ASTEROIDS®
RECHARGED

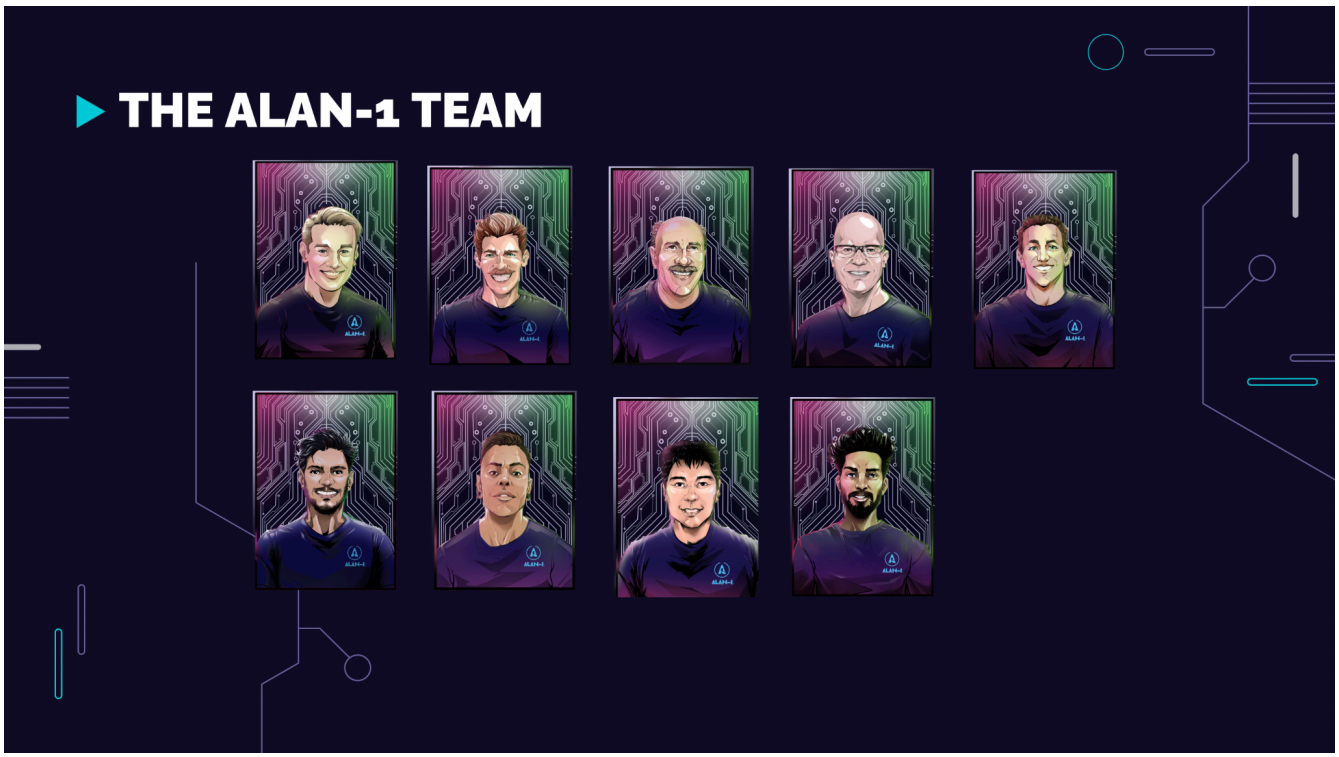
OPERATION, MAINTAINANCE and SERVICE MANUAL

You are now the proud owner of an official Asteroids Recharged arcade machine! Our team has worked hard to ensure that it is the best possible arcade game that will bring you years of enjoyment and profits. Built in the USA, it has been designed and built to the highest possible quality standards.

To ensure top operation for that time it is in your possession, refer to this manual for general maintenance and any repair needs.

We've had so much fun building this. We hope you have fun playing it too. We appreciate your purchase and wish you many years of happy gaming for all who play Asteroids Recharged.

The Alan-1 Crew



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SAFETY

Read This Manual!

This manual contains important information about your Alan-1 game machine, including details to prevent any injury to yourself, your employees, and your players. If followed properly, this advice will also help you prevent any damage to your valuable new game.

Alan-1 Inc. is not responsible for any operation or modifications that are outside of the game's original design, as delivered.

Transporting The Game

Due to the height and weight of the Asteroids Recharged game machine, along with its delicate glass and electronic components, we advise great care when moving it, whether for short or distant transport.

Before moving it, ensure that the built-in casters have been raised to prevent catching on any raised surfaces. **We recommend a minimum of two people to move the machine at all times.** Avoid any rough handling. If transporting on a truck, use proper soft packing on all of the edges when applying moving straps, otherwise it can cause severe damage to the game cabinet during transport.

If there are any game issues after moving or transport, we recommend that you check the various cables and components, which may have come loose from the movement.

Power and Grounding

Take care to avoid electrical shock.This game comes with a standard 3-prong power cord. *Do not cut off or defeat the grounding prong of the power plug!* This creates a safety hazard that could harm yourself or your guests.

On rare occasion, the power cord may fail. It is replaceable. ***Never use a damaged power cord!*** Replace it immediately. (See the "Power Requirements" subsection under "Product Specifications.")
We recommend that you plug this game into a surge suppressor.

Always power off and unplug the unit before any servicing or making adjustments unless otherwise instructed by an Alan-1 or other authorized service technician. Installing new or repairing existing components while the power is on can damage crucial components, thus voiding the game's warranty.

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Water

Keep this game away from water and water sources. Do not clean it with running water.
We recommend installing against a wall with a small amount of clearance, so that the ventilation ports are not accessible to spills and sprays, but also to allow for proper ventilation and air circulation. If the unit sustains any water damage, cease using it immediately and unplug the AC power.

Monitor

The monitor contains no user serviceable parts. Only trained service technicians should attempt to service the display. If the tips in this manual do not help in solving any display issues, contact the service department at the distributor you purchased the game from for assistance.

Connectors

Connectors are often keyed and should only connect one way in these instances. When servicing the machine, ensure all connectors mate properly. If connectors do not slip in easily, do not force them as this will cause damage. Check for correct orientation. If any connector is damaged, discontinue use of the game until an authorized service technician can replace it.

Computer & Electronic Components

The computer board contains sensitive components, including an SSD hard drive. It and the other electronic components are *highly sensitive to electrostatic discharge (ESD).*

Prior to servicing the computer or components, discharge your body from any ESD, as a discharge into a component can permanently damage the part that was touched. Also be mindful of certain articles of clothing that might generate ESD, such as jackets with wool lining.

Treat all components as fragile. Call your distributor's service department before servicing. Ask about warranty information as it relates to the PC and other electronic parts.
Cycle AC power on or off with the cabinet power switch instead of unplugging it directly from the PC motherboard.

Voltage

Each game is manufactured for a specific AC voltage to ensure its proper operation. On first use, verify that the AC voltage matches the game's specified voltage rating before activating the power, Games in North America should be set for 110V/120V.

Hazard To Epileptics

A small portion of the population has an epileptic condition that may cause seizures. Individuals affected by this condition may already avoid video games, however, some may have an undetected condition that can be triggered by certain visual patterns. The game cabinet has

front-facing, bright LED flashing lights, in addition to rapid, colorful action on-screen. P*laying this game, and watching others play this game, can potentially cause seizures*. If you, your children, or anyone else you are responsible for are diagnosed as epileptic; have suffered seizures in the past; are related to someone with epilepsy; or suspect that you may be epileptic or susceptible to seizures; you should consult your physician before playing this game.

Servicing

Only authorized service personnel should access the internal components of the game.

Disconnect power before servicing unless specifically directed otherwise. This game contains no isolation transformer and there are no power interlocks.

Be mindful of Electrostatic Discharge(ESD) as previously mentioned and refer to the section on connectors when dealing with the wiring and internal connections.

Keep the back door of the game on at all times. Leaving the back open may invite snooping customers to get inside of the game, where they might injure themselves, damage the game, or steal components.

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PRODUCT SPECIFICATIONS

Asteroids Recharged Pro Model - 2 Player

Power Requirements

United States, Canada (ETL)
Voltage: 120VAC / 60 Hz
Operating AC Current: 1.5A
Power draw ranges from 20 minimum; 105 watts operating; 115 watts peak.
Power cord is IEC type 13.

Operating Conditions

Temperature 50F - 104F (10C - 40C)
Humidity < 95%

Cabinet Dimensions

Shipping (Inches)	Installed (Inches)
Height- 82 ¼” Width- 48” Depth- 40” Weight: 335lbs	Height- 77 ¾” Width- 31 ⅛” Depth- 29 ¼” Weight: 300lbs

Monitor Specifications

32” 1920x1080p HD
Connection to PC: HDMI

I/O Board

Each Alan-1 game uses a custom-designed I/O board called the 400 i/oT (for 2 player games), 600 i/oT for 3 player games and the 800 i/oT for 4 player games. This board is the heart of what is called the Alan-1 Video Arcade System® (VAS). The VAS operates all controls and lighting. Modifying the i/oT board or any component of the VAS in any way will void your warranty.

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Stress Testing

Each Alan-1 game undergoes stress testing as a part of the Quality Assurance (QA) process. This is done to ensure that the cabinets are up to professional standards where they can be operated on location for decades to come. Our stress testing includes:

- Once a cabinet is completed on the line, technicians check and ensure that all buttons light up and are responsive; ensure that the inputs (controls and coin door) works properly while also testing the outputs (the monitor, speakers, “cabinet toys”). There is a factory checklist that needs to be signed off by two individuals (line worker and a manager).
- Cabinets are then moved multiple times on their back wheels around the factory to ensure that they can withstand typical and practical wear-and-tear, then inspected and tested again to ensure that there are no issues. If there are, these are corrected at the factory and the game is fully tested again.
- The overall cabinet design that is being used for all Alan-1 upright 2-player models has been thoroughly tested and refined through location testing and shipping cabinets across the country, then making adjustments/corrections as needed, and applied to all future construction.

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CABINET OVERVIEW

(Pro)

FIGURE 1. ASTEROIDS 2 PLAYER PRO CABINET

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SETUP

Unpacking

The Cabinet will be fully intact and closed during transit. There will be plastic and foam layers around the VAS that will have to be taken off for use. Please do not use any sharp knives as you remove those layers, taking caution to not mare or scratch the cabinet. A razor can be used to cut the straps, but still take care to not injure yourself or the cabinet while removing those. Any actions which damage the VAS will void any warranty work pertaining to the art or outer image. You can find the KEYS inside of a coin reject slot, behind a sticker that says KEYS. The power cord will be located inside of the coin box, while the keys to the rear door will be inside of the top coin door near the top left.

If the cabinet arrives damaged from the shipping company, DO NOT SIGN FOR IT. Otherwise, you will be held responsible for the costs of repairing the damages. Contact your distributor salesperson ASAP to follow their corporate policies regarding damaged shipments.

Assembly

The game comes fully assembled. However, a few steps are necessary before you install the game, plug it in, and turn it on to start generating revenue.

- Find the coin door keys behind a sticker that says KEYS on a coin reject slot
- Open the coin box door and retrieve the power cord.
- Unlock and remove the rear door (keys are hanging from the top coin door)
- Check all internal cables, verify that they're still inserted and tight. Some cables might have become dislodged during transport.
- HDMI cable between the mainboard and monitor
- Power cable to the monitor
- Power cable to the audio amplifier
- Speaker cables (to upper speakers and the lower subwoofer)
- USB cables between the mainboard and the I/O board
- Edge connectors from I/O board to control panel. The 2P cabinet has one.
- Check for anything else obviously out of place
- Put all keys and spares in a safe place, according to whatever system you use.

CAUTION! Before Plugging In Your Game

If you have purchased a game that may have been originally shipped to or intended for a different country, STOP! *Plugging it in and turning it on is dangerous due to voltage differences, and can damage the game.*

Find the power distribution box at the bottom of the cabinet. (Wall power goes into this box from the outside.)
Unplug the game's wiring harness from the power distribution box. There are several connectors.

Unscrew the power distribution box from the bottom of the game.
Turn the power distribution box over.
There will be a long, thin rectangular box screwed to one side of the outer case. On the bottom of this box is a red slider, set to either "115V" or "230V". If the voltage on the slider is different from the wall power in your country, slide it to the other side using a small screwdriver.
Reattach the power distribution box to the bottom of the game.
Plug the game's wiring harness back into the power distribution box.
Now you can plug in your game and power it up!

Wall Power Requirements

Asteroids Recharged Pro 2-player requires wall power at either 110-120VAC or 220-240VAC, depending on your country.
Power draw is approximately X watts continuous, Y watts peak.

- Make sure you have at least Y more watts available on the circuit you're plugging it into, after taking everything else on that circuit into account, including the amperage.
- Do not overload the circuit. Circuits should also not be driven to the limit (i.e., do not operate a total of 20A worth of games on a 20A circuit, as this will wear out the breaker faster and may lead to circuit shorts or other power issues that can damage the game).

Do not cut off or defeat the grounding prong of the power plug! This creates a safety hazard.

Installing a Cashless Card Reader System

Asteroids Recharged ships with a single standard 2-slot coin door. The included coin mechs are set to 25¢ by default. **If you are using coins or intend on setting it to free play, you may skip this section.**

If your venue uses a card system, then Asteroids Recharged is compatible with the UCL standard. *Each Asteroids Recharged cabinet contains one 9-pin UCL connector per player.*
All modern card systems should connect directly to the UCL connector, which provides power and ground to the card reader, as well as credit and ticket signals.

- IMPORTANT: When connecting a cashless system via the UCL connector, you must first disconnect the white COIN+ wire from the coin switch, and connect it to the white COIN+ wire on the UCL connector.
- If your card reader system does not support UCL, see the "Illustrations" section for a diagram of the UCL harness, which will provide the power and signals you must tap into.

We recommend that card readers be installed on the coin doors. Suzo Happ sells upper coin doors with mounting holes for different types of card readers:

- https://na.suzohapp.com/products/coin_doors/42-3145-10
- https://na.suzohapp.com/products/coin_doors/42-3145-03

Smaller card readers can be installed directly on the upper control panel. ***Do not drill without checking clearances underneath first!*** There are fans mounted underneath the upper control panel and drilling might easily damage them.

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Network Setup

Asteroids Recharged can connect to the internet for free online leaderboards, updates, remote operator access, and MLeS connectivity in one of two ways:

- Wired (Ethernet)
- Wireless (WiFi)

For WIRED connectivity:

- Remove the back door of the game machine
- Locate the RJ-11 Ethernet port on the game computer. It looks like an oversized telephone jack
- Using a CAT5e or CAT6 ethernet cable, connect one end of the cable into the computer, then the other end into your switch or router.
- Within the service menu, the game should state “Internet connected” in the top right corner if a signal is present. If not, check your type of cable and your internet switch or router ports

For WIRELESS (WiFi) connectivity

- Your game comes with a WiFi antenna that connects to the motherboard. Access this area by removing the backdoor.
- Ensure that the thin wires from this component are properly connected. If not due to shaking during transport, they are fastened using a small screwdriver.
- **Please refer to the next section below for full wireless setup.**

Alan-1 Operator Account & WiFi Setup

Alan-1 offers a free mobile app for operators called the Alan-1 Game Grid app. Available for both iPhone [iTunes/Apple] & Android [on the Google Play store] devices, this app is required for connecting your machine to the internet and **registering the game for warranty service**. It will also allow you remote access to the game to register your location for customers to find you, run tournaments, see which registered MLeS users have played the game, monitor the audits, and get a FREE first time advertising run paid for by Alan-1.

You can find the app by searching for “alan-1 operators app” or “alan-1 game grid app” in either store. Here are direct links, while on the next page you will find QR codes to download (for offline versions of this manual)

Android: https://play.google.com/store/apps/details?id=com.alan1.operator
Apple/iOS: https://apps.apple.com/in/app/alan-1-operators/id6473255460

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Once you have downloaded the app, setting up your account is simple. Follow the instructions within the app such as entering your name, location, email, and password. Required fields will be given a *. After all of the info is entered, follow these steps to connect your cabinet to the internet:

- On the cabinet with the game on, open the coin door and turn the service switch to the ON position. The screen will change to the Service Menu
- Navigate down to ONLINE HQ
- In this menu, select WiFi HOTSPOT and press 'hyperspace' to accept. This will generate a hotspot that your phone can connect to for sending network information.
- Open up the Alan-1 Game Grid app on your mobile device. Click on the triple line icon in the upper left hand corner of your screen.
- In the menu that appears, press 'Connect WiFi'
- A screen with instructions and a Continue button will appear. **DO NOT click continue until you complete the next step! Otherwise the setup will not work**
- Go to your WiFi network settings (usually by pressing and holding on the WiFi symbol in your top menu). Available networks should appear, including the "Alan-1 Cabinet Hotspot." Press this and your device will connect to it. It may take a moment and it will mention that it has no internet, but is connected.
- Now go back to the Alan-1 Game Grid app and press continue. It will then present you with a screen to input the Network ID & Password that you wish the cabinet to connect to. This is NOT the Alan-1 hotspot, but whichever network you want the machine to be connected to. We recommend that this be a secure, private network that you have access/permission to use and not public WiFi. Once the info is submitted, there will be a message about the success of the credentials being sent to the machine. If there is an issue, such as an incorrect password, you will need to try again. In some instances, you may need to connect to the hotspot all over again.
- Now you should see the 'Internet Connected' message in the top right hand corner of the screen. You may exit the service menu and begin to enjoy your game.

If there is an issue with the setup, please refer to the Troubleshooting section in this manual.

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Pricing Setup

Asteroids Recharged will be set to accept four coins by default, but you can set it to what fits with your venue's needs. You can find more details on this and other settings down in the GAME OPTIONS section.

To access the pricing setting, follow these easy steps:

1. With the game powered on, use the key to open the top coin door.
2. Inside of the coin door, you will see a switch & a button, like this:

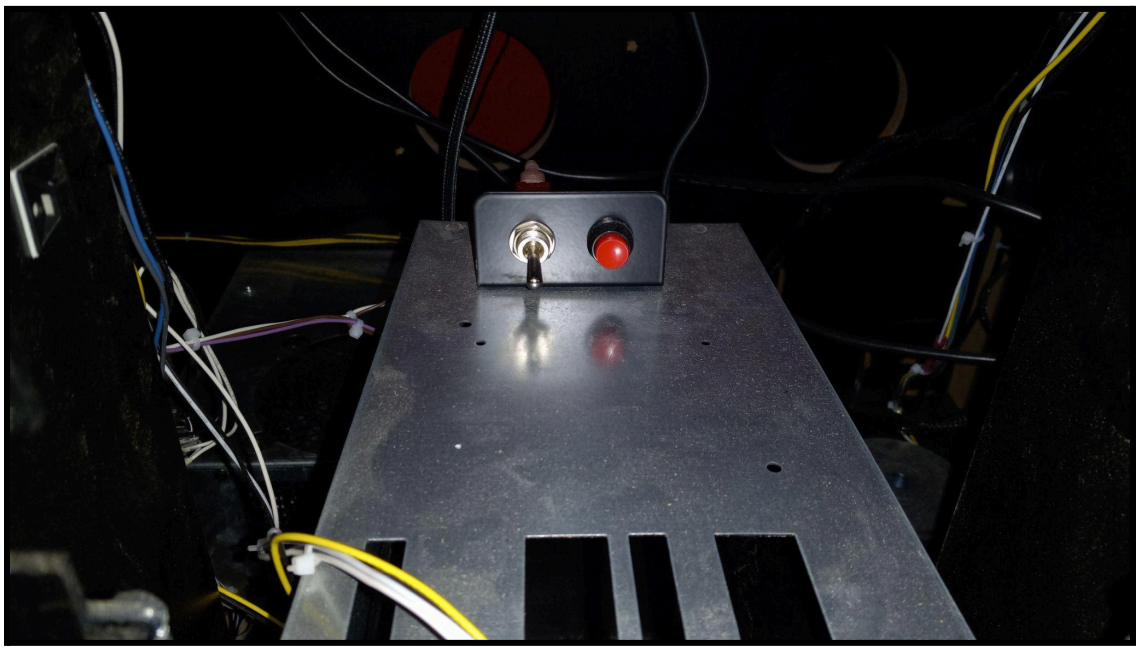

FIGURE 2. SETTINGS MENU TOGGLE SWITCH

3. Flick the Operator Menu switch to the UP position. On the monitor screen, it will load the Operator Menu.
4. Use the control panel to navigate to the Pricing Options menu
5. On this submenu, you can first set the game to one of the following options: Currency | Swipes | Taps | Tokens | Coins
6. Units per start credit can then be set to your desired amount.
7. If the game is going to be set to free play, you may also set it on this page
8. If you wish to use Bonus Pricing, you can also set this up here under that setting.
9. In the unlikely event that the game accumulates a large number of 'phantom credits,' you can clear this by selecting the CLEAR CREDITS option.

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Initial Testing

After the game has been set up with these settings, it is highly recommended that you test the game to ensure that it is accepting payment and that all of the controls for each player are working properly. You can also go into the service menu and navigate to the TESTS to verify that all of the switches are operating correctly.

Redemption Notice

Each Alan-1 game supports ticket redemption through card swipe readers (also known as eTickets). **Systems do not ship with, nor do they support, physical ticket dispensers.**

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GAME DESCRIPTION

Asteroids Recharged - Arcade Edition

Asteroids Recharged is the fifth version of Atari's *Asteroids* to come to the arcade scene, following *Asteroids Deluxe*, *Space Duel*, & *Blasteroids*. The player controls a spaceship that is surrounded by asteroids where they must shoot them for points and survive. When an asteroid is hit, it splits into two smaller pieces. Shoot one of those pieces again and it splits again into smaller, faster asteroids. Once the smallest asteroids are shot, they disappear from the screen. Each time the rocks are smaller, they change in point value, but by hitting the asteroids in succession (i.e., landing each shot and not missing), there is a bonus multiplier that can increase points.

In this version of Asteroids, the game includes a number of power-ups to give the player the upper hand. Read more about these power-ups below.

Thanks to the arcade cabinet, players get to use the same button controls that the original had with a LEFT & RIGHT ROTATE button to adjust your direction; FIRE to shoot; THRUST for forward motion on the screen; HYPERSPACE to jump to a random point on the screen to escape dangerous situations. Just note: When using the Hyperspace function, there is a small chance where your ship will overload and explode. So be careful and don't overuse it!

Arcade Exclusive Features

Thanks to our extensive refinement process, which has included feedback from casual gamers and world record classic gamers alike, the Arcade Edition of Asteroids Recharged is a very different (and in our opinion, superior) experience from the Asteroids Recharged game that was released back in 2021. These changes include:

- Physical effects (called "toys" by the game) such as a cabinet knocker, wind effect fans, and two types of rumble motors, and interactive LED lighting that reacts to events.
- Wave-based gameplay. There are 256 waves to play through, including some new Challenge waves that offer unique situations and enemies to encounter.
- User selectable difficulty. When beginning a game, players can choose from Beginning, Advanced, and Expert.
- Refined gameplay that holds closer to the arcade original in terms of how shots work and how UFOs behave.
-
- Voice overs. "Captain Ace" guides the player in how to play the game and comments on the player's performance.
- An official comic book and in-game integrated comic panels within the game.
- Online leaderboards and achievements through the integrated Major League eSports (MLeS) app. Find out more about the app here: https://mles.com
- Optional ticket redemption support.

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- Bonus multipliers. This means that if you hit an asteroid, you get a small point bonus; if your next shot hits another asteroid, the point bonus increases. This continues until a maximum limit or you fire a shot that misses. A missed shot resets the multiplier.
- Secrets. Remember the "Konami Code" of old, and the excitement that brought to gaming? After a coin is inserted or card swiped/tapped, there will be a screen that shows the MLeS QR code. If you input a certain sequence of button presses while on this screen, a chime will play for a successful input. Then push start to see what you might have unlocked. Explore the possibilities and get people talking!

Power-Ups

One aspect about Asteroids Recharged that is unique from the original arcade versions is the addition of power-ups. These can mean the difference between in-game life and death! They are obtained by shooting at the giant purple dome UFO that occasionally appears on the screen.

