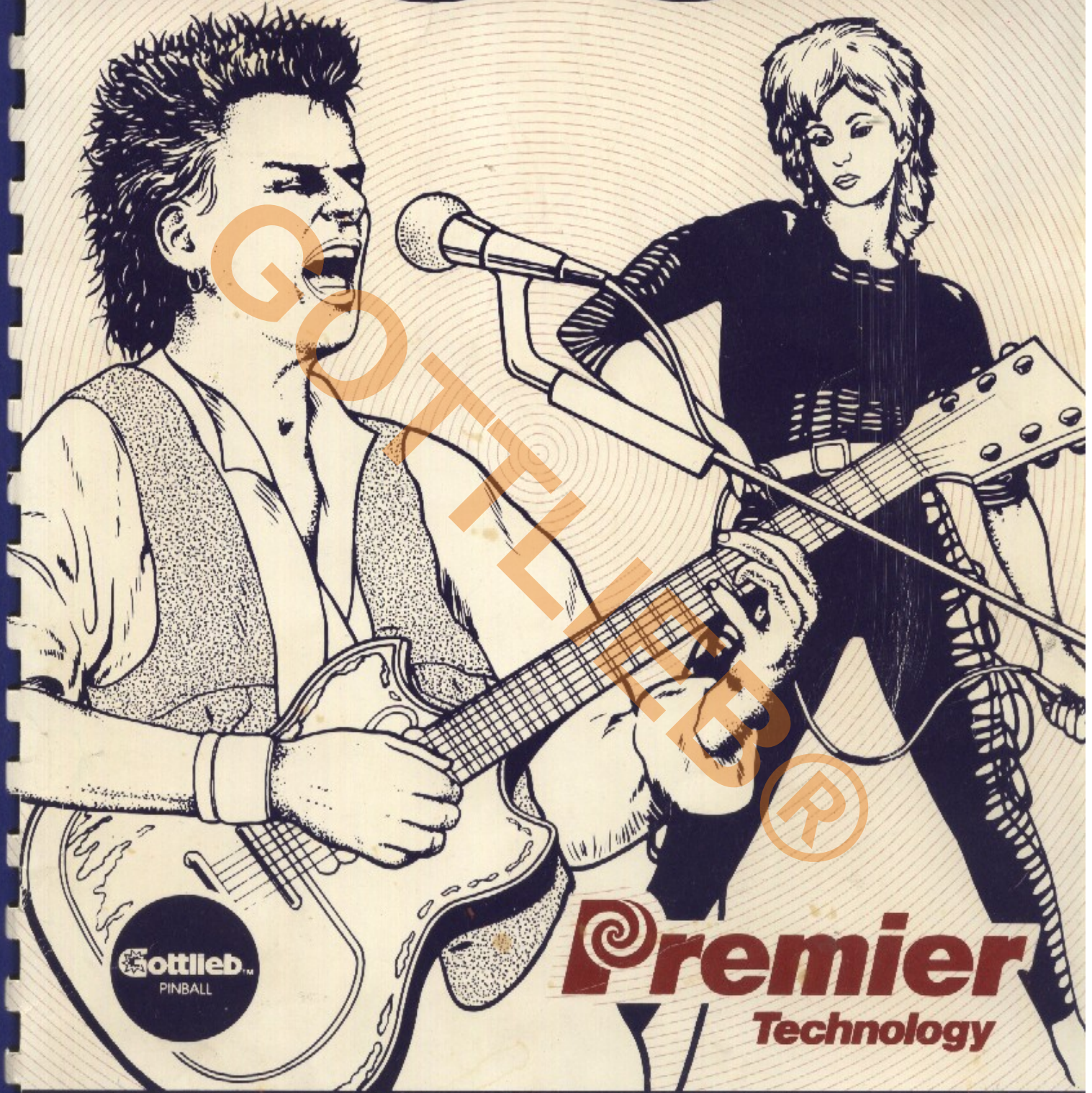


# ROCK



**Premier**  
Technology

INSTRUCTION MANUAL

ROCK

(GAME #697)

INSTRUCTION MANUAL

Applicable for all games.

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ROCK

GAME PROM 697

SOUND PROMS:

697/DROM 1

697/YROM 1

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ADDENDUM  
ATTACH TO AND A PART OF  
ROCK (GAME #697)

SWITCH 7 ON THE CONTROL BOARD WAS SHOWN AS A SPARE  
AND SHOULD BE CORRECTED AS FOLLOWS:

CHANGED PAGE

1. SECTION VI. GAME ADJUSTMENTS, PAGE 6.

SWITCH 7.....ATTRACT MODE SOUND  
ON.....ENABLED  
OFF.....DISABLED

CORRECTED PAGES

2. SECTION VIII. THEORY OF OPERATION, PAGES 15 AND 16.

SYSTEM CLOCK

2ND LINE, "C22" SHOULD BE "C21".

RESET

2ND LINE, "P3 PIN 1" SHOULD BE "A1J2 PIN 24."

MAIN SUMMER

4TH LINE, "P3 PIN 2" SHOULD BE "A6P1 PIN 18."

3. SECTION X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS,  
PAGES 31, 32 AND 33.

SOUND BOARD IC'S A3 AND B2 WERE TYPE 74LS373 AND  
SHOULD BE 74LS374, PART NUMBER XO-96.

ADD A 0.1UF, 50V, AX-CM, +80%-20% CAPACITOR PART NO.  
XO-230, FROM A2-8 TO GROUND. NOTE: THIS CAPACITOR  
IS ATTACHED ON THE NON-COMPONENT SIDE OF THE BOARD.

4. SECTION X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS,  
PAGE 41.

GENERAL PLAYBOARD ILLUMINATION LAMPS WERE ADDED AS  
INDICATED IN THE PARTIAL PLAYBOARD SCHEMATIC, SEE  
FIGURE 1.

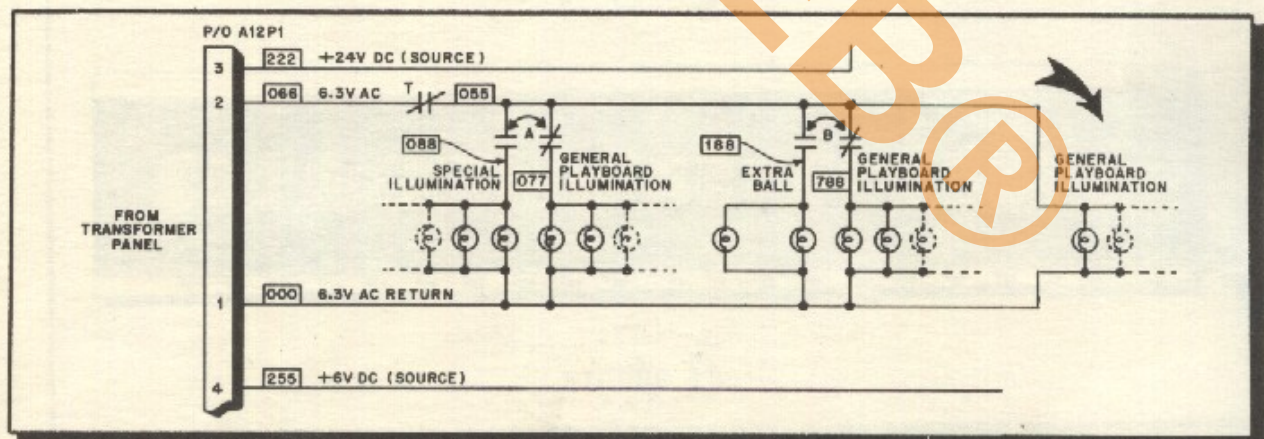


FIGURE 1.

SUPPLEMENTAL ADDENDUM

ATTACHED TO AND A PART OF ALL  
SYSTEM 80B ALPHANUMERIC DISPLAY  
GAME INSTRUCTION MANUALS

DISPLAY BOARD(A4)

1. THE ALPHANUMERIC DISPLAY BOARD(A4) IN THIS GAME MAY BE DIFFERENT THAN THE ONE AS ILLUSTRATED ON PAGE(S) 34 AND 35-36.
2. THE DIFFERENT DISPLAY BOARD (A4), PART NO. MA-644F, CONTAINS DISPLAYS DS1 AND DS2, PART NOS. XO-870.
3. THE DISPLAY BOARDS AS AN ASSEMBLY ARE INTERCHANGEABLE; HOWEVER, THE DISPLAY(S) DS1 AND DS2 ARE NOT INTERCHANGEABLE FROM ONE ASSEMBLY TO ANOTHER.
4. TO QUICKLY DETERMINE WHICH DISPLAY BOARD (A4) IS USED IN THIS GAME, OBSERVE THE LOCATION OF THE VACUUM EXHAUST TIP.

FIGURE 1A. DISPLAY BOARD (A4), (MA-644), DISPLAY(S) XO-840  
FIGURE 1B. DISPLAY BOARD (A4), (MA-644F), DISPLAY(S) XO-870



FIGURE 1A.

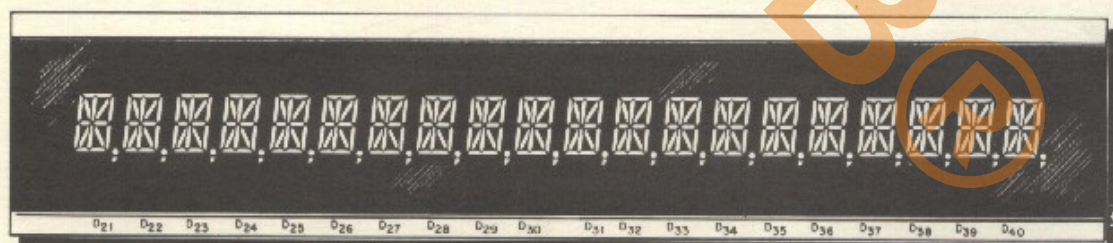
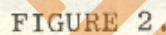


FIGURE 1B.



## SYSTEM 80B OVERVIEW

System 80B contains three new circuit boards. These are the Alphanumeric Display, the Power Supply, and the Control Board Piggyback which is attached to the Control Board. The Alphanumeric Display takes the place of the Four and Seven Digit Displays used in System 80A games. The new Power Supply takes the place of the System 80A Power Supply. The Control Board Piggyback takes the place of ROMS (U2-U3) and game Prom (PROM 1) used in System 80A games.

Some of the new features of System 80B are:

- 1) Capability to display messages.
- 2) Enhanced bookkeeping and self-test.
- 3) Players can enter their initials if they achieve a high score.
- 4) Top five high scores are displayed in the attract mode.

**"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

## I. INSTALLATION

### A. SET-UP

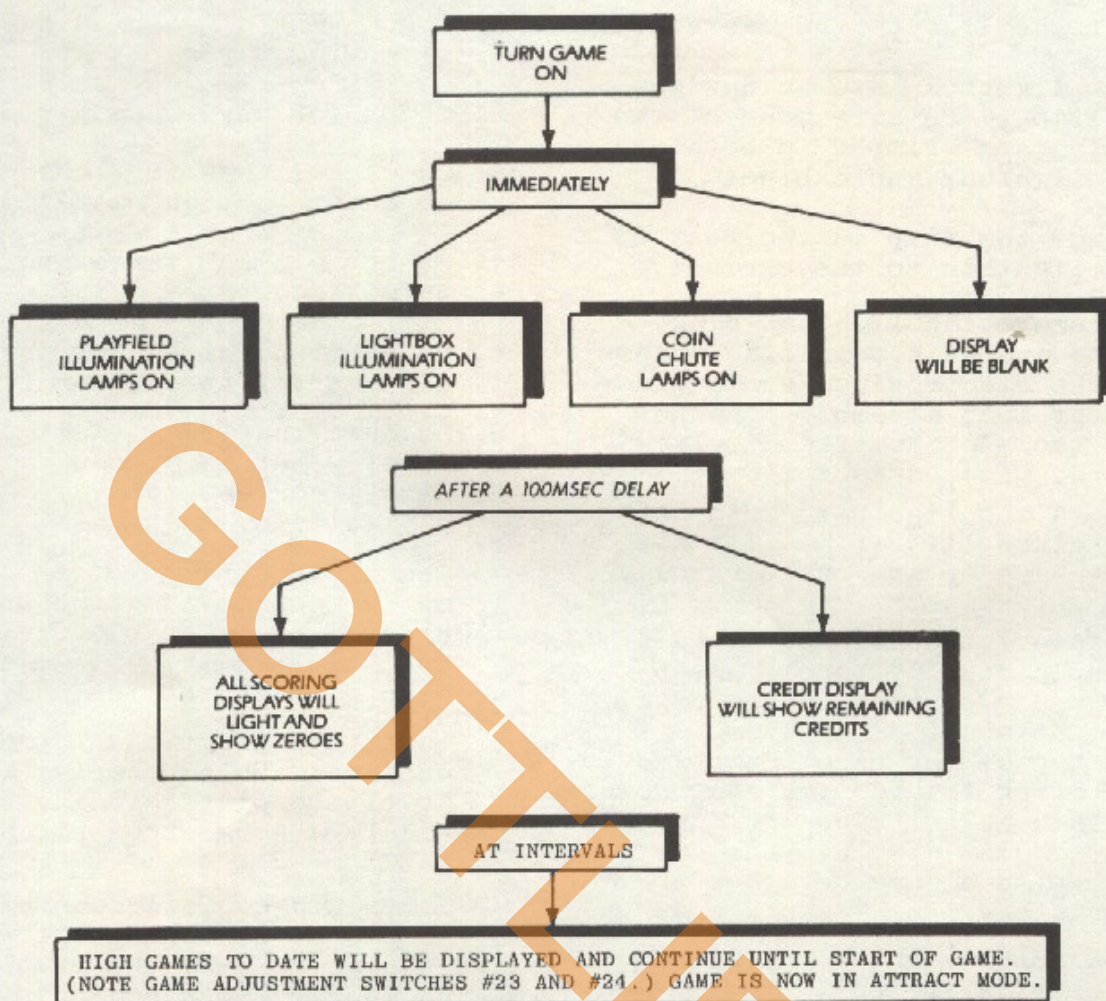
1. Bolt the legs to the cabinet.
2. Lift lightbox into an upright position. Be sure none of the cables are crimped in between the lightbox and cabinet.
3. Engage the snap in the rear of the lightbox to the cabinet.
4. To remove the lightbox backglass and gain servicing access to the electronics panel, fluorescent lamp assembly, speaker and the alphanumeric display board, proceed as follows:  
Unlock the lightbox, grasp the backglass lift trim, lift the backglass up and out carefully and set aside.  
To remove the speaker/alphanumeric display panel, grasp the upper portion of the panel, lift up about 1/2", swivel the top of the panel downwards and bring towards you, set down on the cabinet side mouldings. The acrylic display panel cover will also become detached at this stage.
5. Secure the lightbox to the cabinet with the bolts and washers provided.
6. Open the cabinet door and loosen the front moulding locking arm.
7. Remove the moulding from the playfield.
8. Slide the cabinet glass toward you and remove it.
9. Raise the playboard, slide it forward and rest it on its support.
10. Unravel and straighten out the power line cord located at the rear of the pinball cabinet.
11. Proceed to "B. CHECK-OUT".

### 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 transformer for any foreign matter across terminals.
6. Be sure that the Transformer Panel power input connector A12J7, 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. Lower the playfield into the cabinet. Using the leg adjusters, level the playfield and set the pitch. Recommended pitch is  $4\frac{1}{2}^{\circ}$  -  $5^{\circ}$ .
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. Reinstall the cabinet glass, front moulding and the lightbox assembly.
11. Plug the line-cord into a properly grounded 3-wire receptacle ONLY!
12. Refer to Section VI to make all necessary game adjustments.
13. **CAUTION** If this game has been subjected to extreme cold, allow to warm up to room temperature.

## 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 the center of the lower 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 two zeros.

#### B. FIRST PLAYER

1. First player's score display flashes two zeros.
2. The other player's displays are now blank.
3. The ball-in-play is displayed in the center of the upper display.

### III. GAME OPERATION

4. When the ball enters the outhole, any bonus earned is scored.

#### C. ADDITIONAL PLAYERS

1. Additional players are indicated by two zeros (not flashing) in each corresponding player's display.
2. After the maximum number of players are added, or no more credits remain, the Credit Button has no effect.
3. Additional players can be added anytime during the first player's first ball in play.

#### 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 entire switch matrix is inactive for three seconds.
3. If the match feature exists (dependent on Switch #26), a replay can be won even if the game is slammed.
4. Game returns to the attract mode.

#### G. GAME OVER

1. A random match 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 #26) is awarded.
2. The High Games To Date are periodically displayed, dependent on Switches #23 and #24. When the Highest Game To Date is beaten, an award (dependent on Switches #23 and #24) is given.
3. All of the drop targets will reset (when used).

## IV. GAME PLAY AND SCORING

# ROCK

### HOW TO PLAY

#### TOP ROLLOVERS

- SCORE 1000 UNLIT.
- SCORE 10,000 WHEN LIT.
- COMPLETING SEQUENCE (A-B-C) ADVANCES THE BONUS MULTIPLIER.
- (5 BALL) SCORE 500 UNLIT.
- (5 BALL) SCORE 5000 WHEN LIT.

#### LOWER RIGHT FLIPPER SWITCH

- ROTATE TOP ROLLOVER LAMPS.

#### TOP DROP TARGETS

- SCORE 1000 UNLIT OR WHEN LIT.
- HITTING FLASHING TARGET ADVANCES LAMP AND SCORES:
  - 1) 1000 AT LEVEL 0 (NO LAMPS LIT)
  - 2) 5000 WHEN LEVEL 1 LIT
  - 3) 10,000 WHEN LEVEL 2 LIT
  - 4) 15,000 WHEN LEVEL 3 LIT
  - 5) 20,000 WHEN SPECIAL FLASHING

- COMPLETING SEQUENCE (ALL DROP TARGETS LIT) ADVANCES LEVELS.
- COMPLETING SEQUENCE WHEN SPECIAL IS FLASHING (LEVEL 4), AWARDS SPECIAL AND RESETS LEVELS.
- (5 BALL) SCORE 500 UNLIT OR WHEN LIT.

#### BOTTOM DROP TARGETS

- SCORE 1000 UNLIT.
- SCORE 10,000 AND ADD 2 BONUS LETTERS WHEN LIT.
- (5 BALL) SCORE 500 UNLIT.
- (5 BALL) SCORE 5000 WHEN LIT.

#### ROLLUNDER (LOOP)

- SCORE 10,000 AND ACTIVATE DOUBLE SCORING FOR 7 SECONDS.
- SET EXTRA BALL FLAG WHEN EXTRA BALL LIT.

## IV. GAME PLAY AND SCORING

### LEFT AND RIGHT SIDE ROLLOVER, LEFT AND RIGHT SIDE RETURN ROLLOVER

- SCORE 1000 UNLIT.
- SCORE 5000 AND ADD A BONUS LETTER WHEN LIT.
- COMPLETING ALL FOUR ROLLOVERS FLASHES THE SPOT TARGET.
- LEFT SIDE ROLLOVER AWARDS EXTRA BALL WHEN FLAG IS PREVIOUSLY SET BY ROLLUNDER.

### SPOT TARGET

- SCORE 1000.
- RESET LEFT AND RIGHT SIDE ROLLOVERS AND LEFT AND RIGHT RETURN ROLLOVERS WHEN FLASHING.

### TOP LEFT AND RIGHT SIDE ROLLOVERS

- SCORE 300.

### LEFT AND RIGHT SIDE SPINNERS

- SCORE 1000 UNLIT.
- SCORE 10,000 WHEN LIT.

### LEFT AND RIGHT OUTSIDE ROLLOVERS

- SCORE 1000 UNLIT.
- SCORE 10,000 WHEN LIT.

### RUBBER SWITCHES

- SCORE 30.
- ALTERNATE SPINNER AND LEFT AND RIGHT OUTSIDE ROLLOVER LAMPS.
- ROTATE LEFT AND RIGHT SIDE AND LEFT AND RIGHT RETURN ROLLOVERS.

### BONUS

- WHEN BONUS IS COMPLETED ("ROCK AND ROLL LIVES!"), THE EXTRA BALL LAMPS ARE LIT, AND THE BONUS IS COLLECTED IMMEDIATELY IF SWITCH #31 IS ON.

### OUTHOLE

- SCORE 10,000 TIMES BONUS MULTIPLIER FOR EACH BONUS LETTER LIT.
- RESET LEVEL LAMPS IF SPECIAL ENABLED (LEVEL 4).
- (5 BALL) RESET ANY BONUS WORD THAT IS INCOMPLETE.
- (5 BALL) REDUCE BONUS MULTIPLIER BY 1X.

# ROCK

# V. SOUND, VI. GAME ADJUSTMENTS

## V. SOUND

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

## VI. GAME ADJUSTMENTS

### A. CONTROL BOARD SWITCH ADJUSTMENTS

NOTE: The following switch adjustments pertaining to SYSTEM 80B 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 80B

| 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.

**SWITCH 6** HIGH GAMES TO DATE CONTROL  
ON ..... Reset High Games #2-#5 on Power Off  
OFF ..... No Effect

SWITCHES 7 AND 8 \_\_\_\_\_ SPARES

**SWITCH 14** COIN CHUTE LEFT AND RIGHT CONTROL  
ON ..... Same  
OFF ..... Separate

**SWITCHES 15 16** MAXIMUM CREDITS  
OFF OFF ..... 8  
OFF ON ..... 10  
ON OFF ..... 15  
ON ON ..... 20

**SWITCH 22** PLAYFIELD SPECIAL  
ON ..... Extra Ball  
OFF ..... Special

**SWITCHES 23 24** HIGHEST GAME TO DATE AWARDS  
OFF OFF ..... None (Not Displayed)  
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

**SWITCH 31** PLAYFIELD EXTRA BALL ADJUSTMENT  
ON ..... Collect bonus immediately when completed (Liberal)  
OFF ..... Collect bonus at end of ball (Conservative)

**SWITCH 32** PLAYFIELD SPECIAL ADJUSTMENT  
ON ..... Memorize level lamps ball to ball (Liberal)  
OFF ..... Reset level lamps ball to ball (Conservative)

#### 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 |  | 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 |  | Right Coin Chute |  | Center Coin Chute |  | COIN/CREDIT GIVEN |  | COIN/CREDIT GIVEN |  | COIN/CREDIT GIVEN |  | COIN/CREDIT GIVEN |  | COIN/CREDIT GIVEN |  |                          |     |
| S9       | S10 | S11 | S12 | S13 |                 |  |                  |  |                   |  |                   |  |                   |  |                   |  |                   |  |                   |  |                          |     |
| S17      | S18 | S19 | S20 | S21 |                 |  |                  |  |                   |  |                   |  |                   |  |                   |  |                   |  |                   |  |                          |     |
| 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 |

## VI. GAME ADJUSTMENTS

### B. SOUND ADJUSTMENTS

The speaker(s) output is controlled by the potentiometer mounted on a bracket located inside the cabinet next to the front door hinge.

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

#### SWITCH BANK SETTINGS:

##### DIP SWITCH

|                 |          |
|-----------------|----------|
| Position 1..... | NOT USED |
| Position 2..... | NOT USED |
| Position 3..... | OFF      |
| Position 4..... | ON       |

### C. POST ADJUSTMENTS

There are no liberal/conservative post adjustments in this game.

## 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.

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 80B

- See Flow Chart for Bookkeeping Assignments (1-15).

#### I. STEPPING THROUGH BOOKKEEPING

1. Press the SELF-TEST button inside the front door.

"TEST MODE" should appear in the upper display.

2. Press the SELF-TEST button again. Step 1 and its information will be displayed.
3. Pressing the SELF-TEST button will increment the bookkeeping step number and appropriate information will be displayed.

Pressing the SELF-TEST button after Step 15 will start the SELF-TEST function (Step 16-21). At this

point Bookkeeping cannot be re-entered by pressing the SELF-TEST button. To reenter, turn the game OFF/ON or open the slam switch. The game will return to the attract mode. Then press the SELF-TEST button.

4. To exit from Bookkeeping at any time:

- a. Turn power OFF/ON or
- b. Open slam 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 credit button. Notice information replaced by zeros. Note: Step 6 (Replay Percentage) cannot be zeroed using the credit button.

