

TX-SECTOR™



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THE PREMIER NAME IN PINBALL

INSTRUCTION MANUAL

TX-SECTOR
(GAME #712)
(3 BALL GAME)

INSTRUCTION MANUAL
Applicable for all games.

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GAME PROMS:	SOUND PROMS:
712/PROM 1	712/DROM 1
712/PROM 2	712/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

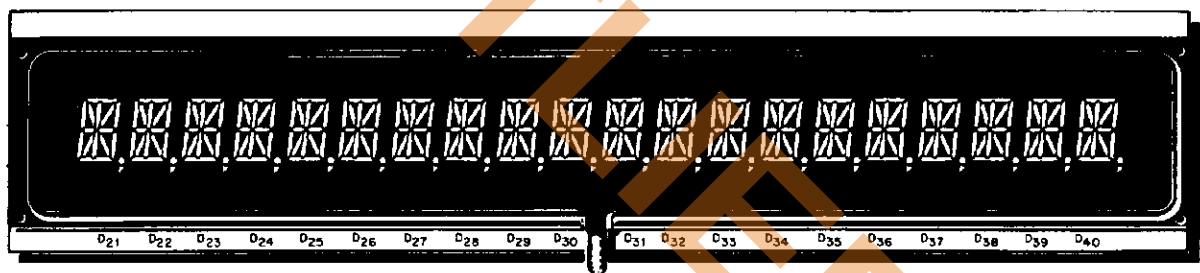


FIGURE 1A.

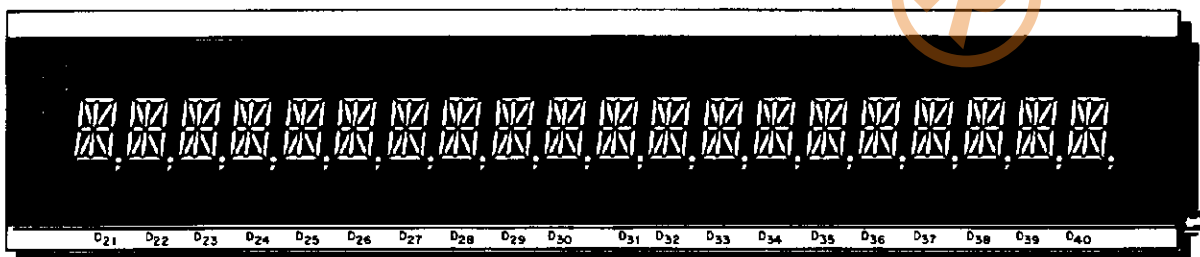


FIGURE 1B.

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.

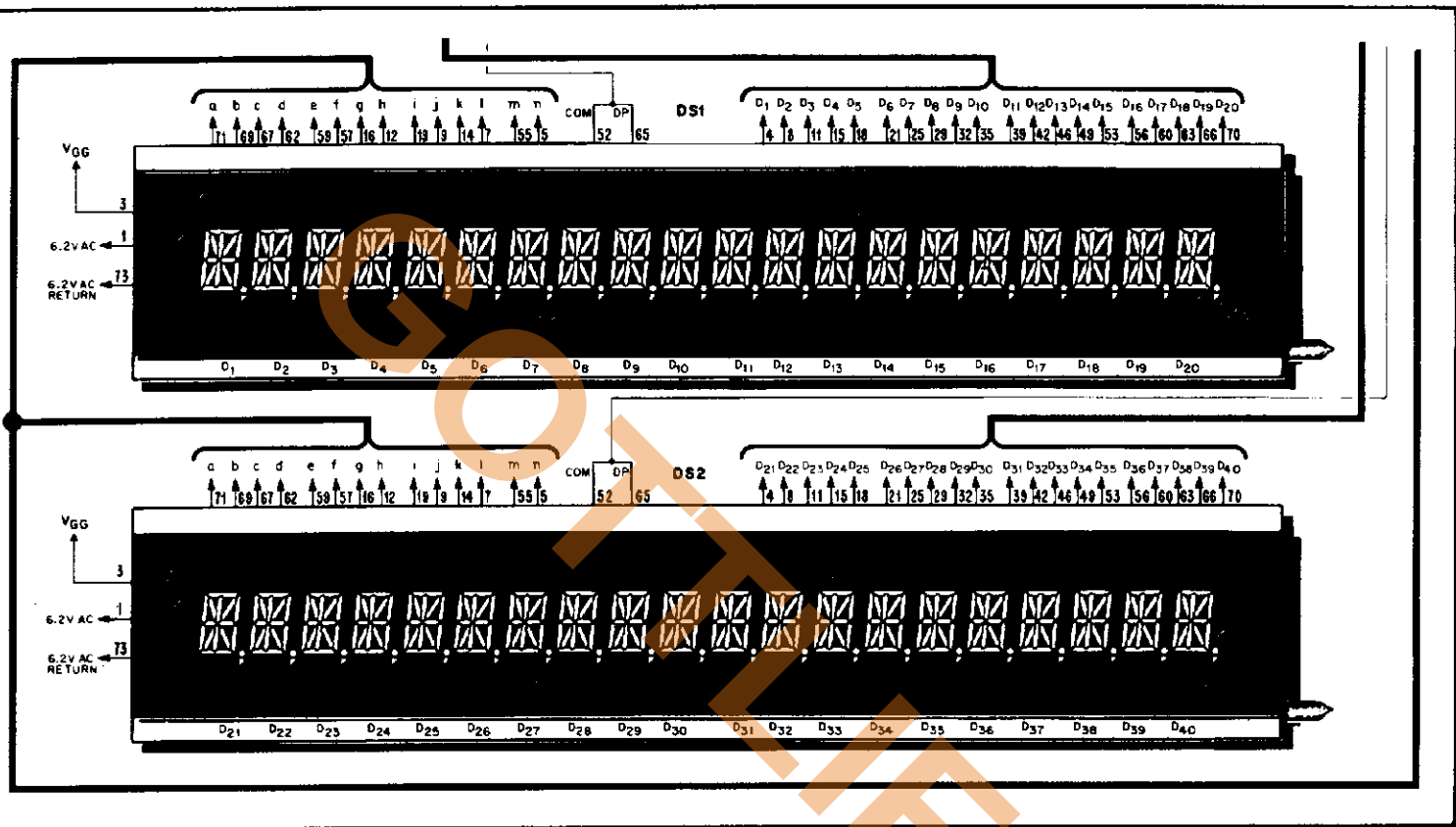


FIGURE 2.

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.

