

STERN


# CATACOMB

A CHILLING GAME OF SKILL



1725 Diversey Parkway, Chicago, Illinois 60614  
(312) 935-4600, Telex 25-4657  
Toll Free Service Assistance (800) 621-8424

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**WARNING:** THIS EQUIPMENT GENERATES, USES, AND CAN RADIATE RADIO FREQUENCY ENERGY AND IF NOT INSTALLED AND USED IN ACCORDANCE WITH THE INSTRUCTION MANUAL, MAY CAUSE INTERFERENCE TO RADIO COMMUNICATIONS. AS TEMPORARILY PERMITTED BY REGULATION IT HAS NOT BEEN TESTED FOR COMPLIANCE WITH THE LIMITS FOR CLASS A COMPUTING DEVICES PURSUANT TO SUBPART J OF PART 15 OF FCC RULES, WHICH ARE DESIGNED TO PROVIDE REASONABLE PROTECTION AGAINST SUCH INTERFERENCE. OPERATION OF THIS EQUIPMENT IN A RESIDENTIAL AREA IS LIKELY TO CAUSE INTERFERENCE IN WHICH CASE THE USER AT HIS OWN EXPENSE WILL BE REQUIRED TO TAKE WHATEVER MEASURES MAY BE REQUIRED TO CORRECT THE INTERFERENCE.

## **SECTION I. INSTALLATION**

### **Assemble the game as follows:**

Bolt legs to cabinet. Using flat washers under bolt heads, bolt back box to cabinet. Feed cable connectors and ground braid through cable port in back box. Screw ground braid to braid in back box. Insert connectors so they are completely seated on printed circuit board assemblies.

On all games there are some items that must be checked after shipment. Making these visual inspections may avoid time consuming service work later. Minor troubles caused by abusive handling in shipment are unavoidable. Cable connectors may be loosened, switches (especially tilt switches) may go out of adjustment. Plumb bob tilt switches should always be adjusted after game is set on location and leg levelers are adjusted.

### **Visual inspections before plugging in line cord:**

1. Check that wiring of transformer corresponds to location voltage.
2. Check the transformer for any foreign material shorting across wiring lugs.
3. Check that fuses are firmly seated and making good contact.
4. Check wire on coils for proper soldering. Cold solder connections may not show up in factory inspection, but vibration in shipment may break contact.
5. Check switches for loose solder or other foreign material that may have come loose in shipment and could cause shorting of contacts.
6. Check for any wires that may have become disconnected.
7. Check that all cable connectors are completely seated on printed circuit board assemblies.
8. Check that cables are clear of all moving parts.

### **Check adjustment of the two (normally open) tilt switches:**

1. Plumb bob tilt on left side of cabinet near front door.
2. Ball tilt above plumb bob tilt. Insert the smaller ball (gold 15/16" dia.) into ball tilt assembly, and adjust the bracket so the ball will roll free to contact the switch blade, if front of cabinet is raised.

## **STATIC DISCHARGE CAUTION**

Integrated circuit chips can be damaged by static discharge from the body. Before touching chips, discharge body by touching any ground path.



## SECTION II. ROUTINE MAINTENANCE ON LOCATION

Self tests, which are programmed into the design of the game, are very helpful. As with any solid state piece of equipment the three prong grounding receptacle is an important piece part of the game, that must not be tampered with and must be used properly.

### MPU MODULE SELF-TEST:

During power-up, the MPU assembly tests itself, which can visibly be seen by the flashing of a LED on the board. When the game is turned on, the LED will flash, have a pause, flash again, a longer pause, then flash five more times and then will be dimly lit. Accompanying each flash is one note (total of seven), this indicates proper MPU game operation conditions.

### GAME SELF-DIAGNOSTIC TESTS:

Pressing the Self-Test button inside the coin door activates the game into its "Self-Diagnostic Test."

1. BURN IN TEST - All outputs tested.
2. FEATURE LAMPS - All feature lamps will flash on and off continuously, determining any burnt lamps.
3. DISPLAYS - Each digit on all displays will cycle from 0 thru 9, then (a) number 8 will shift left to right. This test will recycle continuously.
4. SOLENOIDS - Each solenoid will be energized, one at a time, in a continuous sequence. (Holding both flipper buttons "in" during this test will cause the flipper coils to be energized). The number appearing on the "Player Score" display is the same as the number assigned to the solenoid and also the same transistor number on the SDU board. The sound of a solenoid pulling-in as a number appears indicates proper operation (providing transistor is being used), the absence of a solenoid sound shows a fault. If sound is absent, see Solenoid I.D. page in book for help in Solenoid Identification. (After the solenoids are tested, the game sounds are tested.)
5. SWITCHES - The MPU will look at each switch assembly for stuck contacts. \*(Flipper Button and flipper End of Stroke switches are not included). If there are any stuck, the lowest number encountered is flashed on the Player Score displays. The number remains until the fault is corrected. See Switch I.D. page in book for help in switch identification. Other numbers may follow if more stuck contacts are present. If there are no stuck switches, the "Match/Ball in Play" display flashes '0'. DO NOT BURNISH OR FILE GOLD PLATED SWITCH CONTACTS.
6. GAME LEVELS AND BOOKKEEPING FUNCTIONS: - Pressing the Self-Test button eighteen more times causes the MPU to step thru the game levels and bookkeeping functions and finally to repeat the power-up test. To bypass these functions, turn the game off, then on. The game is now ready to play, after the MPU Self-Test.

## PLAYFIELD SWITCH ADJUSTMENTS

All contact switches should be adjusted to have a gap 1/16" in the open position, and have .010" overtravel closed. All contact switches (except for flipper buttons & flipper end of stroke switches) are gold plated to resist corrosion and, **SHOULD NOT BE FILED OR BURNISHED**. If contacts have dirt or dust on them, a clean piece of paper should be used to clean them, by closing the contacts and wiping gently.

**FLIPPER BUTTON & FLIPPER SWITCHES ONLY.** Tarnish or pitted contacts can be corrected with a contact file followed by a burnishing tool. Severely pitted contact must be replaced as an assembly.

## CLEAN AND WAX THE PLAYFIELD

Stern playfields have a durable long life playing finish. Its life expectancy, as well as playing appeal can be greatly extended by periodic cleaning. Inspect and hand polish the ball with a clean cloth. A chipped ball must be replaced, as it will ruin the finish on the playfield. (DO NOT USE WATER IN LARGE QUANTITIES, HIGHLY CAUSTIC CLEANERS, ABRASIVE CLEANERS OR CLEANING PADS ON THE PLAYFIELD SURFACE.



DISPLAY DRIVER ASSEM'S  
1ST, 2ND, 3RD & 4TH PLAYERS, CREDITS  
AND MATCH/BALL IN PLAY.  
(SEE BACK-RACK GLASS FOR LOCATIONS)

B-605 SOUND BOARD

S-33 (MEMORY CLEAR)

S1 TO S32  
(SEE DETAIL)

MPU ASSY.

BACK-RACK

BACK-RACK INSERT

VOICE SYNTHESIZER UNIT  
(USED IN VOICE GAMES ONLY)

SOLENOID DRIVER,  
VOLT. REGULATOR  
ASSEM.

LED

LAMP DRIVER ASSEM.

CABINET

TRANSFORMER ASSEM.

PLUMB BOB TILT  
SPEAKER

S-33  
(MEMORY CLEAR)

SELF TEST

CREDIT BUTTON

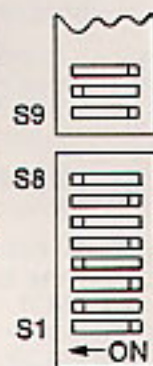
SLAM SWITCH

FRONT DOOR

KNOCKER  
(WHEN USED)

RECTIFIER BOARD  
VOLUME CONTROL

LEG LEVELING  
ADJUSTMENT (TYP)



DETAIL S1-S32  
MPU ASS'Y

## ELECTRONIC PIN BALL GAME



### SECTION III. GENERAL GAME OPERATION

#### PLACE BALL INTO PLAYFIELD BY OUTHOLE:

COIN GAME. Plug in line cord. (For proper game operation grounding circuit must be used). Move power ON-OFF toggle switch at bottom right front corner of cabinet to "ON" position. Seven singular tones will be heard to indicate game-readiness. Feature lamps will flash in a programmed attract mode, "HIGH SCORE" lamp is lit, player displays flash high score to date, numbers 1 to 7 will display from right to left, all 7s will flash, "HIGH SCORE" lite goes off, previous played scores are flashed, "Coin lock-out coil" is energized and game is ready for play. Coin Game. The game should accept the coin and post credits for coins accepted (\*). Pressing the credit button on the door will reset drop targets and cause the outhole kicker to move the ball to the shooter lane. The first player display will flash 00.

