ALLIED LEISURE

PINBALL

allied leisure industries, inc.

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 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
350	Coin switch #2 - right side
360	Coin switch #3 - center

TEST MODE INFO

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 grounf.
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.

SLAM/SWITCH/TILT MECHANISM

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.*

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.

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.*

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

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.

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 initated 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 approximatley 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 .

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 continuily 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 :

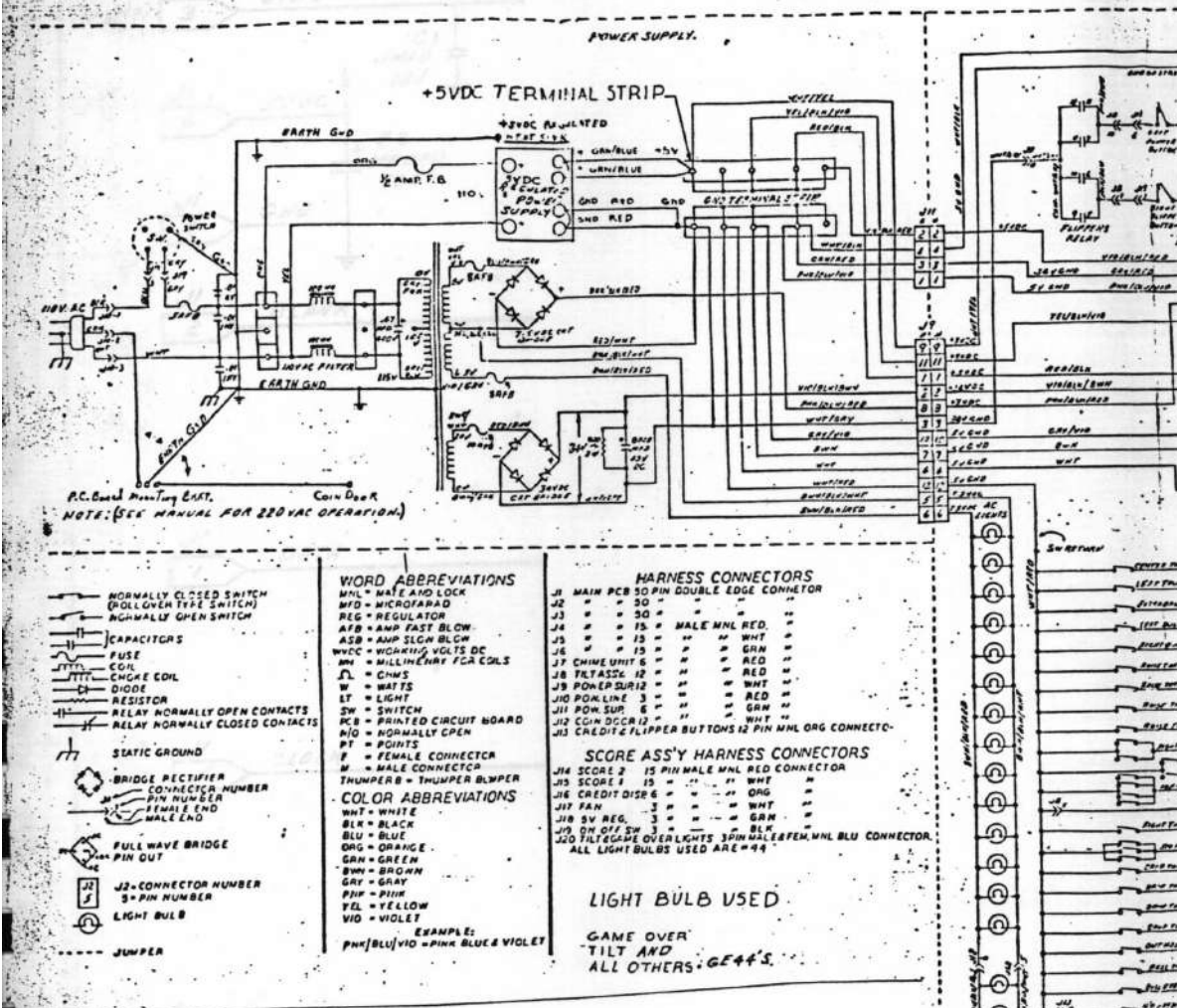
1. Remove system power .

