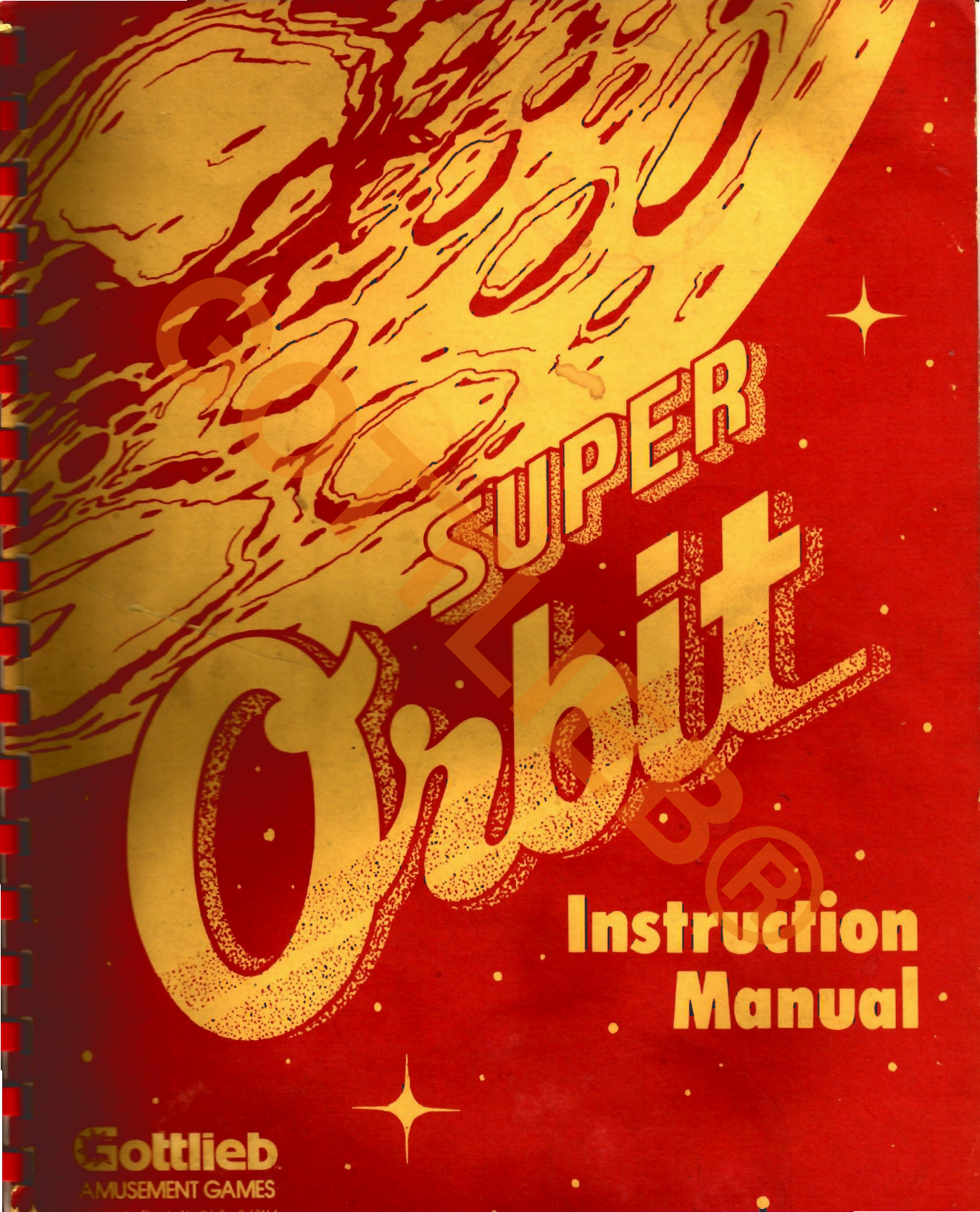




# SUPER Orbitt

**Instruction  
Manual**

**Gottlieb**  
AMUSEMENT GAMES

SUPER ORBIT  
(GAME #680)

FINAL EDITION

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

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SUPER ORBIT PROMS

GAME PROM 680/1

SOUND PROMS 680/S1, 680/S2

## 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:

|        | U2       | U3       | SOCKET   |
|--------|----------|----------|----------|
| SYSTEM | PART NO. | PART NO. | PART NO. |
| 80     | XO-363   | XO-362   | 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

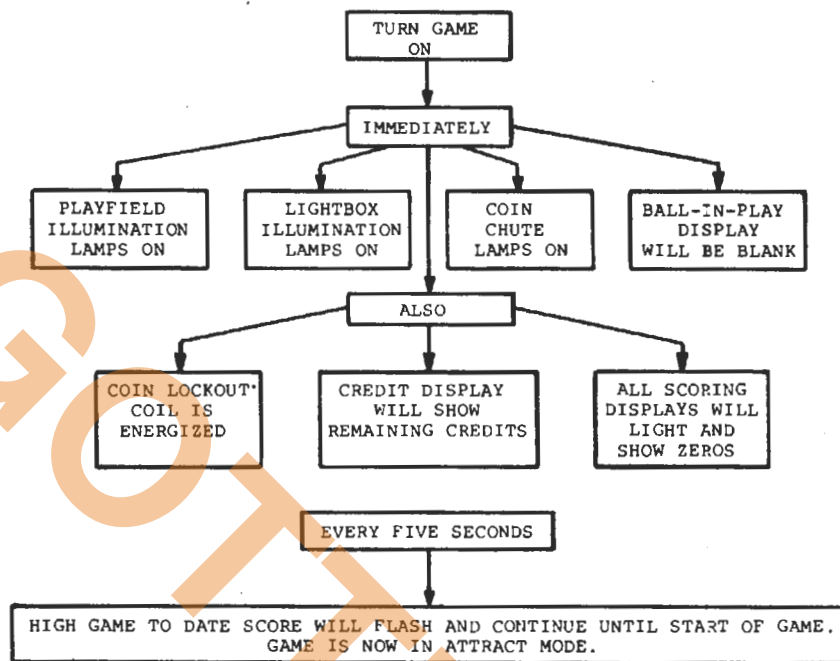
1. Bolt the legs to the cabinet.
2. Lift lightbox into an upright position. Be sure none of the cables are crimped in between the lightbox and cabinet.
3. Engage the snap in the rear of the lightbox to the cabinet.
4. Open the cabinet door and loosen the front moulding locking arm.
5. Remove the moulding from the playfield.
6. Slide the cabinet glass forward and remove it.
7. Raise the playboard, slide it forward and rest it on its supports.
8. 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.
9. Unlock the lightbox and remove the backglass.
10. Loosen and lower the shipping bracket at the top center of the lightbox insert panel.
11. Lift the insert; then swing it out.
12. Secure the lightbox to the cabinet with the bolts and washers provided.

## 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 and 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 line-cord into a properly grounded 3-wire receptacle ONLY!
12. Refer to Section VI to make all necessary game adjustments.

## II. INITIALIZATION, III. GAME OPERATION

### 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. 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.

#### E. 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.

#### F. 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. HIGH GAME TO DATE is periodically flashed in all players score displays. When a score higher than HIGH GAME TO DATE 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

### ORBIT LAMPS

- There are ten Orbit lamps in the center of the play-board. Each is worth 1000 points when the bonus is collected. One complete revolution of the Orbit lamps lights one bonus lamp. The bonus values start at 10,000 points and are incremented by 10,000 points. The maximum accumulated bonus is 190,000. Additional bonus of 1000 points per "Orbit" position back to "0".

### 10-POINT SWITCHES (2)

- Scores 10 points.
- Toggles pop bumper lights.

### POP BUMPERS (3)

- Unlit-Scores 1000 points.  
Advance Orbit lamp one position.
- Lit-Scores 10,000 points.  
Advance Orbit lamp one position (5 ball).  
Advance Orbit lamp two positions (3 ball).

### LEFT TOP ROLLOVER

- Scores 5000 points.
- Advances Orbit lamps.
- Toggles left outlane rollover light.

### LEFT SIDE ROLLOVER

- Same as above.

### TOP LEFT SPOT TARGET

- Same as above.

### RIGHT TOP ROLLOVER

- Scores 5000 points.
- Advances Orbit lamps.
- Toggles right outlane rollover light.

### RIGHT SIDE ROLLOVER

- Same as above.

### TOP RIGHT SPOT TARGET

- Same as above.

### LOWER RIGHT SPOT TARGET

- Same as above.

### ROLLUNDER

- Scores 30,000 points.
- Awards bonus.

### LEFT RETURN ROLLOVER

- Scores 5000 points.
- Opens gate.

### RIGHT OUTLANE ROLLOVER

- Unlit-Scores 3000 points.
- Lit-Scores 30,000 points.  
Awards bonus when lit and gate is open.

### LEFT OUTLANE ROLLOVER

- Unlit-Scores 3000 points.
- Lit-Scores 30,000 points.

## IV. GAME PLAY AND SCORING

### SPINNING TARGET

- Scores 1000 points.
- Advances Orbit lights one step each spin.

### KICKING RUBBER

- Scores 100 points.
- Toggles pop bumper lights.

### TOP CENTER ROLLOVER

- Scores 10,000 points.
- Advances bonus one step.
- Toggles center pop bumper light.

### SPECIAL

- The special is lit when specific Orbit lamps are lit. Special is awarded when the vari-target is pushed up to the fifth level.

### VARI-TARGET

- First level-Scores 1000 points.
- Advances bonus one step.
- Second level-Scores 2000 points.
- Advances bonus two steps.
- Third level-Scores 3000 points.
- Advances bonus three steps.
- Fourth level-Scores 4000 points.
- Advances bonus four steps.
- Fifth level-Scores 5000 points.
- Advances bonus five steps.
- Sixth level-Scores 5000 points.
- Advances bonus five steps.
- Lights double bonus (double bonus is always on in last ball).
- Scores special when lit (one per ball).

## V. SOUND

The Sound Board installed in this game  
has been programmed for sound only.

GOTTLEB®

## VI. GAME ADJUSTMENTS

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

\* SPECIAL LAMP IS LIT WHEN ANY OF THESE ORBIT LAMPS ARE LIT.

\*\* NUMBER OF STEPS THE ORBIT LAMPS ADVANCE WHEN THE LEFT TOP ROLLOVER, LEFT SIDE ROLLOVER, TOP LEFT SPOT TARGET, RIGHT TOP ROLLOVER, RIGHT SIDE ROLLOVER, LOWER RIGHT SPOT TARGET OR THE TOP RIGHT SPOT TARGET ARE ACTIVATED.

#### ADDITIONAL COIN CHUTE COMBINATIONS CREDIT INCENTIVES

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

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

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 \_\_\_\_\_ LIBERAL/CONSERVATIVE

|     |           |               |  |              |           |                       |   |
|-----|-----------|---------------|--|--------------|-----------|-----------------------|---|
|     |           | 3 BALL        |  | *ORBIT LAMPS |           | **ORBIT LAMP ADVANCES |   |
| ON  | ON (LIB)  | 1-2-4-5-6-7-9 |  | ON           | OFF (MED) | 1-2-4-5-7             | 5 |
| ON  | OFF (MED) | 1-2-4-5-7     |  | OFF          | OFF (CON) | 4-5-7                 | 4 |
| OFF | OFF (CON) | 4-5-7         |  |              |           |                       | 3 |
|     |           | 5 BALL        |  |              |           |                       |   |
| ON  | ON (LIB)  | 1-4-6-7       |  | ON           | OFF (MED) | 1-4-7                 | 4 |
| ON  | OFF (MED) | 1-4-7         |  | OFF          | OFF (CON) | 4-7                   | 3 |
| OFF | OFF (CON) | 4-7           |  |              |           |                       | 2 |

## VI. GAME ADJUSTMENTS

### B. SOUND ADJUSTMENTS

The speaker output is controlled by the potentiometer mounted on the front door.

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

**IMPORTANT:** Each of the potentiometers installed on the Sound 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 | NOT USED                      |
| SB1-7 | NOT USED                      |
| SB1-8 | NOT USED                      |

### C. POST ADJUSTMENTS

The bottom post at the mouth of the right outlane can be repositioned for liberal/conservative play. The smaller opening produces a more liberal game play.

## 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 SYSTEM 80A

- . 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.

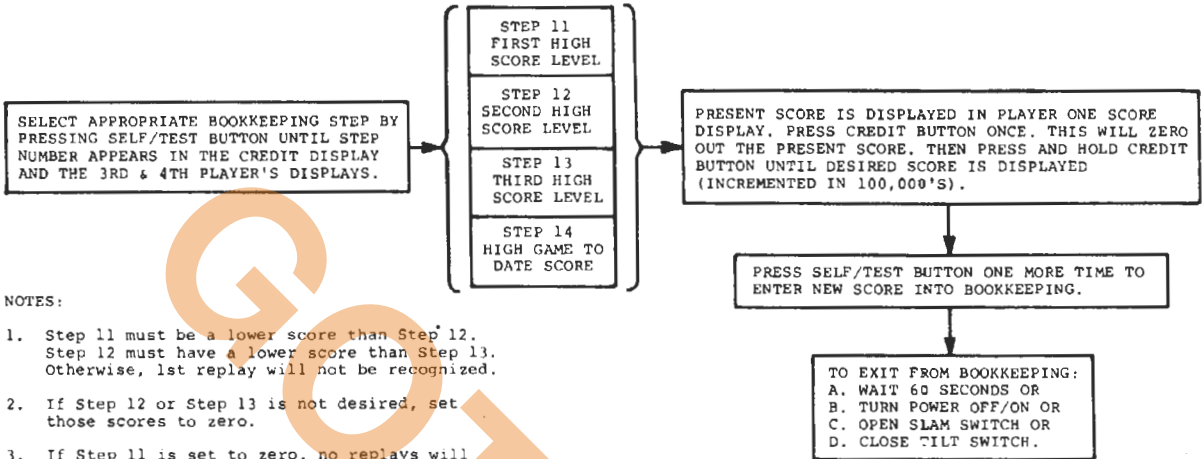
4. To exit from Bookkeeping at any time:
  - a. Wait 60 seconds or
  - b. Turn power OFF/ON or
  - c. Open slam switch or
  - d. Close a tilt switch.

### 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 HIGH SCORE LEVELS OR HIGH GAME TO DATE SCORES

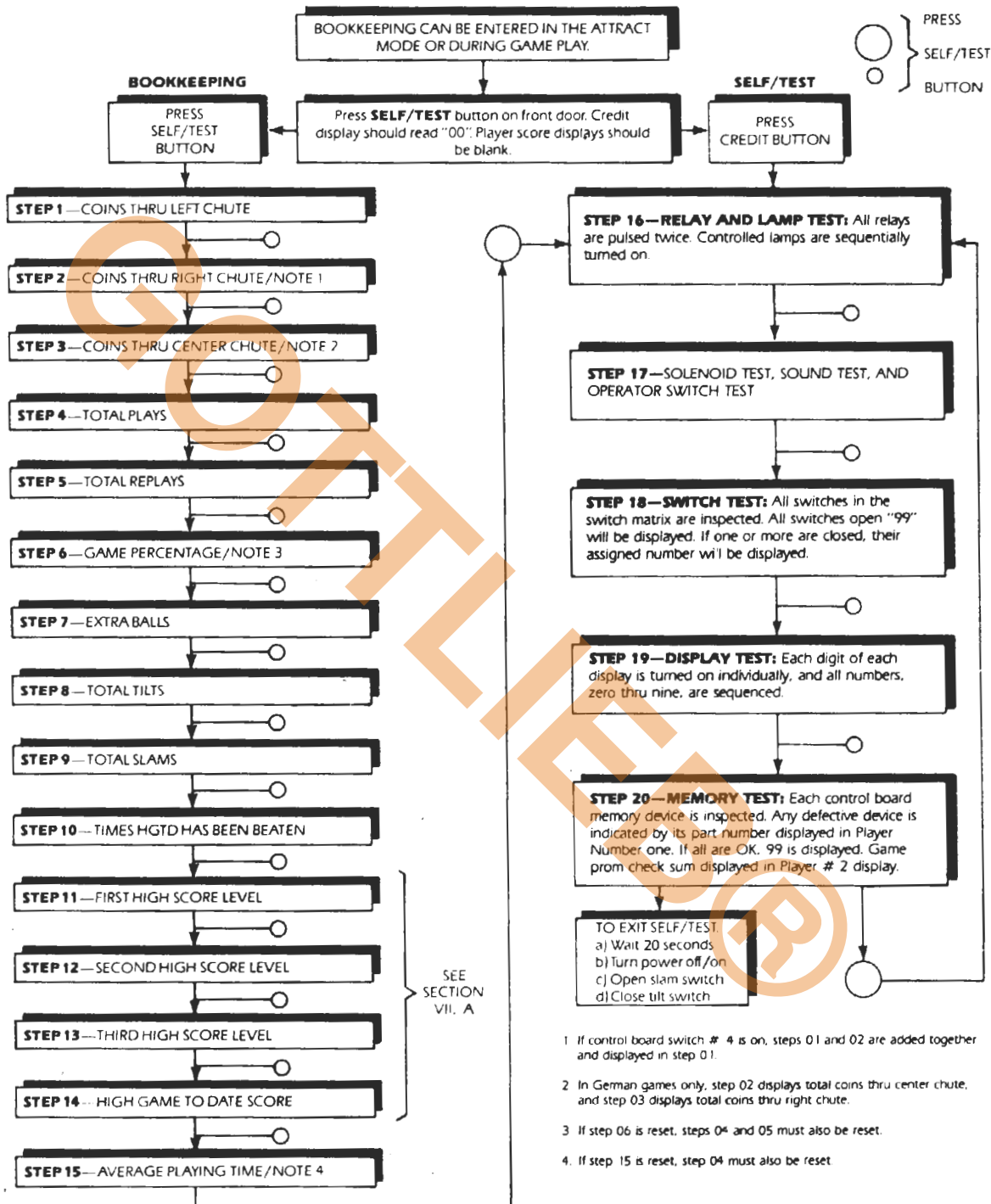


NOTES:

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.

## VII. BOOKKEEPING AND SELF TEST

### B. FLOW CHART



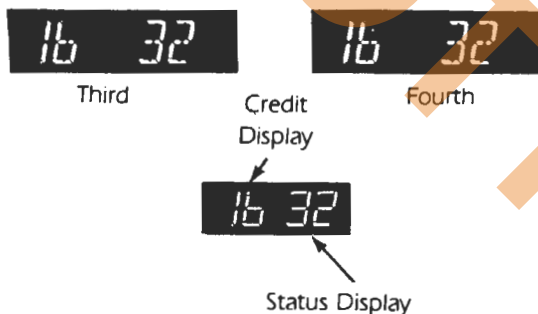
1. If control board switch # 4 is on, steps 01 and 02 are added together and displayed in step 01.
2. In German games only, step 02 displays total coins thru center chute, and step 03 displays total coins thru right chute.
3. If step 06 is reset, steps 04 and 05 must also be reset.
4. If step 15 is reset, step 04 must also be reset.

## VII. BOOKKEEPING AND SELF TEST

### 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.
- If the SELF/TEST button or the replay button is not pressed within 20 seconds after completion of a tests complete cycle, the game will return to the attract mode.

EXAMPLE:

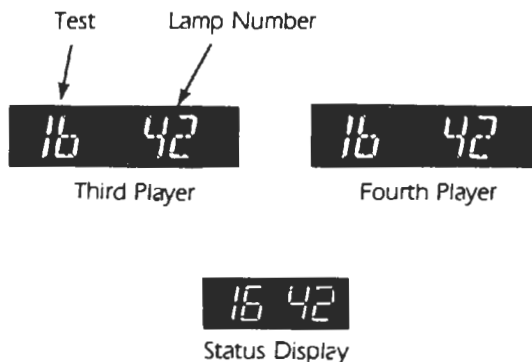


#### STEP 16—RELAY AND LAMP TEST

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

| A3 Driver Board Transistor Assignment (See Schematic) |                |
|-------------------------------------------------------|----------------|
| O (Game Over) Relay                                   | A3J3 PIN #1 Q1 |
| T (Tilt) Relay                                        | A3J3 PIN #8 Q2 |
| Coin Lockout Relay                                    | A3J5 PIN #2 Q3 |

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



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.

- a. 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.

| NUMBER<br>DISPLAYED | ASSIGNMENT | A3 DRIVER BOARD<br>TRANSISTOR ASSIGN.<br>SEE SCHEMATIC |
|---------------------|------------|--------------------------------------------------------|
| Sol. 1              | Not Used   | Q60                                                    |
| Sol. 2              | Not Used   | Q57/Q58                                                |
| Sol. 3              | Not Used   | Q54                                                    |
| Sol. 4              | Not Used   | Q55                                                    |
| Sol. 5              | Not Used   | Q61/Q62                                                |
| Sol. 6              | Not Used   | Q63/Q64                                                |
| Sol. 7              | Not Used   | Q56                                                    |
| Sol. 8              | Knocker    | Q53                                                    |
| Sol. 9              | Outhole    | Q59                                                    |

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

## VII. BOOKKEEPING AND SELF TEST

### SOUND NUMBER ENABLE DISPLAYED

S16 17 (combination S1 & S16)  
S8 8  
S2 2  
S4 4  
S1 1

### A3 DRIVER BOARD TRANSISTOR ASSIGN. SEE SCHEMATIC

A3J2 PIN 9  
A3J5 PIN 7  
A3J5 PIN 5  
A3J5 PIN 1  
A3J5 PIN 6

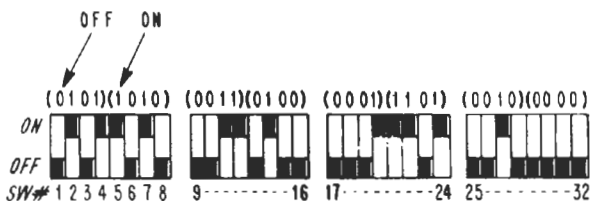
- c. The first and second player's score displays show hexadecimal representative of the operator switch positions. Converting hexadecimal to binary will give the switch positions in binary form.

#### CONVERSION TABLE

0 = OFF 1 = ON

| DISPLAYED<br>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   |
| BLANK                    |         |        |

#### EXAMPLE:



#### DISPLAYED

SW 1-8 SW 9-16

5c 34

First Player

SW 17-24 SW 25-32

1e 20

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:

cc cc

First Player

cc cc

Second Player

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

55 55

First Player

55 55

Second Player

To repeat test # 17, push the credit button.

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

### STEP 18—SWITCH TEST

18 67

Third Player

18 67

Fourth Player

Credit  
Display

18 67

Status Display

- 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 liberal or conservative adjustments for this game.

