

ALLIED LEISURE PINBALL MACHINES

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

All games manufactured by
Allied Leisure Industries, Inc. have the same
features. The features are 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
upright pinball cabinet models are available.

The games to which the following diagrams apply
to are:

DISCO 79 - cocktail
ERON ONE - cocktail
HEARTS & SPADES - cocktail
HOT DOWN - upright
JACK CLARK THE ENTERTAINER - cocktail
STAR SHOOTER - cocktail
SUPER PICKER - upright
TANG FIVE - cocktail
THUNDERBOLT - upright

SWITCH IDENTIFICATION

10	Drop coil - 100 points - advance left value - advance right value
30	Collect left value - advance bonus
60	Drive coil - 10 points
80	Collect right value - advance bonus
70	Drive coil - 10 points
50	Outlet switch
100	Ball in play switch
170	Raise drop target - 500 points - advance bonus
140	Open gate
150	Raise drop target - 500 points - advance bonus
210	Close gate - 10 points
230	500 points
240	Raise drop target - 500 points
250	Extra ball when in - 1000 points - advance bonus
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 PINBALL MACHINES

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

All games manufactured used the same computer board. 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 standard upright pinball cabinet models are very similar.

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
350	Coin switch #2 - right side
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 bull's-eye targets instead of outhole kickers.

SLAM SWITCH/TILT MECHANISM

The SLAM SWITCH, which is located on the inside of the COIN TACTON, is designed to allow a player to easily abuse 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 returns to normal play indicating the end of game or games. Whenever a slam occurs, the SLAM SWITCH is factory-adjusted to approximately the 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

RESET SIGNAL TEST 1

Momentarily turn power to the game off and then on. For approximately 3 seconds after the power is restored, the following sequence of events occurs:

SLAM/SWITCH/TILT MECHANISM

1. Score display shows 0.
2. Thumper bumper lamps are on.
3. Rebound kicker lamps are on.
4. Game over lamp is out.
5. Tilt lamp is on.

The SLAM SWITCH, which is located on the inside of the COIN DOOR, is designed 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.

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.

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

- 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 display shows 0.
 2. Game over lamp is on.
 3. Rebound kicker lamps are on.
 4. Thumper bumper lamps are on.
 5. Tilt lamp is on.

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.)

NOTE: Game will not tilt until ball rolls over BALL-IN-PLAY switch.

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

The TILT mechanism consists of one electrical circuit which can be activated by either of two mechanical assemblies:

NOTE: Once the TILT mechanism is initiated the only way it can be terminated is by pressing the "Test" 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.

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.

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.

(B) Press the "Test" switch for approximately 3 seconds.

1. Credit display shows 0.
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 the credit button to remove the number from the score display .

TEST MODE #4 :

- (A) Press the test switch for 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 shows 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 .

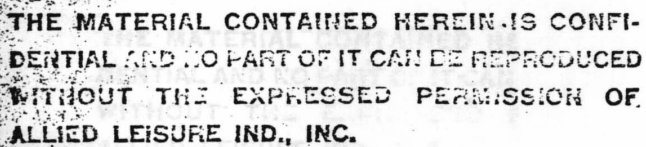
All of the coils in the game (including the FLIPPER power relay located on the ROLL / TILT assembly) have one side tied to +32 VDC. The computer board switches these coils to system ground to complete the circuit thus energizing the coil .

