



GottliebTM
AMUSEMENT GAMES

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A Columbia Pictures Industries Company 

PINK PANTHER INSTRUCTION MANUAL

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PINK PANTHER PROMS GAME #664

ARE MARKED AS FOLLOWS:

**GAME PROM 1 is 664/1
GAME PROM 2 IS NOT USED
SOUND PROM IS 664
INSERT PROMS WITH
INDENT NOTCH UP
CONTROL BOARD
#PB03-D107-001**

I. INSTRUCTIONS FOR PINK PANTHER (GAME #664)

TOP ROLLOVERS **WHEN LIT:** SCORE 5000 PTS. (3-BALL) OR 3000 PTS. (5-BALL). LIGHT CORRESPONDING BOTTOM ROLLOVER. LIGHT CORRESPONDING BLUE DIAMOND.
WHEN UNLIT: SCORE 500.
SEQUENCE COMPLETE LIGHTS EXTRA BALL. LAUNCH CAPTIVE BALLS WHEN THIRD BALL HITS SWITCH.

TOP POP BUMPERS SCORE 1000 PTS. (3-BALL) or 100 PTS. (5-BALL). ALTERNATE EXTRA BALL LIGHT IN FIVE BALL ONLY.

10 POINT SWITCHES AND BOTTOM POP BUMPER SCORE 10 PTS.

BOTTOM ROLLOVERS **WHEN LIT:** SCORE 5000 PTS.
ADD BLUE DIAMOND.
WHEN UNLIT: SCORE 500 PTS.

BLACK DROP TARGETS SCORE 500 PTS.
SEQUENCE COMPLETE: RESET BANK AND ADD BONUS. LIGHTS LEFT HOLE FOR CAPTURE. AWARDS SPECIAL WHEN LIT.
ADDS TO BLUE DIAMOND TOTAL WHEN MULTIPLE BALLS ARE ON THE PLAYFIELD.

WHITE DROP TARGETS **WHEN LIT:** 3000 PTS. AND ADD BONUS.
WHEN UNLIT: 500 PTS.
SEQUENCE COMPLETE: RESET BANK AND ADD BONUS. LIGHTS RIGHT HOLE FOR CAPTURE.

1ST SPOT TARGET **WHEN LIT:** SCORE 3000 PTS. AND ADD BONUS.
WHEN UNLIT: SCORE 500 PTS. AND LIGHT PINK. ADDS TO BLUE DIAMOND TOTAL WHEN MULTIPLE BALLS ARE ON PLAYFIELD.

SPOT TARGETS NONE LIT: SCORE 500 PTS. AND LIGHT PINK.
 PINK LIT: SCORE 3000 PTS. AND LIGHT BLUE. TURN OFF PINK AND
 ADD BONUS.
 BLUE LIT: SCORE 3000 PTS., LIGHT PINK, AND ADD BONUS.
 BOTH LIT: COLLECT BONUS AND TURN OFF PINK AND BLUE.
 SPOTS CORRESPONDING WHITE DROP TARGETS (2ND AND 3RD SPOT
 TARGET). ADDS TO BLUE DIAMOND TOTAL DURING MULTIPLE BALL PLAY.

LEFT CAPTIVE SCORE 5000 PTS.
 HOLE WHEN LIT: CAPTURE BALL AND RELEASE NEXT BALL TO SHOOTER.

RIGHT CAPTIVE SCORE 5000 PTS.
 HOLE WHEN LIT: CAPTURE BALL AND RELEASE BALL TO SHOOTER.

LOWER RIGHT HOLE SCORE 5000 PTS. ADD A BLUE DIAMOND. AWARD EXTRA BALL WHEN LIT.

OUTHOLE SWITCH COLLECT BONUS TIMES MULTIPLIER.

MULTIBALL UPON CAPTURING BALLS IN BOTH THE LEFT AND RIGHT HOLES, THE
 CLOSURE OF A TOP ROLLOVER WITH THE THIRD BALL WILL RELEASE
 FIRST THE LEFT BALL, THEN THE RIGHT. AT THIS POINT ALL SPOT
 TARGETS WILL HAVE ONLY THEIR BLUE DIAMONDS LIT. HITTING THE
 SPOT TARGETS WHILE IN THIS STATE WILL SCORE 3000 PTS. AND ADD
 BONUS AND ADD TO THE BLUE DIAMOND TOTAL SHOWN IN THE LIGHT-
 BOX. HITTING ANY BLACK DROP TARGET WILL ALSO ADD TO THE BLUE
 DIAMOND TOTAL. THE REST OF THE SWITCHES SCORE AS BEFORE
 BUT NOW NO PINK LIGHTS CAN BE LIT. WHEN TWO BALLS HAVE
 RETURNED TO THE OUTHOLE, THE GAME REVERTS BACK TO ORIGINAL
 SCORING AND CONTROL.

AFTER COLLECTING BONUS, THE NUMBER OF BLUE DIAMONDS WON (IF
 ANY) ON THAT BALL ARE CHECKED AGAINST THE PREVIOUS HIGH. IF THE
 PREVIOUS HIGH HAS BEEN EXCEEDED, THEN THE PLAYER IS AWARDED
 A SPECIAL AND HIS TOTAL BECOMES THE NEW HIGH.

THE CURRENT BLUE DIAMOND TOTAL TO DATE IS STORED IN BOOK-
 KEEPING. IT IS HELD AND SHOWN IN THE FIRST HIGH SCORE LEVEL
 MEMORY IN THE UNIT'S AND TEN'S DIGIT POSITIONS. THIS IS STEP
 11 IN THE TEST MODE. IT CAN BE ZEROED BY USING THE FRONT
 DOOR SWITCH.

SWITCH #32 WILL CONTROL THE MAXIMUM BLUE DIAMOND TOTAL. AT
 THE START OF A GAME, IF THE BLUE DIAMOND TOTAL IS AT THE
 MAXIMUM, IT WILL AUTOMATICALLY BE RESET TO 18.
 SWITCH #32 ON — MAXIMUM TOTAL IS 50.
 SWITCH #32 OFF — MAXIMUM TOTAL IS 40.

SPECIAL

AWARDED 2 WAYS. DURING MULTI-BALL, EACH SPOT TARGET AND BLACK TARGET HIT SCORES 1 DIAMOND. EXCEEDING "TOTAL TO BEAT" AWARDS SPECIAL. ALSO, COMPLETING BLACK TARGET BANK AWARDS SPECIAL WHEN LIT.

THE SPECIAL LIGHT WILL COME ON ONLY WHEN THERE HAVE BEEN THREE BALLS RELEASED ON THE PLAYFIELD. IT WILL REMAIN ON FOR A TIME DETERMINED BY SWITCH #31 OR UNTIL TWO BALLS HAVE LEFT THE PLAYFIELD, WHICHEVER OCCURS FIRST.

EXTRA BALL

WHEN LIT, WILL ALTERNATE OFF THE TOP POP BUMPERS DURING FIVE BALL PLAY.

BONUS MULTIPLIER

EACH SPOT TARGET BECOMES A MULTIPLIER WHEN BOTH PINK AND BLUE LIGHTS ARE LIT. AT THE END OF BALL PLAY, BONUS TIMES MULTIPLIER (ONE PLUS NUMBER OF MULTIPLIER).

HIGH GAME TO DATE

IF THE HGTD SCORE IS 990,000 OR GREATER AT THE START OF A GAME, THEN IT WILL AUTOMATICALLY BE RESET TO THE PROM DEFAULT VALUE OF HGTD (740,000).

II. INSTALLATION

To assemble the game, first bolt the legs to the cabinet. Feed the line cord through the slot provided in the pedestal. Place the lightbox atop the pedestal and engage the holding brackets.

To remove glass, insert key and unlock. Lift glass up and swing bottom out. Loosen and lower the shipping bracket at top center of lightbox insert panel. Lift panel up and then swing out. Secure lightbox to cabinet with the four bolts and washers provided.

Connect all cables and secure with cable clamps provided. Inspect the following before plugging in the line cord:

1. Check that cables are clear of moving parts.
2. Look for any disconnected wires.
3. Check switches for loose solder or other foreign matter.
4. Be certain all fuses are firmly seated.
5. Check the transformers for foreign matter across the terminals.
6. Be sure that the transformer wiring corresponds to the supply voltage.
7. Check the setting of the tilt switch on the underside of the playfield. One blade of this switch is free-floating with a weight on the end.

After leveling the machine, adjust the plum-bob tilt (on left side of cabinet near front door) to the sensitivity desired.

III. GAME ADJUSTMENTS

A. CONTROL BOARD SWITCH ADJUSTMENTS

There are 32 switches on the control board which permit adjustment of the game parameters. These switches are contained in four packages of eight switches each, as shown below:

S1 — S8	S9 — S16	S17 — S24	S25 — S32
---------	----------	-----------	-----------

SWITCHES				COIN CHUTE ADJUSTMENTS
S1	S2	S3	S4	Left Chute
S5	S6	S7	S8	Right Chute
S9	S10	S11	S12	Center Chute

NOTE: FOR GERMAN GAMES ONLY, switches S5-S8 adjust the center chute and switches S9-S12 adjust the right chute.

				COINS/CREDITS
OFF	OFF	OFF	OFF	1/1
OFF	OFF	OFF	ON	1/2
OFF	OFF	ON	OFF	1/3
OFF	OFF	ON	ON	1/4
OFF	ON	OFF	OFF	1/5
OFF	ON	OFF	ON	1/6
OFF	ON	ON	OFF	1/7
OFF	ON	ON	ON	1/8
ON	OFF	OFF	OFF	1/9
ON	OFF	OFF	ON	2/1*
ON	OFF	ON	OFF	2/2*
ON	OFF	ON	ON	2/3*
ON	ON	OFF	OFF	2/4*
ON	ON	OFF	ON	2/5*
ON	ON	ON	OFF	1/1 and 2/3
ON	ON	ON	ON	3/1*

*NO CREDITS UNTIL LAST COIN IS INSERTED.

SWITCH 13	EXTRA CREDITS
ON	Adds 9 credits to center coin chute setting
OFF	No effect

NOTE: FOR GERMAN GAMES ONLY, Switch 13 adds 9 credits to the right coin chute setting, when ON.

SWITCH 14	COIN CHUTE CONTROL
ON	Left and Right Chutes Same
OFF	Left and Right Chutes Separate

NOTE: FOR GERMAN GAMES ONLY, Switch 14 controls the left and center coin chutes.

SWITCHES	MAXIMUM CREDITS
15 OFF	8
16 OFF	10
ON OFF	15
ON ON	25

SWITCH 17	BALLS PER GAME
ON	3
OFF	5

SWITCH 18	MATCH FEATURE
ON	ON
OFF	OFF

SWITCH 19	REPLAY LIMIT
ON	Limits each player to one replay per game
OFF	No replay limit

SWITCH 20	NOVELTY MODE
ON	Playfield SPECIAL and EXTRA BALL features award 50,000 points and 5 knocks. High score, high game to date, and match features disabled.
OFF	Normal game mode

NOTE: SWITCH 20 overrides SWITCH 21.

SWITCH 21	GAME MODE
ON	Extra Ball
OFF	Replay

NOTE: IF SWITCH 21 is ON, the high game to date and match awards are disabled.

SWITCH 22	PLAYFIELD SPECIAL
ON	Awards Extra Ball
OFF	Awards Special

SWITCHES	HIGH GAME TO DATE
23 OFF	Not displayed — no award
24 OFF	Displayed — no award
ON OFF	Displayed — awards 2 replays
ON ON	Displayed — awards 3 replays

SWITCH 25	SOUND WHEN SCORING?
ON	Yes
OFF	No

SWITCH 26	REPLAY BUTTON TUNE?
ON	Yes
OFF	No

SWITCH 27	COIN SWITCH TUNE?
ON	Yes
OFF	No

SWITCH 28	CREDITS DISPLAYED?
ON	Yes
OFF	No

SWITCH 29	TILT PENALTY
ON	Ball in play only
OFF	Game over

SWITCH 30	ATTRACT FEATURES
ON	ON
OFF	OFF

SWITCH 31	
ON	Liberal
OFF	Conservative

SWITCH 32	
ON	Conservative
OFF	Liberal

LIBERAL-CONSERVATIVE ADJUSTMENT

Switch 31 in the liberal position allows playfield special to be on 20% longer than conservative position.

Switch 32 controls the maximum Blue Diamond Total. The conservative position sets maximum to 50. The liberal position sets maximum to 40.

B. ELECTRONIC SOUND ADJUSTMENTS

There are two switches on the SOUND BOARD which allow variation:

SWITCH S1

MUST REMAIN IN OFF POSITION

SWITCH S2

OFF NO ATTRACT TUNE

ON ATTRACT TUNE PLAYED EVERY 6 MINUTES

The volume control is on the bottom panel in the cabinet and is accessible from the front door opening.

Switch S3 is a test switch. Pushing S3 will generate a short tune if switches S1 and S2 are in opposite states. No tune will be played if switches S1 and S2 are in the same state. This enables the operator to test the condition of both switches and to verify that the audio-output portion of the sound board is functional.

C. POST ADJUSTMENT SEE PAGE 9.

IV. GAME OPERATION

With the line cord unplugged drop a coin into one of the chutes. It should be rejected. Plug the line cord ONLY into a properly grounded 3-wire receptacle of the correct voltage. Turn on the game by pressing the main switch located on the cabinet bottom near the front right corner.

After a five second delay the relays will pulse and the score displays will light and show all zeros. The credit display will show the number of credits remaining and the ball in play display will be blank. If the credits fail to light, turn off the game and inspect the front door slam switch. It is normally closed.

Five seconds after the score displays light, they will flash the High Game to Date score for one second. This cycle continues until the game is started. A number of playfield lights controlled by the MPU will be flashed to create an attract mode.

Insert coins into each chute and note that the correct number of credits are added on the credit display according to the information on the coin entrance plate. Press the replay button to reset the game; the ball should now be at the shooter. (Note: All balls must be in trough to start game.) The first player score reads zero and flashes, indicating that that player is now scoring. The other player displays are blank and a one appears on the ball in play display. Additional players are indicated by a zero showing in each corresponding player display. After the maximum number of players has been added, or when the credit display reads zero, the replay button has no effect.

Additional players can be added at any time the first ball is still in play.

When the ball enters the outhole the bonus is scored, the ball is kicked to the shooter, and the display of the player now scoring begins to flash and continues to flash until a score is made. When the Shoot Again light is lit neither the player designation (flashing display) nor the ball in play display changes when the ball enters the outhole. Only one extra ball per ball in play can be given.

The number of balls per game is adjustable. When the last ball enters the outhole, the Game Over and Number to Match lights come on. A random number appears in the ball in play display and if this number matches the last two digits in any player's score a replay is awarded. At this time a High Game to Date score is periodically flashed in all player displays. When a score higher than this is achieved, an award dependent on switches 23 and 24 is given.

Tilting the game results in a penalty depending on the setting of switch 29. There is a normally closed switch on the front door. If this switch opens from pounding the front door, the entire game is ended. The Game Over light comes on and for three seconds the entire switch matrix is inactive.

V. BOOKKEEPING AND SELF-TEST

The circuitry in this game helps the operator perform many bookkeeping functions. The information is shown one step at a time on the first player score display while the step number is shown in the credit display. Pressing the play/test button on the front door begins the bookkeeping and advances it to the next step each time the button is pressed. If the button is not pressed within sixty seconds of each step, the game returns to the attract mode.

STEP NUMBER	INFORMATION SHOWN
----------------	-------------------

- | | |
|----|--------------------------------------|
| 00 | NONE |
| 01 | TOTAL COINS THROUGH LEFT COIN CHUTE |
| 02 | TOTAL COINS THROUGH RIGHT COIN CHUTE |

NOTE: IF CONTROL BOARD SWITCH 14 IS ON, STEPS 01 AND 02 ARE ADDED TOGETHER AND DISPLAYED IN STEP 01.

- | | |
|----|---------------------------------------|
| 03 | TOTAL COINS THROUGH CENTER COIN CHUTE |
|----|---------------------------------------|

NOTE: FOR GERMAN GAMES ONLY, STEP 02 DISPLAYS TOTAL COINS THROUGH CENTER COIN CHUTE AND STEP 03 DISPLAYS TOTAL COINS THROUGH RIGHT COIN CHUTE.

- | | |
|----|--|
| 04 | TOTAL PLAYS |
| 05 | TOTAL REPLAYS |
| 06 | GAME PERCENTAGE
(Replays ÷ total plays) |

NOTE IF STEP 06 IS RESET, STEPS 04 AND 05 MUST ALSO BE RESET.

