MEDIEVAL MADNESS

REMAKE

OPERATIONS MANUAL INCLUDES

Operations & Adjustments • Testing & Problem Diagnosis • Parts Information • Wiring Diagrams & Schematics

Chicago Gaming Company, 4616 W. 19th Street, Cicero, IL 60804 • (800) 379-9776

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DIP SWITCH CHART

COUNTRY	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
AMERICA	OFF	OFF	ON	ON	ON	ON	ON	ON
EUROPEAN	OFF	OFF	ON	ON	ON	OFF	ON	ON
FRENCH	OFF	OFF	ON	ON	ON	ON	OFF	OFF
GERMAN	OFF	OFF	ON	ON	ON	ON	ON	OFF
SPAIN	OFF	OFF	ON	ON	OFF	ON	ON	ON

Solenoid - Flasher Table

SOL#	Function	Driver Brd	FET#	Con.	FUSE	WIRE COLOR	PART#
01	AUTO PLUNGER	1	Q4	J4	F1	BLU-YEL	AE-23-800
02	TROUGH EJECT	1	Q3	J3	F1	VIO-RED	AE-26-1500
03	LEFT POPPER	3	Q3	J3	F1	GRY-ORG	AE-26-1200
04	CASTLE	3	Q2	J2	F1	GRN-ORG	AE-26-1500
05	CASTLE GATE POWER	2	Q7	J7	F3	BRN	A-20099
06	CASTLE GATE HOLD	2	Q8	J7	F3	BLU	
07	KNOCKER	PS	Q2	J5	F4	BRN	AE-23-800
08	CATAPULT	3	Q1	J1	F1	BLK-ORG	AL-23-800
09	RIGHT EJECT	2	Q1	J1	F1	BLU-YEL	AE-27-1200
10	LEFT SLINGSHOT	1	Q1	J1	F1	BRN-ORG	AE-26-1200
11	RT SLINGSHOT	1	Q2	J2	F1	BRN-ORG	AE-26-1200
12	LEFT JET	2	Q3	J3	F1	BLU-WHT	AE-26-1200
13	BOTTOM JET	2	Q2	J2	F1	BLU-RED	AE-26-1200
14	RIGHT JET	2	Q4	J4	F1	BLU-BLK	AE-26-1200
15	TOWER DIVERT HOLD	3	Q5	J5	F2	BLU-GRN	A-20099
16	TOWER DIVERT POWER	3	Q6	J5	F2	BRN	
	FLASHERS						
17	LEFT SIDE LOW BB Insert	PF	Q45B	PL4			PIN-PCB-TWSFLSH PIN-PCB-BBFLASH
18	LEFT RAMP BB Insert	PF	Q32B	J6p12			PIN-PCB-TRUFLSH PIN-PCB-BBFLASH
19	LEFT SIDE HIGH BB Insert	PF	Q44B	J5p4			PIN-PCB-TWSFLSH PIN-PCB-BBFLASH
20	RIGHT SIDE HIGH BB Insert	PF	Q46B	J7p6			PIN-PCB-TWSFLSH PIN-PCB-BBFLASH
21	RIGHT RAMP (Dragon Flasher is an Upside Down	PF	Q46A	J9p5			PIN-PCB-TRUFLSH PIN-PCB-MOTFLSH)
22	CASTLE RIGHT SIDE Back Board	PF	Q33A	PL71			PIN-PCB-TWSFLSH PIN-PCB-MARFLSH
23	RIGHT SIDE LOW	PF	Q40B	PL92			PIN-PCB-TWSFLSH PIN-PCB-TRUFLSH
24	MOAT (X2)	PF	Q33B	PL72			PIN-PCB-MOTFLSH
25	CASTLE LEFT SIDE Back Board	PF	Q44A	J6p10			PIN-PCB-TWSFLSH PIN-PCB-MARFLSH
	Solenoids						
26	TOWER LOCK	3	Q4	J4	J4	WHT-ORG	AE-27-1200
27	RIGHT GATE - 12V	PF	Q47A	J9 Pin2	F1	BLU-BLK	PIN-A-14406
28	LEFT GATE - 12V	PF	Q47B	J6 Pin1	F1	BLU-YEL	PIN-A-14406
29	FLIPPER RIGHT POWER	1	Q5	J5	F2	BRN	FL-11629
30	FLIPPER RIGHT HOLD	1	Q6	J5	F2	BLU	Blue
31	FLIPPER LEFT POWER	1	Q7	J7	F3	BRN	FL-11629
32	FLIPPER LEFT HOLD	1	Q8	J7	F3	BLU	Blue
33	TROLL LEFT POWER	3	Q7	J7	F3	BRN	FL-11753
34	TROLL LEFT HOLD	3	Q8	J7	F3	BLU	Yellow
35	TROLL RIGHT POWER	2	Q5	J5	F2	BRN	FL-11753
36	TROLL RIGHT HOLD	2	Q6	J5	F2	BLU	Yellow
37	DRAWBRIDGE MOTOR - 12V	PF	Q45A	PL9	F1	YEL	14-8015
	GENERAL ILLUMINATION						
01	BOTTOM PLAYIELD	PF	Q42A	P93	P93B	WHT-BRN	000-LMP-LED6VWW
02	MIDDLE PLAYIELD	PF	Q42B	P94	P94B	WHT-ORG	000-LMP-LED6VWW
03	TOP PLAYIELD	PF	Q43A	P95	P95B	WHT-YEL	000-LMP-LED6VWW
04	TOP INSERT	CONTRLR	Q5A	J4 P9		RED-GRN	PIN-PCB-24LEDBR
05	BOTTOM INSERT	CONTRLR	Q7A	J4 P13		BLK-YEL	PIN-PCB-24LEDBR

IMPORTANT NOTICE

PLEASE READ

This pinball game is equipped with a SAFETY FEATURE to prevent shocks from

the solenoid circuit when the coin door is opened. An interlock switch, located at

the left of the coin door opening, has been added to the game. When the coin door

is opened, this interlock switch opens, breaking the connection to the +50V winding of

the transformer secondary.

COM 1
NO 1
NO 2   BLK-ORG
COM 2   BLK-RED

INTERLOCK SWITCH
PIN-56431519000
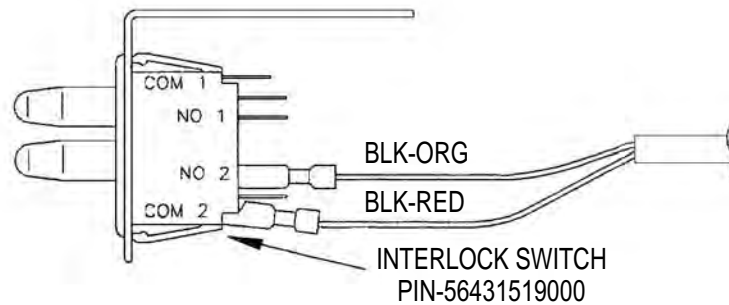
Safety Notices

The following safety instructions apply to all game operators. We recommend that you read this page before setting up Medieval Madness. Use the following safety guidelines to help protect the system from potential damage and to ensure your personal safety.

- Medieval Madness will function at either 115V or 230V. Instructions on changing operating voltage can be found on Page 1-6.
- If operating at 230V, the operator must use a CE certified power cord rated for 250V, 5A.
- To help prevent electric shock, plug the system power cables into properly grounded power sources. These cables are equipped with 3-prong plugs to help ensure proper grounding.
  Do not use adapter plugs or remove the grounding prong from a cable. If you must use an extension cable, use a 3-wire cable with properly grounded plugs.
- Do not spill food or liquid on your system.
- Do not push any objects into the openings of the system. Doing so can cause fire or electric shock by shorting out interior components.
- Keep your game far away from radiators and heat sources.
- Do not block cooling vents.
- Before working on the machine be sure to unplug it.
- Be sure to use fuses that meet the specified rating. (5A, 250V Fast-blow) Using fuses exceeding the specified rating can cause a fire and electrical shock.
- If the supply cord is damaged, it must be replaced by a special cord or assembly available from the manufacturer or service agent.
- CAUTION, battery may explode if mistreated. Do not recharge, disassemble or dispose of in fire.
- CAUTION, when you raise the backbox, it must be secured in place with the wing bolts provided. These can be found in the cash box. Do not rely on the latch alone. Instructions for lowering the speaker panel to access the mounting holes can be found on page 1-3.

FCC Compliance

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

MEDIEVAL MADNESS

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.

Serial Number_____

We reserve the rights to make modifications and improvements to our products. The specifications and parts identified in this manual are subject to change without notice.

TABLE OF CONTENTS

Section 1 Continued…

Section 2 Continued…

Section 3 – Wiring Diagrams & Schematics

MEDIEVAL MADNESS

Rules
&
Shotmaps

HOW TO PLAY MEDIEVAL MADNESS

SUPER SKILL SHOT - Hold left flipper button WHILE launching the ball. Make any flashing arrow shot to collect.

DESTROY CASTLES - Shoot drawbridge, then gate, then into castle to destroy. Destroy all the Baron's castles to attack the King of Payne!

EXTRA BALL - Destroy castles OR collect Hurry-ups OR collect castle multiball super jackpot(s) to light extra ball. Shoot right eject to collect extra ball.

RAID THE CASTLE MULTIBALL - Lock three balls in castle to start multiball. Shoot ramps to collect jackpots. Collect five jackpots to light super jackpot. Collect super jackpot(s) to light extra ball.

TROLLS! - Hit center yellow targets to light Trolls! Shoot right eject to start Trolls! Hit Trolls to destroy them and light Troll Madness at right eject.

MULTIBALL MADNESS - Complete one or more of: Joust Victory, Catapult Slam, Revolting Peasants, Save the Damsels, or Trolls to light Multiball Madness at right eject. The more you light the more you are rewarded. Shoot right eject to start Multiball Madness. Shoot flashing arrows for jackpots and strobing shots for super jackpots.

HURRY-UP - Start Hurry-up on center shot by completing one or more of Joust Victory, Catapult Slam, Revolting Peasant, Save the Damsel or Trolls AFTER Multiball Madness is lit. Shoot center shot to collect award.

ROYAL MADNESS - Complete Joust, Catapult, Peasants, Damsels, Trolls, and Multiball Madness to light Royal Madness at right eject. Shoot right eject to start. Complete all lit shots in the time allowed to collect Extra Ball.

BATTLE FOR THE KINGDOM - Collect three Joust Victories, three Catapult Slams, three Revolting Peasants, three Damsels, Destroy all Castles, and destroy ten Trolls to light Battle for the Kingdom. Shoot center shot to start. During Battle for the Kingdom, shoot all flashing shots to destroy the King of Payne and restore order to the land.

Medieval Madness Instruction Card.

RULES FOR PLAYING MEDIEVAL MADNESS

SUPER SKILL SHOT - Hold left flipper button WHILE launching the ball. Make any flashing arrow shot to collect.

DESTROY CASTLES - Shoot drawbridge, then gate, then into castle to destroy. Destroy all the Baron's castles to attack the King of Payne!

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SKILL SHOT   Collect Skill Shot at ball start by using flippers to move the blinking light on the top lanes to the same lane the ball rolls down. The right flipper button will move the light to the right; the left flipper button will move the light to the left. Skill Shot awards Big Points and Plus 5X Bonus.

BLINKING   LIGHTS
(SWORD   FIGHT)

SUPER SKILL SHOT At ball start, hold left flipper <u>while</u> launching the ball. Then, make any flashing jackpot shot. Making a flashing shot awards Big Points and starts a Hurry-up on the center Castle Drawbridge shot,

HURRY-UP

JACKPOT
ARROW
LIGHTS

JACKPOT
ARROW
LIGHTS

4
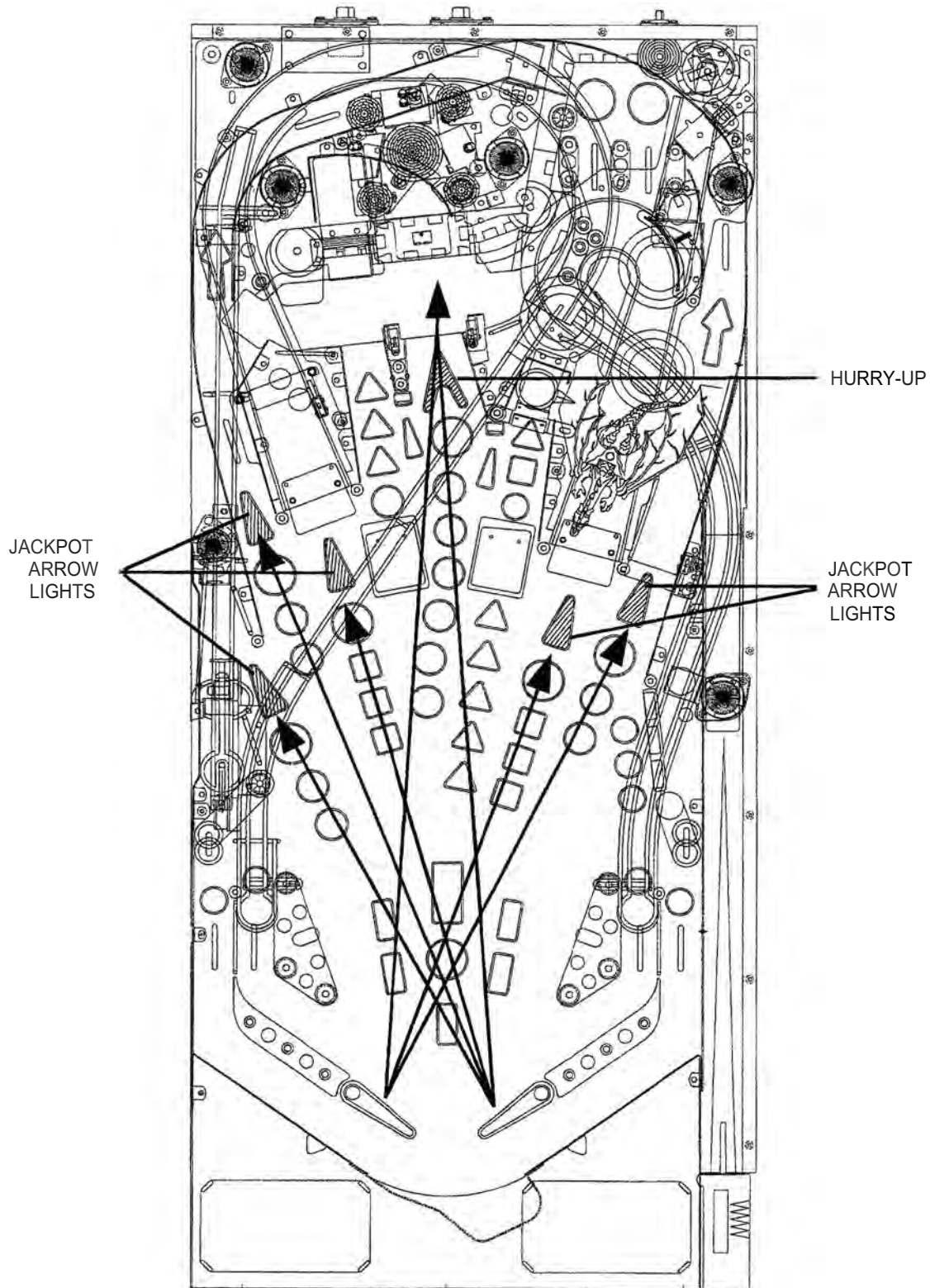
MERLIN'S MAGIC   Complete the three right side Standup Targets to light Merlin's Magic located at the right eject hole. Make the right eject shot to collect Merlin's Magic Mystery Award, (shown in the display).

RIGHT
EJECT

MERLIN'S
MAGIC

SIDE   STANDUP
TARGETS
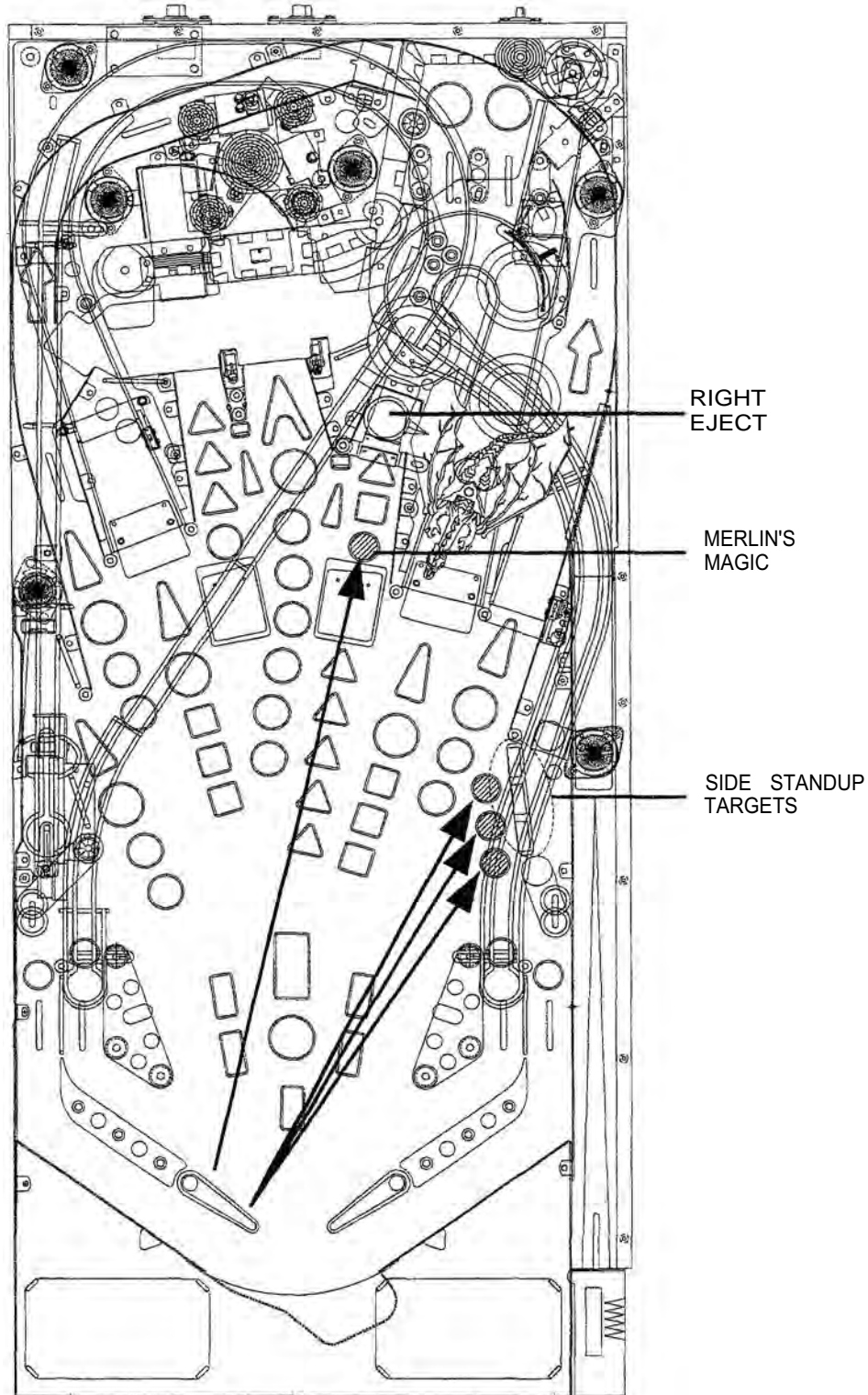
EXTRA BALL To light Extra Ball, destroy Castles, complete Hurry-ups (the displayed number of times), and/or collect Castle Multiball Super Jackpots (adjustable). Then, make the right eject shot to collect the Extra Ball. Completing Royal Madness also awards an Extra Ball (adjustable).

HURRY-UP

CASTLE
SUPER
JACKPOT

RIGHT EJECT

EXTRA BALL

ROYAL
MADNESS
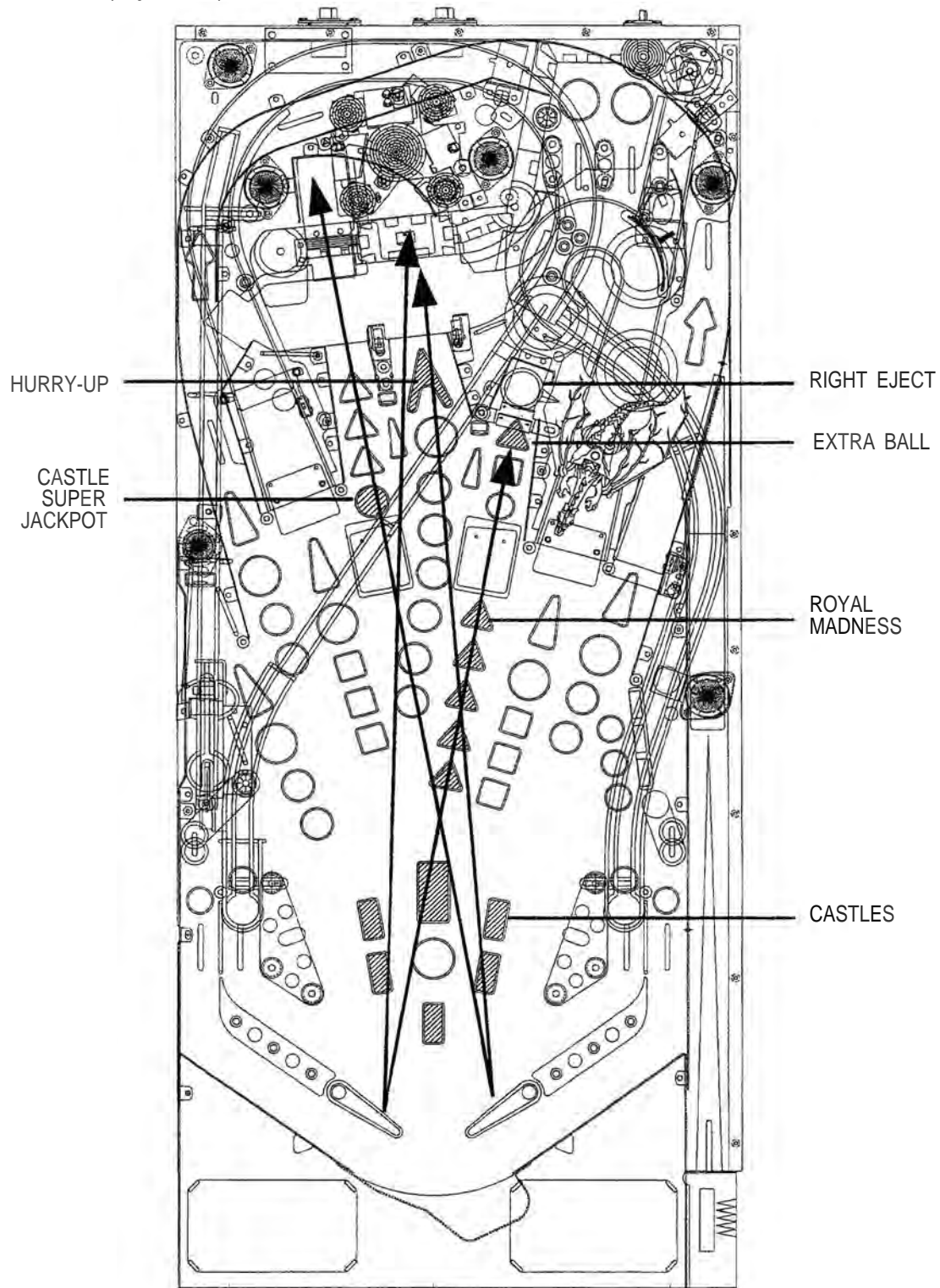
CASTLES

CASTLE MULTIBALL Lock three balls in the Castle, (complete Jump the Moat and Break Through the Castle Wall shot) to start Multiball. Shoot ramps to collect Jackpots. Collect five jackpots to light Super Jackpot. Collect Super Jackpot to light Victory Jackpots. Shoot ramps, loops and catapult to collect all Victory Jackpots.

LOCK BALL-1

LOCK BALL-2

LOCK BALL-3

SUPER JACKPOT

JACKPOTS

JACKPOTS

VICTORY JACKPOTS

VICTORY JACKPOTS

7
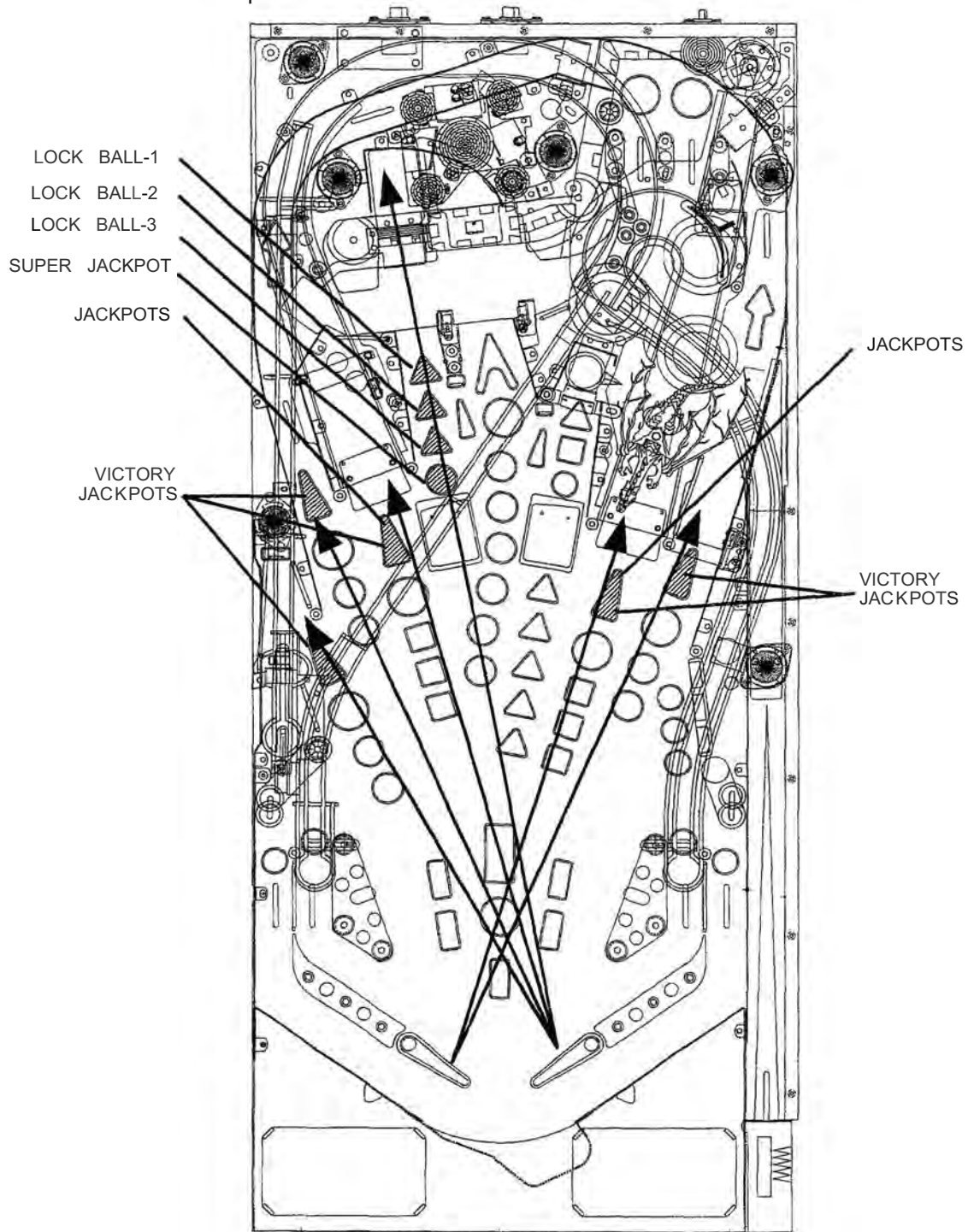
TROLLS!   Hit the center yellow Standup Targets to light Trolls! (See display for number of hits needed.) Make the Right Eject shot to start Trolls! Hit pop-up troll heads to destroy them and light Troll Madness located at the Right Eject hole.
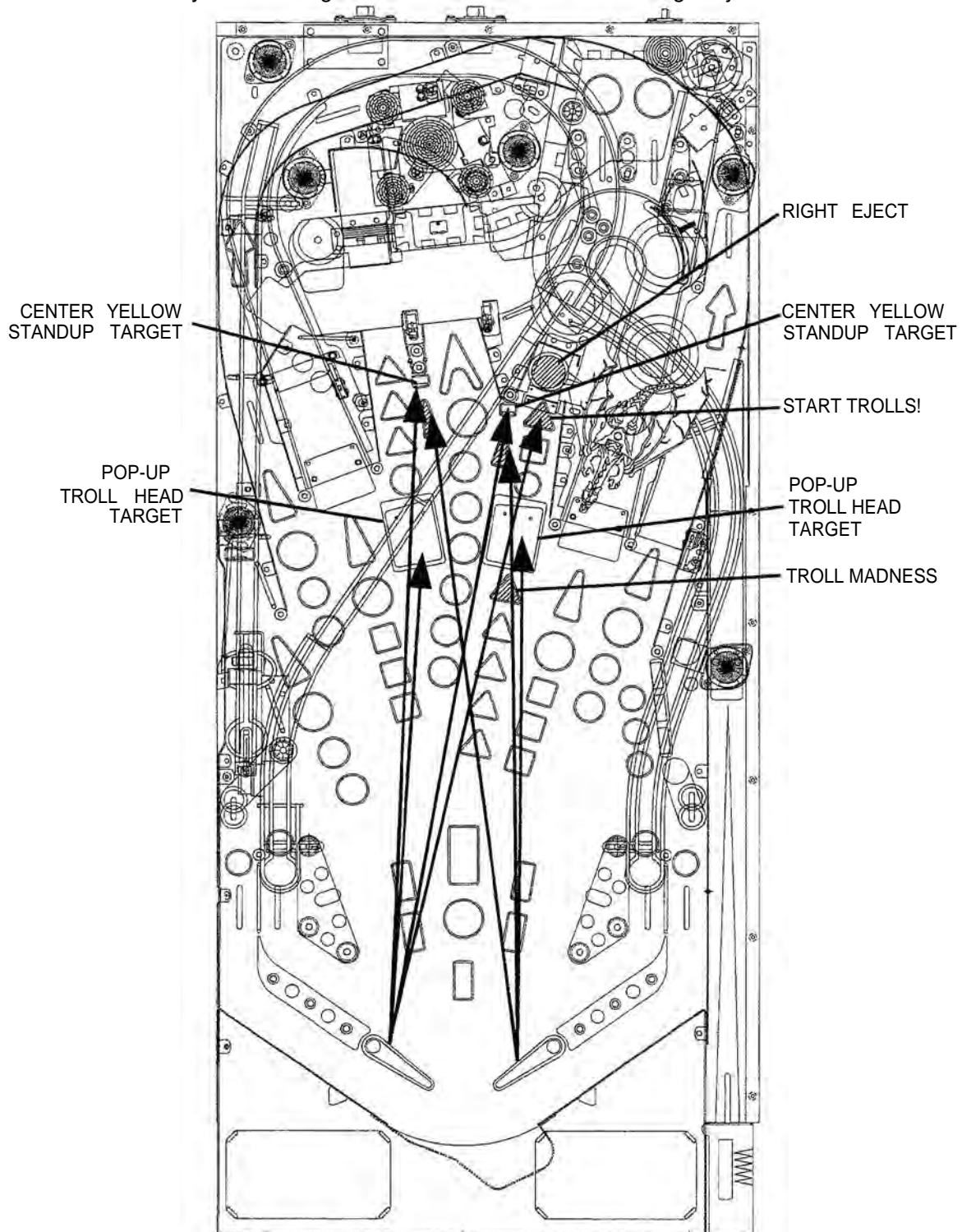
RIGHT EJECT

CENTER YELLOW
STANDUP TARGET

CENTER YELLOW
STANDUP TARGET

START TROLLS!

POP-UP
TROLL HEAD
TARGET

POP-UP
TROLL HEAD
TARGET

TROLL MADNESS

MULTIBALL MADNESS Complete one or more of: Joust Victory, Catapult Slam, Revolting Peasants, Save the Damsels, or Trolls to light Multiball Madness located at the Right Eject hole. Make the Right Eject shot to start Multiball Madness. Make flashing Arrows shots for Jackpot and strobing shots for Super Jackpots.
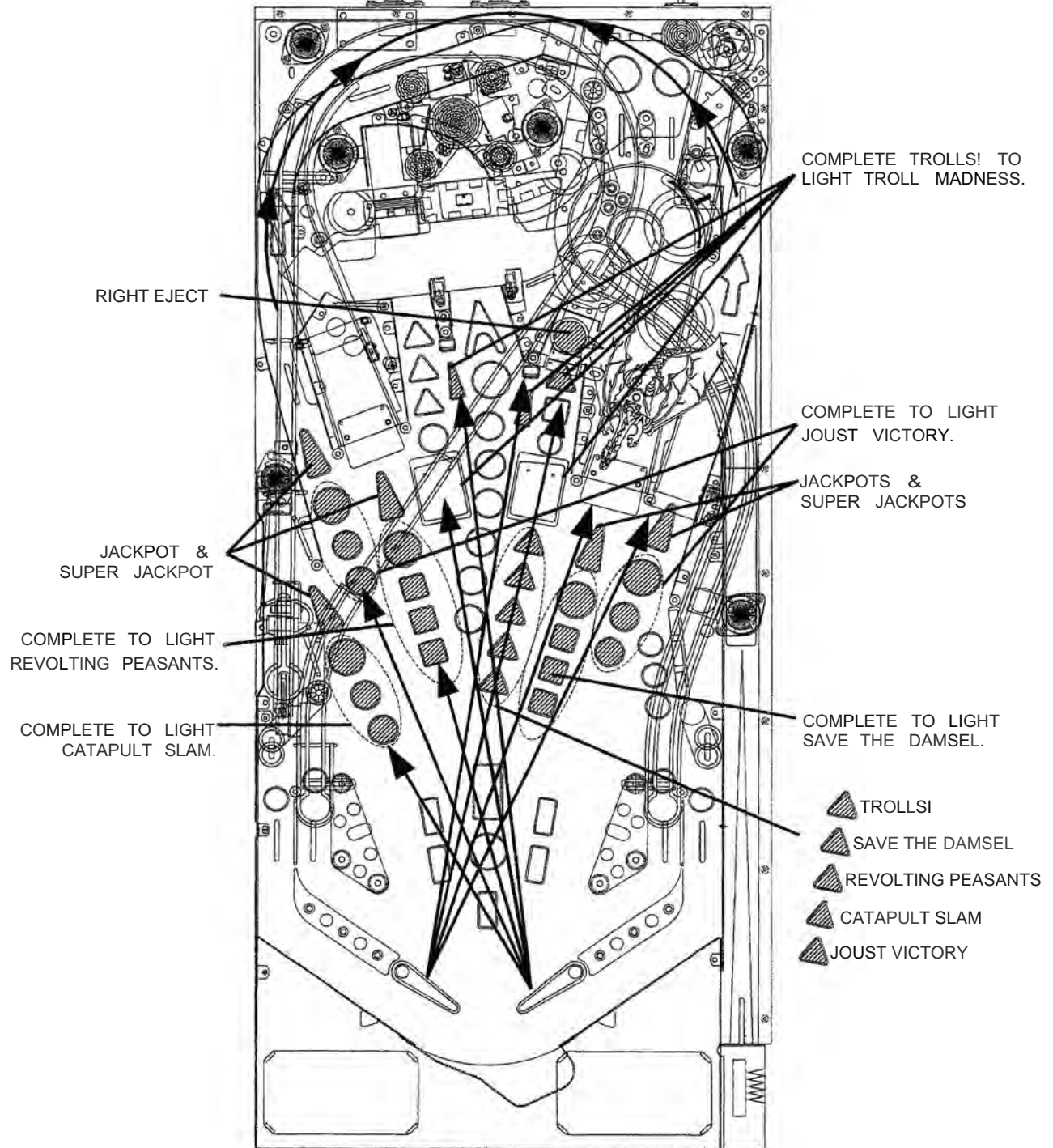
COMPLETE TROLLS! TO LIGHT TROLL MADNESS.

RIGHT EJECT

COMPLETE TO LIGHT JOUST VICTORY.

JACKPOTS & SUPER JACKPOTS

JACKPOT & SUPER JACKPOT

COMPLETE TO LIGHT REVOLTING PEASANTS.

COMPLETE TO LIGHT CATAPULT SLAM.

COMPLETE TO LIGHT SAVE THE DAMSEL.

TROLLSI

SAVE THE DAMSEL

REVOLTING PEASANTS

CATAPULT SLAM

JOUST VICTORY

9

ROYAL MADNESS Complete Joust, Catapult, Peasants, Damsels, Trolls, and Multiball Madness to light Royal Madness located at the Right Eject hole. Make the Right Eject shot to start Royal Madness. Complete all lit shots in the time allowed, (adjustable) to collect Extra Ball.