One player is registered each time the credit button is pressed (one to four can play). The credits are reduced by one each time the credit button is pressed until the credits are reduced to zero. (Credit button is in-operative after 4 players are registered). Shooting the ball initiates play.

When the ball enters the outhole, the bonus score is added to the player's score. The player-up and/or ball in play on the back box is advanced one position. The bonus score starts at \*\* points. The outhole kicker moves the ball to the shooter lane and play is resumed. This continues until each player has played the allowable number of balls per game (3 or 5). At this time the "Game Over" lamp becomes lit. A random "Match" number appears and the "Match" lamp becomes lit. If the match number is the same as the last two digits in the player's score a free game can be awarded (\*).

Extra ball won during the course of the game is played immediately after the player's regular ball enters the outhole. The player-up and/or ball in play is not advanced for extra ball play. Bonus score is added to the player's score, the bonus is reset to \*\* and the bonus multiplier earned is restored (memory) or reset (\*) before the game moves the extra ball for play.

At the end of the game, a "High Game" is flashed on all players' scores. If the "High Game" is beat, this feature (\*) can award up to 3 free games.

Tilting while playing the game results in loss of the ball in play. The flippers, thumper-bumper, etc., go "dead". Bonus score is not added. The purpose of the tilt penalty is to discourage the player from jostling the machine in an attempt to prolong play. Game action becomes normal after the outhole kicker moves the ball to the shooter lane.

Slamming the machine results in the loss of the game. All feature lamps go out and the game becomes "dead" through a built-in time delay circuit. The purpose of the time delay circuit is to discourage abuse of the machine. After the delay, the "Game Over" lamp lights, "Shoot Again" flashes and the game is ready for play. The time delay occurs any time one of the slam switches is made to contact.

There is a slam switch on the front door, one on the tilt board. (Any number of slam switches could be installed by the operator, to meet his individual requirement). The switch should be adjusted to have approximately 1/16" gap between the contacts. The weighted blade should be adjusted to attain the desired sensitivity. Decreasing gap between contacts will make the switch more sensitive. Opening the gap will reduce sensitivity.

\* Some tunes and features can be disabled by operator if so desired.

\*\* Bonus starts at 0.

\*\*\* See back box adjustments.\*\*\*



## CATACOMB OPERATION

Catacomb is a multi-ball pin game for 1-4 players. Each player gets 3 or 5 balls per game (option) and shooting the first initiates play. The object is to light all of the numbers in the square in the middle of the playfield either by hitting drop targets or with the Backbox Playfield feature.

There are 4 drop target banks each with 4 different colored and numbered rotating lights. All targets down on a bank spots the lit number in the square. The lights will rotate faster to indicate when all of the numbers in the bank have been made.

The two adjacent rollover switches at the top of the playfield stop rotating bank lights on certain colors. If, on a particular bank that color has already been made, then the lights in that bank will continue to rotate.

When a ball enters either of the captive ball holes, another is kicked into the shooting lane for continued play. Balls are released each time any one color in the square is completed. If a color is completed in the Backbox Playfield feature, the balls are released on the next turn.

Completing a color in the square also increases the bonus multiplier up to 5X. 4X lights the spinner lane Extra Ball lamp and 5X lights both the spinner lane and the out lane specials.

The return lane Extra Ball lamp lights by making banks A, B, C and D in order (all targets down when letter is lit).

At the end of each turn you can light extra numbers with the Bankbox Playfield feature. The player gets a courtesy shot, plus a shot for each lit number in the square. Making a letter A-B-C or D spots the lit number on that bank in the square.

When the ball enters the outhole it collects the bonus points times the bonus multiplier. The bonus points come from the square, where each lit number is worth 1,000 points.

If the square is completely lit when a ball drains, then after the bonus points are collected the square is cleared and Super Bonus lights for the next ball worth 136,000 points.

## SECTION IV. SELF TEST AND BOOKKEEPING FUNCTIONS

The game is designed to allow the operator to perform certain diagnostic tests as well as accounting functions as follows:

**TABLE 4-1. SELF TEST FUNCTIONS**

1st		Burn in test - all outputs tested.
2nd		Lamp test - all feature lamps on and off.
3rd		Display test - all digits display 0000000 thru 9999999 then an 8 shifts from left to right.
4th		Solenoid test - continuous sequence of solenoids pulsed with solenoid driver transistor, "Q" number displayed.
5th	Flashing O if all cabinet switches are open and all balls moved from the outhole to the shooter position.	Switch test - switch I.D. Number appears on display when it is manually closed.

**TABLE 4-2. BOOKKEEPING FUNCTIONS**

TEST SWITCH PUSH NUMBER	BALL/MATCH DISPLAY	DESCRIPTION	DISPLAYS
6th	01	1st Threshold (High Score)	
7th	02	2nd Threshold (High Score)	
8th	03	3rd Threshold (High Score)	
9th	04	Current High Game Threshold	
10th	05	Current Credits	00 to 99
11th	06	Total Plays	00 to 999999
12th	07	Total Replays	00 to 999999
13th	08	Total times high score is passed	00 to 999999
14th	09	Number of coins thru Chute No. 2	00 to 999999
15th	10	Number of coins thru Chute No. 1	00 to 999999
16th	11	Number of coins thru Chute No. 3	00 to 999999
17th	12	Total balls played	00 to 999999
18th	13	Total Extra Balls Awarded	00 to 999999
19th	14	Total Playfield Special Awards	00 to 999999
20th	15	Total Level 1 Passed	00 to 999999
21st	16	Total level 2 Passed	00 to 999999
22nd	17	Total times completed square	00 to 999999



## SECTION V. FRONT DOOR GAME ADJUSTMENTS:

### HIGH SCORE FEATURE ADJUSTMENTS:

The game is designed to award an "Extra Ball" or "Free Game" (option) at three score levels. (See High Score Feature). The recommended levels are listed below.

Any level from 10,000 or 9,990,000 can be set, as desired. It is possible to reset or turn off (00) any or all of the levels, if desired.

1. Push and release Self-Test button at one second intervals six times or until number 01 appears on the Match/Ball in Play display.
2. The number on the Player Score Displays is the first score level\*. It can be increased, if desired, by holding the credit button in. To decrease the score level, reset to '00', and then hold the credit button in. Release the credit button when the desired High Score appears. Note that the level changes 10,000 points at a time. If the number '00' is left on the displays, the high score feature is eliminated for that level.
3. Repeat steps 1 and 2 for the second and third high score levels. The number '02' and '03' on the Match/Ball-in-Play display are for the second and third levels, respectively.

### HIGH GAME TO DATE FEATURE:

The game is designed to award up to 3 free games (option) when "High Score to Date" is beat. For the recommended, factory preset level, see below.

It is recommended that the level, which will build with game play, be periodically reset to the factory recommended level to encourage game play. The adjustment procedure is the same as for the High Score Feature Adjustments, Steps 1 and 2. Continue pushing the Self-Test button until the number '04' appears on the Match/Ball-in-Play display and then do Step 2.

Any level from '00' to 9,990,000 can be set as described. It is to be noted that '00' does not turn off the feature, as it does on High Score feature. The feature can be turned off by positioning the correct MPU switches.

\*Can be quickly set to '00' by pressing S33 on the MPU assembly in the back box or front door.

