

Spooky Pinball Presents Looney Tunes



Chapter 1. Game Assembly and Setup	3
Update Instructions	6
Updating the Looney Tunes Base Image	6
Maintaining Your Pinball Machine	6
Chapter 2. Game Menu System	9
Chapter 3.	
Cabinet Components	19
Head Breakdown	20
Playfield From Overhead View	21
Playfield Underside	22
Boards on Playfield Underside	23
Illuminated Playfield Underside	24
Coin Door	25
Open View of Crate Door	26
Upper Portion Of Playfield With Toy	27
LCD Display	28
Large Power Supply	29
Small Power Supply	29
Shaker Motor	30
Shaker Motor Board	31
Shaker Motor in Cabinet	31
Trough	32
Service Outlet	32
Right Flipper Button	33
Start Button Connection	33
Monitor Control Adjust Board	34
LED Control Board	34
Flipper Detail	35
Amplifier Front View	35
Amplifier Top View	35
Amplifier Rear View	36
HH-0035 PICO Layout (Topper)	37
HH-0035 PICO Breakout (Topper)	38
HH-0065 SERVO Expander	39
HH-0065 SERVO Expander Breakout	40
SPKY-0100 LEFT ORBIT LAYOUT	40
SPKY-0101 LOWER LEFT ORBIT LAYOUT	41
SPKY-0103 RIGHT LANES LAYOUT	42
SPKY-0106 RIGHT OUTER ORBIT LAYOUT	42
SPKY-0107 BBQ LAYOUT	44
SPKY-0108 TOP INNER ORBIT LAYOUT	45
SPKY-0109 RIGHT INNER ORBIT LAYOUT	46
SPKY-0110 MAGNET LAYOUT	47
HH-0020 LED Harness Converter Schematic	47
HH-0022 Trough Opto-To-Switch Converter Layout	48
HH-0022 Trough Opto-To-Switch Converter Schematic	48
HH-0023 Drop Bank LED Panel Layout	49

HH-0023 Drop Bank LED Panel Schematic	50
HH-0000 Warden Root	51
HH-0000 Warden Inputs	52
HH-0000 Warden uC	53
HH-0000 Warden Power	54
HH-0000 Warden PWM Outputs	55
HH-0000 Warden LED Out	56
HH-0000 Warden 48Vo Transistors	57
HH-0000 Warden AUX Transistors	58
HH-0000 Warden Rev 6 Diagram	59
Populated Warden Board	60
Warden Board Fuse Locations	61
Chapter 4. Diagnose a Bad MOSFET on the Warden Board	63
Tools Required	63
Looney Tunes Coil Chart	65
Chapter 5. Looney Tunes Switch Chart	67
Looney Tunes Coil Chart	69

Chapter 1 Game Assembly and Setup

Game Assembly and Setup

Tools Required

You will need the following tools for setup:

- 5/8" socket wrench
- Utility knife
- Wire snips
- Small bubble level (side-to-side and incline)
- Someone to help you

Game Dimensions

- Shipping box (h x w x d) - 66 x 32 x 32 in
- Folded (h x w) - 55 x 29 in
- Setup with topper (h x w x d) - 90 x 29 x 55 in
- Setup without topper (h x w x d) - 75 x 29 x 55 in

Parts List

Qty.	Part (s)
1	Set of coin door keys
1	Tilt plum bob
1	Back box (head) bolt
4	Pinball legs
4	Pinball leg levelers with nut
8	5/8" headed pinball leg bolts
4	Pinballs
1	Power cable (line cord) for your country's electrical system

Qty.	Part (s)
1	<ul style="list-style-type: none">• Door Servo - 1 x 180 regular servo• Part number: FT-5320m-C004
1	<ul style="list-style-type: none">• Grinder - 1 x 360 Continuous servo• Part number: FT-7135-C003
1	<ul style="list-style-type: none">• Taz/Leatherface - 1 x 360 Continuous servo• Part number: FT-7135-C003
1	<ul style="list-style-type: none">• Backboard Diverter - 1 x 360 non-continuous servo• Part number: FT6335-C001
1	TNT/Freezer - 1x mini MG90s

Rubber Rings

Lower Playfield Rubber Rings	
Qty.	Ring Size
2	2.5 in
1	2 in
3	3/8 OD
2	3/8 OD
1	1 in
2	3/16 in
Upper Playfield Rubber Rings	
Qty.	Ring Size
1	1 in
4	3/8 OD
2	3/16 in

NOTICE

Need to report a code bug in Looney Tunes? You can send an email directly to service@spookypinball.com with the subject "Code Bug"

Assemble your game

1. Locate the coin door keys inside the leg box.

All the pinballs, a power cord, legs, leg bolts, and head bolt & washer, are in the same package.

2. Please take a minute to inspect to make sure you have all the parts and that they are not damaged.
3. Open the flaps to the game box. Make sure you remove the staples from the flaps so you don't get scratched!

⚠ WARNING

DO NOT CUT THE PLASTIC STRAP JUST YET!

- A With some assistance, lay the machine flat on the floor on the side that is marked "Truck this side only." Grab the plastic strap and pull the game from the box. After the game has been removed from the box (and with the assistance of a helper), stand the game back upright on its back. OR
 - B Using your utility knife, carefully cut down the sides of the box that are labeled "Truck this side only," making sure that your knife DOES NOT come in contact with the game cabinet, itself. After both sides are cut you will be able to access the pinball cabinet itself.
4. Thread the leg leveler nut onto each of the levelers. After that is complete then you can thread the leg leveler into the bottom of each of the pinball legs. Begin with all of the levelers adjusted to their lowest positions (threaded all the way in).

Install the pinball legs and back box assembly

1. Using 2 of the 5/8" headed pinball legs bolts per leg, start with either of the front legs. Thread the leg bolts into the corresponding holes on the corners of the front of the cabinet.

Using your ratchet or wrench, tighten adequately to make sure the leg is attached to the machine. With the assistance of a friend or helper slowly tip the game forward until the two front legs are resting on the floor.

Now, as a team, pick up the rear of the cabinet and attach the back two legs in the same fashion as the front. You may want to find a stool or other sturdy support system to rest the game on while attempting this. Once the rear legs bolts are inserted and tightened you can set the game down on its legs.

2. Using your wire cutters, cut the plastic strap that runs the length of the game. **ATTENTION!** Be careful there is some tension on this strap and it may release with some force.

After the strap is free, now you can lift the back box into position. Be mindful to make sure none of the wiring gets pinched while lifting the back box. Use the clasp on the back box and the cabinet to temporarily hold the back box upright. This should not be used as a permanent fastener.

Using the keys from the parts box, open the coin door and retrieve the back box keys to unlock the back box lock and pivot down the LCD display panel. Now, using the head bolt and washer provided, secure the back box to the base cabinet. At this time thoroughly check for any loose or disconnected connection(s) in your back box. When you are done, reinstall the back glass and engage the lock. Place the back box key back on the hook in the coin door.

CAUTION

PLEASE USE CAUTION WHEN HANDLING THE PLAYFIELD GLASS!

3. With the coin door open, grasp the lever located at the top right of the door frame and pull it to the left. This will release the mechanism that holds the lock down bar in place. Set the lock down bar aside in order to remove the playfield glass. Now close your coin door to keep it out of the way of the playfield glass. In order to remove the playfield glass, simply slide the glass down the front of the machine. This is tempered glass, so please take care not to hit the edges of it on anything as it may shatter. With the glass safely stored off to the side, you are ready to level the machine

Adjust the pitch and level

1. With your small bubble level you can level the side to side action of your game. Placing the level on the playfield itself will give you the most accurate results.

2. First level the back of the game. With your helper watching the level, crawl under the machine and rotate the leg leveler counterclockwise to make the leveler "longer." Do this until your bubble is between the two lines on your level. Repeat this process for the bottom of the playfield.
3. After that is done, you can use your pitch level to adjust the pitch of the game. The steeper the pitch, the faster the game will play. **Spooky recommends a pitch of 6.5°.** The pitch can be increased by raising the back of the game. This is accomplished by making the leg levelers on the back legs longer.
4. After the proper pitch is established, recheck the level of the playfield.

Install the balls

1. Remove the pinballs from their package. Please take a minute to inspect them for any nicks or scratches. Also, this is a good time to wipe them off before installing them into the game.
2. After you are satisfied that they are acceptable, place them on the lower playfield, and let them naturally fall into the trough. Please install all balls that come with the game .

Install the tilt bob

The tilt plumb bob (hereafter referred to as tilt bob) is a metal cone, that when it makes contact with the ring it is inside of, will issue a Tilt Warning. After repeated tilts the machine's coils will shut down and the player will lose their current ball.

1. To install the tilt plumb bob open the coin door on the front of the game.
2. On the inside left of the base cabinet you will find a long metal rod inside a metal closed hoop. Insert the narrow end of the tilt bob onto the metal rod and then tighten the nut on the side of the tilt bob.

The farther up the metal rod you go, the less movement will be necessary to tilt the machine. After playing a couple of games you can adjust this to your liking.

Power up the game

1. Using the line cord from your supplied parts, plug the female end into the receptacle on the back of the base cabinet, and the male end into your outlet.
2. Turn the switch on (under the bottom of the cabinet, right front side). Please take this moment to check for proper function for the basics of the machine.
3. If the machine does not seem to function properly refer the troubleshooting section in this manual, or contact Service@SpookyPinball.com

CAUTION

YOU ARE WORKING WITH SENSITIVE ELECTRONIC MATERIALS. PLEASE USE CAUTION!

Update Instructions

SPOOKY PINBALL SOFTWARE UPDATE INSTRUCTIONS

1. Retrieve the latest code package from the link on the Spooky Support page.
2. Load the file onto a USB flash drive (do not place it inside any folders on the drive).
3. Safely eject the drive, and insert it into the pinball machine, using either the USB port behind the coin door, or plugging directly into the PC in the head.
4. With the game booted and on the attract screen, enter the service menu (green button inside coin door), and navigate to SYSTEM > UPDATE SOFTWARE > (choose your code version).

If you do not see your code version there, try unplugging and re-plugging the USB drive, and hit REFRESH in the service menu.

When you select the desired version, the game will begin updating, and the play field lights illuminate in yellow.

When the update is complete, the play field lights turn green.

5. Power the game off for a moment. When you turn it back on, the game will take a few minutes to make backups and finalize the update. Allow the game to fully boot into attract mode, otherwise the game will revert back to the previous code version the next time it turns on.

Note: You may keep several versions of code on the USB stick and choose in the menu which to install.

Updating the Looney Tunes Base Image

Sometimes things go really bad; your game won't load, and the screen remains black, or displays an error, or you'll see a gray BIOS screen, or another issue. This can be a problem with the mini PC, but it might also just be a problem with the software.

This can be fixed by "re-imaging" your mini-pc, which gets you back to a working state so that you can update to the latest code.

To update the Looney Tunes base image

1. Download the Looney Tunes base image from the link on the Spooky Support page.
2. Unzip the contents of your download and copy to a new, or freshly formatted USB drive.
3. Safely eject the USB drive after the file transfer completes.
4. Plug the USB into your game (direct into mini pc or into coin door USB extension is fine) while it is off and turn it on to start the process. It should automatically start.
5. You'll see "Clonezilla" and it will take a fair while doing things, so please be patient. Finally you'll see a reboot menu with three options (Power off, Reboot, and CMD). Turn your game off, unplug the USB, and turn the game on again.
6. It should load the base image and only the service menu will be accessible. You can then download the latest game software version online, and install the update following the normal update procedure in this manual.

Maintaining Your Pinball Machine

Spooky Pinball recommends that you regularly perform select maintenance routines. These maintenance routines focus on the important areas within your machine.

Routine Maintenance

- Remove the glass to visually inspect the playfield for loose connectors, worn rubbers, cracked plastics, and debris that may have collected.
- Eject the pinballs and inspect for ball damage. Replace pinballs, if necessary. Coil dust at the bottom of the cabinet suggests coil stop damage.
- Examine the inside of the cabinet for bulbs and other loose parts.
- Use a pinball to check all playfield switches.
- Review the game audits.
- Run the diagnostics.
- Adjust the tilt bob, if necessary.
- Verify that the latest software version is installed.
- Replace worn or dirty rubber parts.
- Use an ammonia-free glass cleaner to clean the playfield glass.
- Use a non abrasive cleaner (like NOVUS 1: Clean & Shine) to clean the plastics.

NOTICE

Need to report a code bug in Looney Tunes? You can send an email directly to service@spookypinball.com with the subject "Code Bug"

PAGE INTENTIONALLY LEFT BLANK

Chapter 2 Game Menu System

Game Menu System

Standard Settings			
	Min	Max	Default
Attract Mode Music Every X Minutes	off	60	30
Attract Mode Sounds	off	on	on
Auto Launch Ball Timer	0	60	0
Balls Per Game	1	10	3
Default Ball Save Timer	0	90	10
Default Ball Search Timer	10	45	20
MAX Extra Balls Per Game	0	10	2
Knocker Enabled	off	on	on
Shaker Motor Enabled	off	on	on
Shaker Power Percentage	0	100	100
Match Boost	0	100	0
Match Enabled	off	on	on
Maximum Initials Length	3	10	10
Tilt Warnings	0	5	2
Tilt Settle Time MS	1000 ms	10000 ms	1500 ms
Allow Tilt In Shooter Lane	off	on	off
Restart Enabled	off	on	on
Tournament Mode Active	off	on	off
Trough Settle Time	0.5	1	.75
Volume: Master	0	1	0.5

Table 2-1. Standard Settings

Standard Settings			
	Min	Max	Default
Volume: Effects	0	1	0.5
Volume: Music	0	1	0.5
Volume: Voice	0	1	0.5
Music Ducking Percent	0	100	60
Trough Lost Ball Compensation	off	on	on
Flipper Button Launch	enabled	disabled	disabled
Debug Monitor Visible	off	on	off
Warden Reconnect Cycle	off	on	on

Table 2-1. Standard Settings

Feature Settings			
	Min	Max	Default
Episode Select Method	Optional Select	Always Select	Random
Toon Selecting Timer	0	30	5
Toon Select React Time	0	10	2
Toon Mode Default Ball Save	0	20	10
Light Extra Ball After (X) Toons	0	6	3
Light Special After (X) Full Win Reels	0	6	1
Toon Special Award	Credit	Points	Extra Ball
Mode Start Difficulty	Easy	Hard	Difficult
Mode 2+ Qual Arrow Count	0	8	3
Duck Amuck After X Toons	1	12	6
Duck Amuck Lit At Game Start	off	on	off
Combos Difficulty	Easy	Hard	Default
Light Extra Ball At (X) MPH	0	500	200
Carry Over Loop Progress	off	on	off
Easy Loop Jackpot Qualifications	0	10	1
Shot Multiplier Timer	5	60	30
Inner Orbit MB Time-out	1	3	1.5

Table 2-2. Feature Settings

Feature Settings			
Outer Orbit MB Time-out	1	3	2
Anvil Multiball Ball Save	0	30	15
TNT Add-A-Ball Ball Save	0	30	15
Anvil SJP HI Magnet Pulse	0.3	3	1
Giant Rocket Multiball Ball Save	0	30	15
First Lock Fuse Length	1	5	5
Additional Fuses Add Length	0	4	1
Tazmania Ball Save	0	30	15
Rabbit Transit Shots To Win	4	8	6
Rabbit Transit Opponent Advance Timer	5	30	15
Combos: Seconds Before Time Out	2	15	4
Rotating Taz Toy Enabled	off	off	on
Magnet Fling: How Long To Hold	0.1	4	3
Magnet Fling: Power When Holding	30	250	150
Magnet Fling: Off Time Before Fling	0	1.5	0.23
Magnet Fling: Duration Of Pulse	2	30	20
Magnet Fling: Strength Of Pulse	50	255	255

Table 2-2. Feature Settings

Feature Settings			
Anvil Hurry-up Duration	3	20	10
Spins To Qualify Marvin Mode 1	30	300	40
Spins To Qualify Marvin Mode 2	30	300	60
Spins To Qualify Marvin Mode 3+	30	300	80
Planet X: Seconds Between Mars Claims	5	30	15
Taz Meter Shot Timeout	5	30	15
First Acme Crate Hits	1	10	3
Acme Crate Hits Boost	1	5	1
Max Acme Crate Hits	5	20	5
TNT Lock Release Delay	0	2	1
TNT Lock Release Post Hold Time	.3	.6	.3
Carrots For First Hare Restore	1	10	6
Carrot Increase For Hare Restore	0	10	1
Grinder Disabled	off	on	off

Table 2-2. Feature Settings

Coil Settings			
	Min	Max	Default
Lower Left Flipper Main Pulse MS	20	40	30
Lower Right Flipper Main Pulse MS	20	40	30
Upper Left Flipper Main Pulse MS	20	40	30
Upper Right Flipper Main Pulse MS	20	40	30
Drop Target Knock- down	65	255	180
Drop Target Reset	65	255	255
Crate Eject Pulse MS	10	30	13
Vault Eject Pulse MS	10	50	26
Hole Eject Pulse MS	10	35	20
Auto-plunge Pulse MS	1	30	17
Auto-plunge PWM Strength	100	255	255
Trough Eject Pulse MS	15	30	20
Right Sling PWM	120	255	200
Knocker PWM	50	255	120
Upper Right VUK Pulse MS	10	35	35

Table 2-3. Coil Settings

Servo Settings			
	Min	Max	Default
Rotating TAZ Toy Stop Angle	80	100	90
Grinder Stop Angle	80	100	90
Lock Release (Far Left)	50	250	72
Lock Position 3 (Left)	50	250	94
Lock Position 2	50	250	136
Lock Position 1 (Right)	50	250	177
Lock Position Bypass (Far Right)	50	250	223
Crate Open	20	240	28
Crate Closed	5	245	168
TNT Up	5	245	128
TNT Down	5	245	128

Table 2-4. Servo Settings

Pricing Settings			
	Min	Max	Default
Free Play	off	on	on
Coins Per Credit	1	8	1
Bonus Credit After	0	10	1
Number Of Bonus Credits	0	10	0
Bonus Coin After	0	10	1
Number Of Bonus Coins	0	10	0
Bonus Credit Count	0	10	0
Coin Value	0	8	1
Target Free Game Percent	0	50	5

Table 2-5. Pricing Settings

Replay Settings			
	Min	Max	Default
Bonus Credit Count	0	10	1
Replay Award	Disabled/ Credit/Points		Credit
Replay Point Value (If Set)	1,000,000	200,000,000	50,000,000
Replay Backdown Amount	1,000,000	100,000,000	50,000,000
Replay Increase Amount	1,000,000	100,000,000	50,000,000
Losing Streak Threshold	0	30	3
Replay Minimum Score	20,000,000	4,000,000,000	50,000,000
Replay Maximum Score	2,000,000,000	4,000,000,000	2,000,000,000
Replay Score	20,000,000	4,000,000,000	2,000,000,000
Replay Score Enabled	off	on	on
Replay Type	Fixed	Auto Adjust	Auto Adjust