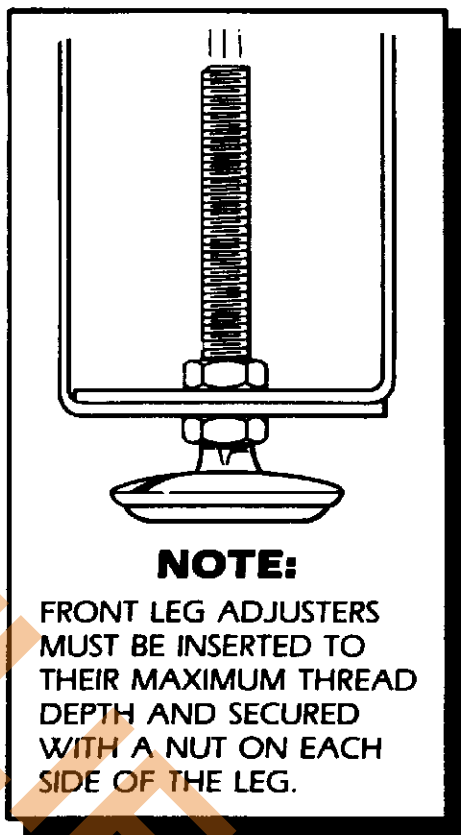
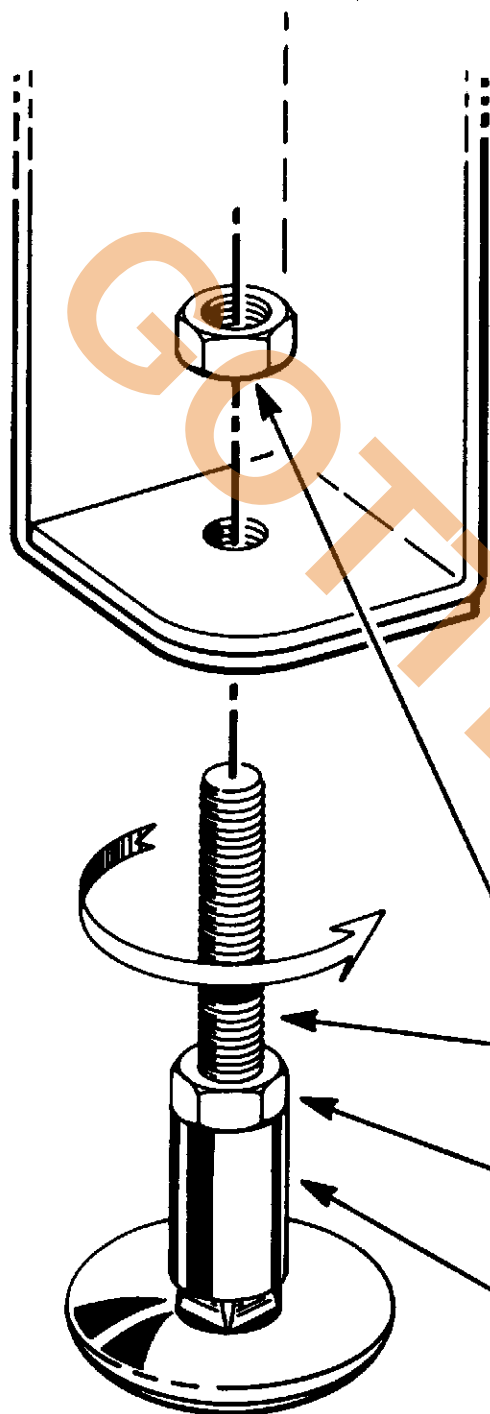
Some of the new features of System 80B are:

- 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 and fluorescent lamp assembly, proceed as follows:

Unlock the lightbox, lift the bottom edge of the speaker(s) and the Alphanumeric Display Board and disengage the top of the backglass from the groove in the bottom of the display panel. Rest the display panel on the two wooden retaining tabs.

Lift the backglass up about an inch, pull the bottom of the backglass towards you and slide it down past the two wood retaining tabs, carefully set aside.

To replace the backglass and the display panel, slide the backglass up behind the wood retaining tabs and slide down into the bottom retaining groove. Lift the display panel and slide it to the top of the lightbox and at the same time, engage the top of the backglass to the retaining groove in the bottom of the display panel. Lock the lightbox.
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".

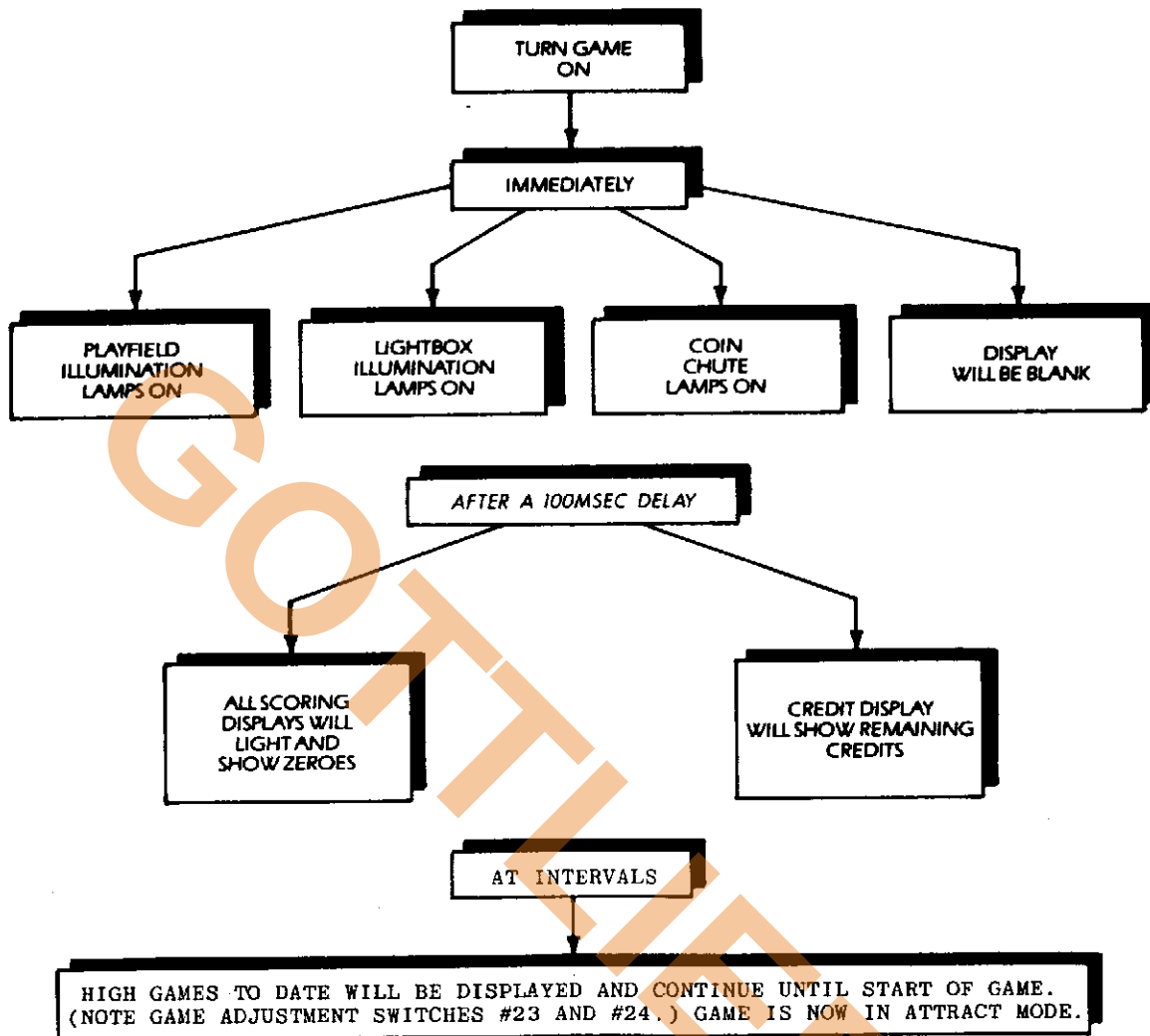
B. CHECK-OUT

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 $5\frac{1}{2}^{\circ}$ - 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

II. INITIALIZATION



III. GAME OPERATION

A. GAME START

Three 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



DROP TARGETS

- SCORE 3000.
- COMPLETING THE TOP OR RIGHT BANK SCORES 10,000 TIMES LIT "X" VALUE, ADVANCES ENERGY LEVEL BONUS BY THE LIT "X" VALUE, AND RESETS THE OPPOSITE BANK WHEN FLASHING.
- ALL TARGETS DOWN ONCE ON BOTH BANKS ADVANCES THE "X" VALUE.
- ALL TARGETS DOWN ON BOTH BANKS LIGHTS SPECIAL BASED ON SWITCH #31.
- (5-BALL) SCORE 1000.