While this aspect exists in the console version of the game, the behavior of the power-ups has changed for most, allowing them to function in a way that better fits with the expectations of a fast-paced arcade game. As one example, the Mega Laser no longer has a heat up period, instead firing off a beam instantly. Slow Time changes the sounds to that of the original Asteroids. Deflectors now deflect both UFO shots and asteroid collisions. There are a few other small improvements.

Instead of the power-ups being drawn to the player's ship as though it were a magnet, players must take a risk to go and grab the power-up while also keeping in mind that depending upon the game's difficulty, there is an invincibility timer attached to each pick-up. Beginner waves have the longest timer, while Expert waves have the timer as practically non-existent.

The power-ups themselves are generally given a pre-set time as to how long you can use them, instead of being based on how many shots you have, so use them quickly. The ship itself will fill up with a solid color, which wears down along with the timer, so you can see how long you have left with any given power-up.

Types:

Spread burst - A short-range spread shot. Great for clearing out the screen quickly.

Tri-Burst - Fires three bullets at once. Has full-range to reach across the screen.

Bi-Way - Fires a bullet from the back of the ship, along with the front.

Tri-way - Fires three bullets, one straight, the other two to the direct left & right. Great screen cover.

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Exploding Bullets - Destructive shots that create mini-black holes upon impact

Mega Laser - A straight beam of energy that slices through anything in encounters. Takes a few seconds to warm up and your ship rotation will slow down while using it.

Orbiting bullets - A breakable shield that orbits your ship. If one collides with an asteroid, it's removed like it had been fired.

Slow Time - Slows everything down except for your ship for a couple of moments.

Rapid Fire - Hold the button down for a machine-gun type firing effect

Trailing Bullets - See your bullet trails while dealing more damage.

Deflector - An energy shield that will keep you safe for a short period of time.

Secrets

Long ago, many video games featured codes or other methods to unlock secrets within the game. These could reward the player with extra lives, such as with the famous "Konami code" found on many NES titles, or it could entail silly game changes, as found in Midway's *NBA Jam*. Atari themselves pioneered the whole idea of the "Easter Egg," such as with hidden elements in some of their early arcade games, or most famously within the Atari 2600 game *Adventure*.

While much of the gaming industry has discontinued the use of secrets & Easter Eggs, especially within the arcade industry, Alan-1 has brought them back in Asteroids Recharged.

To activate a secret, the player must first credit up the game. When they are presented with the MLeS login screen (where it shows a QR code for the player who pushed start, along with other MLeS tournament information), the player must enter in a sequence of button presses on the control panel (do not press the start button first!). If the correct secret sequence has been entered, the game will play a chime, then they can press start and see what is new. Only one secret can be active at any given time.

Aside from adding a spice of extra fun to the game, secrets are also intended to drive players out to your location either to try them, or to record themselves in a potentially "viral" moment for discovering a new sequence! This can create excellent, organic marketing for your location, so use it to your advantage - especially if your location is where a never-before seen secret is unlocked!

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MAJOR LEAGUE ESPORTS

Unlock a deeper game experience with MLeS

Alan-1 has created a mobile app that brings the excitement of eSports to arcades. Called Major League eSports (MLeS), this free mobile app is available for both Android & Apple iOS devices. Every Alan-1 arcade game supports MLeS, which unlocks a richer game experience. This includes nationwide leaderboards & tournaments, League Points, the ability to continue your game from where you left off, and the app will notify a player when someone has defeated their scores!

Asteroids Recharged advertises the MLeS app in the attract mode, which your customers can download by scanning the QR code, then downloading the app.

After credits have been inserted into the game and any player pushes start, the screen will display a QR code for each player to use. Go into the app, press the QR code button in the upper right corner of the phone screen, then scan the code on the game screen. It will log you in and begin tracking your progress.

We highly recommend that you promote this feature, as we designed it to drive repeat play to your location. You will also be able to set up your own local tournaments by using the Alan-1 Game Grid app that was used for connecting WiFi and registering the cabinet.

Direct link: https://mles.com/download
You can also access the link on your phone by scanning this QR code:

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A PARTNER IN YOUR SUCCESS

Driving Traffic To Your Venue

Alan-1 wants to do more than just make a game for your collection - we want to help drive customers to your venue. As long as you register in the Alan-1 Game Grid App (see below), and you keep your game connected to the internet, your venue will be listed for FREE on the following websites:

- Videogames.org
- Alan-1.com
- Mles.com
- The MLeS mobile app

The MLeS app mentioned on the previous page will be a fantastic tool for driving this traffic. Aside from the game finder map, it also has these replay features:

- Notifications about the week's new nationwide tournaments and any local tournaments that you organize through the app.
- Notifications on defeated scores, mentioning YOUR venue so they can return and reclaim those points
- League Points to participate in the annual Alan-1 World Championships.
- Continue from the last wave you had reached

The Alan-1 Game Grid App

A separate mobile app (available for both Android and iOS devices) called the Alan-1 Game Grid app. Registering the game here is free and it unlocks the following benefits:

- Available software updates, which may include bug fixes and content
- Remote technical alerts (if a component doesn't get used after multiple games, etc.
- Warranty information for any Alan-1 made game
- Shows all MLeS players who have played on your machine so you can do targeted advertising to them.
- Send custom messages to those MLeS players to draw them back (tournament invitations, upcoming events/parties, etc.)
- Participate in a special, one-time Alan-1 promotion (details below)

Upon registration, it will require your venue's name & location. With that and the machine being online, Alan-1 will set up a special social media promotion - localized on Instagram and Facebook, touting that the machine is now at your location, **at no cost to you**.

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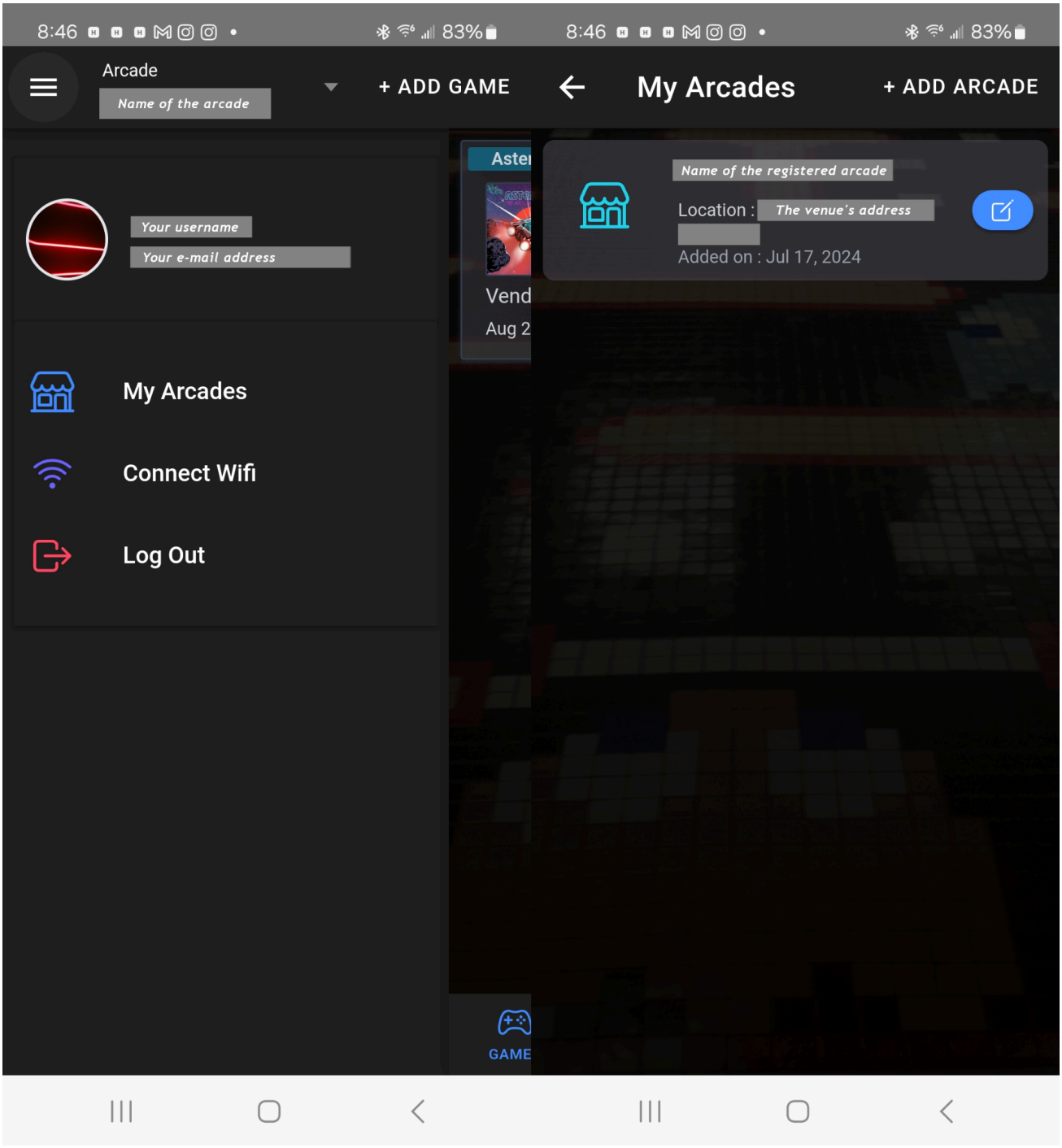
The Game Grid Operators App is straightforward to use. Here are some screenshots that allow you to familiarize yourself with the layout. You can register and track Alan-1 games across multiple locations under My Arcades. Connect WiFi is for connecting the machine to the internet in the event that there is an issue doing so on the machine itself.



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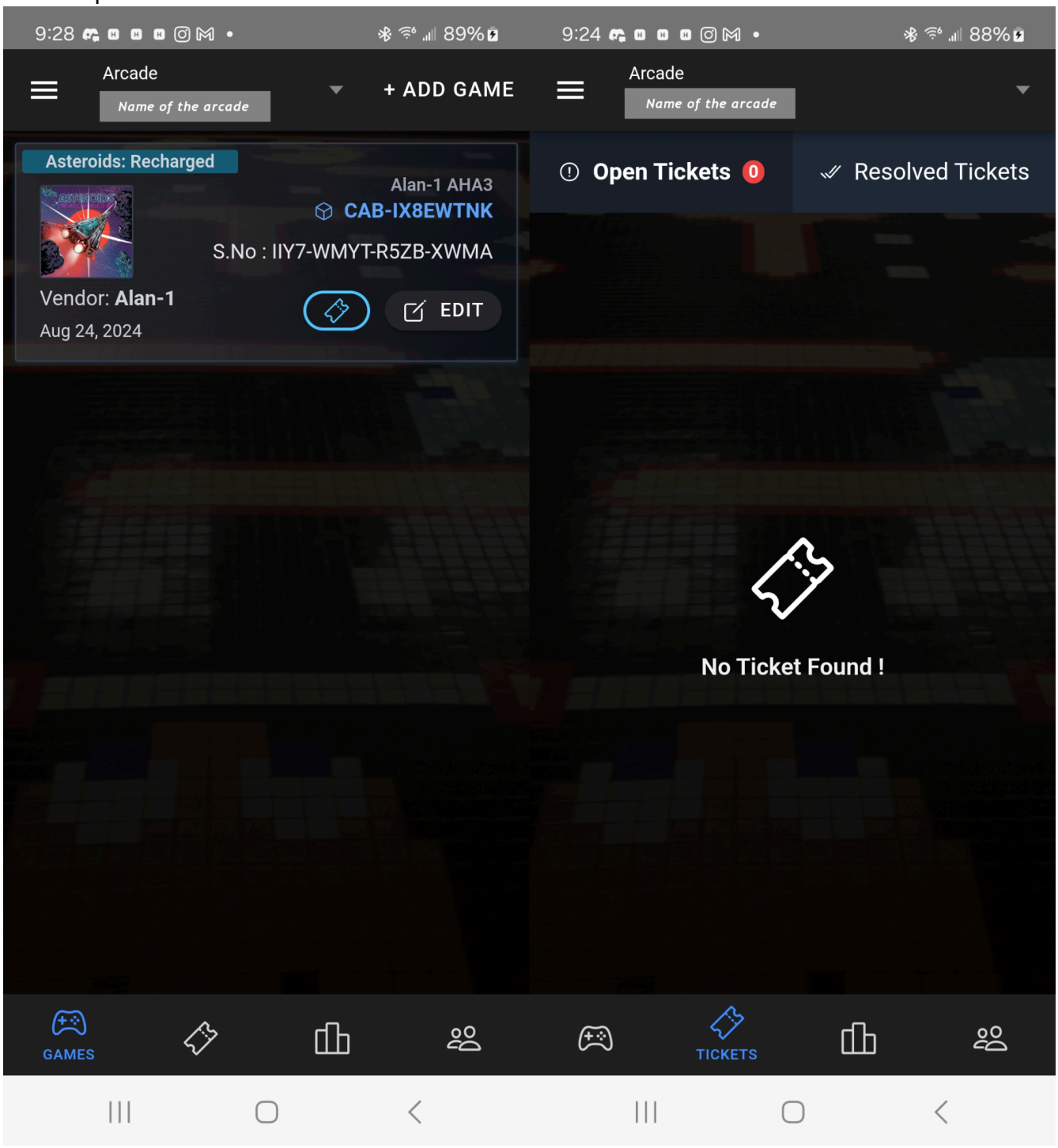
The ‘Games’ icon at the bottom will show all Alan-1 games within the location, along with details. Tickets are for any technical issues that the game has reported. You can switch between Open & Resolved.



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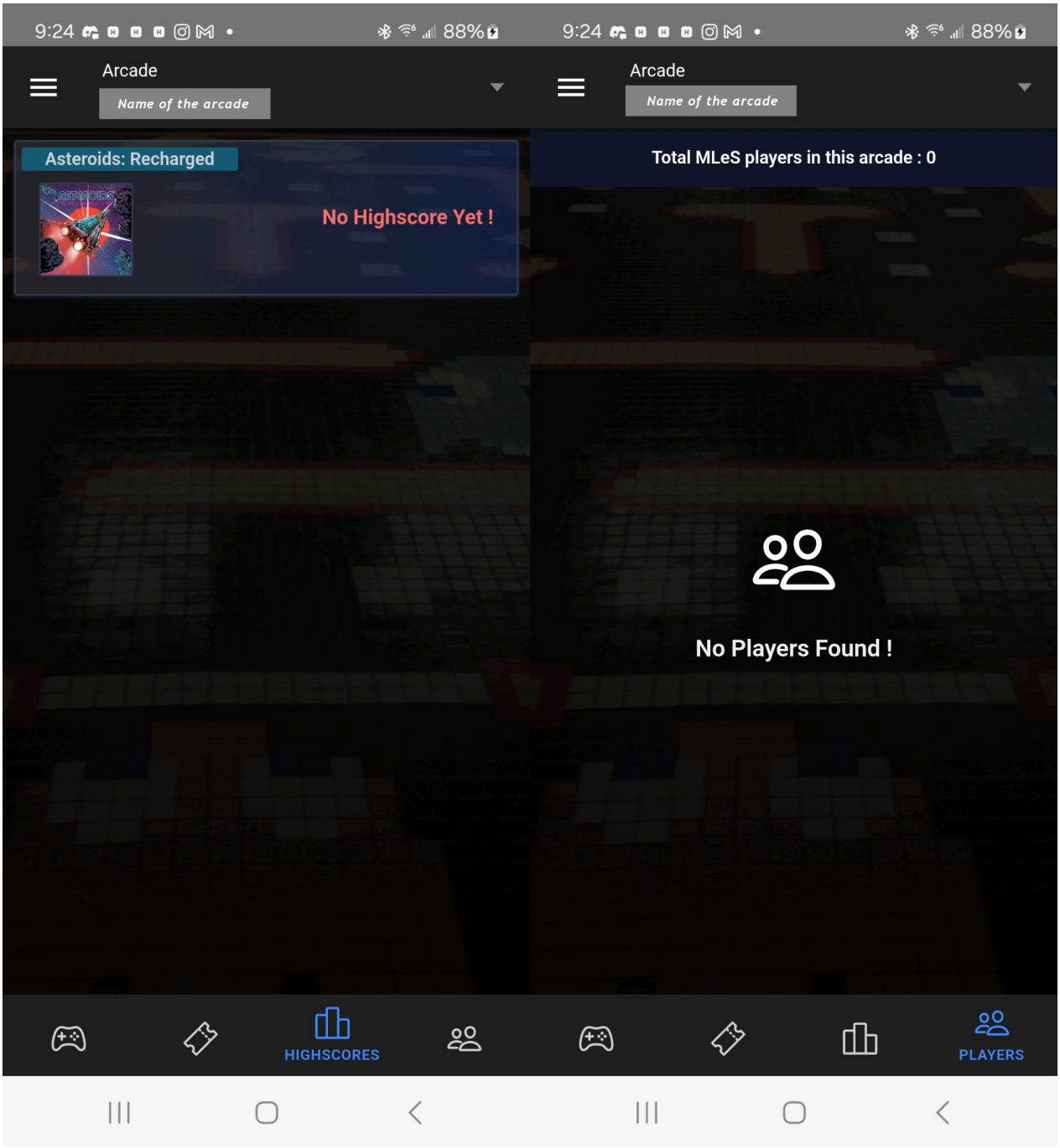
The High Scores icon shows a list of the latest high scores logged onto the game. The Players icon shows which registered MLeS players have played on your machine at the location.



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Accessing The Operator Menu

To access the various operator settings, follow these easy steps:

1. With the game powered on, use the key to open the top coin door
2. Inside of the coin door, you will see a switch & a button, like this:

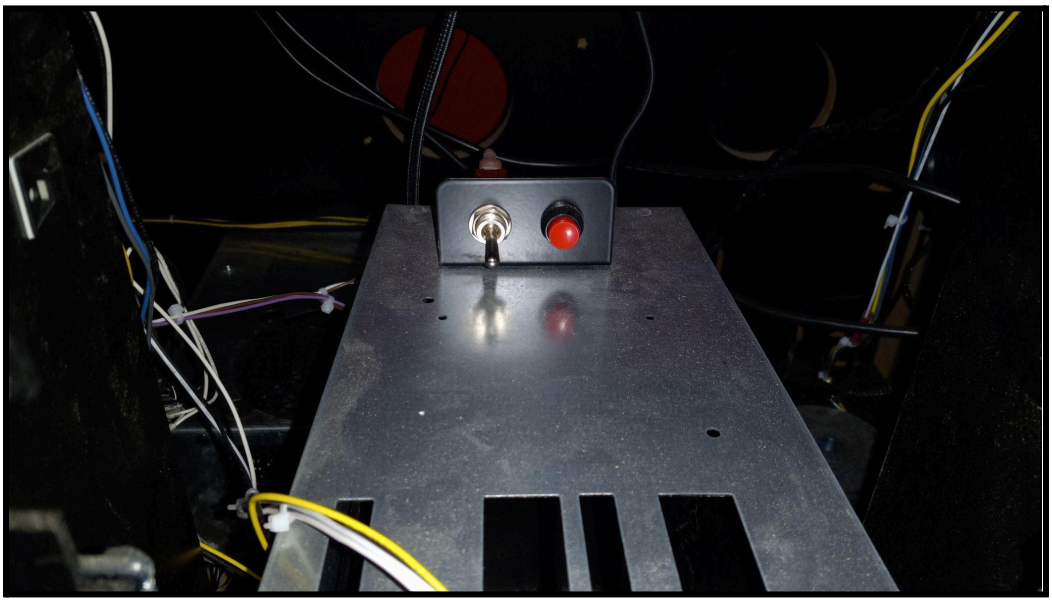

FIGURE 3. SETTINGS MENU TOGGLE SWITCH

3. Flick the Operator Menu switch to the UP position. On the monitor screen, it will load the Operator Menu.
4. The game should now be inside of the Operator Menu. Use the controls as labeled on the right hand side to navigate the menu
5. To LEAVE the Operator Menu, flick the switch back down. All your settings will have been saved.
6. Navigation controls are mentioned on the right hand side of the screen.

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FIGURE 4. SETTINGS MENU

Pricing Options

Main Option	Available Settings (Left most column is the default)				
Credits Display Mode	Coins	Currency	Swipes	Taps	Tokens
Credit Unit Value	1	*Min = 0.05; Max= 100. Adjusts in values of 0.25, except below 1. A unit represents 1 input action by the player to insert money into the game. For example, 1 swipe = 1 unit, 1 coin insertion = 1 unit, 1 token insertion = 1 unit, 1 dollar bill inserted = 1 unit.*			
Credit Unit Currency	$	*Decides the currency branding for the Credit Unit Value. Also can display €, £, or ¥*			
Units Per Start Credit	1	*For the general game cost. Values: 1-30*			
Player grouping	Pooled	Independent	*Determines how coin slots or readers are treated, if there is a 1 slot/reader for all or per player.*		
Is Free Play	Off	On	Pressing start will launch the game w/o any payment needed.		

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Bonus Pricing	Off	On	*If turned on, the player can gain extra free credit units when inserting excess credit units in bulk.*
If Bonus Pricing is ON: Bonus Credit Units Required	Set bonus value, 1-30. Default is 1	*How many additional credit units are needed to award a bonus credit.*	
If Bonus Pricing is ON: Bonus Credit Units Awarded	Set bonus value, 1-30. Default is 1	*How many credit units are awarded if the required amount is reached.*	
Service Credit Value	Set value, 1-100. Default is 1	*What the value of a service credit is when the service credit button is pressed.*	
Grant Service Credits		*If this is chosen, it performs the same function as pushing the physical service credit button. This will instantly add whatever the service credit value is to available players each time it is pressed*	
Clear active credits		*If selected, then all credits on the virtual/game counters will be reset to 0. This is for any glitches of "phantom credits" caused by a short or other rare issue.*	

Game Options

Main Option	Available Settings (Left-most column is default)				
Main Game Volume	100	Set between 0-100. Percentage value of the in-game volume. Note that the game at max (100) is loud but not loud enough to blow the speakers.			
Attract Mode Volume	100	Set between 0-100. Percentage value of the attract mode sound.			
Attract sound mode	Always	Occasional	Seldom	Never	*How often does sound play during the attract mode?*
Starting lives	3	Set between 1-10. How many lives players start with.			
Extra lives	On	Off	If you wish to award extra lives.		