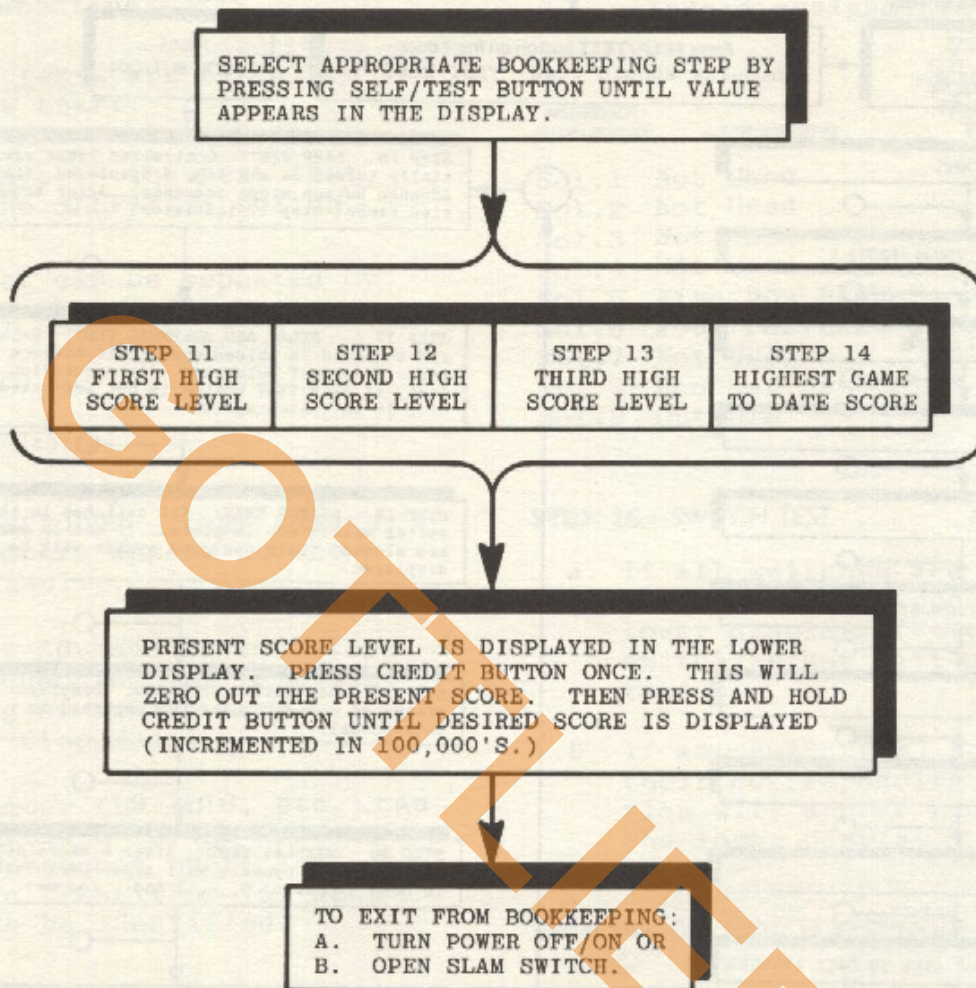
2. Zeroing All Bookkeeping Steps Except #11, 12, 13 and 14.

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

- a. Go to Step #15.
- b. Press the credit button. A message will be displayed.
- c. Zeroing is complete.

## VII. BOOKKEEPING AND SELF TEST

### III. HOW TO RESET HIGH SCORE LEVELS OR HIGH GAME TO DATE SCORES

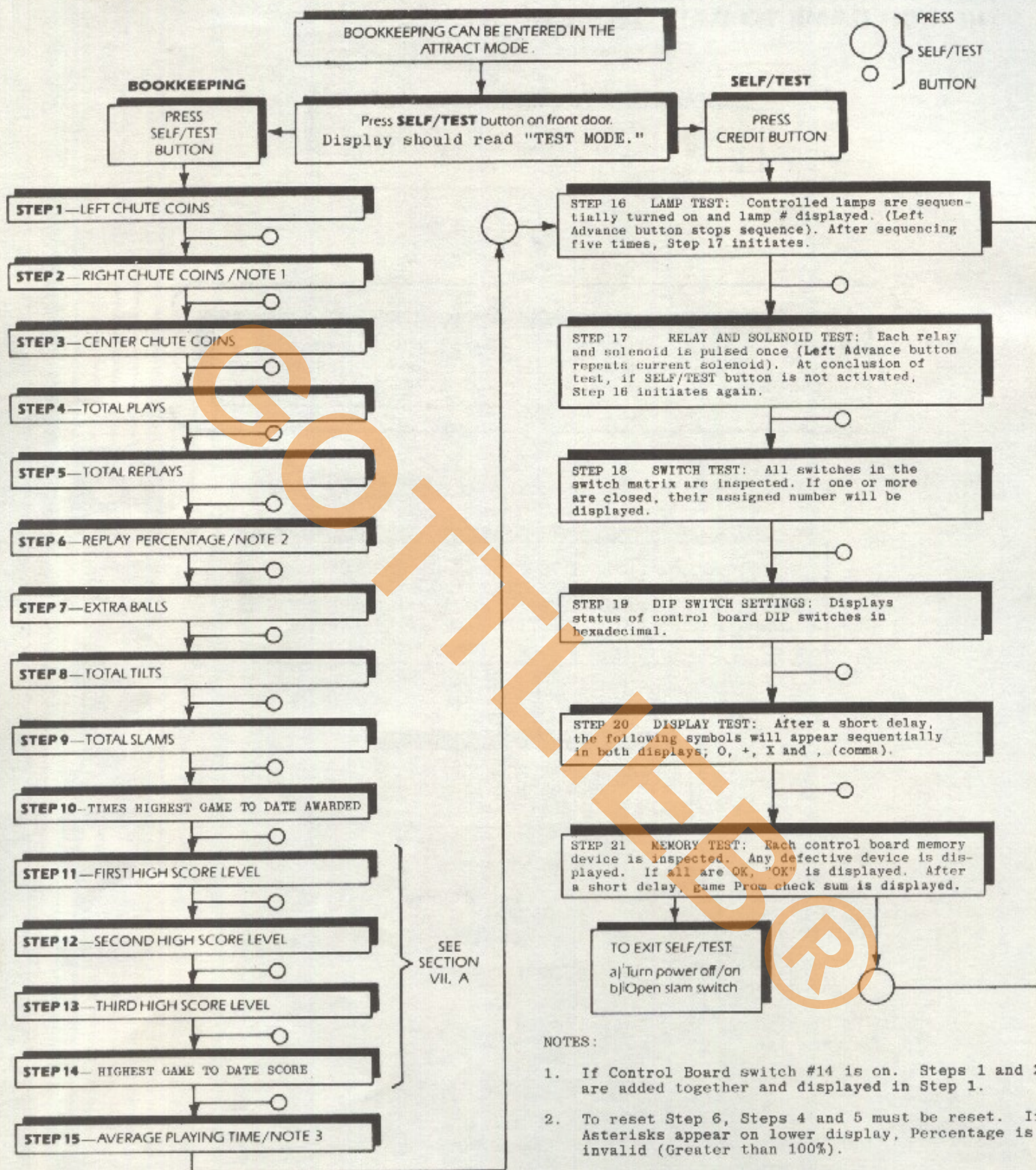


#### NOTES:

1. Step 11 must be a lower score than Step 12. Step 12 must have a lower score than Step 13. Otherwise, the scores will not be recognized.
2. If Step 12 or Step 13 is not desired, set those scores to zero.
3. If Step 14 is reset, all High Games to Date scores are reset.

## VII. BOOKKEEPING AND SELF TEST

### B. FLOW CHART



#### NOTES:

1. If Control Board switch #14 is on. Steps 1 and 2 are added together and displayed in Step 1.
2. To reset Step 6, Steps 4 and 5 must be reset. If Asterisks appear on lower display, Percentage is invalid (Greater than 100%).
3. If step 15 is reset, Steps 1 thru 10 are also reset. If Asterisks appear on lower display, Time is invalid (Greater than 16½ minutes per game).

## VII. BOOKKEEPING AND SELF TEST

### C. SELF/TEST

- Steps 16 through 21 are SELF/TEST or game tests the operator can use for quick troubleshooting.
- All the tests are explained in the flow chart.
- To advance to the next test, press the SELF/TEST switch.
- Each test can be repeated by pressing the credit button.

#### STEP 16—LAMP TEST

- Lamp Test—Lamps are sequentially strobed. Lamp assignment numbers appear in the lower display.

The Left Advance button stops lamp sequencing for repeated flashing of active lamp. (Single Step Mode).

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

#### STEP 17—RELAY AND SOLENOID TEST

- Relay Test—All relays are pulsed in the following order with their corresponding lamp driver number appearing in the lower display.

The left advance button stops sequencing for repeated activation of relay or solenoid. (Single Step Mode).

A3 Driver Board Transistor Assignment (See Schematic)

Q (Game Over) Relay.....A3J3 PIN-A(Q1)  
T (Tilt) Relay.....A3J3 PIN-B(Q2)  
(Any other relays which may be used).

- 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               | Five Pos.Bank Reset | Q61/Q62                                                |
| Sol.6               | Four Pos.Bank Reset | Q63/Q64                                                |
| Sol.7               | Not Used            | Q56                                                    |
| Sol.8               | Knocker Assembly    | Q53                                                    |
| Sol.9               | Outhole             | Q59                                                    |

#### STEP 18—SWITCH TEST

- If all switches are open, "ALL SWITCHES OPEN" appears in the lower display. (Note: Slam switch is not part of this test.)
- If any switch(es) are closed, their corresponding matrix location will appear sequentially in the lower display.

#### STEP 19—DIP SWITCH SETTINGS

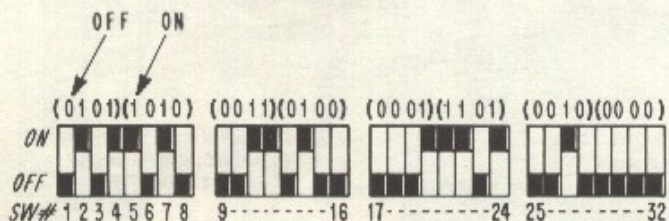
- The status of the Control Board (A1) switches appears in the lower display.

| DISPLAYED<br>HEXADECIMAL | 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   |

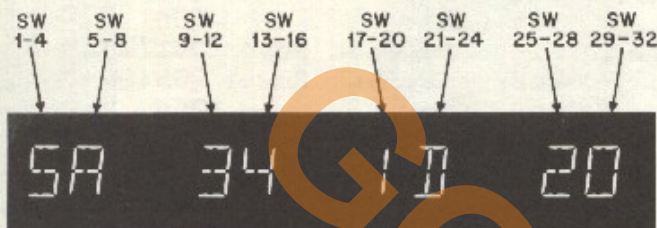
## VII. BOOKKEEPING AND SELF TEST

### CONTROL BOARD (A1) SWITCHES

#### EXAMPLE

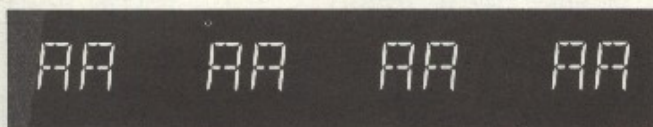


#### DISPLAYED

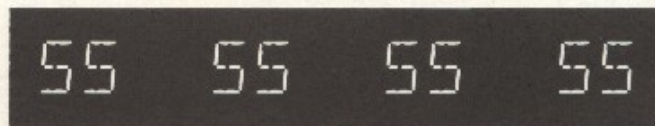


### Checking Switches

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



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



### STEP 20—DISPLAY TEST

After a short delay, the following characters will appear sequentially in all digit positions; O, +, X and , (comma).

### STEP 21—MEMORY TEST

Each control based memory device is checked. If all are good, an "OK" will be displayed.

If a memory chip located on the A1 Control Board is defective, its number will be displayed. If no devices are found to be defective, "OK" is displayed in the lower display. Then after a short delay the Game Prom check sum will be displayed.

## VIII. THEORY OF OPERATION

This section will cover only the differences between System 80A and System 80B. Figure 1 is a block diagram indicating the interconnections between the modules of System 80B.

### A. CONTROL BOARD (A1)

The Piggyback Board eliminates the need for the ROMS (U2-U3) and the game prom (PROM 1) used in System 80A. The new game prom for each game is a 2764 EPROM labeled with the game number. This device is plugged into the Piggyback Board which is soldered into the Control Board.

The use of the Alphanumeric Display eliminates the need for Z19, Z21, Z22, Z23, Z24, Z25 (System 80A Display Control), and connector AJ3. The Control Board transmits information to the Display Board via a data bus (DATA 0 - DATA 7) and control lines (LD1, LD2, and RESET) from AJ2 to 1A4J1. The state of the LD1 and LD2 lines determine whether the upper or lower display tube receives the information on the data bus.

### B. POWER SUPPLY (A2)

The new Power Supply develops a regulated +5V DC only and supplies it to the Control Board (VCC), Display Board (VSS), and Sound Board (VCC).

### C. DISPLAY BOARD (A4)

This board takes the place of the four and seven digit displays used in System 80A games. During game play the upper display contains the scores of players one and two along with the ball in play (center). The lower display contains the scores of players three and four along with the amount of credits remaining (center). During Game Over the display information alternates between the scores from the previous game and the current High Games To Date.

The Display Board incorporates two vacuum fluorescent display tubes and three display controllers (U1-U2-U3). Each tube consists of a filament, grids (digits), and anodes (segments). U1 controls the digits of the upper display tube. U2 controls the digits of the lower display tube. U3 controls the segments of both tubes. When power is supplied to the game, the Control Board sends a negative going reset pulse to the base of Q1. This resets the display system. The digit information is multiplexed using an internal clock in U1 to control the refresh rate. This makes it appear as if all the digits are being enabled at once.

## VIII. THEORY OF OPERATION

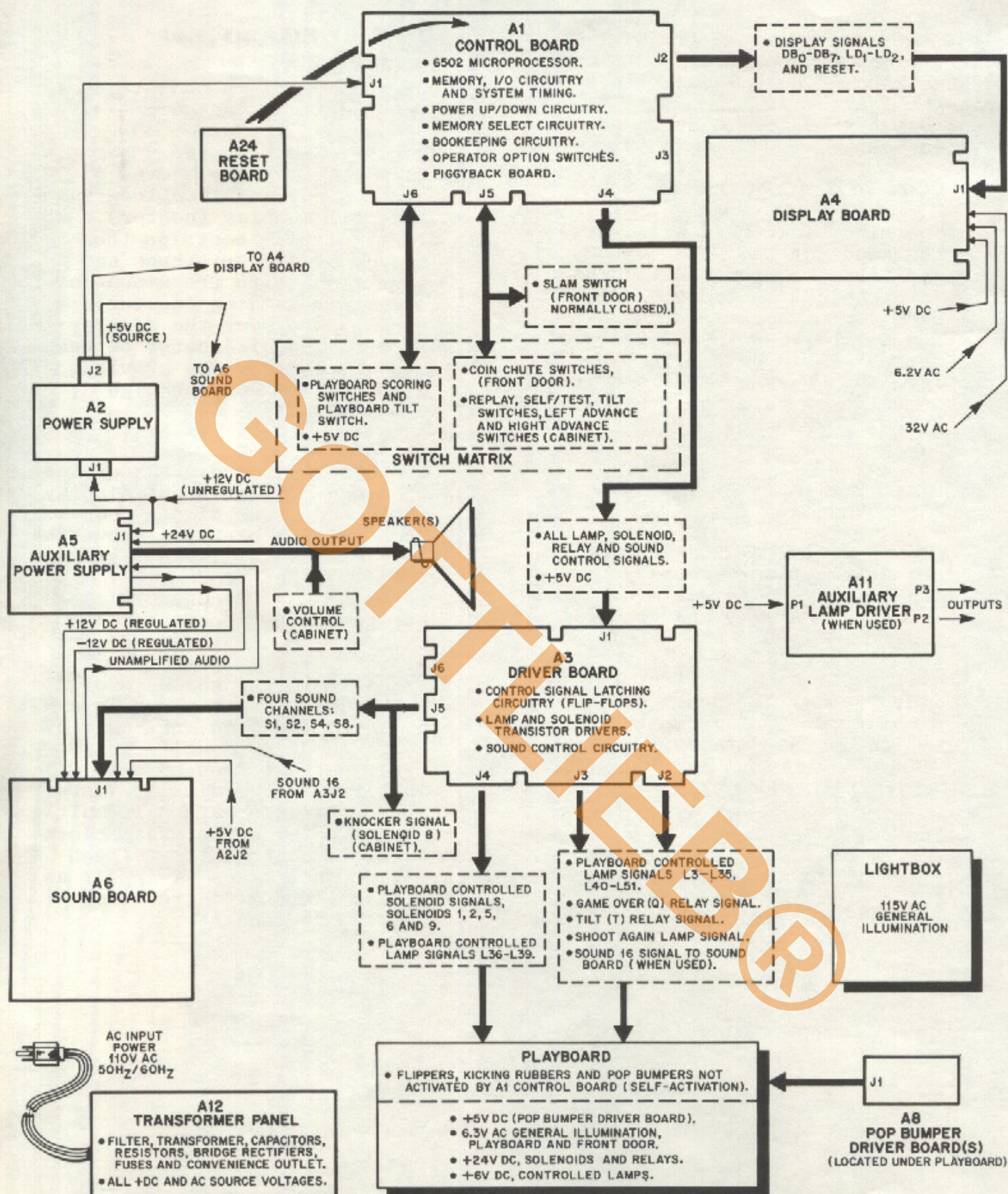


**FIGURE 1. SYSTEM 80B BLOCK DIAGRAM**

## VIII. THEORY OF OPERATION

The Display Board is supplied with 32V AC from the transformer panel. Voltages VGG, VDD, and VCO are then developed from this input. The transformer panel also supplies 6.2V AC to the display tube filaments.

The filaments are biased 7.5V DC above VGG (VCO) by the zener diode VR1. Figure 2 shows the basic drive circuitry and waveform for a single digit and segment of the display.

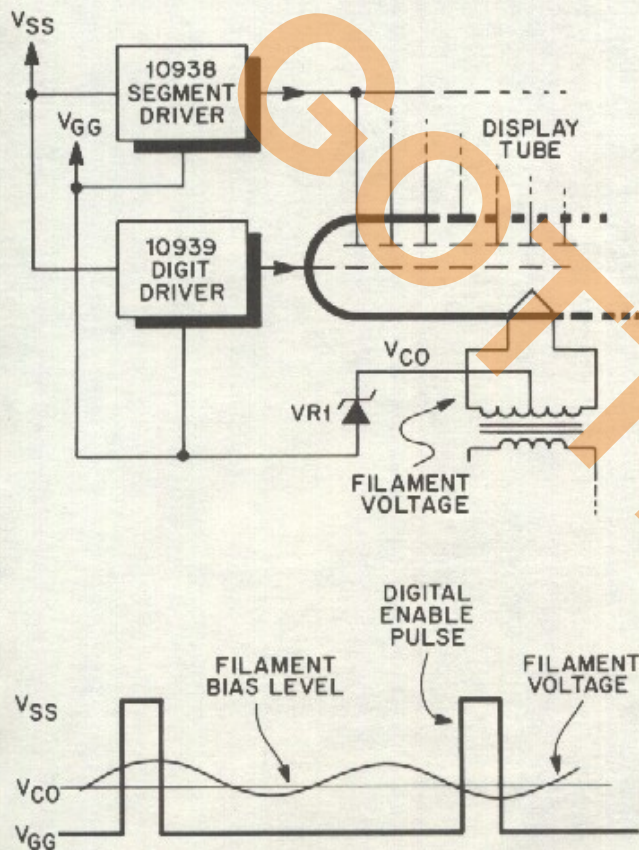


FIGURE 2. BASIC DRIVE CIRCUIT

### D. SOUND BOARD (A6)

The MA-766 Sound Board consists of two 6502 microprocessor systems, a dual DAC, an L.P.C. speech generator, two programmable sound generators, input ports to receive commands from

the game Control Board, and a low level audio output, which is sent to the MA-767 Auxiliary Power Supply Board for amplification.

The Sound Board requires three supply voltages: +5V DC, +12V DC and -12V DC. In addition a power up reset signal is required from the Control Board.

### SYSTEM CLOCK

A 4 MHz oscillator is configured with R11, R12, C14, C15, C22, XTAL-1 and T1. R21 and C22 are optional. This 4 MHz clock is divided by 4 to a 1 MHz clock for both processors' clock input, pin 37 of N1 and T3. A 2 Mhz clock from S1 pin 14 is sent to the two AY-3-8913 Programmable Sound Generator, H4 and K4, pin 20. A 250 KHz signal from S1 pin 11 is the clock for the programmable timer section consisting of N5, H5, T5 and K5, pin 2.

### INPUT CODE LATCH SYSTEM

Eight input lines from the Control Board come in on A6P1 and are pulled up by S1P1 and sent to the two input code latches A3 and B2, one for each microprocessor system. A2, pin 8, becomes a logic high when any of it's inputs are low. This output is connected to pin 11 of the input code latches (A3 and B2). A positive edge at pin 11 causes A3 and B2 to latch the data at their inputs. A2 pin 8 is also connected to the clock inputs of two flip flops, A4 pin 3 and A4 pin 11. When A2 pin 8 goes high, both flip flops are clocked, setting both Q outputs low. The Q outputs, A4 pin 6 and pin 8, are connected to both of the 6502's active low interrupt request lines, T3 and N1, pin 4. The Q outputs of A4 will stay low until the associated 6502 reads its input port therefore clearing the interrupt.

NOTE: DIP Switch 3 should remain off and DIP Switch 4 should remain on. This prevents the S4 input from generating an interrupt.

## VIII. THEORY OF OPERATION

### SYSTEM RAM

The sound board is designed to accomodate different types of RAM. JP1 and JP3 should be connected if HM6116's or 2158A's are used. JP2 and JP4 should be connected if 2158B's are used.

### RESET

The Sound Board receives an external reset signal from P3 pin 1. This active low reset signal is pulled up by R34 and sent to G5, pin 1 (2-input AND gate). However, if a manual reset is desired, pushing switch SW2 will reset the processor.

### INPUT PORT

Input Port B3 reads the test switch SW1 and two option switches, DIP switches 1 and 2. Pressing test switch SW1 will produce a tone.

### MAIN SUMMER

The main summer consists of R13 through R17 and B1, pins 12, 13 and 14. B1 pin 14 is the main output from the Sound Board, at P1 pin 2, and will swing plus or minus 5V peak to peak.

## IX. GENERAL INFORMATION

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

A1 - Control Board  
A2 - Power Supply  
A3 - Driver Board  
A4 - Display Board  
A5 - Auxiliary Power Supply  
A6 - Sound Board  
A7 - Diode Boards  
A8 - Pop Bumper Driver Boards  
A11- Auxiliary Lamp Driver  
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 Gray  
9 White

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

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

### C. FUSES

#### TRANSFORMER PANEL FUSES

|     |                                    |         |      |                   |
|-----|------------------------------------|---------|------|-------------------|
| F1  | Sound/Speech Power Supply (A6).... | 12V AC  | .... | 1/2 Amp           |
| F2  | Power Supply (A2).....             | 10V AC  | .... | 6-1/4 Amp SLO-BLO |
| F3  | Display .....                      | 32V AC  | .... | 1/4 Amp SLO-BLO   |
| F4  | Solenoids (+24V DC).....           | 28V AC  | .... | 8 Amp SLO-BLO     |
| F5  | Controlled Lamps.....              | 8V AC   | .... | 10 Amp            |
| F6  | Playboard Illumination.....        | 6.3V AC | .... | 10 Amp            |
| F7  | Lightbox Illumination.....         | 115V AC | .... | 1/2 Amp SLO-BLO   |
| F8  | Primary Power.....                 | 110V AC | .... | 5 Amp SLO-BLO     |
|     |                                    | 220V AC | .... | 2-1/2 Amp SLO-BLO |
| F20 | Input Line .....                   | 110V AC | .... | 8 Amp SLO-BLO     |
|     |                                    | 220V AC | .... | 4 Amp SLO-BLO     |

#### PLAYBOARD FUSES

|     |                                   |               |
|-----|-----------------------------------|---------------|
| F9  | Outhole.....                      | 1 Amp SLO-BLO |
| F10 | 4 Pos. and 5 Pos. Bank Reset..... | 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<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<br>POP BUMPERS | 4.5               | 780             | #24        | Blue          |
| A-5195         | CONTACT KICKER<br>KNOCKER<br>HOLE KICKER            | 11.6              | 1305            | #26        | White         |
| A-16570        | HOLE KICKER,<br>OUTHOLE                             | 15.5              | 1450            | #27        | Green         |
| A-17875        | FLIPPERS                                            | 2.8/40            | 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        |
| A-24161        | INTERMEDIATE<br>FLIPPER                             | 2.2/40            | 520/1050        | #23/31     | Blue          |
| RELAY COILS    |                                                     |                   |                 |            |               |
| A-16890        | O, 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         |

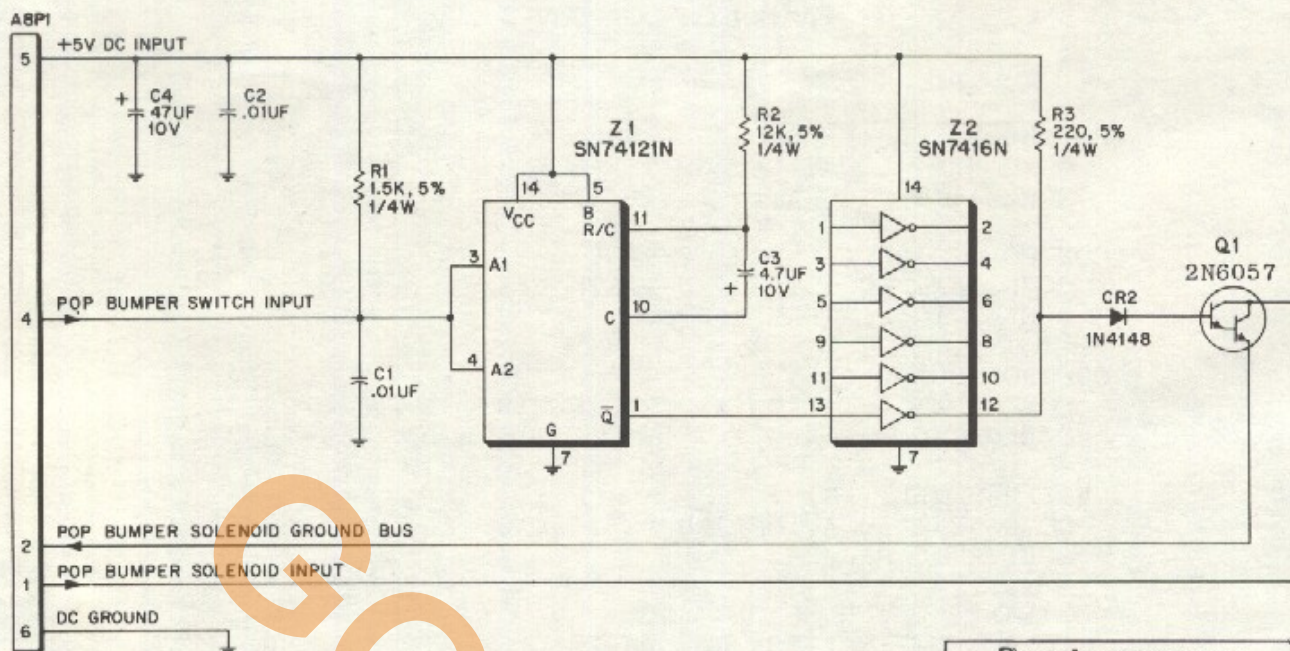
\*Coils may vary from game to game. Check game manual for exact coil usage.