## RECOMMENDED SETTING

### CATACOMB

#### 3 BALLS

1ST LEVEL PAST	680,000	1 CREDIT
2ND LEVEL PAST	980,000	1 CREDIT
3RD LEVEL PAST		
4TH LEVEL PAST	1,600,000	HIGH SCORE TO DATE

#### 5 BALLS

1ST LEVEL PAST	1,200,000	1 CREDIT
2ND LEVEL PAST	2,000,000	1 CREDIT
3RD LEVEL PAST		
4TH LEVEL PAST	2,500,000	HIGH SCORE TO DATE



## GAME ADJUSTMENTS

### A. PLAYFIELD POST ADJUSTMENTS:

Posts that control left and right outlane openings on playfield can be moved to make access to outlanes conservative or liberal for ball to enter. (See appropriate illustrations).

Conservative entry will decrease playing time and scoring.

Liberal entry will increase playing time and scoring.

### B. BACK BOX GAME ADJUSTMENTS:

Each game has thirty-two switches located on the MPU module, located in the back box, that allows play to be customized to the location. (See Fig. 1). Credits per coin, maximum credits, credit display, balls (3 or 5) per game, match feature, high game feature, special award, maximum extra balls and background sound are selectable by means of switches. The switches are contained in four sixteen lead packages numbered S1-8, S9-16, S17-24, and S25-32 for easy identification. The "On" position is marked on the assembly. **TURN OFF POWER BEFORE MAKING ADJUSTMENTS. MAKE ADJUSTMENTS BEFORE TURNING POWER BACK ON.**

### CATACOMB SWITCH ASSIGNMENTS

		NONE X BALL 100K REPLAY						ON OFF	
32	Special .....	OFF	ON	OFF	ON	32		←	←
31	Award .....	OFF	OFF	ON	ON	31		←	←
30	NOT USED .....					30			
29	NOT USED .....					29			
28	Coin Chute #3					28	See Catalog Or Label On Side Of Cabinet		
27						27			
26						26			
25						25			
24	Add-A-Ball .....					24	ON	OFF	
23	Add-A-Ball Feature .....					23	3 Or 5	1	
22	Maximum Add-A-Balls .....					22	5	3	
21	Match Feature .....					21	ON	OFF	
20	Display Credits .....					20	ON	OFF	
19	Maximum Credit .....	16	15	25	40	19			
18		OFF	OFF	ON	ON	18			
17	Talking Sound .....	OFF	ON	OFF	ON	17	ON	OFF	
16	High Score .....	0	1	2	3	16			
15		OFF	OFF	ON	ON	15			
14	NOT USED .....	OFF	ON	OFF	ON	14			
13	NOT USED .....					13			
12	Coin Chute #2					12	See Catalog Or Label On Side Of Cabinet		
11						11			
10						10			
9						9			
8	Background Sound .....					8	ON	OFF	
7	Ball Per Game .....					7	5	3	
6	High Score Feature .....					6	Replay	X-Ball	
5	NOT USED .....					5			
4	Coin Chute #1					4	See Catalog Or Label On Side Of Cabinet		
3						3			
2						2			
1						1			



## SECTION VII. CREDIT/COIN AND GAME ADJUSTMENTS

### CREDITS/COIN ADJUSTMENTS:

The credits given are selectable by means of MPU switches. Sixteen credit ratios are available. The MPU switch settings and resultant credits/coin are as follows:

**TABLE 7-1. CREDITS/COIN ADJUSTMENTS**

**MPU SWITCHES**

SWITCH NO. 1 (BLU) LEFT	4	3	2	1		
	12	11	10	9		
	28	27	26	25	CREDITS	COIN
OFF	OFF	OFF	OFF	OFF	..... 1	Per 1
OFF	OFF	OFF	ON	OFF	..... 2	
OFF	OFF	ON	ON	OFF	..... 3	
OFF	OFF	ON	ON	ON	..... 4	
OFF	ON	OFF	OFF	OFF	..... 5	
OFF	ON	OFF	ON	ON	..... 6	
OFF	ON	ON	ON	OFF	..... 7	
OFF	ON	ON	ON	ON	..... 10	
ON	OFF	OFF	OFF	OFF	..... 14	
ON	OFF	OFF	ON	ON	..... 1	
ON	OFF	ON	OFF	OFF	..... 3	
ON	OFF	ON	ON	ON	..... 5	
ON	ON	OFF	OFF	OFF	..... 7	
ON	ON	OFF	ON	ON	..... 3	
ON	ON	ON	OFF	OFF	..... 5	
ON	ON	ON	ON	ON	..... 7	

If two or three coin chutes are adjusted the same for multiple coins, credits will increase as if dropped in same chute.

Credit sequence will reset when:

- 1) credit button is pressed
- 2) any points are scored



**BALLS FOR GAME:****NO. OF BALLS PER GAME**3  
5**MPU SWITCH 7**OFF  
ON**CREDIT DISPLAY:****CREDIT DISPLAY**YES  
NO**MPU SWITCH 20**ON  
OFF**AWARDED MAXIMUM CREDITS:**

In answer to public demand, we at "STERN" are trying to give the players what they want—MORE playfield excitement. In order to do this, additional features are NEEDED.

In an effort to do so, we have added a coil on the playfield and eliminated the "COIN LOCK OUT COIL."

This Stern game has a new feature not used in any previous Stern pinball: Coins will be accepted and credit for the amount of coins inserted.

There are no MPU switches to limit the amount of credits given as in older Stern pinballs (it is even possible to attain 99 credits). There are, however, two (2) MPU switches that will limit the amount of replays awarded. These two switches can be set for a limit of 10, 15, 25, and 40 replays. If the amount of credits shown in the credit/match window is greater than the MPU switches are set for, no replay credit will be awarded.

**AWARDED MAXIMUM CREDITS**

10

15

25

40

**MPU SWITCHES**

18

OFF

ON

OFF

ON

19

OFF

OFF

ON

ON

**HIGH SCORE FEATURE:**

The game is designed to award an "Extra Ball" or "Free Game" at one, two or three "High Score" levels. (See "Front Door Game Adjustments" for setting levels.)

**AWARD**

Extra Ball

Replay

**MPU SWITCH 6**

OFF

ON

**BACKGROUND SOUND:**

The background sound during game play can be controlled as follows:

**SOUND**

ON

OFF

**MPU SWITCH 8**

ON

OFF

**TALKING SOUND:**

The talking feature during game play can be controlled as follows:

**TALKING**

ON

OFF

**MPU SWITCH 17**

ON

OFF



### HIGH GAME TO DATE FEATURE:

The game is designed to award up to 3 free games when "High Score to Date" is beat. Each time this happens, the winning score becomes the new "High Game Score to Beat". This score is displayed on all 4 player score displays at the end of each game as an incentive to play.

AWARD	MPU SWITCHES	
	15	16
No Free Game	OFF	OFF
1 Free Game .....	ON	OFF
2 Free Games	OFF	ON
3 Free Games .....	ON	ON

### MATCH FEATURE:

When the "Match Feature" is ON, a random tens digit number appears in the "Match/Ball in Play" window and the word "Match" is illuminated. If the number matches the ten digit in a player's score, a free game is awarded. The "Match Feature" creates an incentive to play.

MATCH	MPU SWITCH 21
ON	ON
OFF	OFF

### SPECIAL AWARD:

AWARD	MPU SWITCHES	
	31	32
No Award	OFF	OFF
Extra Ball .....	OFF	ON
100,000 Points	ON	OFF
Replay .....	ON	ON

### ADD-A-BALL (Memory):

This adjustment can store in memory 0, 1, 3, 5, "Add-A-Balls".

NUMBER OF BALLS	MPU SWITCHES		
	22	23	24
0	OFF	OFF	OFF
1	OFF	OFF	ON
3	OFF	ON	ON
5	ON	ON	ON



**SPINNER (Pl. Sw. No. 4)**

Scores 100 points or 500 points for each spinner light lit.

**SPINNER LANE GATE (Pl. Sw. No. 5)**

Scores 1,000 points and collects Extra Ball when lit and Special when lit. Extra Ball lights with 4X and Special lights with 5X. Completing a color in the Square increases the Bonus Multiplier (max. 5X).

**LEFT FLIPPER BUTTON (Pl. Sw. No. 8)**

Stops the Drop Target bank lights on desired color for Backbox Playfield feature.

**TOP & BOTTOM THUMPER BUMPER (Pl. Sw. No. 9 [top] & No. 10 [btm.])**

Scores 1,000 points and alternates return lane Extra Ball lights, out lane Special lights and switch 25, 26 and 27 lights.