Extra life score	25000	Set between 100-100000. Score that must be reached to award a single extra life, if active.	
Ticket Redemption Mode	Off	On	*Enable or Disable ticket redemption. This adds new graphics and language to the attract mode to indicate that users can earn tickets by playing. This will also enable other menus if active(marked by a * below). Only eTickets through a card swipe system are available.* ***MAY NOT BE AVAILABLE ON SOME MODELS***
*Ticket Value Conversion	Fixed	Ranged	*Ranged offers a variable number of tickets. Fixed is a set amount.*
*Score points for ticket(s)	500	*Set value: 100-10000*	*Decides how many score points are needed to win a new number of tickets*
**Ranged max tickets count	3	*Set value: 2-10000*	*Sets the maximum range for tickets. A random number will be picked between 1 and the value you set here. ONLY FOR RANGED MODE*
*Mercy Tickets	0	*Set value: 0-10000*	*If ON, guarantees a number of tickets awarded, regardless of the player's score.*
*Tickets Upper Limit	100	*Set value: 1-10000*	*Decides the max number of tickets a player can win within a single game session, excluding the Bonus Tickets Award.*
*Bonus Award	OFF	ON	*Activate the Bonus Ticket Award feature. Setting this to ON will also activate*
*Bonus Tickets Awarded	100	*Set value: 1-10000*	*How many tickets will be awarded for reaching the high score as set below the option of this one*
*Bonus tickets required score	100000	*Set value: 500-100000000*	*How many points are required to earn the Bonus Award. Max is 100 million*
Fans	ON	OFF	*Decides whether the control panel fans will be on/off during gameplay*

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Control panel lights	ON	OFF	*Decides whether the control panel lights will be on/off during gameplay*
Door lights	ON	OFF	*Decides whether the coin door lights will be on/off during gameplay*
Down Lights	ON	OFF	*Decides whether the player down lights will be on/off during gameplay*
Knocker	ON	OFF	*Decides whether the knocker will be on/off during gameplay*
Marquee	ON	OFF	*Decides whether the marquee lights will be on/off during gameplay*
Monitor Flashers	ON	OFF	*Decides whether the lights around the monitor and behind the bezel will be on/off during gameplay*
Shakers	ON	OFF	*Decides whether the shaker motors will be on/off during gameplay*
Light Toys Brightness	100	*Set value: 20-100*	*Percentage value of the LED brightness intensity. Min = 20%*

Online HQ

Main Option	Available Settings (Left-most column is default)
Operators App Setup	*Choose this to get a QR code that will allow you to download the Alan-1 Operators app where you can easily set up the online connectivity on location and register your cabinet. You must register within 15 days of receipt to get full warranty coverage.*
WiFi Setup	*Connect your cabinet to the internet. You must use the Alan-1 Game Grid app to send the network information to your machine, but you must activate this first for the cabinet to generate a WiFi hotspot that your phone can connect to.*
Check for Updates	*Select this to check for and install the latest software. The MCP operator app will notify you when an update is available.*

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Tests

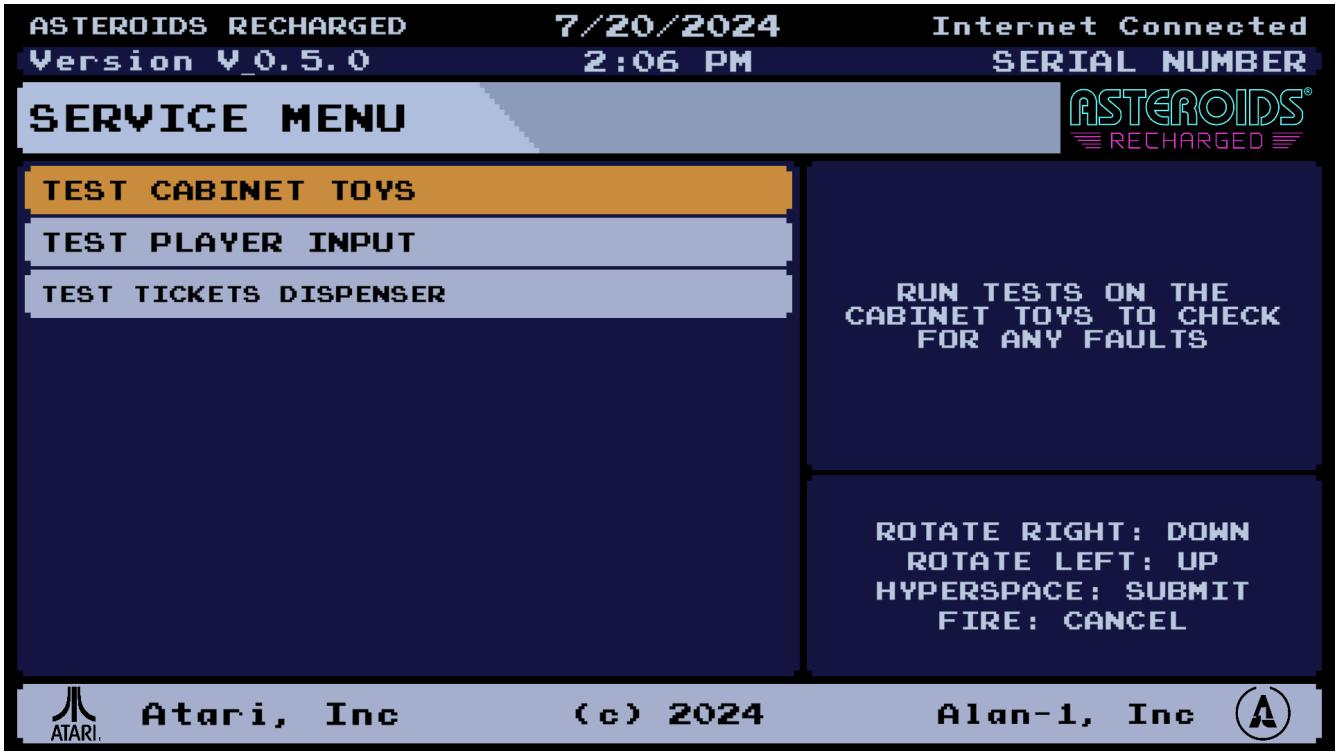

FIGURE 5. SETTINGS MENU TESTING PAGE

Main Option	Available Settings (Left-most column is default)
Test Cabinet Toys	*Select this to then trigger the highlighted test on: Control panel lights; Door lights; Fans; Knocker; Marquee lights; Monitor lights; Small shaker motor; Large shaker motor.*
Test Player Input	*An interactive method for testing the inputs on the control panel*
Test tickets dispenser	*Shows how many tickets are detected as dispensing*

Resets

Main Option	Available Settings (Left-most column is default)
Reset local leaderboard	*Resets the game's own leaderboard with a randomly generated one*

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Reset Audits Data	*Reset the game's audits to 0*
Reset Settings to Default	*Puts all game settings back to their default values*
Factory Reset	*Replenish the game to factory defaults on all options. Does not back up data*

Game Audits

Select the audit you wish to view and press FIRE to look at the stats

Main Option	Available Settings (Left-most column is default)		
Credit Audits	*Detailed audit information on the game's earnings*		
Gameplay Audits	*How many times has Player 1 Start been pressed? Player 2? Average game time? How often do players continue? How many hours/minutes has the game been on?*		
Redemption Audits	*Total tickets awarded; Total Play cost in; Percent paid out; Average tickets per game*		
Online analytics	*On*	*Off*	*Provides real-time analytics data over the internet, allowing Alan-1 to improve the game.*

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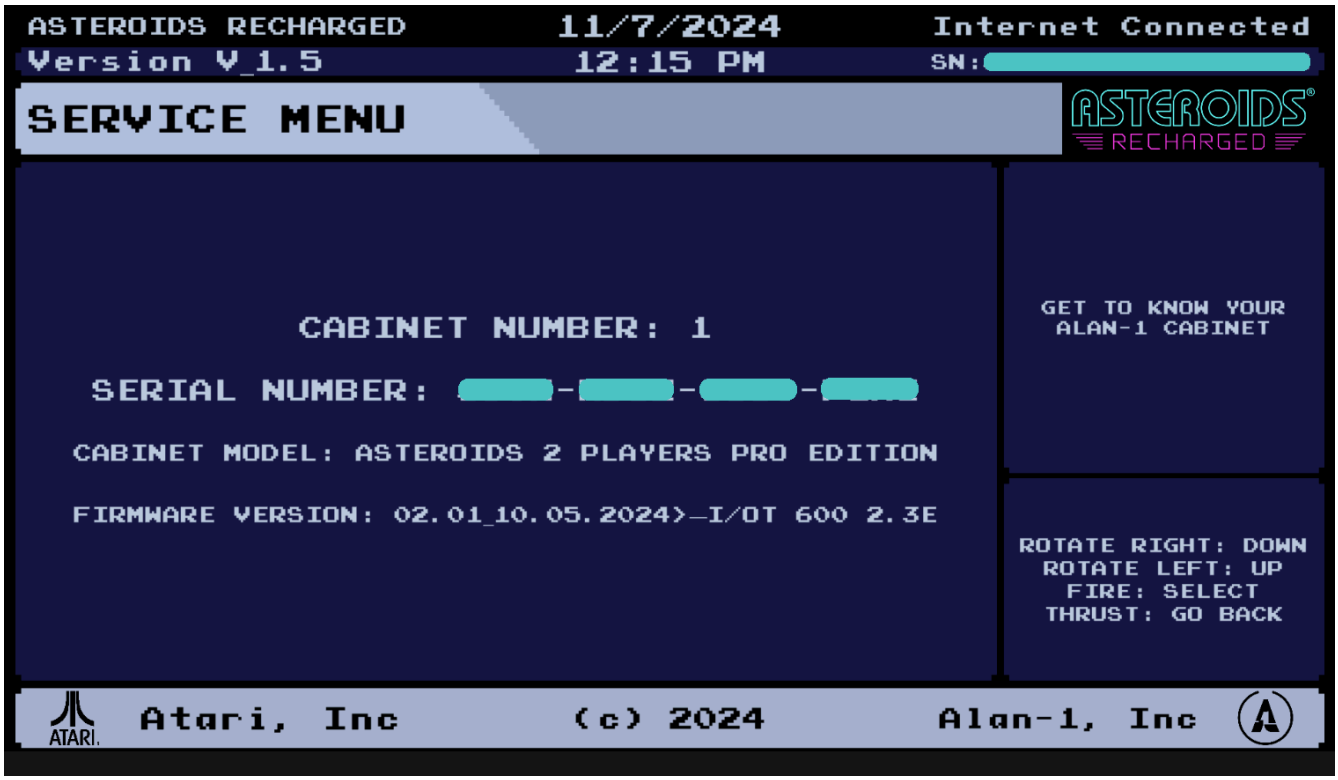
General Cabinet Info

Select this option to view some basic information on your cabinet, including the serial number, cabinet model, and the firmware version.



Exiting the Settings Menu

All options are saved when selected. To return to the game, please flip the SETTINGS MENU TOGGLE SWITCH as shown in figure 3 to GAME MODE. The system will reboot into the game with the settings selected saved.

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Regular Maintenance – Read First

In addition to following the safety tips found earlier in this manual, the best way to prevent issues with your game is to regularly perform machine maintenance. We recommend these basics:

- Clean the glass by using a non-ammonia based glass cleaner
- Keep the control panel clean and any vents clean from dust
- Occasionally clean the interior of of the machine by blowing it out with a can of air

Inspecting Your Game

A quick visual glance over the machine might be able to identify any obvious issues, such as an LED light being out, or trouble with the monitor. An in-depth inspection will be required to identify any serious issues however.

Be sure to check the LED lighting, glass front, coin door, and control panel for anything that may be out of place, loose, or damaged. If a component such as a control or the monitor is no longer functioning, you may need to open the back door and see if any basic components such as a power or video cable have come detached from its socket. Note that a loose cable may look like it's inserted correctly but it is not, thus causing the component to malfunction.

In the case of the video or power cable to the monitor, the game can be on for reseating them. In any other instance, the power should be off to the cabinet to avoid potential electrical shock. Also take care to discharge any static from your body before touching the components.

Finally, play the games to ensure everything works correctly and all I/O functions are tested. Be sure to re-calibrate any controls and replace parts as needed.

Cleaning Requirements

This Cabinet may be cleaned with any non-abrasive cleaner. Make sure that there is minimal to no water being used, as it can damage the wood beneath the vinyl. Absolutely no running water should come into contact with the machine as this may cause physical and technical issues with the integrity of the cabinet.

The interior of the cabinet should be vacuumed occasionally. Some games, by design, develop more dust and dirt and need to be cleaned more frequently than others. If there are visible “dust bunnies” coming out of the game fans on the front or cabinet vents on the back, it is time to vacuum the interior.

Much like the exterior, ensure no loose items are in the cabinet. This can cause a short or block the ventilation fans, which can cause more severe issues down the line. IF your game is using coins, it is

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normal for a coin to accidentally bounce or fall outside of the coin mechanism system and into the cabinet. Remove these ASAP to prevent shorts.

To summarize:

First, give your game a good visual safety inspection.
Clean the cabinet's exterior; use a mild general-purpose cleaner.
Only use a soft rag, such as a microfiber towel.
Check and clean all cabinet vents and fans.
The interior cabinet should be vacuumed occasionally.
Compressed air blows out the ticket notch sensor on all ticket dispensers.
Games should be played, and all I/O functions should be tested.
Replace any parts as required.

Opening the Control Panel

Unlock and remove the rear access panel. Reach up through the rear of the cabinet to the bottom of the control panel. Release the hinge that is locked onto the back side of the cabinet. These will release the cabinet from the control panel to have it open. Lift the control panel upward and this should let you access the connections tied to the game's buttons.

While operators may be used to accessing the control panel latch through the coin door, this is not recommended as there is a potential for minor injury and/or damage to the components as you cannot see what you are doing.

Basic Maintenance Items

Before performing one of these tasks, make sure that you have the proper tools in hand and have taken safety precautions.

Cleaning and Changing the Glass

- As dust tends to accumulate behind the glass, it may be necessary to remove it and clean both sides. Note that cleaning the LCD screen itself should be done using a light amount of warm water and a soft cloth OR a certified LCD screen cleaning solution.
- To remove the glass, unlatch the control panel from the back of the machine (the latch is located in the center underneath the shelf for the fans).
- Once the latch is loose, the control panel will hinge away from the cabinet
- There are 2 cutout tabs about 3 inches in from either side. This is where you can use your finger to carefully slide the glass towards you.
- Use protector corner covers or set the glass down on a soft surface, away from any foot traffic.
- Proceed to clean it and the LCD monitor; take care to not leave fingerprints on the back side of the glass

Replacing Monitor LEDs

- Remove the front monitor glass by following the instructions preceding this step.

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- Remove the LED diffuser material from the track that is wrapped around the screen by using a knife or thin flat head screwdriver.
- Use the tool to lift the diffuser at either the left or right bottom.
- The LEDs will now be exposed and you can pull out the old track and replace them with the new.

Troubleshooting the 800 IOT

- Flip service switch to go to the Service Menu
- Navigate to the Tests Tab and enter it
- Test the functionality in question with the associated options

Control Panel Button replacement

- Unlatch the control panel from the back of the machine (the latch is located in the center underneath the shelf for the fans). You also might be able to reach the latch by opening up the coin door and reaching for it.
- Once the latch is loose, the control panel will hinge away from the cabinet
- Find the button that needs to be replaced. Disconnect the two wires, making a note of their positions on the present switch.
- Loosen and remove the plastic nut that holds the button in place.
- It should pop out. Reverse the process with your replacement button to install the new one.

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TROUBLESHOOTING

Please refer to the Safety Guide section before commencing any repair work on the game. Always start with the simplest solutions first and work your way up from there to save yourself time and money.

Problem	Possible Cause	Potential Solution
The game will not power on	The power cord is loose or disconnected	Plug the power cord firmly into a working wall socket
	The game is not turned on	Flick the power button on the lower back to the ON or | position
	Power supply fuse has blown	Replace the fuse(s). See fuse replacement guide on page 24 for instructions
	The power cord has failed	Replace with new or working power cord
	The power socket on the game is burnt or otherwise damaged	Replace the power supply
	No power to the wall receptacle	Test the AC outlet to verify power; Ensure that the circuit hasn't tripped and that the breaker is active and working properly. Contact a professional electrician if there is an issue.
	Power is flowing through the power cord but not past the power supply into the game.	Ensure that the voltage setting is correct for your region (110V/120V for North America); Replace the power supply
The controls don't work	Faulty wiring	Turn the game off and verify all connections are in their proper places. A wire such as the ground may have come detached from a spade on the microswitch - reconnect it. You may have to press on the prongs with a pair of needle nose pliers

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		to increase tension to hold (usually when the game is old this happens); Check for frayed & burnt wires or grounding shorts. Discuss with a technician on replacement for any damaged wires.
	Faulty microswitch Use the input test menu to help verify connectivity.	First verify that the wires are on the correct metal spades when testing. If any wires have changed, it will result in no connection. You can also test the wiring on a known working switch to rule out a wiring issue. If the above fails, replace the microswitch and re-test.
The controls don't work	Faulty 800 IOT PCB	Turn the game off and verify all connections going to the 800 IOT board. Check for any potential debris that may be causing a short (use a can of air to blow this out). Reseat any of the black edge connectors with wires going into them and DO NOT install these backwards (it can fry the board). Ensure that the connectors are snug and not loose. Verify connections between the 800 IOT & PC motherboard, such as USB. Verify power is going to the 800 IOT. If it still does not work, replace the PCB.
No sound or bad audio	Volume dials or software volume levels are set to 0 or low	Return these to their proper range. Do not put at max
	Attract mode is set to "Silent"	Choose a different option under Attract Sound Frequency

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Problem	Possible Cause	Potential Solution
No sound or bad audio	Poor or no connection; Faulty wiring	An audio cable may be loose, incorrectly set, or disconnected. Reseat and reconnect firmly on both ends of the cable. Ensure that the PC audio cable is also firmly seated. Check cables for fraying or damage; Replace the cables
	Blown speakers	Verify that no dial on the audio equalizer is set to max, nor set to max volume in the software; Use the output tests to ensure which speaker is at fault; Check connections; Remove speaker and inspect for any damage or debris; If still blown sound, replace the speaker
	Weak or muffled sound	Check all volume settings; Check for sources of localized interference; The speaker wires may have been reversed; Remove and reapply in their proper places
	Faulty audio amp	Verify that all audio connections are set firmly in their proper ports; Verify that the audio cable from the green audio jack on the motherboard is inserted properly.
	Faulty audio jack on the motherboard	Plug in a pair of working headphones or speakers to the green audio jack on the motherboard and play the game or do a sound test; Ensure volume in software is in the mid-range; Try swapping the male-to-male audio cable out with a new or working one; Replace motherboard if still no sound

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Problem	Possible Cause	Potential Solution
Constant, low or loud audio hum	Local interference	Check for sources of interference that may be picked up by the speakers, such as certain types of radios, antennas, any device that uses high-end magnets; Remove the offending equipment or move the machine to another spot in the venue.
	Faulty power supply	Check both the DC external power and the power supply itself to ensure they are operating within normal parameters. If not, replace the power supply
	Open ground	Check all ground wires inside the cabinet. Ensure that the AC wall outlet is properly grounded.
No video, video corruption, or sound plays, no video	The motherboard is not on	Press the PC power button to make sure it is on. Ensure that the power cable to the motherboard is firmly plugged in; If the rest of the cabinet is getting power but the motherboard is not, test the PSU for proper operation. If bad, replace the PSU; If fine, replace the motherboard
	Video cable not secure or has gone bad	Ensure that the DisplayPort cable is firmly plugged in on both ends (monitor and PC). Replace cable with new or working one.
	Monitor has gone bad	Check power and video cabling to ensure firm connections; Plug a power cable directly from an AC outlet into the monitor's outlet; Connect another video

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Problem	Possible Cause	Potential Solution
No video, video corruption, or sound plays, no video		source (game console, laptop) into the monitor's DisplayPort (you may need to use a DisplayPort-to-HDMI adapter for this).
	Bad video card (Discolored blocks and "gibberish" video can be a symptom of this.)	See if the corrupted graphics appear on the screens when the machine starts (before the game loads). If it is only in-game, there might be an issue with the card. To verify it isn't a monitor problem, connect a different device to your monitor and see if there are different results. You should also try a different monitor (any with a DisplayPort should work) and connect the game's video cable to it while on. If the corrupted graphics still show up on the other monitor, then try a different video cable; If the issue persists, perform a full factory restore (see pg. 13 for instructions on a manual launch). This can fix a bad video driver. If the issue is still present after these steps, replace the motherboard.
If you encounter one of these errors: **Game Doesn't Load** **Game loads partially, then crashes** **Gets stuck in a "boot loop" of constant resets** **Any message about file system errors** **Game resets at random** **Unstable attract mode (freezing, stuttering)**	Hard drive corruption or failure	Attempt to restore the game to its original factory settings by following the Manual Launch instructions (pg. 13 in this manual); Replace the SSD on the motherboard

Problem	Possible Cause	Potential Solution
An incorrect number of credits are awarded when inserting coins/bills or swiping a card	Incorrect price settings	Make adjustments in the Pricing Options menu inside of the Service Menu
	Faulty wiring	Disconnect the 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 microswitch	If wiring is properly setup, remove the connectors from both of the coin switches, then try the wires on the problem side with the known working switch. If it still works, then replace the microswitch.
	Faulty coin mech or card reader	Check the coin mechanism for any jams or other issues that might be causing the switch to work improperly; check with your card reader's technical support on troubleshooting the reader. Replace the mech or reader.
Toys don't activate	Incorrect setting	Check the GAME OPTIONS menu to ensure that all toys are turned ON.
	Faulty wiring	Check the wiring to each toy to ensure no frayed or shorted wires. Replace the toy which will come with its own wiring harness.
	Power issue	Check the power supply voltages to ensure that they are within their proper ranges; Check fuses; Replace the PSU
	Component failure	Replace the toy in question

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WiFi won't connect	WiFi Antenna disconnected from main board	Ensure that the two small black wires are connected to their proper place on the motherboard.
	Improper setup in Alan-1 Operators app (wrong password or network)	Inside the Online HQ, choose WiFi Setup, then follow the instructions. Within the app, you can find where it asks to setup WiFi on a game. This is where you'll enter the network ID and the password. Ensure that all of the information is correct
	No WiFi hotspot detected.	Check antenna wire connections; Check your phone to ensure that WiFi is on (no Airplane mode) to find the network; ensure that your phone is seeing other networks to eliminate the issue on the phone. If everything is in place and still not hotspot, replace the antenna

-=> ORIGINAL VERSION RESTORE / RESET! <=-

In the extremely rare event that the software to the game becomes corrupted, you can perform a clean reset of the machine to put it back to the original software state. This includes the game code as well as the settings.

When the operator turns Asteroids Recharged on for the first time, the Alan-1 App Launcher activates before launching the next app (such as the game) based on the service menu switch status. However, each time the game starts, the operator has a small time window where they can interrupt the automatic launch, and go into "Manual launch" mode by pressing any button 3 times, quickly.

In the manual launch mode, you can reset the game back to the original version & settings instead of running the updated version.

This is intended so that if the updated software version is corrupted, thus leaving the game inoperable, the operator still has the chance to clear that and go back to the version that the cabinet shipped with.

