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THE PREMIER NAME IN PINBALL

INSTRUCTION MANUAL

VICTORY

(GAME #710)

(2 BALL GAME)

INSTRUCTION MANUAL

Applicable for all games.

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GAME PROMS:	SOUND PROMS:
710/PROM 1	710/DROM 1
710/PROM 2	710/YROM 1

NOTE: ANY PROM CHANGES DURING PRODUCTION WILL BE INDICATED BY A REVISION NUMBER FOLLOWING THE GAME NUMBER. CONSULT YOUR DISTRIBUTOR FOR ANY PROM CHANGE UPDATE.

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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

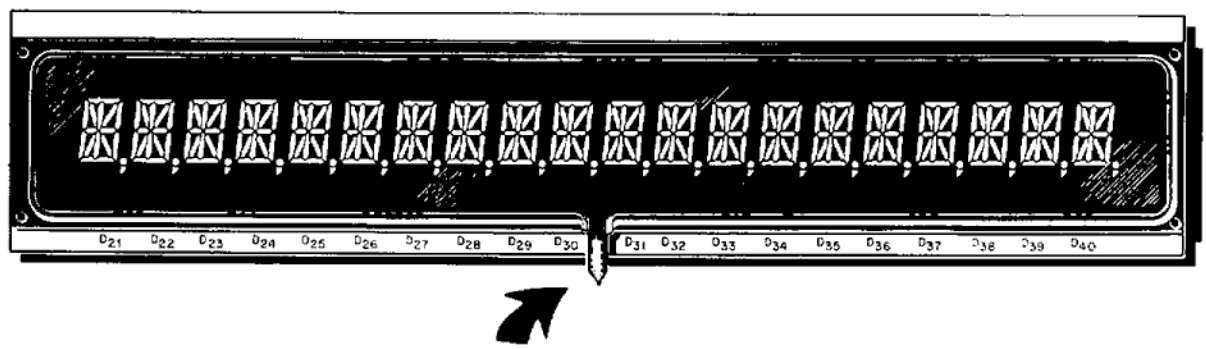


FIGURE 1A.

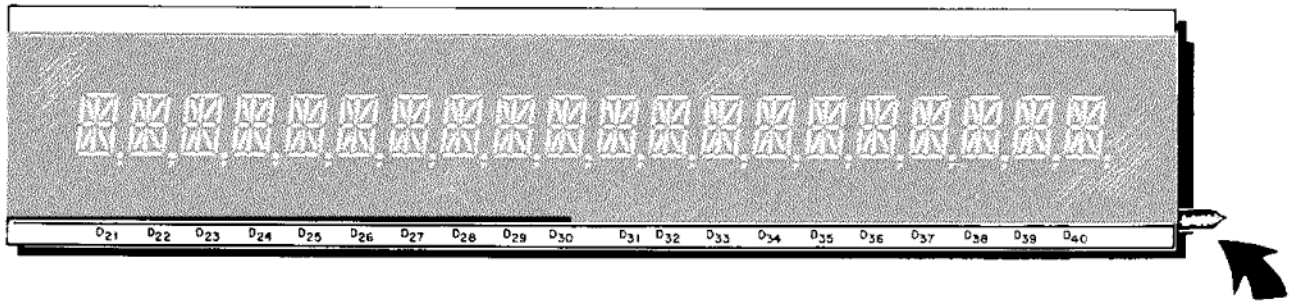


FIGURE 1B.

5. THE DIFFERENT DISPLAYS, XO-840 AND XO-870, ARE ELECTRICALLY EQUIVALENT. HOWEVER, THE PINOUT NUMBERING SEQUENCES ARE DIFFERENT. FIGURE 2 ILLUSTRATES THE SCHEMATIC PORTION OF MA-644F UTILIZING THE XO-870 DISPLAYS.

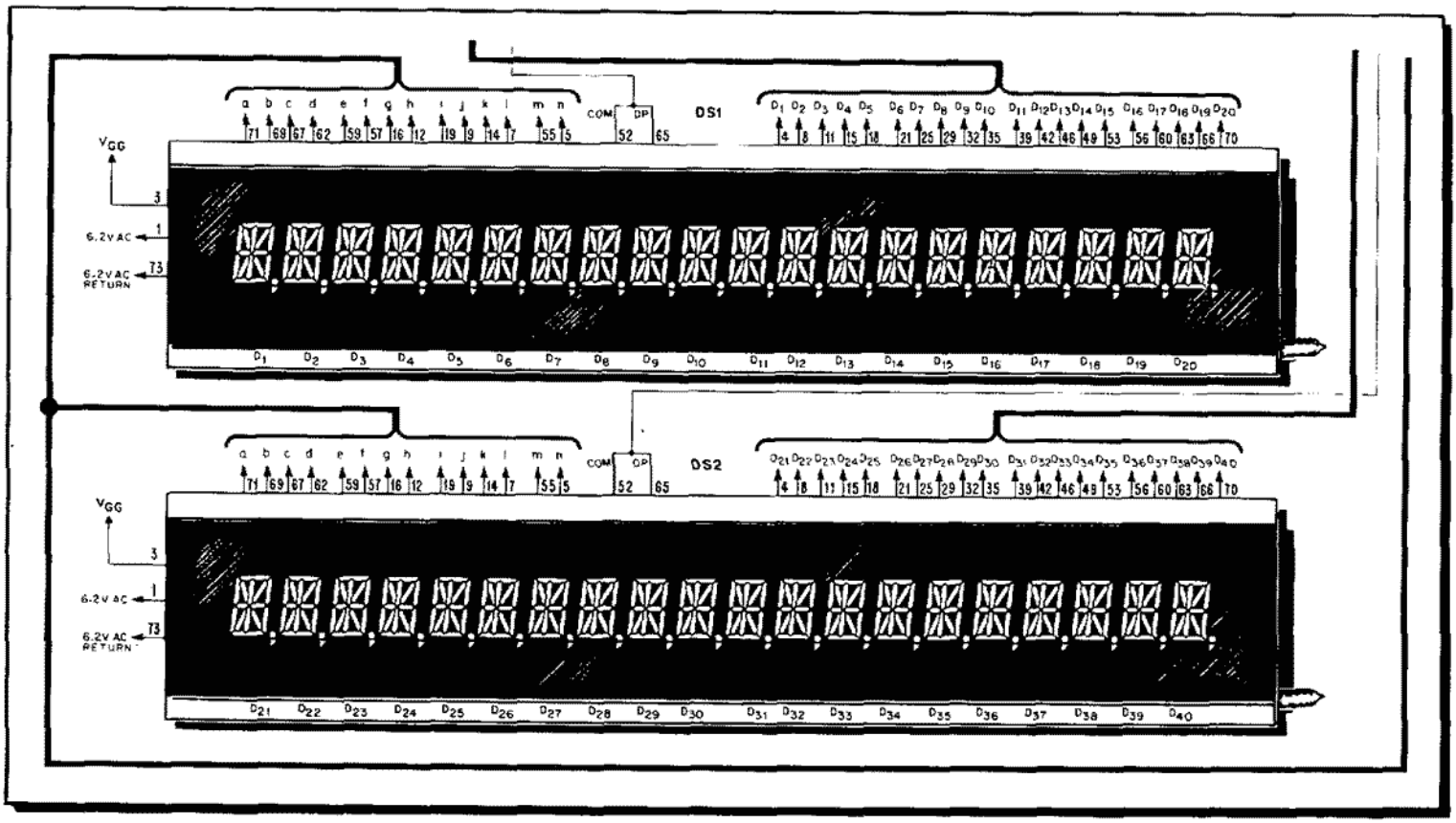


FIGURE 2.

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) used in System 80A games.

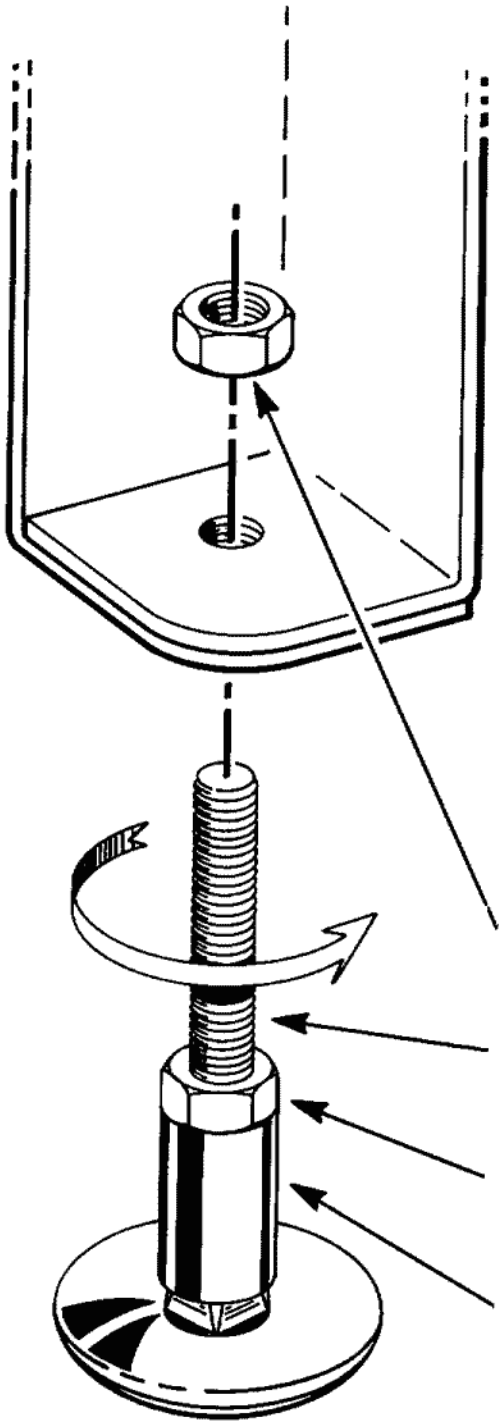
Some of the new features of System 80B are:

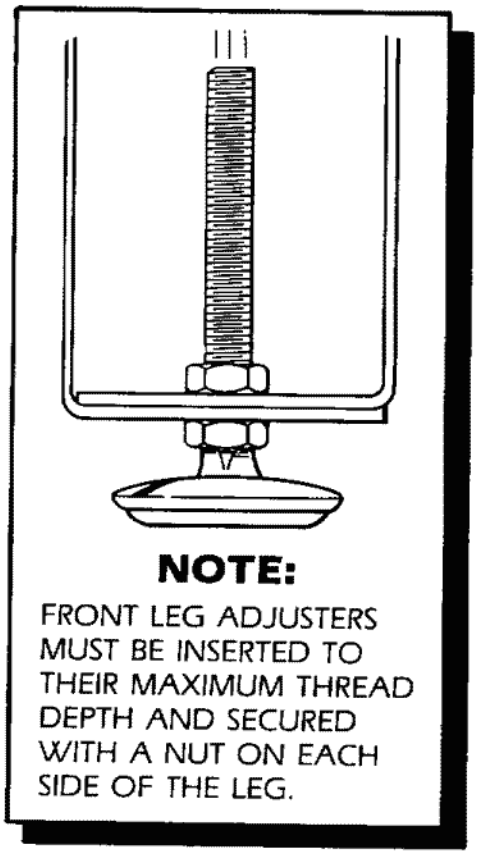
1) Capability to display messages.
2) Enhanced bookkeeping and self-test.
3) Players can enter their initials if they achieve a high score.
4) Top five high scores are displayed in the attract mode.
5) Automatic Replay percentaging.

"**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."

SET-UP PROCEDURE

TO ADJUST PLAYFIELD PITCH ANGLE (6°)
(REAR LEGS ONLY)





NOTE:

FRONT LEG ADJUSTERS MUST BE INSERTED TO THEIR MAXIMUM THREAD DEPTH AND SECURED WITH A NUT ON EACH SIDE OF THE LEG.

4. TIGHTEN LOCKING NUT.

3. ATTACH ASSEMBLY TO LEG.

2. FASTEN NUT TO SLEEVE.

1. INSERT 1" SLEEVE
(PART NO. 25317)

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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 5-1/2°-6°, SEE ILLUSTRATION AT LEFT.

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.

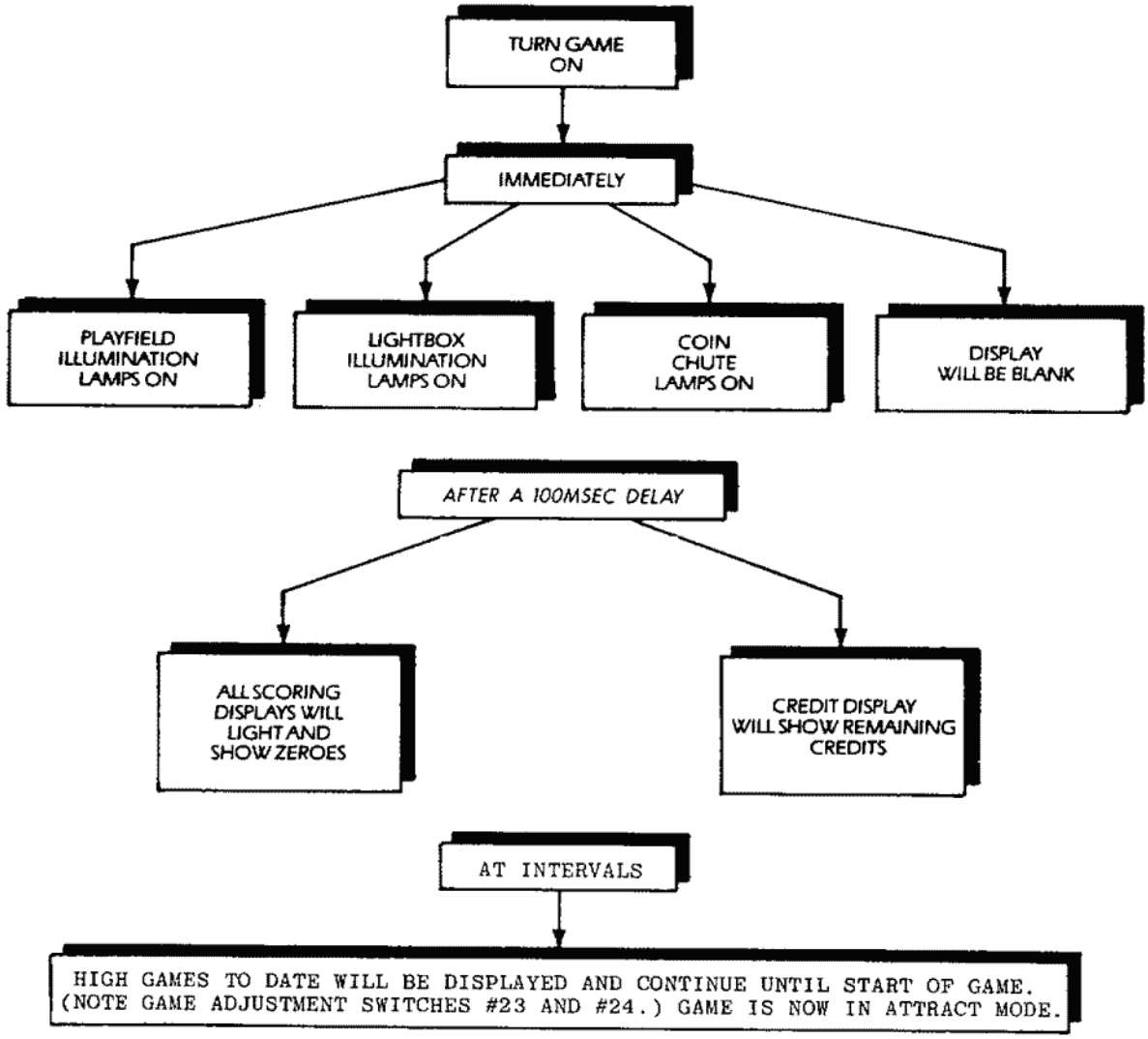
10. Reinstall the cabinet glass, front moulding and the lightbox assembly.

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

A. GAME START

Two balls 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.

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 ball in play.

D. EXTRA BALLS

1. When the SHOOT AGAIN lamp is lit, neither the player-up nor the ball-in-play 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.

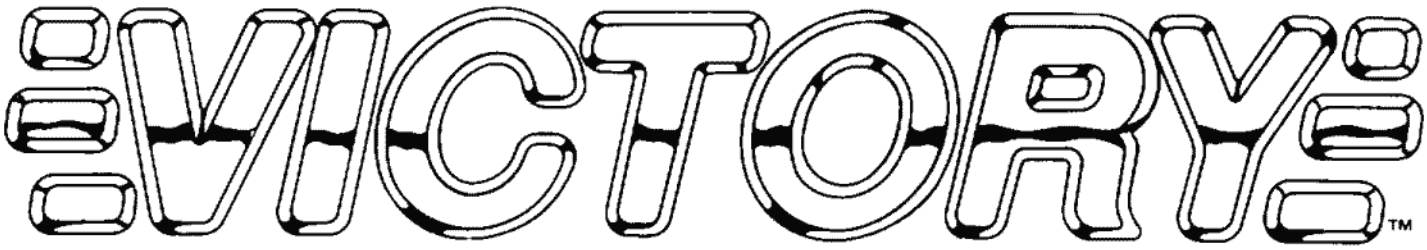
G. GAME OVER

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



DROP TARGETS

- SCORE 500 UNLIT OR WHEN LIT.
- SCORE 3000 WHEN FLASHING.
- COMPLETING THE SEQUENCE (F-U-E-L) SCORES LIT VALUE (50,000-100,000-200,000) AND ADVANCE DROP TARGET SEQUENCE VALUE.
- AWARD SPECIAL WHEN FLASHING AND RESET SEQUENCE VALUE.
- (5-BALL) SCORE 100 UNLIT OR WHEN LIT.
- (5-BALL) SCORE 1000 WHEN FLASHING.
- (5-BALL) COMPLETING THE SEQUENCE SCORES 10,000 UNLIT.

SPOT TARGETS (6)

- SCORE 500 WHEN LIT.
- SCORE 3000 WHEN FLASHING.
- COMPLETING THE SEQUENCE (F-I-N-I-S-H) ADVANCES THE MULTIPLIER.
- (5-BALL) SCORE 100 WHEN LIT.
- (5-BALL) SCORE 1000 WHEN FLASHING.

LEFT SIDE SPOT TARGET

- SCORE 1000 UNLIT.
- SCORE 10,000 WHEN LIT.
- AWARD CHECKPOINT #6 WHEN FLASHING.

RIGHT SIDE SPOT TARGET

- SCORE 1000 UNLIT
- SCORE 10,000 WHEN LIT.
- AWARD CHECKPOINT #5 WHEN FLASHING

TOP CENTER KICKER

- SCORE 1000 UNLIT.
- SCORE 100,000 WHEN LIT (YELLOW).
- SCORE "RACE BONUS" WHEN FLASHING (CLEAR).
- LIGHT AN OUTLANE FOR SPECIAL (BASED ON SWITCH #32), SCORE CHECK-POINT BONUS (IF ANY), AND RESET ALL PLAYERS TO FIRST CHECKPOINT WHEN LIT (AMBER) (FINISH LINE).

RIGHT KICKER

- SCORE 1000.
- SCORE"RACE BONUS" WHEN FLASHING (CLEAR).
- AWARD CHECKPOINT #2 WHEN FLASHING.

HOLE

- SCORE LIT VALUE (50,000-100,000-150,000-200,000) AND ADVANCE HOLE VALUE.
- AWARD EXTRA BALL AND CAPTURE BALL WHEN FLASHING.
- AWARD CHECKPOINT #1 WHEN FLASHING.
- (5-BALL) SCORE 10,000 WHEN UNLIT.

IV. GAME PLAY AND SCORING

TOP ROLLOVER

- SCORE 1000.
- AWARD EXTRA BALL WHEN FLASHING (PURPLE).
- AWARD CHECKPOINT #3 WHEN FLASHING.

LEFT SIDE ROLLUNDER

- SCORE 1000.
- AWARD CHECKPOINT #1 WHEN FLASHING

LEFT RETURN ROLLOVER

- SCORE 500.
- AWARD CHECKPOINT #4 WHEN FLASHING.

RIGHT RETURN ROLLOVER

- SCORE 500.
- AWARD CHECKPOINT #7 WHEN FLASHING.
- FLASH LEFT SPINNER (WHITE) FOR A TIME PERIOD (DOUBLE SCORE).

TOP RIGHT RAMP ENTRANCE ROLLUNDER

- NO SCORE.

TOP LEFT RAMP ENTRANCE ROLLUNDER

- SCORE 300.

LEFT TRACK EXIT ROLLUNDER

- SCORE 3000 UNLIT.
- SCORE 100,000 WHEN LIT (YELLOW).

LEFT SPINNER

- SCORE 500 UNLIT.
- SCORE 10,000 WHEN LIT (AMBER).
- SCORE DOUBLE WHEN FLASHING (WHITE).

RIGHT SPINNER

- SCORE 500 UNLIT.
- SCORE 10,000 WHEN LIT (AMBER).

LEFT AND RIGHT OUTSIDE ROLLOVERS

- SCORE 10,000.
- AWARD SPECIAL WHEN LIT.

RUBBER SWITCHES

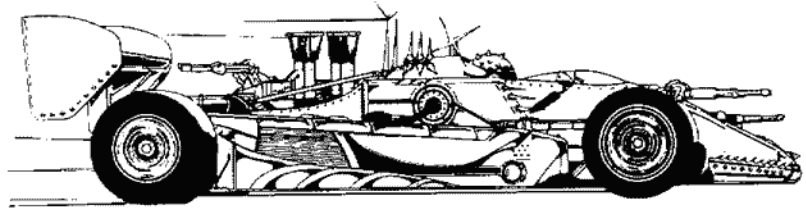
- SCORE 30.
- TOGGLE LEFT AND RIGHT OUT ROLL-OVERS (SPECIAL) WHEN ENABLED.
- TOGGLE HOLE AND TOP ROLLOVER (EXTRA BALL) WHEN ENABLED.
- TOGGLE LEFT AND RIGHT SPINNERS (10,000).
- TOGGLE TOP CENTER KICKER AND RIGHT RAMP ENTRANCE (100,000).

OUTHOLE

- SCORE 10,000 X MULTIPLIER (RACE BONUS) FOR EACH CHECKPOINT POSITION ACHIEVED.

CHECKPOINT BONUS

- SCORE VALUE IN DISPLAY WHEN THE ACTIVE CHECKPOINT TARGET HAS BEEN HIT.



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	CREDITS/COINS
S1	S2	S3	S4	S5	Left Coin Chute	
S9	S10	S11	S12	S13	Right Coin Chute	
S17	S18	S19	S20	S21	Center Coin Chute	
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

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

SWITCH 8 — AUTO-PERCENTAGE CONTROL
- ON . . . ENABLED
- OFF . . . DISABLED (NORMAL HIGH SCORE MODE)

SWITCH 14 — COIN CHUTE LEFT AND RIGHT CONTROL
- ON . . . SAME
- OFF . . . SEPARATE

SWITCHES 15 16 — MAXIMUM CREDITS

15	16	
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

23	24	
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 . . . SCORE 500,000 IN PLACE OF EXTRA BALL AND SPECIAL.
- 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 — EXTRA BALL CONTROL

ON.....HOLE VALUE LAMPS ARE MEMORIZED BALL TO BALL. ONLY ONE EXTRA BALL LAMP LIGHTS AND TOGGLES WHEN A RUBBER SWITCH IS HIT. (LIBERAL)

OFF.....HOLE VALUE IS RESET BALL TO BALL. BOTH EXTRA BALL LAMPS ARE LIT AT THE SAME TIME. (CONSERVATIVE)

SWITCH 32 — OUTLANE SPECIAL CONTROL

ON.....LIGHT AN OUTLANE WHEN THE QUALIFYING HEAT IS COMPLETED. (LIBERAL)

OFF.....LIGHT AN OUTLANE WHEN THE RACE AFTER THE QUALIFYING HEAT IS COMPLETED. (CONSERVATIVE)

ADDITIONAL COIN CHUTE COMBINATIONS
CREDIT INCENTIVES

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

SWITCHES

S1	S2	S3	S4	S5 -	Left Coin Chute
S9	S10	S11	S12	S13 -	Right Coin Chute
S17	S18	S19	S20	S21 -	Center Coin Chute

					COIN/CREDIT GIVEN	COIN/CREDIT GIVEN	COIN/CREDIT GIVEN	COIN/CREDIT GIVEN	COIN/CREDIT GIVEN		TOTAL COIN/ TOTAL CREDIT
ON	ON	OFF	OFF	ON	1st/1	2nd/2				-	2/3
ON	ON	OFF	ON	OFF	1st/0	2nd/1	3rd/1	4th/1		=	4/3
ON	ON	OFF	ON	ON	1st/0	2nd/1	3rd/0	4th/2		=	4/3
ON	ON	ON	OFF	OFF	1st/1	2nd/1	3rd/1	4th/2		=	4/5
ON	ON	ON	OFF	ON	1st/1	2nd/2	3rd/1	4th/3		=	4/7
ON	ON	ON	ON	OFF	1st/1	2nd/2	3rd/2	4th/2		=	4/7
ON	ON	ON	ON	ON	1st/0	2nd/0	3rd/1	4th/0	5th/1	=	5/2

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

C. POST ADJUSTMENTS

The post located just above the left outlane can be positioned for liberal/conservative play. The smaller opening produces a more liberal 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 reentered 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

   Applicable only to:
   Step 1 - Left chute coins
   Step 2 - Right chute coins
   Step 3 - Center chute coins

   a. Advance Bookkeeping so the step to be zeroed is displayed.

   b. Press the credit button. Notice information replaced by zeros.

2. Zeroing All Bookkeeping Steps

   Except Auto-Percentaging setting (Step 6), Replay Levels (Steps 11-13), and Highest Game To Date Score (Step 14).

   a. Go to Step 15 (average playing time).

   b. Press the credit button. The message "Bookkeeping Cleared" will be displayed.

   c. Zeroing is complete.

