main Menu, pressing the Back/Escape button will exit back to the game.

Use the volume buttons to change the option highlighted. In the image above, Quick Adjustments is highlighted, and pressing the Select button will enter that menu.



Quick Adjustments has the more common settings that help for a quick setup of the game.

Pressing the volume buttons will move through the options here. Pressing Select on an option allows the volume buttons to change current value/setting. Save the change with the Select button, or cancel the change with the Back/Escape button.

To go back to the previous menu, press the Back/Escape button.

Service Menu Table Of Contents

Quick Adjustments

Diagnostics

- Switch Test
- Coil Test
- LED Test
- Node Board Test
- Technician Alerts

Device Tests

- Ball Trough Test
- Sound/Speaker Test
- Game Specific Device Tests

Audits

- Play Counts
- Awards
- Scores
- Time
- Earnings Audits
- Diagnostic Audits
- Game Play Audits
- Dump Audits to USB
- Dump Audits to USB (Comp)

Adjustments

- Pricing
- Game Play Settings
- Machine Settings

Stern Insider Connected™

- About
- Setup Connection
- Test Connection
- Game Registration
- Software Update
- Setup Home Team™
- Change Settings

Utilities

- Presets
- Start Guided Setup
- Enter Custom Message
- Save Settings
- Restore Settings
- Resets

Tournament Menu

Redemption Menu

SERVICE MENU DEFINITIONS

Quick Adjustments

- » The most commonly changed adjustments are located here.

Diagnostics

- **Switch Test**
- **Coil Test**
- **LED Test**
- **Node Board Test**
- **Technician Alerts** (located here in addition to the main page)

Device Tests

- **Ball Trough Test**
- **Sound/Speaker Test**
- **Game Specific Device Tests**

Audits

- **Play Counts**
 - » Counts of games and balls played, plus any play count specific audits unique to the game.
- **Awards**
 - » Counts of replays, extra balls, specials, and matches awarded, plus any award specific audits unique to the game.
- **Scores**
 - » Counts of game scores, split into divisions of score ranges.
- **Time**
 - » Average ball and game time, plus counts of total game time, split into divisions of time ranges.
- **Earnings Audits**
 - » Counts of coins deposited, credits paid, service credits and other counts related to money and earnings.
- **Diagnostic Audits**
 - » Counts of ball searches, lost balls, power on time, and other counts related to machine operation.
- **Game Play Audits**
 - » Game audits unique to the game.
- **Dump Audits to USB**
 - » Save the audits to a text file on a USB storage device. Includes Game and Location IDs set via the machine adjustments. Audit text will include mixed upper/lower case letters.
- **Dump Audits to USB (Comp)**
 - » Save the audits to a text file on a USB storage device, in a format . similar to previous software release. Game and Location IDs will not be present in this file, and all audit text will be upper case only.

Adjustments

- **Pricing**
 - » Game pricing and coin door settings, and on-screen credit formatting options.
- **Game Play Settings**
 - **Player and Ball Settings**
 - » Ball and players per game, tilt adjustments, ball save timer and plunger settings.
 - **Game Settings**
 - » Game play adjustments unique to the game.
 - **Game Types**
 - » For games with multiple types of play modes, the enabling and disabling of these play types.
 - **Standard High Scores**
 - » High score default scores and award settings. High score initial entry settings and how often they will be reset.
 - **Game High Scores**
 - » Game specific high scores defaults.

Machine Settings

- **Machine Operation**
 - » Controls how the start and action buttons behave, the ticket dispenser settings and the Game and Location IDs (used for audit dumps).
- **Devices**
 - » Allows you to disable certain game devices, so the game will ... continue to function while repairs are being made.
- **Coil Settings**
 - » Adjust the power settings of flippers and coils, and any settings relevant to any game specific devices.
- **LCD/Lamp**
 - » Brightness settings for lamps and the LCD screen.
- **Audio Settings**
 - » Main volume settings, plus any individual volume settings specific to this game.
- **Audio Configuration**
 - » Speaker, Volume, and sound setup settings.
- **Attract Mode**
 - » Control of some attract mode displays.

Stern Insider Connected™

- **About**
 - » Network connection details
- **Setup Connection**
 - » Connect this game to the internet.
- **Test Connection**
 - » Test the machine's internet connection.
- **Game Registration**
 - » Register this game with Stern Insider Connected. Display the .. registration details, and unregister games.
- **Software Update**
 - » Check for, download, and install any software updates. Enable/Disable updates and change the download scheduling.
- **Setup Home Team™**
 - » For non-commercial settings, scan players to the Stern Insider . Connected™ account, so connected games can be played without having to scan in each time.
- **Change Settings**
 - » Stern Insider Connected™ related adjustments, including start . button behavior, play again times, and home team settings.

Utilities

- **Presets**
 - » Change the game settings en-mass from a selection of grouped adjustment settings.
- **Start Guided Setup**
 - » Enter the guided setup menu, setting up the machine for the first time.
- **Enter Custom Message**
 - » Enter a message unique to this specific game that will **display in the attract mode.**
- **Save Settings**
 - » Save the settings to a USB storage device.
- **Restore Settings**
 - » Restore the settings from a USB storage device.
- **Resets**
 - » Allows resetting coin, game, and high score audits, credits, audio and other settings back to default values.

Tournament Menu

- » Allows the configuration of a built-in tournament on this game.

Redemption Menu

- » Allows the configuration of a game that dispenses tickets during game play.

1.3 GAME PRICING REFERENCE TABLE

Country	ID	Pricing (Credits / Cost)						Unit per Pulse	Coin Door Pulse Settings					
									Left	Center	Right	4th	5th	6th
Australia	1	1/\$1.00 AU	3/\$2.00 AU					\$0.10 AU	2	10	20	50	5	0
	2	1/\$1.00 AU												
	3	1/\$2.00 AU												
	4	1/\$2.00 AU	2/\$4.00 AU	3/\$5.00 AU										
	5	1/\$2.00 AU	2/\$3.00 AU											
Canada	1	1/\$0.50 CN	2/\$0.75 CN	3/\$1.00 CN				\$0.25 CN	1	1	4	8	0	0
	2	1/\$1.00 CN	3/\$2.00 CN					\$1.00 CN	1	1	2	2	0	0
China	1	1/5 Yuan	3/10 Yuan					1 Yuan	1	1	1	0	0	0
	2	1/10 Yuan	2/15 Yuan											
Croatia		1/3 kuna	2/5 kuna					1 kuna	1	2	5	1	0	0
Denmark	1	1/3 DKr	2/5 DKr					1 DKr	1	5	10	20	0	0
	2	1/2 DKr	2/4 DKr	3/5 DKr	4/7 DKr	5/9 DKr	7/10 DKr							
	3	1/5 DKr												
	4	1/10 DKr												
	5	1/20 DKr												
	6	1/10 DKr	3/20 DKr											
Euro	1	1/EUR 0.50						Electronic EUR 0.10	5	10	20	2	0	0
	2	1/EUR 0.50	2/EUR 1.00	3/EUR 1.50	5/EUR 2.00									
	3	1/EUR 0.50	3/EUR 1.00											
	4	1/EUR 1.00	2/EUR 2.00	3/EUR 3.00	5/EUR 4.00									
	5	1/EUR 1.00	3/EUR 2.00											
	6	1/EUR 1.00	2/EUR 1.50	3/EUR 2.00										
	7	1/EUR 1.00	3/EUR 2.00	7/EUR 3.00				Mechanical EUR 0.10	5	1	5	1	0	0
	8	1/EUR 1.00	4/EUR 2.00											
	9	2/EUR 1.00	4/EUR 2.00	6/EUR 3.00	9/EUR 4.00									
	10	1/EUR 2.00	2/EUR 3.00	3/EUR 4.00										
	11	1/EUR 2.00	2/EUR 4.00	3/EUR 5.00										
	12	1/EUR 2.00	3/EUR 4.00	7/EUR 6.00										
Indonesia	1	1/20000 Rp	2/40000 Rp	3/50000 Rp	4/60000 Rp	5/80000 Rp	8/100000 Rp	10,000 Rp	0	0	0	0	0	1
	2	1/20000 Rp	2/40000 Rp	4/50000 Rp	5/60000 Rp	6/80000 Rp	10/100000 Rp							
	3	2/20000 Rp	4/40000 Rp	6/50000 Rp	8/60000 Rp	10/80000 Rp	13/100000 Rp							
Japan	1	1/YEN 100						Yen 100	1	1	1	1	0	0
	2	1/YEN 100	3/YEN 200											
	2	1/YEN 200												
Lithuania		1/2 LTL						1 LTL	1	2	5	0	0	0
Middle East		1/1 token						1 token	1	1	1	1	0	0
New Zealand	1	1/\$1 NZ						\$1 NZ	1	1	2	1	0	0
	2	1/\$1 NZ	3/\$2 NZ											
	3	1/\$2 NZ	2/\$3 NZ											
Norway	1	1/10 Nkr						1 Nkr	1	5	10	20	0	0
	2	1/10 Nkr	3/20Nkr											
	3	1/20 Nkr												
	4	1/20 Nkr	3/40 Nkr											
	5	1/5 Nkr												
Russia		1/5 RUB						1 RUB	10	5	1	1	0	0
South Africa	1	1/R2						R 0.50	1	2	4	10	0	0
	2	1/R3	2/R5											
Sweden	1	1/10 SKr	2/15 SKr	3/20 SKr				1 SKr	1	5	10	2	0	0
	2	1/5 SKr												
	3	1/10 SKr												
	4	1/20 SKr												
	5	1/10 SKr	3/20 SKr											
Switzerland	1	1/1 SwF	2/2 SwF	3/3 SwF	4/4 SwF	6/5 SwF		1 SwF	1	2	5	1	0	0
	2	1/2 SwF	2/4 SwF	3/5 SwF										
Taiwan		1/10 TWD						10 TWD	1	1	1	1	0	0
UK	1	1/2.00						10p	1	5	10	2	20	0
	2	1/1.00												
	3	1/50p	2/1.00	3/1.50	5/2.00									
	4	1/2.00	2/3.00	4/5.00										
	5	1/1.00	3/2.00											
USA	1	1/\$0.25						\$0.25	1	4	1	1	0	0
	2	1/\$0.50	2/\$0.75	3/\$1.00										
	3	1/\$0.50												
	5	1/\$0.50	2/\$1.00	3/\$1.50	5/\$2.00									
	7	1/\$0.50	2/\$1.00	4/\$1.50	6/\$2.00									
	8	1/\$0.50	3/\$1.00											
	9	1/\$1.00												
	10	1/\$0.75	2/\$1.50	3/\$2.00										
	11	1/\$1.00	3/\$2.00											
	12	1/\$0.25	2/\$0.50	3/\$0.75	5/\$1.00									
	13	1/\$1.00	2/\$2.00	3/\$3.00	4/\$4.00	7/\$5.00								

1.4 TRANSPORTING THE GAME

When transporting the game, such as in the back of a truck or with a hand truck, the game's backbox must be secured to prevent damage to the side rails.

1. SECURE THE BACKBOX

1. Ensure that the pinballs are removed from the playfield, and secure any free-moving mechanisms that may get damaged in transport.

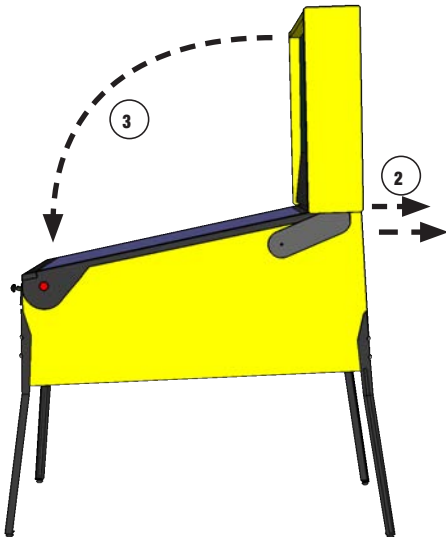
TOOLS REQUIRED

- STRAP (500LB OR GREATER)
- AN ASSISTANT
- HAND TRUCK

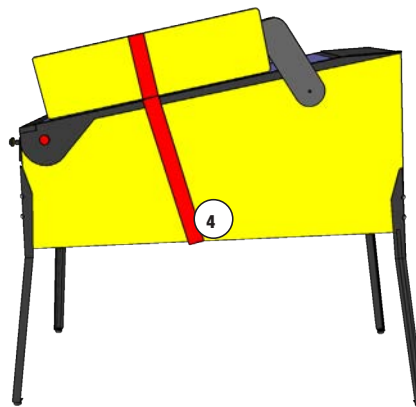
CAUTION

NEVER TRANSPORT THE GAME IN A MOVING VEHICLE WITH THE BACKBOX RAISED! TWO PEOPLE ARE REQUIRED TO REMOVE THE LEGS!

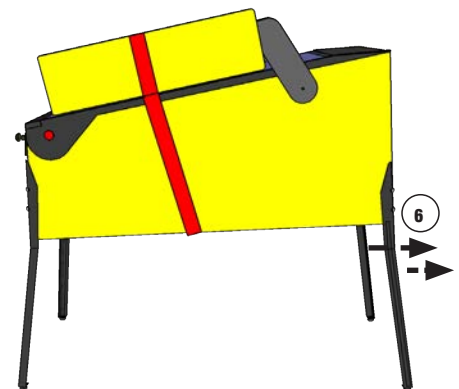
2. REMOVE THE LEGS AND STAND UP



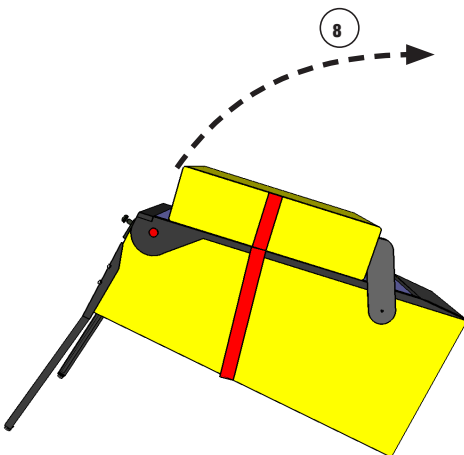
2. Remove the backbox securing bolts.
3. Carefully lower the backbox onto the side rails. Use a piece of cardboard or suitable padding between the backbox and the game.



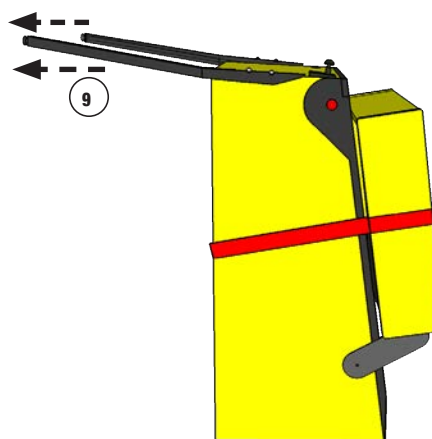
4. Securely strap the back box to the game.
5. The game may be transported with the legs on. If the legs must be removed, follow the remaining steps.



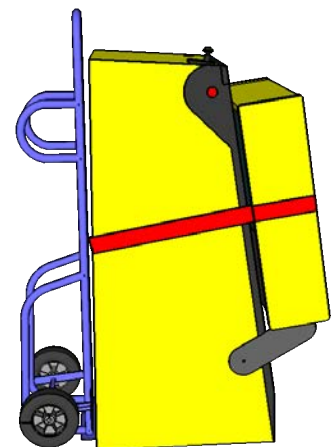
6. Remove the legs, rear legs first. Use a stool or a friend to support the rear of the game.
7. Rest the rear of the game on the ground.



8. Stand the game up on its back.



9. Remove the front two legs.



10. Secure all loose parts and transport with a hand truck in the upright position.

1.5 MAINTENANCE

REGULAR MAINTENANCE - (MONTHLY/500 GAMES)

- Remove the playfield glass
- Enter the software diagnostics menu, start lamp test, then clean and wax the playfield.
 - While cleaning the playfield, identify and repair malfunctioning lights, loose parts, cracked plastics and worn rubber parts.
- While in diagnostics, enter the switch test.
 - Use a pinball to actuate all switches and verify the correct switch registers with the switch test.
 - The game will play a sound to confirm the switch.
- Lift the playfield and inspect all assemblies for loose parts, broken wires or excessive wear. Look at the bottom of the cabinet for any parts that may have worked loose, then find the source.
- Check all coin door mechanisms and bill acceptor (if installed) for proper operation
- Play the game to ensure all coils and features are working
- Check the playfield to ensure it is level and set to the proper pitch using the bubble level on the right side wood rail.
- Check game audits: Replay % and Ball Time and note abnormal values which can indicate problems.
- Ensure game volume is set appropriately for the location.
- Clean both sides of the playfield glass and reinstall.
- Check and clean pinballs and replace if excessively worn or scuffed. Dirty pinballs accelerate game wear.

OVERHAUL MAINTENANCE - (5000 GAMES)

- Verify latest game software is installed
- Check flippers for excessive wear. Excessive flipper sloppiness (vertical or horizontal) or weakness indicates a flipper rebuild is required.
- Clean machine inside and out and check leg levelers for free operation.
- Visual check for loose or broken playfield and cabinet parts and repair as necessary.
- Electrical check: Plug into grounded outlet and check for proper operation through DIAGNOSTICS.
- Replace worn or dirty rubbers.
- Replace pinballs.
- Check all playfield switches with a pinball.
- Check all settings (refer to manual for factory settings).
- Check coin door: With door closed, insert coins to verify proper operation.
- Check for proper adjustment of the plumb bob tilt.
- Play game: Check for satisfactory operation.

COMMON PINBALL TOOLS

- Common nut drivers (1/4", 5/16", 11/32", 3/8")
- Phillips screwdriver
- Standard Allen wrench/Hex key set
- 5/8" Socket with ratchet
- Adjustable wrench (5/8" & 9/16")
- 6" Torpedo Level (or use a pinball)
- Flashlight or headlamp
- Soldering Iron (60w with flat tip), lead-free solder
- Wire cutter
- Wire stripper
- Long nose ("needle nose") pliers

1.6 MAINTENANCE KITS

Description	Part Number
Star Wars: Fall Of The Empire LE Playfield Plastics Kit	803-5000-Z2
Star Wars: Fall Of The Empire LE Playfield Decals Kit	802-5000-Z2
Star Wars: Fall Of The Empire LE Backbox Decal Left	820-76Z2-01
Star Wars: Fall Of The Empire LE Backbox Decal Right	820-76Z2-02
Star Wars: Fall Of The Empire LE Cabinet Decal Left	820-76Z2-03
Star Wars: Fall Of The Empire LE Cabinet Decal Right	820-76Z2-04
Star Wars: Fall Of The Empire LE Cabinet Decal Front	820-76Z2-05
Star Wars: Fall Of The Empire LE Playfield, Bare	830-5100-Z2
Star Wars: Fall Of The Empire LE Mirror Backglass	830-8426-Z2

1.7 COMMON PARTS

Description	Part Number
8 oz Pinball Playfield wax (Novus # 2)	675-0003-01
Standard Pinball, 1-1/16 in	260-5000-00
Flipper Rebuild Kit Left (Standard)	500-6307-10
Flipper Base Plate Kit Left	515-6617-01
Flipper Rebuild Kit Right	500-6307-00
Flipper Base Plate Kit Right	515-6617-00
Memory Card - MicroSD	970-0142-64
Wi-Fi Adapter	509-2023-02

2. SPIKE SYSTEM AND NODE GUIDE

2.1 SPIKE SYSTEM OVERVIEW

The SPIKE Pinball system is a rugged, distributed, and embedded platform custom-designed for the rigors of the pinball machine environment. SPIKE takes advantage of modern technologies to deliver an immersive pinball experience that supports modern features, reduces cabling, and increases serviceability and reliability.

A Stern Pinball machine based on the SPIKE system will have at least two nodes networked together with the SPIKE node bus, a custom industrial pinball control bus that is designed around industry standards and optimized for the pinball environment. The primary CPU node is networked to one or more input/output nodes over standard Category 5 UTP (unshielded twisted pair) Ethernet cabling.

There are five primary types of nodes that are found in the game.

- CPU node (Node 0) - The primary node that controls other nodes in the system. Contains the primary game software for the system and provides SPIKE node bus power for other nodes.
- Cabinet 48V node (Node 1) - Specialized node with specific inputs and outputs for coin doors, tilt mechanisms, and other bottom-cabinet devices.
- 48V playfield node - Controls high power devices such as coils and flashers, and also supports a few switch and low-power outputs. Powered by the system 48V power supply.
- Light and switch node - High-density switch and low-power LED outputs, bus-powered from the node bus. These boards contain as many as 32 switch inputs and light outputs.
- Node extensions - These sub-nodes add additional low-power input and outputs to a specific Power or I/O node and are connected with simple serial bus.

2.2 NODE BUS CABLING

The SPIKE node bus utilizes standard Ethernet-style RJ45 8-pin modular jacks, and off-the-shelf Category 5e or better Ethernet cabling. The node bus is electrically different from Ethernet and does not utilize Ethernet or TCP/IP protocols or signaling standards. SPIKE nodes are not compatible with standard computer networking equipment.

CAUTION: *Plugging a SPIKE Node or CPU board into a standard Ethernet port may damage one or both devices and may void your warranty.*

2.3 SYSTEM POWER

The SPIKE System is powered from an 48V DC power supply bus. Each SPIKE node converts this voltage to lower voltages required by the node and its specific components. A SPIKE 48V node typically controls high-power outputs such as game coil mechanisms and high-brightness LEDs. These powered nodes are supplied directly with 48V system power. SPIKE standard I/O nodes are low-power nodes that read switch inputs and output to standard-brightness LEDs. Standard I/O nodes use the node bus power, which is supplied by the main CPU node over the node bus modular jack connectors.

2.4 SPIKE NODE ADDRESSES

Each SPIKE node has a unique address ranging from 0 to 15. Not all addresses are used in all games. Nodes can be of the same part number, so the address is specified on the DIP switches on each node. When replacing a node, be certain that the correct address is set. Nodes can have 3-position and 4-position DIP switches. Refer to the appropriate table to set the address for each type of Node. The correct address for a node can be found in the SPIKE node reference section of the manual or in the game diagnostic software. Address 0 is reserved for the backbox CPU node, where the game software resides. Address 1 is reserved for the cabinet node, located inside the coin door. These two nodes do not have DIP switches as their address is not configurable.

Address	1	2	3	4
8	OFF	OFF	OFF	OFF
9	OFF	OFF	ON	OFF
10	OFF	ON	OFF	OFF
11	OFF	ON	ON	OFF
12	ON	OFF	OFF	OFF
13	ON	OFF	ON	OFF
14	ON	ON	OFF	OFF
15	ON	ON	ON	OFF

SPIKE node addresses for nodes with 4-position DIP switches. Addresses 0-7 are reserved for fixed-function nodes and do not require configuration.

SPIKE SYSTEM AND NODE GUIDE CONTINUED

2.5 SPIKE NODE PROGRAMMING

The SPIKE nodes are smart nodes that have on-board processors and run embedded code. The nodes are programmed automatically by the CPU node whenever software updates are installed to the CPU. When replacing a node, the CPU node will detect and update the node to the latest software with no user intervention. Always replace nodes with the power to the game turned OFF.

2.6 SPIKE SYSTEM TERMINOLOGY

MULTI GENERAL ILLUMINATION LIGHTING

General Illumination Lighting is two or more lights powered by one control source. These are often a number of LEDs connected in parallel and the system controls these as one large LED. A missing LED will not affect these circuits, however a shorted LED can cause the entire string of LEDs to turn off.

SINGLE LIGHTS

Single lights and LEDs are direct-controlled from SPIKE node boards. A common power source is grounded by individual transistors to turn individual LEDs on and off. Groups of LEDs, usually by node connector, share a common power source, so if a group of LEDs is out, check the wiring for the power source.

FLASHERS

SPIKE games treat flashers the same as single LEDs that draw more power. Flashers are controlled from the same circuits that power regular lights.

DRIVERS

A driver is a circuit that controls a high power-device such as a coil, magnet, or motor. Each device has a common 48V power source that is then connected to ground by a dedicated control transistor. Each driver is protected against shorting, static electricity, and over-current conditions. Take caution as 48V is always present on a device even when it is not energized.

OPTOS

Certain types of optical switches ("optos") require external signal conditioning. For these optos, they will interface to a SPIKE node via an opto signal conditioning board. Other optical switches connect directly to the Spike node board.

CAUTION: Unless explicitly directed by an Authorized Stern Repair technician, perform ALL work on your pinball machine with the power disabled!

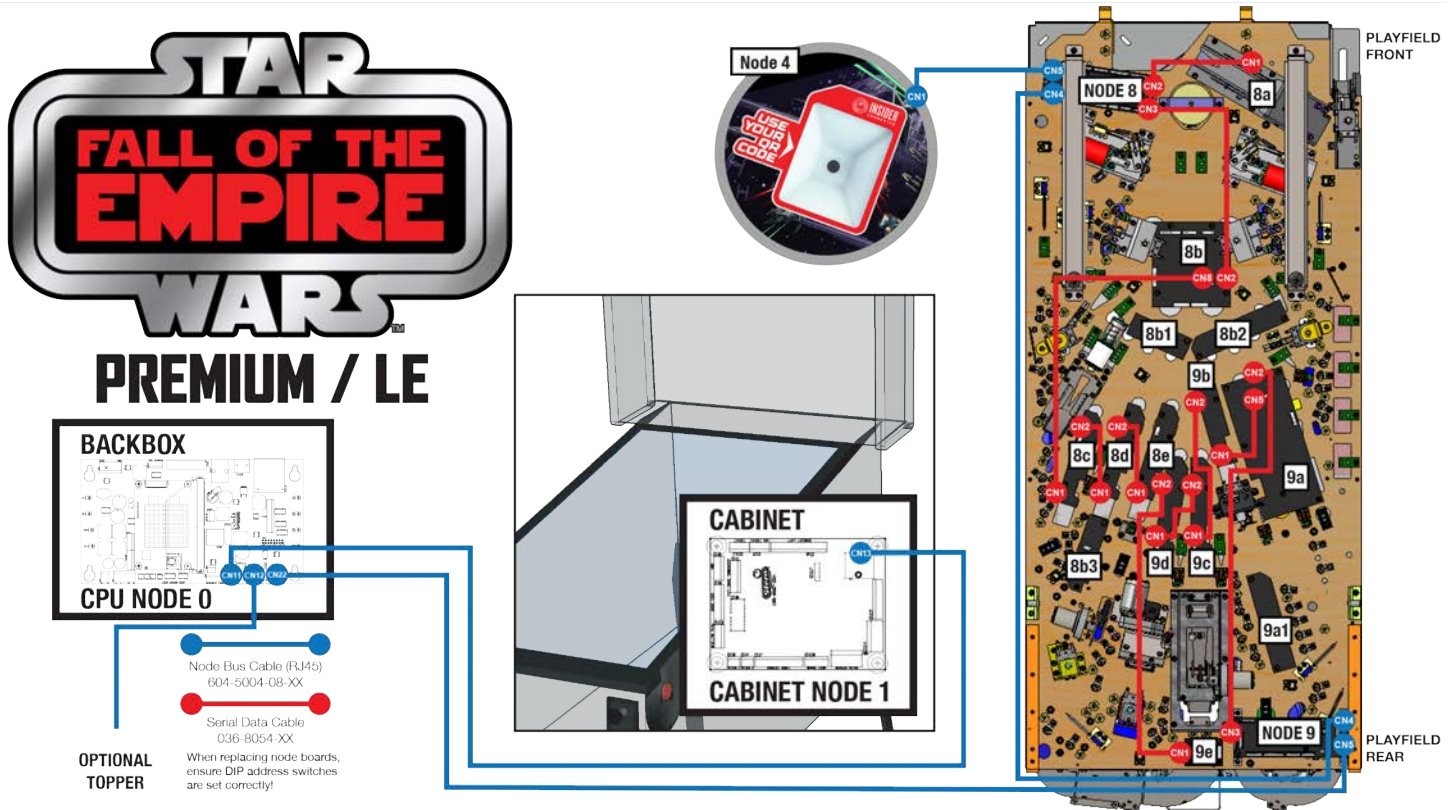
INPUT/OUTPUT PROTECTIONS (OVERCURRENT)

SPIKE features built-in short-circuit, static electricity, and other protections to maximize reliability. If an LED, coil or other device shorts, it will be disabled but will not shut down the entire system in most circumstances. Groups of LEDs, coils, and switches often share common power supplies or other circuits, so it is possible that a bad device will affect the group of related devices and require removal or repair to fix the group. The system diagnostics will inform the technician of shorted or otherwise malfunctioning devices whenever possible. While the system is protected against permanent damage, it is strongly recommended to repair or replace these bad components as soon as possible to minimize downtime and maximize game earnings.

2.7 COMMON SPIKE NODE BOARDS

Description	Type	Part Number
SPIKE CPU Node	Node	509-1007-42
Cabinet Node	Node	520-6967-72
Playfield 48V Core-Driver Node	Node	520-1070-00 520-1057-00
Trough Serial Opto Receiver Extension	Extension	520-8516-00
QR Scanner Assembly	Node	509-2020-00

3. LIGHT, SWITCH, AND DRIVER REFERENCE



3.1 SPIKE NODE BOARDS

ID	DIP Address	Description	Location	Part Number
Node 0	n/a	SPIKE 3 CPU Node	Backbox	509-1007-42
Node 1	n/a	Cabinet Node	Cabinet	520-6967-72
Node 4	n/a	QR Reader Node	Bottom Arch	509-2020-00
Node 8	OFF-OFF-OFF-OFF	Core - Driver Node	Lower Playfield	520-1070-00
8a	n/a	Trough Serial Opto Receiver Extension	Playfield	520-8516-00
8b	n/a	5F-6S- LED Board	Playfield	520-8707-00
8b1	n/a	3W- LED Board	Playfield	520-9867-00
8b2	n/a	RAMP-R 4R- LED Board	Playfield	520-8703-00
8b3	n/a	1R-4W-1S- LED Board	Playfield	520-8704-00
8c	n/a	2RGB-2W- LED Board	Playfield	520-8695-00
8d	n/a	2RGB-2W- LED Board	Playfield	520-8695-00
8e	n/a	2RGB-2W- LED Board	Playfield	520-8695-00
Node 9	OFF-OFF-ON-OFF	Core - Driver Node	Playfield	520-1070-00
9a	n/a	4R-7W- LED Board	Playfield	520-8706-00
9a1	n/a	RAMP-R 4R- LED Board	Playfield	520-8703-00
9b	n/a	2RGB-2W- LED Board	Playfield	520-8695-00
9c	n/a	2RGB-2W- LED Board	Playfield	520-8695-00
9d	n/a	2RGB-2W- LED Board	Playfield	520-8695-00
9e	n/a	Serial Motor Control	Playfield	520-6996-00
Node 0(2)	n/a	(LE Option)	Cabinet-Expression	
Node (7)	n/a	(LE Option)	Speaker-Expression	
Node 13	ON-OFF-ON-OFF	Topper (Optional)	Topper	
Node 14	ON-ON-OFF-OFF	Expression Topper (Optional)	Topper	

3.2 DRIVER REFERENCE

ID	Name	Node	Connector	Ret. Pin	Ret. Wire	Voltage	V+ Pin	V+ Color	Location	Type	Address	Part Number
1	Trough	8	CN8	7	ORG GRY	48V	1-4	GRY ORG	Playfield	Coil - 27-1500	8-DR-1	090-5004-ND
2	Auto Plunger	8	CN8	9	ORG WHT	48V	1-4	GRY ORG	Playfield	Coil - 23-800	8-DR-4	090-5001-ND
3	Left Flipper	8	CN8	6	ORG YEL	48V	1-4	GRY ORG	Playfield	Coil - 22-1080	8-DR-5	090-5032-ND
4	Right Flipper	8	CN8	5	ORG GRN	48V	1-4	GRY ORG	Playfield	Coil - 22-1080	8-DR-0	090-5032-ND
5	Left Slingshot	8	CN8	11	ORG BLU	48V	1-4	GRY ORG	Playfield	Coil - 26-1200	8-DR-3	090-5044-ND
6	Right Slingshot	8	CN8	10	ORG VIO	48V	1-4	GRY ORG	Playfield	Coil - 26-1200	8-DR-2	090-5044-ND
7	Shaker Motor	1	CN16	1	BLU	48V	5	RED	Cabinet	Motor	1-DR-0	041-5029-04
8												
9	Magnet	8	CN7	4	BRN RED	48V	1	GRY ORG	Playfield	Coil - 22-650	8-DR-7	511-5065-ND
10	Right Pop Bumper	8	CN7	2	YEL RED	48V	1	GRY ORG	Playfield	Coil - 26-1200	8-DR-8	090-5044-ND
11	Left Pop Bumper	9	CN8	10	ORG BLK	48V	1-4	GRY BRN	Playfield	Coil - 26-1200	9-DR-2	090-5044-ND
12	Left Eject	9	CN8	11	ORG BRN	48V	1-4	GRY BRN	Playfield	Coil - 23-800	9-DR-3	090-5001-ND
13												
14												
15	Top VUK	9	CN7	3	YEL GRN	48V	1	GRY BRN	Playfield	Coil - 23-800	9-DR-6	090-5001-ND
16												
17												
18	Death Star Eject	9	CN7	2	YEL ORG	48V	1	GRY BRN	Playfield	Coil - 23-800	9-DR-8	090-5001-ND
19	Drop Target-Reset	9	CN8	9	ORG RED	48V	1-4	GRY BRN	Playfield	Coil - 25-1240	9-DR-4	090-5034-ND
20	Drop Target-Trip	9	CN8	7	YEL WHT	48V	1-4	GRY BRN	Playfield	Coil - 32-1800	9-DR-1	090-5031-00-ND
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												
31												
32												
33	Coin Meter	1	CN3	2	BLK	12V	1	RED	Cabinet	Digital Out	1-DR-2	500-9946-00
34	Ticket Meter	1	CN4	2	BLK	12V	1	RED	Cabinet	Digital Out	1-DR-3	500-9946-00
35	Ticket Dispenser	1	CN11	3		12V	1		Cabinet	Digital Out	1-DR-4	

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DRIVER REFERENCE CONTINUED

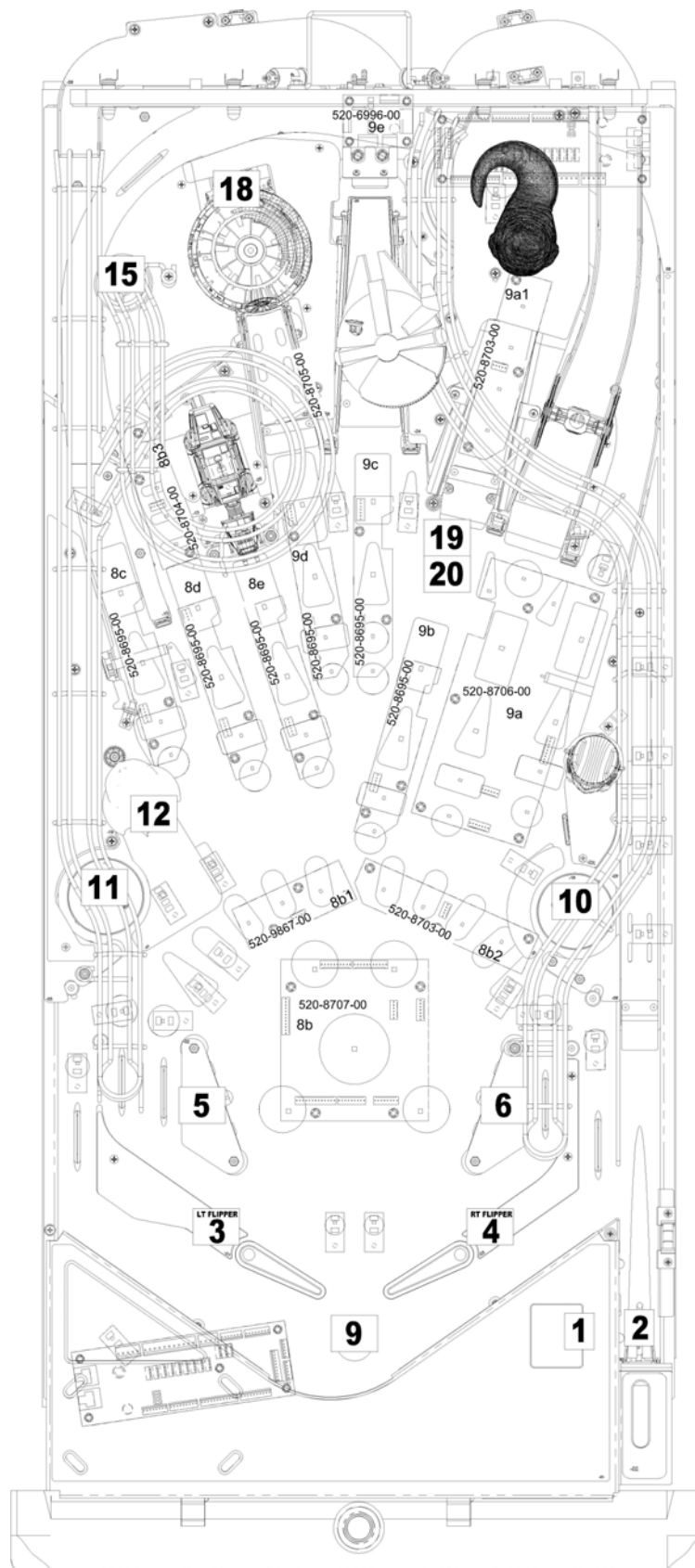


Figure 3.2.1. Playfield driver locations (top view).

