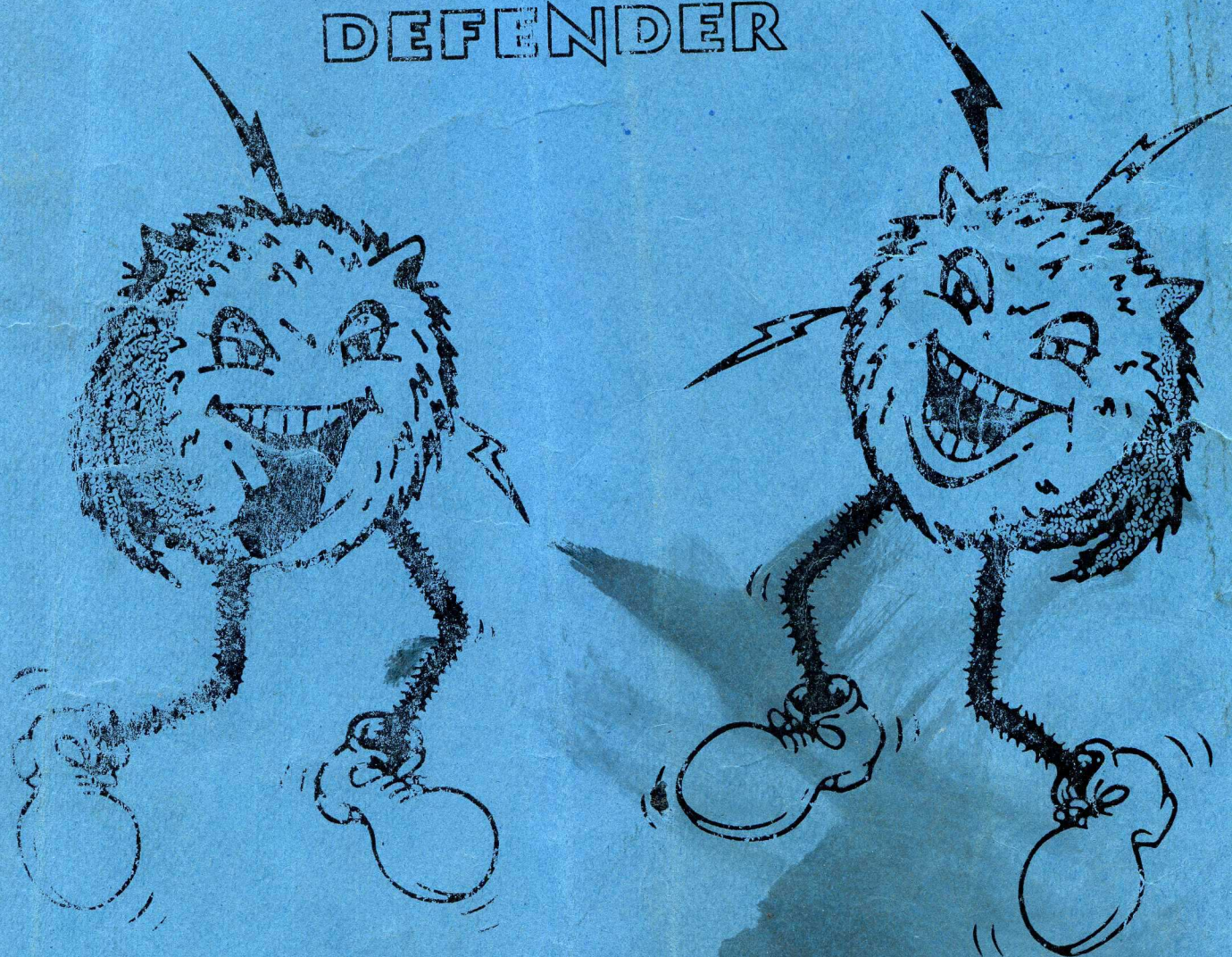


NEW

Bell Games

PRESENTS

WORLD
DEFENDER

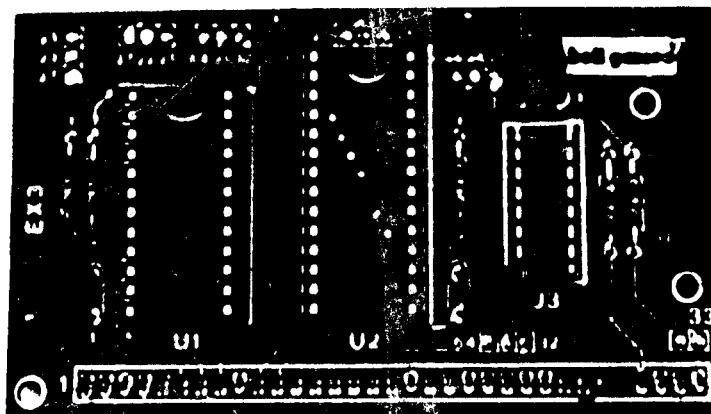


A) Mount on the display our o and behind put one lamp 7 volts and connect with the other lamps.

B) Take out from MPU logic board the old memories game in the position U1, U2, U3, U4, U5, U6.

If your MPU is the old one with the connector J 5 with 32 pins, look the MPU on the side components and cut the connection beetwin the connector J 5 position 32 and the other components.

In solder side make a jumper from J 5 pin 32 and U 9 pin 24. Inserit the connectors of the board with the memories of a new game (mem ex 2) in position J 5 and do a jumper in 33 (see the schema).