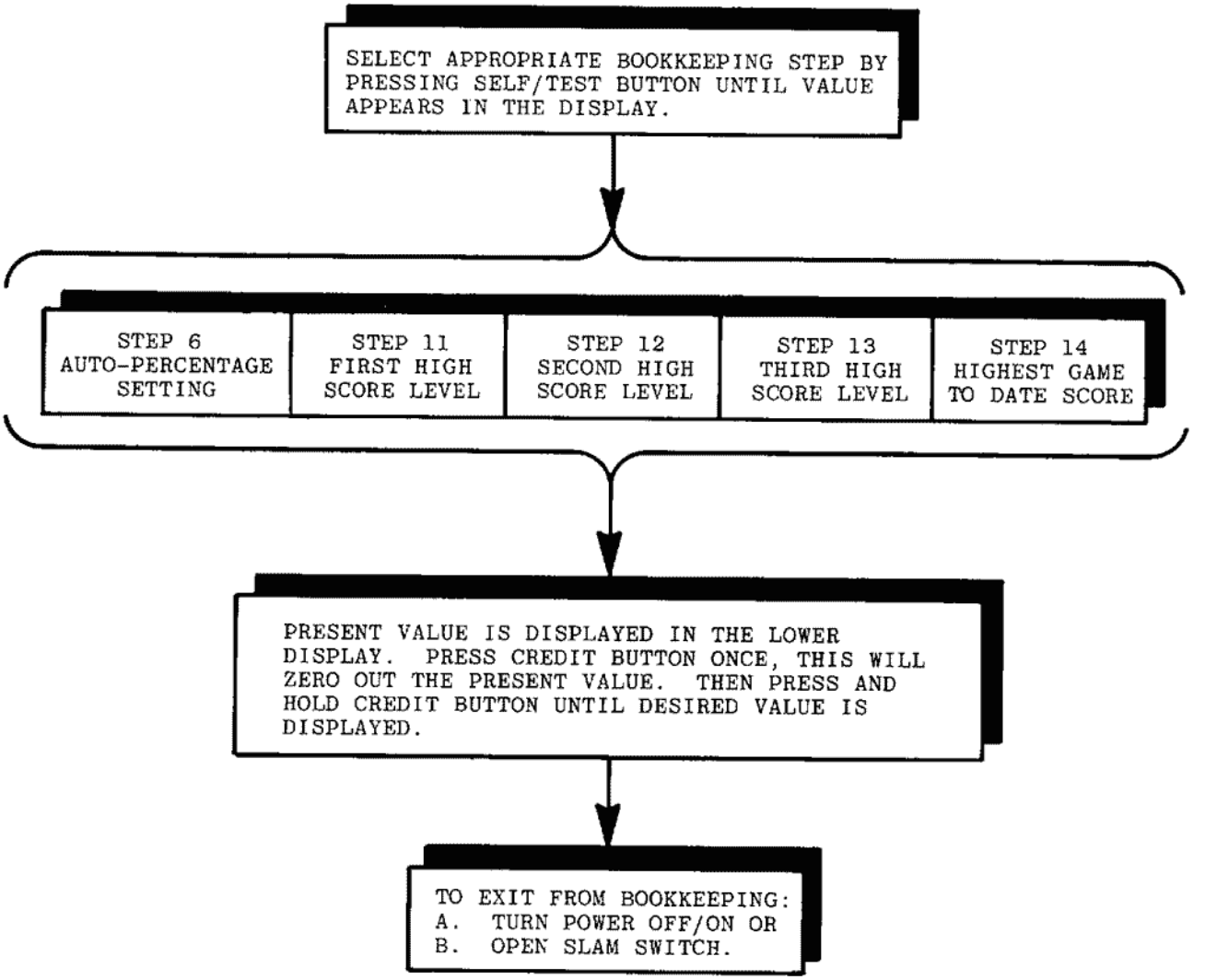
HOW TO USE AUTOMATIC REPLAY PERCENTAGING

Move Control Board switch #8 to the on position to enable Auto-Percentaging. Set the desired percent payout while in Step 6 of bookkeeping (See Page 9). When Auto-Percentaging is enabled, only the first High Score Replay Level is used. The second and third levels are ignored.

Periodically the first Replay Level will be adjusted by 100,000 points at a time. After 10,000 games have been played, the Total Plays (Step 4), Total Replays (Step 5), and Game Time (Step 15) bookkeeping values are reset to 0 (Refer to Page 10).

VII. BOOKKEEPING AND SELF TEST

III. HOW TO SET/RESET AUTO-PERCENTAGE SETTING, 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.

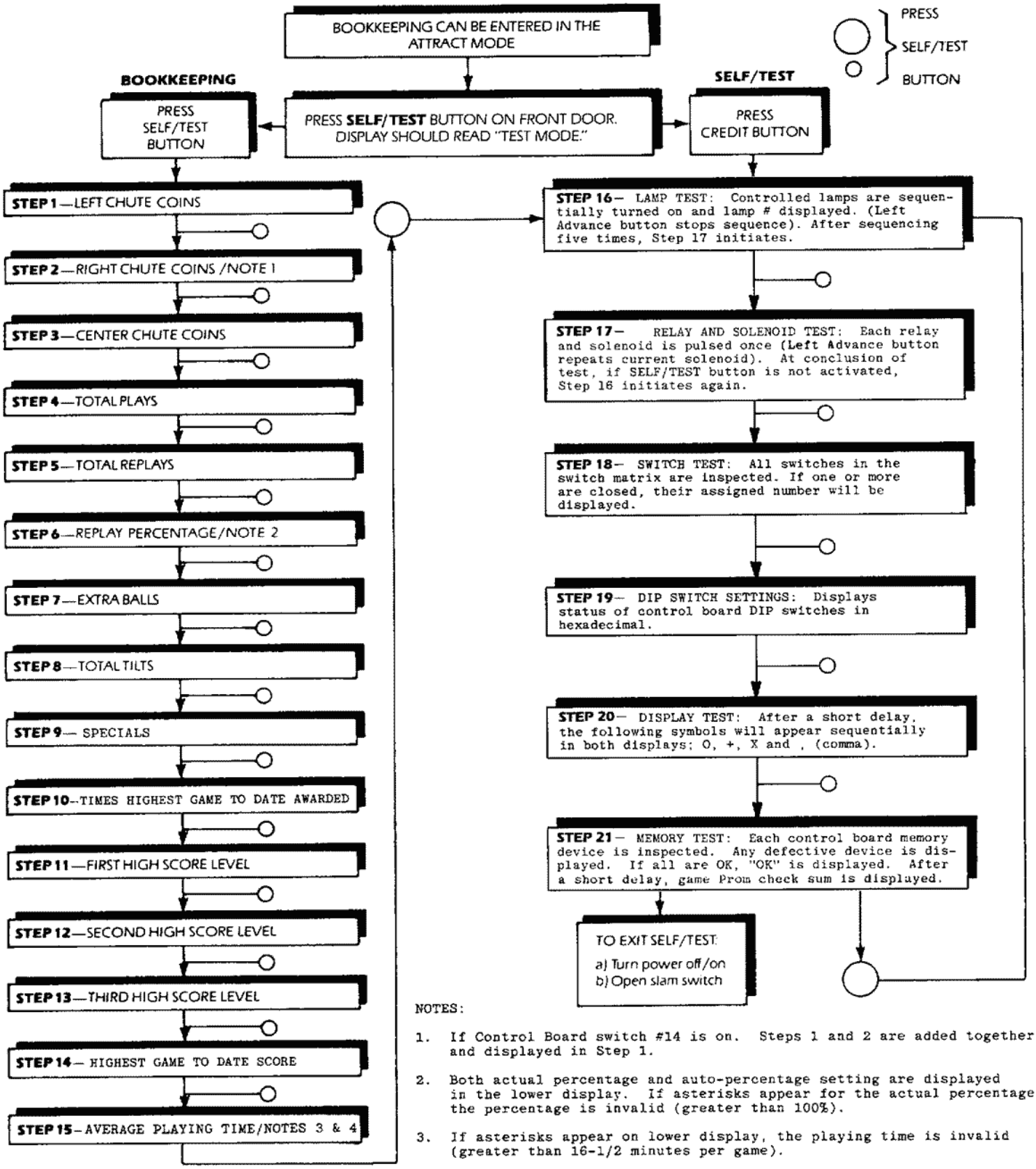
3. If Step 14 is reset, all High Games to Date scores are reset.

4. High Score Levels may range from 100,000 to 9,900,000 in increments of 100,000.

5. Only the first High Score Level is used when auto-percentaging (switch 8) is enabled.

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. Both actual percentage and auto-percentage setting are displayed in the lower display. If asterisks appear for the actual percentage, the percentage is invalid (greater than 100%).
3. If asterisks appear on lower display, the playing time is invalid (greater than 16-1/2 minutes per game).
4. Pressing the credit button during this step will reset all book keeping information except:
   Step 6 - Auto-percentage setting
   Steps 11 thru 13 - Replay levels
   Step 14 - Highest game to date

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

a. 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

a. 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-$\overline{A}$(Q1)
T (Tilt) Relay.....A3J3 PIN-$\overline{B}$(Q2)
(Any other relays which may be used).

b. 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 DISPLAYED	ASSIGNMENT	A3 DRIVER BOARD TRANSISTOR ASSIGN. SEE SCHEMATIC
Sol.1	Hole	Q60
Sol.2	Bank Reset	Q57/Q58
Sol.3	R./L. Center Lamps	Q54
Sol.4	Right Domes	Q55
Sol.5	Right Ball Kicker	Q61/Q62
Sol.6	Display Light Show	Q63/Q64
Sol.7	Left Domes	Q56
Sol.8	Knocker Assembly	Q53
Sol.9	Outhole	Q59

STEP 18—SWITCH TEST

a. If all switches are open, "ALL SWITCHES OPEN" appears in the lower display. (Note: Slam switch is not part of this test.)

b. If any switch(es) are closed, their corresponding matrix location will appear sequentially in the lower display

STEP 19—DIP SWITCH SETTINGS

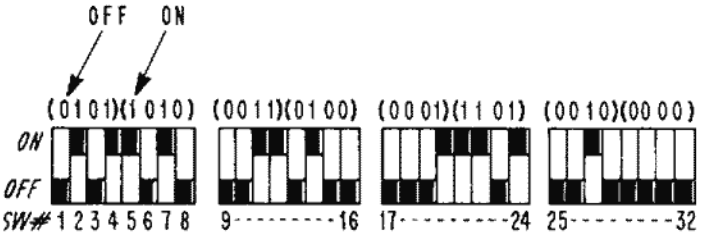
a. The status of the Control Board (A1) switches appears in the lower display

DISPLAYED 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

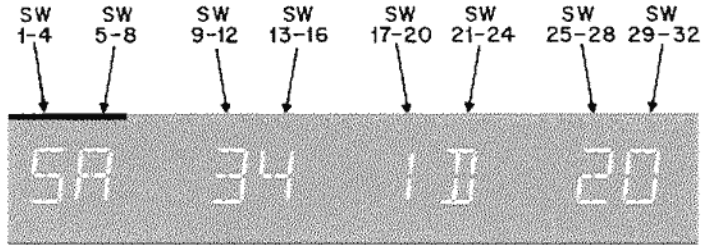
VII. BOOKKEEPING AND SELF TEST

CONTROL BOARD (A1) SWITCHES

EXAMPLE

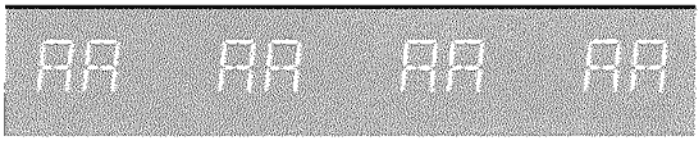


DISPLAYED

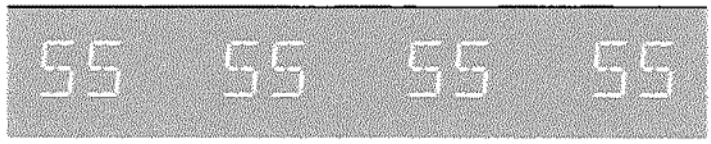


Checking Switches

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; 0, +, 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 A1J3. 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 A1J2 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

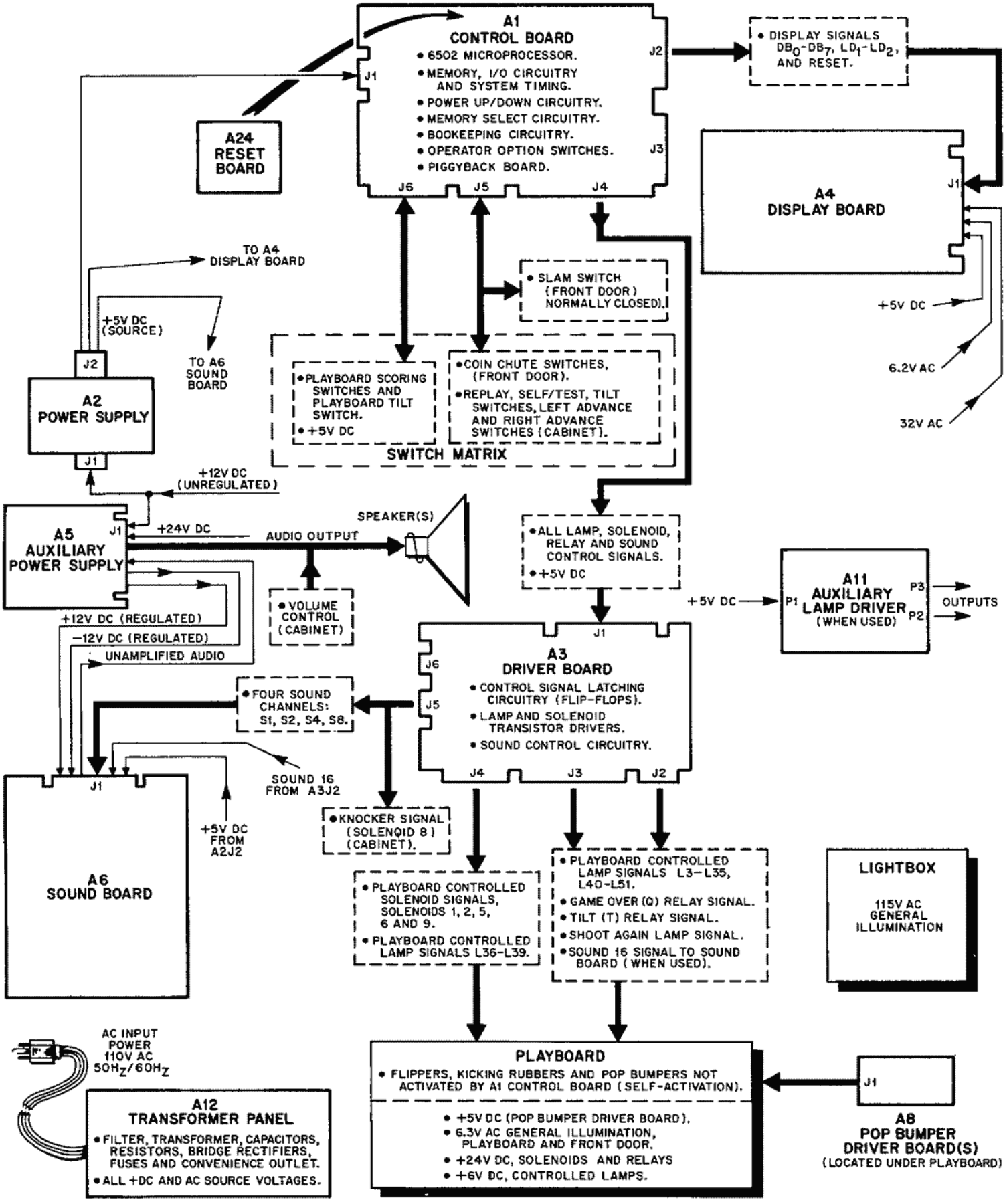


FIGURE I. SYSTEM 80B BLOCK DIAGRAM

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.

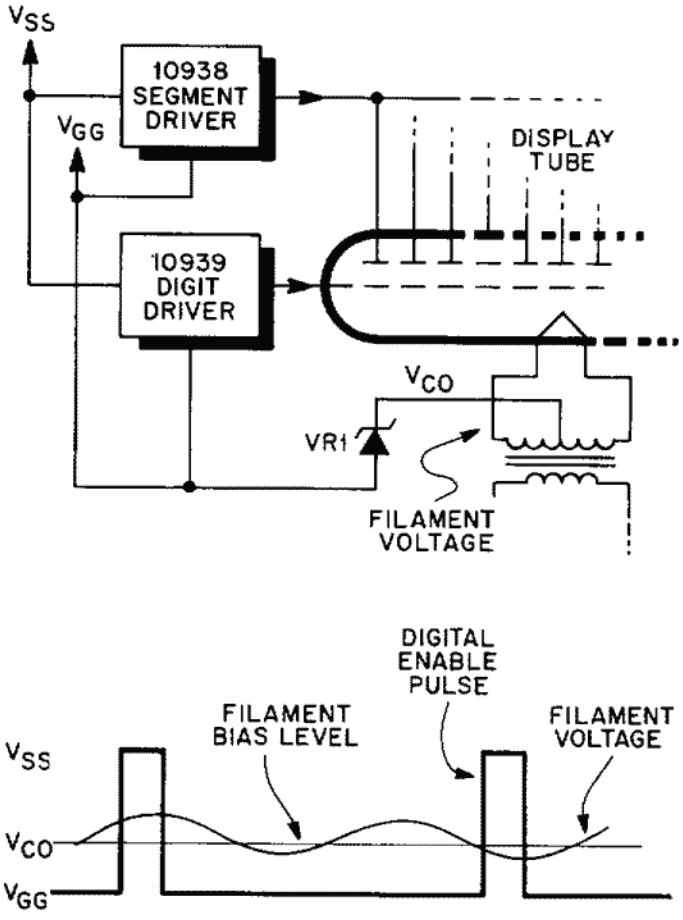


FIGURE 2. BASIC DRIVE CIRCUIT

D. SOUND BOARD (A6)

The MA-886 Sound Board consists of two 6502 microprocessor systems, a dual DAC, a programmable switched capacitor filter, 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. This 4 MHz clock is divided by 4 to a 1 or 2 MHz clock for both processors' clock input, pin 37 of N1 and T3. A 2 MHz clock from S1 pin 14 is presented to the two AY-3-8913 Programmable Sound Generators, H4 and K4, at 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 $\overline{Q}$ outputs low. The $\overline{Q}$ 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 $\overline{Q}$ outputs of A4 will stay low until the associated 6502 reads its input port therefore clearing the interrupt.

VIII. THEORY OF OPERATION

SYSTEM EPROMS

The sound board is designed to accommodate different types of EPROMS. Jumpers JP1, 2, 3 and 4 should be set to the proper position based on the EPROM being used, (See Schematic Diagram).

RESET

The Sound Board receives an external reset signal from A1J2 pin 24. 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.

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 A6P2 pin 9, 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 Board
A8 - Kicker Driver Board
A11 - Auxiliary Lamp Driver
A13 - Resistor Board
A16 - Transistor Driver Board
A17 - Diode Board
A24 - Reset Board

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

B. WIRE COLORS ARE SHOWN AS NUMBERS:

0 Black
1 Brown
2 Red
3 Orange
4 Yellow
5 Green
6 Blue
7 Violet
8 Gray
9 White

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	8 Amp SLO-BLO
F6	Playboard Illumination.....	6.3V AC	5 Amp SLO-BLO
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
F9	Display Filament.....	6.2V AC	1 Amp
F9A	Display Filament.....	6.2V AC	1 Amp
F20	Input Line.....	110V AC	8 Amp SLO-BLO
		220V AC	4 Amp SLO-BLO

PLAYBOARD FUSES

F10	Ball Release	1 Amp SLO-BLO
F11	Hole, Outhole	1 Amp SLO-BLO
F12	Bank Reset	2 Amp SLO-BLO
F13	Right Ball Kicker	3 Amp SLO-BLO

D. COIL CHART

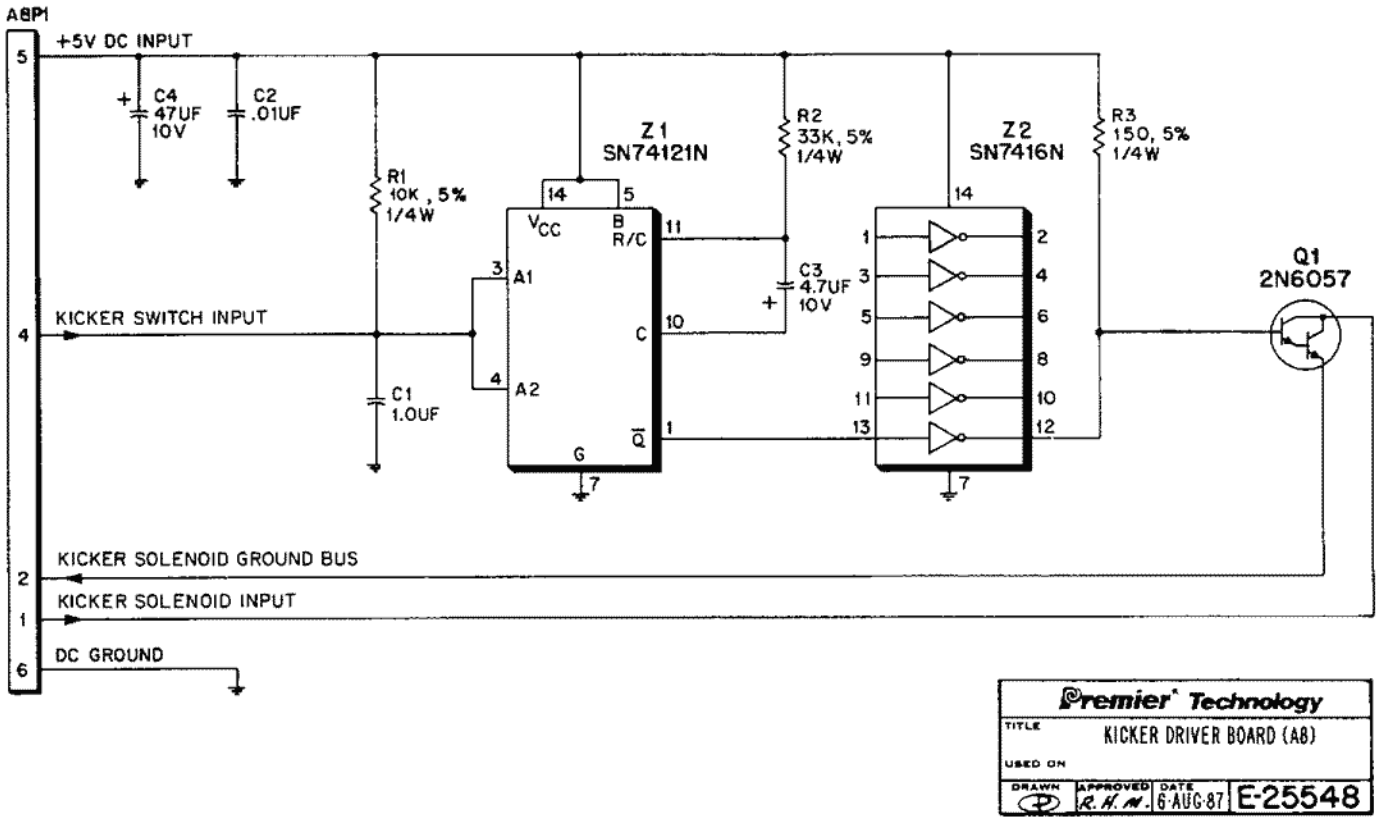
SOLENOID COILS					
PART NUMBER	GENERAL USAGE	RESISTANCE (OHMS)	NUMBER OF TURNS	WIRE GAUGE	WRAPPER COLOR
A-1496	KICKING TARGET KICKING RUBBERS POP BUMPERS	2.95	635	#23	Yellow
A-4893	UP KICKER POP BUMPERS BALL KICKER	2.1	535	#22	Red
A-5194	UP KICKER GONG KICKING TARGETS POP BUMPERS	4.5	780	#24	Blue
A-5195	CONTACT KICKER KNOCKER HOLE KICKER	11.6	1305	#26	White
A-16570	HOLE KICKER, 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, 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
A-24161	INTERMEDIATE FLIPPER	2.2/40	520/1050	#23/31	Blue
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
A-19508	MEMORY/ DROP TARGETS	35.0	1250	#32	YELLOW

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

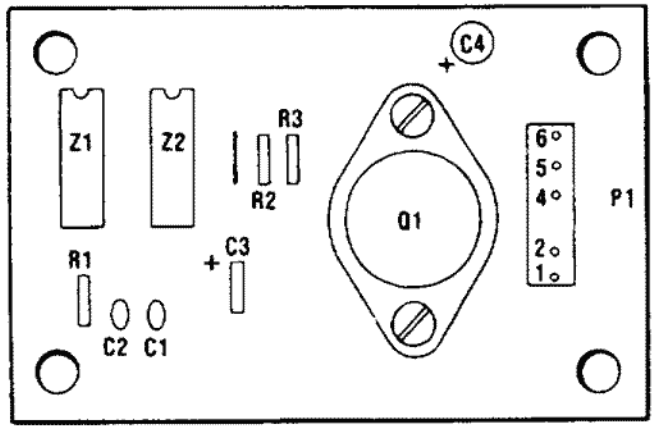
X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS

TABLE OF CONTENTS

X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS



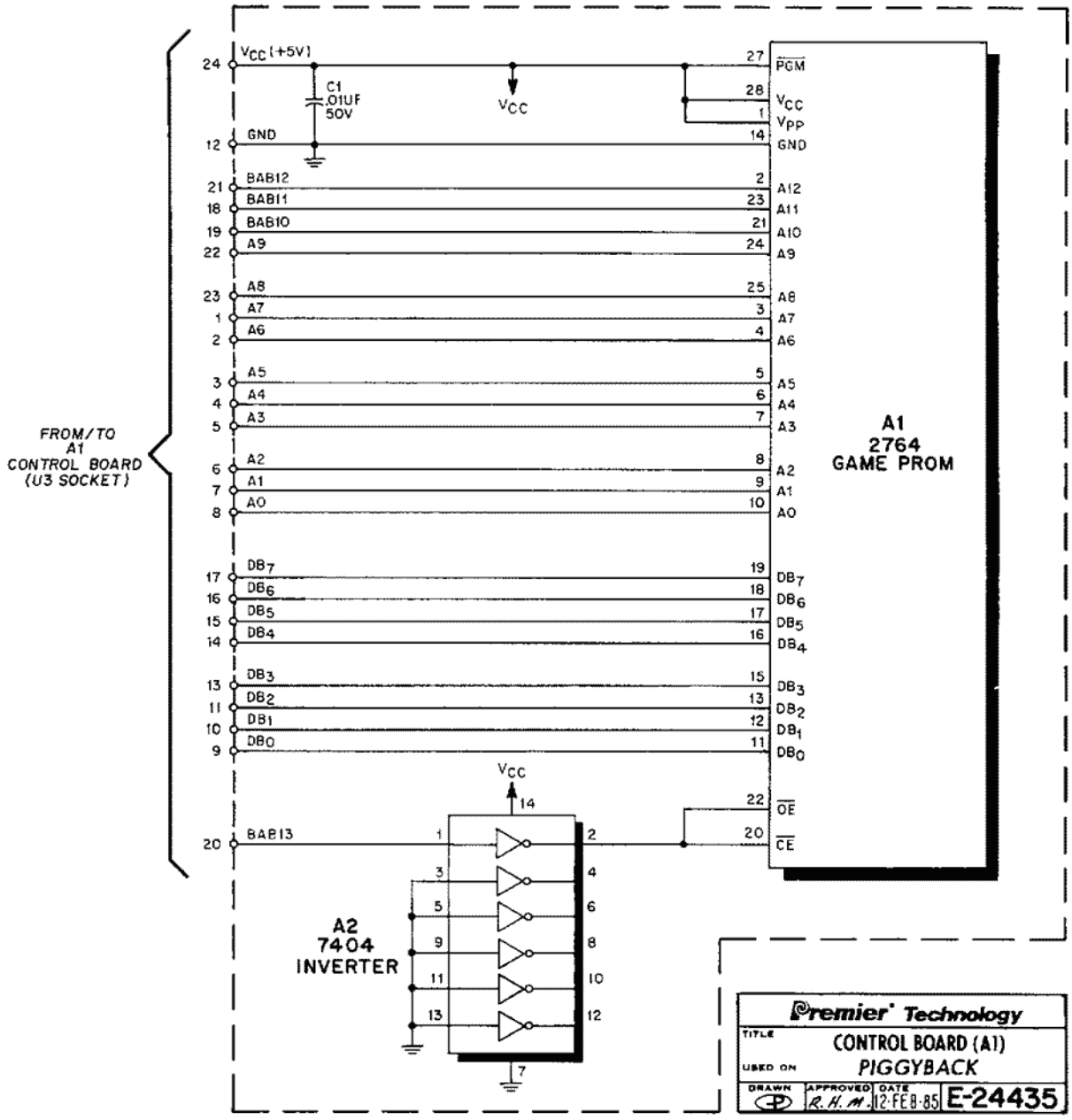
KICKER DRIVER BOARD (A8) COMPONENT LOCATION