RIGHT EJECT

START ROYAL MADNESS

COMPLETE LIT SHOTS

COMPLETE LIT SHOTS

COMPLETE TO LIGHT
ROYAL MADNESS

TROLLSI

SAVE THE DAMSEL

REVOLTING PEASANTS

CATAPULT SLAM

JOUST VICTORY

ROYAL MADNESS IS LIT
WHEN ALL THE ABOVE
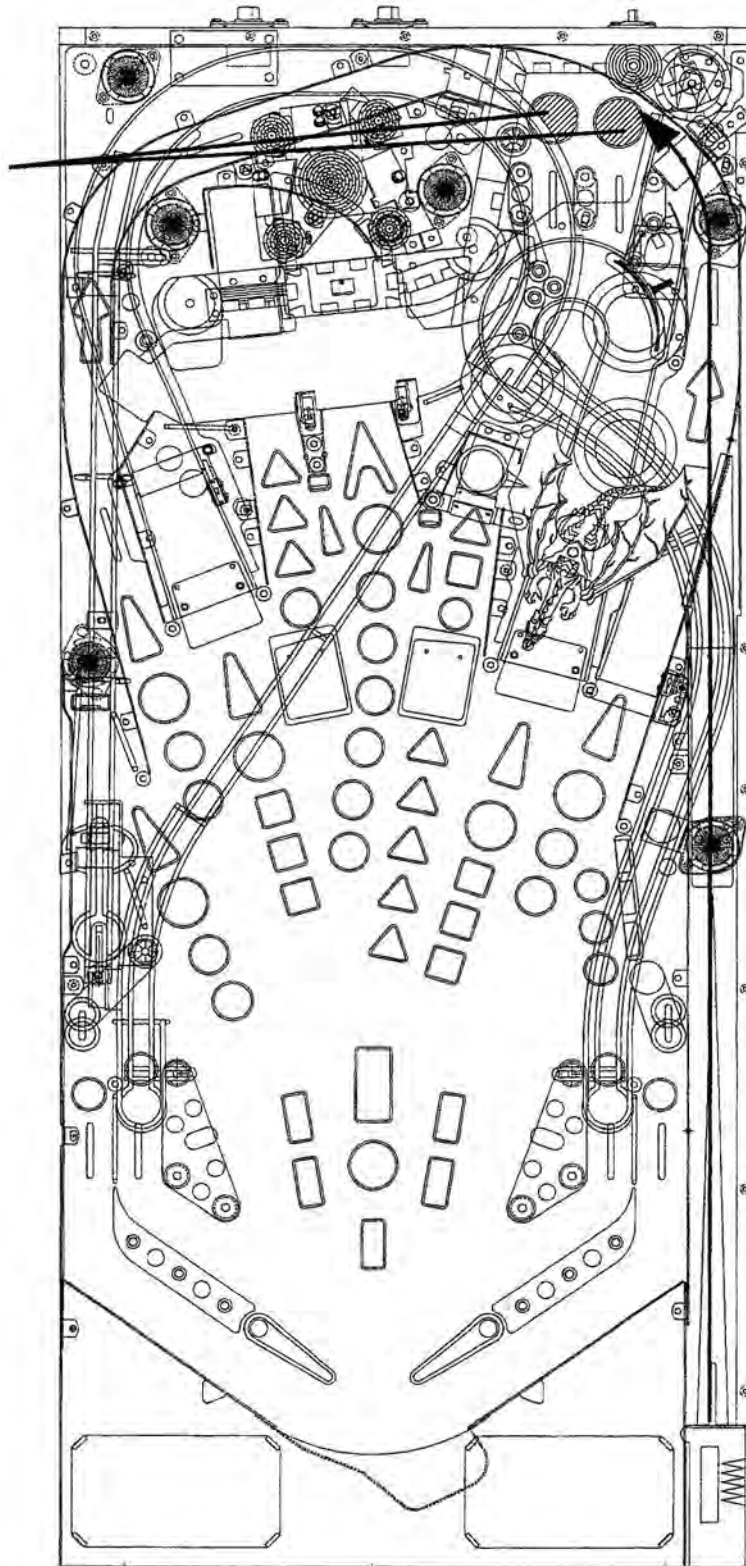IS FLASHING.
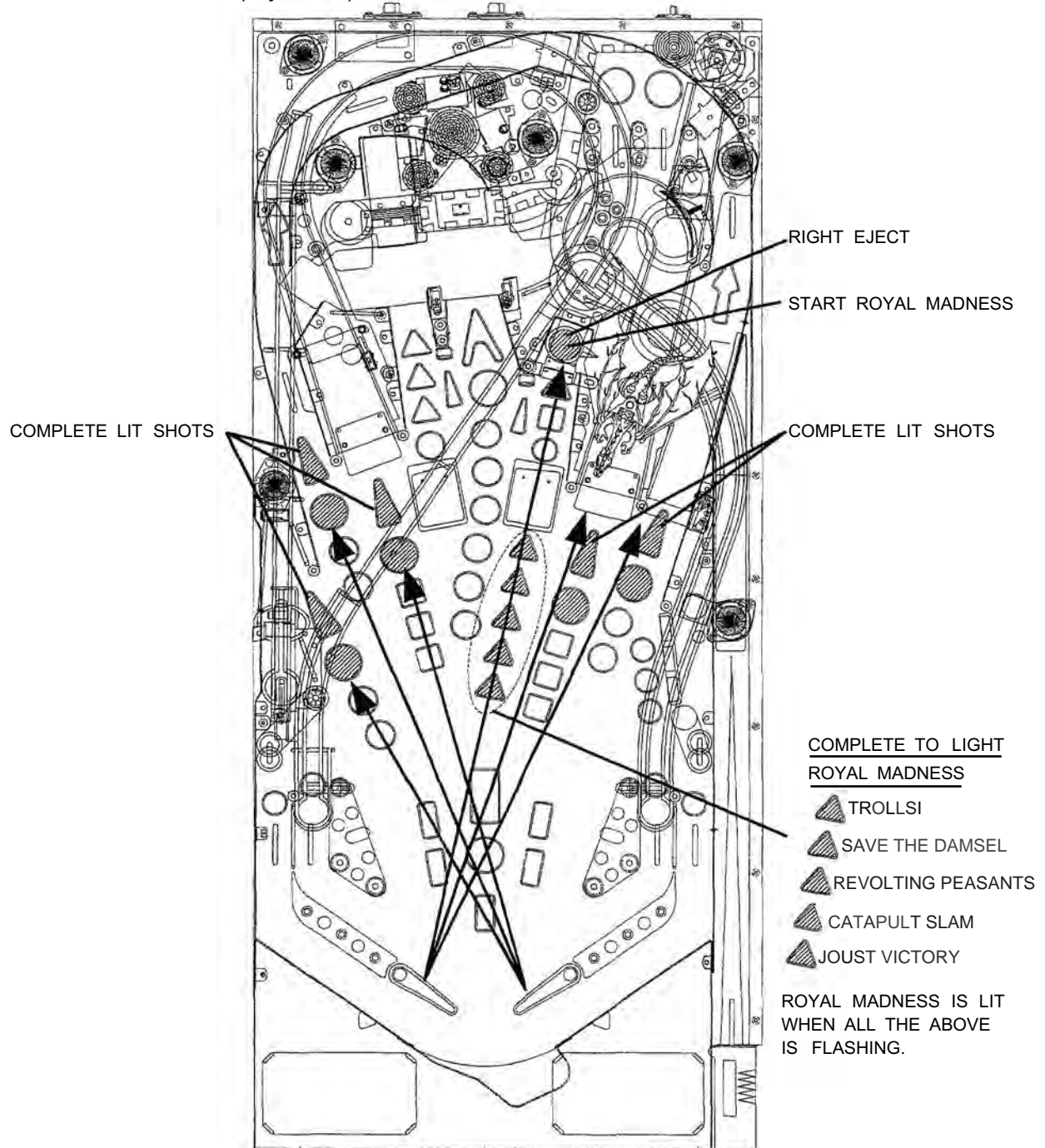
HURRY-UP   Start Hurry-up on center shot by completing one or more of the following: Joust Victory, Catapult Slam, Revolting Peasants, Save the Damsel, or Trolls after its Multiball Madness light is lit. Make the center shot to collect Hurry-up Award.

HURRY-UP
CENTER   SHOT

MULTIBALL
MADNESS
LIGHTS

COMPLETE
REVOLTING
PEASANTS

COMPLETE
SAVE THE
DAMSEL

COMPLETE
JOUST VICTORY

COMPLETE
JOUST VICTORY

COMPLETE
CATAPULT SLAM

11
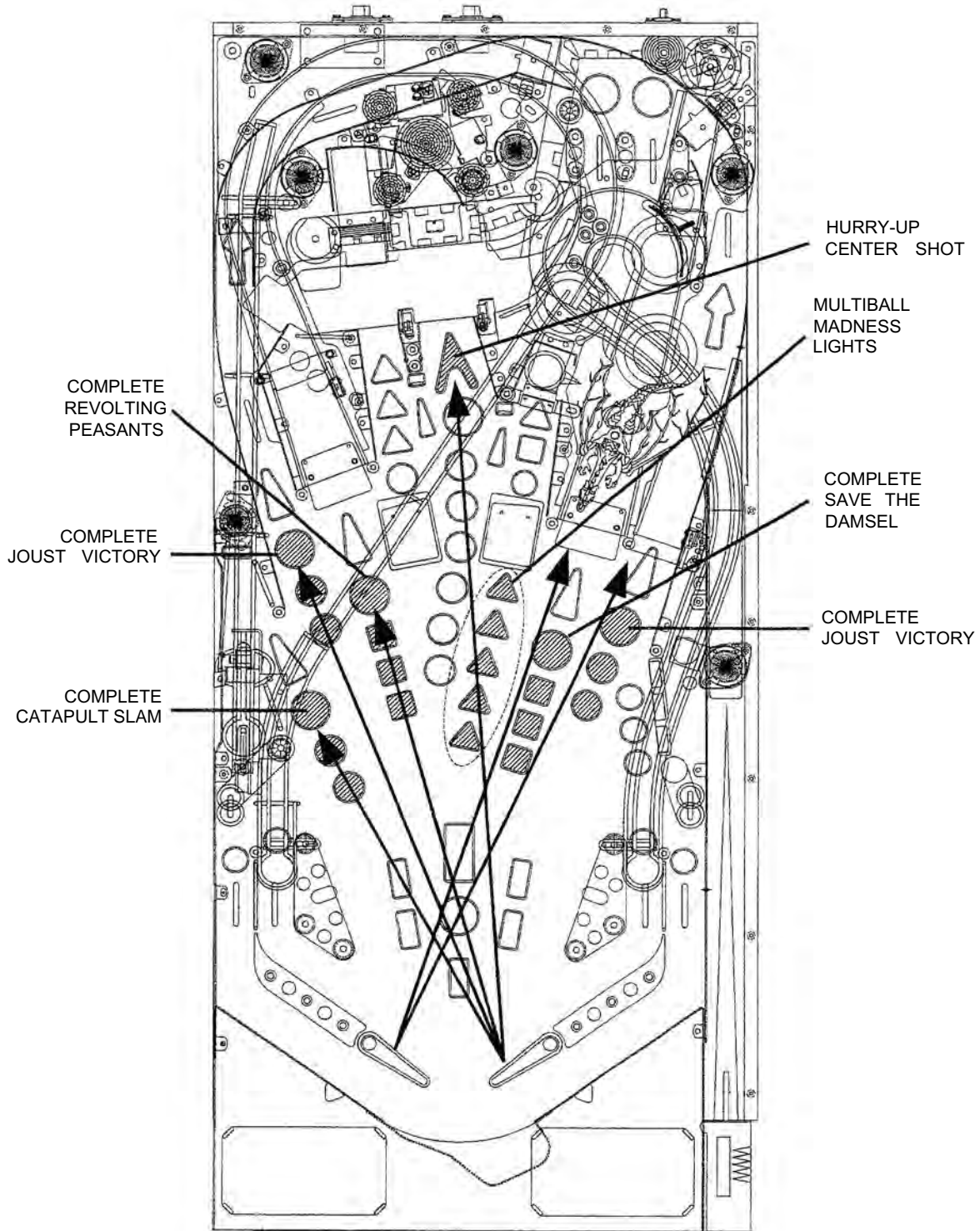
DESTROY CASTLES To destroy castles, shoot the drawbridge, then castle gate, then shoot into castle. Destroy each of the King's Men's Castles to attack the King of Payne.

INTO CASTLE

GATE

DRAWBRIDGE

KING OF PAYNE'S CASTLE

KING'S MEN'S CASTLES

12
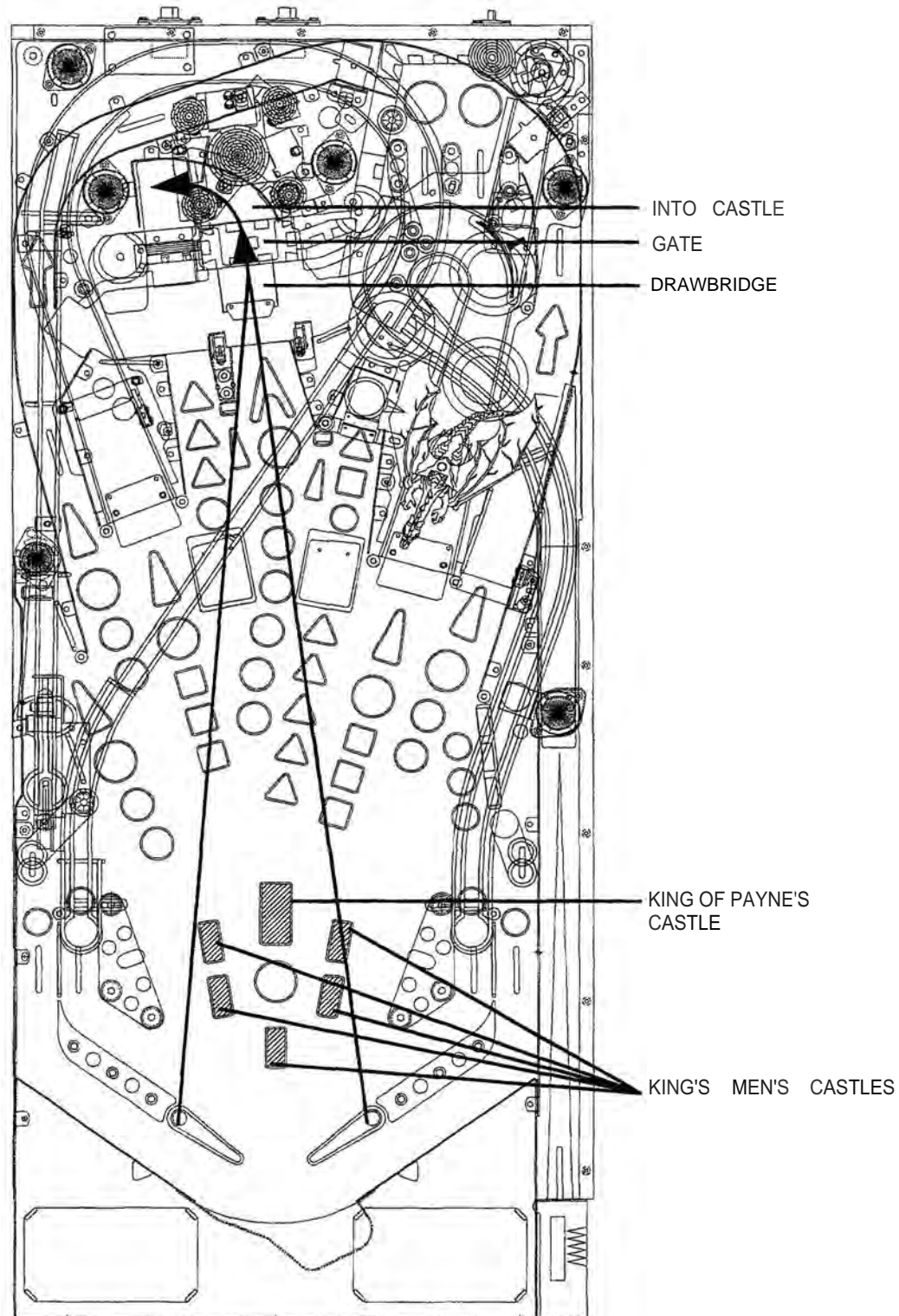
SUPER JETS Hit the jet bumpers the number of times needed (see display) to start Super Jets. Once Super Jets is started, hit the jet bumpers the number of times (see display again) for Big Points. Each time Super Jets is started, the value of each hit increases.

SUPER JETS
ACTIVE
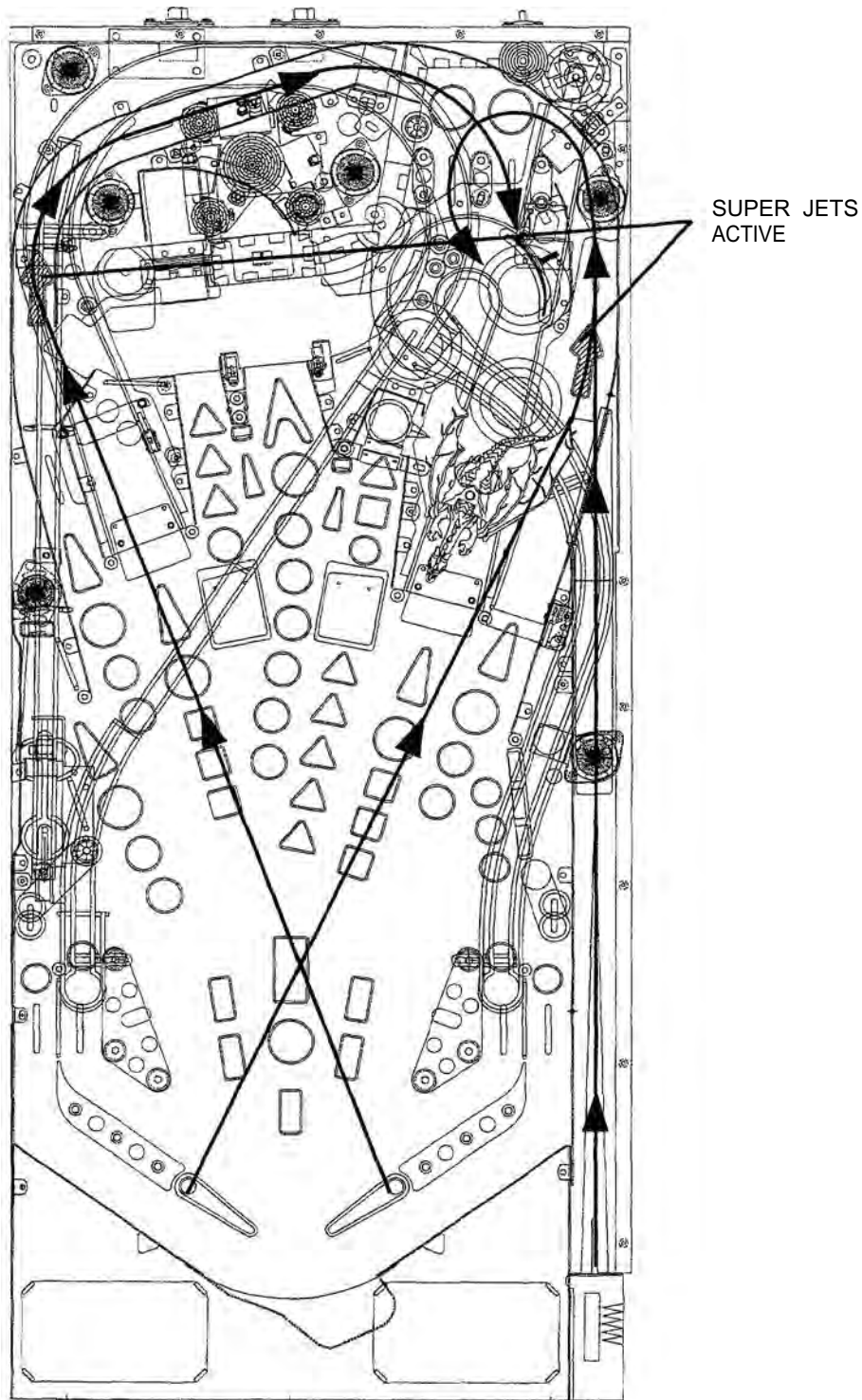
BONUS X   Complete top lanes for End of Ball Bonus Multiplier. Complete bottom lanes for End of Ball Bonus Multiplier X2.

TOP LANES

BOTTOM LANES

14
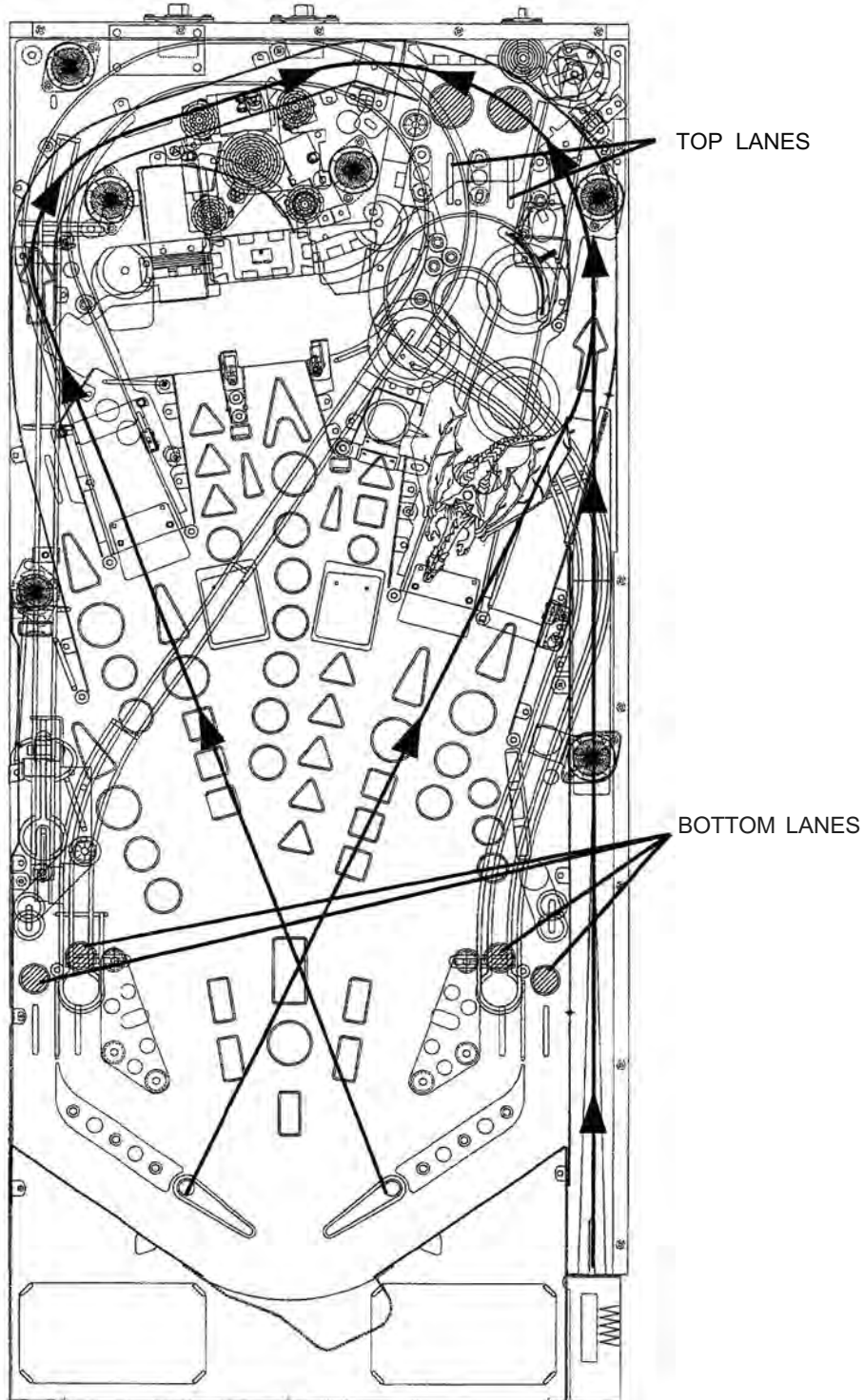
SMACK-A-TROLL Awarded randomly from the Merlin's Magic Mystery Award located at the Right Eject. Hit Trolls as they pop up the required number of times (see display) during the allowed time for Big Points.

TROLLS

RIGHT   EJECT

MERLIN'S MAGIC

BOTTOM LANES

15
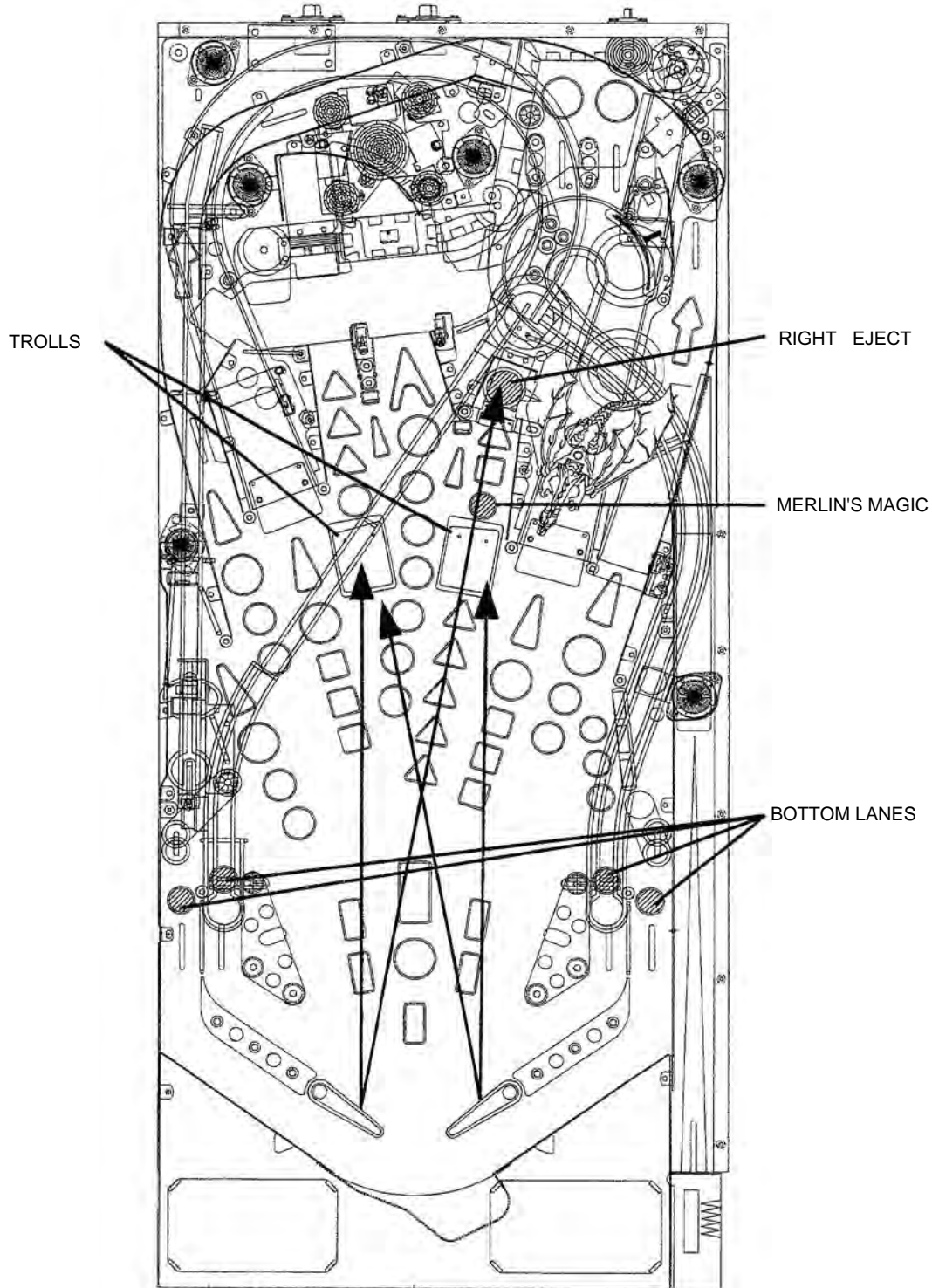
BARNYARD MULTIBALL   Collect (throw), all five different catapult projectiles to light Barnyard Multiball located at the catapult. Shoot the catapult to start. Make flashing shots while in multiball for Big Points and fun animal sounds.

CATAPULT

16
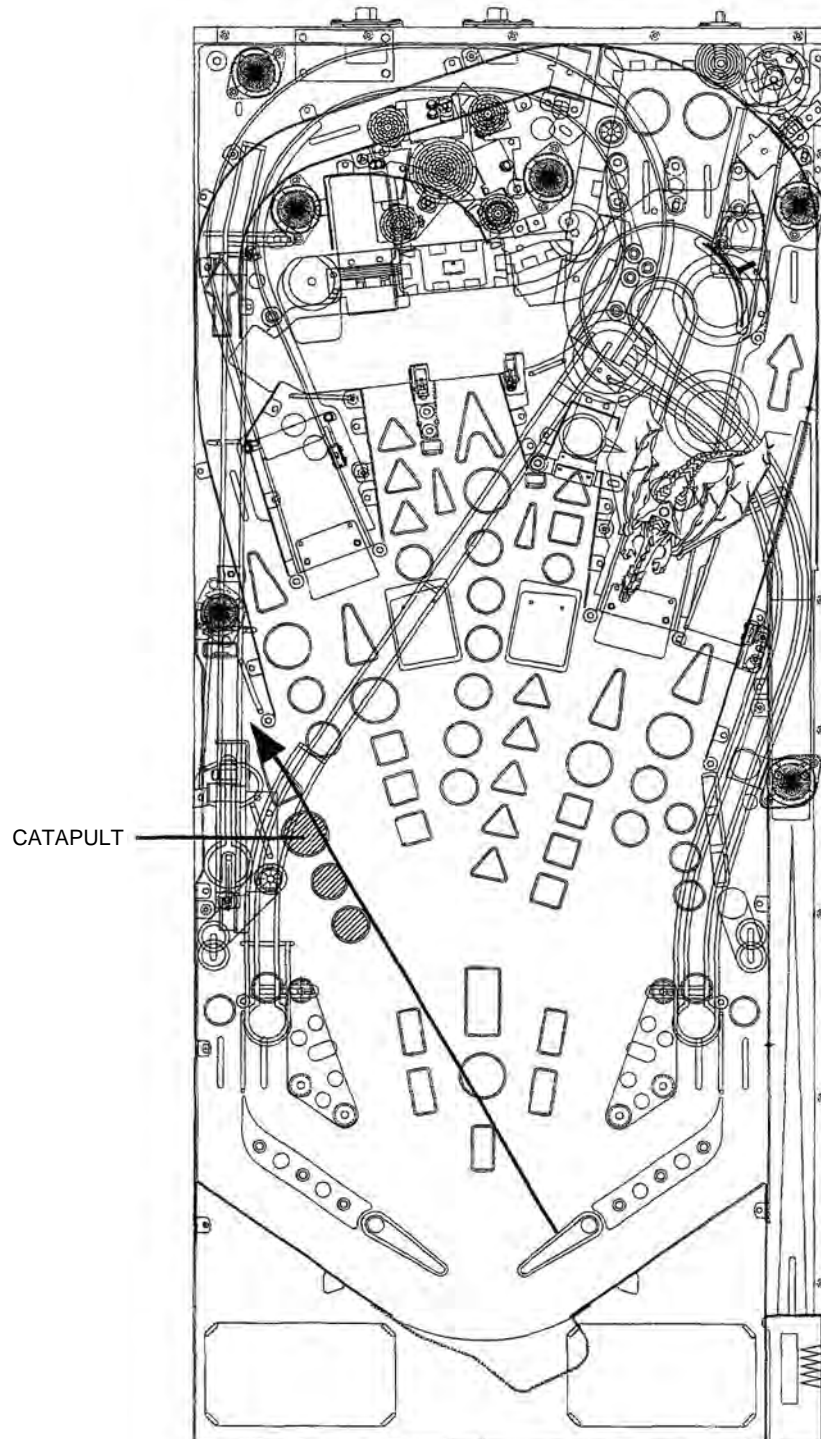
SECTION ONE

GAME OPERATION
AND TEST INFORMATION

PINBALL GAME ASSEMBLY INSTRUCTIONS

MEDIEVAL MADNESS IS A FOUR BALL GAME.

Power: Domestic 120V @ 60Hz
Foreign 230V @ 50Hz

Dimensions: Width: 29" approx.
Depth: 52" approx.
Height: 75" approx.

Temp: 32°F to 100° F, (O°C to 38°C)
Humidity: Not to exceed 95% relative.

Weight: 325 lb. approx. (crated)

1. Remove all cartons, parts, and other items from the shipping container and set them aside.

2. Place cabinet on a support and attach rear legs using leg bolts (View 2).

3. Attach front legs using leg bolts (View 2).

0 Degrees

Approx. Playfield Pitch Angle: 6 - 6 1/2 Degrees

See Detailed View

Detailed View – Leg Leveler

Chrome Leg Assembly PIN-A-19514

Chrome Leg Leveler PIN-08-7377

Chrome Nut FNT-381-HXC025

VIEW 1

Alternate Finish Part Numbers

Gold Leg Assembly PIN-A-19514GD

Gold Leg Levler PIN-08-7377GD

Gold Nut FNT-381-HXC025GD

Gold Leg Bolt FSM-381-HAH250G

Black Gold Leg Assembly PIN-A-19514BK

Black Leg Leveler PIN-08-7377BK

Black Nut FNT-381-HXC025BK

Black Leg Bolt FSM-381-HAH250B

Coin Door

Chrome Leg Bolt FSM-381-HAH250C

FRONT

REAR

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.

Note: *The insert panel is no longer hinged to the backbox; it is attached to the backglass.   The backglass and the insert panel are removed from the backbox housing as a single unit.*

Unlock the backbox. Carefully, lift the backglass/insert panel from the bottom and slide it out of the backbox. Lay it down on the playfield glass. Unplug the insert panel cable from the controller PCB. Carefully, set the backglass/insert panel aside.

Note: *The speaker panel uses a new hinging system.   The bottom of the speaker panel remains attached to the backbox unit when released.*

Carefully lift the speaker panel so that the top notches clear the top pins. Rotate it away from the backbox and toward the playfield glass. The bottom of the speaker panel remains attached to the backbox unit.

Lowering the speaker panel allows access to the holes for the bolts used to secure the backbox upright. Install one washer-head mounting bolt with washer a through each hole and 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 HDMI display cable, speaker cable, monitor power cable, and monitor keyboard cable. Line up the bottom notches with the bottom backbox pins. Lower the speaker panel through the notches and slide it under the backbox pins.
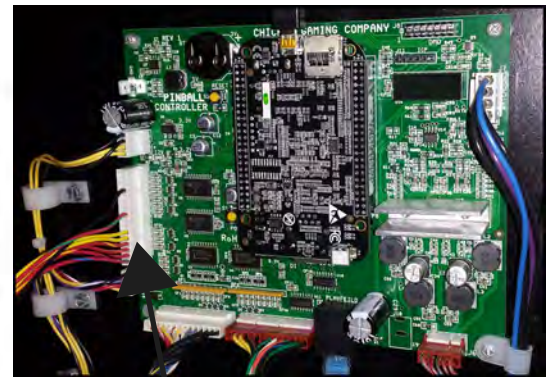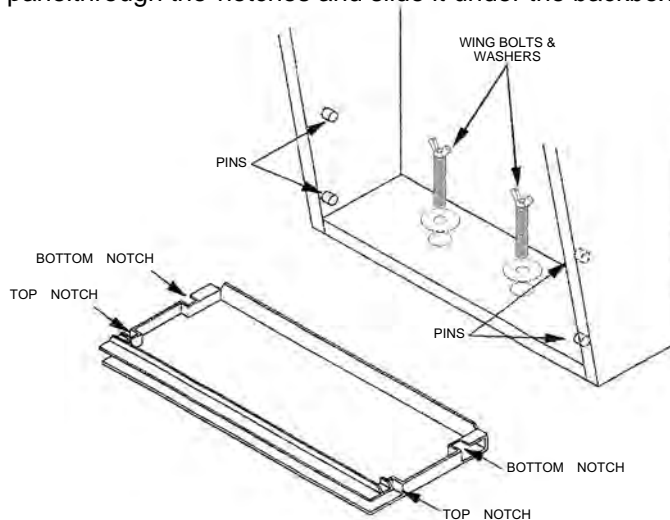
Connector for Insert Panel

6.   After   the   wing-head mounting bolts are installed, replace the speaker panel and the backglass/insert panel. Lock the backbox.

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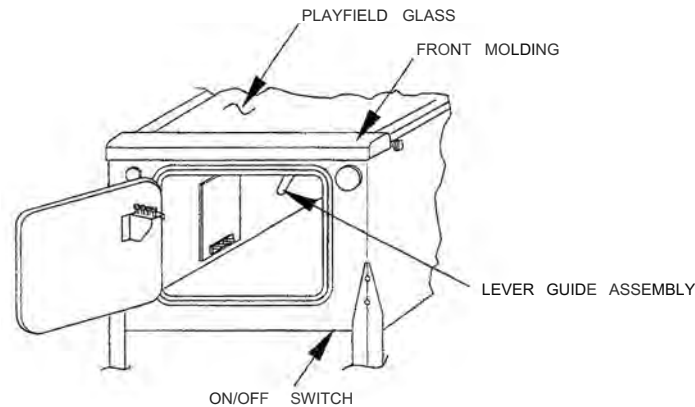
9.   Place a level or an inclinometer on the playfield surface. Adjust the leg levelers for proper playfield level (side-to-side).

   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).
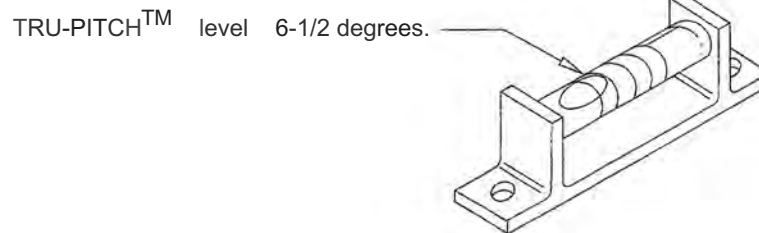
IMPORTANT!
Playfield pitch angle can affect the operation of the plumb bob tilt. The plumb bob weight is among the parts in the cash box; the operator should install the weight and adjust this tilt mechanism for proper operation, after completion of the desired playfield pitch angle setting. The unit 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 **MEDIEVAL MADNESS** game uses FOUR balls.

1-4

12. Clean and reinstall the playfield cover glass. Replace and lock the front molding.

13. To attach the line cord, remove the four Phillips-head screws that mount the 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 cabinet (indentation should point toward bottom of the cabinet). Remount line cord cover plate.
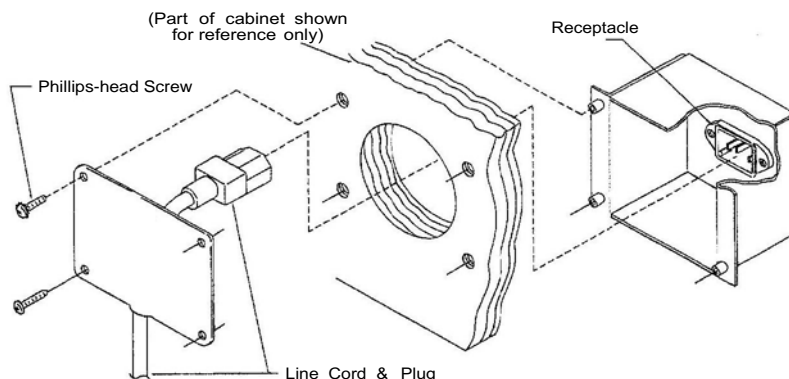
14. Move the game into the desired location; recheck the level and pitch angle of the playfield.

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

VOLTAGE SELECTION

⚠️ **CAUTION**

If you are converting a game between 115V and 230V, be sure to change the AC Input Selection switch on the power supply, and use the correct voltage selection block, shown below.

