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# Safety

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## Operation

Before operating game, read this manual. Failure to properly install and operate this game could result in malfunction or accident. Operate the game in accordance with the manual.

## Transporting

When moving the LED display, ensure all 4 quadrants have been removed. Never attempt to move the LED display with the quadrants still attached, as this can cause the frame to bend and warp. Always use appropriate care when moving or transporting either the cabinet or LED display.

## Handling Components

Many components are extremely sensitive to handling, environmental and Electrostatic Discharge (ESD) events—especially the computer. Do not handle it roughly. Before servicing, call your distributor and inquire about the PC warranty. Use proper ESD procedures when servicing. Protect components from harmful environmental conditions, such as extreme temperatures, excessive moisture or other damaging effects.

## Disconnect Power

Always turn the power off and unplug the unit before servicing or making adjustments unless otherwise instructed. Installing or repairing components while power is on can damage the components and void the warranty.

## Grounding

Avoid electrical shock. Do not plug in AC power until you have inspected and properly grounded the unit. Only plug into a grounded, three-wire outlet. Do not use a “cheater” plug or cut off the ground pin on the line cord.

## Electrical Shocks

There is no isolation transformer in the cabinet. Disconnect AC power before servicing. However, be aware that lethal voltages can remain in the electronic components even when AC power is disconnected. Use extreme caution when servicing. Verify that there is a working ground connection. If the unit sustains water damage, cease using it immediately and unplug AC power.

## Power Cord

If the power cord is damaged or lost, replace it with an identical cord as supplied by the manufacturer or an authorized service agent.

## Surge Suppressor

It is recommended that you plug your game’s power cord into a surge suppressor to help protect from power surges that may damage sensitive electronic components.

## Water and Other Liquid Sources

Do not install game near sprinkler or other water jet sources. Do not use water jet to clean game. Keep minimum clearance behind game and wall for proper ventilation but also prevent access of liquid from spills and sprays from entering ventilation holes.

## Connectors

When servicing machine, ensure all connectors mate properly. If connectors do not slip in easily, do not force them. Connectors are often keyed and only connect one way. Check for correct orientation.

## Computer

The computer contains sensitive components, including a hard drive. Do not handle it roughly. Call your distributor before servicing its internal components. Ask about warranty information as it relates to the PC.

Do not turn the PC power switch on or off. It should remain permanently in the ON position.

Cycle AC power on or off with the cabinet power switch.

A dongle has been inserted into one of the USB ports. This is required for game play.

Do not remove the dongle except for troubleshooting purposes.

## Hazard to Epileptics

A small portion of the population has an epileptic condition that may cause seizures. Affected persons experience seizures while watching some television pictures or playing certain video games. People who have not had seizures may still have an undetected epileptic condition. If anyone in your family has experienced epilepsy symptoms (seizures or loss of awareness), consult your physician before using video games. While children play video games, a parent should observe. Be alert to the following symptoms: dizziness, altered vision, eye or muscle twitching, involuntary movements, loss of awareness, disorientation or convulsions. If you or your child experiences these symptoms, discontinue use immediately and consult your physician.

## Manual

Keep this manual available and ready for use. If the game fails to function properly, turn off the machine and unplug the AC line cord. Contact your local distributor. Your warranty, when applicable, lasts 60 days from your purchase date. You may not reproduce this document or any of its contents without written authorization from Raw Thrills, Inc.

## Specifications

For reasons such as performance, this product's specifications may change without notice. Federal patent, copyright and other intellectual property laws protect the content, devices and design of the game and its equipment.

## Product Specifications

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### Electrical Power

United States, International and Japan  
Operating AC Current: 5/2.5 Amps  
Voltage: 115/230 ~ VAC 50/60Hz  
Inrush AC Current: 5 Amps

### Dimensions

#### *Seat Pedestal*

Height: 55.0" (1.40 meters)  
Width: 43.5" (1.10 meters)  
Depth: 32.5" (0.83 meters)

#### *Control Cabinet*

Height: 46.0" (1.17 meters)  
Width: 43.5" (1.10 meters)  
Depth: 29.0" (0.74 meters)

#### *Display*

Height: 117.0" (2.97 meters)  
Width: 68.0" (1.73 meters)  
Depth: 35.5" (0.90 meters)

### Operating Temperature

50° F to 104° F  
(10° C to 40° C)

### Operating Humidity

Must not exceed 95% relative humidity

## Fuse Replacement Guide

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NOTE: FOR CONTINUED PROTECTION AGAINST  
FIRE AND ELECTRICAL DAMAGE, USE ONLY  
SPECIFIED FUSE TYPE AND VALUE.

### **RIO:**

5VDC = 3A 250V SLO-BLO  
12VDC = 5A 250V SLO-BLO

### **Game Lighting:**

5A 250V SLO-BLO (x4)

### **LED Display Panel:**

5A 250V SLO-BLO (x9 PER QUADRANT)



# Setup

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## Unpack Materials

1. Place the shipping crates on a flat, stable surface.
2. Cut the banding straps and remove the cardboard lids.
3. Lift off the large cardboard containers surrounding the cabinets (control & pedestal) and monitor assemblies and remove any shipping cleats.
4. Remove the coin door key from the coin return slot.
5. Open the top coin door.
6. Locate the keys for the back door and the cash box door.
7. Open the cash box door and remove the cash box.
8. Check for shipping damage to the following:
  - Marquee and monitor
  - Cabinet decals
9. Check the AC line cord for visible signs of damage.  
*Pay particular attention to the plug and line cord insulation.*

## Check Electrical Settings

1. Verify the voltage in the nearest AC outlet.
2. Verify the AC outlet ground connection is present and working.
3. Open the service door of the control cabinet assembly
4. Locate the 24V power supply and verify the voltage selector switch is set to the correct AC voltage.  
Please note: some 24V power supplies are universal and do not have a voltage selector switch.

## LED Display Quick Setup Guide

**Important Note:** This manual is accompanied by a separate document: “LED Display (P7.62 Version) Full Assembly and Service Procedure”. Please refer to this document when installing, servicing and troubleshooting the LED display. It is a more comprehensive guide and provides more detail than the quick setup guide listed below. Keep this and other documentation for future reference. Additional information regarding the latest version of software and documents can also be found on our website:

[www.rawthrills.com](http://www.rawthrills.com)



Listed below is a step by step process to assemble the P7.62 based LED Display for Space Invaders Frenzy. For additional assistance, reference the full Assembly and Service Procedure included with the game. 2 people are required to do the assembly. Ladders are recommended when assembling the top quadrants of the LED screen. Refer to the “LED Display (P7.62 Version) Full Assembly and Service Procedure” for details.

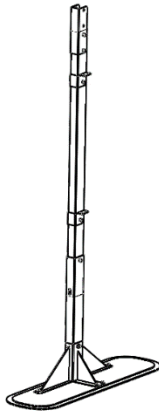
## Required Tools

M6 Allen Key, #2 Phillips Screwdriver, and a Level

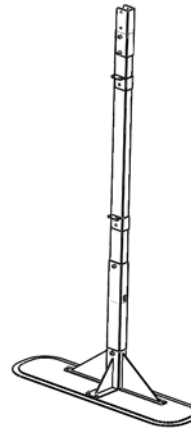
## Parts Note

All parts are labeled with decals. Refer to these decals when assembling the screen.

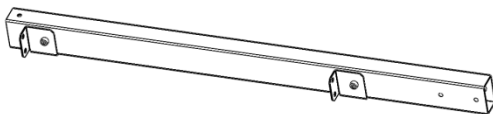
## Frame Components (Not to Scale)



**1** – Left Base Assembly (x1)



**2** – Right Base Assembly (x1)



**3** – Left Upper Tube Assembly (x1)



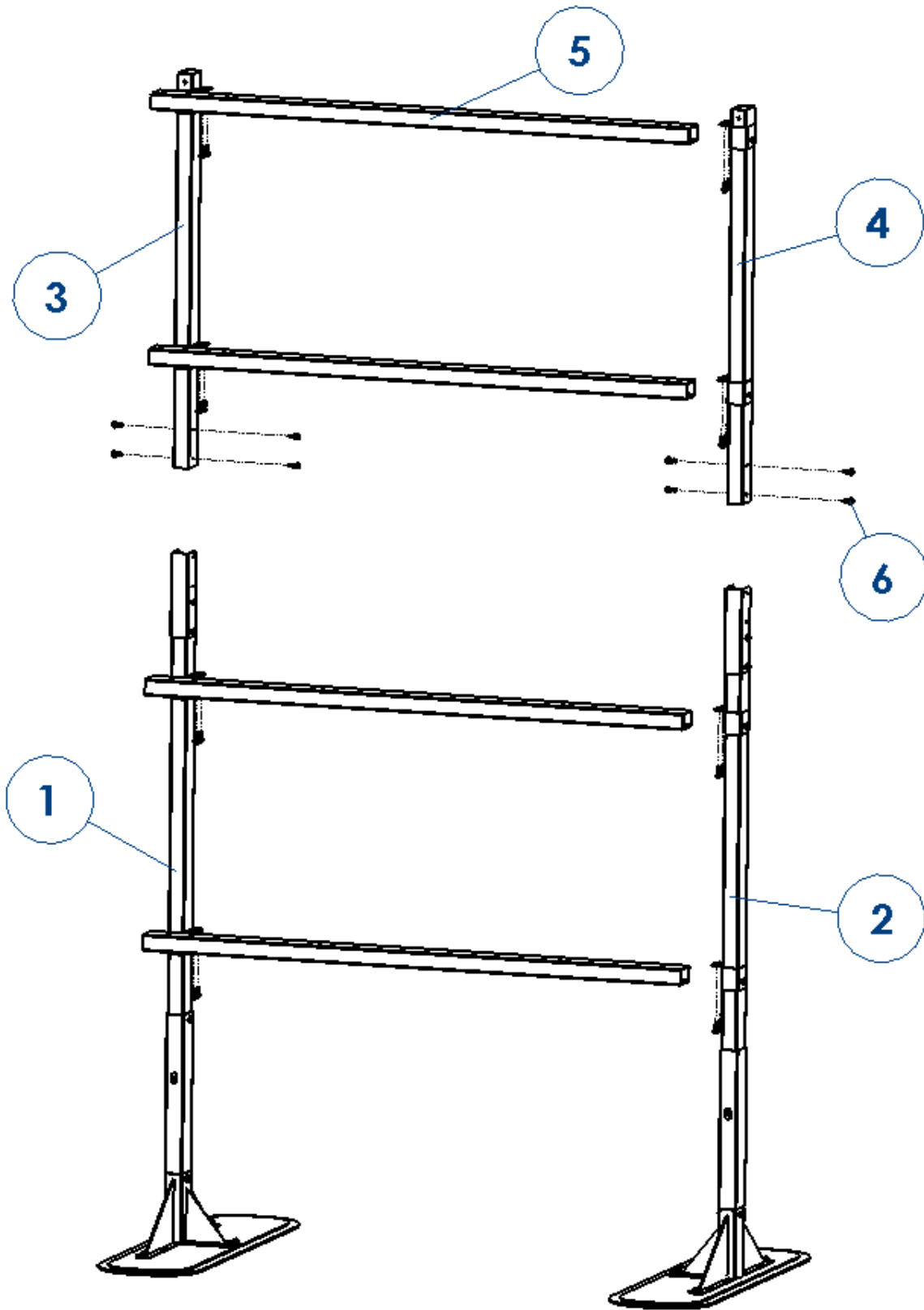
**4** – Right Upper Tube Assembly (x1)



**5** – Cross Tube (x4)

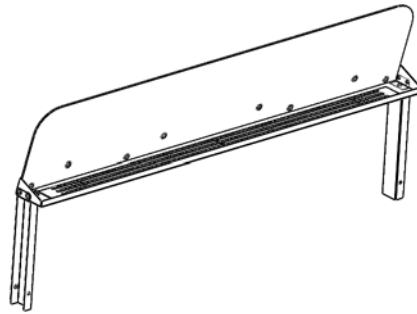


**6** – M8x16mm Socket Head Cap Screw (x24)

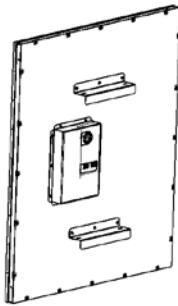


VIEW FROM BACK

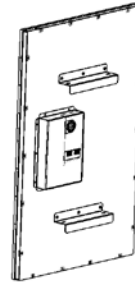
## Quadrants and Marquee Components (Not to Scale)



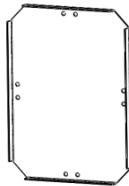
**7** – Marquee Assembly (x1)



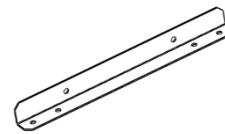
**8** – 4x9 Display Quadrant (x2)



**9** – 3x9 Display Quadrant (x2)



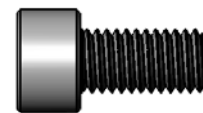
**10** – Center Planar Bracket (x1)



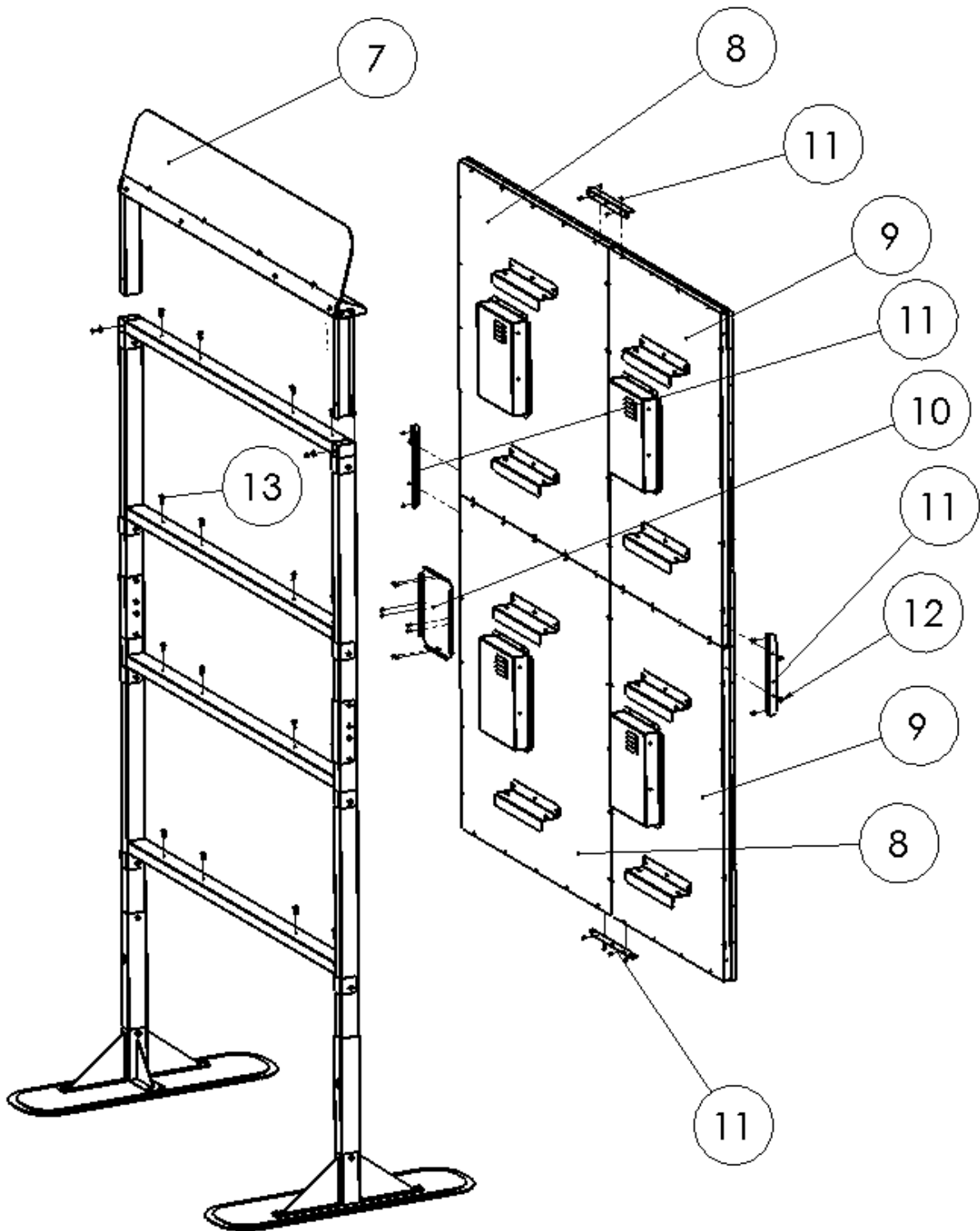
**11** – Side Planar Bracket (x4)



