

ALLIED LEISURE PINBALL MACHINES

The following information answers some frequently asked questions about ALLIED LEISURE electronic pinball machines.

All games manufactured by Allied Leisure are designed to be re-programmed. The features we re-arranged on each game to change the rules of the game.

The wiring diagram attached refers to cocktail table style machines, although the same applies to upright pinball cabinet models as well.

The games to which the following diagrams apply to are:

- DISCO 79* - cocktail
- EROS ONE* - cocktail
- HEARTS & SPADES* - cocktail
- HGF DOWN* - upright
- ROY CLARK THE ENTERTAINER* - cocktail
- STARSHOOTER* - cocktail
- SUPER PICKER* - upright
- TAG FIVE* - cocktail
- THUNDERBOLT* - upright

SWITCH IDENTIFICATION

40	Collect left value - advance left value
60	Drive coil - 10 points
50	Collect right value - advance bonus
70	Drive coil - 10 points
80	Orifice switch
90	Special when lit - advance bonus - 500 points
100	Ball in play switch
170	Raise drop target - 300 points - advance bonus - open gate
180	Raise drop target - 500 points - advance bonus
190	Close gate - 10 points
210	500 points
230	Raise drop target - 500 points
240	Extra ball when lit - 1000 points - advance bonus
250	Drop target down switch
260	Drop target down switch
270	Drop target down switch
280	Drop target down switch
310	Tilt switches
330	Credit switch
350	Slam switch
340	Coin switch #1 - left side
350	Coin switch #2 - right side
360	Coin switch #3 - center



allied leisure industries, inc.

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The wiring diagram attached refers to cocktail table style machines, although the standard upright pinball cabinet models are very similiar.

The games to which the following diagrams apply to are:

DISCO 79 - cocktail

EROS ONE - cocktail

HEARTS & SPADES - cocktail

HOE DOWN - upright

ROY CLARK / THE ENTERTAINER - cocktail

STAR SHOOTER - cocktail

SUPER PICKER - upright

TAKE FIVE - cocktail

THUNDERBOLT - upright

SWITCH IDENTIFICATION

10	Drive coil - 100 points - advance left value
20	Drive coil - 100 points
30	Drive coil - 100 points - advance right value
40	Collect left value - advance bonus
60	Drive coil - 10 points
50	collect right value - advance bonus
70	Drive coil - 10 points
80	Outhole switch
140	Special when lit - advance bonus - 500 points
150	10 points
160	Ball in play switch
170	Raise drop target - 500 points - advance bonus - open gate
180	Raise drop target - 500 points - advance bonus
190	Close gate - 10 points
210	500 points
230	Raise drop target - 500 points
240	Extra ball when lit - 1000 points - advance bonus
250	Drop target down switch
260	Drop target down switch
270	Drop target down switch
280	Drop target down switch
310	Tilt switches
320	Credit switch
330	Slam switch
340	Coin switch #1 - left side
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360	Coin switch #3 - center

THUNDERBOLT uprights - early versions

Holding credit button in, while ball was in "collect hole" causes game to lock up

Re-wire "Collect Right Value" and "Collect Left Value" switches to bullseye targets instead of outhole kickers.

SLAM SWITCH/TILT MECHANICAL

The SLAM SWITCH, which is located on the inside of the COIN TRAY, is designed to detect a ball when it falls into the game. SLAMMING the coin tray causes a flash of lights in games. The machine simply goes DEAD-A-BALL-GAME status after which the lights flash and the machine indicates the end of game or award when no ball is being played.

The SLAM SWITCH is factory-adjusted to approximately 1/8" gap between contacts. Decreasing the gap will make the switch more sensitive. Opening the gap will reduce sensitivity.

TEST MODE INFO

NOTE: Always adjust the WEIGHTED blade to attain the desired sensitivity.

NOTE:

1. You MUST remove ball from outhole before starting TEST MODE.
2. When in the "stuck switch" test, all switches MUST BE OPEN or game will not proceed to next test mode.
3. Machine is programmed to ignore ALL switches if a stuck closed switch is detected during game play. The EXCEPTION is if a coil drive switch is stuck closed; the computer will ignore that switch and continue game play. If another coil drive switch is stuck closed, the 1st stuck switch will be reactivated and the 2nd switch will be ignored.
4. Game will not score if ball in play switch (ball shooter trough) does not make contact at start of each ball in play.