## IX. GENERAL INFORMATION

### A. PRINTED CIRCUIT BOARDS ARE DESIGNATED AS FOLLOWS:

A1 - Control Board  
A2 - Power Supply  
A3 - Driver Board  
A5 - Status Display  
A6 - Sound Board  
A7 - Sound/Speech Power Supply  
A8 - Pop Bumper Driver Boards  
A14 - 7-Digit Display  
A24 - Reset Board

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

### 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.

### 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   | 5 Amp SLO-BLO     |
| F6 | Playboard Illumination    | 6.3VAC | 8 Amp             |
| F7 | Lightbox Illumination     | 6.3VAC | 7 1/2 Amp         |
| F8 | Sound/Speech Power Supply | +24VDC | 1 Amp SLO-BLO     |
| F9 | Primary Power             | 115VAC | 5 Amp SLO-BLO     |
|    |                           | 230VAC | 2 1/2 Amp SLO-BLO |

#### PLAYFIELD FUSES

|     |                   |               |
|-----|-------------------|---------------|
| F10 | Left Pop Bumper   | 2 Amp SLO-BLO |
| F11 | Right Pop Bumper  | 2 Amp SLO-BLO |
| F12 | Center Pop Bumper | 2 Amp SLO-BLO |
| F13 | Outhole           | 1 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<br>KICKING RUBBERS<br>POP BUMPERS | 2.95              | 635             | #23        | Yellow        |
| A-4893         | UP KICKER<br>POP BUMPERS<br>BALL KICKER          | 2.1               | 535             | #22        | Red           |
| A-5194         | UP KICKER<br>GONG<br>KICKING TARGETS             | 4.5               | 780             | #24        | Blue          |
| A-5195         | CONTACT KICKER<br>KNOCKER<br>HOLE KICKER         | 12.3              | 1305            | #26        | White         |
| A-16570        | HOLE KICKER,<br>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,<br>7 BANK RESET<br>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<br>LOCKOUT RELAYS                 | 231.0             | 4000            | #35        | Orange        |
| A-20558        | GATE RELAY                                       | 156.0             | 3400            | #34        | White         |
| A-18642        | MEMORY/<br>DROP TARGETS                          | 58.0              | 1590            | #33        | White         |

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

### E. SOUND BOARD (A6) TEST

1. Game must be in game over mode to initiate test.
2. Pressing the test button on the sound board will initiate test.
3. After the test button has been pressed, the sound board must correctly reproduce all of the sounds of game play and scoring. If not, the board is defective.

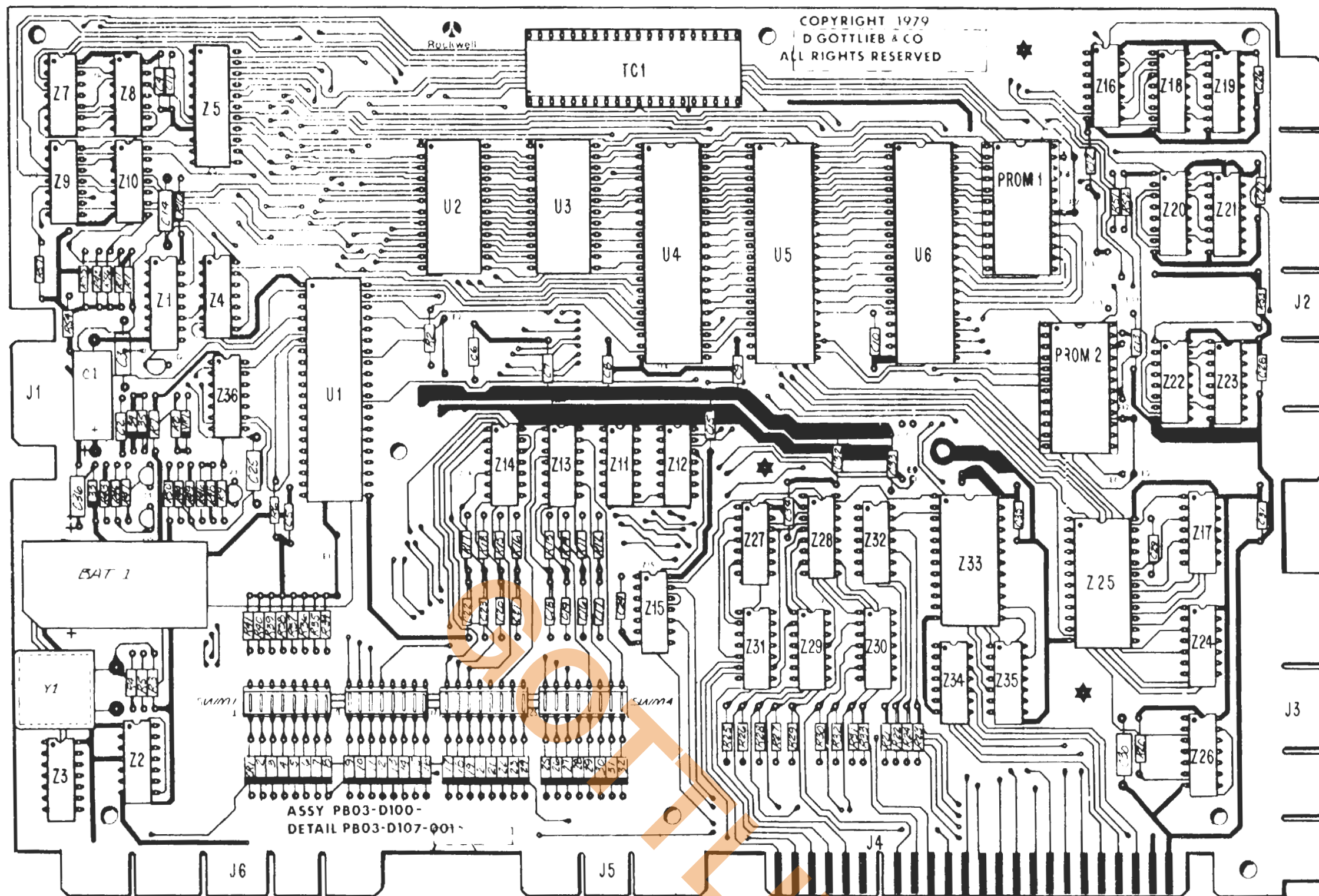
## X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS

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# X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS

## CONTROL BOARD (A1) COMPONENT LOCATION

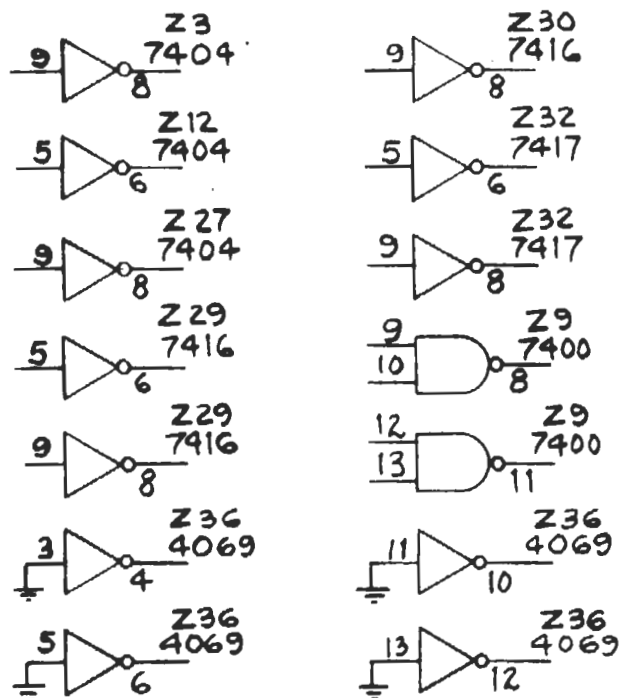


## CONTROL BOARD (A1) PARTS LIST

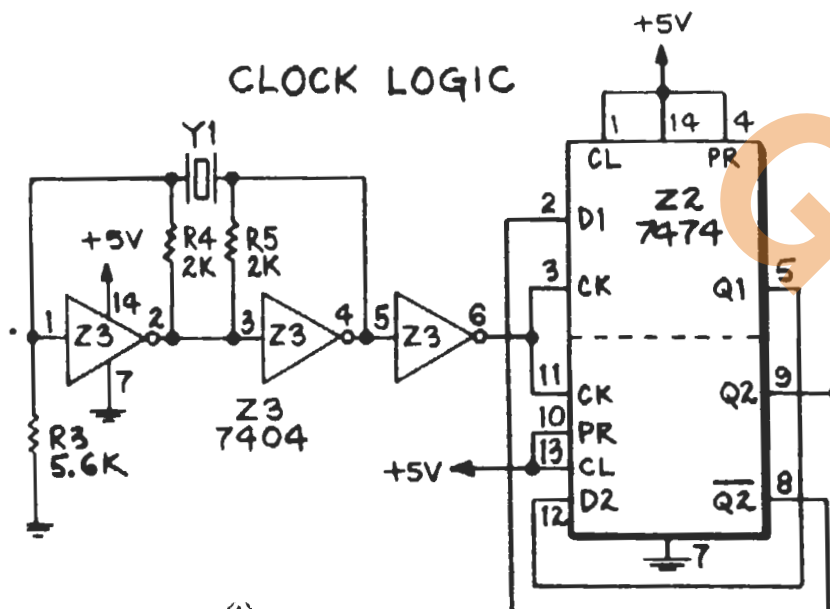
| REFERENCE        | DESCRIPTION                       | PART NUMBER | REFERENCE      | DESCRIPTION                          | PART NUMBER |
|------------------|-----------------------------------|-------------|----------------|--------------------------------------|-------------|
| Bat. 1           | Battery-3.6V 326R10-002           | XO-458      | U3             | ROM R3272-12                         | XO-362      |
| C1               | Capacitor, 100 mfd., 10V          | XO-211      | U4, U5, U6     | PRIOT R6532-18                       | XO-361      |
| C2, C4-C13,      | Capacitor, 01 mfd., 50V           | XO-229      | VR1            | Diode-3.0V, 5% 1N5225B or 1N5987B    | XO-269      |
| C15-C24, C26-    |                                   |             | Y1             | Crystal, 3.579545 MHz                | XO-456      |
| C29, C31-C35     |                                   |             | Z1             | IC-Cmos-Dual 1 Shot SCL4528BE        | XO-414      |
| C3, C14, C25,    | Capacitor, 1 mfd., 50V            | XO-230      | Z2             | IC-Dual Flip Flop SN7474N            | XO-423      |
| C30              |                                   |             | Z3, Z11, Z12,  | IC-Hex Inverter SN7404N              | XO-402      |
| C36              | 10 mfd., 10V, TNT-AX CAP          | XO-209      | Z16, Z17, Z24, |                                      |             |
| CR1-CR35         | Diode, GP 1N4148                  | XO-261      | Z26, Z27, Z34, |                                      |             |
| Q1, Q4           | Transistor-PNP MPS-A70            | XO-309      | Z35            |                                      |             |
| Q2, Q3           | Transistor, NPN (Motorola) 2N440C | XO-313      | Z4             | IC-Cmos-Quad 2 Input                 |             |
| R1, R6, R11-R24, | Resistor, 3.0K ohm, 5%, 1/4W      | XO-23       |                | "And" SCL4081BE                      | XO-401      |
| R42, R45, R46,   |                                   |             | Z5             | IC-Static Ram S5101-L                | XO-356      |
| R48, R51-R57     |                                   |             | Z7             | IC-Hex Inverter SN74LS04N            | XO-418      |
| R2, R34-R41      | Resistor, 4.7K ohm, 5%, 1/4W      | XO-7        | Z8             | IC-2 Input "Nor" SN7402N             | XO-421      |
| R3, R43, R49     | Resistor, 5.6K ohm, 5%, 1/4W      | XO-19       | Z9, Z13, Z14   | IC-2 Input "Nand" SN7400N            | XO-420      |
| R4, R5, R44      | Resistor, 2.0K ohm, 5%, 1/4W      | XO-14       | Z10            | IC-Open Collector Inverter SN74LS05N | XO-411      |
| R7               | Resistor, 62 ohm, 5%, 1/4W        | XO-3        | Z15            | IC-2 Input "Or" SN7432N              | XO-407      |
| R8, R50          | Resistor, 180 ohm, 5%, 1/4W       | XO-24       | Z18, Z20, Z22  | IC-"D" Flip Flop SN74175N            | XO-410      |
| R9               | Resistor, 1K ohm, 5%, 1/4W        | XO-5        | Z19, Z21, Z23  | IC-4 to 7 Decoder SN7448N            | XO-408      |
| R10              | Resistor, 2.7M ohm, 5%, 1/4W      | XO-13       | Z25, Z33       | IC-4-16 Decoder SN74154N             | XO-409      |
| R25-R33          | Resistor, 620 ohm, 5%, 1/4W       | XO-4        | Z28            | IC-2 to 4 Decoder SN74LS139N         | XO-419      |
| R47              | Resistor, 24K ohm, 5%, 1/4W       | XO-10       | Z29, Z30       | IC-Hex Inverter—OC/HV SN7416N        | XO-405      |
| SW1-SW4          | Dip Switch 1008-692               | XO-505      | Z31            | IC-2 Input "And" SN7408N             | XO-404      |
| TC1              | Socket, 40 Pin 640379-3           | XO-530      | Z32            | IC-Hex Buffer—OC SN7417N             | XO-406      |
| U1               | CPU R6502-13                      | XO-360      | Z36            | IC-Cmos SCL4069B                     | XO-424      |
| U2               | ROM R3273-12                      | XO-363      |                | Socket 24 Pin 64036 -3               | XO-529      |

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.

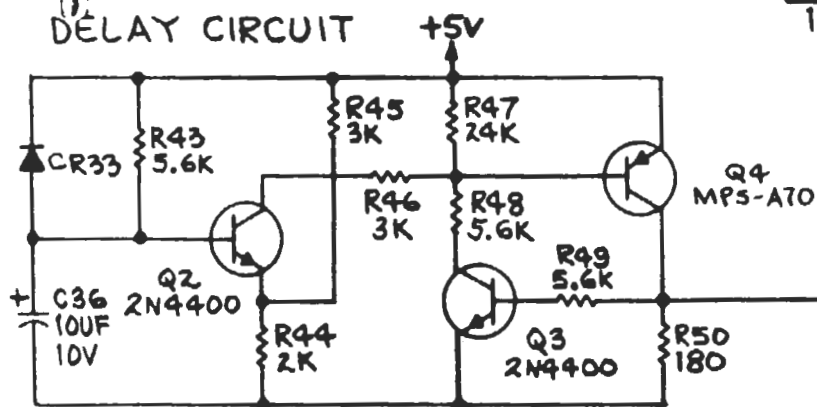
#### SPARE GATES



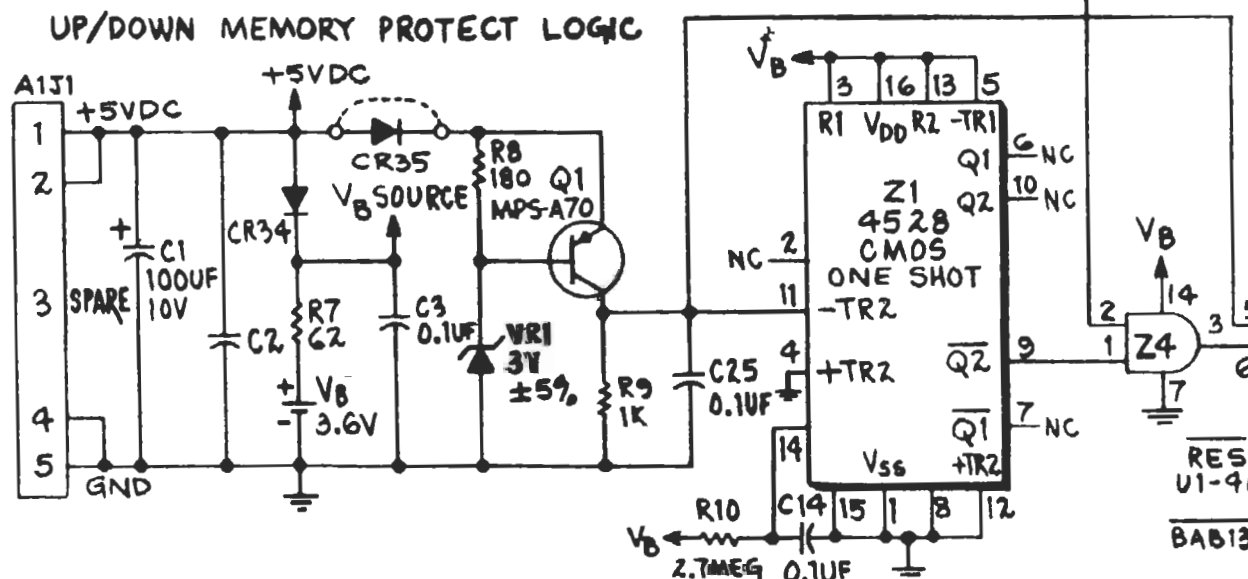
#### CLOCK LOGIC



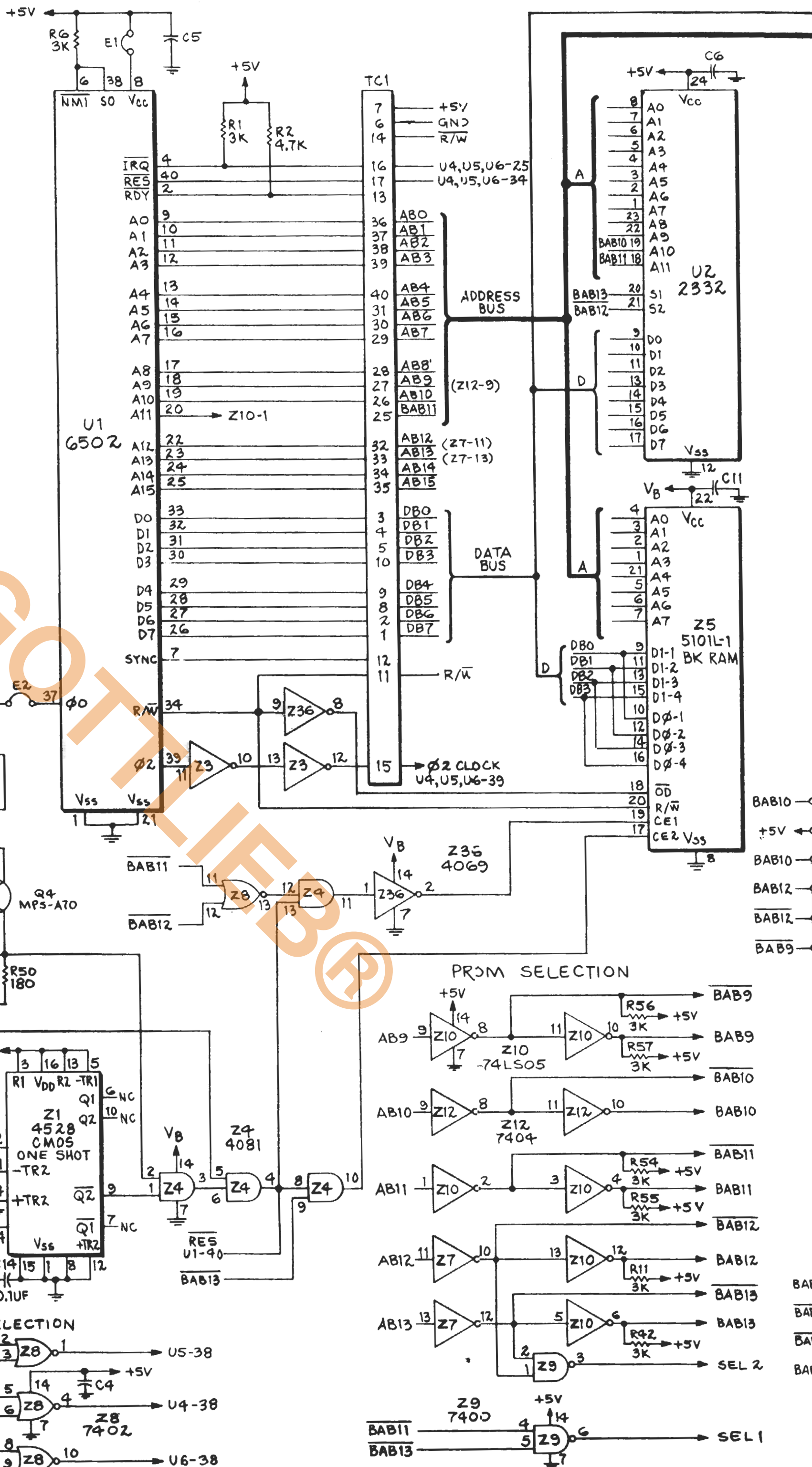
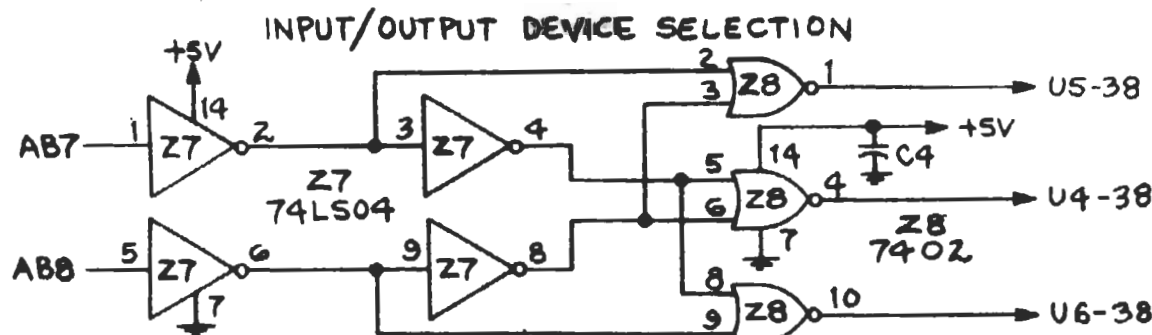
#### DELAY CIRCUIT