**12**  
– M5x8mm Phillips Head Screws (x8)

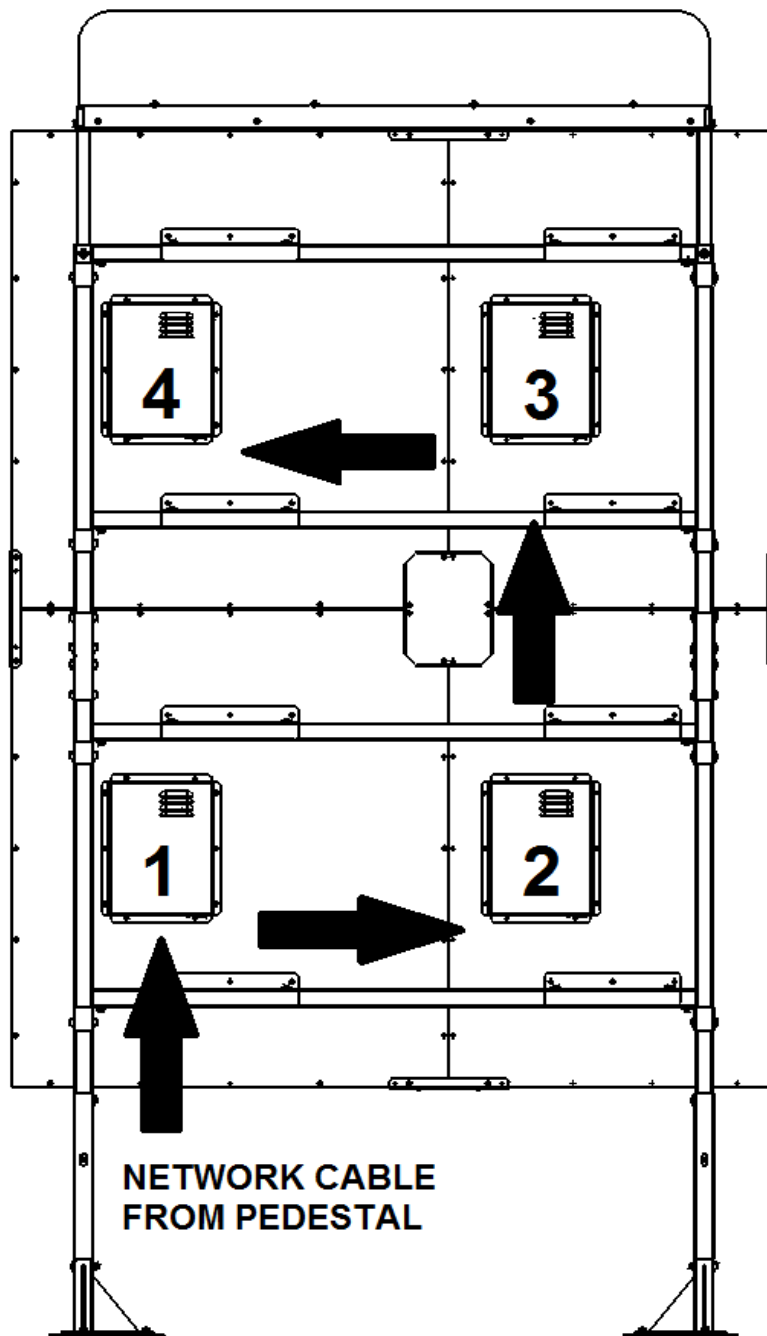


**13** – M8x16mm Socket Head Cap Screw (x16)



**(Note- Install screen quadrants individually, starting with the bottom quadrants)**

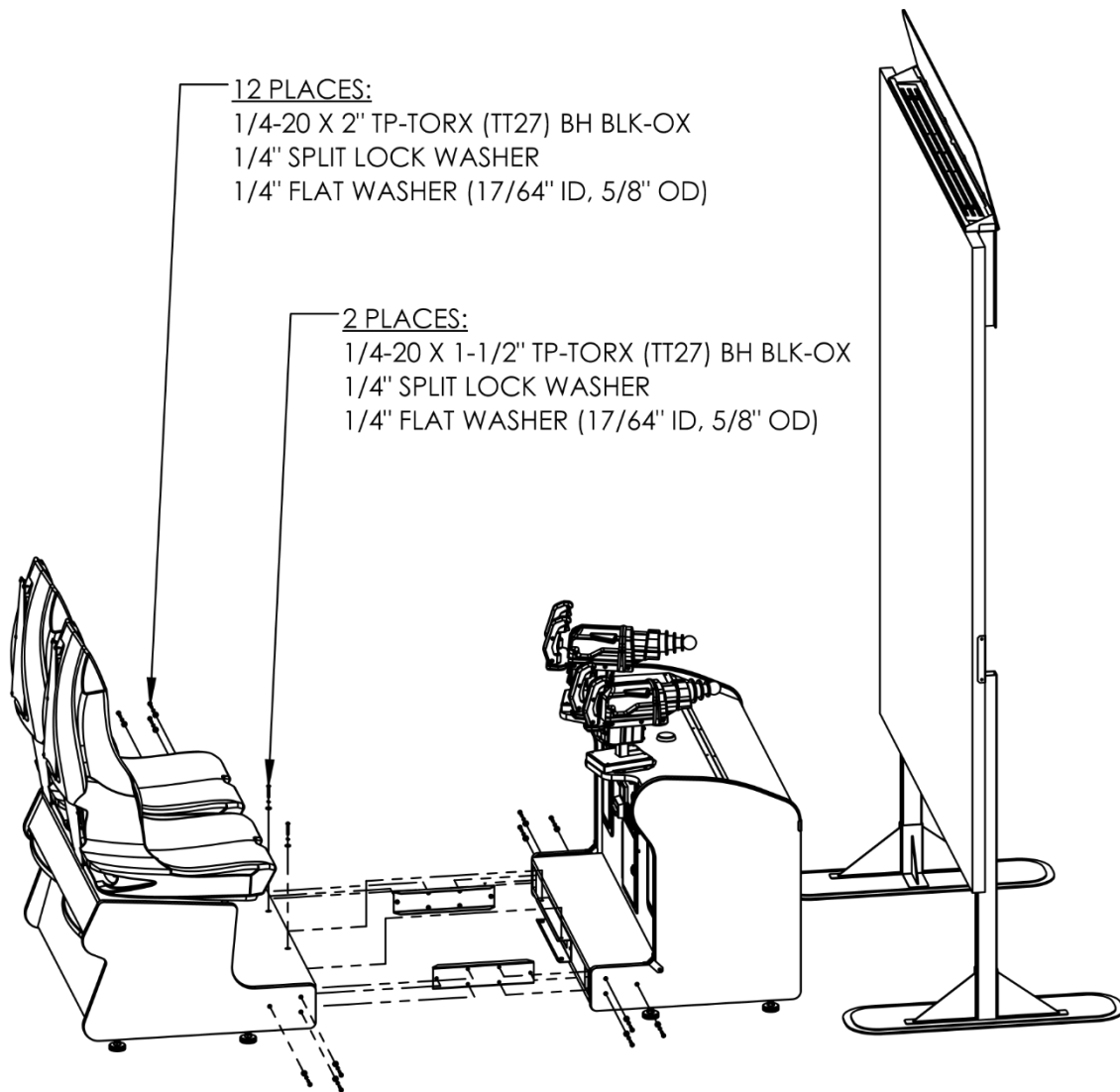
## Network Cable Connections



### **NETWORK CABLE CONNECTIONS**

*NETWORK CABLES MUST BE CONNECTED  
IN THE ORDER SHOWN ABOVE.*

## Cabinet Assembly Setup Diagram



**(Recommended *minimum* 20" distance between the LED display and the cabinet assembly)**

## Cabinet Assembly Instructions

1. Place control (control) cabinet in front of LED display.
2. Locate the two connecting brackets and the following hardware: (6) black tamper proof Torx machine screws, ¼-20 thread, 1-1/2" long, and (6) ¼" black split lock washers, and (6) ¼" black flat washers. Using a T-27 bit, attach these connecting brackets to the inside of each cabinet side as shown in the cabinet assembly setup diagram.
3. Move Seat Pedestal assembly in front of control cabinet and connect harness. Locate the following hardware: (6) black tamper proof Torx machine screws, ¼-20 thread, 2" long, and (6) ¼" black split lock washers, and (6) ¼" black flat washers. Push cabinet halves (seat and control section) completely together and be sure not to pinch wire harness. Using T-27 bit, connect the two cabinet halves with the hardware as shown in the cabinet assembly setup diagram.  
(Note: Leg levelers may need to be adjusted to account for uneven surfaces.)
4. Locate the following hardware: (2) black tamper proof Torx machine screws, ¼-20 thread, 1-1/2" long, and (2) ¼" black split lock washers, and (2) ¼" black flat washers. Install screws through Seat Pedestal floor to center connecting bracket.
5. Move the completed cabinet assembly into the desired position in front of the display. Raw Thrills recommends a *minimum* distance of 20 inches between the LED display and the cabinet assembly. Once positioned, lower all (8) leg levelers.
6. Connect the network CAT 5 cable between the back of the completed cabinet at the terminal near the on/off switch and the back of the LED wall assembly. Use supplied D-channel sleeve and carpet tape to properly dress the network cable on the floor.

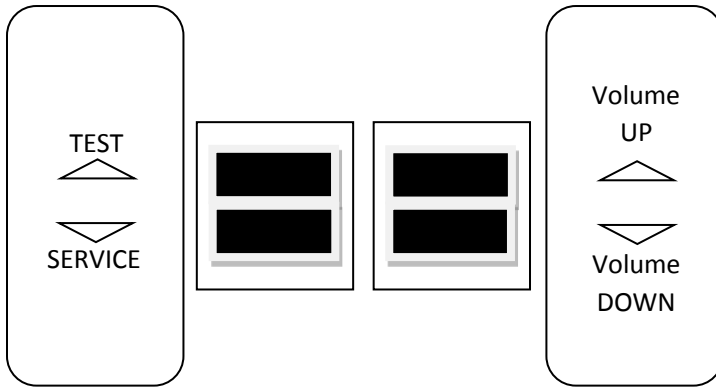
## Startup Game

1. Plug in line cord to AC outlet.
2. Turn the power switch to ON.
3. Verify game display, sound, lights and controls are operating normally.  
*If not, turn off AC power and disconnect line cord. Refer to the diagnostic section of this manual.*

## Diagnosics and Adjustments

The Service Button Panel has four buttons, three of which can navigate the menu system.

The start buttons and gun triggers can also advance through test menu screens.



Navigating the Test Menu	
Button	Action
TEST/BACK (Not in Test Menu)	Enters Test Menu
TEST/BACK (In Test Menu)	Selects Highlighted Option
SERVICE (On Main Menu)	Exits Test Menu
SERVICE (Not on Main Menu)	Cancels Selection
VOLUME UP	Move Up
VOLUME DOWN	Move Down
Start Buttons	Selects Highlighted Option

An on-screen message acknowledges changes or when you exit a selection without making a change.

### Basic Functional Test on Initial Power Up

See the Diagnostic Section for further information.

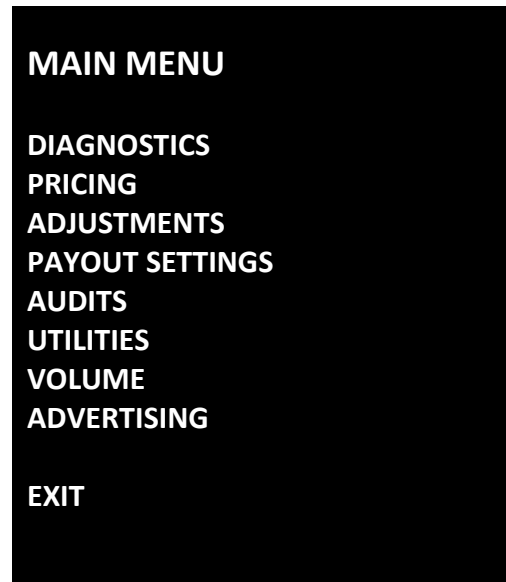
1. Enter the Switch Test menu and verify all switches function.
2. Enter the Sound Test menu and verify the audio works and is not distorted.
3. Enter the Coin Meter Test menu and verify the operation of the coin meter.
4. Enter the Cabinet Lamps Test menu and verify that all cabinet lights work correctly.
5. Enter the Watchdog Test menu, which reboots the game.
6. Upon a successful reboot, you are ready to adjust pricing, volume and other functions found in the Adjustments, Audits, and Diagnostics section.



## Test Menus

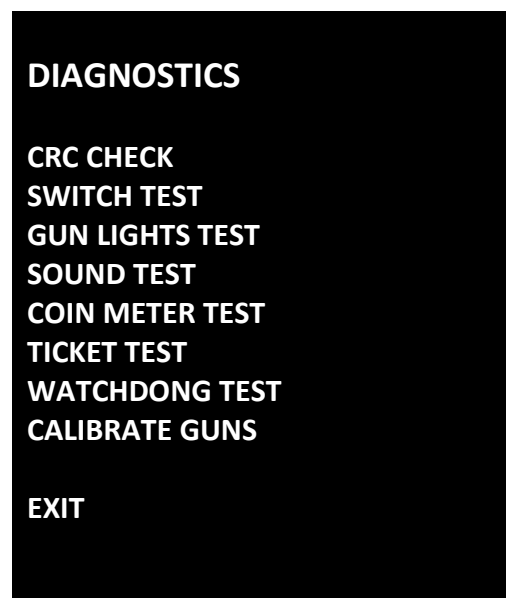
### Main Menu

**Main Menu Description-** Choose from all available operator settings and menus here. You can use the test menu bracket and volume buttons to navigate. The guns, gun triggers, and start buttons also are available to use for easier navigation through these menus.



### Diagnostics

This menu allows all game functions to be verified or diagnosed. You can improve collections by periodically verifying proper game function and operation. This includes periodic CRC checks to verify that software has not been corrupted or reporting an error.



- **CRC Check:** Checks for errors in the game's files
- **Switch Test:** Test all the switches on the game
- **Cabinet Lights Test:** Test all cabinet lighting
- **Gun Lights Test:** Test gun lighting
- **Coin Meter Test:** Tests functionality of "hard meter"
- **Ticket Test:** Tests functionality of ticket mech(s)
- **Watchdog Test:** Tests Functionality of watchdog (If working properly, game will reboot).
- **Calibrate Guns:** Calibrate the aim of the guns

## Pricing Adjustments

This allows customization of coin values, currency denominations, bill pulse, and swipe value.

### Pricing Adjustments: Coins Active (Default)

#### PRICING ADJUSTMENT (COINS)

FREE PLAY  
CURRENCY TYPE  
CURRENCY INPUT  
COIN VALUE  
COINS TO PLAY

EXIT

- **Free Play**: No coins or swipes needed to play.
- **Currency Type**: Choose between: Cash, Tokens, or Card Swipes
- **Coin Value**: Money value of a coin. This is a very important setting and impacts payout. Default value is \$0.25.
- **Coins to Play**: Number of coins per credit.

### Pricing Adjustments: Swipes Active

#### PRICING ADJUSTMENT (SWIPES)

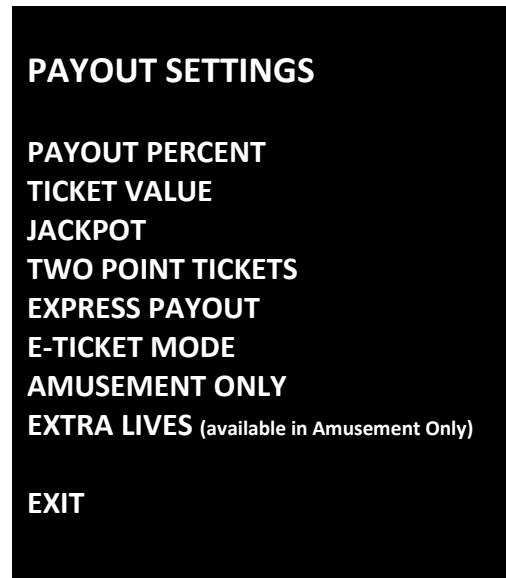
FREE PLAY  
CURRENCY TYPE  
CURRENCY INPUT  
SWIPE VALUE  
SWIPES TO PLAY

EXIT

- **Free Play**: No coins or swipes needed to play.
- **Currency Type**: Choose between: Cash, Tokens, or Card Swipes
- **Coin Value**: Money value of a swipe. This is a very important setting and impacts payout. Default value is \$1.00.
- **Swipes to Play**: Number of swipes per credit.

## Payout Settings Menu

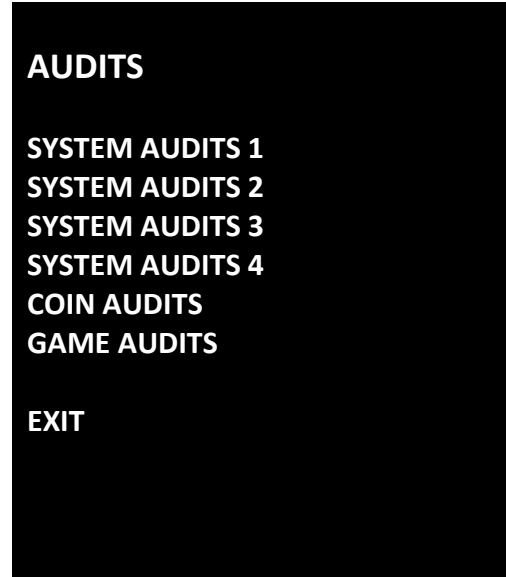
This menu allows for customization of target compensation, payout percentage, ticket value, E-Ticket support (Paperless Tickets), and Jackpot compensation.