3.3 SWITCH REFERENCE

ID	Name	Node	Node Ext	Conn.	Input Pin	Input Wire	GND Pin	Ground Wire	Location	Type	Address	Part Number
1	Left Outlane	8	-	CN11	4	LGN RED	11/12	BLK ORG	Playfield	Rollover	8-SW-17	500-9935-04
2	Left Return Lane-Left	8	-	CN11	5	LGN ORG	11/12	BLK ORG	Playfield	Rollover	8-SW-18	500-9935-04
3	Left Return Lane-Right	8	-	CN11	8	LGN VIO	11/12	BLK ORG	Playfield	Rollover	8-SW-21	500-9935-04
4												
5	Right Return Lane	8	-	CN11	6	LGN YEL	11/12	BLK ORG	Playfield	Rollover	8-SW-19	500-9935-03
6	Right Outlane	8	-	CN11	7	LGN BLU	11/12	BLK ORG	Playfield	Rollover	8-SW-20	500-9935-04
7	Left Slingshot	8	-	CN10	4	GRY BLU	8	BLK GRN	Playfield	Leaf	8-SW-30	180-5231-00
8	Right Slingshot	8	-	CN10	3	GRY VIO	8	BLK GRN	Playfield	Leaf	8-SW-29	180-5231-00
9	Left Flipper Button	8	-	CN9	4	GRY BRN	7	BLK GRN	Cabinet	Leaf	8-SW-25	180-5160-01
10	Right Flipper Button	8	-	CN9	3	GRY RED	7	BLK GRN	Cabinet	Leaf	8-SW-24	180-5160-01
11	Left Flipper EOS	8	-	CN10	6	GRY YEL	9	BLK GRN	Playfield	Leaf	8-SW-16	180-5149-00
12	Right Flipper EOS	8	-	CN10	5	GRY GRN	9	BLK GRN	Playfield	Leaf	8-SW-31	180-5149-00
13												
14												
15	Trough 6	8	8a	-	-		-		Playfield	Opto	8-SW-32	520-5344-00 tx 520-8516-00 rx
16	Trough 5	8	8a	-	-		-		Playfield	Opto	8-SW-33	520-5344-00 tx 520-8516-00 rx
17	Trough 4	8	8a	-	-		-		Playfield	Opto	8-SW-34	520-5344-00 tx 520-8516-00 rx
18	Trough 3	8	8a	-	-		-		Playfield	Opto	8-SW-35	520-5344-00 tx 520-8516-00 rx
19	Trough 2	8	8a	-	-		-		Playfield	Opto	8-SW-36	520-5344-00 tx 520-8516-00 rx
20	Trough 1	8	8a	-	-		-		Playfield	Opto	8-SW-37	520-5344-00 tx 520-8516-00 rx
21	Trough Jam	8	8a	-	-		-		Playfield	Opto	8-SW-38	520-5344-00 tx 520-8516-00 rx
22	Shooter Lane	8	-	CN10	2	GRY WHT	7	BLK GRN	Playfield	Micro	8-SW-28	180-5157-01
23												
24												
25	Left Pop Bumper	9	-	CN10	2	GRY BLK	7/8/9	BLK BLU	Playfield	Leaf	9-SW-28	180-5232-00
26	Left Eject Opto	9	-	CN10	3	GRY BRN	7/8/9	BLK BLU	Playfield	Opto	9-SW-29	515-0215-00 tx 515-0215-01 rx
27	Right Pop Bumper	8	-	CN11	9	LGN GRY	11/12	BLK ORG	Playfield	Leaf	8-SW-22	180-5232-00
28	Right Spinner Opto	8	-	CN11	10	LGN WHT	11/12	BLK ORG	Playfield	Opto	8-SW-23	511-2785-01
29	Right Target	8	-	CN11	3	LGN BRN	11/12	BLK ORG	Playfield	Leaf, Target	8-SW-27	515-9783-00-00
30	Left Spinner Opto	9	-	CN10	4	GRY RED	7/8/9	BLK BLU	Playfield	Opto	9-SW-30	180-5232-00
31	(F)ORCE Target	9	-	CN10	5	GRY ORG	7/8/9	BLK BLU	Playfield	Leaf, Target	9-SW-31	511-2785-01
32	Left Orbit	9	-	CN10	6	GRY YEL	7/8/9	BLK BLU	Playfield	Rollover	9-SW-16	500-9935-04
33												
34												
35												
36	AT-AT Target	9	-	CN9	6	TAN RED	11/12	BLK GRY	Playfield	Leaf, Target	9-SW-27	515-9784-00-00
37	AT-AT Up-Mag Sw	9	-	CN9	3	LGN ORG	7/8	BLK BLU	Playfield	Magnet Switch	9-SW-24	520-9871-00
38	AT-AT Down-Mag Sw	9	-	CN9	4	LGN YEL	7/8	BLK BLU	Playfield	Magnet Switch	9-SW-25	520-9871-00
39												
40												
41	Death Star Tgt Opto	9	-	CN11	4	TAN ORG	11/12	BLK GRY	Playfield	Opto	9-SW-17	511-5815-00 tx 511-5815-01 rx
42	Death Star Motor Up	9	-	CN11	5	TAN YEL	11/12	BLK GRY	Playfield	Micro	9-SW-18	180-5119-02

Continued on next page...

SWITCH REFERENCE CONTINUED

ID	Name	Node	Node Ext	Conn.	Input Pin	Input Wire	GND Pin	Ground Wire	Location	Type	Address	Part Number
43	Death Star Motor Down	9	-	CN11	6	TAN GRN	11/12	BLK GRY	Playfield	Micro	9-SW-19	180-5119-02
44	Death Star Lock 1	9	-	CN11	7	TAN BLU	11/12	BLK GRY	Playfield	Opto	9-SW-20	520-1077-00 tx 520-5378-00 rx
45	Death Star Lock 2	9	-	CN11	8	TAN VIO	11/12	BLK GRY	Playfield	Opto	9-SW-21	520-1077-00 tx 520-5378-00 rx
46	Death Star Lock 3	9	-	CN11	9	TAN WHT	11/12	BLK GRY	Playfield	Opto	9-SW-22	520-1077-00 tx 520-5378-00 rx
47												
48												
49												
50												
51	Top VUK	9	-	CN12	2	WHT BRN	10	BLK WHT	Playfield	Micro	9-SW-8	180-5209-00
52	F(O)RCE Target	9	-	CN12	3	WHT RED	10	BLK WHT	Playfield	Leaf, Target	9-SW-9	515-9785-00-00
53	FO(R)CE Target	9	-	CN12	4	WHT ORG	10	BLK WHT	Playfield	Leaf, Target	9-SW-10	515-9785-00-00
54	Jump Ramp Enter Opto	9	-	CN12	5	WHT YEL	10	BLK WHT	Playfield	Opto	9-SW-11	520-8115-00 tx 520-8116-00 rx
55	Jump Ramp Exit Opto	9	-	CN12	6	WHT GRN	10	BLK WHT	Playfield	Opto	9-SW-12	515-0215-00 tx 515-0215-01 rx
56	Jump Ramp Up-Mag Sw	9	-	CN12	7	WHT BLU	10	BLK WHT	Playfield	Magnet Switch	9-SW-13	520-8470-00
57	Jump Ramp Down-Mag Sw	9	-	CN12	8	WHT VIO	10	BLK WHT	Playfield	Magnet Switch	9-SW-14	520-8470-00
58												
59	Drop Target Opto	9	-	CN13	2	PNK RED	10	BLK BRN	Playfield	Opto	9-SW-0	520-5357-00
60	Sarlacc Ramp Opto	9	-	CN13	3	PNK ORG	10	BLK BRN	Playfield	Opto	9-SW-1	515-0215-00 tx 515-0215-01 rx
61	Sarlacc Pit Exit	9	-	CN13	4	PNK YEL	10	BLK BRN	Playfield	Rollover	9-SW-2	500-9935-03
62	Right Orbit	9	-	CN13	5	PNK GRN	10	BLK BRN	Playfield	Rollover	9-SW-3	511-3637-03 (500-9935-03& 036-6242-04)
63	FOR(C)E Target	9	-	CN13	6	PNK BLU	10	BLK BRN	Playfield	Leaf, Target	9-SW-4	515-9785-00-00
64	FORC(E) Target	9	-	CN13	7	PNK VIO	10	BLK BRN	Playfield	Leaf, Target	9-SW-5	515-9785-00-00
65	Right Ramp Exit Opto	9	-	CN13	8	PNK GRY	10	BLK BRN	Playfield	Opto	9-SW-6	515-0215-00 tx 515-0215-01 rx
66												
67												
68												
69												
70												
71												
72												
73												
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80												
81												
82												
83												
84												

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SWITCH REFERENCE CONTINUED

ID	Name	Node	Node Ext	Conn.	Input Pin	Input Wire	GND Pin	Ground Wire	Location	Type	Address	Part Number
85												
86												
87												
88												
89												
90	Lockdown Button	1	-	CN7	10	TAN WHT	9	BLK WHT	Cabinet	Leaf	1-SW-2	180-5218-00
91												
92												
93	Start Button	1	-	CN6	11	GRY	12	BLK WHT	Cabinet	Micro	1-SW-11	500-1060-44-LED
94	Tournament Start Button	1	-	CN6	9	-	5	-	Cabinet	-	1-SW-12	
95												
96	Left Coin	1	-	CN5	9	PNK BRN	3	BLK	Coin Door	Micro	1-SW-16	
97	Right Coin	1	-	CN5	7	PNK ORG	3	BLK	Coin Door	Micro	1-SW-18	
98	Center Coin	1	-	CN5	8	PNK RED	3	BLK	Coin Door	Micro	1-SW-17	
99	Fourth Coin	1	-	CN5	6	-	-	-	Coin Door	-	1-SW-19	
100	Fifth Coin	1	-	CN5	5	-	-	-	Coin Door	-	1-SW-20	
101	Tilt Pendulum	1	-	CN6	7	WHT	5	BLK WHT	Cabinet	Plumb Bob	1-SW-14	516-0007-00
102	Sixth Coin	1	-	CN9	5	-	-	-	Coin Door	-	1-SW-21	
103	Ticket Notch	1	-	CN11	5	BLU	4	BLK	Cabinet	-	1-SW-8	
104	Slam Tilt	1	-	CN5	4	-	3	-	Coin Door	-	1-SW-22	
105	Ticket Low	1	-	CN2	2	-	1	-	Cabinet	-	1-SW-7	
106												
107												
108												
109												
110												
C9	Service Select	0	-	CN25	1	LGN GRY	11	BLK WHT	Coin Door		0-SW-8	515-1963-00
C10	Service Plus	0	-	CN25	2	LGN VIO	11	BLK WHT	Coin Door		0-SW-9	515-1963-00
C11	Service Minus	0	-	CN25	3	LGN BLU	11	BLK WHT	Coin Door		0-SW-10	515-1963-00
C12	Service Back	0	-	CN25	4	LGN BLK	11	BLK WHT	Coin Door		0-SW-11	515-1963-00
C17	Headphone Detect	0	-	-	-	-	-	-	Coin Door		0-SW-16	-
C18	Headphone Kit Cable Detect	0	-	CN3	5	BLK	4	BLK	Coin Door		0-SW-17	-
C19	Volume Encoder 1	0	-	CN3	6	WHT	1	DRAIN	Coin Door		0-SW-18	-
C20	Volume Encoder 2	0	-	CN3	7	GRN	1	DRAIN	Coin Door		0-SW-19	-
C21	Jumper LVDS Resolution 1	0	-	-	-	-	-	-	CPU Node		0-SW-20	-
C22	Jumper LVDS Resolution 2	0	-	-	-	-	-	-	CPU Node		0-SW-21	-
C23	Jumper Unused	0	-	-	-	-	-	-	CPU Node		0-SW-22	-
C24	Coin Door Interlock	0	a	CN4	1	WHT GRY	4	BLK WHT	Cabinet		0-SW-23	-

Continued on next page...

SWITCH REFERENCE CONTINUED

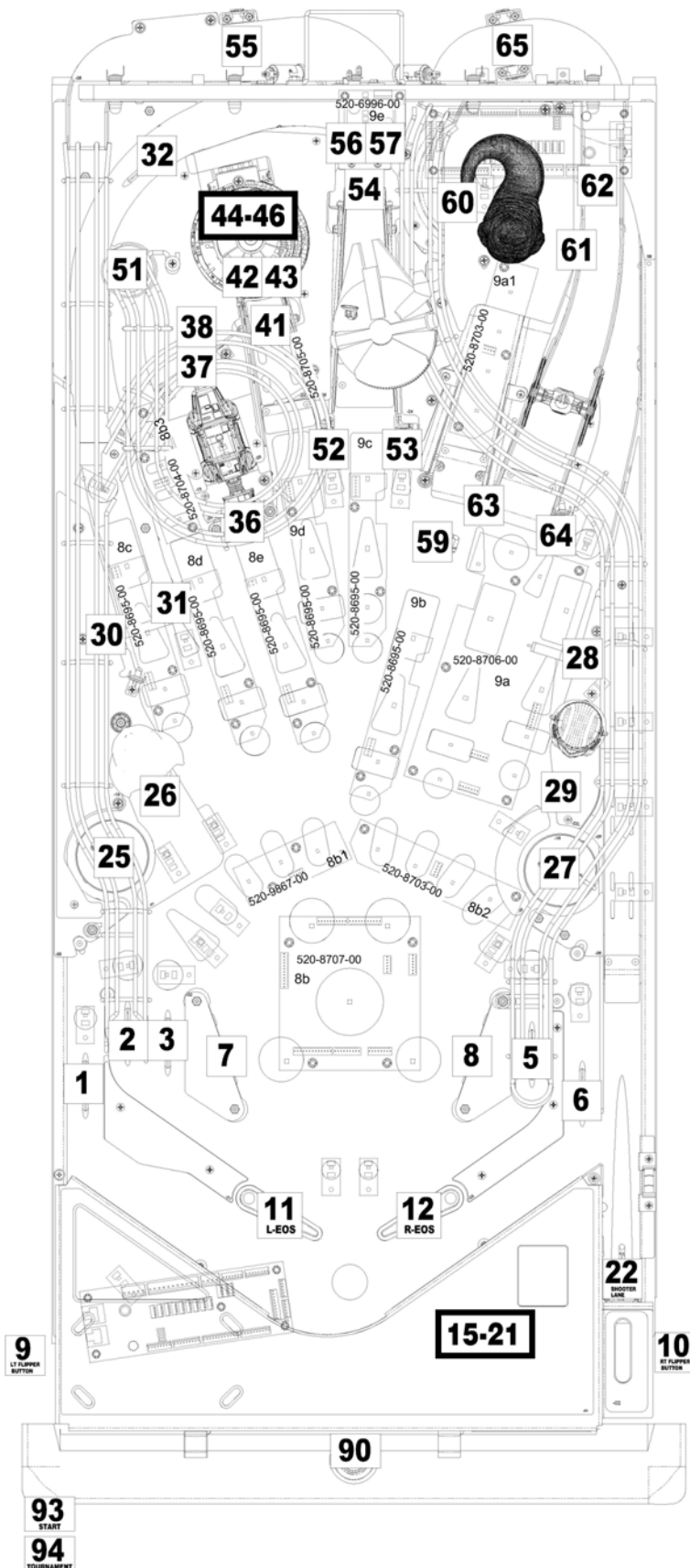


Figure 3.3.1. Playfield switch locations (top view).

3.4 LIGHT REFERENCE

ID	Name	Node	Node Ext.	Conn.	Ret. Pin	Ret. Wire	Src. Pin	Src. Wire	Location	Type	Light Color	Address	Part Number
1	Coin Enable	1	-	CN8	6	BLK GRY	2	GRY RED	Coin Door	Digital Out		1-LP-0	
2	Start Button	1	-	CN6	3	YEL BRN	1	RED	Cabinet	Feature	White	1-LP-2	113-5071-00
3	Tournament Start	1	-	CN6	2	YEL RED	1	RED	Cabinet	Feature	White	1-LP-3	112-5031-01
4	Lockdown Button-R	1	-	CN7	2	RED WHT	1	RED	Cabinet	Feature	RGB	1-LP-5	520-5333-00
5	Lockdown Button-G	1	-	CN7	3	GRN WHT	1	RED	Cabinet	Feature	RGB	1-LP-4	520-5333-00
6	Lockdown Button-B	1	-	CN7	4	BLU WHT	1	RED	Cabinet	Feature	RGB	1-LP-7	520-5333-00
7													
8													
9													
10													
11	Left Outlane	8	b	CN7	4	BRN RED	1	RED	Playfield	Feature	White	8-LP-51	520-5307-00
12	Left Return Lane-Left	8	b	CN7	5	BRN ORG	1	RED	Playfield	Feature	White	8-LP-52	520-5307-00
13	Left Return Lane-Right	8	b	CN7	6	BRN VIO	1	RED	Playfield	Feature	White	8-LP-53	520-5307-00
14	Right Return Lane	8	b	CN7	7	BRN YEL	1	RED	Playfield	Feature	White	8-LP-54	520-5307-00
15	Right Outlane	8	b	CN7	8	BRN BLU	1	RED	Playfield	Feature	White	8-LP-55	520-5307-00
16	Shoot Again	8	b	CN7	2	BRN GRY	1	RED	Playfield	Feature	White	8-LP-49	520-5307-00
17													
18	Shooter Lane Runway 1	8	b	CN1	4	YEL BRN	1/2/3	RED	Playfield	Feature	White	8-LP-9	520-5307-00
19	Shooter Lane Runway 2	8	b	CN1	5	YEL RED	1/2/3	RED	Playfield	Feature	White	8-LP-10	520-5307-00
20	Shooter Lane Runway 3	8	b	CN1	6	YEL ORG	1/2/3	RED	Playfield	Feature	White	8-LP-11	520-5307-00
21	Shooter Lane Runway 4	8	b	CN1	7	YEL GRN	1/2/3	RED	Playfield	Feature	White	8-LP-12	520-5307-00
22													
23													
24	Scene 1	8	b	CN7	3	BRN	1	RED	Playfield	Feature	White	8-LP-50	520-5307-00
25	Scene 2	8	b	CN5	6	BLU RED	1/2/3/4/5	RED	Playfield	Feature	White	8-LP-33	520-9867-00
26	Scene 3	8	b	CN5	7	BLU GRN	1/2/3/4/5	RED	Playfield	Feature	White	8-LP-34	520-9867-00
27	Scene 4	8	b	CN5	8	BLU VIO	1/2/3/4/5	RED	Playfield	Feature	White	8-LP-35	520-9867-00
28	Scene 5	8	b	CN5	9	GRN RED	1/2/3/4/5	RED	Playfield	Feature	White	8-LP-36	520-8703-00
29	Scene 6	8	b	CN5	10	GRN BLU	1/2/3/4/5	RED	Playfield	Feature	White	8-LP-37	520-8703-00
30	Scene 7	8	b	CN5	11	GRN VIO	1/2/3/4/5	RED	Playfield	Feature	White	8-LP-38	520-8703-00
31	Scene 8	8	b	CN5	12	GRN	1/2/3/4/5	RED	Playfield	Feature	White	8-LP-39	520-8703-00
32													
33													
34	Left Pop Arrow-R	8	b	CN3	6	RED YEL	1/2	RED	Playfield	Feature	RGB	8-LP-20	520-5333-00
35	Left Pop Arrow-G	8	b	CN3	7	GRN YEL	1/2	RED	Playfield	Feature	RGB	8-LP-21	520-5333-00
36	Left Pop Arrow-B	8	b	CN3	8	BLU YEL	1/2	RED	Playfield	Feature	RGB	8-LP-22	520-5333-00
37	Left Pop-R	8	b	CN6	2	RED BLK	1	RED	Playfield	Feature	RGB	8-LP-40	520-5374-00
38	Left Pop-G	8	b	CN6	3	GRN BLK	1	RED	Playfield	Feature	RGB	8-LP-41	520-5374-00
39	Left Pop-B	8	b	CN6	4	BLU BLK	1	RED	Playfield	Feature	RGB	8-LP-42	520-5374-00
40	Darth Vader x2-R	8	b	CN6	5	RED BRN	1	RED	Playfield	Feature	RGB	8-LP-43	520-5333-00
41	Darth Vader x2-G	8	b	CN6	6	GRN BRN	1	RED	Playfield	Feature	RGB	8-LP-44	520-5333-00
42	Darth Vader x2-B	8	b	CN6	7	BLU BRN	1	RED	Playfield	Feature	RGB	8-LP-45	520-5333-00
43													
44													
45	Right Pop Arrow-R	8	b	CN3	3	RED ORG	1/2	RED	Playfield	Feature	RGB	8-LP-17	520-5333-00
46	Right Pop Arrow-G	8	b	CN3	4	GRN ORG	1/2	RED	Playfield	Feature	RGB	8-LP-18	520-5333-00
47	Right Pop Arrow-B	8	b	CN3	5	BLU ORG	1/2	RED	Playfield	Feature	RGB	8-LP-19	520-5333-00
48	Right Pop-R	8	b	CN1	8	RED GRY	1/2/3	RED	Playfield	Feature	RGB	8-LP-13	520-5374-00
49	Right Pop-G	8	b	CN1	9	GRN GRY	1/2/3	RED	Playfield	Feature	RGB	8-LP-14	520-5374-00
50	Right Pop-B	8	b	CN1	10	BLU GRY	1/2/3	RED	Playfield	Feature	RGB	8-LP-15	520-5374-00
51	Right Target	8	b	CN3	9	YEL BLU	1/2	RED	Playfield	Feature	White	8-LP-23	520-5307-00

Continued on next page...

LIGHT REFERENCE CONTINUED

ID	Name	Node	Node Ext.	Conn.	Ret. Pin	Ret. Wire	Src. Pin	Src. Wire	Location	Type	Light Color	Address	Part Number
52													
53													
54	Yoda-R	8	c	LED4	-	-	-	-	Playfield	Feature	RGB	8-LP-61	520-8695-00
55	Yoda-G	8	c	LED4	-	-	-	-	Playfield	Feature	RGB	8-LP-62	520-8695-00
56	Yoda-B	8	c	LED4	-	-	-	-	Playfield	Feature	RGB	8-LP-63	520-8695-00
57	Yoda Arrow-R	8	c	LED3	-	-	-	-	Playfield	Feature	RGB	8-LP-58	520-8695-00
58	Yoda Arrow-G	8	c	LED3	-	-	-	-	Playfield	Feature	RGB	8-LP-59	520-8695-00
59	Yoda Arrow-B	8	c	LED3	-	-	-	-	Playfield	Feature	RGB	8-LP-60	520-8695-00
60	Yoda-WHT	8	c	LED2	-	-	-	-	Playfield	Feature	White	8-LP-57	520-8695-00
61	Icon 1	8	c	LED1	-	-	-	-	Playfield	Feature	White	8-LP-56	520-8695-00
62													
63	(F)ORCE	8	b	CN6	9	ORG BRN	1	RED	Playfield	Feature	White	8-LP-47	520-5307-00
64	Luke-R	8	d	LED4	-	-	-	-	Playfield	Feature	RGB	8-LP-69	520-8695-00
65	Luke-G	8	d	LED4	-	-	-	-	Playfield	Feature	RGB	8-LP-70	520-8695-00
66	Luke-B	8	d	LED4	-	-	-	-	Playfield	Feature	RGB	8-LP-71	520-8695-00
67	Luke Arrow-R	8	d	LED3	-	-	-	-	Playfield	Feature	RGB	8-LP-66	520-8695-00
68	Luke Arrow-G	8	d	LED3	-	-	-	-	Playfield	Feature	RGB	8-LP-67	520-8695-00
69	Luke Arrow-B	8	d	LED3	-	-	-	-	Playfield	Feature	RGB	8-LP-68	520-8695-00
70	Luke-WHT	8	d	LED2	-	-	-	-	Playfield	Feature	White	8-LP-65	520-8695-00
71	Icon 2	8	d	LED1	-	-	-	-	Playfield	Feature	White	8-LP-64	520-8695-00
72													
73	R2D2-R	8	e	LED4	-	-	-	-	Playfield	Feature	RGB	8-LP-77	520-8695-00
74	R2D2-G	8	e	LED4	-	-	-	-	Playfield	Feature	RGB	8-LP-78	520-8695-00
75	R2D2-B	8	e	LED4	-	-	-	-	Playfield	Feature	RGB	8-LP-79	520-8695-00
76	R2D2 Arrow-R	8	e	LED3	-	-	-	-	Playfield	Feature	RGB	8-LP-74	520-8695-00
77	R2D2 Arrow-G	8	e	LED3	-	-	-	-	Playfield	Feature	RGB	8-LP-75	520-8695-00
78	R2D2 Arrow-B	8	e	LED3	-	-	-	-	Playfield	Feature	RGB	8-LP-76	520-8695-00
79	R2D2-WHT	8	e	LED2	-	-	-	-	Playfield	Feature	White	8-LP-73	520-8695-00
80	Icon 3	8	e	LED1	-	-	-	-	Playfield	Feature	White	8-LP-72	520-8695-00
81													
82	Lando-R	9	d	LED4	-	-	-	-	Playfield	Feature	RGB	9-LP-69	520-8695-00
83	Lando-G	9	d	LED4	-	-	-	-	Playfield	Feature	RGB	9-LP-70	520-8695-00
84	Lando-B	9	d	LED4	-	-	-	-	Playfield	Feature	RGB	9-LP-71	520-8695-00
85	Lando Arrow-R	9	d	LED3	-	-	-	-	Playfield	Feature	RGB	9-LP-66	520-8695-00
86	Lando Arrow-G	9	d	LED3	-	-	-	-	Playfield	Feature	RGB	9-LP-67	520-8695-00
87	Lando Arrow-B	9	d	LED3	-	-	-	-	Playfield	Feature	RGB	9-LP-68	520-8695-00
88	Lando-WHT	9	d	LED2	-	-	-	-	Playfield	Feature	White	9-LP-65	520-8695-00
89	Icon 4	9	d	LED1	-	-	-	-	Playfield	Feature	White	9-LP-64	520-8695-00
90													
91	F(O)RCE	9	a	CN3	8	YEL GRY	1/2	RED	Playfield	Feature	White	9-LP-29	520-5307-00
92	Han Solo-R	9	c	LED4	-	-	-	-	Playfield	Feature	RGB	9-LP-61	520-8695-00
93	Han Solo-G	9	c	LED4	-	-	-	-	Playfield	Feature	RGB	9-LP-62	520-8695-00
94	Han Solo-B	9	c	LED4	-	-	-	-	Playfield	Feature	RGB	9-LP-63	520-8695-00
95	Han Solo Arrow-R	9	c	LED3	-	-	-	-	Playfield	Feature	RGB	9-LP-58	520-8695-00
96	Han Solo Arrow-G	9	c	LED3	-	-	-	-	Playfield	Feature	RGB	9-LP-59	520-8695-00
97	Han Solo Arrow-B	9	c	LED3	-	-	-	-	Playfield	Feature	RGB	9-LP-60	520-8695-00
98	Han Solo-WHT	9	c	LED2	-	-	-	-	Playfield	Feature	White	9-LP-57	520-8695-00
99	Icon 5	9	c	LED1	-	-	-	-	Playfield	Feature	White	9-LP-56	520-8695-00
100													
101	FO(R)CE	9	a	CN3	9	YEL WHT	1/2	RED	Playfield	Feature	White	9-LP-30	520-5307-00
102	Chewie-R	9	b	LED4	-	-	-	-	Playfield	Feature	RGB	9-LP-53	520-8695-00

Continued on next page...

LIGHT REFERENCE CONTINUED

ID	Name	Node	Node Ext.	Conn.	Ret. Pin	Ret. Wire	Src. Pin	Src. Wire	Location	Type	Light Color	Address	Part Number
103	Chewie-G	9	b	LED4	-	-	-	-	Playfield	Feature	RGB	9-LP-54	520-8695-00
104	Chewie-B	9	b	LED4	-	-	-	-	Playfield	Feature	RGB	9-LP-55	520-8695-00
105	Chewie Arrow-R	9	b	LED3	-	-	-	-	Playfield	Feature	RGB	9-LP-50	520-8695-00
106	Chewie Arrow-G	9	b	LED3	-	-	-	-	Playfield	Feature	RGB	9-LP-51	520-8695-00
107	Chewie Arrow-B	9	b	LED3	-	-	-	-	Playfield	Feature	RGB	9-LP-52	520-8695-00
108	Chewie-WHT	9	b	LED2	-	-	-	-	Playfield	Feature	White	9-LP-49	520-8695-00
109	Icon 6	9	b	LED1	-	-	-	-	Playfield	Feature	White	9-LP-48	520-8695-00
110													
111	FOR(C)E	9	a	LED29	-	-	-	-	Playfield	Feature	White	9-LP-40	520-8706-00
112	Extra Ball-Right	9	a	LED12	-	-	-	-	Playfield	Feature	White	9-LP-23	520-8706-00
113	Leia-R	9	a	LED30	-	-	-	-	Playfield	Feature	RGB	9-LP-41	520-8706-00
114	Leia-G	9	a	LED30	-	-	-	-	Playfield	Feature	RGB	9-LP-42	520-8706-00
115	Leia-B	9	a	LED30	-	-	-	-	Playfield	Feature	RGB	9-LP-43	520-8706-00
116	Leia Arrow-R	9	a	LED31	-	-	-	-	Playfield	Feature	RGB	9-LP-44	520-8706-00
117	Leia Arrow-G	9	a	LED31	-	-	-	-	Playfield	Feature	RGB	9-LP-45	520-8706-00
118	Leia Arrow-B	9	a	LED31	-	-	-	-	Playfield	Feature	RGB	9-LP-46	520-8706-00
119	Leia-WHT	9	a	LED32	-	-	-	-	Playfield	Feature	White	9-LP-47	520-8706-00
120	Icon 7	9	a	LED1	-	-	-	-	Playfield	Feature	White	9-LP-8	520-8706-00
121													
122	FORC(E)	9	a	LED11	-	-	-	-	Playfield	Feature	White	9-LP-22	520-8706-00
123	Obi-Wan-R	9	a	LED10	-	-	-	-	Playfield	Feature	RGB	9-LP-19	520-8706-00
124	Obi-Wan-G	9	a	LED10	-	-	-	-	Playfield	Feature	RGB	9-LP-20	520-8706-00
125	Obi-Wan-B	9	a	LED10	-	-	-	-	Playfield	Feature	RGB	9-LP-21	520-8706-00
126	Obi-Wan Arrow-R	9	a	LED9	-	-	-	-	Playfield	Feature	RGB	9-LP-16	520-8706-00
127	Obi-Wan Arrow-G	9	a	LED9	-	-	-	-	Playfield	Feature	RGB	9-LP-17	520-8706-00
128	Obi-Wan Arrow-B	9	a	LED9	-	-	-	-	Playfield	Feature	RGB	9-LP-18	520-8706-00
129	Obi-Wan-WHT	9	a	LED3	-	-	-	-	Playfield	Feature	White	9-LP-10	520-8706-00
130	Icon 8	9	a	LED2	-	-	-	-	Playfield	Feature	White	9-LP-9	520-8706-00
131													
132													
133	Lock 1	9	a	CN3	3	BRN BLU	1/2	RED	Playfield	Feature	White	9-LP-24	520-8705-00
134	Lock 2	9	a	CN3	4	BRN VIO	1/2	RED	Playfield	Feature	White	9-LP-25	520-8705-00
135	Lock 3	9	a	CN3	5	BRN WHT	1/2	RED	Playfield	Feature	White	9-LP-26	520-8705-00
136													
137													
138	Feature 1	9	a	CN1	4	YEL BRN	1/2/3	RED	Playfield	Feature	White	9-LP-11	520-8703-00
139	Feature 2	9	a	CN1	5	YEL RED	1/2/3	RED	Playfield	Feature	White	9-LP-12	520-8703-00
140	Feature 3	9	a	CN1	6	YEL ORG	1/2/3	RED	Playfield	Feature	White	9-LP-13	520-8703-00
141	Feature 4	9	a	CN1	7	YEL GRN	1/2/3	RED	Playfield	Feature	White	9-LP-14	520-8703-00
142													
143	Luke Shot 1	8	b	CN4	7	YEL VIO	1/2/3/4	RED	Playfield	Feature	White	8-LP-27	520-8704-00
144	Luke Shot 2	8	b	CN4	8	YEL GRY	1/2/3/4	RED	Playfield	Feature	White	8-LP-28	520-8704-00
145	Luke Shot 3	8	b	CN4	9	YEL WHT	1/2/3/4	RED	Playfield	Feature	White	8-LP-29	520-8704-00
146	Extra Ball-Left	8	b	CN4	10	ORG GRN	1/2/3/4	RED	Playfield	Feature	White	8-LP-30	520-8704-00
147													
148													
149													

Continued on next page...

LIGHT REFERENCE CONTINUED

ID	Name	Node	Node Ext.	Conn.	Ret. Pin	Ret. Wire	Src. Pin	Src. Wire	Location	Type	Light Color	Address	Part Number
150	Coin Door Gl	1	-	CN5	2	YEL	1	YEL-WHT	Coin Door	G.I.	White	1-LP-1	112-5033-08
151	Bottom GI-WHT (x14)	8	-	CN15	5	WHT BLK	1	YEL BLK	Playfield	G.I.	White	8-LP-0	112-5034-08F 520-7000-00 520-5307-00(Bot Arch) 520-8609-00
152	Bottom GI-RED (x11)	8	-	CN15	6	RED BLK	2	YEL RED	Playfield	G.I.	Red	8-LP-1	112-5034-02F 520-8609-00
153	Bottom GI-BLU (x7)	8	-	CN15	7	BLU BLK	3	YEL BLU	Playfield	G.I.	Blue	8-LP-2	112-5034-05F 520-8609-00
154													
155	Top GI-WHT (x18)	9	-	CN15	5	WHT BLK	1	YEL BLK	Playfield	G.I.	White	9-LP-0	112-5034-08F
156	Top GI-RED (x5)	9	-	CN15	6	RED BLK	2	YEL RED	Playfield	G.I.	Red	9-LP-1	112-5034-02F
157	Top GI-BLU (x10)	9	-	CN15	7	BLU BLK	3	YEL BLU	Playfield	G.I.	Blue	9-LP-2	112-5034-05F
158													
159													
160													
161													
162													
163													
164	Mini Wiz 1	8	b	LED17	-	-	-	-	Playfield	Flash	White	8-LP-24	520-8707-00
165	Mini Wiz 2	8	b	LED1	-	-	-	-	Playfield	Flash	White	8-LP-8	520-8707-00
166	Mini Wiz 3	8	b	LED25	-	-	-	-	Playfield	Flash	White	8-LP-32	520-8707-00
167	Mini Wiz 4	8	b	LED41	-	-	-	-	Playfield	Flash	White	8-LP-48	520-8707-00
168	Wizard Mode	8	b	LED9	-	-	-	-	Playfield	Flash	White	8-LP-16	520-8707-00
169	Darth Vader Flash	8	b	CN6	8	ORG	1	RED	Playfield	Flash	Red	8-LP-46	520-8457-00
170	Left Spinner Flash	8	b	CN4	5	ORG RED	1/2/3/4	RED	Playfield	Flash	White	8-LP-25	520-7000-00
171													
172	AT-AT Flash	9	a	CN3	7	YEL VIO	1/2	RED	Playfield	Flash	White	9-LP-28	520-7000-00
173	Stormtrooper Flash	9	a	CN3	6	YEL BLU	1/2	RED	Playfield	Flash	White	9-LP-27	520-7000-00
174	Jabba Flash	9	a	CN4	5	ORG YEL	1/2	RED	Playfield	Flash	White	9-LP-34	520-7000-00
175	Sarlacc Flash	9	a	CN4	8	ORG VIO	1/2	RED	Playfield	Flash	White	9-LP-37	520-7000-00
176													
177	Rt Spinner Flash	9	a	CN4	10	ORG WHT	1/2	RED	Playfield	Flash	White	9-LP-39	520-7000-00
178	AT-AT Spotlight	8	b	CN4	11	ORG BLU	1/2/3/4	RED	Playfield	Flash	White	8-LP-31	520-8625-00
179	Death Star Spotlight	9	a	CN4	3	ORG BRN	1/2	RED	Playfield	Flash	White	9-LP-32	113-5045-08
180	Tie Fighter Spotlight	9	a	CN4	4	ORG RED	1/2	RED	Playfield	Flash	White	9-LP-33	520-8625-00
181	Millenium Falcon Flash	9	a	CN3	10	ORG BLK	1/2	RED	Playfield	Flash	White	9-LP-31	520-7000-00
182	Hyperspace Flash	9	a	CN4	6	ORG GRN	1/2	RED	Backpanel	Flash	White	9-LP-35	520-7000-00
183	Asteroid Field Flash	9	a	CN4	7	ORG BLU	1/2	RED	Backpanel	Flash	White	9-LP-36	113-5045-08
184													
185													
186													
187													
188													
189													

Continued on next page...