Table 2-6. Replay Settings

Tests		
Switch Test		
Note: Use <u>Switch Reports</u> to display statistics on switch activations		
Default Switch Screen	<ul style="list-style-type: none">SW91: Menu button off "First report on screen"Pressing any switch on cabinet or playfield will display	
Stuck Switch Test		
Default Switch Screen Test	<ul style="list-style-type: none">Trough 7Trough 6Trough 5Trough 4Trough 3Trough 2Orbit Diverter DetectedTrough 1Spinning Toy HomeEnter	<ul style="list-style-type: none">Already Active 1Already Active 2Already Active 3Already Active 4Already Active 5Already Active 6Already Active 43Already Active 49Already Active 59Inactive 91
Individual LED Test		
Default Screen	<ul style="list-style-type: none">Current LED: #0 - Inner Orbit 4 (Use Flippers to toggle next LED in chain)Current Color: RGB CycleCurrent Mode: (Cycling)Use Enter Button To Toggle Red/Green/Blue/White/RGB Cycle	
All LED Test		
Default Screen	<ul style="list-style-type: none">ALL LEDsCurrent Color: RGB CycleCycles all LEDs from Red/Green/Blue/White/RGB CycleCurrent Mode: User Enter button to toggle between colors	
Coil Test		
To Test Coils	<ul style="list-style-type: none">User the flippers to toggle/test each coil	
Servo Test/Adjust		
To change servo	<ul style="list-style-type: none">Use action button	
To move servo to next postion	<ul style="list-style-type: none">User flippers to toggle	

Table 2-7. Tests

Tests	
Servos	<ul style="list-style-type: none"> • Lock Diverter • Crate Door • TNT Plunger • Scoop Feeder • TAZ Toy
Export Error Log	Exports Error Log to inserted USB

Table 2-7. Tests

Utilities	
Reset Settings/Data	<ul style="list-style-type: none"> • Feature Settings • Pricing Settings • Coil Settings • Replay Settings • Servo Settings • Hardware Audits • Earnings Audits • Feature Audits • Classic High Scores • Vanity High Scores • Clear Credits • All Settings and Data at Once
Empty Balls	<ul style="list-style-type: none"> • Enter button ejects all balls onto playfield
Update Code	<p>With Flash Drive attached to dongle inside coin door:</p> <ul style="list-style-type: none"> • select the appropriate code • select "start" or "enter" to update code
Update Speaker Kit	
Burn In Test	<ul style="list-style-type: none"> • Cycles thru all coils in the game, one coil at a time
Calibrate Launch	<p>Calibrate ball launch to hit the middle drop target</p> <ul style="list-style-type: none"> • Enter button toggles between 'Launch PWM' and Launch Pulse Time' adjustment values • Use flippers to adjust values to ensure ball hits middle drop target

Table 2-8. Utilities

Audits	
Earning Audits	<ul style="list-style-type: none">• Games Started With Credits• Games Started Without Credits• Coins Inserted• Total Coins Inserted• Replays Awarded• Replays Current Losing Streak• Matches Awarded• Paid Credits• Free Game Credits• Bonus Credits• Free Game Percent• Service Credits• Total Bonus Coins
Hardware Audits	<ul style="list-style-type: none">• Total Games Restarted• Total Games Started• Total Games Finished• Average Game Time• Total Balls Started• Total Balls Finished• Average Ball Time• Lower Left Ramp Shots• Upper Left Ramp Shots• Lower Right Ramp Shots• Upper Right Ramp Shots• Lower Left Flips• Upper Left Flips• Lower Right Flips• Upper Right Flips• Left Outlane Drains• Right Outlane Drains• Number Of Times Tilted• Number Of Times Warned

Table 2-9. Audits

Audits	
Feature Audits	<ul style="list-style-type: none">• Balls Locked• Rocket MB Started• Crates Opened• Crates Entered• Modes Lit

Table 2-9. Audits

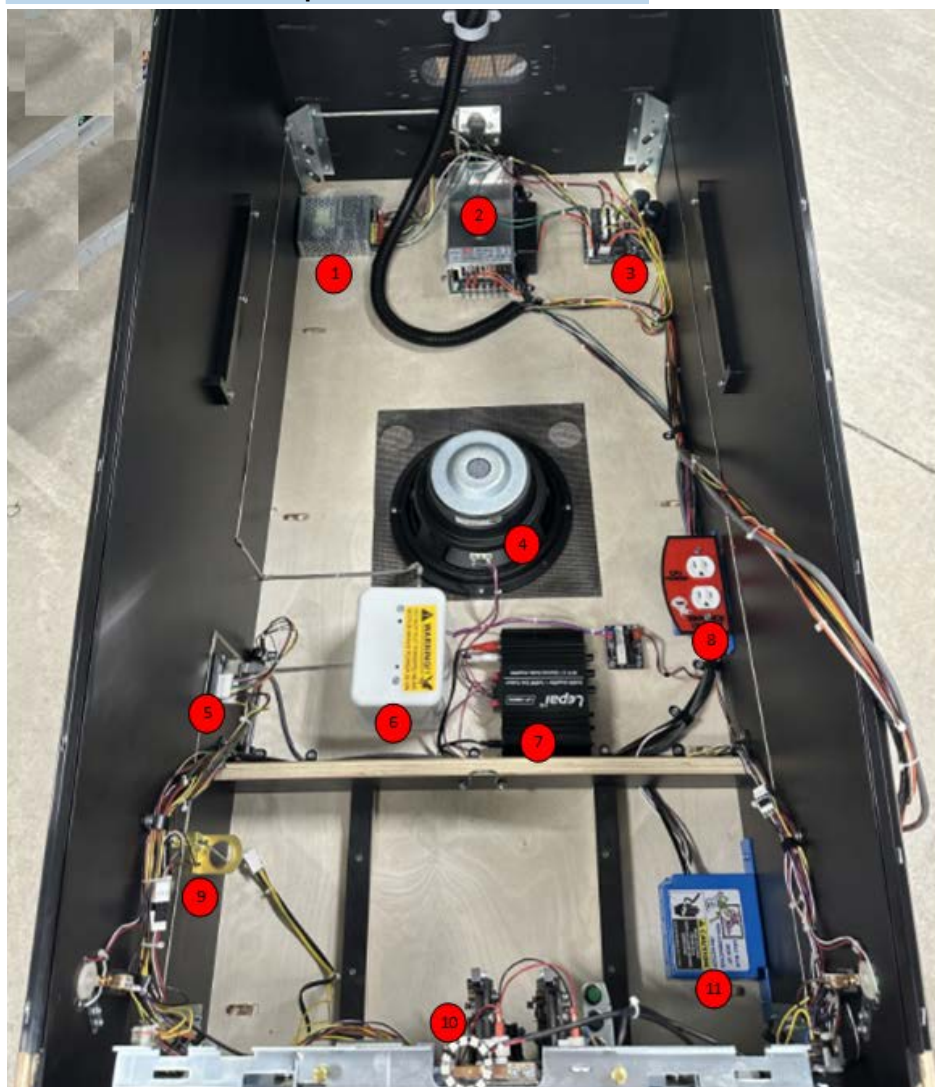
NOTICE

Need to report a code bug in Looney Tunes? You can send an email directly to service@spookypinball.com with the subject "Code Bug"

PAGE INTENTIONALLY LEFT BLANK

Chapter 3 Layouts and Schematics

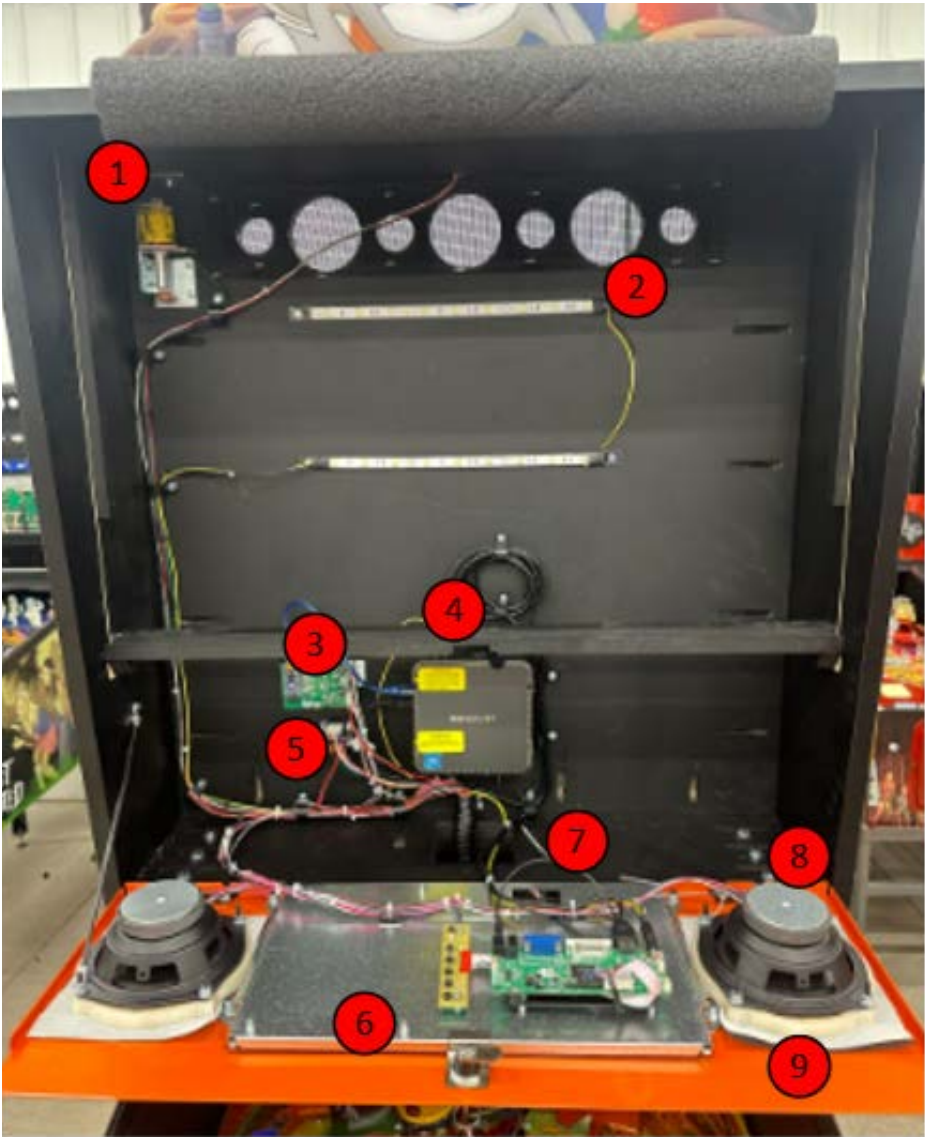
1 Cabinet Components



1	Small Power Supply
2	Large Power Supply
3	Power Splitter Board
4	Subwoofer
5	Cabinet Switch Expander
6	Shaker Motor
7	Amplifier
8	Service Outlet

9	Tilt Bob
10	Action Button/Light
11	Power Switch/Fuse Cover

2 Head Breakdown

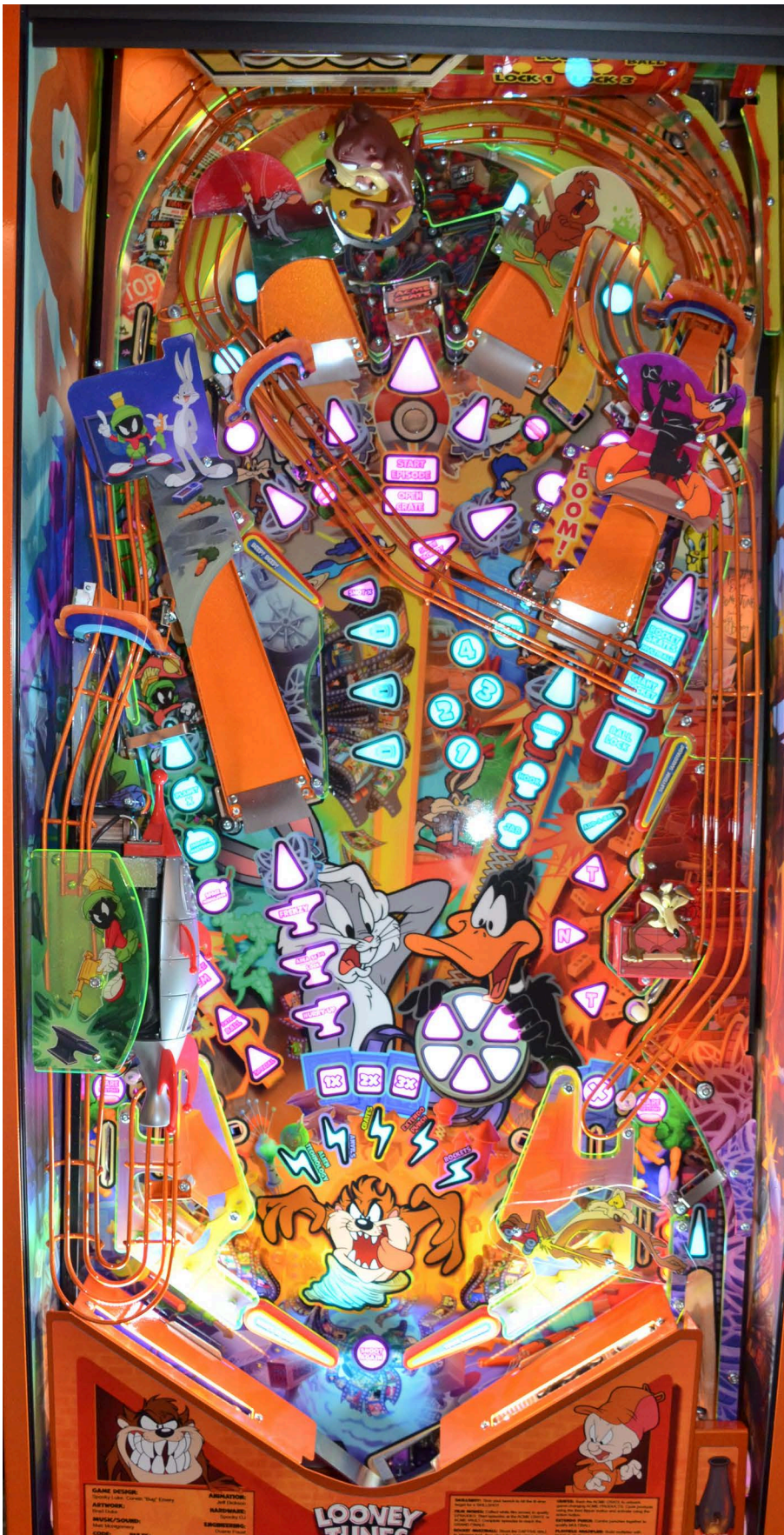


1	Kicker
2	Back Box Lights
3	Topper/Speaker/Flipper LED Driver Board
4	Computer
5	Kicker/Shaker Expansion Board

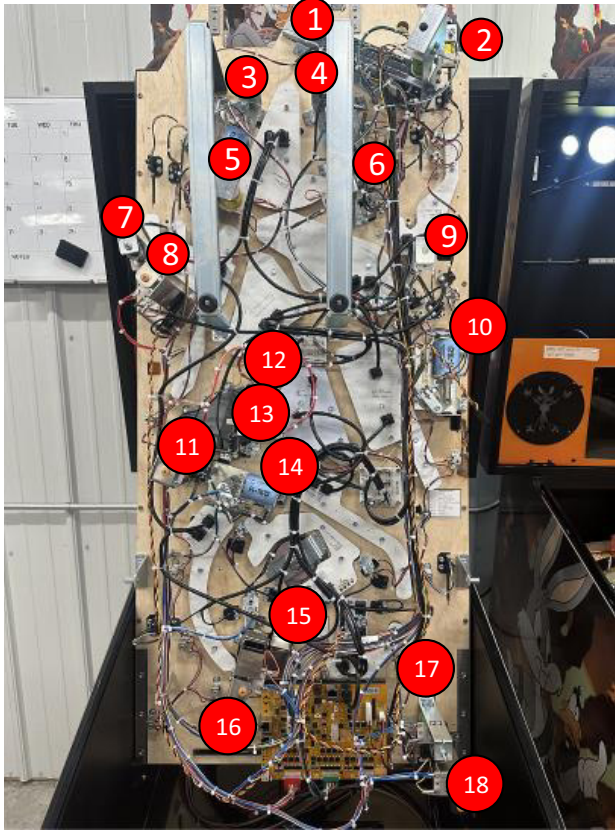
6	Display
7	Display Driver Board
8	Speaker
9	Speaker LED Kit

3

Playfield From Overhead View



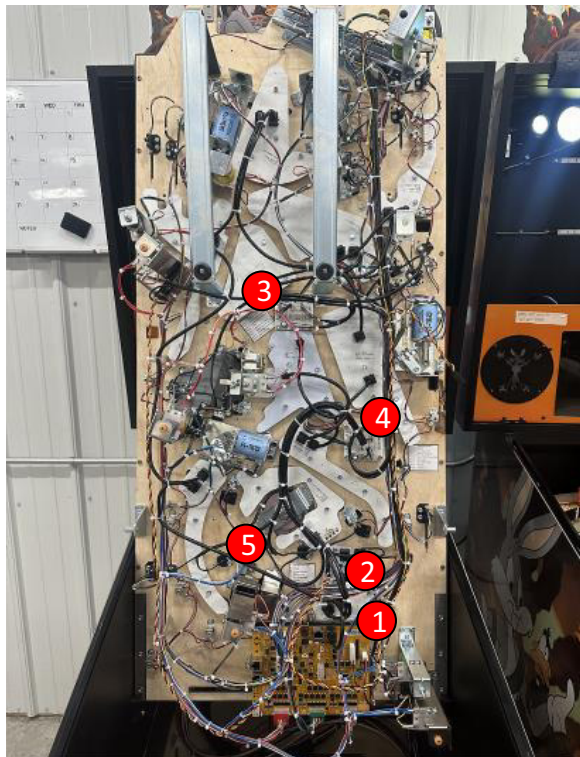
4 Playfield Underside



1	Trough
2	Auto Launch
3	Left Flipper
4	Right Flipper
5	Left Sling
6	Right Sling
7	Rocket Diverter
8	Left Front Scoop
9	TNT Post
10	Right Flipper
11	Middle Left Scoop
12	Drop Target Knockdown
13	Drop Reset
14	Left Flipper
15	Magnet
16	Back Crate Scoop