- **Payout Percent:** Set your targeted payout percentage. Game defaults to 40% which is the recommended setting. IMPORTANT NOTE- *Space Invaders Frenzy* has a dynamic targeted payout system in place but it is a skill based redemption game. There will be some slight volatility and variation in payout among different skill level players.
- **Ticket Value:** Set the value of your tickets. Default value: \$0.01 and is the recommended setting.
- **Jackpot:** Set the value of the game's jackpot award up to 1000 tickets. Default value is 500.
- **Two Point Tickets:** When set to ON, this setting allows a single ticket dispensed to be worth 2 points in the game.
- **Express Payout-** when set to ON, allows for tickets to be dispensed as tickets are earned (recommended setting). When set to OFF, ticket payout is dispensed after the completion of the current game.
- **E Ticket Mode-** Raw Thrills supports the use of paperless tickets or "E-TICKETS" with our new "E-Ticket Mode". If you are using digital tickets via a card based system like Embed, Intercard, Semnox or equivalent system, you will need to activate E-Ticket Mode. This mode provides E-Ticket support to a 2-player simultaneous play experience like *Space Invaders Frenzy*. It splits the credits and E-ticket payout to the Player 1 and Player 2 sides of the game to two separate card swipers. Each player's payout and credits will be properly divided to the corresponding player's card.
- **Amusement Only-** This mode is a unique action arcade experience and is different than the video redemption mode. While the controls and general gameplay remain the same, "Amusement Only" has many various waves, power ups, bonus stages, and a continue feature with gameplay tailored towards a longer playing experience. The player plays only for points and to complete the game after all 50 stages are cleared. There are no tickets awarded during this mode. To turn on "Amusement Mode", you can access it in the "Payout Settings" menu. This mode is perfect for non-ticket redemption locations and provides a more traditional longer play action arcade experience.
- **Extra Lives-** This is an adjustment only available and accessible when Amusement Only is set to ON. Operator can adjust the number of lives given per credit.

## Audits

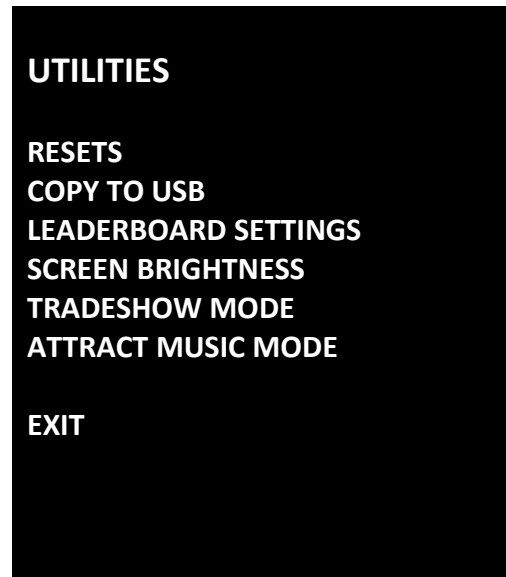
Audit screens help assess game performance, find intermittent problems, decide whether to adjust game difficulty and free game award and help maximize game earnings.



- **System Audits**- Logged information including boots, resets, game times, and more
- **Coin Audits**- Tracks income related information, coin slot usage, dollar bill usage, and more
- **Game Audits**- Tracks the gameplay habits of your customers. How many bonus ships hit, average scores, number of jackpots won, payout percentage, and more.

## Utilities

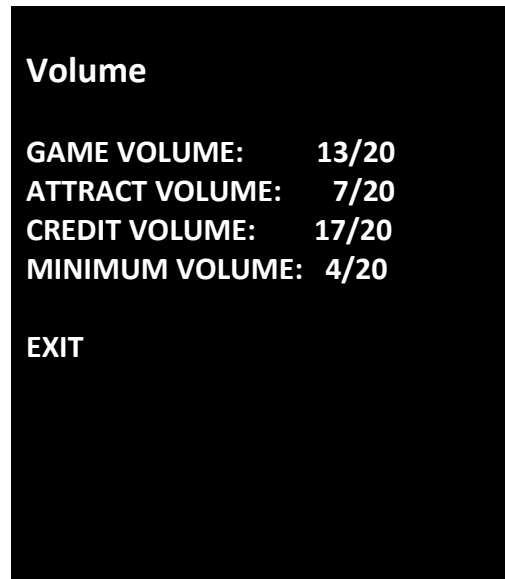
Utilities is a miscellaneous menu of operator tools and settings



(Utilities Menu Continued from Previous Page)

- **Resets**- All operator resets are available in this menu. Coins, tickets, audits, adjustments, high score leaderboards, are all accessible here. You can also factory reset the game from this menu which will restore all settings in the game to their original factory settings.
- **Copy to USB**- Allows you to upload your audits to an easy to read text file (.TXT) on a USB flash drive
- **Leaderboard Settings**- Allows you to turn high score leaderboards on and off. ON is the default and recommended setting.
- **Screen Brightness**- Adjust the brightness of your *Space Invaders Frenzy* screen. There are 6 levels of brightness to choose from. 6 is the default value and is the recommended setting.
- **Tradeshow Mode**- Turn this mode on when operating on a trade show, sales floor, or demo floor. The game runs on free play and also simulates ticket payouts without a ticket error appearing on the screen.
- **Attract Music Mode**- This allows you to set how frequently you want the volume to play during the attract mode. Choose from "ON", "Occasionally", and "OFF".

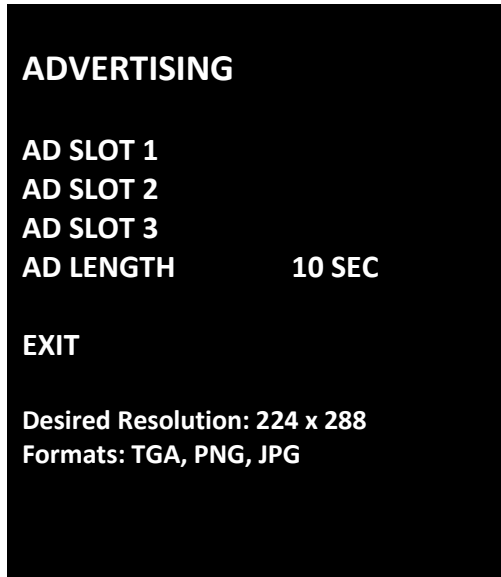
## Volume



- **Game Volume**- Adjusts the volume level during gameplay
- **Attract Volume**- Adjusts the volume during the attract mode sequences
- **Credit Volume**- Adjusts the volume level of the credit chime only (Independent setting of game and attract volume)
- **Minimum Volume**- Adjusts the minimum floor the volume can be lowered

## Advertising

*Space Invaders Frenzy* has an advertising feature that allows the operator to upload photos which will be displayed during the attract mode of the game.

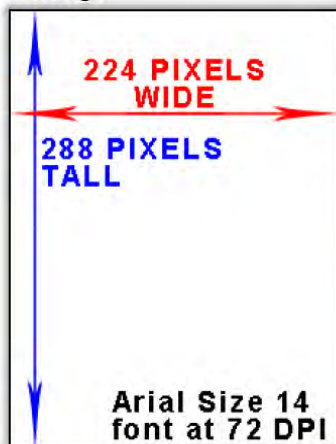


- **Ad Slot 1:** First of 3 available advertising file slots
- **Ad Slot 2:** Second of 3 available advertising file slots
- **Ad Slot 3:** Third of 3 available advertising file slots
- **Ad Length:** Adjusts the time duration that the advertising image appears

## Advertising Menu User Guide

1. Identify and select advertising image files you would like to have displayed on the screen during the game's attract mode. On your personal computer or laptop, upload these advertising images to a USB flash drive. **Image files should be .TGA, .PNG, or .JPG format type.**

Sizing:



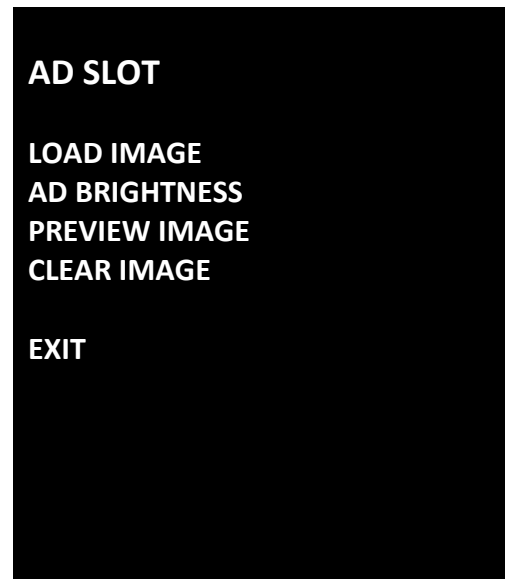
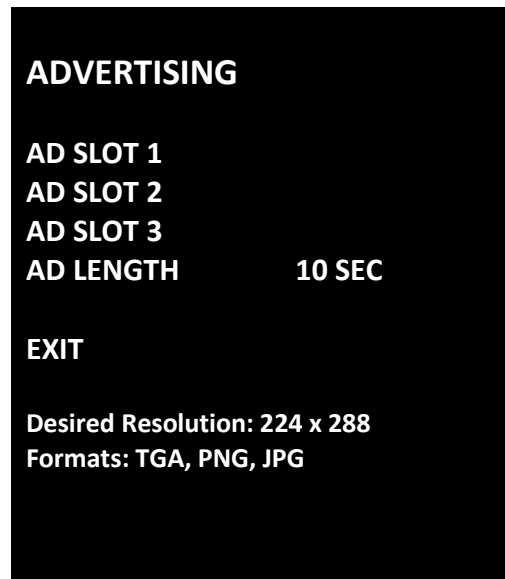
**Note** – The resolution of images should be 224 x 288 pixels. (224 x 288) Larger resolution files or different file types can cause an error or won't appear correctly on your *Space Invaders Frenzy* screen. (To be able to clearly read text and images, we recommend making your image 72 DPI, 224 x 288 resolution) Game can hold up to 3 images.

2. After you have your images picked out, sized, and copied to your USB flash drive, you are now ready to upload the images into *Space Invaders Frenzy*. Open the coin door and find the service bracket that has the test menu and service buttons. On this bracket, you will find a USB slot to insert your flash drive. **\*\*\*Important\*\*\* Make sure to only insert your flash drive while the game is in attract mode. Never insert a flash drive while the game is booting up, or in the Test Menu.**



(Above- Image of the USB slot above the test menu buttons)

3. Once your USB flash drive is inserted into the USB slot on the service control panel, you can then press the "TEST" button to access the main menu.
4. Select "ADVERTISING" from the main menu to access the upload feature. From this menu, you can then select an ad slot for your image.



5. After you are in the “AD SLOT MENU” you can select “LOAD IMAGE” which generates a list of the file names of the image files that are on your USB drive. Navigate to the file name you would like to upload and select it. (See image below)



6. When you select the image you would like to upload, you will be presented with a preview of the image, which you can accept or decline. If you accept the image, you will be taken back to “AD SLOT MENU” which will allow you to load a different image, adjust the ad brightness, preview the image again, clear your image or exit the menu.

**Please Note:** If you have lighter colors or lots of white areas in your advertisement, we recommend that you adjust the ad brightness to a lower level. The default ad brightness is 6 but many advertisements have a better appearance at 3-5 brightness.

## [Advertising Image Troubleshooting](#)

<b>Error</b>	<b>Solution</b>
USB DEVICE NOT CONNECTED	Check your USB drive to ensure it is properly connected. Also, check to make sure your USB drive can be read on other devices. Ensure the coin door USB connection cable to the PC inside the cabinet did not become disconnected or dislodged.
INCORRECT RESOLUTION DETECTED	Please check the resolution of the image that you are trying to upload. Recommended image size is 224 x 288 pixels
NO IMAGES ON FLASH DRIVE IN AD SELECT SCREEN	Check to make sure your files have properly loaded on to your flash drive and ensure that they are in the proper .PNG, .TGA, or .JPG format.
FILES MISSING FROM AD SELECT SCREEN WHEN THE AD SELECT SCREEN HAS MORE THAN 1 PAGE	Please remove some files on your flash drive and check to make sure you do not have more than 10 files on the main USB flash drive folder



## Keys to Maximizing Your Earning and Collections

### Card Swipe Locations

- Make Sure Your Game is Set to **Swipes Mode**:
  1. Hold the Test Button for 2 seconds to enter the Test Menu.
  2. Select "Pricing Adjustments" from the menu.
  3. Select "Currency Input" from the menu.
  4. Select "Swipes" from the menu.
  5. Set "Swipe Value" to the currency equivalent of your swipe, or the payout will be incorrect.  
**THIS SETTING IS EXTREMELY IMPORTANT!** (Example: If the card swipe is worth \$1.50 in your card system, set the swipe value to \$1.50 as well)

### E-Ticket Locations

- Make Sure Your Game is Set to **E-Ticket Mode**:
  1. Hold the Test Button for 2 seconds to enter the Test Menu.
  2. Select "Payout Settings" from the menu.
  3. Select "E Ticket Mode" and set to "On"

**IMPORTANT NOTE:** You must have two card swipers for E-Ticket mode to work. One for Player 1 Gun and one for Player 2 Gun.

### Coin Locations

- Make Sure Your **Pricing & Coin Value** are Correct:
  1. Hold the Test Button for 2 seconds to enter the Test Menu.
  2. Select "Pricing Adjustments" from the menu.
  3. Select "Coins to Play" and set the desired amount of coins per game of Space Invaders Frenzy™.
  4. After setting the coins per play, set "Coin Value" to the currency equivalent of your coin, or the payout will be incorrect.  
**THIS SETTING IS EXTREMELY IMPORTANT!** (Example: If your coin is worth \$0.25, set "Coin Value" to \$0.25 as well)

### 2 Point Ticket Locations

- Make Sure the **2 Point Ticket** Setting is Activated:
  1. Hold the Test Button for 2 seconds to enter the Test Menu.
  2. Select "Payout Settings" from the menu.
  3. Select "Two Point Tickets" and set to "On". (Your tickets are now worth 2Pts each)

**IMPORTANT NOTE:** Only use this setting if your tickets are worth 2 points per ticket or the payout will be incorrect.

### More Tickets = More Fun = Better Earnings

- We recommend using the default payout setting of 40% to maximize earning potential and fun factor for the players. To set the "Payout Percentage":
  1. Hold the Test Button for 2 seconds to enter the Test Menu.
  2. Select "Payout Adjustments" from the menu.
  3. Select "Payout Percent" and adjust to desired amount.

**IMPORTANT NOTE:** Space Invaders Frenzy™ will dynamically adjust to your desired payout setting.

## PC Hardware

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Your *Space Invaders Frenzy™* game may ship with either a **DELL INSPIRON 3050** computer or a **Fujitsu IMP-3313-S4-4G-HD Mini PC computer** ("Fujitsu Mini PC"). The Dell Inspiron 3050 computer is square in shape has a "Dell" logo on it while the Fujitsu computer is rectangular in shape and has no logo. Listed below are the BIOS settings for each computer.

### **NOTICE**

Both the **DELL INSPIRON 3050** and **FUJITSU MINI PC** ship with correct BIOS settings. Making changes to the BIOS different from the description below may adversely affect game functions.



(Above- Dell Inspiron 3050)



(Above- Fujitsu Mini PC)

## Fujitsu Mini BIOS

### **To Access BIOS Settings:**

With the computer powered off, plug a USB keyboard into an open USB slot, hold 'F2' key and turn the computer on. Continue holding the F2 key until the BIOS Setup screen appears.

