Williams

16P-504-103
Game No. 504
June, 1981

PHARAOH

This booklet provides game operation, bookkeeping, game adjustment, diagnostic, and self-test procedures for PHARAOH. For installation and special maintenance information refer to the bluecovered game manual. For detailed information refer to Williams Solid State Flipper maintenance Manual.

SPECIAL CONSIDERATIONS WHEN REPLACING CIRCUIT BOARDS

CPU Board

1. Revision level 7 CPU Boards (batteries located on lower left corner at board) of later boards must be used.
2. Must be equipped with blue-labeled Flipper ROMs and blue-labeled Game ROMs.
3. Jumpers W3, W10, W1 1,W14 W17, W19, W20, and W22 must be connected Jumpers W4, W9, W12, W15, W16, W18, W21, and W23 must be removed. With the exception of W25, (Factory Setting Jumper) all other jumpers are not changed.

Driver Board
Must be equipped with zero-ohm resistors or wire jumpers (W9-W16) in place of switch matrix drive series resistors R204-R211.

Sound Board

1. Model D 8224 required for speech.
2. Must be jumpered for ROM operation and be equipped with Sound ROM 6. (Jumpers W3, W5, W7, W9, W10, W12, and W15 connected; W2, W4, W6, W8, Wll, and W13 removed).

Power Supply Board

1. Model D 8345 board required (equipped with relay).
2. Fuse F4 (20A SB) for flipper solenoids and magnets must be installed.

Display Boards
Model C 8363 Master Display and 7-digit Slave Displays required.

Optional Speech Module
Requires 5T5041 (IC7), 5T5042 (IC5), 5T5043 (IC6), and 5T5044 (IC4) Speech ROMs.

GAME OPERATION
*Indicates adjustable features.
Game Over Mode - Turn game ON; player I score shows 00; all player scores alternate the high score to date, Game Over lamps light. All playfield lamps cycle in attract mode.

Credit Posting - Insert coins; sound produced, number of credits displayed. If maximum credits* exceeded by coin or high score to date, credits are posted correctly, coin lockout,de-energizes until remaining credits are below maximum. No credits may be won and coins are rejected while lockout is deenergized.

Game Start - Two balls must be resting on ball ramp or ball shooter switches (maximum of one ball in ball shooter trough) before game will start. Push credit button, startup tune played, ball served, credit display reduced by 1, player 1 score flashes 00 until first scoring switch is made, ball in play shows 1. Pushing credit button before ball 2 displayed allows additional players.

Multi-Ball and ***Magna-Save*** are trademarks of Williams Electronics, Inc.

Bonus Advance - One advance for each drop target and for bottom inside rollovers. Three advances for completing a lower drop target 3-bank, completing matching targets on the upper 3-banks, or ? lanes when not lit. When lit, ? lanes can award random bonus advances. With maximum bonus (49,000), instead of a bonus advance, 10,000 is scored. Completing both lower 3-banks lights Hidden Tomb arrow to collect IX bonus. Bottom inside rollovers and Hidden Tomb flash Bull's-Eye Targets; making target while flashing advances bonus multiplier (2X, 3X, 5X). Making ? lane when lit can advance bonus multiplier.

P-H-A-R-A-O-H - Making target in upper drop target 3-bank lights target arrow and flashes associated arrow in the other 3-bank. Completing flashing arrow(s) advances lighting of P-H-A-R-A-O-H. Spotting letter R* lights eject hole lock lamp for possible ***Multi-Ball*** play. Completing PHARAOH lights Slaves Tomb and Hidden Tomb alternately for possible Extra Ball. Making captive ball shot collects 5,000 for each lit letter. When letters are flashing, the Captive Ball shot collects 3X or 5X the lit value.

Stop & Score - Countdown from 3X or 5X of lit PHARAOH value is initiated in another player display by making Hidden Tomb (3X) or Slaves Tomb (5X). Starting Stop & Score also flashes the lit letters in PHARAOH for the captive ball to collect 3X or 5X the lit value. As the countdown is made, the eject hole lamps flash. Making an eject hole while flashing stops the countdown and the score remaining in the display is collected.

Magna-Save Feature - Making drop targets in the lower drop target 3-banks advances lighting of associated (left or right) magna-units lamps. Up to seven timing units may be accumulated. Holding in a ***Magna Save*** button on the side of the cabinet energizes the corresponding magnet.

Multi-Ball Play: Spotting letter R* in PHARAOH lights the eject hole lock lamps. Making an eject hole at this time locks up the ball and initiates 2-ball, ***Multi-Ball*** play. Locked ball is released after time interval or certain scoring feature occurs.

Bonus Ball - With two or more players, the player with the highest score is awarded a bonus ball*. Both balls are released and play is allowed for 25* seconds with 2X scoring. There is no Playfield Extra Ball feature during the bonus ball. Extra balls won from a Special or replay score during bonus ball are awarded as additional bonus balls.

Memory - Magna-unit lamps, bonus multipliers* until 5X is lit, and Extra Ball When Lit lamps.

Tilt - Ball in play tilted on first closure of ball roll tilt and third* closure of plumb bob and playfield tilts. Slam tilt returns game to game over.

End of Game - Match Digits* appear in ball in play display, *credit awarded for match. Exceeding high score to date awards *three credits. Match, High Score to Date, and Game Over sounds made as appropriate. A new game cannot be started with both balls resting in the ball shooter trough; excess balls must be returned to the playfield and rest on the ball-ramp switches.