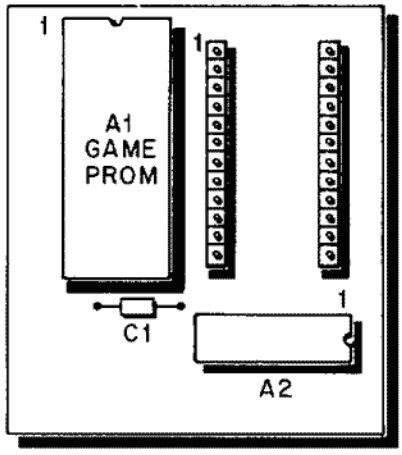
KICKER DRIVER BOARD (A8) PARTS LIST

REFERENCE	DESCRIPTION	PART NUMBER
	Kicker Driver Board	MA-992
C1	Capacitor, 1 UF, 50V, Non-polarized	XO-294
C2	Capacitor, .01 UF, 100V	XO-202
C3	Capacitor, 4.7 UF, 10%, 10V Tantalum, Axial	XO-226
C4	Capacitor, 47 UF, 10V	XO-227
P1	Connector	XO-879
R1	Resistor, 10K Ohm, 1/4W, 5%	XO-18
R2	Resistor, 33K Ohm, 1/4W, 5%	XO-43
R3	Resistor, 150 Ohm, 1/4W, 5%	XO-374
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

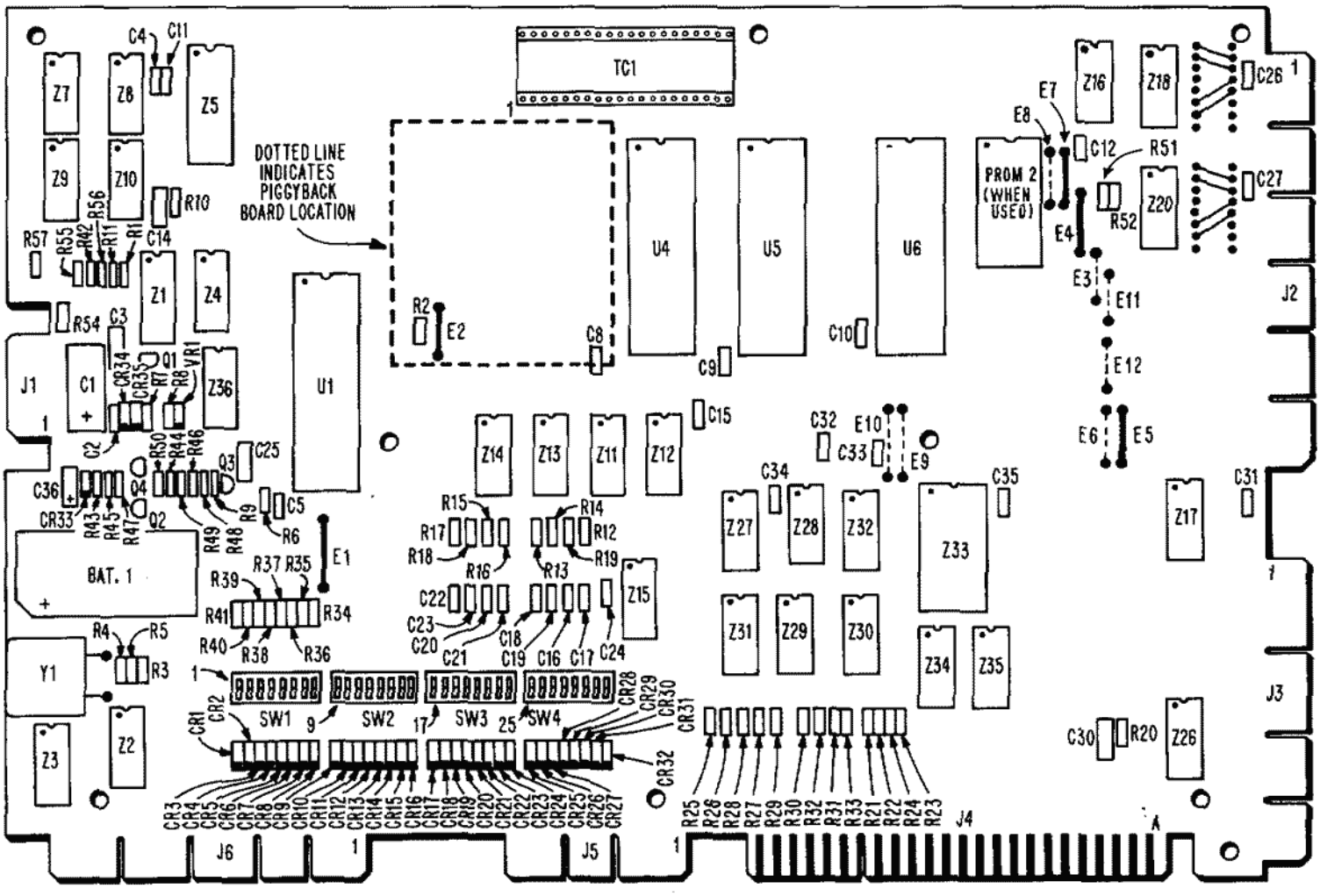


CONTROL BOARD (A1), PIGGYBACK PARTS LIST

REFERENCE	DESCRIPTION	PART NUMBER
	Control Board (A1), Piggyback	MA689
A1	Game Prom, 2764	XO-489
A2	IC, 7404 Inverter	XO-402
C1	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
	CONTROL BOARD	MA-774
Bat. 1	Battery-3.6V NI-CAD	XO-458
C1	Capacitor, 100 mfd., 10V	XO-211
C2, C4, C5, C8-C12, C15-C24, C26, C27, C31-C35	Capacitor, .01 mfd., 50V	XO-229
C3, C14, C25, C30	Capacitor, .1 mfd., 50V	XO-230
C36	10 mfd., 10V, TNT-AX CAP	XO-209
CR1-CR35	Diode, GP 1N4148	XO-261
Q1, Q4	Transistor-PNP MPS-A70	XO-309
Q2, Q3	Transistor, NPN (Motorola) 2N4400	XO-313
R1, R6 R11-R24 R42, R45, R46, R48, R51, R52, R54-R57	Resistor, 3.0K ohm, 5%, ¼W	XO-23
R2, R34-R41	Resistor, 4.7K ohm, 5%, ¼W	XO-7
R3, R43, R49	Resistor, 5.6K ohm, 5%, ¼W	XO-19
R4, R5, R44	Resistor, 2.0K ohm, 5%, ¼W	XO-14
R7	Resistor, 62 ohm, 5%, ¼W	XO-3
R8, R50	Resistor, 180 ohm, 5%, ¼W	XO-24
R9	Resistor, 1K ohm, 5%, ¼W	XO-5
R10	Resistor, 2.7M ohm, 5%, ¼W	XO-13
R25-R33	Resistor, 620 ohm, 5%, ¼W	XO-4
R47	Resistor, 24K ohm, 5%, ¼W	XO-10
SW1-SW4	Dip Switch 1008-692	XO-505
TC1	Socket, 40 Pin 640379-3	XO-530
U1	CPU R6502P	XO-360
U4, U5, U6	PRIOT R6532P	XO-361
VR1	Diode-3.0V, 5% 1N5225B or 1N5987B	XO-269
Y1	Crystal, 3.579545 MHZ	XO-456
Z1	IC-Cmos-Dual 1 Shot SCL4528BE	XO-414
Z2	IC-Dual Flip Flop SN7474N	XO-423
Z3, Z11, Z12, Z16, Z17, Z26, Z27, Z34, Z35	IC-Hex Inverter SN7404N	XO-402
Z4	IC-Cmos-Quad 2 Input "And" SCL4081BE	XO-401
Z5	IC-Static Ram 5101-L	XO-356
Z7	IC-Hex Inverter SN74LS04N	XO-418
Z8	IC-2 Input "Nor" SN7402N	XO-421
Z9, Z13, Z14	IC-2 Input "Nand" SN7400N	XO-420
Z10	IC-Open Collector Inverter SN74LS05N	XO-411
Z15	IC-2 Input "Or" SN7432N	XO-407
Z18, Z20	IC-"D" Flip Flop SN74175N	XO-410
Z33	IC-4-16 Decoder SN74154N	XO-409
Z28	IC-2 to 4 Decoder SN74LS139N	XO-419
Z29, Z30	IC-Hex Inverter—OC/HV SN7416N	XO-405
Z31	IC-2 Input "And" SN7408N	XO-404
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 ±5%, 1/4W.
2. CAPACITORS ARE .01UF, 50V.
3. DIODES ARE TYPE 1N4148.
4. REF. DESIGNATION Z6 NOT USED

SPARE GATES

Z3 7404
Z12 7404
Z27 7404
Z29 7416
Z29 7416
Z36 4069
Z36 4069
Z30 7416
Z32 7417
Z32 7417
Z9 7400
Z9 7400
Z36 4069
Z36 4069

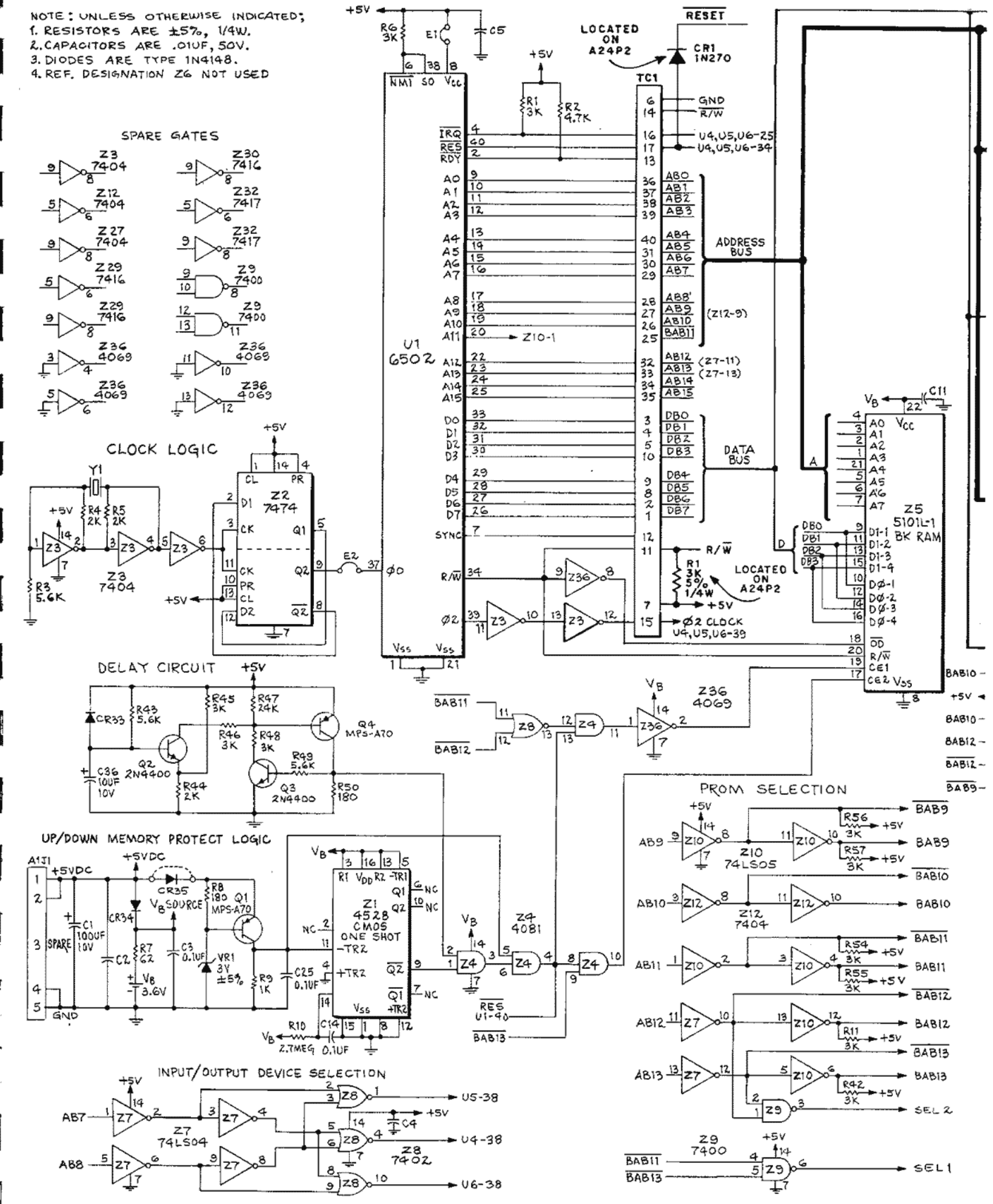
CLOCK LOGIC

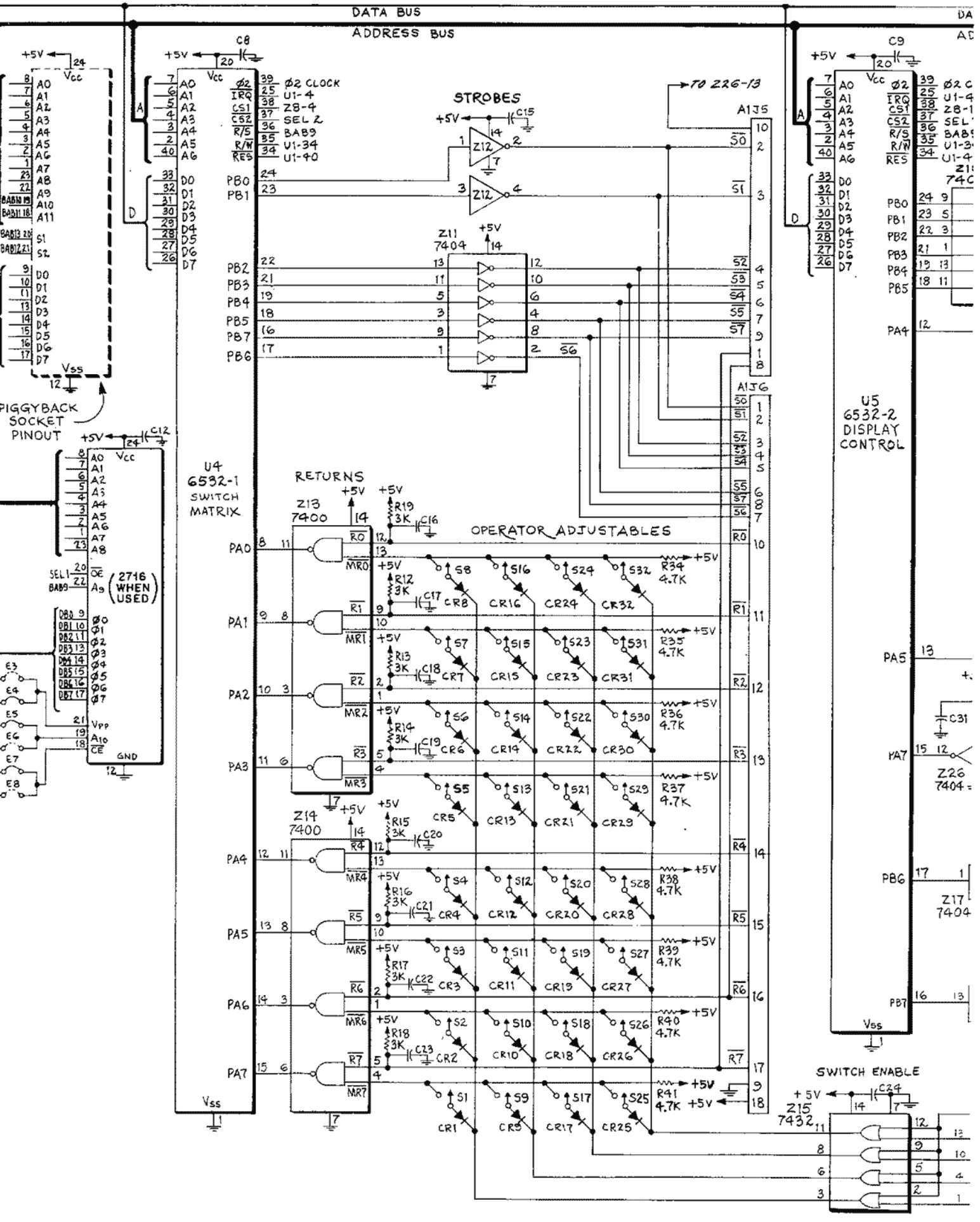
DELAY CIRCUIT

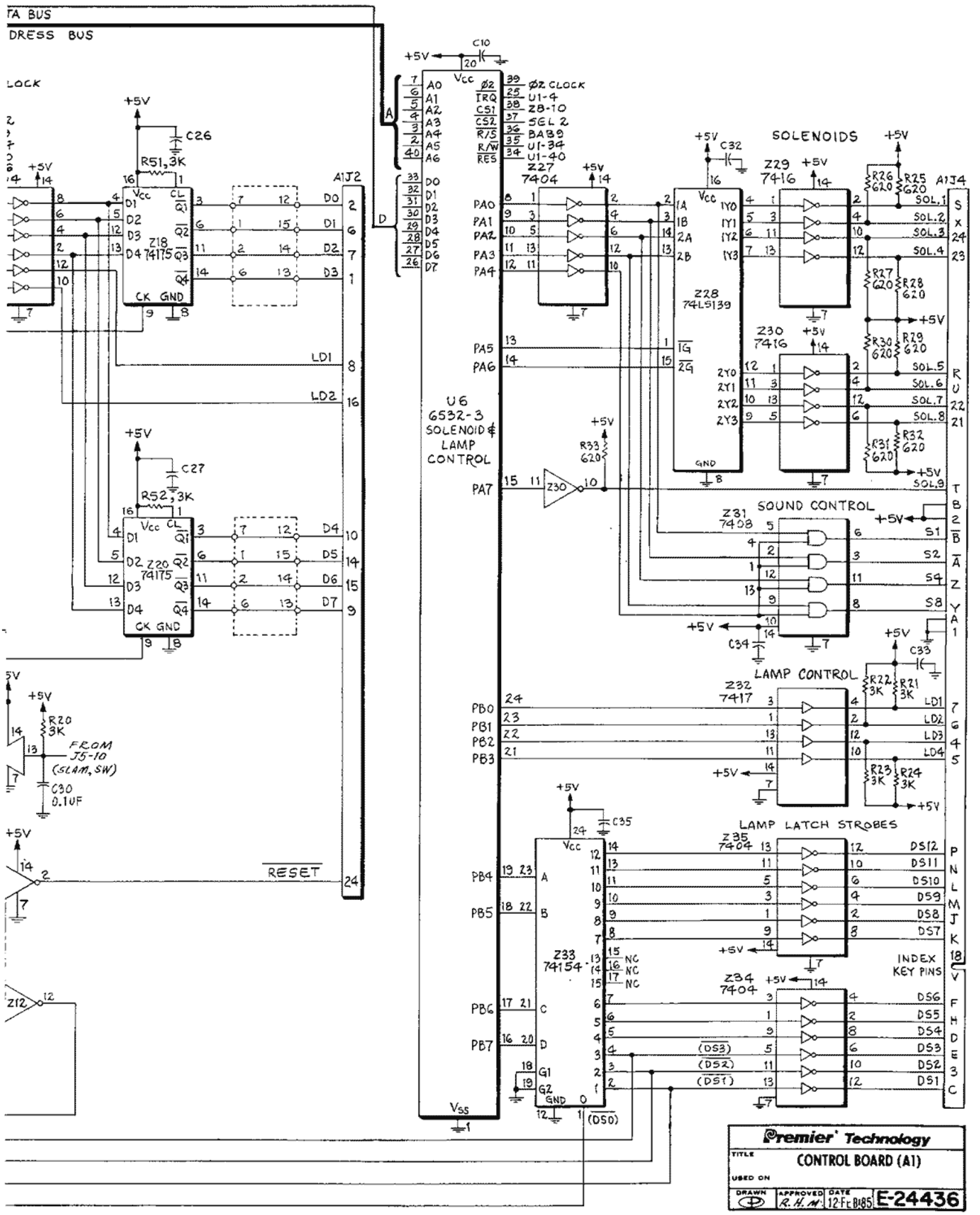
UP/DOWN MEMORY PROTECT LOGIC

INPUT/OUTPUT DEVICE SELECTION

PROM SELECTION




DATA BUS
ADDRESS BUS
STROBES
TO Z26-13
U4
6532-1
SWITCH
MATRIX
RETURNS
OPERATOR ADJUSTABLES
U5
6532-2
DISPLAY
CONTROL
PIGGYBACK
SOCKET
PINOUT
2716
WHEN
USED
SWITCH ENABLE
Z13
7400
Z14
7400
Z11
7404
Z12
Z15
7432
Z26
7404
Z17
7404
A1J5
A1J6
Vcc
Vss
+5V
GND



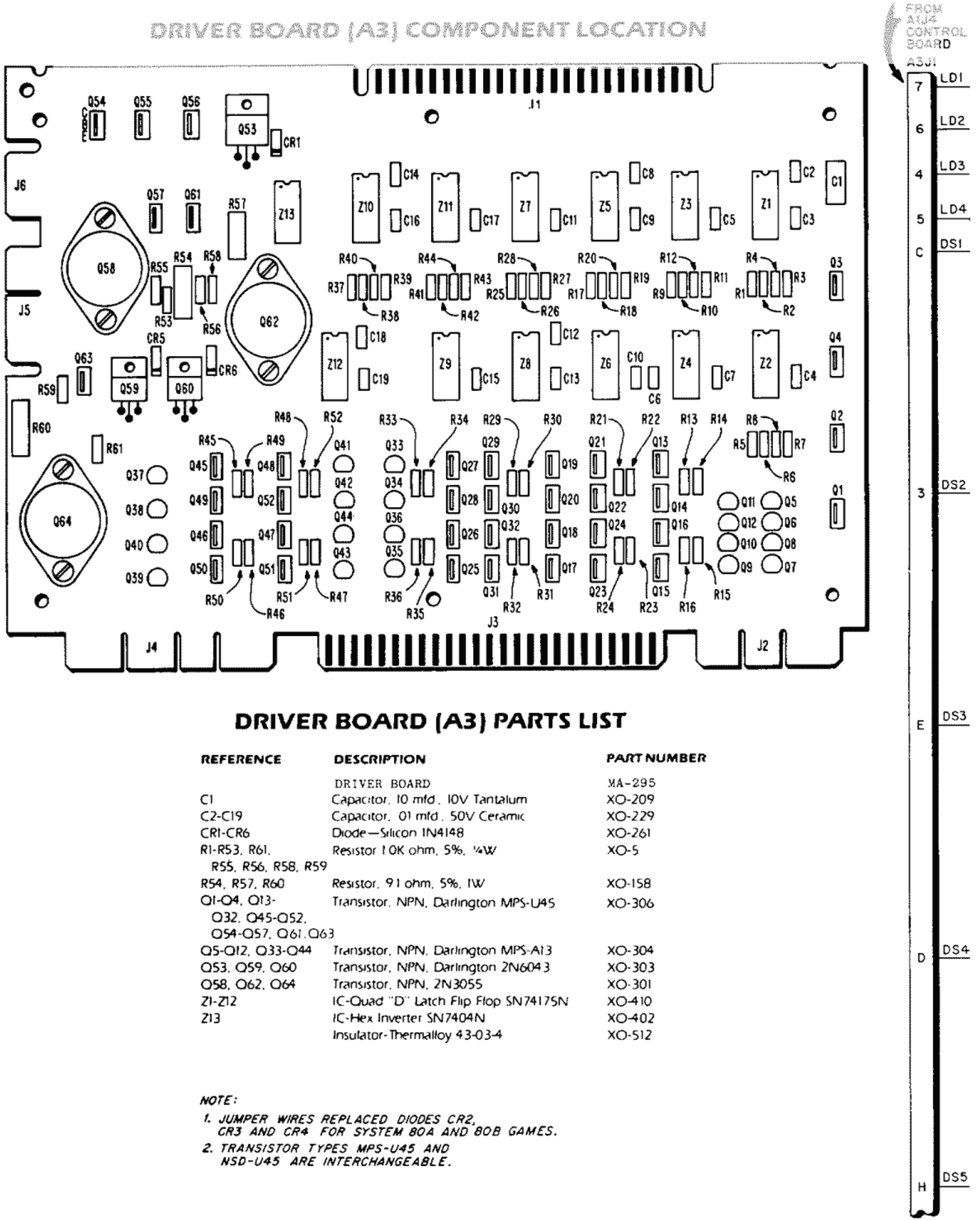
Premier Technology

TITLE: CONTROL BOARD (A1)