TOP RIGHT HOLE

- SCORE 10,000 UNLIT.
- SCORE 10,000 TIMES TELEPORT MULTIPLIER PLUS 10,000 TIMES TELEPORT MULTIPLIER FOR EACH LIT ENERGY LEVEL WHEN LIT FOR TELEPORT.

LOWER RIGHT HOLE

- NO SCORE.
- ACTIVATE TELEPORT IF A BALL IS CAPTURED IN THE LOWER LEFT HOLE.
- COLLECT ENERGY LEVEL BONUS AND CAPTURE IF ENERGY LEVEL BONUS IS AT THE TOP.

TOP LEFT HOLE

- SAME AS TOP RIGHT HOLE.

LOWER LEFT HOLE

- NO SCORE.
- ACTIVATE TELEPORT IF A BALL IS CAPTURED IN THE LOWER RIGHT HOLE.
- COLLECT ENERGY LEVEL BONUS AND CAPTURE IF ENERGY LEVEL BONUS IS AT THE TOP.

LEFT AND RIGHT SPOT TARGETS

- SCORE 1000 UNLIT.
- SCORE 10,000 AND ADVANCE ENERGY LEVEL BONUS 1X WHEN LIT (AMBER).
- AWARD EXTRA BALL WHEN LIT (PURPLE).
- AWARD SPECIAL WHEN LIT (RED).

TOP SPOT TARGET

- SCORE 1000.
- ADVANCE ENERGY LEVEL BONUS 2X.

ROLLOVER DROP TARGET

- SCORE 10,000.
- ENABLE LEFT RAMP FOR TELEPORT IF A BALL IS CAPTURED IN THE LOWER LEFT HOLE.
- ENABLE TELEPORT MULTIPLIER COUNTDOWN IN THE DISPLAY.

SHOOTER RAMP ROLLUNDER

- ACTIVATE MULTIBALL AND LIGHT EXTRA BALL WHEN TWO BALLS ARE CAPTURED.

LEFT RETURN ROLLOVER

- SCORE 3000.
- LIGHT RIGHT SPINNER.
- (5-BALL) SCORE 1000.

RIGHT RETURN ROLLOVER

- SCORE 3000.
- LIGHT LEFT SPINNER.
- TRIP ROLLOVER DROP TARGET IF A BALL IS CAPTURED IN THE LOWER LEFT HOLE.
- (5-BALL) SCORE 1000.

IV. GAME PLAY AND SCORING

LEFT AND RIGHT SPINNERS

- SCORE 1000 UNLIT.
- SCORE 10,000 WHEN LIT.
- ROTATE POP BUMPER LAMPS.

POP BUMPERS

- SCORE 1000 UNLIT.
- SCORE 10,000 WHEN LIT.
- ROTATE POP BUMPER LAMPS.
- ALTERNATE EXTRA BALL LAMPS WHEN ENABLED.

LEFT AND RIGHT OUTLANE ROLLOVERS

- SCORE 30,000.

LEFT AND RIGHT RAMP ROLLUNDERS

- NO SCORE.

KICKING TARGETS AND RUBBER SWITCHES

- SCORE 30.
- ALTERNATE LEFT AND RIGHT SPOT TARGETS (AMBER).
- ALTERNATE EXTRA BALL LAMPS WHEN ENABLED.
- ALTERNATE SPECIAL LAMPS WHEN ENABLED.

OUTHOLE

- SCORE 10,000 FOR EACH LIT ENERGY LEVEL BONUS LAMP.
- SCORE 100,000 FOR EACH TIME THAT THE ENERGY LEVEL BONUS HAS BEEN AT MAXIMUM.
- DISABLE LEFT AND RIGHT EXTRA BALL LAMPS WHEN RETURNING TO SINGLE BALL PLAY.

MULTI-BALL

- ACHIEVED WHEN THE ENERGY LEVEL BONUS IS AT THE TOP AND A BALL IS SHOT INTO THE FLASHING TELEPORT.



V. SOUND

VI. GAME 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 ADJUSTMENTS

SWITCHES					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	ON	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

SWITCH 7 _____ **ATTRACT MODE SOUND**
ON ENABLED
OFF DISABLED

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

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

ON	ON	OFF	OFF	ON	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 14 _____ COIN CHUTE LEFT AND RIGHT CONTROL
ON SAME
OFF SEPARATE

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

23	24	HIGHEST GAME TO DATE AWARDS
OFF	OFF	NONE (NOT DISPLAYED)
OFF	ON	NONE
ON	OFF	2 REPLAY
ON	ON	3 REPLAY

SWITCH 25 _____	BALLS/GAME
ON	3
OFF	5

SWITCH 26	MATCH
ON	ON
OFF	OFF

SWITCH 27 _____ **REPLAY LIMIT**
ON 1
OFF NO LIMIT

SWITCH 28 _____ **NOVELTY**
ON . . . 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
ON		CREDIT CONTROL
OFF		ADD 9
		NO EFFECT

SWITCH 31 PLAYFIELD SPECIAL CONTROL

ON.....LIGHT SPECIAL AFTER BANKS ARE COMPLETED TWICE
(LIBERAL)
OFF.....LIGHT SPECIAL AFTER BANKS ARE COMPLETED THREE TIMES
(CONSERVATIVE)

SWITCH 32 _____ EXTRA BALL CONTROL

ON...MEMORIZE ENERGY LEVEL BONUS BALL TO BALL.....(LIBERAL)
OFF..RESET ENERGY LEVEL BONUS BALL TO 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.