With Speech Module, the following phrases are produced.

Attract Mode, randomly:	Dare you enter the tomb of the mighty PHARAOH? Who dares enter the mighty PHARAOH's hidden chamber?
Game Start, add players; randomly:	You may enter the tomb. Behold the PHARAOH's chambers. You dare enter PHARAOH's tomb. Beware of cobras!
Making Hidden Tomb or Slaves Tomb Shooters, randomly:	Behold the PHARAOH's chambers. Enter the hidden tomb. Behold the hidden tomb. Enter the PHARAOH's chambers.
? Lane with Magna-Save button in:	You Failed.
Making a lower kicker, on occasion:	Doomed.
Making upper kicker, on occasion:	RA (or) Hail.
Making left or right inside rollovers, often:	Cobras
Win Extra Ball:	Hail, Hail, RA, RA, RA.
Win credit from replay or special:	You may return to PHARAOH's treasures. You may return to PHARAOH's tomb.
Matching. randomly:	Behold the PHARAOH's treasure. Hail to mighty PHARAOH.
High Score to Date: Game Over:	You hold PHARAOH's treasure. Dare you return to mighty PHARAOH's tomb?

BOOKKEEPING AND GAME EVALUATION

(Functions 01-17)

1. Set AUTO-UP/ MANUAL-DOWN switch to AUTO-UP and depress ADVANCE pushbutton. Test 04 is indicated in the credits display, Function 00 in Match display, and Game Identification in Player 1 display.

2. Operate the ADVANCE pushbutton to display Functions 01 thru 04 on the Match display (See Table 1) and record the corresponding totals (number of coins and total paid credits) from the Player I display. (To review a total that has been advanced past, set switch to MANUAL-DOWN and operate the ADVANCE pushbutton).

3. Operate the ADVANCE pushbutton to display Functions 05, 06, and 07 in the Match display and record the corresponding free credit totals from the Player I display.

4. Operate the ADVANCE pushbutton to display Function 08 in the Match display. 1 otal credits is indicated in the Player I display, total free credits in the Player 2 display, and percentage of i free credits in the Player 4 display.

5. Operate the ADVANCE pushbutton to display Function 09 thru 12 in the Match display and record the corresponding totals from the Player I display.

6. Operate the ADVANCE pushbutton to display Functions 13 thru 17 in the Match display and record the corresponding totals from the Player 2 display.

7. With switch set to MANUAL-DOWN operate ADVANCE to display Function 50 in the Match Display. From Function 50 you can return to game over or zero audit totals and return to game over. Perform step 8.a. or 8.b. as desired.

8. a. To return to game over, set the switch to AUTO-UP and depress ADVANCE.
   b. To zero audit totals and return to game over set switch to AUTO-UP, operate the credit button to display 35 in the Player 1 display, and depress ADVANCE.

Table 1. Audit Totals

DESCRIPTION			
FUNCTION	PLAYER 1	PLAYER 2	PLAYER 4
00	Game Identification (2504 1)	--	--
01	Coins, Left chute (closest to coin door hinge)	--	--
02	Coin, center chute	--	--
03	Coin, right chute	--	--
04	Total Paid Credits	--	--
05	Special Credits	--	--
06	Replay Score Credits	--	--
07	Match Credits	--	--
08	Total Credits	Free Credits	% Free Credits
09	Total Extra Balls	--	--
10	Ball Time in Minutes	--	--
11	Total Balls Played	--	--
12	Current High Score to Date	--	--
13	Backup High Score to Date	High Score to Date Credits Awarded	--
14	Replay 1 Score	Times exceeded	--
15	Replay 2 Score	Times exceeded	--
16	Replay 3 Score	Times exceeded	--
17	Replay 4 Score	Times exceeded	--

GAME ADJUSTMENT PROCEDURE

(Functions 13-41)

Coin door must be open to change settings.

1. Set AUTO-UP/ MANUAL-DOWN switch to AUTO-UP and depress ADVANCE pushbutton. Test 04 is indicated in the Credits display, Function 00 in Match display, and game identification in Player I display.

2. **To raise** Function number in Match display, operate ADVANCE pushbutton with switch set to AUTO-UP. **To lower** Function number operate ADVANCE with it set to MANUAL-DOWN.

3. With desired Function indicated in Match display, raise value in player 1 display by operating credit button with switch set to AUTO-UP; lower value by operating credit button with it set to MANUAL DOWN. Value left in Player 1 display is new setting. For values see Table 2 and (for pricing) Table 3.

4. Repeat steps 2 and 3 until all required adjustments have been made.

5. Operate ADVANCE until Function 50 is indicated in Match display. From Function 50 you can return to game over or **restore factory settings**. Perform step 6 or 7 as desired.

6. To return to game over, depress ADVANCE with switch set to AUTO-UP.

7. To restore factory settings **and** zero audit totals:
   a. Operate Credit button with switch set to AUTO-UP until 45 is indicated in Player 1 Display.
   b. Depress ADVANCE. The game returns to Test 04, Function 00.
   c. Set switch to MANUAL-DOWN and depress ADVANCE to indicate Function 50.
   d. Set Switch to AUTO-UP and depress ADVANCE.