## X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS

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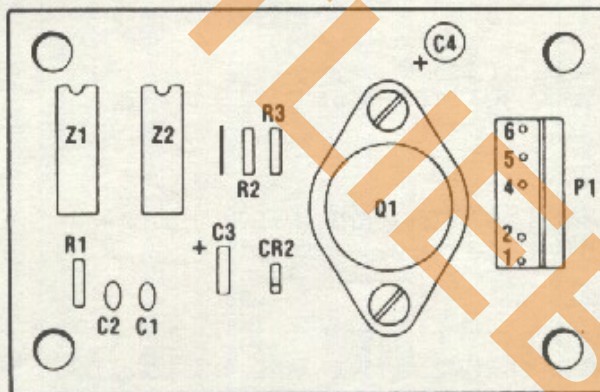
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## X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS



| Premier Technology                 |                |                 |         |
|------------------------------------|----------------|-----------------|---------|
| TITLE POP BUMPER DRIVER BOARD (A8) |                |                 |         |
| USED ON                            |                |                 |         |
| DRAWN<br>P                         | APPROVED<br>AC | DATE<br>10-4-82 | D-20923 |

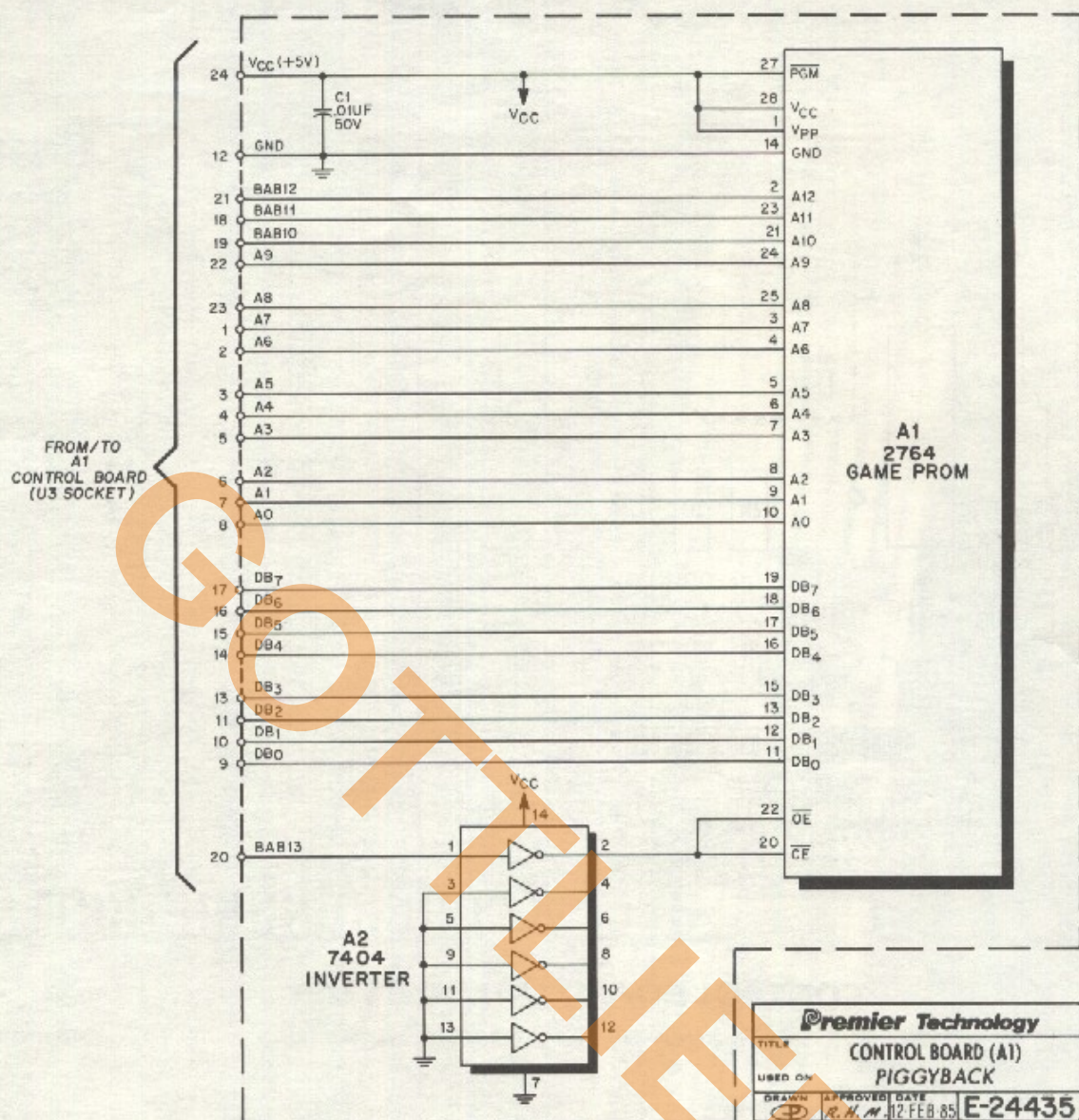
### POP BUMPER DRIVER BOARD (A8) COMPONENT LOCATION



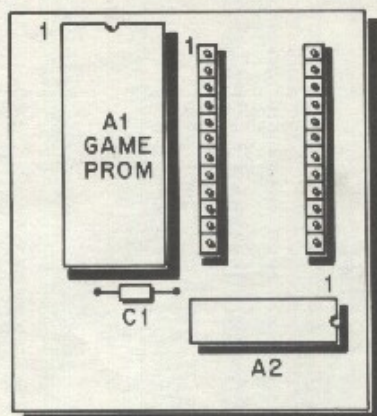
### POP BUMPER DRIVER BOARD (A8) PARTS LIST

| REFERENCE | DESCRIPTION                    | PART NUMBER |
|-----------|--------------------------------|-------------|
|           | POP BUMPER DRIVER BOARD        | A-19741     |
| C1, C2    | Capacitor, 01 mfd., 100V       | XO-202      |
| C3        | Capacitor, 4.7 mfd., 10%, 10V. |             |
|           | 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, Darlington 2N6057  | XO-311      |
| Z1        | IC SN74121N                    | XO-417      |
| Z2        | IC SN7416N                     | XO-405      |

## X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS



**CONTROL BOARD (A1),  
PIGGYBACK  
COMPONENT LOCATION**

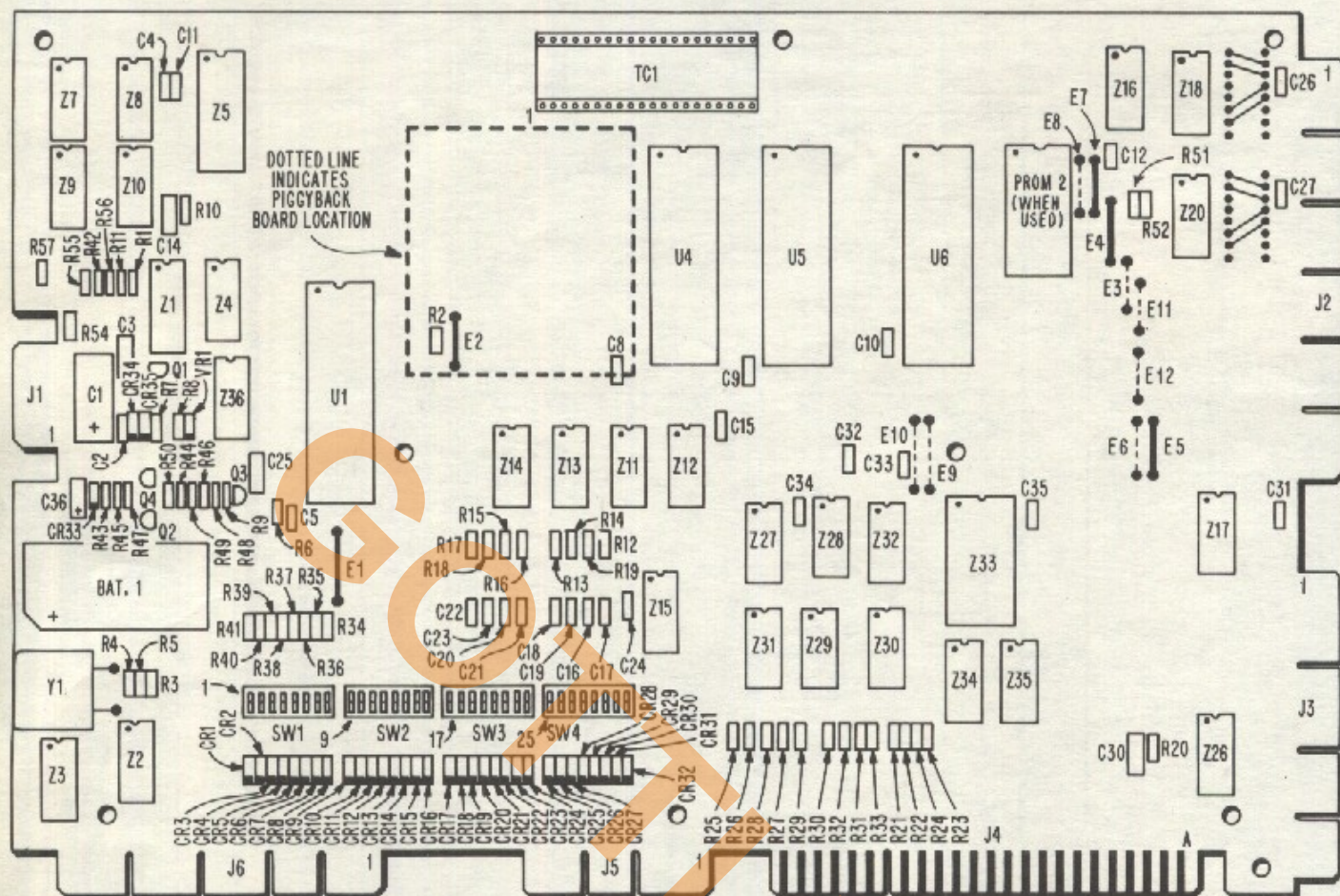


**CONTROL BOARD (A1),  
PIGGYBACK  
PARTS LIST**

| REFERENCE | DESCRIPTION                      | PART NUMBER |
|-----------|----------------------------------|-------------|
| A1        | Control Board (A1), Piggyback    | XA689       |
| A2        | Game Prom, 2764                  | XO-489      |
| C1        | IC, 7404 Inverter                | XO-402      |
|           | Capacitor, .01UF, +80% -20%, 50V | XO-229      |
|           | Socket, 28 Pin                   | XO-536      |

# X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS

## CONTROL BOARD (A1) COMPONENT LOCATION

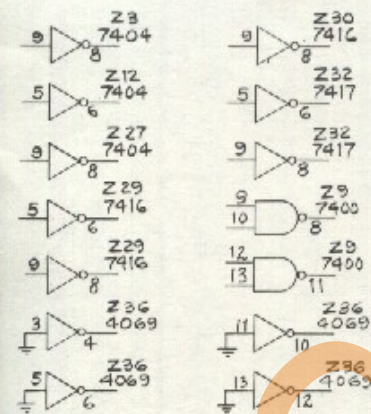
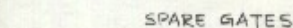


## CONTROL BOARD (A1) PARTS LIST

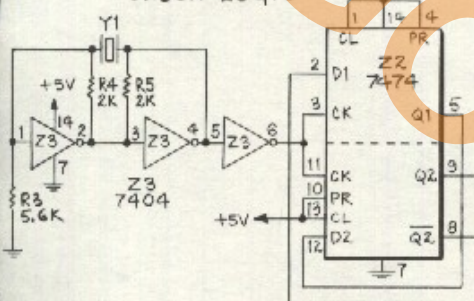
| REFERENCE     | DESCRIPTION                       | PART NUMBER | REFERENCE      | DESCRIPTION                          | PART NUMBER |
|---------------|-----------------------------------|-------------|----------------|--------------------------------------|-------------|
|               | CONTROL BOARD                     | MA-774      |                |                                      |             |
| Bat. 1        | Battery-3.6V 326R10-002           | XO-458      | R47            | Resistor, 24K ohm, 5%, 1/4W          | XO-10       |
| C1            | Capacitor, 100 mfd., 10V          | XO-211      | SW1-SW4        | Dip Switch 100B-692                  | XO-505      |
| C2, C4, C5,   | Capacitor, .01 mfd., 50V          | XO-229      | TC1            | Socket, 40 Pin 640379-3              | XO-530      |
| C8-C12,       |                                   |             | U1             | CPU R6502-13                         | XO-360      |
| C15-C24,      |                                   |             | U4, U5, U6     | PRIOT R6532-18                       | XO-361      |
| C26, C27,     |                                   |             | VRI            | Diode-3.0V, 5% 1N5225B or 1N5987B    | XO-269      |
| C31-C35       |                                   |             | Y1             | Crystal, 3.579545 MHZ                | XO-456      |
| C3, C14, C25, | Capacitor, .1 mfd., 50V           | XO-230      | Z1             | IC-Cmos-Dual T Shot SCL4528BE        | XO-414      |
| C30           |                                   |             | Z2             | IC-Dual Flip Flop SN7474N            | XO-423      |
| C36           | 10 mfd., 10V, TNT-AX CAP          | XO-209      | Z3, Z11, Z12,  | IC-Hex Inverter SN7404N              | XO-402      |
| CR1-CR35      | Diode, GP 1N4148                  | XO-261      | Z16, Z17,      |                                      |             |
| Q1, Q4        | Transistor-PNP MPS-A70            | XO-309      | Z26, Z27, Z34, |                                      |             |
| Q2, Q3        | Transistor, NPN (Motorola) 2N4400 | XO-313      | Z35            |                                      |             |
| R1, R6        | Resistor, 3.0K ohm, 5%, 1/4W      | XO-23       | Z4             | IC-Cmos-Quad 2 Input                 | XO-401      |
| R11-R24       |                                   |             |                | "And" SCL4081BE                      | XO-401      |
| R42, R45,     |                                   |             | Z5             | IC-Static Ram S5101-L                | XO-356      |
| R46, R48,     |                                   |             | Z7             | IC-Hex Inverter SN74LS04N            | XO-418      |
| R51, R52,     |                                   |             | Z8             | IC-2 Input "Nor" SN7402N             | XO-421      |
| R54-R57       |                                   |             | Z9, Z13, Z14   | IC-2 Input "Nand" SN7400N            | XO-420      |
| R2, R34-R41   | Resistor, 4.7K ohm, 5%, 1/4W      | XO-7        | Z10            | IC-Open Collector Inverter SN74LS05N | XO-411      |
| R3, R43, R49  | Resistor, 5.6K ohm, 5%, 1/4W      | XO-19       | Z15            | IC-2 Input "Or" SN7432N              | XO-407      |
| R4, R5, R44   | Resistor, 2.0K ohm, 5%, 1/4W      | XO-14       | Z18, Z20       | IC-"D" Flip Flop SN74175N            | XO-410      |
| R7            | Resistor, 62 ohm, 5%, 1/4W        | XO-3        | Z33            | IC-4-16 Decoder SN74154N             | XO-409      |
| R8, R50       | Resistor, 180 ohm, 5%, 1/4W       | XO-24       | Z28            | IC-2 to 4 Decoder SN74LS139N         | XO-419      |
| R9            | Resistor, 1K ohm, 5%, 1/4W        | XO-5        | Z29, Z30       | IC-Hex Inverter-OC/HV SN7416N        | XO-405      |
| R10           | Resistor, 2.7M ohm, 5%, 1/4W      | XO-13       | Z31            | IC-2 Input "And" SN7408N             | XO-404      |
| R25-R33       | Resistor, 620 ohm, 5%, 1/4W       | XO-4        | Z32            | IC-Hex Buffer-OC SN7417N             | XO-406      |
|               |                                   |             | Z36            | IC-Cmos SCL4069B                     | XO-424      |
|               |                                   |             |                | Socket 24 Pin 640361-3               | XO-529      |

CONTROL BOARD (A1), PIGGYBACK MA689

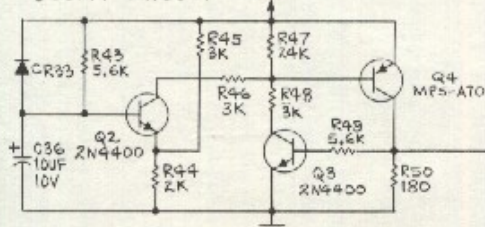
NOTE: UNLESS OTHERWISE INDICATED;  
1. RESISTORS ARE  $\pm 5\%$ , 1/4W.  
2. CAPACITORS ARE .01UF, 50V.  
3. DIODES ARE TYPE IN4148.  
4. REF. DESIGNATION Z6 NOT USED.



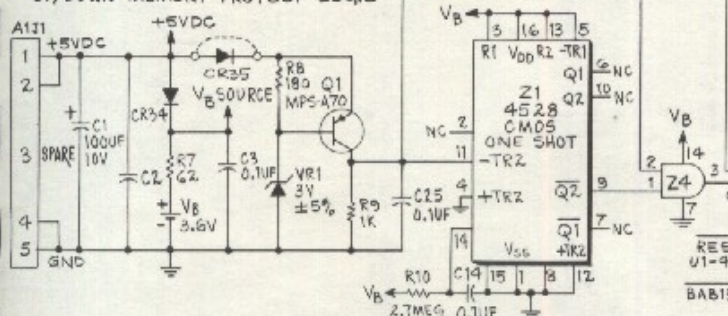
## CLOCK LOGIC



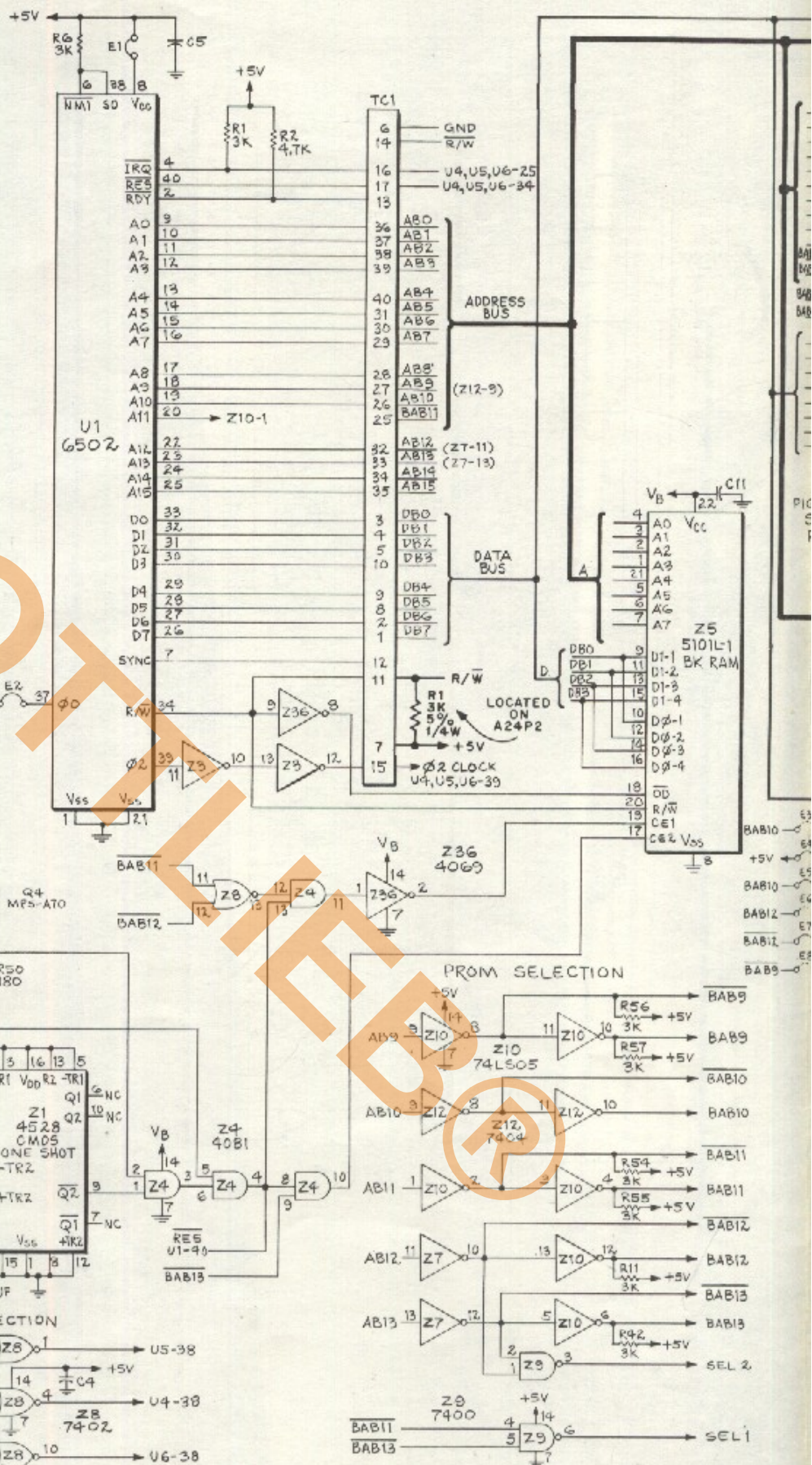
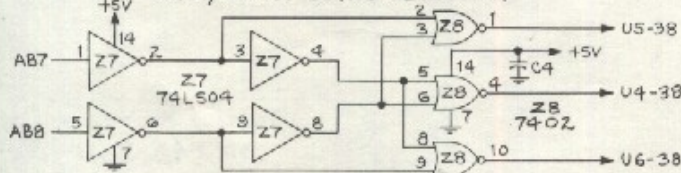
DELAY CIRCUIT