ILLUSTRATIONS & DIAGRAMS

Exploded Cabinet View

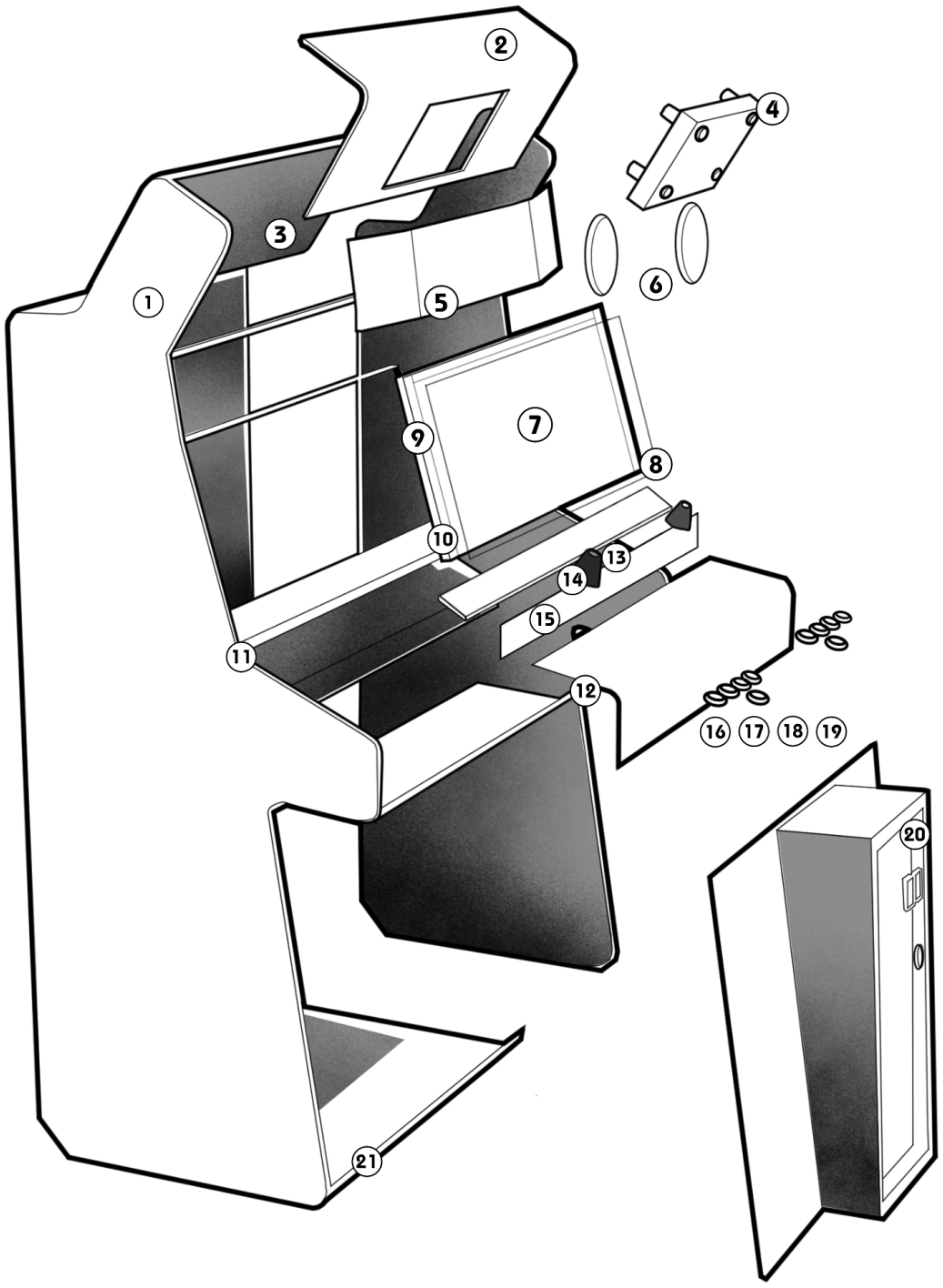

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FIGURE 6. ARCADE CABINET FRONT VIEW

Exploded Cabinet View Part Numbers

Item	Part No.	Description	Quantity
1	AK2-RAW-1	Raw Game Cabinet (various pieces)	1
2	AR2P-VYL-123	Asteroids Recharged 2P Pro Hood vinyl	1
3	AK2-LED-1	Marquee LEDs / Backlight (4 / 2p cabinet)	4
4	AR2P-GLS-100	Asteroids Recharged 2P Marquee	1
5	AR2P-VYL-100	Speaker panel vinyl	1
6	AR2-AUD-4	Speakers (These go behind the speaker panel, part of the Telstar Audio system)	2
7	AK2-VAS-1	VAS Portal (32" Monitor 4K)	1
8	AR2P-GLS-101	Asteroids Recharged 35" Monitor Glass w/ Bezel	1
9	AK2-LED-2	Diffuser LEDs (8 ft/ 2P cab)	8
10	AK2-LED-3	LED Channel/Strip	0.75
11	AK2-CAB-3	T-Molding (38’ total per cabinet)	2
12	AK2-CAB-17	Control panel door latch	1
13	AK2-I/P-4	Volcanic start push buttons	2
14	AK2-I/P-5	Volcanic start button nut	2
15	AK2-ACR-1	Player acrylic fan protector	1
16	AK2-I/P-6	Green button with nut (Four Pin) D-LED, Blank Button	2
17	AK2-I/P-7	Blue button with nut (Four Pin) D-LED, Blank Button	4
18	AK2-I/P-8	Red button with nut (Four Pin) D-LED, Blank Button	2
19	AR2-I/P-9	White Button with nut (Four Pin) D-LED, Blank Button	2
20	AR2-CAB-2	Coin door & coin box	1
21	AK2-CAB-16	Leg levelers	2

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Cabinet - Rear

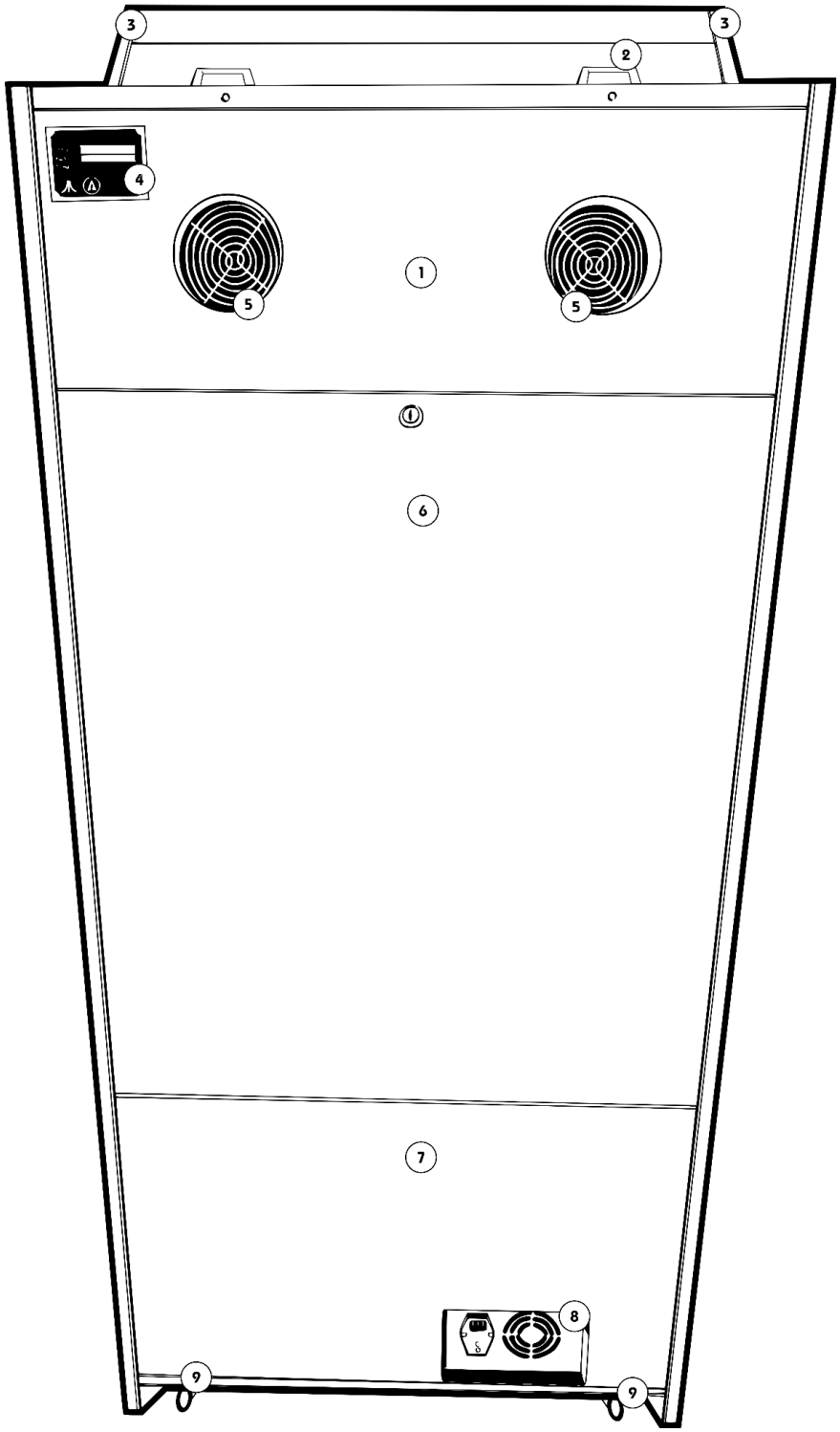

FIGURE 7. ARCADE CABINET REAR VIEW

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Cabinet - Rear Parts Numbers

Item	Part No.	Description	Quantity
1	AK2-CUT-2	Back (upper)	1
2		Handles	
3	AK2-CAB-3	T-Molding (38’ total per cabinet)	2
4	AK2-VAS-9	VAS Cabinet s/n tag	1
5	AK2-CAB-18	Rear cabinet air flow grill protector	2
6	AK2-CUT-3	Back door	1
7	AK2-CUT-1	Back (lower)	1
8	AK2-VAS-7	VAS Energy Distribution Unit (PDB-JH-01)	1
9	AK2-CAB-9	3” caster wheels	2

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Open From The Back

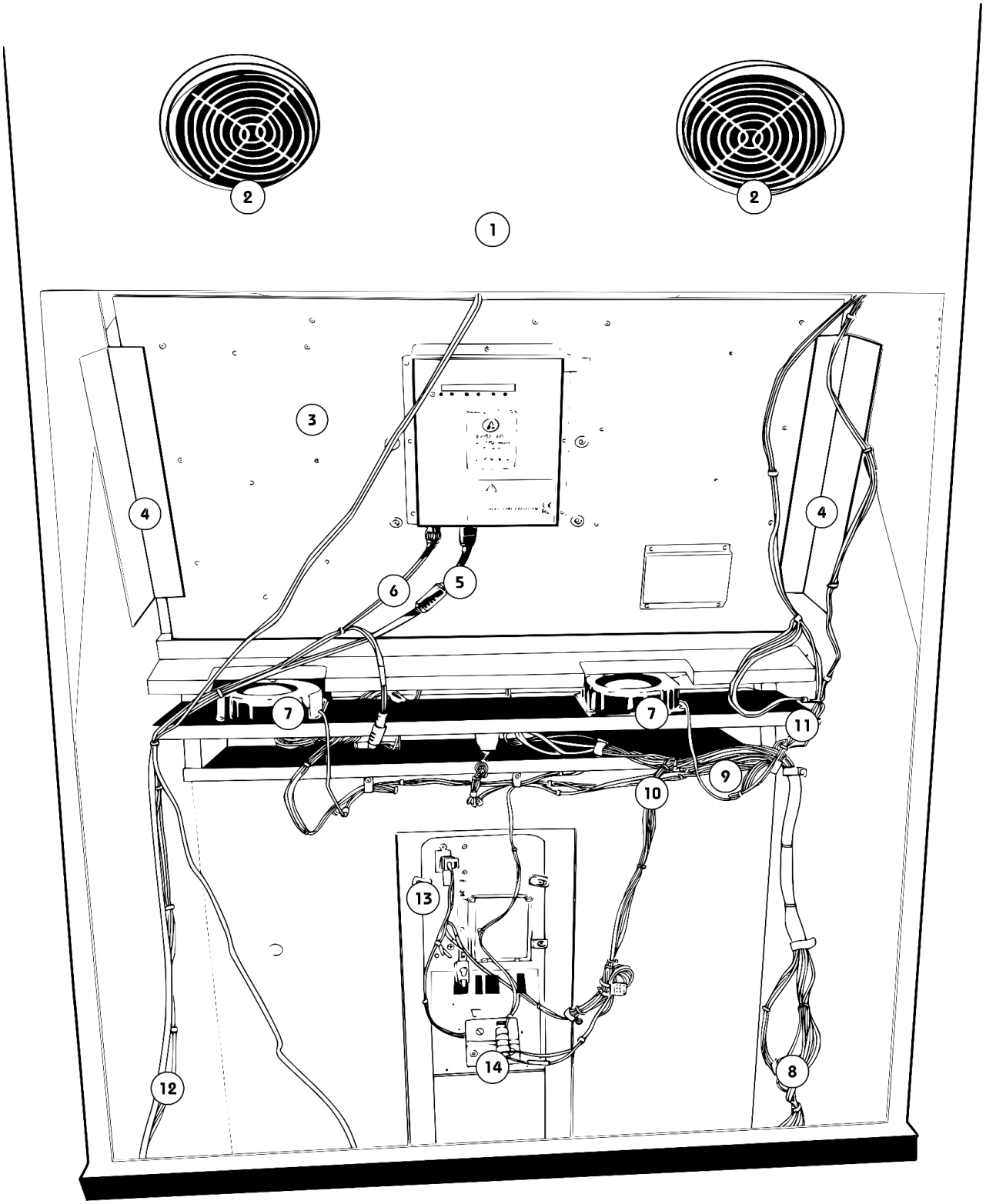

FIGURE 8. Inside the cabinet from the back

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Open From The Back Parts Numbers

Item	Part No.	Description	Quantity
1	AK2-CUT-2	Back (upper)	1
2	AK2-CAB-18	Rear cabinet air flow grill protector	2
3	AK2-VAS-1	VAS Portal (32" Monitor 4K)	1
4	AR2-CAB-22	Metal Monitor mount brackets for 32” monitor	2
5	AK2-W/H-21	HDMI Cable, 4K, 4’ length	1
6	AK2-W/H-10	Monitor power cable	1
7	AK2-TOY-4	Control panel fans	2
8	AK2-W/H-12	HDRV Harness (CAS-ALN2001-005)	1
9	AK2-W/H-13	MDRV 1-6 Harness (CAS-ALN2001-008)	1
10	AK2-W/H-14	MDRV 7-11 Harness (CAS-ALN2001-009)	1
11	AK2-W/H-15	MDRV 12-18 Harness (CAS-ALN2001-012)	1
12	AK2-W/H-16	I/o T Power Harness (CAS-ALN2001-004)	1
13	AR2-CAB-2	Coin door & coin box	1
14	AK2-I/P-3	Settings Toggle switch panel	1

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Inside the cabinet - From The Back

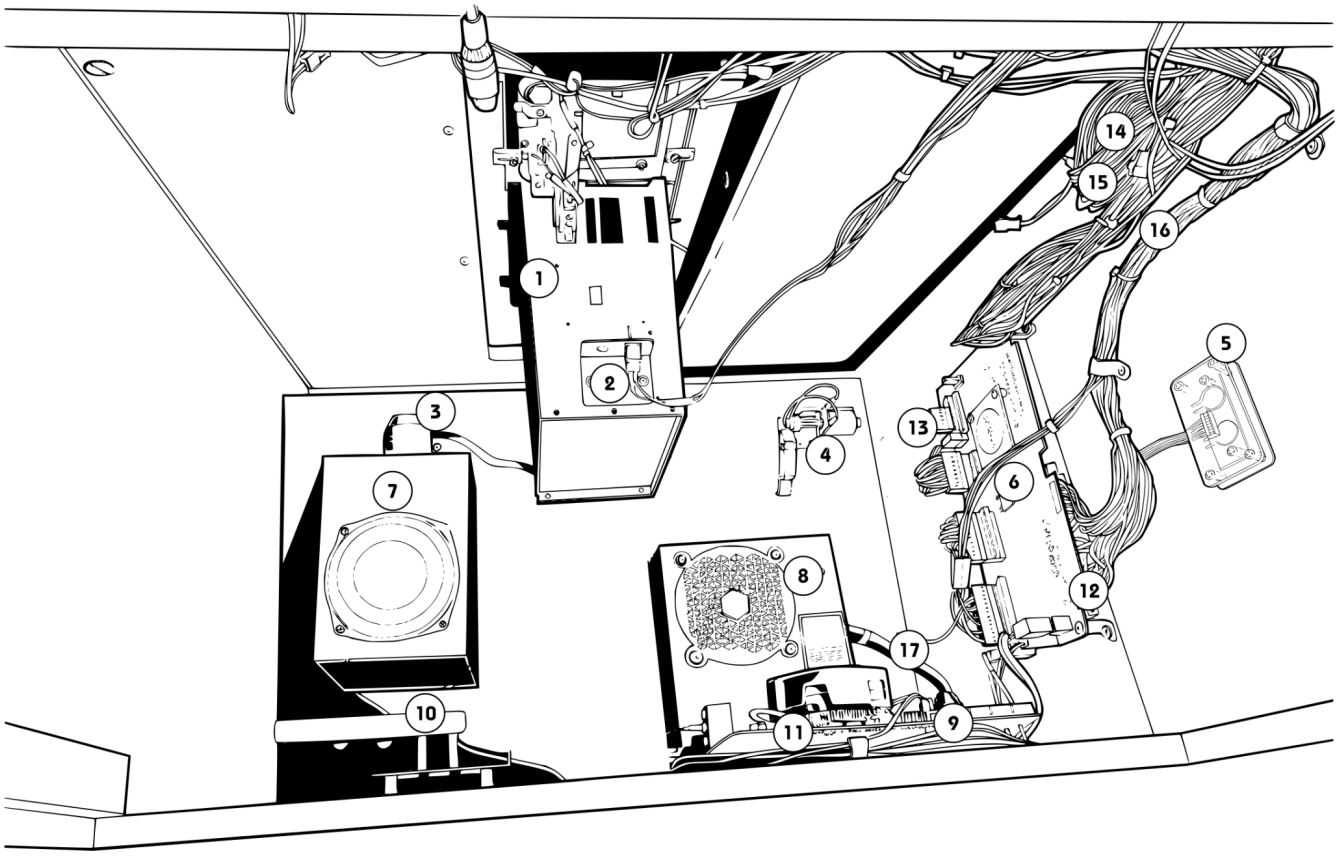

FIGURE 9. INSIDE THE CABINET | THE VIDEO ARCADE SYSTEM® (VAS) VIEW

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Inside The Cabinet - From The Back Parts Numbers

Item	Part No.	Description	Quantity
1	AR2-CAB-2	Coin door & coin box	1
2	AK2-I/P-3	Settings Toggle switch panel	1
3	AK2-TOY-3	VAS Big shaker motor	1
4	AK2-TOY-1	VAS 24 Volt pinball knocker	1
5	AK2-W/H-1	On/off power/reset switch	1
6	AK4-VAS-6	VAS 800 i/o T rev 1.4XL	1
7	AR2-AUD-4	Audio kit with amp, speakers, base, and wires	1
8	AK2-VAS-7	VAS Energy Distribution Unit (PDB-JH-01)	1
9	AK2-VAS-10	Wi-Fi Card (M.2)	1
10	AK2-VAS-25	Intel WiFi Antenna	1
11	AR2P-VAS-100	VAS MCP Asteroids Recharged Pro 2P (mb, cpu, memory, ssd, wifi, standoffs)	1
12	AR2-W/H-17	Asteroids Recharged Edge Connector Harness for 1-2 Players (CAS-ALN2002-006)	1
13	AK2-W/H-12	HDRV Harness (CAS-ALN2001-005)	1
14	AK2-W/H-13	MDRV 1-6 Harness (CAS-ALN2001-008)	1
15	AK2-W/H-14	MDRV 7-11 Harness (CAS-ALN2001-009)	1
16	AK2-W/H-15	MDRV 12-18 Harness (CAS-ALN2001-012)	1
17	AK2-W/H-16	I/o T Power Harness (CAS-ALN2001-004)	1

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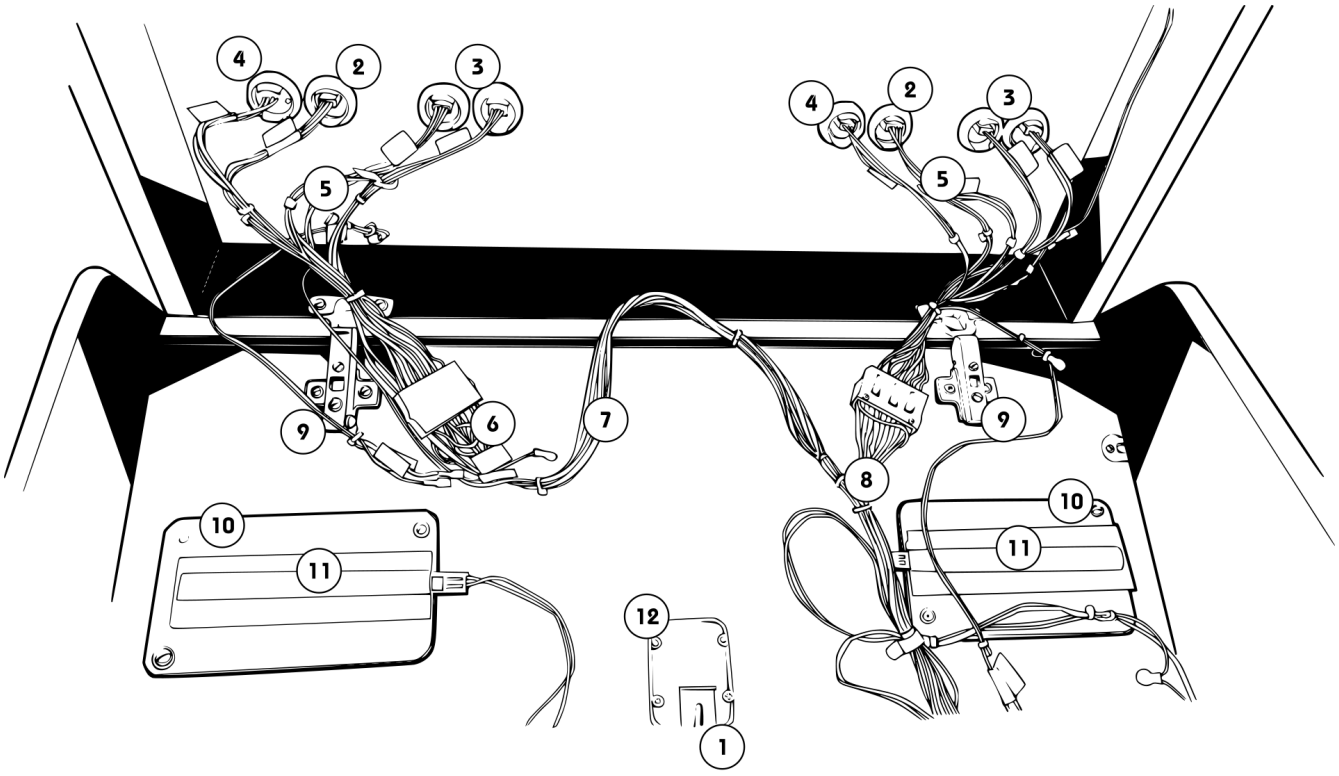
Control Panel - Inner/Open View

FIGURE 10



. UNDER THE ARCADE CONTROL PANEL

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Control Panel - Inner View Part Numbers

Item	Part No.	Description	Quantity
1	AK2-CAB-17	Control panel door latch	1
2	AK2-I/P-6	Green button with nut (Four Pin) D-LED, Blank Button	2
3	AK2-I/P-7	Blue button with nut (Four Pin) D-LED, Blank Button	4
4	AK2-I/P-8	Red button with nut (Four Pin) D-LED, Blank Button	2
5	AR2-I/P-9	White Button with nut (Four Pin) D-LED, Blank Button	2
6	AR2-WH-006	AR2 EC1 (P1+P2 Edge)	1
7	AR2-WH-006	MDRV 7-11 Harness (CAS-ALN2001-009)	1
8	AR2-WH-006	MDRV 12-18 Harness (CAS-ALN2001-012)	1
9	AK2-CAB-10	Hinges	2
10	AK2-ACR-2	Hood diffusers	2
11	AK2-LED-2	Diffuser LED lights	2
12	AK2-TOY-2	VAS Small shaker motor	1

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LDVR, MDVR, HDVR Wiring Harness, 800 IOP Information

As mentioned above, there are three principle wiring harnesses found in each Asteroids Recharged machine. The harness connects to the 800 IOP board, which is pre-installed into the cabinet, with the wire edge connectors facing upwards. Edge connectors are keyed to prevent improper installation. **Note that forcing an improper install will damage the 800 IOP board.** Input and output wires for the 5 voltage lines are contained within the 40-pin wiring harness (see next page). The 12 volt wires are connected to 18 of the output connectors on the I/oT board—which makes up the heart of the Video Arcade System. Lastly, there are six 24 volt lines available on the lower level output panel of the i/oT.