- | | |
|----|-------------|
| 07 | EXTRA BALLS |
| 08 | TILTS |
| 09 | SLAMS |

- | | |
|----|--|
| 10 | a) Number of times High Game to Date has been incremented to reach its present value. (Displayed in the 4th (100's), 5th (tens), and 6th (units) digit positions).
b) Number of times that the Blue Diamond to Date total has been exceeded. (Display in the 1st (100,000's), 2nd (10,000's), and 3rd (1,000's) digit positions). |
|----|--|

- | | |
|----|---|
| 11 | a) First High Score level.
b) Current Blue Diamond total. (Displayed in the 5th (10's) and 6th (units) digit positions). |
|----|---|

- | | |
|----|-------------------------|
| 12 | Second High Score level |
|----|-------------------------|

- | | |
|----|------------------------|
| 13 | Third High Score level |
|----|------------------------|

- | | |
|----|-------------------------|
| 14 | High Game to Date score |
|----|-------------------------|

- | | |
|----|---|
| 15 | Average playing time per game
PLAYER 1 shows minutes
PLAYER 2 shows seconds |
|----|---|

NOTE: IF STEP 15 IS RESET, STEP 04 MUST ALSO BE RESET.

All bookkeeping information is checked against itself to insure that it is correct. If the data changes for any reason, such as a dead battery, that information will be flashing while it is displayed.

The data in any bookkeeping step may be reset to zero while it is displayed by pressing the replay button on the front door. The play/test button must then be pressed to enter the zero into memory.

TO CHANGE HIGH SCORE LEVELS OR HIGH GAME TO DATE SCORE:

1. Press the play/test button on the front door to advance to step 11 (1st high score level).
2. Reset the score by pressing the replay button on the front door.
3. Release the replay button then hold it in again. This causes the score to advance by 10,000's. Hold in the replay button until the desired score is shown.

Enter the new score into memory by pressing the play/test button and advancing to the next step.

To return to the attract mode at any time, actuate the slam switches, tilt switches, on-off power switch, or wait sixty seconds.

SELF-TEST FEATURES:

The self-test routine begins with STEP 16. To bypass the bookkeeping functions and advance directly to self-test, press the Replay button in STEP 00.

STEP NUMBER

16 LAMP TEST

Relays and coin lockout coil are pulsed, then all controlled lamps are turned on in sequence.

17 SOLENOID TEST

Each controlled solenoid is pulsed while its number appears on the status display.

SOLENOID ASSIGNMENTS

NUMBER

FUNCTION

- | | |
|---|----------------------------|
| 1 | Lower Right Hole Kicker |
| 2 | Center Drop Target Bank |
| 3 | Left Coin Chute counter* |
| 4 | Right Coin Chute counter* |
| 5 | Left Drop Target Bank |
| 6 | Trough Switch |
| 7 | Center Coin Chute counter* |
| 8 | Knocker |
| 9 | Outhole |

* Coin counters are optional and are **NOT** pulsed during SOLENOID TEST.

NOTE: FOR GERMAN GAMES ONLY, SOLENOID #4 is assigned to the **center** coin chute counter and SOLENOID #7 is assigned to the **right** coin chute counter.

18 SWITCH TEST

All switches on the switch matrix are inspected. If all switches are open, 99 is displayed on the status display. If one or more switches are closed, their numbers will appear on the status displays.

CAUTION: TURN POWER OFF BEFORE MAKING ANY SWITCH ADJUSTMENTS!

19 DISPLAY TEST

Each digit of each display is turned on individually and all numbers 0-9 are sequenced.

20 MEMORY TEST

Each control board memory device is inspected. Any defective devices are indicated by part number on the PLAYER 1 score display. If all memory devices are okay, 99 is displayed on the status display.

Any of the tests in steps 16 through 20 may be repeated any number of times by pressing the replay button immediately after the test is completed.

VI. OPTIONAL ELECTRO-MECHANICAL COIN COUNTERS

Electro-mechanical coin counters may be installed on the bottom board, if desired. Directly behind the seven position fuse block, solder lugs are provided which will connect the counters to the electronic circuitry.

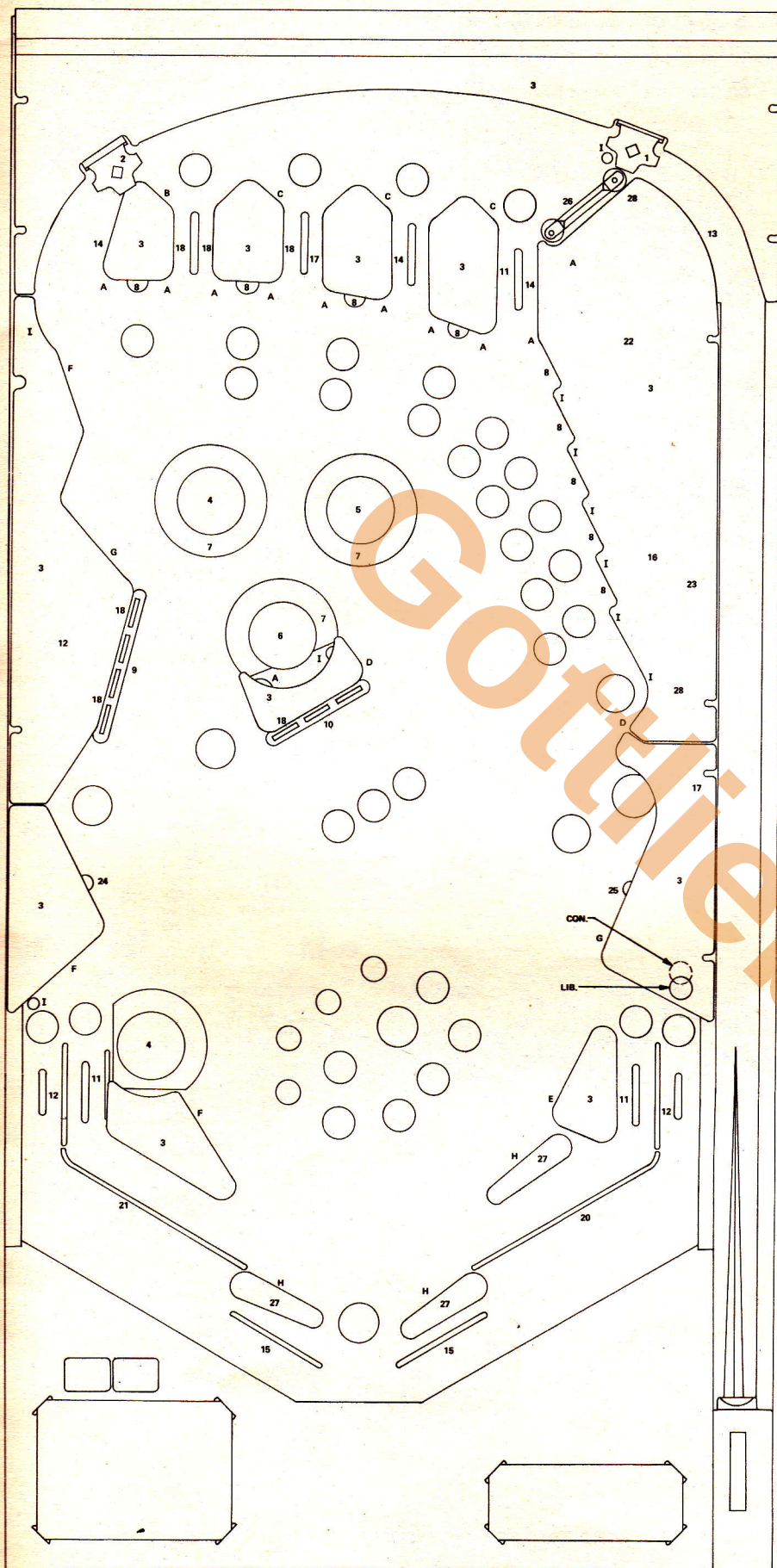
1. Position the counter and secure it to the bottom board. Mounting holes are spotted in the bottom board for most standard 24 volt counters.
2. **CAUTION:** A 1N4004 diode must be connected across each counter with the cathode end connected to the solder lug with the RED-BLACK-BLACK wire.
3. Connect one counter lead to each of the two solder lugs provided for each counter.
4. The counter should increment once when the respective coin chute switch is closed.

[illegible]

SW. MATRIX NUMBER	SWITCH ASSIGNMENT
00	#1 White Target
01	#5 White Target
02	#1 Top Rollover
03	Right Return Rollover
10	#2 White Target
11	#6 White Target
12	#2 Top Rollover
13	Extra Ball Hole Sw.
20	#3 White Target
21	#7 White Target
22	#3 Top Rollover
23	Top Pop Bumper (3)
30	#4 White Target
31	#8 White Target
32	#4 Top Rollover
33	Bottom Pop Bumper
40	10 Point Switches
41	#1 Black Drop Target
42	#9 White Target
43	Left Return Rollover
44	Left Captive Hole
50	#2 Black Drop Target
51	#1 White Drop Target
53	Right Captive Hole
60	#3 Black Drop Target
61	#2 White Drop Target
62	Left Outside Rollover
63	Outhole
70	#4 Black Drop Target
71	#3 White Drop Target
72	Right Outside Rollover
73	Trough

LAMP NUMBER	LAMP ASSIGNMENT
0	Game Over Relay (Located Under Playfield)
1	Tilt Relay (Located Under Playfield)
2	Coin Lockout Coil (Located On Front Door)
3	Same Player Shoots Again (Light Box and Playfield)
10	High Game To Date (Located in Lightbox)
11	Game Over
L12	1 x Multiplier
L13	1 x Multiplier
L14	1 x Multiplier
L15	1 x Multiplier
L16	1 x Multiplier
L17	1 x Multiplier
L18	1 x Multiplier
L19	1 x Multiplier
L20	#1 White Target
L21	#1 White Target
L22	#2 White Target
L23	#2 White Target
L24	#3 White Target
L25	#3 White Target
L26	#4 White Target
L27	#5 White Target
L28	#6 White Target
L29	#7 White Target
L30	#8 White Target
L31	#9 White Target
L32	Left Captive Hole
L33	Extra Ball
L34	Special
L35	Right Captive
L36	1 Carat
L37	2 Carat
L38	3 Carat
L39	4 Carat
L40	5 Carat
L41	6 Carat
L42	7 Carat
L43	8 Carat
L44	9 Carat
L45	10 Carat
L46	20 Carat
L47	Left Outside Rollover
L48	Left Return Rollover
L49	Right Return Rollover
L50	Right Outside Rollover
L51	#1 Top Rollover
L52	#2 Top Rollover
L53	#3 Top Rollover
L54	#4 Top Rollover

VIII. PLAYBOARD INFORMATION



PLAYBOARD INFORMATION

RUBBER RINGS

A	— A-10217	5/16	(11)
B	— A-10218	3/4	(1)
C	— A-10219	1"	(3)
D	— A-10220	1 1/2"	(2)
E	— A-10221	2"	(1)
F	— A-10222	2 1/2"	(2)
G	— A-10223	3"	(2)
H	— A-13151		(3)
I	— A-15705		(10)

PARTS LIST

1. A-19645 Ball Guide Right.
 2. A-19646 Ball Guide Left.
 3. D-20478 Plastic Shield Set.
 4. Blue Pop Bumper A-20577 and A-20586 Cap in Blue. (2)
 5. Blue Pop Bumper A-20577 and A-20588 Cap in Blue. (1)
 6. Blue Pop Bumper A-20577 and A-20590 Cap in Blue. (1)
 7. Blue Pop Bumper Skirt. (4)
 8. A-20522 Plastic Target in Pink. (9)
 9. A-20524 Black Drop Target in Blue. (4)
 10. A-20647 White Drop Target in Pink. (3)
 11. A-4831 Ball Guide Rail. (4)
 12. A-4832 Ball Guide Rail. (2)
 13. A-4833 Ball Guide Rail.
 14. A-6931 Ball Guide Rail. (4)
 15. A-13798 Ball Snubber Rail. (2)
 16. A-16991 Ball Guide Rail.
 17. A-17650 Ball Guide Rail. (2)
 18. A-18070 Ball Guide Rail. (6)
 19. A-18563 Ball Guide Rail.
 20. A-19995 Ball Guide Rail.
 21. A-19996 Ball Guide Rail.
 22. A-14389 Metal Flat Rail.
 23. C-20453 Metal Flat Rail.
 24. A-15636 Left Kicking Rubber.
 25. A-15638 Right Kicking Rubber.
 26. A-17300 Roll Under Gate.
 27. C-13150 Jumbo White Flipper. (3)
 28. A-20362 Flat Rail Clip. (2)
- C-11561 Clear 1" High Post. (48)
C-11562 Clear 13/16" High Post. (2)

CON. = CONSERVATIVE.
LIB. = LIBERAL.

IX. P.C. BOARD CONNECTOR AND CABLE PLUG WIRE ASSIGNMENTS

The following lists provide wire color and function information for each wire of each connector in the game.

Wire colors are shown as numbers. Use the chart below to convert to colors.

- 0 Black
- 1 Brown
- 2 Red
- 3 Orange
- 4 Yellow
- 5 Green
- 6 Blue
- 7 Purple
- 8 Slate
- 9 White

For example, 688 is a BLUE-SLATE-SLATE striped wire.

Printed Circuit Board connectors are shown as AX-JX.

Use the following chart to determine which printed circuit board applies:

- A1 Control Board
- A2 Power Supply
- A3 Driver Board
- A4 Score Displays (4)
- A5 Status Display
- A6 Sound Board
- A8 Pop Bumper Driver Board

For example, A3-J3 is connector J3 on the driver board.

There are eight male/female cable connectors in the game. These are shown as A7-JX/PX.

There are three male/female cable connectors to interconnect the status display on the playboard to the control board in the lightbox. They are listed on page 14 as A10-JX/PX.

A1-J1		
PIN	WIRE COLOR	FUNCTION
1	*688	+5VDC
2	*688	+5VDC
3	—	SPARE
4	*54	GROUND
5	*54	GROUND

A1-J2		
PIN	WIRE COLOR	FUNCTION
1	300	aA
2	311	bA
3	322	cA
4	333	dA
5	344	eA
6	355	fA
7	366	gA
8	377	hA
9	600	aB
10	611	bB
11	622	cB
12	633	dB
13	644	eB
14	655	fB
15	666	gB
16	677	hB
17	800	aC
18	811	bC
19	822	cC
20	833	dC
21	844	eC
22	855	fC
23	866	gC
24	877	hC

A1-J3		
PIN	WIRE COLOR	FUNCTION
1	400	D1
2	411	D2
3	422	D3
4	433	D4
5	444	D5
6	455	D6
7	466	D7
8	477	D8
9	700	D9
10	711	D10
11	722	D11
12	733	D12
13	744	D13
14	755	D13
15	766	D15
16	777	D16
17	—	SPARE

A1-J4		
PIN	WIRE COLOR	FUNCTION
1	*54	GROUND
2	*688	+5VDC
3	9	DS2
4	9	LD3
5	9	LD4
6	9	LD2
7	9	LD1
8	—	SPARE
9	—	SPARE
10	—	SPARE
11	—	SPARE
12	—	SPARE
13	—	SPARE
14	—	SPARE
15	—	SPARE
16	—	SPARE
17	—	SPARE
18	—	KEY
19	—	SPARE
20	—	SPARE
21	9	KNOCKER
22	9	3RD COUNTER
23	9	2ND COUNTER
24	9	1ST COUNTER
A	—	SPARE
B	—	SPARE
C	9	DS1
D	9	DS4
E	9	DS3
F	9	DS6
H	9	DS5
J	9	DS8
K	9	DS7
L	9	DS10
M	9	DS9
N	9	DS11
P	9	DS12
R	9	SOLENOID 5
S	9	SOLENOID 1
T	9	OUTHOLE
U	9	SOLENOID 6
V	—	(KEY)
W	—	SPARE
X	9	SOLENOID 2
Y	9	SOUND 8
Z	9	SOUND 4
A	9	SOUND 2
B	9	SOUND 1

ALL WIRES #22 GAUGE UNLESS SPECIFIED* (18 GA.)

A1-J5		
PIN	WIRE COLOR	FUNCTION
1	677	RETURN 7
2	400	STROBE 0
3	411	STROBE 1
4	422	STROBE 2
5	433	STROBE 3
6	*444	STROBE 4
7	455	STROBE 5
8	666	RETURN 6
9	477	STROBE 7
10	700	SLAM SW.