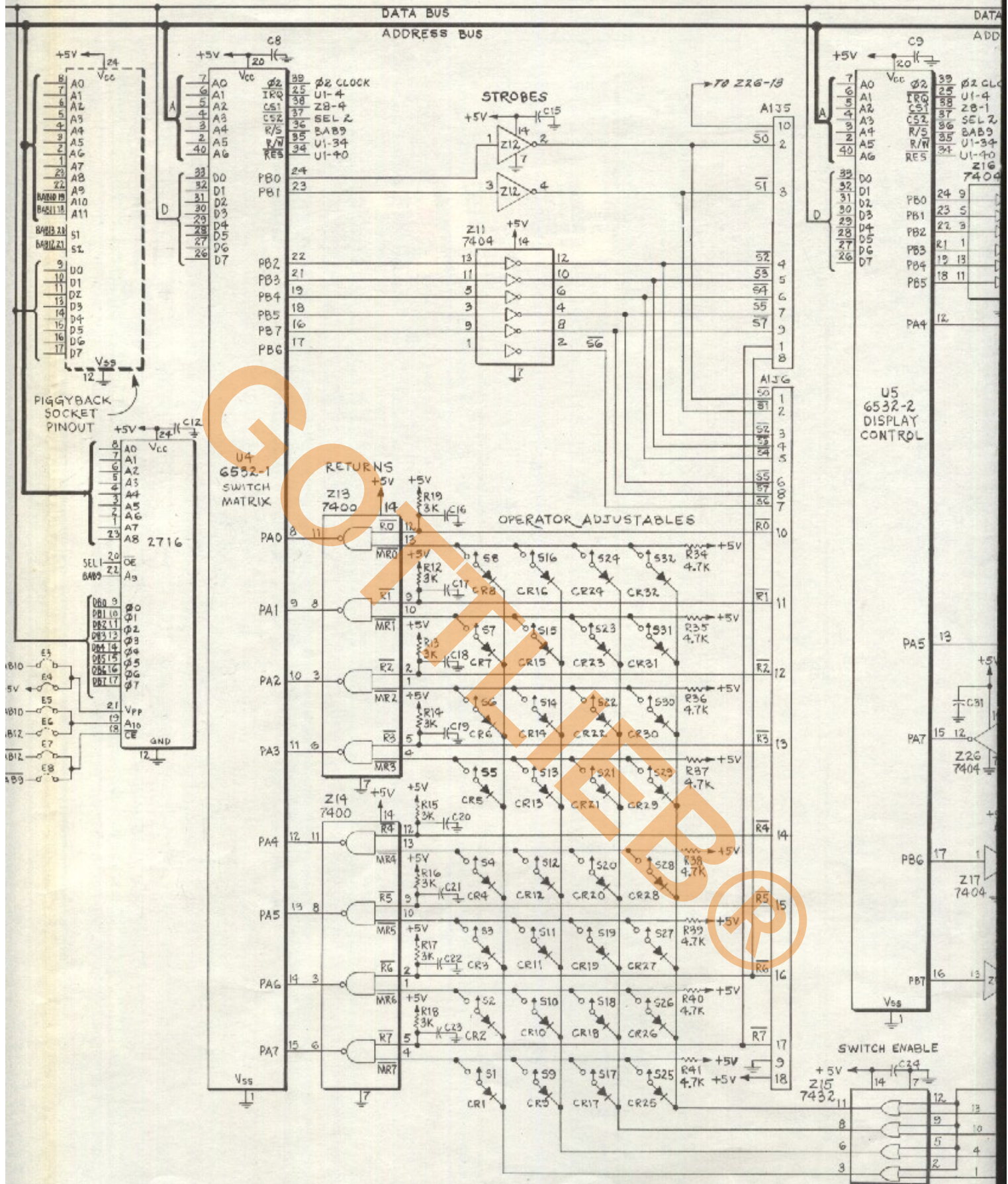
## UP/DOWN MEMORY PROTECT LOGIC

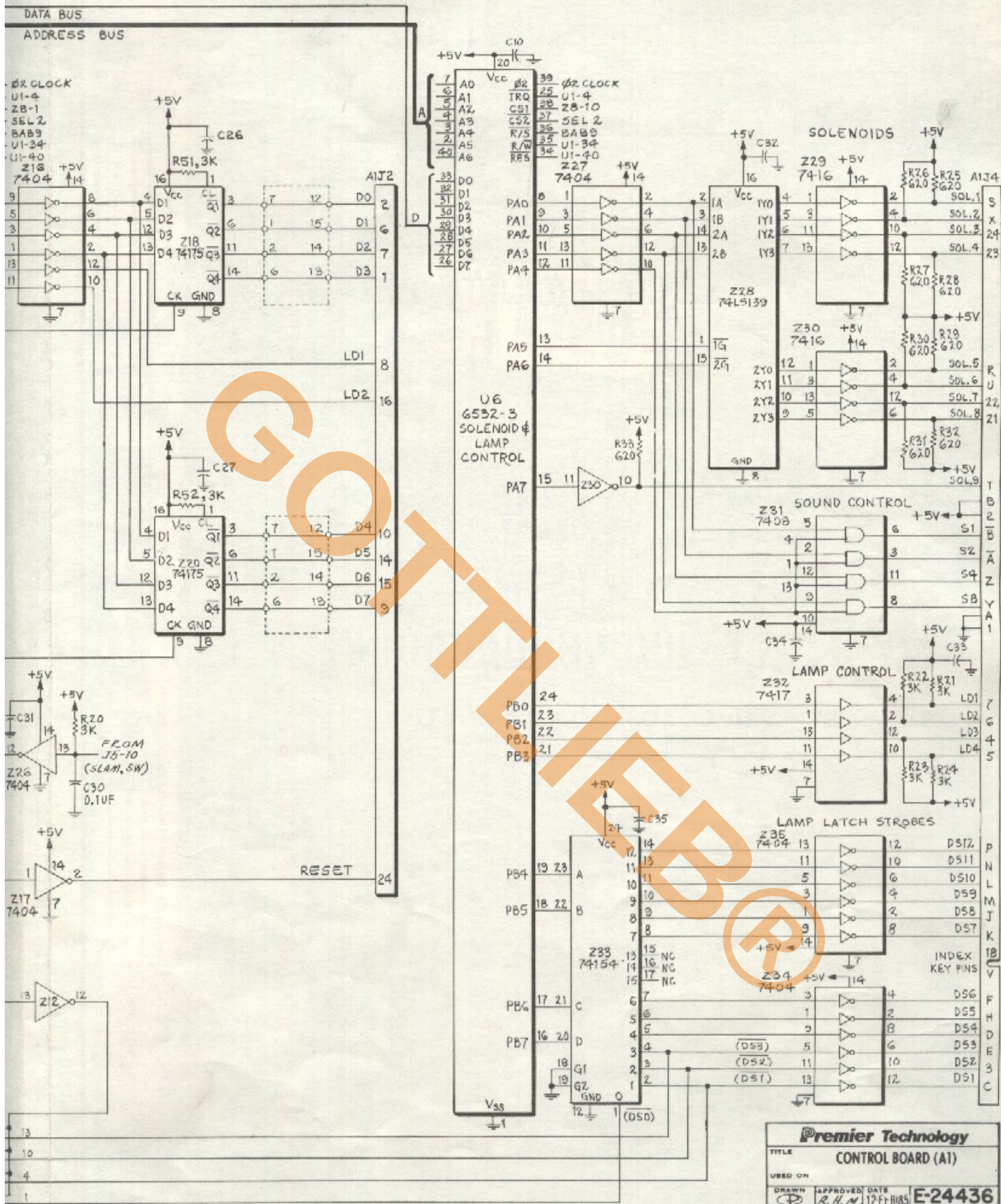


### INPUT/OUTPUT DEVICE SELECTION



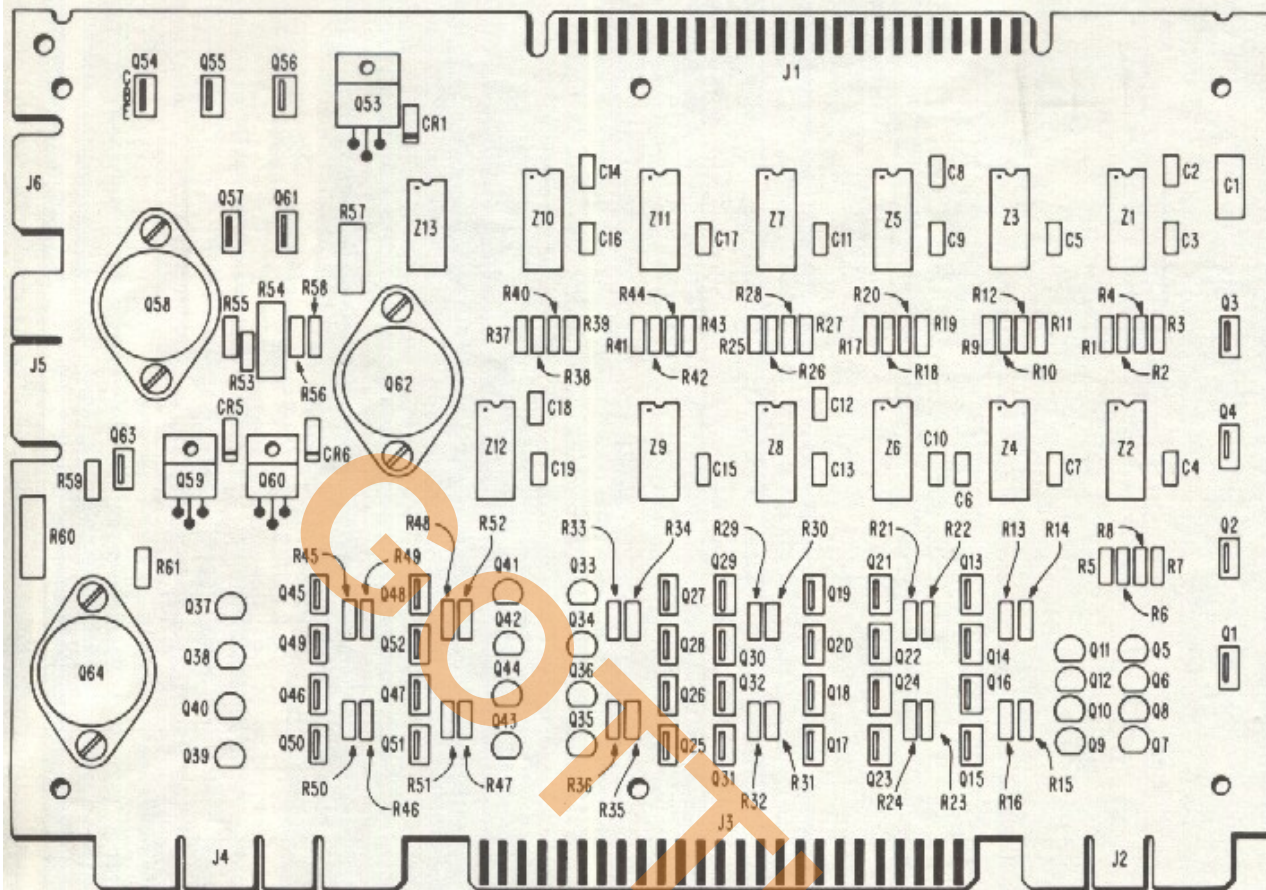
# X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS





# X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS

## DRIVER BOARD (A3) COMPONENT LOCATION



FROM  
A1J4  
CONTROL  
BOARD  
A3J1

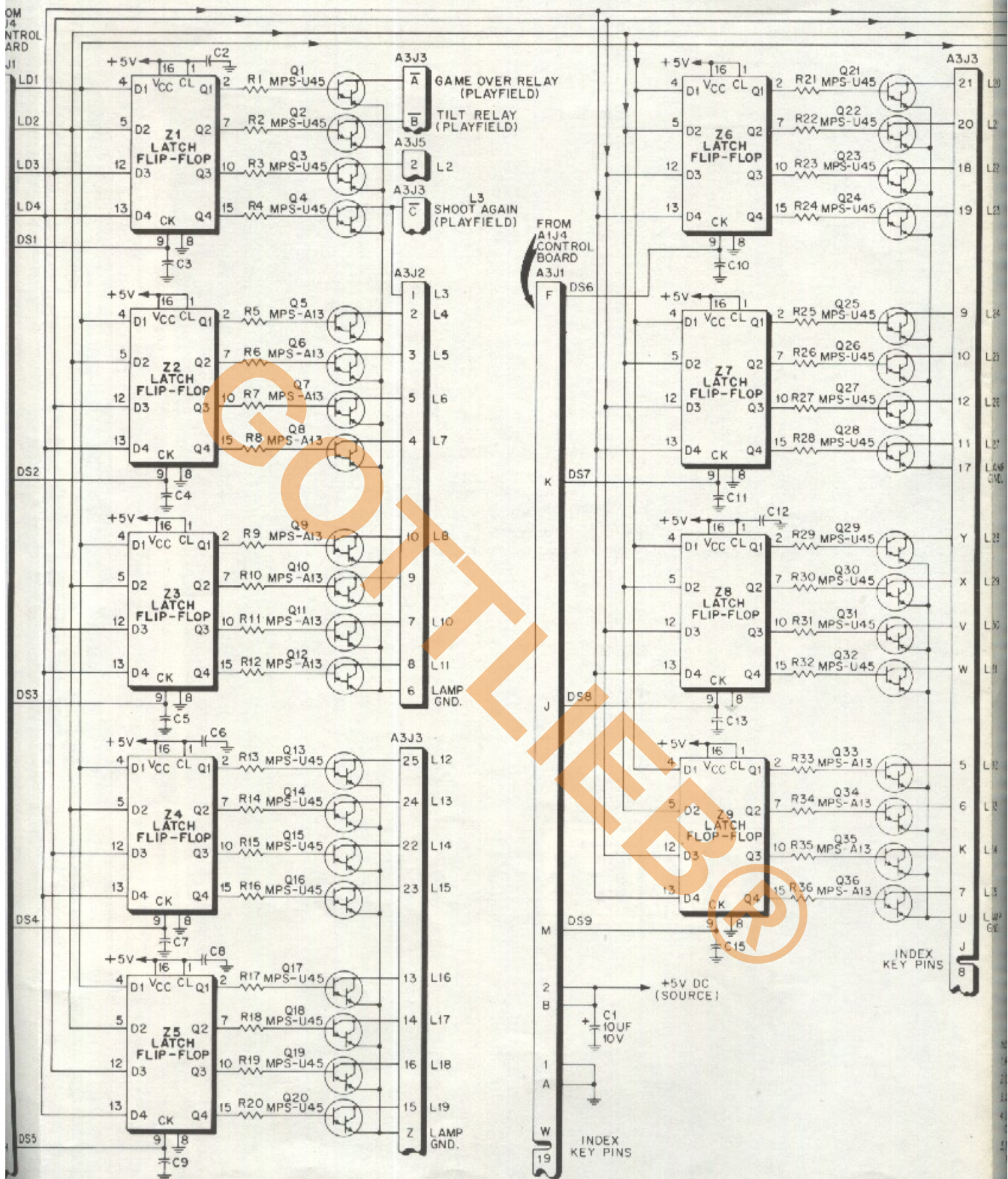
7 LD1  
6 LD2  
4 LD3  
5 LD4  
C DS1  
3 DS2  
E DS3  
D DS4  
H DS5

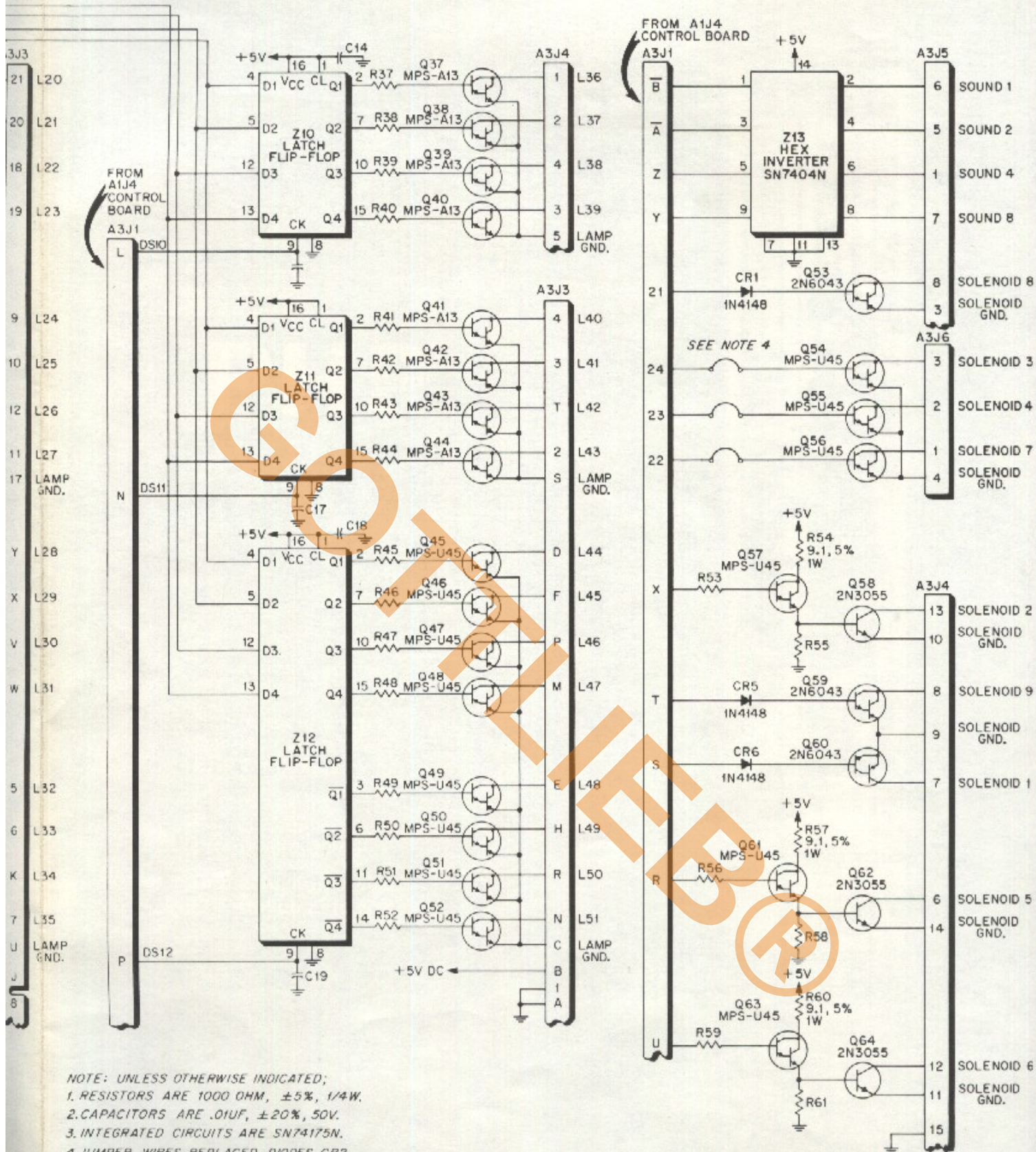
## DRIVER BOARD (A3) PARTS LIST

| REFERENCE                                         | DESCRIPTION                          | PART NUMBER |
|---------------------------------------------------|--------------------------------------|-------------|
|                                                   | DRIVER BOARD                         | XA-295      |
| C1                                                | Capacitor, 10 mfd, 10V Tantalum      | XO-209      |
| C2-C19                                            | Capacitor, 01 mfd, 50V Ceramic       | XO-229      |
| CR1-CR6                                           | Diode—Silicon 1N4148                 | XO-261      |
| R1-R53, R61,<br>R55, R56, R58, R59                | Resistor 10K ohm, 5%, 1/4W           | XO-5        |
| R54, R57, R60                                     | Resistor, 91 ohm, 5%, 1W             | XO-158      |
| Q1-Q4, Q13-<br>Q32, Q45-Q52,<br>Q54-Q57, Q61, Q63 | Transistor, NPN, Darlington MPS-U45  | XO-306      |
| Q5-Q12, Q33-Q44                                   | Transistor, NPN, Darlington MPS A13  | XO-304      |
| Q53, Q59, Q60                                     | Transistor, NPN, Darlington 2N6043   | XO-303      |
| Q58, Q62, Q64                                     | Transistor, NPN, 2N3055              | XO-301      |
| Z1-Z12                                            | IC-Quad "D" Latch Flip Flop SN74175N | XO-410      |
| Z13                                               | IC-Hex Inverter SN7404N              | XO-402      |
|                                                   | Insulator Thermalloy 43-03-4         | XO-512      |

### NOTE:

1. JUMPER WIRES REPLACED DIODES CR2, CR3 AND CR4 FOR SYSTEM BOA AND BOB GAMES.
2. TRANSISTOR TYPES MPS-U45 AND NDS-U45 ARE INTERCHANGEABLE.



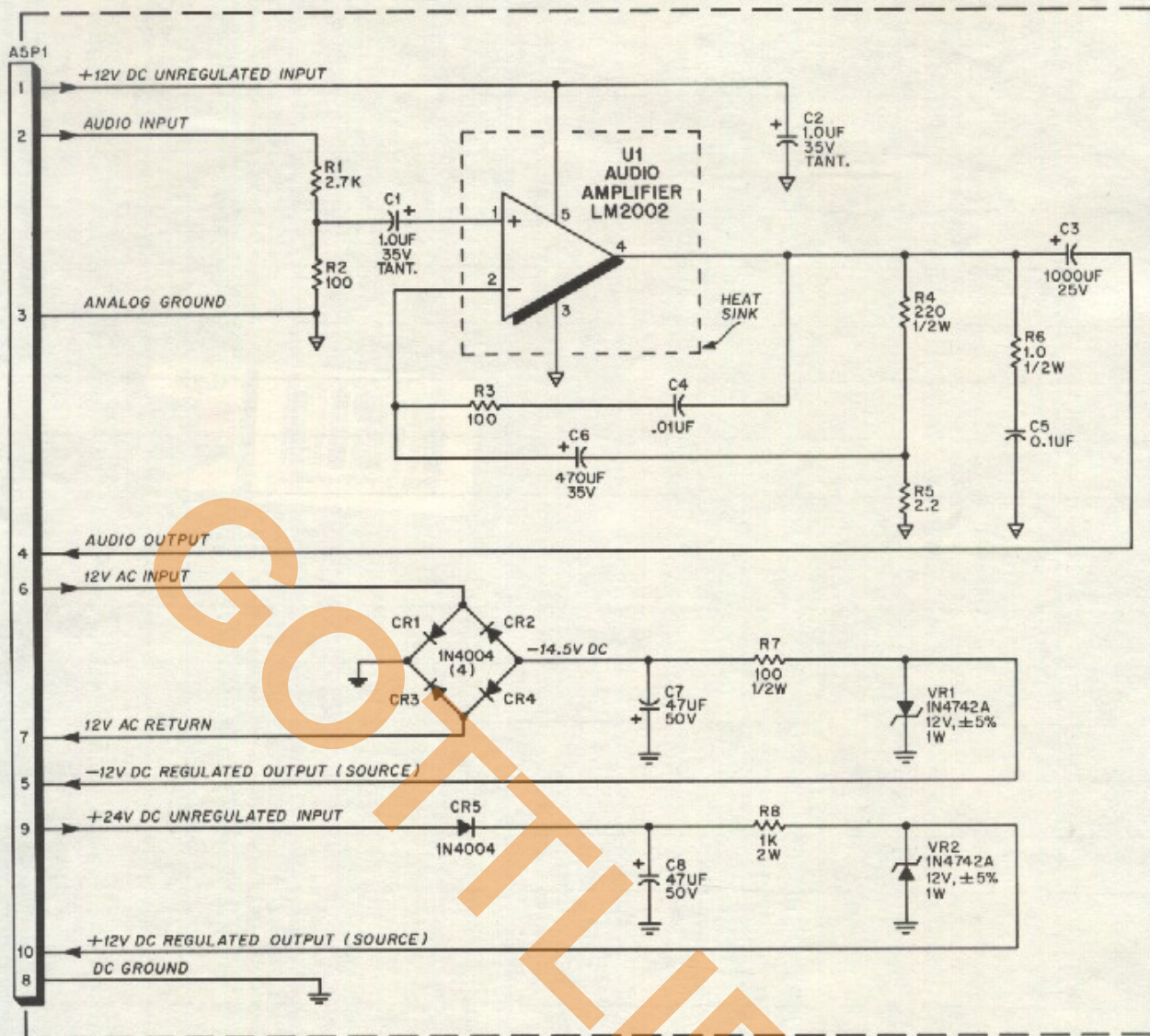


NOTE: UNLESS OTHERWISE INDICATED;  
 1. RESISTORS ARE 1000 OHM,  $\pm 5\%$ , 1/4W.  
 2. CAPACITORS ARE .01UF,  $\pm 20\%$ , 50V.  
 3. INTEGRATED CIRCUITS ARE SN74175N.  
 4. JUMPER WIRES REPLACED DIODES CR2, CR3 AND CR4 FOR SYSTEM 80A AND 80B GAMES.  
 5. TRANSISTOR TYPES MPS-U45 AND NDS-U45 ARE INTERCHANGEABLE.