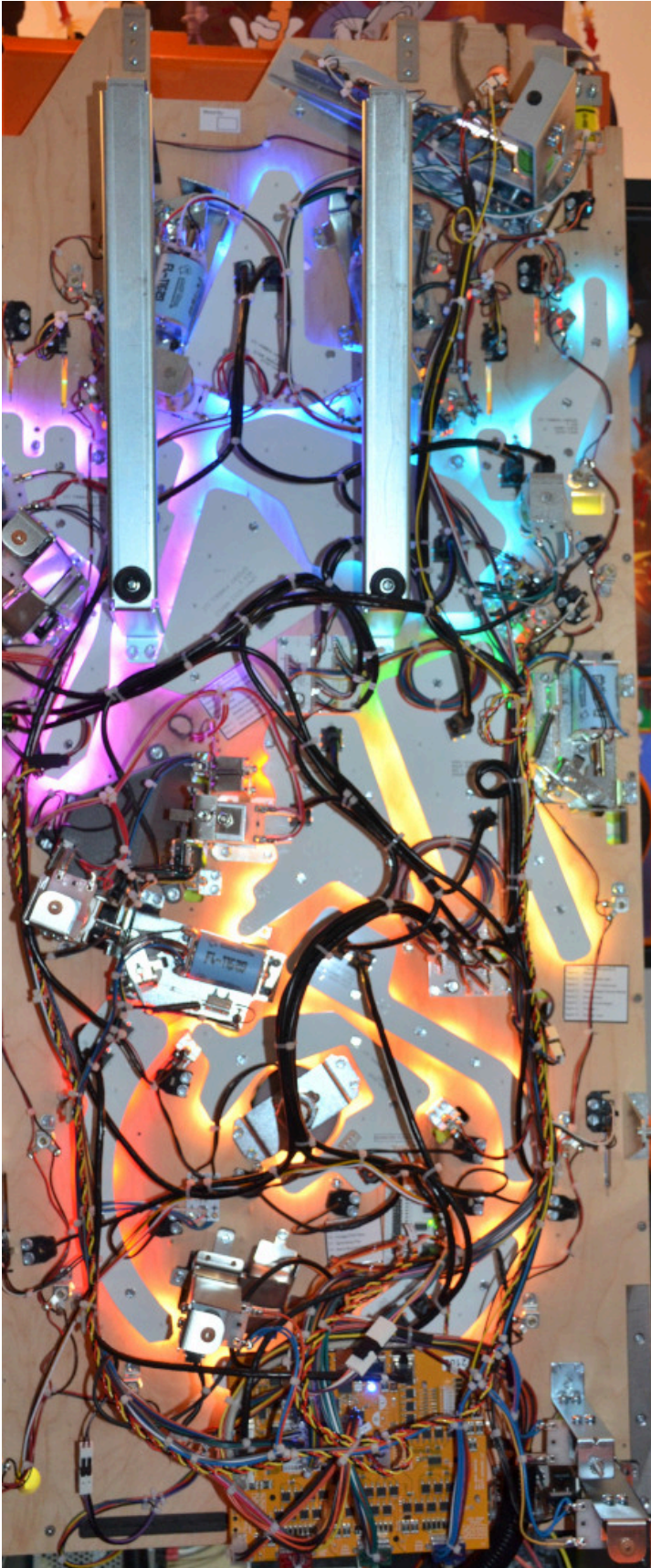
17	Back Right Diverter
18	VUK

5 Boards on Playfield Underside

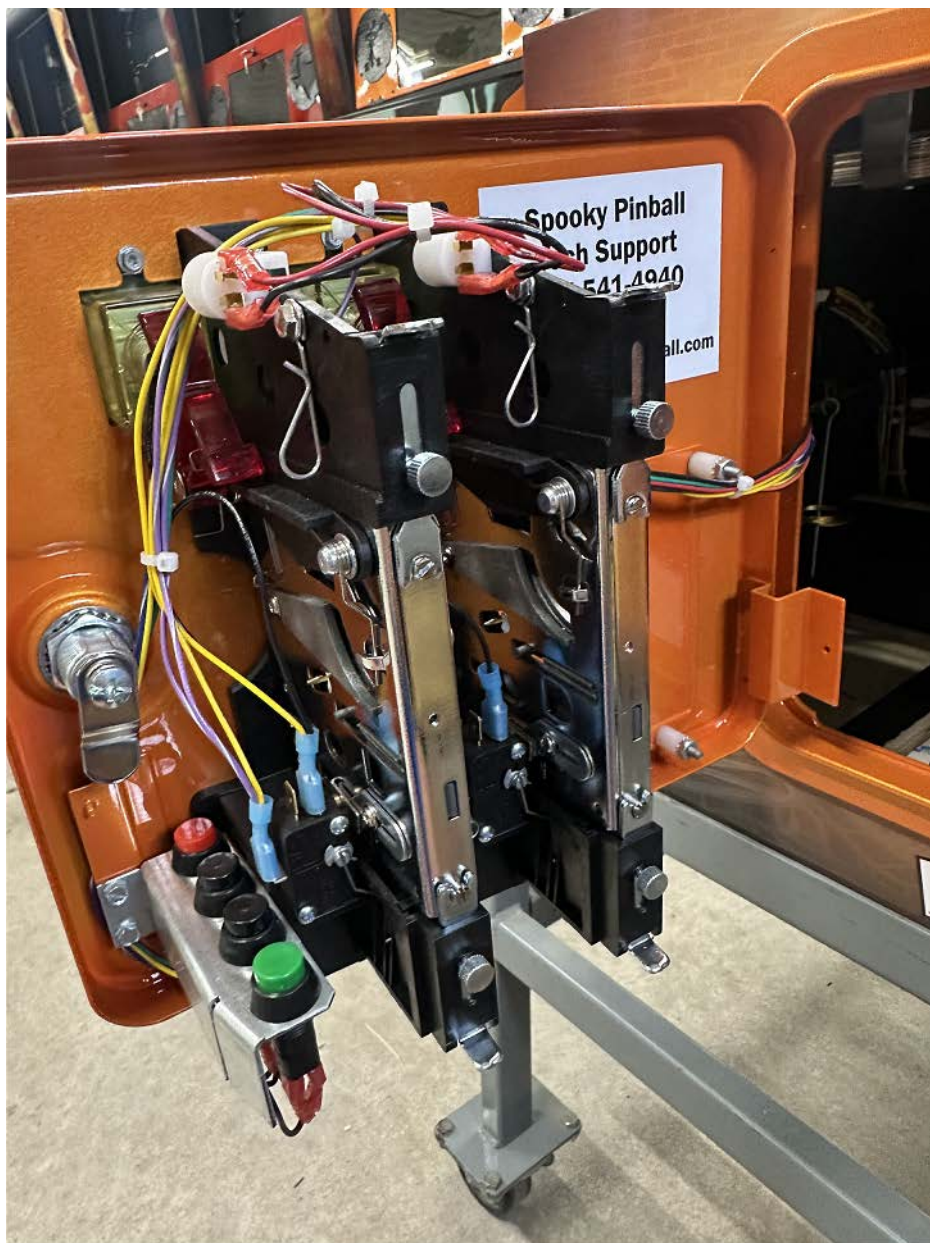


1	Warden
2	Servo Board
3	Opto Board A
4	Opto Board B
5	Magnet Board

6 Illuminated Playfield Underside



7 Coin Door



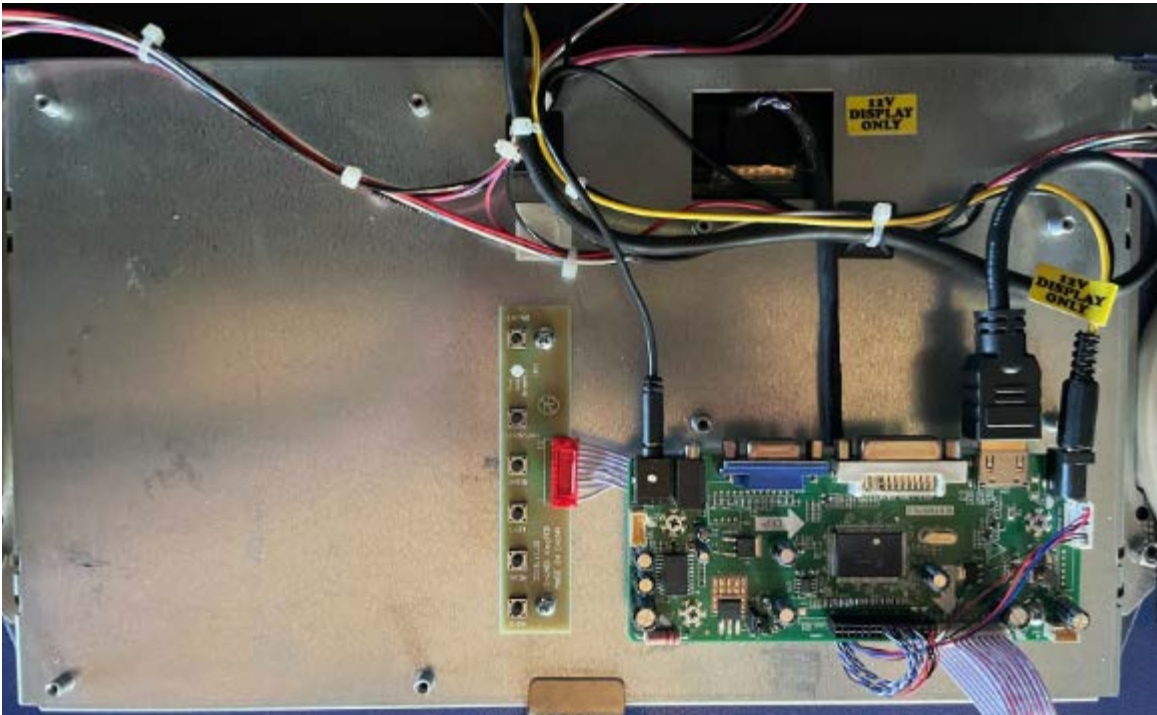
8 Open View of Crate Door



9 Upper Portion Of Playfield With Toy



10 LCD Display



LCD Display Recommended Settings:

(Access using Display Adjustment Panel board to the left of the display's driver board)

Brightness - 40%

Contrast - 80%

Gamma - On

Note: Audio jack plugged into left port for UP Board Mini PC)

Screen Size: 27 Inches

Display Resolution Maximum: 1920 x 1080

Display Brand: VSDISPLAY

Connectivity Technology: VGA, DVI, HDMI

Display Type: LCD

About This Item:

Compatible With: 27inch 1920x1080: TPM270WF1-MWN1

HDMI DVI VGA AUDIO LCD Board for LVDS Interface LCD

Screen

Video Input: HDMI DVI VGA

Audio Input: HDMI

Audio Output: Speaker Connector

Recommend Power Adapter Spec.

Input Power Adapter: 12Vdc More than 2A.

(VSDISPLAY Power Adapter, AC 100-240V Input to 12V DC, 2A

Output, Power Supply, US Plug, Fit SC24W-1202000U jhd-ap024U-1202000a-a, Fit for All Types of VSDISPLAY LCD Controller Board)

Goes into Standby Mode When No Input Signal Standby Mode power usage <1W.

Display Packing List:

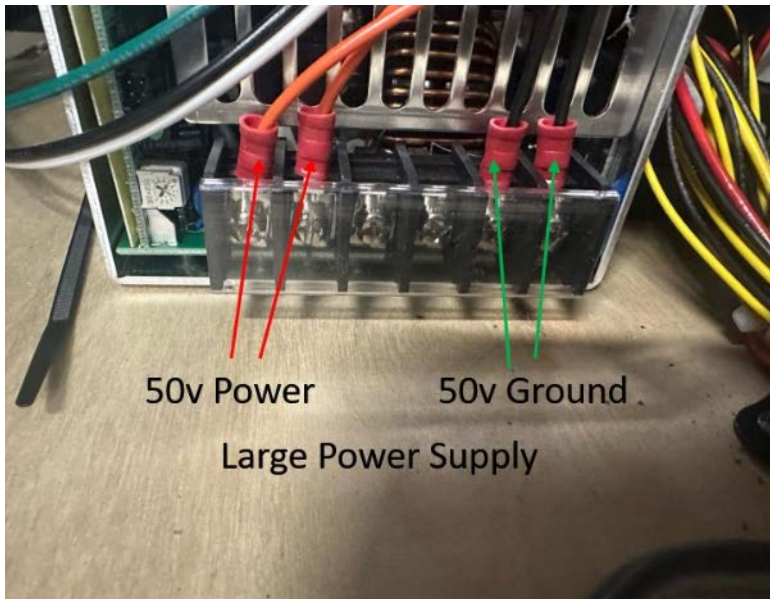
1x HD-MI VGA DVI LCD Controller Board M.NT68676.3 (new version)

1x Inverter Board

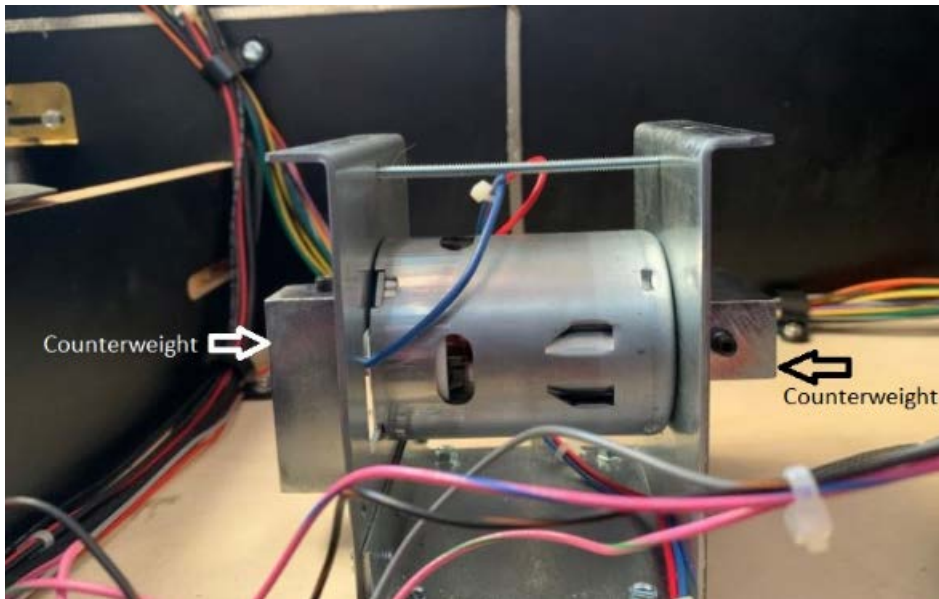
1x LVDS Signal Cable

1x Keyboard With Cable

Note: There is No Power Adapter in the Display Packing List.

11 Large Power Supply**12 Small Power Supply**

13 Shaker Motor



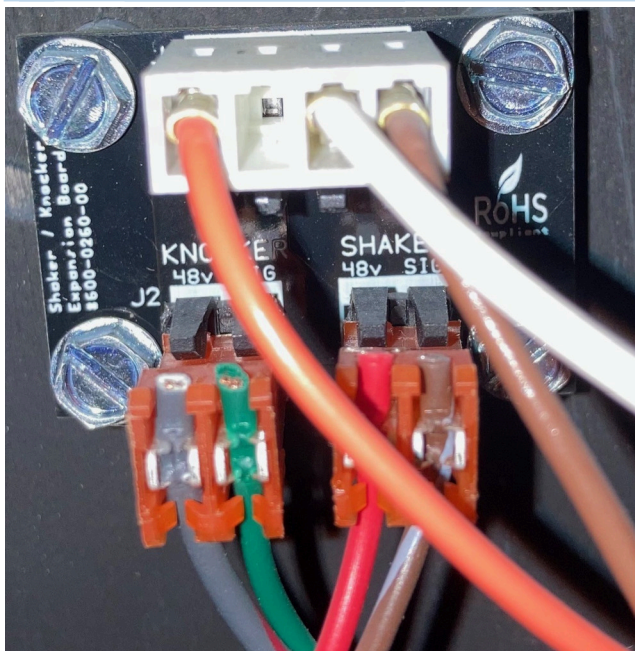
To Adjust Shaker Motor Vibration

1. With the shaker motor cover removed, locate the two counterweights on each side held in place with a hex screw.
2. Loosen the hex screw. You will be able to rotate the counterweight.

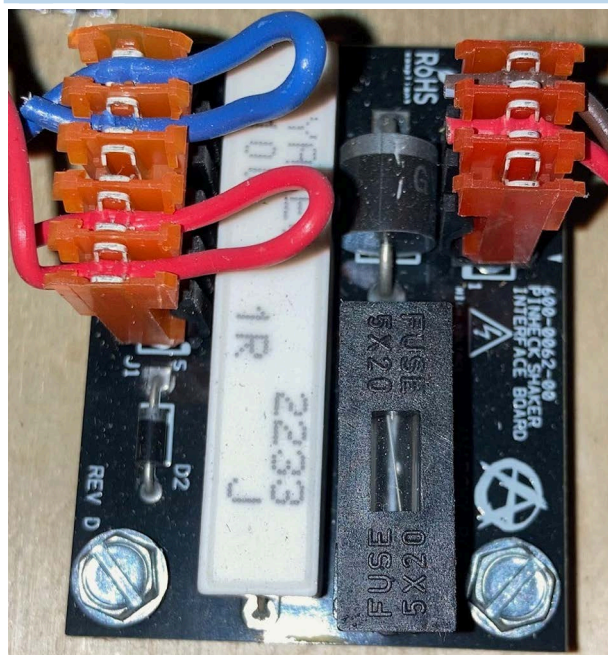
Shaker Motor Settings:

- Both weights in same direction = Strong Shake
 - One weight at a 90 degree angle as shown in photo = Medium Shake
 - One weight at 180 degree angle from the other counterweight = Low Shake
3. After you have made the adjustments, ensure the hex screws are good and tight.
 4. Replace the protective cover.