120V Voltage Selection Block
PIN-CBL-VOLT120


```
BLACK ──┤ 1
        ├ 2
WHITE ──┤ 5
        ├ 6
WHITE ──┤ 7
BLACK ──┤ 8
TERM MLX MALE
02-08-2004
```
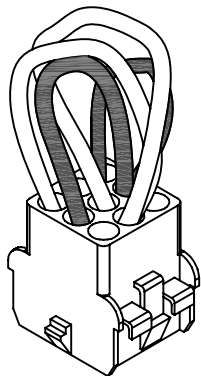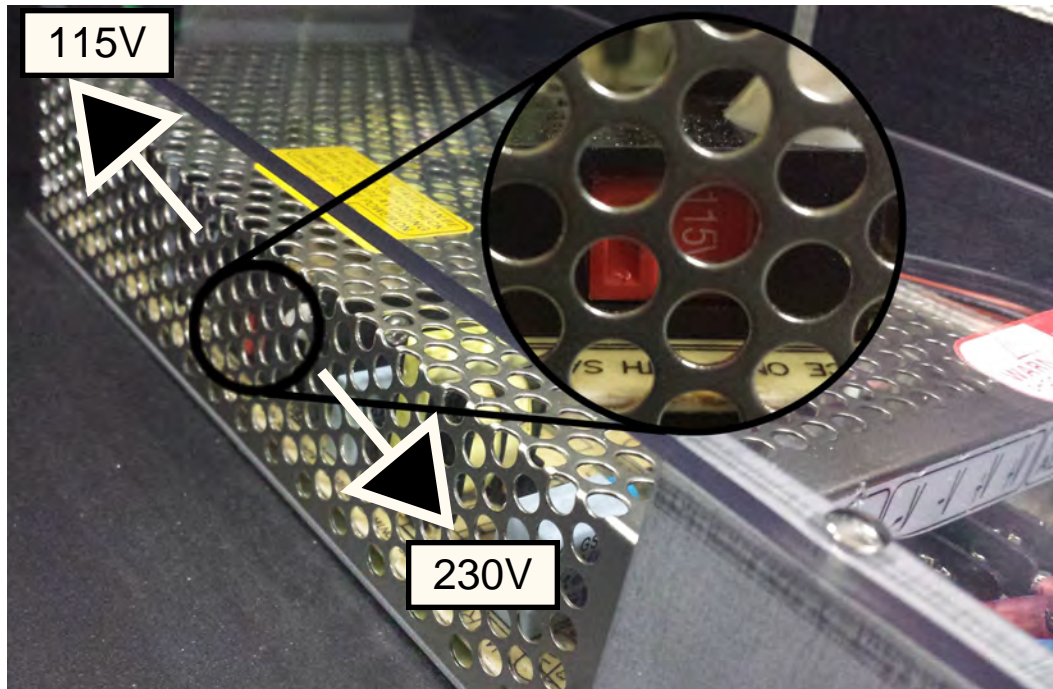
```
⑦ ○ ①
○ □ ○
⑨ ○ ③
RECEPTACLE .084"
50-84-2090
```
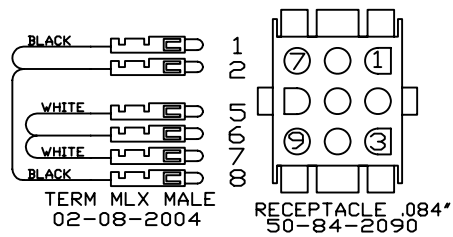
Viewed
from top

240V Voltage Selection Block
PIN-CBL-VOLT240


```
BLACK ──┤ 1
BROWN ──┤ 2
WHITE ──┤ 5
BROWN ──┤ 6
WHITE ──┤ 7
BLACK ──┤ 8
TERM MLX MALE
02-08-2004
```

```
⑦ ○ ①
○ □ ○
⑨ ○ ③
RECEPTACLE .084"
50-84-2090
```

Viewed
from top

1-6
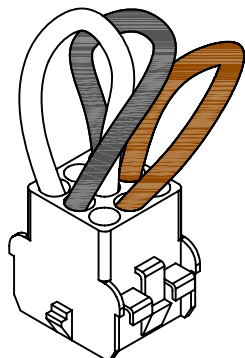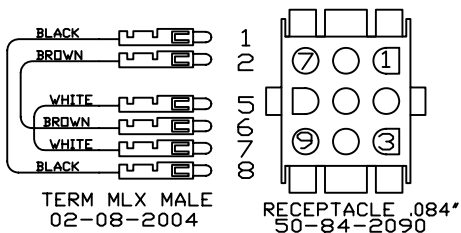
GAME CONTROL LOCATIONS

Cabinet Switches

The <u>On-Off Switch</u> is on the bottom of the cabinet near the right front leg. Press the side of the rocker switch closest to the front of the cabinet to power the game on.

The <u>Start Button</u> 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 tor 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 <u>Service Credits</u> button puts credits on the games that are not included in any of the game audits.

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

The <u>Volume Down</u> (-) 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 <u>Begin Test</u> button starts the Menu System operation and changes the coin door buttons from Normal Function to Test Function.

Test Function

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

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

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

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

Hold the <u>Escape</u> button for 4 seconds to enter the **MMR SYSTEM MENU. See PAGE 1-10 for more information

COIN DOOR BUTTONS

NORMAL MODE FUNCTION
SERVICE CREDITS / VOLUME / BEGIN TEST
ESCAPE — + ENTER
TEST MODE FUNCTION

YELLOW START BUTTON
PIN-20-966316

FRONT MOLDING
PIN-D-12615SS

LEVER GUIDE ASSEMBLY
PIN-SUB-A16773

Alternate Finish Part Numbers

GOLD FRONT MOLDING
PIN-D-12615GD

GOLD SIDE MOLDING
PIN-01-89932GD

BLACK FRONT MOLDING
PIN-D-12615BK

BLACK SIDE MOLDING
PIN-01-89932BK

RED FLIPPER BUTTON ASSEMBLY
PIN-A-168834

RED BALL LAUNCH BUTTON
PIN-20-9663B4

TEST SWITCH ASSEMBLY

ON/OFF SWITCH
000-SWC-ALCO16A

*To reset High Score, hold down the Begin Test/Enter switch for five seconds while in the Attract mode.
** This menu did not exist in the original game

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:	*MEDIEVAL MADNESS*		**Sound Rev. 1.0A**
50059	**Rev. 1.0A**	**SY.0.X0**	**XX-XX-97**

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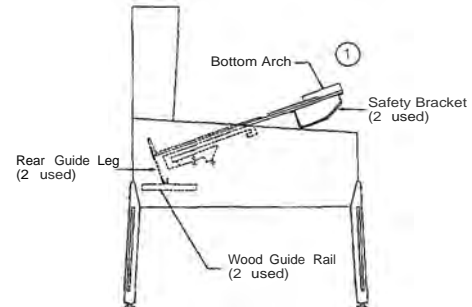
2. Pull the playfield out toward you until it stops (rest position), and raise it approximately 3".

   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.
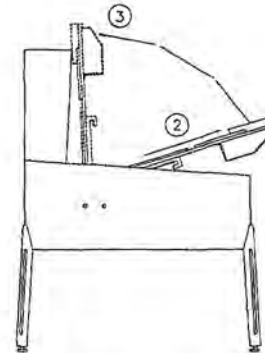
To Lower the Playfield.

4. Rotate the playfield to the rest position. This unlocks the pivoting mechanism.

5. Push the playfield back into cabinet and into the playing position.
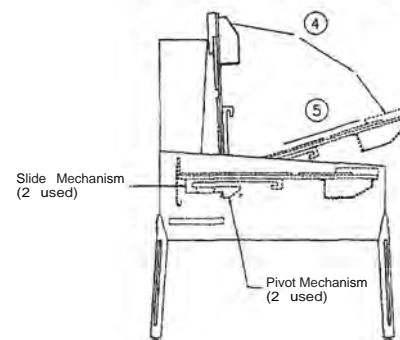
MMR SYSTEM MENU OPERATION

The **MMR System Menu** displays the current software versions and allows you to adjust DIP switch settings, as well as several other settings. To access the MMR System Menu, open the coin door and hold the Service Credits button for four seconds. Press Service Credits again to move through the screens, and to exit the System Menu from the DIP switch Settings screen.

Press and hold the **Service Credits** button for
4 seconds to enter the MMR System Menu ──────►

```
┌──────────────────────────────────┐
│     NORMAL  MODE  FUNCTION        │
│ SERVICE    VOLUME         BEGIN   │
│ CREDITS  / / / \ \ \       TEST   │
│                                   │
│  ○   ◯   ◯   ◯   ◯   ○           │
│                                   │
│ ESCAPE    ─       +      ENTER    │
│      TEST  MODE  FUNCTION          │
└──────────────────────────────────┘
```
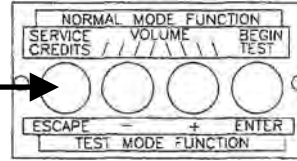
```
            PRESS SERVICE TO START SYSTEM MENU

INFORMATION
SOFTWARE VERSION:                    1.0
BUILD DATE:                          JAN 20 2015
PLAYFIELD FIRMWARE REV:              1.0
SPI STATUS:                          GOOD
```

MMR SYSTEM MENU – PAGE 1

The first page of the MMR System Menu allows you to make adjustments to the game's display and LED settings.

To change a setting, use **UP/DOWN** to highlight the setting, and press **ENTER** to select it. Press **UP/DOWN** to change the setting. When you are done, press **ENTER** again to save the new setting. Press **SERVICE** advance to the next page and exit the menu.

```
 SYSTEM MENU – PRESS SERVICE TO ADVANCE
DISPLAY COLOR                    GREEN
      RED                        0
      GREEN                      100
      BLUE                       0
INCANDESCENT EMULATION           SLOW
BACKBOX BRIGHTNESS               MAX
```
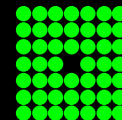
DISPLAY COLOR   [DEFAULT: GREEN]
This setting changes the color of the dot matrix display in game. There are several preset color configurations, or you can create a custom color.

RED, GREEN, BLUE   [0 – 100]
Independently adjusting Red, Green, and Blue allows you to customize the display color.

INCANDESCENT EMULATION   [OFF, SLOW, MED, FAST, DEFAULT: SLOW]
MMR replicates the look of incandescent lights while using LEDs. The incandescent emulation setting allows you to adjust the speed that the LEDs turn on and off.

BACKBOX BRIGHTNESS   [-3, -2, -1, MAX, DEFAULT: MAX]
MMR allows you to adjust the brightness of the GI's in the backbox.

MMR SYSTEM MENU – PAGE 2
The second page of the MMR System Menu allows you to adjust the strength of the solenoids in the game.

```
 SHAKER MENU    PRESS SERVICE TO ADVANCE
 FLIPPER STRENGTH                    DEFAULT
 POPPER STRENGTH                     DEFAULT
 CATAPULT STRENGTH                   DEFAULT
 SOLENOID STRENGTH                   DEFAULT
 SHAKER STRENGTH                     DEFAULT


 SHAKER TEST – HOLD LAUNCH           OFF
```

FLIPPER STRENGTH   [MIN, -16 to -1, DEFAULT, +1 to +5, MAX]
The strength of the flipper coils is highly adjustable. This adjustment is very useful for making Medieval Madness feel just like you remember. This setting can be adjusted to optimize flipper strength for each location. Adjust setting up or down to increase or decrease flipper strength to compensate for differences in line voltage.

POPPER STRENGTH   [MIN, DEFAULT, +1, MAX]
This adjustment changes the strength of the left popper. If the ball is bouncing too much when coming out of the popper, try turning the popper strength down.

CATAPULT STRENGTH   [DEFAULT, +1, +2, MAX]
This adjustment changes how fast the ball is shot from the catapult. The default value is set to the minimum setting.

SOLENOID STRENGTH   [MIN, DEFAULT, +1, MAX]
This setting controls then strength of the Trough Eject, Auto-Fire, Left and Right Slingshots, and all three Jet Bumper coils.

SHAKER STRENGTH   [OFF, MIN, DEFAULT, MAX]
The shaker motor is activated when the catapult fires, when trolls pop up, and when the castle is destroyed. You can increase or decrease the strength of the shaker motor during play, or turn it off entirely.

DIP SWITCH SETTINGS

DIP Switch settings may be adjusted in the MMR System Menu

After changing DIP switch Settings, you will have to enter the Main Menu or power cycle the game to apply the new settings.
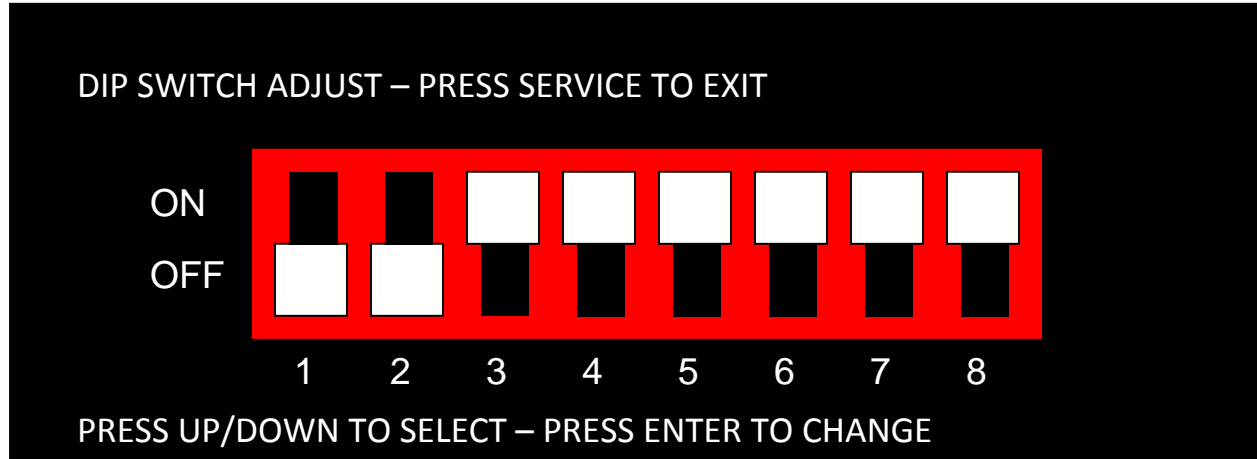
DIP SWITCH ADJUST – PRESS SERVICE TO EXIT

ON

OFF

1   2   3   4   5   6   7   8

PRESS UP/DOWN TO SELECT – PRESS ENTER TO CHANGE

COUNTRY	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
AMERICA	OFF	OFF	ON	ON	ON	ON	ON	ON
EUROPEAN	OFF	OFF	ON	ON	ON	OFF	ON	ON
FRENCH	OFF	OFF	ON	ON	ON	ON	OFF	OFF
GERMAN	OFF	OFF	ON	ON	ON	ON	ON	OFF
SPAIN	OFF	OFF	ON	ON	OFF	ON	ON	ON

NOTE: CHANGING DIP SWITCH SETTINGS WIILL CLEAR ALL HIGH SCORES AND PERFORM A FACTORY RESET!

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	Press Escape
B.2 Earning Audits	To move out of a menu selection.
B.3 Standard Audits	
B.4 Feature Audits	Press Enter
B.5 Histograms	To get into a menu selection.
B.6 Time-Stamps	

P. PRINTOUTS MENU

Press Up
Increases sequence; Example A.1, A.2, A.3, A.4.

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-Stamps
P.8 All Data

Press Down
Decreases sequence; Example A.4, A.3, A.2, A.1.

Use Up or Down to cycle through the selections in a menu.

T. TEST MENU

T.1 Switch Edges Test
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 Loop/Gate Test
T.17 Tower Test
T.18 Drawbridge Test
T.19 Castle Gate Test
T.20 Trolls Test
T.21 Empty Balls Test

Use Escape and Enter to move into and out of the selected menu.

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

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-Stamps**

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	22	Minutes On	00
B.3	02	Total Plays**	00	B.3	23	Balls Played	00
B.3	03	Total Free Play	00	B.3	24	Tilts	00
B.3	04	Free Play Percent	00	B.3	25	Replay 1 Awards	00
B.3	05	Replay Awards	00	B.3	26	Replay 2 Awards	00
B.3	06	Percent Replays	00	B.3	27	Replay 3 Awards	00
B.3	09	Match Awards	00	B.3	28	Replay 4 Awards	00
B.3	10	Percent Match	00	B.3	29	1 Player Games	00
B.3	11	H.S.T.D. Credits	00	B.3	30	2 Player Games	00
B.3	12	Percent H.S.T.D.	00	B.3	31	3 Player Games	00
B.3	13	Extra Ball	00	B.3	32	4 Player Games	00
B.3	14	Percent Extra Ball	00	B.3	33	H.S.T.D. Reset Count	00
B.3	15	Tickets Awarded	00	B.3	34	Burn-in Time ǂ	00:00:00
B.3	16	Percent Tickets	00	B.3	35	1st Replay Level	00
B.3	17	Left Drains	00	B.3	36	Left Flipper	00
B.3	18	Right Drains	00	B.3	37	Right Flipper	00
B.3	19	Average Ball Time	00				
B.3	20	Average Game Time	00				
B.3	21	PlayTime	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. ǂThis Audit cannot be reset.

B.4   FEATURE AUDITS

B.4 01   Ball Saves   00%   00
The number of times the ball was saved.

B.4 02   Total Multiballs   00%   00
The number of times a Multiball Feature was started.

B.4 03   Balls Locked   00%   00
The number of times a ball was locked from the Castle Lock.

B.4 04   Castle Multiball Start   00%   00
The number of times the Castle Multiball feature was started.

B.4 05   Castle Multiball Jackpots   00%   00
The number of times a Castle Multiball Jackpot was awarded.

B.4 06   Castle Multiball Super Jackpots   00%   00
The number of times a Castle Multiball Super Jackpot was awarded.

B.4 07   Castle Multiball Extra Balls Lit   00%   00
The number of extra balls lit from Castle Multiball super jackpot awards.

B.4 08   Castle Attacks Started   00%   00
The total number of Castle Attacks started.

B.4 09   Castle Attacks Completed   00%   00
The total number of Castle Attacks completed.

B.4 10   Castle Attack Extra Balls Lit   00%   00
The total number of extra balls lit from Castle Attacks.

B.4 11   First Castle Attack Started   00%   00
The number of times a first Castle Attack was started.

B.4 12   First Castle Attack Completed   00%   00
The number of times a first Castle Attack was completed.

B.4 13   Second Castle Attack Started   00%   00
The number of times a second Castle Attack was started.

B.4 14   Second Castle Attack Completed   00%   00
The number of times a second Castle Attack was completed.

B.4 15   Third Castle Attack Started   00%   00
The number of times a third Castle Attack was started.

B.4 16   Third Castle Attack Completed   00%   00
The number of times a third Castle Attack was completed.

B.4 17   Fourth Castle Attack Started   00%   00
The number of times a fourth Castle Attack was started.

B.4 18   Fourth Castle Attack Completed   00%   00
The number of times a fourth Castle Attack was completed.

FEATURE AUDITS CONTINUED ...

B.4 19   Fifth Castle Attack Started   00%   00
The number of times a fifth Castle Attack was started.

B.4 20   Fifth Castle Attack Completed   00%   00
The number of times a fifth Castle Attack was completed.

B.4 21   Sixth Castle Attack Started   00%   00
The number of times a sixth Castle Attack was started.

B.4 22   Sixth Castle Attack Completed   00%   00
The number of times a sixth Castle Attack was completed.

B.4 23   Trolls Lit   00%   00
The number of times the Troll feature was lit.

B.4 24   Trolls Started   00%   00
The number of times the Troll feature was started.

B.4 25   Trolls Completed   00%   00
The number of times the Troll feature was completed.

B.4 26   Troll Bombs Collected   00%   00
The total number of Troll Bombs collected.

B.4 27   Troll Bombs Used   00%   00
The total number of Troll Bombs used.

B.4 28   Joust Madness Lit   00%   00
The number of times the Joust Madness feature was lit.

B.4 29   Catapult Madness Lit   00%   00
The number of times the Catapult Madness feature was lit.

B.4 30   Peasant Madness Lit   00%   00
The number of times the Peasant Madness feature was lit.

B.4 31   Damsel Madness Lit   00%   00
The number of times the Damsel Madness feature was lit.

B.4 32   Troll Madness Lit   00%   00
The number of times the Troll Madness feature was lit.

B.4 33   Multiball Madness Starts   00%   00
The number of times a Multiball Madness feature was started.

B.4 34   1 Multiball Madness Starts   00%   00
The number of times a single Multiball Madness feature was started.

B.4 35   2 Multiball Madness Starts   00%   00
The number of times that two Multiball Madness features were started simultaneously.

B.4 36   3 Multiball Madness Starts   00%   00
The number of times that three Multiball Madness features were started simultaneously.

FEATURE AUDITS CONTINUED ...

B.4 37   4 Multiball Madness Starts   00%   00
The number of times that four Multiball Madness features were started simultaneously.

B.4 38   5 Multiball Madness Starts   00%   00
The number of times all five Multiball Madness features were started simultaneously.

B.4 39   Multiball Madness Jackpots   00%   00
The number of times a Multiball Madness jackpot was awarded.

B.4 40   Multiball Madness Super Jackpots   00%   00
The number of times a Multiball Madness super jackpot was awarded.

B.4 41   Multiball Madness Double Super Jackpots   00%   00
The number of times a Multiball Madness double super jackpot was awarded.

B.4 42   Hurry-Ups Started   00%   00
The number of times the Hurry-up feature was started.

B.4 43   Hurry-Up Awards   00%   00
The number of times the Hurry-up feature was awarded.

B.4 44   Hurry-Up Extra Balls Lit   00%   00
The number of extra balls lit from the Hurry-up feature.

B.4 45   Royal Madness Starts   00%   00
The number of times the Royal Madness feature was started.

B.4 46   Royal Madness Completed   00%   00
The number of times the Royal Madness feature was completed.

B.4 47   Royal Madness Extra Balls   00%   00
The number of extra balls awarded from the completion of the Royal Madness feature.

B.4 48   Barnyard Multiball Started   00%   00
The number of times the Barnyard Multiball feature was started.

B.4 49   Battle For The Kingdom Started   00%   00
The number of times the Battle for the Kingdom feature was started.

B.4 50   Battle For The Kingdom Completed   00%   00
The number of times the Battle for the Kingdom feature was completed.

B.4 51   Super Skill Shot   00%   00
The number of times the Super Skill Shot was scored.

B.4 52   Super Jets Started   00%   00
The number of times the Super Jets feature was started.

B.4 53   Random Awards   00%   00
The number of times a Merlin's Magic Random Award feature was collected.

B.4 54   Random Award Extra Balls Lit   00%   00
The number of times Light Extra Ball was given as a Random Award.

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FEATURE AUDITS CONTINUED ...

B.4 55   Video Mode Started   00%   00

The number of times the Video Mode feature was started.

B.4 56   Video Mode Extra Balls   00%   00

The number of Extra Balls awarded from the Video Mode feature.

B.4 57   Video Mode Completed   00%   00

The number of times the Video Mode feature was completed.

B.4 58   Smack-A- Troll Started   00%   00

The number of times the Smack-A-Troll feature was started

B.5   HISTOGRAMS

B.5	01	0 - .99 Million Scores	00%	00
B.5	02	1 - 1.99 Million Scores	00%	00
B.5	03	2 - 4.99 Million Scores	00%	00
B.5	04	5 - 9.99 Million Scores	00%	00
B.5	05	10 - 19.99 Million Scores	00%	00
B.5	06	20 - 29.99 Million Scores	00%	00
B.5	07	30 - 39.99 Million Scores	00%	00
B.5	08	40 - 49.99 Million Scores	00%	00
B.5	09	50 - 59.99 Million Scores	00%	00
B.5	10	60 - 69.99 Million Scores	00%	00
B.5	11	70 - 79.99 Million Scores	00%	00
B.5	12	80 - 89.99 Million Scores	00%	00
B.5	13	Over 90 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-Stamps Menu allows you to view dates and times that are important to game software.

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 **Loop/Gate Test**
T.7 **Sound & Music Test**	T.17 **Tower Test**
T.8 **Single Lamps Test**	T.18 **Drawbridge Test**
T.9 **All Lamps Test**	T.19 **Castle Gate Test**
T.10 **Lamps And Flasher Test**	T.20 **Trolls Test**
	T.21 **Empty Balls Test**

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

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 to 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. To return to 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 to 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 flasher(s) blinks. The same flasher(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 flasher(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 in game, they are always ON. HOWEVER, the brightness can be adjusted in the MMR System Menu.

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 LEDs 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.

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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 LEDs 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 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

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 version of Medieval Madness does not use a lamp matrix, so this test is not needed.

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 which are set in the Custom Settings Menu.

To return to the Test menu, press the Escape button.

T.16 LOOP/GATE TEST

This test is used to verify proper ball delivery from the shooter lane onto the playfield, and to exercise the four loop switches and the two control gates. This test has two modes of operation:

Loops Mode: This mode is used to verify that the ball is able to pass through the control gates and around either of the loops. This is useful for clearing "Left Gate Stuck Closed" and "Right Gate Stuck Closed" errors that may appear in the test report. If an error exists, one of them will be shown on the bottom line of the display.

To verify loop switch and control gate operation in "Loops Mode", press the Up or Down buttons until the message "Test Mode: Around Loops" appears on the second line of the display. Roll a ball around either of the loops (a ball may be ejected from the trough by

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T.16 LOOP/GATE TEST CONTINUED ...

pressing the launch button). A sound is made as the ball passes over the loop switches, and the state of the loop switches is updated in the display. If the ball is traveling around the loop from left to right, the right control gate should open upon activation of the second left loop switch (L.HI). If the ball is traveling around the loop from right to left, the left control gate should open upon activation of the second right loop switch (R.HI). When the ball has finished its path around the loop (either from left to right, or from right to left), the test should report "TEST PASSED - PRESS ENTER" on the bottom line of the display. Any other result indicates a problem with either the loop switches, or the control gates, or both. To re-test, press the Enter button.

"Left Gate Stuck Closed" errors can be cleared in "Loops Mode" by repeatedly testing the right loop (the Enter button must be pressed at the end of each test). The test will clear this error when there have been two consecutive successful right loop tests in this mode.

"Right Gate Stuck Closed" errors can be cleared in "Loops Mode" by repeatedly testing the left loop (the Enter button must be pressed at the end of each test). The test clears this error when there have been two consecutive successful left loop tests in this mode.

Jets Mode: This mode is used to verify that the ball is able to pass into either of the loops and be diverted into the jets. This is useful for clearing "Left Gate Stuck Open" and "Right Gate Stuck Open" errors that may appear in the test report. If an error exists, one of them will be shown on the bottom line of the display.

To verify loop switch and control gate operation in "Jets Mode", press the Up or Down buttons until the message "Test Mode: To Jet Bumpers" appears on the second line of the display. Roll a ball into either of the loops (a ball may be ejected from the trough by pressing the launch button). A sound is made as the ball passes over the loop switches, and the state of the loop switches is updated in the display. If the ball is traveling to the jets from left to right, the right control gate should remain closed upon activation of either of the left loop switches (L.LO and L.HI). If the ball is traveling to the jets from right to left, the left control gate should remain closed upon activation of either of the right loop switches (R.LO and R.HI). When the ball has finished its path into the jets (either from the left, or from the right), and makes contact with one of the top lane switches, the test should report "TEST PASSED - PRESS ENTER" on the bottom line of the display. Any other result indicates a problem with either the loop switches, or the control gates, or both. To re-test, press the Enter button.

"Left Gate Stuck Open" errors can be cleared in "Jets Mode" by repeatedly testing the right loop (the Enter button must be pressed at the end of each test). The test will clear this error when there have been two consecutive successful right loop tests in this mode.

"Right Gate Stuck Open" errors can be cleared in "Jets Mode" by repeatedly testing the left loop (the Enter button must be pressed at the end of each test). The test will clear this error when there have been two consecutive successful left loop tests in this mode.

Ball delivery from the shooter lane can be verified by this test in either "Loops Mode" or "Jets Mode" by placing a ball into the shooter lane, and pressing the launch button. When in "Loops Mode", the ball should travel all the way around the loop, and be delivered cleanly to the left flipper. When in "Jets Mode", the ball should be delivered into the loop, through one of the top lane switches, and into the jet bumpers.

During this test, the diagnostic test buttons inside the coin door act as follows:
Escape: This button returns to the previous menu.
Down/Up: These buttons toggle the test mode between "Loops Mode" and "Jets Mode".
Enter: This button is used to clear the "TEST PASSED/TEST FAILED" messages.

T.17   TOWER TEST

This test is used to verify proper operation of the tower (right ramp). It exercises the ramp and tower switches, the tower diverter, and the tower lock (post) mechanism. This test has two modes of operation:

Ramp Mode: This mode is used to verify that the ball is able to pass up the right ramp and back down to the right flipper. This is useful for clearing "Tower Diverter Stuck Open" errors that may appear in the test report. If the error exists, it will be shown on the bottom line of the display.

To verify right ramp switch and tower diverter operation in "Ramp Mode", press the Up or Down buttons until the message "Test Mode: Right Ramp" appears on the second line of the display. The tower diverter should set itself to the UP position when this mode is entered. Roll a ball up the right ramp.   A sound is made as the ball passes under the switches, and the state of the switches is updated in the display. The ball should trigger the right ramp entrance switch (R.EN), followed by the right ramp exit switch (R.EX), and the test should report "TEST PASSED - PRESS ENTER" on the bottom line of the display. Any other result indicates a problem with either the ramp switches, or the tower diverter, or both. To re-test, press the Enter button.

"Tower Diverter Stuck Open" errors can be cleared in "Ramp Mode" by repeatedly testing the ramp (the Enter button must be pressed at the end of each test). The test will clear this error when there have been two consecutive successful right ramp tests in this mode.

Tower Lock Mode: This mode is used to verify that the ball is able to pass up the right ramp and into the tower lock mechanism. This is useful for verifying proper tower lock post operation, as well as clearing any "Tower Diverter Stuck Closed" errors that may appear in the test report. If the error exists, it will be shown on the bottom line of the display.

To verify tower lock mechanism and tower diverter operation in "Tower Lock Mode", press the Up or Down button until the message "Test Mode: Tower Lock" appears on the second line of the display. The tower diverter should set itself to the DOWN position when this mode is entered. Roll a ball up the right ramp. A sound is made as the ball passes under/over the switches, and the state of the switches are updated in the display. The ball should trigger the right ramp entrance switch (R.EN), activate the tower lock post, travel up the ramp into the tower mechanism, trigger the tower exit switch (T.EX), and the test should report "TEST PASSED - PRESS ENTER" on the bottom line of the display. Any other result indicates a problem with the ramp switch, the tower exit switch, the diverter, or the tower lock post. To re-test, press the Enter button.

"Tower Diverter Stuck Closed" errors can be cleared in "Tower Mode" by repeatedly testing the ramp (the Enter button must be pressed at the end of each test). The test will clear this error when there have been two consecutive successful right ramp tests in this mode.

Note that if the game is left idle in "Tower Mode", the test will change its mode of operation to "Ramp Mode" after two minutes. This keeps the tower diverter coil from overheating during long periods of inactivity.

During this test, the diagnostic test buttons inside the coin door act as follows:
Escape: This button returns to the previous menu.
Down/Up: These buttons toggle the test mode between "Ramp Mode" and "Tower Mode".
Enter: This button is used to clear the "TEST PASSED/TEST FAILED" messages.

T.18 DRAWBRIDGE TEST

This test is used to verify proper operation of the drawbridge. It exercises the drawbridge motor, and the drawbridge position switches.

This test is an automatic test. Upon entry, this test will continually run the drawbridge up and down (with small pauses in between when a drawbridge up/down switch edge is detected) while the test is running. To stop the drawbridge motor from running during this test, press the Enter button. To re-start the drawbridge motor, press the Enter button again.

This test is useful for clearing "Drawbridge Down Switch Bad" and "Drawbridge Up Switch Bad" errors that may appear in the test report. If errors exist, they will be shown on the bottom line of the display. The error(s) are cleared when the drawbridge completes two consecutive successful operations to either open or close the drawbridge.

During this test, the diagnostic test buttons on the coin door act as follows:
Escape: This button returns to the previous menu.
Enter: This button toggles the state of the test from Running to Stopped, or from Stopped to Running.

T.19 CASTLE GATE TEST

This test is used to verify proper operation of the castle gate and the exploding castle. It exercises the moat entrance, castle gate, and castle lock switches, along with the castle gate and the exploding castle.

When this test is entered, the test attempts to lower the drawbridge in order to provide access to the castle gate. The test does this by activating the drawbridge motor and waiting for the drawbridge "down" switch to close. If the test is unable to position the drawbridge in this manner, the message "DRAWBRIDGE ERROR - SEE T.18" will be shown on the bottom line of the display. If this occurs, it will be necessary to repair the drawbridge (use T.18 to verify proper drawbridge operation after it is repaired). This test will not operate at all if it cannot position the drawbridge properly. This test has two modes of operation:

Castle Gate Mode: This mode is used to verify that the ball is able to strike the castle gate. This is useful tor clearing "Castle Gate Stuck Open" errors that may appear in the test report. If the error exists, it will be shown on the bottom line of the display.

To verify castle gate operation in "Castle Gate Mode", press the Up or Down buttons until the message "Test Mode: At Castle Gate" appears on the second line of the display. The castle gate should set itself to the Down position when this mode is entered. Roll a ball at the castle gate. A sound is made as the ball passes through the switches, and the state of the switches is updated in the display. The ball should trigger the moat entrance switch (M.EN), followed by the castle gate switch (C.GT), followed by the moat entrance switch (M.EN) again, and the test should report "TEST PASSED - PRESS ENTER" on the bottom line of the display. Any other result indicates a problem with either the switches, or the castle gate, or both. To re-test, press the Enter button.

"Castle Gate Stuck Open" errors can be cleared in "Castle Gate Mode" by repeatedly testing the castle gate (the Enter button must be pressed at the end of each test). The test will clear this error when there have been two consecutive successful castle gate tests in this mode.

Castle Mode: This mode is used to verify that the ball is able to pass through the castle gate and into the castle lock area. This is useful for clearing any "Castle Gate Stuck Closed" errors that may appear in the test report. If the error exists, it will be shown on the bottom line of the display.

T.19   CASTLE GATE TEST CONTINUED...

To verify castle gate operation in "Castle Mode", press the Up or Down buttons until the message "Test Mode: Into Castle" appears on the second line of the display. The castle gate should set itself to the UP position when this mode is entered. Roll a ball into the castle. A sound is made as the ball passes through/over the switches, and the state of the switches are updated in the display. The ball should trigger the moat entrance switch (M.EN), followed by the castle gate switch (C.GT), followed by the castle lock switch (C.LK), and the test should report "TEST PASSED - PRESS ENTER" on the bottom line of the display. Any other result indicates a problem with the switches, the castle gate, or both. To re-test, press the Enter button.

"Castle Gate Stuck Closed" errors can be cleared in "Castle Mode" by repeatedly testing the castle gate (the Enter button must be pressed at the end of each test). The test will clear this error when there have been two consecutive successful castle gate tests in this mode.

Note that if the game is left idle in "Castle Mode", the test will change its mode of operation to "Castle Gate Mode" after two minutes. This keeps the castle gate coil from overheating during long periods of inactivity.

This test can also be used to exercise the exploding castle. To test the exploding castle, press the Enter button. The castle should shake three times, and then explode for approximately four seconds.

During this test, the diagnostic test buttons inside the coin door act as follows:
Escape: This button returns to the previous menu.
Down/Up: These buttons toggle the test mode between "Castle Gate Mode" and "Castle Mode".
Enter: This button is used to clear the "TEST PASSED/TEST FAILED" messages.
Enter: This button is used to test the exploding castle when "PASSED/FAILED" does not appear on the display.

T.20   TROLLS TEST

This test is used to verify proper operation of the trolls.

To test the left troll, press the Down button. The left troll should pop up out of the playfield, and the left troll Up switch should close (a sound is made for this, and the status of the left troll Up switch is shown in the display). Roll a ball at the left troll while he is raised. A sound is made for the switch closure, and the picture of the left troll in the display should quickly invert, then return to normal. To lower the left troll, press the Down button again.

"Left Troll Up Switch Bad" errors can be cleared by repeatedly testing the left troll. The test will clear this error when there have been two consecutive successful attempts at raising the left troll (note that the left troll Up switch must close when the troll is raised each time for this to happen).

To test the right troll, press the Up button. The right troll should pop up out of the playfield, and the right troll Up switch should close (a sound is made for this, and the status of the right troll Up switch is shown in the display). Roll a ball at the right troll while he is raised. A sound is made for the switch closure, and the picture of the right troll in the display should quickly invert, then return to normal. To lower the right troll, press the Up button again.

"Right Troll Up Switch Bad" errors can be cleared by repeatedly testing the right troll. The test will clear this error when there have been two consecutive successful attempts at raising the right troll (note that the right troll Up switch must close when the troll is raised each time for this to happen).

T.20   TROLLS TEST CONTINUED ...

Note that if the game is left idle with either troll in the raised position, the test will lower the raised troll(s) after two minutes. This keeps the troll coils from overheating during long periods of inactivity.

During this test, the diagnostic test buttons on the coin door act as follows:
Escape: This button returns to the previous menu.
Down: This button raises and lowers the left troll.
Up: This button raises and lowers the right troll.

T.21   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.

<div align="center">

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

</div>

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 01	Ball Saves	02	01	01	01	00
A.2 02	Ball Save Time	06	05	04	03	N/A
A.2 03	Extra Ball Percent	35%	30%	25%	20%	15%
A.2 05	Castle Difficulty	EASY	EASY	HARD	HARD	HARD
A.2 07	First Hard Lock	03	02	02	02	01
A.2 08	Castle Multiball Extra Ball Difficulty	EASY	EASY	MED.	HARD	HARD
A.2 11	Trolls! Difficulty	EASY	EASY	MED.	HARD	HARD
A.2 17	Battle Kingdom Start Difficulty	EASY	EASY	EASY	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.

<div align="center">

PRESET ADJUSTMENTS TABLE FOR U.S. AND CANADIAN GAMES

</div>

Adj. #	Adj. Description	Install 5-ball U.9 06	Install 3-ball U.9 07
A.1 01	Balls Per Game	05	03
A.1 07	Replay Start	42,000,000	28,000,000
A.2 06	Castle Extra Ball	03	02
A.2 07	First Hard Lock	01	02

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
A.4 16	Castle Credits	00
A.4 18	Joust Credits	00
A.4 20	Catapult Credits	00
A.4 22	Peasant Credits	00
A.4 24	Damsel Credits	00
A.4 26	Troll Credits	00
A.4 28	Multiball Madness Credits	00
A.4 29	Battle 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
A.4 16	Castle Credits	00
A.4 18	Joust Credits	00

U.9 10 INSTALL NOVELTY CONTINUED...

A.4 20	Catapult Credits	00
A.4 22	Peasant Credits	00
A.4 24	Damsel Credits	00
A.4 26	Troll Credits	00
A.4 28	Multiball Madness Credits	00
A.4 29	Battle Credits	00

U.9 11 NOT USED

U.9 12 SERIAL CAPTURE - NOT SUPPORTED

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 (not supported)

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 of 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. (Not Supported)
                 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. (Not Supported)

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. (Not Supported)

Factory Default: NO

A.1 18 MAXIMUM TICKET/PLAYER

The amount of tickets each player can earn. (Not Supported)

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 feature has been disabled in this version of Medieval Madness. When changed, it will revert back to "OFF".

Settings: OFF

Factory Default: OFF

1-35

A.1 30 POWER SAVER LEVEL

Because General Illumination Power Saver (A.1 29) has been disabled, this setting does not affect the intensity of the general illumination and controlled lamps. This setting can be ignored.

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

Factory Default: 5

A.1 31 TICKET EXPANSION BOARD

Ticket printing is not supported in this version of Medieval Madness. This setting has no effect on the game.

