

ROCKY

INSTRUCTION MANUAL



 **Gottlieb**
AMUSEMENT GAMES

165 W. Lake Street, Northlake, IL 60164
(312) 562-7400 Telex 72-8463

A Columbia Pictures Industries Company 

FINAL EDITION

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

ROCKY (GAME #672)
INSTRUCTION MANUAL

TABLE OF CONTENTS

| | Page |
|---------------------------------------|------|
| I. INSTALLATION..... | 1 |
| II. INITIALIZATION..... | 2 |
| III. GAME OPERATION..... | 2 |
| IV. GAME PLAY AND SCORING..... | 4 |
| V. SOUND/SPEECH..... | 6 |
| VI. GAME ADJUSTMENTS..... | 7 |
| VII. BOOKKEEPING AND SELF TEST..... | 9 |
| VIII. OPTIONS..... | 14 |
| IX. GENERAL INFORMATION..... | 15 |
| X. WIRING AND SCHEMATIC DIAGRAMS..... | 17 |
| XI. PARTS INFORMATION..... | 44 |

ROCKY PROMS

GAME PROM 672

SOUND PROMS 672/S1, 672/S2

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SYSTEM 80A

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

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

The part numbers of each set are as follows:

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

The ROMS are labeled as follows:

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

I. INSTALLATION

A. SET-UP

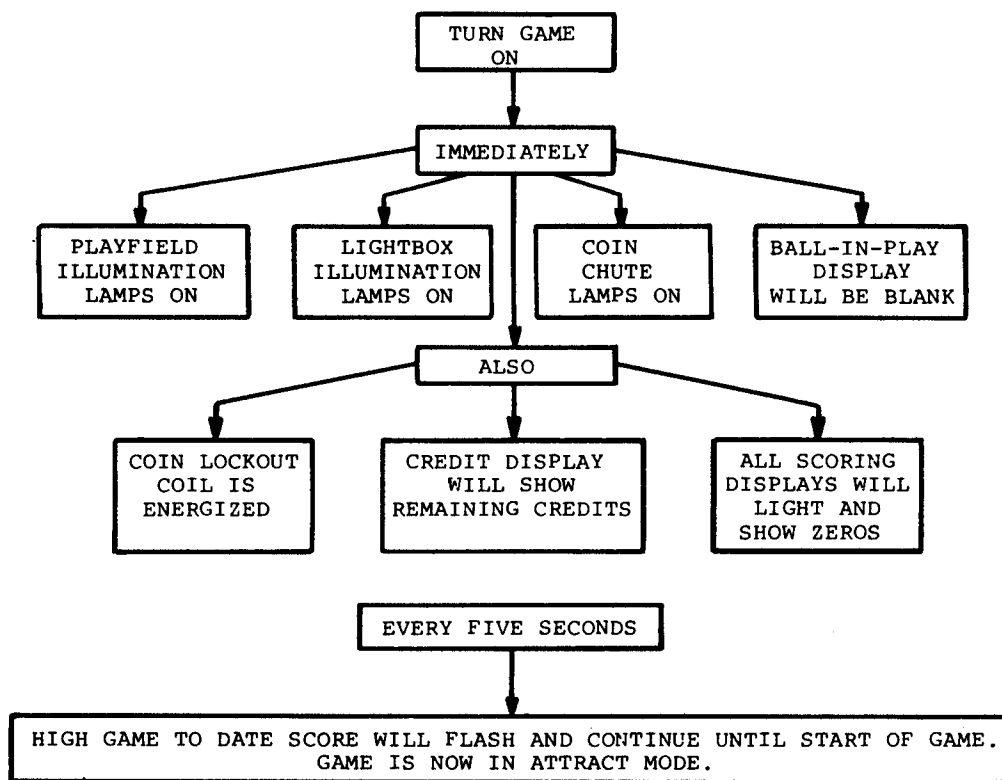
1. Bolt the legs to the cabinet.
2. Open the cabinet door and loosen the front moulding locking arm.
3. Remove the moulding from the playfield.
4. Slide the cabinet glass forward and remove it.
5. Raise the playboard, slide it forward and rest it on its supports.
6. From the inside of the cabinet, remove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

B. CHECK-OUT

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

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

II. INITIALIZATION



III. GAME OPERATION

A. GAME START

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

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

B. FIRST PLAYER

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

C. ADDITIONAL PLAYERS

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

III. GAME OPERATION

credits remain, the Credit Button has no effect.

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

D. EXTRA BALLS

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

E. TILT MODE

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

F. SLAM MODE

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

entire game is ended for all players.

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

G. GAME OVER

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

IV. GAME PLAY AND SCORING

INSTANT WIN

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

SPECIAL

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

EXTRA BALL

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

MEMORY

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

TOP HOLE

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

POP BUMPERS

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

TOP ROLLOVERS

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

LEFT AND RIGHT RETURN ROLLOVERS

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

IV. GAME PLAY AND SCORING

LOWER OUTLANE ROLLOVERS

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

DROP TARGETS

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

ROLLUNDER

- Score 500 points.

SPOT TARGET

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

SPINNER

- Score 1,000 points.

ON THE ROPES SHOOTER

- Collect bonus.

10 POINT SWITCHES

- Score 10 points.

OTHER FEATURES

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

V. SOUND/SPEECH

SPEECH

ROUND ONE

ROUND TWO

ROUND THREE

ROUND FOUR

ROUND FIVE

ROUND SIX

ROUND SEVEN

ROUND EIGHT

ROUND NINE

ROUND TEN

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

A. CONTROL BOARD SWITCH ADJUSTMENTS

NOTE: The following switch adjustments pertaining to system 80A only. There are 32 switches on the control board which permit adjustment of the game parameters. These switches are contained in four packages of eight switches each, as shown below.

COIN CHUTE COMBINATIONS SYSTEM 80A

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

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

SWITCHES 6, 7 AND 8 _____ SPARES

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

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

SWITCH 22 _____ PLAYFIELD SPECIAL
 ON Extra Ball
 OFF Special

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

SWITCH 25 _____ BALLS/GAME
 ON 3
 OFF 5

SWITCH 26 _____ MATCH
 ON On
 OFF Off

SWITCH 27 _____ REPLAY LIMIT
 ON 1
 OFF No Limit

SWITCH 28 _____ NOVELTY
 ON Yes
 OFF Normal

SWITCH 29 _____ GAME MODE
 ON Extra Ball
 OFF Replay

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

SWITCHES 31 32 _____ NOT USED
 ON
 OFF

ADDITIONAL COIN CHUTE COMBINATIONS CREDIT INCENTIVES

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

| SWITCHES | | | | | COIN/CREDIT GIVEN | COIN/CREDIT GIVEN | COIN/CREDIT GIVEN | COIN/CREDIT GIVEN | COIN/CREDIT GIVEN | TOTAL COIN/TOTAL CREDIT |
|----------|-----|-----|-----|-----|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------------|
| S1 | S2 | S3 | S4 | S5 | Left Coin Chute | 1st/1 | 2nd/2 | | | = 2/3 |
| S9 | S10 | S11 | S12 | S13 | Right Coin Chute | 1st/0 | 2nd/1 | 3rd/1 | 4th/1 | = 4/3 |
| S17 | S18 | S19 | S20 | S21 | Center Coin Chute | 1st/0 | 2nd/1 | 3rd/0 | 4th/2 | = 4/3 |
| ON | ON | OFF | OFF | ON | 1st/1 | 2nd/1 | 3rd/1 | 4th/2 | | = 4/5 |
| ON | ON | ON | OFF | OFF | 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 output is controlled by the potentiometer mounted on the fuse/knocker panel.

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

The potentiometer is accessible through the front door.

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

SWITCH BANK (SB1) SETTINGS:

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

VII. BOOKKEEPING AND SELF TEST

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

A. BOOKKEEPING

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

I. STEPPING THROUGH BOOKKEEPING

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

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

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

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

4. To exit from Bookkeeping at any time:

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

II. HOW TO SET BOOKKEEPING INFORMATION TO ZERO

1. For a Particular Bookkeeping Step

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

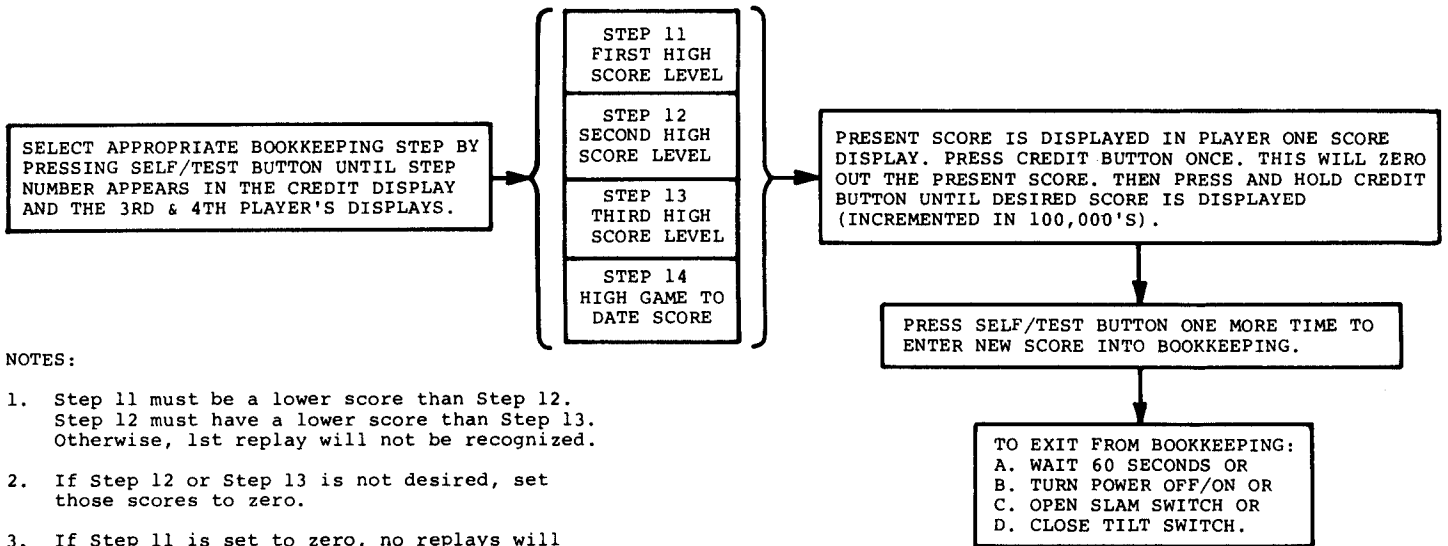
2. Zeroing All Bookkeeping Steps Except #11, 12, 13 and 14.

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

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

VII. BOOKKEEPING AND SELF TEST

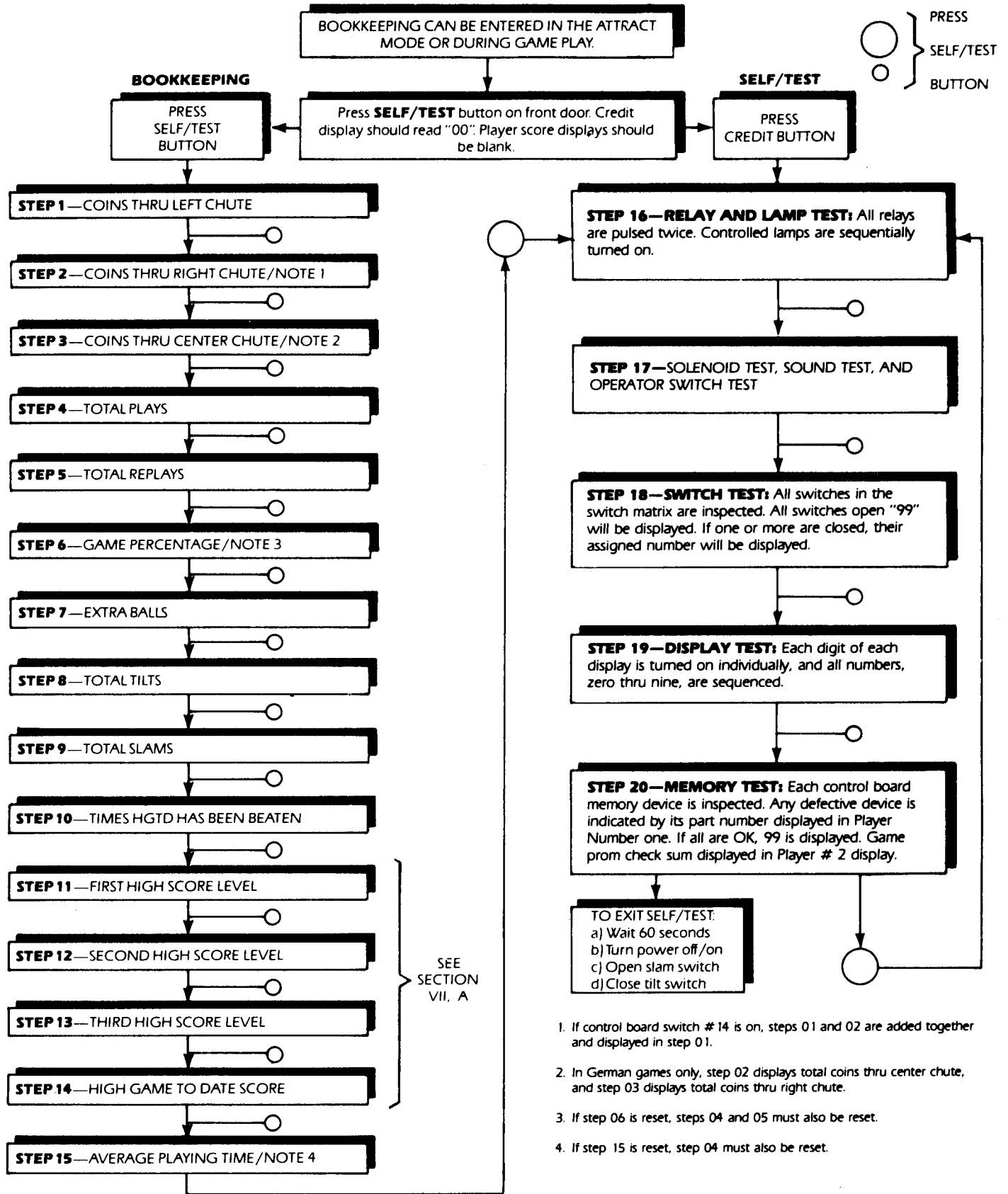
III. HOW TO RESET REPLAY SCORE LEVELS OR HIGH GAME TO DATE SCORE



NOTES:

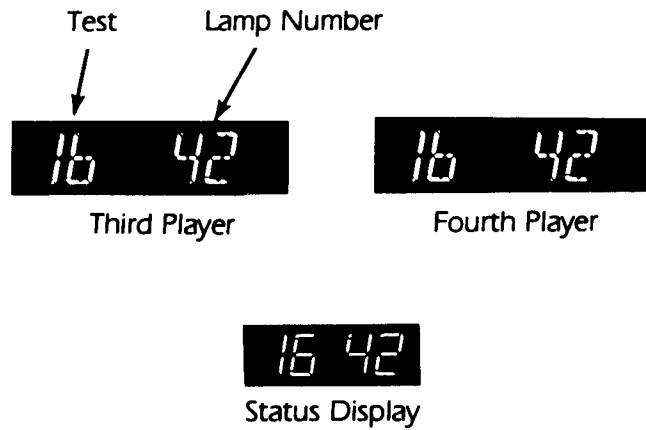
1. Step 11 must be a lower score than Step 12. Step 12 must have a lower score than Step 13. Otherwise, 1st replay will not be recognized.
2. If Step 12 or Step 13 is not desired, set those scores to zero.
3. If Step 11 is set to zero, no replays will be awarded, no matter what the settings are for Step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

B. FLOWCHART

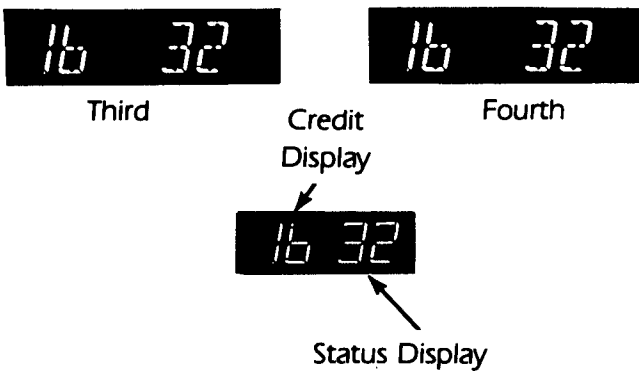


C. SELF/TEST

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



EXAMPLE:



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

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

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

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

STEP 16—RELAY AND LAMP TEST

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

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

A3 DRIVER BOARD TRANSISTOR ASSIGN. SEE SCHEMATIC

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

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

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

SOUND NUMBER ENABLE DISPLAYED

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

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

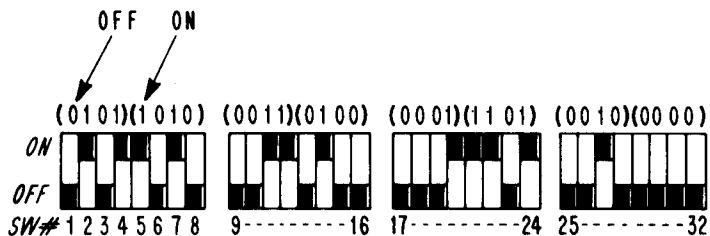
c. The first and second player's score displays show hexadecimal representative of the operator switch positions. Converting hexadecimal to binary will give the switch positions in binary form.

CONVERSION TABLE

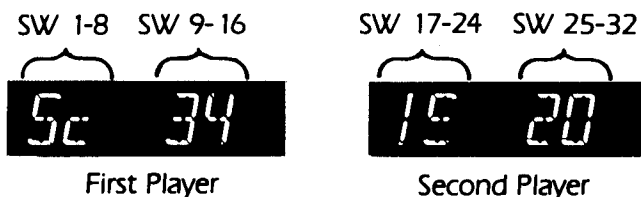
0 = OFF 1 = ON

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

EXAMPLE:



DISPLAYED



Checking Switches

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



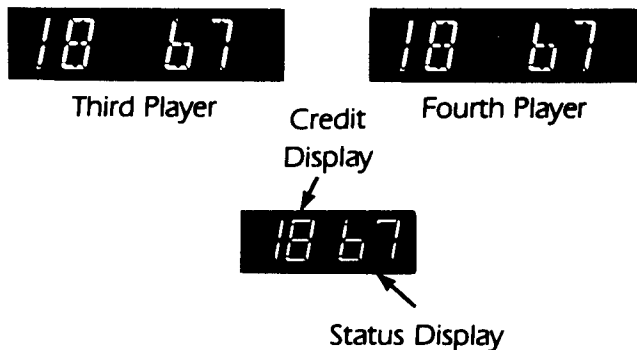
2) Switch all even numbered switches to the ON position and all odd switches to the OFF position. Display should show:



To repeat test # 17, push the credit button.