14 Shaker Motor Board

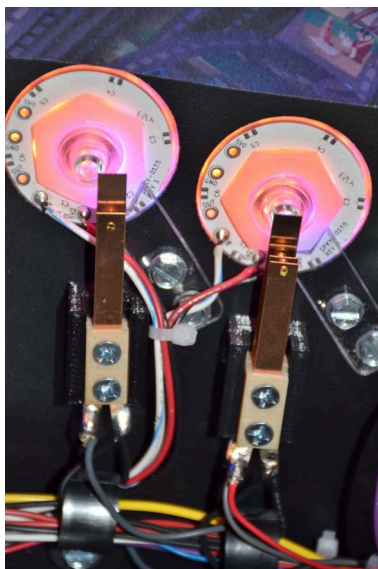


15 Shaker Motor in Cabinet



16 Trough**17 Service Outlet**

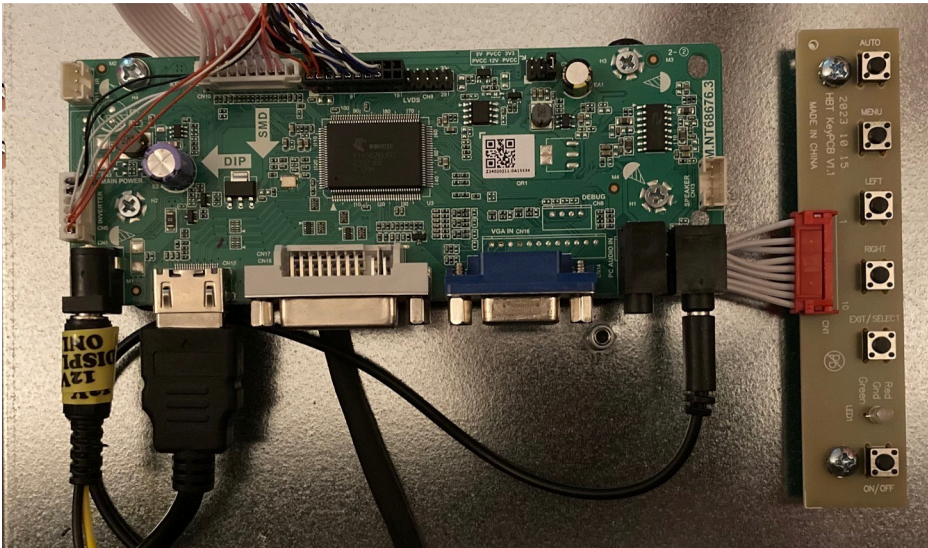
18 Right Flipper Button



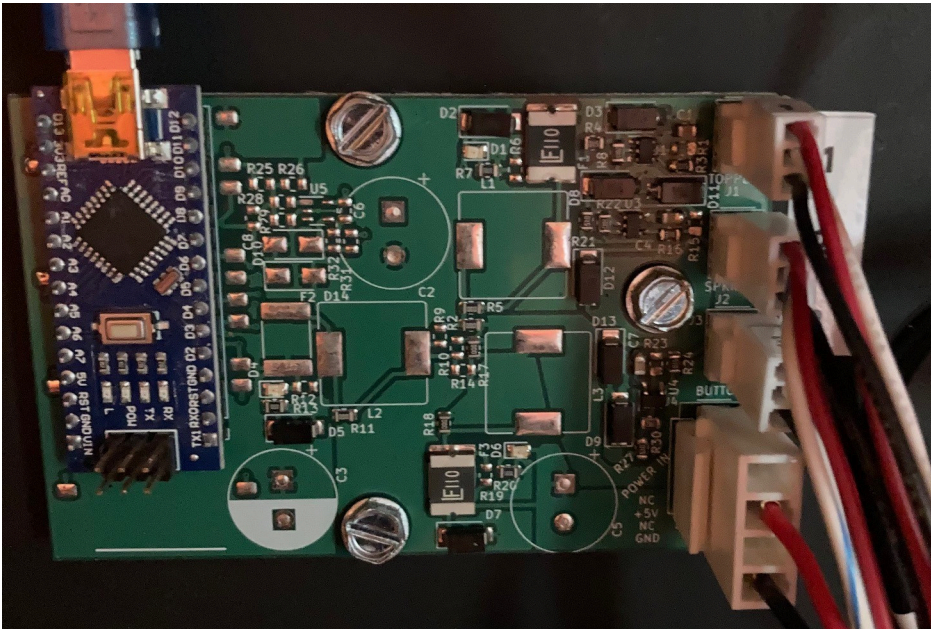
19 Start Button Connection



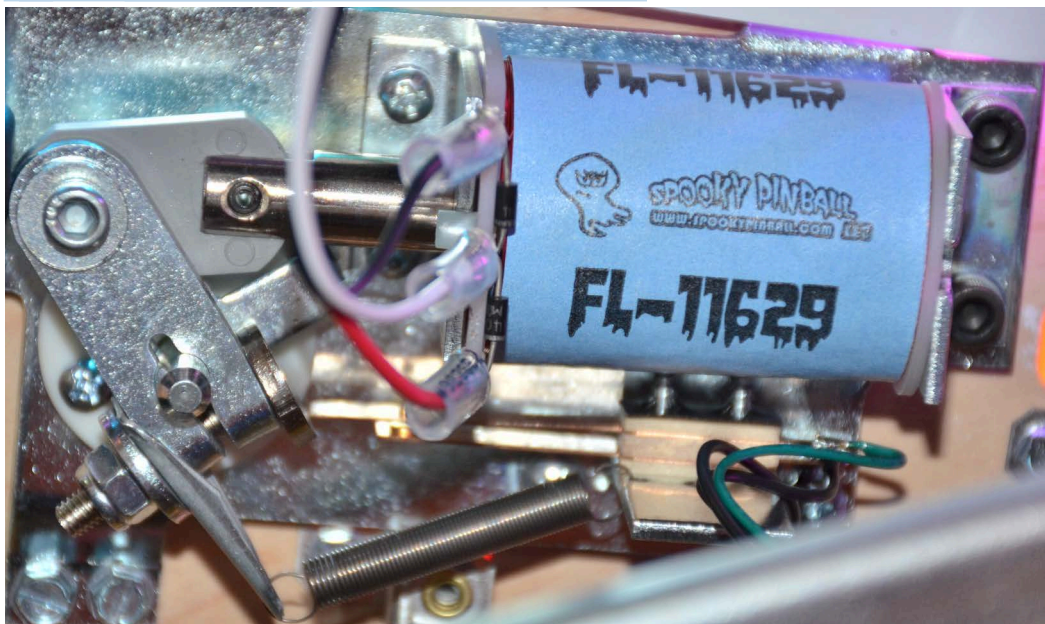
20 Monitor Control Adjust Board



21 LED Control Board



22 Flipper Detail



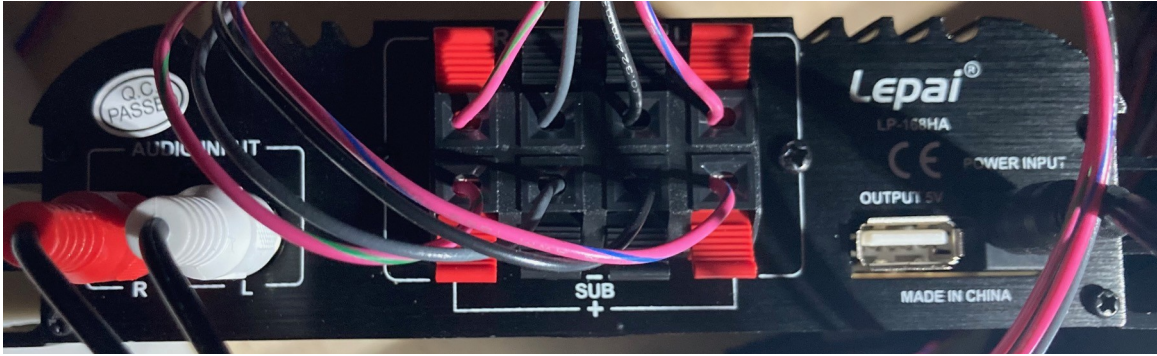
23 Amplifier Front View



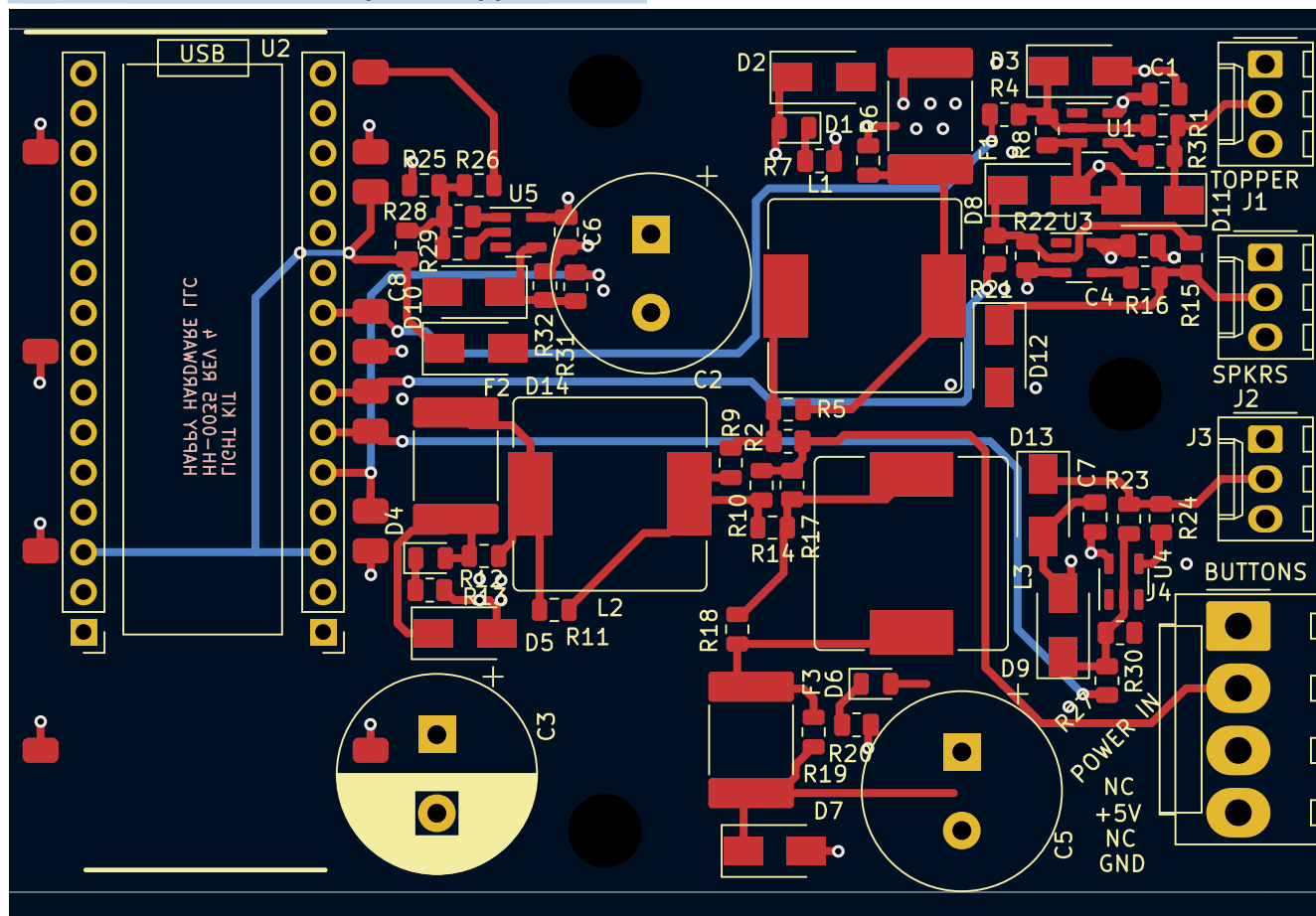
24 Amplifier Top View



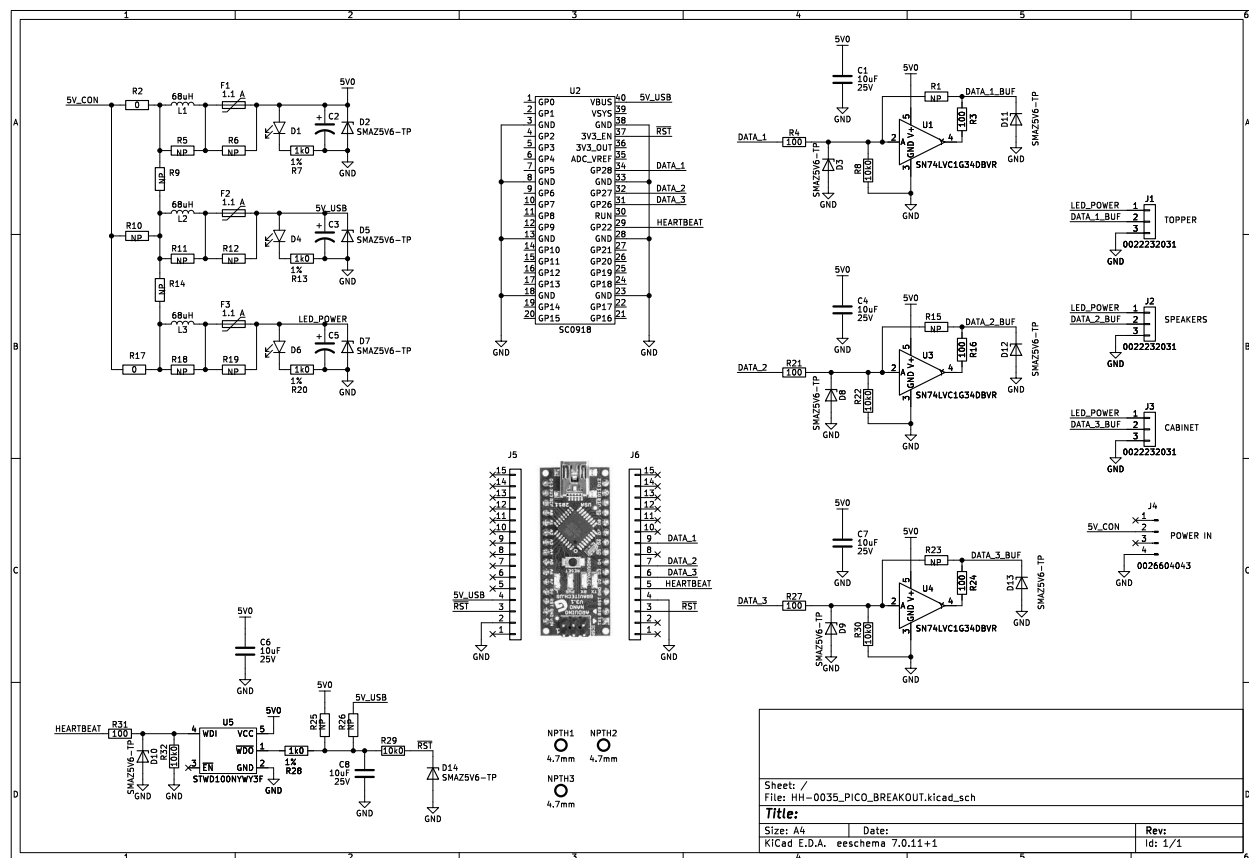
25 Amplifier Rear View



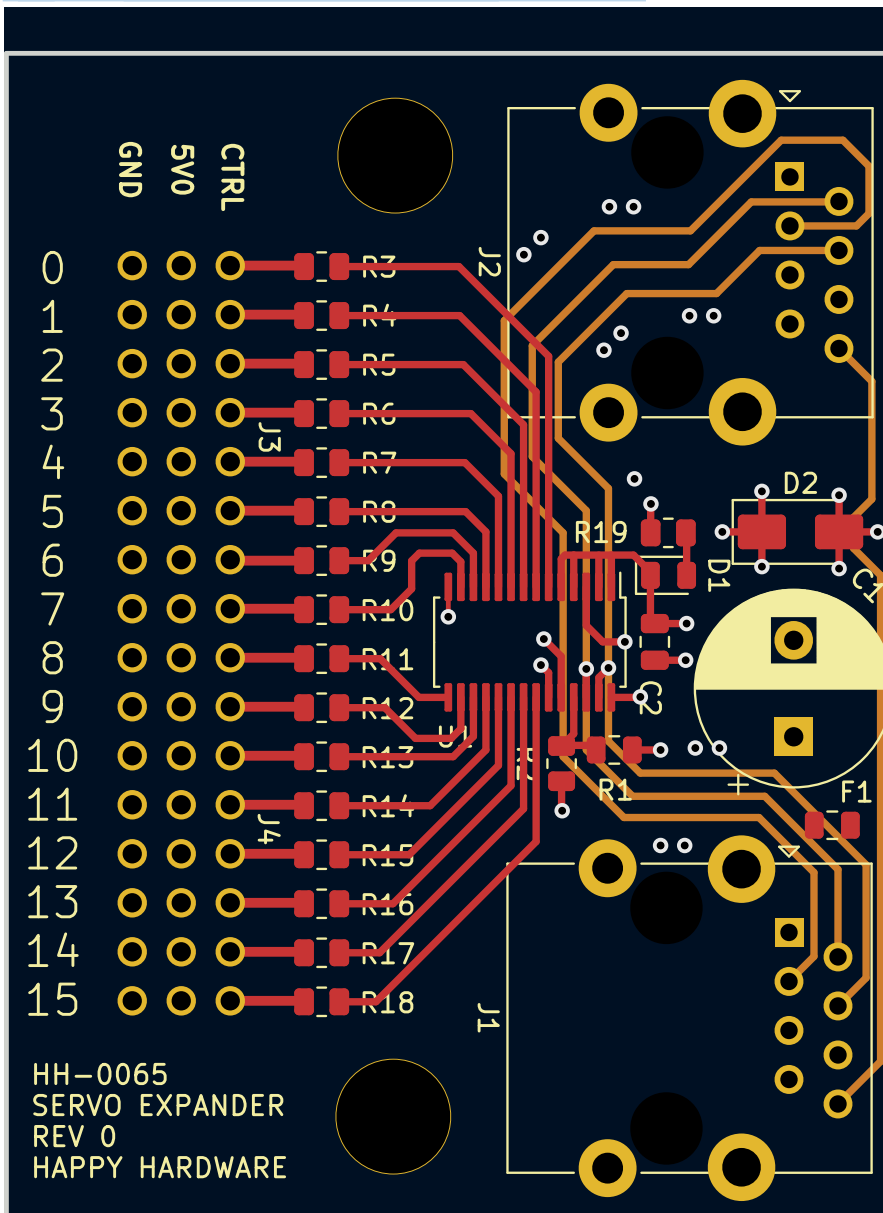
26 HH-0035 PICO Layout (Topper)



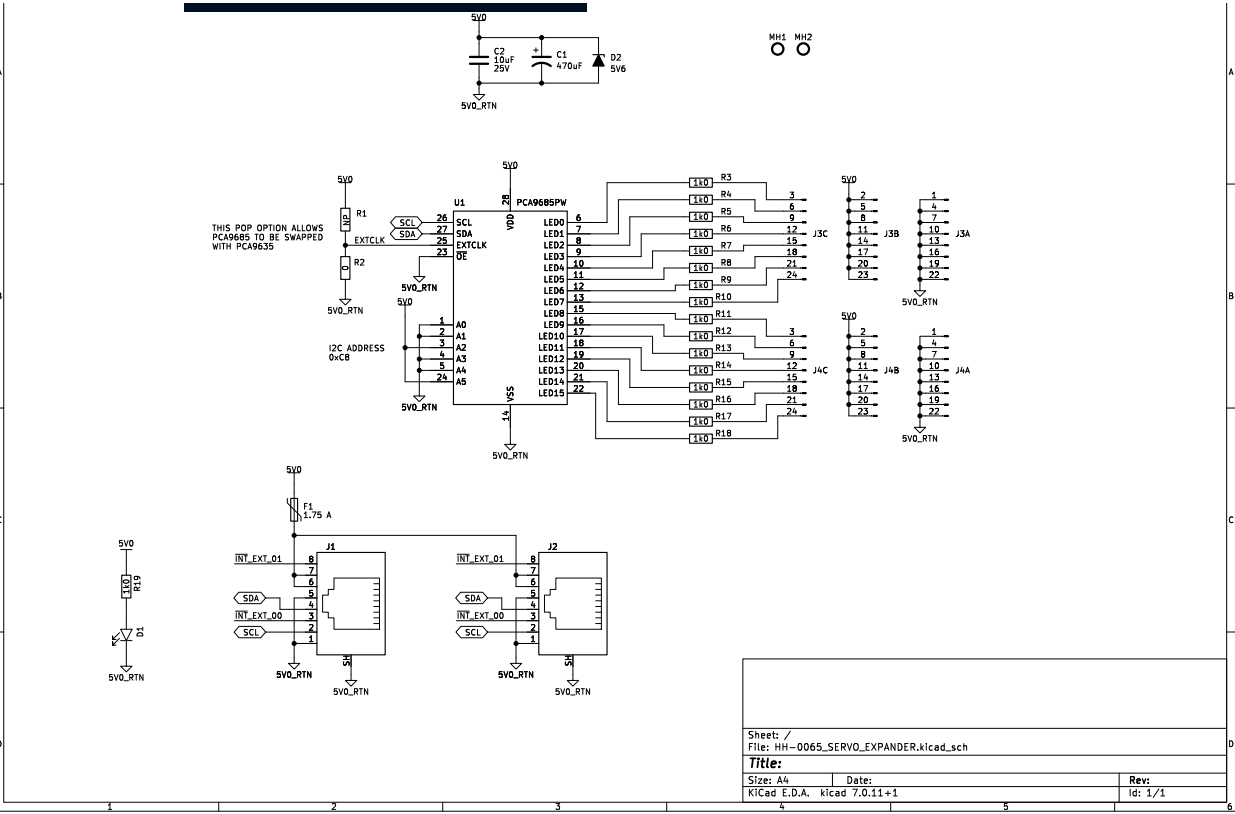
27 HH-0035 PICO Breakout (Topper)