Settings: YES - Ticket Expansion board is connected. (Not Supported)
                   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

A.2 01 BALL SAVES

This adjustment determines the number of "full" Ball Saves that each player receives in a game. A ball that is "saved" will be returned to play without a change in the player up number or the ball in play number. A "full" Ball Save is "used" if a ball drains after it is launched into play within the amount of time specified in A.2 02 (Ball Save Time). Once all "full" Ball Saves are used, balls will no longer be returned to play should they drain quickly after being launched into play.

Settings: OFF - Balls will not be saved.
                 01 to 05 "full" Ball Saves given to each player per game.

A.2 02 BALL SAVE TIME

This adjustment determines the number of seconds in which a ball may drain after being launched into play, such that it will be returned to play without a change in the player up number or the ball in play number.

Settings: 03 to 15 seconds

A.2 03 EXTRA BALL PERCENTAGE

This adjustment determines the total percentage of Extra Balls desired (for all Extra Balls awarded from all features except Replay Score levels). The game will adjust the percentage of the Merlin's Magic "Light Extra Ball" Random Award to achieve the requested level (the percentage for this Random Award normally runs between 1% and 10%). When this adjustment is set to FIXED, no automatic percentaging will be done for the Merlin's Magic "Light Extra Ball" Award; it will operate with a FIXED percentage of 5%.

Settings: FIXED - Do not percentage the Merlin's Magic "Light Extra Ball" Award.
                 15% to 40% - Percentage the Merlin's Magic "Light Extra Ball" Award to achieve
                 this percentage.

A.2 04 STARTING CASTLE

This adjustment is used to set the Baron with whom the first Castle Attack will occur. The Baron is set for all players at the start of a new game, and randomized by the left and right slingshots.

Settings: RANDOM - Start the first Castle Attack with a random Baron.
                 FRANCOIS D'GRIMM - Start the first Castle Attack with Francois D'Grimm.
                 HOWARD HURTZ - Start the first Castle Attack with Lord Howard Hurtz.
                 DUKE OF BOURBON - Start the first Castle Attack with the Duke Of Bourbon.
                 SIR PSYCHO - Start the first Castle Attack with Sir Psycho.
                 EARL OF EGO - Start the first Castle Attack with the Earl Of Ego.

A.2 05 CASTLE DIFFICULTY

This adjustment specifies the difficulty level for destroying a Castle. The adjustment affects the number of times the Castle Gate must be hit before the gate opens to allow a Castle to be destroyed.

Settings: EASY: The First Castle requires 1 hit on the Gate before the Gate will open for
                 the Castle to be destroyed. Subsequent Castles require an additional hit each.
                 The progression is; First Castle - 1 Gate Hit, Second Castle - 2 Gate Hits, Third
                 Castle - 3 Gate Hits, etc.
                 HARD: The First Castle requires 2 hits on the Gate before the Gate will open for
                 the Castle to be destroyed. Subsequent Castles require an additional hit each.
                 The progression is; First Castle - 2 Gate Hits, Second Castle - 3 Gate Hits, Third
                 Castle - 4 Gate Hits, etc.

A.2 06 CASTLE EXTRA BALL
This adjustment specifies the number of castles that need to be destroyed to light an Extra Ball.

Settings: NO EXTRA BALL - Do not light an Extra Ball after destroying a castle.
01 to 05 - Light an Extra Ball after destroying this many castles.

A.2 07 FIRST HARD LOCK
This adjustment affects the difficulty of earning Castle Multiball. An "easy" lock does not require the player to light any locks before locking balls for Castle Multiball; all of the locks are lit for them. A "hard" lock requires the player to light a lock by making a shot to the Castle Lock before they can lock a ball for Castle Multiball. This adjustment specifies the first Castle Multiball in which the player must light locks before locking balls for Castle Multiball. The lower this number is, the harder it is to achieve Castle Multiball.

Settings: 01-03: The first Castle Multiball in which the player must light locks.

A.2 08 CASTLE MULTIBALL EXTRA BALL DIFFICULTY
This adjustment specifies the difficulty with which the Castle Multiball Extra Ball is lit. Note that only ONE Castle Multiball Extra Ball can be lit PER Castle Multiball.

Settings: NO EXTRA BALL - Do NOT light the Castle Multiball Extra Ball.
EASY - The Extra Ball will light when the first Super Jackpot is collected.
MEDIUM - The Extra Ball will light when the first Super Jackpot is collected. Once this Extra Ball has been lit, subsequent Extra Balls will light when ALL of the Super Jackpots have been collected.
HARD - The Extra Ball will light when ALL of the Super Jackpots have been collected.

A.2 09 TROLL TARGET MEMORY
This adjustment determines whether or not scored Troll Targets remain in memory from ball to ball.

Settings: YES - Scored Troll Targets remain in memory from ball to ball.
NO - Scored Troll Targets reset at the start of a new ball.

A.2 10 TROLL TARGET COUNT
This adjustment determines the number of times the Troll Targets need to be hit before they will light the Troll Feature.

Settings: 06 to 10 - The number of Troll Targets needed to light the Troll Feature.

A.2 11 TROLL DIFFICULTY
This adjustment specifies the difficulty level of the Troll Feature. It directly affects the number of times each Troll needs to be hit during the Feature to complete the Feature.

Settings: EASY: Each Troll requires two (2) hits for completion of the feature.
MEDIUM: Each Troll requires three (3) hits for completion of the feature.
HARD: Each Troll requires four (4) hits for completion of the feature.

A.2 12 TROLL TIMER
This adjustment specifies the number of seconds the player is given to complete the Troll Feature.

Settings: 20-40: The number of seconds in which the Troll Feature must be completed.

A.2 13 HURRY UP EXTRA BALL 1

This adjustment specifies the number of times the Hurry-up Feature must be collected before lighting the first Extra Ball from this Feature.

Settings: NO EXTRA BALL - Do NOT light the first Hurry-up Extra Ball
1 to 15 - Light the first Extra Ball after this many Hurry-up Awards have been collected.

A.2 14 HURRY UP EXTRA BALL 2

This adjustment specifies the number of times the Hurry-up Feature must be collected before lighting the second Extra Ball from this Feature.

Settings: NO EXTRA BALL - Do NOT light the second Hurry-up Extra Ball.
30 to 50 - Light the second Extra Ball after this many Hurry-up Awards have been collected.

A.2 15 ROYAL MADNESS BALL SAVE

This adjustment specifies whether or not the Ball Save feature is activated at the start of the Royal Madness feature.

Settings: YES - Activate the ball saver for 5 seconds at the start of the Royal Madness feature.
NO - Do NOT activate the ball saver.

A.2 16 MAXIMUM ROYAL MADNESS EXTRA BALLS

This adjustment specifies the maximum number of Extra Balls that will be awarded to each player for completing the Royal Madness Feature.

Settings: NO EXTRA BALL: Do NOT award an Extra Ball for completing Royal Madness.
01-10: Award no more than this many Extra Balls to a player for completing Royal Madness this many times (subsequent completions will award additional points instead).
UNLIMITED: Each time a player completes Royal Madness, award an Extra Ball.

A.2 17 BATTLE FOR THE KINGDOM START DIFFICULTY

This adjustment specifies the difficulty in which the Battle For The Kingdom Feature is lit.

Settings: EASY: The player must earn: 1 Set of Castles, 3 Joust Victories, 3 Catapult Slams, 3 Peasant Revolts, 3 Damsels Saved, 10 Trolls Destroyed.
HARD: The player must earn: 1 Set of Castles, 5 Joust Victories, 5 Catapult Slams, 5 Peasant Revolts, 5 Damsels Saved, 20 Trolls Destroyed.

A.2 18 LANE VIDEO 1

This adjustment specifies the number of times the bottom lanes must be completed to light the first Video Mode, awarded from Merlin's Magic at the Right Eject.

Settings: 5 - 15: Light the first video mode with this many bottom lane completions.

A.2 19 LANE VIDEO 2

This adjustment specifies the number of times the bottom lanes must be completed to light the second Video Mode, awarded from Merlin's Magic at the Right Eject.

Settings: 30 - 50: Light the second video mode with this many bottom lane completions.

A.2 20 VIDEO EXTRA BALL
This adjustment specifies whether or not an Extra Ball is available from the Video Mode.

Settings: YES - An Extra Ball is available from the Video Mode.
                   NO - Video Mode should NOT give out an Extra Ball.

A.2 21 PLAYER TOURNAMENT MODE
This adjustment allows players to simulate the Tournament Mode setting in the game (see A.1 26 for a description of Tournament Mode). If this adjustment is set to YES, and there are credits posted on the game, Tournament Mode may be enabled for the next game start. To do this, hold in both flipper buttons for approximately two seconds and pressing the Start button while the "Tournament Mode Ready" message is shown on the dot-matrix display.

Settings: YES - Allow player-selectable Tournament Mode.
                   NO - Do NOT allow player-selectable Tournament Mode.

A.2 22 FAMILY MODE
This adjustment allows the game to operate in "Family Mode". Any possibly offensive or objectionable dot matrix images and sounds will not be utilized.

Settings: YES - Do NOT utilize any possibly offensive or objectionable dot matrix images and sounds.
                   NO - Utilize all dot matrix images and sounds.

A.2 23 ATTRACT MODE MUSIC
This adjustment is used to allow the playing of music in Attract Mode.

Settings: YES - Allow music to be played in Attract Mode.
                   NO - Do NOT allow music to be played in Attract Mode.

A.2 24 ATTRACT MODE SOUNDS
This adjustment is used to allow the playing of sound effects in Attract Mode.

Settings: YES - Allow sounds effects to be played in Attract Mode.
                   NO - Do NOT allow sound effects to be played in Attract Mode.

A.2 25 TIMED PLUNGER
This adjustment specifies the number of seconds before automatically plunging a ball onto the playfield that can otherwise be plunged by the player via the launch button.

Settings: OFF - Never automatically plunge a ball onto the playfield that can otherwise be plunged by the player via the launch button.
                   30-90 - The number of seconds before the game automatically plunges the ball onto the playfield.

A.2 26 FLIPPER PLUNGER
When this adjustment is set to YES, the right flipper will cause 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 will automatically detect 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.

A.2 27 DISABLE LEFT GATE

This adjustment is provided for use when the Left Gate is broken and/or intermittent. The game will automatically detect a broken Left Gate, but it may take several games to perform the detection. In this case, set this adjustment to YES until the Left Gate can be repaired.

Settings: NO - Do NOT disable the Left Gate.
                   YES - Disable the Left Gate.

A.2 28 DISABLE RIGHT GATE

This adjustment is provided for use when the Right Gate is broken and/or intermittent. The game will automatically detect a broken Right Gate, but it may take several games to perform the detection. In this case, set this adjustment to YES until the Right Gate can be repaired.

Settings: NO - Do NOT disable the Right Gate.
                   YES - Disable the Right Gate.

A.2 29 DISABLE TOWER DIVERTER

This adjustment is provided for use when the Tower Diverter (on the Right Ramp) is broken and/or intermittent. The game will automatically detect a broken Tower Diverter, but it may take several games to perform the detection. In this case, set this adjustment to YES until the Tower Diverter can be repaired.

Settings: NO - Do NOT disable the Tower Diverter.
                   YES - Disable the Tower Diverter.

A.2 30 DISABLE TOWER LOCK POST

This adjustment is provided for use when the Tower Lock Post is broken and/or intermittent. The game will automatically detect a broken Tower Lock Post, but it may take several games to perform the detection. In this case, set this adjustment to YES until the Tower Lock Post can be repaired.

Settings: NO - Do NOT disable the Tower Lock Post.
                   YES - Disable the Tower Lock Post.

A.2 31 DISABLE DRAWBRIDGE

This adjustment is provided for use when the Drawbridge is broken and/or intermittent. The game will automatically detect a broken Drawbridge, but it may take several games to perform the detection. In this case, set this adjustment to YES until the Drawbridge can be repaired.

If it is necessary to set this adjustment to YES, and the motor is operable, use T.18 (Drawbridge Test) to move the Drawbridge to either its UP or its DOWN position. This will minimize possible damage to the top of the unit during game play, and allow for maximum game-play software compensation.

Settings: NO - Do NOT disable the Drawbridge.
                   YES - Disable the Drawbridge.

A.2 32 DISABLE CASTLE GATE

This adjustment is provided for use when the Castle Gate is broken and/or intermittent. The game will automatically detect a broken Castle Gate, but it may take several games to perform the detection. In this case, set this adjustment to YES until the Castle Gate can be repaired.

Settings: NO - Do NOT disable the Castle Gate.
                   YES - Disable the Castle Gate.

A.2 33 DISABLE CASTLE
This adjustment is provided for use when the Castle is broken. In this case, set this adjustment to YES until the Castle can be repaired.

Settings: NO - Do NOT disable the Castle.
                        YES - Disable the Castle.

A.2 34 DISABLE LEFT TROLL
This adjustment is provided for use when the Left Troll is broken and/or intermittent. The game will automatically detect a broken Left Troll, but it may take several games to perform the detection. In this case, set this adjustment to YES until the Left Troll can be repaired.

Settings: NO - Do NOT disable the Left Troll.
                        YES - Disable the Left Troll.

A.2 35 DISABLE RIGHT TROLL
This adjustment is provided for use when the Right Troll is broken and/or intermittent. The game will automatically detect a broken Right Troll, but it may take several games to perform the detection. In this case, set this adjustment to YES until the Right Troll can be repaired.

Settings: NO - Do NOT disable the Right Troll.
                        YES - Disable the Right Troll.

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
Not Used

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, 1/6 etc.). 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 used 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.

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:

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

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 VIEW
```

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.     │
└──────────────────────────────────────────┘
```

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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 be 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 Chances
```
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 tor 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:

1-48