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

STEP 18—SWITCH TEST



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

VII. BOOKKEEPING AND SELF TEST, VIII. OPTIONS

VII. BOOKKEEPING AND SELF TEST

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

- Test number is not displayed.

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

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

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

**NUMBER
DISPLAYED**

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

**CHIP ASSIGNMENT/
DESCRIPTION**

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

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

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

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

VIII. OPTIONS

There are no options for this game.

IX. GENERAL INFORMATION

A. PRINTED CIRCUIT BOARDS ARE DESIGNATED AS FOLLOWS:

- A1 - Control Board
- A2 - Power Supply
- A3 - Driver Board
- A4 - Bonus Displays
- A5 - Status Display
- A6 - Sound/Speech Board
- A7 - Sound/Speech Power Supply
- A8 - Pop Bumper Driver Boards
- All - Auxiliary Lamp Driver Board
- A14 - 7-Digit Display
- A24 - Reset Board

B. WIRE COLORS ARE SHOWN AS NUMBERS:

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

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

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

C. FUSES

BOTTOM CABINET FUSES

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

PLAYFIELD FUSES

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

IX. GENERAL INFORMATION

D. COIL CHART

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

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

E. SOUND/SPEECH BOARD (A6) TEST

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

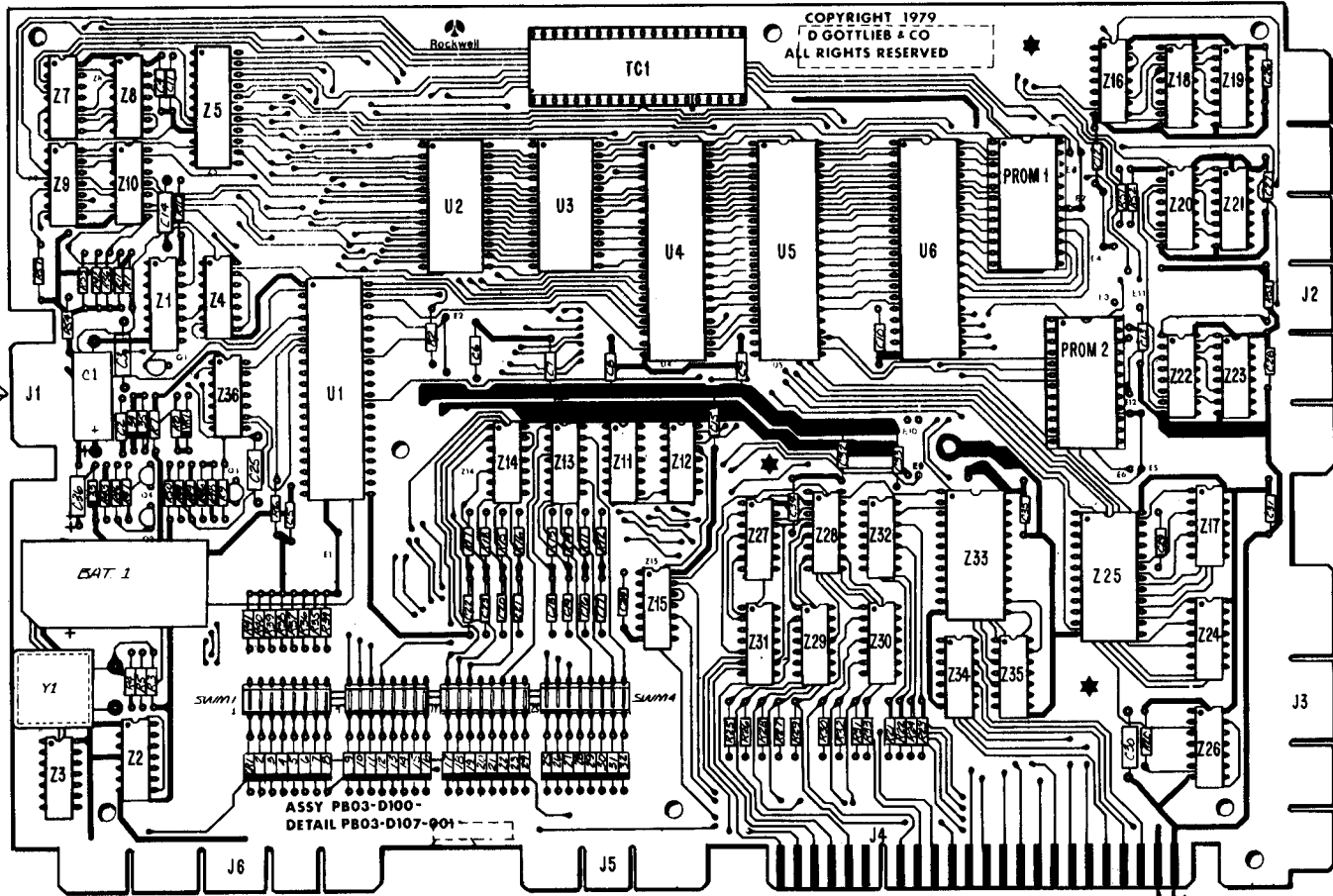
X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS

TABLE OF CONTENTS

| | PAGE |
|---|------|
| CONTROL BOARD (A1) | |
| COMPONENT LOCATION AND PARTS LIST..... | 18 |
| SCHEMATIC DIAGRAM..... | 19 |
| DRIVER BOARD (A3) | |
| COMPONENT LOCATION AND PARTS LIST..... | 22 |
| SCHEMATIC DIAGRAM..... | 23 |
| SOUND/SPEECH BOARD (A6) | |
| COMPONENT LOCATION AND PARTS LIST..... | 25 |
| SCHEMATIC DIAGRAM..... | 26 |
| POP BUMPER DRIVER BOARD (A8) | |
| COMPONENT LOCATION AND PARTS LIST..... | 28 |
| SCHEMATIC DIAGRAM..... | 28 |
| LIGHTBOX WIRING..... | 29 |
| 7-DIGIT DISPLAY (A14) | |
| COMPONENT LOCATION AND PARTS LIST..... | 31 |
| SCHEMATIC DIAGRAM..... | 31 |
| 4-DIGIT DISPLAY (A5) | |
| COMPONENT LOCATION AND PARTS LIST..... | 32 |
| SCHEMATIC DIAGRAM..... | 32 |
| RESET BOARD (A24) | |
| COMPONENT LOCATION AND PARTS LIST..... | 33 |
| SCHEMATIC DIAGRAM..... | 33 |
| AUXILIARY LAMP DRIVER BOARD (A11) | |
| COMPONENT LOCATION AND PARTS LIST..... | 34 |
| SCHEMATIC DIAGRAM..... | 34 |
| PLAYBOARD | |
| PLAYBOARD SWITCH MATRIX..... | 35 |
| PLAYBOARD ILLUMINATION AND SOLENOIDS..... | 36 |
| POWER SUPPLY (A2) | |
| COMPONENT LOCATION AND PARTS LIST..... | 38 |
| SCHEMATIC DIAGRAM..... | 39 |
| SOUND/SPEECH BOARD POWER SUPPLY (A7) | |
| COMPONENT LOCATION AND PARTS LIST..... | 40 |
| SCHEMATIC DIAGRAM..... | 40 |
| BOTTOM BOARD AND CABINET SCHEMATIC..... | 41 |

X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS

CONTROL BOARD (A1) COMPONENT LOCATION

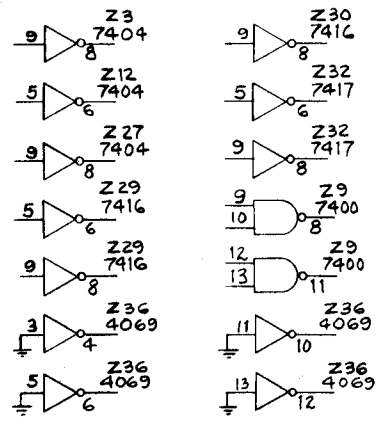


CONTROL BOARD (A1) PARTS LIST

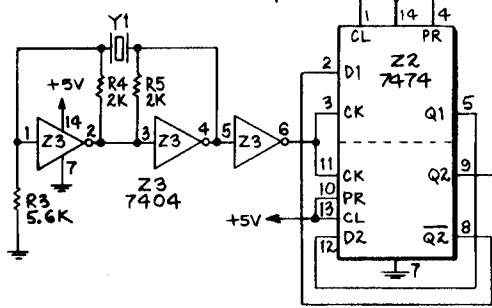
| REFERENCE | DESCRIPTION | PART NUMBER | REFERENCE | DESCRIPTION | PART NUMBER |
|-----------|------------------------------|-------------|------------|----------------------------|-----------------------|
| BAT.1 | Battery—3.6V | 326R10-002 | U3 | ROM | XO-327 |
| C1 | Capacitor, 100 mfd., 10V | | U4, U5, U6 | RIOT | R6532-18 |
| C2, | Capacitor, .01 mfd., 50V | | VR1 | Zener Diode—3.0V, 5% | 1N5225B or 1N5987B |
| C4-C13, | | | Y1 | Crystal, 3.579545 MHZ | 333R08-001 |
| C15-C24, | | | Z1 | IC-CMOS—Dual 1 Shot | SCL4528B |
| C26-C29, | | | Z2 | IC—Dual Flip Flop | SN7474N |
| C31-C35 | Capacitor, .1 mfd., 50V | | Z3, Z11, | IC—Hex Inverter | SN7404N |
| C3, C14, | | | Z12, Z16, | | |
| C25, C30 | | | Z17, Z24, | | |
| C36 | Capacitor, 10 mfd. | 10V.TNT | Z26, Z27, | | |
| CR1-CR35 | Diode, GP | 1N4148 | Z34, Z35 | | |
| O1, O4 | Transistor—PNP | MPS-A70 | Z4 | IC-CMOS—Quad 2 Input "AND" | SCL4081B |
| O2, O3 | Transistor, NPN (Motorola) | 2N440 | Z5 | IC-Static Ram | S5101-L |
| R1, R6, | Resistor, 3.0K ohm, 5%, 1/4W | | Z7 | IC—Hex Inverter | SN74LS04N |
| R11-R24, | | | Z8 | IC—2 Input "NOR" | SN7402N |
| R42, R45, | | | Z9, Z13, | IC—2 Input "NAND" | SN7400N |
| R46, R48, | | | Z14 | | |
| R51-R57 | | | Z10 | IC—Open Collector Inverter | SN74LS05N |
| R2, | Resistor, 4.7K ohm, 5%, 1/4W | | Z15 | IC—2 Input—"OR" | SN7432N |
| R34-R41 | | | Z18, Z20 | IC—"D" Flip Flop | SN74175N |
| R3, R43, | Resistor, 5.6K ohm, 5%, 1/4W | | Z22 | | |
| R49 | | | Z19, Z21, | IC—4 to 7 Decoder | SN7448N |
| R4, R5, | Resistor, 2.0K ohm, 5%, 1/4W | | Z23 | | |
| R44 | | | Z25, Z33 | IC—4 to 16 Decoder | SN74154N |
| R7 | Resistor, 62 ohm, 5%, 1/4W | | Z28 | IC—2-to-4 Decoder | SN74LS139N |
| R8, R50 | Resistor, 180 ohm, 5%, 1/4W | | Z29, Z30 | IC—Hex Inverter—OC/HV | SN7416N |
| R9 | Resistor, 1K ohm, 5%, 1/4W | | Z31 | IC—2 Input "AND" | SN7408N |
| R10 | Resistor, 2.8M ohm, 5%, 1/4W | | Z32 | IC—Hex Buffer—OC | SN7417N |
| R25-R33 | Resistor, 620 ohm, 5%, 1/4W | | Z36 | IC—CMOS | MM74C04 or |
| R47 | Resistor, 24K ohm, 5%, 1/4W | | | Socket—DIL, 24 PIN | SCL4069B |
| SW1-SW4 | Dip Switch Pak—8 Position | 341R31-005 | | Spacer, Cork | 640361-3 |
| TC1 | Socket, 40 Pin | 640379-3 | | | 131R06-001 |
| U1 | CPU | R6502-13 | | | |
| U2 | ROM | XO-326 | | | |

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

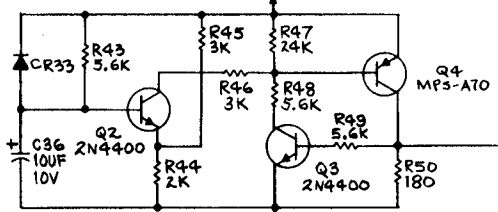
SPARE GATES



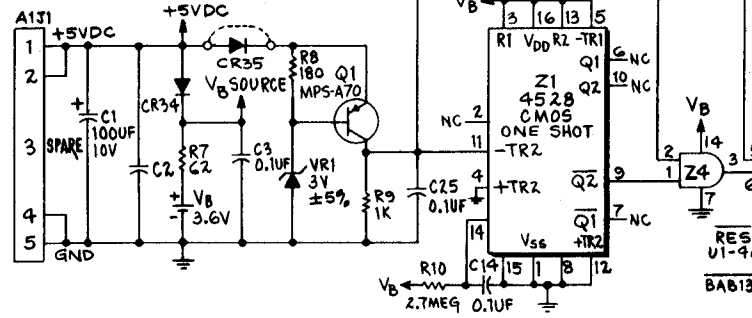
CLOCK LOGIC



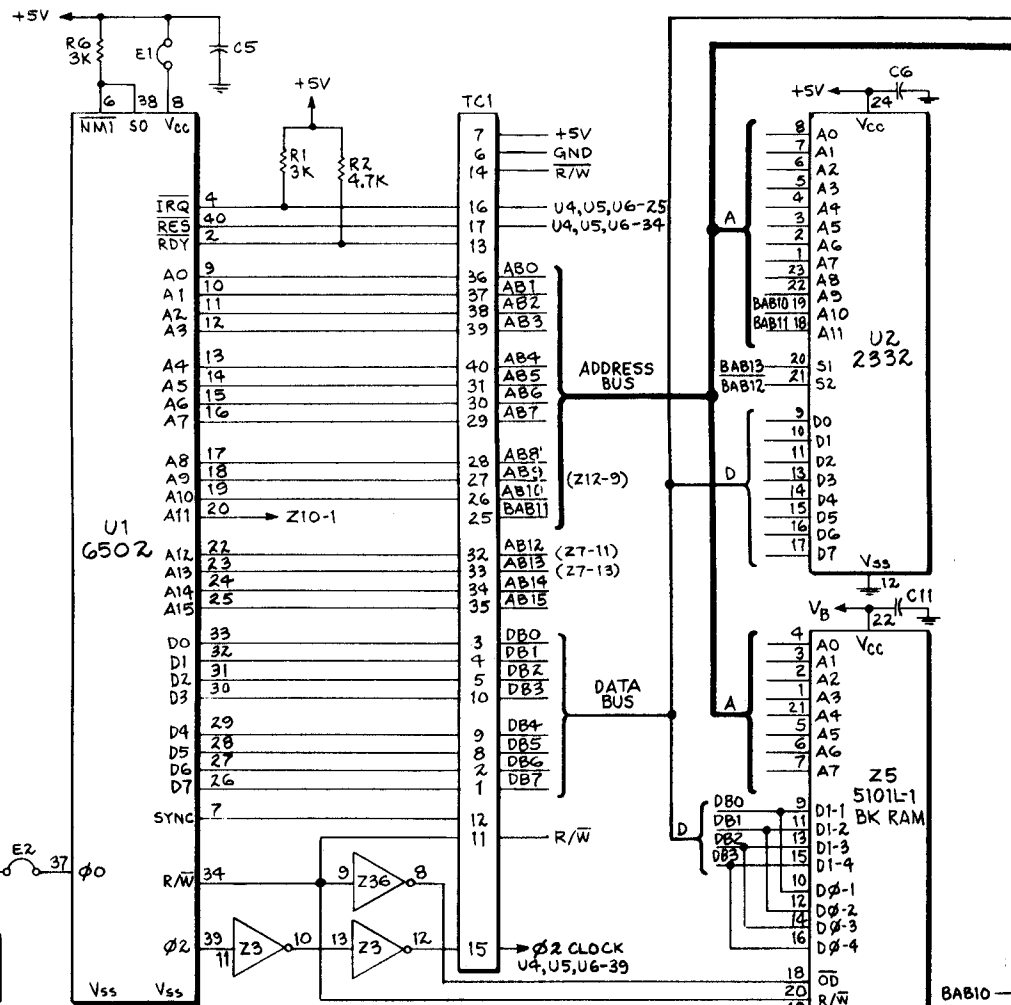
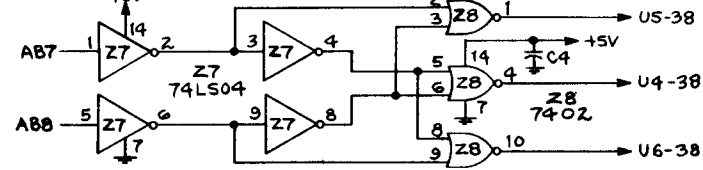
DELAY CIRCUIT