RESETTING HIGH SCORE TO DATE

1. Using game adjustment procedure, set Function 13 to the desired reset value.

2. Depress HIGH SCORE RESET pushbutton.

FACTORY AUDIT TOTALS

(Functions 42-49)
The following factory audit functions are assigned:
42 - Total times ***Multi-ball*** achieved
43 - Total times Stop & Score started
44 - Total times Stop & Score collected
45 - Total times Bonus collected from Hidden Tomb
46-49- Not Used

Table 2. Game Adjustments

FUNCTION	DESCRIPTION	NOTES	*FACTORY SETTING
13	Backup High Score to Date [HSTD Credits Awarded]	1	2,300,000
14	Replay 1 Score [Times exceeded]	2	700,000
15	Replay 2 Score [Times exceeded]	2	1,500,000
16	Replay 3 Score [Times exceeded]	2	0
17	Replay 4 Score [Times exceeded]	2	0
18	Maximum Credits	3	30
19	Standard and Custom Pricing Control (00-08)	4	01/02
20	Left Coin Slot Multiplier	4	01/09
21	Center Coin Slot Multiplier	4	04/45
22	Right Coin Slot Multiplier	4	01/18
23	Coin Units Required for Credit	4	01/05
24	Coin Units Bonus Point	4	00/45
25	Minimum Coin Units	4	00
26	Match: 00 = Match ON; 01 = Match OFF	-	00
27	Special: 00 = Awards Credit; 01 = Awards Extra Ball or Bonus Ball, 02 = Awards Points	-	01
28	Replay Scores: 00 = Awards Credit; 01 = Awards Extra Ball or Bonus Ball	-	00
29	Maximum Plumb Bob Tilts	-	03
30	Number of Balls (03 or 05)	-	03
31	Lower Drop Target 3-Bank Timing; 00 (conservative) to 09 (liberal)	-	05
32	Bull's-Eye (Bonus X) Timing, 00 (conservative) to 09 (liberal)	-	05
33	Bonus Ball Timing 01-99 Seconds (00 = disabled)	-	25
34	Attract Mode Sounds/? Lane Special; 01 (conservative) to 09 (liberal) (With 11 to 19 attract mode sounds disabled)	-	01
35	Stop & Score Timing; 01 (conservative) to 09 (liberal)	-	05
36	***Multi-Ball*** possible at PHARAOH letter: 03 = PHA. 04 = PHAR, 05 = PHARA	-	04
37	Spot PHARAOH initially: 00 = None, 01 = P. 02 = PH, 03 = PHA	-	02
38	Bonus X Memory: 00 = memory, 01 - no memory	-	00
39	Background Sound/Bell: 00 = sound/bell 01 = no sound/bell, 10 = sound/no bell, 11 = no sound/no bell	-	00
40	High Score Credits	1	03
41	Maximum Extra Balls at one time (00 = No Extra Ball)	-	04

*Second Factory Setting value is with jumper W25 on GPU Board connected.
[ ] Description in brackets shown in Player 2 Display.

1. Function 13 may be set to any multiple of 100,000 points. Setting Function 40 to zero with Function 13 set to any score but zero permits the High Score to Date feature to operate but no credits are awarded.

2. Functions 14-17 (Replay Scores) may be set to any multiple of 100,000 points. Setting a function to Zero disables the replay score point.

3. Setting Maximum Credits (Function 18) to zero places the game in a **free play mode**.

4. With Function 19 set to 00, Functions 20-25 must be set manually. Refer to Table 2 for eight standard pricing schemes (selected by values of 01-08 for Function 19) and custom pricing values.

RECOMMENDED SCORE LEVELS

CREDIT GAMES
3-Ball: *700,000; 1,500,000
5-Ball: 1,000,000; 2,000,000
EXTRA BALL
3-Ball: 500,000
5-Ball: 700,000

*Factory Setting

Table 3. Standard and Custom Price Settings

COIN DOOR MECHANISM	CREDITS	FUNCTION						
		19	**20**	**21**	**22**	**23**	**24**	**25**
Twin-Quarter	1/25¢, 3/50¢, 7/$1	00	03	12	03	02	12	00
Quarter, Dollar, Quarter	1/25¢, 3/50¢, 7/$1 coin only	00	03	14	03	02	00	00
	1/25¢, 7/$1 coin only	00	01	07	01	01	00	00
	1/25¢, 3/50¢, 6/$1	00	01	04	01	01	02	00
	1/25¢, 6/$1 coin only	00	01	06	01	01	00	00
	1/25¢, 5/$1	00	01	04	01	01	04	00
	2/50¢, 5/$1	00	01	04	01	01	04	02
	1/25¢, 5/$1 coin only	00	01	05	01	01	00	00
	·1/25$, 4/$1	**01**	**01**	**04**	**01**	**01**	**00**	**00**
	2/50¢, 4/$1	00	01	04	01	01	00	02
	·1/50, 2/75¢, 3/4 x 25¢ 4/$1 or 5 x 24¢	**05**	**03**	**15**	**03**	**04**	**15**	**00**
	1/50¢,3/$1, 4/$1.25	00	03	12	03	04	15	00
	1/50¢, 3/$1, 7/$2	00	12	48	12	14	96	18
	·1/50e, 3/$1, 6/$2	**03**	**01**	**04**	**01**	**02**	**04**	**00**
	1/50¢	00	01	04	01	02	00	00
1DM, 5DM, 2DM	**·1/1DM, 3/2DM, 10/5DM**	**02**	**09**	**45**	**18**	**05**	**45**	**00**
	2/1DM, 5/2DM, 14/5DM	00	13	65	26	05	65	00
20-Cent, 50-Cent	1/20¢, 3/50¢	00	06	00	15	05	00	00
1 Franc, 10 Franc, 5 Franc	**·1/2F, 3/5F only, 8/10F only**	**04**	**01**	**16**	**06**	**02**	**00**	**00**
25 Cent,	**·1/25¢, 4/1G**	**06**	**01**	**00**	**04**	**01**	**00**	**00**
1 Guilder	1/25¢, 5/1G	00	01	00	04	01	04	00
Twin 100 Yen	2/100Y	00	02	00	02	01	00	00
1 Franc or	1/1F, 3/2F	00	01	01	01	01	02	00
Twin-1 Franc	1/1F	00	01	01	01	01	00	
5 Franc,	**·1/5F, 2/10F**	**07**	**01**	**00**	**02**	**01**	**00**	**00**
10 Franc	**·1/10F**	**08**	**01**	**00**	**02**	**02**	**00**	**00**
Twin-2 Franc	**·1/2F**	**03**	**01**	**04**	**01**	**01**	**00**	**00**
10, 20 Franc	**·1/10F, 2/20F**	**07**	**01**	**00**	**02**	**01**	**00**	**00**
Twin-1 Sucre	1/3S, 2/5S	00	02	00	02	05	00	00

