MEDIEVAL MADNESS

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OPERATIONS MANUAL INCLUDES

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

DIP SWITCH SETTINGS AND JUMPERS

EPROM Jumper Settings for G11	W1	W2
1MEG, 2MEG, 4 MEG EPROM	In	Out

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. No.	Function	Solenoid Type	Voltage Connections Playfield	Voltage Connections Backbox	Voltage Connections Cabinet	Drive Xistor	Drive Connections Playfield	Drive Connections Backbox	Drive Connections Cabinet	Drive Wire Color	Solenoid Part Number / Flashlamp Type Playfield	Insert
01	AUTO PLUNGER	High Power	J133-2			Q72	J116-1			VIO-BRN	AE-23-800	
02	TROUGH EJECT	High Power	J133-2			Q68	J116-2			VIO-RED	AE-26-1500	
03	LEFT POPPER	High Power	J133-2			Q71	J116-4			VIO-ORG	AE-26-1200	
04	CASTLE	High Power	J133-2			Q67	J116-5			VIO-YEL	AE-26-1500	
05	CASTLE GATE POWER	High Power	J133-2			Q70	J116-6			VIO-GRN	A-20099	
06	CASTLE GATE HOLD	High Power				Q66	J116-7			VIO-BLU		
07	KNOCKER	High Power		J133-2		Q69		J116-8		VIO-BLK	AE-23-800	
08	CATAPULT	High Power	J133-2			Q65	J116-9			VIO-GRY	AL-23-800	
09	RIGHT EJECT	Low Power	J133-3			Q44	J113-1			BRN-BLK	AE-27-1200	
10	LEFT SLINGSHOT	Low Power	J133-3			Q48	J113-3			BRN-RED	AE-26-1200	
11	RIGHT SLINGSHOT	Low Power	J133-3			Q43	J113-4			BRN-ORG	AE-26-1200	
12	LEFT JET BUMPER	Low Power	J133-3			Q47	J113-5			BRN-YEL	AE-26-1200	
13	BOTTOM JET BUMPER	Low Power	J133-3			Q42	J113-6			BRN-GRN	AE-26-1200	
14	RIGHT JET BUMPER	Low Power	J133-3			Q46	J113-7			BRN-BLU	AE-26-1200	
15	TOWER DIVERTER PWR	Low Power	J133-3			Q41	J113-8			BRN-VIO	A-20099	
16	TOWER DIVERTER HOLD	Low Power				Q45	J113-9			BRN-GRY		
17	LEFT SIDE LOW FLSHRS	Flasher	J133-6	J134-5		Q28	J111-1	J112-1		BLK-BRN	#906 (1)	#906 (1)
18	LEFT RAMP FLASHERS	Flasher	J133-6	J134-5		Q32	J111-2	J112-2		BLK-RED	#89 (1)	#906 (1)
19	LEFT SIDE HIGH FLSHRS	Flasher	J133-6	J134-5		Q27	J111-3	J112-3		BLK-ORG	#906 (1)	#906 (1)
20	RIGHT SIDE HIGH FLSHRS	Flasher	J133-6	J134-5		Q31	J111-4	J112-4		BLK-YEL	#906 (1)	#906 (1)
21	RIGHT RAMP FLASHERS	Flasher	J133-6			Q26	J111-5			BLU-GRN	#906 (1), #89 (1)	
22	CASTLE RIGHT SIDE FLSHRS	Flasher	J133-6			Q30	J111-6			BLU-BLK	#906 (2)	
23	RIGHT SIDE LOW FLSHRS	Flasher	J133-6			Q25	J111-7			BLU-VIO	#906 (1), #89 (1)	
24	MOAT FLASHERS	Flasher	J133-6			Q29	J111-8			BLU-GRY	#89 (2)	
25	CASTLE LEFT SIDE FLSHRS	Gen. Purpose	J133-6			Q16	J109-1			BLU-BRN	#906 (2)	
26	*TOWER LOCK POST	Gen. Purpose	J133-1			Q15	J109-2			BLU-RED	AE-27-1200	
27	*RIGHT GATE	Gen. Purpose	J133-1			Q14	J109-3			BLU-ORG	A-14406	
28	*LEFT GATE	Gen. Purpose	J133-1			Q13	J109-4			BLU-YEL	A-14406	

General Illumination

Sol. No.	Function	Type	Voltage Connections Playfield	Voltage Connections Backbox	Voltage Connections Cabinet	Drive Xistor	Drive Connections Playfield	Drive Connections Backbox	Drive Connections Cabinet	Drive Wire Color	Playfield	Insert
01	BOTTOM PLAYFIELD	G.I.	J106-1	J105-1		Q5	J106-7	J105-7		WHT-BRN	#44	#555
02	MIDDLE PLAYFIELD	G.I.		J105-2		Q4		J105-8		WHT-ORG		#555
03	TOP PLAYFIELD	G.I.		J105-3		Q3		J105-9		WHT-YEL		#555
04	**TOP INSERT	G.I.	J106-5			Q2	J106-10			WHT-GRN	#44	
05	**BOTTOM INSERT	G.I.	J106-6		J104-3	Q1	J106-11		J104-1	WHT-VIO	#44	

Flipper Circuits		Solenoid Type	Voltage Connection Playfield	Drive Xistors Power	Drive Xistors Hold	Drive Connections Playfield	Drive Wire Colors Power	Drive Wire Colors Hold	Coil Part No.	Coil Colors
29		Power	J119-1 (RED-GRN)	Q90		J120-13	YEL-GRN		FL-11629	BLUE
30	LOWER RIGHT FLIPPER	Hold	J119-1 (RED-GRN)		Q92	J120-11		ORG-GRN		
31		Power	J119-4 (RED-BLU)	Q87		J120-9	YEL-BLU		FL-11629	BLUE
32	LOWER LEFT FLIPPER	Hold	J119-4 (RED-BLU)		Q89	J120-7		ORG-BLU		
33		Power	J119-6 (RED-VIO)	Q84		J120-6	YEL-VIO		FL-11753	YELLOW
34	LEFT TROLL	Hold	J119-6 (RED-VIO)		Q86	J120-4		ORG-VIO		
35		Power	J119-8 (RED-GRY)	Q81		J120-3	YEL-GRY		FL-11753	YELLOW
36	RIGHT TROLL	Hold	J119-8 (RED-GRY)		Q83	J120-1		ORG-GRY		

Motor Circuit		Solenoid Type	Voltage Connections Playfield	Drive Gates	Drive Connections Playfield	Drive Wire Color	Device Part Number Playfield
37	DRAWBRIDGE MOTOR	Low Power	J139-2	U3A, U3B	J110-1	BRN-WHT	14-8015

J1XX = POWER DRIVER BOARD
24-6549 = #44 BULB; 24-8704 = #89 BULB; 24-8768 = #555 BULB; 24-8802 = #906 BULB
*TIEBACK DIODES FOR SOLENOIDS 26 THROUGH 28 ARE AT J109-6, J109-8, AND J109-9 RESPECTIVELY.
**THESE G.I. STRINGS DO NOT BRIGHTEN AND DIM, THEY ARE ALWAYS ON.

DECLARATION OF CONFORMITY

WILLIAMS ELECTRONICS GAMES, INC.

3401 N. CALIFORNIA AVE.
CHICAGO, IL 60618
U.S.A.

WE, HEREBY DECLARE UNDER SOLE RESPONSIBILITY THAT

THE MODEL: *"MEDIEVAL MADNESS"* *50259,50359,50459,50759,50959,*
51059,51159,51359,51459,51859,52059,52159,52259, 52359, 57259 PIN

TO WHICH THIS DECLARATION RELATES IS IN CONFORMITY WITH THE
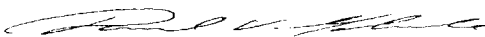FOLLOWING EUROPEAN PRODUCT SAFETY DIRECTIVES:

ELECTROMAGNETIC COMPATABILITY DIRECTIVE
(89/336/EEC AND AMENDMENTS 91/C162/08, 92/31/EEC,93/68/EEC

ELECTRICAL EQUIPMENT DESIGNED FOR USE WITHIN
CERTAIN VOLTAGE LIMITS DIRECTIVE
(73/23/EEC AND AMENDMENTS 88/C168/02, 92/C210/01,
93/68/EEC, 94/C199/03, 95/C214/02)

EN 55014:1993   EN55104:1995   EN61000-4-2: 1995
IEC 801-3: 1984 (EN61000-4-3)   EN61000-4-4: 1995   EN61000-4-5: 1995
ENV50141: 1993 (EN61000-4-6)   EN61000-4-11: 1994 EN60335-1: 1995
IEC 335-2-82 (DRAFT)

Date issued: MAY 1, 1997

MANUFACTURE'S SIGNATURE

DAN GALARDE

CORPORATE V.P. OF QUALITY

ATTENTION

The game uses a Security CPU Board that is not downward compatible to the CPU boards used in previous games. The board has an added security chip that can be interchanged between other **MEDIEVAL MADNESS** games and software revision levels. The CPU board itself is interchangeable with later model games, but must be equipped with the correct security chip and software for that specific game.

The games' electronic ID number is shown in the display during power-up. The number displayed is the same nine-digit number printed on the security chip label. The first three digits are the project number without the country specific code. An example of the power-up display is shown below, the electronic ID number is bolded.

TESTING	
50059	EPROM 1.0 A
559 100006 95749	

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 assembly (part no. A-18249-3), located at the left of the coin door opening, has been added to the game. This assembly consists of a bracket containing the existing memory protect switch on the bottom and a new interlock switch on the top. When the coin door is opened, this new interlock switch opens, breaking the connection to the +50V and +20V winding of the transformer secondary.

INTERLOCK SWITCH ASSEMBLY
(A-18249-3)
(A-18249-2, JAPAN ONLY)
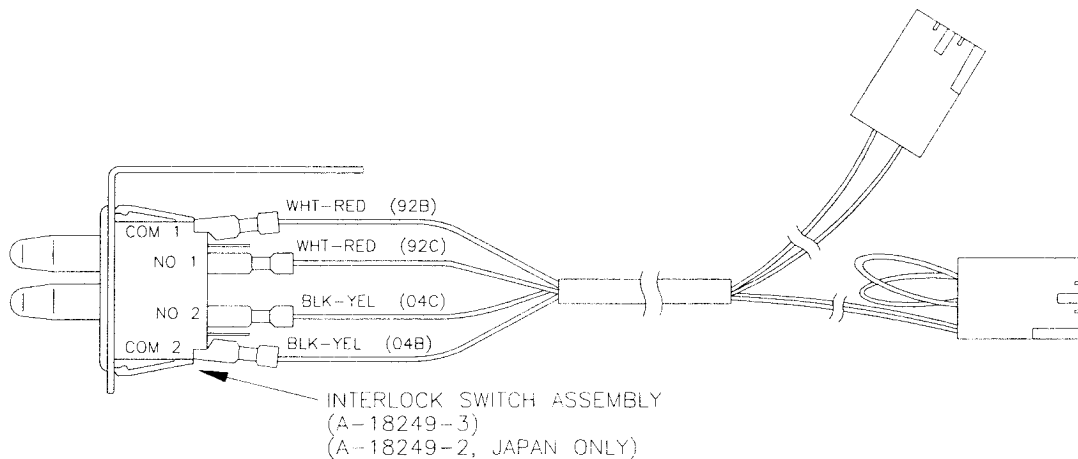
MEDIEVAL MADNESS

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.

PIC Number _____   Serial Number _____

TABLE OF CONTENTS

Section 3 Continued...

NOTES

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.

16-10489.1

Typical 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!

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.

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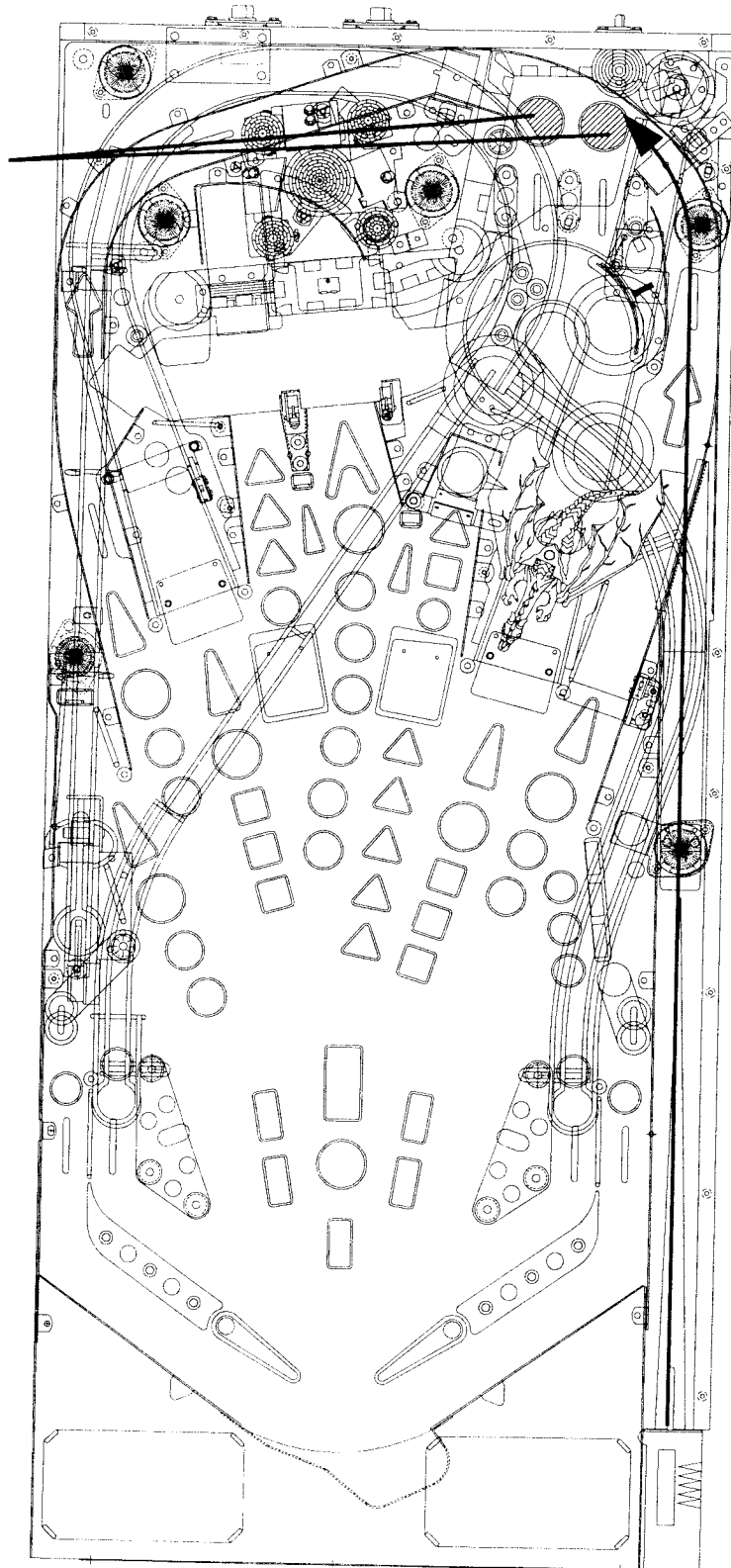
SUPER SKILL SHOT At ball start, hold left flipper <u>while</u> launching the ball. Then, make any flashing jackpot shot. Making a flashing shot awards Big Points and starts a Hurry-up on the center Castle Drawbridge shot.

