

CHAMPION PUB



The information is current as of the time of its release.

Fill out and mail in game Registration card. Be sure to include the game serial number. For your records, write the PIC and game serial numbers in manual.

PIC Number _____

Serial Number _____

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NOTES

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The CHAMPION PUB Story, Rules, and Shotmaps

CHAMPION PUB RULES

WATCH DISPLAY FOR INSTRUCTIONS AND PROMPTS.

OBJECTIVE - Win five fights to become Pub Champion.

Train on the heavy bag, speed bag, and jump rope to increase your LIFE BAR.
A full LIFE BAR lights START FIGHT.

*** Use flipper buttons to make the ball jump in the jump rope
or to operate fists in speed bag area. ***

SKILL SHOT - Press launch button and hold, release to collect highlighted award.

EXTRA BALL - Win second fight to light extra ball.

MULTIBALLS **MULTI BRAWL** - Lock three balls.

RAID - Win third fight.

FISTICUFFS - Hit heavy bag to spell out BARFLY FISTICUFFS.

JACKPOTS - Lit Return lanes light Jackpots.

WHEN IN DOUBT SHOOT FOR THE FLASHING LIGHT.
CHECK WWW.WMS.COM FOR A COMPLETE SET OF RULES.

16-10539

The Champion Pub Story

A barely audible piano was playing in the background and a large crowd was cheering “kid kid kid”. Then THUMP POW BOOM and everything became quiet as the lights blackened.

For a brief second, a serene numb calmness overcame me. Then in an abrupt instance my senses returned one at a time. First, I could here the loudest almost deafening chant “KID KID KID!!!” While a blurry figure of a barrel chested man with enormous fists poised ready to punch became clear. I then realized my knees where half bent as I stumbled backed slipping on the peanut shells littering the filthy wooden floor. The chant seemed to get even louder “KID KID KID!!!” It was that instant the pain became overwhelming. I could feel my face swelling as my confusion diminished. I suddenly remembered how this all started.

On February 3rd, 1898 the Doane shipyard whistle blew for the last time and the era for great wooden ships was officially over. I walked out the main gate unemployed, and wandering aimlessly into the city that never seemed colder. It most of been hours before I could no longer tolerate the frigid winter wind. I needed shelter. I heard cheering, laughter and music echoing down the street. It was coming from the Champion Pub. I crossed the street carefully avoiding the ice routs formed by the horse carriages. Peering into the front window I saw what seemed to be hundreds of people. In the center of all this commotion was a boxing bout.

I heard a tap on the glass and looked over. I was hailed in by an elderly patron, who saw me entranced by the excitement of the pub. Walking in I was taken back by expanse of the pub. It was a very large room encircled by a balcony with almost as much activity as the main floor. The smell of sweat and stale beer filled the comforting warm air of the pub.

I stood there shivering, and admiring the surroundings while blowing into my cupped hands. “Allow me to introduce my self...Mr. Freres Proprietor of dis lovely establishment.” “So What’s ya poison”? He asked “Hmm? Oh a beer.” I replied timidly. “Here ya go Kid.” I sipped the beer slowly as I watched the dancing girls behind the bar.

Later I heard a slurry voice bellowing “sho you thinx you are sho tuff” I turned to see a glassy eyed drunk pointing at me. He repeated himself “sho you thinx you are sho tuff”. He threw a sloppy punch my direction. Instinctively my left hand blocked his hand as I jabbed him with my right. He stumbled back as Freres reached over the bar and grabbed his collar and said. “Dats it... hey Jimmy ya Bar Fly if ya wants to fight. Do it in the ring” “Naa, it’s just a shimiple mishunderstanding.” the drunk replied.

Immediately after, an older man approached me. “Call me Coach.” He said. “Hey Kid you’re a natural but you need to train, and you need a coach.” “So ya interested?” “Interested in what?” I asked. In an excited raspy voice he yelled. “Hey kid, ya interested in being the pub champ?” “No Thanx, I am no fighter” “No your wrong, I saw your reflexes. It’s in ya Kid. Let me bring it out. Besides the last purse for a Pub Champion Bout was ten thousand dollars. You also win purses in the four bouts before that. Kid, ya gonna be rich...that is if ya listen to me. Well what do ya think now?” I have to admit the sound of the shipyard whistle did go off in my head reminding me of my resent unemployment. The idea of winning a purse to hold me over for a few weeks was very tempting. My response was a simple “Hey, Coach” Hurriedly walking away he spouted out an order. “Kid, follow me up to the balcony.” Barely keeping up with him I exclaimed. “I’ve got a name.” He response was snide. “Ya kid we all do.”

“Now listen up this is a speed bag it develops timing and arm strength. Watch this...First hit it with one hand then with the other and repeat.” He demonstrated. “Now give it a try”. After a few cumbersome attempts I got the hang of it. “Now it’s time to try the jump rope” He barked out as he quickly marched over to another corner of the balcony. My hesitation was very apparent. “Jump roping that’s what little girls do.” “Listen up kid... there’s nothing better to

build up them legs... Start jumping." I jumped rope for several minutes when the elated coach screamed. "Kid, you're a natural! Now lets go pound the heavy bag."

On the way to the heavy bag he pointed out a poker game. "Look over there. That's Mr. Sullivan, he's a big player. That's Mr. Cornell, Mr. Thomas, Mr. Barker, and that skinny guy is Mr. West. Get to know those gentlemen they're the ones that set the purse in fights. The more you visit them the better the purse in one of your bouts. Remember that Kid."

We later passed the piano, which was booming a catchy tune in repetition to the insatiable audience. Hey what's that you're playing? I yelled. "*Maple Leaf Rag*" Rich the piano man proudly exclaimed as his head nodded to the beat. He smiled and added. "Isn't it great?"

"Come On Hurry-Up Kid we don't have much time. Here's the heavy bag. Hit it high and hit it low. Learn how to throw good hard punches. Practice them combo shots...first throw a left jab then a right jab another if can then POW the knock out blow." That's it Kid your ready to fight!!! He then signaled to the bar owner.

"So whom do I fight first?" "I don't know it's Bout One it's gonna be one of the lower ranked regulars. There are about ten regulars and the ranking is always changing." Before the coach could finish explaining the owner jumped up on the bar and yelled. "For our first fight tonight... Knuckles O'Brian verses da Kid."

Laughter broke out in the Pub. Knuckles, along time favorite of the crowd, and his entrance were very demonstrative. He flirted with the dancing girls on the balcony as he drank a beer. In true bully fashion he knocked a top hat of a gentleman standing next to him. His actions drove the crowd into a whimsical frenzy. I do have to confess his lack of concern about the fight did make me very nervous. Eventually he made his way to the center of the ring. "Top of my fist to ya lad" He said in a heavy Irish accent. Knuckles a blacksmith by trade had broad shoulders and robust forearms from pounding a hammer all day. His face could be best described as grizzly looking with burnt umber hair. A thick mustache skirted a crooked and puffy nose that was obviously broken several times. He was wearing an under shirt that was even more grizzly looking then his face. The shirt was riddled with stains from cinders, sweat, and his last meal.

The bell rang and the banter of the crowd faded revealing the piano music in the background. A punch and a question from Knuckles quickly rekindled the crowd's cheering. "That's a KNUCLES SANDWICH... Didja ya like that?" It was a punch to my gut and the force pushed me back a few feet. "That hurt ya" Knuckles exclaimed. Embarrassed and enraged I lost control and threw several punches to Knuckles gut and head. At first the crowd was just jeering me on trying to stoke up the intensity of the fight by cheering "KID KID KID." To the surprise of everyone it riled me into an invulnerable state. We exchanged many punches, but Knuckles had a comment for each. "Thanks, I needed that!" Or "Now that's the fighting spirit." It was a big joke to him until I delivered a jab combo that stunned him. "Definitely felt that one."

Suddenly Knuckles' grin was gone. The whole pub was now chanting in unison "KID KID KID". The crowd's demeanor changed from a taunt to sincere ovation. I could barely here the coach's voice "Now you've got him KID." The volume of the crowd increased with every punch. "KID KID KID!!!" Knuckles in utter desperation released a deluge of punches. I dodged three of these sloppily punches hurled my way. Unfortunately, The coach's acclaim came a bit too premature. Knuckles landed one of his enormous mitts on my chin. Then three more punches. THUMP POW BOOM The last one connected solidly. As I described before the lights darkened and my whole body went numb. My knees were half bent as I lost footing. The crowd got even louder "KID KID KID".

As my senses returned the coach's voice cut through the chaos "KID remember the combos, the combos kid." I took a few steps back. My face was throbbing. I could only catch

short breaths, and my body tingled from head to toe. Knuckles lunged forward to deliver another set of blows. His stamina was completely gone. Now I could predict his every movement by watching his eyes. Wherever he looked that's where the next punch would be thrown. "THE COMBOS KID, THE COMBOS KID" was still echoing through the crowd. First I jabbed him with my left then with the right as he drooped his arm to protect his side I could hear the coach "NOW KID NOW" I missed my opportunity he raised his arms again. This time a right jab followed by quick left caught him with his guard down as I delivered a punch to his head with all my might.

Knuckles half-squatting he stumbled back falling into an abandoned chair. "You win Kid.... Now how bout buying me a beer" Before he could finish I was lifted onto the shoulders of a group as the bar owner yelled out "KID....DA WINNER".

The coach ran up to me and said "Kid your set up for Bout TWO, I told ya you're a natural." I knew then that I could be Pub Champ but it would involve more training and a strong desire to win.

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Rules and Game Play

Skill Shot

Depress and **HOLD** release the launch button to collect the highlighted prize displayed on the dot matrix. Use strategy in collecting prizes to help you out during a game.

10 points

Smart Punch (Press the launch button during a fight to use. One smart punch is equivalent to a head punch)

M = Million points

! = Hurry Up

Door Prize (A random award feature)

5X Bonus Multiplier

2X Purse Multiplier

Extra Ball

The far left eject hole collects extra balls when lit. There are several ways to light extra ball:

Wining the second bout

Finishing the fourth hurry up

Door prize award

Video modes

Multiballs

Multi-Brawl

Shoot three balls into the lock to start. All jackpots are lit until collected. All jackpots will relite after all have been collected.

Fisticuffs Multiball

Hit the heavy bag to spell out Fisticuffs to start. Head shoots are worth 100,000, and gut shoots are worth 50,000.

Raid

Win the third bout to start. In this mode the first target is worth 5,000 points and incrementing by 5,000. All targets score and the maximum value is 50,000 per target.

Poker Night

Poker night is a simple video five card draw poker game. The display will present five cards the player can keep or discard any cards. Flipper buttons move the selection box left or right. The launch button discards, and both flipper buttons depressed at the same time collects the prize. Prizes are awarded according to the nature of the hand.

Spitting Gallery

The spitting gallery is a whimsical video mode where the player must move the spittoon left or right using the flipper buttons to catch the spittle. Catch 10 before missing three to win. Occasionally a surprise extra ball will be spit out.

Shadow Boxing Hurry Up

Hit the heavy bag to collect the hurry up prize. You can increase the value of the hurry up by completing jab shots. You can start hurry up in the skill shot, or by shooting the jabs.

Jackpots

Collect jackpots when they are lit. The jackpot awards are progressive.

The first jackpot is worth 100,000 point the second is worth 200,000 and so forth. See how far you can go. The Left Return Lane when lit lights the outer right lane jackpot. The right-return lane lights the ramp jackpot. Both of these are repeatable until the shot times out.

Training

There are three ways to train for a fight:

- 1) The **Heavy Bag**-- Shoot the ball into the heavy bag. Use the green hook ramps to learn how to control the height of the ball. Earn life bars and spell out Fisticuffs to start multiball.
- 2) The **Speed Bag**-- Climb the staircase ramp to get to the speed bag on the balcony. Use either hand to fire the ball into speed bag. Develop timing and coordination try to get as many hits on speed bag before the mode times out. Earn life bars and see if you can become the Speed Bag Champ.
- 3) The **Jump Rope**-- The left outer lane shot will get you to the popper to launch you up to the jump rope area. As the rope spins around use the flipper button to jump the ball over the rope. Earn life bars and see if you can become the Jump Rope Champ.

**It is only possible to train in an event when it is lit.*

Life Bars

The life bars are two stacks of LEDs located in the middle of the playfield. The Stack on the left represents the player's level of strength. The players stack will have three bars lit at the beginning of every game. The player can increase his life bar by training. The stack on the right represents the boxer the player is facing. The boxer's life bar is illuminated after the player has completed his training and is ready to fight. During a fight the player's life bar is decreased based on time. The boxer's life bar decreases when the ball hits the boxer.

Jewels in the Belt

Complete all five events to finish off the belt:

Complete all Jackpots

Complete all multiballs

Complete all training events

Win A fight by KO (knock out)

Become PUB CHAMP

* Completing Belt, lights ultimate challenge

Bouts

To become PUB CHAMP you must win the four preliminary BOUTS. After which you can fight to become the PUB CHAMP. To win a bout you must shoot the boxer and decrease all of his life bars before he decreases yours. Your life bar will decrease based by time, each time the boxers swings his arms bars are deducted from your stack. Every shot to the boxer decreases his life bar. A shot to the gut reduces the boxer's life bar by one or two, while a hit to the head always reduces it by two. Jab shots reduce the life bar by one. Use the JAB COMBO to set up for a KO. After wining each BOUT you will be awarded with a prize.

Bout ONE	Lights Spitting Gallery
Bout TWO	Lights Extra Ball
Bout Three	Starts RAID Multiball
Bout Four	Starts Contender Challenge

The Purse

The purse is the prize for winning a bout. There are several ways to increase the purse value:

Skill Shot award.

Shoot the corner shot throughout the game.

Completing the 3-Bank Target.

Shooting the ramp during a fight.

Ten successful Jumps of the rope or Speed bag hits in a row doubles purse.

Jab Combo

During a bout shoot either the left or the right jab shot. This will light the other jab shot. Completing the second jab shot will light the Boxer KO lights. Hitting the boxer in the head will win the bout instantly. After each successful KO the player will have to complete an additional jab shot to light Boxer KO.

Power Shot

During a fight if the ball enters the Danger Zone and enters the catapult you will receive a power shoot. Which will give you three life bars and several seconds of invulnerability.

Contender Challenge

This is a mode that starts after winning the fourth bout. All shots are lit and the player must complete each shot. A Million points are displayed on the screen at the beginning of the mode. This value decreases with time and is collected when each shot is completed. The score is then reset after every successful shot. If mode is completed successfully the life bar will be advanced to top and START FIGHT will light.

Pub Champion

Winning this bout gives you the title and starts CHAMPION MULTIBALL.

Champion Multiball

Champion Multiball is a four-ball multiball where all three multiballs start.

Ultimate Challenge

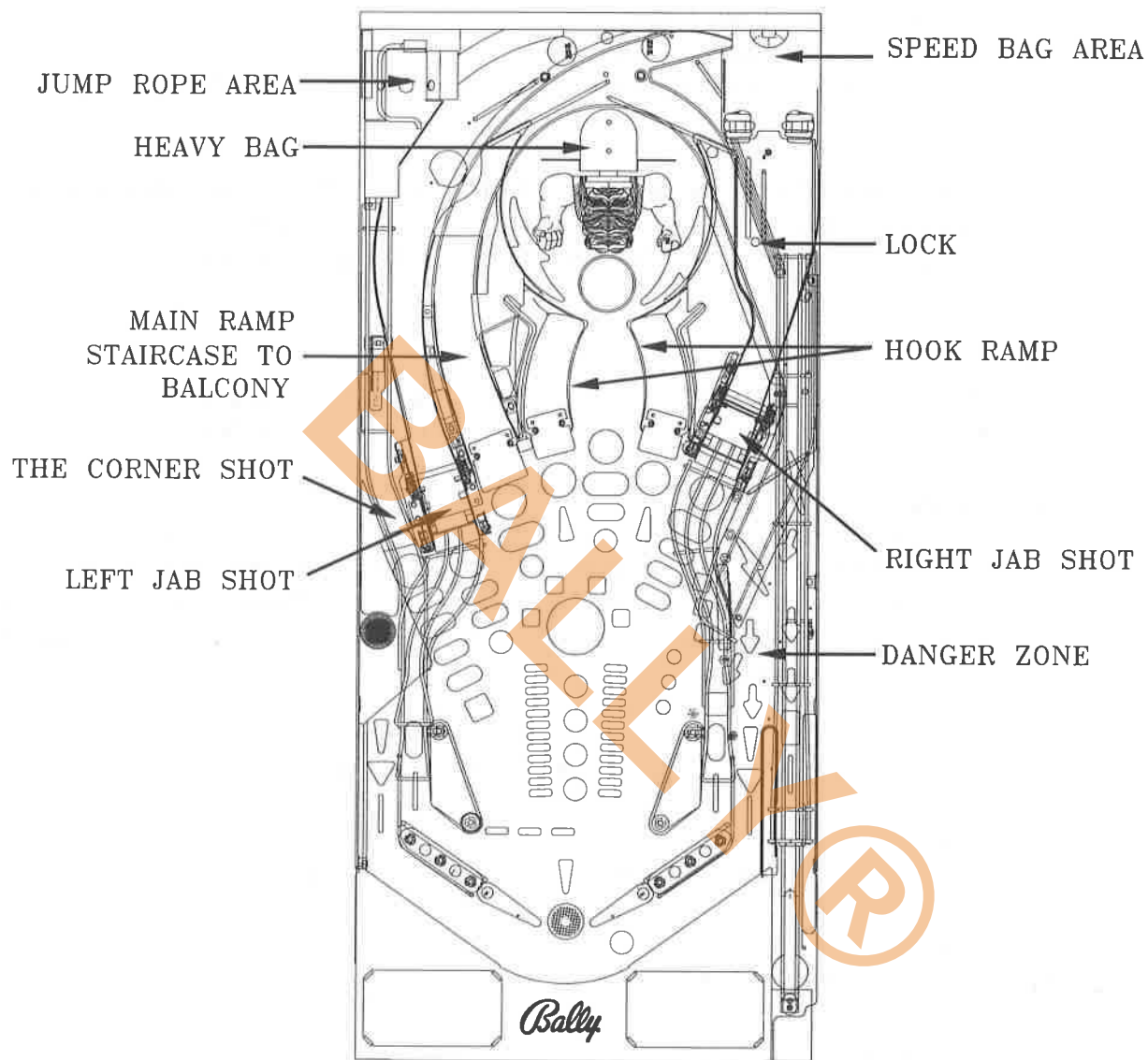
To start this mode three conditions have to be met:

- 1) You must be Pub Champ
- 2) Have all the jewels in the belt
- 3) Have a full Life Bar

In this mode you will face the five remaining boxers on one life bar during a 4-ball multiball.

****Until all conditions are met you can train and fight in CASH FIGHTS.***

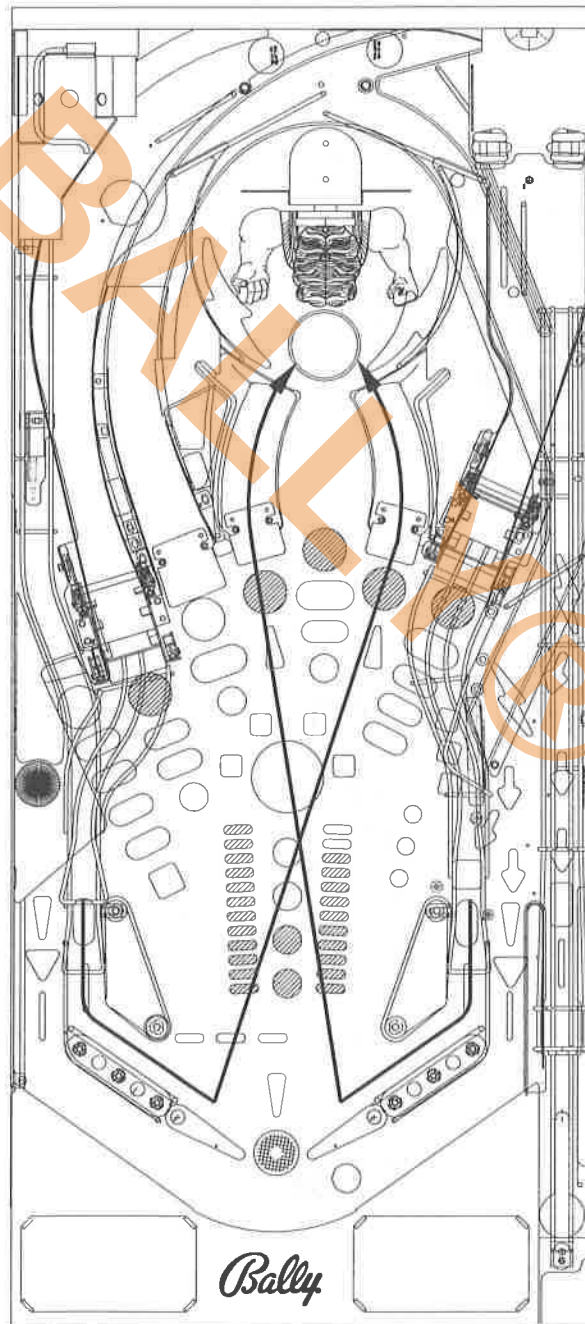
PLAYFIELD SHOTS



BOUTS

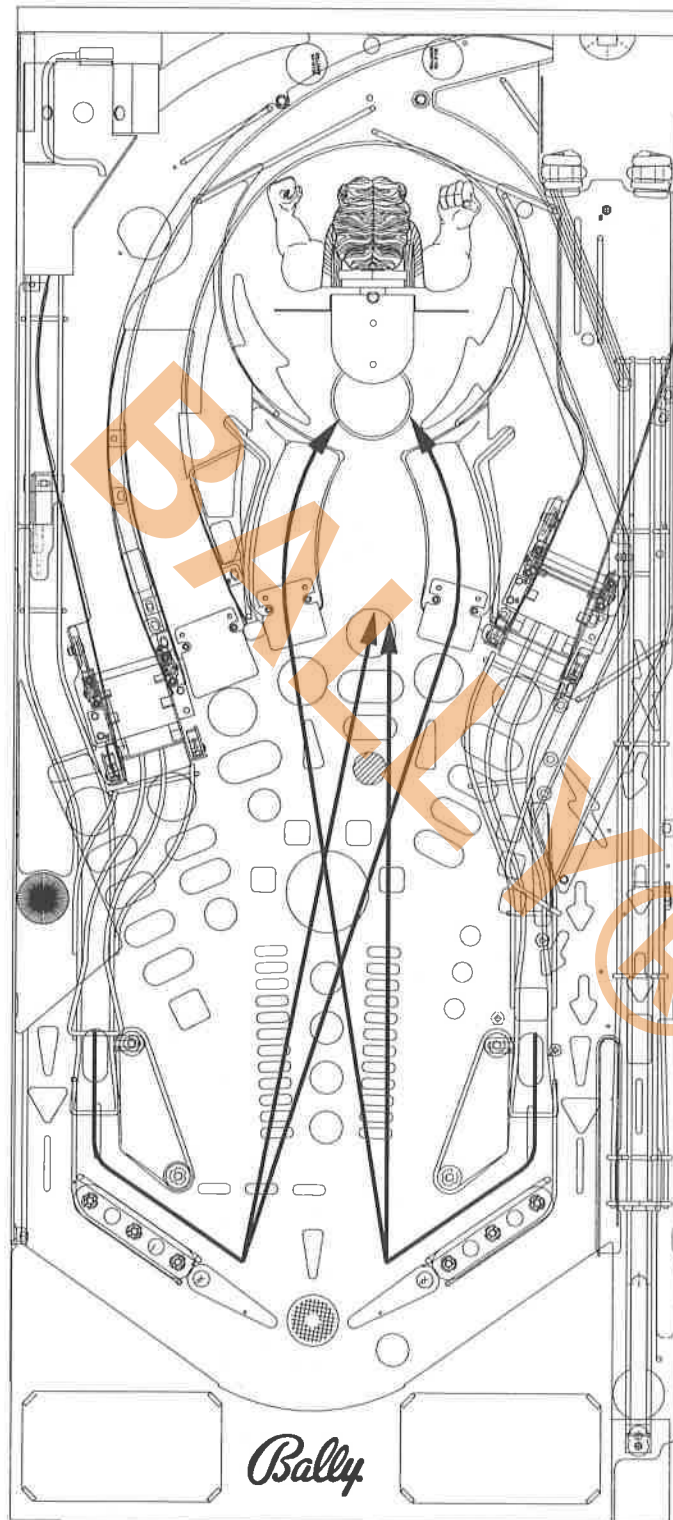
To become PUB CHAMP you must win the four preliminary BOUTS. After which you can fight to become the PUB CHAMP. To win a bout you must shoot the boxer and decrease all of his life bars before he decreases yours. Your life bar will decrease based by time, each time the boxers swings his arms bars are deducted from your stack. Every shot to the boxer decreases his life bar. A shot to the gut reduces the boxer's life bar by one or two, while a hit to the head always reduces it by two. Jab shots reduce the life bar by one. Use the JAB COMBO to set up for a KO. After wining each BOUT you will be awarded with a prize.

Bout ONE	Lights Spitting Gallery
Bout TWO	Lights Extra Ball
Bout Three	Starts RAID Multiball
Bout Four	Starts Contender Challenge



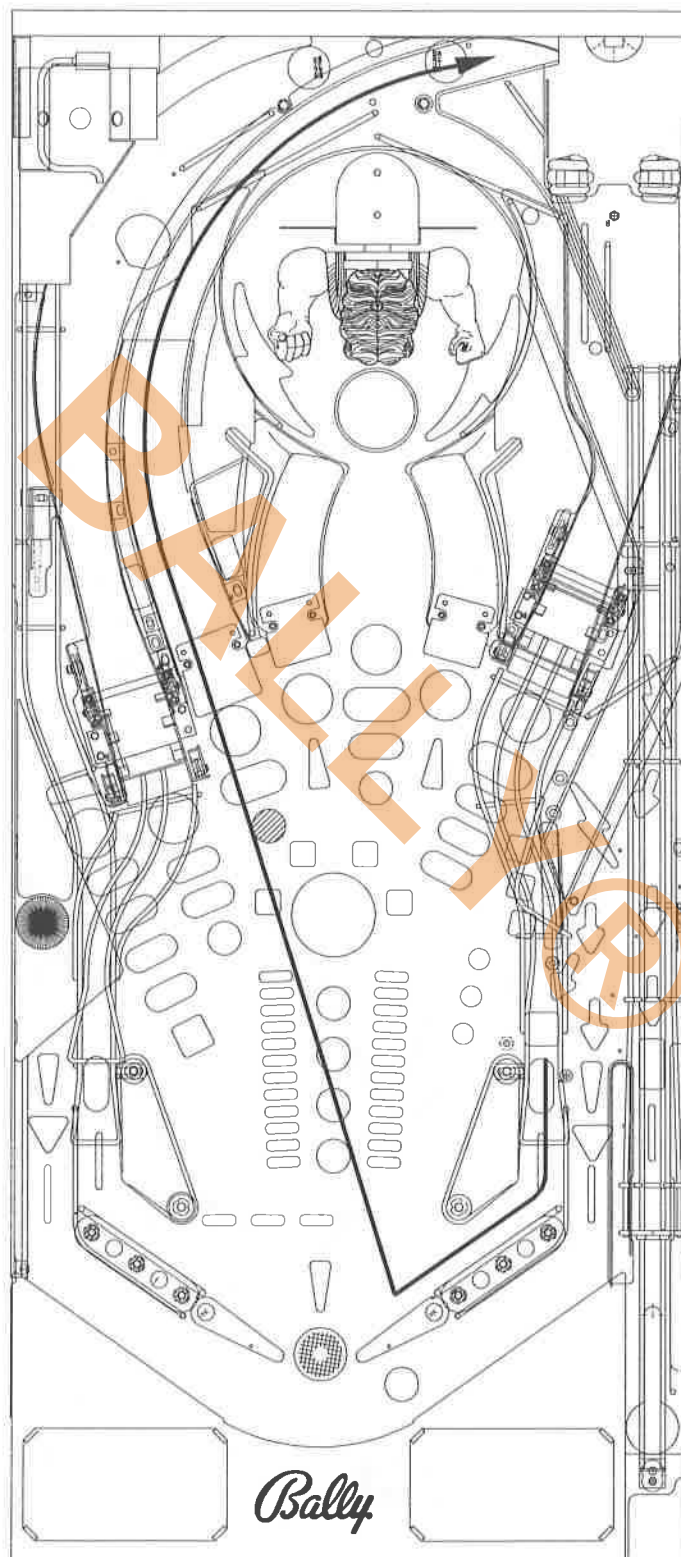
HEAVY BAG TRAINING

- 1) Heavy Bag Training light must be lit.
- 2) Shoot the Heavy Bag.



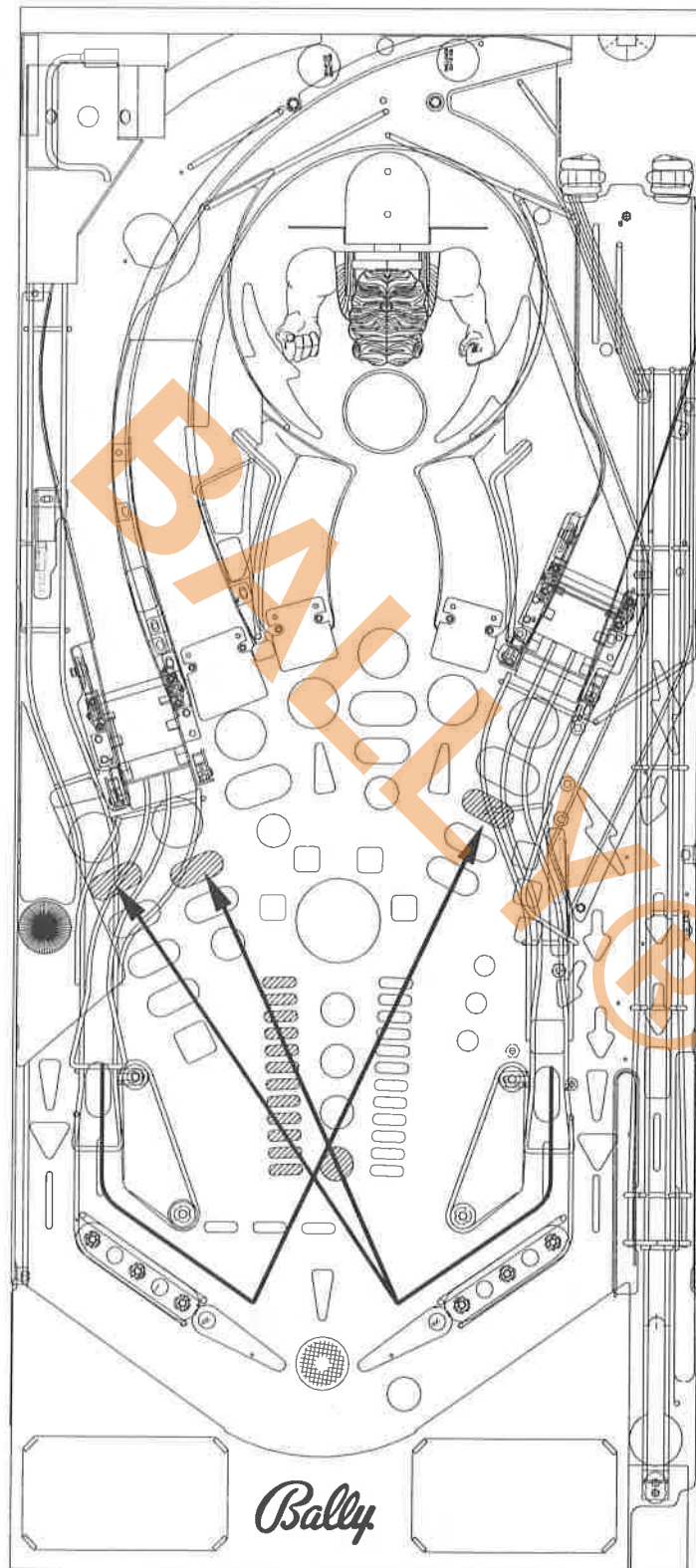
SPEED BAG

- 1) Speed Bag Training light must be lit.
- 2) Shoot the balcony staircase.
- 3) Use the flipper buttons to hit the ball into the bag.



START A BOUT

- 1) Full Life Bar.
- 2) Shoot any of the three shots.



EXTRA BALL

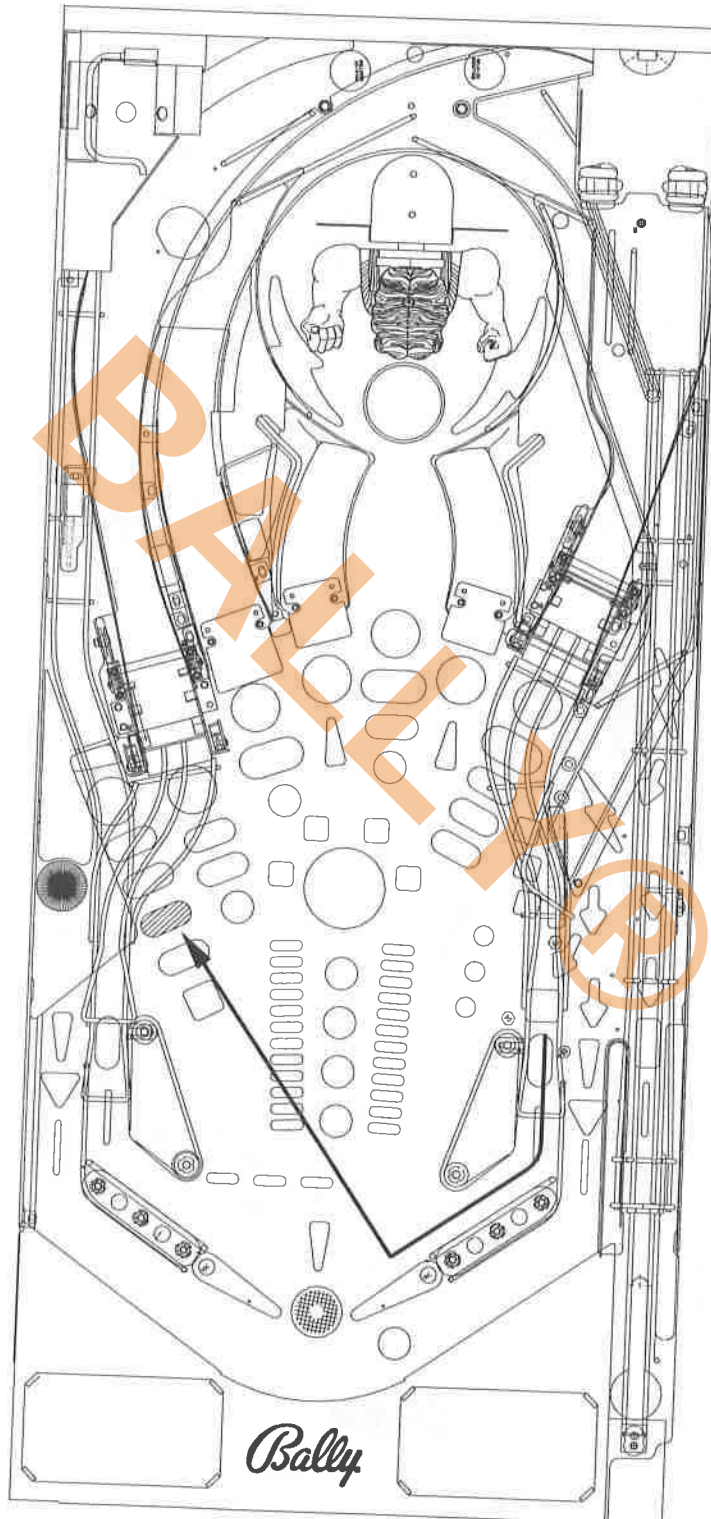
The far left eject hole collects extra balls when lit. There are several ways to light extra ball:

Wining the second bout

Finishing the fourth hurry up

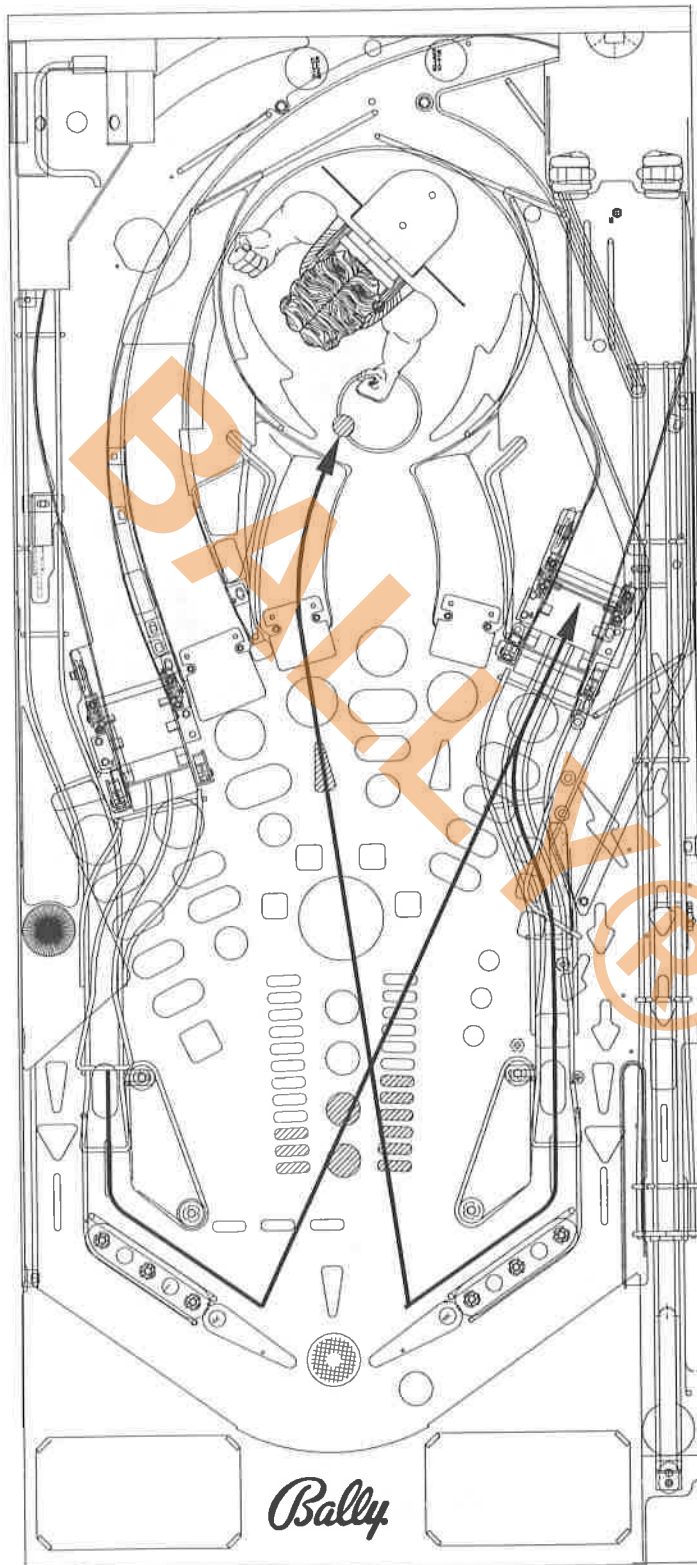
Door prize award

Video modes



JAB COMBO

During a bout shoot either the left or the right jab shot. This will light the other jab shot. Completing the second jab shot will light the Boxer KO lights. Hitting the boxer in the head will win the bout instantly. After each successful KO the player will have to complete an additional jab shot to light Boxer KO.



THE BELT AREA

Complete all five events to finish off the belt:

Complete all Jackpots

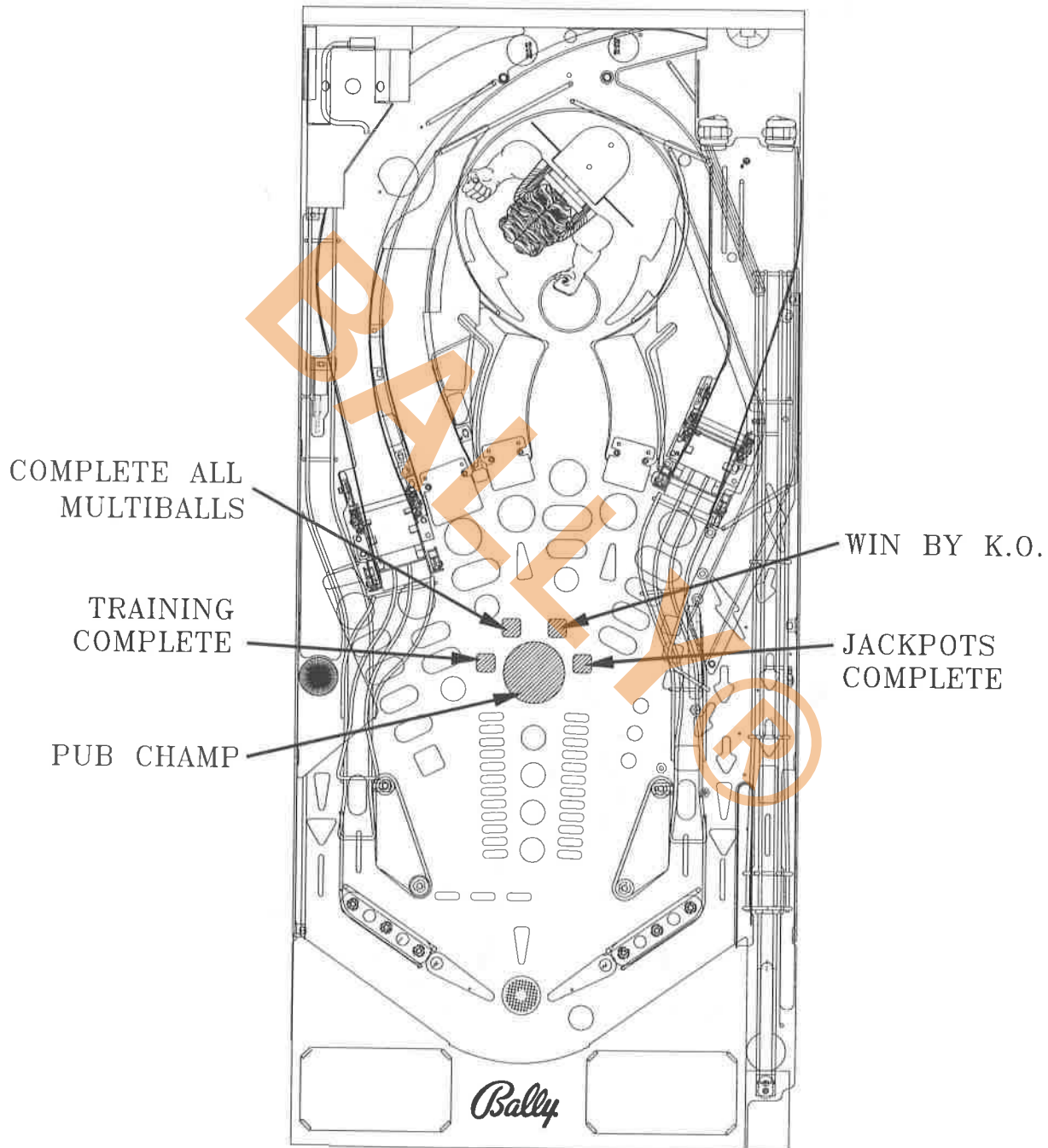
Complete all multiballs

Complete all training events

Win A fight by KO (knock out)

Become PUB CHAMP

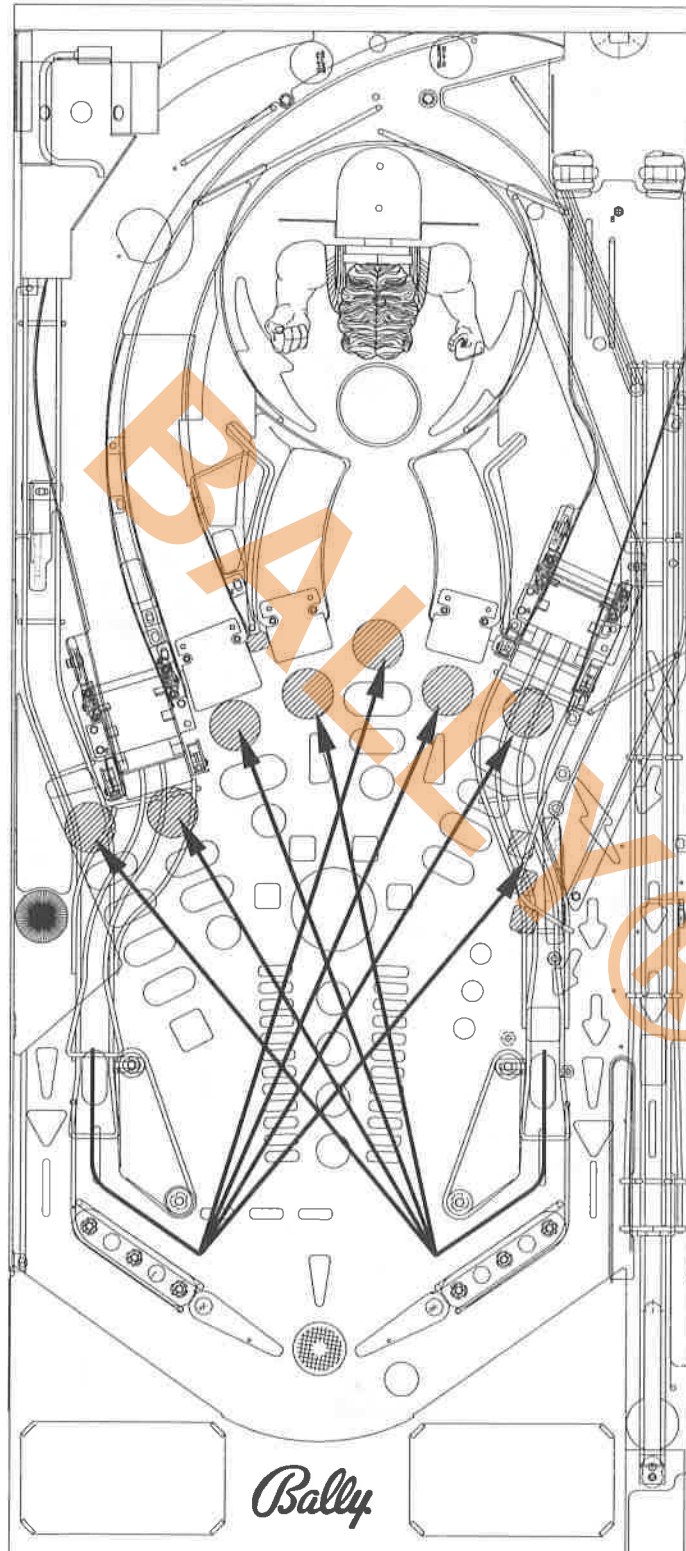
* Completing Belt, lights ultimate challenge



RAID

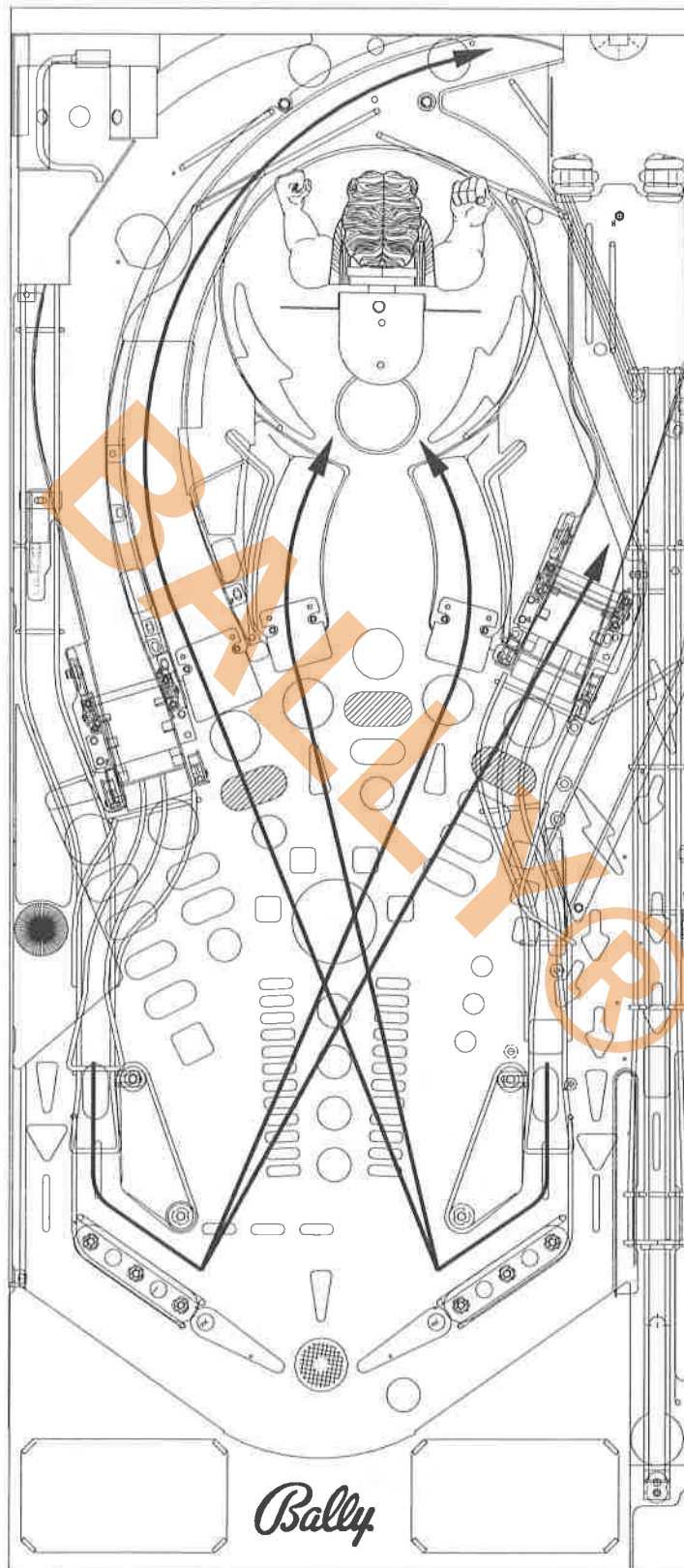
During Raid, all completed shots and targets score.

Win the third bout to start. In this mode the first target is worth 5,000 points and incrementing by 5,000. All targets score and the maximum value is 50,000 per target.



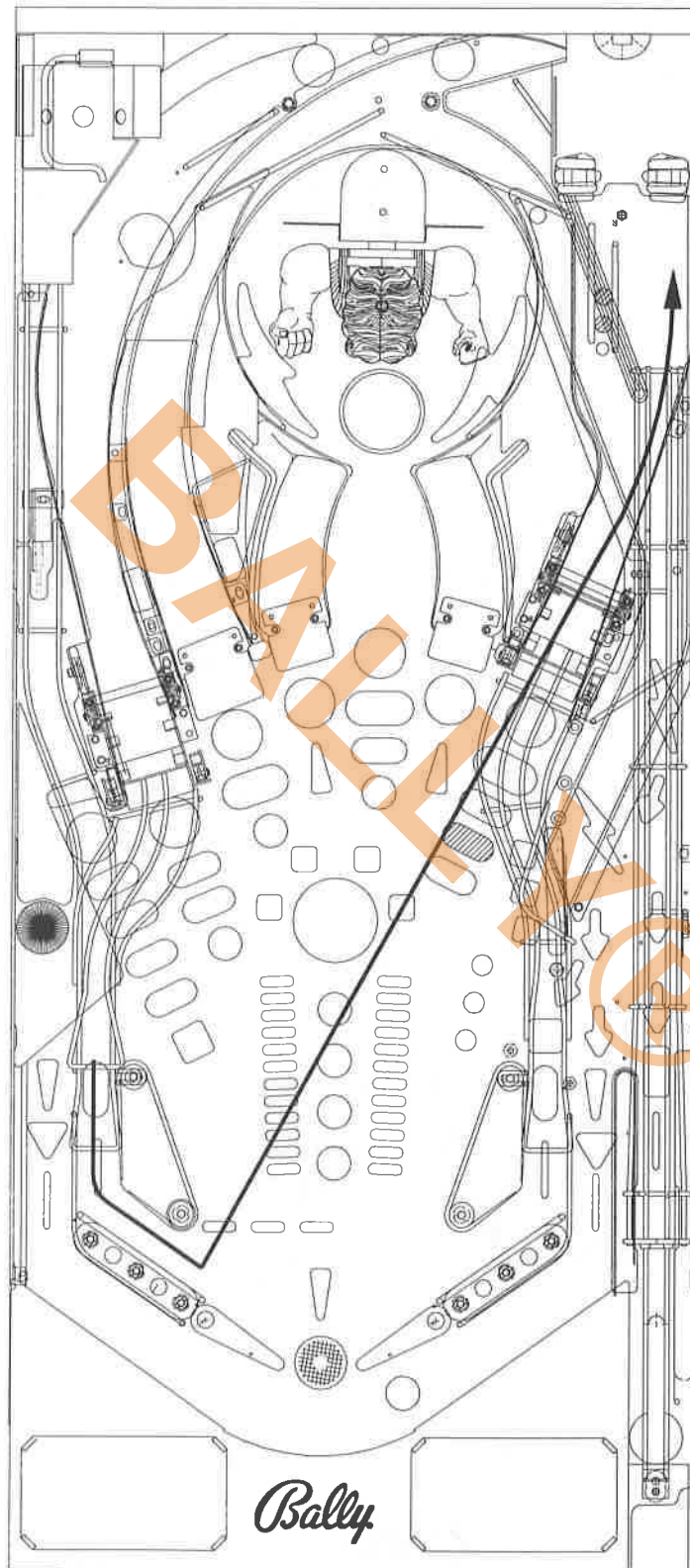
MULTI BRAWL

During Multi Brawl shoot the lit Jackpots to collect the value.



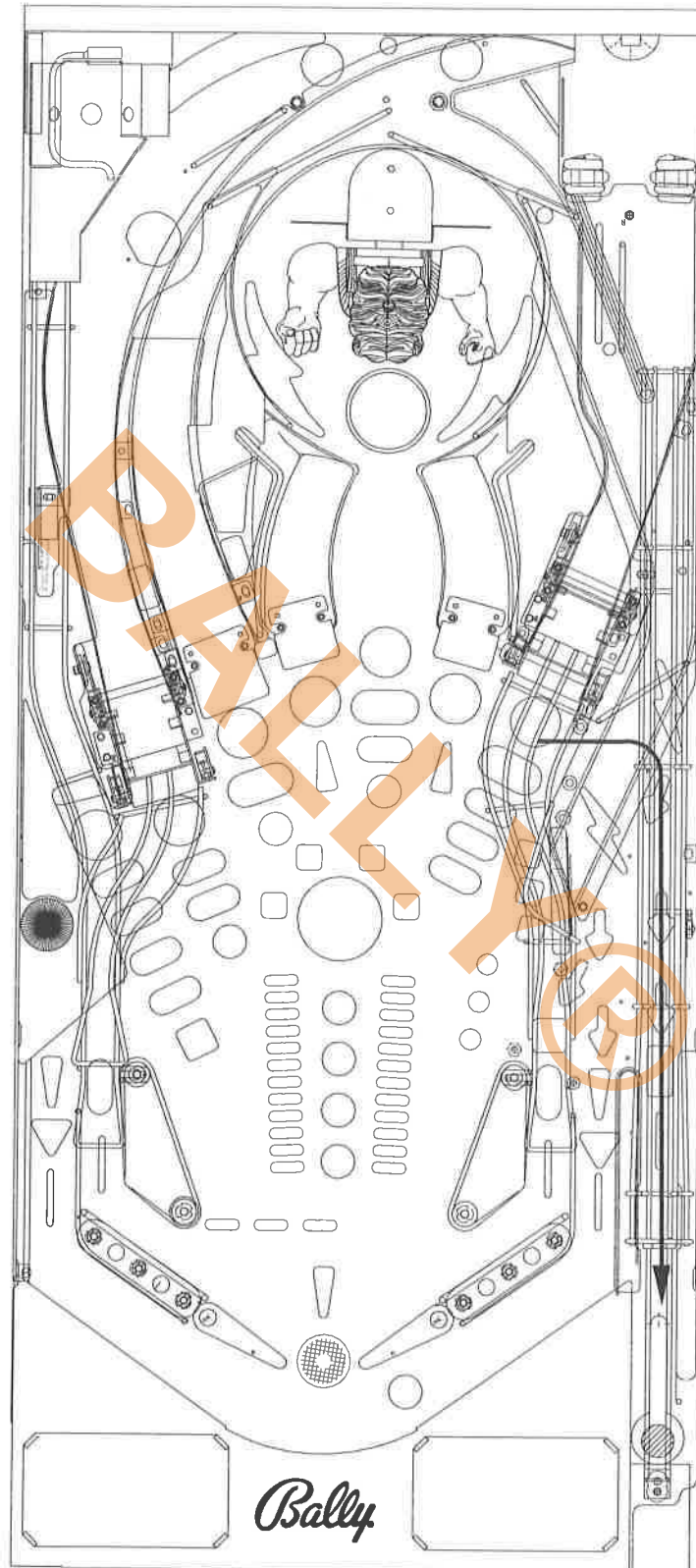
MULTI BRAWL LOCK-UP

When Lock is lit, shoot the Left Jab Shot.



POWER SHOT

During a fight, if the ball enters the Danger Zone and enters the catapult you will receive a Power Shot. Which will give you three Life Bars and several seconds of invulnerability.



NOTES

BALLY®

SECTION ONE

GAME OPERATION AND TEST INFORMATION

(System WPC) ROM SUMMARY

IC	TYPE	BOARD	LOCATION	PART NUMBER
Game 1	27c040	CPU	G11	A-5343-50063-1
Security Chip	PIC16C57	CPU	G10	A-5400-50063-1
Music/Speech	27c040	Audio	SU2	A-5343-50063-S2
Music/Speech	M27c801	Audio	SU3	A-5343-50063-S3
Music/Speech	M27c801	Audio	SU4	A-5343-50063-S4
Music/Speech	M27c801	Audio	SU5	A-5343-50063-S5
Music/Speech	M27c801	Audio	SU6	A-5343-50063-S6
Music/Speech	M27c801	Audio	SU7	A-5343-50063-S7

NOTICE

Order replacement ROMS from your authorized Williams Electronics Games, Inc. distributor. Specify (1), part number (if available); (2), ROM level (number) on label; (3) game in which ROM is used.

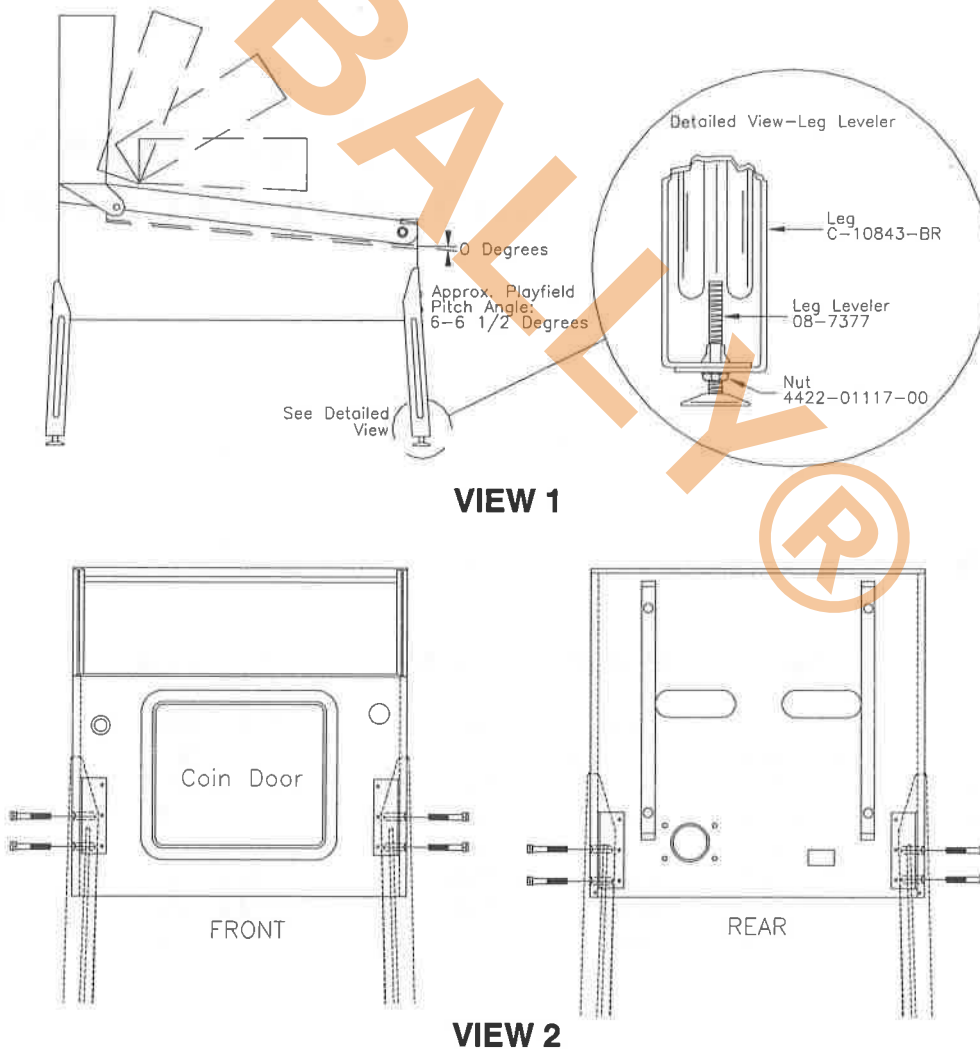
PINBALL GAME ASSEMBLY INSTRUCTIONS

-CHAMPION PUB IS A FOUR BALL GAME-

Power: Domestic 120V @ 60Hz
Foreign 230V @ 50Hz
Japan 100V @ 50HZ
Temp: 32°F to 100° F, (0°C to 38°C)
Humidity: Not to exceed 95% relative.

Dimensions: Width: 29" approx.
Depth: 52" approx.
Height: 75" approx.
Weight: 325 lb. approx. (crated)

1. Remove all cartons, parts, and other items from the shipping container and set them aside.
2. The leg levelers and leg bolts are among the parts in the cash box. Install the leg levelers on the front and rear legs (View 1). Place the cabinet on a support and attach the rear legs using leg bolts (View 2).
3. Attach front legs using leg bolts (View 2).



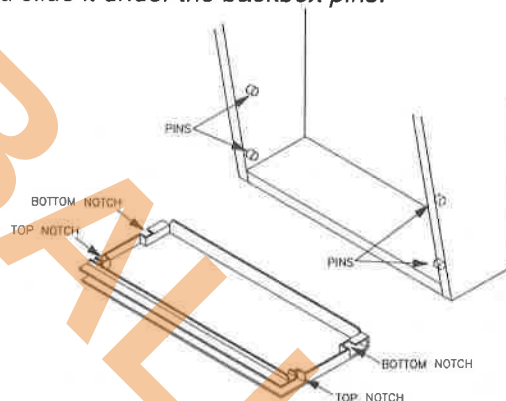
4. Reach into the cabinet and backbox and ensure that the interconnecting cables are not kinked or pinched. Be careful to avoid damaging wires at any stage of the assembly process.

5. Raise the hinged backbox upright and latch it into position. Unlock the backbox. Carefully, lift the backglass/insert panel from the bottom. Slide it down and out of the backbox grooves. Rotate it forwards from the top, and lay it facedown on the playfield glass. Unplug the cables extending from the backbox to the backglass/insert panel. Set the backglass/insert panel aside.

Lift the speaker panel so that the top notches clear the top set of pins in the sides of the backbox. Rotate it forwards from the top, and lay it facedown on the playfield glass. The bottom of the speaker panel remains attached to the backbox.

Once the backglass/insert panel is removed and the speaker panel is lowered onto the playfield, the holes needed to secure the backbox upright are accessible. To secure the backbox, install the washer-head mounting bolts through the holes in the bottom of the backbox. Be sure that the bolts extend into the threaded fasteners in the cabinet.

Note: You have the option of removing the speaker panel completely. Lay the speaker panel on the playfield glass. Unplug the display cable, speaker cable, and the ground strap. Line up the bottom notches in the speaker panel with the bottom pins in the sides of the backbox. Lower the speaker panel through the notches and slide it under the backbox pins.

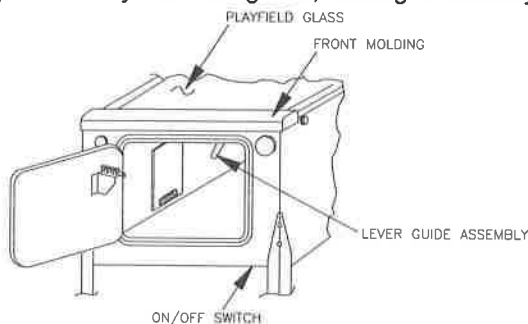


6. After the washer-head mounting bolts are installed, replace the speaker panel and the backglass/insert panel. Take care when plugging in the connectors. Connectors should plug in easily. Do not force the connectors.

CAUTION

FAILURE TO INSTALL the backbox mounting hardware properly can cause personal injury. **NEVER TRANSPORT** a pinball game with the hinged backbox erect. Always lower the backbox forward onto the playfield cabinet on a layer of protective material to prevent marring or damage and possible personal injury.