In case that is a new M.P.U. tipe (as 2518-35) with 33 pins in J 5 you only inserit our memories board mem ex 2 in J 5 and dont do the jumper 33.

C) Don't connect the connector J2 lamp driver and connect our from playfield with 3 wires not connected. Solder this 3 wires in the following position on the back box lamps.

RED = TILT
 BLACK = GAME OVER
 WHITE = SHOOT AGAIN

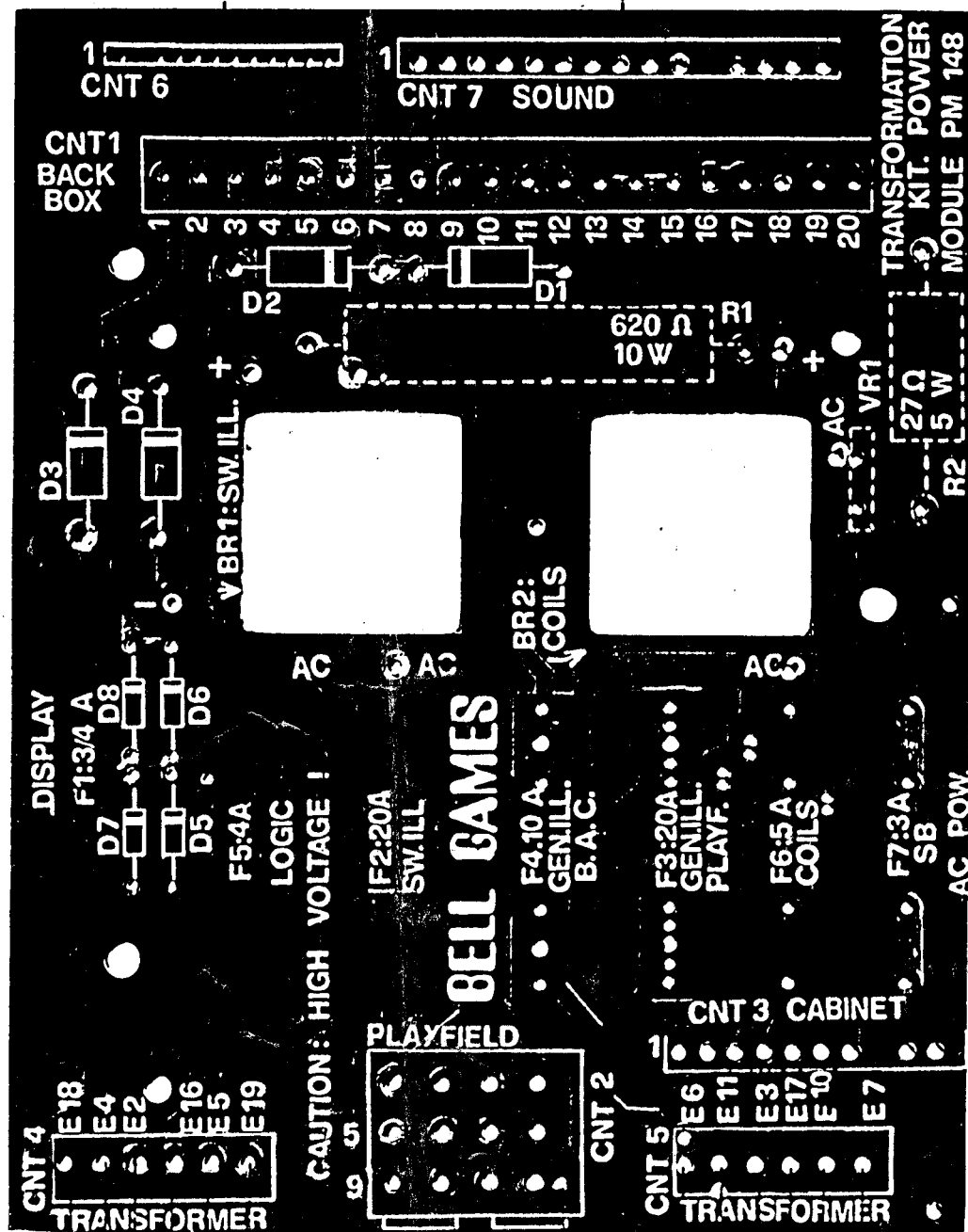
D) For mounting a new power board see the schema and solder the old wires of the transformer in the exact position.