HURRY—UP

JACKPOT
ARROW
LIGHTS

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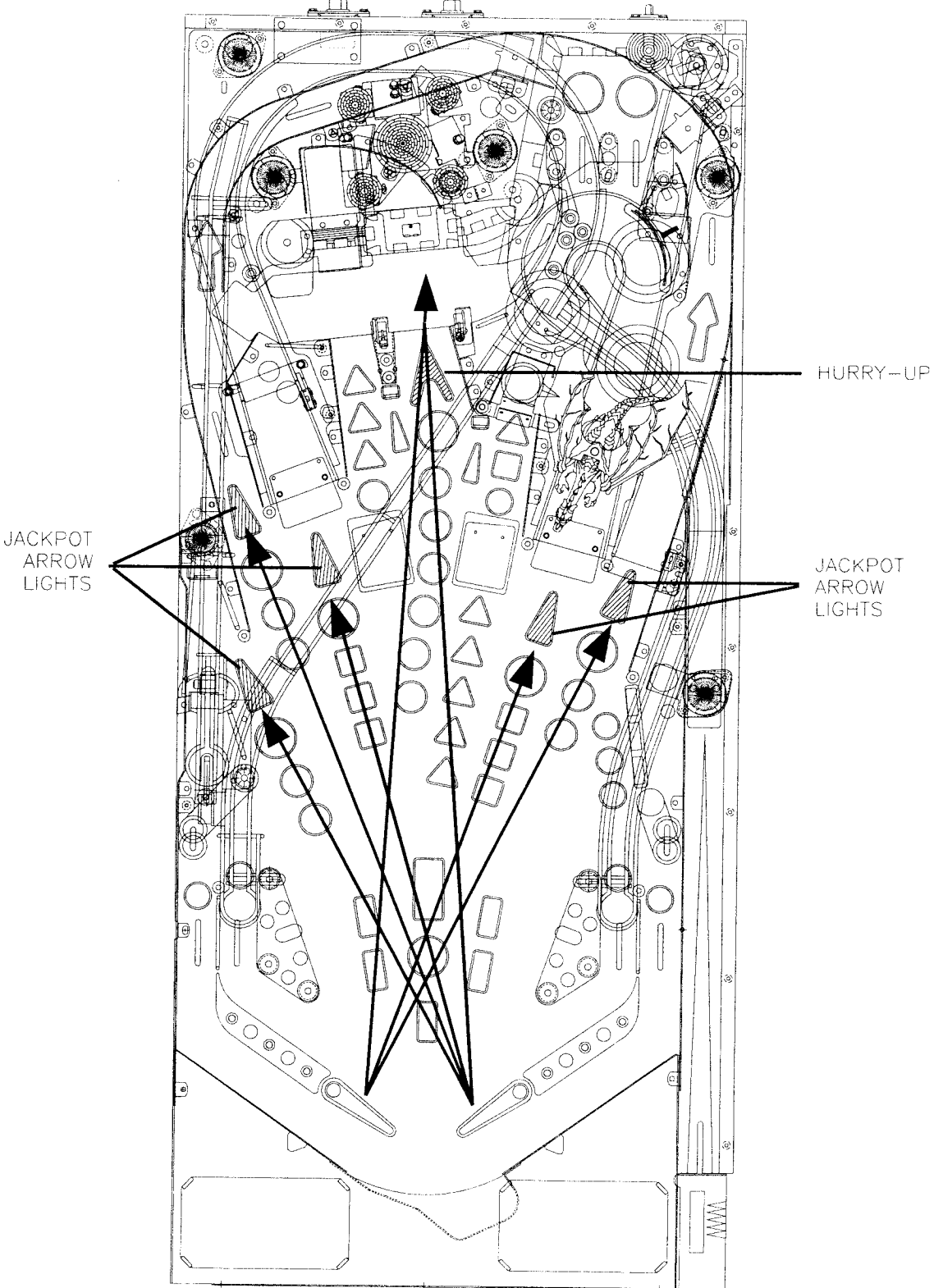
MERLIN'S MAGIC   Complete the three right side Standup Targets to light Merlin's Magic located at the right eject hole. Make the right eject shot to collect Merlin's Magic Mystery Award, (shown in the display).

RIGHT
EJECT

MERLIN'S
MAGIC

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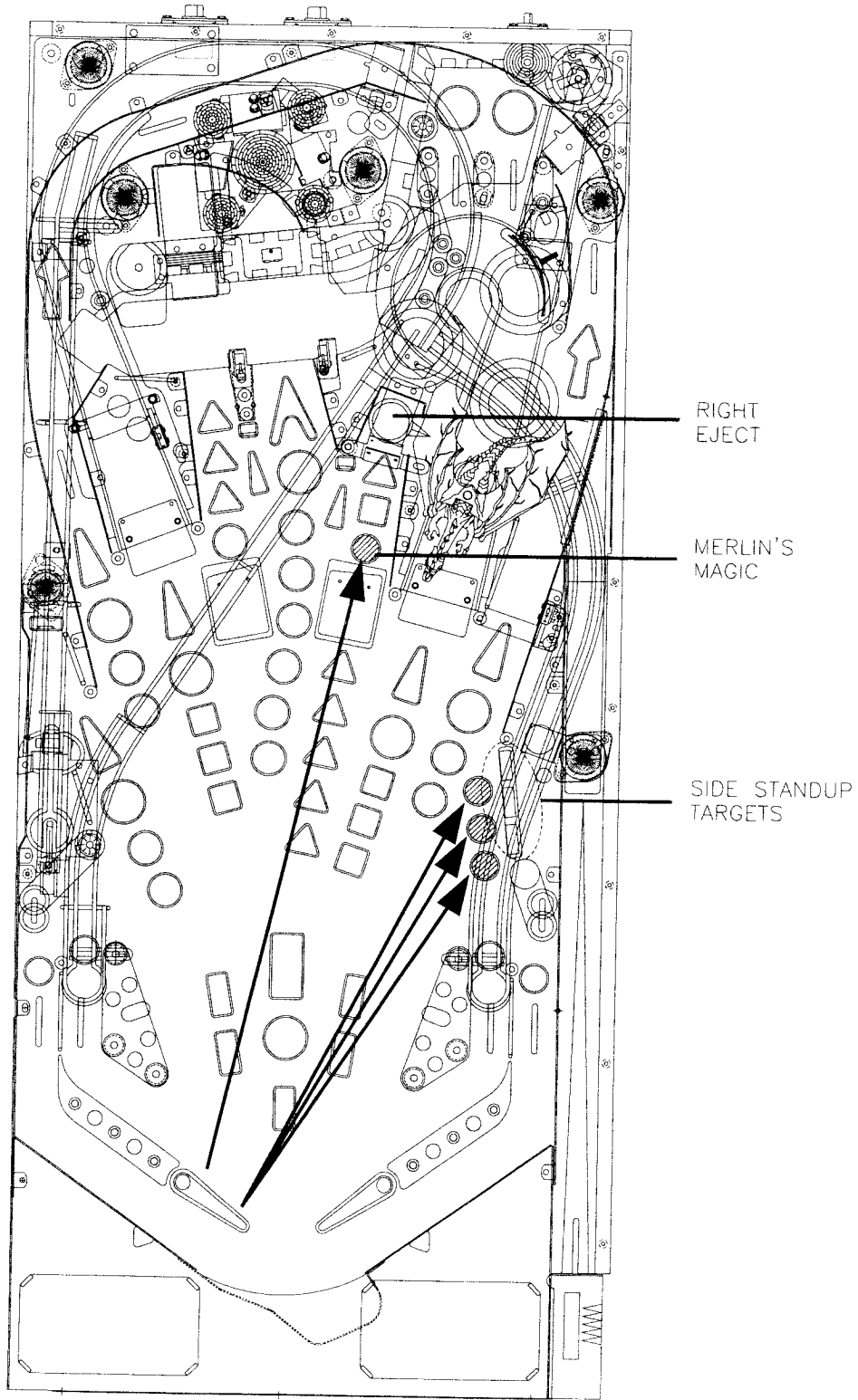
EXTRA BALL To light Extra Ball, destroy Castles, complete Hurry-ups (the displayed number of times), and/or collect Castle Multiball Super Jackpots (adjustable). Then, make the right eject shot to collect the Extra Ball. Completing Royal Madness also awards an Extra Ball (adjustable).