LIGHT REFERENCE MAP

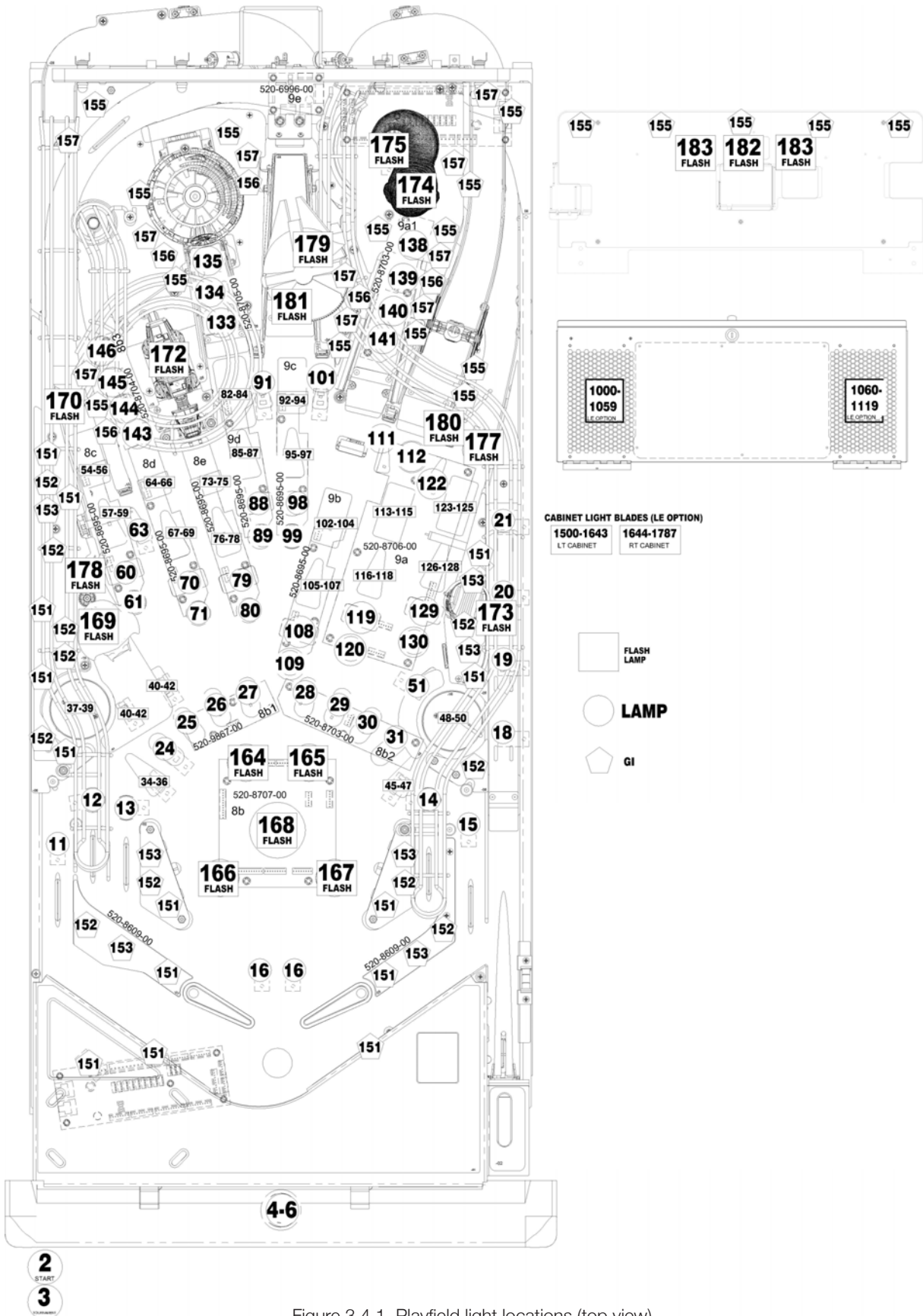


Figure 3.4.1. Playfield light locations (top view).

3.5 MOTOR REFERENCE

Bi-Direction						
MOTOR A		Coast	Brake	Brake	Dir. 1	Dir. 2
x-LP-0	Enable A	H	L	L	L	L
x-LP-1	Control 1A	H	L	H	L	H-PWM
x-LP-2	Control 2A	H	L	H	H-PWM	L
MOTOR B		Coast	Brake	Brake	Dir. 1	Dir. 2
x-LP-3	Enable B	H	L	L	L	L
x-LP-4	Control 1B	H	L	H	L	H-PWM
x-LP-5	Control 2B	H	L	H	H-PWM	L

x=Node #			L/Low=Lamp On			
			H/High=Lamp Off			
	Motor Wiring: Drive 1A&2A/1B&2B					
Single Direction						
MOTORS 1 & 2		Coast	Brake	Motor 1	Motor 2	
x-LP-0	Enable A	H	L	L	L	
x-LP-1	Control 1A	H	L	H-PWM	N/A	
x-LP-2	Control 2A	H	L	N/A	H-PWM	
MOTORS 3 & 4		Coast	Brake	Motor 3	Motor 4	
x-LP-3	Enable B	H	L	L	L	
x-LP-4	Control 1B	H	L	H-PWM	N/A	
x-LP-5	Control 2B	H	L	N/A	H-PWM	
x=Node #			L/Low=Lamp On			
			H/High=Lamp Off			
Single Direction Notes:					PWM Notes:	
	When Enable A is High both motors (1&2) are off (coast)				12V Motor - PWM of 25%	
	When Enable B is High both motors (3&4) are off (coast)				24V Motor - PWM of 50%	
	Motor Wiring: 48V & required drive					

3.6 DIAGNOSTICS MENU REFERENCE

Single Coil Test

#1: Trough Ⓐ

Node: 8 - Lower Playfield

Connector: CN8

Voltage: 48V

Return pin: 7 Org-Gry

Voltage pin: 1-4 Gry-Org

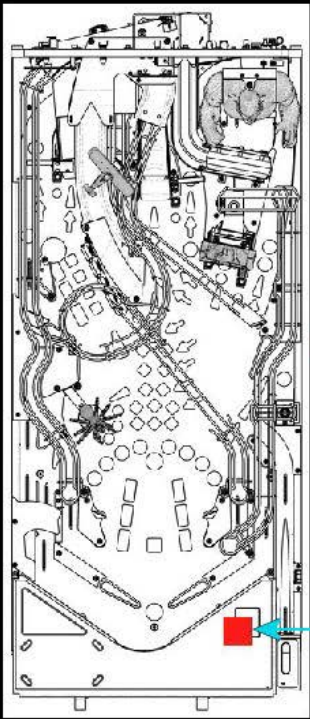
Location: Playfield

Type: Coil - 27-1500

Part Number: 090-5004-ND

Address: 8-DR-1

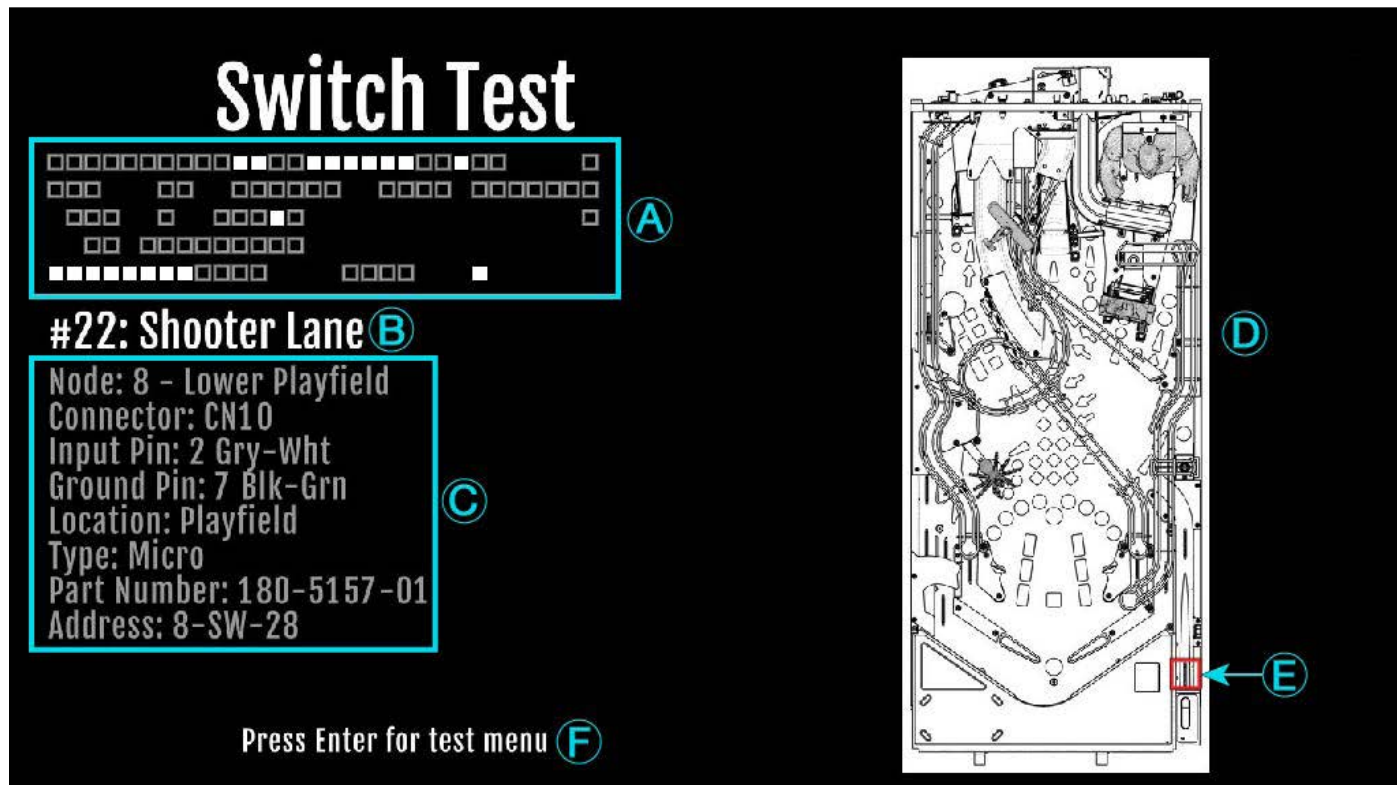
Kicks a ball out of the trough and into the shooter lane. Ⓒ



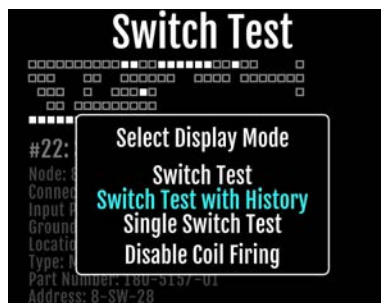
Press Enter to fire coil Ⓕ

- A.** This is the currently selected Coil. Use the - / + Volume buttons to go to the previous / next coil.
- B.** This is the information for the currently selected coil.
- Node is the board that controls it, and the Connector is the connector on that board the output is coming from.
 - Voltage is how much voltage is output to the coil. Measuring voltage from the Voltage Pin to a ground connection should measure close to the Voltage listed. Voltage pin is typically live while the controlling board is active.
 - Return and Voltage Pins show the exact pin of the connector, and the color of the wires for each pin. The return wire completes the circuit to energize / activate the coil.
 - Type and Part Number show what the wires are going to. In this case, it shows that it is a coil made up of wire that is 27 gauge thick, with 1,500 windings,. The Stern part number for the specific coil used is 090-5004-ND.
- C.** This is a brief description of what the Coil does when activated. May not be present for all Coils.
- D.** This is a map of the playfield. The image will change to help show location of currently selected Coil.
- E.** This is the relative position of the currently selected Coil.
- F.** Pressing the Select button will cause the game to briefly energize the Coil.
- For magnets that only hold the ball when energized, this may not be long enough to hold the ball. Instead, place a ball near the magnet and see if the ball is affected by the magnet when energized.

DIAGNOSTICS MENU REFERENCE CONTINUED



- A. This top area shows all the currently active switches. The filled boxes are currently registering as active, and the empty boxes are not being registered. It updates live, so blocking an optic sensor's path or pressing a switch will cause its box to fill in.
-Some inputs are normally active, such as device position switches, and the DIP switches on the main CPU Node 0.
- B. This is the last switch input the game registered. In this sample image, we pressed down on the Shooter Lane switch to activate it.
- C. This is the switch input's information. Node is the board the switch plugs into, and Connector is where the switch plugs into that circuit board. Input and Ground Pin shows what pin and color wire goes into that connector.
-In this sample image, the text is greyed out because the input is not currently active. There is currently no ball in the Shooter Lane.
- D. This is a map of the playfield. The image will change to help show location of currently selected switch.
- E. The last active input will show up highlighted. If it is currently active, it will be a full shape. In the sample, it is a hollow box because the input is not currently being triggered.
- F. Pressing the Select button will pop up a menu for other testing options.



The starting screen is Switch Test.

Switch Test with History will show a list of the previously activated switches.

Single Switch Test allows the - / + Volume buttons to scroll through the boxes in the top area.

Disable Coil Firing will stop coils from firing when their respective switch is activated. For the sample image, that would mean the Auto-Plunger would not fire when the Shooter Lane Switch is activated.

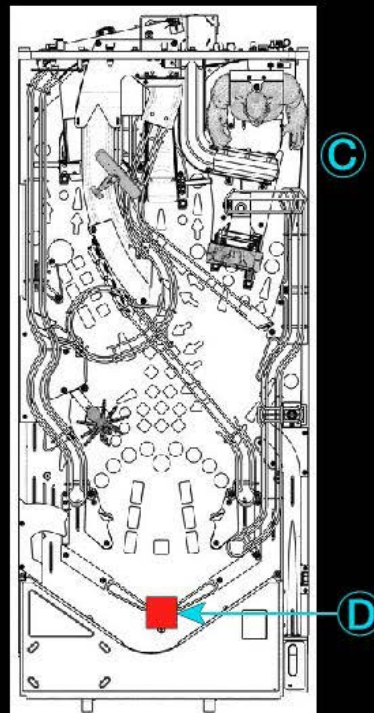
After disabling the coils, re-entering the menu will show the bottom option as Enable Coil Firing to turn that feature back on.

DIAGNOSTICS MENU REFERENCE CONTINUED

LED/Flasher Test

#18: Shoot Again **A**

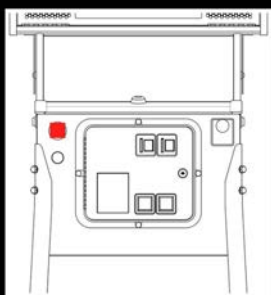
Node: 8 - Lower Playfield / 8b: 9W MC LED Brd.
 Connector: CN2
 Return Pin: 11 / Yel-Wht
 Source Pin: 1/2/3 / Red
 Location: Playfield
 Type: Feature
 Part Number: 520-5307-00
 Address ID: 8-LP-15

BPress Enter to change LED test **E**

- A.** This is the currently selected LED. Use the - / + Volume buttons to go to the previous / next LED.
- B.** This is the information for the currently selected LED.
- Node is the board that controls it, and the Connector is the labeled connector on that board. In this sample, LED Serial board 8b, which is connected to Node 8, is what turns this LED On / Off.
 - Return and Source Pins show the exact pin of the connector, and the color of the wires that go to the LED. The source wire is typically live, and the return wire is what completes the circuit to turn on the LED.
 - Type and Part Number show what type of light is selected, and the Stern part number for the board or light bulb.
- C.** This is a map of the playfield. The image will change to help show location of currently selected LED.
- D.** This is the relative position of the currently selected LED.
- E.** Pressing the Select button will cause a small menu to pop up. You can change to G.I. test and ALL LEDS from the pop up menu.

LED/Flasher Test

#2: Start Button
 Node: 1 - Cabinet
 Connector: CNG
 Return Pin: 3 / Yel-Brn
 Source Pin: 1 / Red
 Location: Cabinet
 Type: Feature
 Part Number: 113-5071-00
 Address ID: 1-LP-2



The sample image here shows that the image on-screen for the Start Button shows the cabinet instead of the playfield.

#30: (K)ing Kong

Node: 8 - Lower Playfield / 8b: 9W MC LED Brd.
 Connector: LED32

Location: Playfield
 Type: Feature
 Part Number: 520-8668-00
 Address ID: 8-LP-39

The sample image here shows an LED that is a part of the LED serial board. The Connector instead shows what LED on the board is selected. There are no Return or Source Pins listed since the LED is directly on the board, and there are no wires going to the light.

SPIKE-3 CPU NODE 0 CONTINUED CONNECTORS

ID	Connector Type	Description
CN1	5-Pin .156" Header	Backbox 2-channel amplified speaker out
CN3	7-Pin .100" Header	Headphone connector
CN4	2-Pin .156" Header	Cabinet 1-channel amplified speaker out
CN5	7-Pin .100" Header	Line In/Out
CN6	34-Pin 2.00mm Header	LCD display connector
CN7	5-Pin .156" Header	48V supply from main power supply
CN8	6-Pin .100" Header	SPI Serial
CN9	USB	USB connector - for software updates, audit dumps, and expansion modules
CN10	HDMI	HDMI Out
CN11	RJ45	SPIKE node bus - To Cabinet Node 1
CN12	RJ45	SPIKE node bus - To Topper accessory kit
CN13	SD CARD	MicroSD Card Connector
CN14	5-Pin .100" Header	LCD Backlight
CN15	ETHERNET	ETHERNET connector
CN16	4-Pin .100" Header	3.3v / 5v / 12v
CN17	HDMI	HDMI-1 Mirror Display
CN18	3-Pin .156" Header	Cabinet LEDs
CN19	3-Pin .156" Header	Topper LEDs
CN20	10-Pin 1.00mm Header	DMD / Accessories
CN21	SATA Header	Camera
CN22	RJ45	SPIKE node bus - To Playfield node board
CN23	3-Pin .156" Header	Speaker LEDs
CN25	12-Pin .100" Header	Dedicated switch inputs - service, volume switches

COMPONENTS

ID	Name
Micro SD Card (CN13)	For system SD card. Note: only to be removed if instructed to by Stern Service.

STATUS LEDs

LED ID	Name	Color	Description
D35 [48V]	48V Supply In	Red	ON: Main system power is connected. OFF: No 48V system power. Check power supply connections, cables, and fuses.
D32 [3.3V]	3.3V Logic	Red	ON: Logic power supply is good. OFF: Logic power supply bad, call tech support.
D20 [5V]	5V Logic	Red	ON: Logic power supply is good. OFF: Power power supply bad, call tech support.
D55 [12V]	12V Backbox Illumination	Red	ON: Back box LED power good. OFF: Backbox LED power bad, call tech support.
D5 [VA]	30V Audio	Red	ON: Audio power supply is good. OFF: Audio power supply off, call tech support.
D3 [VNB]	9V Node Bus	Red	ON: Power for node bus good. OFF: Power to node bus not detected, call tech support.
D23	CPU Heartbeat	Red	Should blink once every ~1/2 second. OFF: Processor not running, call tech support.
D67 [ACT]	MPU Status	Red	MPU Activity LED. Flashes with use of MPU, typically flicker.

AUDIO PINOUTS

ID	Type	Pin	Description	Minimum Impedance	Max Power (RMS)	Wire Color
CN1	.156" 5-pin Header	1	Speaker Right Ground (-)	4 Ohms	-	BLK-WHT
		2	Speaker Right (+)	4 Ohms	19 W	RED-WHT
		3	n/c	-	-	
		4	Speaker Left Ground (-)	4 Ohms	-	BLK-RED
		5	Speaker Left (+)	4 Ohms	19 W	RED-BLK
CN3	.100" 7-pin Header	1	n/c	-	-	
		2	L-HP	16 Ohms	30 mW	
		3	R-HP	16 Ohms	30 mW	
		4	n/c	-	-	
		5	Headphone Detect	-	-	
		6	Headphone vol +	-	-	
		7	Headphone vol -	-	-	
CN4	.156" 2-pin Header	1	Woofer Ground (-)	6 Ohms	-	YEL-BLK
		2	Woofer Out (+)	6 Ohms	50 W	YEL-WHT
CN5	.100" 7-pin Header	1	n/c	-	-	
		2	n/c	-	-	
		3	n/c	-	-	
		4	n/c	-	-	
		5	L-OUT	10k Ohms	1.95 V	
		6	R-OUT	10k Ohms	1.95 V	
		7	n/c	-	-	

BACK BOX WIRING

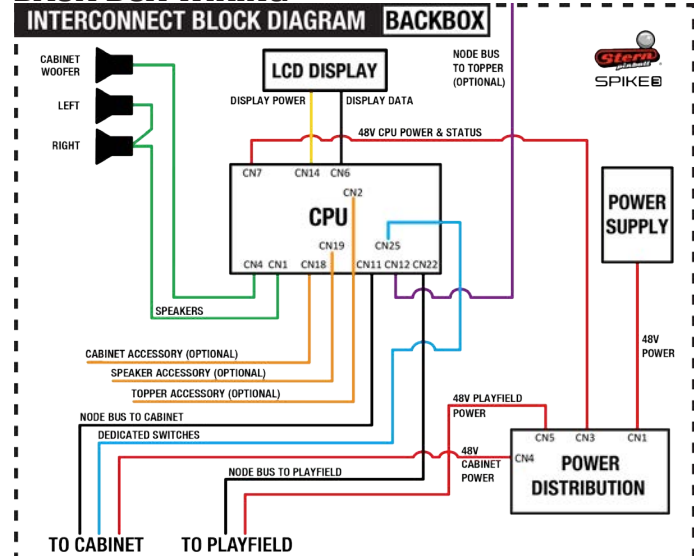


Figure 4.1.2. SPIKE 3 Back box wiring block diagram.

COIN DOOR SERVICE SWITCH WIRING

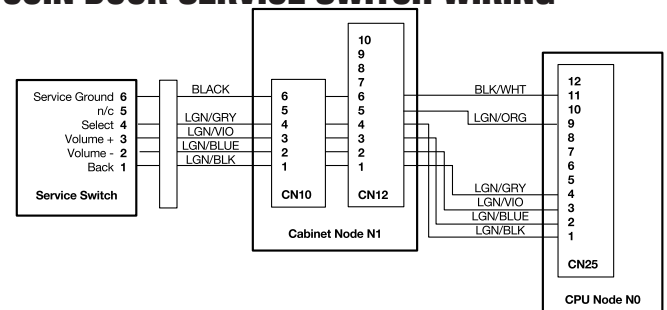
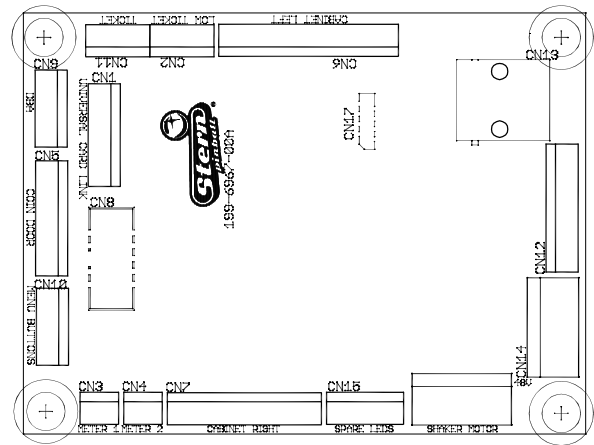


Figure 4.1.3. Service switch wiring. Note that the Cabinet Node must be present and CN10 and CN12 connected for the Coin Door Service Switches to function correctly.

4.2 CABINET NODE 1

520-6967-72

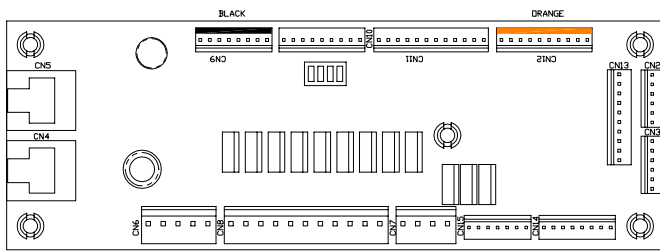
ID	Type	Pin	Description	Wire Color
CN1	.100" 8-Pin Header Universal Card Link	1	12V	-
		2	Coin 1	-
		3	Meter 1	-
		4	N/C	-
		5	Notch	-
		6	Coin Enable	-
		7	Ticket Enable	-
		8	Ground	-
CN2	.100" 5-Pin Header low ticket	1	Ground	-
		2	Ticket Low sw.	-
		3	Key	-
		4	Ticket Low	-
		5	5V Out	-
CN3	.100" 3-Pin Header Meter 1	1	Meter 12V (+)	RED
		2	Meter (-)	BLK
		3	N/C	-
CN4	.100" 3-Pin Header Meter 2	1	Meter 12V (+)	RED
		2	Meter (-)	BLK
		3	N/C	-
CN5	.100" 9-Pin Header	1	5V Out	YEL/WHT
		2	Coin LED Out	YEL
		3	Ground	BLK
		4	Slam Tilt In	LGN/RED
		5	Coin 5	PNK/GRN*
		6	Coin 4	PNK/YEL*
		7	Coin 3	PNK/ORN*
		8	Coin 2	PNK/RED*
		9	Coin 1	PNK/BRN*
CN6	.100" 14-Pin Header Cabinet Left	1	5V LED Power	RED
		2	Start 2 LED	YEL-RED
		3	Start 1 LED	YEL-BRN
		4	Spare LED	-
		5	Ground	BLK-WHT
		6	Spare Left	-
		7	Tilt Input	WHT
		8	Door Open	-
		9	Start 2 Switch [Tournament]	GRY-WHT
		10	Start 1 Switch	-
		11	Flip Left 2 [Start Signal]	GRY
		12	Flip Left 1 [Start Ground]	BLK-WHT
		13	CTRL RTN	-
		14	N/C	-
CN7	.100" 12-Pin Header Cabinet Right	1	5V LED Power	RED
		2	Plunge 2 LED	RED-WHT
		3	Plunge 1 LED	GRN-WHT
		4	Spare LED 2	BLU-WHT
		5	Ground	-
		6	Spare Right In	-
		7	Plunge 2 Switch	-
		8	Plunge 1 Switch	-
		9	Flip Right 2 [Action Ground]	BLK-WHT
		10	Flip Right 1 [Action Signal]	TAN-WHT
		11	CTRL RTN	-
		12	N/C	-
CN8	.100" 10-Pin Header dual row. Electronic Coin Mech	1	Ground	-
		2	12V	-
		3	Coin 5	-
		4	Coin 6	-
		5	N/C	-
		6	Coin Enable/Inhibit (+)	-
		7	Coin 1	-
		8	Coin 2	-
		9	Coin 3	-
		10	Coin 4	-



CN9	.100" 6-Pin Header Dollar Bill Acceptor	1	Coin Enable/DBA Inhibit (-)	-
		2	Coin Enable/DBA Inhibit (+)	-
		3	Key	Key
		4	DBA 12V	ORG
		5	Coin 6 / DBA Credit	-
		6	Ground	BLK-ORG
CN10	.100" 6-Pin Header Service Switch In	1	Service Back (To Coindoor)	LGN-BLK
		2	Service - / Down (To Coindoor)	LGN-BLU
		3	Service + / Up (To Coindoor)	LGN-VIO
		4	Service Select (To Coindoor)	LGN-GRY
		5	Key	Key
		6	Service Ground (To Coindoor)	BLK
CN11	.100" 5-Pin Header Ticket Dispenser	1	12V	RED
		2	N/C	-
		3	Ticket Dispenser Enable	WHT
		4	Ground	BLK
		5	Ticket Dispenser Notch	BLU
CN12	.100" 10-Pin Header CPU Direct Switches	1	Service Back (To CPU)	LGN-BLK
		2	Service Down (To CPU)	LGN-BLU
		3	Service Up (To CPU)	LGN-VIO
		4	Service Select (To CPU)	LGN-GRY
		5	Power Present	LGN-ORG
		6	Service Ground (To CPU)	BLK-WHT
		7	Flip Left 2 [Start Signal]	GRY
		8	Flip Left 1 [Start Ground]	BLK-BRN
		9	Flip Right 1 [Action Signal]	TAN-WHT
		10	Flip Right 2 [Action Ground]	BLK-BRN
CN14	.156" 5-Pin Header Power Input	1	Ground	BLK
		2	Key	Key
		3	N/C	-
		4	N/C	-
		5	48VDC In	GRY-YEL
CN15	.100" 6-Pin Header Spare LED's	1	5V LED Power	-
		2	Key	Key
		3	Spare LED 3	-
		4	Spare LED 4	-
		5	Spare LED 5	-
		6	Spare LED 6	-
CN16	.156" 5-Pin Header Shaker Motor	1	Shaker Motor (-)	BLU
		2	Shaker Motor (-)	-
		3	Shaker Motor (+)	-
		4	Key	Key
		5	Shaker Motor (+)	RED
			*Varies by country model	

4.5 MID UPPER PLAYFIELD 48V DRIVER PINOUT NODE 9

520-1070 / 520-1057-00

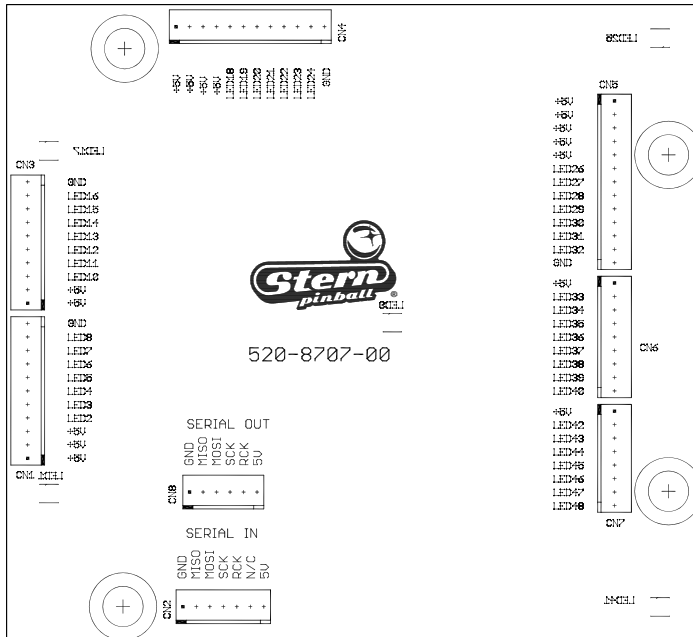


ID	Type	Pin	Description	Wire Color
SW1	Address DIP	-	Node 9 - OFF-OFF-ON-OFF	-
CN4	RJ45	-	SPIKE Node Bus	Multi
CN5	RJ45	-	SPIKE Node Bus	Multi
CN6	.156" 5-Pin Header Node Power	1	Ground	BLK
		2	Key	Key
		3	N/C	-
		4		-
		5	48VDC In	GRY
CN7	.156" 4-Pin Header (White)	1	48V Driver Power	GRY BRN
		2	9-DR-8 Driver Return	YEL ORG
		3	9-DR-6 Driver Return	YEL GRN
		4	9-DR-7 Driver Return	-
CN8	.156 11-Pin Header (White)	1	48V Driver Power	GRY BRN
		2	48V Driver Power	GRY BRN
		3	48V Driver Power	GRY BRN
		4	48V Driver Power	GRY BRN
		5	9-DR-0 Driver Return	-
		6	9-DR-5 Driver Return	-
		7	9-DR-1 Driver Return	YEL WHT
		8	9-DR-8 Driver Return	-
		9	9-DR-4 Driver Return	ORG RED
		10	9-DR-2 Driver Return	ORG BLK
		11	9-DR-3 Driver Return	ORG BRN
CN9	.100" 8-Pin Header (Black)	1	V+	RED
		2	V+	-
		3	9-SW-24 Switch	LGN ORG
		4	9-SW-25 Switch	LGN YEL
		5	9-SW-26 Switch	-
		6	9-SW-27 Switch	LGN VIO
		7	Ground	BLK BLU
		8	Ground	BLK BLU
CN10	.100" 9-Pin Header (White)	1	V+	RED
		2	9-SW-28 Switch	GRY BLK
		3	9-SW-29 Switch	GRY BRN
		4	9-SW-30 Switch	GRY RED
		5	9-SW-31 Switch	GRY ORG
		6	9-SW-16 Switch	GRY YEL
		7	Ground	BLK BLU
		8	Ground	BLK BLU
		9	Ground	BLK BLU

ID	Type	Pin	Description	Wire Color
CN11	.100" 12-Pin Header (White)	1	V+	RED
		2	9-SW-26 Switch	-
		3	9-SW-27 Switch	-
		4	9-SW-17 Switch	TAN ORG
		5	9-SW-18 Switch	TAN YEL
		6	9-SW-19 Switch	TAN GRN
		7	9-SW-20 Switch	TAN BLU
		8	9-SW-21 Switch	TAN VIO
		9	9-SW-22 Switch	TAN WHT
		10	9-SW-23 Switch	-
		11	Ground	BLK GRY
		12	Ground	BLK GRY
CN12	.156 10-Pin Header (Orange)	1	V+	RED
		2	9-SW-8 Switch	WHT BRN
		3	9-SW-9 Switch	WHT RED
		4	9-SW-10 Switch	WHT ORG
		5	9-SW-11 Switch	WHT YEL
		6	9-SW-12 Switch	WHT GRN
		7	9-SW-13 Switch	WHT BLU
		8	9-SW-14 Switch	WHT VIO
		9	9-SW-15 Switch	-
		10	Ground	BLK WHT
CN13	.156 10-Pin Header (White)	1	V+	RED
		2	9-SW-0 Switch	PNK RED
		3	9-SW-1 Switch	PNK ORG
		4	9-SW-2 Switch	PNK YEL
		5	9-SW-3 Switch	PNK GRN
		6	9-SW-4 Switch	PNK BLU
		7	9-SW-5 Switch	PNK VIO
		8	9-SW-6 Switch	PNK GRY
		9	9-SW-7 Switch	-
		10	Ground	BLK BRN
CN15	.100" 7-Pin Header (White)	1	LED V+	YEL BLK
		2	LED V+	YEL RED
		3	LED V+	YEL BLU
		4	-	-
		5	9-LP-0 GI Return	WHT BLK
		6	9-LP-1 GI Return	RED BLK
		7	9-LP-2 GI Return	BLU BLK
CN2	.100" 6-Pin Header, Node Extension Bus	1	Ground	-
		2	DIN	-
		3	DOUT	-
		4	SCK	-
		5	RCK	-
		6	V+	-
CN3	.100" 6-Pin Header, Node Extension Bus	1	Ground	BLK
		2	DIN	VIO BLK
		3	DOUT	VIO BRN
		4	SCK	VIO RED
		5	RCK	VIO ORG
		6	V+	RED

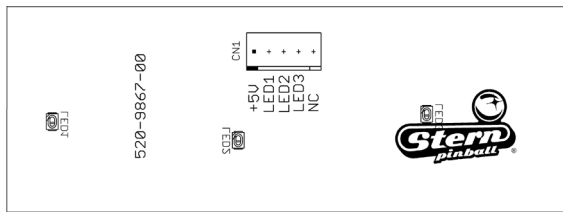
4.6 5F- 6S LED BOARD 8B

520-8707-00

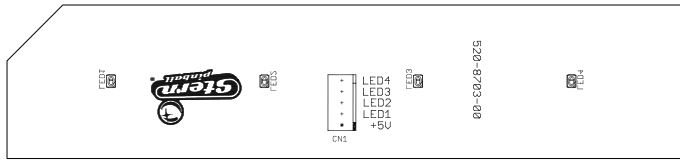


ID	Type	Pin	Description	Wire Color
CN1	.100" 11-Pin Header	1	+5V	RED
		2	+5V	RED
		3	+5V	RED
		4	LED 2	YEL-BRN
		5	LED 3	YEL-RED
		6	LED 4	YEL-ORG
		7	LED 5	YEL-GRN
		8	LED 6	RED-GRY
		9	LED 7	GRN-GRY
		10	LED 8	BLU-GRY
		11	GND	-
CN2	.100" 7-Pin Header	1	Ground	BLK
		2	MISO Output Data	VIO BLK
		3	MOSI Input Data	VIO BRN
		4	SCK Serial Clock	VIO RED
		5	RCK Register Clock	VIO ORG
		6	NC	-
		7	+5 VDC IN	RED
CN3	.100" 10-Pin Header	1	+5V	RED
		2	+5V	RED
		3	LED 10	GRN-ORG
		4	LED 11	GRN-ORG
		5	LED 12	BLU-ORG
		6	LED 13	RED-YEL
		7	LED 14	GRN-YEL
		8	LED 15	BLU-YEL
		9	LED 16	YEL-BLU
		10	GND	-

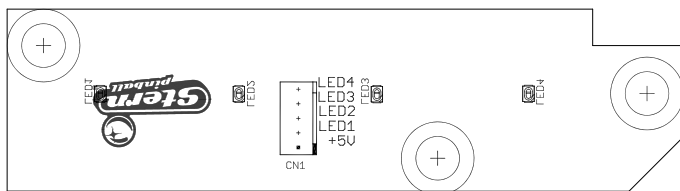
ID	Type	Pin	Description	Wire Color	
CN4	.100" 12-Pin Header	1	+5V	RED	
		2	+5V	RED	
		3	+5V	RED	
		4	+5V	-	
		5	LED 18	ORG-RED	
		6	LED 19	-	
		7	LED 20	YEL-VIO	TO 8b3
		8	LED 21	YEL-GRY	TO 8b3
		9	LED 22	YEL-WHT	TO 8b3
		10	LED 23	ORG-GRN	TO 8b3
		11	LED 24	ORG-BLU	
		12	GND	-	
CN5	.100" 12-Pin Header	1	+5V	RED	TO 8b2
		2	+5V	RED	TO 8b1
		3	+5V	-	
		4	+5V	-	
		5	+5V	-	
		6	LED 26	BLU-RED	TO 8b1
		7	LED 27	BLU-GRN	TO 8b1
		8	LED 28	BLU-VIO	TO 8b1
		9	LED 29	GRN-RED	TO 8b2
		10	LED 30	GRN-BLU	TO 8b2
		11	LED 31	GRN-VIO	TO 8b2
		12	LED 32	GRN	TO 8b2
		13	GND		
CN6	.100" 9-Pin Header	1	+5V	RED	
		2	LED 33	RED-BLK	
		3	LED 34	GRN-BLK	
		4	LED 35	BLU-BLK	
		5	LED 36	RED-BRN	
		6	LED 37	GRN-BRN	
		7	LED 38	BLU-BRN	
		8	LED 39	ORG	
		9	LED 40	ORG-BRN	
CN7	.100" 8-Pin Header	1	+5V	RED	
		2	LED 42	BRN-GRY	
		3	LED 43	BRN	
		4	LED 44	BRN-RED	
		5	LED 45	BRN-ORG	
		6	LED 46	BRN-VIO	
		7	LED 47	BRN-YEL	
		8	LED 48	BRN-BLU	
CN8	.100" 7-Pin Header	1	Ground	BLK	
		2	MISO Output Data	VIO BLK	
		3	MOSI Input Data	VIO BRN	
		4	SCK Serial Clock	VIO RED	
		5	RCK Register Clock	VIO ORG	
		6	+5 VDC IN	RED	

4.7 3W LED BOARD 8B1**520-9867-00**

ID	Type	Pin	Description	Wire Color
CN1	.100" 5-Pin Header	1	5V	RED
		2	LED 1	BLU-RED
		3	LED 2	BLU-GRN
		4	LED 3	BLU-VIO
		5	NC	-

4.8 RAMP-R 4R- LED BOARD 8B2**520-8703-00**

ID	Type	Pin	Description	Wire Color
CN1	.100" 5-Pin Header	1	5V	RED
		2	LED 1	GRN-RED
		3	LED 2	GRN-BLU
		4	LED 3	GRN-VIO
		5	LED 4	GRN

4.9 1R-4W-1S- LED BOARD 8B3**520-8704-00**

ID	Type	Pin	Description	Wire Color
CN1	.100" 5-Pin Header	1	5V	RED
		2	LED 1	YEL-VIO
		3	LED 2	YEL-GRY
		4	LED 3	YEL-WHT
		5	LED 4	ORG-GRN

4.10 2RGB-2W- LED BOARD 8C, 8D, 9B, 9C, & 9D**520-8695-00**

The only wiring going to these boards are the Serial Data Cables: 036-8054-XX.