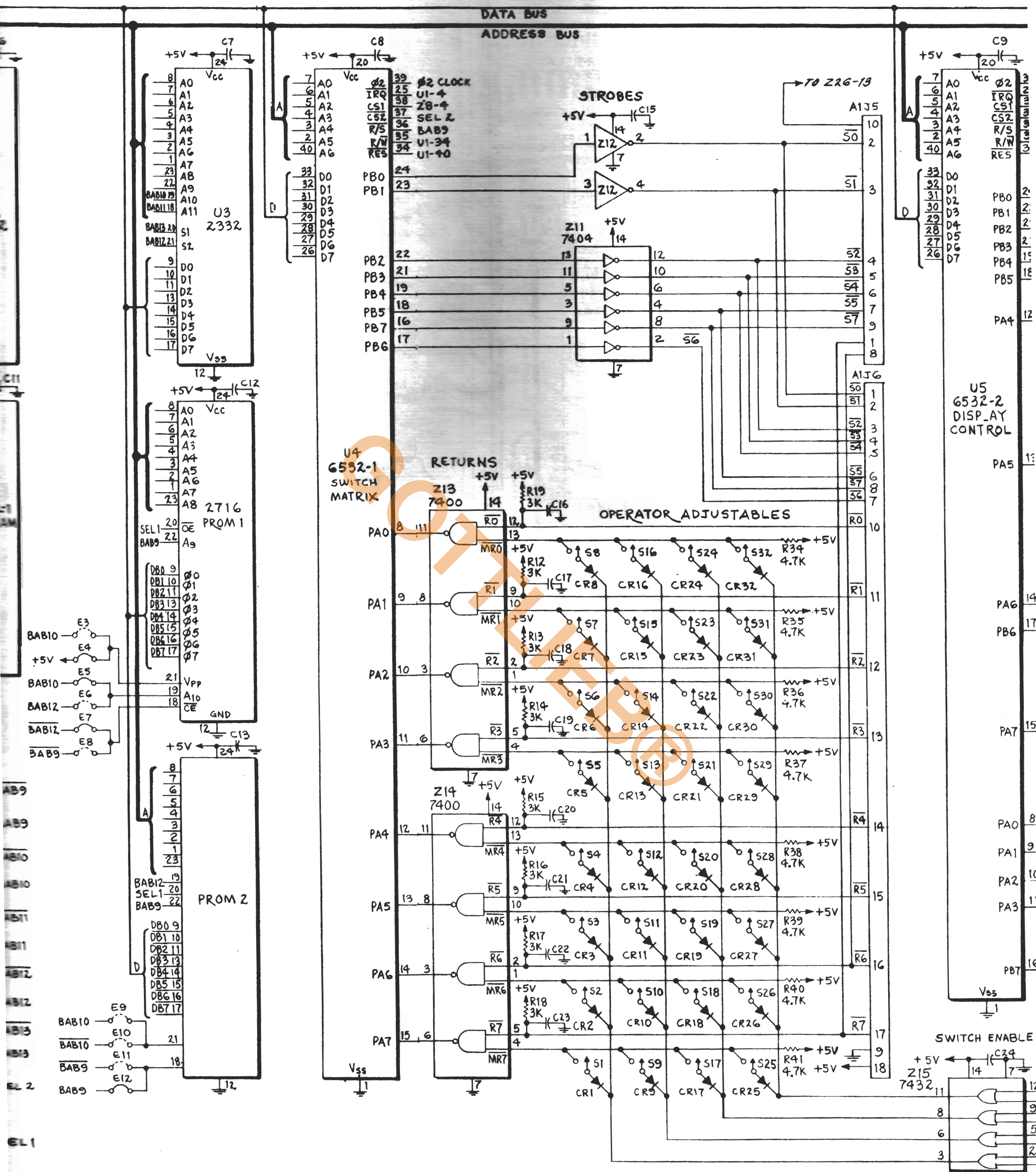
#### UP/DOWN MEMORY PROTECT LOGIC



#### INPUT/OUTPUT DEVICE SELECTION



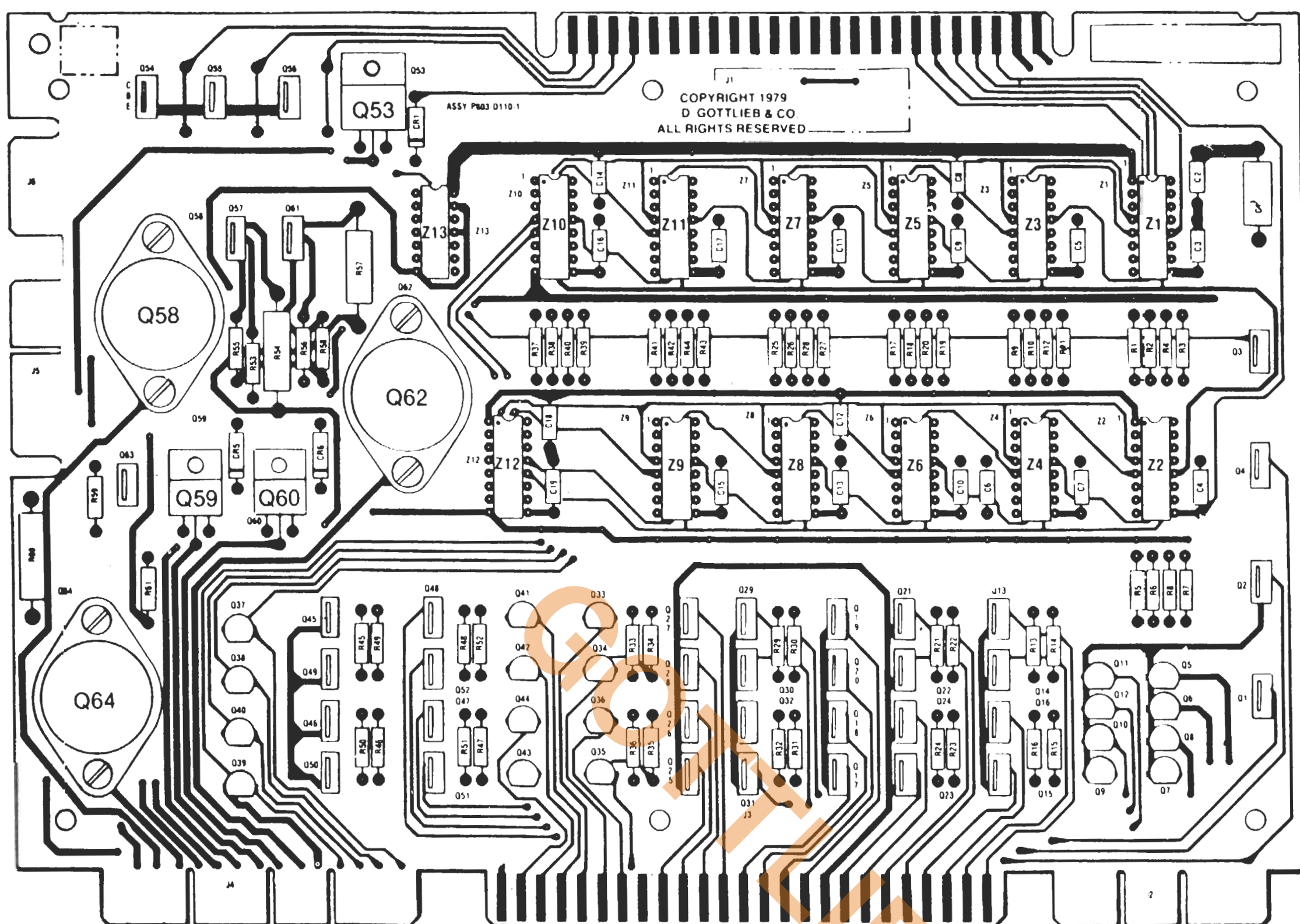
# X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS





# X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS

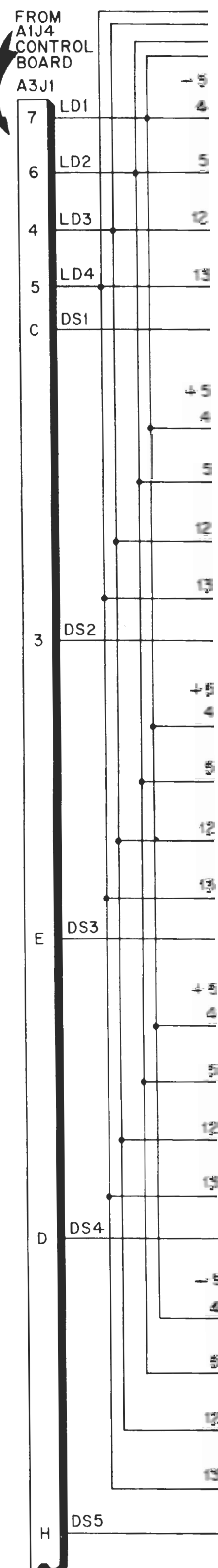
## DRIVER BOARD (A3) COMPONENT LOCATION

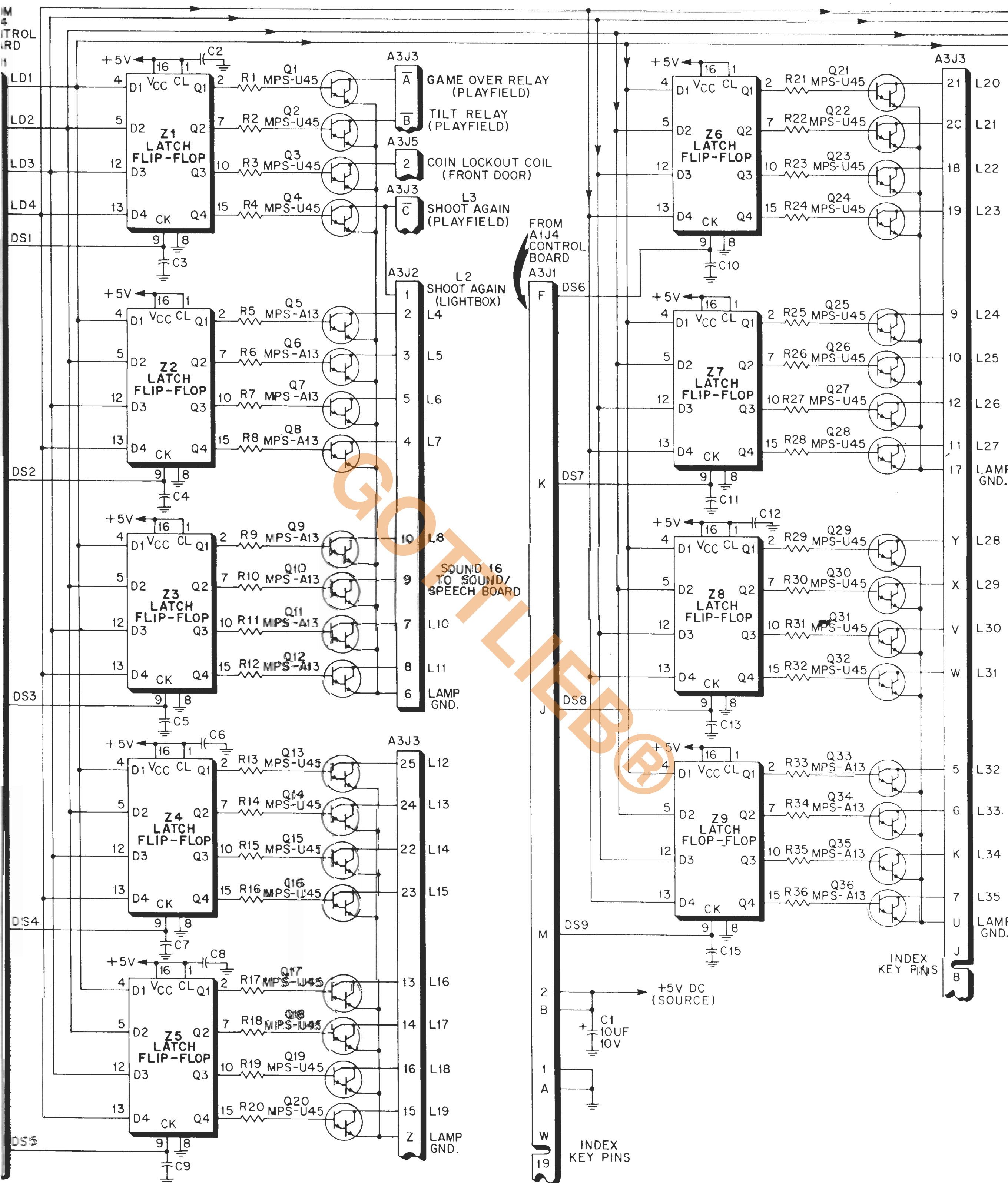


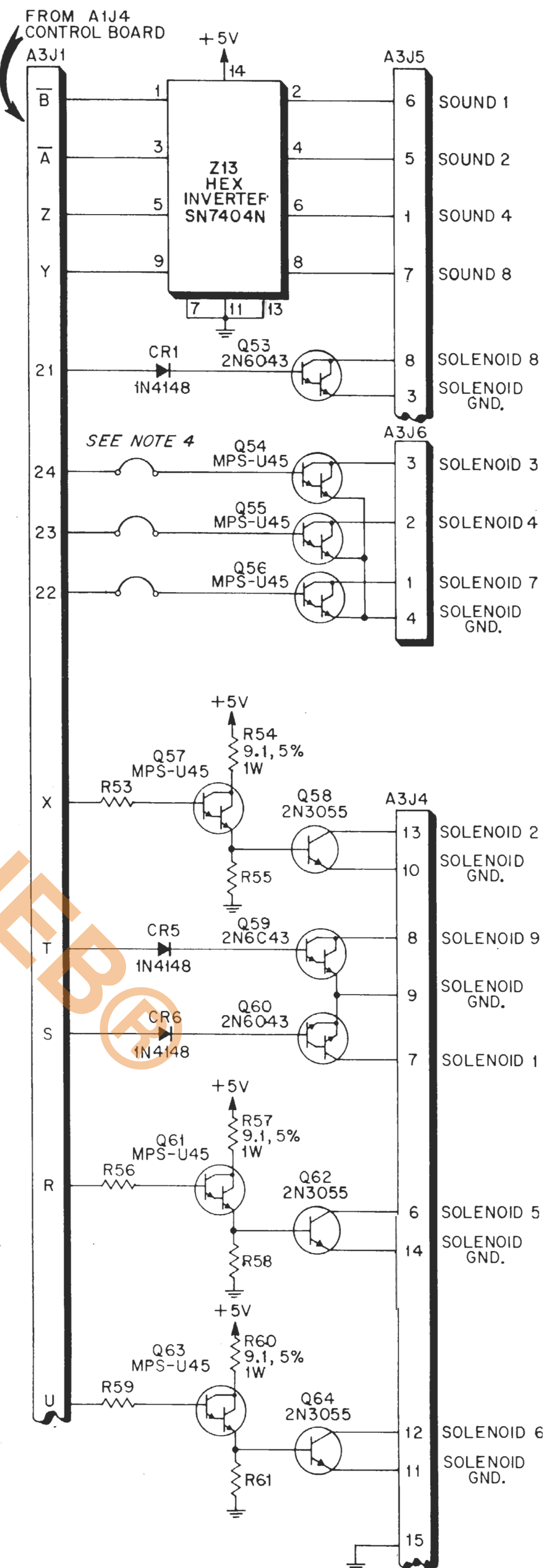
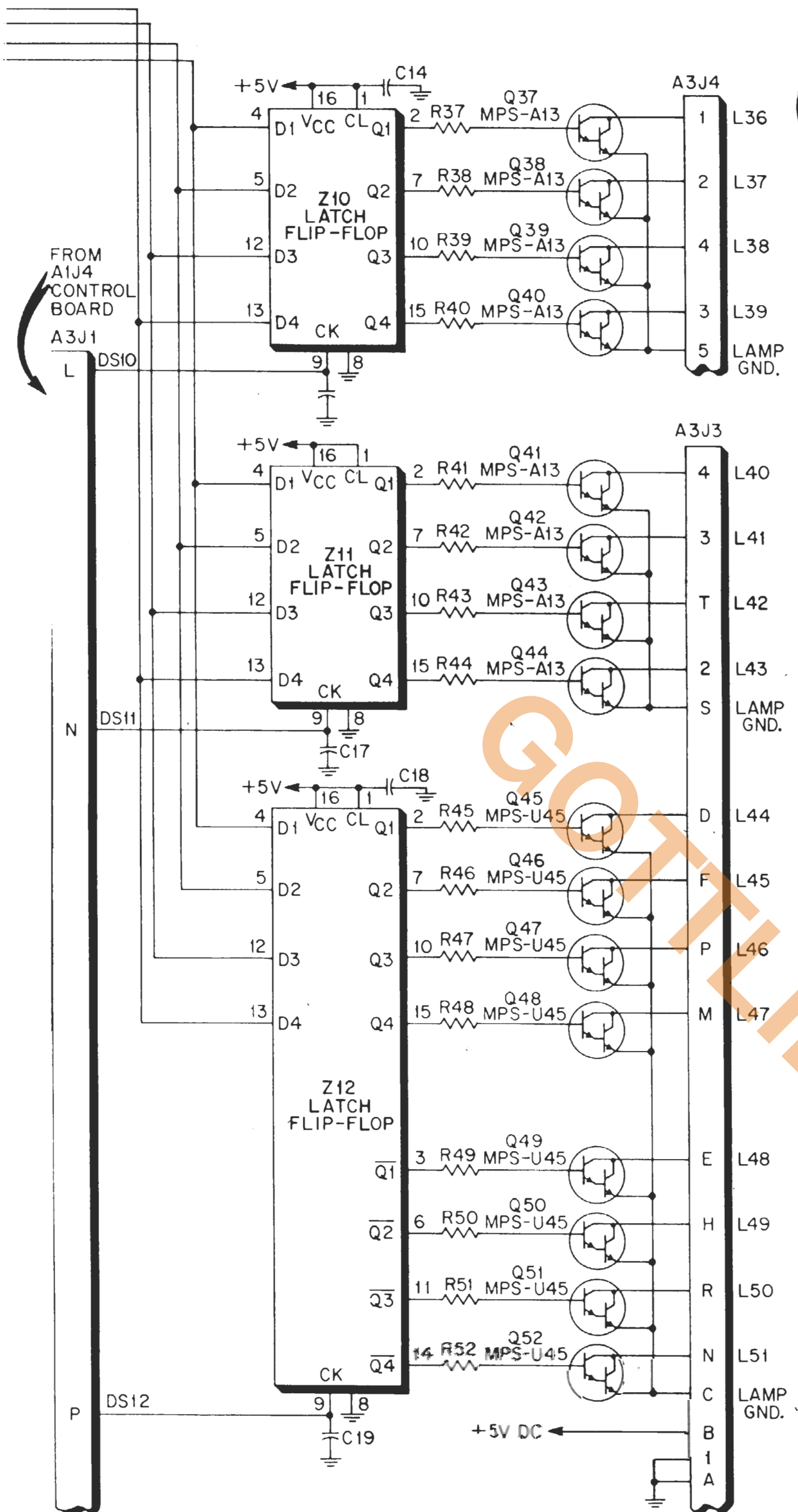
## DRIVER BOARD (A3) PARTS LIST

| REFERENCE                                         | DESCRIPTION                         | PART NUMBER |
|---------------------------------------------------|-------------------------------------|-------------|
| C1                                                | Capacitor, 10 mfd., 10V<br>Tantalum |             |
| C2-C19                                            | Capacitor, .01 mfd., 50V            |             |
| CR1-CR6                                           | Diode—Silicon                       | 1N4148      |
| R1-R53,<br>R61, R55,<br>R56, R58,<br>R59          | Resistor, 1000 ohm, 5%, 1/4W        |             |
| R54, R57,<br>R60                                  | Resistor, 9.1 ohm, 5%, 1W           |             |
| Q1-Q4,<br>Q13-Q32,<br>Q45-Q52,<br>Q54-Q57,<br>Q63 | Transistor, NPN, Darlington         | MPS-U45     |
| Q5-Q12,<br>Q33-Q44                                | Transistor, NPN, Darlington         | MPS-A13     |
| Q53, Q59,<br>Q60                                  | Transistor, NPN, Darlington         | 2N6043      |
| Q58, Q62,<br>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.