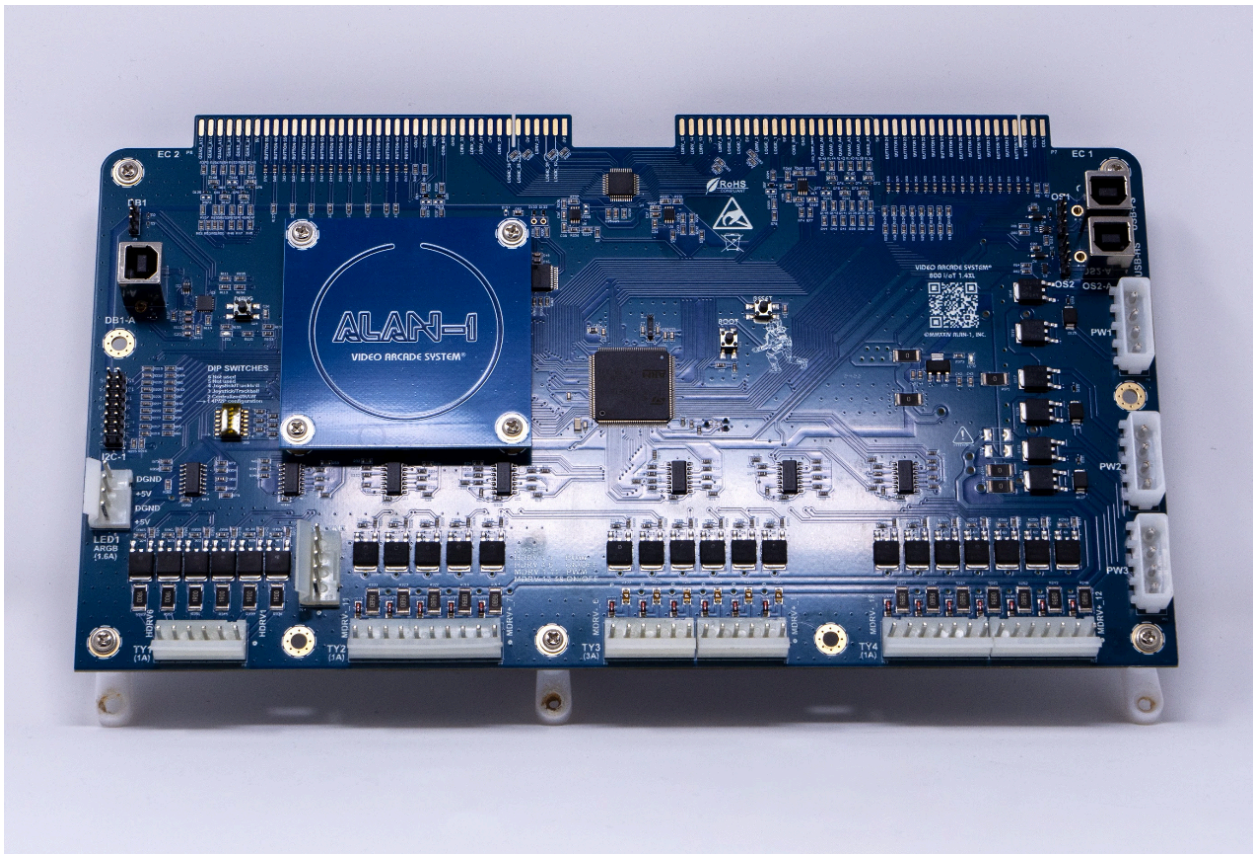

Figure x. I/oT rev 1.4XL Front Side

There will only be one edge connector+harness used in a 2-player cabinet. Two connectors are only used in 3p/4p games.

Yellow wires are always +12V; Red are always +5V; Black & White are always GND. (Though sometimes it may be a switched GND through MDRV or HDRV.) Note that LDRV, MDRV, and HDRV all switch the ground leg of the circuit.

They control the following components, with their labels and expected voltages listed below:

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- LDVR - Low Voltage (5V) channels control the LEDs found in the control panel buttons
    - All player input controls
    - LED output for all player's controls
    - Players start buttons
    - Coin mechanism triggers
    - Settings switch toggle
    - Ticket notch output
- MDVR - Medium voltage (12V) channels control the brighter lights and most cabinet toys.
    - Monitor flashers + diffuser lights around the monitor (RGB light)
    - The white marquee lights
    - The front lights under the control panel and over the control deck
    - The coin door lighting
    - Player fans
    - Big & Small shaker motors
- HDVR - High voltage (24V) channels for high powered toys
    - Pinball knocker (solenoid)

There is an intermediate connector between the edge connector and each individual player's controls. It serves two purposes:

- It allows the operator to disconnect the player controls and remove the control panel entirely.
- It "fans out" several wires, like COLX, +5V, and GND. The edge connectors can't safely hold multiple wires in their crimps, whereas the intermediate connectors can.

The MDRV and HDRV connectors are the .396 pin sockets across the bottom of the PCB. The amperage is written on the PCB next to the connector, along with an identifier (see figure _)

- Each has a different number of pins. **Plug each connector into the pin socket with the same number of pins, or you can damage the 800IOP**.
- The connectors are half-shrouded, so it'll be difficult to push them in backwards. The locking tabs on both the socket and the connector housing face the outside edge of the PCB.
- **Be very careful to NOT plug in the connector housings offset by a pin!** This is nearly guaranteed to damage the 800IOP once the game powers up.

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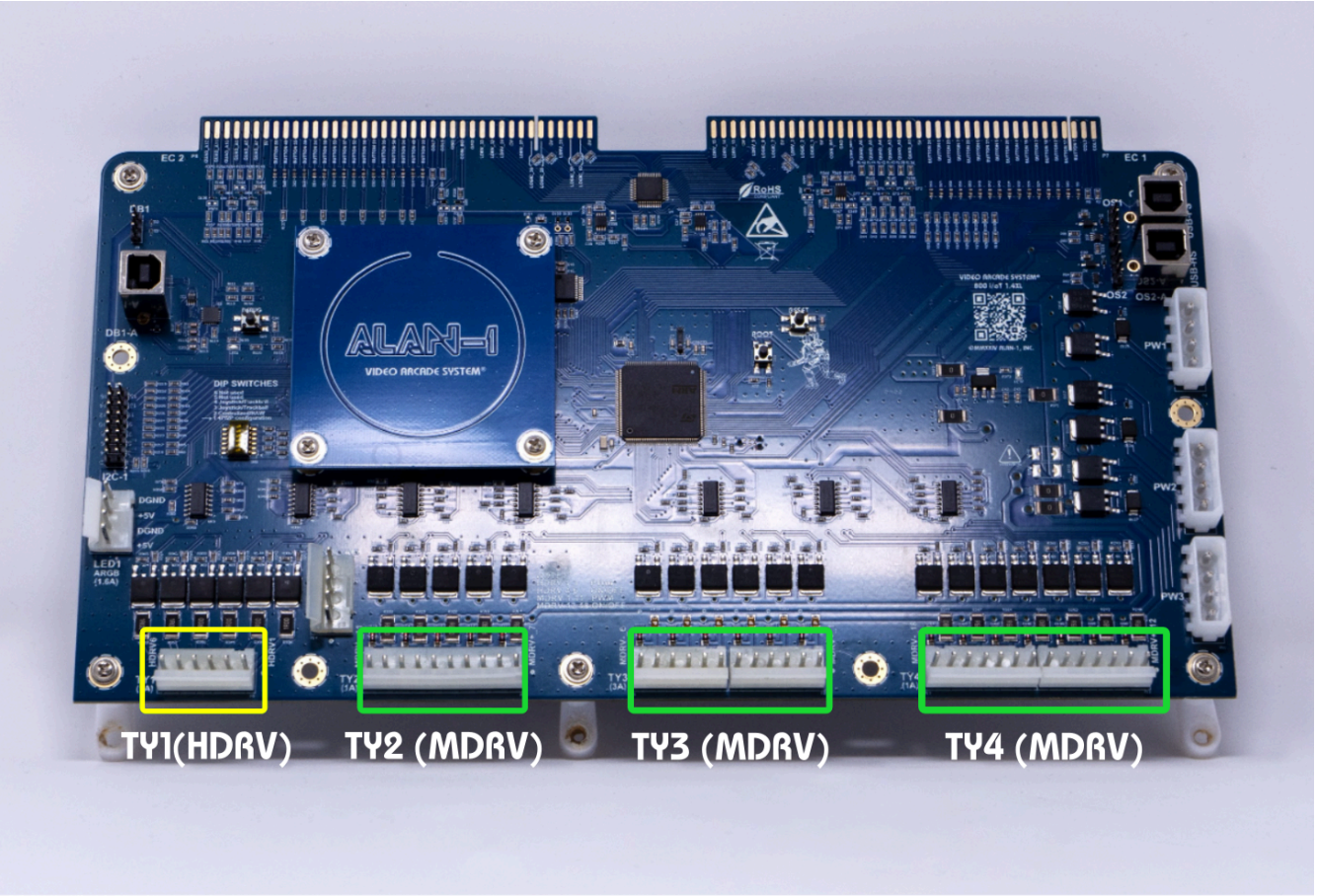

Figure x. I/oT rev 1.4XL with indicators

TY1 (HDRV; 1A)

- The HDRV connector goes only to the pinball knocker.
- The other side of the pinball knocker connects to a 24V power output of the PDB.
- The coil used has a coil diode pre-installed, so you must hook the wires up correctly or you will blow the +24V supply.
    - The diode should conduct in reverse, from HDRV (switched ground) to +24V. It should NOT conduct from +24V to GND.

TY2 (MDRV 7-11; 1A)

- 2-player cabinets do not use P4 Front and P4 Down
- Marquee Light is a string of white COB LEDs that shine through the back of the marquee plex. ◦ Each COB is ~200 lumens.
- Fan 1 L/Fan 2 L/Fan 1 R/Fan 2 R are the centrifugal fans that mount to the underside of the upper control panel. The 2P cabinet has only one each of Fan L and Fan R.
- BIGSHAKE goes to the big shaker motor.
    - The coil diode is already in the harness, so you can hook either wire to either terminal of the motor.

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TY3 (MDRV 1-6; 3A)

- Mon LED 1-2 are the COB LED strips that go above and below the monitor. They live inside the black plastic LED channel with the milky white diffusers.
- Marq LED 1-2 are the COB LED strips that light up the diffusers on each side of the marquee. The gray plastic channel clamps the LED strip onto the back of the diffusers without requiring adhesives.
- P1-P3 Front and P1-P3 Down are the frontlights and downlights for each player, respectively. The 2P cabinet has only P1 and P2 frontlights and downlights.

TY4 (MDRV 12-18; 1A)

- The harness at TY4 has 4-pin square Molex sockets on very short wires. These connect to the 4-pin plugs on the edge connectors that terminate near the edge connector itself. (They provide power to the UCL connector.)
- L MiniShk and R MiniShk are the small shaker motors. These are designated as such as the 2P cabinet has only one MiniShk, the 3P cabinet has two.
- L Coin Lite 1 and 2, and R Coin Lite 1 and 2, connect to the coin return lights on the coin doors. The 2P cabinet has only L Coin Lite 1 and 2.

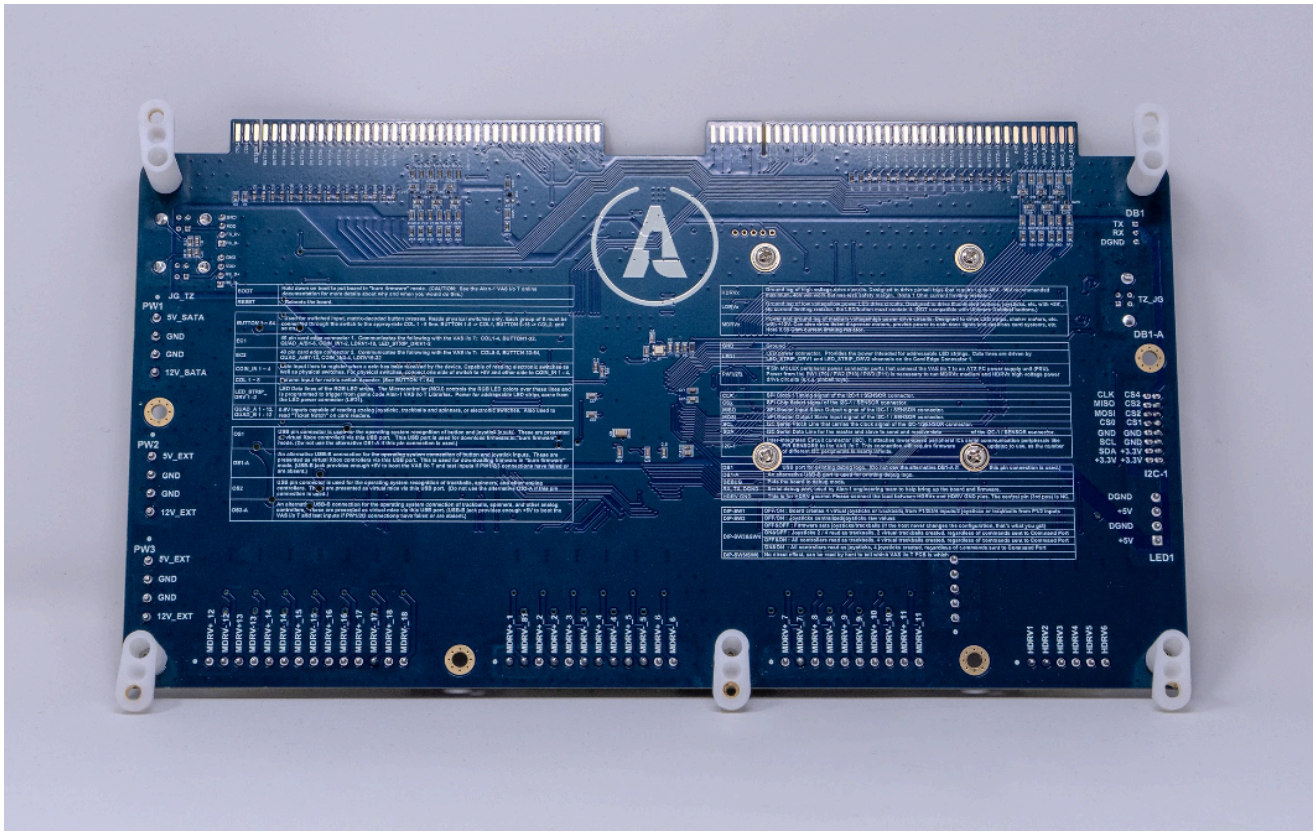

Figure x. I/oT rev 1.4XL Back Side

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Dual Player 40 pin Wiring Harness Diagram

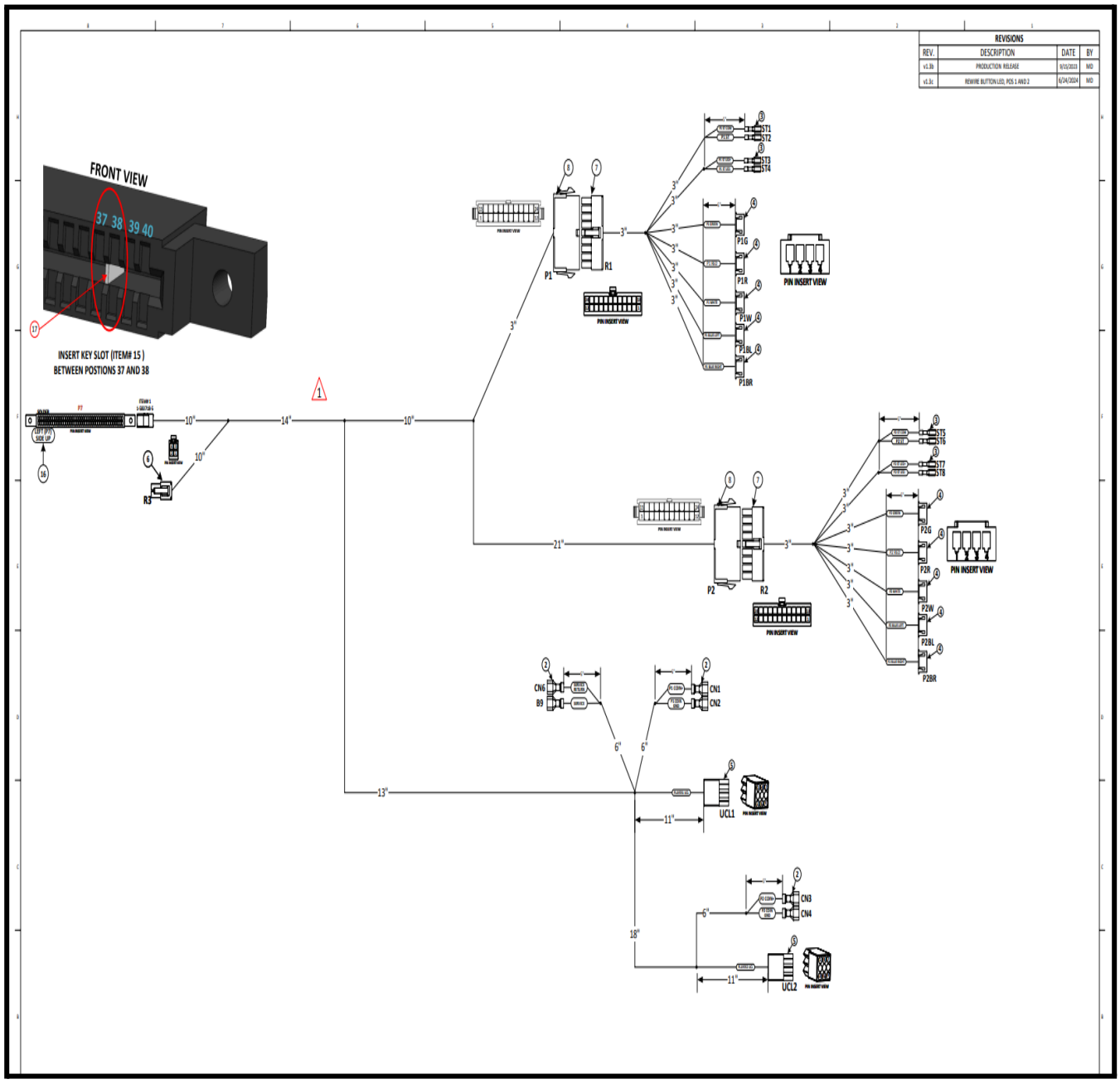

FIGURE 11. 40 PIN WIRING HARNESS DIAGRAM

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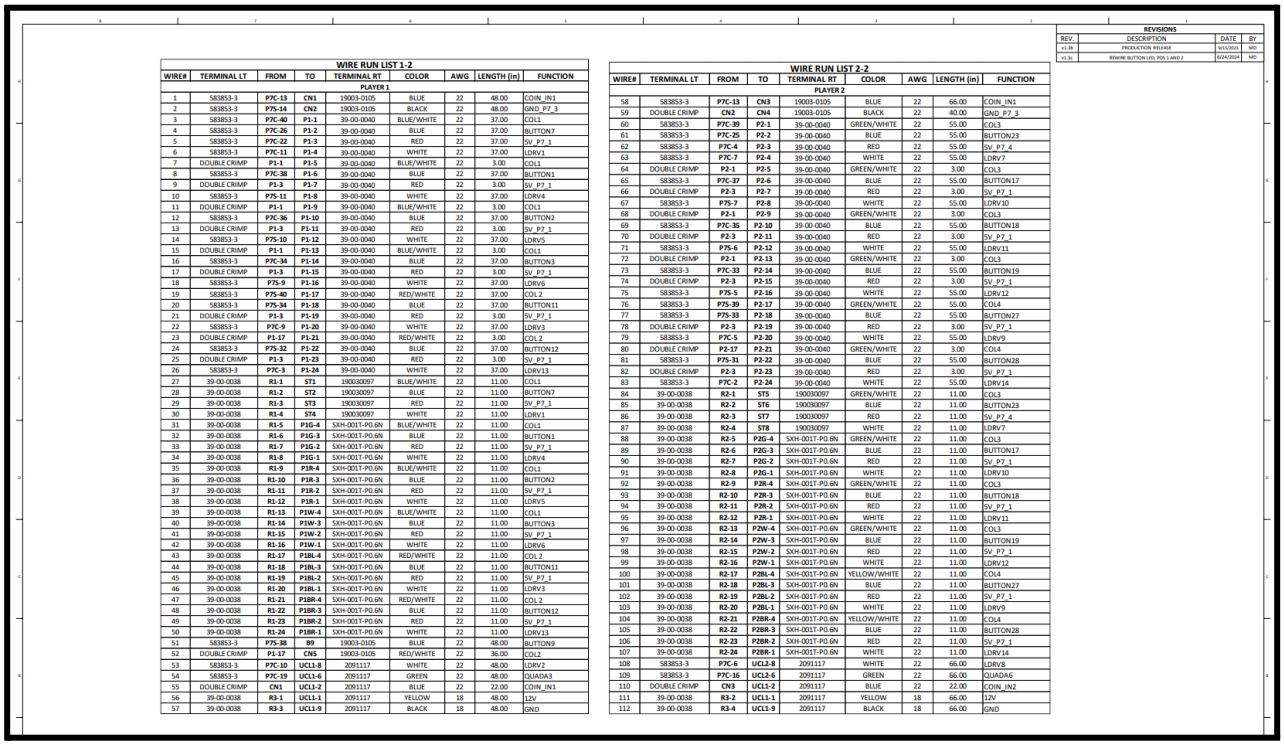
Wiring Harness pinouts:



WIRE RUN LIST 1-2

WIRE#	TERMINAL LT	FROM	TO	TERMINAL RT	COLOR	AWG	LENGTH (in)	FUNCTION
PLAYER 1								
1	583853-3	P7C-13	CN1	19003-0105	BLUE	22	48.00	COIN_IN1
2	583853-3	P7S-14	CN2	19003-0105	BLACK	22	48.00	GND_P7_3
3	583853-3	P7C-40	P1-1	39-00-0040	BLUE/WHITE	22	37.00	COL1
4	583853-3	P7C-26	P1-2	39-00-0040	BLUE	22	37.00	BUTTON7
5	583853-3	P7C-22	P1-3	39-00-0040	RED	22	37.00	5V_P7_1
6	583853-3	P7C-11	P1-4	39-00-0040	WHITE	22	37.00	LDRV1
7	DOUBLE CRIMP	P1-1	P1-5	39-00-0040	BLUE/WHITE	22	3.00	COL1
8	583853-3	P7C-38	P1-6	39-00-0040	BLUE	22	37.00	BUTTON1
9	DOUBLE CRIMP	P1-3	P1-7	39-00-0040	RED	22	3.00	5V_P7_1
10	583853-3	P7S-11	P1-8	39-00-0040	WHITE	22	37.00	LDRV4
11	DOUBLE CRIMP	P1-1	P1-9	39-00-0040	BLUE/WHITE	22	3.00	COL1
12	583853-3	P7C-36	P1-10	39-00-0040	BLUE	22	37.00	BUTTON2
13	DOUBLE CRIMP	P1-3	P1-11	39-00-0040	RED	22	3.00	5V_P7_1
14	583853-3	P7S-10	P1-12	39-00-0040	WHITE	22	37.00	LDRV5
15	DOUBLE CRIMP	P1-1	P1-13	39-00-0040	BLUE/WHITE	22	3.00	COL1
16	583853-3	P7C-34	P1-14	39-00-0040	BLUE	22	37.00	BUTTON3
17	DOUBLE CRIMP	P1-3	P1-15	39-00-0040	RED	22	3.00	5V_P7_1
18	583853-3	P7S-9	P1-16	39-00-0040	WHITE	22	37.00	LDRV6
19	583853-3	P7S-40	P1-17	39-00-0040	RED/WHITE	22	37.00	COL 2
20	583853-3	P7S-34	P1-18	39-00-0040	BLUE	22	37.00	BUTTON11
21	DOUBLE CRIMP	P1-3	P1-19	39-00-0040	RED	22	3.00	5V_P7_1
22	583853-3	P7C-9	P1-20	39-00-0040	WHITE	22	37.00	LDRV3
23	DOUBLE CRIMP	P1-17	P1-21	39-00-0040	RED/WHITE	22	3.00	COL 2
24	583853-3	P7S-32	P1-22	39-00-0040	BLUE	22	37.00	BUTTON12
25	DOUBLE CRIMP	P1-3	P1-23	39-00-0040	RED	22	3.00	5V_P7_1
26	583853-3	P7C-3	P1-24	39-00-0040	WHITE	22	37.00	LDRV13
27	39-00-0038	R1-1	ST1	190030097	BLUE/WHITE	22	11.00	COL1
28	39-00-0038	R1-2	ST2	190030097	BLUE	22	11.00	BUTTON7
29	39-00-0038	R1-3	ST3	190030097	RED	22	11.00	5V_P7_1
30	39-00-0038	R1-4	ST4	190030097	WHITE	22	11.00	LDRV1
31	39-00-0038	R1-5	P1G-4	SXH-001T-P0.6N	BLUE/WHITE	22	11.00	COL1
32	39-00-0038	R1-6	P1G-3	SXH-001T-P0.6N	BLUE	22	11.00	BUTTON1
33	39-00-0038	R1-7	P1G-2	SXH-001T-P0.6N	RED	22	11.00	5V_P7_1
34	39-00-0038	R1-8	P1G-1	SXH-001T-P0.6N	WHITE	22	11.00	LDRV4
35	39-00-0038	R1-9	P1R-4	SXH-001T-P0.6N	BLUE/WHITE	22	11.00	COL1
36	39-00-0038	R1-10	P1R-3	SXH-001T-P0.6N	BLUE	22	11.00	BUTTON2
37	39-00-0038	R1-11	P1R-2	SXH-001T-P0.6N	RED	22	11.00	5V_P7_1
38	39-00-0038	R1-12	P1R-1	SXH-001T-P0.6N	WHITE	22	11.00	LDRV5
39	39-00-0038	R1-13	P1W-4	SXH-001T-P0.6N	BLUE/WHITE	22	11.00	COL1
40	39-00-0038	R1-14	P1W-3	SXH-001T-P0.6N	BLUE	22	11.00	BUTTON3
41	39-00-0038	R1-15	P1W-2	SXH-001T-P0.6N	RED	22	11.00	5V_P7_1
42	39-00-0038	R1-16	P1W-1	SXH-001T-P0.6N	WHITE	22	11.00	LDRV6
43	39-00-0038	R1-17	P1BL-4	SXH-001T-P0.6N	RED/WHITE	22	11.00	COL 2
44	39-00-0038	R1-18	P1BL-3	SXH-001T-P0.6N	BLUE	22	11.00	BUTTON11
45	39-00-0038	R1-19	P1BL-2	SXH-001T-P0.6N	RED	22	11.00	5V_P7_1
46	39-00-0038	R1-20	P1BL-1	SXH-001T-P0.6N	WHITE	22	11.00	LDRV3
47	39-00-0038	R1-21	P1BR-4	SXH-001T-P0.6N	RED/WHITE	22	11.00	COL 2
48	39-00-0038	R1-22	P1BR-3	SXH-001T-P0.6N	BLUE	22	11.00	BUTTON12
49	39-00-0038	R1-23	P1BR-2	SXH-001T-P0.6N	RED	22	11.00	5V_P7_1
50	39-00-0038	R1-24	P1BR-1	SXH-001T-P0.6N	WHITE	22	11.00	LDRV13
51	583853-3	P7S-38	B9	19003-0105	BLUE	22	48.00	BUTTON9
52	DOUBLE CRIMP	P1-17	CN5	19003-0105	RED/WHITE	22	36.00	COL2
53	583853-3	P7C-10	UCL1-8	2091117	WHITE	22	48.00	LDRV2
54	583853-3	P7C-19	UCL1-6	2091117	GREEN	22	48.00	QUADA3
55	DOUBLE CRIMP	CN1	UCL1-2	2091117	BLUE	22	22.00	COIN_IN1
56	39-00-0038	R3-1	UCL1-1	2091117	YELLOW	18	48.00	12V
57	39-00-0038	R3-3	UCL1-9	2091117	BLACK	18	48.00	GND