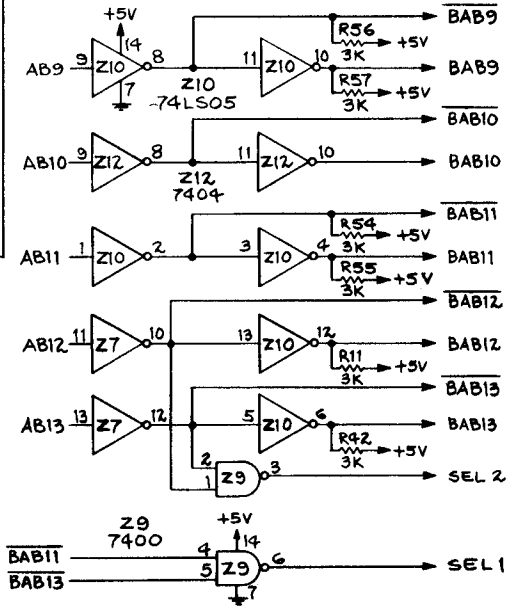
UP/DOWN MEMORY PROTECT LOGIC

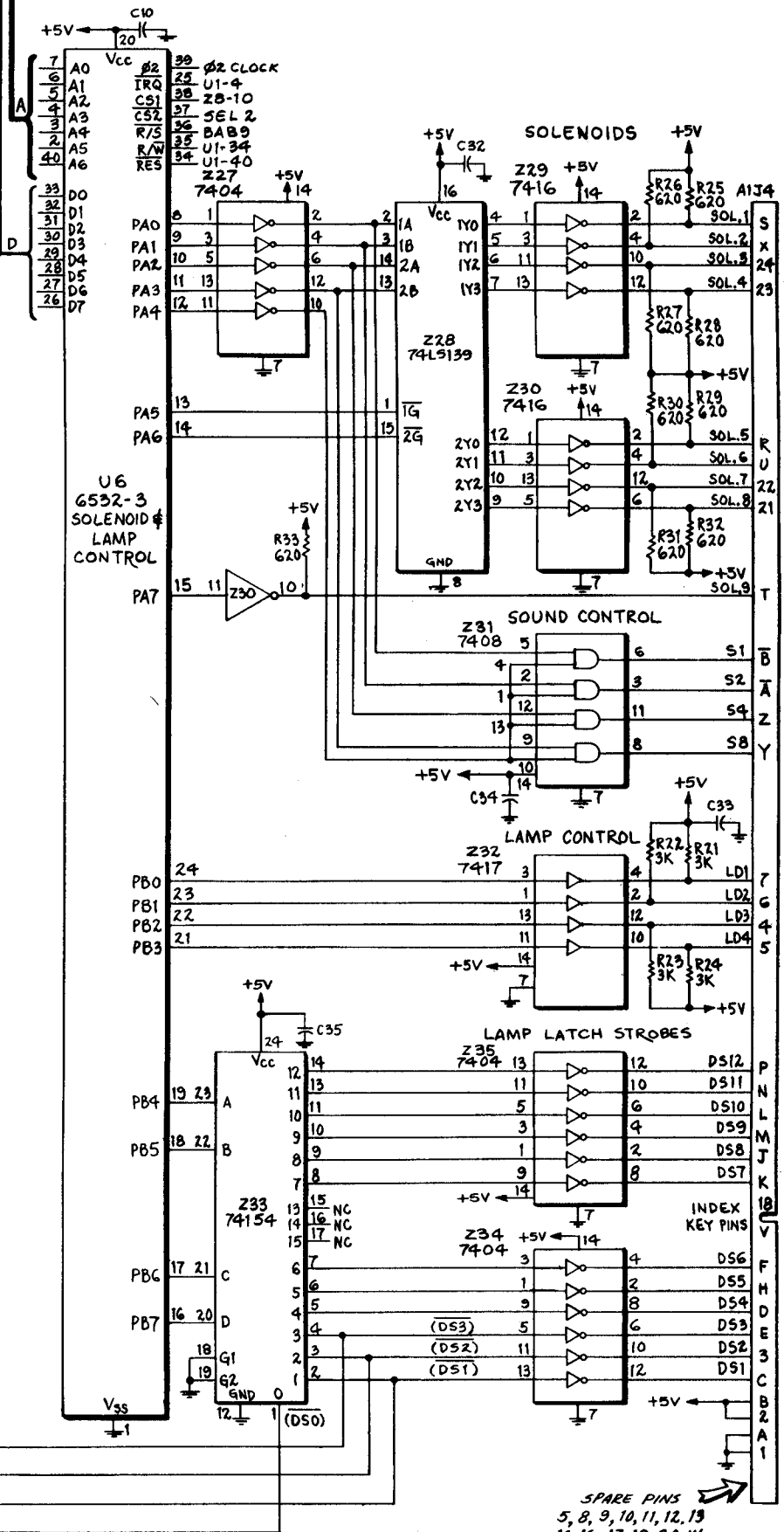
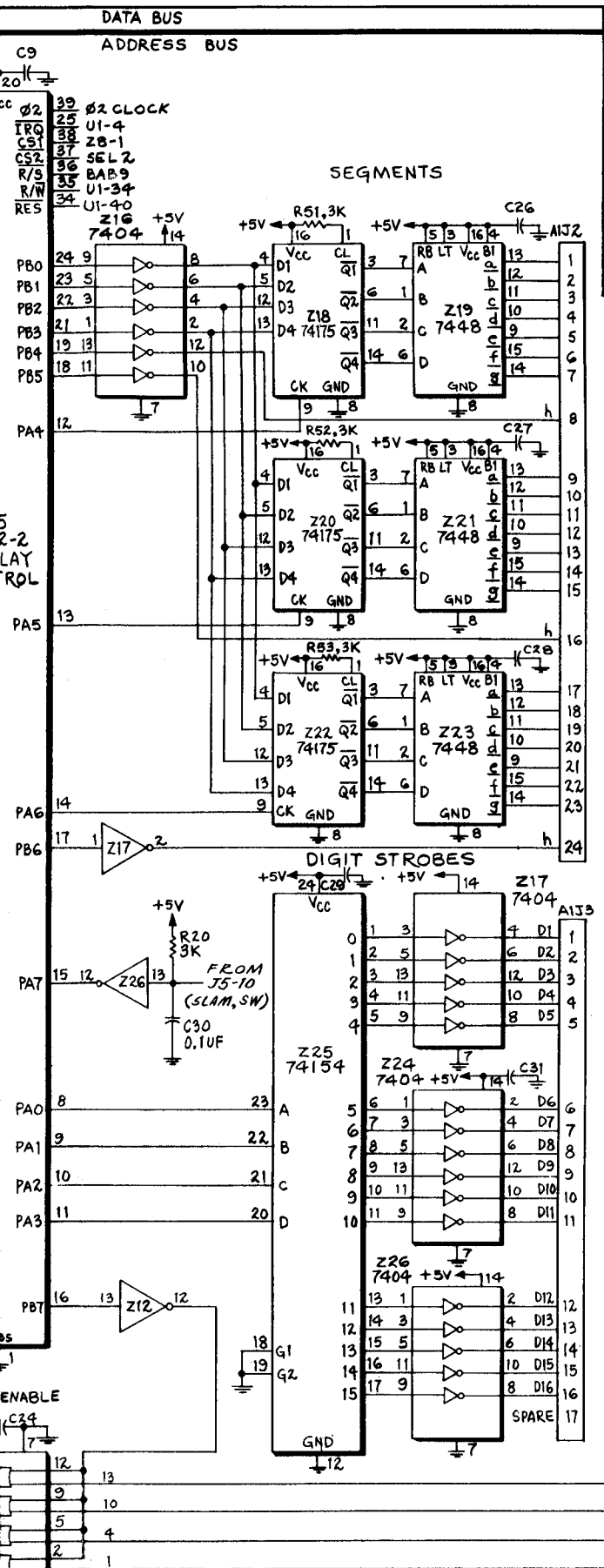


INPUT/OUTPUT DEVICE SELECTION



PROM SELECTION





D. GOTTLIEB & CO.

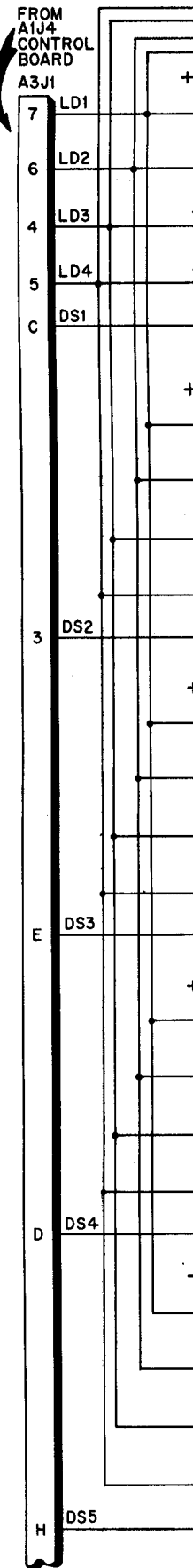
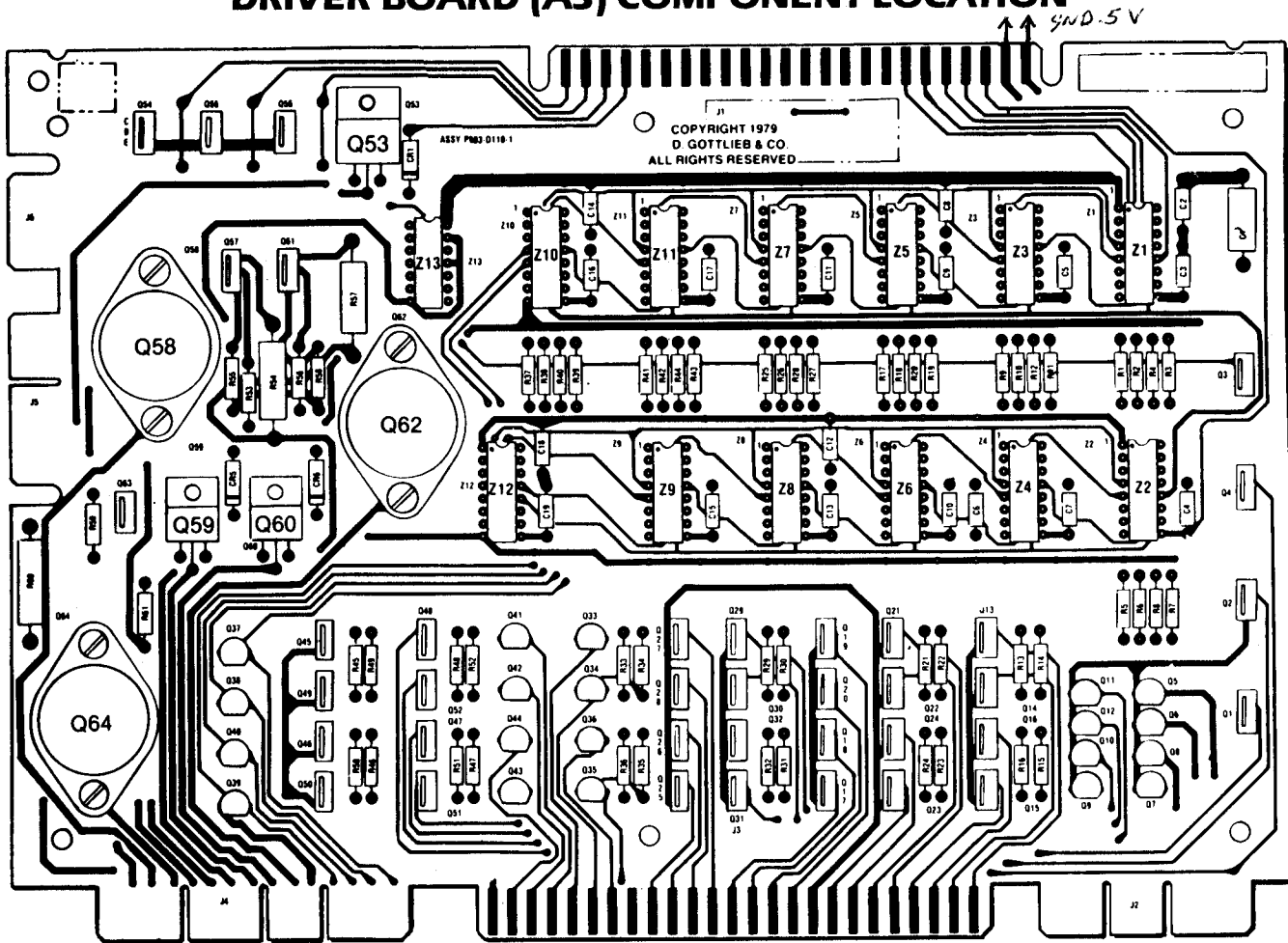
TITLE
CONTROL BOARD (A1)

USED ON

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

X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS

DRIVER BOARD (A3) COMPONENT LOCATION

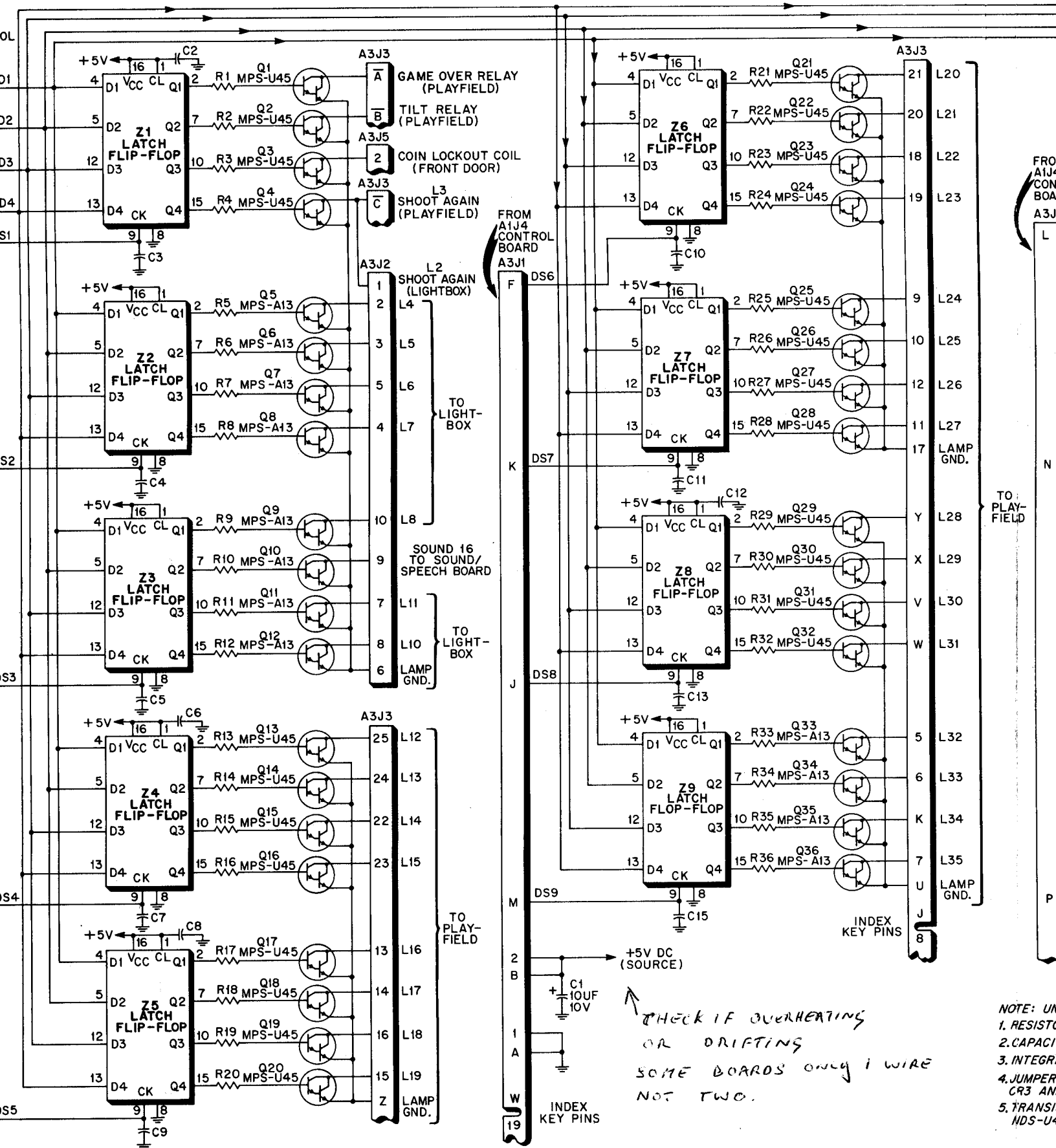


DRIVER BOARD (A3) PARTS LIST

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

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

X. WIRING AND SCHEMATIC D



FROM A1J4 CONTROL BOARD A3J1

LAMP GND.

TO LIGHT-BOX

TO SOUND/ SPEECH BOARD

TO LIGHT-BOX

LAMP GND.

TO PLAY-FIELD

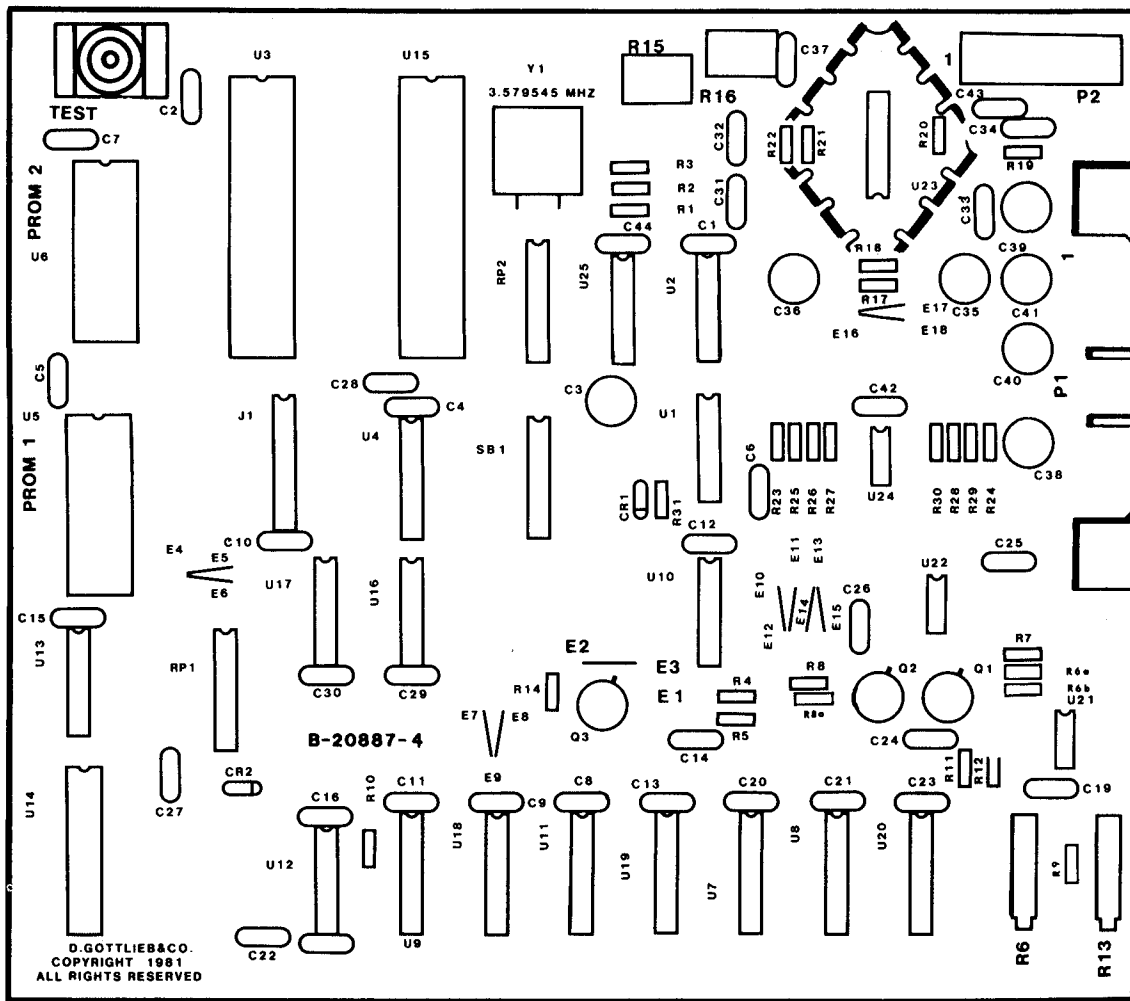
LAMP GND.

