

ROCKY

INSTRUCTION MANUAL



 **Gottlieb**
AMUSEMENT GAMES

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A Columbia Pictures Industries Company 

FINAL EDITION

APPLICABLE TO ALL GAMES
NOT HAVING THE LETTER "S"
IN THEIR SERIAL NUMBER

ROCKY (GAME #672)
INSTRUCTION MANUAL

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ROCKY PROMS

GAME PROM 672

SOUND PROMS 672/S1, 672/S2

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SYSTEM 80A

Gottlieb's enhanced System 80 Program, System 80A, will permanently replace System 80 in future games.

System 80A has improved bookkeeping and self test capabilities, permits the use of seven digit displays and allows for greater coin/credit combination flexibility. The control boards' ROM memory chips, U2 and U3, have been reprogrammed for System 80A. They have also been socketed. In doing so, the control board can be used for either system by simply using the appropriate set of ROM memory chips.

The part numbers of each set are as follows:

SYSTEM	U2 PART NO.	U3 PART NO.	SOCKET PART NO.
80	XO-362	XO-363	XO-529
80A	XO-326	XO-327	XO-529

The ROMS are labeled as follows:

SYSTEM	U2	U3
80	R3273-12	R3272-12
80A	XO-326	XO-327

I. INSTALLATION

A. SET-UP

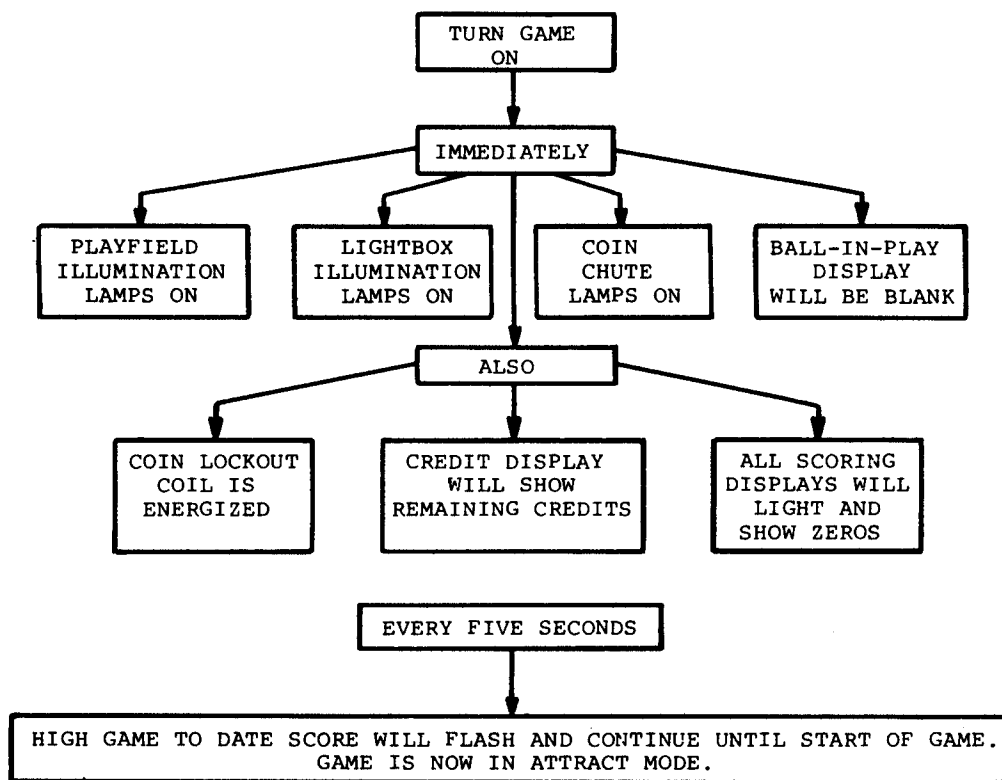
1. Bolt the legs to the cabinet.
2. Open the cabinet door and loosen the front moulding locking arm.
3. Remove the moulding from the playfield.
4. Slide the cabinet glass forward and remove it.
5. Raise the playboard, slide it forward and rest it on its supports.
6. From the inside of the cabinet, remove the binding strap from the power cord. Feed the cord to the outside of the cabinet through the black plastic line cord housing.
7. Place the lightbox atop the pedestal and engage the holding bracket.
8. Unlock the lightbox and remove the backglass.
9. Loosen and lower the shipping bracket at the top center of the lightbox insert panel.
10. Lift the insert; then swing it out.
11. Secure the lightbox to the cabinet with the bolts and washers provided.
12. Connect all cables in the lightbox.

B. CHECK-OUT

1. Check that all cables are clear of moving parts.
2. Check for any loose wires.
3. Check switches for loose solder or other foreign matter.
4. Be certain all fuses are firmly seated.
5. Check transformers for any foreign matter across terminals.
6. Be sure transformer wiring corresponds to the supply voltage.
7. Check the setting of the normally open tilt switch on the underside of the playfield. One blade should be free-floating with a weight on the end.
8. Reassemble and level the game.
9. The plumb-bob tilt can be adjusted by loosening the wing nut and raising the plumb-bob to increase its sensitivity, or lowering it to decrease its sensitivity.

The ball-roll tilt can be adjusted by loosening the front screw or raising the tilt bracket to increase sensitivity, or lowering it to decrease its sensitivity.
10. With the line cord unplugged, drop a coin into one of the chutes. It should be rejected.
11. Plug the game into a properly grounded 3-wire receptacle ONLY!
12. Refer to Section VI to make all necessary game adjustments.

II. INITIALIZATION



III. GAME OPERATION

A. GAME START

The ball must be in the ball return trough to start a game.

1. Insert coins into coin chute.
 - a. Coin chute tune is played.
 - b. Total credits are displayed in status display.
2. Press Credit Button to start game.
 - a. Credit tune is played.
 - b. Total credits displayed decrease by one.
3. All playfield features reset.
4. The first player score display flashes 2 zeros.
5. When the ball is released to the shooter, the playfield-controlled lamps flash.

B. FIRST PLAYER

1. First player's score display flashes two zeros.
2. The other player's displays are now blank.
3. A "1" appears on the ball-in-play display.
4. When the ball enters the outhole, any bonus earned is scored.

C. ADDITIONAL PLAYERS

1. Additional players are indicated by 2 zeros (not flashing) in each corresponding player's display.
2. After the maximum number of players are added, or no more

III. GAME OPERATION

credits remain, the Credit Button has no effect.

3. Additional players can be added anytime the first player's ball is still in play. If the Credit Button is pressed after the first player's first ball has entered the outhole, all players' scores will be erased with the first player's score display showing a flashing zero, indicating a new game only for the first player.

D. EXTRA BALLS

1. When the SHOOT AGAIN lamp is lit, neither the player-up nor the ball-in-play display changes when the ball enters the outhole.
2. Only one extra ball per ball-in-play is given.

E. TILT MODE

1. Tilting the game results in a loss of ball in play.
2. When the game is tilted, all the playfield lamps go off.
3. All accumulated bonus and bonus multipliers are lost.

F. SLAM MODE

1. If the normally closed slam switch (located inside front door) is opened, the

entire game is ended for all players.

2. The GAME OVER lamp comes on.
3. The entire switch matrix is inactive for three seconds.
4. All coins will be rejected if dropped into any coin chute during the three-second delay.
5. If the match feature exists (dependent on Switch #26), a replay can be won even if the game is slammed.
6. Game returns to the attract mode.

G. GAME OVER

1. When the last ball enters the outhole, the GAME OVER lamp continually flashes.
2. A random number appears in the ball-in-play display. If this number matches the last two digits in any player's score, a replay (dependent on Switch #27) is awarded.
3. HGTD is periodically flashed in all players' displays. When a score higher than this is achieved, an award (dependent on Switches #23 and #24) is given.
4. All of the target banks will reset.

IV. GAME PLAY AND SCORING

INSTANT WIN

- Left cabinet switch awards an "instant win" when feature is active.
- Feature can be used a maximum of two times per game.
- Winning a round by use of "instant win" or, by going out a lit outlane rollover will re-establish a previously lost round drop target.
- Remembered ball to ball.

SPECIAL

- Left lane arrow will advance after one round won, then two rounds, then for one round, etc... (3-BALL) every two rounds won after the first win (5-BALL)
- Advancement will light top hole.
- Top hole awards SPECIAL.

EXTRA BALL

- Completing ten rounds lights EXTRA BALL.
- Target Banks reset, bonus is collected, and the fight starts over.
- EXTRA BALL target on 5 bank awards EXTRA BALL when lit.

MEMORY

- "Instant wins" and "Instant wins remaining", the round currently being fought, targets corresponding to rounds lost, rounds won and multiplier are remembered ball to ball.

TOP HOLE

- Award SPECIAL when lit, and resets arrows to lowest value.
- Advance lighting of pop bumpers.
- Score 1,000 points if ball has not come from left lane, otherwise score value of lit left lane arrow.
- Extend round by 50% of time gone in round if ball has come from the left lane.

POP BUMPERS

- Score 1,000 points when lit.
- Score 10,000 points when flashing.
- Score 100 points when unlit.
- After 3 pop bumpers are lit, advancing the pop bumper lights due to the top hole will cause one to flash and the others to remain lit.

TOP ROLLOVERS

- Score 5,000 points when lit.
- Score 1,000 points unlit.
- Completing sequence lights left spot target, resets sequence, and advances or activates "instant winning round" if the maximum has not been used.
- Lights left or right return rollover.

LEFT AND RIGHT RETURN ROLLOVERS

- Score 20,000 points when lit.
- Score 1,000 points unlit.
- Lit lanes indicate number of "instant wins" available for use.

IV. GAME PLAY AND SCORING

LOWER OUTLANE ROLLOVERS

- Score 15,000 points.
- Win a round when lit.

DROP TARGETS

- Score 10,000 points if target number is equivalent to round number being fought.
- Score 1,000 points if target number is not equivalent to round number.
- Completing sequence resets bank, and adds bonus.
- Extra ball target on five bank awards extra ball when lit, and scores 10,000 points.

ROLLUNDER

- Score 500 points.

SPOT TARGET

- Score 1,000 points unlit..
- Score 50,000 points when lit, turns off target light, and adds bonus.

SPINNER

- Score 1,000 points.

ON THE ROPES SHOOTER

- Collect bonus.

10 POINT SWITCHES

- Score 10 points.

OTHER FEATURES

- The status display in the cardholder will show the number of rounds won on the left side and the current round being fought on the right side.
- A target associated with a lost round is never left standing upon any bank reset.
- The out rollovers, rollunder, spinner, and 10 point switches do not add to the round timer.
- The player has a certain amount of switch closures in which to knock down the drop target associated with the current round being fought. If he does this within the allocated number of switch closures, then he wins the round and the round advances. If he does not, then the drop target drops and the round advances. If a target is hit that is not equal to the current round being fought, then this target will remain down until that round is reached, the bank is completed, or until the bank is reset because a target having been knocked down earlier is reset when the appropriate round number is reached.
- Bonus maximum is 19,000. Bonus multiplier is 1X if rounds won is 0 or 1, 2X if 2,3, or 4. 5X if 5,6, or 7 and 10X if greater than 8.
- Right flipper circulates the lit pop bumper lights, the lit top rollover lights and alternates the lower outlane rollover lights.

V. SOUND/SPEECH

SPEECH

ROUND ONE

ROUND TWO

ROUND THREE

ROUND FOUR

ROUND FIVE

ROUND SIX

ROUND SEVEN

ROUND EIGHT

ROUND NINE

ROUND TEN

TOO BAD YOU LOSE,
HA, HA, HA, HA.

A. CONTROL BOARD SWITCH ADJUSTMENTS

NOTE: The following switch adjustments pertaining to system 80A only. 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.

COIN CHUTE COMBINATIONS SYSTEM 80A

SWITCHES					COIN CHUTE ADJUSTMENTS	CREDITS/COINS
S1	S2	S3	S4	S5	Left Coin Chute	1/1
S9	S10	S11	S12	S13	Right Coin Chute	2/1
S17	S18	S19	S20	S21	Center Coin Chute	3/1
OFF	OFF	OFF	OFF	OFF		4/1
OFF	OFF	OFF	OFF	ON		5/1
OFF	OFF	OFF	ON	OFF		6/1
OFF	OFF	OFF	ON	ON		7/1
OFF	OFF	ON	OFF	OFF		8/1
OFF	OFF	ON	OFF	ON		9/1
OFF	ON	OFF	OFF	OFF		10/1
OFF	ON	OFF	OFF	ON		1/2
OFF	ON	OFF	ON	ON		2/2
OFF	ON	ON	OFF	OFF		3/2
OFF	ON	ON	OFF	ON		4/2
OFF	ON	ON	ON	OFF		5/2
OFF	ON	ON	ON	ON		6/2
ON	OFF	OFF	OFF	OFF		7/2
ON	OFF	OFF	OFF	ON		8/2
ON	OFF	OFF	ON	OFF		9/2
ON	OFF	OFF	ON	ON		10/2
ON	OFF	ON	OFF	OFF		1/3
ON	OFF	ON	OFF	ON		2/3
ON	OFF	ON	ON	OFF		1/4
ON	OFF	ON	ON	ON		3/4
ON	ON	OFF	OFF	OFF		1/5

* All of the above do not give credits until the last coin is inserted.

SWITCHES 6, 7 AND 8 _____ SPARES

SWITCH 14 _____ COIN CHUTE 1 & 2 CONTROL
 ON Same
 OFF Separate

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

SWITCH 22 _____ PLAYFIELD SPECIAL
 ON Extra Ball
 OFF Special

SWITCHES 23 24 _____ HIGH GAME TO DATE AWARDS
 OFF OFF None
 OFF ON None
 ON OFF 2 Replay
 ON ON 3 Replay

SWITCH 25 _____ BALLS/GAME
 ON 3
 OFF 5

SWITCH 26 _____ MATCH
 ON On
 OFF Off

SWITCH 27 _____ REPLAY LIMIT
 ON 1
 OFF No Limit

SWITCH 28 _____ NOVELTY
 ON Yes
 OFF Normal

SWITCH 29 _____ GAME MODE
 ON Extra Ball
 OFF Replay

SWITCH 30 _____ 3RD COIN CHUTE CREDIT CONTROL
 ON Add 9
 OFF No Effect

SWITCHES 31 32 _____ NOT USED
 ON
 OFF

ADDITIONAL COIN CHUTE COMBINATIONS CREDIT INCENTIVES

ALL OF THE BELOW CANNOT HAVE 9 CREDITS ADDED BASED ON SWITCH 30

SWITCHES					COIN/CREDIT GIVEN	COIN/CREDIT GIVEN	COIN/CREDIT GIVEN	COIN/CREDIT GIVEN	COIN/CREDIT GIVEN	TOTAL COIN/TOTAL CREDIT
S1	S2	S3	S4	S5 -	Left Coin Chute	1st/1	2nd/2			= 2/3
S9	S10	S11	S12	S12 -	Right Coin Chute	1st/0	2nd/1	3rd/1	4th/1	= 4/3
S17	S18	S19	S20	S21 -	Center Coin Chute	1st/0	2nd/1	3rd/0	4th/2	= 4/3
ON	ON	ON	OFF	OFF		1st/1	2nd/1	3rd/1	4th/2	= 4/5
ON	ON	ON	OFF	ON		1st/1	2nd/2	3rd/1	4th/3	= 4/7
ON	ON	ON	ON	OFF		1st/1	2nd/2	3rd/2	4th/2	= 4/7
ON	ON	ON	ON	ON		1st/0	2nd/0	3rd/1	4th/0	= 5/2
ON	ON	ON	ON	ON		1st/0	2nd/0	3rd/1	4th/0	= 5/2

VI. GAME ADJUSTMENTS

B. SOUND ADJUSTMENTS

The speaker output is controlled by the potentiometer mounted on the fuse/knocker panel.

Turning the potentiometer counter clockwise will decrease the volume. Turning it clockwise will increase the volume.

The potentiometer is accessible through the front door.

IMPORTANT: Each of the potentiometers installed on the sound/speech board have been factory adjusted. The potentiometer settings should never be changed except when performing the recommended calibration procedure.

SWITCH BANK (SB1) SETTINGS:

SB1-1	NOT USED.
SB1-2	NOT USED.
SB1-3	SB1-4 Attract Mode
OFF	OFF Disabled
ON	OFF Every 10 Seconds.
OFF	ON Every 2 Minutes.
ON	ON Every 4 Minutes.
SB1-5	ON Background Sound enabled.
	OFF Background Sound disabled.
SB1-6	ON Speech enabled.
	OFF Speech disabled.
SB1-7	ON Crowd Cheer (Full Volume)
	OFF Crowd Cheer (Half Volume)
SB1-8	NOT USED.

VII. BOOKKEEPING AND SELF TEST

The circuitry in this game helps the operator perform many bookkeeping and Self/Test functions. These functions are accessed by the Self/Test Switch inside the front door and information is displayed on the players' and credit displays. Bookkeeping is listed in Steps 16 through 20. Section VII, A details the Bookkeeping system, while Section VII, B details the Self/Test operation. The Flow Chart in Section VII, D gives the general order and function of both Bookkeeping and Self/Test steps.

A. BOOKKEEPING

- . See Flow Chart for Bookkeeping Assignments.
- . Bookkeeping Steps (01-15) are displayed in the credit display and the 3rd and 4th player's score display.
- . Information for the particular bookkeeping step displayed will appear in the 1st player's score display.
- . All bookkeeping information is checked against itself to insure that it is correct. If any data is invalid or bad, that information will flash while it is displayed.

I. STEPPING THROUGH BOOKKEEPING

1. Press the SELF-TEST button inside the front door.
Double zeros (00) should appear in the designated bookkeeping step displays.
2. Press the SELF-TEST button again. Step 01 and its information will be displayed.
3. Pressing the SELF-TEST button will increment the bookkeeping step number and the appropriate information will be displayed.

NOTE: If the SELF-TEST button is not pressed within 60 seconds of

each step, the game will return to the attract mode.

Pressing the SELF-TEST button after Step 15 will start the SELF-TEST function (Step 16-20). At this point Bookkeeping cannot be reentered by pressing the SELF-TEST button. To reenter, turn the game OFF/ON, open the slam switch, close a tilt switch, or wait 60 seconds. The game will return to the attract mode. Then press the SELF-TEST button.

4. To exit from Bookkeeping at any time:

- a. Wait 60 seconds or
- b. Turn power OFF/ON or
- c. Open slam switch or
- d. Close a tilt switch.

II. HOW TO SET BOOKKEEPING INFORMATION TO ZERO

1. For a Particular Bookkeeping Step

- a. Advance Bookkeeping so the step to be zeroed is displayed.
- b. Press the replay button. Notice all zeros will appear in the 1st player's display.
- c. Press the SELF-TEST button. This will enter zeros into memory. Note: If the SELF-TEST button is not pressed, the bookkeeping memory will retain its information.

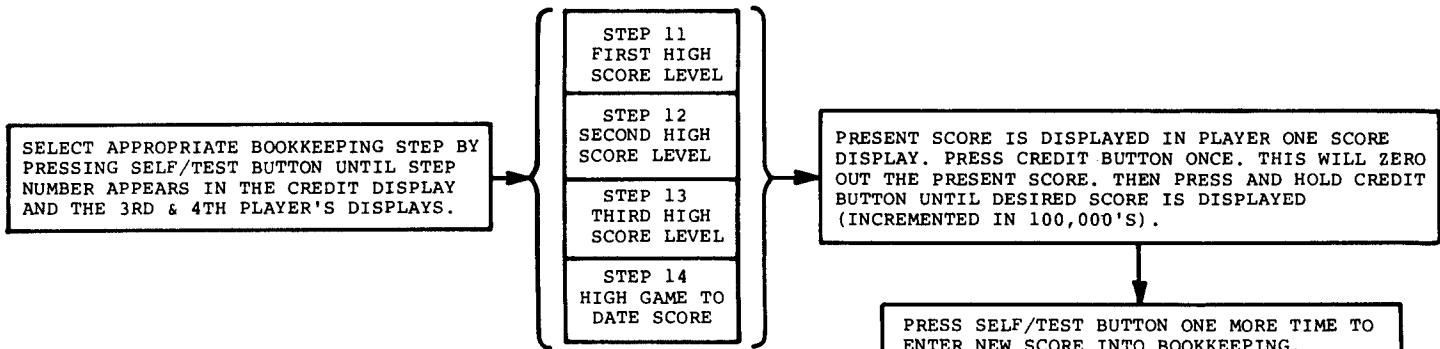
2. Zeroing All Bookkeeping Steps Except #11, 12, 13 and 14.

(These are the replay level and high game to date scores)

- a. Go to Step #15.
- b. Press the credit button. Step 15 data will zero.
- c. Press the SELF-TEST button.
- d. Zeroing is complete.

VII. BOOKKEEPING AND SELF TEST

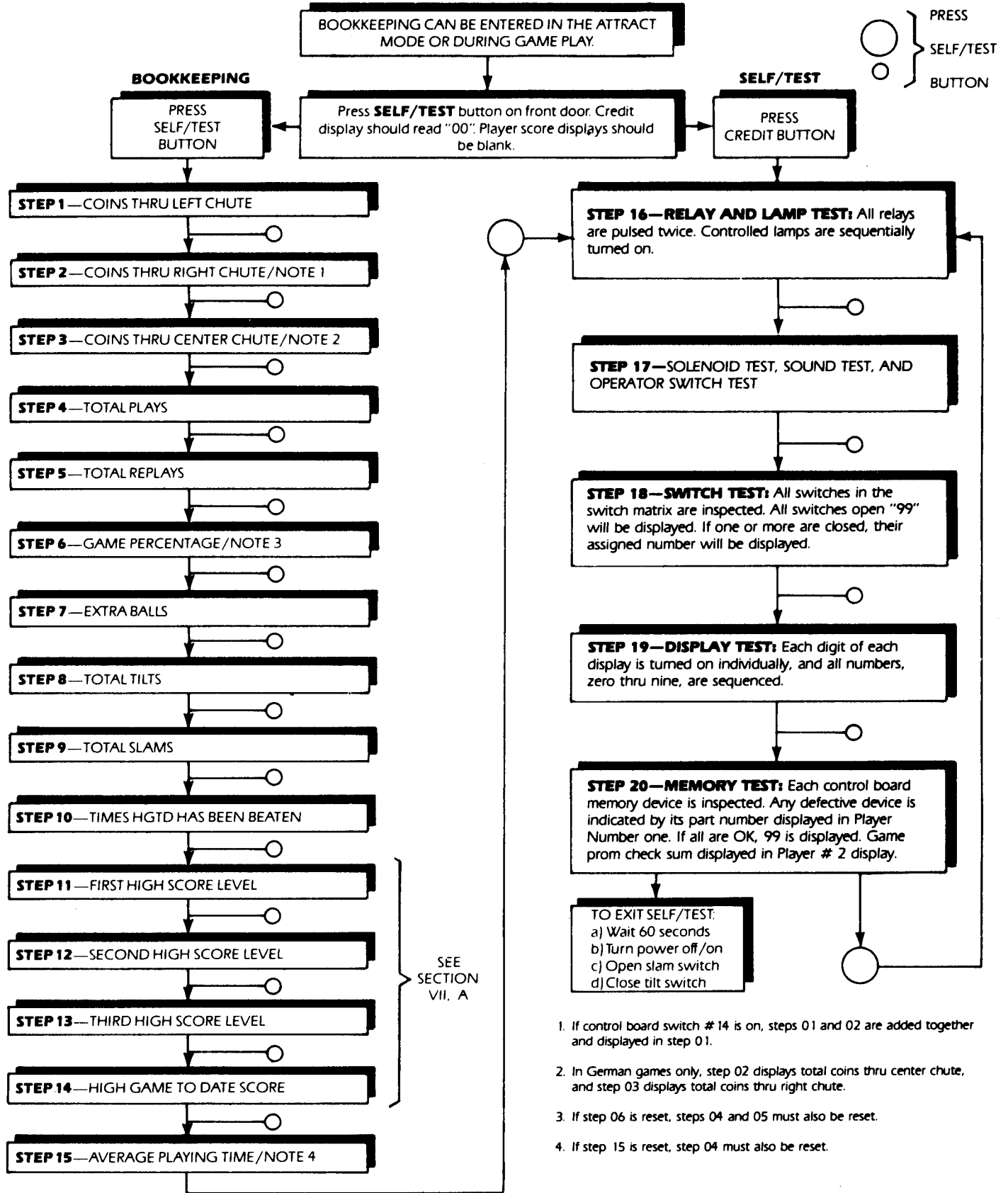
III. HOW TO RESET REPLAY SCORE LEVELS OR HIGH GAME TO DATE SCORE



NOTES:

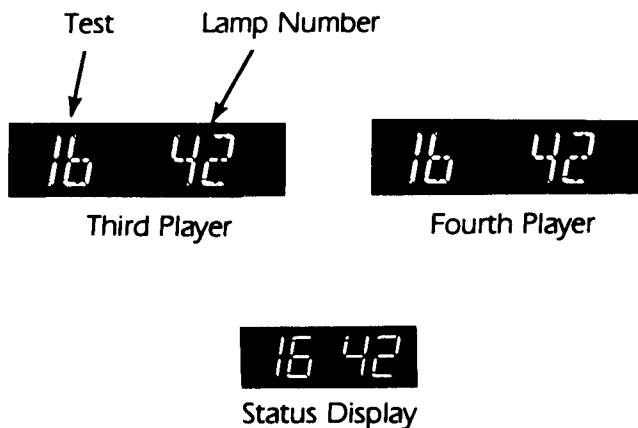
1. Step 11 must be a lower score than Step 12. Step 12 must have a lower score than Step 13. Otherwise, 1st replay will not be recognized.
2. If Step 12 or Step 13 is not desired, set those scores to zero.
3. If Step 11 is set to zero, no replays will be awarded, no matter what the settings are for Step 12 and Step 13.