· Indicates standard price setting by adjusting **only** Function 19. For other price settings, set Fuction 19 to 00 and set Functions 20 through 25 to the values indicated in the chart

DIAGNOSTIC PROCEDURES

Display Digits Test

1. Set AUTO-UP/MANUAL-DOWN switch to MANUAL-DOWN and depress ADVANCE. Displays should indicate all 0's.

2. Set the switch to AUTO-UP. Displays should sequence from all 0's thou all 9's. Comma segments should come on when odd digits are displayed.

3. To stop cycling, set switch to MANUAL-DOWN. Operate ADVANCE pushbutton to step tests one number at a time. Set switch to AUTO-UP to resume cycling.

Sound Test

1. From Display Digits Test depress ADVANCE with the switch set to AUTO-UP. Test 00 should be indicated in the Credits display and the Match display should sequence from 00 thou 06. Different sounds should be produced for 00, 01, 02, 03, and 04.

2. To continuously pulse a single sound, set the toggle switch to MANUAL-DOWN. Operate ADVANCE pushbutton to sequence through sounds one at a time. Set toggle switch to AUTO-UP to resume sequencing.

Lamp Test

From Sound Test depress ADVANCE with the switch set to AUTO-UP Test 01 should be indicated in the Credits display and all multiplexed lamps should flash.

Figure 1. Lamp Matrix

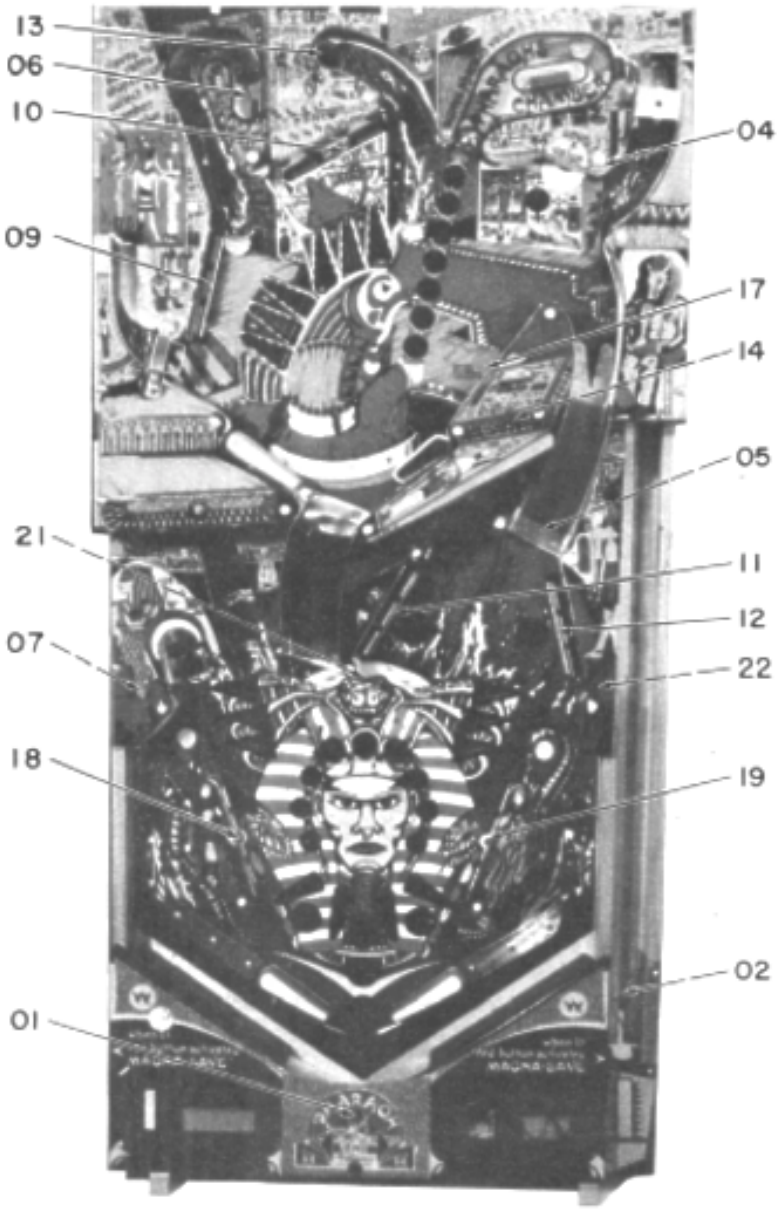
ROW	COLUMN	1 YEL-BRN 2J5-8	2 YEL-RED 2J5-9	3 YEL-ORN 2J5-6	4 YEL-BLK 2J5-7	5 YEL-GRN 2J5-3	6 YEL-BLU 2J5-5	7 YEL-VIO 2J5-1	8 YEL-GRY 2J5-2
1	**RED-BRN 2J7-1**	Same Player Shoots Again(Backbox)	Left Magnet Bottom Arrow	2X Scoring	"A"	Slaves Tomb Extra Ball When Lit	"O"	"1" Bonus	"9" Bonus
2	**RED-BLK 2J7-2**	Ball in Play	Left Magnet, 2+ Arrow	Hidden Tomb Collect Bonus	"O"	Upper Eject Hole Arrow	"H"	"2" Bonus	"10" Bonus
3	**RED-ORN 2J7-3**	Tilt	Left Magnet 4+ Arrow	Lower Center 3-Bank	"H"	Lower Eject Hold Arrow	Extra Ball When Lit Hidden Tomb	"3" Bonus	"20" Bonus
4	**RED-YEL 2J7-4**	Game Over	Right Magnet Bottom Arrow	Lower Center 3-Bank	Upper Bull's-Eye Target	"P" Backbox	Slaves Tomb General Illumination	"4" Bonus	"30" Bonus
5	**RED-GRN 2J7-5**	Match	Right Magnet 2+ Arrow	"P" (Playfield)	Upper Left 3-Bank Bottom Arrow	"H"	Captive Ball General Illumination	"5" Bonus	"40" Bonus
6	**RED-BLU 2J7-6**	High Score to Date	Right Magnet 4+ Arrow	"H"	Upper Left 3-Bank Center Arrow	"A"	Upper Center 3-Bank Left Arrow	"6" Bonus	2X
7	**RED-VIO 2J7-9**	Bonus Ball Timer	Left ? Lane	"A"	Upper Left 3-Bank Top Arrow	"R"	Upper Center 3-Bank Center Arrow	"7" Bonus	3X
8	**RED-GRY 2J7-8**	Same Player Shoots Again (Playfield)	Right ? Lane	"R"	Lower Bull's-Eye Target	"A"	Upper Center 3-Bank Right Arrow	"8" Bonus	5X