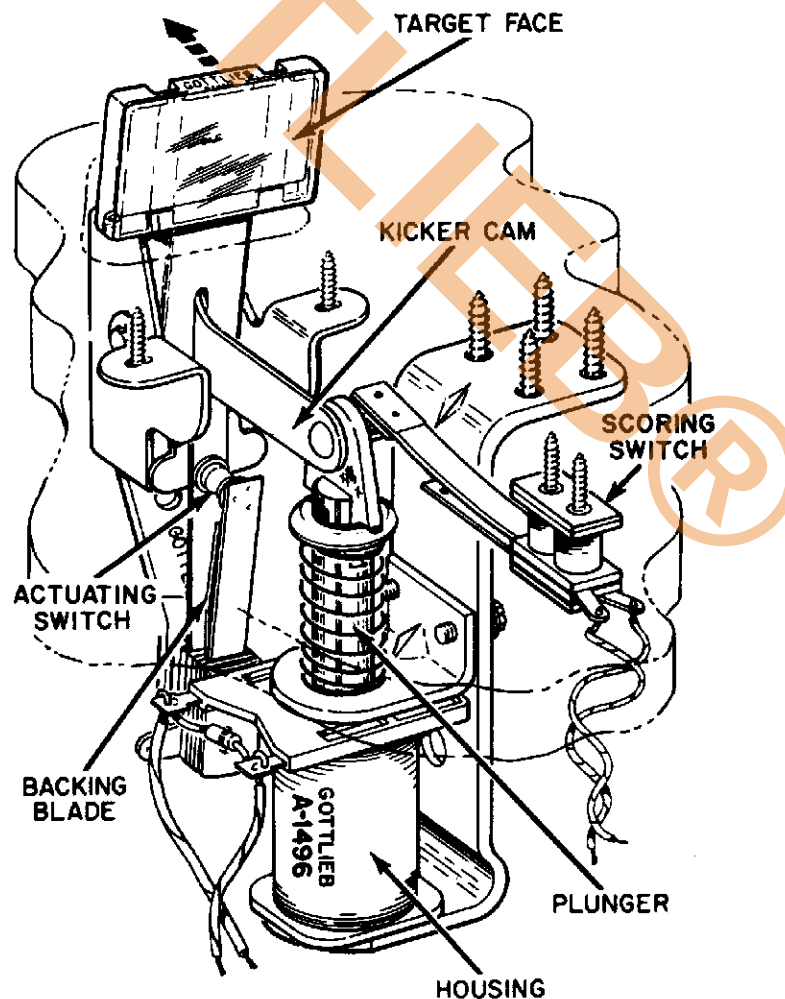
C. POST ADJUSTMENTS

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 $1/32$ nd 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

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.

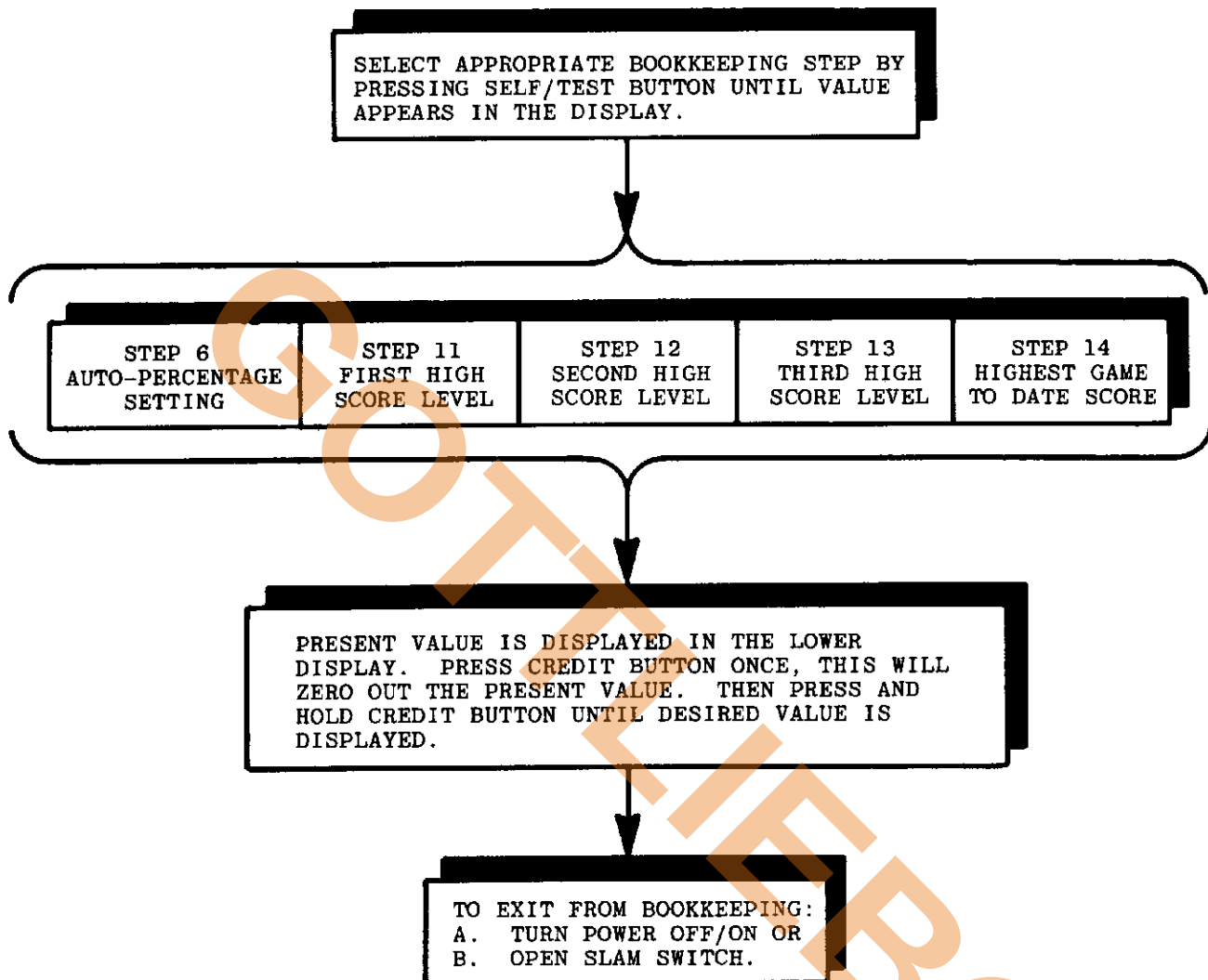
HOW TO USE AUTOMATIC REPLAY PERCENTAGING

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.