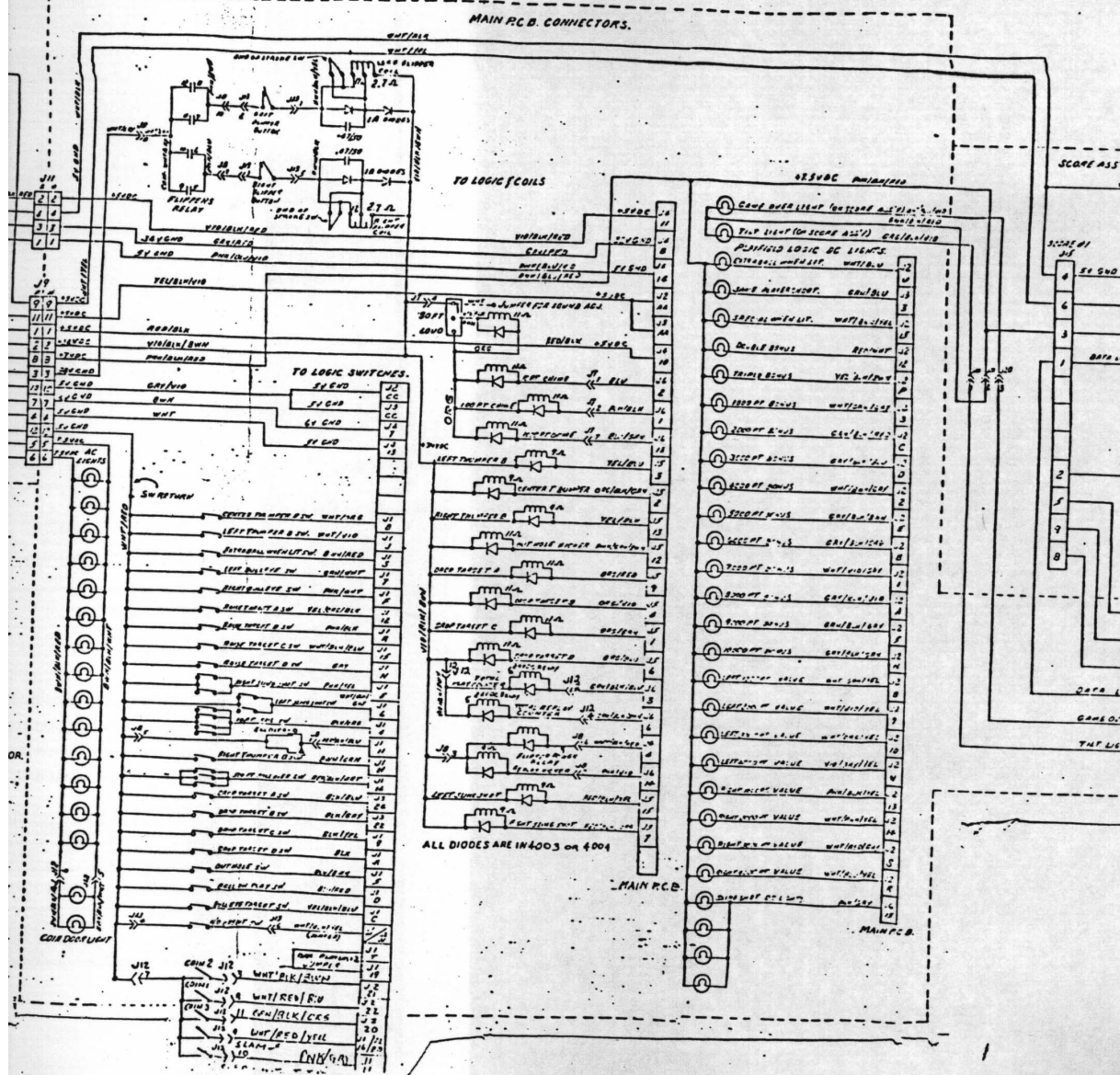
If a coil driver on the computer board is suspected , a quick test of the remaining circuitry is performed as follows :

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

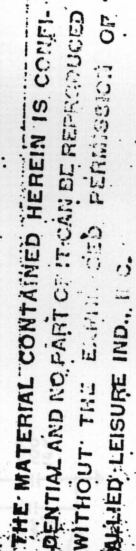
REMEMBER : The only function the computer board performs when turning on a coil is to supply system ground . Thus , if you take a jumper from system ground to the output pin from the computer board which connects to the coil , the coil should energize if the circuit is working properly .