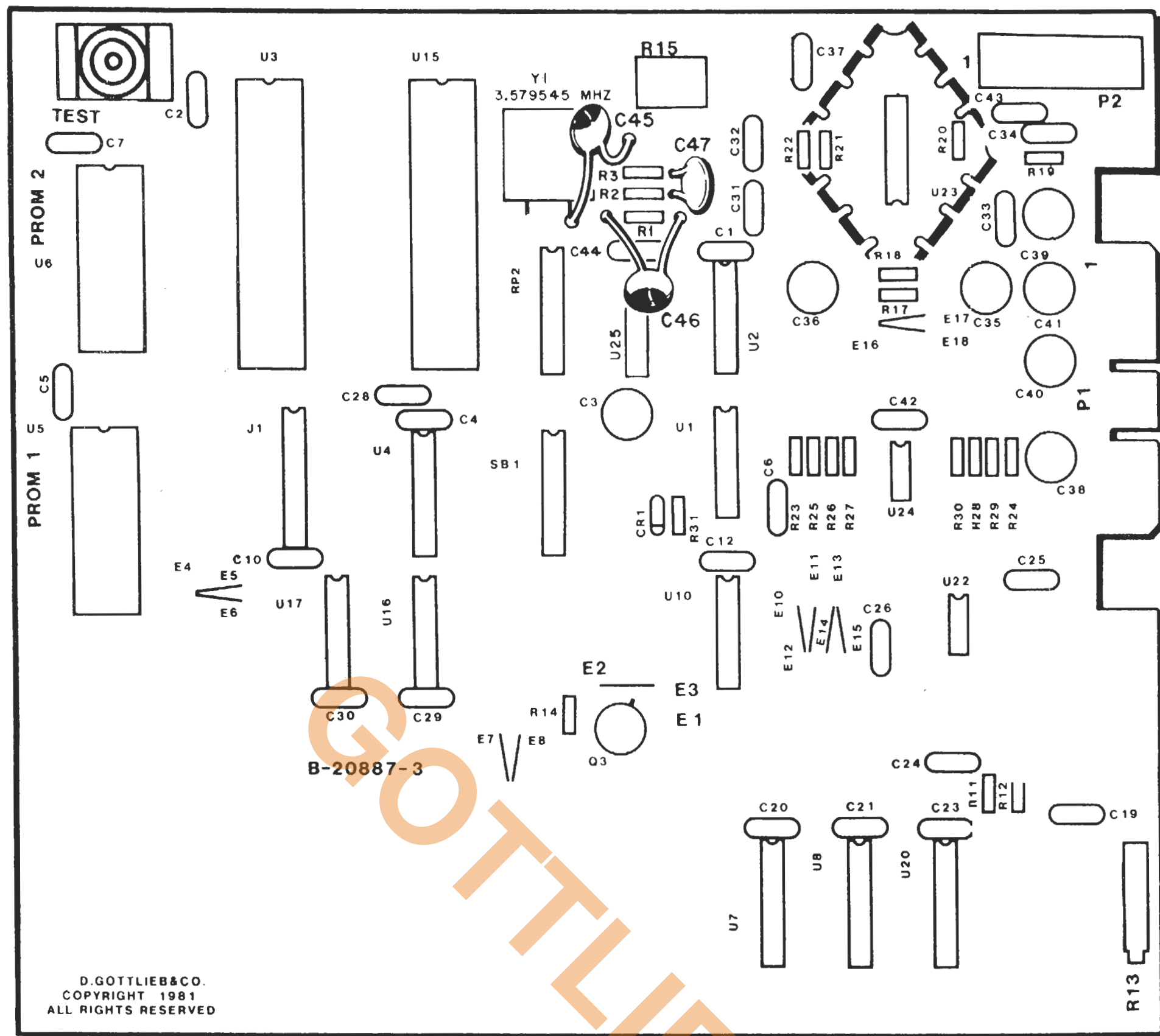


NOTE: UNLESS OTHERWISE INDICATED;  
 1. RESISTORS ARE 1000 OHM,  $\pm 5\%$ , 1/4W.  
 2. CAPACITORS ARE .01UF,  $\pm 20\%$ , 50V.  
 3. INTEGRATED CIRCUITS ARE SN74175N.  
 4. JUMPER WIRES REPLACED DIODES CR2, CR3 AND CR4 FOR SYSTEM 80A GAMES.  
 5. TRANSISTOR TYPES MPS-U45 AND NDS-U45 ARE INTERCHANGEABLE.

|                            |                 |                  |         |
|----------------------------|-----------------|------------------|---------|
| D. GOTTLIEB & CO.          |                 |                  |         |
| TITLE<br>DRIVER BOARD (A3) |                 |                  |         |
| USED ON                    |                 |                  |         |
| DRAWN<br>P                 | APPROVED<br>B41 | DATE<br>12-12-80 | E-20915 |

# X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS

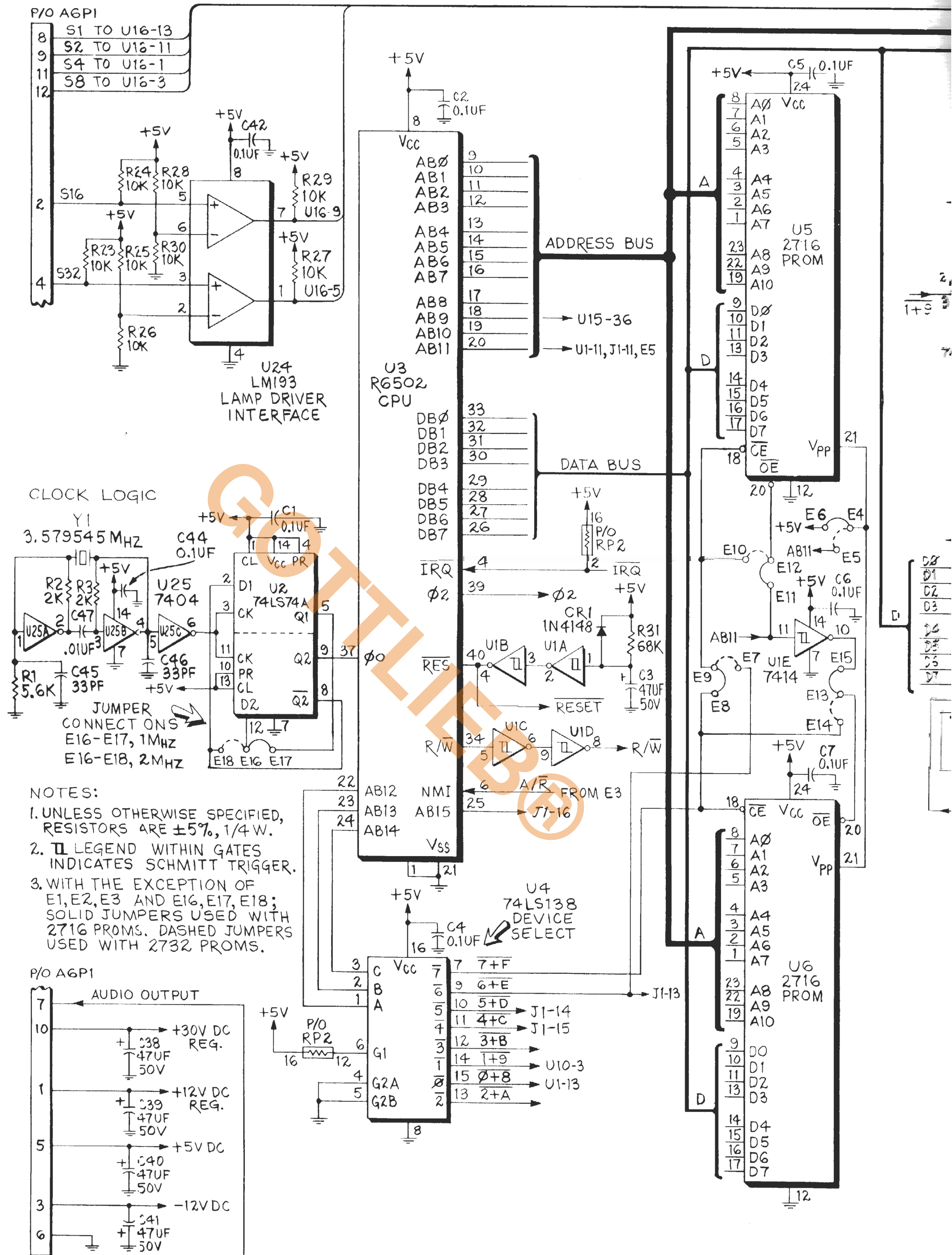
## SOUND BOARD ASSY. (A6), COMPONENT LOCATION



## SOUND BOARD ASSY. (A6), PARTS LIST

| REFERENCE     | DESCRIPTION                  | PART NUMBER |
|---------------|------------------------------|-------------|
|               | Sound Board Assembly         | MA-309      |
|               | Capacitor, 0.1UF, 25V        | XO-248      |
| C1, C2        |                              |             |
| C4-C7, C10    |                              |             |
| C12, C20, C21 |                              |             |
| C23, C25, C26 |                              |             |
| C28, C29, C30 |                              |             |
| C33, C42, C44 |                              |             |
| C31, C32      | Capacitor, .047UF, 25V       | XO-222      |
| C37           | Capacitor, 4.7UF, 35V        | XO-291      |
| C3, C38-C41   | Capacitor, 47UF, 50V         | XO-210      |
| C24           | Capacitor, 100PF             | XO-223      |
| C36           | Capacitor, 470UF, 35V        | XO-284      |
| C45, C46      | Capacitor, 33PF              | XO-277      |
| C47           | Capacitor, .01UF, 100V       | XO-202      |
| CR1           | Diode, 1N4148                | XO-261      |
| R1, R11, R12  | Resistor, 5.6K ohm, 5%, 1/4W | XO-19       |
| R2, R3        | Resistor, 2K ohm, 5%, 1/4W   | XO-14       |
| R13           | Potentiometer, 10K ohm       | XO-108      |
| R23-R30       | Resistor, 10K ohm, 5%, 1/4W  | XO-18       |
| R15           | Potentiometer, 10K ohm       | XO-109      |
| R18, R21      | Resistor, 100K ohm, 5%, 1/4W | XO-45       |
| R22           | Resistor, 2K ohm, 5%, 1/4W   | XO-14       |
| R31           | Resistor, 68K ohm, 5%, 1/4W  | XO-189      |
| RP2           | Resistor, DIP                | XO-168      |
| SB1           | Switch, DIP                  | XO-505      |
| SW1           | Switch, Momentary Pushbutton | XO-515      |
| U1            | IC, 7414                     | XO-397      |
| U2            | IC, SN74LS74N                | XO-434      |
| U3            | CPU, R6502-13                | XO-360      |
| U4            | IC, SN74LS138N               | XO-437      |
| U5, U6        | EPROM, 2716                  | PR-53       |
| U7            | IC, SN74LS75                 | XO-394      |
| U10           | IC, SN74LS02N                | XO-428      |
| U15           | RRIOT, R6532-18              | XO-361      |
| U16           | IC, SN74LS04N                | XO-418      |
| U17           | IC, SN74LS30N                | XO-432      |
| U20           | Converter, PMI, 1408A-6P     | XO-416      |
| U22           | IC, LM741CP                  | XO-393      |
| U23           | IC, LM379S                   | XO-395      |
| U24           | IC, Dual Comparitor, LM193   | XO-396      |
| U25           | Inverter, 7404               | XO-402      |
| Y1            | Crystal, 3.579545MHZ         | XO-456      |
|               | Socket, 22 Pin DIP           | XO-467      |
|               | Socket, 24 Pin (2)           | XO-529      |
|               | Socket, 40 Pin (2)           | XO-530      |

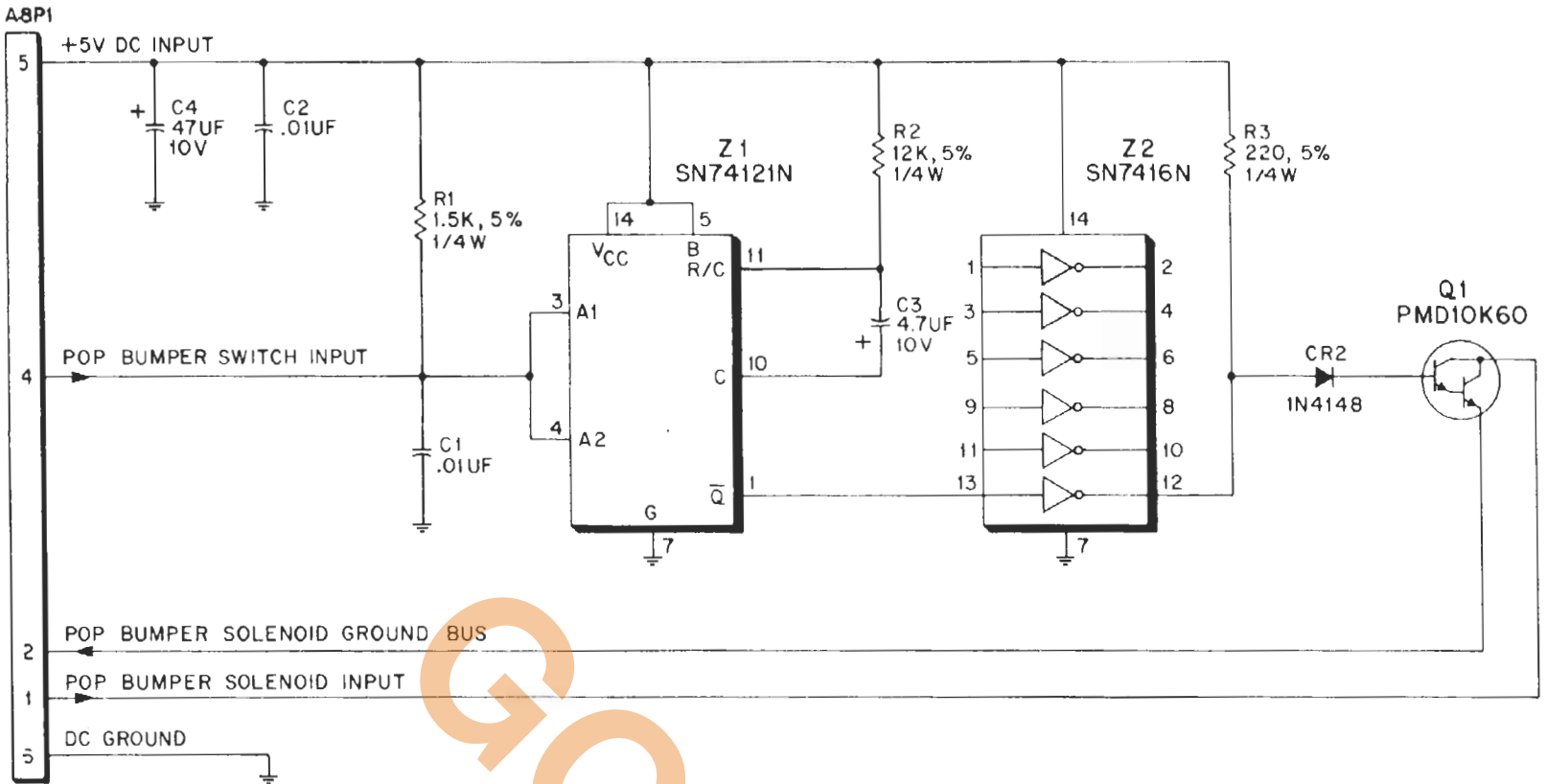
## X. WIRING AND SCHEMATA



The diagram illustrates a portable digital-to-analog converter circuit. Key components and their connections include:

- Power Supply:** +5V and +12V sources are used throughout the circuit. Decoupling capacitors C10, C12, C20, C21, C23, C24, C25, C26, C28, C29, C30, C31, C32, C33, C36, and C37 are placed near the power pins of the ICs.
- Data Latches:** Two 74LS75 latches (U7 and U8) are used to store digital data. They are connected to a 10A 0.10F capacitor and a 10A 0.10F capacitor.
- Digital-to-Analog Converter:** The 1408 Digital-to-Analog Converter (U20) converts the digital data into an analog signal. It is connected to the latches and the analog inverter.
- Analog Inverter:** The LM741 Analog Inverter (U22) converts the analog signal into a usable output. It is connected to the DAC and the amplifier.
- Memory:** The 6532 RIOT (U15) provides non-volatile memory for the circuit. It is connected to the DAC and the amplifier.
- Counter:** The 74LS30 decade counter (U17) is used for timing and control. It is connected to the DAC and the amplifier.
- Amplifier:** The LM379S Amplifier (U23) amplifies the output signal. It is connected to the inverter and the speaker.
- Control and Timing:** Various resistors (R11, R12, R13, R15, R18, R21, R22) and capacitors (C10, C12, C20, C21, C23, C24, C25, C26, C28, C29, C30, C31, C32, C33, C36, C37) are used for timing and signal conditioning.
- Expansion:** A 18-pin DIP socket (J1) is provided for expansion. It is connected to the DAC and the amplifier.

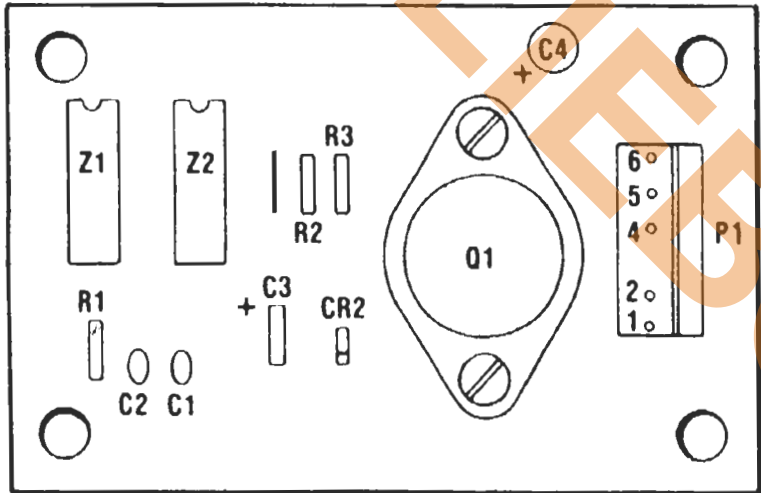
# X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS



FROM  
A1  
CONTROL  
BOARD

|                                    |          |         |         |
|------------------------------------|----------|---------|---------|
| D. GOTTLIEB & CO.                  |          |         |         |
| TITLE POP BUMPER DRIVER BOARD (A8) |          |         |         |
| USED ON                            |          |         |         |
| DRAWN                              | APPROVED | DATE    | D-20923 |
|                                    |          | 10-4-82 |         |

## POP BUMPER DRIVER BOARD (A8) COMPONENT LOCATION

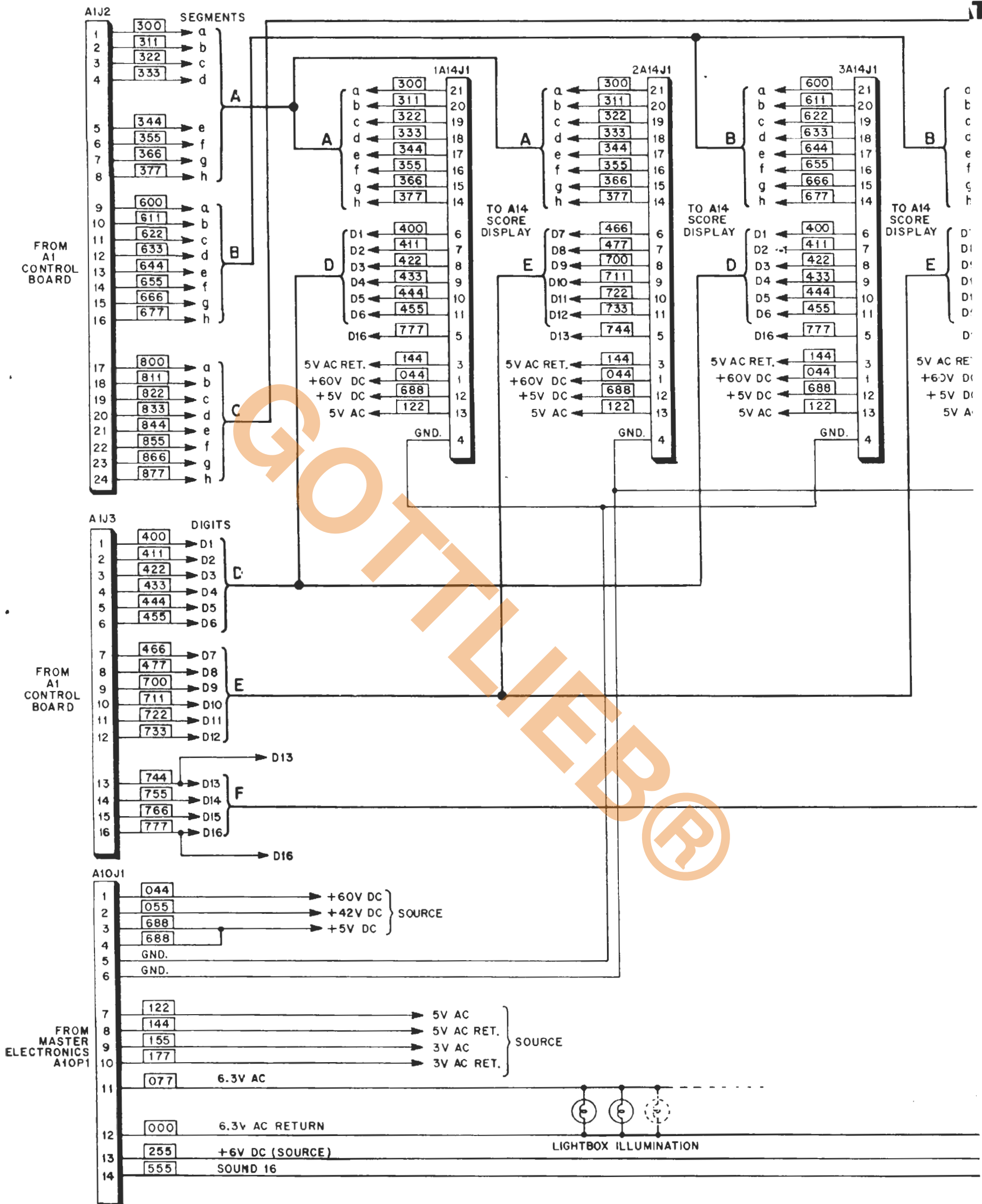


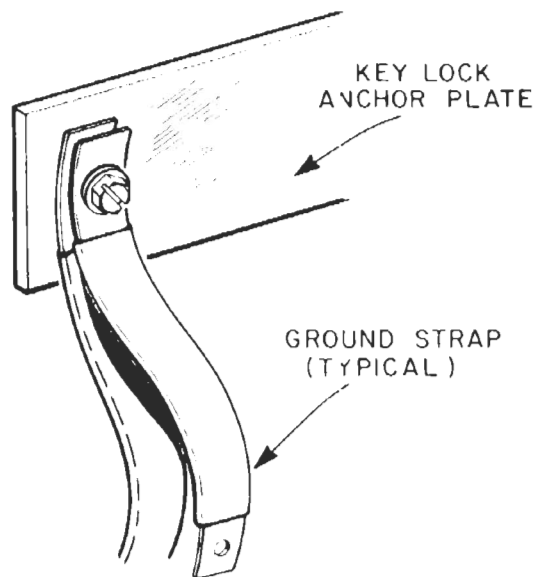
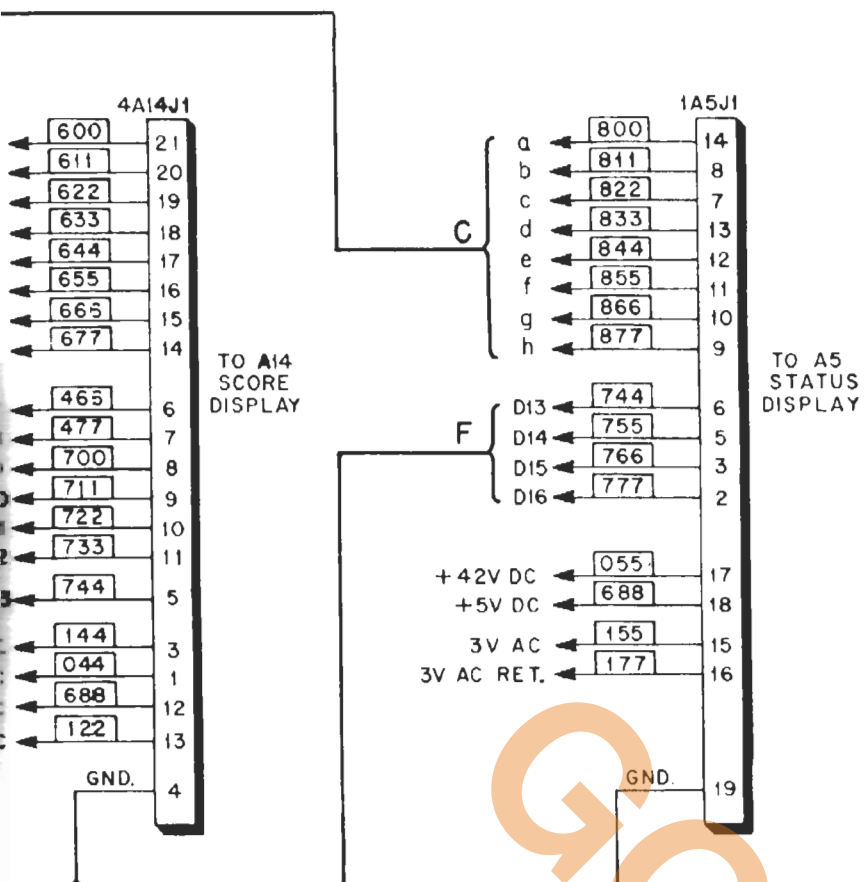
FROM  
A1  
CONTROL  
BOARD