7. Extend each leg leveler *slightly* below the leg bottom, so that all four leg leveler pads are extended about the same distance. Remove the cabinet from its support and place it on the floor.
8. Unlock and open the coin door. Move the lever guide toward the left side of the game, and lift the front molding off of the playfield cover glass. Slide the lever guide to the right, and close the coin door. Carefully slide the glass downward, until it clears the grooves of the left and right side moldings. Lift the glass up and away from the game, storing it carefully to avoid breakage.

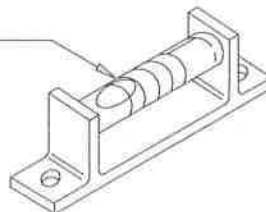


9. Place a level or an inclinometer on the playfield surface. Adjust the leg levelers for proper playfield level (side-to-side).

Note: This measurement must be made *ON the playfield, not the cabinet or the playfield cover glass*. Tighten the nut on each leg leveler shaft to maintain this setting.

10. The TRU-PITCH™ level is located on the right shooter rail. This allows the playfield pitch angle to be properly adjusted **WITHOUT REMOVING THE GLASS**. The first line (closest to the front of the game) on the level is approximately 6 degrees. Every line thereafter is approximately another 1/2 degree of pitch. The recommended pitch is 6-1/2 degrees. The NOSE of the bubble should be between the first and second line on the level (see diagram below).

TRU-PITCH™ level 6-1/2 degrees.



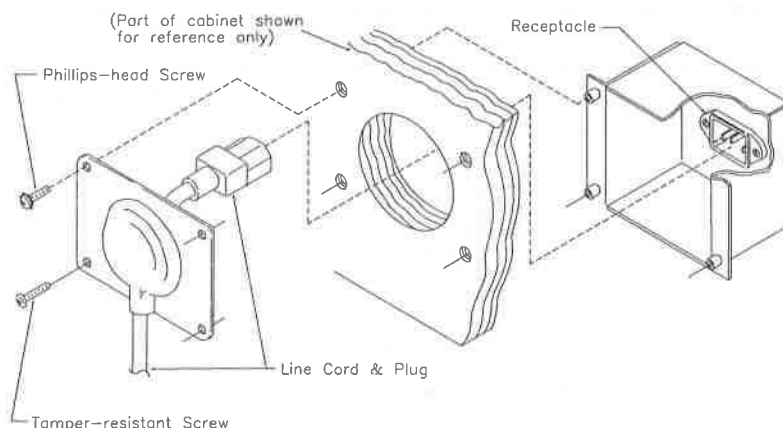
IMPORTANT!

Playfield pitch angle can affect the operation of the plumb bob tilt. The plumb bob weight is among the parts in the cash box; the operator *should* install the weight and adjust this tilt mechanism for proper operation, after completion of the desired playfield pitch angle setting. The unit is factory installed for a 6-1/2 degree angle. If an adjustment is necessary, loosen the screw at the bottom of the unit. Move the pointer, one groove at a time to the left or the right, depending on the degree desired. Hold the pointer in place and tighten screw

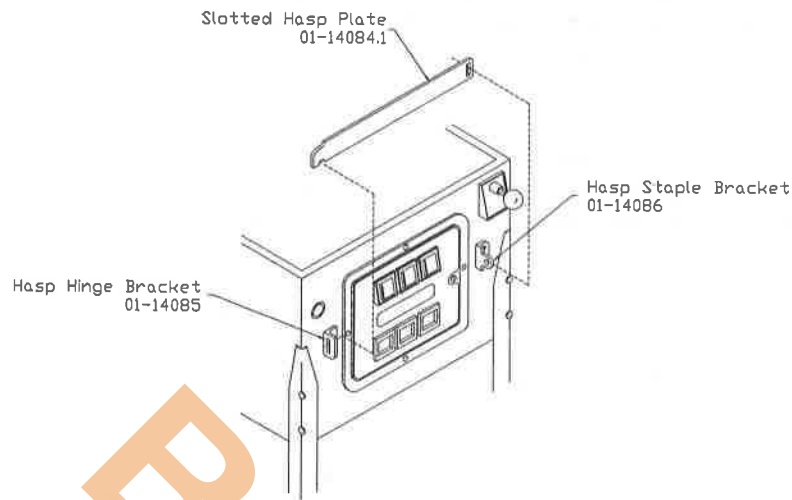
11. Be sure the **required number** of balls is installed. The **CHAMPION PUB** game uses FOUR balls, plus one captive ball.
12. Install full playfield Mylar, if desired.

Note: The **CHAMPION PUB** playfield is coated with a special *hardcoat* surface and does not require a protective Mylar. However, mylars can be purchased through your local Williams Distributor.

13. Clean and reinstall the playfield cover glass. Replace and lock the front molding.
14. To attach the line cord, remove the four Phillips-head screws that mount to line cord cover plate to the rear cabinet. Match the prongs on the plug with the holes in the receptacle, and push the line cord securely into place. Make sure the cord is aligned with the indentation on the cover plate (indentation should point toward bottom of the cabinet). Remount line cord cover plate. If desired, four tamper resistant screws have been provided, in the unique parts bag, to remount cover plate.



15. Move the game into the desired location. Adjust the leg levelers so that the playfield pitch is the recommended 6-1/2 degrees. This places the game in a FIXED position.
16. If a padlock is desired, install the security bar as shown below.



17. IMPORTANT: Fill out and return the registration card.

GAME CONTROL LOCATIONS

CHAMPION PUB features a coin door display. When the coin door is open (in Attract mode and game play), the display shows that the high-power has been disabled. It also shows the Test Report (if there is anything to report), and some game specific information. Use the flipper buttons to page through this information.

Cabinet Switches

The On-Off Switch is on the bottom of the cabinet near the right front leg.

The Start Button is a push-button to the left of the coin door on the cabinet exterior. Press the Start button to begin a game, or during the diagnostic mode, to ask for HELP.

Coin Door Buttons

The operator controls all game adjustments, obtains bookkeeping information, and diagnoses problems, using only four push-button switches mounted on the inside of the coin door. The coin door buttons have two modes of operation Normal Function and Test Function.

Normal Function

The Service Credits button puts credits on the games that are not included in any of the game audits.

The Volume Up (+) button raises the sound level of the game. Press and hold the button until the desired level is reached.

The Volume Down (-) button lowers the sound level of the game. Press and hold the button until the desired level is reached. See Adjustment A.1 28 to turn sound off completely.

The Begin Test button starts the Menu System operation and changes the coin door buttons from Normal Function to Test Function.

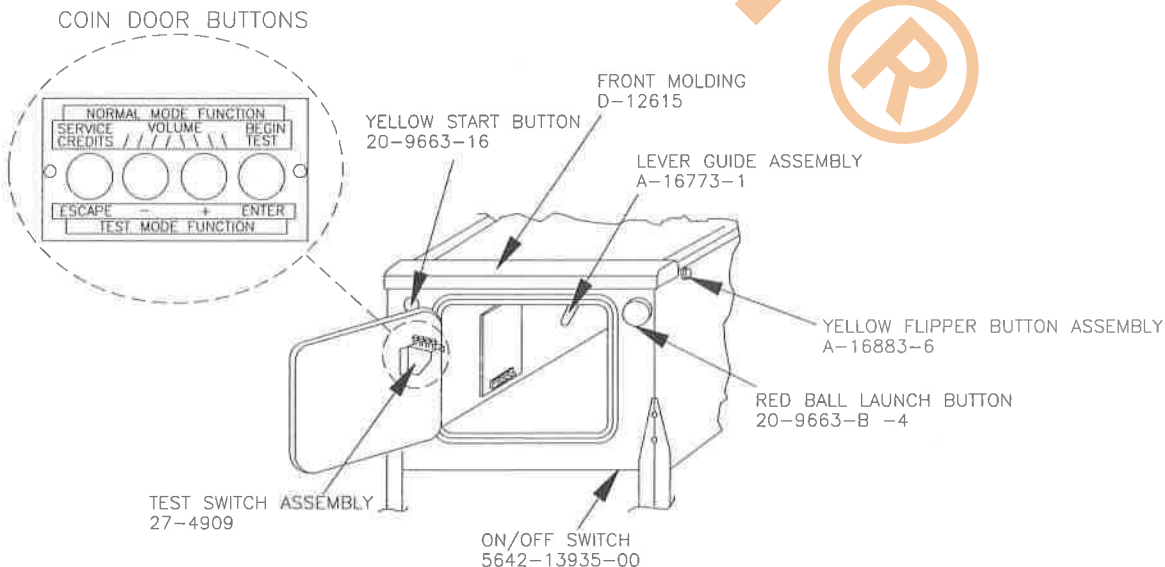
Test Function

The Escape button allows you to get out of a menu selection or return to the Attract mode.

The Up (+) button allows you to cycle forward through the menu selections or adjustment choices.

The Down (-) button allows you to cycle backward through the menu selections or adjustment choices.

The *Enter button allows you to get into a menu selection or lock in an adjustment choice.



***To reset High Score, hold down the Begin Test/Enter switch for five seconds while in the Attract mode.**

GAME OPERATION

CAUTION

After assembly and installation at its site location, this game must be plugged into a properly grounded outlet to prevent shock hazard, and to assure proper game operation. DO NOT use a 'cheater' plug to defeat the ground pin on the line cord. DO NOT cut off the ground pin.

POWERING UP. With the coin door closed, plug the game in, and switch it on. In normal operation, TESTING shows in the displays as the game performs Start-up tests. Once the Start-up tests have been successfully completed the last score is displayed and the game goes into the Attract mode.

***Note:** After the game has been on location for a time, the Start-up tests may contain messages concerning game problems. See 'Error Messages' for more detailed information regarding messages.*

Open the coin door and press the Begin Test switch. The display shows the game name, number, and software revision. The message changes and the display will show the sound software revision, the revision level of the system software, and the date the software was revised.

Example:

	CHAMPION PUB	Sound Rev. 1.0A
50063	Rev. 1.0A	SY. 0.X0 XX-XX-98

Press the Enter button to enter the Menu System (refer to the section entitled "Menu System Operation" for more information). Perform the entire Test menu routine to verify that the game is operating satisfactorily.

In order to operate the tests that use the +50V or +20V circuits, pull the top interlock switch button out. The interlock switches are located on a bracket in the coin door opening.

ATTRACT MODE*. After completing the Test menu routine, press the Escape button three times to enter the Attract mode. During the Attract mode, the display shows a series of messages informing the player of the recent highest *scores, "**custom messages", and the score to obtain a replay *award.

CREDIT POSTING. Insert coin(s). A sound is heard for each coin, the music plays for one minute, and the display shows the number of credits purchased. So long as the number of maximum allowable credits* are NOT exceeded by coin purchase or high score, credits are posted correctly.

STARTING A GAME. Press the Start button. A startup sound plays, and the credit amount shown in the display decreases by one. The display flashes 00 (until the first playfield switch is actuated), and shows ball 1. If credits are posted, additional players may enter the game by pressing the Start button once for each player, before the end of play on the first ball.

TILTS. Actuating the cabinet slam tilt switch inside the cabinet ends the current game and proceeds to the Game Over mode. With the third closure* of the plumb bob tilt switch, the player loses the remaining play of that ball, but can complete the game.

END OF A GAME. All earned scores and bonuses are awarded. If a player's final score exceeds the specified value, the player receives a designated award for achieving the current highest score. A random digit set* appears in the display. Credits* may be awarded, when the last two digits of any player's score match the random digits. Match, high score, and game over sounds are made.

GAME OVER MODE. The Game Over display shows the high scores and the game proceeds to the Attract Mode.

* - Operator-adjustable feature

RAISING THE PLAYFIELD

CAUTION

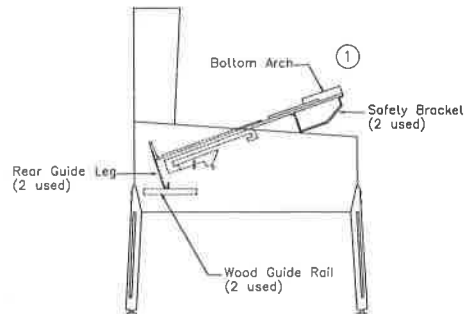
Do not raise the playfield straight up! This game uses a slide assembly to raise and lower the playfield.

Before Raising the Playfield:

Be sure there are no balls present in the ball trough or any of the other ball-holding playfield devices (i.e. poppers). Raising the playfield with balls present in these locations may cause them to come loose and damage the playfield. Use the "Empty Balls Test" to remove all of the balls from these locations.

To Raise the Playfield:

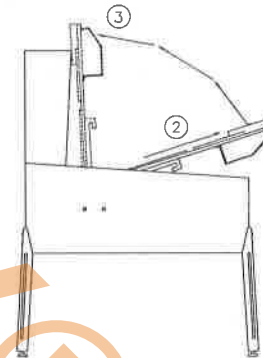
1. Grasp bottom arch and carefully lift up playfield only high enough to clear safety brackets. Rear guide legs should not hit wood guide rails, or be used to slide out playfield.



2. Pull the playfield out toward you until it stops (rest position), and raise it approximately 3".

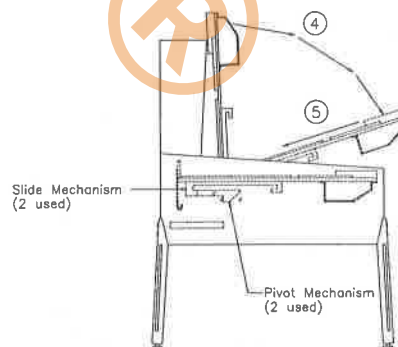
Be sure playfield is in locked position and does not slide back into cabinet. If it does, repeat Step 2 before proceeding to Step 3.

3. Rotate playfield to upright service position (lean on backbox) by pulling toward you and up. Listen for the sound of a click: this ensures locking and pivoting sequence. The latch will engage at the upper position.



To Lower the Playfield

4. Press down on the latch end to disengage (see decal) and rotate the playfield to the rest position. This unlocks the pivoting mechanism.
5. Push the playfield back into cabinet and into the playing position.



MENU SYSTEM OPERATION

The Main Menu allows you to choose from several options, which in turn lead to other menus to choose from. To access the Main Menu open the coin door, press the Begin Test button, then the Enter button. Press the Up and Down buttons to scroll through the Main Menu. To access a menu, (Bookkeeping, Printouts, etc.), from the Main Menu, press the Enter button. To return to the Main Menu (from Bookkeeping, Printouts, etc.) press the Escape button. Press the Start button for HELP.

MAIN MENU

B. BOOKKEEPING MENU	
B.1 Main Audits	<u>Press Escape</u>
B.2 Earning Audits	To move out of a menu selection.
B.3 Standard Audits	
B.4 Feature Audits	<u>Press Enter</u>
B.5 Histograms	To get into a menu selection.
B.6 Time-Stamp	
P. PRINTOUTS MENU	
P.1 Earnings Data	<u>Press Up</u>
P.2 Main Audits	Increases sequence; Example A.1, A.2, A.3, A.4.
P.3 Standard Audits	
P.4 Feature Audits	<u>Press Down</u>
P.5 Score Histograms	Decreases sequence; Example A.4, A.3, A.2, A.1.
P.6 Time Histograms	
P.7 Time-Stamp	Use Up or Down to cycle through the selections in a menu.
P.8 All Data	
T. TEST MENU	
T.1 Switch Edges Test	Use Escape and Enter to move into and out of the selected menu.
T.2 Switch Levels Test	
T.3 Single Switches Test	
T.4 Solenoid Test	
T.5 Flasher Test	
T.6 General Illumination Test	
T.7 Sound and Music Test	
T.8 Single Lamp Test	
T.9 All Lamps Test	
T.10 Lamp and Flasher Test	
T.11 Display Test	
T.12 Flipper Coil Test	
T.13 Ordered Lamps Test	
T.14 Lamp Row-Col.	
T.15 DIP Switch Test	
T.16 Jump Rope Test	
T.17 Boxer Test	
T.18 LED Bar Test	
T.19 Empty Balls Test	
U. UTILITIES MENU	
U.1 Clear Audits	
U.2 Clear Coins	
U.3 Reset H.S.T.D.	
U.4 Set Time and Date	
U.5 Custom Message	
U.6 Set Game I.D.	
U.7 Factory Adjustments	
U.8 Factory Resets	
U.9 Presets	
U.10 Clear Credits	
U.11 Auto Burn-in	
U.12 Shipping	
A. ADJUSTMENT MENU	
A.1 Standard Adjustments	
A.2 Feature Adjustments	
A.3 Pricing Adjustments	
A.4 H.S.T.D. Adjustments	
A.5 Printer Adjustments	

Press the Up or Down buttons to scroll through the Bookkeeping menu. Press the Enter button to access an audit menu. Press the Escape button to return to the Bookkeeping Menu.

B. BOOKKEEPING MENU

- B.1 Main Audits**
- B.2 Earning Audits**
- B.3 Standard Audits**
- B.4 Feature Audits**
- B.5 Histograms**
- B.6 Time-Stamped**

Using the One Button Audit System. The Bookkeeping Menu is obtainable directly from the Attract Mode. Repeatedly pressing the Enter button, while in the Attract Mode, will cycle through all of the game audits.

B.1 MAIN AUDITS

B.1 01	Total Earnings	00	B.1 06	Total Plays	00
B.1 02	Recent Earnings	00	B.1 07	Replay Awards	00
B.1 03	Free Play Percent	00	B.1 08	Percent Replays	00
B.1 04	Average Ball Time	00	B.1 09	Extra Balls	00
B.1 05	Time Per Credit	00	B.1 10	Percent Extra Ball	00

B.2 EARNING AUDITS

B.2 01	Recent Earnings	00	B.2 08	Total Earnings*	00
B.2 02	Recent Left Slot	00	B.2 09	Total Left Slot*	00
B.2 03	Recent Center Slot	00	B.2 10	Total Center Slot*	00
B.2 04	Recent Right Slot	00	B.2 11	Total Right Slot*	00
B.2 05	Recent 4th Slot	00	B.2 12	Total 4th Slot*	00
B.2 06	Recent Paid Credits	00	B.2 13	Total Paid Credits*	00
B.2 07	Recent Service Credits	00	B.2 14	Total Service Credits*	00

*These audits are NOT re-settable. They are a record of the earnings of the game since the "CLOCK 1ST SET" Time-stamp.

B.3 STANDARD AUDITS

B.3 01	Games Started	00	B.3 21	Play Time	00
B.3 02	Total Plays**	00	B.3 22	Minutes On	00
B.3 03	Total Free Play	00	B.3 23	Balls Played	00
B.3 04	Free Play Percent	00	B.3 24	Tilts	00
B.3 05	Replay Awards	00	B.3 25	Replay 1 Awards	00
B.3 06	Percent Replays	00	B.3 26	Replay 2 Awards	00
B.3 09	Match Awards	00	B.3 27	Replay 3 Awards	00
B.3 10	Percent Match	00	B.3 28	Replay 4 Awards	00
B.3 11	H.S.T.D. Credits	00	B.3 29	1 Player Games	00
B.3 12	Percent H.S.T.D.	00	B.3 30	2 Player Games	00
B.3 13	Extra Ball	00	B.3 31	3 Player Games	00
B.3 14	Percent Extra Ball	00	B.3 32	4 Player Games	00
B.3 15	Tickets Awarded	00	B.3 33	H.S.T.D. Reset Count	00
B.3 16	Percent Tickets	00	B.3 34	Burn-in Time†	00:00:00
B.3 17	Left Drains	00	B.3 35	1st Replay Level	00
B.3 18	Right Drains	00	B.3 36	Left Flipper	00
B.3 19	Average Ball Time	00	B.3 37	Right Flipper	00
B.3 20	Average Game Time	00			

***"Total Plays" only counts on completed games. A game is considered complete when the final ball begins. Audit information from incomplete games is ignored. Operation for test and service do not affect audits. †This Audit cannot be reset.

B.4 FEATURE AUDITS

B.4 01 START BOUT 1 Number of Bout 1 started.	00%	00
B.4 02 START BOUT 2 Number of Bout 2 started.	00%	00
B.4 03 START BOUT 3 Number of Bout 3 started.	00%	00
B.4 04 START BOUT 4 Number of Bout 4 started.	00%	00
B.4 05 START BOUT 5 Number of Bout 5 started.	00%	00
B.4 06 WIN BOUT 1 Number of Bout 1 won.	00%	00
B.4 07 WIN BOUT 2 Number of Bout 2 won.	00%	00
B.4 08 WIN BOUT 3 Number of Bout 3 won.	00%	00
B.4 09 WIN BOUT 4 Number of Bout 4 won.	00%	00
B.4 10 WIN BOUT 5 Number of Bout 5 won.	00%	00
B.4 11 BALL SAVES Number of balls returned to the player.	00%	00
B.4 12 SECOND WIND SAVE Number of balls returned for second wind.	00%	00
B.4 13 HEAVY COMPLETE Number of times the heavy bag was completed.	00%	00
B.4 14 JUMP COMPLETE Number of times the jump rope was completed.	00%	00
B.4 15 SPEED COMPLETE Number of times the speed bag was completed.	00%	00
B.4 16 FIRST JACKPOT Number of first jackpots collected.	00%	00
B.4 17 FIFTH JACKPOT Number of fifth jackpots collected.	00%	00
B.4 18 TENTH JACKPOT Number of tenth jackpots collected.	00%	00
B.4 19 JACKPOT DELUXE Number of fifteenth jackpots collected.	00%	00

Feature Audits Continued...

B.4 20 ALL TRAINING	00%	00
Number of All Training was completed.		
B.4 21 MULTIBALLS	00%	00
Number of all the multiballs that were completed.		
B.4 22 KO BOXER	00%	00
Number of players that knocked out the boxer.		
B.4 23 CASH FIGHTS	00%	00
Number of cash fights started.		
B.4 24 START ULTIMATE	00%	00
Number of Ultimate Challenges that were started.		
B.4 25 FINISH ULTIMATE	00%	00
Number of Ultimate Challenges that were completed.		
B.4 26 FIST STARTED	00%	00
Number of Fisticuffs Multiballs that were started.		
B.4 27 FIRST LOCK	00%	00
Number of first locks completed.		
B.4 28 SECOND LOCK	00%	00
Number of second locks completed.		
B.4 29 START MULTIBRAWL	00%	00
Number of Multibrawls started.		
B.4 30 START SPIT	00%	00
Number of times Spitting Gallery was started.		
B.4 31 END SPIT	00%	00
Number of times Spitting Gallery was finished.		
B.4 32 SPIT EXTRA BALL	00%	00
Number of extra balls from Spitting Gallery.		
B.4 33 START HURRY UPS	00%	00
Number of times Hurry Up was started.		
B.4 34 END 1ST HURRY UP	00%	00
Number of times 1 st Hurry Up award was collected.		
B.4 35 END 2ND HURRY UP	00%	00
Number of times 2 nd Hurry Up award was collected.		
B.4 36 END 3RD HURRY UP	00%	00
Number of times 3 rd Hurry Up award was collected.		
B.4 37 END 4TH HURRY UP	00%	00
Number of times 4 th Hurry Up award was collected.		
B.4 38 SKILL 10 POINTS	00%	00
Number of times Skill Shot awarded ten points.		

Feature Audits Continued...

B.4 39 SKILL SMART PUNCH Number of times Skill Shot awarded Smart Punch.	00%	00
B.4 40 SKILL MILLION Number of times Skill Shot awarded 1 Million.	00%	00
B.4 41 SKILL DOOR PRIZE Number of times Skill Shot awarded Door Prize.	00%	00
B.4 42 SKILL HURRY UP Number of times the Skill Shot awarded Hurry Up.	00%	00
B.4 43 SKILL BONUS MULTIPLIER Number of times Skill Shot awarded Bonus Multiplier.	00%	00
B.4 44 SKILL 2X PURSE Number of times Skill Shot awarded 2X Purse.	00%	00
B.4 45 SKILL LIGHT JACKPOT Number of times Skill Shot awarded Light Jackpot.	00%	00
B.4 46 DOOR START FIGHT Number of times Door Prize awarded Start Fight.	00%	00
B.4 47 DOOR LIGHT SPIT Number of times Door Prize awarded Light Spitting Gallery.	00%	00
B.4 48 DOOR LIGHT EXTRA BALL Number of times Door Prize awarded Light Extra Ball.	00%	00
B.4 49 DOOR SIX HEALTH Number of times Door Prize awarded Six Health.	00%	00
B.4 50 DOOR SMART PUNCH Number of times Door Prize awarded Smart Punch.	00%	00
B.4 51 DOOR LIGHT SECOND Number of times Door Prize awarded Light Second Wind.	00%	00
B.4 52 DOOR LIGHT POKER Number of times Door Prize awarded Light Poker.	00%	00
B.4 53 POKER ROYAL FLUSH Number of times Poker Night awarded a Royal Flush.	00%	00
B.4 54 POKER STRAIGHT FLUSH Number of times Poker Night awarded a Straight Flush.	00%	00
B.4 55 POKER FOUR OF A KIND Number of times Poker Night awarded Four of a Kind.	00%	00
B.4 56 POKER FULL HOUSE Number of times Poker Night awarded a Full House.	00%	00
B.4 57 POKER FLUSH Number of times Poker Night awarded a Flush.	00%	00

Feature Audits Continued...

B.4 58 POKER STRAIGHT

Number of times Poker Night awarded a Straight.

00% 00

B.4 59 POKER THREE OF A KIND

Number of times Poker Night awarded Three of a Kind.

00% 00

B.4 60 POKER TWO PAIR

Number of times Poker Night awarded Two Pair.

00% 00

B.4 61 POKER PAIR

Number of times Poker Night awarded a Pair.

00% 00

B.4 62 POKER ACE HIGH

Number of times Poker Night awarded Ace High.

00% 00

B.4 63 POKER HIGH CARD

Number of times Poker Night awarded a High Card.

00% 00

B.4 64 DANGER ZONES

Number of times the ball entered the Danger Zone.

00% 00

B.4 65 DANGER ZONE POWER SHOT

Number of times Power Shot was awarded.

00% 00

B.4 66 DANGER ZONE KNOCK OUT

Number of times Knockout as lit from the Danger zone.

00% 00

B.5 HISTOGRAMS

B.5 01 0 - 120,000 Scores

00% 00

B.5 02 120,000 to 250,000 Scores

00% 00

B.5 03 250,000 to 500,000 Scores

00% 00

B.5 04 500,000 to 1 Million Scores

00% 00

B.5 05 1 to 2 Million Scores

00% 00

B.5 06 2 to 4 Million Scores

00% 00

B.5 07 4 to 6 Million Scores

00% 00

B.5 08 6 to 12 Million Scores

00% 00

B.5 09 12 to 25 Million Scores

00% 00

B.5 10 25 to 50 Million Scores

00% 00

B.5 11 50 to 75 Million Scores

00% 00

B.5 12 75 to 99 Million Scores

00% 00

B.5 13 Over 99 Million Scores

00% 00

B.5 14 Game Time 0.0-1.0 Minute

00% 00

B.5 15 Game Time 1.0-1.5 Minutes

00% 00

B.5 16 Game Time 1.5-2.0 Minutes

00% 00

B.5 17 Game Time 2.0-2.5 Minutes

00% 00

B.5 18 Game Time 2.5-3.0 Minutes

00% 00

B.5 19 Game Time 3.0-3.5 Minutes

00% 00

B.5 20 Game Time 3.5-4.0 Minutes

00% 00

B.5 21 Game Time 4-5 Minutes

00% 00

B.5 22 Game Time 5-6 Minutes

00% 00

B.5 23 Game Time 6-8 Minutes

00% 00

B.5 24 Game Time 8-10 Minutes

00% 00

B.5 25 Game Time 10-15 Minutes

00% 00

B.5 26 Game Time Over 15 Minutes

00% 00

B.6 TIME-STAMPS

- B.6 01** Current Time
- B.6 02** Clock 1st Set
- B.6 03** Clock Last Set
- B.6 04** Audits Cleared
- B.6 05** Coins Cleared
- B.6 06** Factory Setting
- B.6 07** Last Game Start
- B.6 08** Last Replay
- B.6 09** Last H.S.T.D. Reset
- B.6 10** Champion Reset
- B.6 11** Last Printout
- B.6 12** Last Service Credit

Time-Stamp Menu allows you to view dates and times that are important to game software.

Press the Up or Down buttons to scroll through the Printouts menu. Press the Enter button to access a menu. Press the Escape button to return to the Printouts Menu.

P. PRINTOUTS MENU

(An optional board is required to use the Printouts feature.)

- P.1 Earnings Data**
- P.2 Main Audits**
- P.3 Standard Audits**
- P.4 Feature Audits**
- P.5 Score Histograms**
- P.6 Time Histograms**
- P.7 Time-Stamp**
- P.8 All Data**

The Printouts Menu is a combination of the other menus. This menu allows you to access and print information in the available menu selections.

If no printer is attached the message "Waiting for Printer" appears in the displays. **Note:** Set the print specification from the Adjustment Menu, A.5 Printer Adjustments.

Press the Up or Down buttons to scroll through the Test menu. Press the Enter button to access a test. Press the Escape button to return to the Test menu. During any test, press the Start button to obtain the wire color, driver number, connector number and fuse location.

T. TEST MENU

- | | |
|--------------------------------------|--------------------------------|
| T.1 Switch Edges Test | T.11 Display Test |
| T.2 Switch Levels Test | T.12 Flipper Coil Test |
| T.3 Single Switch Test | T.13 Ordered Lamps Test |
| T.4 Solenoid Test | T.14 Lamp Row-Col. |
| T.5 Flasher Test | T.15 DIP Switch Test |
| T.6 General Illumination Test | T.16 Jump Rope Test |
| T.7 Sound & Music Test | T.17 Boxer Test |
| T.8 Single Lamps Test | T.18 LED Bar Test |
| T.9 All Lamps Test | T.19 Empty Balls Test |
| T.10 Lamps And Flasher Test | |

In order to operate the tests that use the +50V or +20V circuits, pull the top interlock switch button out. The interlock switches are located on a bracket just inside the coin door opening.

The switch matrix, on the left side of the display, shows the state of all switches. A dot indicates the switch is open, a square indicates the switch is closed. The numbers assigned to each switch indicate where the switch is located in the matrix. The number on the left indicates the column, the number on the right indicates the row. Example - Switch 23 is 2nd column, 3rd row.

A short to ground - on either the row or column wire - appears as a shorted row(s). However, a column wire shorted to ground disappears when all of the indicated row switches are open. A row wire shorted to ground does not disappear.

A shorted diode in the switch matrix can cause other switches to appear closed. These "phantom" switches (though not actually closed), complete a rectangle in the switch matrix. Therefore, if two switches in the same column are closed (example; #22 and #24), and a third switch is pressed in another column but in the same row as one of the first two (example; #32), the "phantom" switch #34 is falsely indicated as closed. The switch with the shorted diode is diagonally opposite the "phantom" switch (in this case #22).

T.1 SWITCH EDGES TEST

Press each of the switches one at a time. The name and number of the switch is shown in the display. If a switch other than the one pressed, or no switch at all is indicated, the system has detected a problem with the switch circuit. To return the Test menu, press the Escape button.

T.2 SWITCH LEVELS TEST

This test automatically cycles through all switches that are detected closed. The name and number of each switch that is detected is shown in the display. A filled square indicates the switch's position in the matrix. To return the Test menu, press the Escape button.

T.3 SINGLE SWITCHES TEST

This test isolates a single switch and shows its state in the display. A mechanical switch is 'made' when the display reads closed. An opto switch is 'made' (opto beam broken) when the display reads open. Use the Up or Down buttons to select the switch to be tested. To return the Test menu, press the Escape button.

T.4 SOLENOID TEST

The Solenoid test has three modes -- Repeat, Stop, and Run. Only one solenoid should pulse at a time. The system has detected a problem if more than one solenoid pulses, a solenoid comes on and stays on, or no solenoids pulse during the Repeat and Run modes.

Repeat: The Repeat mode pulses an individual solenoid. Press the Enter button to start this test. The name of the first solenoid shows in the display and the corresponding coil pulses. Press the Up or Down buttons to cycle through the solenoids, one at a time. The same solenoid pulses until you press the Up or Down buttons to advance to the next one. To return the Test menu, press the Escape button. To advance to the next test mode, press the Enter button.

Stop: The Stop mode halts the Solenoid test. No solenoids should be active. To return the Test menu, press the Escape button. To advance to the next test mode, press the Enter button.

Run: The Run mode cycles through the solenoids automatically. The display shows the name and number of the solenoid currently being pulsed. To return the Test menu, press the Escape button. To return to the Repeat mode, press the Enter button.

T.5 FLASHER TEST

This tests the flashlamp part of the solenoid circuit. There are three modes -- Repeat, Stop, and Run. During this test the flashlamp circuit named in the display should blink. The system has detected a problem if more than one flashlamp circuit blinks, the lamps stays on, or no lamps blink during the Repeat and Run modes.

Repeat: The Repeat mode pulses an individual flashlamp. Press the Enter button to start this test. The name and number of the first flashlamp is displayed and the corresponding bulb(s) blinks. The same bulb(s) blinks until you press the Up or Down buttons to advance to the next one. To return to the Test menu, press the Escape button. To advance to the next test mode, press the Enter button.

Stop: The Stop mode halts the Flasher test. There should not be any flashlamps lit during this mode. To return to the Test menu, press the Escape button. To advance to the next test mode, press the Enter button.

Run: The Run mode cycles through the flashlamps automatically. The display shows the name and number of the flashlamp circuit currently being pulsed as the corresponding bulb(s) flashes. To return to the Test menu, press the Escape button. To return to the Repeat mode, press the Enter button.

T.6 GENERAL ILLUMINATION TEST

This test checks all of the General Illumination circuits. There are two modes of operation -- Stop and Run.

Note: General Illumination strings four & five do not brighten or dim, they are always ON.

Stop: The Stop mode allows you to cycle through the General Illumination test manually. Press the Up or Down buttons to advance through the test. All illumination is tested first, followed by an individual circuit test. The circuit name and number shows in the display while the corresponding bulbs light. If any other results occur the system has detected an error. To return to the Test menu, press the Escape button. To advance to the next test mode, press the Enter button.

T.6 General Illumination Test Continued...

Run: The Run mode cycles through the General Illumination test automatically. For each circuit shown in the display the corresponding bulbs should light. If any other results occur, the system has detected a problem. To return to the Test menu, press the Escape button. To return to the Stop mode, press the Enter button.

T.7 SOUND AND MUSIC TEST

The Sound and Music test checks the audio circuits. This test has three modes for testing the sound and music circuits -- Run, Repeat, and Stop.

Run: The Run mode steps through a sequence of sounds and music. Press the Up or Down buttons to advance to a particular sound or tune. A sound or tune should be heard for each name and number that appears in the display. Any other results indicate the system has detected a problem. To return to the Test menu, press the Escape button. To advance to the next test mode, press the Enter button.

Repeat: The Repeat mode causes the program to stop and repeat a particular sound/tune. The same sound repeats continuously until you press the Up or Down buttons to advance to the next one. Any other results indicates the system has detected a problem. To return to the Test menu, press the Escape button. To advance to the next test mode, press the Enter button.

Stop: The Stop mode stops this test altogether. Nothing should be heard. Any other results indicate the system has detected a problem. To return to the Test menu, press the Escape button. To return to the Run mode, press the Enter button.

T.8 SINGLE LAMP TEST

The number assigned to each lamp indicates the lamp's position in the matrix. The number on the left indicates the column. The number on the right indicates the row. Example - Lamp 23 means 2nd column, 3rd row.

The Single Lamp test checks each lamp circuit individually. Press the Up or Down buttons to scroll through this test. A lamp should light for each name and number that is displayed. Any other results indicate the system has detected a problem. To return to the Test menu, press the Escape button.

T.9 ALL LAMPS TEST

This test causes all the controlled lamps to flash at the same time. Every controlled lamp should flash. Any other results indicate the system has detected a problem. To return to the Test menu, press the Escape button.

T.10 LAMP AND FLASHER TEST

This test causes all the flashlamps and the controlled lamps to flash at the same time. The controlled lamps blink, while the flashlamps cycle from highest to lowest. Any other results indicate the system has detected a problem. To return to the Test menu, press the Escape button.

T.11 DISPLAY TEST

This test automatically checks every dot in the Dot Matrix Display board. A series of patterns appear in sequence. Each pattern turns on and off a section of dots. Every dot on the matrix display should be turned on and off during this test. To return to the Test menu, press the Escape button.

T.12 FLIPPER COIL TEST

The Flipper Coil test has three modes -- Repeat, Stop, and Run. Only one flipper should pulse at a time. The system has detected a problem if more than one flipper pulses, a flipper comes on and stays on, or no flippers pulse during the Repeat and Run modes.

Repeat: The Repeat mode pulses an individual flipper. Press the Enter button to begin the test. Press the Up or Down buttons to cycle through the flipper coils one at a time. To return to the Test menu, press the Escape button. To advance to the next test mode, press the Enter button.

Stop: The Stop mode halts the Flipper Coil test. No coils should pulse while the test is stopped. To return to the Test menu, press the Escape button. To advance to the next test mode, press the Enter button.

Run: The Run mode cycles through the flippers automatically. The display shows the name and number of the flipper coil currently being pulsed. To return to the Test menu, press the Escape button. To return to the Repeat mode, press the Enter button.

T.13 ORDERED LAMPS TEST

The number assigned to each lamp indicates the lamp's position in the matrix. The number on the left indicates the column. The number on the right indicates the row. Example - Lamp 23 means 2nd column, 3rd row.

This test checks each lamp circuit individually. Press the Up or Down buttons to cycle through the lamps. Lamps light in a clock-wise or counter clock-wise direction starting from the bottom of the playfield. The direction depends on whether the Up or Down button is pressed. For each name and number that is shown in the display, the corresponding lamp should light. Any other results indicate the system has detected a problem. To return to the Test menu, press the Escape button.

T.14 LAMP ROW - COLUMN

This test allows individual rows and columns in the lamp matrix to be operated. This is useful for troubleshooting wiring and driver problems.

Press the Up and Down buttons to cycles through the different rows and columns. To return to the Test menu, press the Escape button.

T.15 DIP SWITCH TEST

This test is used to show the positions of the DIP switches on the CPU board (U27). To return to the Test menu, press the Escape button.

T.16 JUMP ROPE TEST

This test shows the state of the rope motor, popper, magnet, cam switch, and opto switch.

CAM SWITCH – The cam switch should open when the rope is in the 'home' position. The 'home' position is left is center at a downward 45° angle.

OPTO – The opto is open when a ball is sitting on the magnet.

These are the controls: **ENTER BUTTON** – to toggle the rope motor ON and OFF.

UP BUTTON – to activate the popper and magnet as in the game.

EXIT BUTTON – to exit the test.

You can put a ball on the magnet, start the motor and use the Up button to cause the ball avoid the rope.

T.17 BOXER TEST

This test shows the operator the state of the Boxer/Heavy Bag. It shows the state of the four position switches as well as the three target switches.

LT - This OPTO is CLOSED when the boxer is facing LEFT.
FT - This OPTO is CLOSED when the boxer is facing FRONT.
RT - This OPTO is CLOSED when the boxer is facing RIGHT.
RR - This OPTO is CLOSED when the boxer is facing REAR.

HD - This is CLOSED when the HEAD switch is activated.
G1 - This is CLOSED when the GUT 1 switch is activated.
G2 - This is CLOSED when the GUT 2 switch is activated.

These are the controls: ENTER - to change modes between ARMS and MOVE.
EXIT - to exit the test.

ARMS MODE:

DOWN BUTTON - causes the left arm to swing.

UP BUTTON - causes the right arm to swing.

MOVE MODE:

DOWN BUTTON - causes the boxer to move to the next CLOCKWISE position and then stop.

UP BUTTON - causes the boxer to move to the next COUNTER-CLOCKWISE position and the stop.

T.18 LED BAR TEST

This test turns ON various patterns on the Life Bar LEDS.

These are the controls: ENTER - to toggle the test Running or Stopped.
EXIT - to exit the test.

Both Life Bars should always display the same number of LEDS On during this test.

T.19 EMPTY BALLS TEST

This test kicks out all balls loaded in troughs, lockups, poppers, and kick-outs until no balls remain in those locations.

Note: As the trough kicks out balls, they will stack up in the shooter groove, which may require manual clearing in order to allow further balls to be kicked out.

To scroll through the Utilities menu, press the Up or Down buttons. To access a utility, press the Enter button. To see the setting choices of a utility option, press the Up and Down buttons. Press the Enter button to lock in a choice. If you make a mistake, press Escape while "Saving Adjustment Value" is in the display. The original setting is retained and the new setting is ignored. To return to the Utilities menu, press the Escape button.

U. UTILITIES MENU

U.1	Clear Audits	U.7	Factory Adjustments
U.2	Clear Coins	U.8	Factory Reset
U.3	Reset H.S.T.D.	U.9	Preset
U.4	Set Time & Date	U.10	Clear Coins
U.5	Custom Message	U.11	Auto Burn-in
U.6	Set Game I.D.		

U.1 CLEAR AUDITS

Press the Enter button to clear the Standard Audits (except Burn-in Time), Feature Audits, and Histograms.

U.2 CLEAR COINS

Press the Enter button to clear the Earnings Audits.

U.3 RESET H.S.T.D.

Press the Enter button to clear the High Score to Date Table and the Grand Champion.

U.4 SET TIME AND DATE

Press the Enter button to activate the time and date. Use the Up or Down buttons to change the value, then press the Enter button to lock in that value. If you make a mistake press the Escape button while "Saving Adjustment Value" is displayed. The new value is ignored and the original value is retained.

U.5 CUSTOM MESSAGE

Set A.1 20 to ON before trying to write a custom message.

Press the Enter button to begin entry of the custom message. Use the Up or Down buttons to cycle through letters. Use the Start button to cycle through punctuation marks. Press the Enter button to lock in the desired letter and punctuation. If you make a mistake, use Up and Down to select the "back-arrow" character. The "back-arrow" character is located before the space character and after the number nine. Press Enter while the back-arrow shows to erase the previously entered character. Once the message is complete, press and hold the Enter button until "Message Stored" is displayed.

Press the Escape button to cancel the new message. The message "Press Enter to Reset" appears. If Enter is pressed, the custom message is cleared and no message is displayed. If Escape is pressed, the original message remains intact.

U.6 SET GAME I.D.

This utility allows for the installation of a message, such as game location, that only appears on the printouts. Press the Enter button to activate Set Game I.D. Use the Up or Down buttons to cycle through letters. Use the Start button to cycle through punctuation marks. Press the Enter button to lock in desired letters and punctuation marks.

U.7 FACTORY ADJUSTMENT

Press the Enter button to restore the adjustments to factory settings.

U.8 FACTORY RESET

Press the Enter button to restore the adjustments to their factory setting, clear the Audits, H.S.T.D. Table, and Custom Message/Game I.D.

U.9 PRESETS

Use the Up or Down buttons to cycle through the available Presets. When the desired Preset is displayed, press the Enter button to lock in that Preset. If you make a mistake, press the Escape button while "Saving Adjustment Value" is displayed. The new value is ignored and the original value is retained.

Game Difficulty Levels The game play difficulty adjustments can be changed to a combination that is MUCH LESS to MUCH MORE difficult than Factory Settings. The Game Difficulty Setting Table lists the adjustments and settings that comprise the individual group.

U.9 01	INSTALL EXTRA EASY	MUCH LESS difficult than factory setting.
U.9 02	INSTALL EASY	Somewhat LESS difficult than factory setting.
U.9 03	INSTALL MEDIUM	Nearly the SAME as factory setting.
U.9 04	INSTALL HARD	Somewhat MORE difficult than factory setting.
U.9 05	INSTALL EXTRA HARD	MUCH MORE difficult than factory setting.

**DIFFICULTY SETTING TABLE FOR
U.S., CANADIAN, FRENCH, GERMAN, AND EUROPEAN GAMES**

Adj. #	Adj. Description	Extra Easy U.9 01	Easy U.9 02	Medium U.9 03 (factory)	Hard U.9 04	Extra Hard U.9 05
A.2 04	EXTRA BALL PERCENT	30%	25%	20%	15%	10%
A.2 05	POST DIFFICULTY	EASY	EASY	MEDIUM	HARD	HARD
A.2 06	BRAWL DIFFICULTY	MEDIUM	MEDIUM	MEDIUM	HARD	EX HARD
A.2 07	FIST DIFFICULTY	MEDIUM	MEDIUM	MEDIUM	HARD	HARD
A.2 08	FIGHT DIFFICULTY	EASY	EASY	MEDIUM	HARD	HARD
A.2 09	HURRY DIFFICULTY	EASY	EASY	MEDIUM	HARD	HARD

U.9 06 INSTALL 5 BALL

U.9 07 INSTALL 3 BALL

Adjustments U.9 06 and U.9 07 can be used to change a game to 3 or 5 ball play, including changing of certain features to the recommended 3-and 5-ball level. The Preset Game Adjustments Table for U.S./Canadian Games lists the adjustments and settings that comprise the individual groups.

PRESET ADJUSTMENTS TABLE FOR U.S. AND CANADIAN GAMES

Adj. #	Adj. Description	Install 5-ball U.9 06	Install 3-ball U.9 07
A.1 01	BALL PER GAME	5	3
A.1 07	REPLAY START	75,000,000	50,000,000
A.2 04	EXTRA BALL PERCENT	15%	20%
A.2 05	POST DIFFICULTY	HARD	MEDIUM
A.2 06	BRAWL DIFFICULTY	HARD	MEDIUM
A.2 07	FIST DIFFICULTY	HARD	MEDIUM
A.2 08	FIGHT DIFFICULTY	HARD	MEDIUM
A.2 09	HURRY DIFFICULTY	HARD	MEDIUM

U.9 08 INSTALL ADD-A-BALL

This option deletes all Free Play awards and replaces them with Extra Ball awards. Individual adjustments are affected, as follows:

Adjust.	Name	New Settings
A.1 13	Replay Boost	Off
A.1 14	Replay Award	Extra Ball
A.1 15	Special Award	Extra Ball
A.1 17	Extra Ball Ticket	No
A.1 19	Match Feature	Off
A.4 04	Champion Credits	00
A.4 05	High Score 1 Credits	00
A.4 06	High Score 2 Credits	00
A.4 07	High Score 3 Credits	00
A.4 08	High Score 4 Credits	00

U.9 09 INSTALL TICKET

This option deletes Credit awards and replaces them with Ticket awards. Individual adjustments are affected as follows:

Adjust.	Name	New Settings
A.1 14	Replay Award	Ticket
A.1 15	Special Award	Ticket
A.1 16	Match Award	Ticket
A.1 17	Extra Ball Ticket	Yes
A.1 31	Ticket Expansion Brd.	Yes
A.4 02	H.S.T.D. Award Ticket	Yes

U.9 10 INSTALL NOVELTY

This option removes all Free Play and Extra Ball awards. Individual adjustments are affected as follows:

Adjust.	Name	New Settings
A.1 04	Maximum Extra Ball	Off
A.1 05	Replay system	Fixed
A.1 09	Replay Level 1	Off
A.1 10	Replay Level 2	Off
A.1 11	Replay Level 3	Off
A.1 12	Replay Level 4	Off
A.1 15	Special Award	Points
A.1 19	Match Feature	Off
A.4 01	Highest Score	On
A.4 04	Champion Credit	00
A.4 05	High Score 1 Credits	00
A.4 06	High Score 2 Credits	00
A.4 07	High Score 3 Credits	00
A.4 08	High Score 4 Credits	00

U.9 11 NOT USED

U.9 12 SERIAL CAPTURE

This sets up the printer adjustments for a serial transmission to a laptop computer, (9600 baud, 40 column, no page breaks, serial printer). This option requires the installation of the optional printer kit; part number 63110.

U.9 13 TO U.9 16 NOT USED

U.9 17 INSTALL GERMAN 1
U.9 18 INSTALL GERMAN 2
U.9 19 INSTALL GERMAN 3
U.9 20 INSTALL GERMAN 4
U.9 21 INSTALL GERMAN 5
U.9 22 INSTALL GERMAN 6

Adjustments U.9 17 through U.9 22 are used to modify game pricing and type of play.

U.9 23 INSTALL FRENCH 1
U.9 24 INSTALL FRENCH 2
U.9 25 INSTALL FRENCH 3
U.9 26 INSTALL FRENCH 4
U.9 27 INSTALL FRENCH 5
U.9 28 INSTALL FRENCH 6

Adjustments U.9 23 through U.9 28 are used to modify game pricing and type of play.

U.10 CLEAR CREDITS

Press the Enter button to clear the game Credits.

U.11 AUTO BURN-IN

Press the Enter button to activate Auto Burn-in. This utility automatically cycles through several tests. This helps in finding intermittent problems. The tests that Auto Burn-in cycles through are: the Display Test, the Sound and Music Test, the All Lamps Test, the Solenoid Test, the Flashers Test, the General Illumination Test, and the Flipper Coil Test. All of the tests run concurrently. The time spent on the burn-in cycle and the total time the game has spent in burn-in are displayed.

Press the Up or Down buttons to scroll through the Adjustments menu. To access an adjustment menu option, press the Enter button. To see the setting choices for that option press the Up and Down buttons. To lock in a setting choice, press the Enter button. If you make a mistake, press the Escape button while "Saving Adjustment Value" is in the display. The original value is retained and the new value is ignored. Press the Escape button to return to the Adjustment menu.

A. ADJUSTMENTS MENU

A.1 Standard Adjustments

A.2 Feature Adjustments

A.3 Pricing Adjustments

A.4 H.S.T.D Adjustments

A.5 Printer Adjustments (optional board required)

A.1 STANDARD ADJUSTMENTS

A.1 01 BALLS PER GAME

A "game" is defined by specifying the number of balls to be played.

Settings: 1 to 10

Factory Default: 3

A.1 02 TILT WARNINGS

The number of total actuation's of the plumb bob that can occur before the game is "tilted".

Settings: 1 to 10

Factory Default: 3

A.1 03 MAXIMUM EXTRA BALLS COUNT

The number of extra balls that a player may accumulate.

Settings: 0 to 10
NO EXTRA BALL - No extra balls may be accumulated.

Factory Default: 4

A.1 04 MAXIMUM EXTRA BALLS PER BALL IN PLAY

The number of extra balls to be awarded per ball in play.

Settings: OFF - No maximum number of extra balls per ball in play.
1 to 10 - 1 through 10 extra balls per ball in play.

Factory Default: OFF

A.1 05 REPLAY SYSTEM

The type of replay system to be used.

Settings: FIXED - Replay value is set and does not change during game play.
AUTO % - Replay starting value is set but changes every 50 games to comply with the percentage of replays desired.
OFF - Disable the replay system. No replays are awarded.

Factory Default: AUTO %

A.1 06 REPLAY PERCENT

The percentage of replays the players are able to earn when Auto Replay is used.

Settings: 5% to 50%

Factory Default: 10%

A.1 07 REPLAY START

Replay Start value when Auto % Replay is used.

Settings: 5,000,000 to 105,000,000

Factory Default: 24,000,000

A.1 08 REPLAY LEVELS

The number of replay levels used by the Auto % Replay mode. When two replay levels are chosen, the second replay level is automatically adjusted to twice the starting replay level. When three or four replay levels are chosen, their values are automatically adjusted to three or four times the starting replay level.

Settings: 1 to 4

Factory Default: 1

A.1 09 REPLAY LEVEL 1

A.1 10 REPLAY LEVEL 2

A.1 11 REPLAY LEVEL 3

A.1 12 REPLAY LEVEL 4

The value to be used for the 1st through 4th Fixed Replay.

Settings: 00 to 105,000,000.

A.1 13 REPLAY BOOST

The replay score can be temporarily boosted by the selected amount EACH time the player reaches or exceeds the replay score. This temporary boost is canceled when credits equal 0; the player inserts another coin, or when Begin Test is pressed.

Settings: AUTO - The Replay Boost value is half of the current Replay value.
ON - Score is boosted between 2,000,000 and 20,000,000 points.
OFF - Replay score is not boosted.

Factory Default: AUTO

A.1 14 REPLAY AWARD

The form of award automatically provided when the player exceeds any replay level for either Auto % Replay or Fixed Replay.

Settings: CREDIT - Reaching each replay level awards credit.
TICKET - Reaching each replay level awards a ticket.
BALL - Reaching each replay level awards an extra ball.
AUDIT - Reaching each replay level awards nothing to the player; it does increase the entry value of the audit item(s) maintaining a tally of these awards.

Factory Default: CREDIT

A.1 15 NOT USED

A.1 16 MATCH AWARD

The award automatically provided when the players win a match.

Settings: CREDIT - Winning a match awards a credit.
TICKET - Winning a match awards a ticket.

Factory Default: CREDIT

A.1 17 EXTRA BALL TICKET

A ticket is awarded when the player earns an extra ball.

Settings: YES - The player is awarded a ticket in addition to an extra ball.
NO - The player is not awarded a ticket.

Factory Default: NO

A.1 18 MAXIMUM TICKET/PLAYER

The amount of tickets each player can earn.

Settings: 00 to 100.

Factory Default: 25

A.1 19 MATCH FEATURE

This is the desired percentage for the Match Feature occurring at the end of the game.

Settings: OFF - Match Feature is not available.
1 to 50% - 1% is 'hard'; 50% is 'extremely easy'. The Match Feature selects random points score value at the end of the game and compares each player's score for an identical match. A match of an entire score value results in an award of a Credit or a Ticket.

Factory Default: 7%

A.1 20 CUSTOM MESSAGE

The message displayed during the Attract mode.

Settings: ON - A message is displayed
OFF - A message is not displayed.

Factory Default: ON

A.1 21 LANGUAGE

The language the game uses.

Settings: ENGLISH, FRENCH, OR GERMAN

Factory Default: ENGLISH

A.1 22 CLOCK STYLE

The style of clock the game uses.

Settings: A.M./P.M. or 24 hours.

Factory Default: A.M./P.M.

A.1 23 DATE STYLE

The style of dates the game uses.

Settings: MONTH/DATE/YEAR OR DATE/MONTH/YEAR

Factory Default: MONTH/DATE/YEAR

A.1 24 SHOW DATE AND TIME

The date and time show in the Attract mode.

Settings: YES - Show the date, time in status report or in the Attract mode.
NO - Do not show date, time in status report or in the Attract mode.

Factory Default: NO

A.1 25 ALLOW DIM ILLUMINATION

The game program dims the general illumination for special effects and during the Attract mode.

Settings: YES - Dim the general illumination during the Attract mode.
NO - Do not dim the general illumination.

Factory Default: YES

A.1 26 TOURNAMENT PLAY

Equalize random game features and global score values during multi-player games.

Settings: YES - Equalize random game features and global score values.
NO - Do not equalize random game features and global score values.

Factory Default: NO

A.1 27 EUROPEAN SCORE FORMAT

Use either commas or dots between digits when numbers are displayed.

Settings: YES - Dots instead of commas, (example- 1.000.000).
NO - Commas instead of dots, (example- 1, 000, 000).

Factory Default: NO

A.1 28 MINIMUM VOLUME OVERRIDE

The volume can be turned off.

Settings: YES - Volume can be turned off.
NO - Volume can be turned down but not off.

Factory Default: NO

A.1 29 GENERAL ILLUMINATION POWER SAVER

This allows the general illumination and controlled lamps to be dimmed following a time interval after a game is played. Power Saver Level (A.1 30) determines dimness of the lamps. Using this feature substantially increases the life of the lamps.

Settings: OFF, 2 to 60 minutes.

Factory Default: 15 minutes

A.1 30 POWER SAVER LEVEL

When General Illumination Power Saver (A.1 29) is set for 2 to 60 minutes, the Power Saver Level controls the intensity of the general illumination and controlled lamps after the game has been idle for the specified period of time.

Settings: 4 to 7 (4 = dimmest, 7 = brightest)

Factory Default: 5

A.1 31 TICKET EXPANSION BOARD

When a Ticket Expansion board is connected, full control of the ticket dispenser is available. This includes a ticket low/error lamp, resume on ticket jam switch and manual ticket dispense switch.

Settings: YES - Ticket Expansion board is connected.
NO - Ticket Expansion board is NOT installed in the game.

Factory Default: NO

A.1 32 NO BONUS FLIPS

The activation of flippers during the end of ball "bonus" sequence. Setting to "YES" may extend the life of the flipper mechanisms.

Settings: YES, NO

Factory Default: YES

A.1 33 GAME RESTART

When you press the Start button during or after the 2nd ball, the game in progress ends and a new game begins. This adjustment has three settings to determine how to handle this.

Settings: NEVER - Do not allow a new game start until the current game is over.
SLOW - Restart if the Start button is pressed continuously for over 1/2 second. This helps to prevent the unintended restart of the game in progress.
INSTANTLY - Restart as soon as the Start button is pressed.

When you press the Start button during game over, or during the 1st ball (to add a player), it is always handled instantly.

Factory Default: SLOW

A.2 FEATURE ADJUSTMENTS

A2.01 PLAYER TOURNAMENT

When this adjustment is set to YES, holding both flipper buttons during Game Over mode for five seconds prompts the player with "TOURNAMENT MODE READY" and gives them ten seconds to start a game in Tournament mode.

Settings: YES, NO

A2.02 TIMED PLUNGER

This setting allows the game to automatically plunge the ball from the shooter groove after a determined amount of inactivity. This time is shown in seconds after the ball is served.

Settings: ON, OFF

A2.03 FLIPPER PLUNGER

When this adjustment is set to YES, the right flipper causes a ball sitting in the shooter lane to be launched onto the playfield. This adjustment is provided for use when the launch button is broken and/or intermittent. The game automatically detects a broken launch button, but it may take several games to perform the detection. In this case, set this adjustment to YES until the launch button can be repaired.

Settings: YES – Allow the right flipper to launch a ball sitting in the shooter lane.
NO – Do NOT allow the right flipper to launch a ball sitting in the shooter lane.

A2.04 EXTRA BALL PERCENT

The operator selects the percentage of Extra Balls desired. The game will try to match this percentage.

Settings: Range is from OFF to 40%.

A2.05 POST DIFFICULTY

This adjustment allows the operator to vary how long the post stays up for the player.

Settings: EASY – The post stays up a long time.
MEDIUM – This is the factory default setting.
HARD – The post does not stay up as long.

A2.06 BRAWL DIFFICULTY

This adjustment allows the operator to vary how often the player receives MULTI-BRAWL.

Settings: MEDIUM – (Factory Default): All locks are lit at game start.
HARD – The first 3- bank target completed lights all locks.
EXTRA HARD – The 3-bank target lights the locks one at a time.

A2.07 FIST DIFFICULTY

This adjustment allows the operator to vary how often the player receives FISTICUFFS MULTIBALL.

Settings: MEDIUM – (Factory Default): The Heavy Bag awards letters all the time.
HARD – The Heavy Bag awards letters only if health is not awarded.

A2.08 FIGHT DIFFICULTY

This adjustment allows the operator to vary how hard it is for the player to beat the boxer during a fight.

Settings: EASY – This is easier for the player to win.
MEDIUM – This is the factory default setting.
HARD – This is harder for the player to win.

A2.09 HURRY DIFFICULTY

This adjustment allows the operator to vary how hard it is for the player to start Hurry-ups off the Scoop.

Settings: EASY – This is easier for the player to start Hurry-up.
 MEDIUM – This is the factory default setting.
 HARD – This is harder for the player to start Hurry-up,

A2.10 SPECIAL MODE

This allows the operator to turn Special Modes on or off.

Settings: ON – Allow Special Modes
 OFF – No Special Modes

A2.11 ATTRACT MODE BONG SOUNDS

This allows the operator to determine how often the Game Over bong sounds are heard.

Settings: ON – The Game Over clock will bong.
 SPARSE – The Game Over clock will only bong 1/3 of the time.
 OFF – The Game Over clock will not bong.

A2.12 DISABLE ARMS

This allows the operator to disable the swinging of the boxer's arms during a game.

Settings: ON – The arms will not operate.
 OFF – (Factory Default): The arms operate.

NOTE - If this adjustment is set to "ON", the game will remind the operator in the test messages at power up and the error dot will appear after all credits.

A2.13 DISABLE BOXER

This allows the operator to disable the entire boxer during a game.

Settings: ON – The boxer will not operate.
 OFF – (Factory Default): The boxer operates.

NOTE - If this adjustment is set to "ON", the game will remind the operator in the test messages at power up and the error dot will appear after all credits.

A2.14 DISABLE SPEED

This allows the operator to disable the Speed Bag 'flippers' during the game.

Settings: ON – The Speed Bag flippers will not operate.
 OFF – (Factory Default): The Speed Bag 'flippers' operate.

NOTE - If this adjustment is set to "ON", the game will remind the operator in the test messages at power up and the error dot will appear after all credits.

A2.15 DISABLE ROPE

This allows the operator to disable the Jump Rope feature.

Settings: ON – The Jump Rope will not operate.
 OFF – (Factory Default): The Jump Rope feature operates.

NOTE - If this adjustment is set to "ON", the game will remind the operator in the test messages at power up and the error dot will appear after all credits.

A. 3 PRICING ADJUSTMENTS

A.3 01 GAME PRICING (If set to custom, then 02 to 09 are available).

The cost of a game is selected here from the Standard Pricing Table or by using the custom pricing editor (A.3 27).

A.3 02 to A.2 09 NOT USED

A.3 10 COIN DOOR TYPE (If set to custom, then 11 to 15, 20 and 25 are available).

This adjustment is used to preset adjustments 11 through 15, 20 and 25, based on standard coin doors.

A.3 11 COLLECTION TEXT

The coin system is used to display the Earning Audits.

A.3 12 LEFT SLOT VALUE

A.3 13 CENTER SLOT VALUE

A.3 14 RIGHT SLOT VALUE

A.3 15 4TH SLOT VALUE

These are the values for the coins for these respective coin slots. These values are used for determining collection totals. The corresponding adjustments A.3 28 (Left Slot Credit Value) through A.3 31 (4th Slot Credit Value) typically contain the same values and are used to determine the number of credits awarded for the coin slot. Whenever these values are changed, the new value is copied to the corresponding A.3 28 through A.3 31 adjustment. If a bonus is desired for a particular coin (such as three credits for dollar coin), then the corresponding A.3 28 through A.3 31 "Credit Value" adjustment should be modified to award the bonus. See "Bonus for Special Coin" section for more information.

A.3 16 MAXIMUM CREDITS

The maximum number of credits the game can accumulate, either through game plays awards or coin purchases. The range of this setting is 5 through 99. Reaching the specified setting prevents the award of any credits. Factory default is 10.

A.3 17 FREE PLAY

A player can operate the game without a coin (free play), or with a coin.

- NO - A coin is necessary for game play.
- YES - Game play is free; no coin required.

A.3 18 HIDE COIN AUDITS

The coin audits may, or may not, be displayed.

- YES - The coin audits are not displayed.
- NO - The coin audits are displayed.
- HIDE NAMES - The coin audit value is shown but not the audit name.

A.3 19 NOT USED

A.3 20 BASE COIN SIZE

This is the smallest unit of coin that may be used when creating a custom pricing mode using the Pricing Editor (A.3 27). For example, in the USA this is typically \$0.25. All pricing levels are then specified in 25 cents (or greater) increments.

A.3 21 COIN METER UNITS

The adjustment determines the value of each coin unit on the coin meter. For example, to show the total amount of money collected as total quarters, set the adjustment to 0.25. To show the total amount of money collected as "total dollars", set this adjustment to 1.00. Setting this adjustment to anything other than OFF establishes the coin unit for the meter installed on the Coin Door Interface board. **Note:** All WPC-95 games are cable ready to operate a coin meter mounted to the Coin Door Interface board. Boards without a meter can use the parts listed below to take advantage of the coin meter feature. The coin meter and spacer may be purchased from your distributor. coin meter +6V p/n 20-9302-3; spacer p/n 20-9914

A.3 22 DOLLAR BILL SLOT

The system normally requires 150 microseconds between coin pulses. This is too long a delay for a fast-pulsing dollar bill validator. This adjustment may be used to tell the game that there is a fast-pulsing dollar bill validator connected to one of the coin switches.

NONE	=	No validator connected.
LEFT	=	Validator connected to left slot.
CENTER	=	Validator connected to center slot.
RIGHT	=	Validator connected to right slot.
FOURTH	=	Validator connected to fourth.

A.3 23 MINIMUM COIN MILLISECONDS

This is the minimum width required for coin pulses to be accepted as valid coins. This may be changed to prevent certain kinds of cheating.

A.3 24 NOT USED

A.3 25 ALLOW HUNDREDTHS

This is used for a custom door specifier. If set to YES, then the values for A.3 12-15 are specified in units and hundredths (such as dollars and quarters). If set to NO, then all values are in units (such as Francs and Lire.)

A.3 26 CREDIT FRACTION

This determines the smallest fraction used for credits. It must be even to accommodate the extra ball buy-in option of 1/2 credit, and is typically 1/2 but may need to be a different value for modes requiring more coins per credit.

A.3 27 PRICING EDITOR

This function is now used to enter information for a custom pricing mode. The adjustment A.3 26 (Credit Fraction) may need to be set before entering the custom pricing editor. This specifies the smallest fraction available for partial credits.

Because of availability of an extra ball (buy-in) for 1/2 credit, this value is always even (1/2, 1/4, 1/6etc.). The typical setting for A.3 26 is 1/2 (such that there are only full credits and half credits) but you may need to use a different value for other pricing modes.