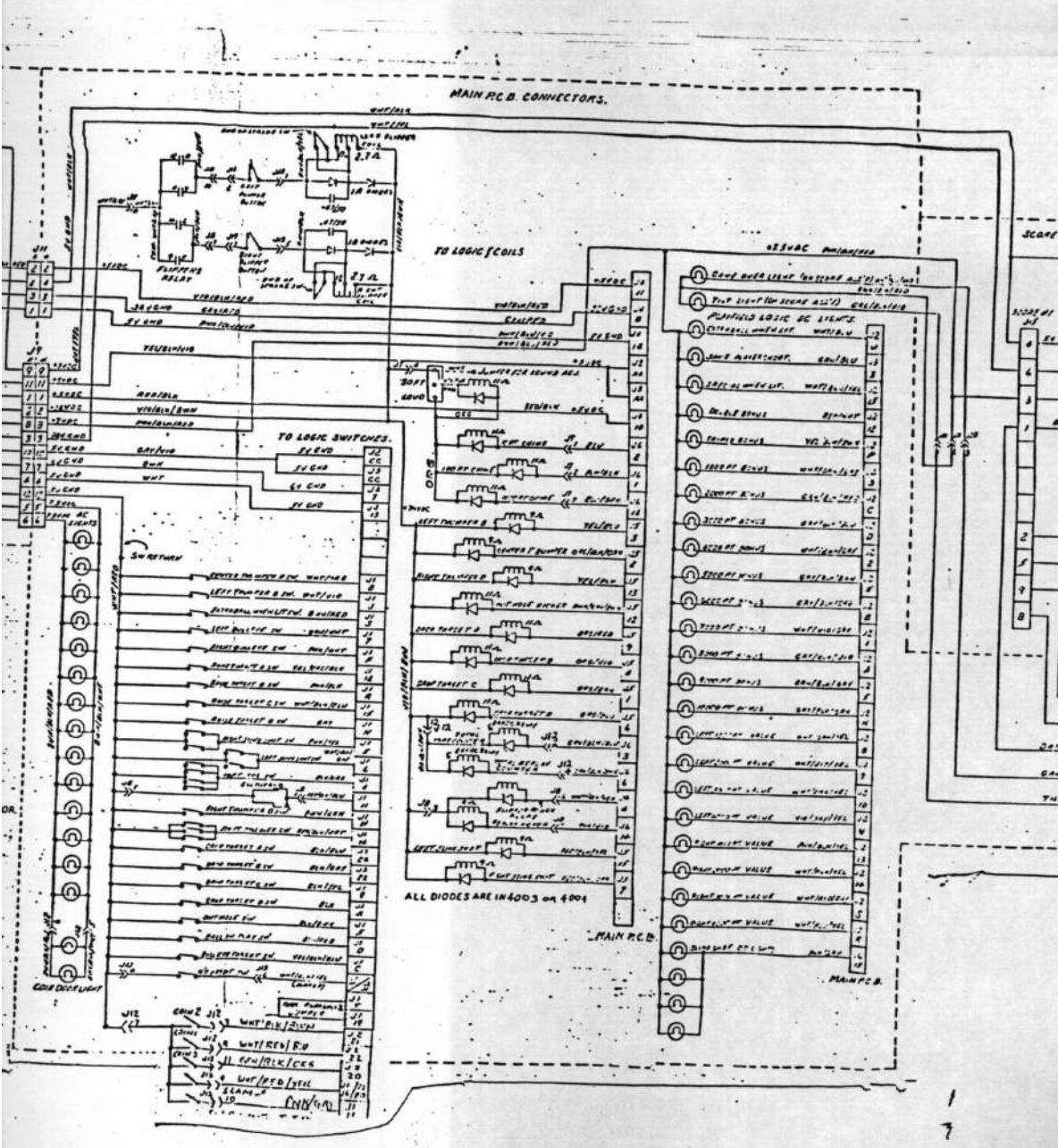
2. Completely remove main computer board .