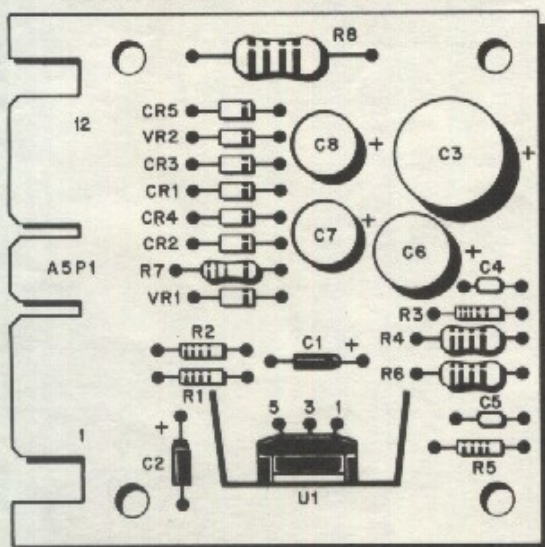
## SERVICE NOTES

GOTTlieb®

# X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS



**AUXILIARY POWER SUPPLY (A5)  
COMPONENT LOCATION**



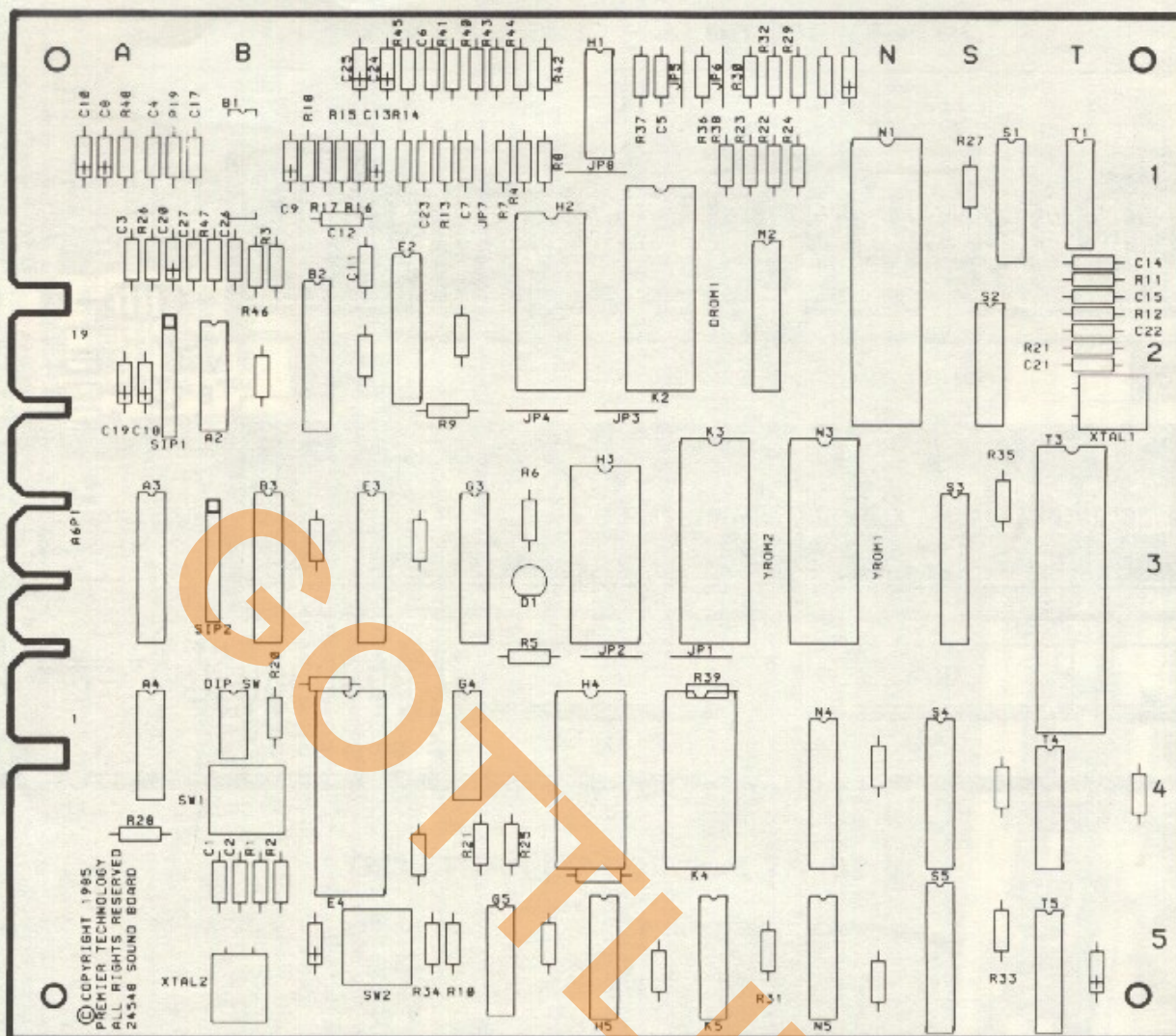
| Premier Technology |                             |          |         |
|--------------------|-----------------------------|----------|---------|
| TITLE              | AUXILIARY POWER SUPPLY (A5) |          |         |
| USED ON            |                             |          |         |
| DRAWN              | APPROVED                    | DATE     | E-24715 |
| P                  | R.H.M.                      | 9-OCT-85 |         |

**AUXILIARY POWER SUPPLY (A5)  
PARTS LIST**

| REFERENCE | DESCRIPTION                         | PART NUMBER |
|-----------|-------------------------------------|-------------|
| C1, C2    | Auxiliary Power Supply              | MA-767      |
| C1, C2    | Capacitor, 1UF, 10%, 35V, TANT      | XO-715      |
| C3        | Capacitor, 1000UF, 25V              | XO-874      |
| C4        | Capacitor, .01UF, +80% -20%, 50V    | XO-229      |
| C5        | Capacitor, 0.1UF, +80% -20%, 50V    | XO-230      |
| C6        | Capacitor, 470UF, 35V               | XO-284      |
| C7, C8    | Capacitor, 47UF, 50V                | XO-210      |
| CR1-CR5   | Diode, 1N4004                       | XO-254      |
| R1        | Resistor, 2.7K Ohm, 5%, 1/4W        | XO-6        |
| R2, R3    | Resistor, 100 Ohm, 5%, 1/4W         | XO-28       |
| R4        | Resistor, 220 Ohm, 5%, 1/2W         | XO-185      |
| R5        | Resistor, 2.2 Ohm, 5%, 1/4W         | XO-595      |
| R6        | Resistor, 1 Ohm, 5%, 1/2W           | XO-593      |
| R7        | Resistor, 100 Ohm, 5%, 1/2W         | XO-52       |
| R8        | Resistor, 1K Ohm, 5%, 2W            | XO-627      |
| U1        | Audio Amplifier, LM2002             | XO-550      |
| VR1, VR2  | Diode, Zener, 1N4742A, 12V, +5%, 1W | XO-257      |
|           | Heat Sink                           | XO-472      |

# X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS

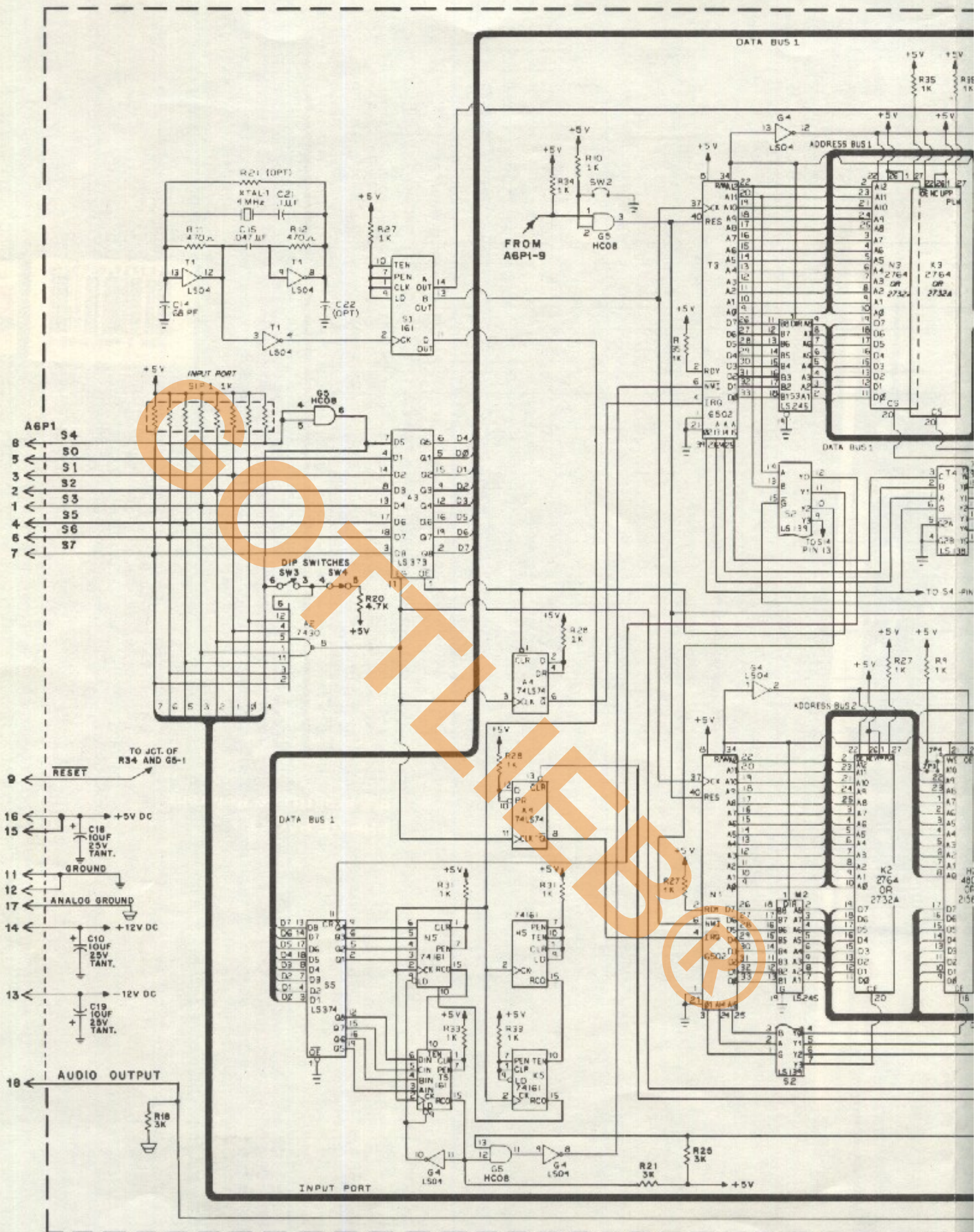
## SOUND BOARD (A6) COMPONENT LOCATION



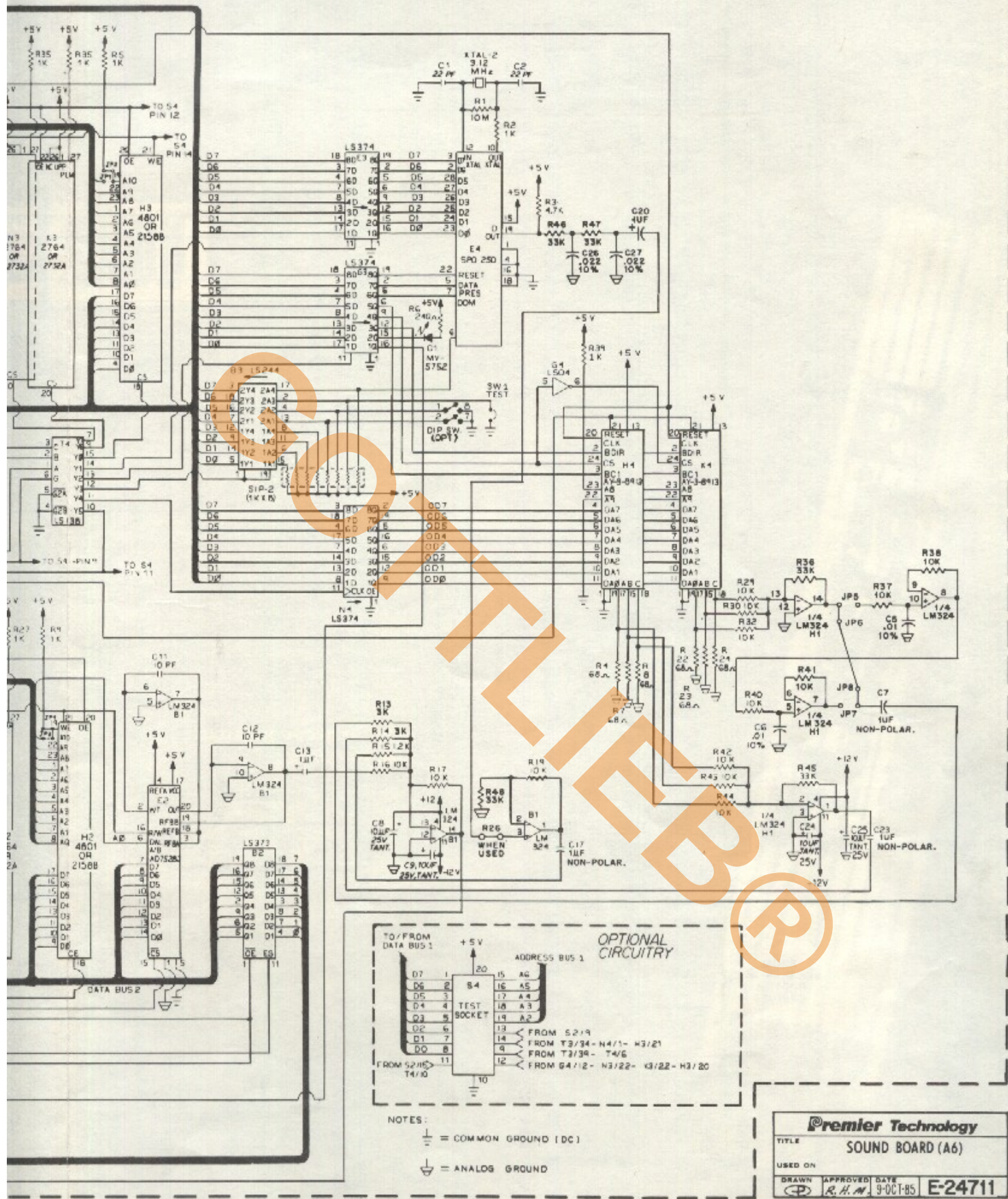
## SOUND BOARD (A6) PARTS LIST

| REFERENCE                                                                         | DESCRIPTION                                | PART NUMBER | REFERENCE                                          | DESCRIPTION                                     | PART NUMBER |
|-----------------------------------------------------------------------------------|--------------------------------------------|-------------|----------------------------------------------------|-------------------------------------------------|-------------|
| C1,C2                                                                             | Sound Board Assembly (A6)                  | MA766       | R6                                                 | Resistor, 240 Ohm, 5%, 1/4W                     | XO-173      |
| C3,C6                                                                             | Capacitor, 22PF, 50V MONO                  | XO-633      | R11,R12                                            | Resistor, 470 Ohm, 5%, 1/4W                     | XO-35       |
| C7,C17,C23                                                                        | Capacitor, .01UF, 50V                      | XO-696      | R13,R14,R18,<br>R21,R25                            | Resistor, 3K Ohm, 5%, 1/4W                      | XO-23       |
| C8,C9,C10,<br>C18,C19,C24,<br>C25, and ALL<br>UNMARKED<br>POLARIZED<br>CAPACITORS | Capacitor, 1UF, 50V CM-RD<br>Non-Polarized | XO-294      | R15                                                | Resistor, 1.2K Ohm, 5%, 1/4W                    | XO-175      |
| C11,C12                                                                           | Capacitor, 10UF, 25V                       | XO-127      | R16,R17,R19<br>R29,R30,R32,<br>R37,R38,R40-<br>R44 | Resistor, 10K Ohm, 5%, 1/4W                     | XO-18       |
| C13,C20                                                                           | Capacitor, 10PF, 50V AX-CM<br>+80%-20%     | XO-635      | R36,R45-R48                                        | Resistor, 33K Ohm, 5%, 1/4W                     | XO-43       |
| C14                                                                               | Capacitor, 1UF, 35V                        | XO-715      | SIP1,SIP2                                          | Resistor Pack, SIP, 1K Ohm, 9 Pin               | XO-463      |
| C15                                                                               | Capacitor, 68PF, 50V MONO                  | XO-636      | SW1,SW2                                            | Switch, Push Button, N.O.                       | XO-365      |
| C21, and ALL<br>UNMARKED<br>CAPACITORS                                            | Capacitor, .047UF, 50V MONO                | XO-638      | XTAL1                                              | Crystal, 4.0 MHz                                | XO-366      |
| C26,C27                                                                           | Capacitor, 0.1UF, 50V                      | XO-230      | XTAL2                                              | Crystal, 3.12 MHz                               | XO-693      |
| D1                                                                                | Capacitor, +80%-20%                        | XO-635      | A2                                                 | 7490 8-input "NAND" gate                        | XO-843      |
| R1                                                                                | Capacitor, 1UF, 35V                        | XO-715      | A3,B2                                              | 74LS373 Octal D-type flip flop                  | XO-445      |
| R2,R5,R9                                                                          | Capacitor, 10PF, 50V MONO                  | XO-636      | A4                                                 | 74LS74 Dual D-type flip flop                    | XO-434      |
| R10,R27,R28,<br>R31,R33-R35,<br>R39                                               | Capacitor, AX-CM, 10%                      | XO-638      | B1,H1                                              | LM324 Quad op-amp                               | XO-644      |
| R3,R20                                                                            | Capacitor, AX-CM, 20%                      | XO-638      | B3                                                 | 74LS244 Octal buffer/driver                     | XO-117      |
| R4,R7,R8                                                                          | Capacitor, 0.1UF, 50V                      | XO-230      | E2                                                 | AD7528J DAC                                     | XO-647      |
| R22-R24                                                                           | Capacitor, AX-CM, +80%-20%                 | XO-230      | E3,G3,N4,S5                                        | 74LS374 Octal D-type flip flop                  | XO-96       |
|                                                                                   | Capacitor, .022UF, 50V                     | XO-873      | E4                                                 | 6P0250 Speech generator                         | XO-645      |
|                                                                                   | Capacitor, AX-CM, 10%                      | XO-873      | G4,T1                                              | 74LS04 Hex Inverter                             | XO-418      |
|                                                                                   | Capacitor, AX-CM, 10%                      | XO-873      | G5                                                 | 74HC08 Quad 2-input "AND" gate                  | XO-872      |
|                                                                                   | Capacitor, AX-CM, 10%                      | XO-873      | H2,H3                                              | 2K x 8 RAM (6116) (200NS)                       | XO-181      |
|                                                                                   | Capacitor, AX-CM, 10%                      | XO-873      | H4,K4                                              | AY-3-8913 Sound generator                       | XO-646      |
|                                                                                   | Capacitor, AX-CM, 10%                      | XO-873      | H5,K3,N5,<br>S1,T3                                 | 74161 Synchronous presettable<br>binary counter | XO-192      |
|                                                                                   | Capacitor, AX-CM, 10%                      | XO-873      | K2,K3,N3                                           | 2764 EProm                                      | XO-489      |
|                                                                                   | Capacitor, AX-CM, 10%                      | XO-873      | N1,T3                                              | R6502-13 CPU                                    | XO-360      |
|                                                                                   | Capacitor, AX-CM, 10%                      | XO-873      | M2,S3                                              | 74LS245 Octal bus transceiver                   | XO-79       |
|                                                                                   | Capacitor, AX-CM, 10%                      | XO-873      | S2                                                 | 74LS139 Dual 1 of 4 decoder                     | XO-419      |
|                                                                                   | Capacitor, AX-CM, 10%                      | XO-873      | T4                                                 | 74LS138 1 of 8 decoder/<br>demultiplexer        | XO-437      |
|                                                                                   | Capacitor, AX-CM, 10%                      | XO-873      |                                                    | 28 Pin Dip Socket (4)                           | XO-536      |
|                                                                                   | Capacitor, AX-CM, 10%                      | XO-873      |                                                    | Jumper, 22 GA (5)                               | XO-469      |