A1-J6		
PIN	WIRE COLOR	FUNCTION
1	400	STROBE 0
2	411	STROBE 1
3	422	STROBE 2
4	433	STROBE 3
5	444	STROBE 4
6	455	STROBE 5
7	466	STROBE 6
8	477	STROBE 7
9	9	GROUND
10	—	RETURN 0
11	611	RETURN 1
12	622	RETURN 2
13	633	RETURN 3
14	644	RETURN 4
15	—	SPARE
16	—	SPARE
17	677	RETURN 7
18	688	+5VDC
19	—	SPARE

A2-J1		
PIN	WIRE COLOR	FUNCTION
1	(#16GA) 200	12VDC
2	(#16GA) 54	GROUND
3	—	SPARE
4	—	(KEY)
5	688	+5VDC
6	166	+5VDC offset
7	100	60VAC
8	111	60VAC RETURN
9	133	+8VDC offset

A2-J2		
PIN	WIRE COLOR	FUNCTION
1	*688	+5VDC
2	*688	+5VDC
3	*54	GROUND
4	*54	GROUND
5	—	(KEY)
6	—	SPARE

A2-J3		
PIN	WIRE COLOR	FUNCTION
1	044	+60VDC
2	—	(KEY)
3	055	+42VDC
4	54	GROUND
5	54	GROUND
6	—	SPARE
7	688	+5VDC

A3-J1		
PIN	WIRE COLOR	FUNCTION
1	*54	GROUND
2	*688	+5VDC
3	9	DS2
4	9	LD3
5	9	LD4
6	9	LD2
7	9	LD1
8	—	SPARE
9	—	SPARE
10	—	SPARE
11	—	SPARE
12	—	SPARE
13	—	SPARE
14	—	SPARE
15	—	SPARE
16	—	SPARE
17	—	SPARE
18	—	SPARE
19	—	(KEY)
20	—	SPARE
21	9	KNOCKER
22	9	3RD COUNTER
23	9	2ND COUNTER
24	9	1ST COUNTER
A	—	SPARE
B	—	SPARE
C	9	DS1
D	9	DS4
E	9	DS3
F	9	DS6
H	9	DS5
J	9	DS8
K	9	DS7
L	9	DS10
M	9	DS9
N	9	DS11
P	9	DS12
R	9	SOLENOID 5
S	9	SOLENOID 1
T	9	OUTHOLE
U	9	SOLENOID 6
V	—	SPARE
W	—	(KEY)
X	9	SOLENOID 2
Y	9	SOUND 8
Z	9	SOUND 4
A	9	SOUND 2
B	9	SOUND 1

ALL WIRES #22 GAUGE
UNLESS SPECIFIED* (18 GA)

A3-J2		
PIN	WIRE COLOR	FUNCTION
1	588	SHOOT AGAIN LAMP
2	500	PLAYER 1 LAMP
3	511	PLAYER 2 LAMP
4	533	PLAYER 4 LAMP
5	522	PLAYER 3 LAMP
6	*54	GROUND
7	577	HIGH GAME TO DATE LAMP
8	566	GAME OVER LAMP
9	555	L9
10	544	L8

A3-J3		
PIN	WIRE COLOR	FUNCTION
1	—	SPARE
2	777	L43
3	755	L41
4	744	L40
5	544	L32
6	555	L33
7	577	L35
8	—	KEY
9	344	L24
10	355	L25
11	377	L27
12	366	L26
13	144	L16
14	155	L17
15	177	L19
16	166	L18
17	(16GA) 54	GROUND (L20-27)
18	322	L22
19	333	L23
20	311	L21
21	300	L20
22	122	L14
23	133	L15
24	111	L13
25	100	L12
A	—	SPARE
B	—	SPARE
C	*54	GROUND (L44-L51)
D	800	L44
E	—	SPARE
F	811	L45
H	—	SPARE
J	—	KEY
K	566	L34
L	—	SPARE
M	833	L47
N	—	SPARE
P	822	L46
R	866	L50

A3-J3 continued		
PIN	WIRE COLOR	FUNCTION
S	*54	GROUND (L40-L43)
T	766	L42
U	(16GA) 54	GROUND (L28-L35)
V	522	L30
W	533	L31
X	511	L29
Y	500	L28
Z	(16GA) 54	GROUND (L12-L19)
<u>A</u>	288	GAME OVER RELAY
<u>B</u>	277	TILT RELAY
C	588	SHOOT AGAIN LAMP

A3-J4		
PIN	WIRE COLOR	FUNCTION
1	700	L36
2	711	L37
3	733	L39
4	722	L38
5	*54	GROUND (L36-L39)
6	*211	SOLENOID 5
7	*266	SOLENOID 1
8	*244	OUTHOLE (SOL. 9)
9	*54	GROUND (SOL. 1, 9)
10	*54	GROUND (SOL. 2)
11	*54	GROUND (SOL. 6)
12	*233	SOLENOID 6
13	*200	SOLENOID 2
14	*54	GROUND (SOL. 5)
15	—	SPARE

A3-J5		
PIN	WIRE COLOR	FUNCTION
1	733	SOUND 4
2	877	COIN LOCKOUT COIL
3	54	GROUND (KNOCKER)
4	—	SPARE
5	722	SOUND 2
6	711	SOUND 1
7	744	SOUND 8
8	888	KNOCKER

A3-J6		
PIN	WIRE COLOR	FUNCTION
1	633	2ND COUNTER
2	644	3RD COUNTER
3	655	1ST COUNTER
4	54	GROUND

ALL WIRES #22 GAUGE UNLESS SPECIFIED* (18 GA.)

1A4-J1		
PIN	WIRE COLOR	FUNCTION
1	455	D6
2	444	D5
3	433	D4
4	422	D3
5	411	D2
6	400	D1
7	377	hA
8	366	gA
9	355	fA
10	344	eA
11	333	dA
12	322	cA
13	311	bA
14	300	aA
15	122	5VAC
16	144	5VAC RETURN
17	044	+60VDC
18	—	SPARE
19	54	GROUND

2A4-J1		
PIN	WIRE COLOR	FUNCTION
1	733	D12
2	722	D11
3	711	D10
4	700	D9
5	477	D8
6	466	D7
7	377	hA
8	366	gA
9	355	fA
10	344	eA
11	333	dA
12	322	cA
13	311	bA
14	300	aA
15	122	5VAC
16	144	5VAC RETURN
17	044	+60VDC
18	—	SPARE
19	54	GROUND

3A4-J1		
PIN	WIRE COLOR	FUNCTION
1	455	D6
2	444	D5
3	433	D4
4	422	D3
5	411	D2
6	400	D1
7	677	hB
8	666	gB
9	655	fB

3A4-J1 continued		
PIN	WIRE COLOR	FUNCTION
10	644	eB
11	633	dB
12	622	cB
13	611	bB
14	600	aB
15	122	5VAC
16	144	5VAC RETURN
17	044	+60VDC
18	—	SPARE
19	54	GROUND

4A4-J1		
PIN	WIRE COLOR	FUNCTION
1	733	D12
2	722	D11
3	711	D10
4	700	D9
5	477	D8
6	466	d7
7	677	hB
8	666	gB
9	655	fB
10	644	eB
11	633	dB
12	622	cB
13	611	bB
14	600	aB
15	122	5VAC
16	144	5VAC RETURN
17	044	+60VDC
18	—	SPARE
19	54	GROUND

5A4-J1		
PIN	WIRE COLOR	FUNCTION
1	455	D6
2	444	D5
3	—	SPARE
4	—	SPARE
5	411	D2
6	400	D1
7	822	hC
8	811	gC
9	877	fC
10	866	eC
11	855	dC
12	844	cC
13	833	bC
14	—	aC
15	155	5VAC
16	177	5VAC RETURN
17	055	+60VDC
18	—	SPARE
19	—	GROUND

ALL WIRES #22 GAUGE UNLESS SPECIFIED* (18 GA.)

A5-J1		
PIN	WIRE COLOR	FUNCTION
1	—	SPARE
2	—	SPARE
3	777	D16
4	766	D15
5	755	D14
6	744	D13
7	822	cC
8	811	bC
9	877	hC
10	866	gC
11	855	fC
12	844	eC
13	833	dC
14	800	aC
15	155	3VAC
16	177	3VAC RETURN
17	055	+42VDC
18	688	+5VDC
19	54	GROUND

A6-J1		
PIN	WIRE COLOR	FUNCTION
1	200	+12VDC
2	—	SPARE
3	333	AC
4	344	AC RETURN
5	688	+5VDC
6	54	GROUND
7	011	SPEAKER OUTPUT
8	711	SOUND 1
9	722	SOUND 2
10	—	SPARE
11	733	SOUND 4
12	744	SOUND 8

A7-J1/P1		
PIN	WIRE COLOR	FUNCTION
1	677	RETURN 7
2	500	STROBE 0
3	511	STROBE 1
4	533	STROBE 2
5	522	STROBE 3
6	544	STROBE 4
7	555	STROBE 5
8	—	SPARE
9	—	SPARE
10	700	ANTI-CHEAT SW. (SLAM)
11	9	ANTI-CHEAT SW. (GND)
12	*54	EARTH GROUND

A7-J2/P2		
PIN	WIRE COLOR	FUNCTION
1	*066	COIN CHUTE LIGHTS
2	*000	COIN CHUTE LIGHTS RETURN
3	*055	LEFT FLIPPER SWITCH
4	*388	FLIPPER SWITCH RETURN
5	222	+24VDC
6	877	COIN LOCKOUT

A7-J3/P3		
PIN	WIRE COLOR	FUNCTION
1	*122	5VAC
2	*144	5VAC RETURN
3	155	3VAC
4	177	3VAC RETURN
5	*54	LAMP GROUND
6	—	SPARE
7	(16GA) 077	6.3VAC
8	(16GA) 000	6.3VAC RETURN
9	*255	+6VDC

A7-J4/P4		
PIN	WIRE COLOR	FUNCTION
1	*54	GROUND
2	*54	GROUND
3	*54	GROUND
4	*54	GROUND
5	*54	GROUND
6	*54	GROUND
7	*54	GROUND
8	*54	GROUND
9	*54	GROUND
10	*54	GROUND
11	*54	GROUND
12	—	SPARE

A7-J5/P5		
PIN	WIRE COLOR	FUNCTION
1	(16GA) 255	+6VDC
2	(16GA) 54	GROUND
3	(16GA) 54	GROUND
4	(16GA) 54	GROUND
5	(16GA) 54	GROUND
6	(16GA) 222	+24VDC
7	*388	FLIPPER SW. RETURN
8	*388	FLIPPER SW. RETURN
9	*055	LEFT FLIPPER SWITCH
10	*044	RIGHT FLIPPER SWITCH
11	(16GA) 066	6.3VAC
12	(16GA) 000	6.3VAC RETURN
13	*277	25VAC
14	*288	25VAC
15	(16GA) 366	+38VDC

ALL WIRES #22 GAUGE UNLESS SPECIFIED* (18 GA.)

A7-J6/P6		
PIN	WIRE COLOR	FUNCTION
1	022	TILT LIGHT
2	544	L8
3	555	L9
4	—	SPARE

A7-J8/P8		
PIN	WIRE COLOR	FUNCTION
1	022	SPEAKER
2	*54	GROUND
3	*54	EARTH GROUND
4	—	SPARE

1A8-J1		
PIN	WIRE COLOR	FUNCTION
1	*188	COIL #1
2	*54	GROUND
3	—	KEY
4	077	SWITCH #1
5	688	+5VDC
6	9	DC GROUND

2A8-J1		
PIN	WIRE COLOR	FUNCTION
1	*488	COIL #2
2	*54	GROUND
3	—	KEY
4	011	SWITCH #2
5	688	+5VDC
6	9	DC GROUND

3A8-J1		
PIN	WIRE COLOR	FUNCTION
1	*888	COIL #3
2	*54	GROUND
3	—	KEY
4	022	SWITCH #3
5	688	+5VDC
6	9	DC GROUND

4A8-J1		
PIN	WIRE COLOR	FUNCTION
1	277	COIL #4
2	*54	GROUND
3	—	KEY
4	033	SWITCH #4
5	688	+5VDC
6	9	DC GROUND

A10-J1/P1		
PIN	WIRE COLOR	FUNCTION
1	122	5VAC
2	144	5VAC RETURN
3	155	3VAC
4	177	3VAC RETURN

A10-J2/P2		
PIN	WIRE COLOR	FUNCTION
1	777	D16
2	766	D15
3	755	D14
4	744	D13
5	822	cC
6	811	bC
7	877	hC
8	866	gC
9	855	fC
10	844	eC
11	833	dC
12	800	aC

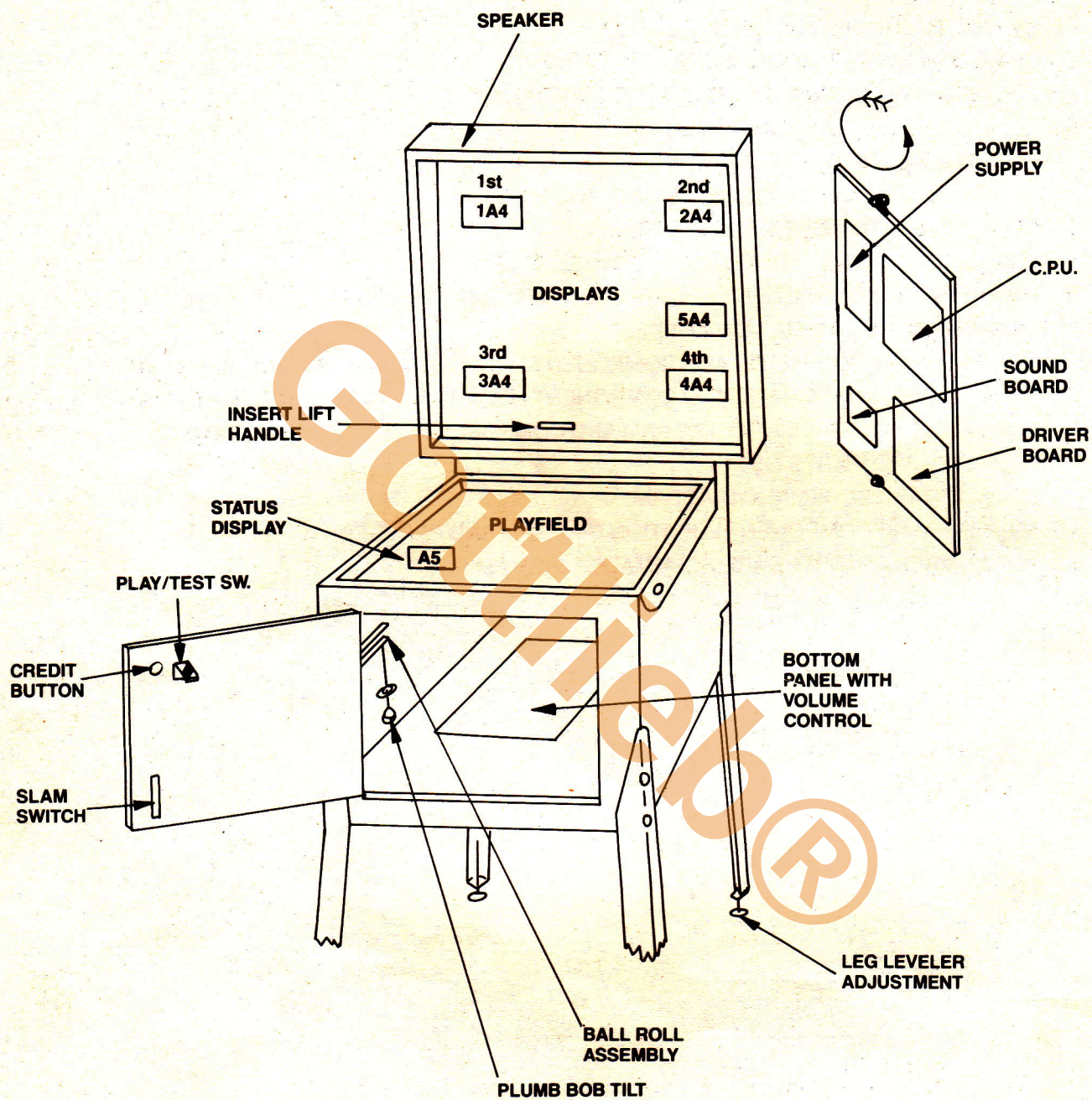
A10-J3/P3		
PIN	WIRE COLOR	FUNCTION
1	155	3VAC
2	177	3VAC RETURN
3	055	+42VDC
4	688	+5VDC
5	54	GROUND
6	—	SPARE

ALL WIRES #22 GAUGE UNLESS SPECIFIED* (18 GA)