INDEX KEY PINS

NOTE: UN
1. RESISTO
2. CAPACI
3. INTEGR
4. JUMPER
CR3 AN
5. TRANSI
NDS-U

X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS

SOUND/SPEECH BOARD (A6) COMPONENT LOCATION

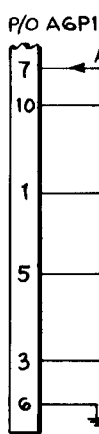


SOUND/SPEECH BOARD (A6) PARTS LIST

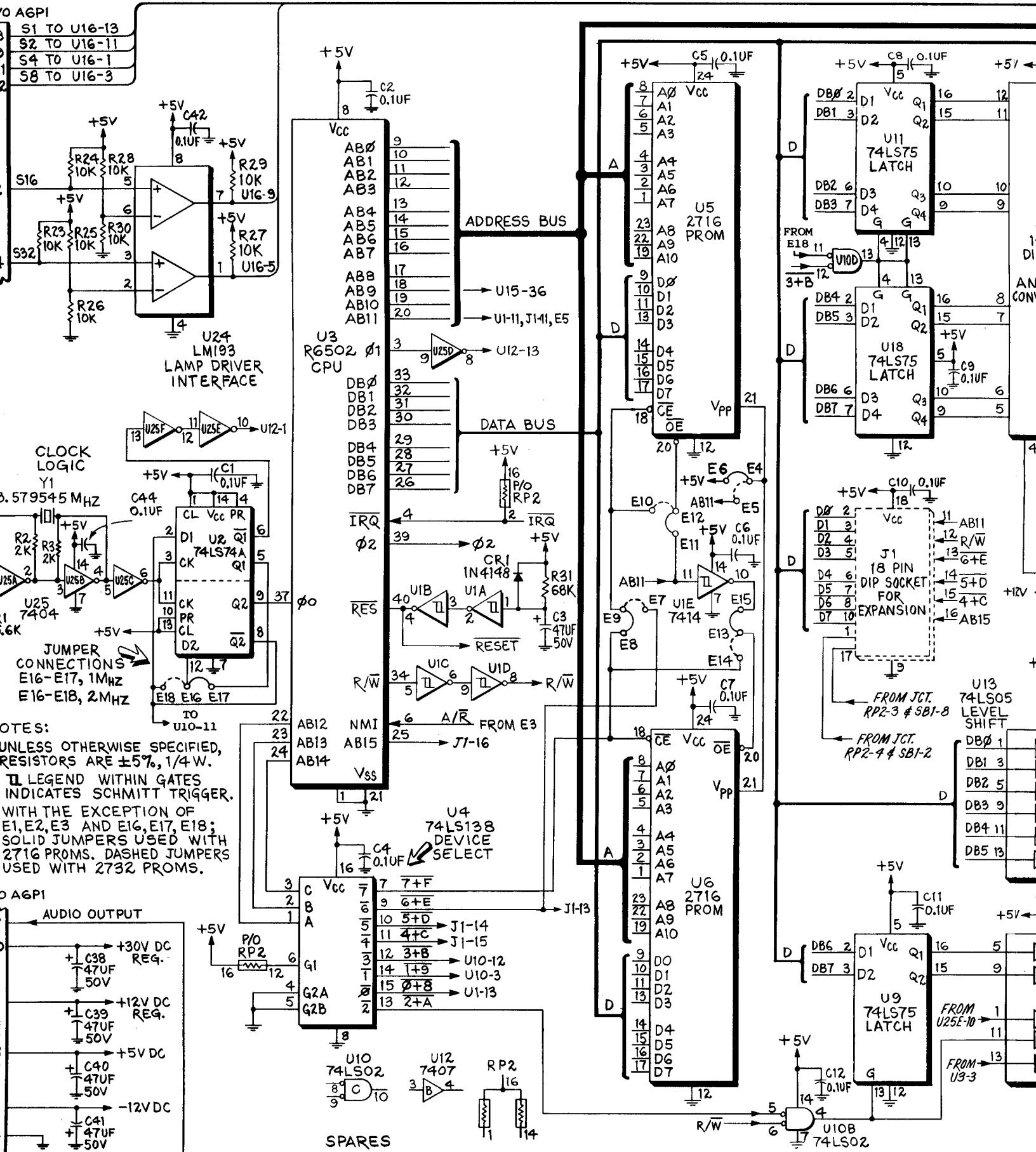
| REFERENCE | DESCRIPTION | PART NUMBER | REFERENCE | DESCRIPTION | PART NUMBER |
|---|--|--|---|--|--|
| C1, C2, C4-C13, C15, C16, C19, C20, C21, C23, C25, C26, C28-C30, C33, C42, C44, C31-C32, C37, C3, C38-C41, C14, C24, C22, C27, C36, CR1, CR2, Q1, Q3, R1, R4, R5, R11, R12, R2, R3, R6, R13, R6A, R7,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



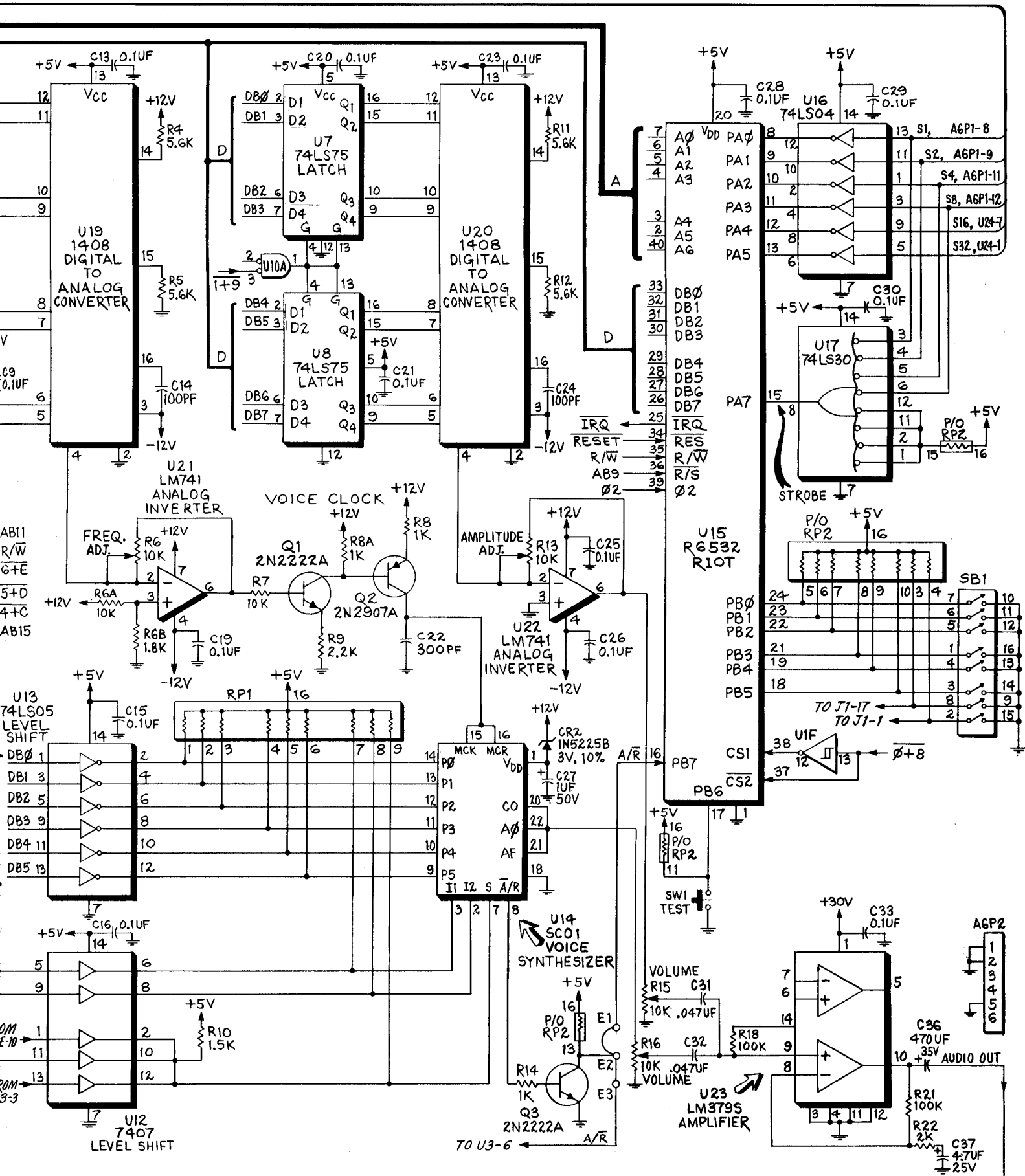
NOTES
1. UNLESS INDICATED OTHERWISE
2. ALL LEADS TO BE USED
3. WITH THE BOARD IN THE SOLID STATE BOARD USED



X. WIRING AND SCHEMATIC

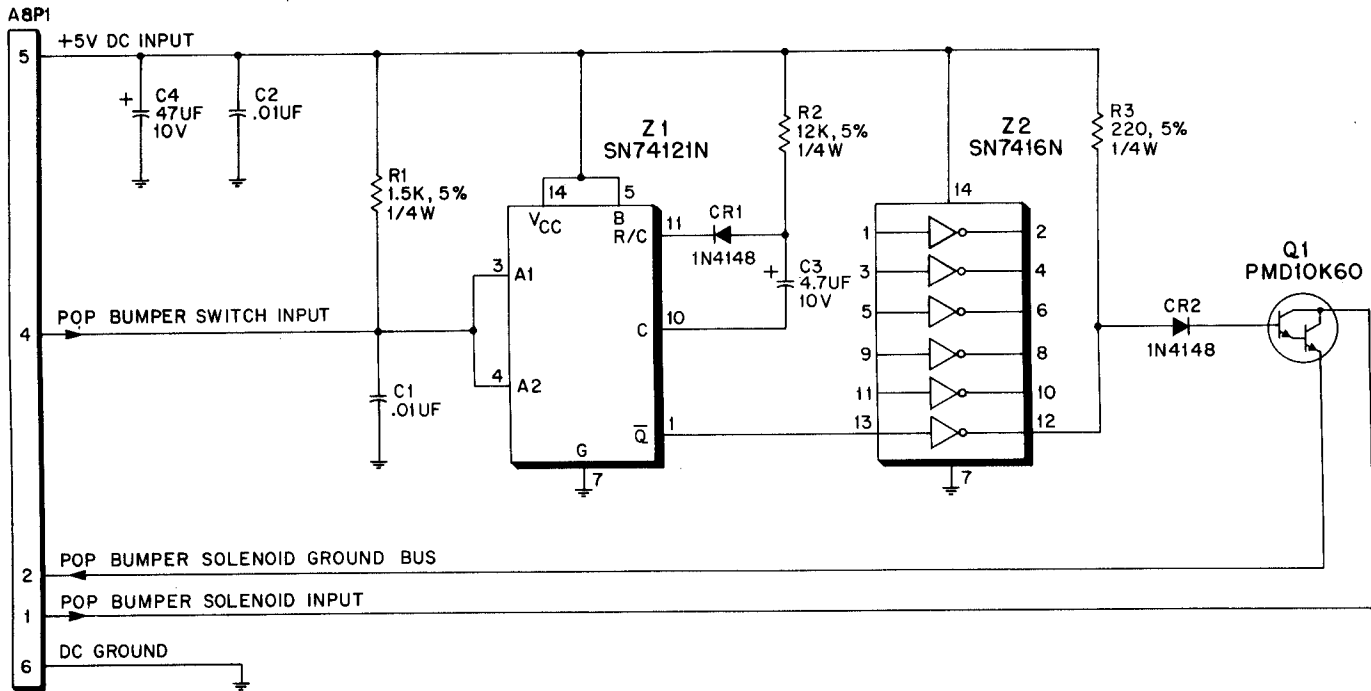


SCHEMATIC DIAGRAMS, PARTS LISTS



D. GOTTLIEB & CO.
 TITLE SOUND/SPEECH BOARD A6
 USED ON
 DRAWN APPROVED DATE
 2/28/81 AC 4-23-81 E-21337

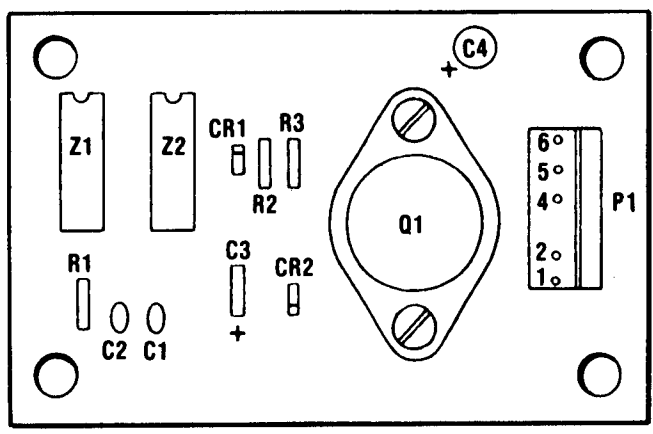
X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS



