

G·E·N·E·S·I·S



Premier
Technology

INSTRUCTION MANUAL

GENESIS
(GAME #705)

INSTRUCTION MANUAL
Applicable for all games.

TABLE OF CONTENTS

	PAGE(S)
I. INSTALLATION.....	1
II. INITIALIZATION.....	2
III. GAME OPERATION.....	2,3
IV. GAME PLAY AND SCORING.....	4-5
V. SOUND.....	6
VI. GAME ADJUSTMENTS.....	6,7
VII. BOOKKEEPING AND SELF TEST.....	8-12
VIII. THEORY OF OPERATION.....	13-16
IX. GENERAL INFORMATION.....	17,18
X. WIRING AND SCHEMATIC DIAGRAMS.....	19-46
XI. PARTS INFORMATION.....	47-52

GENESIS
GAME PROMS:
705/PROM 1
705/PROM 2

SOUND PROMS:
705/DROM 1
705/YROM 1
705/YROM 2


Premier
Technology

759 INDUSTRIAL DRIVE
BENSENVILLE, IL 60106
TELEX 215009 PRMR UR

FOR SERVICE, CALL (312) 350-0400

SYSTEM 80B OVERVIEW

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

Some of the new features of System 80B are:

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

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

A-22670

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

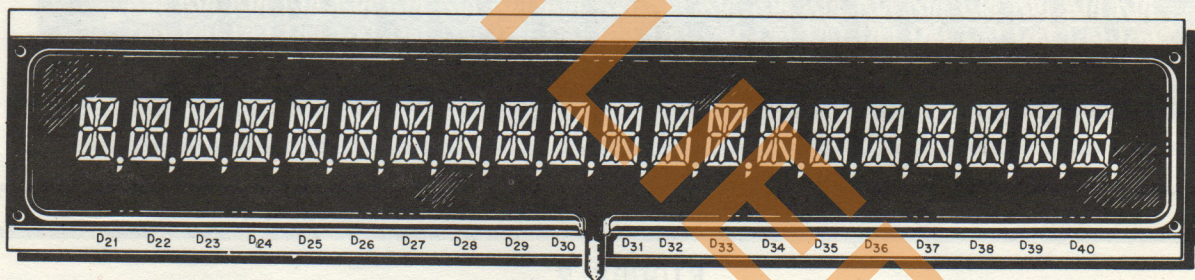


FIGURE 1A.

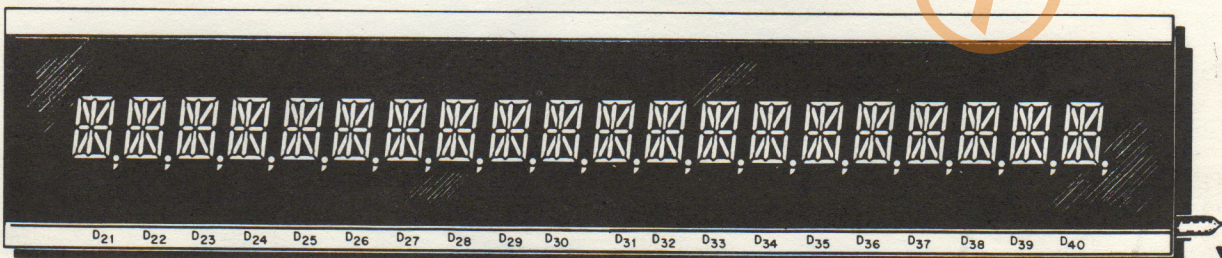


FIGURE 1B.

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.

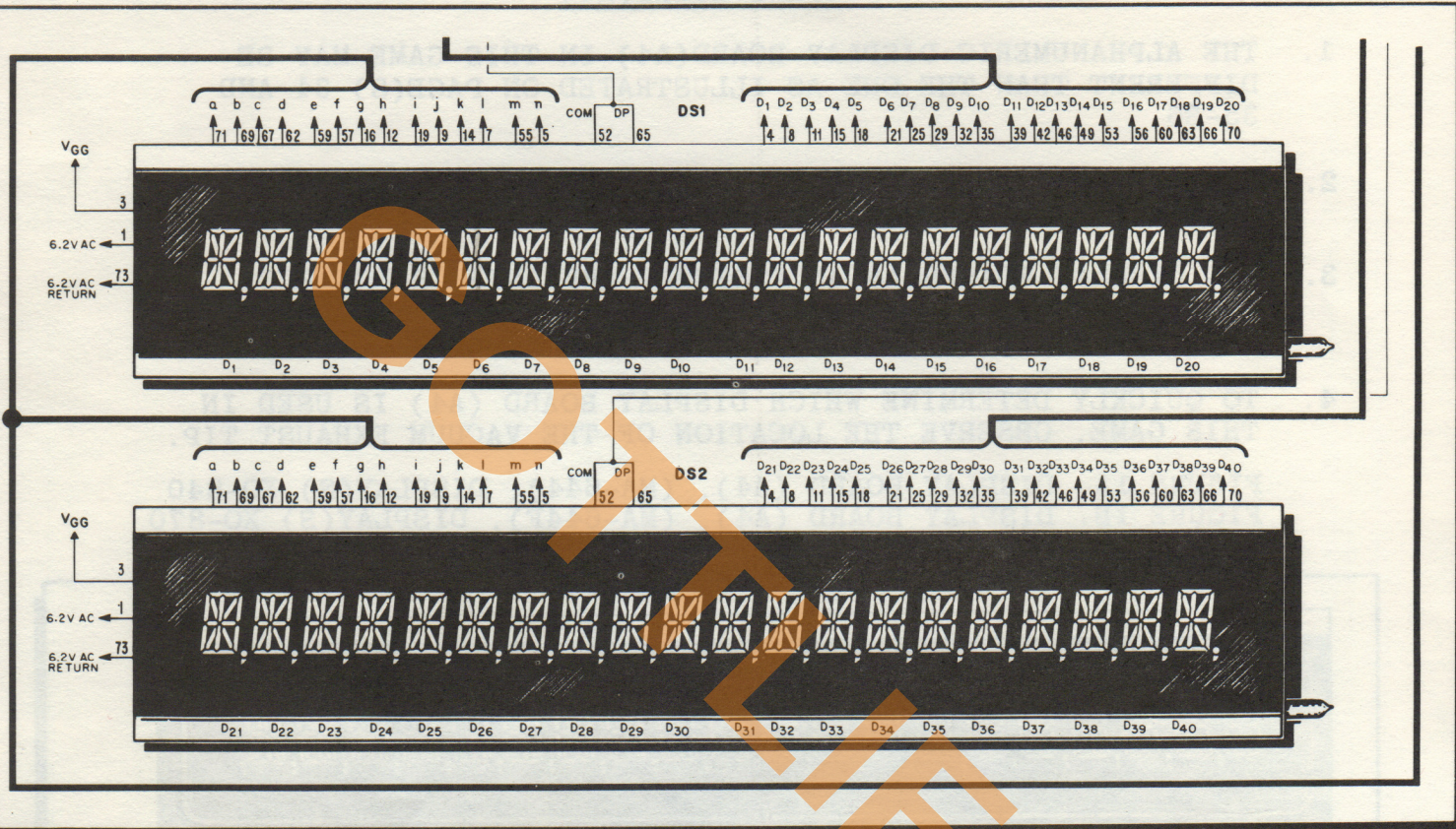


FIGURE 2.

I. INSTALLATION

A. SET-UP

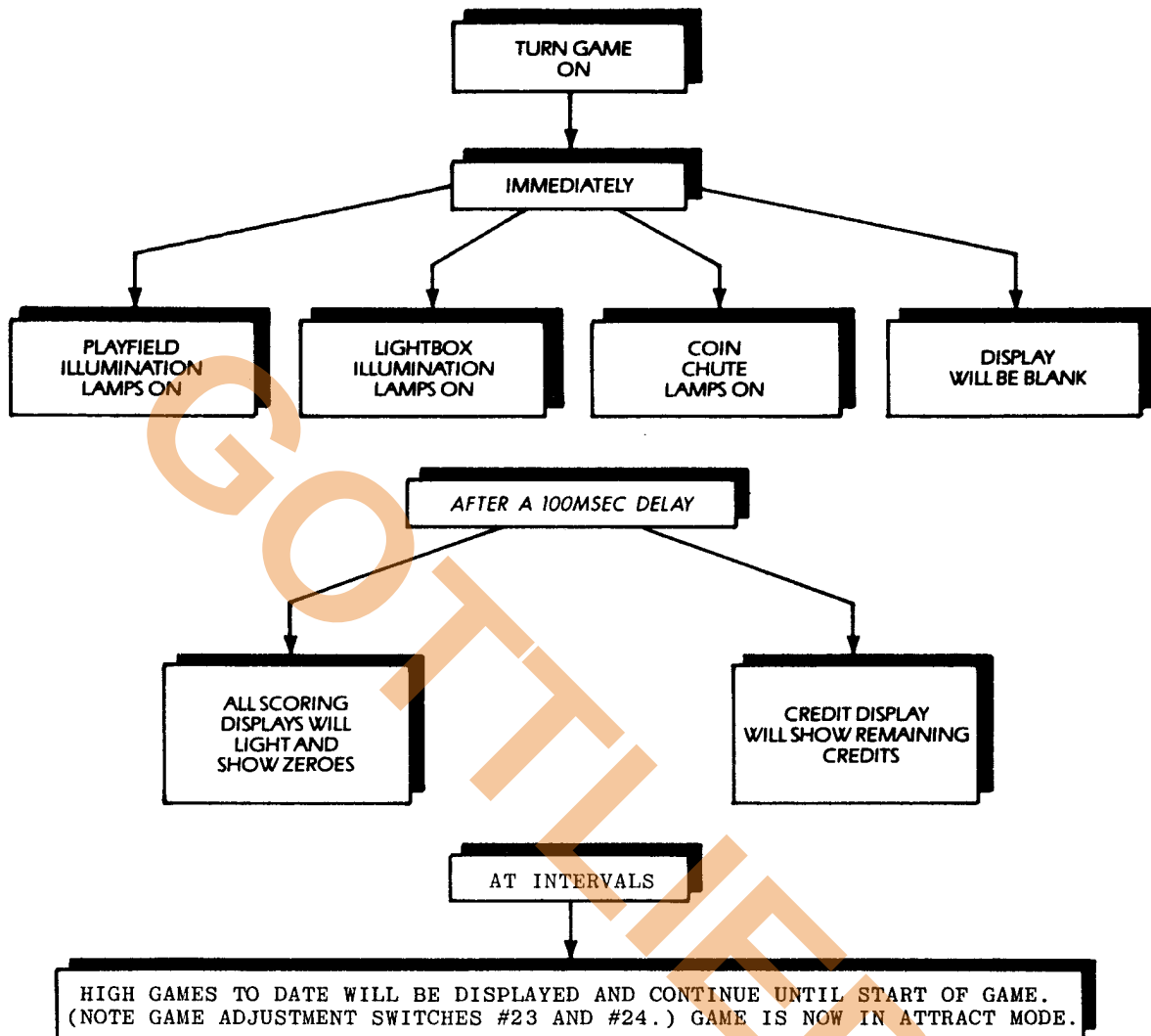
1. Bolt the legs to the cabinet.
2. Lift lightbox into an upright position. Be sure none of the cables are crimped in between the lightbox and cabinet.
3. Engage the snap in the rear of the lightbox to the cabinet.
4. To remove the lightbox backglass and gain servicing access to the electronics panel, 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 $5-1/2^{\circ} - 6^{\circ}$.
9. The plumb-bob tilt can be adjusted by loosening the wing nut and raising the plumb-bob to increase its sensitivity, or lowering it to decrease its sensitivity.
The ball-roll tilt can be adjusted by loosening the front screw and raising the tilt bracket to increase sensitivity, or lowering it to decrease its sensitivity.
10. Reinstall the cabinet glass, front moulding and the lightbox assembly.
11. Plug the line-cord into a properly grounded 3-wire receptacle ONLY!
12. Refer to Section VI to make all necessary game adjustments.
13. CAUTION If this game has been subjected to extreme cold, allow to warm up to room temperature.

II. INITIALIZATION, III. GAME OPERATION

II. INITIALIZATION



III. GAME OPERATION

A. GAME START

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.

III. GAME OPERATION

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

C. ADDITIONAL PLAYERS

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

G.E.N.F.E.S.I.S.

HOW TO PLAY

TOP ROLLOVERS

- SCORE 1000 UNLIT.
- SCORE 5000 WHEN LIT.
- COMPLETING TOP ROLLOVERS ADDS A LETTER TO "BODY".
- COMPLETING "BODY" SCORES 50,000, LIGHTS THE "BODY COMPLETED" LAMP, AND RESETS THE SEQUENCE.
- (5 BALL) SCORE 500 UNLIT.
- (5 BALL) SCORE 3000 WHEN LIT.

DROP TARGETS

- SCORE 1000 UNLIT.
- SCORE 5000 WHEN LIT OR FLASHING.
- ADVANCE DROP TARGET LAMPS WHEN FLASHING.
- COMPLETING THE DROP TARGET LAMP SEQUENCE ADDS A LETTER TO THE MOST COMPLETE PART (IF SW #8 IS OFF) OR SPOTS A LETTER IN EACH PART (IF SW #8 IS ON).
- COMPLETING "BODY" SCORES 50,000, LIGHTS THE "BODY COMPLETED" LAMP AND RESETS THE SEQUENCE.
- (5 BALL) SCORE 500 UNLIT.
- (5 BALL) SCORE 3000 WHEN LIT OR FLASHING.

RIGHT FLIPPER SWITCH

- ROTATE TOP ROLLOVERS.
- HOLDING RIGHT FLIPPER BUTTON IN DISPLAYS CURRENT SCORING MULTIPLIER AFTER A SHORT DELAY.

VARI-TARGET

- SCORE 10,000 (1ST POS.), 20,000 (2ND AND 3RD POS.), 30,000 (4TH AND 5TH POS.), OR 40,000 (6TH POS.).
- HITTING THE TARGET ALL THE WAY BACK SPOTS A LETTER IN EACH PART WHEN THE "SPOT LETTER" LAMP IS FLASHING OR ADDS A LETTER TO THE MOST COMPLETE PART WHEN LIT.
- HITTING THE TARGET ALL THE WAY BACK WHEN "LIFEFORCE" IS FLASHING, EXPOSES THE ROBOT, COLLECTS BONUS FOR ALL LIT PART LETTERS, LIGHTS LEFT KICKING TARGET (SPECIAL) (IF SW #31 IS OFF), AND RESETS THE SEQUENCE.

LEFT HOLE

- SCORE 10,000
- ADD A LETTER TO "ARMS" WHEN LIT OR FLASHING.
- COMPLETING "ARMS" SCORES 50,000, LIGHTS THE "ARMS COMPLETED" LAMP, AND RESETS THE SEQUENCE.
- CAPTURE BALL WHEN LEFT RAMP IS FLASHING (LAMPS UNDER RAMP).

IV. GAME PLAY AND SCORING

RIGHT KICKER

- SCORE 10,000.
- ADD A LETTER TO "LEGS" WHEN LIT OR FLASHING.
- COMPLETING "LEGS" SCORES 50,000, LIGHTS THE "LEGS COMPLETED" LAMP, AND RESETS THE SEQUENCE.
- CAPTURE BALL WHEN RIGHT RAMP IS FLASHING (LAMPS UNDER RAMP).

LEFT SIDE ROLLOVER AND RIGHT SIDE ROLLUNDER

- SCORE 1000 UNLIT.
- SCORE 10,000 WHEN LIT OR FLASHING.
- ADD A LETTER TO "BRAIN" WHEN LIT OR FLASHING.
- COMPLETING "BRAIN" SCORES 100,000, LIGHTS THE "BRAIN COMPLETED" LAMP, AND RESETS THE SEQUENCE.

LEFT AND RIGHT KICKING TARGETS

- SCORE 1000 UNLIT.
- SCORE 10,000 WHEN LIT (WHITE).
- AWARD SPECIAL WHEN LIT (RED).

LEFT AND RIGHT RETURN ROLLOVERS

- SCORE 1000.
- FLASH "SPOT LETTER" LAMP (VARI-TARGET) FOR A TIME PERIOD.

LEFT AND RIGHT OUTSIDE ROLLOVERS

- SCORE 5000 UNLIT.
- SCORE 50,000 WHEN LIT.

POP BUMPERS

- SCORE 1000
- TOGGLE LEFT AND RIGHT "SHOOT BRAIN" LAMPS.
- TOGGLE LEFT AND RIGHT OUT ROLLOVERS AND LEFT AND RIGHT KICKING TARGETS (WHITE). TOGGLE LEFT AND RIGHT KICKING TARGETS WHEN LIT (RED).
- (5 BALL) SCORE 500.
- (5 BALL) TOGGLE "SPOT LETTER" LAMP (VARI-TARGET).
- (5 BALL) TOGGLE LEFT AND RIGHT RAMP LETTER LAMPS.

RUBBER SWITCHES

- SCORE 30.
- TOGGLE SAME LAMPS AS POP BUMPERS.

OUTHOLE

- SCORE 10,000 BONUS FOR EACH BODY PART LETTER LIT.

SCORING MULTIPLIER

- EVERY TIME A NEEDED BODY PART IS COMPLETED, ALL PLAYFIELD SWITCHES INCREASE IN SCORE BY 1X.

MULTI-BALL

- COMPLETING ANY PART OF THE BODY WILL ENABLE THE BALL TO BE CAPTURED BY SHOOTING EITHER THE LEFT RAMP OR THE RIGHT RAMP (WHICHEVER IS FLASHING).
- DURING MULTI-BALL PLAY, THE CURRENT SCORING MULTIPLIER IS DOUBLED.

EXTRA BALL

- COMPLETING 3 OR 4 BODY PARTS (BASED ON SW #32) DURING THE SAME BALL IN PLAY AWARDS AN EXTRA BALL.

SPECIAL

- COMPLETING ALL BODY PARTS OR HITTING THE VARI-TARGET WHEN FLASHING ("LIFEFORCE") (BASED ON SW #31) LIGHTS SPECIAL.

V. SOUND

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

VI. GAME ADJUSTMENTS

A. CONTROL BOARD SWITCH ADJUSTMENTS

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

COIN CHUTE COMBINATIONS SYSTEM 80B

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

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

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

```

SWITCH 7                                ATTRACT MODE SOUND
ON .....Enabled
OFF .....Disabled

```

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

SWITCH #8 _____ SPECIAL AND EXTRA BALL ADJUSTMENT
ON ...Completing drop target sequence spots a letter in
each part (Liberal).

OFF... Completing drop target sequence adds a letter to the most complete part (Conservative).

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

SWITCHES

15	16	MAXIMUM CREDITS
OFF	OFF	8
OFF	ON	10
ON	OFF	15
ON	ON	20

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

SWITCHES

23	24	HIGHEST GAME TO DATE AWARDS
OFF	OFF	None (Not Displayed)
OFF	ON	None
ON	OFF	2 Replay
ON	ON	3 Replay

SWITCH 25	BALLS/GAME
ON	3
OFF	5

SWITCH 26 _____ **MATCH**

ON On

OFF Off

SWITCH 27	REPLAY LIMIT
ON	1
OFF	No Limit

SV TCH 28 _____ NOVELTY
ON Yes
OFF Normal

SWITCH 29 **GAME MODE**
ON Extra Ball
OFF Replay

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

SWITCH #31 _____ SPECIAL ADJUSTMENT
ON.....Completing all body parts lights special (Liberal).

OFF..Hitting "Lifeforce" (vari-target) when flashing lights
special (Conservative).

SWITCH #32 _____ EXTRA BALL ADJUSTMENT _____

ON Completing 3 body parts during same ball in play
awards extra ball (Liberal).
OFF..... Completing 4 body parts during same ball in play
awards extra ball (Conservative).

VI. GAME ADJUSTMENTS

B. SOUND ADJUSTMENTS

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

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

SWITCH BANK SETTINGS:

DIP SWITCH

Position 1.....Not Used
Position 2.....Not Used
Position 3.....Off
Position 4.....On

INSTRUCTION CARD USAGE TABLE

SW. 8	SW. 31	SW. 32	CARD #
OFF	OFF	OFF	**1
OFF	OFF	ON	2
OFF	ON	OFF	*3
OFF	ON	ON	4
ON	OFF	OFF	5
ON	OFF	ON	6
ON	ON	OFF	7
ON	ON	ON	8

*DENOTES 3 BALL (FACTORY PRE-SET)

**DENOTES 5 BALL (FACTORY PRE-SET)

NOTE:

If game adjustment switch settings are changed to your own specifications, use the associated instruction card as indicated in the table.

See the control board game adjustment switch table for switch 8, 31 and 32 functions.

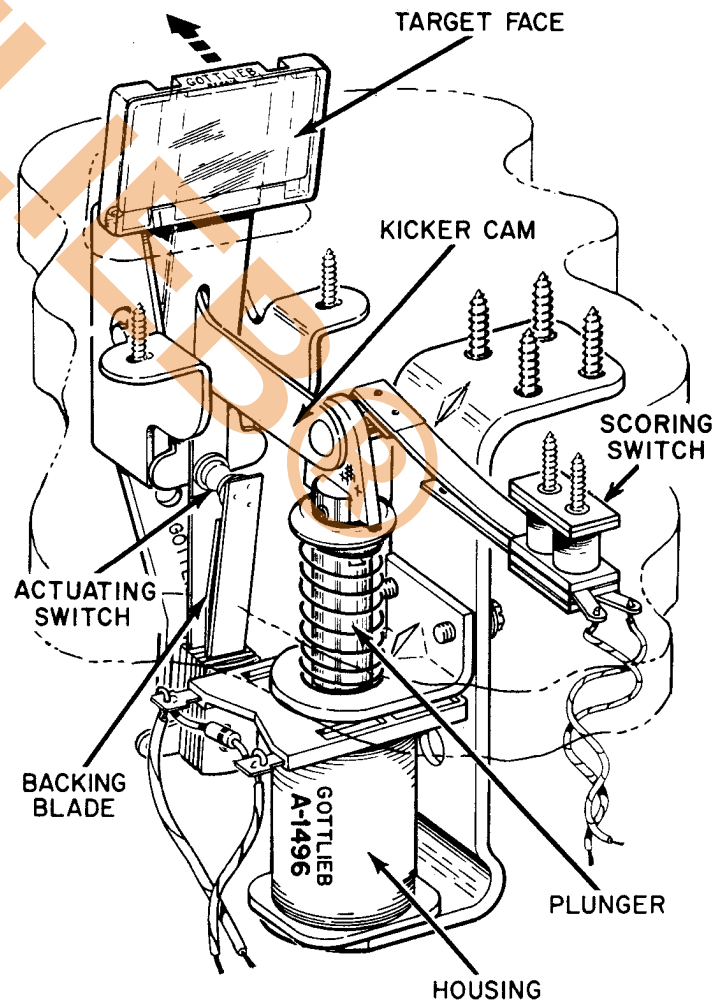
C. POST ADJUSTMENTS

The post at the mouth of the right and left side outlanes can be positioned for liberal/conservative play. The smaller opening produces a more liberal game.

D. KICKING TARGET ADJUSTMENT

Push the PLUNGER down until it "bottoms out" in the coil HOUSING. Push the TARGET FACE in the direction of the arrow shown until it makes contact with the vertical leg of the KICKER CAM. The vertical leg of the cam is located behind the kicking target and is not shown.

Observe that the gap between the ACTUATING SWITCH contacts is at least 1/32nd of an inch. If not, bend the switch's BACKING BLADE in the proper direction.



VII. BOOKKEEPING AND SELF TEST

The circuitry in this game helps the Operator perform many Bookkeeping and Self/Test functions. These functions are accessed by the Self/Test Switch inside the front door.

Section VII A., details the Bookkeeping system, while Section VII B., details the Self/Test operation. The Flow Chart in Section VII D., gives the general order and function of both Bookkeeping and Self/Test steps.