Please note that formerly, the coin values specified by custom coin doors adjustments A.3 12-15 only affected audit totals that showed collection totals. In the 10/94 pricing system, these coin values are added up for each coin received and credits are awarded based on pricing levels being reached. The pricing editor described here allows you to set these levels, however it may be necessary for you to set A.3 10 (Coin Door Type) to CUSTOM and then change A.3 11-15, 20 and 25 to reflect the value of the coins being used. This is usually NOT NECESSARY, but must be done BEFORE using the custom pricing editor when it is necessary.

Begin the custom pricing function by pressing the Enter button while A.3 27 Pricing Editor is showing in the display.

The pricing editor will now show the data for the currently selected pricing mode. If this is the 1st use of the pricing editor then this will show the last built-in pricing that was selected. Otherwise it will be the last custom mode created by this function. (Note that A.3 01 will display Custom any time a non-standard pricing has been selected.)

Assuming the last mode installed was 1/\$0.50, 2/\$0.75, 3/\$1.00 the display appears as follows:

CUSTOM PRICING EDITOR		
1)	\$0.25	1/2 cred.
2)	\$0.50	1 cred.
3)	\$0.75	2 cred.
4)	\$1.00	3 cred.

DISPLAY VIEW

The \$0.25 field will be flashing. You may now use the test mode buttons to perform the following functions:

Escape:

Undo any changes to the current field and move to the previous field.

"-" (Down):

Make the current field lower.

"+" (Up):

Make the current field higher.

Enter:

Save any changes to the current field and move to the next field. Note that there are 2 columns of fields. Price levels are in the left column and credit levels are in the right column. Pressing Enter will move from left column to right column before moving to the next line.

Start:

Save the current price mode or start over

By using the above functions, you simply enumerate each pricing level and the number of credits that should be awarded at that level. Please note that you must specify each fractional level in sequence.

Example: 1/\$0.50 2/\$1.00 4/\$1.50 6/\$2.00

1)	\$0.25	1/2 cred.
2)	\$0.50	1 cred.
3)	\$0.75	1 1/2 cred.
4)	\$1.00	2 cred.
5)	\$1.25	2 1/2 cred.
6)	\$1.50	4 cred.
7)	\$1.75	4 1/2 cred.
8)	\$2.00	6 cred.

Also note that once the value of the coins repeat that no further specification is necessary.

Example: 1/\$0.50 2/\$1.00

1)	\$0.25	1/2 cred.
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In the above example, only one line needs to be specified, indicating that 1/2 credit is awarded for each \$0.25 received.

Special Features:

There are some special features available by pressing the Down button while in the left column. The following words will be displayed instead of a pricing level:

<i>End</i>	<i>Repeat 3</i>	<i>Repeat 9</i>	<i>Repeat 15</i>
<i>Delete</i>	<i>Repeat 4</i>	<i>Repeat 10</i>	<i>Repeat 16</i>
<i>Insert</i>	<i>Repeat 5</i>	<i>Repeat 11</i>	<i>Repeat 17</i>
<i>Clear</i>	<i>Repeat 6</i>	<i>Repeat 12</i>	<i>Repeat 18</i>
<i>Repeat 1</i>	<i>Repeat 7</i>	<i>Repeat 13</i>	<i>Repeat 19</i>
<i>Repeat 2</i>	<i>Repeat 8</i>	<i>Repeat 14</i>	<i>Repeat 20</i>

Pressing Enter with the above words selected will activate the following instructions:

End

This is the same as pressing the Start button. A menu of choices will be provided (see Start Button later in this section).

Delete

This deletes the current level from the pricing mode.

Insert

This inserts a new pricing level ABOVE the current level. The current level will be unaffected. There must be room for at least one coin between the current level and the previous level, and at least one fractional credit unit between the current level and the previous level.

Example: Inserting a new pricing level.

CUSTOM PRICING EDITOR		
1)	\$0.50	1 cred.
2)	\$1.00	2 cred.
3)	\$1.50	4 cred.
4)	\$2.00	6 cred

DISPLAY VIEW

Use the Enter button to move to the \$1.50 field. Now press the Down button once to create the following display:

CUSTOM PRICING EDITOR		
1)	\$0.50	1 cred.
2)	\$1.00	2 cred.
3)	INSERT	4 cred.
4)	\$2.00	6 cred

DISPLAY VIEW

Now press the Enter button. The display will now show:

CUSTOM PRICING EDITOR		
1)	\$0.50	1 cred.
2)	\$1.00	2 cred.
3)	\$1.25	2 1/2 cred.
4)	\$1.50	4 cred

DISPLAY VI

Note that the line "5) \$2.00 6 cred." No longer fits on the display. Whenever there are more than four pricing levels that the display will scroll up and down as Enter and Escape are used to move from field to field. If you repeatedly press Enter the display will then show:

CUSTOM PRICING EDITOR		
2)	\$1.00	2 cred.
3)	\$1.25	2 1/2 cred.
4)	\$1.50	4 cred.
5)	\$2.00	6 cred

DISPLAY VIEW

Clear

This clears out the current entries to allow a new pricing mode to be entered.

Repeat (1-20)

This causes all of the entries above the current line to be repeated the number of times specified. This is only available when there are no pricing levels below the current line.

Example: 1/\$0.50 2/\$1.00 15/\$5.00

Use the "Edit New Pricing Mode" feature described below to clear out the current levels.

Use the Up and Enter buttons to specify 1/2 credit for \$0.25:

CUSTOM PRICING EDITOR		
1)	\$0.25	1/2 cred.
DISPLAY VIEW		

Now, use the Up button until the display shows "Repeat 20". The display looks like this:

CUSTOM PRICING EDITOR		
1)	\$0.50	1 cred.
2)	REPEAT 20	
DISPLAY VIEW		

Press the Enter button and the display will show the following:

CUSTOM PRICING EDITOR		
1)	\$0.25	1/2 cred.
2)	\$0.50	1 cred.
3)	\$0.75	1 1/2 cred.
4)	\$1.00	2 cred
DISPLAY VIEW		

Actually, by repeating the 1st line 20 times the pricing mode is currently set up as follows, but only the 1st four lines are displayed.

CUSTOM PRICING EDITOR		
1)	\$0.25	1 /2 cred.
2)	\$0.50	1 cred.
3)	\$0.75	1 1/2 cred.
4)	\$1.00	2 cred.
5)	\$1.25	2 1/2 cred.
6)	\$1.50	3 cred.
7)	\$1.75	3 1/2 cred.
8)	\$2.00	4 cred.
9)	\$2.25	4 1/2 cred.
10)	\$2.50	5 cred.
11)	\$2.75	5 1/2 cred.
12)	\$3.00	6 cred.
13)	\$3.25	6 1/2 cred.
14)	\$3.50	7 cred.
15)	\$3.75	7 1/2 cred.
16)	\$4.00	8 cred.
17)	\$4.25	8 1/2 cred
18)	\$4.50	9 cred.
19)	\$4.75	9 1/2 cred.
20)	\$5.00	10 cred
DISPLAY VIEW		

Now repeatedly press the Enter button to move the right hand column to the 20th level. The display will show (with "10 cred." Blinking):

CUSTOM PRICING EDITOR		
17)	\$4.25	8 1/2 cred.
18)	\$4.50	9 cred.
19)	\$4.75	9 1/2 cred.
20)	\$5.00	10 cred

DISPLAY VIEW

Now press the Up button repeatedly until the right hand column of line 20 reads "15 cred."

Start Button

Once the pricing mode has been specified, you exit the custom pricing editor by pressing the 'Start' button. This will bring up a menu with some or all of the following choices:

Choose an Option:	
Return to Editor	
Clear Pricing	
Ignore Changes	
Save Changes	

DISPLAY VIEW

Use the Up and Down buttons to select your choice and press the Enter button to activate it. The selections cause the following actions:

Return To Editor

This option will allow you to continue to edit the pricing information.

Clear Pricing

This option will clear out all pricing levels and bring you back to the pricing editor to create a pricing mode from scratch.

Ignore Changes

This option will discard the work done in the previous pricing editor and leave the previously installed pricing mode in the game.

Save Changes

Press the Enter button to save your custom edited pricing mode and install it as the pricing for the game. Note that this choice will not be displayed if there is not at least one pricing level specified in the pricing editor, or if no changes have been made.

Exit Pricing Editor

This option will appear if no changes have been made. It will exit the Pricing Editor leaving the pricing as is.

Bonus for Special Coins

For most coin modes, the system allows the mixing of any combination of any size coin and awards credits as each appropriate amount is accumulated. With A.3 10 (Coin Door Type) set to "custom", the value of each coin slot may be entered for adjustments A.3 12 (Left Slot Value) through A.3 15 (4th slot value). Whenever these values are changed, the new values are copied to A.3 28 (Left Slot Credit Value) through A.3 31 (4th Slot Credit Value) respectively. To give a bonus for a particular coin, you need to modify the Credit Value adjustment to specify the value to be given for the bonus coin.

For example, in a game with a Left Coin Slot that takes quarters and a center coin slot that takes dollars, if you wish to charge 50 cents for 1 play and \$1.00 for 2 plays, you setup the pricing editor to show:

CUSTOM PRICING EDITOR		
1)	\$0.25	1/2 cred.
2)	\$0.50	1 cred.
3)	\$0.75	1-1/2 cred.
4)	\$1.00	2 cred
DISPLAY VIEW		

If you set A.3 10 (Coin Door Type) to Custom you will see the following coin door specifier adjustments:

A.3 12	Left Slot Value	0.25
A.3 13	Center Slot Value	1.00
A.3 28	Left Slot Credit Value	0.25
A.3 29	Center Slot Credit Value	1.00

To change the pricing to 1 play for \$0.50, 2 plays for \$1.00 and 3 plays for a dollar coin, you change A.3 29 (Center Slot Credit Value) to 1.50. This will result in the following settings:

A.3 12	Left Slot Value	0.25
A.3 13	Center Slot Value	1.00
A.3 28	Left Slot Credit Value	0.25
A.3 29	Center Slot Credit Value	1.50

This will cause \$1.50 worth of credits (3) to be awarded for each coin inserted in the center coin slot (dollar coin). This is due to the \$1.50 setting of A.3 29 (Center Slot CREDIT VALUE). Note that the 1.00 setting of A.3 13 tells the game that each coin in the center slot adds \$1.00 to the total collection.

A.3 28 LEFT SLOT CREDIT VALUE **A.3 29 CENTER SLOT CREDIT VALUE** **A.3 30 RIGHT SLOT CREDIT VALUE** **A.3 31 4TH SLOT CREDIT VALUE**

This adjustment specifies the value to be used for awarding credits. It is typically the same value as the corresponding A.3 12 (Left Slot Value) through A.3 15 (4th Slot Value) adjustment.

The A.3 12 through A.3 15 values are used to determine the auditing value of each coin (for collection totals) while the A.3 28 through A.3 31 value determine the coin value for awarding credits. By making this "Credit Value" adjustment higher than the A.3 12 through A.3 15 "Value" adjustment, a bonus may be given for a specific call (see Bonus for Special Coin section for more information).

Pricing Table

COUNTRY	COIN CHUTES				GAMES/COINS	DISPLAY	PRICING ADJUSTMENTS A3
	LEFT	CENTER	RIGHT	4 TH CHUTE			02 03 04 05 06 07 08 09
USA	25¢	\$1.00*	25¢	\$1.00	1/50¢, 2/75¢, 3/\$1 ²	50¢, 75¢, \$1.00	
	25¢	\$1.00*	25¢	\$1.00	1/75¢, 2/\$1.50, 3/\$2.00 ²	1/.75, 3/2.00	
	25¢	\$1.00	25¢	\$1.00	1/3X25¢ ²	USA 1/\$0.75	
	25¢	\$1.00	25¢	\$1.00	1/50¢, 2/\$1 ²	USA 2/\$1.00	
	25¢	\$1.00	25¢	\$1.00	1/50¢, 3/\$1.00 ²	USA 3/\$1.00	
	25¢	\$1.00	25¢	\$1.00	1/2x25¢, 2/\$1.00, 3/\$1.50, 6/\$2.00 ²	USA 6/\$2.00	
	25¢	\$1.00	25¢	\$1.00	1/2x25¢, 2/\$1.00, 3/\$1.50, 5/\$2.00 ^{1,2}	USA 5/\$2.00	
	25¢	\$1.00	25¢	\$1.00	1/3x25¢, 2/\$1.50, 4/\$2.00 ²	1/.75, 4/\$2.00	
	25¢	\$1.00	25¢	\$1.00	1/2x25¢, 2/\$1.00, 4/\$1.50, 6/\$2.00 ²	6/\$2.00 4/\$1.50	
	25¢	25¢	25¢	-	1/4x25¢, 6/\$5.00 ²	1/1, 6/5	
	25¢	25¢	25¢	-	1/4x25¢ ²	1/\$1.00	
Canada	25¢	-	\$1.00	-	1/50¢, 2/75¢, 3/\$1 ²	CAN. 50-75-1	
	25¢	-	\$1.00	-	1/50¢, 2/\$1 ²	CAN. 2/\$1.00	
	25¢	-	\$1.00	-	1/50¢, 3/\$1.00 ²	CAN. 3/\$1.00	
	25¢	-	\$1.00	-	1/2x25¢, 2/4x25¢, 3/\$1.00 ²	3/\$1.00 Coin	
	25¢	-	\$1.00	-	1/2x25¢, 2/\$1.00, 3/\$1.50, 6/\$2.00 ²	CAN. 6/\$2.00	
	25¢	-	\$1.00	-	1/2x25¢, 2/\$1.00, 3/\$1.50, 5/\$2.00 ^{1,2}	CAN. 5/\$2.00	
	25¢	-	\$1.00	-	1/2x25¢, 2/\$1.00, 4/\$1.50, 6/\$2.00 ²	6/\$2, 4/1.50	
	25¢	-	\$1.00	-	1/3x25¢, 2/\$1.50, 4/\$2.00 ²	1/.75, 4/2.00	
	25¢	-	\$1.00	-	1/75¢, 2/\$1.50, 3/\$2.00 ²	1/.75, 3/2.00	
	25¢	-	\$1.00	-	1/3X25¢ ²	CAN. 1/\$0.75	
	25¢	-	\$1.00	-	1/0.50, 2/\$1.00, 3/\$1.00-Coin	CAN.\$ BONUS	
Canada 3/Dollar Coin	25¢	-	\$1.00	-			
Austria	5sch	10sch	10sch	-	1/2x5sch, 3/2x10sch ²	AUSTRIA	
	5sch	-	10sch	-	12/5sch, 5/10sch	CUSTOM	02 00 05 00 01 00 01 00
Australia	20¢	\$1	\$1	\$2	1/\$1, 3/\$2 ²	AUSTRALIA 1	
	20¢	\$1	\$1	\$2	1/\$1, 2/\$2	AUSTRALIA 2	
U.K.	£1.00	50P	20P	10P	1/3x10P, 2/50P, 4/£1 ²	U. KINGDOM	
Switzerland	1Fr	2Fr	5Fr	-	1/1Fr, 3/2Fr, 7/5Fr ²	SWISS 1	
Swiss 2	1Fr	2Fr	5Fr	-	1/2Fr, 2/3Fr, 3/4Fr, 5/5Fr	SWISS 2	
Swiss 3	1Fr	2Fr	5Fr	-	1/1Fr, 5/5Fr	SWISS 3	
Swiss 4	1Fr	2Fr	5Fr	-	1/1Fr, 2/2Fr, 3/3Fr, 4/4Fr, 6/5Fr ¹	SWISS 4	
Swiss 5	1Fr	1Fr	1Fr	-	1/1Fr (all slots = 1Fr)	SWISS 5	
Belgium	5Fr	20Fr	50Fr	-	1/4x5Fr, 1/20Fr, 3/50Fr ²	BELGIUM	
Belgium 2	5Fr	20Fr	50Fr	-	1/20Fr, 3/60Fr, 3/50Fr-Coin	BELG. BONUS	
Germany	1DM	2DM	5DM	-	1/1DM, 2/2DM, 6/5DM ^{1,2}	GER. 6/5DM	
					1/2DM, 2/3DM, 3/4DM, 4/5DM ²	GER. 4/5DM	
					1/2DM, 2/3DM, 3/4DM, 5/5DM ²	GER. 1/2DM	
					1/1DM, 2/2DM, 5/5DM ²	GER. 1/1DM	
Holland	1G	-	1G	-	1/1G ²	HOLLAND	
Sweden	1Kr	5Kr	10Kr	1Kr	1/10Kr, 2/15Kr, 3/20Kr ^{1,2}	SWEDEN 1	
	1Kr	5Kr	10Kr	1Kr	1/5Kr ²	SWEDEN 2	
France	1Fr	5Fr	10Fr	20Fr	1/3x1Fr, 2/5Fr, 5/10Fr, 10/20Fr ^{2,3}	TARIFF 1	
	1Fr	5Fr	10Fr	20Fr	1/2x1Fr, 3/5Fr, 7/10Fr, 14/20Fr ^{2,3}	TARIFF 2	
	1Fr	5Fr	10Fr	20Fr	1/5Fr, 3/10Fr, 7/2x10Fr, 7/20Fr ^{2,3}	TARIFF 3	
	1Fr	5Fr	10Fr	20Fr	2/5Fr, 4/10Fr, 9/2x10Fr, 9/20Fr ^{2,3}	TARIFF 4	
	1Fr	5Fr	10Fr	20Fr	2/5Fr, 5/10Fr, 11/2x10Fr, 11/20Fr ^{2,3}	TARIFF 5	
	1Fr	5Fr	10Fr	20Fr	1/5Fr, 3/10Fr, 6/20Fr ^{2,3}	TARIFF 6	
Italy	500L	500L	500L	-	1/500L ²	ITALY 1	
	500L	500L	500L	-	1/2x500L, 3/4x500L ^{1,2}	ITALY 2	
	500L	500L	500L	-	1/2x500L, 2/4x500L ²	ITALY 3	
Spain	100P	-	500P	-	1/100P, 6/500P ²	SPAIN	
	25P	-	100P	-	1/25P, 5/100P	CUSTOM	01 00 04 00 01 04 01 00
	25P	-	100P	-	1/25P, 4/100P	CUSTOM	01 00 04 00 01 00 01 00
	25P	-	100P	-	1/2x25P, 2/100P	CUSTOM	01 00 04 00 02 00 01 00
	25P	-	100P	-	1/2x25P, 3/100P	CUSTOM	03 00 12 00 04 00 01 06
Japan	100¥	-	100¥	-	1/100¥ ²	JAPAN	
Chile	Token	-	Token	-	1/1Token ²	CHILE	
Denmark	1Kr	5Kr	10Kr	20Kr	1/2x1 Kr, 3/5 Kr, 7/10 Kr ²	DENMARK 1	
	1Kr	5Kr	10Kr	20Kr	1/5 Kr, 3/10 Kr, 6/20 Kr ^{1,2}	DENMARK 2	
Finland	1Mka	-	5Mka	-	1/2x1Mka, 3/5Mka ²	FINLAND 1	
	1Mka	-	5Mka	-	1/3x1Mka, 2/5Mka ²	FINLAND 2	
New Zealand	\$1.00	-	\$2.00	-	1/\$1, 3/\$2 ²	NEW ZEALAND 1	
	\$2.00	-	\$1.00	-	1/\$1, 3/\$2, (\$2-\$1 door)	NEW ZEALAND 2	
Norway	5Kr	-	10Kr	-	1/5Kr, 2/10Kr, 5/20Kr ²	NORWAY	
Argentina	10¢	10¢	10¢	-	1/1 Token ²	ARGENTINA	
Greece	10D	20D	50D	-	1/2x10D, 1/20D, 3/50D	GREECE	
Antilles	25¢	25¢	1G	-	1/25¢, 4/1G	ANTILLES	
Netherlands 1	1 HFI	2.5 HFI	2.5 HFI	-	1/1HFI, 3/2.5HFI	NETHERLANDS	
Netherlands 2	1 HFI	2.5 HFI	2.5 HFI	-	1/1HFI, 3/3HFI, 3/2.5HFI-Coin	NETH. BONUS	
Netherlands 3	1 HFI	2.5 HFI	5 HFI	-	1/1HFI, 3/2.5HFI	NETH. CSHFL	
Hungary	20 Old	20 New	50F	-	1/40F, 2/60F, 4/100F	HUNGARY	

1. Factory Default. 2. Standard Setting - Change by pressing Enter button. 3. Other functions are also affected. * Only if Bill Acceptor and Center Chute are available.

A.4 HIGH SCORE TO DATE (H.S.T.D.) ADJUSTMENTS

A.4 01 HIGHEST SCORES

The game maintains a record of the four highest scores achieved to date.

- OFF - No high scores are recorded, or displayed.
- ON - The four highest scores are stored in memory and displayed in Attract Mode.

A.4 02 H.S.T.D. AWARD

This is the award given for achieving the High Score to Date or the Champion High Score to Date. Credit or Ticket

A.4 03 CHAMPION H.S.T.D.

The "Highest" High Score can be displayed in the Attract Mode. This score is not cleared when "High Score Reset Every" occurs.

- ON - The "Highest" High Score is retained in memory and displayed.
- OFF - The "Highest" High Score is not retained.

A.4 04 CHAMPION CREDITS

The number of credits or tickets awarded for a Grand Champion Score.

Range: 00 to 10.

A.4 05 H.S.T.D. 1 CREDITS

A.4 06 H.S.T.D. 2 CREDITS

A.4 07 H.S.T.D. 3 CREDITS

A.4 08 H.S.T.D. 4 CREDITS

The number of credits or tickets awarded whenever a player exceeds the four highest scores.

Range: 00 to 10.

A.4 09 HIGH SCORE RESET EVERY

The number of games to be played before an automatic reset of the displayed Highest Score occurs. The operator selects the values provided at reset in the Back-up High Scores.

Range: OFF (disabled), 250 to 20,000.

A.4 10 BACKUP CHAMPION

The Back-up Grand Champion Score.

Range: 00 to 120,000,000

A.4 11 BACKUP H.S.T.D. 1

A.4 12 BACKUP H.S.T.D. 2

A.4 13 BACKUP H.S.T.D. 3

A.4 14 BACKUP H.S.T.D. 4

The first through fourth Back-up High Score values. The game automatically restores this value when the "High Score Reset Every" value is reached.

Range: 00 to 120,000,000

A.5 PRINTER ADJUSTMENTS (optional board required)

A.5 01 COLUMN WIDTH

The column width to be printed. Range: 22 to 80.

A.5 02 LINES PER PAGE

This is the amount of lines per page. Range: 20 to 80.

A.5 03 PAUSE EVERY PAGE

Choose whether the printer pauses at the end of a page.

- YES - The printer does pause.
- NO - The printer doesn't pause.

A.5 04 PRINTER TYPE

Select the type of printer: Parallel, Serial, ADP, Mini-Drucker, or NSM.

A.5 05 SERIAL BAUD RATE

Select which baud rate to use for serial or ADP communications (bit rate): 300, 600, 1200, 2400, 4800, or 9600.

A.5 06 SERIAL D.T.R. (DATA TERMINAL READY)

When a serial printer is used, this line may be connected to a printer output line signaling that the printer is busy.

- NORMAL - Normal D.T.R. signal goes low to indicate the printer is not ready.
- INVERTED - Inverted D.T.R. (busy) signal goes high to indicate the printer is not ready.
- IGNORE - D.T.R. signal is ignored.

A.5 07 AUTO PRINTOUT

With the optional printer board installed, this adjustment allows the initiation of printouts whenever the game detects a printer connected to the game. Parallel printers are detected automatically by plugging them in and putting them on-line. Serial printers (or computers) are detected by sending a carriage return (ASCII 0x0D) or XON (ASCII 0x11).

This adjustment has the following settings:

OFF	Disable automatic printouts
MAIN AUDITS	Main Audit Table (B.1)
EARNINGS	Earning Audits (B.2)
STD. AUDITS	Standard Audits (B.3)
FEATURES	Feature Audits (B.4)
HISTOGRAMS	Histograms (B.5)
TIMESTAMPS	Time Stamps (B.6)
ALL DATA	All of the above data

The table specified above will automatically be printed when a printer (or computer) is detected.

If the printer is detected during game over or test mode, the printout will be taken right away.

If the printer is connected while a game is being played, it will take up to 10 seconds to be detected, after which the printout will occur. The game will resume after the printout is complete.

Automatic printouts will only take place if the coin door is open.

After an automatic printout has been generated, a 2nd automatic printout will not be possible until a new game has started, or test mode begins.

ERROR MESSAGES

The WPC-95 game program has the capability to aid the operator and service personnel. At game turn-on, or after pressing the Begin Test switch, once the game has been operating for an extended period, the display may signal with a message, "Press ENTER for Test Report". This indicates the game program has detected a possible problem with the game.

CHAMPION PUB features a new coin door display. When the coin door is open (in Attract mode and game play), the display shows that the high-power has been disabled. It also shows the Test Report (if there is anything to report), and some game specific information. Use the flipper buttons to page through this information.

To obtain details of the problem open the coin door and press the Begin Test switch. Press the Enter button to begin displaying the message(s). The following messages apply to your game.

GAME SPECIFIC ERROR MESSAGES.

THE BOXER MECH. IS MALFUNCTIONING

This error message occurs if the boxer mech. is unable to reach one of more of its positions.

THE ROPE MOTOR IS MALFUNCTIONING

This error message occurs if the rope motor is on but the cam switch is closed.

GENERAL ERROR MESSAGES.

CHECK SWITCH ##

This message indicates that at least one switch was stuck 'On' at game turn-on or has NOT been actuated during ball play (for 90 balls or apx. 30 games). The game program compensates the game play requirements affected by each disabled switch to allow 'nearly normal' play. This helps keep your game earning, until the service technician can repair the problem. To verify the problem, refer to the Test Menu text describing Switch Testing, and check each reported switch using applicable switch tests. Always check switch operation using a ball, to simulate game conditions. Switch problems may often be resolved by adjusting the wire switch actuators, fixing switch circuitry problems, securing loose connectors, etc. Mechanisms using 'opto switches' (drop targets, etc.) need to be checked for proper power connections (+12V dc and ground).

CHECK FUSES F115 AND F116 AND OPTO 12V SUPPLY

This message will be displayed if the game senses that all optical switches are not functioning. This usually occurs when there is no +12V supply to the playfield optics.

The problem is likely to be a blown fuse (F109), or at connectors J138, J139, J140 or J141 on the power driver board.

OPTO TROUGH BAD CHECK CONNECTORS, WIRES AND 12V SUPPLY

This message will be displayed if all of the opto switches in the playfield ball trough are not functioning. This is usually caused by a problem with a ball trough connector supplying +12V and ground for the optical circuits.

PINBALL MISSING

This game normally uses four balls, however, it will operate with less. This message announces that a ball is missing or stuck. When the ball is located, return it to the game via the Outhole. Other possibilities for this problem could be malfunctions of the Ball Trough switches or the Ball Shooter switch.

XXXX SW. IS STUCK ON

This message indicates that a switch, which is not usually on, remains in the On position after. The stuck switch is essential for game play (for example, a coin chute switch, the slam tilt switch, and the plumb bob tilt switch), and should be cleared to permit proper game operation.

GROUND SHORT ROW - N, WHT - XXX

This message indicates that the switch wires being called out are touching a grounded part on the playfield or coin door. The following should be checked:

1. Slam tilt (or other coin door switch) touching the grounded coin door.
2. A leaf-type, playfield switch touching a grounded part.
3. Players poking metallic objects (wires, coat hangers, etc.) into the game.
4. Switch cable insulation pierced or damaged allowing bare wire contact with a grounded part.
5. All switches in a row closing at the same time. **Note:** This is NOT a switch problem; however, for most games this is a very rare possibility.

G10 ERROR

The security chip is incorrect or faulty. If this occurs, replace the security chip.

G11 CHECKSUM ERROR

The game ROM checksum is invalid. If this occurs replace the game ROM.

TIME AND DATE NOT SET.

The real time clock is not set. Go to U.4 of the Utilities Menu and set the time and date.

FACTORY SETTINGS RESTORED.

This message indicates that the CMOS RAM (U8) no longer retains any custom Pricing or Game Adjustment settings and has reverted to factory default settings. Generally, the following CPU checks will isolate the cause of the CMOS RAM memory failure. The voltages at pin 28 and pin 26 of U8 should be +5V (game turned On) and at least +4V (game turned Off). When the voltage drops below +4V, memory reset occurs. Check the batteries and battery holder. Be sure that the batteries are good and that there is no contamination on the battery holder terminals. Turn the game OFF, and use an ohmmeter to check diodes D1 and D2 on the CPU Board. D1 should read 0 ohms when forward-biased and infinite ohms when reverse-biased. D2 should read 15 ohms when forward-biased and infinite ohms when reverse-biased. (Readings taken with an analog meter.) This message can also indicate that there is an open diode on a 50V-coil circuit and noise is entering the circuit.

CPU AND AUDIO/VISUAL BOARD ERROR CODES

The CPU has three LED's, 201, 202, and 203. At game turn-on LED 201 and LED 202 are on, LED 203 is off. During normal operation LED 201 is off, LED 202 is on, and LED 203 is flashing. If the system detects an error the following happens:

CPU board error codes

Center LED blinks once	= G11 ROM Failure
Center LED blinks twice	= U8 RAM Failure
Center LED blinks three times	= G10 Security Chip Failure

The Audio/Visual board produces one beep upon game turn on if the board is operating properly. If the system detects an error the following happens:

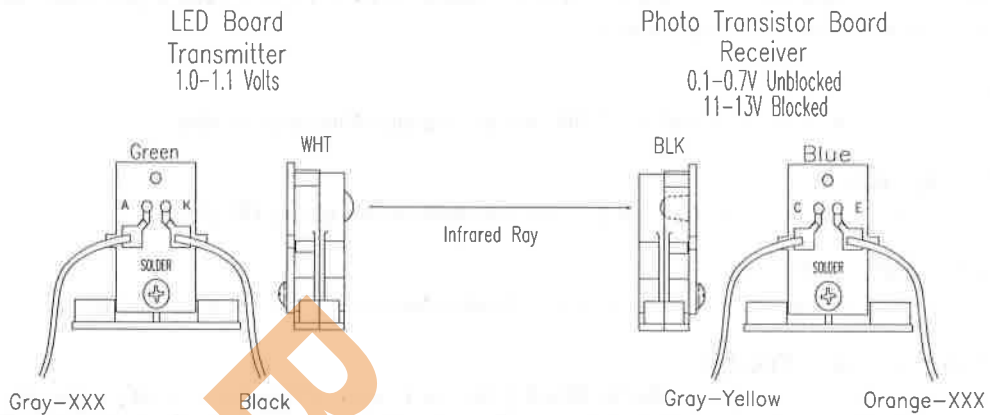
Audio/Visual board error codes

1 Beep	= Audio/Visual Board is O.K.
2 Beeps	= S2 Failure
3 Beeps	= S3 Failure
4 Beeps	= S4 Failure
5 Beeps	= S5 Failure
6 Beeps	= S6 Failure
7 Beeps	= S7 Failure
10 Beeps	= Audio Static RAM Failure

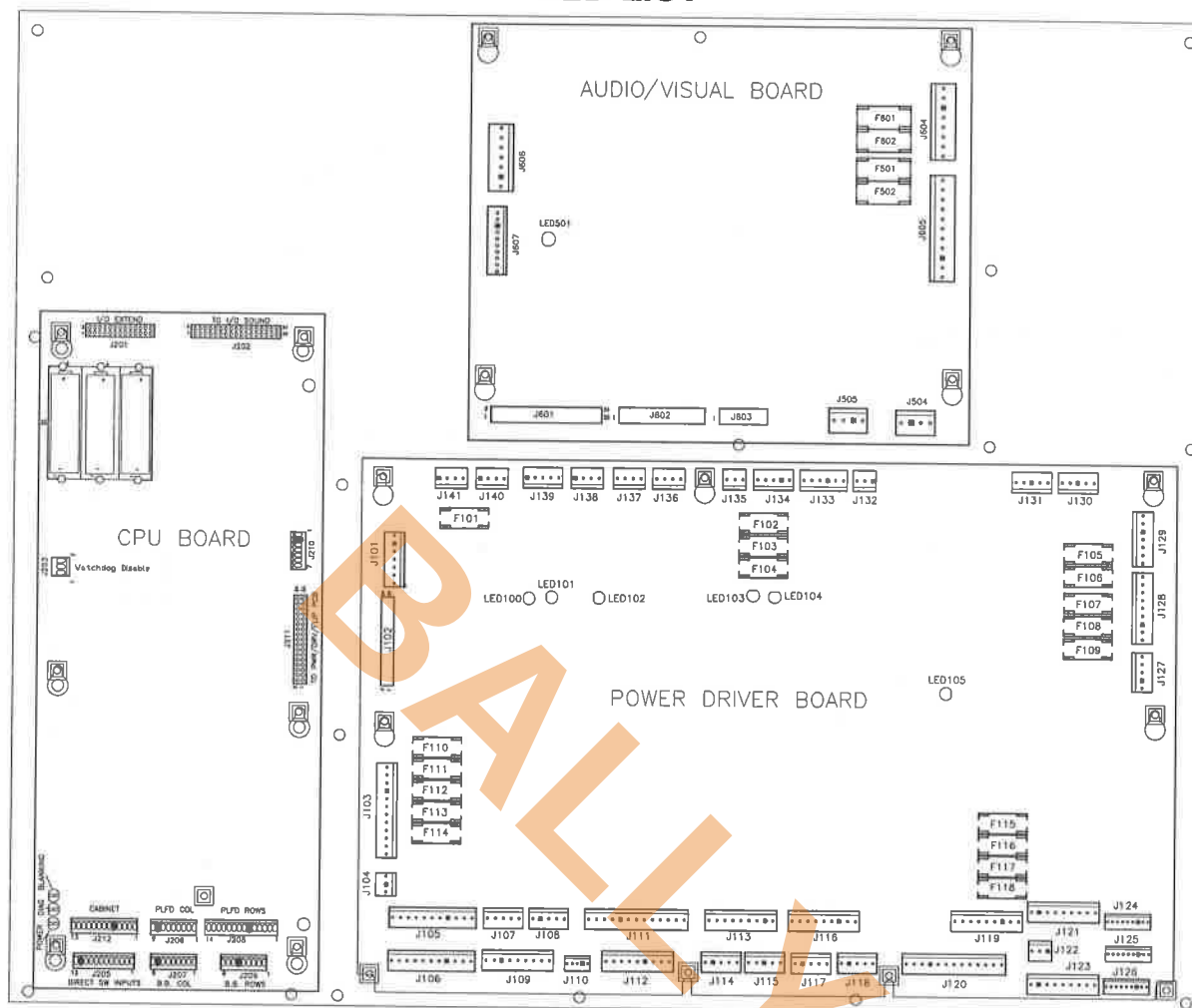
OPTO THEORY

The opto receiver (Photo Transistor) should be approximately 0.1 - 0.7 volts when the opto beam is unblocked and approximately 11 - 13 volts when the opto beam is blocked. The opto transmitter (LED) should always be approximately 1.4 volts.

Note: The transmitter (LED) is larger than the receiver (Photo Transistor); it protrudes further from its case.



LED LIST



CPU BOARD

- LED 201 Blanking
- LED 202 Power
- LED 203 Diagnostics

At game turn-on, LED 201 and LED 202 are on, LED 203 is off. During normal operation LED 201 is off, LED 202 is on, and LED 203 is flashing.

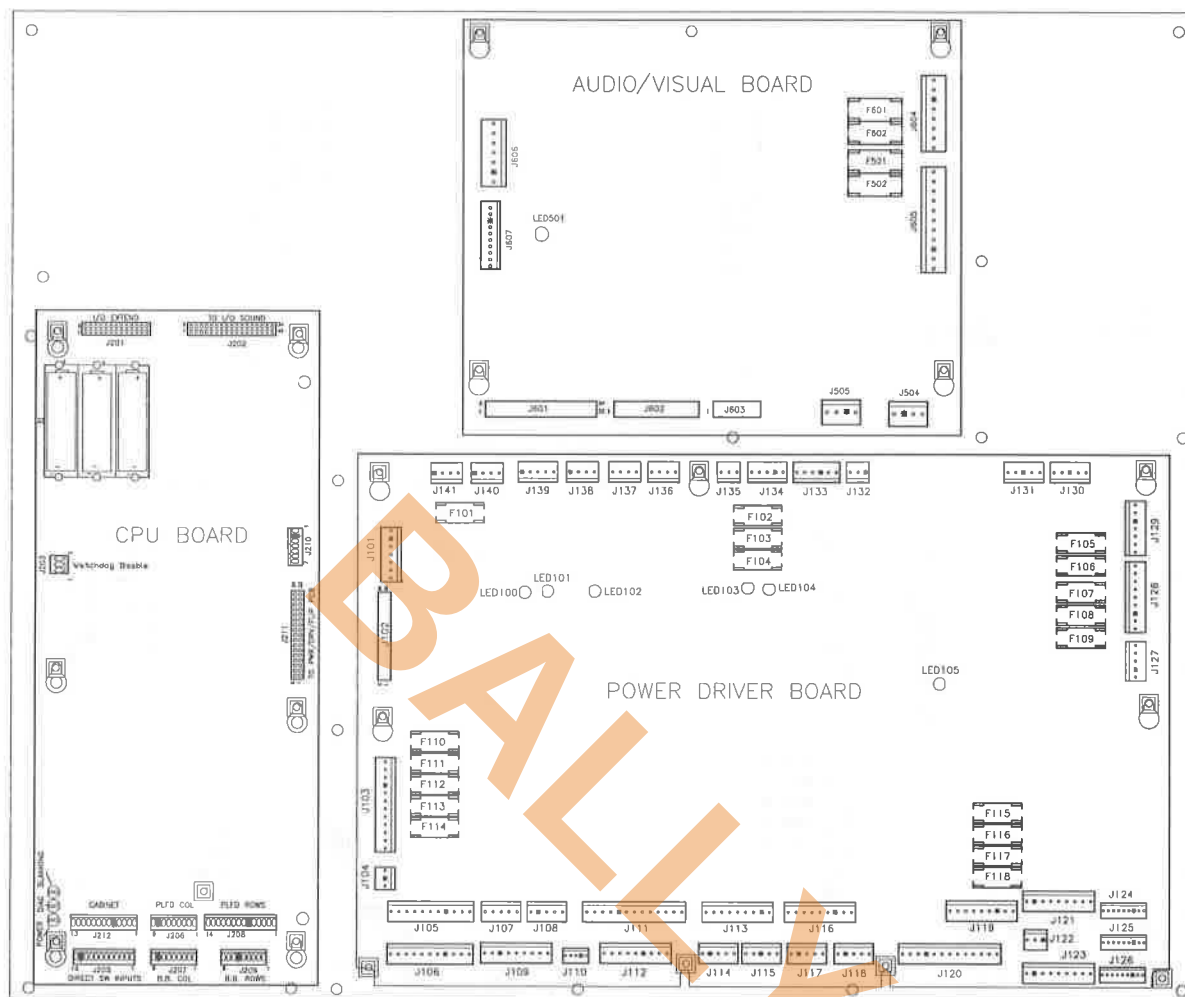
AUDIO/VISUAL BOARD

- LED 501 +5VDC, Normally flashing, but at a slower rate than LED 203.

POWER DRIVER BOARD

- LED 100 +12VDC Regulated, Normally On
- LED 101 +5VDC Digital, Normally On
- LED 102 +18VDC Lamps, Normally On
- LED 103 +12VDC Unregulated, Normally On
- LED 104 +20VDC Flashlamps, Normally On
- LED 105 +50VDC Coils, Normally On

FUSE LIST



MAINTENANCE INFORMATION

LUBRICATION

The two main lubrication points of the Ball Release mechanism are the pivots for the arm. The mechanisms of other playfield devices are somewhat similar to the Ball Release device, and have the same lubrication requirements. A medium viscosity oil (switch target grease) is satisfactory for these devices.

Because of the functional design (arm-actuated via solenoid plunger operation), the pivot points of the Left and Right Kickers ("Slingshots") all require lubrication as a regular servicing procedure.

Lubrication to ensure proper operation also applies to the target blades of the Drop Targets. MBI Instrument Grease, also known as Drop Target Switch Lubricant, with a Williams' part number of EI165, is a recommended lubricant.

SWITCH CONTACTS

Playfield Switches

For proper game operation, switch contacts should be free of dust, dirt, contamination, and corrosion. Blade switch contacts are plated to resist corrosion. Cleaning blade switch contacts requires gentle closing of the contacts on a clean business card or piece of paper, and then pulling the paper about 2 inches, which should restore the clean contact surface. Adjust the switch contacts to a 1/16-inch gap.

Flipper Switches

This game uses the new Fliptronic II Electronic Flipper System. The End-of-Stroke switches are NORMALLY OPEN. The switch should close when the flipper is energized. All E.O.S. switches are gold flashed computer grade leaf switches. Only low computer current is carried through these switches. DO NOT FILE or abrasively clean these switches! DO NOT REPLACE these switches with the tungsten high current switches, as intermittent operation could occur.

Note: Unlike the old style of flipper, an E.O.S. switch failure does not harm the flipper. The game notifies the operator that the switch is misadjusted in the test report, but continues to play. The E.O.S. switches are a means by which the new electronic flippers feel and play with all of the subtleties of the old flippers.

CLEANING

Good game action and extended playfield life are the results of regular playfield cleaning. During each collection stop, the playfield glass should be removed and thoroughly cleaned and the playfield should be wiped off with a clean, lint-free cloth. The game balls should be cleaned and inspected for any chips, nicks, or pits. Replace any damaged balls to prevent playfield damage.

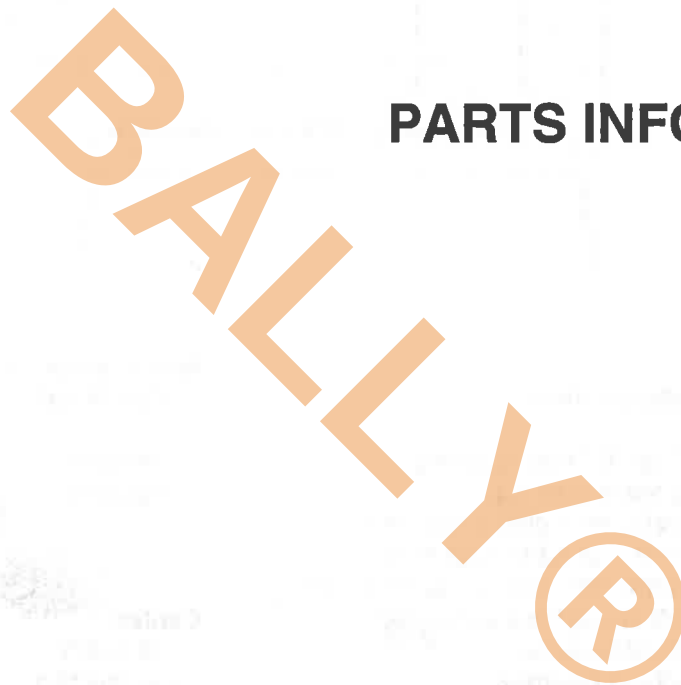
Regular, more extensive, playfield cleaning is recommended. However, avoid excessive use of water and caustic or abrasive cleaners because they tend to damage the playfield surface. Playfield wax (or any carnauba based wax), or polish may be used sparingly, to prevent a buildup on the playfield surface. Do not use cleaners containing petroleum distillates on any playfield plastics because they may dissolve the plastic material or damage the artwork.

NOTES

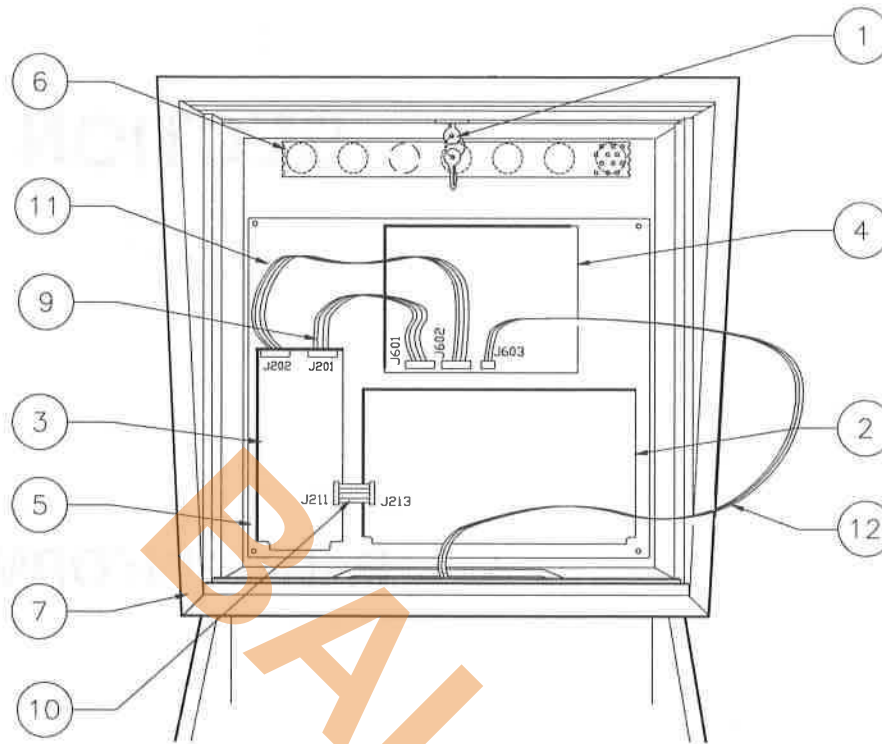
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SECTION TWO

PARTS INFORMATION



50063-BB Backbox Assembly



Item	Part Number	Description
1	A-21998	Lock & Plate Assembly
a)	20-10462	Lock & Cam Kit
2	A-20028	WPC '95 Power Driver PCB
3	A-21377-50063	WPC '95 CPU PCB Assy.
4	A-20516-50063	WPC '95 Audio Visual PCB Assy.
5	A-14092-7	Mounting Plate Assembly
6	01-6645	Vent Screen
7	04-11038	Wood Backbox
*8	A-20796	Speaker/Display Assembly

Ribbon Cables:

9	5795-12653-15	Ribbon Cable, 34-Pin, 2 Conn.
10	5795-12653-03	Ribbon Cable, 34-Pin, 3"
11	5795-10938-19	Ribbon Cable, 26-Pin, 2 Conn.
12	5795-13434-25	Ribbon Cable, 14 Pin w/Ferrite

Miscellaneous Parts: (Not Shown)

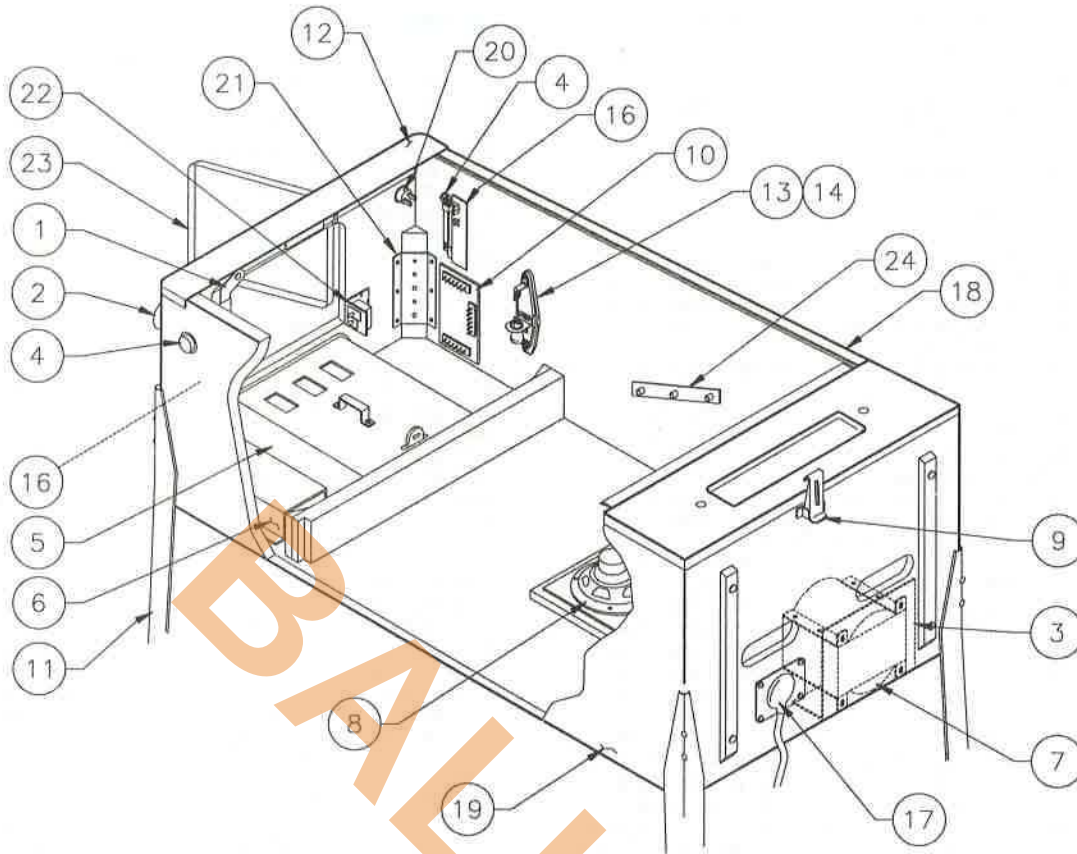
Part Number	Description
01-8397	Bracket Trunk Latch
02-5223	Button Speaker Panel (4)

Cables:

H-20477	Logic Power Cable
H-20478-1	Secondary Cable
H-20479	Dot Matrix Power Cable
H-22231-2	Insert Cable

* Not Shown.

50063-CAB Cabinet Assembly



Item	Part Number	Description
1	A-16773-1	Lever Guide Assembly
2	20-9663-B-4	Large Round Push Button
3	01-13936	Drip Plate – Narrow
4	A-16883-6	Flipper Button w/Spring (2)
5	A-20729-5	4-Ball Cashbox Assembly
6	A-20871	Power Interface Assy.
7	5610-14515-00	WPC Transformer
8	5555-12929-00	Speaker, 4Ω, 6", 25w
9	20-9347	Toggle Latch
10	A-20580	Coin Door Interface Board
11	A-19514	Leg Assembly, Chrome (4)
12	D-12615	Front Molding Assembly
13	20-6502-A	Plumb Bob
14	04-10346	Tilt Mechanism Assembly
15	*	Cordset
16	A-17316	Opto Flipper Assembly (2)
17	01-10714	Line Cord Cover
18	A-12359-3	Side Molding Assembly (2)
19	11-1355.1	Wood Cabinet
20	20-9663-16	Push Button w/Sw., Start (Yellow)
21	01-11400	Leg Plate (4)
22	A-18249-3	Cable & Interlock Switch Assy.
23	09-61000-1	Coin Door-U.S.A.
24	01-11408	Plate Spacer (2)

Miscellaneous Parts: (Not Shown)

A-17195	Tilt Switch Assy. w/Cable
A-19562.1	Stay Arm Assembly
01-12352	Clip Bracket
01-9011.2-L	Backbox Mtg. Bracket, Left
01-9011.2-R	Backbox Mtg. Bracket, Right
01-6389-1	Cashbox Lock Bracket
08-7028-T	Playfield Glass
08-7377	Leg Leveler Adjuster, 3"
20-6500	Steel Ball, 1-1/16" (6)

Cabinet Cables:

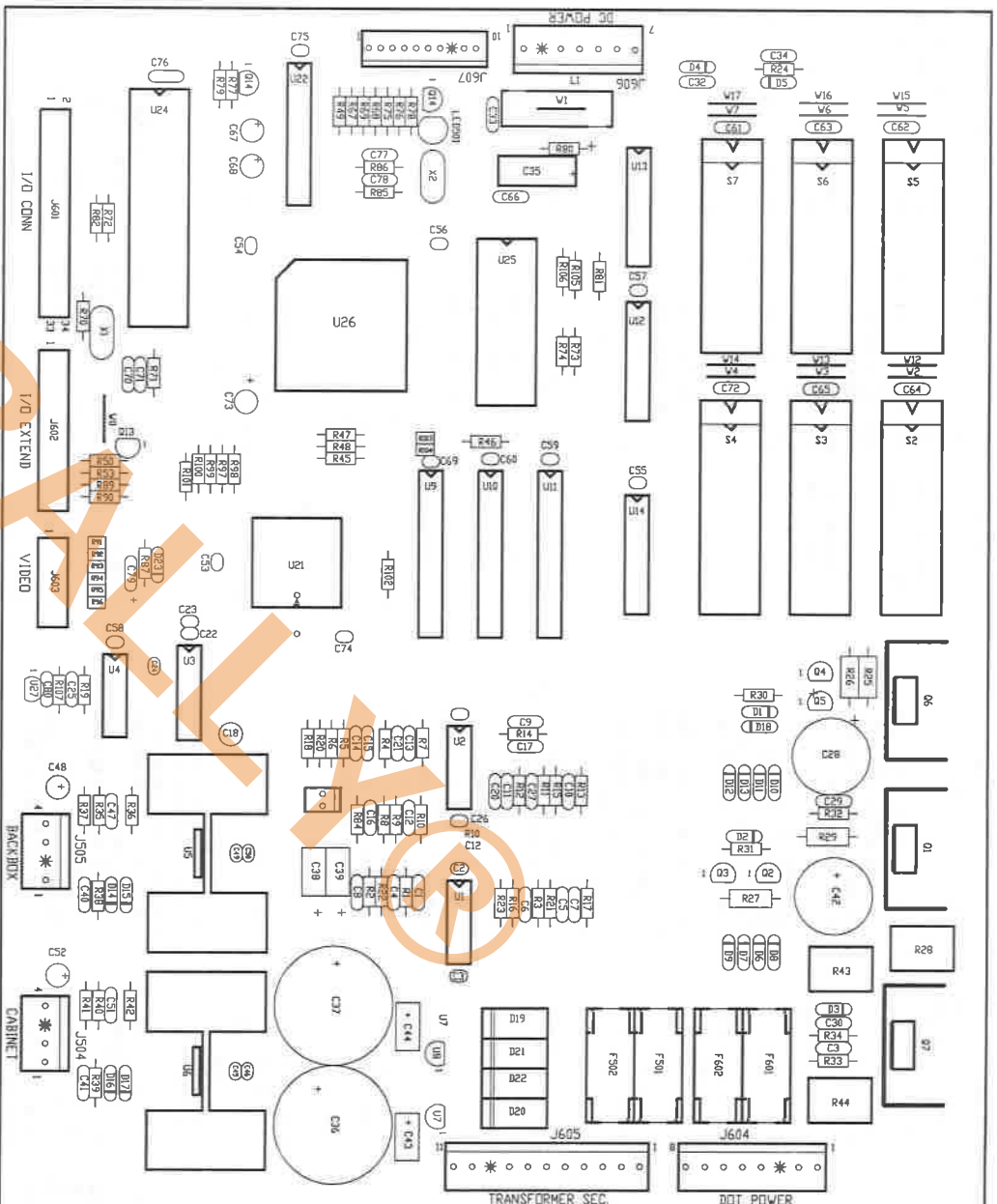
A-20201	Cable & Jumper Assy., Coin Door
H-17217.1	Plumb/Bob Mech. Protect Cable
H-17837-2	Voltage Program Jumper Cable
H-20599-1.1	WPC '95 Cabinet Cable
H-19601-1	Power Extension Cable
H-22239	Cabinet Cable

* See Power Interface/Cordset Application Chart on page 2-56.

A-20516-50063 WPC '95 Audio Visual PCB Assembly

Part Number	Designator	Description	Part Number	Designator	Description
4004-01005-06	-	Mach. Screw, 4-40 x 3/8"	5048-13610-00	C8, C10, C11, C13, C14	Cap., 1000pf, 50v, 5% Ax.
4404-01119-00	-	Nut 4-40 ESN	5048-13611-00	C16, C17, C20, C21	Cap., 680pf, 50v, 5% Ax.
5010-08774-00	R2, R17, R22, R23, R35, R36, R40, R42, R87	Resistor, 22K Ω , 1/4w, 5%	5048-14563-00	C29-C31, C81, C82	Cap., .01 μ f, 200v, 10% Axial
5010-08991-00	R20, R46-R48, R50, R72, R76, R77, R81, R107	Resistor, 4.7K Ω , 1/4w, 5%	5070-09045-00	D19-D22	Diode MR501, 3.0A
5010-09034-00	R21	Resistor, 10K Ω , 1/4w, 5%	5070-09054-00	D4, D6-D17, D23	Diode 1N4004, 1.0A
5010-09036-00	R19	Resistor, 100 Ω , 1/4w, 5%	5075-12823-00	D1, D18	Zener, 1N4758A 56v, 1w
5010-09134-00	R32-R34	Resistor, 150K Ω , 1/4w, 5%	5075-12824-00	D3, D5	Zener, 1N4742A 12v, 1w
5010-09219-00	R1, R3	Resistor, 8.2K Ω , 1/4w, 5%	5075-12826-00	D2	Zener, 1N4759, 62v, 1w
5010-09416-00	R73, R74, R82, R88, R105, R106	Resistor, 470 Ω , 1/4w, 5%	5160-08938-00	Q13-Q15	Transistor, 2N4401 NPN
5010-09807-00	R30, R31, R67-R69, R102	Resistor, 120 Ω , 1/4w, 5%	5164-09056-00	Q2, Q3	Transistor, MPSD02 NPN
5010-10171-00	R24	Resistor, 56 Ω , 1/4w, 5%	5164-12154-00	Q1, Q7	Transistor, MJE15030 NPN
5010-10258-00	R86	Resistor, 1M Ω , 1/4w, 5%	5194-09055-00	Q4, Q5	Transistor, MPSD52 PNP
5010-10983-00	R53, R75, R79, R84, R85, R89, R90	Resistor, 1.8K Ω , 1/4w, 5%	5194-12155-00	Q6	Transistor, MJE15031 PNP
5010-12832-00	R25, R26, R27, R29	Resistor, 47K Ω , 1/4w, 5%	5250-13302-00	U7	Reg. 78L05T 5v
5010-13215-00	R78, R97-R101	Resistor, 200K Ω , 1/4w, 5%	5250-13303-00	U8	Reg. 79L05T 5v
5010-13372-00	R91-R96, R103, R104	Resistor, 220 Ω , 1/8w, 5%	5311-12538-00	U4	IC 74HC14 Hex. S-T
5010-13420-00	R37, R41	Resistor, 680 Ω , 1/4w, 5%	5317-12211-00	U12-U14	IC Octal Buffer 74ALS541
5010-13517-00	R38, R39	Resistor, 15 Ω , 1/4w, 5%	5340-12278-00	U25	S/Ram 2064 150NS
5010-13607-00	R4, R5, R7-R15	Resistor, 6.19K Ω , 1/8w, 1%	5370-12687-00	U27	IC MC 340640Reset Chp
5012-14558-00	R44	Resistor, 1.8K Ω , 5w vertical	5349-14351-00	U9-U11	SRAm 8Kx8-35ms, 28pdlp
5012-14559-00	R43	Resistor, 4.7K Ω , 5w vertical	5370-12730-00	U1, U2	IC Op Amp TL084
5012-14560-00	R28	Resistor, 120 Ω , 5w vertical	5370-13419-00	U5, U6	IC TDA 2030AV 18w, Audio Amp
5013-13661-00	R16	Resistor, 9.09K Ω , 1/4w, 1%	5371-13299-00	U3	IC Ad-1851 16bit mono
5013-14456-00	R6, R18	Resistor, 3.32K Ω , 1/4w, 1%	5410-14705-00	U26	IC Custom WPC A/V Asic 120PQFP
5040-14569-00	C35	Cap., 100mf, 25v, Axial	5400-13298-00	U21	IC MPU 210kp-40 ADSP
5040-09365-00	C38, C39, C43, C44	Cap., 1m, 63v(+50,-10%)Ax.	5520-14561-00	X2	Crystal 20mHz, parallel 20pf
5040-12750-00	C48, C52, C73	Cap., 22m, 35v Radial	5671-14516-00	LED 501	Led-Display Red T 1-3/4
5040-13098-00	C18, C67, C68	Cap., 4.7 μ , 35v ($\pm$ 20%)	5700-08985-00	U24	Socket IC 40-pin .6
5040-15413-00	C36, C37	Cap., 10000 μ f, 35v, 25mm	5700-12047-00	U22	Socket IC 24.3P
5040-14564-00	C28, C42	Cap., 150 μ f, 160v, 20%Rad.	5700-12088-00	S2-S7	Socket Dip 32.6P"
5043-08996-00	C2, C3, C19, C22-C24, C26, C32, C34, C45, C46, C49, C50, C53-C66, C69, C72, C74-C76, C79, C80	Cap., 0.1 μ f, 50v ($\pm$ 20%) Ax.	5705-12638-00	U5, U6	Heatsink 5298B
5048-10992-00	C27	Cap., .0047m, 50v, 10% Ax.	5705-14562-00	Q1, Q6, Q7	Heatsink 10-220 wave sol 287
5048-11028-00	C77	Cap., 22p, 50v, Axial	5733-14528-00	F501, F502, F601, F602	Fuse Holder 5x20mm 10A.
5048-11029-00	C25	Cap., 100p, 50v, 5% Axial	5731-14532-00	F501, F502	Fuse 5x20mm T2.5A., 250V
5048-11030-00	C7	Cap., 470p, 50v, Axial	5731-14840-00	F601, F602	Fuse 5x20mm T0.315A., 250V
5048-11033-00	C1	Cap., .022m, 50v, 10% Ax.	5791-10850-00	J602	Connector, 26-pin Header Str.
5048-12036-00	C40, C41	Cap., .22m, 50v, Axial	5791-10862-04	J504, J505	Connector, 4-pin Header Str.
5048-13172-00	C78	Cap., 47pf, 50v, 20% Ax.	5791-10862-07	J606	Connector, 7-pin Header Str.
5048-13418-00	C4 - C6	Cap., .047m, 50v, 5% Ax.	5791-10862-08	J604	Connector, 8-pin Header Str.
5048-13609-00	C9, C12, C15	Cap., 3900pf, 50v, 5% Ax.	5791-10862-11	J605	Connector, 11-pin Header Str.
			5791-12516-00	J601	Connector, 34 hdr 2 x 17 .100
			5791-12827-00	J603	Connector, 14 Hen 7x2 Str.
			5791-13830-10	J607	Connector, 10-pin Str. Sq.
			5010-09534-00	W0, W1, W12-W17, R49	Resistor, 0 Ω , 0w
			A-5343-50063-S2	S2	ROM Assembly
			A-5343-50063-S3	S3	ROM Assembly
			A-5343-50063-S4	S4	ROM Assembly
			A-5343-50063-S5	S5	ROM Assembly
			A-5343-50063-S6	S6	ROM Assembly
			A-5343-50063-S7	S7	ROM Assembly

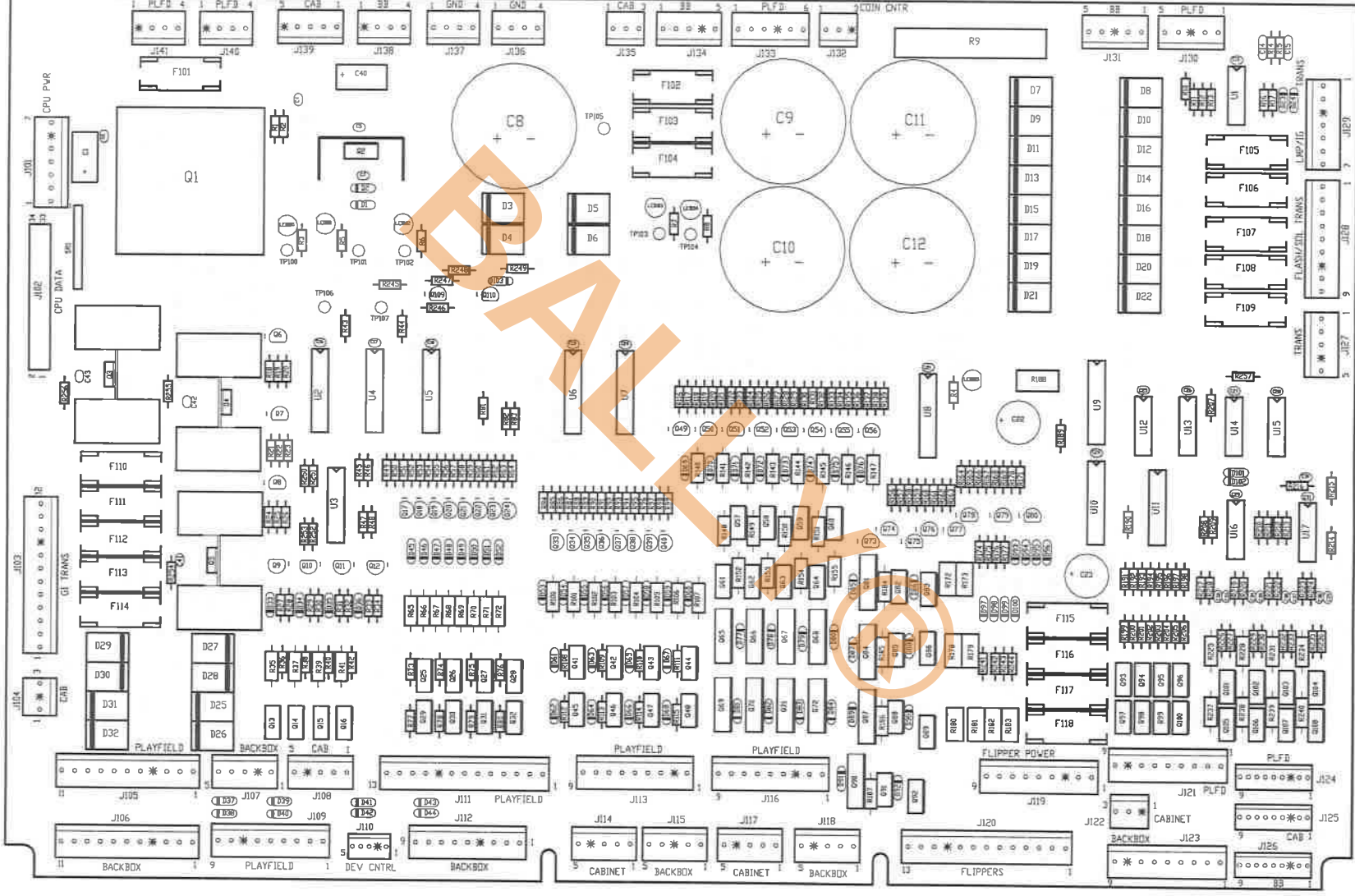
A-20516-50063 WPC '95 Audio Visual PCB Assembly