USED ON

DRAWN	APPROVED	DATE	E-24436
	R.H.M.	12 Feb 85	

DRIVER BOARD (A3) COMPONENT LOCATION

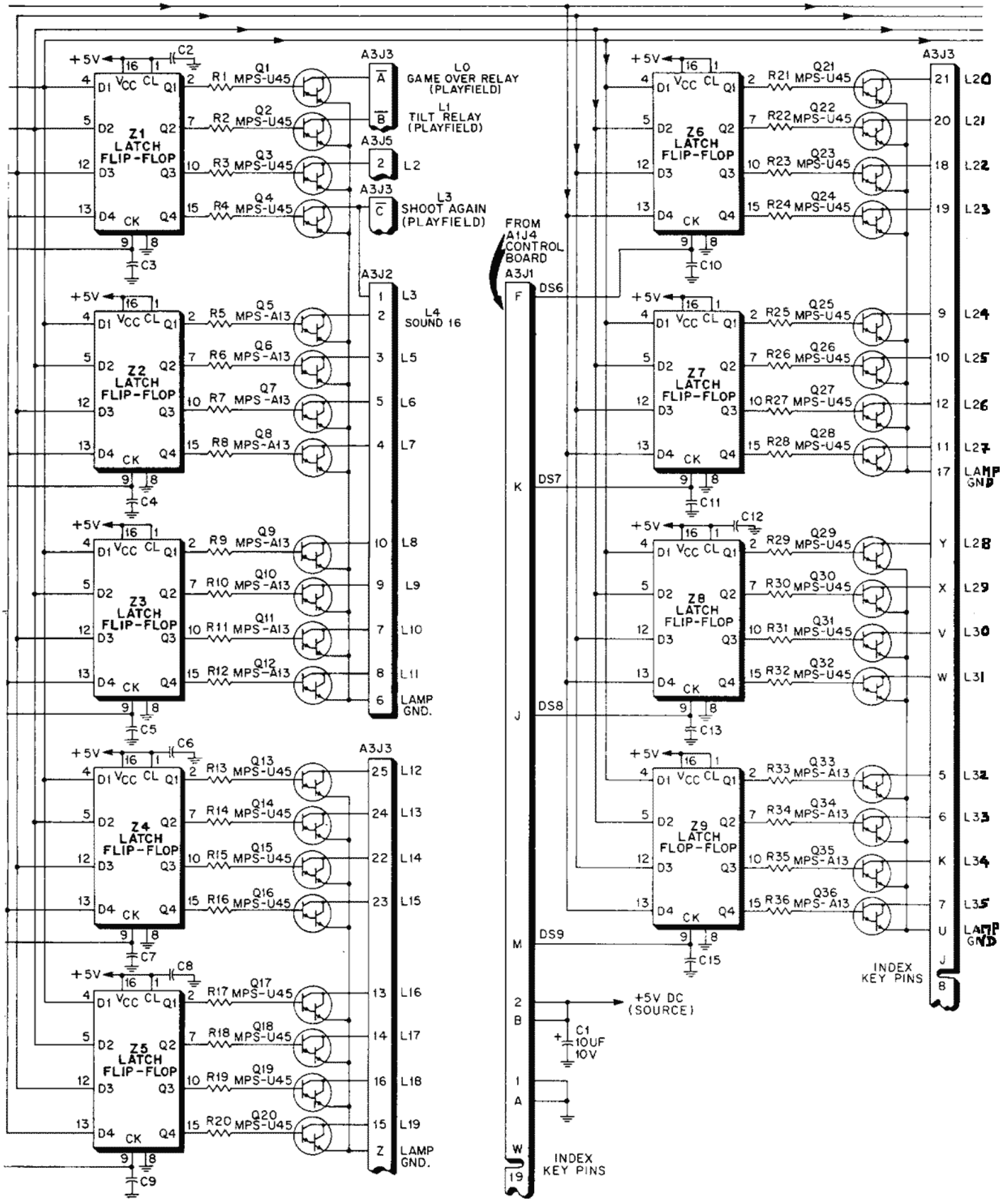


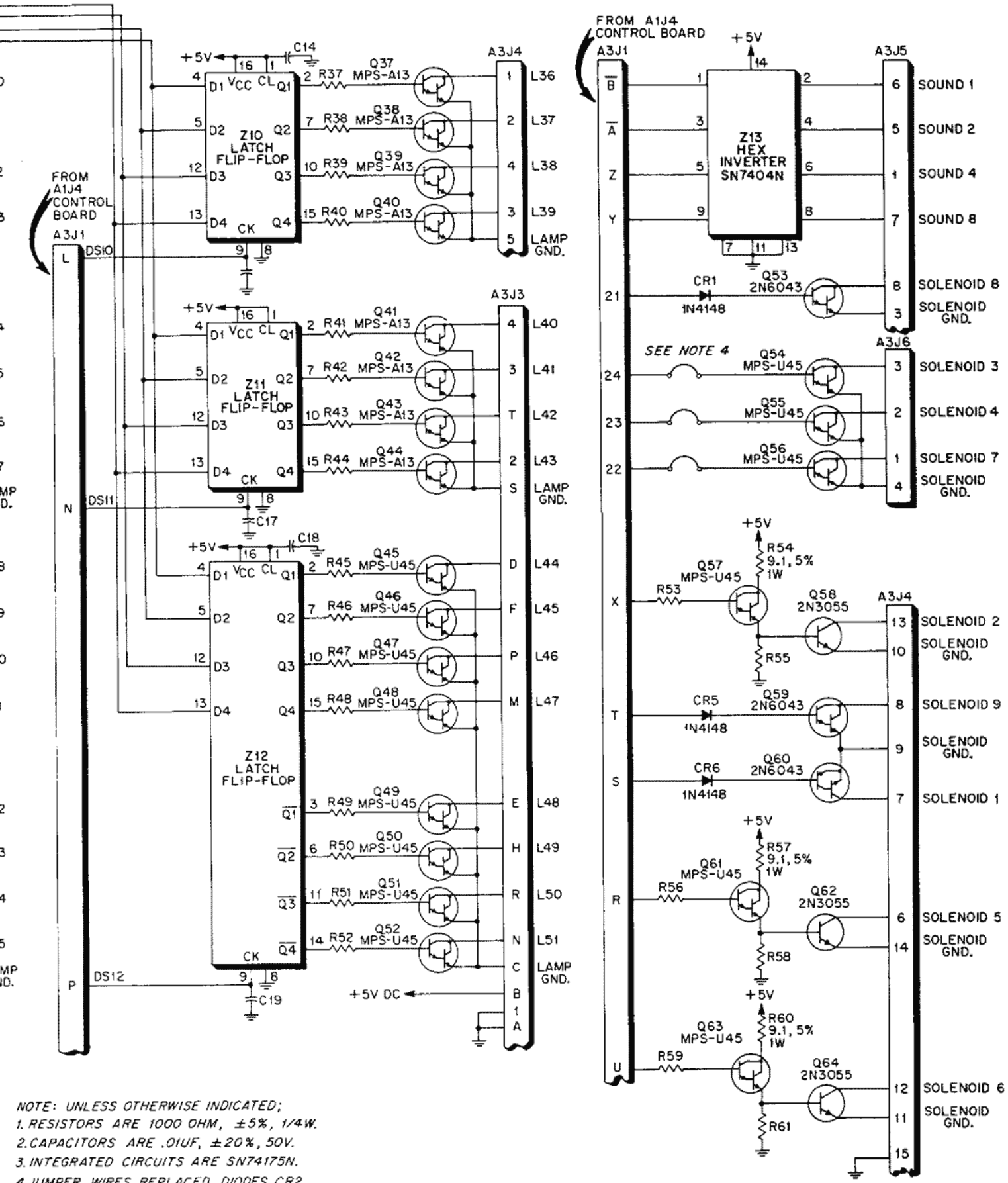
DRIVER BOARD (A3) PARTS LIST

REFERENCE	DESCRIPTION	PART NUMBER
	DRIVER BOARD	MA-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, R55, R56, R58, R59	Resistor 10K ohm, 5%, ¼W	XO-5
R54, R57, R60	Resistor, 91 ohm, 5%, 1W	XO-158
Q1-Q4, Q13-Q32, Q45-Q52, 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 80A AND 80B GAMES.*
2. *TRANSISTOR TYPES MPS-U45 AND NSD-U45 ARE INTERCHANGEABLE.*


+5V
C2
Z1 LATCH FLIP-FLOP
Z2 LATCH FLIP-FLOP
Z3 LATCH FLIP-FLOP
Z4 LATCH FLIP-FLOP
Z5 LATCH FLIP-FLOP
Z6 LATCH FLIP-FLOP
Z7 LATCH FLIP-FLOP
Z8 LATCH FLIP-FLOP
Z9 LATCH FLOP-FLOP
Q1 MPS-U45
Q2 MPS-U45
Q3 MPS-U45
Q4 MPS-U45
Q5 MPS-A13
Q6 MPS-A13
Q7 MPS-A13
Q8 MPS-A13
Q9 MPS-A13
Q10 MPS-A13
Q11 MPS-A13
Q12 MPS-A13
Q13 MPS-U45
Q14 MPS-U45
Q15 MPS-U45
Q16 MPS-U45
Q17 MPS-U45
Q18 MPS-U45
Q19 MPS-U45
Q20 MPS-U45
Q21 MPS-U45
Q22 MPS-U45
Q23 MPS-U45
Q24 MPS-U45
Q25 MPS-U45
Q26 MPS-U45
Q27 MPS-U45
Q28 MPS-U45
Q29 MPS-U45
Q30 MPS-U45
Q31 MPS-U45
Q32 MPS-U45
Q33 MPS-A13
Q34 MPS-A13
Q35 MPS-A13
Q36 MPS-A13
A3J3
L0 GAME OVER RELAY (PLAYFIELD)
L1 TILT RELAY (PLAYFIELD)
A3J5
L2
A3J3
L3 SHOOT AGAIN (PLAYFIELD)
A3J2
L3
L4 SOUND 16
L5
L6
L7
L8
L9
L10
L11
LAMP GND.
A3J3
L12
L13
L14
L15
L16
L17
L18
L19
LAMP GND.
FROM A1J4 CONTROL BOARD
A3J1
DS6
DS7
DS8
DS9
+5V DC (SOURCE)
C1 10UF 10V
INDEX KEY PINS
A3J3
L20
L21
L22
L23
L24
L25
L26
L27
LAMP GND
L28
L29
L30
L31
L32
L33
L34
L35
LAMP GND
INDEX KEY PINS



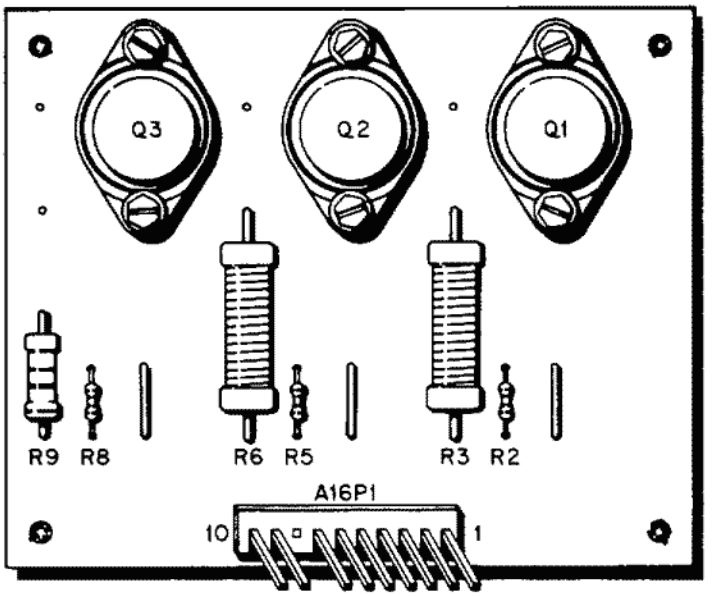
NOTE: UNLESS OTHERWISE INDICATED;

1. *RESISTORS ARE 1000 OHM, ±5%, 1/4W.*
2. *CAPACITORS ARE .01UF, ±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.*

Premier Technology			
TITLE: DRIVER BOARD (A3)			
USED ON			
DRAWN	APPROVED	DATE	E-20915
	BAM	12-12-80	

X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS

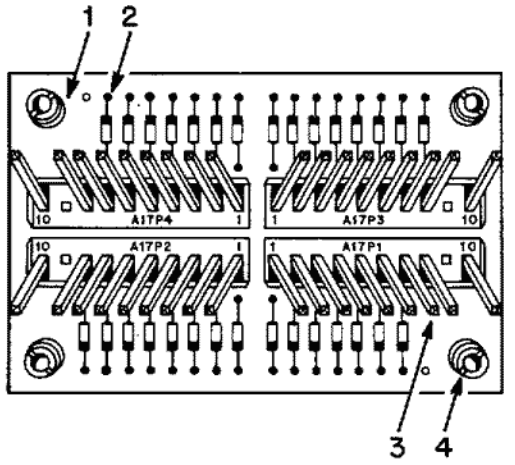
TRANSISTOR DRIVER BOARD (A16) COMPONENT LOCATION



TRANSISTOR DRIVER BOARD (A16) PARTS LIST

REFERENCE	DESCRIPTION	PART NUMBER
	Transistor Driver Board Assembly (1A16 and 2A16)	MA985
Q1-Q3	Transistor, MJ2955	XO-799
R2, R5, R8	Resistor, 4.7K Ohm, 5%, 1/4W	XO-7
R3, R6	Resistor, 4 Ohm, 5%, 7W	XO-878
R9	Resistor, 30 Ohm, 5%, 2W	XO-155
P1	10 Position Connector	XO-879
	Circuit Board Support (4)	MP-40

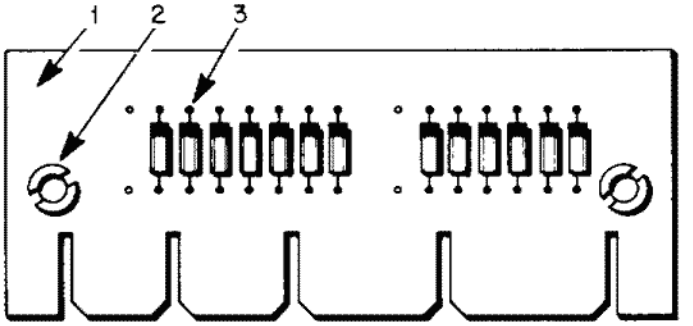
DIODE BOARD (A17)



DIODE BOARD (A17)

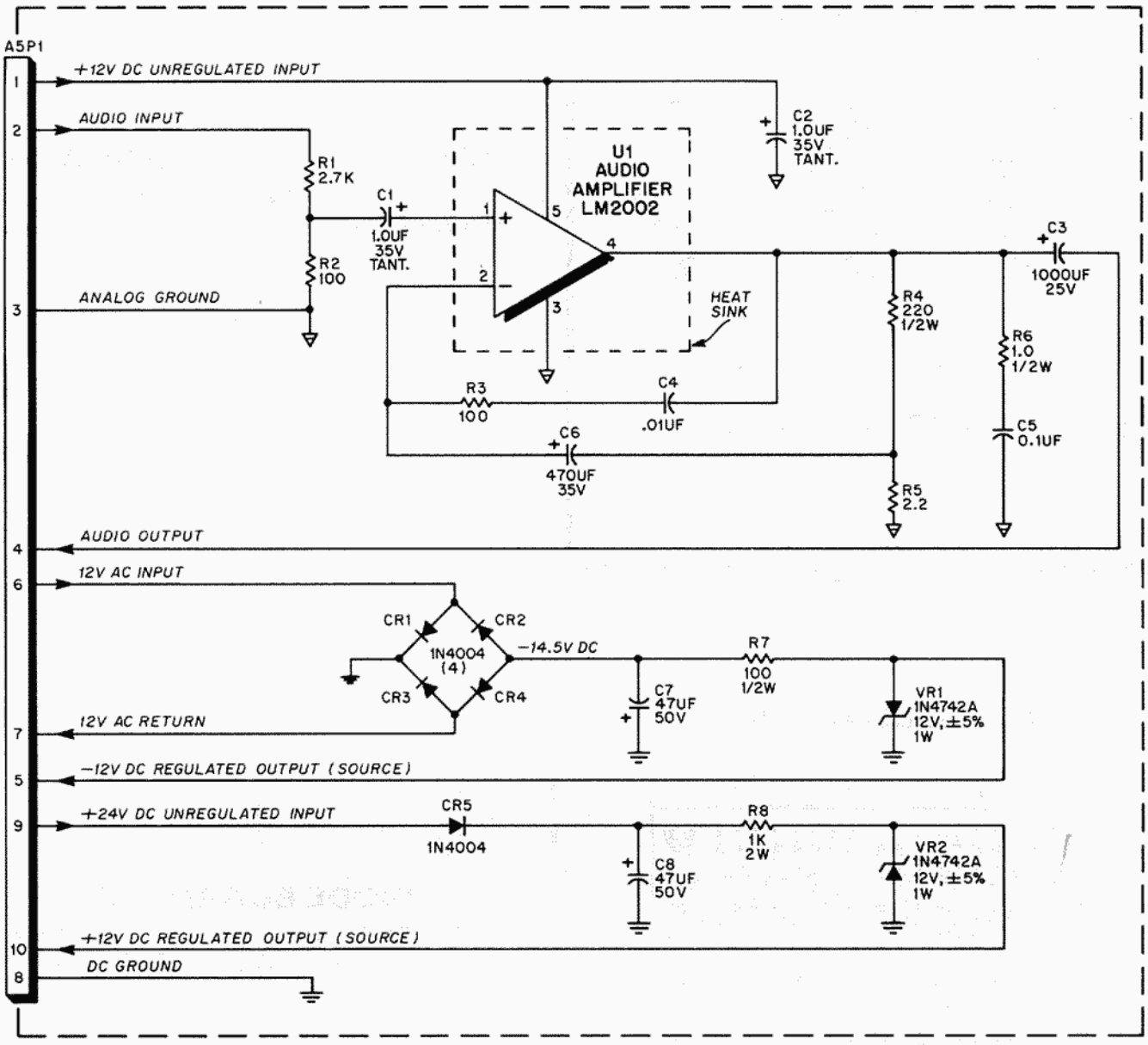
ITEM	DESCRIPTION	PART NO.
1	Diode Board Assembly	MA-987
2	Diode, 1N270 (30)	XO-265
3	10 Position Connector (4)	XO-879
4	Spacer (4)	23984

DIODE BOARD (A7)

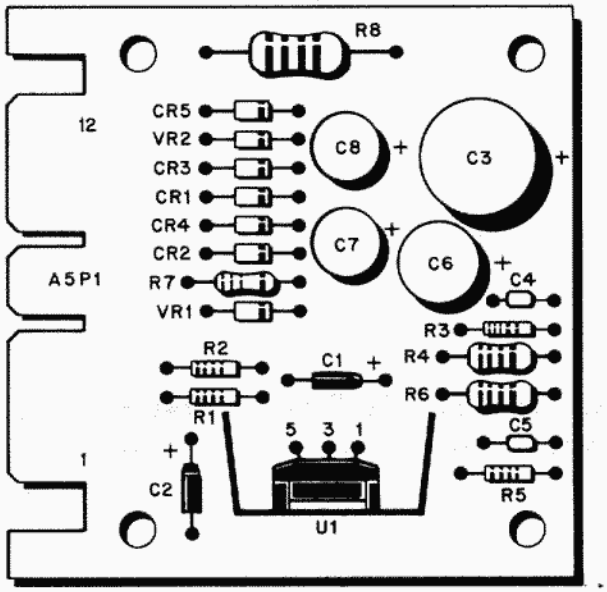


DIODE BOARD (A7) PARTS LIST

ITEM	DESCRIPTION	PART NO.
1	Diode Board Assembly (A7)	23941
2	Spacer (2)	23984
3	Diode, 1N270 (13)	XO-265



AUXILIARY POWER SUPPLY (A5) COMPONENT LOCATION



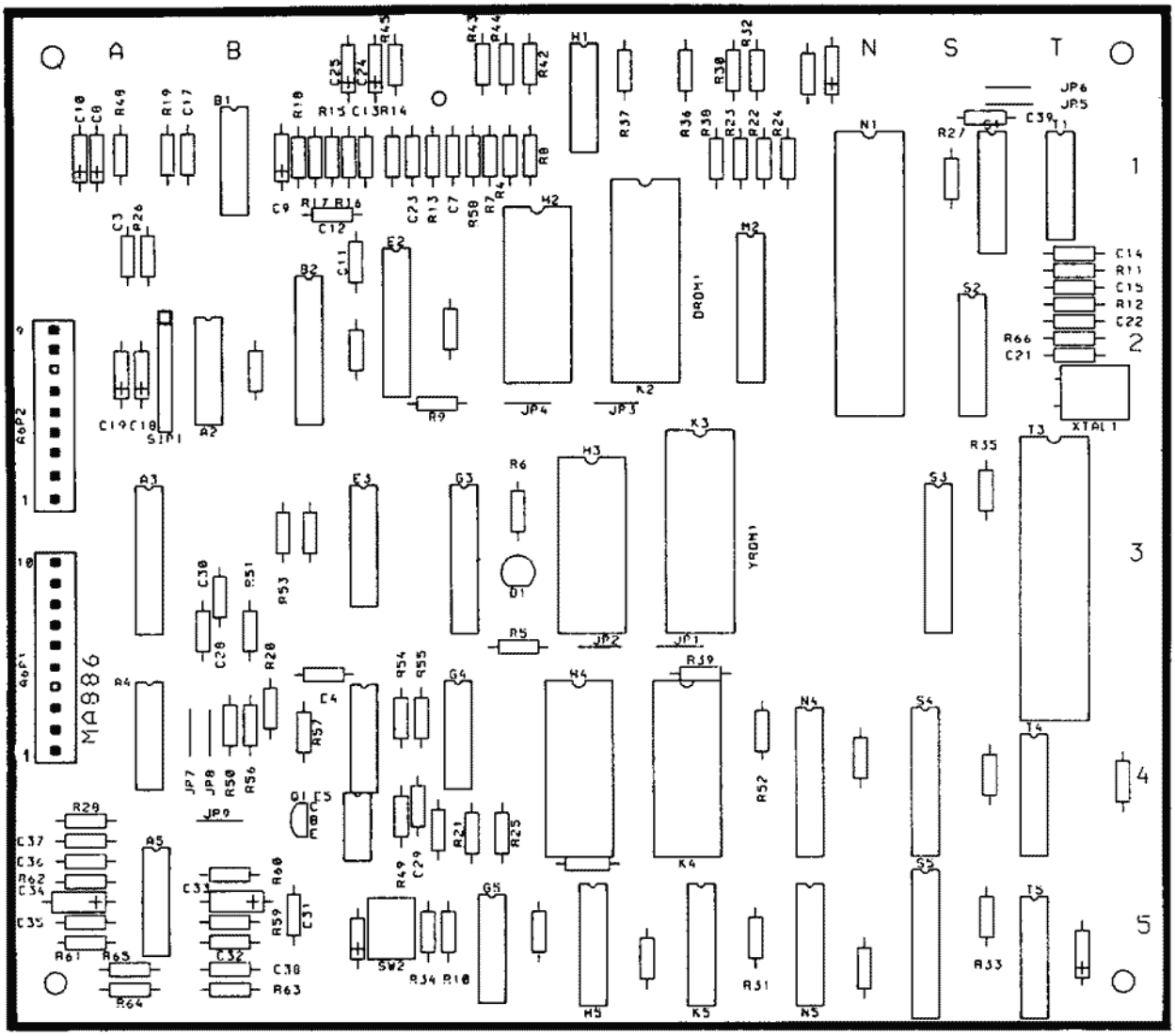
Premier Technology			
TITLE: AUXILIARY POWER SUPPLY (A5)			
USED ON			
DRAWN	APPROVED	DATE	
	R. H. M.	9-OCT-85	E-24715

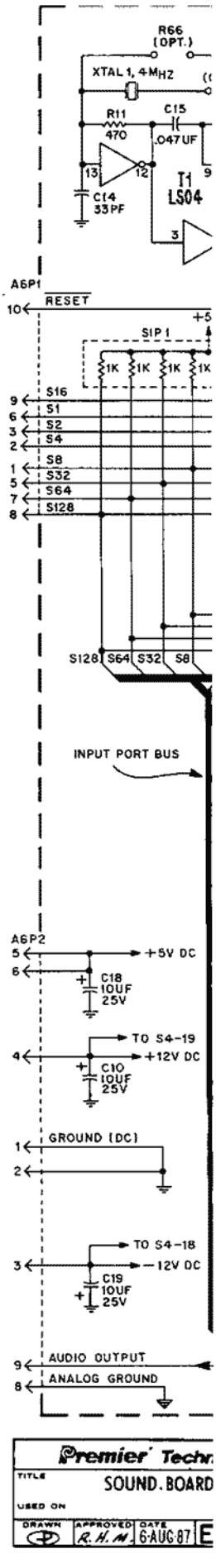
AUXILIARY POWER SUPPLY (A5) PARTS LIST

REFERENCE	DESCRIPTION	PART NUMBER
	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