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





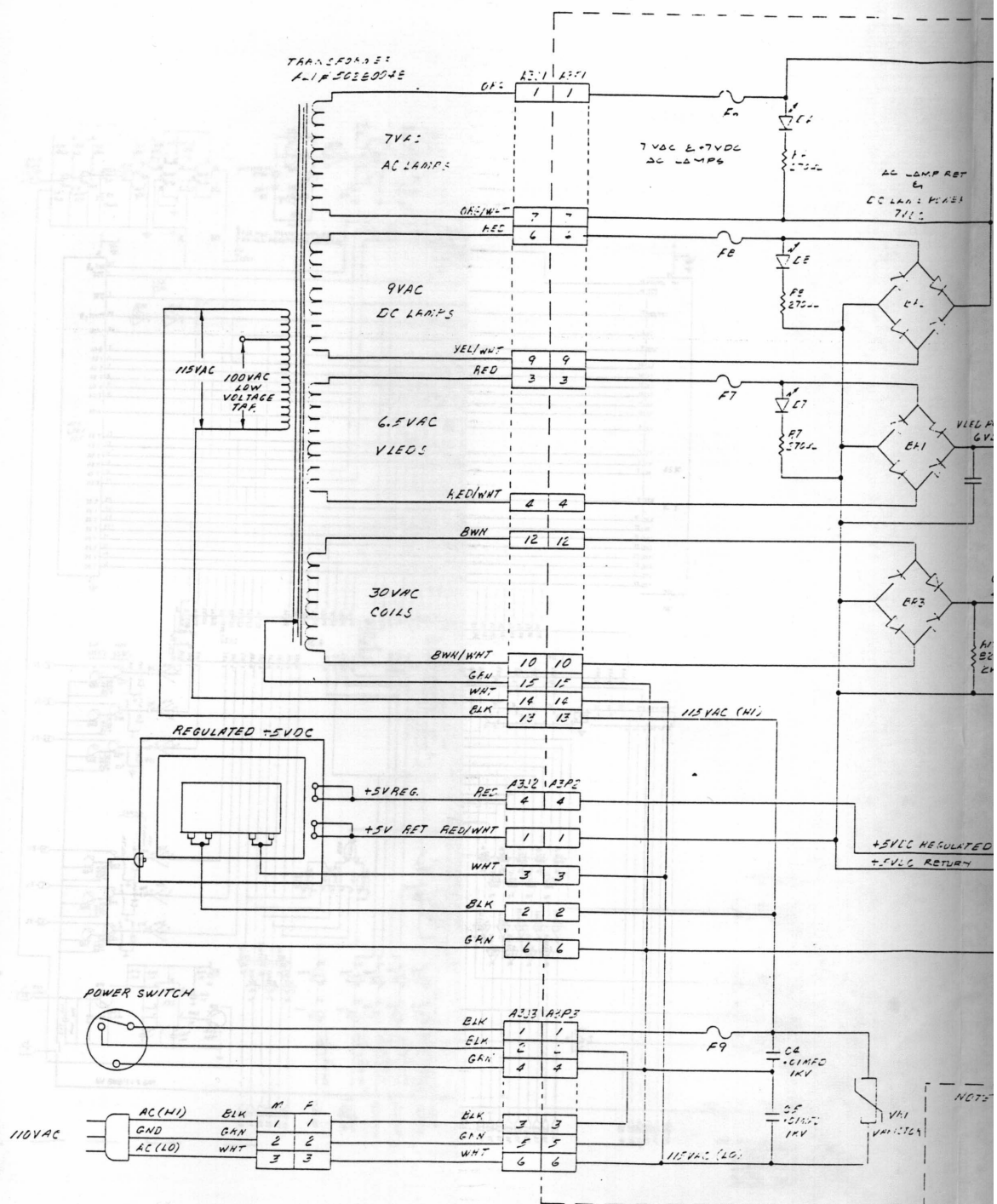
1
7
12



REV. LETTER	ITEM NO.	ECN NO.	DESCRIPTION	DISPOSITION OF EXISTING PARTS	
				RE- WORK	SCRAP
A				DISCONNECTED PIN 3 (C2, C3) FROM PIN 5. CONNECTED TO PIN 16.	