A-20028 WPC '95 Power Driver PCB Assembly

Part Number	Designator	Description	Part Number	Designator	Description
5040-14569-00	C1, C40	Capacitor, 100µF, 25v, Ax.	5010-09999-00	R3, R4, R6-R8, R43, R44, R81-R83, R190	Resistor, 2KΩ, 1/4w, 5%
5043-08996-00	C2, C4, C5, C7, C13, C16-C21, C24-C39, C41-C43	Capacitor, 0.1m, 50v (±20%) Ax.	5012-12632-00	R9	Resistor, .12Ω, 10w, 5%
5040-13417-00	C8 - C12	Capacitor, 10000µf, 35v Radial	5010-09324-00	R10	Resistor, 27KΩ, 1/4w, 5%
5048-11031-00	C14, C15	Capacitor, .001m, 50v, 10% Ax.	5010-09358-00	R11, R157, R159, R161, R163, R165, R167, R169, R171, R216-R224	Resistor, 1KΩ, 1/4w, 5%
5040-09537-00	C22, C23	Capacitor, 100µ, 100v (±20%) Radial	5010-09036-00	R247	Resistor, 100Ω, 1/4w, 5%
5070-09054-00	D1, D2, D23, D24, D33 - D100, D103	Diode 1N4004 1.0A.	5010-09034-00	R12, R13, R189, R208-R215, R248	Resistor, 10KΩ, 1/4w, 5%
5070-14526-00	D3-D22	Diode P600G 6A 400 PIV	5010-08992-00	R18, R21, R24, R192, R194, R196, R198, R200, R202, R204, R206	Resistor, 560Ω, 1/4w, 5%
5070-08919-00	D101, D102	Diode, 1N4148 150mA.	5010-08991-00	R19, R22, R25, R28, R30, R32, R34, R50, R52, R54, R56, R58, R60, R62, R64, R84, R86, R88, R90, R92, R94, R96, R98, R116, R119, R122, R125, R128, R131, R134, R137, R246	Resistor, 4.7KΩ, 1/4w, 5%
5731-14531-00	F101	Fuse 5 x 20mm T.63A., 250V	5010-11079-00	R20, R23, R26, R254-R256	Resistor, 51Ω, 1/4w, 5%
5731-14530-00	F102-F105, F107, F109-F118	Fuse 5 x 20mm T 4A, 250V	5010-09416-00	R27, R29, R31, R33, R45-R49, R51, R53, R55, R57, R59, R61, R63, R85, R87, R89, R91, R93, R95, R97, R99, R117, R120, R123, R126, R129, R132, R135, R138, R156, R158, R160, R162, R164, R166, R168, R170, R245, R250-R253, R257	Resistor, 470Ω, 1/4w, 5%
5731-14046-00	F106	Fuse, 5x20mm T5.0A, 250V	5010-08993-00	R35, R37, R39, R41, R65-R72, R100-R107, R140-R147	Resistor, 68Ω, 1/4w, 5%
5731-14529-00	F108	Fuse 5 x 20mm T6.3A, 250V	5010-08997-00	R36, R38, R40, R42, R73-R80, R108, R109, R110-R115, R118, R121, R124, R127, R130, R133, R136, R139	Resistor, 2.7kΩ, 1/4w, 5%
5733-14528-00	F101-F118	Fuse Holder 5 x 20mm 10A	5010-09361-00	R148-R155, R184-R187	Resistor, 220Ω, 1/4w, 5%
5705-14724-00	Q1	Heat Sink TO-3 5.1DEG/W	5011-12956-00	R172, R173, R178-R183	Resistor, 2.7KΩ, 1/4w, 5%
5701-09652-00	Q1	Thermal Pad TO-3	5010-10171-00	R174-R177, R241-R244	Resistor, 56Ω, 1/4w, 5%
4406-01128-00	Q1	Nut 6-32 KEPS	5010-14711-00	R188	Resistor, 10KΩ, 1/4w, 5%
4006-01005-06	Q1	Mach. Screw, 6-32 x 3/8"	5010-09314-00	R191, R193, R195, R197, R199, R201, R203, R205	Resistor, 1.2kΩ, 1/4w, 5%
5705-14562-00	Q2	Heat Sink 10-220 Wave Sol 287	5010-09086-00	R207	Resistor, 6.8kΩ, 1/4w, 5%
4004-01005-06	Q2-Q5	Mach. Screw, 4-40 x 3/8"	5010-12427-00	R225, R228, R231, R234, R237-R240	Resistor, .22kΩ, 1/4w, 5%
4404-01119-00	Q2-Q5	Nut 4-40 ESN	5010-08998-00	R226, R227, R229, R230, R232, R233, R235, R236	Resistor, 2.2kΩ, 1/4w, 5%
5705-12638-00	Q3-Q5	Heat Sink 5298B	5010-13517-00	R249	Resistor, 150Ω, 1/4w, 5%
5791-10862-07	J101, J129	Connector, 7-pin Header Str.	5010-09534-00	D25-D32	Resistor, 0Ω, 0w
5791-12516-00	J102	Connector, 34 Hdr 2x17	5019-10143-00	SRI	SIP RES 470 x 9R
5791-10862-12	J103	Connector, 12-pin Header Str.	5824-09248-00	TP100-TP107	Test Point #1502-1
5791-10862-03	J104, J122, J132, J135	Connector, 3-pin Header Str.	5370-12272-00	U1, U16, U17	I.C. LM339 Quad Comp
5791-10862-11	J105, J106	Connector, 11-pin Header Str.	5281-09486-00	U2, U4-U8, U10	I.C. 74LS374 8d/f/f
5791-10862-05	J107, J108, J114, J115, J117, J118, J127, J130, J131, J134, J139	Connector, 5-pin Header Str.	5162-12422-00	U3, U11	Trans uln 2803 Oc-drl
5791-10862-09	J109, J112, J113, J116, J119, J121, J123, J128	Connector, 9-pin Header Str.	5281-10182-00	U9	I.C. 74LS240 l/drvr
5791-10862-13	J111, J120	Connector, 13-pin Header Str.	5281-09487-00	U12 - U15	I.C. 74LS74 Dual d t/f
5791-13830-09	J124-J126	Connector, 9-pin Header Str.	5791-13830-05	J110	Connector, 5-pin Header
5791-10862-06	J133	Connector, 6-pin Header Str.			
5791-10862-04	J136-J138, J140, J141	Connector, 4-pin Header Str.			
5671-14516-00	LED100-LED105	LED Dspl Red T-1			
5250-14527-00	Q1	Regulator Voltage LM317K			
5460-12423-00	Q2	I.C. LM7812			
5131-12725-00	Q3-Q5	Triac 4 Quad Low Gate Current			
5194-09055-00	Q6-Q12, Q17-Q24, Q33-Q40, Q49-Q56, Q109	Transistor, MPSD52 PNP			
5162-12635-00	Q13-Q16, Q25-Q32, Q41-Q48, Q57-Q64, Q82, Q83, Q85, Q86, Q88, Q89, Q91, Q92, Q101-Q108	Transistor, TIP102			
5191-12179-00	Q65-Q72, Q81, Q84, Q87, Q90	Transistor, TIP36C			
5190-09016-00	Q73 - Q80	Transistor, 2N4403 PNP			
5192-12428-00	Q93 - Q100	Transistor, TIP107			
5160-10269-00	Q110	Transistor, 2N3904			
5013-14535-00	R1	Resistor, 750Ω, 1/4w, 1%			
5013-14534-00	R2	Resistor, 243Ω, 1/4w, 1%			
5010-09224-00	R5, R14-R17	Resistor, 270Ω, 1/4w, 1%			

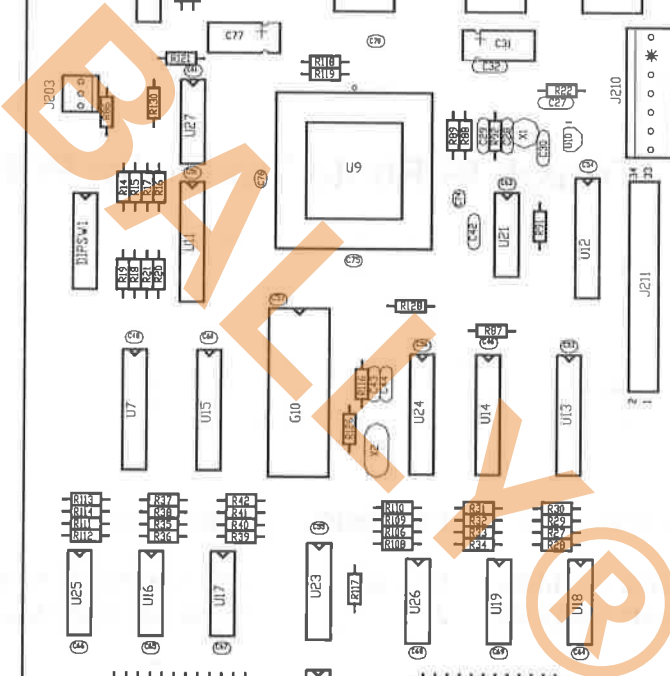
A-20028



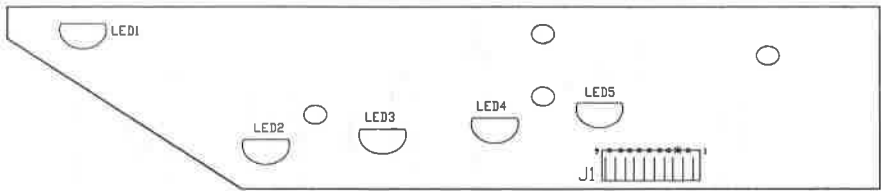
A-21377-50063 WPC '95 CPU PCB Assembly

Part Number	Designator	Description
A-15814	B1	Battery Holder
5048-11033-00	C1, C42	Capacitor, .022m, 50v, 10% Axial
5048-11030-00	C3-C26, C34-C41	Capacitor, 470p, 50v, Axial
5043-09030-00	C27	Capacitor, .047m, 50v (±20%) Axial
5048-13375-00	C28	Capacitor, 100p, 50v (10%) Axial
5048-11028-00	C29, C30, C43, C44	Capacitor, 22p, 50v Axial
5040-14569-00	C31, C77	Capacitor, 100mf, 25v Axial
5048-11031-00	C32	Capacitor, .001m, 50v, 10% Axial
5043-08996-00	C45-C70, C74-C76	Capacitor, 0.1m, 50v (±20%) Axial
5040-13098-00	C73	Capacitor, 4.7µF, @35v (±20%)
5645-09025-00	DIPSW1	Switch Dip 8 Pos
5070-09266-00	D1, D25	Diode 1N5817 1.0A.
5070-08919-00	D2-D24, D26, D27	Diode 1N4148 150ma
5700-10176-00	G10A	Socket Dip 28.6
5700-12088-00	G11	Socket Dip 32.6p"
5700-08985-00	U4	Socket I C 40PI N .6
5700-12424-00	U9	socket 84 PI N PL CC
5700-10389-00	U20	Socket I C 18 PIN 3"
5791-10850-00	J201	26H STR Sq. .100
5791-12516-00	J211, J202	34 HDR 2x17 .100
5791-13830-12	J205	12H STR Sq. Pin .100 Solid Tab
5791-13830-09	J206, J207, J209	9H STR Sq. Pin .100 Solid Tab
5791-13830-14	J208	14H STR Sq. Pin .100 Solid Tab
5791-10862-07	J210	7H STR Sq. Pin .156
5791-13830-13	J212	13H STR Sq. Pin .100 Solid Tab
5671-14516-00	LED201, LED202, LED203	LED DSPL RED T-1 3/4
5160-10269-00	Q1	Trans 2N3904 NPN
5019-09669-00	RP1	SIP 1K 9R 10 5%
5010-09358-00	R1, R2, R3, R4, R9, R10, R11, R23, R24, R25, R26, R43, R44, R45, R46, R47, R48, R49, R50, R51, R52, R53, R54, R55, R56, R57, R58, R59, R60, R61, R62, R63, R64, R65, R66, R67, R68, R69, R70, R71, R72, R73, R74, R75, R76, R77, R78, R79, R80, R81, R82, R83, R84, R93, R95, R96, R97, R99, R100, R101, R102, R103, R104, R105, R106, R107, R108, R109, R110, R111, R112, R113, R114, R117	Resistor, 1KΩ, 1/4w, 5%
5010-09416-00	R5, R6, R7, R8, R12, R13, R87, R88, R89	Resistor, 470Ω, 1/4w, 5%
5010-09034-00	R14, R15, R16, R17, R18, R19, R20, R21, R22, R27, R28, R29, R30, R31, R32, R33, R34, R35, R36, R37, R38, R39, R40, R41, R42, R86, R90, R94, R98	Resistor, 10KΩ, 1/4w, 5%
5010-12104-00	R91	Resistor, 22M, 1/4w, 5%
5010-10989-00	R92	Resistor, 470KΩ, 1/4w, 5%
5010-09187-00	R118, R119, R120, R121, R122, R123, R128, R130	Resistor, 150Ω, 1/4w, 5%
5010-09534-00	W3, W4, W7, R124, R125	Resistor, 0Ω, 0w
5010-10258-00	R126	Resistor, 1M, 1/4w, 5%
5010-09040-00	R127	Resistor, 33Ω, 1/4w, 5%
5281-09867-00	U1, U2	I C 74LS244 OCT BUF
5281-09308-00	U3	I C 74LS245 TRNC
5281-09851-00	U5	I C 74LS14 SMT/TRG
5315-12031-00	U7	I C 74HCT244
5340-12558-00	U8	IC RAM 8K x8 Static Cmos 100ns
5370-12687-00	U10	I C MC 34064 Reset CHP
5281-10182-00	U11, U12, U13, U15	I C 74LS240 L/DRVR
5311-14068-00	U14, U24	I C 74HC574 OCTAL D-Latch
5370-12272-00	U16, U17, U18, U19, U25, U26	I C LM339 Quad Comp
5284-12651-00	U21	I C 4584 Hex Schmitt
5311-14554-00	U23	U I C 74HC237 3 to 8 NON I NV DE
5281-09247-00	U27	I C 74LS02 Quad Nor
5520-12084-00	X1	Crystal 32. 768 KHZ
5520-14761-00	X2	XTL 8MHz Anti-Res Parallel Cut
A-5400-50063-1	G10	PIC16C57 Assembly
A-5343-50063-1	G11	Game ROM Assembly
5880-09022-00	B1	Battery 1.5v, AA Alk.
5400-10320-00	U4	IC MPU 68B09E
5410-12426-00	U9	IC WPC-89 ASIC
5162-12422-00	U20	Trans Uln 2803 Oc-Dri

WPC '95 CPU PCB Assembly

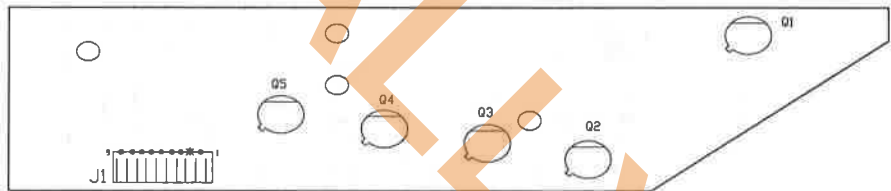


A-18617-1 Trough IR LED PCB Assembly



Part Number	Description	Description
5671-12731-00	LED1 - LED	Infra Red Diode
5791-12622-09	J1	Connector, 9-pin Header Sq.

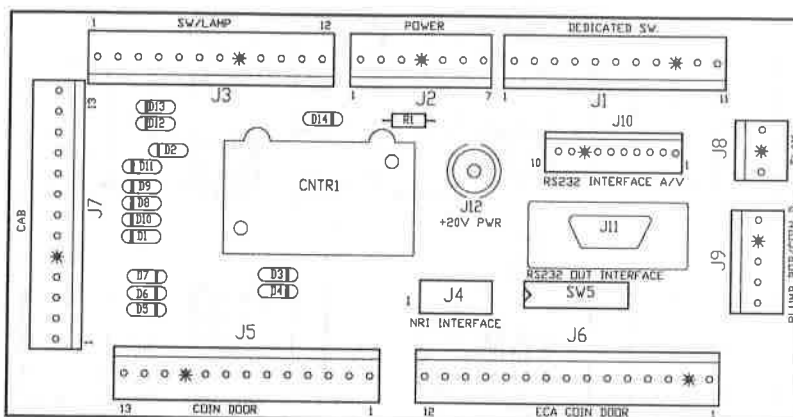
A-18618-1 Trough IR Photo Transistor PCB Assembly



Part Number	Description	Description
5163-14114-00	Q1 – Q5	Infra Red Photo Transistor
5791-12622-09	J1	Connector, 9-pin Header Sq.

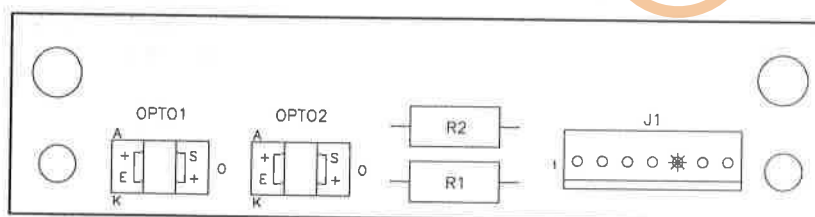
A-20580 Coin Interface PCB Assembly

(This board does not contain optional items such as the coin counter and printer interface.)



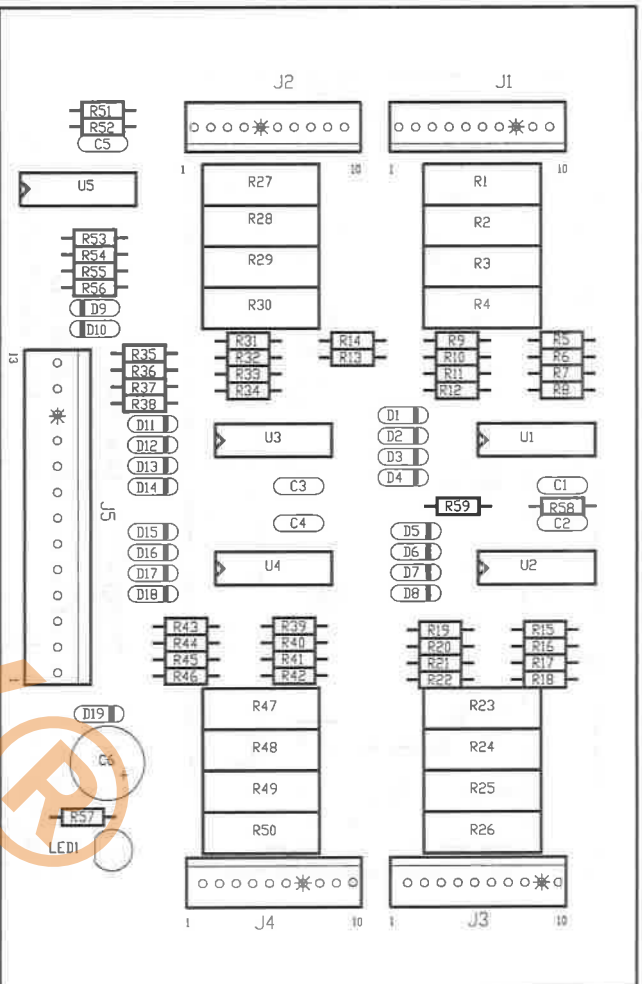
Part Number	Designator	Description
5070-09054-00	D1-D14	Diode 1N4004 1.0A.
5791-10862-11	J1	Connector, 11-pin Header Str. Sq.
5791-10862-07	J2	Connector, 7-pin Header Str. Sq.
5791-10862-12	J3	Connector, 12-pin Header Str. Sq.
5791-11000-10	J4	Connector, 10-pin Header Str. Sq.
5791-10862-13	J5, J7	Connector, 13-pin Header Str. Sq.
5791-10862-15	J6	Connector, 15-pin Header Str. Sq.
5791-10862-03	J8	Connector, 3-pin Header Str. Sq.
5791-10862-05	J9	Connector, 5-pin Header Str. Sq.
5791-12462-10	J10	Connector, 10-pin Header Str. Sq.
5010-13517-00	R1	Resistor, 15Ω, 1/4w, 5%
5645-09025-00	SW5	Switch DIP 8 Pos.

A-17316 Flipper Opto PCB Assembly



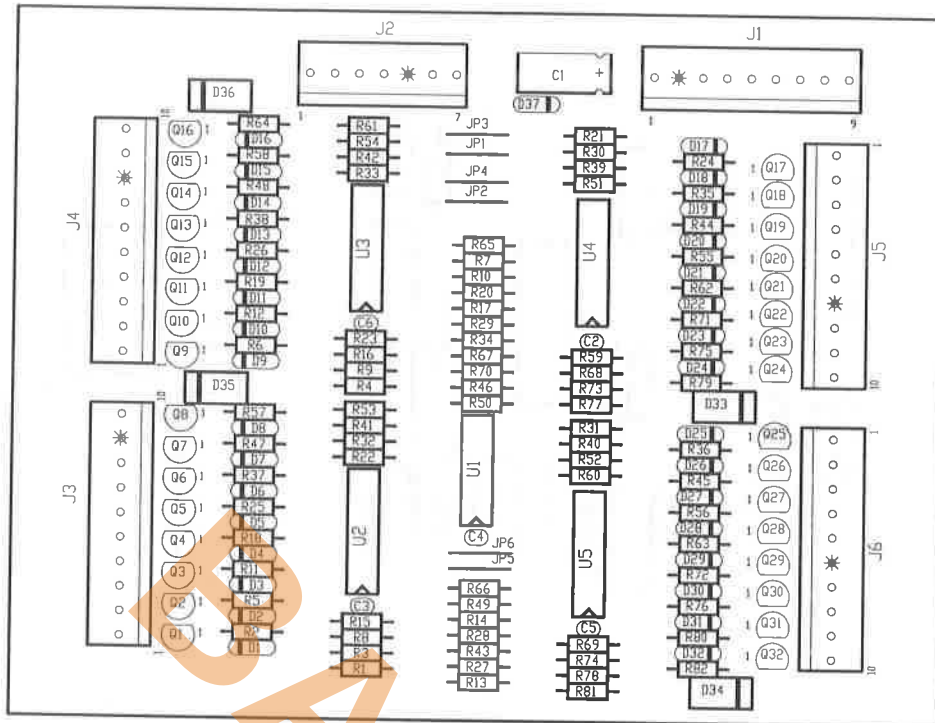
Part Number	Designator	Description
A-20207.1	-	Flipper Opto Switch PCB
5010-09061-00	R1, R2	Resistor, 680Ω, 1/2w, 5%
5490-14575-00	OPTO1, OPTO2	IC Opto Integ Schmitt 10mA.
5791-13830-07	J1	Connector, 7-pin Header Solid Sq.
03-9001.1	-	Interrupter Flip-Opto
01-14348	-	Spring Flipper Switch

16-Opto PCB w/Brackets



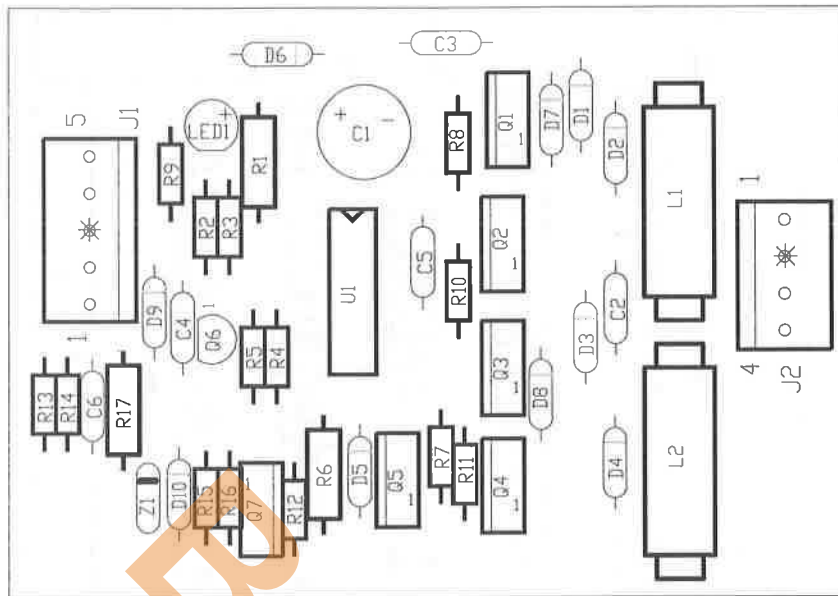
Part Number	Designator	Description
A-22019		
5043-08996-00	C1 - C5	16-Opto Driver PCB Assembly
5040-13102-00	C6	Capacitor, 0.1m, 50v, ±20Axi
5070-09054-00	D1 - D19	Capacitor, 470µF, @35v, ±20%
5791-13830-10	J1 - J4	Diode 1N4004, 1.0A.
5791-10862-13	J5	Connector, 10-pin Header Str. Sq.
5671-14516-00	LED1	Connector, 13-pin Header Str. Sq.
5010-12928-00	R1-R4, R23-R30, R47-R50	Led Display Red T-1 ¼
5010-09999-00	R5-R12, R15-R22, R31-R46, R57	Resistor, 270Ω, 2w, 5%
5010-08776-00	R51	Resistor, 2KΩ, 1/4w, 5%
5010-08774-00	R13, R14, R53, R55	Resistor, 68KΩ, 1/4w, 5%
5010-09162-00	R52, R54, R56, R58, R59	Resistor, 22KΩ, 1/4w, 5%
5370-12272-00	U1 - U5	Resistor, 100KΩ, 1/4w, 5%
01-10756		ICLM330 Quad Comp.
07-6688-18N		PCB Mounting Bracket
		Rivet: 1/8 x 3/16"

A-21967-2 Serial 24 Drive PCB Assembly



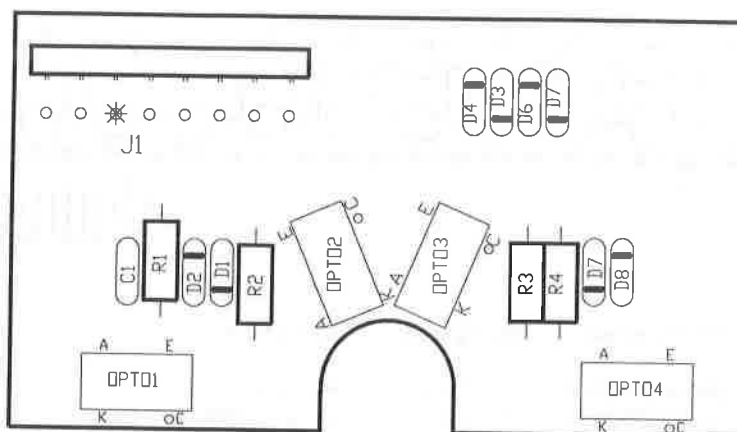
Part Number	Designator	Description
A-21967	-	Serial 24 Drive PCB Assembly
5040-09343-00	C1	Capacitor, 10 μ F, 20v, $\pm$ 20% Ax.
5043-08996-00	C2 - C6	Capacitor, 0.1 μ F, 50v, $\pm$ 20% Ax.
5070-08919-00	D1 - D12, D17 - D28	Diode 1N4148 150mA
5070-09054-00	D33 - D37	Diode 1N4004, 1.0A.
5010-09534-00	JP1 - JP4, JP6	Resistor, 0 Ω , 0w
5791-10862-07	J2	Connector, 7-pin Header STR. Sq.
5791-10862-10	J3 - J6	Connector, 10-pin Header Sq. Pin .156
5162-13514-00	Q1-Q12, Q17-Q28	Trans. 2N6426 NPN DAR
5010-09999-00	R1, R3, R4, R8, R9, R15, R16, R21-R23, R30-R32, R39-R41, R51-R53, R59, R60, R68, R73, R77	Resistor, 2K Ω , 1/4w, 5%
5010-09034-00	R2, R5-R7, R10-R13, R18, R19, R24-R26, R35-R37, R44, R45, R47, R49, R55-R57, R62, R63, R71, R75, R79	Resistor, 10K Ω , 1/4w, 5%
5010-09358-00	R14, R20, R27, R28, R34, R43, R50, R65, R66, R70	Resistor, 1K Ω , 1/4w, 5%
5010-09040-00	R17, R29, R46, R67	Resistor, 33 Ω , 1/4w, 5%
5370-12272-00	U1	IC LM339 Quad Comp
5310-14760-00	U2-U5	IC LM4094 Parl SHF Reg
01-10756	-	PCB Mounting Bracket
07-6688-18N	-	Rivet: 1/8 x 3/16"

A-22013 TTL Bi-Direction Motor Drive PCB



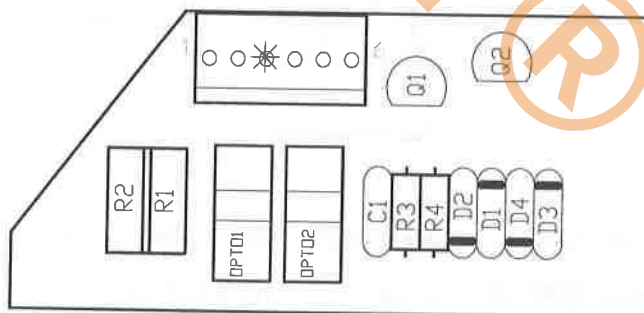
Part Number	Designator	Description
5040-10974-00	C1	Capacitor .100 μ F, 35v, +80, -20%
5043-08996-00	C2, C6	Capacitor, 0.1 μ F, $\pm$ 20% Axial
5043-08980-00	C3-C5	Capacitor, 0.01 μ F, 50v, $\pm$ 20%
5070-09054-00	D1-D10	Diode 1N4004, 1.0A
5791-12273-05	J1	Connector, 5-pin Header Str. LCK
5791-12273-04	J2	Connector, 4-pin Header Str. LCK
5551-09822-00	L1, L2	Ind. 4.7 μ H, 3A
5671-13732-00	LED1	Display LED RED
5162-12635-00	Q1, Q3, Q5, Q7	Trans. TIP102
5192-12428-00	Q2, Q4	Trans TIP107
5194-09055-00	Q6	Trans MPSD52 PNP
5010-09061-00	R1, R6	Resistor, 680 Ω , 1/2w, 5%
5010-09085-00	R2, R3, R9	Resistor, 1.5K Ω , 1/4w, 5%
5010-09034-00	R4, R5	Resistor, 10K Ω , 1/4w, 5%
5010-09999-00	R7, R8, R10, R11	Resistor, 2K Ω , 1/4w, 5%
5010-08997-00	R12, R16	Resistor, 2.7K Ω , 1/4w, 5%
5010-09416-00	R13	Resistor, 470 Ω , 1/4w, 5%
5010-08991-00	R14	Resistor, 4.7K Ω , 1/4w, 5%
5010-09036-00	R15	Resistor, 100 Ω , 1/4w, 5%
5010-15454-00	R17	Resistor, 750 Ω , 1/2w, 5%
5370-12272-00	U1	IC LM339 Quad Comp
5075-09406-00	Z1	Zn 1N5234 6.2v, 1/2w, Zener

A-22260 Motor 4 Opto PCB Assembly



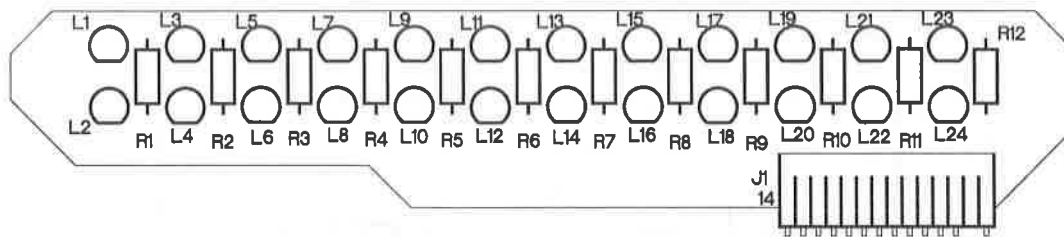
Part Number	Designator	Description
5070-09054-00	D1-D8	Diode 1N4004, 1.0A.
5010-09061-00	R1-R4	Resistor, 680, 1/2w, 5%
5043-08996-00	C1	Capacitor, 0.1 μ F, 50v, $\pm$ 20% Axial
5490-12451-00	Opto1-Opto4	Opto Inter Lg. 10mA.
5791-10869-08	J1	Connector, 8-pin Header .156

A-20533.1-1 Position Encoder PCB Assembly



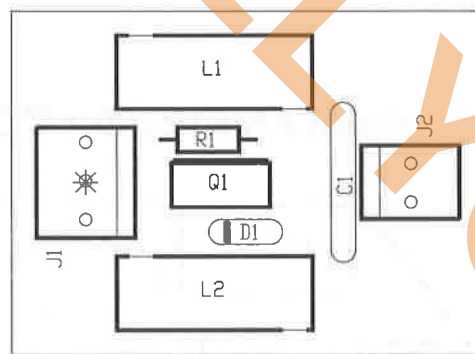
Part Number	Designator	Description
5791-13830-06	J1	Connector 6-Pin Header .100
5010-09061-00	R1	Resistor, 680, 1/2w, 5%
5070-08919-00	D1-D2	Diode 1N4148 150mA
5490-14327-00	Opto1	Opto, Int. w/Schmitt-Trigger Out
5160-10269-00	Q1	Trans. 2N3904, NPN
5010-08998-00	R3	Resistor, 2.2K, 1/4w, 5%
5043-08996-00	C1	Capacitor, 0.1mfd, 50v, Ceramic Ax.

A-21991 24 LEDS PCB Assembly



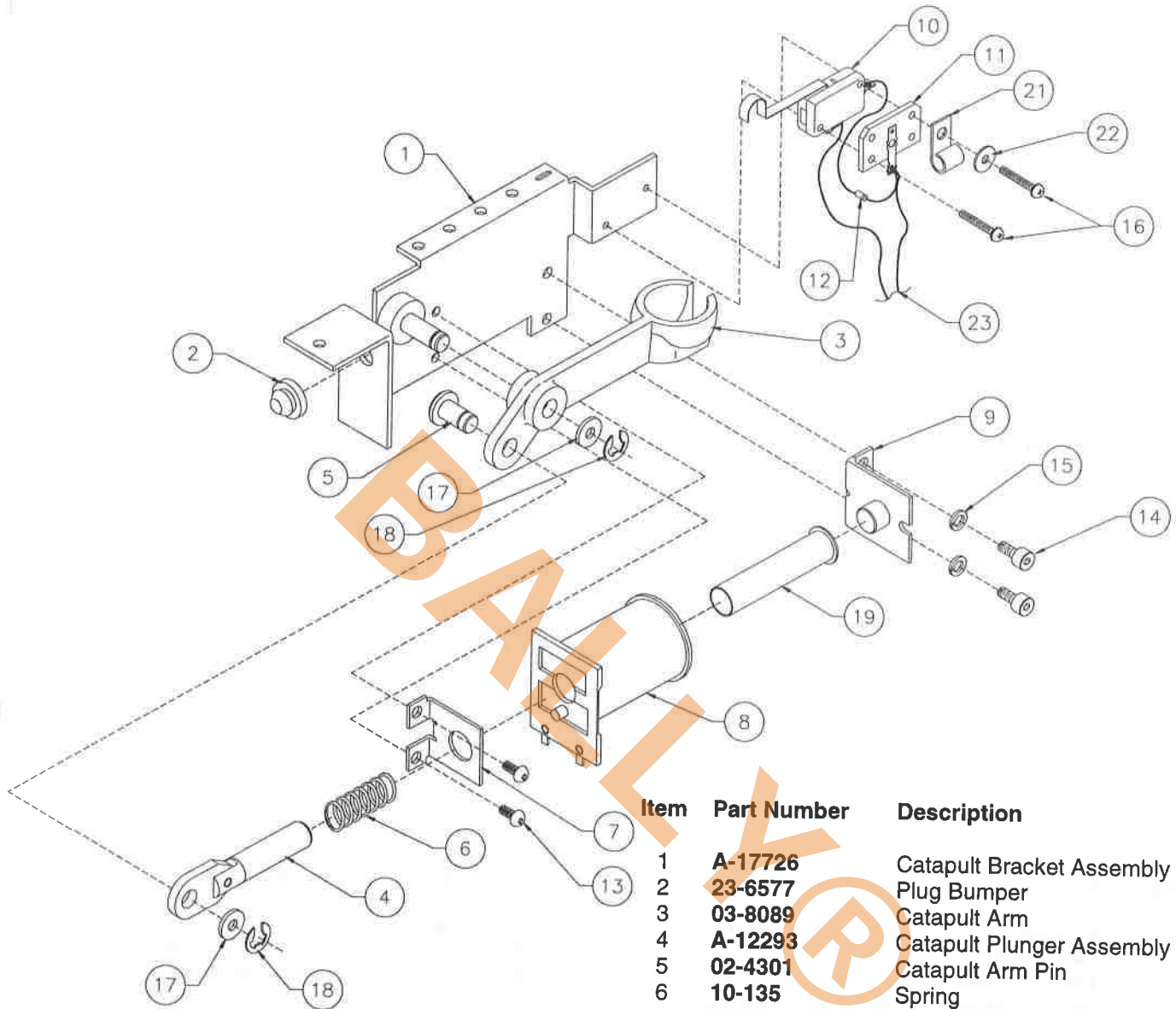
Part Number	Designator	Description
5671-13732-00	L1-L24	LED Red
5010-13509-00	R1-R12	Resistor, 330Ω, 1/2w
5791-12622-14	J1	Connector 14-pin Header

A-15542 Motor EMI Assembly



Part Number	Designator	Description
5551-09822-00	L1, L2	Ind. 4.7μH, 3A.
5791-12273-03	J1	Connector, 3-Pin Header
5791-12273-02	J2	Connector, 2-Pin Header
5070-09054-00	D1	Diode 1N4004, 1.0A.

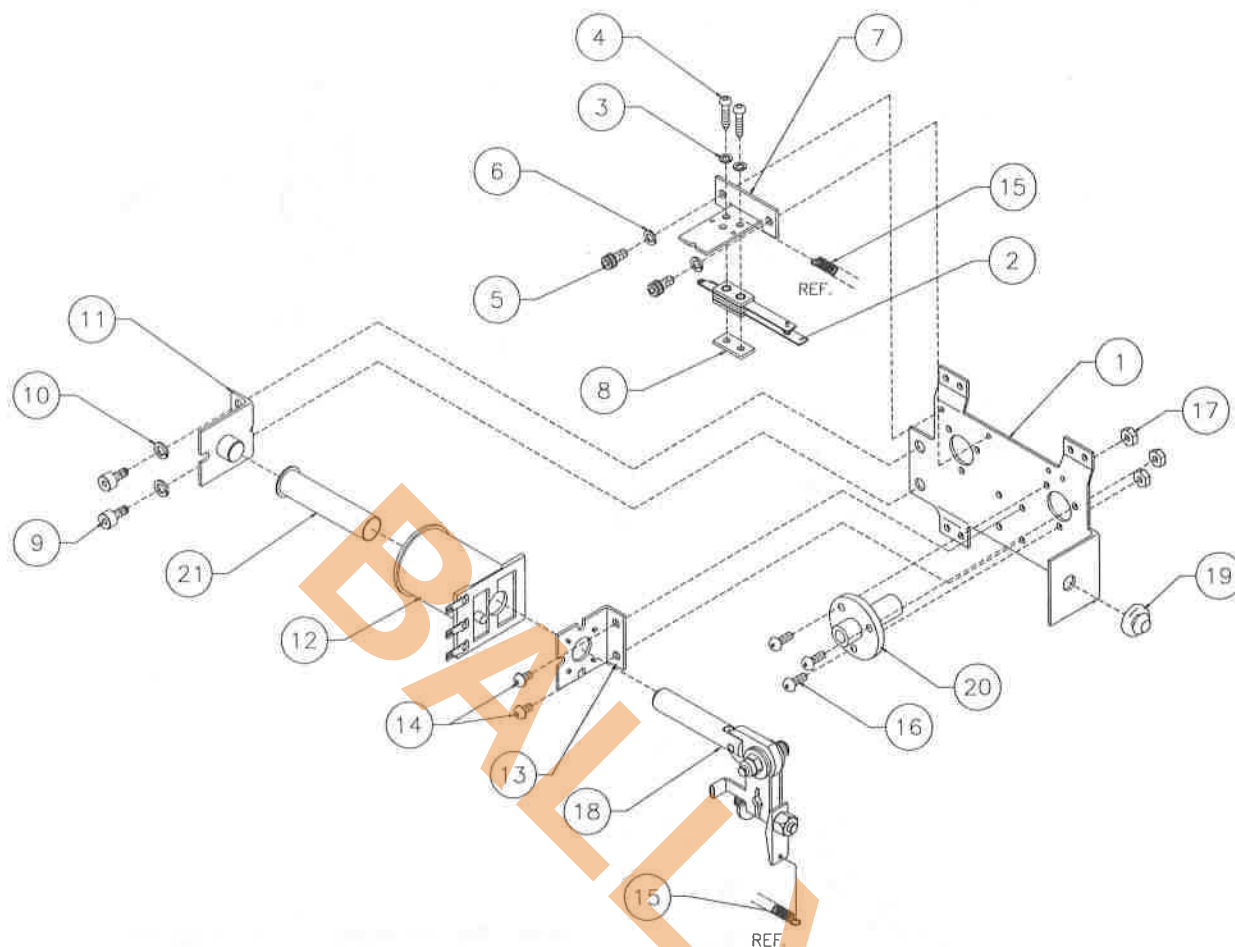
A-16757-2 Catapult Assembly



Item	Part Number	Description
1	A-17726	Catapult Bracket Assembly
2	23-6577	Plug Bumper
3	03-8089	Catapult Arm
4	A-12293	Catapult Plunger Assembly
5	02-4301	Catapult Arm Pin
6	10-135	Spring
7	01-8413	Coil Mounting Bracket
8	AE-26-1200	Coil Assembly
9	A-12390	Stop Bracket Assembly
10	5647-12133-12	Miniature Switch
11	A-7438-1	Terminal Strip Assembly
12	5070-09054-00	Diode 1N4004, 1.0A.
13	4008-01017-04	Mach. Screw 8-32 x 1/4"
14	4010-01066-06	Cap Screw, 10-32 x 3/8"
15	4701-00004-00	Lock Washer # 10 Split
16	4004-01003-12	Mach. Screw, 4-40 x 3/4"
17	4700-00104-00	Flat Washer: 5/16 x 1/2 x 16ga.
18	20-8712-31	Retaining Ring
19	03-7066	Coil Tubing
*20	23-6622	Foam Tape
21	03-7655-4	Cable Clamp
22	4700-00005-00	Flat Washer: 9/64 x 7/16 x 20ga.
23	H-21778-8	Switch Cable

* Not Shown.

A-15849-L-4 Flipper Assembly



Item	Part Number	Description
1	B-13104-L	Flipper Base Assembly, Left
2	SW-1A-194	Switch Assembly
3	4701-00002-00	Lock Washer #6 Split
4	4105-01019-10	Sh. Metal Screw, #5 x 5/8"
5	4008-01079-05	Mach. Screw, 8-32 x 5/16"
6	4701-00003-00	Lock Washer #8 Split
7	01-9375	Switch Mounting Bracket
8	20-6516	Speednut, Tinnerman
9	4010-01066-06	Cap Screw, 10-32 x 3/8"
10	4701-00004-00	Lock Washer #10 Split
11	A-12390	Flipper Stop Assembly
12	FL-15411	Flipper Coil
13	01-7695-1	Solenoid Bracket
14	4006-01017-04	Mach. Screw, 6-32 x 1/4"
15	10-364	Spring
16	4006-01005-06	Mach. Screw, 6-32 x 3/8"
17	4406-01117-00	Nut 6-32 Hex.

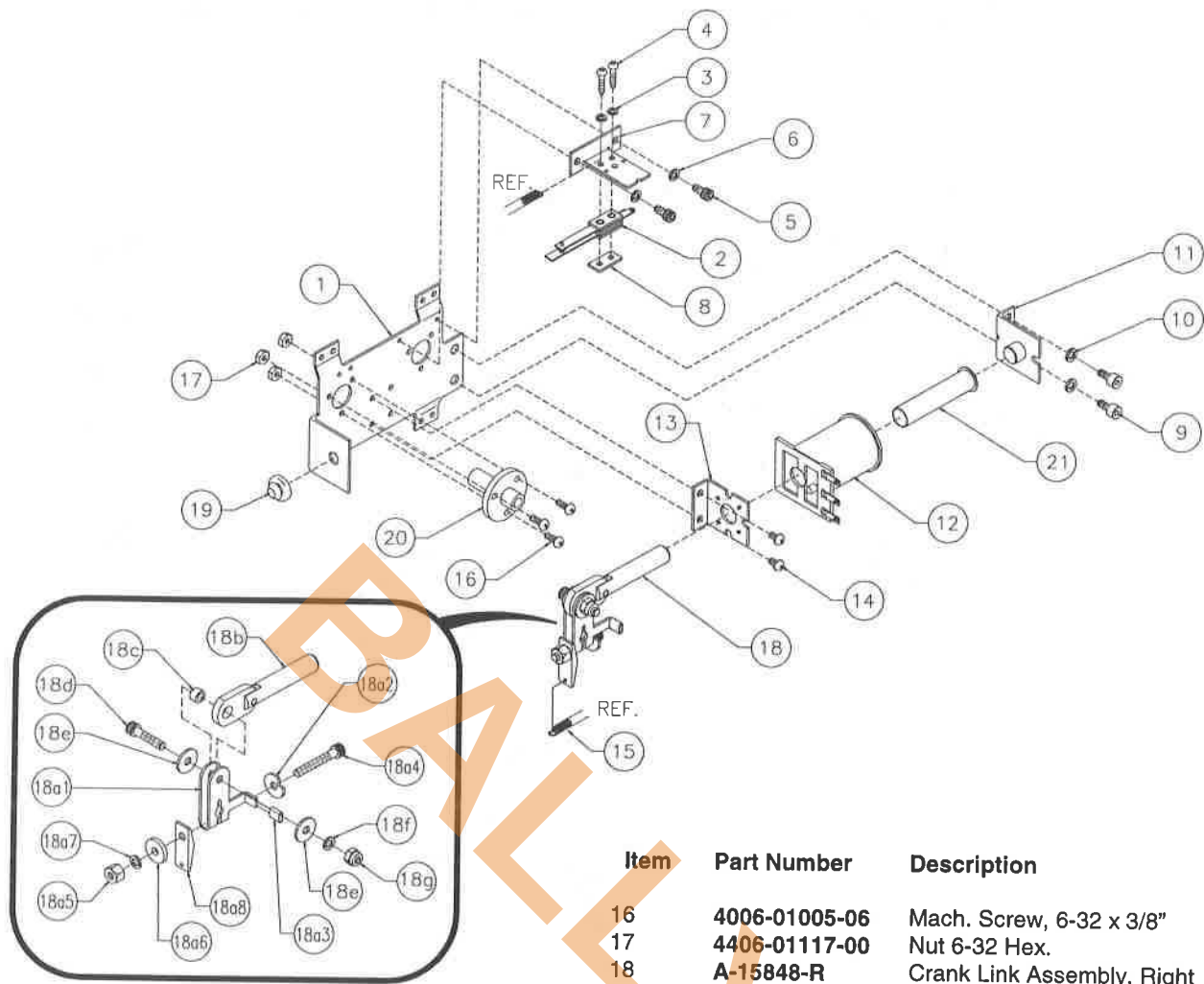
Item	Part Number	Description
*18	A-15848-L	Crank Link Assembly, Left
a)	A-17050-L	Flipper Crank Assembly, Left
b)	A-15847	Flipper Link Assembly
c)	02-4676	Link Spacer Bushing
d)	4010-01086-14	Cap Screw, 10-32 x 7/8"
e)	4700-00023-00	Flat Washer, 5/8 x 13/64 x 16ga.
f)	4701-00004-00	Lock Washer #10 Split
g)	4410-01132-00	Nut 10-32 ESN
19	23-6577	Bumper Plug, 5/8"
20	03-7568	Flipper Bushing
21	03-7066-5	Coil Tubing

Associated Parts: (Not Shown)

23-6695	Flipper Ring
20-10110-6	Flipper Bat w/Shaft

* See page 2-19 for assembly detail drawing.

A-15849-R-4 Flipper Assembly

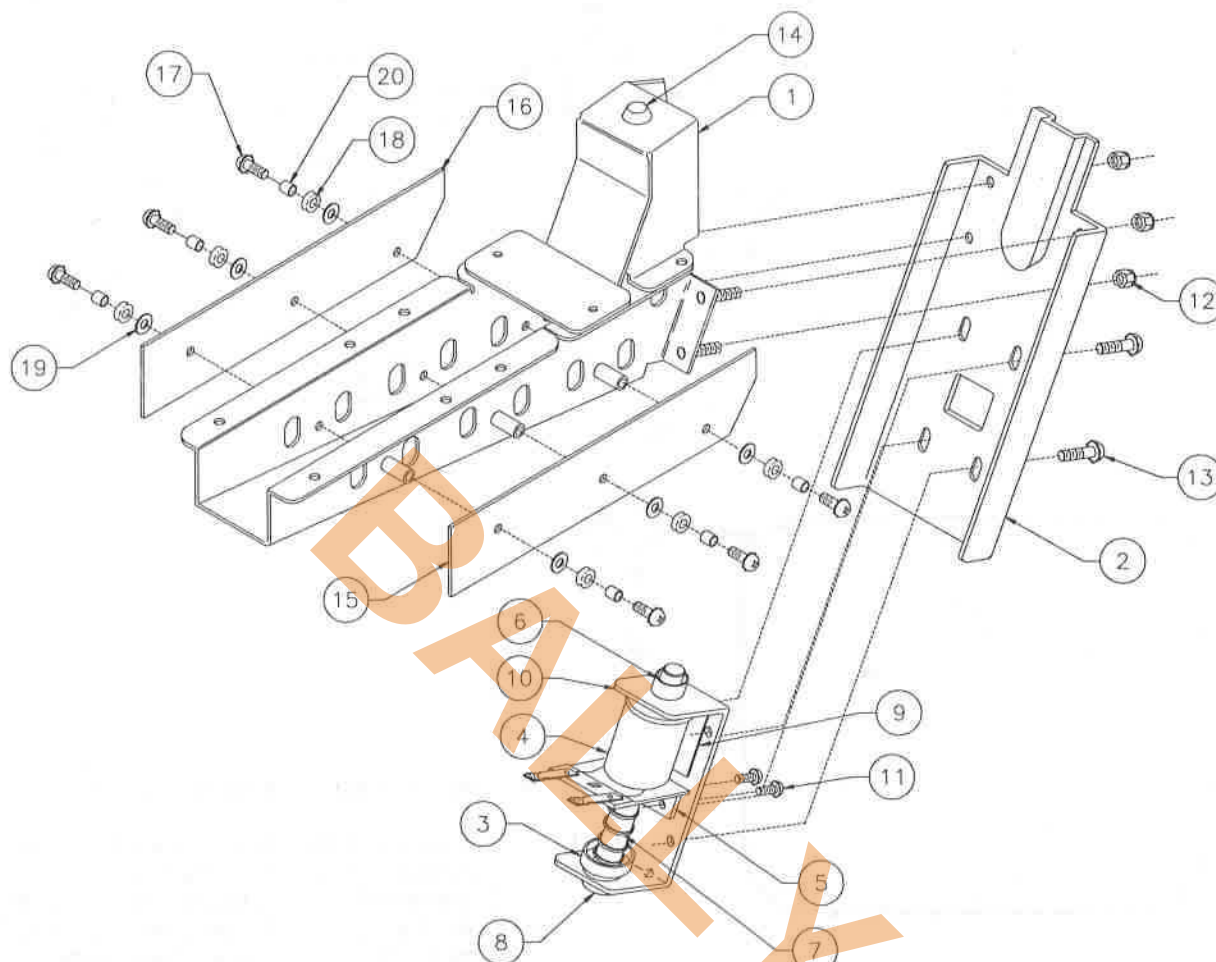


Item	Part Number	Description
1	B-13104-R	Flipper Base Assembly, Right
2	SW-1A-194	Switch Assembly
3	4701-00002-00	Lock Washer #6 Split
4	4105-01019-10	Sh. Metal Screw, #5 x 5/8"
5	4008-01079-05	Mach. Screw, 8-32 x 5/16"
6	4701-00003-00	Lock Washer #8 Split
7	01-9375	Switch Mounting Bracket
8	20-6516	Speednut, Tinnerman
9	4010-01066-06	Cap Screw, 10-32 x 3/8"
10	4701-00004-00	Lock Washer #10 Split
11	A-12390	Flipper Stop Assembly
12	FL-15411	Flipper Coil
13	01-7695-1	Solenoid Bracket
14	4006-01017-04	Mach. Screw, 6-32 x 1/4"
15	10-364	Spring
16	4006-01005-06	Mach. Screw, 6-32 x 3/8"
17	4406-01117-00	Nut 6-32 Hex.
18	A-15848-R	Crank Link Assembly, Right
a)	A-17050-R	Flipper Crank Assembly, Right
1.	01-11764-R	Flipper Crank, Right
2.	4700-00107-01	Mod-Crank Washer
3.	RM-23-06	H.S. Tubing 1/4"
4.	4010-01066-20	Mach. Screw, 10-32 x 1-1/4"
5.	4410-01127-00	Nut, 10-32 Hex.
6.	4700-00107-00	FW: 13/64 x 5/8 x 12ga.
7.	4701-00004-00	Lockwasher #10 Split
8.	01-9376	Spring Retainer Bracket
b)	A-15847	Flipper Link Assembly
c)	02-4676	Link Spacer Bushing
d)	4010-01086-14	Cap Screw, 10-32 x 7/8"
e)	4700-00023-00	Flat Washer, 5/8 x 13/64 x 16ga.
f)	4701-00004-00	Lock Washer #10 Split
g)	4410-01132-00	Nut 10-32 ESN
19	23-6577	Bumper Plug, 5/8"
20	03-7568	Flipper Bushing
21	03-7066-5	Coil Tubing
Associated Parts: (Not Shown)		
	23-6695	Flipper Ring
	20-10110-6	Flipper Bat w/Shaft

Flipper Notes...

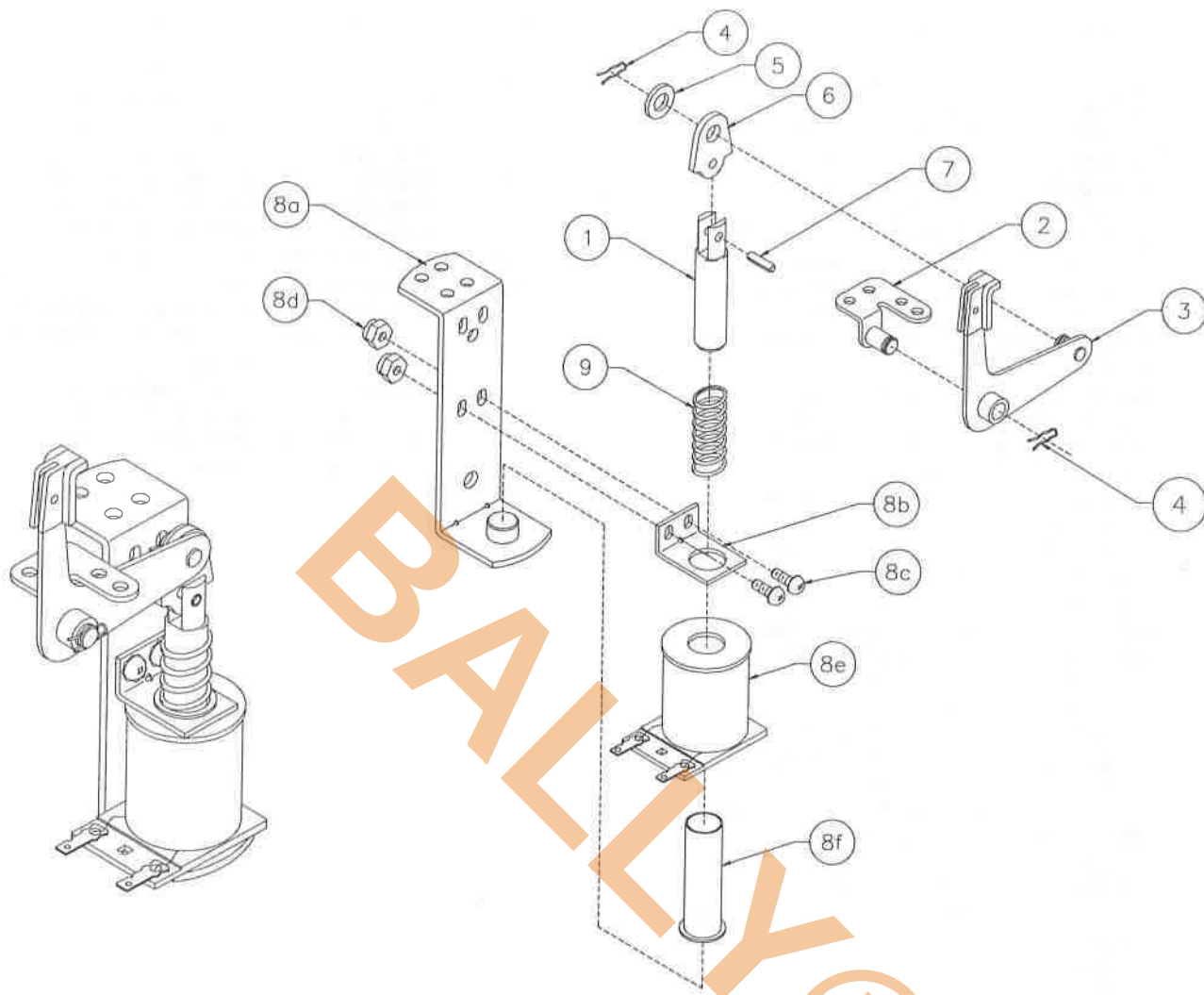
- Each Flipper Assembly is mounted beneath the playfield, in conjunction with the Plastic Flipper & Shaft, and Flipper Rubber on the upper side of the playfield.
- With the flipper, in the non-activated position, the E.O.S. Switch contacts must have a gap of .062 (±.015) inch. When flipper is activated switch must close.
- Any adjustment of the E.O.S. switch must be made at a minimum distance of 0.25 inch from the switch body.
- Longer blade of E.O.S. switch must be made straight. Gap adjustment is done by adjusting shorter blade.
- All moving elements of the assembly must operate freely without any evidence of binding.
- Apply Loctite™ 245 when reattaching screws to the Flipper Stop Assembly, the Solenoid Bracket, and the Flipper Bushing.