**TOP, LEFT & RIGHT SLINGSHOTS (Pl. Sw. No. 11 [top], No. 12 [lt.] & No. 13 [rt.])**

Scores 10 points and alternates return lane Extra Ball lights, out lane Special lights and switch 25, 26 and 27 lights.

**DROP TARGET SET "A" & BACKBOX "A" ROLLOVERS (Pl. Sw. No. 14, 15, 16)**

Each target and rollover scores 1,000 points. All targets down or making "A" lane in Backbox spots lit number on Bank "A" in the Square.

**OUTHOLE REFLEX (Pl. Sw. No. 17)**

When closed will advance the ball to the outhole runway switches.

**LEFT & RIGHT OUT LANE (Pl. Sw. No. 18 [lt.] & No. 19 [rt.])**

Scores 5,000 points and Special when lit. Lights with 5X. (Only one out lane Special lit at a time — alternate).

**LEFT & RIGHT RETURN LANE (Pl. Sw. No. 20 [lt.] & No. 21 [rt.])**

Scores 1,000 points and awards Extra Ball when lit. Lights by making A, B, C and D banks in order (all targets down when letter is lit.) (Only one return lane Extra Ball light lit at a time).

**DROP TARGET SET "B" & BACKBOX "B" ROLLOVERS (Pl. Sw. No. 22, 23, 24)**

Each target and rollover scores 1,000 points. All targets down or making "B" lane in Backbox spots lit number on Bank "B" in the Square.

**SPOT 6 ROLLOVER WIRE (Pl. Sw. No. 25)**

Scores 1,000 points and stops the Drop Target bank lights on Red. (If, on a particular bank, red has already been made, then the lights on that bank will continue to rotate.)

Scores 5,000 points and spots No. 6 in the Square when lit.

**SPOT 1 ROLLOVER WIRE (Pl. Sw. No. 26)**

Same as Sw. No. 25 but stops lights on Amber and spots No. 1 in Square when lit.



**SPOT 2 STAND-UP TARGET (Pl. Sw. No. 27)**

Scores 1,000 points.

Scores 5,000 points and spots No. 2 in the Square when lit.

**TOP SWITCH & ROLLOVER BUTTON (Pl. Sw. No. 28)**

Scores 10 points and alternates return lane Extra Ball lights, out lane specials, and switch 25, 26 and 27 lights.

**TOP RIGHT ROLLOVER WIRE (Pl. Sw. No. 29)**

Scores 1,000 points and increases the spinner value (lights spinner lamps).

**DROP TARGET SET "C" & BACKBOX "C" ROLLOVERS (Pl. Sw. No. 30, 31, 32)**

Each target and rollover scores 1,000 points. All targets down or making "C" lane in Backbox spots lit number on Bank "C" in the Square.

**OUTHOLE LANE SWITCHES (Pl. Sw. No. 33 [rt.], No. 34 [ctr.] & No. 35 [lt.])**

Ball count switches.

**LEFT & RIGHT KICKOUT HOLES (Pl. Sw. No. 36 [lt.] & No. 37 [rt.])**

Scores 7,000 points and releases ball when any color in the Square is completed. If a color in the Square is completed in the Backbox Playfield feature, the ball is released on next turn.

**DROP TARGET SET "D" & BACKBOX "D" ROLLOVERS (Pl. Sw. No. 38, 39, 40)**

Each target and rollover scores 1,000 points. All targets down or making "D" lane in Backbox spots lit number on Bank "D" in the Square.



# PARTS LIST

## CATACOMB

### MISCELLANEOUS

	PART NUMBER
Transformer (Domestic or Export) .....	16B-6
Transformer & Rectifier Board .....	B438-4
Bulbs, #44 .....	8A-101
U1 .....	E-147-U1CA22
U2 .....	E-147-U2CA22
U5 .....	E-147-U5CA22
U6 .....	E-147-U6CA22
U9 Voice E-Prom .....	E-147-U9CAT 1
U10 Voice E-Prom .....	E-147-U10CAT 2

### ASSEMBLY COILS (DIODES ON COILS ARE IN 4004)

3 Drop Target Bank (4) .....	B-27-2300
Flippers (2) .....	J-25-475/34-4500
Back Box Flipper (1) .....	J-25-600/34-4500
Slingshot (3) .....	J-26-1500
Ball Ejector .....	J-28-2300
Ball Ejector Release .....	J-28-2300
Kicker (3) .....	J-28-2300
Knocker .....	N-26-1200
Thumper Bumper (2) .....	J-26-1200

### MODULES

Lamp Driver .....	B-431
Display Driver .....	A-645
Match & Ball in Play Display .....	A-434
Solenoid Driver/Voltage Regulator .....	B-432
MPU (FOR E PROM SEE MISCELLANEOUS ABOVE) .....	C-602
Rectifier Board .....	A-430
Sound Module .....	C-605
Voice Synthesizer Unit (E PROM SEE MISCELLANEOUS ABOVE) .....	A-720

### PLAYFIELD PARTS

SEE PLAYFIELD DIAGRAM

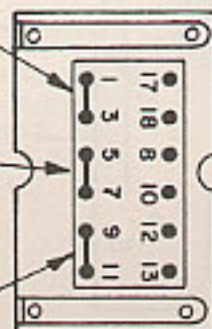
**FIGURE 8-1. STERN 16B-6 TRANSFORMER WIRING CONNECTION INSTRUCTIONS**

115/120V., 50/60 Cycle Input.  
Varistor - Soldered to Line Filter on Left Side of Cabinet  
Must Be Stern Part No. 25A-18-1.

Solder Lugs 1 & 3  
Together. Solder Heavy  
Red Wire To Lug 1

120V  
Solder Lugs 5 & 7  
Together. Solder Heavy  
Yellow Wire To Lug 5

115V  
Solder Lugs 9 & 11  
Together. Solder Heavy  
Yellow Wire To Lug 9



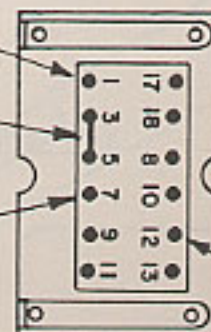
220/240V., 50/60 Cycle Input.  
Varistor - Soldered to Line Filter on Left Side of Cabinet  
Must be Stern Part No. 25A-18-2.