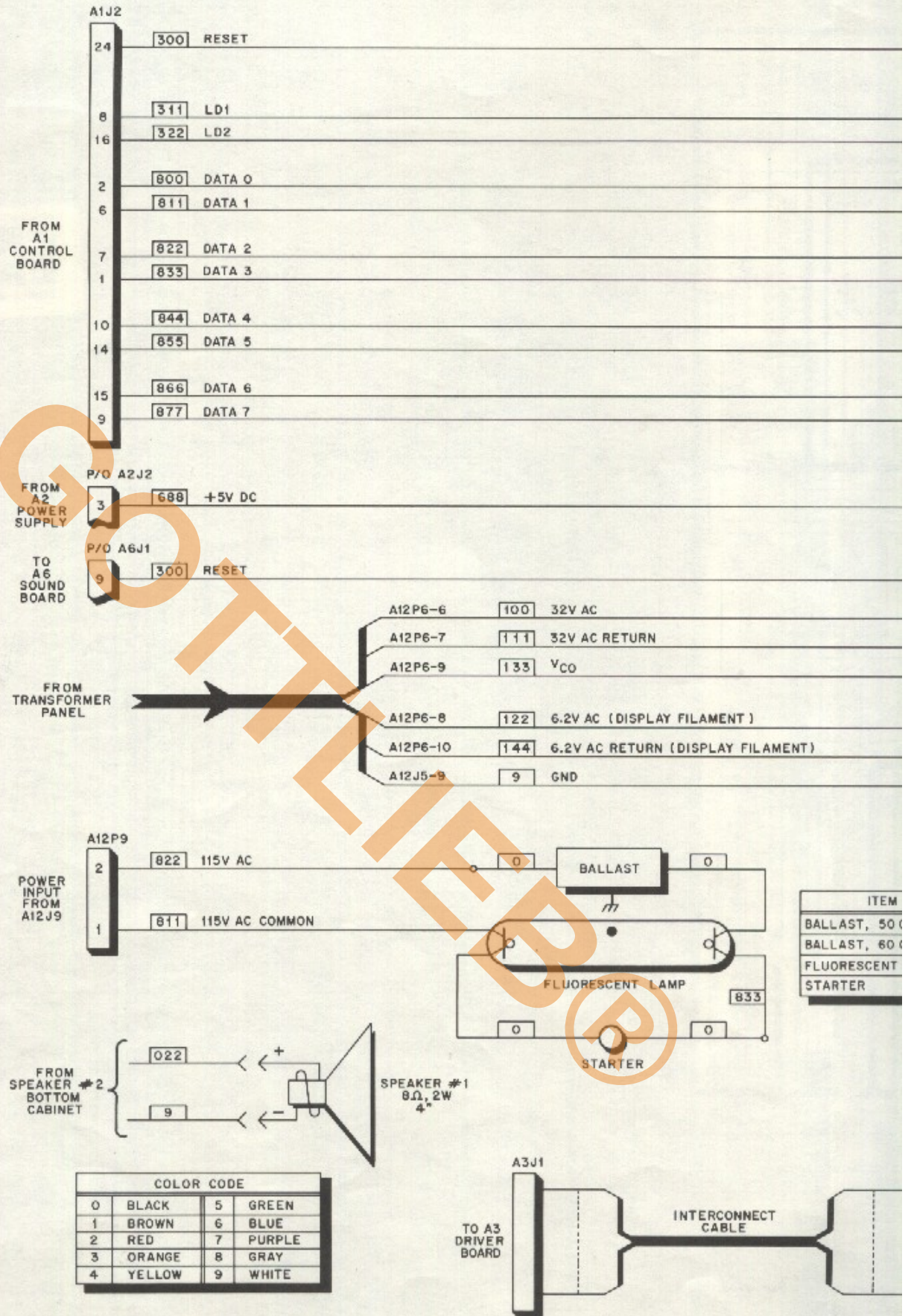
## X. WIRING AND SCHEMATIC

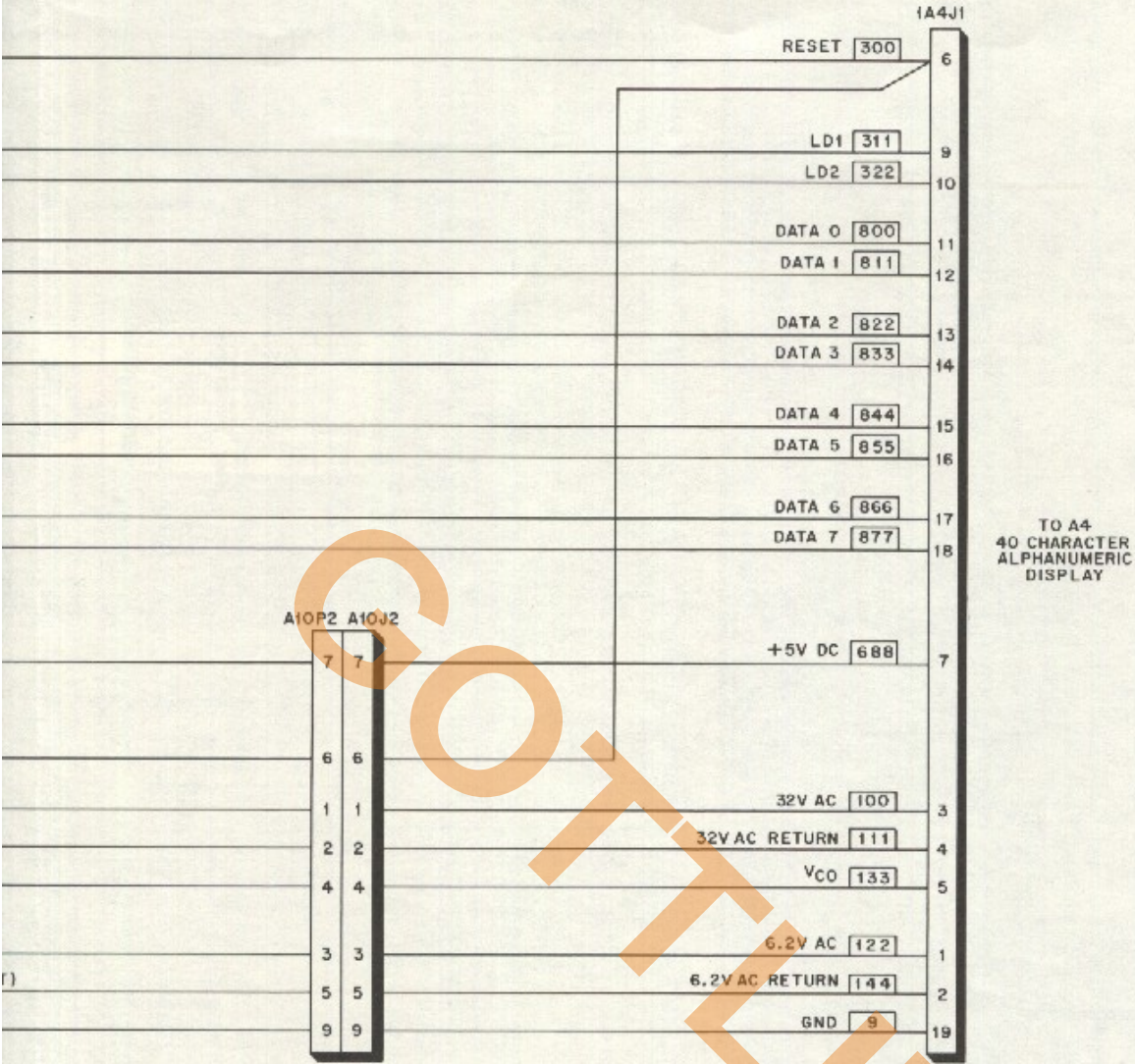


# SCHEMATIC DIAGRAMS, PARTS LISTS

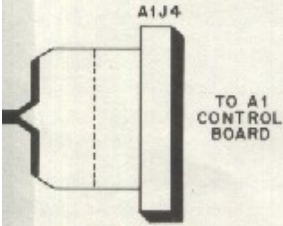


# X. WIRING AND SCHEMATIC DIAGRAM





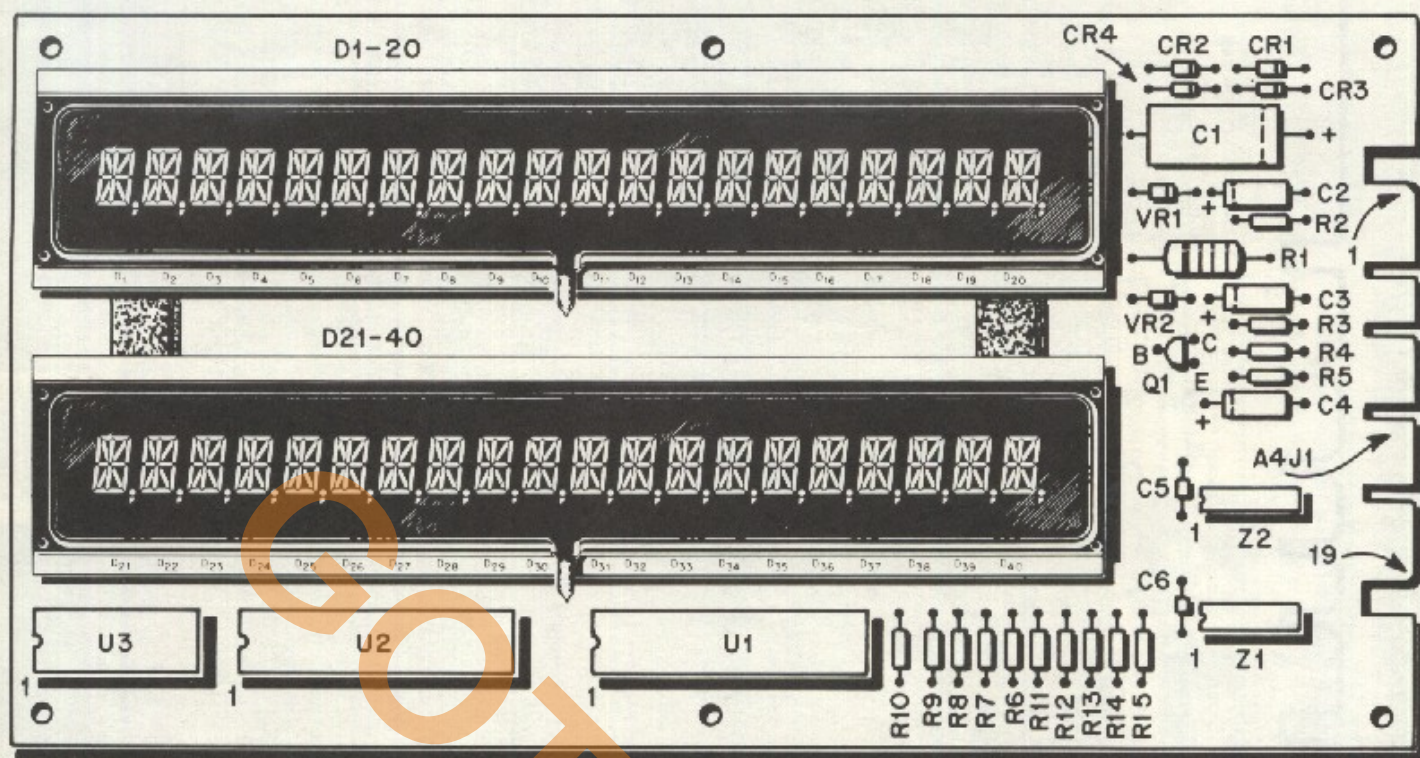
| ITEM              | PART NO. |
|-------------------|----------|
| BALLAST, 50 CYCLE | 24672    |
| BALLAST, 60 CYCLE | 24673    |
| FLUORESCENT LAMP  | 24674    |
| STARTER           | 24675    |



|                                              |          |          |         |
|----------------------------------------------|----------|----------|---------|
| Premier Technology                           |          |          |         |
| TITLE LIGHTBOX, SCHEMATIC/<br>WIRING DIAGRAM |          |          |         |
| DRAWN                                        | APPROVED | DATE     |         |
| P                                            | R.H.M.   | 9-OCT-85 | E-24712 |

## X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS

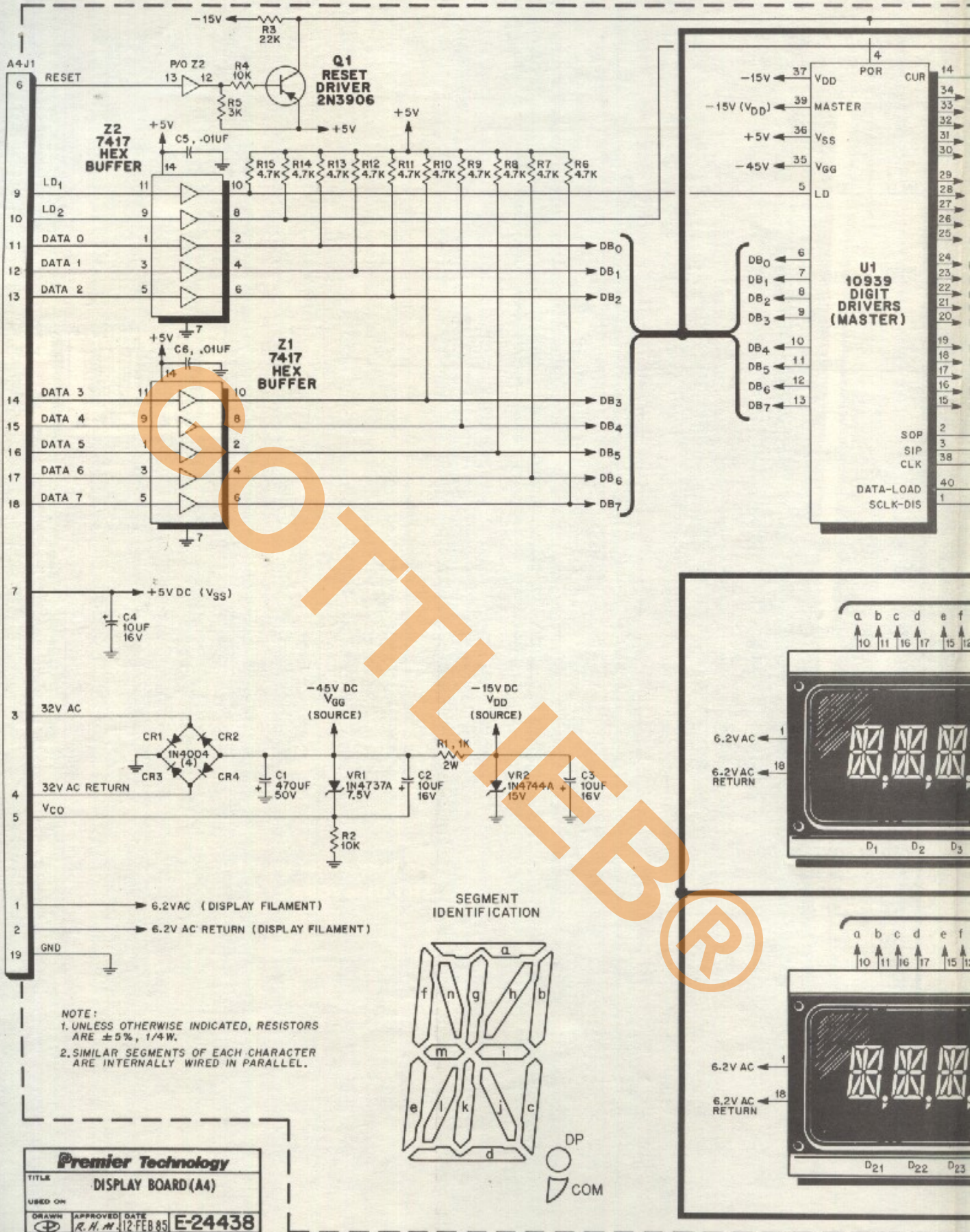
### DISPLAY BOARD (A4) COMPONENT LOCATION

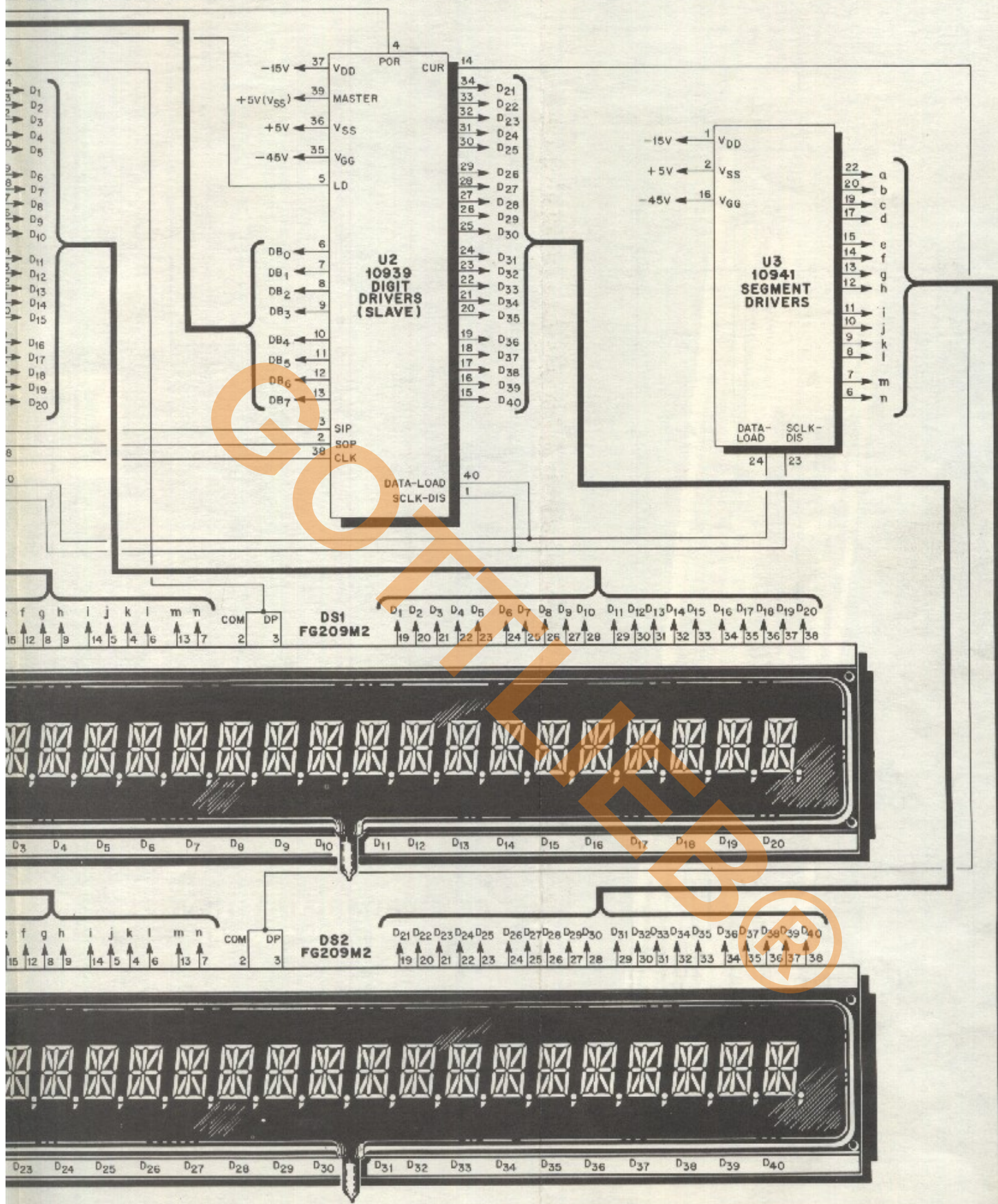


### DISPLAY BOARD (A4) PARTS LIST

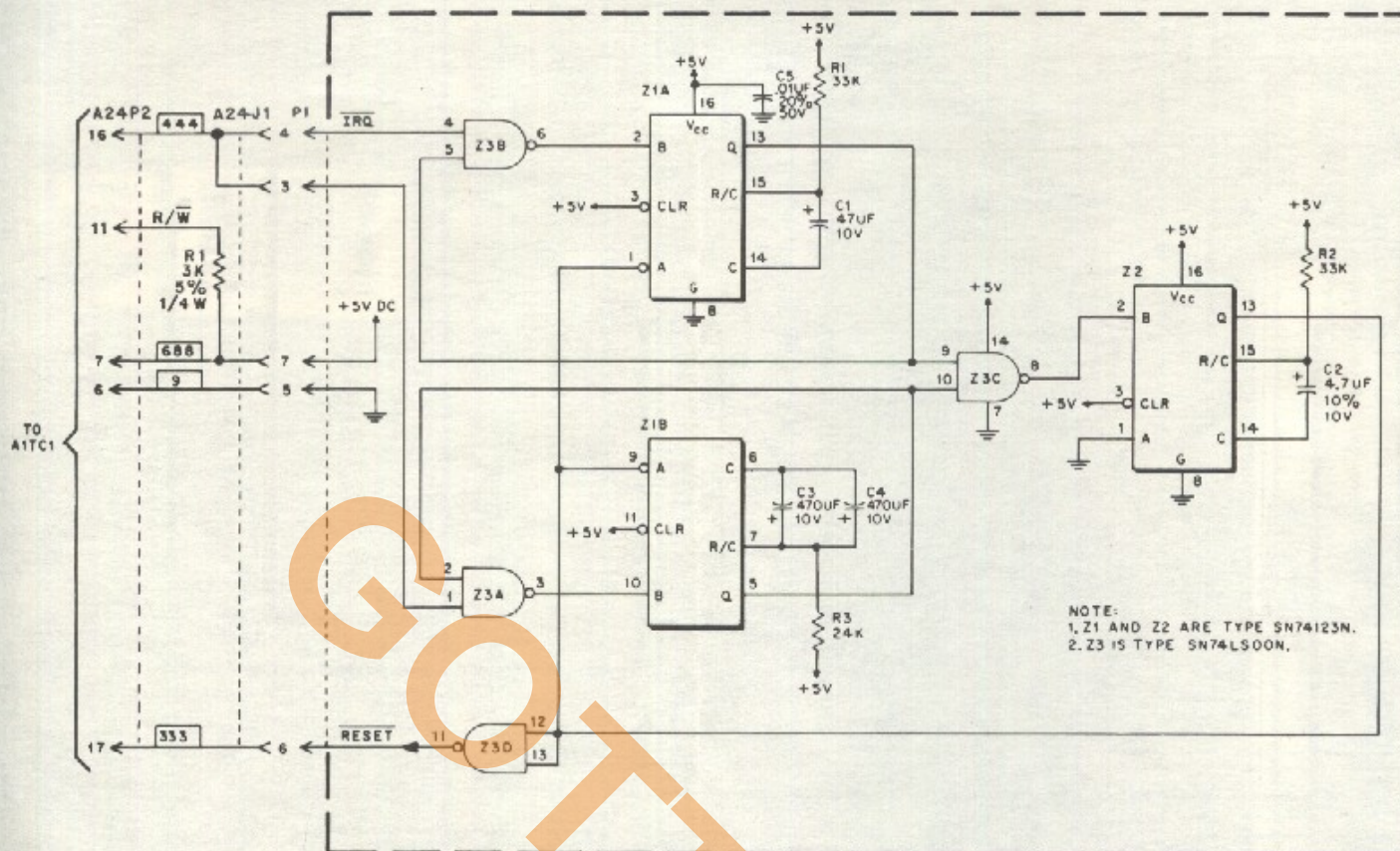
| REFERENCE  | DESCRIPTION                 | PART NUMBER |
|------------|-----------------------------|-------------|
|            | Display Board (A4)          | MA644       |
| C1         | Capacitor, 470UF, 50V       | XO-847      |
| C2, C3, C4 | Capacitor, 10UF, 16V        | XO-846      |
| C5, C6     | Capacitor, .01UF, +80% -20% | XO-228      |
| CR1-CR4    | Diode, 1N4004               | XO-254      |
| DS1, DS2   | Display, Alphanumeric       | XO-840      |
| Q1         | Transistor, PNP, 2N3906     | XO-588      |
| R1         | Resistor, 1K, 5%, 2W        | XO-627      |
| R2, R4     | Resistor, 10K, 5%, 1/4W     | XO-18       |
| R3         | Resistor, 22K, 5%, 1/4W     | XO-42       |
| R5         | Resistor, 3K, 5%, 1/4W      | XO-23       |
| R6-R15     | Resistor, 4.7K, 5%, 1/4W    | XO-7        |
| U1, U2     | IC, Digit Drivers, 10939    | XO-841      |
| U3         | IC, Segment Drivers, 10941  | XO-842      |
| VR1        | Diode, Zener, 1N4737A, 7.5V | XO-844      |
| VR2        | Diode, Zener, 1N4744A, 15V  | XO-843      |
| Z1, Z2     | IC, Hex Buffer, 7417        | XO-406      |
|            | Tape, Vinyl Foam            | 24127-1     |

# X. WIRING AND SCHEMATIC



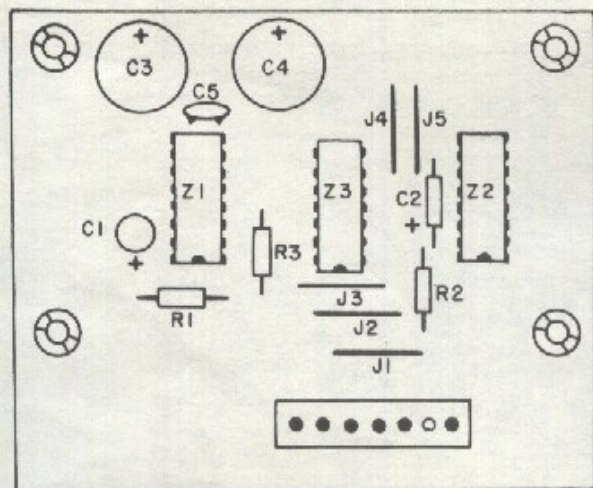


## X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS



| Premier Technology        |          |        |         |
|---------------------------|----------|--------|---------|
| TITLE RESET CIRCUIT BOARD |          |        |         |
| USED ON                   |          |        |         |
| DRAWN                     | APPROVED | DATE   | C-21063 |
|                           | BAM      | 9-2-81 |         |

**RESET BOARD (A24)  
COMPONENT LOCATION**

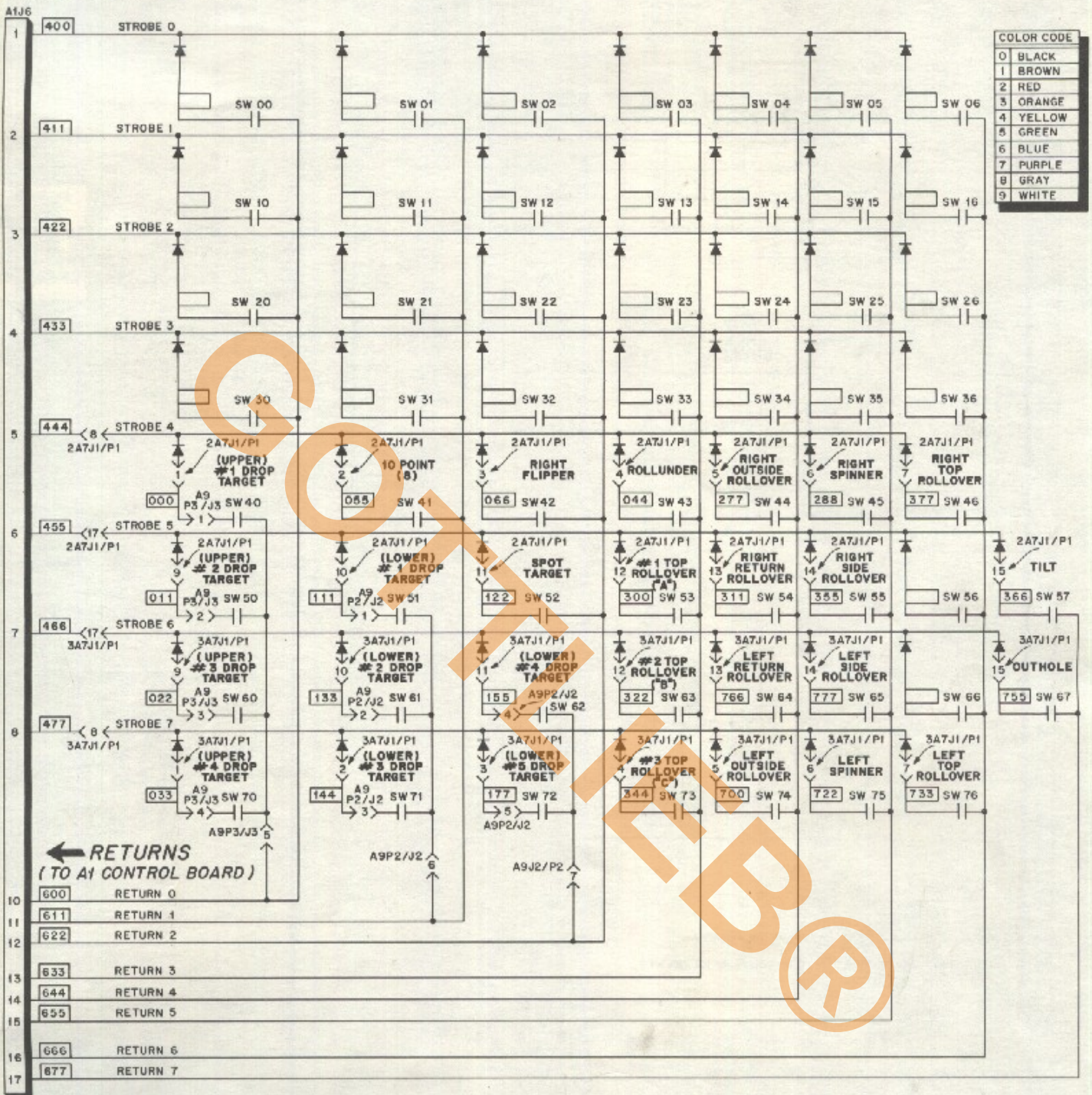


**RESET BOARD (A24) PARTS LIST**

| REFERENCE | DESCRIPTION                   | PART NUMBER |
|-----------|-------------------------------|-------------|
|           | RESET BOARD                   | MA-164      |
| R1, R2    | Resistor 33K ohm, 5%, 1/4W    | XO-43       |
| R3        | Resistor 24K ohm, 5%, 1/4W    | XO-10       |
| C1        | Capacitor 47 $\mu$ fd., 10V   | XO-227      |
| C2        | Capacitor 4.7 $\mu$ fd., 10V  | XO-226      |
| C3, C4    | Capacitor 470 $\mu$ fd., 16V  | XO-214      |
| C5        | Capacitor .01 $\mu$ fd., 100V | XO-202      |
| Z1, Z2    | IC 74123N                     | XO-398      |
| Z3        | IC 74LS00N                    | XO-427      |
|           | 7 Pin Connector               | XO-526      |