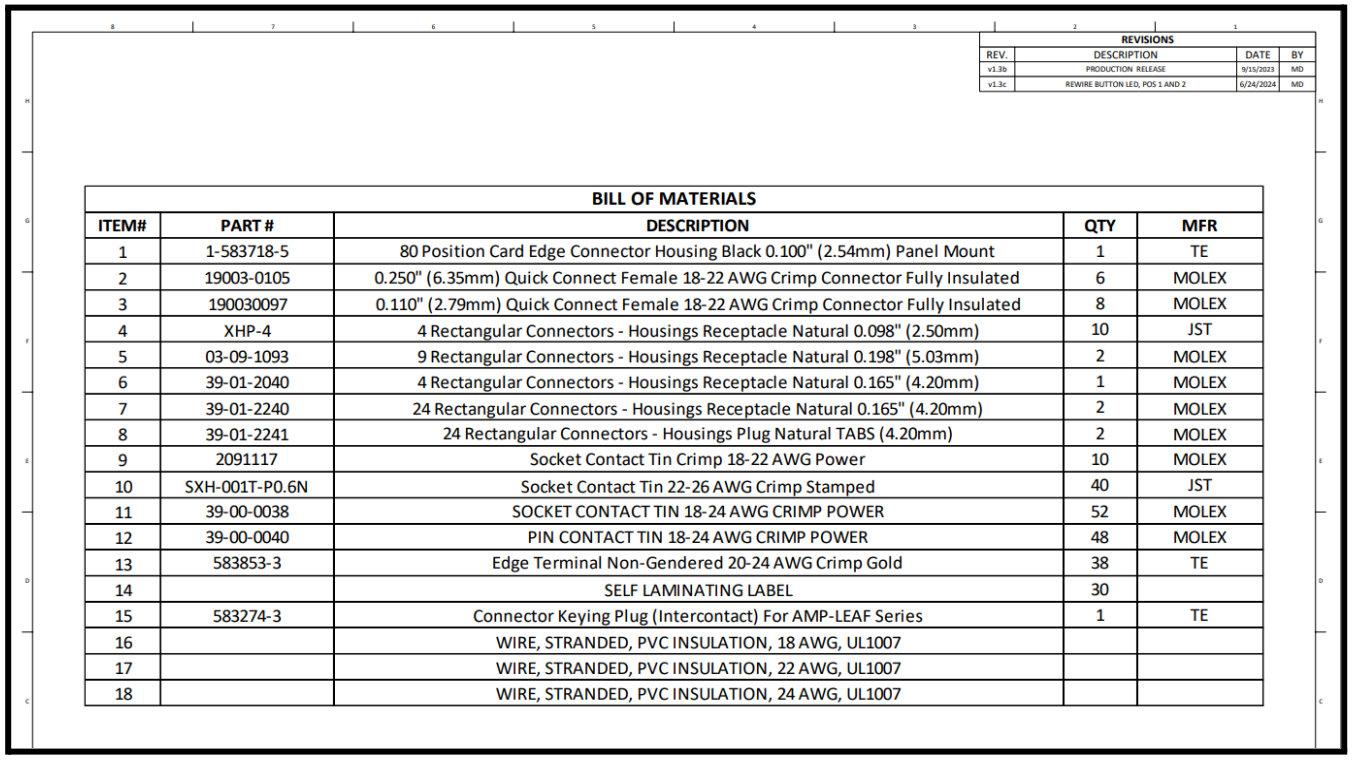
WIRE RUN LIST 2-2

WIRE#	TERMINAL LT	FROM	TO	TERMINAL RT	COLOR	AWG	LENGTH (in)	FUNCTION
PLAYER 2								
58	583853-3	P7C-13	CN3	19003-0105	BLUE	22	66.00	COIN_IN1
59	DOUBLE CRIMP	CN2	CN4	19003-0105	BLACK	22	40.00	GND_P7_3
60	583853-3	P7C-39	P2-1	39-00-0040	GREEN/WHITE	22	55.00	COL3
61	583853-3	P7C-25	P2-2	39-00-0040	BLUE	22	55.00	BUTTON23
62	583853-3	P7C-4	P2-3	39-00-0040	RED	22	55.00	5V_P7_4
63	583853-3	P7C-7	P2-4	39-00-0040	WHITE	22	55.00	LDRV7
64	DOUBLE CRIMP	P2-1	P2-5	39-00-0040	GREEN/WHITE	22	3.00	COL3
65	583853-3	P7C-37	P2-6	39-00-0040	BLUE	22	55.00	BUTTON17
66	DOUBLE CRIMP	P2-3	P2-7	39-00-0040	RED	22	3.00	5V_P7_1
67	583853-3	P7S-7	P2-8	39-00-0040	WHITE	22	55.00	LDRV10
68	DOUBLE CRIMP	P2-1	P2-9	39-00-0040	GREEN/WHITE	22	3.00	COL3
69	583853-3	P7C-35	P2-10	39-00-0040	BLUE	22	55.00	BUTTON18
70	DOUBLE CRIMP	P2-3	P2-11	39-00-0040	RED	22	3.00	5V_P7_1
71	583853-3	P7S-6	P2-12	39-00-0040	WHITE	22	55.00	LDRV11
72	DOUBLE CRIMP	P2-1	P2-13	39-00-0040	GREEN/WHITE	22	3.00	COL3
73	583853-3	P7C-33	P2-14	39-00-0040	BLUE	22	55.00	BUTTON19
74	DOUBLE CRIMP	P2-3	P2-15	39-00-0040	RED	22	3.00	5V_P7_1
75	583853-3	P7S-5	P2-16	39-00-0040	WHITE	22	55.00	LDRV12
76	583853-3	P7S-39	P2-17	39-00-0040	GREEN/WHITE	22	55.00	COL4
77	583853-3	P7S-33	P2-18	39-00-0040	BLUE	22	55.00	BUTTON27
78	DOUBLE CRIMP	P2-3	P2-19	39-00-0040	RED	22	3.00	5V_P7_1
79	583853-3	P7C-5	P2-20	39-00-0040	WHITE	22	55.00	LDRV9
80	DOUBLE CRIMP	P2-17	P2-21	39-00-0040	GREEN/WHITE	22	3.00	COL4
81	583853-3	P7S-31	P2-22	39-00-0040	BLUE	22	55.00	BUTTON28
82	DOUBLE CRIMP	P2-3	P2-23	39-00-0040	RED	22	3.00	5V_P7_1
83	583853-3	P7C-2	P2-24	39-00-0040	WHITE	22	55.00	LDRV14
84	39-00-0038	R2-1	ST5	190030097	GREEN/WHITE	22	11.00	COL3
85	39-00-0038	R2-2	ST6	190030097	BLUE	22	11.00	BUTTON23
86	39-00-0038	R2-3	ST7	190030097	RED	22	11.00	5V_P7_4
87	39-00-0038	R2-4	ST8	190030097	WHITE	22	11.00	LDRV7
88	39-00-0038	R2-5	P2G-4	SXH-001T-P0.6N	GREEN/WHITE	22	11.00	COL3
89	39-00-0038	R2-6	P2G-3	SXH-001T-P0.6N	BLUE	22	11.00	BUTTON17
90	39-00-0038	R2-7	P2G-2	SXH-001T-P0.6N	RED	22	11.00	5V_P7_1
91	39-00-0038	R2-8	P2G-1	SXH-001T-P0.6N	WHITE	22	11.00	LDRV10
92	39-00-0038	R2-9	P2R-4	SXH-001T-P0.6N	GREEN/WHITE	22	11.00	COL3
93	39-00-0038	R2-10	P2R-3	SXH-001T-P0.6N	BLUE	22	11.00	BUTTON18
94	39-00-0038	R2-11	P2R-2	SXH-001T-P0.6N	RED	22	11.00	5V_P7_1
95	39-00-0038	R2-12	P2R-1	SXH-001T-P0.6N	WHITE	22	11.00	LDRV11
96	39-00-0038	R2-13	P2W-4	SXH-001T-P0.6N	GREEN/WHITE	22	11.00	COL3
97	39-00-0038	R2-14	P2W-3	SXH-001T-P0.6N	BLUE	22	11.00	BUTTON19
98	39-00-0038	R2-15	P2W-2	SXH-001T-P0.6N	RED	22	11.00	5V_P7_1
99	39-00-0038	R2-16	P2W-1	SXH-001T-P0.6N	WHITE	22	11.00	LDRV12
100	39-00-0038	R2-17	P2BL-4	SXH-001T-P0.6N	YELLOW/WHITE	22	11.00	COL4
101	39-00-0038	R2-18	P2BL-3	SXH-001T-P0.6N	BLUE	22	11.00	BUTTON27
102	39-00-0038	R2-19	P2BL-2	SXH-001T-P0.6N	RED	22	11.00	5V_P7_1
103	39-00-0038	R2-20	P2BL-1	SXH-001T-P0.6N	WHITE	22	11.00	LDRV9
104	39-00-0038	R2-21	P2BR-4	SXH-001T-P0.6N	YELLOW/WHITE	22	11.00	COL4
105	39-00-0038	R2-22	P2BR-3	SXH-001T-P0.6N	BLUE	22	11.00	BUTTON28
106	39-00-0038	R2-23	P2BR-2	SXH-001T-P0.6N	RED	22	11.00	5V_P7_1
107	39-00-0038	R2-24	P2BR-1	SXH-001T-P0.6N	WHITE	22	11.00	LDRV14
108	583853-3	P7C-6	UCL2-8	2091117	WHITE	22	66.00	LDRV8
109	583853-3	P7C-16	UCL2-6	2091117	GREEN	22	66.00	QUADA6
110	DOUBLE CRIMP	CN3	UCL1-2	2091117	BLUE	22	22.00	COIN_IN2
111	39-00-0038	R3-2	UCL1-1	2091117	YELLOW	18	66.00	12V
112	39-00-0038	R3-4	UCL1-9	2091117	BLACK	18	66.00	GND

REVISIONS

REV.	DESCRIPTION	DATE	BY
v1.3b	PRODUCTION RELEASE	9/15/2023	MD
v1.3c	REWIRE BUTTON LED, POS 1 AND 2	6/24/2024	MD

FIGURE 12. 40 PIN WIRING HARNESS PINOUT



REVISIONS

REV.	DESCRIPTION	DATE	BY
v1.3b	PRODUCTION RELEASE	9/15/2023	MD
v1.3c	REWIRE BUTTON LED, POS 1 AND 2	6/24/2024	MD

BILL OF MATERIALS

ITEM#	PART #	DESCRIPTION	QTY	MFR
1	1-583718-5	80 Position Card Edge Connector Housing Black 0.100" (2.54mm) Panel Mount	1	TE
2	19003-0105	0.250" (6.35mm) Quick Connect Female 18-22 AWG Crimp Connector Fully Insulated	6	MOLEX
3	190030097	0.110" (2.79mm) Quick Connect Female 18-22 AWG Crimp Connector Fully Insulated	8	MOLEX
4	XHP-4	4 Rectangular Connectors - Housings Receptacle Natural 0.098" (2.50mm)	10	JST
5	03-09-1093	9 Rectangular Connectors - Housings Receptacle Natural 0.198" (5.03mm)	2	MOLEX
6	39-01-2040	4 Rectangular Connectors - Housings Receptacle Natural 0.165" (4.20mm)	1	MOLEX
7	39-01-2240	24 Rectangular Connectors - Housings Receptacle Natural 0.165" (4.20mm)	2	MOLEX
8	39-01-2241	24 Rectangular Connectors - Housings Plug Natural TABS (4.20mm)	2	MOLEX
9	2091117	Socket Contact Tin Crimp 18-22 AWG Power	10	MOLEX
10	SXH-001T-P0.6N	Socket Contact Tin 22-26 AWG Crimp Stamped	40	JST
11	39-00-0038	SOCKET CONTACT TIN 18-24 AWG CRIMP POWER	52	MOLEX
12	39-00-0040	PIN CONTACT TIN 18-24 AWG CRIMP POWER	48	MOLEX
13	583853-3	Edge Terminal Non-Gendered 20-24 AWG Crimp Gold	38	TE
14		SELF LAMINATING LABEL	30	
15	583274-3	Connector Keying Plug (Intercontact) For AMP-LEAF Series	1	TE
16		WIRE, STRANDED, PVC INSULATION, 18 AWG, UL1007		
17		WIRE, STRANDED, PVC INSULATION, 22 AWG, UL1007		
18		WIRE, STRANDED, PVC INSULATION, 24 AWG, UL1007		

FIGURE 13. 40 PIN WIRING HARNESS BOM

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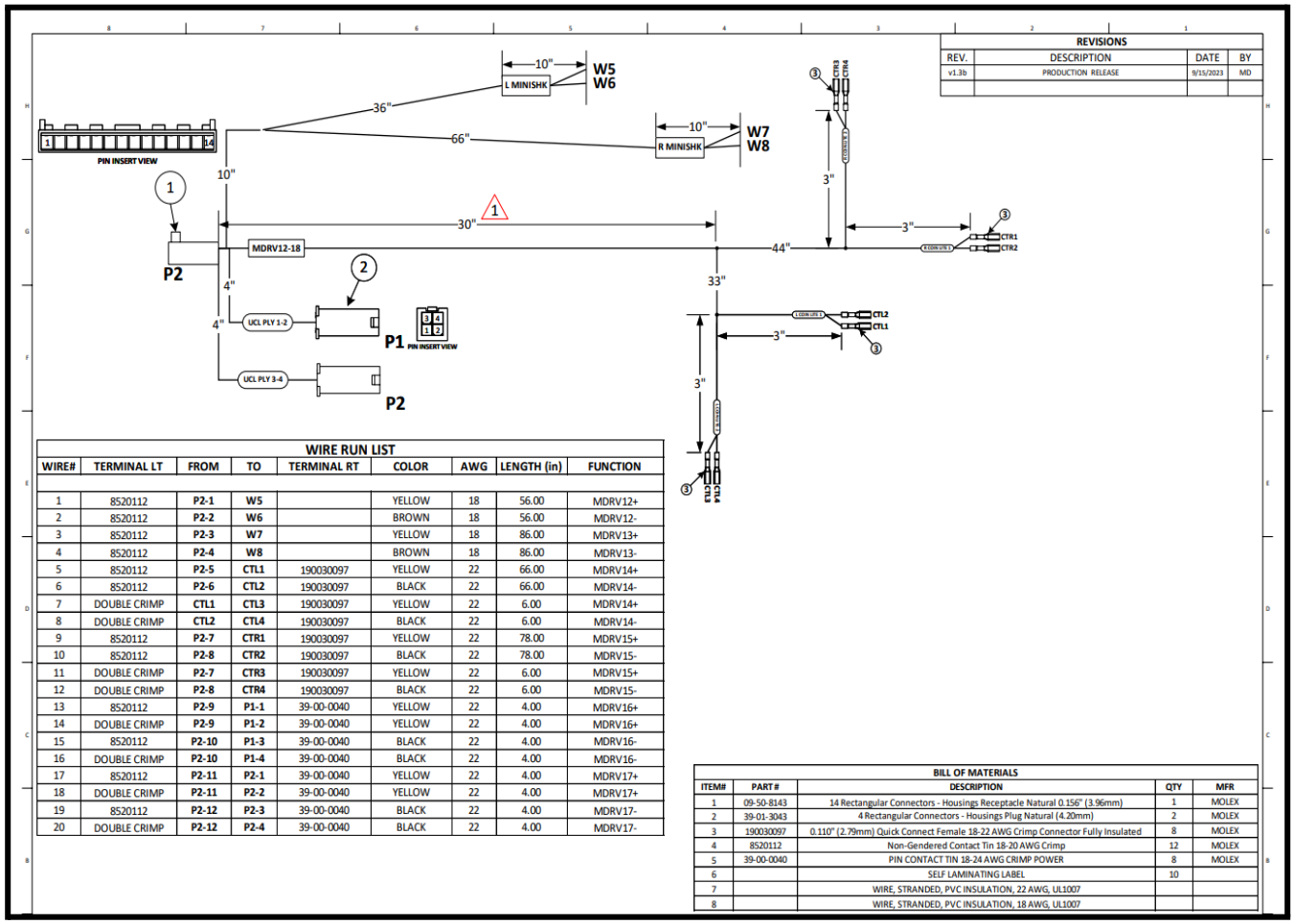
Wiring harness, 800IOP, Coin Door LEDs & Ticket Disp.



WIRE RUN LIST

WIRE#	TERMINAL LT	FROM	TO	TERMINAL RT	COLOR	AWG	LENGTH (in)	FUNCTION
1	8520112	P2-1	W5		YELLOW	18	56.00	MDRV12+
2	8520112	P2-2	W6		BROWN	18	56.00	MDRV12-
3	8520112	P2-3	W7		YELLOW	18	86.00	MDRV13+
4	8520112	P2-4	W8		BROWN	18	86.00	MDRV13-
5	8520112	P2-5	CTL1	190030097	YELLOW	22	66.00	MDRV14+
6	8520112	P2-6	CTL2	190030097	BLACK	22	66.00	MDRV14-
7	DOUBLE CRIMP	CTL1	CTL3	190030097	YELLOW	22	6.00	MDRV14+
8	DOUBLE CRIMP	CTL2	CTL4	190030097	BLACK	22	6.00	MDRV14-
9	8520112	P2-7	CTR1	190030097	YELLOW	22	78.00	MDRV15+
10	8520112	P2-8	CTR2	190030097	BLACK	22	78.00	MDRV15-
11	DOUBLE CRIMP	P2-7	CTR3	190030097	YELLOW	22	6.00	MDRV15+
12	DOUBLE CRIMP	P2-8	CTR4	190030097	BLACK	22	6.00	MDRV15-
13	8520112	P2-9	P1-1	39-00-0040	YELLOW	22	4.00	MDRV16+
14	DOUBLE CRIMP	P2-9	P1-2	39-00-0040	YELLOW	22	4.00	MDRV16+
15	8520112	P2-10	P1-3	39-00-0040	BLACK	22	4.00	MDRV16-
16	DOUBLE CRIMP	P2-10	P1-4	39-00-0040	BLACK	22	4.00	MDRV16-
17	8520112	P2-11	P2-1	39-00-0040	YELLOW	22	4.00	MDRV17+
18	DOUBLE CRIMP	P2-11	P2-2	39-00-0040	YELLOW	22	4.00	MDRV17+
19	8520112	P2-12	P2-3	39-00-0040	BLACK	22	4.00	MDRV17-
20	DOUBLE CRIMP	P2-12	P2-4	39-00-0040	BLACK	22	4.00	MDRV17-

BILL OF MATERIALS

ITEM#	PART #	DESCRIPTION	QTY	MFR
1	09-50-8143	14 Rectangular Connectors - Housings Receptacle Natural 0.156" (3.96mm)	1	MOLEX
2	39-01-3043	4 Rectangular Connectors - Housings Plug Natural (4.20mm)	2	MOLEX
3	190030097	0.110" (2.79mm) Quick Connect Female 18-22 AWG Crimp Connector Fully Insulated	8	MOLEX
4	8520112	Non-Gendered Contact Tin 18-20 AWG Crimp	12	MOLEX
5	39-00-0040	PIN CONTACT TIN 18-24 AWG CRIMP POWER	8	MOLEX
6		SELF LAMINATING LABEL	10	
7		WIRE, STRANDED, PVC INSULATION, 22 AWG, UL1007		
8		WIRE, STRANDED, PVC INSULATION, 18 AWG, UL1007		

FIGURE 14. COIN DOOR LED & TICKET DISPENSER DIAGRAM

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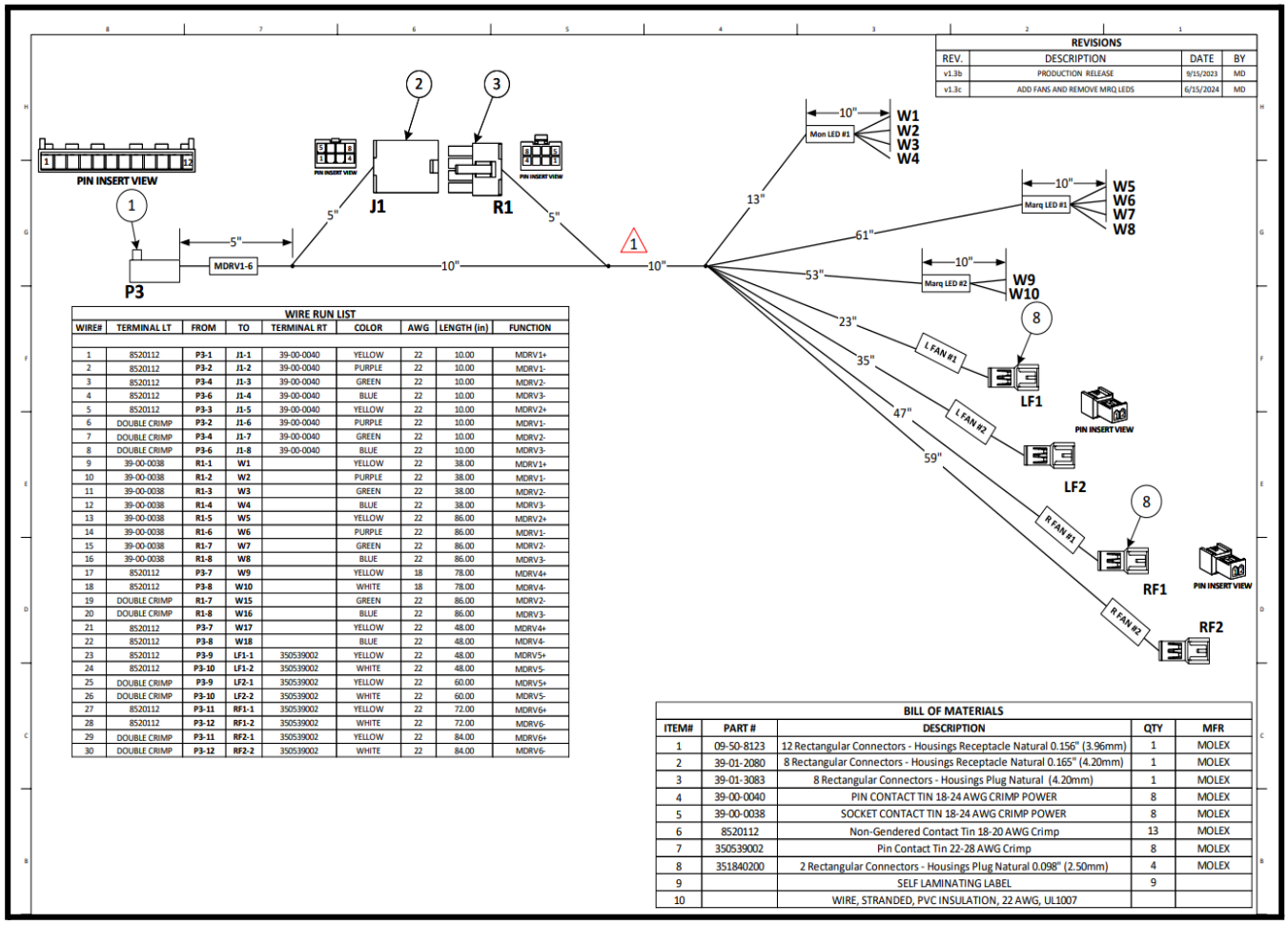
LED Wiring Connections