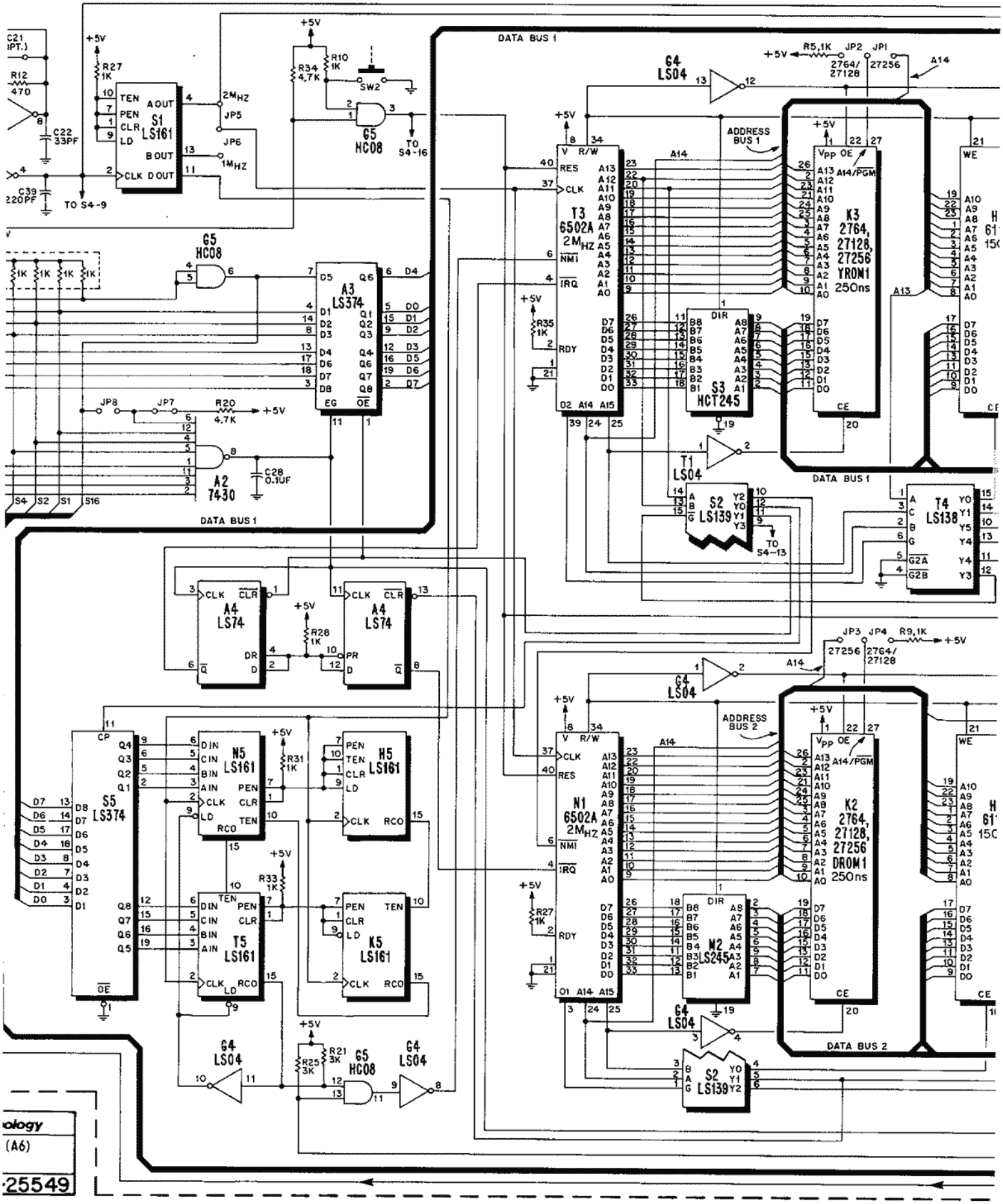
REFERENCE	DESCRIPTION	PART NUMBER
	Sound Board Assembly	MA-886
C7,C13,C17, C23,C29,C37	Capacitor, 1UF, 20%, 50V (Non-Polarized)	XO-746
C8,C9,C10, C18,C19,C24, C25,C33,C34 AND THREE UNMARKED CAPACITORS	Capacitor, 10UF, 20%, 25V (Tantalum)	XO-127
C11,C12	Capacitor, 10PF, +80%-20%, 50V	XO-635
C14,C22	Capacitor, 33PF, 10%, 100V	XO-896
C15	Capacitor, .047UF, 20%, 50V	XO-638
C28,C30,AND FOURTEEN UNMARKED CAPACITORS	Capacitor, 0.1UF, +80%-20%, 50\	XO-230
C31,C32	Capacitor, 0.1UF, 10%, 50V	XO-784
C35	Capacitor, 1000PF, 10%, 100V	XO-296
C36	Capacitor, 2200PF, 10%, 100V	XO-289
C38	Capacitor, .0033UF, 10%, 100V	XO-600
C39	Capacitor, 220PF, 10%, 100V	XO-694
D1	Diode, MV5752, (LED, Red)	XO-270
R4,R7,R8, R22,R23	Resistor, 68 Ohm, 5%, 1/4W	XO-748
R5,R9,R10, R27,R28,R31, R33,R35,R39, R52,R54,R55	Resistor, 1K Ohm, 5%, 1/4W	XO-5
R6	Resistor, 240 Ohm, 5%, 1/4W	XO-173
R11,R12	Resistor, 470 Ohm, 5%, 1/4W	XO-35
R13,R14, R21,R25	Resistor, 3K Ohm, 5%, 1/4W	XO-23
R15	Resistor, 18K Ohm, 5%, 1/4W	XO-762
R16,R17,R30, R32,R38,R42, R43,R44, R50,R51	Resistor, 10K Ohm, 5%, 1/4W	XO-18
R18,R53	Resistor, 6.8K Ohm, 5%, 1/4W	XO-8
R20,R34	Resistor, 4.7K Ohm, 5%, 1/4W	XO-7
R24,R56	Resistor, 2.2K Ohm, 5%, 1/4W	XO-27
R36,R45,R61, R62,R63,R64	Resistor, 33K Ohm, 5%, 1/4W	XO-43
R37	Resistor, 2.7K Ohm, 5%, 1/4W	XO-6
R49,R59,R60	Resistor, 100K Ohm, 5%, 1/4W	XO-45
R57	Resistor, 12K Ohm, 5%, 1/4W	XO-9
R65	Resistor, 27K Ohm, 5%, 1/4W	XO-11
A2	IC, 7430, 8 Input NAND Gate	XO-643
A3,B2,S5	IC, 74LS374, Octal "D" Flip Flop	XO-96
A4,E4,	IC, 74LS74, Dual "D" Flip Flop	XO-434
A5,B1,H1	IC, LM324, Quad Op-Amp	XO-644
E2	IC, AD7528J, Multiplier DAC	XO-647
E3	IC, 74HC592, 8 Bit Counter	XO-892
E5	IC, MF-4CN-50,Switched Capacitor Filter	XO-894
G3,N4	IC, 74LS377, Octal "D" Flip Flop	XO-97
G4,T1	IC, 74LS04, Hex Inverter	XO-418
G5	IC, 74HC08, Quad 2 Input "AND" Gate	XO-872
H2,H3	IC, 6116P-3, 2K x 1 RAM	XO-193
H4,K4	IC, AY-3-8913, Sound Generator	XO-646
H5,K5,N5,	IC, 74LS161, Synchronous Presettable Binary Counter	XO-440
S1,T5	IC, Specified Per Game	
K2,K3	IC, 74LS245, Octal Bus Transceiver	XO-79
M2	IC, 6502A, CPU	XO-893
N1,T3	IC, 74LS139, Dual 1 of 4 Decoder	XO-419
S2	IC, 74HCT245, Octal Bus Tranceiver	XO-891
S3	IC, 74LS138, 1 of 8 Decoder	XO-437
T4	Transistor, 2N4264, Level Shifter	XO-895
Q1	Resistor Pack 8 x 1K Ohm	XO-493
SIP 1	Switch, Pushbutton	XO-897
SW2	Crystal, 4 MHZ	XO-366
XTAL 1	Connector (2)	XO-879
A6P1,A6P2		
	28 Pin Dip Socket (2)	XO-536
	Jumper, 22 Gauge (7)	XO-469

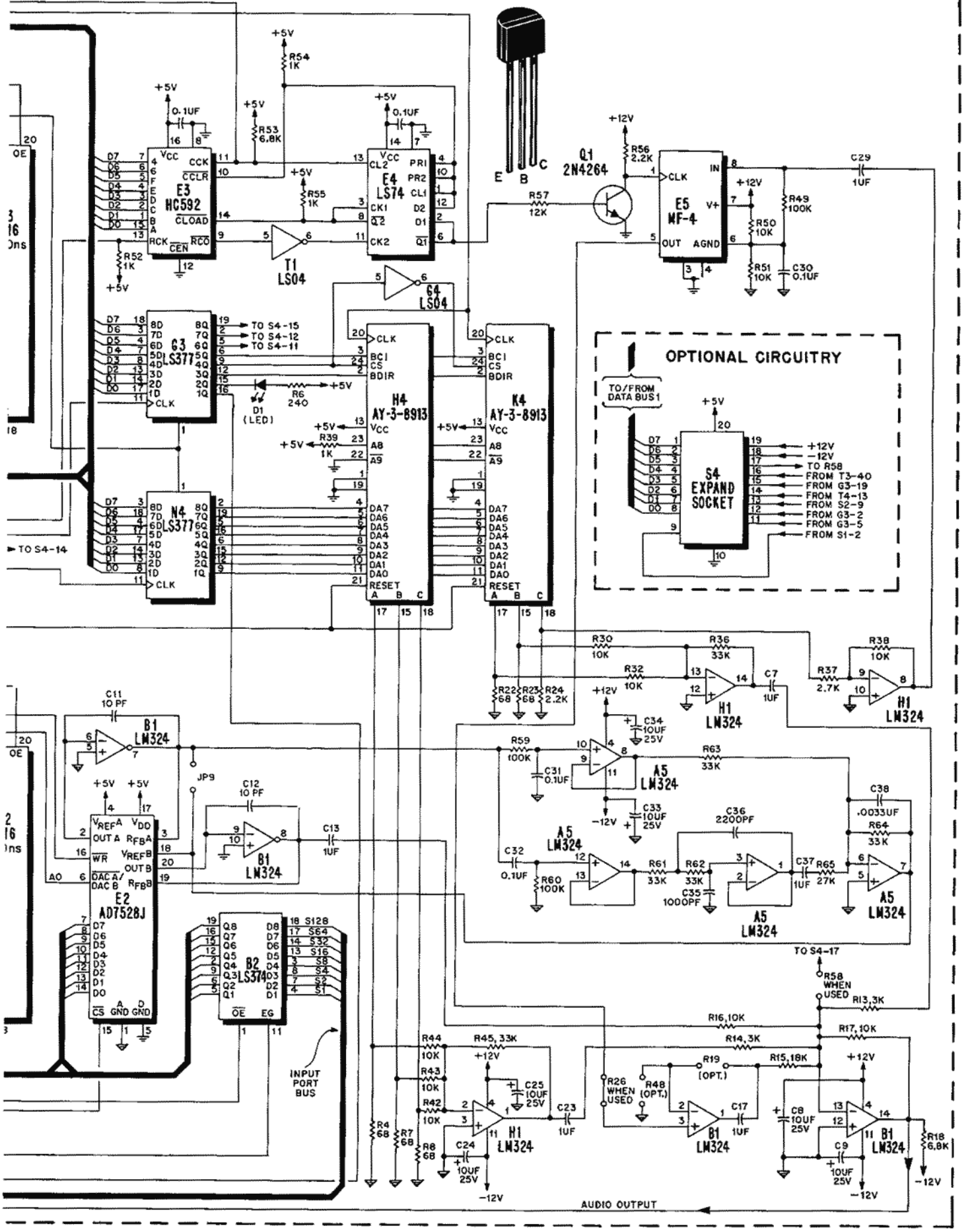
Premier Technology

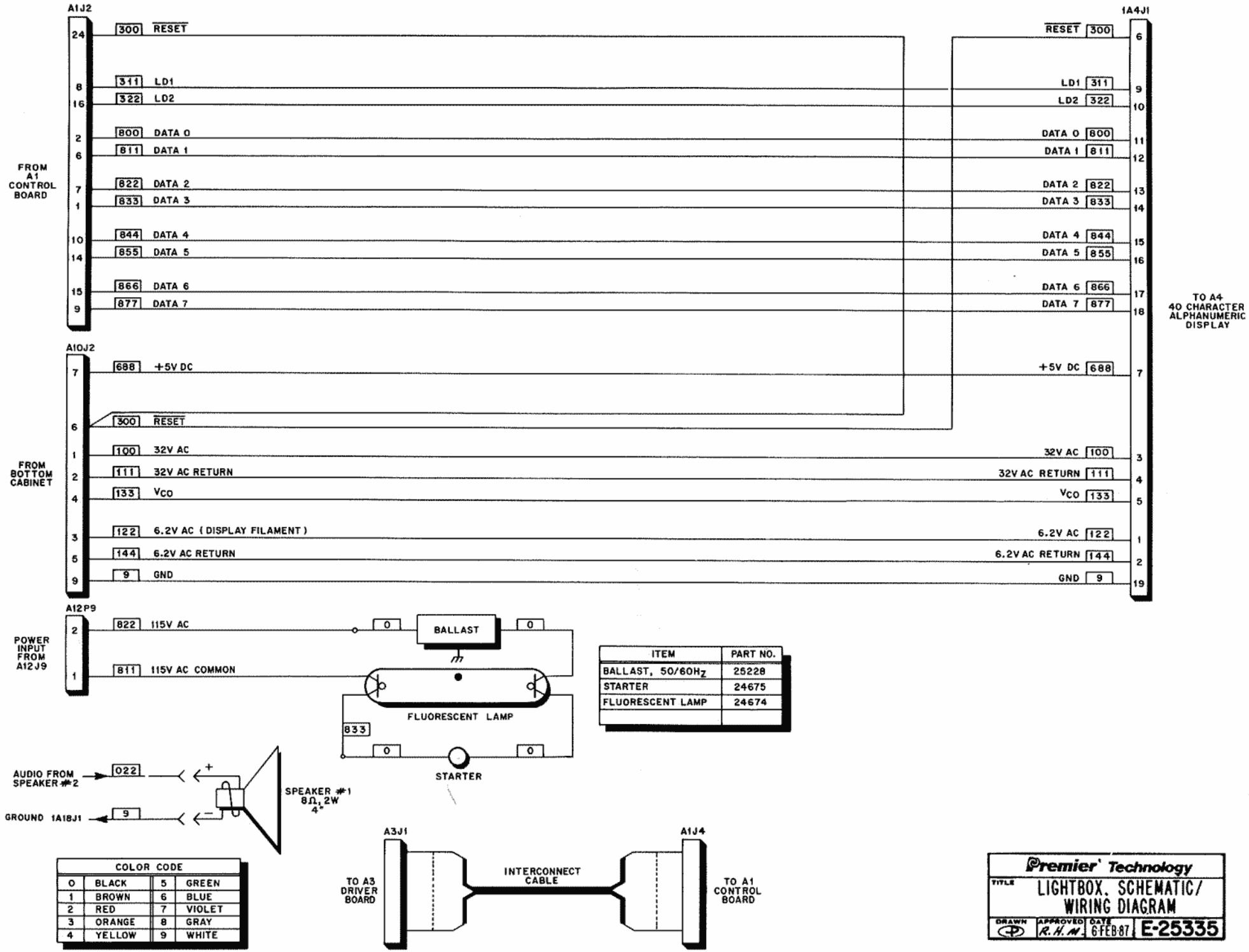
TITLE: SOUND BOARD

USED ON

DRAWN	APPROVED	DATE	
	R.H.M.	6-AUG-87	E


DATA BUS 1
DATA BUS 2
ADDRESS BUS 1
ADDRESS BUS 2
+5V
R27 1K
S1 LS161
2MHZ
1MHZ
JP5
JP6
TO S4-9
R10 1K
R34 4.7K
SW2
G5 HC08
TO S4-16
C21 (PT.)
R12 470
C22 33PF
C39 220PF
G5 HC08
A3 LS374
1K 1K 1K 1K
JP8 JP7 R20 4.7K
A2 7430
C28 0.1UF
S4 S2 S1 S16
T3 6502A 2MHZ
R35 1K
S3 HCT245
G4 LS04
T1 LS04
R5,1K JP2 JP1
2764/ 27128
27256
A14
K3 2764, 27128, 27256 YROM1 250ns
S2 LS139
TO S4-13
T4 LS138
A4 LS74
R28 1K
S5 LS374
N5 LS161
H5 LS161
T5 LS161
K5 LS161
R31 1K
R33 1K
R25 3K
R21 3K
N1 6502A 2MHZ
R27 1K
M2 LS245
JP3 JP4 R9,1K
K2 2764, 27128, 27256 DROM1 250ns
ology
(A6)
25549


OPTIONAL CIRCUITRY
TO/FROM DATA BUS1
S4 EXPAND SOCKET
+12V
-12V
TO R58
FROM T3-40
FROM G3-19
FROM T4-13
FROM S2-9
FROM G3-2
FROM G3-5
FROM S1-2
Q1 2N4264
E3 HC592
E4 LS74
E5 MF-4
T1 LS04
G4 LS04
G3 LS377
N4 LS377
H4 AY-3-8913
K4 AY-3-8913
E2 AD7528J
B2 LS374
B1 LM324
H1 LM324
A5 LM324
TO S4-14
TO S4-15
TO S4-12
TO S4-11
TO S4-17
D1 (LED)
JP9
INPUT PORT BUS
AUDIO OUTPUT
R58 WHEN USED
R26 WHEN USED
R48 (OPT.)
R19 (OPT.)



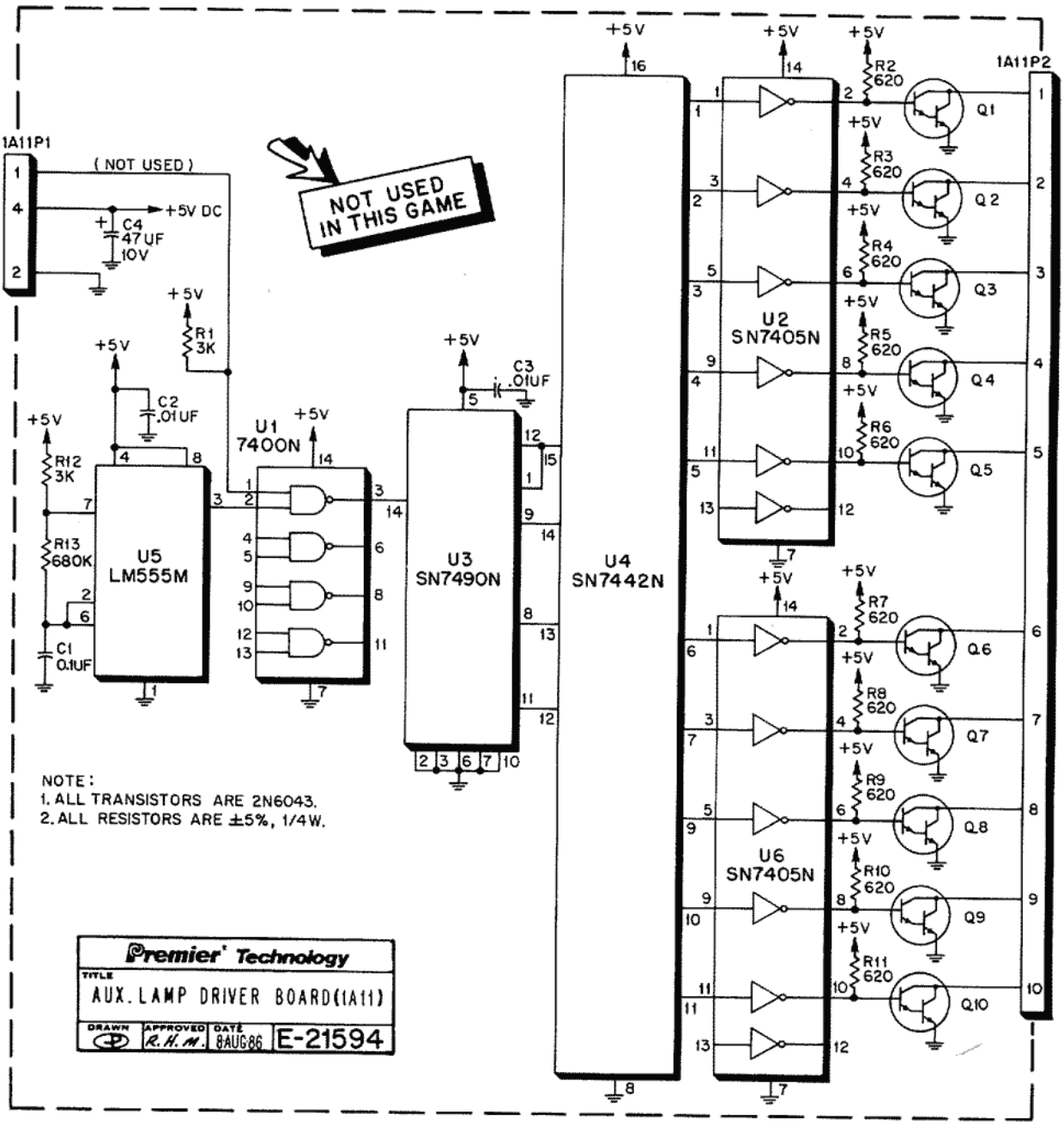
ITEM	PART NO.
BALLAST, 50/60Hz	25228
STARTER	24675
FLUORESCENT LAMP	24674

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

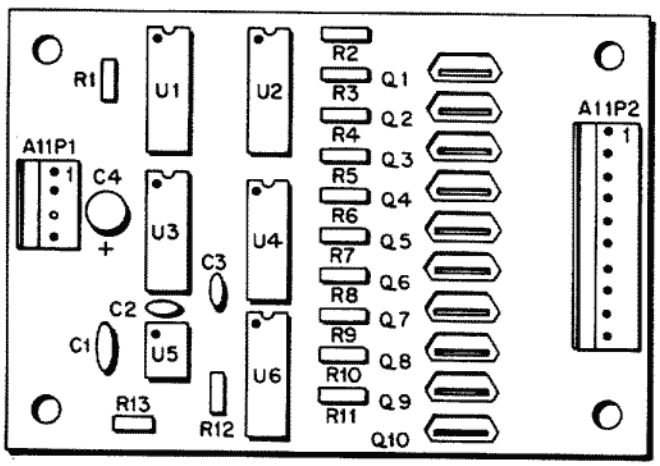
Premier Technology

TITLE: LIGHTBOX, SCHEMATIC/ WIRING DIAGRAM

DRAWN: CP | APPROVED: R.H.M. | DATE: 6 FEB 87 | E-25335



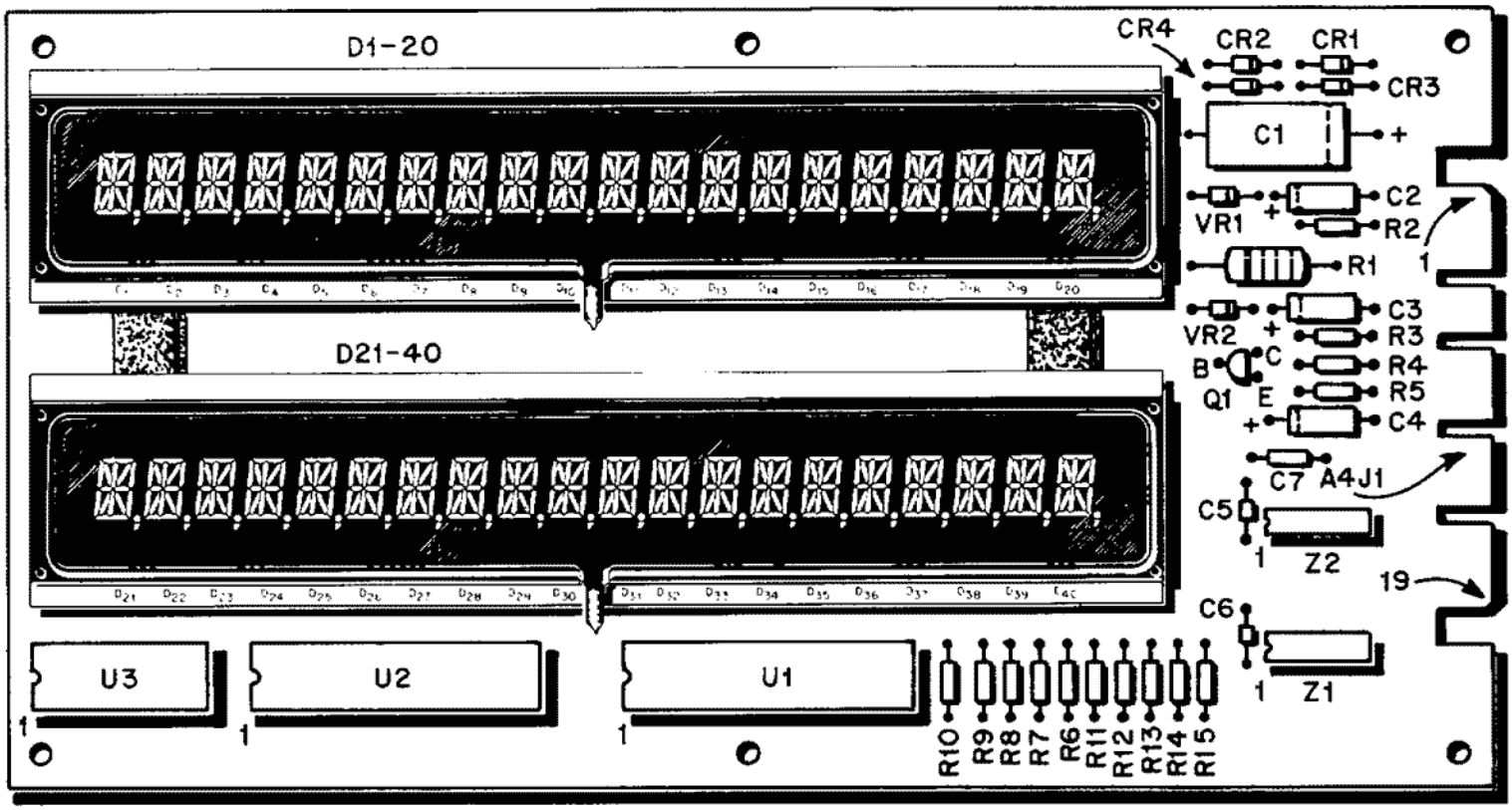
AUXILIARY LAMP DRIVER BOARD (A11) COMPONENT LOCATION



AUXILIARY LAMP DRIVER BOARD (A11) PARTS LIST

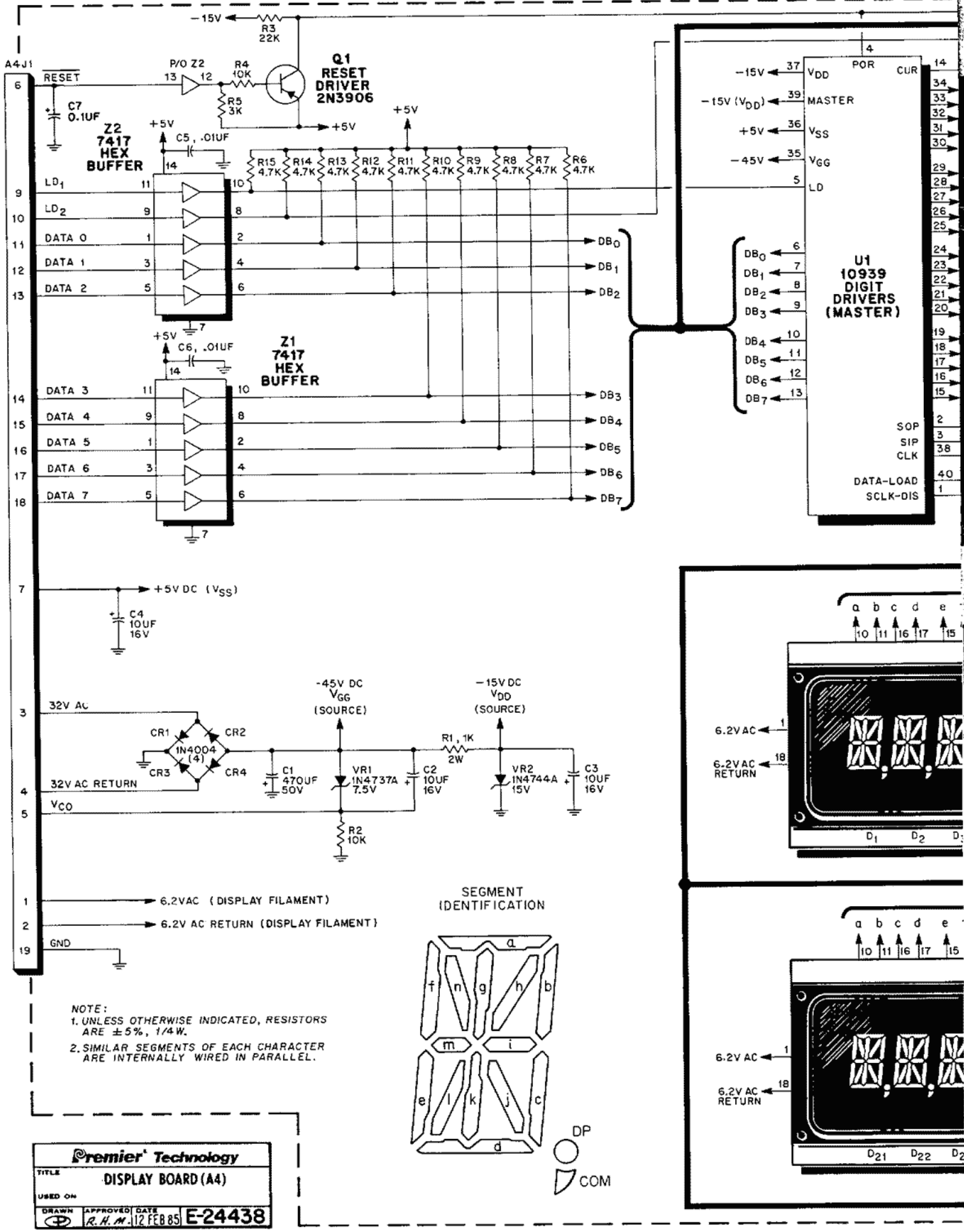
REFERENCE	DESCRIPTION	PART NUMBER
	AUXILIARY LAMP DRIVER ASSEMBLY	MA-866
C1	CAPACITOR, .1 MFD, 100V CERAMIC RADIAL LEAD	XO-626
C2-C3	CAPACITOR, .01 MFD, 100V RADIAL LEAD	XO-202
C4	CAPACITOR, 47 MFD, 10V ELECTROLYTIC RADIAL LEAD	XO-227
Q1-Q10	TRANSISTOR, 2N6043 NPN DARLINGTON	XO-303
R1,R12	RESISTOR, 3K OHM, 5%, 1/4 W	XO-23
R2-R11	RESISTOR, 620 OHM, 5%, 1/4W	XO-4
R13	RESISTOR, 680K OHM, 5%, 1/4W	XO-669
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