A. BOOKKEEPING SYSTEM 80B

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

I. STEPPING THROUGH BOOKKEEPING

1. Press the SELF-TEST button inside the front door.
"TEST MODE" should appear in the upper display.
2. Press the SELF-TEST button again. Step 1 and its information will be displayed.
3. Pressing the SELF-TEST button will increment the bookkeeping step number and appropriate information will be displayed.

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

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

4. To exit from Bookkeeping at any time:

- a. Turn power OFF/ON or
- b. Open slam switch.

II. HOW TO SET BOOKKEEPING INFORMATION TO ZERO

1. For a Particular Bookkeeping Step

- a. Advance Bookkeeping so the step to be zeroed is displayed.
- b. Press the credit button. Notice information replaced by zeros. Note: Step 6 (Replay Percentage) cannot be zeroed using the credit button.

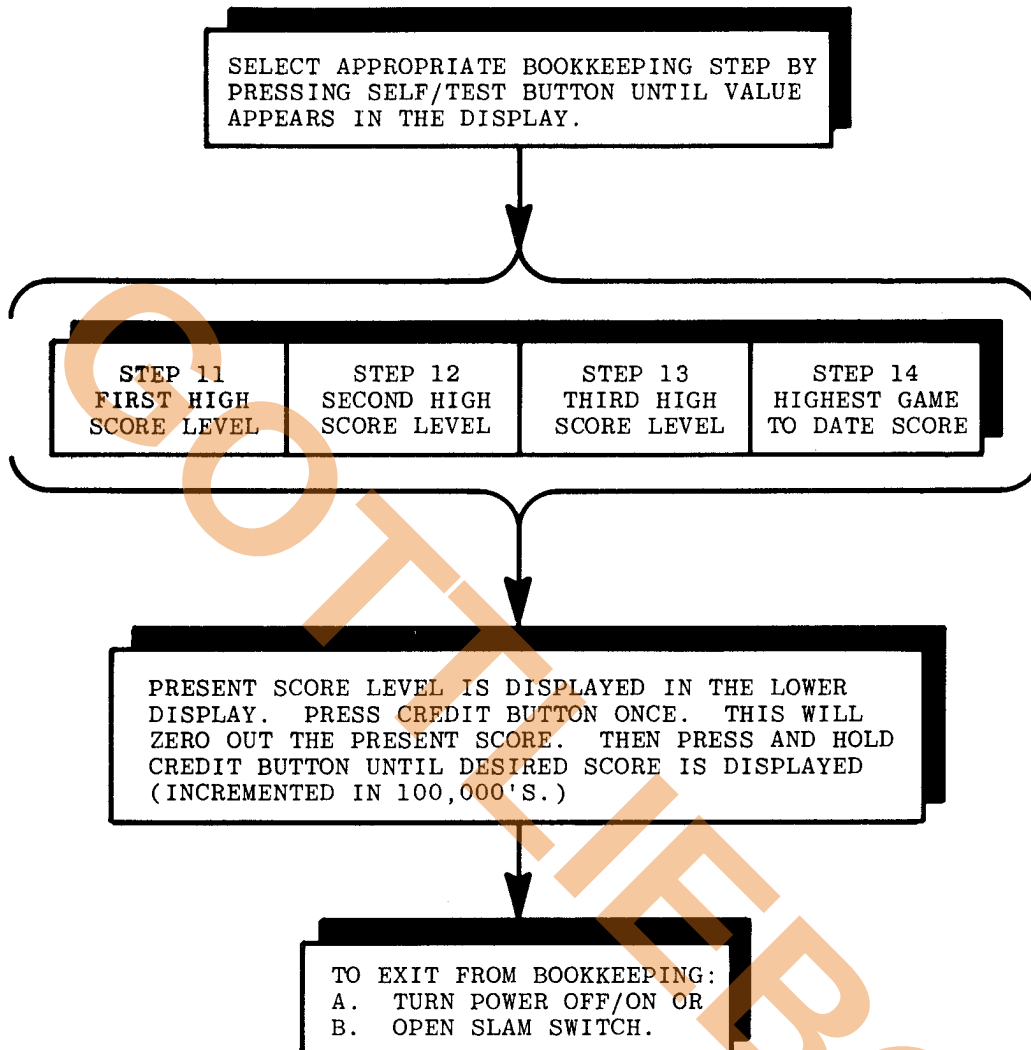
2. Zeroing All Bookkeeping Steps Except #11, 12, 13 and 14.

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

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

VII. BOOKKEEPING AND SELF TEST

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

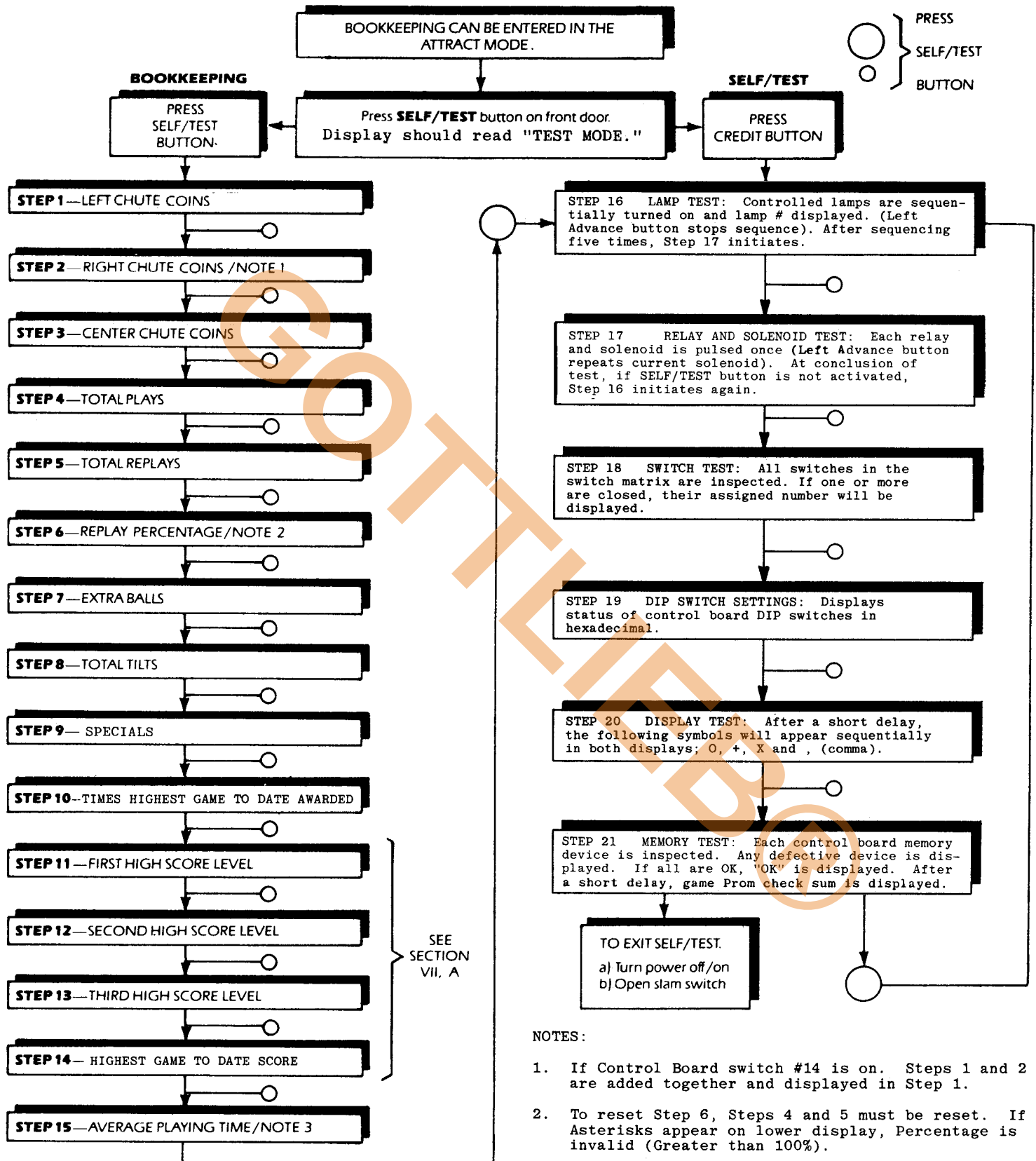


NOTES:

1. Step 11 must be a lower score than Step 12.
Step 12 must have a lower score than Step 13.
Otherwise, the scores will not be recognized.
2. If Step 12 or Step 13 is not desired, set those scores to zero.
3. If Step 14 is reset, all High Games to Date scores are reset.
4. High Score Levels may range from 100,000 to 9,900,000 in increments of 100,000.

VII. BOOKKEEPING AND SELF TEST

B. FLOW CHART



NOTES:

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

VII. BOOKKEEPING AND SELF TEST

C. SELF/TEST

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

STEP 16—LAMP TEST

- 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- $\bar{A}$ (Q1)
T (Tilt) Relay.....A3J3 PIN- $\bar{B}$ (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	Vari-Target Release	Q60
Sol.2	Right Kicker	Q57/Q58
Sol.3	Not Used	Q54
Sol.4	Left Ramp Lamps	Q55
Sol.5	Top Left Hole	Q61/Q62
Sol.6	3 Pos. Bank Reset	Q63/Q64
Sol.7	Right Ramp Lamps	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

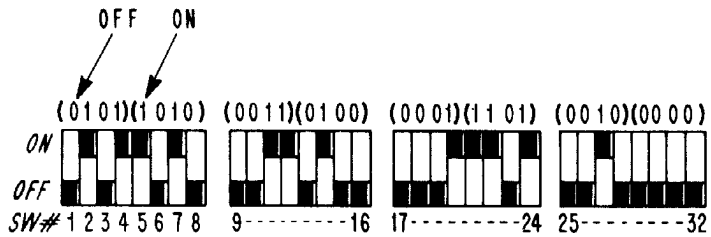
- a. The status of the Control Board (A1) switches appears in the lower display.

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

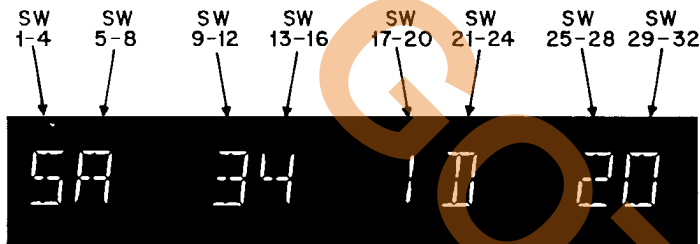
VII. BOOKKEEPING AND SELF TEST

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; O, +, X and , (comma).

STEP 21—MEMORY TEST

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

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

VIII. THEORY OF OPERATION

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

A. CONTROL BOARD (A1)

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

The use of the Alphanumeric Display eliminates the need for Z19, Z21, Z22, Z23, Z24, Z25 (System 80A Display Control), and connector 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

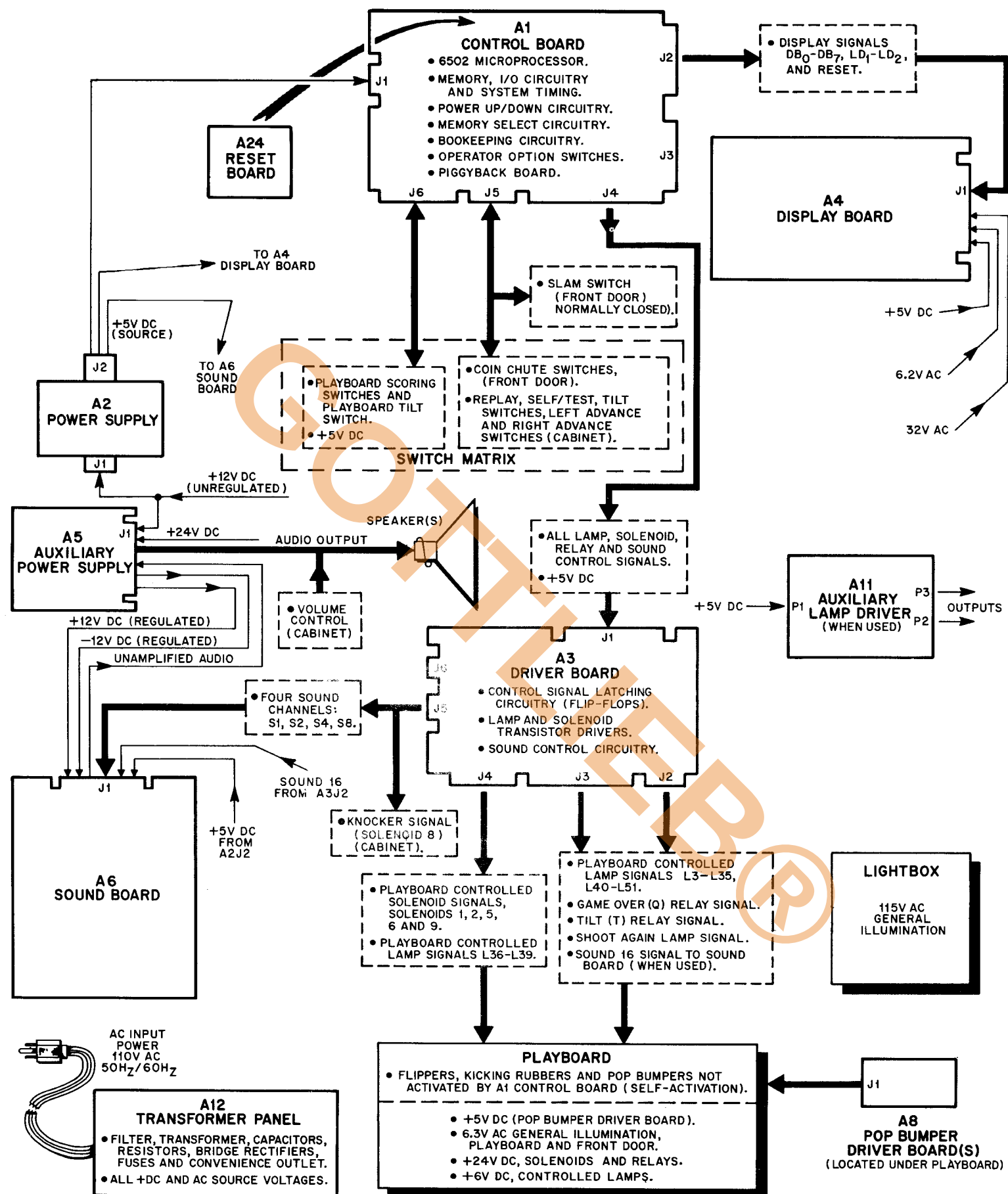


FIGURE 1. SYSTEM 80B BLOCK DIAGRAM

VIII. THEORY OF OPERATION

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

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

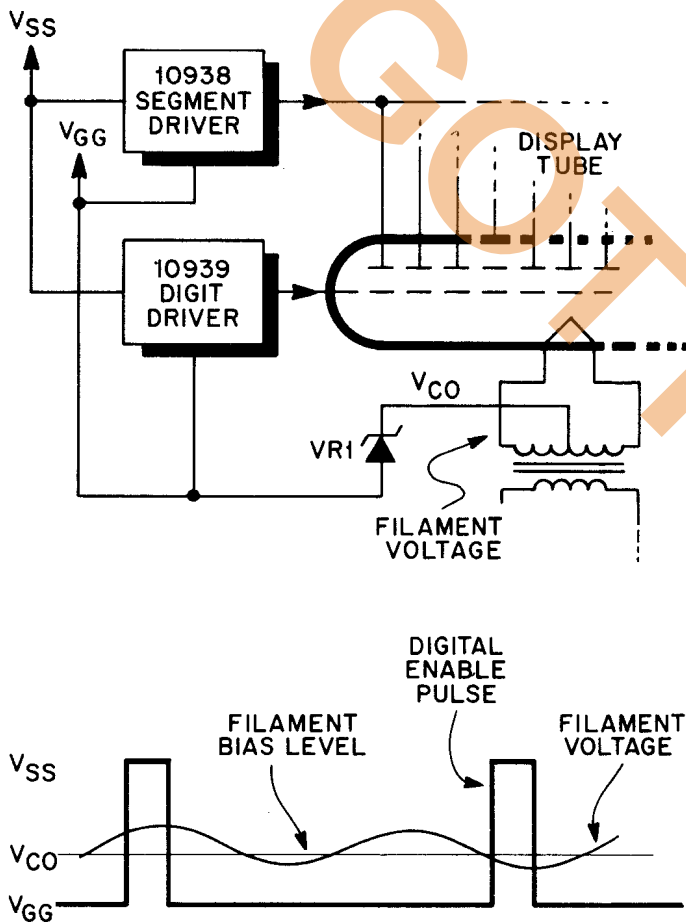


FIGURE 2. BASIC DRIVE CIRCUIT

D. SOUND BOARD (A6)

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

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

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

SYSTEM CLOCK

A 4 MHz oscillator is configured with R11, R12, C14, C15, C21, XTAL-1 and T1. R21 and C22 are optional. This 4 MHz clock is divided by 4 to a 1 MHz clock for both processors' clock input, pin 37 of N1 and T3. A 2 Mhz clock from S1 pin 14 is sent to the two AY-3-8913 Programmable Sound Generator, H4 and K4, pin 20. A 250 KHz signal from S1 pin 11 is the clock for the programmable timer section consisting of N5, H5, T5 and K5, pin 2.

INPUT CODE LATCH SYSTEM

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

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

VIII. THEORY OF OPERATION

SYSTEM RAM

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

RESET

The Sound Board receives an external reset signal from 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.

INPUT PORT

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

MAIN SUMMER

The main summer consists of R13 through R17 and B1, pins 12, 13 and 14. B1 pin 14 is the main output from the Sound Board, at A6P1 pin 18, 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 - Pop Bumper Driver Board
A11- Auxiliary Lamp Driver
A24- Reset Board

B. WIRE COLORS ARE SHOWN AS NUMBERS:

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

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

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

C. FUSES

TRANSFORMER PANEL FUSES

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

PLAYBOARD FUSES

F9	Bottom Right Pop Bumper	2 Amp	SLO-BLO
F10	Top Right Pop Bumper	2 Amp	SLO-BLO
F11	Bottom Left Pop Bumper	2 Amp	SLO-BLO
F12	Top Left Pop Bumper	2 Amp	SLO-BLO
F13	Top Right Kicker; Top Left Hole ...	2 Amp	SLO-BLO
F14	Target Bank Reset; Outhole	1 Amp	SLO-BLO
F15	Ball Release	1 Amp	SLO-BLO

IX. GENERAL INFORMATION

D. COIL CHART

SOLENOID COILS					
PART NUMBER	GENERAL USAGE	RESISTANCE (OHMS)	NUMBER OF TURNS	WIRE GAUGE	WRAPPER COLOR
A-1496	KICKING TARGET 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	O, 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

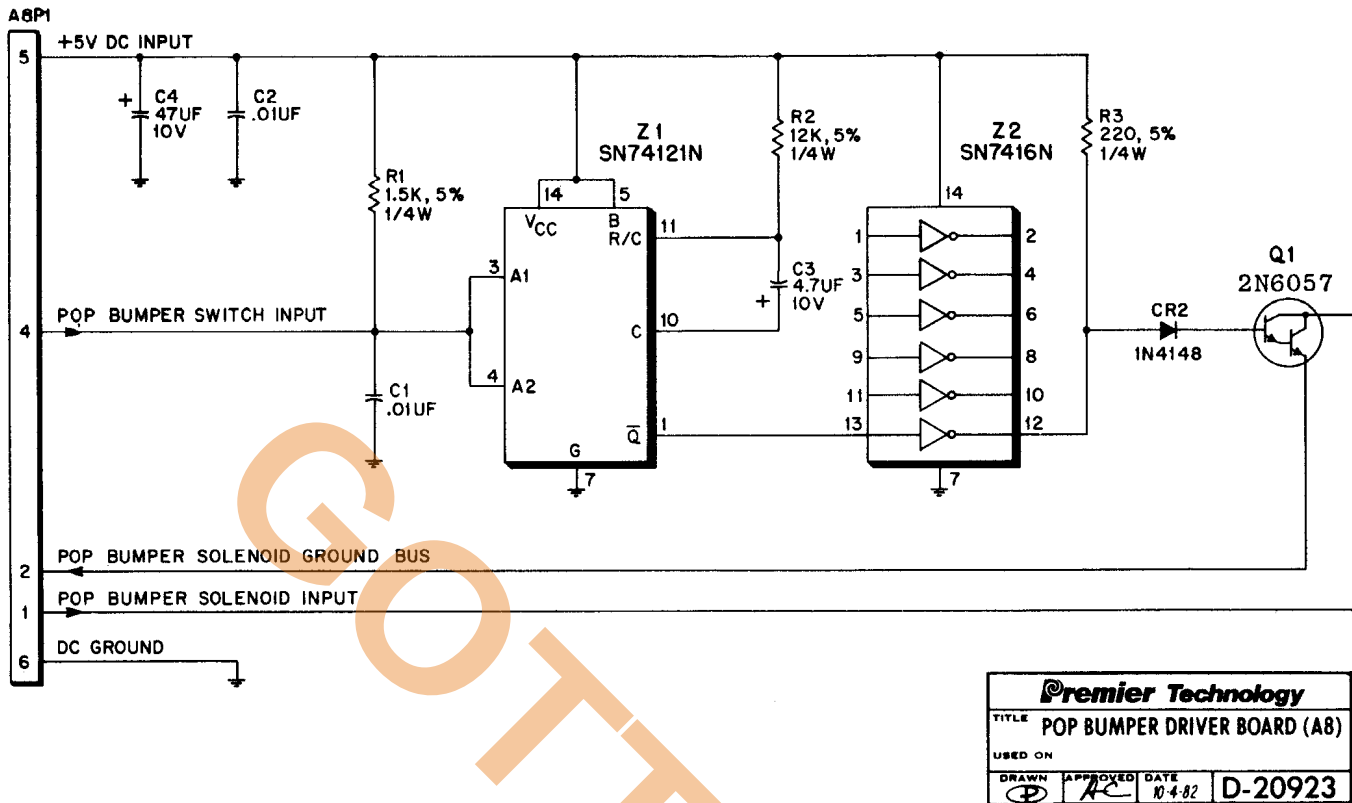
*Coils may vary from game to game. Check game manual for exact coil usage.