Solenoid Test

1. From Lamp Test depress ADVANCE with the switch set to AUTO-UP. Test 02 should be indicated in the Credits display. Display sequences from 01 thru 25. Corresponding solenoids 01 thru 24 are pulsed. Flipper relay is de-energized with subtest 25.

2. To continuously pulse a single solenoid set switch to MANUAL-DOWN. Operate ADVANCE pushbutton sequence through the solenoids one at a time. Set toggle switch to AUTO-UP to resume sequencing.

Figure 2. Playfield Solenoid Locations and Solenoid Chart



Sol.
No. Function

01 Ball Release
02 Ball Ramp Thrower
03 Backbox Gen. Illum. Relay
04 Upper Playfield Gen. Illum. Relay
05 Lower Playfield Gen. Illum. Relay
06 Slaves Tomb Ball Shooter
07 Hidden Tomb Ball Shooter Relay
08 Not Used
09 Upper Left Drop Targets Reset
10 Upper Center Drop Targets Reset
11 Lower Center Drop Targets Reset
12 Lower Right Drop Targets Reset
13 Upper Eject Hole
14 Lower Eject Hole
15 Bell
16 Coin Lockout
17 Upper Kicker
18 Left Kicker
19 Right Kicker
20 Not Used
21 Left Magnet Relay
22 Right Magnet Relay