Solder Heavy Red Wire  
To Lug 1

Solder Lugs 3 & 5  
Together

240V  
Solder Heavy Yellow  
Wire To Lug 7

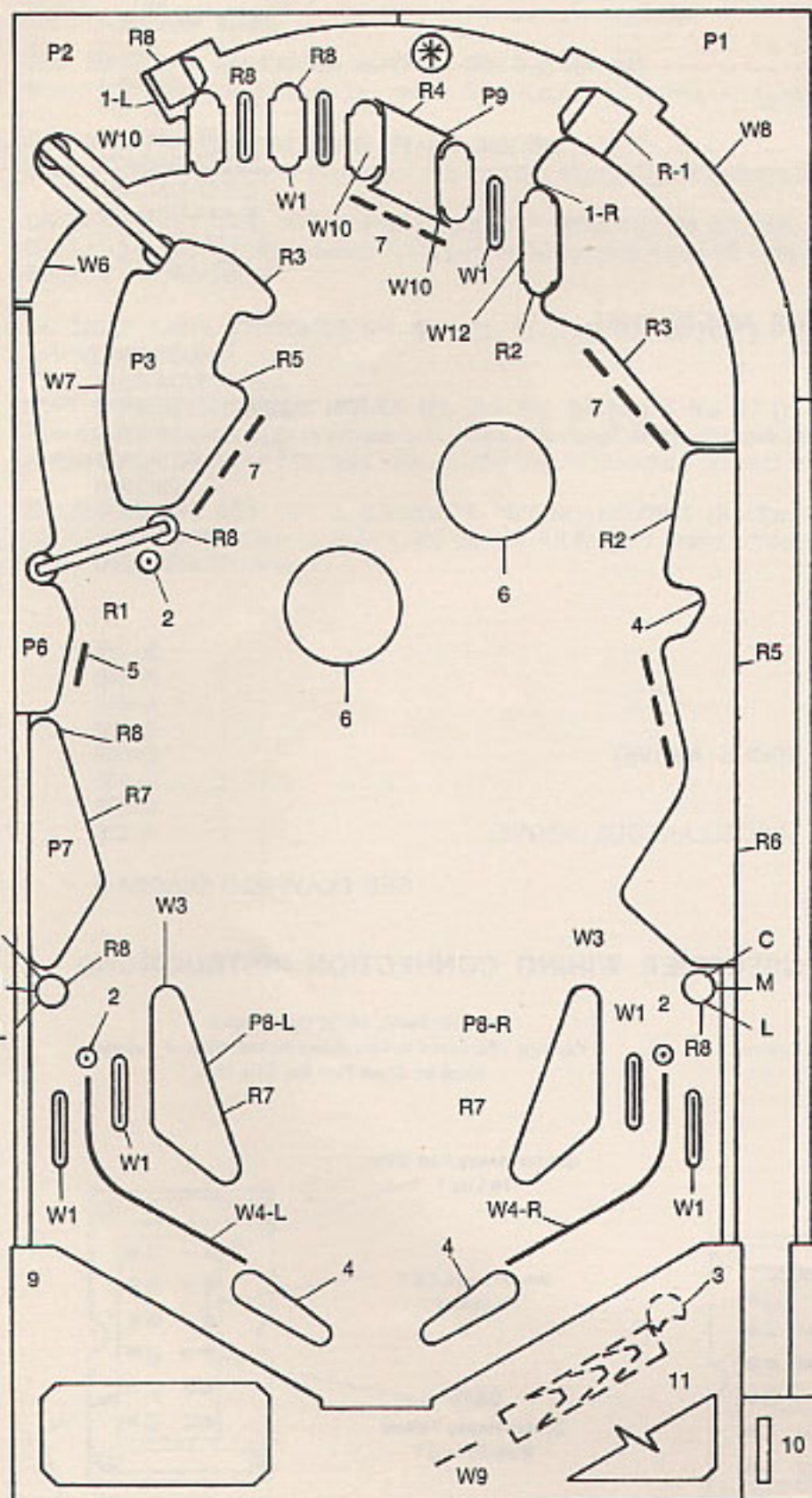
220V  
Solder Heavy Yellow  
Wire To Lug 12





# CATACOMB

## PLAYFIELD PARTS



### RUBBER RINGS

R1-7A-100	R5-7A-120-225
R2-7A-125	R6-7A-120-250
R3-7A-150	R7-7A-120-275
R4-7A-200	R8-7A-135

### BALL GUIDES & ROLL-OVERS

W1-A-149	W6-A-952
W2-A-991	W7-B-953
W3-6A-101	W7-C-956
W4-6A-279	W9-A-860
(L+R)	W10-4A-110-RT
W5-A-950	W11-4A-121-RT
	W12-4A-223-RT

### PLASTIC SHIELDS

13C-147-1 to 9  
(P1 to P9)

### MISC. PARTS & ASSEMBLIES

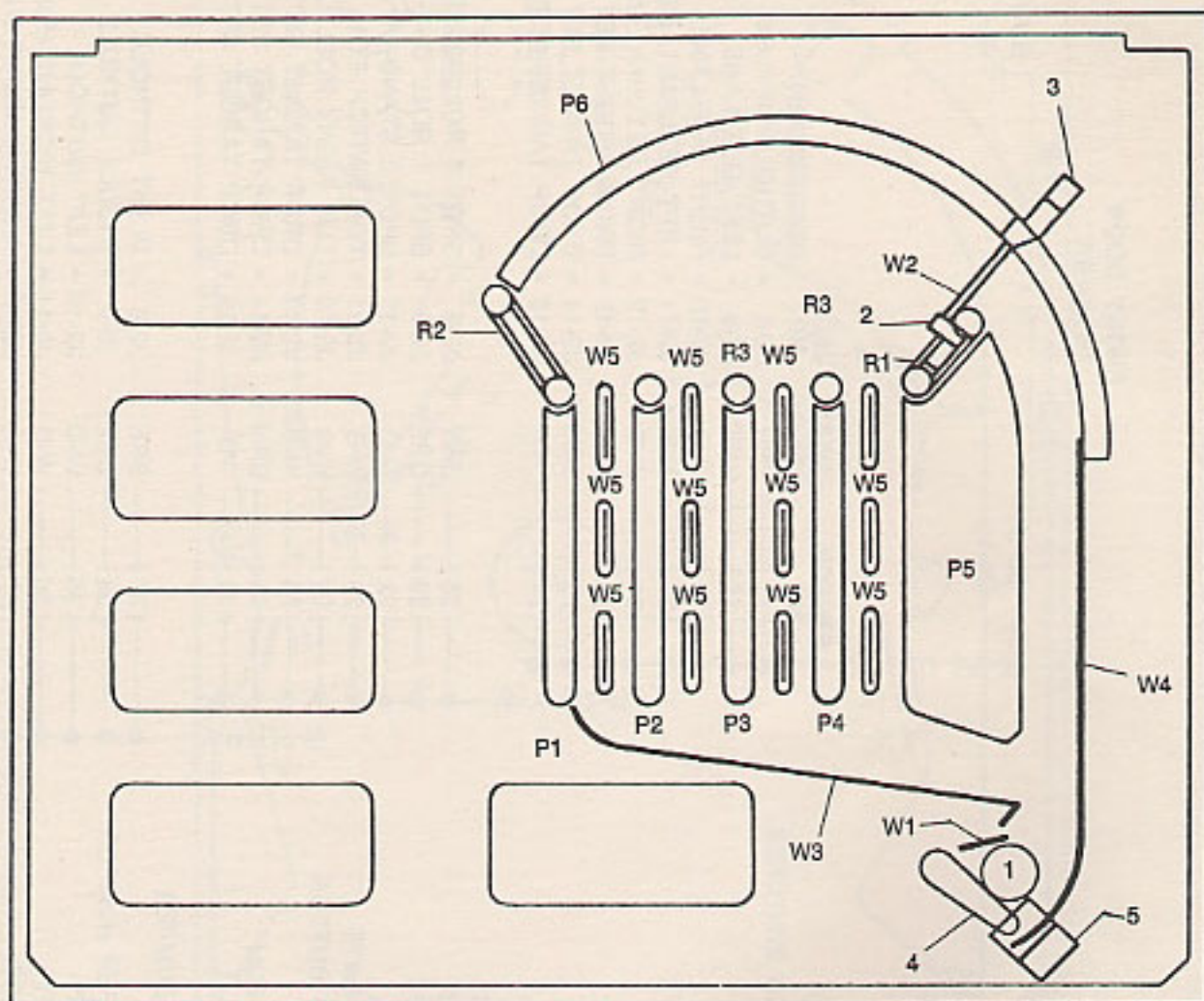
1. Ball Gate Assembly A-611 (L & R)
2. Ball Guide Post 2A-200  
(Rubber Ring 7A-125)
3. Ball Release Assembly B-842
4. Flipper Assembly  
B-634-1-LY+ -RY
5. (1) Stand-Up Target  
A-722-L-2
6. Thumper Bumper  
B-695-4
7. 3-Bank Drop Target  
D-823-3F (Targets alone)  
4A-195-3
8. 3-Bank Drop Target  
D-823-3G (Targets alone 4A-195-3)
9. Instruction Plate 14B-32-1
10. Shooter Gauge 14A-2-14
11. Switch, Plate and Wireform  
Assembly B-881-3  
(3) Wire Forms 6A-290-2

### GAME ADJUSTMENT

C-CONSERVATIVE  
M-MEDIUM  
L-LIBERAL



**CATACOMB**  
**BACKBOX PLAYFIELD PARTS**



**RUBBER RINGS**

R1-7A-120-100  
R2-7A-120-200  
R3-7A-135

**MISC. PARTS AND ASSEMBLIES**

1. Ball (yellow) 4A-406-y
2. Bottom Gate Bracket 1A-1031
3. Top Gate Bracket 1B-1032
4. Flipper Assembly B-634-3-L
5. Ball Retainer 4A-407