FROM
A1
CONTROL
BOARD

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

POP BUMPER DRIVER BOARD (A8) COMPONENT LOCATION

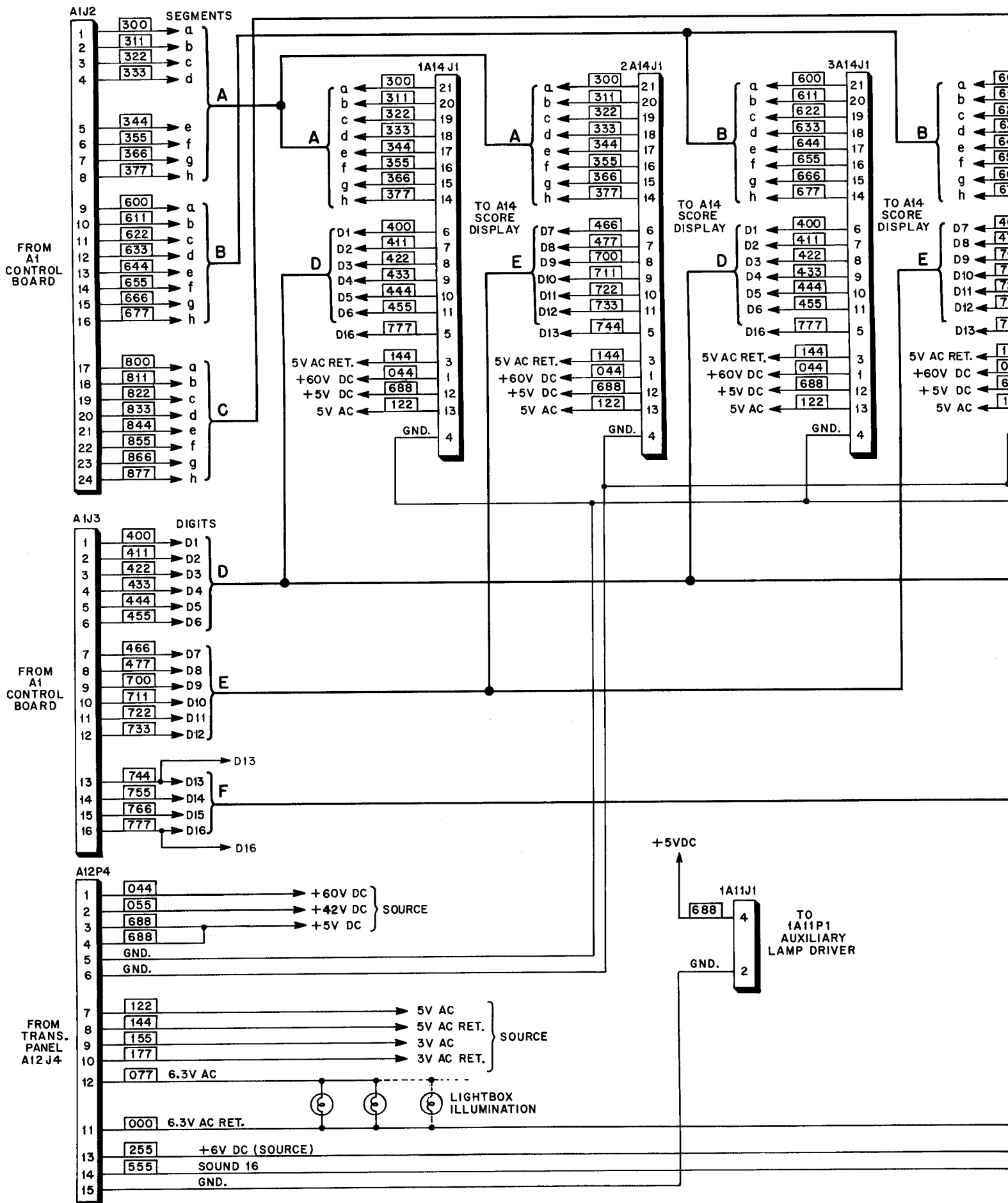


FROM
A1
CONTROL
BOARD

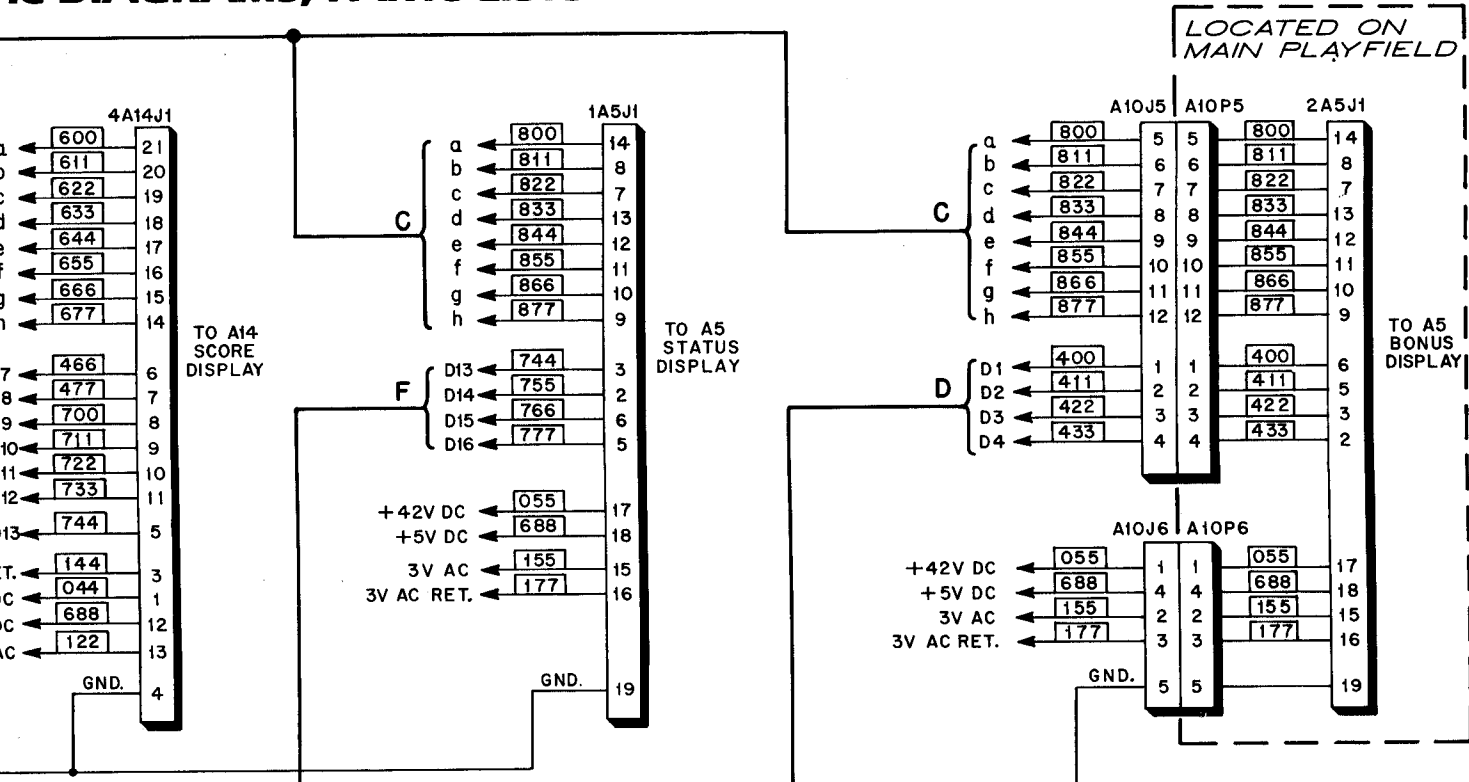
POP BUMPER DRIVER BOARD (A8) PARTS LIST

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

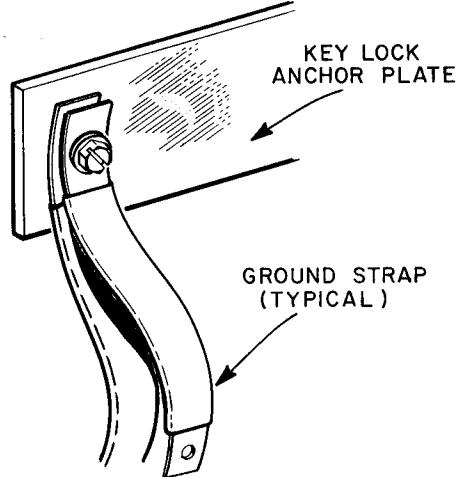
FROM
TRANS
PANEL
A12 J4



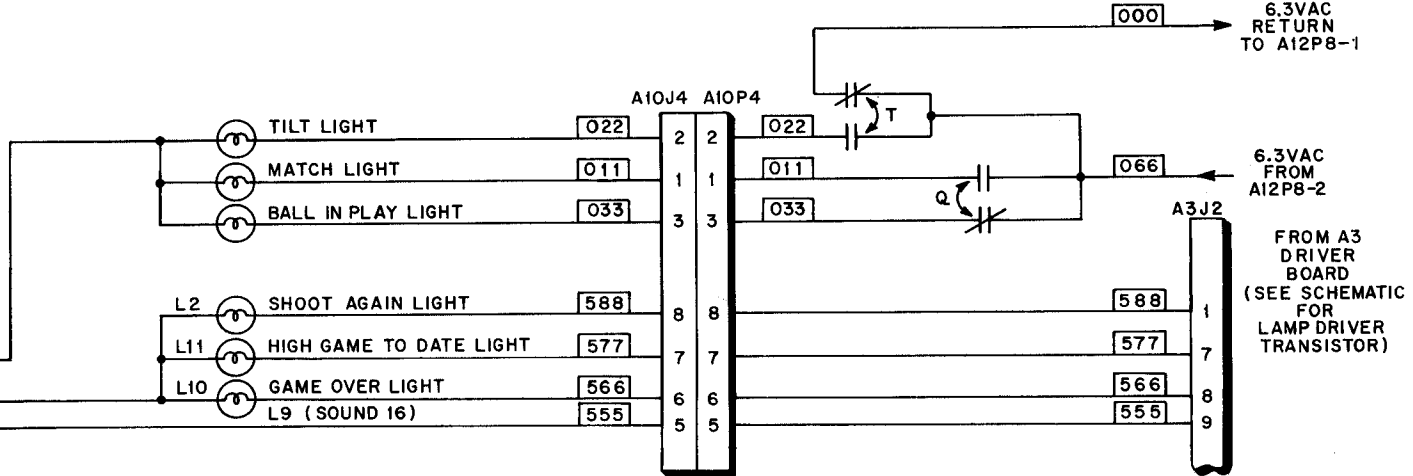
WIRING DIAGRAMS, PARTS LISTS



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

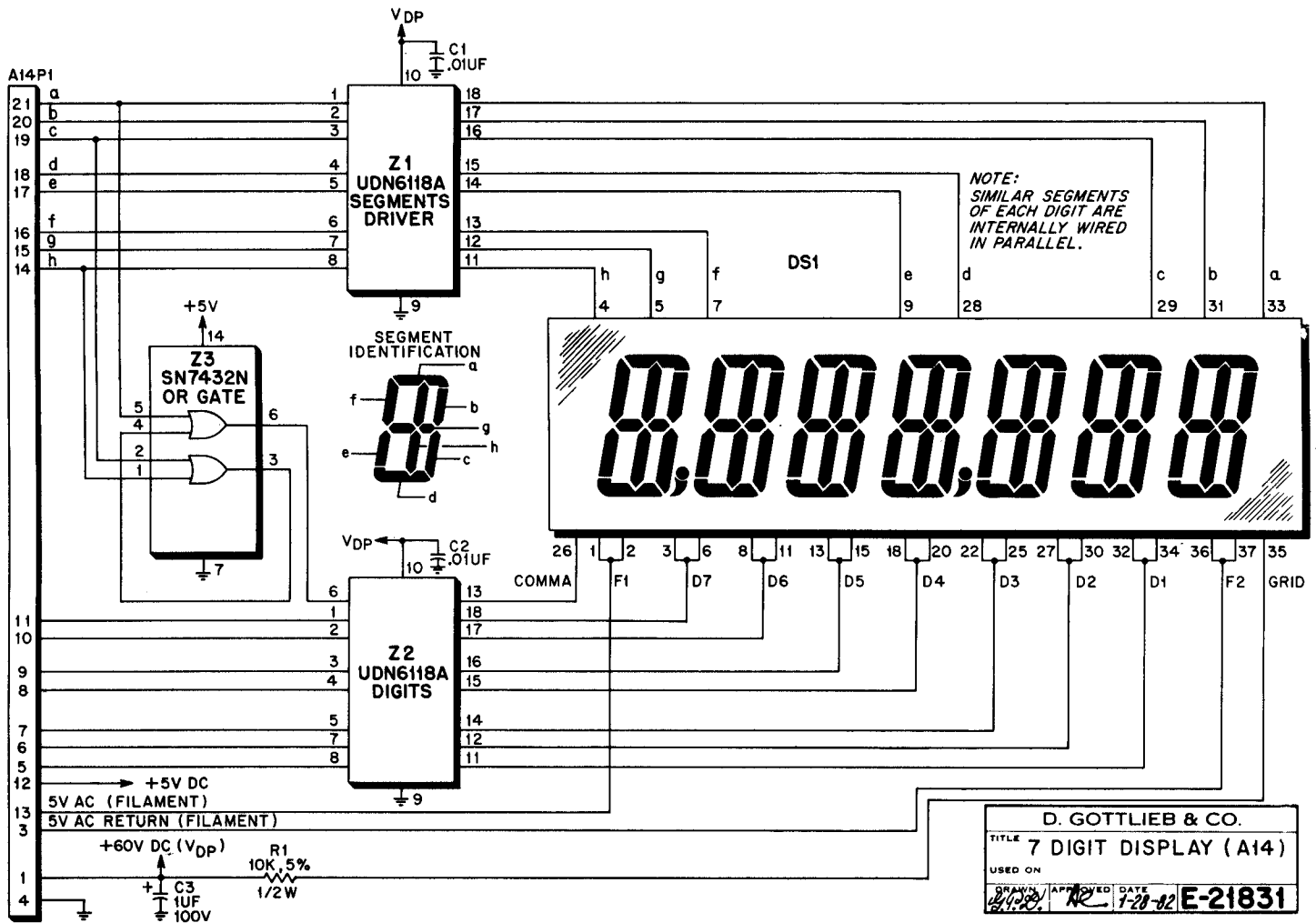


NOTE:
 1. XXX INDICATES WIRE COLOR.
 2. GROUND WIRE IS # 9, 18GA.