A-19963 Ball Trough Assembly Complete



Item	Part Number	Description	Item	Part Number	Description
1	A-16809-2	Ball Trough Welded Assy.	11	4008-01017-05	Mach. Screw, 8-32 x 5/16"
2	01-11587	Ball Trough Front	12	4408-01119-00	Nut 8-32 ESN
3	A-6306-2	Bell Armature Assembly	13	4008-01017-06	Mach. Screw, 8-32 x 3/8"
4	AE-26-1500	Coil Assembly	14	23-6702	Bumper Plug
5	01-8-508-T	Solenoid Assembly	15	A-18617-1	Trough IRED LED PCB Assembly
6	03-7067-5	Coil Tubing	16	A-18618-1	Trough IRED Transistor PCB Assy.
7	10-135	Spring	17	4006-01003-10	Mach. Screw, 6-32 x 5/8" SEMS
8	23-6420	Rubber Grommet	18	23-6626	Rubber Grommet
9	03-8523	Insulator	19	4700-00004-00	Flat Washer, 9/64 x 7/16 x 21ga.
10	01-11586	Coil Mounting Bracket	20	02-4975	Bushing

A-17811 Kicker Arm (Slingshot) Assembly



Associated Parts for Right & Left Kickers:

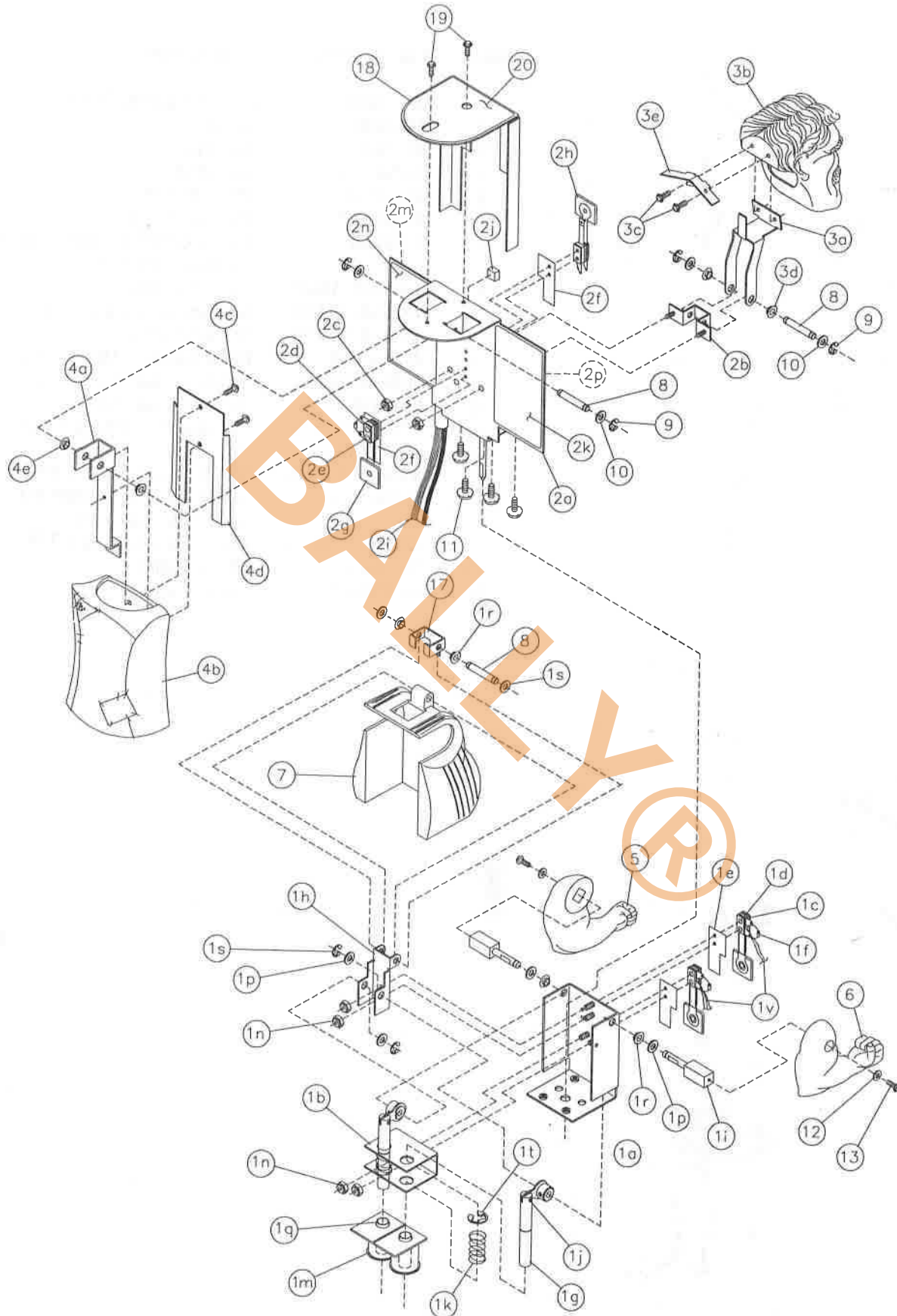
Item	Part Number	Description
1	02-2364	Coil Plunger
2	A-17810	Mounting Bracket Assy.
3	A-12664	Kicker Crank Assembly
4	12-6227	Hairpin Clip
5	4700-00030-00	FW, 17/64 x 1/2 x 15ga.
6	03-8085	Armature Link
7	20-8716-5	Roll Pin, 1/8 x 7/16"

Item	Part Number	Description
8	A-22206-2	Coil & Bracket Assembly, R. & L.
a)	A-17808	Bracket & Stop Assembly
b)	01-8-508-S	Coil Retaining Bracket
c)	4006-01017-06	Mach. Screw, 6-32 x 3/8"
d)	4406-01119-00	Nut, 6-32 ESN
e)	AE-26-1200	Coil Assembly
f)	03-7066	Coil Tubing
9	10-128	Spring

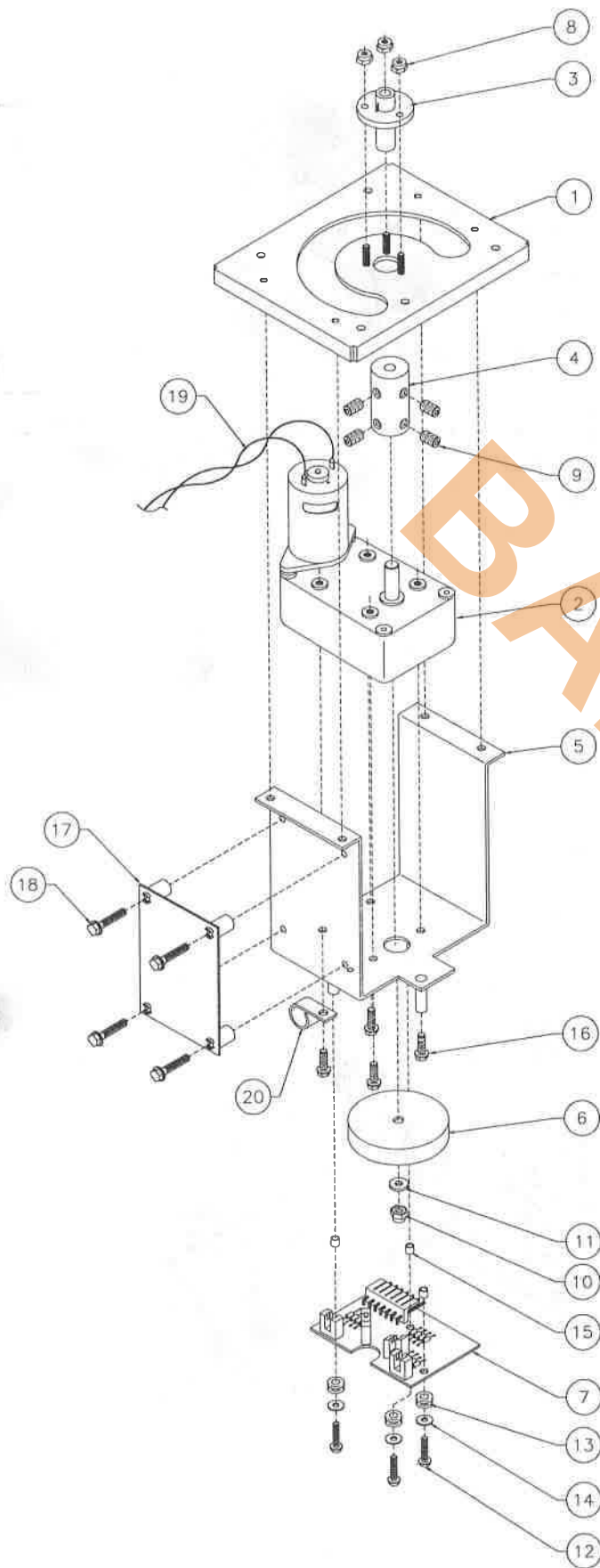
A-22170 Boxer/Heavy Bag Assembly

Item	Part Number	Description	Item	Part Number	Description
1	A-22177	Boxer Assembly	5	31-3065	Left Arm, Molded
a)	04-11029	Main Bracket	6	31-3066	Right Arm, Molded
b)	01-14781	Coil Hold Bracket	7	31-3067	Boxer Body, Molded
c)	01-3670	Switch Plate (2)	8	02-5434.1	Head Axle (3)
d)	07-6688-27	Rivet 1/8 x 9/16 (4)	9	20-8712-25	"E" Ring, .25 Shaft (6)
e)	01-14781	Fish Paper (2)	10	4700-00030-00	FW .265 x .500 x .067 (6)
f)	A-11777	Target & Diode Ass'y (2)	11	4008-01017-06	MS 8-32 x 3/8 P-RH-S (4)
g)	A-22188	Plunger Assembly (2)	12	4700-00011-00	2 x .437 x .059 (2)
h)	01-14780	Shoulder Hold Bracket	13	4008-01113-10	MS 8-32 x .63 PL-HWH (2)
i)	02-5436	Shoulder Pin (2)	14	5791-09400-00	4-Pin Male Connector, Lg.
j)	4010-01186-04	SS 10-32 x 1/4 SH-SCP (2)	15	5791-10770-00	3-Pin Male Connector, Sm.
k)	10-135	Spring (2)	16	-	Not used
m)	04-11000	Coil w/Wire Leads (2)	17	01-14807	Hold Body Bracket
n)	4408-01119-01	Nut 8-32 ESN (4)	18	01-14818	Boxer Back Guard
p)	4700-00030-00	FW .265 x .500 x .067 (4)	19	4008-01113-04	MS 8-32 x 1/4 PL-HWH (2)
q)	03-7066	Tubing (2)	20	31-3102-8	Decal
r)	20-8790	Nyliner, .25 Shaft (4)			
s)	20-8712-25	"E" Ring, .25 Shaft (2)			
t)	20-8712-43	"E" Ring, .437 Shaft (2)			
u)	H-22230	Boxer Assembly Cable			
v)	03-9454	Cable Tie			
2	A-22187	Mounting Bracket Ass'y			
a)	04-11027	Mounting Bracket			
b)	04-11035	Head Axle Mount			
c)	4408-01119-01	Nut 8-32 ESN (2)			
d)	01-3670	Switch Plate (2)			
e)	07-6688-27	Rivet 1/8 x 9/16 (4)			
f)	01-14782	Fish Paper (2)			
g)	A-11177	Target & Diode Assembly			
h)	SW-1A-216-3	Target Switch Ass'y, Red			
i)	H-22259	Cable Assembly			
j)	23-6652	Edge Protector			
k)	31-3102-4	Decal			
m)	31-3102-5	Decal			
n)	31-3102-6	Decal			
p)	31-3102-7	Decal			
3	A-22262	Head Assembly			
a)	04-11025.2	Head Mount			
b)	31-3064	Boxer Head, Molded			
c)	4008-01113-08	MS 8-32 x 1/2 PL-HWH (2)			
d)	20-8790	Nyliner, .25 Shaft (2)			
e)	01-14838	Neck Protector			
4	A-22263	Heavy Bag Assembly			
a)	04-11026.1	Heavy Bag Mount			
b)	31-3068	Heavy Back, Molded			
c)	4008-01113-08	MS 8-32 x 1/2 PL-HWH (2)			
d)	01-14804.2	Heavy Bag Back Plate			
e)	20-8790	Nyliner, .25 Shaft (2)			

A-22170 Boxer/Heavy Bag Assembly

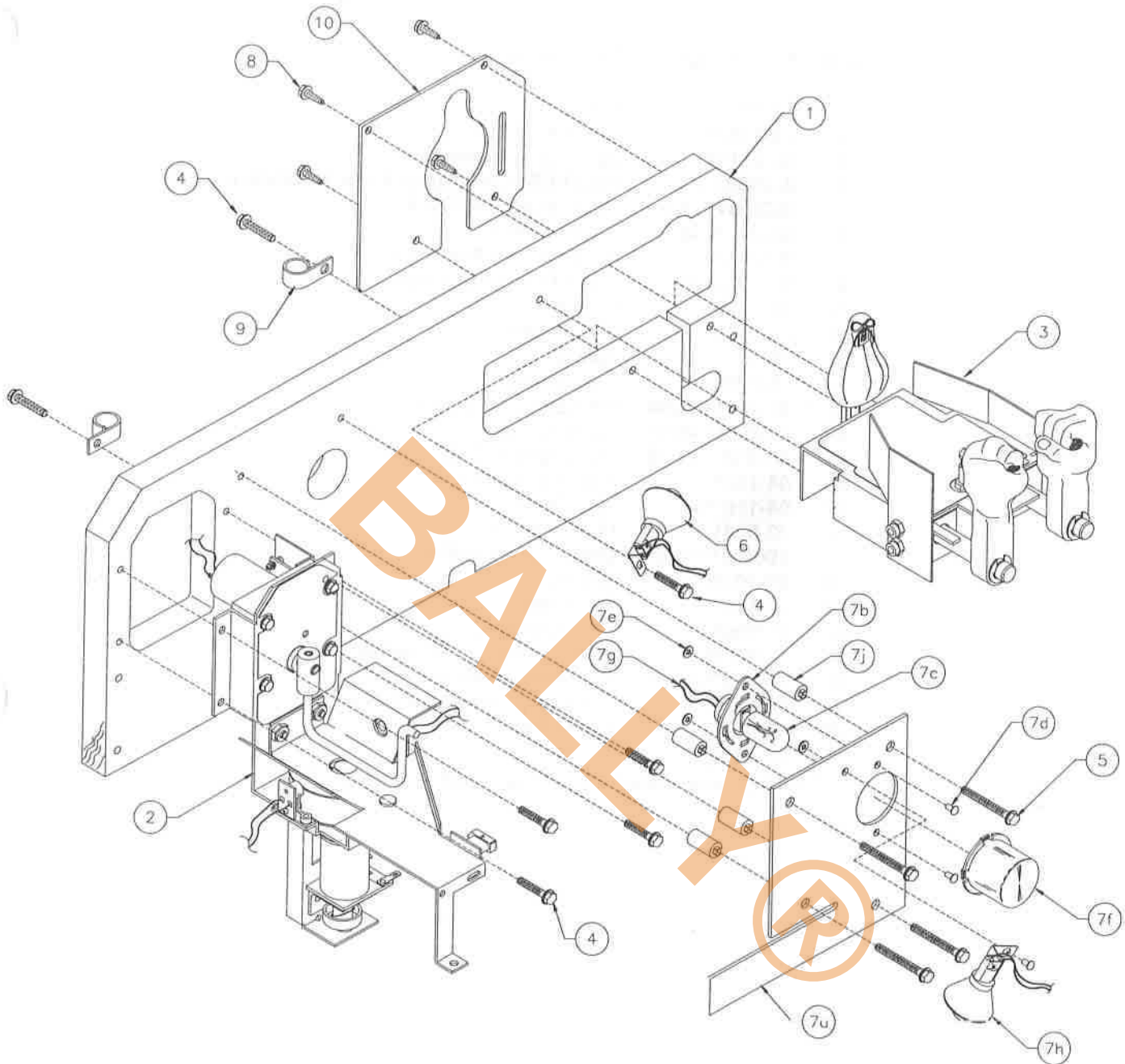


A-22171 Boxer Motor Assembly



Item	Part Number	Description
1	04-11012	Flipper Bearing Bracket
2	14-8036	Motor
3	03-7568	Bearing
4	02-5432.1	Coupling
5	04-11013	Motor Mount
6	03-9820.2	Opto Interrupt
7	A-22260	Opto PCB (See page 2-15 for assembly drawing.)
8	4406-01119-00	Nut 6-32 ESN
9	4323-01158-06	Set Screw, 1/4-28 x 3/8"
10	4408-01119-01	Nut 8-32 ESN
11	4700-00011-00	Flat Washer: 11/64 x 7/16 x 17ga.
12	4006-01003-10	Mach. Screw, 6-32 x 5/8"
13	23-6626	Rubber Grommet
14	4700-00004-00	Flat Washer: 9/64 x 7/16 x 21ga.
15	02-4975	Bushing
16	4008-01168-06	Mach. Screw, 8-32 x 3/8"
17	A-22013-1	Motor PCB (See page 2-14 for assembly drawing.)
18	4008-01113-14	Mach. Screw, 8-32 x 7/8"
19	H-18601-1	Motor Cable
20	03-7655-8	Cable Clamp

A-22146 Back Panel Assembly



Item	Part Number	Description	Item	Part Number	Description
1	04-11015.1	Back Panel	7d)	07-6688-19N	Rivet: 1/8 x 7/32"
*2	A-22147	Jump Rope Assembly	e)	4700-00003-00	Flat Washer 1/8 x 9/32"
**3	A-22148	Speed Bag Assembly	f)	03-8171-13	Twist/Lock Mini Dome, Clear
4	4008-01113-14	Mach. Screw: 8-32 x 7/8"	g)	H-21780-4	Cable
5	4008-01113-24	Mach. Screw, 8-32 x 1.5"	h)	04-11152.1	Fl. Refl. Lamp & Cable
6	04-11152.1-16	Fl Refl Lamp & Cable, 16"	j)	03-9255-5	Standoff #8 x 3/4"
7	A-22267-4	Back Panel Plastic Assembly	8	4808-01175-08	E-P #8 x 1/2" IND PL-HWH
a)	31-3099-1	Playfield Plastic	9	03-7655-8	Cable Clamp
b)	A-14265-13	Receptacle & Socket, Clear	10	31-3099-2A	Playfield Plastic #2
c)	24-8802	Bulb #906 13v, 0.69A.			

* See pages 2-26 and 2-27 for assembly detail drawing.

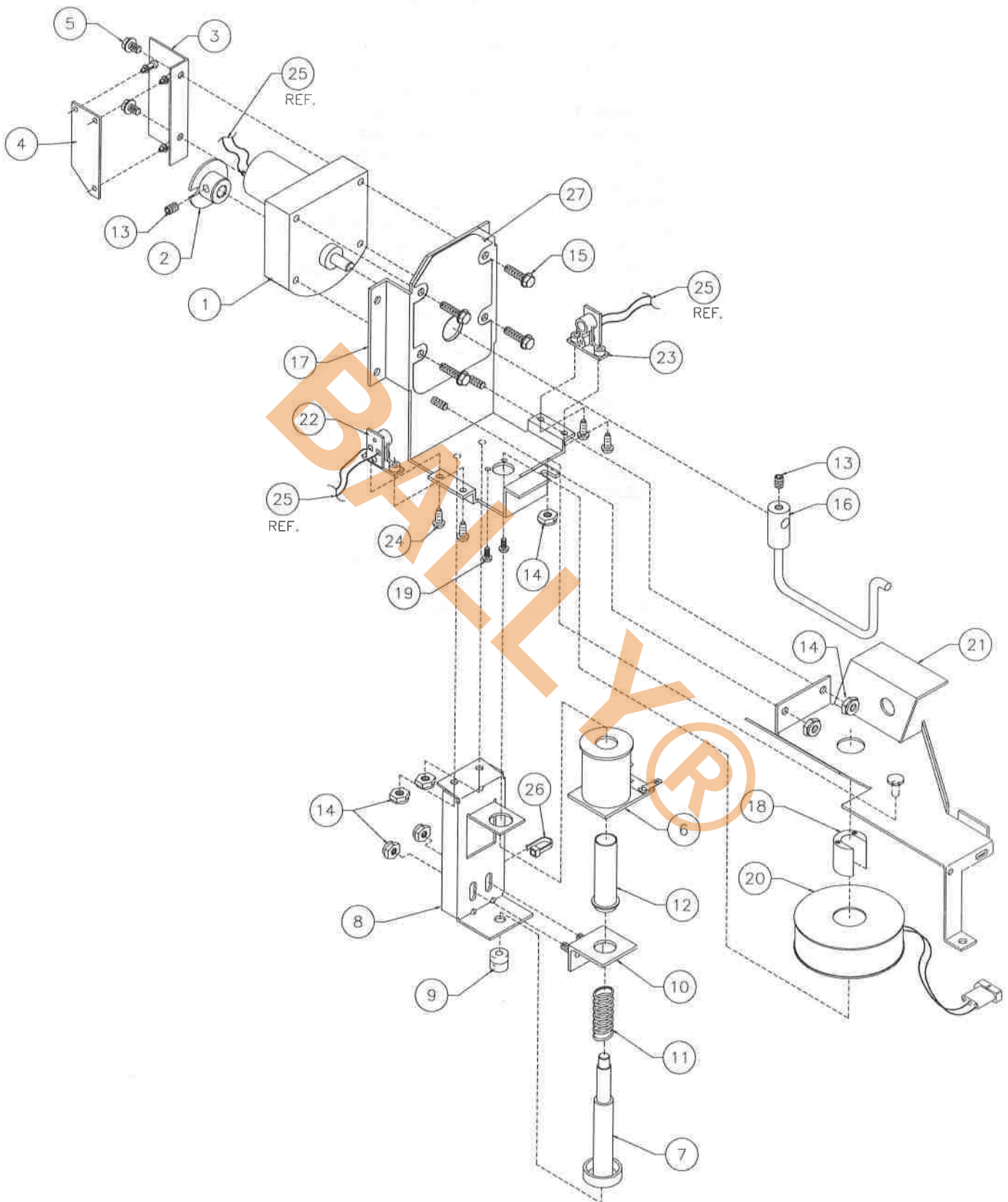
** See pages 2-28 and 2-29 for assembly detail drawing.

A-22147 Jump Rope Assembly

Item	Part Number	Description
1	14-8038	Motor
2	04-11020	Opto Interrupt
3	04-11149	Opto Board Bracket
4	A-20533.1-1	Opto PCB (See page 2-15 for assembly drawing.)
5	4008-01113-4	Mach. Screw, 8-32 x 1/4"
6	AE-30-2000	Coil Assembly
7	A-6306-2	Bell Armature Assembly
8	01-14764.1	Coil & Plunger Bracket
9	23-6420	Grommet
10	04-10910-1	Coil Bracket
11	10-135	Spring
12	03-7067	Coil Tubing
13	4010-01186-04	Set Screw, 10-32 x 1/4"
14	4408-01119-01	Nut 8-32 ESN
15	4008-01113-10	Mach. Screw, 8-32 x 5/8"
16	04-11019	Wire Jump Rope
17	04-11018.1	Main Plate
18	02-5431.1	Magnet Core
19	4004-01003-04	Mach. Screw, 2-56 x 1/4"
20	20-10197	Magnet
21	04-11017	Top Plate
22	A-16909	LED Assembly
23	A-16908	Photo Transistor Assembly
24	4106-01013-06	Sh. Metal Screw, #6 x 3/8"
25	H-22232	Jump Rope Assembly Cable
26	03-9454	Cable Tie
*27	31-3102-2	Decal

* Not available for individual sale. Order Decal Set 31-3102.

A-22147 Jump Rope Assembly

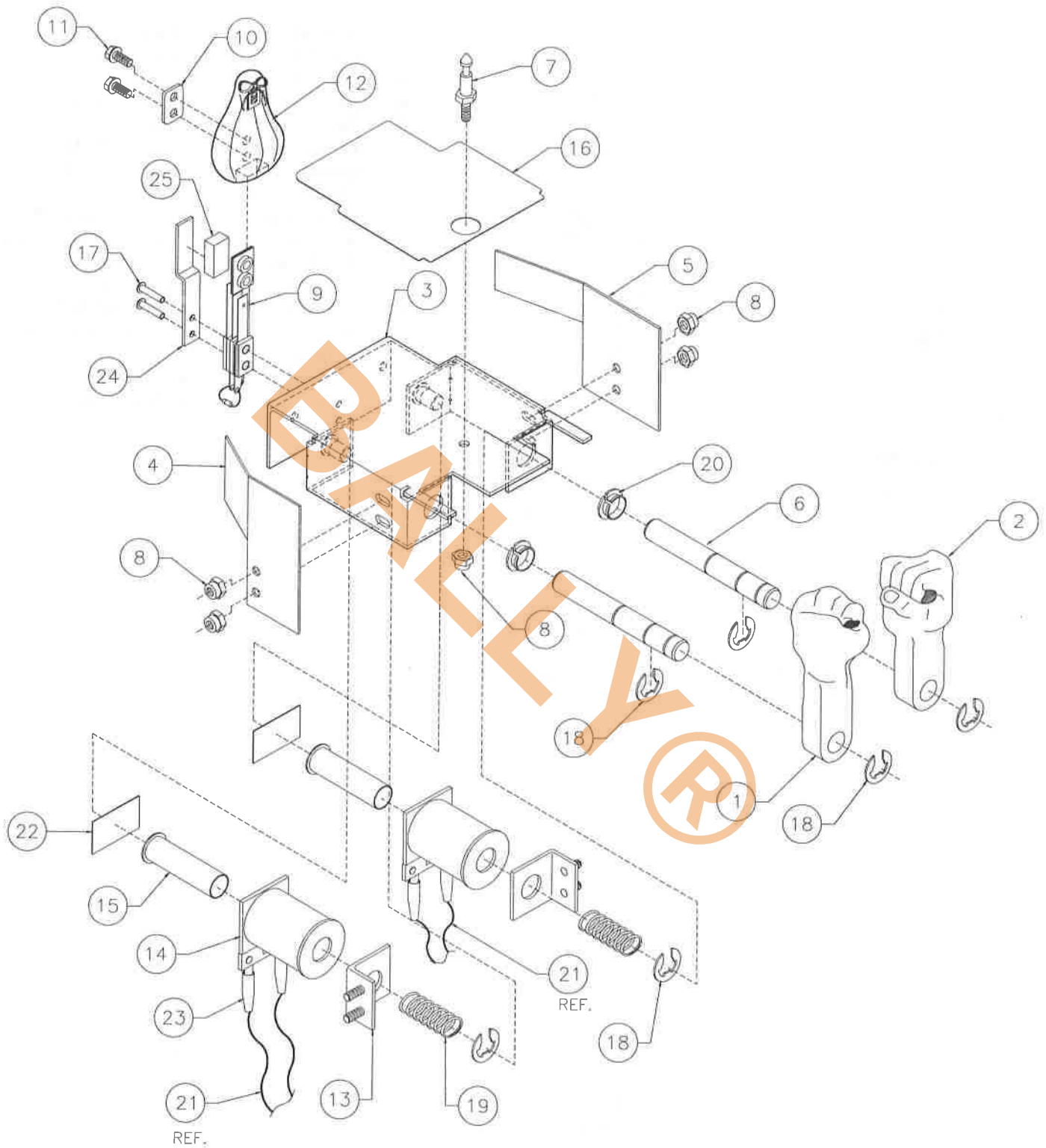


A-22148 Speed Bag Assembly

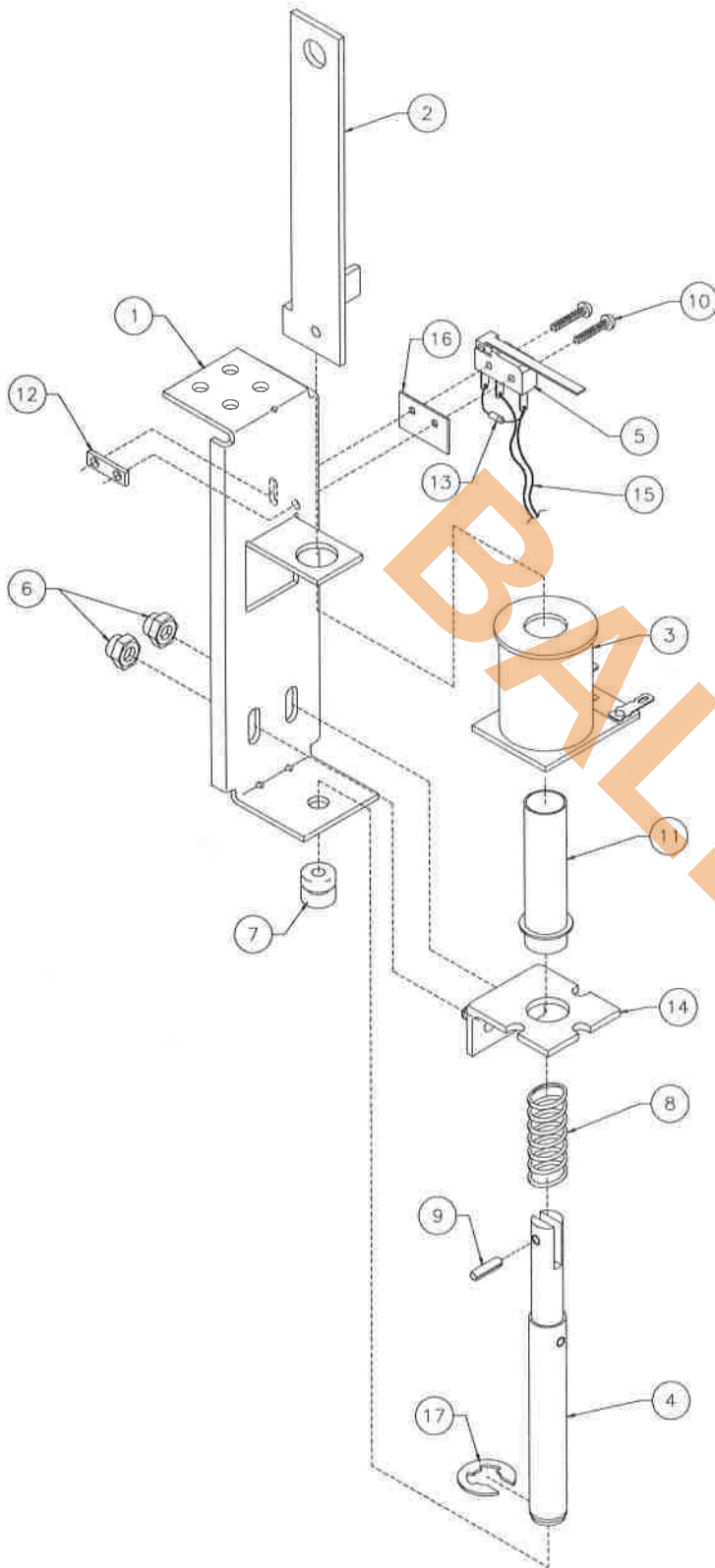
Item	Part Number	Description
1	31-3061.1	Molded Fist, Left
2	31-3062.1	Molded Fist, Right
3	04-11030.1	Main Bracket
4	01-14785.1	Ball Guide, Left
5	01-14786	Ball Guide, Right
6	02-5437	Plunger, Speed Bag
7	02-4177	Post
8	4408-01119-01	Nut 8-32ESN
9	SW-1A-215	Speed Bag Switch Assembly
10	01-14672	Troll Washer
11	4008-01168-06	Mach. Screw, 8-32 x 3/8"
12	31-3069	Speed Bag
13	04-10910-1	Coil Bracket
14	AE-27-1200	Coil
15	03-7066	Coil Tubing
*16	31-3102-3A	Decal
17	07-6688-27	Rivet: 1/8 x 9/16"
18	20-8712-43	E-Ring, 7/16" Shaft
19	10-135	Spring
20	20-8790-5	Nyliner, 7/16" Shaft
21	H-22233	Cable
22	03-8523	Insulator
23	RM-23-01	Heat Shrink Tubing
24	01-14837	Target Back Support
25	23-6652	Edge Protector

* Not available for individual sale. Order Decal Set 31-3102.

Speed Bag Assembly

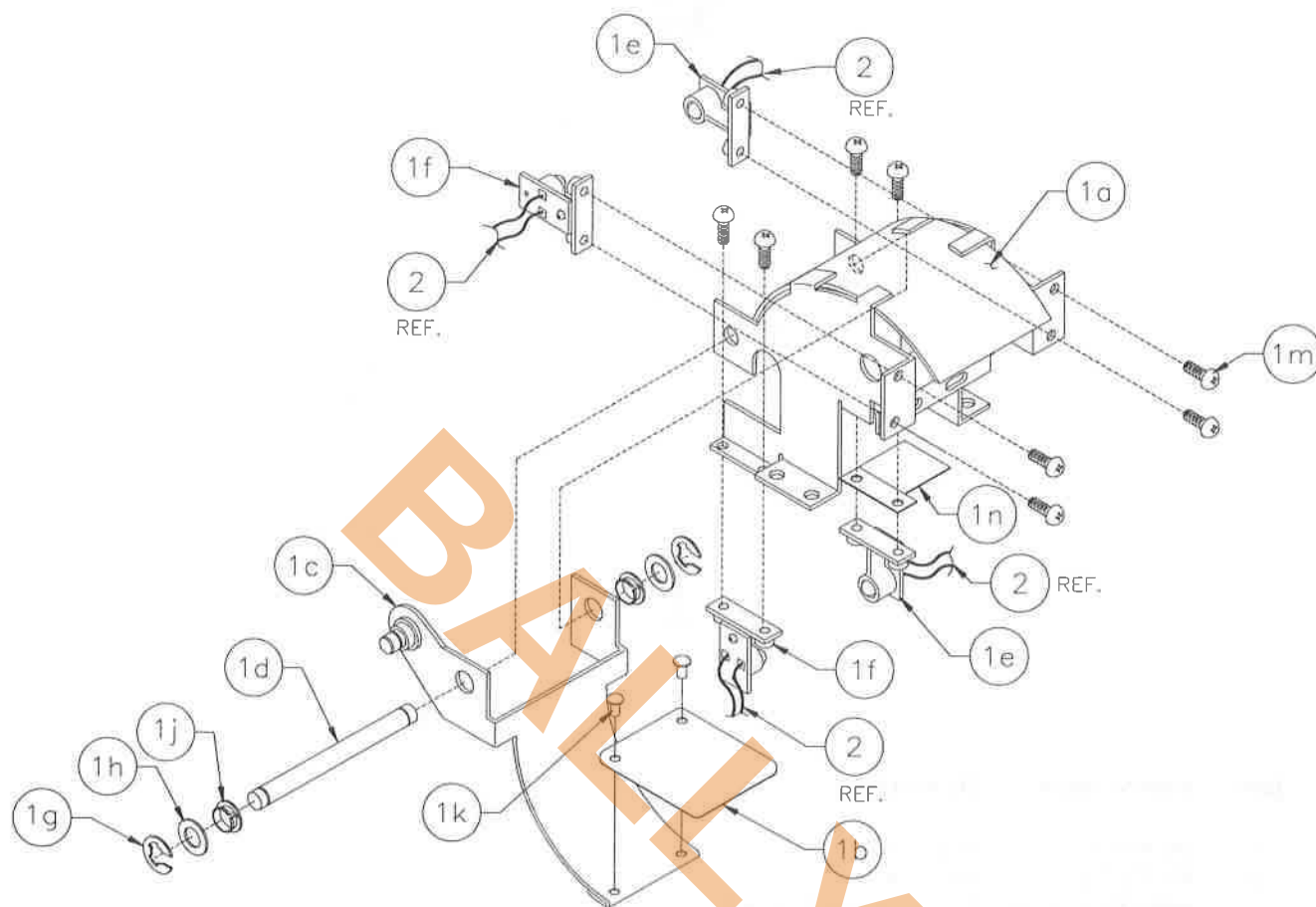


A-22176 Scoop Assembly



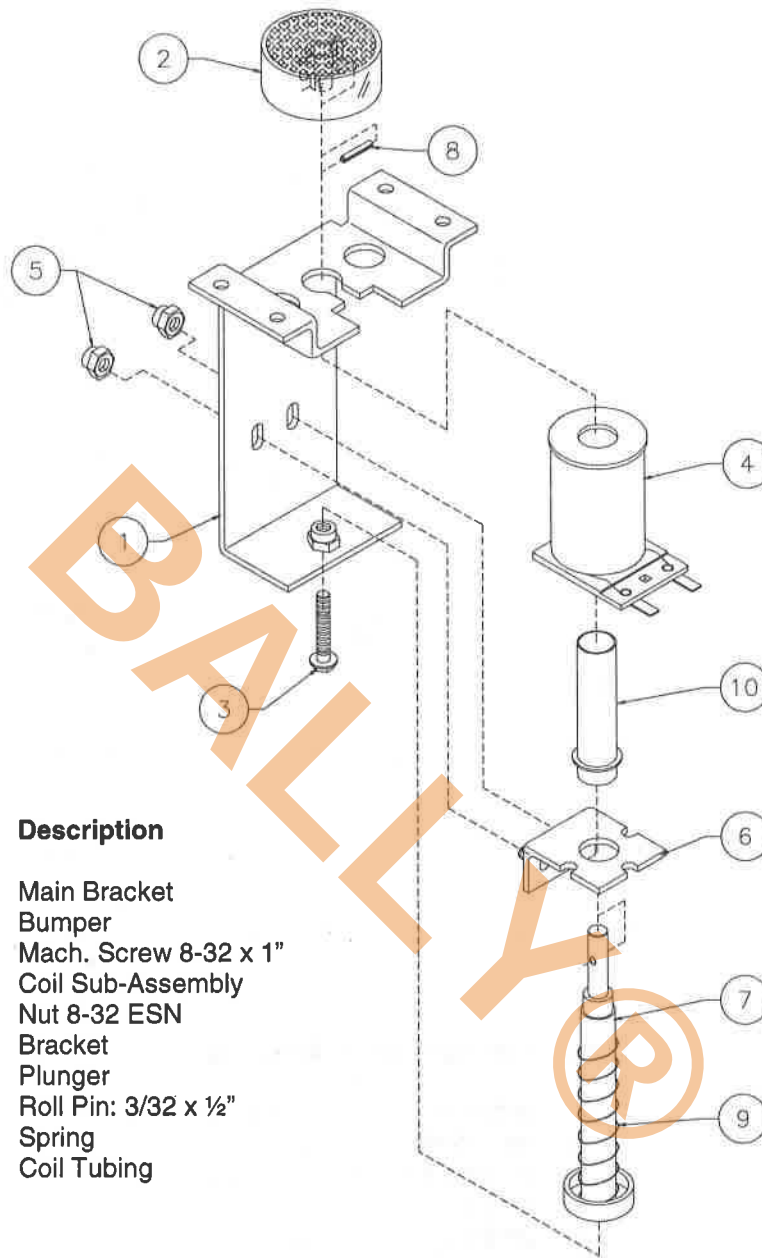
Item	Part Number	Description
1	01-14769	Bracket: Scoop
2	01-14767	Link: Scoop
3	FL-22241	Coil
4	04-11011.1	Plunger: Scoop
5	5647-12693-36	Switch
6	4408-01119-01	Nut 8-32 ESN
7	23-6420	Rubber Grommet
8	10-540	Spring
9	20-8716-20	Roll Pin: 1/8 x 3/8"
10	4004-01105-08	Mach. Screw: 2-56 x 1/2"
11	03-7067-6	Coil Tubing
12	01-8240	Nut Plate
13	5070-09054-00	Diode 1N4004
14	04-10911-1	Coil Mounting Bracket
15	H-16437	Cable
16	01-8600	Insulator
17	20-8712-43	E-Ring 7/16" Shaft

A-22245 Right Scoop Assembly
A-22246 Left Scoop Assembly



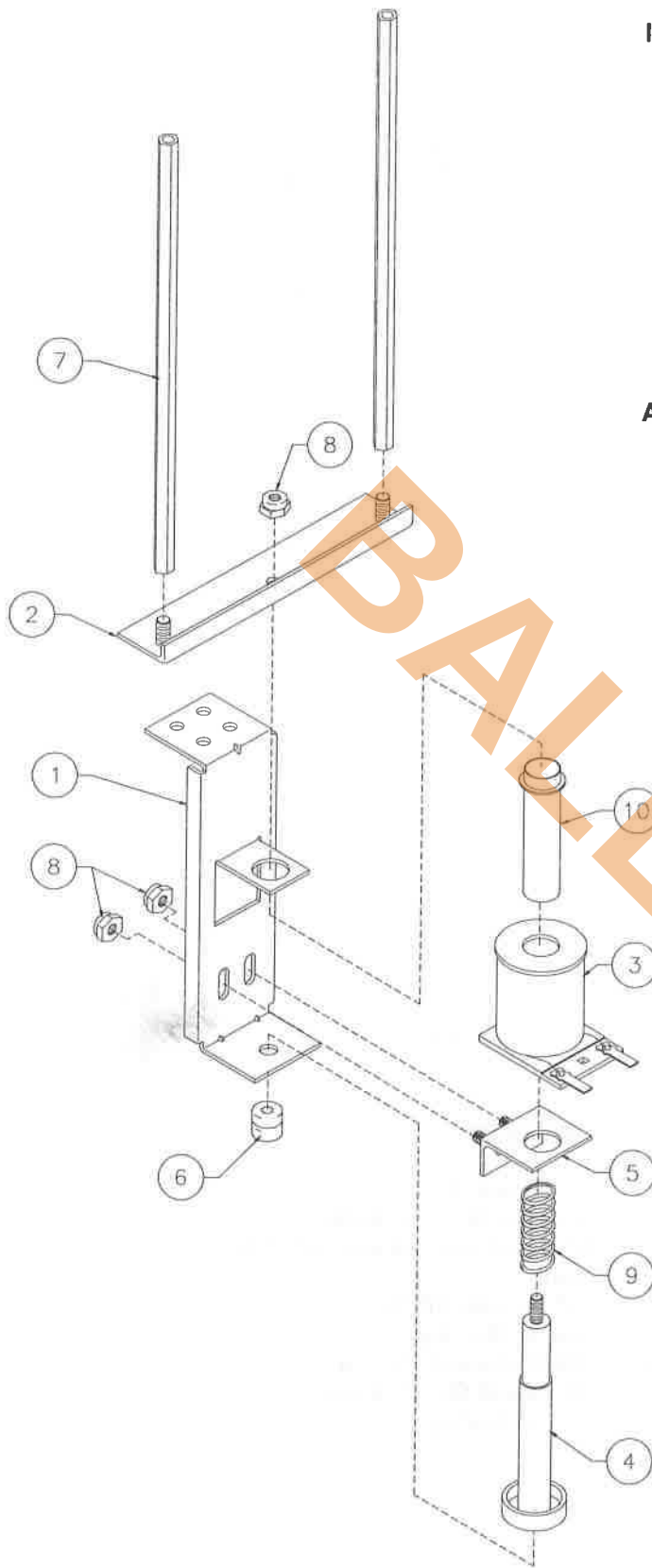
Item	Part Number	Description
1	A-22175	Scoop Assembly
a)	04-11009.1	Hood - Scoop
b)	01-14768.1	Scoop Flap
c)	04-11010	Scoop
d)	02-5433	Axle
e)	A-16909	Opto Transistor
f)	A-16908	Opto LED
g)	20-8712-25	"E"-Ring 1/4" Shaft
h)	4700-00073-00	Flat Washer: 9/32 x 1/2 x 21ga.
j)	20-8790	Nyliner
k)	07-6688-16N	Rivet: 1/8 x 1/8 Nickel
m)	4106-01013-06	Sh. Metal Screw #6 x 3/8"
n)	01-13591.1	Fish Paper
2	H-22234	Right Scoop Cable (use w/A-22245 Assembly)
	H-22235	Left Scoop Cable (use w/A-22246 Assembly)

A-22173 Ball Save Post Assembly



Item	Part Number	Description
1	04-11006.1	Main Bracket
2	03-7257-8	Bumper
3	4008-01113-16	Mach. Screw 8-32 x 1"
4	FL-22241	Coil Sub-Assembly
5	4408-01119-01	Nut 8-32 ESN
6	04-10911-1	Bracket
7	04-11005	Plunger
8	20-8716-1	Roll Pin: 3/32 x 1/2"
9	10-135	Spring
10	03-7067-6	Coil Tubing

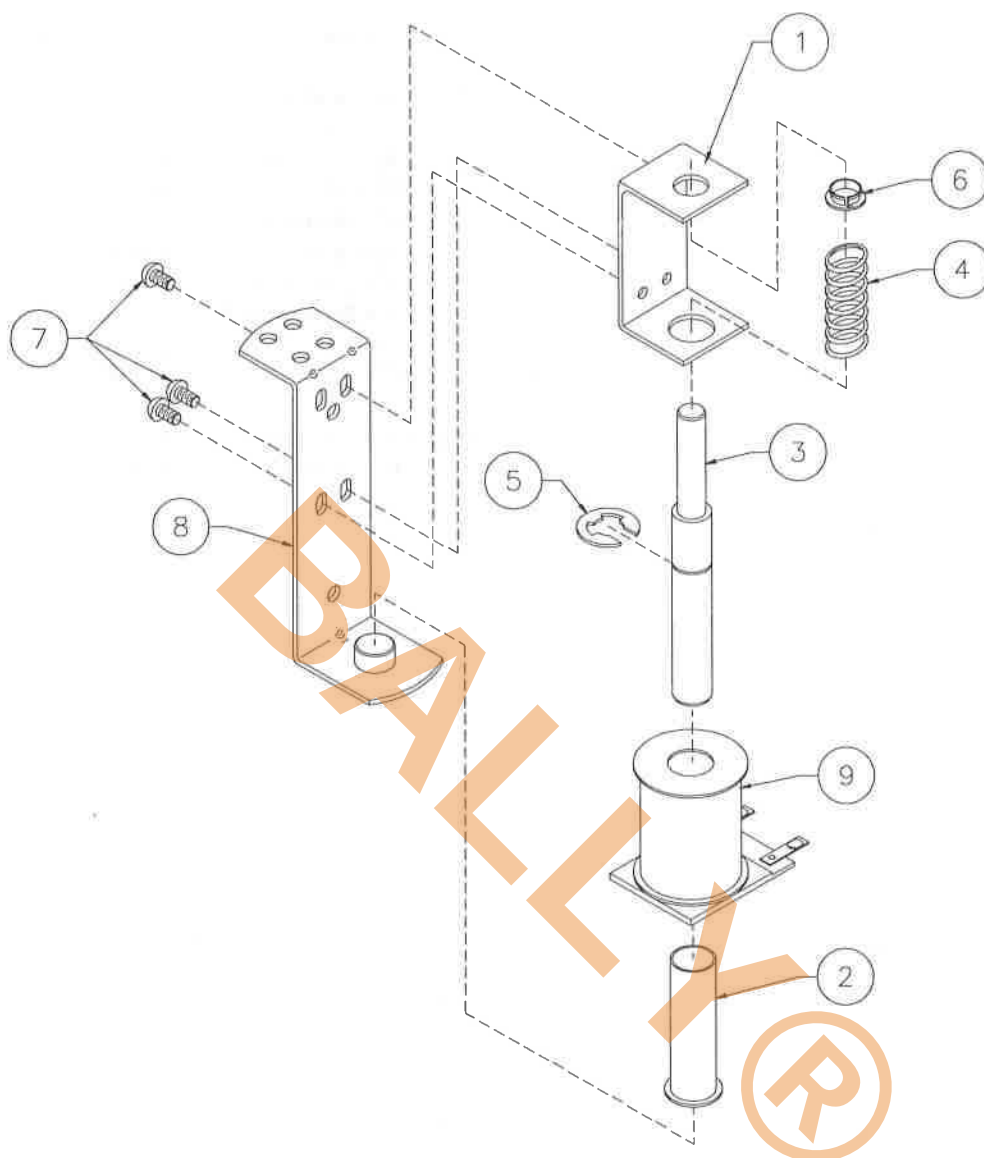
A-22172 Diverter Assembly



Item	Part Number	Description
1	01-14765	Bracket
2	04-11007	Post Mount
3	AE-26-1500	Coil
4	04-11014	Plunger
5	04-10910-1	Coil Bracket
6	23-6420	Grommet
7	02-5294-114	F-F Post 8-32 L:7.13"
8	4408-01119-01	Nut 8-32 ESN
9	10-135	Spring
10	03-7067	Coil Tubing

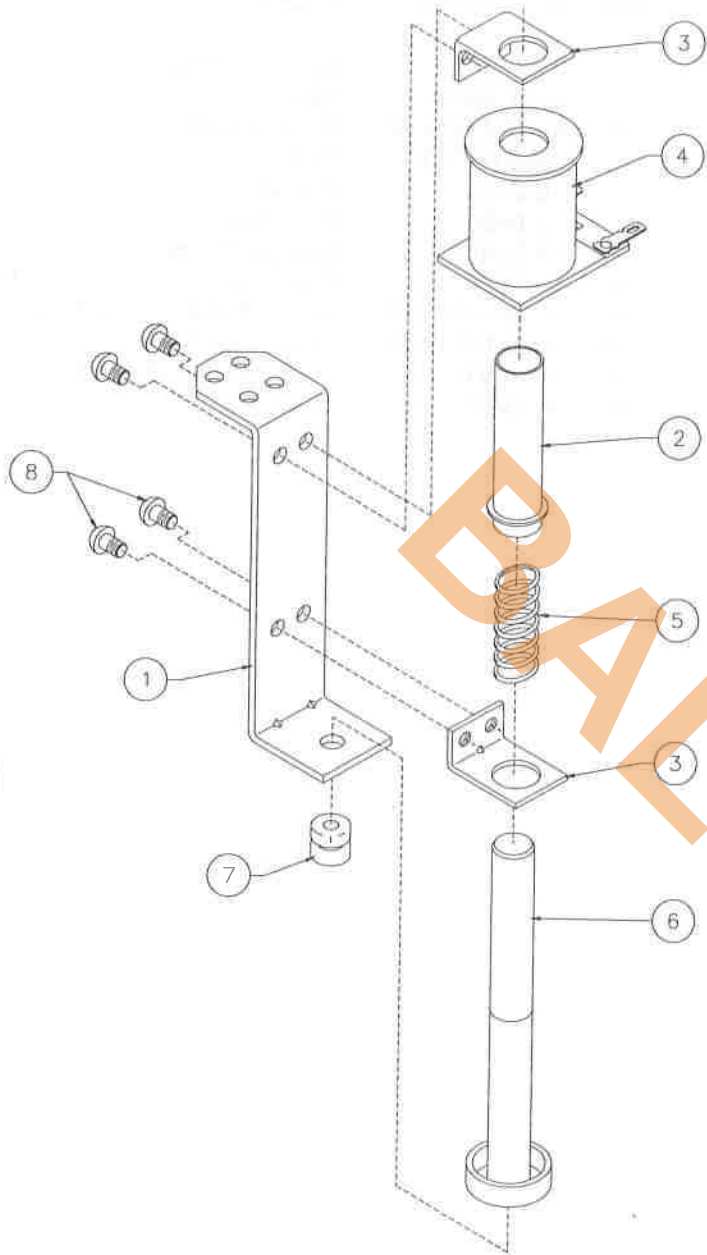
Associated Assembly: (Not Shown)
01-14766.1 Diverter Blade

A-22221 Disappearing Post Assembly



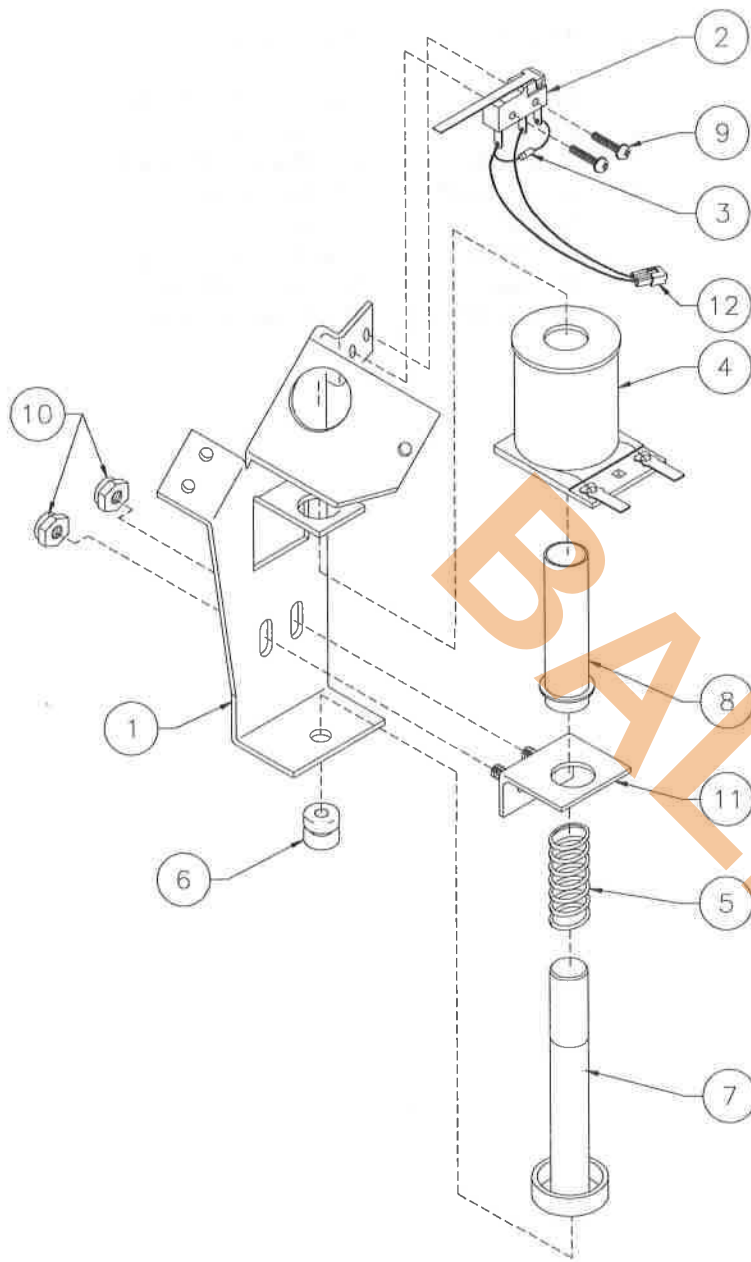
Item	Part Number	Description
1	01-14185	Coil Bracket
2	03-7066	Coil Tubing: 1.745 Long
3	02-5240	Plunger Disappearing Post .313
4	10-135	Spring
5	20-8712-43	"E" Retaining Ring
6	20-8790-2	Nyliner Bearing
7	4006-01003-04	Mach. Screw 6-32 x 1/4"
8	A-17808	Bracket & Stop Assembly
9	AE-26-1500	Coil Assembly

A-22167 Up Down Post Assembly



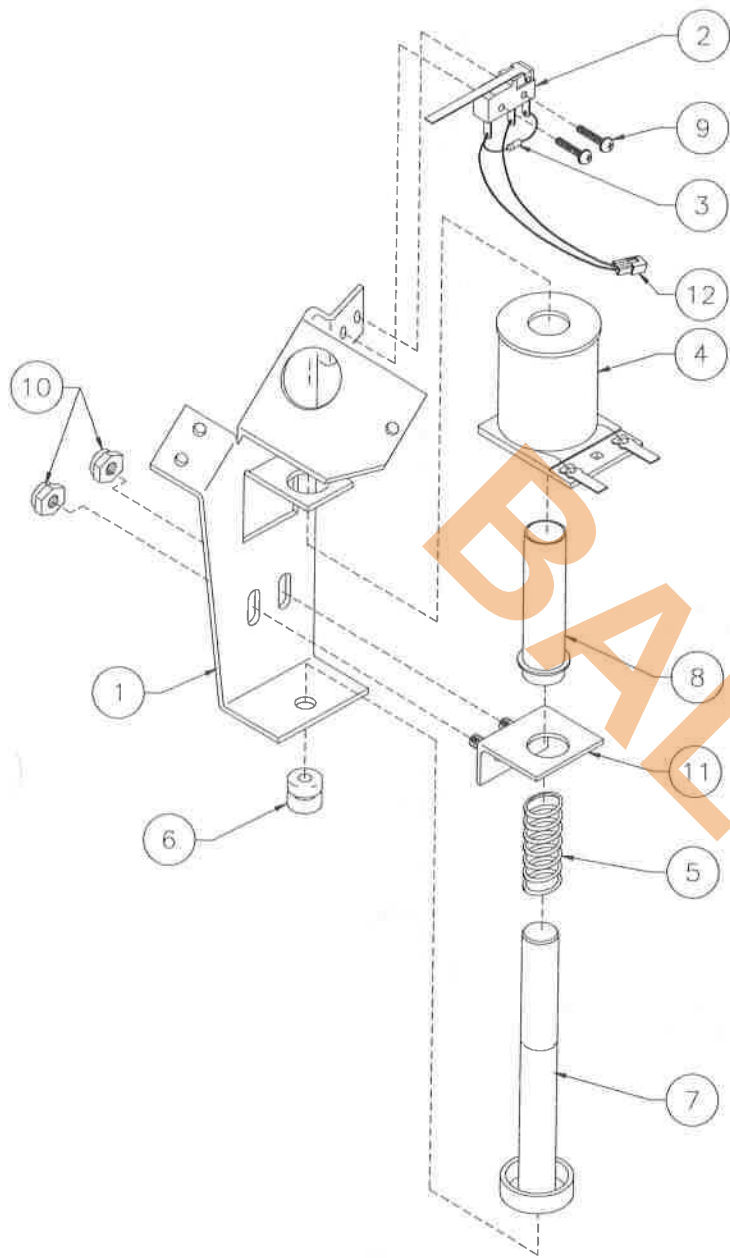
Item	Part Number	Description
1	01-12441	Diverter Post Bracket
2	03-7067-5	Coil Tubing
3	01-8-508-T	Coil Retainer Bracket
4	AE-27-1200	Coil Assembly
5	10-135	Spring
6	04-11004	Post Diverter Plunger
7	23-6420	Rubber Grommet
8	4008-01017-04	Mach. Screw, 8-32 x 1/4"

A-22169 Popper Assembly



Item	Part Number	Description
1	01-14757	Bracket – Popper
2	5647-12693-11	Switch
3	5070-09054-00	Diode 1N4004
4	AE-27-1200	Coil
5	10-395	Spring
6	23-6420	Grommet
7	04-10962	Plunger Popper
8	03-7067	Coil Tubing
9	4002-01105-07	Mach. Screw: 2-56 x 7/16"
10	4408-01119-01	Nut 8-32 x 7/16"
11	04-10910-1	Coil Mounting Bracket
12	H-16437	Cable

A-22214 Eject Popper Assembly



Item	Part Number	Description
1	01-14793.1	Bracket – Eject Popper
2	5647-12693-11	Switch
3	5070-09054-00	Diode 1N4004
4	AE-30-2000	Coil
5	10-135	Spring
6	23-6420	Grommet
7	A-17767	Plunger – Popper
8	03-7067	Coil Tubing
9	4002-01105-07	Mach. Screw, 2-56 x 7/16"
10	4408-01119-01	Nut 8-32 ESN
11	04-10910-1	Coil Mounting Bracket
12	H-16437	Cable

Posts



02-4425-1
Post #8-32/#8-32
Qty.: 2

02-4425-2
Post #8-32/#8-32
Qty.: 8



02-5254
Bumper Post 8-32
Qty.: 12



02-5222
Post #10-32 x 3/8"
Qty.: 1



02-4660
Mini-Post Single Bumper
Qty.: 3



03-8319-16
Post #8 Starred
Qty.: 9



02-5107
Post-Adjusting
Qty.: 1



03-8365-16
Post #8
Qty.: 6



03-8044-13
Mini Post
Qty.: 2



02-5295-22
Post M-F 8-32 x 1.38"
Qty.: 2

02-5295-48
Post M-F 8-32 x 3"
Qty.: 1

02-5295-56
Post M-F 8-32 x 3.50"
Qty.: 2

02-5295-64
Post M-F 8-32 x 4"
Qty.: 1



02-5294-114
1/4 Hex Post 8F/8F
Qty.: 2

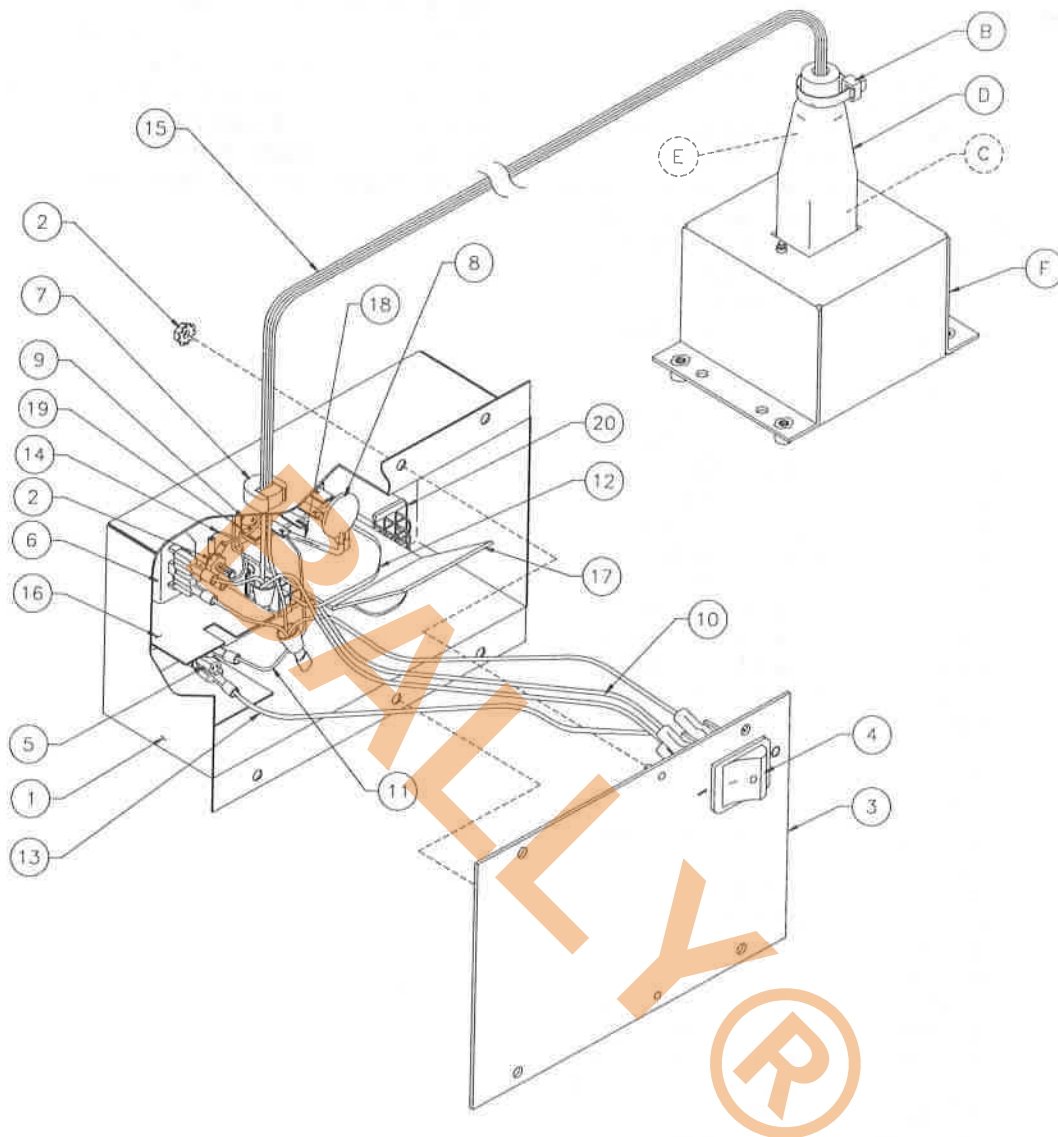


03-9842
Stand Off
Qty.: 27



20-9658-1
Dual PCB Support
Qty.: 9

A-20871 Power Interface Assembly



Item	Part Number	Description
A	A-20872	Power Control Chassis Assembly
1)	04-10292	Power Control Chassis Box
2)	4406-01128-00	Nut #6-32 KEPS (3)
3)	01-12294	Switch Mounting Plate Assembly
4)	5642-13935-00	Power Switch
5)	5733-14734-00	Fuse Holder Panel (5x20mm)
6)	5851-13867-00	Outlet-IEC Conn. 237 Socket
7)	03-8712	Strain Relief Bushing
8)	5016-12978-00	Thermistor 8A., 2.5R25
9)	4006-01003-10	Mach. Screw, #6-32 x 5/8"
10)	H-17992	Jumper Cable Neutral Sw/1FC
11)	H-17543	Hot Jumper Black Cable
12)	H-17546	Jumper Interface Hot Black Cable
13)	H-17545	Jumper Switch/Fuse Black Cable

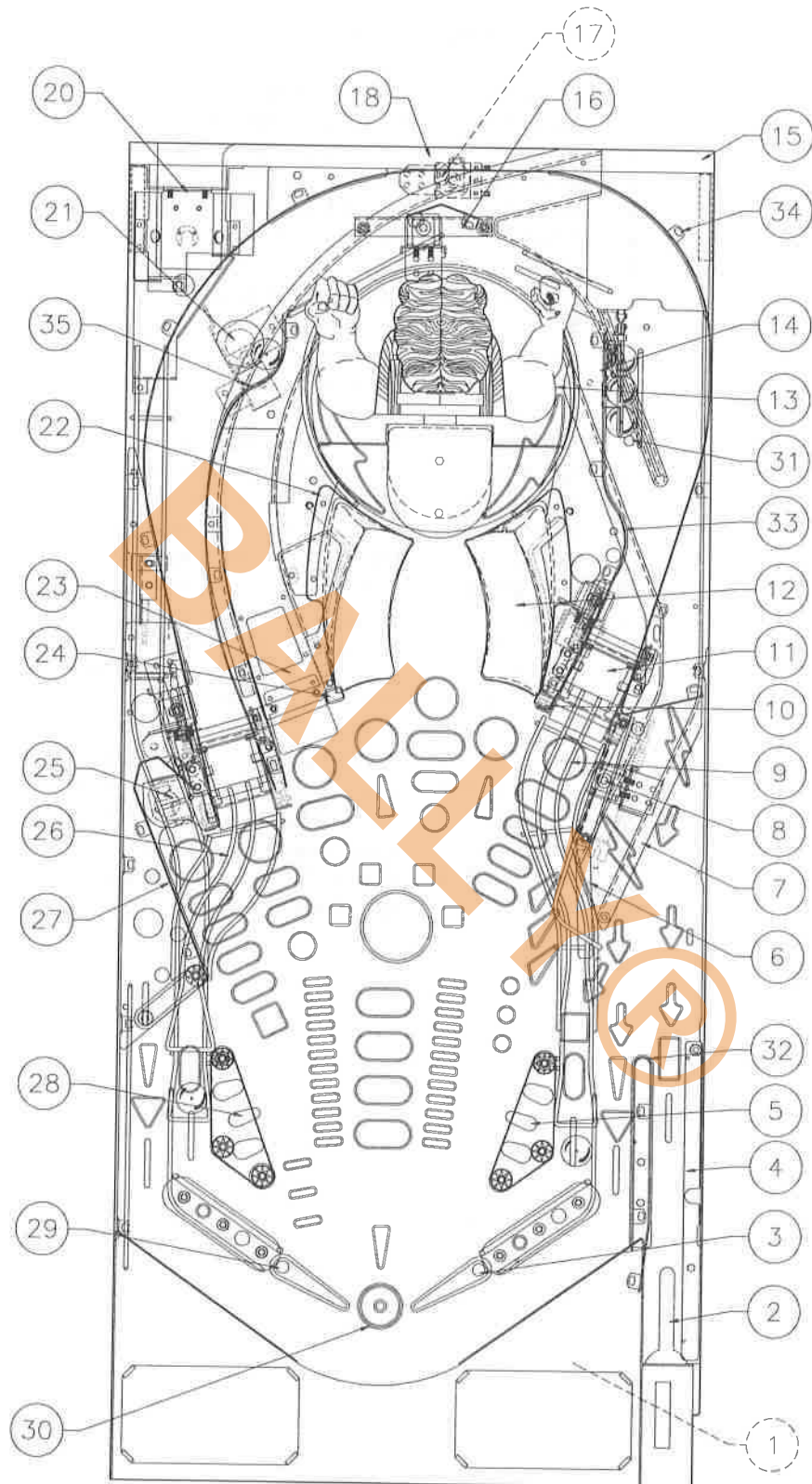
Item	Part Number	Description
14)	H-17542	Ground Jumper Grn/Yel Cable
15)	5797-13940-01	Jumper Cable
16)	01-10623	Insulator, Thermistor
17)	01-12299	Insulator, Terminal Strip
18)	RM-21-06	#18 Vinyl Fgls
19)	5822-13865-00	Terminal Strip 3-CKT 2-Mtg.
20)	H-18050	Jumper Cable, Transformer Prog
B	03-7933	Ty-Wrap Nylon
C	5045-14007-00	Capacitor, 1 μ F 275v
D	23-6776-4	Heat Shrink
E	RM-21-06	#18 Vinyl Sleeving
F	A-20873	Line Filter Entry Chassis

Upper Playfield Parts

Item Number	Part Number	Description	Not Shown: Part Number	Description
1	A-19963	Ball Trough Assembly	A-13204-50063	Bottom Arch Assembly
2	A-16757-2	Catapult Assembly	A-22220	Rollover Button
3	A-15849-R-4	Flipper Coil - Orange	01-12624	Lower Arch Mounting Bracket
	20-10110-6	Flipper Bat & Shaft	01-14776	Left Steel Rail
4	12-7402.2	Launch Ramp	01-14777	Right Steel Rail
5	A-17811	Kicker Slingshot Assembly	31-1357-50063	Screened Backglass
	A-17801	Kicker Switch Assembly		
	A-22206-2	Coil & Bracket Assembly		
6	A-22252	3-bank Standup Target		
7	A-22145	Main Ramp		
8	A-22168	One Way Gate Assembly		
	12-7405	Gate Wire		
9	12-7401	Right Ramp		
10	A-17795-6	Yellow Standup Target		
11	A-22245	Right Scoop Assembly		
	A-22175	Up/Down Ball Scoop		
	A-22176	Scoop Actuator		
12	A-22154	Right Punch Ramp		
13	A-22170	Boxer/Heavy Bag Assembly		
	A-22177	Boxer Assembly		
	A-22263	Heavy Bag Assembly		
	A-22171	Boxer Motor Assembly		
14	A-22254	3-bank Micro Switch Assy		
	B-13289	3-Bank Switch & Bracket		
15	A-22148	Speed Bag Assembly		
16	A-22172	Ramp Diverter Assembly		
	01-14766	Diverter Blade		
17	A-22167	Up/Down Post Diverter		
18	A-22146	Back Panel Assembly		
19	NOT USED			
20	A-22147	Jump Rope Assembly		
21	A-22169	Popper Assembly		
22	A-22153	Left Punch Ramp		
23	A-22246	Left Scoop Assembly		
	A-22175	Up/Down Ball Scoop		
	A-22176	Scoop Actuator		
24	A-17795-6	Yellow Standup Target		
25	A-22214	Eject Popper Assembly		
26	12-7400.1	Left Wire Ramp		
27	01-14775	Ball Guide #5		
28	A-17811	Kicker Slingshot Assembly		
	A-17801	Kicker Switch Assembly		
	A-22206-2	Coil & Bracket Assembly		
29	A-15849-L-4	Flipper Coil - Orange		
	20-10110-6	Flipper Bat & Shaft		
30	A-22173	Ball Save Post		
31	A-22221	Disappearing Post Assy		
32	01-14771	Ball Guide #1		
33	01-14773	Ball Guide #3		
34	01-14778	Ball Guide #6		
35	01-14772	Ball Guide #2		

*The *Champion Pub* hardcoat playfield does not require a full Mylar. However, mylars can be purchased through your local WILLIAMS Distributor.