DISPLAY BOARD (A4) COMPONENT LOCATION



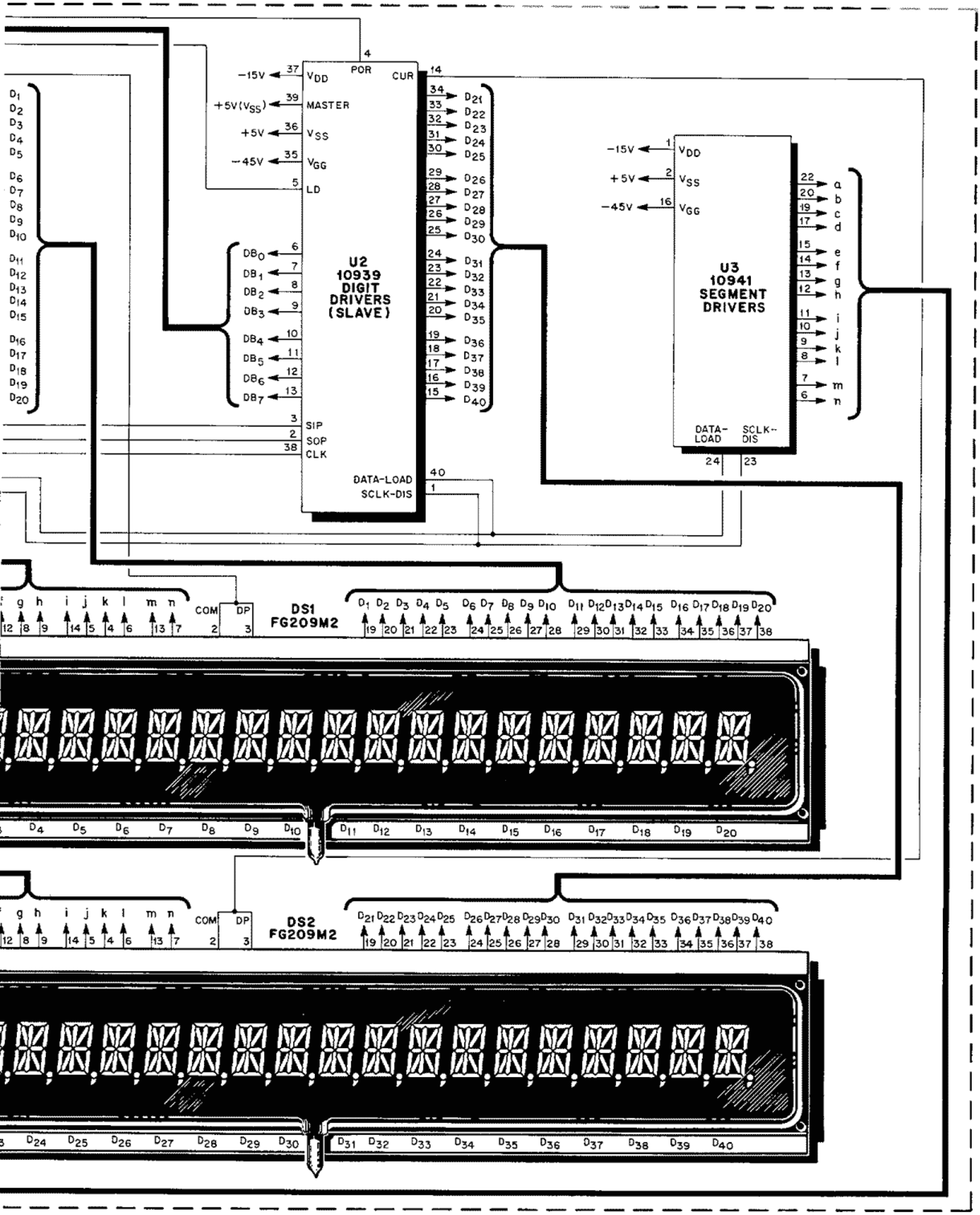
DISPLAY BOARD (A4) PARTS LIST

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-229
C7	Capacitor, 0.1UF, 50V	XO-230
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

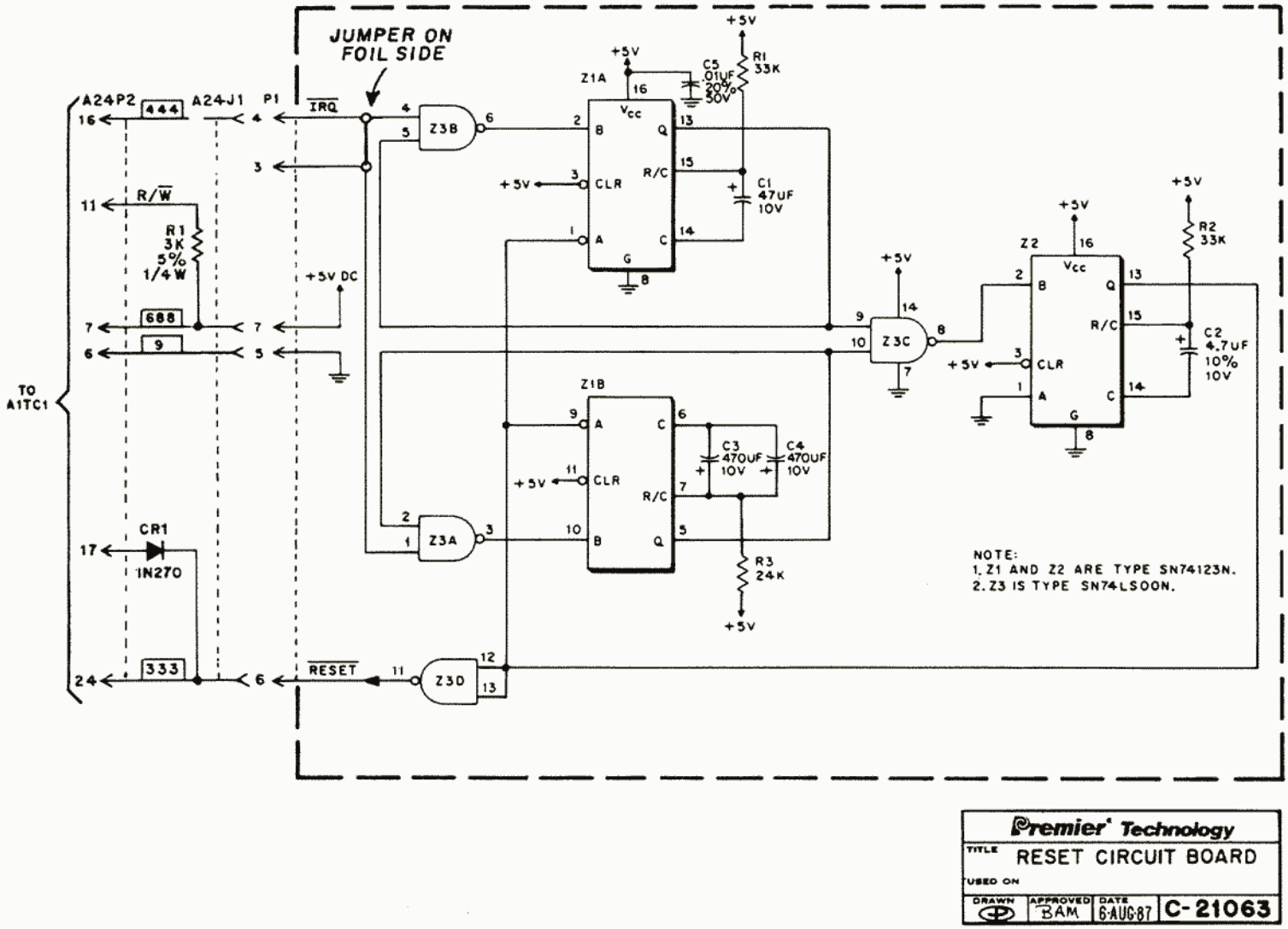


NOTE:
1. UNLESS OTHERWISE INDICATED, RESISTORS ARE ±5%, 1/4W.
2. SIMILAR SEGMENTS OF EACH CHARACTER ARE INTERNALLY WIRED IN PARALLEL.

Premier Technology			
TITLE: DISPLAY BOARD (A4)			
USED ON			
DRAWN	APPROVED R.H.M.	DATE 12 FEB 85	E-24438

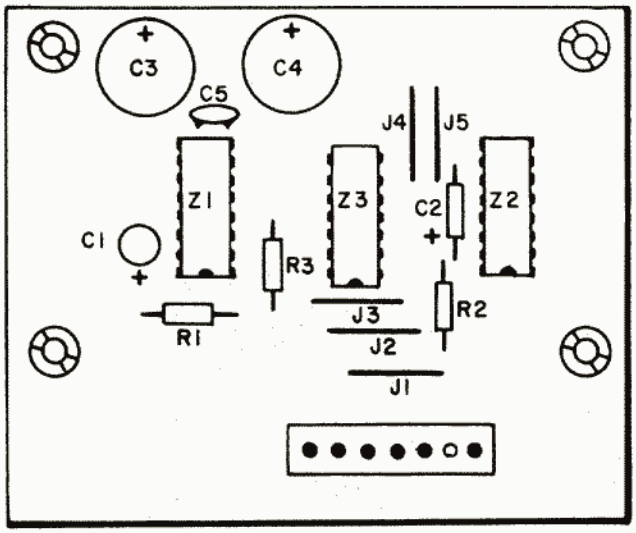

U2
10939
DIGIT
DRIVERS
(SLAVE)
U3
10941
SEGMENT
DRIVERS
−15V
+5V(VSS)
+5V
−45V
MASTER
LD
POR
CUR
SIP
SOP
CLK
DATA-LOAD
SCLK-DIS
DB0
DB1
DB2
DB3
DB4
DB5
DB6
DB7
DS1
FG209M2
DS2
FG209M2
COM
DP

X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS



Premier Technology			
TITLE: RESET CIRCUIT BOARD			
USED ON:			
DRAWN: CP	APPROVED: BAM	DATE: 6-AUG-87	C-21063

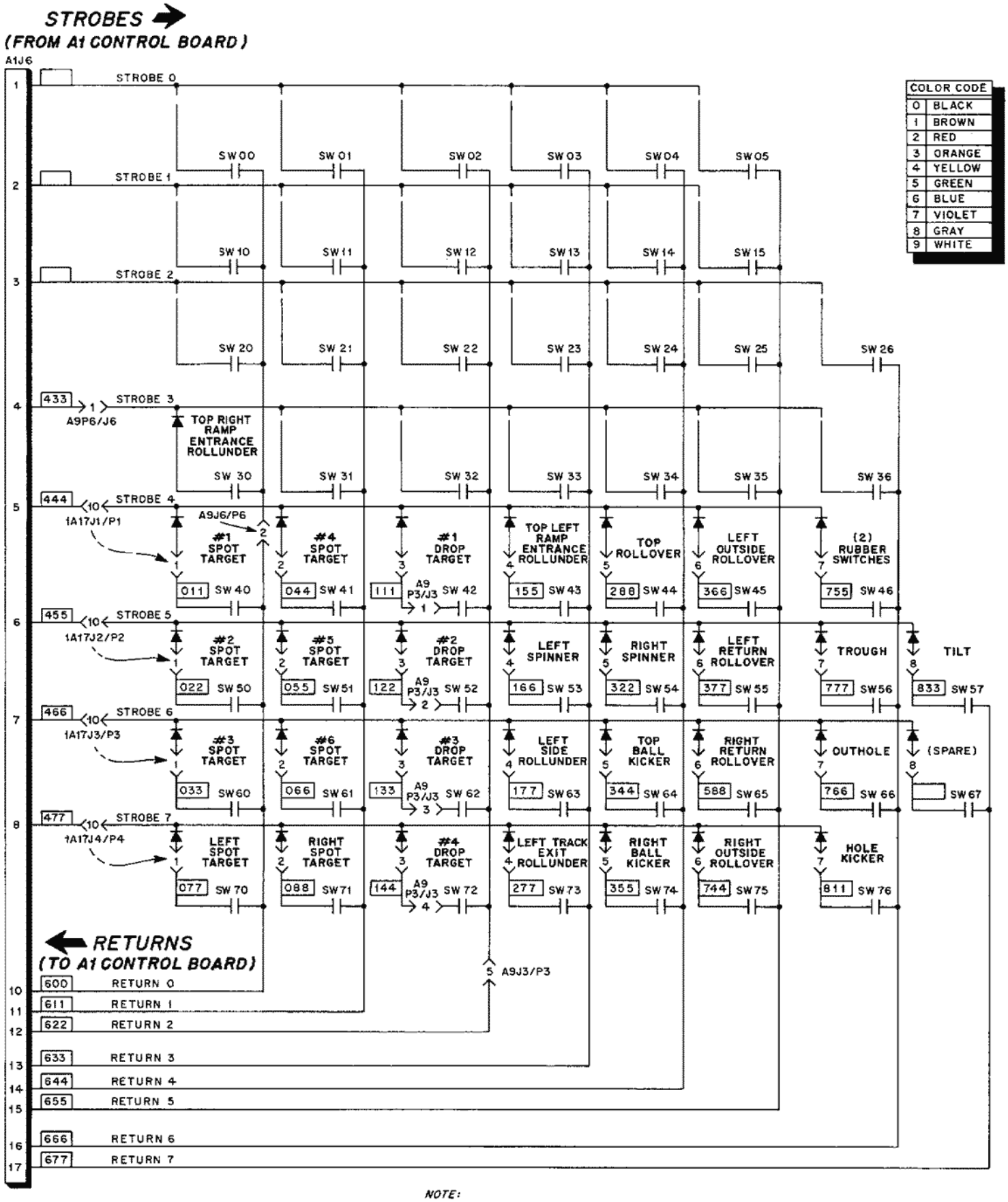
RESET BOARD (A24) COMPONENT LOCATION



RESET BOARD (A24) PARTS LIST

REFERENCE	DESCRIPTION	PART NUMBER
	Reset Board Assembly	MA-980
R1, R2	Resistor 33K Ohm, 5%, 1/4W	XO-43
R3	Resistor 24K Ohm, 5%, 1/4W	XO-10
C1	Capacitor 47UF, 10V	XO-227
C2	Capacitor 4.7UF, 10V	XO-226
C3, C4	Capacitor 470UF, 10V	XO-214
C5	Capacitor .01UF	XO-202
Z1, Z2	IC, 74123N	XO-398
Z3	IC, 74LS00N	XO-427
A24P2/ A24J2	Cable Assembly	MA-796
	7 Pin Connector	XO-879

X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS



NOTE:
1. DIODES USED ARE TYPE 1N270.
2. DIODE BOARD ASSEMBLY, MA-987.

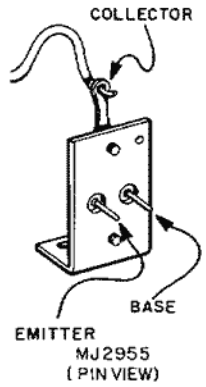
Premier Technology			
TITLE	SWITCH MATRIX		
USED ON	GAME #710		
DRAWN	APPROVED R.H.M	DATE 6-AUG-87	E-25550

PLAYBOARD "CONTROLLED" SOLENOIDS AND ILLUMINATION

NOTES:
1. ALL DIODES ARE TYPE IN4004.
2. LAMPS L4 THRU L11 AND L32 THRU L43 ARE DRIVEN BY MPS-A13'S; EXCEPT FOR "AL" LAMPS, ALL OTHER LAMPS ARE DRIVEN BY MPS-U45'S.
3. UNLESS OTHERWISE SPECIFIED, GROUND WIRE COLOR IS 9, 18 GAUGE.
4. [XXX] INDICATES WIRE COLOR.
5. UNLESS OTHERWISE SPECIFIED, ALL LAMPS ARE TYPE #44.

REFERENCE	PART NO.
#44 LAMP	LA-0
#67 LAMP	LA-5
#86 LAMP	LA-6
Q1	XO-799
R1	XO-7
R2	XO-878
C1	XO-290
CR1	XO-263

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



OUTPUT FROM A3 MASTER DRIVER BOARD (SEE SCHEMATIC FOR LAMP DRIVER TRANSISTOR)

OUTPUT FROM A3 MASTER DRIVER BOARD

P/O A3J3
25 [133] L12 → TO 1A8J1-4 (KICKER DRIVER BOARD)
24 [122] L13 — 16890 — AUX. LAMP RELAY "A"
A [277] LO — 16890 — GAME OVER RELAY "Q"
B [288] L1 — 16890 — TILT RELAY "T"

P/O A3J4 — P/O A9P4/J4 — DISPLAY LIGHT SHOW #67 / #67 — P/O A9J4/P4 — +24V DC [222] — R2 4Ω 7W WW
4 [233] SOLENOID 6 — 2 2 — [233] — [244] — 1 1 — [244]

7 [266] SOLENOID 1 — 5195 — HOLE — [488] — F11 1 AMP SLO-BLO
8 [244] SOLENOID 9 — 5195 — OUTHOLE — [488]

P/O A9P3/J3 — P/O A9J3/P3
13 [200] SOLENOID 2 — 6 6 — [200] — 18318 BANK RESET — [188] — 7 7 — [188] — F12 2 AMP SLO-BLO

6 [211] SOLENOID 5 — 5194 — RIGHT BALL KICKER [888] → TO TOP BALL KICKER COIL (1A18J1-1) — F13 3 AMP SLO-BLO

TRANSISTOR DRIVER BOARD (1A16)

P/O 1A16J1 — P/O P1 — P/O 1A16J1

P/O A3J6
1 [633] SOL. 7
2 [644] SOL. 4
P/O A3J3
22 [100] L14

R2 4.7K 1/4W — Q1, MJ2955 DRIVER — R3 4Ω 7W WW
R5 4.7K 1/4W — Q2, MJ2955 DRIVER — R6 4Ω 7W WW
R8 4.7K 1/4W — Q3, MJ2955 DRIVER — R9 30 2W, WW

7 7 — [222]
3 3 — [044] LEFT DOMES — #67
5 5 — [022] RIGHT DOMES — #67
10 10 — [033] #44 [077] #44 TOP RIGHT, BOTTOM LEFT CENTER LAMPS
1 1 — [9] → GROUND FROM 1A18J2-9

MA-985

TRANSISTOR DRIVER BOARD (2A16)

P/O 2A16J1 — P/O P1 — P/O 2A16J1

P/O A3J6
3 [655] SOL. 3
P/O A3J3
23 [111] L15
13 [144] L16

R2 4.7K 1/4W — Q1, MJ2955 DRIVER — R3 4Ω 7W WW
R5 4.7K 1/4W — Q2, MJ2955 DRIVER — R6 4Ω 7W WW
R8 4.7K 1/4W — Q3, MJ2955 DRIVER — R9 30 2W, WW

7 7 — [222]
3 3 — [011] TOP DOMES — #67
5 5 — [055] TOP RAMP — #67
10 10 — [066] #44 [088] #44 TOP LEFT, BOTTOM RIGHT CENTER LAMPS
1 1 — [9] → GROUND FROM 1A18J2-10

MA-985

FROM BOTTOM CABINET — P/O A9P1 — 6 [877] L2
R1 4.7K 1/4W — Q1 MJ2955 DRIVER — [211] — 16570 BALL RELEASE — [200] — F10 1 AMP SLO-BLO
GROUND FROM 1A18J2-5

FROM TRANSFORMER PANEL — A12P1
3 [222] +24V DC
2 [066] 6.3V AC — T
1 [000] 6.3V AC RETURN
4 [255] +6V DC

P/O A9P5/J5 — UPPER PLAYBOARD ILLUMINATION
[788] — 14 14 — [788]
15 15 — [000]
[788] — PLAYBOARD ILLUMINATION

RIGHT RAMP SHOW

1A11J2 — A9P7 — A9J7
FROM AUX. LAMP DRIVER MA-789

1 [400] — [400] — 1 1
2 [411] — [411] — 2 2
3 [422] — [422] — 3 3
4 [433] — [433] — 4 4
5 [444] — [444] — 5 5
6 [400]
7 [411]
8 [422]
9 [433]
10 [444]

[833] — 6 6
#1 #2 #3 #4 #5 #6 #7 #8 #9 #10 — #86 LAMPS
RIGHT RAMP 100,000
GROUND FROM 1A18J2-2

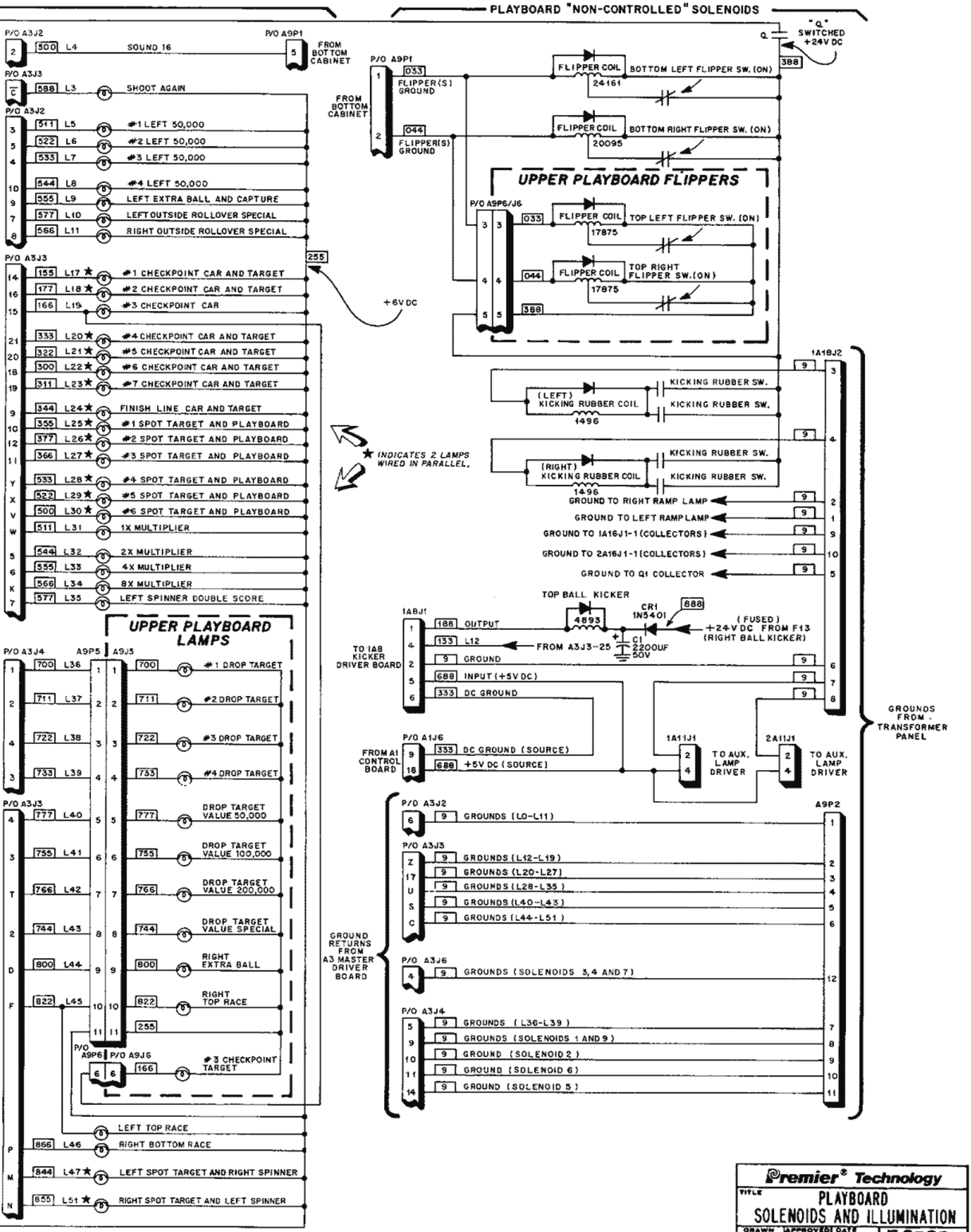
LEFT RAMP SHOW

2A11J2 — A9P8 — A9J8
FROM AUX. LAMP DRIVER MA-789

1 [455] — [455] — 1 1
2 [466] — [466] — 2 2
3 [477] — [477] — 3 3
4 [600] — [600] — 4 4
5 [611] — [611] — 5 5
6 [455]
7 [466]
8 [477]
9 [600]
10 [611]