```
                      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
```

It 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 tor a specific call (see Bonus for Special Coin section for more information).

Pricing Table

Country	Coin Chutes Left	Center	Right	4th Chute	Games/Coins	Display	Pricing Adjustments A3 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	
Canada 3/Dollar Coin	25¢	-	$1.00	-	1/0.50, 2/$1.00, 3/$1.00 Coin	Can.$ Bonus	
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	20c	$1	$1	$2	1/$1, 3/$2[2]	Australia 1	
	20c	$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	
Switerland	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, 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	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[1,2,3]	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	100Y	-	100Y	-	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[1,2]	Denmark 1	
	1Kr	5Kr	10Kr	20Kr	1/5 Kr, 3/10 Kr, 6/20 Kr	Denmark 2	
Finland	1Mka	-	5Mka	-	1/2x1Mka, 3/5Mka[2]	Finland 1	
		-	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	10c	10c	10c	-	1/1 Token[2]	Argentina	
Greece	10D	20D	50D	-	1/2x100, 1/20D, 3/50D	Greece	
Antilles	25c	25c	1G	-	1/25c, 4/1G	Antilles	
Netherlands	1HFI	2.5HFI	2.5HFI	-	1/1HFI, 3/2.5HFI	Netherlands	
Netherlands 2	1HFI	2.5HFI	2.5HFI	-	1/1HFI, 3/3HFI, 3/2.5HFI-Coin	Neth Bonus	
Hungary	20Old	20New	50F	-	1/40F, 2/60F, 4/100F	Hungary	

Note: 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.4 15 CASTLE CHAMPION

This adjustment is used to set the number of Castles that must be destroyed in a game to become the New Castle Champion.

Range: 1-10

A.4 16 CASTLE CHAMPION CREDITS

This adjustment specifies the number of credits to award to the new Castle Champion at the end of a game.

Range: 00-03

A.4 17 JOUST CHAMPION

This adjustment is used to set the number of Joust Victories that must be earned in a game to become the new Joust Champion.

Range: 1-10

A.4 18 JOUST CHAMPION CREDITS

This adjustment specifies the number of credits to award to the new Joust Champion at the end of a game.

Range: 00-03

A.4 19 CATAPULT CHAMPION

This adjustment is used to set the number of Catapult Slams that must be earned in a game to become the new Catapult Champion.

Range: 1-10

A.4 20 CATAPULT CHAMPION CREDITS

This adjustment specifies the number of credits to award to the new Catapult Champion at the end of a game.

Range: 00-03

A.4 21 PEASANT CHAMPION

This adjustment is used to set the number of Peasant Revolts that must be earned in a game to become the new Peasant Champion.

Range: 1-10

A.4 22 PEASANT CHAMPION CREDITS

This adjustment specifies the number of credits to award to the new Peasant Champion at the end of a game.

Range: 00-03

A.4 23 DAMSEL CHAMPION

This adjustment is used to set the number of Damsels that must be saved in a game to become the new Damsel Champion.

Range: 1-10

A.4 24 DAMSEL CHAMPION CREDITS

This adjustment specifies the number of credits to award to the new Damsel Champion at the end of a game.

Range: 00-03

A.4 25 TROLL CHAMPION

This adjustment is used to set the number of Trolls that must be destroyed in a game to become the new Troll Champion.

Range: 10-40

A.4 26 TROLL CHAMPION CREDITS

This adjustment specifies the number of credits to award to the new Troll Champion at the end of a game.

Range: 00-03

A.4 27 MULTIBALL MADNESS CHAMPION

This adjustment is used to set the score that must be beaten during a single Multiball Madness Multiball to become the new Multiball Madness Champion.

Range: 5,000,000 - 40,000,000

A.4 28 MULTIBALL MADNESS CREDITS

This adjustment specifies the number of credits to award to the new Multiball Madness Champion at the end of a game.

Range: 00-03

A.4 29 BATTLE FOR THE KINGDOM CHAMPION CREDITS

This adjustment specifies the number of credits to award to the new Battle For The Kingdom Champion at the end of a game.

Range: 00-03

ERROR MESSAGES

The Medieval Madness 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.

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.

CHECK LEFT GATE - STUCK CLOSED
The game has detected that the Left Gate is stuck closed. Use T.16 (Loop/Gate Test), Loops Mode, to verify that all of the Loop switches and the Left Gate are operating properly.

CHECK LEFT GATE - STUCK OPEN
The game has detected that the Left Gate is stuck open. Use T.16 (Loop/Gate Test), Jets Mode to verify that the Right Loop switches and the Left Gate are operating properly.

CHECK RIGHT GATE - STUCK CLOSED
The game has detected that the Right Gate is stuck closed. Use T.16 (Loop/Gate Test), Loops Mode, to verify that all of the Loop switches and the Right Gate are operating properly.

CHECK RIGHT GATE - STUCK OPEN
The game has detected that the Right Gate is stuck open. Use T.16 (Loop/Gate Test), Jets Mode to verity that the Left Loop switches and the Right Gate are operating properly.

CHECK TOWER DIVERTER - STUCK CLOSED
The game has detected that the Tower Diverter is stuck closed. Use T.17 (Tower Test), Tower Mode, to verify that the Right Ramp Entrance switch, the Tower Diverter, the Tower Lock Post, and the Tower Exit switch are operating properly.

CHECK TOWER DIVERTER - STUCK OPEN
The game has detected that the Tower Diverter is stuck open. Use T.17 (Tower Test), Ramp Mode, to verify that the Right Ramp Entrance switch, the Right Ramp Exit switch, and the Tower Diverter are operating properly.

CHECK DRAWBRIDGE - DOWN SWITCH BAD
The game has detected that the Drawbridge DOWN switch is bad. Use T.18, Drawbridge Test, to verify that the switch closes when the Drawbridge is DOWN, and opens when the Drawbridge is NOT DOWN.

CHECK DRAWBRIDGE - UP SWITCH BAD
The game has detected that the Drawbridge UP switch is bad. Use T.18, Drawbridge Test, to verify that the switch closes when the Drawbridge is UP, and opens when the Drawbridge is NOT UP.

CHECK CASTLE GATE - STUCK CLOSED
The game has detected that the Castle Gate is stuck closed. Use T.19 (Castle Gate Test), Castle Mode, to verify that the Moat Entrance switch, the Castle Gate switch, the Castle Lock switch, and the Castle Gate are operating properly.

CHECK CASTLE GATE - STUCK OPEN
The game has detected that the Castle Gate is stuck open. Use T.19 (Castle Gate Test), Castle Gate Mode, to verify that the Moat Entrance Switch, the Castle Gate Switch, and the Castle Gate are operating properly.

CHECK LEFT TROLL - UP SWITCH BAD

The game has detected that the Left Troll UP switch is bad. Use T.20 (Trolls Test) to verify proper operation of the Left Troll.

CHECK RIGHT TROLL - UP SWITCH BAD

The game has detected that the Right Troll UP switch is bad. Use T.20 (Trolls Test) to verify proper operation of the Right Troll.

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 60 balls or apx. 20 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.

CHECK FUSES F115 AND F116 AND OPTO 12V SUPPLY

You should not see this message in MMR since the optos now use the same +5V (VCC) that runs the switches.

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 being disconnected, since the optos run on +5V, and not +12V.

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 game is switched On. 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.

TIME AND DATE NOT SET

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

LED List

Controller Board

Power Supply Board

CR5

CR3
CR2

CR12

CR5

CR2

CR1

CR10
CR8
CR9

CR7

Playfield Board

Solenoid Driver Board

MEDIEVAL MADNESS

CHICAGO GAMING COMPANY

CR3

CR2
CR6

CR7

CR8

CR4
CR3
CR2

CR1

CR1

Controller Board

CR2: 12V, normally on
CR3: 3.3V, normally on
CR5: 5V, normally on
CR7: Amp Fault, normally off
CR8: Heartbeat, flashes normally
CR9: Blank, normally off. Yellow ON indicates blank is active.
CR10: Reset, normally off. Flashes red on boot and when watchdog hits reset.

Power Supply Board

CR1: Knocker, flashes when knocker fires
CR2: Shaker, on when shaker motor is running
CR5: 50V, normally on
CR12: 12VUR, normally on

Playfield Board

CR1: 12V, Normally on
CR2: VCC, normally on
CR3: 3.3V, normally on
CR6: 6V, normally on
CR7: DIA, normally flashes
CR8: +5V, normally on

Solenoid Driver Board

CR1: 12V, normally on
CR2: SOL 1-4, normally on when coin door closed
CR3: SOL 5-6, normally on when coin door closed
CR4: SOL 7-8, normally on when coin door closed

Fuse List
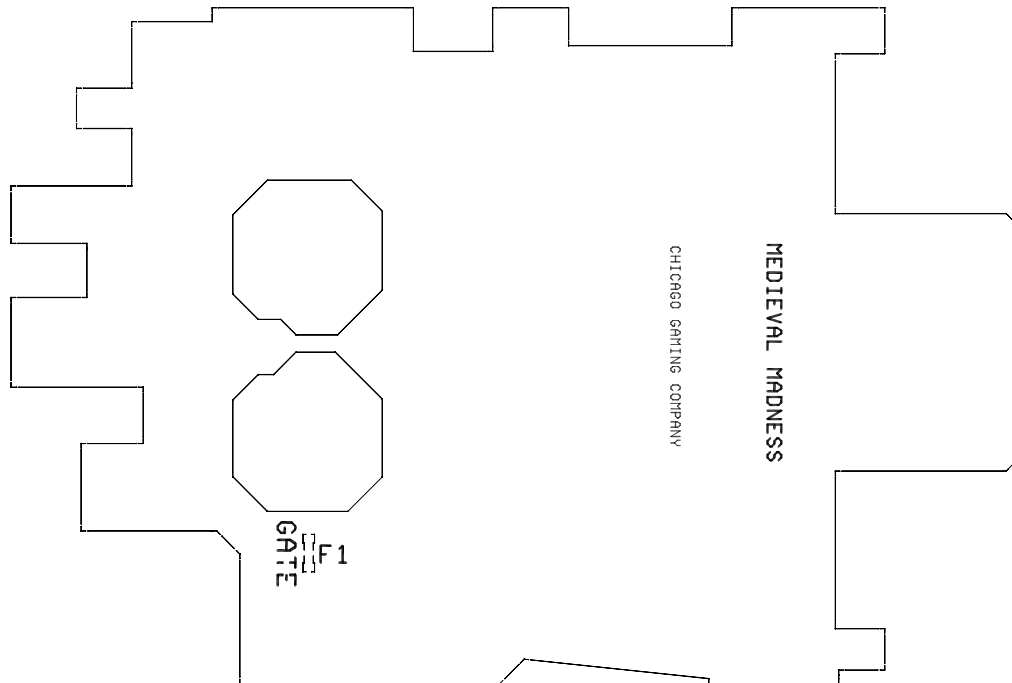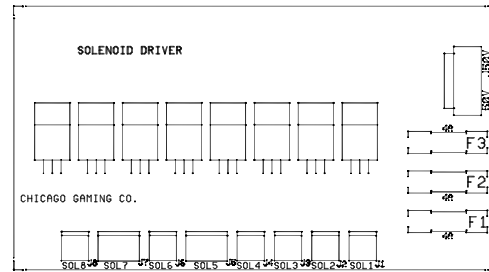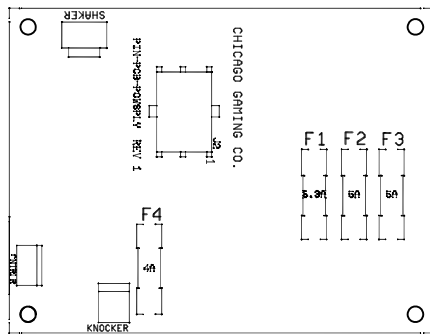
Power Interface Assembly (not shown)

LOC.	DESC.	PART NUMBER	VALUE
Panel Mount (*x2*) AC Input		5ST 5-R	5A 250V Slow Blow

Power Supply Board

LOC.	DESC.	PART NUMBER	VALUE
F1	50V	5ST 6.3R	6.3A 250V Slow Blow
F2	12V	5ST 5-R	5A 250V Slow Blow
F3	12V	5ST 5-R	5A 250V Slow Blow
F4	KNOCKER	5ST 4-R	4A 250V Slow Blow

Solenoid Driver Board

LOC.	DESC.	PART NUMBER	VALUE
F1		5ST 4-R	4A 250V Slow Blow
F2		5ST 4-R	4A 250V Slow Blow
F3		5ST 4-R	4A 250V Slow Blow

Playfield Board

LOC.	DESC.	PART NUMBER	VALUE
F1	GATE	5ST 4-R	4A 250V Slow Blow

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 is recommended.

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.

SECTION TWO

PARTS INFORMATION

MM-SUB-50059BB
Backbox Assembly
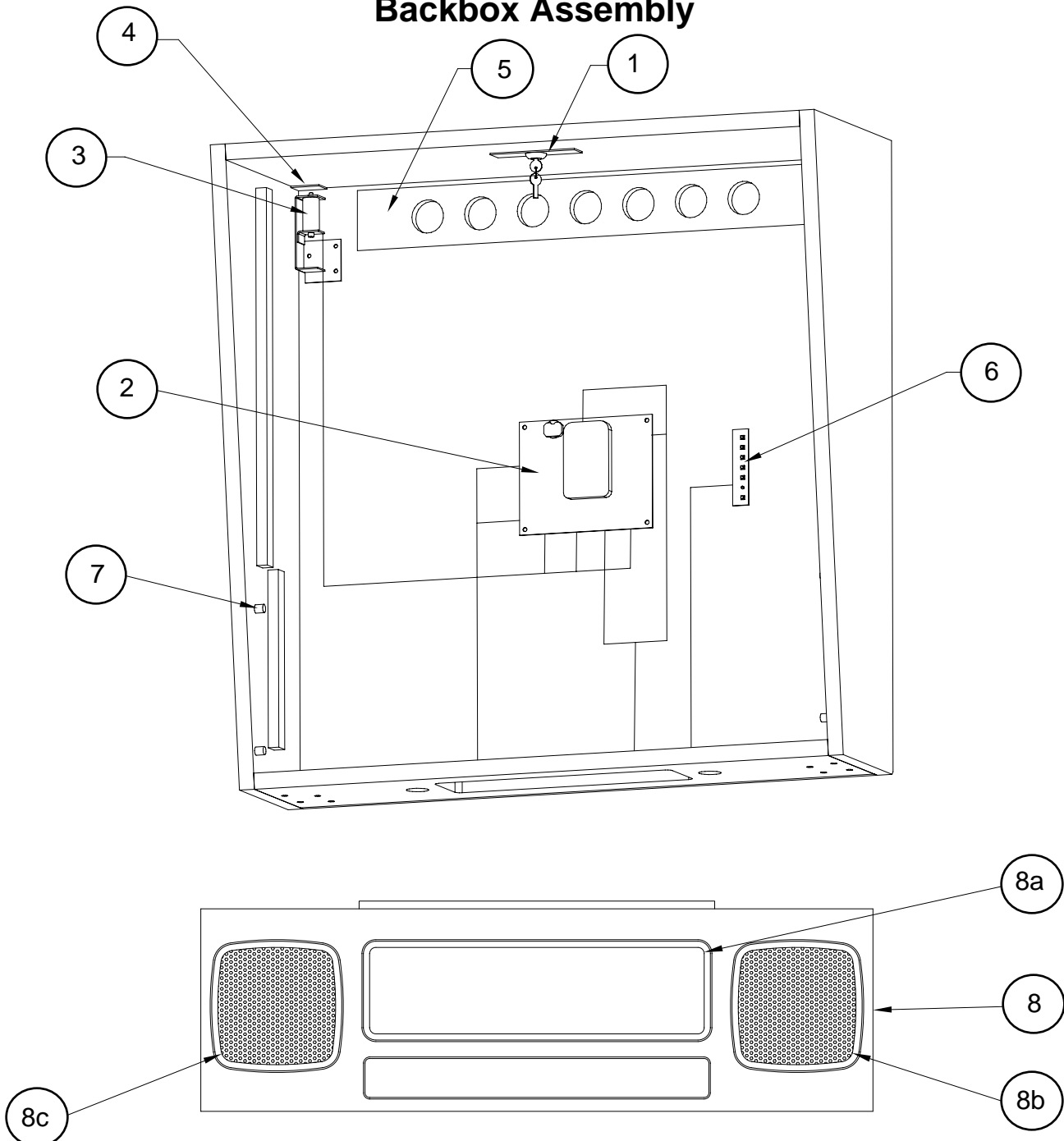
Item   Part Number   Description

1	A-13379	Lock & Plate Assembly
a)	20-9637	Lock & Cam Kit
2	MM-SUB-CTRLCOMP	Medieval Madness Controller Board Assy.
3	B-10686-1	Knocker Assembly
4	01-7525	Knocker Plate
5	01-6645	Vent Screen
6	000-PCB-OSDKEY	LCD On Screen Display Keyboard
7	02-5223	Bushing Button, Speaker Panel
8	MM-SUB-A21559	Speaker/Display Assembly
a)	000-MON-156LCD	LCD Panel
b)	000-SPK-51410CE	Speaker, 5-1/4", 8Ω
c)	000-SPK-51410CE	Speaker, 5-1/4", 8Ω

Miscellaneous Parts:
(Not shown)

08-7456   Backbox Glass, 27 x 18-7/8"
MM-ART-BACKBOX   MM Backbox Marquee Translight

2-2

MM-SUB-50059BB
Backbox Assembly Cables
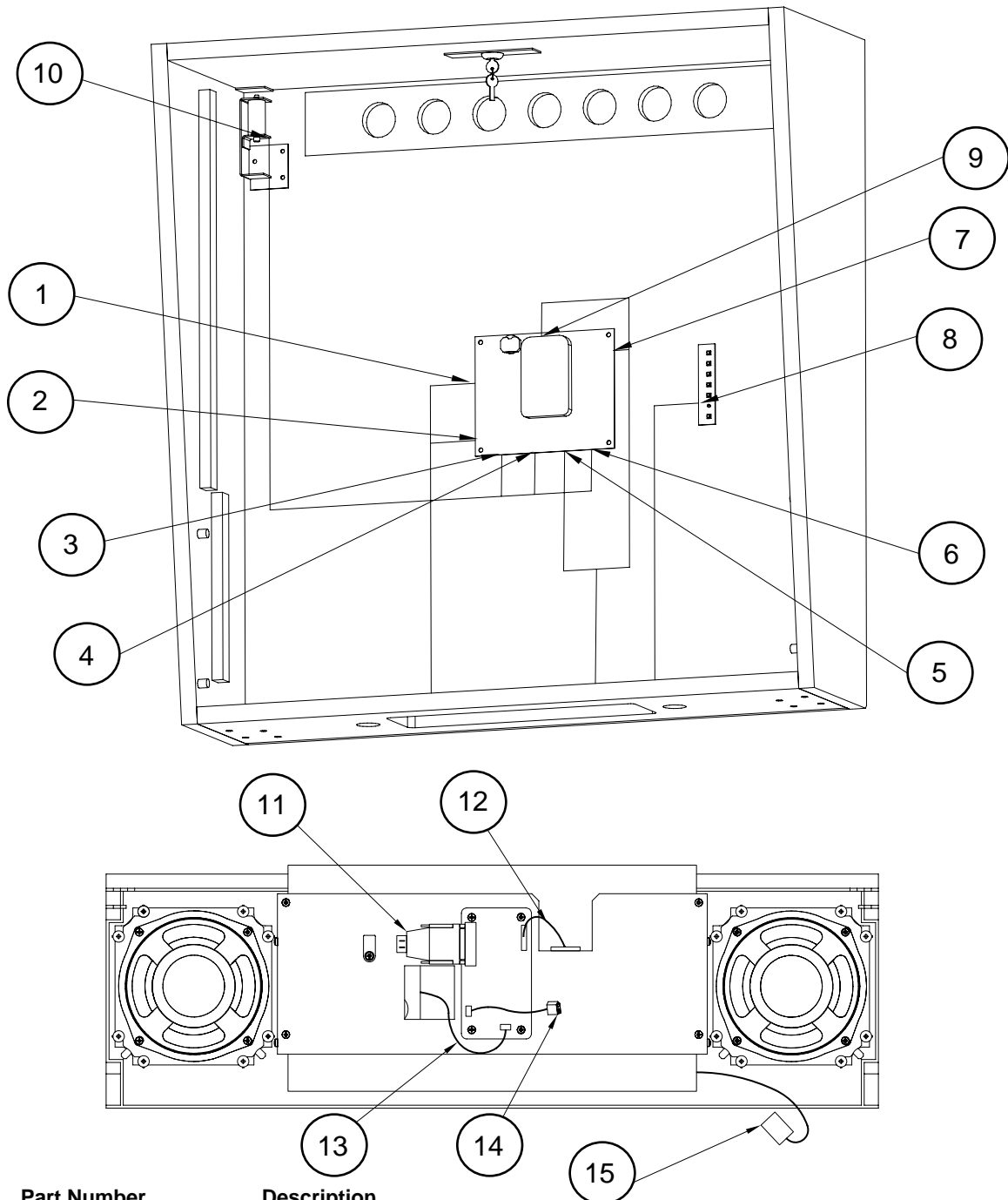
Item	**Part Number**		**Description**
1	MM-CBL-ACPOWR	J1	+12V
2	MM-CBL-CABINET	J9	Knocker/Shaker
3	MM-CBL-CABINET	J2	Cabinet
4	MM-CBL-CABINET	J3	Coindoor
5	000-CBL-2MCAT6S	J5	Playfield
6	MM-CBL-CABINET	J6	Speakers
7	MM-CBL-WTCHDOG	J7	Watchdog
8	000-CBL-LCDOSD		OSD Keyboard Cable
9	000-CBL-MICHDMI		HDMI to Micro HDMI
10	000-CBL-KNOCKER		Knocker Coil Cable

Item	**Part Number**	**Description**
11	000-CTR-DVIHDMI	DVI to HDMI Adapter
12	000-CBL-LVDS10C	LVDS Cable
13	000-CBL-BACKLIT	LCD Backlight Cable
14	MM-CBL-MONPOWR	LCD Power Cable
15	MM-CBL-SPKRPNL	Speaker Panel Cable

2-3

MM-SUB-50059CAB
Cabinet Assembly
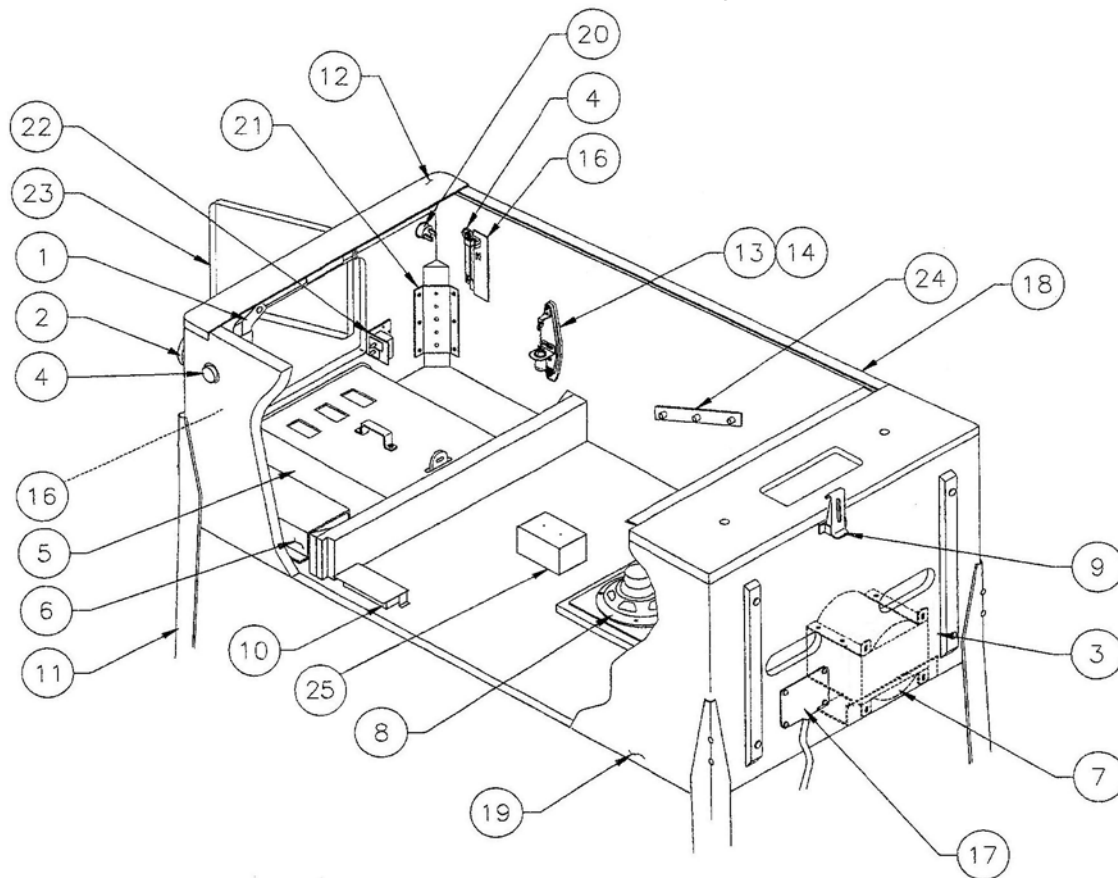
Item	Part Number	Description
1	A-16773	Lever Guide Assembly
2	20-9663-B-4	Push Button, Round
3	MM-MLS-DRIPPLT	Drip Plate - Narrow
4	A-16883-4	Flipper Button w/Spring (2)
5	A-20729-5	4-Ball Cashbox Assembly
6	A-20871	Power Interface Assy.
7	PIN-TRF-PTRANS	WPC Transformer
8	5555-12929-00	Speaker, 4.(2,6", 25w
9	PIN-20-9347	Toggle Latch
10	000-ELE-RS15012	Switching Power Supply, 12V, 150W
11	A-19514	Leg Assembly, Chrome (4)
12	0-12615	Front Molding Assembly
13	20-6502-A	Plumb Bob
14	04-10346	Tilt Mechanism Assembly
16	PIN-PCB-FLIPBTN	Opto Flipper Assembly (2)
17	PIN-MLS-CORDCVR	Line Cord Cover
18	A-12359-3	Side Molding Assembly (2)
19	MM-SUB-CABDECAL	MM Cabinet with Decals
20	20-9663-16	Push Button w/Sw., Start (Yellow)
21	01-11400	Leg Plate (4)
22	A-18249-3	Cable & Interlock Switch Assy. Coin
23	09-61000-1	Door-U.S.A.
24	01-11408	Plate Spacer (2)
25	PIN-SUB-SHKRMTR	Shaker Motor Assy.

Miscellaneous Parts (Not Shown)

Part Number	Description
PIN-A-17195	Tilt Switch Assy.
A-19562.1	Stay Arm Assembly
01-12352	Clip Bracket
01-9011.l-L	Backbox Mtg. Bracket, Left
01-90l1.l-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" (4)

Cabinet Cables:

MM-CBL-CABINET	Cabinet Cable
MM-CBL-ACPOWER	AC Power Cable
MM-CBL-PFPOWR	Playfield Power Cable
MM-CBL-SOLPOWR	Solenoid Power Cable

MM-SUB-CTRLCOMP
Medieval Madness Controller Board

**PIN-PCB-PLAYFLD
Medieval Madness
Playfield PCB**

MEDIEVAL MADNESS

CHICAGO GAMING COMPANY

PIN-PCB-TRGHLED
Trough IR LED PCB Assembly

CHICAGO GAMING CO.

TROUGH IR EMITTERS REV 0

IR EMITTERS

RoHS

PIN-PCB-TRGHDET
Trough IR Photo Transistor PCB Assembly

TROUGH IR DETECTORS REV 0
CHICAGO GAMING CO.

IR DETECTORS

RoHS

PIN-PCB-FLIPBTN
Flipper Opto PCB Assembly

PIN-PCB-MOTRDRV
Motor Driver Board

DRAWBRIDGE MOTOR WIRE

PIN-A-15849L2
Flipper Assembly

REF.

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-11629	Flipper Coil, Blue
13	01-7695-1	Solenoid Bracket
14	4006-01017-04	Mach. Screw, 6-32 x 1/4"
15	10-364	Spring
16	FSM-063-PPH043C	Mach. Screw, 6-32 x 7/16"
17	FNT-063-ESNA125	Nut 6-32 Nylock, 1/8" Tall

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
	20-10110-5	Flipper Bat w/Shaft

* *See page 2-10 for assembly detail drawing.*

PIN-A-15849R2
Flipper Assembly

Item	Part Number	Description
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	MS, 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
	20-10110-5	Flipper Bat w/Shaft

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-11629	Flipper Coil, Blue
13	01-7695-1	Solenoid Bracket
14	4006-01017-04	Mach. Screw, 6-32 x 1/4"
15	10-364	Spring
16	FSM-063-PPH043C	Mach. Screw, 6-32 x 7/16"
17	FNT-063-ESNA125	Nut 6-32 Nylock, 1/8" Tall

Flipper Notes:

1. *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,*
2. *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.*
3. *Any adjustment of the E.O.S. switch must be made at a minimum distance of 0.25 inch from the switch body.*
4. *Longer blade of E.O.S. switch must be made straight. Gap adjustment is done by adjusting shorter blade.*
5. *All moving elements of the assembly must operate freely without any evidence of binding.*
6. *Apply Loctite 290 when reattaching screws to the Flipper Stop Assembly and the Solenoid Bracket*

PIN-SUB-A199631
Ball Trough Assembly Complete
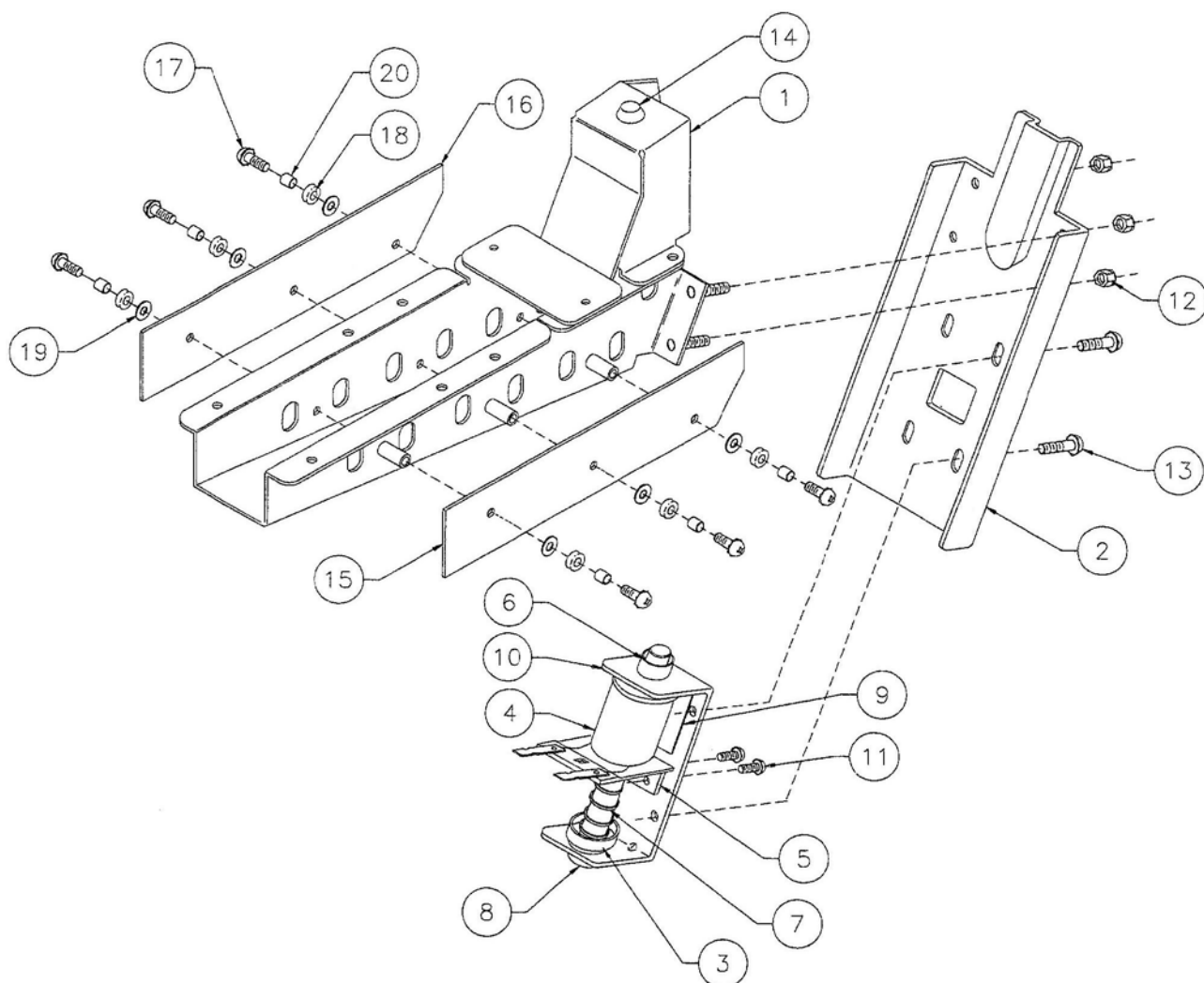
Item	Part Number	Description		Item	Part Number	Description
1	A-16809-2	Ball Trough Welded Assy.		12	4408-01119-00	Nut 8-32 ESN