Table 4. Solenoid Connections

SOL. NO.	FUNCTION	WIRE COLOR	CONNECTIONS	DRIVER TRANS.	SOLENOID PART NO.
01	Ball Release	GRY-BRN	2P11-4, 8P3-1, 8P6-11	Q15	SA-23-850-DC
02	Ball Ramp Thrower	GRY-RED	2P11-5, 8P3-2, 8P6-12	Q17	SG-23-850-DC
03	Backbox Gen. Illum. Relay	GRY-ORN	2P11-7, 9P2-2	Q19	5580-09613-00
04	Upper Playfield Gen. Illum.	GRY-YEL	2P11-8, 8P3-4	Q21	5580-09613-00
05	Lower Playfield Gen. Illum.	GRY-GRN	2P11-9, 8P3-5, 8P6-13	Q23	5580-09613-00
06	Slaves Tomb Ball Shooter	GRY-BLU	2P11-3, 8P3-6	Q25	SG-23-750-DC
07	Hidden Tomb Ball Shooter Relay	GRY-VIO	2P11-2, 8P3-7, 8P6-14	Q27	5580-0961 3-00
08	Not Used	GRY-BLK	2P11-1, 8P3-8	Q29	--
09	Upper Left Drop Targets Reset	BRN-BLK	2P9-9, 8P3-9	Q31	SA3-23-850-DC
10	Upper Center Drop Targets Reset	BRN-RED	2P9-7, 8P3-10	Q33	SA3-23-850-DC
11	Lower Center Drop Targets Reset	BRN-ORN	2P9-1, 8P3-11, 8P6-15	Q35	SA3-23-850-DC
12	Lower Right Drop Targets Reset	BRN-YEL	2P9-2, 8P3-12, 8P6-16	Q37	SA3-23-850-DC
13	Upper Eject Hole	BRN-GRN	2P9-3, 8P3-13	Q39	SG-23-850-DC
14	Lower Eject Hole	BRN-BLU	2P9-4, 8P3-14, 8P6-17	Q41	SG-23-850-DC
15	Bell	BRN-VIO	2P9-5, 7P1-17	Q43	SM-29-1000-DC
16	Coin Lockout	BRN-GRY	2P9-6, 7P1-18, 7P2-4	Q45	SM-35-4000-DC
17*	Upper Kicker	BLU-BRN	2P12-7, 8P3-17	Q2	SG-23-850-DC
18*	Left Kicker	BLU-RED	2P12-4, 8P3-18, 8P6-7	Q4	SG-23-850-DC
19*	Right Kicker	BLU-ORN	2P12-3, 8P3-19, 8P6-8	Q6	SG-23-850-DC
20	Not Used	BLU-YEL	2P12-6, 8P3-20	Q8	--
21*	Left Magnet	BLU-GRN	2P12-8, 8P3-21, 8P6-9	Q10	5580-09613-00
22*	Right Magnet Relay	BLU-BLK	2P12-9, 8P3-22, 8P6-10	Q12	5580-09613-00
*	Lower Right Flipper	BLU-VIO	7P1-8, 8P3-34, 8P6-3	--	SFL-19-400/ 30-750-DC
*	Upper Right Flipper	BLK-YEL	7P1-31, 8P3-33	--	SFL-19-400/ 30-750-DC
*	Lower Left Flipper	BLU-GRY	7P1-10, 8P3-32, 8P6-4	--	SFL-19-400/ 30 -750-DC
*	Upper Left Flipper	BLK-BLU	7P1-30, 8P3-31	--	SFL-19-400/ 30-750-DC

***NOTES:**

1. Contacts of solenoid 7 switch ground to Hidden Tomb solenoid (Part No. SG-23-550-DC). Contacts of solenoids 21 - and 22 switch ground to magnets (Part No. 20-9297).

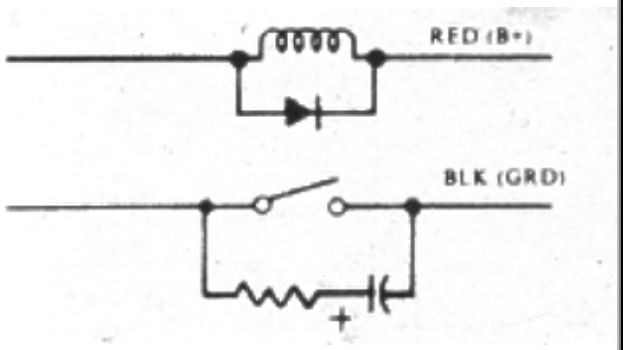
2. Special switch connections for solenoids 17 through 19 are as follows:

   17--ORN-BRN--2P13-5, 8P3-24
   18--ORN-RED--2P13-3, 8P3-25, 8P6-5
   19--ORN-BLK--2P13-2, 8P3-26, 8P6-6

3. Flipper button connections are as follows:

   Right--ORN-VIO--2P12-1, 7P1-7
   Left--ORN-GRY--2P12-2, 7P1-9

4. Typical wiring for solenoids and special switches:



Switch Test

1. From Solenoid Test depress ADVANCE with the switch set to AUTO-UP. Test 03 should be indicated in the Credits display and any stuck switches in the Master display. As stuck switch(es) is displayed a sound is produced. The display continuously cycles through the stuck switches and as they are opened, the number is removed from the sequence. When all switches are open, the Match display is blank and the sounds stop.

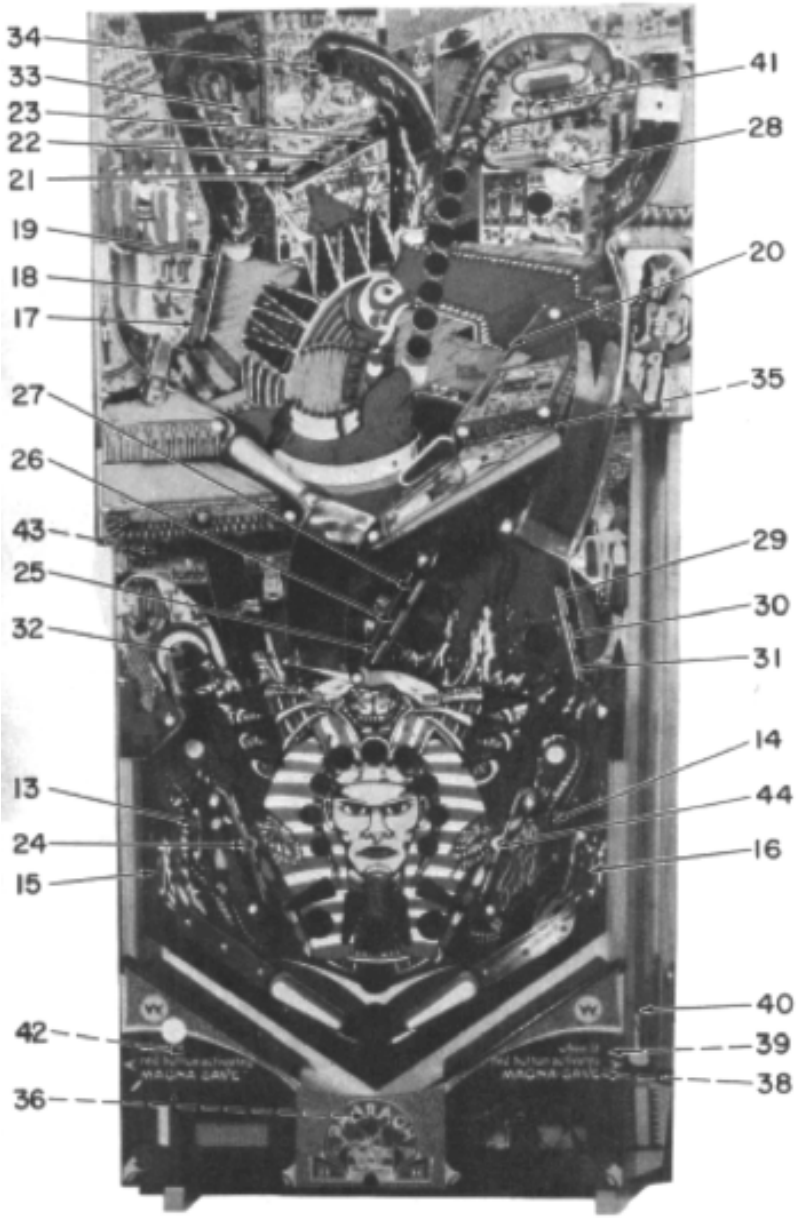
2. If all switches in a row are displayed, first verify that all are open and then check for a short to ground on the row wire.