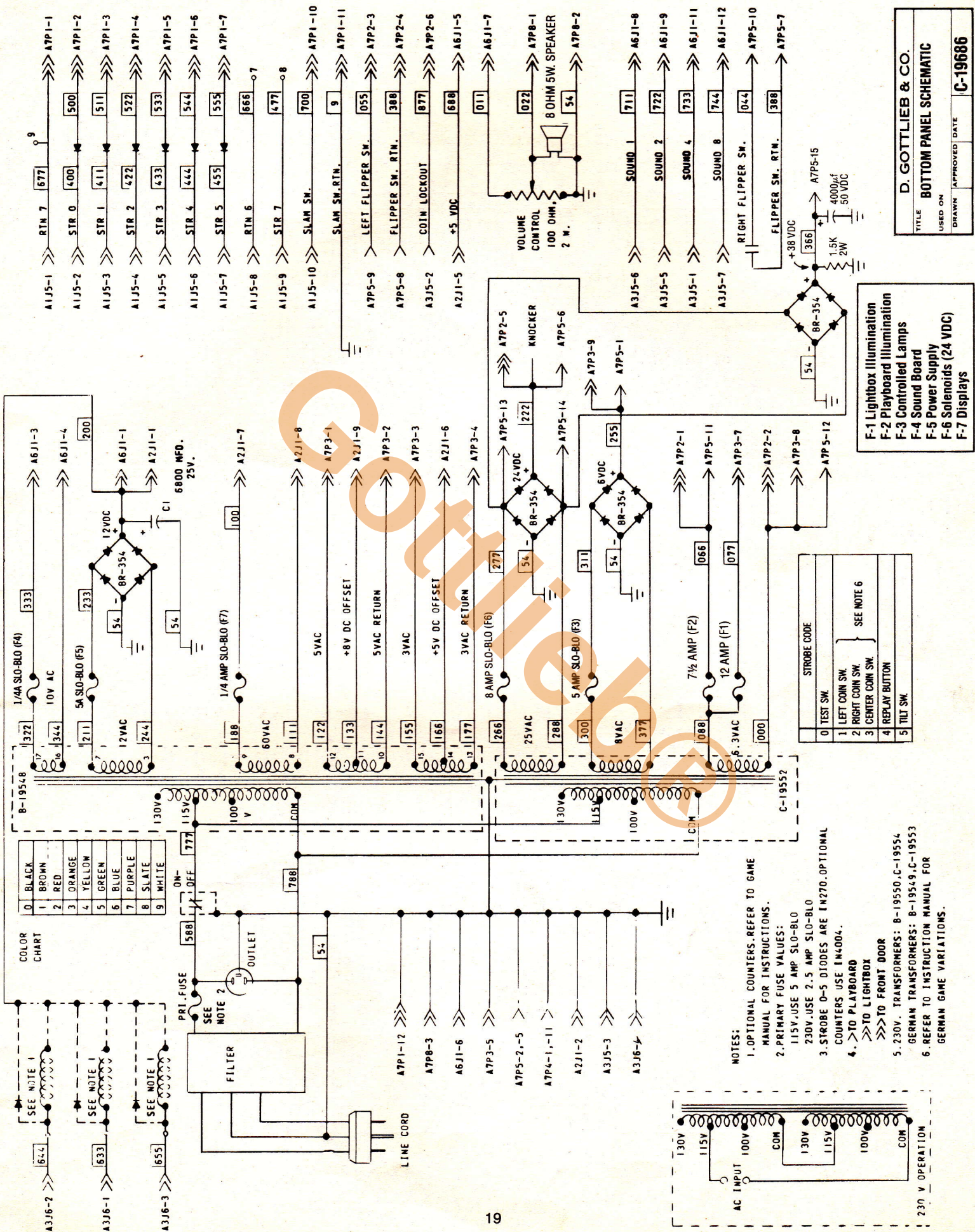
X. WIRING AND SCHEMATIC DIAGRAMS

- A. COMPONENT LOCATION DIAGRAM
- B. BOTTOM BOARD SCHEMATIC
- C. BOTTOM BOARD AND LIGHTBOX SCHEMATIC
- D. SWITCH MATRIX ASSIGNMENT DIAGRAM
- E. PLAYBOARD SOLENOID SCHEMATIC DIAGRAM
- F. PLAYBOARD ILLUMINATION SCHEMATIC DIAGRAM
- G. LIGHTBOX CABLE SCHEMATIC DIAGRAM
- H. CONTROL BOARD PARTS LIST
- I. CONTROL BOARD COMPONENT LOCATION DIAGRAM
- J. CONTROL BOARD SCHEMATIC DIAGRAM 1 OF 2
- K. CONTROL BOARD SCHEMATIC DIAGRAM 2 OF 2
- L. DRIVER BOARD COMPONENT LOCATION DIAGRAM AND PARTS LIST
- M. DRIVER BOARD SCHEMATIC DIAGRAM
- N. 6 DIGIT DISPLAY SCHEMATIC AND COMPONENT LOCATION DIAGRAM AND PARTS LIST
- O. 4 DIGIT DISPLAY SCHEMATIC AND COMPONENT LOCATION DIAGRAM AND PARTS LIST
- P. POWER SUPPLY SCHEMATIC DIAGRAM AND COMPONENT LOCATION DIAGRAM
- Q. POWER SUPPLY PARTS LIST
- R. SOUND BOARD SCHEMATIC DIAGRAM
- S. SOUND BOARD COMPONENT LOCATION DIAGRAM AND PARTS LIST
- T. POP BUMPER DRIVER BOARD SCHEMATIC DIAGRAM

X. A. COMPONENT LOCATION DIAGRAM



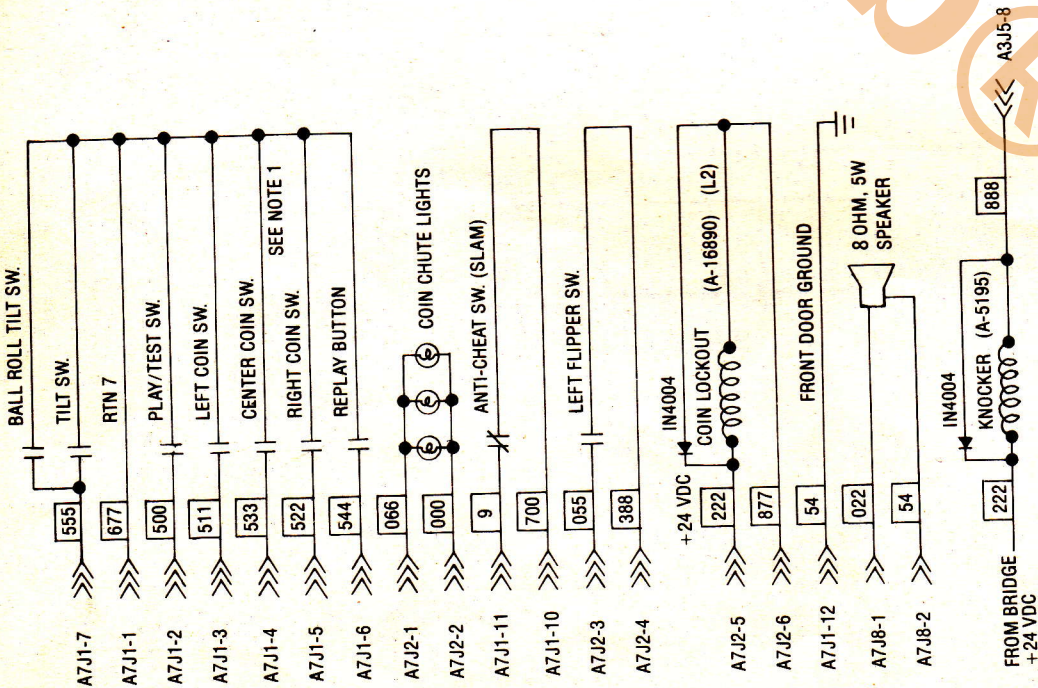
X. B. BOTTOM BOARD PANEL SCHEMATIC



D. GOTTlieb & CO.
TITLE
BOTTOM PANEL SCHEMATIC
USED ON
DRAWN
APPROVED DATE
C-19686

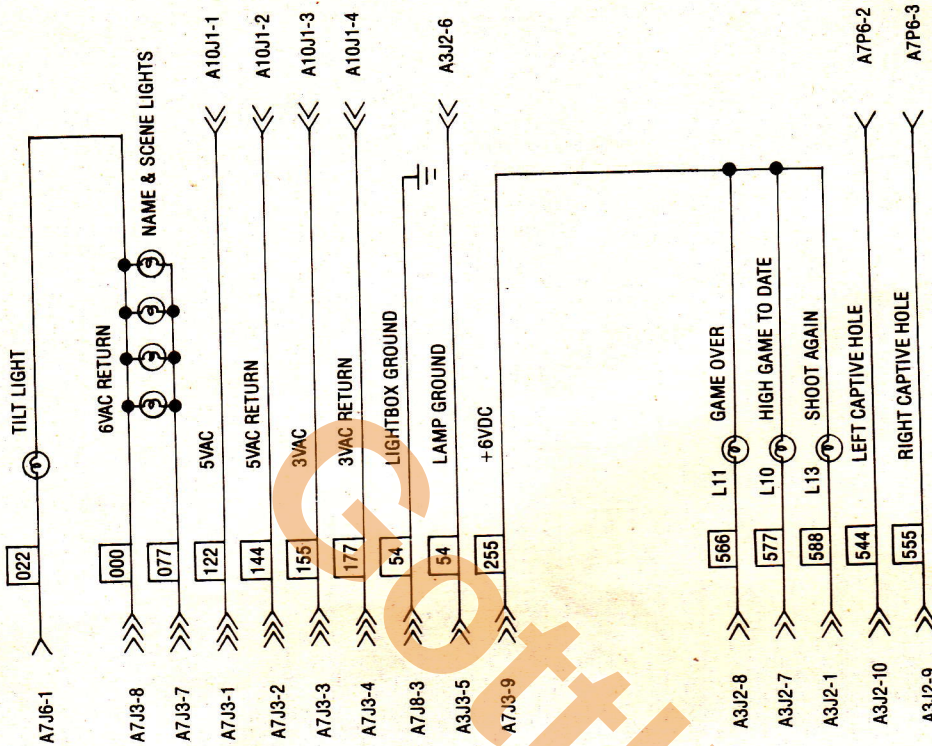
F-1 Lightbox Illumination
F-2 Playboard Illumination
F-3 Controlled Lamps
F-4 Sound Board
F-5 Power Supply
F-6 Solenoids (24 VDC)
F-7 Displays

X. C. BOTTOM BOARD & LIGHTBOX SCHEMATIC



NOTE 1: REFER TO INSTRUCTION MANUAL FOR
 GERMAN GAME VARIATIONS

- > FROM PLAYBOARD
- >> FROM LIGHTBOX
- >>> FROM BOTTOM BOARD



D. GOTTLIEB & CO.			
TITLE	BOTTOM BOARD & LIGHT BOX		
USED ON	SCHEMATIC		
DRAWN	APPROVED	DATE	C-19690

X. D. SWITCH MATRIX



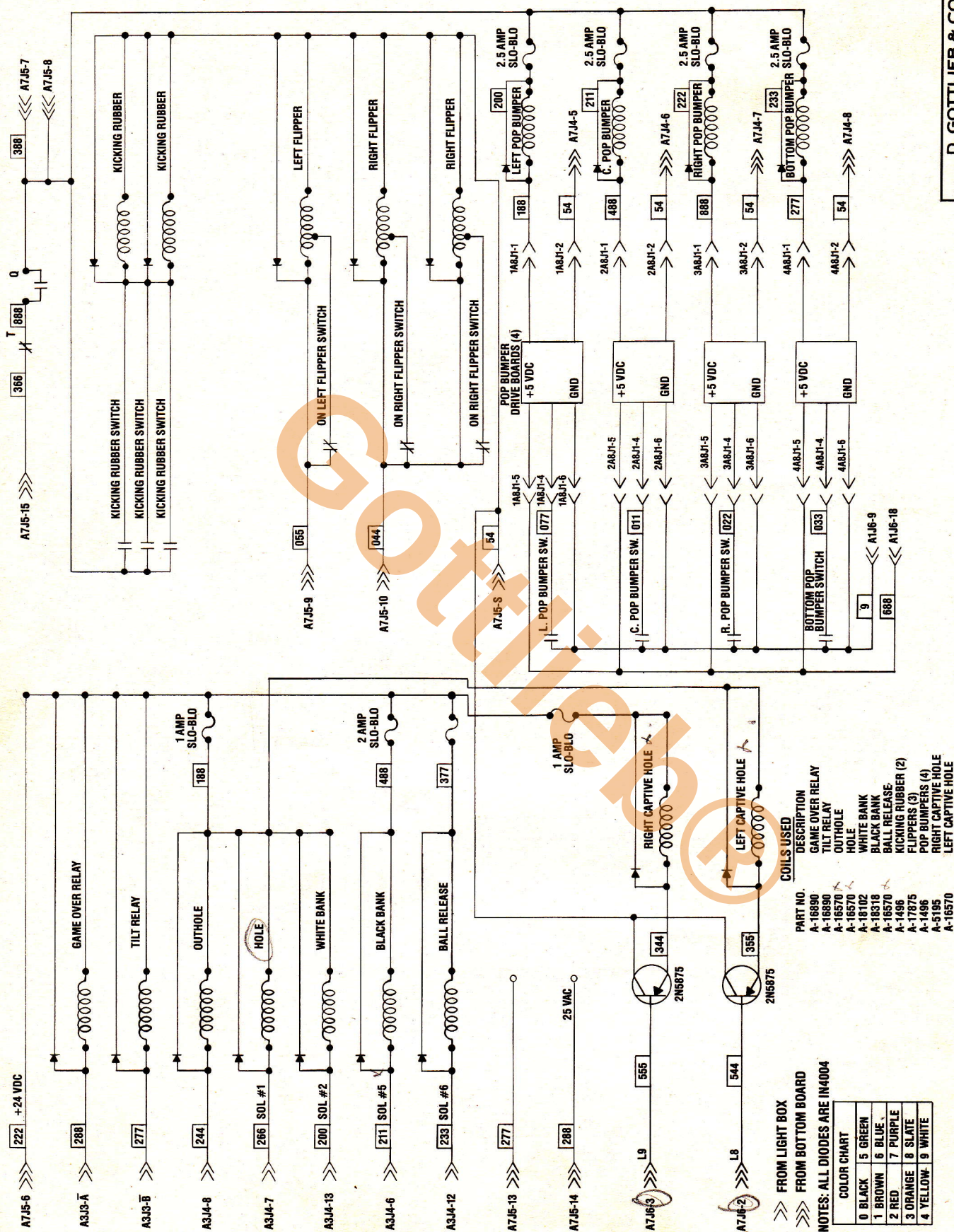
COLOR CHART	
0 BLACK	5 GREEN
1 BROWN	6 BLUE
2 RED	7 PURPLE
3 ORANGE	8 SLATE
4 YELLOW	9 WHITE