HARDWARE REVISIONS

Some games had a "glitch" that would cause the machine to stop working and the lamps to flash. The following is a fix for this condition:

IC 28 Pin 13 - Add .001 mfd capacitor to ground.

IC 4 Pin 17 - Lift or cut pin off so it no longer connects.

IC 29 Pins 1 + 14 - add 1K ohm resistor to ground.

THUNDERBOLT uprights - early versions

Holding credit button in while ball was in "collect hole" causes game to lock up.

Re-wire "Collect Right Value" and "Collect Left Value" switches to bulls-eye targets instead of outhole kickers.

Continuation

ASSET SIGNAL TEST 4

Momentarily turn power off and then on for approximately 5 seconds after the power

SLAM/SWITCH/TILT MECHANISM

1. Score to discourage unnecessary abuse to the game. SLAMMING THE MACHINE results in loss of game or games... the machine simply goes DEAD! A short delay occurs, after which the GAME OVER lamp flashes indicating the end of game or games, whichever is being played.

2. Thumper bumper The SLAM SWITCH is factory-adjusted to approximately 1/16" gap between contacts. Decreasing the gap will make the switch more sensitive. Opening the gap will reduce sensitivity.

3. Rebound kicker Game over lamp is out

4. Tilt lamp **NOTE: Always adjust the WEIGHTED blade to attain the desired sensitivity.**

5. Tilt lamp After 2 seconds The game is equipped with a TILT mechanism designed to discourage the player from jolting or lifting the machine in an attempt to prolong play Tilting the game causes the flippers to go dead. The thumper bumper and the rebound kicker lights go OUT. The FLIPPER SWITCHES cannot be activated. The TILT lamp located on the SCORE GLASS assembly flashes.

1. Score

2. Game If one person is playing, the ball in play will advance. If two persons are playing, it will move to the next player. The OUT-HOLE KICKER propels the ball into the ALLEY, and the game returns to NORMAL. (The net effect of tilting the game is loss of a ball to the player who did the tilting.)

3. Rebound kicker lamps are out **NOTE: Game will not tilt until ball rolls over BALL-IN-PLAY switch.**

4. Thumper bumper lamp is out The TILT mechanism consists of one electrical circuit which can be activated by either of two mechanical assemblies:

NOTE: Game will not tilt until ball rolls over BALL-IN-PLAY switch. The first assembly is called the ROLL-TILT, and is activated when the front of the machine is lifted, allowing the ball in illustration No. 2-D to roll down the bracket until it touches the ROLL-TILT switch. It can be adjusted by loosening screws "A," "B" and "C," and sliding the end of the bracket that is closer to the switch UP to decrease sensitivity, and DOWN to increase sensitivity.

TEST MODE The other TILT assembly is called the PENDULUM TILT, and is activated when the machine is jolted causing the weight to touch the pendulum bracket. Sensitivity can be decreased by sliding the weight and the clip UPWARD on the pendulum ROD... similarly sensitivity can be increased by sliding the weight and the clip DOWNWARD on the pendulum ROD.

TEST MODE Be sure that the pendulum rod and the pendulum weight are ALWAYS centered. If necessary, adjust the pendulum bracket by loosening screws "D" and "E" and then adjust accordingly.

- 1. Credit display shows 42
- 2. Score display #1 will show the number of any switch that is struck.

Continuation

RESET SIGNAL TEST :

Momentarily turn power to the game off and then on . For approximately 2 seconds after the power is reapplied .

1. Score units are extinguished .
2. Thumper bumper lamps are out .
3. Rebound kickers lamps are out .
4. Game over lamp is out .
5. Tilt lamp is on .

After 2 second have expired .

1. Score units relight and reset to 0's .
2. Game over lamp flashes .
3. Rebound kicker lamps are on .
4. Thumper bumper lamps are on .
5. Tilt lamp is off .

NOTE : No coils (solenoids) should energize at this time .

PROCEDURE :

To start the self diagnostic test press the 'test' switch located on the coin door .

NOTE : Once the self diagnostic test is initiated the only way it can be terminated is by removing power to the machine .

