TRANSFORMERS

MORE THAN MEETS THE EYE

SERVICE AND OPERATION MANUAL



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WARNING

IMPORTANT HEALTH WARNING: PHOTOSENSITIVE SEIZURES - A very small percentage of people may experience a seizure when exposed to certain visual images, including flashing lights or patterns. Even people with no history of seizures of epilepsy may have an undiagnosed condition that can cause “photosensitive epileptic seizures” due to certain visual images, flashing lights or patterns. Symptoms can include 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.

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).

MANUAL #780-50AC-00
TRANSFORMERS: MORE THAN MEETS THE EYE LE #500-55AC-01
TRANSFORMERS: MORE THAN MEETS THE EYE PREMIUM #500-55AB-01

1-800-KICKERS - service@sternpinball.com
www.sternpinball.com - facebook.com/sternpinball

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1. SETUP AND MOVING

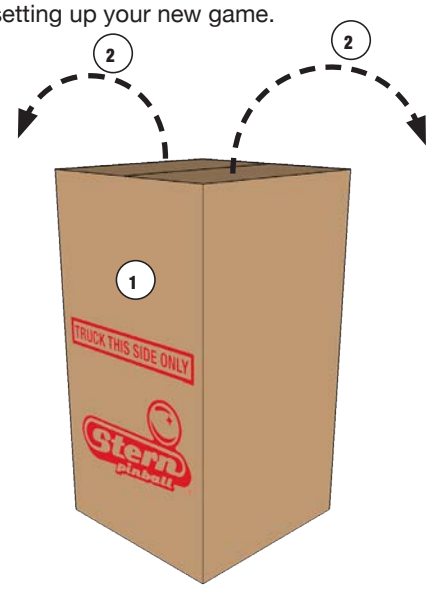
1.1 FIRST-TIME SETUP INSTRUCTIONS

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

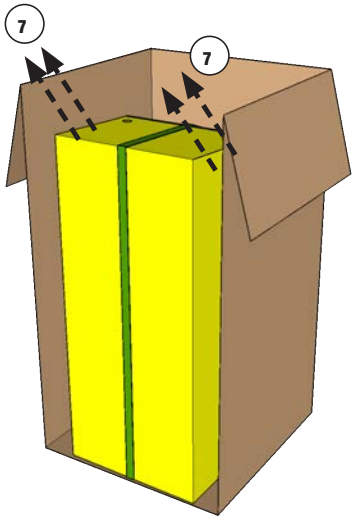
CAUTION: AT LEAST TWO (2) PEOPLE ARE REQUIRED TO MOVE AND MANEUVER THE GAME. USE PROPER MOVING EQUIPMENT AND EXTREME CARE WHILE HANDLING. STERN PINBALL MACHINES WEIGH OVER 250LBS BOXED.



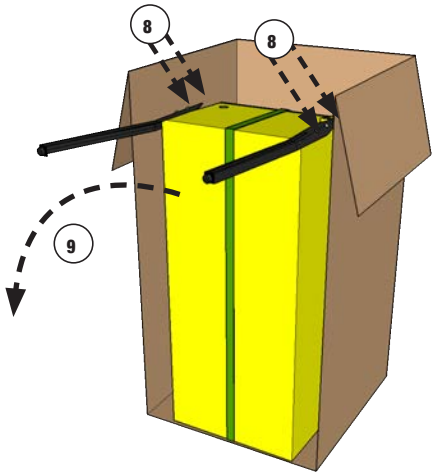
1. Locate the side labeled “TRUCK THIS SIDE ONLY”. The bottom of the game faces this side.
2. Open the top box flaps by pulling hard in an upward motion on each flap. If the flaps are taped, cut the tape first, taking care to avoid the box staples.



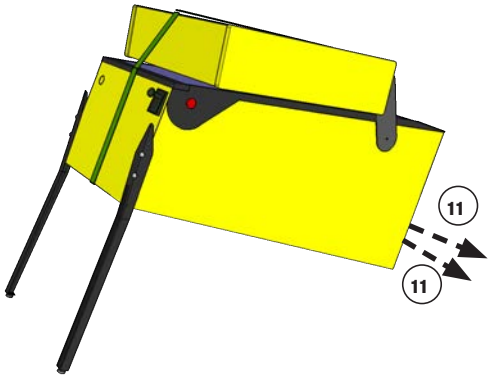
3. Remove the four (4) foam pieces and two (2) narrow box tubes which contain the four (4) identical legs with levelers.
4. DO NOT CUT STRAPPING YET. Keep backbox secured in the down position.
5. With the utility knife, carefully cut down the left and right corners of the box.



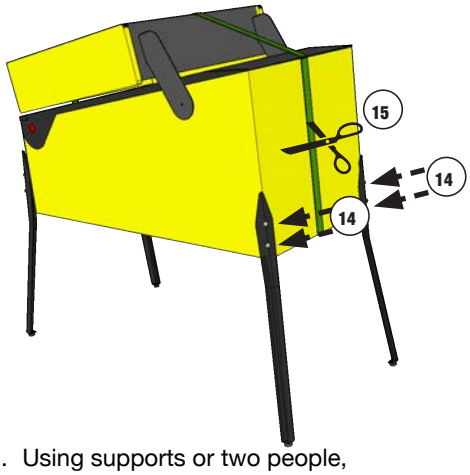
6. Let the face fall forward and remove the entire side by carefully cutting the bottom.
7. With the game still in its folded position, use a 5/8” wrench to loosen and remove the 2 leg bolts on each side of the front cabinet. Ensure the leg levelers are screwed all the way into the legs.



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.



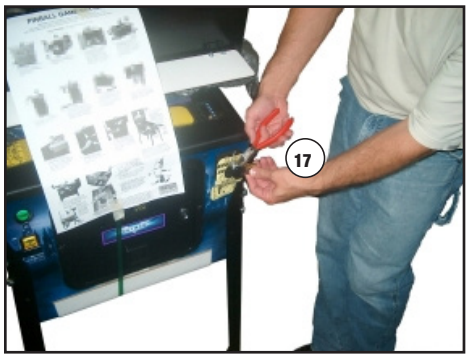
10. Set aside the open box.
11. With a 5/8” socket wrench, loosen and remove the 2 leg bolts on each side of the rear cabinet, 4 total.



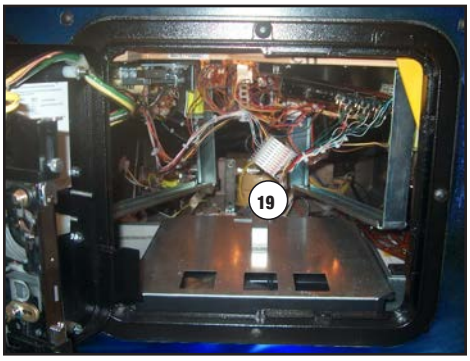
12. Using supports or two people, prop the rear of the cabinet up.
13. Ensure the rear leg levelers are screwed all the way into the legs.
14. Install rear legs using the 4 bolts removed from step 11.

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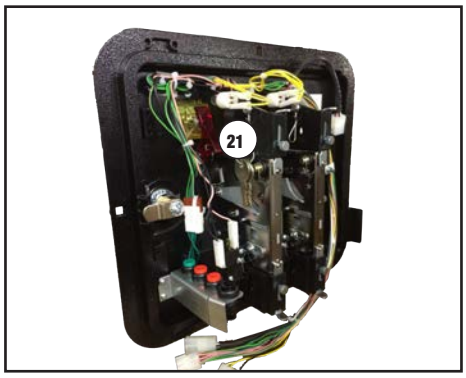
FIRST-TIME SETUP CONTINUED



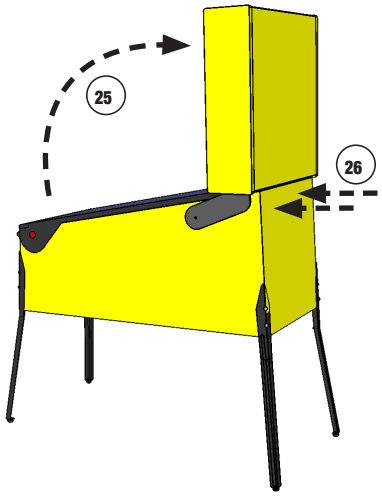
15. Cut nylon strapping and remove protective strap corner guards.
16. Locate the factory keys, either on the shooter rod or taped to the playfield glass.
17. Using snips, cut the tie-wrap securing the keys if required. One set of keys is for the front coin door, the other set of keys is for accessing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



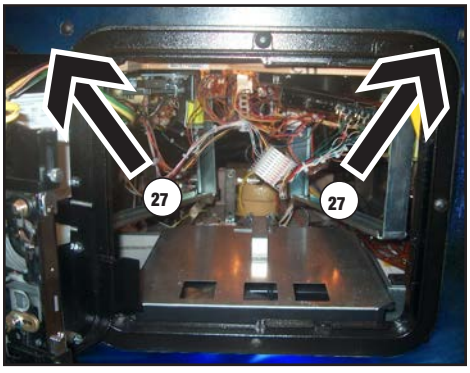
18. Open the front coin door.
19. Reach into the game and remove the retaining clip at the rear of the cash box.
20. Remove the cash box lid by sliding it toward you.



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.

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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

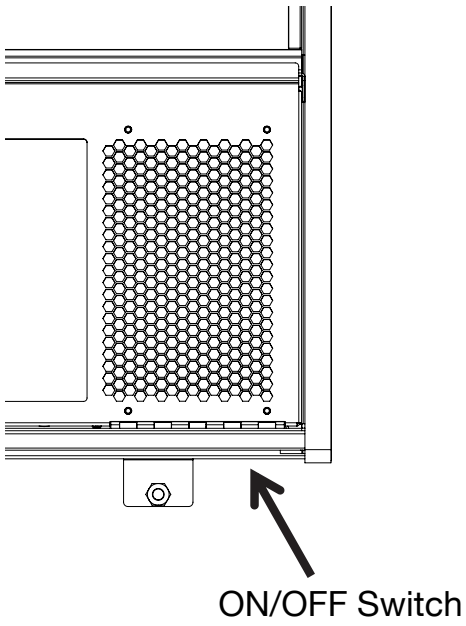
1. Select a location that is indoors, out of direct sunlight, and climate controlled. Excessive moisture/humidity can cause long-term damage to your game.
2. Adjust the front or rear levelers as necessary to position the playfield level bubble, located on the front right of the playfield next to the 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 acccount, 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.

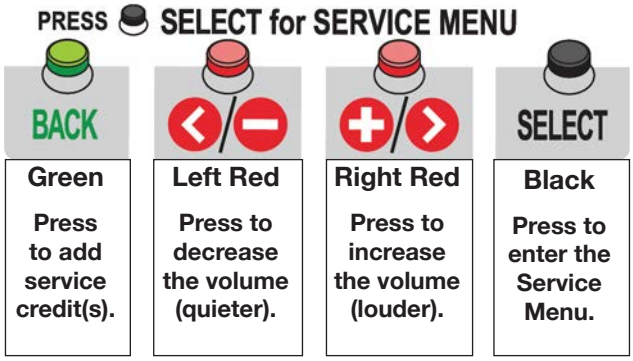


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1.2 SERVICE MENU NAVIGATION

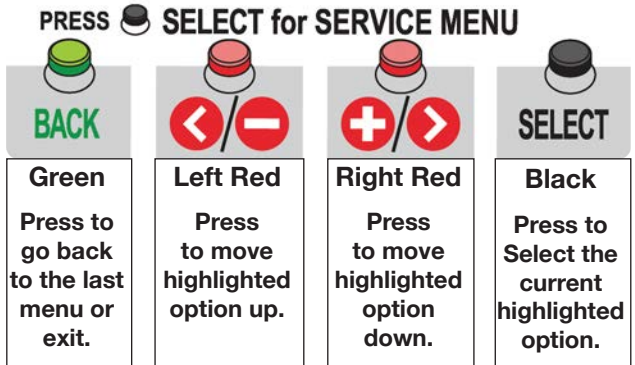
The four service buttons (inside Coin Door) have multiple functions. The buttons react differently depending on what state the game is currently in.

FUNCTIONS DURING GAME OR ATTRACT MODE



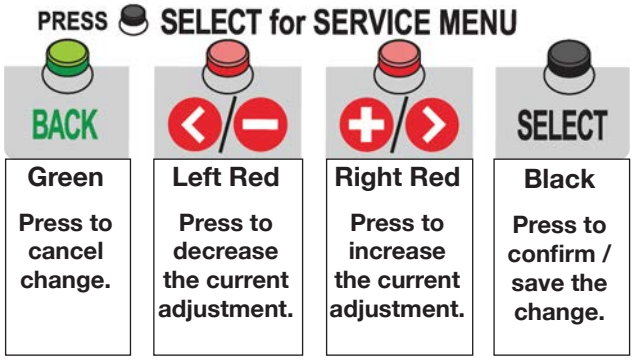
Green	Left Red	Right Red	Black
Press to add service credit(s).	Press to decrease the volume (quieter).	Press to increase the volume (louder).	Press to enter the Service Menu.

FUNCTIONS DURING SERVICE MENU



Green	Left Red	Right Red	Black
Press to go back to the last menu or exit.	Press to move highlighted option up.	Press to move highlighted option down.	Press to Select the current highlighted option.

FUNCTIONS WHEN MAKING ADJUSTMENTS



Green	Left Red	Right Red	Black
Press to cancel change.	Press to decrease the current adjustment.	Press to increase the current adjustment.	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.

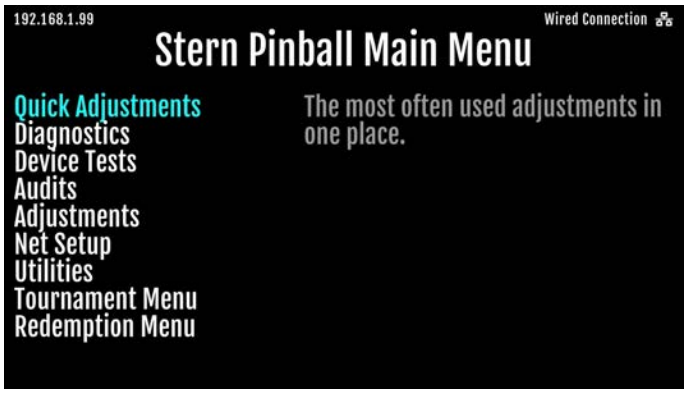
H 
Not Registered



Registered

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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

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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.

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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 Yaun	3/10 Yuan					1 Yuan	1	1	1	0	0	0
	2	1/10 Yaun	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								

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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.

CAUTION

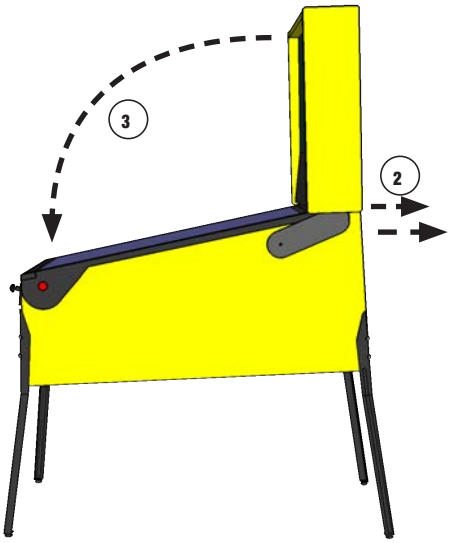
NEVER TRANSPORT THE GAME IN A MOVING VEHICLE WITH THE BACKBOX RAISED! TWO PEOPLE ARE REQUIRED TO REMOVE THE LEGS!

1. SECURE THE BACKBOX

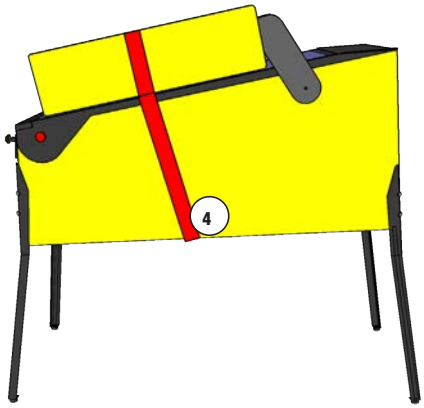
TOOLS REQUIRED

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

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

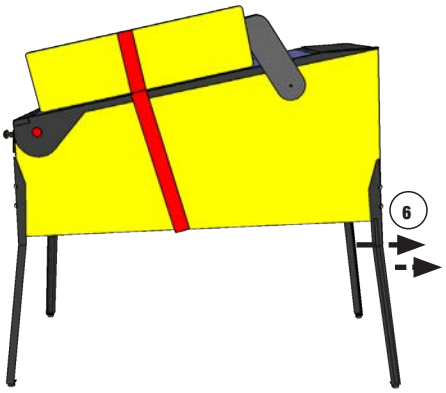


2. Remove the backbox securing bolts
3. Carefully lower the backbox onto the side rails. Use a piece of cardboard or suitable padding between the backbox and the game.

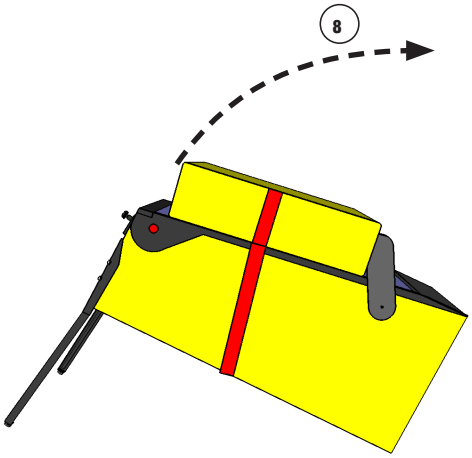


4. Securely strap the back box to the game
5. The game may be transported with the legs on. If the legs must be removed, follow the remaining steps.

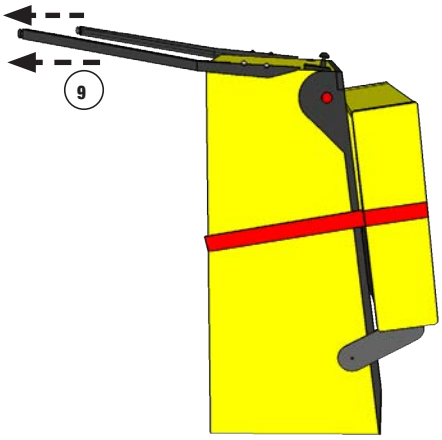
2. REMOVE THE LEGS AND STAND UP



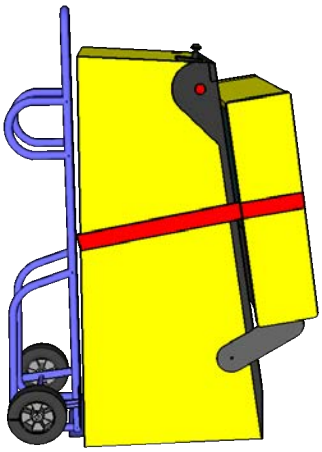
6. Remove the legs, rear legs first. Use a stool or a friend to support the rear of the game.
7. Rest the rear of the game on the ground.



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.

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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 (Select the "SW" Icon, then "TEST" Icon).
  - 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
TRANSFORMERS: MTMTE LE / Premium Playfield Plastics Kit	803-5000-AC
TRANSFORMERS: MTMTE LE / Premium Playfield Decals Kit	802-5000-AC
TRANSFORMERS: MTMTE LE Backbox Decal Left	820-30AC-01
TRANSFORMERS: MTMTE Premium Backbox Decal Left	820-81AB-01
TRANSFORMERS: MTMTE LE Backbox Decal Right	820-30AC-02
TRANSFORMERS: MTMTE Premium Backbox Decal Right	820-81AB-02
TRANSFORMERS: MTMTE LE Cabinet Decal Left	820-30AC-03
TRANSFORMERS: MTMTE Premium Cabinet Decal Left	820-81AB-03
TRANSFORMERS: MTMTE LE Cabinet Decal Right	820-30AC-04
TRANSFORMERS: MTMTE Premium Cabinet Decal Right	820-81AB-04
TRANSFORMERS: MTMTE LE Cabinet Decal Front	820-30AC-05
TRANSFORMERS: MTMTE Premium Cabinet Decal Front	820-81AB-05
TRANSFORMERS: MTMTE LE / Premium Playfield, Bare	830-5100-AC
TRANSFORMERS: MTMTE LE Mirror Backglass	830-8426-AC
TRANSFORMERS: MTMTE Premium Translite	830-8427-AB

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

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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 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.

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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)

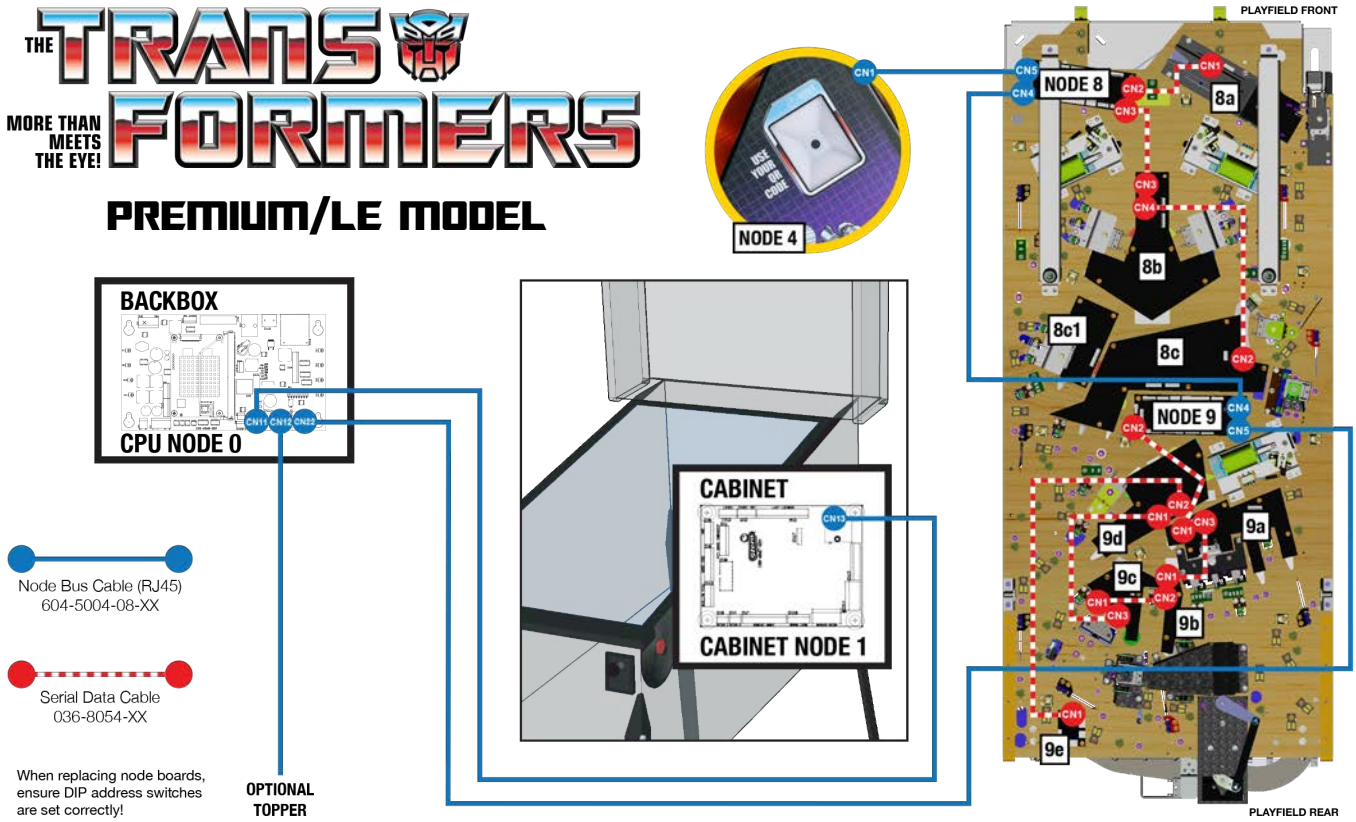
SPIKE features built-in short-circuit, static electricity, and other protections to maximize reliability. If an LED, coil or other device shorts, it will be disabled but will not shut down the entire system in most circumstances. Groups of LEDs, coils, and switches often share common power supplies or 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	524-1002-00
Cabinet Node	Node	520-6967-72
Playfield 48V Core-Driver Node	Node	520-1057-00 520-1070-00
Trough Serial Opto Receiver Extension	Extension	520-8516-00
QR Scanner Assembly	Node	524-1001-00

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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	524-1002-00
Node 1	n/a	Cabinet Node	Cabinet	520-6967-72
Node 4	n/a	QR Reader Node	Bottom Arch	524-1001-00
Node 8	OFF-OFF-OFF-OFF	Core - Driver Node	Lower Playfield	520-1070-00 520-1057-00
8a	n/a	Trough Serial Opto Receiver Extension	Playfield	520-8516-00
8b	n/a	12W LC LED Board	Playfield	520-8712-00
8c	n/a	5R 8W 2F MC LED Board	Playfield	520-9872-00
8c1	n/a	2R 4W LM LED Board	Playfield	520-8713-00
Node 9	OFF-OFF-ON-OFF	Core - Driver Node	Playfield	520-1070-00 520-1057-00
9a	n/a	7R 5W UMR LED Board	Playfield	520-8716-00
9b	n/a	1R 4W 1F UCR LED Board	Playfield	520-8718-00
9c	n/a	4R 1W 2F UCL LED Board	Playfield	520-8717-00
9d	n/a	3R 7W UML LED Board	Playfield	520-8715-00
9e	n/a	Serial Motor Driver Board	Playfield	520-6996-00
Node 0(2)	n/a	(LE Option)	Cabinet-Expression	
Node 0(7)	n/a	(LE Option)	Speaker-Expression	
Node 12	ON-OFF-OFF-OFF	Topper (Optional)	Topper	
Node 13	ON-OFF-ON-OFF			
Node 14	ON-ON-OFF-OFF	Universal Topper (Optional)	Topper	520-5370-72

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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	Soundwave Diverter	8	CN7	3	YEL BLK	48V	1	GRY ORG	Playfield	Coil - 32-1800	8-DR-6	515-3031-00 (090-5031-00-ND)
9	Upper Right Flipper	8	CN7	4	YEL BRN	48V	1	GRY ORG	Playfield	Coil - 22-1080	8-DR-7	090-5032-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	VUK	9	CN8	10	ORG BLK	48V	1-4	GRY BRN	Playfield	Coil - 23-800	9-DR-2	090-5001-ND
12	Upper Left Sling	9	CN8	11	ORG BRN	48V	1-4	GRY BRN	Playfield	Coil - 26-1200	9-DR-3	090-5044-ND
13												
14	Top Diverter	9	CN8	6	BLU BRN	48V	1-4	GRY BRN	Playfield	Coil - 26-1200	9-DR-5	090-5044-ND
15	Combiner Up Post	9	CN7	3	YEL GRN	48V	1	GRY BRN	Playfield	Coil - 26-1200	9-DR-6	090-5044-ND
16												
17	3 Bank Drop	9	CN8	7	YEL VIO	48V	1-4	GRY BRN	Playfield	Coil - 25-1240	9-DR-1	090-5034-ND
18	Soundwave	9	CN7	2	YEL ORG	48V	1	GRY BRN	Playfield	Coil - 26-1200	9-DR-8	500-7051-06 (090-5091-00)
19	Cannon	9	CN8	9	ORG RED	48V	1-4	GRY BRN	Playfield	Coil - 26-1200	9-DR-4	500-7051-03 (090-5091-00)
20												
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

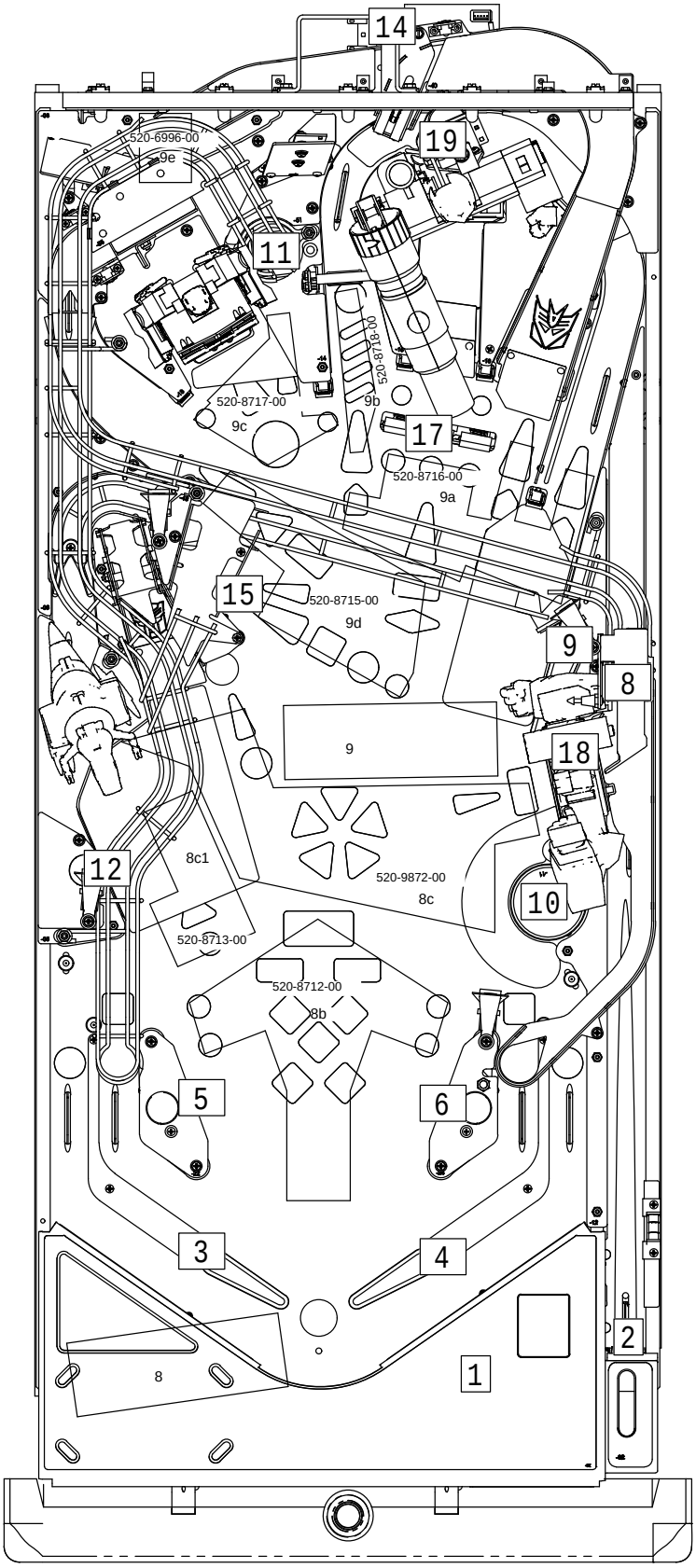


Figure 3.2.1. Playfield driver locations (top view).

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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	500-2567-03
2	Left Return Lane	8	-	CN11	5	LGN ORG	11/12	BLK ORG	Playfield	Rollover	8-SW-18	500-2567-03
3												
4												
5	Right Return Lane	8	-	CN11	6	LGN YEL	11/12	BLK ORG	Playfield	Rollover	8-SW-19	500-2567-04
6	Right Outlane	8	-	CN11	7	LGN BLU	11/12	BLK ORG	Playfield	Rollover	8-SW-20	500-2567-04
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	180-5164-01
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	UP Right Flipper Button	8	-	CN9	5	VIO WHT	7	BLK VIO	Playfield	Leaf	8-SW-26	180-5164-01
15	Trough 6	8	8a	CN14	-		-		Playfield	Opto	8-SW-32	520-5344-00 tx 520-8516-00 rx
16	Trough 5	8	8a	CN14	-		-		Playfield	Opto	8-SW-33	520-5344-00 tx 520-8516-00 rx
17	Trough 4	8	8a	CN14	-		-		Playfield	Opto	8-SW-34	520-5344-00 tx 520-8516-00 rx
18	Trough 3	8	8a	CN14	-		-		Playfield	Opto	8-SW-35	520-5344-00 tx 520-8516-00 rx
19	Trough 2	8	8a	CN14	-		-		Playfield	Opto	8-SW-36	520-5344-00 tx 520-8516-00 rx
20	Trough 1	8	8a	CN14	-		-		Playfield	Opto	8-SW-37	520-5344-00 tx 520-8516-00 rx
21	Trough Jam	8	8a	CN14	-		-		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	Upper Shooter Lane	8	-	CN11	9	LGN GRY	11/12	BLK ORG	Playfield	Rollover	8-SW-22	500-2567-04
24	UP Right Flipper EOS	8	-	CN12	9	PNK BRN	10	BLK RED	Playfield	Leaf	8-SW-15	180-5149-00
25	Paddle Target	8	-	CN11	10	LGN WHT	11/12	BLK ORG	Playfield	Leaf, Target	8-SW-23	510-8028-00
26												
27												
28												
29												
30	Upper Left Sling	9	-	CN13	8	PNK GRY	10	BLK BRN	Playfield	Leaf	9-SW-6	180-5231-00
31	Grimlock Target Left	9	-	CN13	5	PNK GRN	10	BLK BRN	Playfield	Leaf, Target	9-SW-3	515-9785-00-00
32	Grimlock Target Right	9	-	CN13	6	PNK BLU	10	BLK BRN	Playfield	Leaf, Target	9-SW-4	515-9785-00-00
33	Grimlock Enter	9	-	CN13	7	PNK VIO	10	BLK BRN	Playfield	Leaf, Target	9-SW-5	500-2567-03
34	Grimlock Exit Opto	9	-	CN13	9	PNK WHT	10	BLK BRN	Playfield	Leaf, Target	9-SW-7	511-5815-00 tx 511-5815-01 rx
35												
36												
37	Right Pop Bumper	8	-	CN11	8	LGN VIO	11/12	BLK ORG	Playfield	Leaf	8-SW-21	180-5232-00
38	Soundwave Lock 1 Opto	9	-	CN12	2	WHT BRN	10	BLK WHT	Playfield	Opto	9-SW-8	520-9903-00 tx 520-9902-00 rx
39	Soundwave Lock 2 Opto	9	-	CN12	3	WHT RED	10	BLK WHT	Playfield	Opto	9-SW-9	520-9903-00 tx 520-9902-00 rx
40												
41												
42	PF Target 1	9	-	CN11	10	TAN	11/12	BLK GRY	Playfield	Leaf, Target	9-SW-23	515-9785-00-00
43	PF Target 2	9	-	CN10	6	GRY YEL	7/8/9	BLK BLU	Playfield	Leaf, Target	9-SW-16	515-9785-00-00

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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
44	PF Target 3	8	-	CN12	2	WHT BRN	10	BLK RED	Playfield	Leaf, Target	8-SW-8	515-9785-00-00
45												
46												
47												
48	Optimus Ramp Entrance	9	-	CN10	2	GRY BLK	7/8/9	BLK BLU	Playfield	Rollover	9-SW-28	500-2567-03
49	Left Ramp Exit Opto	9	-	CN10	3	GRY BRN	7/8/9	BLK BLU	Playfield	Opto	9-SW-29	511-5815-00 tx 511-5815-01 rx
50	VUK Opto	9	-	CN10	4	GRY RED	7/8/9	BLK BLU	Playfield	Opto	9-SW-30	515-0215-00 tx 515-0215-01 rx
51												
52												
53	Optimus Hit	9	-	CN9	3	LGN ORG	7/8	BLK BLU	Playfield	Leaf, Target	9-SW-24	510-8028-02
54												
55												
56												
57												
58	Subway Opto	9	-	CN11	5	TAN YEL	11/12	BLK GRY	Playfield	Opto	9-SW-18	515-0215-00 tx 515-0215-01 rx
59	Spinner Opto	9	-	CN10	5	GRY ORG	7/8/9	BLK BLU	Playfield	Opto	9-SW-31	511-2785-01
60	Center Loop	9	-	CN11	4	TAN ORG	11/12	BLK GRY	Playfield	Rollover	9-SW-17	500-2567-04
61												
62												
63	Right Orbit	8	-	CN12	4	WHT ORG	10	BLK RED	Playfield	Rollover	8-SW-10	500-2567-03
64	Megatron Enter	9	-	CN11	6	TAN GRN	11/12	BLK GRY	Playfield	Micro	9-SW-19	180-5119-02
65	Megatron Target Left	8	-	CN12	5	WHT YEL	10	BLK RED	Playfield	Leaf, Target	8-SW-11	515-9785-00-00
66	Megatron Target Right	8	-	CN12	6	WHT GRN	10	BLK RED	Playfield	Leaf, Target	8-SW-12	515-9785-00-00
67	Megatron Hit	9	-	CN11	9	TAN WHT	11/12	BLK GRY	Playfield	Micro	9-SW-22	180-5119-02
68	Megatron Motor Left	9	-	CN13	2	PNK RED	10	BLK BRN	Playfield	Opto	9-SW-0	520-8719-00
69	Megatron Motor Center	9	-	CN13	3	PNK ORG	10	BLK BRN	Playfield	Opto	9-SW-1	520-8719-00
70	Megatron Motor Right	9	-	CN13	4	PNK YEL	10	BLK BRN	Playfield	Opto	9-SW-2	520-8719-00
71												
72	Right Ramp Exit Opto	9	-	CN12	4	WHT ORG	10	BLK WHT	Playfield	Opto	9-SW-10	515-0215-00 tx 515-0215-01 rx
73	3 Bank Drop Left	9	-	CN12	5	WHT YEL	10	BLK WHT	Playfield	Opto	9-SW-11	520-8497-00
74	3 Bank Drop Center	9	-	CN12	6	WHT GRN	10	BLK WHT	Playfield	Opto	9-SW-12	520-8497-00
75	3 Bank Drop Right	9	-	CN12	7	WHT BLU	10	BLK WHT	Playfield	Opto	9-SW-13	520-8497-00
76	Optimus Ramp Exit Opto	9	-	CN12	9	WHT GRY	10	BLK WHT	Playfield	Opto	9-SW-15	515-0215-00 tx 515-0215-01 rx
77												
78	Combiner Target	9	-	CN11	7	TAN BLU	11/12	BLK GRY	Playfield	Leaf, Target	9-SW-20	515-9783-00-00
79	Captive Ball Target	9	-	CN11	8	TAN VIO	11/12	BLK GRY	Playfield	Leaf, Target	9-SW-21	515-9785-00-00
80												
81												
82												
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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
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	GRY WHT	5	BLK WHT	Cabinet	Micro	1-SW-12	500-6587-06-TL
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	-	3	-	Coin Door	-	1-SW-19	
100	Fifth Coin	1	-	CN5	5	-	3	-	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	-	6	-	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 Power Interlock	0	a	CN4	1	WHT GRY	4	BLK WHT	Cabinet		0-SW-23	180-5248-00

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SWITCH REFERENCE CONTINUED

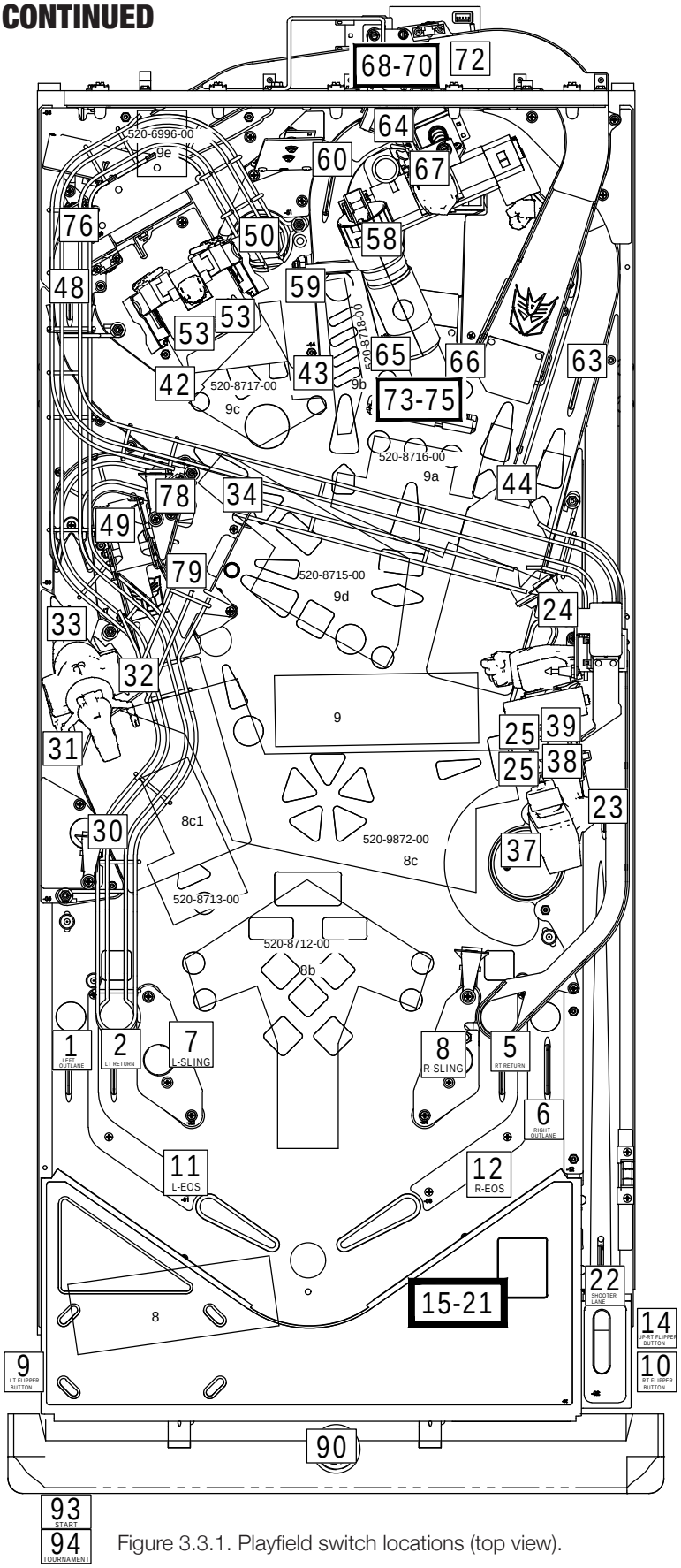


Figure 3.3.1. Playfield switch locations (top view).