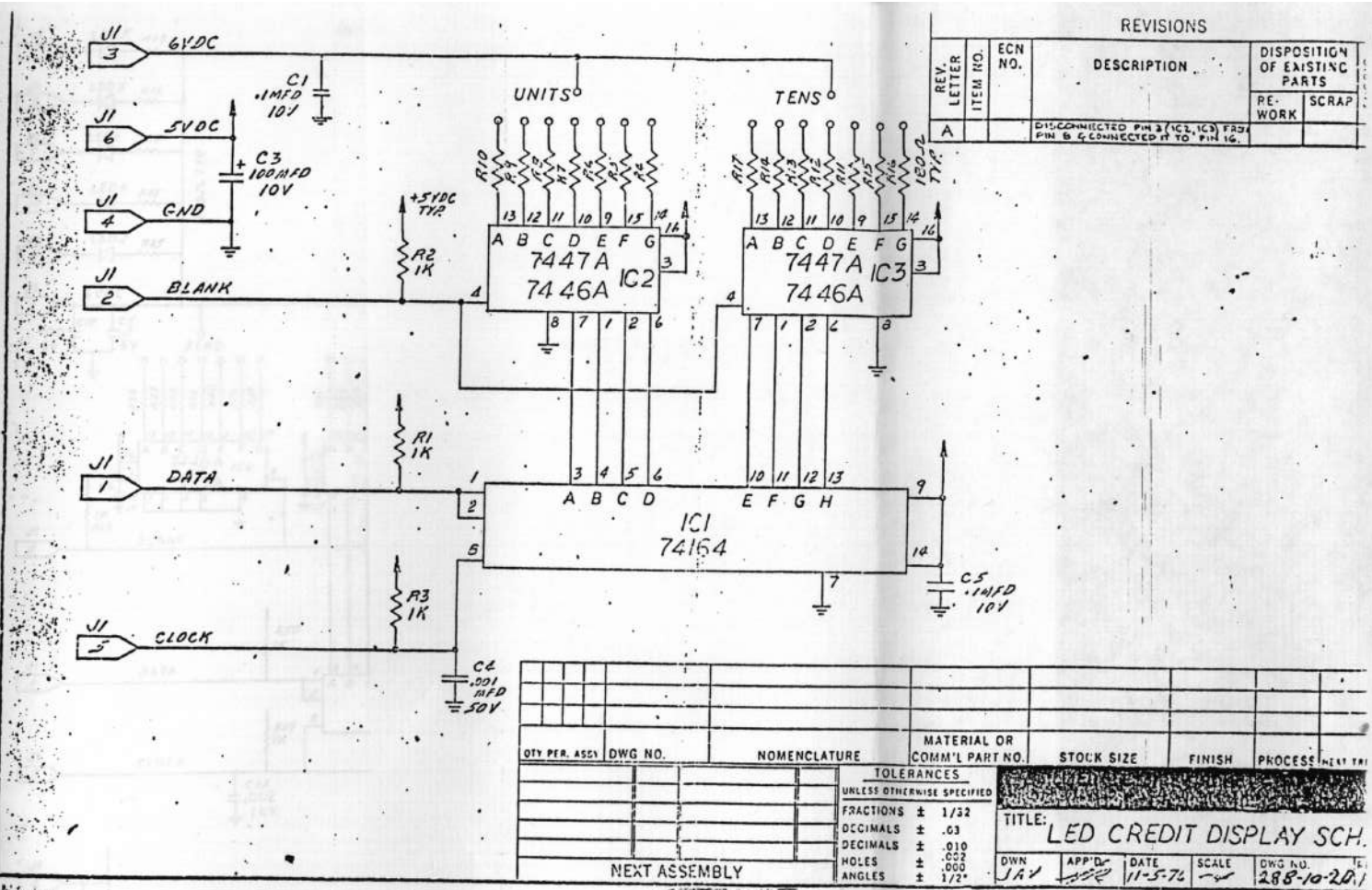
3. Re-apply power .

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 !




MAIN P.C.B. CONNECTORS.
TO LOGIC COILS
TO LOGIC SWITCHES.
ALL DIODES ARE IN4003 OR 4004
MAIN P.C.B.
MAIN P.C.B.



REVISIONS

REV. LETTER	ITEM NO.	ECN NO.	DESCRIPTION	DISPOSITION OF EXISTING PARTS: RE-WORK	SCRAP
A			DISCONNECTED PIN 3 (IC2, IC3) FROM PIN 6 & CONNECTED IT TO PIN 16.		

QTY PER. ASSY	DWG NO.	NOMENCLATURE	MATERIAL OR COMM'L PART NO.	STOCK SIZE	FINISH	PROCESS	NEXT ASSY

NEXT ASSEMBLY

TOLERANCES UNLESS OTHERWISE SPECIFIED

FRACTIONS	±	1/32
DECIMALS	±	.03
DECIMALS	±	.010
HOLES	±	.002
ANGLES	±	.000 1/2°

TITLE: LED CREDIT DISPLAY SCH.