B. FLOWCHART

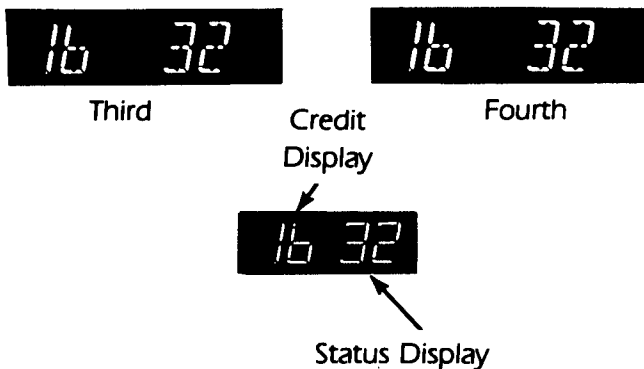


C. SELF/TEST

- Steps 16 through 20 are SELF/TEST or game tests the operator can use for quick troubleshooting.
- All the tests are explained in the flow chart.
- Each test can be repeated by pressing the replay button on the front door. This starts the test for another 60 seconds.
- If the SELF/TEST button or the replay button is not pressed within 60 seconds, the game will return to the attract mode. Test information is displayed in the third and fourth player score displays and the status display.



EXAMPLE:



Lamp number (L9, L16, etc.) can be referenced to the Driver Board Schematic where the specific transistor for each lamp can be identified.

To repeat test, push the credit button. To advance to test # 17, push the Self/Test Button.

STEP 17—SOLENOID TEST, SOUND TEST, OPERATOR SWITCH TEST.

- Solenoid Test-Each solenoid on the playfield is sequentially pulsed. The solenoid number displayed identifies which solenoid is being tested. The following chart lists solenoid assignments.

STEP 16—RELAY AND LAMP TEST

- Relay Test-All relays are pulsed twice in the following order:

		A3 Driver Board Transistor Assignment (See Schematic)
Q (Game Over) Relay	-	A3J3 PIN #A Q1
T (Tilt) Relay	-	A3J3 PIN #B Q2
Coin Lockout Relay	-	A3J5 PIN #2 Q3

A3 DRIVER BOARD TRANSISTOR ASSIGN. SEE SCHEMATIC

NUMBER DISPLAYED	ASSIGNMENT	ASSIGNMENT
Sol. 1	Top Hole	Q60
Sol. 2	5 Bank	Q57/Q58
Sol. 3	Shooter	Q54
Sol. 4	Gong	Q55
Sol. 5	Right 3 Bank	Q61/Q62
Sol. 6	Left 3 Bank	Q63/Q64
Sol. 7	Not Used	---
Sol. 8	Knocker	Q53
Sol. 9	Outhole	Q59

- Lamp Test-Lamps are sequentially strobed. Lamp assignment numbers appear in the third and fourth player's score display and the status display:

- Sound Test-Immediately after the solenoid test, the sound enable signals (inputted to the A6 Sound Board) will be tested in the following order:

SOUND NUMBER ENABLE DISPLAYED

S16	17	(combination S1 & S16)	A3J2	PIN 9
S8	8		A3J5	PIN 7
S2	2		A3J5	PIN 5
S4	4		A3J5	PIN 1
S1	1		A3J5	PIN 6

**A3 DRIVER BOARD
TRANSISTOR ASSIGN.
SEE SCHEMATIC**

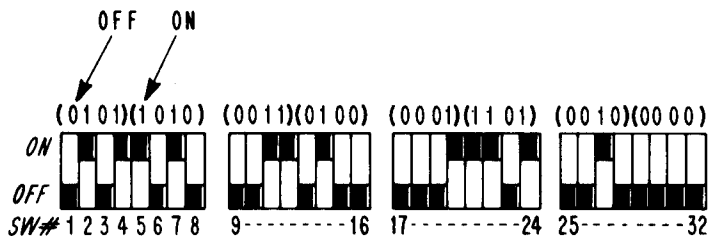
c. The first and second player's score displays show hexadecimal representative of the operator switch positions. Converting hexadecimal to binary will give the switch positions in binary form.

CONVERSION TABLE

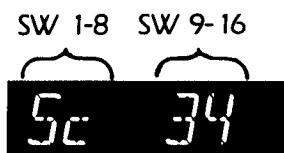
0 = OFF 1 = ON

DISPLAYED HEXIDECIMAL	DECIMAL	BINARY
0	0	0000
1	1	0001
2	2	0010
3	3	0011
4	4	0100
5	5	0101
6	6	0110
7	7	0111
8	8	1000
9	9	1001
A	10	1010
B	11	1011
C	12	1100
D	13	1101
E	14	1110
F	15	1111

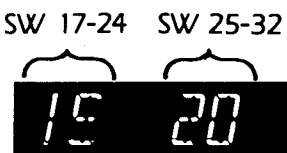
EXAMPLE:



DISPLAYED



First Player



Second Player

Checking Switches

1) Switch all odd number switches to the ON position, and all even switches to the OFF position. Display should show:



First Player



Second Player

2) Switch all even numbered switches to the ON position and all odd switches to the OFF position. Display should show:



First Player



Second Player

To repeat test # 17, push the credit button.

To advance to test # 18, push the Self/Test switch.

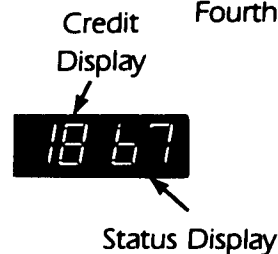
STEP 18—SWITCH TEST



Third Player



Fourth Player



- 1) All switches open. 99 will be displayed. (Note: The slam switch is not part of the switch test (normally closed).)
- 2) Switch(es) closed. Designated number(s) will be sequentially displayed. The last switch number will remain displayed, unless test is repeated.

VII. BOOKKEEPING AND SELF TEST, VIII. OPTIONS

VII. BOOKKEEPING AND SELF TEST

STEP 19—DISPLAY TEST: Each digit of each display is individually turned on, and numbers zero through nine are sequenced.

- Test number is not displayed.

NOTE: On the second and fourth player displays only, the least significant digits are strobed first. Then the most significant digits and the remaining digits are sequentially strobed. This is normal operation.

STEP 20—MEMORY TEST - Each control based memory device is checked. If all are good, a 99 will be displayed.

If a memory chip located on the A1 Control Board is defective, a corresponding number in the following chart will be displayed.

**NUMBER
DISPLAYED**

99
5 10 1
2332-1
2332-2
6532-1
6532-2
6532-3
27 16*

**CHIP ASSIGNMENT/
DESCRIPTION**

All Memory Good
Z5 Bookkeeping Ram
U2 Background Rom
U3 Background Rom
U4 Ram
U5 Ram
U6 Ram
Prom 1 Game E Prom

Player #2 displays the check sum for the game prom in hexadecimal. Refer to the conversion Table for interpretation.

To repeat test #20, push the credit button. To advance to Step # 16, push the Self/Test button.

* James Bond (658) and later System 80 games up to and including Haunted House will display 764 1-1 for a bad 27 16 game prom.

VIII. OPTIONS

There are no options for this game.

IX. GENERAL INFORMATION

A. PRINTED CIRCUIT BOARDS ARE DESIGNATED AS FOLLOWS:

- A1 - Control Board
- A2 - Power Supply
- A3 - Driver Board
- A4 - Bonus Displays
- A5 - Status Display
- A6 - Sound/Speech Board
- A7 - Sound/Speech Power Supply
- A8 - Pop Bumper Driver Boards
- All - Auxiliary Lamp Driver Board
- Al4 - 7-Digit Display
- A24 - Reset Board

B. WIRE COLORS ARE SHOWN AS NUMBERS:

- 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 will be labeled AX-JX. For example, A3-J4 is the connector J4 on the driver board (A3).

C. FUSES

BOTTOM CABINET FUSES

F1	Sound/Speech Power Supply	12VAC	1/2 Amp
F2	Power Supply	10VAC	5 Amp SLO-BLO
F3	Displays	60VAC	1/4 Amp SLO-BLO
F4	Solenoids	25VAC	8 Amp SLO-BLO
F5	Controlled Lamps	8VAC	7½ Amp
F6	Playboard Illumination	6.3VAC	7½ Amp
F7	Lightbox Illumination	6.3VAC	10 Amp
F8	Sound/Speech Power Supply	+24VDC	1 Amp SLO-BLO
F9	Primary Power	115VAC	5 Amp SLO-BLO
		230VAC	2½ Amp SLO-BLO

PLAYFIELD FUSES

F10	Bottom Right Pop Bumper	2 Amp SLO-BLO
F11	Upper Right Pop Bumper	2 Amp SLO-BLO
F12	Upper Left Pop Bumper	2 Amp SLO-BLO
F13	Upper Top Pop Bumper	2 Amp SLO-BLO
F14	Outhole, Left and Right 3 Position Drop Target Banks, and Hole Kicker	1 Amp SLO-BLO
F15	5 Position Drop Target Bank	2 Amp SLO-BLO
F16	Shooter and Gong	2 Amp SLO-BLO

IX. GENERAL INFORMATION

D. COIL CHART

SOLENOID COILS					
PART NUMBER	GENERAL USAGE	RESISTANCE (OHMS)	NUMBER OF TURNS	WIRE GAUGE	WRAPPER COLOR
A-1496	KICKING TARGET KICKING RUBBERS POP BUMPERS	2.95	635	#23	Yellow
A-4893	UP KICKER POP BUMPERS BALL KICKER	2.1	535	#22	Red
A-5194	UP KICKER GONG KICKING TARGETS	4.5	780	#24	Blue
A-5195	CONTACT KICKER KNOCKER HOLE KICKER	12.3	1305	#26	White
A-16570	HOLE KICKER, OUTHOLE	15.5	1450	#27	Green
A-17875	FLIPPERS	2.8/40.0	560/1100	#24/31	Yellow
A-17891	5 BANK RESET	3.35	850	#22	White
A-18102	3 BANK RESET, 7 BANK RESET USES 2	9.0	1430	#24	Red
A-18318	4 BANK RESET	6.7	1130	#24	Orange
A-19300	BALL KICKER	7.8	1075	#25	Orange
A-20095	SUPER FLIPPER	1.55/35.5	450/900	#22/31	Red
A-21741	UP KICKER	2.5	575	#23	Orange
RELAY COILS					
A-16890	Q, T, AND COIN LOCKOUT RELAYS	231.0	4000	#35	Orange
A-20558	GATE RELAY	156.0	3400	#34	White
A-18642	MEMORY/ DROP TARGETS	58.0	1590	#33	White

* Coils may vary from game to game. Check game manual for exact coil usage.

E. SOUND/SPEECH BOARD (A6) TEST

1. Game must be in game over mode to initiate test.
2. Pressing the test button on the sound/speech board will initiate test.
3. After the test button has been pressed the sound/speech board must correctly reproduce all of the speeches listed in section 5. If not the board is defective.

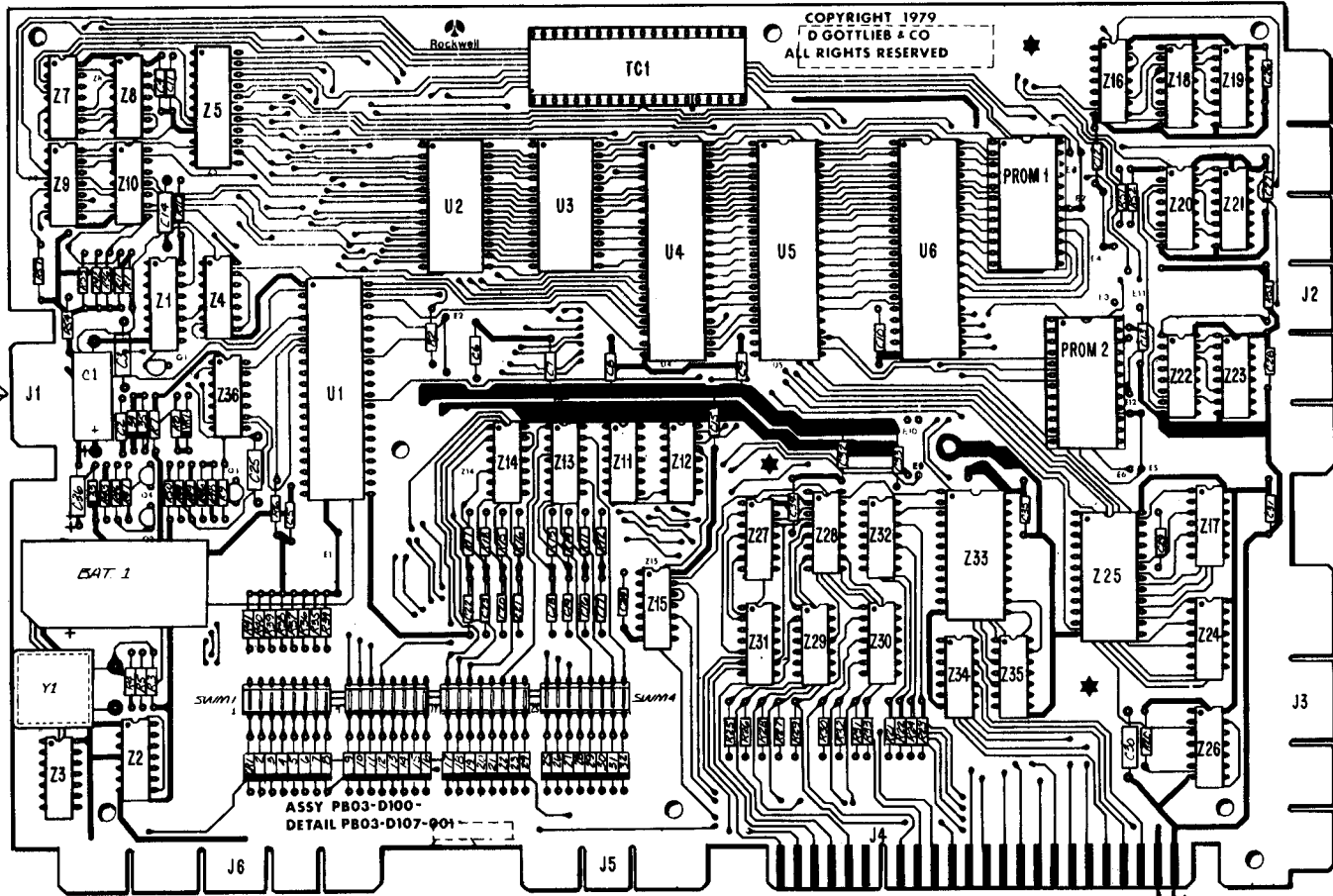
X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS

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X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS

CONTROL BOARD (A1) COMPONENT LOCATION

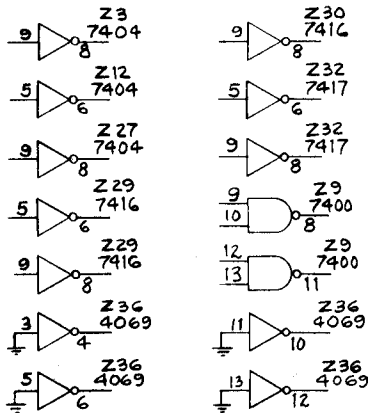


CONTROL BOARD (A1) PARTS LIST

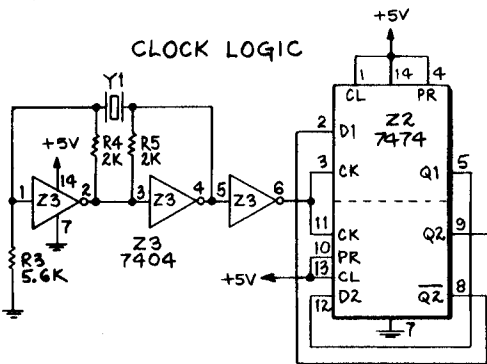
REFERENCE	DESCRIPTION	PART NUMBER	REFERENCE	DESCRIPTION	PART NUMBER
BAT.1	Battery—3.6V	326R10-002	U3	ROM	XO-327
C1	Capacitor, 100 mfd., 10V		U4, U5, U6	RIOT	R6532-18
C2,	Capacitor, .01 mfd., 50V		VR1	Zener Diode—3.0V, 5%	1N5225B or 1N5987B
C4-C13,			Y1	Crystal, 3.579545 MHZ	333R08-001
C15-C24,			Z1	IC-CMOS—Dual 1 Shot	SCL4528B
C26-C29,			Z2	IC—Dual Flip Flop	SN7474N
C31-C35	Capacitor, .1 mfd., 50V		Z3, Z11,	IC—Hex Inverter	SN7404N
C3, C14,			Z12, Z16,		
C25, C30			Z17, Z24,		
C36	Capacitor, 10 mfd.	10V.TNT	Z26, Z27,		
CR1-CR35	Diode, GP	1N4148	Z34, Z35		
Q1, Q4	Transistor—PNP	MPS-A70	Z4	IC-CMOS—Quad 2 Input "AND"	SCL4081B
Q2, Q3	Transistor, NPN (Motorola)	2N440	Z5	IC-Static Ram	S5101-L
R1, R6,	Resistor, 3.0K ohm, 5%, 1/4W		Z7	IC—Hex Inverter	SN74LS04N
R11-R24,			Z8	IC—2 Input "NOR"	SN7402N
R42, R45,			Z9, Z13,	IC—2 Input "NAND"	SN7400N
R46, R48,			Z14		
R51-R57			Z10	IC—Open Collector Inverter	SN74LS05N
R2,	Resistor, 4.7K ohm, 5%, 1/4W		Z15	IC—2 Input—"OR"	SN7432N
R34-R41			Z18, Z20	IC—"D" Flip Flop	SN74175N
R3, R43,	Resistor, 5.6K ohm, 5%, 1/4W		Z22		
R49			Z19, Z21,	IC—4 to 7 Decoder	SN7448N
R4, R5,	Resistor, 2.0K ohm, 5%, 1/4W		Z23		
R44			Z25, Z33	IC—4 to 16 Decoder	SN74154N
R7	Resistor, 62 ohm, 5%, 1/4W		Z28	IC—2-to-4 Decoder	SN74LS139N
R8, R50	Resistor, 180 ohm, 5%, 1/4W		Z29, Z30	IC—Hex Inverter—OC/HV	SN7416N
R9	Resistor, 1K ohm, 5%, 1/4W		Z31	IC—2 Input "AND"	SN7408N
R10	Resistor, 2.8M ohm, 5%, 1/4W		Z32	IC—Hex Buffer—OC	SN7417N
R25-R33	Resistor, 620 ohm, 5%, 1/4W		Z36	IC—CMOS	MM74C04 or
R47	Resistor, 24K ohm, 5%, 1/4W			Socket—DIL, 24 PIN	SCL4069B
SW1-SW4	Dip Switch Pak—8 Position	341R31-005		Spacer, Cork	640361-3 131R06-001
TC1	Socket, 40 Pin	640379-3			
U1	CPU	R6502-13			
U2	ROM	XO-326			

NOTE: UNLESS OTHERWISE INDICATED;
 1. RESISTORS ARE $\pm 5\%$, 1/4W.
 2. CAPACITORS ARE .01UF, 50V.
 3. DIODES ARE TYPE 1N4148.
 4. REF. DESIGNATION Z6 NOT USED.