# X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS

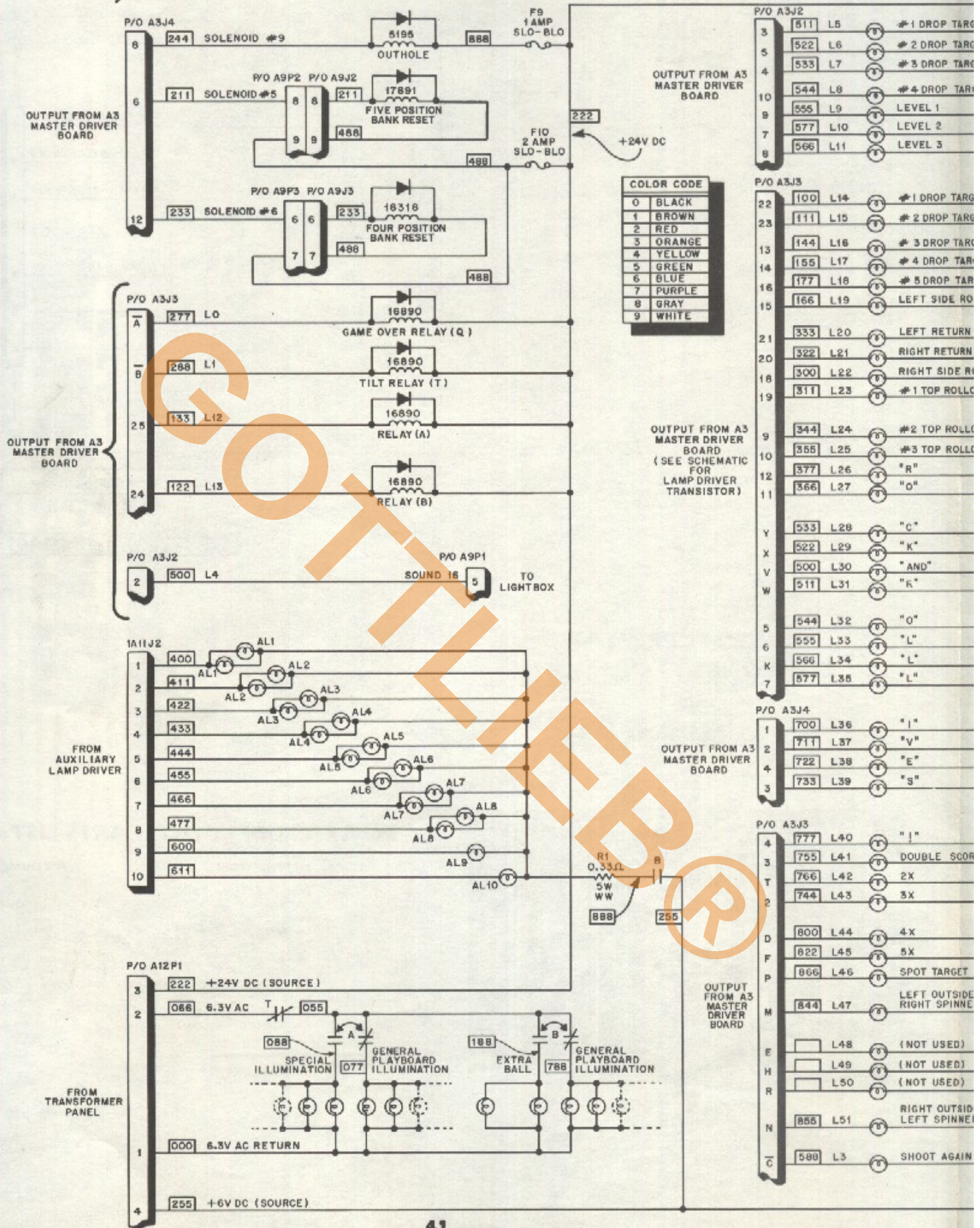
STROBES →  
(FROM A1 CONTROL BOARD)



|                           |          |               |         |
|---------------------------|----------|---------------|---------|
| <b>Premier Technology</b> |          |               |         |
| TITLE                     |          | SWITCH MATRIX |         |
| USED ON                   |          | GAME #697     |         |
| DRAWN                     | APPROVED | DATE          |         |
|                           | R.H.M.   | 9-OCT-85      | E-24713 |

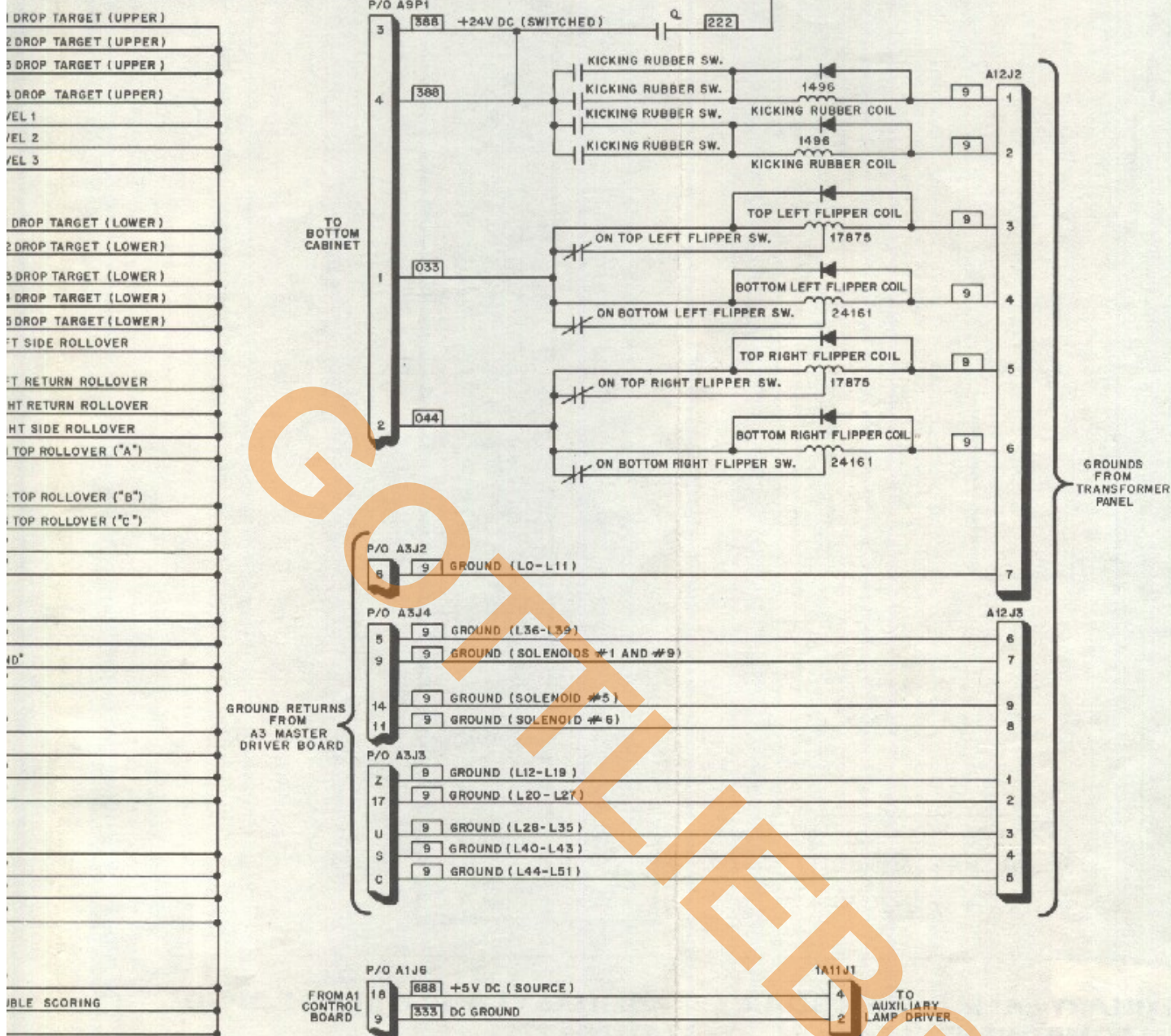
# X. WIRING AND SCHEMATIC

## PLAYBOARD "CONTROLLED" SOLENOIDS AND ILLUMINATION



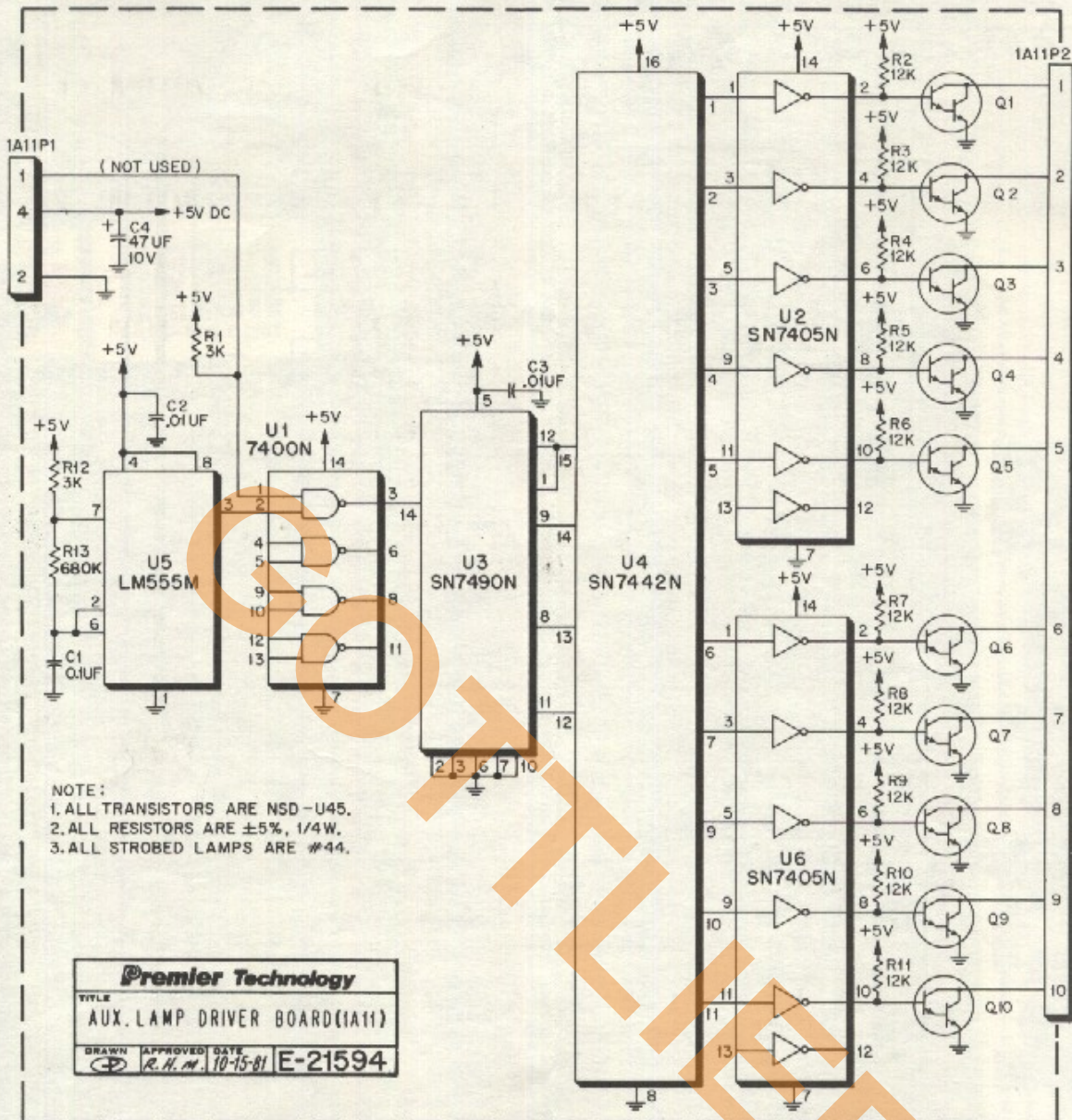
# ATIC DIAGRAMS, PARTS LISTS

## PLAYBOARD "NON-CONTROLLED" SOLENOIDS AND ILLUMINATION

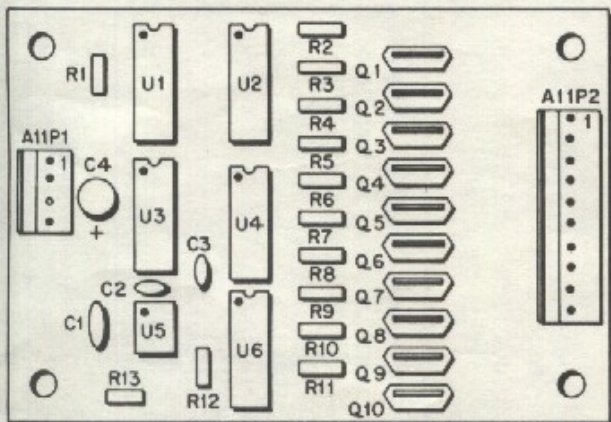


|                                                  |                    |                  |         |
|--------------------------------------------------|--------------------|------------------|---------|
| <b>Premier Technology</b>                        |                    |                  |         |
| TITLE<br>PLAYBOARD<br>SOLENOIDS AND ILLUMINATION |                    |                  |         |
| DRAWN<br>R.H.M.                                  | APPROVED<br>R.H.M. | DATE<br>9-OCT-85 | E-24714 |

# X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS



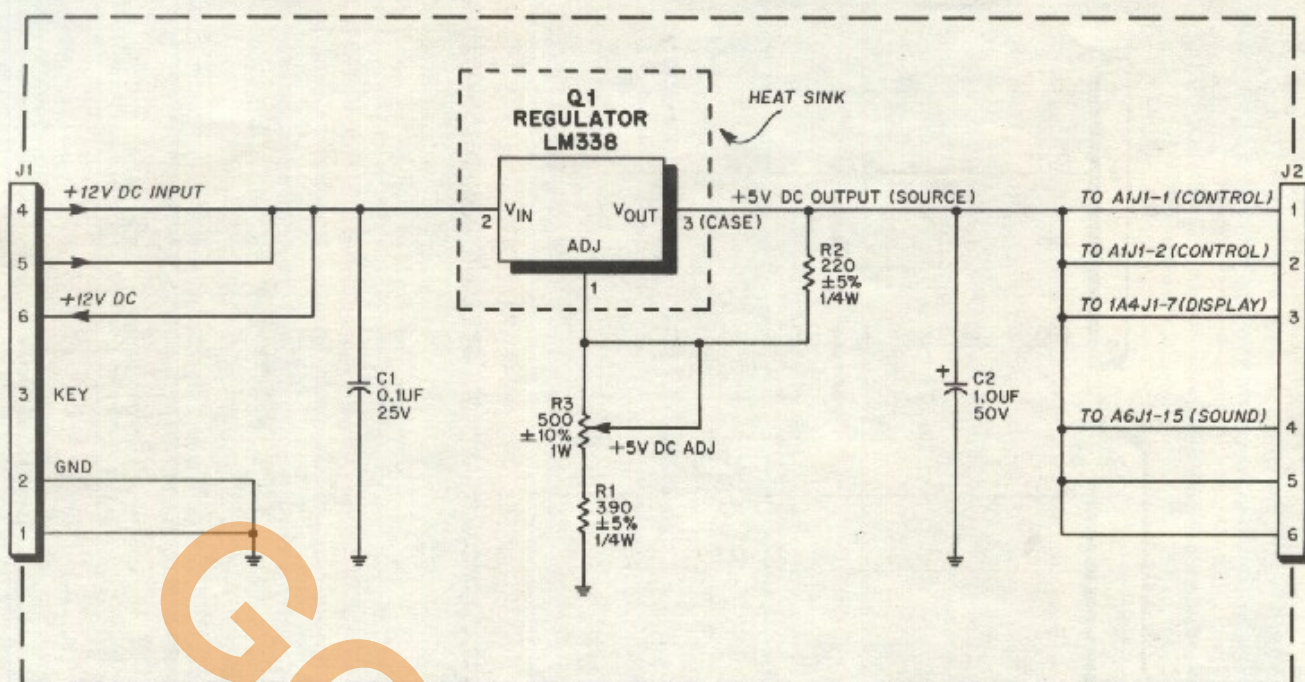
**AUXILIARY LAMP DRIVER BOARD (A111) COMPONENT LOCATION**



**AUXILIARY LAMP DRIVER BOARD (A111) PARTS LIST**

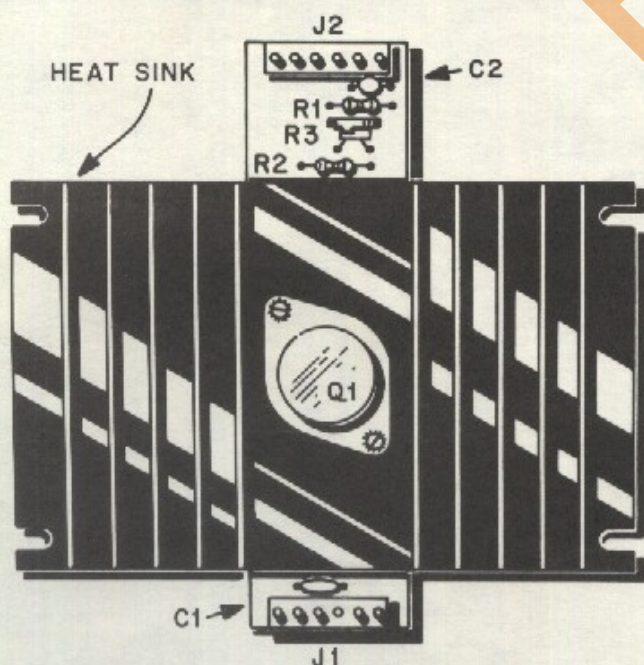
| REFERENCE | DESCRIPTION                                                 | PART NUMBER |
|-----------|-------------------------------------------------------------|-------------|
|           | AUXILIARY LAMP DRIVER ASSEMBLY                              | MA-789      |
| C1        | CAPACITOR, .1 MFD, 100V                                     | XO-626      |
| C2-C3     | CERAMIC RADIAL LEAD CAPACITOR, .01 MFD, 100V                | XO-202      |
| C4        | CAPACITOR, 47 MFD, 10V                                      | XO-227      |
| Q1-Q10    | ELECTROLYTIC RADIAL LEAD TRANSISTOR, NSD-U45 NPN DARLINGTON | XO-146      |
| R1, R12   | RESISTOR, 3K OHM, 5%, 1/4 W                                 | XO-23       |
| R2-R11    | RESISTOR, 12K OHM, 5%, 1/4W                                 | XO-9        |
| R13       | RESISTOR, 680K OHM, 5%, 1/4W                                | XO-689      |
| U1        | I.C. 2-INPUT NAND                                           | XO-420      |
| U2, U6    | I.C. INVERTER                                               | XO-403      |
| U3        | I.C. DECADE COUNTER                                         | XO-425      |
| U4        | I.C. DECODER                                                | XO-426      |
| U5        | I.C. TIMER                                                  | XO-631      |
| P2        | 10 POS. CONNECTOR                                           | XO-531      |
| P1        | 4 POS. CONNECTOR                                            | XO-532      |

## X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS



| Premier Technology |          |           |         |
|--------------------|----------|-----------|---------|
| TITLE              |          |           |         |
| POWER SUPPLY (A2)  |          |           |         |
| USED ON            |          |           |         |
| DRAWN              | APPROVED | DATE      | E-24441 |
| R.H.M.             |          | 12 FEB 85 |         |

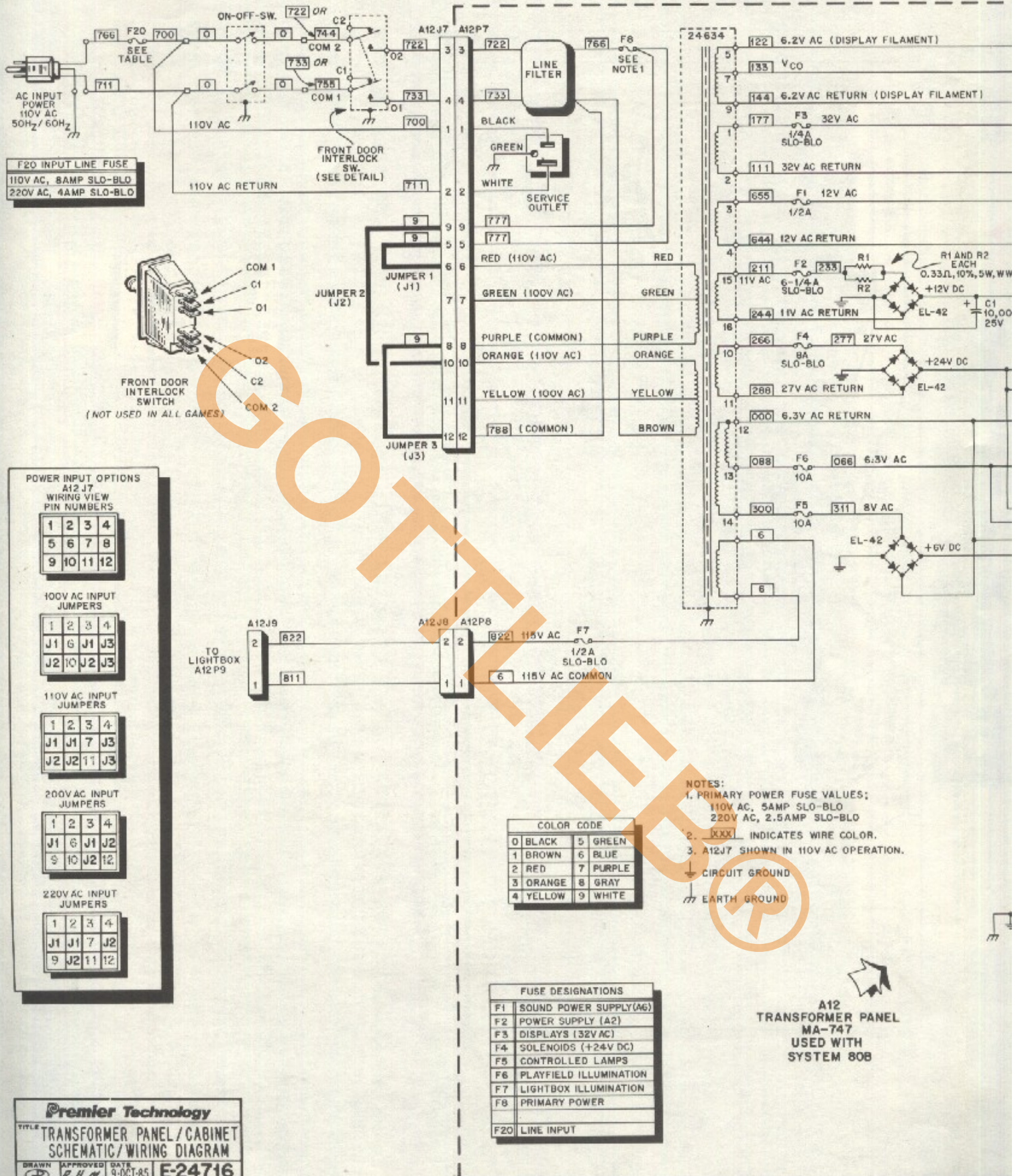
### POWER SUPPLY (A2) COMPONENT LOCATION



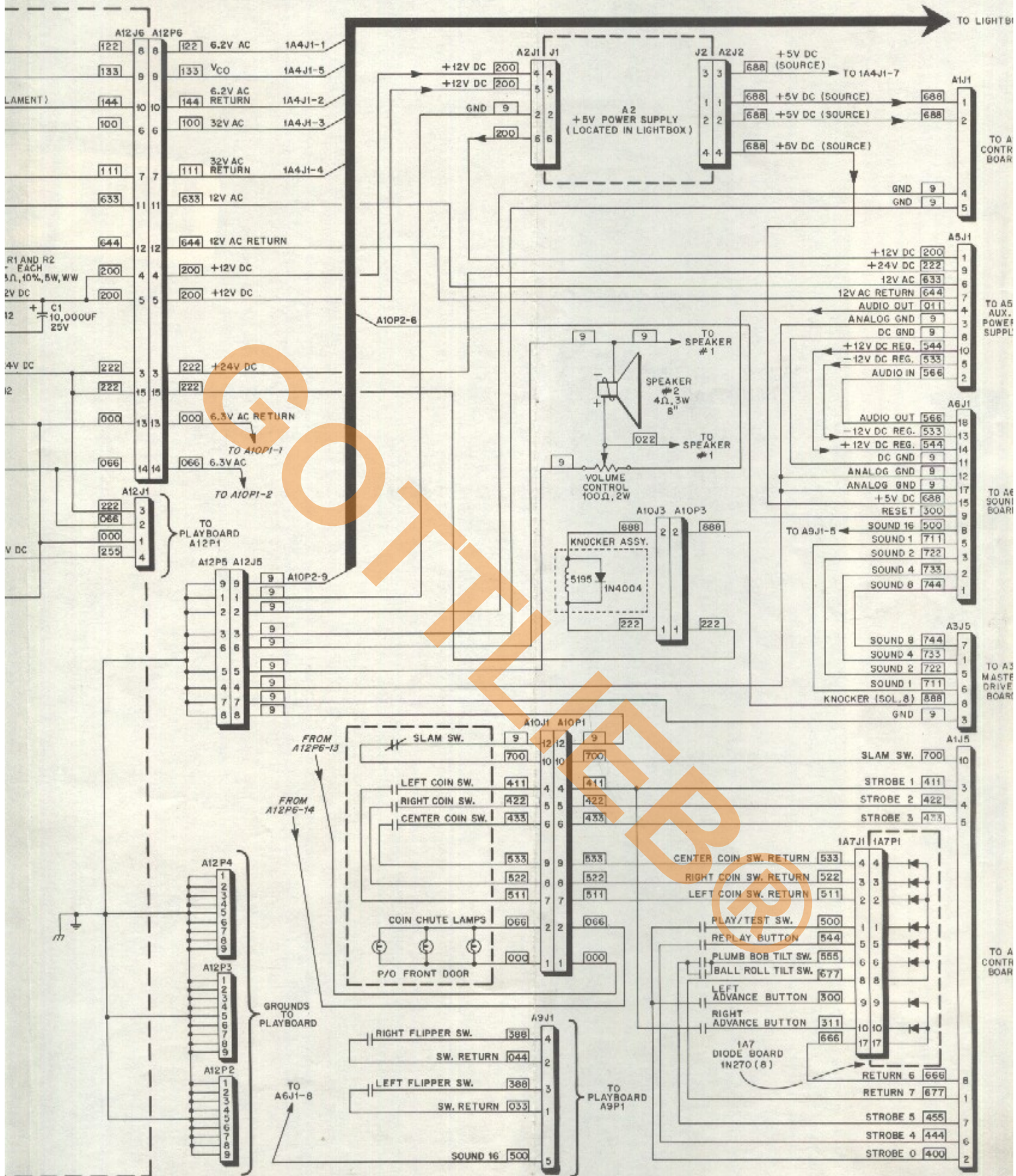
### POWER SUPPLY (A2) PARTS LIST

| REFERENCE | DESCRIPTION                      | PART NUMBER |
|-----------|----------------------------------|-------------|
|           | Power Supply (A2)                | MA845       |
| C1        | Capacitor, 0.1µF, +80% -20%, 25V | XO-248      |
| C2        | Capacitor, 10µF, 10%, 50V        | XO-217      |
| J1, J2    | Connector, 6 Pin, Molex          | XO-373      |
| Q1        | Regulator, LM338, (5 Amp)        | XO-839      |
| R1        | Resistor, 390 ohm, 5%, 1/4W      | XO-845      |
| R2        | Resistor, 220 ohm, 5%, 1/4W      | XO-21       |
| R3        | Resistor, (Pot) 500 ohm, 10%, 1W | XO-112      |
|           | Heat Sink                        | XO-534      |
|           | Insulator, (Regulator)           | XO-522      |
|           | Insulator, (Regulator)           | XO-523      |