2	01-11587	Ball Trough Front		13	4008-01017-06	Mach. Screw, 8-32 x 3/8"
3	A-6306-2	Bell Armature Assembly		14	23-6702	Bumper Plug
4	AE-26-1500	Coil Assembly		15	A-18617-1	Trough IRED LED PCB Assembly
5	01-8-508-T	Solenoid Assembly		16	A-18618-1	Trough IRED Transistor PCB Assy.
6	03-7067-5	Coil Tubing		17	4006-01003-10	Mach. Screw, 6-32 x 5/8" SEMS
7	10-135	Spring		18	23-6626	Rubber Grommet
8	23-6420	Rubber Grommet		19	4700-00004-00	Flat Washer, 9/64 x 7/16 x 21gao
9	03-8523	Insulator		20	02-4975	Bushing
10	01-11586	Coil Mounting Bracket				
11	4008-01017-05	Mach. Screw, 8-32 x 5/16"				

PIN-SUB-A17811L
PIN-SUB-A17811R
Kicker Arm (Slingshot) Assembly
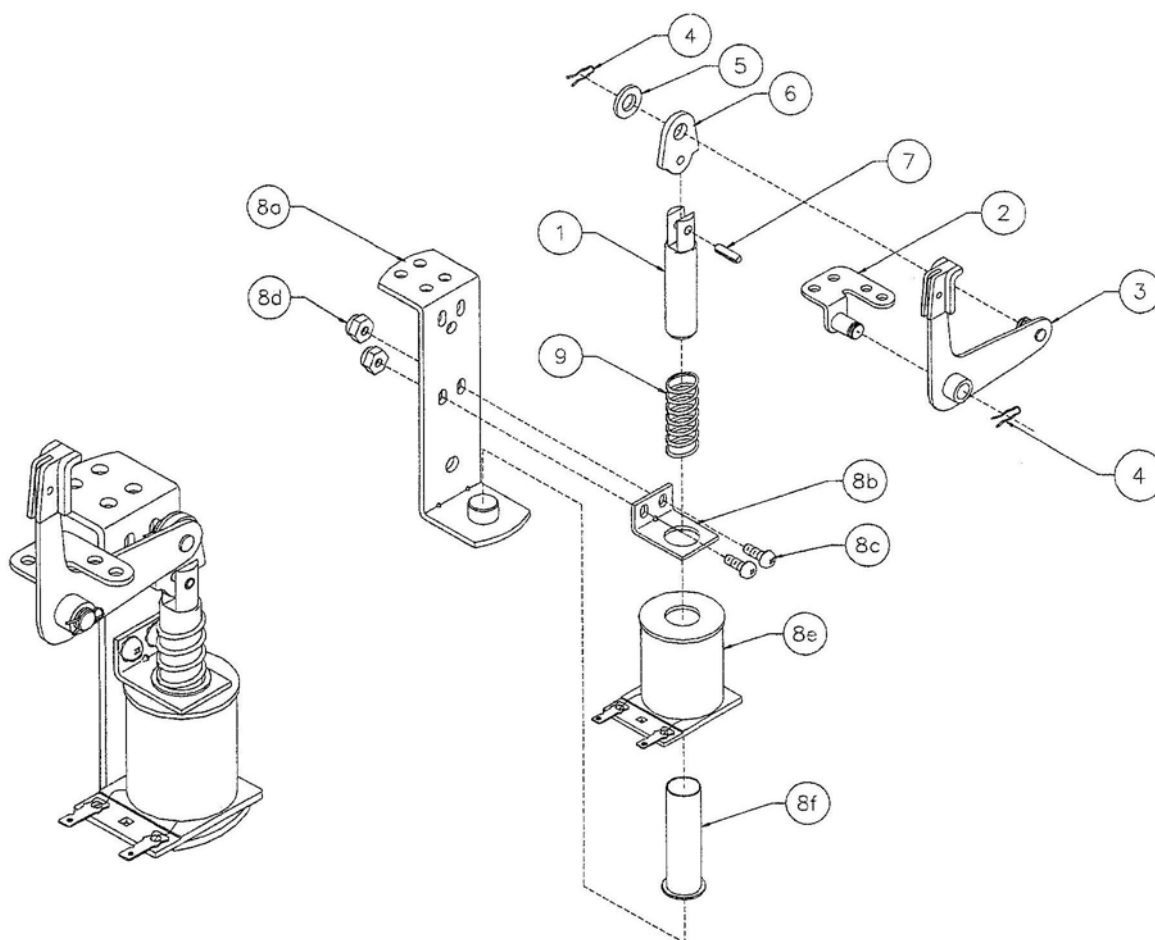
Associated Parts for Right & Left Kickers:

Item	Part Number	Description
1	02-2364	Coil Plunger
2	A-17810	Mounting Bracket Assembly
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	B-9362-R-3	Coil & Bracket Assembly, Right
	B-9362-L-2	Coil & Bracket Assembly, Left
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
g)	H-19523	Mini Solenoid Cable
9	10-128	Spring

PIN-SUB-B94146
Jet Bumper Assembly
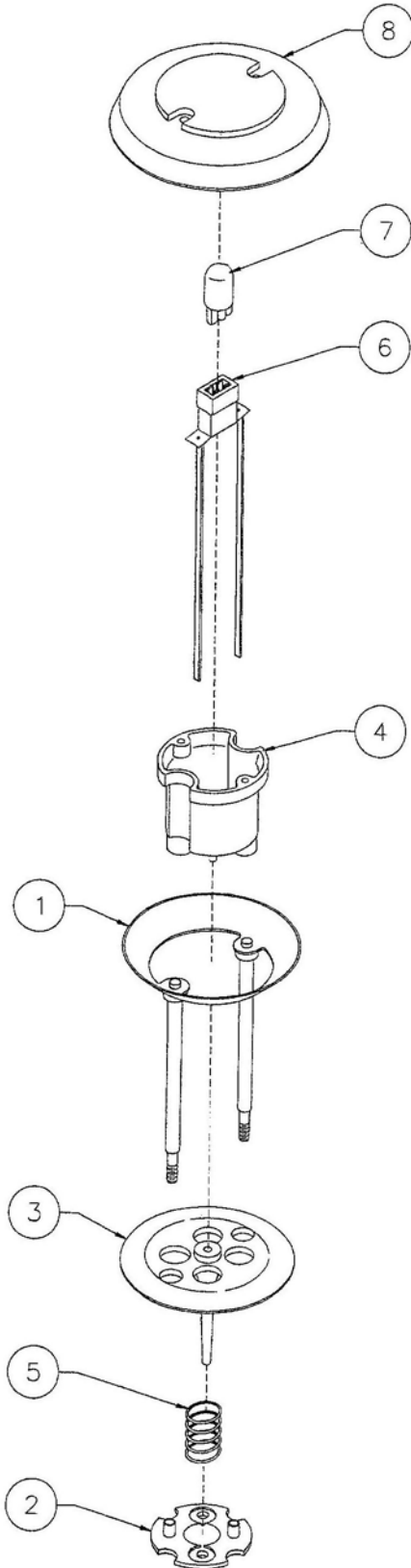
Item	Part Number	Description
1	A-4754	Bumper Ring Assembly
2	03-6009-A5	Bumper Base, White
3	03-6035-7	Bumper Wafer, Black
4	03-7443-5	Bumper Body, White
5	10-7	Spring
6	PIN-24-8776-C	Socket-Wedge Base
7	000-LMP-LED6VT3	LED, 6V T3-1/4, White

Associated Parts:

8	03-8254-18	Jet Bumper Cap (2)
	03-9831	Jet Bumper Cap, Modified (1)
9	PIN-PLS-JETSPCR	Socket Spacer (not shown)

PIN-SUB-A94152
Jet Bumper Coil Assembly
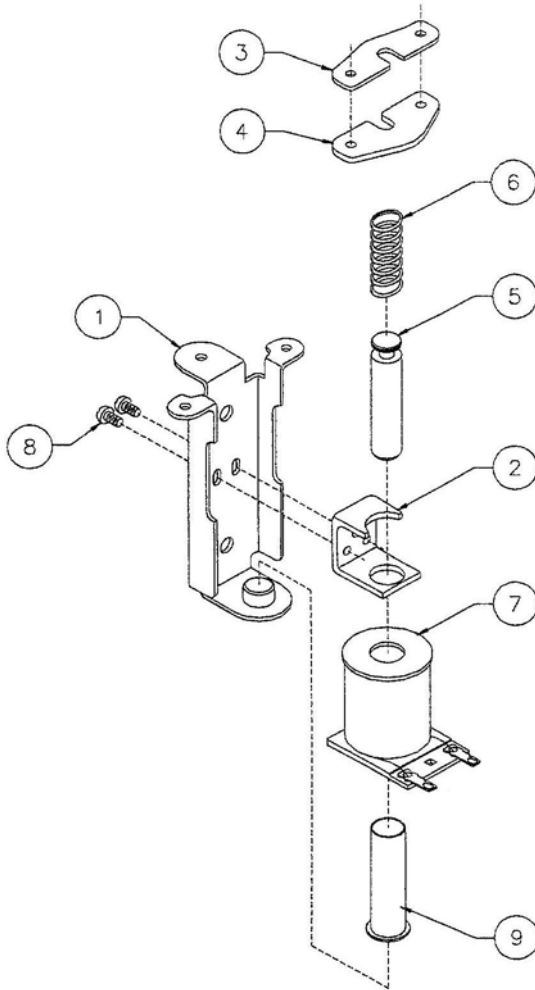
Item	Part Number	Description
1	04-10888	Bracket & Stop Assembly
2	01-1747	Coil Retaining Bracket
3	01-5492	Armature Link, Steel
4	01-5493	Armature Link, Bakeline
5	02-3406-1	Coil Plunger
6	10-326	Armature Spring
7	AE-26-1200	Coil Assembly
8	4006-01017-04	Mach. Screw, 6-32 x *1/4"*
9	03-7066	Coil Tubing

Associated   Parts:
(Not Shown)

10	B-12030-2	Leaf Switch Assembly
a)	A-16443	Switch & Diode Assembly
b)	01-1168	Switch Mounting Bracket
c)	01-3670	Switch Plate
d)	03-7395	Switch Actuator
e)	4005-01003-12	Mach. Screw, 5-40 x 3/4"
f)	4405-01117-00	Nut 5-40 Hex.

2-14

PIN-SUB-A21970
Popper Assembly (Right)
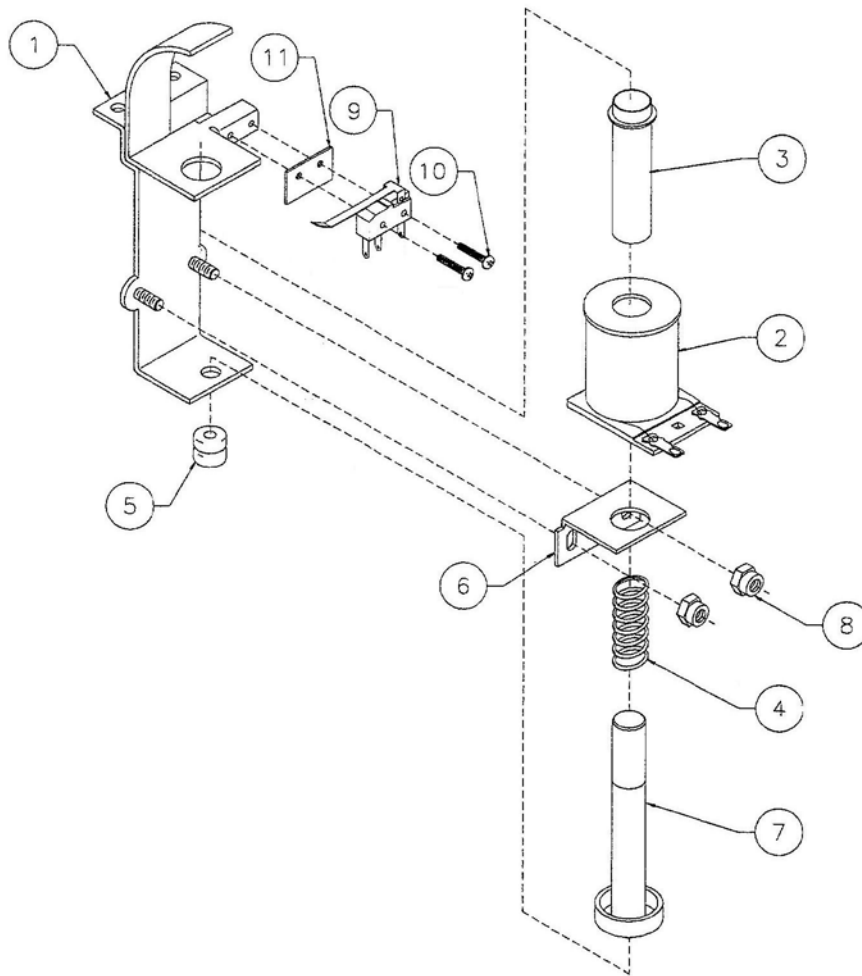
Item	Part Number	Description
1	04-10948.1	Popper Bracket
2	AE-27-1200	Coil Assembly
3	03-7067	Coil Tubing
4	10-135	Solenoid Spring
5	23-6420	Rubber Grommet
6	01-9784	Coil Bracket
7	A-17767	Bell Armature Assembly
8	4408-01119-00	Nut #8-32 ESN
9	5647-12693-43	Micro Switch
10	4002-01105-08	Mach. Screw: 2-56 x 1/2"
11	01-8600	Switch Insulator

PIN-SUB-A215531
Auto-Fire Assembly
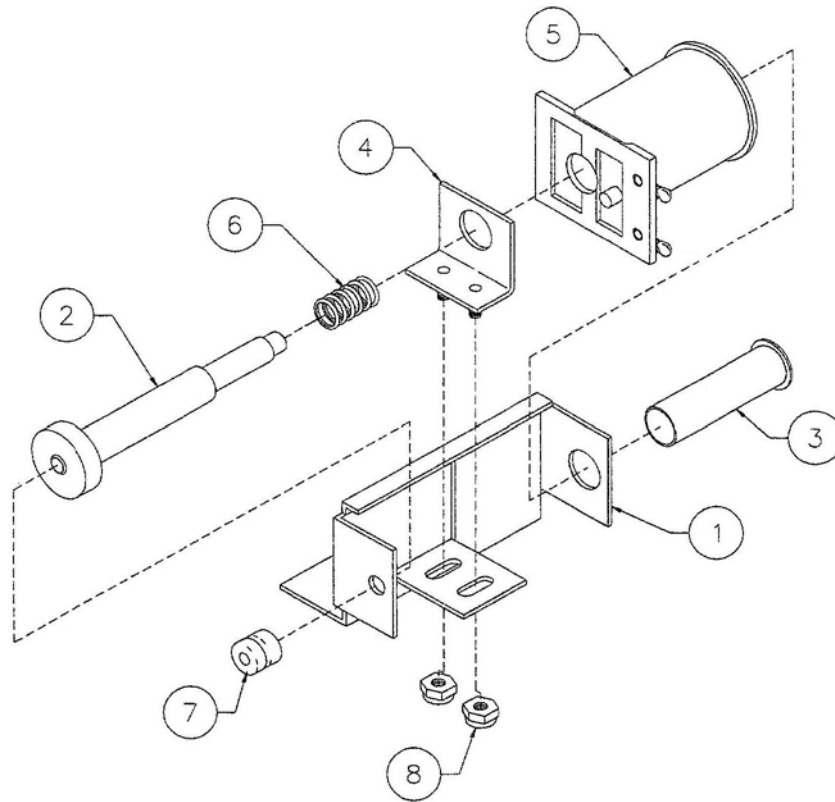
Item	Part Number	Description
1	01-14618	Bracket Assembly
2	A-6306-2	Plunger Assembly
3	03-7067	Coil Tubing
4	04-10322-2	Coil Bracket
5	AE-23-800	Coil Sub-Assembly
6	10-135	Spring
7	23-6420	Rubber Grommet
8	4408-01119-00	Nut 8-32 ESN

PIN-SUB-A177961
Ball Gate Actuator Assembly

Item	Part Number	Description
1	01-12348	Ball Gate Coil Bracket
2	PIN-A-14406	12V Coil Assembly
3	A-11146	Armature Assembly
4	A-6892	Frame & Eyelet Assy.
5	10-120	Spring
6	4701-00003-00	Lockwasher #18 Split
7	4700-00089-00	Flat Washer: 11/64 x 7/16 x 16ga.
8	4008-01021-07	Mach. Screw, 8-32 x *7/16"*
9	10-194	Extension Spring
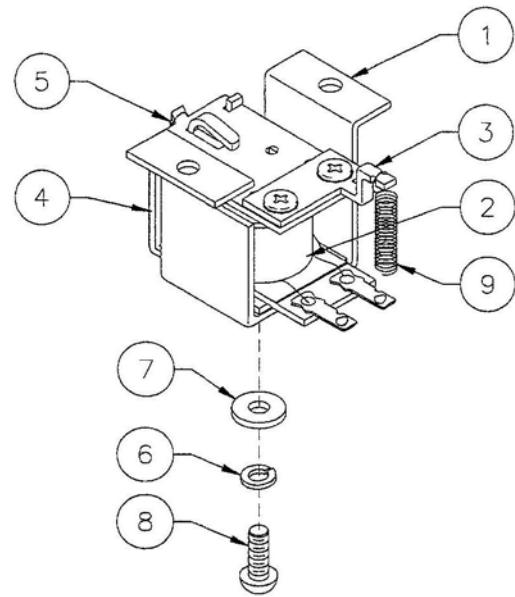
NOTE: MMR uses a 12V coil for the ball gates instead of a 50V coil. Make sure to replace with the correct coil assembly.

PIN-SUB-A217125
Up Down Post Assembly
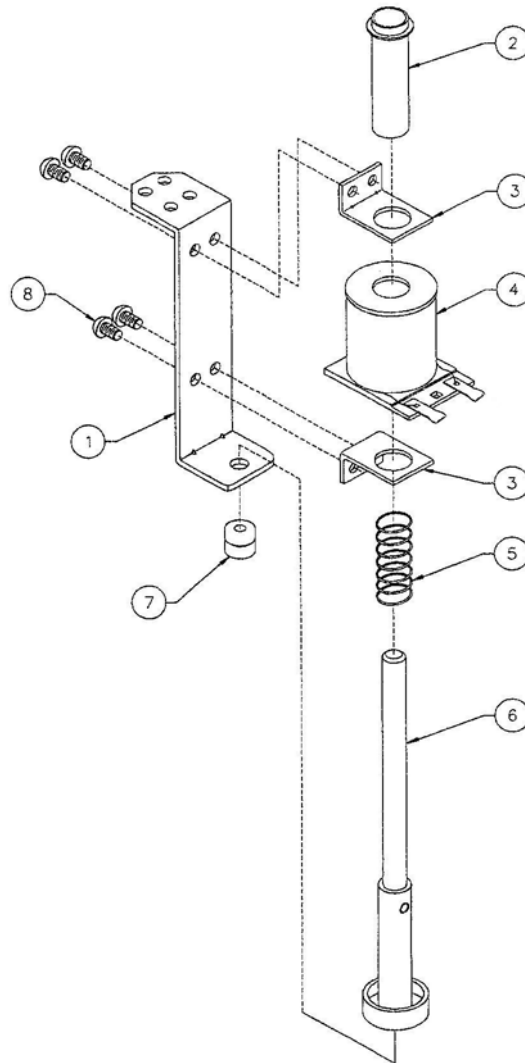
Item	Part Number	Description
1	01-12441	Diverter Post Bracket
2	03-7067-5	Coil Tubing
3	01-8-508-T	Coil Retainer Bracket
4	AE-27-1200	Coil Assembly
5	10-135	Spring
6	04-10996	Armature Assembly, Tower
7	23-6420	Rubber Grommet
8	4008-01017-04	Mach. Screw, 8-32 x 1/4"

PIN-SUB-A22027
Popper Assembly
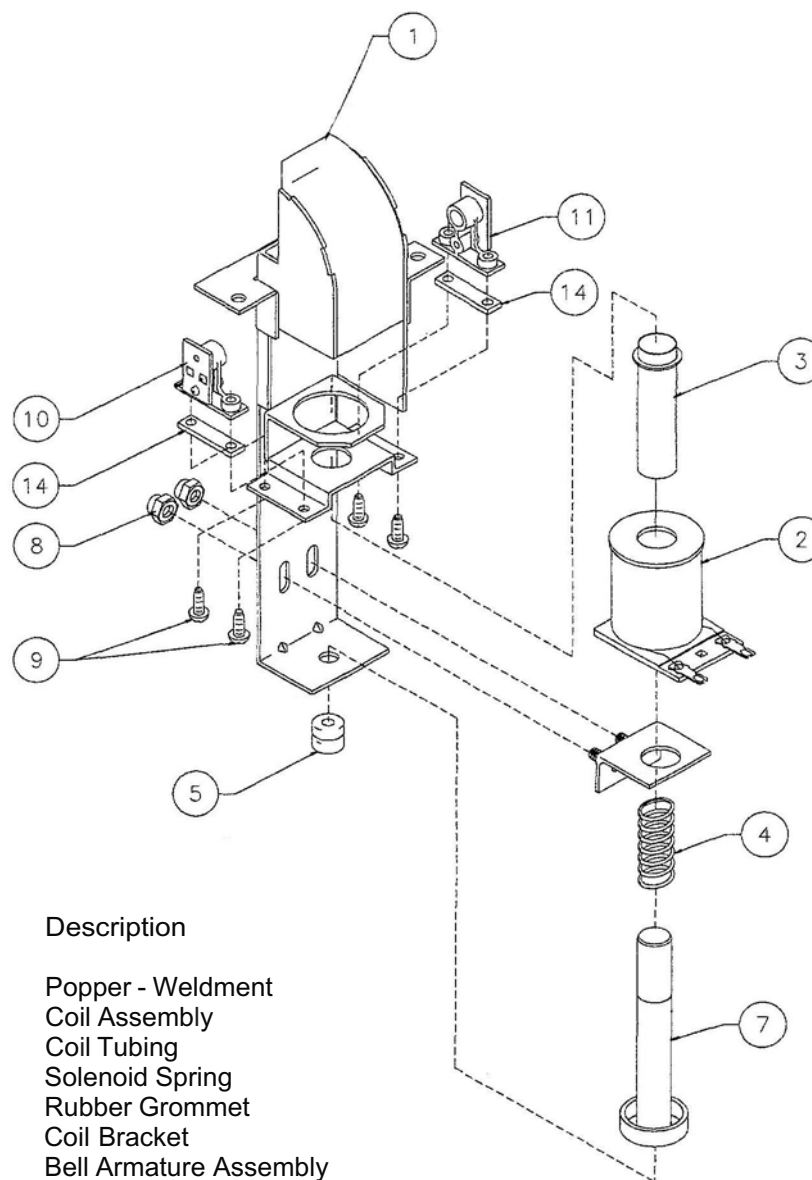
Item	Part Number	Description
1	04-10979	Popper - Weldment
2	AE-26-1200	Coil Assembly
3	03-7067	Coil Tubing
4	10-135	Solenoid Spring
5	23-6420	Rubber Grommet
6	04-10322-2	Coil Bracket
7	A-17767	Bell Armature Assembly
8	4408-01119-00	Nut, 8-32ESN
9	4106-01013-06	Sh. Metal Screw, #6 x 3/8"
10	A-16908	LED Assembly, RTV
11	A-16909	Photo Trans. Assembly, RTV
12	H-17609-5	Gen. Opto Cable
13	H-19523	Cable Assembly
14	03-9832	Playfield Plastic Spacer

MM-SUB-A22034
Troll Assembly
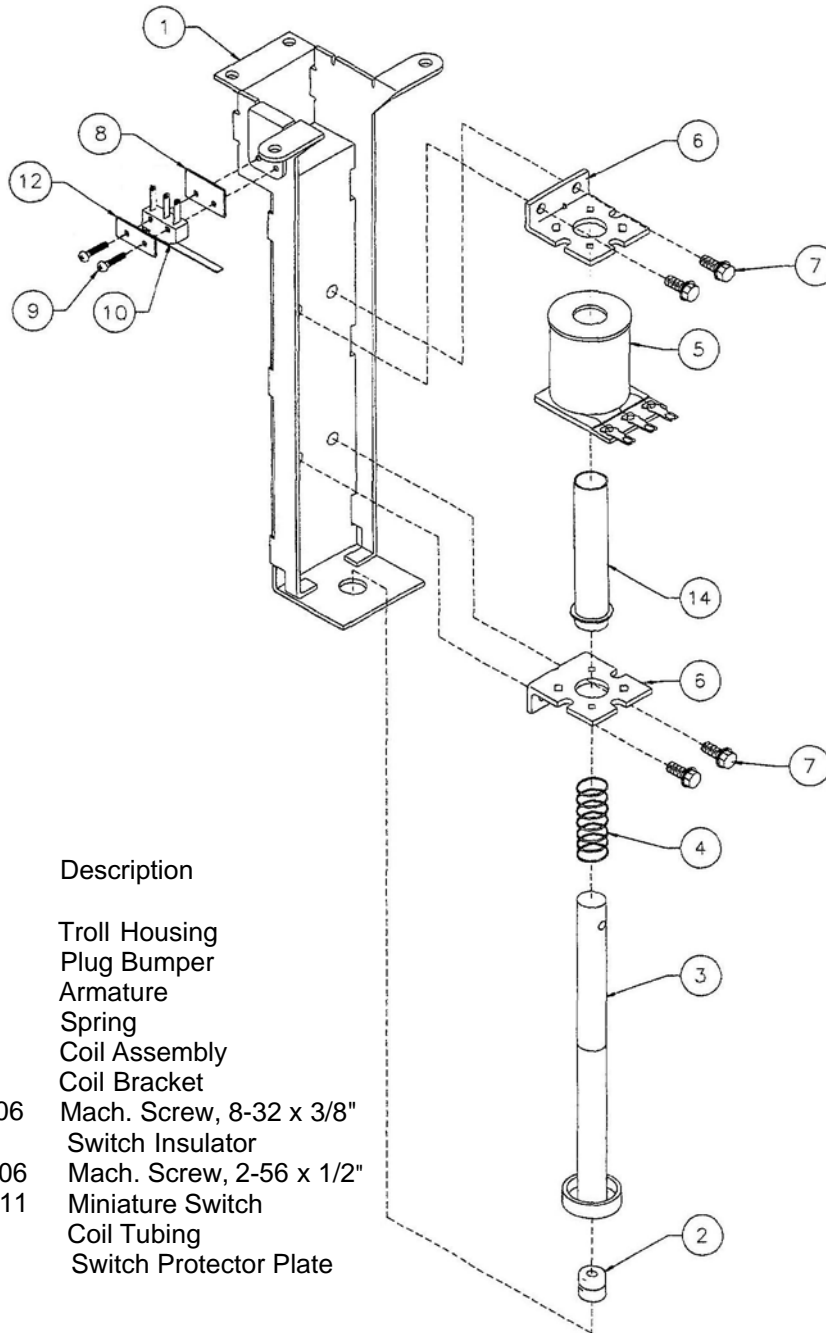
Item	Part Number	Description
1	04-10982.1	Troll Housing
2	23-6420	Plug Bumper
3	04-10019	Armature
4	10-128	Spring
5	FL-11753	Coil Assembly
6	01-7695-1	Coil Bracket
7	4008-01168-06	Mach. Screw, 8-32 x 3/8"
8	01-8600	Switch Insulator
9	4002-01105-06	Mach. Screw, 2-56 x 1/2"
10	5647-12693-11	Miniature Switch
11	03-7067-6	Coil Tubing
12	01-15218	Switch Protector Plate

MM-SUB-A21718
Castle Actuator Assembly
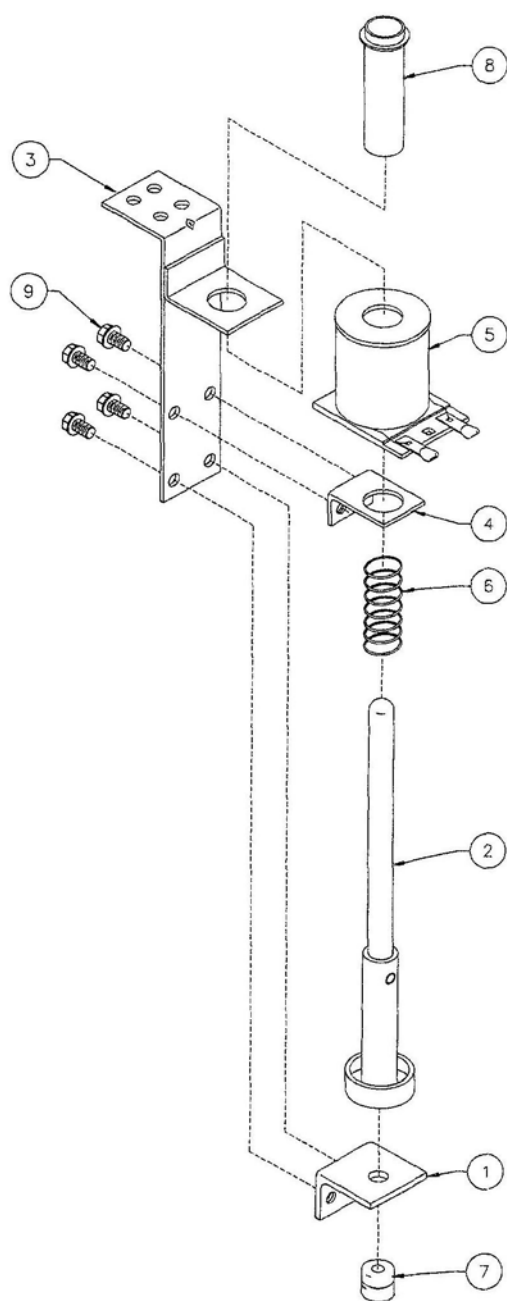
Item	Part Number	Description
1	01-14172	Coil Stop Bracket
2	04-10878.3	Armature Assembly
3	04-10933	Castle Actuator Bracket
4	01-8-508-T	Coil Retainer Bracket
5	AE-26-1500	Coil Assembly
6	10-135	Plunger Spring
7	23-6420	Rubber Grommet
8	03-7067	Coil Tubing
9	4008-01168-04	Mach. Screw: 8-32 x 1/4"

MM-SUB-A21744
Troll Carriage Assembly
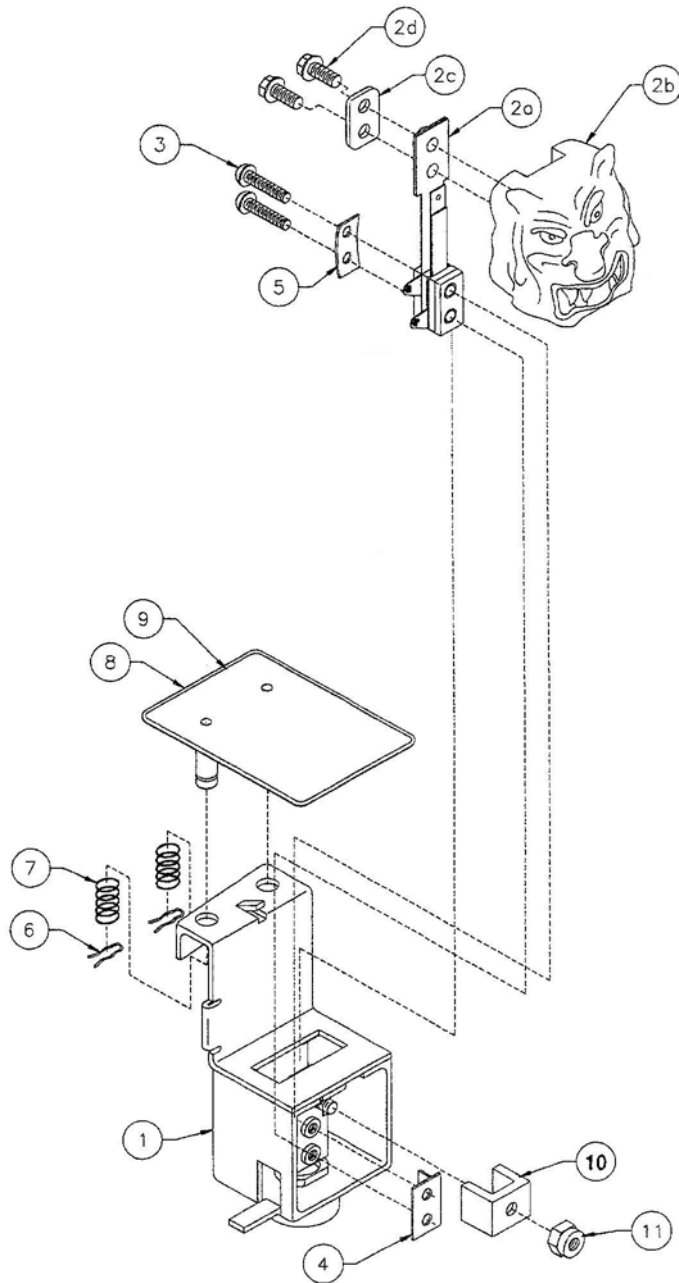
Item	Part Number	Description
1	04-10763.1	Troll Carriage
2	A-21724	Troll Target Assembly
a)	A-21743	Troll Target Switch Assy.
b)	31-2824	Troll Head
c)	01-14672	Washer-Troll
d)	4008-01168-06	Mach. Screw: 8-32 x 3/8"
3	4006-01003-10	Mach. Screw, 6-32 x 5/8"
4	01-14680.1	Troll Switch Bracket Assy.-Guard
5	01-3670	Curved Switch Plate
6	12-6227	Hairpin Clip
7	10-392-1	Spring
8	04-10761.2	Troll Flap
9	31-2840-2A	Decal
10	03-9808	Troll Locator
11	4408-01119-00	Nut 8-32 ESNA

MM-SUB-A21706
Diverter Assembly
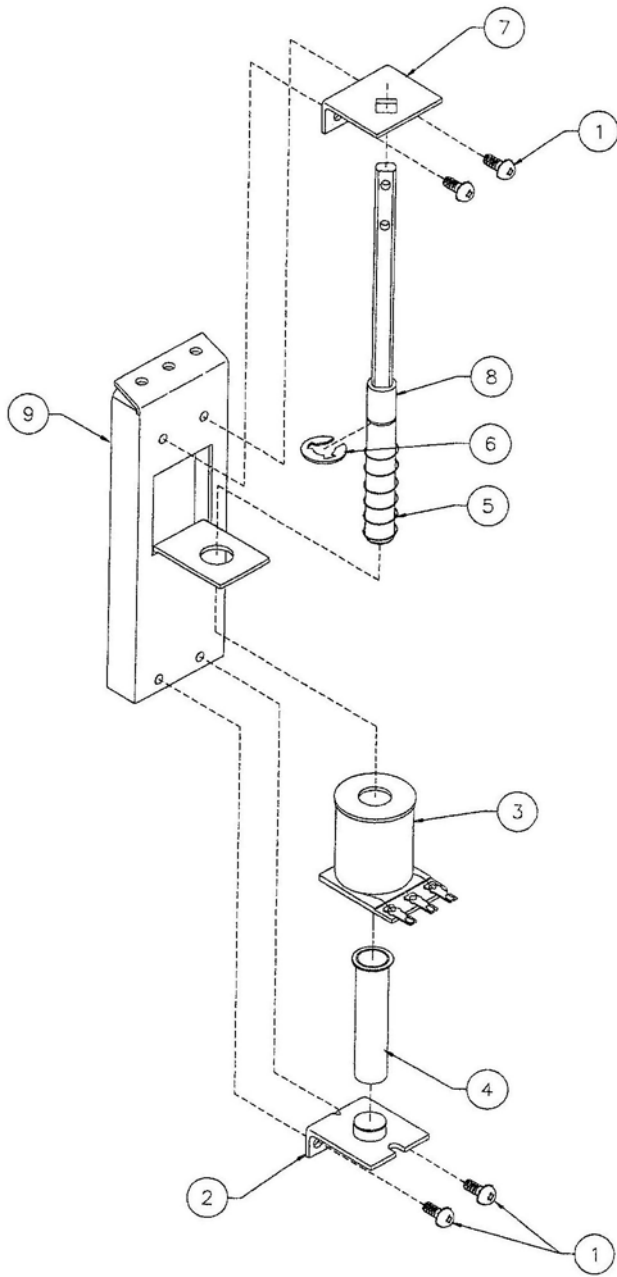
Item	Part Number	Description
1	4008-01017-06	Mach. Screw, 8-32 x 3/8"
2	A-12390	Coil Stop Bracket
3	A-20099	Coil Assembly
4	03-7066-5	Coil Tubing, 2-7/8"
5	10-437	Spring
6	20-8712-43	E-Ring
7	01-14655	Diverter Bracket
8	02-5298	Diverter Shaft
9	04-10748	Diverter Main Bracket

PIN-04-10346
Tilt Mechanism Assembly

PIN-04-10346
TILT MECHANISM ASSY.

Associated Assemblies:

PIN-20-6502A
PLUMB BOB

PIN-20-10289
FASTENER
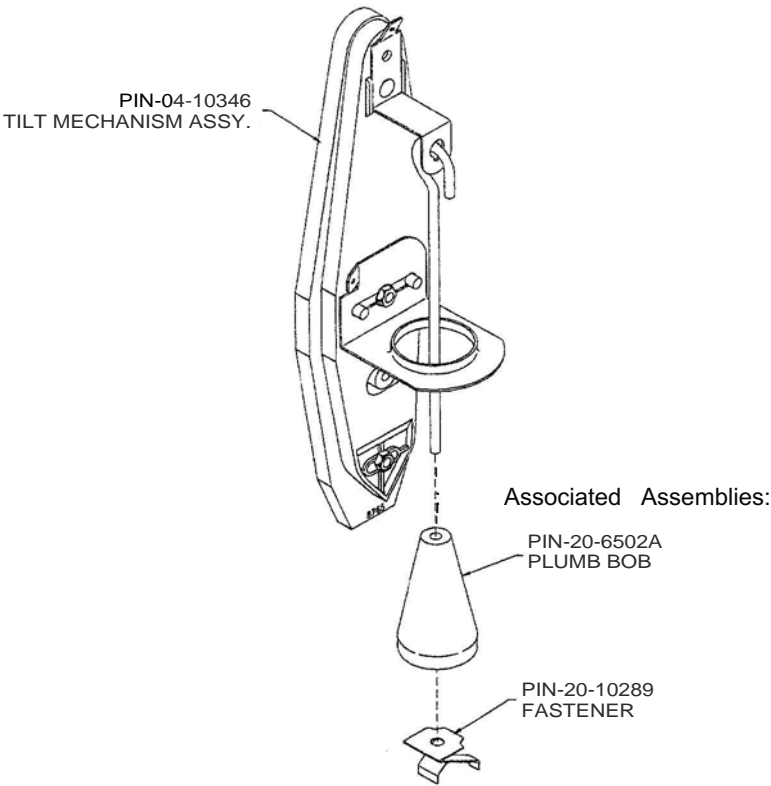
PIN-SUB-B106861
Knocker Assembly
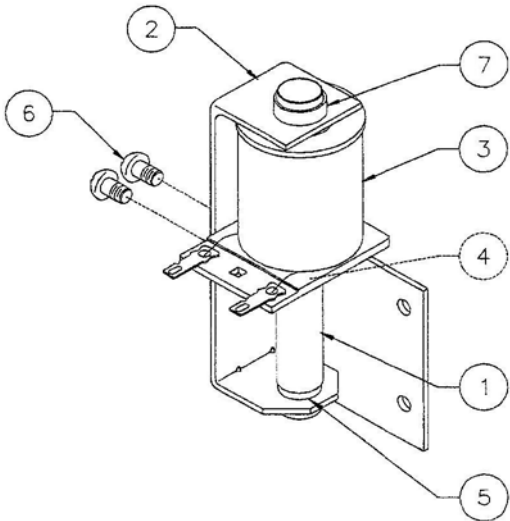
Item	Part Number	Description
1	A-5387	Coil Plunger Assembly
2	01-11273	Mounting Bracket Assembly
3	AE-23-800	Coil Sub-Assembly
4	01-8-508-T	Coil Retaining Bracket
5	23-6420	Rubber Grommet
6	40008-01017-04	Mach. Screw, 8-32 x 1/4"
7	03-7067-5	Coil Tubing

MM-SUB-A21728
Exploding Castle Assembly
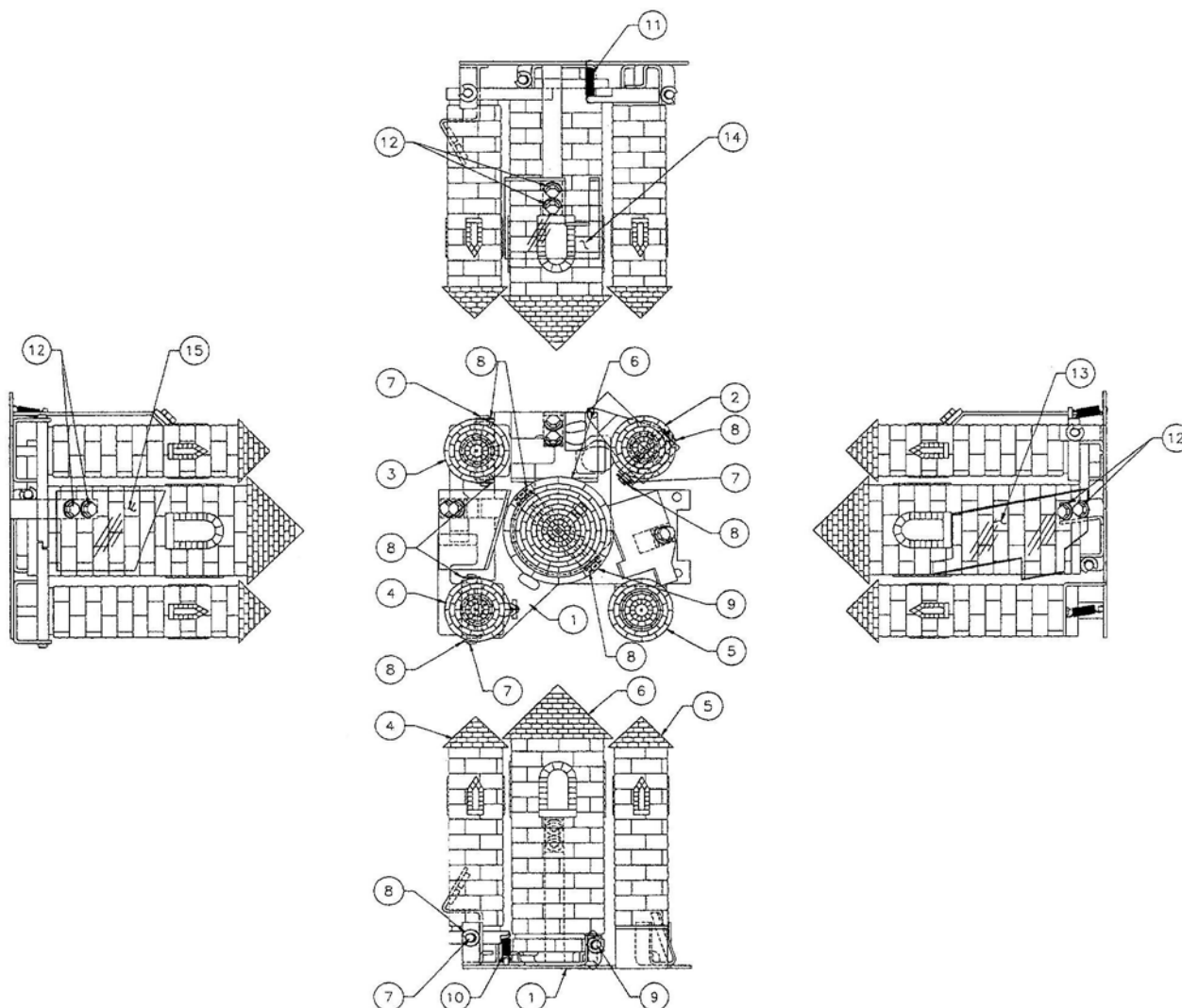
Item	Part Number	Description
1	04-10879.2	Bracket-Castle
2	04-10942.2	Up/Right Tower Sub-Assembly
3	04-10941.2	Up/Left Tower Sub-Assembly
4	04-10943.2	Lo/Left Tower Sub Assembly
5	31-2827	Tower
6	04-10944.2	Center Tower Sub-Assembly
7	02-5309.1	Pivot Shaft Short
8	20-8712-18	E-Ring: 3/16" Shaft
9	02-5310.1	Pivot Shaft Long
10	10-520	Spring
11	10-521	Spring (Red)
12	4008-01168-06	Mach. Screw: #8-32 x 3/8"
13	31-2949-3	Playfield Plastic
14	31-2949-2	Playfield Plastic
15	31-2949-1	Playfield Plastic

MM-SUB-A21755
Castle Assembly

REAR VIEW

FRONT VIEW
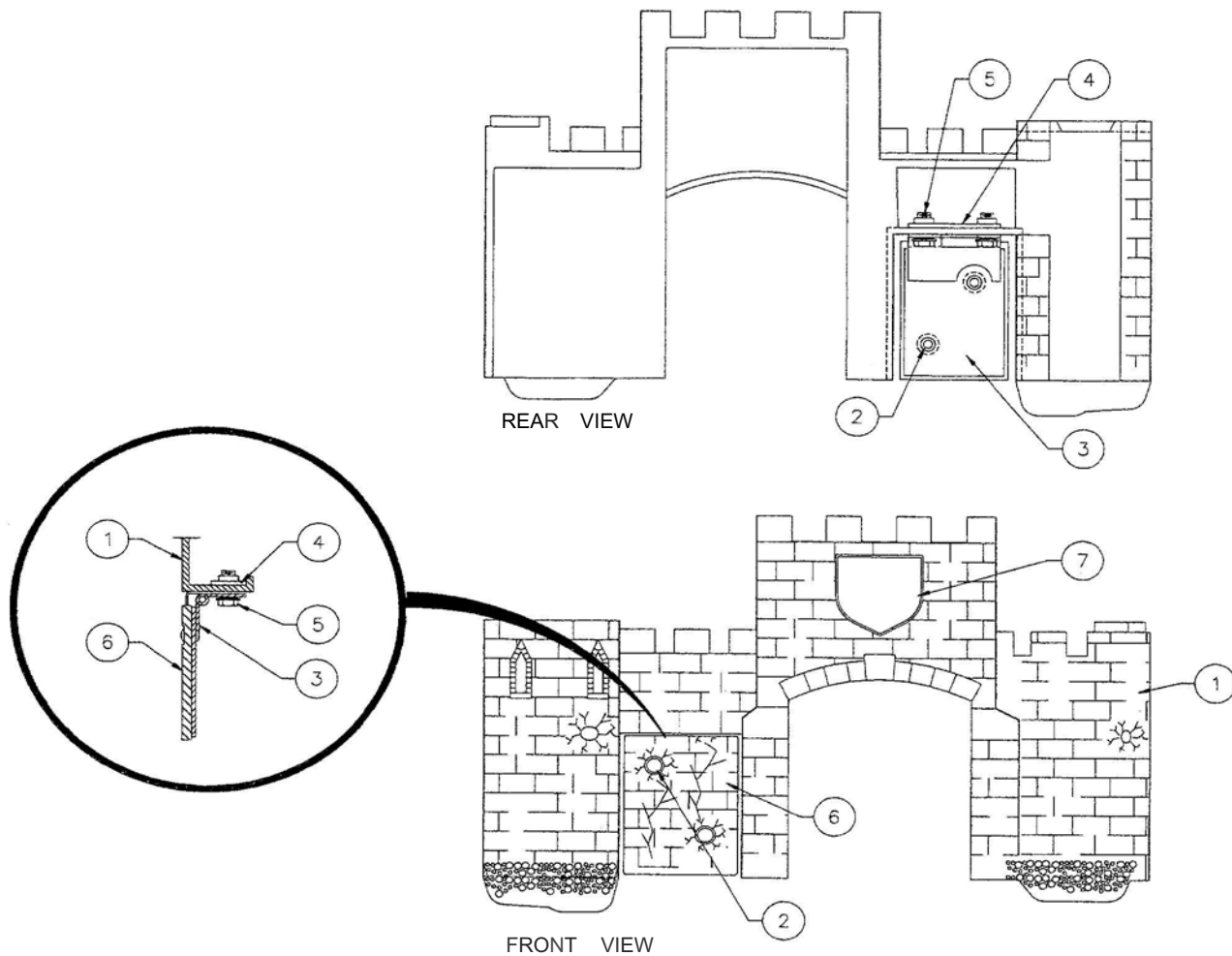
Item	Part Number	Description
1	31-2826-4A	Castle Front
2	07-6697-8	Rivet-Black Oval Hd.
3	04-10889.3	Hinge Flap Sub-Assembly
4	04-10897	Washer Flap
5	4008-01168-06	Mach. Screw, 8-32 x 3/8"
6	31-2826-3B	Hinge - Flap
7	31-2841-2	Decal

MM-SUB-A22033
Drawbridge Gate Assembly

Item	Part Number	Description
1	04-10989	Drawbridge Gate Bracket
2	04-10773.1	Gate-Castle
3	04-10019	Armature Assembly
4	04-10771	Pivot Bracket
5	A-22036	Switch/Bracket Assembly
6	04-10986	Link 2
7	04-10985	Link 1
8	A-21722	Bridge Sub-Assembly
9	01-14748	Linkage
10	03-9219-1	Gear - Cluster
11	04-10988.1	Gear & Shaft Assembly
12	03-9222	Pinion Gear
13	14-8015	Motor - Gear Box
14	FSM-M02-PPH12C	Metric Screw,M2.6 x 6mm
15	4700-00005-00	Flat Washer: 9/64 x 7/16 x 21ga.
16	02-5324	Gear Shaft
17	4008-01157-06	Mach. Screw,8-32 x 3/8"
18	20-8790	Nyliner Bearing
19	4700-00072-00	Flat Washer, 17/64 x 1/2 x 21ga
20	20-8712-12	E-Ring, 1/8" Shaft
21	20-8712-25	E-Ring, 1/4" Shaft
22	A-16908	Opto LED Assembly
23	A-16909	Opto Photo/Transistor Assembly
24	4404-01119-00	Nut 4-40 ESN
25	4010-01196-12	SS 10-32x 3/4"
26	10-128	Spring Kicker
27	A-20099	Coil Assembly
28	01-7695-1	Solenoid Bracket
29	03-7067-6	Coil Tubing
30	02-5161	Screw Pin Scoop
31	4008-01083-04	SS 8-32 x 1/4"
32	MM-CBL-CBPOPTO	Opto Cable
33	MM-CBL-CSTLGAT	Castle Gate Coil Cable
34	MM-CBL-DBGMOTR	Drawbridge Motor Cable
35	4008-01157-04	Mach. Screw,8-32 x 3/8"
36	03-9834-1	Spacer, 31/64" Long
37	03-9834-2	Spacer,1/4"Long
38	20-8712-15	E-Ring, 5/32" Shaft
39	20-8712-18	E-Ring, 3/16" Shaft

MM-SUB-A22033
Drawbridge Gate Assembly

SECTION A-A

SECTION B-B
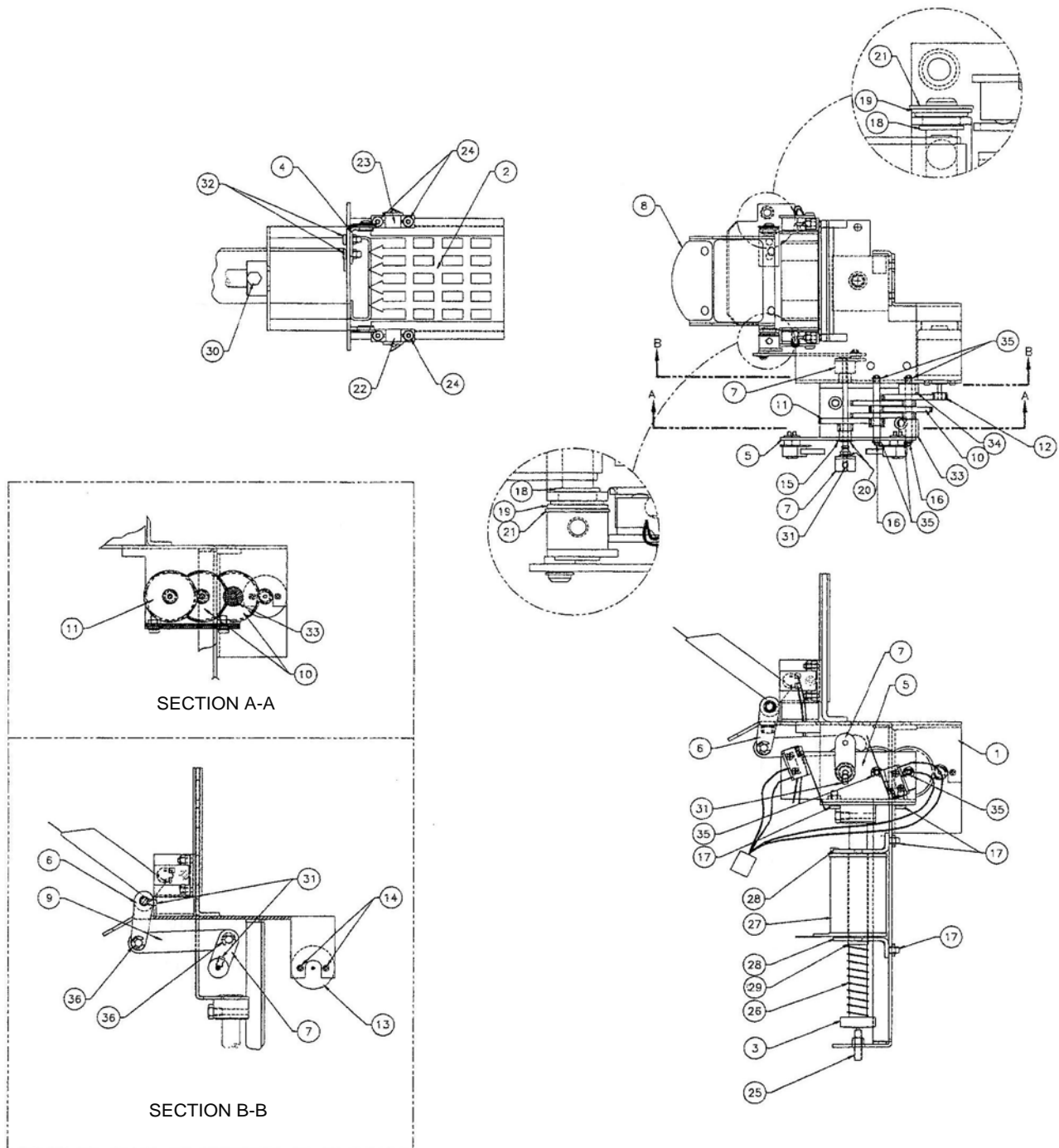
PIN-SUB-A20871
Power Interface Assembly
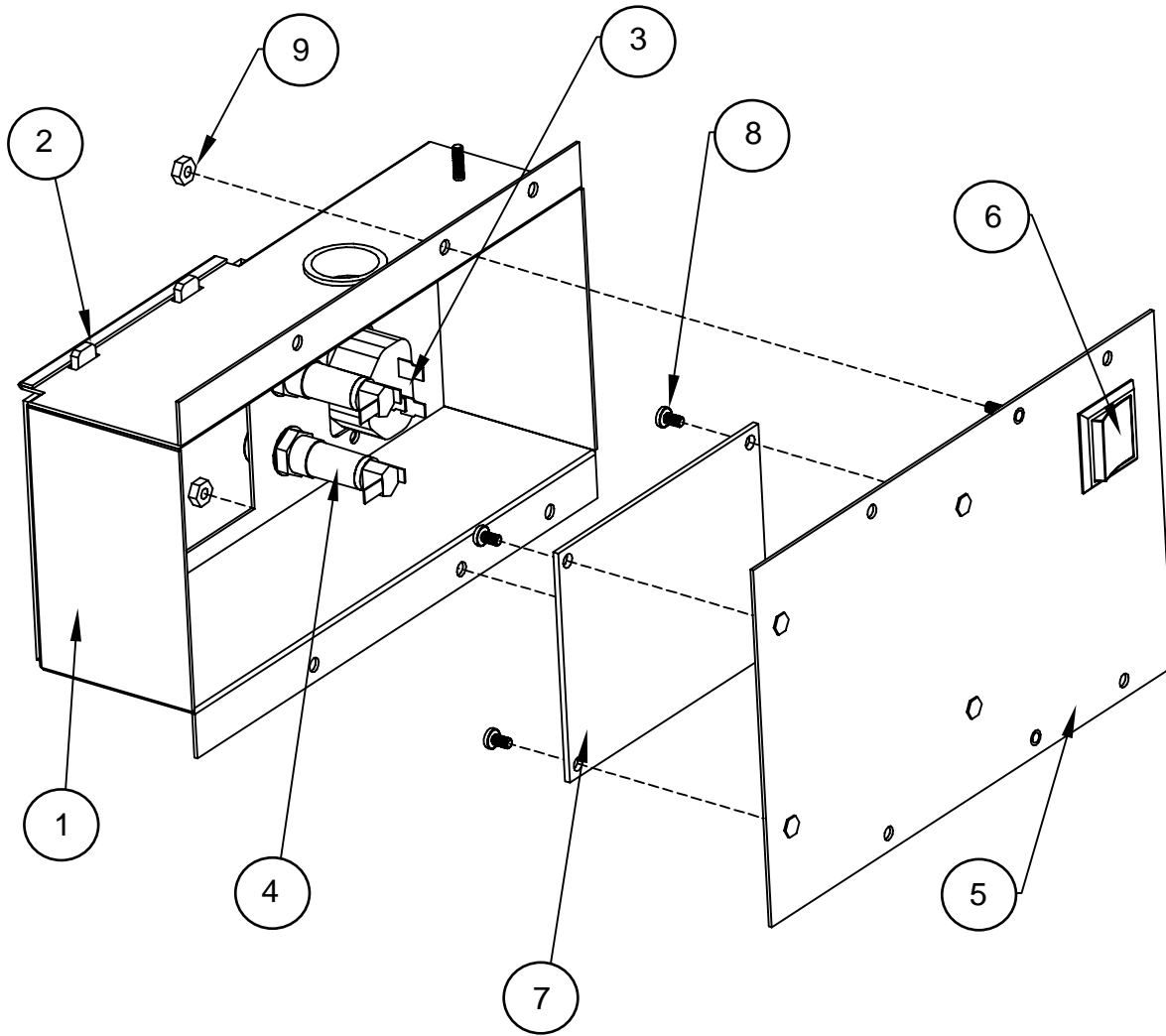
Item	Part Number	Description
1	PIN-04-10292	Power Box
2	MM-PLS-ACWINDO	Power Box Window
3	000-ELE-IECOUTL	IEC Outlet
4	000-ELE-PNLFUSE	Panel Mount Fuse Holder
a)	000-FUS-5M5ASLO	Bell Fuse (5ST 5-R), 5A Slow Blow
5	PIN-01-12294	Switch Mounting Plate
6	000-SWC-ALCO16A	Switch, 16A, Double Pole, Single Throw, Rocker
7	PIN-PCB-POWSPLY	ATI Power Supply Board
8	FSM-063-PPH037C	Machine Screw, 6-32 x 3/8"
9	FNT-063-KEC0000	6-32 Kep Nut (2)

PIN-SUB-A149471
Catapult Unit Assembly
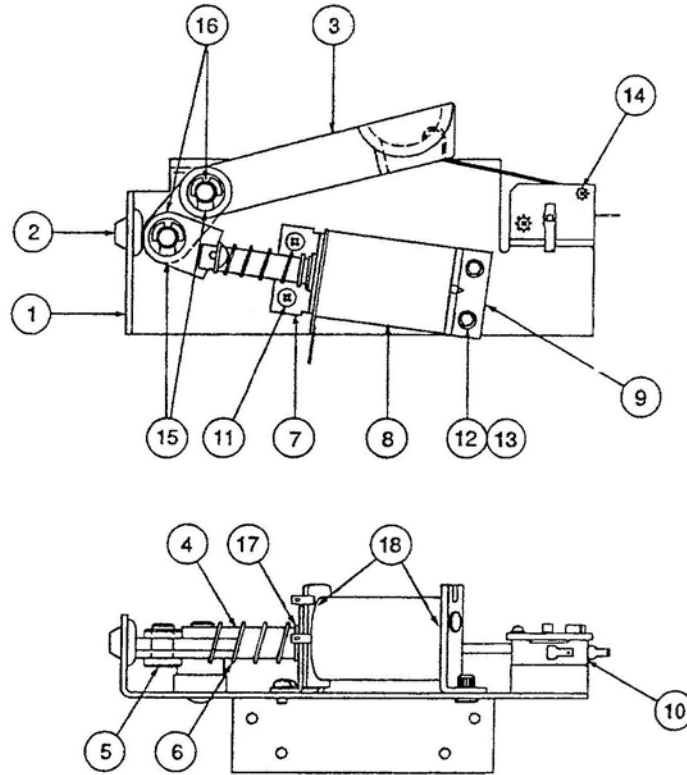
Item	Part Number	Description
1	A-14946	Catapult Bracket Assembly
2	23-6577	Plug Bumper, 5/8"
3	03-8089	Catapult Arm
4	04-10952.1	Plunger Assembly
5	02-4301	Catapult Arm Pin
6	10-135	Thumper Bumper Spring
7	01-8413	Coil Mounting Bracket
8	AL-23-800	Coil Sub-Assembly
9	A-10821	Flipper Stop Bracket Assembly
10	5647-12133-12	Miniature Switch
11	4008-01017-04	Mach. Screw, #8-32 x 1/4"
12	4010-01066-06	Cap Screw, #10-32 x 3/8"
13	4701-00004-00	Lockwasher #10 Split
14	4004-01003-10	Mach. Screw, #4-40 x 5/8"
15	4700-00104-00	FW, 5/16 x 1/2" x 16ga.
16	20-8712-31	Retaining Ring
17	03-7066	Coil Tubing
18	FWG-053-087S001	Wave Washer, 17/32" ID, 7/8" OD

MM-SUB-A21703
Moat Assembly
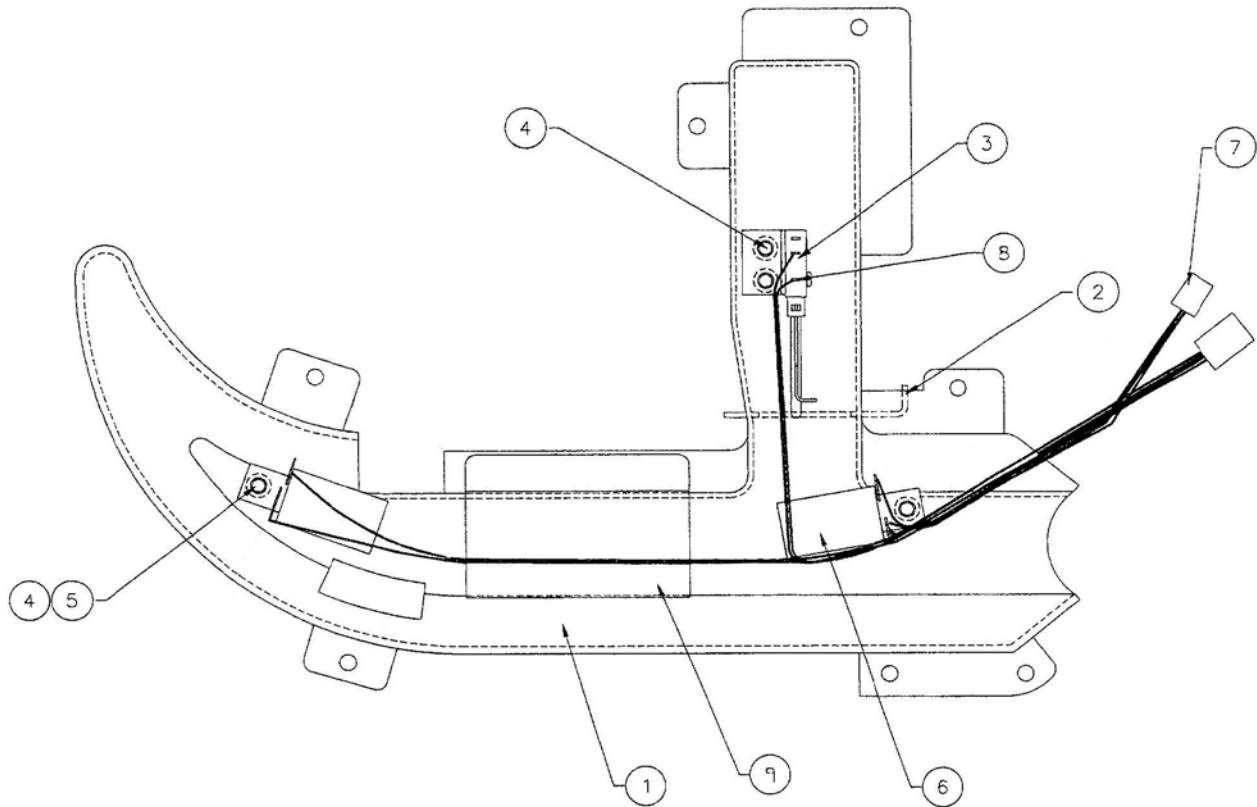
Item	Part Number	Description
1	03-9681.6	Moat
2	12-7380	Wire
3	A-21800	Switch Assembly
4	07-6688-19N	Rivet: 1/8 x 7/32"
5	4700-00003-00	Flat Washer: 1/8 x 9/32 x 21ga.
6	PIN-PCB-MOTFLSH	Moat Flasher
7	MM-CBL-MOTFLSH	Moat Flasher Cable
8	MM-CBL-MOATMSW	Moat Switch Cable
9	03-9804	Moat Mylar

PIN-SUB-SHAKRMO
Shaker Motor Assembly
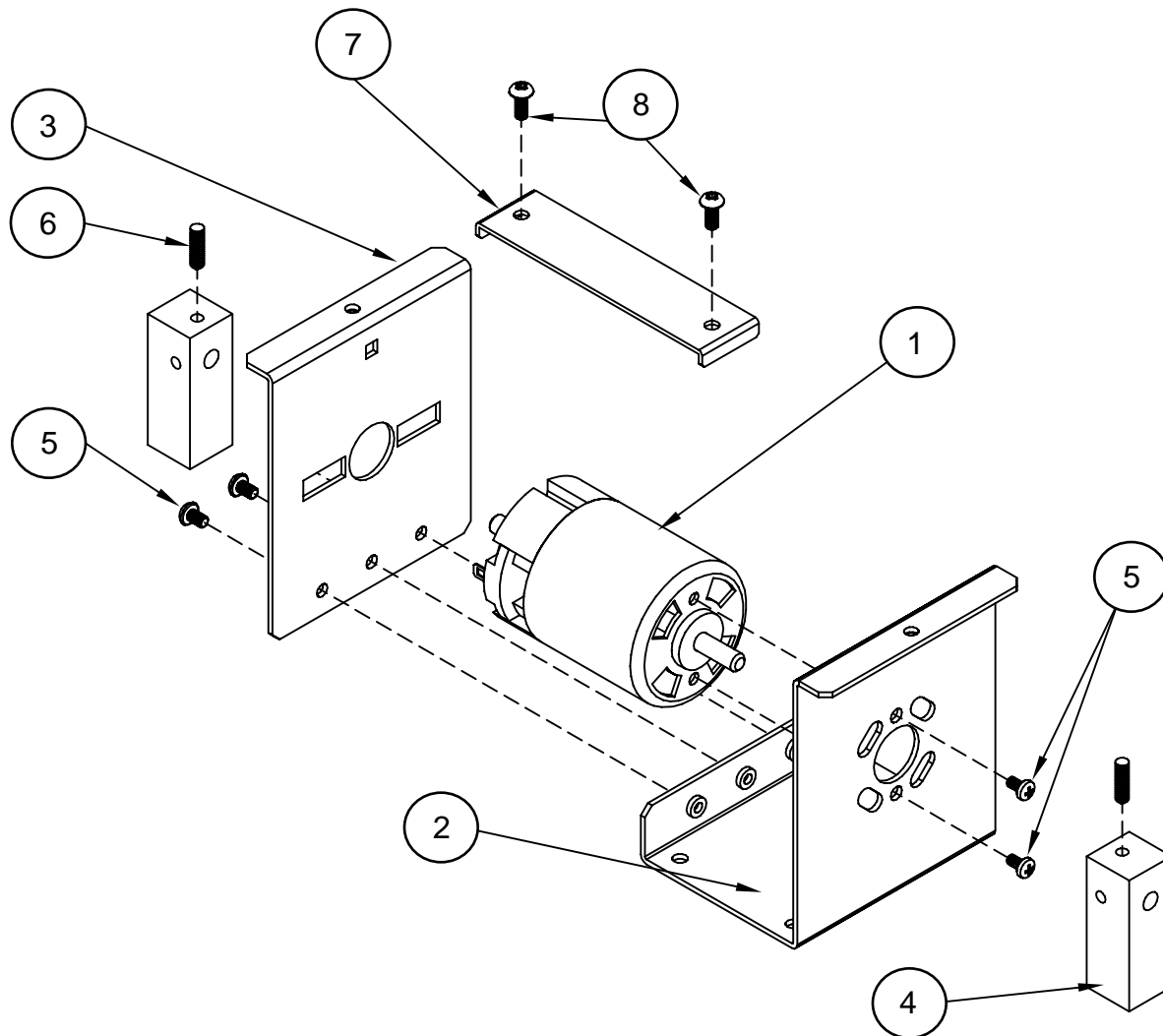
Item	Part Number	Description
1	PIN-MTR-SHAKER	Shaker Motor
2	PIN-MLS-MTRMAIN	Shaker Motor Bracket 1
3	PIN-MLS-MTRSECD	Shaker Motor Bracket 2
4	PIN-MLS-SHKRWHT	Shaker Motor Weight
5	FSM-083-PPH025C	8-32 x 1/4" Phil. Pan Mach. Screw
6	FSM-103-AAS063C	Cone Point Set Screw, 10-32 x 5/8"
7	PIN-MLS-SHKRSUP	Shaker Motor Support Bracket
8	FSM-083-PPH037K	8-32 x 3/8" Phil. Pan, Nylon Patch

Associated Parts:
(Not Shown)

9	PIN-545-524100	Shaker Motor Cover
10	MM-CBL-SHAKERS	Shaker Motor Cable
11	000-PLM-25CLMP	1/4" Cable Clamp
12	FNT-083-ESNA000	Nut 8-32 ESNA

Lower Playfield Parts

Item	Part Number	Description
1	PIN-SUB-A199631	Ball Trough Assembly Complete
2	PIN-SUB-A215531	Auto Fire Assembly
3	PIN-A-15849R2	Right Flipper Assembly
4	PIN-B-9362R3	Coil and Bracket Assembly - Right
5	MM-PCB-PLEDL81	Lamp 81 Board
6	MM-PCB-PLAYFLD	Medieval Madness Playfield PCB
7	PIN-PCB-TRUFLSH	Through Playfield Flasher Board (3)
8	PIN-SUB-A94152	Jet Bumper Coil Assembly (3)
9	MM-PCB-PLEDL78A	Lamp 78A Board
10	MM-SUB-A21706	Divertor Assembly
11	PIN-SUB-A217125	Up Down Post Assembly
12	MM-PCB-PLEDL55	Lamp 55 and 56 Board
13	PIN-SUB-A177961	Ball Gate Actuator Assembly (2)
14	MM-PCB-MOTRDRV	Motor Driver Board
15	MM-SUB-A22033	Drawbridge/Gate Assembly
16	MM-PCB-PLEDL78	Lamp 78 Board
17	PIN-SUB-A22027	Left Popper Assembly
18	MM-SUB-A21703	Moat Assembly
19	MM-SUB-A22034	Troll Assembly (2)
20	PIN-PCB-SOLDRV1	Solenoid Driver Board (3)
21	PIN-SUB-A149471	Catapult Assembly
22	MM-PCB-PLEDL84	Lamp 84 Board
23	PIN-B-9362L2	Coil and Bracket Assembly
24	PIN-A-15849L2	Left Flipper Assembly
25	MM-PCB-PLEDL74	Lamp 74 Board
26	MM-PCB-PLEDL86	Lamp 86 Board
27	PIN-01-11781	Support Bracket (2)
28	PIN-A-1774911	Slide Playfield Assembly Right
29	PIN-A-1774912	Slide Playfield Assembly Left

Lower Playfield Parts
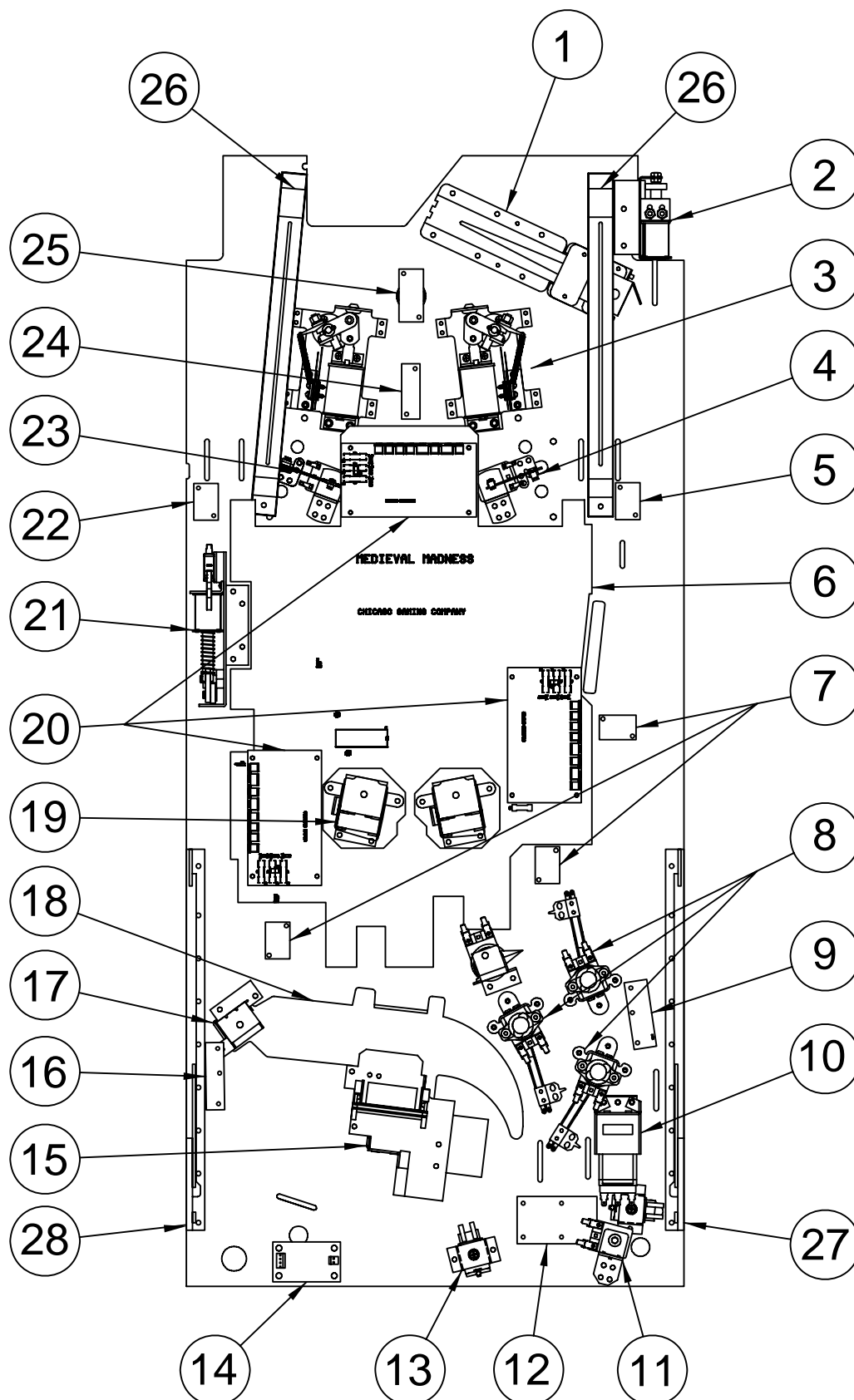
Underside of playfield, viewed in raised position.

Upper Playfield Parts

Item No.	Part number	Description
1	A-21553-1	Auto Fire Plunger Assembly
2a	A-21805-15	Right Flipper Ball Guide
2b	A-15849-R-2	Flipper Coil & Bracket Assembly
2c	20-10110-5	Flipper Bat & Shaft - White
3	A-21697	Right Ramp Assembly
4	A-21576-4	Red Standup Targets
5a	A-22034	Troll Assembly
5b	A-21744	Troll Carriage Assembly
5c	31-2824	Troll Head
6	31-2818	Dragon Body
7	A-18530-6	Yellow Troll Standup Targets
8	A-21777	Dragon Switch Gate Assembly
9	31-2819	Dragon Wings
10	A-21970	Right Troll Eject Popper Assembly
11	A-21714	Gate Assembly w/Spring
12a	A-94-15-2	Jet Bumper Coil Assembly
12b	B-94-14-6	Jet Bumper Assembly
13	A-21706	Tower Diverter Assembly
14	A-21702	Right Plastic Ramp Assembly
15a	A-17797-1	Right Gate Assembly
15b	PIN-SUB-A177961	Ball Gate Actuator
16	A-21712-5	Up/Down Tower Lock Post
17a	A-17797-1	Left Ball Gate Assembly
17b	PIN-SUB-A177961	Ball Gate Actuator
18a	A-21718	Castle Actuator Assembly
18b	A-21728	Exploding Castle Assembly
19	A-21755	Castle Assembly
20	A-22033	Drawbridge/Gate Assembly
21	A-21703	Moat Assembly
22	A-21701	Left Plastic Ramp Assembly
23	A-21799	Switch Gate Assembly
24	A-21990-4	Red Catapult Standup Target
25	A-21751	Catapult Ramp
26	12-7377.1	Left Wire Ramp
27a	A-21805-15	Right Flipper Ball Guide
27b	A-15849-R-2	Flipper Coil & Bracket Assembly
27c	20-10110-5	Flipper Bat & Shaft - White
28a	A-17811	Kicker Assembly
28b	B-9362-L-2	Coil & Bracket Assembly
29a	A-17811	Kicker Assembly
29b	B-9362-R-3	Coil & Bracket Assembly
30	A-22027	Popper
31a	A-9415-3	Jet Bumper Coil Assembly
31b	B-9414-6	Jet Bumper Assembly
32	A-21750	Back Panel Assembly

Not Shown:		