DWN	APP'D	DATE	SCALE	DWG NO.
JAV		11-5-76		288-10-20

NOTES: UNLESS OTHERWISE NOTED RESISTORS ARE 1/4 W ± 5%, CAPACITORS ARE IN MFD.

REV LETTER	ITEM NO	ECN NO	DESCRIPTION	DISPOSITION OF EXISTING PARTS: RE WORK	SCRAP	ENGR'G APP'D
A			CAPC18 WAS .033/6V			

J1 7 LED5 R48
J1 8 LED3 R46
J1 9 LED1 R44
J1 10 LED4 R47
J1 11 LED2 R45
470Ω TYP

J1 3 6VDC
C10 100 6V
C9 .1 6V

ZERO TENS HUNDREDS THOUSANDS TEN THOUSANDS HUNDRED THOUSANDS

R38 R39 R40 R41 R42 R36 R37
R31 R32 R33 R34 R35 R29 R30
R24 R25 R26 R27 R28 R22 R23
R17 R18 R19 R20 R21 R15 R16
R10 R11 R12 R13 R14 R8 R9
R3 R4 R5 R6 R7 R1 R2
270Ω TYP

7446A OR 7447A IC6
7446A OR 7447A IC5
7446A OR 7447A IC4
7446A OR 7447A IC3
7446A OR 7447A IC2
7446A OR 7447A IC1

C6 .1 6V
R43 1K
J1 2 BLANK

R50 1K
J1 1 DATA
C11 .1 6V
C12 .1 6V
C13 .1 6V
IC7 74164
IC8 74164
IC9 74164

R49 1K
J1 5 CLOCK
C14 .002 1KV

J1 6
C7 100 16V
C8 100 16V
J1 4

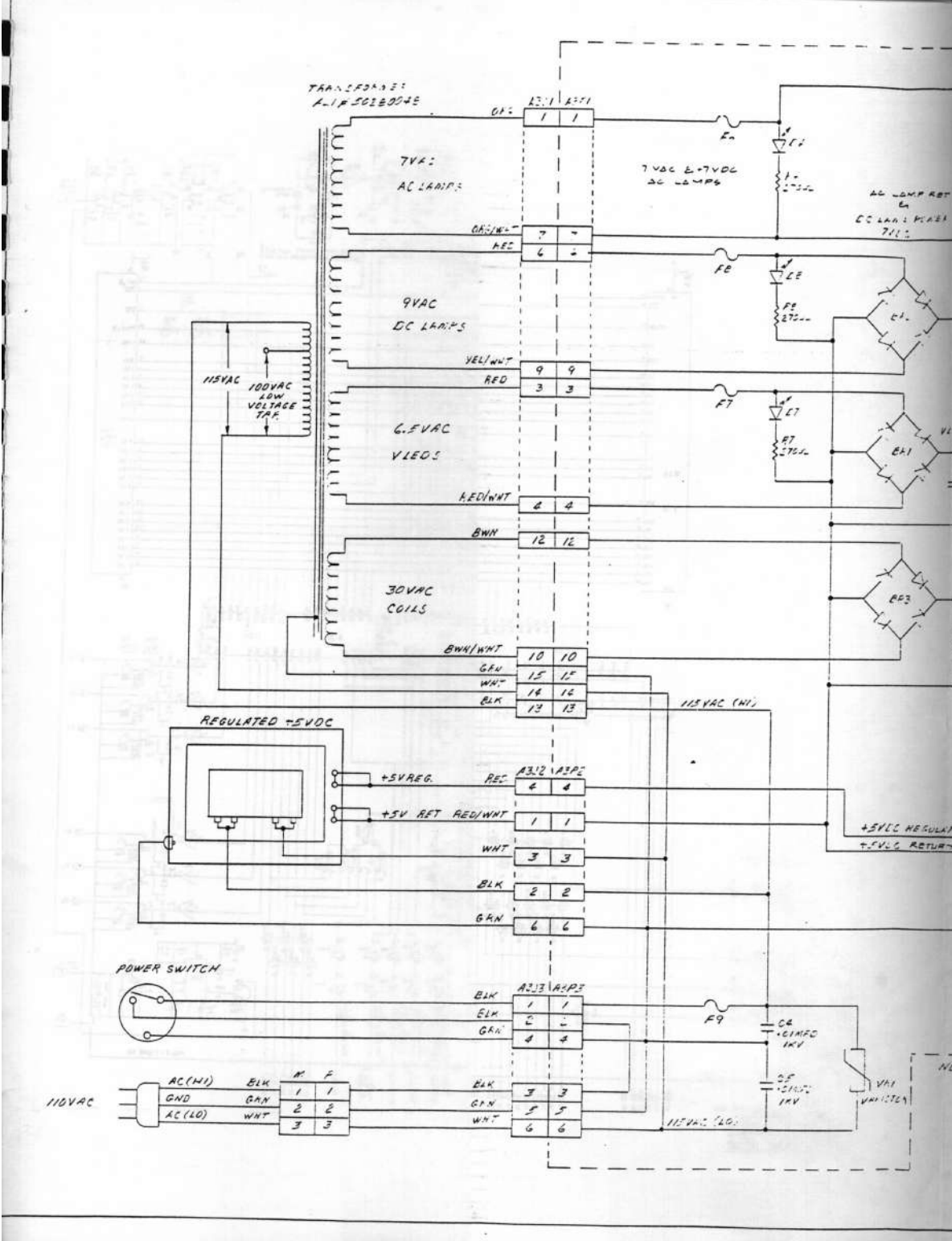
QTY PER ASSY	DWG NO	NOMENCLATURE	MATERIAL OR COMM'L PART NO	STOCK SIZE	FINISH	PROCESS
	307-1-					