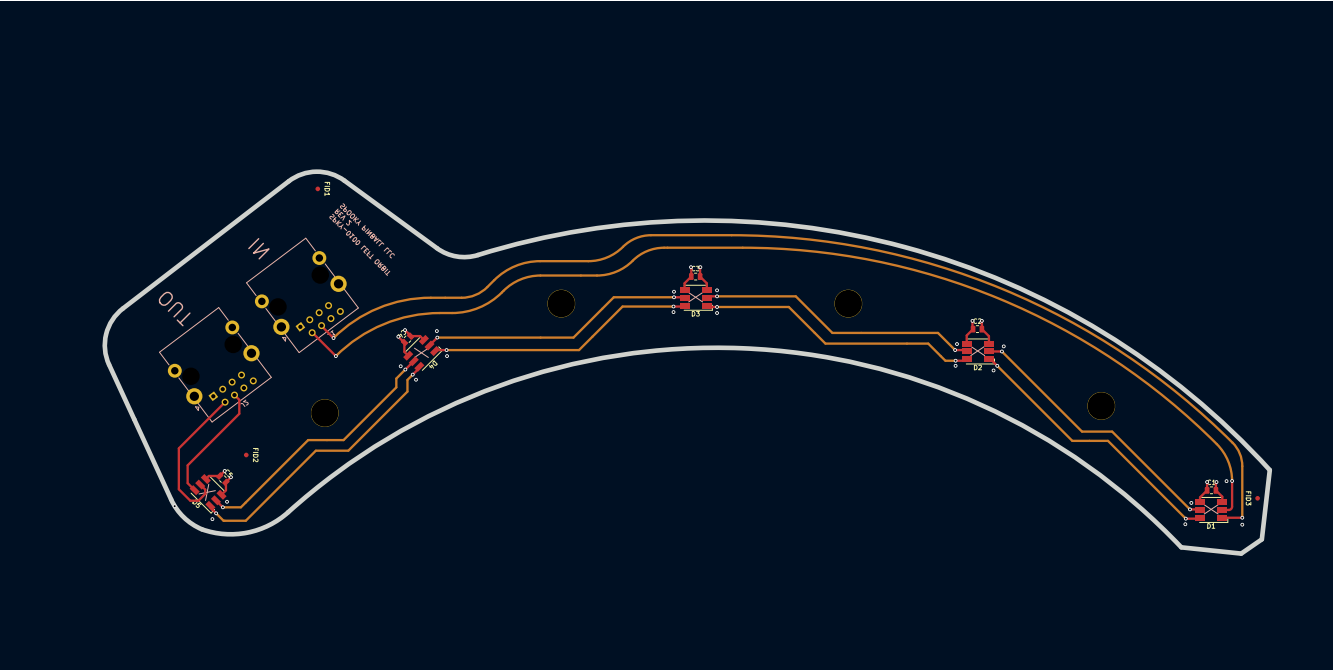
28 HH-0065 SERVO Expander

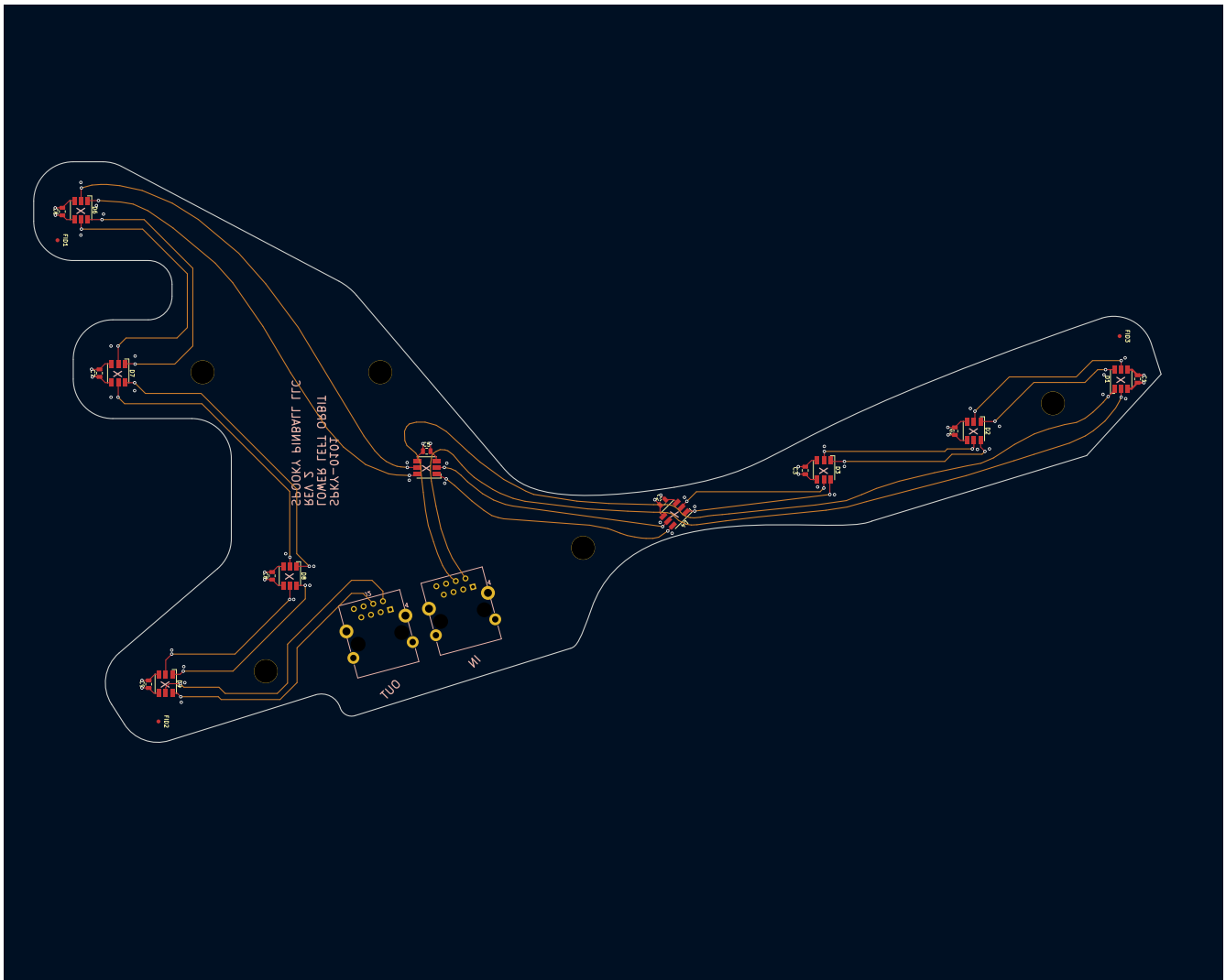


29 HH-0065 SERVO Expander Breakout

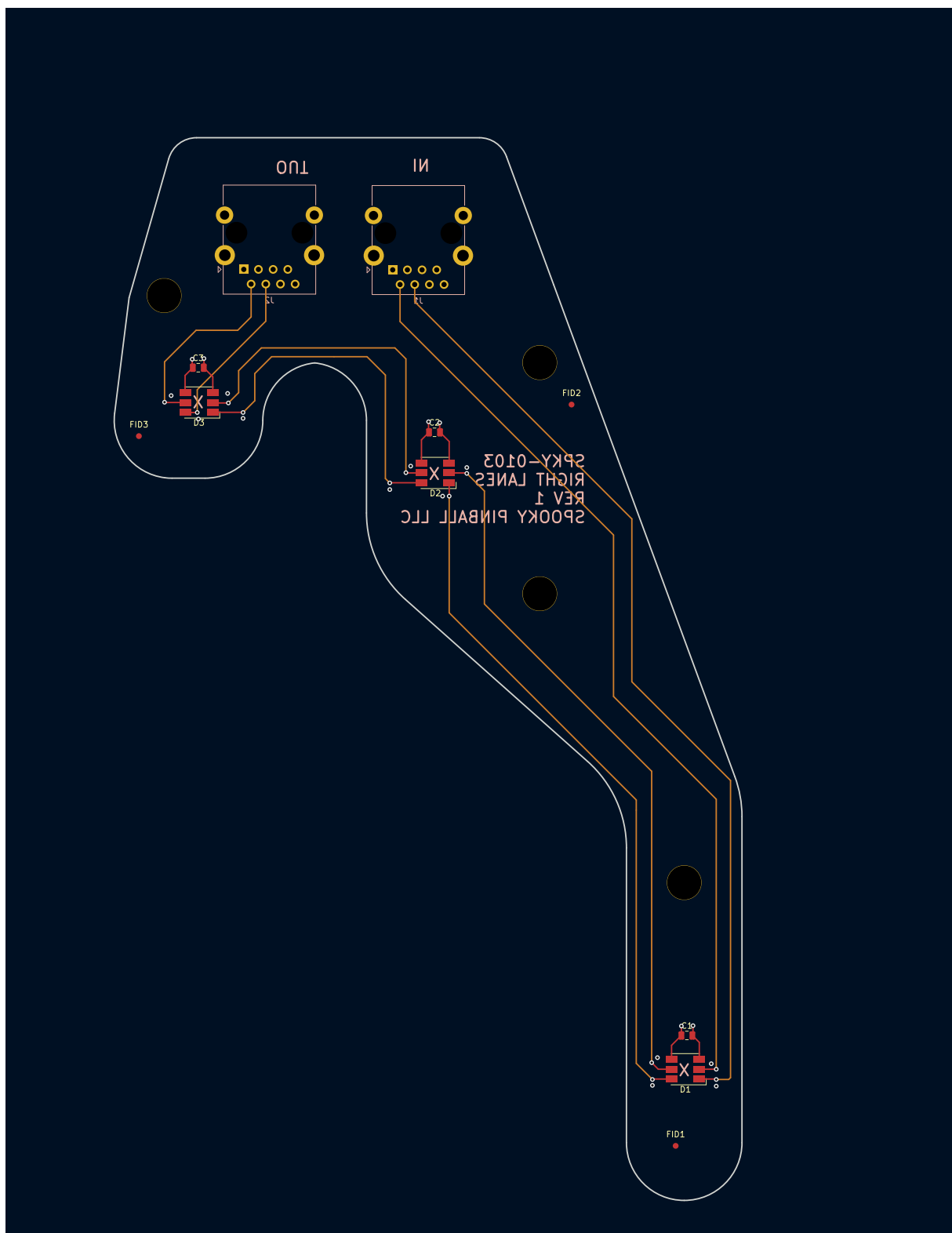


30 SPKY-0100 LEFT ORBIT LAYOUT

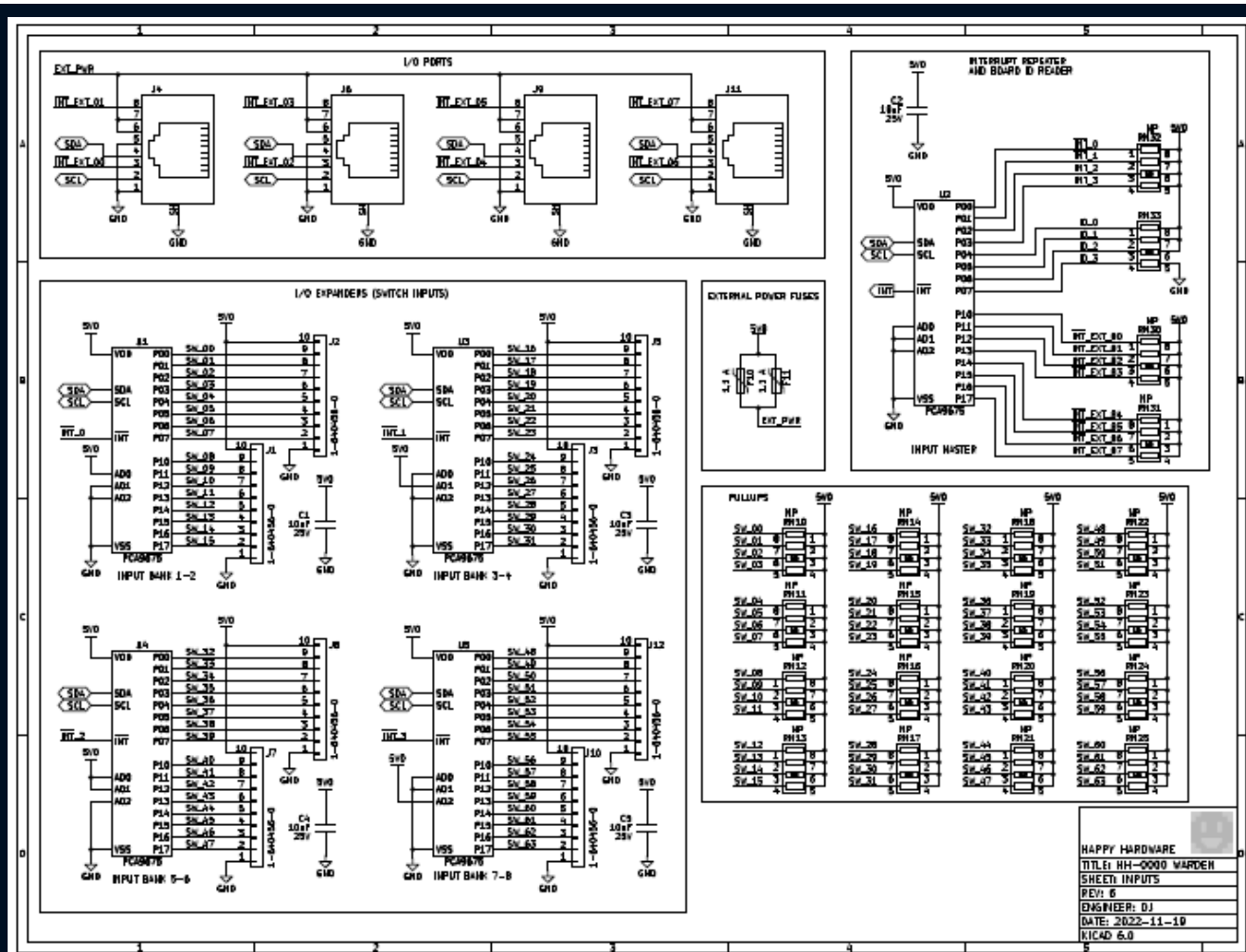




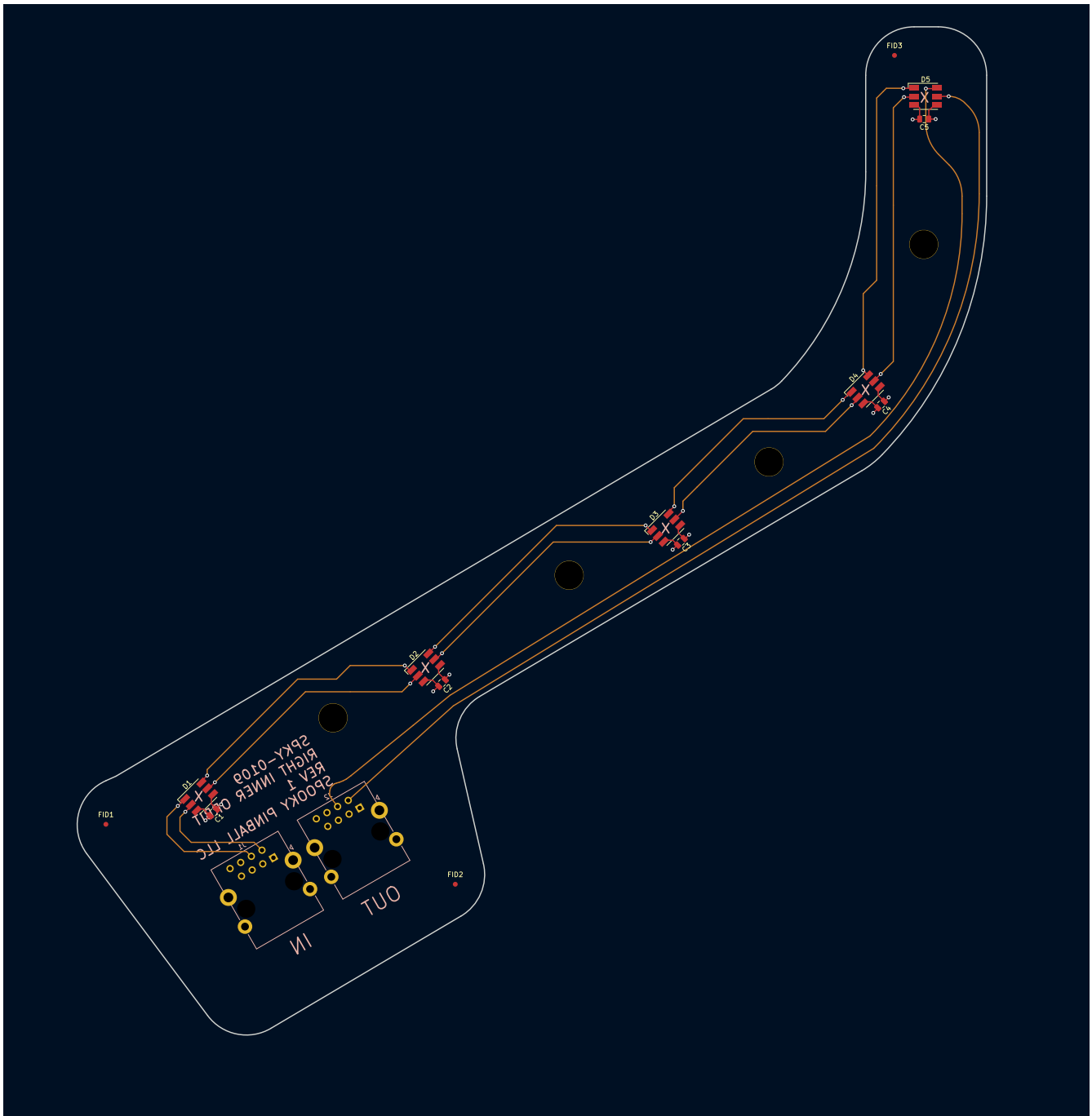
32 SPKY-0103 RIGHT LANES LAYOUT



33 SPKY-0106 RIGHT OUTER ORBIT LAYOUT



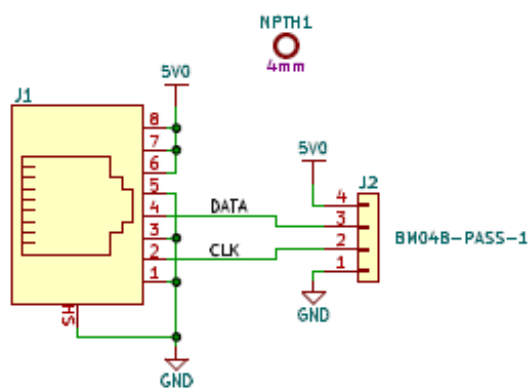




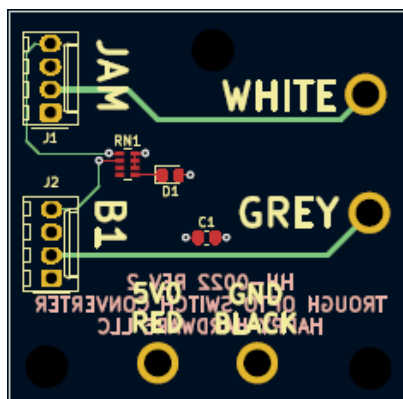