**Note:** All settings that are not listed should remain their default values

### **Advanced**

- + Graphics Configuration
  - Internal Graphics ..... [Enabled]
  - Primary Display ..... [IGD]
  - IGD Memory ..... [512M]

### **Power**

- Power Failure Recover ..... [Always ON]

### **Boot**

- Prefer USB Boot ..... [Enabled]

**Note:** After exiting BIOS settings screen, power-cycle the cabinet by using the cabinets main power switch.

## Dell Inspiron 3050 BIOS

### **To Access BIOS Settings:**

With the computer powered off, plug a USB keyboard into an open USB slot, hold 'F12' key and turn the computer on. Continue holding the F12 key until a menu with a blue background appears. From the menu, select 'BIOS Setup'

### **Main**

- Nothing

### **Advanced**

- Intel® SpeedStep™ ..... [Enabled]
- Virtualization ..... [Enabled]
- Integrated NIC ..... [Enabled]
- SATA Operation ..... [AHCI]
- Adapter Warnings ..... [Enabled]
  
- + Miscellaneous Device
  - Nothing
  
- + Power Options
  - Wake Up by Integrated LAN ..... [Disabled]
  - AC Recovery ..... [Enabled]
  - Auto Power On ..... [Disabled]

### **Security**

- Nothing

### **Boot**

- Boot List Option ..... [Legacy]
- File Browser Add Boot Option
- File Browser Del Boot Option
- Secure Boot ..... [Disabled]
- Load Legacy Option Rom ..... [Enabled]
- 1<sup>st</sup> Boot Priority ..... [USB Storage Device]

### **Exit**

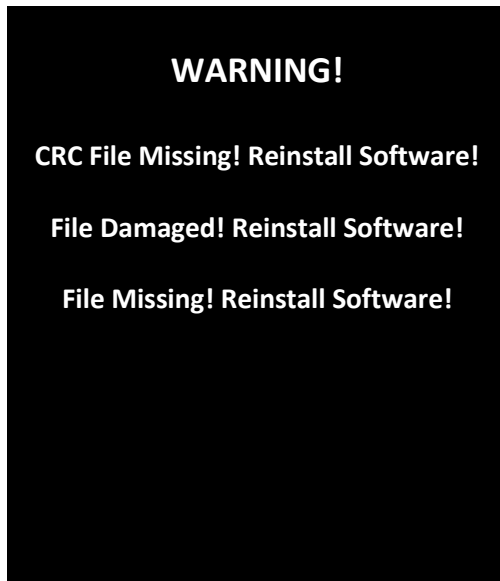
- Nothing

**Note:** After exiting BIOS settings screen, power-cycle the cabinet by using the cabinets main power switch.

## PC Hard Drive Recovery

Symptoms requiring PC hard drive recovery include

- File Test reports bad or missing files.
- Game fails to finish loading during startup.
- After resetting the AC power, an error is reported.
- Erratic Game or Attract Mode.
- The following screen:



The only way to repair corrupt files is to reinstall the software as described below:

### **Computer**

The computer contains sensitive components. Do not handle roughly. Call your distributor before servicing its internal components. Ask about warranty information as it relates to the PC.

Do **not** use the PC on/off switch. Turn AC power on or off with the cabinet power switch.

Steps to Re-install the software:

(NO DVD Restoration. USB Thumb Drive is used on the *Dell Inspiron 3050 PC* or *Fujitsu Mini*)

1. With game and PC on, verify that the RIO board has power. If not, see Troubleshooting.
2. Open the coin door
3. Insert the recovery USB thumb drive (included in your game) into the USB port on the Test button bracket inside the coin door.
4. Turn cabinet power switch to OFF. Wait 30 seconds.
5. Turn cabinet power switch to ON.
6. Select the *Space Invaders Frenzy* restore version from the menu and follow on screen instructions
7. If recovery does not begin, check to ensure USB Drive is inserted correctly and is not damaged.
8. Initial software loading may take several minutes. Check progress periodically.  
*Do not interrupt power or reset the game during recovery.*
9. When software has been loaded, a message indicates that restore is complete. When instructed to remove USB Drive, wait 15 seconds to remove the drive from the PC.
10. Turn cabinet power switch off and then turn the cabinet on again. Your game will now be restored.

# Troubleshooting

**Warning:** Review safety chapter before making any adjustments to game.

Problem	Possible Cause	Solution
<b>Game will not power up.</b>	Game not plugged in.	Plug game into AC outlet.
	Game not turned on.	Turn on main power switch.
	Game fuse is blown.	Check and replace fuse. See Specification section for fuse values.
	No power to receptacle.	Test AC outlet and plug game into powered outlet.
	PC BIOS set incorrectly.	See BIOS Settings section.
	Flash Drive Installer is left connected to PC.	Disconnect Flash Drive Installer and power cycle the game.
	Advertising USB flash drive left connected to PC.	Remove USB flash drive and power cycle the game.
<b>Buttons do not work.</b>	Faulty micro switch.	Replace the micro switch on the button and re-test. Verify that the wires are connected to the correct spades on the micro switch.
	Faulty wiring.	Disconnect the cabinet from AC power. Verify that all wires are firmly connected to each button and the PCB. Verify that no wires are frayed or improperly shorting to ground. Verify that wires are connected to the correct spades on the micro switches.
	Faulty PCB.	Ensure all connections to PCB are secure. Replace PCB if faulty.
<b>Neither buttons nor audio work.</b>	PCB connected to faulty USB port (boot message may indicate not detected)	To test a USB port, turn off the game, disconnect the device from the port, and then connect the game dongle to the port. Reboot the game. A No Dongle message indicates the port is bad. If the game starts, the port is working. After the test, reconnect all devices to the correct USB ports and reboot.

<b>Problem</b>	<b>Possible Cause</b>	<b>Solution</b>
<b>No sound or bad sound.</b>	Bad connection.	Check connection to speakers.
	Volume set too low.	Use VOL UP button on Test panel to raise volume
	Faulty wiring.	Verify all wires are firmly connected to the speakers, PCB, and green computer audio port. Verify that each wire is connected to the correct port and no wires are frayed or improperly shorting to ground.
	Blown speakers.	Remove the grill and inspect each speaker for visible damage. Run the Sound Test from System Tests in the Operator Menu to verify each speaker is working.
	Reversed wires.	A weak or low muffled sound is a sign of reversed speaker wires. Check for reversed wires on each speaker.
Faulty PCB.	To verify audio is working at the computer, connect stereo headphones to the green computer audio port.	

<b>Constant low audio hum.</b>	Faulty power supply.	Check external DC supply and the PC supply.
	Open ground.	Check all ground wires in cabinet. Ensure AC wall outlet is properly grounded

<b>Game does not load.</b>	PC hard drive failure.	Recover hard drive. See Flash Installer Document or visit <a href="http://www.rawthrills.com">www.rawthrills.com</a> for latest software version download.
<b>PC Drive test reports "bad" or "missing" files.</b>		
<b>Game fails to finish loading.</b>		
<b>After resetting, game still reports an error.</b>		
<b>Erratic game mode or attract mode.</b>		
<b>WARNING!</b> <b>Data files Corrupted.</b> <b>(Game Operation May Become Unstable.)</b> <b>Use "Test" Switch to Enter Test Mode and Run "File Test."</b>		

<b>Problem</b>	<b>Possible Cause</b>	<b>Solution</b>
<b>Game Resets</b>	Bad file.	Run Flash Installer.

<b>Coin meter does not click during test.</b>	No pulse to meter.	Check wiring from meter to RIO board.
	Faulty meter.	Replace coin meter.
	Blown fuse(s) on PCB	Replace 12vdc 5A fuse(s) on PCB.

<b>Improper number of credits given when coins or bills are inserted.</b>	Incorrect setting in Pricing Adjustments.	Adjust pricing settings.
	Faulty wiring.	Disconnect cabinet from AC power. Verify wires are firmly connected to coin mech and bill validator and ground wires are properly connected. Verify no wires are frayed or shorting to ground.
	Faulty coin mech.	Verify coin mech is not jammed. Ensure coin mech is properly aligned and latched to coin door.

<b>Exits Test Mode every 3 seconds.</b>	Test button stuck in ON position.	Slide or toggle button off after Test Menu appears
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<b>No Video</b>	PC not turned on.	Turn PC power switch on. Ensure IEC cable tightly plugged in. Trace cable back to source to ensure continuity.
	Video cable not secure.	Check and secure DVI connector to LED controller card. Check and secure DVI or HDMI connector to PC.
	Network cable missing or not secure between cabinet and LED screen.	Connect network cable between RJ45 Network jack on the back of the cabinet and quadrant #1 of the LED screen. Power cycle the game after connecting the network cable.
	Network cable missing or not secure between LED controller card and RJ45 Network jack.	With the cabinet AC power off and the line cord removed, check the Ethernet cable between the LED controller card (Port "U") and the RJ45 Network jack on the inside of the cabinet.
	Faulty RJ45 pass-through Network jack.	Replace jack.

<b>Problem</b>	<b>Possible Cause</b>	<b>Solution</b>
<b>Dongle Not Present</b>	Dongle missing or disconnected.	Find dongle cable and reseal in USB port.
	Faulty USB port.	Insert dongle cable in different USB port.
<b>Connect RIO Board or RIO Board Missing.</b>	USB cable disconnected.	Check USB connection from PC to RIO board.
	No Power to RIO board.	Check for proper voltage (+5V, +12V) at RIO P1 connector.
<b>Defective single pixel.</b>	Defective LED module.	<ul style="list-style-type: none"> <li>• Tap gently on defective pixel.</li> <li>• Replace LED module.</li> </ul>
<b>Several defective pixels, but not all in same row or same column.</b>	Defective LED module.	<ul style="list-style-type: none"> <li>• Replace LED module.</li> </ul>
<b>Entire row or column of defective pixels.</b>	Faulty data transmission.	<ul style="list-style-type: none"> <li>• Check ribbon cable between malfunctioning module and module to the left (from the back).</li> <li>• Check/replace module to the left (from the back).</li> <li>• If module is left-most in quadrant (from the back):                             <ul style="list-style-type: none"> <li>○ Check ribbon cable between module and LED display controller.</li> <li>○ Check quadrant LED display controller.</li> </ul> </li> </ul>
	Defective LED module.	<ul style="list-style-type: none"> <li>• Replace LED module.</li> </ul>



Problem	Possible Cause	Solution
<p><b>Entire module malfunctioning.</b></p>	<p>Faulty data transmission.</p>	<ul style="list-style-type: none"> <li>• Check ribbon cable between malfunctioning module and module to the left (from the back).</li> <li>• Check/replace module to the left (from the back).</li> <li>• If module is left-most in quadrant (from the back):                             <ul style="list-style-type: none"> <li>○ Check ribbon cable between module and LED display controller.</li> <li>○ Check quadrant LED display controller.</li> </ul> </li> </ul>
	<p>Bad power.</p>	<ul style="list-style-type: none"> <li>• Check power connection to LED module.</li> <li>• Check quadrant fuse block for blown fuse.</li> </ul>
	<p>Defective LED module.</p>	<ul style="list-style-type: none"> <li>• Replace LED module.</li> </ul>

<p><b>Entire row of modules in quadrant malfunctioning.</b></p>	<p>Faulty data transmission.</p>	<ul style="list-style-type: none"> <li>• Check ribbon cable between malfunctioning module and module to the left (from the back).</li> <li>• Check/replace module to the left (from the back).</li> <li>• If module is left-most in quadrant (from the back):                             <ul style="list-style-type: none"> <li>○ Check ribbon cable between module and LED display controller.</li> <li>○ Check quadrant LED display controller.</li> </ul> </li> </ul>
	<p>Bad power.</p>	<ul style="list-style-type: none"> <li>• Check power connection to LED module.</li> <li>• Check quadrant fuse block for blown fuse.</li> </ul>

**Screen Note 1-** *Space Invaders Frenzy* uses over 65,000 LEDs on its giant screen. It is normal for a few LEDs to fail over the course of operating the game. This will not affect normal operation or viewing of the game and most will not be noticeable to the eye.

**Screen Note 2-** This manual is accompanied by a separate document: “*LED Display (P7.62 Version) Full Assembly and Service Procedure*”. Please refer to this document when servicing and troubleshooting the LED display. Additional information regarding the latest version of software and documents can also be found on our website: [www.rawthrills.com](http://www.rawthrills.com)

## Technical Support

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Contact your distributor for support.

For a list of authorized distributors near you, check the Raw Thrills website at:  
[www.rawthrills.com](http://www.rawthrills.com)



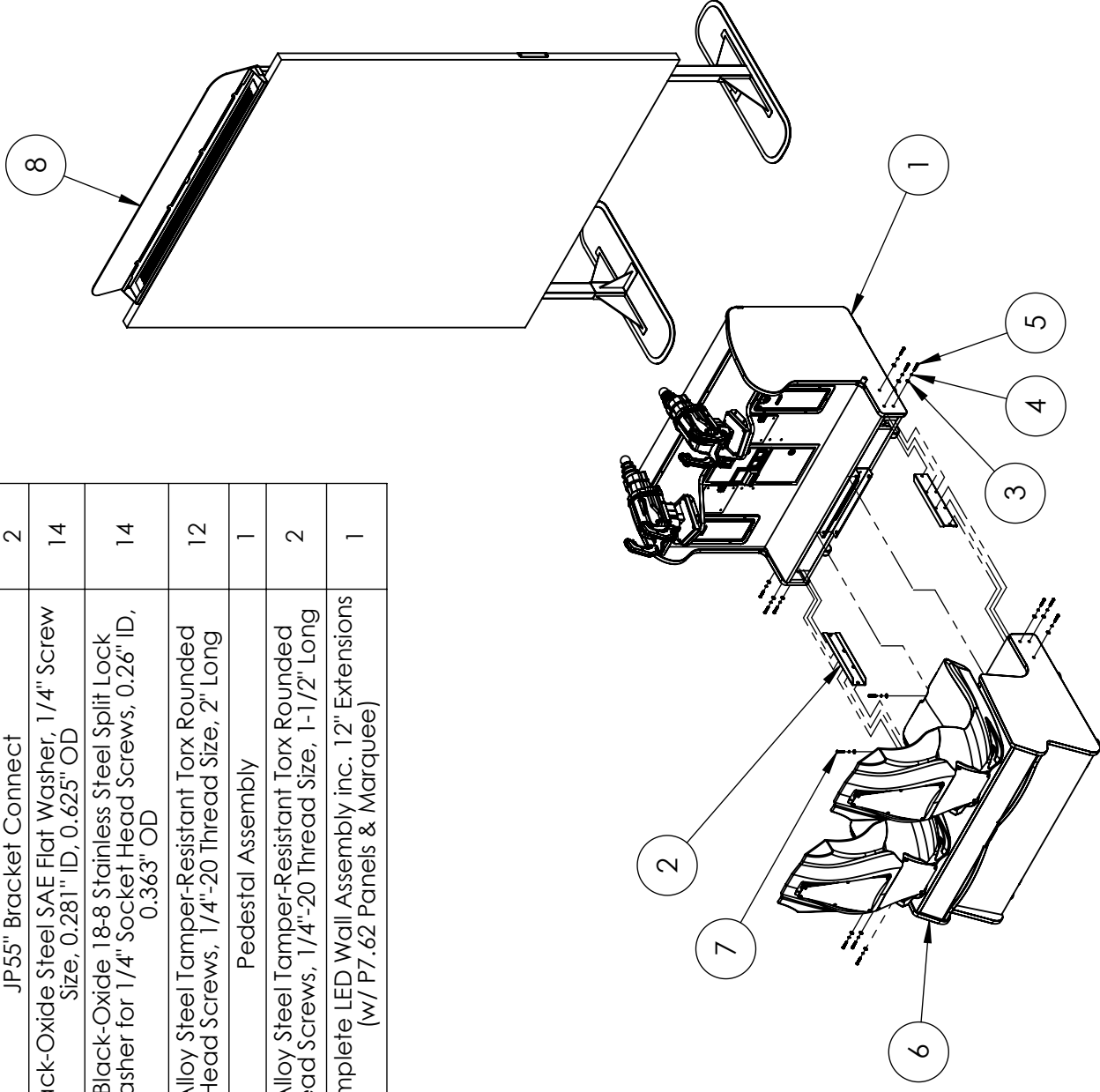
# Electrical and Mechanical Illustrations

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**NOTE: PLEASE CHECK FOR THE LATEST VERSION OF GAME SOFTWARE AND MANUAL AT [WWW.RAWTHRILLS.COM](http://WWW.RAWTHRILLS.COM)**



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	Space_Invaders_Control_Assy	Control Cabinet Assembly	1
2	600-01457-01	JP55" Bracket Connect	2
3	McMaster-Carr - 97416A119	Black-Oxide Steel SAE Flat Washer, 1/4" Screw Size, 0.281" ID, 0.625" OD	14
4	McMaster-Carr - 93711A500	Black-Oxide 18-8 Stainless Steel Split Lock Washer for 1/4" Socket Head Screws, 0.26" ID, 0.363" OD	14
5	Special Order Hardware (not available at McMaster-Carr)	Alloy Steel Tamper-Resistant Torx Rounded Head Screws, 1/4"-20 Thread Size, 2" Long	12
6	Space_Invaders_Pedestal_Assy	Pedestal Assembly	1
7	McMaster-Carr - 96075A231	Alloy Steel Tamper-Resistant Torx Rounded Head Screws, 1/4"-20 Thread Size, 1-1/2" Long	2
8	P7.62_LED_Wall_Assy	Complete LED Wall Assembly inc. 12" Extensions (w/ P7.62 Panels & Marquee)	1