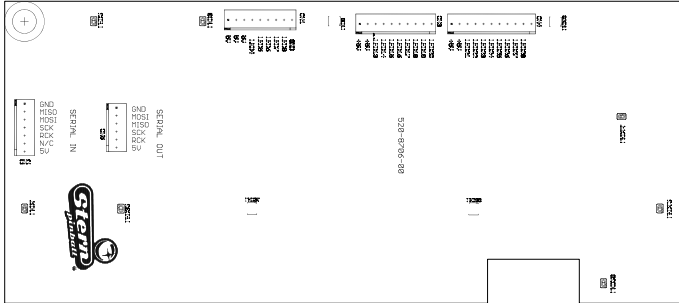
ID	Type	Pin	Description	Wire Color
CN1	.100" 7-Pin Header	1	Ground	BLK
		2	MISO Output Data	VIO-BLK
		3	MOSI Input Data	VIO-BRN
		4	SCK Serial Clock	VIO-RED
		5	RCK Register Clock	VIO-ORG
		6	NC	-
		7	+5 VDC IN	RED
CN2	.100" 6-Pin Header	1	GND	BLK
		2	MOSI Input Data	VIO-BLK
		3	MISO Output Data	VIO-BRN
		4	SCK Serial Clock	VIO-RED
		5	RCK Register Clock	VIO-ORG
		6	+5V	RED

4.11 2RGB-2W- LED BOARD 8E**520-8695-00**

ID	Type	Pin	Description	Wire Color
CN1	.100" 7-Pin Header	1	Ground	BLK
		2	MISO Output Data	VIO-BLK
		3	MOSI Input Data	VIO-BRN
		4	SCK Serial Clock	VIO-RED
		5	RCK Register Clock	VIO-ORG
		6	NC	-
		7	+5 VDC IN	RED
CN2	.100" 6-Pin Header	1	GND	-
		2	MOSI Input Data	-
		3	MISO Output Data	-
		4	SCK Serial Clock	-
		5	RCK Register Clock	-
		6	+5V	-

4.12 4R-7W- LED BOARD 9A

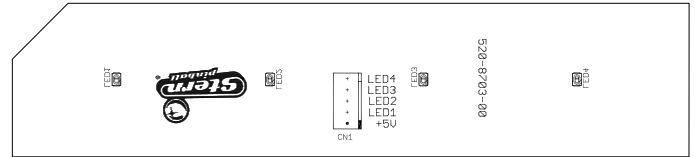
520-8706-00



ID	Type	Pin	Description	Wire Color	
CN1	.100" 9-Pin Header	1	+5V	RED	TO 9a1
		2	+5V	-	
		3	+5V	-	
		4	LED 4	YEL-BRN	TO 9a1
		5	LED 5	YEL-RED	TO 9a1
		6	LED 6	YEL-ORG	TO 9a1
		7	LED 7	YEL-GRN	TO 9a1
		8	LED 8	-	
		9	GND	-	
CN2	.100" 7-Pin Header	1	Ground	BLK	
		2	MISO Output Data	VIO-BLK	
		3	MOSI Input Data	VIO-BRN	
		4	SCK Serial Clock	VIO-RED	
		5	RCK Register Clock	VIO-ORG	
		6	NC	-	
		7	+5 VDC IN	RED	
CN3	.100" 10-Pin Header	1	+5V	RED	
		2	+5V	RED	
		3	LED 13	BRN-BLU	
		4	LED 14	BRN-VIO	
		5	LED 15	BRN-WHT	
		6	LED 16	YEL-BLU	
		7	LED 17	YEL-VIO	
		8	LED 18	YEL-GRY	
		9	LED 19	YEL-WHT	
		10	LED 20	ORG-BLK	
CN4	.100" 11-Pin Header	1	+5V	RED	
		2	+5V	RED	
		3	LED 21	ORG-BRN	
		4	LED 22	ORG-RED	
		5	LED 23	ORG-YEL	
		6	LED 24	ORG-GRN	
		7	LED 25	ORG-BLU	
		8	LED 26	ORG-VIO	
		9	LED 27	-	
		10	LED 28	ORG-WHT	
		11	GND	-	
CN5	.100" 6-Pin Header	1	GND	BLK	
		2	MOSI Input Data	VIO-BLK	
		3	MISO Output Data	VIO-BRN	
		4	SCK Serial Clock	VIO-RED	
		5	RCK Register Clock	VIO-ORG	
		6	+5V	RED	

4.13 RAMP-R 4R- LED BOARD 9A1

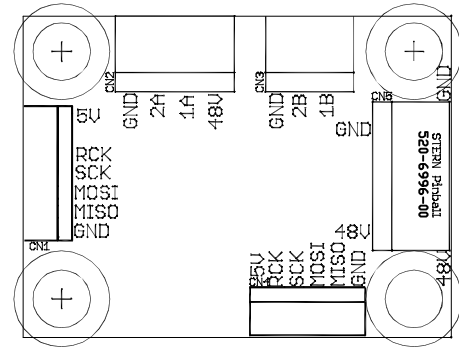
520-8703-00



ID	Type	Pin	Description	Wire Color
CN1	.100" 5-Pin Header	1	+5V	RED
		2	LED 1	YEL GRN
		3	LED 2	YEL ORG
		4	LED 3	YEL RED
		5	LED 4	YEL BRN

4.14 SERIAL MOTOR DRIVER BOARD 9E

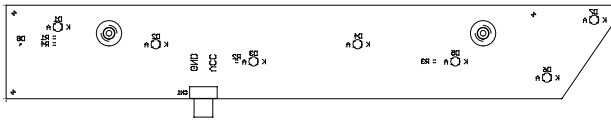
520-6996-00



ID	Type	Pin	Description	Wire Color
CN1	.100" 7-Pin Header	1	Ground	BLK
		2	MISO Output Data	VIO-BLK
		3	MOSI Input Data	VIO-BRN
		4	SCK Serial Clock	VIO-RED
		5	RCK Register Clock	VIO-ORG
		6	NC	-
		7	+5 VDC IN	RED
CN2	.156 4-Pin Connector	1	Ground	-
		2	DRIVE2-A	BRN-RED
		3	DRIVE1-A	BRN
		4	V+	GRY
CN3	.156 3-Pin Connector	1	Ground	-
		2	DRIVE2-B	GRY
		3	DRIVE1-B	BRN-BLK
CN4	.100" 6-Pin Header	1	Ground	-
		2	MISO Output Data	-
		3	MOSI Input Data	-
		4	SCK Serial Clock	-
		5	RCK Register Clock	-
		6	V+	-
CN5	.156 5-Pin Connector	1	GND	BLK
		2	KEY	Key
		3	N/C	-
		4	N/C	-
		5	+48 VDC IN	GRY

4.15 TROUGH SERIAL OPTO TRANSMITTER

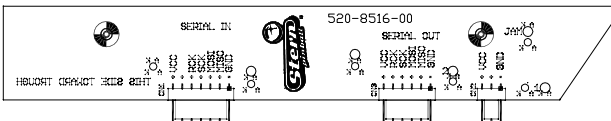
520-5344-00



ID	Type	Pin	Description	Wire Color
CN1	.100" 3-Pin Header	1	Ground	BLK
		2	N/C	-
		3	+5 VDC IN	RED

4.16 TROUGH SERIAL OPTO RECEIVER 8A

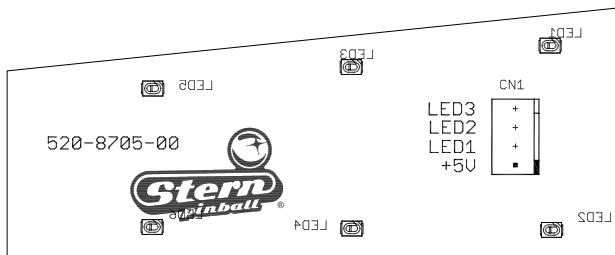
520-8516-00



ID	Type	Pin	Description	Wire Color
CN1	.100" 7-Pin Header	1	Ground	BLK
		2	MISO Output Data	VIO-BLK
		3	MOSI Input Data	VIO-BRN
		4	SCK Serial Clock	VIO-RED
		5	RCK Register Clock	VIO-ORG
		6	N/C	-
		7	+5 VDC IN	RED
CN2	.100" 3-Pin Header	1	Ground	BLK
		2	N/C	-
		3	+5 VDC IN	RED
CN3	.100" 6-Pin Header	1	Ground	-
		2	MISO Output Data	-
		3	MOSI Input Data	-
		4	SCK Serial Clock	-
		5	RCK Register Clock	-
		6	V+	-

4.17 PCA-6W-LU-D BOARD

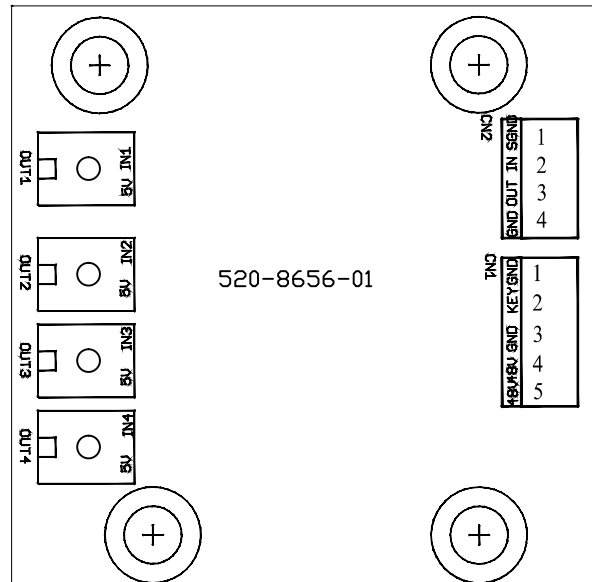
520-8705-00



ID	Type	Pin	Description	Wire Color
CN1	.100" 4-Pin Header	1	5V	RED
		2	LED 1	BRN BLU
		3	LED 2	BRN VIO
		4	LED 3	BRN WHT

4.18 ISOLATED SMART LED PSU

520-8656-01

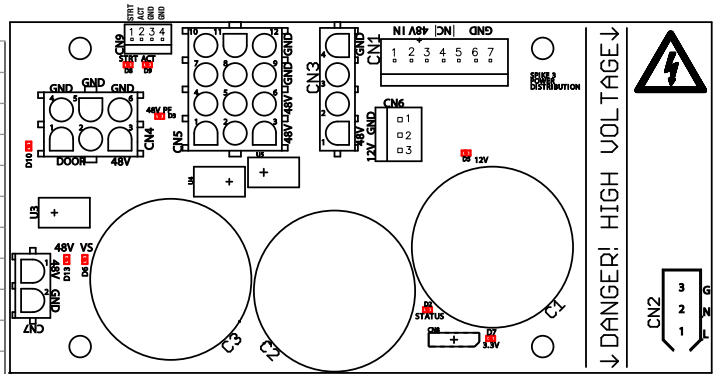


ID	Type	Pin	Description	Wire Color
CN1	.156 5-Pin Connector	1	GND	BLK
		2	KEY	Key
		3	GND	-
		4	+48 VDC IN	-
		5	+48 VDC IN	GRY
CN2	.156 4-Pin Connector	1	S-Ground	BLK
		2	SIGNAL-IN	GRN
		3	OUT	-
		4	GND	-
CN3	Mini-Fit Jr.4-Pin Connector	1	+5V	RED
		2	IN1	GRN
		3	OUT-1	WHT
		4	GND	BLK
CN4	Mini-Fit Jr.4-Pin Connector	1	+5V	RED
		2	IN2	GRN
		3	OUT-2	WHT
		4	GND	BLK
CN5	Mini-Fit Jr.4-Pin Connector	1	+5V	RED
		2	IN3	GRN
		3	OUT-3	WHT
		4	GND	BLK
CN6	Mini-Fit Jr.4-Pin Connector	1	+5V	RED
		2	IN4	GRN
		3	OUT-4	WHT
		4	GND	BLK

4.19 POWER DISTRIBUTION BOARD

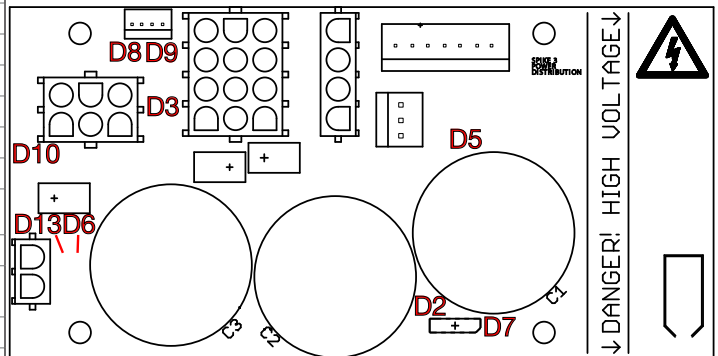
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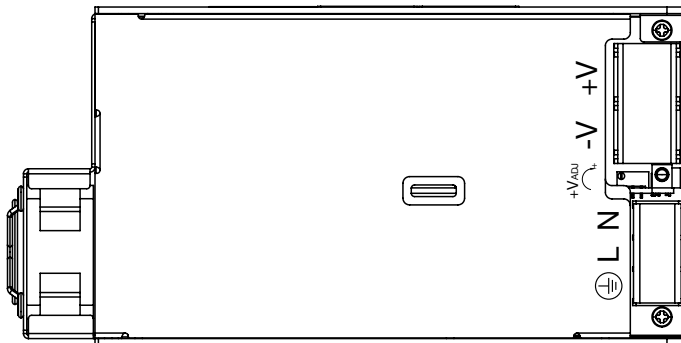
ID	Type	Pin	Description	Wire Color
CN1	.156 in 7-Pin Housing Plug: 045-5259-07 Pin: 055-5331-00 Key: 060-5013-00	1	+48 VDC IN	GRY
		2	+48 VDC IN	GRY
		3	+48 VDC IN	GRY
		4	NC	KEY
		5	Ground	BLK
		6	Ground	BLK
		7	Ground	BLK
CN2	.093 in 3-Pos Plug Plug: 045-5003-03 Pin: 055-5013-09	1	Line In (100-240 VAC)	BLK
		2	Neutral	WHT
		3	Earth Ground	GRN
CN3	0.084 in 4-Pos Plug Plug: 045-5200-04 Pin: 055-5033-08	1	+48 VDC to CPU Node	GRY
		2	Door Interlock Switch Status	GRY RED
		3	Line Voltage Status	VIO
		4	Ground	BLK
CN4	0.084 in 6-Pos Plug Plug: 045-5200-06 Pin: 055-5033-08	1	Door Interlock Switch +48V	WHT GRY
		2	Door Interlock Switch +48V	-
		3	Switched 48V Out (to Node 1)	GRY YEL
		4	Door Interlock Return Ground	BLK WHT
		5	Smart LED Ground	BLK
		6	Ground (to Node 1)	BLK
CN5	0.084 in 12-Pos Plug Plug: 045-5200-12 Pin: 055-5033-08	1	Switched 48V Node Power	GRY
		2	Switched 48V Node Power	GRY
		3	Switched 48V Node Power	GRY
		4	Switched 48V Node Power	-
		5	Switched 48V Node Power	-
		6	Switched 48V Node Power	-
		7	Node Ground	-
		8	Node Ground	-
		9	Node Ground	-
		10	Node Ground	BLK
		11	Node Ground	BLK
		12	Node Ground	BLK
CN6	.156 in 3-Pos Plug: 045-5259-03 Pin: 055-5331-00 (18awg)	1	Ground	-
		2	Ground	-
		3	+12VDC	-
CN7	.084 2-Pos Plug: 045-5200-02 Pin: 055-5033-08	1	+48 VDC to Topper Node	-
		2	Ground	-
CN9	.100 in 4-Pos	1	Start	GRY
		2	Action	TAN-WHT
		3	Ground	BLK-BRN
		4	Ground	BLK-BRN



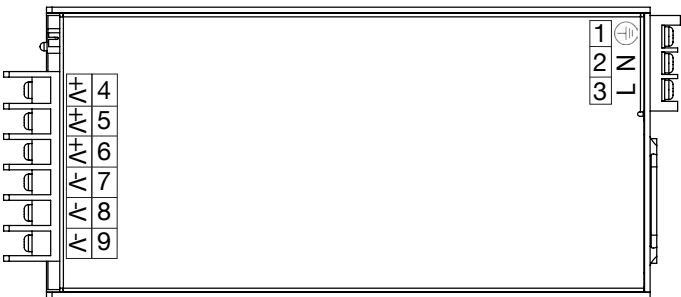
STATUS LEDS

LED ID	Name	Color	Description
D13	48V	Red	48V from the main power supply
D6	VS	Red	Power to the bulk caps, indicates if the caps are charged
D3	48V PF	Red	Power to playfield/cabinet node
D5	12V	Red	12V power supply (for topper), shuts off when DOOR is open
D7	3.3V	Red	3.3V logic supply
D10	DOOR	Red	Cabinet door switch is closed
D8	STRT	Red	Start switch is closed
D9	ACT	Red	Action switch is closed
D2	STATUS	Red	MCU status
			Boot Mode - fast blink (4Hz), 75% duty cycle
			Runtime Mode - slow blink (1Hz), 75% duty cycle
			Blink several times, long pause - error code(s)



4.20 POWER SUPPLY 48V/600W**011-5011-00 (DELTA)**

ID	Type	Pin	Description	Wire Color
CN1	Screw Terminal	+V	+48 V System Power	GRY
		-V	DC Ground	BLK
CN2	Potentiometer	+V ADJ	V Adjustment	N/A
CN3	Screw Terminal	N	AC Neutral In	WHT
		L	AC Line In	BLK
		⏏	Earth Ground In	GRN

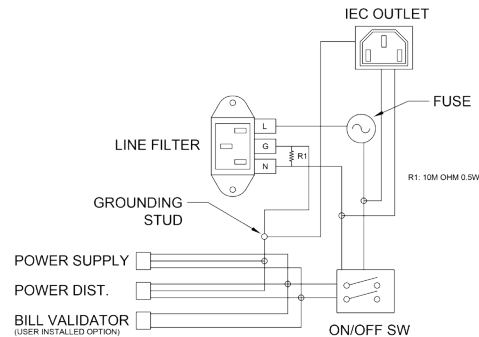
4.21 POWER SUPPLY 48V/600W**011-5004-00 (MEANWELL)**

ID	Type	Pin	Description	Wire Color
CN1	Screw Terminal	1	Earth Ground In	GRN
		2	AC Neutral In	WHT
		3	AC Line In	BLK
CN2	Screw Terminal	4	+48 V System Power	GRY
		5	+48 V System Power	GRY
		6	+48 V System Power	GRY
		7	DC Ground	BLK
		8	DC Ground	BLK
		9	DC Ground	BLK

4.22 POWER PLUG WIRING**CAUTION**

TO MAINTAIN SAFETY, GROUND WIRE FROM LINE FILTER IS TO BE MOUNTED FIRST ON GROUNDING STUD AND SECURED WITH NUT. ALL OTHER GROUNDS MAY THEN BE ATTACHED TO GROUNDING STUD.

REPLACE ALL FUSES WITH CORRECT CURRENT RATINGS!

NORTH AMERICA / INTERNATIONAL**LINE CORDS**

Part Number	Description
034-6012-00	Line Cord, 3m, 5-15P USA
034-6012-01	Line Cord, 3m, CEE77P EUROPE
034-6012-02	Line Cord, 3m, BS1363P United Kingdom
034-6012-03	Line Cord, 3m, AS-NZS4417P Australia
034-6012-04	Line Cord, 3m, CEI23-16P Italy
034-6012-05	Line Cord, 3m, SEV1011P Switzerland
034-6012-06	Line Cord, 3m, JIS8303P Japan
034-6012-07	Line Cord, 3m, SI32P Israel
034-6012-08	Line Cord, 3m, BS546P S Africa, India
034-6012-09	Line Cord, 3m, IS6538P S. India

LINE FUSES

Line Voltage (Region)	Fuse Current	Type	Part Number
120/250V (North America / International)	8 A	Slow Blow 5 x 20mm	200-5003-08

5. PARTS REFERENCE

5.1 PLAYFIELD RUBBER PARTS

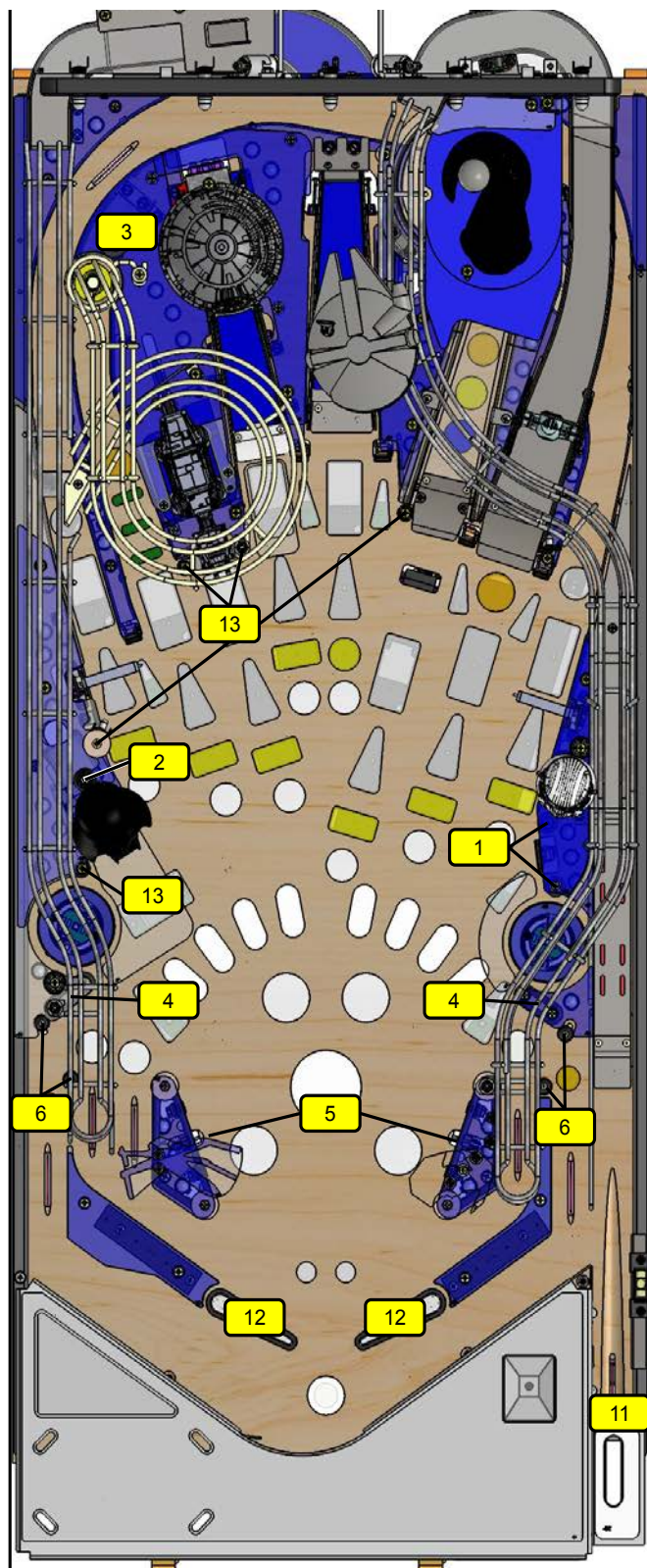


Figure 5.1.1. Rubber o-ring part locations

RUBBER O-RINGS

ID	Qty	Size (ID)	Size (OD)	Durometer	Color	Part Number
1	2	3/16"		50	Black	545-5348-01
2	1	5/16"		50	Black	545-5348-02
3	1	3/8"		50	Black	545-5348-03
4	2	3/4"		50	Black	545-5348-04
5	2	2"		50	Black	545-5348-08
6	4		7/16"	50	Black	545-5348-17

Figure 5.1.2. Rubber o-ring part numbers and usage. ID: Inner Diameter, OD: Outer Diameter, Durometer: Higher number is firmer, less bounce, and more durable.

ID	Qty	Description	Color	Part Number
11	1	Plunger Tip	Black	545-5276-00
12	2	Flipper Rubber	Black	545-5277-00
13	5	Post Sleeve	Black	545-5308-00
14	4	Bumper Pad (Sub assemblies)	Black	545-5105-00
15	3	Bumper Pad (Flippers)	Black	545-5428-00
16	2	Viton Rubber Rings (Sub Assemblies)	Black	545-9991-00

Figure 5.1.3. Other rubber part numbers and usage

5.2 RUBBER SIZE CHART

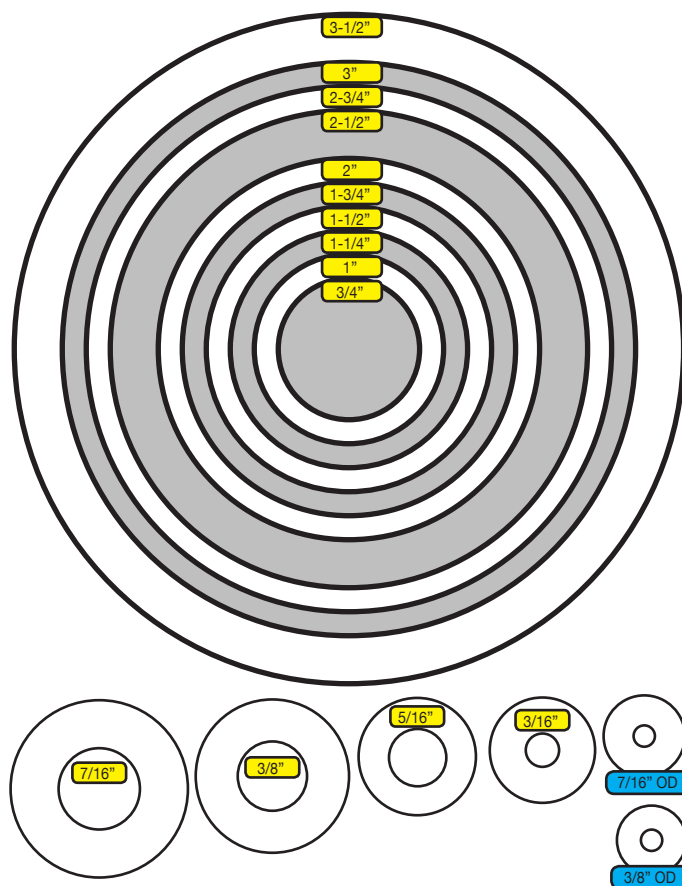
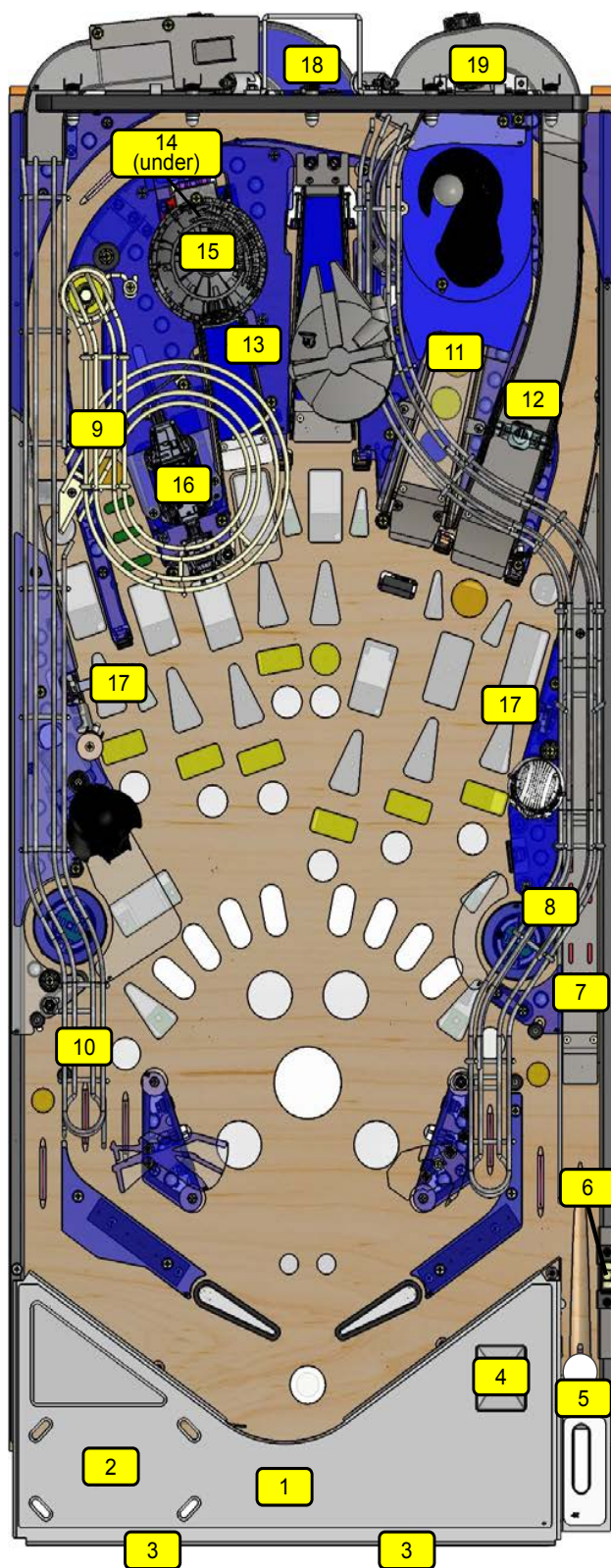


Figure 5.2.1. Rubber ring inner diameter sizing tool. Hold ring up to chart and read largest size on inside of ring. Dimensions are Inner Diameter (ID) unless otherwise noted as Outer Diameter (OD).

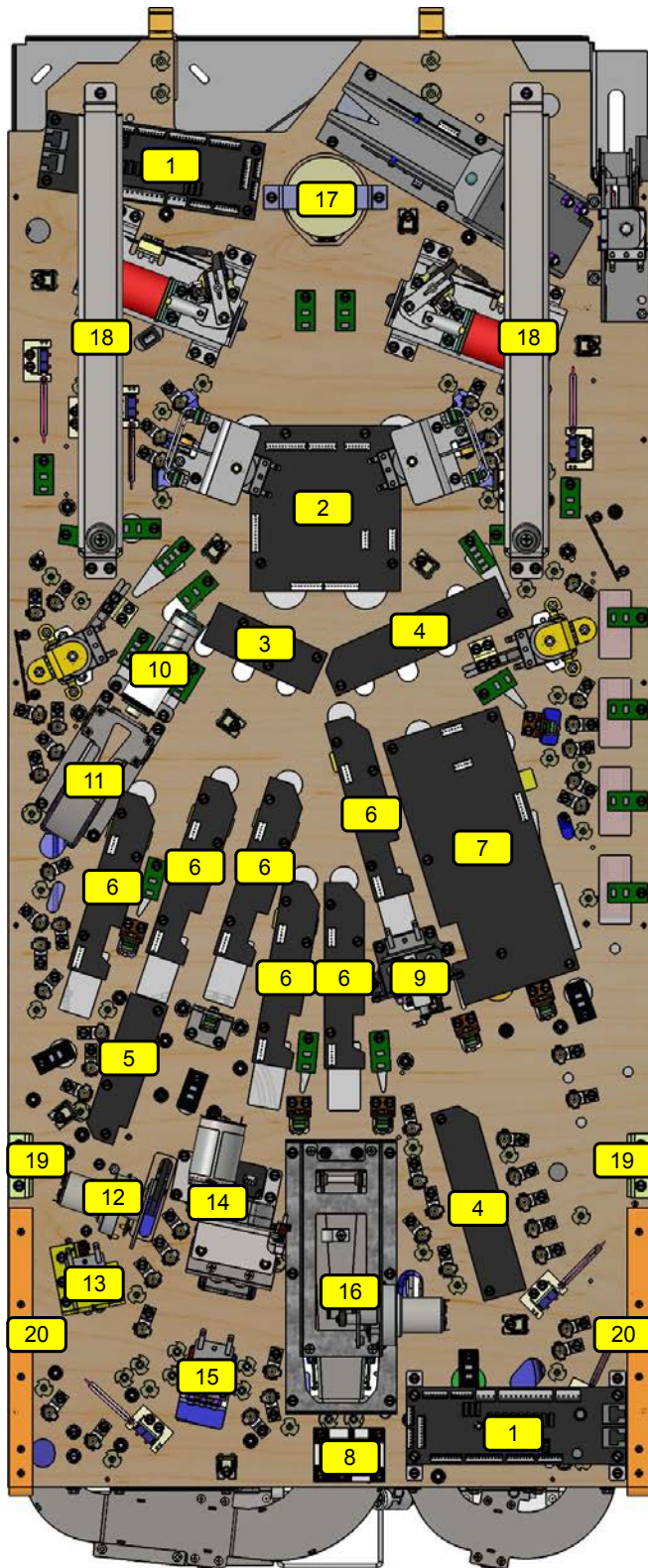
5.3 PLAYFIELD ASSEMBLIES, TOP



ID	Part Number	Description	Qty
1	510-7805-00	Bottom Arch Assembly	1
2	755-51Z2-XX	Instructions Card	1
3	535-8385-00	Welded Hanger Bracket	2
4	509-2020-00	QR Reader	1
5	260-5000-00	Pinballs	6
6	500-6815-00	Bubble Level Assembly	1
7	511-3285-00	Shooter Ramp Assembly	1
8	511-3266-00	Falcon Wire Ramp Assembly (Right Wire Ramp)	1
9	515-9946-00	AT-AT Wire Ramp	1
-	237-5871-01P	Screw, PFH, 6-32 X 1/4", Zinc, Patch (attaches wire ramps)	1
10	515-9942-00	Left Wire Ramp	1
11	500-1210-00	Funnel Ramp Assembly	1
12	500-1209-01	Right Metal Ramp Assembly	1
-	237-5976-03P	Screw, 6-32 x 1/2" HWH SWAGE, Patch (attaches to Backpanel)	2
13	500-1209-02	Death Star Ramp Assembly	1
14	500-1212-00	Offset VUK Assembly (Death Star VUK)	1
-	237-6378-00P	Screw, 6-32 X 3/8" PAN Phillips w/ Double Sems, Patch	1
15	511-3263-00	Death Star Assembly	1
-	232-5201-00P	Screw, 6-32 X 3/8" PPH MS SEMS, Patch (attaches to bracket)	2
-	535-0734-00	Death Star Guide Bracket (mounted to playfield)	1
16	500-2704-00	AT-AT Top Assembly	1
17	511-3044-00	Reflective Opto Spinner Assembly	2
18	500-2702-00	Backpanel Assembly	1
-	535-2288-00	Backpanel Handle	1
19	510-7589-27	Riveted Plastic Assembly #27 (Right Metal Ramp Cover)	1
-	234-5000-00	Screw, #6 X 3/8" HWH (attaches cover to backpanel)	2

Figure 5.3.1. Major playfield assemblies, Top locations.