## POP BUMPER DRIVER BOARD (A8) PARTS LIST

| REFERENCE | DESCRIPTION                                       | PART NUMBER |
|-----------|---------------------------------------------------|-------------|
| C1, C2    | Capacitor, .01 mfd., 100V                         | XO-202      |
| C3        | Capacitor, 4.7 mfd., 10%, 10V,<br>Tantalum, Axial | XO-226      |
| C4        | Capacitor, 47 mfd., 10V                           | XO-227      |
| CR2       | Diode 1N4148                                      | XO-261      |
| P1        | Connector 09-65-1061                              | XO-502      |
| R1        | Resistor, 1.5K ohm, 5%, 1/4W                      | XO-20       |
| R2        | Resistor, 12K ohm, 5%, 1/4W                       | XO-9        |
| R3        | Resistor, 220 ohm, 5% 1/4W                        | XO-21       |
| Q1        | Transistor-Lambda PMD10K60                        | XO-311X     |
| Z1        | IC SN74121N                                       | XO-417X     |
| Z2        | IC SN7416N                                        | XO-405X     |

FROM  
MASTE  
ELECTRONIC  
A101

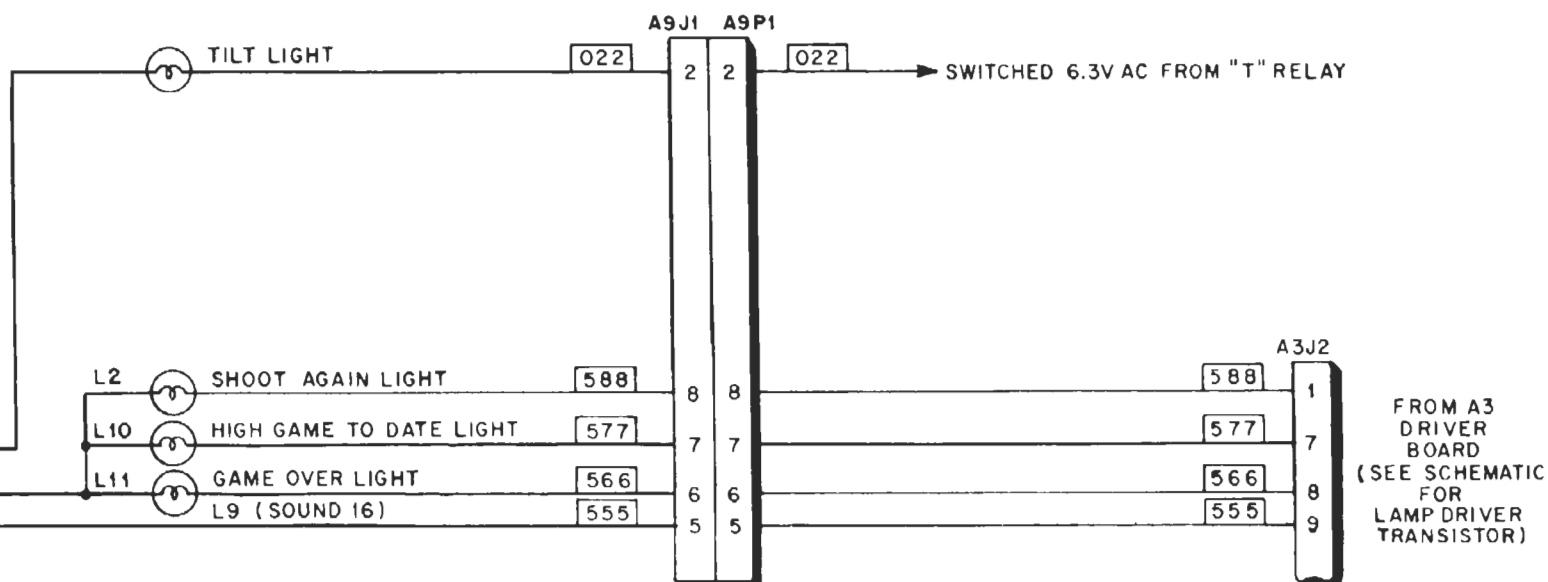


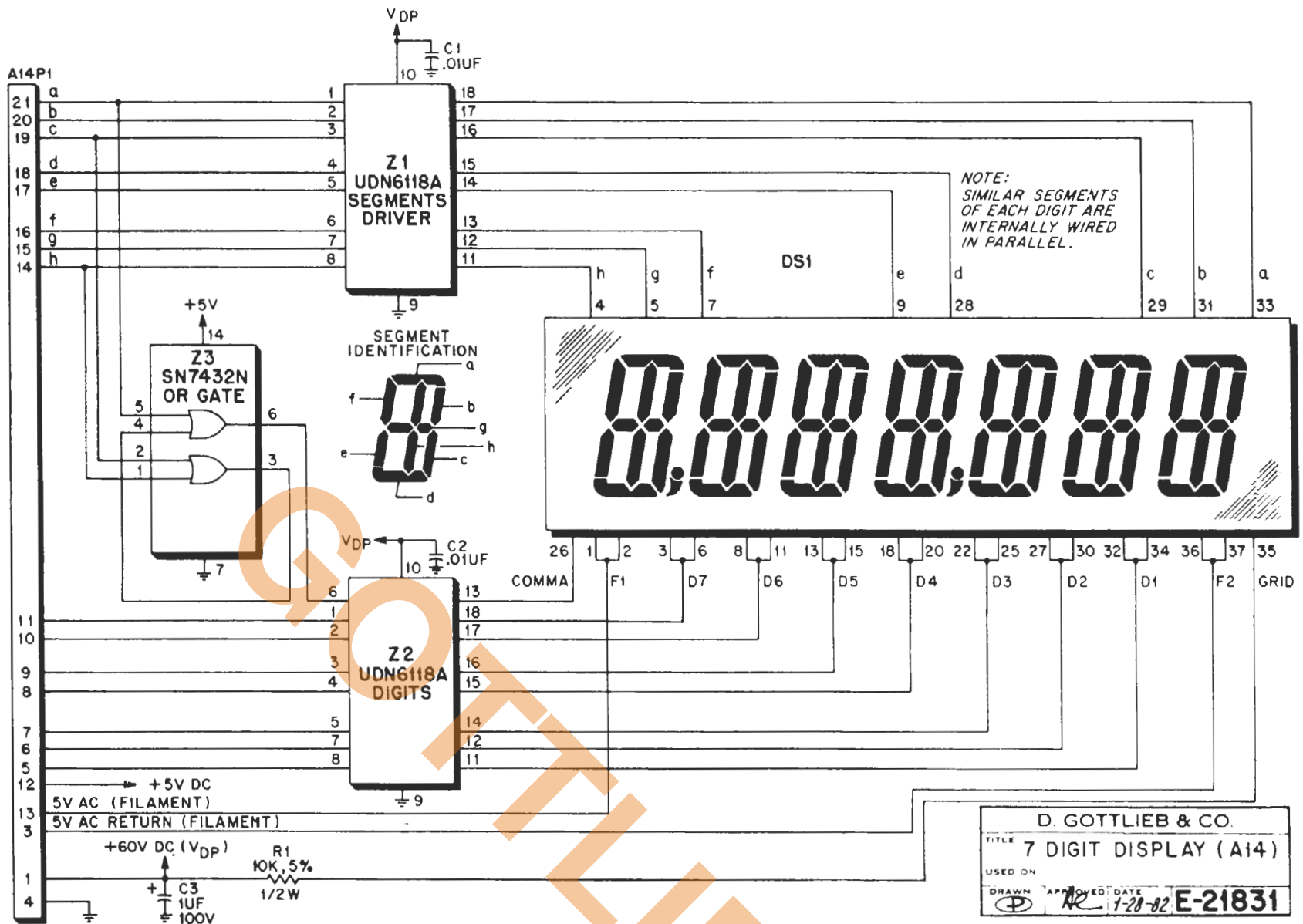


| COLOR CODE |        |   |        |
|------------|--------|---|--------|
| 0          | BLACK  | 5 | GREEN  |
| 1          | BROWN  | 6 | BLUE   |
| 2          | RED    | 7 | PURPLE |
| 3          | ORANGE | 8 | SLATE  |
| 4          | YELLOW | 9 | WHITE  |

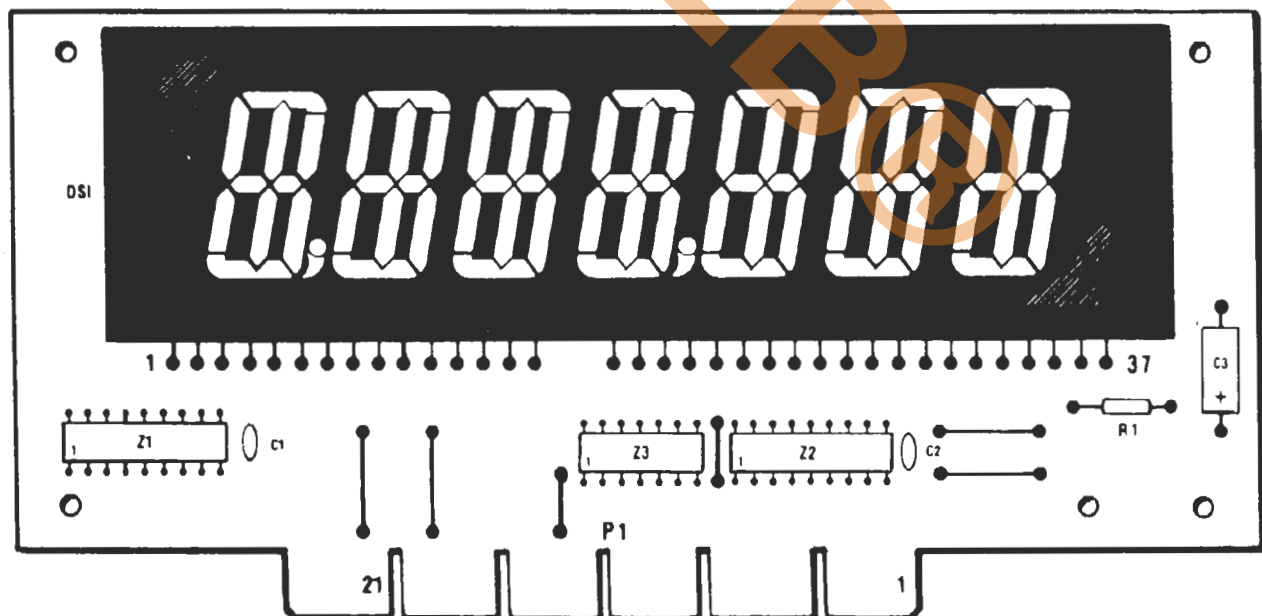
## NOTE:

1. XXX INDICATES WIRE COLOR.
2. GROUND WIRE IS #522, 18GA.
3. NAME AND SCENE LAMPS ARE #44 OR #455 FLASHING.



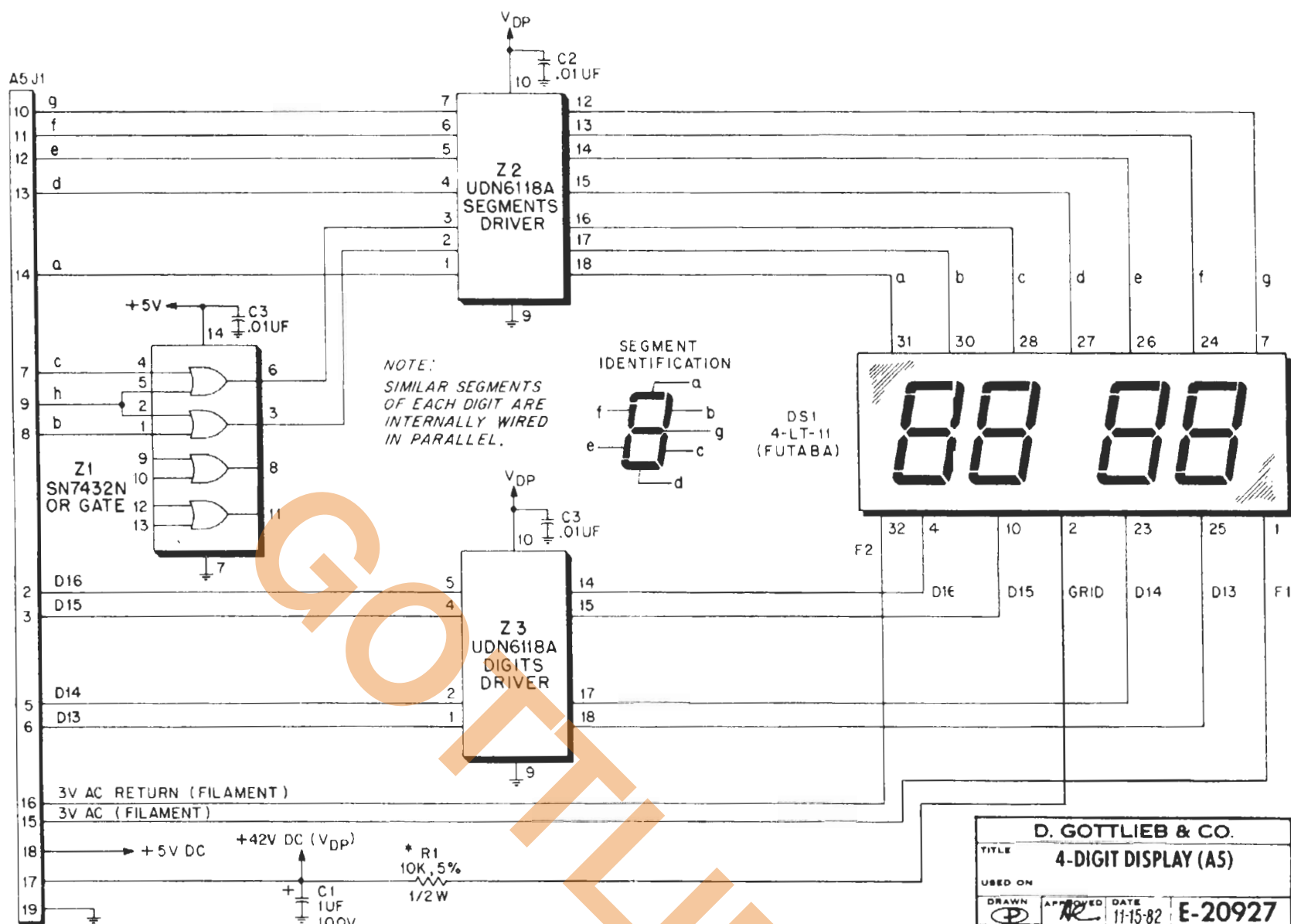


## 7-DIGIT DISPLAY (A14) COMPONENT LOCATION

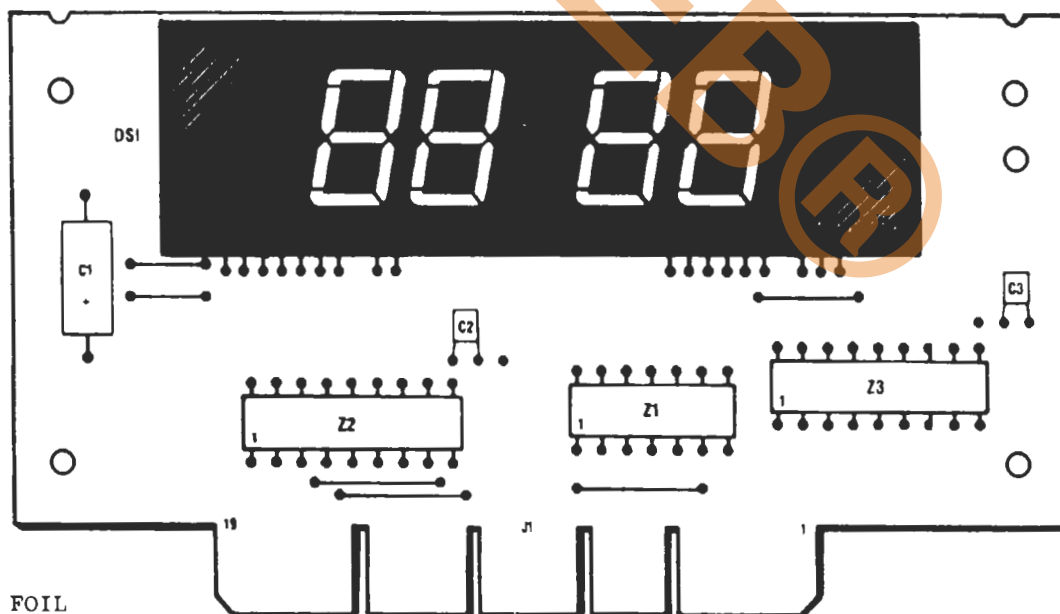


## 7-DIGIT DISPLAY (A14) PARTS LIST

| 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

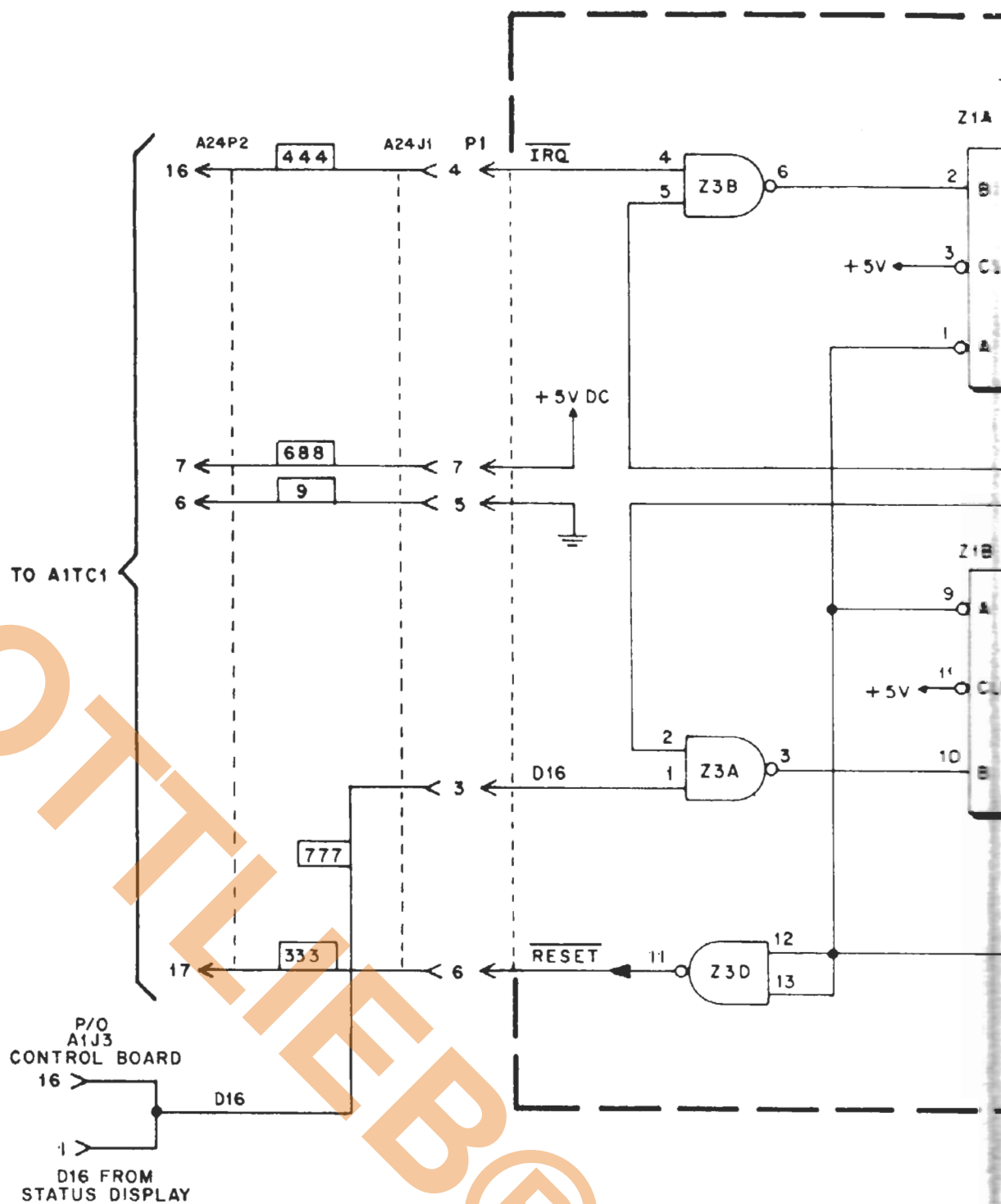


\*NOTE:  
R1 MOUNTED ON FOIL  
SIDE OF BOARD.