X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS

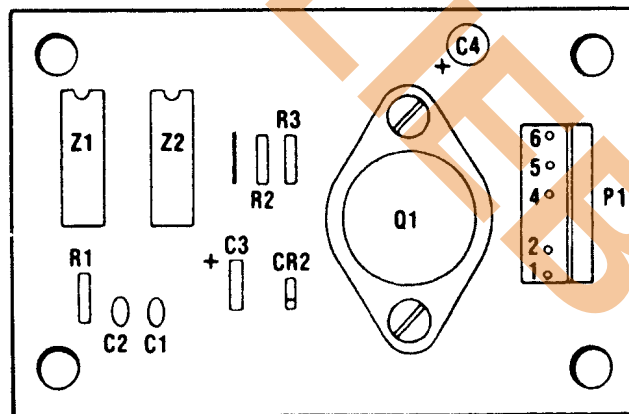
TABLE OF CONTENTS

	PAGE(S)
POP BUMPER DRIVER BOARD (A8)	
COMPONENT LOCATION AND PARTS LIST.....	20
SCHEMATIC DIAGRAM.....	20
CONTROL BOARD (A1), PIGGYBACK	
COMPONENT LOCATION AND PARTS LIST.....	21
SCHEMATIC DIAGRAM.....	21
CONTROL BOARD (A1)	
COMPONENT LOCATION AND PARTS LIST.....	22
SCHEMATIC DIAGRAM.....	23-25
DRIVER BOARD (A3)	
COMPONENT LOCATION AND PARTS LIST.....	26
SCHEMATIC DIAGRAM.....	27, 28
AUXILIARY POWER SUPPLY (A5)	
COMPONENT LOCATION AND PARTS LIST.....	30
SCHEMATIC DIAGRAM.....	30
SOUND BOARD (A6)	
COMPONENT LOCATION AND PARTS LIST.....	31
SCHEMATIC DIAGRAM.....	32, 33
LIGHTBOX	
SCHEMATIC/WIRING DIAGRAM.....	34, 35
DISPLAY BOARD (A4)	
COMPONENT LOCATION AND PARTS LIST.....	36
SCHEMATIC DIAGRAM.....	37, 38
RESET BOARD (A24)	
COMPONENT LOCATION AND PARTS LIST.....	39
SCHEMATIC DIAGRAM.....	39
PLAYBOARD	
PLAYBOARD SWITCH MATRIX.....	40
PLAYBOARD ILLUMINATION AND SOLENOIDS.....	41, 42
AUXILIARY LAMP DRIVER (A11)	
COMPONENT LOCATION AND PARTS LIST.....	43
SCHEMATIC DIAGRAM.....	43
POWER SUPPLY (A2)	
COMPONENT LOCATION AND PARTS LIST.....	44
SCHEMATIC DIAGRAM.....	44
TRANSFORMER PANEL/CABINET	
SCHEMATIC/WIRING DIAGRAM.....	45, 46

X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS



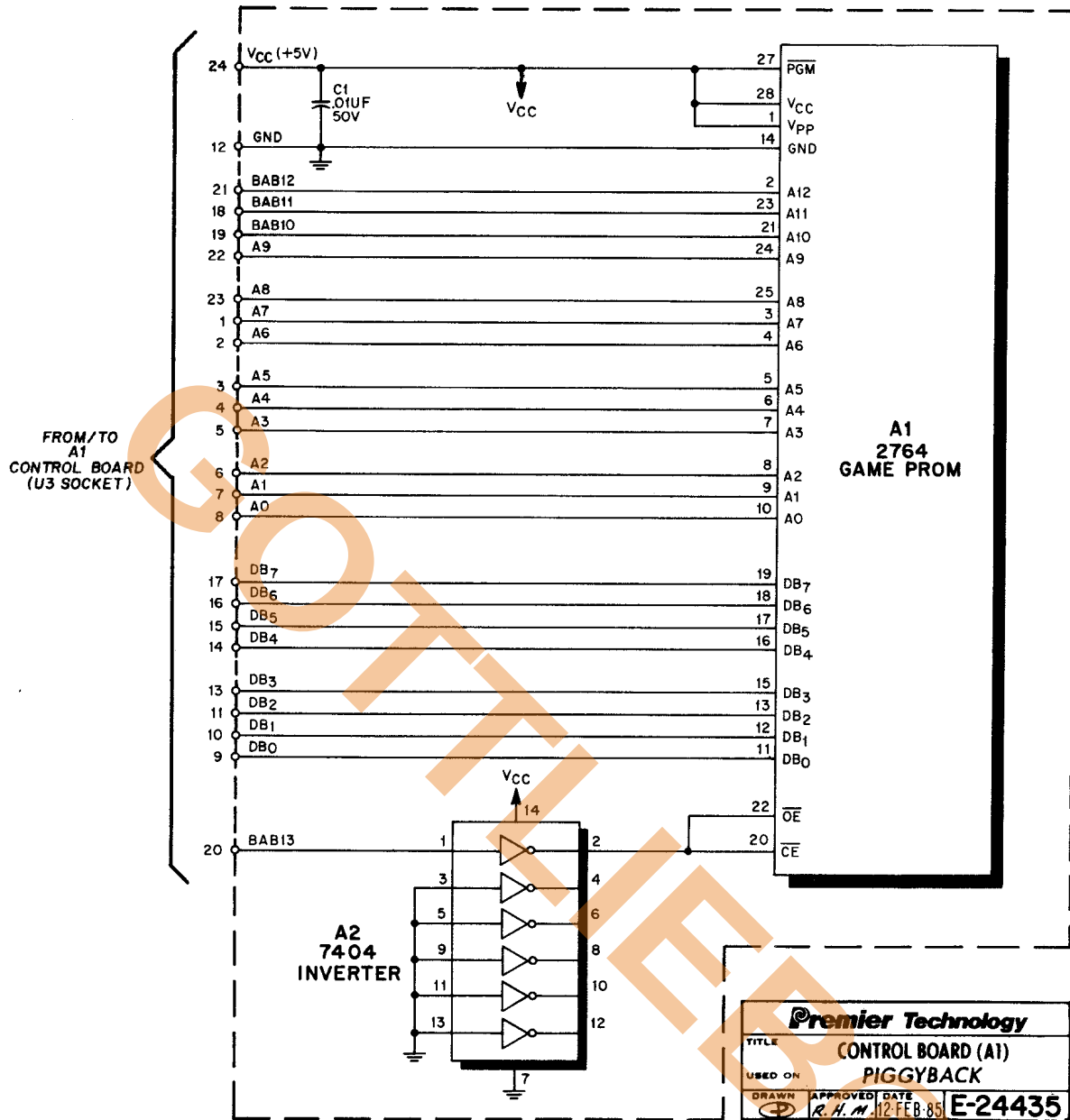
POP BUMPER DRIVER BOARD (A8) COMPONENT LOCATION



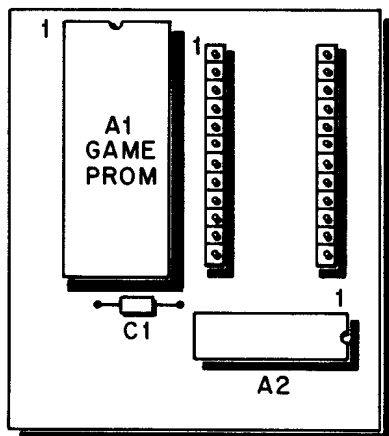
POP BUMPER DRIVER BOARD (A8) PARTS LIST

REFERENCE	DESCRIPTION	PART NUMBER
	POP BUMPER DRIVER BOARD	A-19741
C1, C2	Capacitor, .01 mfd., 100V	XO-202
C3	Capacitor, 4.7 mfd., 10%, 10V, Tantalum, Axial	XO-226
C4	Capacitor, 47 mfd., 10V	XO-227
CR2	Diode 1N4148	XO-261
P1	Connector 09-65-1061	XO-868
R1	Resistor, 1.5K ohm, 5%, 1/4W	XO-20
R2	Resistor, 12K ohm, 5%, 1/4W	XO-9
R3	Resistor, 220 ohm, 5%, 1/4W	XO-21
Q1	Transistor, Darlington 2N6057	XO-311
Z1	IC SN74121N	XO-417
Z2	IC SN7416N	XO-405

X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS



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

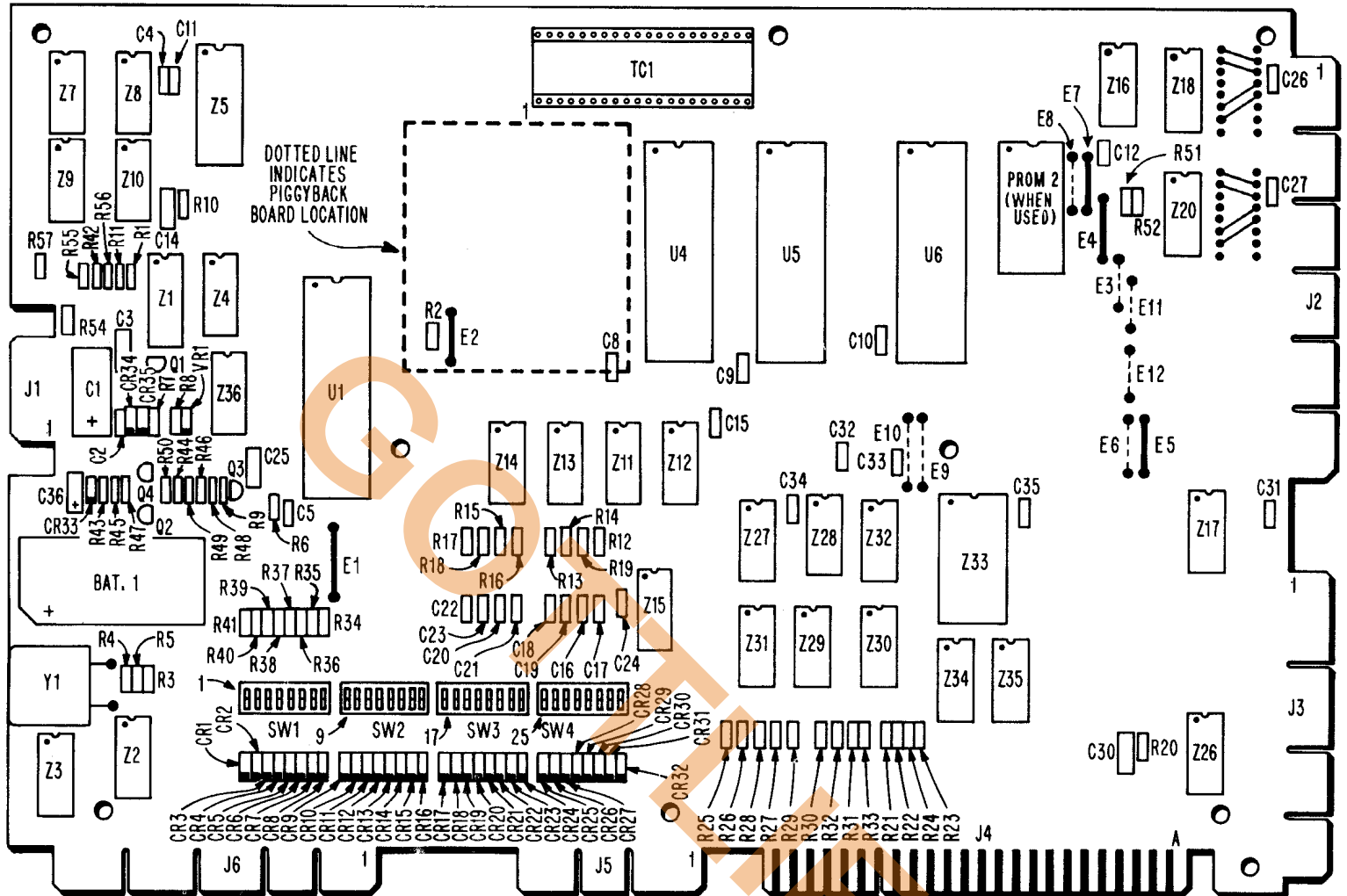


**CONTROL BOARD (A1),
PIGGYBACK
PARTS LIST**

REFERENCE	DESCRIPTION	PART NUMBER
A1	Control Board (A1), Piggyback	MA689
A2	Game Prom, 2764	XO-489
	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



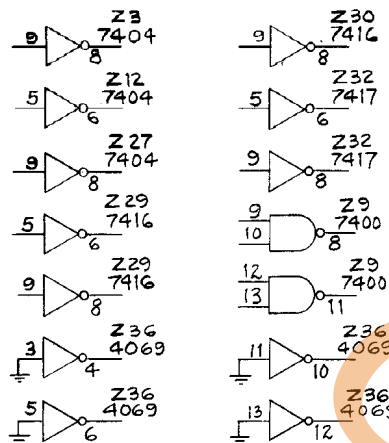
CONTROL BOARD (A1) PARTS LIST

REFERENCE	DESCRIPTION	PART NUMBER	REFERENCE	DESCRIPTION	PART NUMBER
	CONTROL BOARD	MA-774			
Bat. 1	Battery-3.6V 326R10-002	XO-458	R47	Resistor, 24K ohm, 5%, 1/4W	XO-10
C1	Capacitor, 100 mfd., 10V	XO-211	SW1-SW4	Dip Switch 1008-692	XO-505
C2, C4, C5, C8-C12, C15-C24, C26, C27, C31-C35	Capacitor, .01 mfd., 50V	XO-229	TC1	Socket, 40 Pin 640379-3	XO-530
C3, C14, C25, C30	Capacitor, .1 mfd., 50V	XO-230	U1	CPU R6502P	XO-360
C36	10 mfd., 10V, TNT-AX CAP	XO-209	U4, U5, U6	PRIOT R6532P	XO-361
CR1-CR35	Diode, GP IN4148	XO-261	VR1	Diode-3.0V, 5% IN5225B or IN5987B	XO-269
Q1, Q4	Transistor-PNP MPS-A70	XO-309	Y1	Crystal, 3.579545 MHZ	XO-456
Q2, Q3	Transistor, NPN (Motorola) 2N4400	XO-313	Z1	IC-Cmos-Dual 1 Shot SCL4528BE	XO-414
R1, R6	Resistor, 3.0K ohm, 5%, 1/4W	XO-23	Z2	IC-Dual Flip Flop SN7474N	XO-423
R11-R24			Z3, Z11, Z12, Z16, Z17, Z26, Z27, Z34, Z35	IC-Hex Inverter SN7404N	XO-402
R42, R45, R46, R48, R51, R52, R54-R57					
R2, R34-R41	Resistor, 4.7K ohm, 5%, 1/4W	XO-7	Z4	IC-Cmos-Quad 2 Input "And" SCL4081BE	XO-401
R3, R43, R49	Resistor, 5.6K ohm, 5%, 1/4W	XO-19	Z5	IC-Static Ram S5101-L	XO-356
R4, R5, R44	Resistor, 2.0K ohm, 5%, 1/4W	XO-14	Z7	IC-Hex Inverter SN74LS04N	XO-418
R7	Resistor, 62 ohm, 5%, 1/4W	XO-3	Z8	IC-2 Input "Nor" SN7402N	XO-421
R8, R50	Resistor, 180 ohm, 5%, 1/4W	XO-24	Z9, Z13, Z14	IC-2 Input "Nand" SN7400N	XO-420
R9	Resistor, 1K ohm, 5%, 1/4W	XO-5	Z10	IC-Open Collector Inverter SN74LS05N	XO-411
R10	Resistor, 2.7M ohm, 5%, 1/4W	XO-13	Z15	IC-2 Input "Or" SN7432N	XO-407
R25-R33	Resistor, 620 ohm, 5%, 1/4W	XO-4	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

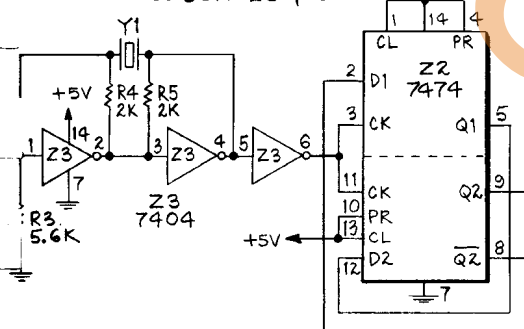
CONTROL BOARD (A1), PIGGYBACK MA689

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

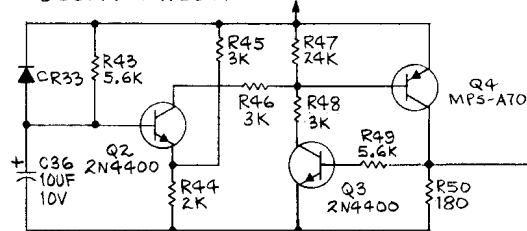
SPARE GATES



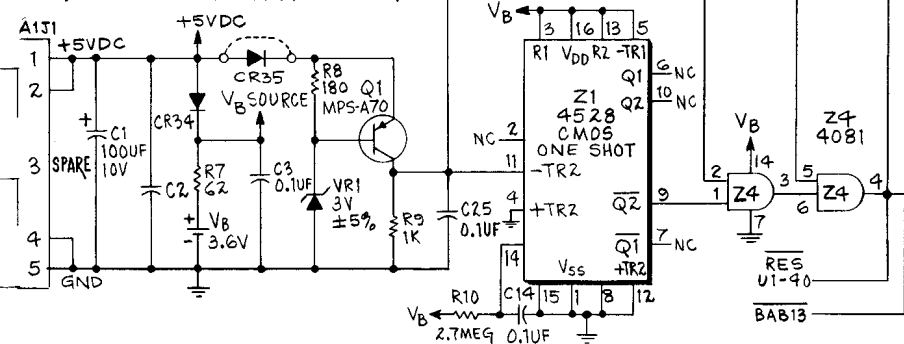
CLOCK LOGIC



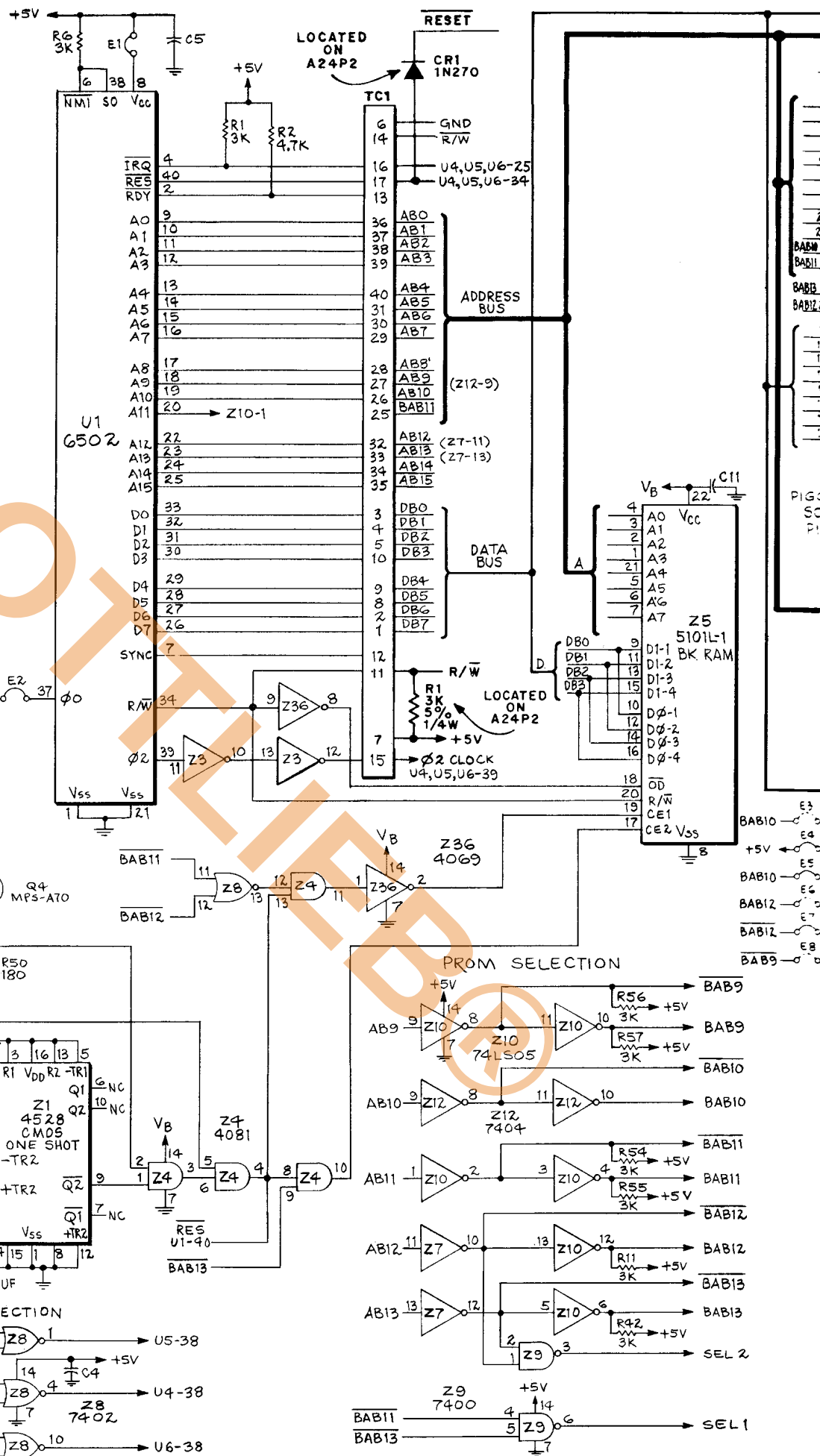
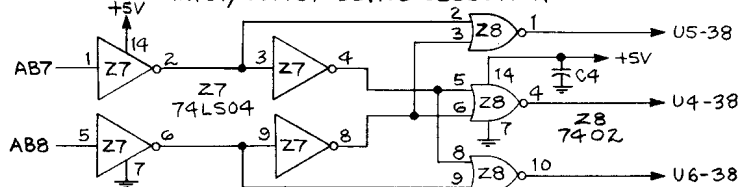
DELAY CIRCUIT