37 SPKY-0110 MAGNET LAYOUT



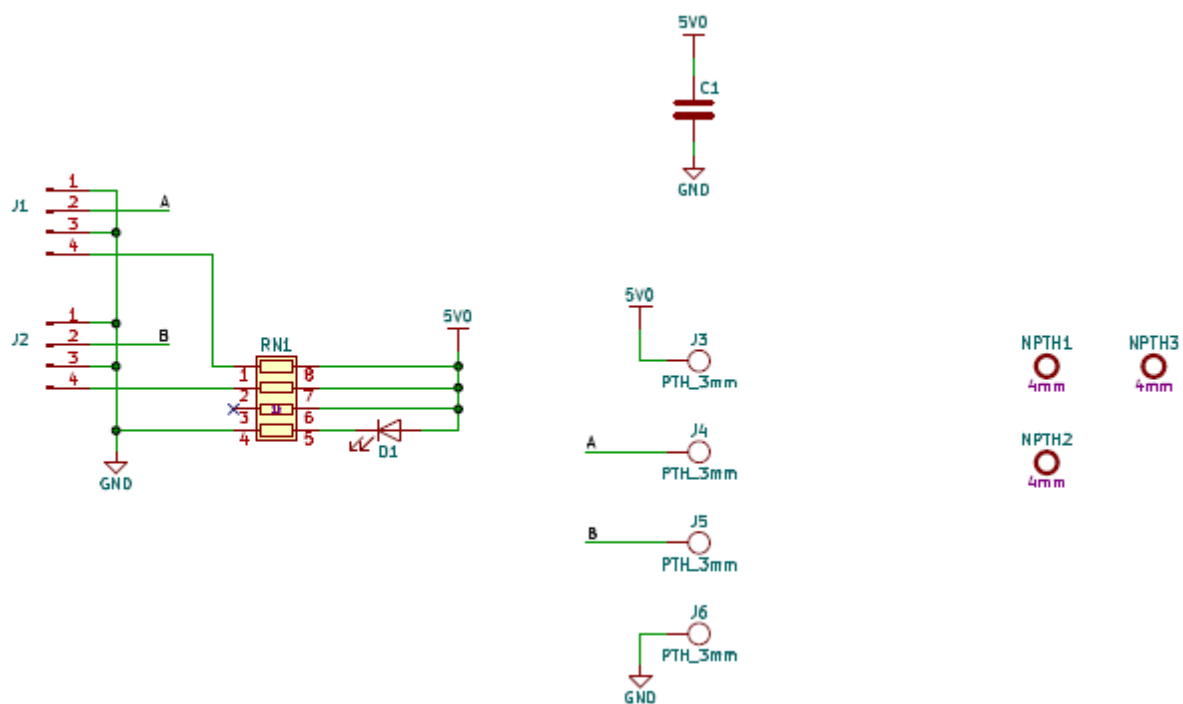
38 HH-0020 LED Harness Converter Schematic



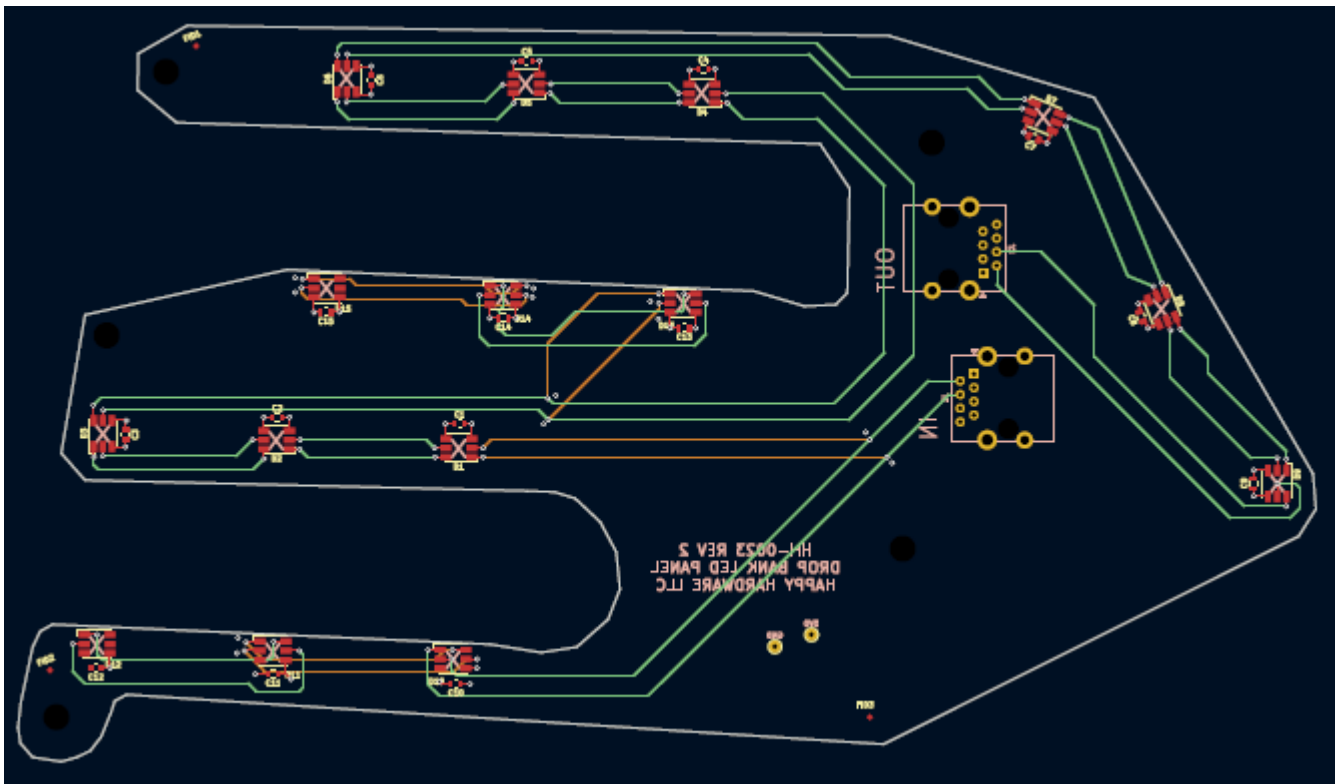
39 HH-0022 Trough Opto-To-Switch Converter Layout



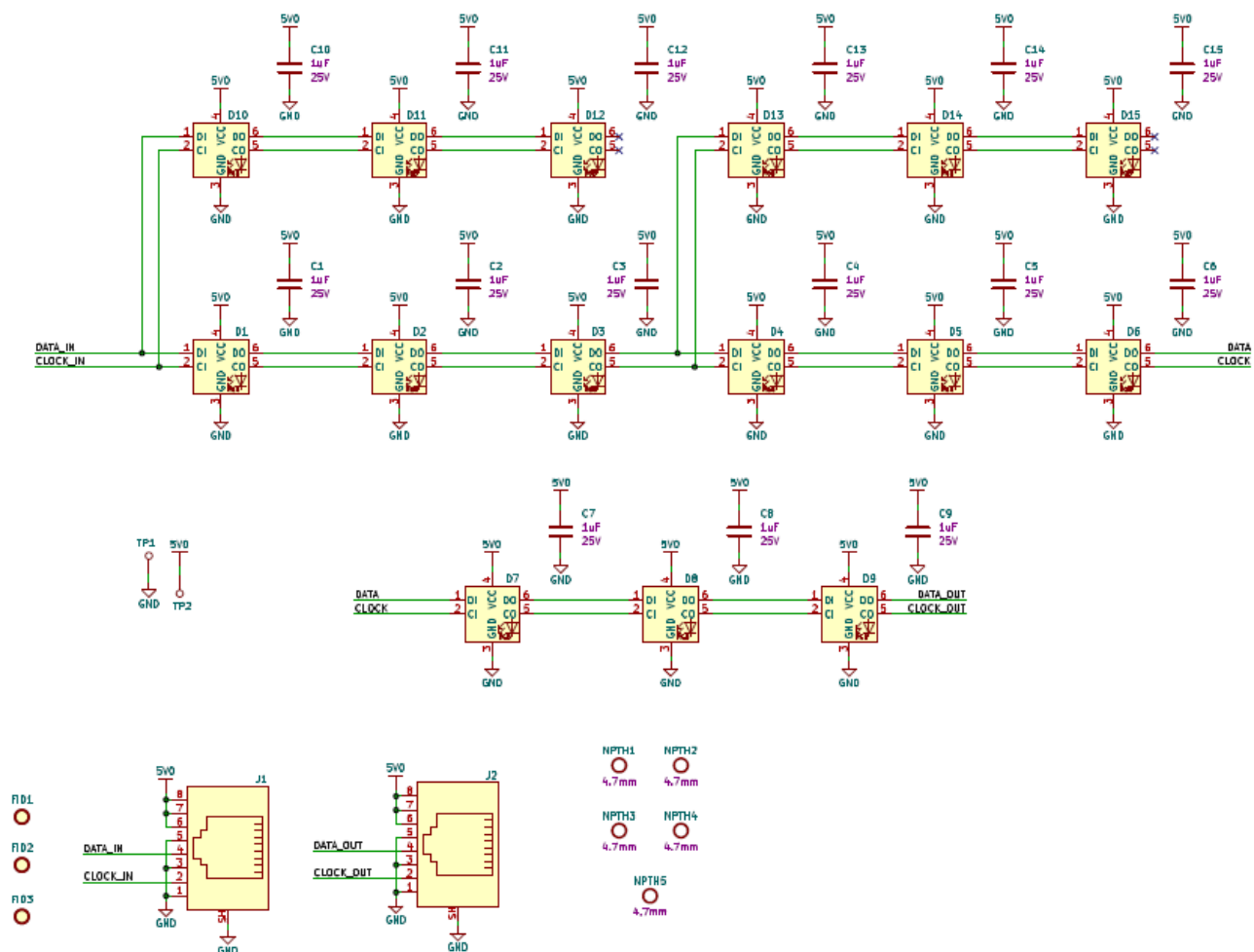
40 HH-0022 Trough Opto-To-Switch Converter Schematic



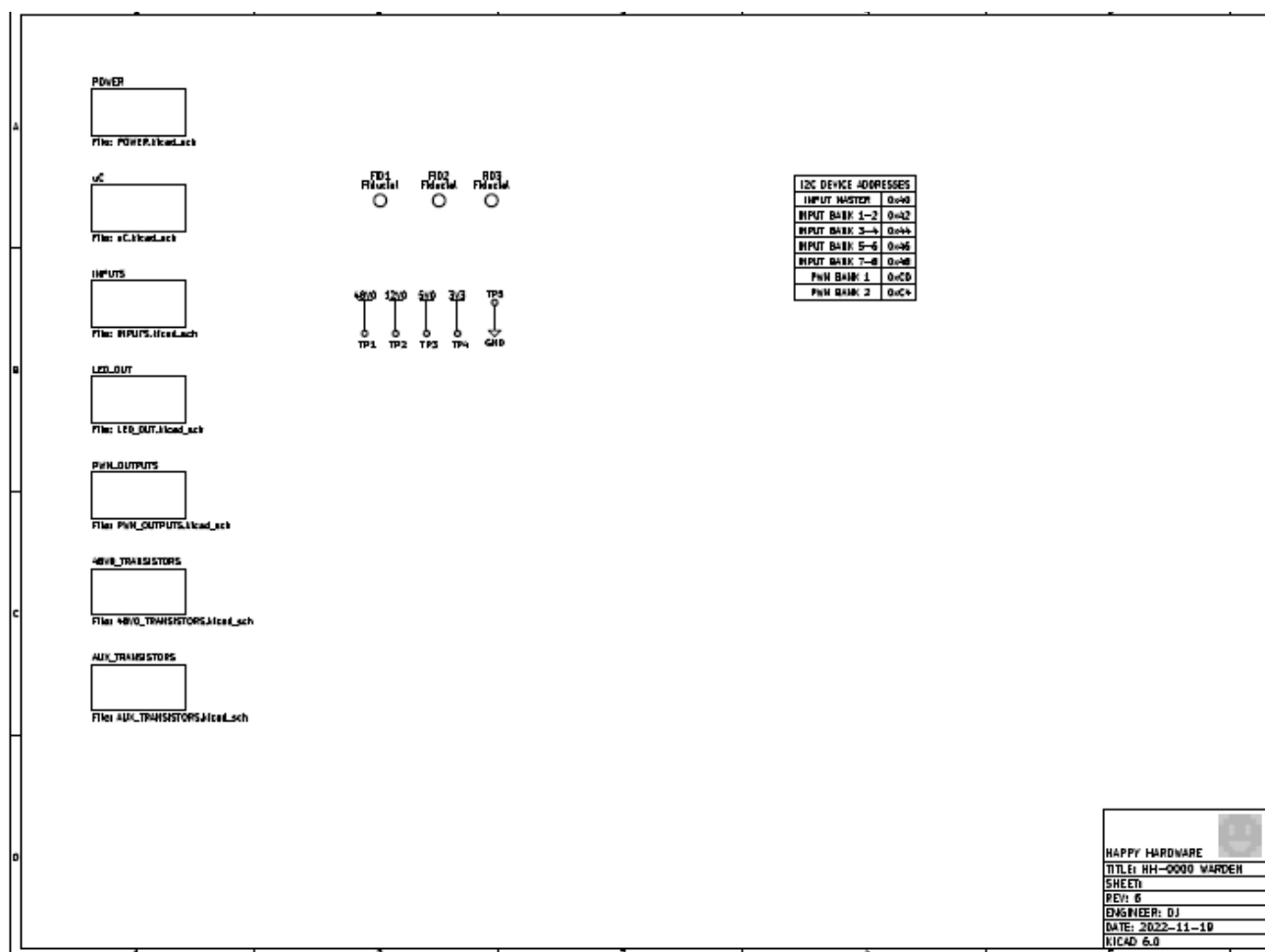
41 HH-0023 Drop Bank LED Panel Layout



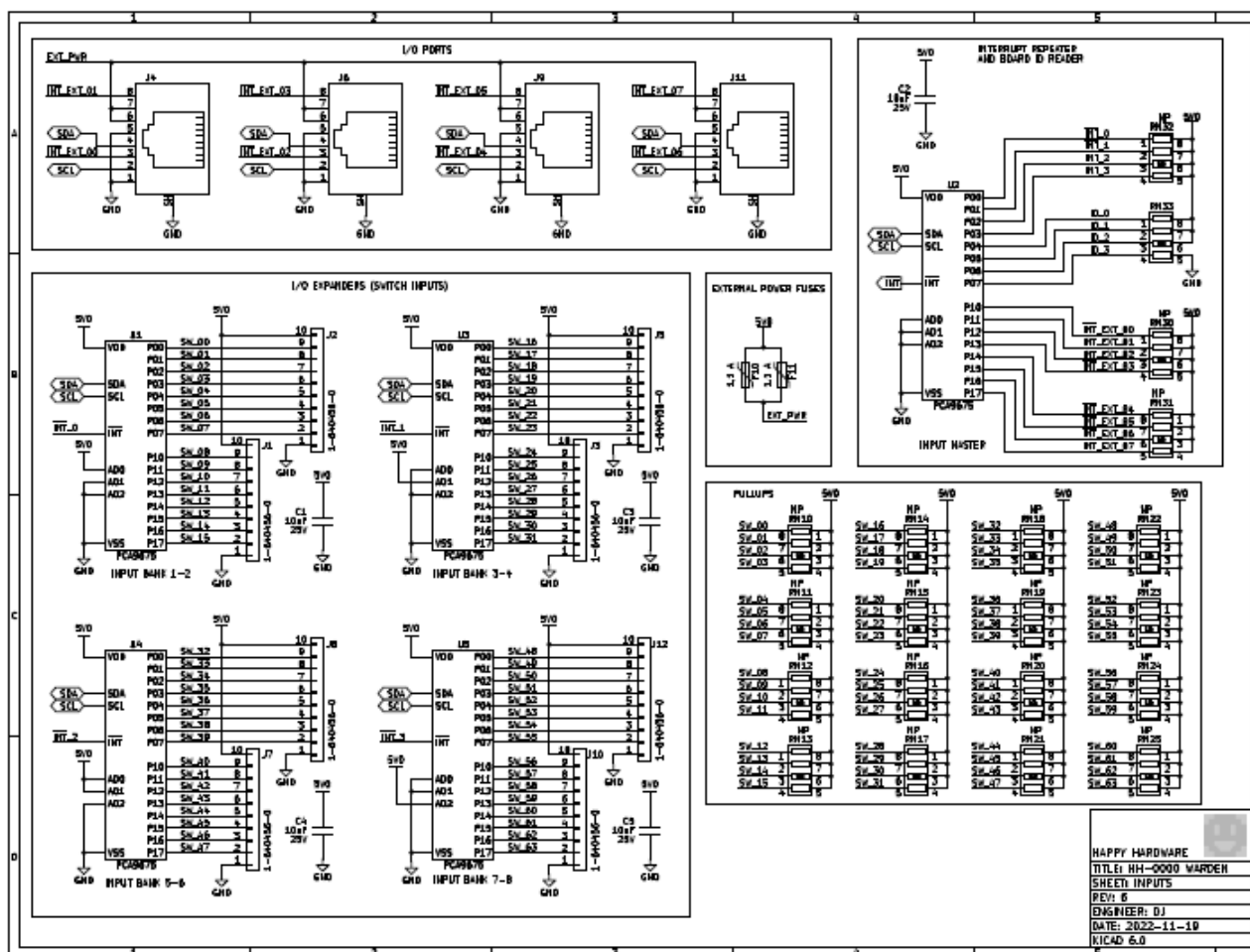
42 HH-0023 Drop Bank LED Panel Schematic