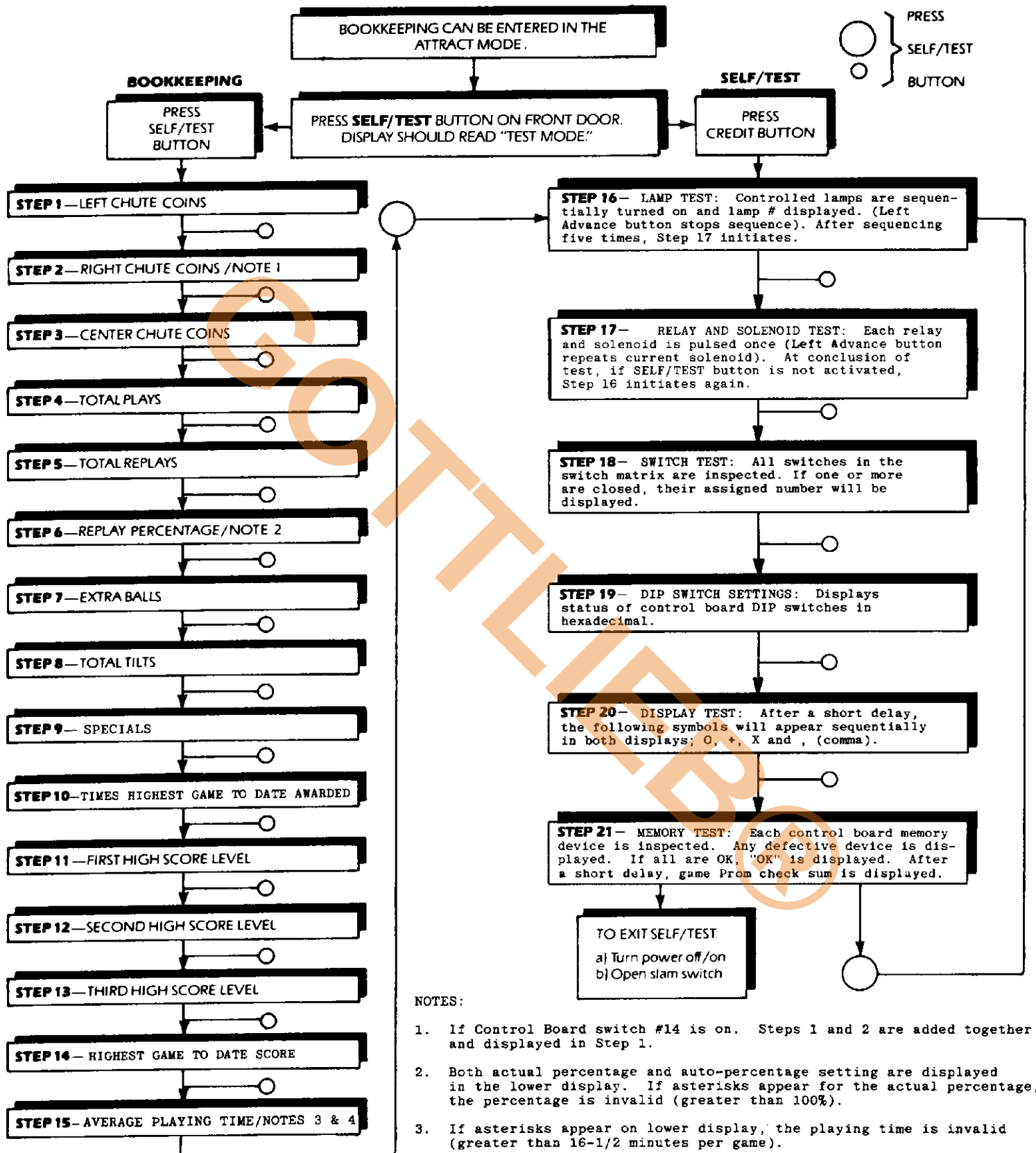


NOTES:

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



VII. BOOKKEEPING AND SELF TEST

C. SELF/TEST

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

STEP 16—LAMP TEST

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

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

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

STEP 17—RELAY AND SOLENOID TEST

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

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

A3 Driver Board Transistor
Assignment (See Schematic)

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

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

NUMBER DISPLAYED	ASSIGNMENT	A3 DRIVER BOARD TRANSISTOR ASSIGN. SEE SCHEMATIC
Sol.1	Switching Diode	Q60
Sol.2	Switching Diode	Q57/Q58
Sol.3	Right 4 Bank Reset	Q54
Sol.4	Top 4 Bank Reset	Q55
Sol.5	Switching Diode	Q61/Q62
Sol.6	Switching Diode	Q63/Q64
Sol.7	1 Bank Reset	Q56
Sol.8	Knocker Assembly	Q53
Sol.9	Outhole	Q59

STEP 18—SWITCH TEST

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

STEP 19—DIP SWITCH SETTINGS

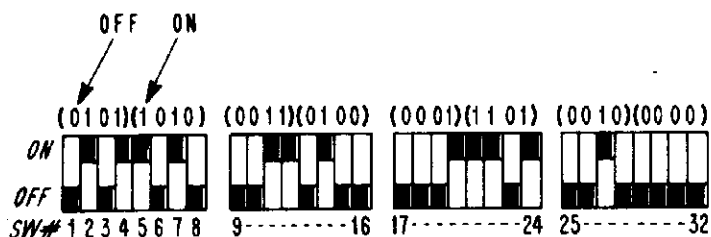
- The status of the Control Board (A1) switches appears in the lower display.