POWER BOARD POSITION	COLOR	TRANSFORMER RIF. NUMBER
E. 10/220 VOLTS	RED 0,80	1
E. 11/6,3 "	BLACK	18
E. 18/170 "	GREEN 0,35	8
E. 19/7,8 "	GREEN 0,80	14
E. 17/49 "	RED 0,35	2
E. 6/7,8 "	BLUE	17
E. 7/220 "	YELLOW	12
E. 4/170 "	WHITE/GREEN	10
E. 2/12ac.VOLTS	WHITE/BLACK	16
E. 5/7,8 "	ORANGE	13
E. 3/49 vac.	WHITE/RED	6
E. 16/12 ac.	WHITE	15

SEE DIAGRAM.

TO J4 SOLENOID DRIVER

TO SOUND BOARD.



Green 0,35
White/Green
White/Black
White
Orange
Green 0,80

Blue
Black
White / Red
Red 0,35
Red 0,80
Yellow

E) Cut the wires of the transformer connector 20 pins and see the schema.

POSITION	COLOR	SIZE
1	WHITE	0,80 Ø
2	RED-BLACK	0,35 "
3	GREY-BLUE	0,35 "
4	RED-WHITE	0,35 "
5	BLUE	0,80 "
6	WHITE-BLACK	0,35 "
7	ORANGE	0,35 "
8	WHITE-BLUE	0,35 "
9	RED	0,80 "
10	ORANGE	0,80 "
11	BLUE-BLACK	0,35 "
12	WHITE-BROWN	0,35 "
13	YELLOW -	0,35 "
14	GREY	0,35 "
15	WHITE-YELLOW	0,35 "
16	WHITE <i>blanc jaune</i>	0,35 "
17	RED-YELLOW	0,35 "
18		
19	WHITE-ORANGE	0,35 Ø
20	GREEN	0,80 "

V. GAME ADJUSTMENTS

SPECIAL REPLAY/X-BALL/NOVELTY MODES

Self test positions 16 and 17 give the operator flexibility to award a replay ball or score (Novelty) when a special is scored. A combination of X/Ball, Novelty can be obtained through the following chart.