TEST MODE #1 :

Momentarily press the test switch located on the coin door . The credit and score display should sequence from 0 thru 9 and repeat .

Note: The first led on the right side of each score will always remain a '0' .

TEST MODE #2 :

- (A) Remove the ball from the out-hole.
- (B) Press the credit button for approximately 5 seconds .

1. Credit display shows 02 .
2. Score display #1 will show the number of any switch that is struck .

Continuation

TEST MODE #3 :

- (A) Press the test switch for approximately 2 seconds .
- (B) Credit display shows '03' .
- (C) Tap very lightly the surface of the playfield . If there are any switches not correctly adjusted (gap too close) the number of that switch will be displayed in score display #1 . Make the necessary adjustments , then press teh credit button to remove the number from the score display .

TEST MODE #4 :

- (A) Press the test switch fro approximately 2 seconds .
- (B) Credit display should show '04' .

NOTE: Ignore any numbers on the score display . The following lights should be lit .

- 1. Extra ball when lit .
- 2. Collect spades value 1,000 - 2,000 - 3,000 - 4,000 .
- 3. Collect hearts value 1,000 .
- 4. Special when lit .

NOTE : Ignore game over lamp .

TEST MODE #5 :

- (A) Press the credit button for approximately 1 second .
- (B) Credit display shows '05' . The following lamps should be lit .
 - 1. Collect hearts value 1,000 - 2,000 - 3,000 - 4,000 .
 - 2. 10,000 bonus lamp .
 - 3. Double bonus lamp .
 - 4. Triple bonus lamp .

TEST MODE #6 :

- (A) Press the credit button for approximately 1 second .
- (B) Credit display shows 06 .The following should be lit .
 - 1. Ball in play 1-2-3-4-5 . Same player shoots again .

TEST MODE #7 :

- (A) Press the credit switch for approximately 1 second .
- (B) The credit display shows 07 . In this mode the players leds are lit and the score display are extinguished .

TEST MODE #8 :

- (A) Press the credit switch for approximately 1 second .
- (B) The credit display show 08 . In this mode the bonus lamp count down from 9,000 to 1,000 after which the game over lamp flashes . Followed by the tilt lamp .

Continuation

TEST MODE #9 :

- (A) Press the credit switch for approximately 5 seconds .
- (B) The credit display shows 09 . The solenoids (coils) should energize in the following sequence .
1. Red sling shot and drop hearts drop target .
 2. Middle thumper bumper and spades drop target .
 3. Right sling shot .
 4. Left thumper bumper .
 5. Right thumper bumper .
 6. Out-hole kicker .
 7. 1,000 point chime (low tone) .
 8. 100 point chime (middle tone) .
 9. 10 point chime (high tone) .
 10. Replay knocker .
 11. Flag gate .

NOTE : Flipper button must be held in for coils to energize in this mode .

TEST MODE #10 :

This test is used primarily for burn-in testing procedure at the factory . But can also be used for "on location" testing of new or repaired logic boards .

- (A) Press credit switch for approximately 10 seconds .
- (B) Credit display shows 01 tests 4 thru 9 are automatically repeated until power to the game is removed .

TROUBLE - SHOOTING GUIDE :

Never EXPERIMENT with any mechanism ! Improper adjustment or makeshift repair will only cause either serious damage to other parts of the machine or repeated failure of the part .

To properly service / repair this machine in a minimum time , it is necessary to isolate the problem to a specific circuit . A system of logical elimination will reduce the number of possible trouble spots ... the self-diagnostic test built into this game are designed particularly to expedite location of problems .

In many situations , attempting to play the game and observing the results may be helpful...also , careful reasoning along with reference to the schematic may determine the cause of the problem .

A visual inspection of the components in a suspected area may often save time . Always look for a possible loose wire , a bad connection at a plug or socket , or a broken / unhooked spring .

Continuation

RE-SET CIRCUIT

Upon application of power to the game, LED #1 on the main computer board should momentarily light for approximately 2 seconds and then extinguish, thereby indicating a proper re-set condition. If this LED does not come on, or refuses to extinguish, check the 5 - volt power supply. If the computer board has 5 - volt across C-19 (the large capacitor in the lower right hand corner) and LED #1 is not functioning properly, then the malfunction is the re-set circuitry on the main board.