Upper Playfield Parts

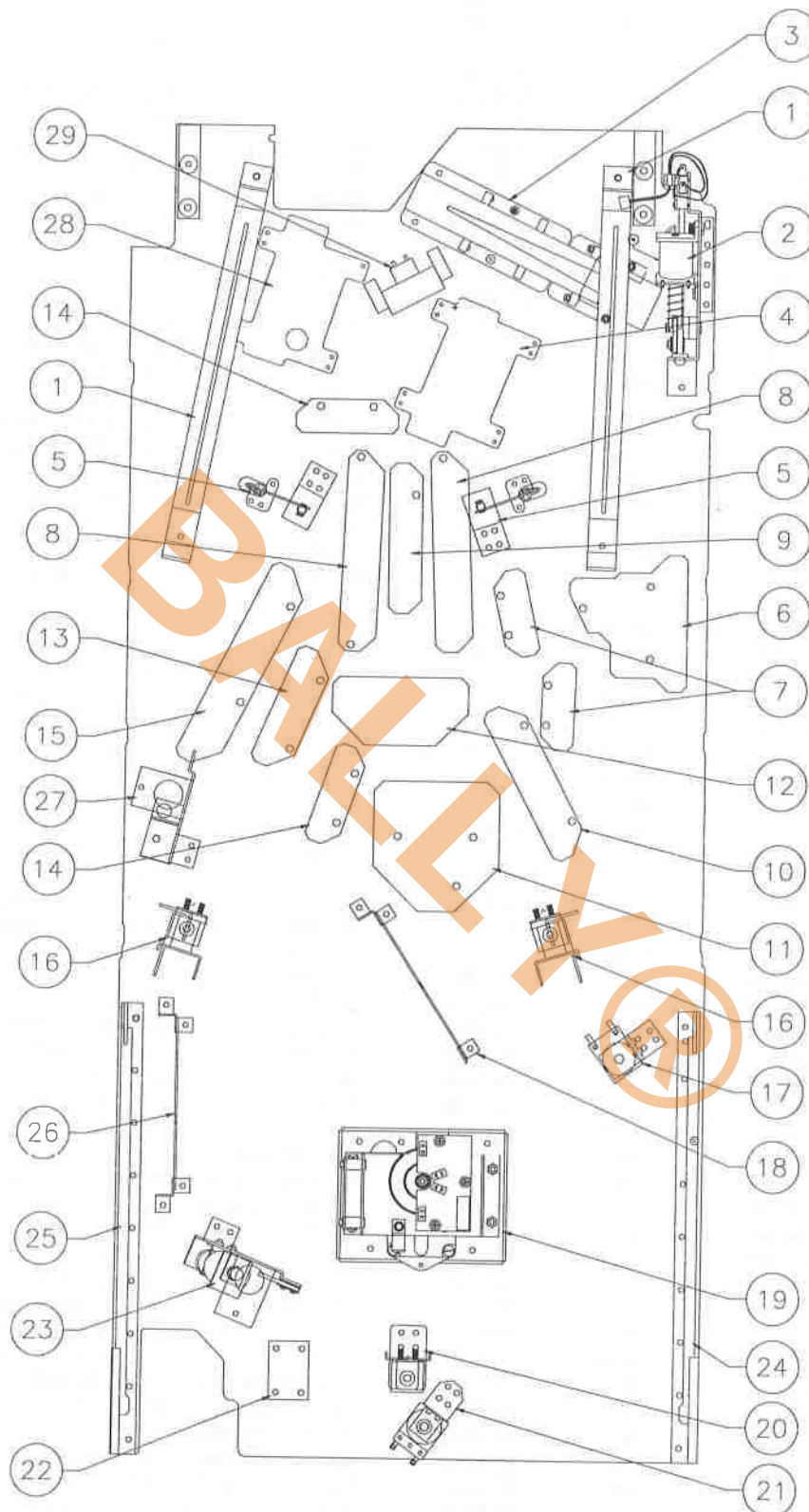


Lower Playfield Parts

Item	Part Number	Description
1	01-11781	Support Bracket (2)
2	A-16757-2	Catapult Assembly
3	A-19963	Ball trough Assembly
4	A-15849-R-4	Flipper Assembly Complete
5	A-22206-2	Coil & Bracket Assembly (2)
6	A-22195	7-Lamp PCB Assembly
7	A-22192	3-Lamp PCB Assembly
8	A-21991-1	24 LED PCB Assembly (2)
9	A-22194	4-Lamp PCB Assembly
10	A-22196	5-Lamp PCB Assembly
11	A-22201	8-Lamp PCB Assembly
12	A-22193	6-Lamp PCB Assembly
13	A-22202	4-Lamp PCB Assembly
14	A-21808	3-Lamp PCB Assembly (2)
15	A-22243	5-Lamp PCB Assembly
16	A-22176	Scoop Actuator Assembly (2)
17	A-22221	Disappearing Post Assembly
18	A-22019-2	16-Opto PCB Assembly
19	A-22171	Boxer Motor Assembly
20	A-22172	Ramp Diverter Assembly
21	A-22167	Up/Down Post Diverter Assy.
22	A-15542	Motor EMI Assembly
23	A-22169	Popper Assembly
24	A-17749.1-2	Slide Playfield Assembly, Right
25	A-17749.1-1	Slide Playfield Assembly, Left
26	A-21967-2	Serial 24 Driver PCB Assembly
27	A-22214	Eject Popper Assembly
28	A-15849-L-4	Flipper Assembly Complete
29	A-22173	Ball Save Post Assembly



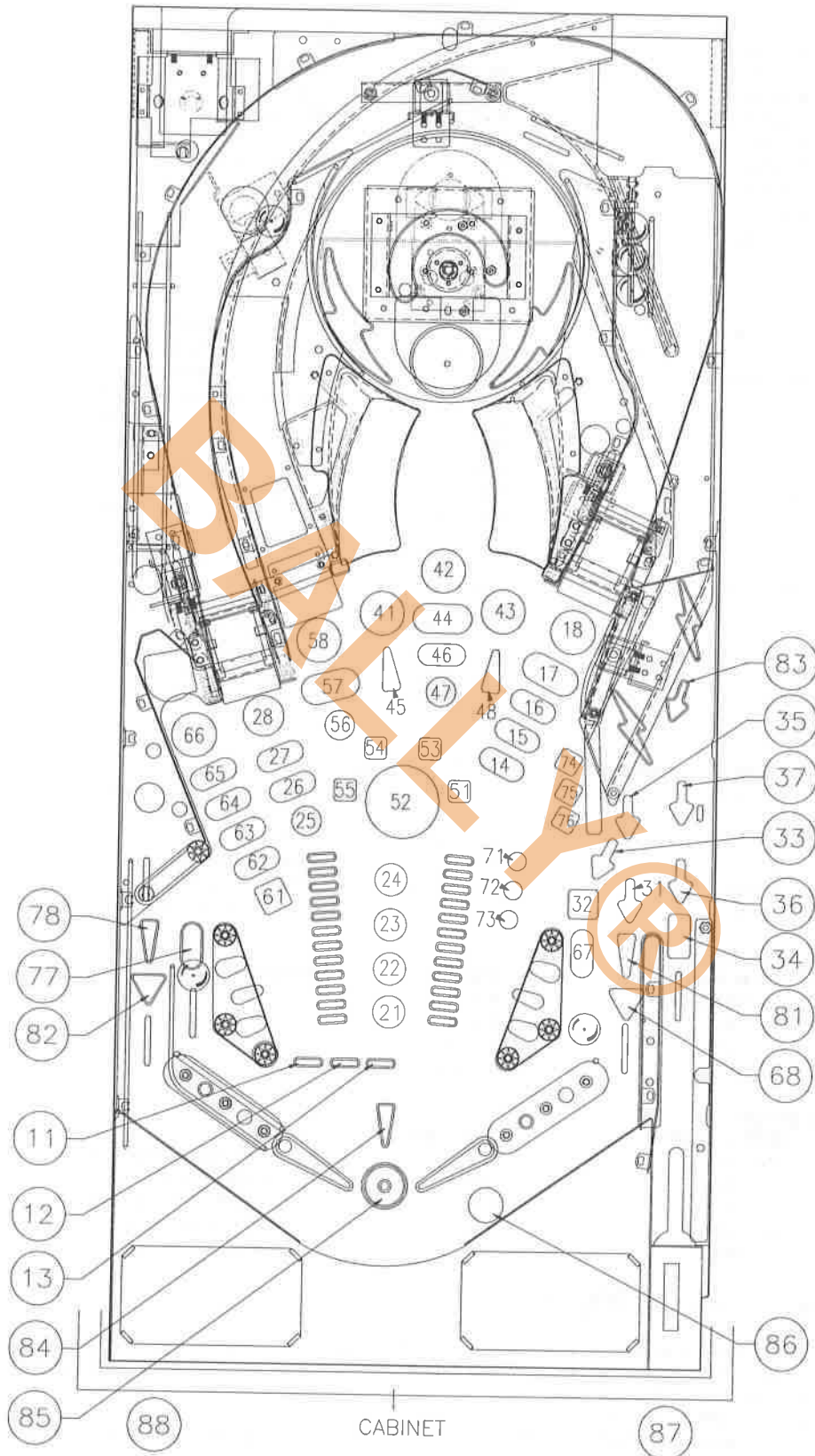
Lower Playfield Parts



Lamp Locations

Item Number	Lamp Assembly Part Number	Bulb Type	Bulb Part Number	Socket Part Number	Description
11	A-21808	#555	24-8768	24-8767	HEAVY BAG COMPLETE
12	A-21808	#555	24-8768	24-8767	JUMP ROPE COMPLETE
13	A-21808	#555	24-8768	24-8767	SPEED BAG COMPLETE
14	A-22196	#555	24-8768	24-8767	RIGHT JAB COMBO
15	A-22196	#555	24-8768	24-8767	LOCK
16	A-22196	#555	24-8768	24-8767	RIGHT START FIGHT
17	A-22196	#555	24-8768	24-8767	RIGHT JACKPOT
18	A-22196	#555	24-8768	24-8767	RIGHT JAB
21	A-22194	#555	24-8768	24-8767	BOUT 1
22	A-22194	#555	24-8768	24-8767	BOUT 2
23	A-22194	#555	24-8768	24-8767	BOUT 3
24	A-22194	#555	24-8768	24-8767	BOUT 4
25	A-22202	#555	24-8768	24-8767	JUMP ROPE
26	A-22202	#555	24-8768	24-8767	LEFT JAB COMBO
27	A-22202	#555	24-8768	24-8767	CENTER START FIGHT
28	A-22202	#555	24-8768	24-8767	LEFT JAB
31	A-22195	#555	24-8768	24-8767	LOWER BLUE ARROW
32	A-22195	#555	24-8768	24-8767	LEFT HOOK TO WIN
33	A-22195	#555	24-8768	24-8767	WHITE ARROW
34	A-22195	#555	24-8768	24-8767	THROWN TOWEL
35	A-22195	#555	24-8768	24-8767	CENTER BLUR ARROW
36	A-22195	#555	24-8768	24-8767	LOWER YELLOW ARROW
37	A-22195	#555	24-8768	24-8767	TOP YELLOW ARROW
38					NOT USED
41	A-22201	#555	24-8768	24-8767	LEFT HOOK
42	A-22201	#555	24-8768	24-8767	BODY BLOW
43	A-22201	#555	24-8768	24-8767	RIGHT HOOK
44	A-22201	#555	24-8768	24-8767	CENTER JACKPOT
45	A-22201	#555	24-8768	24-8767	LEFT KO BOXER
46	A-22201	#555	24-8768	24-8767	HURRY-UP
47	A-22201	#555	24-8768	24-8767	HEAVY BAG
48	A-22201	#555	24-8768	24-8767	RIGHT KO BOXER
51	A-22193	#555	24-8768	24-8767	JACKPOT COMPLETE
52	A-22193	#555	24-8768	24-8767	PUB CHAMPION
53	A-22193	#555	24-8768	24-8767	WON BY KO
54	A-22193	#555	24-8768	24-8767	MULTIBALLS COMPLETE
55	A-22193	#555	24-8768	24-8767	TRAINING COMPLETE
56	A-21808	#555	24-8768	24-8767	SPEED BAG
57	A-21808	#555	24-8768	24-8767	LEFT JACKPOT
58	A-21808	#555	24-8768	24-8767	BALCONY
61	A-22243	#555	24-8768	24-8767	ULTIMATE CHALLENGE
62	A-22243	#555	24-8768	24-8767	POKER NIGHT
63	A-22243	#555	24-8768	24-8767	EXTRA BALL
64	A-22243	#555	24-8768	24-8767	SPITTING GALLERY
65	A-22243	#555	24-8768	24-8767	LEFT START FIGHT
66	A-17807	#44	24-6549	Not Sold Separate	THE CORNER
67	A-17385	#44	24-6549	Not Sold Separate	RIGHT RETURN
68	A-17385	#44	24-6549	Not Sold Separate	RIGHT SECOND WIND
71	A-22192	#555	24-8768	24-8767	RAID
72	A-22192	#555	24-8768	24-8767	FISTICUFF
73	A-22192	#555	24-8768	24-8767	MULTIBRAWL
74	A-22192	#555	24-8768	24-8767	THREE BANK TOP
75	A-22192	#555	24-8768	24-8767	THREE BANK MIDDLE
76	A-22192	#555	24-8768	24-8767	THREE BANK BOTTOM
77	A-17835	#44	24-6549	Not Sold Separate	LEFT RETURN
78	A-17835	#44	24-6549	Not Sold Separate	LEFT KO
81	A-17835	#44	24-6549	Not Sold Separate	RIGHT KO
82	A-17835	#44	24-6549	Not Sold Separate	LEFT SECOND WIND
83	A-17835	#44	24-6549	Not Sold Separate	TOP BLUE ARROW
84	A-17835	#44	24-6549	Not Sold Separate	CENTER KO
85	A-17807	#44	24-6549	Not Sold Separate	BALL SAVE POST
86	A-17835	#44	24-6549	Not Sold Separate	SHOOT AGAIN
87	20-9663-B-4	----	----	----	LAUNCH BUTTON
88	20-9663-16	----	----	----	START BUTTON

Lamp Locations



Solenoid/Flasher Locations

Item Number	Assembly Part Number	Coil or Flasher Part Number	Description
01	A-16757-2	AE-26-1200	AUTO PLUNGER
02	A-19963	AE-26-1500	TROUGH EJECT
03	A-22176	FL-22241	LEFT SCOOP POWER
04	A-22176	FL-22241	RIGHT SCOOP POWER
05	A-22214	AE-30-2000	CORNER KICKOUT
06	A-22173	FL-22241	POST POWER
07	A-22147	20-10197	ROPE MAGNET
08	A-22167	AE-27-1200	POST DIVERTER
09	A-22176	FL-22241	LEFT SCOOP HOLD
10	A-22176	FL-22241	RIGHT SCOOP HOLD
11	A-22177	04-11000	RIGHT ARM
12	A-22173	FL-22241	POST HOLD
13	A-22177	04-11000	LEFT ARM
14	A-22169	AE-27-1200	POPPER
15	A-22206-2	AE-26-1200	LEFT SLINGSHOT
16	A-22206-2	AE-26-1200	RIGHT SLINGSHOT
17	04-11152.1-12 (2), A-17802 (1)	#906 (3)	BOXER FLASHER
18	A-17802 (2)	#906 (2)	DANGER ZONE FLASHER
19	A-22267-4 (1)	#906 (1)	JUMP ROPE FLASHER
19	-----	#906 (1)	INSERT PANEL FLASHER
20	A-22267-2 (1)	#906 (1)	LOCK KICKOUT FLASHER
20	-----	#906 (1)	INSERT PANEL FLASHER
21	A-22267-1 (1)	#906 (1)	LEFT KICKOUT FLASHER
21	-----	#906 (2)	INSERT PANEL FLASHER
22	A-17802 (2)	#906 (2)	BOXER FLASHER
22	-----	#906 (1)	INSERT PANEL FLASHER
23	04-11152.1-16	#906 (1)	JUMP ROPE FLASHER
24	04-11152.1-16	#906 (1)	SPEED BAG FLASHER
25	A-22147	SEE NOTE 1	ROPE MOTOR
26	A-22171	SEE NOTE 2	TOGGLE DIRECTION
27	A-22171	SEE NOTE 2	MOTOR ON/OFF
28	A-22221	AE-26-1500	LOCK PIN

Flippers

Item	Assembly Part Number	Coil Part Number	Description
29-30	A-15849-R-4	FL-15411	LOWER RIGHT FLIPPER
31-32	A-15849-L-4	FL-15411	LOWER LEFT FLIPPER
33	A-22147	AE-30-2000	ROPE POPPER
34	A-22172	AE-26-1500	RAMP DIVERTER
35	A-22148	AE-27-1200	LEFT SPEED BAG
36	A-22148	AE-27-1200	RIGHT SPEED BAG

24 LED Circuits (SEE NOTE 3)

Item	Driver Board	LED Board	Description
37	A-21967-2	A-21991	
38	A-21967-2	A-21991	
39	A-21967-2	A-21991	
40	A-21967-2	A-21991	

General Illumination

Item	Bulb Number	Bulb Type	Description
01	24-8768	#555	ILLUMINATION STRING 1
02	24-8768	#555	ILLUMINATION STRING 2
03	24-6549	#44	ILLUMINATION STRING 3
04	24-6549	#44	ILLUMINATION STRING 4
05	24-6549	#44	ILLUMINATION STRING 5

24-6549 = #44 Bulb	24-8802 = #906 Bulb
24-8768 = #555 Bulb	

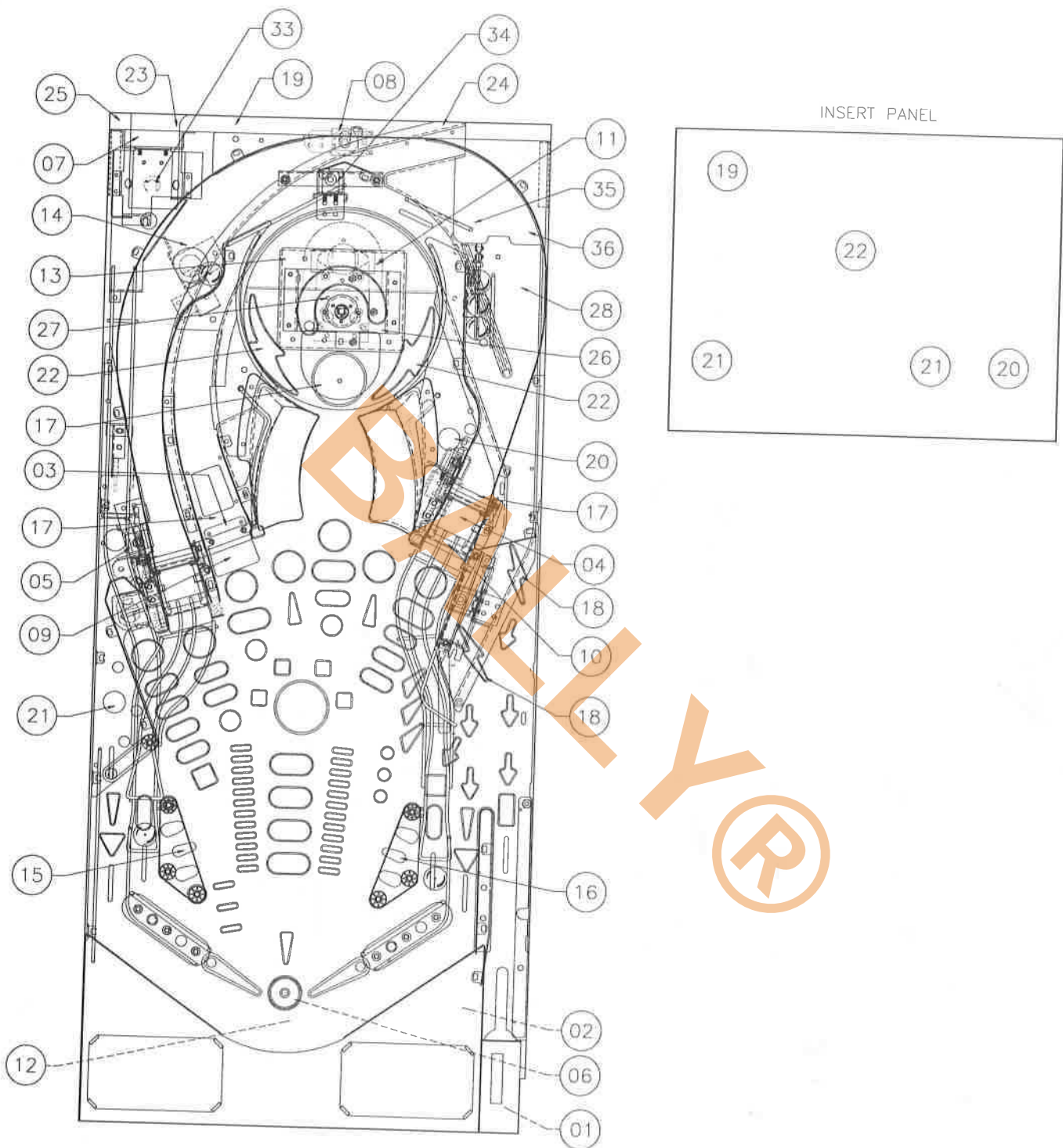
NOTE 1: Solenoid 25, Rope Motor, uses a Motor EMI board, p/n A-15542 (Qty. 1), and a motor, p/n 14-8038 (Qty. 1).

NOTE 2: Solenoid 26 Toggle Direction, and solenoid 27 Motor On/Off, work in tandem and use a TTL Bi-direct Motor board, p/n A-22013 (Qty. 1), and a motor, p/n 14-8036 (Qty.1).

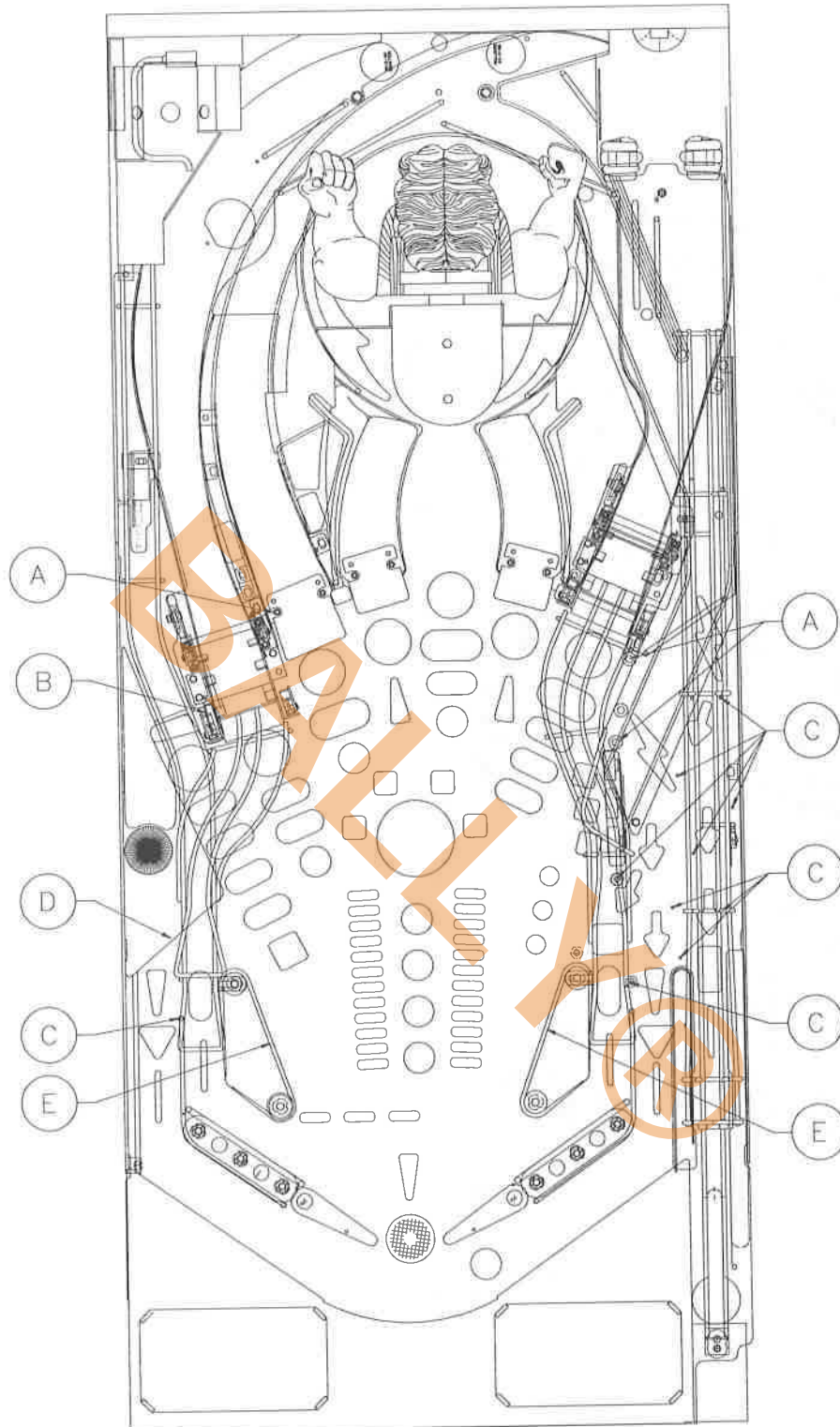
NOTE 3: The 24 LED Display uses two boards:

The Serial 24 Driver Board, part number A-21967-2 (Qty. 1), and the 24 LED Assembly, part number A-21991 (Qty. 2)

Solenoid/Flasher Locations

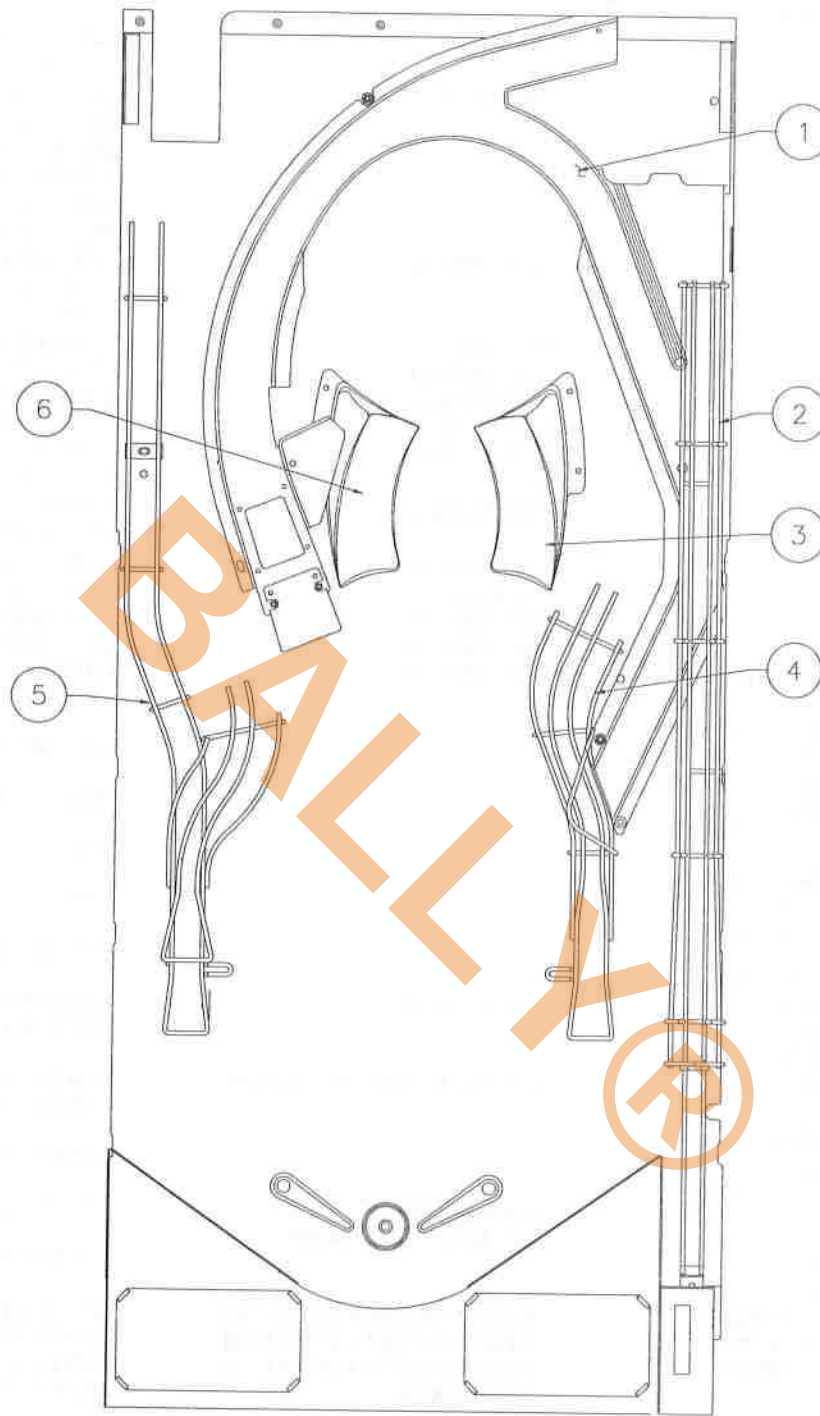


Rubber Rings



Item No.	Part No.	Description	Quantity
A	23-6556	Black Rubber Bumper Sleeve	3
B	23-6579-1	Tapered Rubber Bumper	1
C	23-6694-1	Black Rubber Grommet	10
D	23-6694-7	1-1/4" Black Rubber Ring	1
E	23-6694-10	2-1/2" Black Rubber Ring	2

Ramps



Item	Part Number	Description
1	A-22145	Main Ramp Assembly
2	12-7402.2	Launch Ramp
3	A-22154	Right Punch Ramp
4	12-7401	Right Wire Ramp
5	12-7400.1	Left Wire Ramp
6	A-22153	Left Punch Ramp

Switch Locations

Item Number	Switch Assembly Part Number <i>OR</i> Opto Assembly Part Number	Switch Part Number	Description
F1	----	SW-1A-194	*LOWER RIGHT FLIPPER E.O.S.
F2	A-17316	----	*LOWER RIGHT FLIPPER CABINET
F3	----	SW-1A-194	*LOWER LEFT FLIPPER E.O.S.
F4	A-17316	----	*LOWER LEFT FLIPPER CABINET
F5	NOT USED	----	UPPER RIGHT FLIPPER E.O.S
F6	NOT USED	----	UPPER RIGHT FLIPPER CABINET
F7	NOT USED	----	UPPER LEFT FLIPPER E.O.S.
F8	NOT USED	----	UPPER LEFT FLIPPER CABINET
11	----	5647-12693-13	MADE RAMP
12	A-11177	----	HEAVY BAG
13	20-9663-16	----	START BUTTON
14	----	04-10346	*PLUMB BOB TILT
15	B-13289	5647-12693-34	LOCK UP 1
16	A-17813-1	5647-12693-19	LEFT OUTLANE
17	A-17813	5647-12693-19	RIGHT RETURN
18	----	5647-12133-12	SHOOTER LANE
21	A-17238	----	*SLAM TILT
22	----	5643-09268-00	*COIN DOOR CLOSED
23	20-9663-B-4	----	BALL LAUNCH
24	----	5643-15190-00	*ALWAYS CLOSED
25	A-22252	A-22253-6	THREE BANK MIDDLE
26	A-17813-1	5647-12693-19	LEFT RETURN
27	A-17813-1	5647-12693-19	RIGHT OUTLANE
28	A-22169 (SEE NOTE 1)	5647-12693-11	POPPER
31	A-18617-1 (LED) A-18618-1 (PHOTO TRANS)	----	TROUGH ELECT
32	A-18617-1 (LED) A-18618-1 (PHOTO TRANS)	----	TROUGH BALL 1
33	A-18617-1 (LED) A-18618-1 (PHOTO TRANS)	----	TROUGH BALL 2
34	A-18617-1 (LED) A-18618-1 (PHOTO TRANS)	----	TROUGH BALL 3
35	A-18617-1 (LED) A-18618-1 (PHOTO TRANS)	----	TROUGH BALL 4
36	A-16908 (LED) A-16909 (PHOTO TRANS)	----	LEFT JAB MADE
37	A-22214 (SEE NOTE 1)	5647-12693-11	CORNER EJECT
38	A-16908 (LED) A-16909 (PHOTO TRANS)	----	RIGHT JAB MADE
41	A-22171 (SEE NOTE 1)	A-22260 (MOTOR 4-OPTO PCB)	BOXER POLE CENTER
42	A-16908 (LED) A-16909 (PHOTO TRANS)	----	BEHIND LEFT SCOOP
43	A-16908 (LED) A-16909 (PHOTO TRANS)	----	BEHIND RIGHT SCOOP
44	A-22189	A-16908 (LED) A-16909 (PHOTO TRANS)	ENTER RAMP
45	A-16908 (LED) A-16909 (PHOTO TRANS)	----	JUMP ROPE
46	A-22171 (SEE NOTE 1)	A-22260 (MOTOR 4-OPTO PCB)	BAG POLE CENTER
47	A-22171 (SEE NOTE 1)	A-22260 (MOTOR 4-OPTO PCB)	BOXER POLE RIGHT
48	A-22171 (SEE NOTE 1)	A-22260 (MOTOR 4-OPTO PCB)	BOXER POLE LEFT
51	A-17801	A-17800 (KICK) A-17794 (SCORE)**	LEFT SLINGSHOT
52	A-17801	A-17800 (KICK) A-17794 (SCORE)**	RIGHT SLINGSHOT
53	A-22252	A-22253-6	THREE BANK BOTTOM
54	A-22252	A-22253-6	THREE BANK TOP
55	A-17795-6	----	LEFT HALF GUY
56	A-17795-6	----	RIGHT HALF GUY
57	B-13289	5647-12693-33	LOCK UP 2
58	B-13289	5647-12693-32	LOCK UP 3
61	A-22176 (SEE NOTE 1)	5647-12693-36	LEFT SCOOP UP
62	A-22176 (SEE NOTE 1)	5647-12693-36	RIGHT SCOOP UP
63	A-17813-1	5647-12693-19	THROWN TOWEL
64	A-22147 (SEE NOTE 1)	A-20533.1-1 (POSITION ENCODER PCB)	ROPE CAM

Switch Locations

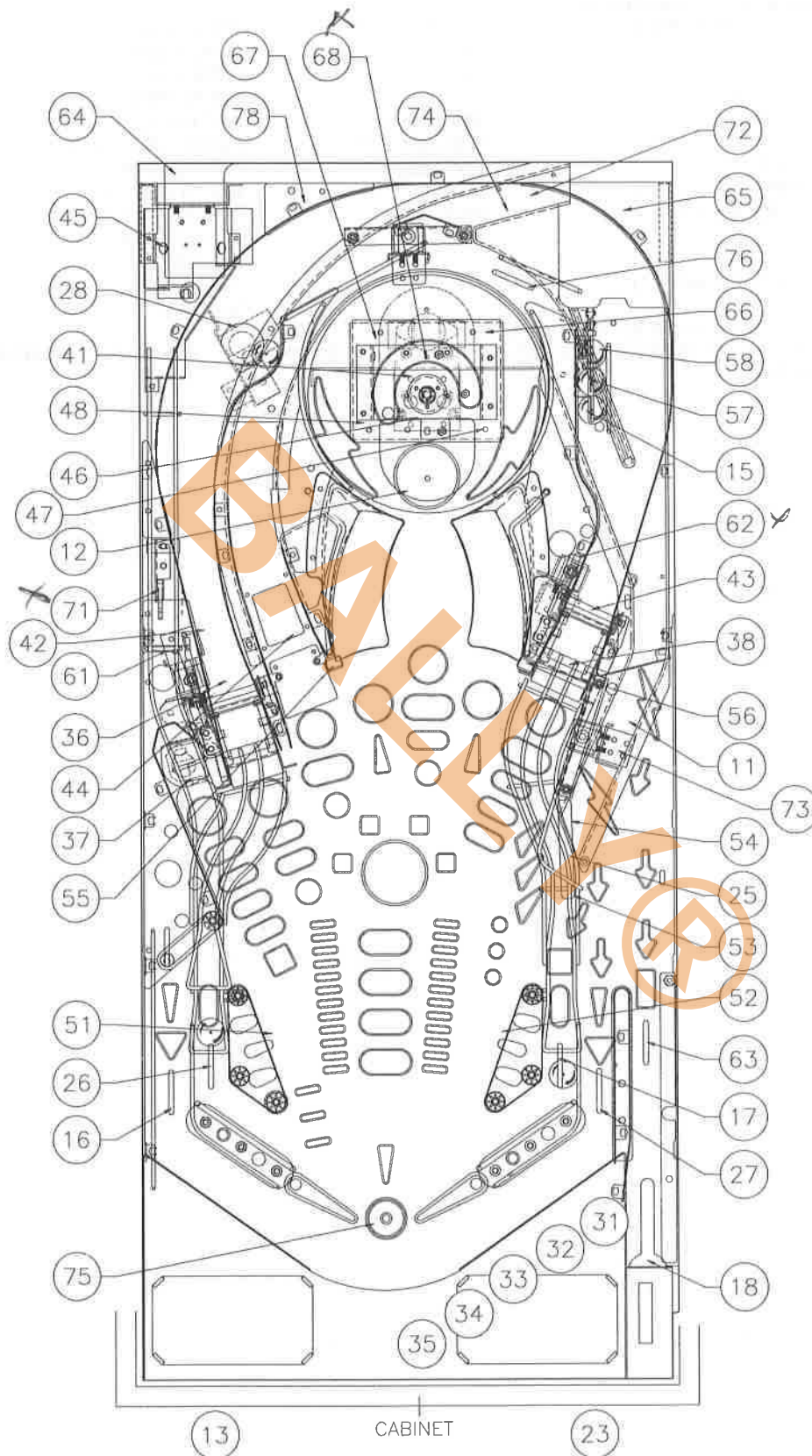
Item Number	Switch Assembly Part Number <u>OR</u> Opto Assembly Part Number	Switch Part Number	Description
65	A-22148 (SEE NOTE 1)	SW-1A-215	SPEED BAG
66	A-11177	-----	BOXER GUT 1
67	A-11177	-----	BOXER GUT 2
68	SW-1A-216-3	-----	BOXER HEAD
71	A-22179	5647-12693-17	EXIT ROPE
72	-----	5647-12693-13	ENTER SPEED BAG
73	A-22168	5647-12693-11	DANGER ZONE
74	A-22220 (SEE NOTE 1)	A-16443	ENTER LOCKUP
75	A-22173 (SEE NOTE 1)	5647-12693-11	UP/DOWN POST
76	-----	5647-12693-13	TOP OF RAMP
77	-----	-----	NOT USED
78	A-22220 (SEE NOTE 1)	A-16443	ENTER ROPE
81 TO 88	-----	-----	NOT USED

*NOT SHOWN. **SCORE SWITCHES HAVE DIODES ATTACHED.

NOTE 1: THIS IS THE COMPLETE MECHANICAL ASSEMBLY PART NUMBER, NOT A SWITCH ASSEMBLY PART NUMBER.

BALLY®

Switch Locations



SWITCH MATRIX

DEDICATED GROUNDED SWITCHES	Column Row	White  Green								FLIPPER GROUNDED SWITCHES
		1 Green-Brown J206-1 U20-18	2 Green-Red J206-2 U20-17	3 Green-Orange J206-3 U20-16	4 Green-White J206-4 U20-15	5 Green-Black J206-5 U20-14	6 Green-Blue J206-6 U20-13	7 Green-Violet J206-7 U20-12	8 Green-Gray J206-9 U20-11	
Orange-Brown J205-1 LEFT COIN CHUTE U17-5 D1	1 White-Brown J208-1 U18-11	MADE RAMP 11	SLAM TILT 21	TROUGH EJECT 31	BOXER POLE CENTER 41	LEFT SLINGSHOT 51	LEFT SCOOP UP 61	EXIT ROPE 71	NOT USED 81	BLACK-GREEN J208-13 LOWER RIGHT FLIPPER E.O.S. F1
Orange-Red J205-2 CENTER COIN CHUTE U17-7 D2	2 White-Red J208-2 U18-9	HEAVY BAG 12	COIN DOOR CLOSED 22	TROUGH BALL 1 32	BEHIND LEFT SCOOP 42	RIGHT SLINGSHOT 52	RIGHT SCOOP UP 62	ENTER SPEED BAG 72	NOT USED 82	BLUE-VIOLET J212-12 LOWER RIGHT FLIPPER OPTO F2
Orange-Black J205-3 RIGHT COIN CHUTE U17-11 D3	3 White-Orange J208-3 U18-5	START BUTTON 13	BALL LAUNCH 23	TROUGH BALL 2 33	BEHIND RIGHT SCOOP 43	THREE BANK BOTTOM 53	THROWN TOWEL 63	DANGER ZONE 73	NOT USED 83	BLACK-BLUE J208-12 LOWER LEFT FLIPPER E.O.S. F3
Orange-Yellow J205-4 4TH COIN CHUTE U17-9 D4	4 White-Yellow J208-4 U18-7	PLUMB BOB TILT 14	ALWAYS CLOSED 24	TROUGH BALL 3 34	ENTER RAMP 44	THREE BANK TOP 54	ROPE CAM 64	ENTER LOCK UP 74	NOT USED 84	BLUE-GRAY J212-11 LOWER LEFT FLIPPER OPTO F4
Orange-Green J205-6 U16-9 Normal Function Test Function Srv Crdts Escape D5	5 White-Green J208-5 U19-11	LOCK UP 1 15	THREE BANK MIDDLE 25	TROUGH BALL 4 35	JUMP ROPE 45	LEFT HALF GUY 55	SPEED BAG 65	UP/DOWN POST 75	NOT USED 85	BLACK-VIOLET J208-11 UPPER RIGHT FLIPPER E.O.S. F5
Orange-Blue J205-7 U16-11 Normal Function Test Function Volume Dn Down D6	6 White-Blue J208-7 U19-9	LEFT OUTLANE 16	LEFT RETURN 26	LEFT JAB MADE 36	BAG POLE CENTER 46	RIGHT HALF GUY 56	BOXER GUT 1 66	TOP OF RAMP 76	NOT USED 86	BLACK-YELLOW J212-10 UPPER RIGHT FLIPPER OPTO F6
Orange-Violet J205-8 U16-7 Normal Function Test Function Volume Up Up D7	7 White-Violet J208-8 U19-5	RIGHT RETURN 17	RIGHT OUTLANE 27	CORNER EJECT 37	BOXER POLE RIGHT 47	LOCK UP 2 57	BOXER GUT 2 67	NOT USED 77	NOT USED 87	BLACK-GRAY J208-10 UPPER LEFT FLIPPER E.O.S. F7
Orange-Gray J205-9 U16-5 Normal Function Test Function Begin Test Enter D8	8 White-Gray J208-9 U19-7	SHOOTER LANE 18	POPPER 28	RIGHT JAB MADE 38	BOXER POLE LEFT 48	LOCK UP 3 58	BOXER HEAD 68	ENTER ROPE 78	NOT USED 88	BLACK-BLUE J212-9 UPPER LEFT FLIPPER OPTO F8

J2XX = CPU BOARD

= OPTO, TYPICALLY CLOSED

LAMP MATRIX

Yellow (B+)

Red

Column Row	1 Yellow-Brown J121-1 Q96	2 Yellow-Red J121-2 Q100	3 Yellow-Orange J121-3 Q95	4 Yellow-Black J121-4 Q99	5 Yellow-Green J121-5 Q94	6 Yellow-Blue J121-6 Q98	7 Yellow-Violet J121-7 Q93	8 Yellow-Gray J121-9 Q97
1 Red-Brown J125-1 Q104	HEAVY BAG COMPLETE 11	BOUT 1 21	LOWER BLUE ARROW 31	LEFT HOOK 41	JACKPOTS COMPLETE 51	ULTIMATE CHALLENGE 61	RAID 71	RIGHT KO 81
2 Red-Black J125-2 Q108	JUMP ROPE COMPLETE 12	BOUT 2 22	LEFT HOOK TO WIN 32	BODY BLOW 42	PUB CHAMPION 52	POKER NIGHT 62	FISTICUFF 72	LEFT SECOND WIND 82
3 Red-Orange J125-4 Q103	SPEED BAG COMPLETE 13	BOUT 3 23	WHITE ARROW 33	RIGHT HOOK 43	WON BY KO 53	EXTRA BALL 63	MULTIBRAWL 73	TOP BLUE ARROW 83
4 Red-Yellow J125-5 Q107	RIGHT JAB COMBO 14	BOUT 4 24	THROWN TOWEL 34	CENTER JACKPOT 44	MULTIBALLS COMPLETE 54	SPITTING GALLERY 64	THREE BANK TOP 74	CENTER KO 84
5 Red-Green J125-6 Q102	LOCK 15	JUMP ROPE 25	CENTER BLUE ARROW 35	LEFT KO BOXER 45	TRAINING COMPLETE 55	LEFT START FIGHT 65	THREE BANK MIDDLE 75	BALL SAVE POST 85
6 Red-Blue J125-7 Q106	RIGHT START FIGHT 16	LEFT JAB COMBO 26	LOWER YELLOW ARROW 36	HURRY-UP 46	SPEED BAG 56	THE CORNER 66	THREE BANK BOTTOM 76	SHOOT AGAIN 86
7 Red-Violet J125-8 Q101	RIGHT JACKPOT 17	CENTER START FIGHT 27	TOP YELLOW ARROW 37	HEAVY BAG 47	LEFT JACKPOT 57	RIGHT RETURN 67	LEFT RETURN 77	LAUNCH BUTTON 87
8 Red-Gray J125-9 Q105	RIGHT JAB 18	LEFT JAB 28	NOT USED 38	RIGHT KO BOXER 48	BALCONY 58	RIGHT SECOND WIND 68	LEFT KO 78	START BUTTON 88

J1XX = Power Driver Board

SOLENOID/FLASHER TABLE

Sol. No.	Function	Solenoid Type	Voltage Connections			Drive Xistor	Drive Connections			Drive Wire Color	Solenoid Part Number	
			Playfield	Insert	Cabinet		Playfield	Insert	Cabinet		Flashlamp Type	Insert
01	AUTO PLUNGER	High Power	J133-2			Q72	J116-1			VIO-BRN	AE-26-1200	
02	TROUGH EJECT	High Power	J133-2			Q68	J116-2			VIO-RED	AE-26-1500	
03	LEFT SCOOP POWER	High Power	J133-2			Q71	J116-4			VIO-ORG	FL-22241	
04	RIGHT SCOOP POWER	High Power	J133-2			Q67	J116-5			VIO-YEL	FL-22241	
05	CORNER KICKOUT	High Power	J133-2			Q70	J116-6			VIO-GRN	AE-30-2000	
06	POST POWER	High Power	J133-2			Q66	J116-7			VIO-BLU	FL-22241	
07	ROPE MAGNET	High Power	J133-2			Q69	J116-8			VIO-BLK	20-10197	
08	POST DIVERTER	High Power	J133-2			Q65	J116-9			VIO-GRY	AE-27-1200	
09	LEFT SCOOP HOLD	Low Power	J133-2			Q44	J113-1			BRN-BLK	FL-22241	
10	RIGHT SCOOP HOLD	Low Power	J133-2			Q48	J113-3			BRN-RED	FL-22241	
11	RIGHT ARM	Low Power	J133-3			Q43	J113-4			BRN-ORG	04-11000	
12	POST HOLD	Low Power	J133-2			Q47	J113-5			BRN-YEL	FL-22241	
13	LEFT ARM	Low Power	J133-3			Q42	J113-6			BRN-GRN	04-11000	
14	POPPER	Low Power	J133-3			Q46	J113-7			BRN-BLU	AE-27-1200	
15	LEFT SLINGSHOT	Low Power	J133-3			Q41	J113-8			BRN-VIO	AE-26-1200	
16	RIGHT SLINGSHOT	Low Power	J133-3			Q45	J113-9			BRN-GRY	AE-26-1200	
17	BOXER FLASHER (3)	Flasher	J133-6			Q28	J111-1			BLK-BRN	#906 (3)	
18	DANGER ZONE FLASHER (2)	Flasher	J133-6			Q32	J111-2			BLK-RED	#906 (2)	
19	JUMP ROPE FLASHER (2)	Flasher	J133-6	J134-5		Q27	J111-3	J112-3		BLK-ORG	#906 (1)	#906 (1)
20	LOCK KICKOUT (2)	Flasher	J133-6	J134-5		Q31	J111-4	J112-5		BLK-YEL	#906 (1)	#906 (1)
21	LEFT KICKOUT (3)	Flasher	J133-6	J134-5		Q26	J111-5	J112-6		BLU-GRN	#906 (1)	#906 (2)
22	BOXER FLASHER (3)	Flasher	J133-6	J134-5		Q30	J111-6	J112-7		BLU-BLK	#906 (2)	#906 (1)
23	JUMP ROPE FLASHER	Flasher	J133-6			Q25	J111-7			BLU-VIO	#906 (1)	
24	SPEED BAG FLASHER	Flasher	J133-6			Q29	J111-8			BLU-GRY	#906 (1)	
25	ROPE MOTOR	Gen. Purpose	J141-2			Q16	J109-1			BLU-BRN	SEE NOTE 1	
26	TOGGLE DIRECTION	Gen. Purpose	J141-2			Q15	J109-2			BLU-RED	SEE NOTE 2	
27	MOTOR ON/OFF	Gen. Purpose	J141-2			Q14	J109-3			BLU-ORG	SEE NOTE 2	
28	LOCK PIN	Gen. Purpose	J133-1			Q13	J109-4			BLU-YEL	AE-26-1500	
Flipper Circuits		Solenoid Type	Playfield Voltage Connection		Drive Xistors Power	Hold	Playfield Drive Connections		Drive Wire Colors Power	Hold	Coil Part No.	Coil Colors
29	LOWER RIGHT FLIPPER	Power	J119-1 (RED-GRN)		Q90		J120-13		YEL-GRN		FL-15411	BLU
30		Hold	J119-1 (RED-GRN)			Q92	J120-11		ORG-GRN			
31	LOWER LEFT FLIPPER	Power	J119-4 (RED-BLU)		Q87		J120-9		YEL-BLU		FL-15411	BLU
32		Hold	J119-4 (RED-BLU)			Q89	J120-7		ORG-BLU			
33	ROPE POPPER	Power	J119-6 (RED-VIO)		Q84		J120-6		YEL-VIO		AE-30-2000	VIO
34	RAMP DIVERTER	Hold	J119-6 (RED-VIO)			Q86	J120-4		ORG-VIO		AE-26-1500	BLU
35	LEFT SPEED BAG	Power	J119-8 (RED-GRY)		Q81		J120-3		YEL-GRY		AE-27-1200	WHT
36	RIGHT SPEED BAG	Hold	J119-8 (RED-GRY)			Q83	J120-1		ORG-GRY		AE-27-1200	WHT
24 LED Display		Solenoid Type	Playfield Voltage Connection		Drive Gates		Playfield Drive Connections		Drive Wire Colors		Device Part Number	
37		Low Power	J138-2		U3A, U3B		J110-1		BRN-WHT		SEE NOTE 3	
38		Low Power	J138-2		U3C, U3D		J110-3		ORG-WHT		SEE NOTE 3	
39		Low Power	J138-2		U3G, U3H		J110-4		YEL-WHT		SEE NOTE 3	
40		Low Power	J138-2		U3E, U3F		J110-5		BLU-WHT		SEE NOTE 3	
General Illumination		Solenoid Type	Voltage Connections			Drive Xistor	Drive Connections			Drive Wire Color	Bulb Type	
01	ILLUMINATION STRING 1	G.I.		J106-1		Q5		J106-7		WHT-BRN		#555
02	ILLUMINATION STRING 2	G.I.		J106-2		Q4		J106-8		WHT-ORG		#555
03	ILLUMINATION STRING 3	G.I.	J105-3			Q3	J105-9			WHT-YEL	#44	
04	ILLUMINATION STRING 4	G.I.	J105-5			Q2	J105-10			WHT-GRN	#44	
05	ILLUMINATION STRING 5	G.I.	J105-6		J104-3	Q1	J105-11		J104-1	WHT-VIO	#44	
*These general illumination strings do not brighten and dim, they are always on.												
24-6549 = #44 bulb		24-8768 = #555 bulb										
24-8704 = #89 bulb		24-8802 = #906 bulb										

†The tieback diode for solenoid 28, Lock Pin, is at J109-9.

NOTE 1: Solenoid 25, Rope Motor, uses a Motor EMI board, p/n A-15542 (Qty. 1), and a motor, p/n 14-8038 (Qty. 1).

NOTE 2: Solenoid 26 Toggle Direction, and solenoid 27 Motor On/Off, work in tandem and use a TTL Bi-direct Motor board, p/n A-22013 (Qty. 1), and a motor, p/n 14-8036 (Qty. 1).

NOTE 3: The 24 LED Display uses two boards:

The Serial 24 Driver Board, part number A-21967-2 (Qty. 1), and the 24 LED Assembly, part number A-21991 (Qty. 2)

POWER INTERFACE/CORDSET APPLICATION CHART

COUNTRY	UNIVERSAL PWR. INTERFACE ASSEMBLY	VOLTAGE PROGRAMMING JUMP CABLE				4AMP FUSE/ LABEL	5AMP FUSE/ LABEL	LABEL HIGH/ VOLTAGE CAUTION	POWER ADAPTER CORD	CORDSET										
	A-20871	H-17837-1	H-17837-2	H-17837-3	H-17837-4	5731-14530-00 FUSE	16-10145 LABEL	5731-14046-00 FUSE	16-9698 LABEL	16-9669	5850-14052-00	5850-13271-00	5850-13272-00	5850-13273-00	5850-13274-00	5850-13275-00	5850-13276-00	5850-13277-00	5850-13278-00	A-17175-2
UNITED STATES	X		X					X	X		X	X								
CANADA	X	X						X	X			X								
TAIWAN	X		X					X	X			X								
MEXICO	X		X					X	X			X								
CENTRAL AMERICA	X		X					X	X			X								
SOUTH KOREA	X		X					X	X			X								
PUERTO RICO	X		X					X	X			X								
AUSTRIA	X		X			X	X			X			X							
BELGIUM	X		X			X	X			X			X							
FINLAND	X		X			X	X			X			X							
FRANCE	X		X			X	X			X			X							
GREECE	X		X			X	X			X			X							
HOLLAND	X		X			X	X			X			X							
HUNGARY	X		X			X	X			X			X							
NETHERLANDS	X		X			X	X			X			X							
NETH. ANTILLES	X		X			X	X			X			X							
NORWAY	X		X			X	X			X			X							
POLAND	X		X			X	X			X			X							
PORTUGAL	X		X			X	X			X			X							
SPAIN	X		X			X	X			X			X							
SWEDEN	X		X			X	X			X			X							
TURKEY	X		X			X	X			X			X							
WEST GERMANY	X		X			X	X			X			X							
UNITED KINGDOM	X		X			X	X			X				X						
IRELAND	X		X			X	X			X				X						
HONG KONG	X		X			X	X			X				X						
DENMARK	X		X			X	X			X					X					
ITALY	X		X			X	X			X						X				
CHILE	X		X			X	X			X						X				
PEOPLE'S REP. OF CHINA	X		X			X	X			X						X				
SWITZERLAND	X		X			X	X			X							X			
AUSTRALIA	X		X			X	X			X								X		
NEW ZEALAND	X		X			X	X			X								X		
ARGENTINA	X		X			X	X			X								X		
JAPAN	X			X				X	X										X	X
CROATIA	X			X		X	X			X			X							

SECTION THREE

GAME WIRING AND SCHEMATICS

CONNECTOR & COMPONENT IDENTIFICATION

Each plug or jack receives a number that identifies the circuit board and the position on that board that it connects to. J-designations refer to a male connector. P-designations refer to a female connector. For example, J101 designates jack 1 of board 1 (a Power Driver board jack); P206 designates plug 6 of board 2 (a CPU board plug). Identifying the specific pin number of a connector involves a hyphen, which separates the pin number from the plug or jack designation. For example, J101-3 refers to pin 3 of jack 1 on board 1.

Other game components may also have similar numbers to clarify their locations or related circuits. For example, F501 is a fuse on the Audio Video board.

Prefix numbers for WPC circuit boards are listed below.

J1XX - Power Driver board jacks; F1XX - Power Driver board fuses

J2XX - CPU Board (There are no fuses on the CPU board.)

J5XX and J6XX - Audio Video board (AV board) jacks; F5XX and F6XX - Audio Video board fuses

Schematics for standard WPC backbox boards are found in the WPC Schematics Manual. Playfield, cabinet and all other backbox board schematics are found in this section.

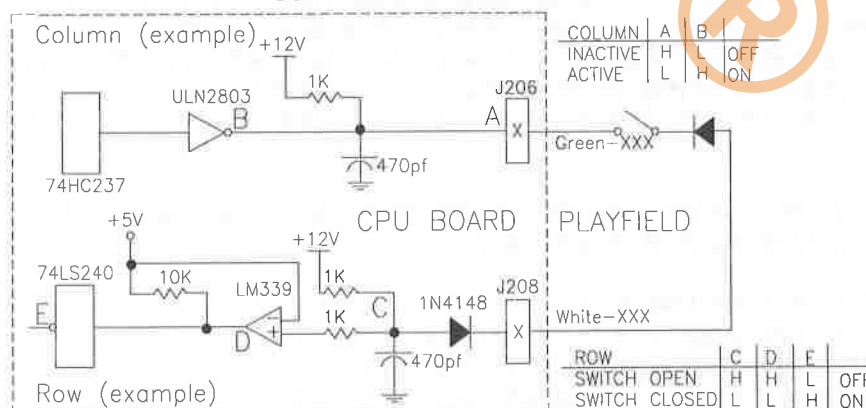
SWITCH MATRIX

DEDICATED GROUNDED SWITCHES	Column	1 Green-Brown J206-1 U20-18	2 Green-Red J206-2 U20-17	3 Green-Orange J206-3 U20-16	4 Green-White J206-4 U20-15	5 Green-Black J206-5 U20-14	6 Green-Blue J206-6 U20-13	7 Green-Violet J206-7 U20-12	8 Green-Gray J206-9 U20-11	FLIPPER GROUNDED SWITCHES
	Row									
Orange-Brown J205-1 LEFT COIN CHUTE U17-5 D1	1 White-Brown J208-1 U18-11	MADE RAMP 11	SLAM TILT 21	TROUGH EJECT 31	BOXER POLE CENTER 41	LEFT SLINGSHOT 51	LEFT SCOOP UP 61	EXIT ROPE 71	NOT USED 81	BLACK-GREEN J208-13 LOWER RIGHT FLIPPER E.O.S. F1
Orange-Red J205-2 CENTER COIN CHUTE U17-7 D2	2 White-Red J208-2 U18-9	HEAVY BAG 12	COIN DOOR CLOSED 22	TROUGH BALL 1 32	BEHIND LEFT SCOOP 42	RIGHT SLINGSHOT 52	RIGHT SCOOP UP 62	ENTER SPEED BAG 72	NOT USED 82	BLUE-VIOLET J212-12 LOWER RIGHT FLIPPER OPTO F2
Orange-Black J205-3 RIGHT COIN CHUTE U17-11 D3	3 White-Orange J208-3 U18-5	START BUTTON 13	BALL LAUNCH 23	TROUGH BALL 2 33	BEHIND RIGHT SCOOP 43	THREE BANK BOTTOM 53	THROWN TOWEL 63	DANGER ZONE 73	NOT USED 83	BLACK-BLUE J208-12 LOWER LEFT FLIPPER E.O.S. F3
Orange-Yellow J205-4 4TH COIN CHUTE U17-9 D4	4 White-Yellow J208-4 U18-7	PLUMB BOB TILT 14	ALWAYS CLOSED 24	TROUGH BALL 3 34	ENTER RAMP 44	THREE BANK TOP 54	ROPE CAM 64	ENTER LOCK UP 74	NOT USED 84	BLUE-GRAY J212-11 LOWER LEFT FLIPPER OPTO F4
Orange-Green J205-6 U16-9 Normal Function Test Function Srv Crdts Escape D5	5 White-Green J208-5 U19-11	LOCK UP 1 15	THREE BANK MIDDLE 25	TROUGH BALL 4 35	JUMP ROPE 45	LEFT HALF GUY 55	SPEED BAG 65	NOT USED 75	NOT USED 85	BLACK-VIOLET J208-11 UPPER RIGHT FLIPPER E.O.S. F5
Orange-Blue J205-7 U16-11 Normal Function Test Function Volume Dn Volume Up D6	6 White-Blue J208-7 U19-9	LEFT OUTLANE 16	LEFT RETURN 26	LEFT JAB MADE 36	BAG POLE CENTER 46	RIGHT HALF GUY 56	BOXER GUT 1 66	TOP OF RAMP 76	NOT USED 86	BLACK-YELLOW J212-10 UPPER RIGHT FLIPPER OPTO F6
Orange-Violet J205-8 U16-7 Normal Function Test Function Volume Up Volume Dn D7	7 White-Violet J208-8 U19-5	RIGHT RETURN 17	RIGHT OUTLANE 27	CORNER EJECT 37	BOXER POLE RIGHT 47	LOCK UP 2 57	BOXER GUT 2 67	NOT USED 77	NOT USED 87	BLACK-GRAY J208-10 UPPER LEFT FLIPPER E.O.S. F7
Orange-Gray J205-9 U16-5 Normal Function Test Function Begin Test Enter D8	8 White-Gray J208-9 U19-7	SHOOTER LANE 18	POPPER 28	RIGHT JAB MADE 38	BOXER POLE LEFT 48	LOCK UP 3 58	BOXER HEAD 68	ENTER ROPE 78	NOT USED 88	BLACK-BLUE J212-9 UPPER LEFT FLIPPER OPTO F8

J2XX = CPU BOARD

= OPTO, TYPICALLY CLOSED

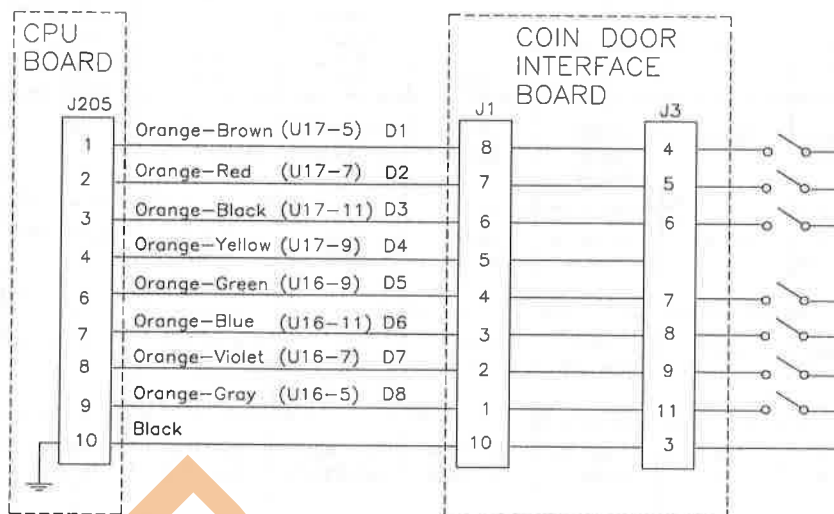
SWITCH MATRIX CIRCUIT



The microprocessor is constantly strobing the column side of the switch. When point "A" on the column circuit toggles low, the column side is active. When a switch closes, the row side of the circuit activates. The "+" input to the LM339 drops below +5V, therefore, its output is low. Corresponding row and column switches must be low at the same time for the switch to be considered closed by the microprocessor. When the switch opens, the "+" input to the LM339 is above +5V, its output is high and the row is inactive.