DISPLAYED 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

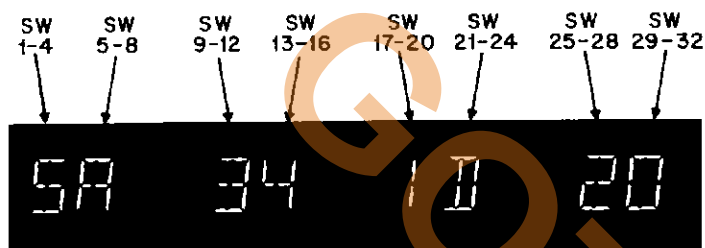
VII. BOOKKEEPING AND SELF TEST

CONTROL BOARD (A1) SWITCHES

EXAMPLE

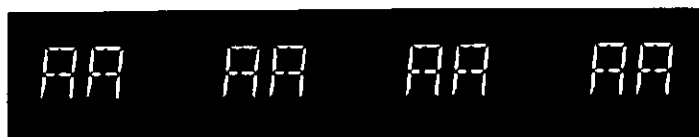


DISPLAYED



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

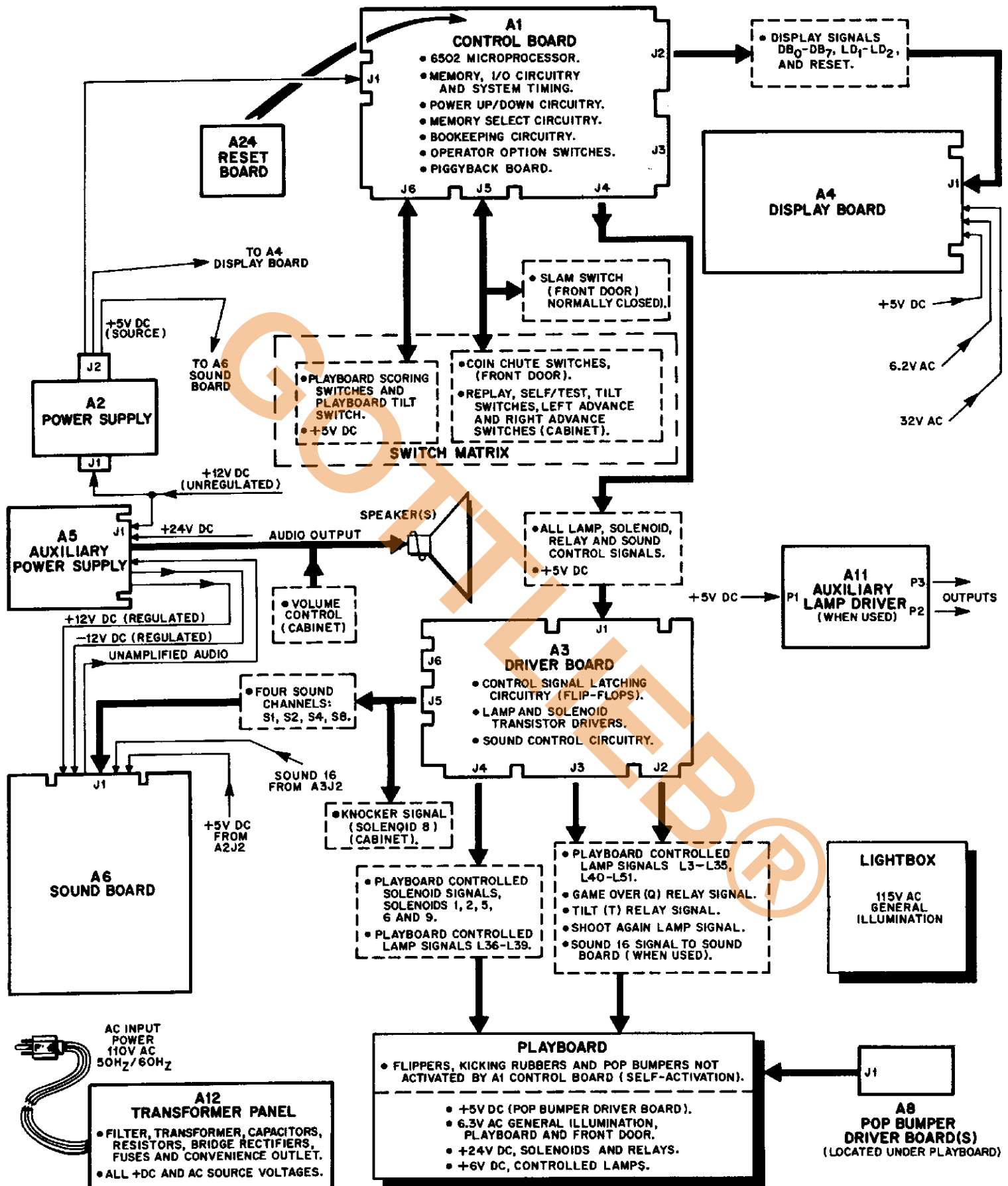


FIGURE 1. SYSTEM 80B BLOCK DIAGRAM

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.

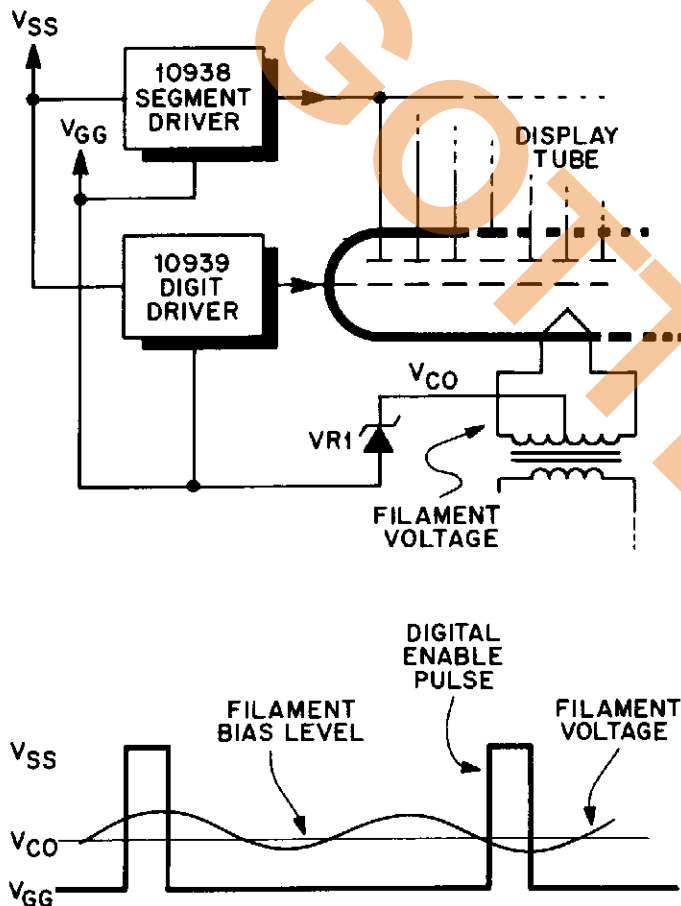


FIGURE 2. BASIC DRIVE CIRCUIT

D. SOUND BOARD (A6)

The MA-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 its inputs are low. This output is connected to pin 11 of the input code latches (A3 and B2). A positive edge at pin 11 causes A3 and B2 to latch the data at their inputs. A2 pin 8 is also connected to the clock inputs of two flip flops, A4 pin 3 and A4 pin 11. When A2 pin 8 goes high, both flip flops are clocked, setting both Q outputs low. The Q outputs, A4 pin 6 and pin 8, are connected to both of the 6502's active low interrupt request lines, T3 and N1, pin 4. The Q outputs of A4 will stay low until the associated 6502 reads its input port therefore clearing the interrupt.

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 - Pop Bumper Driver Board
 A11 - Auxiliary Lamp Driver
 A13 - Resistor Board
 A16 - Transistor Driver Board
 A17 - Diode Board
 A19 - Switching 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	All Ball Holes (4).....	1 Amp SLO-BLO
F12	Single Bank Trip, Single Bank Reset.....	1 Amp SLO-BLO
F13	Top 4 Bank Reset, Right 4 Bank Reset.....	2 Amp SLO-BLO
F14	Top Left Pop Bumper.....	2 Amp SLO-BLO
F15	Top Right Pop Bumper.....	2 Amp SLO-BLO
F16	Bottom Pop Bumper.....	2 Amp SLO-BLO

IX. GENERAL INFORMATION

D. COIL CHART

SOLENOID COILS					
PART NUMBER	GENERAL USAGE	RESISTANCE (OHMS)	NUMBER OF TURNS	WIRE GAUGE	WRAPPER COLOR
A-1496	KICKING TARGET KICKING RUBBERS POP BUMPERS	2.95	635	#23	Yellow
A-4893	UP KICKER POP BUMPERS BALL KICKER	2.1	535	#22	Red
A-5194	UP KICKER GONG KICKING TARGETS 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

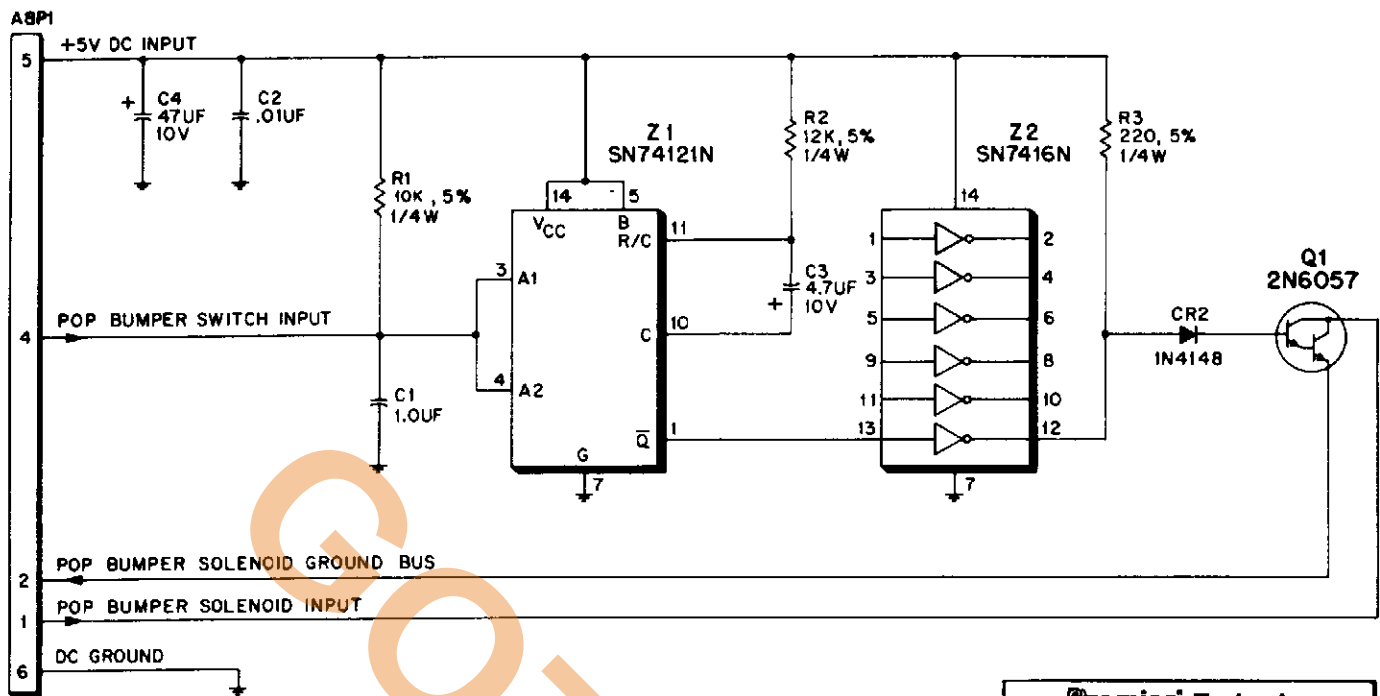
*Coils may vary from game to game. Check game manual for exact coil usage.