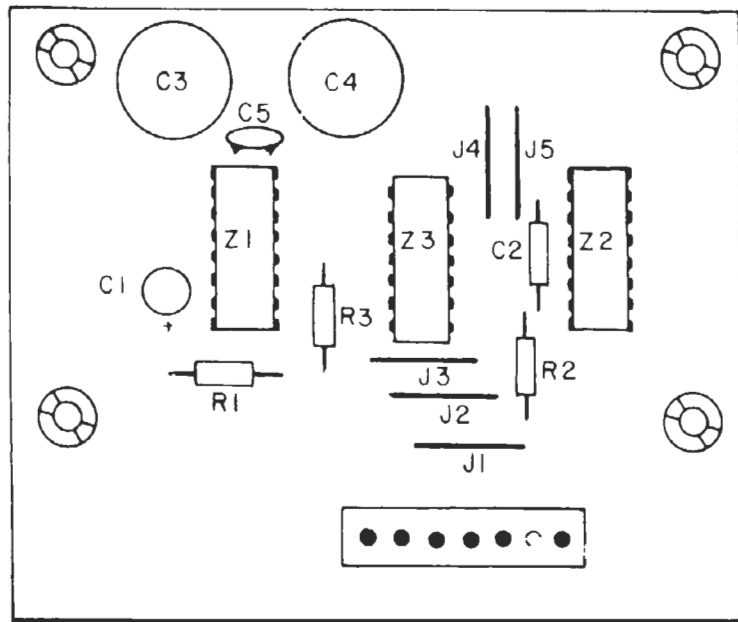
## 4-DIGIT DISPLAY (A5) PARTS LIST

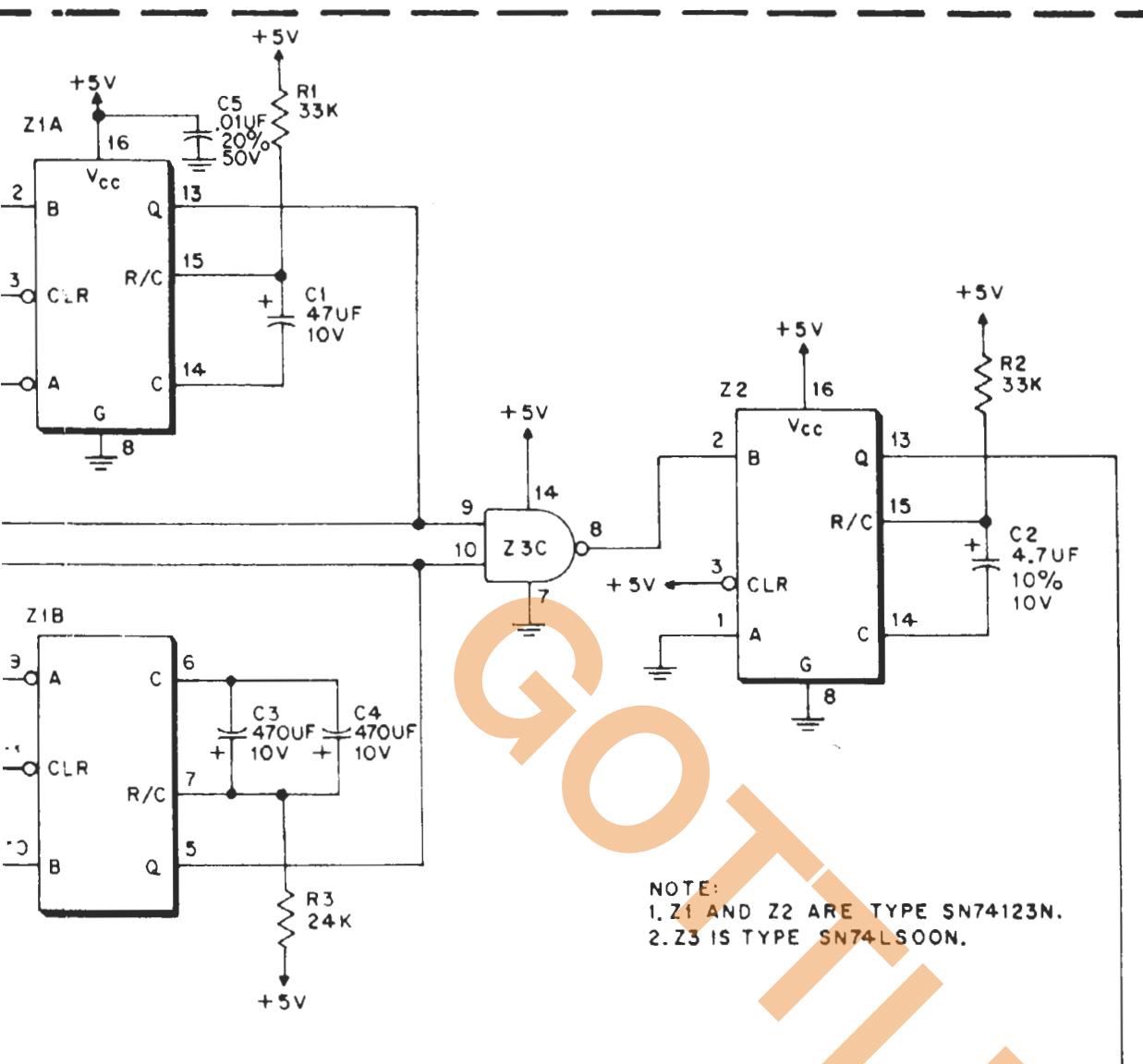
| REFERENCE | DESCRIPTION                                        | PART NUMBER |
|-----------|----------------------------------------------------|-------------|
| C1        | Capacitor, 1 mfd., 100V Sprague 1E1400             | XO-206      |
| C2, C3    | Capacitor, .01 mfd., 100V<br>Kemet C320C103MIR5CA  | XO-202      |
| DS1       | 4-Digit Display Tube-Futaba 4-LT-11                | XO-455X     |
| * R1      | Resistor, 10K Ohm, 5%, 1/2W                        | XO-62       |
| Z1        | IC-Quad or Gate-T.I. SN7432N                       | XO-407      |
| Z2, Z3    | IC-Fluorescent Display Driver—<br>Sprague UDN6118A | XO-415      |

## X. WIRING AND SCHEMATIC



## RESET BOARD (A24) COMPONENT LOCATION





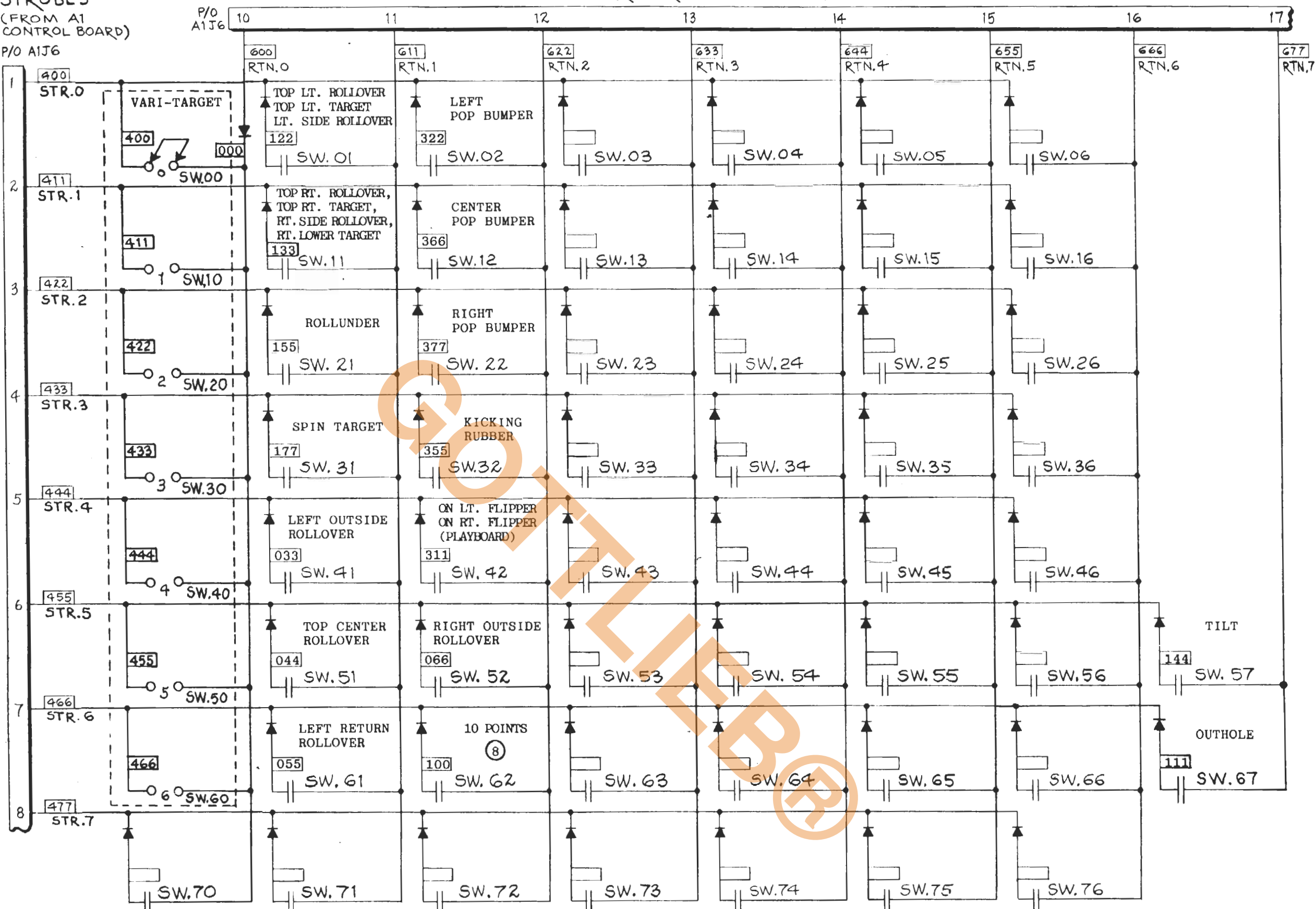
|                              |                |                  |         |
|------------------------------|----------------|------------------|---------|
| D. GOTTLIEB & CO.            |                |                  |         |
| TITLE<br>RESET CIRCUIT BOARD |                |                  |         |
| USED ON                      |                |                  |         |
| DRAWN<br>P                   | APPROVED<br>AC | DATE<br>11-15-82 | C-21063 |

## 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 4.7 $\mu$ fd., 10V  | XO-227      |
| C2        | Capacitor 4.7 $\mu$ fd., 10V  | XO-226      |
| C3, C4    | Capacitor 470 $\mu$ fd., 16V  | XO-214      |
| C5        | Capacitor 0.01 $\mu$ fd., 50V | XO-229      |
| Z1, Z2    | IC 74123N                     | XO-398      |
| Z3        | IC 74LS00N                    | XO-427      |
|           | 7 Pin Connector               | XO-526      |

STROBES  
(FROM A1  
CONTROL BOARD)  
P/O A1J6

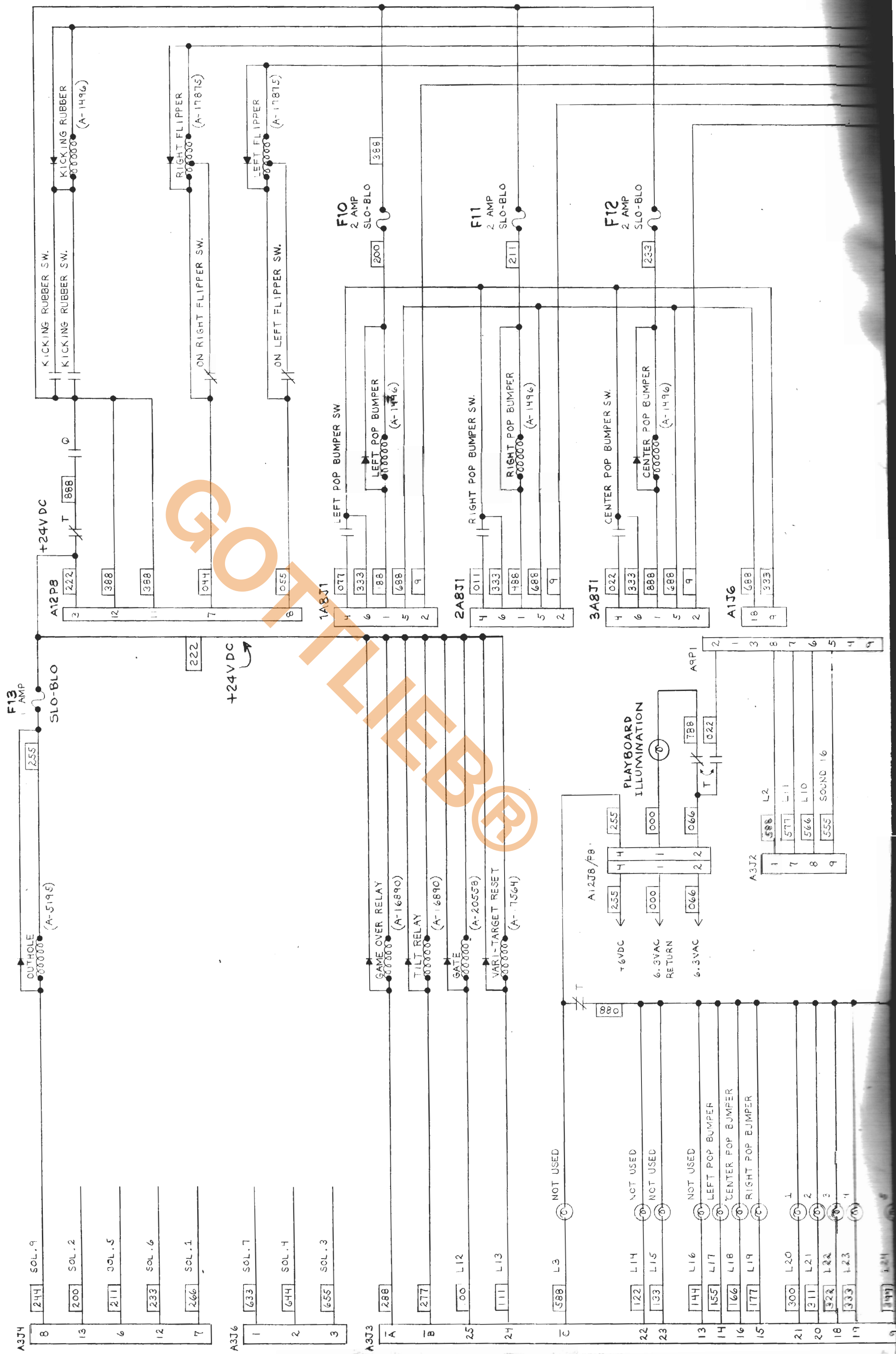
RETURNS (TO A1 CONTROL BOARD)



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

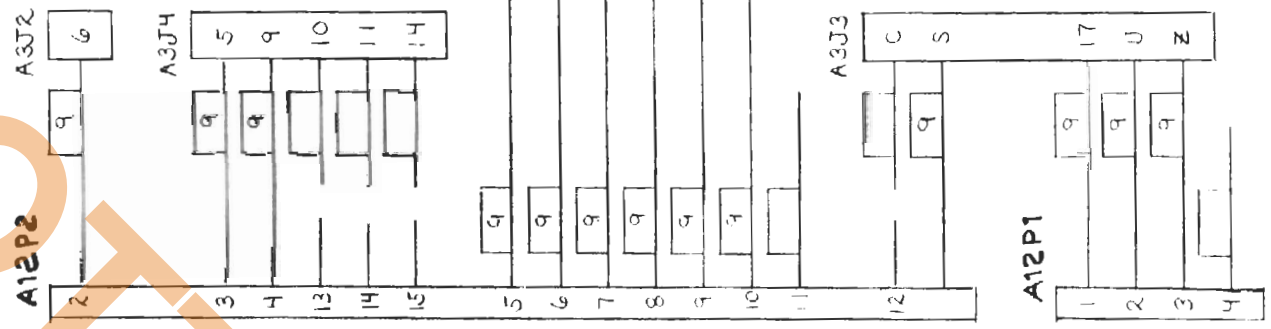
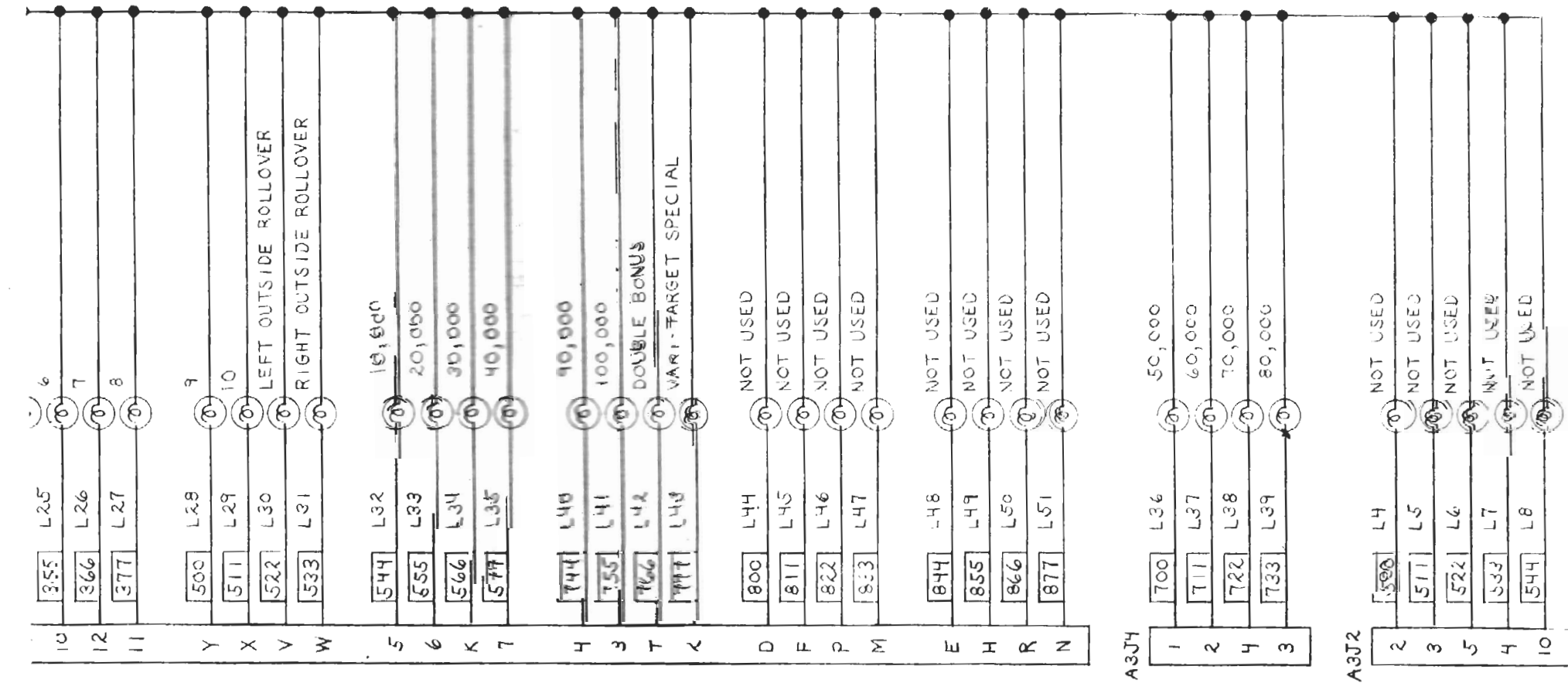
NOTE:  
1. ALL DIODES ARE 1N270.

|                        |                |                 |         |
|------------------------|----------------|-----------------|---------|
| D. GOTTLIEB & CO.      |                |                 |         |
| TITLE<br>SWITCH MATRIX |                |                 |         |
| USED ON<br>GAME #680   |                |                 |         |
| DRAWN<br>P             | APPROVED<br>AC | DATE<br>1-12-83 | E-22823 |



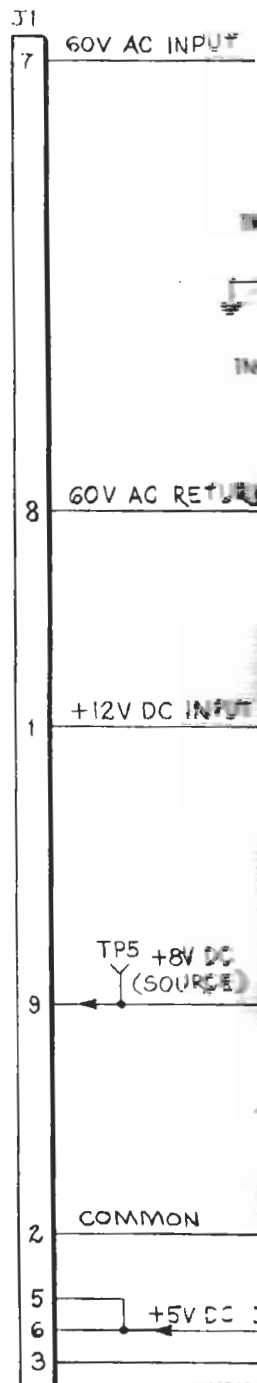
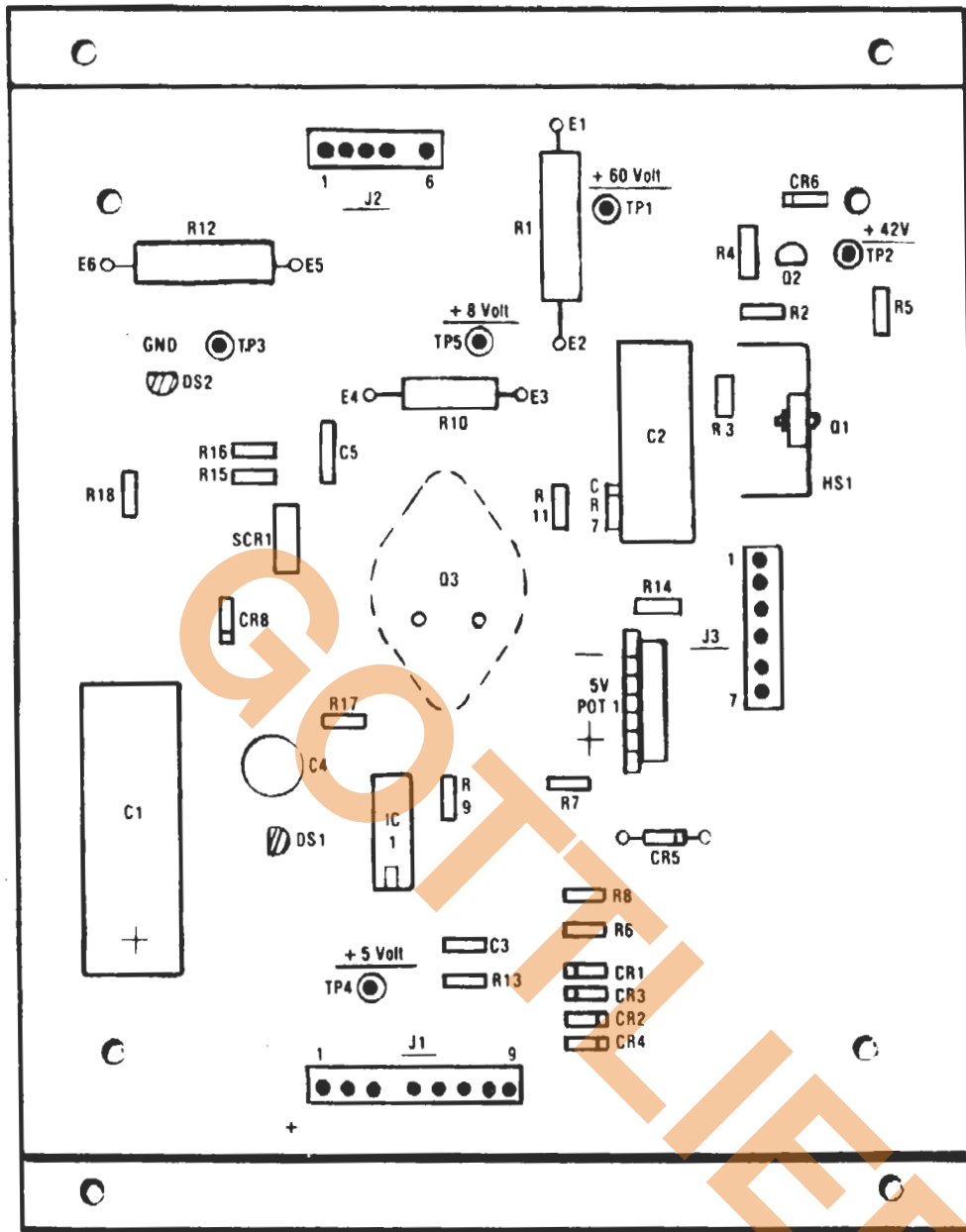
677  
RTN.7