NOTE: DIODES ARE IN-270

TO STR 5

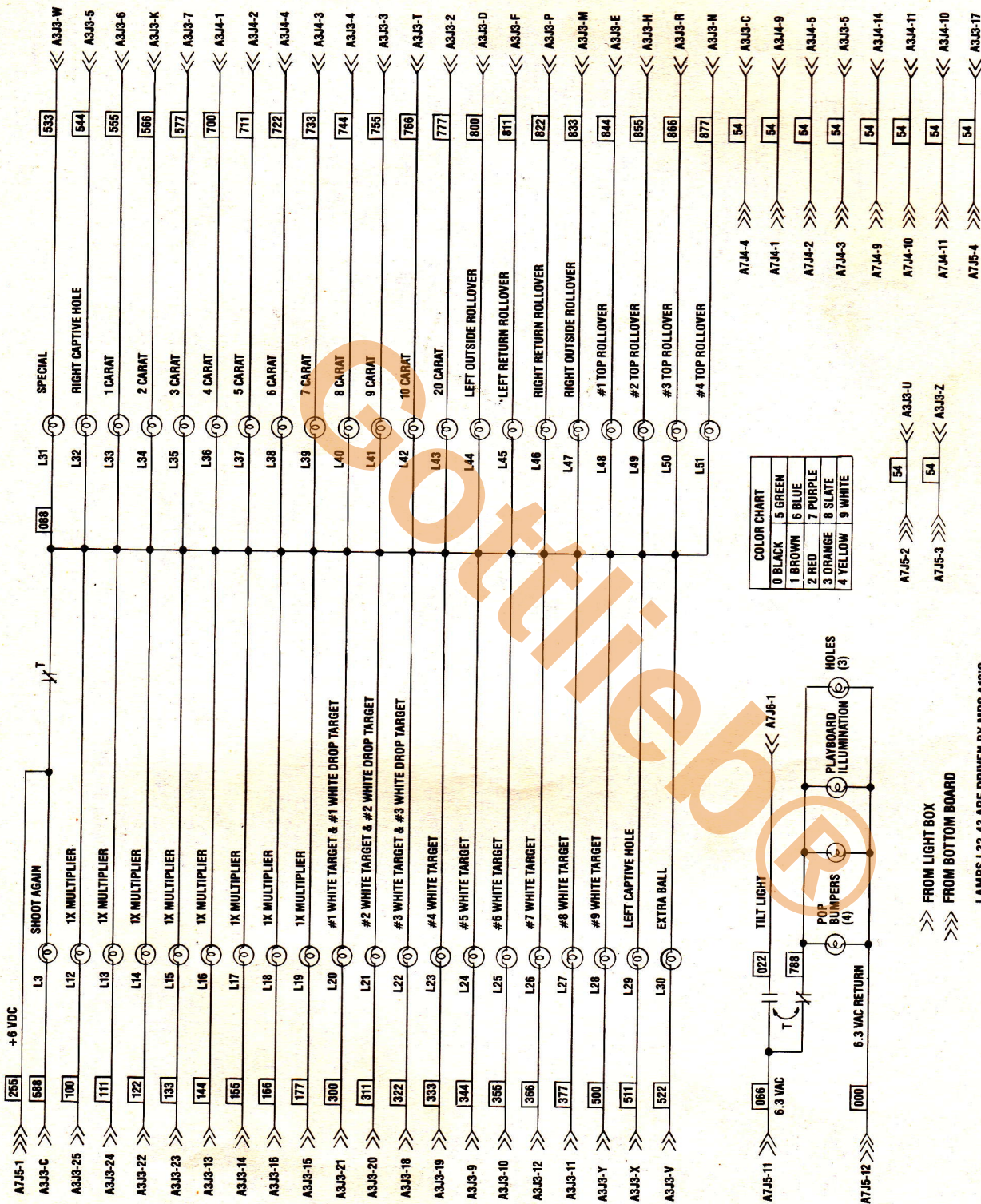
D. GOTTLIEB & CO.	
TITLE	SWITCH MATRIX
USED ON	664
DRAWN	APPROVED DATE
	C-

X. E. PLAYBOARD SOLENOIDS



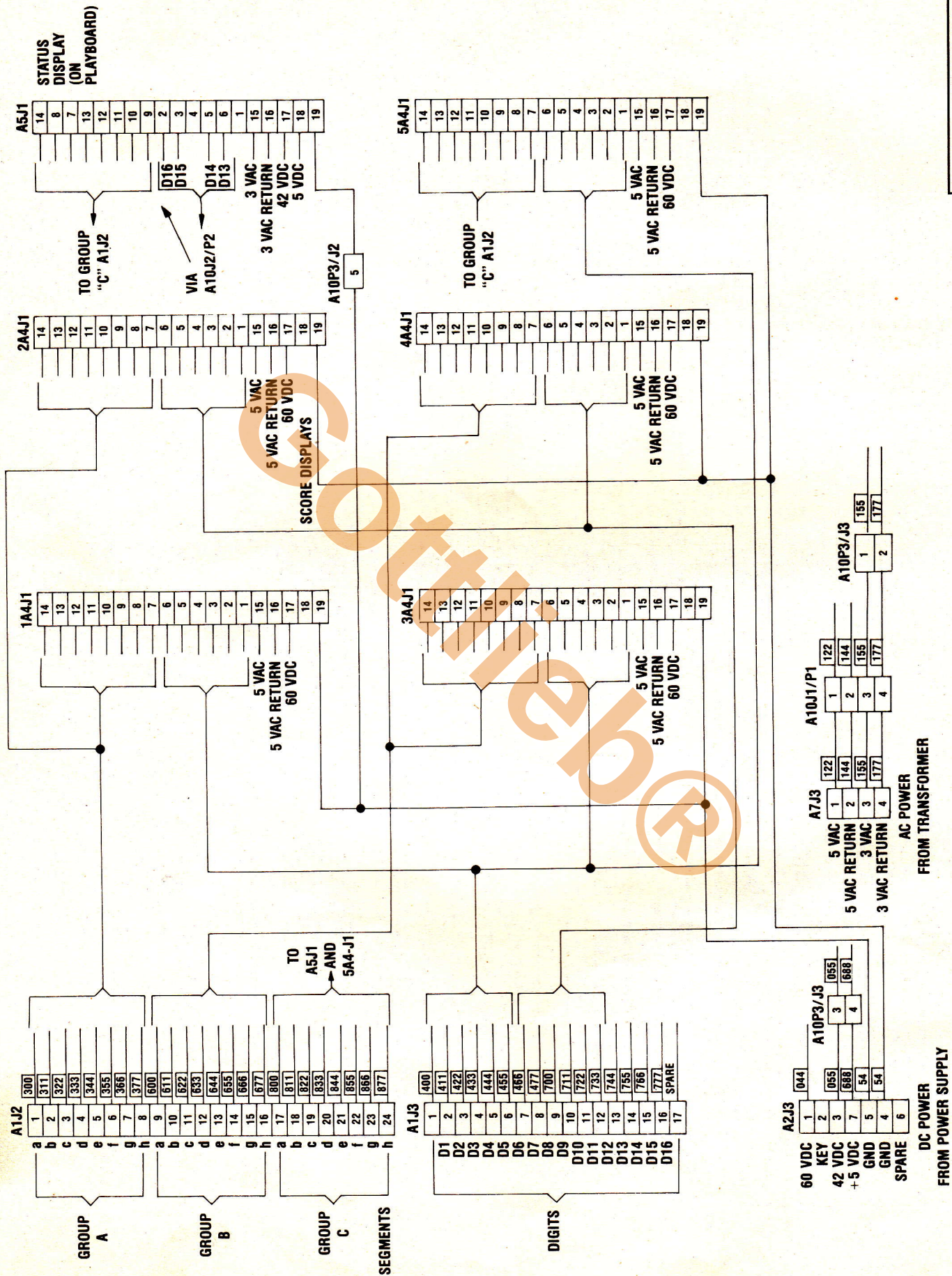
D. GOTTLIEB & CO.	
TITLE	PLAYBOARD SOLENOIDS
USED ON	664
DRAWN	APPROVED DATE
	C-

X. F. PLAYBOARD ILLUMINATION



D. GOTTLIEB & CO.	
TITLE	PLAYBOARD ILLUMINATION
USED ON	664
DRAWN	APPROVED DATE
	C-

X. G. LIGHTBOX CABLE SCHEMATIC DIAGRAM



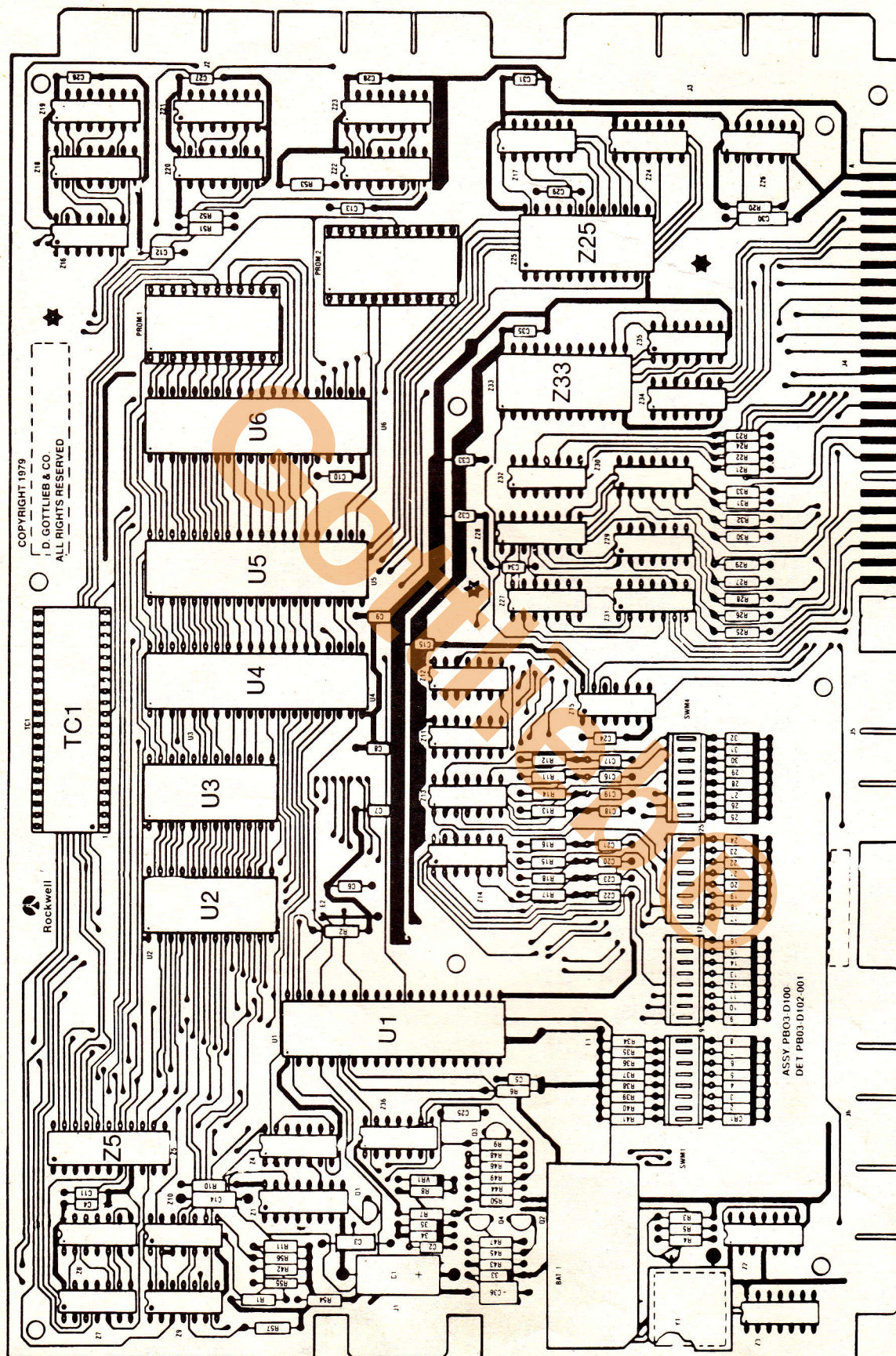
D. GOTTLIEB & CO.			
TITLE	USED ON	DRAWN	APPROVED
LIGHTBOX CABLE SCHEMATIC	1		
		DATE	C-20289

X. H. CONTROL BOARD PARTS LIST

PART NUMBER	CONTROL BOARD DESCRIPTION
R6502-13	CPU — (U1)
R6532-18	RIOT — (U4, U5, U6)
R3273-12	ROM — (U2)
R3272-12	ROM — (U3)
P5101L-1	RAM/CMOS — (Z5)
640361-3	SOCKET — DIP, 24 PIN
SN7402N	IC — 2 INPUT — "NOR" — (Z8)
SN7400N	IC — 2 INPUT — "NAND" — (Z9, Z13, Z14)
SN7432N	IC — 2 INPUT — "OR" — (Z15)
SN7404N	IC — HEX INVERTER — (*)
SN7416N	IC — HEX INVERTER — OC/HV — (Z29, Z30)
SN7417N	IC — HEX BUFFER — OC — (Z32)
SN74LS139N	IC — 2 TO 4 DECODER — (Z28)
SN74175N	IC — "D" FLIP FLOP — (Z18, Z20, Z22)
SN7448N	IC — 4 TO 7 DECODER — (Z19, Z21, Z23)
SN74154N	IC — 4 TO 16 DECODER — (Z25, Z33)
SN7474N	IC — DUAL FLIP FLOP — (Z2)
SCL4528B	CMOS IC — DUAL 1 SHOT — (Z1)
SCL4081B	CMOS IC — QUAD 2 INPUT "AND" — (Z4)
1N4148	DIODE — GP — (CR1-CR35)
1N5225B or 1N5987B	ZENER DIODE — 3.0V, 5% — (VR1)
326R10-002	BATTERY — 3.6V — (BAT. 1)
333R08-001	CRYSTAL — 3.579545 MHZ — (Y1)
131R06-001	SPACER, CORK
MPS A70	TRANSISTOR — PNP — (Q1, Q4)
341R31-005	DIP SWITCH PACK — 8 POS. — (SW1-SW4)
	RESISTOR — 62Ω, ¼W, 5% — (R7)
	CAPACITOR — .01 MICROFARAD, 50V — (C2, C4-C13, C15-C24, C26-C29, C31-C35)
	CAPACITOR — .1 MICROFARAD, 50V — (C3, C14, C25, C30)
	CAPACITOR — 100 MICROFARAD, 10V — (C1)
	RESISTOR — 3.0KΩ, ¼W, 5% — (R1, R6, R11-24, R42, R45, R46, R48, R51-R57)
	RESISTOR — 2.0KΩ, ¼W, 5% — (R4, R5, R44)
	RESISTOR — 180Ω, ¼W, 5% — (R8, R50)
	RESISTOR — 1KΩ, ¼W, 5% — (R9)
	RESISTOR — 2.7MΩ, ¼W, 5% — (R10)
	RESISTOR — 620Ω, ¼W, 5% — (R25-R33)
	RESISTOR — 4.7KΩ, ¼W, 5% — (R2, R34-R41)
	RESISTOR — 5.6KΩ, ¼W, 5% — (R3, R43, R49)
	RESISTOR — 24KΩ, ¼W, 5% — (R47)
	CAPACITOR — 10 MICROFARAD, 10V — (C36)
2N4400	TRANSISTOR — MOTOROLA — (Q2, Q3)
SN74LS05N	IC — OPEN COLLECTOR INVERTER — (Z10)
SN74LS04N	IC — HEX INVERTER — (Z7)
MM74C04 or SCL 4069B	IC — CMOS — (Z36)
640379-3	SOCKET — 40 PIN — (TC1)
*(Z3, Z11, Z12, Z16, Z17, Z24, Z26, Z27, Z34, Z35)	

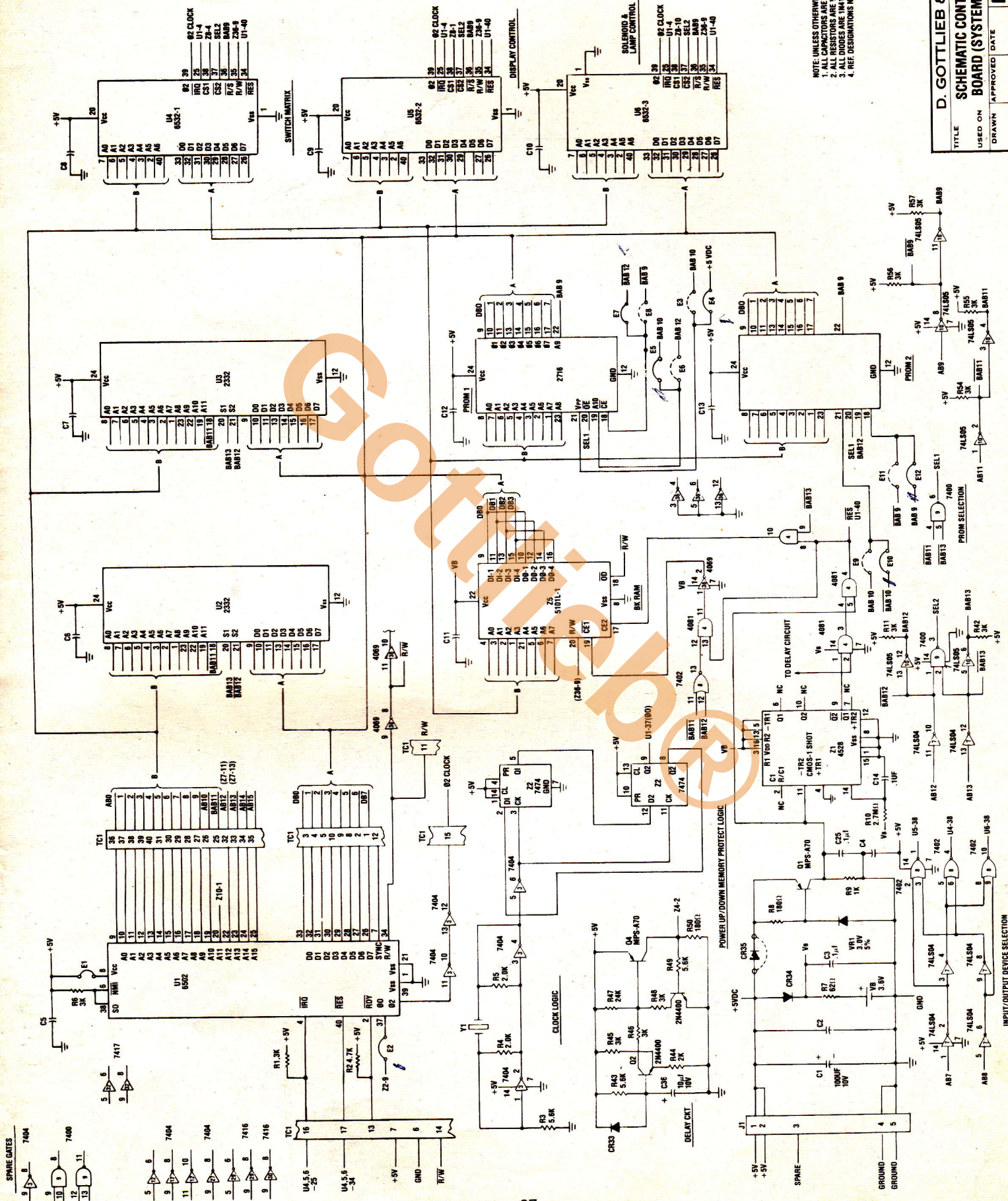
X. I. CONTROL BOARD COMPONENT LOCATION DIAGRAM