[811] — 6 6
#1 #2 #3 #4 #5 #6 #7 #8 #9 #10 — #86 LAMPS

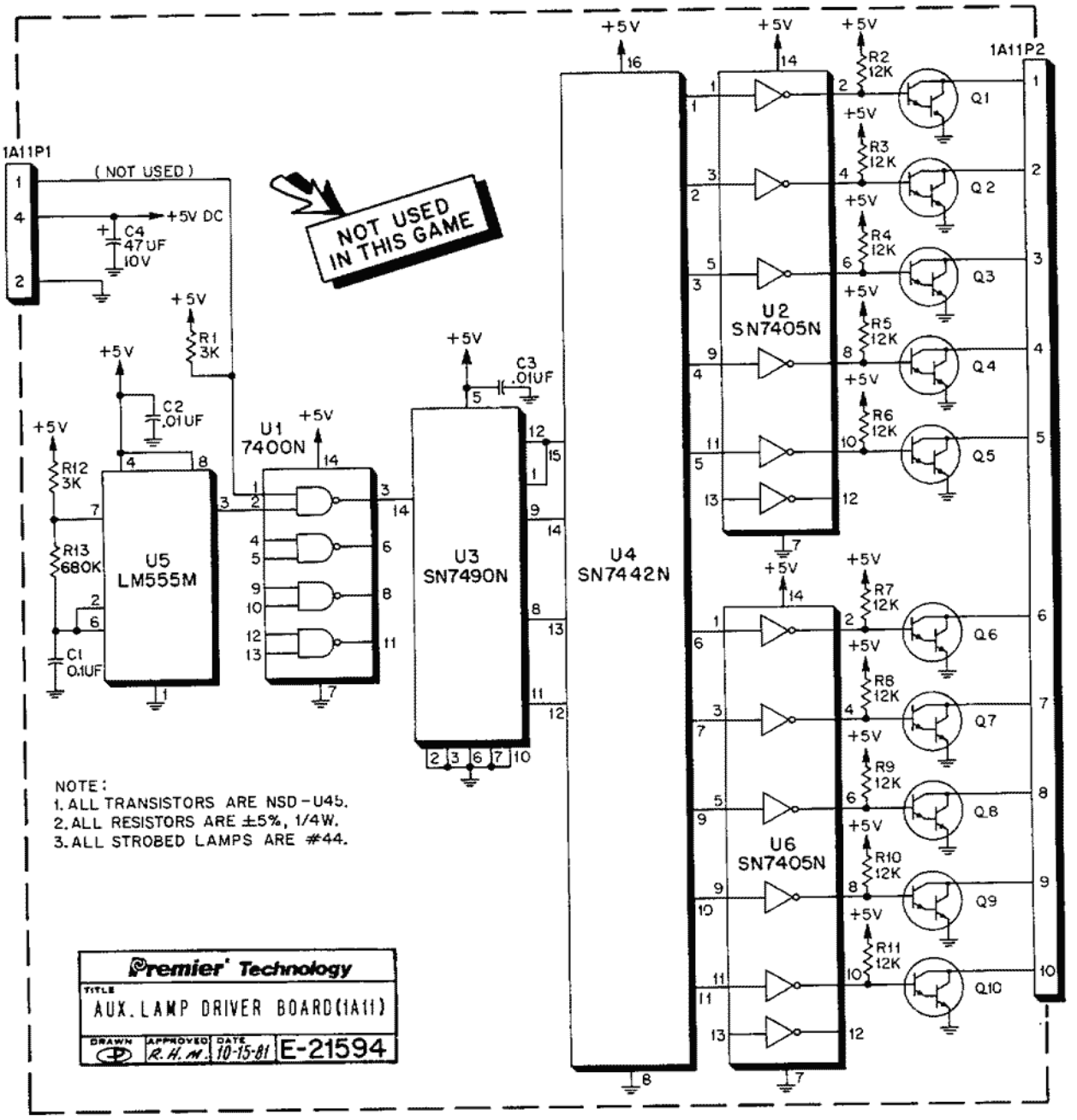
P/O A9P5/J5 — 12 12 — [811] — LEFT RAMP 100,000 — UPPER PLAYBOARD — P/O A9J5/P5 — 13 13 — GROUND FROM 1A18J2-1



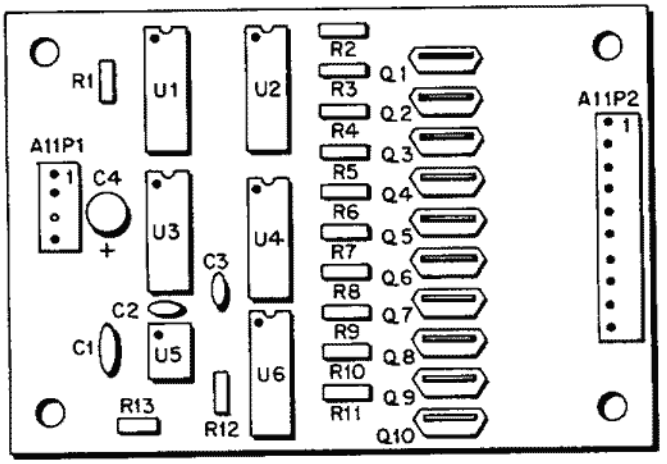
Premier® Technology

TITLE			
PLAYBOARD SOLENOIDS AND ILLUMINATION			
DRAWN	APPROVED	DATE	
	R.H.M.	6-AUG-87	E-25551

X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS



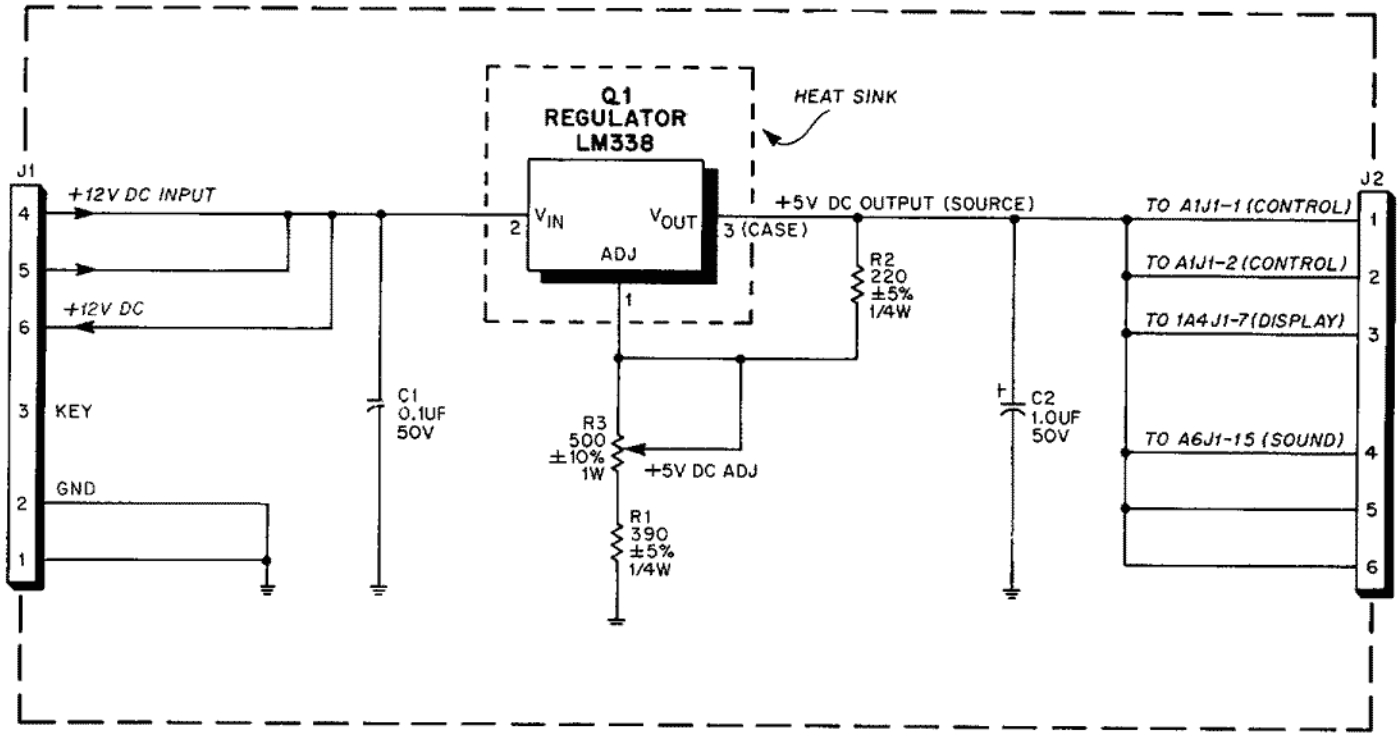
AUXILIARY LAMP DRIVER BOARD (A11) COMPONENT LOCATION



AUXILIARY LAMP DRIVER BOARD (A11) PARTS LIST

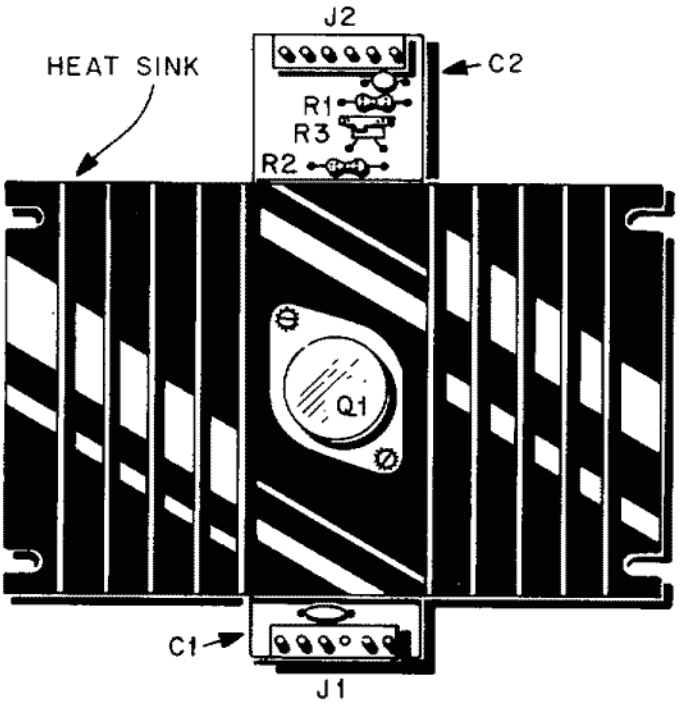
REFERENCE	DESCRIPTION	PART NUMBER
	AUXILIARY LAMP DRIVER ASSEMBLY	MA-789
C1	CAPACITOR, .1 MFD, 100V CERAMIC RADIAL LEAD	XO-626
C2-C3	CAPACITOR, .01 MFD, 100V RADIAL LEAD	XO-202
C4	CAPACITOR, 47 MFD, 10V ELECTROLYTIC RADIAL LEAD	XO-227
Q1-Q10	TRANSISTOR, NSD-U45 NPN DARLINGTON	XO-146
R1,R12	RESISTOR, 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-669
U1	I.C. 2-INPUT NAND, 7400	XO-420
U2,U6	I.C. INVERTER, 7405	XO-403
U3	I.C. DECADE COUNTER, 7490	XO-425
U4	I.C. DECODER, 7442	XO-426
U5	I.C. TIMER, NE555	XO-631
P2	10 POS. CONNECTOR	XO-879
P1	4 POS. CONNECTOR	XO-879

X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS



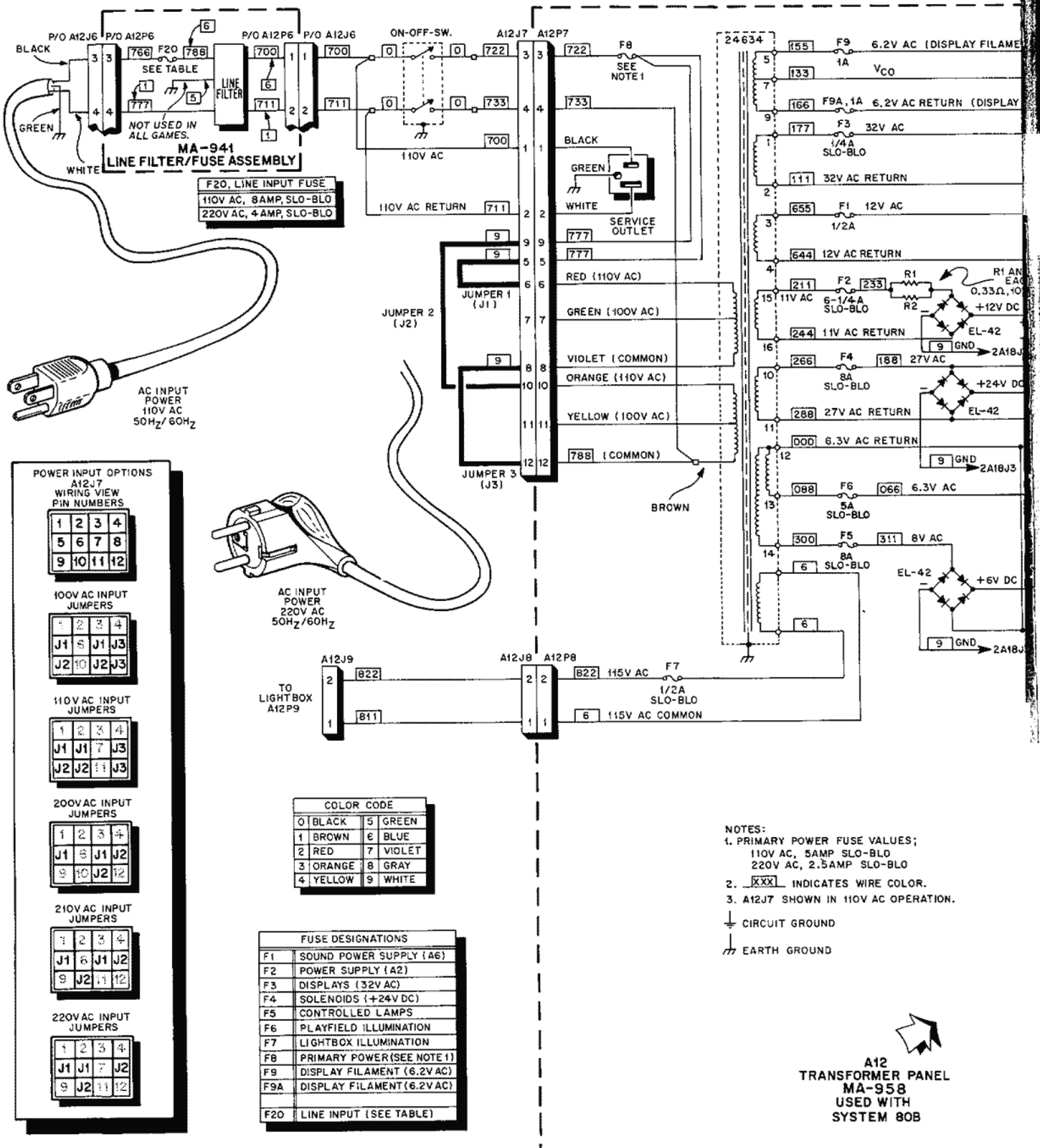
Premier Technology			
TITLE: POWER SUPPLY (A2)			
USED ON			
DRAWN	APPROVED R.H.M.	DATE 12 FEB 85	E-24441

POWER SUPPLY (A2) COMPONENT LOCATION



POWER SUPPLY (A2) PARTS LIST

REFERENCE	DESCRIPTION	PART NUMBER
	Power Supply (A2)	MA-831
C1	Capacitor, 0.1UF, +80% -20%, 50V	XO-230
C2	Capacitor, 1UF, 10%, 50V	XO-217
J1, J2	Connector, 6 Pin	XO-879
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



POWER INPUT OPTIONS
A12J7 WIRING VIEW PIN NUMBERS

1	2	3	4
5	6	7	8
9	10	11	12

100V AC INPUT JUMPERS

1	2	3	4
J1	6	J1	J3
J2	10	J2	J3

110V AC INPUT JUMPERS

1	2	3	4
J1	J1	7	J3
J2	J2	11	J3

200V AC INPUT JUMPERS

1	2	3	4
J1	6	J1	J2
9	10	J2	12

210V AC INPUT JUMPERS

1	2	3	4
J1	6	J1	J2
9	J2	11	12

220V AC INPUT JUMPERS

1	2	3	4
J1	J1	7	J2
9	J2	11	12

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

FUSE DESIGNATIONS	
F1	SOUND POWER SUPPLY (A6)
F2	POWER SUPPLY (A2)
F3	DISPLAYS (32V AC)
F4	SOLENOIDS (+24V DC)
F5	CONTROLLED LAMPS
F6	PLAYFIELD ILLUMINATION
F7	LIGHTBOX ILLUMINATION
F8	PRIMARY POWER (SEE NOTE 1)
F9	DISPLAY FILAMENT (6.2V AC)
F9A	DISPLAY FILAMENT (6.2V AC)
F20	LINE INPUT (SEE TABLE)

NOTES:
1. PRIMARY POWER FUSE VALUES;
   110V AC, 5AMP SLO-BLO
   220V AC, 2.5AMP SLO-BLO
2. XXX INDICATES WIRE COLOR.
3. A12J7 SHOWN IN 110V AC OPERATION.

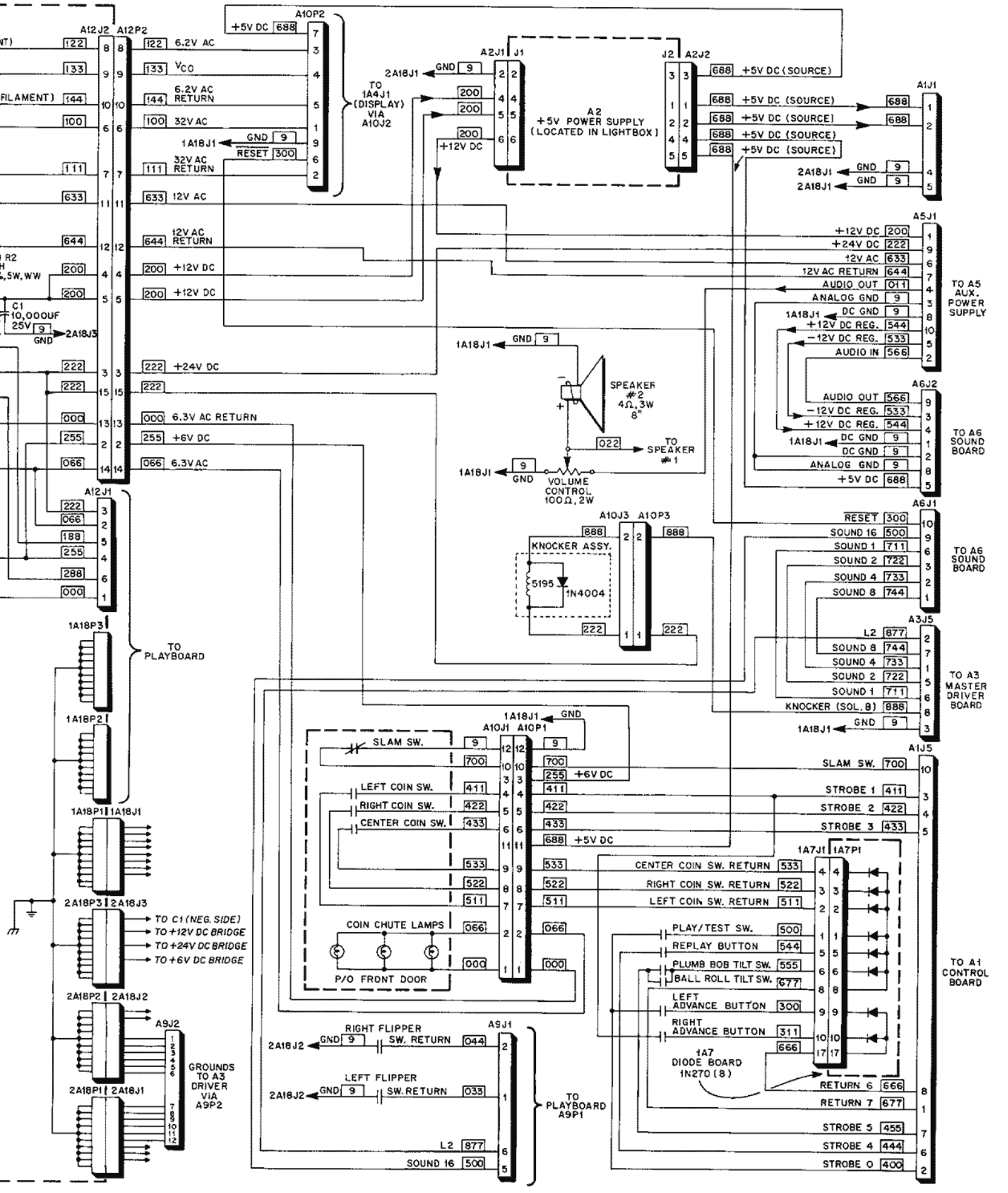
⏚ CIRCUIT GROUND

⏚ EARTH GROUND

A12
TRANSFORMER PANEL
MA-958
USED WITH
SYSTEM 80B

Premier Technology

TITLE			
TRANSFORMER PANEL/CABINET SCHEMATIC/WIRING DIAGRAM			
DRAWN	APPROVED	DATE	E-25552
	R.H.M.	6-AUG-87	


A12J2 A12P2
A10P2
+5V DC 688
6.2V AC
VCC
6.2V AC RETURN
32V AC
GND 9
RESET 300
32V AC RETURN
12V AC
12V AC RETURN
+12V DC
+24V DC
6.3V AC RETURN
+6V DC
6.3V AC
A12J1
TO PLAYBOARD
1A18P3
1A18P2
1A18P1 1A18J1
2A18P3 2A18J3
TO C1 (NEG. SIDE)
TO +12V DC BRIDGE
TO +24V DC BRIDGE
TO +6V DC BRIDGE
2A18P2 2A18J2
A9J2
GROUNDS TO A3 DRIVER VIA A9P2
2A18P1 2A18J1
C1 10,000UF 25V
2A18J3
TO 1A4J1 (DISPLAY) VIA A10J2
2A18J1
A2J1 J1
A2 +5V POWER SUPPLY (LOCATED IN LIGHTBOX)
J2 A2J2
+5V DC (SOURCE)
A1J1
2A18J1
A5J1
+12V DC 200
+24V DC 222
12V AC 633
12V AC RETURN 644
AUDIO OUT 011
ANALOG GND 9
DC GND 9
+12V DC REG. 544
-12V DC REG. 533
AUDIO IN 566
TO A5 AUX. POWER SUPPLY
A6J2
AUDIO OUT 566
-12V DC REG. 533
+12V DC REG. 544
DC GND 9
ANALOG GND 9
+5V DC 688
TO A6 SOUND BOARD
1A18J1
SPEAKER #2 4Ω, 3W 8"
022
TO SPEAKER #1
VOLUME CONTROL 100Ω, 2W
A10J3 A10P3
KNOCKER ASSY.
5195
1N4004
888
222
A6J1
RESET 300
SOUND 16 500
SOUND 1 711
SOUND 2 722
SOUND 4 733
SOUND 8 744
TO A6 SOUND BOARD
A3J5
L2 877
SOUND 8 744
SOUND 4 733
SOUND 2 722
SOUND 1 711
KNOCKER (SOL. 8) 888
TO A3 MASTER DRIVER BOARD
A10J1 A10P1
SLAM SW. 9 700
LEFT COIN SW. 411
RIGHT COIN SW. 422
CENTER COIN SW. 433
COIN CHUTE LAMPS 066
P/O FRONT DOOR
000
255 +6V DC
CENTER COIN SW. RETURN 533
RIGHT COIN SW. RETURN 522
LEFT COIN SW. RETURN 511
1A7J1 1A7P1
PLAY/TEST SW. 500
REPLAY BUTTON 544
PLUMB BOB TILT SW. 555
BALL ROLL TILT SW. 677
LEFT ADVANCE BUTTON 300
RIGHT ADVANCE BUTTON 311
666
1A7 DIODE BOARD 1N270 (8)
RETURN 6 666
RETURN 7 677
STROBE 5 455
STROBE 4 444
STROBE 0 400
A1J5
SLAM SW. 700
STROBE 1 411
STROBE 2 422
STROBE 3 433
TO A1 CONTROL BOARD
A9J1
RIGHT FLIPPER SW. RETURN 044
LEFT FLIPPER SW. RETURN 033
2A18J2
L2 877
SOUND 16 500
TO PLAYBOARD A9P1

XI. PARTS INFORMATION

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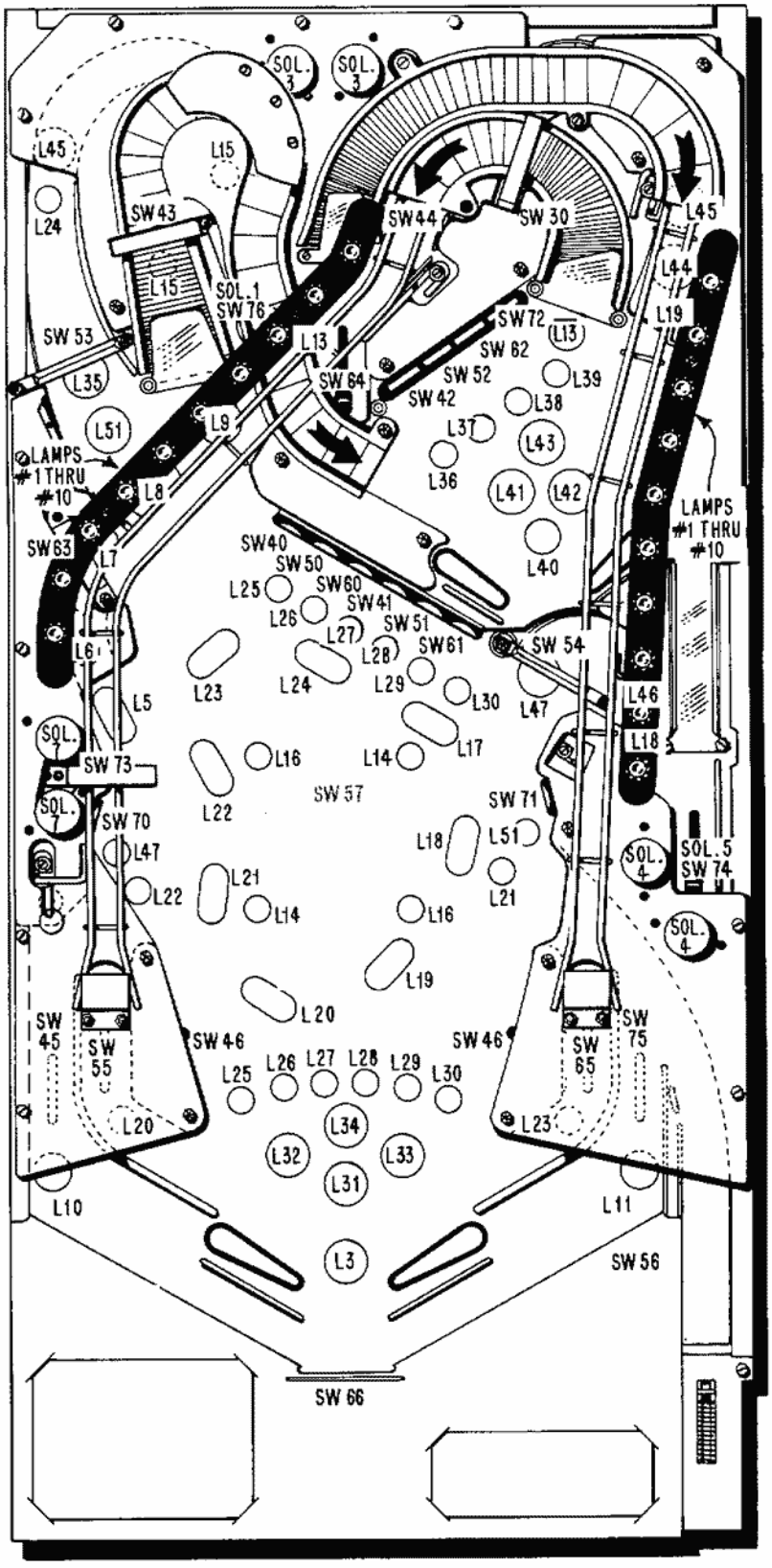
XI. PARTS INFORMATION