823



|                   |         |                            |  |
|-------------------|---------|----------------------------|--|
| D. GOTTlieb & CO. |         |                            |  |
| TITLE             |         | PLAYFIELD                  |  |
| USED ON           |         | SOLENOIDS AND ILLUMINATION |  |
| DRAWN             |         | DATE                       |  |
| M                 | 1-12-83 | E-22825                    |  |

## POWER SUPPLY (A2) COMPONENT LOCATION

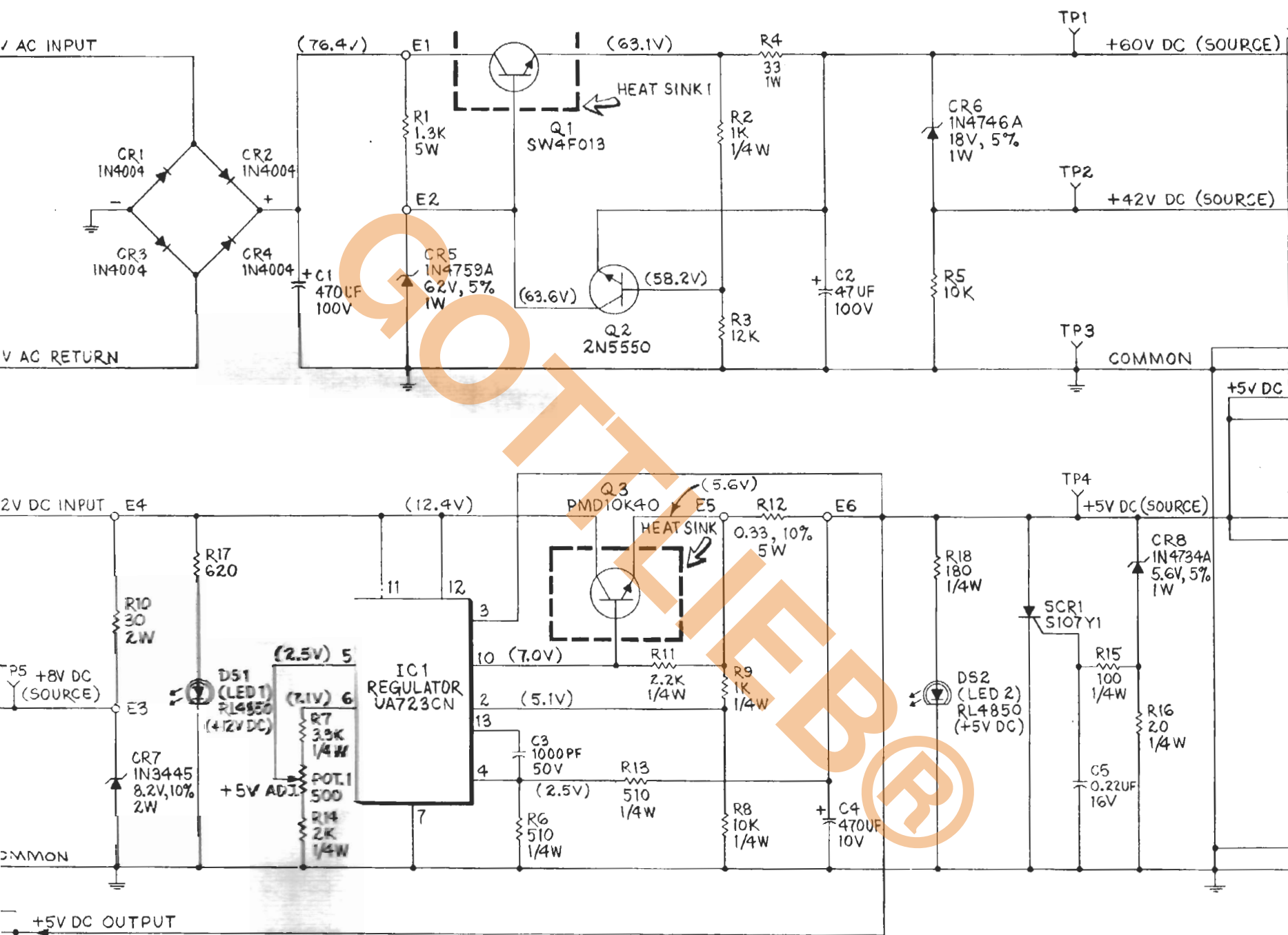


## POWER SUPPLY (A2) PARTS LIST

| REFERENCE | DESCRIPTION                             | PART NUMBER | REFERENCE | DESCRIPTION                            | PART NUMBER |
|-----------|-----------------------------------------|-------------|-----------|----------------------------------------|-------------|
| C1        | Capacitor, 470 mfd., 100V               | XO-233      | R3        | Resistor, 12K ohm, 5%, 1/2W            | XO-63       |
| C2        | Capacitor, 47 mfd., 100V                | XO-231      | R4        | Resistor, 33 ohm, 5%, 1W               | XO-159      |
| C3        | Capacitor, 1000 Picofarad, 50V          | XO-232      | R5        | Resistor, 10K ohm, 5%, 1/2W            | XO-62       |
| C4        | Capacitor, 470 mfd., 10V                | XO-279      | R6, R13   | Resistor, 510 ohm, 5%, 1/4W            | XO-25       |
| C5        | Capacitor, .2 mfd., +80%, -20%, 16V     | XO-205      | R7        | Resistor, 3.9K ohm, 5%, 1/4W           | XO-39       |
| CR1-CR4   | Diode 1N4004                            | XO-254      | R8        | Resistor, 10K ohm, 5%, 1/4W            | XO-18       |
| CR5       | Diode Zener, 62V, 5%, 1W 1N4759A        | XO-267      | R10       | Resistor, 30 ohm, 5%, 2W               | XO-155      |
| CR6       | Diode Zener, 18V, 5%, 1W 1N4746A        | XO-258      | R11       | Resistor, 2.2K ohm, 5%, 1/4W           | XO-27       |
| CR7       | Diode Zener, 8.2V, 10%, 2W 1N3445       | XO-266      | R12       | Resistor, .33 ohm, 10%, 5W (wirewound) | XO-154      |
| CR8       | Diode Zener, 5.6V, 5%, 1W 1N4734A       | XO-255      | R14       | Resistor, 2K ohm, 5%, 1/4W             | XO-14       |
| DS1, DS2  | Diode, Light Emitting CM4-22            | XO-268      | R15       | Resistor, 100 ohm, 5%, 1/4W            | XO-28       |
| IC1       | IC-14 Pin Dip UA723CN                   | XO-422      | R16       | Resistor, 20 ohm, 5%, 1/4W             | XO-29       |
| J1        | Connector, 9 Pin, Molex                 | XO-527      | R17       | Resistor, 620 ohm, 5%, 1/2W            | XO-66       |
| J2        | Connector, 6 Pin, Molex                 | XO-525      | R18       | Resistor, 180 ohm, 5%, 1/4W            | XO-24       |
| J3        | Connector, 7 Pin, Molex                 | XO-526      | SCR1      | Silicon Controlled Rectifier S'07Y1    | XO-451      |
| POT1      | Potentiometer, 500 ohm, CTS 115R501A    | XO-101      |           | Eyelet G52-3                           | XO-524      |
| Q1        | Transistor, NPN, SW4F013                | XO-307      |           | Heat Sink, Thermalloy                  | XO-528      |
| Q2        | Transistor, NPN, 2N5550                 | XO-314      |           | Insulator, INS-3                       | XO-522      |
| Q3        | Transistor, Darlington, Lambda PMD10K40 | XO-315      |           | Insulator, DM 111                      | XO-523      |
| R1        | Resistor, 1.3K ohm, 10%, 5W             | XO-156      |           | Spacer — 6-32 Thread x 5/32            | XO-518      |
| R2, R9    | Resistor, 1K ohm, 5%, 1/4W              | XO-5        |           | Spacer — 6-32 Thread x 1/8             | XO-519      |

NOTES: UNLESS  
1. RESISTORS  
2. VOLTAGES  
3. ALL VOLTAGES

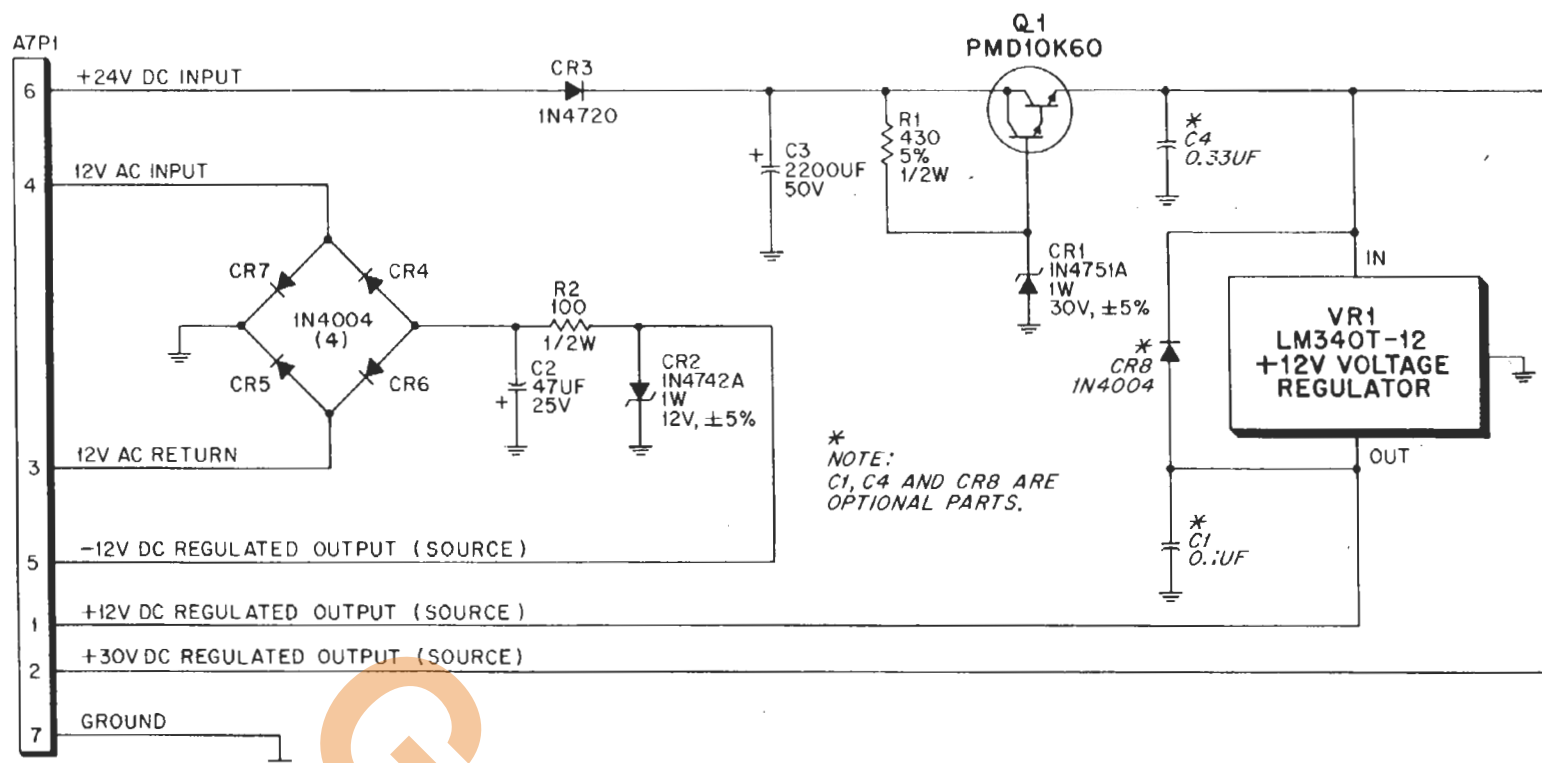
# ATIC DIAGRAMS, PARTS LISTS



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

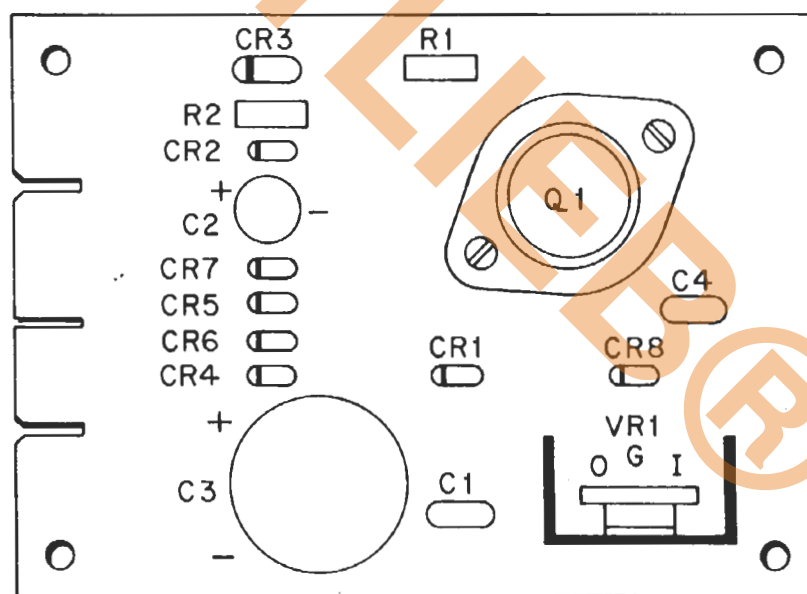
| D. GOTTLIEB & CO.          |                 |                |        |
|----------------------------|-----------------|----------------|--------|
| TITLE<br>POWER SUPPLY (A2) |                 |                |        |
| USED ON                    |                 |                |        |
| DRAWN<br>E                 | APPROVED<br>BAM | DATE<br>2-3-81 | E-2092 |

# X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS



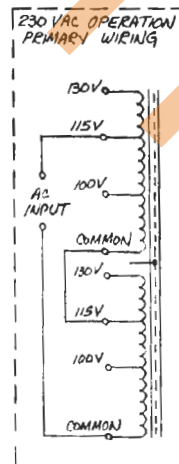
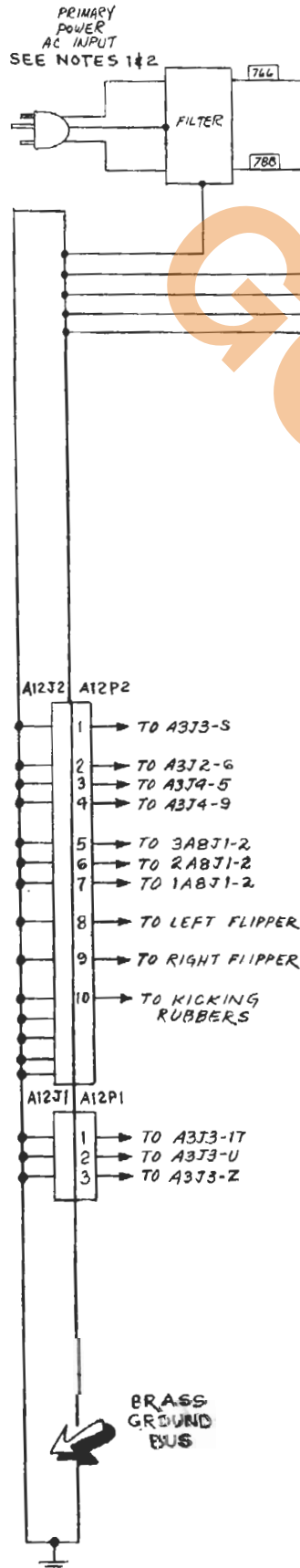
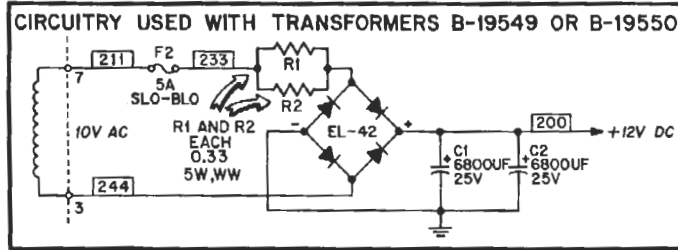
| D. GOTTLIEB & CO. |                                       |         |  |
|-------------------|---------------------------------------|---------|--|
| TITLE             | SOUND/SPEECH BOARD<br>POWER SUPPLY AT |         |  |
| USED ON           |                                       |         |  |
| DRAWN             | APPROVED DATE                         | D-21343 |  |

## SOUND/SPEECH POWER SUPPLY (A7) COMPONENT LOCATION



## SOUND/SPEECH POWER SUPPLY (A7) PARTS LIST

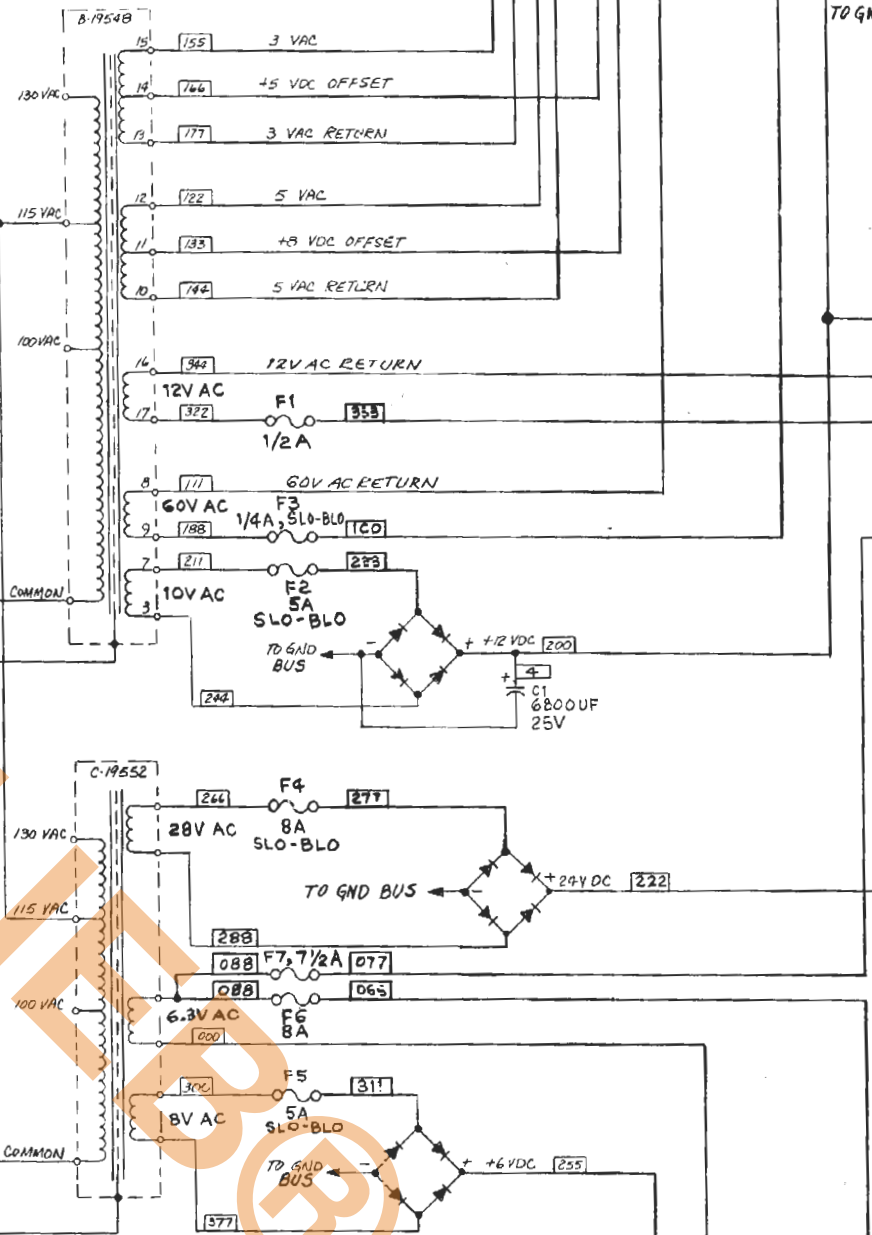
| REFERENCE                  | DESCRIPTION                           | PART NO. |
|----------------------------|---------------------------------------|----------|
| C1                         | Capacitor 0.1UF, 50V                  | XO-230   |
| C2                         | Capacitor 47UF, 25V                   | XO-219   |
| C3                         | Capacitor 2200 UF, 50V                | XO-290   |
| C4                         | Capacitor 0.33 UF                     | XO-250   |
| CR1                        | Diode, Zener 30V, 5%, 1W IN4751A      | XO-271   |
| CR2                        | Diode, Zener 12V, 5%, 1W IN4742A      | XO-257   |
| CR3                        | Diode IN4720                          | XO-260   |
| CR4, CR5, CR6,<br>CR7, CR8 | Diode IN4004                          | XO-254   |
| R1                         | Resistor 430 ohm, 5%, 1/2 Watt        | XO-54    |
| R2                         | Resistor 100 ohm, 5%, 1/2 Watt        | XO-52    |
| Q1                         | Transistor, Darlington Pair PMD10K60  | XO-311   |
| VR1                        | +12 Volt Voltage Regulator LM 340T-12 | XO-473   |



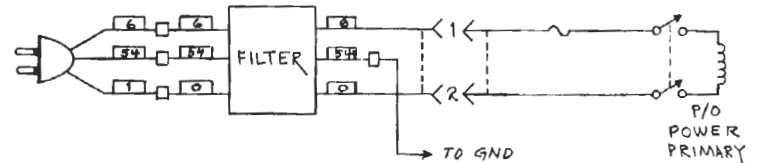
| COLOR CODE |        |   |        |
|------------|--------|---|--------|
| 0          | BLACK  | 5 | GREEN  |
| 1          | BROWN  | 6 | BLUE   |
| 2          | RED    | 7 | PURPLE |
| 3          | ORANGE | 8 | SLATE  |
| 4          | YELLOW | 9 | WHITE  |