A1 CONTROL BOARD SCHEMATIC (DET. PB03-D102-001)

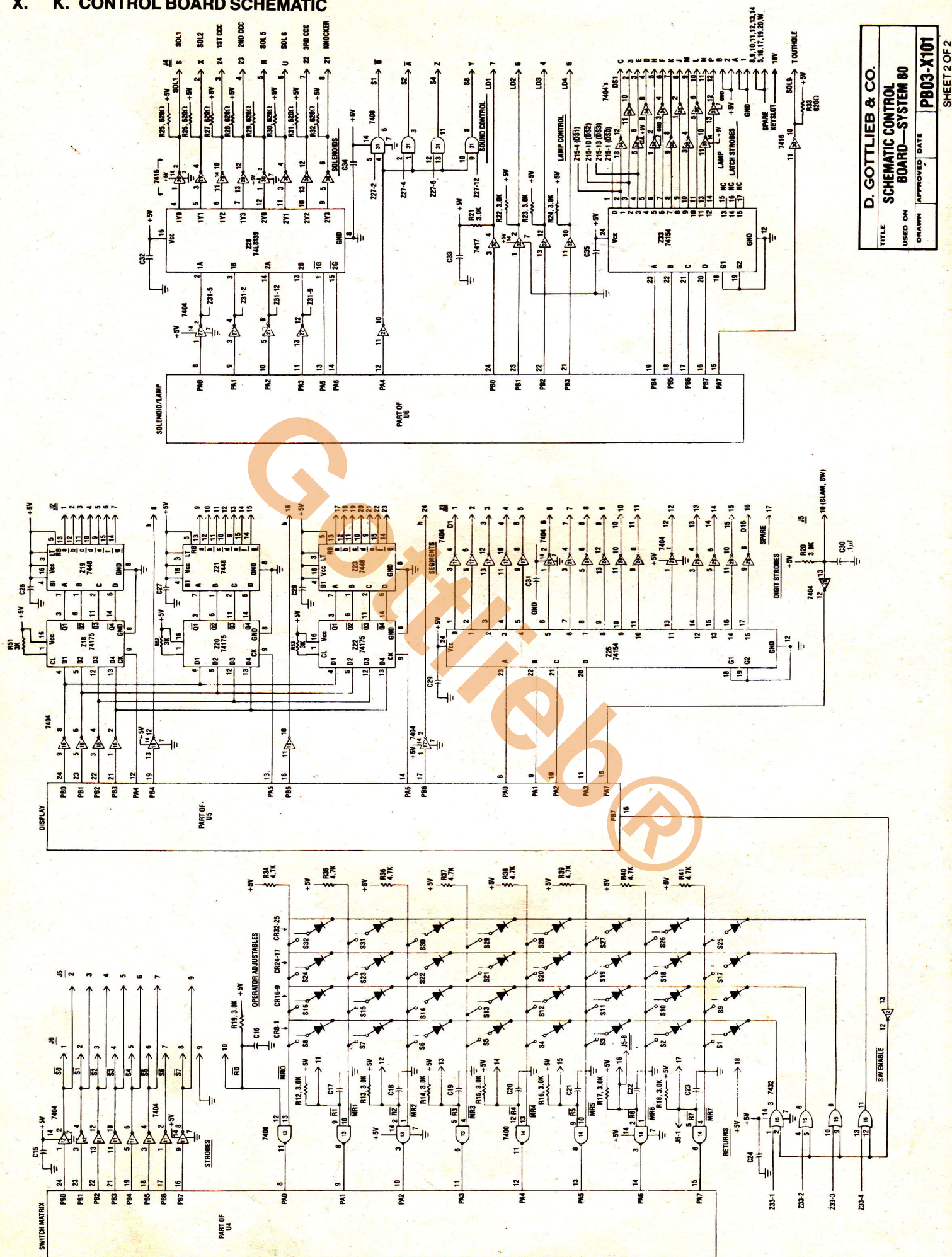


D. GOTTLIEB & CO.	
TITLE	CONTROL BOARD SYSTEM 80
USED ON	
DRAWN	APPROVED DATE
	PR03-D-100

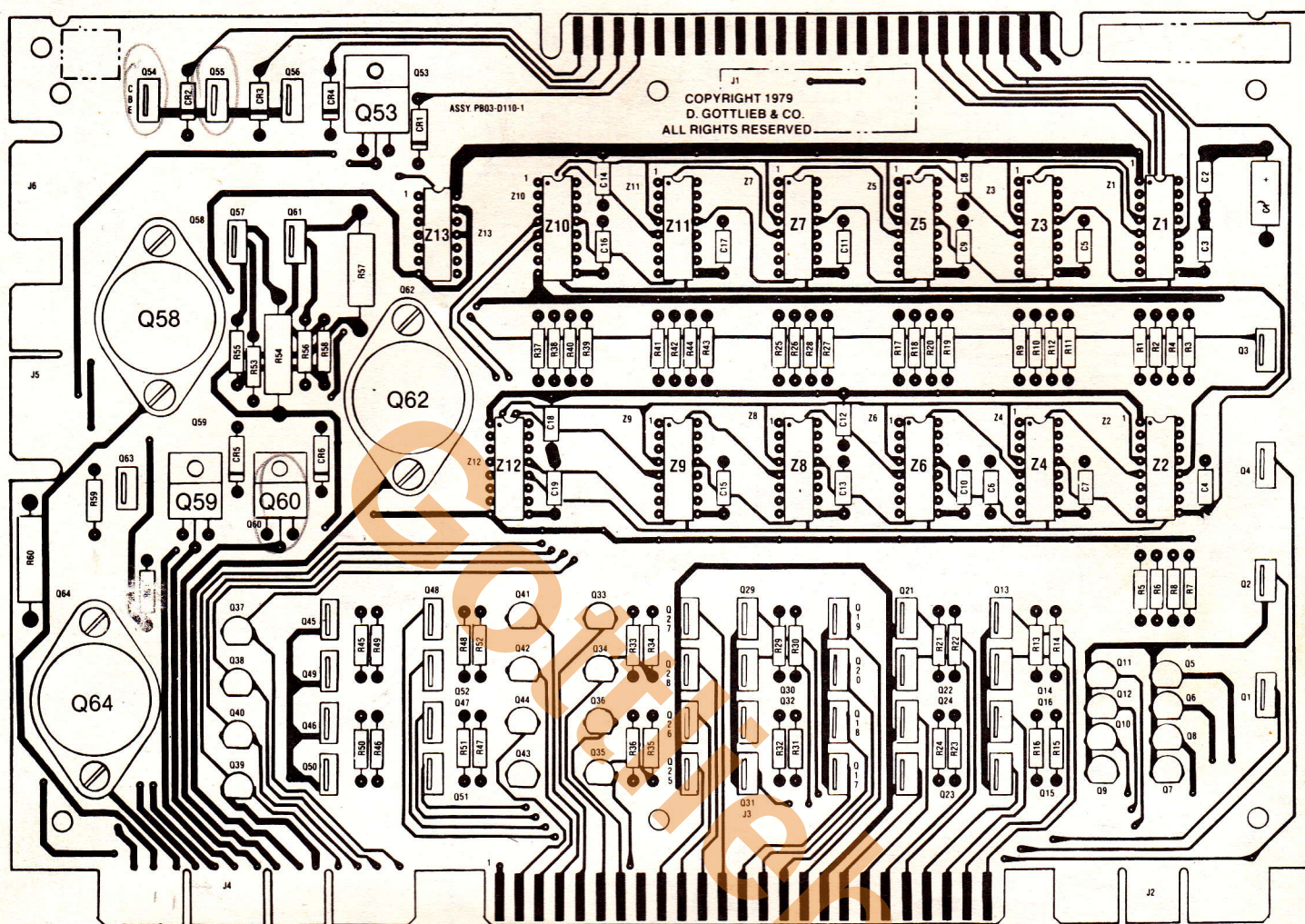
X. J. CONTROL BOARD SCHEMATIC (DET. PB03-D107-001)



X. K. CONTROL BOARD SCHEMATIC



A3 DRIVER BOARD COMPONENT LOCATION



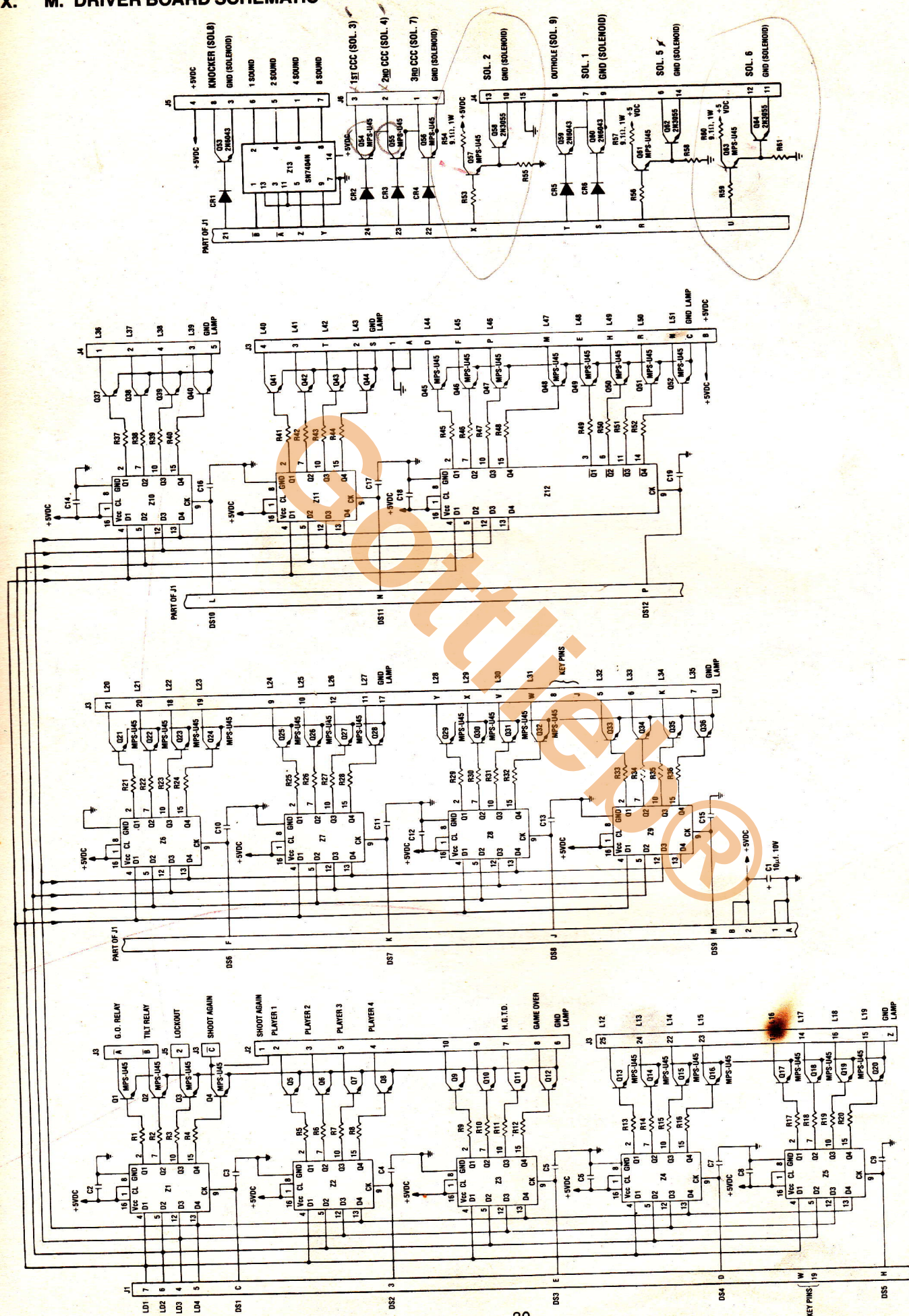
D. GOTTLIEB & CO.			
TITLE MASTER DRIVER SYSTEM 80			
USED ON			
DRAWN	APPROVED	DATE	PB03-D110

PART NUMBER

DESCRIPTION

43-03-4	INSULATOR—THERMALLOY
2N6043	TRANSISTOR—NPN—(Q53, Q59, Q60)
2N3055	TRANSISTOR—NPN—(Q58, Q62, Q64)
MPS-U45	TRANSISTOR—NPN—(Q1-Q4, Q13-Q32, Q45-Q52, Q54-Q57, Q63)
MPS-A13	TRANSISTOR—NPN—(Q5-Q12, Q33-Q44)
SN74175N	IC—QUAD "D" FLIP-FLOP—(Z1-Z12)
SN7404N	IC—HEX INVERTER—(Z13)
1N4148	DIODE—SILICON—(CR1-CR6)
	CAPACITOR—.01 MICROFARAD, 50V—(C2-C19)
	CAPACITOR—10 MICROFARAD, 10V—TANTALUM—(C1)
	RESISTOR—1000 Ω , 1/4W, 5%—(R1-R53, R61, R55, R56, R58, R59)
	RESISTOR—9.1 Ω , 1W, 5%—(R54, R57, R60)