# X. WIRING AND SCHEMATIC D



## ATIC DIAGRAMS, PARTS LISTS

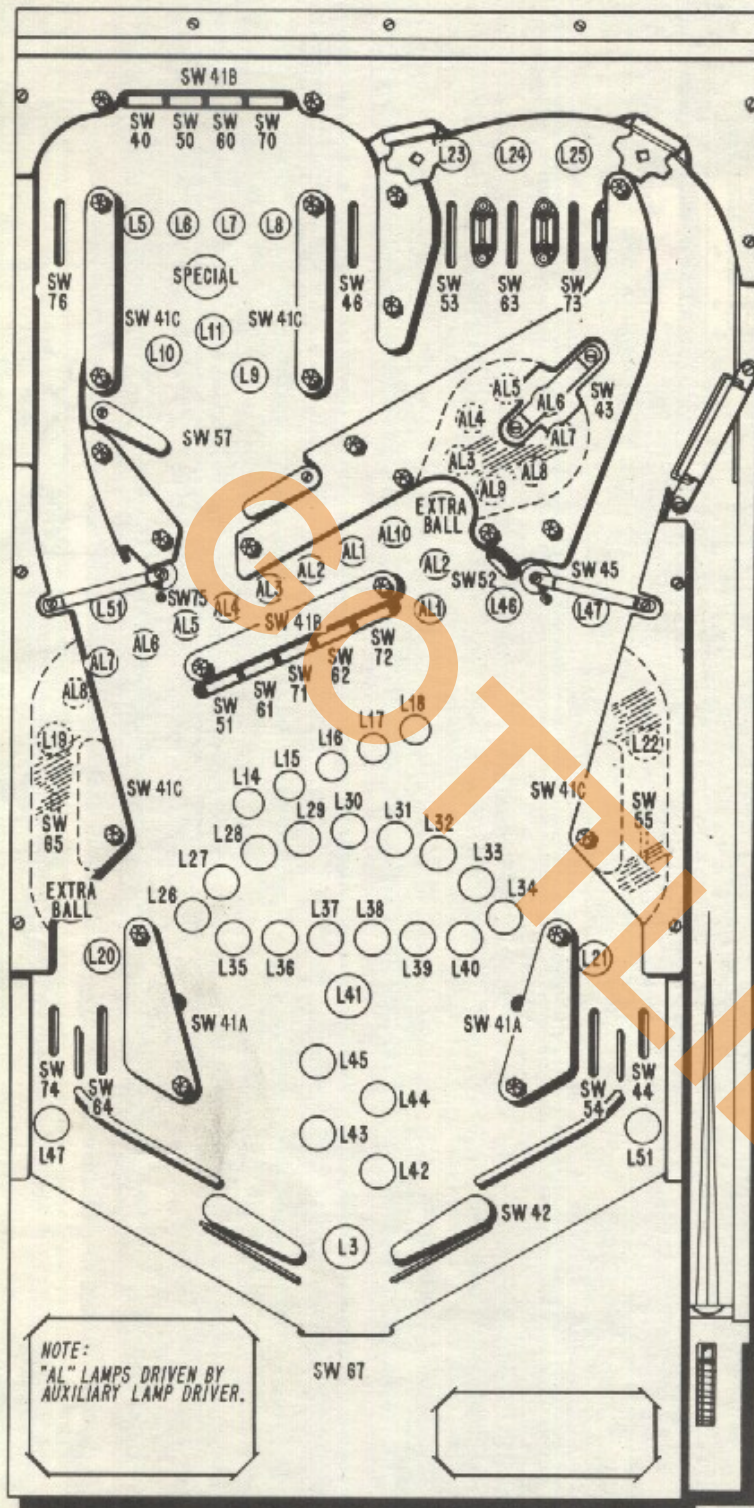


## XI. PARTS INFORMATION

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# XI. PARTS INFORMATION



## PLAYBOARD SWITCH AND LAMP ASSIGNMENTS

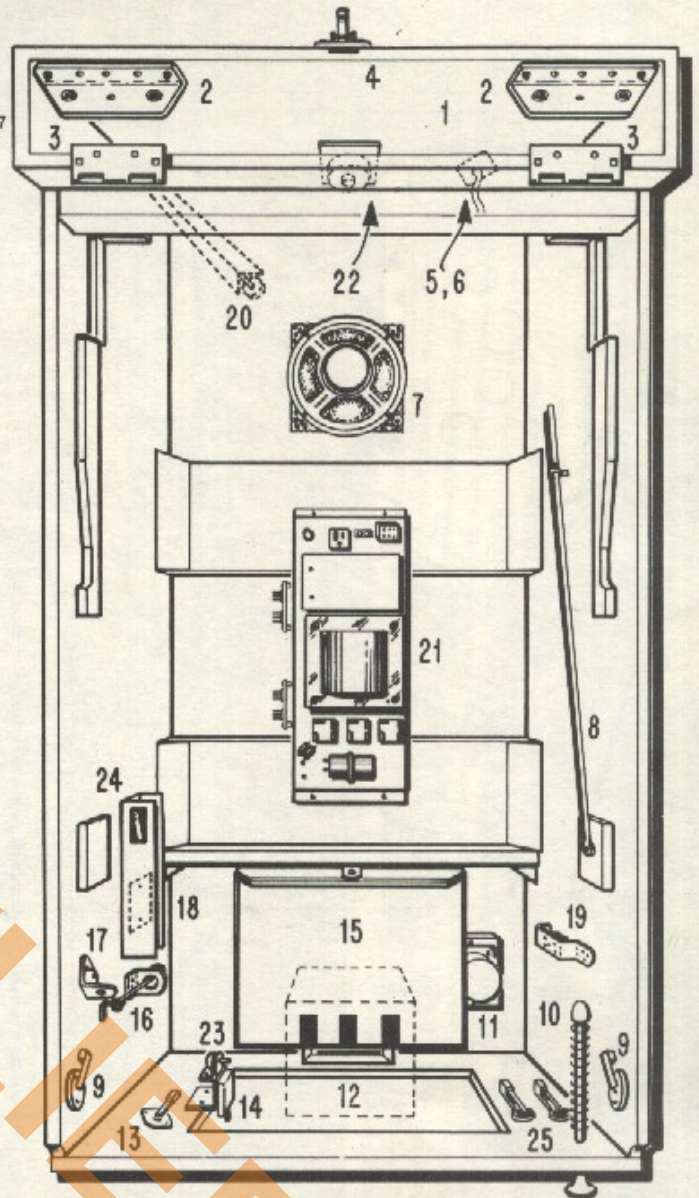
| LAMP NUMBER | LAMP ASSIGNMENT                         |
|-------------|-----------------------------------------|
| L3          | Shoot Again                             |
| L5          | #1 Drop Target (Upper)                  |
| L6          | #2 Drop Target (Upper)                  |
| L7          | #3 Drop Target (Upper)                  |
| L8          | #4 Drop Target (Upper)                  |
| L9          | Level 1                                 |
| L10         | Level 2                                 |
| L11         | Level 3                                 |
| L14         | #1 Drop Target (Lower)                  |
| L15         | #2 Drop Target (Lower)                  |
| L16         | #3 Drop Target (Lower)                  |
| L17         | #4 Drop Target (Lower)                  |
| L18         | #5 Drop Target (Lower)                  |
| L19         | Left Side Rollover                      |
| L20         | Left Return Rollover                    |
| L21         | Right Return Rollover                   |
| L22         | Right Side Rollover                     |
| L23         | #1 Top Rollover ("A")                   |
| L24         | #2 Top Rollover ("B")                   |
| L25         | #3 Top Rollover ("C")                   |
| L26         | "R"                                     |
| L27         | "O"                                     |
| L28         | "C"                                     |
| L29         | "K"                                     |
| L30         | "AND"                                   |
| L31         | "R"                                     |
| L32         | "O"                                     |
| L33         | "L"                                     |
| L34         | "L"                                     |
| L35         | "L"                                     |
| L36         | "I"                                     |
| L37         | "V"                                     |
| L38         | "E"                                     |
| L39         | "S"                                     |
| L40         | "I"                                     |
| L41         | Double Scoring                          |
| L42         | 2X                                      |
| L43         | 3X                                      |
| L44         | 4X                                      |
| L45         | 5X                                      |
| L46         | Spot Target                             |
| L47         | Left Outside Rollover and Right Spinner |
| L51         | Right Outside Rollover Left Spinner     |

| SWITCH MATRIX NUMBER | SWITCH ASSIGNMENT              | PART NO. |
|----------------------|--------------------------------|----------|
| SW 40                | #1 Drop Target (Upper)         | 18094    |
| SW 41(A)             | 10 Point (2)                   | 22224    |
|                      | Contact Kicker and Bracket (4) | 18808    |
| SW 41(B)             | 10 Point (2) (with Bracket)    | 18096    |
| SW 41(C)             | 10 Point (4)                   | 22227    |
| SW 42                | Right Flipper (Lower)          | 22398    |
| SW 43                | Rollunder                      | 21137    |
| SW 44                | Right Outside Rollover         | 18892    |
| SW 45                | Right Spinner (with Bracket)   | 19354    |
| SW 46                | Right Top Rollover             | 18892    |
| SW 50                | #2 Drop Target (Upper)         | 18094    |
| SW 51                | #1 Drop Target (Lower)         | 18094    |
| SW 52                | Spot Target (with Bracket)     | 30867    |
| SW 53                | #1 Top Rollover                | 18892    |
| SW 54                | Right Return Rollover          | 18892    |
| SW 55                | Right Side Rollover            | 18892    |
| SW 57                | Tilt (with Bracket)            | 9141     |
| SW 60                | #3 Drop Target (Upper)         | 18095    |
| SW 61                | #2 Drop Target (Lower)         | 18095    |
| SW 62                | #4 Drop Target (Lower)         | 18095    |
| SW 63                | #2 Top Rollover                | 18892    |
| SW 64                | Left Return Rollover           | 18892    |
| SW 65                | Left Side Rollover             | 18892    |
| SW 67                | Outsole (Assembly)             | 18688    |
| SW 70                | #4 Drop Target (Upper)         | 18093    |
| SW 71                | #3 Drop Target (Lower)         | 18093    |
| SW 72                | #5 Drop Target (Lower)         | 18093    |
| SW 73                | #3 Top Rollover                | 18892    |
| SW 74                | Left Outside Rollover          | 18892    |
| SW 75                | Left Spinner (with Bracket)    | 19354    |
| SW 76                | Left Top Rollover              | 18892    |

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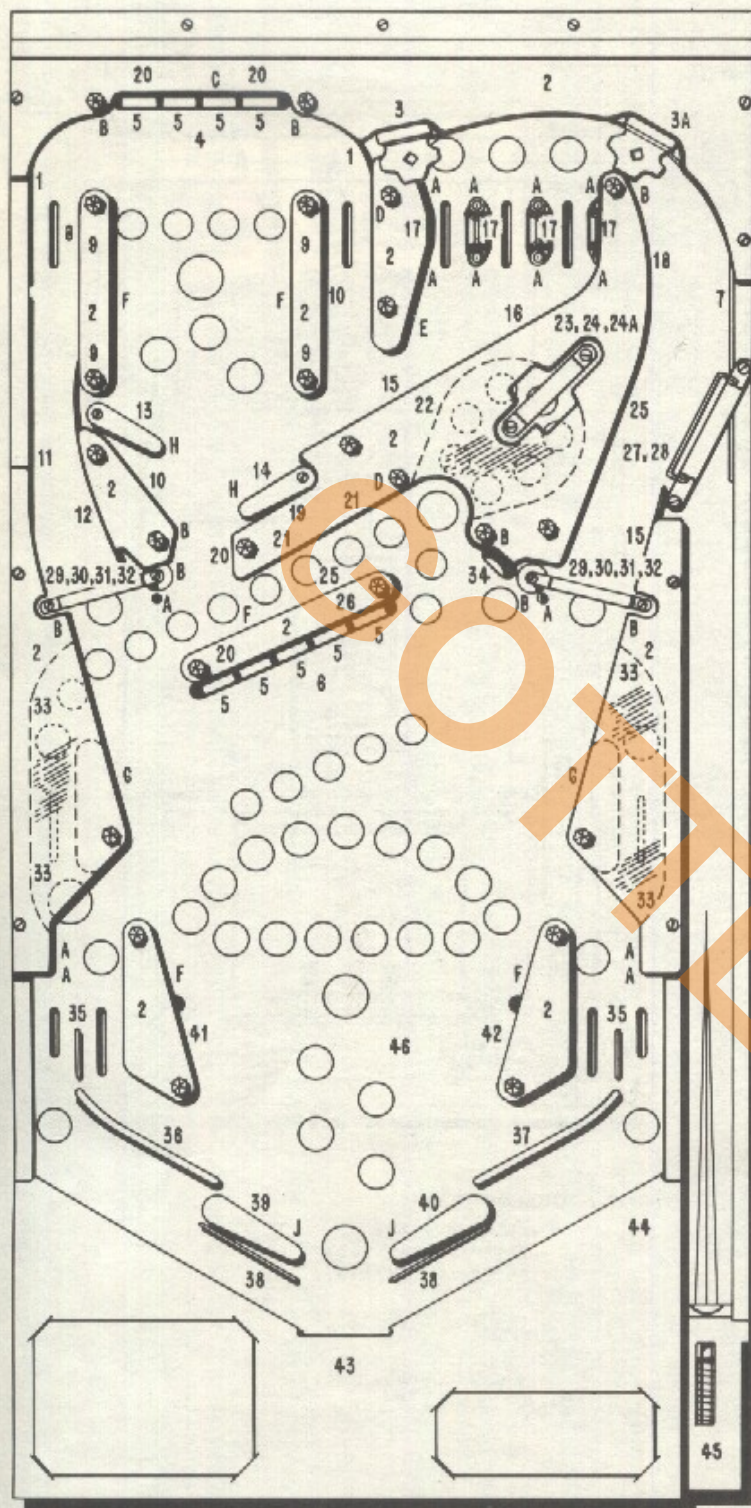
## CABINET PARTS

| ITEM | DESCRIPTION                                                    | PART NO.  |
|------|----------------------------------------------------------------|-----------|
| 1.   | Cabinet                                                        | 24746-697 |
| 2.   | Lightbox Mounting Bracket (2)                                  | 19916     |
| 3.   | Butt Hinge, (Shown For Reference Only, P/O Lightbox Assy.) (2) | 22734     |
| 4.   | "U" Bolt (P/O Lightbox)                                        | 24659     |
|      | Latch Assembly (P/O Cabinet)                                   | 21969     |
| 5.   | Cable Assembly, Domestic (High Voltage)                        | MA-794    |
| 6.   | Line Cord (Domestic)                                           | 23365     |
|      | Line Cord Cover Plate                                          | 21955     |
| 7.   | Speaker, 4 Ohm, 3W, 8"                                         | EL-83     |
|      | Speaker Guard                                                  | 20931     |
| 8.   | Prop Stick, Playfield                                          | 23940     |
| 9.   | Flipper Switch Assembly (2)                                    | 17838     |
| 10.  | Ball Shooter Assembly                                          | 8835      |
| 11.  | Switch, On/Off                                                 | 23799     |
|      | Switch Plate                                                   | 18769     |
|      | Switch Housing                                                 | 15163     |
| 12.  | Front Door Assembly (Universal)                                | MA-688    |
|      | Cable Assembly                                                 | MA-676    |
|      | Slam Switch                                                    | FD-12     |
|      | 6V DC Lamp, Wedge Base                                         | FD-2      |
|      | Frame, Door                                                    | FD-13     |
|      | Three Chute Door                                               | 24160     |
|      | Black Button Bezel                                             | FD-14     |
|      | Entry/Reject Button                                            | FD-15     |
|      | Button Spring                                                  | FD-16     |
|      | Reject Flap                                                    | FD-17     |
|      | Clamp, Frame                                                   | FD-18     |
|      | Flat Lock and Cam Assembly                                     | FD-19     |
|      | Base Plate with Pivot and Stud                                 | FD-20     |
|      | Microswitch Bracket                                            | FD-21     |
|      | Clear Plastic Cover for Microswitch                            | FD-22     |
|      | Coin Microswitch with Wire                                     | FD-23     |
|      | Lampholder                                                     | FD-24     |
|      | Black Reject Bezel                                             | FD-26     |
| 13.  | Replay Switch Assembly                                         | 18092     |
| 14.  | Interlock Switch Assembly (When Used)                          | 24148     |
|      | Switch                                                         | EL-66     |
|      | Switch Cover                                                   | 21888     |
| 15.  | Cashbox                                                        | 24152     |
|      | Cover                                                          | 24153     |
|      | Dividers                                                       | 24146     |
|      | Locator                                                        | 24151     |
|      | Lockeye Assembly                                               | 23878     |
| 16.  | Plumb Bob Tilt Switch Assembly                                 | 358       |
|      | Strike Plate                                                   | MH-30     |
|      | Carbon, Tilt Bob                                               | 357       |
|      | Rod, Tilt                                                      | 18578     |
| 17.  | Locator Bracket                                                | 24252     |
| 18.  | Diode Assembly                                                 | XO-265    |
|      | Diode, 1N270 (8)                                               | MA-12     |
| 19.  | Knocker Assembly                                               | 4337      |
| 20.  | Cabinet Leg (4)                                                | 3775      |
|      | Leg Bolt (8)                                                   | MH-21     |
|      | 3" Leg Adjuster (4)                                            | MA-747    |
| 21.  | Transformer Panel Assembly                                     | EL-42     |
|      | Bridge Rectifier (3)                                           | MA-781    |
|      | Cable Assembly (Secondary)                                     | XO-830    |
|      | Capacitor, 10,000UF, 25V                                       | EL-50     |
|      | Filter, Line                                                   | EL-12     |
|      | Fuse Block (6 Pos.)                                            | 23805     |
|      | Fuse Cover                                                     | EL-78     |
|      | Fuse Holder (F7 and F8) (2)                                    |           |
|      | Fuses                                                          |           |
|      | F1, 1/2 Amp                                                    | EL-28     |
|      | F2, 6-1/4 Amp, SLO-BLO                                         | EL-29     |
|      | F3, 1/4 Amp, SLO-BLO                                           | EL-5      |
|      | F4, 8 Amp, SLO-BLO                                             | EL-26     |
|      | F5, 10 Amp                                                     | EL-23     |
|      | F6, 10 Amp                                                     | EL-23     |
|      | F7, 1/2 Amp, SLO-BLO                                           | EL-20     |
|      | F8, 5 Amp, SLO-BLO (110V AC)                                   | EL-8      |
|      | F8, 2.5 Amp, SLO-BLO (220V AC)                                 | EL-21     |
|      | Ground Bus Assembly (2)                                        | 24542     |
|      | Outlet, Service                                                | 18133     |
|      | Resistor, 0.33 Ohm, 10%                                        | XO-154    |
|      | 5W, Wire-Wound (2)                                             |           |
|      | Transformer                                                    | 24634     |
| 22.  | Fuse Holder                                                    | EL-78     |
|      | F20, 8 Amp, SLO-BLO (110V AC)                                  | EL-26     |
|      | F20, 4 Amp, SLO-BLO (220V AC)                                  | EL-33     |



| ITEM | DESCRIPTION                  | PART NO.  |
|------|------------------------------|-----------|
| 23.  | Mounting Bracket             | 24149     |
|      | Control, Volume, 100 Ohm, 2W | XO-199    |
|      | Switch, PLAY/TEST            | EL-57     |
| 24.  | Ball Roll Tilt               |           |
|      | Housing and Switch Assembly  | 24394     |
|      | Switch                       | 24393     |
| 25.  | Button Holder and Switch (2) | 23503     |
|      | Pushbutton (2) (Black)       | 24293Y    |
|      | Lightbox (Not Shown)         | 24645-697 |

# XI. PARTS INFORMATION



## PLAYBOARD PARTS INFORMATION

### RUBBER RINGS

| ITEM | DESCRIPTION     | PART NO. |
|------|-----------------|----------|
| A    | Mini-Post (14)  | 15705    |
| B    | 5/16" (9)       | 10217    |
| C    | 2-1/2"          | 10222    |
| D    | 7/16" (2)       | 17493    |
| E    | 1"              | 10219    |
| F    | 3" (5)          | 10223    |
| G    | 2" (2)          | 10221    |
| H    | Flipper Red (2) | 13149    |
| J    | Flipper Red (2) | 13151    |

### PARTS LIST

| ITEM | DESCRIPTION                                      | PART NO.  |
|------|--------------------------------------------------|-----------|
| 1    | Flat Rail (2)                                    | 24508     |
| 2    | Plastic Shield Set                               | 24536     |
| 3    | Arch Rebound Assembly                            | 19646     |
| 3A   | Arch Rebound Assembly                            | 19645     |
| 4    | Four Position Target Bank Assembly               | MA42      |
| 5    | Plastic Target<br>(Red body with Gold design, 4) | 24798     |
|      | (Black body with Gold design, 5)                 | 24798     |
| 6    | Five Position Target Bank Assembly               | MA787     |
| 7    | Flat Rail                                        | 24510     |
| 8    | Ball Guide Rail                                  | 18563     |
| 9    | Ball Guide Rail (4)                              | 17650     |
| 10   | Ball Guide Rail (2)                              | 4832      |
| 11   | Flat Rail                                        | 24509     |
| 12   | Ball Guide Rail                                  | 4246      |
| 13   | Flipper Assembly (Small, Left)                   | MA228A    |
| 14   | Flipper Assembly (Small, Right)                  | MA228     |
| 15   | Ball Guide Rail (2)                              | 4833      |
| 16   | Ball Guide Rail                                  | 14505     |
| 17   | Rollover Guide (Red) (4)                         | 15648U    |
| 18   | Ball Guide Rail                                  | 8514      |
| 19   | Ball Guide Rail                                  | 6612      |
| 20   | Ball Guide Rail (4)                              | 18070     |
| 21   | Ball Deflector (2)                               | 21158     |
| 22   | Flat Rail                                        | 22107     |
| 23   | Metal Shield                                     | 4869      |
| 24   | Gate Wireform                                    | 22118     |
| 24A  | Switch Spring                                    | 14236     |
| 25   | Ball Guide Rail (2)                              | 11703     |
| 26   | Ball Guide Rail                                  | 4831      |
| 27   | Metal Shield                                     | 1673      |
| 28   | Gate Wireform                                    | 1674      |
| 29   | Target Shield (2)                                | 14043     |
| 30   | Spinning Target Assembly (2)                     | 20388     |
| 31   | Spinning Target Rod (2)                          | 20405     |
| 32   | Nylon Washer (4)                                 | 20407     |
| 33   | Flat Rail (4)                                    | 22102     |
| 34   | Spot Target (Red) (Bullseye, White)              | 9383U     |
| 31   | Spinning Target Rod (2)                          | 20405     |
| 32   | Nylon Washer (4)                                 | 20407     |
| 33   | Flat Rail (4)                                    | 22102     |
| 34   | Spot Target (Yellow)                             | 9374T     |
| 35   | Ball Guide Rail (2)                              | 6931      |
| 36   | Ball Guide Rail                                  | 24507     |
| 37   | Ball Guide Rail                                  | 24506     |
| 38   | Ball Snubber Rail (2)                            | 13798     |
| 39   | Left Flipper Unit                                | MA656     |
| 40   | Right Flipper Unit                               | MA657     |
| 41   | Kicker Assembly (Left)                           | MA135     |
| 42   | Kicker Assembly (Right)                          | MA135A    |
| 43   | Cardholder (Nickel Plated)                       | 13647-697 |
| 44   | Ball Return Unit Assembly                        | 21822     |
| 45   | Ball Shooter Gauge                               | 9767-697  |
| 46   | Mylar Overlay                                    | 24535     |

|                           |        |
|---------------------------|--------|
| "Q" Relay Assembly        | MA23   |
| "T" Relay Assembly        | MA25   |
| "A" Relay Assembly        | MA786  |
| "B" Relay Assembly        | MA785  |
| Plastic Support Post (10) | 20635P |
| Light Shield (Red) (3)    | 24410U |
| 1" Plastic Post (33)      | 11561P |
| R1, 0.33 Ohm, 10%, 5W, WW | XO-154 |