[illegible]

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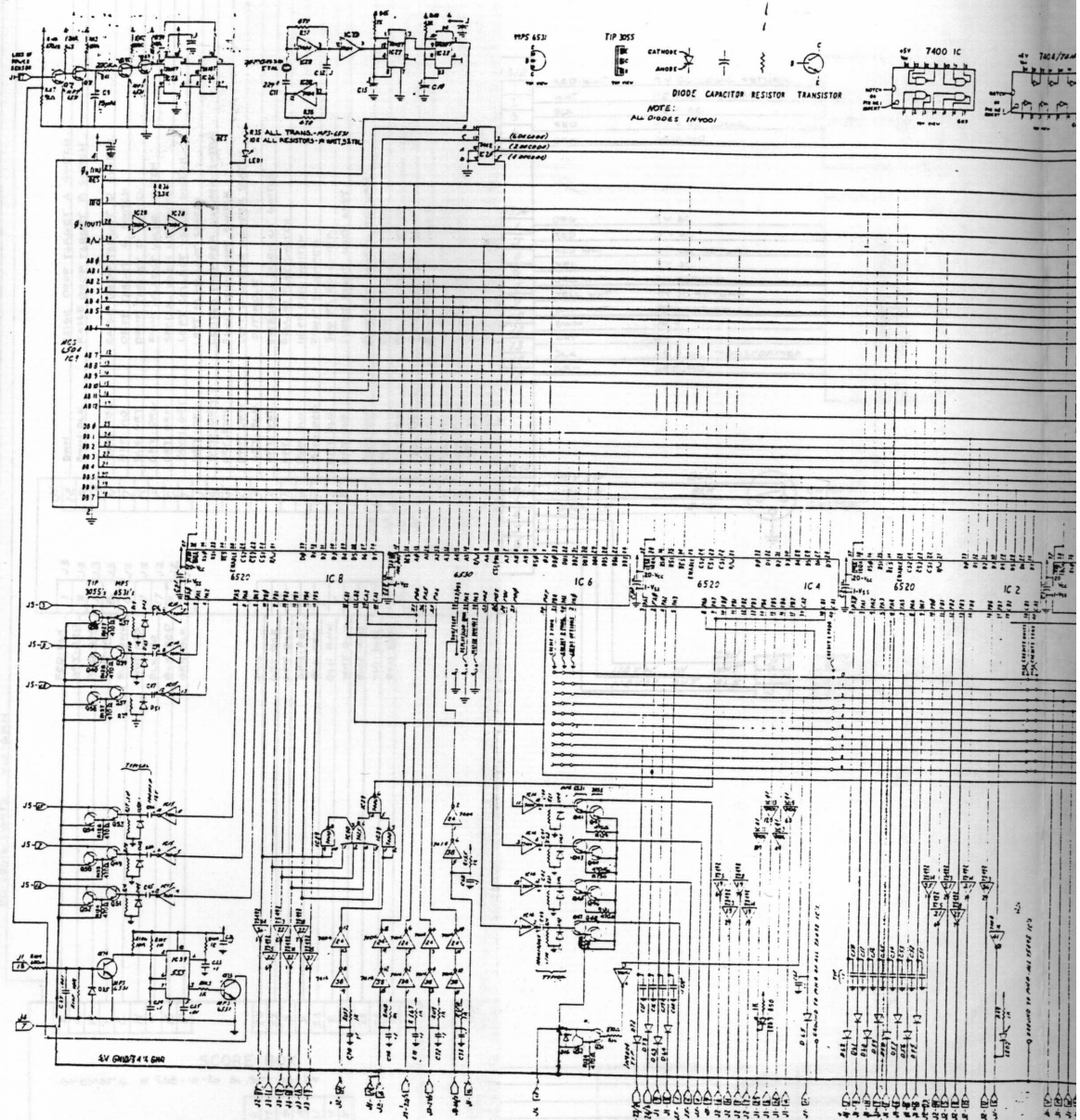