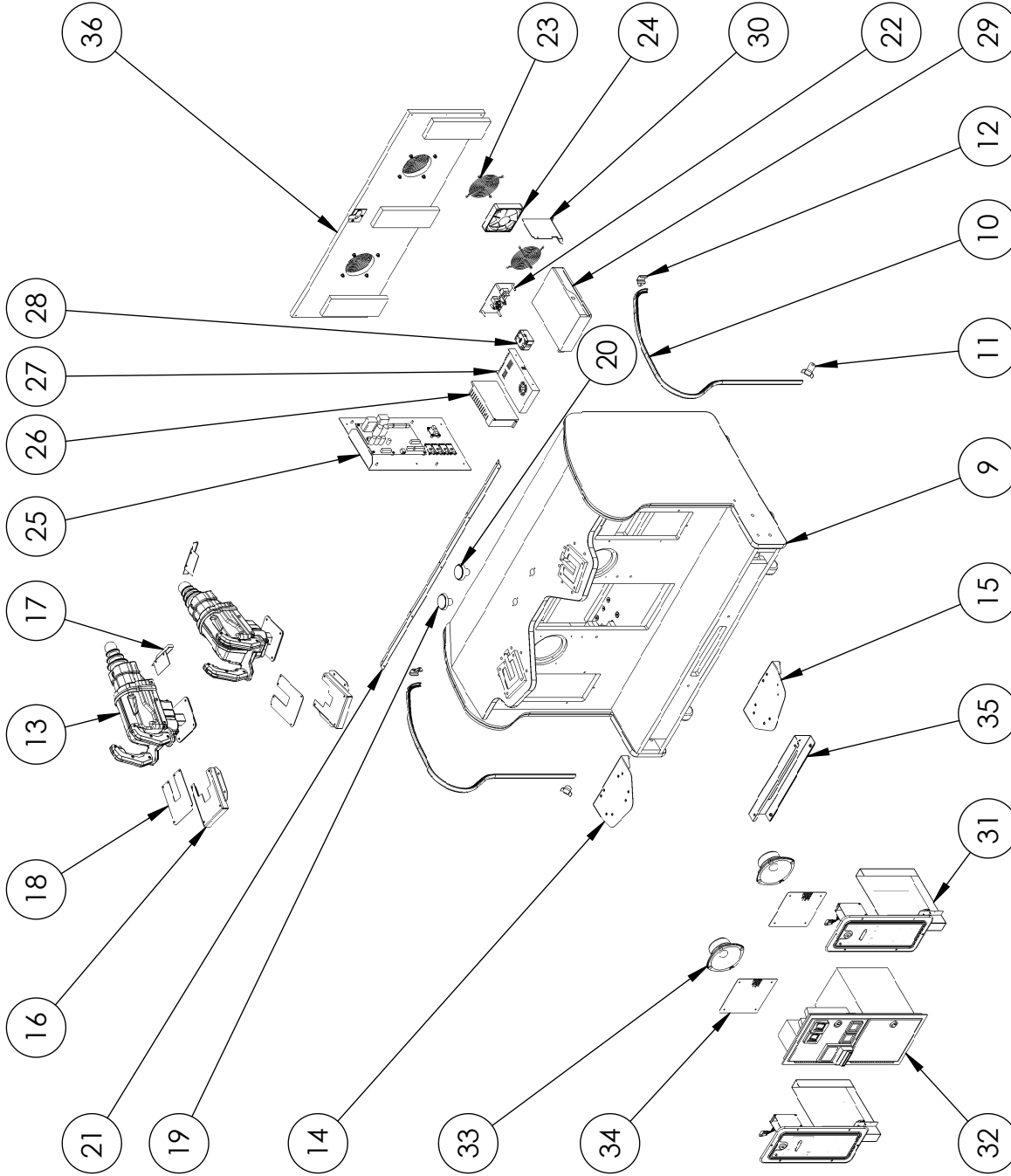
NOT SHOWN:  
 > CABLES/HARNESING  
 > CABLE MANAGEMENT WIRE CHANNEL  
 -5' LONG W/ ADHESIVE TAPE



# Space Invaders Frenzy Assembly



# Space Invaders Frenzy Control Cabinet Assembly (BOM on next page)



NOT SHOWN:  
> HARDWARE  
> 500-00131-01 - RGB LED Strip Reel  
- 2X 120CM / 72 LEDs (installed in #10)

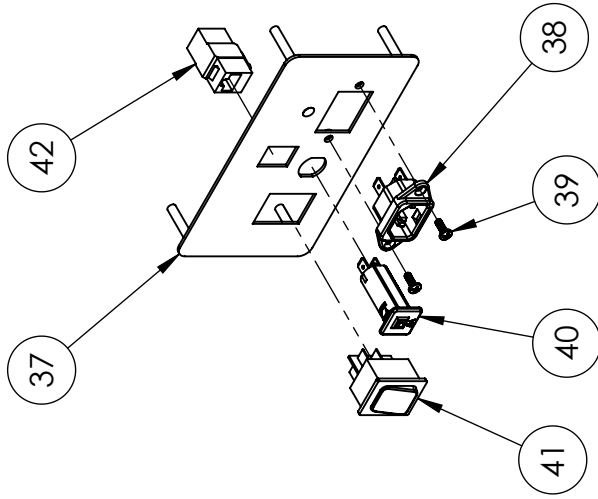


# Space Invaders Frenzy - Control Cabinet Assembly: BOM

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
9	601-00779-01	Main Cabinet	1
10	603-00718-01 (47.5 in)	LED T-Molding Extrusion - 47.5"	2
11	600-01939-01	Flanged LED T-Molding Clip	2
12	600-01938-01	LED T-Molding Clip	2
13	Space_Invaders-Ray_Gun_Assy	Space Invaders Gun Assembly (w/ Ray Gun Tip Assembly)	2
14	600-01913-01	Gun Gusset Bracket L	1
15	600-01912-01	Gun Gusset Bracket R	1
16	600-01936-01	Gun Plate Rear	2
17	600-01937-01	Gun Plate Front	2
18	600-01486-01	Dash Gun Cover Plate	2
19	702-00015-01	Large Round RED Pushbutton (Suzo-Happ)	1
20	702-00019-01	Large Round BLUE Pushbutton (Suzo-Happ)	1
21	600-01944-01	Cabinet Seam Plate	1
22	AC_Plate_Sub-Assy	AC Power Plate Assembly	1
23	800-00001-00	120mm Wire Fan Guard	2
24	820-00012-00	Cooling Fan (standard size): 12VDC, 3W, 80CFM	1
25	Space_Invaders_RIO_Assy	RIO Assembly w/ Mounting Plate	1
26	500-00187-01	Switching Power Supply: 156W, 24V, 6.5A (Mean Well RS-150-24)	1
27	500-00193-01	Switching Power Supply: 320.4W, 12V, 26.7A, PFC (Mean Well RSP-320-12)	1
28	800-00040-01	Solid State Relay (Magnecraft 6210DSX-1)	1
29	850-00024-01	Fujitsu PC (IMP-3313-S4-4G-HD)	1
30	380-00002-01	LED Control Card	1
31	800-00043-01	Ticket Dispenser Door Assembly (Suzo-Happ)	2
32	800-00005-01	Mid-Width Coin Door Assembly (Suzo-Happ)	1
33	2-1-10-00-00-000	5.25", 8 Ohm Full Range Speaker (Goldwood)	2
34	600-01464-01	JP55" Speaker Grill	2
35	600-01458-01	JP55" Center Bracket Connect	1
36	Space_Invaders_Back_Door_Assy	Back Door Sub-Assembly	1



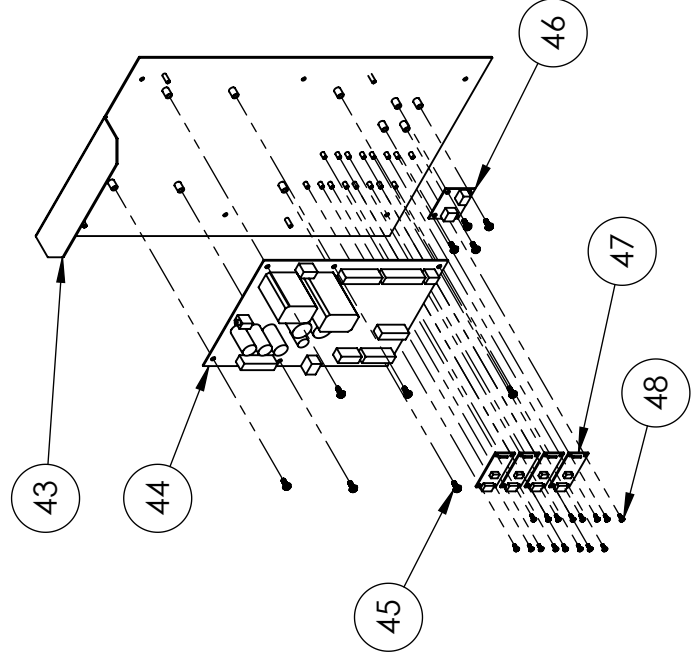
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
37	600-01754-01	AC Electronics Plate	1
38	703W-00/08	AC Receptacle: 250V, 15A (Qualitek)	1
39	McMaster-Carr - 90272A146	Steel Phillips Rounded Head Screws, 6-32 Thread Size, 3/8" Long	2
40	T9-611P-6	Thermal Circuit Breaker: 240VAC, 6A, Snap-in, Fuseholder, 1-Pole (Schurter)	1
41	1832.3312	Rocker Switch (DPST): 250VAC, 20A (Marquardt)	1
42	602690	Cat5e Keystone Coupler: Black, RJ45F/RJ45F (CNAweb)	1



## Space Invaders Frenzy AC Power Plate Assembly



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
43	600-01914-01	RIO Mounting Plate	1
44	500-00040-01	RIO PCB	1
45	McMaster-Carr - 90316A192	18-8 Stainless Steel Hex Washer Head Slotted Machine Screw, 8-32 Thread, 3/8" Length	10
46	500-00194-01	5V, 5A Switching Regulator PCB (12V input)	1
47	520-00024-01	Aliens / Terminator Deluxe Gun Keyboard	4
48	McMaster-Carr - 90272A106	Steel Phillips Rounded Head Screws, 4-40 Thread Size, 1/4" Long	16

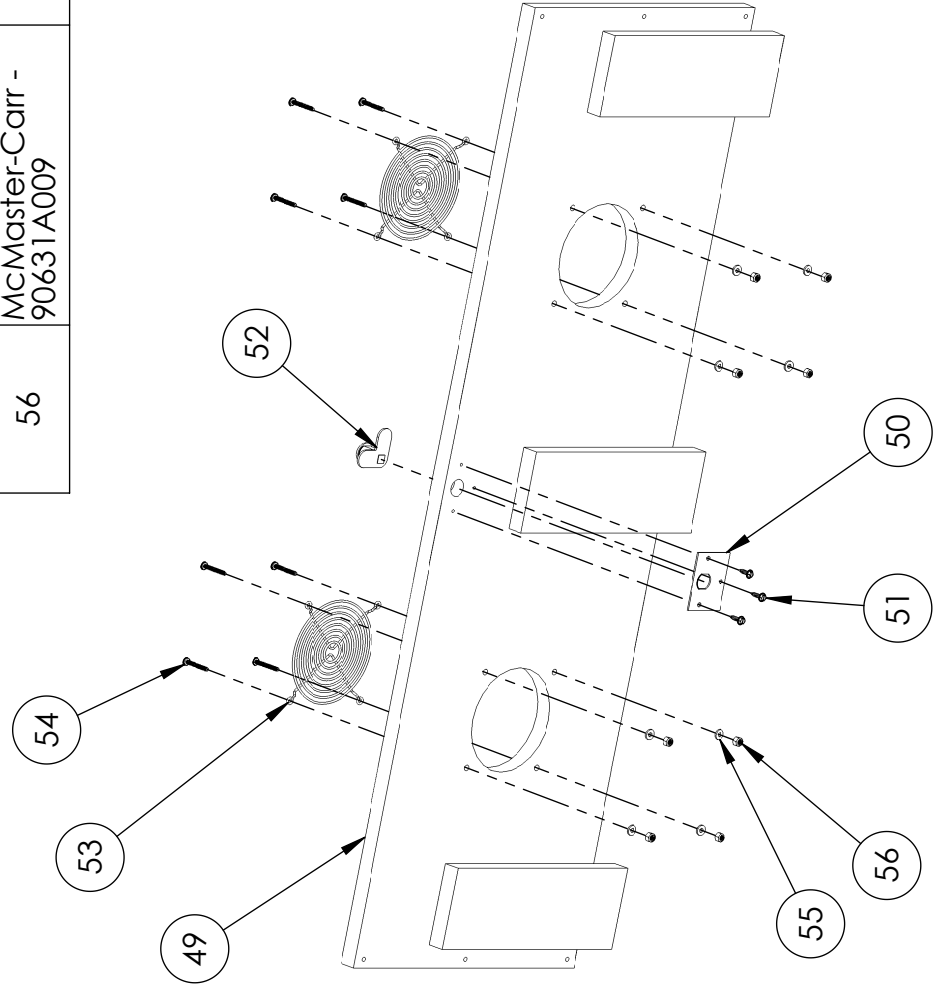


## Space Invaders Frenzy RIO Assembly w/ Mounting Plate





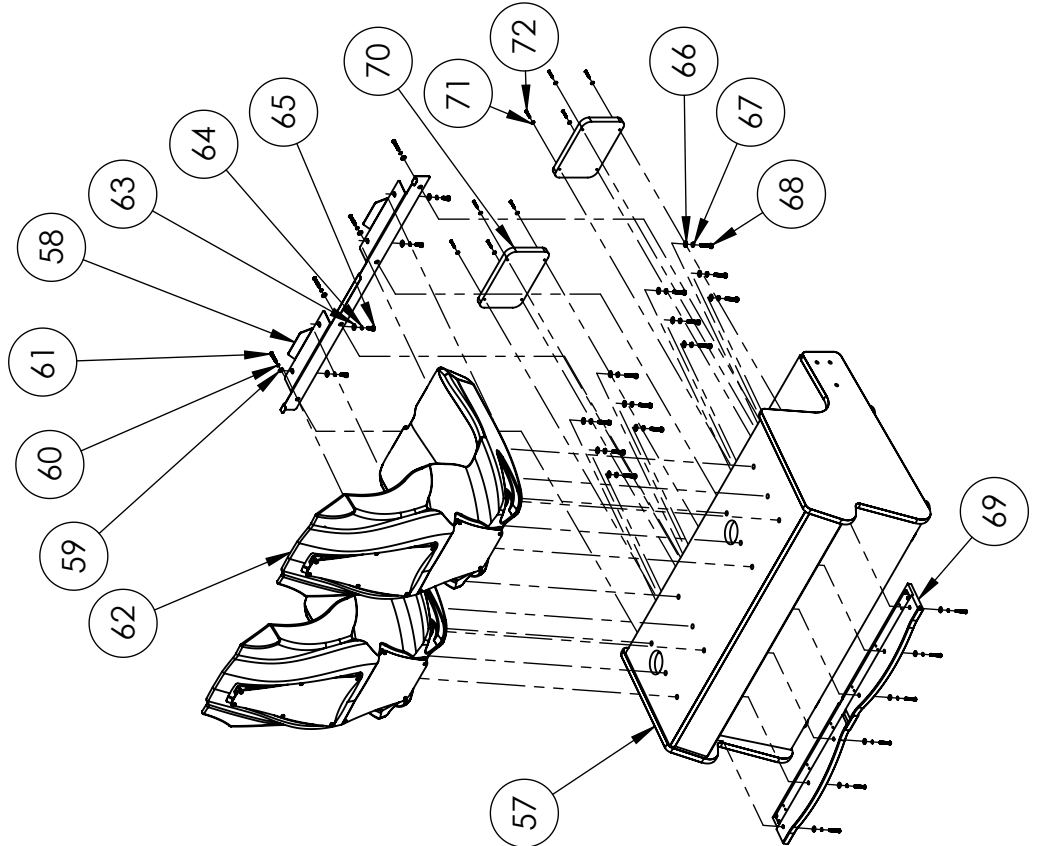
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
49	601-00780-01	Back Door	1
50	600-00043-01	Lock Retainer Plate	1
51	McMaster-Carr - 90054A196	Flanged Hex Head Screws for Sheet Metal, Zinc-Plated Steel, Number 8 Size, 5/8" Long	3
52	150-00001-00	Standard Door Lock Assembly (for 3/4" Panels)	1
53	800-00001-00	120mm Wire Fan Guard	2
54	McMaster-Carr - 90272A201	Steel Phillips Rounded Head Screws, 8-32 Thread Size, 1-1/4" Long	8
55	McMaster-Carr - 90126A009	Zinc-Plated Steel SAE Washer for Number 8 Screw Size, 0.188" ID, 0.438" OD	8
56	McMaster-Carr - 90631A009	Low-Strength Steel Nylon-Insert Locknut, Zinc-Plated, 8-32 Thread Size	8