HURRY-UP

CASTLE
SUPER
JACKPOT

RIGHT EJECT

EXTRA BALL

ROYAL
MADNESS
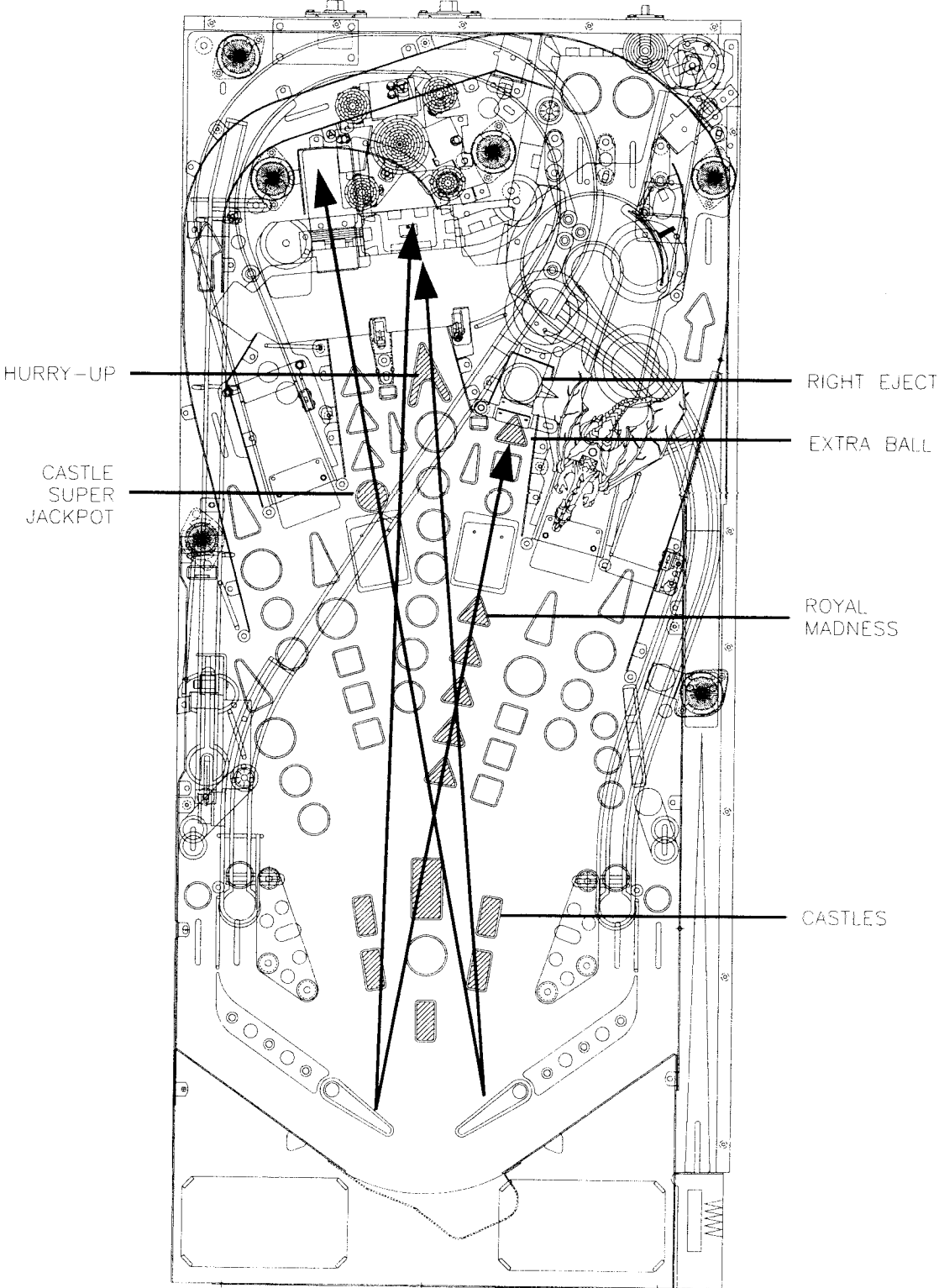
CASTLES

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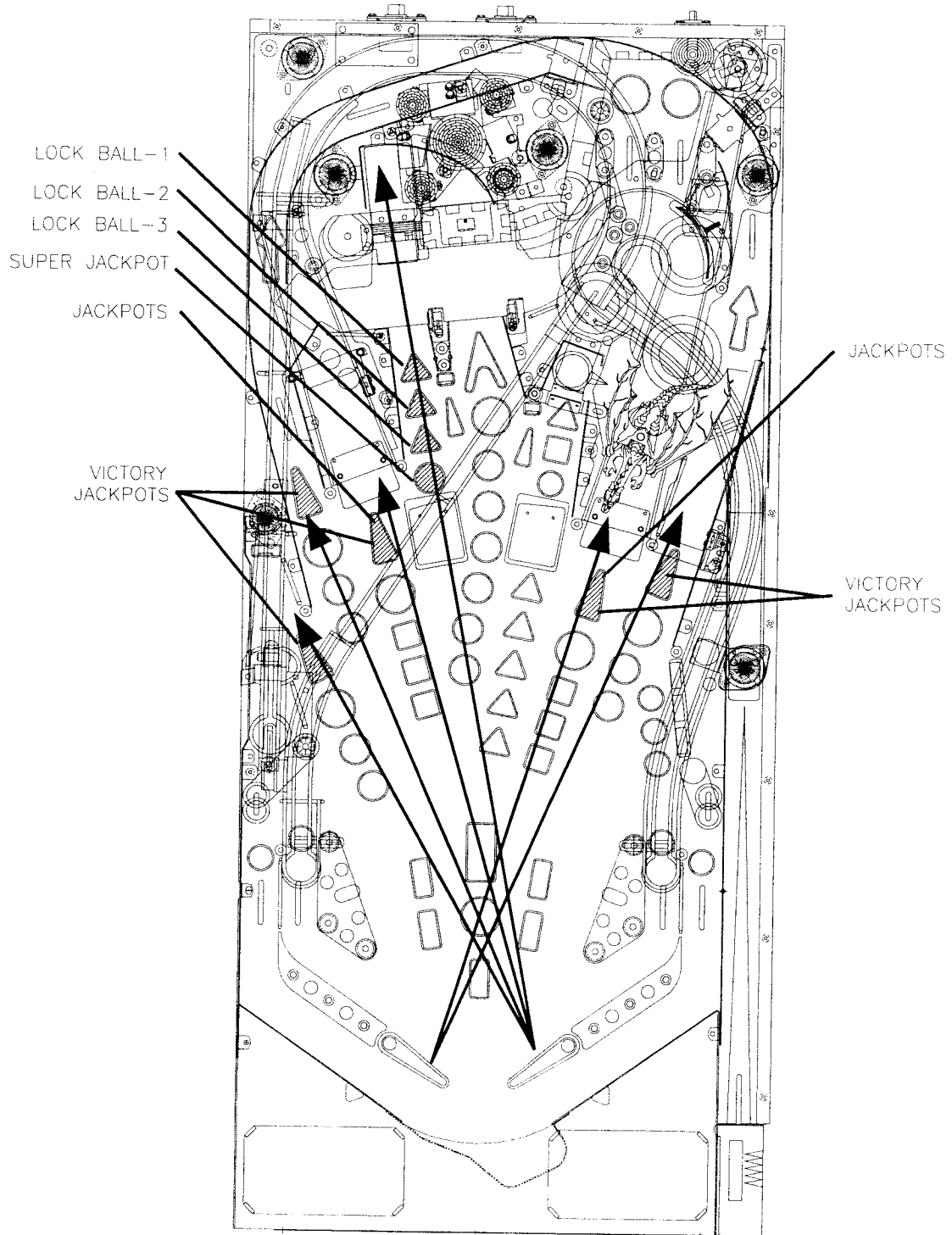
TROLLS! Hit the center yellow Standup Targets to light Trolls! (See display for number of hits needed.) Make the Right Eject shot to start Trolls! Hit pop-up troll heads to destroy them and light Troll Madness located at the Right Eject hole.
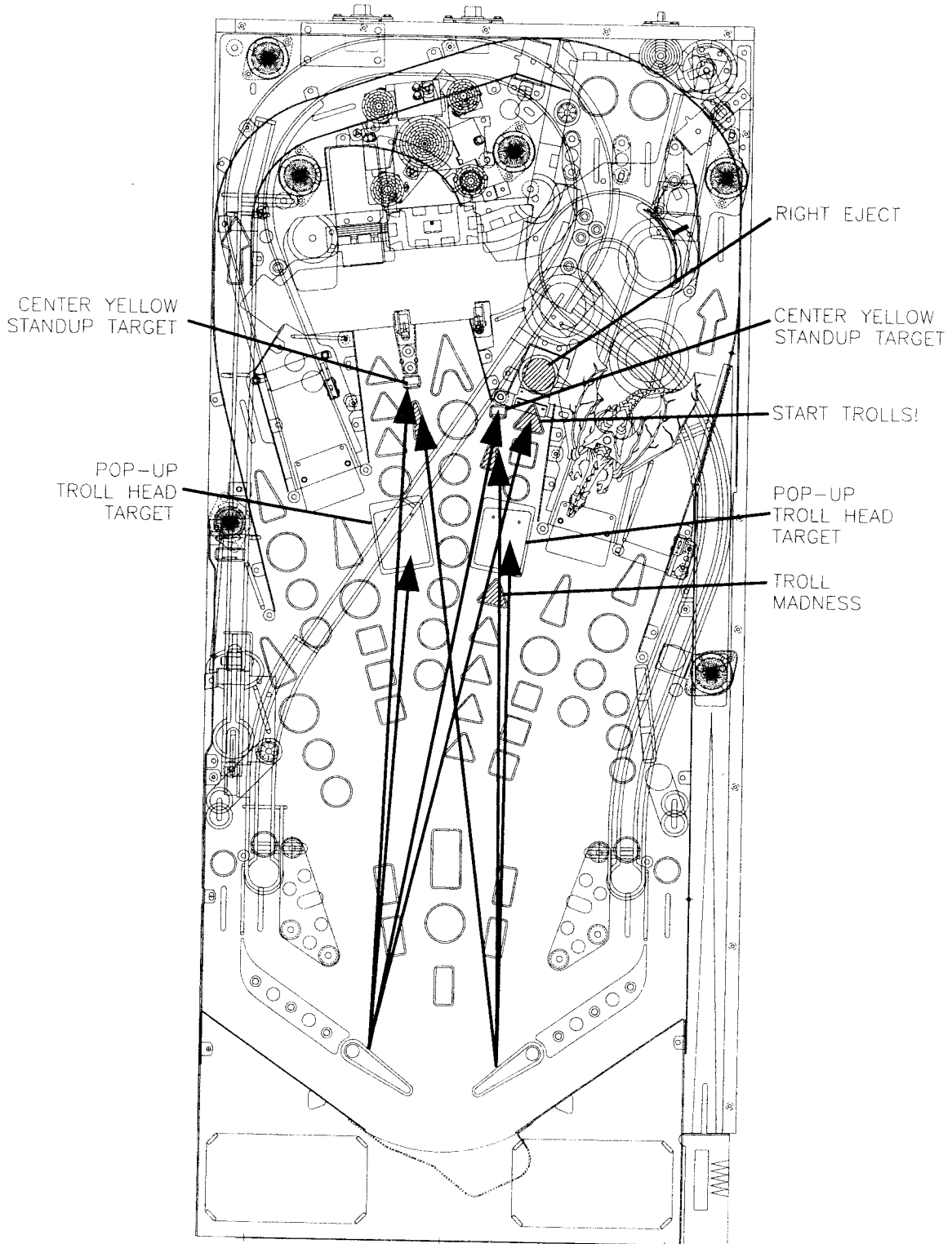
RIGHT EJECT

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.
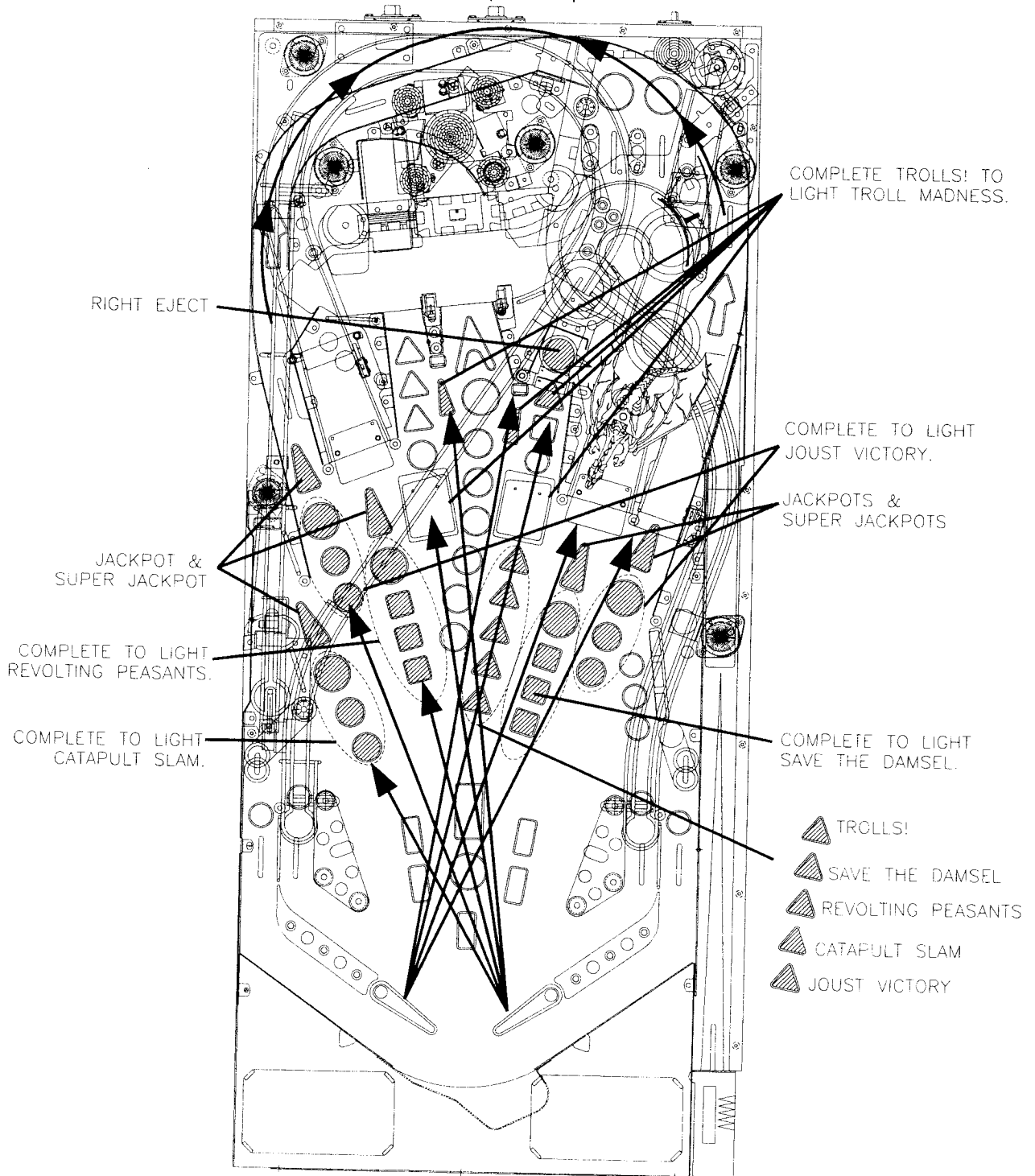
RIGHT EJECT

COMPLETE TROLLS! TO
LIGHT TROLL MADNESS.

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.

TROLLS!

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

TROLLS!

SAVE THE DAMSEL

REVOLTING PEASANTS

CATAPULT SLAM

JOUST VICTORY

ROYAL MADNESS IS LIT
WHEN ALL THE ABOVE
IS FLASHING.

10
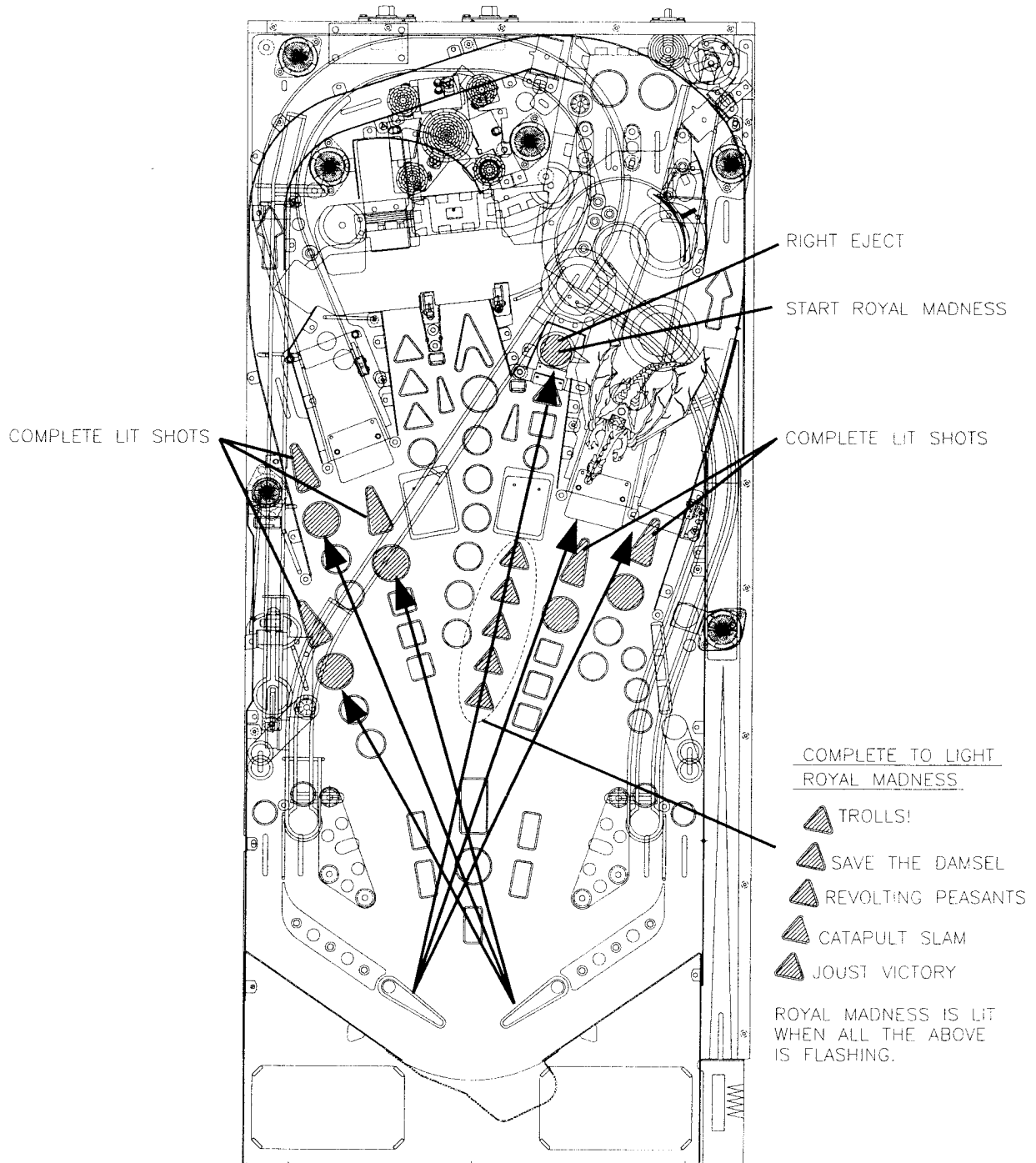
HURRY-UP   Start Hurry-up on center shot by completing one or more of the following: Joust Victory, Catapult Slam, Revolting Peasants, Save the Damsel, or Trolls _after_ its Multiball Madness light is lit. Make the center shot to collect Hurry-up Award.