	MM-SUB-3128203	Bottom Arch Assembly
	MM-31-28203	Bottom Arch, Blank
	PIN-A-1426513WS	Receptacle & Socket, Clear
	A-19514	Chrome Leg Assembly
	03-8633	Level Mount
	08-7028-T	Playfield Glass
	08-7377	Leg Adjuster Leveler
	20-6500	Steel Balls (4)
	20-6502-A	Plumb Bob
	20-9691	Level
	MM-ART-BACKBOX	Backglass Translite
	MM-50059-PL	Screened Hardcoat Playfield

Upper Playfield Parts
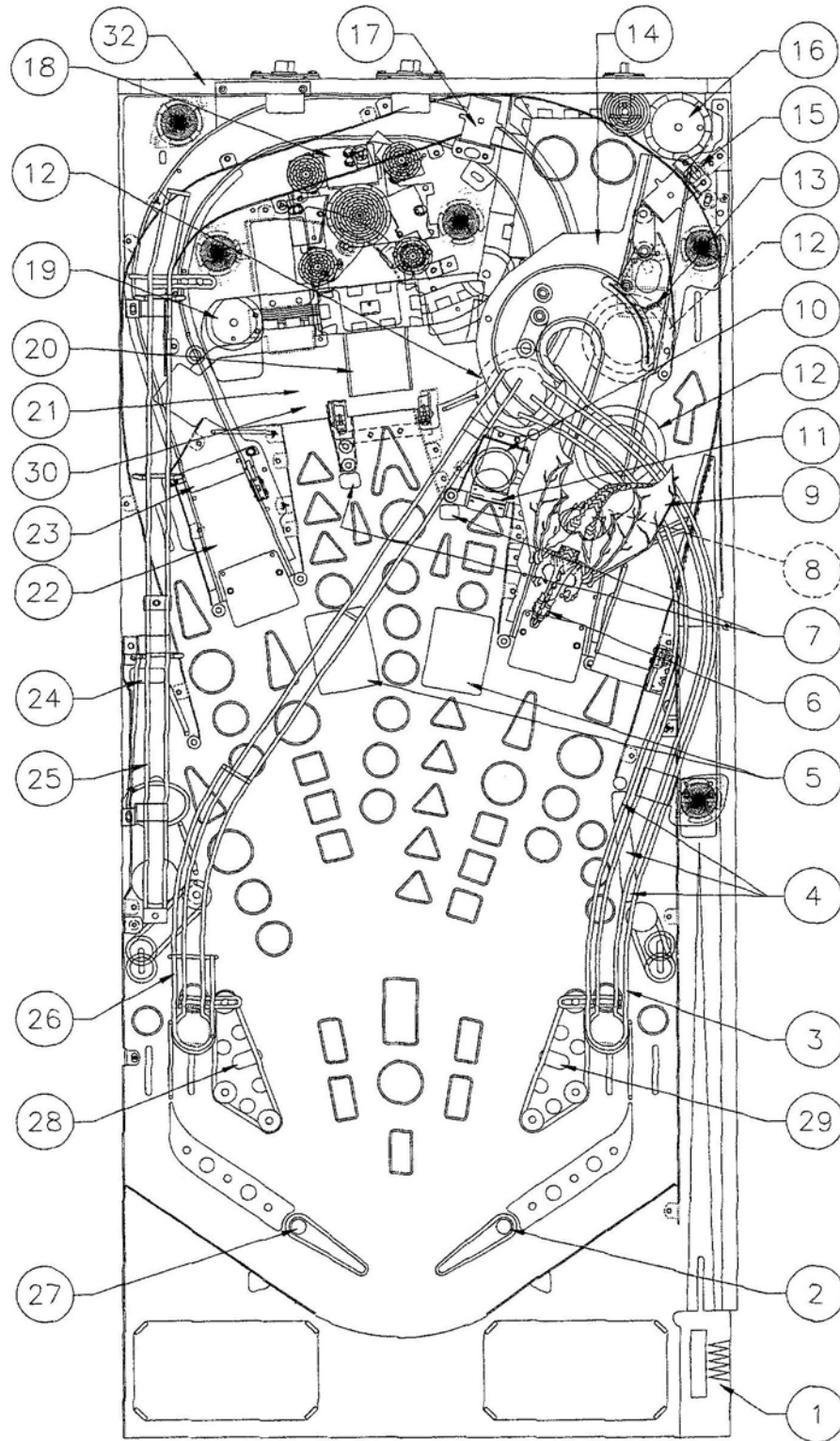
LAMP LOCATIONS

Item Number	Lamp Assembly Part Number	Description
11	MM-PCB-PLAYFLD	RIGHT BANK TOP
12	MM-PCB-PLAYFLD	RIGHT BANK MIDDLE
13	MM-PCB-PLAYFLD	RIGHT BANK BOTTOM
14	MM-PCB-PLAYFLD	RIGHT RAMP JACKPOT
15	MM-PCB-PLAYFLD	SAVE THE DAMSEL!(2)
16	MM-PCB-PLAYFLD	DRAGON DEATH
17	MM-PCB-PLAYFLD	DRAGON SNACK
18	MM-PCB-PLAYFLD	DRAGON BREATH
21	MM-PCB-PLAYFLD	RIGHT LOOP JACKPOT
22	MM-PCB-PLAYFLD	RIGHT JOUST VICTORY!
23	MM-PCB-PLAYFLD	RIGHT CLASH!
24	MM-PCB-PLAYFLD	RIGHT CHARGE!
25	MM-PCB-PLAYFLD	PATRON OF THE PEASANTS
26	MM-PCB-PLAYFLD	CATAPULT ACE
27	MM-PCB-PLAYFLD	JOUST CHAMPION
28	MM-PCB-PLAYFLD	CASTLE CRUSHER
31	MM-PCB-PLAYFLD	TROLLS!
32	MM-PCB-PLAYFLD	EXTRA BALL
33	MM-PCB-PLAYFLD	MERLIN'S MAGIC
34	MM-PCB-PLAYFLD	TROLL MADNESS
35	MM-PCB-PLAYFLD	DAMSEL MADNESS
36	MM-PCB-PLAYFLD	PEASANT MADNESS
37	MM-PCB-PLAYFLD	CATAPULT MADNESS
38	MM-PCB-PLAYFLD	JOUST MADNESS
41	MM-PCB-PLAYFLD	LEFT LOOP JACKPOT
42	MM-PCB-PLAYFLD	LEFT JOUST VICTORY!
43	MM-PCB-PLAYFLD	LEFT CLASH!
44	MM-PCB-PLAYFLD	LEFT CHARGE!
45	MM-PCB-PLAYFLD	CATAPULT JACKPOT
46	MM-PCB-PLAYFLD	CATAPULT SLAM!
47	MM-PCB-PLAYFLD	BAM!
48	MM-PCB-PLAYFLD	WAM!
51	MM-PCB-PLAYFLD	CENTER ARROW
52	MM-PCB-PLAYFLD	BATTLE FOR THE KINGDOM
53	MM-PCB-PLAYFLD	MASTER OF THE TROLLS
54	MM-PCB-PLAYFLD	DEFENDER OF THE DAMSELS
55	MM-PCB-PLEDL55	LEFT TOP LANE
56	MM-PCB-PLEDL55	RIGHT TOP LANE
57	MM-PCB-PLAYFLD	LEFT TROLL TARGET
58	MM-PCB-PLAYFLD	RIGHT TROLL TARGET
61	MM-PCB-PLAYFLD	FRANCOIS D'GRIMM
62	MM-PCB-PLAYFLD	KING O F PAYNE
63	MM-PCB-PLAYFLD	EARL OF EGO
64	MM-PCB-PLAYFLD	LEFT RAMP JACKPOT
65	MM-PCB-PLAYFLD	REVOLTING PEASANTS!
66	MM-PCB-PLAYFLD	UGLY RIOT!
67	MM-PCB-PLAYFLD	ANGRY MOB!
68	MM-PCB-PLAYFLD	RABBLE ROUSER
71	MM-PCB-PLAYFLD	HOWARD HURTZ
72	MM-PCB-PLAYFLD	BALL SAVE
73	MM-PCB-PLAYFLD	SIR PSYCHO
74	MM-PCB-PLEDL74	DUKE OF BOURBON
75	MM-PCB-PLAYFLD	CASTLE LOCK 2
76	MM-PCB-PLAYFLD	CASTLE LOCK 1
77	MM-PCB-PLAYFLD	SUPER JACKPOT
78	MM-PCB-PLEDL78	SUPER JETS (LEFT)
78	MM-PCB-PLEDL78A	SUPER JETS (RIGHT)
81	MM-PCB-PLEDL81	RIGHT OUTLANE
82	MM-PCB-PLAYFLD	RIGHT RETURN
83	MM-PCB-PLAYFLD	LEFT RETURN
84	MM-PCB-PLEDL84	LEFT OUTLANE
85	MM-PCB-PLAYFLD	CASTLE LOCK 3
86	MM-PCB-PLEDL86	SHOOT AGAIN
87	PIN-20-9663B4	LAUNCH BUTTON
88	PIN-20-966316	START BUTTON

Lamp Locations
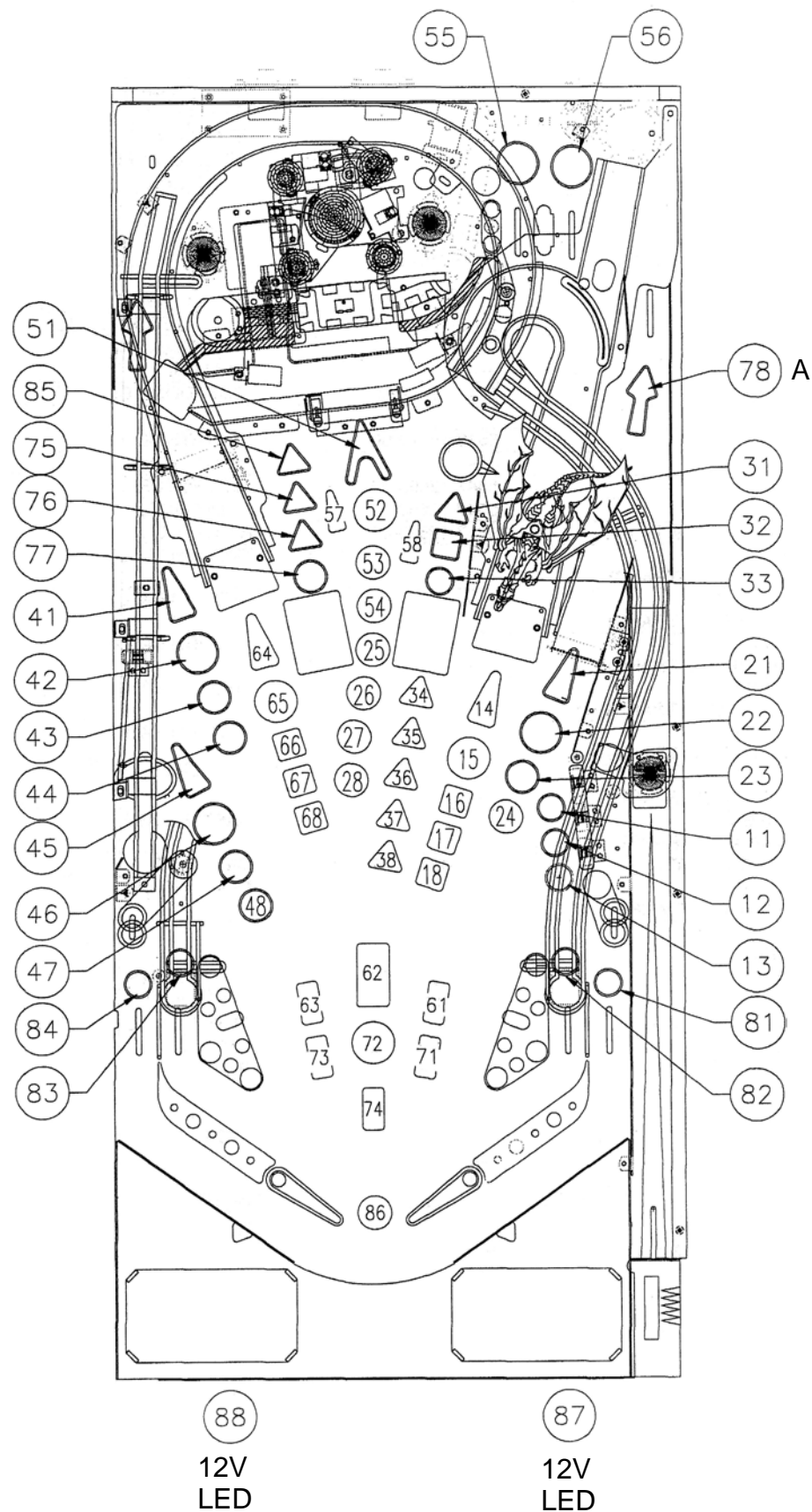
88
12V
LED

87
12V
LED

Switch Locations

Item Number	Switch Assembly Part Number OR 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	20-9663-B-4	- - - - -	BALL LAUNCH
12	A-21990-4	- - - - -	CATAPULT TARGET
13	20-9663-16	- - - - -	START BUTTON
14	- - - - -	04-10346	*PLUMB BOB TILT
15	A-18530-6	- - - - -	LEFT TROLL TARGET
16	A-17813	5647-12693-19	LEFT OUTLANE
17	A-17813	5647-12693-19	RIGHT RETURN LANE
18	A-17791	5647-12693-32	SHOOTER LANE
21	A-17238	- - - - -	*SLAM TILT
22	- - - - -	5643-09268-00	*COIN DOOR CLOSED
23	NOT USED		
24	- - - - -	5643-15190-00	*ALWAYS CLOSED
25	A-18530-6	- - - - -	RIGHT TROLL TARGET
26	A-17813	5647-12693-19	LEFT RETURN LANE
27	A-17813	5647-12693-19	RIGHT OUTLANE
28	A-21970 **(SEE NOTE 1)**	5647-12693-43	RIGHT EJECT
31	A-18617-1 (LED)	- - - - -	TROUGH EJECT
	A-18618-1 (PHOTO TRANS)	- - - - -	
32	A-18617-1 (LED)	- - - - -	TROUGH BALL 1
	A-18618-1 (PHOTO TRANS)	- - - - -	
33	A-18617-1 (LED)	- - - - -	TROUGH BALL 2
	A-18618-1 (PHOTO TRANS)	- - - - -	
34	A-18617-1 (LED)	- - - - -	TROUGH BALL 3
	A-18618-1 (PHOTO TRANS)	- - - - -	
35	A-18617-1 (LED)	- - - - -	TROUGH BALL 4
	A-18618-1 (PHOTO TRANS)	- - - - -	
36	A-16908 (LED)	- - - - -	LEFT POPPER
	A-16909 (PHOTO TRANS)	- - - - -	
37	A-16908 (LED)	- - - - -	CASTLE GATE
	A-16909 (PHOTO TRANS)	- - - - -	
38	A-14947-1 **(SEE NOTE 1)**	5647-12133-12	CATAPULT
41	A-16908 (LED)	- - - - -	MOAT ENTER
	A-16909 (PHOTO TRANS)	- - - - -	
42	NOT USED		
43	NOT USED		
44	A-21800	5647-12693-67	CASTLE LOCK
45	A-21724	A-21743	LEFT TROLL(UNDER PLAYFIELD)
46	A-21724	A-21743	RIGHT TROLL(UNDER PLAYFIELD)
47	A-17813	5647-12693-19	LEFT TOP LANE
48	A-17813	5647-12693-19	RIGHT TOP LANE
51	A-17800 (KICK)	SW-1A-114	LEFT SLINGSHOT
	A-17794 (**SCORE)	SW-1A-120	
52	A-17800 (KICK)	SW-1A-114	RIGHT SLINGSHOT
	A-17794 (**SCORE)	SW-1A-120	
53	A-12030-3	A-16443-1	LEFT JET BUMPER
54	A-12030-3	A-16443-1	BOTTOM JET BUMPER
55	A-12030-3	A-16443-1	RIGHT JET BUMPER
56	A-22036 **(SEE NOTE 1)**	5647-12693-11	DRAWBRIDGE UP
57		5647-12693-11	DRAWBRIDGE DOWN
58	A-21734 **(SEE NOTE 1)**	5647-12693-06	TOWER EXIT
61	A-21799	5647-12693-11	LEFT RAMP ENTER
62	A-21821	5647-12693-13	LEFT RAMP EXIT
63	A-21777	5647-12693-11	RIGHT RAMP ENTER
64	A-21820	5647-12693-13	RIGHT RAMP EXIT
65	A-17813	5647-12693-19	LEFT LOOP LOW
66	A-17813	5647-12693-19	LEFT LOOP HIGH
67	A-21737	5647-12693-36	RIGHT LOOP LOW
68	A-17813	5647-12693-19	RIGHT LOOP HIGH
71	A-21576-4	- - - - -	RIGHT BANK TOP
72	A-21576-4	- - - - -	RIGHT BANK MIDDLE

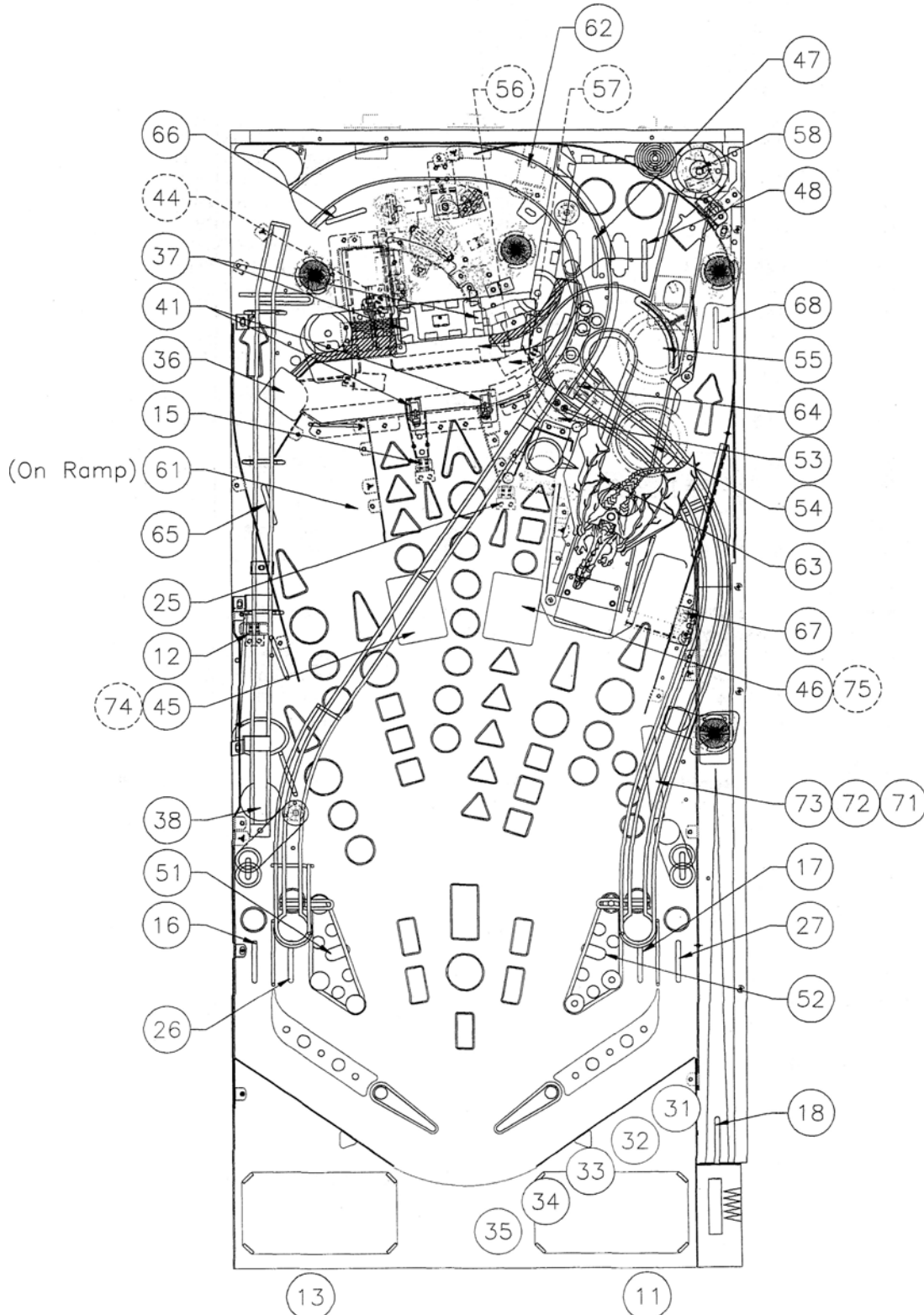# Switch Locations

Item Number	Switch Assembly Part Number *OR* Opto Assembly Part Number	Switch Part Number	Description
73	A-21576-4	- - - - -	RIGHT BANK BOTTOM
74	A-22034	5647-12693-11	LEFT TROLL UP
75	A-22034	5647-12693-11	RIGHT TROLL UP
76 TO 88	NOT USED		

*NOT SHOWN.   **SCORE SWITCHES HAVE DIODES ATTACHED
NOTE 1 - THIS IS A COMPLETE ASSEMBLY, NOT JUST A SWITCH ASSEMBLY

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Solenoid Flashlamp Locations

Item Number	Coil or Flasher Assembly Part Number	Coil or Flasher Part Number	Description
1	A-21553-1	AE-23-800	AUTO PLUNGER
2	A-19963-1	AE-26-1500	TROUGH EJECT
3	A-22027	AE-26-1200	LEFT POPPER
4	A-21718	AS-26-1500	CASTLE
5	A-22033	A-20099	CASTLE GATE POWER
6			CASTLE GATE HOLD
7	B-10686-1	AE-23-800	KNOCKER
8	A-14947-1	AL-23-800	CATAPULT
9	A-21970	AE-27-1200	RIGHT EJECT
10	B-9362-L-2	AE-26-1200	LEFT SLINGSHOT
11	B-9362-R-3	AE-26-1200	RIGHT SLINGSHOT
12	A-9415-3	AE-26-1200	LEFT JET BUMPER
13	A-9415-3	AE-26-1200	BOTTOM JET BUMPER
14	A-9415-2	AE-26-1200	RIGHT JET BUMPER
15	A-21706	A-20099	TOWER DIVERTER POWER
16			TOWER DIVERTER HOLD
17	SEE NOTE 1	PIN-PCB-TWSFLSH	LEFT SIDE LOW FLASHER
17		PIN-PCB-BBFLASH	INSERT PANEL FLASHER
18	A-17983	PIN-PCB-TRUFLSH	LEFT RAMP FLASHER
18		PIN-PCB-BBFLASH	INSERT PANEL FLASHER
19	SEE NOTE 1	PIN-PCB-TWSFLSH	LEFT SIDE HIGH FLASHER
19		PIN-PCB-BBFLASH	INSERT PANEL FLASHER
20	SEE NOTE 1	PIN-PCB-TWSFLSH	RIGHT SIDE HIGH FLASHER
20		PIN-PCB-BBFLASH	INSERT PANEL FLASHER
21	A-17802	PIN-PCB-MOTFLSH	RIGHT RAMP FLASHERS
21	A-17983	PIN-PCB-TRUFLSH	
22	SEE NOTES 1 & 2	PIN-PCB-TWSFLSH	CASTLE RIGHT SIDE FLASHERS
		PIN-PCB-MARFLSH	
23	SEE NOTE 1	PIN-PCB-TWSFLSH	RIGHT SIDE LOW FLASHERS
23	A-17983	PIN-PCB-TRUFLSH	
24	A-17803	PIN-PCB-MOTFLSH	MOAT FLASHERS
25	SEE NOTES 1 & 2	PIN-PCB-TWSFLSH	CASTLE LEFT SIDE FLASHERS
		PIN-PCB-MARFLSH	
26	A-21712-5	AE-27-1200	TOWER L OCK POST
27	PIN-SUB-A177961	PIN-A-27700	RIGHT GATE - 12V
28	PIN-SUB-A177961	PIN-A-27700	LEFT GATE - 12V

FLIPPERS

Item Numbers	Coil or Flasher Assembly Part	Coil or Flasher Part Number	Description
29-30	A-15849-R-2	FL-11629	LOWER RIGHT FLIPPER
31-32	A-15849-L-2	FL-11629	LOWER LEFT FLIPPER
33-34	A-22034	FL-11753	LEFT TROLL
35-36	A-22034	FL-11753	RIGHT TROLL

MOTOR

Item Number	Assembly Part Number	PC Board Part Number	Device Part Number	Description
37	A-22033	A-21708-1	14-8015	DRAWBRIDGE MOTOR

GENERAL ILLUMINATION

Item Number	Bulb Number	Description
1	000-LMP-LED6VWW	Bottom Playfield
2	000-LMP-LED6VWW	Middle Playfield
3	000-LMP-LED6VWW	Top Playfield
3	000-LMP-LED6VY	Spotlights
2/3	000-LMP-LED6VT3	Jet Bumpers
4	000-PCB-24LEDBR	TOP INSERT PANEL
5	000-PCB-24LEDBR	BOTTOM INSERT PANEL

DO NOT REPLACE FLASHERS OR GI'S WITH INCANDESCENT BULBS!!!

NOTE 1 - Located on the playfield. The playfield assembly consists of three parts:
 a receptacle and skirt #PIN-A-1426513WS; a red dome #03-8171-9 and a
 flashlamp board #MM-PCB-TWSFLSH

NOTE 2 - There is one flashlamp board located on the playfield and one located on the back panel.
 The back panel assembly consists of one part, #MM-PCB-MARFLSH.

Solenoid Flashlamp Locations

Typical Lamp circuit

Lamp Table (NOT A MATRIX)   Cabinet lamp drivers are on the CONTROLLER Board

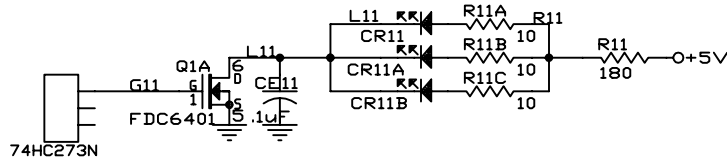|							
L11 Q1A RT BANK TOP	L21 Q6A RT LOOP JACKPOT	L31 Q9A TROLLS!	L41 Q13A LFT LOOP JACKPOT	L51 Q25B CENTER ARROW	L61 Q29A FRANCOIS D'GRIMM	L71 Q37B CR85 HOWARD HURTZ	L81 Q35B RIGHT OUTLANE PL81
L12 Q2B RT BANK MIDDLE	L22 Q5B RT JPUST VICTORY	L32 Q9B EXTRA BALL	L42 Q13B LFT JOUST VICTORY!	L52 Q26A BATTLE FOR KINGDOM	L62 Q30B KING OF PAYNE	L72 Q37A CR87 MAGIC SHIELD	L82 Q35A RT RETURN LANE
L13 Q2A RT BANK BOTTOM	L23 Q6B RIGHT CLASH	L33 Q10A MERLIN'S MAGIC	L43 Q14A LEFT CLASH!	L53 Q25A MASTER OF TROLLS	L63 Q30A EARL OF EGO	L73 Q38A CR88 SIR PSYCHO	L83 Q36B LF RETURN LANE
L14 Q1B RT RAMP JACKPOT	L24 Q6A RIGHT CHARGE	L34 Q10B TROLL MADNESS	L44 Q14B LEFT CHARGE!	L54 Q24B DEFENDER OF DAMSELS	L64 Q27B LFT RAMP JACKPOT	L74 Q40A DUKE OF BOURBON PL91	L84 Q36A LEFT OUTLANE PL84
L15 Q4A CR15 SAVE THE DAMSEL! x2 J9p3 +J9p4	L25 Q7A PATRON OF PEASANTS	L35 Q11A DAMSEL MADNESS	L45 Q15A CATAPULT JACKPOT	L55 Q24A LFT TOP LANE +J8p1 J8p4	L65 Q27A REVOLTING PEASANTS!	L75 Q32A CASTLE LOCK2	L85 Q31A CR73 CASTLE LOCK3
L16 Q4B DRAGON DEATH	L26 Q8B CATAPULT ACE	L36 Q11B PEASANT MADNESS	L46 Q15B CATAPULT SLAM!	L56 Q23B RT TOP LANE +J8p2 J8p3	L66 Q28B UGLY RIOT!	L76 Q34B CASTLE LOCK1	L86 Q38B SHOOT AGAIN PL86
L17 Q3A DRAGON SNACK	L27 Q7B JOUST CHAMPION	L37 Q12B CATAPULT MADNESS	L47 Q18A BAM!	L57 Q26B LFT TROLL TARGET	L67 Q28A ANGRY MOB!	L77 Q34A SUPER JACKPOT	L87 Q2A LAUNCH BUTTON J2p13
L18 Q3B DRAGON BREATH	L28 Q8A CASTLE CRUSHER	L38 Q12A JOUST MADNESS	L48 Q18A WHAM!	L58 Q23A RT TROLL TARGET	L68 Q29B RABBLE ROUSER	L78 Q31B J6p11 SUPER JETS x2 J6p8 J6p9	L88 Q1B START BUTTON J2p12
GI LED#____ PF Left SOCKET#____ PF Right		GI1 P93 BROWN Q42A P93B WHT-BRN		GI2 P94B ORANGE Q42B P94 WHT-ORG		GI3 P95B YELLOW Q43A P95 WHT-YEL	

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Typical switch input circuit

Flipper Opto input circuit

Switch Table (NOT A MATRIX) Cabinet switches are read by CONTROLLER Board

D1 J3p11 LEFT COIN	SW11 J2p9 LAUNCH BALL	SW21 J3p7 SLAM TILT	SW31 JS31p8 TROUGH EJECT	SW41 JS58 MOAT ENTER	SW51 JS38 LEFT SLINGSHOT	SW61 J5p7 LFT RAMP ENTER	SW71 JS22 RT BANK TOP	SW F1 JS27 LOW RT FLIP EOS
D2 J3p10 CENTER COIN	SW12 JS44 CATAPULT TARGET	SW22 J2p7 C DOOR CLOSED	SW32 JS31p7 TROUGH BALL 1	SW42 NOT USED	SW52 JS37 RIGHT SLINGSHOT	SW62 J5p8 LFT RAMP EXIT	SW72 JS23 RT BANK MIDDLE	SW F2 J2p5 LOW RT FLIP OPTO
D3 J3p9 RIGHT COIN	SW13 J2p10 START BUTTON	SW23 NOT USED	SW33 JS31p6 TROUGH BALL 2	SW43 NOT USED	SW53 J8p6 LEFT JET BUMPER	SW63 J7p2 RT RAMP ENTER	SW73 JS24 RT BANK BOTTOM	SW F3 JS28 LOW LFT FLIP EOS
D4 NOT USED	SW14 J2p8 PLUMB BOB TILT	SW24 NOT USED	SW34 JS31p4 TROUGH BALL 3	SW44 JS55 CASTLE LOCK	SW54 J9p12 LOW JET BUMPER	SW64 JS17 RT RAMP EXIT	SW74 JS52 LFT TROLL UP	SW F4 J2p6 LOW LFT FLIP OPTO
D5 J3p7 ESCAPE SVC CRDT	SW15 JS57 LFT TROLL TARGET	SW25 JS62 RT TROLL TARGET	SW35 JS31p3 TROUGH BALL 4	SW45 JS51 LFT TROLL UNDER PF	SW55 J9p11 RIGHT JET BUMPER	SW65 JS45 LFT LOOP LOW	SW75 JS54 RT TROLL UP	SW F5 NOT USED
D6 J3p5 DOWN VOL DWN	SW16 JS42 LEFT OUTLANE	SW26 JS41 LF RETURN LANE	SW36 JS48 LEFT POPPER	SW46 JS53 RT TROLL UNDER PF	SW56 J8p9 D BRIDGE UP	SW66 JS56 LFT LOOP HIGH	NOT USED	SW F6 J2p3 UP RT FLIP OPTO
D7 J3p4 UPp4 VOL UP	SW17 JS26 RT RETURN LANE	SW27 JS25 RIGHT OUTLANE	SW37 JS61 CASTLE GATE	SW47 JS14 LF TOP LANE	SW57 J8p8 D BRIDGE DOWN	SW67 JS21 RT LOOP LOW	NOT USED	SW F7 NOT USED
D8 J3p3 TEST BEGIN	SW18 JS36 SHOOTER LANE	SW28 JS63 RIGHT EJECT	SW38 JS43 CATAPULT	SW48 JS15 RT TOP LANE	SW58 J8p7 TOWER EXIT	SW68 JS16 RT LOOP HIGH	NOT USED	SW F8 J2p4 UP LFT FLIP OPTO

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Solenoid - Flasher Table

SOL#	Function	Driver Brd	FET#	Con.	FUSE	WIRE COLOR	PART#
01	AUTO PLUNGER	1	Q4	J4	F1	BLU-YEL	AE-23-800
02	TROUGH EJECT	1	Q3	J3	F1	VIO-RED	AE-26-1500
03	LEFT POPPER	3	Q3	J3	F1	GRY-ORG	AE-26-1200
04	CASTLE	3	Q2	J2	F1	GRN-ORG	AE-26-1500
05	CASTLE GATE POWER	2	Q7	J7	F3	BRN	A-20099
06	CASTLE GATE HOLD	2	Q8	J7	F3	BLU	
07	KNOCKER	PS	Q2	J5	F4	BRN	AE-23-800
08	CATAPULT	3	Q1	J1	F1	BLK-ORG	AL-23-800
09	RIGHT EJECT	2	Q1	J1	F1	BLU-YEL	AE-27-1200
10	LEFT SLINGSHOT	1	Q1	J1	F1	BRN-ORG	AE-26-1200
11	RT SLINGSHOT	1	Q2	J2	F1	BRN-ORG	AE-26-1200
12	LEFT JET	2	Q3	J3	F1	BLU-WHT	AE-26-1200
13	BOTTOM JET	2	Q2	J2	F1	BLU-RED	AE-26-1200
14	RIGHT JET	2	Q4	J4	F1	BLU-BLK	AE-26-1200
15	TOWER DIVERT HOLD	3	Q5	J5	F2	BLU-GRN	A-20099
16	TOWER DIVERT POWER	3	Q6	J5	F2	BRN	
	FLASHERS						
17	LEFT SIDE LOW BB Insert	PF	Q45B	PL4			PIN-PCB-TWSFLSH PIN-PCB-BBFLASH
18	LEFT RAMP BB Insert	PF	Q32B	J6p12			PIN-PCB-TRUFLSH PIN-PCB-BBFLASH
19	LEFT SIDE HIGH BB Insert	PF	Q44B	J5p4			PIN-PCB-TWSFLSH PIN-PCB-BBFLASH
20	RIGHT SIDE HIGH BB Insert	PF	Q46B	J7p6			PIN-PCB-TWSFLSH PIN-PCB-BBFLASH
21	RIGHT RAMP	PF	Q46A	J9p5			PIN-PCB-TRUFLSH
	(Dragon Flasher is an Upside Down						PIN-PCB-MOTFLSH)
22	CASTLE RIGHT SIDE Back Board	PF	Q33A	PL71			PIN-PCB-TWSFLSH PIN-PCB-MARFLSH
23	RIGHT SIDE LOW	PF	Q40B	PL92			PIN-PCB-TWSFLSH PIN-PCB-TRUFLSH
24	MOAT (X2)	PF	Q33B	PL72			PIN-PCB-MOTFLSH
25	CASTLE LEFT SIDE Back Board	PF	Q44A	J6p10			PIN-PCB-TWSFLSH PIN-PCB-MARFLSH
	Solenoids						
26	TOWER LOCK	3	Q4	J4	J4	WHT-ORG	AE-27-1200
27	RIGHT GATE - 12V	PF	Q47A	J9 Pin2	F1	BLU-BLK	PIN-A-14406
28	LEFT GATE - 12V	PF	Q47B	J6 Pin1	F1	BLU-YEL	PIN-A-14406
29	FLIPPER RIGHT POWER	1	Q5	J5	F2	BRN	FL-11629
30	FLIPPER RIGHT HOLD	1	Q6	J5	F2	BLU	Blue
31	FLIPPER LEFT POWER	1	Q7	J7	F3	BRN	FL-11629
32	FLIPPER LEFT HOLD	1	Q8	J7	F3	BLU	Blue
33	TROLL LEFT POWER	3	Q7	J7	F3	BRN	FL-11753
34	TROLL LEFT HOLD	3	Q8	J7	F3	BLU	Yellow
35	TROLL RIGHT POWER	2	Q5	J5	F2	BRN	FL-11753
36	TROLL RIGHT HOLD	2	Q6	J5	F2	BLU	Yellow
37	DRAWBRIDGE MOTOR - 12V	PF	Q45A	PL9	F1	YEL	14-8015