5.4 PLAYFIELD ASSEMBLIES, BOTTOM



ID	Part Number	Description	Qty
1	520-1070-00 520-1057-00	Core Node Driver Board	2
2	520-8707-00	5F- 6S LED Board (8b)	1
3	520-9867-00	3W- LED Board (8b1)	1
4	520-8703-00	RAMP-R 4R- LED Board (8b2, 9a1)	2
5	520-8704-00	1R-4W-1S- LED Board (8b3)	1
6	520-8695-00	2RGB-2W- LED Board (8c, 8d, 8e, 9b, 9c, 9d)	6
7	520-8706-00	4R-7W- LED Board (9a)	1
8	520-6996-00	Serial Motor Control Driver (9e)	1
9	500-1083-01-Z2	Single Drop Target Assembly W/ Trip Coil (FOTE)	1
10	500-3640-00	Kicker Assembly (For Scoop)	1
11	511-3036-00	Opto Scoop Assembly	1
12	511-1190-00	AT-AT Drive Motor Assembly (Connects to AT-AT Top Asy)	1
-	242-5003-00	#10 Flat Washer (Attaches AT-AT Top Asy)	1
-	270-5001-00	Retaining E-Ring, 3/16" Shaft OD (Attaches AT-AT Top Asy)	1
13	500-7078-00	VUK Assembly (For AT-AT Wire Ramp)	1
14	500-3639-00	Moving Hatch Assembly	1
15	500-1212-00	Offset VUK Assembly (Mounted on top of playfield)	1
16	500-9405-00	Lift Ramp Assembly	1
17	500-7425-00	Magnet Assembly	1
18	511-7621-00	Support Rail Assembly	2
19	500-5329-03	Pivot Bracket Assembly	2
20	535-5988-01	Edge Slide Bracket	2

Figure 5.4.1. Major playfield assemblies, Bottom locations.

5.5 BACKBOX PARTS

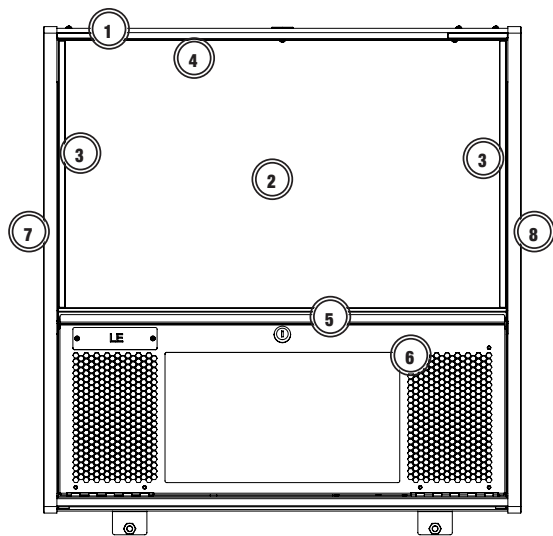


Figure 5.5.1. Backbox external assemblies and components

EXTERNAL

ID	Part Number	Description	Qty
1	545-9910-03	Backbox Bumper	2
2	830-8426-Z2	Mirror Backglass	1
3	545-5018-17	Plastic Extrusion 15-.450"	2
4	545-5018-15	Glass Channel 26"	1
5	545-6313-01	Glass Lift Channel 26"	1
6	500-9404-Z2	LCD Speaker Panel Assembly	1
7	820-76Z2-01	Left Backbox Decal	1
8	820-76Z2-02	Right Backbox Decal	1
9	515-8868-00	Backbox Bottom Bracket [Not Labeled]	1

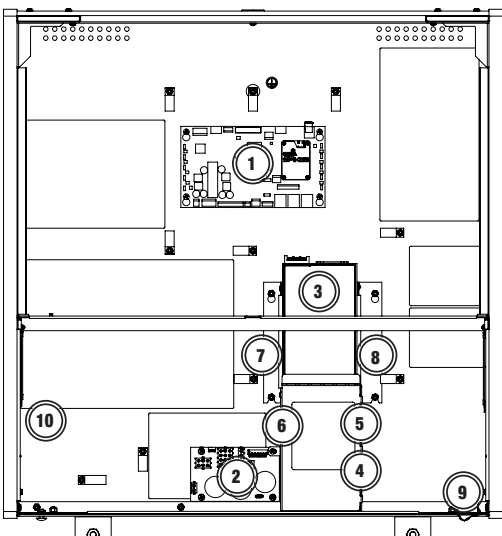


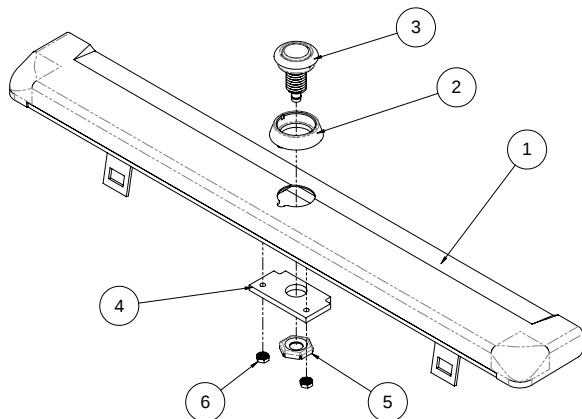
Figure 5.5.2. Backbox internal assemblies and components

INTERNAL

ID	Part Number	Description	Qty
1	509-1007-42	CPU Node Board	1
2	520-1092-00	Power Distribution Board	1
3	011-5004-00	Power Supply 48V/600W (Meanwell)	1
	011-5011-00	Power Supply 48V/600W (Delta)	1
4	205-5004-00	Fuse Holder - Screw In	1
	200-5003-08	8A SB Fuse	1
5	515-9769-00	Utility Outlet (USA)	1
6	535-1130-00	Cover AC, 600W (Meanwell)	1
	535-3050-00	Cover AC, 600W (Delta)	1
7	535-0879-00	P. S. Bracket, 600W Left (Meanwell)	1
*	535-0094-00	P. S. Bracket, 600W (Delta only uses 1)	1
8	535-1161-00	P. S. Bracket, 600W Right (Meanwell)	1
9	180-5001-03	Power Switch	1
10	520-9865-00	Speaker Lights Board	1

5.6 LOCKDOWN BAR ASSEMBLY W/ CENTER BUTTON

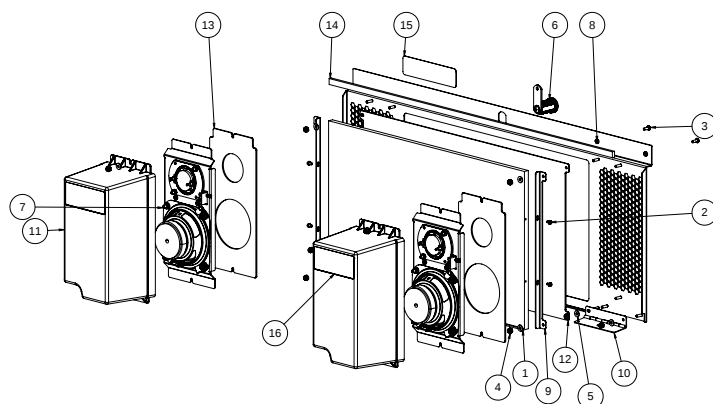
500-2440-67



ID	Part Number	Description	Qty
1	500-2441-67	FRONT MOLD ASSEMBLY - CENTER BUTTON - ROYAL BLUE	1
2	545-7292-10	SPACER, CENTER BUTTON	1
3	515-7791-00	CLEAR CENTER BUTTON ASSEMBLY	1
4	545-7291-00	TOP BUTTON BAR	1
5	240-5003-01	PAL NUT	1
6	240-5104-00	8-32 KEPS NUT	2

5.7 SPEAKER PANEL ASSEMBLY

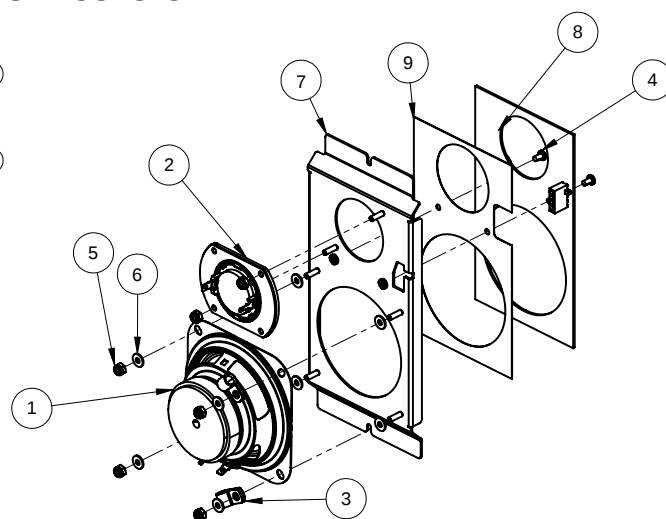
500-9404-Z2



ID	Part Number	Description	Qty
1	116-0036-40	LITEMAX 18.5IN LCD	1
-	037-6034-10	LITEMAX LCD BACK LIGHT CABLE	1
-	037-8062-30	LVDS CABLE 18.5 FHD	1
2	237-6188-01P	SCREW, M3x0.5 X 6MM PPH SEMS ZINC, PATCH	4
3	237-6307-06	SCREW, 6-32 X 3/8" PAN TORX SS	2
4	240-5005-00	6-32 NYLON STOP NUT	12
5	242-5001-00	#6 WASHER	12
6	355-5175-00	CAM LOCK 1-3/16" BODY	1
7	511-3645-02	ASM SPEAKER BRKT MOUNT, LE SPIKE 3	2
-	036-5600-46	SPEAKER PANEL CABLE W/ CONNECTORS	1
-	036-5600-82	RGB SPEAKER CABLE	1
8	515-8870-99	SPEAKER PANEL 18.5IN LCD	1
9	515-8871-00	MOUNTING BRACKET 18.5IN LCD	2
10	515-8872-00	HINGE SPEAKER PANEL 18.5IN LCD	2
11	544-1333-00	SPEAKER ENCLOSURE	2
12	545-9995-00	LCD LENSE, 18.5IN SCREEN	1
13	546-7975-Z2	LIT SPEAKER LENS FOTE LE	2
14	626-5001-00	FOAM TAPE - 3/8 X 3/16 THK (BLACK)	1
15	820-6961-01	DECAL SPEAKER PANEL CONNECTED - SPIKE 3	1
16	820-7983-00	DECAL SPEAKER PANEL	2

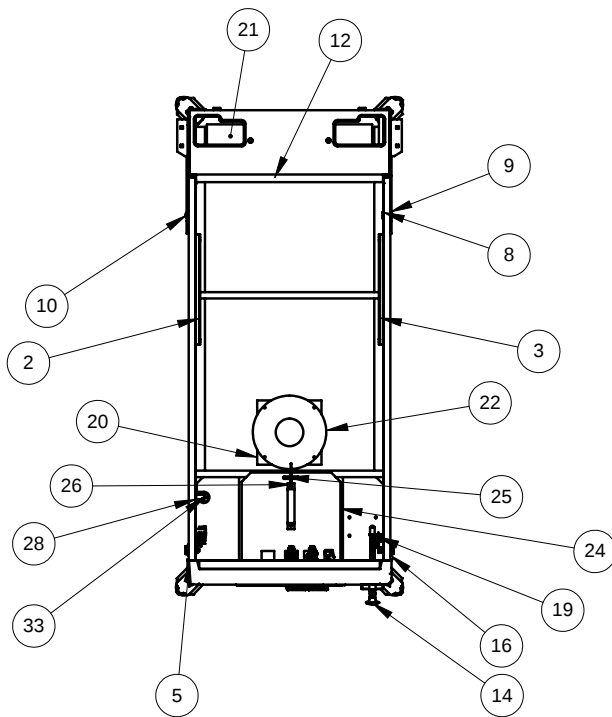
5.8 SPEAKER BRACKET MOUNT ASSEMBLY

511-3645-02

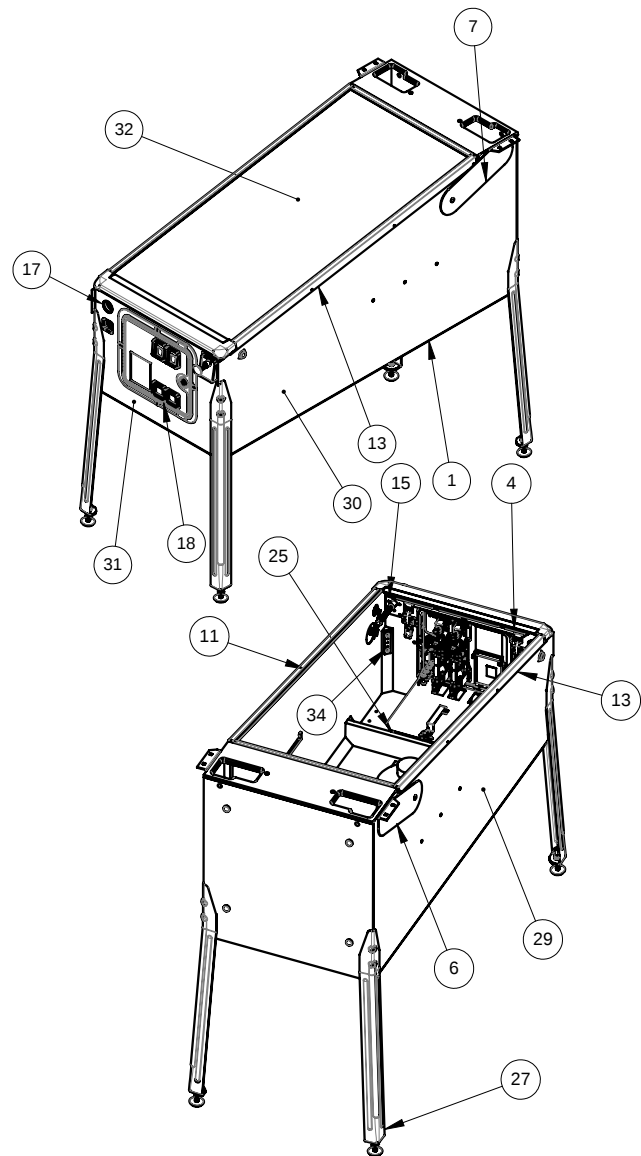


ID	Part Number	Description	Qty
1	031-5026-00	SPK 4" MID RANGE 8 OHM GEN 3 CAB	1
2	031-5028-00	SPK TWEETER 8 OHM GEN 3 CAB	1
3	040-5000-23	WIRE CLAMP, 1/4" CLOSED TAB	2
4	237-5500-01P	SCREW, 6-32 X 1/4" PPH MS BLACK, PATCH	2
5	240-5005-00	6-32 NYLON STOP NUT	6
6	242-5001-00	#6 WASHER	8
7	515-8873-00	BRKT SPEAKER MOUNT SPIKE 3	1
8	520-9865-00	PCA SPKR LIGHTING SPIKE 3	1
9	523-0051-00	FISH PAPER SPIKE 3 EXPRESSION LIGHTS	1

5.9 CABINET PARTS



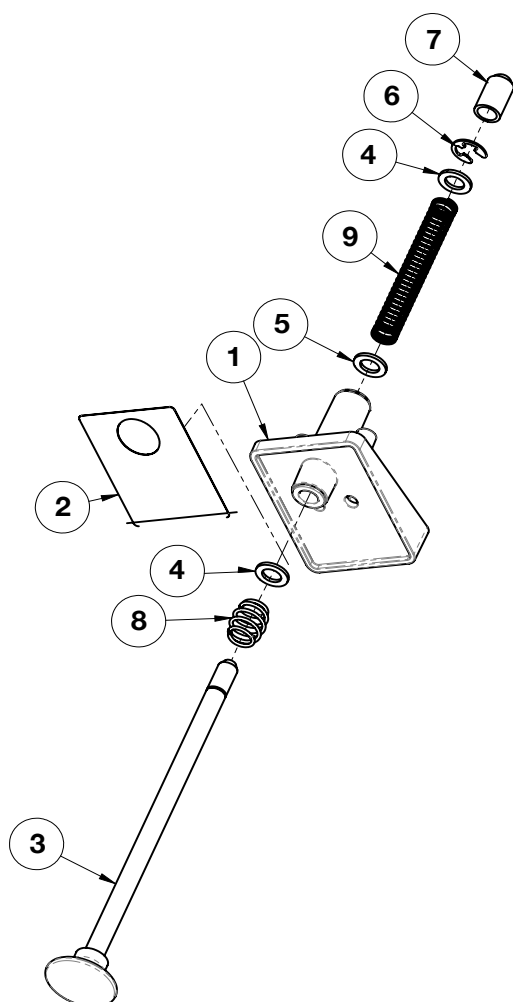
ID	Part Number	Description	Qty
1	525-9750-01	Cabinet Assembly, Single Button, Interior Lighting	1
2	535-5989-00	Slide & Pivot Bracket - Left Side	1
3	535-5990-00	Slide & Pivot Bracket - Right Side	1
4	535-2051-00	Cabinet Playfield Support Bracket	1
5	500-2440-67	Front Molding Assembly - Royal Blue	1
6	535-7999-67L	Pivot Hinge, Left - Royal Blue	1
7	535-7999-67R	Pivot Hinge, Right - Royal Blue	1
8	254-5042-00	Spacer Nut, Hex, 1/2"OD, 1/4-20	2
9	242-5084-00	Washer, 1/2" I.D., 3/16" THK	2
10	231-5072-00	1/4-20 X 1/2" Carriage Bolt	2
11	545-5017-00	Plastic Channel	2
12	545-5038-00	Glass Rear Extrusion	1
13	535-4193-01-67	Side Armor Assembly Left - Fall Of The Empire LE	1
	535-4193-02-67	Side Armor Assembly Right - Fall Of The Empire LE	1
14	500-2604-07	Ball Shooter Assembly - Orange Spring	1
15	535-5027-01	Plunger Support Plate, Notched	1
16	500-1169-38	Flipper Button Assy - White	2
17	500-1060-44-LED	Start Button	1
18	501-5018-173	Coin Door 2-Chute No Emboss	1
19	180-5160-01	Flipper Switch, Single	2
20	545-9544-01	Grill - Speaker / Vent	1
21	545-9544-02	Grill - Speaker / Vent	1
22	031-5016-00	Woofer, 8" Round, 4Ω	1
23	545-5090-00	Cash Box - Plastic	1
24	535-5013-03	Cash Box Cover	1
25	535-7562-00	Cash Box Lock Bracket Wire	1
26	535-7772-00	Hair Pin Clip	1
27	500-5921-67	Leg Assembly - Royal Blue	4
28	516-0007-00	Tilt Assembly	1
	535-5029-00	Tilt Plumb Bob	1
29	820-7622-03	Decal, Cabinet Left, Fall Of The Empire LE	1
30	820-7622-04	Decal, Cabinet Right, Fall Of The Empire LE	1



ID	Part Number	Description	Qty
31	820-7622-05	Decal, Cabinet Front, Fall Of The Empire LE	1
32	660-5053-00	High Resolution Glass	1
33	520-6967-72	Cabinet Node Board	1
	520-8656-01	Isolated Smart LED PSU	1
34	535-2049-00	Corner Brackets For Cabinet Legs	4
	234-5102-00	Screw, 8 X 5/8" SLT HWH AB Zinc	24
35	820-5475-01-Z2	Interior Cabinet Decal, Right, Fall Of The Empire LE	1
	820-5475-00-Z2	Interior Cabinet Decal, Left, Fall Of The Empire LE	1
	820-7622-XX	Cabinet Decal Replacement Set, Speaker Panel Decal Not Included	

5.10 BALL SHOOTER ASSEMBLY

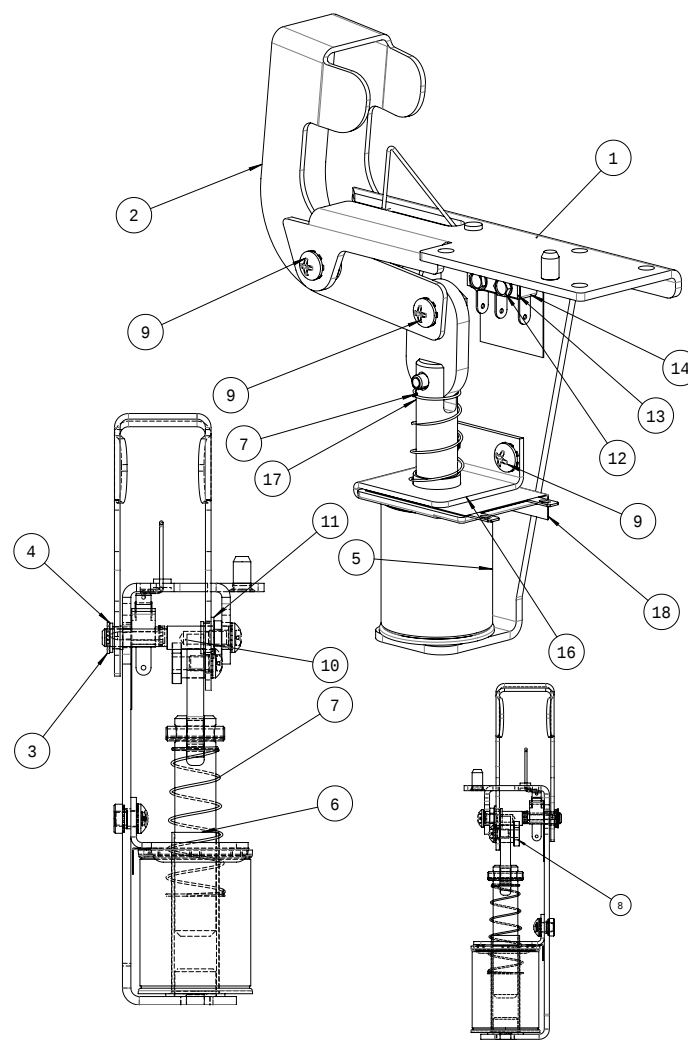
500-2604-07



ID	Part Number	Description	Qty
1	515-2436-01	HOUSING ASSEMBLY	1
2	820-1408-00	DECAL - SHOOTER HOUSING SPI	1
3	515-6557-00	ROD ASSEMBLY	1
4	242-5014-00	WASHER 3/8 ID X 5/8 OD X 1/16"	2
5	242-5637-00	NYLON WASHER 3/8 ID X 5/8 OD X 1/16"	1
6	270-5012-00	RETAINING RING, 3/8"	1
7	545-5276-00	RUBBER TIP	1
8	266-5010-00	COMPRESSED SPRING (SHORT)	1
9	266-5001-07	COMPRESSED SPRING (LONG) - ORANGE	1

5.11 AUTO LAUNCH ASSEMBLY

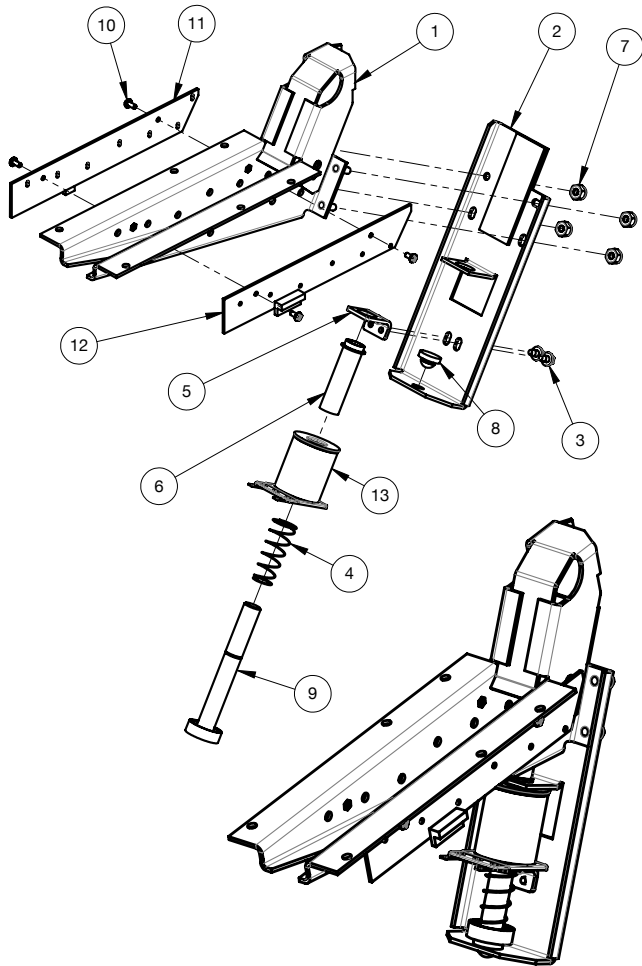
500-9818-02



ID	Part Number	Description	Qty
1	515-9689-01	MAIN BRKT: AUTO-PLUNGER	1
2	535-0728-00	KICKER ARM, AUTO-PLUNGER	1
3	270-5001-00	RETAINING E-RING, 3/16" SHAFT OD	1
4	545-5352-00	NYLINER, 3/16" SHAFT	1
5	090-5001-ND	COIL - 23-800, NO DIODE	1
6	545-5411-00	COIL SLEEVE	1
7	266-5020-00	COMPRESSION SPRING-CONICAL	1
8	530-7834-00	PIN: KICKER ARM, AUTO-PLUNGER	1
9	232-5300-00	SCREW, 8-32 X 1/4" PPH SEMS	4
10	530-7835-00	PIVOT, AUTO-PLUNGER	1
11	545-5423-00	NYLINER, 1/4" SHAFT, 4L1-FF	1
12	237-5937-02	SCREW, 2-56 X 1/2" HWH MS	2
13	535-6539-00	SWITCH BODY PROTECT PLATE	1
14	180-5157-01	SHOOTER SWITCH - SHORT ARM	1
15	545-6268-00	FISCHE PAPER	1
16	535-0762-00	COIL BRACKET-AUTO PLUNGER	1
17	515-6304-03	PLUNGER / LINK ASSEMBLY	1
18	545-0762-00	FISCHE PAPER: AUTO-LAUNCHER	1

5.12 BALL TROUGH ASSEMBLY

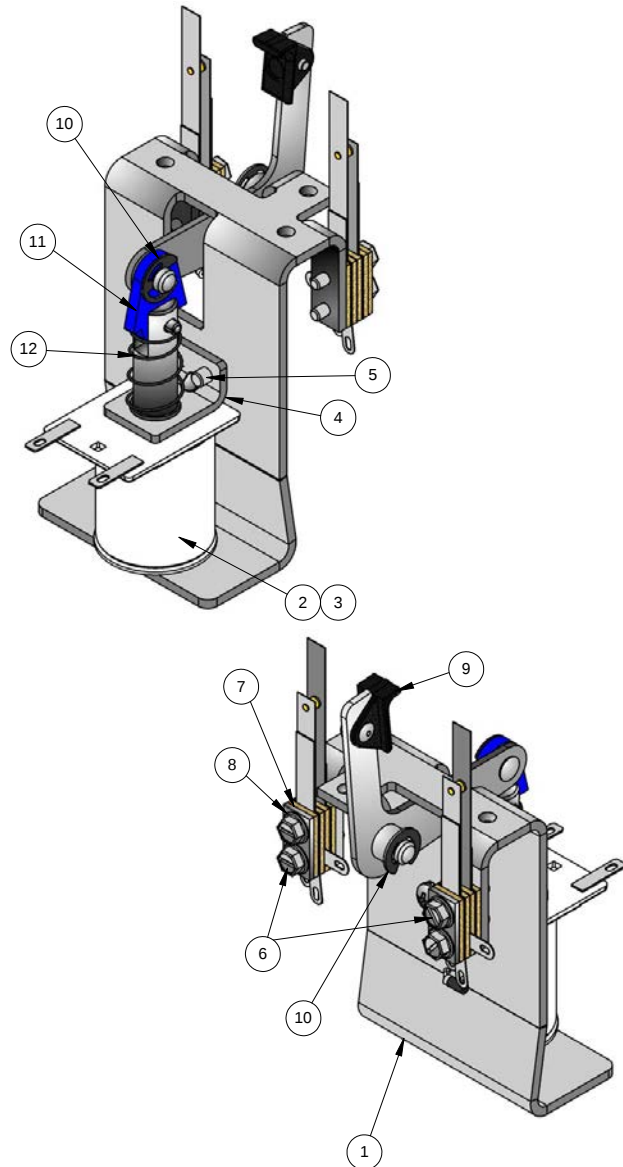
500-9820-01



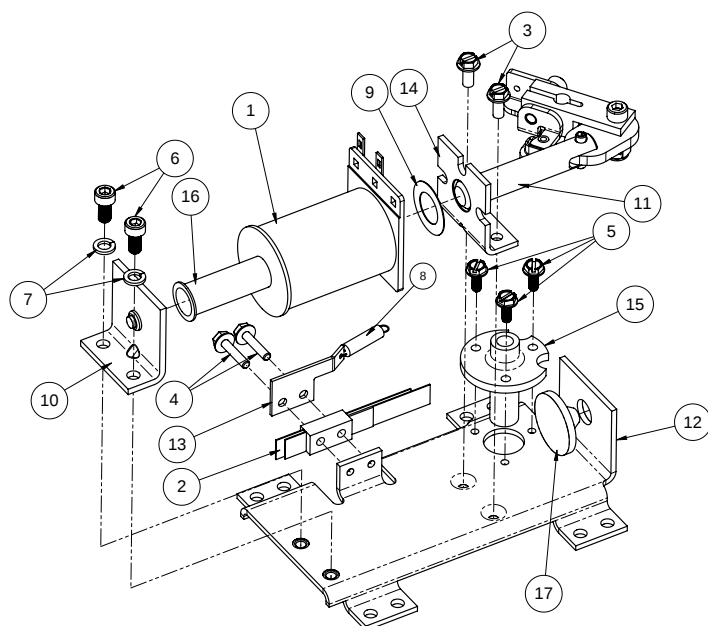
ID	Part Number	Description	Qty
1	515-7811-00	MAIN BRKT. BALL TROUGH	1
2	515-7812-00	COIL BRACKET, BALL TROUGH	1
3	237-5975-04	SCREW, 8-32 X 1/4" HWH SWAGE SERR	2
4	266-5020-00	COMPRESSION SPRING-CONICAL	1
5	535-5203-03	COIL RETAINING BRACKET	1
6	545-5076-01	COIL SLEEVE	1
7	240-5102-00	8-32 NYLON LOCK NUT	4
8	545-5105-00	RUBBER BUMPER	1
9	515-7309-01	PLUNGER ASSEMBLY	1
10	237-5909-00	SCREW, 4-40 X 1/4" PPH SEMS	4
11	520-5344-00	TROUGH BOARD #1 - ILED TRANSMITTER	1
12	520-8516-00	TROUGH BOARD #2 - RECEIVER	1
13	090-5004-ND	COIL 27-1500 - NO DIODE	1
98*	605-5006-00	SHRINK TUBING 1/8"	.42 FT.
99*	036-5611-11-F5	CABLE TROUGH OPTOS	1

5.13 SLINGSHOT ASSEMBLY

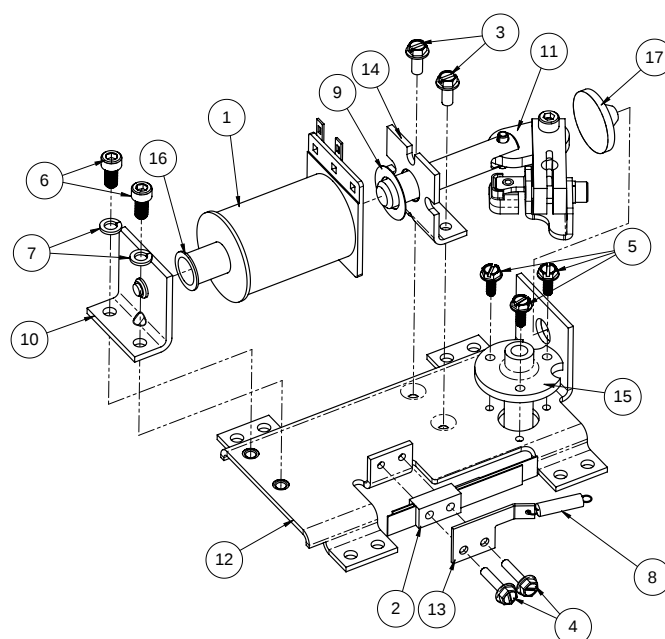
500-9920-01



ID	Part Number	Description	Qty
1	515-5339-01	SLINGSHOT BRACKET ASSEMBLY	1
2	090-5044-ND	COIL 26-1200 - NO DIODE	1
3	545-5031-00	COIL SLEEVE	1
4	535-5203-03	COIL RETAINER BRACKET	1
5	232-5301-00	8-32 X 3/8 PPH MS EXT SEMS ZC	2
6	180-5231-00	SWITCH SLING SHOT 2 LUG CENTER	2
7	535-5045-00	SWITCH PLATE	2
8	237-5976-04	6-32 X 5/8 SLOT SER HWH SW	4
9	515-5340-01	ARM & TIP ASSEMBLY	1
10	270-5002-00	RETAINING RING - 1/4 DIA	2
11	515-5338-00	PLUNGER & LINK ASSEMBLY	1
12	266-5020-00	COMP SPRING CONICAL	1
13	036-5604-00	4" GENERIC JUMPER	2

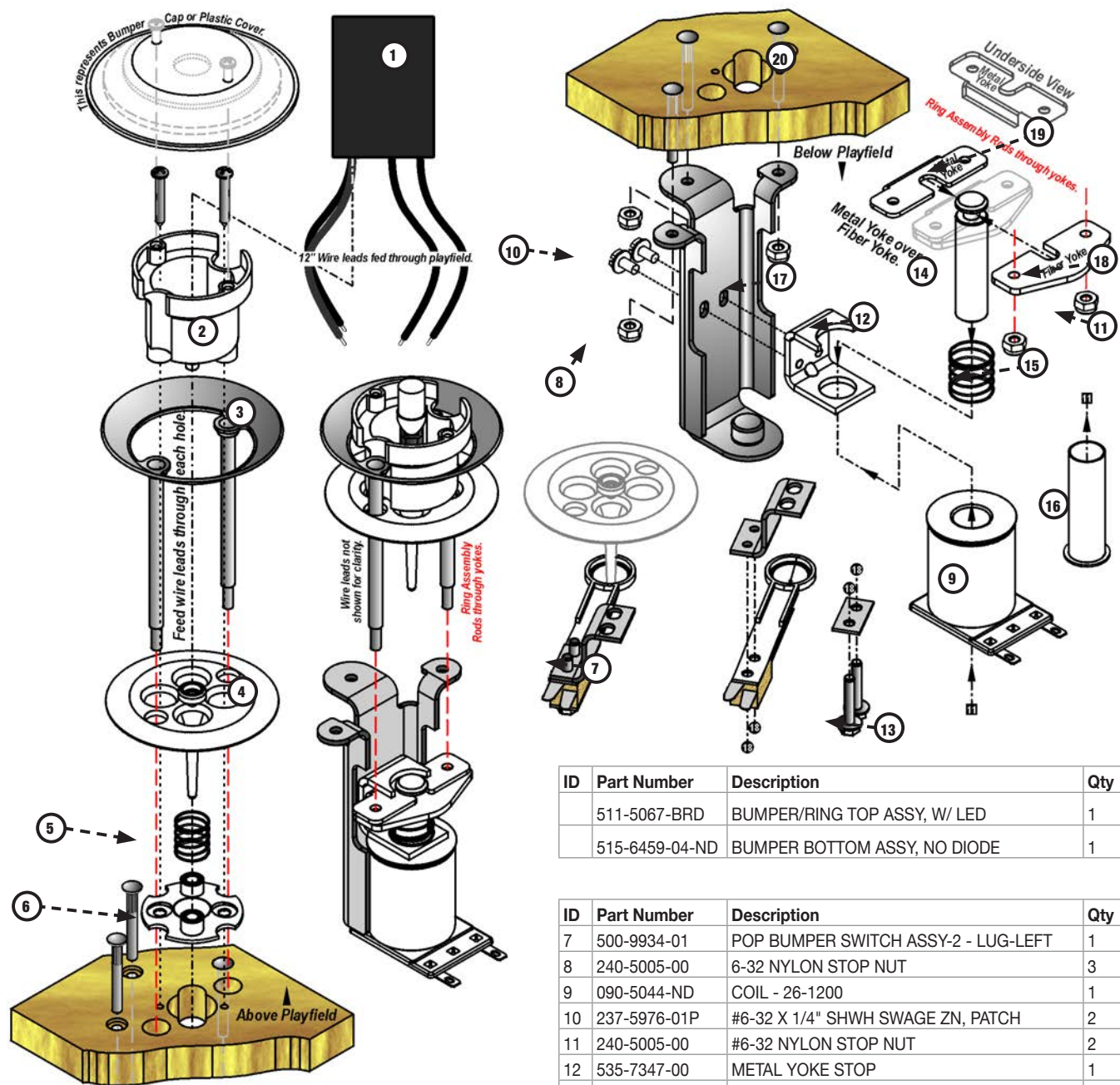
5.14 FLIPPER ASSEMBLY, LEFT**500-6543-12-ND**

ID	Part Number	Description	Qty
1	090-5032-ND	FLIPPER COIL	1
2	180-5149-00	SWITCH, END-OF-STROKE	1
3	237-5975-00	SCREW, 8-32 X 3/8" HWH SWAGE ZN	2
4	237-5976-04	SCREW, 6-32 X 5/8" HWH SWAGE	2
5	237-6388-00	SCREW, 6-32 X 3/8", SLOTTED HWH, TYPE F	3
6	237-6389-00	SCREW, 10-32 X 3/8", SHC	2
7	244-5003-00	#10 LOCK WASHER, SPLIT	2
8	265-5035-00	EXTENSION SPRING	1
9	269-5002-00	SPRING WASHER	1
10	515-6308-01	COIL STOP ASSEMBLY	1
11	515-7203-01	PLUNGER / CRANK ASSEMBLY	1
12	535-7275-01	FLIPPER BASE PLATE, LEFT	1
13	535-7354-01	SWITCH PLATE / SPRING RTN BRKT	1
14	535-7356-00	COIL BRACKET	1
15	545-5070-00	FLIPPER BUSHING	1
16	545-5388-00	COIL SLEEVE	1
17	545-5428-00	RUBBER BUMPER	1
18	515-5133-08-06	FLIPPER BAT (WHITE) AND SHAFT	1
19	545-5277-00	FLIPPER RUBBER	1