WIRE RUN LIST

WIRE#	TERMINAL LT	FROM	TO	TERMINAL RT	COLOR	AWG	LENGTH (in)	FUNCTION
1	8520112	P3-1	J1-1	39-00-0040	YELLOW	22	10.00	MDRV1+
2	8520112	P3-2	J1-2	39-00-0040	PURPLE	22	10.00	MDRV1-
3	8520112	P3-4	J1-3	39-00-0040	GREEN	22	10.00	MDRV2-
4	8520112	P3-6	J1-4	39-00-0040	BLUE	22	10.00	MDRV3-
5	8520112	P3-3	J1-5	39-00-0040	YELLOW	22	10.00	MDRV2+
6	DOUBLE CRIMP	P3-2	J1-6	39-00-0040	PURPLE	22	10.00	MDRV1-
7	DOUBLE CRIMP	P3-4	J1-7	39-00-0040	GREEN	22	10.00	MDRV2-
8	DOUBLE CRIMP	P3-6	J1-8	39-00-0040	BLUE	22	10.00	MDRV3-
9	39-00-0038	R1-1	W1		YELLOW	22	38.00	MDRV1+
10	39-00-0038	R1-2	W2		PURPLE	22	38.00	MDRV1-
11	39-00-0038	R1-3	W3		GREEN	22	38.00	MDRV2-
12	39-00-0038	R1-4	W4		BLUE	22	38.00	MDRV3-
13	39-00-0038	R1-5	W5		YELLOW	22	86.00	MDRV2+
14	39-00-0038	R1-6	W6		PURPLE	22	86.00	MDRV1-
15	39-00-0038	R1-7	W7		GREEN	22	86.00	MDRV2-
16	39-00-0038	R1-8	W8		BLUE	22	86.00	MDRV3-
17	8520112	P3-7	W9		YELLOW	18	78.00	MDRV4+
18	8520112	P3-8	W10		WHITE	18	78.00	MDRV4-
19	DOUBLE CRIMP	R1-7	W15		GREEN	22	86.00	MDRV2-
20	DOUBLE CRIMP	R1-8	W16		BLUE	22	86.00	MDRV3-
21	8520112	P3-7	W17		YELLOW	22	48.00	MDRV4+
22	8520112	P3-8	W18		BLUE	22	48.00	MDRV4-
23	8520112	P3-9	LF1-1	350539002	YELLOW	22	48.00	MDRV5+
24	8520112	P3-10	LF1-2	350539002	WHITE	22	48.00	MDRV5-
25	DOUBLE CRIMP	P3-9	LF2-1	350539002	YELLOW	22	60.00	MDRV5+
26	DOUBLE CRIMP	P3-10	LF2-2	350539002	WHITE	22	60.00	MDRV5-
27	8520112	P3-11	RF1-1	350539002	YELLOW	22	72.00	MDRV6+
28	8520112	P3-12	RF1-2	350539002	WHITE	22	72.00	MDRV6-
29	DOUBLE CRIMP	P3-11	RF2-1	350539002	YELLOW	22	84.00	MDRV6+
30	DOUBLE CRIMP	P3-12	RF2-2	350539002	WHITE	22	84.00	MDRV6-

BILL OF MATERIALS

ITEM#	PART #	DESCRIPTION	QTY	MFR
1	09-50-8123	12 Rectangular Connectors - Housings Receptacle Natural 0.156" (3.96mm)	1	MOLEX
2	39-01-2080	8 Rectangular Connectors - Housings Receptacle Natural 0.165" (4.20mm)	1	MOLEX
3	39-01-3083	8 Rectangular Connectors - Housings Plug Natural (4.20mm)	1	MOLEX
4	39-00-0040	PIN CONTACT TIN 18-24 AWG CRIMP POWER	8	MOLEX
5	39-00-0038	SOCKET CONTACT TIN 18-24 AWG CRIMP POWER	8	MOLEX
6	8520112	Non-Gendered Contact Tin 18-20 AWG Crimp	13	MOLEX
7	350539002	Pin Contact Tin 22-28 AWG Crimp	8	MOLEX
8	351840200	2 Rectangular Connectors - Housings Plug Natural 0.098" (2.50mm)	4	MOLEX
9		SELF LAMINATING LABEL	9	
10		WIRE, STRANDED, PVC INSULATION, 22 AWG, UL1007		

FIGURE 15. LED WIRING CONNECTIONS DIAGRAM

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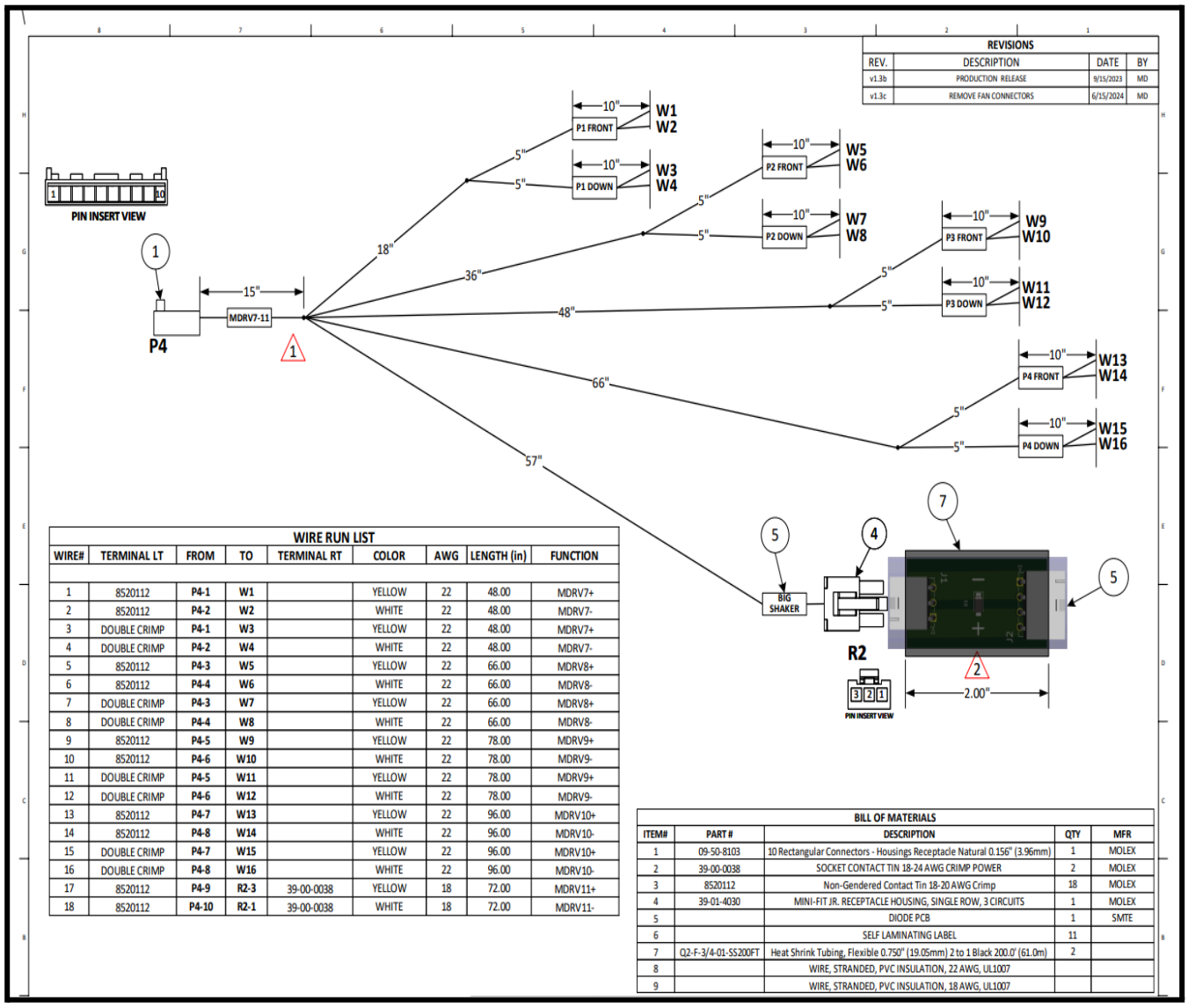
Shaker motor harness



WIRE RUN LIST

WIRE#	TERMINAL LT	FROM	TO	TERMINAL RT	COLOR	AWG	LENGTH (in)	FUNCTION
1	8520112	P4-1	W1		YELLOW	22	48.00	MDRV7+
2	8520112	P4-2	W2		WHITE	22	48.00	MDRV7-
3	DOUBLE CRIMP	P4-1	W3		YELLOW	22	48.00	MDRV7+
4	DOUBLE CRIMP	P4-2	W4		WHITE	22	48.00	MDRV7-
5	8520112	P4-3	W5		YELLOW	22	66.00	MDRV8+
6	8520112	P4-4	W6		WHITE	22	66.00	MDRV8-
7	DOUBLE CRIMP	P4-3	W7		YELLOW	22	66.00	MDRV8+
8	DOUBLE CRIMP	P4-4	W8		WHITE	22	66.00	MDRV8-
9	8520112	P4-5	W9		YELLOW	22	78.00	MDRV9+
10	8520112	P4-6	W10		WHITE	22	78.00	MDRV9-
11	DOUBLE CRIMP	P4-5	W11		YELLOW	22	78.00	MDRV9+
12	DOUBLE CRIMP	P4-6	W12		WHITE	22	78.00	MDRV9-
13	8520112	P4-7	W13		YELLOW	22	96.00	MDRV10+
14	8520112	P4-8	W14		WHITE	22	96.00	MDRV10-
15	DOUBLE CRIMP	P4-7	W15		YELLOW	22	96.00	MDRV10+
16	DOUBLE CRIMP	P4-8	W16		WHITE	22	96.00	MDRV10-
17	8520112	P4-9	R2-3	39-00-0038	YELLOW	18	72.00	MDRV11+
18	8520112	P4-10	R2-1	39-00-0038	WHITE	18	72.00	MDRV11-

BILL OF MATERIALS

ITEM#	PART #	DESCRIPTION	QTY	MFR
1	09-50-8103	10 Rectangular Connectors - Housings Receptacle Natural 0.156" (3.96mm)	1	MOLEX
2	39-00-0038	SOCKET CONTACT TIN 18-24 AWG CRIMP POWER	2	MOLEX
3	8520112	Non-Gendered Contact Tin 18-20 AWG Crimp	18	MOLEX
4	39-01-4030	MINI-FIT JR. RECEPTACLE HOUSING, SINGLE ROW, 3 CIRCUITS	1	MOLEX
5		DIODE PCB	1	SMTE
6		SELF LAMINATING LABEL	11	
7	Q2-F-3/4-01-SS200FT	Heat Shrink Tubing, Flexible 0.750" (19.05mm) 2 to 1 Black 200.0' (61.0m)	2	
8		WIRE, STRANDED, PVC INSULATION, 22 AWG, UL1007		
9		WIRE, STRANDED, PVC INSULATION, 18 AWG, UL1007		

FIGURE 16. SHAKER MOTOR HARNESS DIAGRAM

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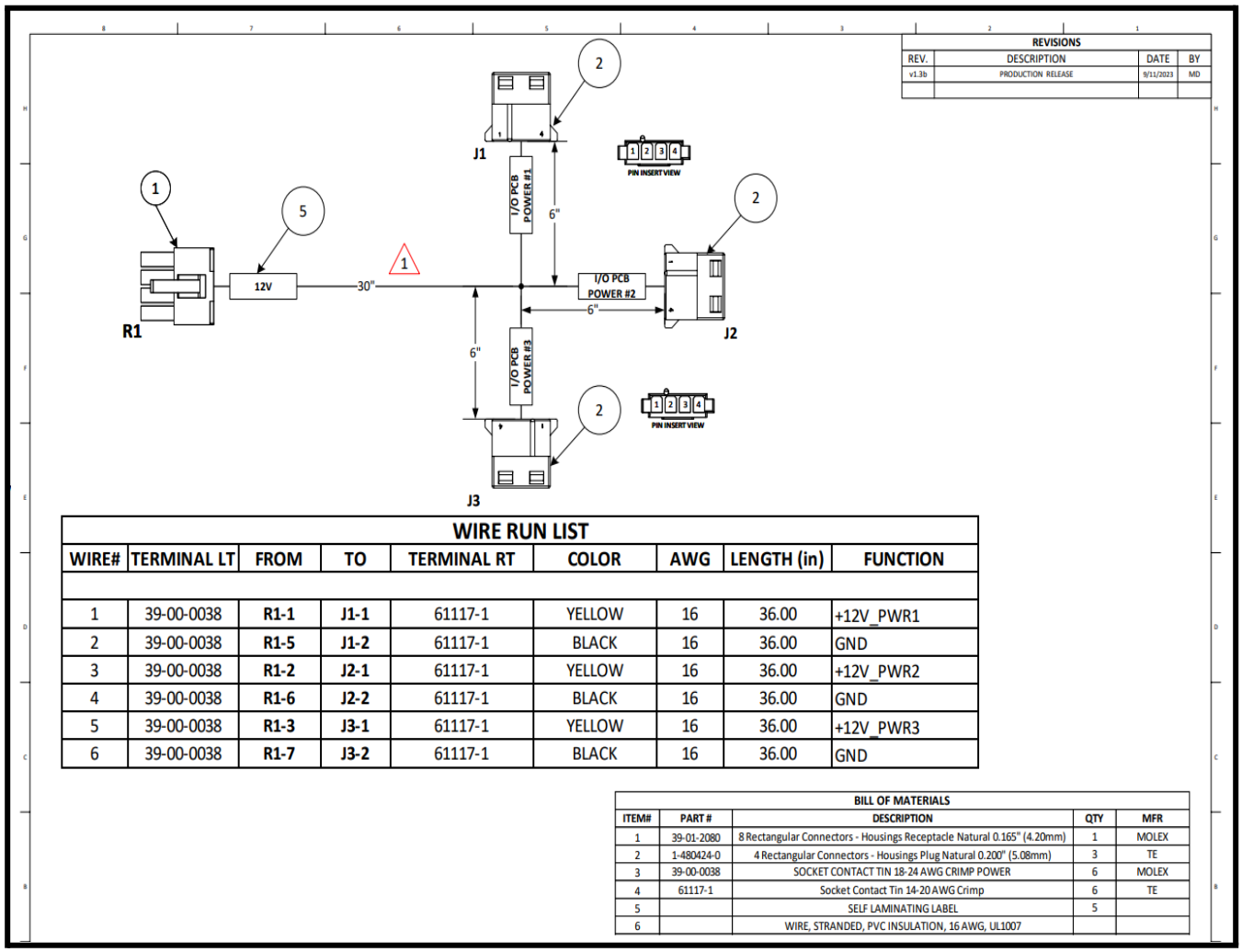
IO/T Power Harness



WIRE RUN LIST

WIRE#	TERMINAL LT	FROM	TO	TERMINAL RT	COLOR	AWG	LENGTH (in)	FUNCTION
1	39-00-0038	R1-1	J1-1	61117-1	YELLOW	16	36.00	+12V_PWR1
2	39-00-0038	R1-5	J1-2	61117-1	BLACK	16	36.00	GND
3	39-00-0038	R1-2	J2-1	61117-1	YELLOW	16	36.00	+12V_PWR2
4	39-00-0038	R1-6	J2-2	61117-1	BLACK	16	36.00	GND
5	39-00-0038	R1-3	J3-1	61117-1	YELLOW	16	36.00	+12V_PWR3
6	39-00-0038	R1-7	J3-2	61117-1	BLACK	16	36.00	GND

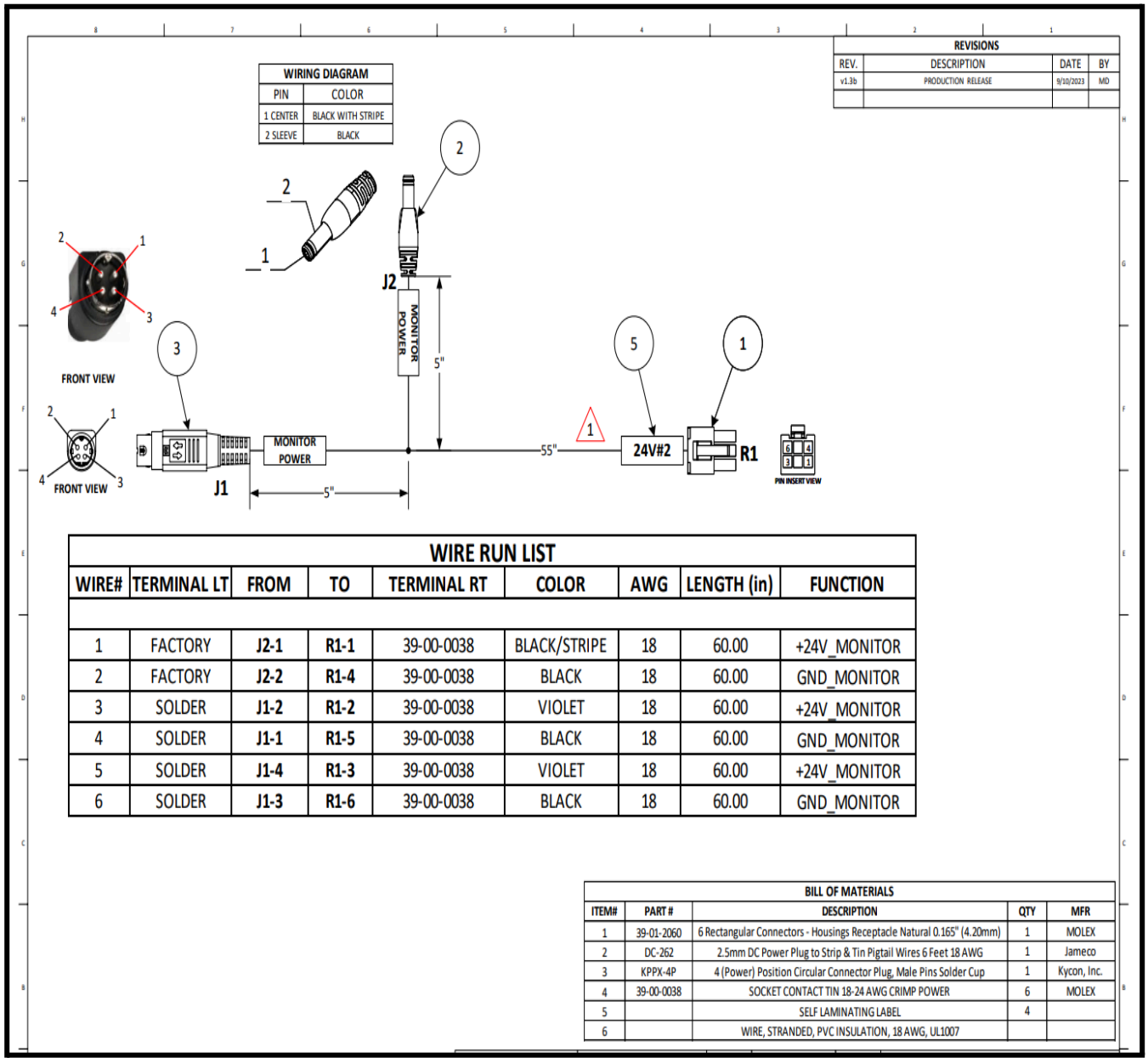
BILL OF MATERIALS

ITEM#	PART #	DESCRIPTION	QTY	MFR
1	39-01-2080	8 Rectangular Connectors - Housings Receptacle Natural 0.165" (4.20mm)	1	MOLEX
2	1-480424-0	4 Rectangular Connectors - Housings Plug Natural 0.200" (5.08mm)	3	TE
3	39-00-0038	SOCKET CONTACT TIN 18-24 AWG CRIMP POWER	6	MOLEX
4	61117-1	Socket Contact Tin 14-20 AWG Crimp	6	TE
5		SELF LAMINATING LABEL	5	
6		WIRE, STRANDED, PVC INSULATION, 16 AWG, UL1007		

FIGURE 17. IO/T POWER HARNESS DIAGRAM

© MMXXIV Alan-1, Inc.