	GENERAL ILLUMINATION						
01	BOTTOM PLAYIELD	PF	Q42A	P93 P93B		WHT-BRN	000-LMP-LED6VWW
02	MIDDLE PLAYIELD	PF	Q42B	P94 P94B		WHT-ORG	000-LMP-LED6VWW
03	TOP PLAYIELD	PF	Q43A	P95 P95B		WHT-YEL	000-LMP-LED6VWW
04	TOP INSERT	CONTRLR	Q5A	J4 P9		RED-GRN	PIN-PCB-24LEDBR
05	BOTTOM INSERT	CONTRLR	Q7A	J4 P13		BLK-YEL	PIN-PCB-24LEDBR

SECTION THREE

GAME WIRING
AND SCHEMATICS

Typical switch input circuit

Flipper Opto input circuit

Switch Table (NOT A MATRIX) Cabinet switches are read by CONTROLLER Board

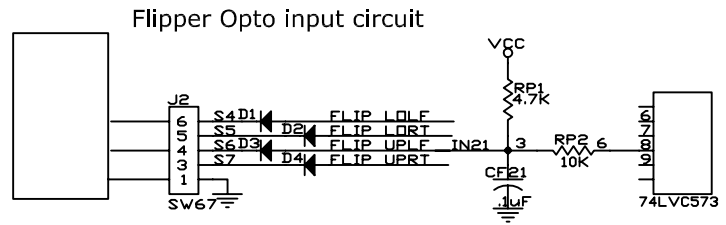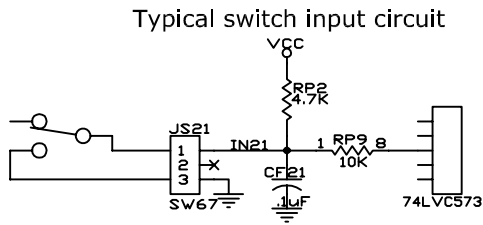|								
D1 J3p11 LEFT COIN	SW11 J2p9 LAUNCH BALL	SW21 J3p7 SLAM TILT	SW31 JS31p8 TROUGH EJECT	SW41 JS58 MOAT ENTER	SW51 JS38 LEFT SLINGSHOT	SW61 J5p7 LFT RAMP ENTER	SW71 JS22 RT BANK TOP	SW F1 JS27 LOW RT FLIP EOS
D2 J3p10 CENTER COIN	SW12 JS44 CATAPULT TARGET	SW22 J2p7 C DOOR CLOSED	SW32 JS31p7 TROUGH BALL 1	SW42 NOT USED	SW52 JS37 RIGHT SLINGSHOT	SW62 J5p8 LFT RAMP EXIT	SW72 JS23 RT BANK MIDDLE	SW F2 J2p5 LOW RT FLIP OPTO
D3 J3p9 RIGHT COIN	SW13 J2p10 START BUTTON	SW23 NOT USED	SW33 JS31p6 TROUGH BALL 2	SW43 NOT USED	SW53 J8p6 LEFT JET BUMPER	SW63 J7p2 RT RAMP ENTER	SW73 JS24 RT BANK BOTTOM	SW F3 JS28 LOW LFT FLIP EOS
D4 NOT USED	SW14 J2p8 PLUMB BOB TILT	SW24 NOT USED	SW34 JS31p4 TROUGH BALL 3	SW44 JS55 CASTLE LOCK	SW54 J9p12 LOW JET BUMPER	SW64 JS17 RT RAMP EXIT	SW74 JS52 LFT TROLL UP	SW F4 J2p6 LOW LFT FLIP OPTO
D5 J3p7 ESCAPE SVC CRDT	SW15 JS57 LFT TROLL TARGET	SW25 JS62 RT TROLL TARGET	SW35 JS31p3 TROUGH BALL 4	SW45 JS51 LFT TROLL UNDER PF	SW55 J9p11 RIGHT JET BUMPER	SW65 JS45 LFT LOOP LOW	SW75 JS54 RT TROLL UP	SW F5 NOT USED
D6 J3p5 DOWN VOL DWN	SW16 JS42 LEFT OUTLANE	SW26 JS41 LF RETURN LANE	SW36 JS48 LEFT POPPER	SW46 JS53 RT TROLL UNDER PF	SW56 J8p9 D BRIDGE UP	SW66 JS56 LFT LOOP HIGH	NOT USED	SW F6 J2p3 UP RT FLIP OPTO
D7 J3p4 UPp4 VOL UP	SW17 JS26 RT RETURN LANE	SW27 JS25 RIGHT OUTLANE	SW37 JS61 CASTLE GATE	SW47 JS14 LF TOP LANE	SW57 J8p8 D BRIDGE DOWN	SW67 JS21 RT LOOP LOW	NOT USED	SW F7 NOT USED
D8 J3p3 TEST BEGIN	SW18 JS36 SHOOTER LANE	SW28 JS63 RIGHT EJECT	SW38 JS43 CATAPULT	SW48 JS15 RT TOP LANE	SW58 J8p7 TOWER EXIT	SW68 JS16 RT LOOP HIGH	NOT USED	SW F8 J2p4 UP LFT FLIP OPTO

3-2

Typical Lamp circuit

Lamp Table (NOT A MATRIX) Cabinet lamp drivers are on the CONTROLLER Board
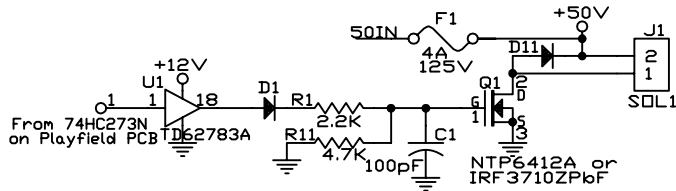
L11 Q1A RT BANK TOP	L21 Q6A RT LOOP JACKPOT	L31 Q9A TROLLS!	L41 Q13A LFT LOOP JACKPOT	L51 Q25B CENTER ARROW	L61 Q29A FRANCOIS D'GRIMM	L71 Q37B CR85 HOWARD HURTZ	L81 Q35B RIGHT OUTLANE PL81
L12 Q2B RT BANK MIDDLE	L22 Q5B RT JPUST VICTORY	L32 Q9B EXTRA BALL	L42 Q13B LFT JOUST VICTORY!	L52 Q26A BATTLE FOR KINGDOM	L62 Q30B KING OF PAYNE	L72 Q37A CR87 MAGIC SHIELD	L82 Q35A RT RETURN LANE
L13 Q2A RT BANK BOTTOM	L23 Q6B RIGHT CLASH	L33 Q10A MERLIN'S MAGIC	L43 Q14A LEFT CLASH!	L53 Q25A MASTER OF TROLLS	L63 Q30A EARL OF EGO	L73 Q38A CR88 SIR PSYCHO	L83 Q36B LF RETURN LANE
L14 Q1B RT RAMP JACKPOT	L24 Q6A RIGHT CHARGE	L34 Q10B TROLL MADNESS	L44 Q14B LEFT CHARGE!	L54 Q24B DEFENDER OF DAMSELS	L64 Q27B LFT RAMP JACKPOT	L74 Q40A DUKE OF BOURBON PL91	L84 Q36A LEFT OUTLANE PL84
L15 Q4A CR15 SAVE THE DAMSEL! x2 J9p3 +J9p4	L25 Q7A PATRON OF PEASANTS	L35 Q11A DAMSEL MADNESS	L45 Q15A CATAPULT JACKPOT	L55 Q24A LFT TOP LANE +J8p1 J8p4	L65 Q27A REVOLTING PEASANTS!	L75 Q32A CASTLE LOCK2	L85 Q31A CR73 CASTLE LOCK3
L16 Q4B DRAGON DEATH	L26 Q8B CATAPULT ACE	L36 Q11B PEASANT MADNESS	L46 Q15B CATAPULT SLAM!	L56 Q23B RT TOP LANE +J8p2 J8p3	L66 Q28B UGLY RIOT!	L76 Q34B CASTLE LOCK1	L86 Q38B SHOOT AGAIN PL86
L17 Q3A DRAGON SNACK	L27 Q7B JOUST CHAMPION	L37 Q12B CATAPULT MADNESS	L47 Q18A BAM!	L57 Q26B LFT TROLL TARGET	L67 Q28A ANGRY MOB!	L77 Q34A SUPER JACKPOT	L87 Q2A LAUNCH BUTTON J2p13
L18 Q3B DRAGON BREATH	L28 Q8A CASTLE CRUSHER	L38 Q12A JOUST MADNESS	L48 Q18A WHAM!	L58 Q23A RT TROLL TARGET	L68 Q29B RABBLE ROUSER	L78 Q31B J6p11 SUPER JETS x2 J6p8 J6p9	L88 Q1B START BUTTON J2p12
GI LED#____ PF Left SOCKET#____ PF Right		GI1 P93 BROWN Q42A P93B WHT-BRN		GI2 P94B ORANGE Q42B P94 WHT-ORG		GI3 P95B YELLOW Q43A P95 WHT-YEL	

Solenoid - Flasher Table

SOL#	Function	Driver Brd	FET#	Con.	FUSE	WIRE COLOR	PART#
01	AUTO PLUNGER	1	Q4	J4	F1	BLU-YEL	AE-23-800
02	TROUGH EJECT	1	Q3	J3	F1	VIO-RED	AE-26-1500
03	LEFT POPPER	3	Q3	J3	F1	GRY-ORG	AE-26-1200
04	CASTLE	3	Q2	J2	F1	GRN-ORG	AE-26-1500
05	CASTLE GATE POWER	2	Q7	J7	F3	BRN	A-20099
06	CASTLE GATE HOLD	2	Q8	J7	F3	BLU	
07	KNOCKER	PS	Q2	J5	F4	BRN	AE-23-800
08	CATAPULT	3	Q1	J1	F1	BLK-ORG	AL-23-800
09	RIGHT EJECT	2	Q1	J1	F1	BLU-YEL	AE-27-1200
10	LEFT SLINGSHOT	1	Q1	J1	F1	BRN-ORG	AE-26-1200
11	RT SLINGSHOT	1	Q2	J2	F1	BRN-ORG	AE-26-1200
12	LEFT JET	2	Q3	J3	F1	BLU-WHT	AE-26-1200
13	BOTTOM JET	2	Q2	J2	F1	BLU-RED	AE-26-1200
14	RIGHT JET	2	Q4	J4	F1	BLU-BLK	AE-26-1200
15	TOWER DIVERT HOLD	3	Q5	J5	F2	BLU-GRN	A-20099
16	TOWER DIVERT POWER	3	Q6	J5	F2	BRN	
	FLASHERS						
17	LEFT SIDE LOW BB Insert	PF	Q45B	PL4			PIN-PCB-TWSFLSH PIN-PCB-BBFLASH
18	LEFT RAMP BB Insert	PF	Q32B	J6p12			PIN-PCB-TRUFLSH PIN-PCB-BBFLASH
19	LEFT SIDE HIGH BB Insert	PF	Q44B	J5p4			PIN-PCB-TWSFLSH PIN-PCB-BBFLASH
20	RIGHT SIDE HIGH BB Insert	PF	Q46B	J7p6			PIN-PCB-TWSFLSH PIN-PCB-BBFLASH
21	RIGHT RAMP	PF	Q46A	J9p5			PIN-PCB-TRUFLSH PIN-PCB-MOTFLSH)
		(Dragon Flasher is an Upside Down					
22	CASTLE RIGHT SIDE Back Board	PF	Q33A	PL71			PIN-PCB-TWSFLSH PIN-PCB-MARFLSH
23	RIGHT SIDE LOW	PF	Q40B	PL92			PIN-PCB-TWSFLSH PIN-PCB-TRUFLSH
24	MOAT (X2)	PF	Q33B	PL72			PIN-PCB-MOTFLSH
25	CASTLE LEFT SIDE Back Board	PF	Q44A	J6p10			PIN-PCB-TWSFLSH PIN-PCB-MARFLSH
	Solenoids						
26	TOWER LOCK	3	Q4	J4	J4	WHT-ORG	AE-27-1200
27	RIGHT GATE - 12V	PF	Q47A	J9 Pin2	F1	BLU-BLK	PIN-A-14406
28	LEFT GATE - 12V	PF	Q47B	J6 Pin1	F1	BLU-YEL	PIN-A-14406
29	FLIPPER RIGHT POWER	1	Q5	J5	F2	BRN	FL-11629
30	FLIPPER RIGHT HOLD	1	Q6	J5	F2	BLU	Blue
31	FLIPPER LEFT POWER	1	Q7	J7	F3	BRN	FL-11629
32	FLIPPER LEFT HOLD	1	Q8	J7	F3	BLU	Blue
33	TROLL LEFT POWER	3	Q7	J7	F3	BRN	FL-11753
34	TROLL LEFT HOLD	3	Q8	J7	F3	BLU	Yellow
35	TROLL RIGHT POWER	2	Q5	J5	F2	BRN	FL-11753
36	TROLL RIGHT HOLD	2	Q6	J5	F2	BLU	Yellow
37	DRAWBRIDGE MOTOR - 12V	PF	Q45A	PL9	F1	RED-BLK	14-8015
	GENERAL ILLUMINATION						
01	BOTTOM PLAYIELD	PF	Q42A	P93 P93B		WHT-BRN	000-LMP-LED6VWW
02	MIDDLE PLAYIELD	PF	Q42B	P94 P94B		WHT-ORG	000-LMP-LED6VWW
03	TOP PLAYIELD	PF	Q43A	P95 P95B		WHT-YEL	000-LMP-LED6VWW
04	TOP INSERT	CONTRLR	Q5A	J4 P9		RED-GRN	PIN-PCB-24LEDBR
05	BOTTOM INSERT	CONTRLR	Q7A	J4 P13		BLK-YEL	PIN-PCB-24LEDBR

SOLENOID WIRING

Typical solenoid driver circuit

+50V

50IN F1 4A 125V D11 J1 2 1 SOL1

+12V
U1
1 18
From 74HC273N
on Playfield PCB TD62783A
D1 R1 2.2K
R11 4.7K C1 100pF
Q1 G D S
NTP6412A or
IRF3710ZPbF

Typical Flipper driver circuit

50IN F2 4A 125V D15 SOL5 50V1 J5 3 2 1 SOL5

+12V
U1
5 14
TD62783A
From 74HC273N
on Playfield PCB
D5 R5 2.2K
R15 4.7K C5 100pF
Q5 G D S
D16 SOL6

+12V
U1
6 13
TD62783A
D6 R6 2.2K
R16 4.7K C6 100pF
Q6 G D S
NTP6412A or
IRF3710ZPbF

Solenoid Driver 1

J	Pins	+50V	Wire	Label
	5 4 3 2 1			
J1	2 1	+50V	ORN / BRN-ORG	LEFT SLINGSHOT — SOL1
J2	2 1	+50V	ORN / BRN-ORG	RT SLINGSHOT — SOL2
J3	2 1	+50V	ORN / VIO-RED	TROUGH EJECT — SOL3
j4	2 1	+50V	ORN / BLU-YEL	AUTO PLUNGER — SOL4
J5	3 2 1	+50V	ORN / BRN / BLU	FLIPPER RIGHT POWER / FLIPPER RIGHT HOLD — SOL5
J7	3 2 1	+50V	ORN / BRN / BLU	FLIPPER LEFT POWER / FLIPPER LEFT HOLD — SOL7

Solenoid Driver 3

Label	Wire	J	Pins	+50V
TROLL LEFT HOLD / TROLL LEFT POWER	BLU / BRN / ORN	J7	1 2 3	+50V SOL7
CASTLE GATE HOLD / CASTLE GATE POWER	BLU-ORG / BLU / ORN	J5	1 2 3	+50V SOL5
TOWER LOCK	WHT-ORG / ORN	J4	1 2	+50V SOL4
LEFT POPPER	GRY-ORG / ORN	J3	1 2	+50V SOL3
CASTLE	GRN-ORG / ORN	J2	1 2	+50V SOL2
CATAPULT	BLK-ORG / ORN	J1	1 2	+50V SOL1

1 2 3 4 5

Solenoid Driver 2

J	Pins	+50V	Wire	Label
	5 4 3 2 1			
J1	2 1	+50V	ORN / BLU-YEL	RIGHT EJECT — SOL1
J2	2 1	+50V	ORN / BLU-RED	BOTTOM JET — SOL2
J3	2 1	+50V	ORN / BLU-WHT	LEFT JET — SOL3
j4	2 1	+50V	ORN / BLU-BLK	RIGHT JET — SOL4
J5	3 2 1	+50V	ORN / BRN / BLU	TROLL RT POWER / TROLL RT HOLD — SOL5
J7	3 2 1	+50V	ORN / BRN / BLU-GRN	TOWER DIVERTER POWER / TOWER DIVERTER HOLD — SOL7

50V

POWER BOX

Flasher Circuit

PL71

+12V

1
2
3
4

16
1/2W

L71

Q33A   6
         D
G71   G   FL22
         1   CE71
From   S
74HC273N FDC6401 5   .1uF

Playfield PCB

Opto Circuit

EMITTER

A   K

DETECTOR

C   E

VCC   JS48
     R10   A
     100   K
            C
SW36   E

1
2
3
4
5

WHT

BLK
RED
GRA

SW36
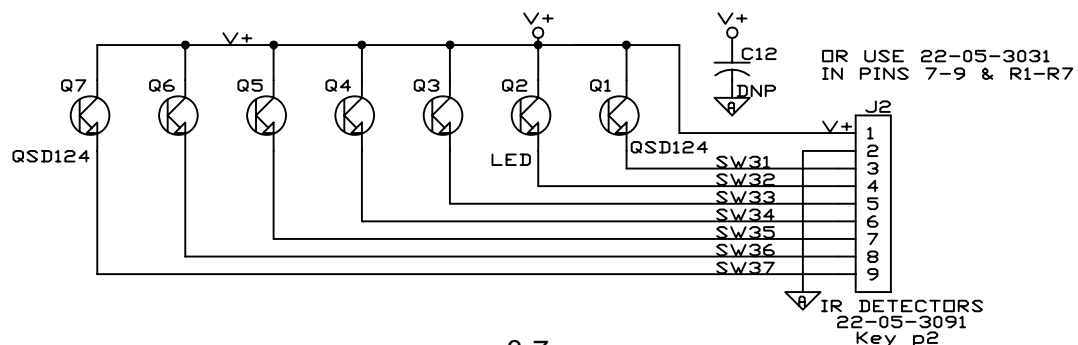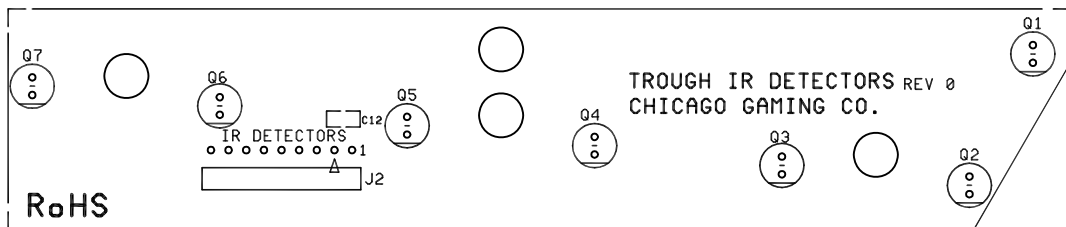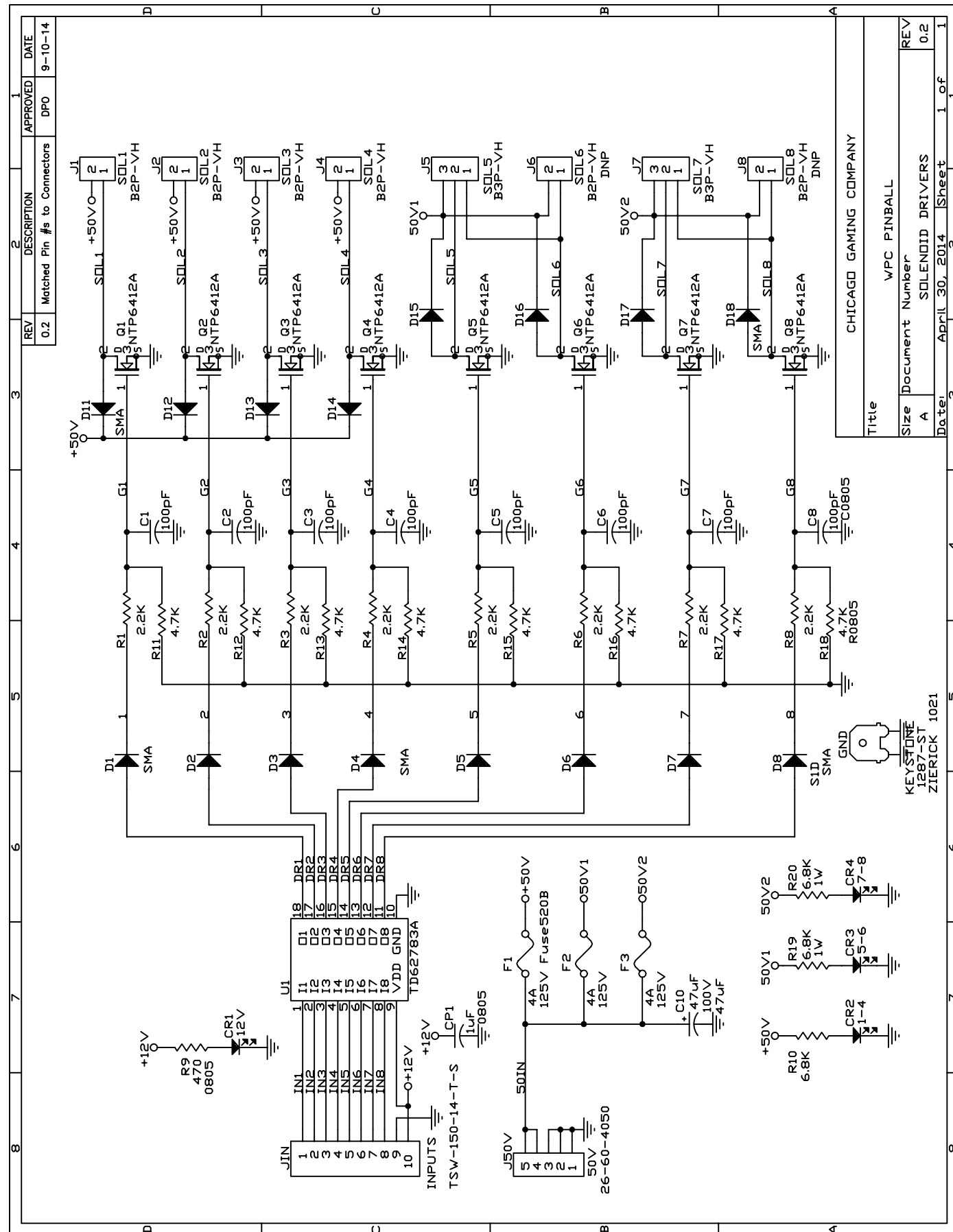
Left Popper

PIN-PCB-TRGHLED
Trough IR LED PCB Assembly

PIN-PCB-TRGHDET
Trough IR Photo Transistor PCB Assembly

Solenoid Driver Schematic

Power Supply Schematic

Playfield Board Schematic 1 of 2

Title: MEDIEVAL MADNESS
Size D | Document Number: PLAYFIELD PCB | REV 1.1
Date: August 6, 2014 | Sheet 1 of 2

Playfield Board Schematic 2 of 2

CHICAGO GAMING COMPANY INC.
4616 WEST 19TH AVENUE
CICERO IL. 60804

Title: MEDIEVAL MADNESS
PLAYFIELD PCB
Size: D REV: 1.1
Date: August 7, 2014 Sheet: 2 of 2

3-10

Controller Board
Schematic

Controller Board Schematic

Title: Pinball Controller Board
Size: D
Document Number: PIN-PCB-CONTRLR
REV: 1.0
Date: August 19, 2014   Sheet 1 of

3-11

AC Wiring Diagram

Cabinet Wiring Diagram

BACKBOX INSERT

HDMI

LCD MONITOR

J4
BACKBOX

BEAGLE
BONE
BLACK

J7
BLANK-
WDOG
WATCHDOG

J5
8 CS0+
7 CS0-
6 DO+
5 CLK-
4 CLK+
3 DO-
2 DI+
1 DI-
RJ45
PLAYFEILD

PLAYFIELD

J9
+12V0
KNOCK
SHAKE
YELLOW
RED-WHT
VIO-WHT
BLACK
KNOCK

PINBALL CONTROLLER PCB
PIN-PCB-CONTRLR

J6
SPKL+
SPKL+
SPKL-
SPKR-
SPKR+
GRA-ORN
GRA-RED
GRA-BLK
BRN-BLK
BRN-RED
SPEAKERS

GRA-BLK
GRA-ORN
GRA-RED
GRN-YEL

KNOCKER

J2 CABINET   J3 COINDOOR   J1

GRA-RED
GRA-BLK

GRA-ORN

MAINS POWER   50V   SOLENOID POWER

12V PS

SHAKER
MOTOR

POWER BOX

+12v

INLET

UPPER LFT
LOWER LFT
BLK-BLU
BLU-GRY
BLACK
BLACK
YEL
YEL
FLIPPER
BUTTON PCB

UPPER RT
LOWER RT
BLK-YEL
BLU-VIO
BLACK
BLACK
YEL
YEL
FRM LF FLIP
FLIPPER
BUTTON PCB

SLAM TILT

GRN-BLK
GRN-BLK
BLK-GRN
BLK-GRN

WHT-YEL

START
YELLOW
WHT-ORN
BLACK
ORN-WHT

BLACK
PLUMB BOB TILT

LAUNCH
YELLOW
WHT-RED
BLACK
RED-WHT

J4
CD LAMPS
+12V
GND
L Coin
Rt Coin
Up Sw
Dwn Sw
KEY
Enter
GND
SLAM TILT

1 YEL-WHT
2 YELLOW
3 BLACK
4 BLK-BRN
5
6 BLK-RED
7 WHT-BRN
8 ORG-RED
9 ORG-GRN
10
11 BLK-BLU
12 BLK-RED
13 GRN-BLK

COINDOOR

FLIPPER
BUTTON PCB
22-23-2071

CHICAGO GAMING COMPANY INC.
4616 WEST 19TH STREET
CICERO IL 60804

Title
Cabinet Wireing.dwg

Size Document Number   REV
C   Cabinet Wireing.dwg   0.3
Date: August 18, 2014   Sheet 1 of 1

Block Diagram

NOTES

Typical switch input circuit

Flipper Opto input circuit

Switch Table (NOT A MATRIX) Cabinet switches are read by CONTROLLER Board

D1 J3p11 LEFT COIN	SW11 J2p9 LAUNCH BALL	SW21 J3p7 SLAM TILT	SW31 JS31p8 TROUGH EJECT	SW41 JS58 MOAT ENTER	SW51 JS38 LEFT SLINGSHOT	SW61 J5p7 LFT RAMP ENTER	SW71 JS22 RT BANK TOP	SW F1 JS27 LOW RT FLIP EOS
D2 J3p10 CENTER COIN	SW12 JS44 CATAPULT TARGET	SW22 J2p7 C DOOR CLOSED	SW32 JS31p7 TROUGH BALL 1	SW42 NOT USED	SW52 JS37 RIGHT SLINGSHOT	SW62 J5p8 LFT RAMP EXIT	SW72 JS23 RT BANK MIDDLE	SW F2 J2p5 LOW RT FLIP OPTO
D3 J3p9 RIGHT COIN	SW13 J2p10 START BUTTON	SW23 NOT USED	SW33 JS31p6 TROUGH BALL 2	SW43 NOT USED	SW53 J8p6 LEFT JET BUMPER	SW63 J7p2 RT RAMP ENTER	SW73 JS24 RT BANK BOTTOM	SW F3 JS28 LOW LFT FLIP EOS
D4 NOT USED	SW14 J2p8 PLUMB BOB TILT	SW24 NOT USED	SW34 JS31p4 TROUGH BALL 3	SW44 JS55 CASTLE LOCK	SW54 J9p12 LOW JET BUMPER	SW64 JS17 RT RAMP EXIT	SW74 JS52 LFT TROLL UP	SW F4 J2p6 LOW LFT FLIP OPTO
D5 J3p7 ESCAPE SVC CRDT	SW15 JS57 LFT TROLL TARGET	SW25 JS62 RT TROLL TARGET	SW35 JS31p3 TROUGH BALL 4	SW45 JS51 LFT TROLL UNDER PF	SW55 J9p11 RIGHT JET BUMPER	SW65 JS45 LFT LOOP LOW	SW75 JS54 RT TROLL UP	SW F5 NOT USED
D6 J3p5 DOWN VOL DWN	SW16 JS42 LEFT OUTLANE	SW26 JS41 LF RETURN LANE	SW36 JS48 LEFT POPPER	SW46 JS53 RT TROLL UNDER PF	SW56 J8p9 D BRIDGE UP	SW66 JS56 LFT LOOP HIGH	NOT USED	SW F6 J2p3 UP RT FLIP OPTO
D7 J3p4 UPp4 VOL UP	SW17 JS26 RT RETURN LANE	SW27 JS25 RIGHT OUTLANE	SW37 JS61 CASTLE GATE	SW47 JS14 LF TOP LANE	SW57 J8p8 D BRIDGE DOWN	SW67 JS21 RT LOOP LOW	NOT USED	SW F7 NOT USED
D8 J3p3 TEST BEGIN	SW18 JS36 SHOOTER LANE	SW28 JS63 RIGHT EJECT	SW38 JS43 CATAPULT	SW48 JS15 RT TOP LANE	SW58 J8p7 TOWER EXIT	SW68 JS16 RT LOOP HIGH	NOT USED	SW F8 J2p4 UP LFT FLIP OPTO

Typical Lamp circuit

Lamp Table (NOT A MATRIX) Cabinet lamp drivers are on the CONTROLLER Board

L11 Q1A RT BANK TOP	L21 Q6A RT LOOP JACKPOT	L31 Q9A TROLLS!	L41 Q13A LFT LOOP JACKPOT	L51 Q25B CENTER ARROW	L61 Q29A FRANCOIS D'GRIMM	L71 Q37B CR85 HOWARD HURTZ	L81 Q35B RIGHT OUTLANE PL81
L12 Q2B RT BANK MIDDLE	L22 Q5B RT JPUST VICTORY	L32 Q9B EXTRA BALL	L42 Q13B LFT JOUST VICTORY!	L52 Q26A BATTLE FOR KINGDOM	L62 Q30B KING OF PAYNE	L72 Q37A CR87 MAGIC SHIELD	L82 Q35A RT RETURN LANE
L13 Q2A RT BANK BOTTOM	L23 Q6B RIGHT CLASH	L33 Q10A MERLIN'S MAGIC	L43 Q14A LEFT CLASH!	L53 Q25A MASTER OF TROLLS	L63 Q30A EARL OF EGO	L73 Q38A CR88 SIR PSYCHO	L83 Q36B LF RETURN LANE
L14 Q1B RT RAMP JACKPOT	L24 Q6A RIGHT CHARGE	L34 Q10B TROLL MADNESS	L44 Q14B LEFT CHARGE!	L54 Q24B DEFENDER OF DAMSELS	L64 Q27B LFT RAMP JACKPOT	L74 Q40A DUKE OF BOURBON PL91	L84 Q36A LEFT OUTLANE PL84
L15 Q4A CR15 SAVE THE DAMSEL! x2 J9p3 +J9p4	L25 Q7A PATRON OF PEASANTS	L35 Q11A DAMSEL MADNESS	L45 Q15A CATAPULT JACKPOT	L55 Q24A LFT TOP LANE +J8p1 J8p4	L65 Q27A REVOLTING PEASANTS!	L75 Q32A CASTLE LOCK2	L85 Q31A CR73 CASTLE LOCK3
L16 Q4B DRAGON DEATH	L26 Q8B CATAPULT ACE	L36 Q11B PEASANT MADNESS	L46 Q15B CATAPULT SLAM!	L56 Q23B RT TOP LANE +J8p2 J8p3	L66 Q28B UGLY RIOT!	L76 Q34B CASTLE LOCK1	L86 Q38B SHOOT AGAIN PL86
L17 Q3A DRAGON SNACK	L27 Q7B JOUST CHAMPION	L37 Q12B CATAPULT MADNESS	L47 Q18A BAM!	L57 Q26B LFT TROLL TARGET	L67 Q28A ANGRY MOB!	L77 Q34A SUPER JACKPOT	L87 Q2A LAUNCH BUTTON J2p13
L18 Q3B DRAGON BREATH	L28 Q8A CASTLE CRUSHER	L38 Q12A JOUST MADNESS	L48 Q18A WHAM!	L58 Q23A RT TROLL TARGET	L68 Q29B RABBLE ROUSER	L78 Q31B J6p11 SUPER JETS x2 J6p8 J6p9	L88 Q1B START BUTTON J2p12

GI LED# ____ PF Left	GI1 P93 BROWN	GI2 P94B ORANGE	GI3 P95B YELLOW
SOCKET# ____ PF Right	Q42A P93B WHT-BRN	Q42B P94 WHT-ORG	Q43A P95 WHT-YEL