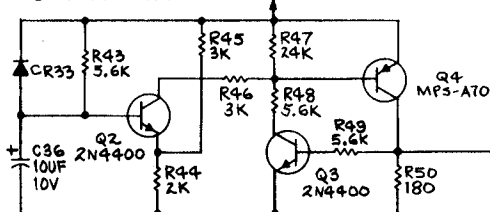
SPARE GATES



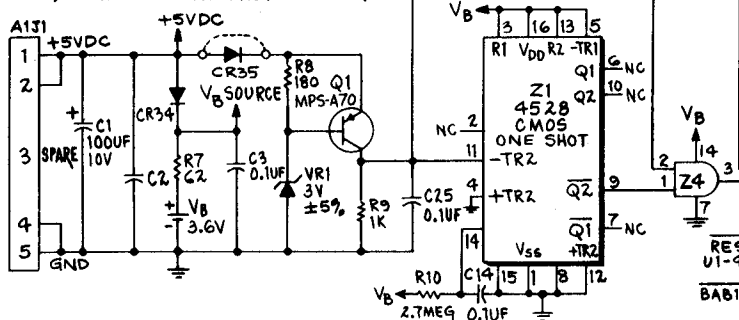
CLOCK LOGIC



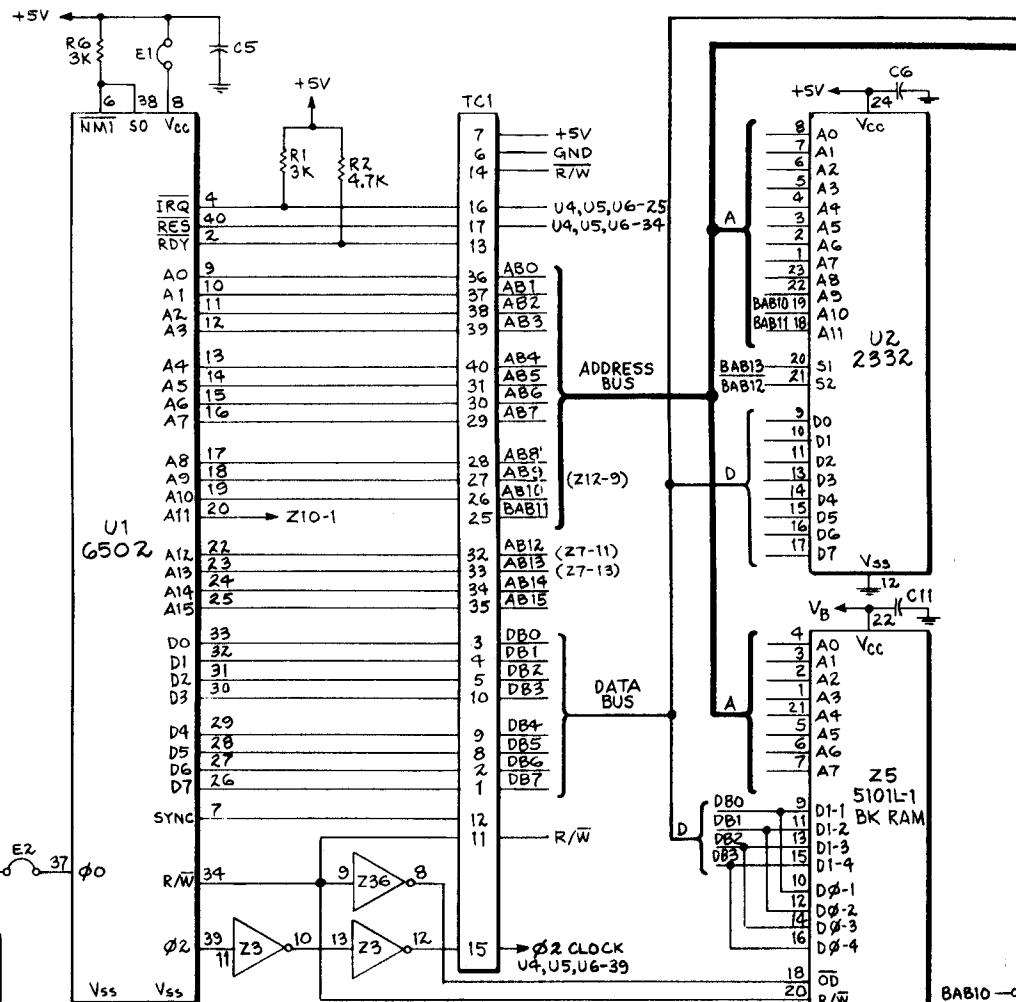
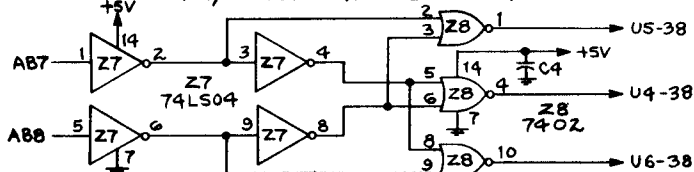
DELAY CIRCUIT



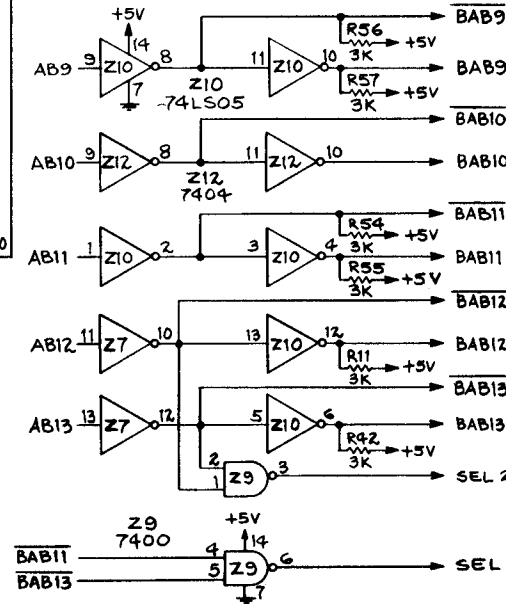
UP/DOWN MEMORY PROTECT LOGIC



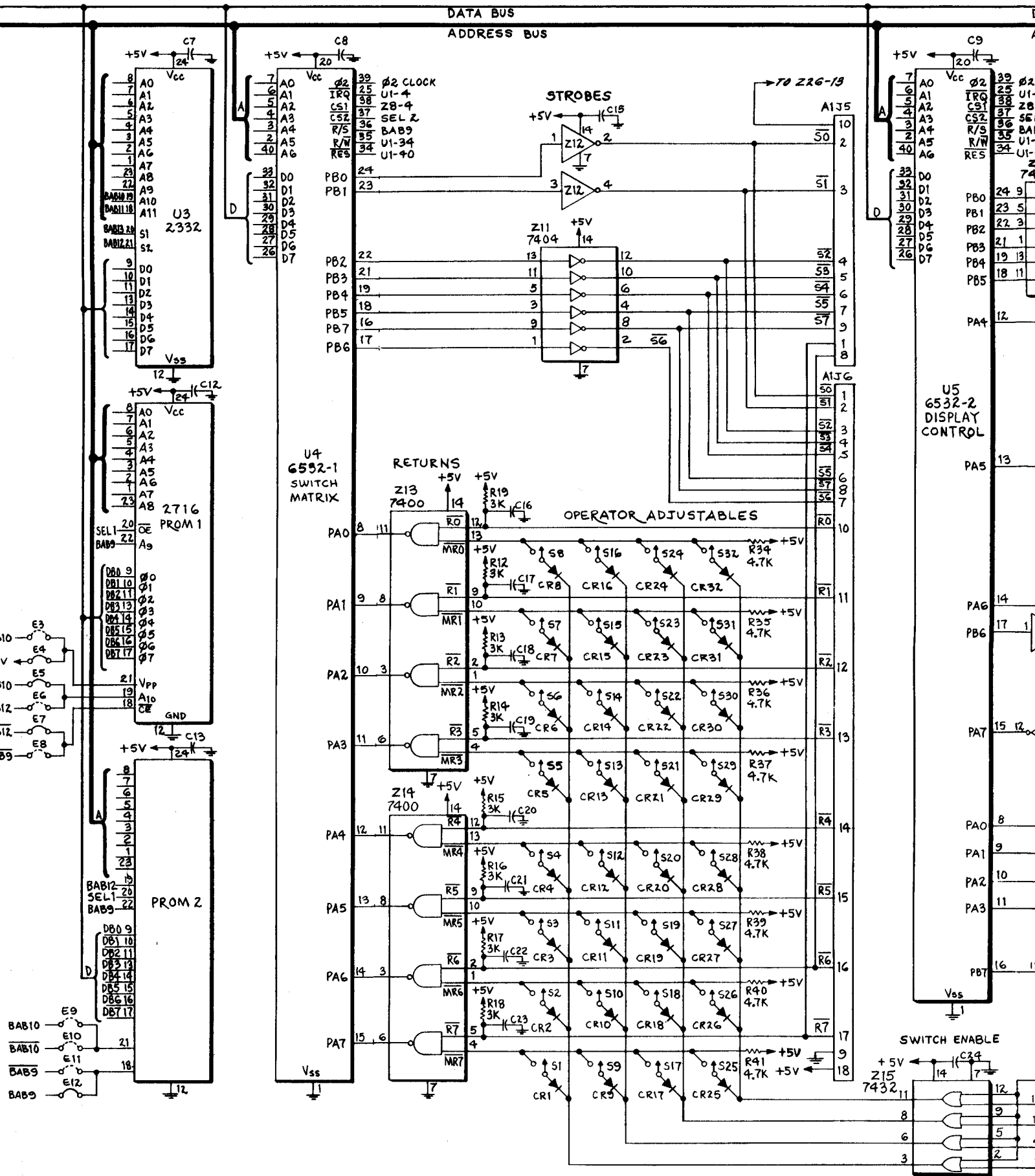
INPUT/OUTPUT DEVICE SELECTION

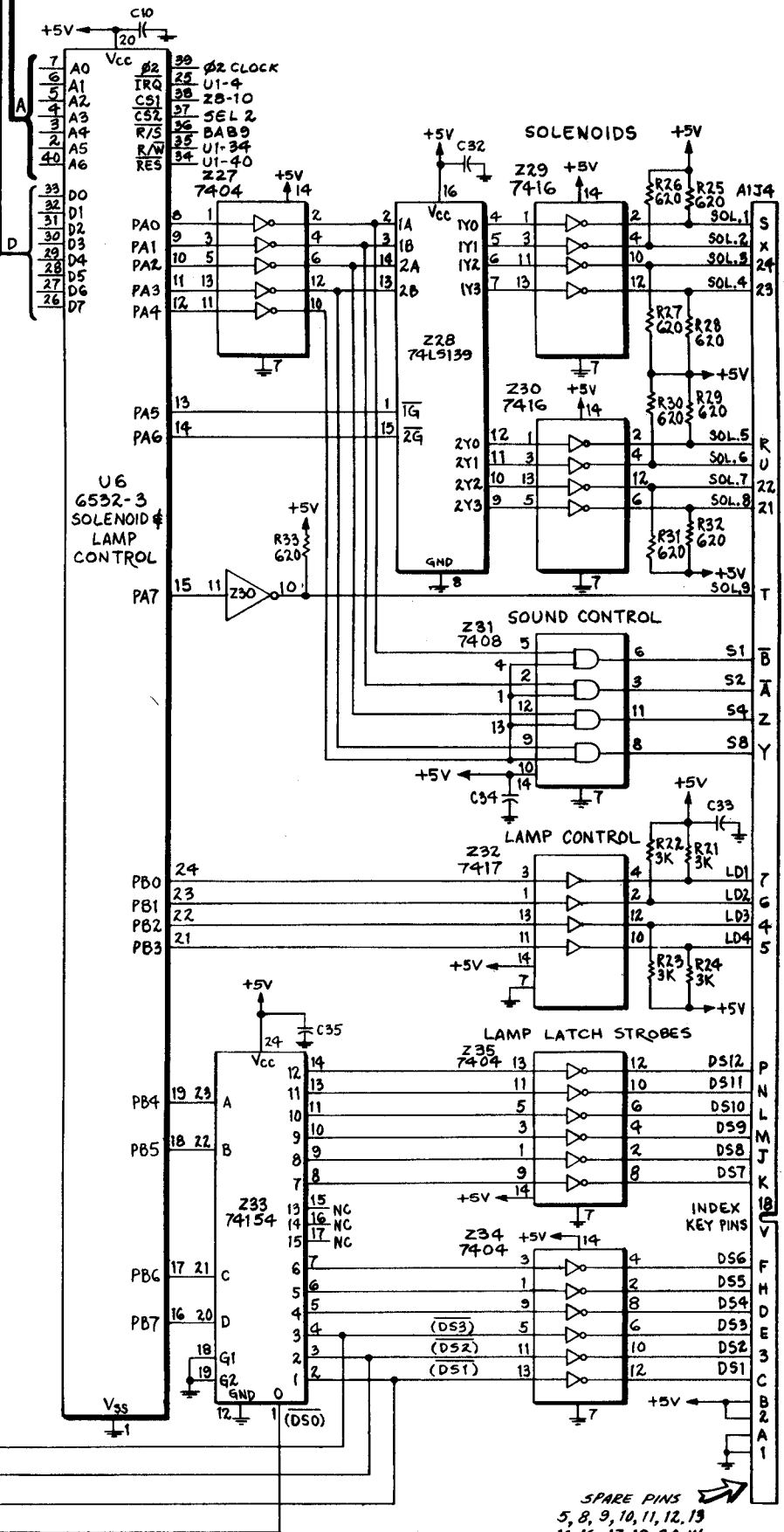
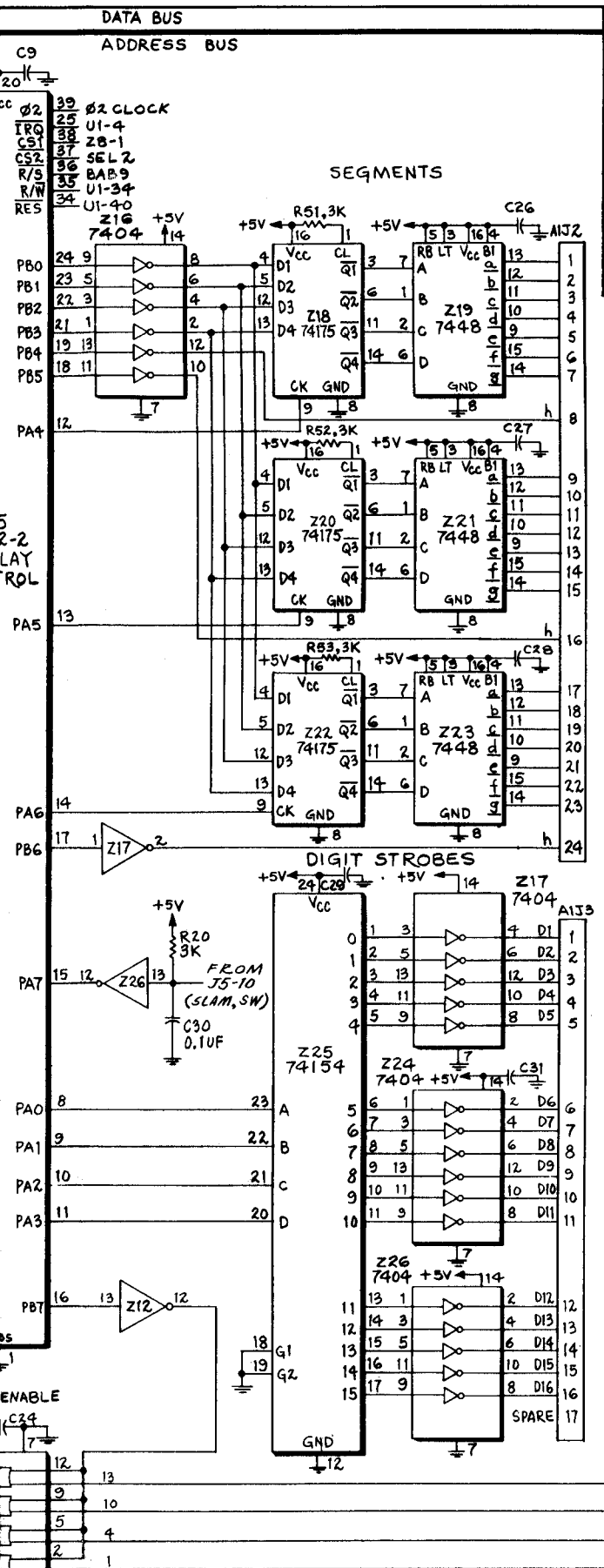


PROM SELECTION



X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS





SPARE PINS
 5, 8, 9, 10, 11, 12, 13
 14, 16, 17, 19, 20, W.

D. GOTTLIEB & CO.

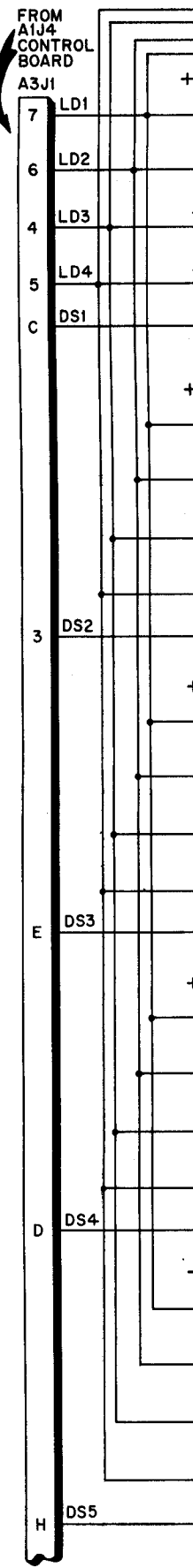
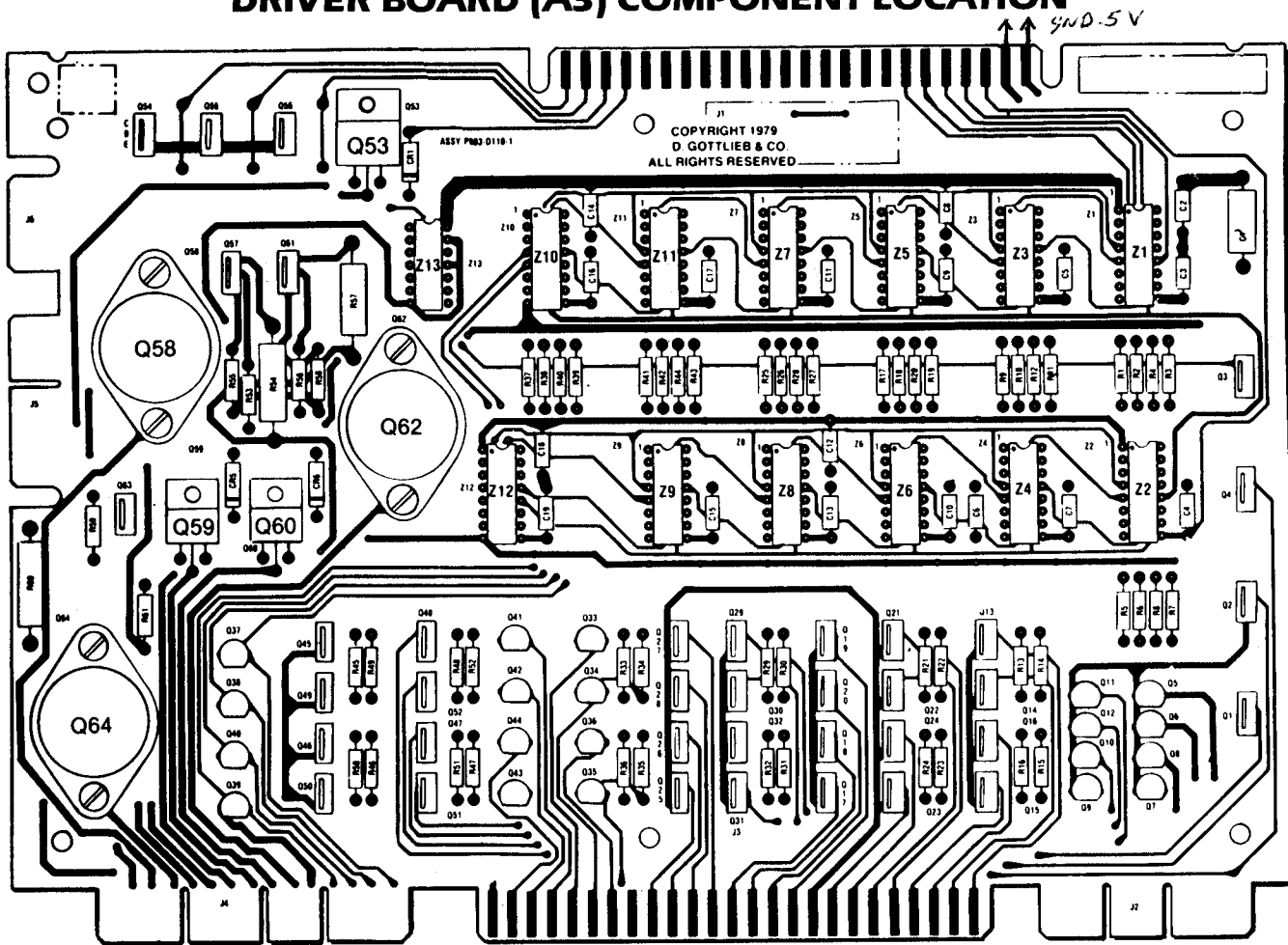
TITLE
CONTROL BOARD (A1)