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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	Ticket Low	1	-	CN2	4		5		Cabinet	Feature	White	1-LP-8	
8													
9													
10													
11	Left Outlane	8	b	CN2	4	BRN RED	1/2/3	RED	Playfield	Feature	White	8-LP-14	520-5307-00
12	Autobot Inlane	8	b	CN2	5	BRN ORG	1/2/3	RED	Playfield	Feature	White	8-LP-15	520-5307-00
13	Shoot Again	8	c	CN3	2	ORG BRN	1	RED	Playfield	Feature	White	8-LP-46	520-5307-00
14	Decepticon Inlane	8	b	CN2	6	BRN YEL	1/2/3	RED	Playfield	Feature	White	8-LP-16	520-5307-00
15	Countdown to Extinction-R	8	b	CN2	7	RED YEL	1/2/3	RED	Playfield	Feature	White	8-LP-17	520-5333-00
16	Countdown to Extinction-G	8	b	CN2	8	GRN YEL	1/2/3	RED	Playfield	Feature	White	8-LP-18	520-5333-00
17	Countdown to Extinction-B	8	b	CN2	9	BLU YEL	1/2/3	RED	Playfield	Feature	White	8-LP-19	520-5333-00
18													
19	The Ultimate Doom	8	b	LED19	-	-	-	-	Playfield	Feature	White	8-LP-26	520-8712-00
20	Rescue Optimus	8	b	LED20	-	-	-	-	Playfield	Feature	White	8-LP-27	520-8712-00
21	Tech Spec Mania	8	b	LED18	-	-	-	-	Playfield	Feature	White	8-LP-25	520-8712-00
22	Autobot Run	8	b	LED23	-	-	-	-	Playfield	Feature	White	8-LP-30	520-8712-00
23	Microbots	8	b	LED15	-	-	-	-	Playfield	Feature	White	8-LP-22	520-8712-00
24	2x	8	b	LED22	-	-	-	-	Playfield	Feature	White	8-LP-29	520-8712-00
25	3x	8	b	LED21	-	-	-	-	Playfield	Feature	White	8-LP-28	520-8712-00
26	Rusted	8	b	LED17	-	-	-	-	Playfield	Feature	White	8-LP-24	520-8712-00
27	Energized	8	b	LED16	-	-	-	-	Playfield	Feature	White	8-LP-23	520-8712-00
28	Solar Needle	8	b	LED24	-	-	-	-	Playfield	Feature	White	8-LP-31	520-8712-00
29	Prime Targets	8	b	LED13	-	-	-	-	Playfield	Feature	White	8-LP-20	520-8712-00
30	Golden Lagoon	8	b	LED14	-	-	-	-	Playfield	Feature	White	8-LP-21	520-8712-00
31													
32	Grimlock Target Right-R	8	c	LED35	-	-	-	-	Playfield	Feature	RGB	8-LP-71	520-9872-00
33	Grimlock Target Right-G	8	c	LED35	-	-	-	-	Playfield	Feature	RGB	8-LP-72	520-9872-00
34	Grimlock Target Right-B	8	c	LED35	-	-	-	-	Playfield	Feature	RGB	8-LP-73	520-9872-00
35	Left Ramp-R	8	c	LED34	-	-	-	-	Playfield	Feature	RGB	8-LP-68	520-9872-00
36	Left Ramp-G	8	c	LED34	-	-	-	-	Playfield	Feature	RGB	8-LP-69	520-9872-00
37	Left Ramp-B	8	c	LED34	-	-	-	-	Playfield	Feature	RGB	8-LP-70	520-9872-00
38													
39	Lt Ramp Tech Spec-R	8	c	LED36	-	-	-	-	Playfield	Feature	RGB	8-LP-74	520-9872-00
40	Lt Ramp Tech Spec-G	8	c	LED36	-	-	-	-	Playfield	Feature	RGB	8-LP-75	520-9872-00
41	Lt Ramp Tech Spec-B	8	c	LED36	-	-	-	-	Playfield	Feature	RGB	8-LP-76	520-9872-00
42													
43	Grimlock Target Left-R	8	c	CN1	8	RED YEL	1/2		Playfield	Feature	RGB	8-LP-42	520-5333-00
44	Grimlock Target Left-G	8	c	CN1	9	GRN YEL	1/2		Playfield	Feature	RGB	8-LP-43	520-5333-00
45	Grimlock Target Left-B	8	c	CN1	10	BLU YEL	1/2		Playfield	Feature	RGB	8-LP-44	520-5333-00
46	Captive Ball-R	8	c	LED33	-	-	-	-	Playfield	Feature	RGB	8-LP-65	520-9872-00
47	Captive Ball-G	8	c	LED33	-	-	-	-	Playfield	Feature	RGB	8-LP-66	520-9872-00
48	Captive Ball-B	8	c	LED33	-	-	-	-	Playfield	Feature	RGB	8-LP-67	520-9872-00
49													
50	Playfield x	8	c	LED32	-	-	-	-	Playfield	Feature	White	8-LP-64	520-9872-00

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LIGHT REFERENCE CONTINUED

ID	Name	Node	Node Ext.	Conn.	Ret. Pin	Ret. Wire	Src. Pin	Src. Wire	Location	Type	Light Color	Address	Part Number
51	Autobot Hurry Up	8	c	LED37	-	-	-	-	Playfield	Feature	White	8-LP-77	520-9872-00
52	Bruticus	8	c	LED31	-	-	-	-	Playfield	Feature	White	8-LP-63	520-9872-00
53	Menasor	8	c	LED22	-	-	-	-	Playfield	Feature	White	8-LP-54	520-9872-00
54	Defensor	8	c	LED13	-	-	-	-	Playfield	Feature	White	8-LP-45	520-9872-00
55	Devastator	8	c	LED39	-	-	-	-	Playfield	Feature	White	8-LP-79	520-9872-00
56	Superion	8	c	LED38	-	-	-	-	Playfield	Feature	White	8-LP-78	520-9872-00
57	Soundwave-R	8	c	LED4	-	-	-	-	Playfield	Feature	RGB	8-LP-34	520-9872-00
58	Soundwave-G	8	c	LED4	-	-	-	-	Playfield	Feature	RGB	8-LP-35	520-9872-00
59	Soundwave-B	8	c	LED4	-	-	-	-	Playfield	Feature	RGB	8-LP-36	520-9872-00
60	Cassette Combo	8	c	LED3	-	-	-	-	Playfield	Feature	White	8-LP-33	520-9872-00
61	Pop Bumper-R	8	c	CN1	3	RED VIO	1/2		Playfield	Feature	RGB	8-LP-37	520-5374-00
62	Pop Bumper-G	8	c	CN1	4	GRN VIO	1/2		Playfield	Feature	RGB	8-LP-38	520-5374-00
63	Pop Bumper-B	8	c	CN1	5	BLU VIO	1/2		Playfield	Feature	RGB	8-LP-39	520-5374-00
64													
65													
66	Grimlock-R	8	c	CN3	3	RED VIO	1	RED	Playfield	Feature	RGB	8-LP-47	520-8713-00
67	Grimlock-G	8	c	CN3	4	GRN VIO	1	RED	Playfield	Feature	RGB	8-LP-48	520-8713-00
68	Grimlock-B	8	c	CN3	5	BLU VIO	1	RED	Playfield	Feature	RGB	8-LP-49	520-8713-00
69	SOS	8	c	CN3	6	ORG BLU	1	RED	Playfield	Feature	White	8-LP-50	520-8713-00
70	Island	8	c	CN3	7	ORG VIO	1	RED	Playfield	Feature	White	8-LP-51	520-8713-00
71	Dino Jackpot	8	c	CN3	8	ORG GRY	1	RED	Playfield	Feature	White	8-LP-52	520-8713-00
72	War	8	c	CN3	9	ORG	1	RED	Playfield	Feature	White	8-LP-53	520-8713-00
73	Grimlock Tech Spec-R	8	c	CN4	3	RED ORG	1/2	RED	Playfield	Feature	RGB	8-LP-55	520-8713-00
74	Grimlock Tech Spec-G	8	c	CN4	4	GRN ORG	1/2	RED	Playfield	Feature	RGB	8-LP-56	520-8713-00
75	Grimlock Tech Spec-B	8	c	CN4	5	BLU ORG	1/2	RED	Playfield	Feature	RGB	8-LP-57	520-8713-00
76													
77													
78	Optimus Ramp-R	9	d	LED8	-	-	-	-	Playfield	Feature	RGB	9-LP-75	520-8715-00
79	Optimus Ramp-G	9	d	LED8	-	-	-	-	Playfield	Feature	RGB	9-LP-76	520-8715-00
80	Optimus Ramp-B	9	d	LED8	-	-	-	-	Playfield	Feature	RGB	9-LP-77	520-8715-00
81	Super Jackpot	9	d	LED7	-	-	-	-	Playfield	Feature	White	9-LP-74	520-8715-00
82	Combiner Part Collect-R	9	d	LED6	-	-	-	-	Playfield	Feature	RGB	9-LP-71	520-8715-00
83	Combiner Part Collect-G	9	d	LED6	-	-	-	-	Playfield	Feature	RGB	9-LP-72	520-8715-00
84	Combiner Part Collect-B	9	d	LED6	-	-	-	-	Playfield	Feature	White	9-LP-73	520-8715-00
85	Add a Ball	9	d	LED5	-	-	-	-	Playfield	Feature	White	9-LP-70	520-8715-00
86	Dead End-R	9	d	LED4	-	-	-	-	Playfield	Feature	RGB	9-LP-67	520-8715-00
87	Dead End-G	9	d	LED4	-	-	-	-	Playfield	Feature	RGB	9-LP-68	520-8715-00
88	Dead End-B	9	d	LED4	-	-	-	-	Playfield	Feature	RGB	9-LP-69	520-8715-00
89	Combiner Multiball Start	9	d	LED3	-	-	-	-	Playfield	Feature	White	9-LP-66	520-8715-00
90	Extra Ball	9	d	LED2	-	-	-	-	Playfield	Feature	White	9-LP-65	520-8715-00
91	Space Bridge	9	d	LED1	-	-	-	-	Playfield	Feature	White	9-LP-64	520-8715-00
92	Final Blow	9	d	LED10	-	-	-	-	Playfield	Feature	White	9-LP-79	520-8715-00
93	Mission Start	9	d	LED9	-	-	-	-	Playfield	Feature	White	9-LP-78	520-8715-00
94													
95													
96	Optimus Target Left-R	9	c	LED4	-	-	-	-	Playfield	Feature	RGB	9-LP-53	520-8717-00
97	Optimus Target Left-G	9	c	LED4	-	-	-	-	Playfield	Feature	RGB	9-LP-54	520-8717-00
98	Optimus Target Left-B	9	c	LED4	-	-	-	-	Playfield	Feature	RGB	9-LP-55	520-8717-00
99	Optimus-R	9	c	LED5	-	-	-	-	Playfield	Feature	White	9-LP-56	520-8717-00
100	Optimus-G	9	c	LED5	-	-	-	-	Playfield	Feature	White	9-LP-57	520-8717-00
101	Optimus-B	9	c	LED5	-	-	-	-	Playfield	Feature	White	9-LP-58	520-8717-00
102	Lock	9	c	LED6	-	-	-	-	Playfield	Feature	White	9-LP-59	520-8717-00
103	VUK-R	9	c	LED7	-	-	-	-	Playfield	Feature	RGB	9-LP-60	520-8717-00

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LIGHT REFERENCE CONTINUED

ID	Name	Node	Node Ext.	Conn.	Ret. Pin	Ret. Wire	Src. Pin	Src. Wire	Location	Type	Light Color	Address	Part Number
104	VUK-G	9	c	LED7	-	-	-	-	Playfield	Feature	RGB	9-LP-61	520-8717-00
105	VUK-B	9	c	LED7	-	-	-	-	Playfield	Feature	RGB	9-LP-62	520-8717-00
106	Spinner Target Left-R	9	c	LED1	-	-	-	-	Playfield	Feature	RGB	9-LP-48	520-8717-00
107	Spinner Target Left-G	9	c	LED1	-	-	-	-	Playfield	Feature	RGB	9-LP-49	520-8717-00
108	Spinner Target Left-B	9	c	LED1	-	-	-	-	Playfield	Feature	RGB	9-LP-50	520-8717-00
109													
110	Energon 1	9	b	LED5	-	-	-	-	Playfield	Feature	White	9-LP-46	520-8718-00
111	Energon 2	9	b	LED4	-	-	-	-	Playfield	Feature	White	9-LP-45	520-8718-00
112	Energon 3	9	b	LED3	-	-	-	-	Playfield	Feature	White	9-LP-44	520-8718-00
113	Energon 4	9	b	LED2	-	-	-	-	Playfield	Feature	White	9-LP-43	520-8718-00
114	Center Orbit-R	9	b	LED1	-	-	-	-	Playfield	Feature	RGB	9-LP-40	520-8718-00
115	Center Orbit-G	9	b	LED1	-	-	-	-	Playfield	Feature	RGB	9-LP-41	520-8718-00
116	Center Orbit-B	9	b	LED1	-	-	-	-	Playfield	Feature	RGB	9-LP-42	520-8718-00
117													
118	Megatron Target Left-R	8	b	CN1	3	RED BRN	1/2		Playfield	Feature	RGB	8-LP-8	520-5333-00
119	Megatron Target Left-G	8	b	CN1	4	GRN BRN	1/2		Playfield	Feature	RGB	8-LP-9	520-5333-00
120	Megatron Target Left-B	8	b	CN1	5	BLU BRN	1/2		Playfield	Feature	RGB	8-LP-10	520-5333-00
121	Megatron Target Right-R	8	b	CN1	6	RED ORG	1/2		Playfield	Feature	RGB	8-LP-11	520-5333-00
122	Megatron Target Right-G	8	b	CN1	7	GRN ORG	1/2		Playfield	Feature	RGB	8-LP-12	520-5333-00
123	Megatron Target Right-B	8	b	CN1	8	BLU ORG	1/2		Playfield	Feature	RGB	8-LP-13	520-5333-00
124													
125	Drop Target Left	9	a	LED1	-	-	-	-	Playfield	Feature	White	9-LP-8	520-8716-00
126	Drop Target Center	9	a	LED2	-	-	-	-	Playfield	Feature	White	9-LP-9	520-8716-00
127	Drop Target Right	9	a	LED3	-	-	-	-	Playfield	Feature	White	9-LP-10	520-8716-00
128	Center Orbit Tech Spec-R	9	a	LED18	-	-	-	-	Playfield	Feature	RGB	9-LP-37	520-8716-00
129	Center Orbit Tech Spec-G	9	a	LED18	-	-	-	-	Playfield	Feature	RGB	9-LP-38	520-8716-00
130	Center Orbit Tech Spec-B	9	a	LED18	-	-	-	-	Playfield	Feature	RGB	9-LP-39	520-8716-00
131	Megatron-R	9	a	LED17	-	-	-	-	Playfield	Feature	RGB	9-LP-34	520-8716-00
132	Megatron-G	9	a	LED17	-	-	-	-	Playfield	Feature	RGB	9-LP-35	520-8716-00
133	Megatron-B	9	a	LED17	-	-	-	-	Playfield	Feature	RGB	9-LP-36	520-8716-00
134	Right Ramp-R	9	a	LED4	-	-	-	-	Playfield	Feature	RGB	9-LP-11	520-8716-00
135	Right Ramp-G	9	a	LED4	-	-	-	-	Playfield	Feature	RGB	9-LP-12	520-8716-00
136	Right Ramp-B	9	a	LED4	-	-	-	-	Playfield	Feature	RGB	9-LP-13	520-8716-00
137	Right Ramp Tech Spec-R	9	a	LED5	-	-	-	-	Playfield	Feature	RGB	9-LP-14	520-8716-00
138	Right Ramp Tech Spec-G	9	a	LED5	-	-	-	-	Playfield	Feature	RGB	9-LP-15	520-8716-00
139	Right Ramp Tech Spec-B	9	a	LED5	-	-	-	-	Playfield	Feature	RGB	9-LP-16	520-8716-00
140	One Shall Fall	9	a	LED16	-	-	-	-	Playfield	Feature	White	9-LP-33	520-8716-00
141	Right Ramp Target Right-R	9	a	LED6	-	-	-	-	Playfield	Feature	RGB	9-LP-17	520-8716-00
142	Right Ramp Target Right-G	9	a	LED6	-	-	-	-	Playfield	Feature	RGB	9-LP-18	520-8716-00
143	Right Ramp Target Right-B	9	a	LED6	-	-	-	-	Playfield	Feature	RGB	9-LP-19	520-8716-00
144	Right Orbit-R	9	a	LED8	-	-	-	-	Playfield	Feature	RGB	9-LP-23	520-8716-00
145	Right Orbit-G	9	a	LED8	-	-	-	-	Playfield	Feature	RGB	9-LP-24	520-8716-00
146	Right Orbit-B	9	a	LED8	-	-	-	-	Playfield	Feature	RGB	9-LP-25	520-8716-00
147	Right Orbit Tech Spec-R	9	a	LED7	-	-	-	-	Playfield	Feature	RGB	9-LP-20	520-8716-00
148	Right Orbit Tech Spec-G	9	a	LED7	-	-	-	-	Playfield	Feature	RGB	9-LP-21	520-8716-00
149	Right Orbit Tech Spec-B	9	a	LED7	-	-	-	-	Playfield	Feature	RGB	9-LP-22	520-8716-00
150	Starscream Frenzy	9	a	LED9					Playfield	Feature	White	9-LP-26	520-8716-00
151													
152	Billboard Transformers Multiball	9	a	CN2	6	YEL BRN	1/2	RED	Playfield	Feature	White	9-LP-30	520-7011-00
153	Billboard Lock 2	9	a	CN2	7	YEL RED	1/2	RED	Playfield	Feature	White	9-LP-31	520-7011-00
154	Billboard Lock 1	9	a	CN2	8	YEL ORG	1/2	RED	Playfield	Feature	White	9-LP-32	520-7011-00
155													

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LIGHT REFERENCE CONTINUED

ID	Name	Node	Node Ext.	Conn.	Ret. Pin	Ret. Wire	Src. Pin	Src. Wire	Location	Type	Light Color	Address	Part Number
156													
157	Coin Door GI	1	-	CN5	2	YEL	1	YEL-WHT	Coin Door	G.I.	White	1-LP-1	112-5033-08
158	Bottom GI-WHT (x19)	8	-	CN15	5	WHT BLK	1	YEL BLK	Playfield	G.I.	White	8-LP-0	511-3294-08 520-7000-00 520-8652-00
159													
160													
161													
162	Top GI-WHT (x15)	9	-	CN15	5	WHT BLK	1	YEL BLK	Playfield	G.I.	White	9-LP-0	511-3294-08 511-3294-02 511-3294-09
163													
164	Backpanel GI (x5)	9	-	CN15	7	BLU BLK	3	YEL BLU	Playfield	G.I.	White	9-LP-2	511-3294-08
165													
166													
167	Left Sling Flash	8	c	CN4	6	ORG YEL	1/2	RED	Playfield	Flash	White	8-LP-58	520-7000-00
168	Right Sling Flash	8	c	CN4	7	ORG RED	1/2	RED	Playfield	Flash	White	8-LP-59	520-7000-00
169	Upper Left Sling Flash	8	c	CN4	8	ORG GRN	1/2	RED	Playfield	Flash	White	8-LP-60	520-7000-00
170	Grimlock Flash	9	a	CN2	3	ORG WHT	1/2	RED	Playfield	Flash	White	9-LP-27	113-5032-08
171	Pop Flash	8	c	LED1/2	-	-	-	-	Playfield	Flash	White	8-LP-32	520-9872-00
172													
173	Soundwave Flash	8	c	CN1	6	ORG VIO	1/2	RED	Playfield	Flash	White	8-LP-40	113-5032-08
174													
175													
176	Spinner Flash	9	b	LED6	-	-	-	-	Playfield	Flash	White	9-LP-47	520-8718-00
177													
178	Optimus Flash-Left	9	c	LED3	-	-	-	-	Playfield	Flash	White	9-LP-52	520-8717-00
179	Optimus Flash-Right	9	c	LED2	-	-	-	-	Playfield	Flash	White	9-LP-51	520-8717-00
180													
181	Optimus Spot	9	a	CN2	4	ORG BLU	1/2	RED	Playfield	Flash	White	9-LP-28	113-5032-08
182	Captive Ball Flash	9	a	CN2	5	ORG GRY	1/2	RED	Playfield	Flash	White	9-LP-29	520-7000-00
183													
184	Megatron Rt Spot	8	c	CN1	7	ORG GRY	1/2	RED	Playfield	Flash	White	8-LP-41	113-5032-08
185													
186													
187													
188													
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LIGHT REFERENCE CONTINUED

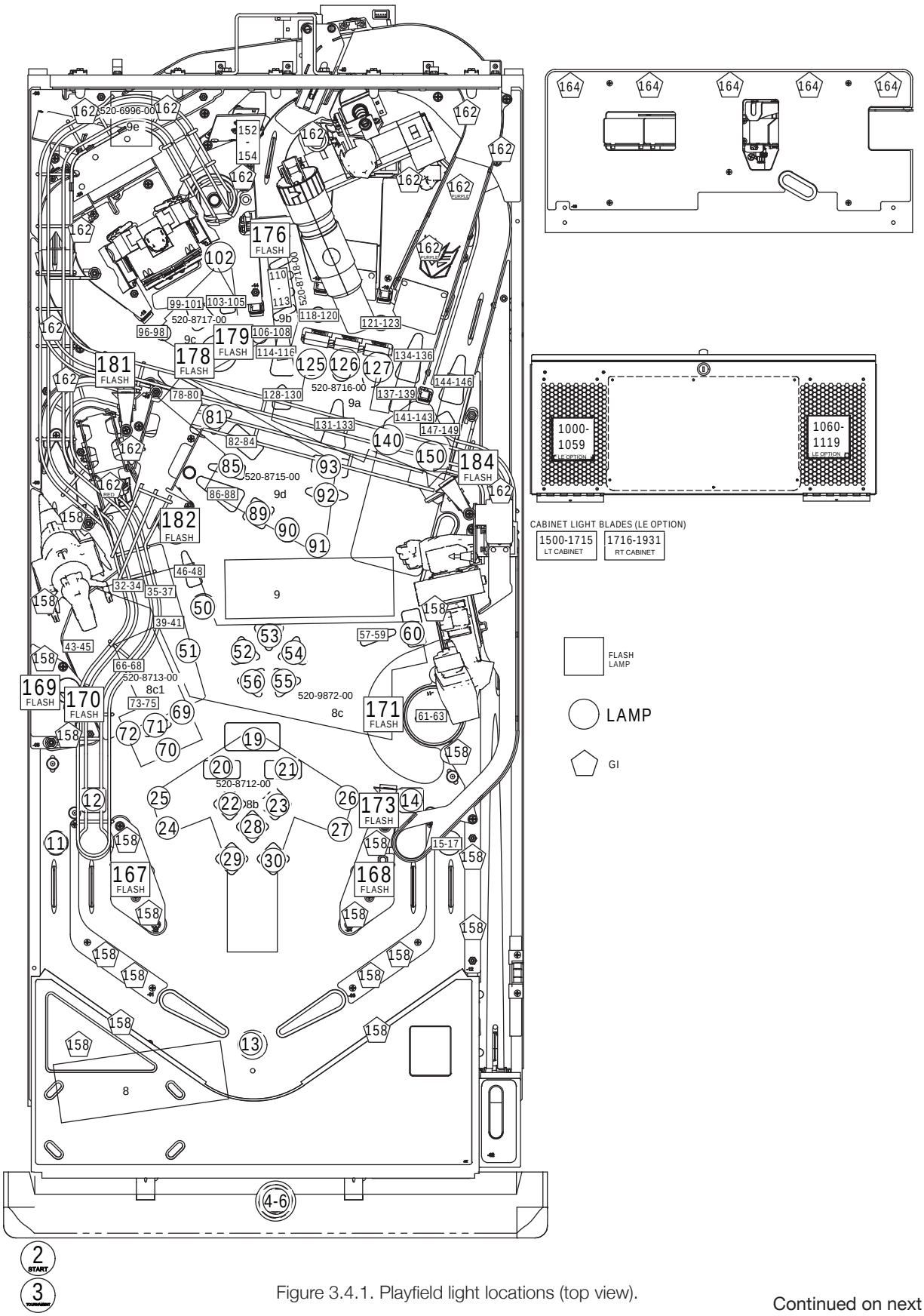


Figure 3.4.1. Playfield light locations (top view).

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3.5 MOTOR REFERENCE

ID	Name	Node	Node Ext.	Conn.	Ret. Pin	Ret. Wire	Src. Pin	Src. Wire	Location	Type	Light Color	Address	Part Number
1													
2													
3													
4													
5	Motor B Enable-Megatron	9	e	CN1	-	-	-	-	Playfield	Motor	-	9-LP-83	520-6996-00
6	Motor B Control 1B-Megatron	9	e	CN1	-	-	-	-	Playfield	Motor	-	9-LP-84	520-6996-00
7	Motor B Control 2B-Megatron	9	e	CN1	-	-	-	-	Playfield	Motor	-	9-LP-85	520-6996-00
8													
9													
10													

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4. ELECTRONIC PINOUTS AND SCHEMATICS

4.1 SPIKE-3 CPU NODE 0

524-1002-00

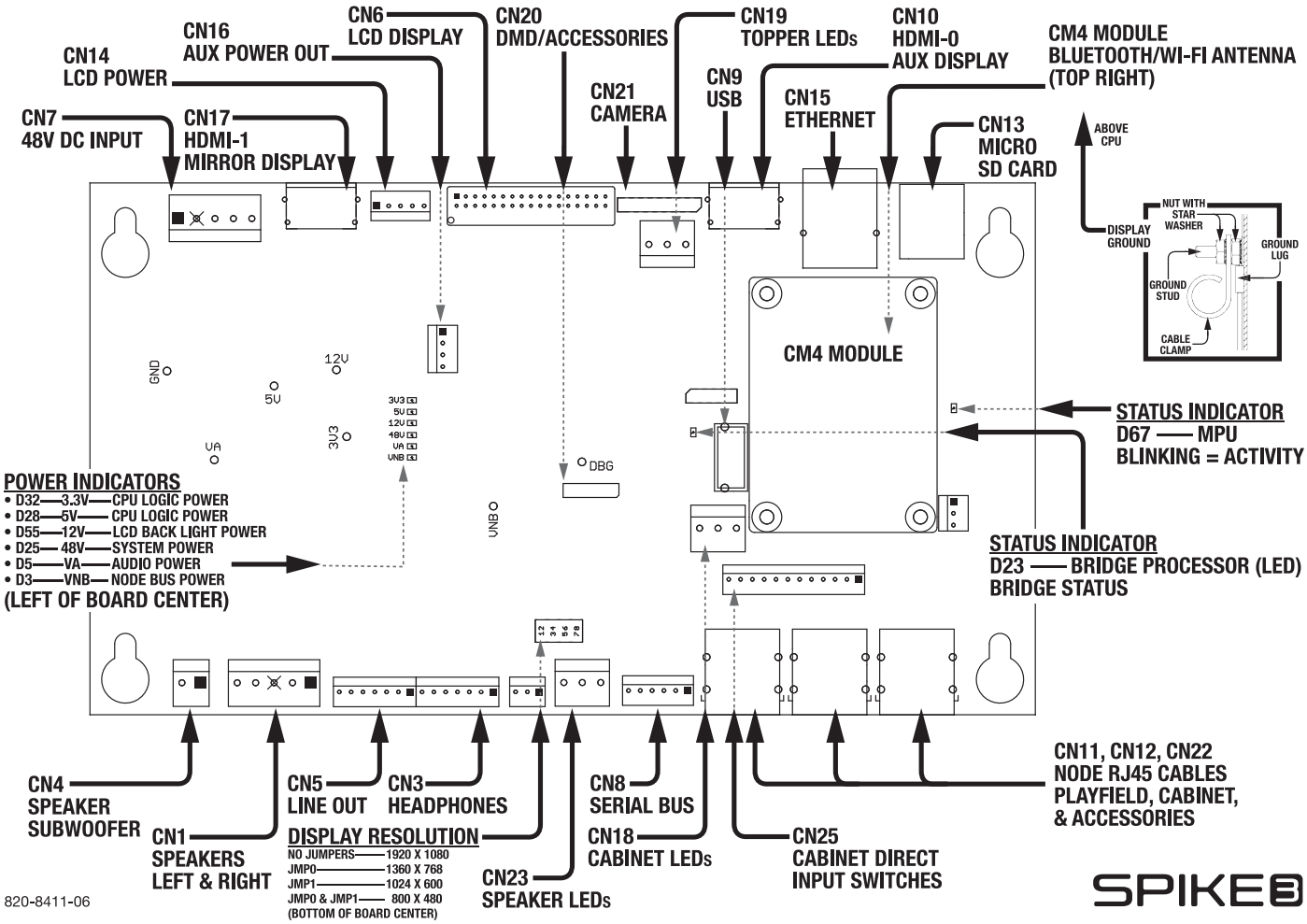


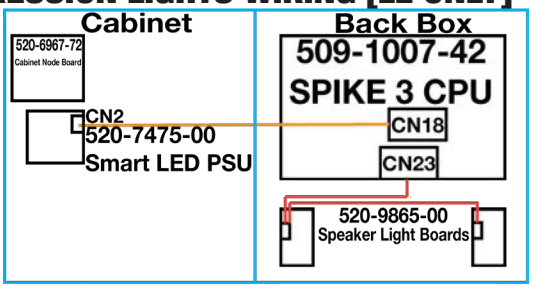
Figure 4.1.1. SPIKE 3 CPU Node connector and status LED details.

DIRECT SWITCH MAPPING (CN25)

The coin-door diagnostic switches are connected directly to the CPU node via the Cabinet Node. Note that both the CPU and Cabinet nodes are required for diagnostic switch operation.

ID	Name	Conn.	Input Pin	Input Wire	GND Pin	Ground Wire	Location	Type	Address	Part Number
C9	Service Select	CN25	1	LGN-GRY	11	BLK-WHT	Coin Door	Push Button	0-SW-9	180-5192-04
C10	Service Plus	CN25	2	LGN-VIO	11	BLK-WHT	Coin Door	Push Button	0-SW-10	180-5192-02
C11	Service Minus	CN25	3	LGN-BLU	11	BLK-WHT	Coin Door	Push Button	0-SW-11	180-5192-02
C12	Service Back	CN25	4	LGN-BLK	11	BLK-WHT	Coin Door	Push Button	0-SW-12	180-5192-00

EXPRESSION LIGHTS WIRING [LE ONLY]



DISPLAY RESOLUTION JUMPER SETTINGS

JP1 Config	Setting
No Jumpers	1920 x 1080 (SPIKE-3: 18" LCD)
JMP0	1360 X 768 (SPIKE-2: 15.6" LCD)
JMP1	1024 X 600 (SPIKE-3: 10" Home Edition LCD)
JPMP 0 & 1	800 X 480 (SPIKE-2: 7.6" Home Edition LCD)

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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: Logic 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

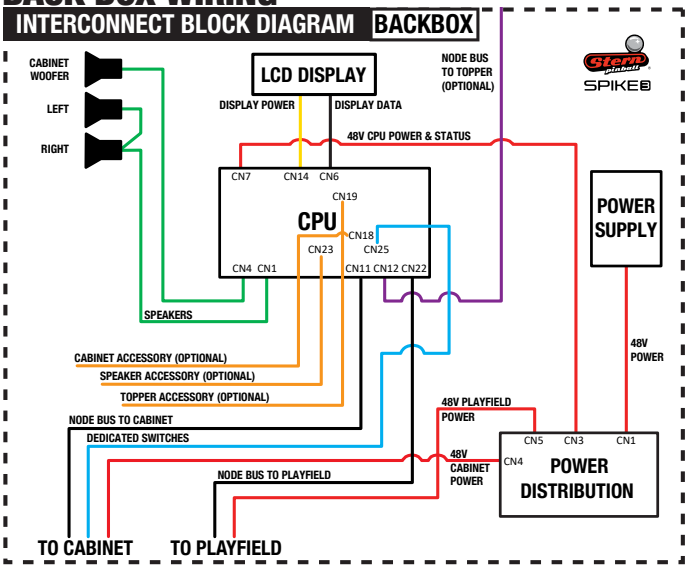


Figure 4.1.2. SPIKE 3 Back box wiring block diagram.