The 5 volt power supply is used to supply regulated 5 volt power to the computer board and the peripheral display boards. This circuit should regulate between 4.8 VDC and 5.2 VDC. This 5 volt can be measured across the 8,000 mfd output capacitor should have approximately 13-14 VDC.

The 5 volt may also be measured across C-19 the 2,200 mfd capacitor on the computer board.

DISPLAYS:

ALWAYS DISCONNECT power BEFORE removing or replacing any printed circuit boards.

SCORE DISPLAY SEE

The best way to test for the proper score unit function is in the self-diagnostic test procedure. If a score unit is suspected, it can be inter-changed with another unit known to be good.

The following signals are necessary to light the score display:

1. 4.8 - 5.2 VDC.
2. 7.8 VDC
3. Proper score blanking (LED #4 on the main computer board should be momentarily flashing).
4. Proper data from the computer board (LED #3 should be momentarily flashing).
5. Proper score clock signal.

TO REMOVE THE SCORE or CREDIT displays, you should proceed as follows:

1. Remove the score glass.
2. Unscrew the respective mounting screws.
3. Separate the connectors and remove the unit.

LAMPS:

The background lamps, such as ENTRANCE GATE lamps, with the exception of the REBOUND KICKER lamps, are in normal circuit operating on 6 VAC as shown in the schematic.

WARNING: DO NOT DO THIS UNLESS THE COMPUTER BOARD HAS BEEN COMPLETELY REMOVED FROM THE GAME!

Continuation

All lamps tested in the self-diagnostic mode are driven from the main computer board . All of these lamps have one side tied to +7.8 VDC .

The other side of each lamp is switched by the computer board to system ground .

If , during the self-diagnostics , a lamp is suspected , the socket should be checked with a known-good lamp .

If none of the lamps light during the self-diagnostic test , then trouble shoot the +7.8 VDC power supply .

If the main computer board is suspected , a quick test to check the continuity of a particular lamp circuit is as follows :

1. Remove game power .
2. Completely remove the main computer board .
3. Re-apply game power .

REMEMBER : The only function the computer board performs when turning on a lamp is to supply system ground . Thus , if you take a jumper from system ground to the output pin from the computer board which connects to the lamp , the lamp should light if the harness and power supply are working properly .

WARNING : DO NOT do this unless the computer board is removed !

Refer to the game schematic to get proper pin connections . If the suspected circuit functions properly , then the fault is on the computer board .

The GAME OVER , TILT and REBOUND KICKER lamps all have one side tied to +7.8 VDC . The other side of the lamp is switched to system through a circuit similar to that which drives the coils... if suspected , these lamps can be tested in the same manner as above .

All of the coils in the game (including the FLIPPER power relay located on the ROLL / TILT assembly) have one side tied to +32 VDC. The computer board switches these coils to system ground to complete the circuit thus energizing the coil .