=====			
SELF TEST POSITION 16 PLAYFIELD X-BALL AND SPECIAL	SET TO 03	SET TO 02	SET TO 01
DEFENDER SPECIAL:	REPLAY	X BALL	50.000
INVADERS SPECIAL:	"	" "	"
SPECIAL X BASE:	"	" "	"
LEFT OR RIGHT OUT SPECIAL:	"	" "	"
TARGET CHANNEL LEFT (RADAR ZONE):	"	" "	"
SPECIAL TARGET CHANNEL RIGHT (GENERATOR):	"	50.000	50.000
EX BALL CHANNEL TARGET RIGHT:	X BALL	X BALL	25.000
=====			
	SET TO 03	SET TO 02	SET TO 01
SELF TEST POSITION 17	AWARD	AWARD	AWARD
SCORING THRESHOLDS	REPLAY	X BALL	NO AWARD

HIGH SCORE TO DATE OR OVER 10,000,000 SCORE FEATURE:

The game is designed to award free games as an option if high score to date is beat or palyer exceeds 10,000,000 points. Each time this happens, the winning score becomes the new high score to beat. This score is displayed on all 4 player score displays at the end of each game as an incentive to play.
Reccomended setting is underlined.

HIGH SCORE TO DATE FEATURE	SELF TEST POSITION 19
NO AWARD	SET TO "00"
ONE CREDIT	SET TO "01"
TWO CREDITS	SET TO "02"
THREE CREDITS	SET TO "03"

State and local laws may regulate the use of the above features, and they have been designed to allow for appropriate adjustment in order to conform to such requirements.

=====

BALLS PER GAME:	BALLS/GAME	SWITCHES	32	31
	5		OFF	ON
	4		ON	OFF
	3		OFF	OFF
	2		ON	ON

=====

MATCH FEATURE:

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

MATCH	SWITCH 28
ON	ON
OFF	OFF

Credits/Coin Adjustments:

The credits per coin are selectable by means of S17-S20 for coin chute #2 (Center). The switch settings and resultant credits/coin are as follows:

S20	S19	S18	S17	Credits/Coin	S20	S19	S18	S17	Credits/Coin
OFF	OFF	OFF	OFF	Same as Coin Chute #1 Settings	ON	OFF	OFF	OFF	8/1 Coin
OFF	OFF	OFF	ON	1/1 Coin	ON	OFF	OFF	ON	9/1 Coin
OFF	OFF	ON	OFF	2/1 Coin	ON	OFF	ON	OFF	10/1 Coin
OFF	OFF	ON	ON	3/1 Coin	ON	OFF	ON	ON	11/1 Coin
OFF	ON	OFF	OFF	4/1 Coin	ON	ON	OFF	OFF	12/1 Coin
OFF	ON	OFF	ON	5/1 Coin	ON	ON	OFF	ON	13/1 Coin
OFF	ON	ON	OFF	6/1 Coin	ON	ON	ON	OFF	14/1 Coin
OFF	ON	ON	ON	7/1 Coin	ON	ON	ON	ON	15/1 Coin

The credits given are selectable by means of switches 1-5 incl., for coin chute #1 and switches 9-13 incl., for coin chute #3. Thirty-one different credit ratios are available for each coin chute. The switch settings and resultant credits/coin are listed below.