X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS

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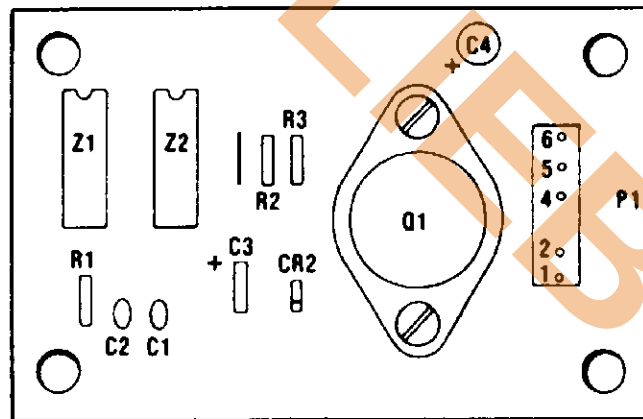
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X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS



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

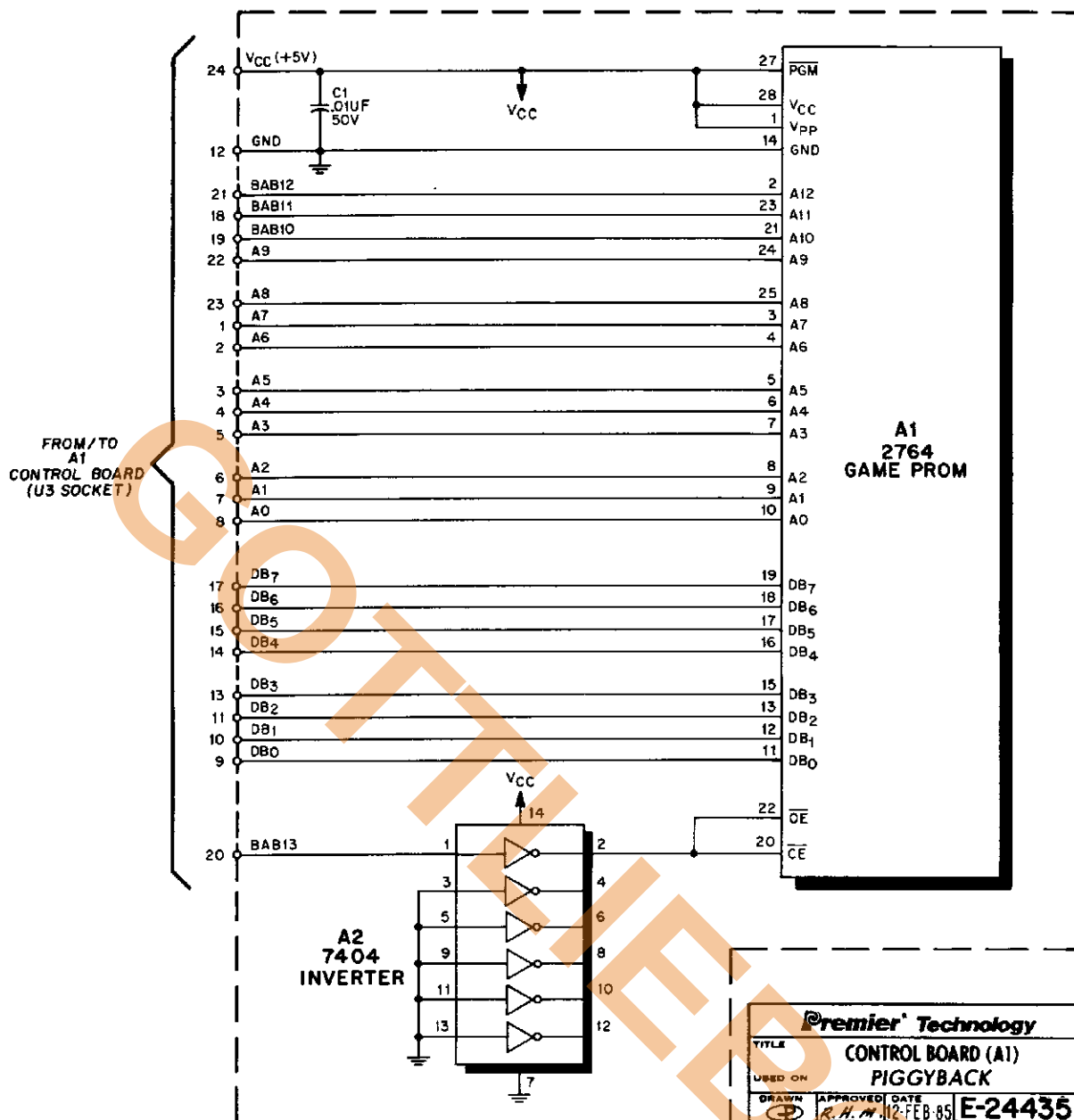
POP BUMPER DRIVER BOARD (A8) COMPONENT LOCATION



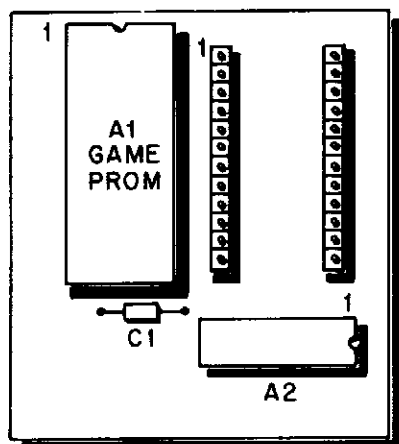
POP BUMPER DRIVER BOARD (A8) PARTS LIST

REFERENCE	DESCRIPTION	PART NUMBER
	POP BUMPER DRIVER BOARD	A-19741
C1	Capacitor, 1 UF, 50V, Non-Polarized	XO-294
C2	Capacitor, .01 UF, 100V	XO-202
C3	Capacitor, 4.7 UF, 10%, 10V	XO-226
C4	Tantalum, Axial	XO-227
CR2	Diode 1N4148	XO-261
P1	Connector	XO-879
R1	Resistor, 10K ohm, 1/4W, 5%	XO-18
R2	Resistor, 12K ohm, 1/4W, 5%	XO-9
R3	Resistor, 220 ohm, 1/4W, 5%	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**