# Space Invaders Frenzy Back Door Sub-Assembly



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
57	601-00781-01	Seat Cabinet	1
58	600-01915-01	Seat Mount Bracket	1
59	McMaster-Carr - 97416A119	Black-Oxide Steel SAE Flat Washer, 1/4" Screw Size, 0.281" ID, 0.625" OD	10
60	McMaster-Carr - 93711A500	Black-Oxide 18-8 Stainless Steel Split Lock Washer for 1/4" Socket Head Screws, 0.26" ID, 0.363" OD	10
61	McMaster-Carr - 96075A231	Alloy Steel Tamper-Resistant Torx Rounded Head Screws, 1/4"-20 Thread Size, 1-1/2" Long	10
62	Space_Invaders_Seat_Assy	Seat Assembly	2
63	McMaster-Carr - 96765A145	Black-Oxide 18-8 Stainless Steel Washer for 5/16" Screw Size, 0.344" ID, 0.75" OD	4
64	McMaster-Carr - 93711A600	Black-Oxide 18-8 Stainless Steel Split Lock Washer for 5/16" Socket Head Screws, 0.322" ID, 0.457" OD	4
65	McMaster-Carr - 92965A581	Black-Oxide Grade 5 Steel Hex Head Screws, Medium-Strength, 5/16"-18 Thread Size, 3/4" Long	4
66	McMaster-Carr - 92141A030	18-8 Stainless Steel Washer for 5/16" Screw Size, 0.344" ID, 0.75" OD	12
67	McMaster-Carr - 91102A030	Zinc-Plated Steel Split Lock Washer for 5/16" Screw Size, 0.322" ID, 0.583" OD	12
68	McMaster-Carr - 92865A587	Medium-Strength Grade 5 Steel Hex Head Screw, Zinc-Plated, 5/16"-18 Thread Size, 1-1/2" Long, Fully Threaded	12
69	Space_Invaders_Rear_Seat_LED_Cap_Assy	Rear Seat LED Cap Assembly	1
70	601-00783-01	Seat Access Panel	2
71	McMaster-Carr - 97416A113	Black-Oxide Steel SAE Flat Washer, Number 8 Screw Size, 0.188" ID, 0.438" OD	8
72	McMaster-Carr - 95638A201	Tamper-Resistant Torx Rounded Head Screws for Sheet Metal, 18-8 Stainless Steel, Number 8 Size, 1-1/4" Long, PAINT BLACK	8

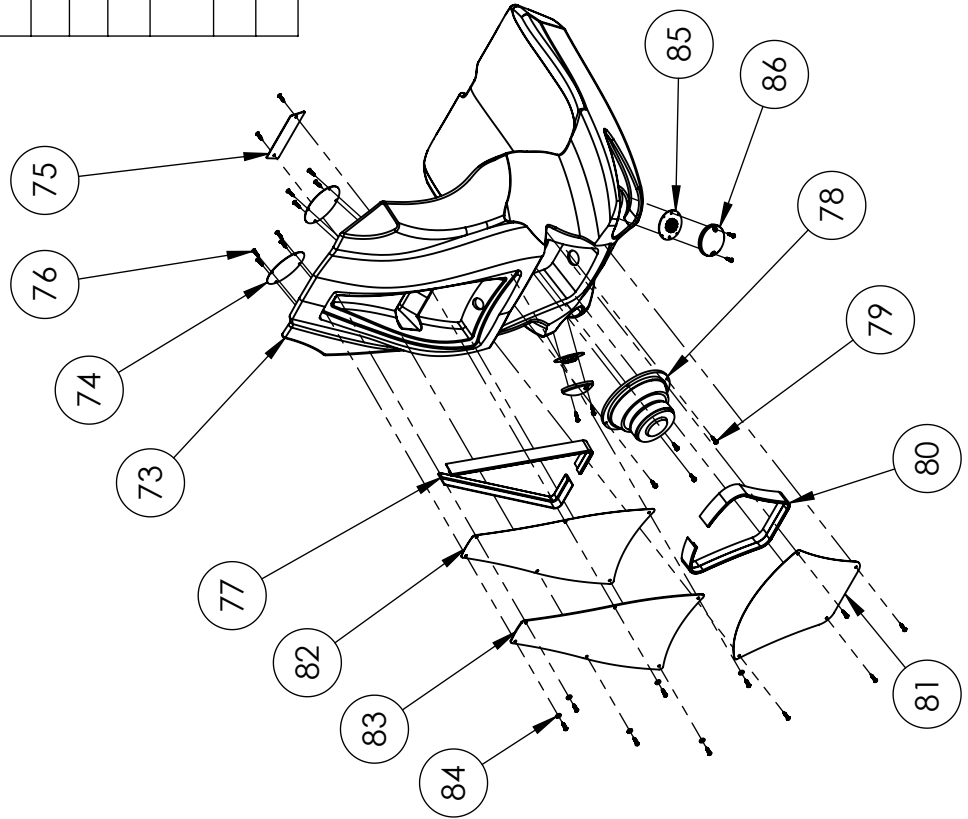


# Space Invaders Frenzy Pedestal Assembly

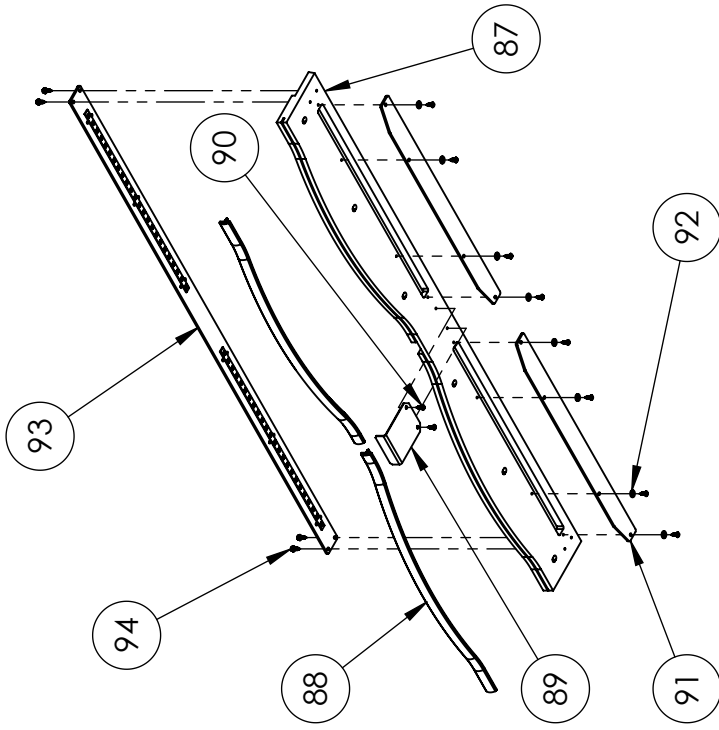


# Space Invaders Frenzy Seat Assembly

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
73	603-00523-01	Plastic Seat - Red	1
74	600-00105-01	Seat Headrest Speaker Grill	2
75	600-00620-01	Middle Seat Plate	1
76	McMaster-Carr - 95638A197	Tamper-Resistant Torx Rounded Head Screws for Sheet Metal, 18-8 Stainless Steel, Number 8 Size, 3/4" Long, PAINT BLACK	24
77	Seatback LED Assy	White LEDs w/ Foam (500-00093-01 - 35CM / 21 LEDs) & Plastic LED Extrusion (603-00762-01 - 16")	2
78	807-00003-00	6.5" Woofer, 8 Ohm (Goldwood)	1
79	McMaster-Carr - 90054A196	Flanged Hex Head Screws for Sheet Metal, Zinc-Plated Steel, Number 8 Size, 5/8" Long	4
80	Woofer LED Assy	ROB Side Emitting LEDs (500-00219-01 - 70CM / 63 LEDs) & Plastic LED Extrusion (603-00762-01 - 28")	1
81	600-00106-01	Woofer Grill	1
82	606-01261-01	Seatback Translite	1
83	600-01840-01	Seatback Clear Overlay	1
84	McMaster-Carr - 97416A113	Black-Oxide Steel SAE Flat Washer, Number 8 Screw Size, 0.188" ID, 0.438" OD	6
85	500-00065-01	Red LED Puck Light w/ Black Face PCB	2
86	603-00540-01	LED Spotlight Lens - Red Tint	2



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
87	601-00782-01	LED Cap Panel	1
88	603-00718-01 (20.5 in)	LED-T-Molding Extrusion - 20.5"	2
89	600-01744-01	LED Cap Bracket	1
90	McMaster-Carr - 95638A194	Tamper-Resistant Screw for Sheet Metal, Pin-in-Torx, 18-8 Stainless Steel, Button Head, Number 8 Size, 1/2" Long, PAINT BLACK	10
91	603-00805-01	LED Cap Lens	2
92	McMaster-Carr - 97416A113	Black-Oxide Steel SAE Flat Washer, Number 8 Screw Size, 0.188" ID, 0.438" OD	8
93	Space Invaders_Rear_Seat_LED_Assy	Rear Seat Light Assembly	1
94	McMaster-Carr - 90054A194	Flanged Hex Head Screws for Sheet Metal, Zinc-Plated Steel, Number 8 Size, 1/2" Long	4

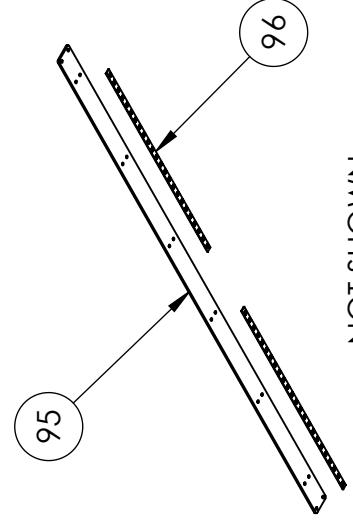


NOT SHOWN:  
 > 500-00131-01 - RGB LED Strip Reel  
 - 2X 50CM / 30 LEDs (installed in #88)

## Space Invaders Frenzy Rear Seat LED Cap Assembly



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
95	603-00806-01	LED Cap Back	1
96	500-00162-01 (40 CM)	White LED Strip Reel w/ Foam Tape: 40CM / 24 LEDs	2

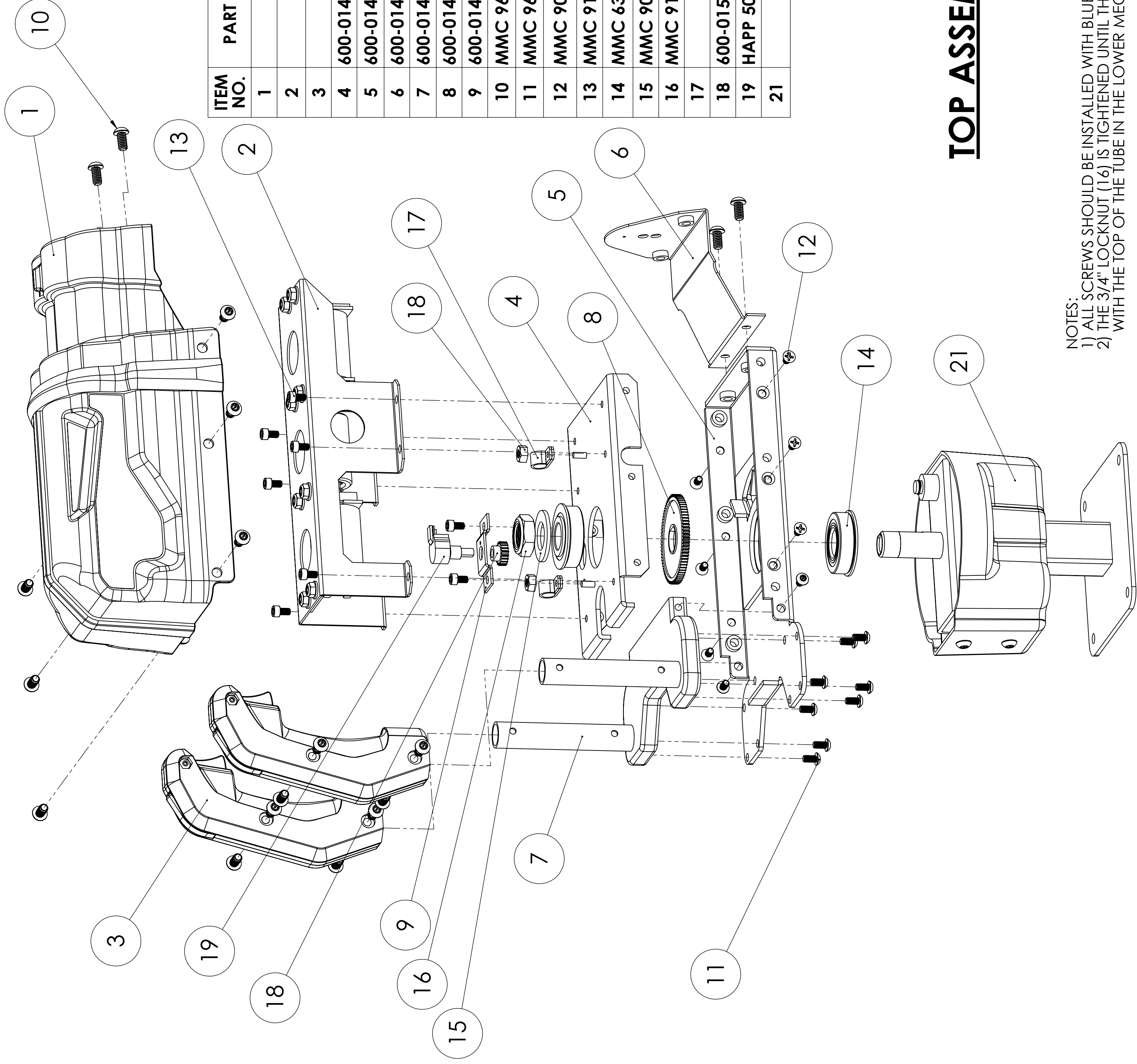


NOT SHOWN:  
 > 6X Wire Ties

## Space Invaders Frenzy Rear Seat Light Assembly



REV.	DESCRIPTION	DATE
A	RELEASED	10/18/14
B	REVISED	1/9/15
C	NO CHANGE THIS SHEET	12/14/16



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1		UPPER VACFORM ASSEMBLY	1
2		SHAKER ASSEMBLY	1
3		GRIP ASSEMBLY	2
4	600-01422-01	PIN PLATE	1
5	600-01423-01	COVER BRACKET	1
6	600-01495-01	FRONT VACFORM BRACKET	1
7	600-01411-01	GRIP PLATE WELDMENT	1
8	600-01420-01	LARGE GEAR	1
9	600-01491-01	POT BRACKET	1
10	MMC 96075A211	1/4-20 X 1/2" BLK TP SCREW	18
11	MMC 96075A183	10-32 X 3/8" BLK TP SCREW	10
12	MMC 90273A827	10-32 X 3/8" FLAT HEAD SCREW	6
13	MMC 91251A337	10-32 X 5/16" CAP SCREW	8
14	MMC 6384K369	3/4" FLANGED BEARING	2
15	MMC 90126A036	3/4" WASHER	1
16	MMC 91342A240	3/4" LOCKNUT	1
17		CABLE CLAMP	2
18	600-01567-01	SMALL POT GEAR	1
19	HAPP 50-2670-01	POT - 5K	1
21		LOWER MECH ASSEMBLY	1

## TOP ASSEMBLY

- NOTES:  
 1) ALL SCREWS SHOULD BE INSTALLED WITH BLUE LOCTITE 242 or 243.  
 2) THE 3/4" LOCKNUT (16) IS TIGHTENED UNTIL THE TOP IS FLUSH WITH THE TOP OF THE TUBE IN THE LOWER MECH ASSEMBLY (21).

RAW THRILLS INC.

TITLE: GUN MAIN ASSEMBLY

TOL: X: ±.030 MATERIAL:

.XX: ±.015 .XXX: ±.005

FINISH: SEE NOTES

HOLES: +.002/- .000

ANGLES: ±0.5°

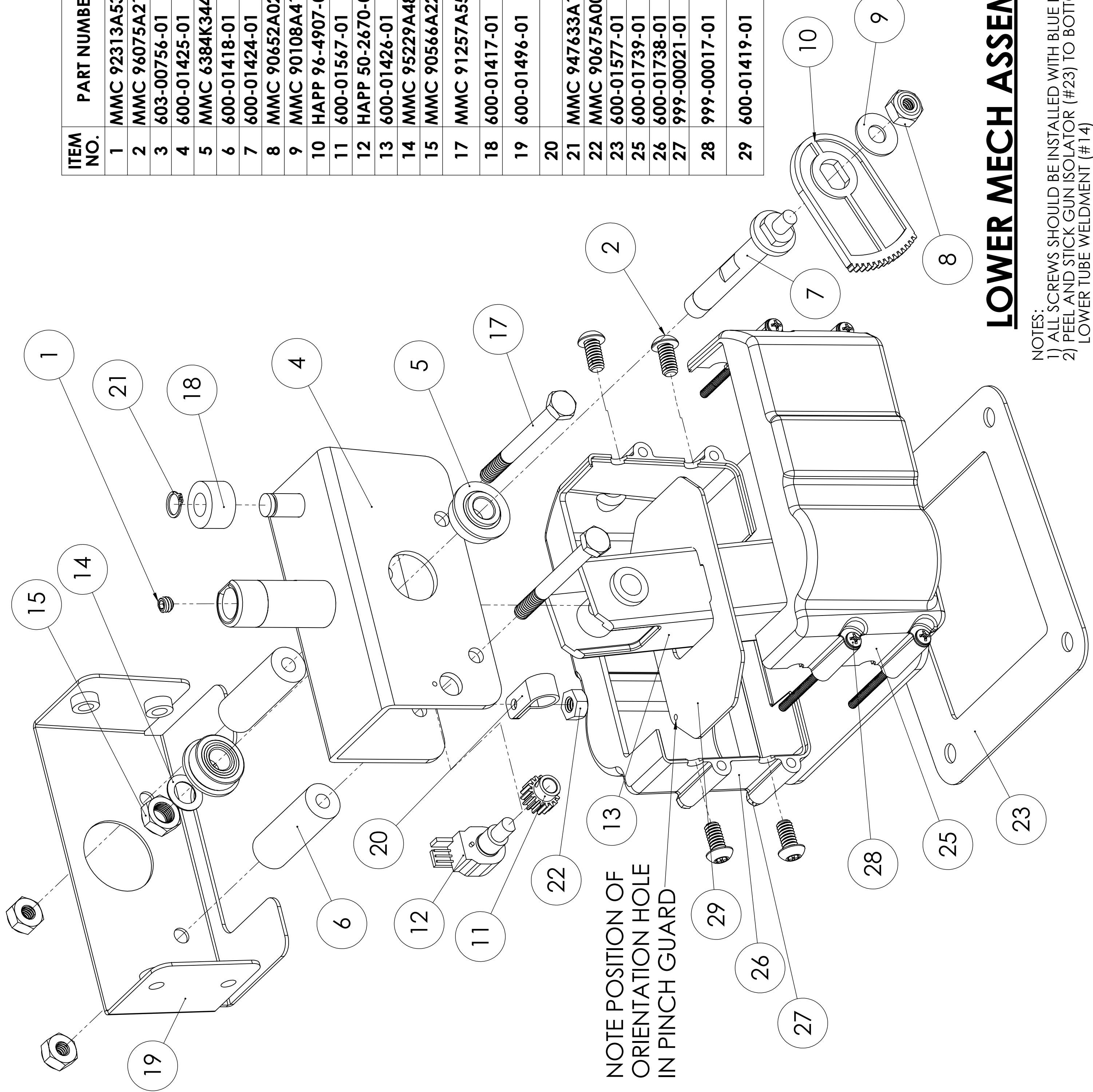
PART NO.