43 HH-0000 Warden Root

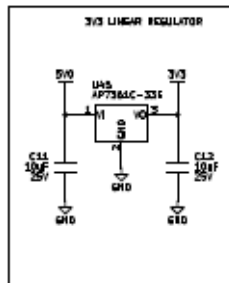
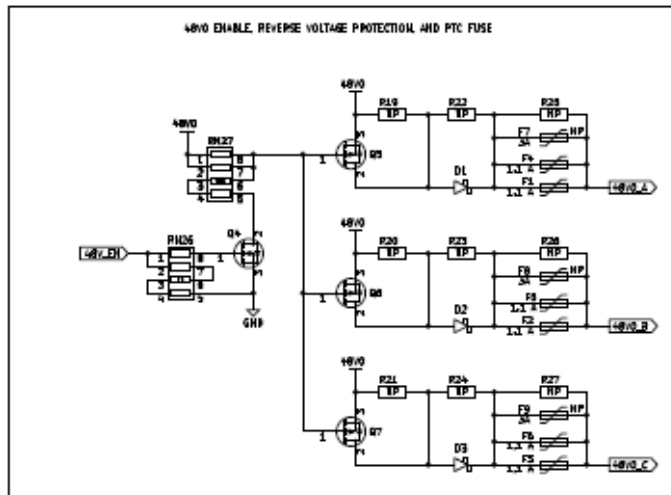
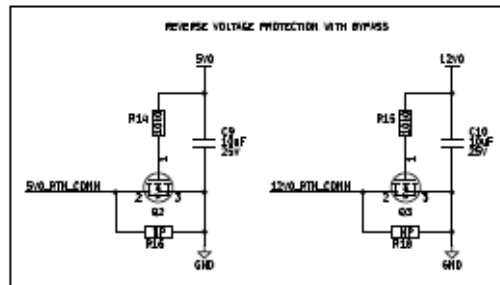
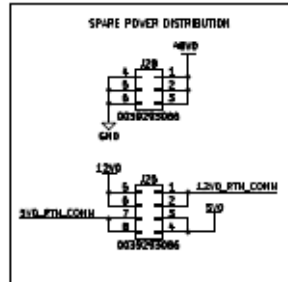
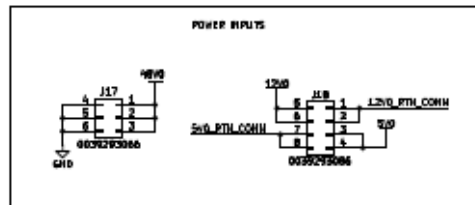