HURRY-UP
CENTER SHOT

MULTIBALL
MADNESS
LIGHTS

COMPLETE
SAVE THE
DAMSEL

COMPLETE
JOUST VICTORY

COMPLETE
REVOLTING
PEASANTS

COMPLETE
JOUST VICTORY

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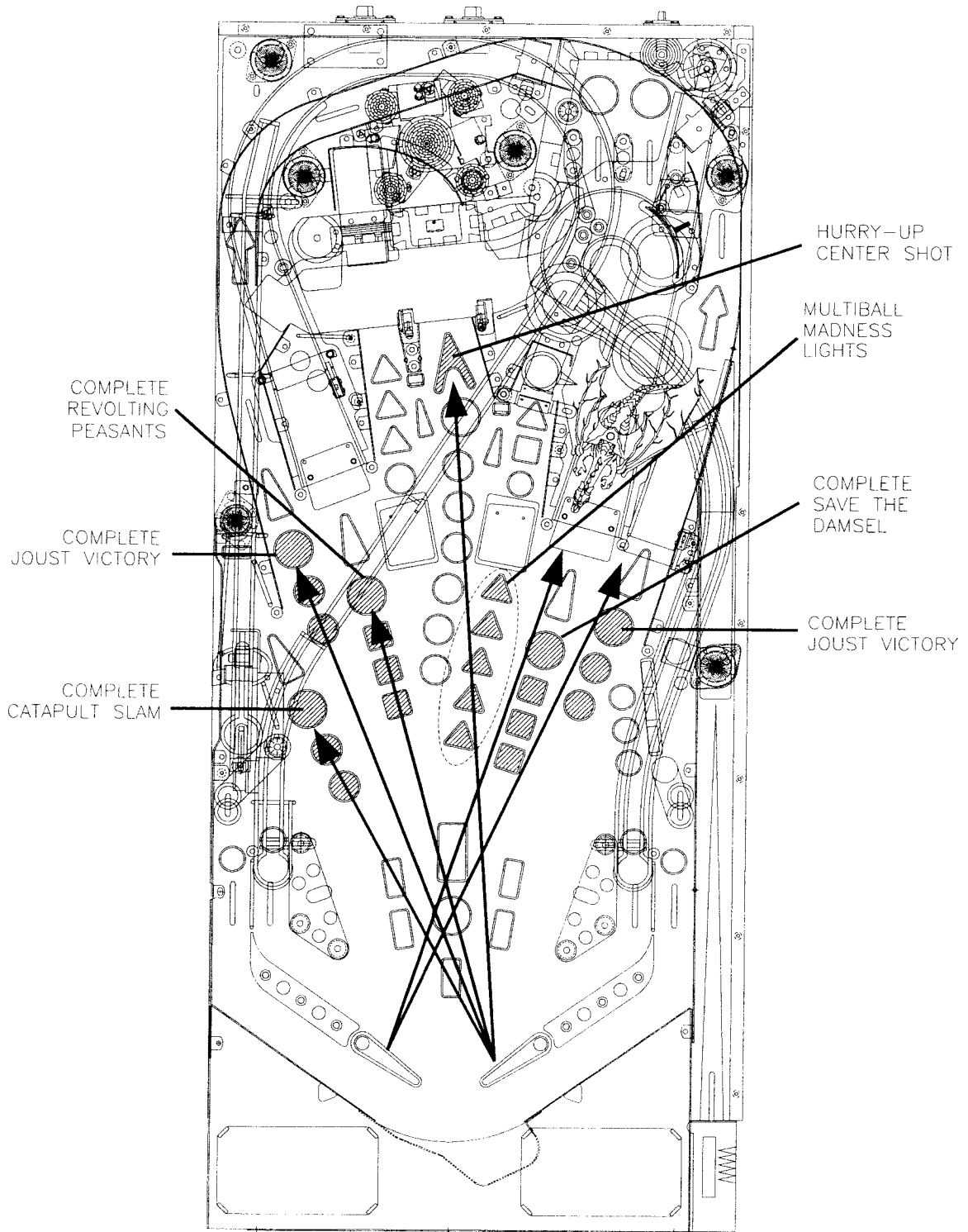
DESTROY CASTLES To destroy castles, shoot the drawbridge, then castle gate, then shoot into castle. Destroy each of the King's Men's Castles to attack the King of Payne.

INTO CASTLE

GATE

DRAWBRIDGE

KING OF PAYNE'S CASTLE

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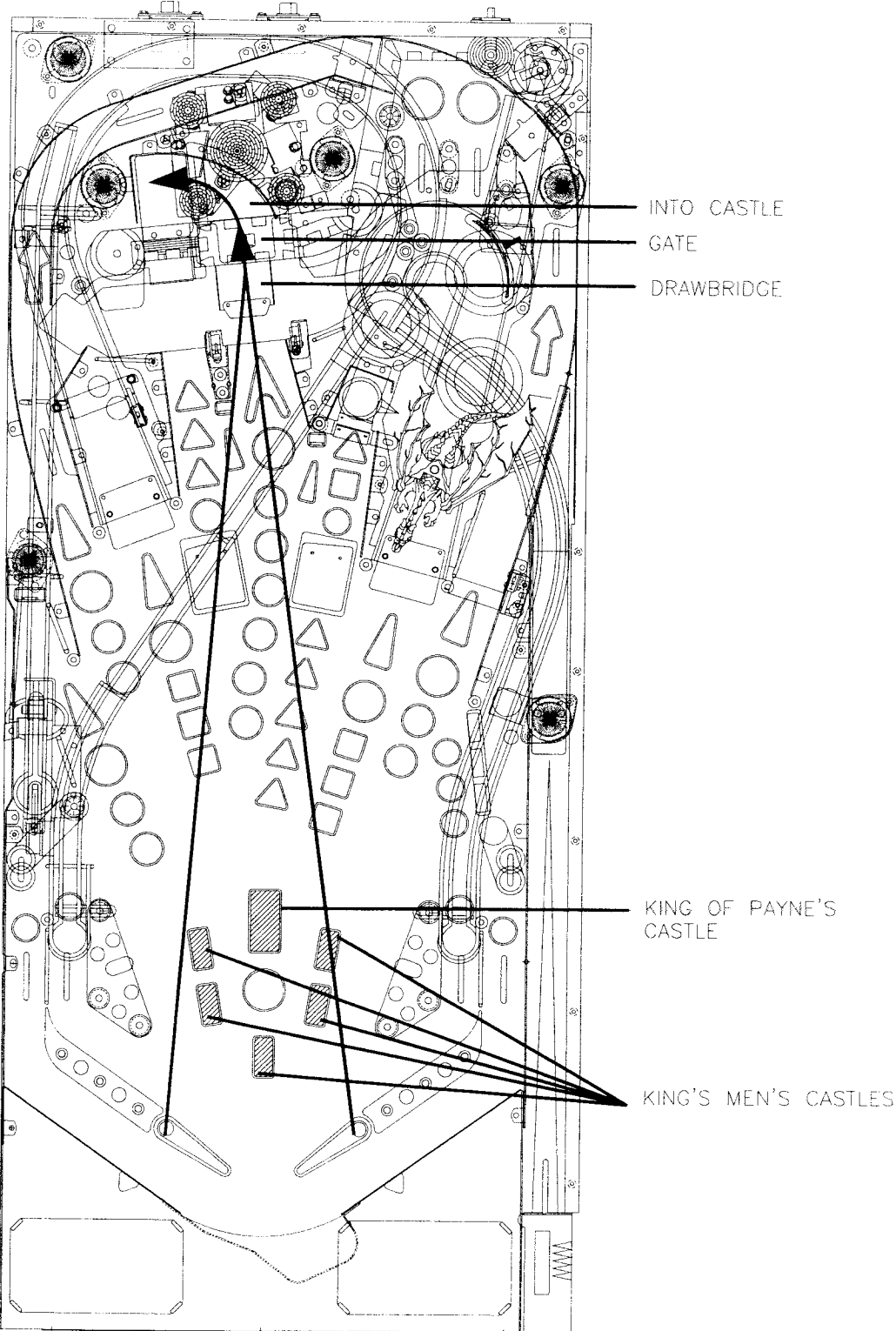
SUPER JETS Hit the jet bumpers the number of times needed (see display) to start Super Jets. Once Super Jets is started, hit the jet bumpers the number of times (see display again) for Big Points. Each time Super Jets is started, the value of each hit increases.

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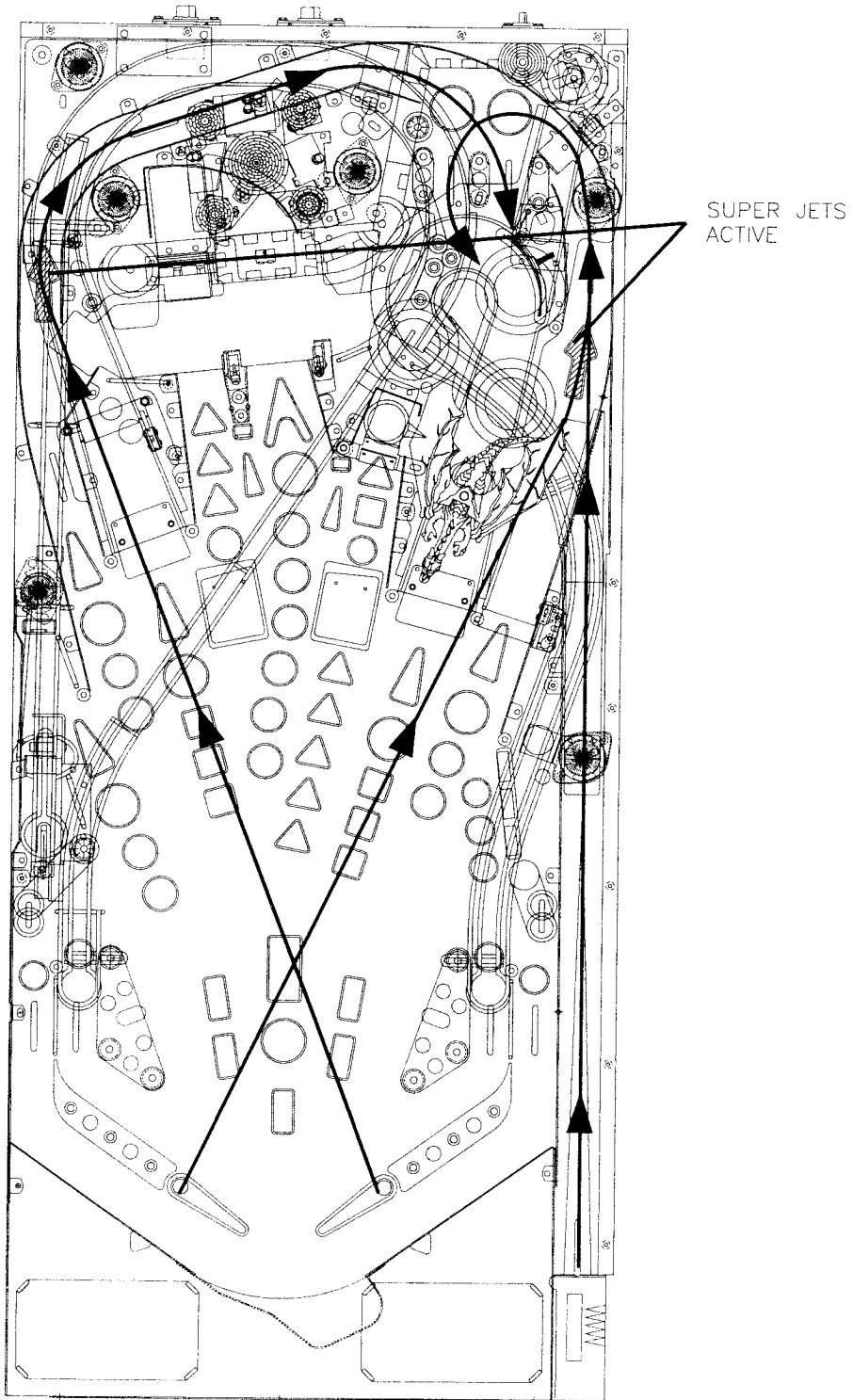
BONUS X   Complete top lanes for End of Ball Bonus Multiplier. Complete bottom lanes for End of
Ball Bonus Multiplier X2.

TOP LANES

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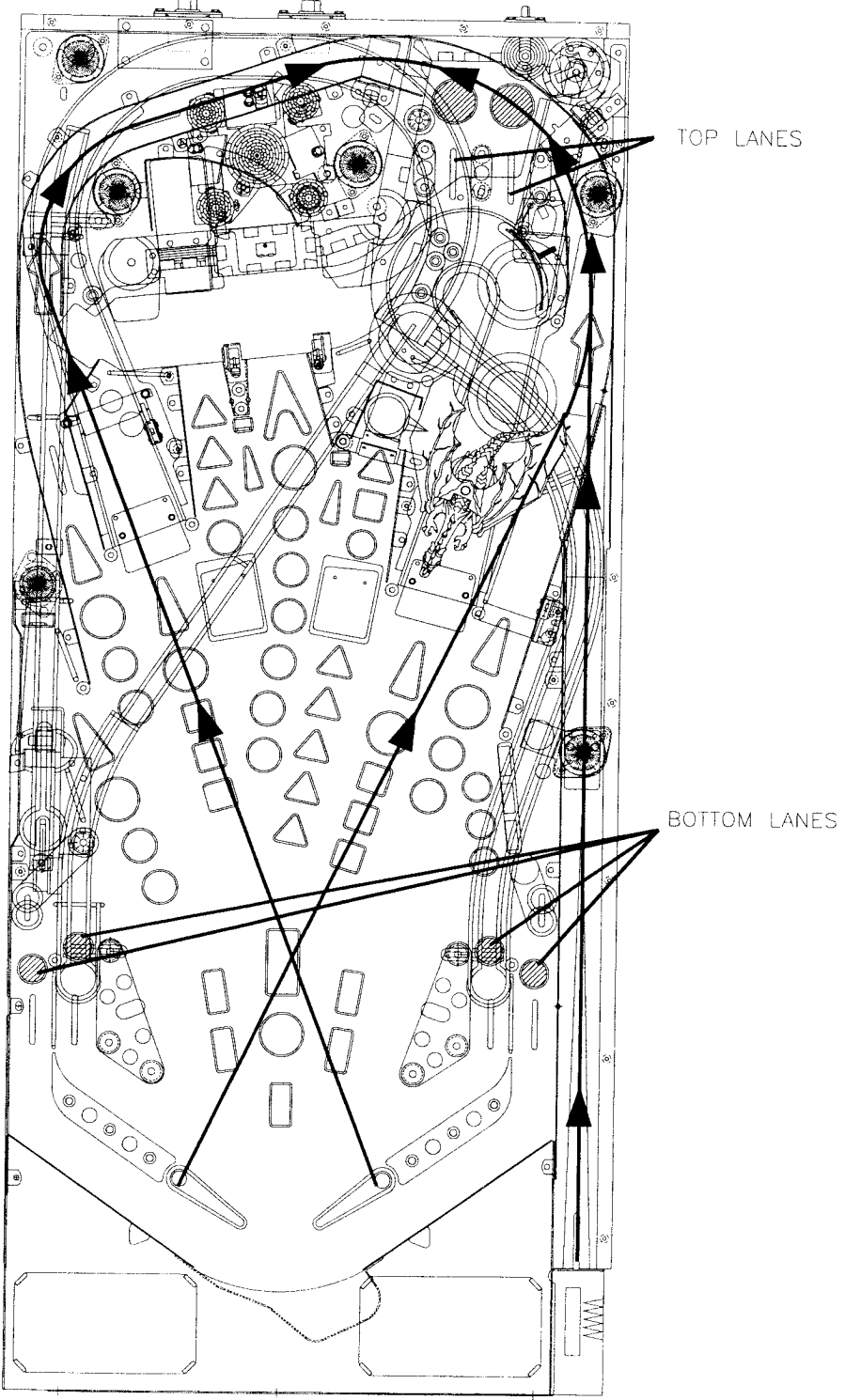
SMACK-A-TROLL   Awarded randomly from the Merlin's Magic Mystery Award located at the Right Eject. Hit Trolls as they pop up the required number of times (see display) during the allowed time for Big Points.