USED ON

DRAWN BY: PSC, APPROVED BY: BAM, DATE: 12-20-80, E-20916

X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS

DRIVER BOARD (A3) COMPONENT LOCATION

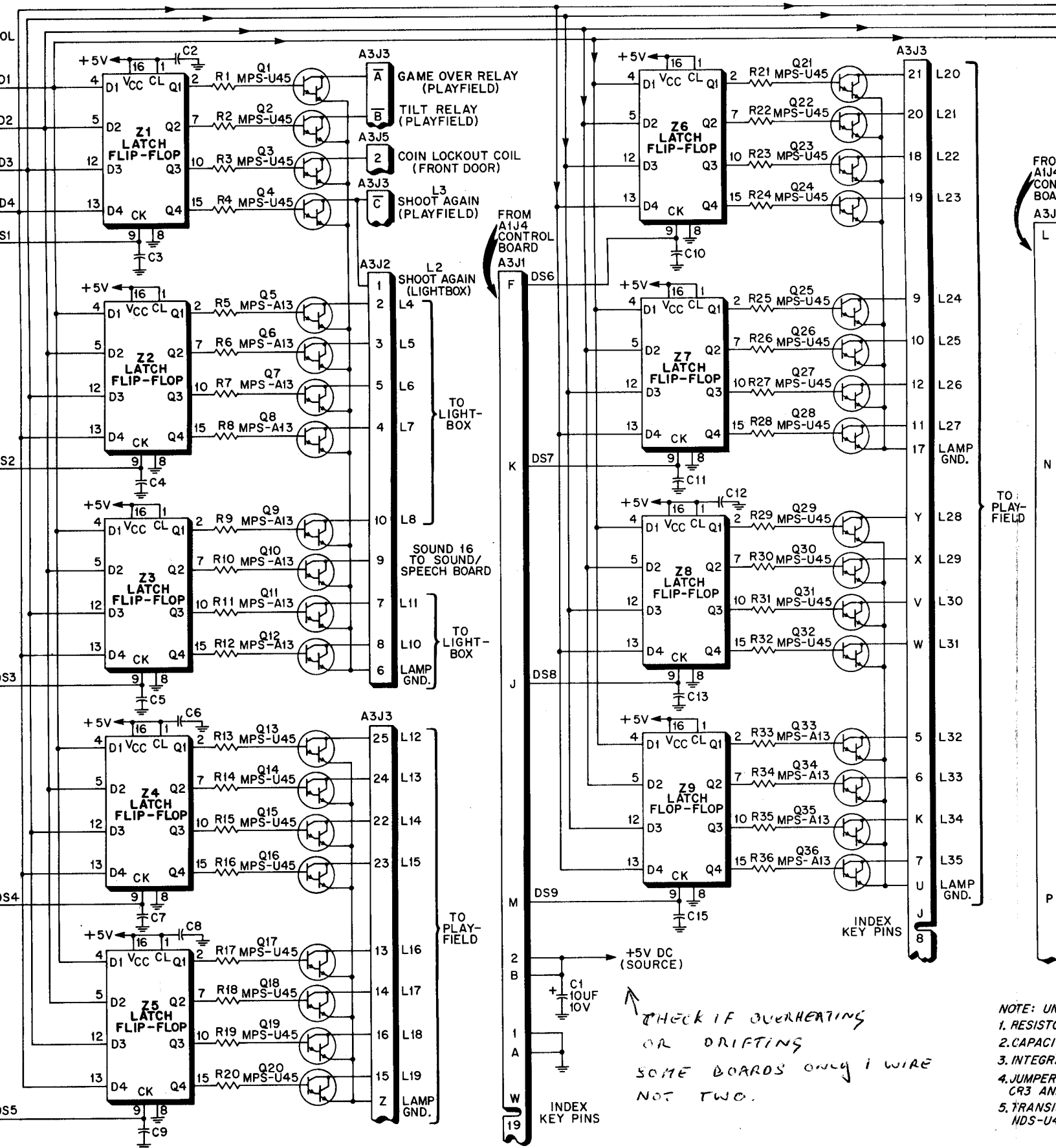


DRIVER BOARD (A3) PARTS LIST

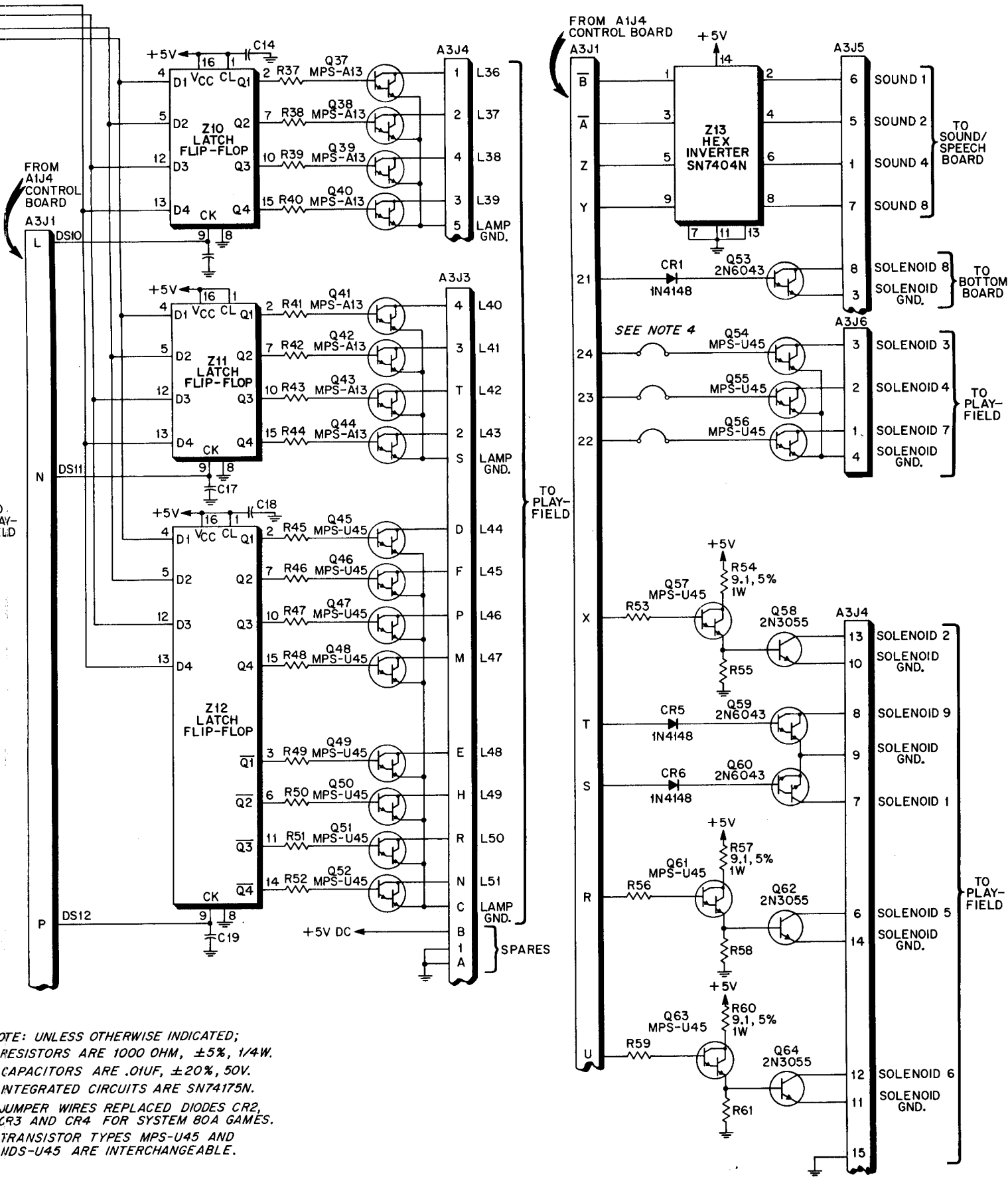
REFERENCE	DESCRIPTION	PART NUMBER
C1	Capacitor, 10 mfd., 10V— Tantalum	
C2-C19	Capacitor, .01 mfd., 50V	
CR1-CR6	Diode—Silicon	1N4148
R1-R53, R61, R55, R56, R58, R59	Resistor, 1000 ohm, 5%, 1/4W	
R54, R57, R60	Resistor, 9.1 ohm, 5%, 1W	
Q1-Q4, Q13-Q32, Q45-Q52, Q54-Q57, Q63	Transistor, NPN, Darlington	MPS-U45
Q5-Q12, Q33-Q44	Transistor, NPN, Darlington	MPS-A13
Q53, Q59, Q60	Transistor, NPN, Darlington	2N6043
Q58, Q62, Q64	Transistor, NPN	2N3055
Z1-Z12	I.C. Quad "D" Latch Flip Flop	SN74175N
Z13	I.C. Hex Inverter	SN7404N
	Insulator—Thermalloy	43-03-4

NOTE: CR2, 3 and 4 have been replaced with jumper wires.

X. WIRING AND SCHEMATIC D



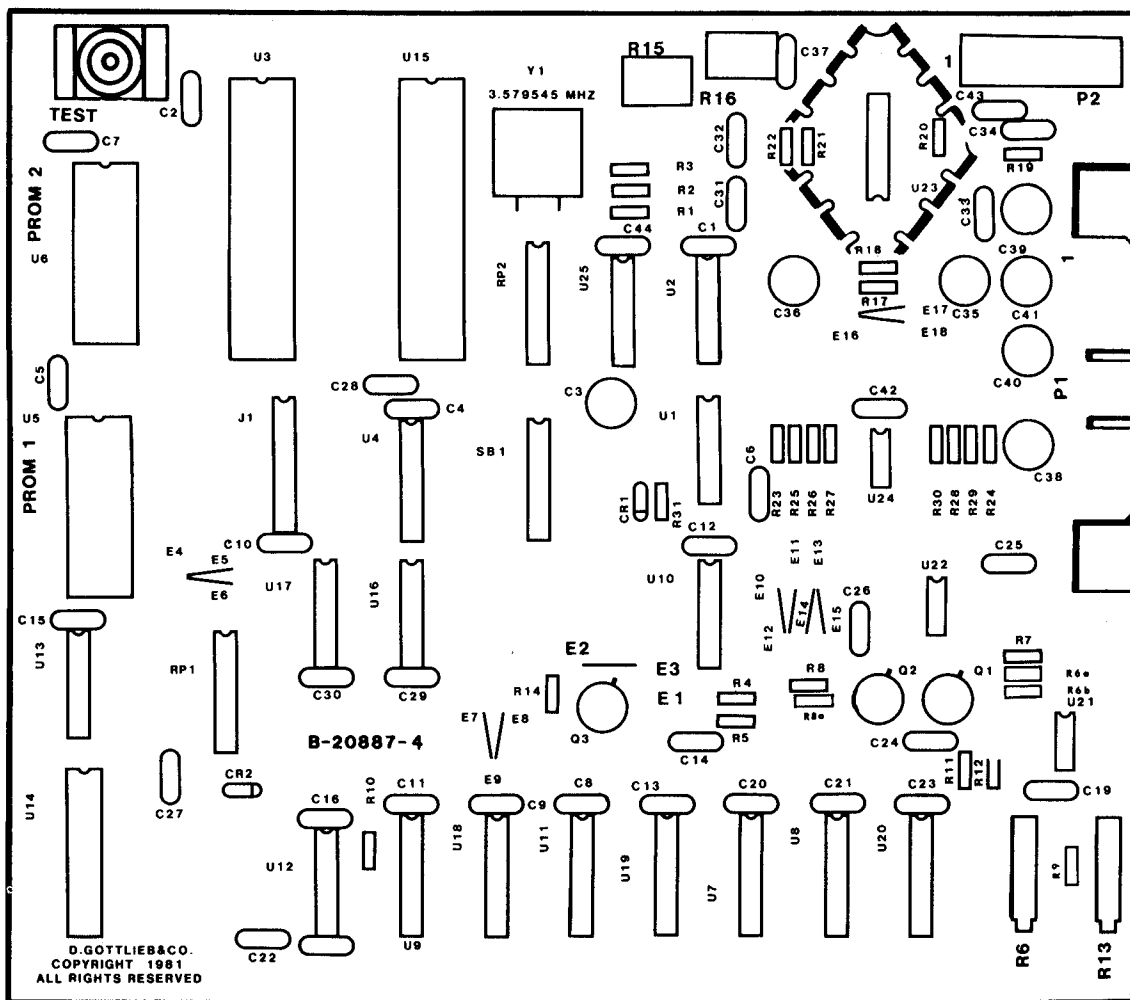
C DIAGRAMS, PARTS LISTS



D. GOTTLIEB & CO.			
TITLE DRIVER BOARD (A3)			
USED ON			
DRAWN 6/20	APPROVED BAW	DATE 1-28-82	E-20915

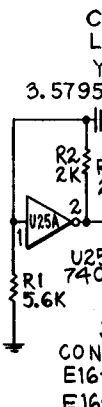
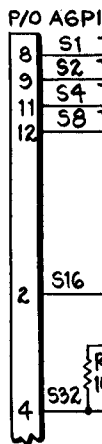
X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS

SOUND/SPEECH BOARD (A6) COMPONENT LOCATION

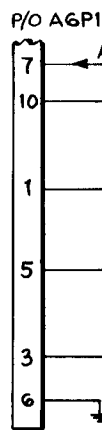


SOUND/SPEECH BOARD (A6) PARTS LIST

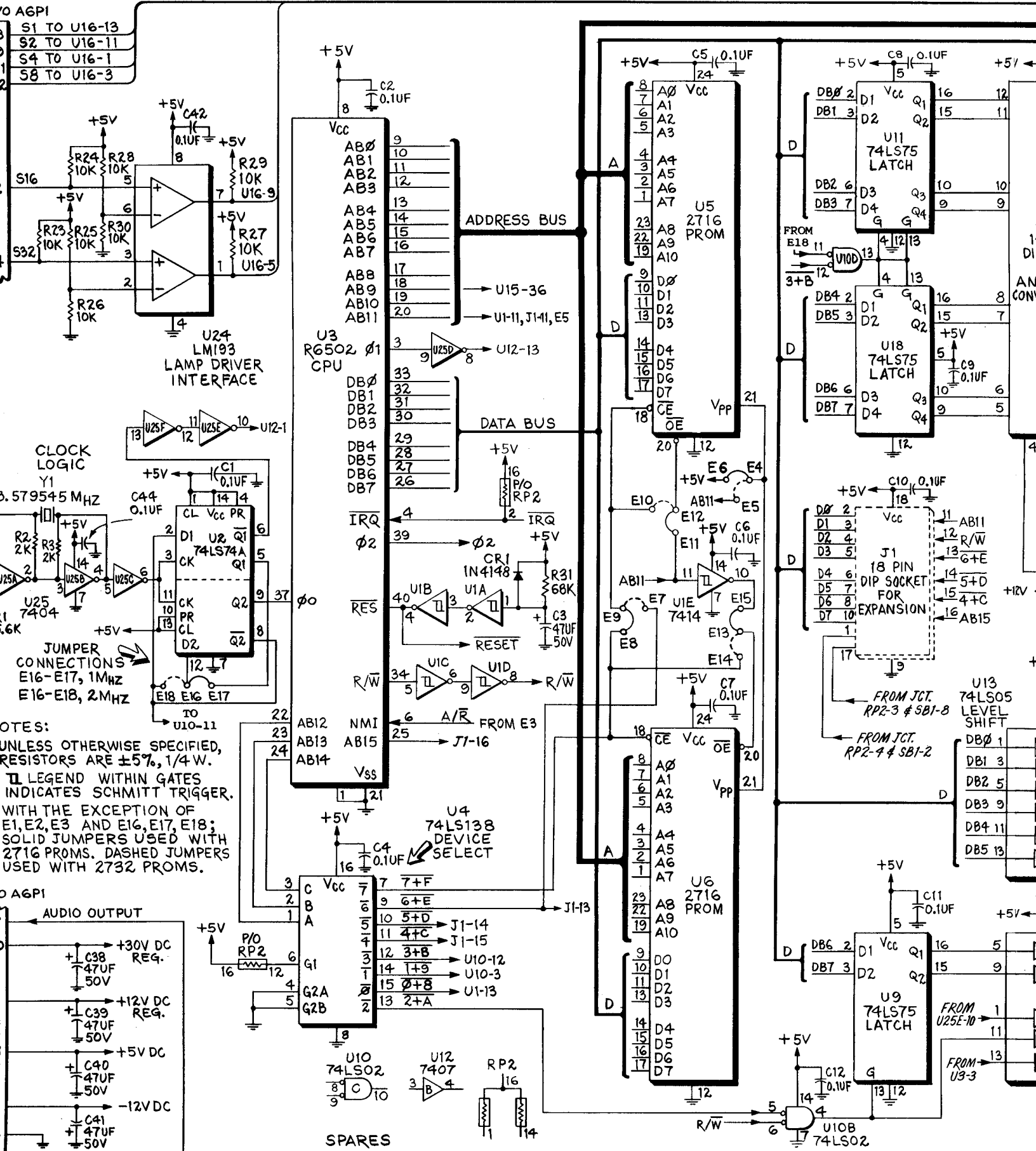
REFERENCE	DESCRIPTION	PART NUMBER	REFERENCE	DESCRIPTION	PART NUMBER
C1, C2, C4-C13, C15, C16, C19, C20, C21, C23, C25, C26, C28-C30, C33, C42, C44, C31-C32, C37, C3, C38-C41, C14, C24, C22, C27, C36, CR1, CR2, Q1, Q3, R1, R4, R5, R11, R12, R2, R3, R6, R13, R6A, R7, R23-R30, R8, R8A, R14, R6B, R9, R10	Sound/Speech Assembly Capacitor, 0.1UF, 25V Capacitor, .047UF, 25V Capacitor, 4.7UF, 35V Capacitor, 47UF, 50V Capacitor, 100PF Capacitor, 300PF Capacitor, 1UF, 50V Capacitor, 470UF, 35V Diode, 1N4148 Diode, Zener, 1N5225B Transistor, NPN, 2N2222A Transistor, PNP, 2N2907A Resistor, 5.6K ohm, 5%, 1/4W Resistor, 2K ohm, 5%, 1/4W Potentiometer, 10K Resistor, 10K ohm, 5%, 1/4W Resistor, 1K ohm, 5%, 1/4W Resistor, 1.8K ohm, 5%, 1/4W Resistor, 2.2K ohm, 5%, 1/4W Resistor, 1.5K ohm, 5%, 1/4W	MA-216 XO-248 XO-222 XO-291 XO-210 XO-223 XO-283 XO-217 XO-284 XO-261 XO-269 XO-320 XO-321 XO-19 XO-14 XO-108 XO-18 XO-5 XO-37 XO-27 XO-20	R15, R16, R18, R21, R22, R31, RP1, RP2, SB1, SW1, U1, U2, U3, U4, U5, U6, U7-U9, U11, U18, U10, U12, U13, U14, U15, U16, U17, U19, U20, U21, U22, U23, U24, U25, Y1	Potentiometer, 10K ohm Resistor, 100K ohm, 5%, 1/4W Resistor, 2K ohm 5%, 1/4W Resistor, 3.3K ohm, 5%, 1/4W Resistor, Dip Switch, Dip Switch, Momentary Pushbutton IC, 7414 IC, SN74LS74N CPU, R6502-13 IC, SN74LS138N EPROM, 2716 IC, SN74LS75 IC, SN74LS02N IC, SN7407N IC, Inverter, SN74LS05N Voice Chip, SC01 RR10T, R6532-18 IC, SN74LS04N IC, SN74LS30N Converter, PMI, 1408A-6P IC, LM741CP IC, LM379S IC, Dual Comparator, LM193 Inverter, 7404 Crystal, 3.579545MHZ Socket 22 Pin Dip Socket 24 Pin (2) Socket 40 Pin (2)	XO-109 XO-45 XO-14 XO-38 XO-168 XO-505 XO-515 XO-397 XO-434 XO-360 XO-437 PR-53 XO-394 XO-428 XO-384 XO-411 XO-468 XO-361 XO-418 XO-432 XO-416 XO-393 XO-395 XO-396 XO-402 XO-456 XO-467 XO-529 XO-530



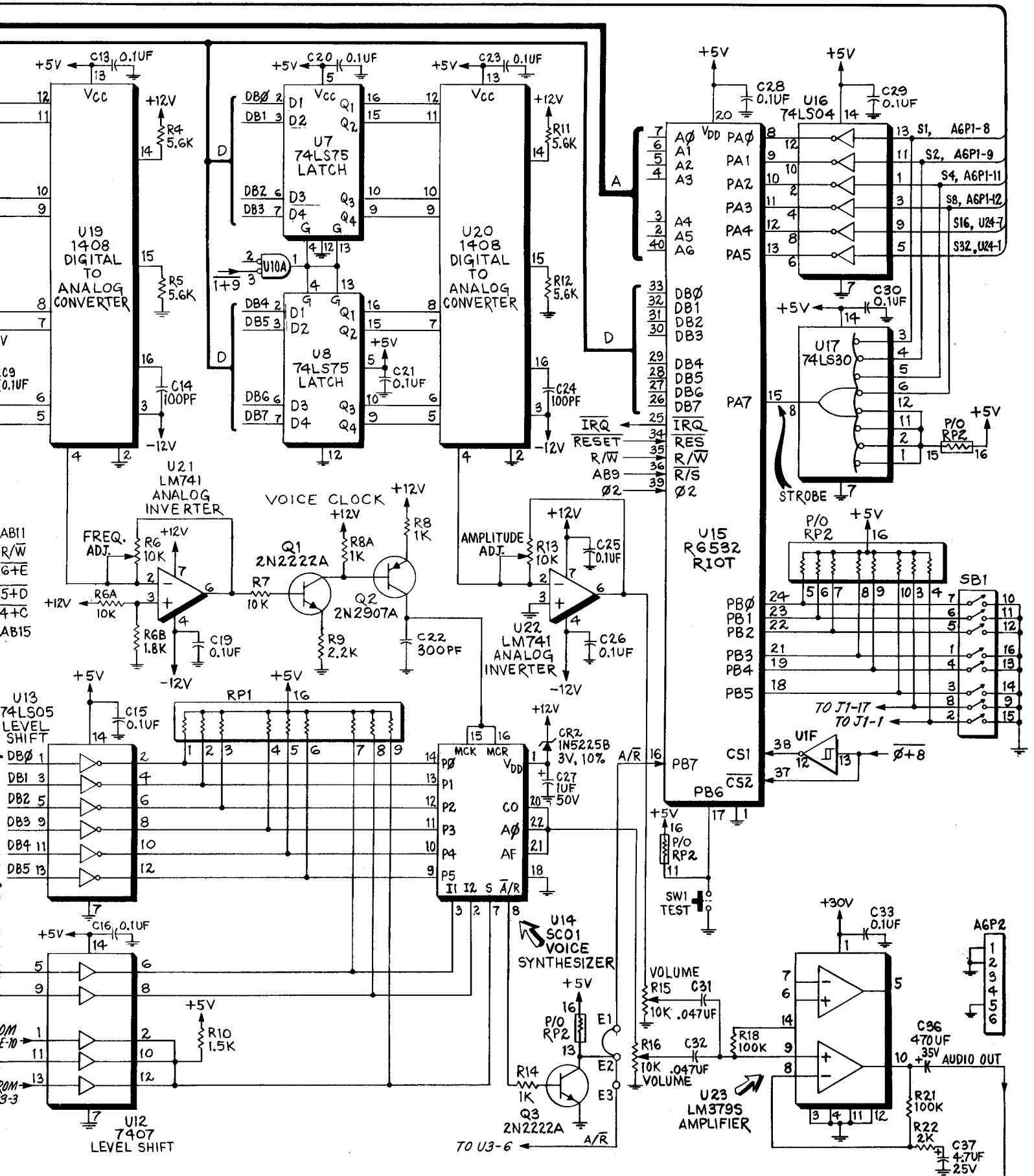
NOTES
 1. UNLESS INDICATED OTHERWISE
 2. ALL LEADERS TO BE INDICATED
 3. WITH THE EXCEPTION OF E1, E2, E16, E17, E18, E19, E20, E21, E22, E23, E24, E25, E26, E27, E28, E29, E30, E31, E32, E33, E34, E35, E36, E37, E38, E39, E40, E41, E42, E43, E44, E45, E46, E47, E48, E49, E50, E51, E52, E53, E54, E55, E56, E57, E58, E59, E60, E61, E62, E63, E64, E65, E66, E67, E68, E69, E70, E71, E72, E73, E74, E75, E76, E77, E78, E79, E80, E81, E82, E83, E84, E85, E86, E87, E88, E89, E90, E91, E92, E93, E94, E95, E96, E97, E98, E99, E100, E101, E102, E103, E104, E105, E106, E107, E108, E109, E110, E111, E112, E113, E114, E115, E116, E117, E118, E119, E120, E121, E122, E123, E124, E125, E126, E127, E128, E129, E130, E131, E132, E133, E134, E135, E136, E137, E138, E139, E140, E141, E142, E143, E144, E145, E146, E147, E148, E149, E150, E151, E152, E153, E154, E155, E156, E157, E158, E159, E160, E161, E162, E163, E164, E165, E166, E167, E168, E169, E170, E171, E172, E173, E174, E175, E176, E177, E178, E179, E180, E181, E182, E183, E184, E185, E186, E187, E188, E189, E190, 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X. WIRING AND SCHEMATIC