**BALL GUIDES AND ROLL-OVERS**

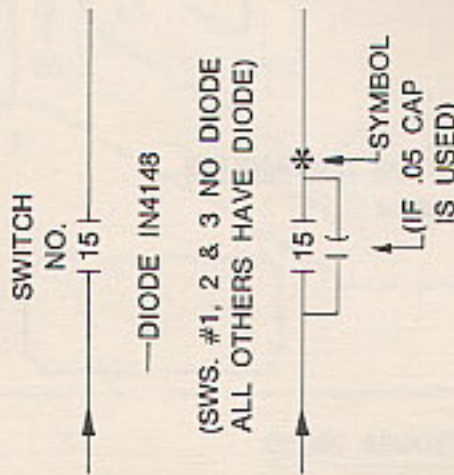
W1-6A-101  
W2-6A-308  
W3-A-951  
W4-A-954  
W5-A-149

**PLASTIC SHIELDS ASSEMBLIES**

A-947-1 TO A-947-4  
(P1 TO P4)  
P5-4-948  
P6-A-949



## SWITCH IDENTIFICATION



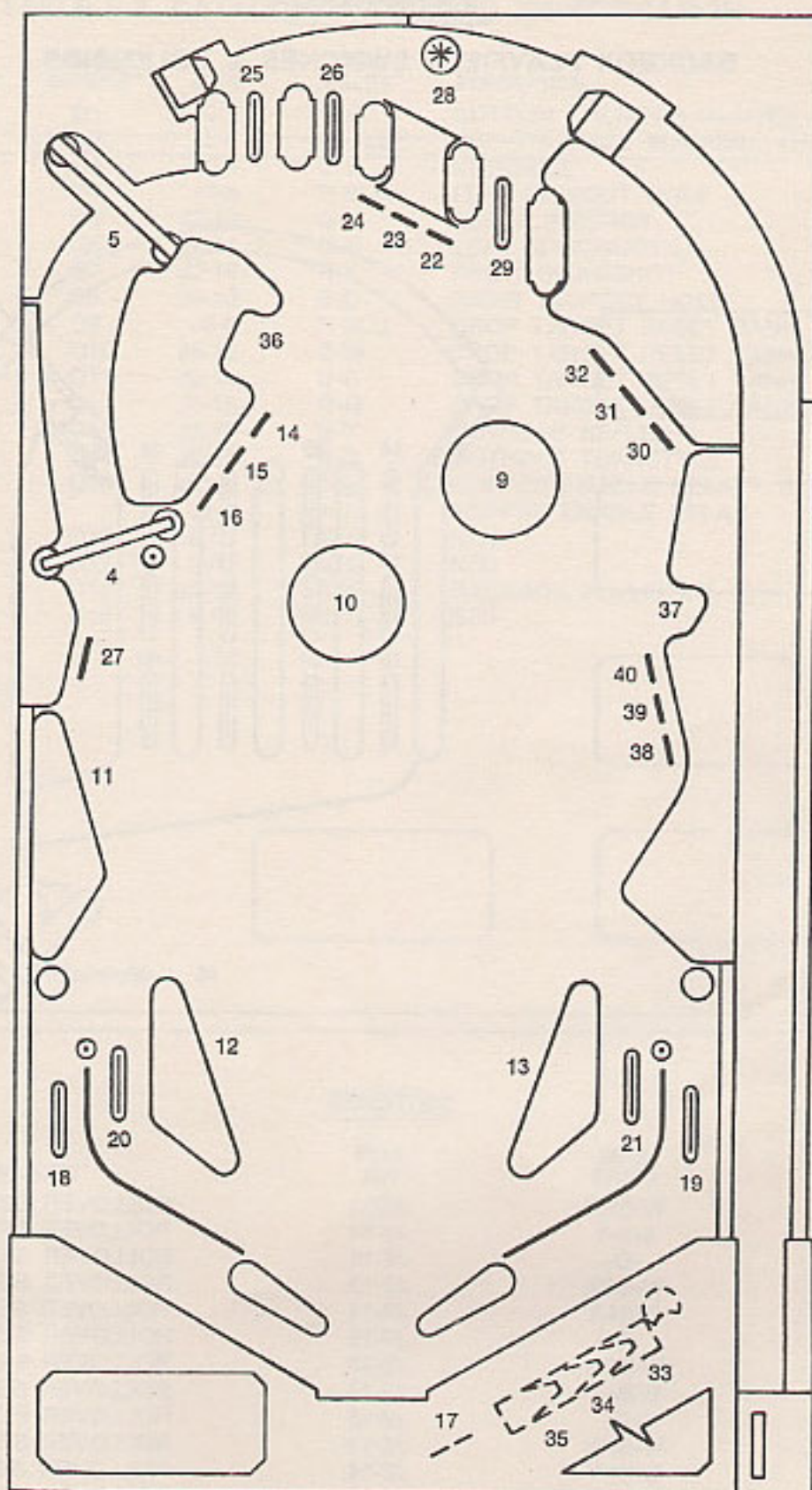
NOTE: DROP TARGET SET SWITCHES A, B, C, & D AND SWITCHES IN ROWS A, B, C, & D IN BACK BOX ARE IN PARALLEL. THE BACK BOX SWITCHES HAVE .05 CAPS. THE DROP TARGET SET SWITCHES DO NOT HAVE CAPS.

SWITCH NO.	WIRE COLOR	JACK NO.	DESCRIPTION
1	BLU	J3-9	COIN CHUTE #1
2	BRN-W	J3-10	COIN CHUTE #2
3	R-W	J3-11	COIN CHUTE #3
4	W-B	J2-11	SPINNER
5   *	W-G	J2-12	SPINNER LANE GATE
6	BLU-W	J3-14	CREDIT (START) BUTTON
7   *	BLU-O	J3-15	TILT
8	-Y-	J3-16	L. FLIPPER BUTTON
9	BRN	J2-8	TOP THUMPER BUMPER
10		J2-9	BOTTOM THUMPER BUMPER
11   *	W-O	J2-10	TOP SLINGSHOT
12   *	W-B	J2-11	LEFT SLINGSHOT
13   *	W-G	J2-12	RIGHT SLINGSHOT
14	W-BRN	J2-13	DROP TARGET SET "A" (RT.)
15	BRN-Y	J2-14	DROP TARGET SET "A" (MID.)
16	-O-	J2-15	DROP TARGET SET "A" (L.)

MPU J4-13	B-O	Y-R	SDU J2-7
FRONT DOOR SLAM SW.			
W-BLU (J2-3)	SWITCH NO.	WIRE COLOR	JACK NO. DESCRIPTION
	17	BRN	J2-8 • OUTHOLE REFLEX
	18	GREY	J2-9 • LEFT OUT LANE
	19	W-O	J2-10 • RIGHT OUT LANE
	20	W-B	J2-11 • LEFT RETURN LANE
	21	W-G	J2-12 • RIGHT RETURN LANE
	22	W-BRN	J2-13 • DROP TARGET SET "B" (RT.)
	23	BRN-Y	J2-14 • DROP TARGET SET "B" (MID.)
	24	-O-	J2-15 • DROP TARGET SET "B" (L.)
W-Y (J2-4)	25	BRN	J2-8 • SPOT 6 ROLL OVER WIRE
	26	GREY	J2-9 • SPOT 1 ROLL OVER WIRE
	27   *	W-O	J2-10 • SPOT 2 STAND-UP TARGET
	28   *	W-B	J2-11 • TOP SWITCH ROLL OVER
	29	W-G	J2-12 • TOP RIGHT ROLL OVER WIRE
	30	W-BRN	J2-13 • DROP TARGET SET "C" (RT.)
	31	BRN-Y	J2-14 • DROP TARGET SET "C" (MID.)
	32	-O-	J2-15 • DROP TARGET SET "C" (L.)
Y-R (J2-5)	33	BRN	J2-8 • RIGHT OUTHOLE
	34	GREY	J2-9 • MIDDLE OUTHOLE
	35	W-O	J2-10 • LEFT OUTHOLE
	36	W-B	J2-11 • LEFT KICKOUT HOLE
	37	W-G	J2-12 • RIGHT KICKOUT HOLE
	38	W-BRN	J2-13 • DROP TARGET SET "D" (RT.)
	39	BRN-Y	J2-14 • DROP TARGET SET "D" (MID.)
	40	-O-	J2-15 • DROP TARGET SET "D" (L.)