COIN DOOR SERVICE SWITCH WIRING

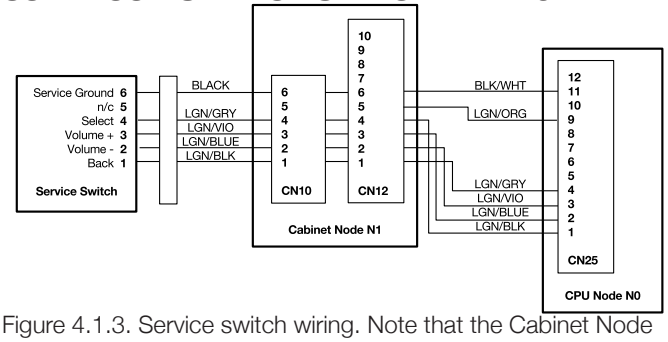


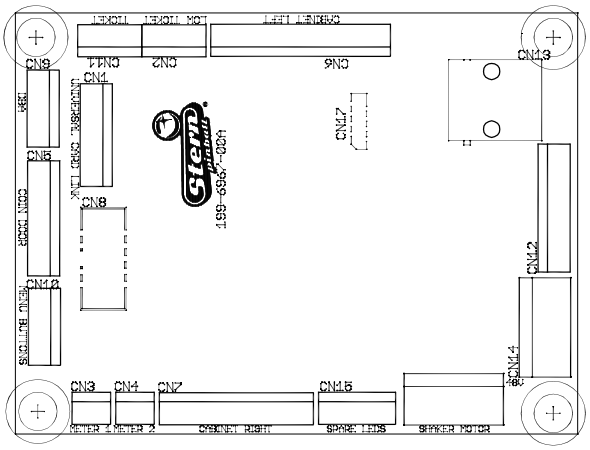
Figure 4.1.3. Service switch wiring. Note that the Cabinet Node must be present and CN10 and CN12 connected for the Coin Door Service Switches to function correctly.

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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	-
		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]	-
		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	-

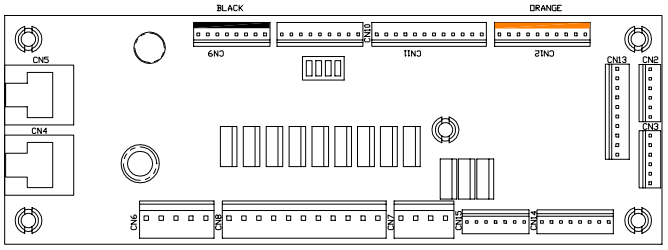


ID	Type	Pin	Description	Wire Color
CN9	.100" 6-Pin Header Dollar Bill Acceptor	1	Coin Enable/DBA Inhibit (-)	-
		2	Coin Enable/DBA Inhibit (+)	-
		3	Key	Key
		4	DBA 12V	ORG
		5	Coin 6 / DBA Credit	-
		6	Ground	BLK-ORG
CN10	.100" 6-Pin Header Service Switch In	1	Service Back (To Coindoor)	LGN-BLK
		2	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 Coin-door)	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	

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4.3 LOWER PLAYFIELD 48V DRIVER PINOUT NODE 8

520-1070 / 520-1057-00



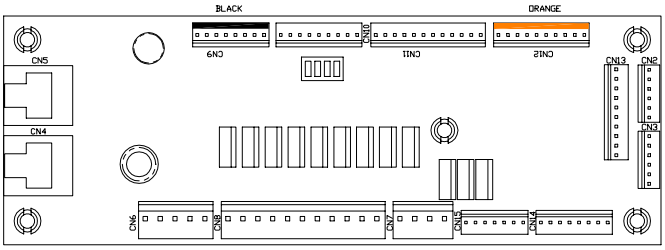
ID	Type	Pin	Description	Wire Color
SW1	Address DIP	-	Node 8 - OFF-OFF-OFF-OFF	-
CN4	RJ45	-	SPIKE Node Bus	Multi
CN5	RJ45	-	SPIKE Node Bus	Multi
CN6	.156" 5-Pin Header Node Power	1	Ground	BLK
		2	Key	Key
		3	N/C	-
		4	N/C	-
		5	48VDC In	GRY
CN7	.156" 4-Pin Header (White)	1	48V Driver Power	GRY ORG
		2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

ID	Type	Pin	Description	Wire Color
CN11	.100" 12-Pin Header	1	V+	-
		2	8-SW-26 Switch	-
		3	8-SW-27 Switch	-
		4	8-SW-17 Switch	LGN RED
		5	8-SW-18 Switch	LGN ORG
		6	8-SW-19 Switch	LGN YEL
		7	8-SW-20 Switch	LGN BLU
		8	8-SW-21 Switch	LGN VIO
		9	8-SW-22 Switch	LGN GRY
		10	8-SW-23 Switch	LGN WHT
		11	Ground	BLK ORG
		12	Ground	BLK ORG
CN12	.100" 10-Pin Header (Orange)	1	V+	-
		2	8-SW-8 Switch	WHT BRN
		3	8-SW-9 Switch	-
		4	8-SW-10 Switch	WHT ORG
		5	8-SW-11 Switch	WHT YEL
		6	8-SW-12 Switch	WHT GRN
		7	8-SW-13 Switch	-
		8	8-SW-14 Switch	-
		9	8-SW-15 Switch	PNK BRN
		10	Ground	BLK RED
CN13	.100" 10-Pin Header	1	V+	-
		2	8-SW-0 Switch	-
		3	8-SW-1 Switch	-
		4	8-SW-2 Switch	-
		5	8-SW-3 Switch	-
		6	8-SW-4 Switch	-
		7	8-SW-5 Switch	-
		8	8-SW-6 Switch	-
		9	8-SW-7 Switch	-
		10	Ground	-
CN14	.100" 8-Pin Header	1	Ground	-
		2	8-LP-7 Driver Return	-
		3	8-LP-6 Driver Return	-
		4	8-LP-5 Driver Return	-
		5	8-LP-4 Driver Return	-
		6	8-LP-3 Driver Return	-
		7	LED V+	-
		8	LED V+	-
CN15	.100" 7-Pin Header	1	LED V+	YEL BLK
		2	LED V+	-
		3	LED V+	-
		4	-	-
		5	8-LP-0 GI Return	WHT BLK
		6	8-LP-1 GI Return	-
		7	8-LP-2 GI Return	-
CN2	.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
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

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4.4 MID UPPER PLAYFIELD 48V DRIVER PINOUT NODE 9

520-1070 / 520-1057-00



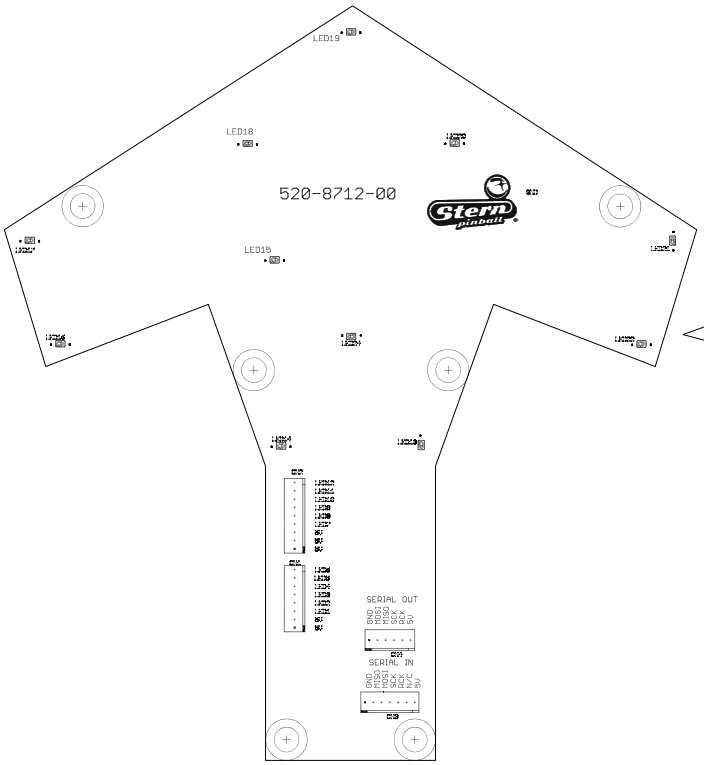
ID	Type	Pin	Description	Wire Color
SW1	Address DIP	-	Node 9 - OFF-OFF-ON-OFF	-
CN4	RJ45	-	SPIKE Node Bus	Mult
CN5	RJ45	-	SPIKE Node Bus	Multi
CN6	.156" 5-Pin Header Node Power	1	Ground	BLK
		2	Key	Key
		3	N/C	-
		4	N/C	-
		5	48VDC In	GRY
CN7	.156" 4-Pin Header (White)	1	48V Driver Power	GRY BRN
		2	9-DR-8 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	BLU BRN
		7	9-DR-1 Driver Return	YEL VIO
		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+	-
		2	V+	-
		3	9-SW-24 Switch	LGN ORG
		4	9-SW-25 Switch	-
		5	9-SW-26 Switch	-
		6	9-SW-27 Switch	-
		7	Ground	-
		8	Ground	BLK BLU
CN10	.100" 9-Pin Header	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	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	TAN
		11	Ground	BLK GRY
		12	Ground	BLK GRY
CN12	.100" 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	-
		9	9-SW-15 Switch	WHT GRY
		10	Ground	BLK WHT
CN13	.100" 10-Pin Header	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	PNK WHT
		10	Ground	BLK BRN
CN14	.100" 8-Pin Header	1	Ground	-
		2	9-LP-7 Driver Return	-
		3	9-LP-6 Driver Return	-
		4	9-LP-5 Driver Return	-
		5	9-LP-4 Driver Return	-
		6	9-LP-3 Driver Return	-
		7	LED V+	-
		8	LED V+	-
CN15	.100" 7-Pin Header	1	LED V+	YEL BLK
		2	LED V+	-
		3	LED V+	YEL BLU
		4	-	-
		5	9-LP-0 GI Return	WHT BLK
		6	9-LP-1 GI Return	-
		7	9-LP-2 GI Return	BLU BLK
CN2	.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
CN3	.100" 6-Pin Header, Node Extension Bus	1	Ground	-
		2	DIN	-
		3	DOUT	-
		4	SCK	-
		5	RCK	-
		6	V+	-

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4.5 12W LC LED BOARD 8B

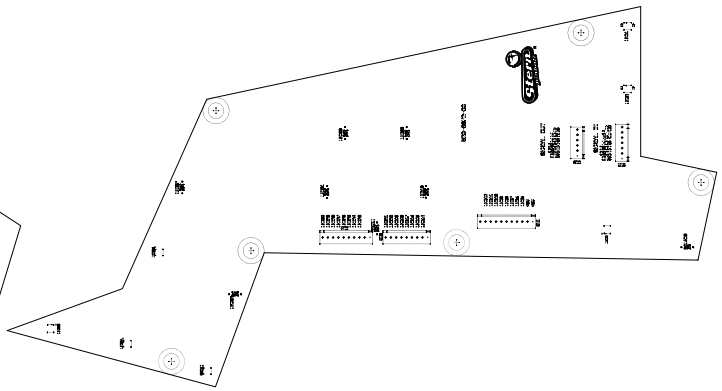
520-8712-00



ID	Type	Pin	Description	Wire Color
CN1	.100" 8-Pin Header	1	+5 VDC	RED
		2	+5 VDC	RED
		3	LED 1	RED-BRN
		4	LED 2	GRN-BRN
		5	LED 3	BLU-BRN
		6	LED 4	RED-ORG
		7	LED 5	GRN-ORG
		8	LED 6	BLU-ORG
CN2	.100" 9-Pin Header	1	+5 VDC	RED
		2	+5 VDC	RED
		3	+5 VDC	-
		4	LED 7	BRN-RED
		5	LED 8	BRN-ORG
		6	LED 9	BRN-YEL
		7	LED 10	RED-YEL
		8	LED 11	GRN-YEL
		9	LED 12	BLU-YEL
CN3	.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
CN4	.100" 6-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	V+	RED

4.6 5R 8W 2F MC LED BOARD 8C

520-9872-00

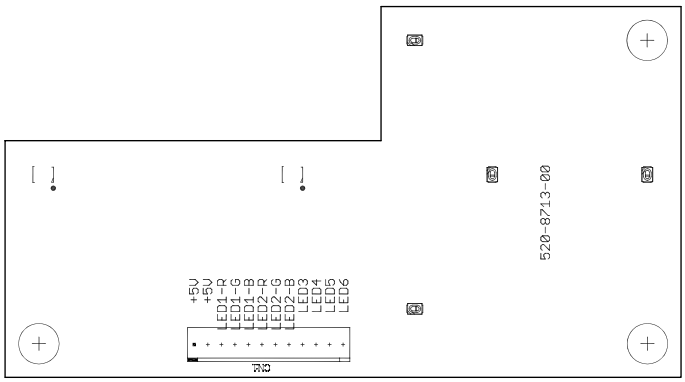


ID	Type	Pin	Description	Wire Color
CN1	.100" 11-Pin Header	1	+5 VDC	RED
		2	+5 VDC	RED
		3	LED 5	RED-VIO
		4	LED 6	GRN-VIO
		5	LED 7	BLU-VIO
		6	LED 8	ORG-VIO
		7	LED 9	ORG-GRY
		8	LED 10	RED-YEL
		9	LED 11	GRN-YEL
		10	LED 12	BLU-YEL
		11	GND	-
CN2	.100" 7-Pin Header	1	Ground	BLK
		2	MISO Output Data	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" 9-Pin Header	1	+5 VDC	RED
		2	LED 14	ORG-BRN
		3	LED 15	RED-VIO
		4	LED 16	GRN-VIO
		5	LED 17	BLU-VIO
		6	LED 18	ORG-BLU
		7	LED 19	ORG-VIO
		8	LED 20	ORG-GRY
		9	LED 21	ORG
CN4	.100" 10-Pin Header	1	+5 VDC	RED
		2	+5 VDC	RED
		3	LED 23	RED-ORG
		4	LED 24	GRN-ORG
		5	LED 25	BLU-ORG
		6	LED 26	ORG-YEL
		7	LED 27	ORG-RED
		8	LED 28	ORG-GRN
		9	LED 29	-
		10	LED 30	-
CN5	.100" 6-Pin Header	1	Ground	-
		2	MISO Output Data	-
		3	MOSI Input Data	-
		4	SCK Serial Clock	-
		5	RCK Register Clock	-
		6	V+	-

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4.7 2R 4W LM LED BOARD 8C1

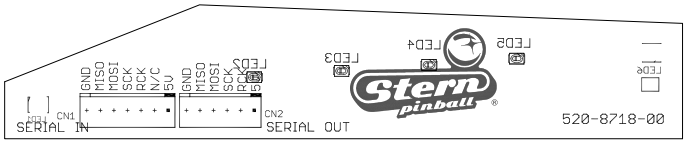
520-8713-00



ID	Type	Pin	Description	Wire Color
CN1	.100" 12-Pin Header	1	+5 VDC	RED
		2	+5 VDC	-
		3	LED 1-R	RED-VIO
		4	LED 1-G	GRN-VIO
		5	LED 1-B	BLU-VIO
		6	LED 2-R	RED-ORG
		7	LED 2-G	GRN-ORG
		8	LED 2-B	BLU-ORG
		9	LED 3	ORG
		10	LED 4	ORG-BLU
		11	LED 5	ORG-GRY
		12	LED 6	ORG-VIO

4.8 1R 4W 1F UCR LED BOARD 9B

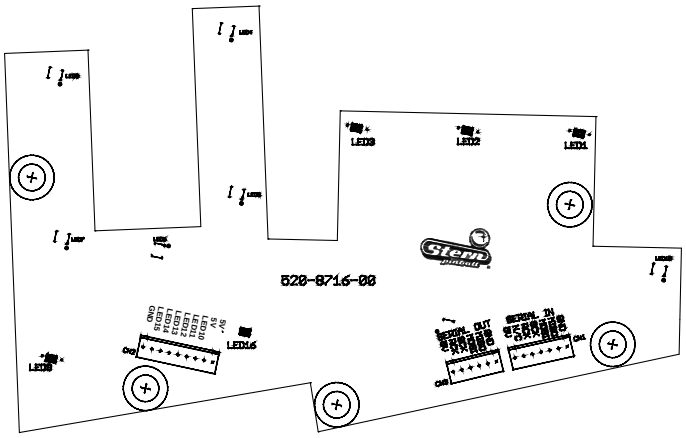
520-8718-00



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	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	V+	RED

4.9 7R 5W UMR LED BOARD 9A

520-8716-00

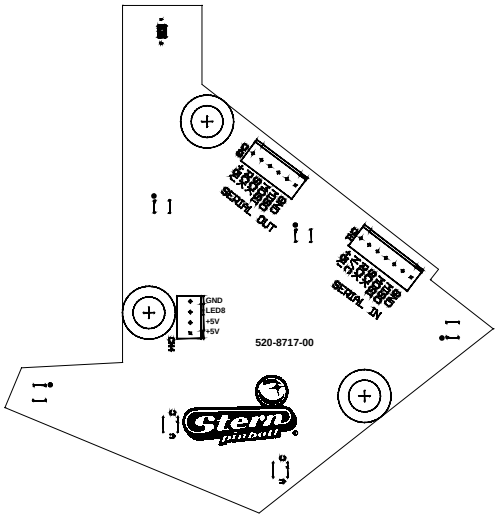


ID	Type	Pin	Description	Wire Color
CN1	.100" 7-Pin Header	1	Ground	BLK
		2	MISO Output Data	VIO-BLK
		3	MOSI Input Data	VIO-BRN
		4	SCK Serial Clock	VIO-RED
		5	RCK Register Clock	VIO-ORG
		6	NC	-
		7	+5 VDC IN	RED
CN2	.100" 9-Pin Header	1	+5 VDC	RED
		2	+5 VDC	RED
		3	LED 10	ORG-WHT
		4	LED 11	ORG-BLU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

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4.10 4R 1W 2F UCL LED BOARD 9C

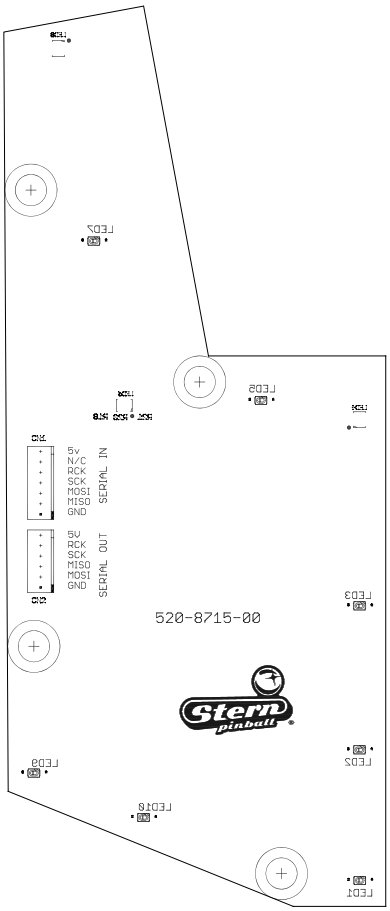
520-8717-00



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
CN3	.100" 6-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	V+	RED
CN4	.100" 4-Pin Header	1	+5 VDC	-
		2	+5 VDC	-
		3	LED 8	-
		4	GND	-

4.11 3R 7W UML LED BOARD 9D

520-8715-00

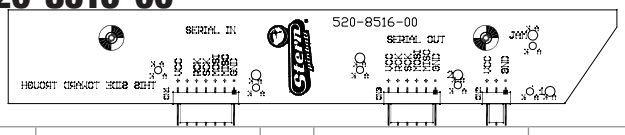


ID	Type	Pin	Description	Wire Color
CN1	.100" 7-Pin Header	1	Ground	BLK
		2	MISO Output Data	VIO-BLK
		3	MOSI Input Data	VIO-BRN
		4	SCK Serial Clock	VIO-RED
		5	RCK Register Clock	VIO-ORG
		6	NC	-
		7	+5 VDC IN	RED
CN2	.100" 6-Pin Header	1	Ground	-
		2	MISO Output Data	-
		3	MOSI Input Data	-
		4	SCK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

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4.12 TROUGH SERIAL OPTO RECEIVER 8A

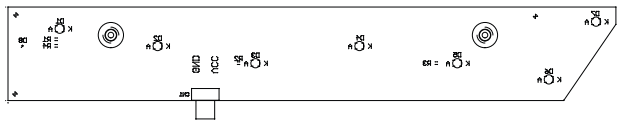
520-8516-00



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+	-

4.13 TROUGH SERIAL OPTO TRANSMITTER

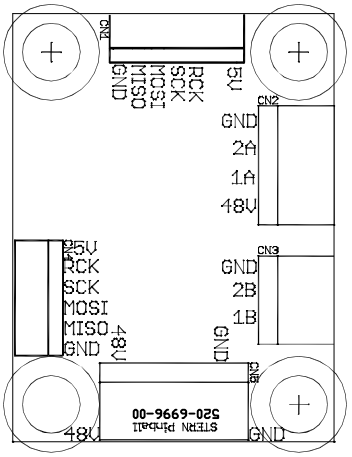
520-5344-00



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

4.14 SERIAL MOTOR DRIVER BOARD (9E)

520-6996-00

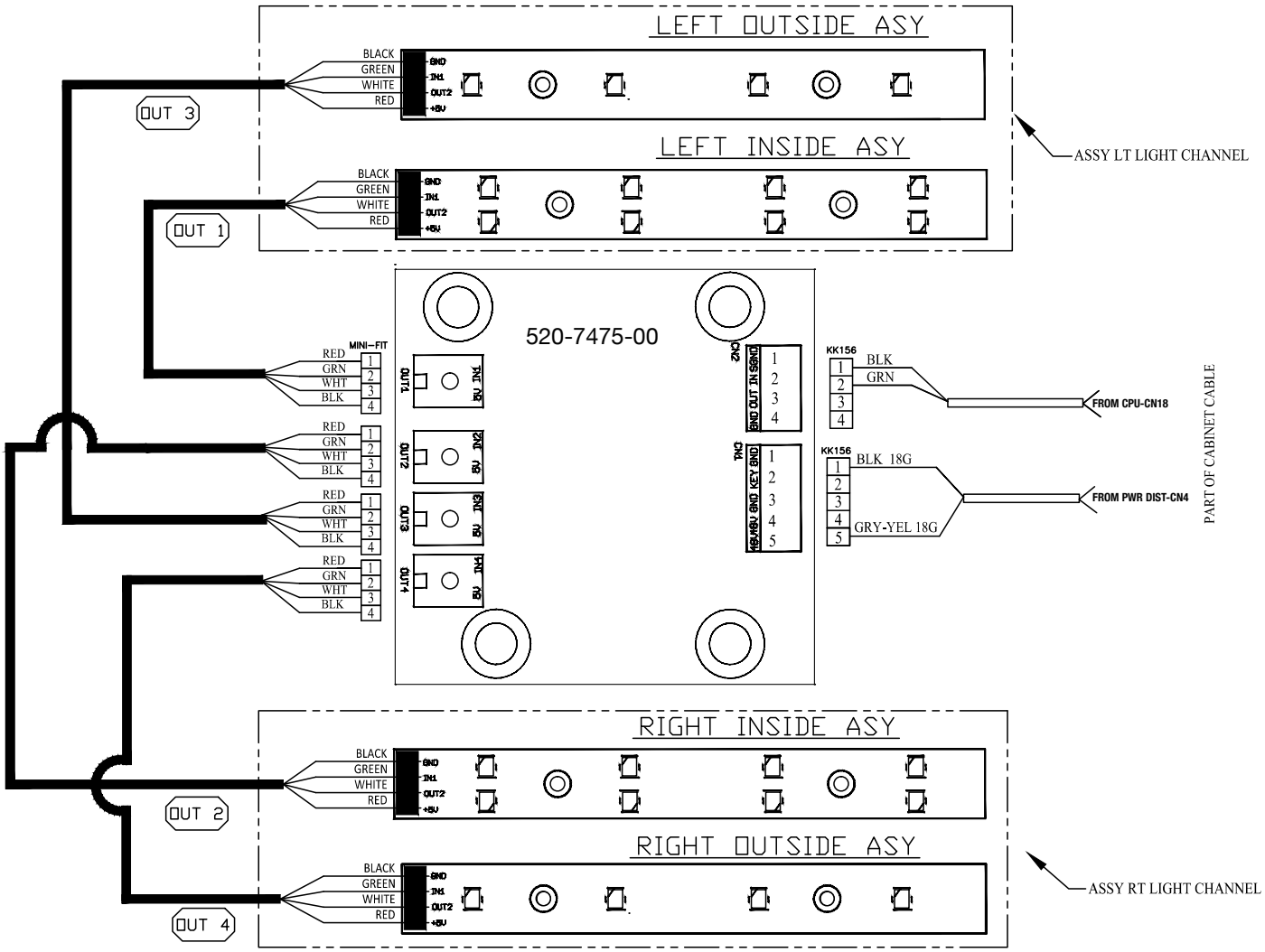


ID	Type	Pin	Description	Wire Color
CN1	.100" 7-Pin Header	1	Ground	BLK
		2	MISO Output Data	VIO-BLK
		3	MOSI Input Data	VIO-BRN
		4	SCK Serial Clock	VIO-RED
		5	RCK Register Clock	VIO-ORG
		6	n/c	-
		7	+5 VDC IN	RED
CN2	.156 4-Pin Connector	1	Ground	-
		2	DRIVE2-A	-
		3	DRIVE1-A	-
		4	V+	-
CN3	.156 3-Pin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

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4.15 ISOLATED SMART LED PSU

520-7475-00



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

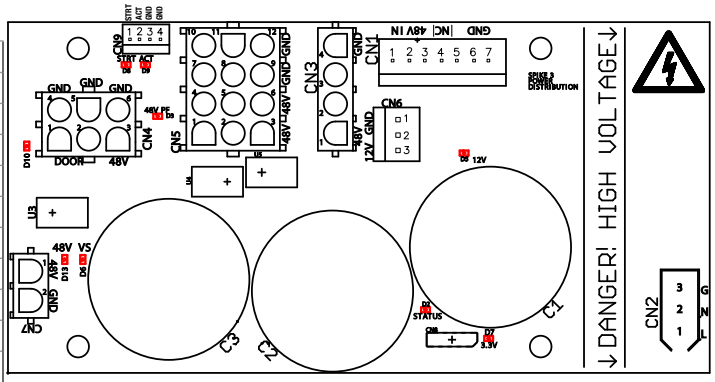
ID	Type	Pin	Description	Wire Color
CN4	Mini-Fit Jr.4-Pin Connector	1	+5V	RED
		2	IN2	GRN
		3	OUT-2	WHT
		4	GND	BLK
CN5	Mini-Fit Jr.4-Pin Connector	1	+5V	RED
		2	IN3	GRN
		3	OUT-3	WHT
		4	GND	BLK
CN6	Mini-Fit Jr.4-Pin Connector	1	+5V	RED
		2	IN4	GRN
		3	OUT-4	WHT
		4	GND	BLK

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4.16 POWER DISTRIBUTION BOARD

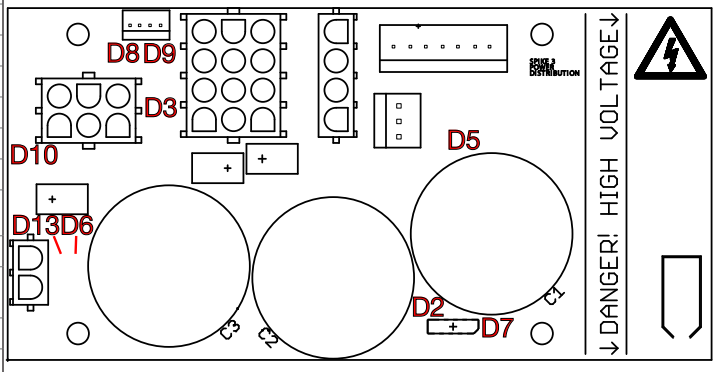
520-1092-00

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

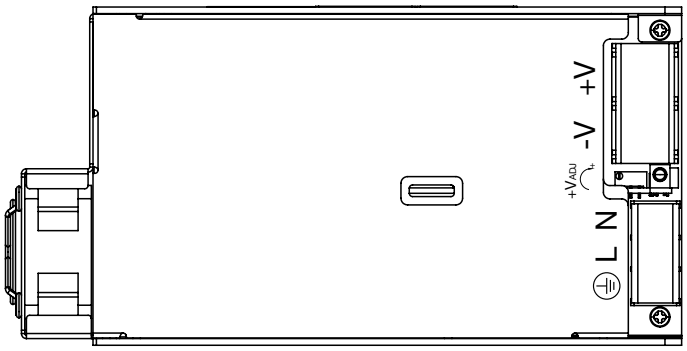
LED ID	Name	Color	Description
D13	48V	Red	48V from the main power supply
D6	VS	Red	Power to the bulk caps, indicates if the caps are charged
D3	48V PF	Red	Power to playfield/cabinet node
D5	12V	Red	12V power supply (for topper), shuts off when DOOR is open
D7	3.3V	Red	3.3V logic supply
D10	DOOR	Red	Cabinet 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)



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4.17 POWER SUPPLY 48V/600W

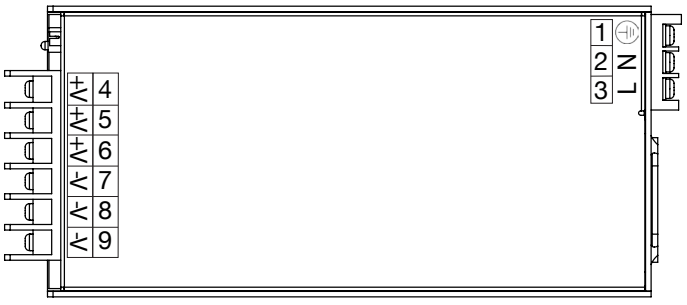
011-5011-00 (DELTA)



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

4.18 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

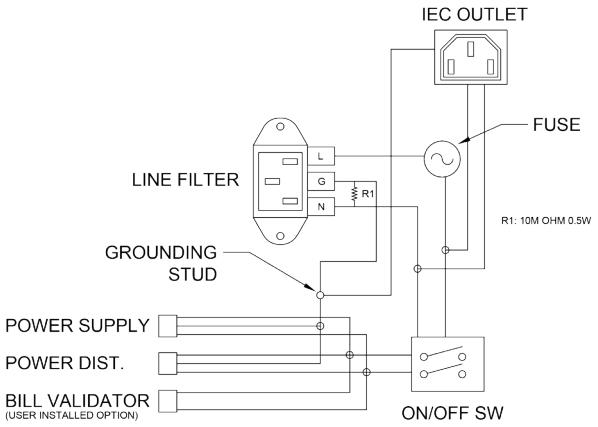
4.19 POWER PLUG WIRING

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

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5. PARTS REFERENCE

5.1 PLAYFIELD RUBBER PARTS

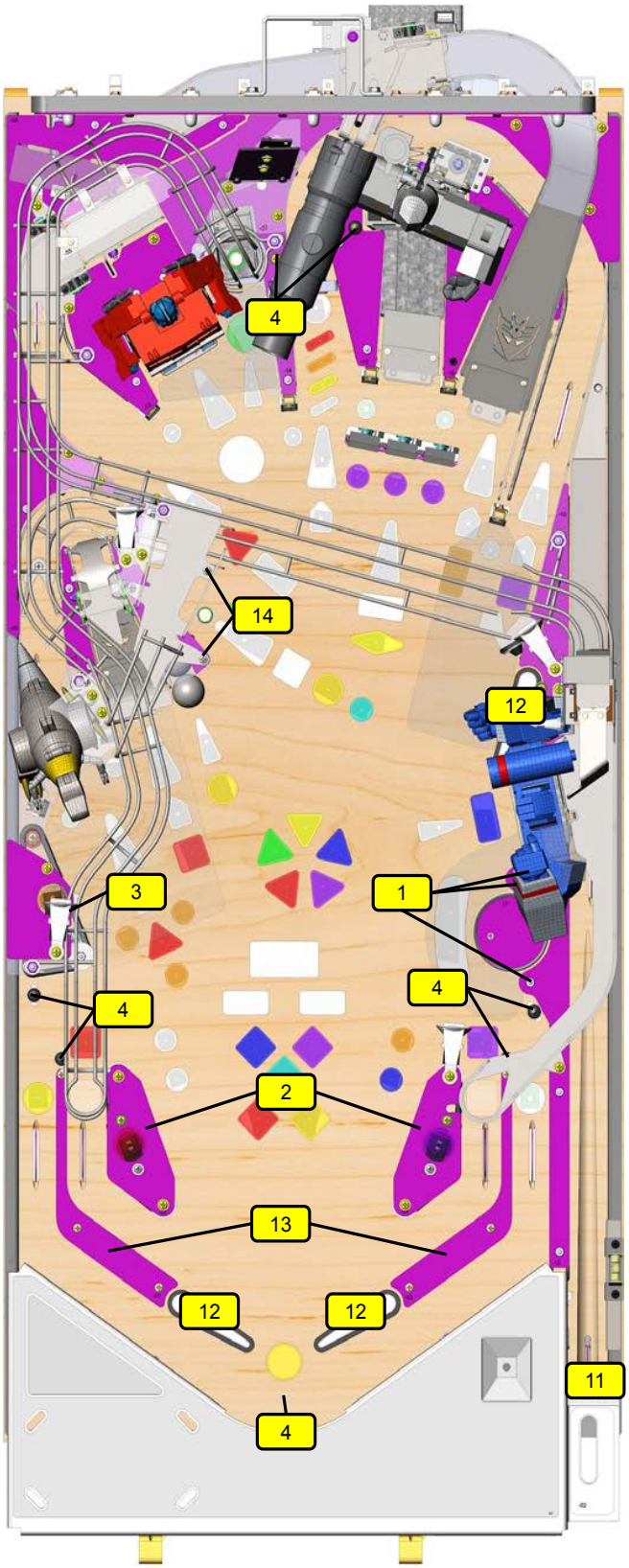


Figure 5.1.1. Rubber o-ring part locations

RUBBER O-RINGS

ID	Qty	Size (ID)	Size (OD)	Durometer	Color	Part Number
1	3	3/16"		50	Black	545-5348-01
2	2	2 - 1/2"		50	Black	545-5348-09
3	1	2 - 3/4"		50	Black	545-5348-06
4	7		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	3	Flipper Rubber	Black	545-5277-00
13	2	Post Sleeve	Black	545-5151-00
14	2	Post Sleeve	Black	545-5308-00
15	2	Bumper Pad (Sub assemblies)	Black	545-5105-00
16	4	Bumper Pad (Flippers)	Black	545-5428-00

Figure 5.1.3. Other rubber part numbers and usage

5.2 RUBBER SIZE CHART

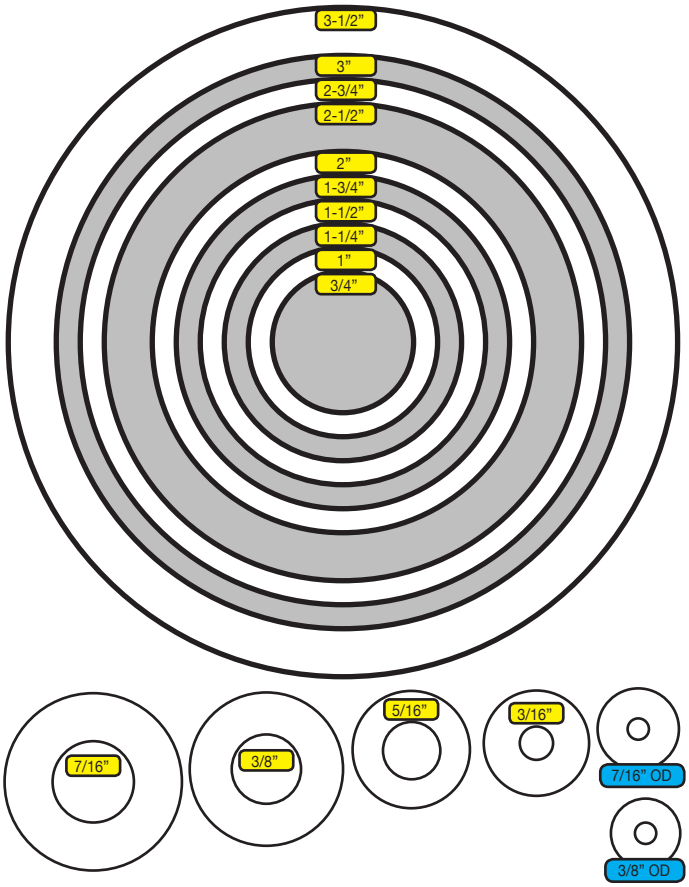
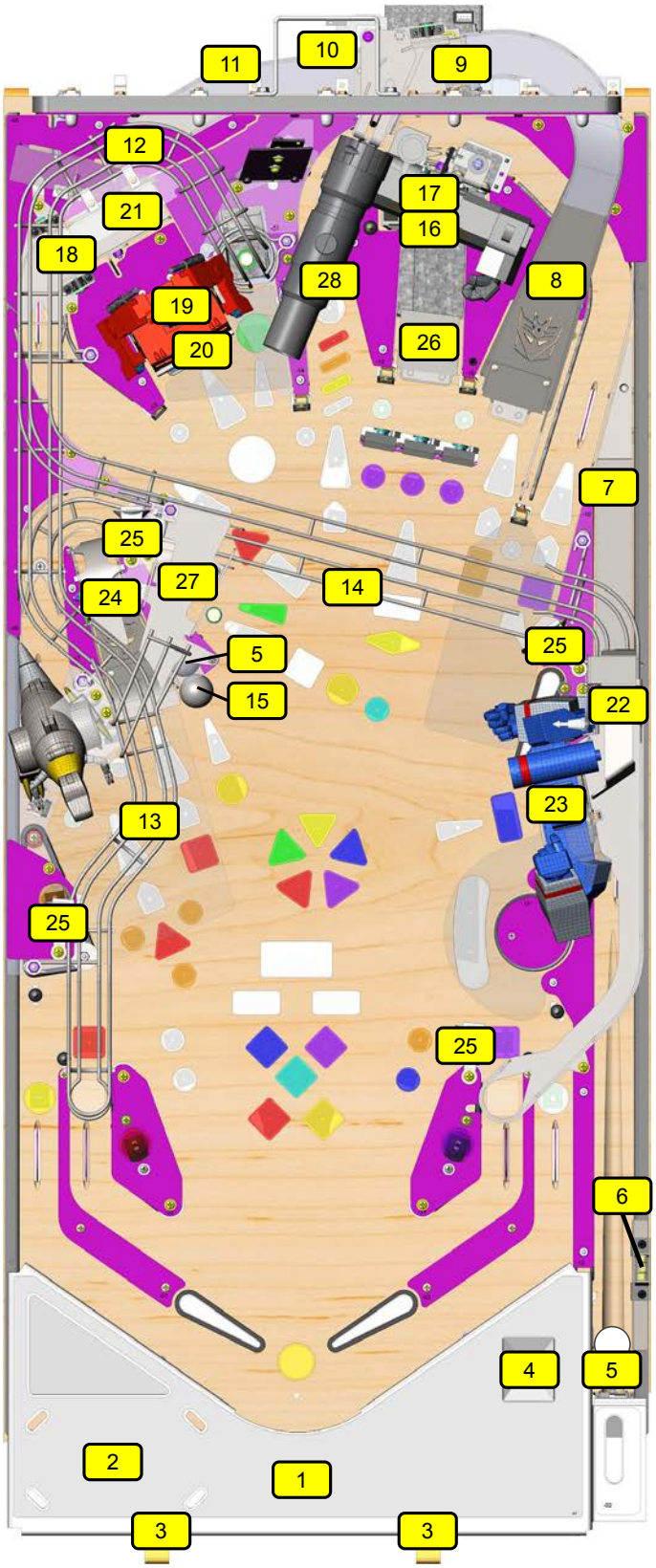


Figure 5.2.1. Rubber ring inner diameter sizing tool. Hold ring up to chart and read largest size on inside of ring. Dimensions are Inner Diameter (ID) unless otherwise noted as Outer Diameter (OD).