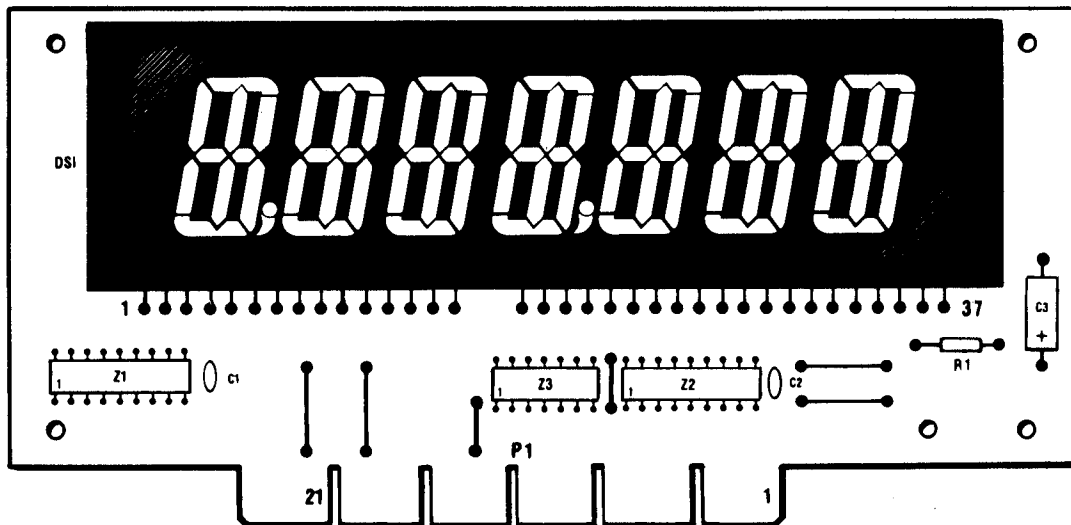


D. GOTTLIEB & CO.
 TITLE LIGHTBOX SCHEMATIC DIAGRAM
 USED ON GAME #672
 DRAWN APPROVED DATE
 5-21-82 E-22190

X. WIRING AND SCHEMATIC

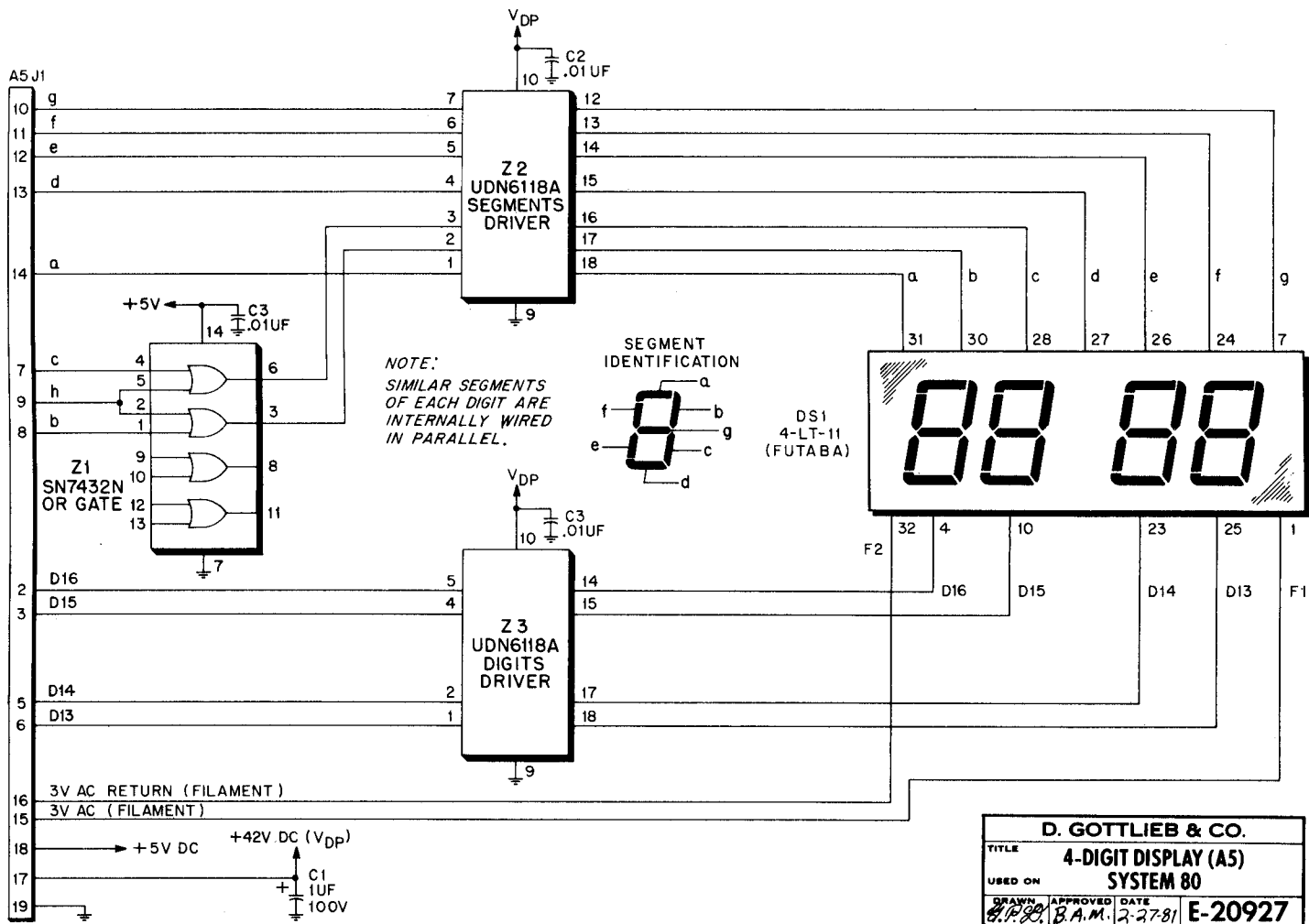


7-DIGIT DISPLAY (A14) COMPONENT LOCATION

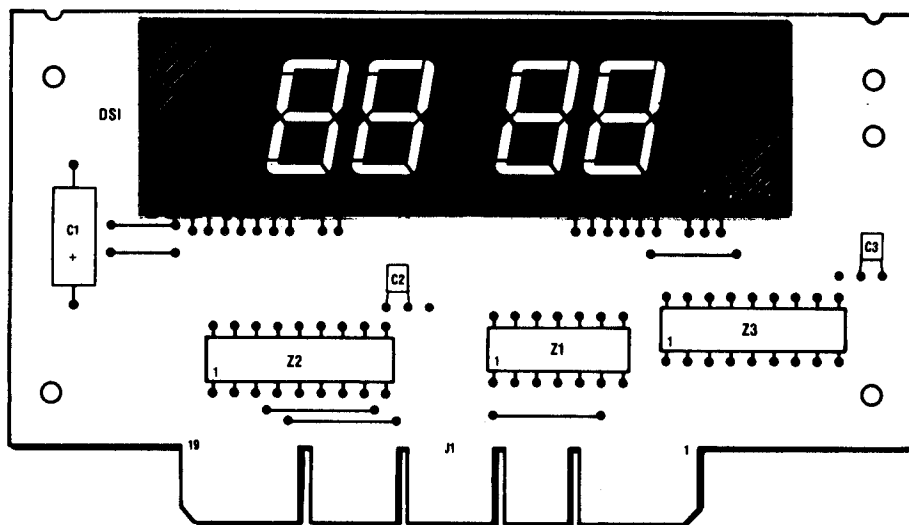


7-DIGIT DISPLAY (A14) PARTS LIST

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

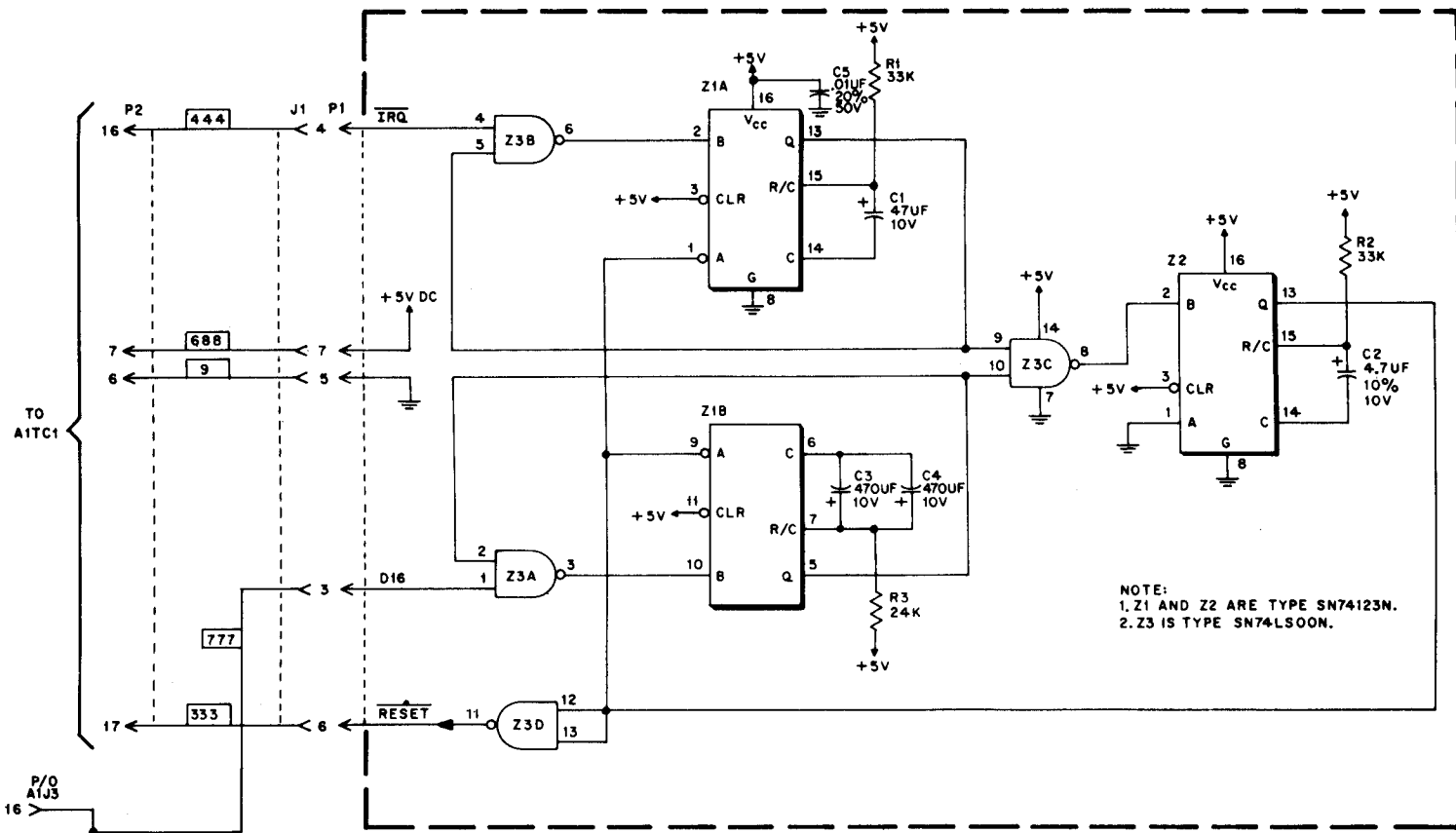


4-DIGIT DISPLAY (A5) COMPONENT LOCATION



4-DIGIT DISPLAY (A5) PARTS LIST

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



NOTE:
 1. Z1 AND Z2 ARE TYPE SN74123N.
 2. Z3 IS TYPE SN74LS00N.

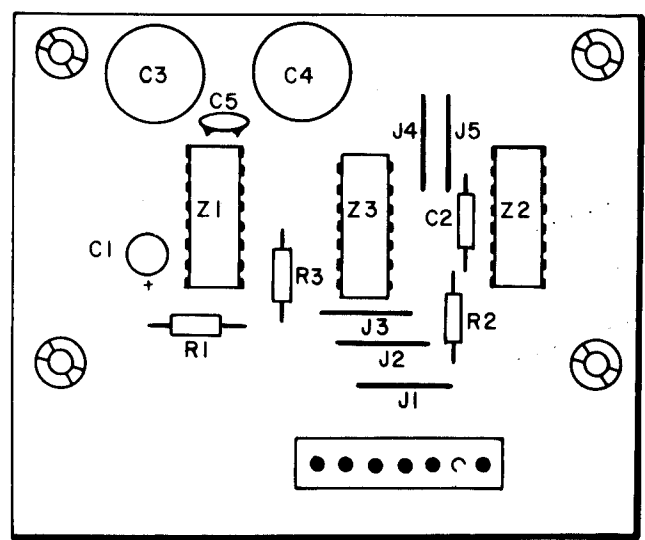
TO
 A1TC1

P/O
 A1J5

P/O
 A1QP2
 (STATUS DISPLAY)

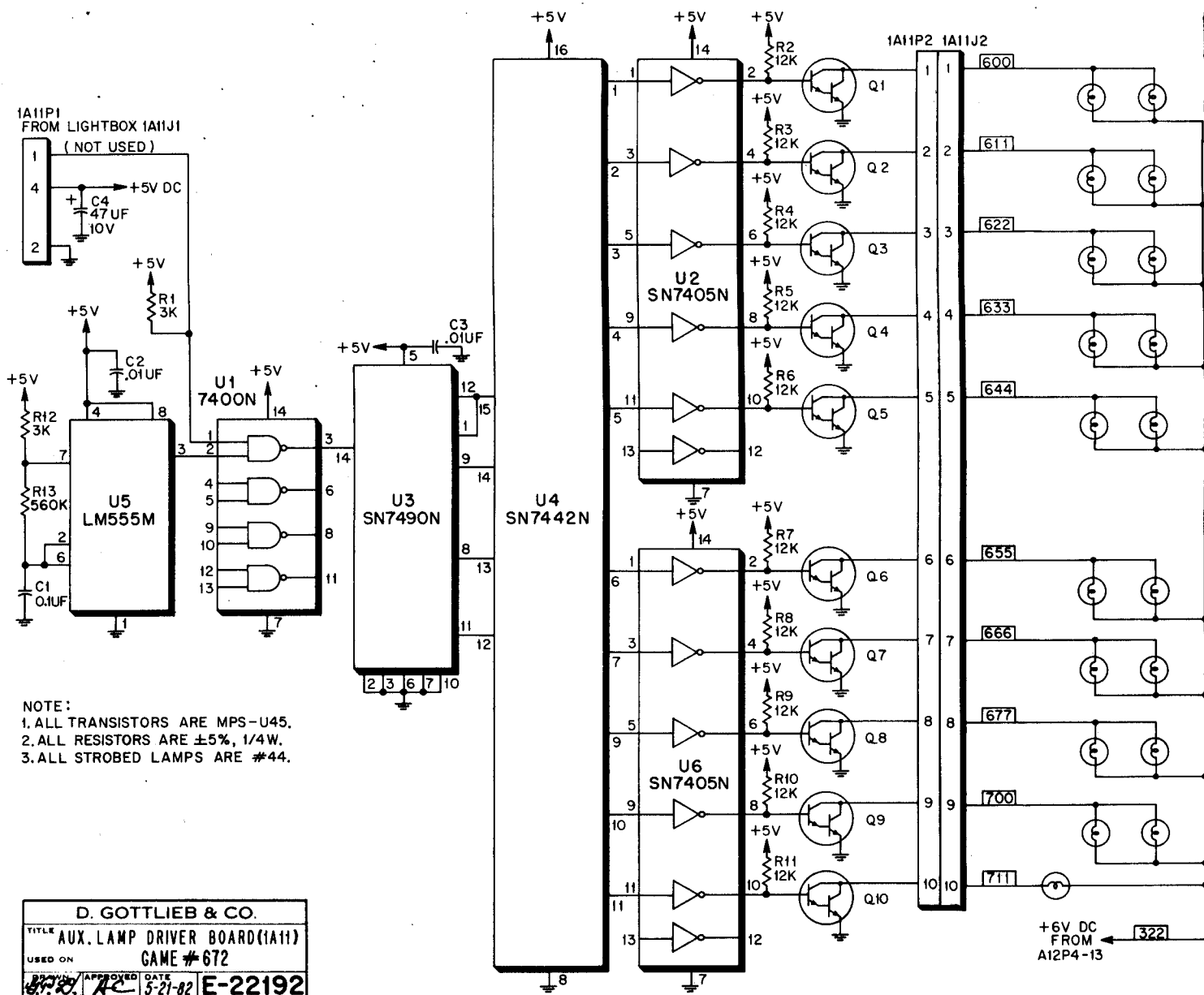
**RESET BOARD (A24)
 COMPONENT LOCATION**

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

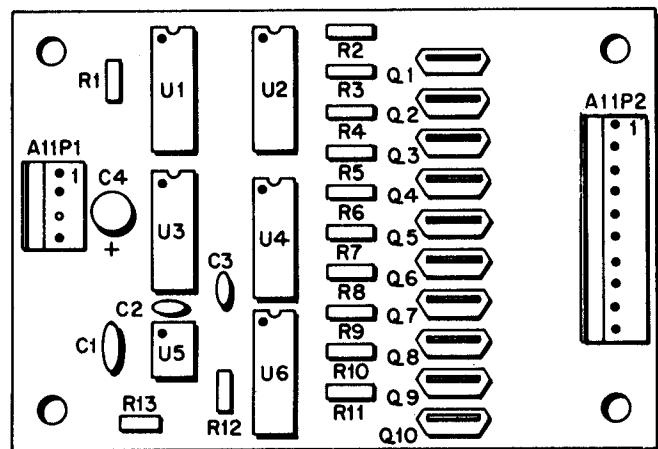


RESET BOARD (A24) PARTS LIST

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



AUXILIARY LAMP DRIVER BOARD (A11) COMPONENT LOCATION



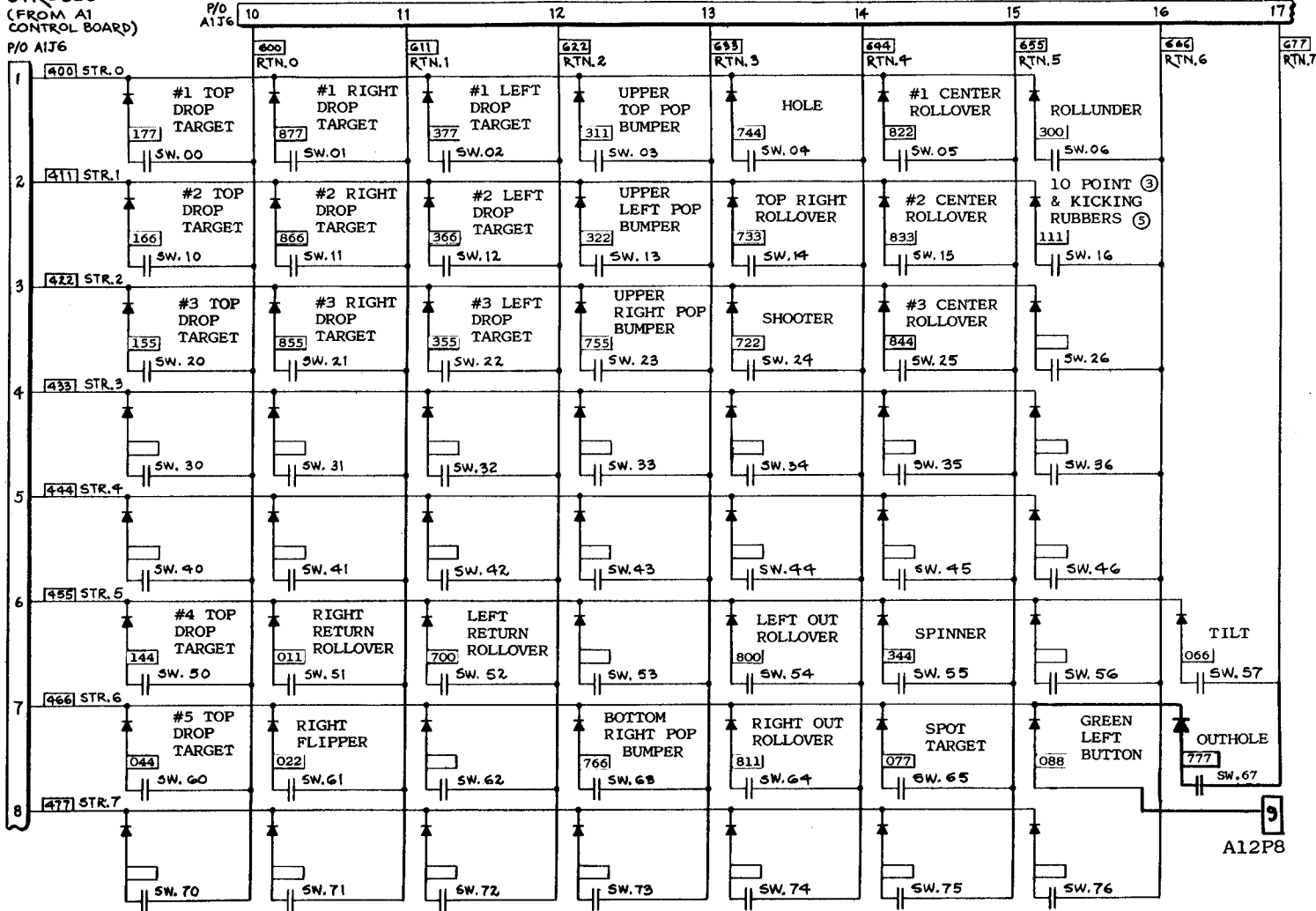
AUXILIARY LAMP DRIVER BOARD (A11) PARTS LIST

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

X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS

STROBES
(FROM A1
CONTROL BOARD)
P/O A1J6

RETURNS (TO A1 CONTROL BOARD)



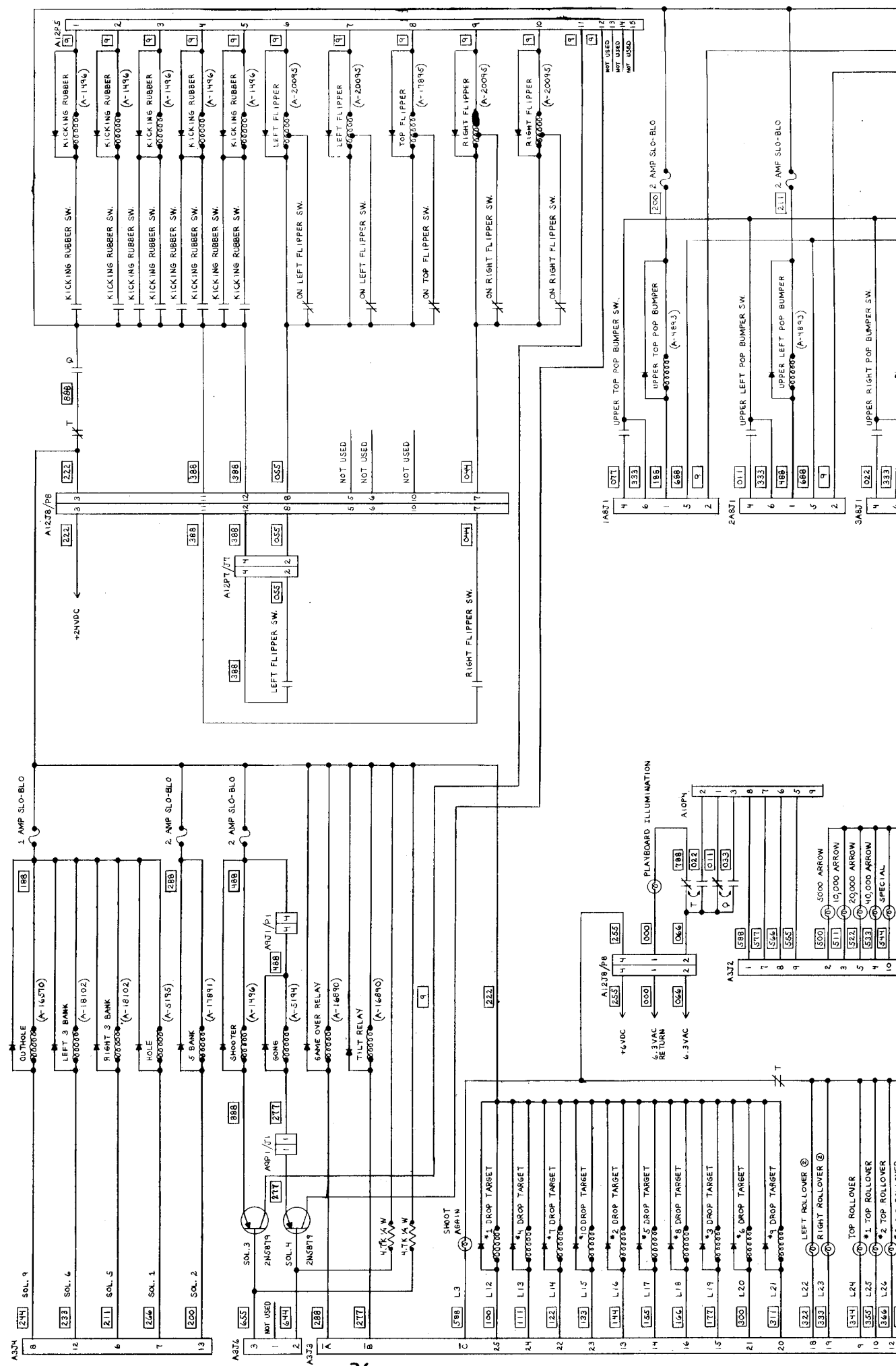
| COLOR CODE | |
|------------|----------|
| 0 BLACK | 5 GREEN |
| 1 BROWN | 6 BLUE |
| 2 RED | 7 PURPLE |
| 3 ORANGE | 8 SLATE |
| 4 YELLOW | 9 WHITE |

NOTE:
1. ALL DIODES ARE IN270.