Control Switches
D5 - Normal Function
D6 - Normal Function
D7 - Normal Function
D8 - Normal Function

DEDICATED SWITCH



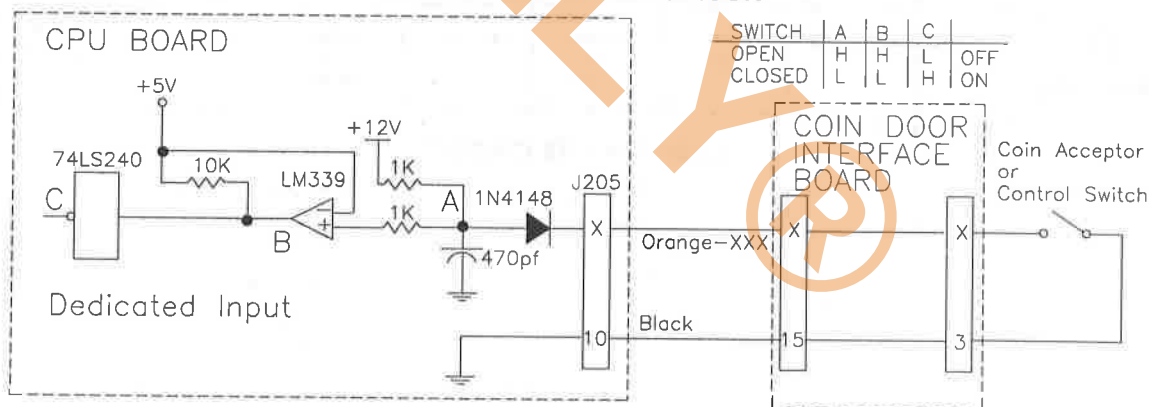
Coin Acceptor Switches

- D1 - Left Coin Chute
D2 - Center Coin Chute
D3 - Right Coin Chute
D4 - Fourth Coin Chute

Control Switches

- D5 - Normal Function, Service Credits; Test Function, Escape
D6 - Normal Function, Volume Down; Test Function, Down
D7 - Normal Function, Volume Up; Test Function, Up
D8 - Normal Function, Begin Test; Test Function, Enter

DEDICATED SWITCH CIRCUIT



The dedicated switches operate similar in the matrix, except that instead of a column circuit there is a direct tie to ground. Therefore, the column side is constantly active (low).

When a switch closes, the row side (dedicated input) of the circuit activates. The “+” input to the LM339 drops below +5V, therefore the output is low. Since the row circuit (dedicated input) is tied directly to ground through the switch, the switch is considered closed by the microprocessor. When the switch opens, the “+” input to the LM339 is above +5V, its output is high and the row is inactive.

LAMP MATRIX

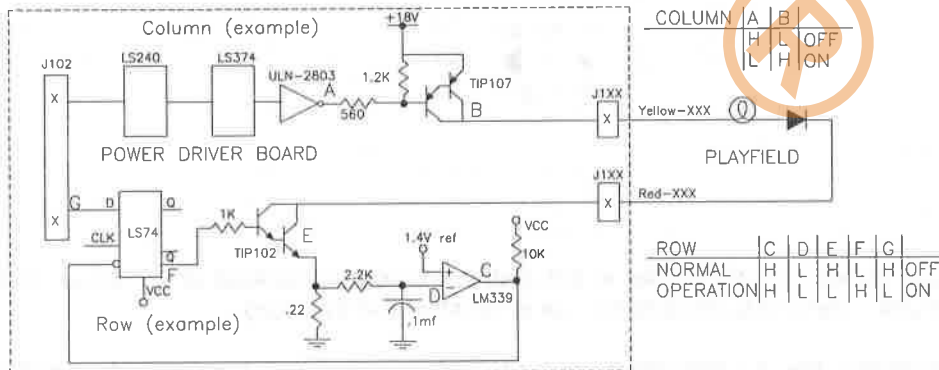
Yellow (B+)

Red

Column Row	1 Yellow-Brown J121-1 Q96	2 Yellow-Red J121-2 Q100	3 Yellow-Orange J121-3 Q95	4 Yellow-Black J121-4 Q99	5 Yellow-Green J121-5 Q94	6 Yellow-Blue J121-6 Q98	7 Yellow-Violet J121-7 Q93	8 Yellow-Gray J121-9 Q97
1 Red-Brown J125-1 Q104	HEAVY BAG COMPLETE 11	BOUT 1 21	LOWER BLUE ARROW 31	LEFT HOOK 41	JACKPOTS COMPLETE 51	ULTIMATE CHALLENGE 61	RAID 71	RIGHT KO 81
2 Red-Black J125-2 Q108	JUMP ROPE COMPLETE 12	BOUT 2 22	LEFT HOOK TO WIN 32	BODY BLOW 42	PUB CHAMPION 52	POKER NIGHT 62	FISTICUFF 72	LEFT SECOND WIND 82
3 Red-Orange J125-4 Q103	SPEED BAG COMPLETE 13	BOUT 3 23	WHITE ARROW 33	RIGHT HOOK 43	WON BY KO 53	EXTRA BALL 63	MULTIBRAWL 73	TOP BLUE ARROW 83
4 Red-Yellow J125-5 Q107	RIGHT JAB COMBO 14	BOUT 4 24	THROWN TOWEL 34	CENTER JACKPOT 44	MULTIBALLS COMPLETE 54	SPITTING GALLERY 64	THREE BANK TOP 74	CENTER KO 84
5 Red-Green J125-6 Q102	LOCK 15	JUMP ROPE 25	CENTER BLUE ARROW 35	LEFT KO BOXER 45	TRAINING COMPLETE 55	LEFT START FIGHT 65	THREE BANK MIDDLE 75	BALL SAVE POST 85
6 Red-Blue J125-7 Q106	RIGHT START FIGHT 16	LEFT JAB COMBO 26	LOWER YELLOW ARROW 36	HURRY-UP 46	SPEED BAG 56	THE CORNER 66	THREE BANK BOTTOM 76	SHOOT AGAIN 86
7 Red-Violet J125-8 Q101	RIGHT JACKPOT 17	CENTER START FIGHT 27	TOP YELLOW ARROW 37	HEAVY BAG 47	LEFT JACKPOT 57	RIGHT RETURN 67	LEFT RETURN 77	LAUNCH BUTTON 87
8 Red-Gray J125-9 Q105	RIGHT JAB 18	LEFT JAB 28	NOT USED 38	RIGHT KO BOXER 48	BALCONY 58	RIGHT SECOND WIND 68	LEFT KO 78	START BUTTON 88

J1XX = Power Driver Board

LAMP MATRIX CIRCUIT



The microprocessor sends a signal to the column circuit causing the output of the ULN-2803 to toggle. When point "A" drops low, the TIP107 transistor conducts and point "B" changes to a high state. At the same time, the microprocessor drives the input of the 74LS74 low, causing a high at output "F". A high state at the base of the TIP102 causes the transistor to conduct, bringing the row circuit to ground and turning the lamp on. The microprocessor changes the input of the 74LS74 to a high state to turn the lamp off. In overcurrent conditions, the lamp is shut off through the comparator. If the voltage at the negative input of the LM339 rises above 1.4V, the output changes to a low, which is fed back to the 74LS74 and shuts the circuit off.

SOLENOID/FLASHER TABLE

Sol. No.	Function	Solenoid Type	Voltage Connections			Drive Xistor	Drive Connections			Drive Wire Color	Solenoid Part Number	
			Playfield	Insert	Cabinet		Playfield	Insert	Cabinet		Flashlamp Type	Playfield Insert
01	AUTO PLUNGER	High Power	J133-2			Q72	J116-1			VIO-BRN	AE-26-1200	
02	TROUGH EJECT	High Power	J133-2			Q68	J116-2			VIO-RED	AE-26-1500	
03	LEFT SCOOP POWER	High Power	J133-2			Q71	J116-4			VIO-ORG	FL-22241	
04	RIGHT SCOOP POWER	High Power	J133-2			Q67	J116-5			VIO-YEL	FL-22241	
05	CORNER KICKOUT	High Power	J133-2			Q70	J116-6			VIO-GRN	AE-30-2000	
06	POST POWER	High Power	J133-2			Q66	J116-7			VIO-BLU	FL-22241	
07	ROPE MAGNET	High Power	J133-2			Q69	J116-8			VIO-BLK	20-10197	
08	POST DIVERter	High Power	J133-2			Q65	J116-9			VIO-GRY	AE-27-1200	
09	LEFT SCOOP HOLD	Low Power	J133-2			Q44	J113-1			BRN-BLK	FL-22241	
10	RIGHT SCOOP HOLD	Low Power	J133-2			Q48	J113-3			BRN-RED	FL-22241	
11	RIGHT ARM	Low Power	J133-3			Q43	J113-4			BRN-ORG	04-11000	
12	POST HOLD	Low Power	J133-2			Q47	J113-5			BRN-YEL	FL-22241	
13	LEFT ARM	Low Power	J133-3			Q42	J113-6			BRN-GRN	04-11000	
14	POPPER	Low Power	J133-3			Q46	J113-7			BRN-BLU	AE-27-1200	
15	LEFT SLINGSHOT	Low Power	J133-3			Q41	J113-8			BRN-VIO	AE-26-1200	
16	RIGHT SLINGSHOT	Low Power	J133-3			Q45	J113-9			BRN-GRY	AE-26-1200	
17	BOXER FLASHER (3)	Flasher	J133-6			Q28	J111-1			BLK-BRN	#906 (3)	
18	DANGER ZONE FLASHER (2)	Flasher	J133-6			Q32	J111-2			BLK-RED	#906 (2)	
19	JUMP ROPE FLASHER (2)	Flasher	J133-6	J134-5		Q27	J111-3	J112-3		BLK-ORG	#906 (1)	#906 (1)
20	LOCK KICKOUT (2)	Flasher	J133-6	J134-5		Q31	J111-4	J112-5		BLK-YEL	#906 (1)	#906 (1)
21	LEFT KICKOUT (3)	Flasher	J133-6	J134-5		Q26	J111-5	J112-6		BLU-GRN	#906 (1)	#906 (2)
22	BOXER FLASHER (3)	Flasher	J133-6	J134-5		Q30	J111-6	J112-7		BLU-BLK	#906 (2)	#906 (1)
23	JUMP ROPE FLASHER	Flasher	J133-6			Q25	J111-7			BLU-VIO	#906 (1)	
24	SPEED BAG FLASHER	Flasher	J133-6			Q29	J111-8			BLU-GRY	#906 (1)	
25	ROPE MOTOR	Gen. Purpose	J141-2			Q16	J109-1			BLU-BRN	SEE NOTE 1	
26	TOGGLE DIRECTION	Gen. Purpose	J141-2			Q15	J109-2			BLU-RED	SEE NOTE 2	
27	MOTOR ON/OFF	Gen. Purpose	J141-2			Q14	J109-3			BLU-ORG	SEE NOTE 2	
28	LOCK PIN	Gen. Purpose	J133-1			Q13	J109-4			BLU-YEL	AE-26-1500	
Flipper Circuits		Solenoid Type	Playfield Voltage Connection		Drive Xistors Power	Hold	Playfield Drive Connections		Drive Wire Colors Power	Hold	Coil Part No.	Coil Colors
29	LOWER RIGHT FLIPPER	Power	J119-1	(RED-GRN)	Q90		J120-13		YEL-GRN		FL-15411	ORG
30		Hold	J119-1	(RED-GRN)	Q92		J120-11		ORG-GRN			
31	LOWER LEFT FLIPPER	Power	J119-4	(RED-BLU)	Q87		J120-9		YEL-BLU		FL-15411	ORG
32		Hold	J119-4	(RED-BLU)	Q89		J120-7		ORG-BLU			
33	ROPE POPPER	Power	J119-6	(RED-VIO)	Q84		J120-6		YEL-VIO		AE-30-2000	VIO
34	RAMP DIVERter	Hold	J119-6	(RED-VIO)	Q86		J120-4		ORG-VIO		AE-26-1500	BLU
35	LEFT SPEED BAG	Power	J119-8	(RED-GRY)	Q81		J120-3		YEL-GRY		AE-27-1200	WHT
36	RIGHT SPEED BAG	Hold	J119-8	(RED-GRY)	Q83		J120-1		ORG-GRY		AE-27-1200	WHT
24 LED Display		Solenoid Type	Playfield Voltage Connection		Drive Gates		Playfield Drive Connections		Drive Wire Colors		Device Part Number	
37		Low Power	J138-2		U3A, U3B		J110-1		BRN-WHT		SEE NOTE 3	
38		Low Power	J138-2		U3C, U3D		J110-3		ORG-WHT		SEE NOTE 3	
39		Low Power	J138-2		U3G, U3H		J110-4		YEL-WHT		SEE NOTE 3	
40		Low Power	J138-2		U3E, U3F		J110-5		BLU-WHT		SEE NOTE 3	
General Illumination		Solenoid Type	Voltage Connections			Drive Xistor	Drive Connections			Drive Wire	Bulb Type	
			Playfield	Insert	Cabinet		Playfield	Insert	Cabinet		Playfield	Insert
01	ILLUMINATION STRING 1	G.I.		J106-1		Q5		J106-7		WHT-BRN		#555
02	ILLUMINATION STRING 2	G.I.		J106-2		Q4		J106-8		WHT-ORG		#555
03	ILLUMINATION STRING 3	G.I.	J105-3			Q3	J105-9			WHT-YEL	#44	
04	ILLUMINATION STRING 4	G.I.	J105-5			Q2	J105-10			WHT-GRN	#44	
05	ILLUMINATION STRING 5	G.I.	J105-6		J104-3	Q1	J105-11		J104-1	WHT-VIO	#44	

*These general illumination strings do not brighten and dim, they are always on.

24-6549 = #44 bulb	24-8768 = #555 bulb
24-8704 = #89 bulb	24-8802 = #906 bulb

†The tieback diode for solenoid 28, Lock Pin, is at J109-9.

NOTE 1: Solenoid 25, Rope Motor, uses a Motor EMI board, p/n A-15542 (Qty. 1), and a motor, p/n 14-8038 (Qty. 1).

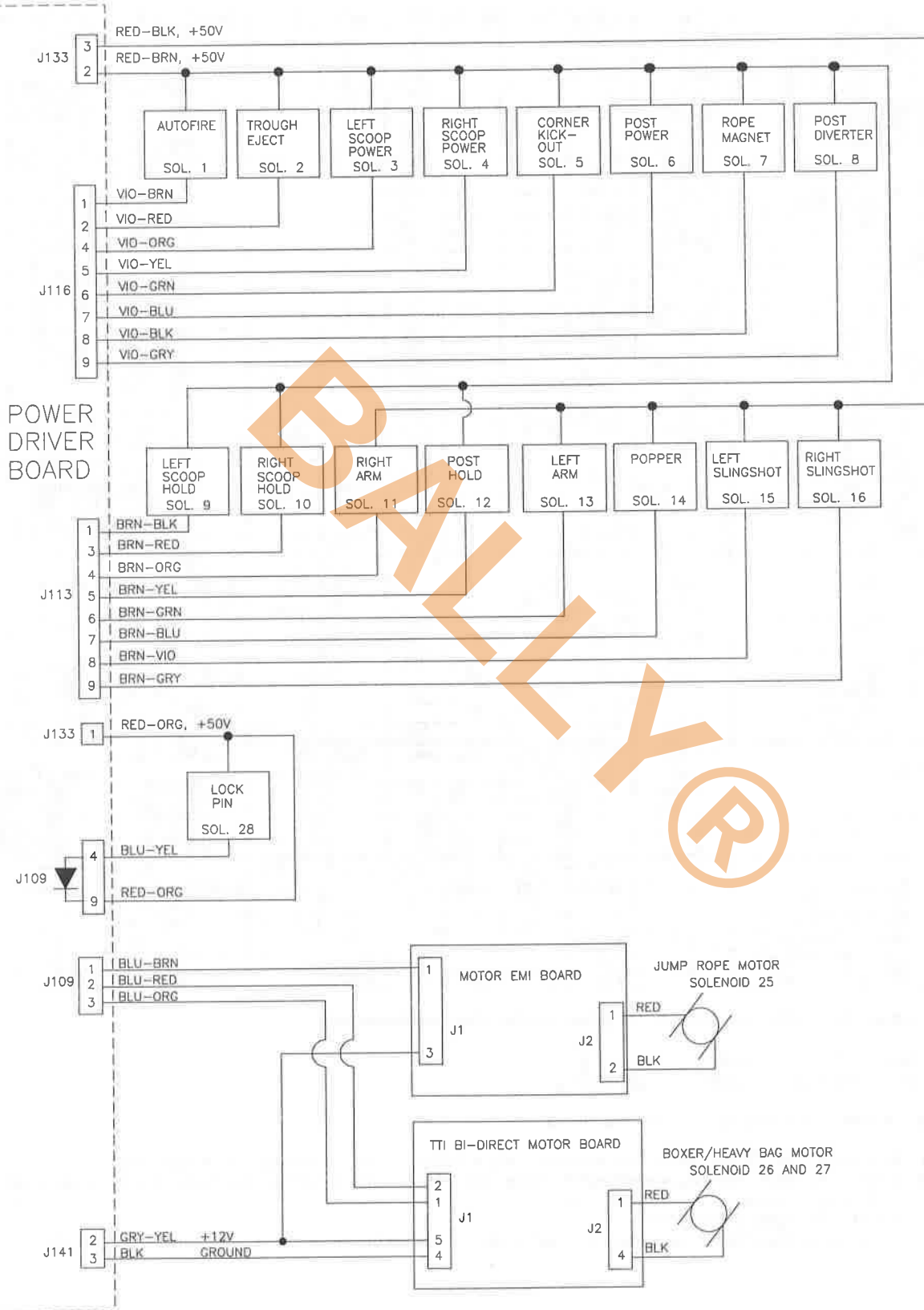
NOTE 2: Solenoid 26 Toggle Direction, and solenoid 27 Motor On/Off, work in tandem and use a TTL Bi-direct Motor board, p/n A-22013 (Qty. 1), and a motor, p/n 14-8036 (Qty.1).

NOTE 3: The 24 LED Display uses two boards:

The Serial 24 Driver Board, part number A-21967-2 (Qty. 1), and the 24 LED Assembly, part number A-21991 (Qty. 2)

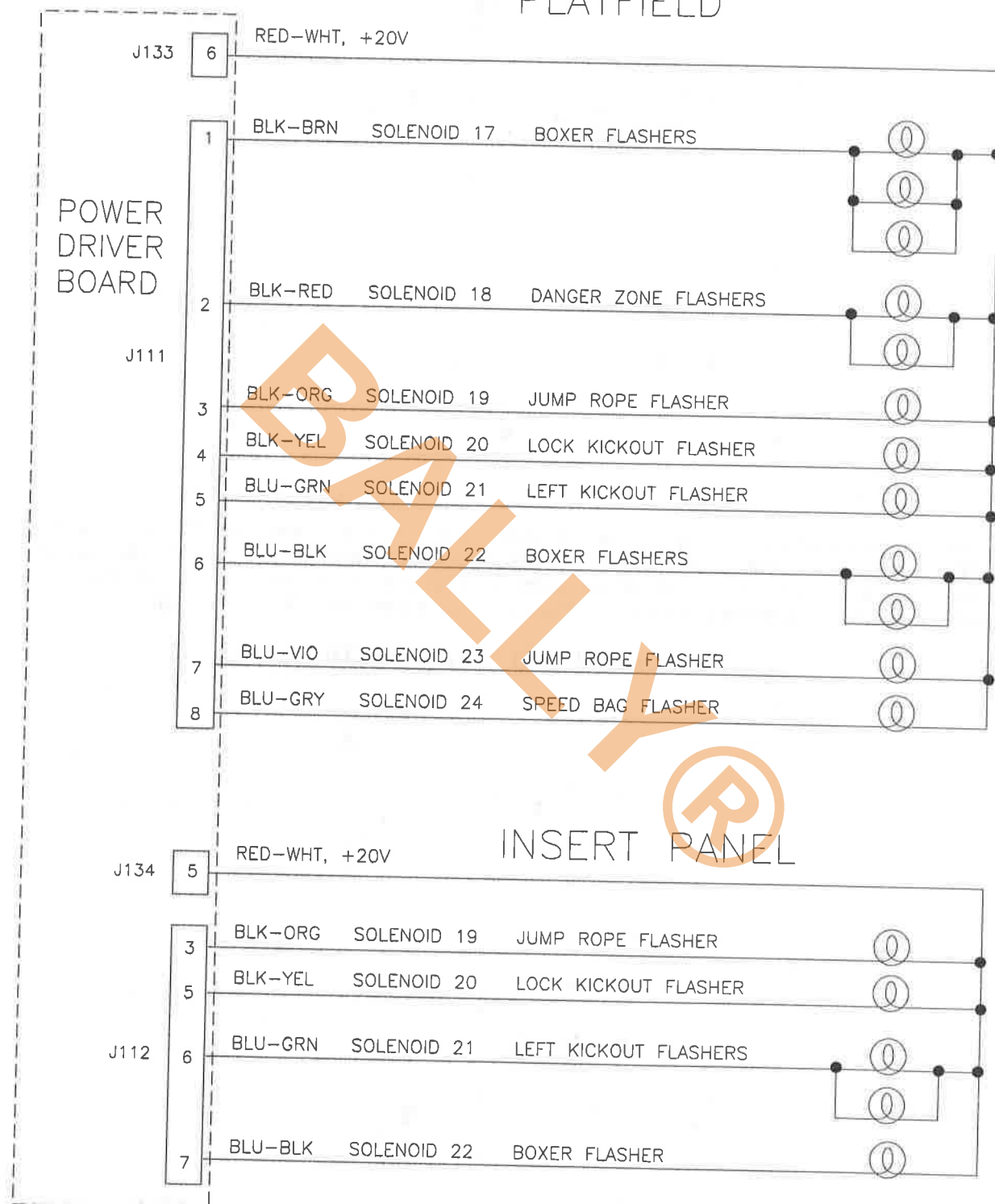
SOLENOID WIRING

COILS

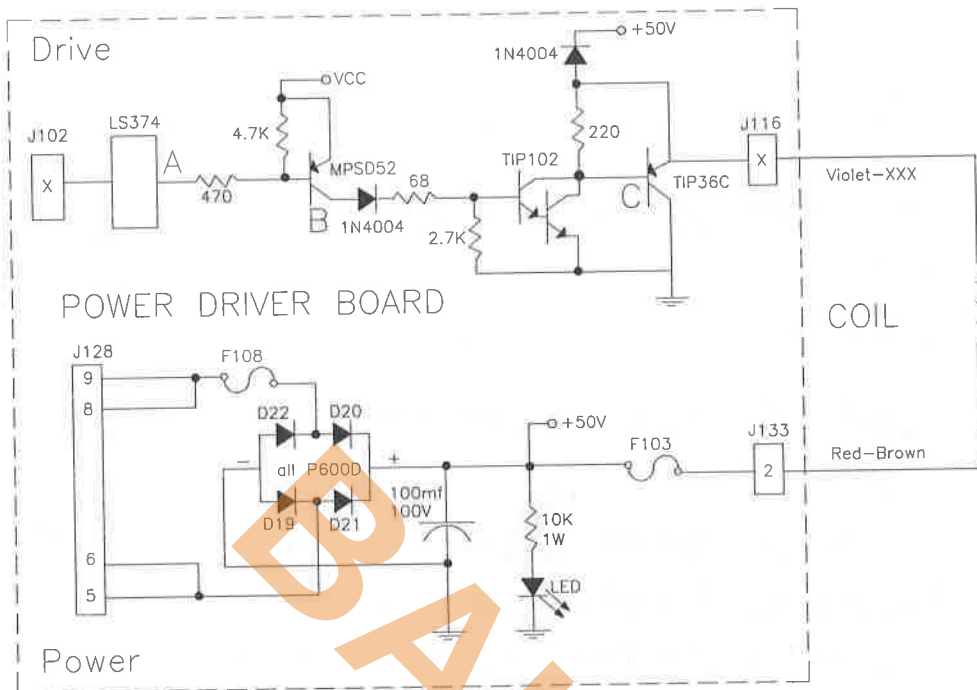


FLASHLAMPS

PLAYFIELD

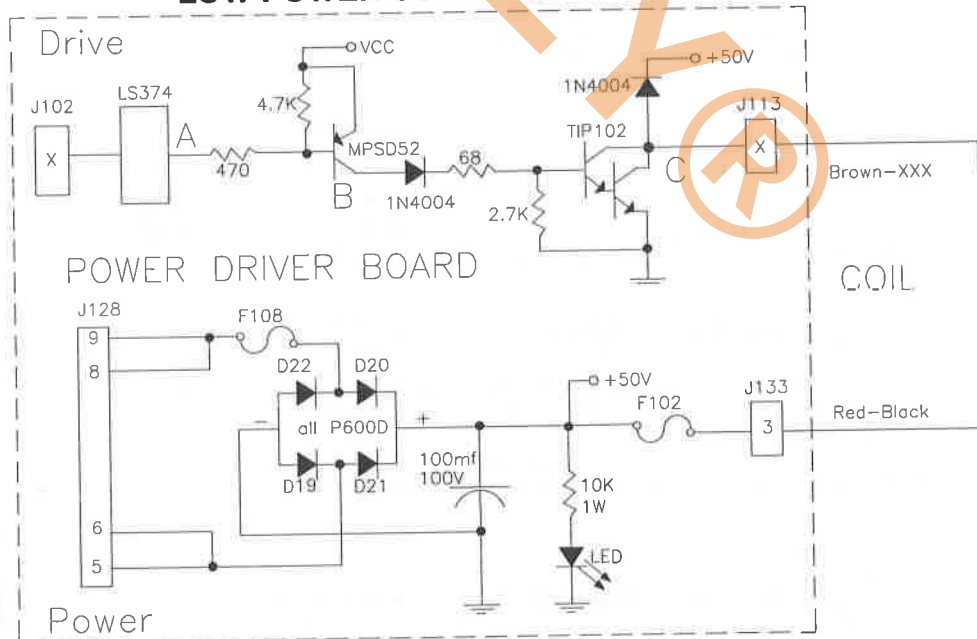


HIGH POWER SOLENOID CIRCUIT



The microprocessor toggles the output of the 74LS374. When point "A" is low, point "B", the collector of the 2N5401 transistor, is high. A high at point "B" causes point "C", the collector of the TIP102 transistor and point "D", the emitter of the TIP36C transistor, to drop low. When point "D" is low, the coil is grounded through the transistor and turns on. The coil shuts off when point "A" toggles high.

LOW POWER SOLENOID CIRCUIT



The microprocessor toggles the output of the 74LS374. When point "A" is low, point "B", the collector of the 2N5401 transistor, is high. A high at point "B" turns on the TIP102 transistor and causes point "C" to drop low. When point "C" is low the coil is grounded through the transistor and turns on. The coil shuts off when point "A" toggles high.

The diagram illustrates the internal circuitry of a car alarm system, divided into two main functional areas: the Drive section and the Power section.

Drive Section:

- Input:** A signal from connector J102 (pin X) enters the LS374 logic chip.
- Logic:** The LS374 output (pin A) passes through a 470Ω resistor to the base of an MPSD52 transistor. The base is also connected to VCC through a 4.7KΩ pull-up resistor.
- Signal Path:** The emitter of the MPSD52 is grounded. Its collector is connected to the anode of a 1N4004 diode. The cathode of this diode is connected to the base of a TIP102 transistor through a 68Ω resistor.
- Output:** The emitter of the TIP102 is grounded. Its collector is connected to connector J109 (pin X) through a 2.7KΩ resistor. The collector is also connected to the anode of another 1N4004 diode, whose cathode is grounded.

Power Section:

- Input:** Power is supplied to connector J128 (pins 5, 6, 8, 9).
- Rectification:** A bridge rectifier (P600D) consists of four diodes (D19, D20, D21, D22). The AC input is connected to pins 8 and 9. The positive DC output is taken from pin 6, and the negative output is taken from pin 5.
- Filtering:** The positive output line passes through a 100mF, 100V electrolytic capacitor (F108) to ground.
- LED Indicator:** A 10K, 1W resistor is connected in series with an LED. One end of the resistor is connected to the positive output line, and the other end is connected to ground.
- Output:** The positive output line is connected to connector J133 (pin 1), which is labeled "Red-White".

Common Components:

- Flasher/Coil:** A common output line, labeled "Blue-XXX", connects to connector J109 (pin X) and the "Flasher or COIL" component.
- Grounding:** Multiple ground connections are shown throughout the circuit, including the emitter of the MPSD52, the cathode of the first 1N4004 diode, the emitter of the TIP102, the negative terminal of the capacitor, and the negative terminal of the LED.

* Tieback diode is not used for flashlamp circuit.

3-9

GENERAL ILLUMINATION CIRCUIT

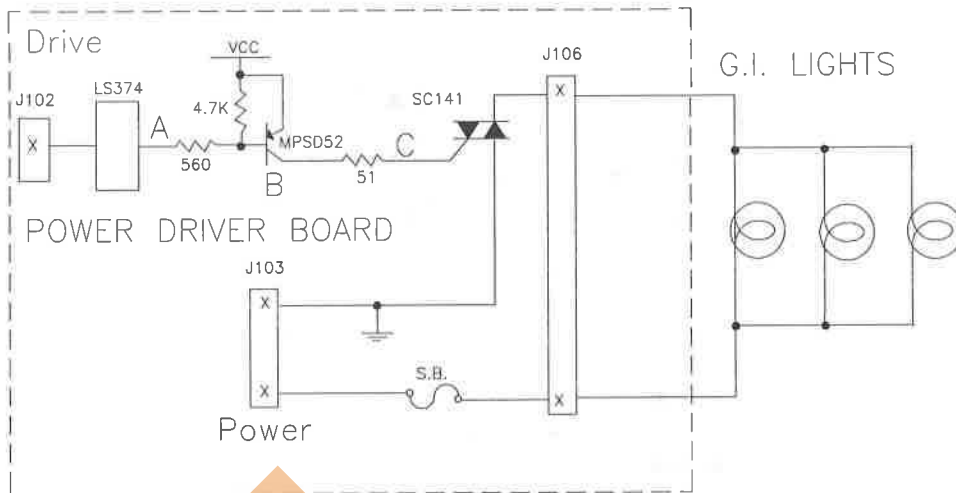


Figure #1

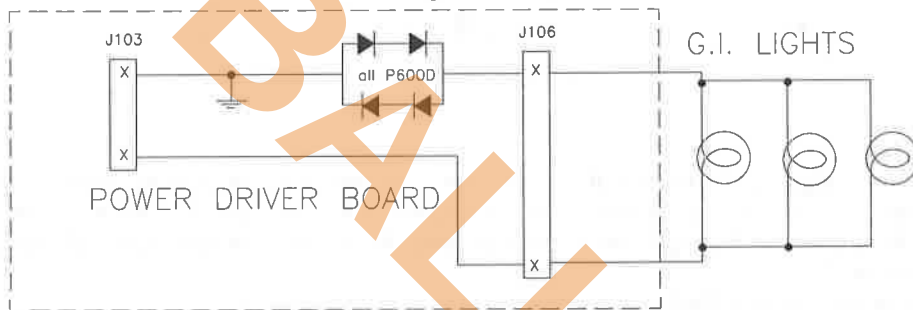
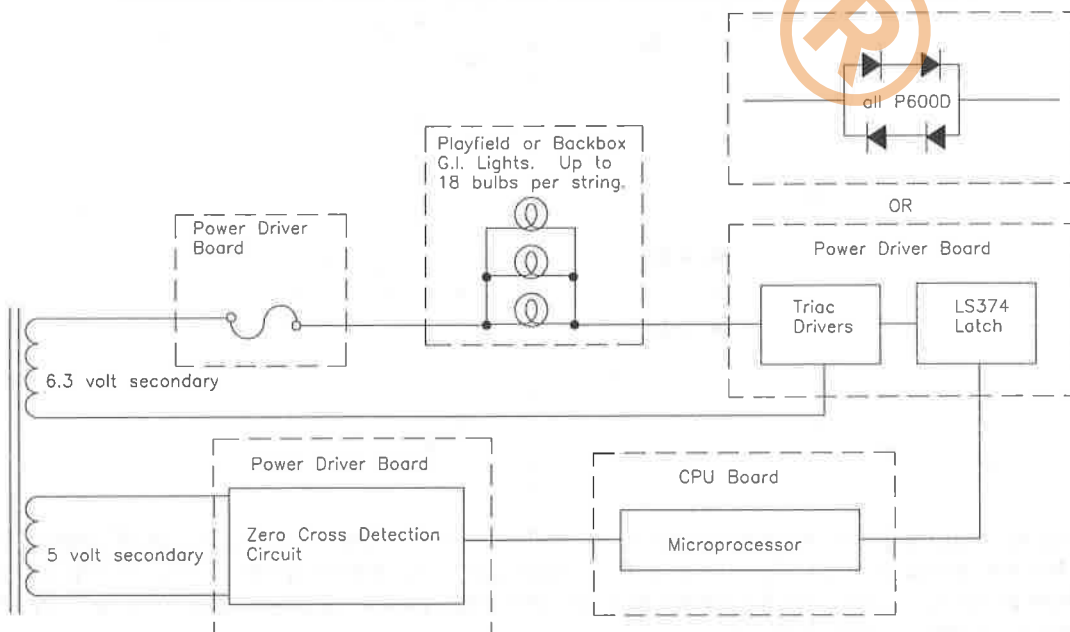


Figure #2

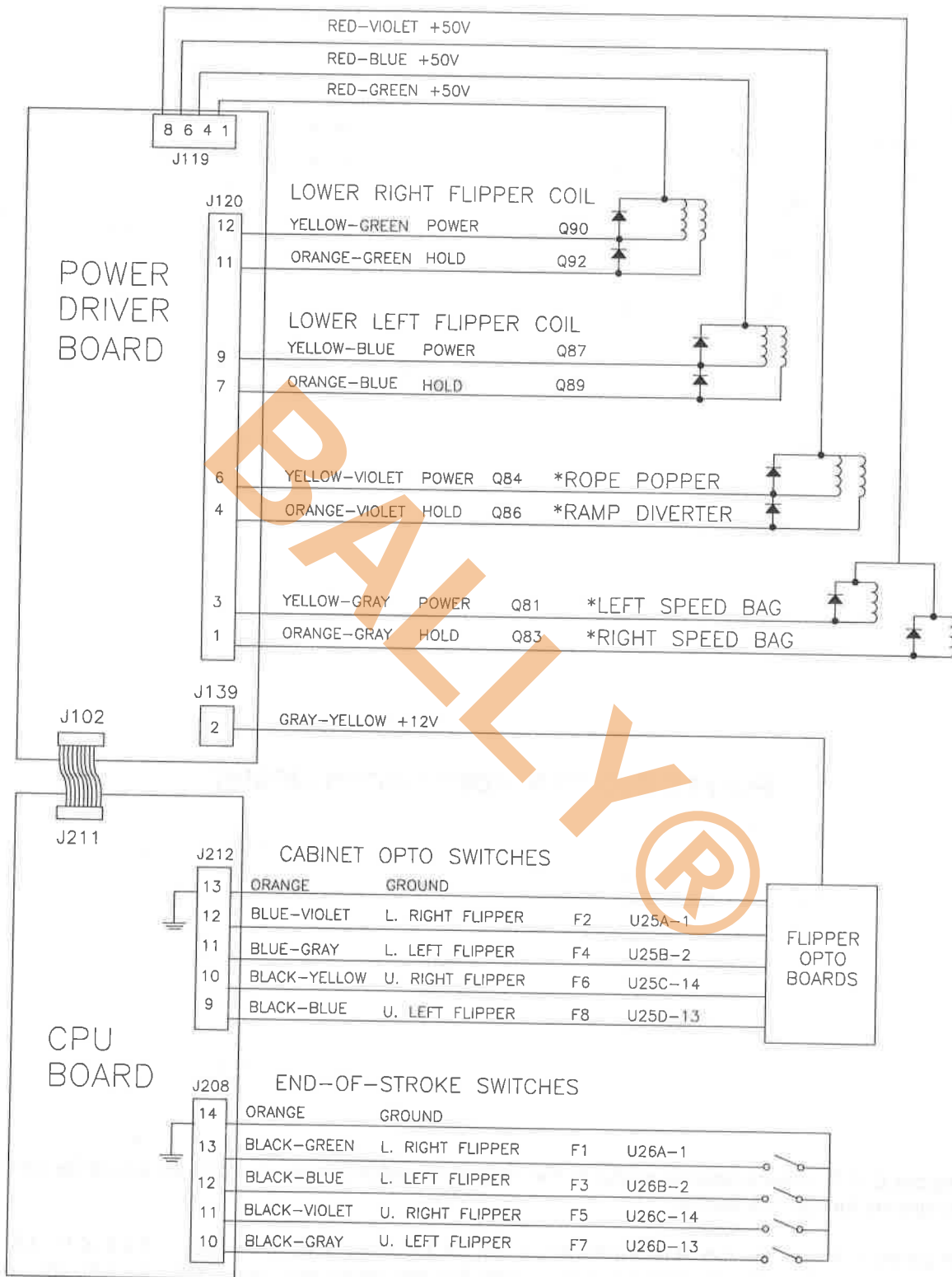
There are five general illumination strings; three like figure #1 and two like figure #2. When point "A" toggles low, points, "B" and "C" are high. This turns on the triac and the desired general illumination string of lights.

BLOCK DIAGRAM OF GENERAL ILLUMINATION CIRCUIT



FLIPPER CIRCUIT DIAGRAM

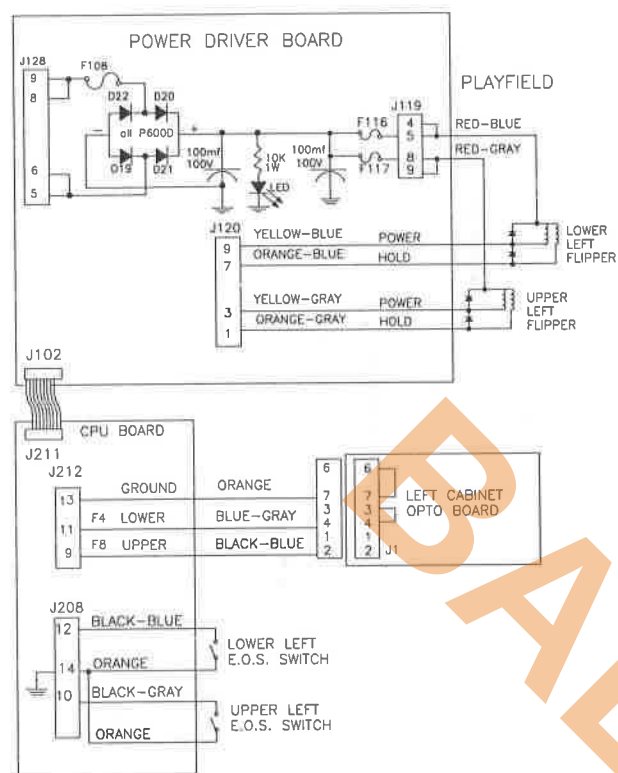
RED-GRAY +50V



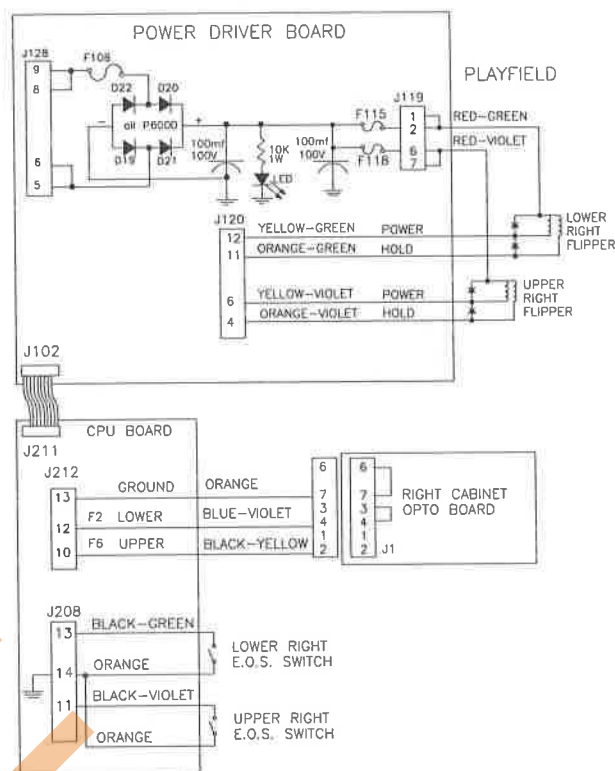
The UPPER LEFT and UPPER RIGHT FLIPPER circuits are used for the Rope Popper, Ramp Diverter, Left Speed Bag, and Right Speed Bag respectively.

FLIPPER COIL CIRCUITS

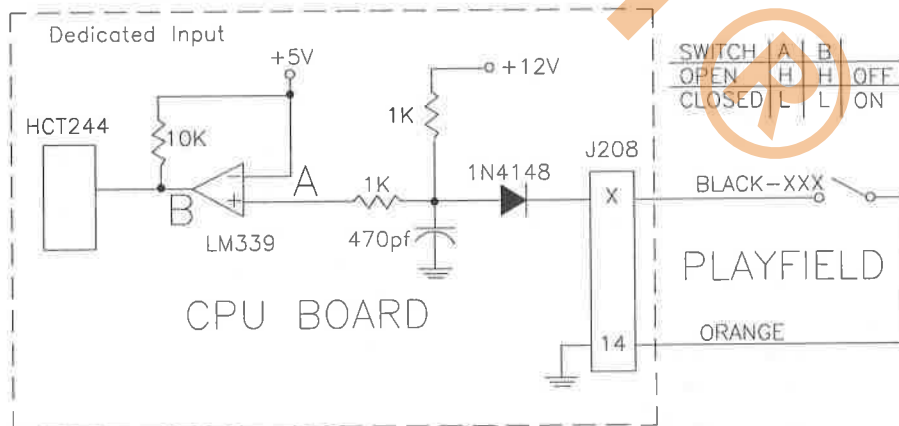
LEFT FLIPPER CIRCUIT



RIGHT FLIPPER CIRCUIT



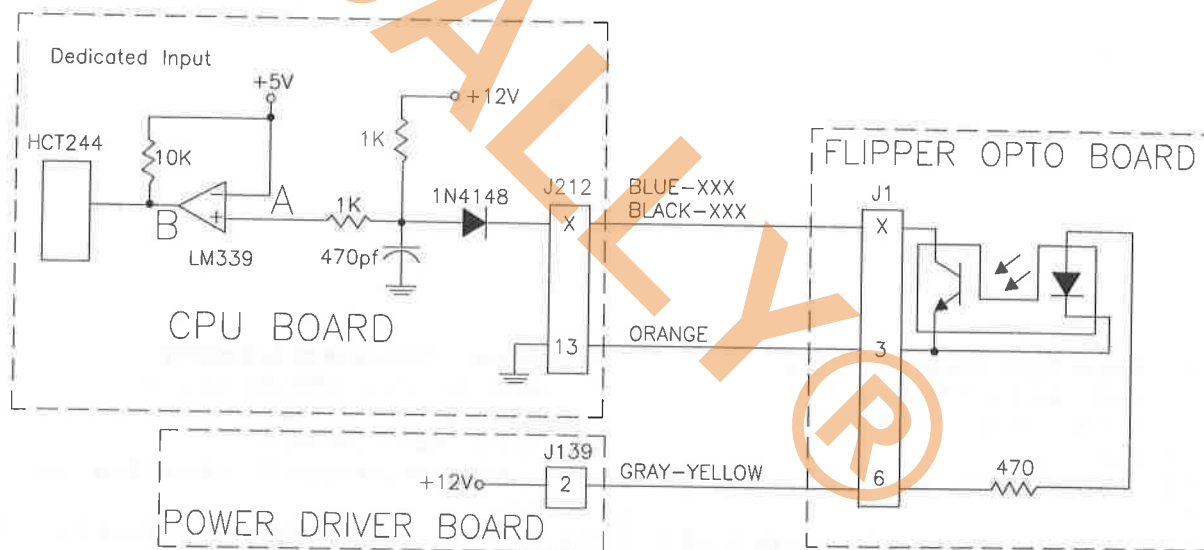
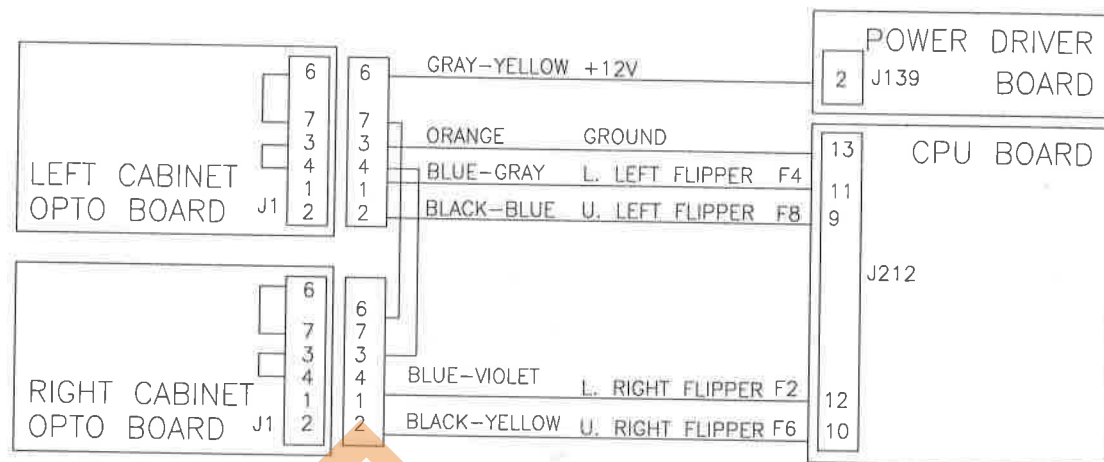
FLIPPER END-OF-STROKE SWITCH CIRCUIT



The flipper E.O.S. circuits operate similar to the dedicated switch circuit. The circuits are active low and tied to ground through the switch.

When a switch closes, the row side, (dedicated input), of the circuit activates. The "+" input of the LM339 drops below +5V therefore its output is low. Since the row (dedicated input), circuit is tied directly to ground through the switch, the switch is considered closed by the microprocessor. When the switch opens, the "+" input to the LM339 is above +5V, its output is high and the row (dedicated input) is inactive.

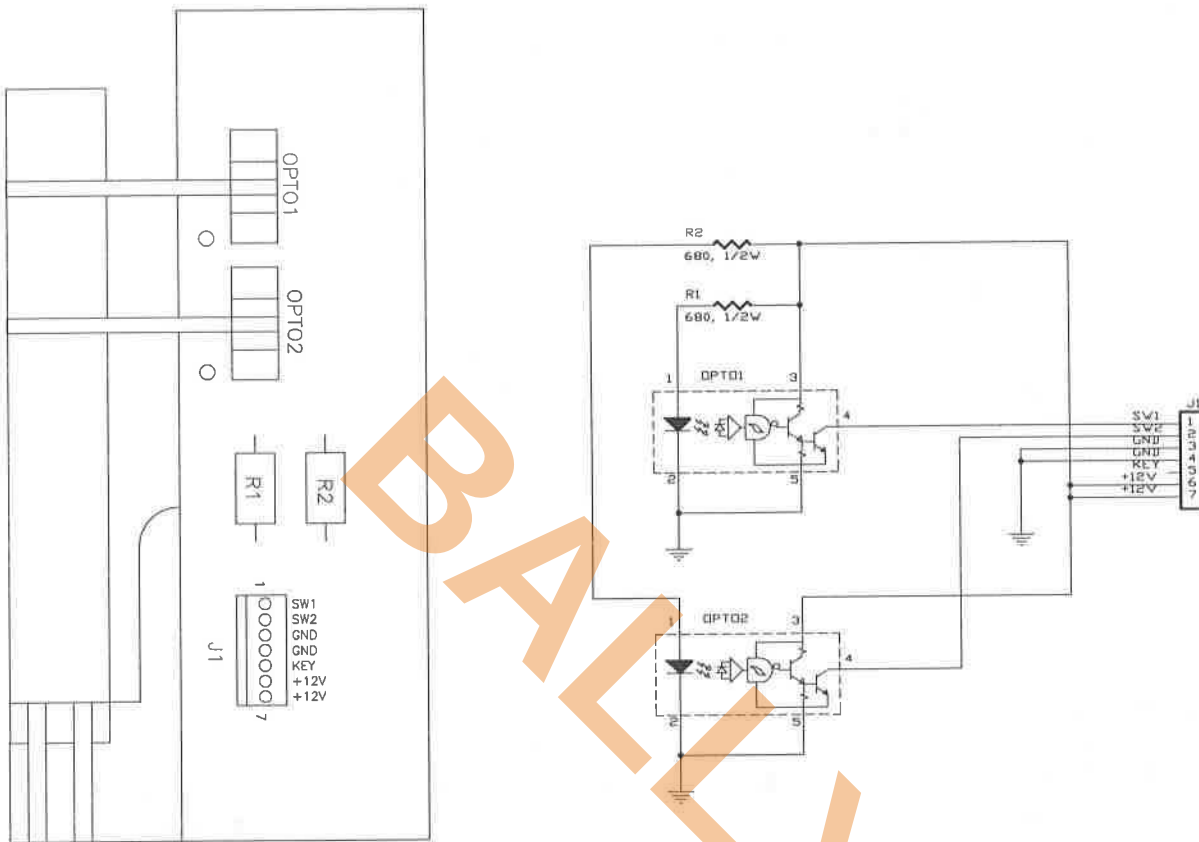
FLIPPER CABINET SWITCH CIRCUITS



The flipper switch circuits operate similar to the dedicated switch circuit. The circuits are active low and tied to ground through the switch circuit.

When a switch closes, the row side (dedicated input) of the circuit activates. The "+" input to the LM339 drops below +5V, therefore, its output is low. Since the row, (dedicated input) circuit is tied directly to ground through the switch, the switch is considered closed by the microprocessor. When the switch opens, the "+" input to the LM339 is above +5V, its output is high and the row, (dedicated Input) is inactive.

FLIPPER OPTO BOARD ASSEMBLY A-17316



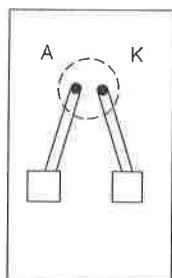
Left Flipper Opto Board Assembly

- J1-1 Black-Blue from CPU board J212-9
- J1-2 Blue-Gray from CPU board J212-11
- J1-3 N/C
- J1-4 Orange from CPU board J212-13
- J1-5 N/C
- J1-6 Gray-Yellow from Power Driver Board J139-2
- J1-7 Gray-Yellow from Power Driver Board J139-2

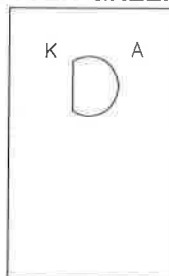
Right Flipper Opto Board Assembly

- J1-1 Black-Yellow from CPU board J212-10
- J1-2 Blue-Violet from CPU board J212-12
- J1-3 Orange from CPU board J212-13
- J1-4 Orange from Left Flipper Opto Board Assy J1-4
- J1-5 N/C
- J1-6 Gray-Yellow from Left Flipper Opto Board Assy J1-6
- J1-7 N/C

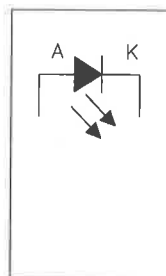
LED BOARD ASSEMBLY A-16908 (TRANSMITTER-GREEN BOARD)



solder side

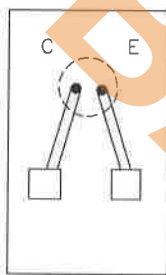


component side

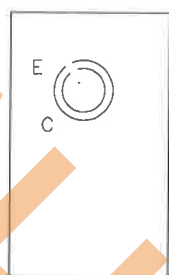


schematic

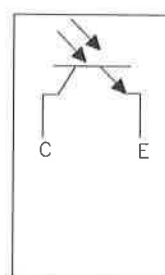
PHOTO TRANSISTOR BOARD ASSEMBLY A-16909 (RECEIVER-BLUE BOARD)



solder side



component side



schematic

TYPICAL CIRCUIT DIAGRAM

LED BOARD
Transmitter
1.0-1.4 volts

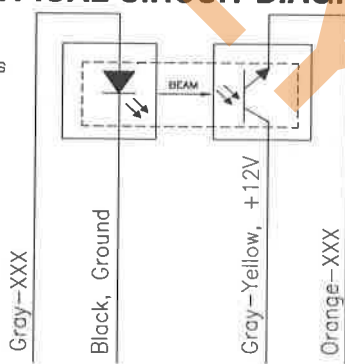
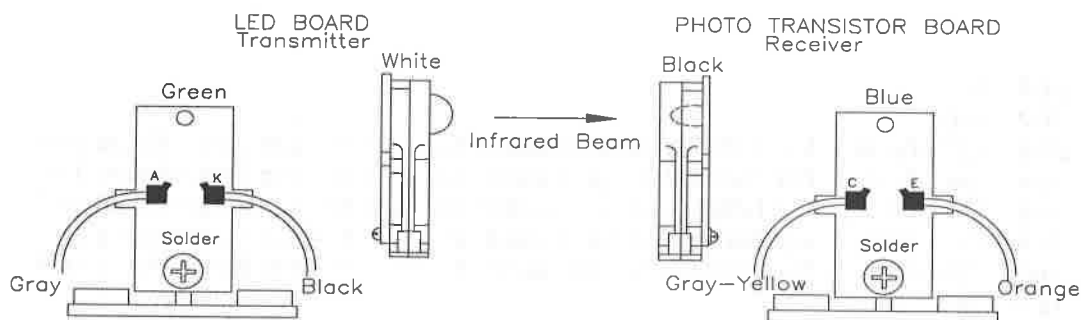
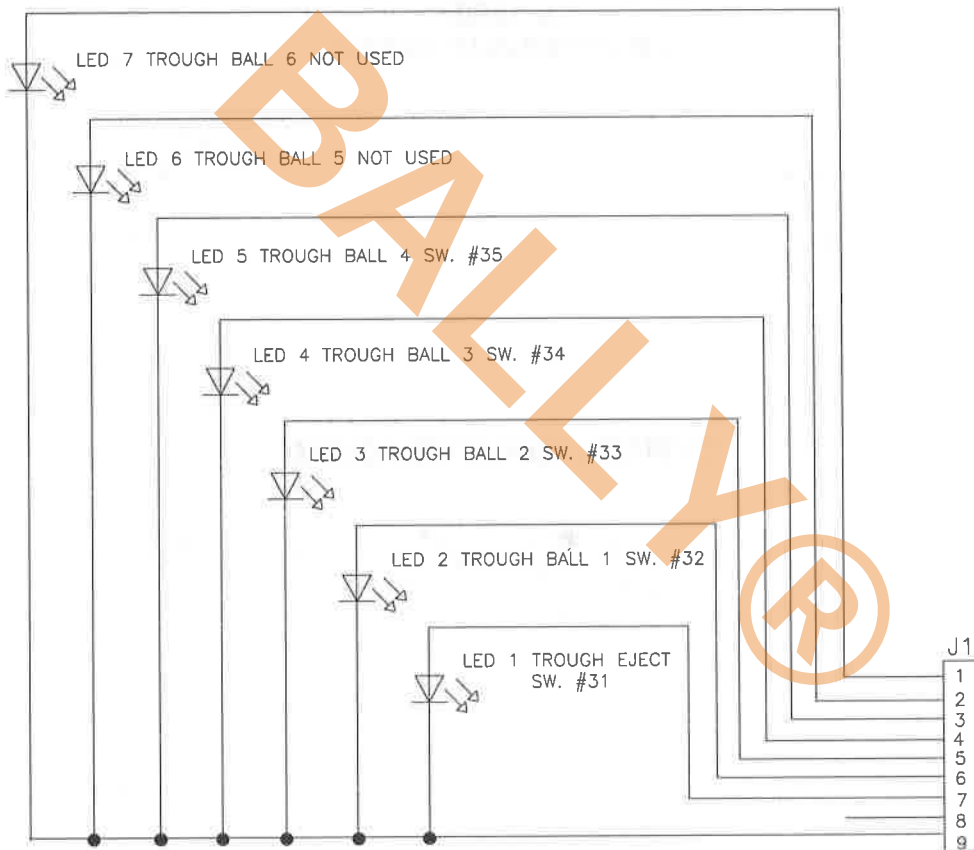
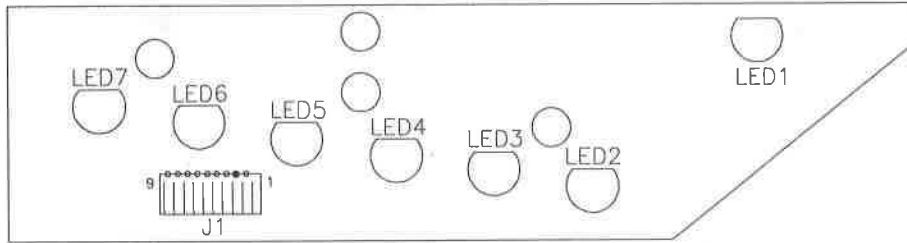


PHOTO TRANSISTOR BOARD
Receiver
0.1-0.7 volts unblocked
11-13 volts blocked

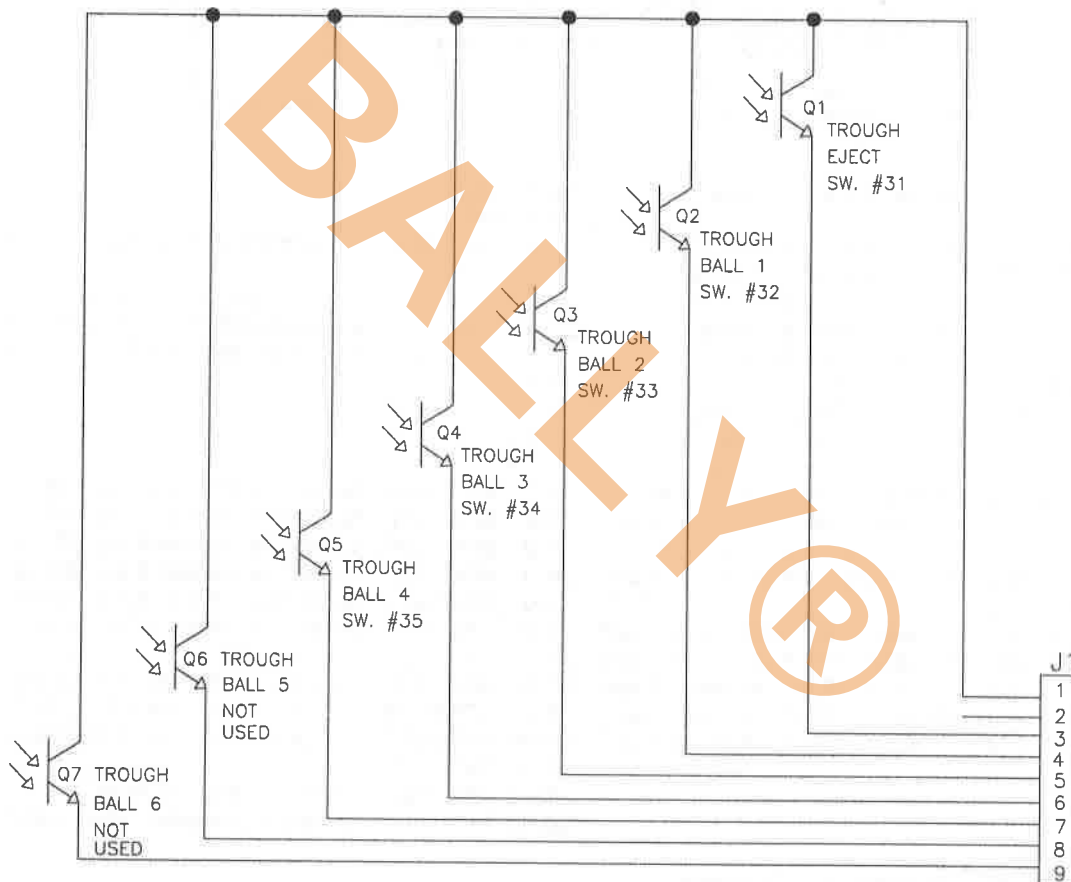
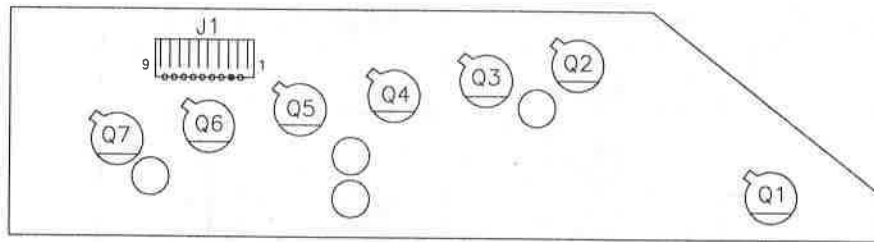


**Trough IR LED Board Assembly
(transmitter - green board)
A-18617-1**



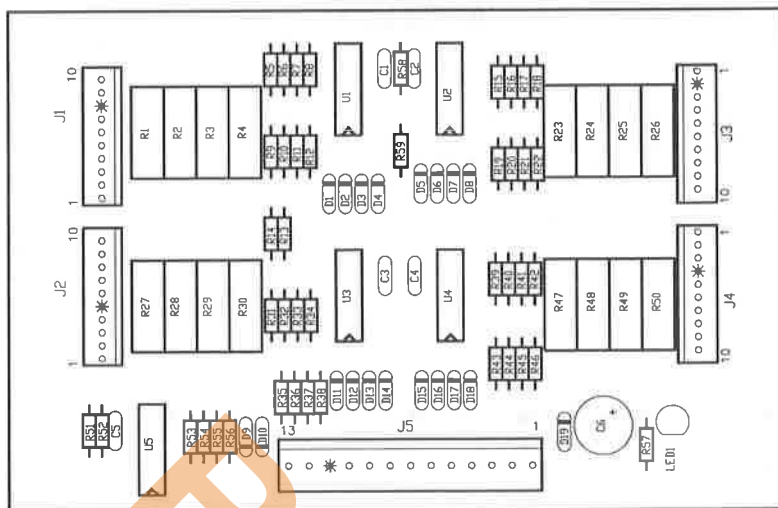
J1-1	N/C	
J1-2	N/C	
J1-3	GRY-GRN,	For TROUGH BALL 4 switch #35 from 16-Opto Switch Board J1-4
J1-4	GRY-BLK,	For TROUGH BALL 3 switch #34 from 16-Opto Switch Board J1-5
J1-5	GRY-ORG,	For TROUGH BALL 2 switch #33 from 16-Opto Switch Board J1-6
J1-6	GRY-RED,	For TROUGH BALL 1 switch #32 from 16-Opto Switch Board J1-7
J1-7	GRY-BRN,	For TROUGH EJECT switch #31 from 16-Opto Switch Board J1-9
J1-8	KEY	
J1-9	BLK,	Ground from 16-Opto Switch Board J1-10

**Trough IR Photo Transistor Board Assembly
(receiver - blue board)
A-18618-1**



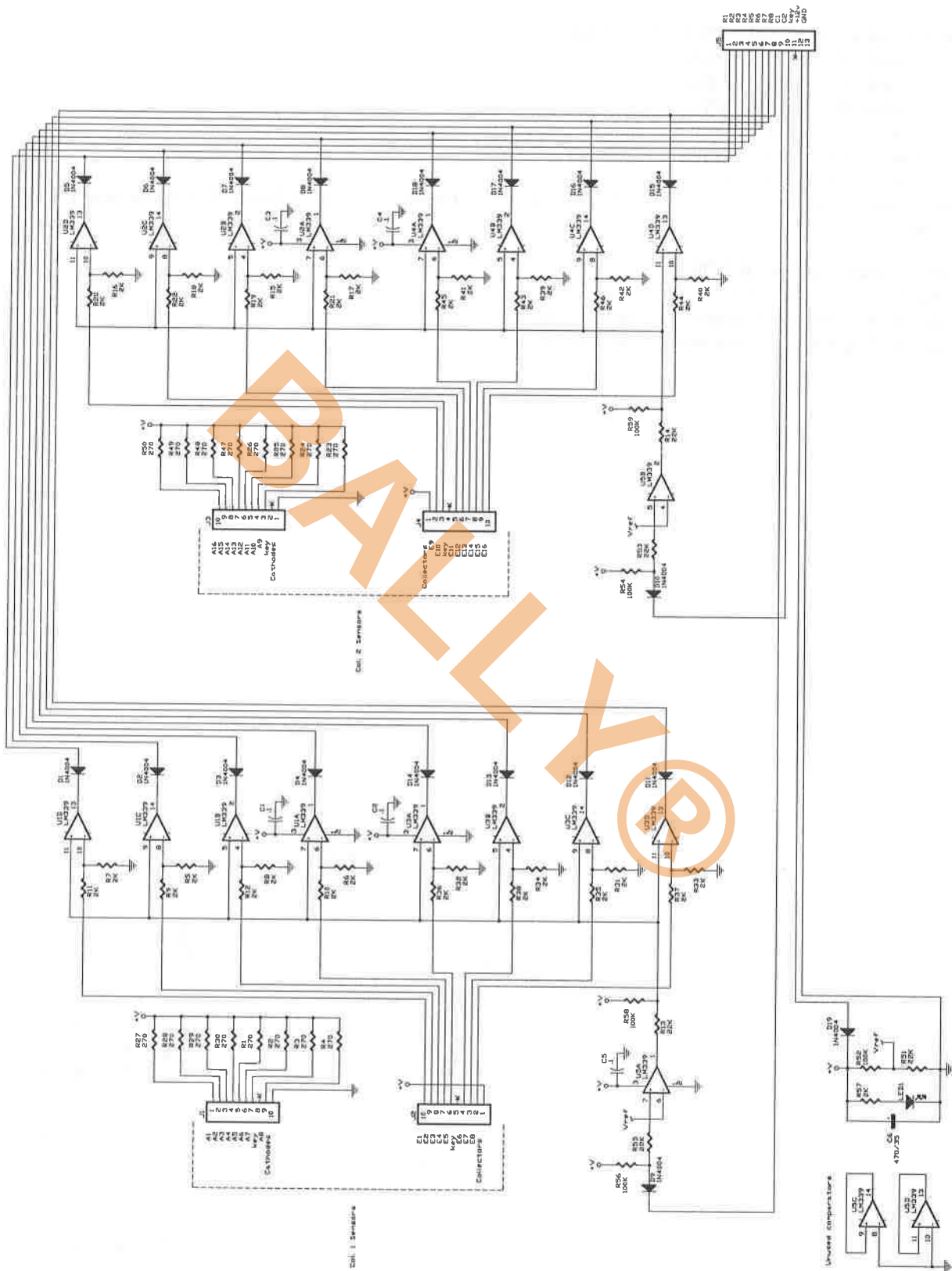
J1-1	GRY-YEL,	+12V from 16-Opto Switch Board J2-1
J1-2	KEY	
J1-3	ORG-BRN,	For TROUGH EJECT switch #31 from 16-Opto Switch Board J2-10
J1-4	ORG-RED,	For TROUGH BALL 1 switch #32 from 16-Opto Switch Board J2-9
J1-5	ORG-BLK,	For TROUGH BALL 2 switch #33 from 16-Opto Switch Board J2-8
J1-6	ORG-YEL,	For TROUGH BALL 3 switch #34 from 16-Opto Switch Board J2-7
J1-7	ORG-GRN,	For TROUGH BALL 4 switch #35 from 16-Opto Switch Board J2-6
J1-8	N/C	
J1-9	N/C	

16-Opto Switch Board Assembly A-22019-2



J1-1	GRY-WHT	To switch #38 LED board	J4-1	N/C
J1-2	N/C		J4-2	N/C
J1-3	GRY-BLU	To switch #36 LED board	J4-3	WHT-RED To switch #42 Photo Trans. board
J1-4	GRY-GRN	To switch #35 LED board	J4-4	KEY
J1-5	GRY-BLK	To switch #34 LED board	J4-5	WHT-ORG To switch #43 Photo Trans. board
J1-6	GRY-ORG	To switch #33 LED board	J4-6	WHT-YEL To switch #44 Photo Trans. board
J1-7	GRY-RED	To switch #32 LED board	J4-7	WHT-GRN To switch #45 Photo Trans. board
J1-8	KEY		J4-8	N/C
J1-9	GRY-BRN	To switch #31 LED board	J4-9	N/C
J1-10	BLK	Ground to LED boards	J4-10	N/C
J2-1	GRY-YEL	+12V to Photo Trans. boards	J5-1	WHT-BRN Switch Col. #1 from CPU J208-1
J2-2	ORG-GRY	To switch #38 Photo Trans. board	J5-2	WHT-RED Switch Col. #2 from CPU J208-2
J2-3	N/C		J5-3	WHT-ORG Switch Col. #3 from CPU J208-3
J2-4	ORG-BLU	To switch #36 Photo Trans. board	J5-4	WHT-YEL Switch Col. #4 from CPU J208-4
J2-5	KEY		J5-5	WHT-GRN Switch Col. #5 from CPU J208-5
J2-6	ORG-GRN	To switch #35 Photo Trans. board	J5-6	WHT-BLU Switch Col. #6 from CPU J208-7
J2-7	ORG-YEL	To switch #34 Photo Trans. board	J5-7	N/C
J2-8	ORG-BLK	To switch #33 Photo Trans. board	J5-8	WHT-GRY Switch Col. #8 from CPU J208-9
J2-9	ORG-RED	To switch #32 Photo Trans. board	J5-9	GRN-ORG Switch Row #3 from CPU J206-3
J2-10	ORG-BRN	To switch #31 Photo Trans. board	J5-10	GRN-WHT Switch Row #4 from CPU J206-4
J3-1	N/C		J5-11	KEY
J3-2	KEY		J5-12	GRY-YEL +12V from Power Driver J140-2
J3-3	N/C		J5-13	BLK Ground from Power Driver J140-3
J3-4	GRN-RED	To switch #42 LED board		
J3-5	GRN-ORG	To switch #43 LED board		
J3-6	GRN-WHT	To switch #44 LED board		
J3-7	GRN-BLK	To switch #45 LED board		
J3-8	N/C			
J3-9	N/C			
J3-10	N/C			

16-Opto Switch Board Schematic A-22019-2



Switch Individual Playfield Opto Switch Wiring Diagram

This diagram shows the wiring for individual playfield opto switches only. See the next page for the wiring diagram for the ball trough opto switches.