REV C

SHEET 1 of 1

REV.	DESCRIPTION	DATE
A	RELEASED	10/18/14
B	REVISED	1/9/15
C	CHANGED TO MOLDED LOWER COVER	12/14/16

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	MMC 92313A532	1/4-20 x 3/16" SET SCREW	1
2	MMC 96075A211	1/4-20 X 1/2" BLK TP SCREW	4
3	603-00756-01	LOWER VACFORM	1
4	600-01425-01	ROCKER BRACKET	1
5	MMC 6384K344	3/8" FLANGED BEARING	2
6	600-01418-01	TUBE STOP BUMPER - 5/8" OD	2
7	600-01424-01	SIDE PIN	1
8	MMC 90652A029	1/4-20 THIN LOCKNUT	3
9	MMC 90108A413	1/4-20 WASHER	1
10	HAPP 96-4907-00	SEGMENT GEAR	1
11	600-01567-01	POT GEAR	1
12	HAPP 50-2670-01	POT - 5K	1
13	600-01426-01	LOWER TUBE WELDMENT	1
14	MMC 95229A480	3/8" WASHER	1
15	MMC 90566A220	3/8" THIN LOCKNUT	1
17	MMC 91257A552	1/4-20 x 2 1/2 HEX HEAD - GRADE 8	2
18	600-01417-01	SHORT STOP BUMPER - 3/4" OD	1
19	600-01496-01	LOWER VACFORM MOUNTING BRACKET	1
20		CABLE CLAMP	1
21	MMC 947633A170	RETAINING CLIP	1
22	MMC 90675A009	8/32" KEPS NUT	1
23	600-01577-01	GUN ISOLATOR	1
25	600-01739-01	BOTTOM COVER - RIGHT	1
26	600-01738-01	BOTTOM COVER - LEFT	1
27	999-00021-01	6-32 HEX LOCKNUT - BLACK	4
28	999-00017-01	6-32 X 2.5" PHILLIPS HEAD SCREW - BLACK	4
29	600-01419-01	PINCH COVER	1



NOTE POSITION OF ORIENTATION HOLE IN PINCH GUARD

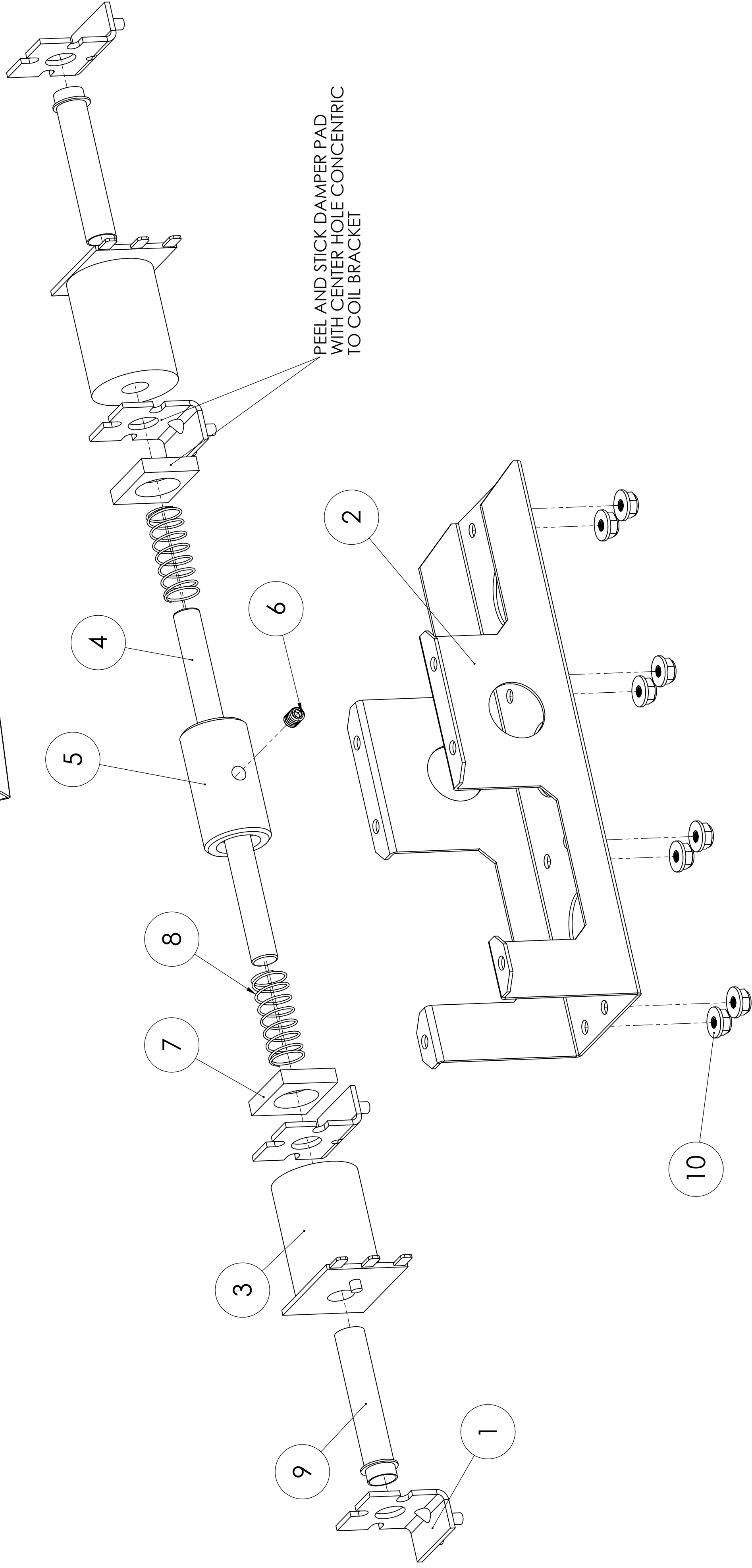
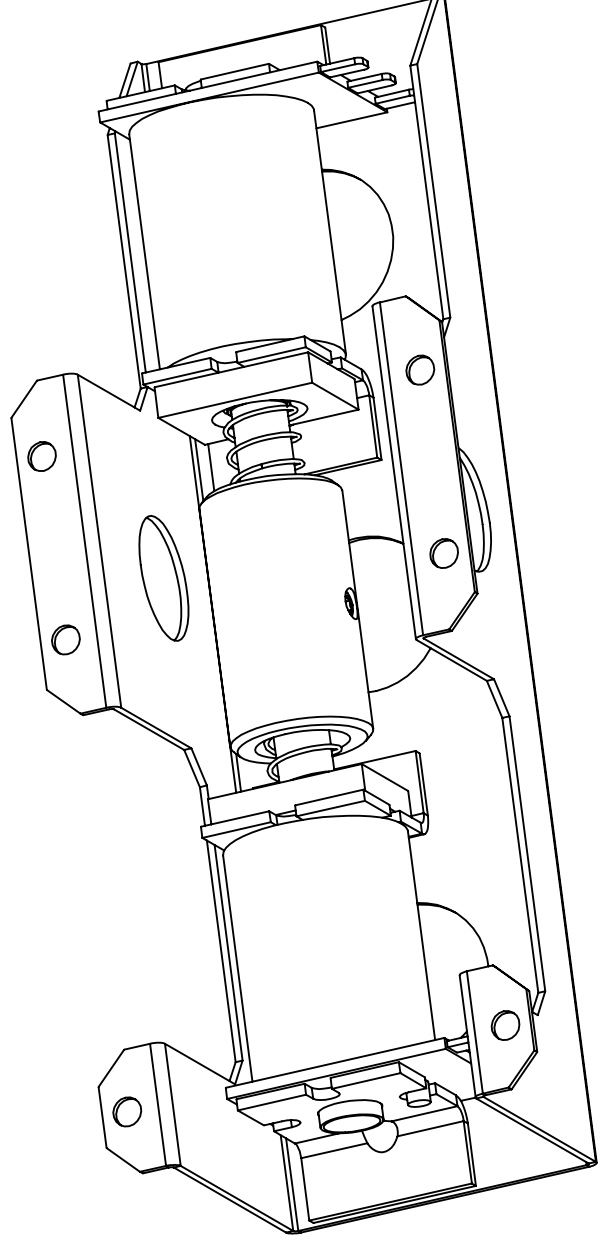
## LOWER MECH ASSEMBLY

NOTES:  
 1) ALL SCREWS SHOULD BE INSTALLED WITH BLUE LOCTITE 242 or 243.  
 2) PEEL AND STICK GUN ISOLATOR (#23) TO BOTTOM OF LOWER TUBE WELDMENT (#14)

RAW THRILLS INC.	
TITLE: GUN MAIN ASSEMBLY	
TOL: X: ±.030	MATERIAL:
.XX: ±.015	.XXX: ±.005
HOLES: +.002/- .000	FINISH: SEE NOTES
ANGLES: ±0.5°	PART NO.
SHEET 1 of 1	REV C

REV.	DESCRIPTION	DATE
A	RELEASED	10/18/14
B	REVISED	1/9/15
C	NO CHANGE THIS SHEET	12/14/16

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	600-01576-01	COIL MOUNT BRACKET	4
2	600-01412-01	COIL BRACKET	1
3	HAPP FL11629	COIL	2
4	600-01413-01	COIL ROD	1
5	600-01414-01	COIL WEIGHT	1
6	MMC 91375A535	1/4-20 x 3/8" SET SCREW	1
7	680-00214-01	BLUE DAMPER PAD	2
8	608-00210-01	COIL SPRING	2
9	HAPP #95-0637-00	COIL SLEEVE	2
10	MMC 93298A109	10-32 FLANGED LOCKNUT	8



# SHAKER ASSEMBLY

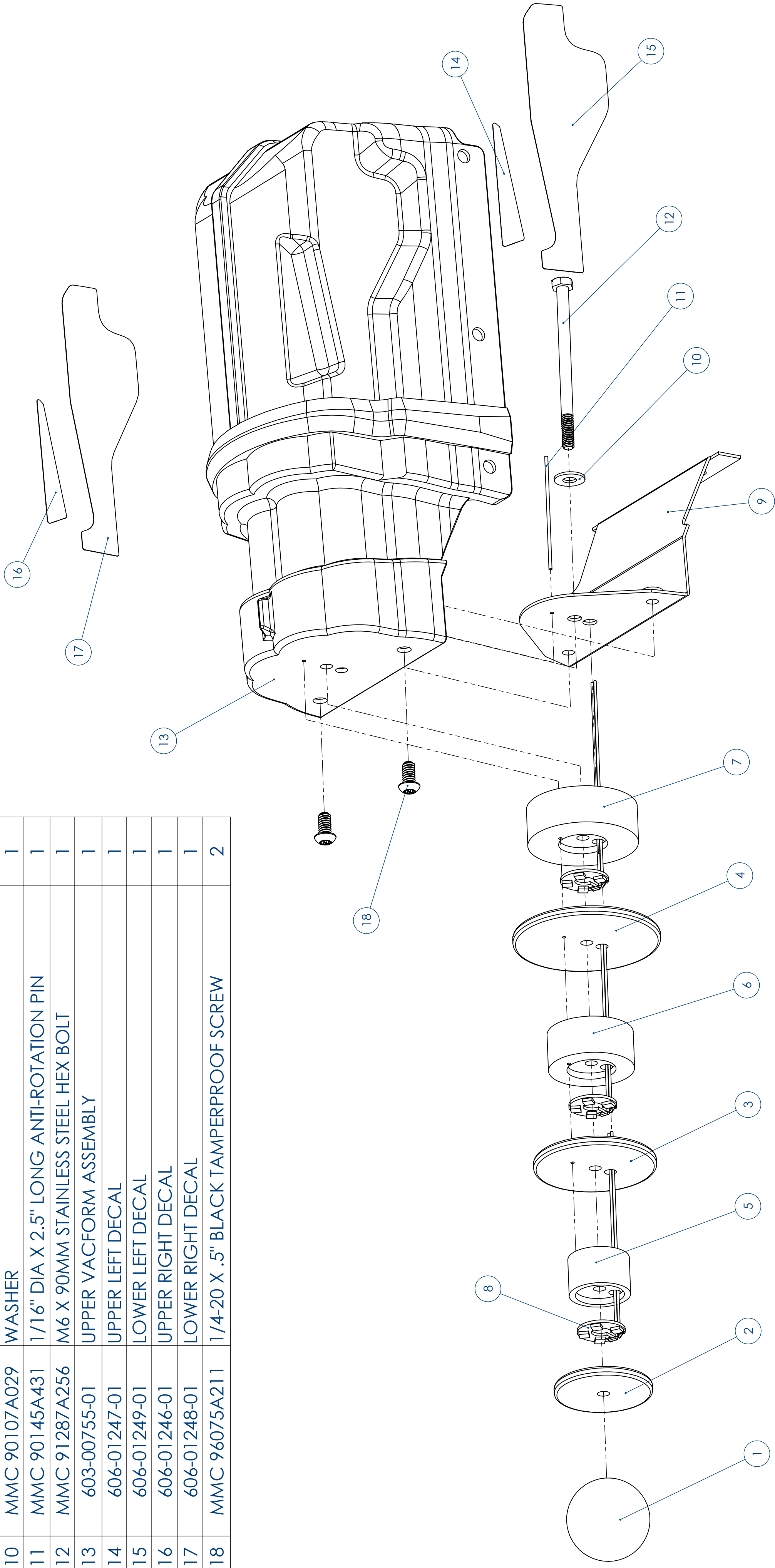
NOTES:  
1) SET SCREW AND LOCKNUTS SHOULD BE INSTALLED WITH RED LOCTITE 262.