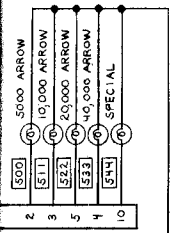
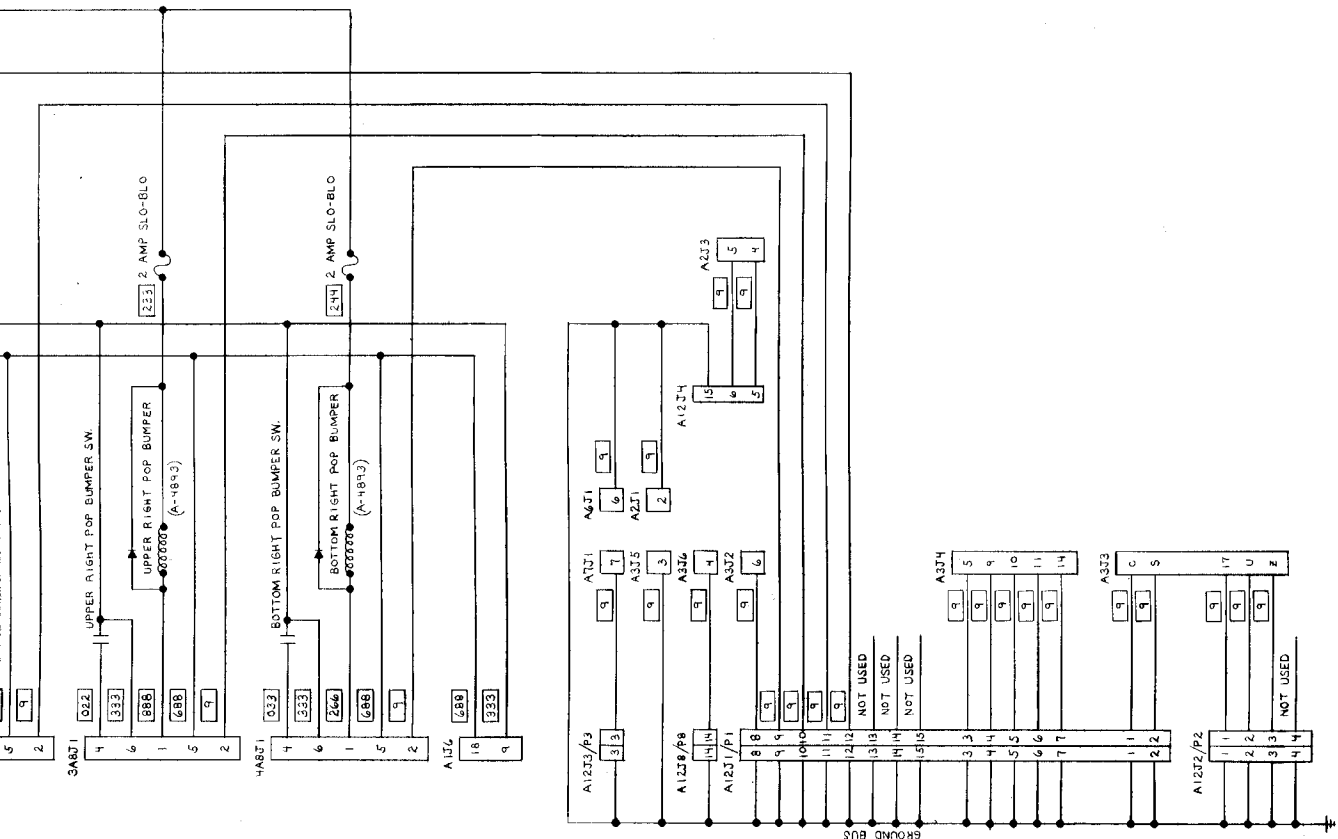
| | |
|-------------------|----------------|
| D. GOTTLIEB & CO. | |
| TITLE | SWITCH MATRIX |
| USED ON | GAME # 672 |
| DRAWN 2/22/82 | APPROVED AC |
| DATE | 3-21-82 |
| | E-22191 |

677
RTN.7

91



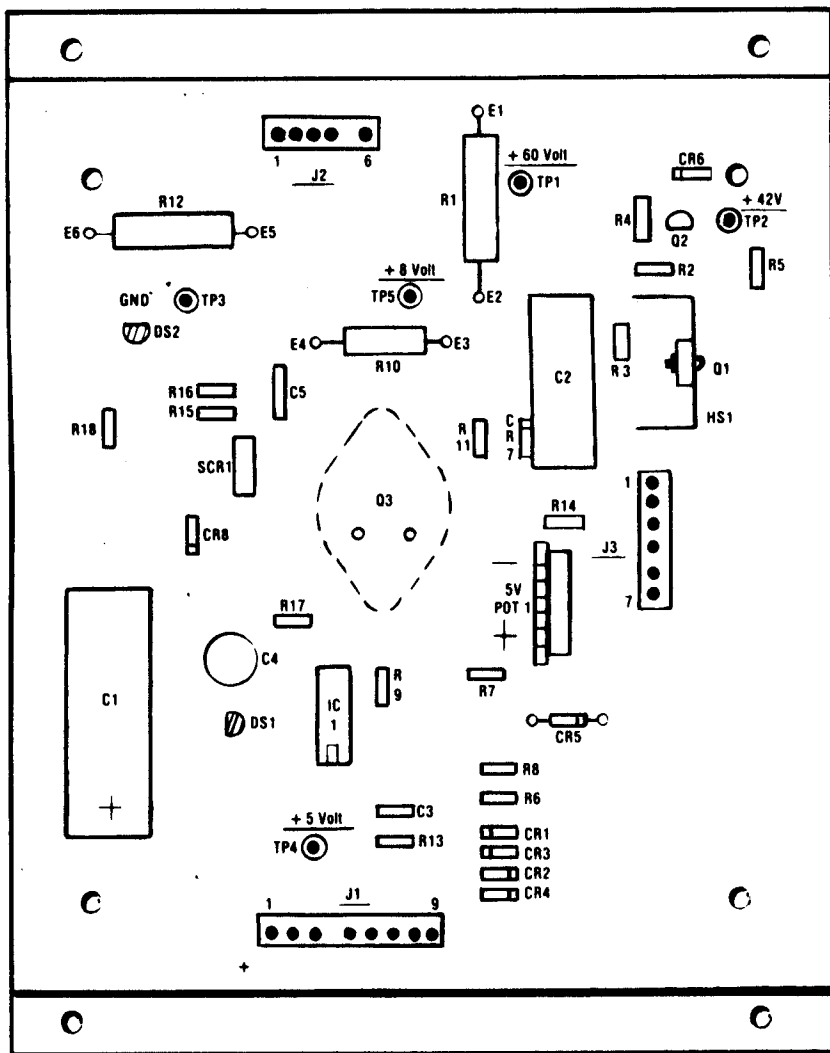
PARTS LIST



| | | | |
|------|-------------------------|------|-----|
| 18 | RIGHT ROLLER | 5333 | L43 |
| 17 | TOP ROLLER | 3414 | L24 |
| 16 | #1 TOP ROLLER | 3535 | L25 |
| 15 | #2 TOP ROLLER | 3666 | L26 |
| 14 | #3 TOP ROLLER | 3777 | L27 |
| 13 | UPPER TOP POP BUMPER | 5020 | L28 |
| 12 | UPPER LEFT POP BUMPER | 5111 | L29 |
| 11 | UPPER RIGHT POP BUMPER | 5222 | L30 |
| 10 | BOTTOM RIGHT POP BUMPER | 5333 | L31 |
| 9 | 1000 | 5444 | L32 |
| 8 | 2000 | 5555 | L33 |
| 7 | 3000 | 5666 | L34 |
| 6 | 4000 | 5777 | L35 |
| 5 | 3000 | 7444 | L40 |
| 4 | 0,000 | 7555 | L41 |
| 3 | EXTRA BALL | 7666 | L42 |
| 2 | ZK | 7777 | L43 |
| 1 | 5X | 8000 | L44 |
| D | 10X | 8111 | L45 |
| F | SPOT TARGET | 8222 | L46 |
| P | RIGHT OUT ROLLER | 8333 | L47 |
| M | NOT USED | | L48 |
| | NOT USED | | L49 |
| | NOT USED | | L50 |
| | LEFT OUT ROLLER | 8777 | L51 |
| A374 | 5000 | 000 | L36 |
| 1 | 6000 | 111 | L37 |
| 2 | 7000 | 222 | L38 |
| 3 | 8000 | 333 | L39 |

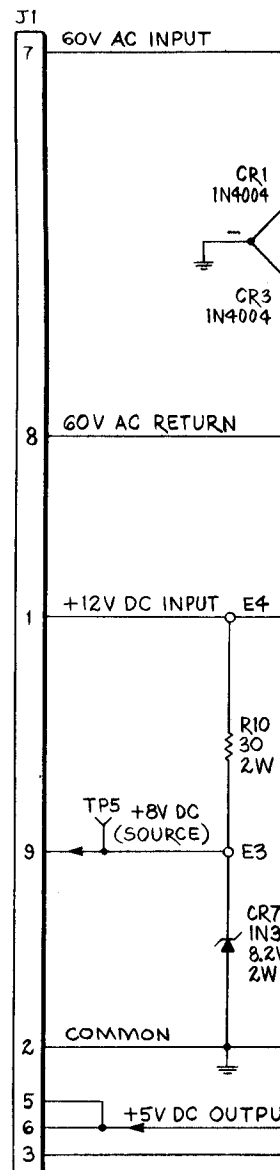
| | | | |
|------------------------------|----------|---------|---------|
| D. GOTTLIEB & CO. | | | |
| PLAYFIELD | | | |
| SOLENOIDS AND ILLUMINATION | | | |
| GAME # 672 | | | |
| DRAWN | APPROVED | DATE | |
| R | AC | 5-21-82 | E-22193 |

POWER SUPPLY (A2) COMPONENT LOCATION



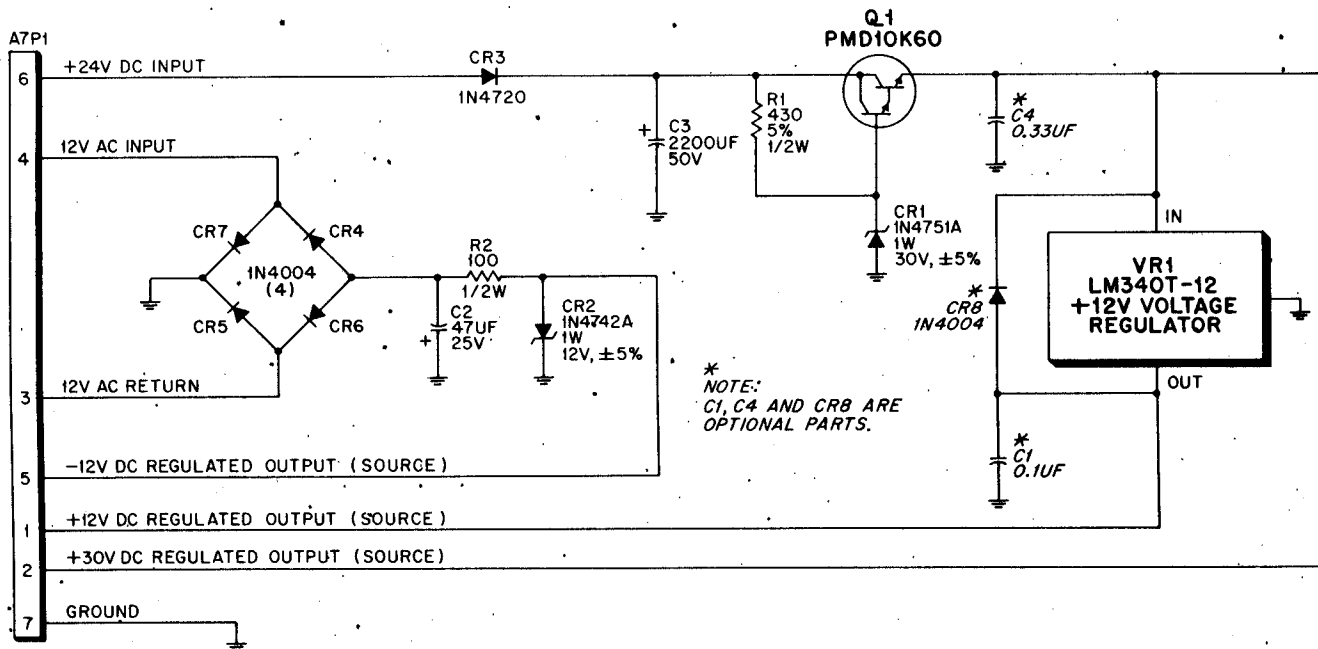
POWER SUPPLY (A2) PARTS LIST

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



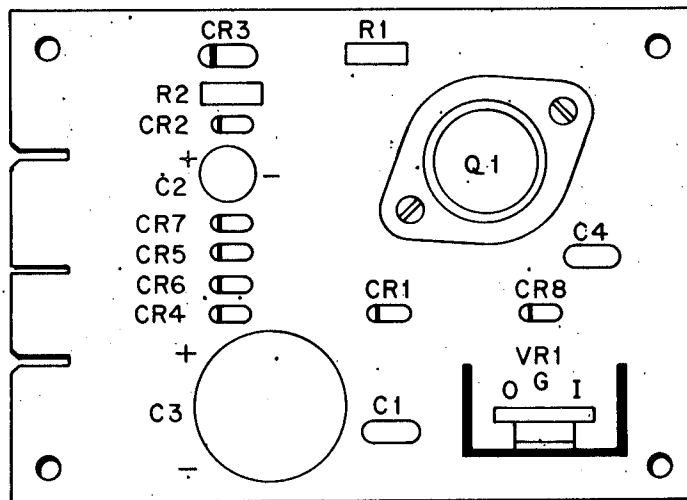
NOTE: UNLESS OTHERWISE SPECIFIED:
 1. RESISTORS ARE 1/4W
 2. VOLTAGES ARE DC
 3. ALL VOLTAGES ARE TO COMMON

X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS



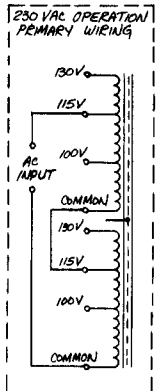
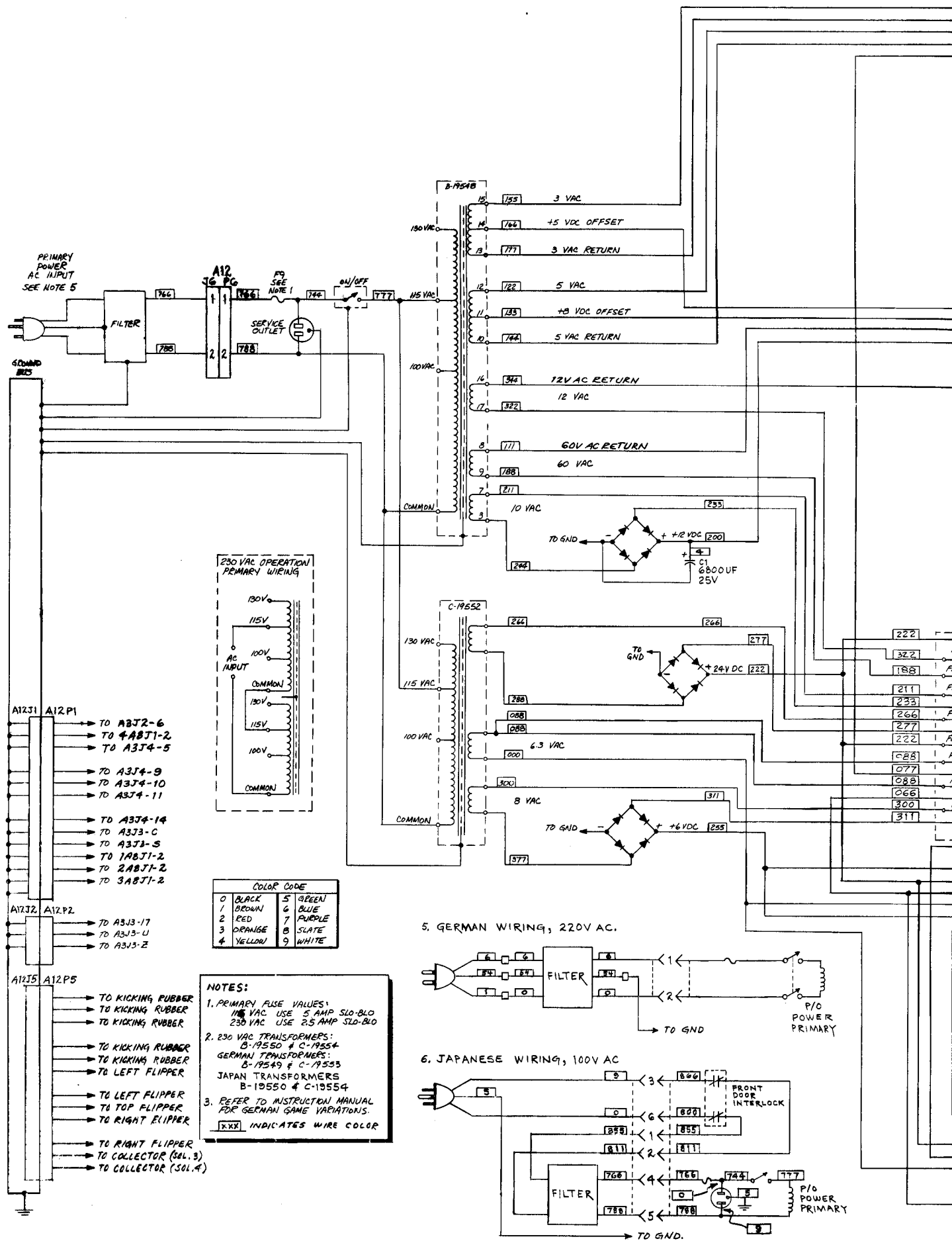
| | |
|-------------------|---------------------------------------|
| D. GOTTLIEB & CO. | |
| TITLE | SOUND/SPEECH BOARD POWER SUPPLY A7 |
| USED ON | |
| DRAWN | APPROVED DATE |
| 8-1-81 | 8-5-81 |
| D-21343 | |

SOUND/SPEECH POWER SUPPLY (A7) COMPONENT LOCATION



SOUND/SPEECH POWER SUPPLY (A7) PARTS LIST

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



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

- NOTES:**
- PRIMARY FUSE VALUES:
115 VAC USE 5 AMP SLO-BLO
230 VAC USE 2.5 AMP SLO-BLO
 - 230 VAC TRANSFORMERS:
B-19550 & C-19554
GERMAN TRANSFORMERS:
B-19549 & C-19553
JAPAN TRANSFORMERS:
B-19550 & C-19554
 - REFER TO INSTRUCTION MANUAL FOR GERMAN GAME VARIATIONS.
[XX] INDICATES WIRE COLOR