TOLERANCES UNLESS OTHERWISE SPECIFIED
FRACTIONS ± 1/32
DECIMALS 3 PL ± .010
DECIMALS 2 PL ± .005
HOLES + .003 - .001
ANGLES ± 1/2°

NEXT ASSEMBLY

TITLE: COCKTAIL LED DISPLAY SCH.

DWN	APP'D	DATE	SCALE	DWG NO	REV


TRANSFORMER
A-IR SCI80048
7VAC
AC LAMPS
9VAC
DC LAMPS
6.3VAC
VLEDS
30VAC
COILS
115VAC
100VAC
LOW
VOLTAGE
TAP
7VAC & 7VDC
DC LAMPS
AC LAMP RET
&
DC LAMPS RET
7VDC
ORG/WHT
RED
YEL/WHT
RED
BRN
RED/WHT
BRN
BRN/WHT
GRN
WHT
BLK
115VAC (HI)
REGULATED +5VDC
+5VREG.
+5V RET
RED/WHT
WHT
BLK
GRN
+5VDC REGULATED
+5VDC RETURN
POWER SWITCH
BLK
BLK
GRN
115VAC (LO)
110VAC
AC(HI)
GND
AC(LO)
BLK
GRN
WHT
M
F
A3J1
A3P1
A3J2
A3P2
A3J3
A3P3
F6
F7
F8
F9
C6
.01MFD
1KV
C8
.01MFD
1KV
VA1
VARISTOR

NOTES: UNLESS OTHERWISE SPECIFIED

ASSY # 324-01-1001

QTY PER ASSY	DWG NO.	NOMENCLATURE	MATERIAL OR COMM'L PART NO.	STOCK SIZE	FINISH	PROCESS HEAT TREAT

NEXT ASSEMBLY

TOLERANCES UNLESS OTHERWISE SPECIFIED
FRACTIONS ± 1/32
DECIMALS ± .03
DECIMALS ± .010
DECIMALS ± .005
HOLES ± .000
ANGLES ± 1/2°