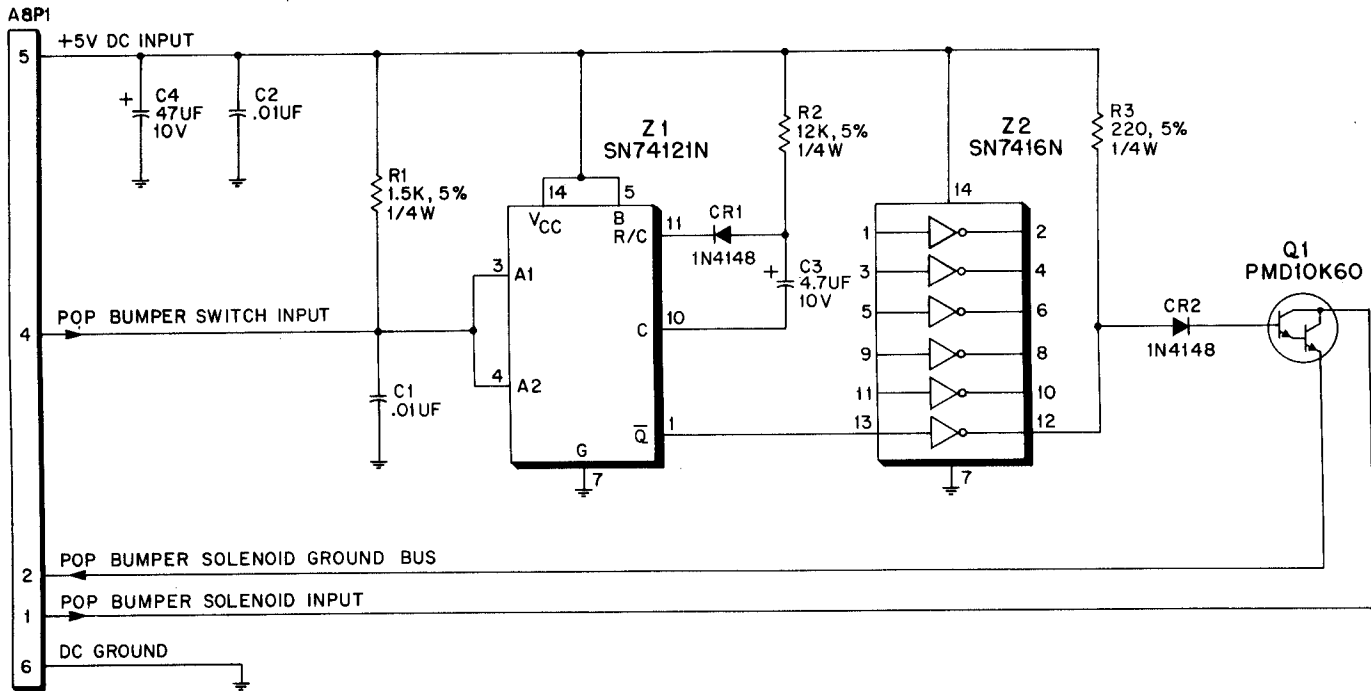


MATIC DIAGRAMS, PARTS LISTS



D. GOTTLIEB & CO.
 TITLE SOUND/SPEECH BOARD A6
 USED ON
 DRAWN BY AC
 APPROVED BY AC
 DATE 4-23-81
 E-21337

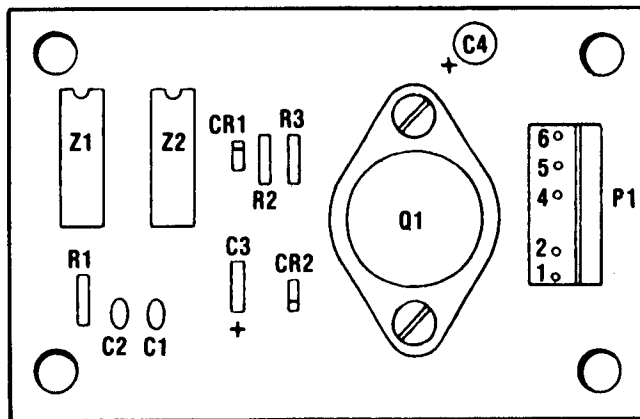
X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS



FROM
A1
CONTROL
BOARD

D. GOTTLIEB & CO.			
TITLE POP BUMPER DRIVER BOARD (A8)			
USED ON			
DRAWN <i>D.P.C.</i>	APPROVED <i>B.A.M.</i>	DATE 2-9-81	D-20923

POP BUMPER DRIVER BOARD (A8) COMPONENT LOCATION

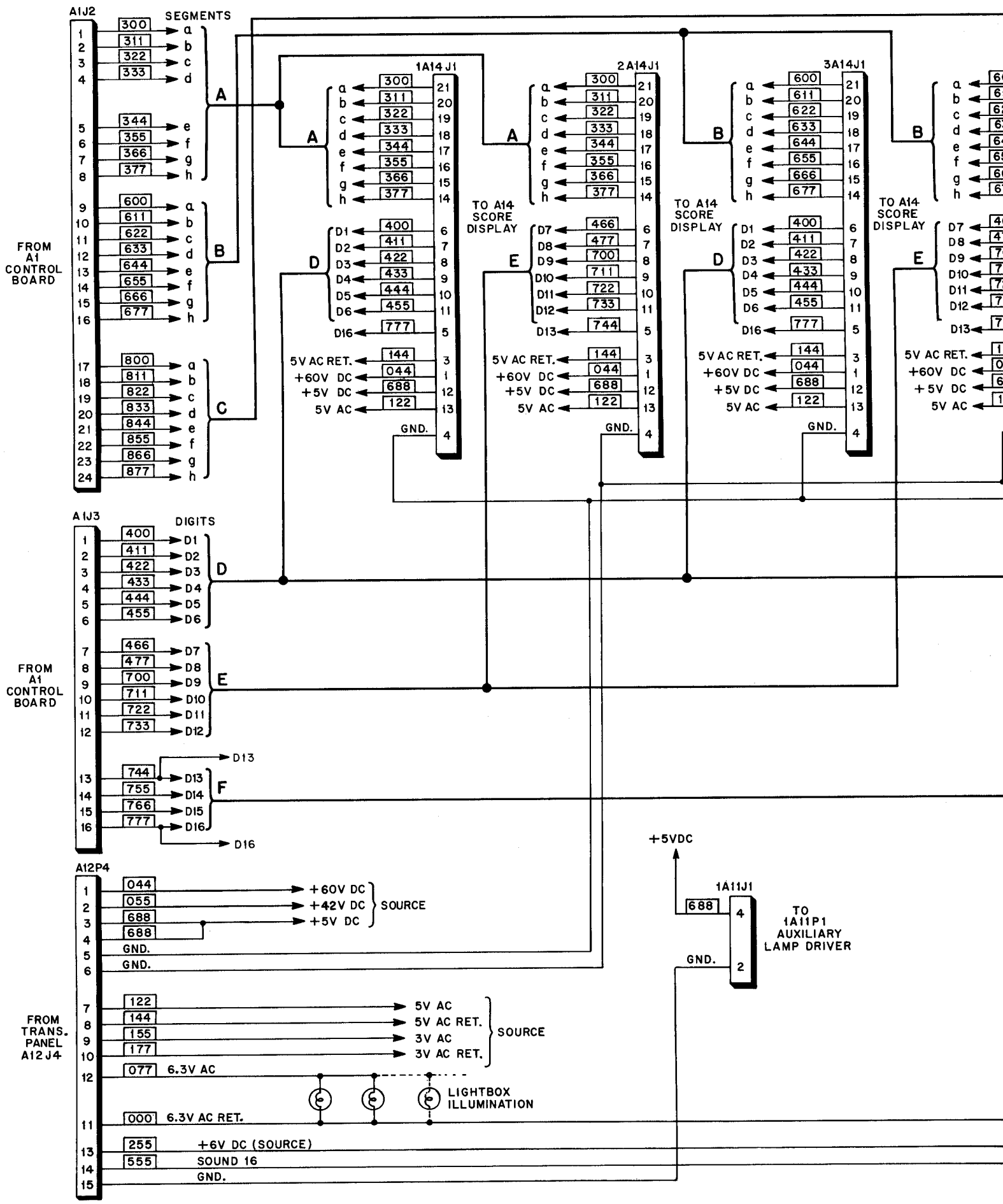


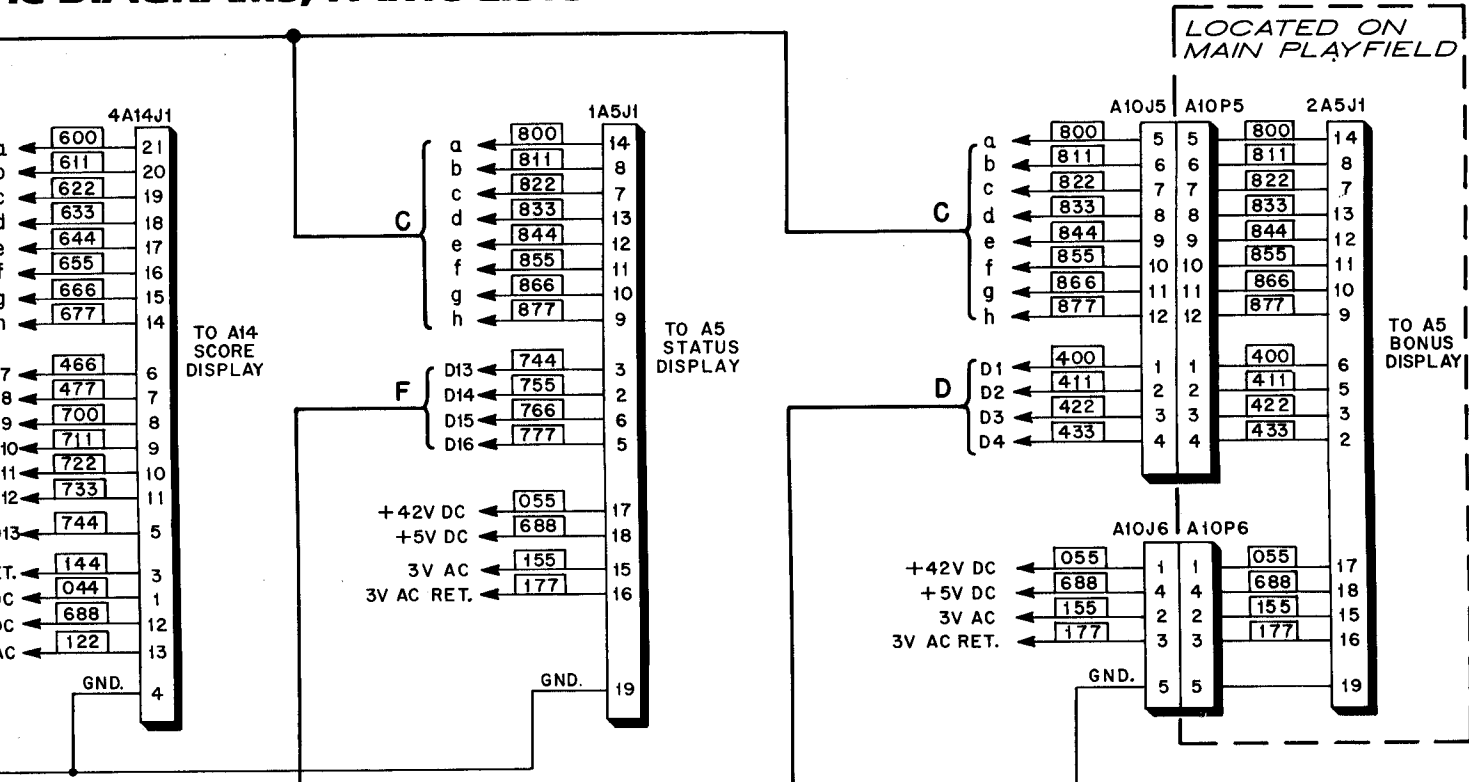
FROM
A1
CONTROL
BOARD

POP BUMPER DRIVER BOARD (A8) PARTS LIST

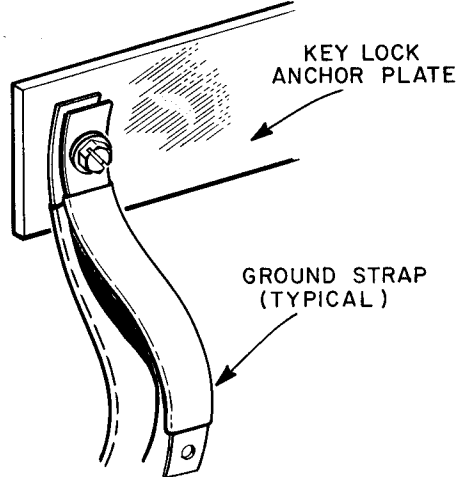
REFERENCE	DESCRIPTION	PART NUMBER
C1, C2	Capacitor, .01 mfd., 20%, 100V	
C3	Capacitor, 4.7 mfd., 10%, 10V	
C4	Capacitor, 47 mfd., 10V	
CR1, CR2	Diode	1N4148
P1	Connector	09-65-1061
R1	Resistor, 1.5K ohm, 5%, 1/4W	
R2	Resistor, 12K ohm, 5%, 1/4W	
R3	Resistor, 220 ohm, 1/4W, 5%	
Q1	Transistor—LAMBDA	PMD10K60
Z1	IC	SN74121N
Z2	IC	SN7416N

FROM
TRANS
PANEL
A12 J4

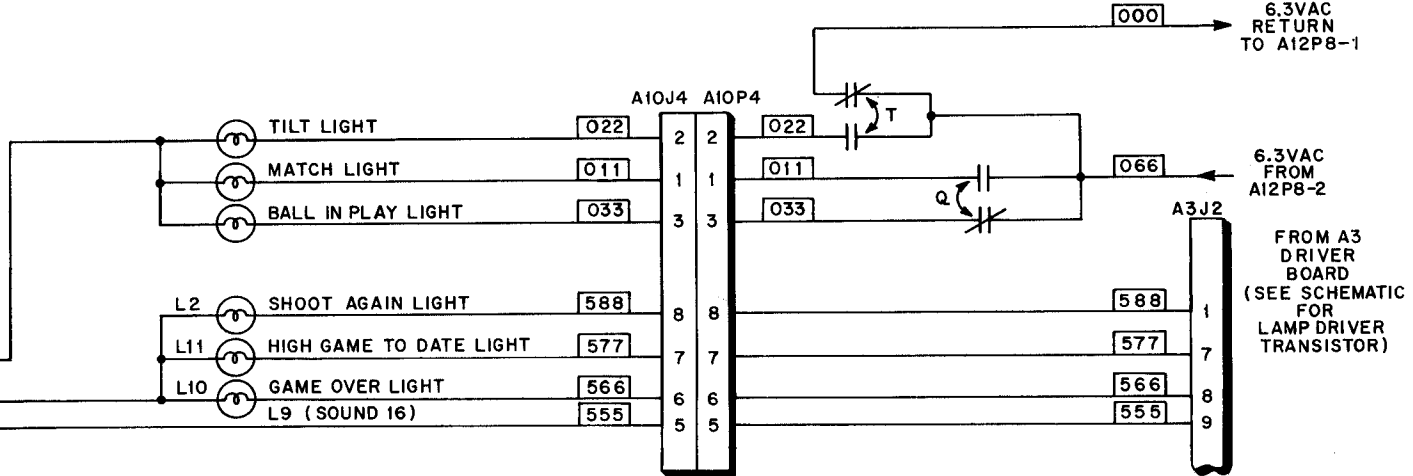




COLOR CODE			
0	BLACK	5	GREEN
1	BROWN	6	BLUE
2	RED	7	PURPLE
3	ORANGE	8	SLATE
4	YELLOW	9	WHITE

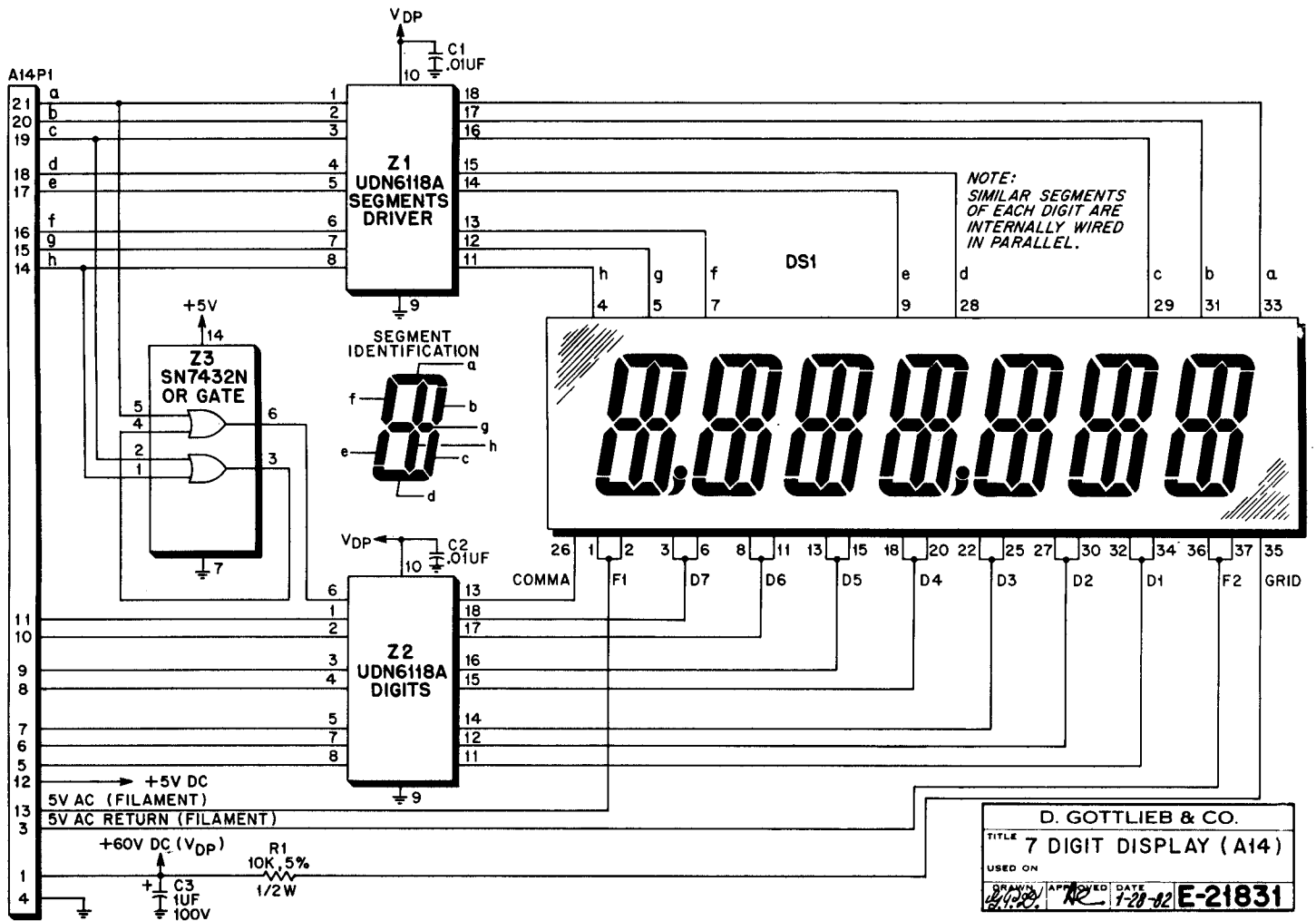


NOTE:
 1. XXX INDICATES WIRE COLOR.
 2. GROUND WIRE IS # 9, 18GA.

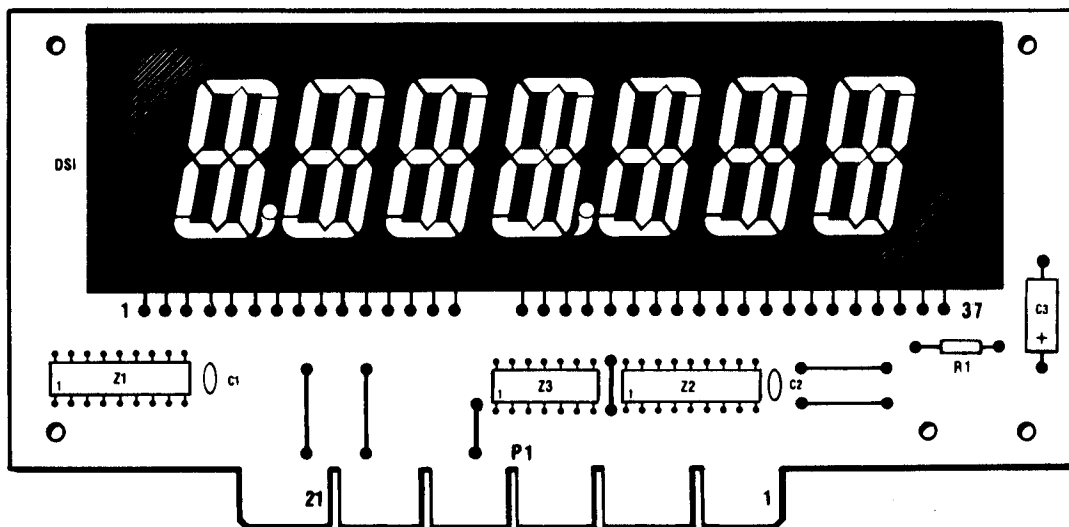


D. GOTTLIEB & CO.
 TITLE **LIGHTBOX SCHEMATIC DIAGRAM**
 USED ON **GAME #672**
 DRAWN, APPROVED, DATE **5-21-82** **E-22190**

X. WIRING AND SCHEMATIC

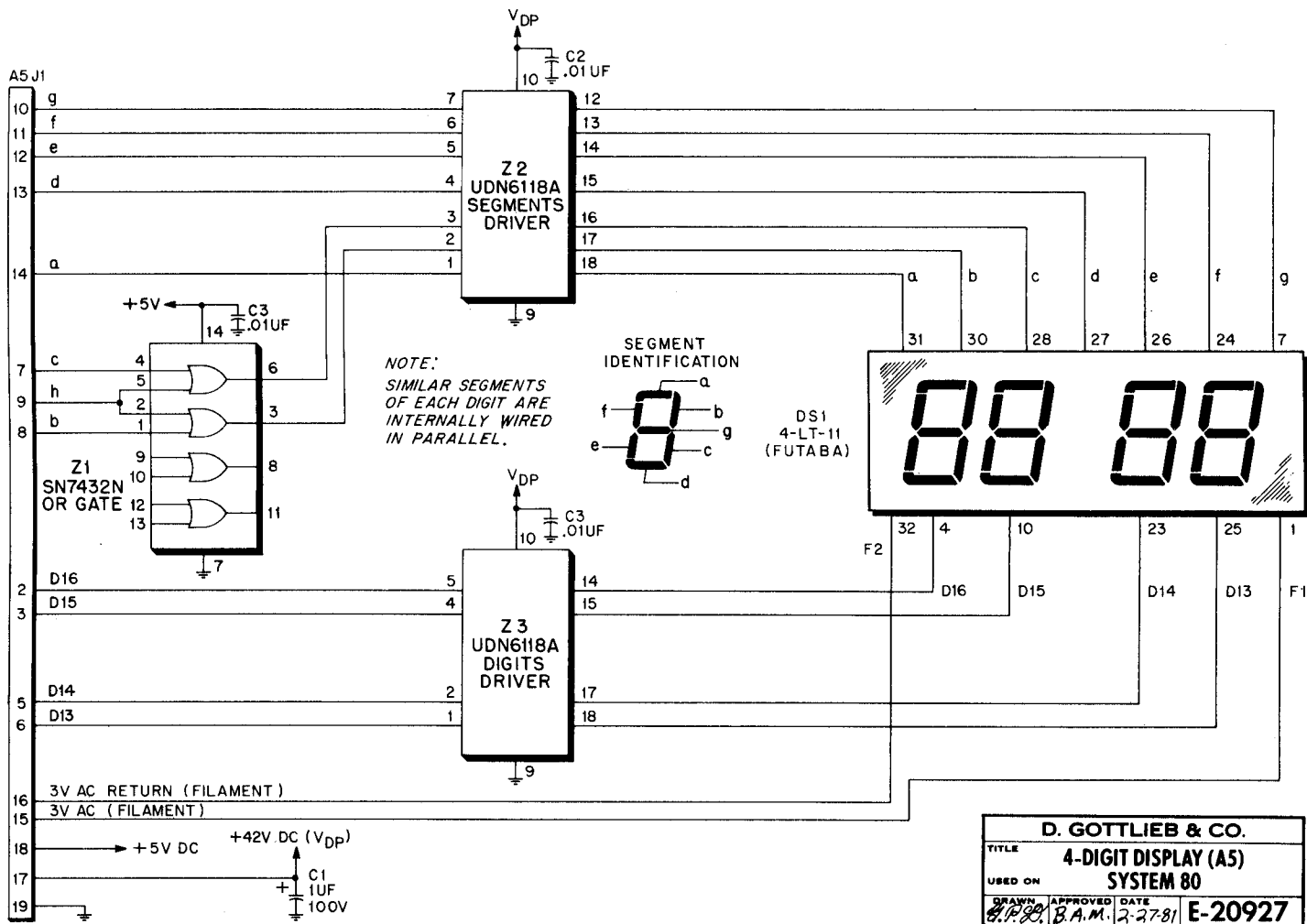


7-DIGIT DISPLAY (A14) COMPONENT LOCATION

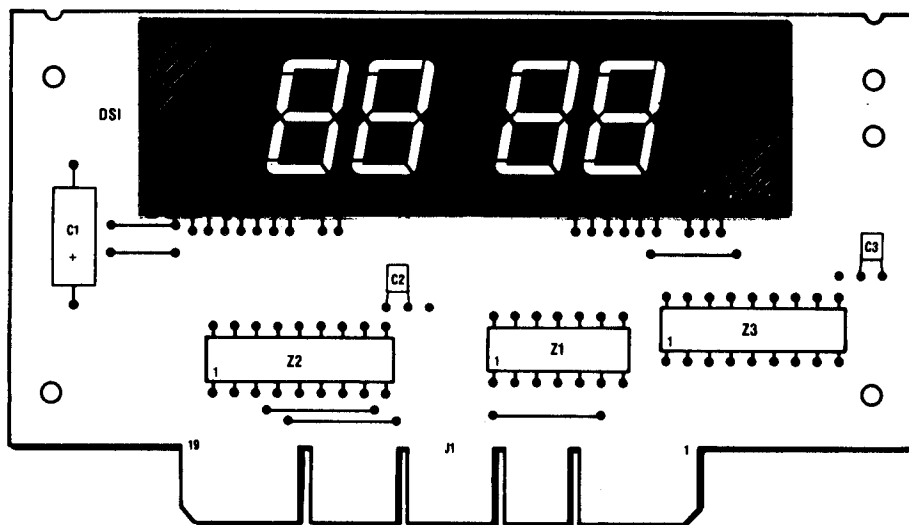


7-DIGIT DISPLAY (A14) PARTS LIST

REFERENCE	DESCRIPTION	PART NUMBER
C1, C2	Capacitor .01 mfd. 100V Kemet	XO-202
C3	Capacitor 1 mfd 100V Sprague	XO-206
DS1	7 Digit Display Tube - FUTABA	XO-477
R1	Resistor, 10K Ohm, 5%, 1/2W	XO-62
Z1, Z2	IC-Fluorescent Display Driver-Sprague	XO-415
Z3	IC Quad or Gate	XO-407