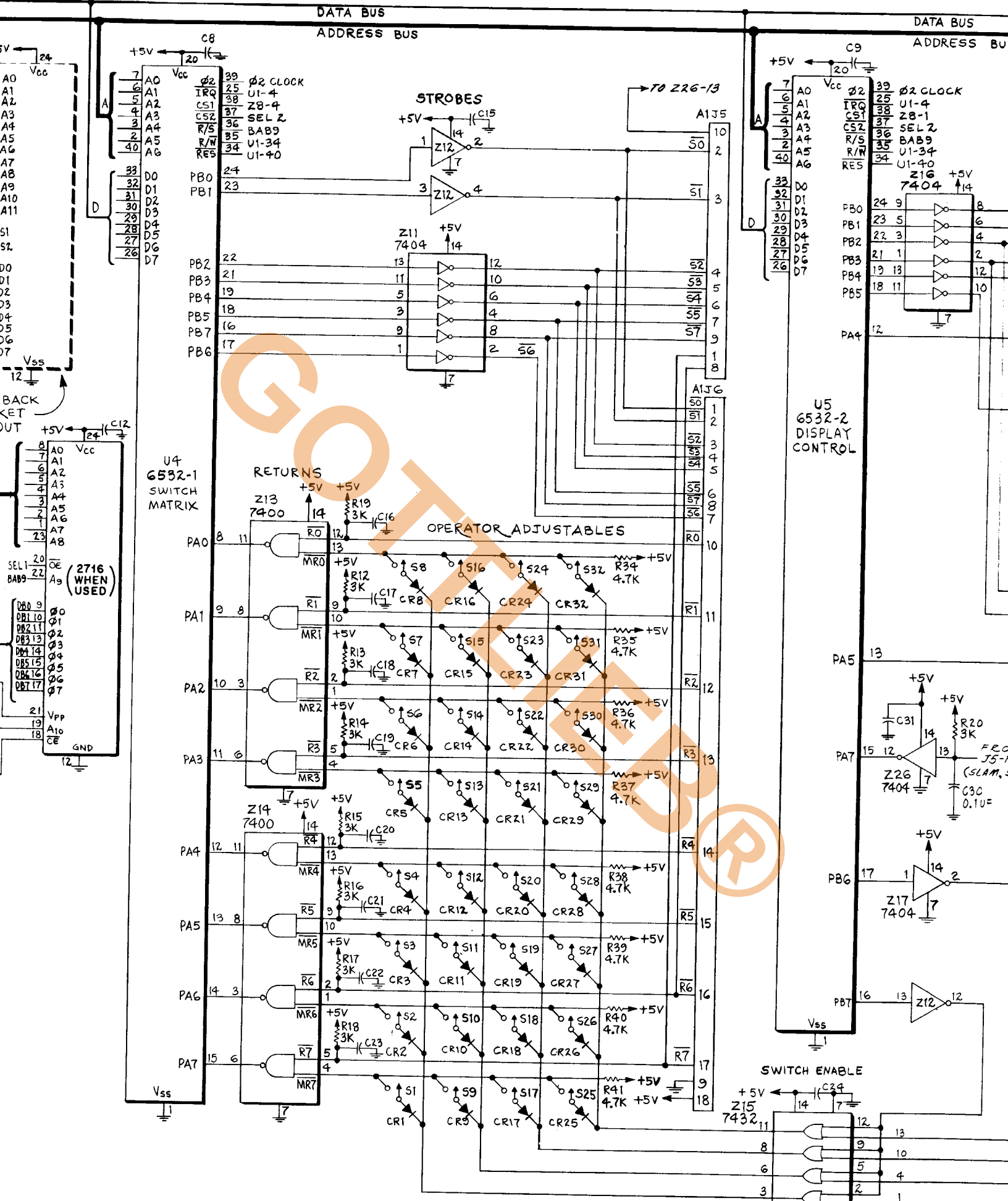


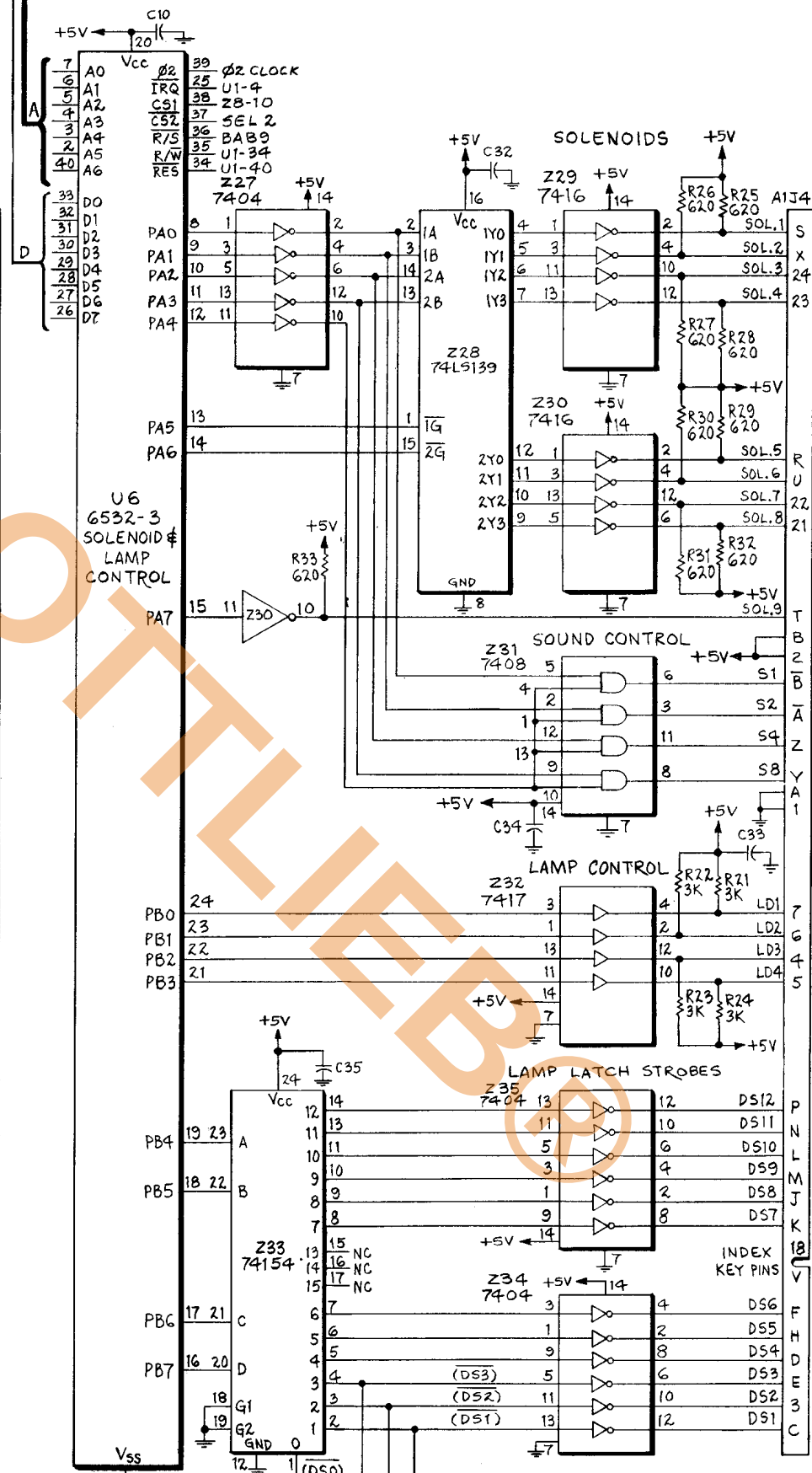
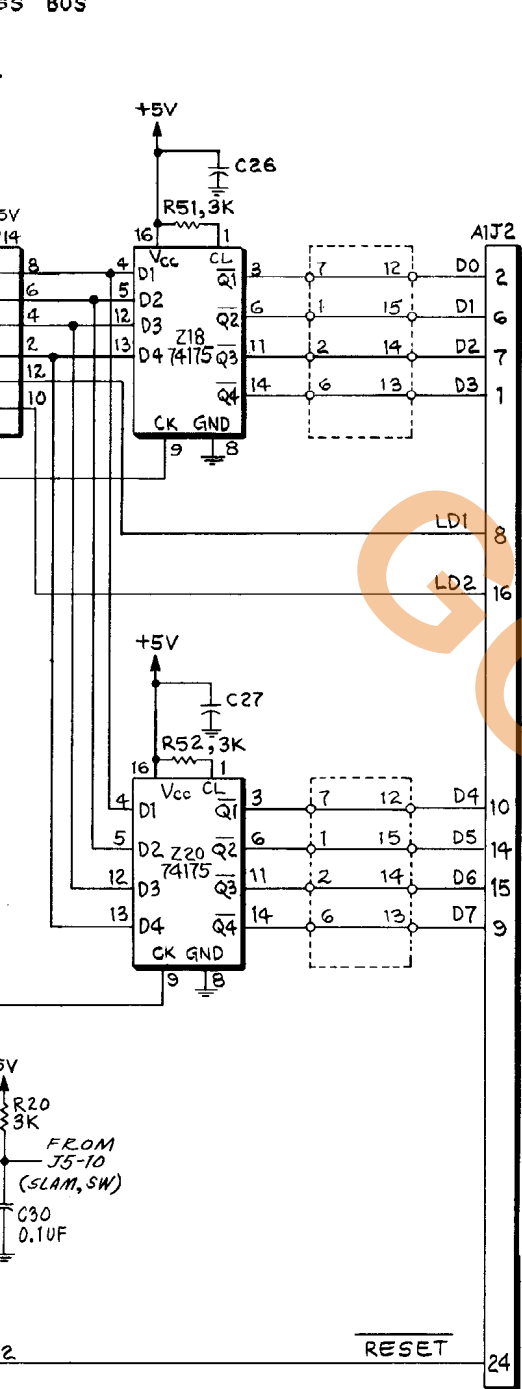
UP/DOWN MEMORY PROTECT LOGIC



INPUT/OUTPUT DEVICE SELECTION







Premier Technology

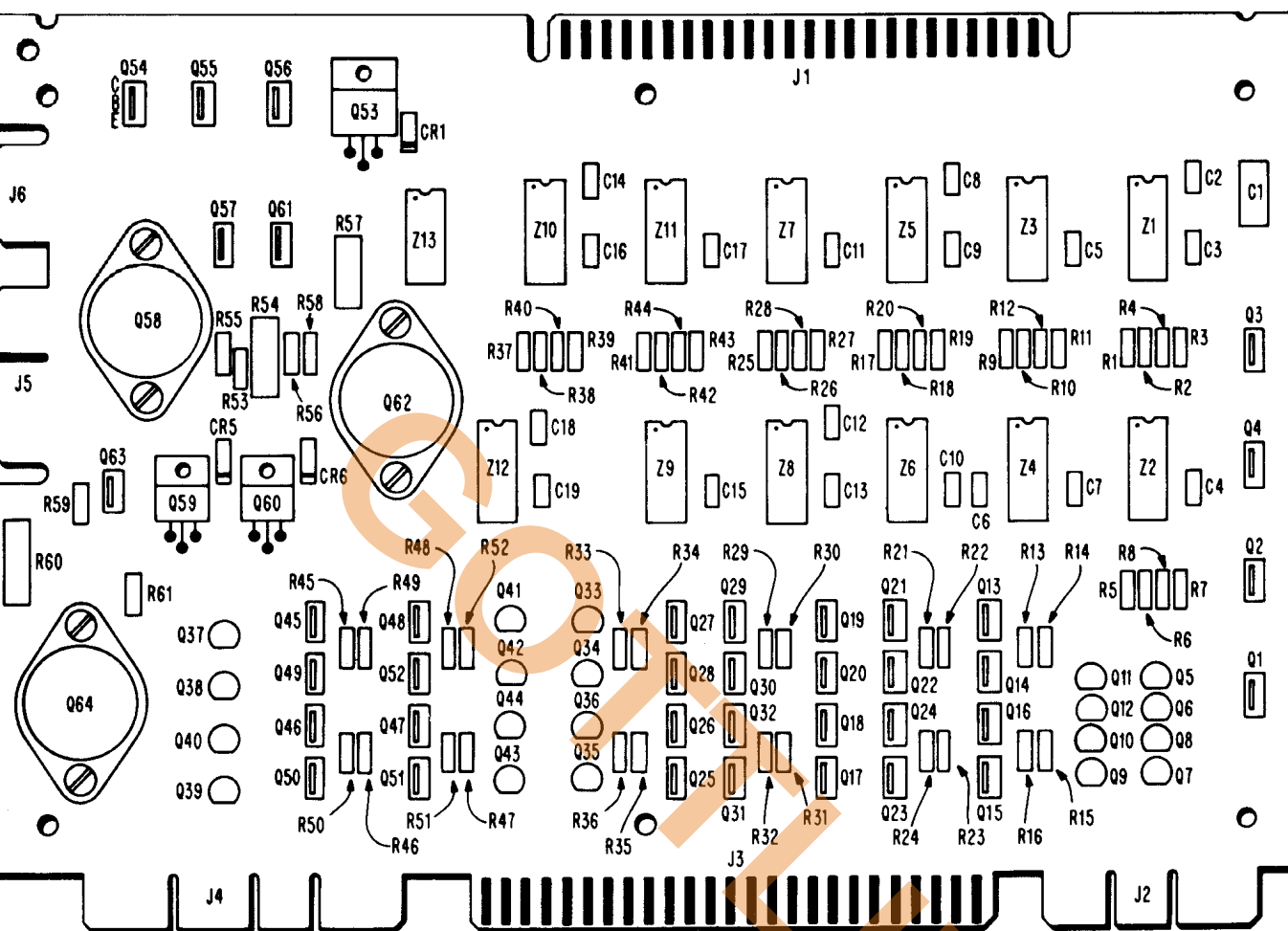
TITLE
CONTROL BOARD (AI)

USED ON

DRAWN APPROVED DATE E-24436

NOTE:
1. RESIS
2. CAPA
3. INTE
4. JUMP
CR3
5. TRAN
NDS

DRIVER BOARD (A3) COMPONENT LOCATION

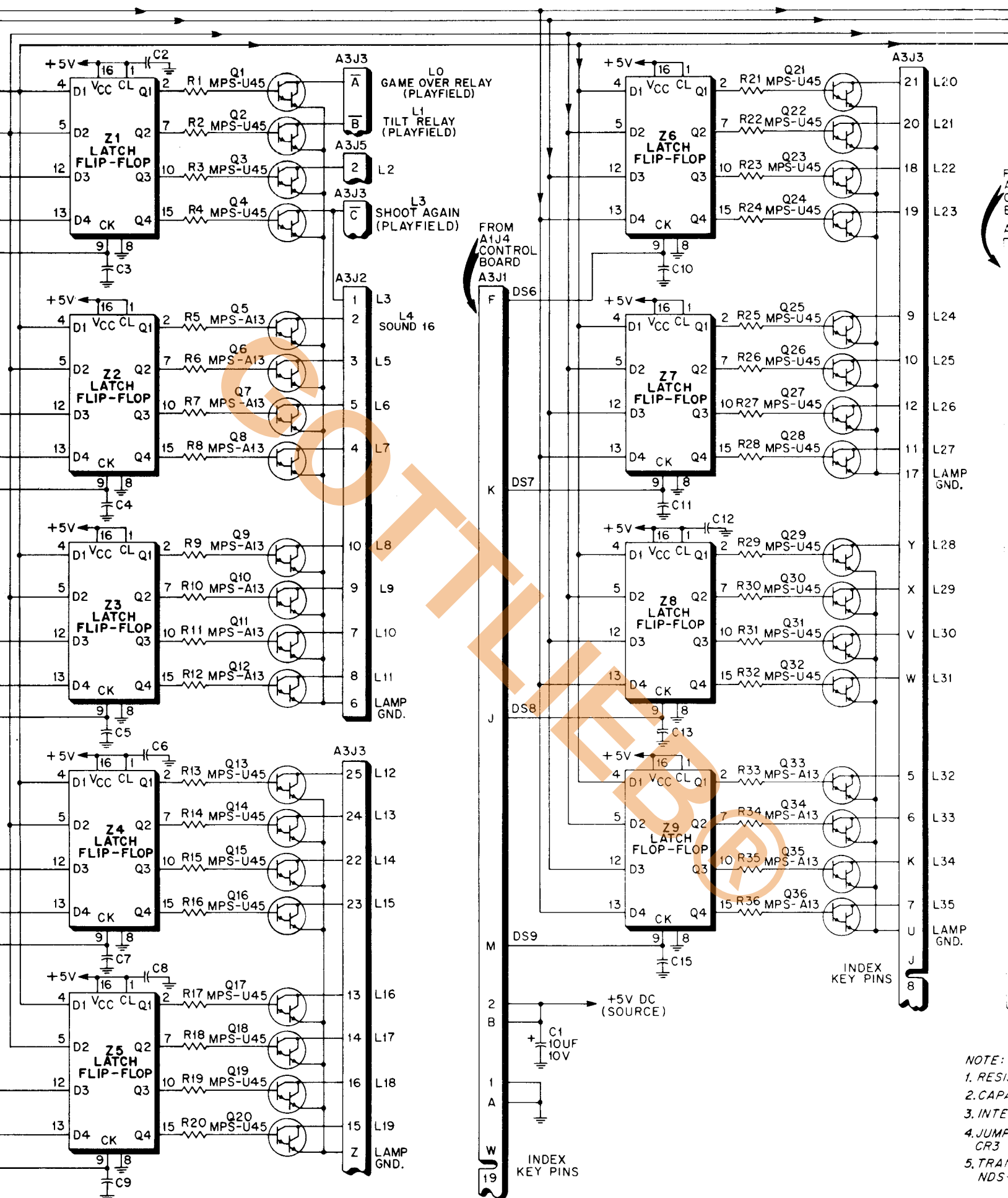


DRIVER BOARD (A3) PARTS LIST

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%, 1/4W	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:

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

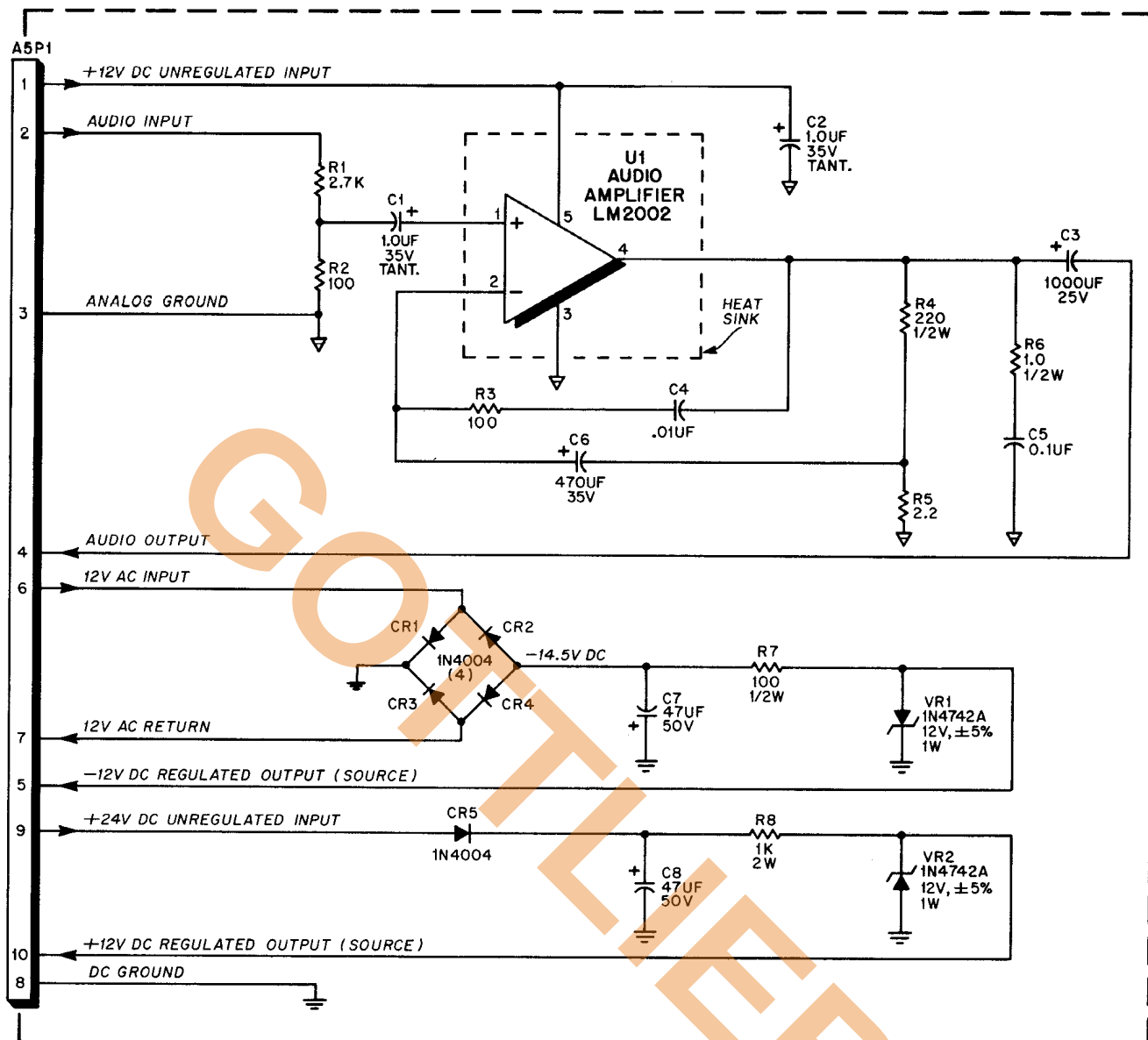


NOTE:
 1. RESIS
 2. CAPA
 3. INTE
 4. JUMP
 CR3
 5. TRAN
 NDS-

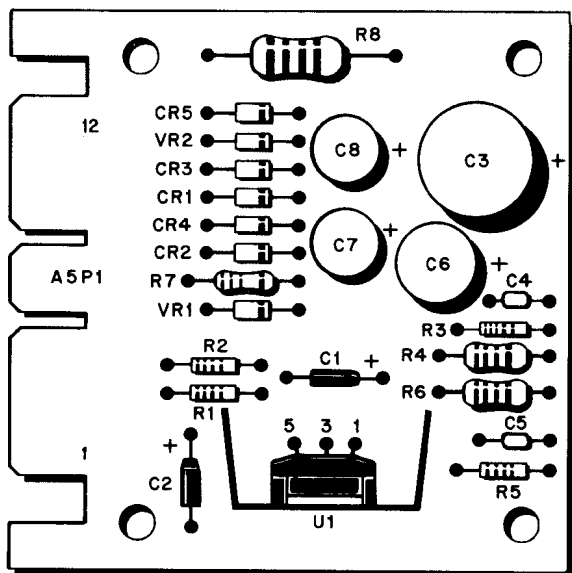
SERVICE NOTES

GO THERAPY®

X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS



AUXILIARY POWER SUPPLY (A5) COMPONENT LOCATION

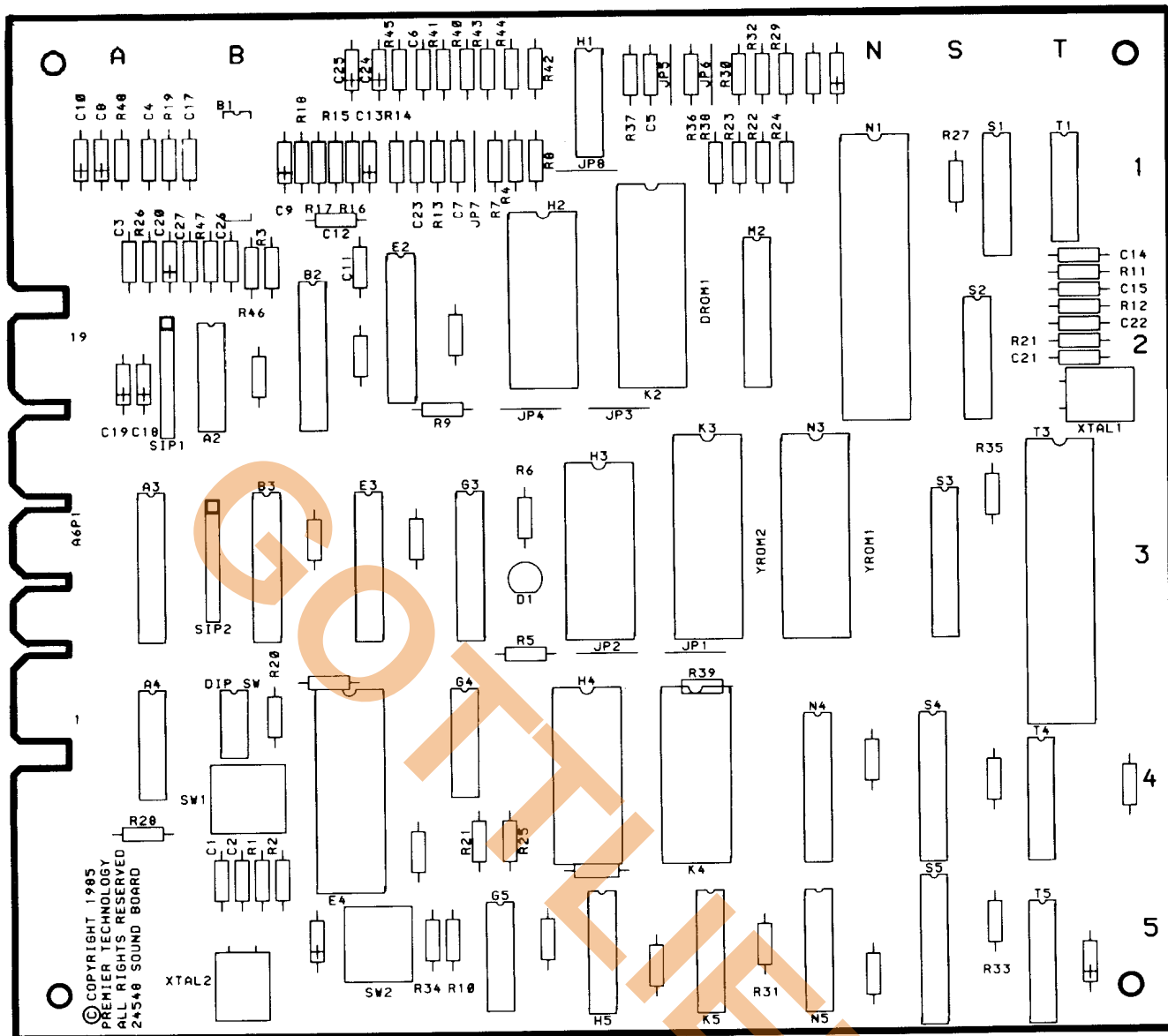


Premier Technology			
TITLE	AUXILIARY POWER SUPPLY (A5)		
USED ON			
DRAWN	APPROVED	DATE	E-24715
P	R.H.M.	9-OCT-85	