TROLLS

RIGHT EJECT

MERLIN'S MAGIC

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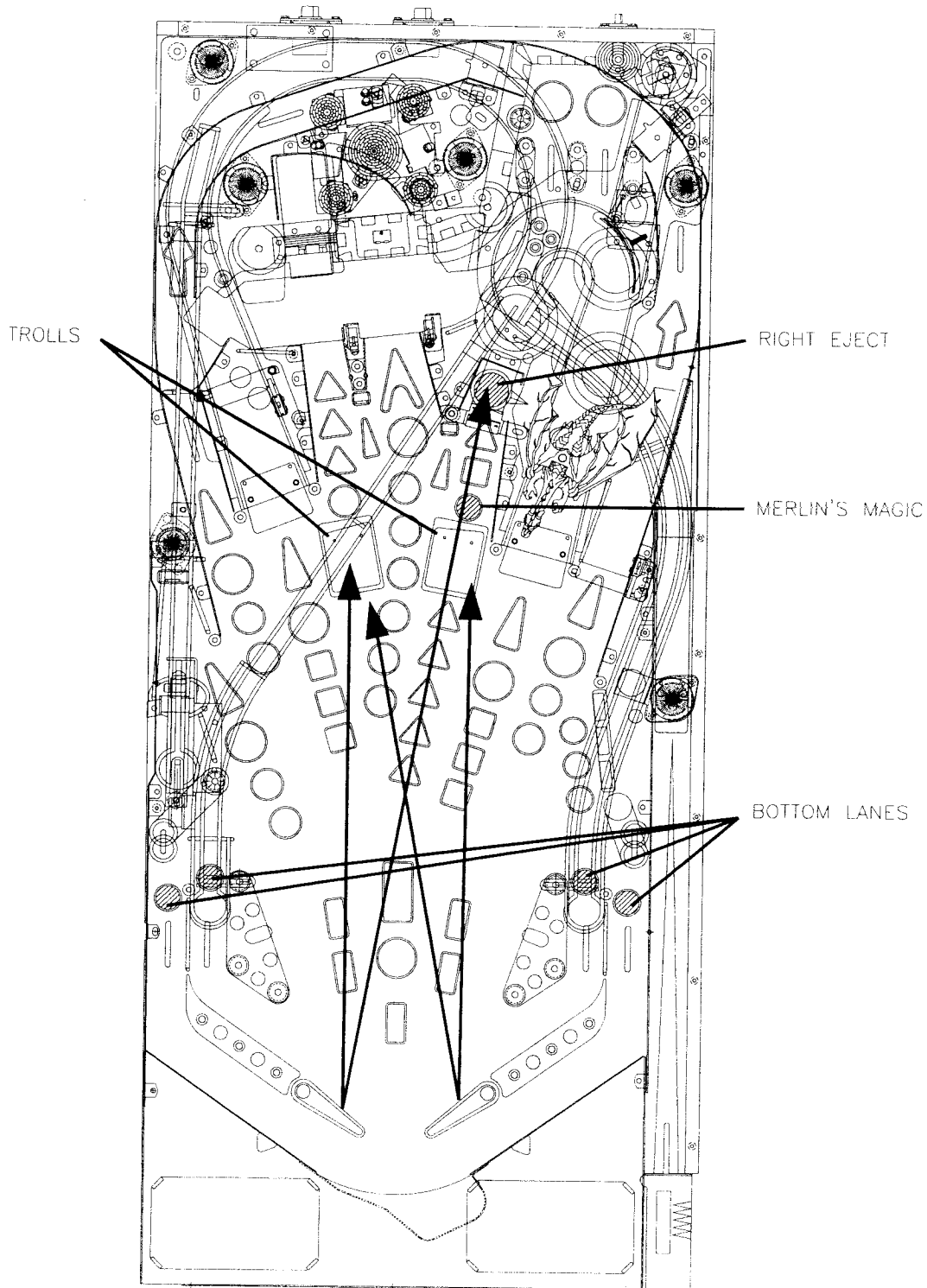
BARNYARD MULTIBALL   Collect (throw), all five different catapult projectiles to light Barnyard Multiball located at the catapult. Shoot the catapult to start. Make flashing shots while in multiball for Big Points and fun animal sounds.
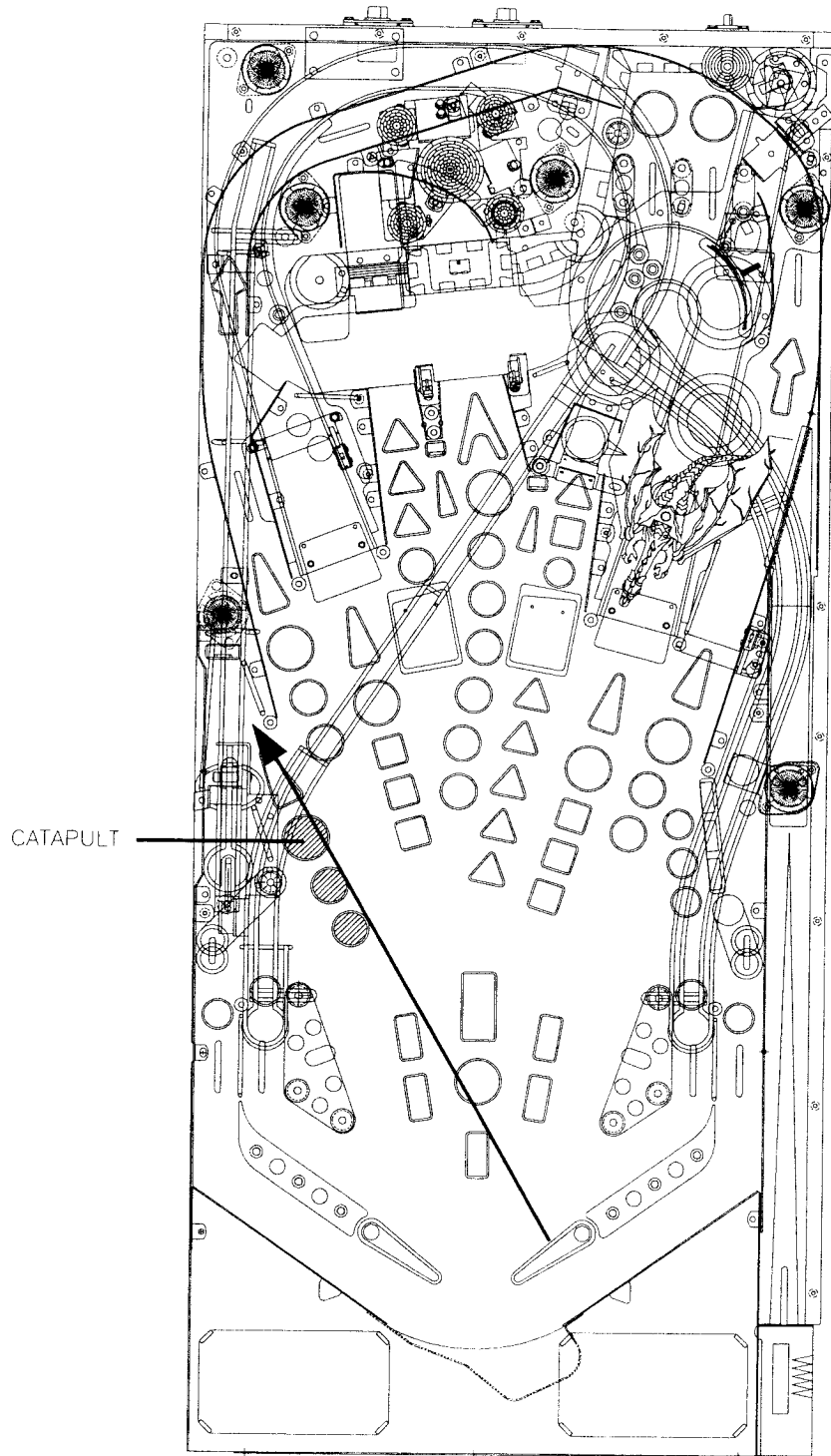
CATAPULT

BATTLE FOR THE KINGDOM   Collect three joust victories (Joust Champion), three catapult slams (Catapult Ace), three revolting peasants (Patron of the Peasants), three damsels (Defender of Damsels), destroy ten trolls (Master of Trolls), and destroy all castles (Castle Crusher), to light Battle for the Kingdom. Make the center shot to start the Battle. During the Battle, make all of the flashing shots to destroy the King of Payne.

FLASHING SHOTS

BATTLE FOR
THE KINGDOM

MASTER OF TROLLS

DEFENDER OF DAMSELS

PATRON OF THE
PEASANTS

FLASHING SHOTS

CATAPULT ACE

JOUST CHAMPION

CASTLE CRUSHER

FLASHING SHOTS
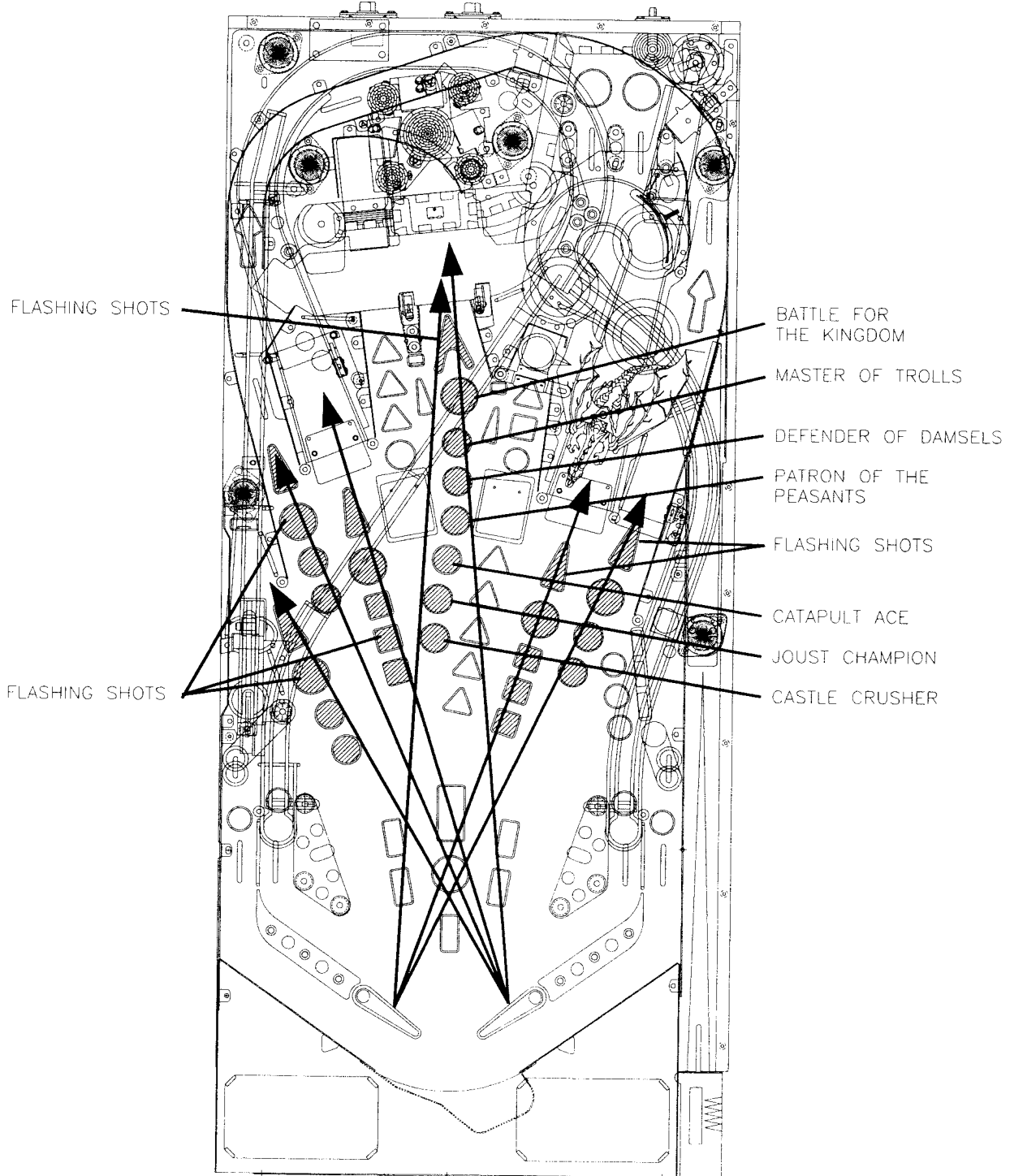
NOTES

SECTION ONE

GAME OPERATION
AND TEST INFORMATION

(System WPC) ROM SUMMARY

IC	TYPE	BOARD	LOCATION	PART NUMBER
Game 1	27c040	CPU	G11	A-5343-50059-1
Security Chip	PIC16C57	CPU	G10	A-5400-50059-1
Music/Speech	27c040	Audio	SU2	A-5343-50059-S2
Music/Speech	M27c801	Audio	SU3	5341-15451-SU3
Music/Speech	M27c801	Audio	SU4	5341-15451-SU4
Music/Speech	M27c801	Audio	SU5	5341-15451-SU5
Music/Speech	M27c801	Audio	SU6	5341-15451-SU6

NOTICE

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

PINBALL GAME ASSEMBLY INSTRUCTIONS

MEDIEVAL MADNESS IS A FOUR BALL GAME.

Power: Domestic 120V @ 60Hz
Foreign 230V @ 50Hz
Japan 100V @ 50HZ

Temp: 32°F to 100° F, (0°C to 38°C)

Humidity: Not to exceed 95% relative.