3. Operate switches, a sound is produced and switch number is momentarily indicated in the ball in play display. If two switches in a row are indicated with one switch closed, check for a short between the column wires; for multiple indication check column wire for short to ground. If two switches in a column are indicated with one switch closed, check for short between row wires.

4. If proper indications are obtained in Test 03 but matrix problem is suspected in game play, disconnect lamp connectors 2P5 and 2P7. Recheck in game play. Perform CPU Self-Test if problem remains. If problem is cleared, check for short between lamp matrix and jet bumper mounting brackets.

5. Shorted diodes can cause "rectangle" switch matrix problems as follows: The center and top targets in the lower center 3-bank down (switches 26 and 27), and with a ball entering the Hidden Tomb Shooter making switch 43, a shorted diode at switch 27 would cause switch 42 Playfield Tilt to be indicated. Note that the "rectangle" is always completed with an incorrect switch diagonally opposite from the switch with the shorted diode.

Figure 3. Playfield Switch Locations and Switch Chart



Switch
No. Function (Score*)

01 Plumb Bob Tilt
02 Ball Roll Tilt
03 Credit Button
04 Right Coin Switch
05 Center Coin Switch
06 Left Coin Switch
07 Slam Tilt
08 High Score Reset
09 Left Magnet Button
10 Right Magnet Button
11 Not Used
12 Not Used
13 Left Inside Rollover (10,000)
14 Right Inside Rollover (.10,000)
15 Left ? Lane Rollover (5,000/Mystery)
16 Right ? Lane Rollover (5,000/Mystery)
17 Upper Left 3-Bank Bottom Target (3,000)
18 Upper Left 3-Bank Center Target (3,000)
19 Upper Left 3-Bank Top Target (3,000)
20 Upper Kicker (10/ 110)
21 Upper Center 3-Bank Left Target (3,000)
22 Upper Center 3-Bank Center target (3,000)
23 Upper Center 3-Bank Right Target (3,000)
24 Left Kicker (10)
25 Lower Center 3-Bank Bottom Target (3,000)
26 Lower Center 3-Bank, Center (3,000)
27 Lower Center 3-Bank, Top (3,000)
28 Upper Bull's-Eye Target (5,000/ 15,000)
29 Lower Right 3-Bank, Top Target (3,000)
30 Lower Right 3-Bank, Center Target (3,000)
31 Lower Right 3-Bank, Bottom Target (3,000)
32 Lower Bull's-Eye Target (5,000/ 15,000)
33 Slaves. Tomb Shooter (20,000)
34 Upper Eject Hole (7,000)
35 Lower Eject Hole (7,000)
36 Outhole
37 Not Used
38 Ball Ramp Left Switch
39 Ball Ramp Right Switch
40 Ballshooter Trough
41 Captive Ball (5,000/5,000 per lit letter)
42 Playfield Tilt
43 Hidden Tomb Shooter (20,000)
44 Right Kicker (10)

*AII scores are doubled for 2X Scoring.

Mystery for switches 15 and 16 (awarded when lit) is random bonus advances, bonus multiplier, random points, or special.

Second value for switch 20 is randomly scored.

Second value for switches 28 and 32 is scored when lit with 5X bonus multiplier.

With full bonus, 10,000 is awarded instead of each bonus advance.