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5.3 PLAYFIELD ASSEMBLIES, TOP

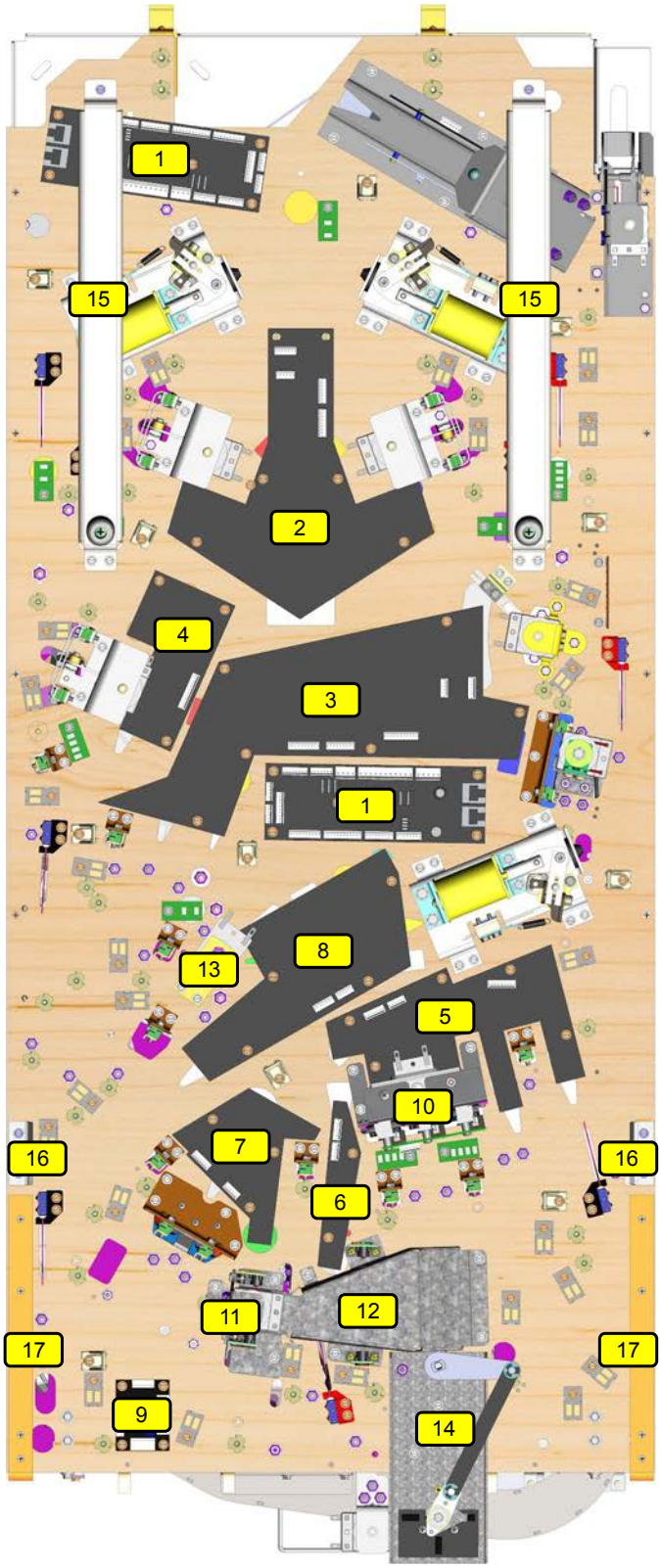


ID	Part Number	Description	Qty
1	500-2548-XX	Bottom Arch Assembly	1
2	755-51AC-XX	Instructions Card	1
3	535-8385-00	Welded Hanger Bracket	2
4	524-1001-00	QR Reader	1
5	260-5000-00	Pinballs	7
6	500-6815-00	Bubble Level Assembly	1
7	510-3645-00	Shooter Lane Ramp	1
8	510-7989-00	Right Metal Ramp	1
9	511-2062-00	One Way Gate Assembly	1
-	535-5307-11	Gate Wire	1
10	535-2288-00	Backpanel Handle	1
11	500-7433-00	Back Panel Ramp Assembly	1
12	515-3010-00	Wire Ramp, Right / VUK	1
13	515-3011-00	Wire Ramp, Left	1
14	500-3657-00	Wire Ramp Assy, Upper Feed	1
15	515-1935-00	Newton Ball	1
16	500-3635-02	Megatron Target Assembly	1
17	500-3635-03	Megatron Upper Assembly	1
18	511-3293-00	Optimus Scoop Ramp Exit Assembly	1
19	511-0055-01	Optimus Prime Assembly	1
20	511-3292-02	Optimus Dual Target Assembly	1
21	511-0054-01	Optimus Scoop Ramp Assembly	1
22	511-3646-00	Soundwave Ramp & Diverter Assembly	1
23	500-7436-00	Soundwave	1
24	500-7432-00	Left Metal Ramp Assembly	1
25	545-5409-01	Reflector	4
-	535-1324-01	Retaining Clip	4
-	077-5026-01	Socket, Laydown Wedge Base, Black	4
26	510-3643-00	Megatron Entry Ramp	1
27	535-2939-00	Megatron Catch Ramp	1
28	511-3044-00	Spinner Assembly, Reflective Opto	1

Figure 5.3.1. Major playfield assemblies, Top locations.

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5.4 PLAYFIELD ASSEMBLIES, BOTTOM



ID	Part Number	Description	Qty
1	520-1070-00 520-1057-00	Core Node Driver Board (8, 9)	2
2	520-8712-00	LED Serial Board - 12W LC (8b)	1
3	520-9872-00	LED Serial Board - 5R 8W 2F MC (8c)	1
4	520-8713-00	LED Serial Board - 2R 4W LM (8c1)	1
5	520-8716-00	LED Serial Board - 7R 5W UMR (9a)	1
6	520-8718-00	LED Serial Board - 1R 4W 1F UCR (9b)	1
7	520-8717-00	LED Serial Board - 4R 1W 2F UCL (9c)	1
8	520-8715-00	LED Serial Board - 3R 7W UML (9d)	2
9	520-6996-00	Serial Motor Driver Board (9e)	1
10	500-1110-03-0-1-2	3-Bank Drop Target Assembly	1
11	500-2970-00	Dual Entry VUK Assembly	1
12	511-3295-00	Transfer Trough Assembly	1
13	500-9914-00	Up Post Assembly (Combiner)	1
14	500-3635-01	Megatron Motor Assembly	1
15	511-7621-00	Support Rail Assembly	2
16	500-5329-03	Pivot Bracket Assembly	2
17	535-5988-01	Edge Slide Bracket	2

Figure 5.4.1. Major playfield assemblies, Bottom locations.

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5.5 BACKBOX PARTS

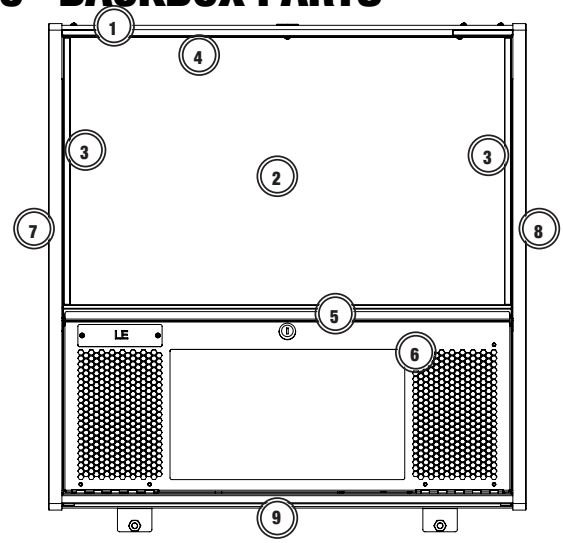


Figure 5.4.2. Backbox external assemblies and components

EXTERNAL

ID	Part Number	Description	Qty
1	545-9910-03	Backbox Bumper	2
2	830-8426-AC	Mirror Backglass [LE]	1
	660-5052-00	Backglass	1
	830-8427-AB	Translite Art [Premium]	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-AC	LCD Speaker Panel Assembly [LE]	1
	500-9404-01	LCD Speaker Panel Assembly [Premium]	1
7	820-30AC-01	Left Backbox Decal [LE]	1
	820-81AB-01	Left Backbox Decal [Premium]	1
8	820-30AC-02	Right Backbox Decal [LE]	1
	820-81AB-02	Right Backbox Decal [Premium]	1
9	515-8868-00	Backbox Bottom Bracket	1

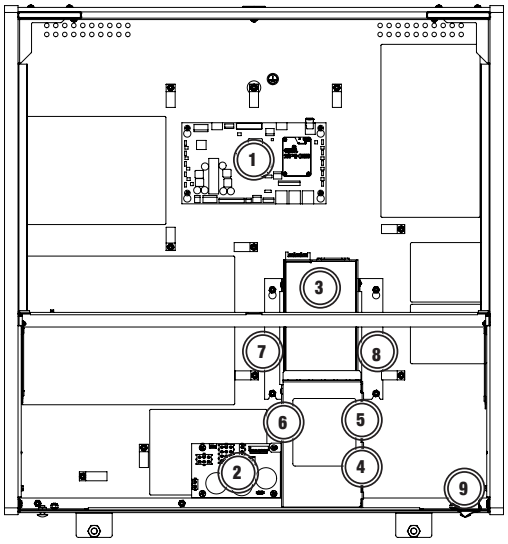


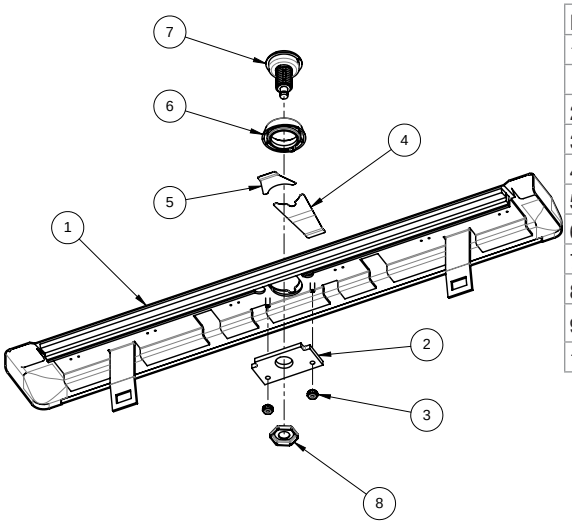
Figure 5.4.3. Backbox internal assemblies and components

INTERNAL

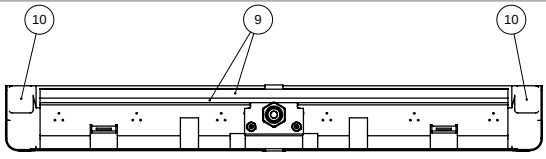
ID	Part Number	Description	Qty
1	524-1002-00	CPU Node Board	1
2	520-1092-00	Power Distribution Board	1
3	011-5004-00	Power Supply 48V/600W (Meanwell)	1
	011-5011-00	Power Supply 48V/600W (Delta)	1
4	205-5004-00	Fuse Holder - Screw In	1
	200-5003-08	8A SB Fuse	1
5	515-9769-00	Utility Outlet (USA)	1
6	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

5.6 LOCKDOWN BAR ASSEMBLY W/ CENTER BUTTON

500-7948-00 [LE] & 500-2440-99 [PREMIUM]



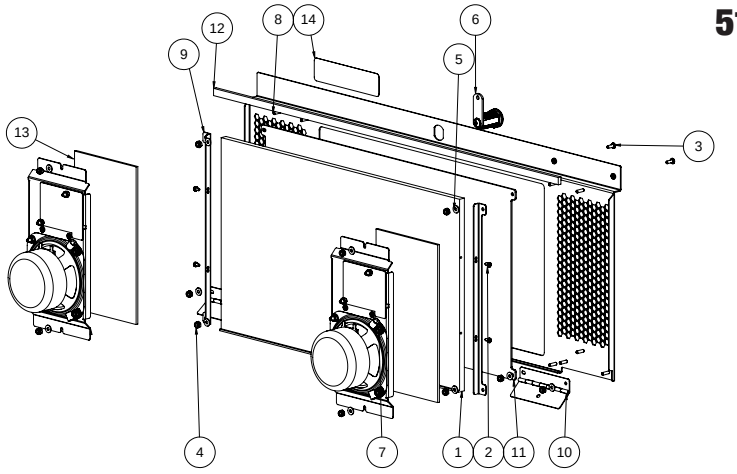
ID	Part Number	Description	Qty
1	515-3297-00	FRONT MOLD ASSEMBLY - CENTER BUTTON - DUAL-COLOR [LE]	1
	500-2441-99	FRONT MOLD ASSEMBLY - CENTER BUTTON [PREMIUM]	1
2	545-7291-00	TOP BUTTON BAR	1
3	240-5104-00	8-32 KEPS NUT	2
4	820-1459-00	DECAL, FRONT MOLDING [LE ONLY]	1
5	820-1459-01	DECAL, FRONT MOLDING [LE ONLY]	1
6	545-7292-10	SPACER, CENTER BUTTON	1
7	515-7791-00	CENTER BUTTON ASSEMBLY	1
8	240-5003-01	PAL NUT	1
9	626-5001-00	FOAM RUBBER, 3/8" W X 3/16" THK - 19.38"	
10	820-5815-00	MYLAR PAD	2



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5.7 SPEAKER PANEL ASSEMBLY

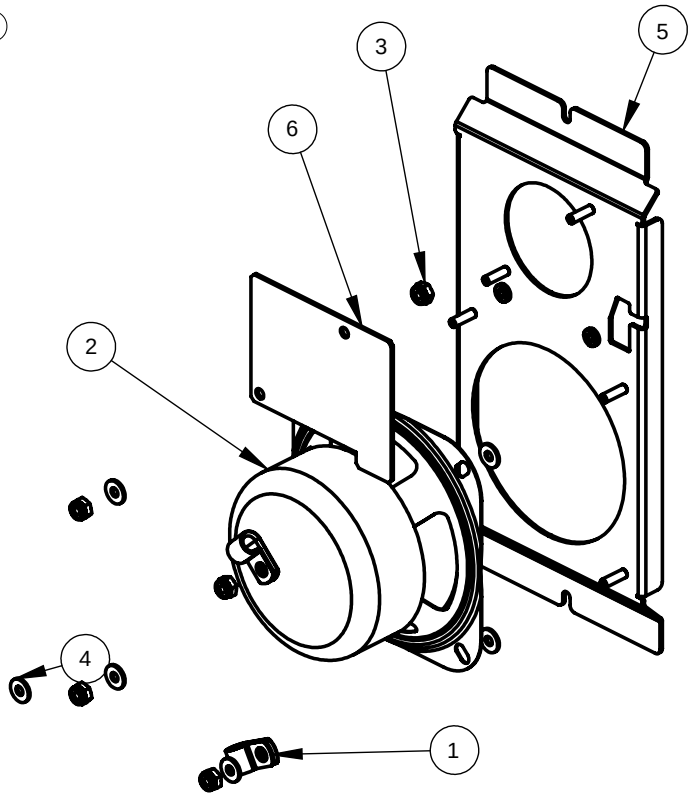
500-9404-01



ID	Part Number	Description	Qty
1	502-8091-00	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	511-3645-01	ASM SPEAKER BRKT MOUNT, PREM/PRO SPIKE 3	2
-	036-5600-46	SPEAKER PANEL CABLE W/ CONNECTORS	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	545-9995-00	LCD LENSE, 18.5IN SCREEN	1
12	626-5001-00	FOAM TAPE - 3/8 X 3/16 THK (BLACK)	1
13	626-5139-00	SPEAKER FOAM - LCD PANEL	2
14	820-6961-01	DECAL SPEAKER PANEL CONNECTED - SPIKE 3	1

5.8 SPEAKER BRACKET MOUNT ASSEMBLY

511-3645-00

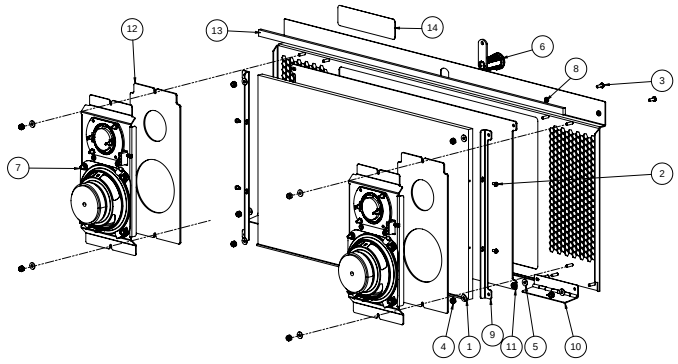


ID	Part Number	Description	Qty
1	040-5000-23	WIRE CLAMP, 1/4" CLOSED TAB	2
2	031-5026-00	SPKR 4 X 4 in 8 OHM MID RANGE	1
3	240-5005-00	6-32 NYLON STOP NUT	8
4	242-5001-00	#6 WASHER	8
5	515-8873-00	BRKT SPEAKER MOUNT SPIKE 3	1
6	535-3367-00	BLANKING PLATE	1

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5.9 SPEAKER PANEL ASSEMBLY [LE]

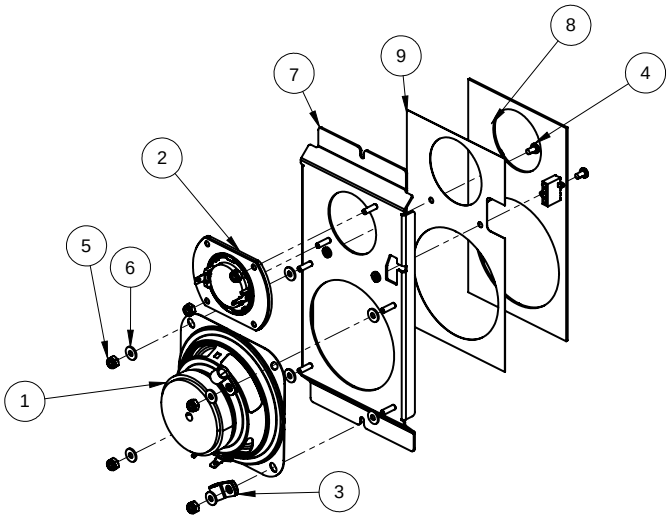
500-9404-AC



ID	Part Number	Description	Qty
1	502-8091-00	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
-	036-5711-00	RGB SPEAKER CABLE W/ ACCEL	1
-	520-9884-00	PCB LIGHTING ACCELERATOR SPIKE 3	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	545-9995-00	LCD LENSE, 18.5IN SCREEN	1
12	546-5043-00	SPEAKER LENS, TRANSFORMERS: MTMTE LE - AUTOBOT	1
-	546-5043-01	SPEAKER LENS, TRANSFORMERS: MTMTE LE - DECPTICON	1
13	626-5001-00	FOAM TAPE - 3/8 X 3/16 THK (BLACK)	1
14	820-6961-01	DECAL SPEAKER PANEL CONNECTED - SPIKE 3	1

5.10 SPEAKER BRACKET MOUNT ASSEMBLY [LE]

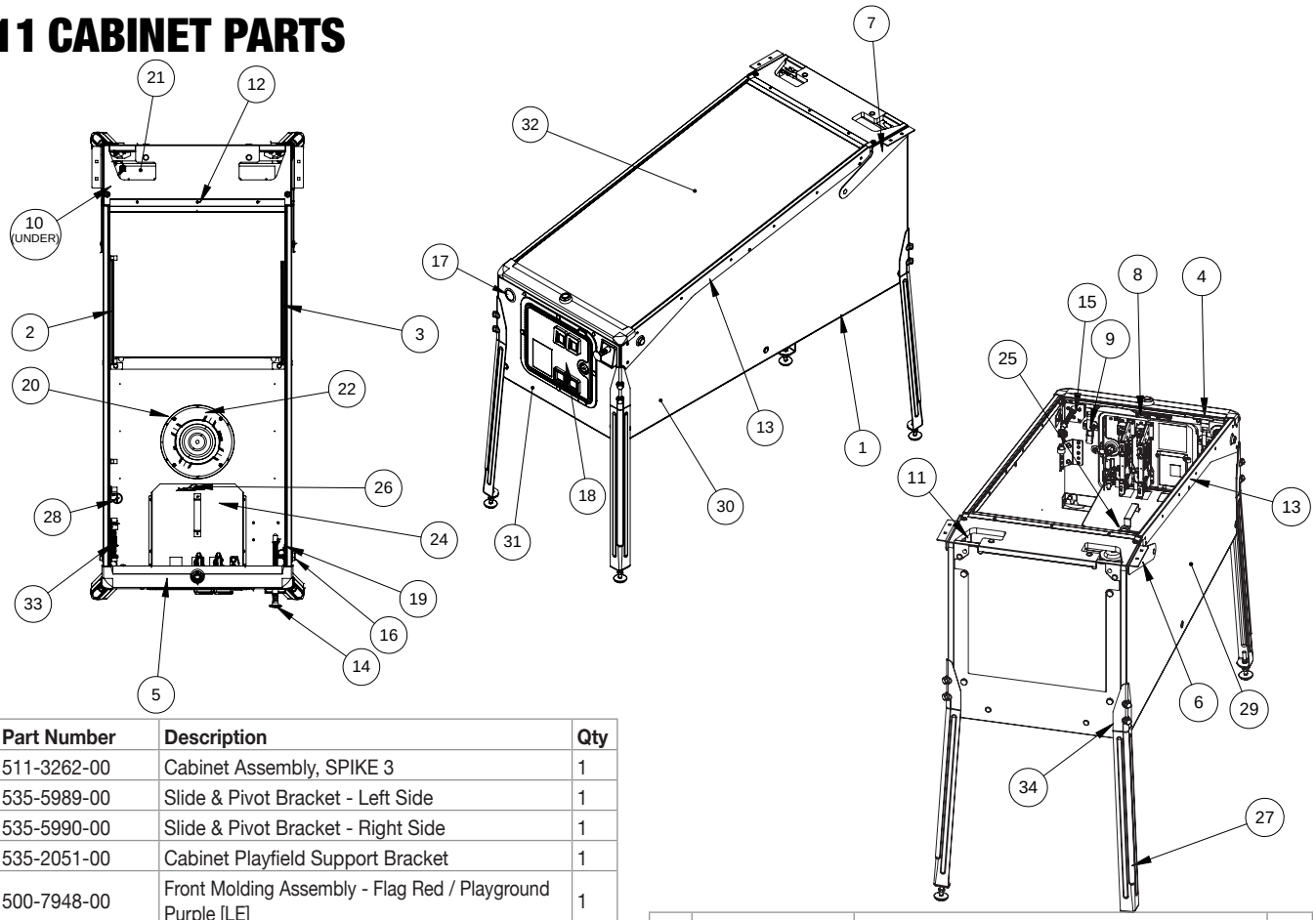
511-3645-02



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

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5.11 CABINET PARTS



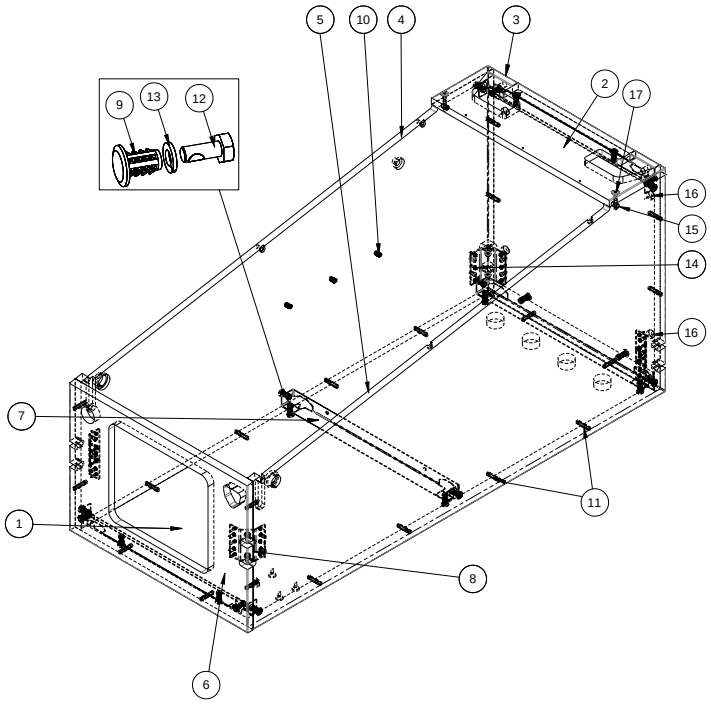
ID	Part Number	Description	Qty
1	511-3262-00	Cabinet Assembly, SPIKE 3	1
2	535-5989-00	Slide & Pivot Bracket - Left Side	1
3	535-5990-00	Slide & Pivot Bracket - Right Side	1
4	535-2051-00	Cabinet Playfield Support Bracket	1
5	500-7948-00	Front Molding Assembly - Flag Red / Playground Purple [LE]	1
	500-2440-99	Front Molding Assembly - Black [Premium]	1
6	535-3315-00-21	Pivot Hinge, Left - Flag Red [LE]	1
	535-3315-00-99	Pivot Hinge, Left - Mini-Tex [Premium]	1
7	535-3315-01-79	Pivot Hinge, Right - Playground Purple [LE]	1
	535-3315-01-99	Pivot Hinge, Right - Mini-Tex [Premium]	1
8	511-2014-00	Switch & Light Assembly for Front Button	1
9	355-5038-00	Cabinet Draw Latch, Center Clamp	2
10	535-1759-00-00	Cabinet Side Cleat - Left	1
11	535-1758-00-00	Cabinet Side Cleat - Right	1
12	545-6876-00	SPIKE 3 Glass Rear Extrusion	1
13	500-7440-00	Side Armor Left - Flag Red - Transformers: MTMTE [LE]	1
	500-7440-01	Side Armor Right - Playground Purple - Transformers: MTMTE [LE]	1
	500-7941-00-99	Side Armor Left- Mini-Tex [Premium]	1
	500-7941-01-99	Side Armor Right- Mini-Tex [Premium]	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 [LE]	2
	500-1169-32	Flipper Button Assy - Red [Premium]	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	535-2925-00	Grill - Speaker / Vent	1
21	545-9544-02	Grill - Speaker / Vent	1
22	031-5007-01	Speaker, Cabinet 8" Round, 4Ω [Premium]	1
	031-5027-00	Speaker, 8" Subwoofer 8Ω [LE]	1

ID	Part Number	Description	Qty
23	545-5090-00	Cash Box - Plastic	1
24	535-5013-03	Cash Box Cover	1
25	535-2926-00	Cash Box Lock Bracket	1
26	535-7772-00	Hair Pin Clip	1
27	500-5921-21	Leg Assembly - Flag Red [LE]	2
	500-5921-79	Leg Assembly - Playground Purple [LE]	2
	500-5921-50	Leg Assembly - Wrinkle Black [Premium]	4
28	516-0007-00	Tilt Assembly	1
	535-5029-00	Tilt Plumb Bob	1
29	820-30AC-03	Cabinet Decal, Left, Transformers: MTMTE LE	1
	820-81AB-03	Cabinet Decal, Left, Transformers: MTMTE Premium	1
30	820-30AC-04	Cabinet Decal, Right, Transformers: MTMTE LE	1
	820-81AB-04	Cabinet Decal, Right, Transformers: MTMTE Premium	1
31	820-30AC-05	Cabinet Decal, Front, Transformers: MTMTE LE	1
	820-81AB-05	Cabinet Decal, Front, Transformers: MTMTE Premium	1
32	660-5001-00	Playfield Glass [Premium]	1
	660-5053-00	High Resolution Glass [LE]	1
33	520-6967-72	Cabinet Node Board (NODE 1)	1
	520-7475-00	Cabinet Expression Lights Accelerator [LE]	1
34	545-7309-00	Leg Spacer Bracket	4
35	820-5484-01-AC	Interior Cabinet Decal, Right, Transformers: MTMTE LE	1
	820-5484-00-AC	Interior Cabinet Decal, Left, Transformers: MTMTE LE	1
36	234-5101-00	SCREW, #8 X 1/2" SLT HWH AB ZINC	34
	820-81AC-XX 820-81AB-XX	Cabinet Decal Replacement Set, Speaker Panel Decal Not Included	

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5.12 SPIKE 3 CABINET ASSEMBLY

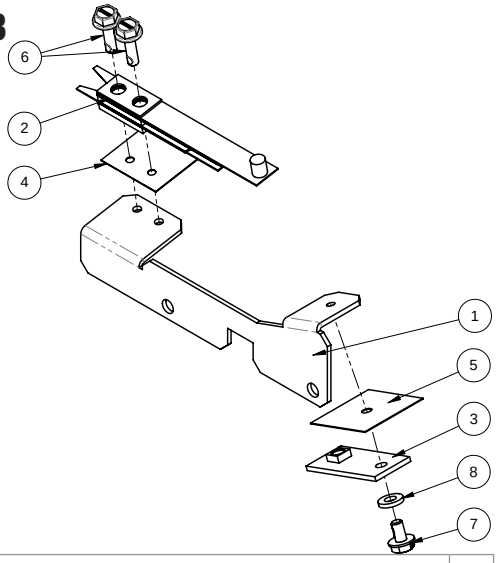
511-3262-00



ID	Part Number	Description	Qty
1	525-9771-00	CABINET FLOOR	1
2	525-9770-05	CABINET TOP PANEL	1
3	525-9770-04	CABINET REAR PANEL	1
4	525-9770-01	CABINET LEFT SIDE PANEL	1
5	525-9770-02	CABINET RIGHT SIDE PANEL	1
6	525-9770-13	CABINET FRONT PANEL W/ PLUNGER MOUNT	1
7	535-3314-00	BRACKET, CABINET MAIN BRACE	4
8	535-5374-02	BRACKET, CABINET LEG	4
9	262-5000-00	1/4-20 X 16MM CLOSED-END FLANGED INSERT FOR SOFT WOOD	22
10	262-5001-00	10-32 x 13MM FLUSH INSERT FOR SOFT WOOD	6
11	251-5051-00	DOWEL, 8 MM X 35 MM, SELF-TIGHTENING PLASTIC	20
12	237-9395-00P	BOLT, 1/4-20" X 5/8" HEX HEAD, PATCH	22
13	244-5000-00	1/4" LOCK WASHER, SPLIT	22
14	234-5102-00	SCREW, #8 X 5/8" SLT HWH AB ZINC (6 per leg bracket)	24
15	240-5409-00	CROSS NUT	2
16	285-0101-00	PLASTIC GLIDE W/ NAIL, 3/4 OD X 1/4 L	4
17	237-6357-00	BOLT, 1/4-20 X 40mm	2

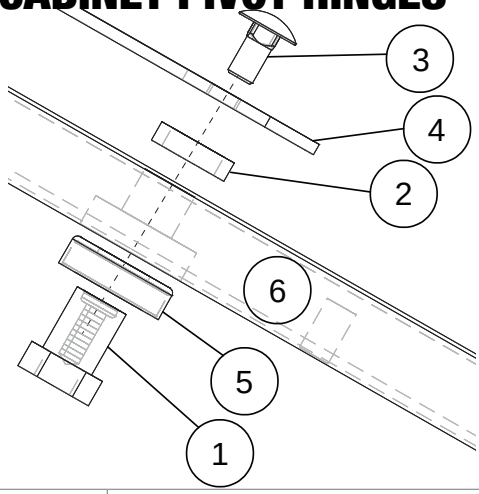
5.13 SWITCH & LIGHT ASSEMBLY FOR FRONT MOLD (LOCKDOWN BAR) BUTTON

511-2014-03



ID	Part Number	Description	Qty
1	535-2050-00	BRACKET, SWITCH AND LIGHT, FRONT MOLD BUTTON	1
2	180-5218-00	SINGLE FLIPPER SWITCH W/ NYLON LIFTER	1
3	520-5333-00	PCB - TRI-COLOR LED	1
4	545-6268-00	FISCHE PAPER	1
5	545-6268-01	FISCHE PAPER	1
6	237-5976-03P	SCREW, 6-32 X 1/2" HWH SWAGE, PATCH	2
7	237-5976-01P	SCREW, 6-32 X 1/4 HWH SWAGE	1
8	242-5079-00	WASHER, .150 I.D. X .312 O.D. X .050 THICK	1