Monitor Power Harness



WIRE RUN LIST

WIRE#	TERMINAL LT	FROM	TO	TERMINAL RT	COLOR	AWG	LENGTH (in)	FUNCTION
1	FACTORY	J2-1	R1-1	39-00-0038	BLACK/STRIPE	18	60.00	+24V_MONITOR
2	FACTORY	J2-2	R1-4	39-00-0038	BLACK	18	60.00	GND_MONITOR
3	SOLDER	J1-2	R1-2	39-00-0038	VIOLET	18	60.00	+24V_MONITOR
4	SOLDER	J1-1	R1-5	39-00-0038	BLACK	18	60.00	GND_MONITOR
5	SOLDER	J1-4	R1-3	39-00-0038	VIOLET	18	60.00	+24V_MONITOR
6	SOLDER	J1-3	R1-6	39-00-0038	BLACK	18	60.00	GND_MONITOR

BILL OF MATERIALS

ITEM#	PART #	DESCRIPTION	QTY	MFR
1	39-01-2060	6 Rectangular Connectors - Housings Receptacle Natural 0.165" (4.20mm)	1	MOLEX
2	DC-262	2.5mm DC Power Plug to Strip & Tin Pigtail Wires 6 Feet 18 AWG	1	Jameco
3	KPPX-4P	4 (Power) Position Circular Connector Plug, Male Pins Solder Cup	1	Kycon, Inc.
4	39-00-0038	SOCKET CONTACT TIN 18-24 AWG CRIMP POWER	6	MOLEX
5		SELF LAMINATING LABEL	4	
6		WIRE, STRANDED, PVC INSULATION, 18 AWG, UL1007		

FIGURE 18. MONITOR POWER HARNESS DIAGRAM

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Audio Power Harness

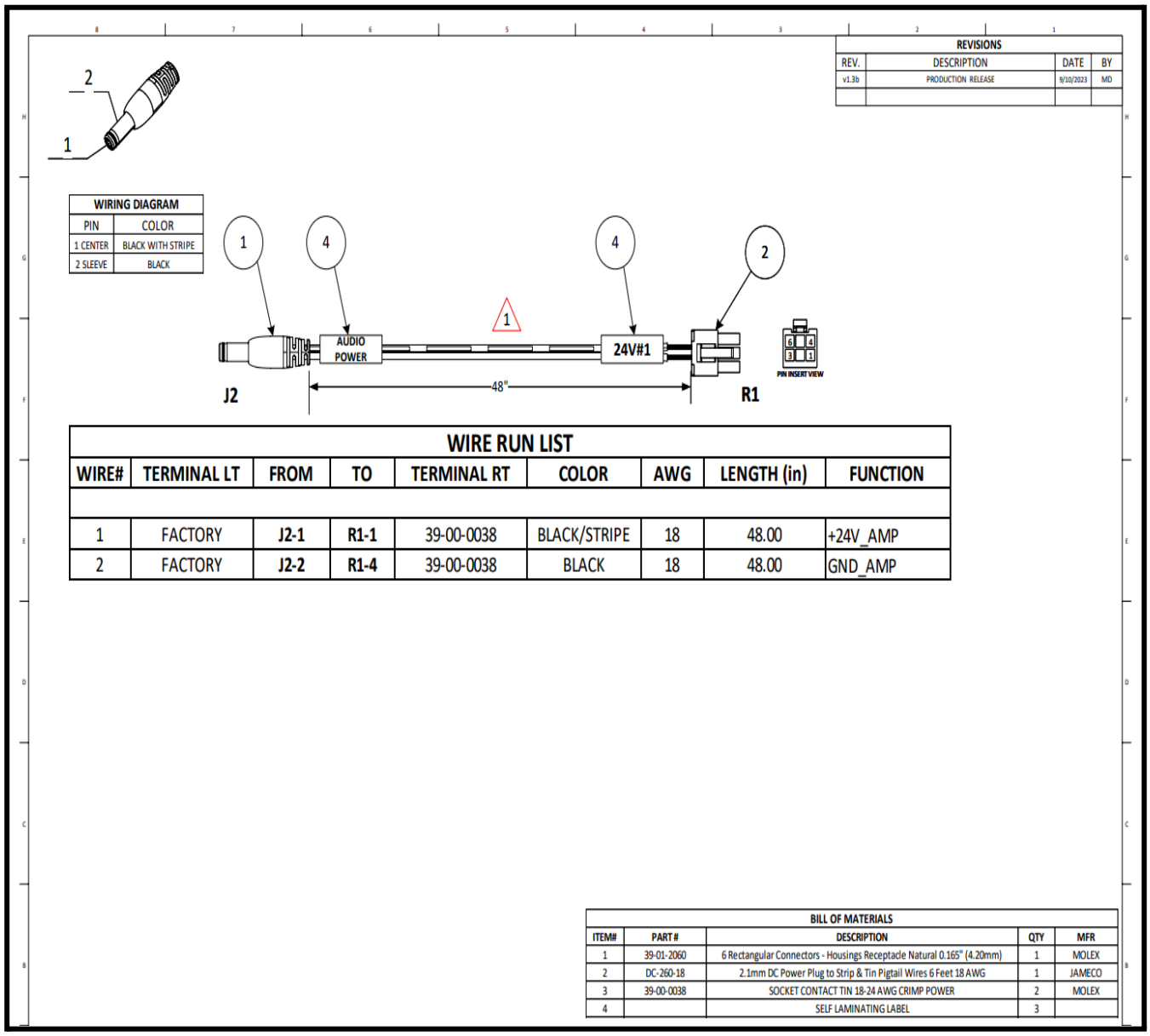

FIGURE 19. AUDIO POWER HARNESS DIAGRAM

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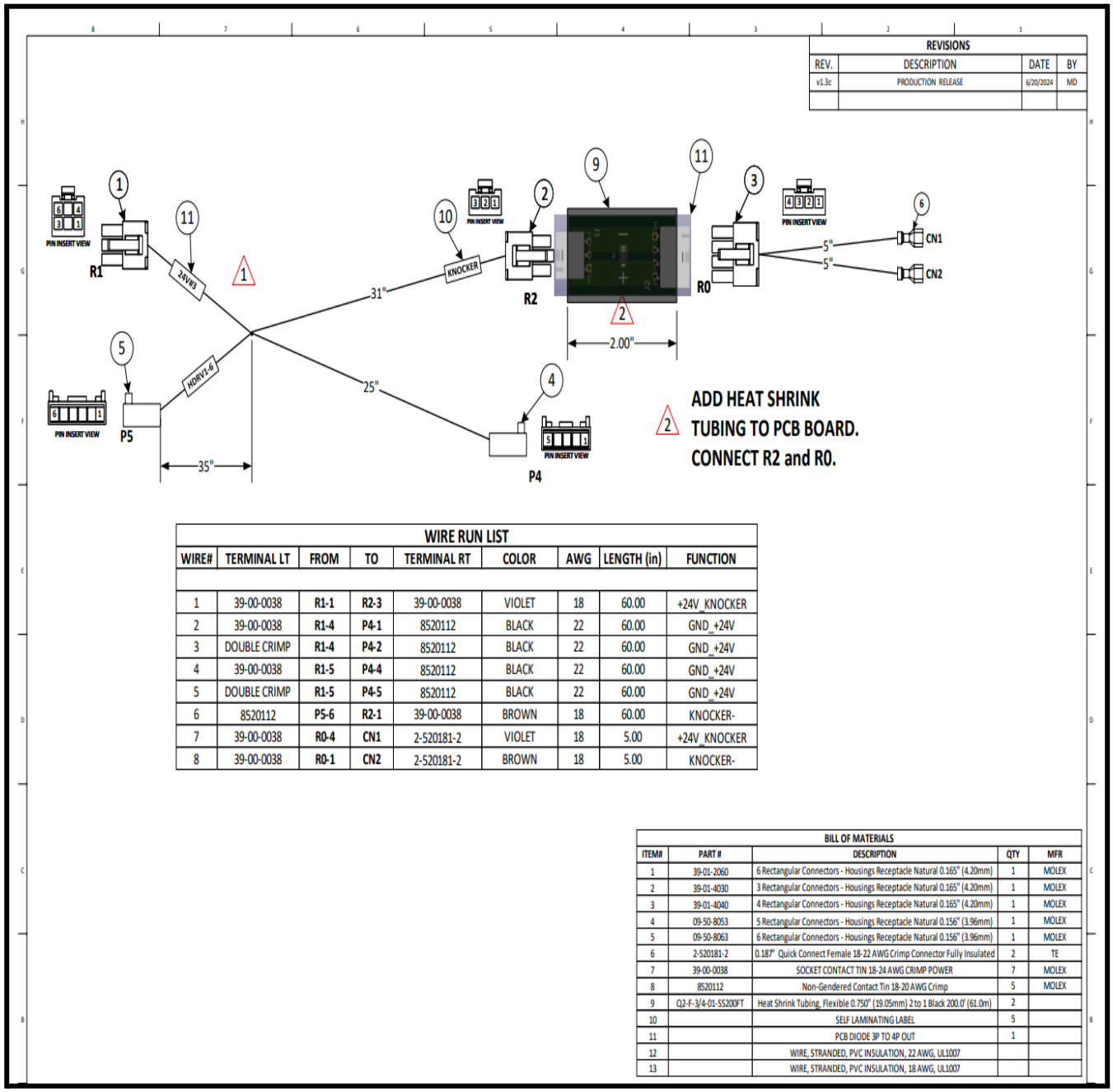
Pinball Knocker (HDRV) Harness



WIRE RUN LIST

WIRE#	TERMINAL LT	FROM	TO	TERMINAL RT	COLOR	AWG	LENGTH (in)	FUNCTION
1	39-00-0038	R1-1	R2-3	39-00-0038	VIOLET	18	60.00	+24V_KNOCKER
2	39-00-0038	R1-4	P4-1	8520112	BLACK	22	60.00	GND_+24V
3	DOUBLE CRIMP	R1-4	P4-2	8520112	BLACK	22	60.00	GND_+24V
4	39-00-0038	R1-5	P4-4	8520112	BLACK	22	60.00	GND_+24V
5	DOUBLE CRIMP	R1-5	P4-5	8520112	BLACK	22	60.00	GND_+24V
6	8520112	P5-6	R2-1	39-00-0038	BROWN	18	60.00	KNOCKER-
7	39-00-0038	R0-4	CN1	2-520181-2	VIOLET	18	5.00	+24V_KNOCKER
8	39-00-0038	R0-1	CN2	2-520181-2	BROWN	18	5.00	KNOCKER-

BILL OF MATERIALS

ITEM#	PART #	DESCRIPTION	QTY	MFR
1	39-01-2060	6 Rectangular Connectors - Housings Receptacle Natural 0.165" (4.20mm)	1	MOLEX
2	39-01-4030	3 Rectangular Connectors - Housings Receptacle Natural 0.165" (4.20mm)	1	MOLEX
3	39-01-4040	4 Rectangular Connectors - Housings Receptacle Natural 0.165" (4.20mm)	1	MOLEX
4	09-50-8053	5 Rectangular Connectors - Housings Receptacle Natural 0.156" (3.96mm)	1	MOLEX
5	09-50-8063	6 Rectangular Connectors - Housings Receptacle Natural 0.156" (3.96mm)	1	MOLEX
6	2-520181-2	0.187" Quick Connect Female 18-22 AWG Crimp Connector Fully Insulated	2	TE
7	39-00-0038	SOCKET CONTACT TIN 18-24 AWG CRIMP POWER	7	MOLEX
8	8520112	Non-Gendered Contact Tin 18-20 AWG Crimp	5	MOLEX
9	Q2-F-3/4-01-SS200FT	Heat Shrink Tubing, Flexible 0.750" (19.05mm) 2 to 1 Black 200.0' (61.0m)	2	
10		SELF LAMINATING LABEL	5	
11		PCB DIODE 3P TO 4P OUT	1	
12		WIRE, STRANDED, PVC INSULATION, 22 AWG, UL1007		
13		WIRE, STRANDED, PVC INSULATION, 18 AWG, UL1007		

FIGURE 20. PINBALL KNOCKER (HDRV) HARNESS DIAGRAM

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PARTS LIST

Part Name	Quantity	Part Number	Part Description/Web Link
VAS MCP (Motherboard)	1	AK2-VAS-8	ASUS-brand motherboard that operates the game.
VAS Asteroids Recharged Pro 2p Game Grid: M.2 Hard Drive	1	AR2P-VAS-16	SSD hard drive that is plugged into the M.2 slot on the motherboard.
RAM	2	AK2-VAS-12	G.SKILL Ripjaws V Series 16GB (2 x 8GB) 288-Pin PC RAM DDR4 3200 (PC4 25600) Desktop Memory Model F4-3200C16D-16GVKB
CPU	1	AK2-VAS-11	AMD Ryzen 5 5600X 6-core, 12-Thread Unlocked Desktop Processor with Wraith Stealth Cooler
Wi-Fi Card (M.2)	1	AK2-VAS-10	M.2 style WiFi board. WiFi antenna plugs into this.
PCB Standoffs	4	AK2-VAS-13	Feet that keep the motherboard above the wood, prevents ground issues
VAS 800 IO/T	1	AK4-VAS-6	The proprietary Alan-1 I/O board
Control Panel Vinyl	1	AR2P-VYL-101	Printed vinyl artwork for the control panel
Hood Vinyl	1	AR2P-VYL-103	Printed vinyl artwork for the top portion of the game cabinet
Speaker Vinyl	1	AR2P-VYL-100	Printed vinyl for the speaker section between the monitor and marquee hood
Buttons (Start)	2	AR2P-I/P-4	“Volcano cone” shaped start buttons
Buttons (Start nut)	2	AR2P-I/P-5	Nut that holds the Start buttons in place
Buttons (Blue)	4	AR2P-I/P-7	D-LED backlit game button in blue
Buttons (Green)	2	AR2P-I/P-6	D-LED backlit game button in green
Buttons (Red)	2	AR2P-I/P-8	D-LED backlit game button in red
Buttons (White)	2	AR2P-I/P-9	D-LED backlit game button in white
Acrylic Fan Guard	1	AK2-ACR-1	Black piece that sits between the fans and the outer control panel
Acrylic Hood Diffusers	2	AK2-ACR-2	LED diffusers for lighting effect
Acrylic Light Covers		AK2-ACR-3	LED covers

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Hinges		AK2-CAB-10	Hinges that are used inside of the control panel
Hinge Plates		AK2-CAB-105	Plates that the hinges attach to
Hood LEDs		AK2-LED-1	White LEDs inside of the marquee/hood area
Raffix Screws		AR2P-CAB-12	
Raffix Cams		AR2P-CAB-11	
T-Molding (Inft)	2	AK2-CAB-3	Purple T-molding that protects the sides of the cabinet
Monitor Bezel Glass Screen	1	AR2P-GLS-101	Protective glass with printed art around the edges
Coin Box	1	AR2-CAB-2	Metal container that securely houses the coin bucket
Marquee (2P Pro)	1	AR2P-GLS-100	Printed art that shows the game title
Marquee Hardware		AK2-CAB-13	LED & spacer hardware for the marquee
Leg Levelers	2	AK2-CAB-16	
Casters	2	AK2-CAB-9	
LED Channel		AK2-LED-3	
LED Strips		AK2-LED-2	
LED Strip Connectors			
VAS Portal (32" Monitor 4K)	1	AK2-VAS-1	Wei-ya brand, open frame 32” 4K monitor
Audio amplifier	1	AK2-AUD-1	Includes subwoofer & controls
Left/Right Speaker pair	2	AK2-AUD-2	
VAS Energy Distribution Unit (PDB-JH-01)	1	AK2-VAS-7	Main power supply
Pinball Knocker	1	AK2-TOY-1	Solenoid that hits the cabinet when activated by the game.
Small Shaker	1	AK2-TOY-2	Small “rumble effect” motor which creates a smaller effect than the large shaker.
Large Shaker	1	AK2-TOY-3	Large “rumble effect” motor which creates a larger effect than the small shaker.
Fans	2	AK2-TOY-4	A centrifugal fan device for blowing air onto the player’s hands.
Settings Switch	1	AK2-I/P-3	Also known as the service switch, this activates the Operator Menu when the game is on.

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Control Panel Latch	1	AK2-CAB-17	Metal latch that holds the control panel in place
I/O Edge Connector	1	AR2P-W/H-100	Black plastic connector that houses wiring pins and connects the wire harness to the I/O board.
HDVR 1		AK2-W/H-12	Part of the Wiring Harness system (24V)
MDVR 1		AK2-W/H-13	Part of the Wiring Harness system (12V)
MDVR 2		AK2-W/H-14	Part of the Wiring Harness system (12V)
MDVR 3		AK2-W/H-15	Part of the Wiring Harness system (12V)
Monitor Power	1	AK2-W/H-10	Power cable to the monitor
HDMI Video cable	1	AK2-W/H-21	HDMI Cable, 4K, 4' length
USB-B		AK2-W/H-4	Powered USB cable for the I/O board
Audio Cable		AK2-W/H-2	3.5mm audio cable
		1	

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LIMITED WARRANTY

Alan-1 Inc. (“Alan-1”) warrants to the Distributor that each Arcade Machine delivered to Distributor is free from defects in workmanship and free from defects in materials, pursuant to the terms and conditions set forth in this Limited Warranty.

COVERAGE: The Limited Warranty covers defective workmanship and materials as follows to original purchaser of Machine: All parts of the Arcade Machine, excluding standard wear & tear parts, for 90 days from the date of invoice or shipment by Distributor; and the LCD monitor for 1 Year from the date of invoice or shipment by Distributor.

CONDITIONS: The original purchaser must register the Limited Manufacturer’s Warranty by completing the Product Registration Form on the Alan-1 Operators App (available on iOS/Android) within fifteen days of purchase or invoice. In the event of a warranty for the above Coverage to apply, the Original Purchaser must open a trouble ticket on www.alan-1.com or call 844-44-ALAN-1. Service related questions can also be sent via email to support@alan-1.com

Defective parts need to be sent to Alan-1 at the purchaser’s expense, if the defective parts cannot be removed, the entire Arcade Machine will need to be returned to the Distributor for repair or replacement. All parts returned must be properly packaged with an RMA tag/Trouble ticket then returned freight prepaid to the Seller's facility. Any modification of the Arcade Machine or its software, improper repairs or attempts at repairs with non-Alan-1 parts will void the Limited Warranty.

EXCLUSIONS: The Limited Warranty does not cover service, labor, or shipping and handling. Damage, wear, and/or breakage not caused by defective materials or workmanship shall not be covered by the Limited Warranty. Damage incurred during shipping and handling shall not be covered by the Limited Warranty.

DISCLAIMER OF IMPLIED WARRANTY: The Limited Warranty, as set forth in this document, is the only warranty. ALL IMPLIED WARRANTIES ARE DISCLAIMED. THE WARRANTY OF MERCHANTABILITY IS DISCLAIMED. THE WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE IS DISCLAIMED.

DISCLAIMER OF DAMAGES: This Warranty does not apply to any parts damaged due to improper handling or due to improper installation, usage or alteration. In no event shall the Seller be held liable for any anticipated profits, loss of profits, loss of use, accidental or consequential damages or any other losses incurred by the customer regarding the purchase of an Alan-1, Inc. product.

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GLOSSARY OF TERMS

AC
Alternating current; from zero it rises to a maximum positive level, then passes through zero again to a maximum negative level.

ACTIVE STATE
The true state of a signal. For example:
The active state for START is low.

ADDRESS
A value that identifies a specific location of data in memory; normally expressed in hexadecimal notation.

ANALOG
Measurable in an absolute quantity (as opposed to on or off). Analog devices are volume controls, light dimmers, stereo amplifiers, etc.

ANODE
The positive (arrow) end of a diode.

AMPLIFIER
A device used to increase the strength of an applied signal.

AMPLITUDE
The maximum instantaneous value of a waveform pulse from zero.

ASTABLE
Having no normal state. An astable device will free-run or oscillate as long as operating voltage is applied. The oscillation frequency is usually controlled by external circuitry.

AUXILIARY COIN SWITCH
A momentary-contact pushbutton switch with a black cap located on the utility panel. The auxiliary coin switch adds credits to the game without activating a coin counter. Better known as the **SERVICE CREDIT** button

BEZEL
A cut, formed, or machined retention device, such as the conical device used to mount a pushbutton switch to a control panel, or the formed device used to frame the video display screen.

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BIDIRECTIONAL
Able to send or receive data on the same line (e.g., the data bus of a microprocessor).

BINARY
A number system that expresses all values by using two digits (0 and 1).

BIT
A binary digit; expressed as 1 or 0.

BLOCK DIAGRAM
A drawing in which functional circuitry units are represented by blocks. Very useful during initial troubleshooting.

BUFFER
1. An isolating circuit designed to eliminate the reaction of a driven circuit on the circuits driving it (e.g., a buffer amplifier).
2. A device used to supply additional drive capability.

BUS
An electrical path over which information is transferred from any of several sources to any of several destinations. Found on PCBs like motherboards and I/O boards.

CAPACITOR
A device capable of storing electrical energy. A capacitor blocks the flow of DC current while allowing AC current to pass. Look like small, round cylinders.

CARD READER
A device, usually with a color LCD screen, which allows the machine to use a specially programmed card to pay for the game, as opposed to coins.

CASH BOX
The lower portion of the coin door which contains a bucket that catches the coins. Secured to help prevent theft.

CATHODE
The negative end of a diode.

CHIP
An integrated circuit comprising many circuits on a single wafer slice.

CLOCK
A repetitive timing signal for synchronizing system functions.

COIN COUNTER
A 6-digit electromechanical device that counts the coins inserted in the coin mechanism(s).

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COIN MECHANISM
A device on the inside of the coin door that inspects the coin to determine if the correct coin has been inserted. Slang terms: **Coin Mech** or just **Mech**

COMPLEMENTARY
Having opposite states, such as the outputs of a flip-flop.

CPU
Central Processing Unit. These are the brains of a computer, where principle calculations take place. They require an elaborate cooling system. CPUs are designed by companies like Intel and AMD.

CREDIT
A digital measurement unit that counts as one play for one person based on the game switch settings.

DATA
General term for the numbers, letters, and symbols that serve as input for device processing.

DBA or DBV
Short for Dollar Bill Acceptor or Dollar Bill Validator

DC
Direct current, meaning current flowing in one direction and of a fixed value.

DIAGNOSTICS
A programmed routine for checking circuitry. For example: the self-test is a diagnostic routine.

DIODE
A semiconductor device that conducts electrical current in only one direction.

DISCRETE
Non-integrated components, such as resistors, capacitors, and transistors.

DOWN TIME
The period during which a game is malfunctioning or not operating correctly due to machine failure.

GRAPHICS CARD
A device which contains a Graphics Processing Unit (GPU) and other components made to draw the frames of a screen. The more powerful the graphics card, the higher fidelity graphics a computer can produce. Also known as the video card. Alan-1 Arcade games use an integrated card, meaning it cannot be removed/separated from the motherboard.

HARNESS
A prefabricated assembly of insulated wires and terminals ready to be attached to a piece of equipment. Also known as the "**WIRING HARNESS**."

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HEXADECIMAL
A number system using the equivalent of the decimal number I6 as a base. The symbols O-9 and A-F are usually used.

I/O
Input/Output. Within Asteroids Recharged, the I/O board is also known as the 800 IOT

KNOCKER
An electronically-driven solenoid device that will create a loud “knocking” sound when activated

LED
The abbreviation for a light-emitting diode. “RGB LED” refers to multi-colored LEDs

MARQUEE
The top space of the arcade kiosk, generally with artwork and the title of the game

MOTHERBOARD
The complex printed circuit board (PCB) which contains the CPU, RAM, SSD, video/graphics card, and various ports that the game needs to function. Features a fan on top of the CPU.

PCB
The abbreviation for a printed-circuit board.

POTENTIOMETER
1. A resistor that has a continuously moving contact which is generally mounted on a moving shaft. Used chiefly as a voltage divider. Also called a “pot” (slang).
2. An instrument for measuring a voltage by balancing it against a known voltage.
These are frequently used in arcade controls for analog input (mounted guns, shifters, yoke controls)

POWER SUPPLY UNIT (PSU)
A metal box that contains the components for driving power to the arcade cabinet.

RANDOM ACCESS MEMORY (RAM)
A device for the temporary storage of data. These are long, thin, and rectangular and are located on the motherboard. Usually measured in gigabytes of capacity (ex. 8GB or 16GB).

RESISTOR
A device designed to have a definite amount of resistance. Used in circuits to limit current flow or to provide a voltage drop.

ROM
Read-only memory. A device for the permanent storage of data. Older games had “ROM chips” to store game data, whereas Asteroids Recharged uses an SSD device for storing data, which can both read and write data for use.

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RUMBLE FEEDBACK
An effect produced by a specialized motor with an off-set weight to create the sensation of shaking the cabinet. Used in all game console gamepads on a smaller scale, whereas Alan-1's rumble motors are larger.

SOLID STATE DRIVE (SSD)
Semiconductor-based data storage medium. As opposed to hard drives, there are no moving parts nor magnets, meaning that data access is much faster. These connect using the "M.2" standard.

TOYS
Alan-1's term for the special hardware features that are used on our cabinets, such as the cabinet knocker, rumble feedback motors, and wind effect fans.

TROUBLESHOOT
The process of locating and repairing a fault.

WATCHDOG
A counter circuit or program designed to protect the microprocessor from self-destruction if a program malfunction occurs. If a malfunction does occur, the counter applies continuous pulses to the reset line of the microprocessor, which causes the microprocessor to keep resetting.

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NOTES

A place for notes like your game's serial number, major milestones like high earnings, repair notes, etc.

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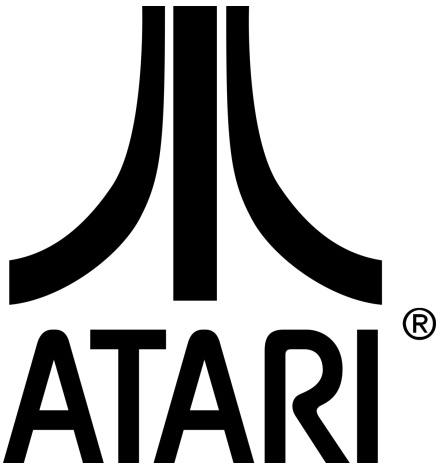

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