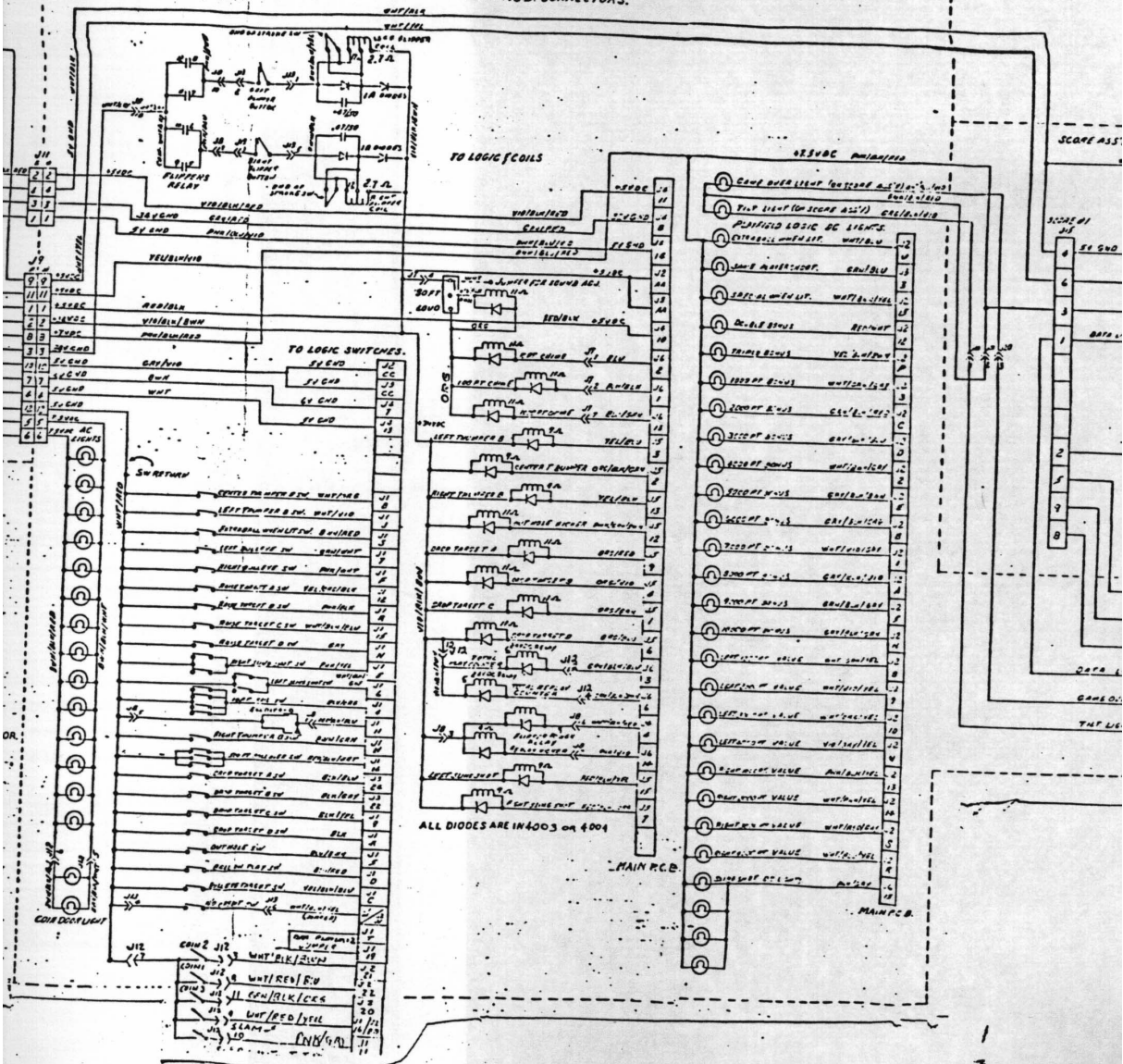
If a coil driver on the computer board is suspected , a quick test of the remaining circuitry is performed as follows :