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

Weight: 325 lb. approx. (crated)

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

2. Leg levelers and leg bolts are among the parts in the cash box. Install leg levelers on the front and rear legs (View 1). Place cabinet on a support and attach rear legs using leg bolts (View 2).

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

Detailed View—Leg Leveler

Chrome Leg Assembly
A-19414

Leg Leveler
08-7377

Nut
4422-01117-00

0 Degrees

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

See Detailed
View

VIEW 1

Coin Door

FRONT

REAR
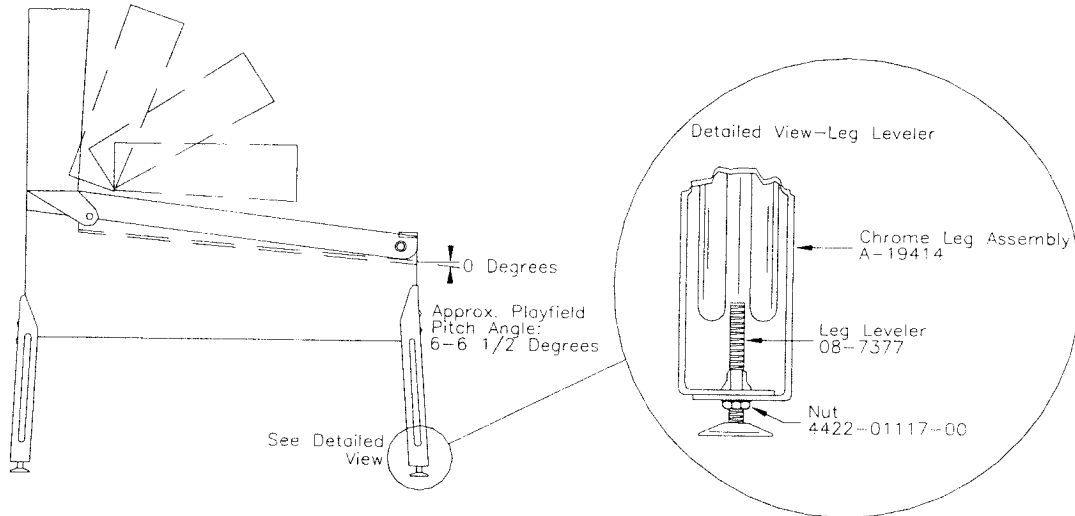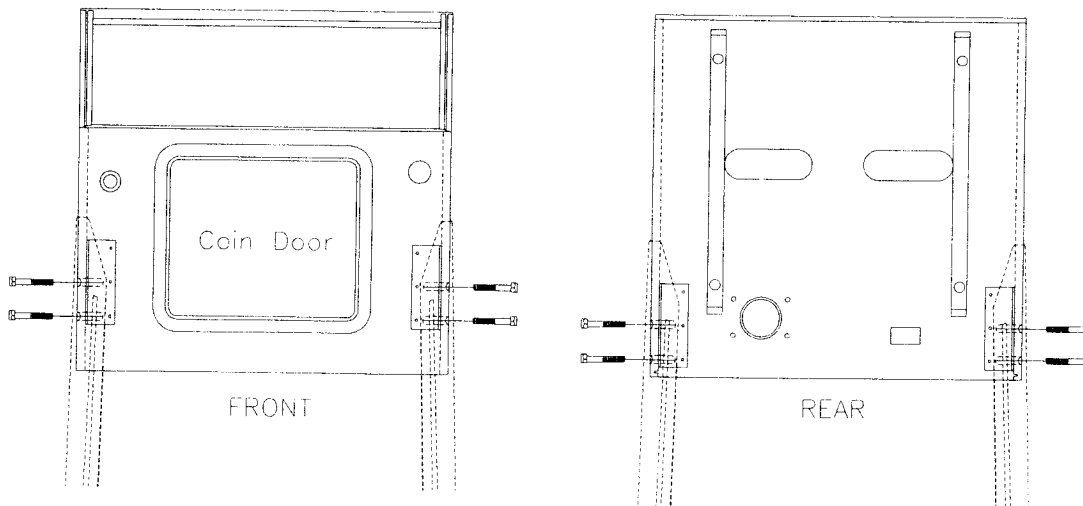
VIEW 2

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 cable extending from the backbox to the insert panel. 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 speakers 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 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 display cable, speaker cable, and ground strap. Line up the bottom notches with the bottom backbox pins. Lower the speaker panel through the notches and slide it under the backbox pins.
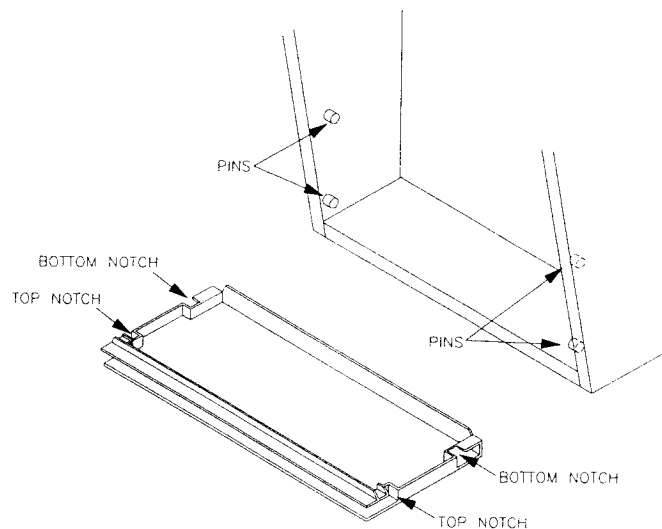
6. After the washer-head mounting bolts are installed, replace the speaker panel and the backglass/insert panel. Lock the backbox.

⚠ 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.

PLAYFIELD GLASS

FRONT MOLDING

LEVER GUIDE ASSEMBLY

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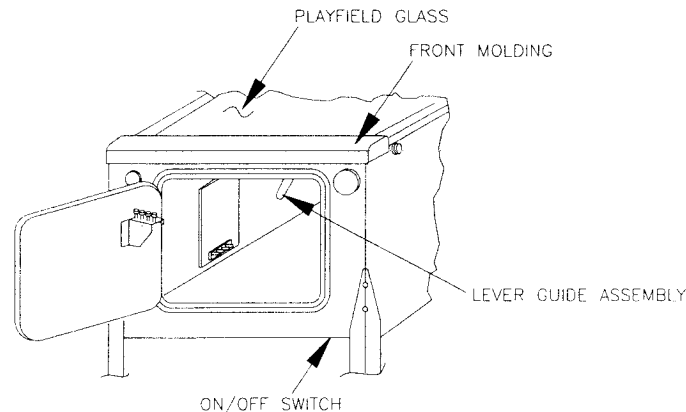
9. Place a level or an inclinometer on the playfield surface. Adjust the leg levelers for proper playfield level (side-to-side).

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

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

TRU-PITCH™ level 6-1/2 degrees.
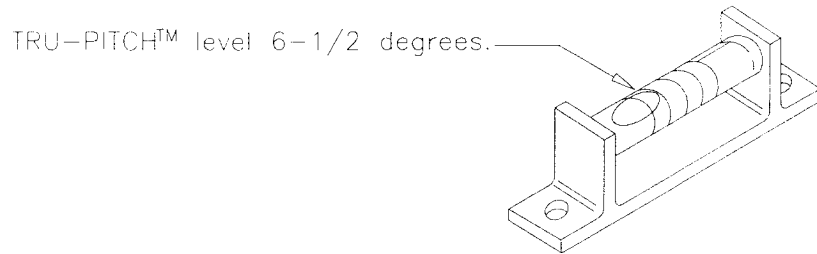
IMPORTANT!
Playfield pitch angle can affect the operation of the plumb bob tilt. The plumb bob weight is among the parts in the cash box; the operator should install the weight and adjust this tilt mechanism for proper operation, after completion of the desired playfield pitch angle setting. The unit is factory installed for a 6-1/2 degree angle. If an adjustment is necessary, loosen the screw at the bottom of the unit. Move the pointer, one grove 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.

12. Install full playfield Mylar, if desired.

   Note: The **MEDIEVAL MADNESS** playfield is coated with a special hardcoat surface and does not require a protective Mylar. However, mylars can be purchased through your local Williams Distributor. Specify part number 03-9804-3 for full playfield Mylar.

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

14. To attach the line cord, remove the four Phillips-head screws that mount to line cord cover plate to the rear cabinet. Match the prongs on the plug with the holes in the receptacle, and push the line cord securely into place. Make sure the cord is aligned with the indentation on the cover plate (indentation should point toward bottom of the cabinet). Remount line cord cover plate. If desired, four tamper resistant screws have been provided, in the unique parts bag, to remount cover plate.
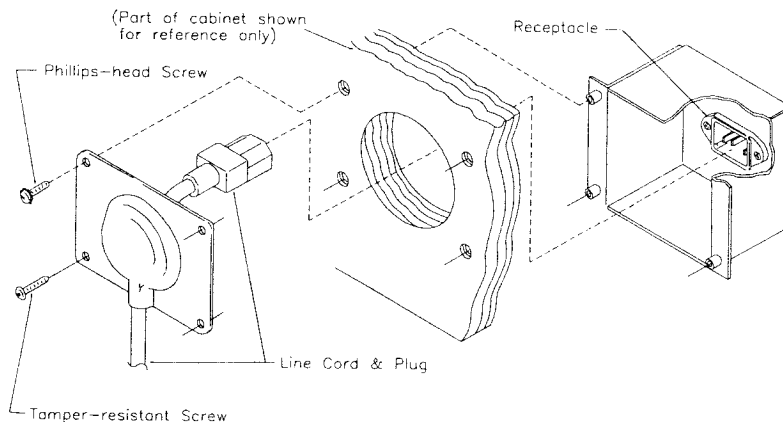
15. Move the game into the desired location; recheck the level and pitch angle of the playfield.

16. If a padlock is desired, install the security bar as shown below.
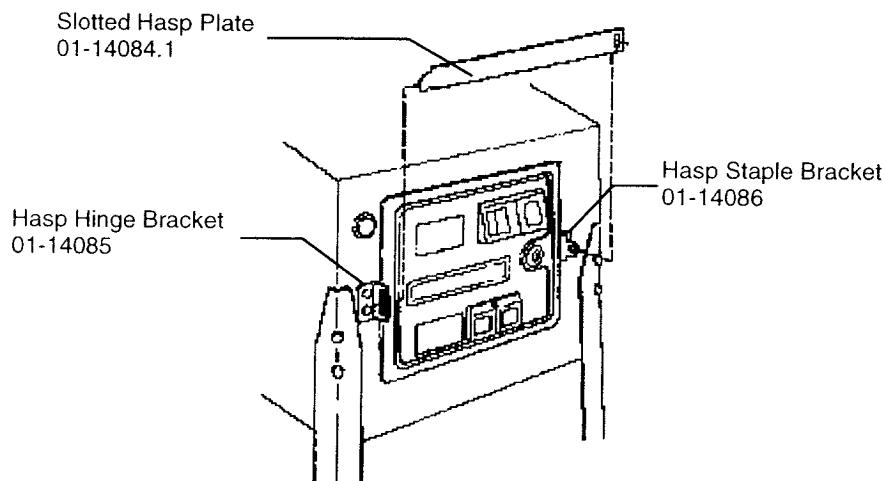
17 IMPORTANT: Fill out and return the registration card.

GAME CONTROL LOCATIONS

Cabinet Switches

The On-Off Switch is on the bottom of the cabinet near the right front leg.
The Start Button is a push-button to the left of the coin door on the cabinet exterior. Press the Start button to begin a game, or during the diagnostic mode, to ask for HELP.

Coin Door Buttons

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

Normal Function

The Service Credits button puts credits on the games that are not included in any of the game audits.
The Volume Up (+) button raises the sound level of the game. Press and hold the button until the desired level is reached.
The Volume Down (-) button lowers the sound level of the game. Press and hold the button until the desired level is reached. See Adjustment A.1 28 to turn sound off completely.
The Begin Test button starts the Menu System operation and changes the coin door buttons from Normal Function to Test Function.

Test Function

The Escape button allows you to get out of a menu selection or return to the Attract mode.
The Up (+) button allows you to cycle forward through the menu selections or adjustment choices.
The Down (-) button allows you to cycle backward through the menu selections or adjustment choices.
The *Enter button allows you to get into a menu selection or lock in an adjustment choice.
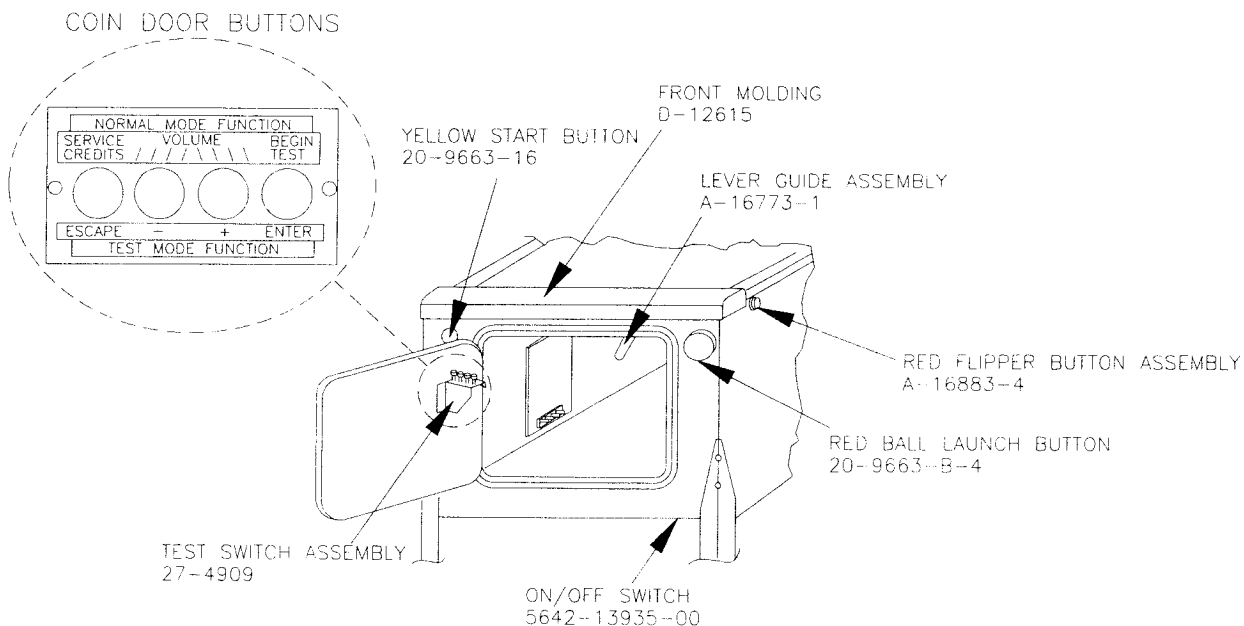
To reset High Score, hold down the Begin Test/Enter switch for five seconds while in the Attract mode.