**NOTES:**

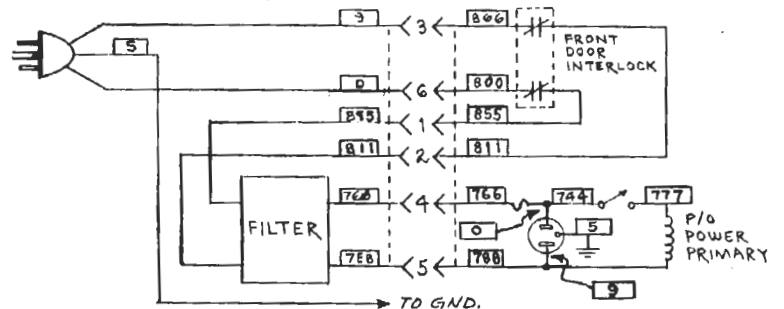
1. PRIMARY FUSE VALUES:  
115 VAC USE 5 AMP SLO-BLO  
230 VAC USE 2.5 AMP SLO-BLO
2. 230 VAC TRANSFORMERS:  
B-19550 & C-19554  
GERMAN TRANSFORMERS:  
B-19549 & C-19553  
JAPAN TRANSFORMERS:  
B-19550 & C-19554
3. REFER TO INSTRUCTION MANUAL FOR GERMAN GAME VARIATIONS.  
XXX INDICATES WIRE COLOR



## 5. GERMAN WIRING, 220V AC.



## 6. JAPANESE WIRING, 100V AC



|                                   |          |      |         |
|-----------------------------------|----------|------|---------|
| D. GOTTLIEB & CO.                 |          |      |         |
| TITLE<br>BOTTOM BOARD AND CABINET |          |      |         |
| USED ON<br>GAME #680              |          |      |         |
| DRAWN                             | APPROVED | DATE | 1-20-68 |

## PLAYBOARD SWITCH AND LAMP ASSIGNMENTS

### LAMP NO.

### LAMP ASSIGNMENT

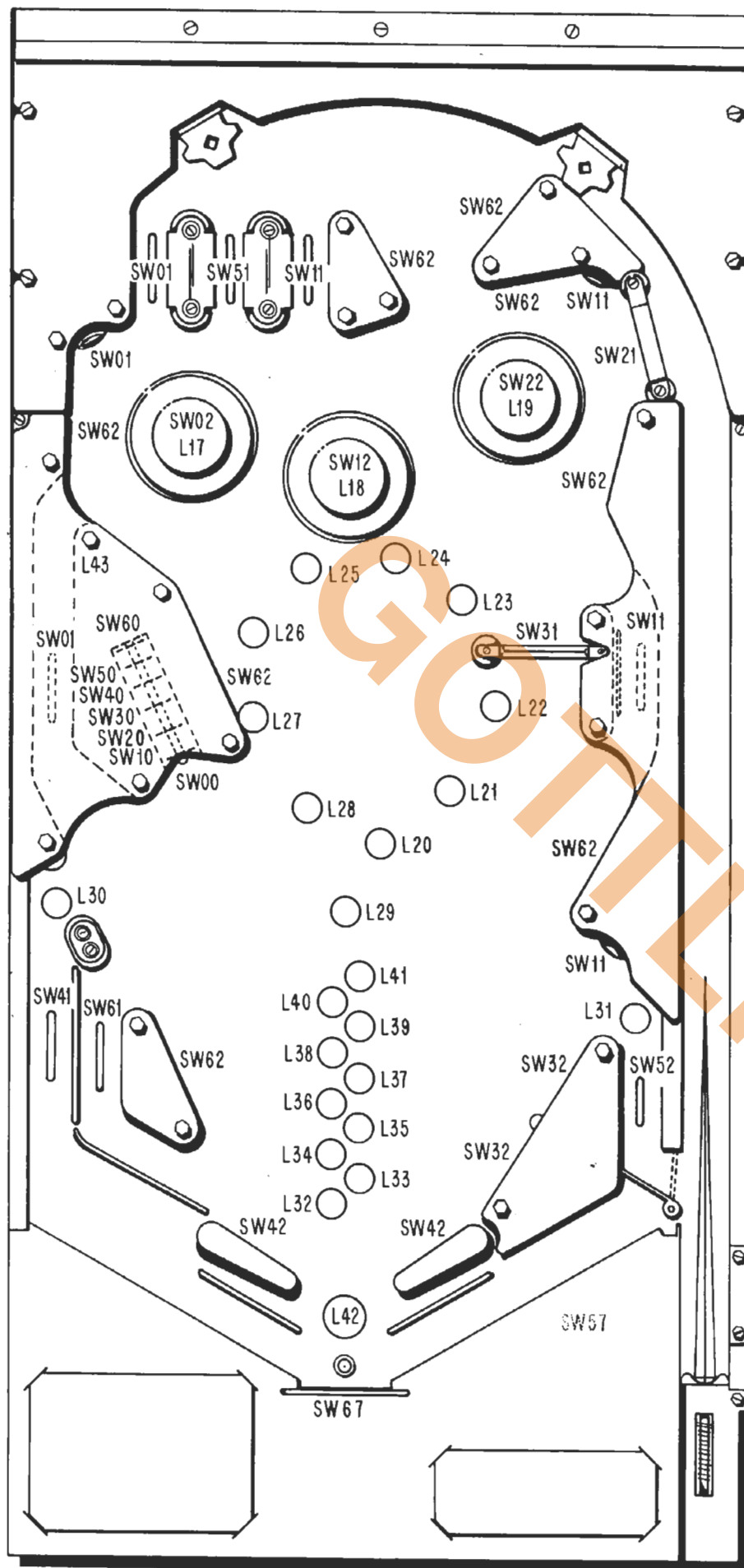
|     |                        |
|-----|------------------------|
| L17 | Left Pop Bumper        |
| L18 | Center Pop Bumper      |
| L19 | Right Pop Bumper       |
| L20 | 1                      |
| L21 | 2                      |
| L22 | 3                      |
| L23 | 4                      |
| L24 | 5                      |
| L25 | 6                      |
| L26 | 7                      |
| L27 | 8                      |
| L28 | 9                      |
| L29 | 10                     |
| L30 | Left Outside Rollover  |
| L31 | Right Outside Rollover |
| L32 | 10,000                 |
| L33 | 20,000                 |
| L34 | 30,000                 |
| L35 | 40,000                 |
| L36 | 50,000                 |
| L37 | 60,000                 |
| L38 | 70,000                 |
| L39 | 80,000                 |
| L40 | 90,000                 |
| L41 | 100,000                |
| L42 | Double Bonus           |
| L43 | Vari-Target Special    |

### SWITCH MATRIX NO.

### SWITCH ASSIGNMENT

### PART NO.

|    |                         |         |
|----|-------------------------|---------|
| 00 | Vari-Target, Position 0 | B-11538 |
| 01 | Top Left Rollover       | B-18892 |
|    | Top Left Target         | B-20867 |
|    | Left Side Rollover      | B-18892 |
| 02 | Left Pop Bumper         | B-21353 |
| 10 | Vari-Target, Position 1 | B-11538 |
| 11 | Top Right Rollover      | B-18892 |
|    | Top Right Target        | B-20867 |
|    | Right Side Rollover     | B-18892 |
|    | Right Lower Target      | B-20867 |
| 12 | Center Pop Bumper       | B-21353 |
| 20 | Vari-Target, Position 2 | B-11538 |
| 21 | Rollunder               | B-21137 |
| 22 | Right Pop Bumper        | B-21353 |
| 30 | Vari-Target, Position 3 | B-11538 |
| 31 | Spin Target             | B-19354 |
| 32 | Kicking Rubber (2)      | B-22224 |
| 40 | Vari-Target, Position 4 | B-11538 |
| 41 | Left Outside Rollover   | B-18892 |
| 42 | On Left Flipper         | B-22478 |
|    | On Right Flipper        | B-22398 |
| 50 | Vari-Target, Position 5 | B-11538 |
| 51 | Top Center Rollover     | B-18892 |
| 52 | Right Outside Rollover  | B-18892 |
| 57 | Tilt                    | B-9141  |
| 60 | Vari-Target, Position 6 | B-11538 |
| 61 | Left Return Rollover    | B-18892 |
| 62 | 10 Points (8)           | B-22227 |
| 67 | Outhole                 | B-18892 |



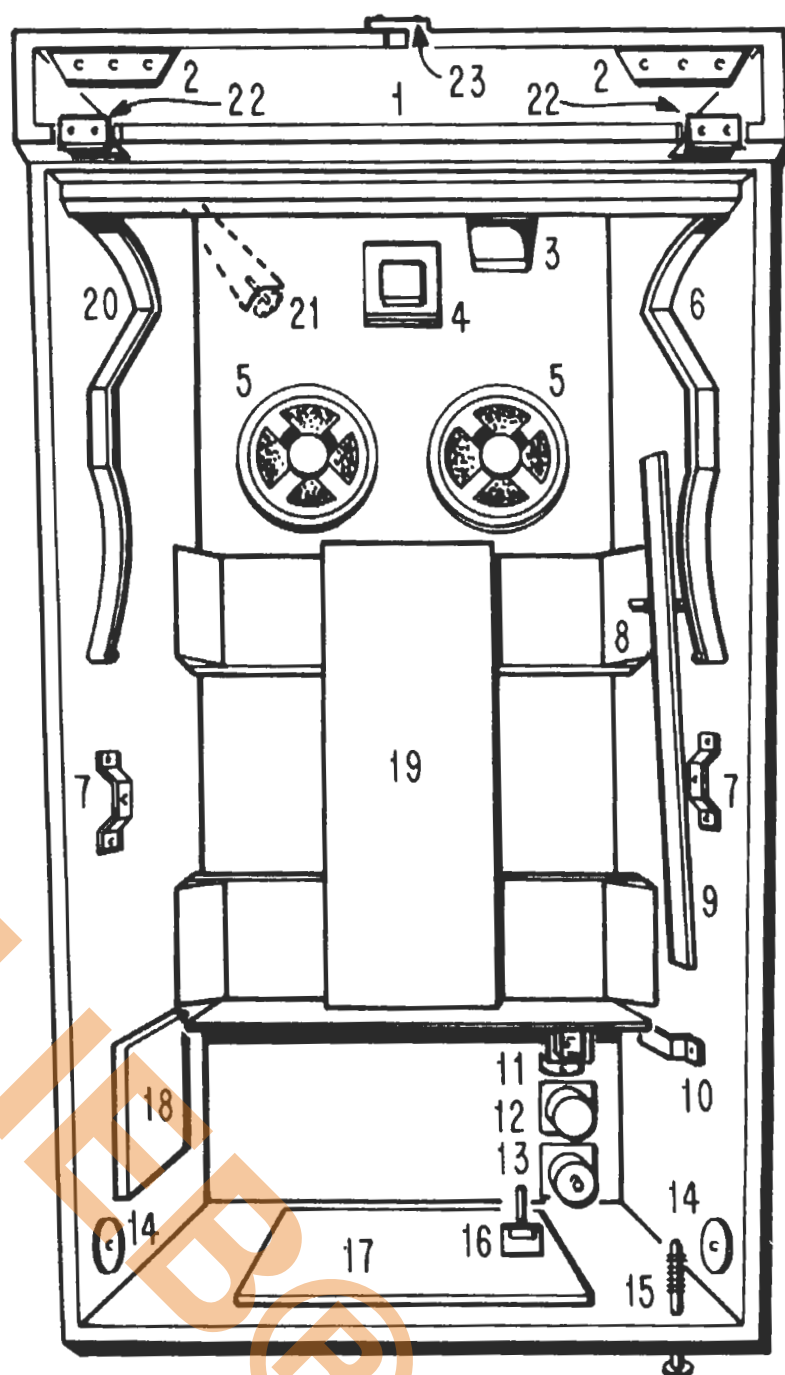
### TABLE OF CONTENTS

|                      | PAGE |
|----------------------|------|
| CABINET PARTS.....   | 45   |
| PLAYBOARD PARTS..... | 46   |

# XI. PARTS INFORMATION

## CABINET PARTS

| ITEM | DESCRIPTION                                   | PART NO.     |
|------|-----------------------------------------------|--------------|
| 1.   | Cabinet                                       | Specify Game |
| 2.   | Lightbox Mounting Bracket (2)                 | A-19916      |
| 3.   | Line Cord Housing                             | C-18534      |
| 4.   | Line Filter                                   | MA-362       |
| 5.   | Speakers, 4 Ohm (2)                           | EL-83        |
| 6.   | Right Playboard Support                       | D-19932      |
| 7.   | Front Rest Saddle (2)                         | A-21960      |
| 8.   | Stop Bracket                                  | A-5024       |
| 9.   | Playboard Prop                                | B-21625      |
| 10.  | Knocker                                       | MA-12        |
| 11.  | Convenience Outlet                            | MA-17        |
| 12.  | Switch, On/Off                                | A-18317      |
| 13.  | Switch Housing                                | B-15163      |
| 14.  | Fuse Assembly                                 | MA-186       |
| 15.  | Flipper Switch Assembly                       | B-17838      |
| 16.  | Ball Shooter                                  | B-8835       |
| 17.  | Pot and Mounting Bracket                      | MA-185       |
| 18.  | Front Door Assembly                           | Specify Game |
| 19.  | Ball Roll Tilt                                | MA-344       |
| 20.  | 6 Diode and Term Strip                        | A-21028      |
| 21.  | Transformer Board Assembly                    | MA-332       |
| 22.  | Bridge Rectifier (3)                          | EL-42        |
| 23.  | Capacitor, 6800 UF, 25 Volt (2)               | XO-228       |
|      | F1, 1/2 Amp Fuse                              | EL-28        |
|      | F2, 5 Amp SLO-BLO Fuse                        | EL-8         |
|      | F3, 1/4 Amp SLO-BLO Fuse                      | EL-5         |
|      | F4, 5 Amp SLO-BLO Fuse                        | EL-8         |
|      | F5, 5 Amp SLO-BLO Fuse                        | EL-8         |
|      | F6, 7-1/2 Amp Fuse                            | EL-22        |
|      | F7, 10 Amp Fuse                               | EL-23        |
|      | F8, 1 Amp SLO-BLO Fuse                        | EL-6         |
| 20.  | Left Playboard Support                        | D-19931      |
| 21.  | Cabinet Leg (4)                               | D-4337       |
|      | 3" Leg Adjuster                               | MH-21        |
| 22.  | Hinge (shown for reference only-P/O Lightbox) | B-22734      |
| 23.  | Latch Bar                                     | A-22733      |
|      | Latch Assembly (P/O Lightbox)                 | A-21969      |



# XI. PARTS INFORMATION

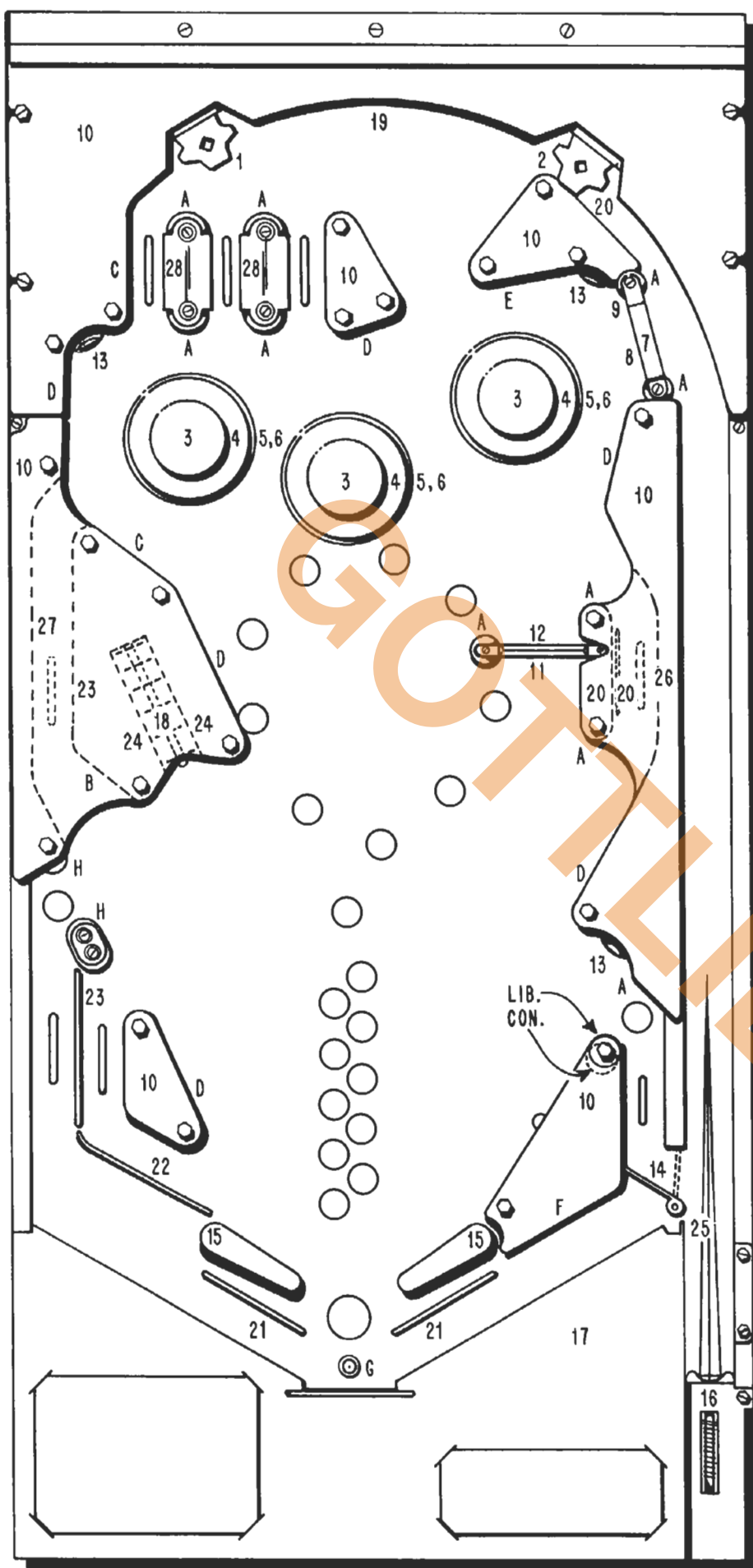
## PLAYBOARD PARTS

### RUBBER RINGS

|   |         |        |      |
|---|---------|--------|------|
| A | A-10217 | 5/16"  | (10) |
| B | A-10219 | 1"     | (1)  |
| C | A-10220 | 1-1/2" | (2)  |
| D | A-10221 | 2"     | (6)  |
| E | A-10222 | 2-1/2" | (1)  |
| F | A-10224 | 3-1/2" | (1)  |
| G | A-15705 | Mini   | (1)  |
| H | A-17493 | Mini   | (2)  |

### PARTS LIST

|     |          |                             |
|-----|----------|-----------------------------|
| 1.  | A-19646  | Arch Rebound                |
| 2.  | A-19645  | Arch Gate                   |
| 3.  | A-15980  | Pop Bumper Cap, White (3)   |
| 4.  | A-21298  | Pop Bumper Body, White (3)  |
| 5.  | C-10433Z | Pop Bumper Skirt, White (3) |
| 6.  | B-8246   | Pop Bumper Trim Platter (3) |
| 7.  | A-4869   | Rollunder Shield            |
| 8.  | A-4706   | Rollunder Gate              |
| 9.  | A-14236  | Spring                      |
| 10. | D-22777  | Plastic Shield Set          |
| 11. | A-14043  | Shield                      |
| 12. | A-20388  | Swinging Target             |
| 13. | A-9374Z  | Target, White (3)           |
| 14. | A-13652  | Gate Wireform               |
| 15. | C-13150  | Flipper, White (2)          |
| 16. | C-9767   | Ball Shooter Gauge          |
| 17. | D-13647  | Cardholder                  |
| 18. | MA-412   | Var-Target                  |
| 19. | D-22744  | Arch Rod                    |
| 20. | A-3722   | Ball Guide Rail (3)         |
| 21. | A-13798  | Ball Guide Rail             |
| 22. | A-12107  | Ball Guide Rail             |
| 23. | A-4833   | Ball Guide Rail (2)         |
| 24. | A-4832   | Ball Guide Rail (2)         |
| 25. | A-6931   | Ball Guide Rail             |
| 26. | A-12431  | Metal Flat Rail             |
| 27. | B-13891  | Metal Flat Rail             |
| 28. | A-9396Z  | Guide Rail, White (2)       |
|     | A-14792  | Mini Post Screw (1)         |
|     | A-20635  | Plastic Support Post (1)    |
|     | B-19875P | Arch Rod Support Post (2)   |
|     | C-11561  | Plastic Post (37)           |
|     | C-11562  | Plastic Post (2)            |
|     | C-17492  | Siamese Post (2)            |



# LIMITED WARRANTY

D. Gottlieb & Co. warrants to the initial purchaser of the D. Gottlieb & Co. machine that the items listed in the following schedule as installed and used in the original D. Gottlieb & Co. machine will for the applicable period set forth in the schedule, computed from the initial date of purchase from an authorized D. Gottlieb & Co. distributor, be free of defects in materials and workmanship:

## SCHEDULE

| GAME          | ITEM                                        | WARRANTY PERIOD |
|---------------|---------------------------------------------|-----------------|
| Pinball       | All Electronic<br>Printed circuit<br>boards | 90 days         |
| Pinball-Video | All Electronic<br>Printed Circuit<br>Boards | 90 days         |
|               | Card Cage                                   | 90 days         |
|               | Television<br>Monitor                       | 30 days         |
| Video         | All Electronic<br>Printed Circuit<br>Boards | 90 days         |
|               | Television<br>Monitor                       | 30 days         |

This Limited Warranty does not apply to any parts damaged in the course of handling or assembling by the customer or damage due to other than normal use or use in violation of instructions or reasonable practices, or further damaged in return shipment. This Limited Warranty is made only to the original customer, and is and shall be in lieu of all other warranties expressed or implied, and of all other obligations or liabilities on the part of D. Gottlieb & Co. and in no event shall D. Gottlieb & Co. be liable for any anticipated profits, consequential damages, loss of time, or other losses incurred by the customer in connection with the purchase or operation of D. Gottlieb & Co. machines or components thereof.

The registration card with each D. Gottlieb & Co. factory-wired machine must be filled in and returned to D. Gottlieb & Co. within ten days after date of purchase for this Limited Warranty to be effective. This Limited Warranty applies only to machines so registered.

THIS LIMITED WARRANTY IS IN LIEU OF ANY OTHER EXPRESS OR IMPLIED WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS, AND OF ANY OTHER OBLIGATION ON THE PART OF THE SELLER AND D. GOTTLIEB & CO.

 **Gottlieb**  
AMUSEMENT GAMES

**WARNING:** This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference."

A-22670



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- BONUS** ..... FAIRE UNE SERIE ORBIT AVANCE LE BONUS TOUCHER LA CIBLE VARIABLE OU FAIRE LE PASSAGE SUPERIEUR CENTRAL, AVANCE AUSSI LE BONUS.
- DOUBLE BONUS** .. TOUS LES BONUS SONT DOUBLES DURANT LA TROISIEME BILLE.
- SPECIAL** ..... POSITIONNER LA CIBLE VARIABLE DANS SA PLUS HAUTE POSITION DONNE LE SPECIAL LORSQU'IL EST ALLUME.

A-22805