5.14 CABINET PIVOT HINGES

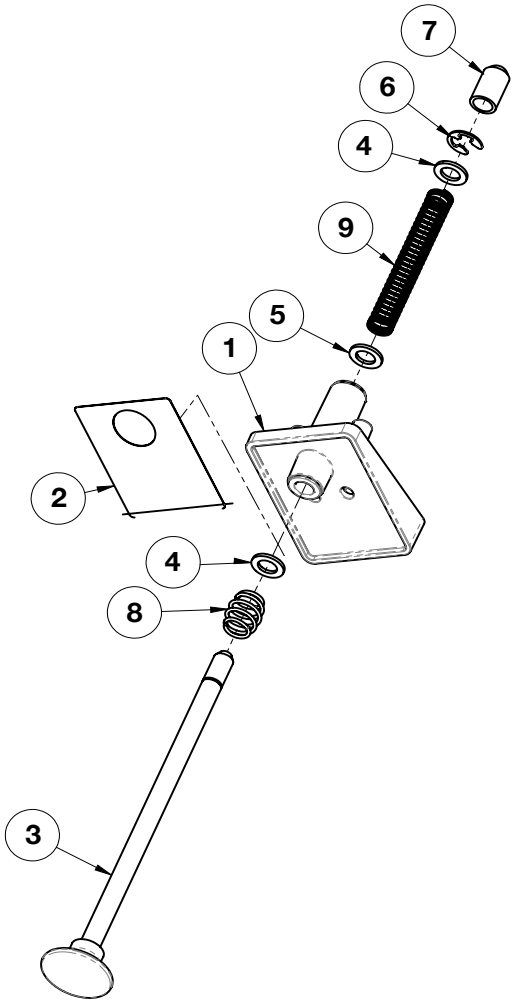


ID	Part Number	Description	Qty
1	254-5042-00	SPACER NUT HEX, 1/2"OD, 1/4-20	1
2	242-5084-00	WASHER, 1/2" I.D., 3/16" THK	1
3	231-5072-00	CARRIAGE BOLT, 1/4-20 X 1/2"	1
4		PIVOT HINGE BRACKET	1
5	544-9930-00	FLANGED WASHER, MOLDED, HOLE TRIM	1
6		CABINET	

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5.15 BALL SHOOTER ASSEMBLY

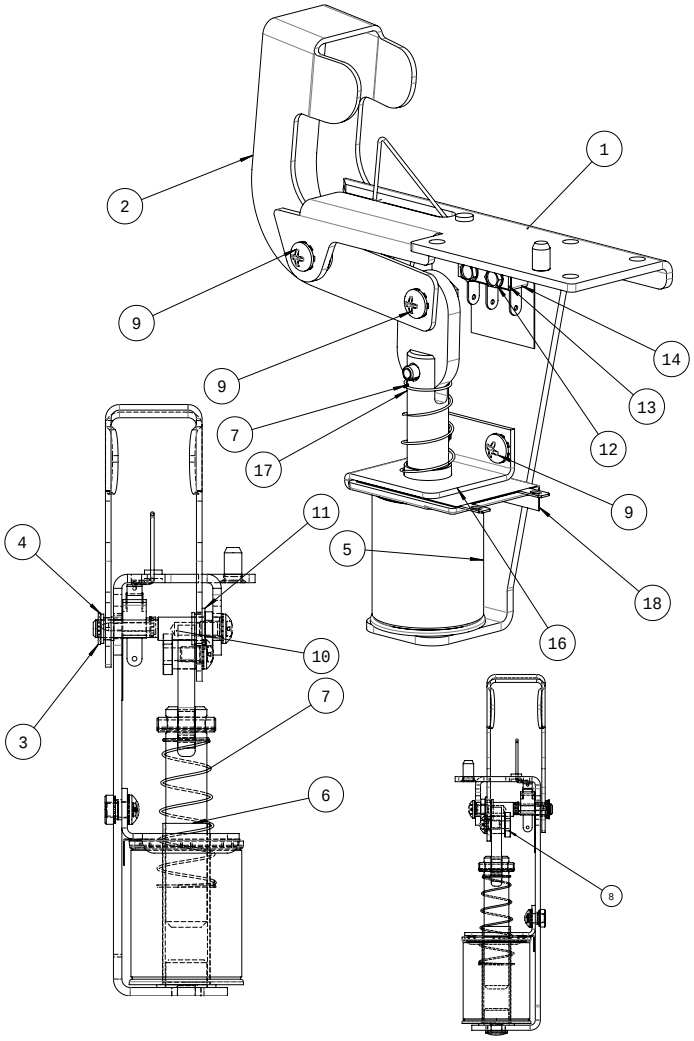
500-2604-07



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

5.16 AUTO LAUNCH ASSEMBLY

500-9818-02

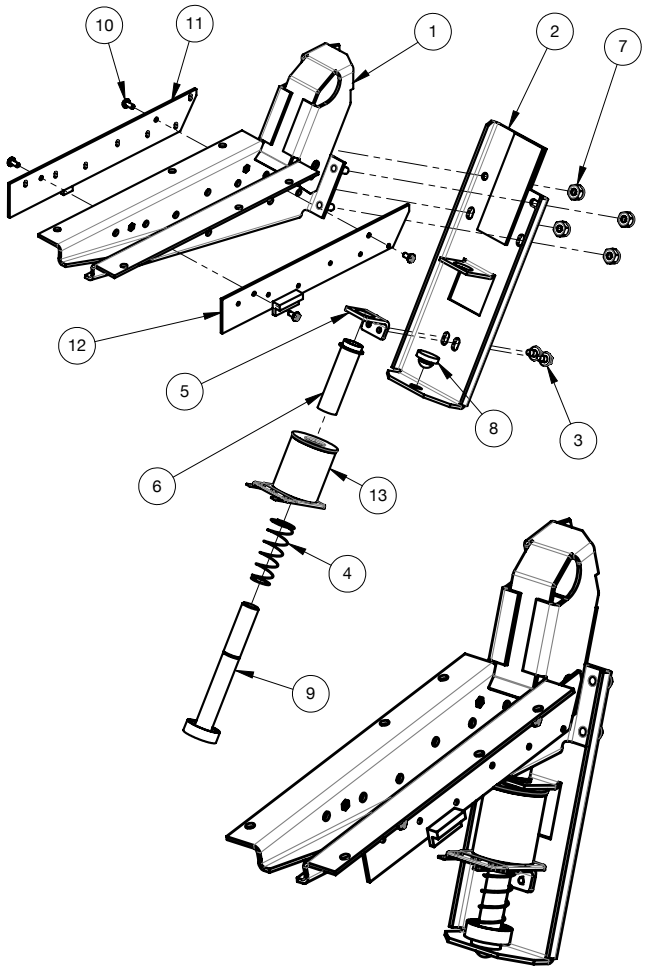


ID	Part Number	Description	Qty
1	515-9689-01	MAIN BRKT: AUTO-PLUNGER	1
2	535-0728-00	KICKER ARM, AUTO-PLUNGER	1
3	270-5001-00	RETAINING E-RING, 3/16" SHAFT OD	1
4	545-5352-00	NYLINER, 3/16" SHAFT	1
5	090-5001-ND	COIL - 23-800, NO DIODE	1
6	545-5411-00	COIL SLEEVE	1
7	266-5020-00	COMPRESSION SPRING-CONICAL	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-AUTOPLUNGER	1
17	515-6304-03	PLUNGER / LINK ASSEMBLY	1
18	545-0762-00	FISCHE PAPER: AUTO-LAUNCHER	1

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5.17 BALL TROUGH ASSEMBLY

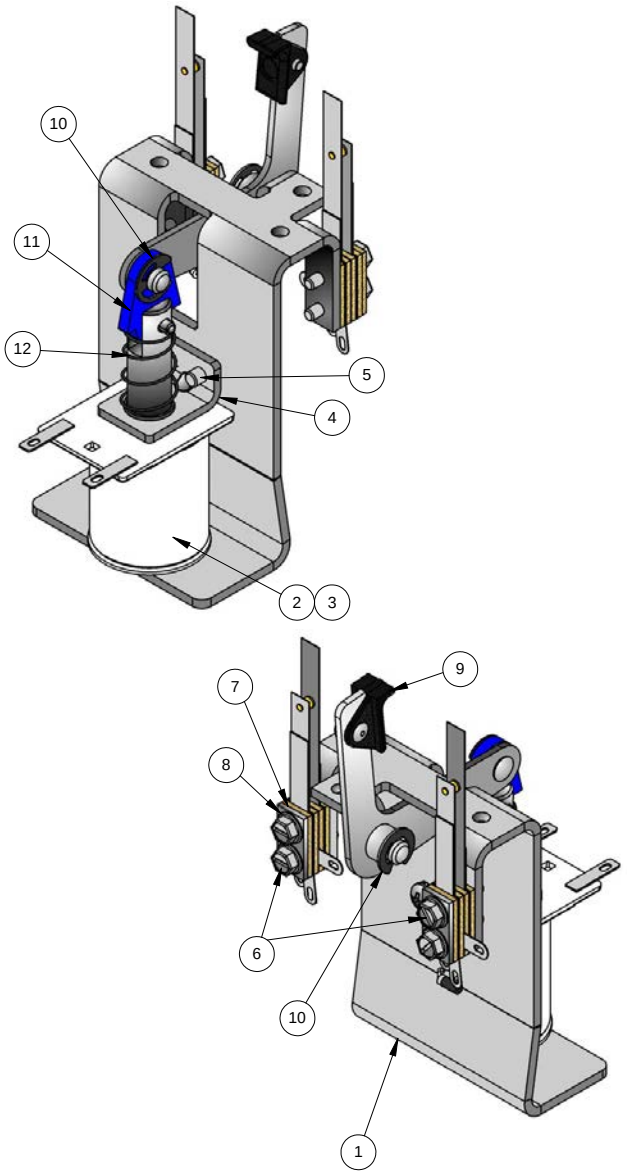
500-9820-01



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

5.18 SLINGSHOT ASSEMBLY

500-9920-01

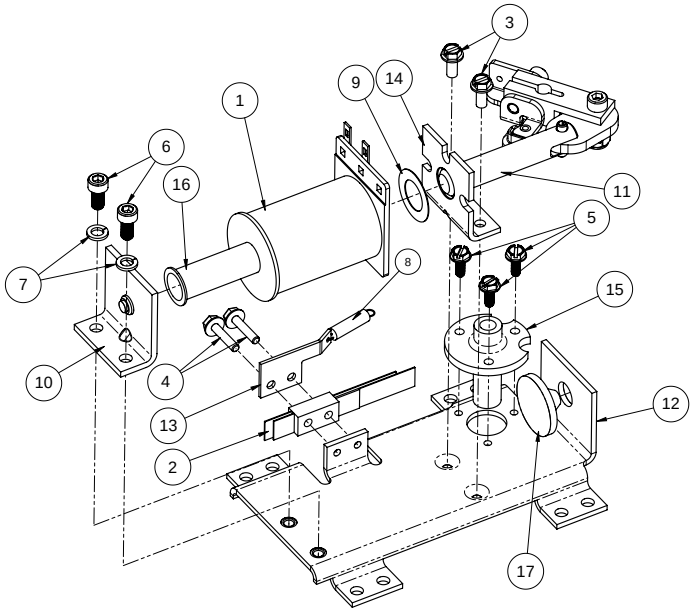


ID	Part Number	Description	Qty
1	515-5339-01	SLINGSHOT BRACKET ASSEMBLY	1
2	090-5044-ND	COIL 26-1200 - NO DIODE	1
3	545-5031-00	COIL SLEEVE	1
4	535-5203-03	COIL RETAINER BRACKET	1
5	232-5301-00	8-32 X 3/8 PPH MS EXT SEMS ZC	2
6	180-5231-00	SWITCH SLING SHOT 2 LUG CENTER	2
7	535-5045-00	SWITCH PLATE	2
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

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5.19 FLIPPER ASSEMBLY, LEFT

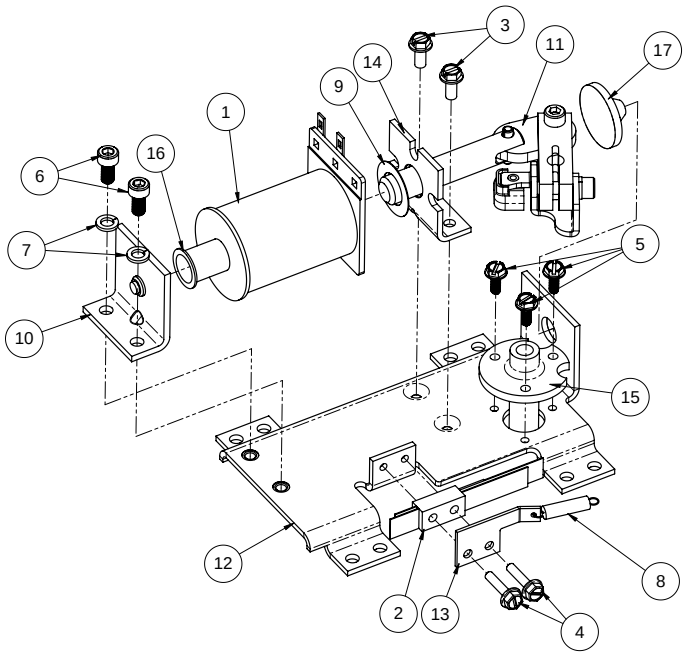
500-6543-12-ND



ID	Part Number	Description	Qty
1	090-5032-ND	FLIPPER COIL (22-1080)	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 AND SHAFT (WHITE)	1
19	545-5277-00	FLIPPER RUBBER	1

5.20 FLIPPER ASSEMBLY, RIGHT & UPPER RIGHT

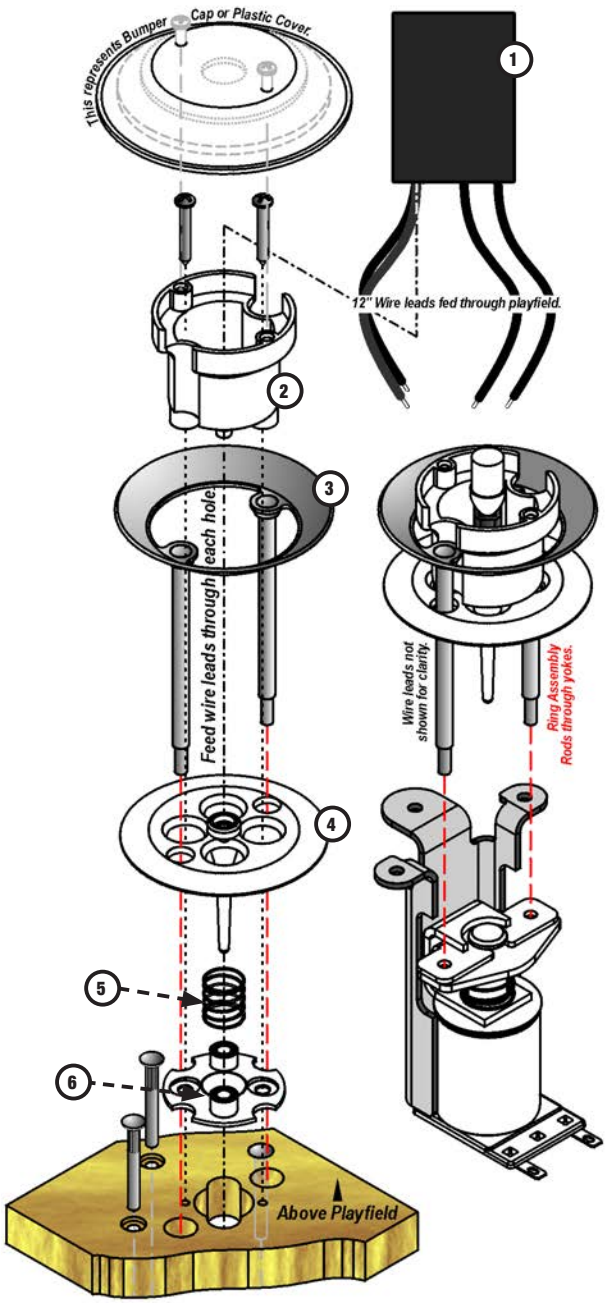
500-6543-02-ND



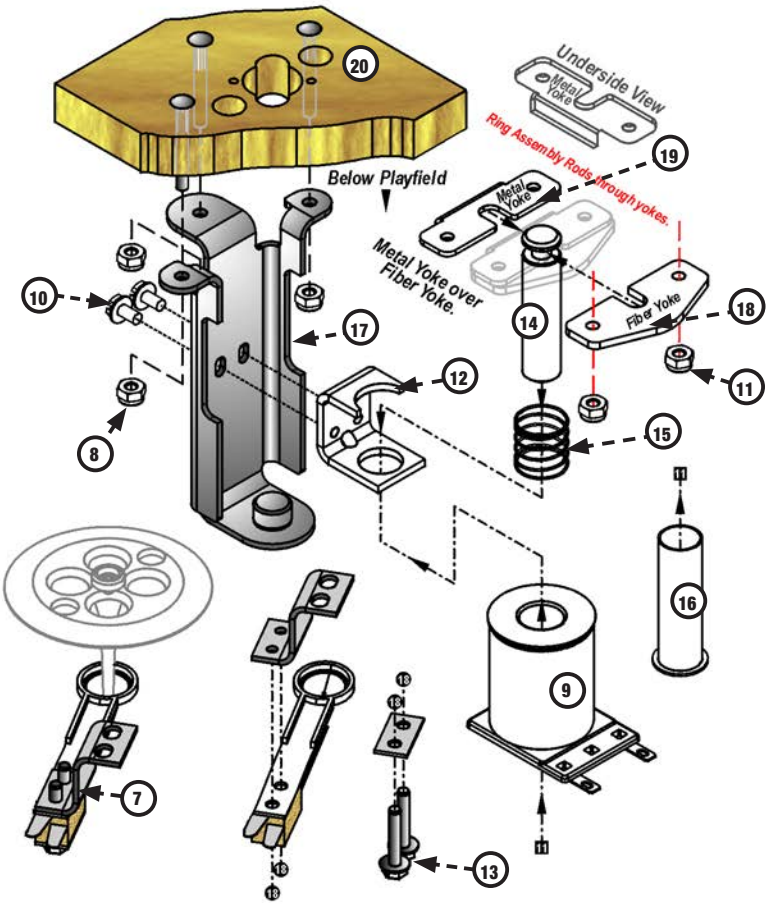
ID	Part Number	Description	Qty
1	090-5032-ND	FLIPPER COIL (22-1080)	1
2	180-5149-00	SWITCH, END-OF-STROKE	1
3	237-5975-00	SCREW, 8-32 X 3/8" HWH SWAGE ZN	2
4	237-5976-04	SCREW, 6-32 X 5/8" HWH SWAGE	2
5	237-6388-00	SCREW, 6-32 X 3/8", SLOTTED HWH, TYPE F	3
6	237-6389-00	SCREW, 10-32 X 3/8", SHC	2
7	244-5003-00	#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 AND SHAFT (WHITE)	1
19	545-5277-00	FLIPPER RUBBER	1

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5.21 POP BUMPER ASSEMBLY



ID	Part Number	Description	Qty
1	511-7670-00	POP BUMPER RGB LED MODULE	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



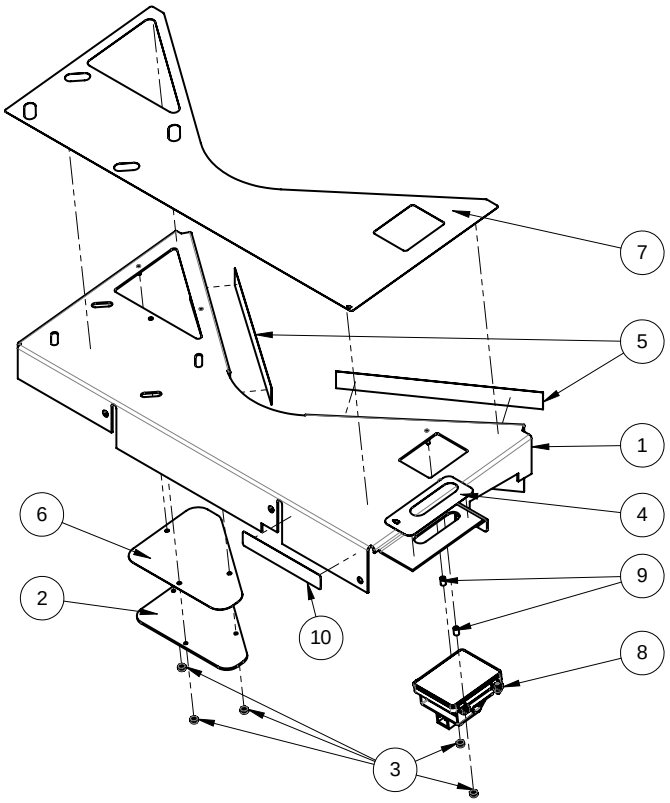
Part Number	Description	Qty
511-5067-BRD	BUMPER/RING TOP ASSY, W/ LED	2
515-6459-04-ND	BUMPER BOTTOM ASSY, NO DIODE	3

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	237-5976-01	#6-32 X 1/4" SHWH SWAGE ZN	2
11	240-5005-00	#6-32 NYLON STOP NUT	2
12	535-7347-00	METAL YOKE STOP	1
13	234-5101-00	SCREW, 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

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5.22 BOTTOM ARCH ASSEMBLY

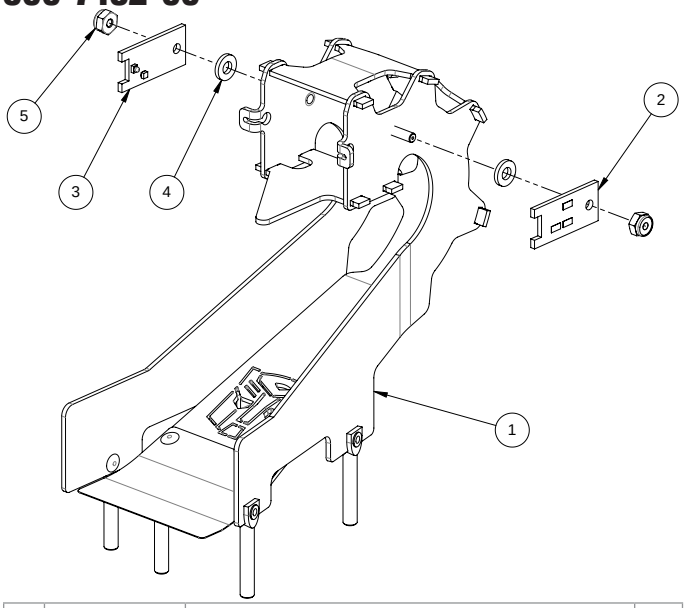
500-2505-AC [LE] & 500-2548-AB [PREMIUM]



ID	Part Number	Description	Qty
1	510-7805-00	BOTTOM ARCH, STEEL W/ SPADE BOLT, QR READY	1
2	830-8502-AC	LEFT SIDE ARCH PLASTIC [LE]	1
-	830-8502-AB	LEFT SIDE ARCH PLASTIC [Premium]	1
3	240-5303-00	4-40 NYLON LOCK NUT	5
4	820-97AC-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 [LE ONLY]	1
7	820-97AC-01	METAL ARCH DECAL SET -01	1
8	524-1001-00	QR SCANNER 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

5.23 LEFT METAL RAMP ASSEMBLY

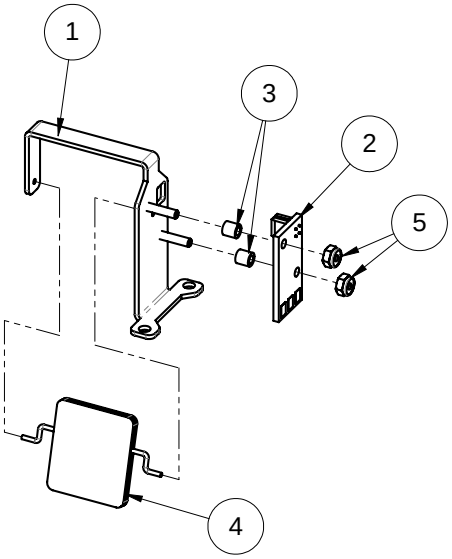
500-7432-00



ID	Part Number	Description	Qty
1	510-7988-00	RIVETED ASSEMBLY, LEFT METAL RAMP	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	2
5	240-5303-00	4-40 NYLON LOCK NUT	2

5.24 REFLECTIVE SPINNER ASSEMBLY

511-3044-00

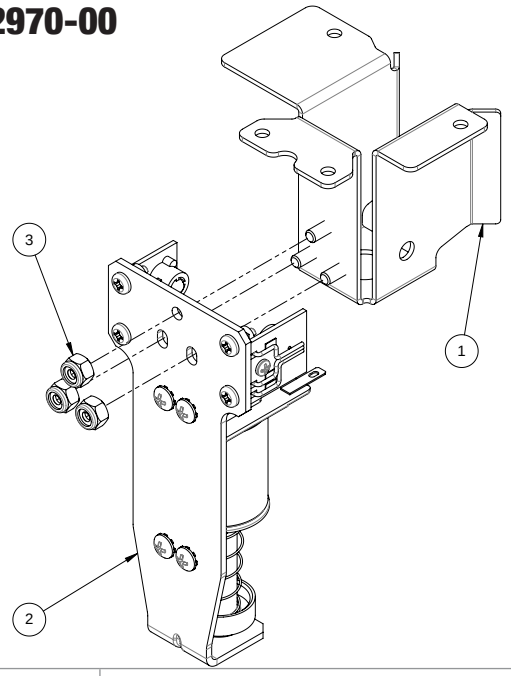


ID	Part Number	Description	Qty
1	515-2456-00	BRACKET, SPINNER, REFLECTIVE OPTO	1
2	511-2785-01	SPINNER OPTO W/ CABLE	1
3	254-5090-01	PLASTIC SPACER #4 SCREW, 3/16" OD - 3/16" LENGTH	2
4	515-2326-00	SPINNER TARGET, REFLECTIVE	1
5	240-5303-00	4-40 NYLON LOCK NUT	2

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5.25 DUAL ENTRY VUK ASSEMBLY

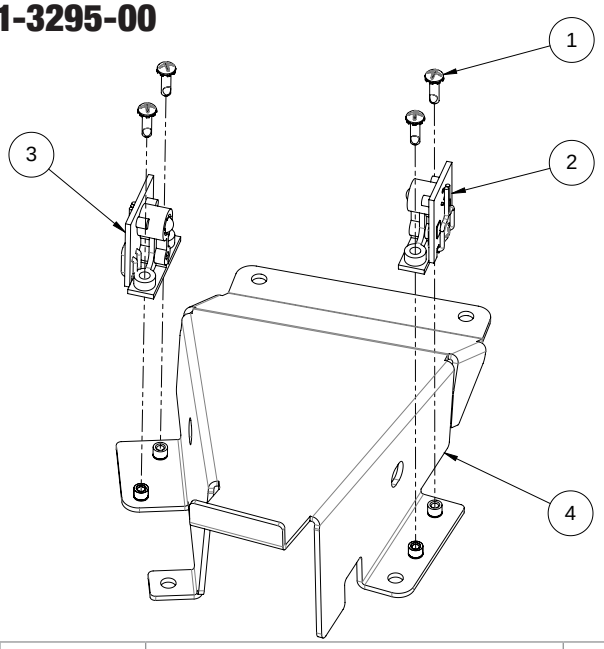
500-2970-00



ID	Part Number	Description	Qty
1	535-3357-00	BRACKET, DUAL-ENTRY VUK	1
2	511-3211-00	ASSEMBLY, VUK TROUGH COIL & OPTOS	1
3	240-5102-00	8-32 NYLON LOCK NUT	3

5.26 TRANSFER TROUGH ASSEMBLY (MEGATRON SUBWAY)

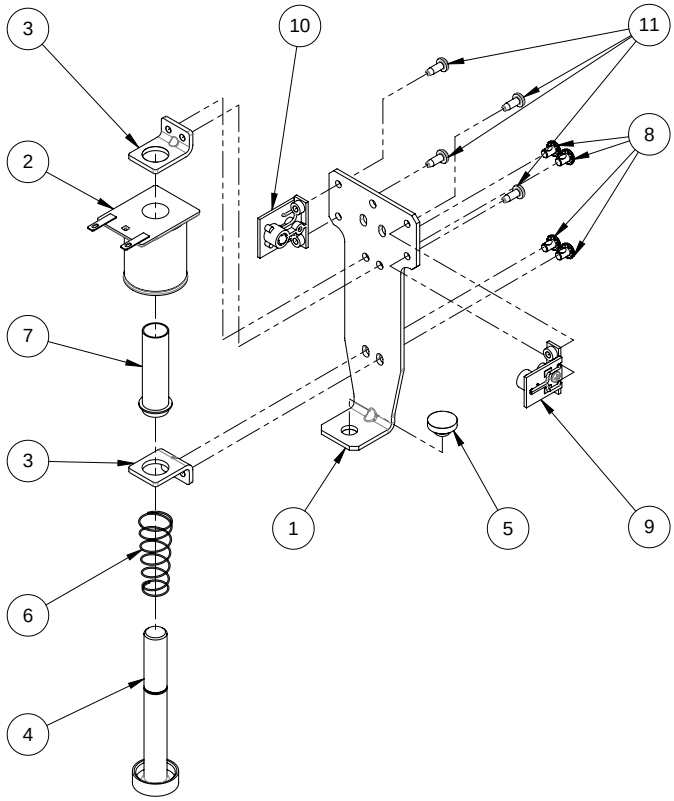
511-3295-00



ID	Part Number	Description	Qty
1	237-5909-01P	SCREW, 4-40 X 3/8" PPH SEMS, PATCH	4
2	515-0215-00	LONG RANGE OPTO EMITTER ASSEMBLY	1
3	515-0215-01	LONG RANGE OPTO RECEIVER ASSEMBLY	1
4	535-4174-00	BRACKET, VUK TRANSFER TROUGH	1

5.27 VUK TROUGH COIL & OPTOS ASSEMBLY

511-3211-00

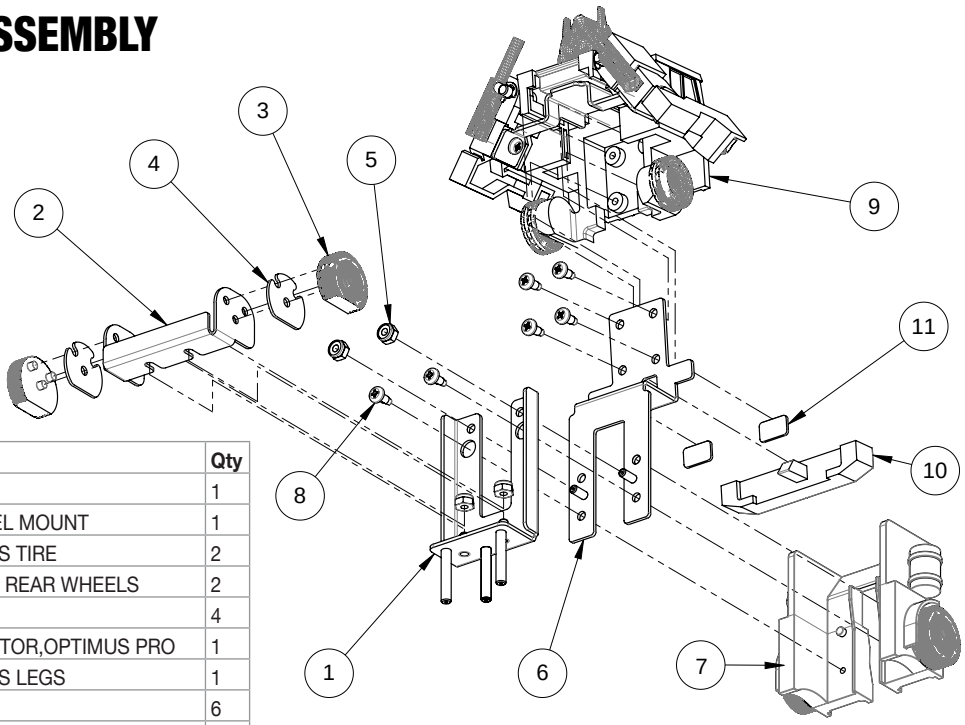


ID	Part Number	Description	Qty
1	535-4058-00	BRACKET, COIL AND OPTOS, DUAL ENTRANCE VUK	1
2	090-5001-ND	090-5001-ND	1
3	535-5203-03	COIL RETAINING BRACKET	2
4	515-7309-00	PLUNGER ASSEMBLY	1
5	545-5105-00	RUBBER BUMPER	1
6	266-5020-00	COMPRESSION SPRING-CONICAL	1
7	545-5076-01	COIL SLEEVE	1
8	232-5300-00P	SCREW, 8-32 X 1/4" PPH SEMS, PATCH	4
9	515-0215-00	LONG RANGE OPTO EMITTER ASSEMBLY	1
10	515-0215-01	LONG RANGE OPTO RECEIVER ASSEMBLY	1
11	237-5880-00	SCREW, #6 X 3/8 PPH T-25	4

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5.28 OPTIMUS PRIME ASSEMBLY

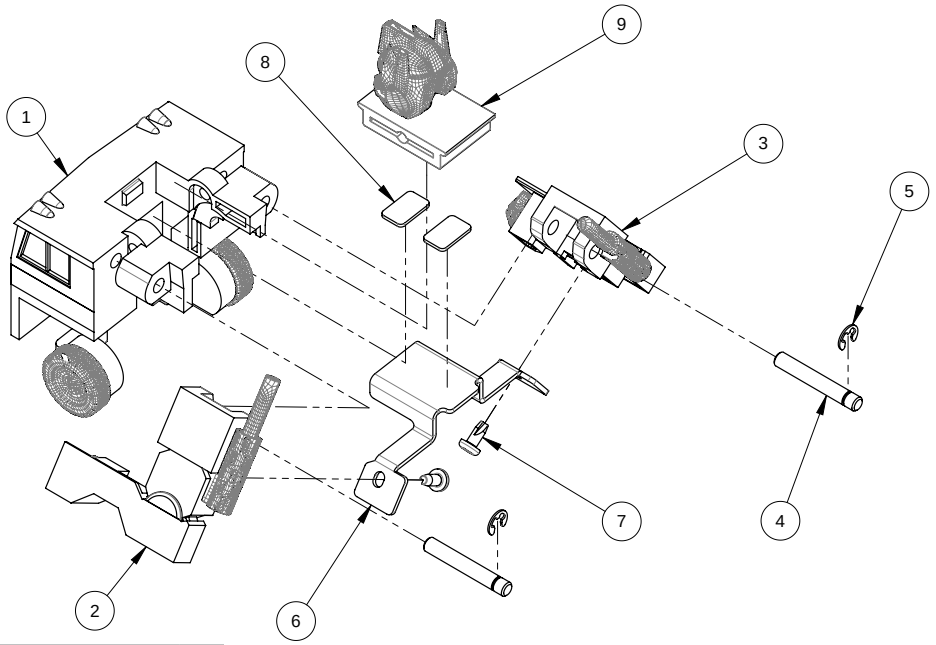
511-0055-01



ID	Part Number	Description	Qty
1	535-0185-09	BRACKET, ROBOT BASE	1
2	535-0185-12	BRACKET, OPTIMUS WHEEL MOUNT	1
3	545-6861-01	DECORATED TOY, OPTIMUS TIRE	2
4	626-5143-00	ADHESIVE TAPE, OPTIMUS REAR WHEELS	2
5	240-5005-00	6-32 NYLON STOP NUT	4
6	535-2943-00	LEG AND TORSO CONNECTOR,OPTIMUS PRO	1
7	545-6862-00	DECORATED TOY, OPTIMUS LEGS	1
8	237-5880-01	SCREW, #6 X 5/16 PPH T-25	6
9	511-4908-01	ASSEMBLY, STANDING OPTIMUS CAB	1
10	545-6859-00	DECORATED TOY, CAB BUMPER	1
11	626-5141-00	ADHESIVE TAPE, CAB BUMPER	2

5.29 STANDING OPTIMUS CAB ASSEMBLY

511-4908-01

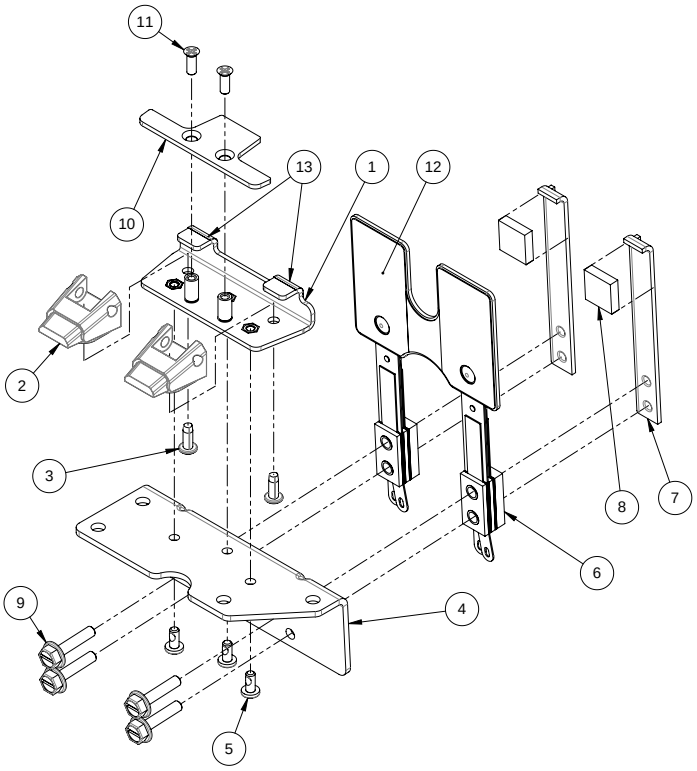


ID	Part Number	Description	Qty
1	545-6860-00	DECORATED TOY, OPTIMUS CAB	1
2	545-6863-01	DECORATED TOY, OPTIMUS LEFT ARM	1
3	545-6863-00	DECORATED TOY, OPTIMUS RIGHT ARM	1
4	530-9682-00	PIN, OPTIMUS ARM PIVOT	2
5	270-5001-00	RETAINING E-RING, 3/16" SHAFT OD	2
6	535-2944-00	ARM RESTRAINT, OPTIMUS PRO	1
7	237-5880-01	SCREW, #6 X 5/16 PPH T-25	2
8	626-5141-00	ADHESIVE TAPE, CAB BUMPER	2
9	545-6864-00	DECORATED TOY, OPTIMUS HEAD	1