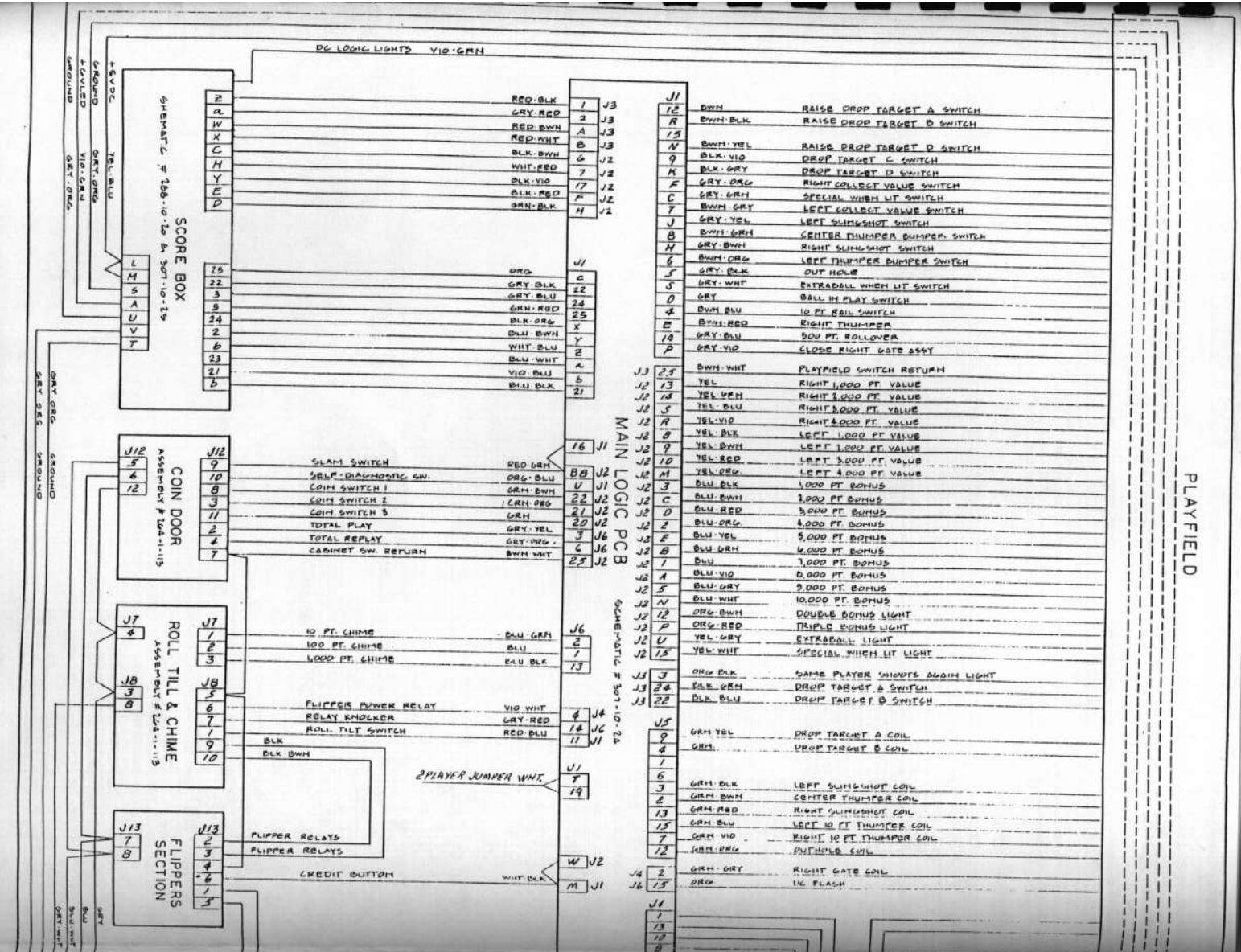
ALLIED LEISURE INDUSTRIES INC.
245 W. 74th PLACE HIALEAH, FLORIDA 33014