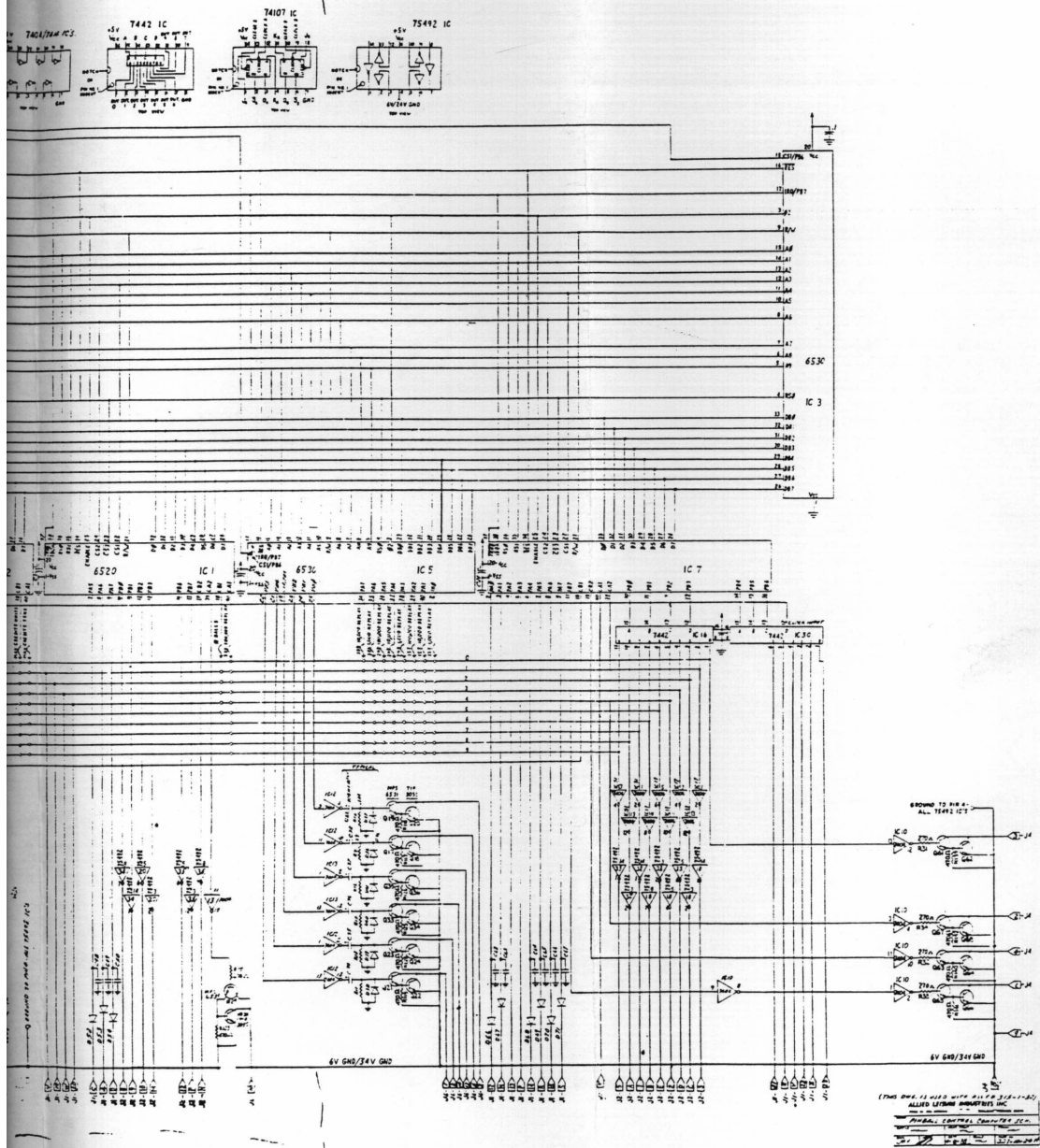
ASSY # 324-01-1001

ISSY # 324-01-1001

QTY PER ASSY		DWG NO	NOMENCLATURE	MATERIAL OR COORD. PART NO	STOCK SIZE	FINISH	PROCESS	HEAT TREAT
			TOLERANCES	ALLIED LEISURE INDUSTRIES INC				
			UNLESS OTHERWISE SPECIFIED	245 W. 74th PLACE HIALEAH, FLORIDA 33014				
			FRACTIONS = 1/32	TITLE: A3 PCC 50813881				
			DECIMALS = .01	RINGALL POWER SUPPLY CO.				
			DECIMALS = .010	OWN	DWG NO	(REV)		
			HOLES = .062	DATE	SCALE			
			ANGLES = 1/2"	JAN	1/1/70	324-17-1001		

NEXT ASSEMBLY





PLAYFIELD