CREDITS/COIN ADJUSTMENTS

COIN CHUTE	SWITCHES	CREDITS	CREDITS	CREDITS	CREDITS	CREDITS	CREDITS	TOTAL CREDITS/COINS
#1 (HINGE SIDE)	5 4 3 2 1							
OR #3	13 12 11 10 9							
(RIGHT SIDE)								
OFF	OFF	OFF	OFF	OFF	OFF			1/1 Coin
OFF	OFF	OFF	OFF	ON	ON			2/1 Coin
OFF	OFF	OFF	ON	OFF	OFF			3/1 Coin
OFF	OFF	OFF	ON	ON	ON			4/1 Coin
OFF	OFF	ON	OFF	OFF	OFF			5/1 Coin
OFF	OFF	ON	ON	OFF	ON			6/1 Coin
OFF	OFF	ON	ON	ON	OFF			7/1 Coin
OFF	OFF	ON	ON	ON	ON			8/1 Coin
OFF	ON	OFF	OFF	OFF	OFF			9/1 Coin
OFF	ON	OFF	OFF	ON	ON			12/1 Coin
OFF	ON	OFF	ON	OFF	OFF			14/1 Coin
OFF	ON	OFF	ON	ON	ON			1/2 Coins*
OFF	ON	ON	OFF	OFF	OFF			2/2 Coins*
OFF	ON	ON	ON	OFF	ON			3/2 Coins*
OFF	ON	ON	ON	ON	OFF			4/2 Coins*
OFF	ON	ON	ON	ON	ON			5/2 Coins*
ON	OFF	OFF	OFF	OFF	OFF			6/2 Coins*
ON	OFF	OFF	OFF	ON	ON			7/2 Coins*
ON	OFF	OFF	ON	OFF	OFF			8/2 Coins*
ON	OFF	OFF	ON	ON	ON			9/2 Coins*
ON	OFF	ON	OFF	OFF	OFF			12/2 Coins*
ON	OFF	ON	OFF	ON	ON			14/2 Coins*
ON	OFF	ON	ON	ON	OFF			1/1st Coin
ON	OFF	ON	ON	ON	ON			0/1st Coin*
ON	ON	OFF	OFF	OFF	OFF			0/1st Coin*
ON	ON	OFF	OFF	ON	ON			1/1st Coin
ON	ON	OFF	ON	OFF	OFF			1/1st Coin
ON	ON	OFF	ON	ON	ON			1/1st Coin
ON	ON	ON	OFF	OFF	OFF			0/1st Coin***
ON	ON	ON	OFF	ON	ON			0/1st Coin**
ON	ON	ON	ON	OFF	OFF			0/1st Coin****
ON	ON	ON	ON	ON	ON			0/1st Coin***
								2/2nd Coin
								1/2nd Coin
								1/3rd Coin
								1/4th Coin
								0/3rd Coin**
								2/4th Coin
								1/3rd Coin
								2/4th Coin
								1/3rd Coin
								2/4th Coin
								0/2nd Coin***
								0/2nd Coin**
								0/3rd Coin***
								1/4th Coin
								0/4th Coin****
								1/5th Coin
								0/4th Coin****
								1/5th Coin

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*No Credits until 2nd coin is dropped.
**No Credits until 4th coin is dropped.
***No Credits until 3rd coin is dropped.
****No Credits until 5th coin is dropped.

MAXIMUM CREDITS:

The maximum credits accepted by the machine limits the number of games that can be accumulated by coining, by winning replays or both. The maximum number of credits is selectable by means of switches 25 and 26. Four credit limits are available. Switch settings are listed below.

MAXIMUM CREDITS	SWITCHES
	26 25
10	OFF OFF
15	OFF ON
25	ON OFF
40	ON ON

CREDIT DISPLAY:	CREDITS DISPLAYED	SWITCH 27
YES		ON
NO		OFF

GAME FEATURE OPTIONS

A. ABCD FEATURE: FEATURE OPERATION & SCORING

Making C & B top rollovers, top arrow lites alternate to score 25,000 points. Making A-B-C & D rollovers, drops one or two targets defender. (depending on SW ~~7~~ 8 setting) and lites the right lane for 20K 1st time, 40K 2nd, 60K 3rd & so on.

A-B-C-D also flashes the bumper for 3000 points. 1st time left bumper, 2nd time right bumper, 3rd time bottom bumper. Bumper flashing will re set after each ball.

B. SAUCER FEATURE

Saucer scores top Right lane SPL W/L and scores 500 or 7000 points for each lit ball on pool table, plus super bonuses of 56K and 112K timer multipliers (depending on SW ~~7~~ 16 setting).

C. TARGET LEFT RADAR ZONE

1st target down 5000 points awarded and 2X lites.
2nd target down 10,000 points awarded and 3X lites.
3rd target down 15,000 points awarded and 4X lites.
4th target down 20,000 points awarded and 5X lites.
Radar zone 1st time hit scores 50,000 points, 2nd time (1 replay), radar zone values ALT or after SPL is made, will camp on 50,000 points (depending on SW ~~7~~ 24 setting).

D. SINGLE DROP TARGET-R-FEATURE

It scores 500 points if no right lane lite is lit, or will score the lite value and will advance it to next higher value.