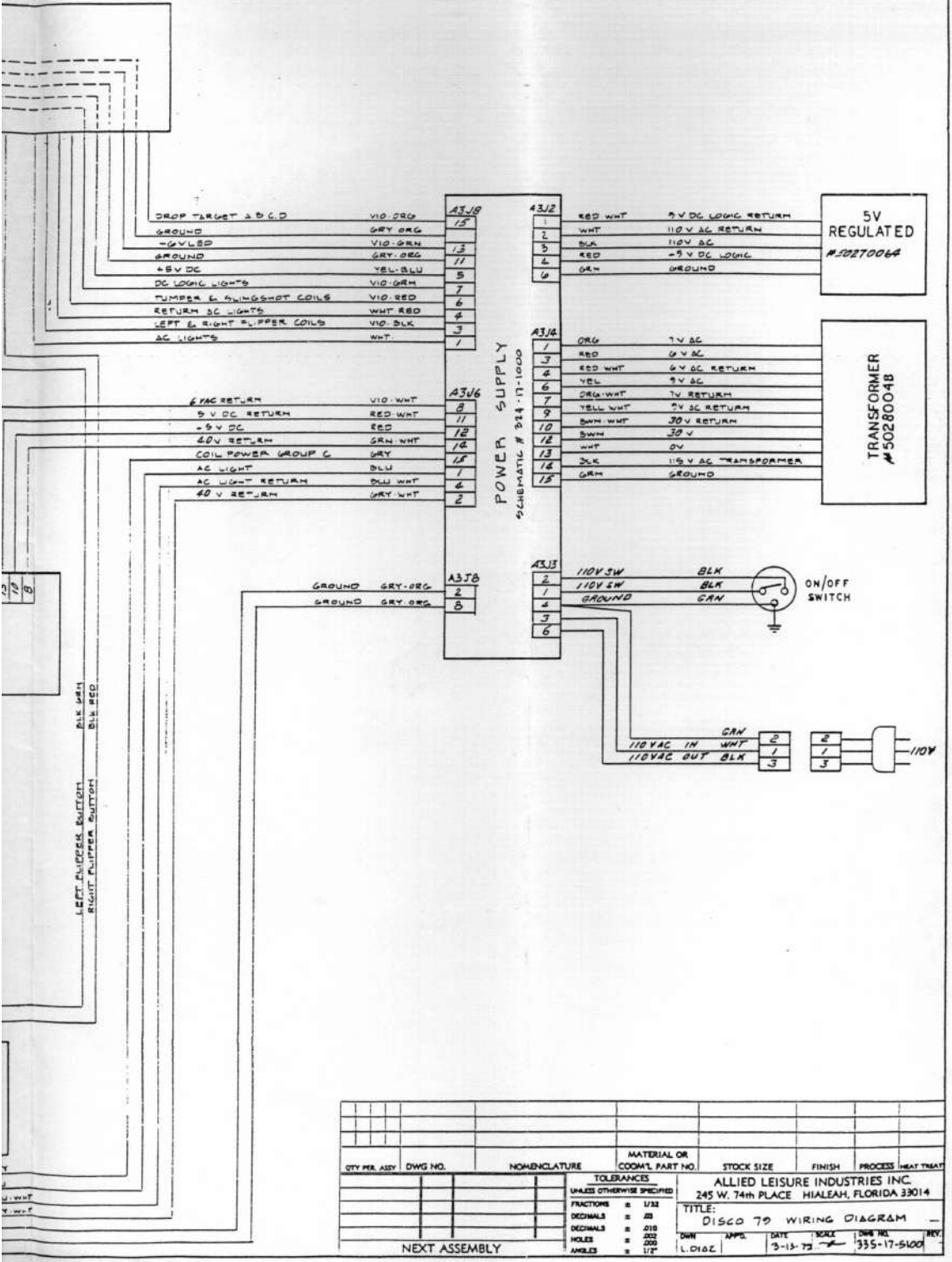
TITLE: A3 PCB SCD13861
FINGALL POWER SUPPLY SCH.

DWN	APPD	DATE	SCALE	DWG NO.	REV
JAV	MJ	1/13/17	—	324-17-1001	

DIODE CAPACITOR RESISTOR TRANSISTOR
7400 IC
IC 8
IC 6
IC 4
IC 2
6520

7442 IC
74107 IC
7549Z IC
6530
IC 3
6520
IC 1
6532
IC 5
IC 7
IC 10
IC 30
6V GND/24V GND
6V GND/24V GND


DC LOGIC LIGHTS VIO·GRN
+5VDC
GROUND
+12VDC
GROUND
TEL·BLU
GRY·ORG
VIO·GRN
GRY·ORG
SCORE BOX
SCHEMATIC # 286-10-20 & 307-10-24
MAIN LOGIC PCB
SCHEMATIC # 307-10-24
COIN DOOR
ASSEMBLY # 268-11-113
ROLL TILT & CHIME
ASSEMBLY # 268-11-113
FLIPPERS SECTION
SLAM SWITCH
SELF-DIAGNOSTIC SW.
COIN SWITCH 1
COIN SWITCH 2
COIN SWITCH 3
TOTAL PLAY
TOTAL REPLAY
CABINET SW. RETURN
10 PT. CHIME
100 PT. CHIME
1,000 PT. CHIME
FLIPPER POWER RELAY
RELAY KNOCKER
ROLL. TILT SWITCH
2 PLAYER JUMPER WHT.
FLIPPER RELAYS
FLIPPER RELAYS
CREDIT BUTTON
PLAYFIELD
RAISE DROP TARGET A SWITCH
RAISE DROP TARGET B SWITCH
RAISE DROP TARGET D SWITCH
DROP TARGET C SWITCH
DROP TARGET D SWITCH
RIGHT COLLECT VALUE SWITCH
SPECIAL WHEN LIT SWITCH
LEFT COLLECT VALUE SWITCH
LEFT SLINGSHOT SWITCH
CENTER THUMPER BUMPER SWITCH
RIGHT SLINGSHOT SWITCH
LEFT THUMPER BUMPER SWITCH
OUT HOLE
EXTRABALL WHEN LIT SWITCH
BALL IN PLAY SWITCH
10 PT RAIL SWITCH
RIGHT THUMPER
500 PT. ROLLOVER
CLOSE RIGHT GATE ASSY
PLAYFIELD SWITCH RETURN
RIGHT 1,000 PT. VALUE
RIGHT 2,000 PT. VALUE
RIGHT 3,000 PT. VALUE
RIGHT 4,000 PT. VALUE
LEFT 1,000 PT VALUE
LEFT 2,000 PT. VALUE
LEFT 3,000 PT. VALUE
LEFT 4,000 PT. VALUE
1,000 PT BONUS
2,000 PT BONUS
3,000 PT BONUS
4,000 PT. BONUS
5,000 PT BONUS
6,000 PT. BONUS
7,000 PT. BONUS
8,000 PT. BONUS
9,000 PT. BONUS
10,000 PT. BONUS
DOUBLE BONUS LIGHT
TRIPLE BONUS LIGHT
EXTRABALL LIGHT
SPECIAL WHEN LIT LIGHT
SAME PLAYER SHOOTS AGAIN LIGHT
DROP TARGET A SWITCH
DROP TARGET B SWITCH
DROP TARGET A COIL
DROP TARGET B COIL
LEFT SLINGSHOT COIL
CENTER THUMPER COIL
RIGHT SLINGSHOT COIL
LEFT 10 PT THUMPER COIL
RIGHT 10 PT THUMPER COIL
OUTHOLE COIL
RIGHT GATE COIL
INC. FLASH