# **CATACOMB SWITCHES**



## **SWITCHES NOT ON PLAYFIELD**

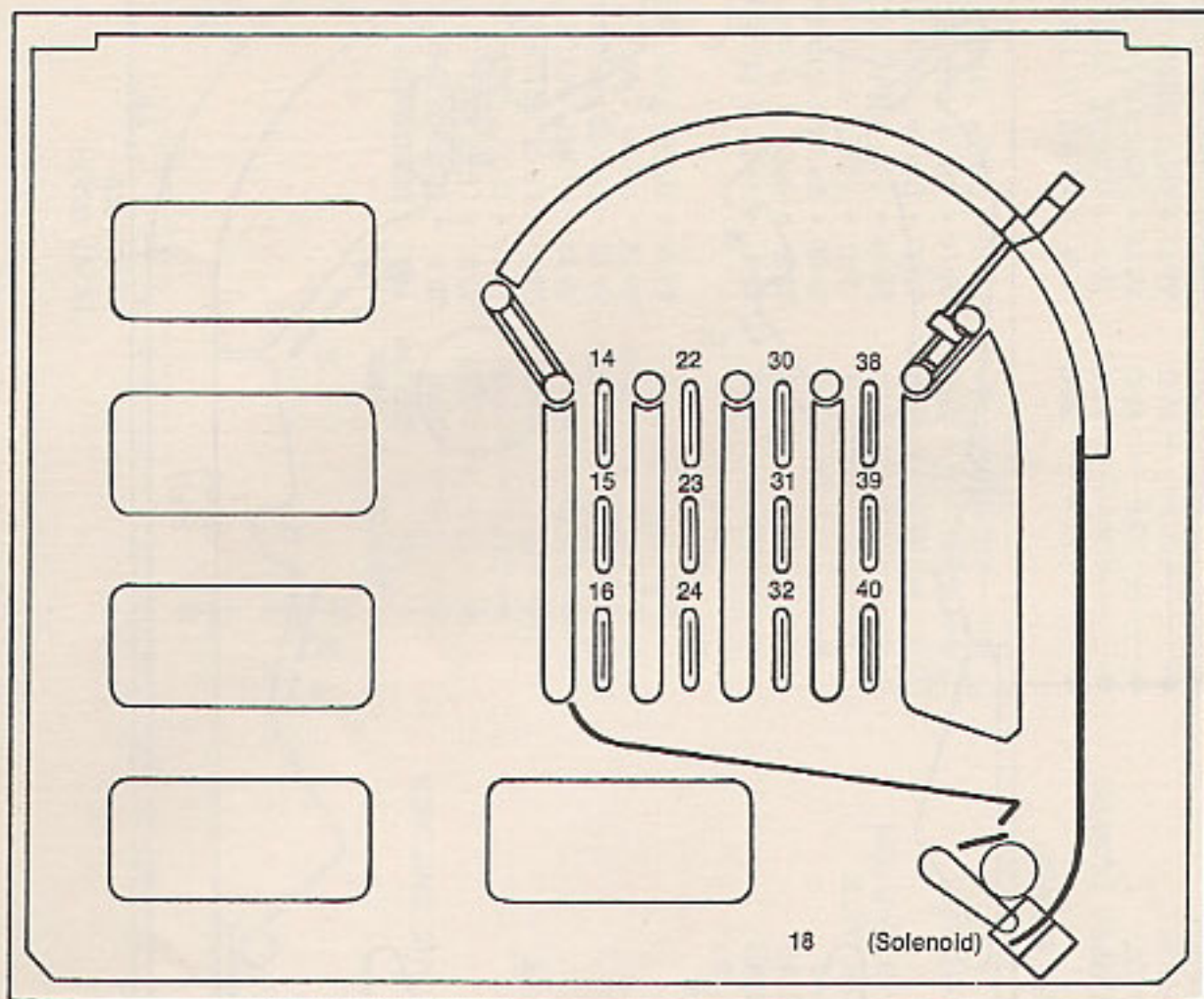
- |                  |                  |
|------------------|------------------|
| 1. *LEFT CHUTE   | 6. CREDIT BUTTON |
| 2. *CENTER CHUTE | 7. TILT          |
| 3. *RIGHT CHUTE  |                  |

\* SEE DRAWG. ON SWITCH IDENTIFICATION PAGE



# CATACOMB

## BACKBOX PLAYFIELD SWITCHES & SOLENOIDS



### SWITCHES

SWITCH NO.	WIRE COLOR	JACK NO.	DESCRIPTION
14	W-BRN	J2-13	ROLLOVER SET "A" (TOP)
15	brn-Y	J2-14	ROLLOVER SET "A" (MID)
16	-O-	J2-15	ROLLOVER SET "A" (BOT)
22	W-BRN	J2-13	ROLLOVER SET "B" (TOP)
23	BRN-Y	J2-14	ROLLOVER SET "B" (MID)
24	-O-	J2-15	ROLLOVER SET "B" (BOT)
30	W-BRN	J2-13	ROLLOVER SET "C" (TOP)
31	BRN-Y	J2-14	ROLLOVER SET "C" (MID)
32	-O-	J2-15	ROLLOVER SET "C" (BOT)
38	W-BRN	J2-13	ROLLOVER SET "D" (TOP)
39	BRN-Y	J2-14	ROLLOVER SET "D" (MID)
40	-O-	J2-15	ROLLOVER SET "D" (BOT)

### SOLENOID

I.D. NO.	TRANS NO.	JACK	WIRE COLOR	DESCRIPTION
18	Q18	J2-15	R-W	BACKBOX PLAYFIELD FLIPPER



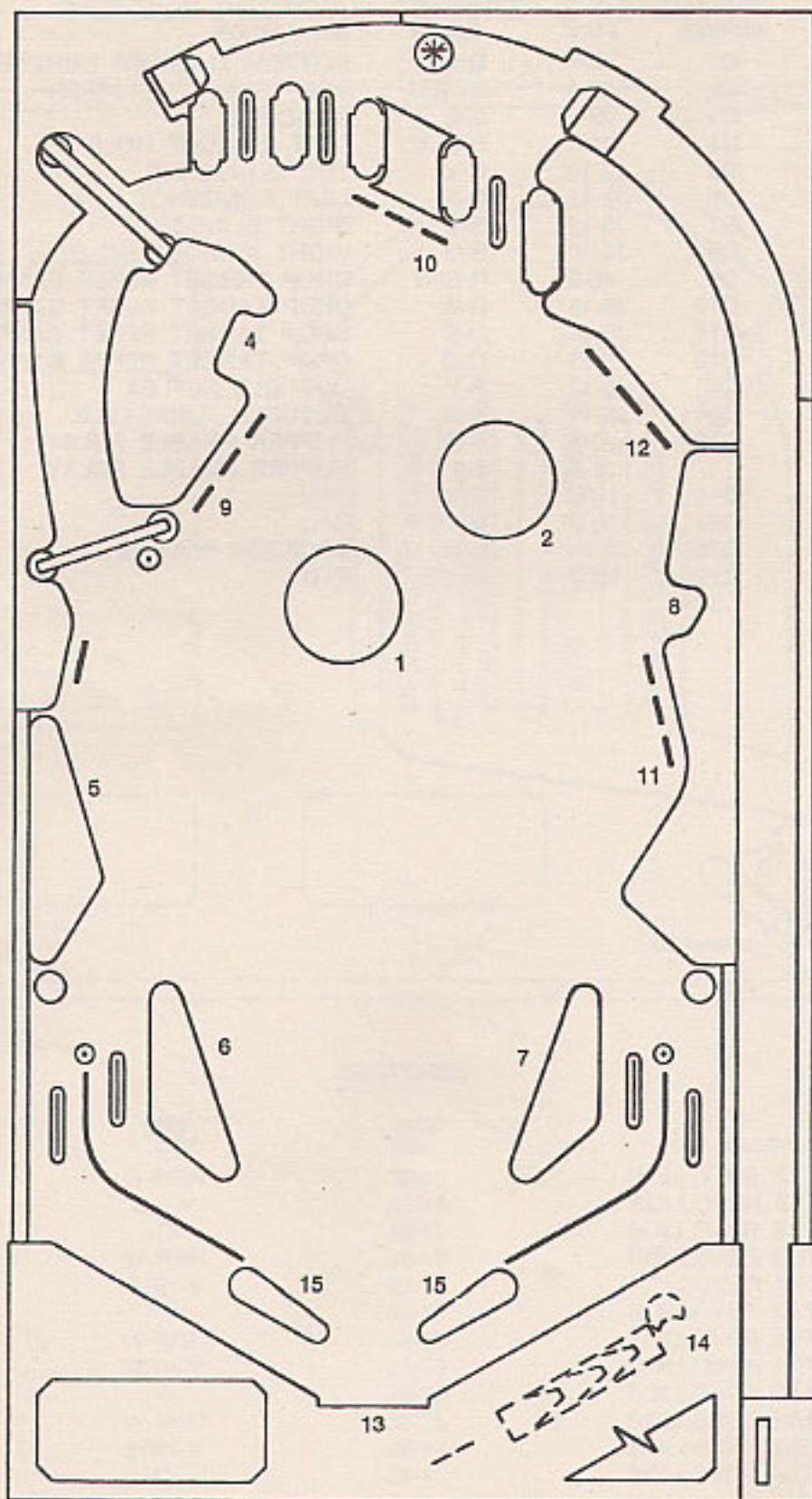
**TABLE 8-3. CATACOMB SOLENOID IDENTIFICATION**