E. GENERATOR TARGET RIGHT

Rollover button scores as follows:

500, 10,000, 30,000, 50,000, EXTRA BALL, 70,000, SPL, and then will camp on 70,000 Pts. Or will score 500, 10,000, 30,000, 50,000, EXTRA BALL, 70,000 Pts. and will stay on 70,000 after this sequence is completed, on next ball will score 500, 10,000, 30,000, 50,000, 70,000, SPL, and will camp back on 70,000 Pts. (depending on SW ~~7~~ 14 setting).

F. 7 BANK DROP & DELUXE TARGETS FEATURE

Knocking 1 thru 7 or 9 thru 15 targets, single target 8 ball will flash. 2000 points for each target and 3000 points for each deluxe target is awarded when hit. Deluxe lites will not come on until 8 ball target is

made. When 8 ball is made, deluxe lites will flash few times and will stay lit. By knocking the deluxe lites, 1st time 50,000 points will be awarded and deluxe SPL will lite, or 7 targets will reset (depending on SW // 23 setting).

G. OUTLANE SPECIAL FEATURE

When right lane values are advanced all the way to top, the outlanes will lite to alternate for SPL.

H. DEFENDER AND INVADERS

Knocking defender targets single target R will flash. 2000 points for each target and 3000 points for each defender target. Invaders lite will not come on until defender is made.

When defender is made, invaders lites will flash few times and will stay lit.

By knocking the invaders 1st time 50,000 points will be awarded and invaders special will lite, or defender lit again (depending on SW // 23 setting).

VERY IMPORTANT

TEST SW 20-21-22 - MUST BE IN 00

=====

SOUND OPTION

The game is designed to make several tones and noises to announce power-up, game-up, etc. The tones are antended to attract attention to the game and increase game usage. The tones are controlled by pressing self test button until the // 18 shows on the match/ball in play display. Now pulse replay button to desired sound setting.

Setting "00"

Most switches associated chimes without feature background.

Setting "01"

Playfield switches associated chimes with background.

Setting "02"

Most scoring will have noise effect without background.

Setting "03"

Most all scoring will have a noise effect with background.

SUMMARY OF GAME ADJUSTMENTS

LEFT TARGET RADAR ZONE

SW 6 ON = 50.000 e special lites alternate
SW 6 OFF = Only 1 special per ball

DEFENDER

SW 7 ON = Lite out will not come for next ball
SW 7 OFF = Lite out will come back on for next ball

A.B.C.D.

SW 8 ON = Completing A,B,C,D rollover drops 2 targets down
SW 8 OFF = Completing A,B,C,D rollover drops 1 target down

RIGHT LANE FEATURE GENERATOR TARGET

SW 14 ON = Lite sequence, no lite, 10K, 30K, 50K, X-ball, 70K,
SPEC., 70K, and 70K stays on
SW 14 OFF = First ball sequence, no lite, 10K, 30K, 50K, X-ball,
70K, and 70K stays on.
Next ball sequence, no lite, 10K, 30K, 50K, 70K,
SPECIAL 70K and 70K stays on.

SPECIAL DEFENDER

SW 15 ON = Completing defender 2nd and 3rd time scores 1 replay each
SW 15 OFF = Completing defender 3rd time scores 1 replay

X BASE

SW 16 ON = 2X, 3X, 4X or 5X bonus values plus any lit
SW 16 OFF = Saucer scores rack and bonus values only

INVADERS

SW 21 ON = Lite out will not come for next ball
SW 21 OFF = Lite out will come back on for next ball

INVADERS GAME

SW 23 ON = Completing defender and invaders does not lit defender
SW 23 OFF = Completing defender and invaders lit defender

50.000 E SPECIAL INVADERS LITE ADJUSTEMENT

SW 24 ON - SW 6 ON = SPECIAL, 50.000, SPECIAL, 50.000
SW 24 OFF - SW 6 ON = 50.000, SPECIAL, 50.000, SPECIAL
SW 24 ON - SW 6 OFF = SPECIAL, 50.000, 50.000, 50.000
SW 24 OFF - SW 6 OFF = 50.000, SPECIAL, 50.000, 50.000