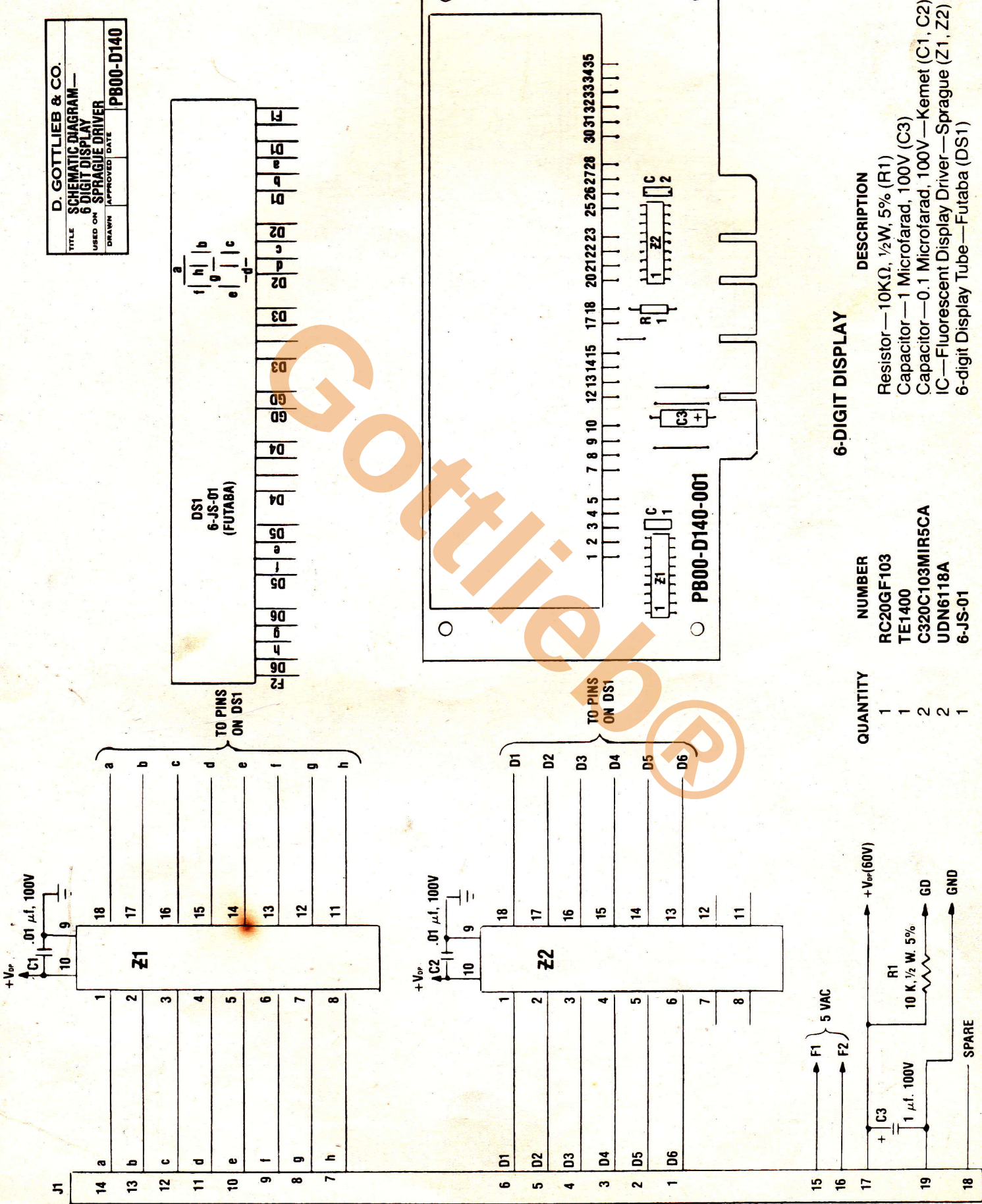
X. M. DRIVER BOARD SCHEMATIC



D. GOTTLIEB & CO.	
TITLE SCHEMATIC DIAGRAM —	
USED ON MASTER DRIVER SYSTEM 80	
DRAWN	APPROVED DATE
PB03-X111	

X. N. 6 DIGIT DISPLAY SCHEMATIC, COMPONENT LOCATION DIAGRAM

A4 6 DIGIT DISPLAY



6-DIGIT DISPLAY

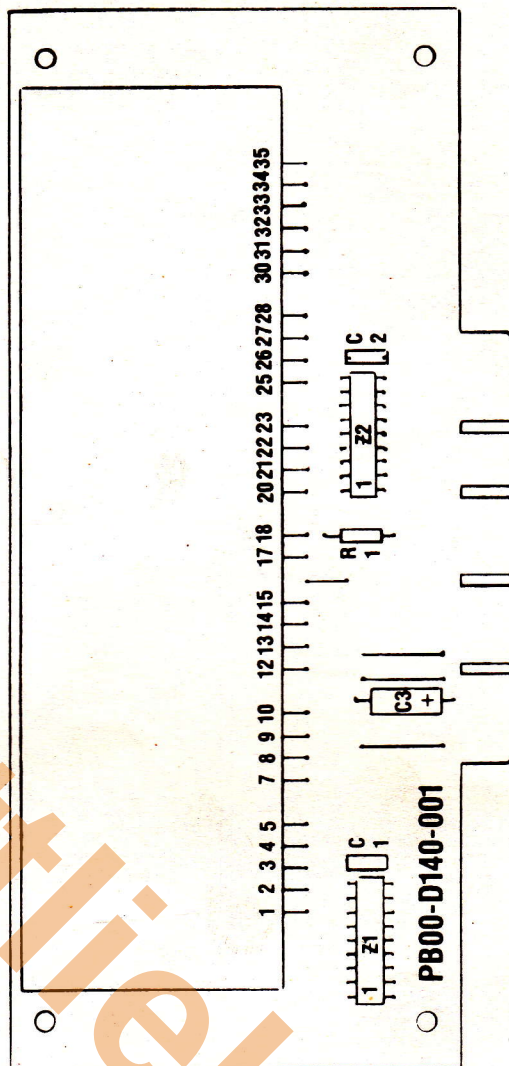
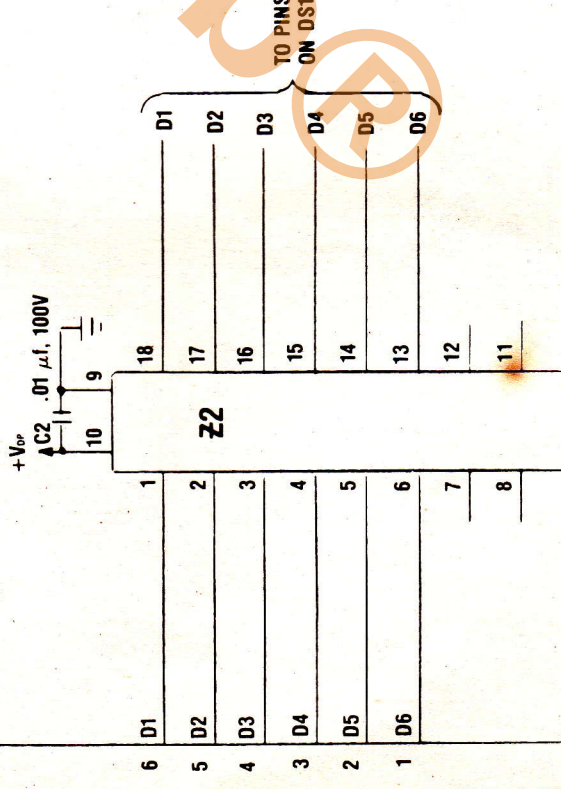
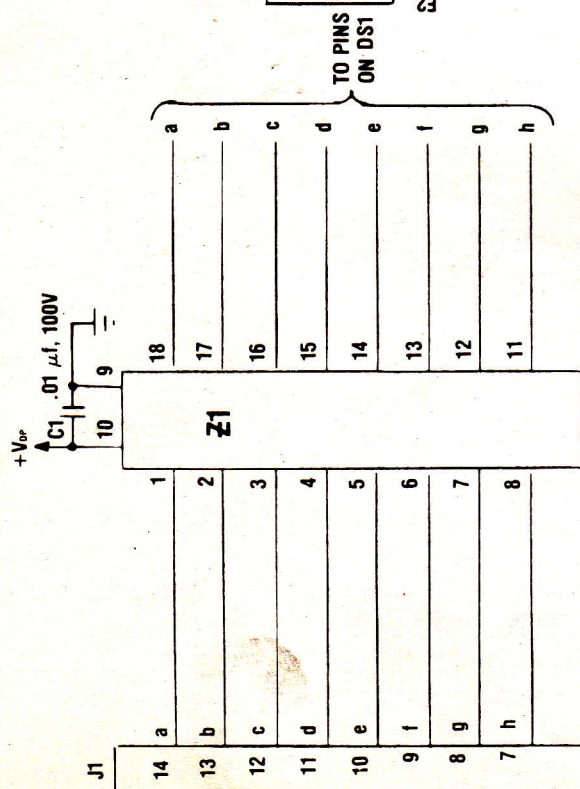
DESCRIPTION

QUANTITY	NUMBER	DESCRIPTION
1	RC20GF103	Resistor — 10KΩ, 1/2W, 5% (R1)
1	TE1400	Capacitor — 1 Microfarad, 100V (C3)
2	C320C103MIR5CA	Capacitor — 0.1 Microfarad, 100V — Kemet (C1, C2)
2	UDN6118A	IC — Fluorescent Display Driver — Sprague (Z1, Z2)
1	6-JS-01	6-digit Display Tube — Futaba (DS1)

X. O. 4 DIGIT DISPLAY SCHEMATIC, COMPONENT LOCATION DIAGRAM

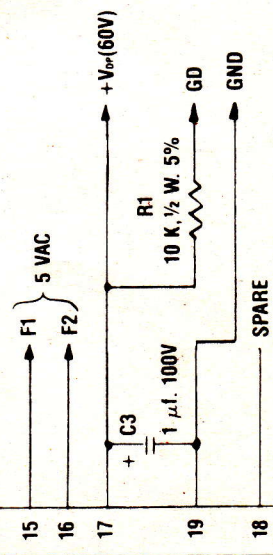
A4 6 DIGIT DISPLAY

D. GOTTLIEB & CO.
TITLE
SCHEMATIC DIAGRAM —
6 DIGIT DISPLAY
USED ON
SPRAGUE DRIVER
DRAWN
APPROVED DATE
PB00-D140



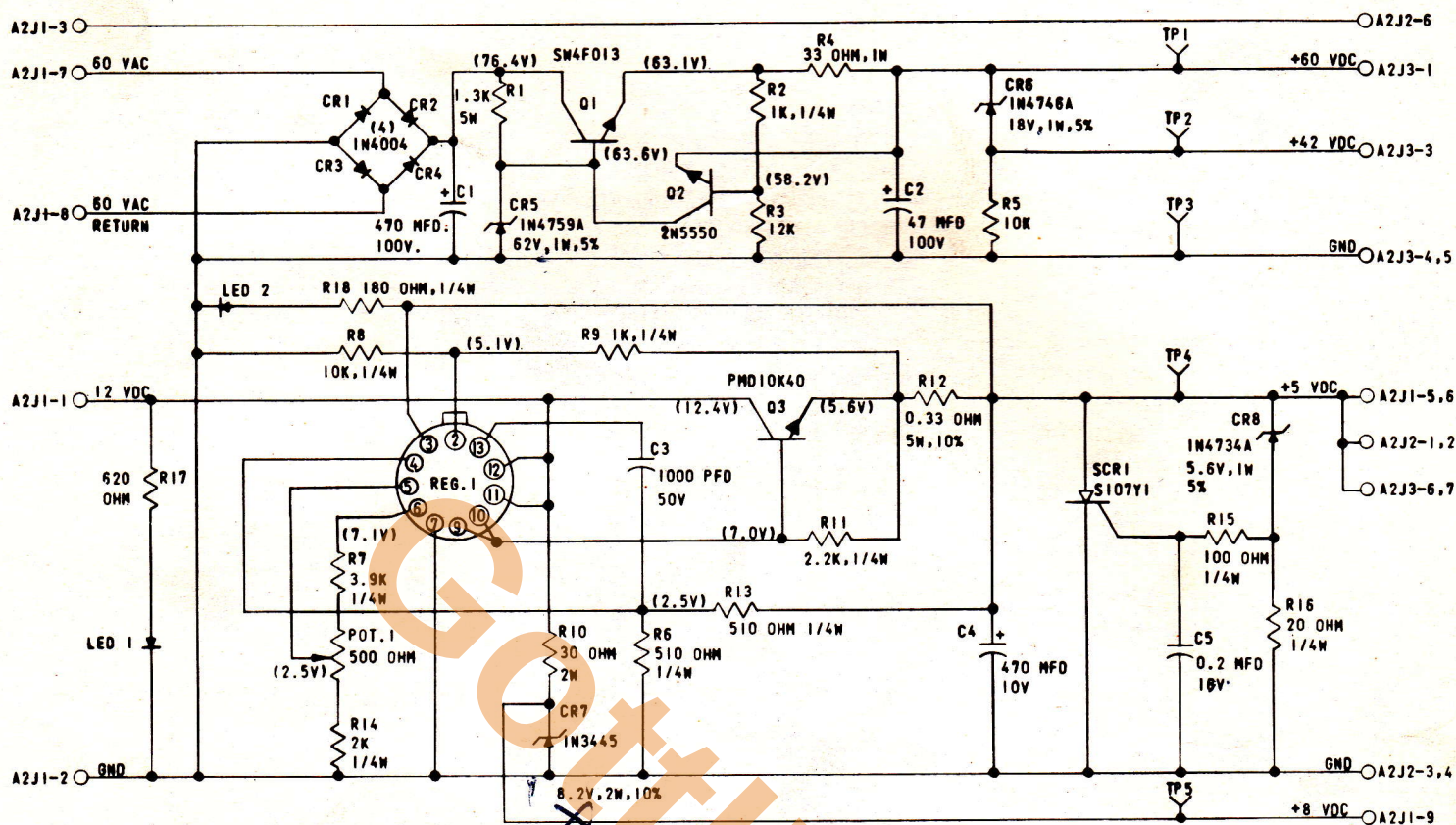
6-DIGIT DISPLAY

QUANTITY	NUMBER	DESCRIPTION
1	RC20GF103	Resistor—10KΩ, 1/2W, 5% (R1)
1	TE1400	Capacitor—1 Microfarad, 100V (C3)
2	C320C103MIR5CA	Capacitor—0.1 Microfarad, 100V—Kemet (C1, C2)
2	UDN6118A	IC—Fluorescent Display Driver—Sprague (Z1, Z2)
1	6-JS-01	6-digit Display Tube—Futaba (DS1)



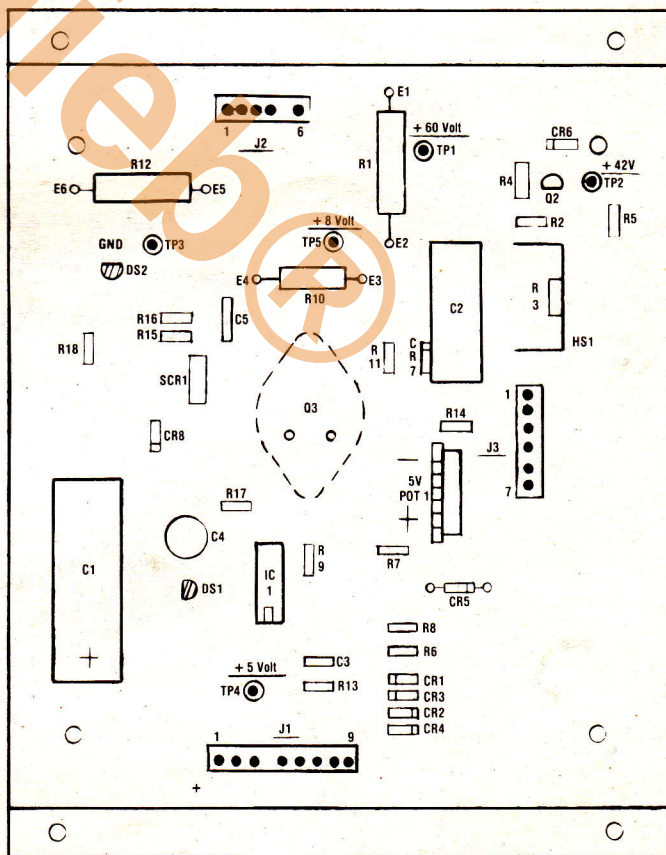
X. P. A2 POWER SUPPLY SCHEMATIC AND COMPONENT LOCATION DIAGRAM

A2 POWER SUPPLY SCHEMATIC



- NOTE: UNLESS OTHERWISE SPECIFIED,
 1. RESISTORS ARE 1/2W, 5%
 2. VOLTAGES ARE DC WITH RESPECT TO CIRCUIT GROUND
 3. ALL VOLTAGES ARE AT NOMINAL LINE VOLTAGE (115VAC)
 4. REG. 1 IS TYPE 723 14 PIN DIP
 5. LEDS ARE RL4850
 6. ASSEMBLY NUMBER PX2600

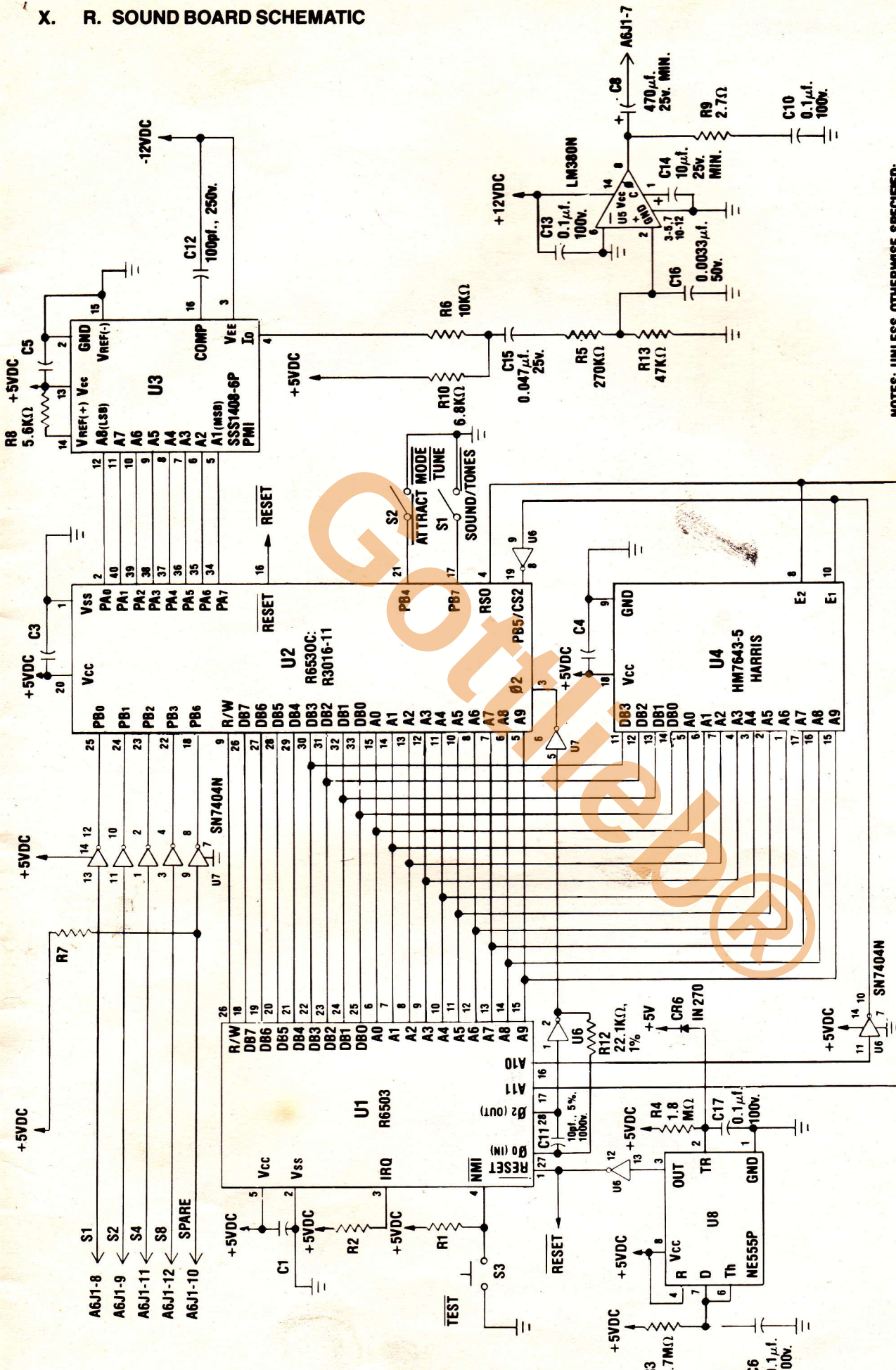
D. GOTTLIEB & CO.			
TITLE POWER SUPPLY SCHEMATIC SYSTEM 80			
USED ON			
DRAWN	APPROVED	DATE	B-19694