5.15 FLIPPER ASSEMBLY, RIGHT**500-6543-02-ND**

ID	Part Number	Description	Qty
1	090-5032-ND	FLIPPER COIL	1
2	180-5149-00	SWITCH, END-OF-STROKE	1
3	237-5975-00	SCREW, 8-32 X 3/8" HWH SWAGE ZN	2
4	237-5976-04	SCREW, 6-32 X 5/8" HWH SWAGE	2
5	237-6388-00	SCREW, 6-32 X 3/8", SLOTTED HWH, TYPE F	3
6	237-6389-00	SCREW, 10-32 X 3/8", SHC	2
7	244-5003-00	#10 LOCK WASHER, SPLIT	2
8	265-5035-00	EXTENSION SPRING	1
9	269-5002-00	SPRING WASHER	1
10	515-6308-01	COIL STOP ASSEMBLY	1
11	515-7203-00	PLUNGER / CRANK ASSEMBLY	1
12	535-7275-00	FLIPPER BASE PLATE, RIGHT	1
13	535-7354-00	SWITCH PLATE / SPRING RTN BRKT	1
14	535-7356-00	COIL BRACKET	1
15	545-5070-00	FLIPPER BUSHING	1
16	545-5388-00	COIL SLEEVE	1
17	545-5428-00	RUBBER BUMPER	1
18	515-5133-08-06	FLIPPER BAT (WHITE) AND SHAFT	2
19	545-5277-00	FLIPPER RUBBER	1

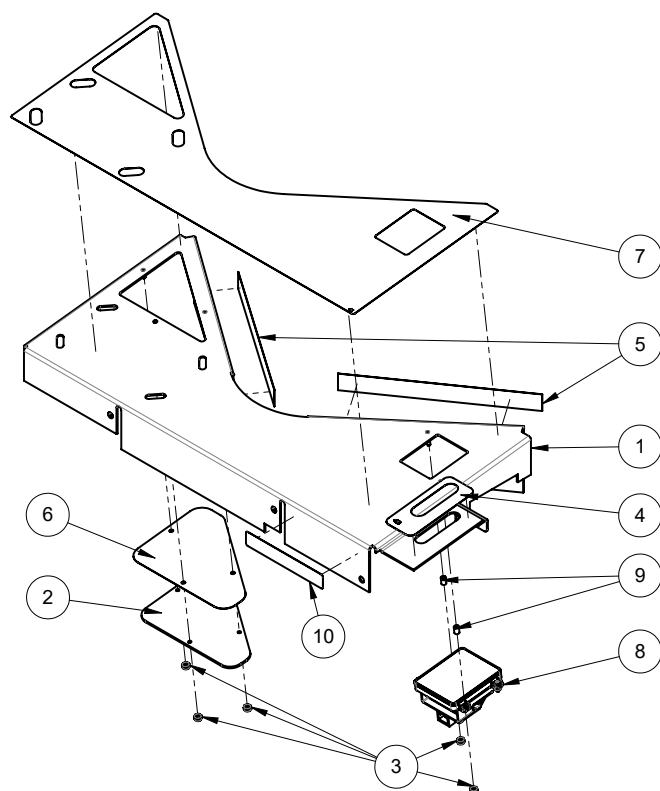
5.16 POP BUMPER ASSEMBLY



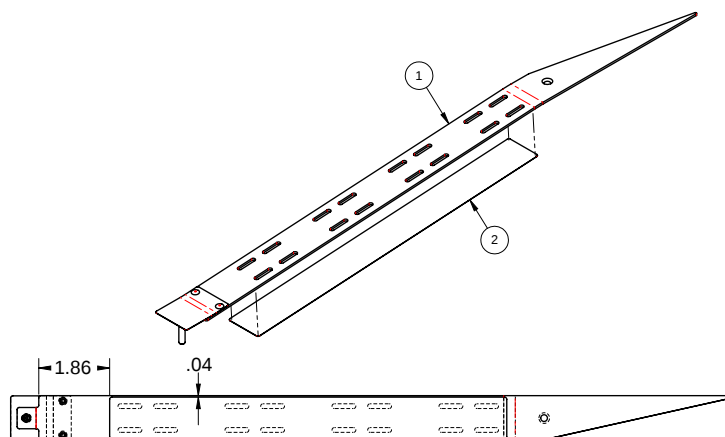
ID	Part Number	Description	Qty
1	511-7670-00	POP BUMPER LED ASSEMBLY	1
2	545-5197-00	BUMPER BODY	1
3	515-5085-00	RING AND ROD ASSY	1
4	545-5607-00	BUMPER SKIRT	1
5	266-5048-00	BUMPER SKIRT COMP SPRING	1
6	545-5195-00	BUMPER BASE	1

ID	Part Number	Description	Qty
	511-5067-BRD	BUMPER/RING TOP ASSY, W/ LED	1
	515-6459-04-ND	BUMPER BOTTOM ASSY, NO DIODE	1

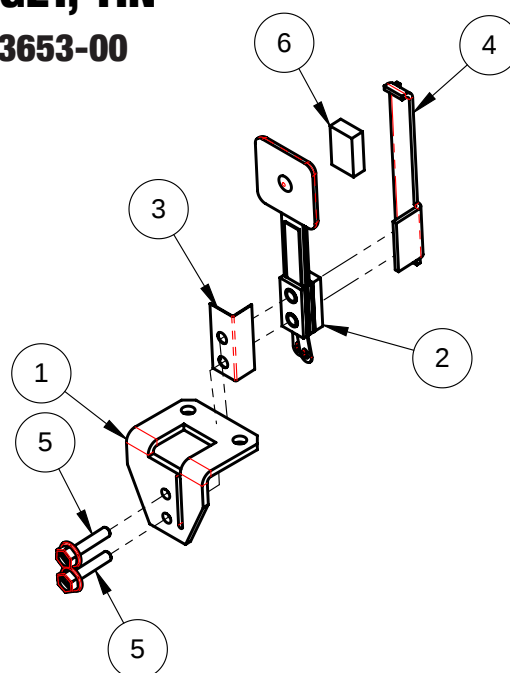
ID	Part Number	Description	Qty
7	500-9934-01	POP BUMPER SWITCH ASSY-2 - LUG-LEFT	1
8	240-5005-00	6-32 NYLON STOP NUT	3
9	090-5044-ND	COIL - 26-1200	1
10	237-5976-01P	#6-32 X 1/4" SHWH SWAGE ZN, PATCH	2
11	240-5005-00	#6-32 NYLON STOP NUT	2
12	535-7347-00	METAL YOKE STOP	1
13	234-5101-00	* 8 X 1/2 SLT	6
14	530-5348-00	PLUNGER, POP BUMPER	1
15	266-5047-00	COMPRESSION SPRING, POP BUMPER	1
16	545-5031-00	COIL SLEEVE	1
17	515-5939-00	COIL BRACKET POP BUMPER ASSY	1
18	545-5609-00	FIBER YOKE	1
19	535-7346-00	METAL YOKE	1
20	237-5957-00	#6-32 x 1-3/16" SPIRAL FIN SHANK SCREW	3

5.17 BOTTOM ARCH ASSEMBLY**500-2505-Z2**

ID	Part Number	Description	Qty
1	510-7805-00	BOTTOM ARCH, STEEL W/ SPADE BOLT, QR READY	1
2	830-8502-Z2	LEFT SIDE ARCH PLASTIC	1
3	240-5303-00	4-40 NYLON LOCK NUT	5
4	820-97Z2-02	METAL ARCH DECAL SET -02	1
5	545-5212-04	MYLAR PROTECT STRIP 7-5/8"	2
6	545-9923-00	COVER, SIGNATURE PROTECTOR	1
7	820-97Z2-01	METAL ARCH DECAL SET -01	1
8	509-2020-00	QR SCANNER M306 ASSEMBLY	1
9	254-5090-04	PLASTIC SPACER #4 SCREW, 3/16" OD - 9/32" LENGTH	2
10	820-5422-00	WARNING DECAL, BOTTOM ARCH, QR READER	1

5.18 SHOOTER RAMP ASSEMBLY**511-3285-00**

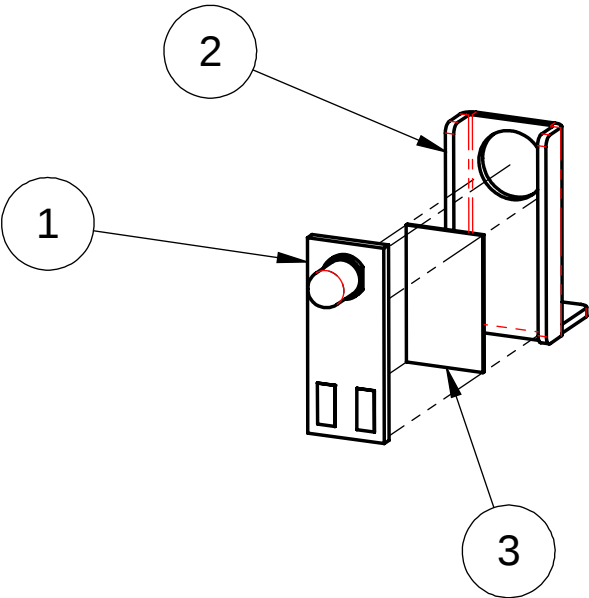
ID	Part Number	Description	Qty
1	510-7981-00	RIVETED ASSY, SHOOTER LANE, FOTE	1
2	830-8594-00	RUBY RED ADHESIVE FILM, SHOOTER RAMP, FOTE	1

5.19 REVERSE MOUNT STAND UP TARGET, 1IN**500-3653-00**

ID	Part Number	Description	Qty
1	535-2912-00	BRACKET, REVERSE MOUNT TARGET	1
2	515-9783-00-00	1" SQ. TARGET SWITCH - ANTILOFT- 2 LUG - BLACK	1
3	545-7874-00	FISCHE PAPER - S/U TARGET	1
4	535-9823-02	SWITCH BACK PLATE - LOCKING	1
5	237-5976-04	SCREW, 6-32 X 5/8" HWH SWAGE, SERRATED	1
6	626-5078-00	3/16" FOAM PAD	1

5.20 SPOTLIGHT ASSEMBLY

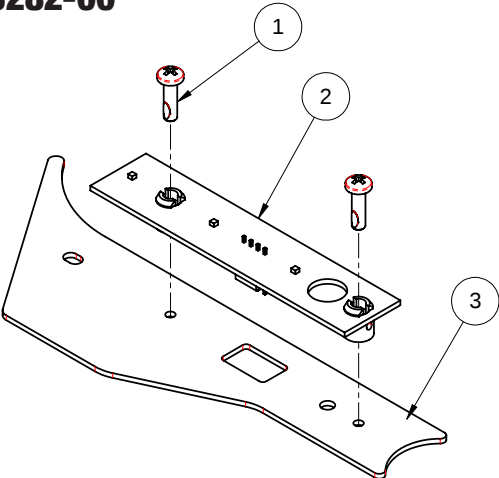
511-3271-00



ID	Part Number	Description	Qty
1	520-8625-00	PCA, SPOTLIGHT 1W HIGH INTENSITY	1
2	535-4172-00	BRACKET, SPOTLIGHT	1
3	626-5136-00	ADHESIVE, SPOTLIGHT BOARD	1

5.21 LEFT INLANE BALL GUIDE ASY

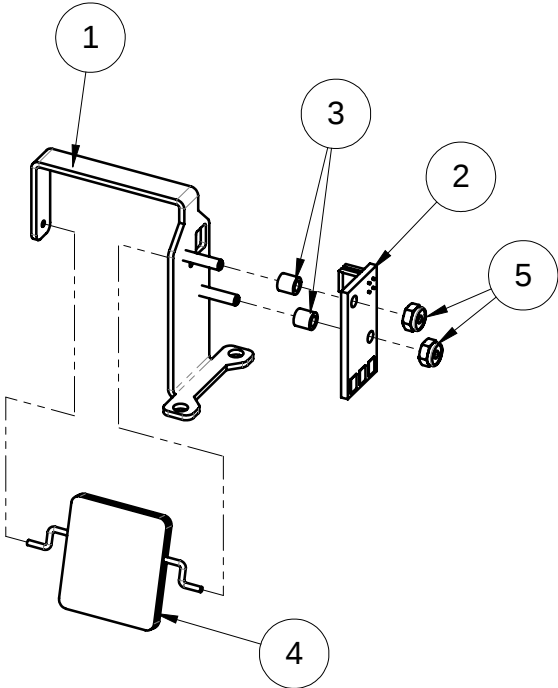
511-3282-00



ID	Part Number	Description	Qty
1	237-5502-00P	SCREW, 6-32 X 1/2" PPH MS ZINC, PATCH	2
2	520-8609-00	PCA INLANE 3 RGB LED BOARD	1
3	535-4188-00	BALL GUIDE, INLANE, LIGHTED	1

5.22 REFLECTIVE OPTO SPINNER ASSEMBLY

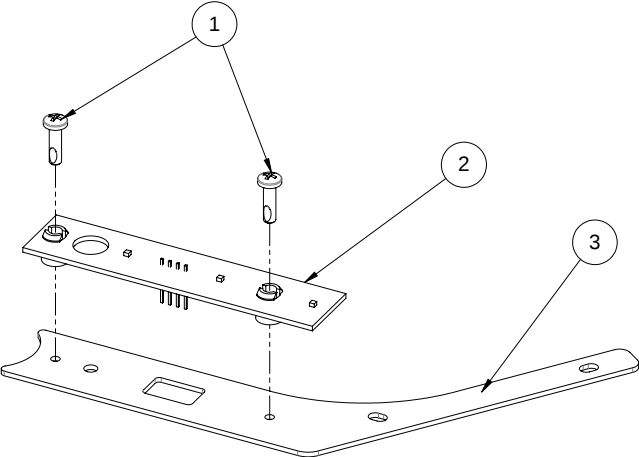
511-3044-00



ID	Part Number	Description	Qty
1	240-5303-00	4-40 NYLON LOCK NUT	2
2	254-5090-01	PLASTIC SPACER #4 SCREW, 3/16" OD - 3/16" LENGTH	2
3	515-2326-00	SPINNER TARGET, REFLECTIVE OPTO	1
4	515-2456-00	BRACKET, SPINNER, REFLECTIVE OPTO	1
5	520-8541-00	PCA SPINNER REFLECTIVE OPTIC	1

5.23 RIGHT INLANE BALL GUIDE ASY

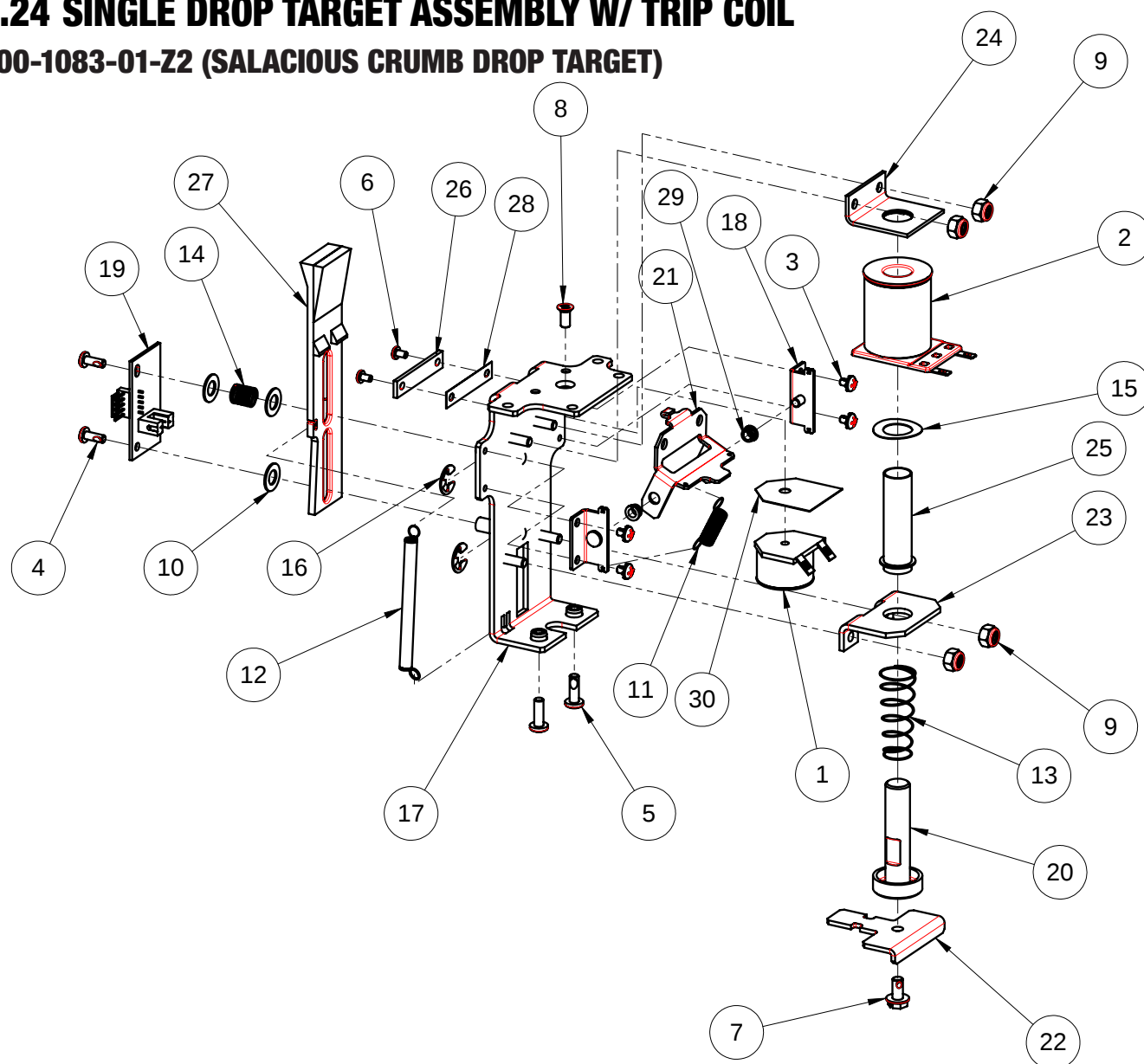
511-4901-00



ID	Part Number	Description	Qty
1	237-5502-00P	SCREW, 6-32 X 1/2" PPH MS ZINC, PATCH	2
2	520-8609-00	PCA INLANE 3 RGB LED BOARD	1
3	535-4017-00	BALL GUIDE, INLANE, LIGHTED	1

5.24 SINGLE DROP TARGET ASSEMBLY W/ TRIP COIL

500-1083-01-Z2 (SALACIOUS CRUMB DROP TARGET)

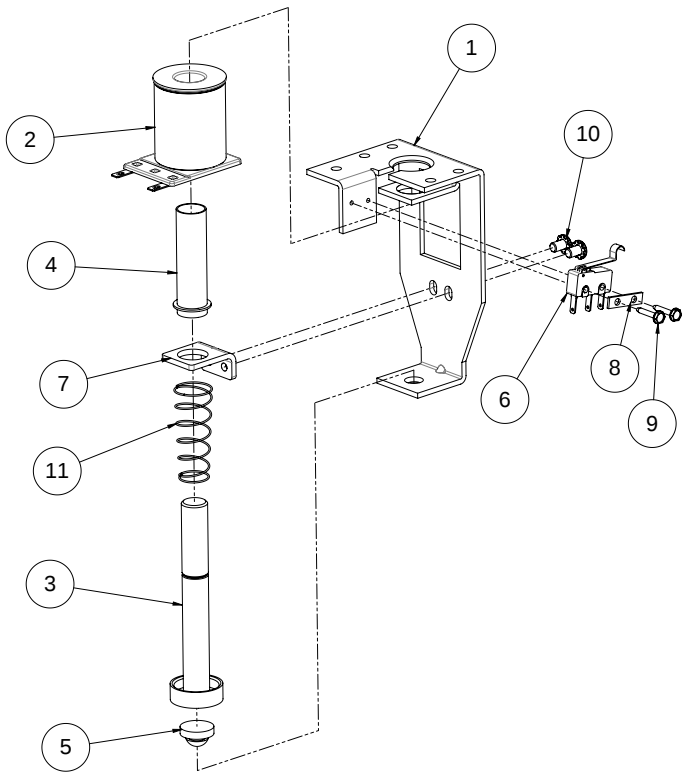


ID	Part Number	Description	Qty
1	090-5031-00-ND	COIL, 32-1800, NO DIODE	1
2	090-5034-ND	COIL 25-1240 - NO DIODE	1
3	232-5209-00P	SCREW, 6-32 X 3/16" PPH SEMS, PATCH	4
4	237-5501-00P	SCREW, 6-32 X 3/8" PPH MS ZINC, PATCH	2
5	237-5602-00P	SCREW, 8-32 X 1/2" PPH MS ZINC, PATCH	2
6	237-5912-00P	SCREW, 4-40 X 3/16" PPH MS, PATCH	2
7	237-5961-00P	SCREW, 10-32 X 3/8" HWH, PATCH	1
8	237-6030-00	SCREW, 8-32 X 3/8" PFH 82° U/C MS	1
9	240-5102-00	8-32 NYLON LOCK NUT	4
10	242-5091-00	WASHER, 1/2 X 17/64 X .03 - DT	3
11	265-5002-00	TRIP SPRING - TARGET	1
12	265-5003-03	TARGET RESET SPRING	1
13	266-5020-00	COMPRESSION SPRING-CONICAL	1
14	266-5089-00	SPRING COMPRESSION - DT	1
15	269-5002-00	SPRING WASHER	1
16	270-5002-00	RETAINING RING - 1/4"	2

ID	Part Number	Description	Qty
17	515-0185-L6	FRAME ASSY, NOTCHED, 1-BANK DT W/ TRIP, GOTG	1
18	515-9960-00	PIVOT BRACKET - RESET D.T.	2
19	520-5357-00	PCB, INLINE DROP TARGET OPTO	1
20	530-5757-00	PLUNGER - D.T. ASSY.	1
21	535-1660-00	BRACKET, 1-BANK DT TRIP	1
22	535-9760-01A	LIFT BRKT - 1 BANK	1
23	535-9777-01	COIL BRACKET-DT-OD	1
24	535-9959-00	STOP BRKT	1
25	545-5076-01	COIL SLEEVE	1
26	545-6163-01	LEDGE, 1-BANK DROP TARGET	1
27	545-6305-00	TARGET - ROLLOVER - BLACK	1
28	545-6798-00	SHIM - FICHE PAPER - D.T. SINGLE	1
29	545-9794-00	SPLIT BEARING - 4MM	2
30	545-9930-00	FISH PAPER	1

5.25 VUK ASSEMBLY

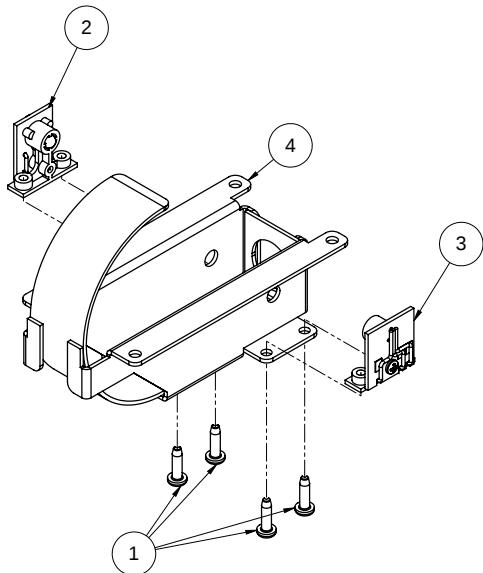
500-7078-00



ID	Part Number	Description	Qty
1	535-9590-02	VUK BRKT, LH, NO ACTUATOR	1
2	090-5001-ND	COIL, 23-800 NO DIODE	1
3	515-7309-00	PLUNGER ASSEMBLY	1
4	545-5076-01	COIL SLEEVE	1
5	545-5105-00	RUBBER BUMPER	1
6	180-5209-00	SUB MINIATURE SWITCH - SIM. ROLLER	1
7	535-5203-03	COIL RETAINER BRKTCOIL RETAINING BRACKET	1
8	535-6539-00	SWITCH BODY PROTECT PLATE	1
9	237-5937-02P	SCREW, 2-56 X 1/2" HWH MS	2
10	232-5300-00P	SCREW, 8-32 X 1/4" PPH SEMS	2
11	266-5020-00	COMPRESSION SPRING, CONICAL	1

5.26 SCOOP ASSEMBLY

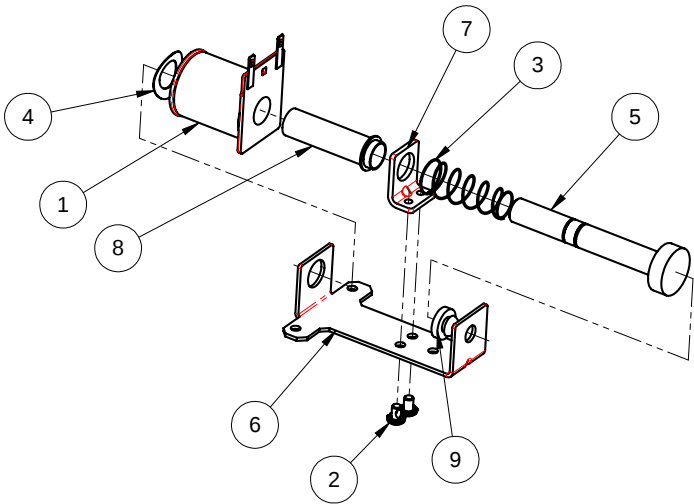
511-3036-00



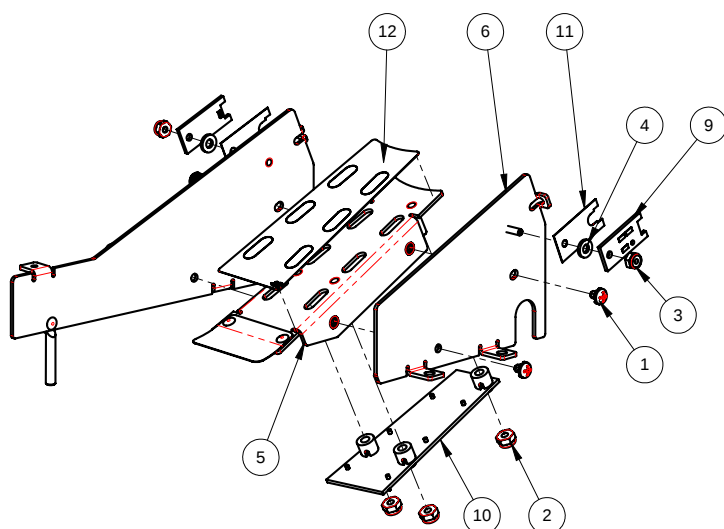
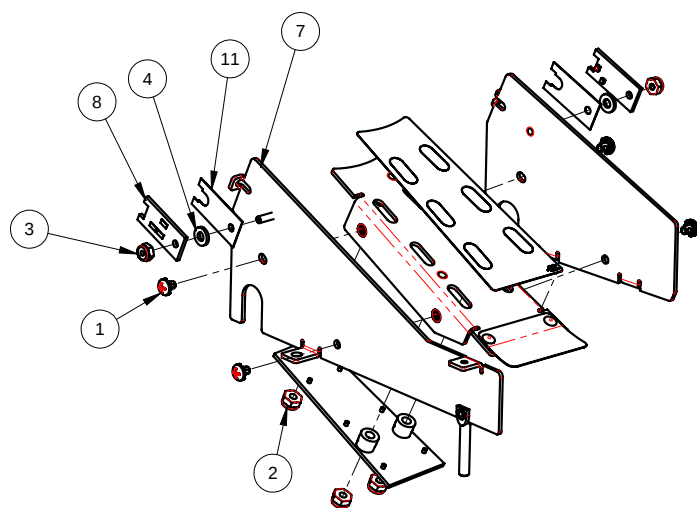
ID	Part Number	Description	Qty
1	237-5880-02	SCREW, #6 X 1/2 PPH T-25	4
2	515-0215-00	LONG RANGE OPTO EMITTER	1
3	515-0215-01	LONG RANGE OPTO RECEIVER	1
4	515-2430-00	SCOOP, OPTO SCOOP	1

5.27 KICKER ASSEMBLY

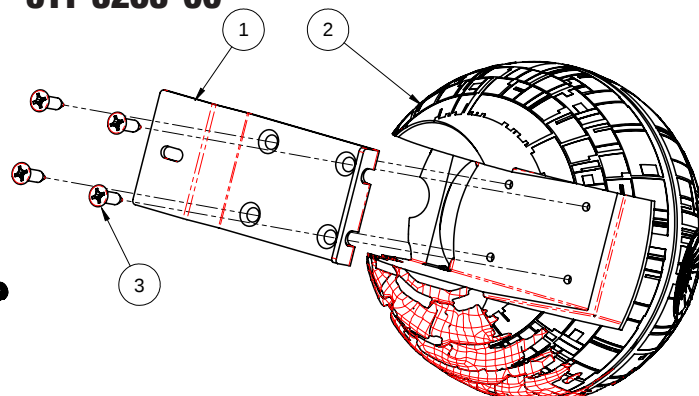
500-3640-00



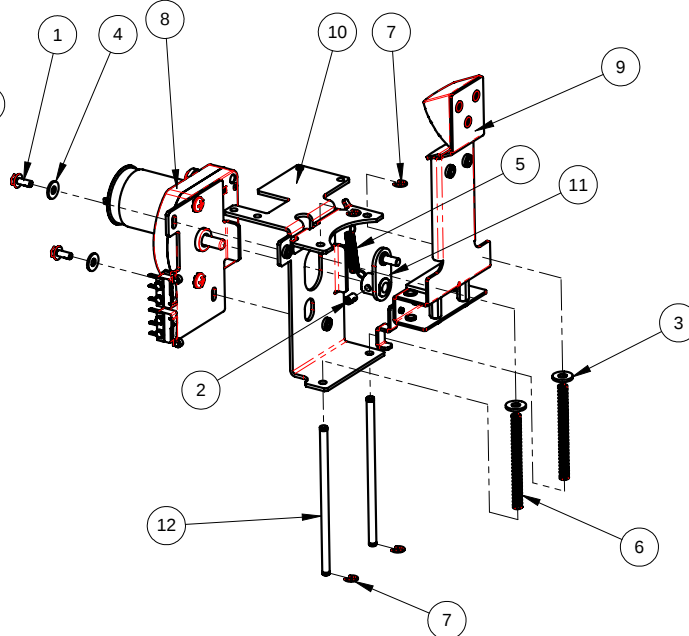
ID	Part Number	Description	Qty
1	090-5001-ND	COIL, 23-800, NO DIODE	1
2	232-5300-00P	SCREW, 8-32 X 1/4" PPH SEMS, PATCH	2
3	266-5020-00	COMPRESSION SPRING-CONICAL	1
4	269-5002-00	SPRING WASHER	1
5	515-7318-00	PLUNGER ASSEMBLY	1
6	535-4167-00	BRACKET, KICK BIG, EXTENDED TABS	1
7	535-5203-03	COIL RETAINING BRACKET	1
8	545-5076-01	COIL SLEEVE	1
9	545-5105-00	RUBBER BUMPER	1

5.28 DEATH STAR RAMP ASSEMBLY**500-1209-02**

ID	Part Number	Description	Qty
1	232-5209-00P	SCREW, 6-32 X 3/16" PPH SEMS, PATCH	4
2	240-5005-00	6-32 NYLON STOP NUT	3
3	240-5303-00	4-40 NYLON LOCK NUT	2
4	242-5079-00	WASHER, .150 I.D. X .312 O.D. X .050 THICK	2
5	510-7993-02	ASSEMBLY, RIVETED RAMP FLAP, FOTE	1
6	515-9643-02	RIGHT WALL, DEATH STAR RAMP	1
7	515-9643-03	LEFT WALL, DEATH STAR RAMP	1
8	520-8115-00	PCB, IR OPTO EMITTER, ANTI-ROTATION	1
9	520-8116-00	PCB, IR OPTO RECEIVER, ANTI-ROTATION	1
10	520-8705-00	LIGHT PC BOARD, DEATH STAR RAMP	1
11	523-0033-00	FISCHE PAPER, MINI OPTOS	1
12	820-7980-22	DECAL #22, FOTE	1

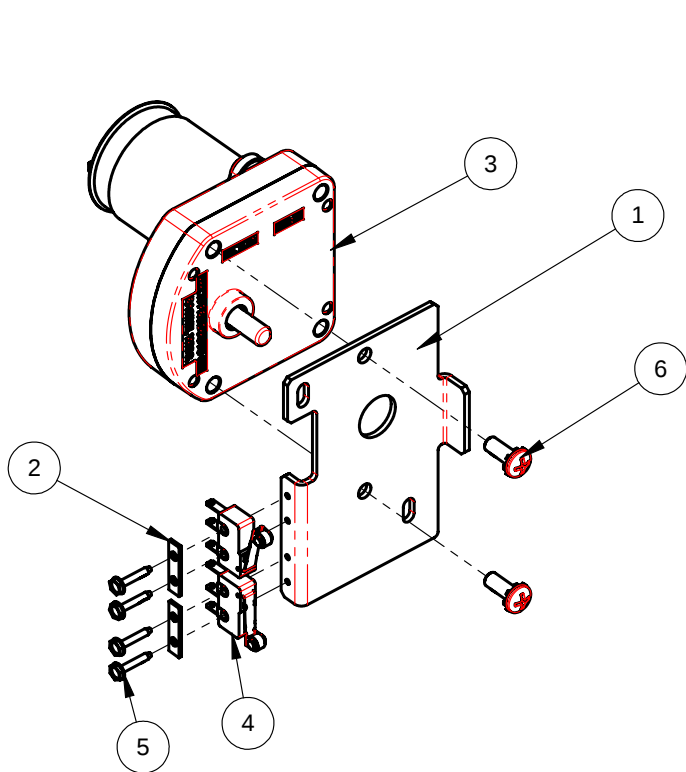
5.29 DEATH STAR ASSEMBLY**511-3263-00**

ID	Part Number	Description	Qty
1	535-4170-00	BRACKET, DEATH STAR MTG., FOTE	1
2	545-7988-00	DEATH STAR, DECORATED, FOTE	1
3	237-5895-01	SCREW, #6 X 1/2" PFH UNDERCUT	4

5.30 MOVING HATCH ASSEMBLY**500-3639-00**

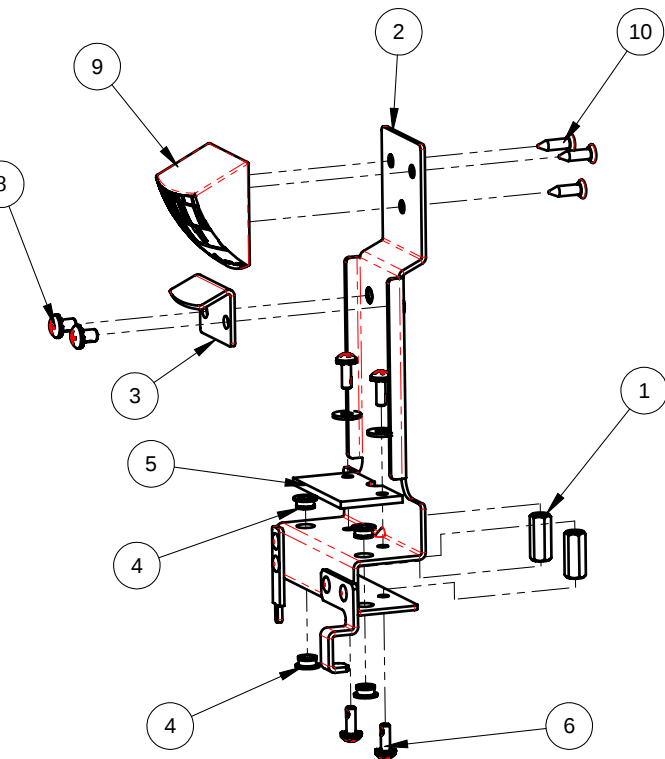
ID	Part Number	Description	Qty
1	237-5903-00P	SCREW, 8-32 X 3/8" HWH, PATCH	2
2	237-6092-00P	SET SCREW, 10-32 X 5/16, SOCKET CUP PT, PATCH	1
3	242-5003-00	#10 FLAT WASHER - 1/2" O.D. X .062 THICK	2
4	242-5005-00	#8 WASHER	2
5	265-5003-02	TARGET RESET SPRING	1
6	266-5109-00	COMPRESSION SPRING	2
7	270-5001-00	RETAINING E-RING, 3/16" SHAFT OD	4
8	511-3250-00	ASSEMBLY, HATCH MOTOR & SWITCHES, FOTE	1
9	511-3251-00	ASSEMBLY, HATCH BRACKET, FOTE	1
10	515-3022-00	WELDMENT, HATCH MOTOR BRACKET, FOTE	1
11	515-3023-00	ASSEMBLY, HATCH CRANK ARM, FOTE	1
12	530-8093-00	GUIDE ROD, HATCH LIFT, FOTE	2