Figure 5. Switch Matrix

ROW	COLUMN	1 GRN-BRN 2J2-9	2 GRN-RED 2J2-8	3 GRN-ORN 2J2-7	4 GRN-YEL 2J2-6	5 GRN-BLK 2J2-5	6 GRN-BLU 2J2-3	7 GRN-VIO 2J2-2	8 GRN-GRY 2J2-1
1	**WHT-BRN 2J3-9**	Plumb Bob Tilt **1**	Left Magnet Button **9**	Upper Left 3-Bank Bottom Target **17**	Lower Center 3-Bank Bottom Target **25**	Slaves Tomb Shooter **33**	Captive Ball **41**	Not Used **49**	Not Used **57**
2	**WHT-RED 2J3-8**	Ball Roll Tilt **2**	Right Magnet Button **10**	Upper Left 3-Bank Center Target **18**	Lower Center 3-Bank Center Target **26**	Upper Eject Hole **34**	Playfield Tilt **42**	Not Used **50**	Not Used **58**
3	**WHT-ORN 2J3-7**	Credit Button **3**	Not Used **11**	Upper Left 3-Bank Top Target **19**	Lower Center 3-Bank Top Target **27**	Lower Eject Hole **35**	Hidden Tomb Shooter **43**	Not Used **51**	Not Used **59**
4	**WHT-YEL 2J3-6**	Right Coin Switch **4**	Not Used **12**	Upper Kicker **20**	Upper Bull's-Eye Target **28**	Outhole **36**	Right Kicker **44**	Not Used **52**	Not Used **60**
5	**WHT-GRN 2J3-5**	Center Coin Switch **5**	Left Inside Rollover **13**	Upper Center 3-Bank Center Target **21**	Lower Right 3-Bank Top Target **29**	Not Used **37**	Not Used **45**	Not Used **53**	Not Used **61**
6	**WHT-BLU 2J3-4**	Left Coin Switch **6**	Right Inside Rollover **14**	Upper Center 3-Bank Center Target **22**	Lower Right 3-Bank Center Target **30**	Ball Ramp Left Switch **38**	Not Used **46**	Not Used **54**	Not Used **62**
7	**WHT-VIO 2J3-3**	Slam Tilt **7**	Left ? Lane Rollover **15**	Upper Center 3-Bank Right Target **23**	Lower Right 3-Bank Bottom Target **31**	Ball Ramp Right Switch **39**	Not Used **47**	Not Used **55**	Not Used **63**
8	**WHT-GRY 2J3-1**	High Score Reset **8**	Right ? Lane Rollover **16**	Left Kicker **24**	Lower Bull's-Eye Target **32**	Ball Shooter Trough **40**	Not Used **48**	Not Used **56**	Not Used **64**

INITIATING AUTO-CYCLE MODE

1. Set AUTO-UP/ MANUAL-DOWN switch to AUTO-UP and depress ADVANCE pushbutton. Test 04 is indicated in Credit display and Function 00 in Match Display.

2. Set switch to MANUAL-DOWN and depress ADVANCE to indicate Function 50 in the Match Display.

3. Set switch to AUTO-UP and operate Credit button to indicate 15 in Player I Display.

4. Depress ADVANCE pushbutton to start Auto-Cycle mode. Each cycle of this mode sequences thru the Display Digits Test, Sound Test (00), Lamp Test (01), and Solenoid test (02).

5. To terminate the test and return to game over, turn the game OFF and back ON.

CPU BOARD SELF-TEST

Depress the DIAGNOSTIC pushbutton on the left side of the CPU Board. The following indications are provided for a few seconds and then the game attempts to go to game over:

0 - Test Passed
1 - IC13 RAM Faulty
2 - IC16 RAM Faulty
3 - IC17 ROM 2 Faulty
4 - IC17 ROM 2 Faulty
5 - IC20 ROM I Faulty
6 - IC14 Game ROM I Faulty
7 - IC26 Game ROM 0 Faulty
8 - IC19 CMOS RAM or Memory Protect Circuit Faulty
9 - Coin-door closed, Memory Protect Circuit Faulty, or ICI9 CMOS RAM Faulty.

Note that "0" remaining after power turn-on indicates CPU Board lockup.

SOUND BOARD SELF-TEST

Depress DIAGNOSTIC pushbutton on the top of the Sound Board. Several electronic sounds should be produced and then the PHARAOH vocabulary contained in the speech ROMS is produced. The vocabulary starts with the first word in 5T-5041(IC7), sequences through all words or partial words in that chip, all words or partial words in 5T-5042(IC5),5T-5043(IC6), and 5T-5044(IC4). Finally, certain composite words are produced. This sequence is repeated until the game is turned OFF and back ON.

Vocabulary	Located in ROM	Composite Words	
Enter	5T 5041(IC7)	Dare	IC4
The	5T 5041	You	IC4/lC7
Tomb	5T 5041	Enter	IC7
Hol...	5T 5041	The Tomb	IC7
Treasure	5T 5041 and ST 5042 (IC5)	Of	IC5
Of	5T 5042	Mighty	IC6/lC4
...ARAOH	5T 5042	PHARAOH's	IC6/lC5
Cobras	5T-5043 and 5T-5043(IC6)	Hidden	IC4/lC7
F...	5T 5043	Chamber	IC6
Hail	5T-5043	May	IC6
...D	5T-5043	Return	IC4/lC7
Chamb...	5T-5043	To	IC7
Bew...	5T-5043	Treasure	IC7/lC5
M...	5T-5043	Beware	IC6/IC5
Mighty	5T-5043 and 5T-5044(IC4)	Cobras	IC5/lC6
Dare	5T-5044	Behold	IC6/IC7/IC6
Y...	5T-5044	Failed	IC6
WH...	5T-5044	Doomed	IC4/IC7/IC6
HID	5T-5044	RA	IC4
RE...	5T-5044	Hail	IC6
RA	5T-5044	Who	IC4/lC7
D...	5T-5044		

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