AUXILIARY POWER SUPPLY (A5) PARTS LIST

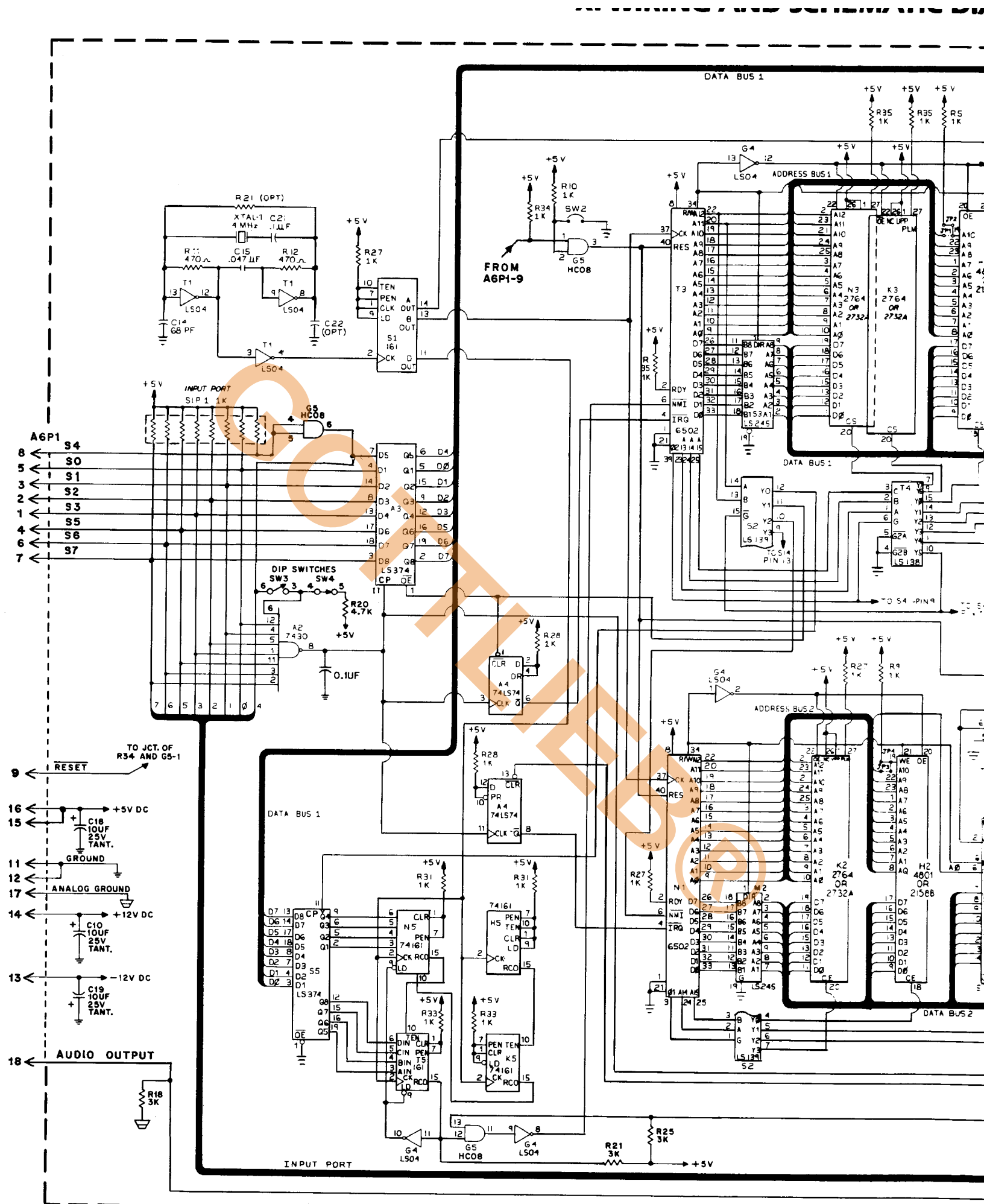
REFERENCE	DESCRIPTION	PART NUMBER
	Auxiliary Power Supply	MA-767
C1, C2	Capacitor, 1UF, 10%, 35V, TANT	XO-715
C3	Capacitor, 1000UF, 25V	XO-874
C4	Capacitor, .01UF, +80% -20%, 50V	XO-229
C5	Capacitor, 0.1UF, +80% -20%, 50V	XO-230
C6	Capacitor, 470UF, 35V	XO-284
C7, C8	Capacitor, 47UF, 50V	XO-210
CR1-CR5	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

SOUND BOARD (A6) COMPONENT LOCATION

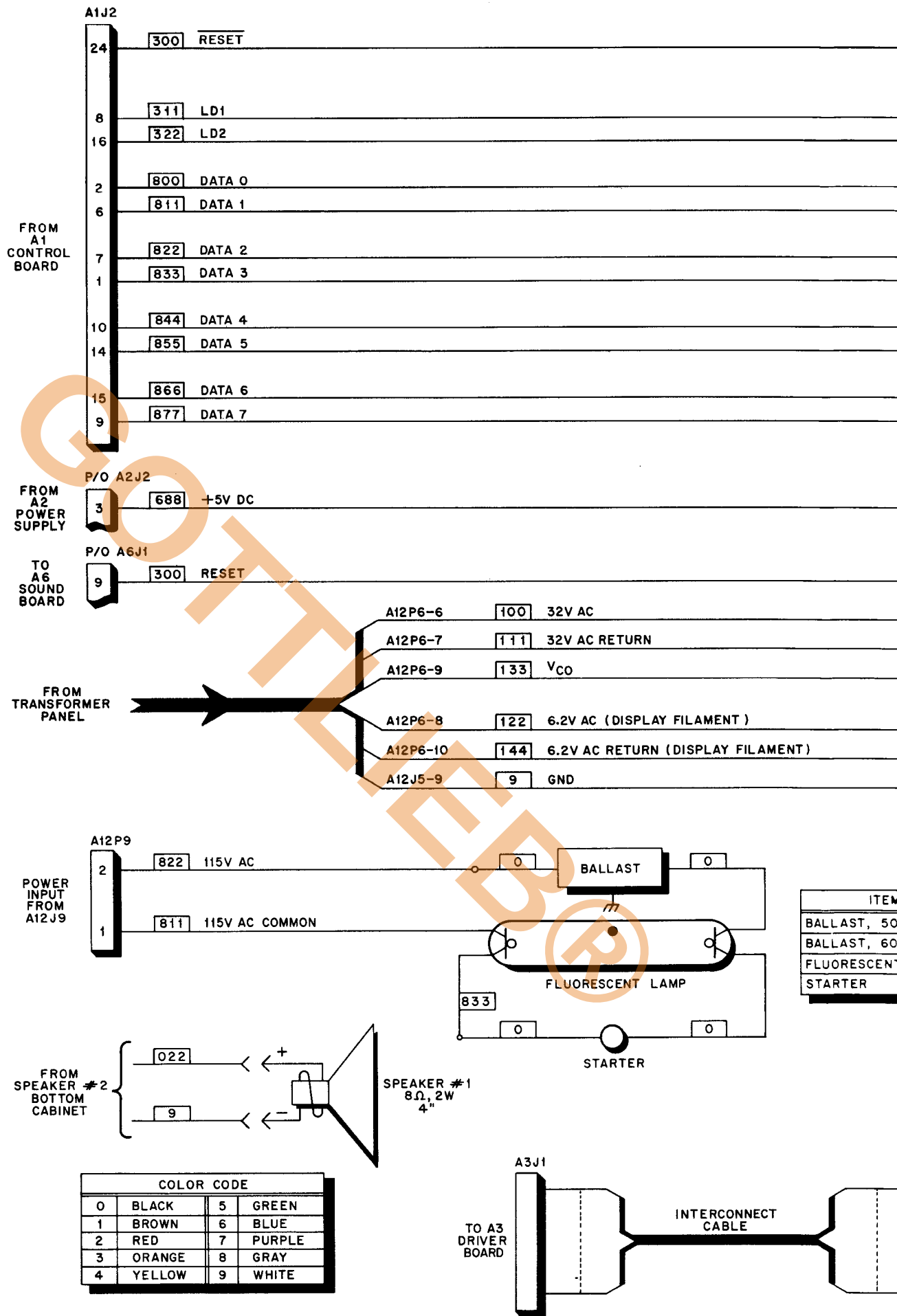


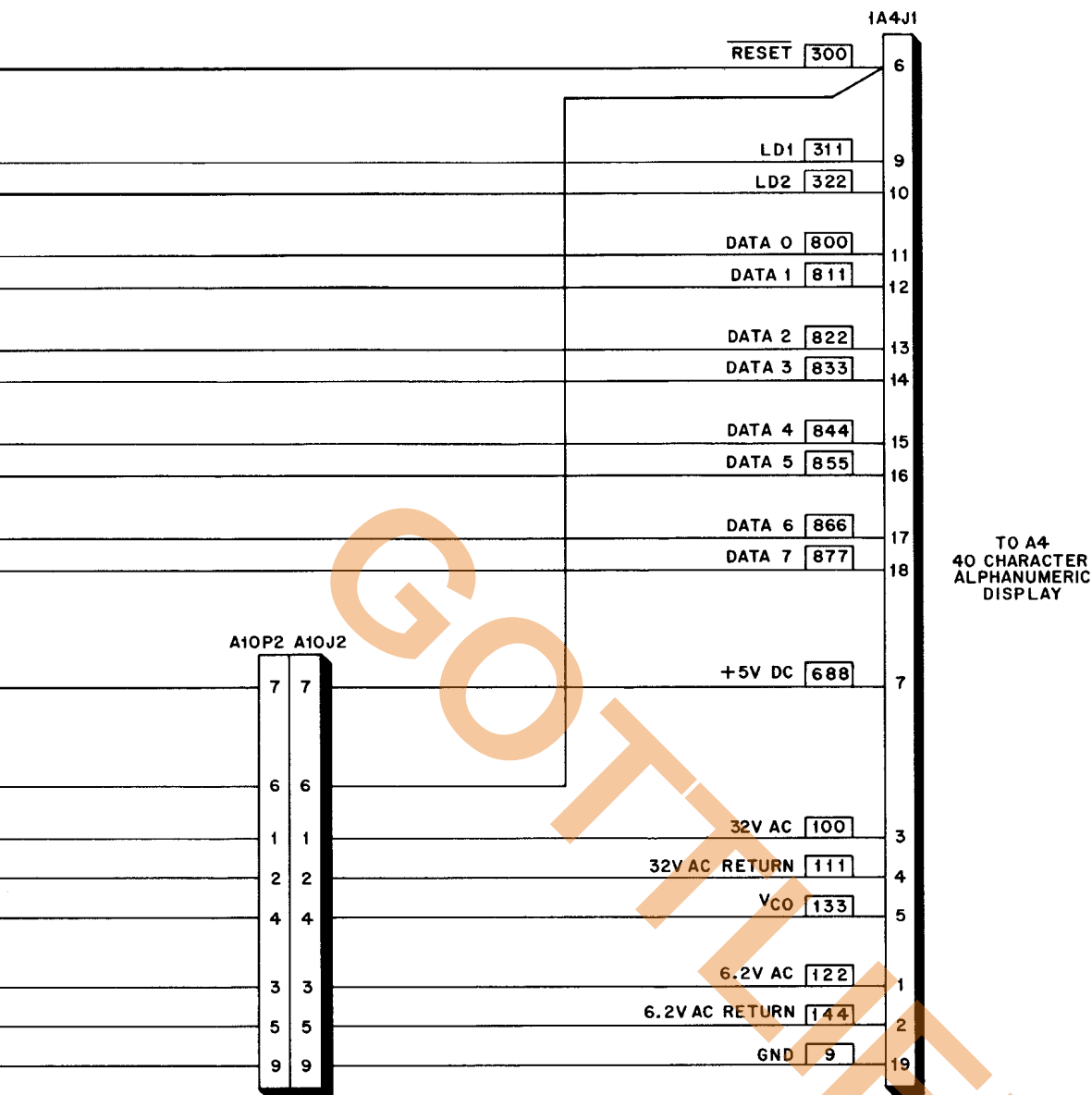
SOUND BOARD (A6) PARTS LIST

REFERENCE	DESCRIPTION	PART NUMBER	REFERENCE	DESCRIPTION	PART NUMBER
C1,C2	Sound Board Assembly (A6)	MA766	R6	Resistor, 240 Ohm, 5%, 1/4W	XO-173
	Capacitor, 22PF, 50V MONO	XO-633	R11,R12	Resistor, 470 Ohm, 5%, 1/4W	XO-35
C5,C6	AX-CM, 10%		R13,R14, R18, R21,R25	Resistor, 3K Ohm, 5%, 1/4W	XO-23
	Capacitor, .01UF, 50V	XO-696	R15	Resistor, 1.2K Ohm, 5%, 1/4W	XO-175
C7,C17,C23	AX-CM, 10%		R16,R17,R19	Resistor, 10K Ohm, 5%, 1/4W	XO-18
	Capacitor, 1UF, 50V CM-RD	XO-294	R29,R30,R32, R37,R38,R40-R44		
C8,C9,C10, C18,C19,C24, C25,and ALL UNMARKED	Non-Polarized		R36,R45-R48	Resistor, 33K Ohm, 5%, 1/4W	XO-43
	Capacitor, 10UF, 25V	XO-127	SIP1,SIP2	Resistor Pack, SIP, 1K Ohm, 9 Pin	XO-493
POLARIZED CAPACITORS	TANT-AX, 20%, Polarized		SW1,SW2	Switch, Push Button, N.O.	XO-365
			XTAL 1	Crytsal, 4.0 MHZ	XO-366
C11,C12	Capacitor, 10PF, 50V AX-CM	XO-635	XTAL2	Crystal, 3.12 MHZ	XO-639
	+80%-20%		A2	7430 8-input "NAND" gate	XO-643
C13,C20	Capacitor, 1UF, 35V	XO-715	A3,B2	74LS374 Octal D-type flip flop	XO-96
	TANT-AX, 10%		A4	74LS74 Dual D-type flip flop	XO-434
C14	Capacitor, 68PF, 50V MONO	XO-636	B1,H1	LM324 Quad op-amp	XO-644
	AX-CM, 10%		B3	74LS244 Octal buffer/driver	XO-117
C15	Capacitor, .047UF, 50V MONO	XO-638	E2	AD7528J DAC	XO-647
	AX-CM, 20%		E3,G3,N4,S5	74LS374 Octal D-type flip flop	XO-96
C21,and ALL UNMARKED	Capacitor, 0.1UF, 50V	XO-230	E4	SP0250 Speech generator	XO-645
	AX-CM, +80%-20%		G4,T1	74LS04 Hex Inverter	XO-418
CAPACITORS			G5	74HC08 Quad 2-input "AND" gate	XO-872
	Capacitor, .022UF, 50V	XO-873	H2,H3	2K x 8 RAM (6116) (200NS)	XO-191
C26,C27	AX-CM, 10%		H4,K4	AY-3-8913 Sound generator	XO-646
			H5,K5,N5, S1,T5	74161 Synchronous presettable binary counter	XO-192
D1	Diode, MV5752	XO-270	K2,K3,N3	2764 EProm	XO-489
DIP SW	Dip Switch, 4 Position, 8 Pin	XO-640	N1,T3	R6502-13 CPU	XO-360
R1	Resistor, 10M Ohm, 5%, 1/4W	XO-73	M2,S3	74LS245 Octal bus transceiver	XO-79
R2,R5,R9	Resistor, 1K Ohm, 5%, 1/4W	XO-5	S2	74LS139 Dual 1 of 4 decoder	XO-419
R10,R27,R28, R31,R33-R35, R39			T4	74LS138 1 of 8 decoder/demultiplexor	XO-437
R3,R20	Resistor, 4.7K Ohm, 5%, 1/4W	XO-7		28 Pin Dip Socket (4)	XO-536
R4,R7,R8	Resistor, 68 Ohm, 5%, 1/4W	XO-748		Jumper, 22 GA (5)	XO-469
R22-R24					



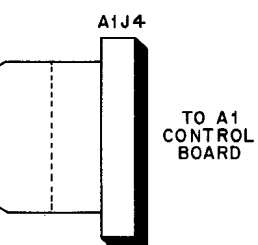






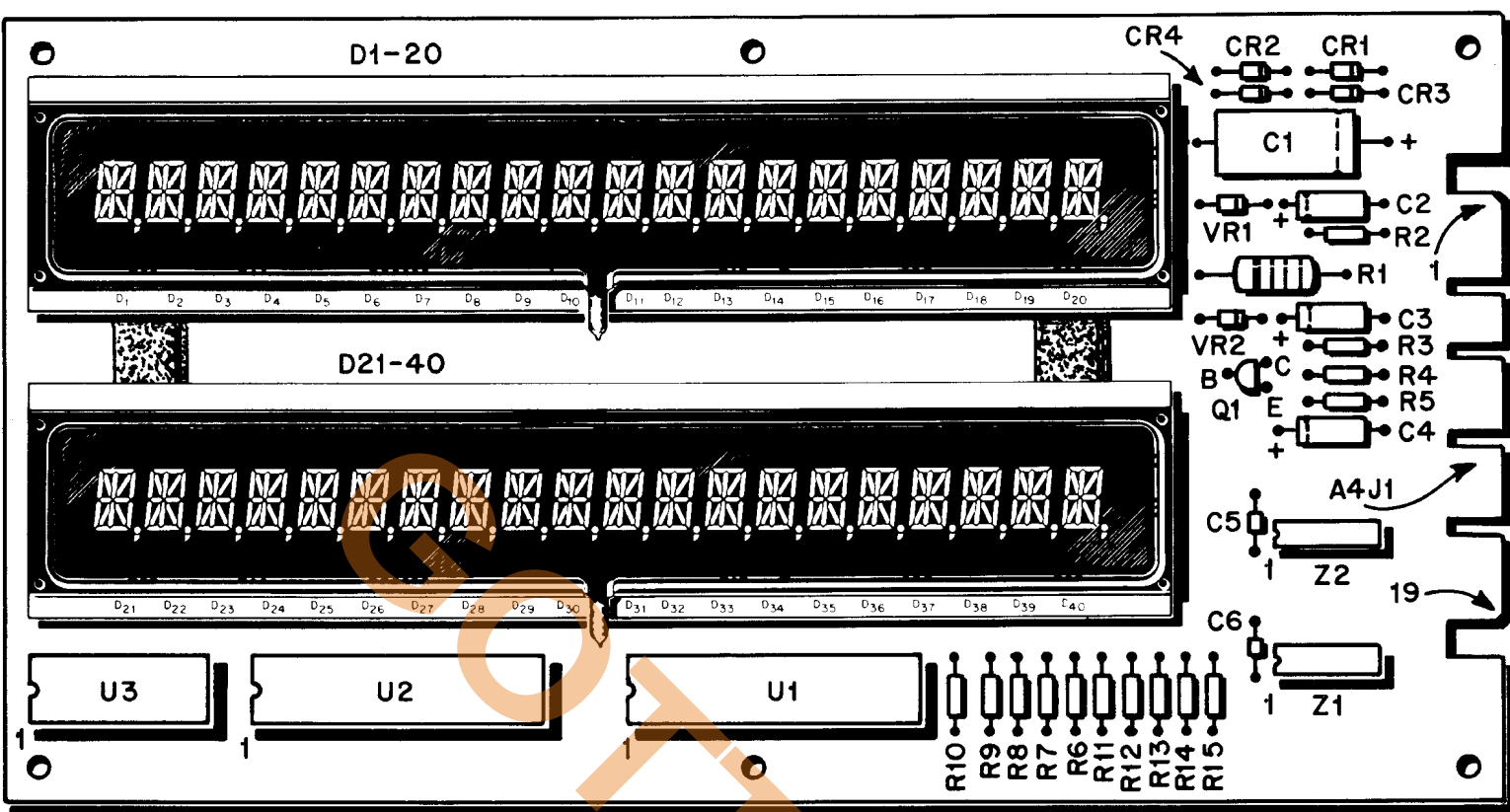
ITEM	PART NO.
AST, 50 CYCLE	24672
AST, 60 CYCLE	24673
RESCENT LAMP	24674
TER	24675

SEE PLAYBOARD SCHEMATIC
FOR LIGHTBOX
AUXILIARY LAMP CIRCUITRY



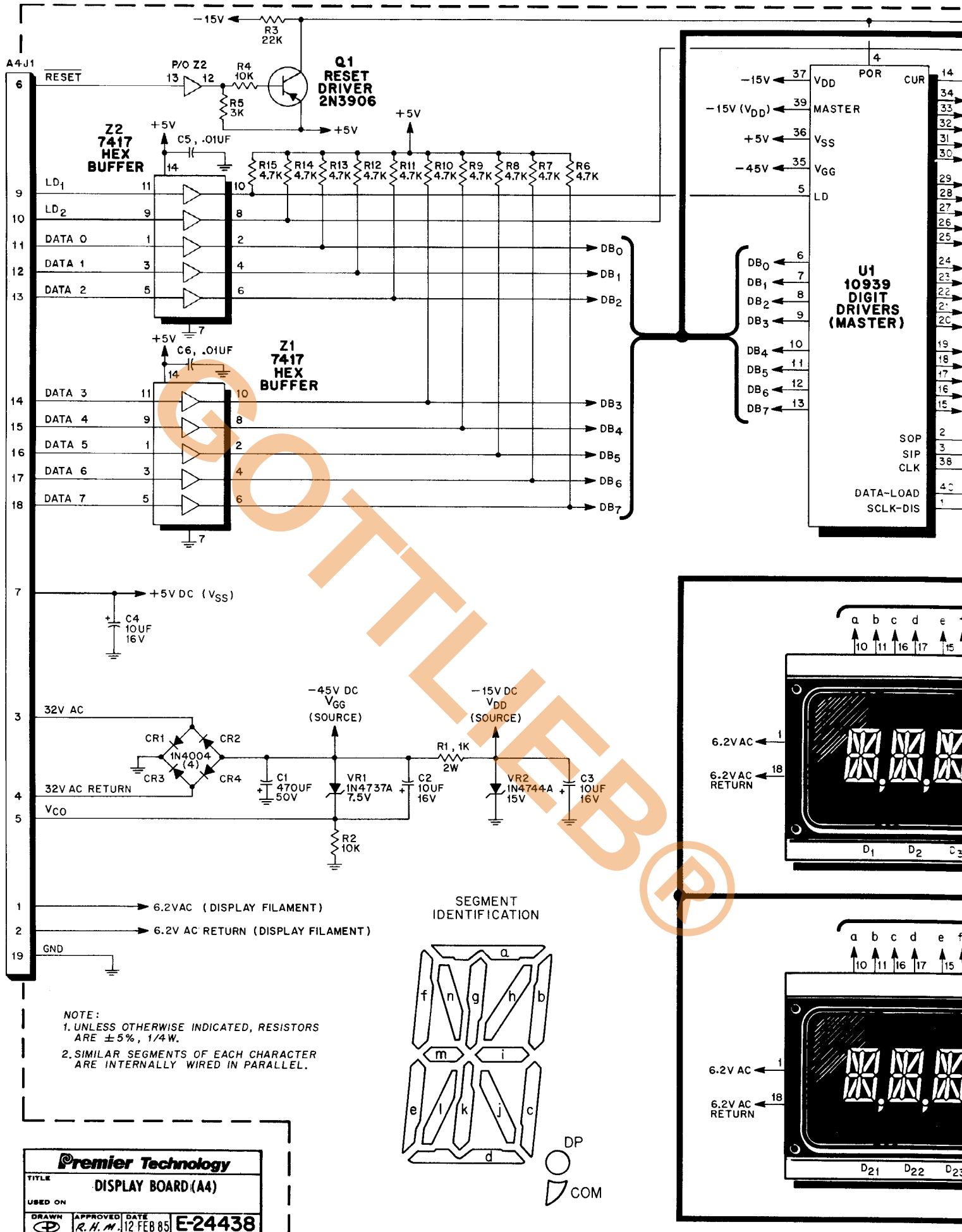
Premier Technology			
TITLE LIGHTBOX, SCHEMATIC/ WIRING DIAGRAM			
DRAWN	APPROVED	DATE	E-25052
	R.H.M.	8 AUG 86	