5.31 HATCH MOTOR & SWITCHES
ASSEMBLY
511-3250-00



ID	Part Number	Description	Qty
1	535-4162-00	BRACKET, HATCH MOTOR ADJUSTMENT	1
2	535-6539-00	SWITCH BODY PROTECT PLATE	2
3	511-3111-09	MOTOR ASM, MP 8000D W/ CAP	1
4	180-5119-02	MICRO-SWITCH - LIGHT ACTUATION	2
5	237-5937-02P	SCREW, 2-56 X 1/2" HWH MS, PATCH	4
6	232-5402-00P	SCREW, 10-32 X 1/2" PPH MS SEMS, PATCH	2

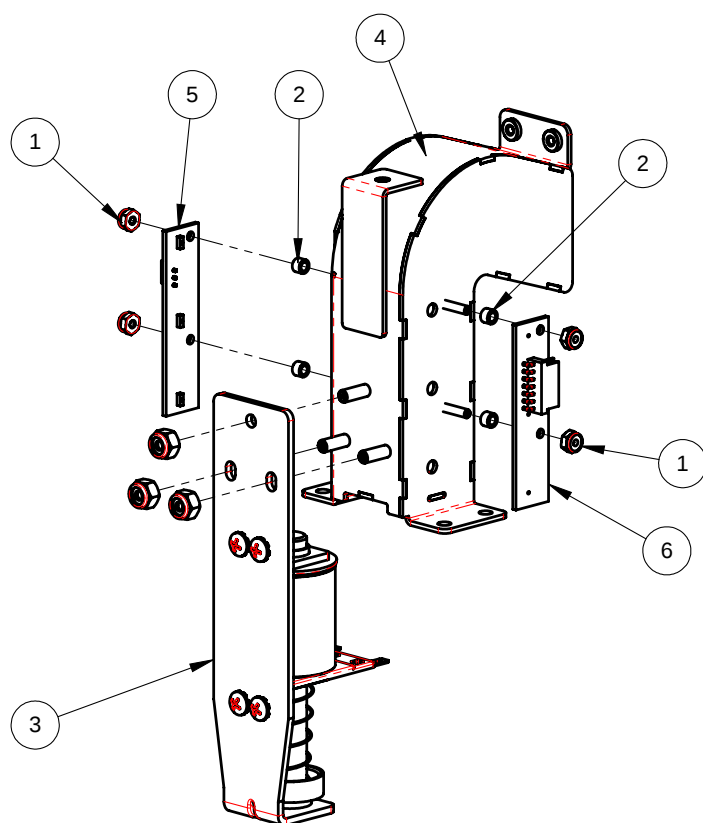
5.32 HATCH BRACKET ASSEMBLY
511-3251-00



ID	Part Number	Description	Qty
1	254-5008-02	HEX SPACER - 5/8 "	2
2	510-7997-00	RIVETED ASSY, HATCH BRKT, FOTE	1
3	535-4164-00	BRACKET, HATCH SHELF, FOTE	1
4	545-5352-00	NYLINER, 3/16" SHAFT	4
5	546-7980-00	GLIDE STRIP, HATCH LIFT, FOTE	1
6	232-5201-00P	SCREW, 6-32 X 3/8" PPH MS SEMS, PATCH	4
7	242-5001-00	#6 WASHER	2
8	232-5300-00P	SCREW, 8-32 X 1/4" PPH SEMS, PATCH	2
9	545-7989-00	HATCH, DEATH STAR, DECORATED, FOTE	1
10	237-5895-01	SCREW, #6 X 1/2" PFH UNDERCUT	3

5.33 OFFSET VUK ASSEMBLY (DEATH STAR VUK)

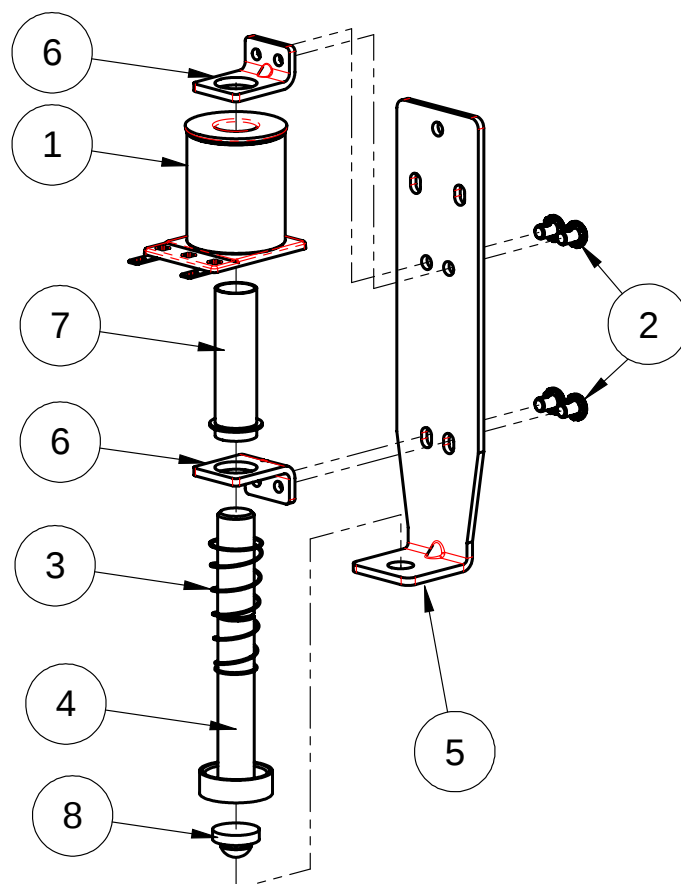
500-1212-00



ID	Part Number	Description	Qty
1	240-5303-00	4-40 NYLON LOCK NUT	4
2	254-5090-03	PLASTIC SPACER #4 SCREW, 3/16" OD - 1/8" LENGTH	4
3	511-9792-00	ASSEMBLY, SIDE-MOUNT VUK NO OPTOS	1
4	515-6029-00	WELDMENT, VUK TUBE, FOTE	1
5	520-5377-00	3 OPTO EMITTER PCA	1
6	520-5378-00	3 OPTO RECEIVER PCB	1
7	240-5102-00	8-32 NYLON LOCK NUT	3

5.34 SIDE-MOUNT VUK NO OPTOS ASSEMBLY

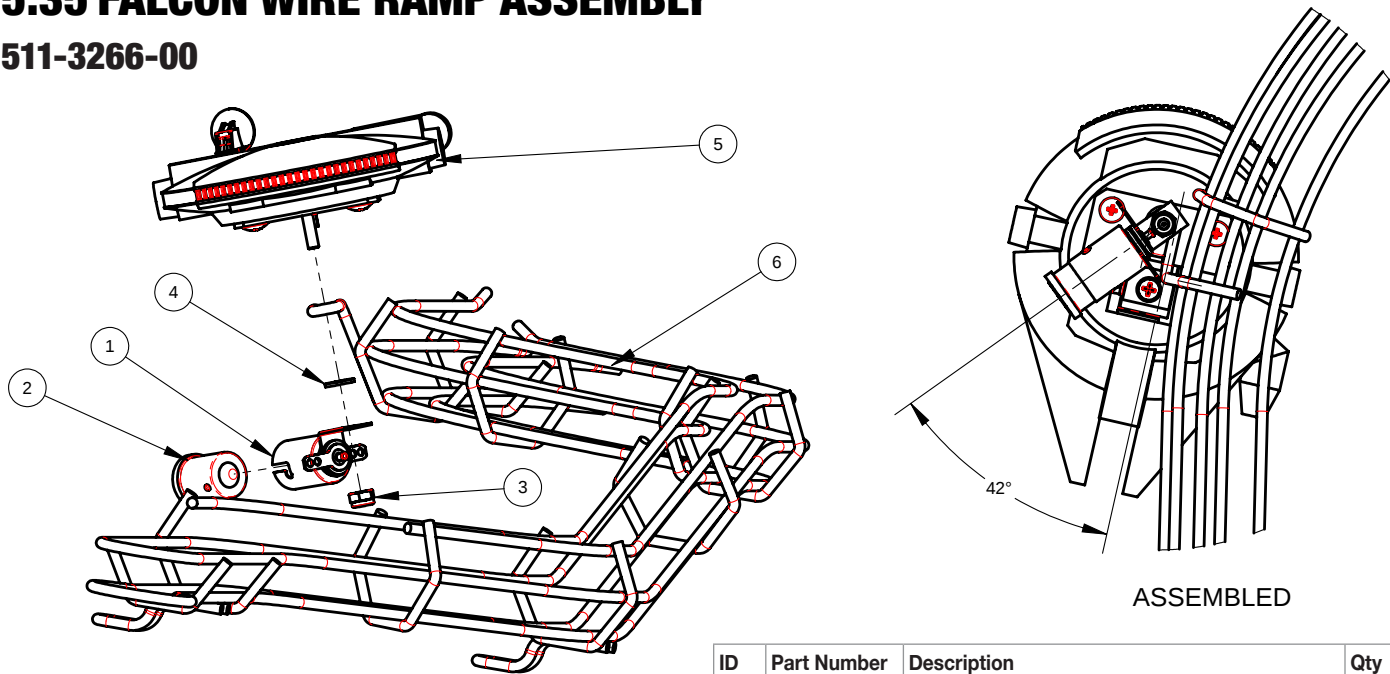
511-9792-00



ID	Part Number	Description	Qty
1	090-5001-ND	COIL, 23-800, NO DIODE	1
2	232-5300-00P	SCREW, 8-32 X 1/4" PPH SEMS, PATCH	4
3	266-5020-00	COMPRESSION SPRING-CONICAL	1
4	515-7309-00	PLUNGER ASSEMBLY	1
5	535-0739-00	BRACKET, SIDE-MOUNT VUK NO OPTOS	1
6	535-5203-03	COIL RETAINING BRACKET	2
7	545-5076-01	COIL SLEEVE	1
8	545-5105-00	RUBBER BUMPER	1

5.35 FALCON WIRE RAMP ASSEMBLY

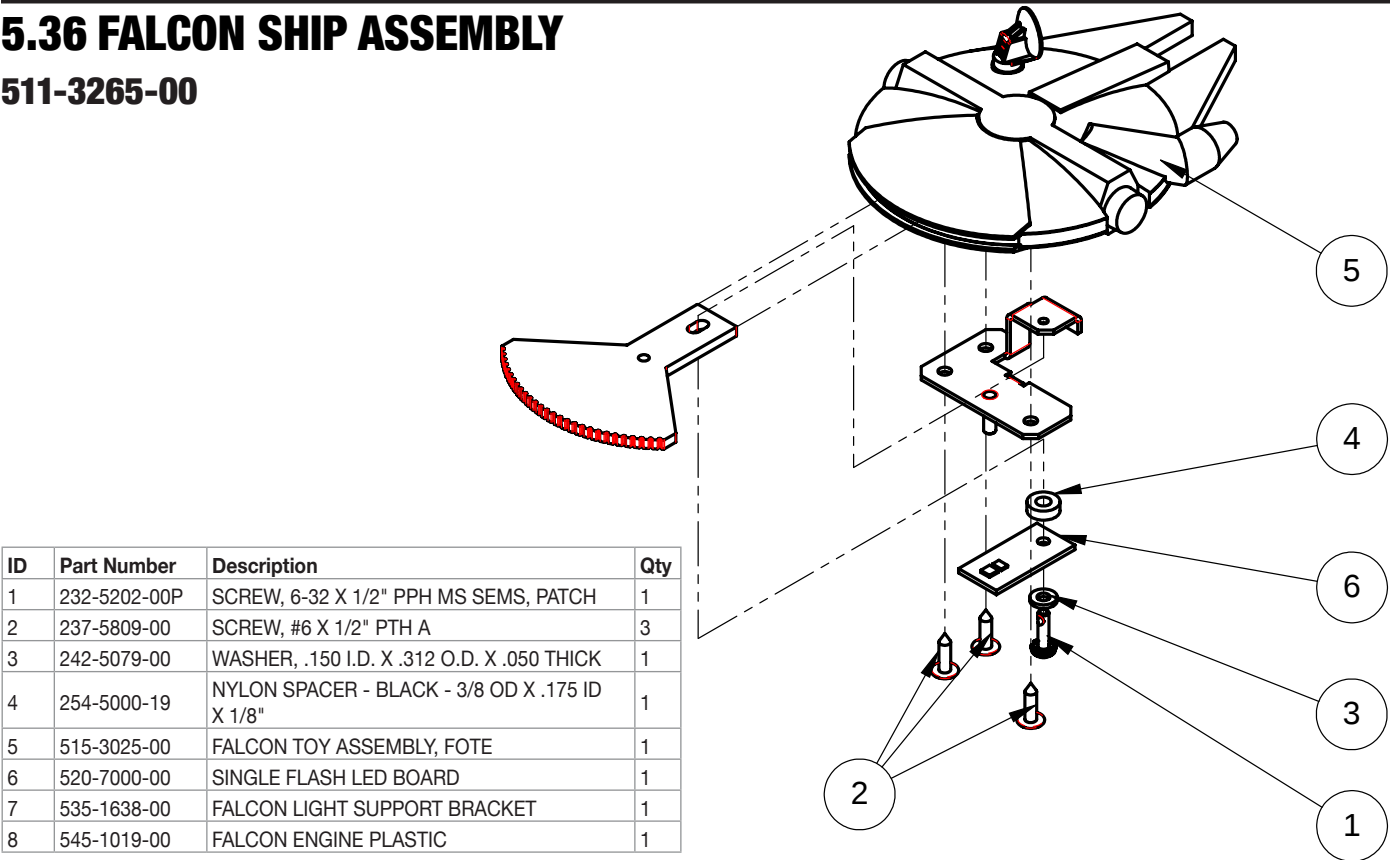
511-3266-00



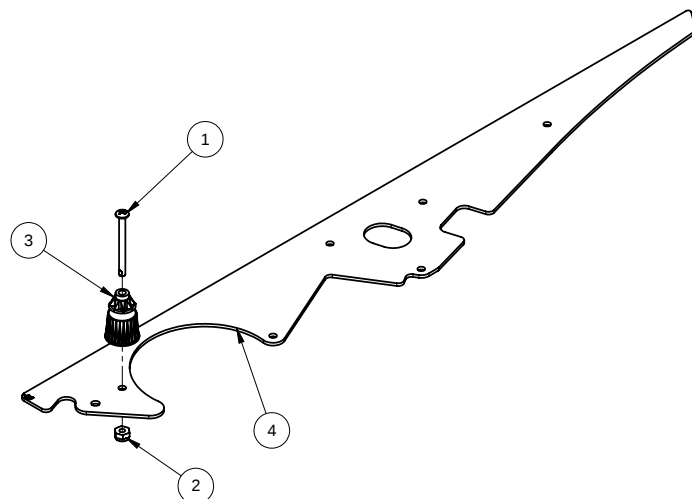
ID	Part Number	Description	Qty
1	077-5100-00	LAYDOWN STANDARD SOCKET	1
2	113-5045-08	MULTI-LED FLASHER, 5 VDC - WHITE	1
3	240-5005-00	6-32 NYLON STOP NUT	1
4	242-5001-00	#6 WASHER	1
5	511-3265-00	FALCON SHIP SUBASSEMBLY, FOTE	1
6	515-9944-00	WIRE RAMP, RIGHT, FOTE	1

5.36 FALCON SHIP ASSEMBLY

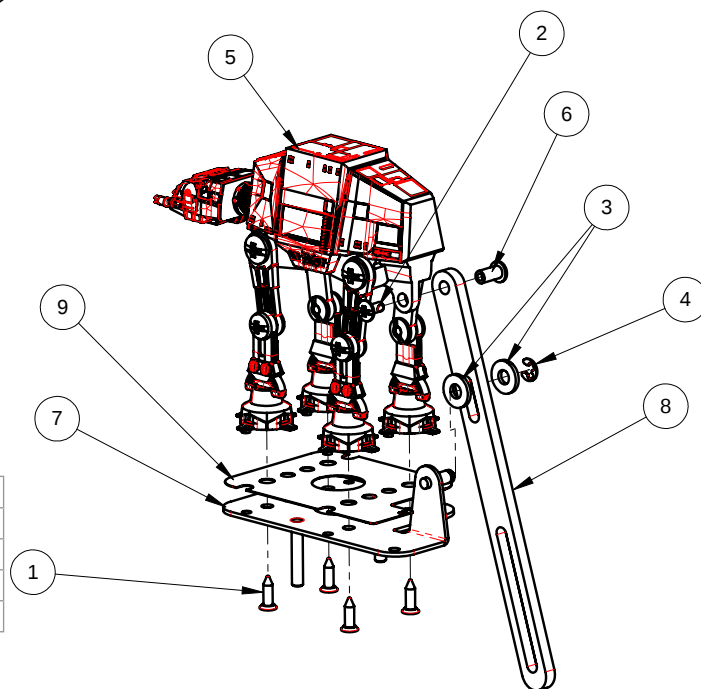
511-3265-00



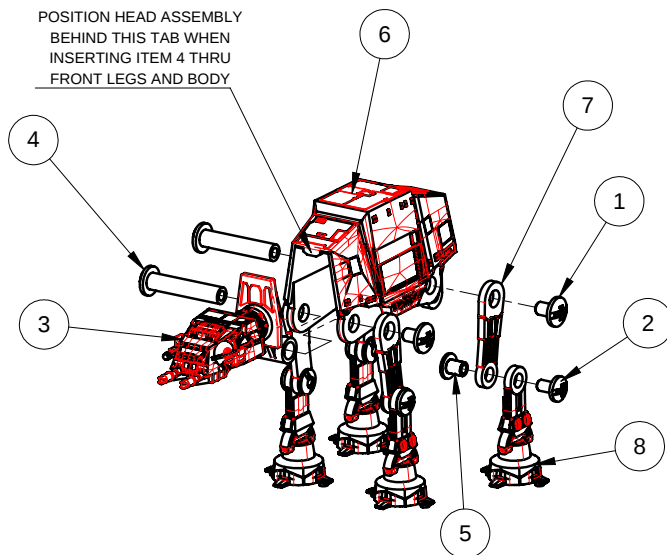
ID	Part Number	Description	Qty
1	232-5202-00P	SCREW, 6-32 X 1/2" PPH MS SEMS, PATCH	1
2	237-5809-00	SCREW, #6 X 1/2" PTH A	3
3	242-5079-00	WASHER, .150 I.D. X .312 O.D. X .050 THICK	1
4	254-5000-19	NYLON SPACER - BLACK - 3/8 OD X .175 ID X 1/8"	1
5	515-3025-00	FALCON TOY ASSEMBLY, FOTE	1
6	520-7000-00	SINGLE FLASH LED BOARD	1
7	535-1638-00	FALCON LIGHT SUPPORT BRACKET	1
8	545-1019-00	FALCON ENGINE PLASTIC	1

5.37 PLASTIC #05 ASSEMBLY**511-3248-05**

ID	Part Number	Description	Qty
1	237-5510-00P	SCREW, 6-32 X 1-1/2" PPH MS, PATCH	1
2	240-5005-00	6-32 NYLON STOP NUT	1
3	550-5034-01	GROOVED JEWEL PLASTIC POST, CLEAR	1
4	830-6972-05	PLASTIC #5, FOTE	1

5.39 AT-AT TOP ASSEMBLY**500-2704-00****5.38 AT-AT ASSEMBLY****511-1189-00**

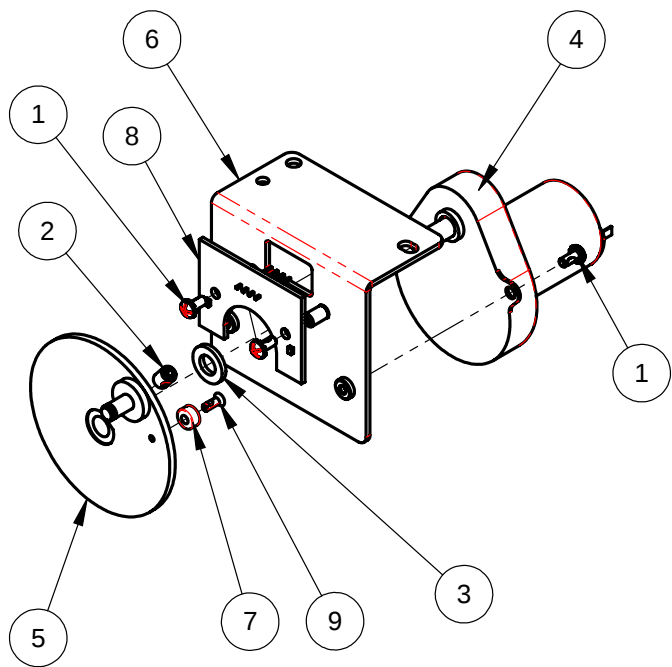
POSITION HEAD ASSEMBLY
BEHIND THIS TAB WHEN
INSERTING ITEM 4 THRU
FRONT LEGS AND BODY



ID	Part Number	Description	Qty
1	237-5895-00	SCREW, #6 X 3/8" PFH UNDERCUT	4
2	237-6403-02P	SCREW, BINDING BARREL, 6-32 X 5/16", PATCH	1
3	242-5003-00	#10 FLAT WASHER - 1/2" O.D. X .062 THICK	2
4	270-5001-00	RETAINING E-RING, 3/16" SHAFT OD	1
5	511-1189-00	ASSEMBLY, AT-AT, FOTE	1
6	530-9029-00	BINDING BARREL, Ø3/16 X 3/8", 6-32 THREADS	1
7	535-5464-00	BRACKET, BASE PLATE, ATAT	1
8	545-7984-00	DRIVE LINK, AT-AT, FOTE L E	1
9	820-7980-29	DECAL #29, AT-AT	1

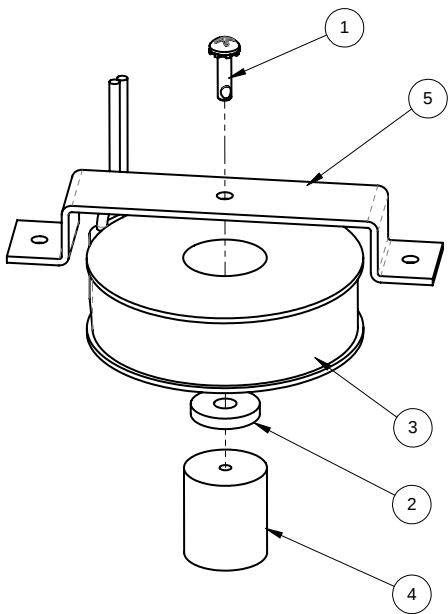
ID	Part Number	Description	Qty
1	237-6403-00P	SCREW, BINDING BARREL, 10-24 X 5/16", PATCH	2
2	237-6403-01P	SCREW, BINDING BARREL, 8-32 X 5/16", PATCH	4
3	515-3027-00	ASSEMBLY, AT-AT HEAD, DECORATED, FOTE	1
4	530-9027-00	BINDING BARREL, Ø1/4 X 1-1/4", 10-24 THREADS	2
5	530-9028-00	BINDING BARREL, Ø13/64 X 1-1/4", 8-32 THREADS	4
6	545-7980-00	BODY, AT-AT, DECORATED	1
7	545-7981-00	UPPER LEG, AT-AT, DECORATED	4
8	545-7982-00	LOWER LEG, AT-AT, DECORATED	4

5.40 AT-AT MOTOR DRIVE ASSEMBLY
511-1190-00

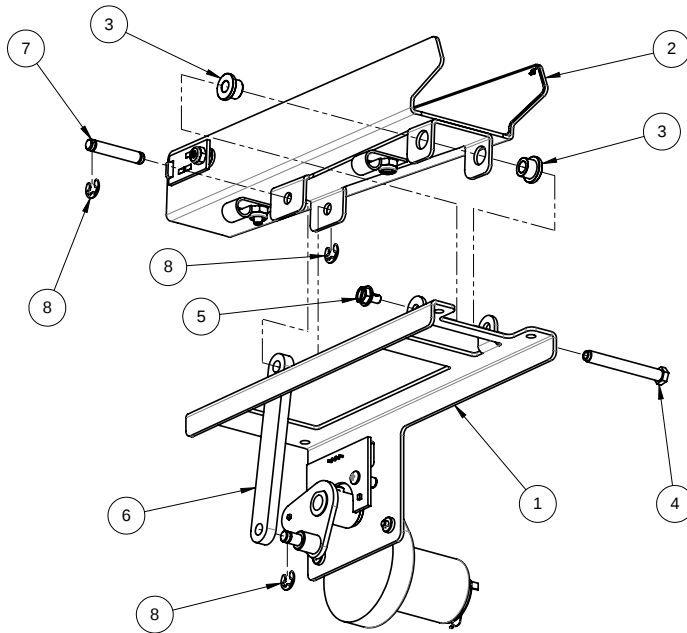


ID	Part Number	Description	Qty
1	237-5909-00P	SCREW, 4-40 X 1/4" PPH SEMS, PATCH	4
2	237-6310-00P	SET SCREW, 10-32 X 1/4", SOCKET CUP PT, PATCH	1
3	242-5072-01	NYLON WASHER .252 ID X .472 OD	1
4	511-6968-01	MOTOR & CONN ASSY 24 VDC 12 RPM	1
5	515-2084-00	DRIVE WHEEL	1
6	535-5465-00	BRACKET, AT-AT MOTOR	1
7	090-5097-00	MAGNET, 1/4" X .125", #2 CSINK, AXIAL	1
8	520-9871-00	PCA MAG SENSOR DUAL	1
9	237-6366-00P	2-56 x 1/4" PFH MS, PATCH	1

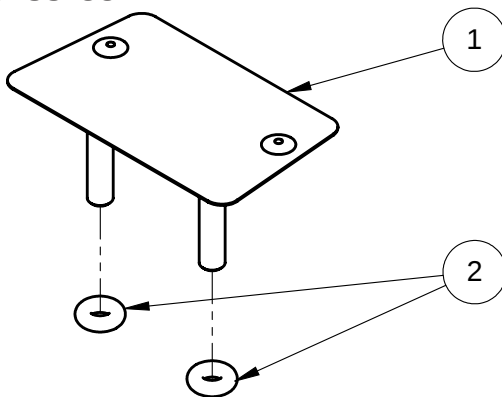
5.41 MAGNET ASSEMBLY
500-7425-00



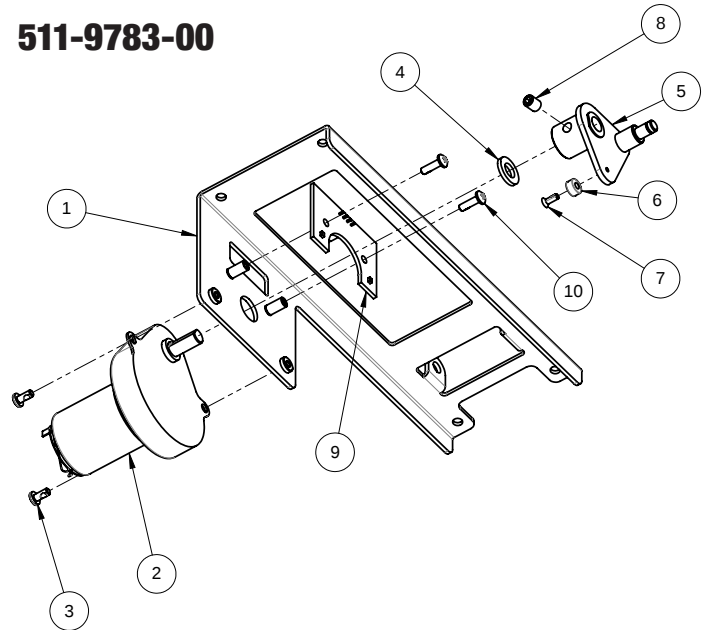
ID	Part Number	Description	Qty
1	232-5202-00P	SCREW, 6-32 X 1/2" PPH MS SEMS, PATCH	1
2	242-5039-00	WASHER - 13/64 ID X 5/8 OD X .105	1
3	511-5065-ND	MAGNET / CONNECTOR ASSY, 22-650	1
4	530-5266-01	MAGNET CORE	1
5	535-6637-01	MAGNET BRACKET	1

5.42 LIFT RAMP ASSEMBLY**500-9405-00**

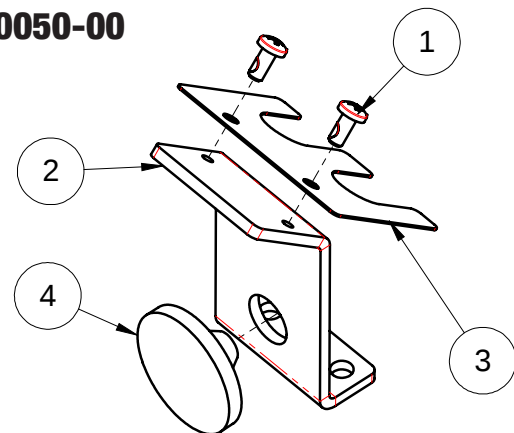
ID	Part Number	Description	Qty
1	511-9783-00	ASSEMBLY, LIFT RAMP MOUNT & MOTOR, FOTE	1
2	511-9782-00	ASSEMBLY, LIFT RAMP & OPTOS, FOTE	1
3	283-5018-03	3/16 ID X 5/16 OD X 1/4 LG. BUNTING SAE 841 BRONZE FLANGED BEARING-PART #EF030504	2
4	530-5986-00	SHAFT, PIVOT, TIME MACHINE RAMP	1
5	237-5976-01P	SCREW, 6-32 X 1/4 HWH SWAGE, PATCH	1
6	546-7979-00	LINK, LIFT RAMP, FOTE LE	1
7	530-7812-10	PIVOT PIN-.188 DIA.	1
8	270-5001-00	RETAINING E-RING, 3/16" SHAFT OD	3

5.43 LIFT RAMP ENTRY FLAP**511-9793-00**

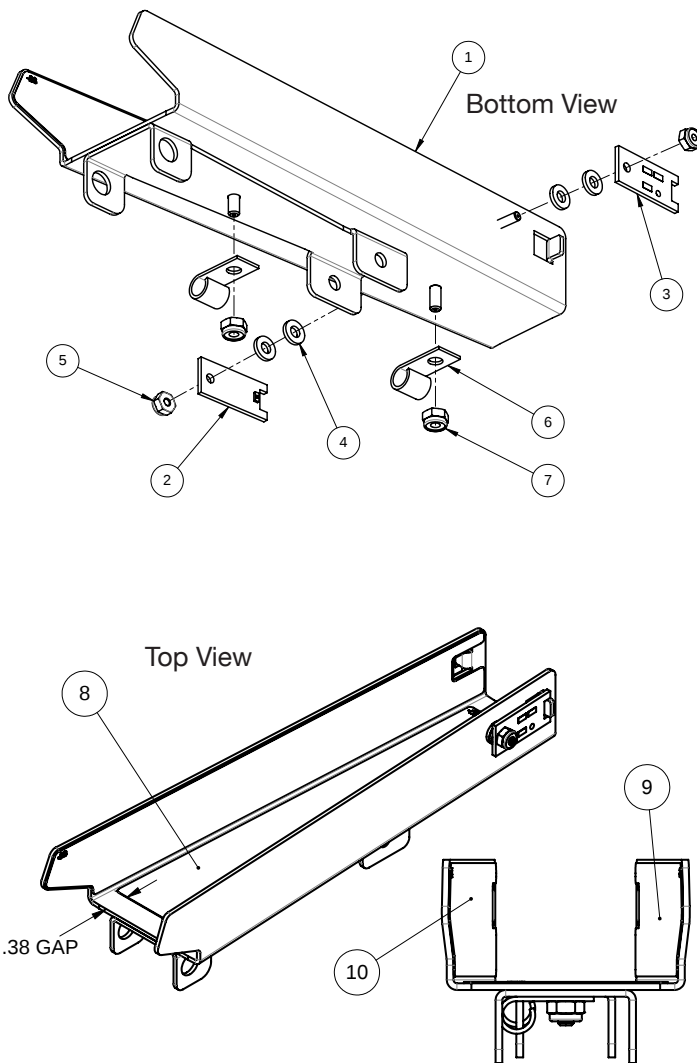
ID	Part Number	Description	Qty
1	510-8014-00	RIVETED ASSEMBLY, LIFT RAMP FLAP, FOTE L E	1
2	545-9991-00	RUBBER RING-VITON, 90A DUROMETER	2

5.44 LIFT RAMP MOUNT & MOTOR ASSEMBLY**511-9783-00**

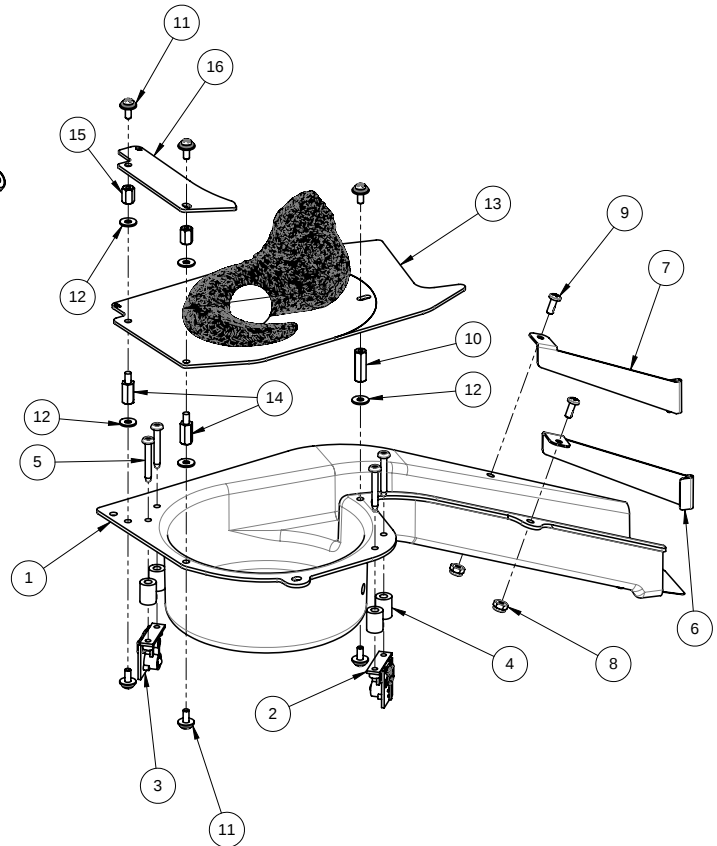
ID	Part Number	Description	Qty
1	515-8876-00	BRACKET, LIFT RAMP FRAME, FOTE	1
2	511-6968-01	MOTOR & CONN ASSY 24 VDC 12 RPM	1
3	237-6169-00P	SCREW, 4-40 X 1/4 PPH MS, PATCH	2
4	242-5072-01	NYLON WASHER .252 ID X .472 OD	1
5	515-8877-00	ASSEMBLY, LIFT RAMP CRANK ARM, FOTE	1
6	090-5097-00	MAGNET, 1/4" X .125", #2 CSINK, AXIAL	1
7	237-6366-00P	2-56 x 1/4" PFH MS, PATCH	1
8	237-6310-00P	SET SCREW, 10-32 X 1/4", SOCKET CUP PT, PATCH	1
9	520-8470-00	PCA MAG SENSOR DUAL 180 OMNI	1
10	237-6379-00P	SCREW, 4-40 X 3/8", PPH MS, ZINC, PATCH	2

5.45 BUMPER BRACKET (LIFT RAMP)**511-0050-00**

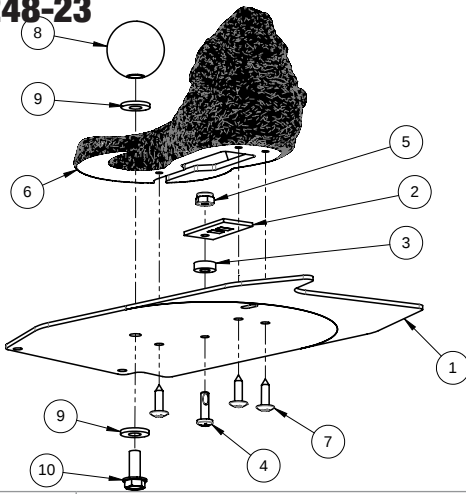
ID	Part Number	Description	Qty
1	237-6169-00P	SCREW, 4-40 X 1/4 PPH MS, PATCH	2
2	535-3351-00	BRACKET, LIFT RAMP BUMPER, FOTE L E	1
3	535-3352-00	DEFLECTOR PLATE, LIFT RAMP, FOTE	1
4	545-5428-00	RUBBER BUMPER	1

5.46 LIFT RAMP & OPTOS ASSEMBLY**511-9782-00**

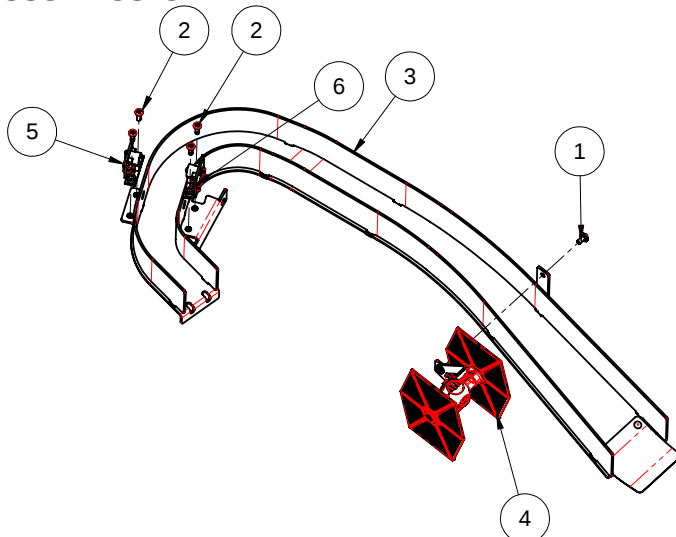
ID	Part Number	Description	Qty
1	515-8875-00	WELDMENT, LIFT RAMP, FOTE	1
2	520-8115-00	PCA MINI SMT EMITTER	1
3	520-8116-00	PCA MINI SMT RECEIVER	1
4	242-5079-00	WASHER, .150 I.D. X .312 O.D. X .050 THICK	4
5	240-5303-00	4-40 NYLON LOCK NUT	2
6	040-5000-03	1/4" CABLE CLAMP	2
7	240-5005-00	6-32 NYLON STOP NUT	2
8	820-7980-23	DECAL #23, FOTE	1
9	820-7980-27	DECAL #27 (Right), FOTE	1
10	820-7980-28	DECAL #28 (Left), FOTE	1