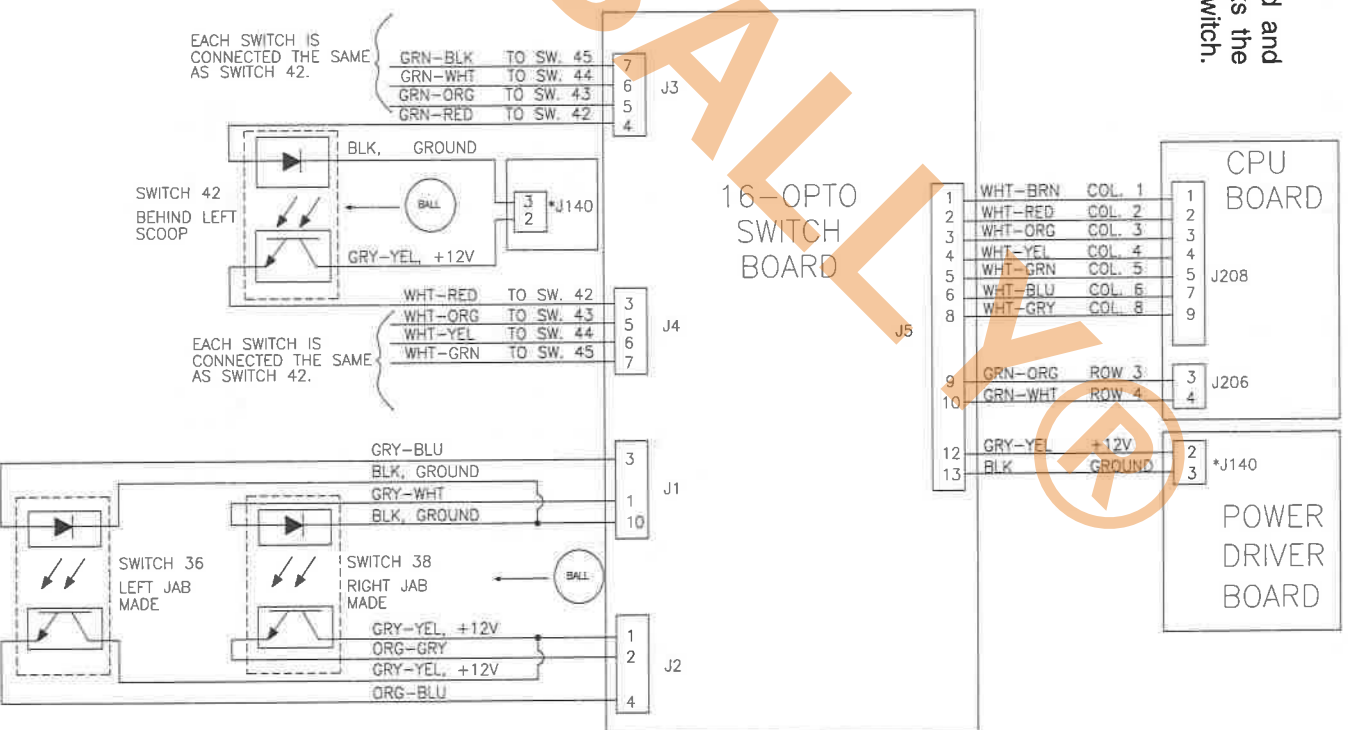
The individual playfield opto switches are:

- Switch 36 Left Jab Made
- Switch 38 Right Jab Made
- Switch 42 Behind Left Scoop
- Switch 43 Behind Right Scoop
- Switch 44 Enter Ramp
- Switch 45 Jump Rope

Each of these switches uses a green LED board (p/n A-16908), and a blue Photo Transistor board (p/n A-16909).

OPTO SWITCH OPERATION:

The ball rolls between the LED board and the Photo Transistor board and breaks the beam. The broken beam 'makes' the switch.



Ball Trough Opto Switches Wiring Diagram

This diagram shows the opto switches for the ball trough assembly only. See the previous page for the individual playfield opto switches.

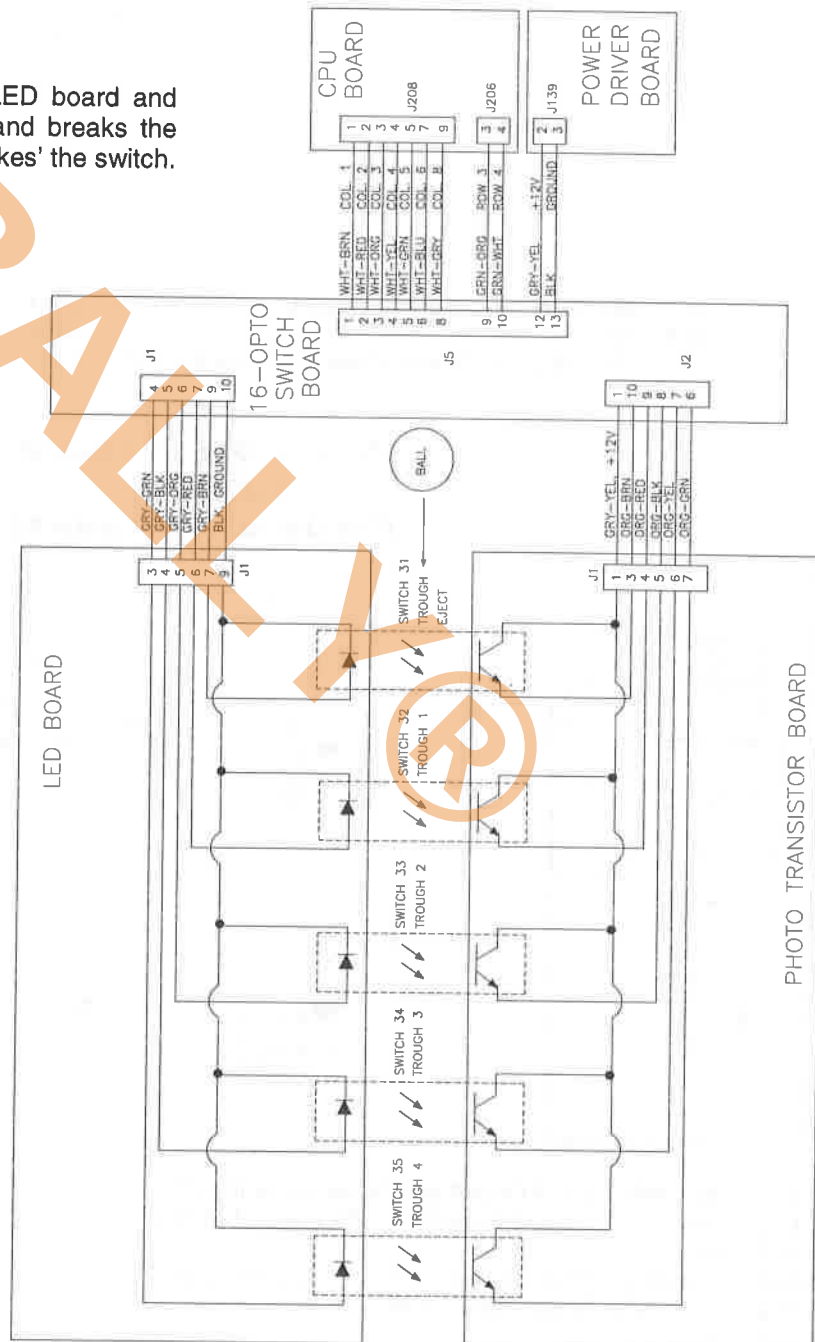
The ball trough opto switches are:

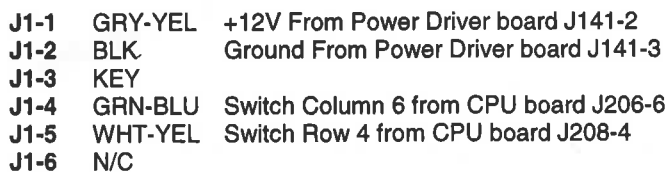
- Switch 31 Trough Eject
- Switch 32 Trough Ball 1
- Switch 33 Trough Ball 2
- Switch 34 Trough Ball 3
- Switch 35 Trough Ball 4

The ball trough switches use a green LED board (p/n A-18617-1), and a blue Photo Transistor board (p/n A-18618-1).

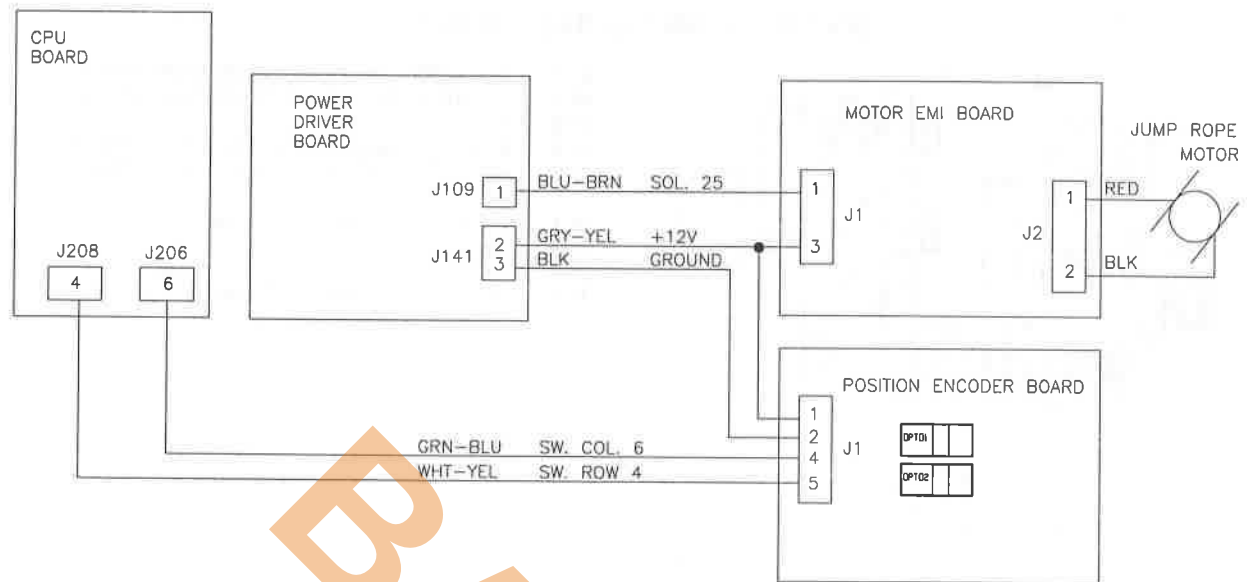
OPTO SWITCH OPERATION:

The ball rolls between the LED board and the Photo Transistor board and breaks the beam. The broken beam 'makes' the switch.

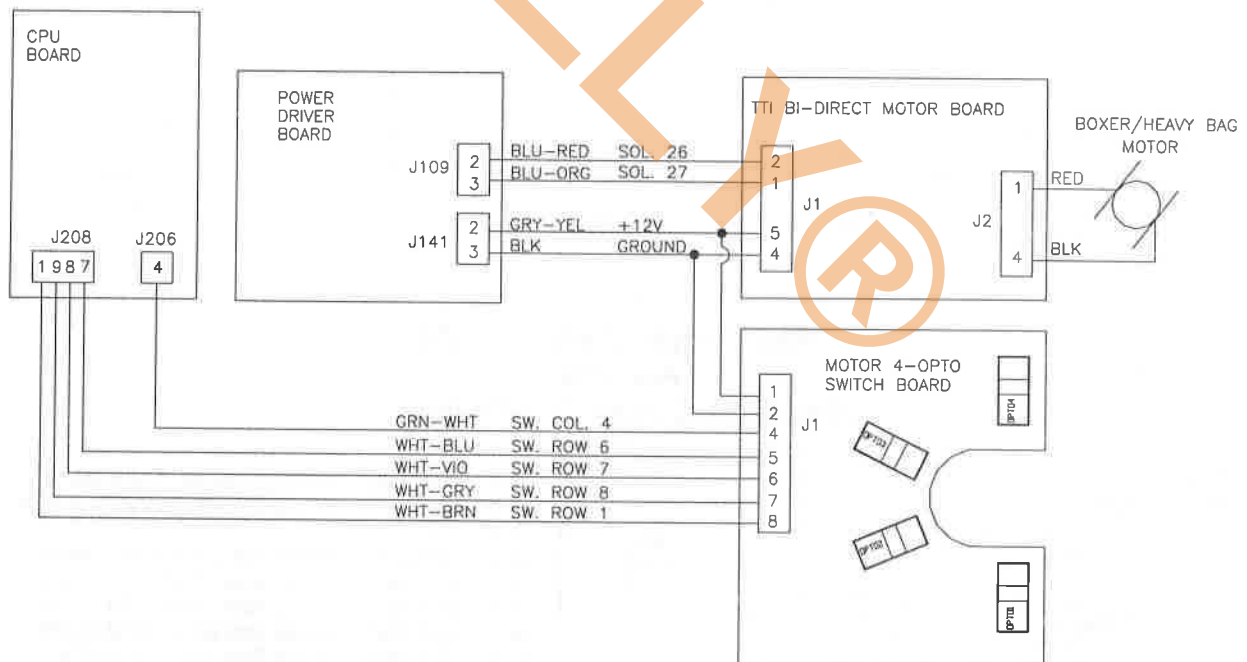




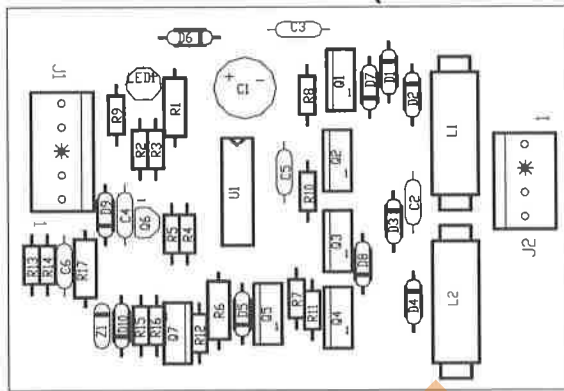
Jump Rope Feature Wiring Diagram



Boxer/Heavy Bag Feature Wiring Diagram

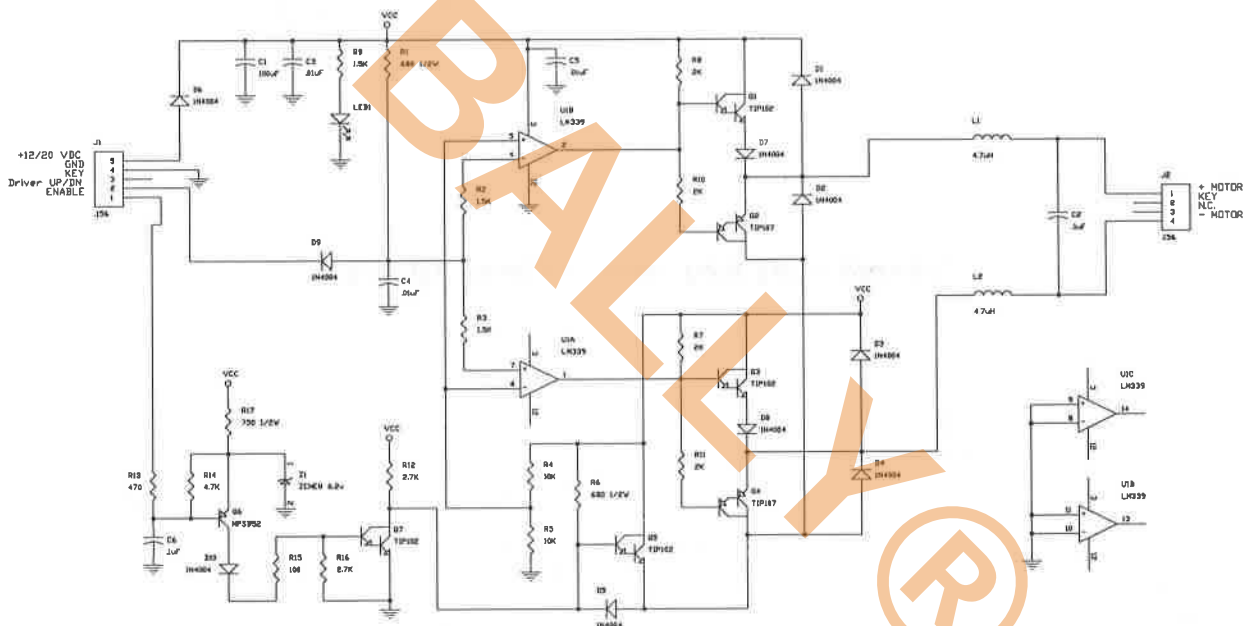


TTL Bi-direct Motor Board **A-22013-1** **(For Boxer/Heavy Bag Feature)**

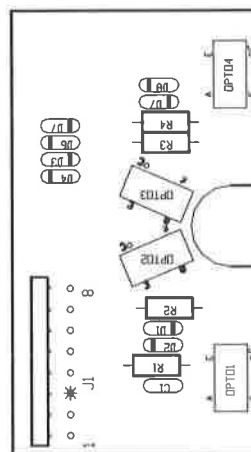
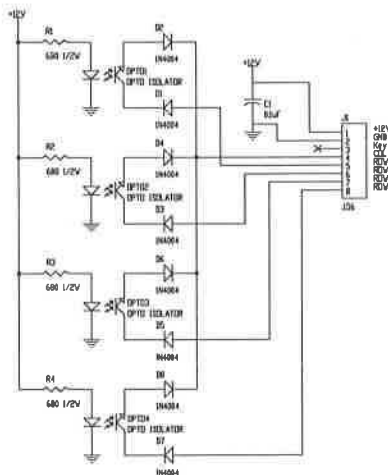


J1-1 BLU-ORG Sol. 27 from Power Driver J109-3
J1-2 BLU-RED Sol. 26 from Power Driver J109-2
J1-3 KEY
J1-4 BLK Ground from Power Driver J141-3
J1-5 GRY-YEL +12V from Power Driver J141-2

J2-1 RED To Motor "+" Terminal
J2-2 KEY
J2-3 N/C
J2-4 BLK To Motor "-" Terminal

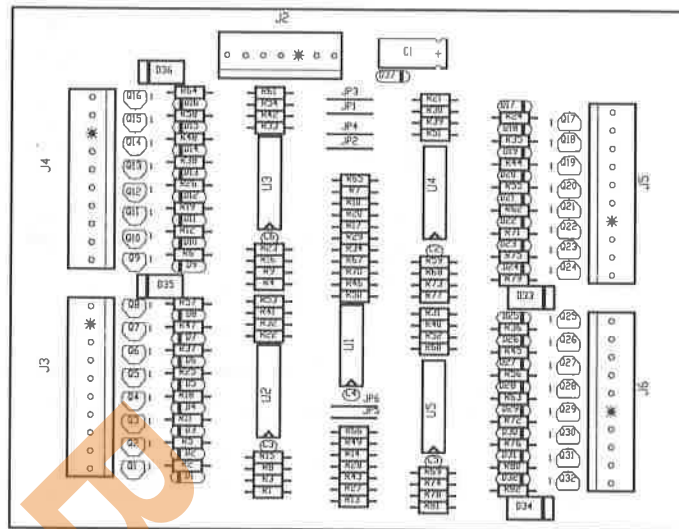


Motor 4-opto Switch Board **A-22260** **(For Boxer/Heavy Bag Feature)**



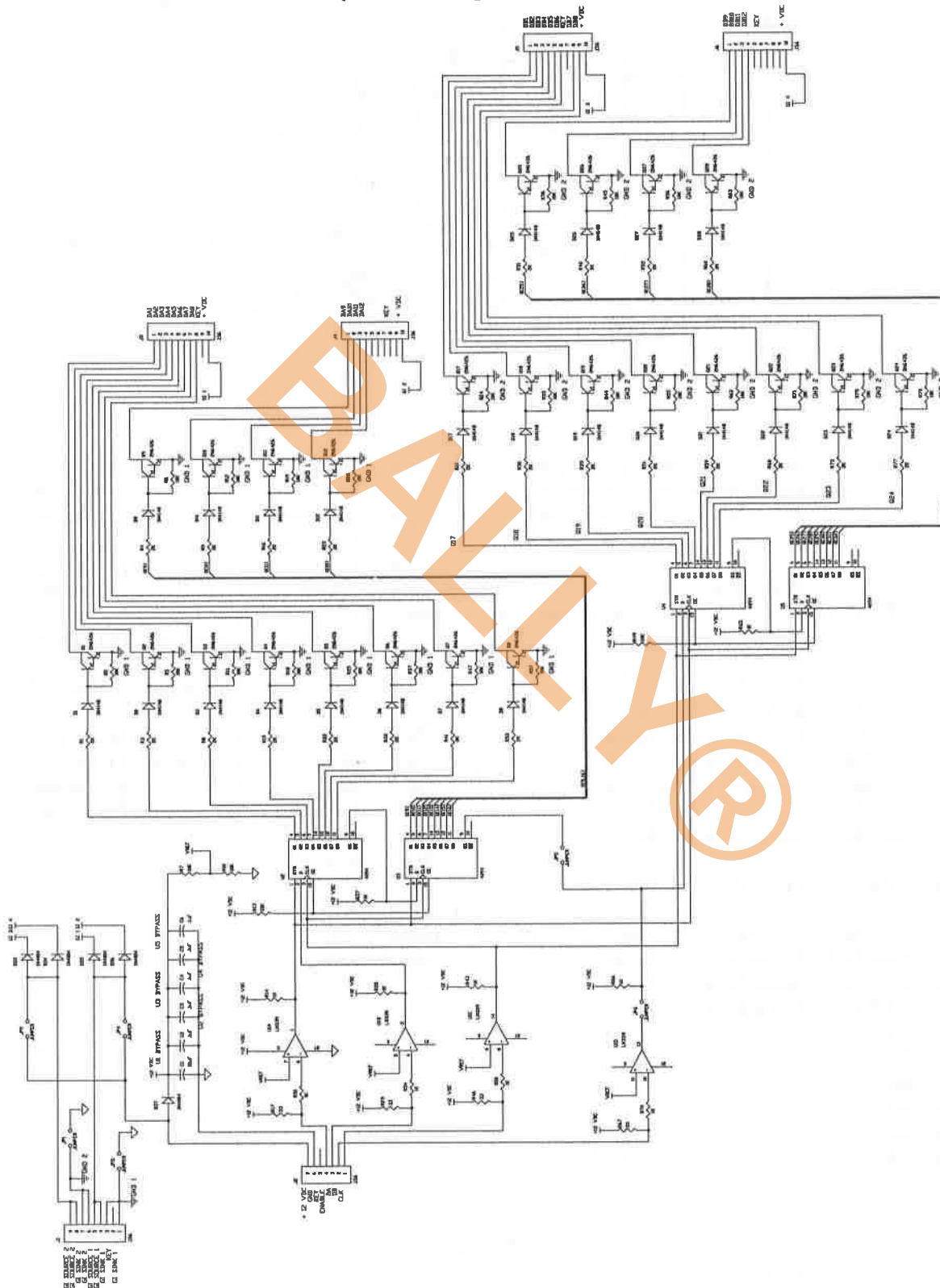
J1-1 GRY-YEL +12V form Power Driver J141-2
J1-2 BLK Ground from Power Driver J141-3
J1-3 N/C
J1-4 GRN-WHT Switch Col. 4 from CPU J206-4
J1-5 WHT-BLU Switch Row 6 from CPU J208-7
J1-6 WHT-VIO Switch Row 7 from CPU J208-8
J1-7 WHT-GRY Switch Row 8 from CPU J208-9
J1-8 WHT-BRN Switch Row 1 from CPU J208-1

**Serial 24 Driver Board
A-21967-2
(For Life Light Feature)**

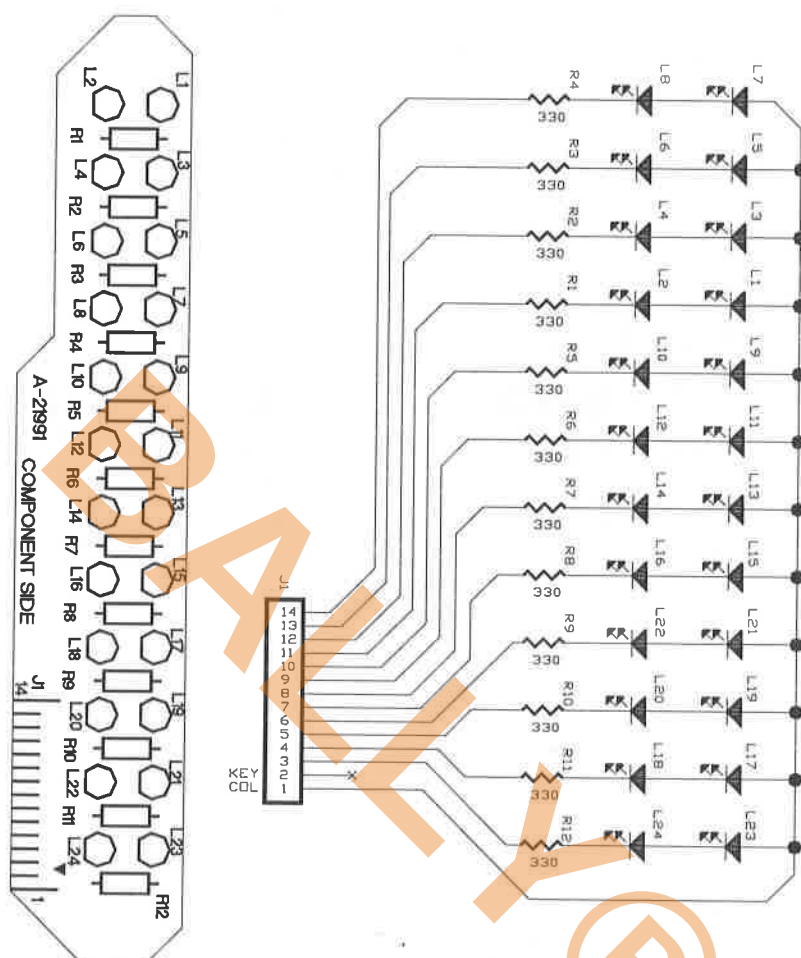


J2-1	BRN-WHT	Sol.37 from Power Driver Board J110-1	J5-1	YEL-BRN	To Left 24 LED Board
J2-2	BLU-WHT	Sol. 40 from Power Driver Board J110-5	J5-2	YEL-RED	To Left 24 LED Board
J2-3	YEL-WHT	Sol. 39 from Power Driver Board J110-4	J5-3	YEL-ORG	To Left 24 LED Board
J2-4	ORG-WHT	Sol. 38 from Power Driver Board J110-3	J5-4	YEL-BLK	To Left 24 LED Board
J2-5	KEY		J5-5	YEL-GRN	To Left 24 LED Board
J2-6	BLK	Ground from Power Driver Board J138-3	J5-6	YEL-BLU	To Left 24 LED Board
J2-7	GRY-YEL	+12V from Power Driver Board J138-2	J5-7	KEY	
J3-1	YEL-BRN	To Right 24 LED Board	J5-8	YEL-VIO	To Left 24 LED Board
J3-2	YEL-RED	To Right 24 LED Board	J5-9	YEL-GRY	To Left 24 LED Board
J3-3	YEL-ORG	To Right 24 LED Board	J5-10	GRY	To Left 24 LED Board
J3-4	YEL-BLK	To Right 24 LED Board	J6-1	RED-BRN	To Left 24 LED Board
J3-5	YEL-GRN	To Right 24 LED Board	J6-2	RED-BLK	To Left 24 LED Board
J3-6	YEL-GRN	To Right 24 LED Board	J6-3	RED-ORG	To Left 24 LED Board
J3-7	YEL-VIO	To Right 24 LED Board	J6-4	RED-YEL	To Left 24 LED Board
J3-8	YEL-GRY	To Right 24 LED Board	J6-5	N/C	
J3-9	KEY		J6-6	KEY	
J3-10	GRY	To Right 24 LED Board	J6-7	N/C	
J4-1	RED-BRN	To Right 24 LED Board	J6-8	N/C	
J4-2	RED-BLK	To Right 24 LED Board	J6-9	N/C	
J4-3	RED-ORG	To Right 24 LED Board	J6-10	N/C	
J4-4	RED-YEL	To Right 24 LED Board			
J4-5	N/C				
J4-6	N/C				
J4-7	N/C				
J4-8	KEY				
J4-9	N/C				
J4-10	N/C				

Serial 24 Driver Board Schematic A-21967-2 (For Life Light Feature)



**24 LED Board
A-21991-1
(For Life Light Feature)**

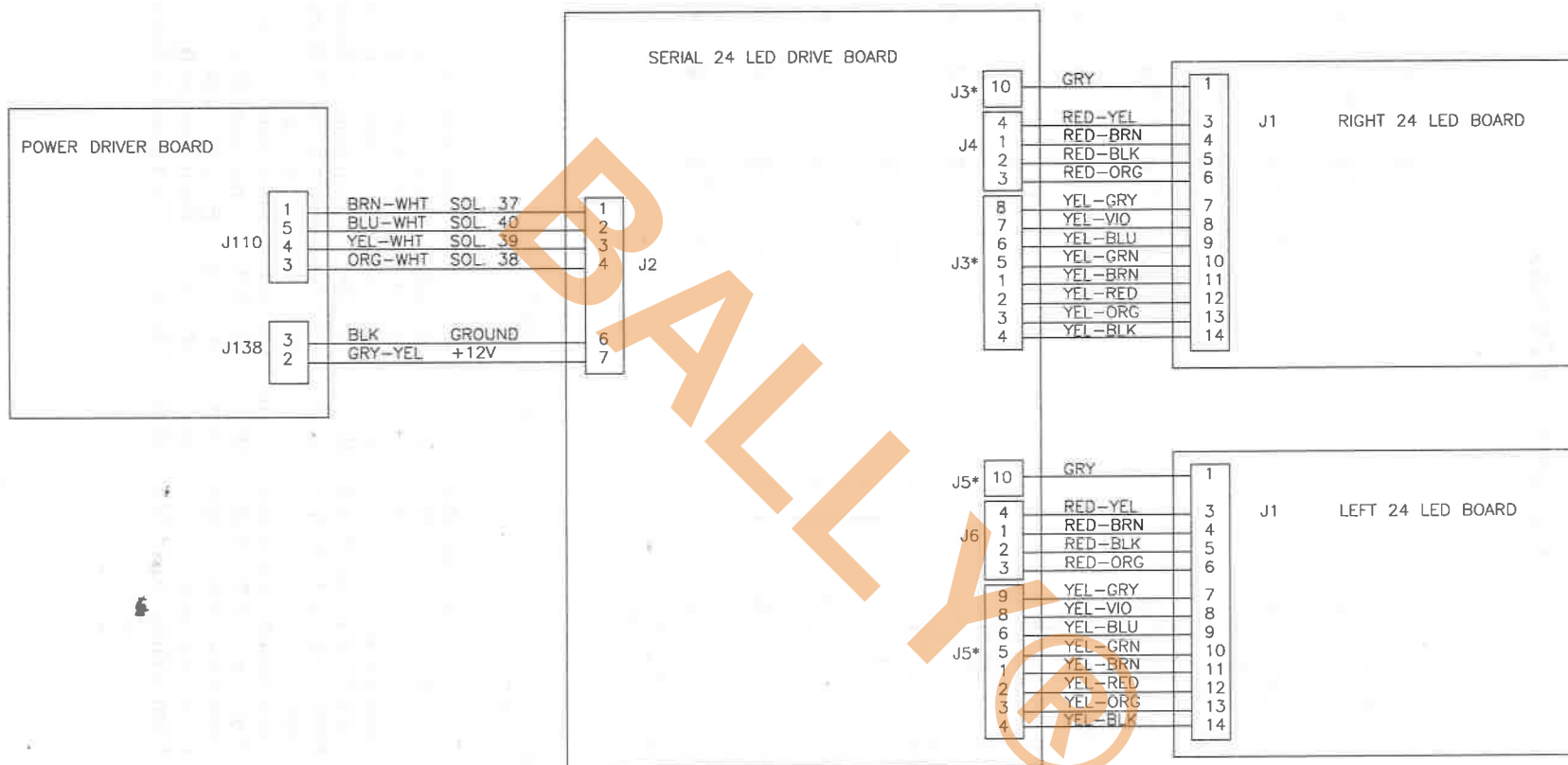


Right 24 LED Board

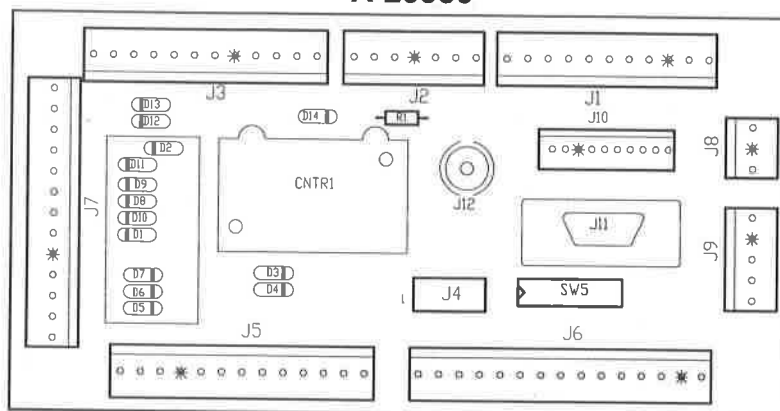
J1-1	GRY	From Serial 24 Board J3-10
J1-2	KEY	
J1-3	RED-YEL	From Serial 24 Board J4-4
J1-4	RED-BRN	From Serial 24 Board J4-1
J1-5	RED-BLK	From Serial 24 Board J4-2
J1-6	RED-ORG	From Serial 24 Board J4-3
J1-7	YEL-GRY	From Serial 24 Board J3-8
J1-8	YEL-VIO	From Serial 24 Board J3-7
J1-9	YEL-BLU	From Serial 24 Board J3-6
J1-10	YEL-GRN	From Serial 24 Board J3-5
J1-11	YEL-BRN	From Serial 24 Board J3-1
J1-12	YEL-RED	From Serial 24 Board J3-2
J1-13	YEL-ORG	From Serial 24 Board J3-3
J1-14	YEL-BLK	From Serial 24 Board J3-4

Left 24 LED Board

J1-1	GRY	From Serial 24 Board J5-10
J1-2	KEY	
J1-3	RED-YEL	From Serial 24 Board J6-4
J1-4	RED-BRN	From Serial 24 Board J6-1
J1-5	RED-BLK	From Serial 24 Board J6-2
J1-6	RED-ORG	From Serial 24 Board J6-3
J1-7	YEL-GRY	From Serial 24 Board J5-9
J1-8	YEL-VIO	From Serial 24 Board J5-8
J1-9	YEL-BLU	From Serial 24 Board J5-6
J1-10	YEL-GRN	From Serial 24 Board J5-5
J1-11	YEL-BRN	From Serial 24 Board J5-1
J1-12	YEL-RED	From Serial 24 Board J5-2
J1-13	YEL-ORG	From Serial 24 Board J5-3
J1-14	YEL-BLK	From Serial 24 Board J5-4

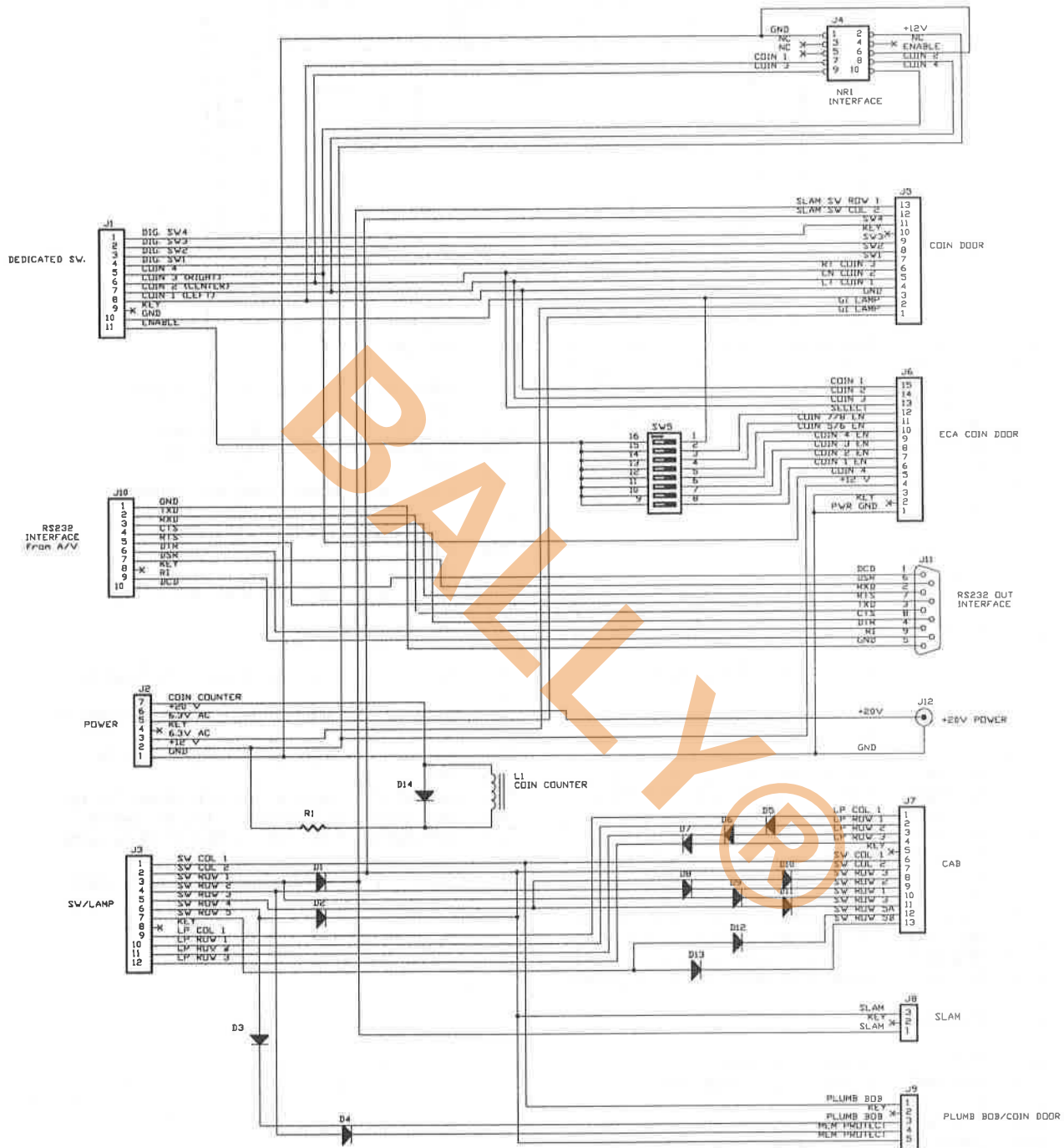


Coin Door Interface Board A-20580



J1-1	ORG-GRY	Dedicated sw row #8 from CPU J205-9.	J6	NOT USED
J1-2	ORG-VIO	Dedicated sw row #7 from CPU J205-8.	J7-1	YEL-GRY Lamp column #8 to cabinet.
J1-3	ORG-BLU	Dedicated sw row #6 from CPU J205-7.	J7-2	N/C
J1-4	ORG-GRN	Dedicated sw row #5 from CPU J205-6.	J7-3	RED-BLU Lamp row #6 to cabinet.
J1-5	ORG-YEL	Dedicated sw row #4 from CPU J205-4.	J7-4	RED-GRY Lamp row #8 to cabinet.
J1-6	ORG-BLK	Dedicated sw row #3 from CPU J205-3.	J7-5	KEY
J1-7	ORG-RED	Dedicated sw row #2 from CPU J205-2.	J7-6	GRN-BRN Switch column #1 to cabinet.
J1-8	ORG-BRN	Dedicated sw row #1 from CPU J205-1.	J7-7	N/C
J1-9	KEY		J7-8	WHT-ORG Switch row #3 to cabinet.
J1-10	BLK	Ground from CPU J205-10.	J7-9	N/C
J1-11	ORG-WHT	Switch enable from CPU J205-12.	J7-10	WHT-BRN Switch row #1 to cabinet.
J2-1	BLK	Ground from Power Driver board J139-3.	J7-11	WHT-ORG Switch row #3 to cabinet.
J2-2	GRY-YEL	+12VAC from Power Driver board J139-2.	J7-12	N/C
J2-3	WHT-VIO	6.8VAC from Power Driver board J104-1.	J7-13	N/C
J2-4	KEY		J8-1	WHT Switch row to cabinet for Slam tilt.
J2-5	VIO	For G.I. from Power Driver board J104-3.	J8-2	KEY
J2-6	N/C		J8-3	GRN Switch column to cabinet for Slam Tilt.
J2-7	BLK-WHT	Signal for coin meter from Power Driver board J139-5.	J9-1	WHT-YEL Switch row #4 to Plumb Bob Tilt.
J3-1	GRN-BRN	Switch column #1 from CPU J212-1.	J9-2	KEY
J3-2	GRN-RED	Switch column #2 from CPU J212-2.	J9-3	GRN-BRN Switch column #1 to Plumb Bob Tilt.
J3-3	WHT-BRN	Switch row #1 from CPU J212-4.	J9-4	WHT-RED Switch row #2 to Interlock Switch.
J3-4	WHT-RED	Switch row #2 from CPU J212-5.	J7-5	GRN-RED Switch column #2 to Interlock Switch.
J3-5	WHT-ORG	Switch row #3 from CPU J212-6.	J10	Ribbon cable To cash flow mechanism (if used).
J3-6	WHT-YEL	Switch row #4 from CPU J212-7.		
J3-7	KEY			
J3-8	YEL-GRY	Lamp col #8 from Pwr Drvr brd J122-3.		
J3-9	RED-BLU	Lamp row #6 from Pwr Drvr brd J125-7.		
J3-10	RED-VIO	Lamp row #7 from Pwr Drvr brd J125-8.		
J3-11	RED-GRY	Lamp row #8 from Pwr Drvr brd J125-9.		
J4	NOT USED			
J5-1	VIO	Return to coin door.		
J5-2	WHT-VIO	6.8VAC for G.I. to coin door.		
J5-3	BLK	Ground to coin door.		
J5-4	ORG-BRN	Dedicated switch row #1 to coin door.		
J5-5	ORG-RED	Dedicated switch row #2 to coin door.		
J5-6	ORG-BLK	Dedicated switch row #3 to coin door.		
J5-7	ORG-GRN	Dedicated switch row #5 to coin door.		
J5-8	ORG-BLU	Dedicated switch row #6 to coin door.		
J5-9	ORG-VIO	Dedicated switch row #7 to coin door.		
J5-10	KEY			
J5-11	ORG-GRY	Dedicated switch row #8 to coin door.		
J5-12	GRN-RED	Switch column #2 to coin door Slam Tilt.		
J5-13	WHT-BRN	Switch row #1 to coin door Slam Tilt.		

Coin Door Interface Board Schematic A-20580



I/O EXTEND
J201

TO I/O SOUND
J202

CABINET
J212

PLFD COL
J206

PLFD ROWS
J208

DIRECT SW INPUTS
J205

B.B. COL
J207

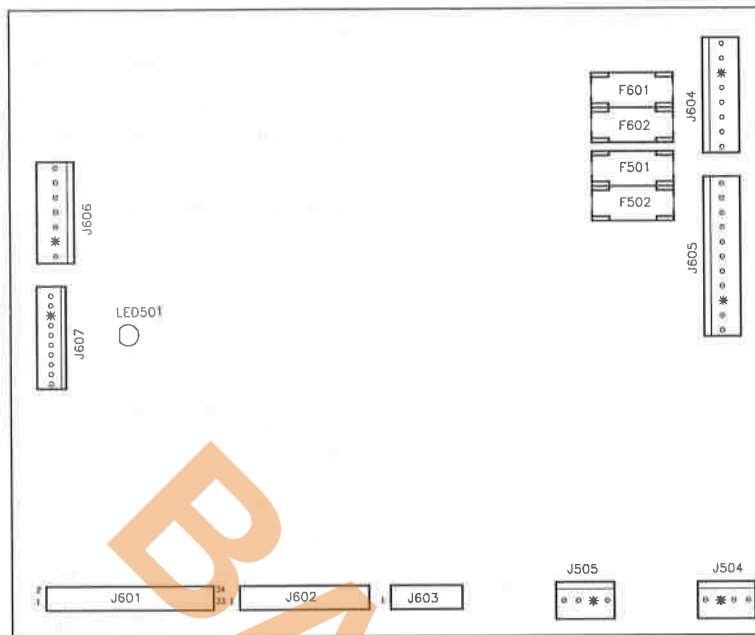
B.B. ROWS
J209

TO PWR/DNR/FLIP PCB
J210

POWER DIAG BLANKING
J206

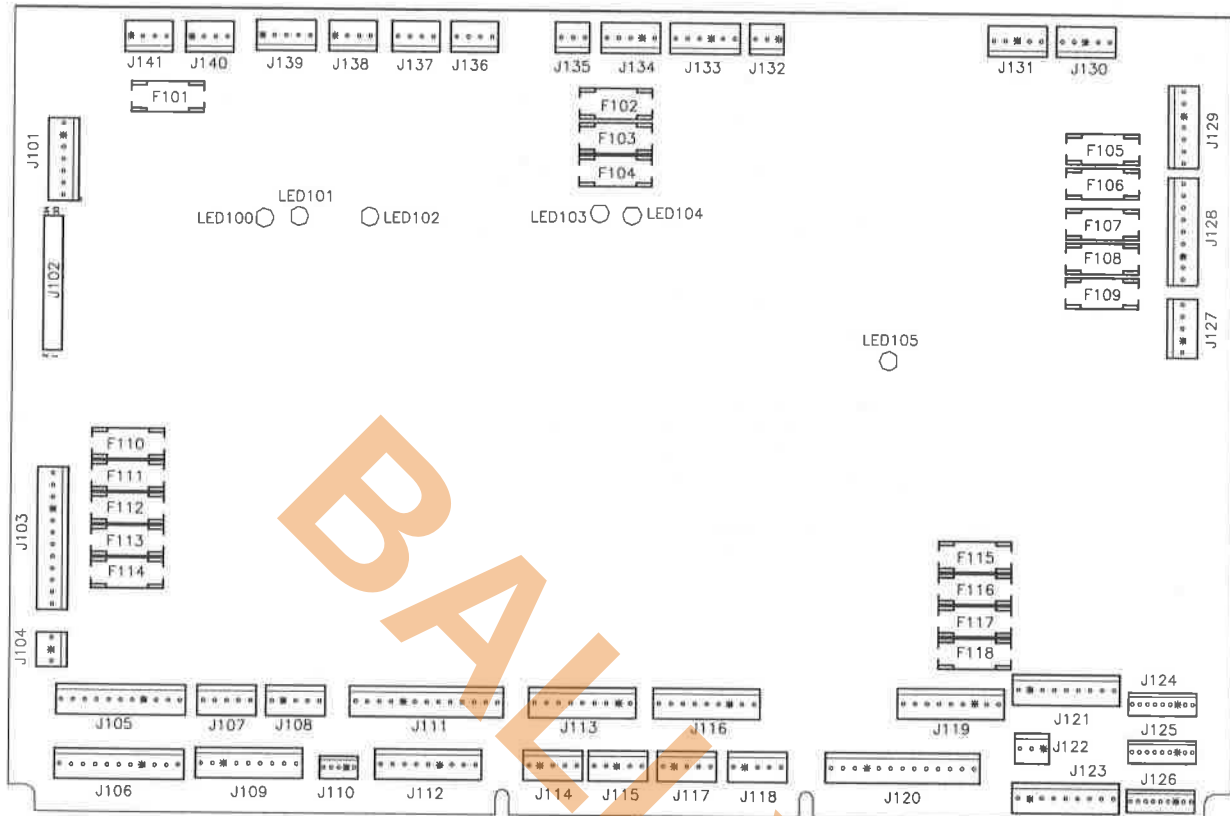
- 3-31

Audio Visual Board Assembly A-20516-50063



J601	34-pin ribbon cable	Data to/from CPU J202.	J504-1	BLK-YEL	Signal to speaker.
J602	26-pin ribbon cable	Data to/from CPU J201.	J504-2	KEY	
J603	14-pin ribbon cable	Data to/from Dot Matrix Display Driver board.	J504-3	N/C	
			J504-4	BLK	Signal to speaker.
J604-1	ORG	+125V to Dot Matrix Display	J505-1	BLK-YEL	Signal to speaker.
J604-2	BLU	+113V to Dot Matrix Display	J505-2	KEY	
J604-3	KEY		J505-3	N/C	
J604-4	BLK	Ground to Dot Matrix Display	J505-4	BLK	Signal to speaker.
J604-5	BLK	Ground to Dot Matrix Display			
J604-6	GRY	+5V to Dot Matrix Display			
J604-7	GRY-YEL	+12V to Dot Matrix Display			
J604-8	BRN	+62V to Dot Matrix Display			
J605-1	WHT	80VAC from transformer secondary.			
J605-2	WHT	80VAC from transformer secondary.			
J605-3	VIO	100VAC from transformer secondary.			
J605-4	VIO	100VAC from transformer secondary.			
J605-5	GRY-WHT	18VAC from transformer secondary.			
J605-6	GRY-WHT	Loop from J605-7.			
J605-7	GRY	18VAC from transformer secondary.			
J605-8	GRY	Loop from J605-7.			
J605-9	KEY				
J605-10	GRY-GRN	18VAC from transformer secondary.			
J605-11	GRY-GRN	Loop from J605-10.			
J606-1	BLK	Ground form Power Driver brd J101-7.			
J606-2	KEY				
J606-3	BLK	Ground from Power Driver brd J101-5.			
J606-4	GRY	+5V from Power Driver board J101-4.			
J606-5	GRY	+5V from Power Driver board J101-3.			
J606-6	GRY-GRN	+12V from Power Driver board J101-2.			
J606-7	GRY-GRN	+12V from Power Driver board J101-1.			
J607	NOT USED				

Power Driver Board Assembly A-20028



J101-1	GRY-GRN	+12V to J210-6, 7; J606-1.	J105-1	N/C	
J101-2	GRY-GRN	+12V to J210-6, 7; J606-2.	J105-2	N/C	
J101-3	GRY	+5V to J210-4, 5; J3-1, 3; J606-3.	J105-3	YEL	Return for G.I. to insert panel.
J101-4	GRY	+5V to J210-4, 5; J3-1, 3; J606-4.	J105-4	KEY	
J101-5	BLK	Ground to J210-1, 3; J606-5.	J105-5	GRN	Return for G.I. to insert panel.
J101-6	KEY		J105-6	VIO	Return for G.I. to insert panel.
J101-7	BLK	Ground to J210-1,3; J606-7.	J105-7	N/C	
J102	34-pin ribbon cable	Data to/from CPU J211.	J105-8	N/C	
J103-1	YEL-WHT	6.8VAC from transformer secondary.	J105-9	WHT-YEL	6.8VAC for G.I. to insert panel.
J103-2	WHT-BRN	6.8VAC from transformer secondary.	J105-10	WHT-GRN	6.8VAC for G.I. to insert panel.
J103-3	WHT-BRN	6.8VAC from transformer secondary.	J105-11	WHT-VIO	6.8VAC for G.I. to insert panel.
J103-4	WHT-ORG	6.8VAC from transformer secondary.	J106-1	BRN	Return for G.I. to playfield.
J103-5	WHT-YEL	6.8VAC from transformer secondary.	J106-2	ORG	Return for G.I. to playfield.
J103-6	WHT-YEL	6.8VAC from transformer secondary.	J106-3	N/C	
J103-7	ORG	6.8VAC from transformer secondary.	J106-4	KEY	
J103-8	ORG	6.8VAC from transformer secondary.	J106-5	N/C	
J103-9	KEY		J106-6	N/C	
J103-10	GRN	6.8VAC from transformer secondary.	J106-7	WHT-BRN	6.8VAC for G.I. to playfield.
J103-11	BRN	6.8VAC from transformer secondary.	J106-8	WHT-ORG	6.8VAC for G.I. to playfield.
J103-12	BRN	6.8VAC from transformer secondary.	J106-9	N/C	
J104-1	WHT-VIO	6.8VAC for G.I. to Coin Door brd J2-5.	J106-10	N/C	
J104-2	KEY		J106-11	N/C	
J104-3	VIO	Return for G.I. to Coin Door board J2-3.	J107	NOT USED	
			J108	NOT USED	

Power Driver Board Continued...

J109-1	BLU-BRN	For solenoid #25 drive to playfld flasher.	J119-1	RED-GRN	+50V to lower right flipper coil.
J109-2	BLU-RED	For solenoid #26 drive to playfld flasher.	J119-2	RED-GRN	Loop from J119-1.
J109-3	BLU-ORG	For solenoid #27 drive to playfield coll.	J119-3	KEY	
J109-4	BLU-YEL	For solenoid #28 drive to playfield coll.	J119-4	RED-BLU	+50V to lower left flipper coil.
J109-5	N/C		J119-5	RED-BLU	Loop from J119-4.
J109-6	N/C		J119-6	RED-VIO	+50V to sol. 33, Rope Popper.
J109-7	KEY		J119-7	RED-VIO	+50V to sol. 34, Ramp Diverter.
J109-8	N/C		J119-8	RED-GRY	+50V to sol. 35, Left Speed Bag.
J109-9	RED-ORG	For solenoid #28 tieback diode.	J119-9	RED-GRY	+50V to sol. 36 Right Speed Bag.
J110-1	BRN-WHT	For sol. 37 drive to Serial 24 LED brd J2-1.	J120-1	ORG-GRY	For sol. #36 drive , Right Speed Bag.
J110-2	KEY		J120-2	N/C	
J110-3	ORG-WHT	For sol. 38 drive to Serial 24 LED brd J2-4.	J120-3	YEL-GRY	For sol. #35 drive, Left Speed Bag.
J110-4	YEL-WHT	For sol. 39 drive to Serial 24 LED brd J2-3.	J120-4	ORG-VIO	For sol. #34 drive, Ramp Diverter.
J110-5	BLU-WHT	For sol. 40 drive to Serial 24 LED brd J2-2.	J120-5	N/C	
J111-1	BLK-BRN	For solenoid #17 drive to playfield flasher.	J120-6	YEL-VIO	For sol. #33 drive, Rope Diverter.
J111-2	BLK-RED	For solenoid #18 drive to playfield flasher.	J120-7	ORG-BLU	For sol. #32 hold drive to low left flipper.
J111-3	BLK-ORG	For solenoid #19 drive to playfield flasher.	J120-8	N/C	
J111-4	BLK-YEL	For solenoid #20 drive to playfield flasher.	J120-9	YEL-BLU	For sol. #31 power drive to low left flipper.
J111-5	BLU-GRN	For solenoid #21 drive to playfield flasher.	J120-10	KEY	
J111-6	BLU-BLK	For solenoid #22 drive to playfield flasher.	J120-11	ORG-GRN	For sol. #30 hold drive to low right flipper.
J111-7	BLU-VIO	For solenoid #23 drive to playfield flasher.	J120-12	N/C	
J111-8	BLU-GRY	For solenoid #24 drive to playfield flasher.	J120-13	YEL-GRN	For sol. #29 power drive to low right flipper.
J111-9	KEY		J121	NOT USED	
J111-10	N/C		J122-1	KEY	
J111-11	N/C		J122-2	N/C	
J111-12	N/C		J122-3	YEL-GRY	For lamp column #8 to cabinet.
J111-13	N/C		J123-1	YEL-BRN	For lamp column #1 to playfield.
J112-1	N/C		J123-2	YEL-RED	For lamp column #2 to playfield.
J112-2	N/C		J123-3	YEL-ORG	For lamp column #3 to playfield.
J112-3	BLK-ORG	For solenoid #19 drive to insert flasher.	J123-4	YEL-BLK	For lamp column #4 to playfield.
J112-4	KEY		J123-5	YEL-GRN	For lamp column #5 to playfield.
J112-5	BLK-YEL	For solenoid #20 driver to insert flasher.	J123-6	YEL-BLU	For lamp column #6 to playfield.
J112-6	BLU-GRN	For solenoid #21 driver to insert flasher.	J123-7	YEL-VIO	For lamp column #7 to playfield.
J112-7	BLU-BLK	For solenoid #22 driver to insert flasher.	J123-8	KEY	
J112-8	N/C		J123-9	YEL-GRY	For lamp column #8 to playfield.
J112-9	N/C		J124-1	N/C	
J113-1	BRN-BLK	For solenoid #9 drive to playfield coll.	J124-2	N/C	
J113-2	KEY		J124-3	KEY	
J113-3	BRN-RED	For solenoid #10 drive to playfield coll.	J124-4	N/C	
J113-4	BRN-ORG	For solenoid #11 drive to playfield coll.	J124-5	N/C	
J113-5	BRN-YEL	For solenoid #12 drive to playfield coll.	J124-6	N/C	
J113-6	BRN-GRN	For solenoid #13 drive to playfield coll.	J124-7	RED-BLU	For lamp row #6 to coin door board J3-9.
J113-7	BRN-BLU	For solenoid #14 drive to playfield coll.	J124-8	RED-VIO	For lamp row #7 to coin door brd J3-10.
J113-8	BRN-VIO	For solenoid #15 drive to playfield coll.	J124-9	RED-GRY	For lamp row #8 to coin door brd J3-11.
J113-9	BRN-GRY	For solenoid #16 drive to playfield coll.	J125-1	RED-BRN	For lamp row #1 to playfield.
J114	NOT USED		J125-2	RED-BLK	For lamp row #2 to playfield.
J115	NOT USED		J125-3	KEY	
J116-1	VIO-BRN	For solenoid #1 drive to playfield coll.	J125-4	RED-ORG	For lamp row #3 to playfield.
J116-2	VIO-RED	For solenoid #2 drive to playfield coll.	J125-5	RED-YEL	For lamp row #4 to playfield.
J116-3	KEY		J125-6	RED-GRN	For lamp row #5 to playfield.
J116-4	VIO-ORG	For solenoid #3 drive to playfield coll.	J125-7	RED-BLU	For lamp row #6 to playfield.
J116-5	VIO-YEL	For solenoid #4 drive to playfield coll.	J125-8	RED-VIO	For lamp row #7 to playfield.
J116-6	VIO-GRN	For solenoid #5 drive to playfield coll.	J125-9	RED-GRY	For lamp row #8 to playfield.
J116-7	VIO-BLU	For solenoid #6 drive to playfield coll.	J126	NOT USED	
J116-8	VIO-BLK	For solenoid #7 drive to playfield coll.	J127-1	WHT-GRN	9.8VAC from transformer secondary.
J116-9	VIO-GRY	For solenoid #8 drive to playfield coll.	J127-2	WHT-GRN	9.8VAC loop from J127-1.
J117	NOT USED		J127-3	WHT-GRN	9.8VAC from transformer secondary.
J118	NOT USED		J127-4	KEY	
			J127-5	WHT-GRN	9.8VAC loop from J127-3.

Power Driver Board Continued...

J128-1	WHT-RED	16VAC loop from J128-2.
J128-2	WHT-RED	16VAC from transformer secondary.
J128-3	WHT-RED	16VAC loop from J128-4.
J128-4	WHT-RED	16VAC from transformer secondary.
J128-5	BLK-YEL	16VAC loop from J128-6.
J128-6	BLK-YEL	16VAC from transformer secondary.
J128-7	KEY	
J128-8	BLK-YEL	16VAC loop from J128-9.
J128-9	BLK-YEL	16VAC from transformer secondary.
J129-1	RED	9VAC from transformer secondary.
J129-2	RED	9VAC from transformer secondary.
J129-3	KEY	
J129-4	BLU-WHT	13VAC from transformer secondary.
J129-5	BLU-WHT	13VAC loop from J129-4.
J129-6	BLU-WHT	13VAC from transformer secondary.
J129-7	BLU-WHT	13VAC loop from J129-6.
J130	NOT USED	
J131	NOT USED	
J132	NOT USED	
J133-1	RED-ORG	+50V to coils.
J133-2	RED-BRN	+50V to coils.
J133-3	RED-BLK	+50V to coils.
J133-4	KEY	
J133-5	N/C	
J133-6	RED-WHT	+20V to playfield flashers.
J134	NOT USED	
J135	NOT USED	
J136	NOT USED	
J137	NOT USED	
J138-1	KEY	
J138-2	GRY-YEL	+12V to Serial 24 LED board J2-7.
J138-3	BLK	Ground to Serial 24 LED board J2-6.
J138-4	N/C	
J139-1	KEY	
J139-2	GRY-YEL	+12V to Coin Door board J2-2.
J139-3	BLK	Ground to Coin Door board J2-1.
J139-4	N/C	
J139-5	BLK-WHT	Signal for coin meter to coin door brd J2-7.
J140-1	KEY	
J140-2	GRY-YEL	+12V to 16-Opto board J5-12.
J140-3	BLK	Ground to 16-Opto board J5-13.
J140-4	N/C	
J141-1	KEY	
J141-2	GRY-YEL	+12V to Motor EMI board J1-3, Position Encoder board J1-1, TTL Bi-direct Motor board J1-5 and, Motor 4-opto Switch board J1-1.
J141-3	BLK	Ground to Position Encoder J1-2, TTL Bi-direct Motor board J1-4 and, Motor 4-opto Switch board J1-2.
J141-4	N/C	

NOTES

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