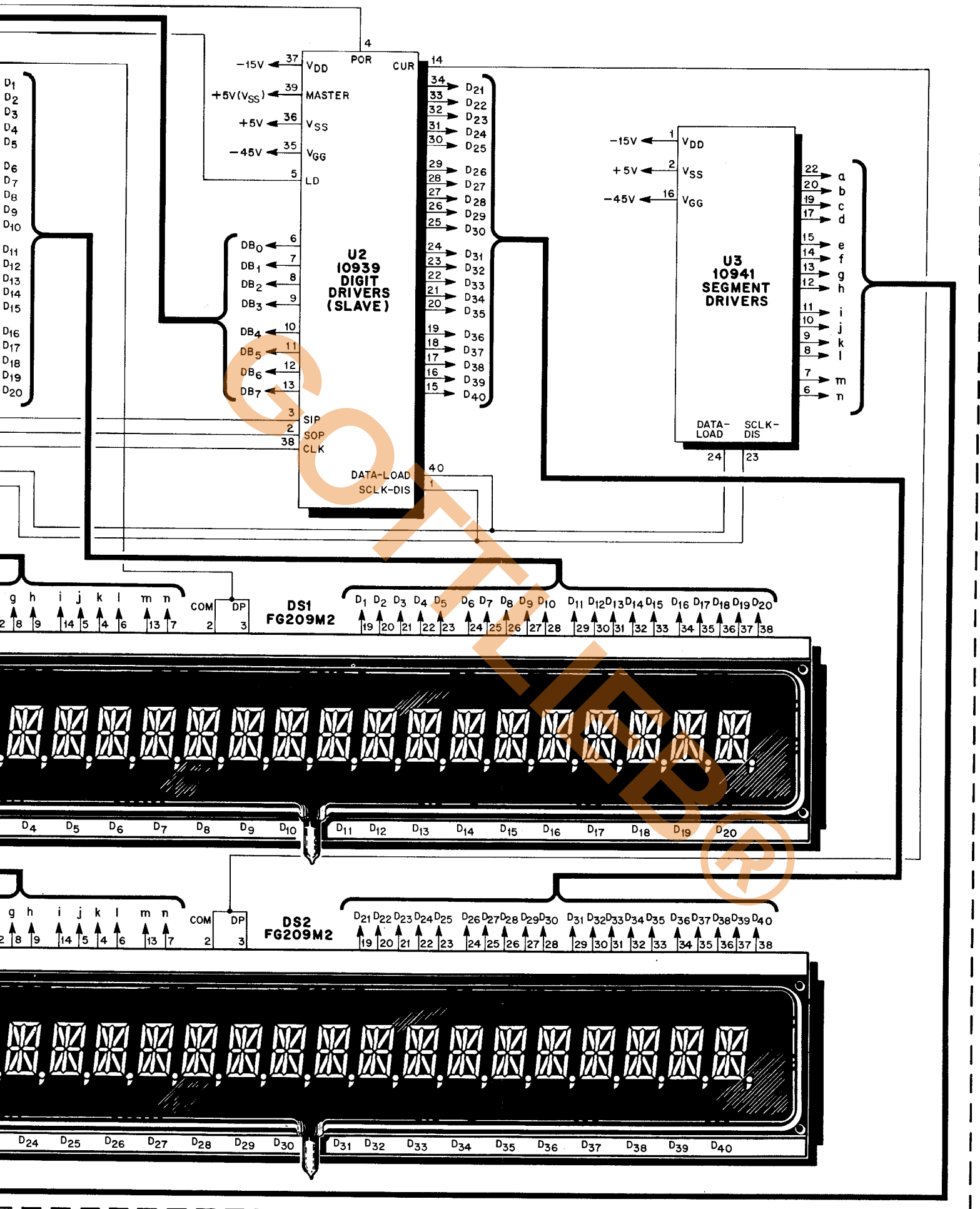
DISPLAY BOARD (A4) COMPONENT LOCATION



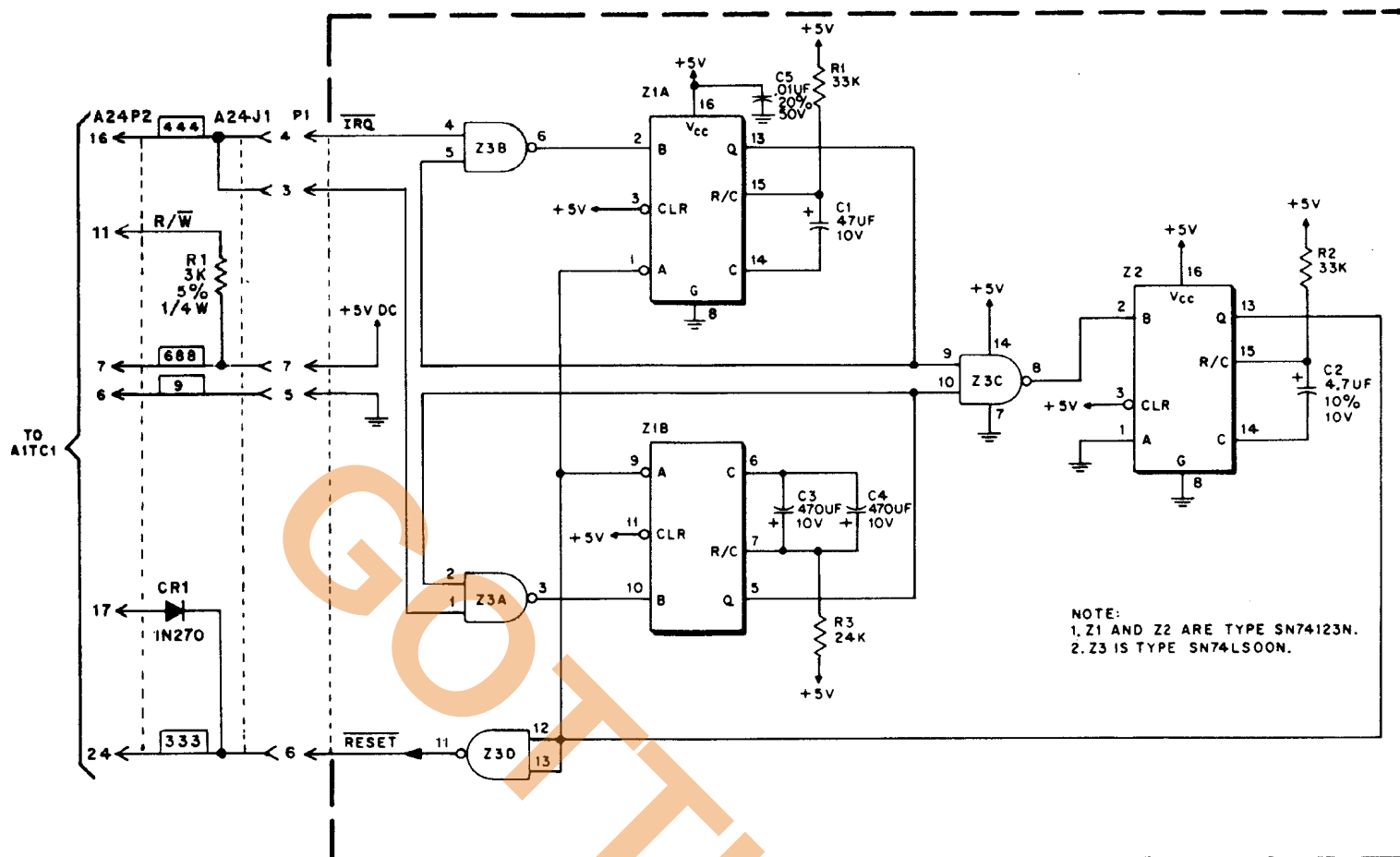
DISPLAY BOARD (A4) PARTS LIST

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
CR1-CR4	Diode, 1N4004	XO-254
DS1, DS2	Display, Alphanumeric	XO-840
Q1	Transistor, PNP, 2N3906	XO-588
R1	Resistor, 1K, 5%, 2W	XO-627
R2, R4	Resistor, 10K, 5%, 1/4W	XO-18
R3	Resistor, 22K, 5%, 1/4W	XO-42
R5	Resistor, 3K, 5%, 1/4W	XO-23
R6-R15	Resistor, 4.7K, 5%, 1/4W	XO-7
U1, U2	IC, Digit Drivers, 10939	XO-841
U3	IC, Segment Drivers, 10941	XO-842
VR1	Diode, Zener, 1N4737A, 7.5V	XO-844
VR2	Diode, Zener, 1N4744A, 15V	XO-843
Z1, Z2	IC, Hex Buffer, 7417	XO-406
	Tape, Vinyl Foam	24127-1



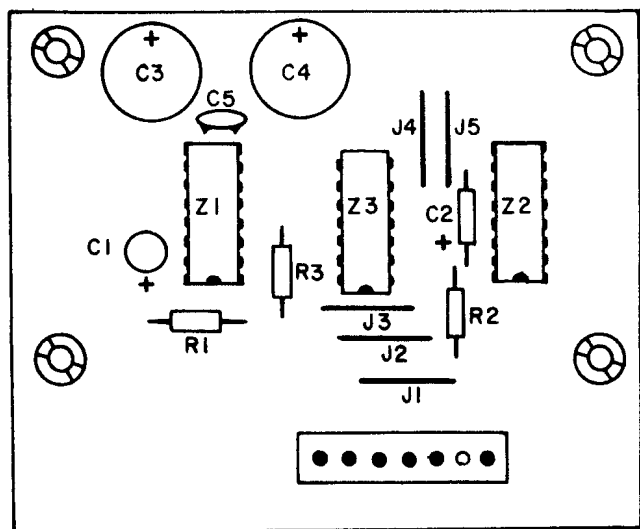


X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS



Premier Technology				
TITLE RESET CIRCUIT BOARD				
USED ON				
DRAWN	APPROVED	DATE	C-21063	
	BAM	4-2-81		

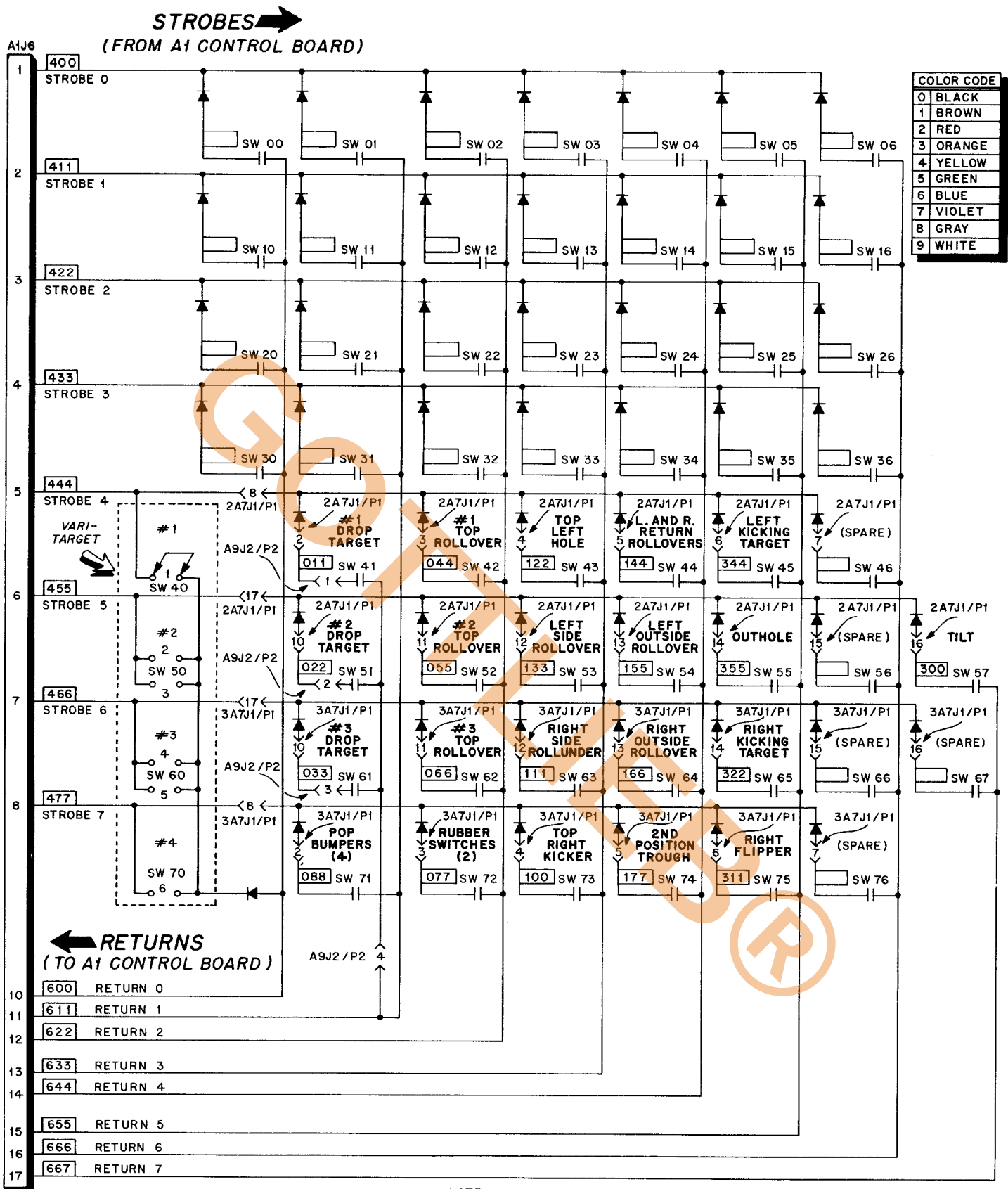
RESET BOARD (A24) COMPONENT LOCATION



RESET BOARD (A24) PARTS LIST

REFERENCE	DESCRIPTION	PART NUMBER
	RESET BOARD	MA-164
R1, R2	Resistor 33K ohm, 5%, 1/4W.	XO-43
R3	Resistor 24K ohm, 5%, 1/4W.	XO-10
C1	Capacitor 47 μ fd., 10V.	XO-227
C2	Capacitor 4.7 μ fd., 10V.	XO-226
C3, C4	Capacitor 470 μ fd., 16V.	XO-214
C5	Capacitor .01 μ fd.	XO-202
Z1, Z2	IC 74123N	XO-398
Z3	IC 74LS00N	XO-427
	7 Pin Connector	XO-526
A24P2/A24J2	Cable Assembly	MA-796

X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS

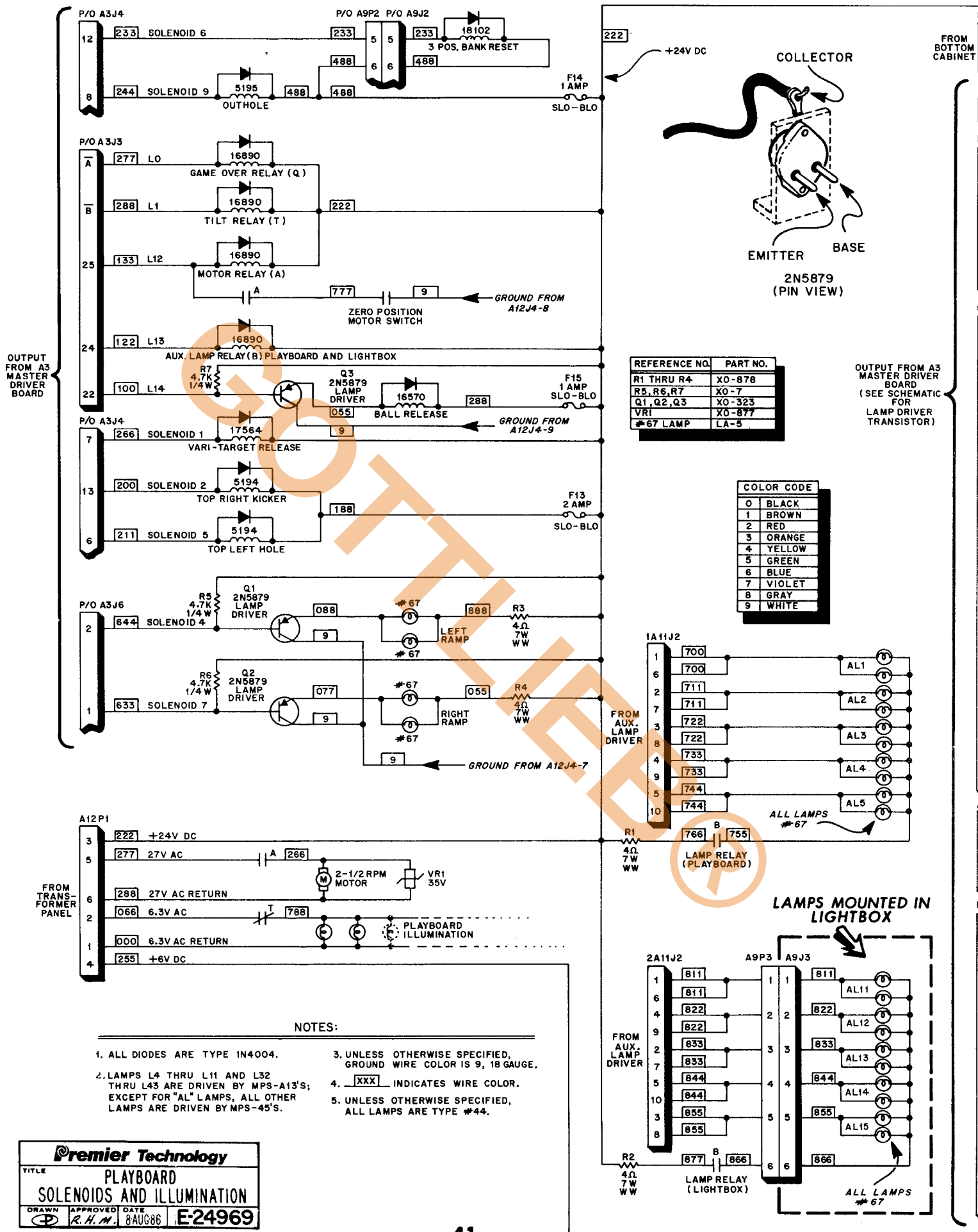


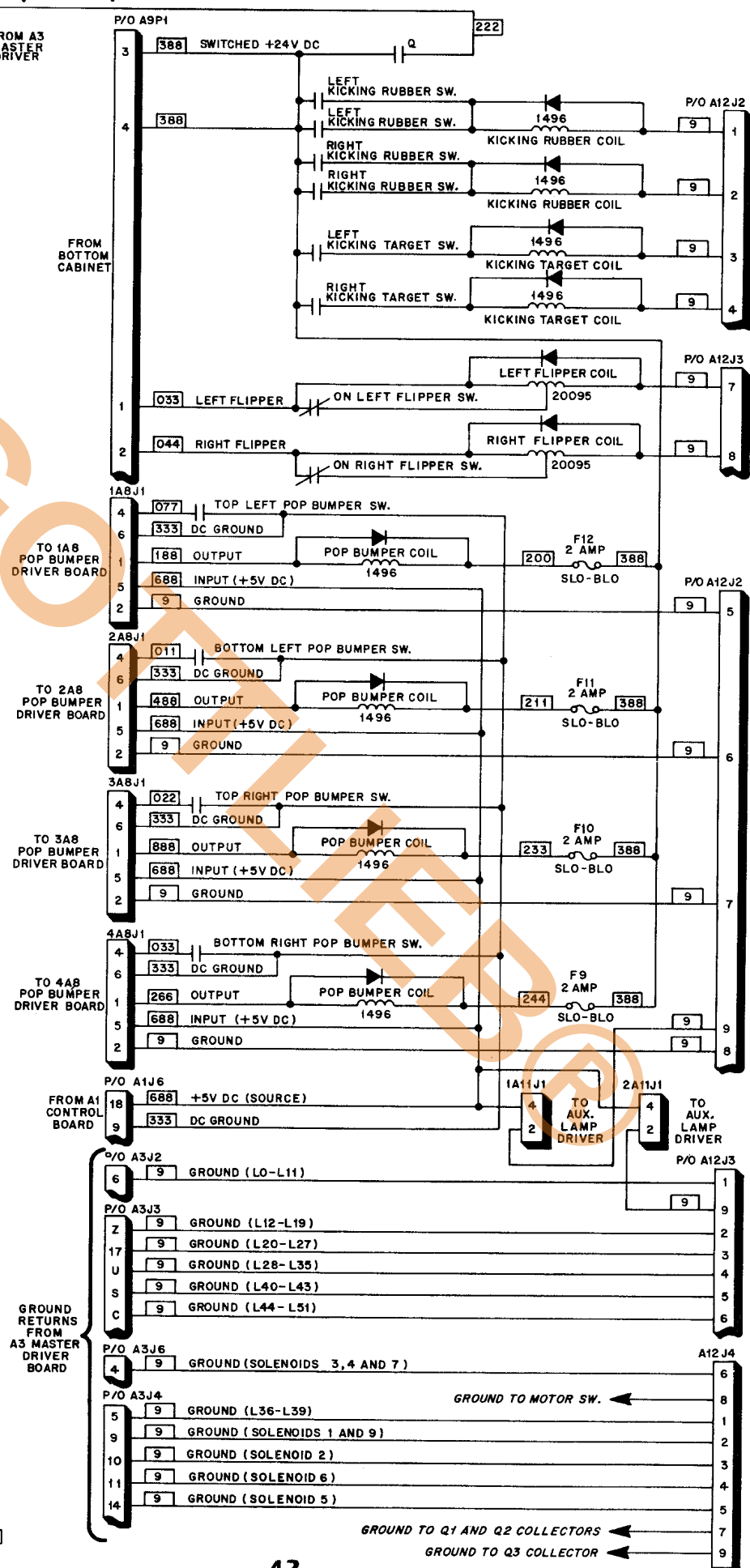
NOTE:

1. DIODES USED ARE TYPE 1N270.
2. DIODE BOARDS 2A7 AND 3A7; PART NO.'S 24030.

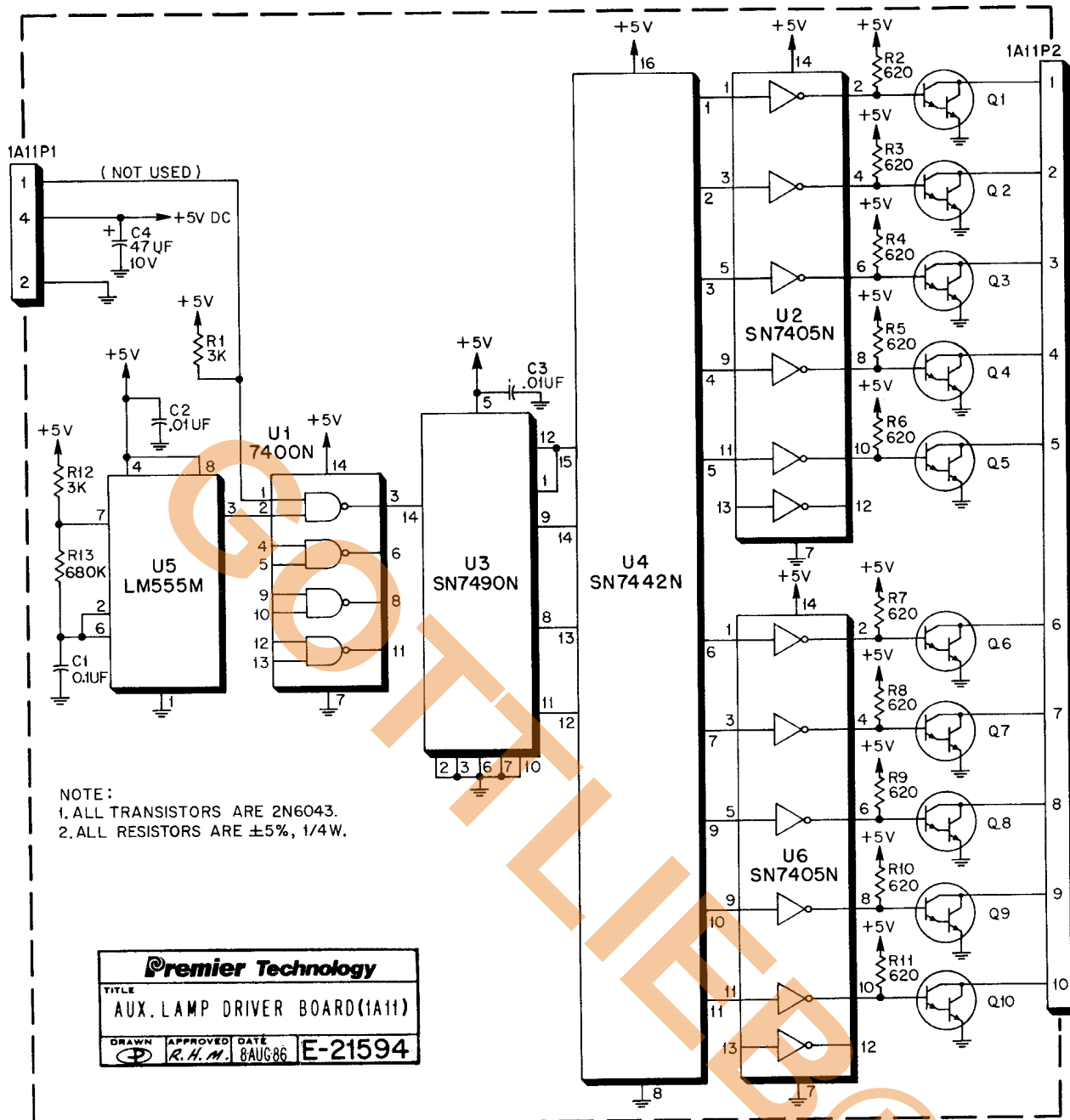
Premier Technology			
TITLE		SWITCH MATRIX	
USED ON		GAME #705	
DRAWN	APPROVED	DATE	E-24968
	R. H. M.	8 AUG 86	

PLAYBOARD "CONTROLLED" SOLENOIDS AND ILLUMINATION

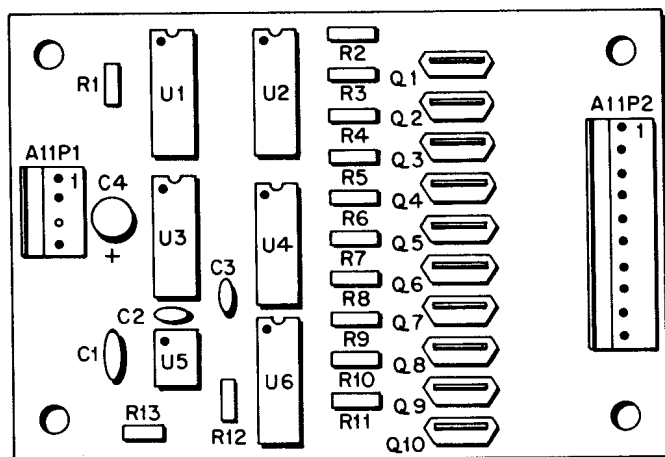




X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS



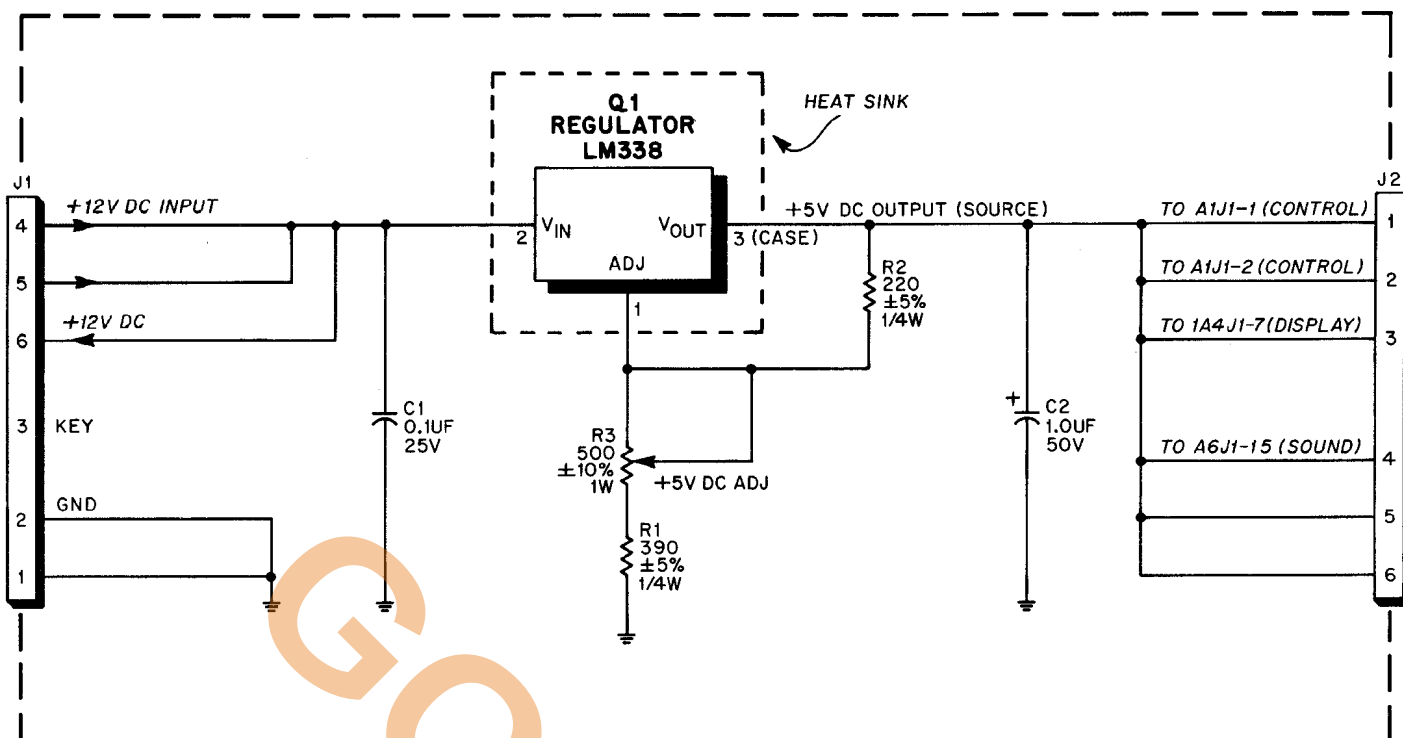
AUXILIARY LAMP DRIVER BOARD (A11) COMPONENT LOCATION



AUXILIARY LAMP DRIVER BOARD (A11) PARTS LIST

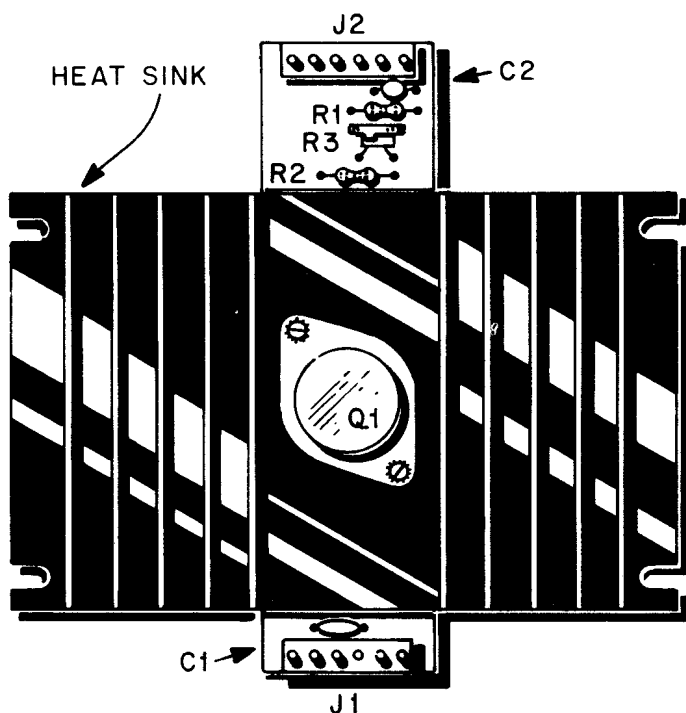
REFERENCE	DESCRIPTION	PART NUMBER
	AUXILIARY LAMP DRIVER ASSEMBLY	MA-866
C1	CAPACITOR, .1 MFD, 100V	XO-626
C2-C3	CERAMIC RADIAL LEAD CAPACITOR, .01 MFD, 100V	XO-202
C4	RADIAL LEAD CAPACITOR, 47 MFD, 10V	XO-227
Q1-Q10	ELECTROLYTIC RADIAL LEAD TRANSISTOR, 2N6043	XO-303
	NPN DARLINGTON	
R1, R12	RESISTOR, 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

X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS



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

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%, 25V	XO-248
C2	Capacitor, 1uF, 10%, 50V	XO-217
J1, J2	Connector, 6 Pin, Molex	XO-373
Q1	Regulator, LM338, (5 Amp)	XO-839
R1	Resistor, 390 ohm, 5%, 1/4W	XO-845
R2	Resistor, 220 ohm, 5%, 1/4W	XO-21
R3	Resistor, (Pot) 500 ohm, 10%, 1W	XO-112
	Heat Sink	XO-534
	Insulator, (Regulator)	XO-522
	Insulator, (Regulator)	XO-523

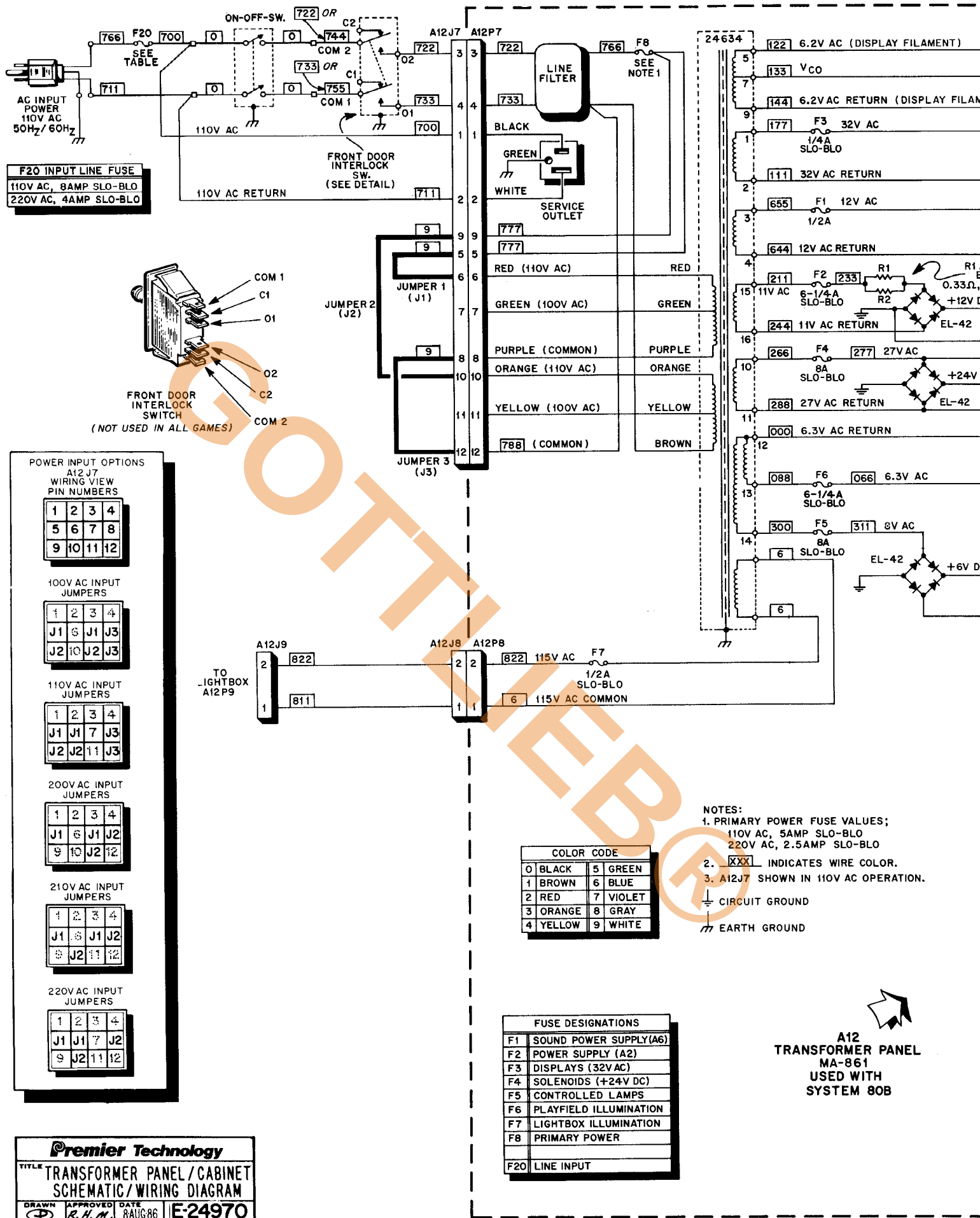


TABLE OF CONTENTS

	PAGE
PLAYBOARD PARTS	
LAMPS AND SWITCHES.....	48
CABINET PARTS.....	49
PLAYBOARD PARTS	
RUBBER RINGS AND MISCELLANEOUS PARTS.....	50
KICKING TARGET ASSEMBLY	
EXPLODED VIEW.....	51
FIGURINE ASSEMBLY	
EXPLODED VIEW.....	52

PLAYBOARD SWITCH AND LAMP ASSIGNMENTS

LAMP NUMBER

LAMP ASSIGNMENT

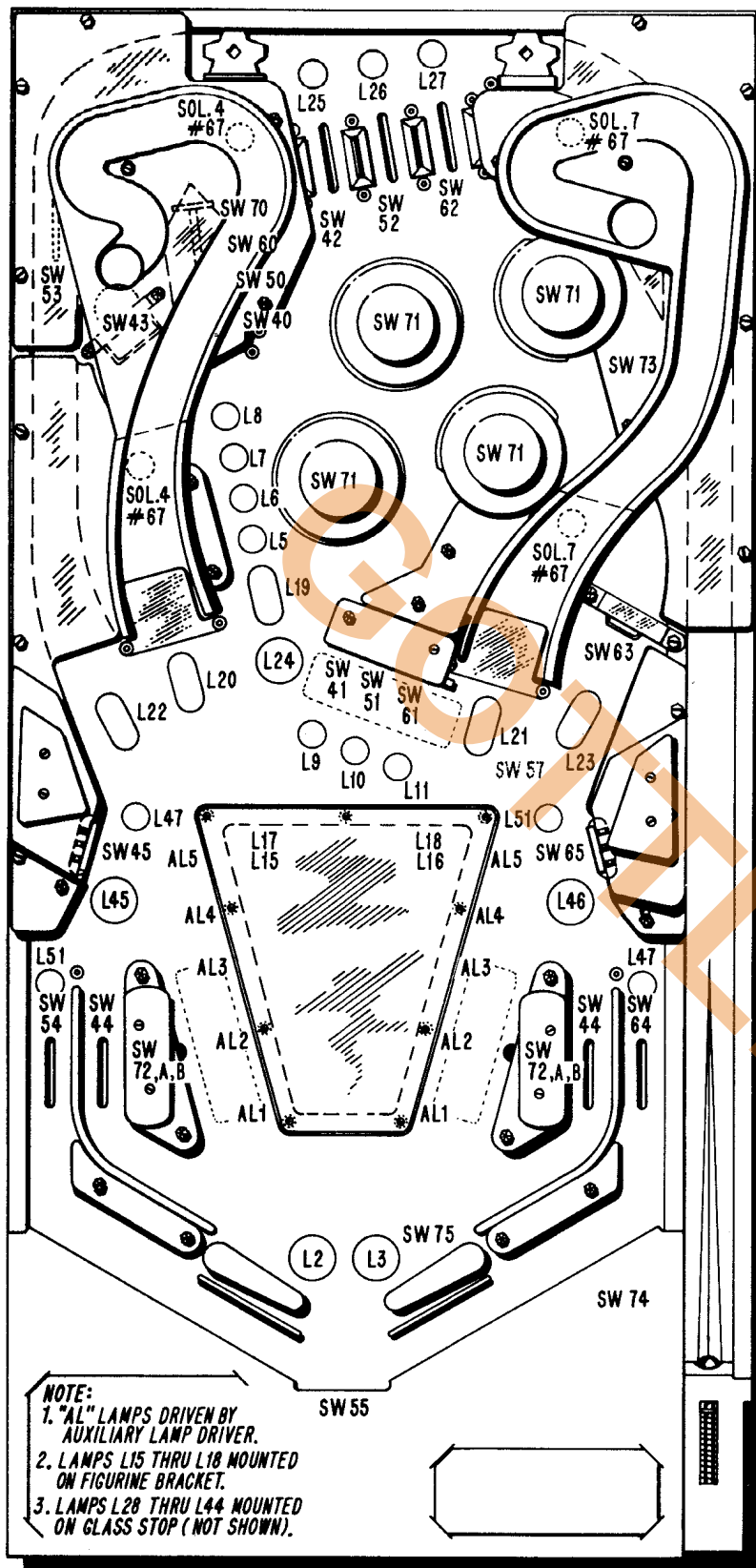
L2	Extra Ball
L3	Shoot Again
L5	#1 Vari-Target
L6	#2 Vari-Target
L7	#3 Vari-Target
L8	#4 Vari-Target
L9	#1 Drop Target
L10	#2 Drop Target
L11	#3 Drop Target
L15	"ARMS" Completed
L16	"LEGS" Completed
L17	"BRAIN" Completed
L18	"BODY" Completed
L19	"Spot Letter" (Vari-Target)
L20	"Arms Letter"
L21	"Legs Letter"
L22	"Brain Letter" (Left)
L23	"Brain Letter" (Right)
L24	"Life Force"
L25	#1 Top Rollover
L26	#2 Top Rollover
L27	#3 Top Rollover
L28	"A"
L29	"R"
L30	"M"
L31	"S"
L32	"B"
L33	"R"
L34	"A"
L35	"I"
L36	"N"
L37	"B"
L38	"O"
L39	"D"
L40	"Y"
L41	"L"
L42	"E"
L43	"G"
L44	"S"
L45	Left Kicking Target "Special"
L46	Right Kicking Target "Special"
L47	Left Kicking Target "10,000"
L47	Right Outside Rollover "50,000"
L51	Right Kicking Target "10,000"
L51	Left Outside Rollover "50,000"

SWITCH MATRIX NUMBER

SWITCH ASSIGNMENT

PART NO.

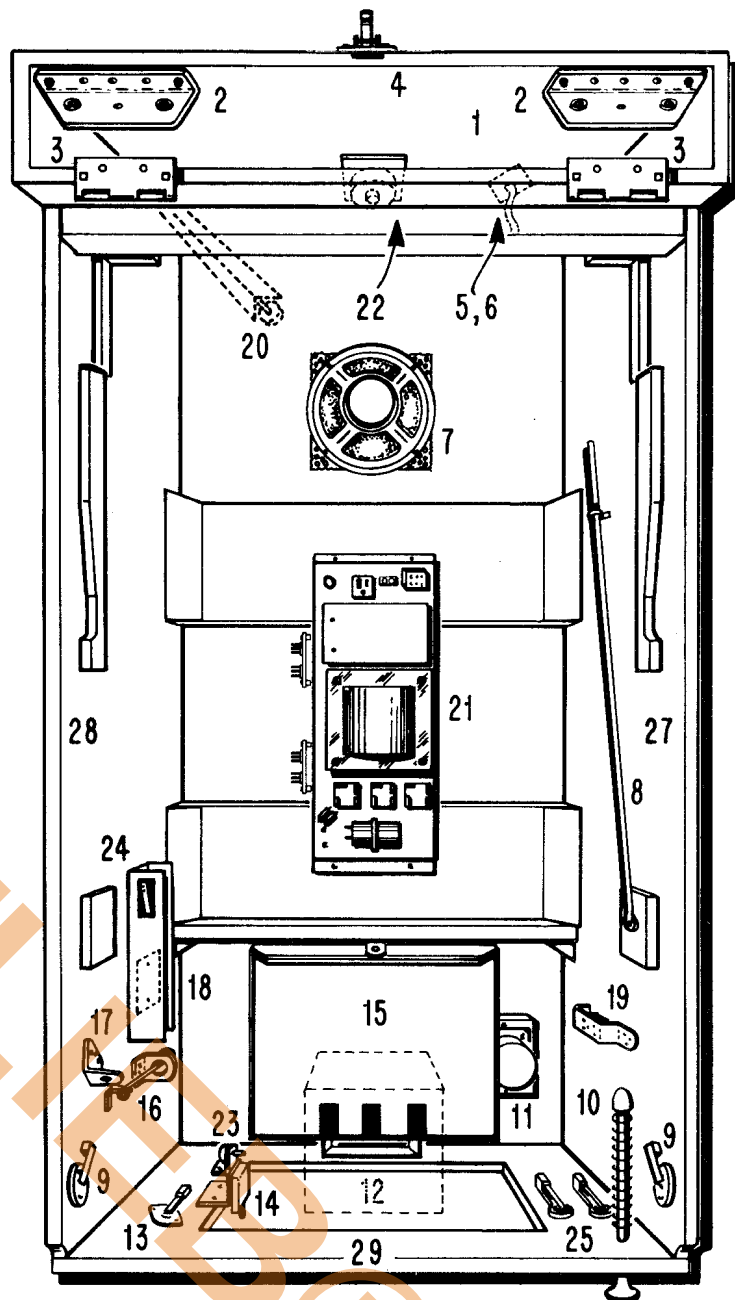
SW 40	Vari-Target #1	P/O MA-237
SW 41	#1 Drop Target	18094
SW 42	#1 Top Rollover	18892
SW 43	Top Left Hole	18085
SW 44	L. and R. Ret. Rollover (2)	18892
SW 45	Left Kicking Target	18808
	Actuating Switch	20227
SW 50	Vari-Target #2	P/O MA-237
SW 51	#2 Drop Target	18095
SW 52	#2 Top Rollover	18892
SW 53	Left Side Rollover	18892
SW 54	Left Outside Rollover	18892
SW 55	Outhole (Assembly)	18688
SW 57	Tilt (with Bracket)	9141
SW 60	Vari-Target #3	P/O MA-237
SW 61	#3 Drop Target	18093
SW 62	#3 Top Rollover	18892
SW 63	Right Side Rollover	21137
SW 64	Right Outside Rollover	18892
SW 65	Right Kicking Target	18808
	Actuating Switch	20227
SW 70	Vari-Target #4	P/O MA-237
SW 71	Pop Bumper (with Bracket) (4)	21353
SW 72	Kicking Rubber	
	Scoring Switch (2)	18808
SW 72A	Actuating Switch and Bracket (2)	22225
SW 72B	Actuating Switch and Bracket (2)	22225
SW 73	Top Right Kicker	18892
SW 74	2nd Position Trough	18892
SW 75	Right Flipper	22398
	(Scoring and Actuating)	
	Left Flipper (Actuating)	16363