1. Remove system power .
2. Completely remove main computer board .
3. Re-apply power .

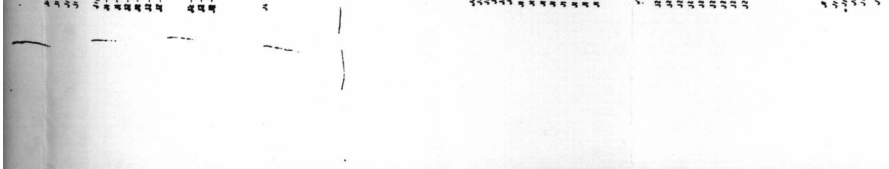
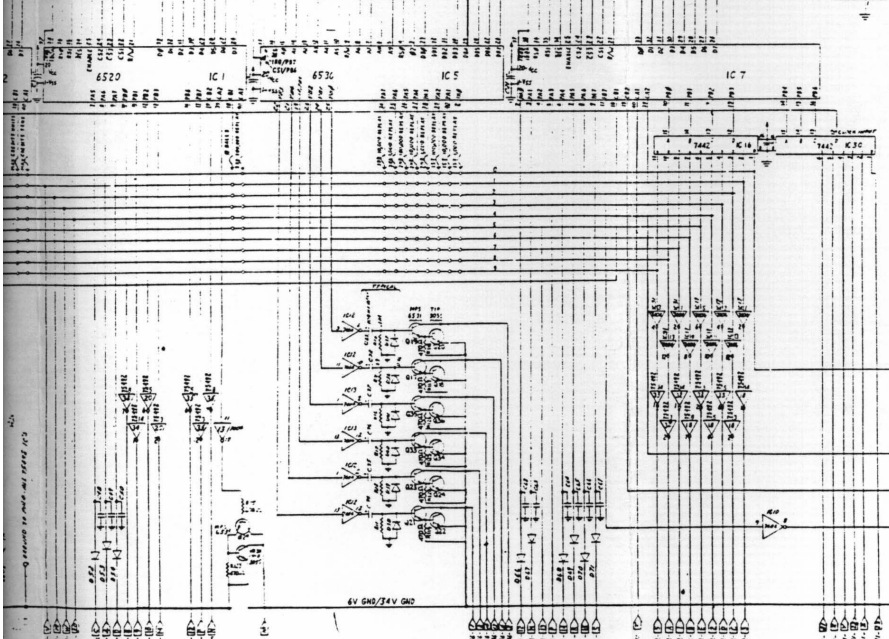
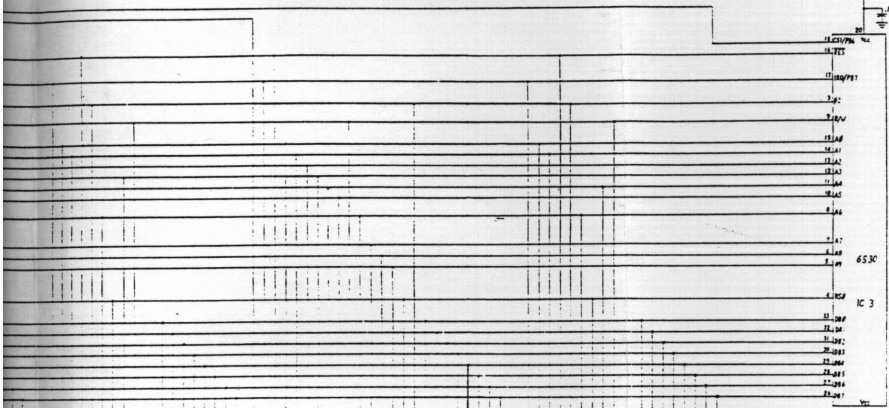
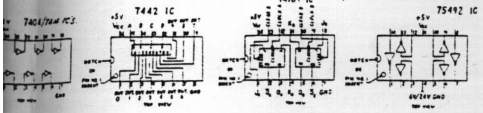
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WARNING : DO NOT DO THIS UNLESS THE COMPUTER BOARD HAS BEEN COMPLETELY REMOVED FROM THE GAME !

MAIN PCB CONNECTORS.



1
7
12



THIS SHEET IS USED WITH SHEET 2 (2-1-65)
 ALLIED SYSTEM COMPONENTS, INC.
 FEDERAL CONTROL COMPONENTS DIV.
 10100 WILSON BLVD., WASHINGTON, D.C. 20044

PLAYFIELD

DC LOGIC LIGHTS VIO-GRN

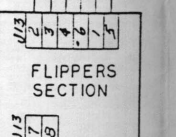
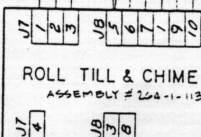
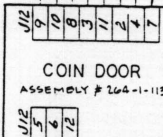
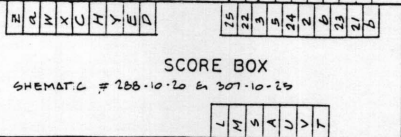
RED-BLK	1	J3
GRY-RED	2	J3
RED-BWN	3	J3
RED-WHT	4	J3
BLK-BWN	5	J2
WHT-RED	6	J2
BLK-VIO	7	J2
BLK-RED	8	J2
GRN-BLK	9	J2

GRG	1	J1
GRY-BLK	2	J1
GRY-BLU	3	J1
GRN-RED	4	J1
BLK-GRG	5	J1
BLK-BWN	6	J1
WHT-BLU	7	J1
BLK-WHT	8	J1
VIO-BLU	9	J1
BLU-BLK	10	J1

RED GRN	16	J1
BLP-DISBURGITE SW	17	J1
GRN-BWN	18	J1
GRN-SWITCH 1	19	J1
GRN-SWITCH 2	20	J1
GRN-SWITCH 3	21	J1
GRN	22	J1
TOTAL PLAY	23	J1
GRY-YEL	24	J1
GRY-GRG	25	J1
BWN-WHT	26	J1