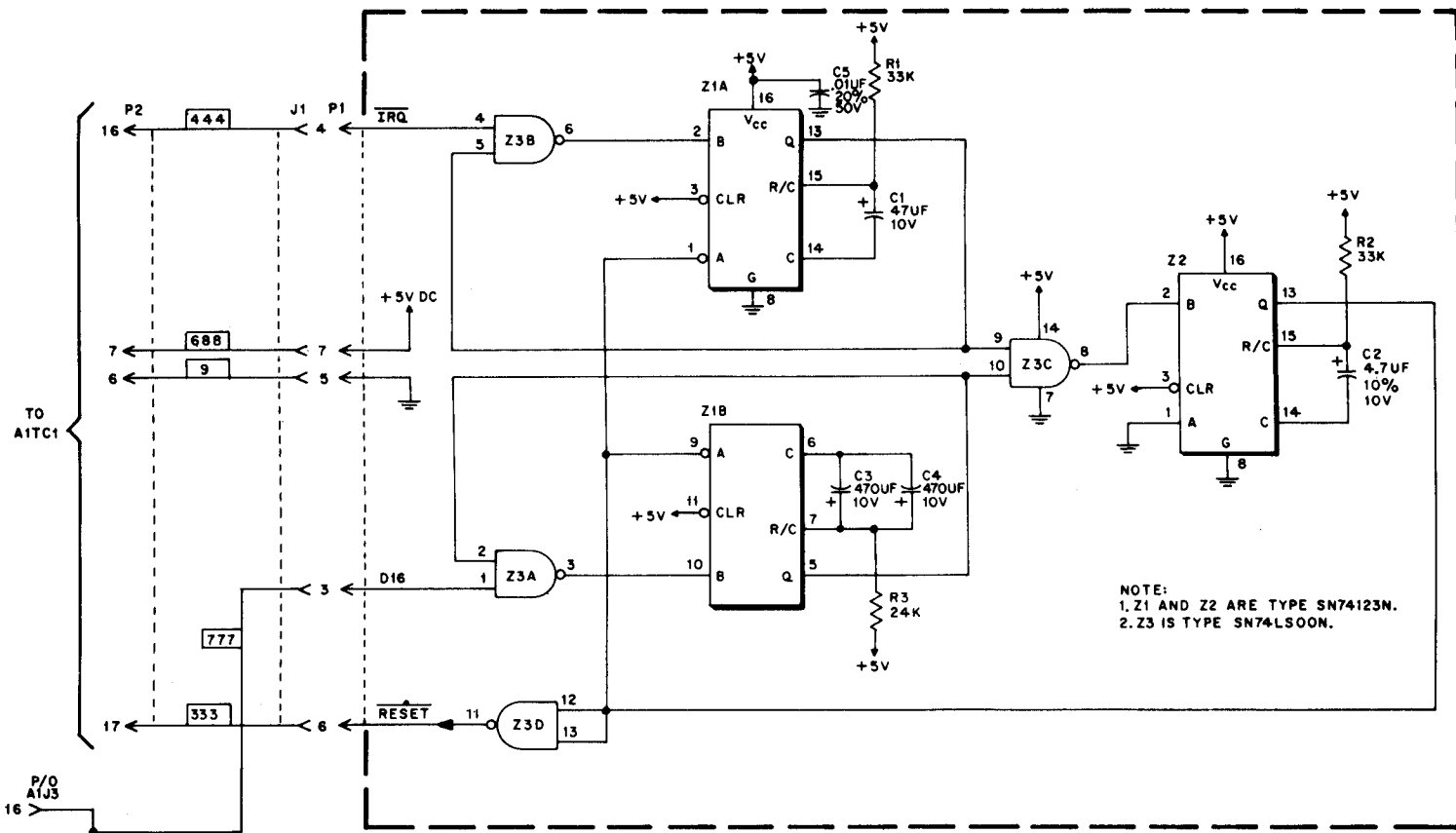


4-DIGIT DISPLAY (A5) COMPONENT LOCATION



4-DIGIT DISPLAY (A5) PARTS LIST

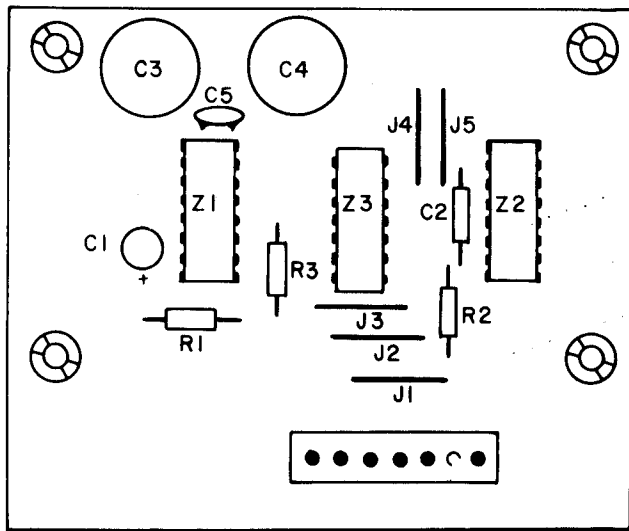
REFERENCE	DESCRIPTION	PART NUMBER
C1	Capacitor, 1 mfd., 100V Sprague	TE1400
C2, C3	Capacitor, .01 mfd., 100V Kemet	C320C103MIR5CA
DS1	4-Digit Display Tube—FUTABA	4-LT-11
Z1	IC—Quad or Gate—T.I.	SN7432N
Z2, Z3	IC—Fluorescent Display Driver—Sprague	UDN6118A



D. GOTTLIEB & CO.

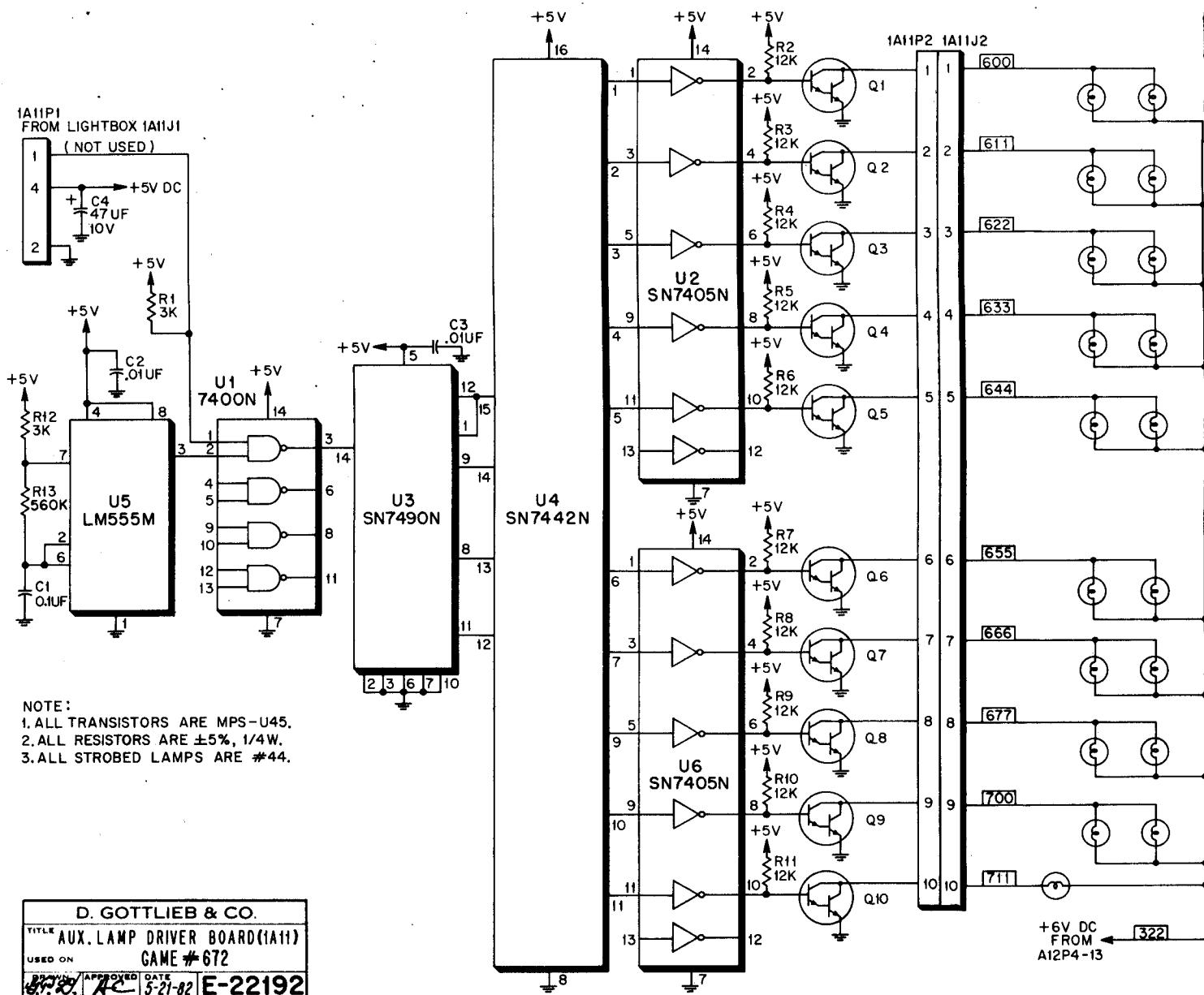
TITLE	RESET CIRCUIT BOARD (A24)		
USED ON			
DRAWN	APPROVED	DATE	C-21063
<i>[Signature]</i>	BAM	4-2-81	

RESET BOARD (A24) COMPONENT LOCATION

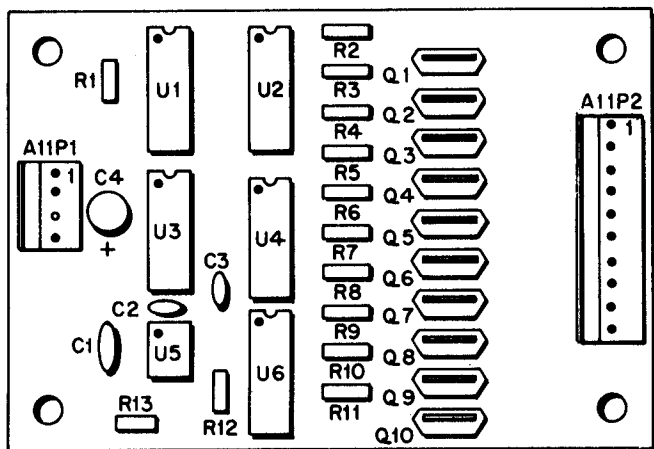


RESET BOARD (A24) PARTS LIST

REFERENCE	DESCRIPTION	PART NUMBER
R1, R2	Resistor 33K ohm, 5%, 1/4W.	XO-43
R3	Resistor 24K ohm, 5%, 1/4W.	XO-10
C1	Capacitor 47 μ d., 10V.	XO-227
C2	Capacitor 4.7 μ d., 10V.	XO-226
C3, C4	Capacitor 470 μ d., 16V.	XO-214
C5	Capacitor .01 μ d., 50V.	XO-229
Z1, Z2	IC 74123N	XO-398
Z3	IC 74LS00N	XO-427
	7 Pin Connector	XO-526



AUXILIARY LAMP DRIVER BOARD (A11) COMPONENT LOCATION



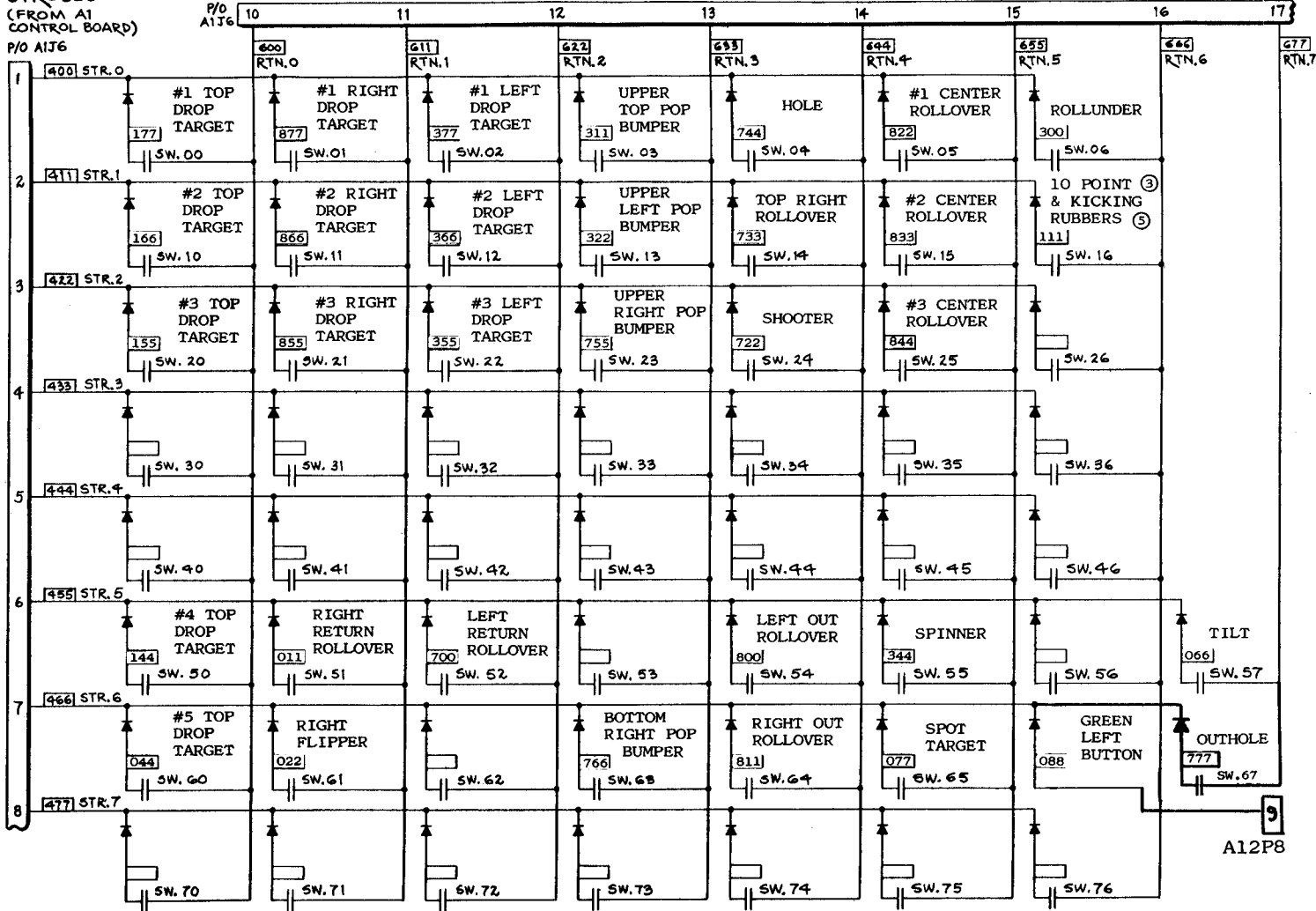
AUXILIARY LAMP DRIVER BOARD (A11) PARTS LIST

REFERENCE	DESCRIPTION	PART NUMBER
C1	CAPACITOR, .1 MFD, 100V	
C2-C3	CERAMIC RADIAL LEAD CAPACITOR, .01 MFD, 100V	
C4	RADIAL LEAD CAPACITOR, 47 MFD, 10V	
Q1-Q10	ELECTROLYTIC RADIAL LEAD TRANSISTOR, NPN DARLINGTON	MPS-U45
R1, R12	RESISTOR, 3K OHM, 5%, 1/4 W	
R2-R11	RESISTOR, 12K OHM, 5%, 1/4 W	
R13	RESISTOR, .560K OHM, 5%, 1/4 W	
U1	I.C. 2-INPUT NAND	SN7400N
U2, U6	I.C. INVERTER	SN7405N
U3	I.C. DECADE COUNTER	SN7490N
U4	I.C. DECODER	SN7442N
U5	I.C. TIMER	LM555N
P2	10 POS. SQUARE WIRE FRICTION LOCK CONNECTOR	
P1	4 POS. SQUARE WIRE FRICTION LOCK CONNECTOR	

X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS

STROBES
(FROM A1
CONTROL BOARD)
P/O A1J6

RETURNS (TO A1 CONTROL BOARD)



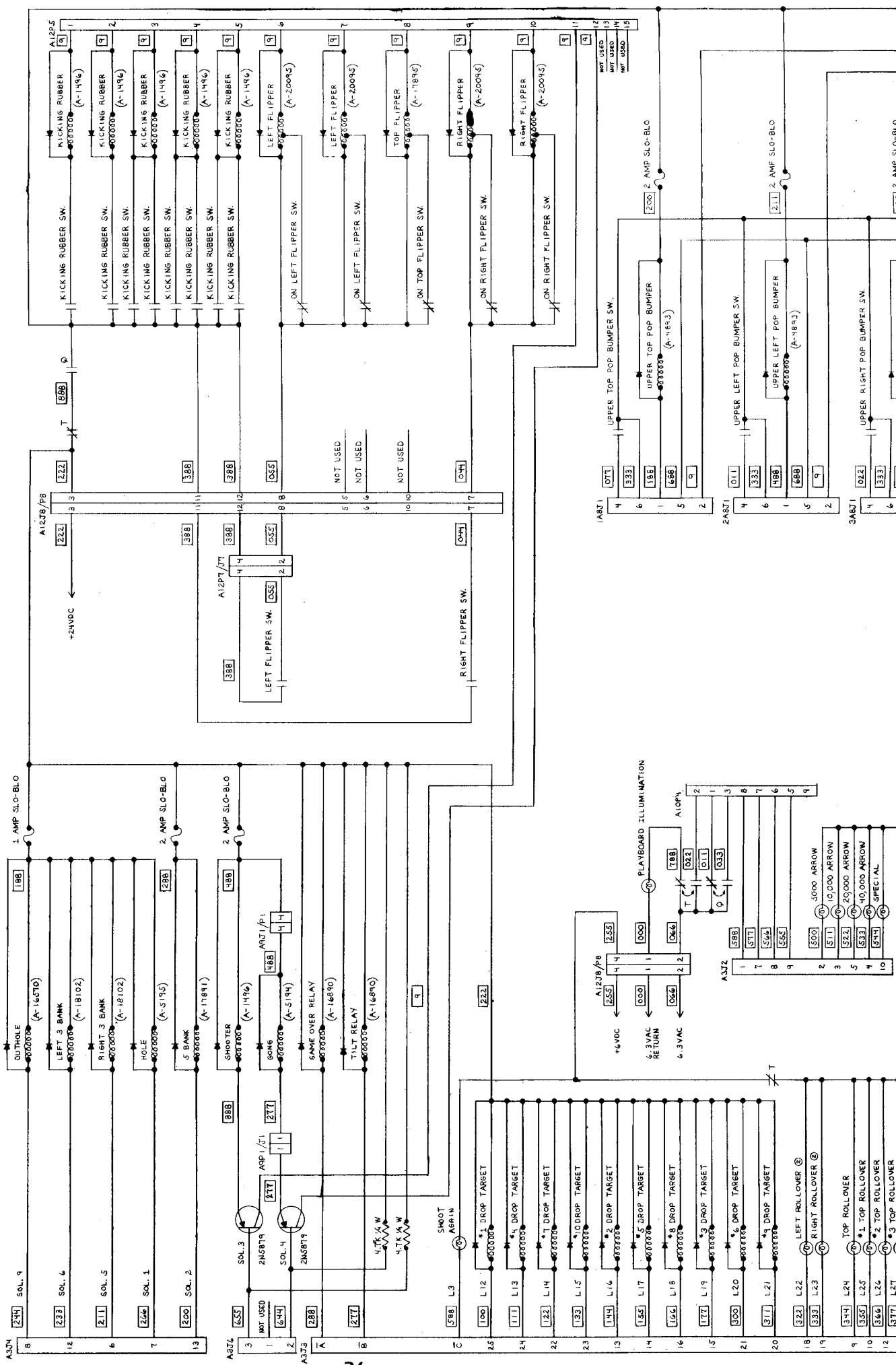
COLOR CODE	
0 BLACK	5 GREEN
1 BROWN	6 BLUE
2 RED	7 PURPLE
3 ORANGE	8 SLATE
4 YELLOW	9 WHITE

NOTE:
1. ALL DIODES ARE IN270.