<b>I.D. NUMBER</b>	<b>TRANS. NUMBER</b>	<b>JACK</b>	<b>WIRE COLOR</b>	<b>DESCRIPTION</b>
1	Q1	J2-9	G-O	BOTTOM THUMPER BUMPER
2	Q2	J2-4	G-BLU	TOP THUMPER BUMPER
3	Q3	J2-5	G-B	KNOCKER
4	Q4	J1-5	B-BLU	LEFT KICKOUT HOLE
5	Q5	J2-10	G-Y	TOP SLINGSHOT
6	Q6	J2-11	G-R	LEFT SLINGSHOT
7	Q7	J2-12	R-Y	RIGHT SLINGSHOT
8	Q8	J5-10	B-O	RIGHT KICKOUT HOLE
9	Q9	J5-9	R-BLU	DROP TARGET RESET BANK "A"
10	Q10	J5-15	O-W	DROP TARGET RESET BANK "B"
11	Q11	J5-14	O-B	DROP TARGET RESET BANK "D"
12	Q12	J5-13	O-G	DROP TARGET RESET BANK "C"
13	Q13	J5-12	B-Y	OUTHOLE REFLEX
14	Q14	J5-11	B-G	OUTHOLE TURNSTYLE
15	Q15	J1-8	8-G	FLIPPER ENABLE RELAY
		J1-9	9-O	FLIPPER ENABLE RELAY
16	Q16	N/U	N/U	N/U
17	Q17	N/U	N/U	N/U
18	Q18	J2-15	R-W	BACKBOX PLAYFIELD
19	Q19	N/U	N/U	N/U



CATACOMB

SOLENOIDS



SOLENOID NOT ON PLAYFIELD

3. KNOCKER



**TABLE 8-4. MPU-200 JUMPER COMBINATIONS**

The MPU-200 can be converted to use 25A Roms or E-Proms or any combination of Roms or E-Proms. Below are listed the jumpers needed for each memory chip.

U1		U5	
ROM Stern #25A-	E-PROMS (paper on top)	ROM	E-PROM
E9 to E8	E9 to E10	E19 to E20	E19 to E21
E28 to E26	E28 to E27	E29 to E31	E29 to E30
U2		U6	
ROM	E-PROM	ROM	E-PROM
E5 to E1	E5 to E7	E13 to E12	E13 to E14
E2 to E6	E2 to E3	E25 to E22	E25 to E23

The MPU-200 can be down graded to act as a MPU-100 (Rom's Only) following are jumper modifications:

Remove - E32 - E33

Remove - E34 - E35

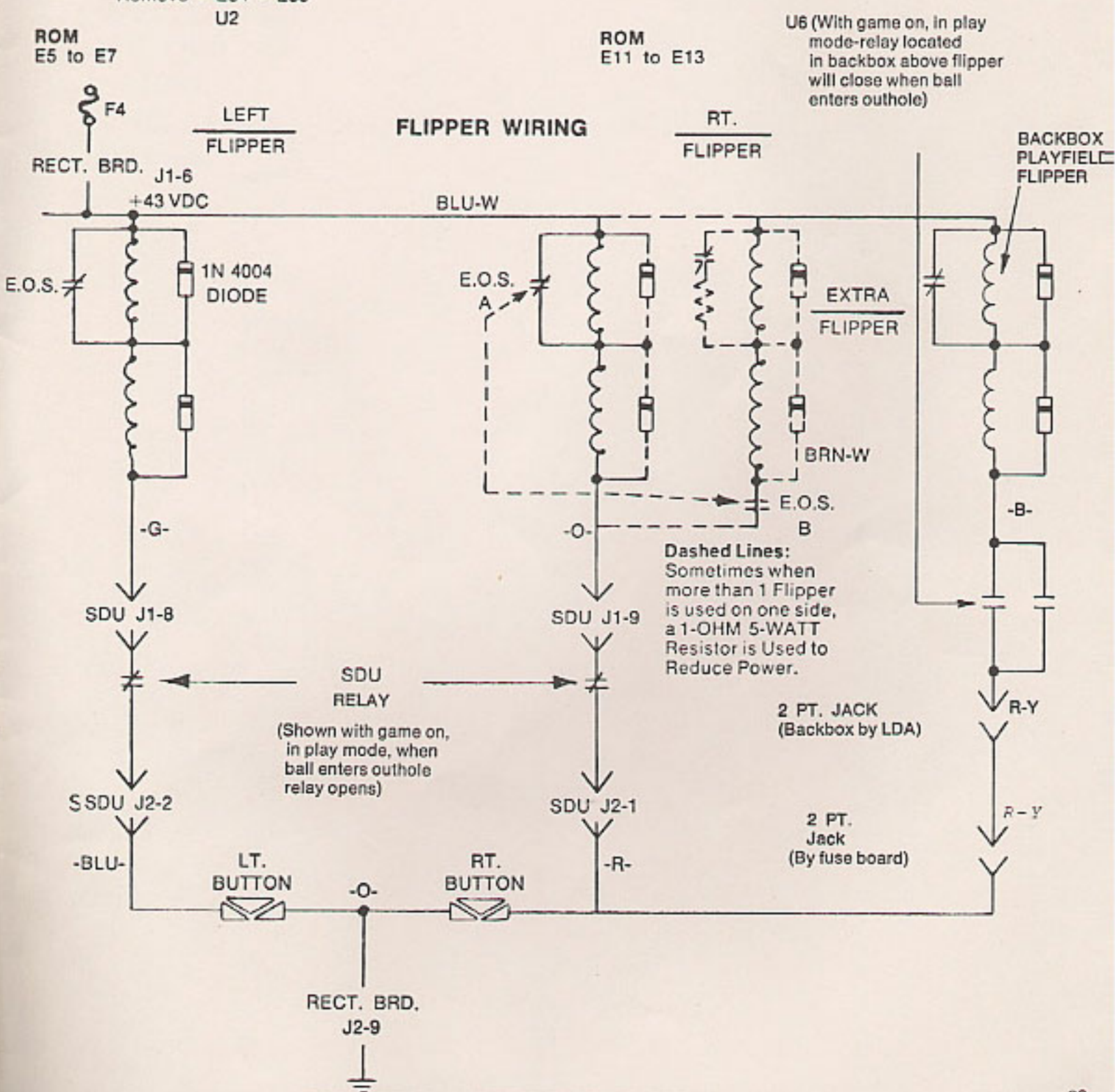
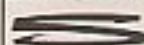


FIGURE 8-4. ADDITIONAL FLIPPER WIRING



STERN

 SEEBURG

1725 Diversey Parkway, Chicago, Illinois 60614  
(312) 935-4800, Telex 25-4657  
Toll Free Service Assistance (800) 621-6424