VIO WHT	16	J4
GRY-RED	17	J4
RED-BLU	18	J4
BLU GRN	19	J4
BLU	20	J4
BLU BLK	21	J4

WHT-BLK	10	J2
WHT	11	J1
WHT	12	J1
WHT	13	J1
WHT	14	J1
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WHT	16	J1
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WHT	95	J1
WHT	96	J1
WHT	97	J1
WHT	98	J1
WHT	99	J1
WHT	100	J1



MAIN LOGIC PCB

J1	BWN	RAISE DROP TARGET A SWITCH
J2	BWN-BLK	RAISE DROP TARGET B SWITCH
J3	BWN-YEL	RAISE DROP TARGET C SWITCH
J4	BLK-VIO	DROP TARGET D SWITCH
J5	GRY-GRG	RIGHT COLLECT VALUE SWITCH
J6	GRY-GRN	SPECIAL WHEN HIT SWITCH
J7	BWN-GRY	LEFT COLLECT VALUE SWITCH
J8	GRY-YEL	LEFT SHOOTER SWITCH
J9	BWN-GRN	CENTER THUMPER BUMPER SWITCH
J10	GRY-BWN	RIGHT SHOOTER SWITCH
J11	GRY-BLK	LEFT THUMPER BUMPER SWITCH
J12	GRY	OUT HOLE
J13	GRY	EXTRABALL WHEN HIT SWITCH
J14	BLU-BLU	10 FT. FALL SWITCH
J15	BWN-RED	RIGHT THUMPER
J16	GRY-BLU	500 FT. ROLL-OVER
J17	GRY-VIO	CLOSE RIGHT GATE ASSY
J18	BWN-WHT	PLAYFIELD SWITCH RETURN
J19	YEL	RIGHT 1000 FT. VALUE
J20	YEL-BLU	RIGHT 3000 FT. VALUE
J21	YEL-VIO	RIGHT 4000 FT. VALUE
J22	YEL-BLK	RIGHT 5000 FT. VALUE
J23	YEL-BWN	LEFT 1000 FT. VALUE
J24	YEL-GRG	LEFT 3000 FT. VALUE
J25	BLU-BLK	1000 FT. BONUS
J26	BLU-RED	3000 FT. BONUS
J27	BLU-GRG	4000 FT. BONUS
J28	BLU-YEL	5000 FT. BONUS
J29	BLU-GRN	6000 FT. BONUS
J30	BLU-VIO	9000 FT. BONUS
J31	BLU-GRY	10000 FT. BONUS
J32	GRY-BWN	DOUBLE BONUS LIGHT
J33	GRY-RED	TRIPLE BONUS LIGHT
J34	YEL-GRY	EXTRABALL LIGHT
J35	GRY-BLK	SAME PLAYER SHOOTER AGAIN LIGHT
J36	BLK-GRN	PREP TARGET A SWITCH
J37	BLK-BLU	PREP TARGET B SWITCH
J38	GRN-YEL	DROP TARGET A COIL
J39	GRN	PREP TARGET B COIL
J40	GRN-BLK	LEFT SHOOTER COIL
J41	GRN-BWN	CENTER THUMPER COIL
J42	GRN-RED	RIGHT SHOOTER COIL
J43	GRN-BLU	LEFT 10 FT. THUMPER COIL
J44	GRN-VIO	RIGHT 10 FT. THUMPER COIL
J45	GRN-GRG	ARTICLE COIL
J46	GRN-GRY	RIGHT GATE COIL
J47	GRG	DC FLASH
J48	GRN-BLK	LEFT SHOOTER COIL
J49	GRN-BWN	CENTER THUMPER COIL
J50	GRN-RED	RIGHT SHOOTER COIL
J51	GRN-BLU	LEFT 10 FT. THUMPER COIL
J52	GRN-VIO	RIGHT 10 FT. THUMPER COIL
J53	GRN-GRG	ARTICLE COIL
J54	GRN-GRY	RIGHT GATE COIL
J55	GRG	DC FLASH

SCHEMATIC # 307-10-26