DROP TARGET 2 B C D
VIO·ORG
GROUND
GRY·ORG
+5V LED
VIO·GRN
GROUND
GRY·ORG
+5V DC
YEL·BLU
DC LOGIC LIGHTS
VIO·GRN
JUMPER & SLINGSHOT COILS
VIO·RED
RETURN DC LIGHTS
WHT·RED
LEFT & RIGHT FLIPPER COILS
VIO·BLK
AC LIGHTS
WHT
A3J8
15
13
11
5
7
6
4
3
1
6 VAC RETURN
VIO·WHT
5 V DC RETURN
RED·WHT
-5 V DC
RED
40V RETURN
GRN·WHT
COIL POWER GROUP C
GRY
AC LIGHT
BLU
AC LIGHT RETURN
BLU·WHT
40 V RETURN
GRY·WHT
A3J6
8
11
12
14
15
1
4
2
GROUND
GRY·ORG
GROUND
GRY·ORG
A3J8
2
8
POWER SUPPLY
SCHEMATIC # 324-17-1000
A3J2
1
2
3
4
6
RED WHT
5 V DC LOGIC RETURN
WHT
110 V AC RETURN
BLK
110 V AC
RED
-5 V DC LOGIC
GRN
GROUND
5V REGULATED
#50270064
A3J4
1
3
4
6
7
9
10
12
13
14
15
ORG
7 V AC
RED
6 V AC
RED WHT
6 V DC RETURN
YEL
9 V AC
ORG·WHT
7V RETURN
YELL WHT
9V AC RETURN
BWN·WHT
30 V RETURN
BWN
30 V
WHT
0V
BLK
115 V AC TRANSFORMER
GRN
GROUND
TRANSFORMER
#50280048
A3J3
2
1
4
3
5
110V SW
BLK
110V SW
BLK
GROUND
GRN
ON/OFF SWITCH
GRN
110 VAC IN
WHT
110VAC OUT
BLK
2
1
3
2
1
3
110V
LEFT FLIPPER BUTTON
BLK GRN
RIGHT FLIPPER BUTTON
BLK RED
QTY PER ASSY
DWG NO.
NOMENCLATURE
MATERIAL OR COMM'L PART NO.
STOCK SIZE
FINISH
PROCESS
HEAT TREAT
NEXT ASSEMBLY
TOLERANCES
UNLESS OTHERWISE SPECIFIED
FRACTIONS ± 1/32
DECIMALS ± .03
DECIMALS ± .010
DECIMALS ± .002
HOLES ± .000
ANGLES ± 1/2°
ALLIED LEISURE INDUSTRIES INC.
245 W. 74th PLACE HIALEAH, FLORIDA 33014
TITLE:
DISCO 79 WIRING DIAGRAM
DWN L.DIAZ
APPD.
DATE 3-13-79
SCALE
DWG NO. 335-17-5100
REV.