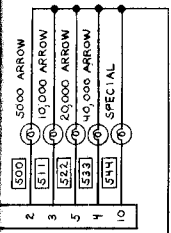
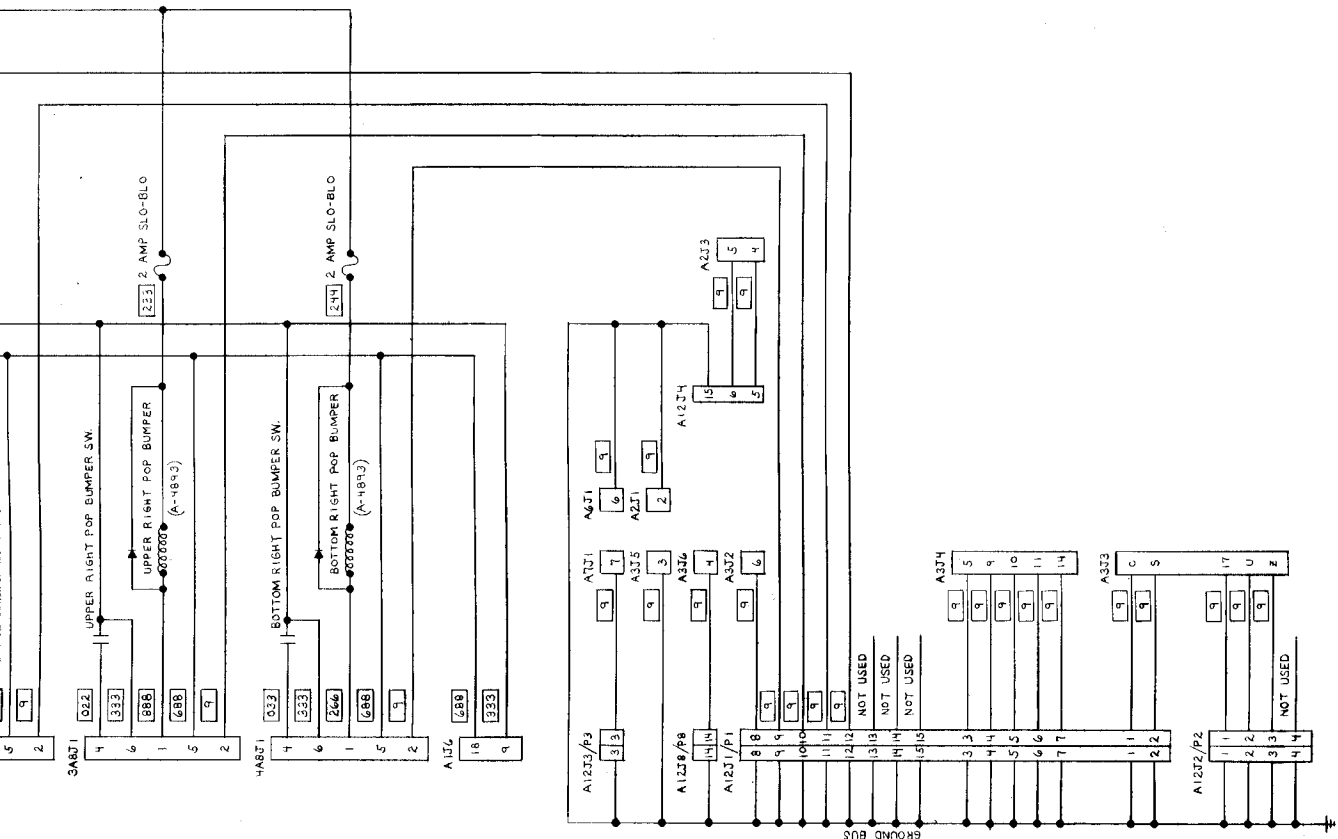
D. GOTTLIEB & CO.	
TITLE	SWITCH MATRIX
USED ON	GAME # 672
DRAWN	DATE
APPROVED	3-21-82
E-22191	

677
RTN.7

91



WIRING DIAGRAMS AND PARTS LISTS



18	RIGHT ROLLOVER	5333	L43
17	TOP ROLLOVER	3444	L24
16	#1 TOP ROLLOVER	5555	L25
15	#2 TOP ROLLOVER	3666	L24
14	#3 TOP ROLLOVER	5777	L27
13	UPPER TOP POP BUMPER	5000	L28
12	UPPER LEFT POP BUMPER	5111	L23
11	UPPER RIGHT POP BUMPER	5222	L30
10	BOTTOM RIGHT POP BUMPER	5333	L31
9	1000	5444	L32
8	2000	5555	L23
7	3000	5666	L34
6	4000	5777	L35
5	5000	5888	L40
4	6,000	5999	L41
3	EXTRA BALL	6666	L42
2	ZK	7777	L43
1	5X	8888	L44
D	10X	9999	L45
F	SPOT TARGET	0000	L46
P	RIGHT OUT ROLLOVER	1111	L47
M	NOT USED	2222	L48
	NOT USED	3333	L49
	NOT USED	4444	L50
	NOT USED	5555	L51
N	LEFT OUT ROLLOVER	6666	L51
A374	5000	6666	L36
1	6000	7777	L37
2	7000	8888	L38
3	8000	9999	L39

D. GOTTLIEB & CO.

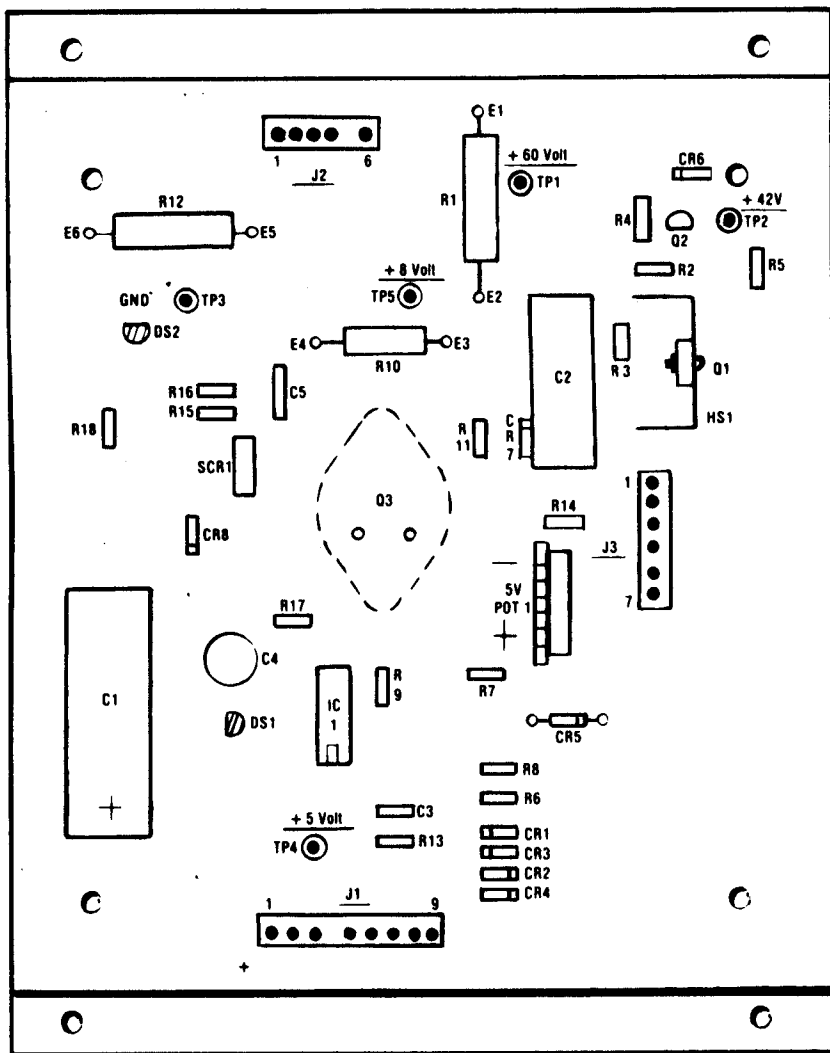
TITLE: **PLAYFIELD SOLENOIDS AND ILLUMINATION GAME #672**

USED ON: _____

DRAWN: **R** APPROVED: **AC** DATE: **5-21-82**

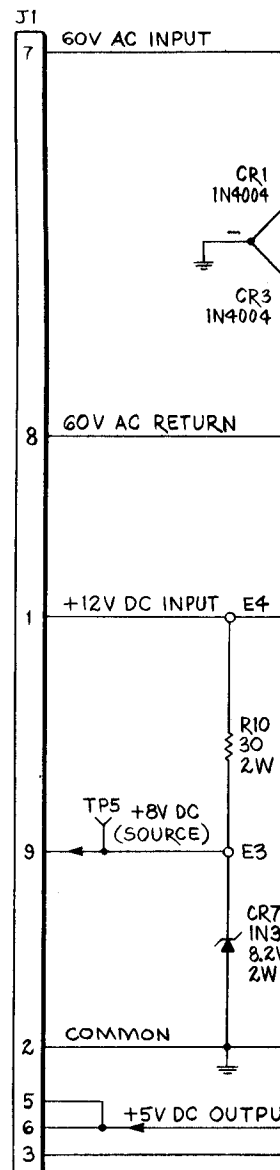
E-22193

POWER SUPPLY (A2) COMPONENT LOCATION



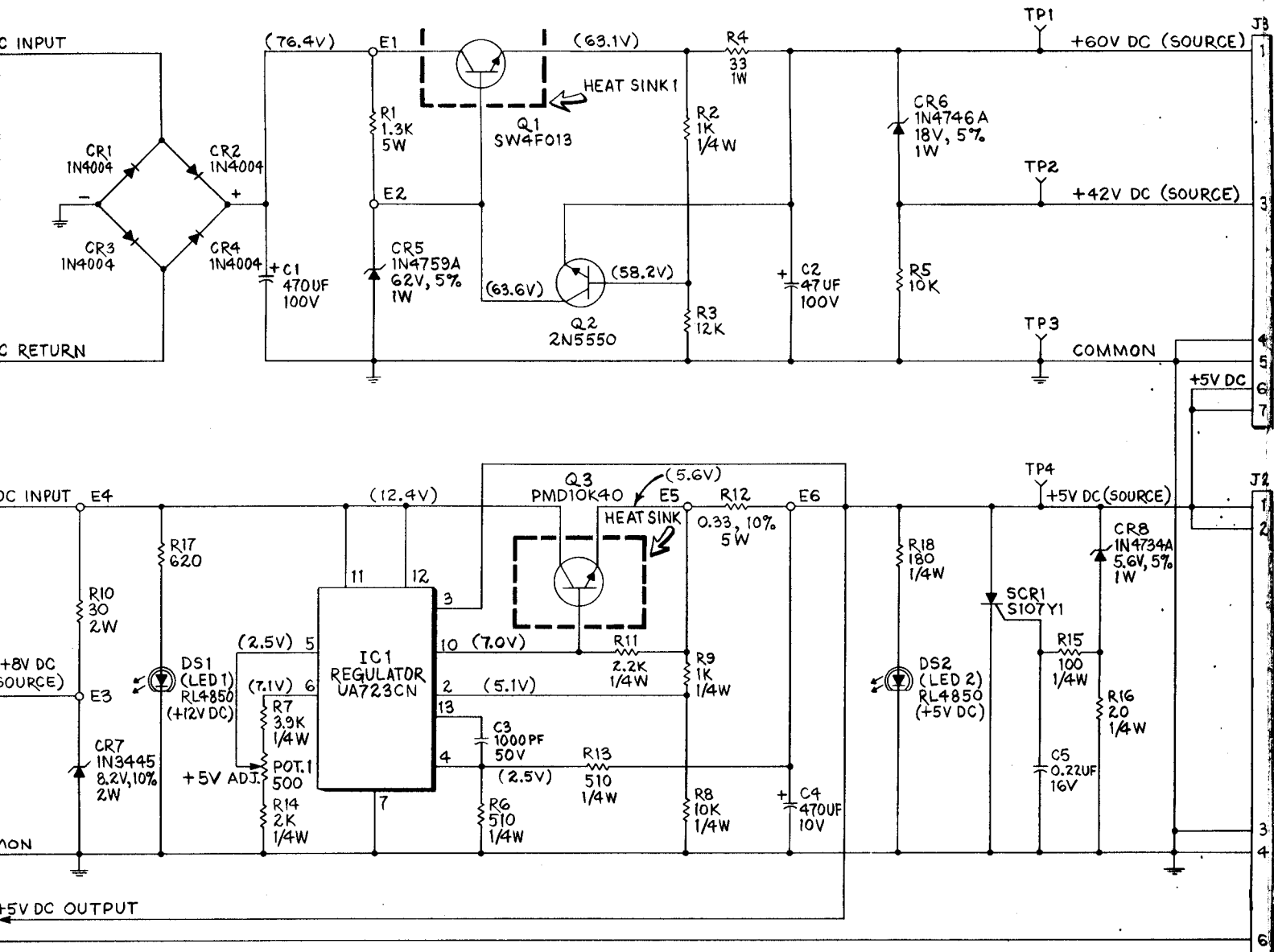
POWER SUPPLY (A2) PARTS LIST

REFERENCE	DESCRIPTION	PART NUMBER	REFERENCE	DESCRIPTION	PART NUMBER
C1	Capacitor, 470 mfd., 100V		R4	Resistor, 33 ohm, 5%, 1W	
C2	Capacitor, 47 mfd., 100V		R5	Resistor, 10K ohm, 5%, 1/2W	
C3	Capacitor, 1000 Picofarad, 50V		R6, R13	Resistor, 510 ohm, 5%, 1/4W	
C4	Capacitor, 470 mfd., 10V		R7	Resistor, 3.9K ohm, 5%, 1/4W	
C5	Capacitor, 2 mfd., +80%, -20%, 16V		R8	Resistor, 10K ohm, 5%, 1/4W	
CR1-CR4	Diode	1N4004	R10	Resistor, 30 ohm, 5%, 2W	
CR5	Diode, Zener, 6.2V, 5%, 1W	1N4759A	R11	Resistor, 2.2K ohm, 5%, 1/4W	
CR6	Diode, Zener, 18V, 5%, 1W	1N4746A	R12	Resistor, .33 ohm, 10%, 5W (Wirewound)	
CR7	Diode, Zener, 8.2V, 10%, 2W	1N3445	R14	Resistor, 2K ohm, 5%, 1/4W	
CR8	Diode, Zener, 5.6V, 5%, 1W	1N4734A	R15	Resistor, 100 ohm, 5%, 1/4W	
DS1, DS2	Diode, Light Emitting	CM4-22	R16	Resistor, 20 ohm, 5%, 1/4W	
E1-E6	Turret Terminal		R17	Resistor, 620 ohm, 5%, 1/2W	
IC1	I.C.—14 Pin Dip	UA723CN	R18	Resistor, 180 ohm, 5%, 1/4W	
J1	Connector, 9 Pin, Molex		SCR1	Silicon Controlled Rectifier	S107Y1
J2	Connector, 6 Pin, Molex		TP1-TP5,	Turret Terminal	
J3	Connector, 7 Pin, Molex			Eyelet	GS2-3
POT1	Potentiometer, 500 ohm, CTS	115R501A		Heat Sink Mounting Plate	
Q1	Transistor, NPN, National	SW4F013		Heat Sink, Thermalloy	
Q2	Transistor, NPN	2N5550		Insulator	INS-3
Q3	Transistor, Darlington, LAMBDA	PMD10K40		Insulator	DM111
R1	Resistor, 1.3K ohm, 10%, 5W			Spacer—6-32 Thread x 5/32	
R2, R9	Resistor, 1K ohm, 5%, 1/4W			Spacer—6-32 Thread x 1/8	
R3	Resistor, 12K ohm, 5%, 1/2W				



NOTE: UNLESS OTHERWISE SPECIFIED:
 1. RESISTORS ARE 1/4W
 2. VOLTAGES ARE DC
 3. ALL VOLTAGES ARE TO COMMON

CIRCUIT DIAGRAMS, PARTS LISTS

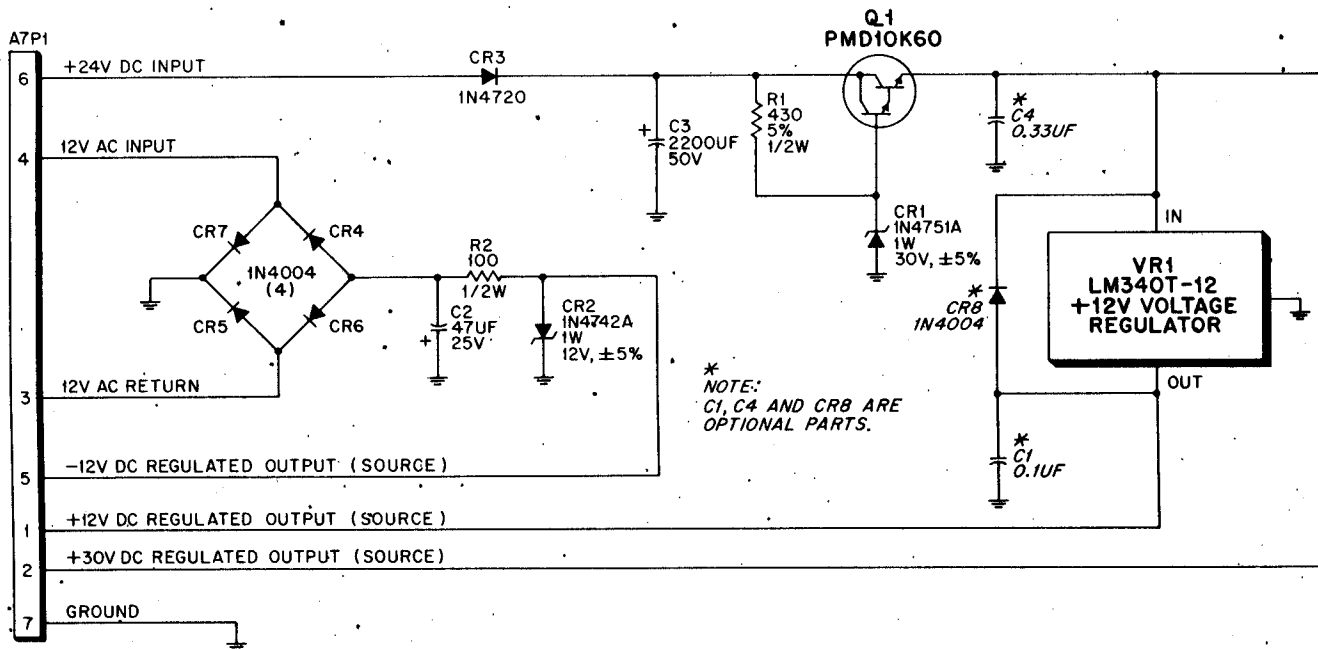


NOTE: UNLESS OTHERWISE SPECIFIED,
RESISTORS ARE $\pm 5\%$, 1/2W.
VOLTAGES ARE DC WITH RESPECT TO CIRCUIT GROUND.
ALL VOLTAGES ARE AT NOMINAL LINE VOLTAGE (115V AC).

CUTTING OUT: CHECK POT 1 IS NOT NOISY.

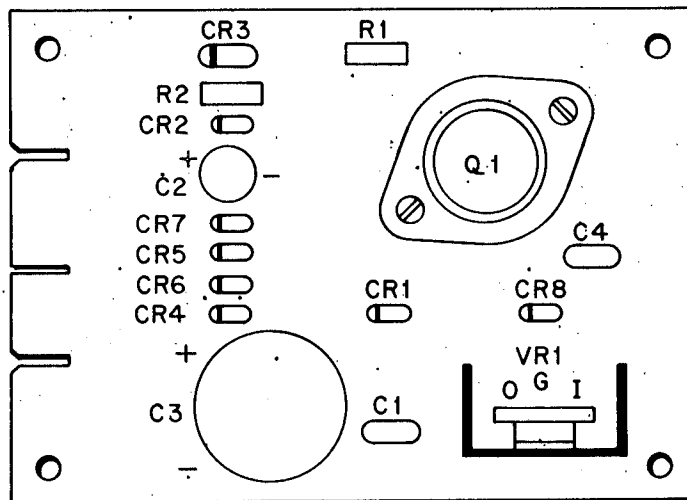
D. GOTTLIEB & CO.			
TITLE	POWER SUPPLY (A2)		
USED ON			
DRAWN	APPROVED	DATE	E-20922
<i>[Signature]</i>	<i>[Signature]</i>	2-3-81	

X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS



D. GOTTLIEB & CO.	
TITLE	SOUND/SPEECH BOARD POWER SUPPLY A7
USED ON	
DRAWN	APPROVED DATE
8-1-81	8-5-81
D-21343	

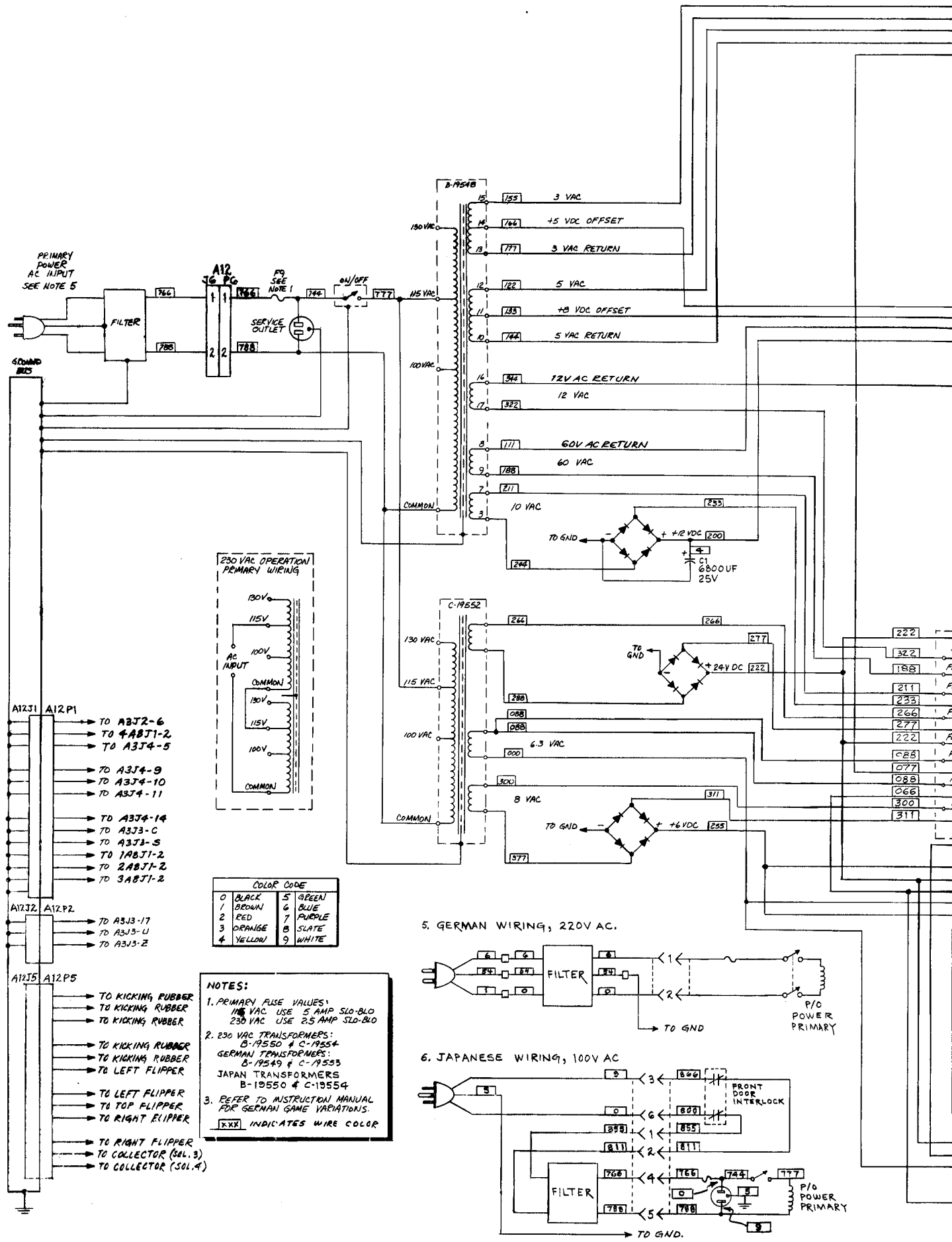
SOUND/SPEECH POWER SUPPLY (A7) COMPONENT LOCATION