NOTE:
1. RIGHT RAMP AND LEFT RAMP LIGHT SHOWS DRIVEN BY AUXILLIARY LAME DRIVERS MA-789

2. SOLENOIDS 3, 4, AND 7 ENABLE ALL DOME LAMPS (#67).

3. L13 LAMPS CONTROLLED BY RELAY "A"

PLAYBOARD SWITCH AND LAMP ASSIGNMENTS

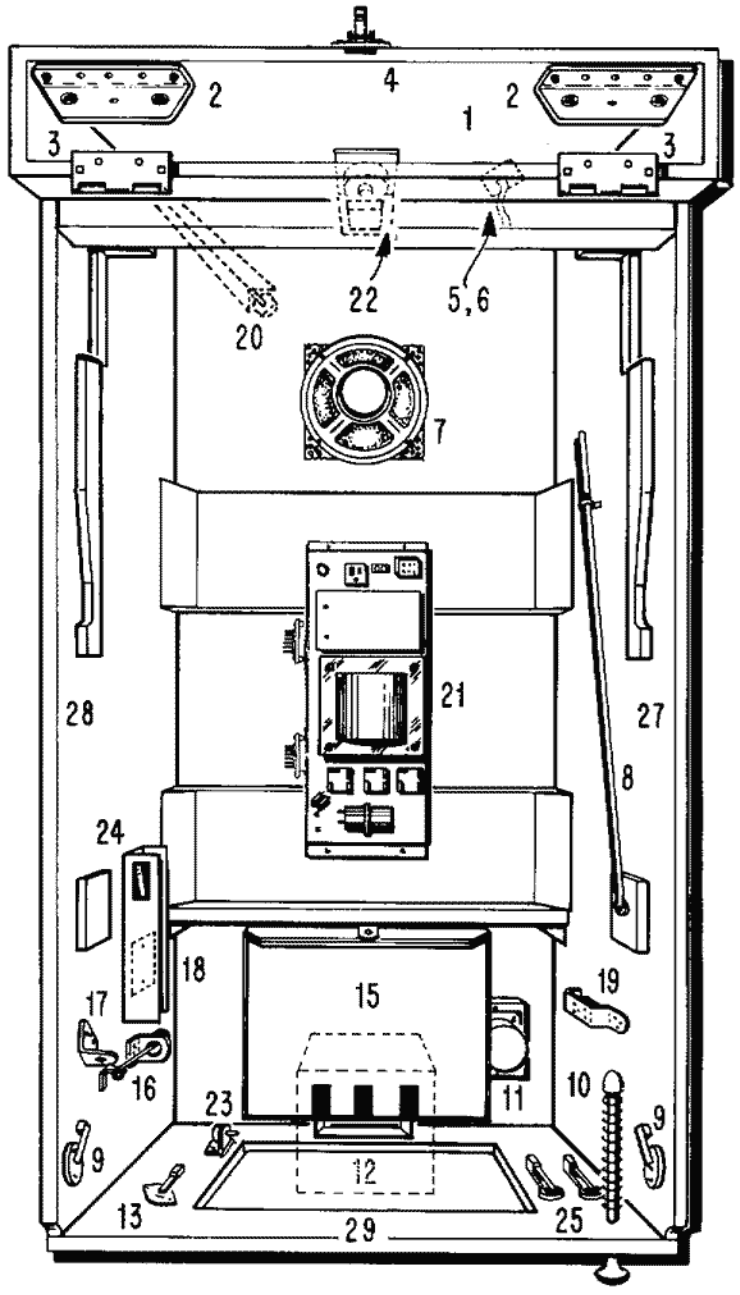
LAMP NUMBER	LAMP ASSIGNMENT
L3	SHOOT AGAIN
L5	#1 LEFT 50,000
L6	#2 LEFT 50,000
L7	#3 LEFT 50,000
L8	#4 LEFT 50,000
L9	LEFT EXTRA BALL AND CAPTURE
L10	LEFT OUTSIDE ROLLOVER SPECIAL
L11	RIGHT OUTSIDE ROLLOVER SPECIAL
L14	TOP RIGHT, BOTTOM LEFT CENTER LAMPS (2)
L15	TOP RAMP
L16	TOP LEFT, BOTTOM RIGHT CENTER LAMPS (2)
L17	#1 CHECKPOINT CAR AND TARGET (2)
L18	#2 CHECKPOINT CAR AND TARGET (2)
L19	#3 CHECKPOINT CAR, #3 CHECKPOINT TARGET
L20	#4 CHECKPOINT CAR AND TARGET (2)
L21	#5 CHECKPOINT CAR AND TARGET (2)
L22	#6 CHECKPOINT CAR AND TARGET (2)
L23	#7 CHECKPOINT CAR AND TARGET (2)
L24	FINISH LINE CAR AND TARGET (2)
L25	#1 SPOT TARGET AND PLAYBOARD (2)
L26	#2 SPOT TARGET AND PLAYBOARD (2)
L27	#3 SPOT TARGET AND PLAYBOARD (2)
L28	#4 SPOT TARGET AND PLAYBOARD (2)
L29	#5 SPOT TARGET AND PLAYBOARD (2)
L30	#6 SPOT TARGET AND PLAYBOARD (2)
L31	1X MULTIPLIER
L32	2X MULTIPLIER
L33	4X MULTIPLIER
L34	8X MULTIPLIER
L35	LEFT SPINNER DOUBLE SCORE
L45	LEFT TOP RACE
L46	RIGHT BOTTOM RACE
L47	LEFT SPOT TARGET AND RIGHT SPINNER (2)
L51	RIGHT SPOT TARGET AND LEFT SPINNER (2)
	UPPER PLAYBOARD LAMPS
L36	#1 DROP TARGET
L37	#2 DROP TARGET
L38	#3 DROP TARGET
L39	#4 DROP TARGET
L40	DROP TARGET VALUE 50,000
L41	DROP TARGET VALUE 50,000
L42	DROP TARGET VALUE 50,000
L43	DROP TARGET VALUE 50,000
L44	RIGHT EXTRA BALL
L45	RIGHT TOP RACE,

SWITCH MATRIX NUMBER	SWITCH ASSIGNMENT	PART NO.
SW 30	Top Right Ramp Entrance Rollunder	21137
SW 40	#1 Spot Target Assembly (RED)	25460U
SW 41	#4 Spot Target Assembly (RED)	26460U
SW 42	#1 Drop Target	18094
SW 43	Top Left Ramp Entrance Rollunder	24622
SW 44	Top Rollover	18892
SW 45	Left Outside Rollover	18892
SW 46	Kicking Rubber	
	Scoring Switch (2)	18808
	Actuating Switch And Bracket (4)	22224
SW 50	#2 Spot Target Assembly (RED)	25460U
SW 51	#5 Spot Target Assembly (RED)	25460U
SW 52	#2 Drop Target	18095
SW 53	Left Spinner	18627
SW 54	Right Spinner	19354
SW 55	Left Return Rollover	18892
SW 56	Trough	18892
SW 57	Tilt (With Bracket)	9141
SW 60	#3 Spot Target Assembly (RED)	25460U
SW 61	#6 Spot Target Assembly (RED)	25460U
SW 62	#3 Drop Target	18093
SW 63	Left Side Rollunder	21137
SW 64	Top Ball Kicker	19754
SW 65	Right Return Rollover	18892
SW 66	Outhole	18892
SW 70	Left Spot Target Assembly (RED)	25460U
SW 71	Right Spot Target Assembly (RED)	25460U
SW 72	#4 Drop Target	18093
SW 73	Left Track Exit Rollunder	24622
SW 74	Right Ball Kicker	19754
SW 75	Right Outside Rollover	18892
SW 76	Hole Kicker	18085

XI. PARTS INFORMATION

CABINET PARTS

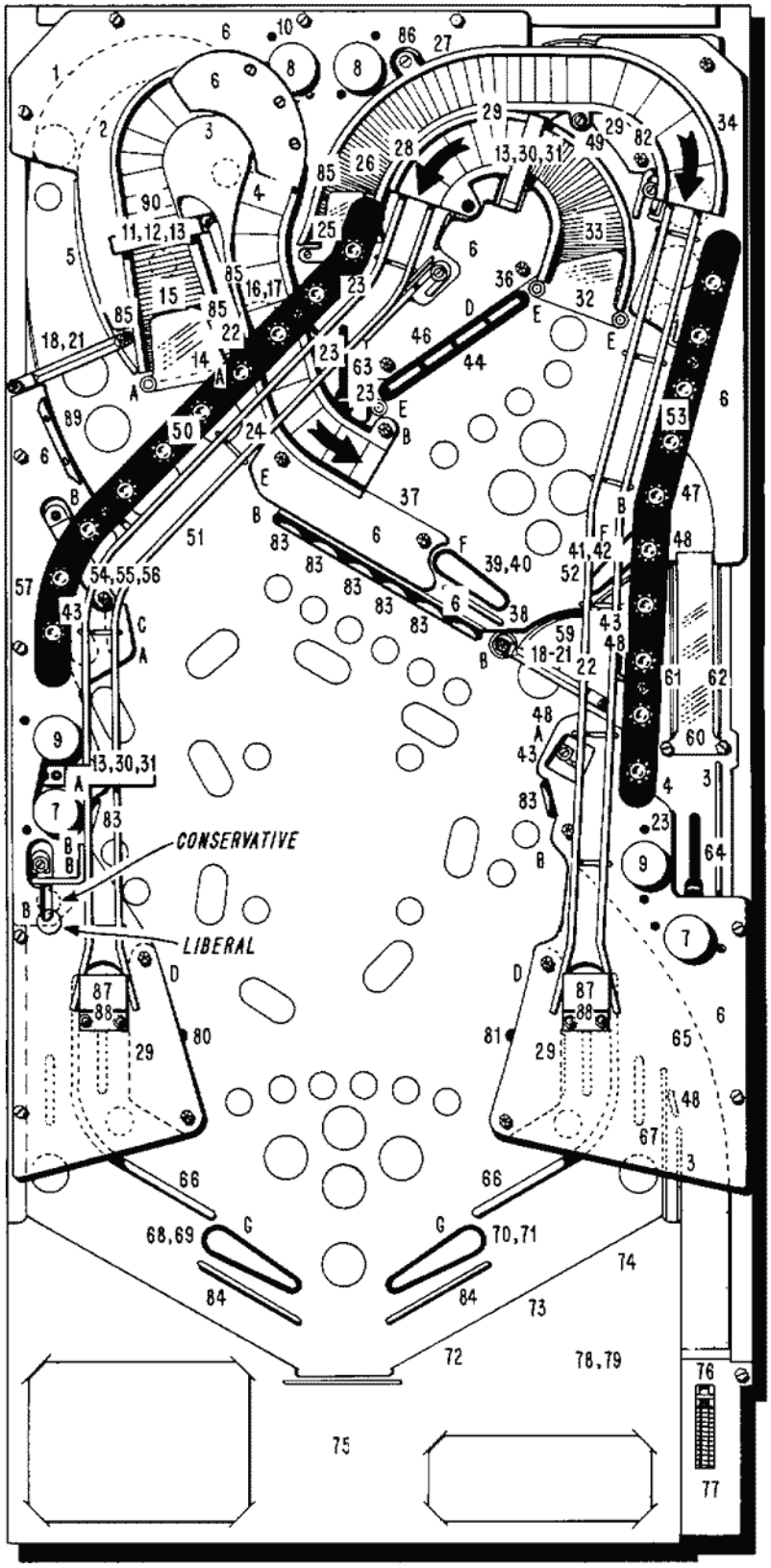
ITEM	DESCRIPTION	PART NO.
1.	Cabinet	25270-710
2.	Lightbox Mounting Bracket (2)	19916
3.	Butt Hinge, (Shown For Reference Only, P/O Lightbox Assy.) (2)	22734
4.	"U" Bolt (P/O Lightbox)	24659
	Latch Assembly (P/O Cabinet)	21969
5.	Cable Assembly, Domestic (High Voltage)	MA-794
6.	Line Cord (Domestic)	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)	17838-3
10.	Ball Shooter Assembly	8835
11.	Switch, On/Off	23799
	Switch Plate (2)	18769
	Switch Housing	15163
12.	Front Door Assembly (Universal)	MA-688
	Cable Assembly	MA-676
	Slam Switch	24567
	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
15.	Cashbox	25309
	Cover	25315
	Liner (Small) (3)	24870
	Liner (Large) (2)	24871
16.	Plumb Bob Tilt Switch Assembly	
	Strike Plate	358
	Carbon, Tilt Bob	MH-30
	Rod, Tilt	357
	Bracket	22043
17.	Locator Bracket	18578
18.	Diode Assembly	24252
	Diode, 1N270 (8)	XO-265
19.	Knocker Assembly	MA-12
	Bell Assembly (Gong)(When Used)	MA-352
20.	Cabinet Leg (4)	4337
	(Black) (4) (When Used)	4337Y
	(Gold) (4) (When Used)	4337T
	Leg Bolt (8)	3775
	3" Leg Adjuster (4)	MH-21
	1" Sleeve (2)	25317
	3/8-16, Jam Nut (8)	FA-665
21.	Transformer Panel Assembly	MA-958
	Bridge Rectifier (3)	EL-42
	Cable Assembly (Secondary)	MA-948
	Capacitor, 10,000UF, 25V	XO-830
	Filter, Line	EL-50
	Fuse Block (8 Pos.)	EL-10
	Fuse Cover	23805
	Fuse Holder (F7 and F8) (2)	EL-78
	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, 8 Amp SLO-BLO	EL-26
	F6, 5 Amp SLO-BLO	EL-8
	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
	F9, 1 Amp	EL-3
	F9A, 1 Amp	EL-3
	Ground Bus Assembly (2)	25374
	Outlet, Service	18133
	Resistor, 0.33 Ohm, 10% 5W, Wire-Wound (2)	XO-154
	Transformer	24634



ITEM	DESCRIPTION	PART NO.
22.	Line Filter Assembly	MA-941
	Fuse Holder	EL-78
	F20, 8 Amp, SLO-BLO (110V AC)	EL-26
	F20, 4 Amp, SLO-BLO (220V AC)	EL-33
	Line Filter	EL-50
	Line Filter (Germany)	EL-51
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
26.	Lightbox (Not Shown)	25181-710
27.	Right Moulding (Not Shown)	22735
	(Black) (When Used)	22735Y
	(Gold) (When Used)	22735T
28.	Left Moulding (Not Shown)	22736
	(Black) (When Used)	22736Y
	(Gold) (When Used)	22736T
29.	Front Moulding (Not Shown)	16951
	(Black) (When Used)	16951Y
	(Gold) (When Used)	16951T

XI. PARTS INFORMATION

PLAYBOARD PARTS INFORMATION



RUBBER RINGS

ITEM	DESCRIPTION	PART NO.
A	Mini-Post (5)	15705
B	5/16" (8)	10217
C	3/4"	10218
D	2-1/2" (2)	10222
E	Sm. Mini-Post (4)	14793
F	Flipper, Red (2)	13149
G	Flipper, Red (2)	13151

MISCELLANEOUS PARTS

DESCRIPTION	PART NO.
Mini-Post Screw	14792
Siamese Post	17492
Plastic 1" Post	11561P
Plastic Support Post	20635
"A" Relay Assembly	MA-995
"T" Relay Assembly	MA-25
"Q" Relay Assembly	MA-23

PARTS LIST

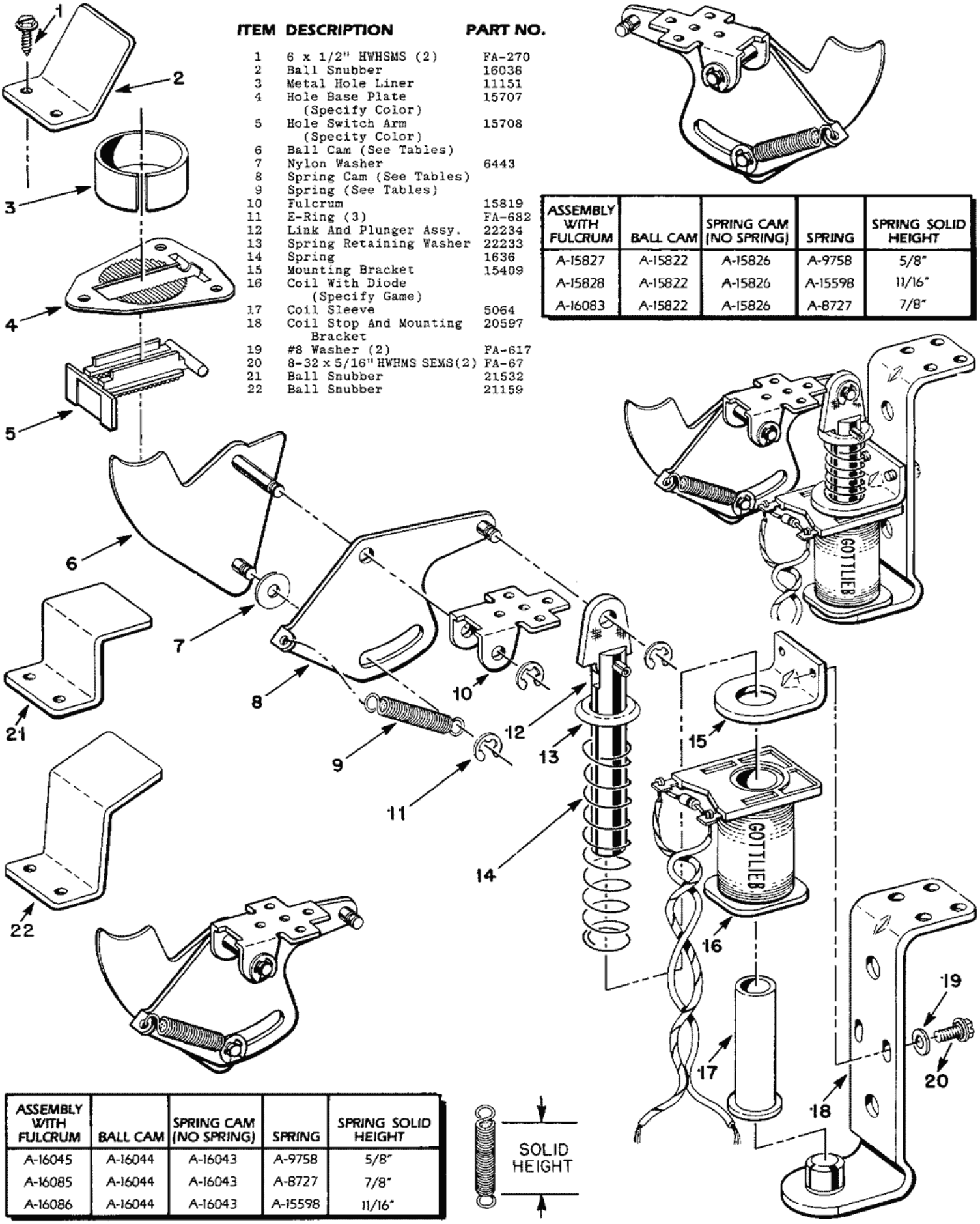
ITEM	DESCRIPTION	PART NO.
1	Flat Rail	25530
2	Ball Guide Rail	17106
3	Ball Guide Rail (3)	13782
4	Ball Guide Rail (2)	6612
5	Ball Guide Rail	18764
6	Plastic Shield Set	25554
7	Plastic Dome Hat, Amber, (2)	25147N
8	Plastic Dome Hat, Blue, (2)	25147W
9	Plastic Dome Hat, Red, (2)	25147U
10	Plastic Rivet (12)	MP-10
11	Metal Shield	25245
12	Gate Wireform	25259
13	Rollunder Spring (2)	25247
14	Ramp Flap	25056
15	Molded Ramp	25492
16	Ball Hole Kicker Assembly (See Exploded View Illustration)	MA-998
17	Ball Snubber	21532
18	Target Shield (2)	14043
19	Swinging Target Assembly (2)	24494
20	Switch Rod (2)	20406
21	Nylon Washers (4)	20407
22	Ball Guide Rail (2)	17650
23	Ball Guide Rail (5)	3722
24	Flat Rail	25526
25	Ramp Flap	25523
26	Molded Ramp	25491
27	Flat Rail	25528
28	Ball Guide Rail	4832
29	Ball Guide Rail (4)	4831
30	Gate Shield (2)	25442
31	Gate Wireform (2)	25443
32	Ramp Flap	25568
33	Molded Ramp	25490
34	Flat Rail	25529
35	Ball Guide Rail	8514
36	Ramp Mounting Bracket	25567
37	Ball Guide Rail	18563
38	Ball Guide Rail	6612
39	Top Left Flipper Assembly	MA-937
40	Top Left Flipper Switch	17875
41	Top Right Flipper Assembly	MA-938
42	Top Right Flipper Switch	17875
43	Ball Guide Rail (3)	6931
44	Target Bank Assembly	MA-42A
45	Target Arm, White, (4)	11905Z
45A	Target Decal (4)	25573
46	Ball Guide Rail	17106
47	Flat Rail	25524
48	Ball Guide Rail (3)	18070
49	Ramp Spacer	25395
50	Light Strip Assembly	MA-974
	Wedge Base Socket (with wires)(10)	25545
	#86 Lamps (10)	LA-6
51	Wireform Ramp	25493
52	Wireform Ramp	25494
53	Light Strip Assembly	MA-975
	Wedge Base Socket (with wires)(10)	25545
	#86 Lamps (10)	LA-6
54	Gate Shield	4705
55	Gate Wireform	21958
56	Rollunder Spring	14236
57	Flat Rail	25527
58	Ball Guide Rail (3)	6931
59	Flat Rail	25525
60	Ramp Flap	25538
61	Ramp Fence	22122
62	Ramp Fence	22123
63	Kicker Assembly	MA-997
64	Kicker Assembly	MA-176A
65	Flat Rail	25531
66	Ball Guide Rail (2)	23833
67	Ball Guide Rail	4833
68	Left Flipper Assembly	MA-937B
69	Left Flipper Switch	24161
70	Right Flipper Assembly	MA-938A
71	Right Flipper Switch	20095
72	1-1/16" Steel Ball (2)	21864
73	Ball Return Unit Assembly	21622
74	Ball Return Gate Assembly	20607
75	Cardholder	13657-710
76	Ball Shooter Gauge	9767-710
77	Ball Shooter Assembly	8835
78	Ball Return Fence	23855
79	Ball Return Gate Fence	23856
80	Contact Kicker Assembly	MA-135A
81	Contact Kicker Assembly	MA-135
82	Ball Guide Rail	8514
83	Spot Target Assembly, Red (8)	25460U
84	Ball Snubber (2)	13798
85	Ball Deflector (4)	21158
86	Ramp Spacer	25086
87	Ball Snubber (2)	21159
88	Velcro Strip (2)	MP-13
89	Ball Deflector	25594
90	Ramp Decal	25596

XI. PARTS INFORMATION

BALL HOLE KICKER PARTS

ITEM	DESCRIPTION	PART NO.
1	6 x 1/2" HWHSMS (2)	FA-270
2	Ball Snubber	16038
3	Metal Hole Liner	11151
4	Hole Base Plate (Specify Color)	15707
5	Hole Switch Arm (Specity Color)	15708
6	Ball Cam (See Tables)	
7	Nylon Washer	6443
8	Spring Cam (See Tables)	
9	Spring (See Tables)	
10	Fulcrum	15819
11	E-Ring (3)	FA-682
12	Link And Plunger Assy.	22234
13	Spring Retaining Washer	22233
14	Spring	1636
15	Mounting Bracket	15409
16	Coil With Diode (Specify Game)	
17	Coil Sleeve	5064
18	Coil Stop And Mounting Bracket	20597
19	#8 Washer (2)	FA-617
20	8-32 x 5/16" HWHMS SEMS(2)	FA-67
21	Ball Snubber	21532
22	Ball Snubber	21159

ASSEMBLY WITH FULCRUM	BALL CAM	SPRING CAM (NO SPRING)	SPRING	SPRING SOLID HEIGHT
A-15827	A-15822	A-15826	A-9758	5/8"
A-15828	A-15822	A-15826	A-15598	11/16"
A-16083	A-15822	A-15826	A-8727	7/8"



ASSEMBLY WITH FULCRUM	BALL CAM	SPRING CAM (NO SPRING)	SPRING	SPRING SOLID HEIGHT
A-16045	A-16044	A-16043	A-9758	5/8"
A-16085	A-16044	A-16043	A-8727	7/8"
A-16086	A-16044	A-16043	A-15598	11/16"

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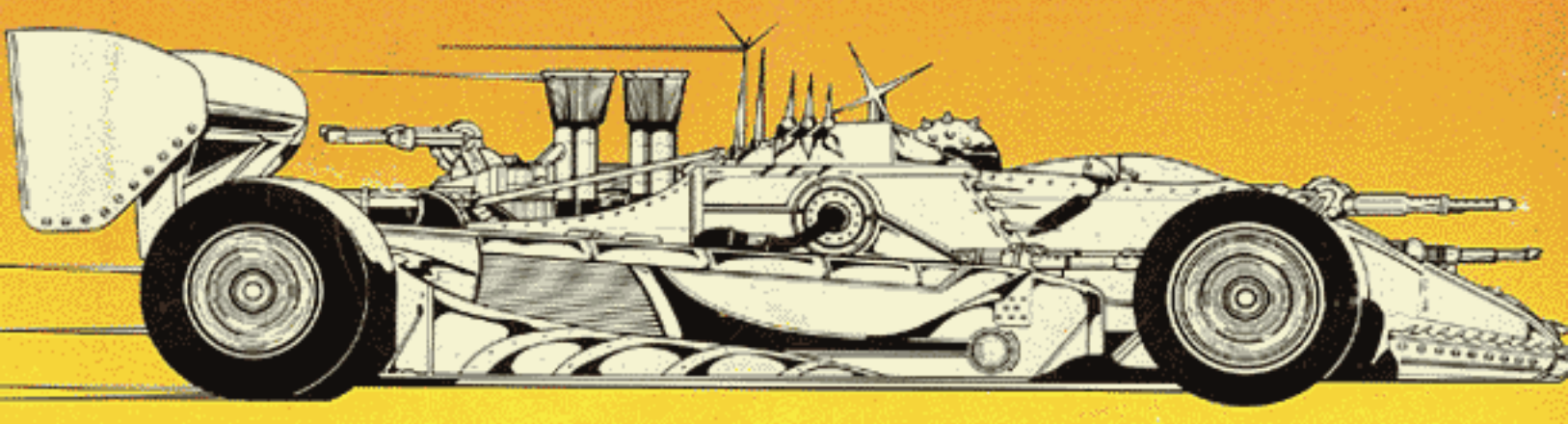

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