GAME OPERATION

⚠ CAUTION

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

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

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

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

Example:	*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 or +20V circuits, pull the top interlock switch button out. The interlock switches are located on a bracket in the coin door opening.

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

CREDIT POSTING. Insert coin(s). A sound is heard for each coin, 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.
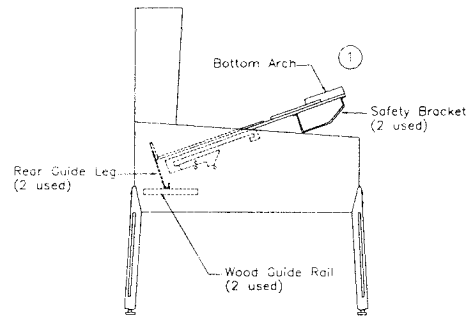
2. Pull the playfield out toward you until it stops (rest position), and raise it approximately 3".

   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.
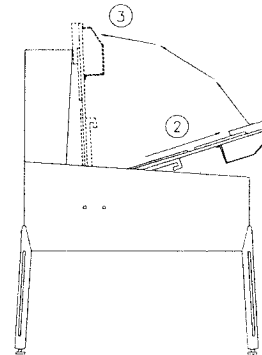
To Lower the Playfield.

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.
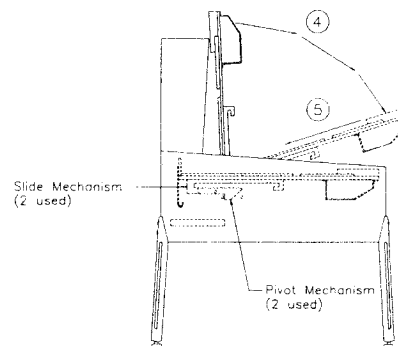
MENU SYSTEM OPERATION

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
B.2	Earning Audits
B.3	Standard Audits
B.4	Feature Audits
B.5	Histograms
B.6	Time-Stamps

P. PRINTOUTS MENU

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

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

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 Escape
To move out of a menu selection.

Press Enter
To get into a menu selection.

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

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.

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

1-9

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†	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	Play Time	00					

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

B.4   FEATURE AUDITS

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

FEATURE AUDITS CONTINUED...

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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.

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 Printouts menu. Press the Enter button to access a menu. Press the Escape button to return to the Printouts menu.

P. PRINTOUTS MENU

(An optional board is required to use the Printouts menu's features.)

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**

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

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

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

T. TEST MENU

T.1 Switch Edges Test	T.11 Display Test
T.2 Switch Levels Test	T.12 Flipper Coil Test
T.3 Single Switch Test	T.13 Ordered Lamps Test
T.4 Solenoid Test	T.14 Lamp Row-Col.
T.5 Flasher Test	T.15 DIP Switch Test
T.6 General Illumination Test	T.16 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 or +20V circuits, pull the top interlock switch button out. The interlock switches are located on a bracket just inside the coin door opening.

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

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

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

T.1   SWITCH EDGES TEST

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

T.2   SWITCH LEVELS TEST

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

T.3   SINGLE SWITCHES TEST

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

T.4   SOLENOID TEST

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

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

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

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

T.5   FLASHER TEST

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

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

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

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

T.6   GENERAL ILLUMINATION TEST

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

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

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

T.6 GENERAL ILLUMINATION TEST CONTINUED...

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

T.7 SOUND AND MUSIC TEST

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

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

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

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

T.8 SINGLE LAMP TEST

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

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

T.9 ALL LAMPS TEST

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

T.10 LAMP AND FLASHER TEST

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

T.11 DISPLAY TEST

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

T.12 FLIPPER COIL TEST

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

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

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

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

T.13 ORDERED LAMPS TEST

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

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

T.14 LAMP ROW - COLUMN

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

Press the Up and Down buttons to cycles through the different rows and columns.

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

T.15 DIP SWITCH TEST

This test is used to show the positions of the DIP switches on the CPU board (U27).

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

T.16 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

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 for 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.

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

Adj. #	Adj. Description	Extra Easy U.9 01	Easy U.9 02	Medium U.9 03 (factory)	Hard U.9 04	Extra Hard U.9 05
A.2 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.

PRESET ADJUSTMENTS TABLE FOR U.S. AND CANADIAN GAMES

Adj. #	Adj. Description	Install 5-ball U.9 06	Install 3-ball U.9 07
A.1 01	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
This sets up the printer adjustments for a serial transmission to a laptop computer, (9600 baud, 40 column, no page breaks, serial printer). This option requires the installation of the optional printer kit; part number 63110.

U.9 13 TO U.9 16 NOT USED

U.9 17 INSTALL GERMAN 1
U.9 18 INSTALL GERMAN 2
U.9 19 INSTALL GERMAN 3
U.9 20 INSTALL GERMAN 4
U.9 21 INSTALL GERMAN 5
U.9 22 INSTALL GERMAN 6
Adjustments U.9 17 through U.9 22 are used to modify game pricing and type of play.

U.9 23 INSTALL FRENCH 1
U.9 24 INSTALL FRENCH 2
U.9 25 INSTALL FRENCH 3
U.9 26 INSTALL FRENCH 4
U.9 27 INSTALL FRENCH 5
U.9 28 INSTALL FRENCH 6
Adjustments U.9 23 through U.9 28 are used to modify game pricing and type of play.

U.10 CLEAR CREDITS
Press the Enter button to clear the game Credits.

U.11 AUTO BURN-IN
Press the Enter button to activate Auto Burn-in. This utility automatically cycles through several tests. This helps in finding intermittent problems. The tests that Auto Burn-in cycles through are: the Display Test, the Sound and Music Test, the All Lamps Test, the Solenoid Test, the Flashers Test, the General Illumination Test, and the Flipper Coil Test. All of the tests run concurrently. The time spent on the burn-in cycle and the total time the game has spent in burn-in are displayed.

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

A. ADJUSTMENTS MENU

A.1 Standard Adjustments
A.2 Feature Adjustments
A.3 Pricing Adjustments
A.4 H.S.T.D Adjustments
A.5 Printer Adjustments (optional board required)

A.1   STANDARD ADJUSTMENTS

A.1 01 BALLS PER GAME
A "game" is defined by specifying the number of balls to be played.

Settings: 1 to 10

Factory Default: 3

A.1 02 TILT WARNINGS
The number of total actuation's of the plumb bob that can occur before the game is "tilted".

Settings: 1 to 10

Factory Default: 3

A.1 03 MAXIMUM EXTRA BALLS COUNT
The number of extra balls that a player may accumulate.

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

Factory Default: 4

A.1 04 MAXIMUM EXTRA BALLS PER BALL IN PLAY
The number of extra balls to be awarded per ball in play.

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

Factory Default: OFF

A.1 05 REPLAY SYSTEM
The type of replay system to be used.

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

Factory Default: AUTO %

A.1 06 REPLAY PERCENT

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

Settings: 5% to 50%

Factory Default: 10%

A.1 07 REPLAY START

Replay Start value when Auto % Replay is used.

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

Factory Default: 24,000,000

A.1 08 REPLAY LEVELS

The number of replay levels used by the Auto % Replay mode. When two replay levels are chosen, the second replay level is automatically adjusted to twice the starting replay level. When three 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.
                 BALL - Reaching each replay level awards an extra ball.
                 AUDIT - Reaching each replay level awards nothing to the player; it does increase the entry value of the audit item(s) maintaining a tally of these awards.

Factory Default: CREDIT

A.1 15 NOT USED

A.1 16 MATCH AWARD

The award automatically provided when the players win a match.

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

Factory Default: CREDIT

A.1 17 EXTRA BALL TICKET

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

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

Factory Default: NO

A.1 18 MAXIMUM TICKET/PLAYER

The amount of tickets each player can earn.

Settings: 00 to 100.

Factory Default: 25

A.1 19 MATCH FEATURE

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

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

Factory Default: 7%

A.1 20 CUSTOM MESSAGE

The message displayed during the Attract mode.

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

Factory Default: ON

A.1 21 LANGUAGE

The language the game uses.

Settings: ENGLISH, FRENCH, OR GERMAN

Factory Default: ENGLISH

A.1 22 CLOCK STYLE

The style of clock the game uses.

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

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

A.1 23 DATE STYLE
The style of dates the game uses.

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

Factory Default: MONTH/DATE/YEAR

A.1 24 SHOW DATE AND TIME
The date and time show in the Attract mode.

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

Factory Default: NO

A.1 25 ALLOW DIM ILLUMINATION
The game program dims the general illumination for special effects and during the Attract mode.

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

Factory Default: YES

A.1 26 TOURNAMENT PLAY
Equalize random game features and global score values during multi-player games.

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

Factory Default: NO

A.1 27 EUROPEAN SCORE FORMAT
Use either commas or dots between digits when numbers are displayed.

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

Factory Default: NO

A.1 28 MINIMUM VOLUME OVERRIDE
The volume can be turned off.

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

Factory Default: NO

A.1 29 GENERAL ILLUMINATION POWER SAVER
This allows the general illumination and controlled lamps to be dimmed following a time interval after a game is played. Power Saver Level (A.1 30) determines dimness of the lamps. Using this feature substantially increases the life of the lamps.

Settings: OFF, 2 to 60 minutes.

Factory Default: 15 minutes

A.1 30 POWER SAVER LEVEL

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

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

Factory Default: 5

A.1 31 TICKET EXPANSION BOARD

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

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

Factory Default: NO

A.1 32 NO BONUS FLIPS

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

Settings: YES, NO

Factory Default: YES

A.1 33 GAME RESTART

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

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

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

Factory Default: SLOW

A.2   FEATURE ADJUSTMENTS

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

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

A.3 22 DOLLAR BILL SLOT

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

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

A.3 23 MINIMUM COIN MILLISECONDS

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

A.3 24 NOT USED

A.3 25 ALLOW HUNDREDTHS

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

A.3 26 CREDIT FRACTION

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

A.3 27 PRICING EDITOR

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

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

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 Changes

DISPLAY VIEW

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

Return To Editor: This option will allow you to continue to edit the pricing information.

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

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

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

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

Bonus for Special Coins

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

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

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

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

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

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

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

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

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

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

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

Pricing Table

| Country | CoinChutes | | | | Games/Coins | Display | Pricing Adjustments A3 |
	Left	Center	Right	4th Chute			02 03 04 05 06 07 08 09
USA	25¢	$1.00*	25¢	$1.00	1/50¢, 2/75¢, 3/$1	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¢	USA 1/$0.75	
	25¢	$1.00	25¢	$1.00	1/50¢, 2/$1	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	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	1/1, 6/5	
	25¢	25¢	25¢	-	1/4x25¢ [2]	1/$1.00	
Canada	25¢	-	$1.00	-	1/50¢, 2/75¢, 3/$1	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	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¢	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	20¢	$1	$1	$2	1/$1, 3/$2	AUSTRALIA 1	
	20¢	$1	$1	$2	1/$1, 2/$2 [2]	AUSTRALIA 2	
U.K.	£1.00	50P	20P	10P	1/3x10P, 2/50P, 4/£1 [2]	U. KINGDOM	
Switzerland	1Fr	2Fr	5Fr	-	1/1Fr, 3/2Fr, 7/5Fr [2]	SWISS 1	
Swiss 2	1Fr	2Fr	5Fr	-	1/2Fr, 2/3Fr, 3/4Fr, 5/5Fr	SWISS 2	
Swiss 3	1Fr	2Fr	5Fr	-	1/1Fr, 5/5Fr	SWISS 3	
Swiss 4	1Fr	2Fr	5Fr	-	1/1Fr, 2/2Fr, 3/3Fr, 4/4Fr, 6/5Fr [1]	SWISS 4	
Swiss 5	1Fr	1Fr	1Fr	-	1/1Fr (all slots = 1Fr)	SWISS 5	
Belgium	5Fr	20Fr	50Fr	-	1/4x5Fr, 1/20Fr, 3/50Fr [2]	BELGIUM	
Belgium 2	5Fr	20Fr	50Fr	-	1/20Fr, 3/60Fr, 3/50Fr-Coin	BELG. BONUS	
Germany	1DM	2DM	5DM	-	1/1DM, 2/2DM, 6/5DM [1,2]	GER. 6/5DM	
					1/2DM, 2/3DM, 3/4DM, 4/5DM [2]	GER. 4/5DM	
					1/2DM, 2/3DM, 3/4DM, 5/5DM [2]	GER. 1/2DM	
					1/1DM, 2/2DM, 5/5DM	GER. 1/1DM	
Holland	1G	-	1G	-	1/1G	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]	TARIFF 6	
Italy	500L	500L	500L	-	1/500L [2]	ITALY 1	
	500L	500L	500L	-	1/2x500L, 3/4x500L [1,2]	ITALY 2	
	500L	500L	500L	-	1/2x500L, 2/4x500L [2]	ITALY 3	
Spain	100P	-	500P	-	1/100P, 6/500P [2]	SPAIN	
	25P	-	100P	-	1/25P, 5/100P	CUSTOM	01 00 04 00 01 04 01 00
	25P	-	100P	-	1/25P, 4/100P	CUSTOM	01 00 04 00 01 00 01 00
	25P	-	100P	-	1/2x25P, 2/100P	CUSTOM	01 00 04 00 02 00 01 00
	25P	-	100P	-	1/2x25P, 3/100P	CUSTOM	03 00 12 00 04 00 01 06
Japan	100¥	-	100¥	-	1/100¥	JAPAN	
Chile	Token	-	Token	-	1/1Token [2]	CHILE	
Denmark	1Kr	5Kr	10Kr	20Kr	1/2x1 Kr, 3/5 Kr, 7/10 Kr [2]	DENMARK 1	
	1Kr	5Kr	10Kr	20Kr	1/5 Kr, 3/10 Kr, 6/20 Kr [1,2]	DENMARK 2	
Finland	1Mka	-	5Mka	-	1/2x1Mka, 3/5Mka [2]	FINLAND 1	
	1Mka	-	5Mka	-	1/3x1Mka, 2/5Mka [2]	FINLAND 2	
New Zealand	$1.00	-	$2.00	-	1/$1, 3/$2 [2]	NEW ZEALAND 1	
	$2.00	-	$1.00	-	1/$1, 3/$2, ($2-$1 door)	NEW ZEALAND 2	
Norway	5Kr	-	10Kr	-	1/5Kr, 2/10Kr, 5/20Kr	NORWAY	
Argentina	10¢	10¢	10¢	-	1/1 Token	ARGENTINA	
Greece	10D	20D	50D	-	1/2x10D, 1/20D, 3/50D	GREECE	
Antilles	25¢	25¢	1G	-	1/25¢, 4/1G	ANTILLES	
Netherlands	1HFl	2.5HFl	2.5HFl	-	1/1Hfl, 3/2.5Hfl	NETHERLANDS	
Netherlands 2	1HFl	2.5HFl	2.5HFl	-	1/1HFl, 3/3HFl, 3/2.5HFl-Coin	NETH. BONUS	
Hungary	20 Old	20 New	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.