RAW THRILLS INC.	
TITLE:	GUN MAIN ASSEMBLY
TOL: X: ±.030	MATERIAL:
.XX: ±.015	.XXX: ±.005
HOLES: +.002/- .000	FINISH: SEE NOTES
ANGLES: ±0.5°	PART NO.
SHEET 1 of 1	REV: <b>C</b>



REV.	DESCRIPTION	DATE
A	RELEASED	11/8/16

ITEM NO.	PART NUMBER	DESCRIPTION	QTY
1	608-00224-01	GREEN BUBBLE BALL	1
2	600-01922-01	GREEN GUN ACRYLIC - SMALL	1
3	600-01922-01	GREEN GUN ACRYLIC - MEDIUM	1
4	600-01922-01	GREEN GUN ACRYLIC - LARGE	1
5	600-01923-01	BLACK GUN DISCS - SMALL	1
6	600-01923-01	BLACK GUN DISCS - MEDIUM	1
7	600-01923-01	BLACK GUN DISCS - LARGE	1
8	500-00223-01	GUN TIP PCB	3
9	600-01924-01	GUN TIP BRACKET	1
10	MMC 90107A029	WASHER	1
11	MMC 90145A431	1/16" DIA X 2.5" LONG ANTI-ROTATION PIN	1
12	MMC 91287A256	M6 X 90MM STAINLESS STEEL HEX BOLT	1
13	603-00755-01	UPPER VACFORM ASSEMBLY	1
14	606-01247-01	UPPER LEFT DECAL	1
15	606-01249-01	LOWER LEFT DECAL	1
16	606-01246-01	UPPER RIGHT DECAL	1
17	606-01248-01	LOWER RIGHT DECAL	1
18	MMC 96075A211	1/4-20 X .5" BLACK TAMPERPROOF SCREW	2

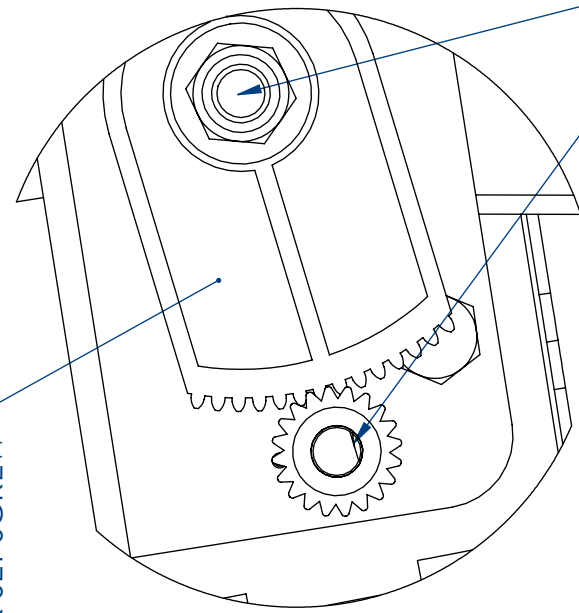


NOTES:  
 1) APPLY LOCTITE RED 271 TO HEX BOLT (ITEM 12) THREADS TO SECURE BUBBLE BALL (ITEM 1)  
 2) APPLY A RAW THRILLS APPROVED ADHESIVE TO THE END OF PIN (ITEM 11) AND INSERT IT INTO SMALL BLACK GUN DISC (ITEM #5)

<b>RAW THRILLS INC.</b>	
TITLE: SPACE INVADERS GUN TIP ASSY	
TOL: X: ±.030	MATERIAL: SEE NOTES
.XX: ±.015	FINISH: SEE NOTES
.XXX: ±.005	PART NO.
HOLES: +.002/- .000	REV: A
ANGLES: ±0.5°	SHEET 1 of 1

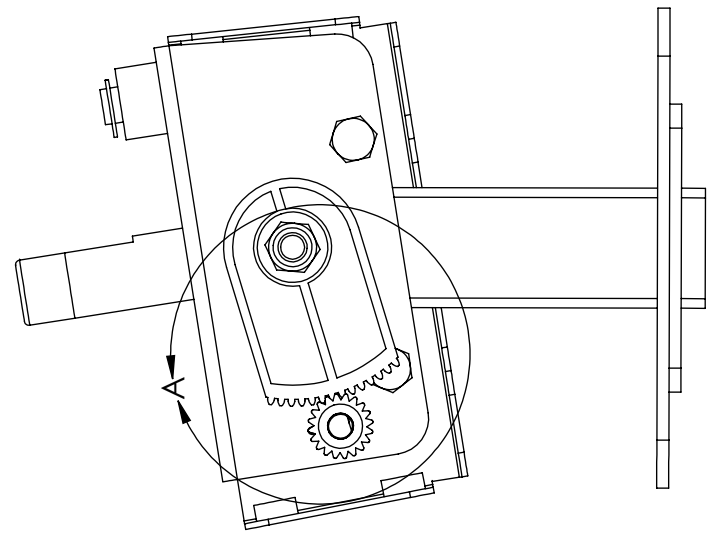
REV.	DESCRIPTION	DATE
A	RELEASED	1/15/15

2) INSTALL SEGMENT GEAR AFTER POT IS ALIGNED FOR EASIER ACCESS TO GEAR SET SCREW

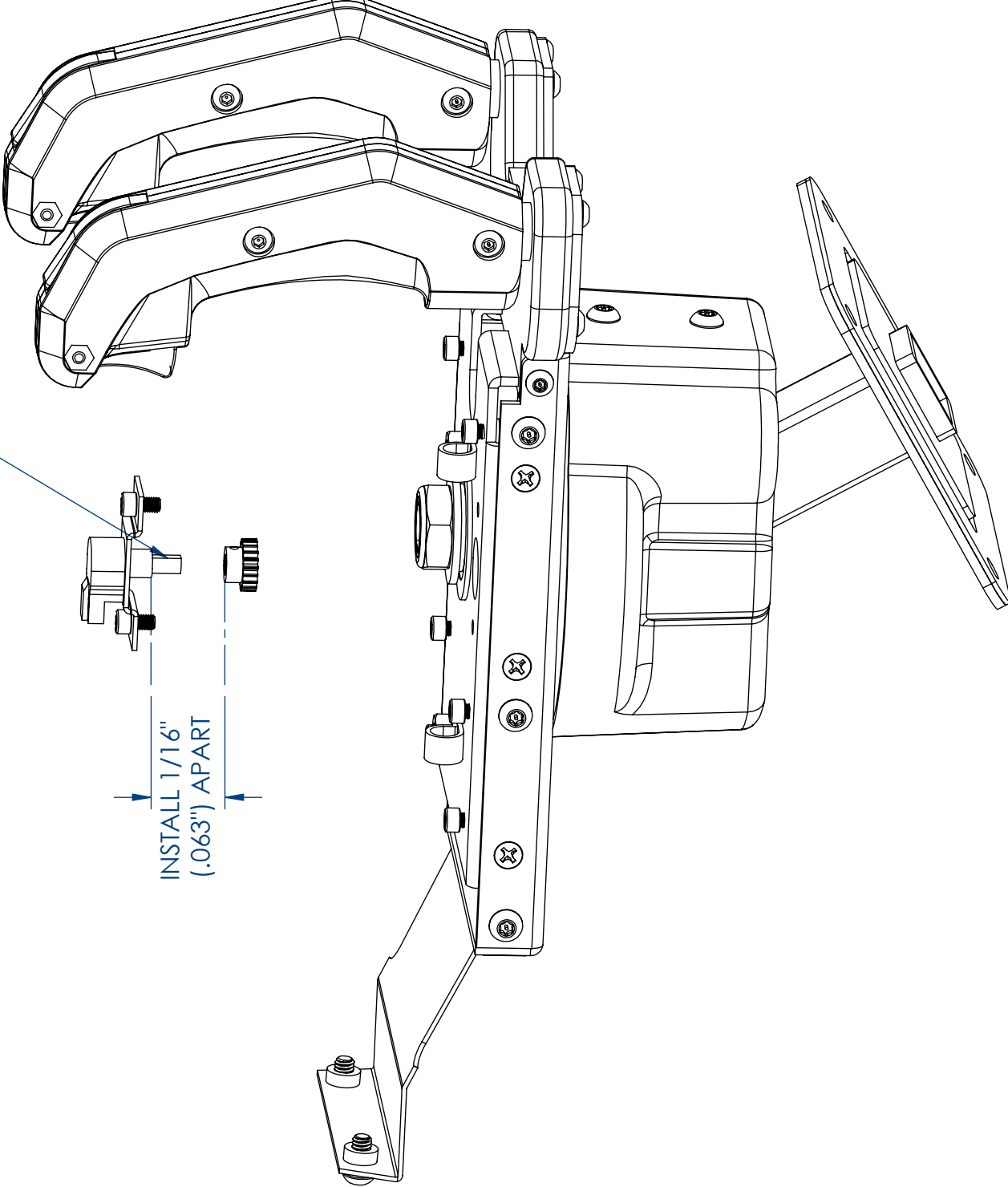


DETAIL A  
SCALE 1 : 1

1) ALIGN FLAT ON POT DOWNWARD AND POINTING TOWARD CENTER OF SEGMENT GEAR



INSTALL WITH GEAR INSTALLED AND POT FLAT POINTING TOWARD HANDLES



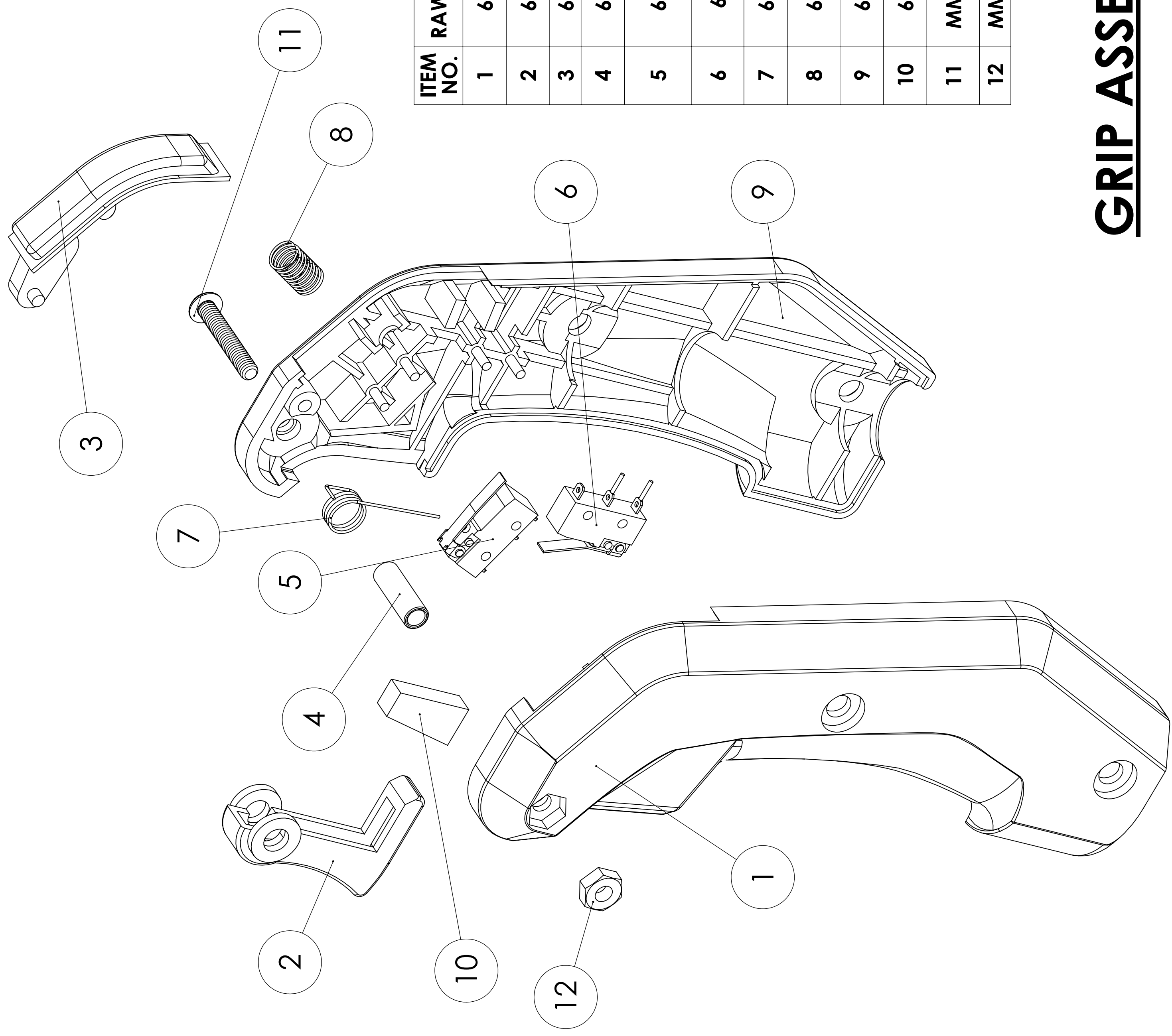
INSTALL 1/16"  
(.063") APART

## UP AND DOWN POT ALIGNMENT

## LEFT TO RIGHT POT ALIGNMENT

RAW THRILLS INC.	
TITLE:	POT ALIGNMENT DRAWING
TOL: X: ±.030	MATERIAL: SEE NOTES
.XX: ±.015	FINISH: SEE NOTES
.XXX: ±.005	HOLES: +.002/- .000
ANGLES: ±0.5°	PART NO.
SHEET 1 of 1	REV. A

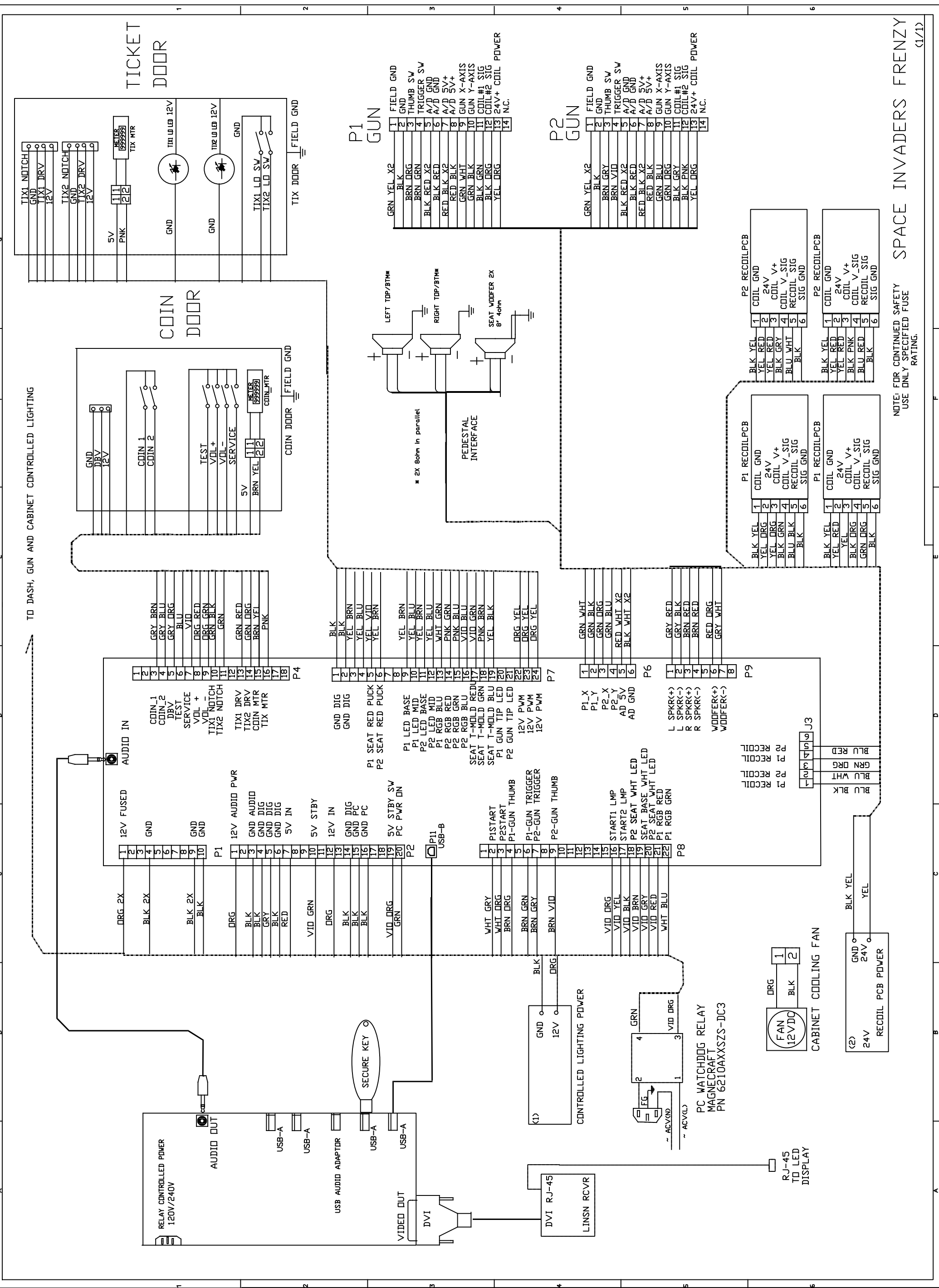
REV.	DESCRIPTION	DATE
A	RELEASED	11/17/10



ITEM NO.	RAW PART NUMBER	HAPP NUMBER	DESCRIPTION	QTY.
1	608-00201-01	95-1294-00	GRIP, LEFT HALF	1
2	608-00204-01	95-1295-00	TRIGGER, RED	1
3	608-00203-01	95-1439-00	LARGE THUMB BUTTON	1
4	608-00205-01	95-1315-00	SHAFT, TRIGGER	1
5	608-00216-01	95-0259-00	SWITCH ASSY FOR THUMB SWITCH	1
6	608-00215-01	95-0028-00	SWITCH ASSY. FOR TRIGGER	1
7	608-00206-01	95-1297-00	SPRING, TORSION	1
8	608-00207-01	95-1298-00	SPRING, COMPRESSION	1
9	608-00202-01	95-1293-00	GRIP, RIGHT HALF	1
10	608-00218-01	96-0110-00	TRIGGER BUMPER	1
11	MMC 96075A147	43-0378-00	SCREW, #8-32 x 1 TP BLACK	1
12	MMC 86537A140	43-1124-00	HEX NUT #8-32 BLACK	1

# GRIP ASSEMBLY

RAW THRILLS INC.	
TITLE:	GRIP ASSEMBLY
TOL: X: ±.030	MATERIAL:
.XX: ±.015	
.XXX: ±.005	FINISH: SEE NOTES
HOLES: +.002/- .000	ANGLES: ±0.5°
PART NO.	REV. A
SHEET 1 of 1	



TO DASH, GUN AND CABINET CONTROLLED LIGHTING

NOTE: FOR CONTINUED SAFETY USE ONLY SPECIFIED FUSE RATING.