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5.30 OPTIMUS DUAL TARGET ASSEMBLY

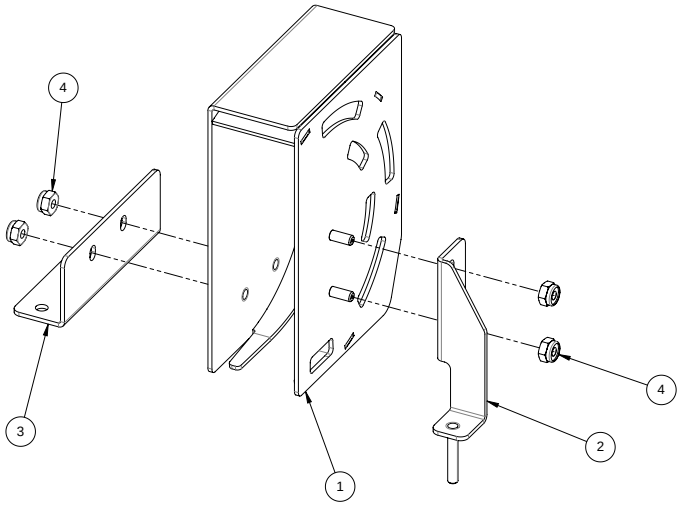
511-3292-02



ID	Part Number	Description	Qty
1	535-0185-10	BRACKET, OPTIMUS DUAL FOOT MOUNT	1
2	544-6861-00	MOLDED TOY, OPTIMUS FEET	2
3	237-5617-00	SCREW, #4 X 5/16" PPH THREAD FORMING FOR PLASTIC	2
4	535-3111-04	BRACKET, OPTIMUS DUAL TARGET	1
5	237-6169-00P	SCREW, 4-40 X 1/4 PPH MS, PATCH	3
6	510-8028-02	RIVETED ASSY, OPTIMUS DUAL TARGET	1
7	535-9823-01	SWITCH BACK PLATE	2
8	626-5029-00	FOAM PAD	2
9	237-5976-04	SCREW, 6-32 X 5/8" HWH SWAGE, SERRATED	4
10	546-7716-01	INSERT, FOOT COVER	1
11	237-5983-01P	SCREW, 4-40 X 3/8" PFH U/C MS	2
12	820-4477-00	DECAL, OPTIMUS DUAL-SHIN	1
13	626-5122-00	KAPTON TAPE W/ ADHESIVE, 3/8" WIDE X 1 MIL FILM	

5.31 TRAILER SCOOP ASSEMBLY

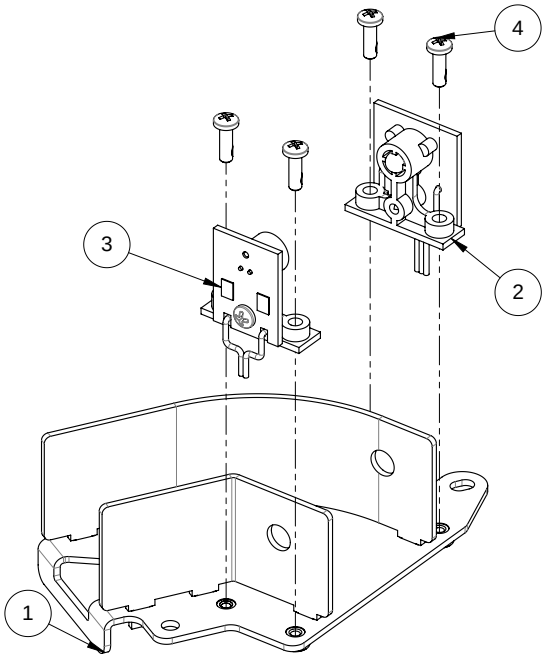
511-0054-01



ID	Part Number	Description	Qty
1	515-1024-01	WELDMENT, OPTIMUS SCOOP	1
2	535-5568-01	BRACKET, SCOOP FRONT MOUNT	1
3	535-5568-02	BRACKET, SCOOP REAR MOUNT	1
4	240-5005-00	6-32 NYLON STOP NUT	4

5.32 TRAILER EXIT ASSEMBLY

511-3293-00

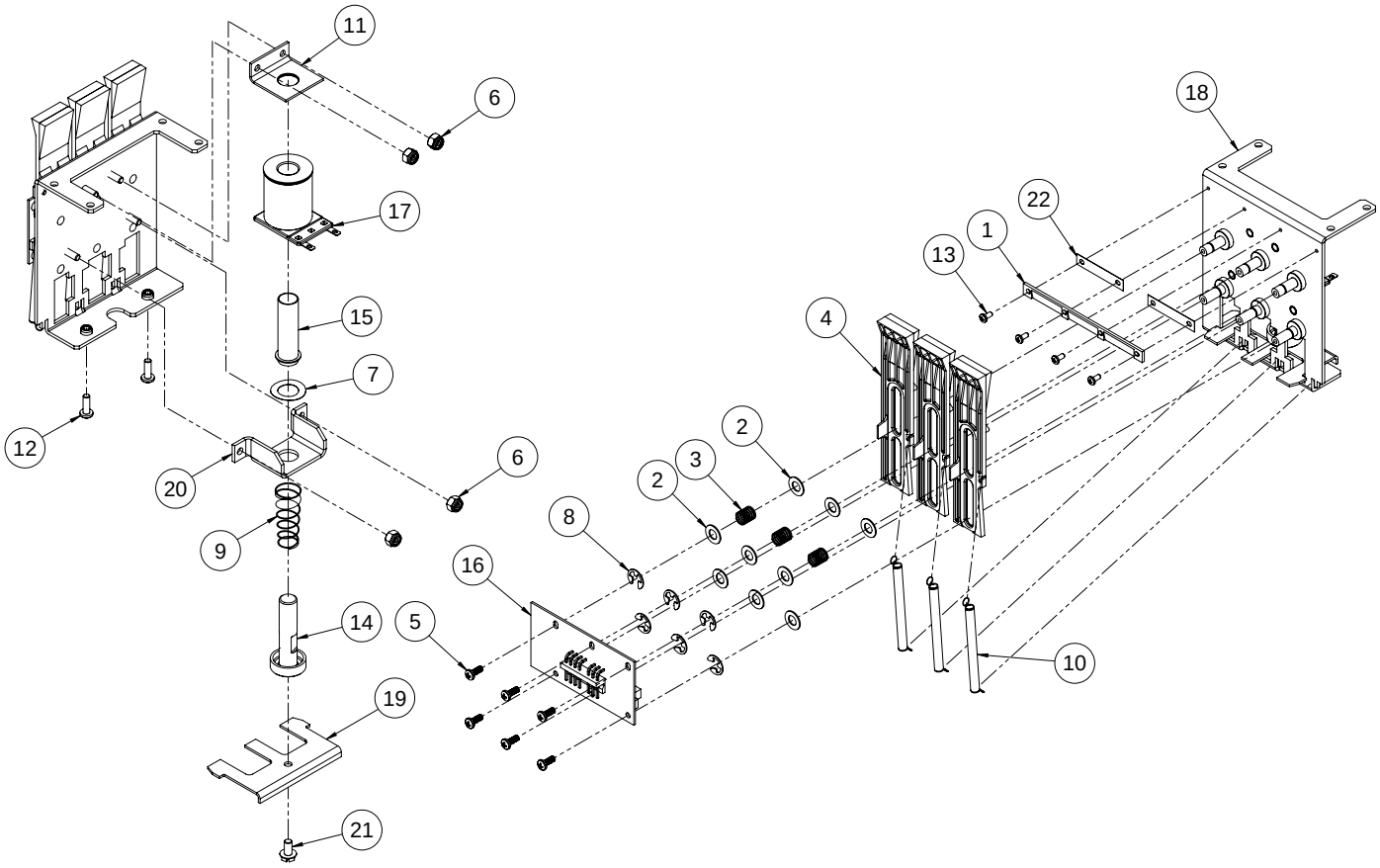


ID	Part Number	Description	Qty
1	515-3042-00	RAMP, OPTIMUS SCOOP EXIT	1
2	515-0215-01	LONG RANGE OPTO RECEIVER ASSEMBLY	1
3	515-0215-00	LONG RANGE OPTO EMITTER ASSEMBLY	1
4	237-5997-00P	SCREW, 4-40 X 3/8" PPH MS BLACK, PATCH	4

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5.33 3-BANK DROP TARGET ASSEMBLY

500-1110-03-0-1-2



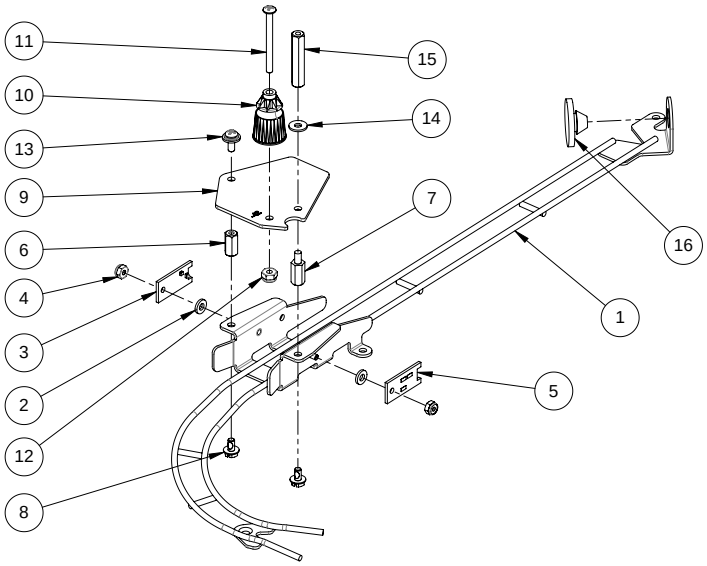
ID	Part Number	Description	Qty
1	545-6163-03	LEDGE, 3-BANK DROP TARGET	1
2	242-5091-00	WASHER, 1/2 X 17/64 X .03 - DT	9
3	266-5089-00	SPRING COMPRESSION - DT	3
4	545-6305-00	TARGET - ROLLOVER	3
5	237-5501-00	SCREW, 6-32 X 3/8" PPH MS ZINC	6
6	240-5102-00	8-32 NYLON LOCK NUT	4
7	269-5002-00	SPRING WASHER	1
8	270-5002-00	RETAINING RING - 1/4"	6
9	266-5020-00	COMPRESSION SPRING-CONICAL	1
10	265-5003-02	TARGET RESET SPRING	3
11	535-9959-00	STOP BRKT	1

ID	Part Number	Description	Qty
12	237-5602-00	SCREW, 8-32 X 1/2" PPH MS ZINC	2
13	237-6169-00	SCREW, 4-40 X 1/4 PPH MS	4
14	530-5757-00	PLUNGER - D.T. ASSY.	1
15	545-5076-01	COIL SLEEVE	1
16	520-8497-00	3 BANK DROP TARGET PCA	1
17	090-5034-ND	COIL 25-1240 - NO DIODE	1
18	515-9927-03	DROP TARGET FRAME ASSY - 3-BANK	1
19	535-9996-03	LIFT BRACKET - 3 BANK	1
20	535-9995-01	COIL BRACKET	1
21	237-5985-00	SCREW, 10-32 X 3/8" HWH SWAGE	1
22	545-6798-00	SHIM - FICHE PAPER - D.T. SINGLE	2

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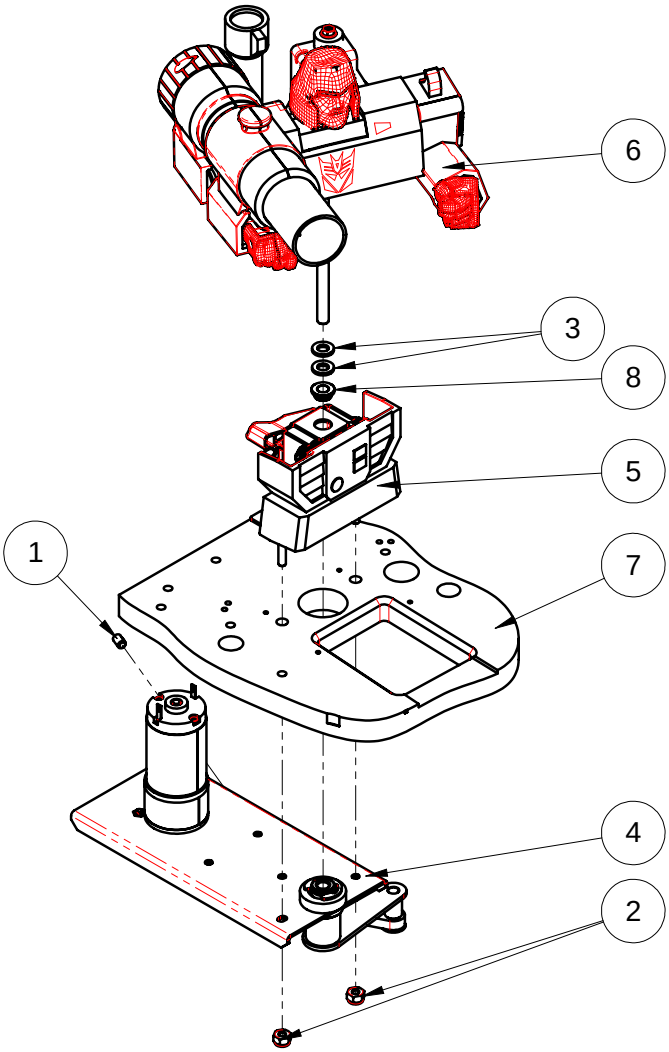
5.34 UPPER FEED WIRE RAMP ASSEMBLY

500-3657-00



ID	Part Number	Description	Qty
1	515-3263-00	WIRE RAMP, UPPER FLIPPER	1
2	242-5079-00	WASHER, .150 I.D. X .312 O.D. X .050 THICK	2
3	511-5815-01	ASM OPTO RECEIVER W/CBL	1
-	520-8116-00	PCA MINI SMT RECEIVER	1
4	240-5303-00	4-40 NYLON LOCK NUT	2
5	511-5815-00	ASM OPTO EMITTER W/CBL	1
-	520-8115-00	PCA MINI SMT EMITTER	1
6	254-5008-03	HEX SPACER - 1/2 "	1
7	254-5024-03	HEX SPACER MALE/FEMALE - 1/2"	1
8	237-5976-01P	SCREW, 6-32 X 1/4 HWH SWAGE, PATCH	2
9	830-8584-42	PLASTIC #42, TRANSFORMERS: MTMTE LE	1
10	550-5034-XX	POST, GROOVED JEWEL, PLASTIC	1
11	237-5510-00	SCREW, 6-32 X 1-1/2" PPH MS	1
12	240-5005-00	6-32 NYLON STOP NUT	1
13	237-6378-00P	#6-32 X 3/8 PAN PHILLIPS w/DOUBLE SEMS, PATCH	1
14	242-5001-00	#6 WASHER	1
15	254-5008-11	HEX SPACER - 1 1/4 "	1
16	545-5428-00	RUBBER BUMPER	1

5.35 MEGATRON

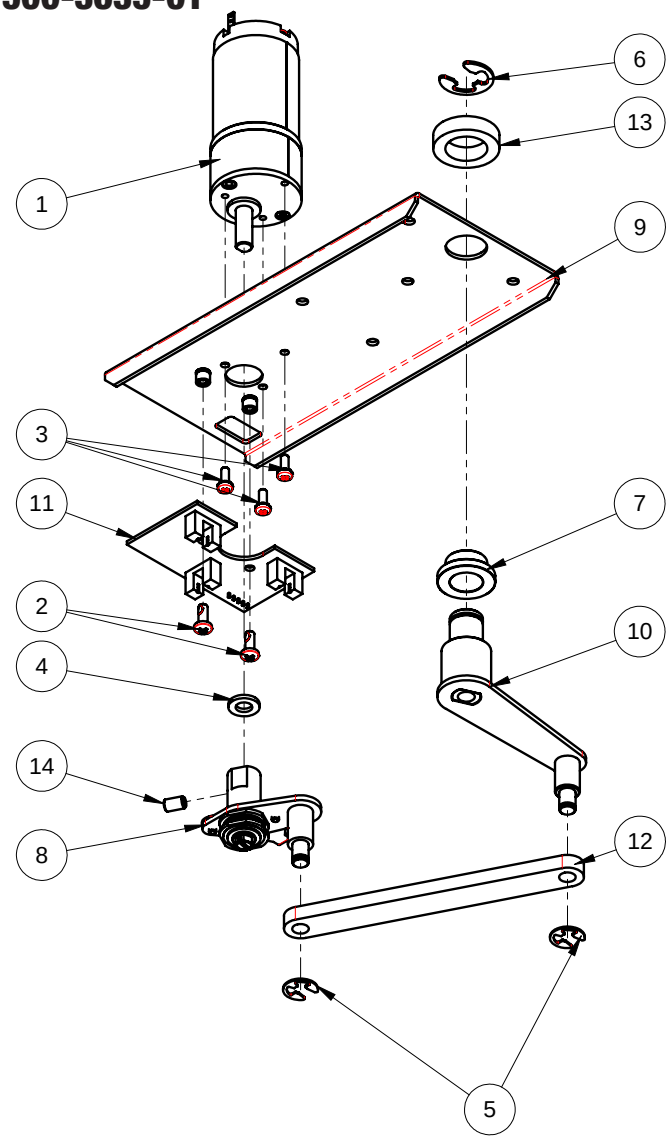


ID	Part Number	Description	Qty
1	237-6092-00P	SET SCREW, 10-32 X 5/16, SOCKET CUP PT, PATCH	1
2	240-5102-00	8-32 NYLON LOCK NUT	2
3	242-5072-01	NYLON WASHER .252 ID X .472 OD	2
4	500-3635-01	ASSEMBLY, MOTOR, MEGATRON	1
5	500-3635-02	ASSEMBLY, TARGET, MEGATRON	1
6	500-3635-03	ASSEMBLY, UPPER HALF, MEGATRON	1
7		PLAYFIELD	1
8	283-5018-01	1/4 ID X 3/8 OD X 3/16 LG. BUNTING SAE 841 BRONZE FLANGED BEARING-PART #EF040603	1

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5.36 MEGATRON MOTOR ASSEMBLY

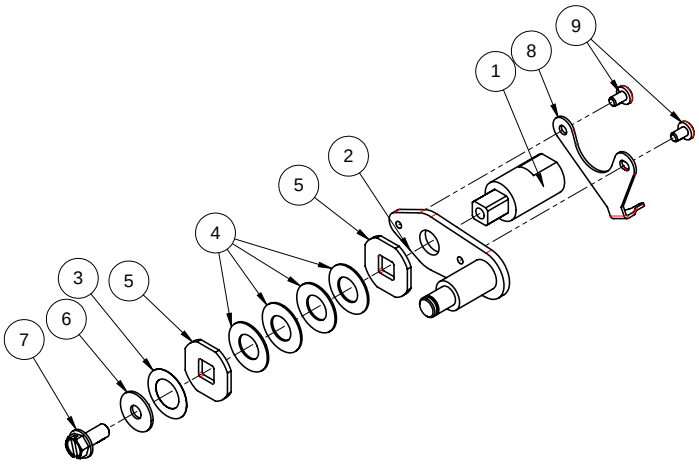
500-3635-01

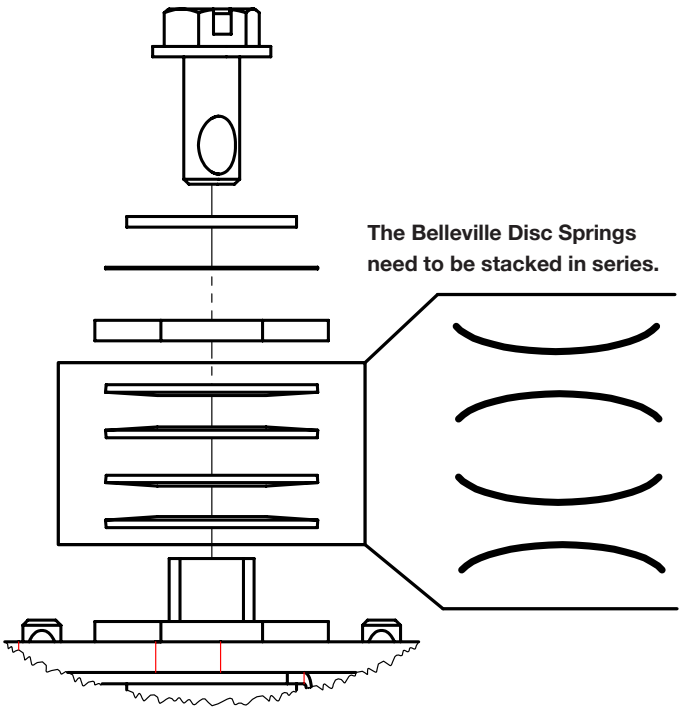


ID	Part Number	Description	Qty
1	511-1081-03	DC MTR ASSY/CAPS & CABLE	1
-	041-5132-00	DC GEARHEAD MOTOR, 24 VDC 10 RPM	1
2	237-5501-00P	SCREW, 6-32 X 3/8" PPH MS ZINC, PATCH	2
3	237-6188-00	SCREW, M3X0.5 X 8MM PPH SEMS ZINC	3
4	242-5072-01	NYLON WASHER .252 ID X .472 OD	1
5	270-5002-00	RETAINING RING - 1/4"	2
6	270-5021-00	RETAINING RING, 1/2" ID	1
7	283-5018-08	1/2 ID X 5/8 OD X 3/8 LG. BUNTING SAE 841 BRONZE FLANGED BEARING-PART #EF081006	1
8	511-3650-00	ASSEMBLY, CLUTCH, MEGATRON	1
9	515-0226-00	BRACKET, MOTOR MOUNTING, MEGATRON	1
10	515-0226-02	CRANK ARM, OUTPUT, MEGATRON	1
11	520-8719-00	PCA MEGATRON SENSOR	1
12	546-7987-00	DRIVE LINK, MEGATRON	1
13	546-7987-05	SPACER, OUTPUT, MEGATRON	1
14	237-6092-00P	SET SCREW, 10-32 X 5/16, SOCKET CUP PT, PATCH	1

5.37 MEGATRON CLUTCH ASSEMBLY

511-3650-00





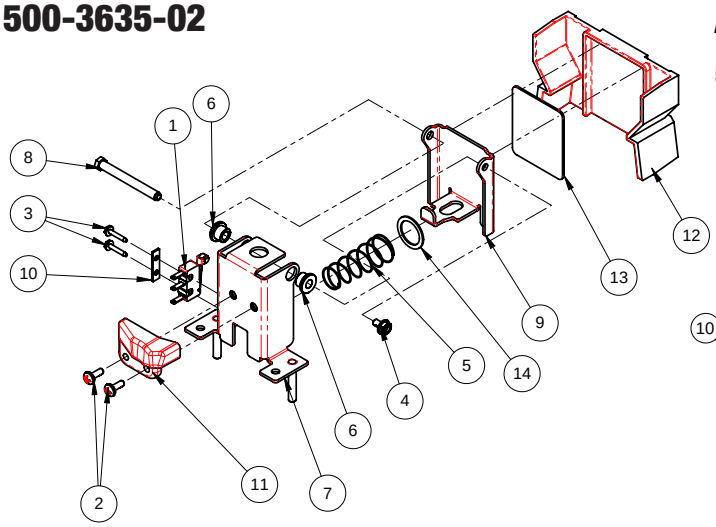
The Belleville Disc Springs need to be stacked in series.

ID	Part Number	Description	Qty
1	530-7808-03	HUB - CLUTCH DRIVE	1
2	515-0226-01	CRANK ARM, DRIVE, MEGATRON	1
3	242-5608-02	.005 SHIM WASHER	1
4	269-5007-00	BELLEVILLE DISC SPRING	4
5	535-0612-00	DRIVE PLATE	2
6	242-5015-00	#8 WASHER - .170 ID X 1/2 OD X .042	1
7	237-5975-00P	SCREW, 8-32 X 3/8" HWH SWAGE ZN, PATCH	1
8	535-3375-03	SENSOR FLAG, MEGATRON	1
9	237-5912-00P	SCREW, 4-40 X 3/16" PPH MS, PATCH	2

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5.38 MEGATRON TARGET ASSEMBLY

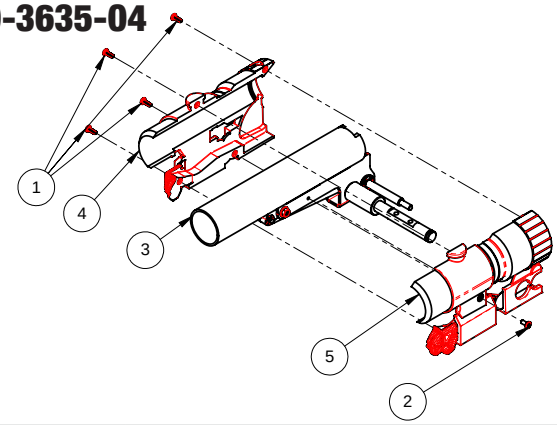
500-3635-02



ID	Part Number	Description	Qty
1	180-5119-02	MICRO-SWITCH - LIGHT ACTUATION	1
2	232-5201-00P	SCREW, 6-32 X 3/8" PPH MS SEMS, PATCH	2
3	237-5937-02	SCREW, 2-56 X 1/2" HWH MS	2
4	237-5976-01P	SCREW, 6-32 X 1/4 HWH SWAGE, PATCH	1
5	266-5020-00	COMPRESSION SPRING-CONICAL	1
6	283-5018-03	3/16 ID X 5/16 OD X 1/4 LG. BUNTING SAE 841 BRONZE FLANGED BEARING-PART #EF030504	2
7	515-0226-03	BRACKET, MAIN PIVOT, MEGATRON	1
8	530-9674-00	SHAFT, MAIN PIVOT, MEGATRON	1
9	535-3375-00	TARGET, MEGATRON	1
10	535-6539-00	SWITCH BODY PROTECT PLATE	1
11	544-6866-00	SLIDE, ARM PIVOT, MEGATRON	1
12	545-2753-00	DECORATED SCULPT, BOTTOM CHEST, MEGATRON	1
13	626-5142-00	ADHESIVE TAPE, MEGATRON CHEST	1
14	242-5641-00	WASHER, .562" ID, .750" OD, .031" THK., NYLON	1

5.39 MEGATRON RIGHT ARM ASSEMBLY

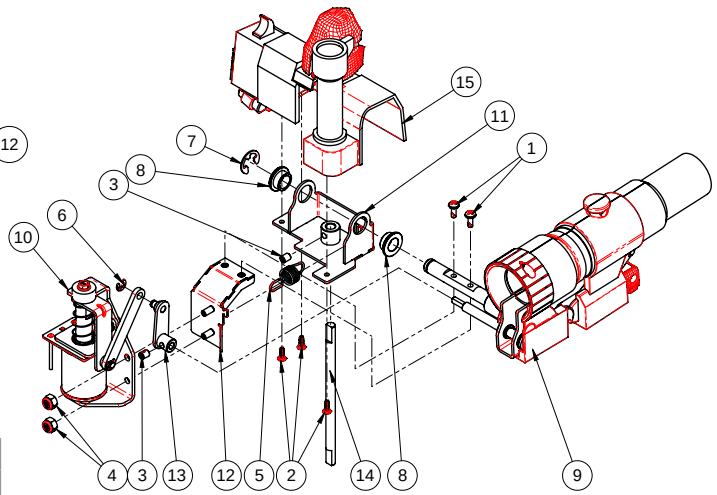
500-3635-04



ID	Part Number	Description	Qty
1	237-5617-00	SCREW, #4 X 5/16" PPH THREAD FORMING FOR PLASTIC	4
2	237-6331-00P	SCREW, 4-40 X 1/4" PPH MS BLACK, PATCH	1
3	500-3635-05	ASSEMBLY, CANNON, MEGATRON	1
4	545-2755-00	RIGHT ARM, LEFT SIDE MEGATRON	1
5	545-2755-01	RIGHT ARM, RIGHT SIDE, MEGATRON	1

5.40 MEGATRON UPPER HALF ASSEMBLY

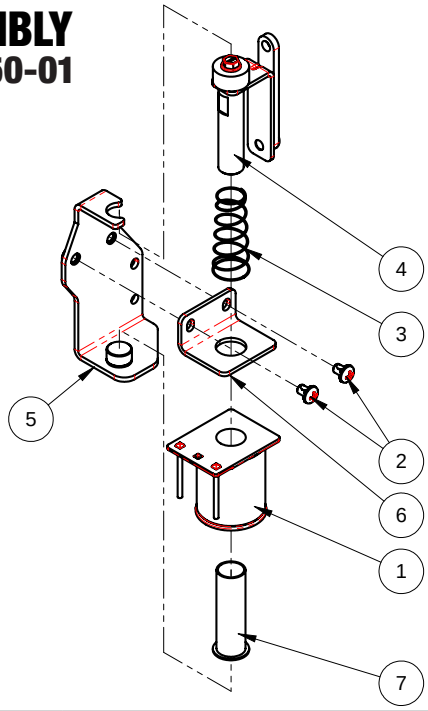
500-3635-03



ID	Part Number	Description	Qty
1	232-5201-00P	SCREW, 6-32 X 3/8" PPH MS SEMS, PATCH	2
2	237-5880-01	SCREW, #6 X 5/16" PPH T-25	3
3	237-6310-00P	SET SCREW, 10-32 X 1/4", SOCKET CUP PT, PATCH	2
4	240-5102-00	8-32 NYLON LOCK NUT	2
5	266-5080-00	SPRING, EXTENSION	1
6	270-5001-00	RETAINING E-RING, 3/16" SHAFT OD	1
7	270-5012-00	RETAINING RING, 3/8 DIA. SHAFT	1
8	283-5018-07	3/8 ID X 1/2 OD X 1/4 LG. BUNTING SAE 841 BRONZE FLANGED BEARING-PART #EF060804	2
9	500-3635-04	ASSEMBLY, RIGHT ARM, MEGATRON	1
10	511-3650-01	ASSEMBLY, COIL, CANNON, MEGATRON	1
11	515-0226-04	MAIN PIVOT, ARM AND TORSO, MEGATRON	1
12	515-0226-05	PADDLE, ARM PIVOT, MEGATRON	1
13	515-0226-10	CRANK COUPLER, MAIN SHAFT, CANNON	1
14	530-9674-04	SHAFT, MAIN, MEGATRON	1
15	545-2754-00	DECORATED SCULPT, TOP HALF, MEGATRON	1

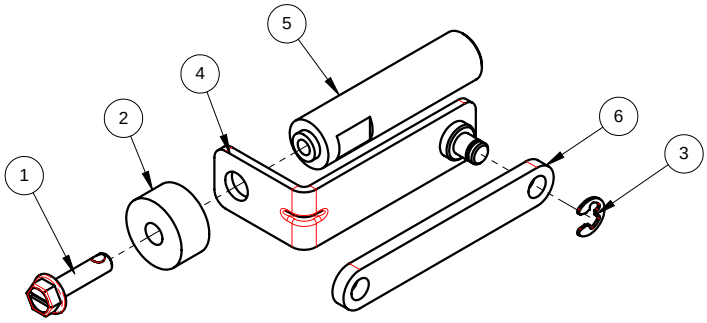
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5.41 MEGATRON CANNON COIL ASSEMBLY
511-3650-01



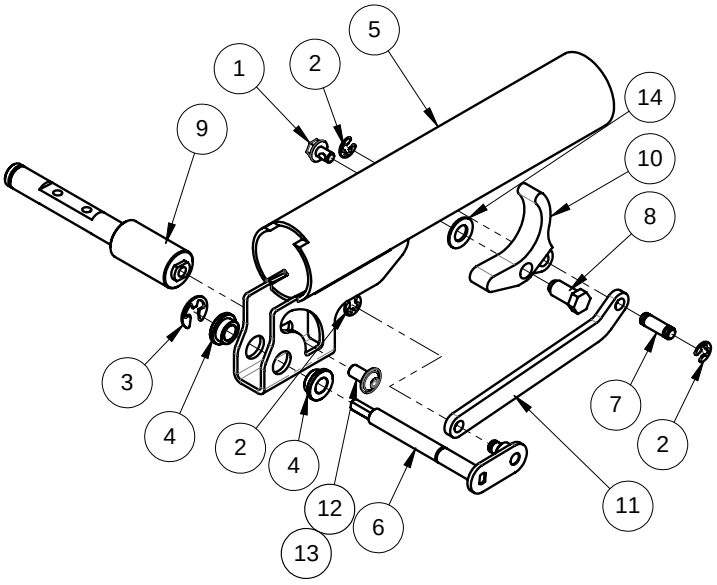
ID	Part Number	Description	Qty
1	500-7051-03	COIL WITH CABLE ASSEMBLY	1
-	090-5093-00	COIL, 26-1200, NO DIODE, LUGLESS, TOP WIRES	1
2	232-5300-00P	SCREW, 8-32 X 1/4" PPH SEMS, PATCH	2
3	266-5020-00	COMPRESSION SPRING-CONICAL	1
4	511-3650-02	ASSEMBLY, PLUNGER, CANNON, MEGATRON	1
5	515-0226-08	ASSEMBLY, BACK STOP, CANNON, MEGATRON	1
6	535-3375-02	BRACKET, COIL, CANNON, MEGATRON	1
7	545-5031-00	COIL SLEEVE	1

5.42 MEGATRON CANNON PLUNGER ASSEMBLY
511-3650-02



ID	Part Number	Description	Qty
1	237-0502-00P	#8-32 X 5/8" HWH MS, PATCH	1
2	254-5511-01	SPACER, #10 ID, 5/8" OD, ZINC PLATED STEEL, 5/16" LENGTH	1
3	270-5001-00	RETAINING E-RING, 3/16" SHAFT OD	1
4	515-0226-09	BRACKET, PLUNGER, CANNON, MEGATRON	1
5	530-9674-03	PLUNGER, CANNON, MEGATRON	1
6	546-7987-03	DRIVE LINK 2, CANNON, MEGATRON	1

5.43 MEGATRON CANNON ASSEMBLY
500-3635-05

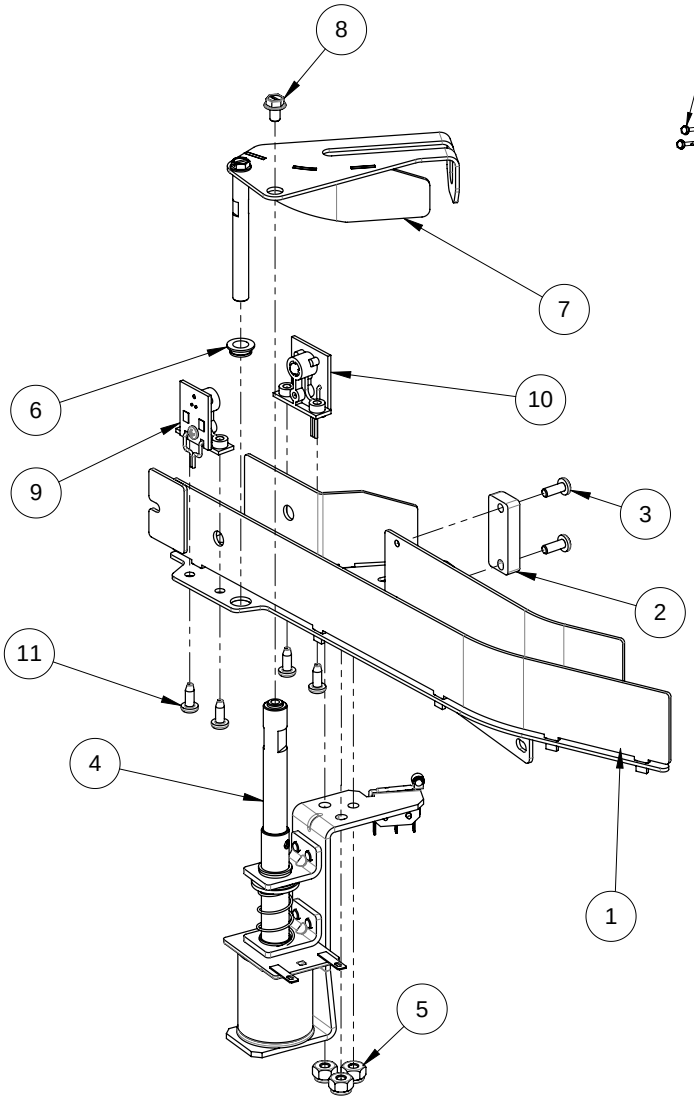


ID	Part Number	Description	Qty
1	237-5964-00P	SCREW, 8-32 X 1/4" HWH SERR ZINC, PATCH	1
2	270-5001-00	RETAINING E-RING, 3/16" SHAFT OD	3
3	270-5002-00	RETAINING RING - 1/4"	1
4	283-5018-01	1/4 ID X 3/8 OD X 3/16 LG. BUNTING SAE 841 BRONZE FLANGED BEARING-PART #EF040603	2
5	515-0226-06	BARREL, CANNON, MEGATRON	1
6	515-0226-07	CRANK ARM, CANNON, MEGATRON	1
7	530-7812-06	PIVOT PIN-.188 DIA.	1
8	530-9674-01	SHAFT, MAIN PIVOT, CANNON, MEGATRON	1
9	530-9674-02	SHAFT, BACK STOP, CANNON, MEGATRON	1
10	546-7987-01	KICKER, CANNON, MEGATRON	1
11	546-7987-02	DRIVE LINK, CANNON, MEGATRON	1
12	237-6405-00	SCREW, 10-32 X 3/8", FLANGE BUTTON HEAD, BLACK OXIDE	1
13		LOCTITE THREADLOCKER 243 "BLUE MED STR"	
14	242-5091-00	WASHER, 1/2 X 17/64 X .03 - DT	1