1-47

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

A.5 PRINTER ADJUSTMENTS (optional board required)

A.5 01 COLUMN WIDTH
The column width to be printed. Range: 22 to 80.

A.5 02 LINES PER PAGE
This is the amount of lines per page. Range: 20 to 80.

A.5 03 PAUSE EVERY PAGE
Choose whether the printer pauses at the end of a page.

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

A.5 04 PRINTER TYPE
Select the type of printer: Parallel, Serial, ADP, Mini-Drucker, or NSM.

A.5 05 SERIAL BAUD RATE
Select which baud rate to use for serial or ADP communications (bit rate): 300, 600, 1200, 2400, 4800, or 9600.

A.5 06 SERIAL D.T.R. (DATA TERMINAL READY)
When a serial printer is used, this line may be connected to a printer output line signaling that the printer is busy.

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

A.5 07 AUTO PRINTOUT
With the optional printer board installed, this adjustment allows the initiation of printouts whenever the game detects a printer connected to the game. Parallel printers are detected automatically by plugging them in and putting then on-line. Serial printers (or computers) are detected by sending a carriage return (ASCII 0x0D) or XON (ASCII 0x11).

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

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

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

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

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

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

ERROR MESSAGES

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

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 verify 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. Mechanisms using 'opto switches' (drop targets, etc.) need to be checked for proper power connections (+12V dc and ground).

CHECK FUSES F115 AND F116 AND OPTO 12V SUPPLY

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

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

OPTO TROUGH BAD CHECK CONNECTORS, WIRES AND 12V SUPPLY

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

PINBALL MISSING

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

XXXX SW. IS STUCK ON

This message indicates that a switch, which is not usually On, remains in the On position after the 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.

GROUND SHORT ROW - N, WHT - XXX

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

G10 ERROR

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

G11 CHECKSUM ERROR

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

TIME AND DATE NOT SET.

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

FACTORY SETTINGS RESTORED.

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

CPU AND AUDIO VISUAL BOARD ERROR CODES

The CPU has three LED's, 201, 202, and 203. At game turn-on LED 201 and LED 202 are on, LED 203 is off. During normal operation LED 201 is off, LED 202 is on, and LED 203 is flashing.

*If the system detects an error the following happens:*

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

*Upon game turn-on you will hear one of the following.*

AUDIO VISUAL BOARD	1 Beep	= Audio Visual Board is O.K.
BEEP ERROR CODES	2 Beeps	= S2 Failure
	3 Beeps	= S3 Failure
	4 Beeps	= S4 Failure
	5 Beeps	= S5 Failure
	6 Beeps	= S6 Failure
	7 Beeps	= S7 Failure
	10 Beeps	= Audio Static RAM Failure

OPTO THEORY

The opto receiver (photo transistor) should be approximately 0.1 - 0.7 volts when the opto beam is unblocked and approximately 11 - 13 volts when the opto beam is blocked. The opto transmitter (LED) should always be approximately 1.4 volts. *The transmitter (LED) is larger than the receiver (photo transistor); it protrudes further from its case.*
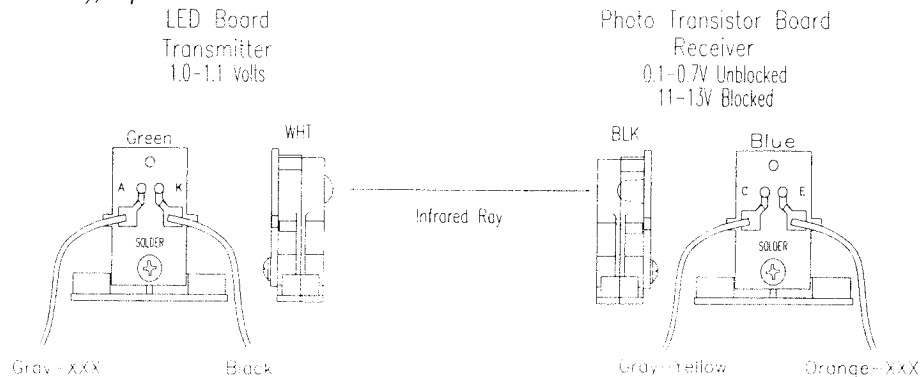
LED LIST
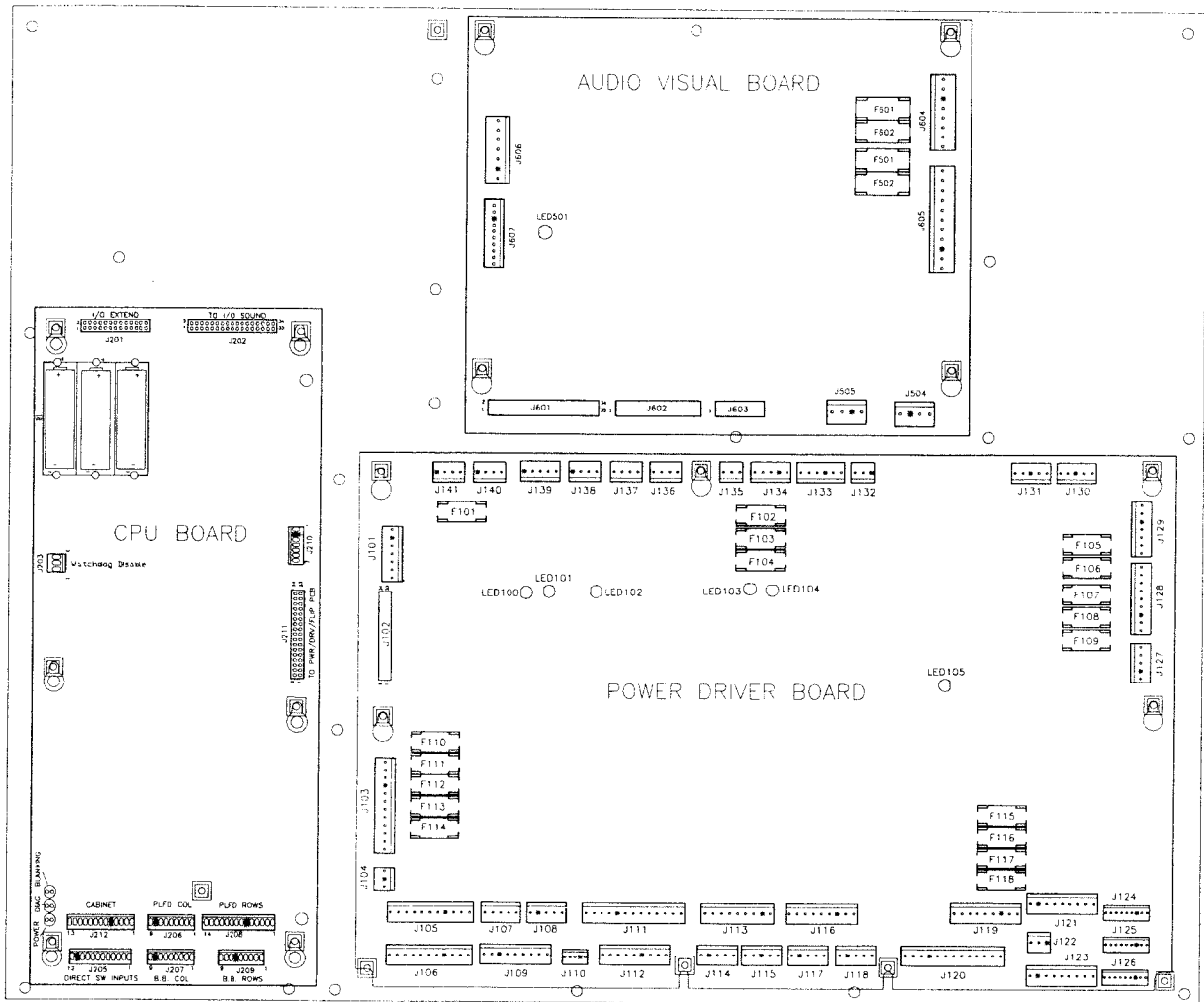
CPU BOARD
LED 201   Blanking
LED 202   Power
LED 203   Diagnostics
At game turn-on, LED 201 and LED 202 are on, LED 203 is off. During normal operation LED 201 is off, LED 202 is on, and LED 203 is flashing.
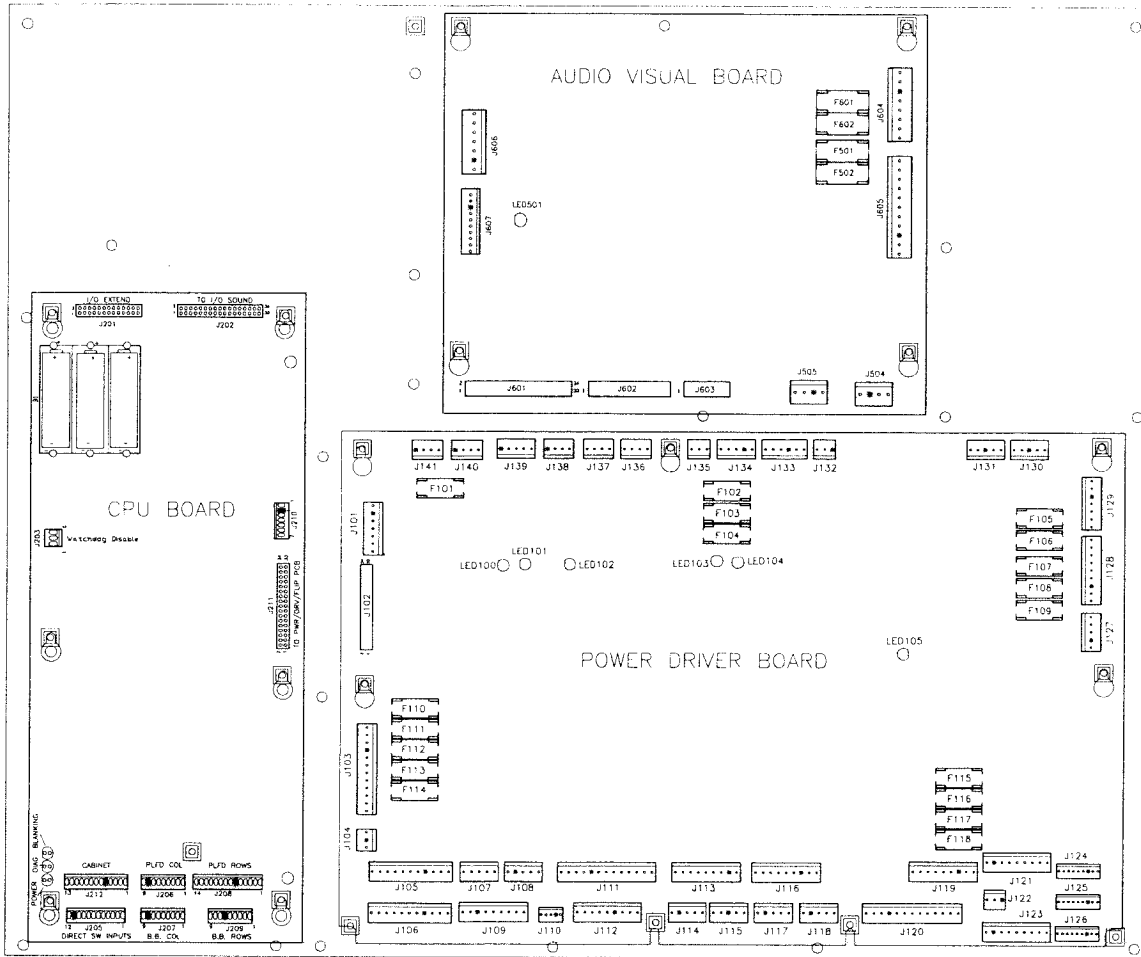
AUDIO VISUAL BOARD
LED 501   +5VDC, Normally flashing, but at a slower rate than LED 203.

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

FUSE LIST

AUDIO VIDEO BOARD

Loc.	Description	Part Number	Value
F501	-25V	5731-14532-00	T2.5A, 250V
F502	+25V	5731-14532-00	T2.5A, 250V
F601	+62V	5731-14840-00	T0.315A, 250V
F602	-113V & -125V	5731-14840-00	T0.315A, 250V

CPU BOARD
There are no fuses on the CPU board.

POWER DRIVER BOARD

Loc.	Description	Part Number	Value	Loc.	Description	Part Number	Value
F101	Regulated 12V	5731-14531-00	T0.63A, 250v	F110	G.I. #5 WHT-VIO	5731-14530-00	T4.0A, 250V
F102	Solenoid. #25 to #28	5731-14530-00	T4.0A, 250V	F111	G.I. #4 WHT-GRN	5731-14530-00	T4.0A, 250V
F103	Solenoid #1-#8	5731-14530-00	T4.0A, 250V	F112	G.I. #3 WHT-YEL	5731-14530-00	T4.0A, 250V
F104	Solenoid #9 to #16	5731-14530-00	T4.0A, 250V	F113	G.I. #2 WHT-ORG	5731-14530-00	T4.0A, 250V
F105	+5V Logic	5731-14530-00	T4.0A, 250V	F114	G.I. #1 WHT-BRN	5731-14530-00	T4.0A, 250V
F106	+18V Lamp Matrix	5731-14046-00	T5.0A, 250V	F115	+50V Flippers	5731-14530-00	T4.0A, 250V
F107	Flasher Secondary	5731-14530-00	T4.0A, 250V	F116	+50V Flippers	5731-14530-00	T4.0A, 250V
F108	Solenoid Secondary	5731-14529-00	T6.3A, 250	F117	+50V Flippers	5731-14530-00	T4.0A, 250V
F109	Unregulated 12V	5731-14530-00	T4.0A, 250V	F118	+50V Flippers	5731-14530-00	T4.0A, 250V

LINE FILTER

Loc.	Part Number	Value
Foreign	5731-14530-00	T4.0A, 250V
Domestic	5731-14046-00	T5.0A, 250V

MAINTENANCE INFORMATION

LUBRICATION

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

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

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

SWITCH CONTACTS

Playfield Switches

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

Flipper Switches

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

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

CLEANING

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

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

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