XI. PARTS INFORMATION

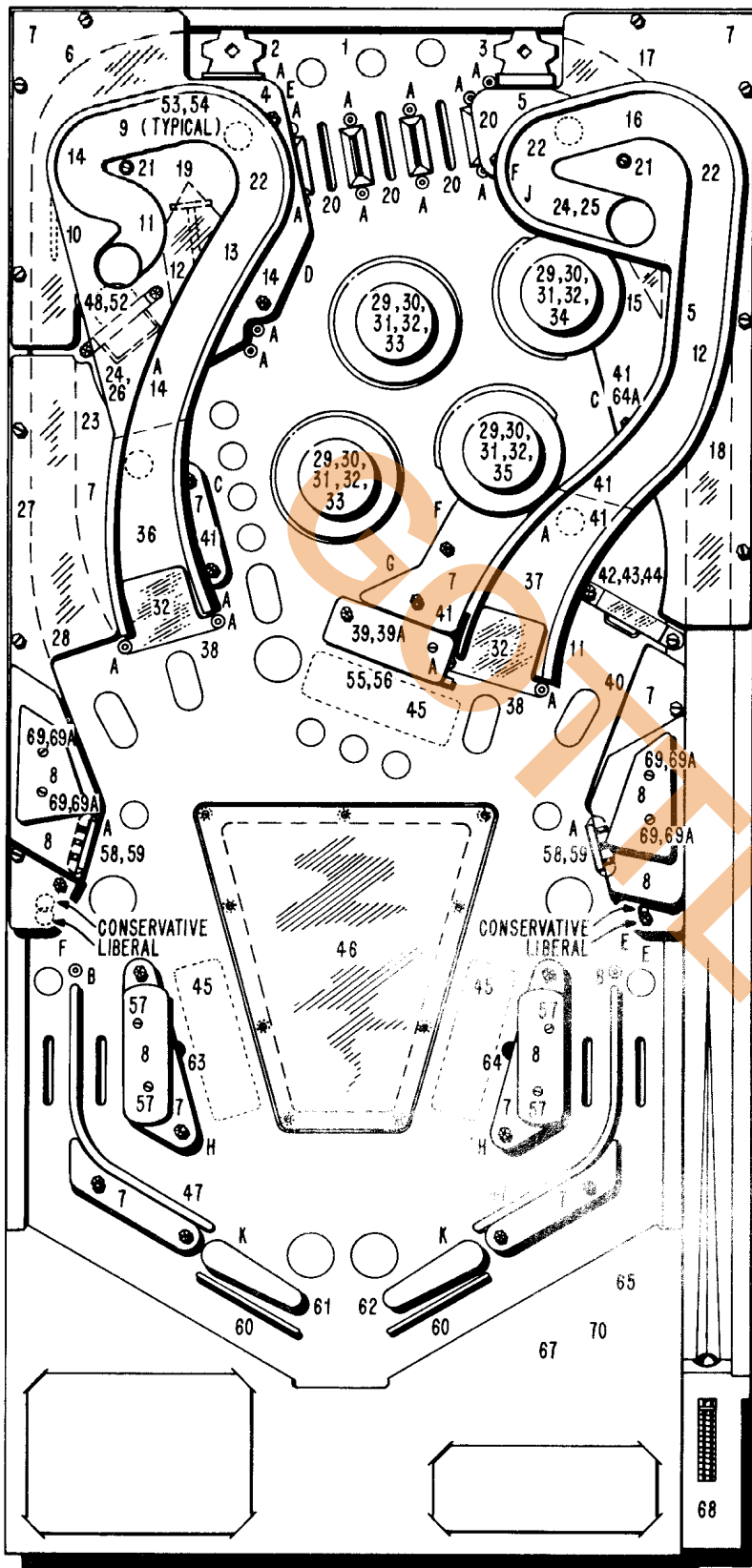
CABINET PARTS

ITEM	DESCRIPTION	PART NO.
1.	Cabinet	24928-705
2.	Lightbox Mounting Bracket (2)	19916
3.	Butt Hinge, (Shown For Reference Only, P/O Lightbox Assy.) (2)	22734
4.	"U" Bolt (P/O Lightbox)	24659
	Latch Assembly (P/O Cabinet)	21969
5.	Cable Assembly, Domestic (High Voltage)	MA-794
6.	Line Cord (Domestic)	23365
	Line Cord Cover Plate	21955
7.	Speaker, 4 Ohm, 3W, 8"	EL-83
	Speaker Guard	20931
8.	Prop Stick, Playfield	23940
9.	Flipper Switch Assembly (2)	17838
10.	Ball Shooter Assembly	8835
11.	Switch, On/Off	23799
	Switch Plate (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
14.	Interlock Switch Assembly (When Used)	24148
	Switch	EL-66
	Switch Cover	21888
15.	Cashbox	24867
	Cover	24868
	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
17.	Locator Bracket	18578
18.	Diode Assembly	24252
	Diode, 1N270 (8)	XO-265
19.	Knocker Assembly	MA-12
20.	Cabinet Leg (4)	4337
	Leg Bolt (8)	3775
	3" Leg Adjuster (4)	MH-21
21.	Transformer Panel Assembly	MA-861
	Bridge Rectifier (3)	EL-42
	Cable Assembly (Secondary)	MA-812
	Capacitor, 10,000UF, 25V	XO-830
	Filter, Line	EL-50
	Fuse Block (6 Pos.)	EL-12
	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, 6-1/4 Amp, SLO-BLO	EL-29
	F7, 1/2 Amp, SLO-BLO	EL-20
	F8, 5 Amp, SLO-BLO (110V AC)	EL-8
	F8, 2.5 Amp, SLO-BLO (220V AC)	EL-21
	Ground Bus Assembly (2)	24542
	Outlet, Service	18133
	Resistor, 0.33 Ohm, 10% 5W, Wire-Wound (2)	XO-154
	Transformer	24634
22.	Fuse Holder	EL-78
	F20, 8 Amp, SLO-BLO (110V AC)	EL-26
	F20, 4 Amp, SLO-BLO (220V AC)	EL-33



ITEM	DESCRIPTION	PART NO.
23.	Mounting Bracket	24149
	Control, Volume, 100 Ohm, 2W	XO-199
	Switch, PLAY/TEST	EL-57
24.	Ball Roll Tilt Housing and Switch Assembly	24394
	Switch	24393
25.	Button Holder and Switch (2)	23503
	Pushbutton (2) (Black)	24293Y
26.	Lightbox (Not Shown)	24645-705
27.	Right Moulding, (Not Shown)	22735
28.	Left Moulding, (Not Shown)	22736
29.	Front Moulding, (Not Shown)	16951

XI. PARTS INFORMATION



PLAYBOARD PARTS INFORMATION

RUBBER RINGS

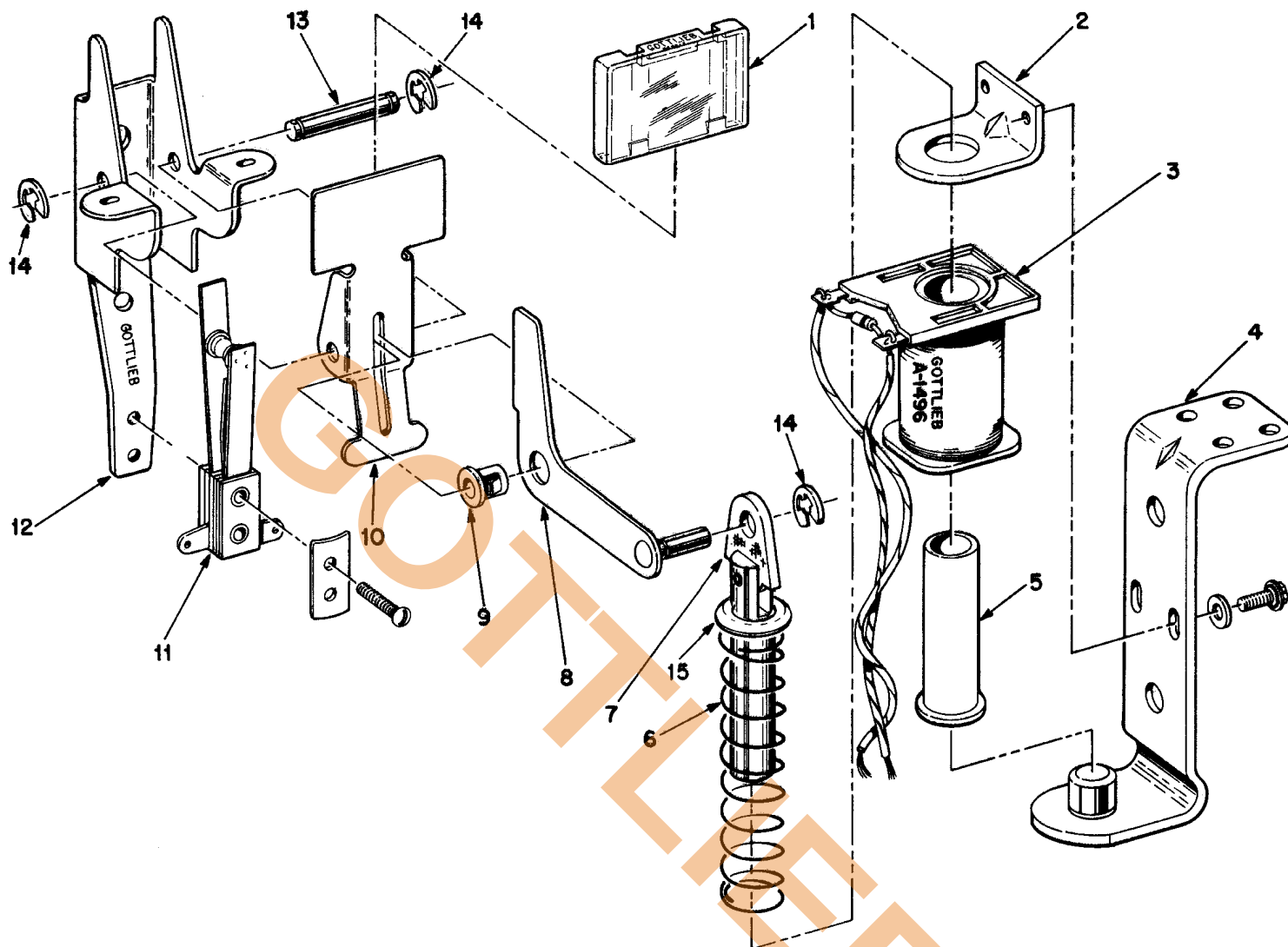
ITEM	DESCRIPTION	PART NO.
A	Mini-Post (21)	15705
B	Mini-Post, Small (2)	14793
C	1-1/2" (2)	10220
D	1"	10219
E	5/16" (3)	10217
F	3/4" (3)	10218
G	2"	10221
H	2-1/2" (2)	10222
J	7/16"	17493
K	Flipper, Red (2)	13151

PARTS LIST

ITEM	DESCRIPTION	PART NO.
1	Flat Rail	24956
2	Arch Rebound Assembly	19645
3	Arch Rebound Assembly	19646
4	Ball Guide Rail	6931
5	Ball Guide Rail (2)	6612
6	Flat Rail	25065
7	Plastic Shield Set	25081
8	Plastic Shield Set (Auxiliary) (Glass Stop Shield Not Shown)	25082
9	Ball Guide Rail	13782
10	Ball Guide Rail	13833
11	Ball Guide Rail (2)	4832
12	Ball Guide Rail	5977
13	Ball Guide Rail	18563
14	Ball Guide Rail (3)	18070
15	Ball Guide Rail	3722
16	Flat Rail	25069
17	Ball Guide Rail	20786
18	Flat Rail	25066
19	Vari-Target Assembly	MA-237
20	Rollover Guide (White) (4)	15647Z
21	Ramp Spacer (2)	25089
22	Ramp Spacer (3)	MP-9
23	Flat Rail	25070
24	Metal Shield (2)	17300
25	Gate Wireform	21696
26	Gate Wireform	22112
27	Ball Guide Rail	4831
28	Ball Guide Rail	8514
29	Pop Bumper Cap (White) (4)	10434Z
30	Pop Bumper Skirt (White) (4)	10433Z
31	Pop Bumper Body and Socket (White) (4)	MA-27
32	Ramp Flap Decal	25103
33	Pop Bumper Trim Platter (2)	8246
34	Pop Bumper Trim Platter	25077
35	Pop Bumper Trim Platter	25076
36	Left Ramp	25064
37	Right Ramp	25063
38	Ramp Flap (2)	25056
39	Ball Snubber	25057
39A	Ball Snubber Decal	25104
40	Flat Rail	25067
41	Ball Guide Rail (5)	17650
42	Rollunder Shield	4869
43	Rollunder Spring	14236
44	Rollunder Gate Wireform	22118
45	Mylar Overlay (3)	25080
46	Window and Figurine Assembly (See Exploded View Illustration)	
47	Ball Guide Rail (2)	23833
48	Ball Snubber	16038
49	Hole Base Plate (Red)	15707U
50	Hole Liner	11151
51	Hole Kicker Assembly	MA-66
52	Hole Switch Arm (Red)	15708U
53	#67 Lamp (4)	LA5
54	#67 Lamp Socket (4)	24881
55	Target Bank Assembly	MA-183
56	Plastic Target (White) (3)	11905Z
57	Spacer, 1/4" (4)	MP-16
58	Kicking Target Assembly (2) (See Exploded View Illustration)	MA-205
59	Kicking Target Decal (2)	25105
60	Ball Snubber Rail (2)	13798
61	Left Flipper Assembly	MA-22
62	Right Flipper Assembly	MA-868
63	Left Kicker Assembly	MA-135A
64	Lower Right Kicker Assembly	MA-135
64A	Top Right Kicker Assembly	MA-176
65	Ball Return Unit Assembly	21622
66	Cardholder	13647-705
67	1-1/16" Steel Ball (2)	21864
68	Ball Shooter Gauge	9767-705
69	Split Post Spacer (4)	14488
69A	Split Post Spacer (4)	14487
70	Ball Return Gate	20607
	1" Plastic Post (30)	11561P
	Plastic Support Post (7)	20635P
	1-3/16" Plastic Post (2)	11562P
	Siamese Post	17492
	"Q" Relay Assembly	MA-23
	"T" Relay Assembly	MA-25
	"A" Relay Assembly	MA-863
	"B" Relay Assembly	MA-864

XI. PARTS INFORMATION

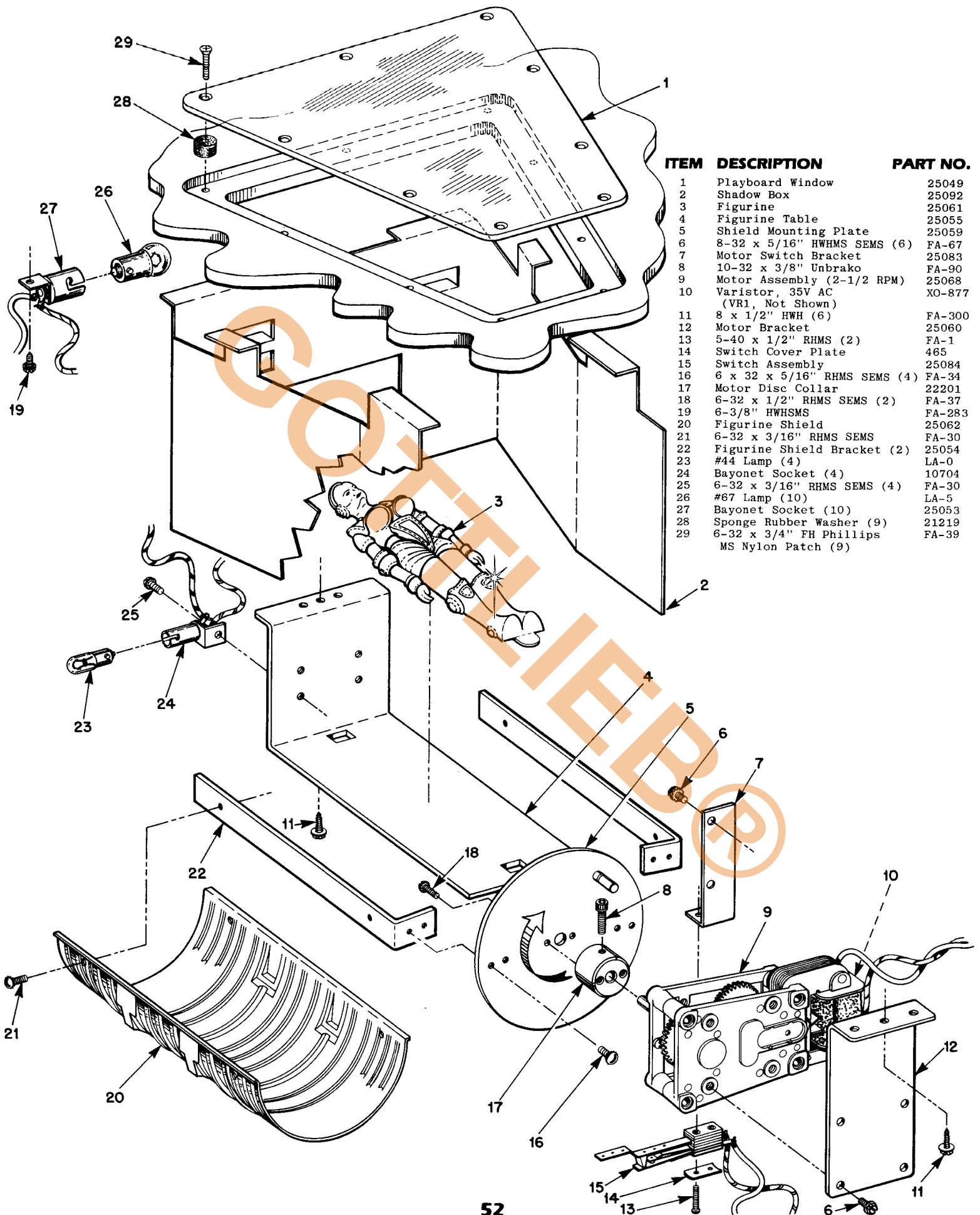
KICKING TARGET ASSEMBLY



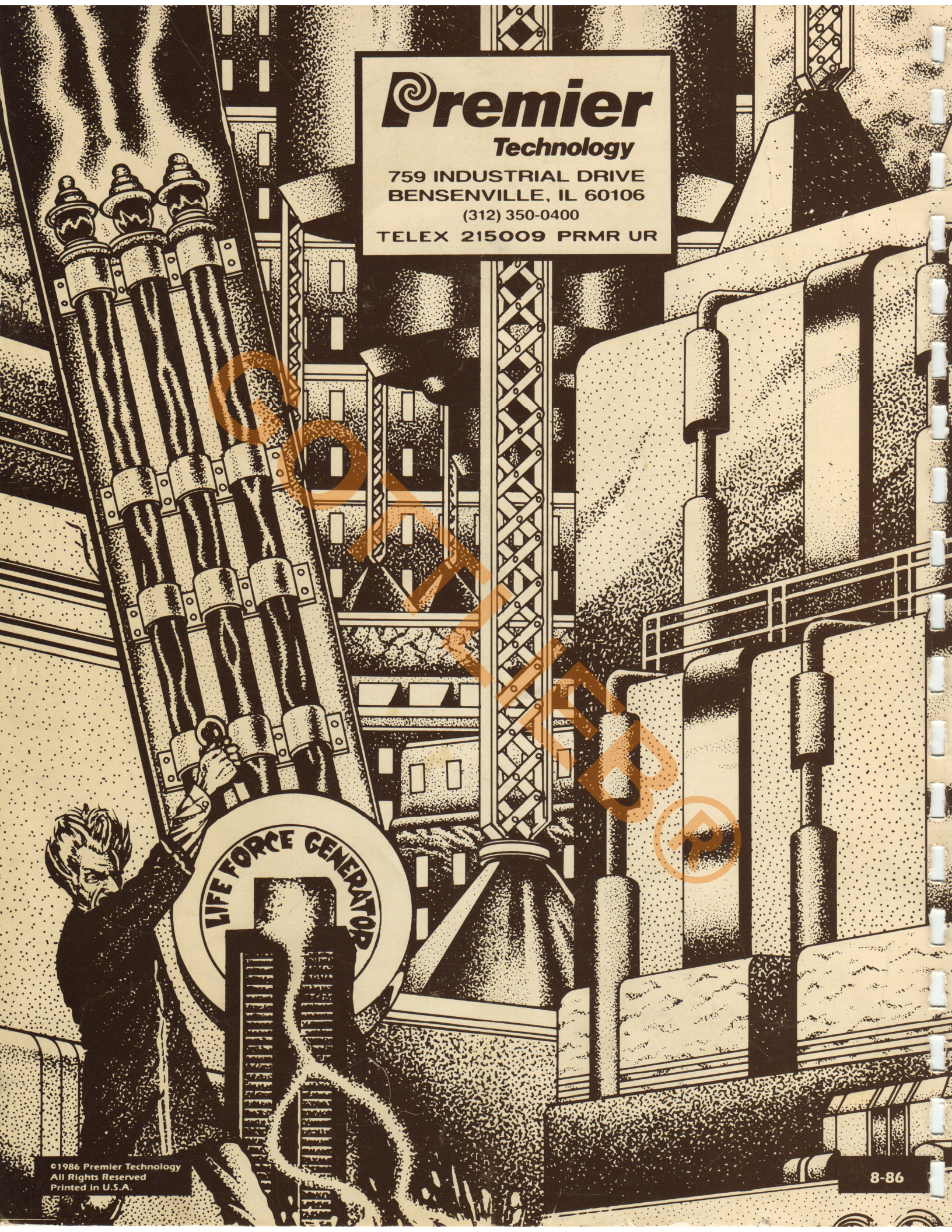
ITEM	DESCRIPTION	PART NO.
	Kicking Target Assembly	MA-205
1.	Plastic Shield	B-202 10
2.	Mounting Bracket	A- 15409
3.	Coil	A- 1496
4.	Coil Stop & Mtg. Bracket	A-20597
5.	Coil Sleeve	A-5064
6.	Spring	A- 1636
7.	Link & Plunger Assembly	A-202 12
8.	Target Kicker Cam	A-20209
9.	Snap Bushing	SB-3 12-3
10.	Target Arm	A-20207
11.	Actuating Switch	B-20227
12.	Target Housing	A-20206
13.	Target Shaft	A-202 11
14.	E-Ring	5133- 18
15.	Spring Retaining Washer	A-22233

XI. PARTS INFORMATION

FIGURINE ASSEMBLY



ITEM	DESCRIPTION	PART NO.
1	Playboard Window	25049
2	Shadow Box	25092
3	Figurine	25061
4	Figurine Table	25055
5	Shield Mounting Plate	25059
6	8-32 x 5/16" HWHMS SEMS (6)	FA-67
7	Motor Switch Bracket	25083
8	10-32 x 3/8" Unbrako	FA-90
9	Motor Assembly (2-1/2 RPM)	25068
10	Varistor, 35V AC (VR1, Not Shown)	XO-877
11	8 x 1/2" HWH (6)	FA-300
12	Motor Bracket	25060
13	5-40 x 1/2" RHMS (2)	FA-1
14	Switch Cover Plate	465
15	Switch Assembly	25084
16	6 x 32 x 5/16" RHMS SEMS (4)	FA-34
17	Motor Disc Collar	22201
18	6-32 x 1/2" RHMS SEMS (2)	FA-37
19	6-3/8" HWHMS	FA-283
20	Figurine Shield	25062
21	6-32 x 3/16" RHMS SEMS	FA-30
22	Figurine Shield Bracket (2)	25054
23	#44 Lamp (4)	LA-0
24	Bayonet Socket (4)	10704
25	6-32 x 3/16" RHMS SEMS (4)	FA-30
26	#67 Lamp (10)	LA-5
27	Bayonet Socket (10)	25053
28	Sponge Rubber Washer (9)	21219
29	6-32 x 3/4" FH Phillips MS Nylon Patch (9)	FA-39



Premier

Technology

759 INDUSTRIAL DRIVE
BENSENVILLE, IL 60106

(312) 350-0400

TELEX 215009 PRMR UR

LIFE FORCE GENERATOR