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5.44 BACK PANEL RAMP ASSEMBLY

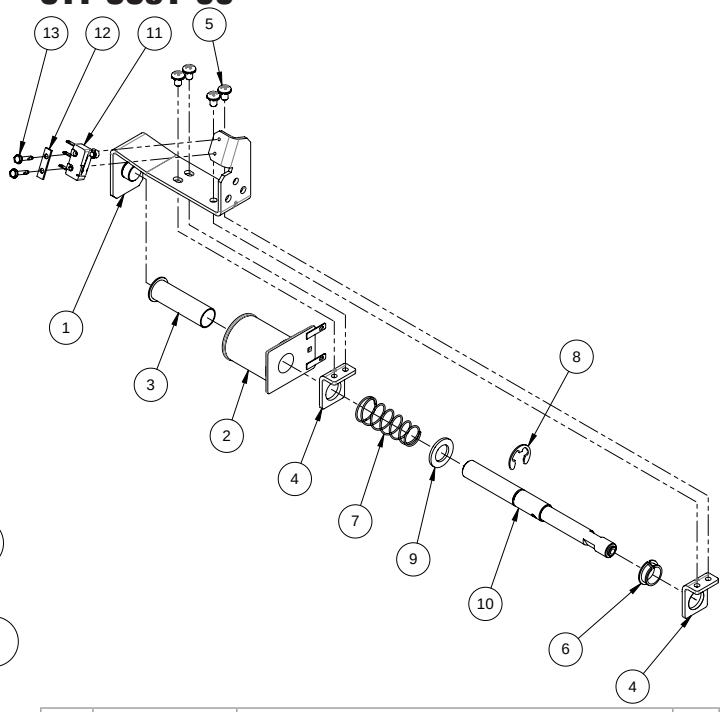
500-7433-00



ID	Part Number	Description	Qty
1	515-1043-00	RIGHT RAMP, BACK PANEL	1
2	546-5041-00	GLIDE BLOCK, DIVERTER, MEGATRON	1
3	237-5501-00P	SCREW, 6-32 X 3/8" PPH MS ZINC, PATCH	2
4	511-3691-00	ASSEMBLY, DIVERTER, COIL AND SWITCH, MEGATRON	1
5	240-5102-00	8-32 NYLON LOCK NUT	3
6	545-5423-00	NYLINER, 1/4" SHAFT, 4L1-FF	1
7	511-3691-01	ASSEMBLY, DIVERTER, MEGATRON	1
8	237-5964-00P	SCREW, 8-32 X 1/4" HWH SERR ZINC, PATCH	1
9	515-0215-00	LONG RANGE OPTO EMITTER ASSEMBLY	1
10	515-0215-01	LONG RANGE OPTO RECEIVER ASSEMBLY	1
11	237-5880-00	SCREW, #6 X 3/8 PPH T-25	4

5.45 MEGATRON DIVERTER COIL & SWITCH ASSEMBLY

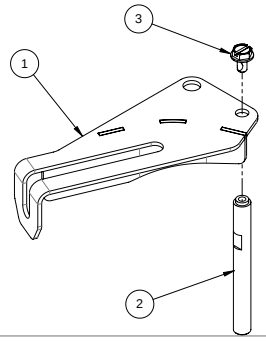
511-3691-00



ID	Part Number	Description	Qty
1	515-3280-00	ASSEMBLY, BRACKET, DIVERTER, MEGATRON	1
2	090-5044-ND	COIL 26-1200 - NO DIODE	1
3	545-5031-00	COIL SLEEVE	1
4	535-5203-03	COIL RETAINING BRACKET	2
5	232-5300-00P	SCREW, 8-32 X 1/4" PPH SEMS, PATCH	4
6	545-5418-01	NYLINER - PLASTIC, 7/16"	1
7	266-5020-02	COMPRESSION SPRING-CONICAL	1
8	270-5005-00	RETAINING E-RING, 7/16" SHAFT OD	1
9	242-5081-00	WASHER - NYLON .75 OD x .44 ID	1
10	515-3280-01	ASSEMBLY, PLUNGER, DIVERTER, MEGATRON	1
11	180-5119-02	MICRO-SWITCH - LIGHT ACTUATION	1
12	535-6539-00	SWITCH BODY PROTECT PLATE	1
13	237-5937-02P	SCREW, 2-56 X 1/2" HWH MS, PATCH	2

5.46 MEGATRON DIVERTER

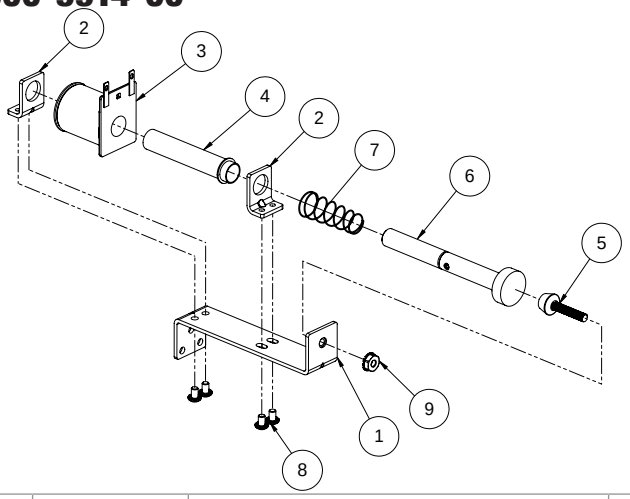
511-3691-01



ID	Part Number	Description	Qty
1	535-3412-00	BALL GUIDE, DIVERTER, MEGATRON	1
2	530-2741-01	ROD, STABILIZER, DIVERTER, MEGATRON	1
3	237-5976-01P	SCREW, 6-32 X 1/4 HWH SWAGE, PATCH	1

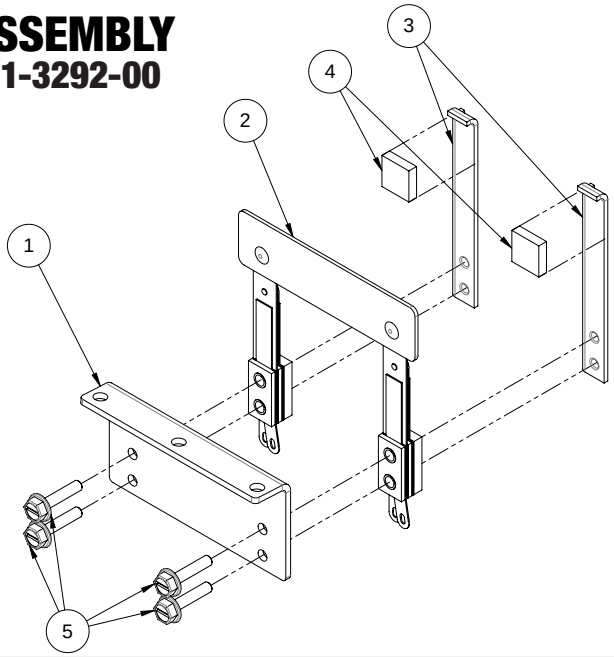
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5.47 UP POST ASSEMBLY (COMBINER)
500-9914-00



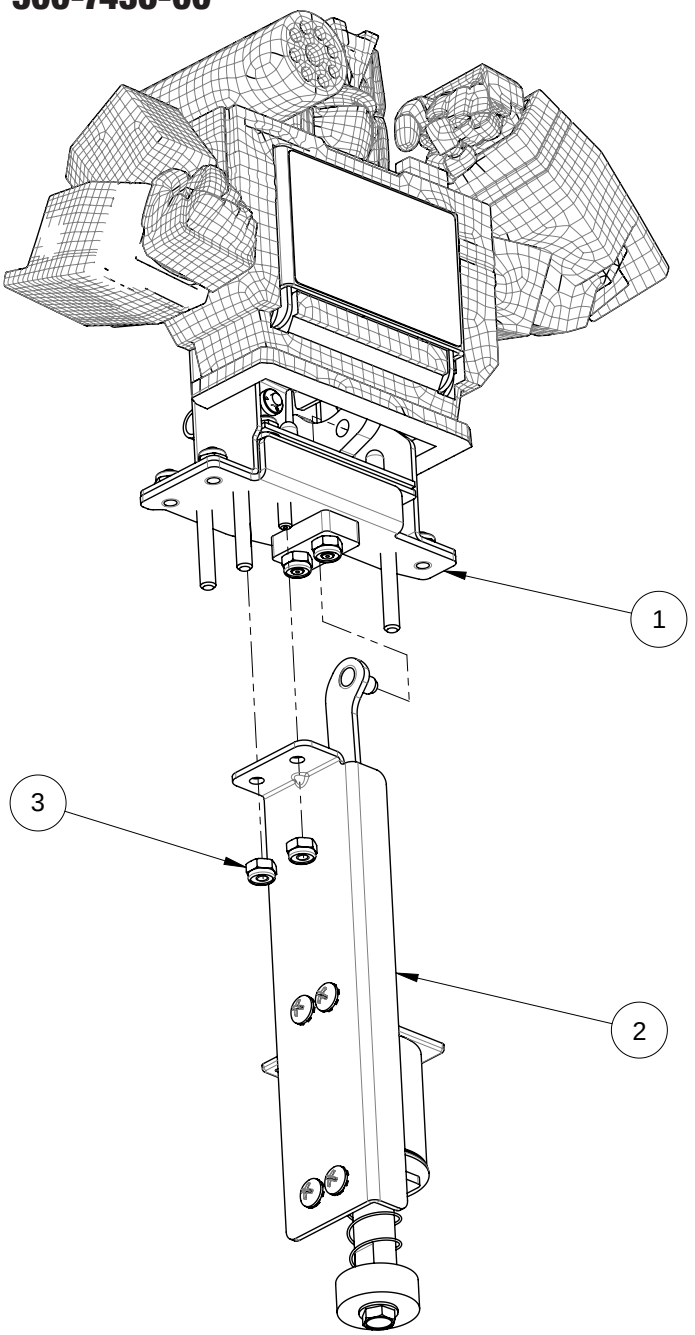
ID	Part Number	Description	Qty
1	535-9248-00	BRACKET	1
2	535-5203-03	COIL RETAINING BRACKET	2
3	090-5044-ND	COIL 26-1200 - NO DIODE	1
4	545-5847-00	COIL SLEEVE	1
5	280-5014-00	ADJUSTABLE BUMPER/STOP	1
6	515-2073-00	PLUNGER ASSEMBLY, UP-POST , STAINLESS	1
7	266-5020-00	COMPRESSION SPRING-CONICAL	1
8	232-5300-00	SCREW, 8-32 X 1/4" PPH SEMS	4
9	240-5208-00	10-32 KEPS NUT	1

5.48 SOUNDWAVE DUAL-TARGET ASSEMBLY
511-3292-00



ID	PART NUMBER	DESCRIPTION	QTY
1	535-3111-00	BRACKET, DUAL TARGET	1
2	510-8028-00	ASSEMBLY, DUAL TARGET	1
3	535-9823-01	SWITCH BACK PLATE	2
4	626-5029-00	FOAM PAD	2
5	237-5976-04	SCREW, 6-32 X 5/8" HWH SWAGE, SERRATED	4

5.49 SOUNDWAVE ASSEMBLY
500-7436-00

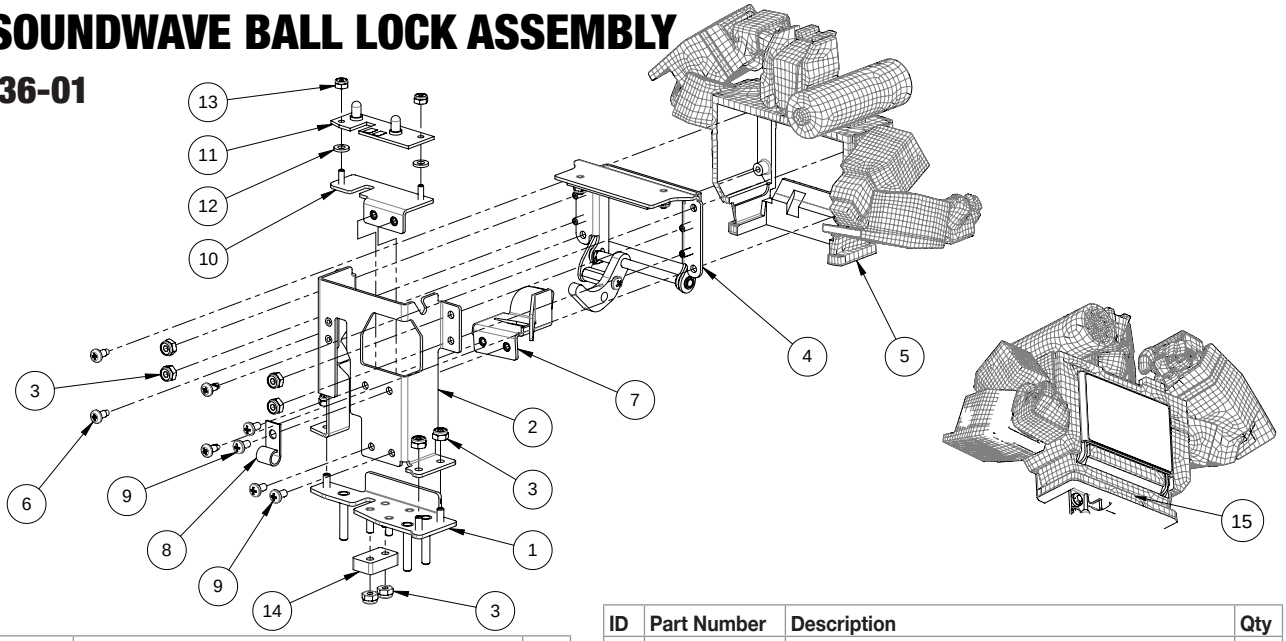


ID	Part Number	Description	Qty
1	500-7436-01	ASSEMBLY, SOUNDWAVE BALL LOCK	1
2	500-7436-02	ASSEMBLY, SOUNDWAVE COIL	1
3	240-5005-00	6-32 NYLON STOP NUT	2

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5.50 SOUNDWAVE BALL LOCK ASSEMBLY

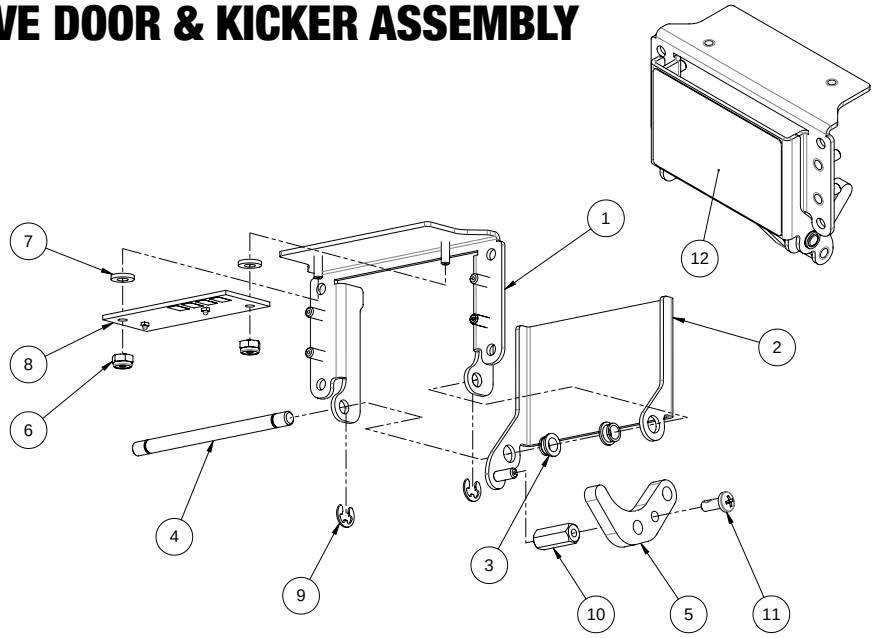
500-7436-01



ID	Part Number	Description	Qty
1	535-2908-03	BRACKET, SOUNDWAVE PF MOUNT	1
2	510-5831-00	RIVETED ASSY, SW FRAME & BALL HOLDER	1
3	240-5005-00	6-32 NYLON STOP NUT	9
4	511-3649-00	ASSEMBLY, SOUNDWAVE DOOR & KICKER	1
5	545-2760-00	DECORATED TOY, SOUNDWAVE	1
6	237-5880-01	SCREW, #6 X 5/16 PPH T-25	4
7	535-2908-02	BRACKET, VUK RAMP TRANSFER	1
8	040-5000-03	1/4" CABLE CLAMP	1
9	237-5500-01P	SCREW, 6-32 X 1/4" PPH MS BLACK, PATCH	4
10	535-2908-06	BRACKET, SOUNDWAVE LOWER OPTO	1
11	520-9903-00	PCB, IR OPTO EMITTER X2, SOUNDWAVE	1
12	242-5079-00	WASHER, .150 I.D. X .312 O.D. X .050 THICK	2
13	240-5303-00	4-40 NYLON LOCK NUT	2
14	546-7720-00	BLOCK, SOUNDWAVE LINK GUIDE	1
15	820-4484-00	CLEAR DECAL, SOUNDWAVE BODY	1

5.51 SOUNDWAVE DOOR & KICKER ASSEMBLY

511-3649-00

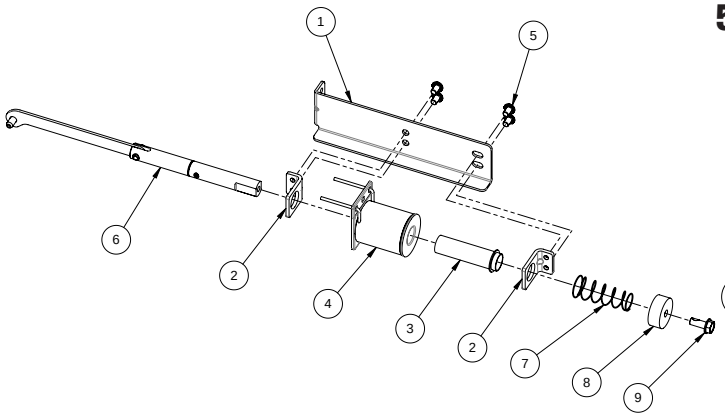


ID	Part Number	Description	Qty
1	535-2908-00	FRAME, SOUNDWAVE BALL LOCK	1
2	535-2908-01	BRACKET, SOUNDWAVE DOOR	1
3	545-5352-00	NYLINER, 3/16" SHAFT	2
4	530-6578-00	PIN, SOUNDWAVE DOOR PIVOT	1
5	546-7997-00	KICKER, SOUNDWAVE BALL LOCK	1
6	240-5303-00	4-40 NYLON LOCK NUT	2
7	242-5079-00	WASHER, .150 I.D. X .312 O.D. X .050 THICK	2
8	520-9902-00	PCB, IR OPTO RECEIVER X2, SOUNDWAVE	1
9	270-5001-00	RETAINING E-RING, 3/16" SHAFT OD	2
10	254-5008-02	HEX SPACER - 5/8 "	1
11	237-5501-00P	SCREW, 6-32 X 3/8" PPH MS ZINC, PATCH	1
12	820-7978-31	DECAL #31, SOUNDWAVE DOOR, TRANSFORMERS: MTMTE LE	1

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5.52 SOUNDWAVE COIL ASSEMBLY

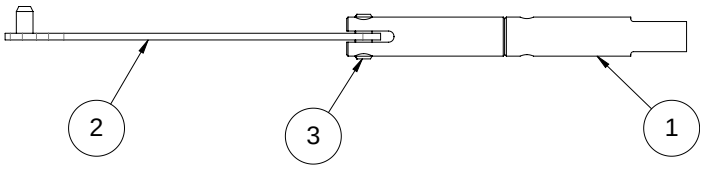
500-7436-02



ID	Part Number	Description	Qty
1	535-2908-04	BRACKET, BALL KICKER COIL	1
2	535-5203-03	COIL RETAINING BRACKET	2
3	545-5076-01	COIL SLEEVE	1
4	500-7051-06	COIL & CONNECTOR ASSEMBLY	1
-	090-5091-00	COIL, 26-1200, NO DIODE, LUGLESS	1
5	232-5300-00P	SCREW, 8-32 X 1/4" PPH SEMS, PATCH	4
6	511-4910-00	ASSEMBLY, SOUNDWAVE PLUNGER & LINK	1
7	266-5020-00	COMPRESSION SPRING-CONICAL	1
8	530-5511-00	PLUNGER HEAD	1
9	237-5995-00P	SCREW, 10-32 X 1/2" HWH SERR MS ZI, PATCH	1

5.53 SOUNDWAVE PLUNGER & LINK ASSEMBLY

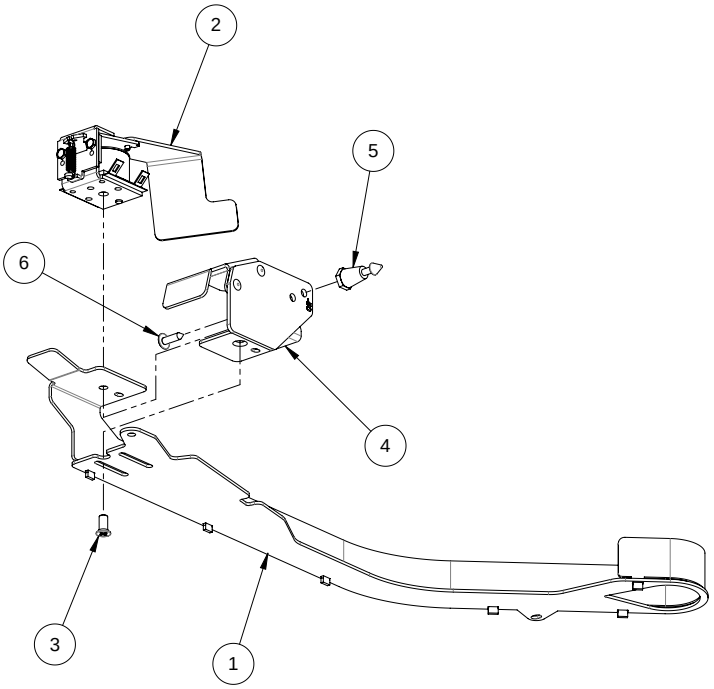
511-4910-00



ID	Part Number	Description	Qty
1	515-1269-00	PLUNGER, GONG LOCK	1
2	535-3387-00	LINK, SOUNDWAVE BALL KICKER	1
3		.188 x .50 ROLL PIN	1

5.54 SOUNDWAVE RAMP & DIVERTER ASSEMBLY

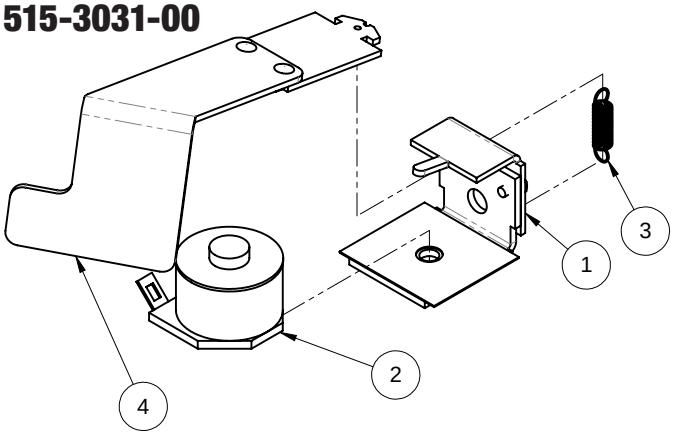
511-3646-00



ID	PART NUMBER	DESCRIPTION	QTY
1	515-3009-00	RAMP, VUK EXIT	1
2	515-3031-00	ASSEMBLY, DIVERTER, SOUNDWAVE	1
3	237-6030-00	SCREW, 8-32 X 3/8" PFH 82° U/C MS	1
4	510-7987-50	RIVETED ASSY, PLASTIC #50, TRANSFORMERS: MTMTE LE	1
5	550-5052-01	MINI POST - CLEAR	1
6	237-5809-00	SCREW, #6 X 1/2" PTH A	1

5.55 SOUNDWAVE DIVERTER ASSEMBLY

515-3031-00

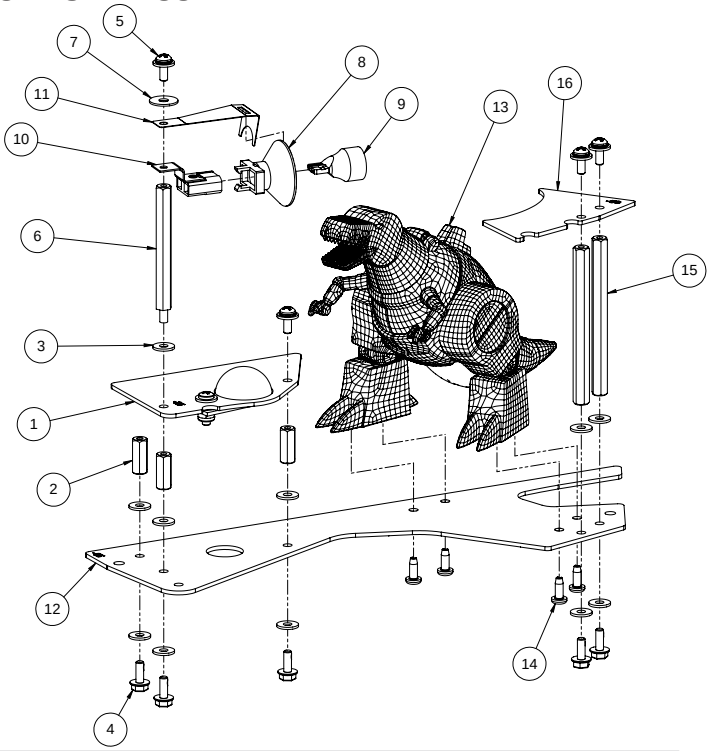


ID	PART NUMBER	DESCRIPTION	QTY
1	535-6198-00	COIL FRAME	1
2	090-5031-00-ND	COIL, 32-1800, NO DIODE	1
3	265-5024-02	RETURN SPRING - 18OZ - SPR 29-18	1
4	515-3296-00	RIVETED ASSEMBLY, DIVERTER, SOUNDWAVE	1

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5.56 PLASTIC 05 ASSEMBLY

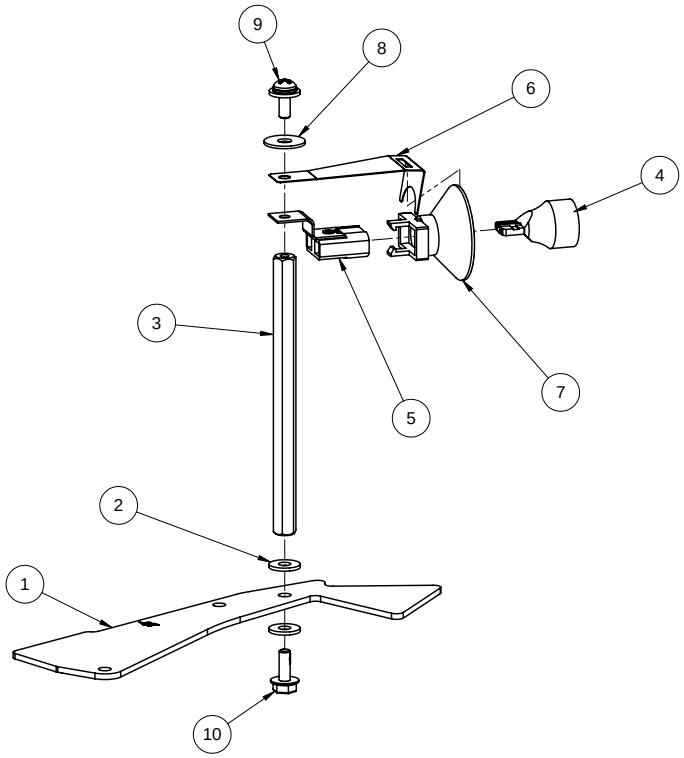
511-3244-05



ID	Part Number	Description	Qty
1	511-3244-25	ASSEMBLY, PLASTIC #25, TRANSFORMERS: MTMTE LE	1
2	254-5008-02	HEX SPACER - 5/8 "	3
3	242-5001-00	#6 WASHER	11
4	237-5976-02P	SCREW, 6-32 X 3/8" HWH SWAGE, PATCH	5
5	237-6378-00P	#6-32 X 3/8 PAN PHILLIPS W/DOUBLE SEMS, PATCH	4
6	254-5024-18	HEX SPACER MALE/FEMALE - 2 1/4"	1
7	242-5015-00	#8 WASHER - .170 ID X 1/2 OD X .042	1
8	545-5409-01	REFLECTOR	1
9	113-5032-08	8 ELEMENT FLAT W-BASE LED 5V AC - WHITE	1
10	077-5026-01	SOCKET, L/D WEDGE BASE BLACK	1
11	535-1324-01	W.B. LED SPOTLAMP RETAINER CLIP	1
12	830-8584-05	PLASTIC #5, TRANSFORMERS: MTMTE LE	1
13	545-2761-00	DECORATED TOY, GRIMLOCK	1
14	232-5000-00	SCREW, #6 X 3/8 PPH AB ZINC	4
15	254-5008-31	HEX SPACER - 2 7/8 "	2
16	830-8584-58	PLASTIC #58, TRANSFORMERS: MTMTE LE	1

5.57 PLASTIC 07 ASSEMBLY

511-3244-07

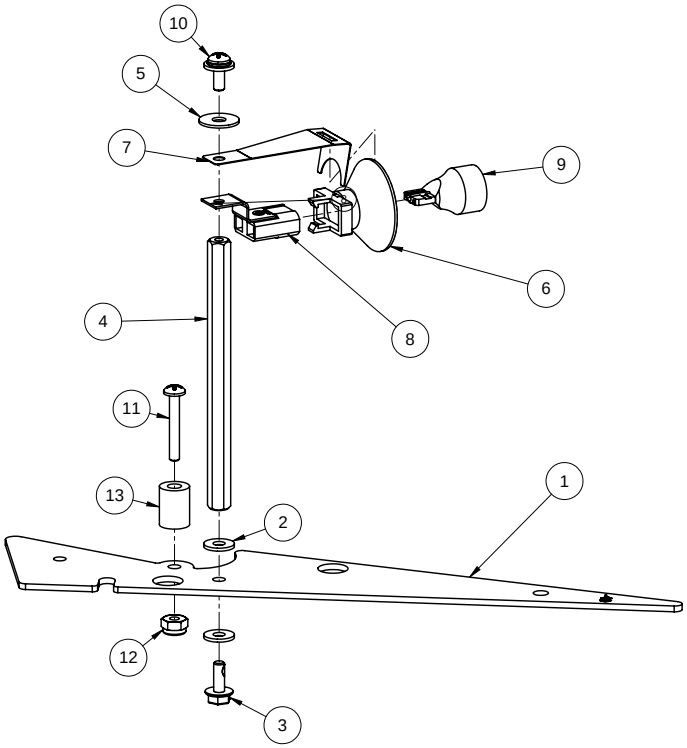


ID	Part Number	Description	Qty
1	830-8584-07	PLASTIC #7, TRANSFORMERS: MTMTE LE	1
2	242-5001-00	#6 WASHER	2
3	254-5008-27	HEX SPACER - 3 1/2 "	1
4	113-5032-08	8 ELEMENT FLAT W-BASE LED 5V AC - WHITE	1
5	077-5026-01	SOCKET, L/D WEDGE BASE BLACK	1
6	535-1324-01	W.B. LED SPOTLAMP RETAINER CLIP	1
7	545-5409-01	REFLECTOR	1
8	242-5015-00	#8 WASHER - .170 ID X 1/2 OD X .042	1
9	237-6378-00P	#6-32 X 3/8 PAN PHILLIPS W/DOUBLE SEMS, PATCH	1
10	237-5976-02P	SCREW, 6-32 X 3/8" HWH SWAGE, PATCH	1

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5.58 PLASTIC 10 ASSEMBLY

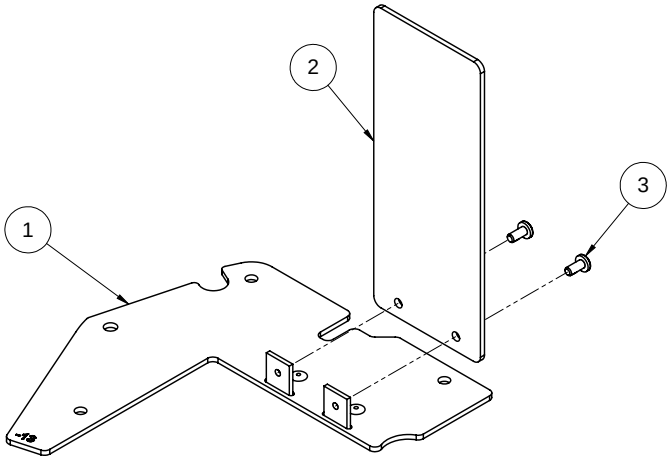
511-3244-10



ID	Part Number	Description	Qty
1	830-8584-10	PLASTIC #10, TRANSFORMERS: MTMTE LE	1
2	242-5001-00	#6 WASHER	2
3	237-5976-02P	SCREW, 6-32 X 3/8" HWH SWAGE, PATCH	1
4	254-5008-27	HEX SPACER - 3 1/2 "	1
5	242-5015-00	#8 WASHER - .170 ID X 1/2 OD X .042	1
6	545-5409-01	REFLECTOR	1
7	535-1324-01	W.B. LED SPOTLAMP RETAINER CLIP	1
8	077-5026-01	SOCKET, L/D WEDGE BASE BLACK	1
9	113-5032-08	8 ELEMENT FLAT W-BASE LED 5V AC - WHITE	1
10	237-6378-00P	#6-32 X 3/8 PAN PHILLIPS W/DOUBLE SEMS, PATCH	1
11	237-5505-00P	SCREW, 6-32 X 7/8" PPH MS, PATCH	1
12	240-5005-00	6-32 NYLON STOP NUT	1
13	254-5000-01	NYLON SPACER - BLACK - 3/8 OD X .175 ID X 1/2"	1

5.59 PLASTIC 13 ASSEMBLY

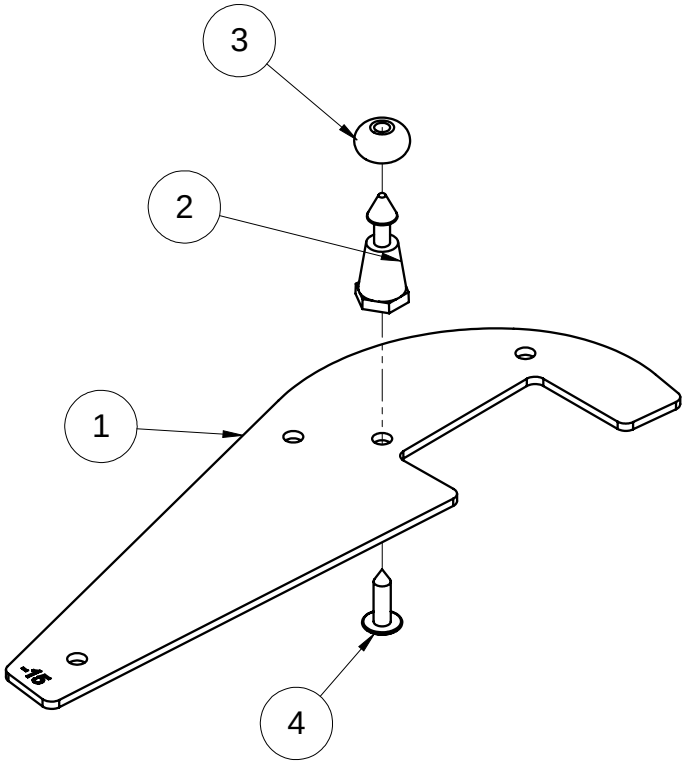
511-3244-13



ID	Part Number	Description	Qty
1	510-7987-13	RIVETED ASSY, PLASTIC #13, TRANSFORMERS: MTMTE LE	1
2	830-8584-43	PLASTIC #43, TRANSFORMERS: MTMTE LE	1
3	237-6331-00P	SCREW, 4-40 X 1/4" PPH MS BLACK, PATCH	2