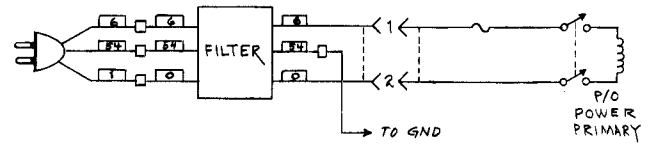
SOUND/SPEECH POWER SUPPLY (A7) PARTS LIST

REFERENCE	DESCRIPTION	PART NO.
C1	Capacitor 0.1 UF	
C2	Capacitor 47 UF, 25 Volt	
C3	Capacitor 2200 UF, 50 Volt	
C4	Capacitor 0.33 UF	
CR1	Diode, Zener 30 V, ± 5%, 1W	1N4751A
CR2	Diode, Zener 12V, ± 5%, 1W	1N4742A
CR3	Diode	1N4720
CR4, CR5, CR6 CR7, CR8	Diode	1N4004
R1	Resistor 430 OHM, 5%, 1/2 Watt	
R2	Resistor 100 OHM, 1/2 Watt	
Q1	Transistor, Darlington Pair	PMD 10K60
VR1	+ 12 Volt Voltage Regulator	LM 340T-12

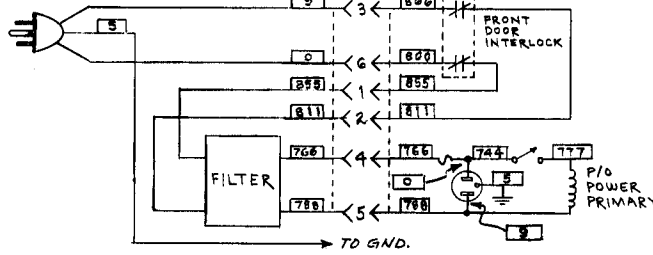
X. WIRING AND SCHEMATIC

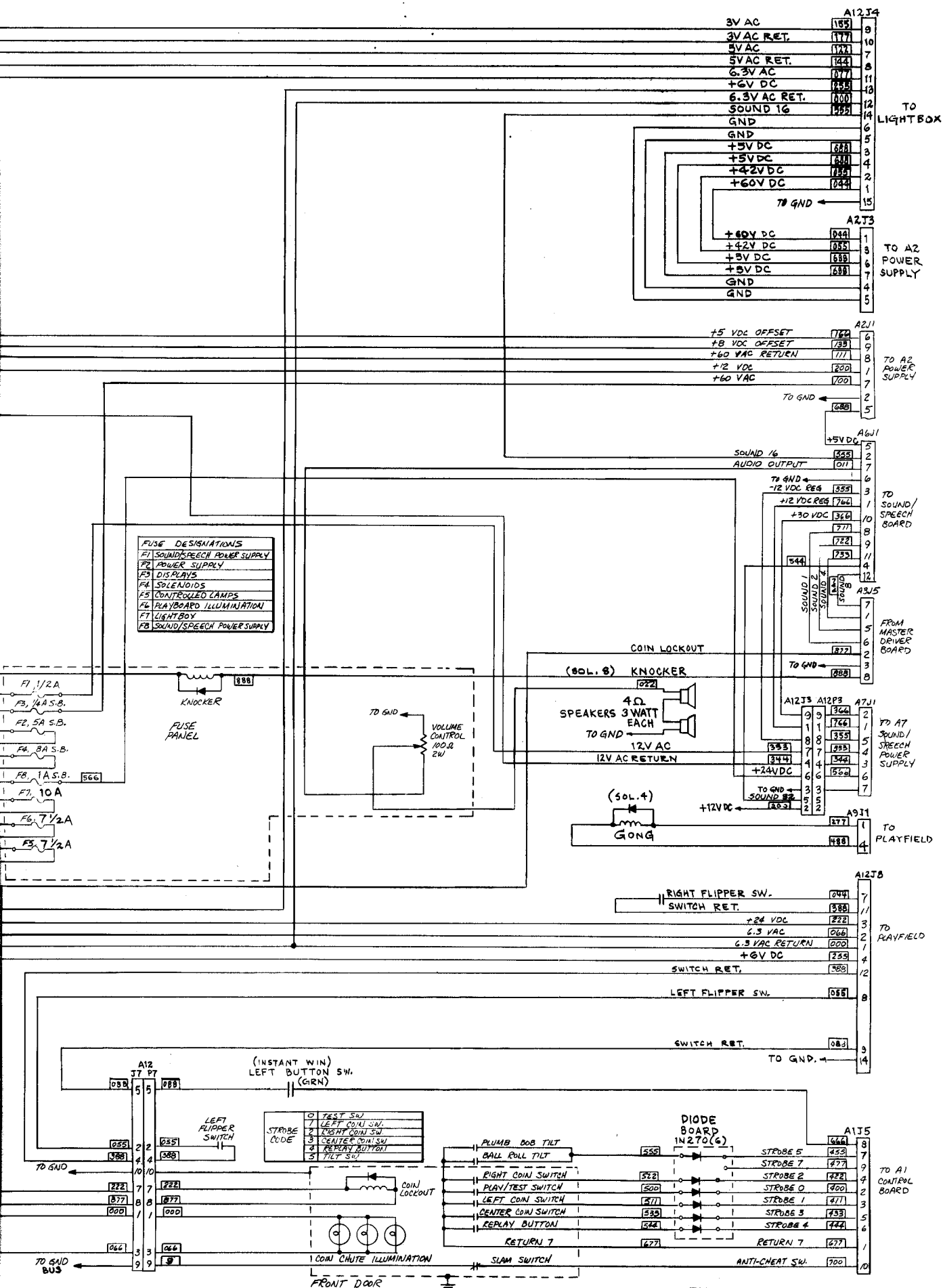


5. GERMAN WIRING, 220V AC.



6. JAPANESE WIRING, 100V AC





D. GOTTLIEB & CO.

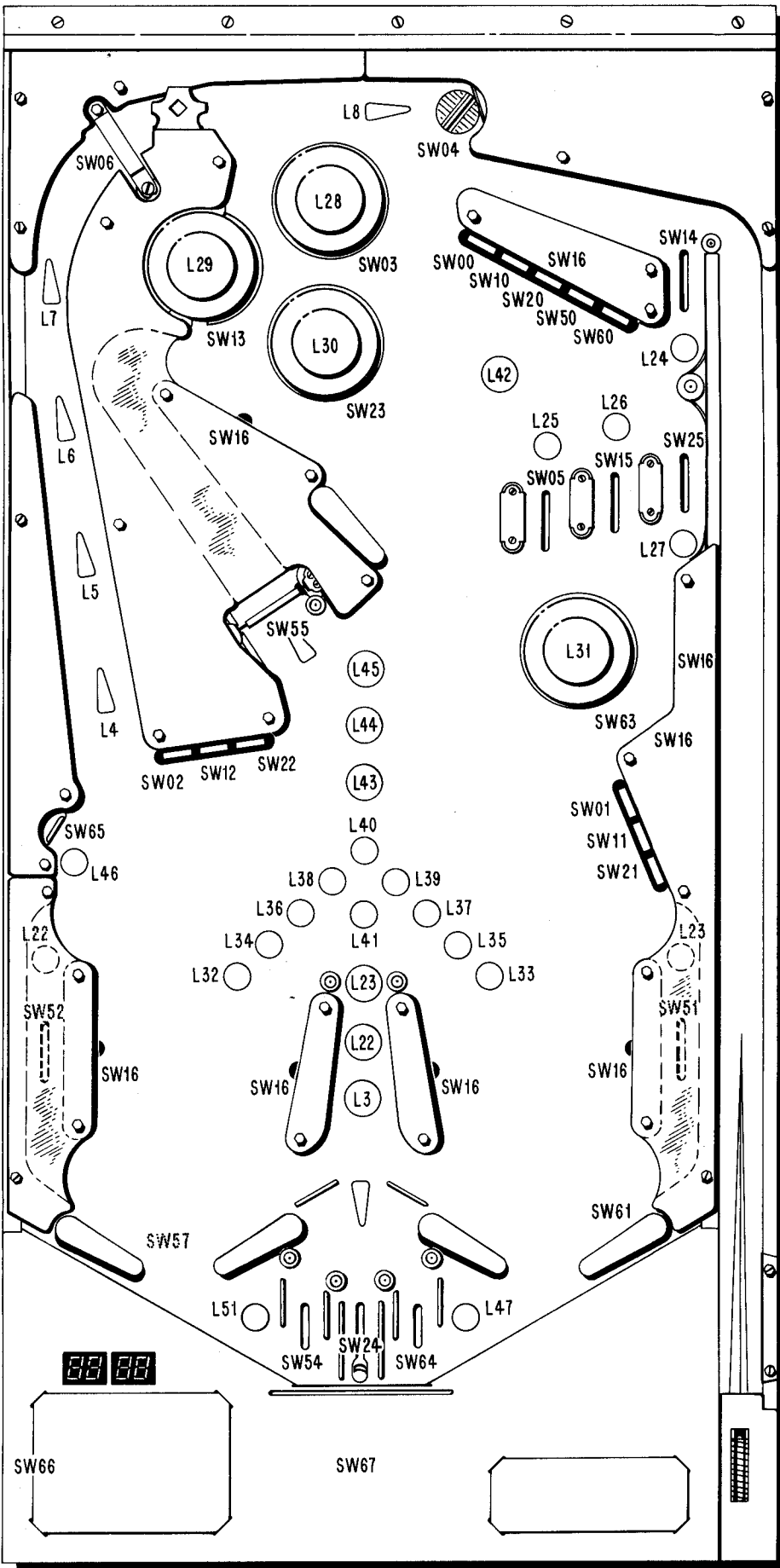
TITLE: **BOTTOM BOARD AND CABINET**

USED ON: **GAME # 672**

DRAWN: **R** APPROVED: **AC** DATE: **5-21-62** E-22194

X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS

PLAYBOARD SWITCH AND LAMP ASSIGNMENTS



SWITCH MATRIX

SWITCH NO.	SWITCH ASSIGNMENT	PART NO.
00	#1 Top Drop Target	B-19209
01	#1 Right Drop Target	B-19209
02	#1 Left Drop Target	B-19209
03	Upper Top Pop Bumper	B-21352
04	Hole	B-19739
05	#1 Center Rollover	B-18892
06	Rollunder	B-21137
10	#2 Top Drop Target	B-19209
11	#2 Right Drop Target	B-19211
12	#2 Left Drop Target	B-19211
13	Upper Left Pop Bumper	B-21352
14	Top Right Rollover	B-18892
15	#2 Center Rollover	B-18892
16	10 Point (3) and Kicking Rubbers (5)	B-18079
20	#3 Top Drop Target	B-22094
21	#3 Right Drop Target	B-19292
22	#3 Left Drop Target	B-19292
23	Upper Right Pop Bumper	B-21352
24	Shooter (on the Ropes)	B-18892
25	#3 Center Rollover	B-18892
50	#4 Top Drop Target	B-19292
51	Right Return Rollover	B-18892
52	Left Return Rollover	B-18892
54	Left Out Rollover	B-18892
55	Spinner	B-19354
57	Tilt	B-9141
60	#5 Top Drop Target	B-19292
61	Right Flipper	B-20873
63	Bottom Right Pop Bumper	B-21352
64	Right Out Rollover	B-18892
65	Spot Target	B-20867
66	Green Left Button	B-17838
67	Outhole	B-18892

LAMP

LAMP NO.	LAMP ASSIGNMENT
L3	Shoot Again
L4	5000 Arrow
L5	10,000 Arrow
L6	20,000 Arrow
L7	40,000 Arrow
L8	Special
L22	Left Rollover (2)
L23	Right Rollover (2)
L24	Top Rollover
L25	#1 Center Rollover
L26	#2 Center Rollover
L27	#3 Center Rollover
L28	Upper Top Pop Bumper
L29	Upper Left Pop Bumper
L30	Upper Right Pop Bumper
L31	Bottom Right Pop Bumper
L32	1000 Bonus
L33	2000 Bonus
L34	3000 Bonus
L35	4000 Bonus
L36	5000 Bonus
L37	6000 Bonus
L38	7000 Bonus
L39	8000 Bonus
L40	9000 Bonus
L41	10,000 Bonus
L42	Extra Ball
L43	2X
L44	5X
L45	10X
L46	Spot Target
L47	Right Out Rollover
L51	Left Out Rollover

XI. PARTS INFORMATION

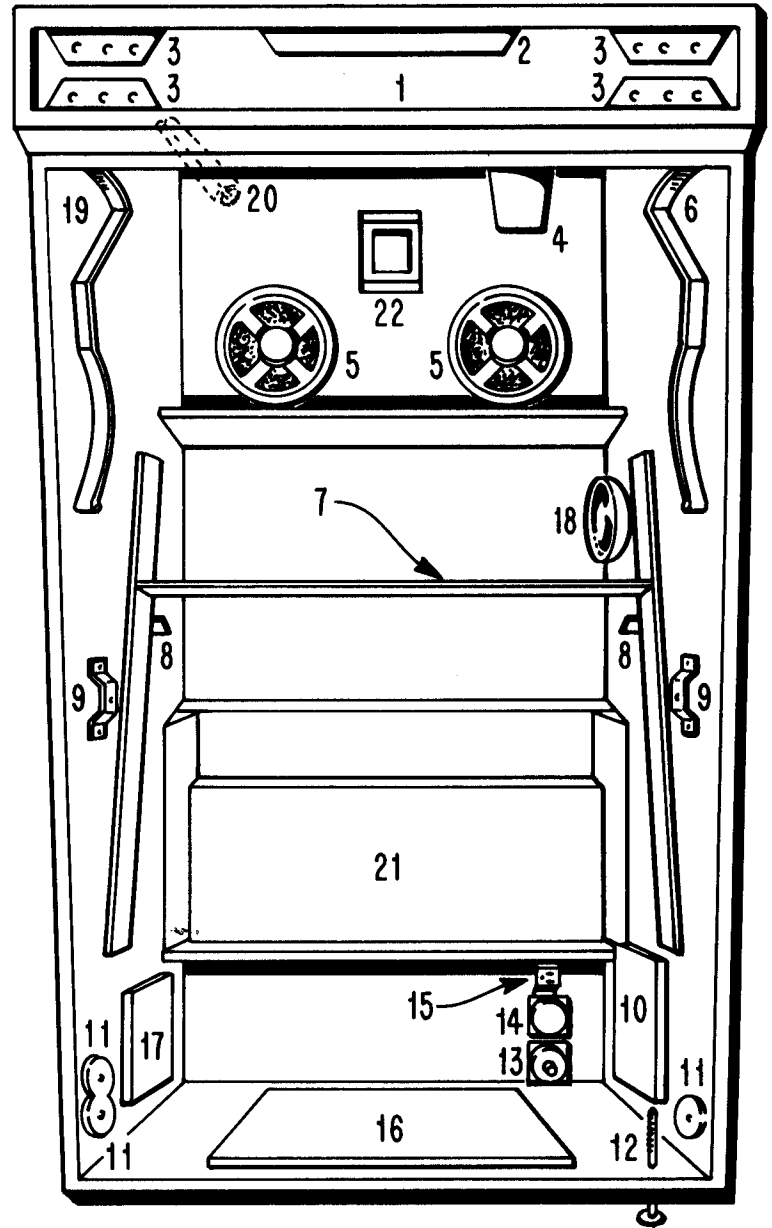
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XI. PARTS INFORMATION

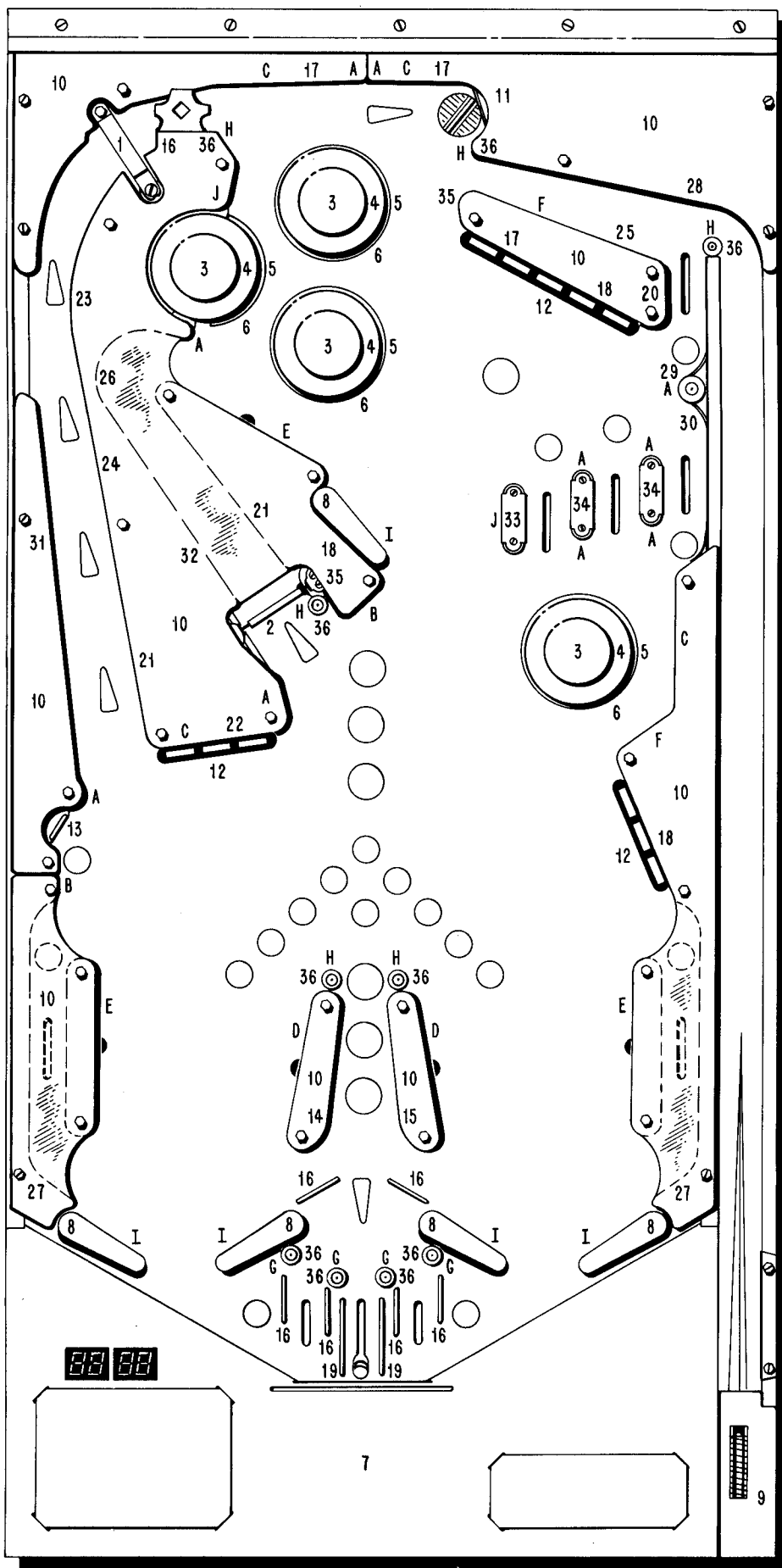
CABINET PARTS

ITEM	DESCRIPTION	PART NO.
1.	Cabinet	Specify Game
2.	Hold Down Angle Bracket	B-19587
3.	Lightbox Mounting Bracket (4)	A-19916
4.	Line Cord Housing	C-18534
5.	Speakers 4 Ohm (2)	EL-83
6.	Right Playboard Support	D-19932
7.	Playboard Prop	D-19604
8.	Stop Bracket	A-5024
9.	Front Rest Saddle	A-11345
10.	Knocker Board Assy.	MA-261
	Knocker	MA-12
	Pot and Mounting Bracket	MA-185
	F1, ½ Amp Fuse	EL-28
	F2, 5 Amp SLO-BLO Fuse	EL-8
	F3, ¼ Amp SLO-BLO Fuse	EL-5
	F4, 8 Amp SLO-BLO Fuse	EL-26
	F5 & 6, 7½ Amp Fuse	EL-22
	F7, 10 Amp Fuse	EL-23
	F8, 1 Amp SLO-BLO Fuse	EL-6
11.	Flipper Switch Assy.	B-17838
12.	Ball Shooter	B-8835
13.	Fuse Assy.	MA-186
14.	Switch	A-15401
	Switch Housing	A-15163
15.	Convenience Outlet	MA-17
16.	Front Door Assy.	Specify Game
17.	Ball Roll Tilt	MA-13
18.	5" Bell Assembly	MA-352
19.	Left Playboard Support	D-19931
20.	Cabinet Leg (4)	D-4337
	3" Leg Adjuster	MH-21
21.	Transformer Board Assy.	MA-266A
	Bridge Rectifier	EL-42
	Capacitor, 6800 mf, 25 Volt	XO-228
22.	Line Filter	EL-50



XI. PARTS INFORMATION

PLAYBOARD PARTS



RUBBER RINGS

A	A-10217	5/16"	(12)
B	A-10218	3/4"	(2)
C	A-10220	1 1/2"	(4)
D	A-10221	2"	(2)
E	A-10222	2 1/2"	(3)
F	A-10223	3"	(2)
G	A-14793	Mini	(4)
H	A-15705	Mini	(7)
I	A-13151	1 13/16"	(5)
J	A-10219	1"	(2)

PARTS LIST

1. A-4869 Shield
2. A-20388 Spinner
3. A-21860 Pop Bumper Cap (Specify Color) (4)
4. C-10435 Pop Bumper Body (Specify Color) (4)
5. C-10433 Pop Bumper Skirt (Specify Color) (4)
6. B-8246 Pop Bumper Trim Platter (4)
7. D-20187 Card Holder
8. C-13150 White Flipper (5)
9. C-9767 Ball Shooter Gauge
10. D-21805 Plastic Shield Set
11. A-16038 Ball Snubber
12. Drop Target Banks "ROCKY" A-21862
Round # 1, A-22061 Round # 6, A-22071
Round # 2, A-22063 Round # 7, A-22073
Round # 3, A-22065 Round # 8, A-22075
Round # 4, A-22067 Round # 9, A-22077
Round # 5, A-22069 Round # 10, A-22079
13. A-9374U Target, Red
14. A-12107 Ball Guide Rail
15. A-12106 Ball Guide Rail
16. A-6931 Ball Guide Rail (7)
17. A-17650 Ball Guide Rail (3)
18. A-17106 Ball Guide Rail (3)
19. A-3722 Ball Guide Rail (2)
20. A-18070X Ball Guide Rail
21. A-11703 Ball Guide Rail (2)
22. A-4831 Ball Guide Rail
23. B-21720 Ball Guide Rail
24. A-13833 Ball Guide Rail
25. A-5977 Ball Guide Rail
26. B-21718 Metal Flat Rail
27. B-21719 Metal Flat Rail (2)
28. C-21721 Metal Flat Rail
29. A-21716 Metal Flat Rail
30. A-21717 Metal Flat Rail
31. D-21722 Metal Flat Rail
32. B-20086 Ball Guide Rail
33. A-9393 Guide Rail 1 1/2" Single
34. A-9394Z Guide Rail 1 1/2" Double (White)
A-9394U Guide Rail 1 1/2" Double (Red)
35. A-17492 Siamese Post (2)
36. A-14792 Mini Post Screw

C-11561	Plastic Post	1" High	(38)
C-11562	Plastic Post	1 3/16" High	(3)

 **Gottlieb**TM
AMUSEMENT GAMES

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