5.47 FUNNEL RAMP ASSEMBLY**500-1210-00**

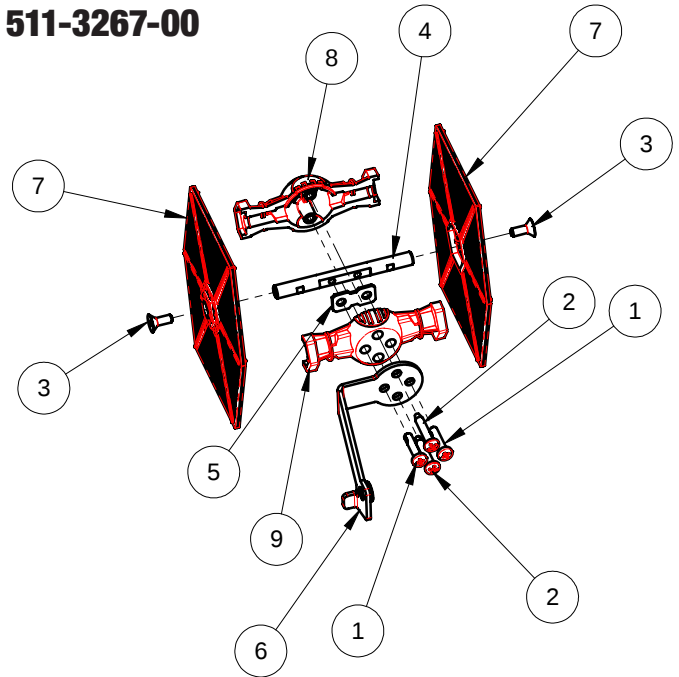
ID	Part Number	Description	Qty
1	510-7994-00	RIVETED ASSY, FUNNEL RAMP, FOTE LE	1
2	515-0215-00	LONG RANGE OPTO EMITTER ASSEMBLY	1
3	515-0215-01	LONG RANGE OPTO RECEIVER ASSEMBLY	1
4	254-5000-01	NYLON SPACER - BLACK - 3/8 OD X .175 ID X 1/2"	4
5	237-5880-04	SCREW, #6 X 1" PPH T-25	4
6	535-3331-00	RAMP PROTECTOR, LEFT WALL, FOTE LE	1
7	535-3331-01	RAMP PROTECTOR, RIGHT WALL, FOTE LE	1
8	240-5005-00	6-32 NYLON STOP NUT	2
9	237-5501-00P	SCREW, 6-32 X 3/8" PPH MS ZINC, PATCH	2
10	254-5008-04	HEX SPACER - 3/4 "	1
11	237-6378-00P	#6-32 X 3/8 PAN PHILLIPS w/DOUBLE SEMS, PATCH	6
12	242-5001-00	#6 WASHER	5
13	511-3248-23	PLASTIC ASSEMBLY #23	1
14	254-5024-03	HEX SPACER MALE/FEMALE - 1/2"	2
15	254-5008-12	HEX SPACER - 3/8 "	2
16	830-6972-30	PLASTIC #30, FOTE L E	1

5.48 PLASTIC -23 ASSEMBLY**511-3248-23**

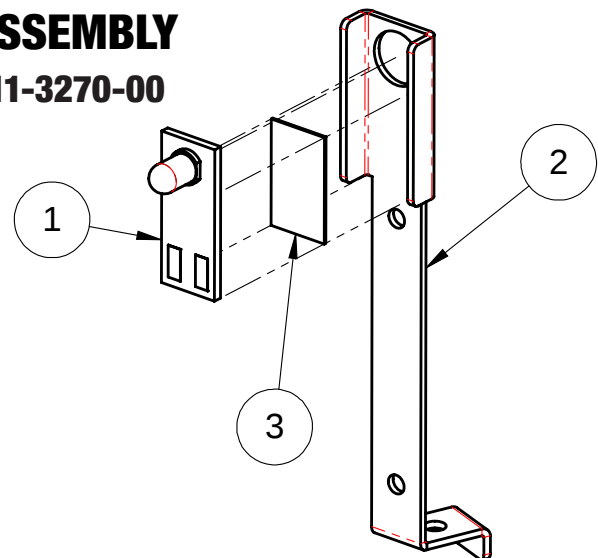
ID	Part Number	Description	Qty
1	830-8585-23	PLASTIC #23, PLASTIC RAMP COVER, FOTE	1
2	520-7000-00	SINGLE FLASH LED BOARD	1
3	254-5000-19	NYLON SPACER - BLACK - 3/8 OD X .175 ID X 1/8"	1
4	237-5502-00P	SCREW, 6-32 X 1/2" PPH MS ZINC, PATCH	1
5	240-5005-00	6-32 NYLON STOP NUT	1
6	545-7990-00	JABBA	1
7	237-5809-00	SCREW, #6 X 1/2" PTH A	3
8	260-5013-00	BALL, CARBON, THREADED	1
9	242-5003-00	#10 FLAT WASHER - 1/2" O.D. X .062 THICK	2
10	237-6320-00	SCREW, 10-24 X 1/2" HWH NON SWAGED	1

5.49 RIGHT METAL RAMP ASSEMBLY**500-1209-01**

ID	Part Number	Description	Qty
1	232-5200-00P	SCREW, 6-32 X 1/4" PPH SEMS, PATCH	1
2	237-5997-00P	SCREW, 4-40 X 3/8" PPH MS BLACK, PATCH	4
3	510-7993-01	RIVETED ASSY, RIGHT METAL RAMP, FOTE	1
4	511-3267-00	ASSEMBLY, TIE FIGHTER, FOTE	1
5	515-0215-00	LONG RANGE OPTO EMITTER ASSEMBLY	1
6	515-0215-01	LONG RANGE OPTO RECEIVER ASSEMBLY	1

5.50 TIE FIGHTER ASSEMBLY**511-3267-00**

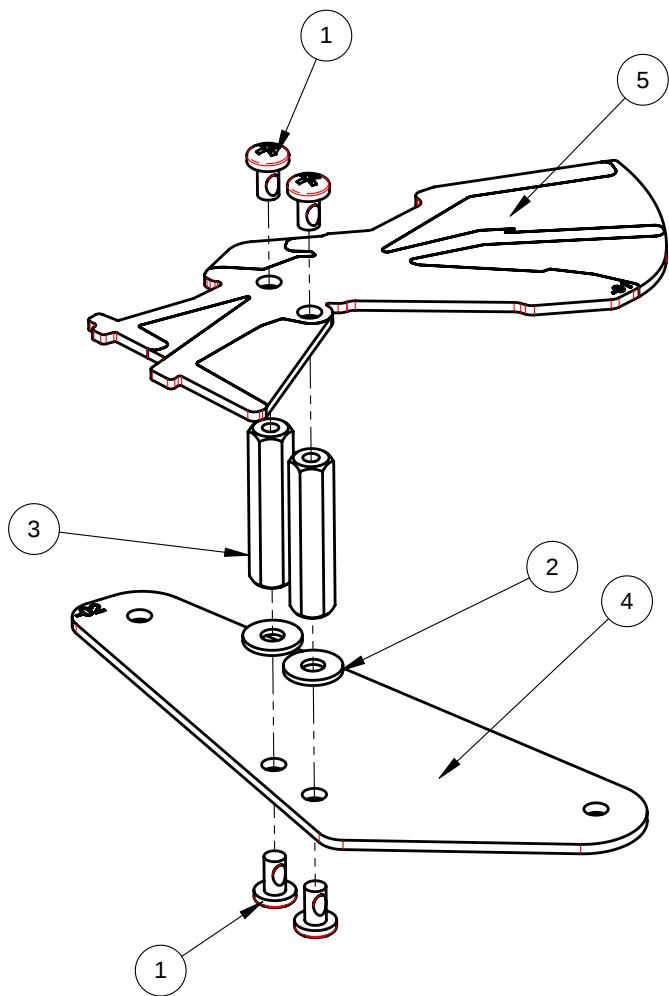
ID	Part Number	Description	Qty
1	237-5816-00P	SCREW, 4-40 X 1/2" PPH, PATCH	2
2	237-5846-00	SCREW, #4 X 5/8" PPH T-25	2
3	237-6338-00	4-40 X 5/16 LG FH HX, BLACK OXIDE	2
4	530-7960-00	DIFFERENTIAL SHAFT	1
5	535-1762-00	TIE FIGHTER SPACER	1
6	535-3349-00	BRACKET, TIE FIGHTER, FOTE	1
7	880-6203-00	TIE FIGHTER WING	2
8	880-6216-00	TIE FIGHTER HOUSING-FRONT	1
9	880-6217-00	TIE FIGHTER HOUSING-BACK	1

5.51 TIE FIGHTER SPOTLIGHT ASSEMBLY**511-3270-00**

ID	Part Number	Description	Qty
1	520-8625-00	PCA, SPOTLIGHT 1W HIGH INTENSITY	1
2	535-4171-00	BRACKET, SPOTLIGHT, TIE FIGHTER	1
3	626-5136-00	ADHESIVE, SPOTLIGHT BOARD	1

5.52 PLASTIC -02 ASSEMBLY

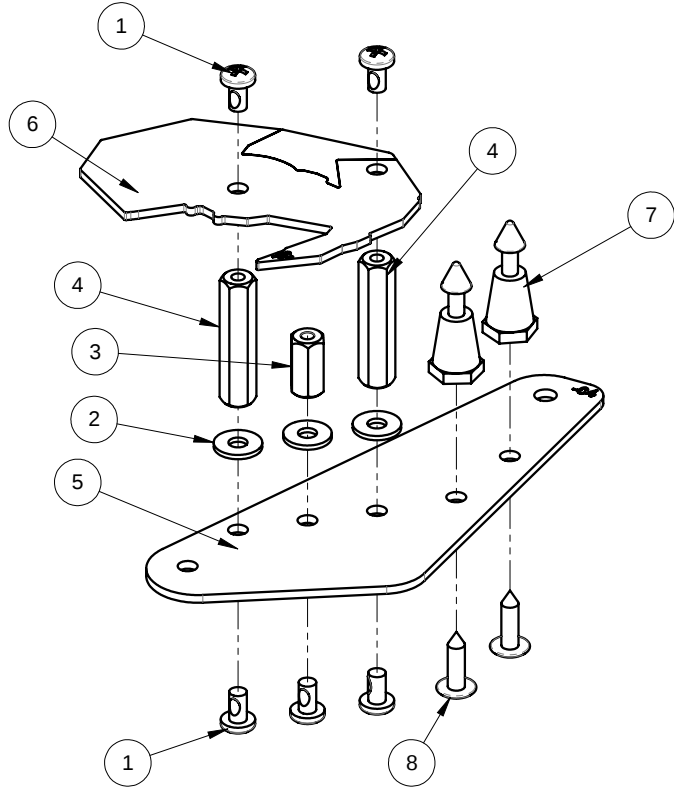
511-3248-02



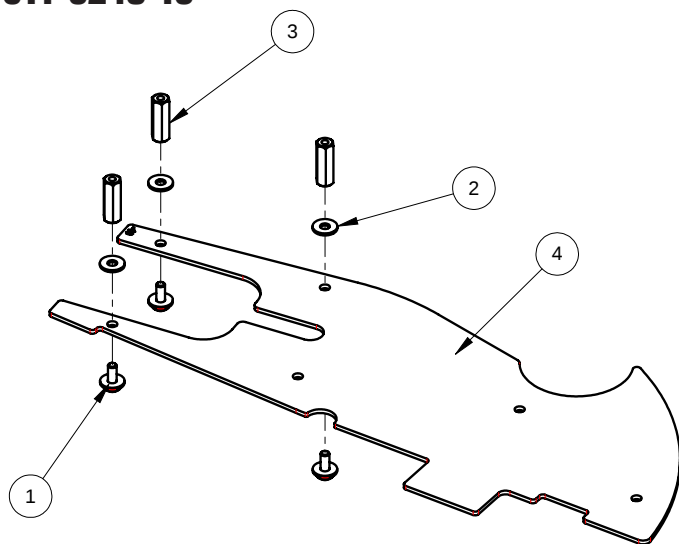
ID	Part Number	Description	Qty
1	237-5500-01P	SCREW, 6-32 X 1/4" PPH MS BLACK, PATCH	4
2	242-5001-00	#6 WASHER	2
3	254-5008-17	HEX SPACER - 1 1/8 "	2
4	830-8585-02	PLASTIC #02, FOTE	1
5	830-8585-31	PLASTIC #31, FOTE	1

5.53 PLASTIC -04 ASSEMBLY

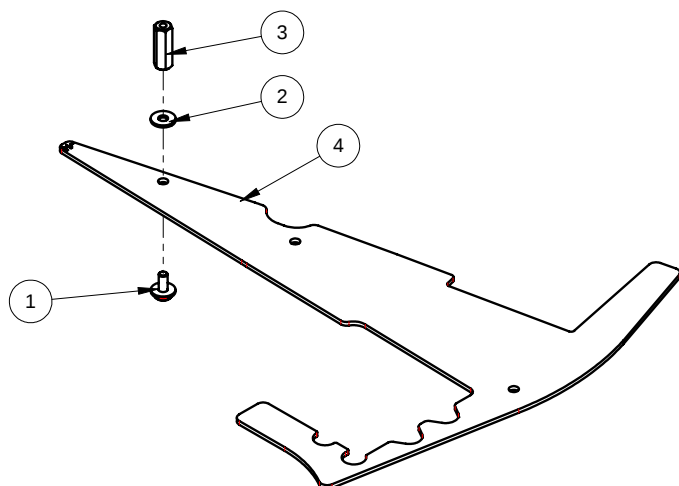
511-3248-04



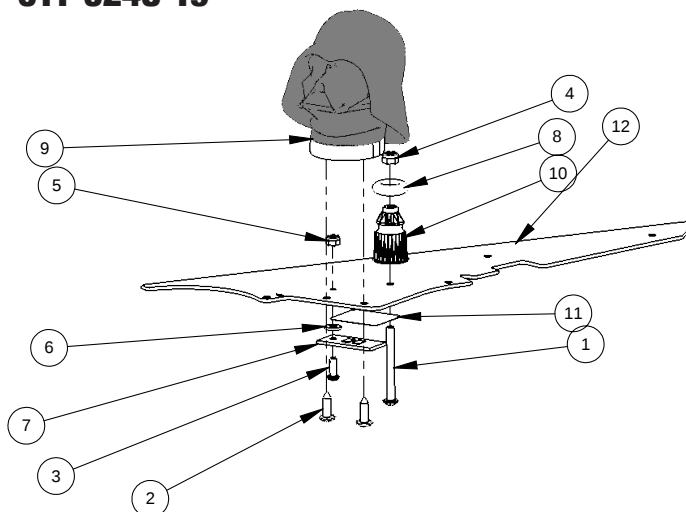
ID	Part Number	Description	Qty
1	237-5500-01P	SCREW, 6-32 X 1/4" PPH MS BLACK, PATCH	5
2	242-5001-00	#6 WASHER	3
3	254-5008-03	HEX SPACER - 1/2 "	1
4	254-5008-17	HEX SPACER - 1 1/8 "	2
5	830-8585-04	PLASTIC #4, FOTE	1
6	830-8585-32	PLASTIC #32, FOTE	1
7	550-5052-01	MINI POST - CLEAR	2
8	237-5809-00	SCREW, #6 X 1/2" PTH A	2

5.54 PLASTIC -13 ASSEMBLY**511-3248-13**

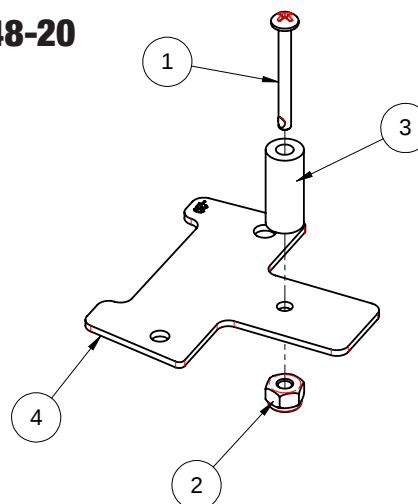
ID	Part Number	Description	Qty
1	237-6378-00P	#6-32 X 3/8 PAN PHILLIPS w/DOUBLE SEMS, PATCH	3
2	242-5001-00	#6 WASHER	3
3	254-5008-04	HEX SPACER - 3/4 "	3
4	830-8585-13	PLASTIC #13, FOTE	1

5.55 PLASTIC -14 ASSEMBLY**511-3248-14**

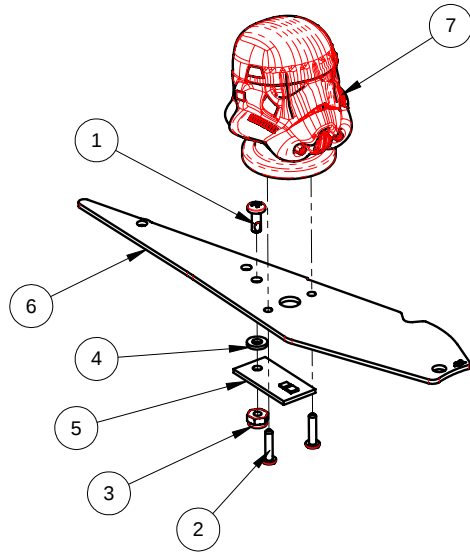
ID	Part Number	Description	Qty
1	237-6378-00P	#6-32 X 3/8 PAN PHILLIPS w/DOUBLE SEMS, PATCH	1
2	242-5001-00	#6 WASHER	1
3	254-5008-04	HEX SPACER - 3/4 "	1
4	830-8585-14	PLASTIC #14, FOTE	1

5.56 PLASTIC -19 ASSEMBLY**511-3248-19**

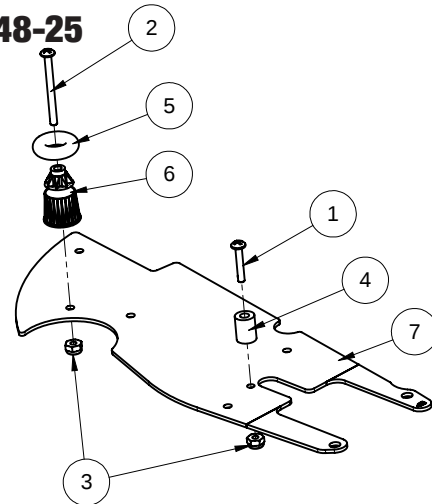
ID	Part Number	Description	Qty
1	237-5510-00P	SCREW, 6-32 X 1-1/2" PPH MS, PATCH	1
2	237-5809-00	SCREW, #6 X 1/2" PTH A	2
3	237-6379-00P	SCREW, 4-40 X 3/8", PPH MS, ZINC, PATCH	1
4	240-5005-00	6-32 NYLON STOP NUT	1
5	240-5303-00	4-40 NYLON LOCK NUT	1
6	242-5079-00	WASHER, .150 I.D. X .312 O.D. X .050 THICK	1
7	520-8457-00	PCB, SINGLE FLOOD LED - RED	1
8	545-5348-02	RUBBER RING, 5/16 ID, BLACK	1
9	545-7987-00	DARTH VADER	1
10	550-5034-02	GROOVED JEWEL PLASTIC POST, RED	1
11	820-5815-00	MYLAR PAD	1
12	830-8585-19	PLASTIC #19, FOTE	1

5.57 PLASTIC -20 ASSEMBLY**511-3248-20**

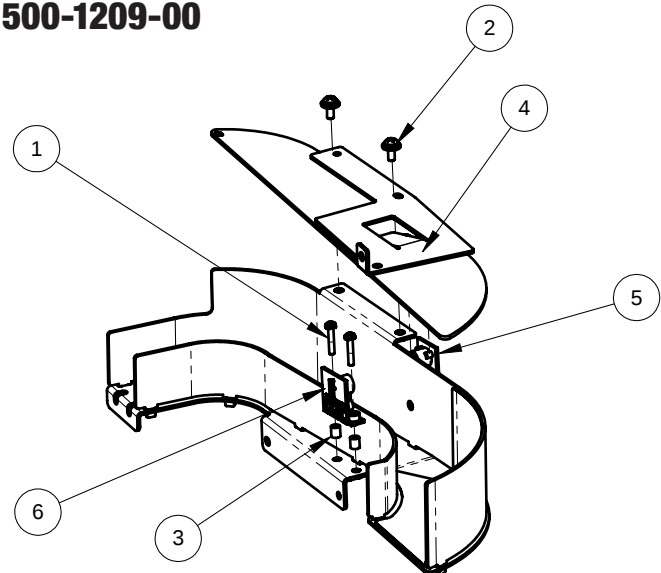
ID	Part Number	Description	Qty
1	237-5508-00P	SCREW, 6-32 X 1-1/4 PPH MS, PATCH	1
2	240-5102-00	8-32 NYLON LOCK NUT	1
3	254-5000-11	NYLON SPACER - BLACK - 3/8 OD X .175 ID X 7/8"	1
4	830-8585-20	PLASTIC #20, FOTE	1

5.58 PLASTIC -22 ASSEMBLY**511-3248-22**

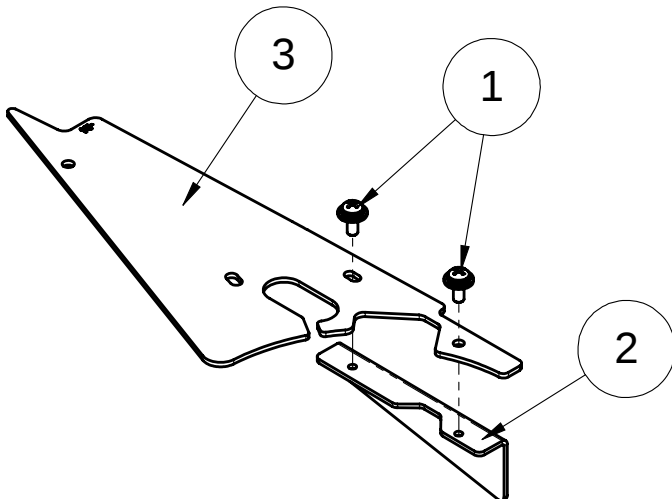
ID	Part Number	Description	Qty
1	237-5501-00P	SCREW, 6-32 X 3/8" PPH MS ZINC, PATCH	1
2	237-6304-00	SCREW, #4 X 1/2" PPH TYPE 25 THREAD CUTTING	1
3	240-5005-00	6-32 NYLON STOP NUT	1
4	242-5079-00	WASHER, .150 I.D. X .312 O.D. X .050 THICK	1
5	520-7000-00	SINGLE FLASH LED BOARD	1
6	830-8585-22	PLASTIC #22, FOTE	1
7	880-6223-01	STORM TROOPER	1

5.61 PLASTIC -25 ASSEMBLY**511-3248-25**

ID	Part Number	Description	Qty
1	237-5504-00P	SCREW, 6-32 X 3/4" PPH MS, PATCH	1
2	237-5510-00P	SCREW, 6-32 X 1-1/2" PPH MS, PATCH	1
3	240-5005-00	6-32 NYLON STOP NUT	2
4	254-5000-01	NYLON SPACER - BLACK - 3/8 OD X .175 ID X 1/2"	1
5	545-5348-03	RUBBER RING, 3/8 ID, BLACK	1
6	550-5034-01	GROOVED JEWEL PLASTIC POST, CLEAR	1
7	830-8585-25	PLASTIC #25, FOTE	1

5.60 LEFT METAL RAMP ASSEMBLY**500-1209-00**

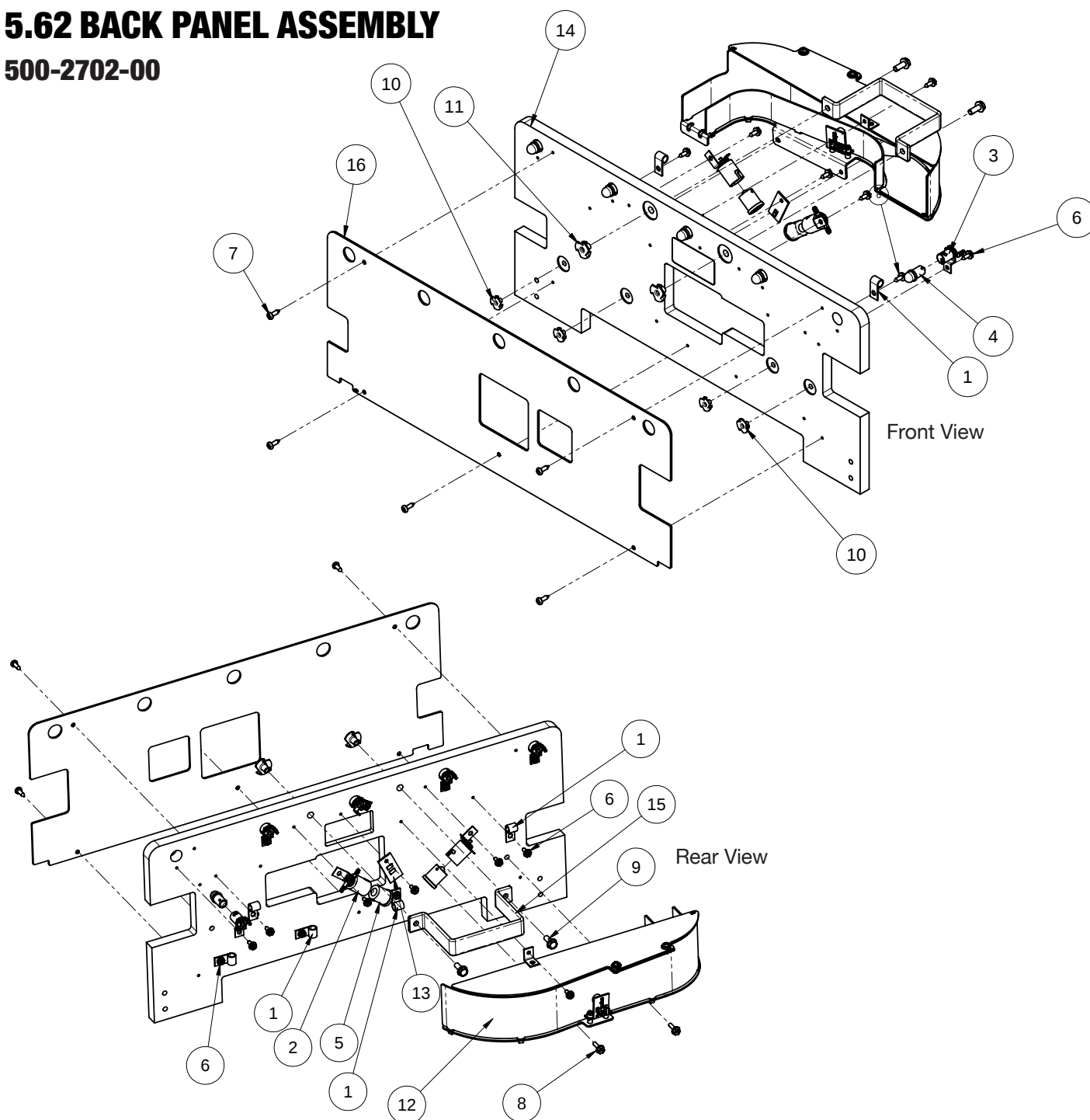
ID	Part Number	Description	Qty
1	237-5832-00	SCREW, 4-40 X 5/8" PPH SEMS	4
2	237-6378-00P	#6-32 X 3/8 PAN PHILLIPS w/DOUBLE SEMS, PATCH	2
3	254-5090-05	PLASTIC SPACER #4 SCREW, 3/16" OD - 7/32" LENGTH	4
4	510-7589-28	ASSEMBLY, RIVETED PLASTIC #28, FOTE	1
5	515-0215-00	LONG RANGE OPTO EMITTER ASSEMBLY	1
6	515-0215-01	LONG RANGE OPTO RECEIVER ASSEMBLY	1
7	515-9642-00	ASSEMBLY, LEFT METAL RAMP, FOTE	1
8	820-7980-30	DECAL #30, FOTE	1
9	820-7980-31	DECAL #31, FOTE	1

5.59 PLASTIC -24 ASSEMBLY**511-3248-24**

ID	Part Number	Description	Qty
1	237-6378-00P	#6-32 X 3/8 PAN PHILLIPS w/DOUBLE SEMS, PATCH	2
2	535-3267-00	BRACKET, BALL TRAP	1
3	830-8585-24	PLASTIC #24, FOTE	1

5.62 BACK PANEL ASSEMBLY

500-2702-00



ID	Part Number	Description	Qty
1	040-5000-03	1/4" CABLE CLAMP	5
2	077-5100-00	LAYDOWN STANDARD SOCKET	2
3	077-5223-00	SOCKET, 2-LUG VERTICAL, SHORT	5
4	112-5034-08F	DOUBLE LED, BAYONET BASE - WHITE FROSTED	5
5	113-5045-08	MULTI-LED FLASHER, 5 VDC - WHITE	2
6	234-5000-00	SCREW, #6 X 3/8" HWH	14
7	237-5805-00	SCREW, #6 X 1/2" PPH AB BLACK	5
8	237-5976-03P	SCREW, 6-32 X 1/2" HWH SWAGE, PATCH	2

ID	Part Number	Description	Qty
9	237-5995-00P	SCREW, 10-32 X 1/2" HWH SERR MS ZI, PATCH	2
10	240-5002-00	6-32 T-NUT	4
11	240-5204-00	#10-32 T-NUT	2
12	500-1209-00	ASSEMBLY, LEFT METAL RAMP, FOTE	1
13	520-7000-00	SINGLE FLASH LED BOARD	1
14	525-9809-00	BACK PANEL, FOTE	1
15	535-2288-00	HANDLE, BACKPANEL	1
16	830-8585-18	PLASTIC #18, BACK PANEL, FOTE L E	1

6. SPECIFICATIONS

500-55Z2-01

SPECIFICATIONS, MECHANICAL, GAME SETUP

Specification	Imperial	Metric
Weight	210 lbs	96 kg
Max dimensions, leg levers extended (h, w, d)	78 x 27.75 x 57 in	198 x 70.5 x 145 cm
Minimum game dimensions (h, w, d)	76 x 27.75 x 57 in	193 x 70.5 x 145 cm
Minimum room dimensions per game (h, w, d)	80 x 36 x 84 in	203 x 91 cm x 214 cm

- (h, w, d) = height, width, depth.

SPECIFICATIONS, MECHANICAL, BOXED

Specification	Imperial	Metric
Weight, boxed (without pallet)	230 lbs	105 kg
Box dimensions (h, w, d)	56.5 x 31 x 31 in	144 x 79 x 79 cm
Minimum dimensions (h, w, d)	76 x 26 x 57 in	193 x 66 x 145 cm

- (h, w, d) = height, width, depth.

SPECIFICATIONS, ELECTRICAL

Specification	North America - 120VAC	International - 240VAC
Line Voltage, Nominal	120 VAC	240 VAC
Line Voltage Range	90 VAC - 250 VAC	90 VAC - 250 VAC
Line Frequency *	60 Hz	50 Hz, 60 Hz
Line Power, Current - attract mode	70 W, 0.6 A @ 120 VAC	70 W, 0.3 A @ 240 VAC
Line Power, Current - nominal	360 W, 3 A @ 120 VAC	360 W, 1.5 A @ 240 VAC
Line Power, Current - peak, <100 ms	540 W, 4.5 A @ 120 VAC	540 W, 2.25 A @ 240 VAC

* NOTE: Games designed for 60hz operation (e.g. North America games) will not function correctly on 50hz power and vice versa.

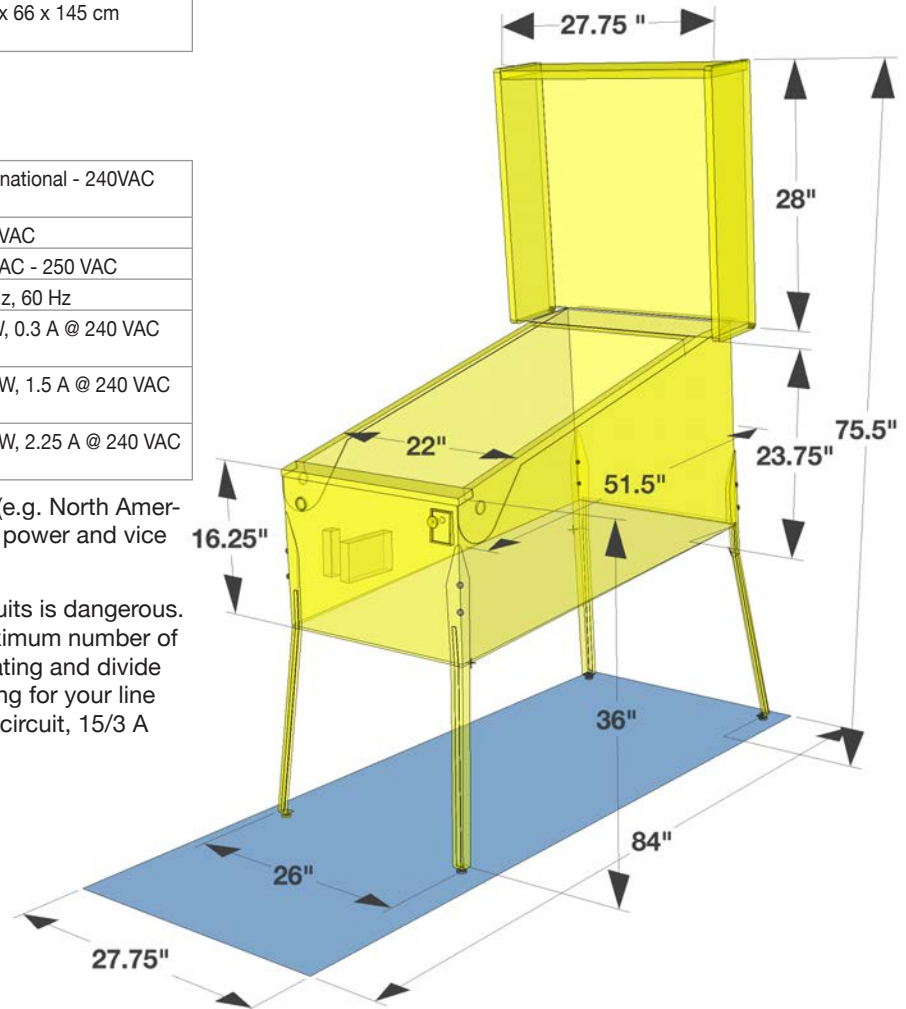
WARNING: Overloading electrical supply circuits is dangerous. Do not overload circuits. To calculate the maximum number of games for a circuit, check circuit amperage rating and divide by the game Nominal Line Power Current rating for your line voltage. For example, a 15A 120V household circuit, $15/3 \text{ A}$ (nominal current) = 5 games maximum.

SPECIFICATIONS, ENVIRONMENT

	Minimum	Maximum
Temperature, Operating	32 °F / 0 °C	104 °F / 40 °C
Temperature, Storage	32 °F / 0 °C	104 °F / 40 °C
Relative Humidity, Operating	5%	95% non-condensing
Relative Humidity, Storage	5%	95% non-condensing

- (a) "The appliance has to be placed in a horizontal position."
- (b) If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified person in order to avoid hazard.

6.1 GAME DIMENSIONS



6.2 WARRANTY

Stern Pinball machines are assembled in Elk Grove Village, 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 ensure it meets stringent quality and playability standards.

STERN PINBALL INC LIMITED WARRANTY

For warranty information, please visit:

sternpinball.com/support/warranty

ATTENTION! IMPORTANT WARRANTY INFORMATION

The electronics system, node network architecture, mechanical devices and associated software control systems in this pinball machine are designed to work with genuine Stern Pinball accessories and devices.

Installation of non-authorized accessories, lamps, LED's, motors or other devices or modification of electro-mechanical devices may damage the system and may void your warranty.

6.3 WARNINGS, COMPLIANCE, AND LEGAL NOTICES

PHOTOSENSITIVE SEIZURES HEALTH WARNING



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 lightheadedness, 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.

PARTS SUBSTITUTIONS



For safety and reliability, substitute parts and equipment modifications are not recommended and may void any and all warranties. Use of Non-Stern Pinball Inc Parts or Modifications of game circuitry may adversely affect game play or game safety. Transport pinball machines 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 remain energized when unplugged. Take great caution when servicing any electrical components.

PERCHLORATE MATERIAL - Special handling may apply. See www.dtsc.ca.gov/hazardouswaste/perchlorate

FCC CLASS A SUBPART J COMPLIANCE



This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

RF INTERFERENCE NOTICE

The cable harness placements, ground strap routing, and other shielding have been designed to keep RF radiation and conduction within levels accepted by FCC rules. To maintain these levels, factory harness position, shielding, and ground straps must be installed in their factory locations should they become disconnected during maintenance.

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