5.60 PLASTIC 15 ASSEMBLY

511-3244-15

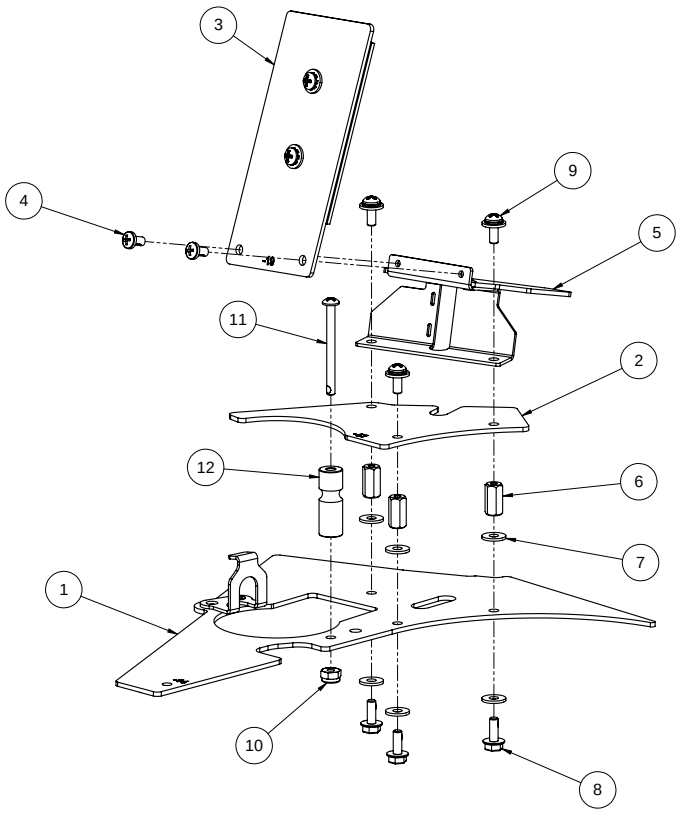


ID	Part Number	Description	Qty
1	830-8584-15	PLASTIC #15, TRANSFORMERS: MTMTE LE	1
2	550-5052-01	MINI POST - CLEAR	1
3	545-5348-17	RUBBER RING, 7/16" OD X 1/8" ID, BLACK	1
4	237-5809-00	SCREW, #6 X 1/2" PTH A	1

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5.61 PLASTIC 14 ASSEMBLY

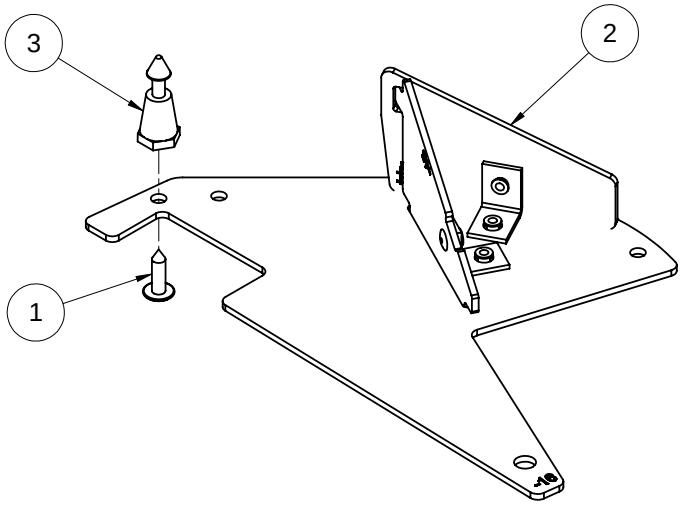
511-3244-14



ID	Part Number	Description	Qty
1	510-7987-14	RIVETED ASSY, PLASTIC #14, TRANSFORMERS: MTMTE LE	1
2	830-8584-51	PLASTIC #51, TRANSFORMERS: MTMTE LE	1
3	511-3244-19	ASSEMBLY, PLASTIC #19, TRANSFORMERS: MTMTE LE	1
4	237-5500-01P	SCREW, 6-32 X 1/4" PPH MS BLACK, PATCH	2
5	510-7987-21	RIVETED ASSY, PLASTIC #21, TRANSFORMERS: MTMTE LE	1
6	254-5008-03	HEX SPACER - 1/2 "	3
7	242-5001-00	#6 WASHER	6
8	237-5976-02P	SCREW, 6-32 X 3/8" HWH SWAGE, PATCH	3
9	237-6378-00P	#6-32 X 3/8 PAN PHILLIPS W/DOUBLE SEMS, PATCH	3
10	240-5005-00	6-32 NYLON STOP NUT	1
11	237-5510-00P	SCREW, 6-32 X 1-1/2" PPH MS, PATCH	1
12	550-5059-01	PLASTIC POST - CLEAR	1

5.62 PLASTIC 16 ASSEMBLY

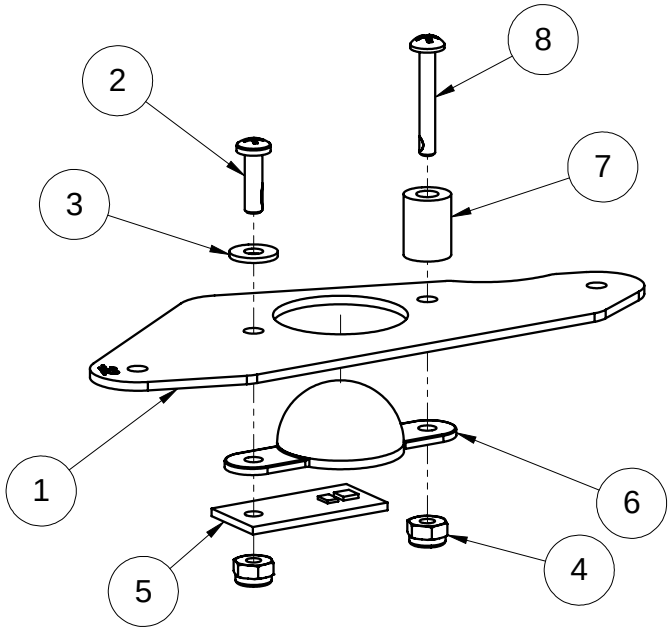
511-3244-16



ID	Part Number	Description	Qty
1	237-5809-00	SCREW, #6 X 1/2" PTH A	1
2	510-7987-16	RIVETED ASSY, PLASTIC #16, TRANSFORMERS: MTMTE LE	1
3	550-5052-01	MINI POST - CLEAR	1

5.63 PLASTIC 22 ASSEMBLY

511-3244-22

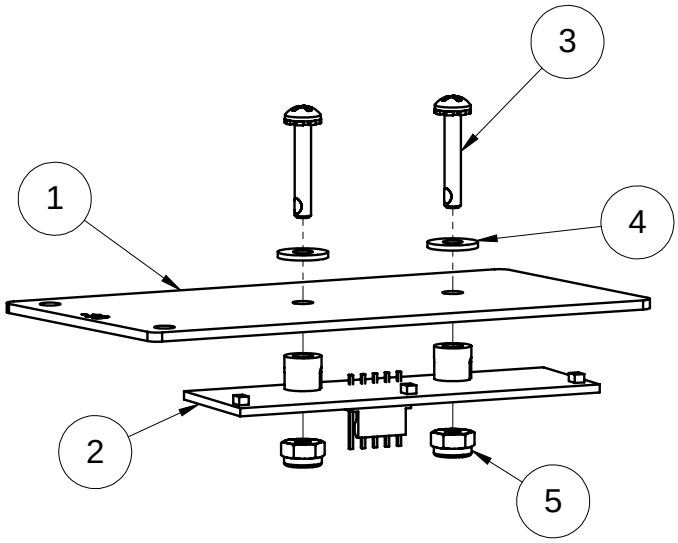


ID	Part Number	Description	Qty
1	830-8584-22	PLASTIC #22, TRANSFORMERS: MTMTE LE	1
2	237-5502-00P	SCREW, 6-32 X 1/2" PPH MS ZINC, PATCH	1
3	242-5001-00	#6 WASHER	1
4	240-5005-00	6-32 NYLON STOP NUT	2
5	520-7000-00	SINGLE FLASH LED BOARD	1
6	550-5032-02	HAT - RED SB	1
7	254-5000-01	NYLON SPACER - BLACK - 3/8 OD X .175 ID X 1/2"	1
8	237-5505-00P	SCREW, 6-32 X 7/8" PPH MS, PATCH	1

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5.64 PLASTIC 19 ASSEMBLY

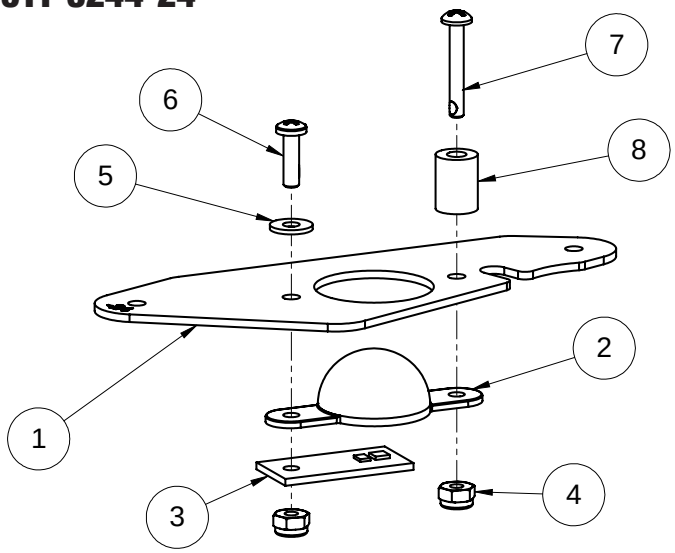
511-3244-19



ID	Part Number	Description	Qty
1	830-8584-19	PLASTIC #19, TRANSFORMERS: MTMTE LE	1
2	520-7011-00	LAMP PCB, 3-LED, CONSUMER PIN	1
3	232-5204-00P	SCREW, 6-32 X 3/4" PPH SEMS, PATCH	2
4	242-5001-00	#6 WASHER	2
5	240-5005-00	6-32 NYLON STOP NUT	2

5.65 PLASTIC 24 ASSEMBLY

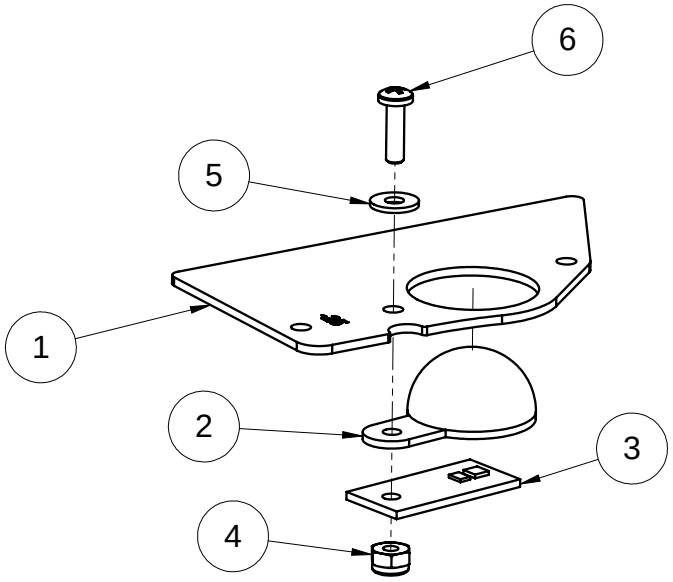
511-3244-24



ID	Part Number	Description	Qty
1	830-8584-24	PLASTIC #24, TRANSFORMERS: MTMTE LE	1
2	550-5032-09	HAT - PURPLE SB	1
3	520-7000-00	SINGLE FLASH LED BOARD	1
4	240-5005-00	6-32 NYLON STOP NUT	2
5	242-5001-00	#6 WASHER	1
6	237-5502-00P	SCREW, 6-32 X 1/2" PPH MS ZINC, PATCH	1
7	237-5505-00P	SCREW, 6-32 X 7/8" PPH MS, PATCH	1
8	254-5000-01	NYLON SPACER - BLACK - 3/8 OD X .175 ID X 1/2"	1

5.66 PLASTIC 25 ASSEMBLY

511-3244-25

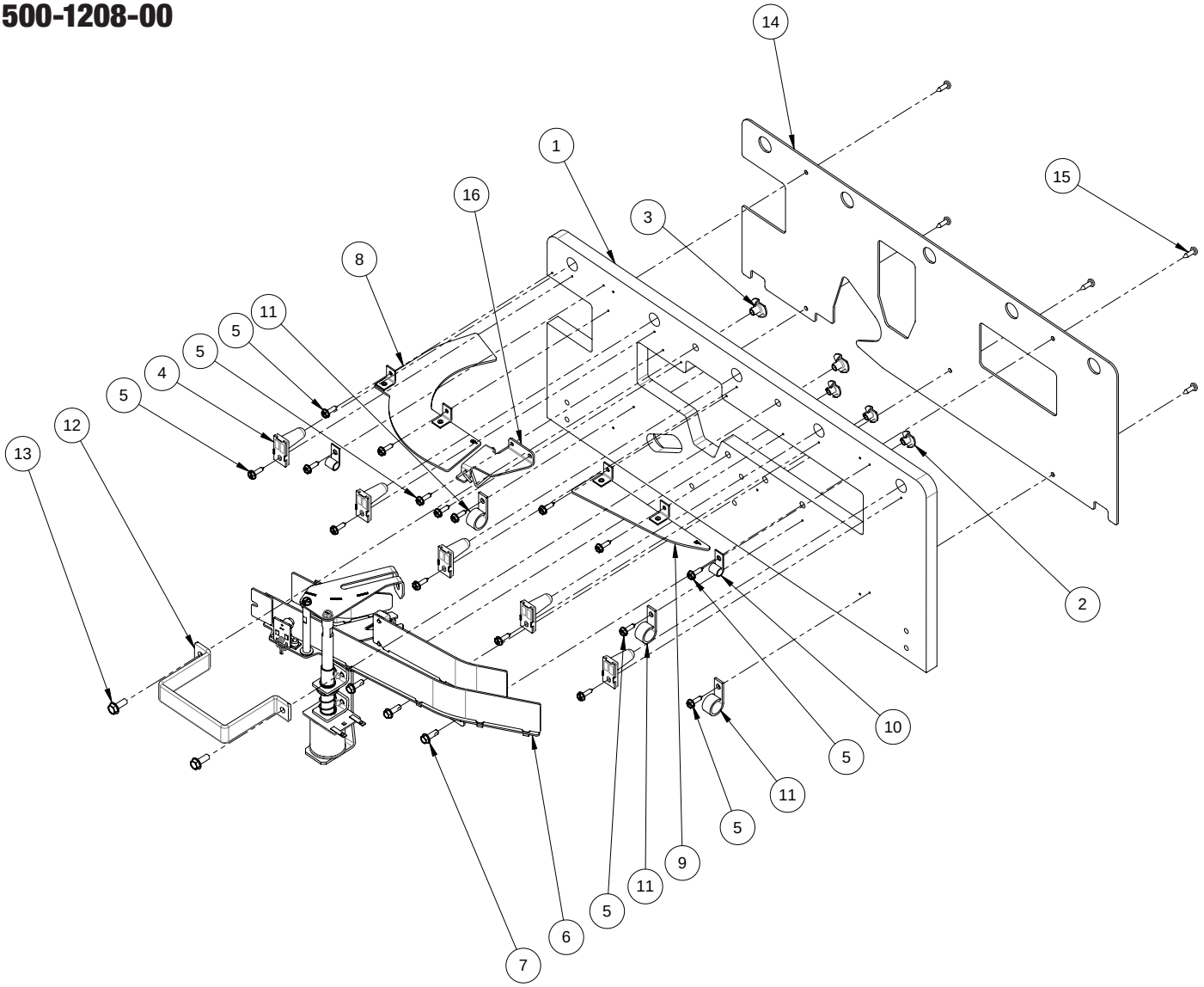


ID	Part Number	Description	Qty
1	830-8584-25	PLASTIC #25, TRANSFORMERS: MTMTE LE	1
2	550-5510-07	HAT - TRIMMED - ORANGE SB	1
3	520-7000-00	SINGLE FLASH LED BOARD	1
4	240-5005-00	6-32 NYLON STOP NUT	1
5	242-5001-00	#6 WASHER	1
6	237-5502-00P	SCREW, 6-32 X 1/2" PPH MS ZINC, PATCH	1

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5.67 BACKPANEL ASSEMBLY

500-1208-00



ID	Part Number	Description	Qty
1	525-9811-00	WOOD, BACK PANEL, TRANSFORMERS: MTMTE	1
2	240-5101-00	8-32 T-NUT	3
3	240-5204-00	#10-32 T-NUT	2
4	511-3294-08	ASM, PCB GI, WHITE	5
5	234-5001-02	SCREW, #6 X 1/2" HWH	16
6	500-7433-00	ASSEMBLY, BACK PANEL RAMP	1
7	237-6337-00P	SCREW, 8-32 X 1/2", HWH, SERRATED, PATCH	3
8	510-7987-40	RIVETED ASSY, PLASTIC 40, TRANSFORMERS: MTMTE LE	1
9	510-7987-41	RIVETED ASSY, PLASTIC 41, TRANSFORMERS: MTMTE LE	1
10	040-5000-03	1/4" CABLE CLAMP	2
11	040-5000-06	1/2" CABLE CLAMP	3
12	535-2288-00	HANDLE, BACKPANEL	1
13	237-5995-00	SCREW, 10-32 X 1/2" HWH SERR MS ZI	2
14	830-8584-18	PLASTIC 18, TRANSFORMERS: MTMTE LE	1
15	237-5805-00	SCREW, #6 X 1/2" PPH AB BLACK	5
16	511-2062-00	1-WAY GATE ASSEMBLY	1

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5.68 MEGATRON CANNON TEST PROCEDURE AND ADJUSTMENTS

Step 1: Go into “Device Tests” > “Megatron Test”

1a. Make sure the interlock switch is in the Service position so the playfield has power.

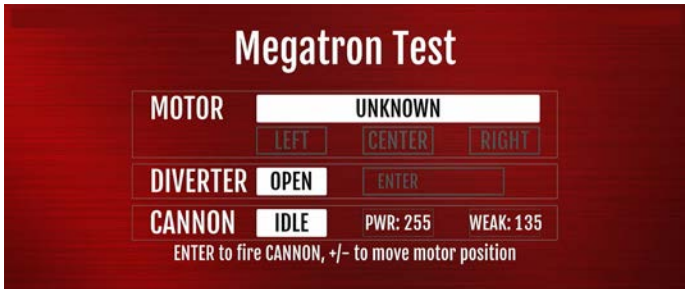


Figure 5.68.1. Initial Megatron Test screen.

Step 2: Check the motor function.

2a. Using the -/+ volume buttons on the coin door, move through each position and make sure everything clears. A little touching with the diverter is okay.

2b. Return Megatron to the “Left” position.

2c. Check to see if the cannon is pointing at the catch area.

2d. If everything is okay, proceed to Step 4.

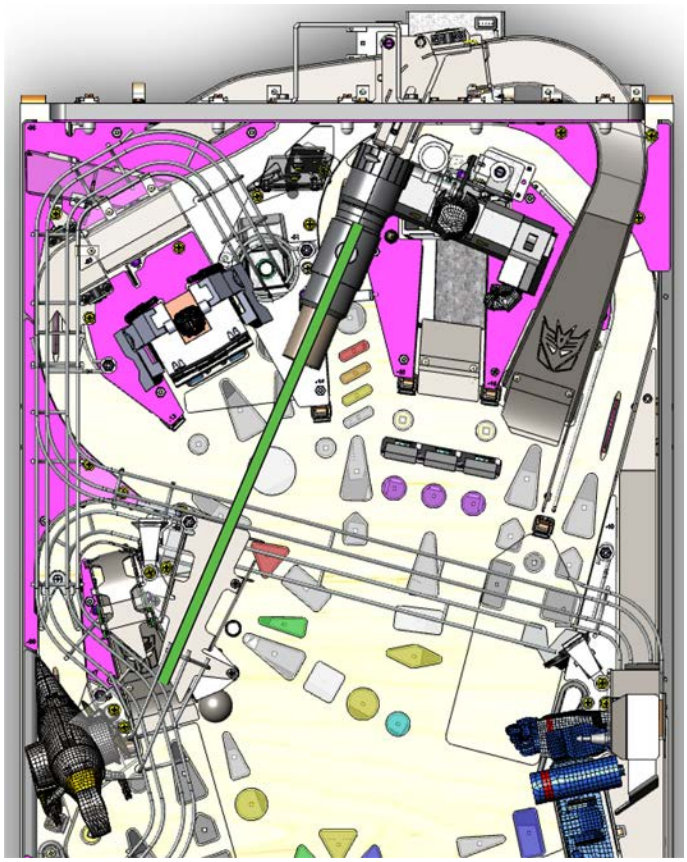


Figure 5.68.2. Top-down view of upper playfield. A line is drawn as a visual aid to show the Cannon’s alignment to the Catch Ramp for Step 2c.

Step 3: Adjust Megatron Position.

3a. Return Megatron to the “Left” position.

3b. Manually move him until the cannon is pointed at the catch ramp. You will feel the mech “settle”when it reaches the correct position.

3c. Tighten the set screw. It is located under the playfield, at the bottom of the mech.

Repeat Step 2.



Figure 5.68.3. Bottom view of the upper section of playfield. An arrow is drawn as a visual aid to show the set screw for Step 3c.

Step 4: Check Cannon Strong Fire.

4a. Load a ball into the cannon via the right ramp and Megatron will move into position and fire.

4b. Acceptable range is landing in the catch ramp directly to hitting the wire ramp and bouncing into the catch ramp.

4c. Repeat this process 3 times.

4d. If the cannon is firing within acceptable range all three times, proceed to Step 6.

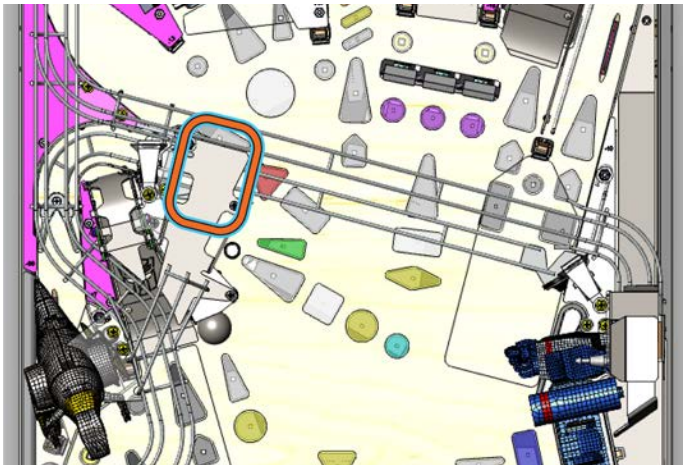


Figure 5.68.4. Top-down view of upper playfield. An area is outlined as a visual aid to show the acceptable range for where the ball may land.

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MEGATRON CANNON TEST / ADJUSTMENT CONTINUED

Step 5: Adjust Cannon Height

5a. Check the top of the Cannon to the top edge of Optimus's arms. They should be roughly the same height.

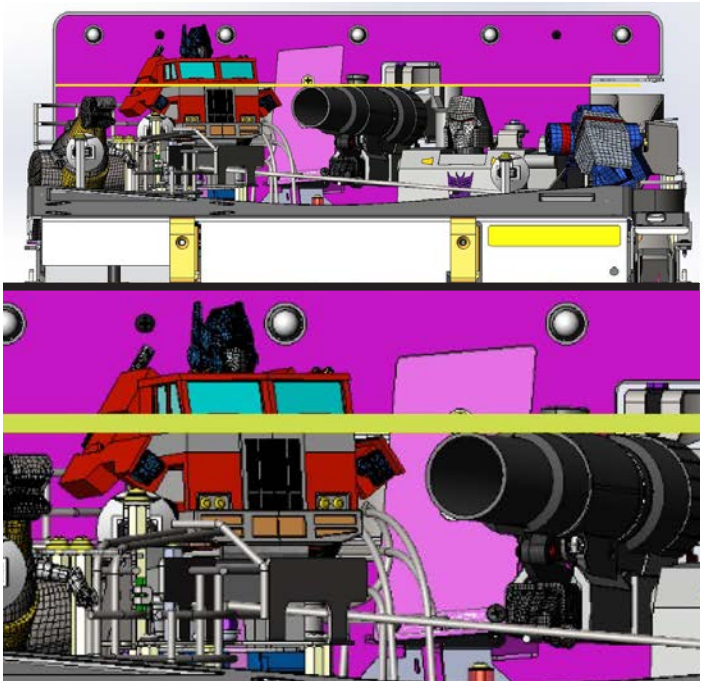


Figure 5.68.5. Front view of playfield. A Line is drawn as a visual aid to show the height of the cannon in relation to the arm for Step 5a. A more zoomed in version is below the top image.

5b. If it is not in the correct position, check to see if the arm is loose.

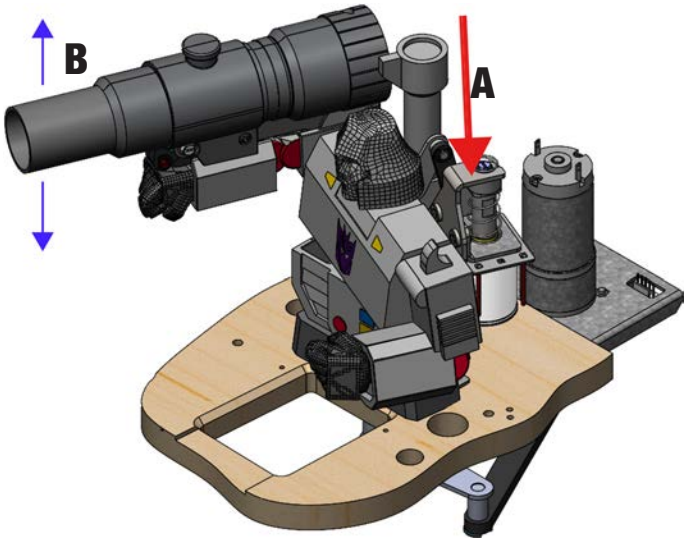


Figure 5.68.6. To check to see if the cannon is loose, press down in the direction of the red arrow **(A)** on the piece of metal that the arrow is pointing at. That will hold the coil assembly steady to the hard stop.

Then, grab the tip of the cannon barrel **(B)** and see if it is stable. It should not have vertical movement if you are holding the coil assembly steady.

5c. If the arm moves, the screw holding it in place needs to be tightened. Loosen the set screw from Step 3c, and remove the Megatron assembly. To access the side where the screw is, remove the four small screws holding the side of the cannon. The cannon plastic side comes off, and the screw to tighten can be found.

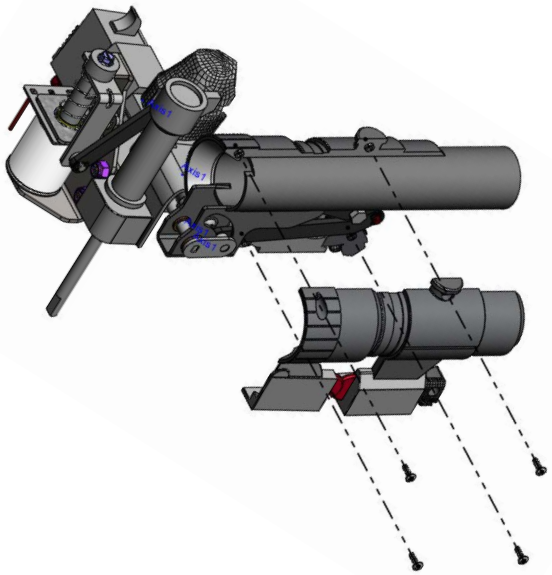


Figure 5.68.7. Angled view of Megatron Assembly. The image shows the four screws and cannon plastic side coming off the rest of the assembly.

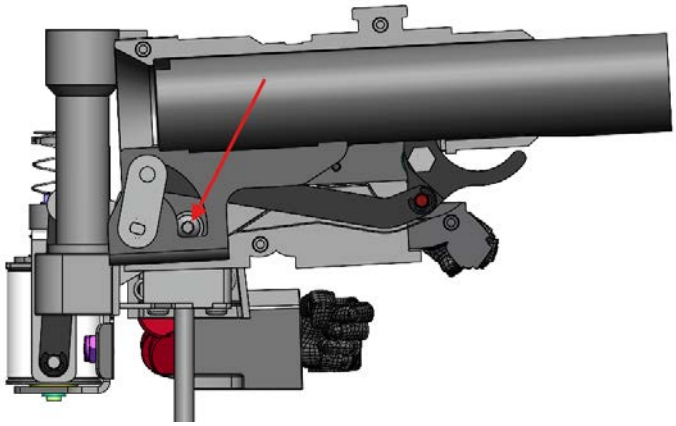


Figure 5.68.8. Side view of Megatron Assembly, with a red arrow pointing to the screw for Step 5c. The side plastic and screws from the previous Figure are removed in this image.

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MEGATRON CANNON TEST / ADJUSTMENT CONTINUED

5d. If the arm is stable, and the cannon is low, adding a washer can help raise the height of the cannon. Loosen the set screw from Step 3c, and remove the Megatron assembly to access the washer stack.

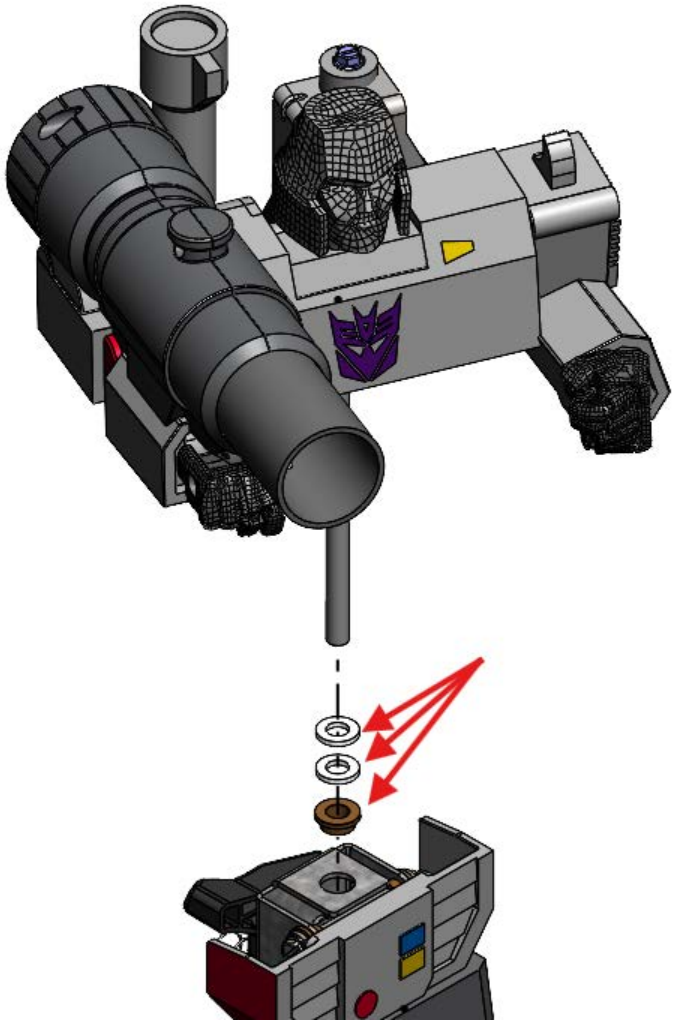


Figure 5.68.9. Exploded view of the Upper and Lower halves of Megatron. Red arrows are pointing to the bushing and washers.

5e. After any adjustments are made, re-assemble Megatron and repeat Step 4 before moving on to Step 6.

Step 6: Test Weak Cannon Fire

6a. Move Megatron to the “Right” position.

6b. Load a pinball directly into the back of the cannon.

6c. Fire the ball using the black “Select” button on the coin door.

6d. If the ball fires out, repeat Steps 6b and 6c two more times. If the ball fails to fire any of those attempts, the coil power may need to be increased.

6e. If the ball is firing properly, move to Step 8.

Step 7: Adjust Weak Cannon Power

7a. Go into “Adjustments” > “Machine Settings” > “Coil Settings” > “Megatron Cannon”

7b. Mark down what the current value is set for Weak Cannon Fire. The game will keep the current value, and also show what the default value is.

Increasing the power will have the ball shoot out faster, going farther. If the ball is not reliably coming out of the cannon during the weak cannon shot, increase the power in increments of 5 until it does fire reliably. Turning the power up too high will result in increased damage to the game from the ball being launched at a higher velocity.

7c. Select the value to adjust by pressing the black “Select” button on the coin door. Use the red volume “- +” buttons to adjust the current value. Press the black “Select” button again to save the current change.

7d. After any changes are made, repeat Step 6.

Step 8: Testing Completed

8a. Hit the green “Back” button until the game is back on the main attract screen.

8b. Play the game.

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6. SPECIFICATIONS

500-55AC-01

SPECIFICATIONS, MECHANICAL, GAME SETUP

Specification	Imperial	Metric
Weight	210 lbs	96 kg
Max dimensions, leg levelers 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.

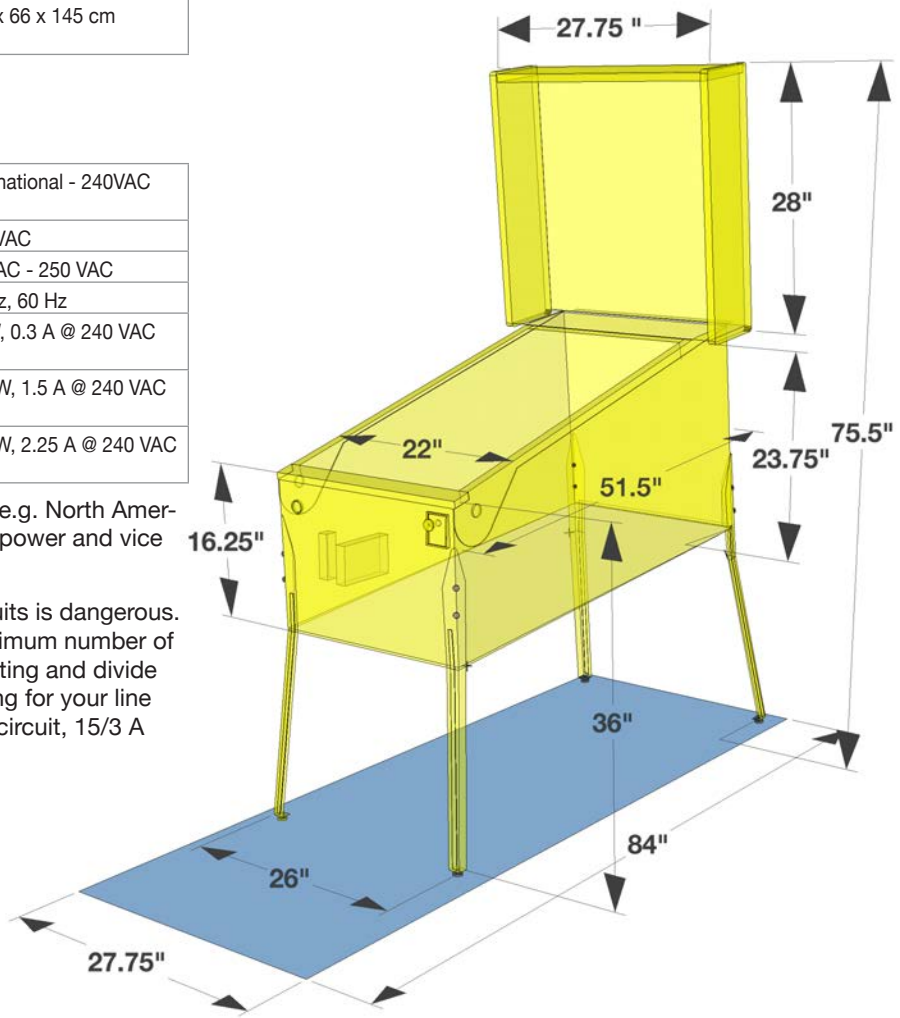
WARNING: Overloading electrical supply circuits is dangerous. Do not overload circuits. To calculate the maximum number of games for a circuit, check circuit amperage rating and divide by the game Nominal Line Power Current rating for your line voltage. For example, a 15A 120V household circuit, 15/3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



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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.

820-6617-00

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.

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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d. "Authorized Update" means an update to the Stern Pinball Software distributed by Stern Pinball or otherwise made available by Stern Pinball, including for download on its website.

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f. "Unauthorized Software" means any software (including but not limited to firmware) not pre-installed by Stern Pinball on a Stern Pinball Machine or that does not comprise Authorized Content or Authorized Update.

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