NUMBER OF GAMES REPLAYS PER GAME ADJUSTEMENT

SW 29 ON = All replays earned will be collected.
SW 29 OFF = Only 1 replay per player per game

GAME OVER ATTRACT ADJUSTEMENT

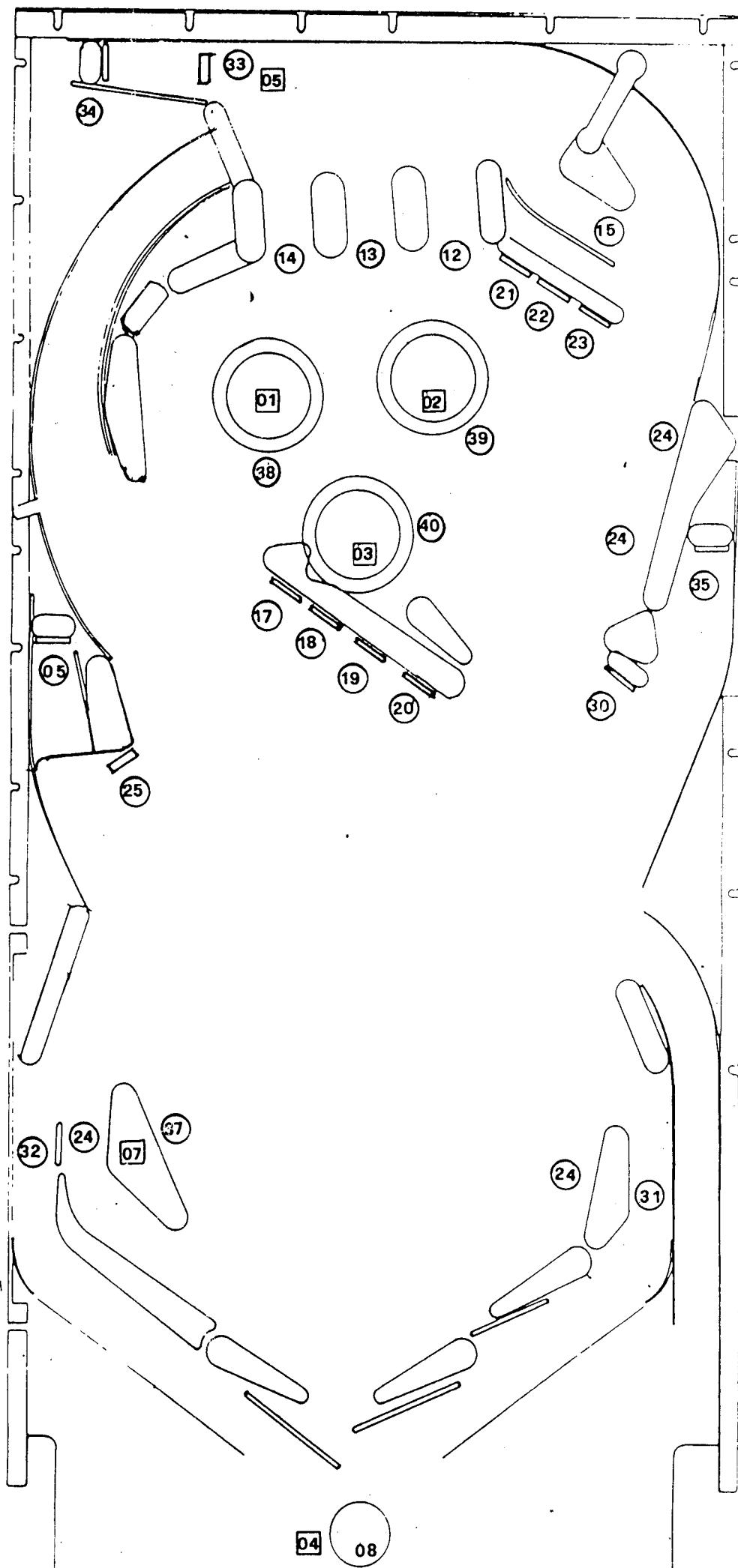
SW 30 ON = Sound
SW 30 OFF = No sound

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"WORLD DEFENDER"