44 HH-0000 Warden Inputs



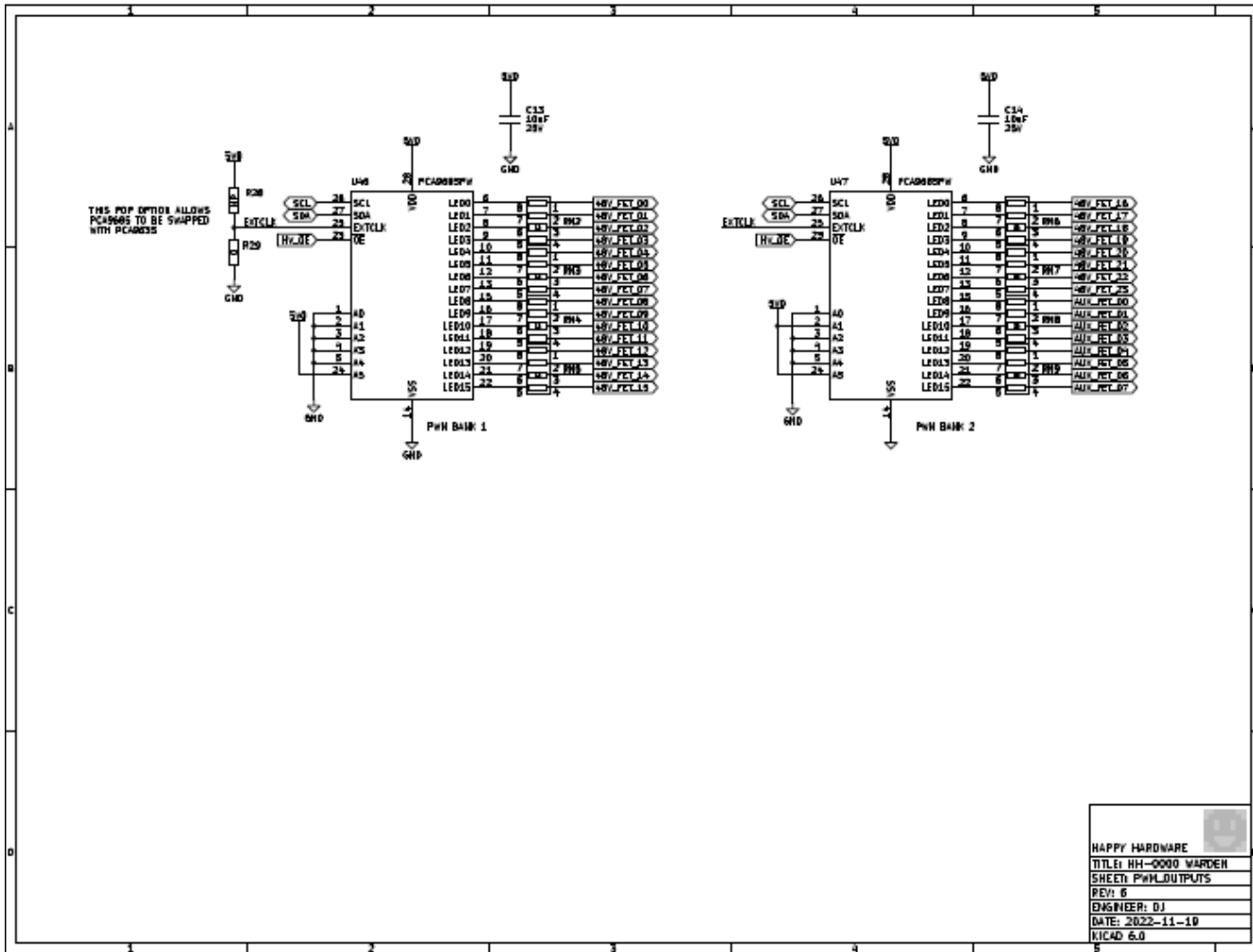


46 HH-0000 Warden Power

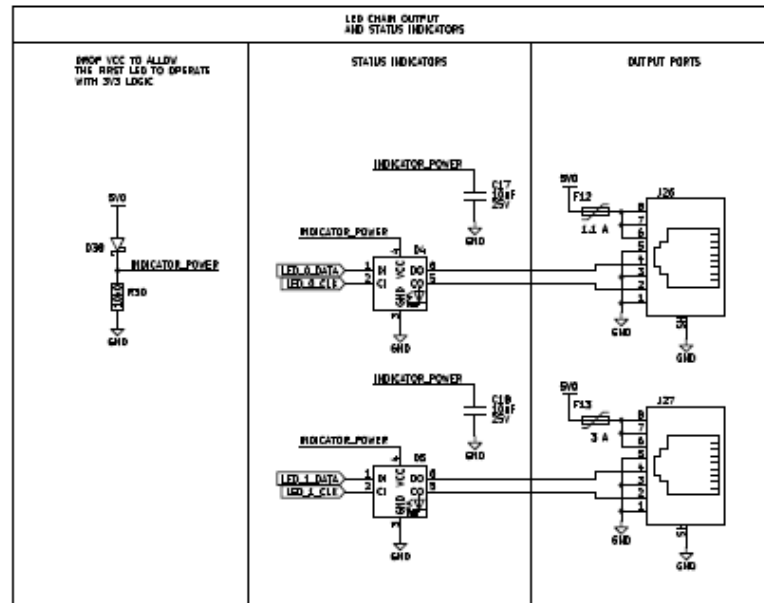


HAPPY HARDWARE
 TITLE: HH-0000 WARDEN
 SHEET: POWER
 REV: 6
 ENGINEER: DJ
 DATE: 2022-11-10
 RICAD 6.0

47 HH-0000 Warden PWM Outputs

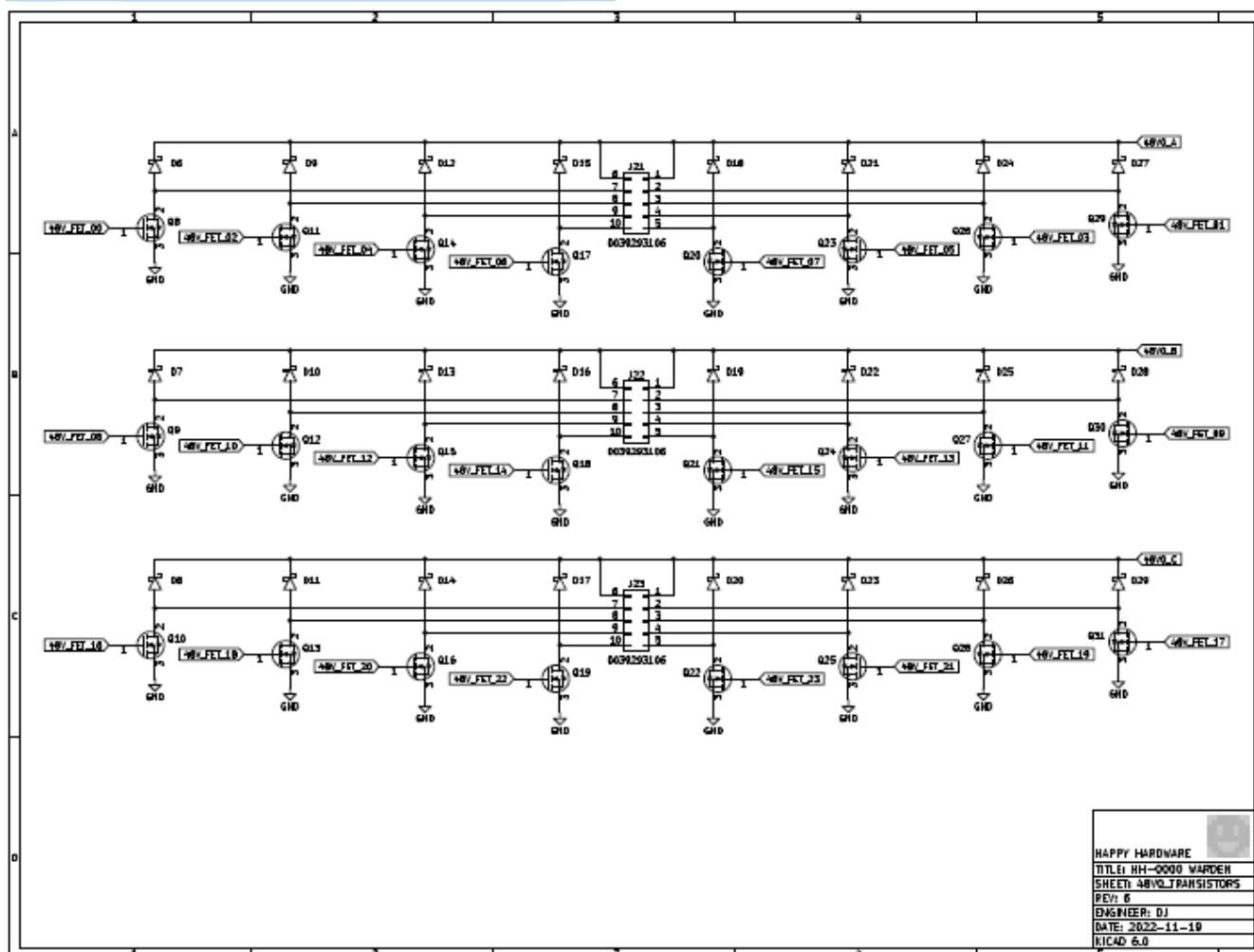


48 HH-0000 Warden LED Out

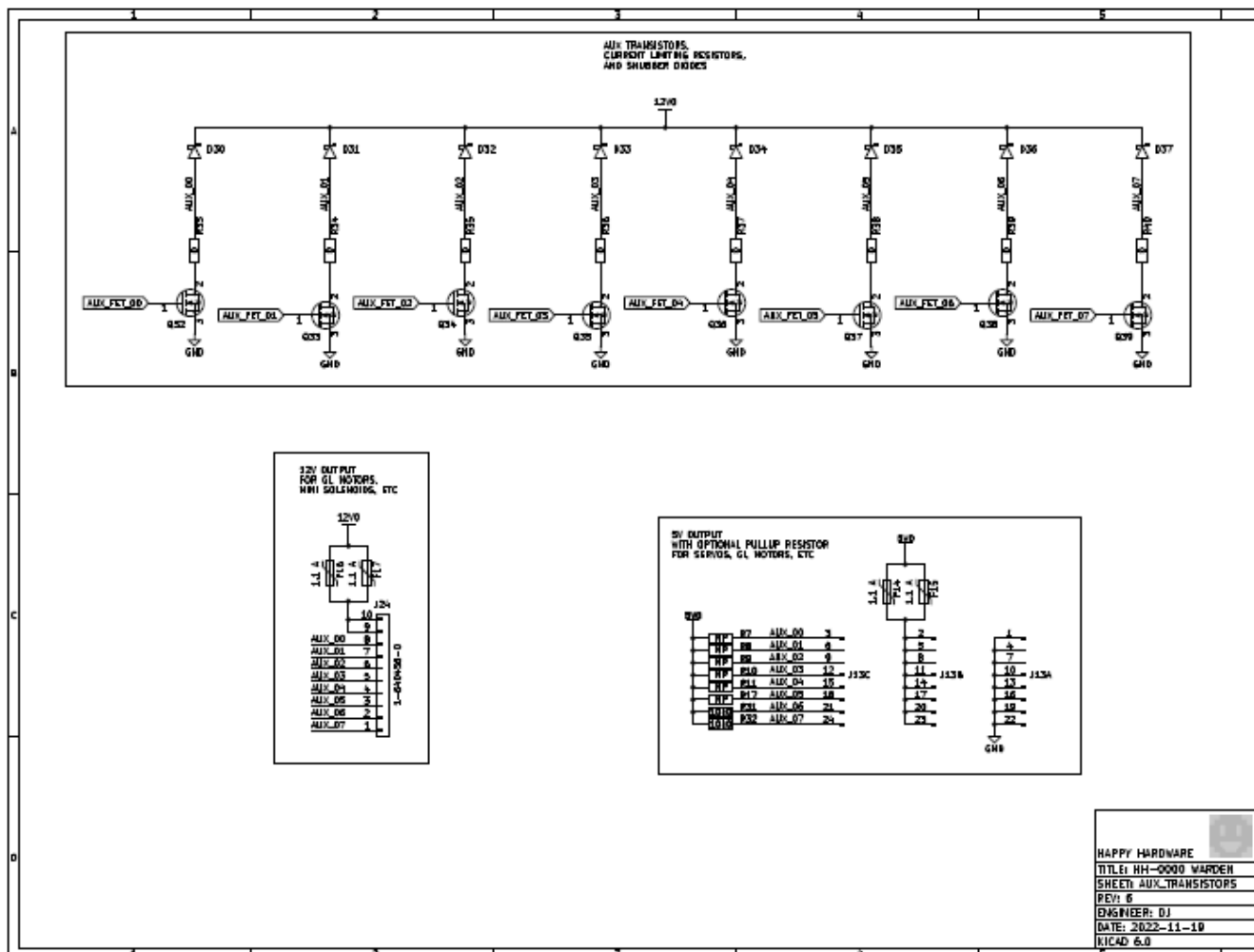


HAPPY HARDWARE
 TITLE: HH-0000 WARDEN
 SHEET: LED_OUT
 REV: 6
 ENGINEER: DJ
 DATE: 2022-11-10
 KICAD 6.0

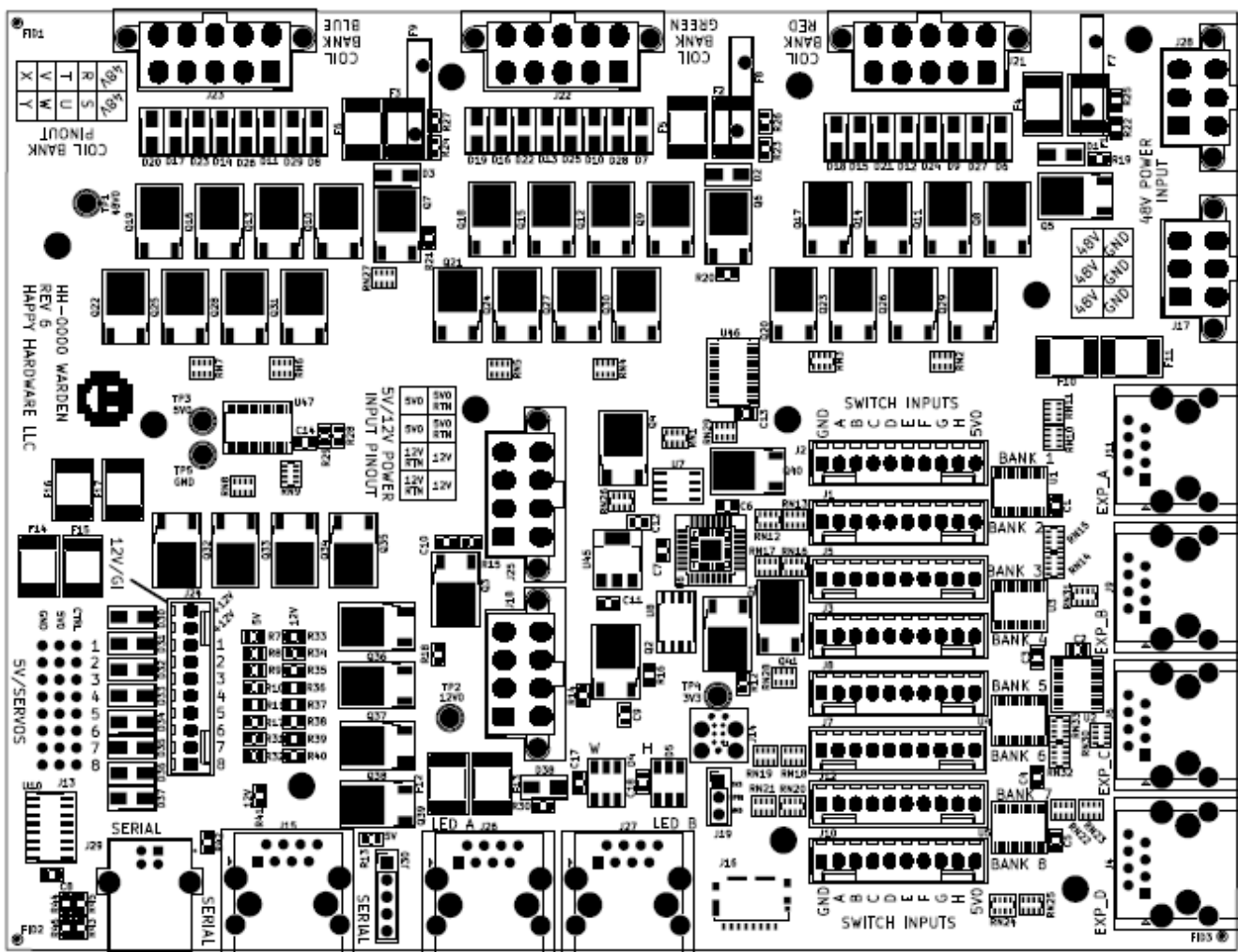
49 HH-0000 Warden 48Vo Transistors



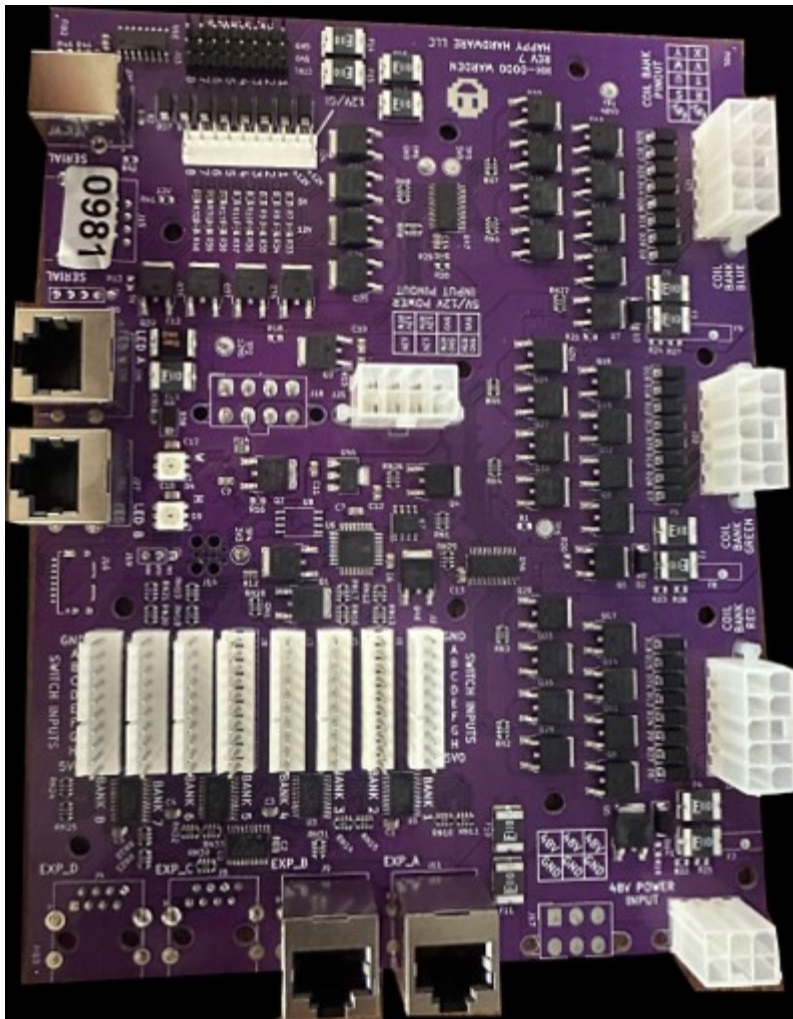
50 HH-0000 Warden AUX Transistors



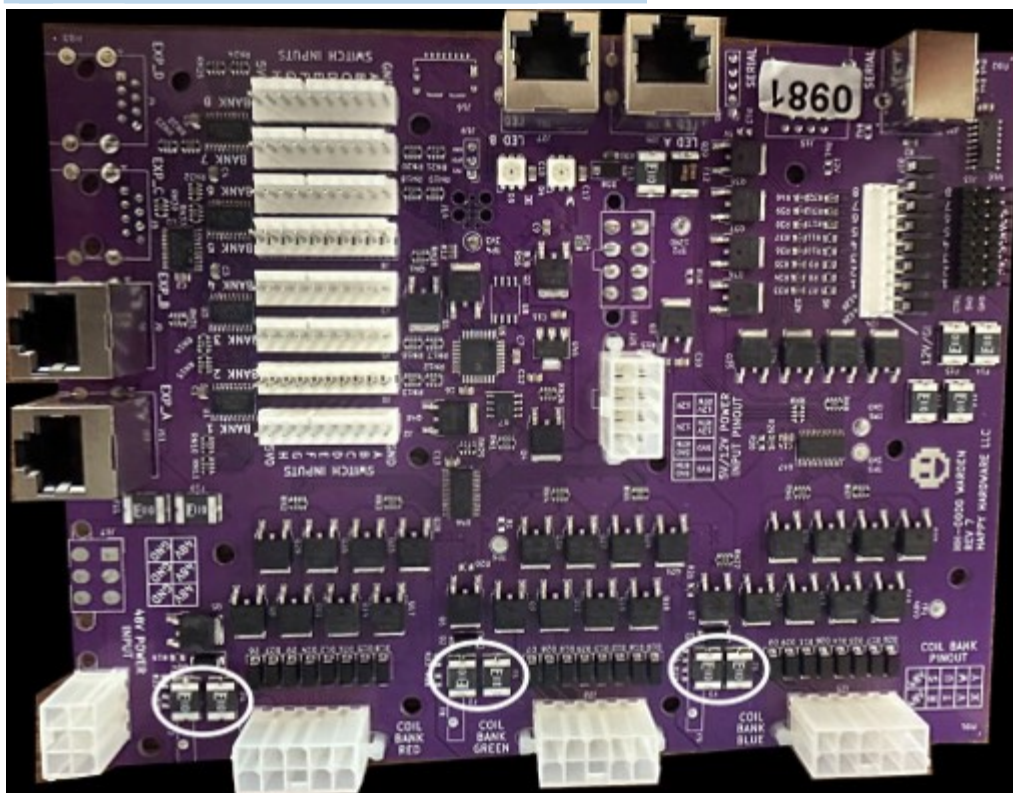
51 HH-0000 Warden Rev 6 Diagram



52 Populated Warden Board



53 Warden Board Fuse Locations



NOTICE

Need to report a code bug in Looney Tunes? You can send an email directly to service@spookypinball.com with the subject "Code Bug"

Chapter 4

Diagnose a Bad MOSFET on the Warden Board

Tools Required

The materials you will need to diagnose a bad MOSFET on the Warden Board:

- Multimeter with an ohms setting (preferably set to 20k)
- Chart for reference (see end of document)
- Wire snips
- Insulating tape

CAUTION

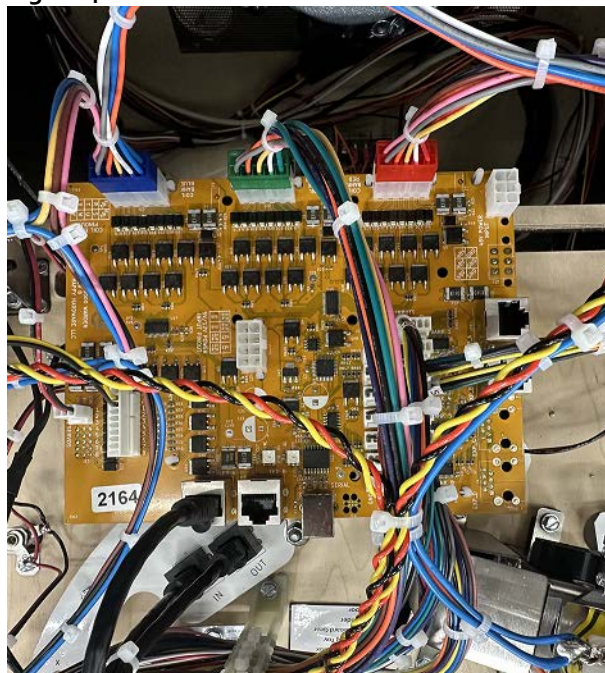
YOU ARE WORKING WITH SENSITIVE ELECTRONIC MATERIALS. PLEASE USE CAUTION!

To diagnose a bad MOSFET

1. Set the multimeter to 20k ohms. If 20k ohms is not available, use the closest available ohms setting.

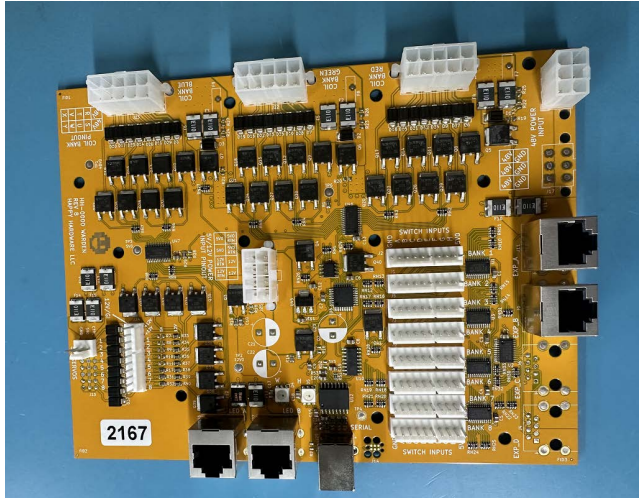
2. Power off and unplug the machine. Carefully unplug all of the coil chains from the main Warden board (Blue, Green, and Red connectors). The connectors are located:
 - underneath the playfield
 - below the drop target mechanism
 - on the left hand side of the playfield

Figure 4-1. Main Warden Board With Connectors



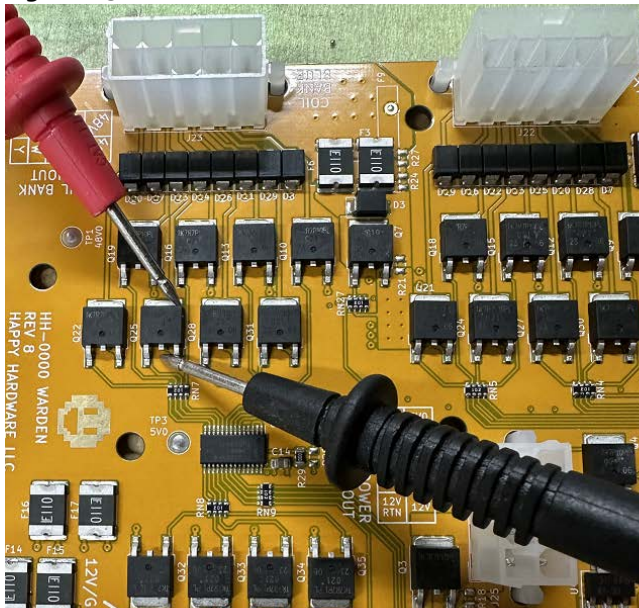
3. To test the MOSFETs, identify the Q8-Q30 MOSFETs on the main Warden board.

Figure 4-2. Main Warden Board - Q8-Q30 MOSFETS



- a Place the red prong of the multimeter on the top bar of each MOSFET (Q8-Q30) and the black prong on the bottom right foot.

Figure 4-3. Main Warden Board with Multimeter



- b A functioning MOSFET should display no resistance reading. If there is any reading, it indicates a faulty component. Test all MOSFETs (Q8-Q30) and note the ones that produce a reading.

4. To identify the coil, use the supplied coil chart to identify the faulty MOSFET to its corresponding coil.
5. To isolate the faulty coil, move the coil plunger that is associated with the bad MOSFET by hand to ensure it has full motion. If the plunger is restricted the coil is bad, too. Check all coils associated with tested bad MOSFETs.

Note: ONLY continue if you have determined that there is a bad/restricted movement coil from Step 5.

⚠ WARNING

If a bad MOSFET is associated with any of the other coils in the machine, stop here and do not continue.

Email: service@spookypinball.com and advise which MOSFETs are bad on your Warden Board causing certain coils not to function.

Please let support know if you have restricted movement coils since you'll need those parts, too.

- a Take good pictures of the associated coil wire connections before cutting wires in Step 5c.
- b Cut the return wire connected to the identified faulty restricted coil associated with the bad MOSFET.

Be careful to cut the return wire only and not the serial power daisy chain wire (Blue, Green, or Red) connecting other coils.

- c Immediately tape over the cut wire to prevent accidental short circuiting.
6. To test the device, power on the machine. It should now function properly, except for the cutout coil that caused the issue.
7. Locate any remaining faulty MOSFETs.

8. If the machine continues not to function correctly, you may have overlooked one faulty MOSFET.
9. Repeat Steps 3 thru 5 for any remaining MOSFETs to identify and isolate the problematic coil.

Spooky Support for Parts

Opt ion #1: Email service@spookypinball.com

Opt ion #2: If you don't receive a reply within 2 business days, call Spooky Support (815-541-4940) to get the parts you need.

Looney Tunes Coil Chart

Red Chain			Green Chain			Blue Chain		
Wire	Coil	MOSFET #	Wire	Coil	MOSFET #	Wire	Coil	MOSFET #
0 Purple	Sling Left	Q8	8 Purple	Lower Right Flipper Main	Q9	16 Purple	Upper Left Flipper Main	Q10
1 White	Lower Left Flipper Main	Q29	9 White	Auto Launch	Q30	17 White	Magnet	Q31
2 Black	Lower Left Flipper Hold	Q11	10 Black	Lower Right Flipper Hold	Q12	18 Black	Upper Right Flipper hold	Q13
3 Yellow	Drop Target Knock-down	Q26	11 Yellow	Knocker	Q27	19 Yellow	VUK	Q28
4 Brown	Divertor (Ball Lock)	Q14	12 Brown	Trough Eject	Q15	20 Brown	Upper Right Flipper Main	Q16
5 Orange	Front Scoop	Q23	13 Orange	Right Sling	Q24	21 Orange	Back Scoop (Door)	Q25
6 Pink	Drop Target Reset	Q17	14 Pink	Shaker	Q18	22 Pink	Right Divertor	Q19
7 Grey	Center Scoop (Left Orbit)	Q20	15 Grey	Right Up Post	Q21	23 Grey	Upper Left Flipper Hold	Q22

Note: Ensure safety precautions are taken, and the machine is disconnected from power during this process. Seek professional assistance if you are not comfortable or experienced in working with electronic components.

NOTICE

Need to report a code bug in Looney Tunes? You can send an email directly to service@spookypinball.com with the subject "Code Bug"

Chapter 5

Switch and Coil Charts

Looney Tunes Switch Chart

Switch Bank for Main Playfield								
Switch Bank 1			Switch Bank 2			Switch Bank 3		
0	NONE	Grey	8	Stand Up Bank Top	Grey	16	Middle Scoop	Grey
1	Trough 7	White	9	Post Lock	White	17	Left Sneakback	White
2	Trough 6	Red	10	Stand Up Bank Bottom	Red	18	Spinner	Red
3	Trough 5	Purple	11	Stand Up Bank Middle	Purple	19	Left Front Scoop	Purple
4	Trough 4	Blue	12	Right Sling	Blue	20	Sling Left	Blue
5	Trough 3	Green	13	Lower Right Flipper EOS	Green	21	Lower Left Flipper EOS	Green
6	Trough 2	Yellow	14	Right Inlane	Yellow	22	Left Inlane	Yellow
7	Shooter Lane	Orange	15	Right Outlane	Orange	23	Left Outlane	Orange
Ground	Ground	Black	Ground	Ground	Black	Ground	Ground	Black
Switch Bank 4			Switch Bank 5			Switch Bank 6 (Upper Board)		
24	Door Scoop	Grey	32	VUK	Grey	H 40	Post Lock Stack	Grey
25	Outer Orbit Left	White	33	Right Orbit	White	G 41	Lower Right Ramp Made	White
26	Back Left Standup	Red	34	Back Right Standup	Red	F 42	Middle Scoop Entry	Red
27	Upper Left Flipper EOS	Purple	35	Upper EOS	Purple	E 43	Orbit Divertor Detect	Purple
28	Middle Scoop Standup Bottom	Blue	36	Captive Ball	Blue	D 44	NONE	Blue
29	Drop Target	Green	37	NONE	Green	C 45	Lower Left Ramp Made	Green
30	Middle Scoop Standup Top	Yellow	38	NONE	Yellow	B 46	Upper Left Ramp Made	Yellow
31	NONE	Orange	39	NONE	Orange	A 47	Corkscrew Exit	Orange
Ground	Ground	Black	Ground	Ground	Black	Ground	Ground	Black
Switch Bank 7 (Lower Board)			Switch Bank 8			Upper Board (Cabinet Expander)		
H 48	Trough Jam	Grey	56	NONE	Grey		Power	NONE
G 49	Trough 1	White	57	NONE	White	80	Lower Right Flipper	Grey

F 50	Inner Right Orbit	Red	58	NONE	Red	81	Action	White
E 51	Door Entry	Purple	59	Spinning Toy Home	Purple	82	Upper Right Flipper	Red
D 52	Upper Right Ramp Made	Blue	60	Lock Enter	Blue	83	Upper Left Flipper	Purple
C 53	Divertor Corkscrew	Green	61	Lock Right	Green	84	Tilt	Blue
B 54	Inner Orbit Left	Yellow	62	Lock Center	Yellow	85	Launch	Green
A 55	Magnet	Orange	63	Lock Left	Orange	86	Lower Left Flipper Button	Yellow
Ground	Ground	Black	Ground	Ground	Black	87	Start	Orange
						Ground	Ground	Black
Lower Board (Cabinet Expander)			GI Bank 1			Servo Expander		
	Power	Yellow	8	NONE	Grey	0-9	NONE	
88	Start Light	Brown	7	NONE	White	10	Fridge/TNT	
89	Action Light	Brown	6	NONE	Red	11	Spinny Toy	
90	Coin left	Red	5	NONE	White	12	Back Board	
91	Enter	Purple	4	NONE	Grey	13	Grinder	
92	Down	Blue	3	NONE	NONE	14	Door	
93	Up	Green	2	GI	NONE			
94	Exit	Yellow	1	Apron Lights	NONE			
95	Cabinet Extra	Orange	Power	Power	Pink			
Ground	Ground	Black						

Looney Tunes Coil Chart

Red Chain			Green Chain			Blue Chain		
Wire	Coil	MOSFET #	Wire	Coil	MOSFET #	Wire	Coil	MOSFET #
0 Purple	Sling Left	Q8	8 Purple	Lower Right Flipper Main	Q9	16 Purple	Upper Left Flipper Main	Q10
1 White	Lower Left Flipper Main	Q29	9 White	Auto Launch	Q30	17 White	Magnet	Q31
2 Black	Lower Left Flipper Hold	Q11	10 Black	Lower Right Flipper Hold	Q12	18 Black	Upper Right Flipper hold	Q13
3 Yellow	Drop Target Knockdown	Q26	11 Yellow	Knocker	Q27	19 Yellow	VUK	Q28
4 Brown	Divertor (Ball Lock)	Q14	12 Brown	Trough Eject	Q15	20 Brown	Upper Right Flipper Main	Q16
5 Orange	Front Scoop	Q23	13 Orange	Right Sling	Q24	21 Orange	Back Scoop (Door)	Q25
6 Pink	Drop Target Reset	Q17	14 Pink	Shaker	Q18	22 Pink	Right Divertor	Q19
7 Grey	Center Scoop (Left Orbit)	Q20	15 Grey	Right Up Post	Q21	23 Grey	Upper Left Flipper Hold	Q22

Note: Ensure safety precautions are taken, and the machine is disconnected from power during this process. Seek professional assistance if you are not comfortable or experienced in working with electronic components.

NOTICE

Need to report a code bug in Looney Tunes? You can send an email directly to service@spookypinball.com with the subject "Code Bug"