PRIMARY POWER AC INPUT SEE NOTE 5

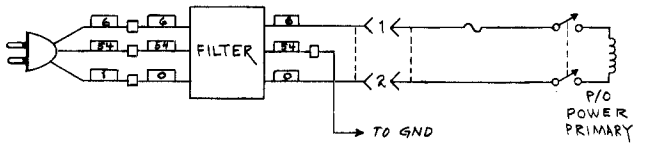
GROUND BUS

- A12J1 A12P1 → TO A3J2-6
- TO A3J1-2
- TO A3J4-5
- TO A3J4-9
- TO A3J4-10
- TO A3J4-11
- TO A3J4-14
- TO A3J3-C
- TO A3J3-S
- TO A3J1-2
- TO A3J1-2
- TO A3J1-2

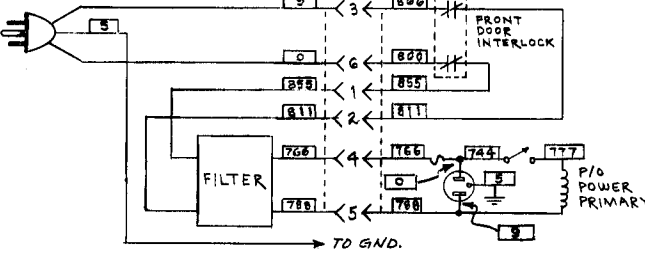
- A12J2 A12P2 → TO A3J3-17
- TO A3J3-U
- TO A3J3-Z

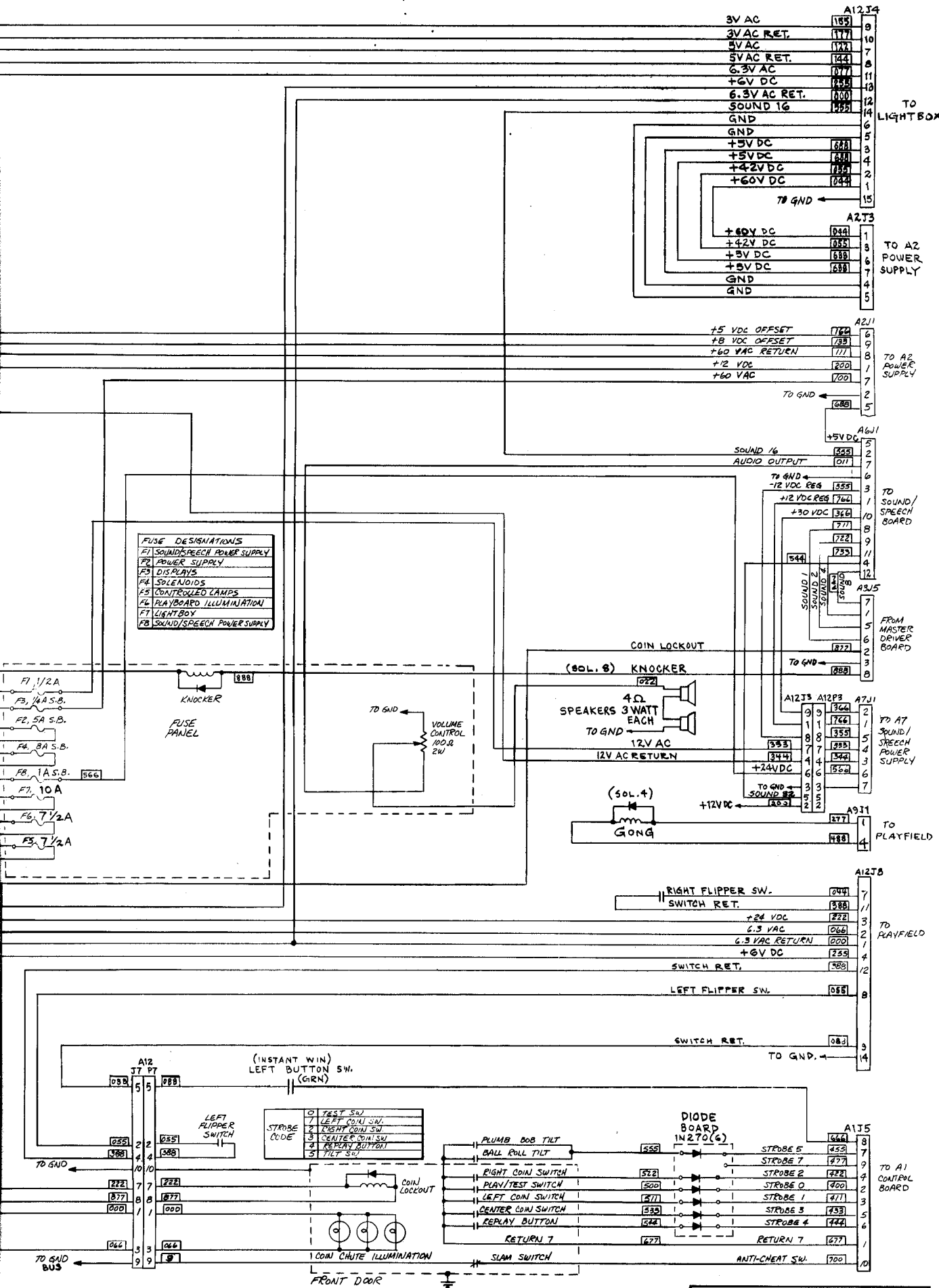
- A12J5 A12P5 → TO KICKING RUBBER
- TO KICKING RUBBER
- TO KICKING RUBBER
- TO KICKING RUBBER
- TO KICKING RUBBER
- TO LEFT FLIPPER
- TO LEFT FLIPPER
- TO TOP FLIPPER
- TO TOP FLIPPER
- TO RIGHT FLIPPER
- TO RIGHT FLIPPER
- TO COLLECTOR (SOL.3)
- TO COLLECTOR (SOL.4)

5. GERMAN WIRING, 220V AC.



6. JAPANESE WIRING, 100V AC





FUSE DESIGNATIONS

| | |
|----|---------------------------|
| F1 | SOUND/SPEECH POWER SUPPLY |
| F2 | POWER SUPPLY |
| F3 | DISPLAYS |
| F4 | SOLENOIDS |
| F5 | CONTROLED LAMPS |
| F6 | PLAYBOARD ILLUMINATION |
| F7 | LIGHTBOX |
| F8 | SOUND/SPEECH POWER SUPPLY |

- F1, 1/2A
- F2, 1/4 A.S.B.
- F3, 5A S.B.
- F4, 8A S.B.
- F5, 1A S.B.
- F6, 7 1/2A
- F7, 1/2A
- F8, 1/2A

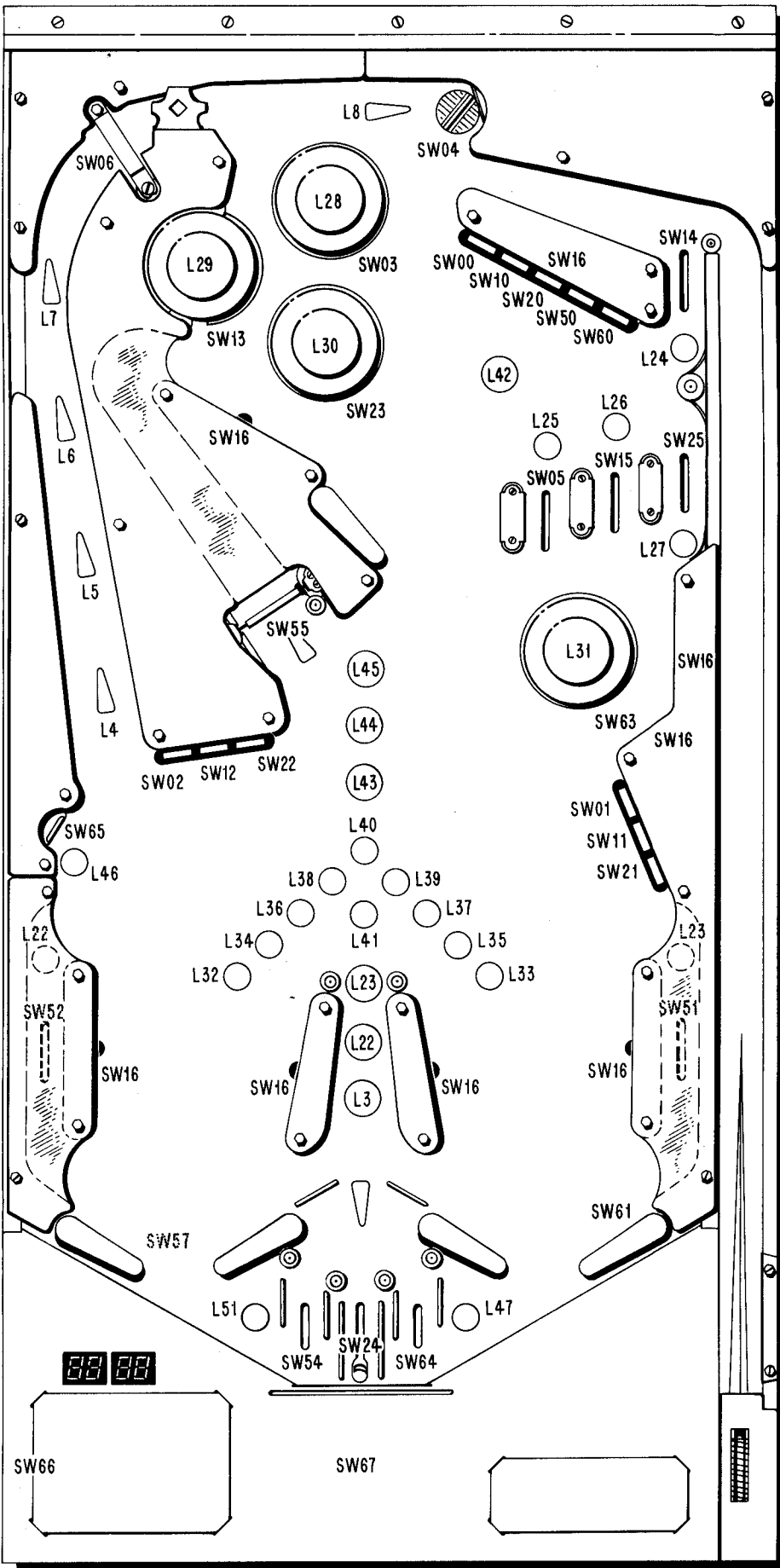
STROBE CODE

| | |
|---|-----------------|
| 0 | TEST SW. |
| 1 | LEFT COIN SW. |
| 2 | RIGHT COIN SW. |
| 3 | CENTER COIN SW. |
| 4 | REPLAY BUTTON |
| 5 | TEST SW. |

| | | | |
|------------------------------|--------------------------|---------|---------|
| D. GOTTLIEB & CO. | | | |
| TITLE | BOTTOM BOARD AND CABINET | | |
| USED ON | GAME # 672 | | |
| DRAWN | APPROVED | DATE | E-22194 |
| R | AC | 5-21-62 | |

X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS

PLAYBOARD SWITCH AND LAMP ASSIGNMENTS



SWITCH MATRIX

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

LAMP

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

XI. PARTS INFORMATION

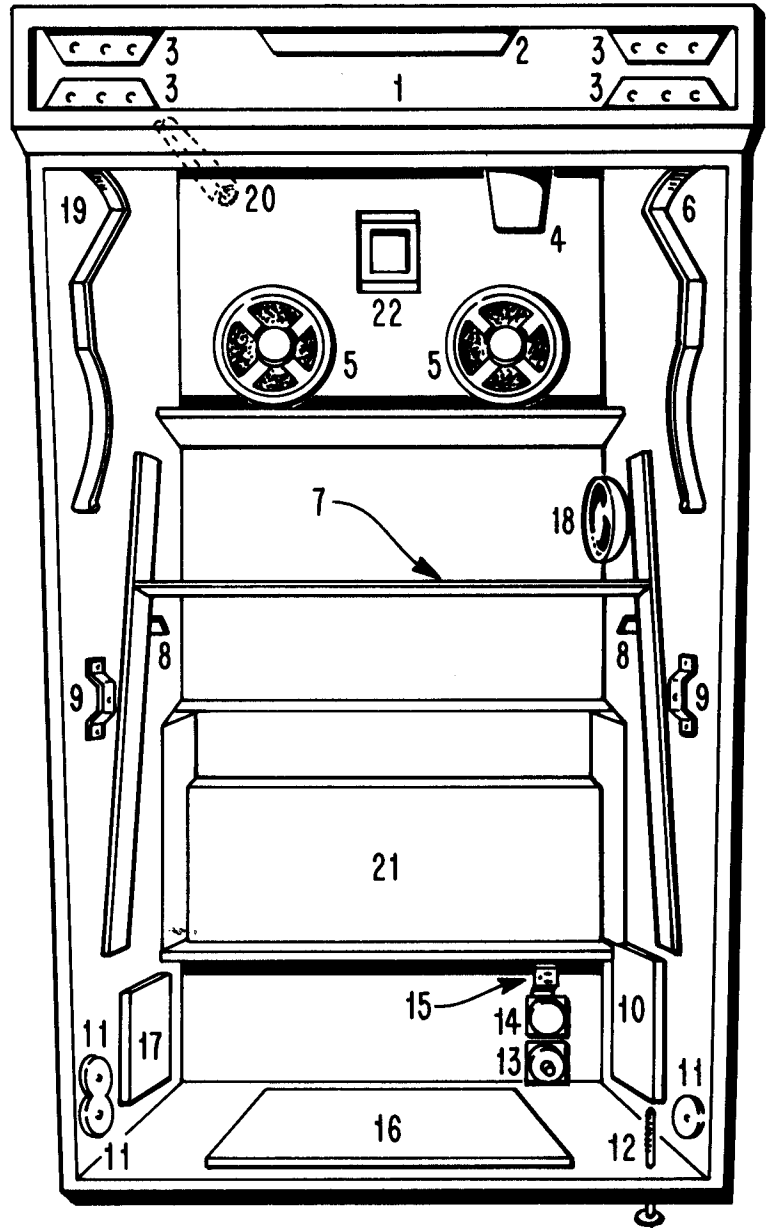
TABLE OF CONTENTS

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

XI. PARTS INFORMATION

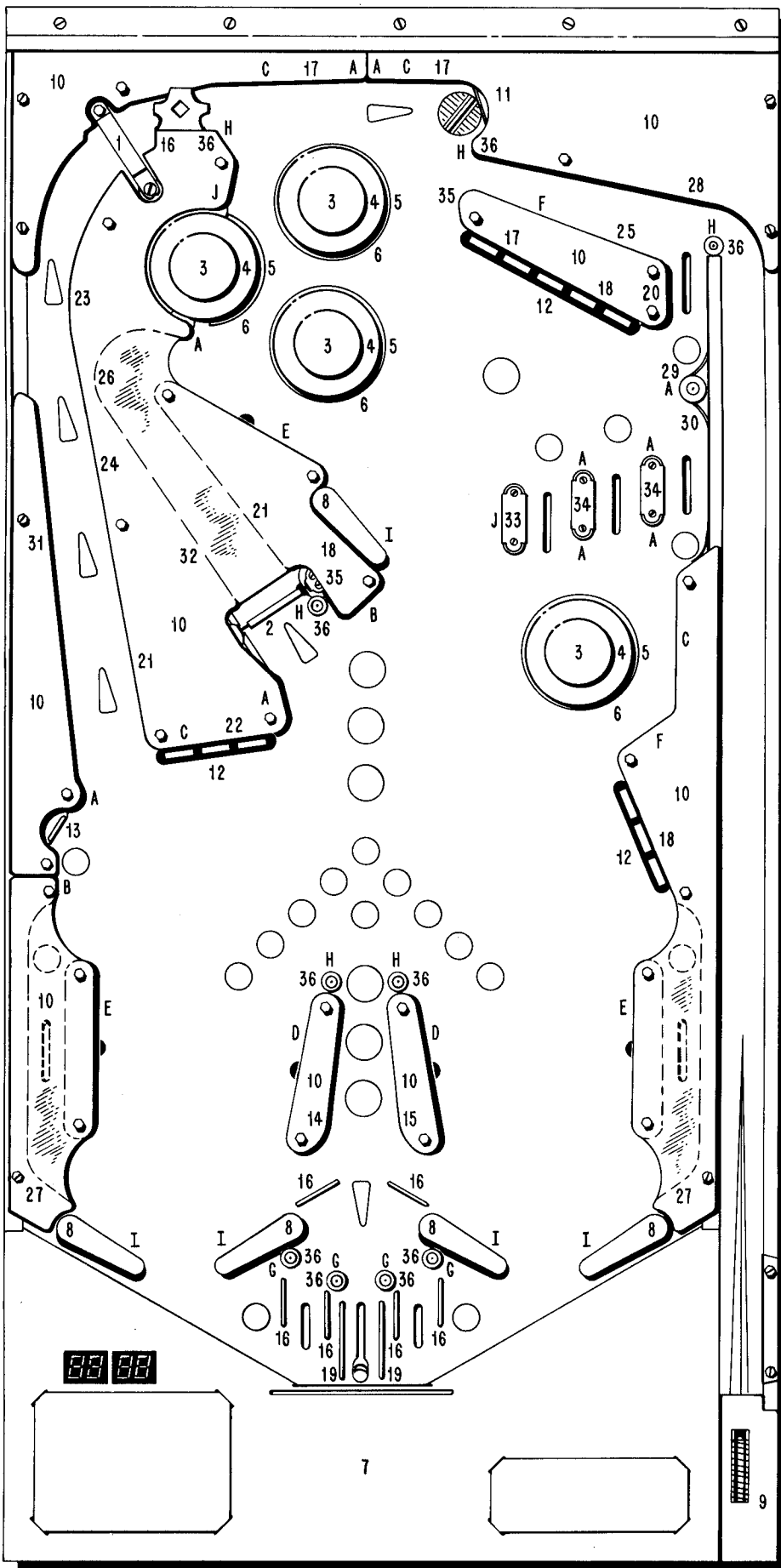
CABINET PARTS

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



XI. PARTS INFORMATION

PLAYBOARD PARTS



RUBBER RINGS

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

PARTS LIST

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

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

 **Gottlieb**TM
AMUSEMENT GAMES

165 W. Lake Street Northlake, IL 60164
(312) 562-7400 Telex 72-8463

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