○ Indicates switch identification

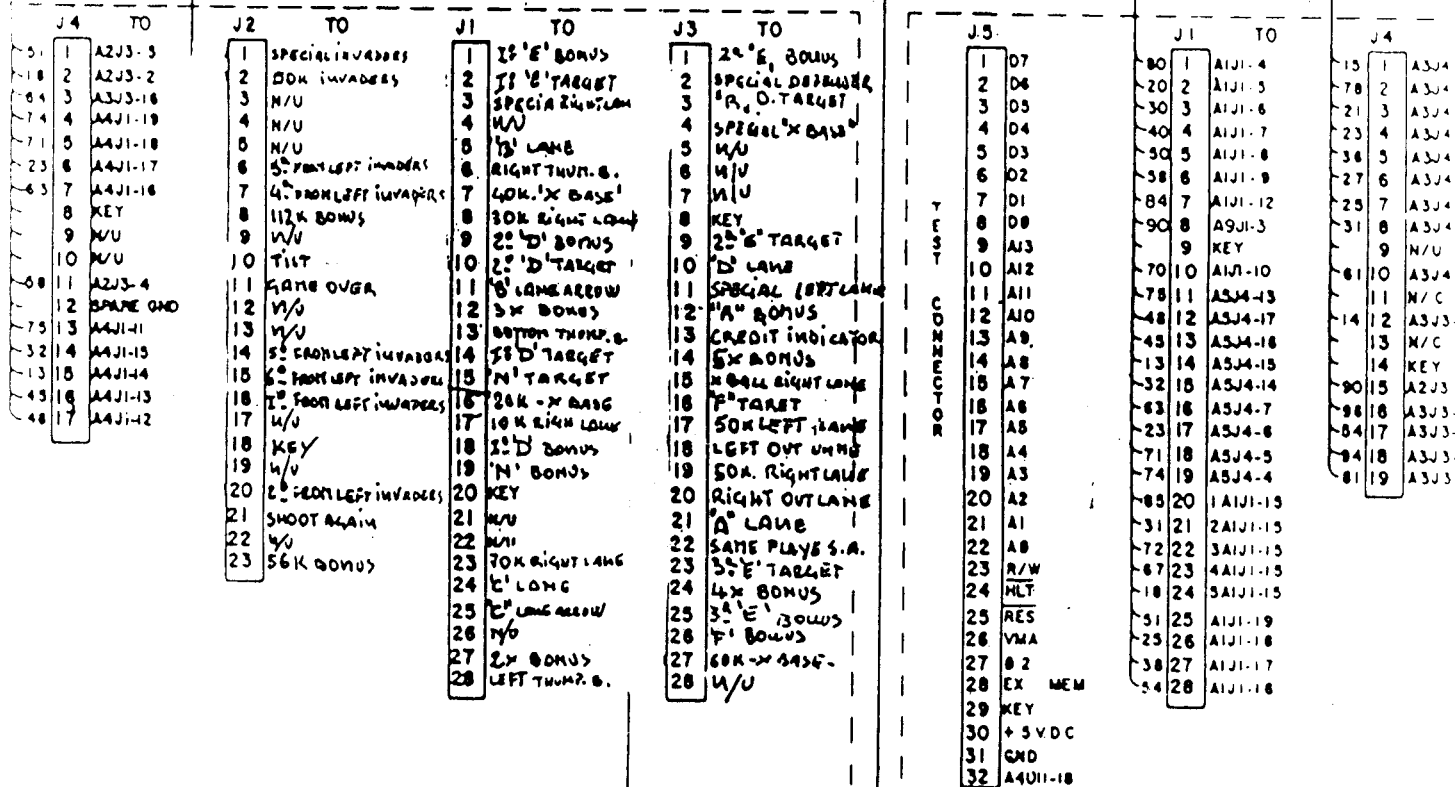
□ Indicates solenoid
identification





LAMP DRIVER A5

MPU



LOWER CABINET
PLAYFIELD

IPU A4

VOLTAGE REGULATOR / SOLENOID DRIVER A3