A2 POWER SUPPLY

PART NUMBER	DESCRIPTION
	HEATSINK MOUNTING PLATE
	SPACER — 6 — 32 THREAD X $\frac{5}{32}$
	SPACER — 6 — 32 THREAD X $\frac{1}{8}$
1N4004	DIODE — (CR1-CR4)
1N4759A	ZENER DIODE — 62V, 1W, 5% — (CR5)
1N4746A	ZENER DIODE — 18V, 1W, 5% — (CR6)
1N3445	ZENER DIODE — 8.2V, 2W, 10% — (CR7)
1N4734A	ZENER DIODE — 5.6V, 1W, 5% — (CR8)
SW4F013	TRANSISTOR — NPN — NATIONAL — (Q1)
2N5550	TRANSISTOR — NPN — (Q2)
PMD10K40	TRANSISTOR — LAMBDA — (Q3)
S107Y1	SILICON CONTROLLED RECTIFIER — (SCR1)
UA723CN	IC — 14 PIN DIP — (IC1)
CM4-22	DIODE — LIGHT EMITTING — (LED1, LED2)
115R501A	POTENTIOMETER — 500 Ω — CTS — (POT1)
	RESISTOR — 1.3 Ω , 5W, 10% — (R1)
	RESISTOR — 1K Ω , $\frac{1}{4}$ W, 5% — (R2, R9)
	RESISTOR — 12K Ω , $\frac{1}{2}$ W, 5% — (R3)
	RESISTOR — 33 Ω , 1W, 5% — (R4)
	RESISTOR — 510 Ω , $\frac{1}{4}$ W, 5% — (R6, R13)
	RESISTOR — 3.9K Ω , $\frac{1}{4}$ W, 5% — (C7)
	RESISTOR — 10K Ω , $\frac{1}{4}$ W, 5% — (R8)
	RESISTOR — 30 Ω , 2W, 5% — (R10)
	RESISTOR — 2.2K Ω , $\frac{1}{4}$ W, 5% — (R11)
	RESISTOR — 33 Ω , 5W, 10% — (WIRE WOUND) — (R12)
	RESISTOR — 10K Ω , $\frac{1}{2}$ W, 5% — (R5)
	RESISTOR — 2K Ω , $\frac{1}{4}$ W, 5% — (R14)
	RESISTOR — 100 Ω , $\frac{1}{4}$ W, 5% — (R15)
	RESISTOR — 20 Ω , $\frac{1}{4}$ W, 5% — (R16)
	RESISTOR — 620 Ω , $\frac{1}{2}$ W, 5% — (R17)
	RESISTOR — 180 Ω , $\frac{1}{4}$ W, 5% — (R18)
	CAPACITOR — 470 MICROFARAD, 100V — (C1)
	CAPACITOR — 47 MICROFARAD, 100V — (C2)
	CAPACITOR — 1000 PICO FARAD, 50V — (C3)
	CAPACITOR — 470 MICROFARAD, 10V — (C4)
	CAPACITOR — 2 MICROFARAD, 16V, $\pm 80\%$ — (C5)
	TURRET TERMINAL — (E1-E6)
	TURRET TERMINAL — (TP1-TP5, CP5)
1NS-3	INSULATOR
DM111	INSULATOR
GS2-3	EYELET
	CONNECTOR — 6 PIN — MOLEX — (J2)
	CONNECTOR — 7 PIN — MOLEX — (J3)
	CONNECTOR — 9 PIN — MOLEX — (J1)
	HEAT SINK — THERMALLOY

X. R. SOUND BOARD SCHEMATIC



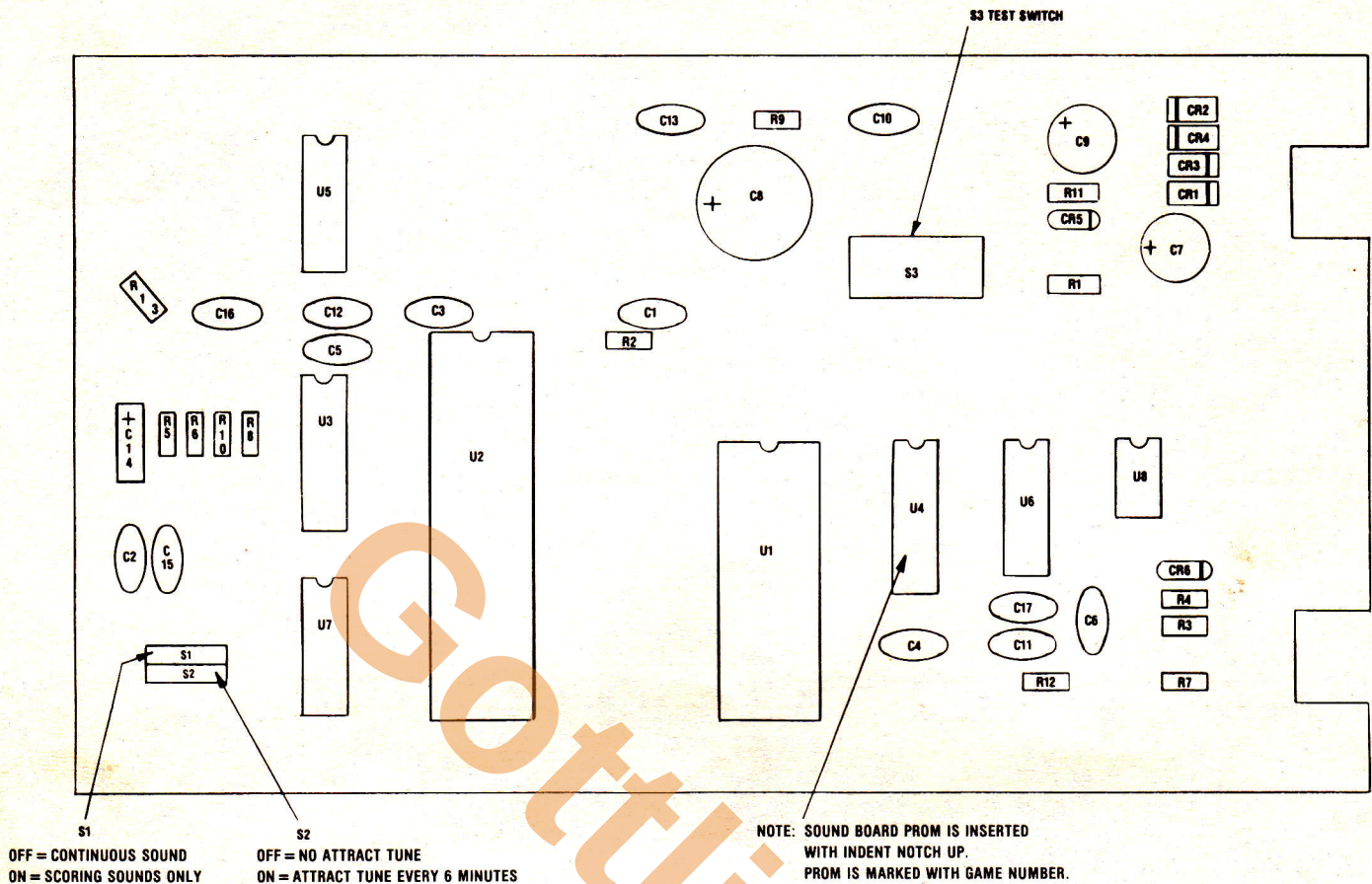
NOTES: UNLESS OTHERWISE SPECIFIED:

1. ALL RESISTORS ARE 2.7KΩ, ± 5%, 1/4W.
2. ALL CAPACITORS ARE 0.01μf., 20%, 100V.
3. ALL DIODES ARE 1N4004

D. GOTTLIEB & CO.		
TITLE	USED ON	APPROVED DATE
SOUND BOARD SCHEMATIC	DRAWN	C-19691

X. S. SOUND BOARD COMPONENT LOCATION DIAGRAM AND PARTS LIST

A6 SOUND BOARD COMPONENT LOCATION



SOUND BOARD

PART NUMBER

DESCRIPTION

	RESISTOR—2.7KΩ, ¼W, 5%—(R1, R2, R7)
	RESISTOR—2.7Ω, ¼W, 5%—(R9)
	RESISTOR—6.8KΩ, ¼W, 5%—(R10)
	RESISTOR—430Ω, ½W, 5%—(R11)
	RESISTOR—2.7MΩ, ¼W, 5%—(R3)
	RESISTOR—1.8MΩ, ¼W, 5%—(R4)
	RESISTOR—22.1KΩ, ¼W, 1%—(R12)
	RESISTOR—10KΩ, ¼W, 5%—(R6)
	RESISTOR—5.6KΩ, ¼W, 5%—(R8)
	RESISTOR—270KΩ, ¼W, 5%—(R5)
	RESISTOR—47KΩ, ¼W, 5%—(R13)
	CAPACITOR—0.01 MICROFARAD, 100V, 20%—KEMET—(C1-C5)
	CAPACITOR—47 MICROFARAD, 25V—(C7, C9)
	CAPACITOR—470 MICROFARAD, 25V—(C8)
	CAPACITOR—0.1 MICROFARAD, 100V, 20%—KEMET—(C6, C10, C13, C17)
	CAPACITOR—10 PICO FARAD, 1000V, 5%—(C11)
	CAPACITOR—100 PICO FARAD, 250V, 20%—(C12)
	CAPACITOR—0.047 MICROFARAD, 25V, 20%—(C15)
	CAPACITOR—0.0033 MICROFARAD, 50V, 20%—(C16)
	CAPACITOR—10 MICROFARAD, 25V—(C14)
R6503	IC—CPU—(U1)
R6530C:R3016-11	IC—ROM/RAM/I/O—(U2)
SSS1408-6P	IC—DAC—(U3)
HM7643-5	IC—PROM—(U4)
NE555P	IC—TIMER—(U8)
SN7404N	IC—INVERTER—(U6, U7)
LM380N	IC—AMPLIFIER—(U5)
1N4004	DIODE—(CR1-CR4)
1N4742A	ZENER DIODE—12V, 1W, 5%—(CR5)
1N270	DIODE—(CR6)
76SB02	2 POSITION DIP SWITCH—(S1, S2)
EVO-PAR-11K	PUSH BUTTON SWITCH—(S3)
640359-1	SOCKET, 18 PIN (PROM SOCKET)

D. GOTTLIEB & CO.

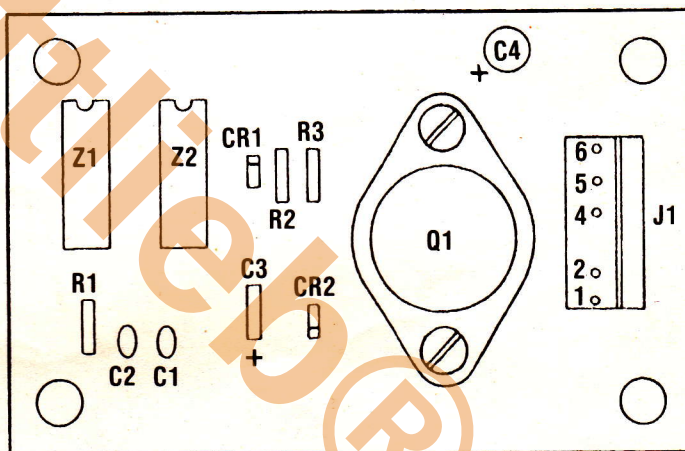
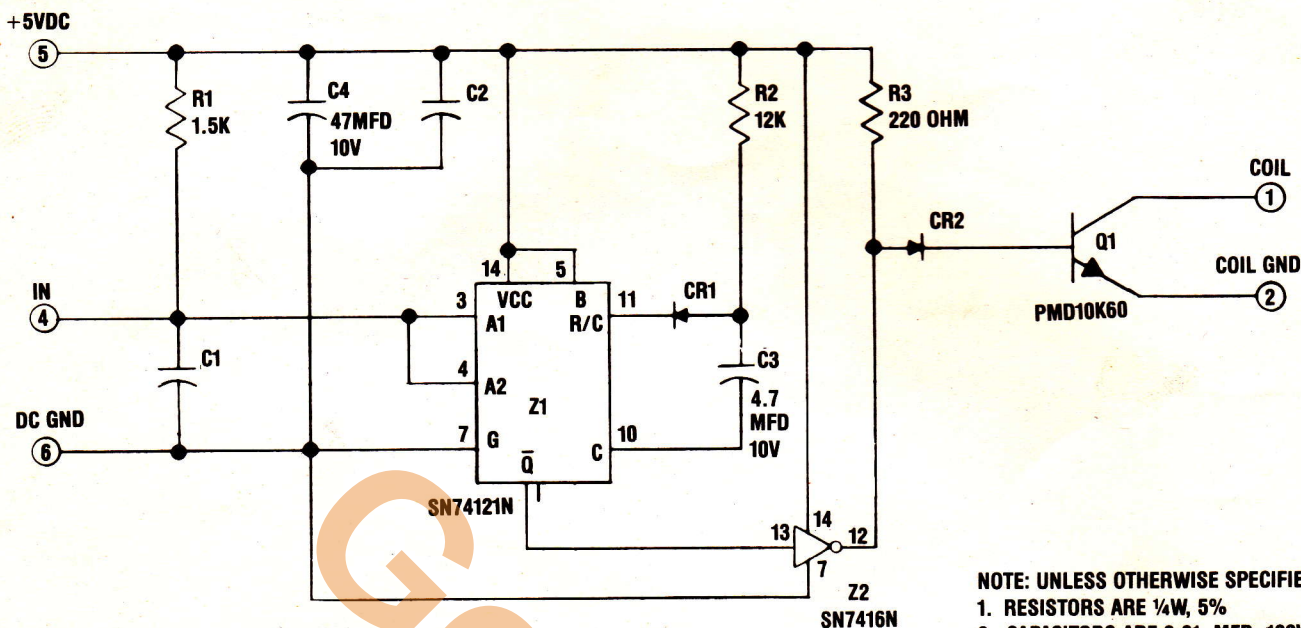
TITLE
SOUND BOARD COMPONENT
LOCATION—SYSTEM 80

USED ON
DRAWN
APPROVED
DATE

C-19829

X. T. POP BUMPER DRIVER BOARD SCHEMATIC, COMPONENT LOCATION DIAGRAM

A8 POP BUMPER DRIVER BOARD SCHEMATIC



POP BUMPER DRIVER BOARD

PART NUMBER

DESCRIPTION

1N4148

SN74121N

SN7416N

PMD10K60

09-65-1061

CAPACITOR—47 MICROFARAD, 10V—(C4)

CAPACITOR—0.01 MICROFARAD, 100V, 20%—(C1, C2)

CAPACITOR—4.7 MICROFARAD, 10V, 10%—(C3)

RESISTOR—1.5K Ω , 1/4W, 5%—(R1)

RESISTOR—12K Ω , 1/4W, 5%—(R2)

RESISTOR—220 Ω , 1/4W, 5%—(R3)

DIODE—(CR1, CR2)

IC—(Z1)

IC—(Z2)

TRANSISTOR—LAMBDA—(Q1)

CONNECTOR—(J1)

D. GOTTLIEB & CO.			
TITLE	POP BUMPER DRIVER BOARD		
USED ON	SYSTEM 80		
DRAWN	APPROVED	DATE	A-19602

Gottlieb®