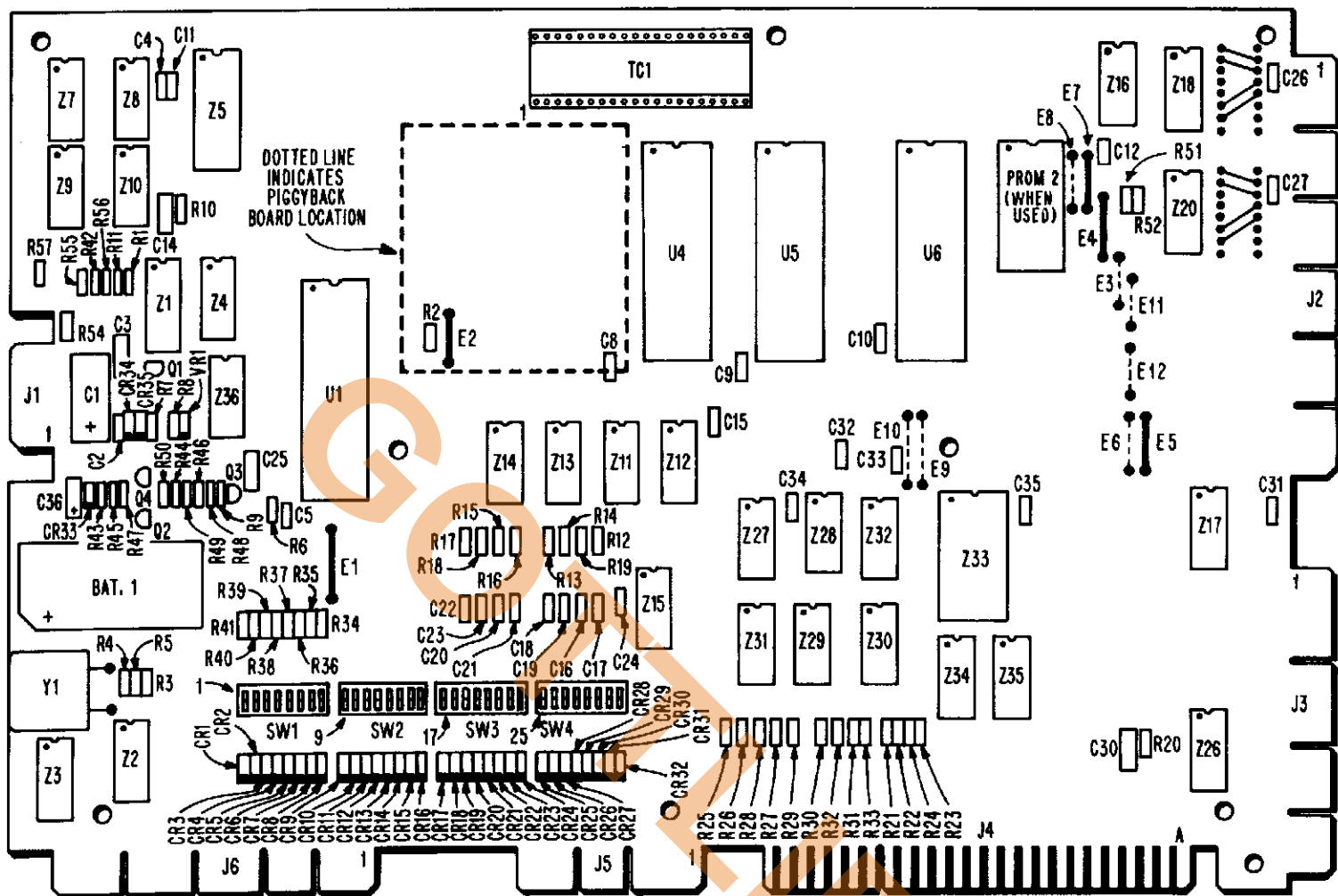


**CONTROL BOARD (A1),
PIGGYBACK
PARTS LIST**

REFERENCE	DESCRIPTION	PART NUMBER
A1	Control Board (A1), Piggyback	MA689
A2	Game Prom, 2764	XO-489
C1	IC, 7404 Inverter	XO-402
	Capacitor, .01UF, +80% -20%, 50V	XO-229
	Socket, 28 Pin	XO-536

X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS

CONTROL BOARD (A1) COMPONENT LOCATION



CONTROL BOARD (A1) PARTS LIST

REFERENCE	DESCRIPTION	PART NUMBER	REFERENCE	DESCRIPTION	PART NUMBER
	CONTROL BOARD	MA-774	R47	Resistor, 24K ohm, 5%, 1/4W	XO-10
Bat. 1	Battery-3.6V NI-CAD	XO-458	SW1-SW4	Dip Switch 100B-692	XO-505
C1	Capacitor, 100 mfd., 10V	XO-211	TC1	Socket, 40 Pin 640379-3	XO-530
C2, C4, C5, C8-C12, C15-C24, C26, C27, C31-C35	Capacitor, .01 mfd., 50V	XO-229	U1	CPU R6502P	XO-360
C3, C14, C25, C30	Capacitor, .1 mfd., 50V	XO-230	U4, U5, U6	PRIOT R6532P	XO-361
C36	10 mfd., 10V, TNT-AX CAP	XO-209	VR1	Diode-3.0V, 5% 1N5225B or 1N5987B	XO-269
CR1-CR35	Diode, GP 1N4148	XO-261	Y1	Crystal, 3.579545 MHZ	XO-456
Q1, Q4	Transistor-PNP MPS-A70	XO-309	Z1	IC-Cmos-Dual 1 Shot SCL4528BE	XO-414
Q2, Q3	Transistor, NPN (Motorola 2N4400)	XO-313	Z2	IC-Dual Flip Flop SN7474N	XO-423
R1, R6	Resistor, 3.0K ohm, 5%, 1/4W	XO-23	Z3, Z11, Z12, Z16, Z17, Z26, Z27, Z34, Z35	IC-Hex Inverter SN7404N	XO-402
R11-R24			Z4	IC-Cmos-Quad 2 Input "And" SCL4081BE	XO-401
R42, R45, R46, R48, R51, R52, R54-R57			Z5	IC-Static Ram S5101-L	XO-356
R2, R34-R41	Resistor, 4.7K ohm, 5%, 1/4W	XO-7	Z7	IC-Hex Inverter SN74LS04N	XO-418
R3, R43, R49	Resistor, 5.6K ohm, 5%, 1/4W	XO-19	Z8	IC-2 Input "Nor" SN7402N	XO-421
R4, R5, R44	Resistor, 2.0K ohm, 5%, 1/4W	XO-14	Z9, Z13, Z14	IC-2 Input "Nand" SN7400N	XO-420
R7	Resistor, 62 ohm, 5%, 1/4W	XO-3	Z10	IC-Open Collector Inverter SN74LS05N	XO-411
R8, R50	Resistor, 180 ohm, 5%, 1/4W	XO-24	Z15	IC-2 Input "Or" SN7432N	XO-407
R9	Resistor, 1K ohm, 5%, 1/4W	XO-5	Z18, Z20	IC-"D" Flip Flop SN74175N	XO-410
R10	Resistor, 2.7M ohm, 5%, 1/4W	XO-13	Z33	IC-4-16 Decoder SN74154N	XO-409
R25-R33	Resistor, 620 ohm, 5%, 1/4W	XO-4	Z28	IC-2 to 4 Decoder SN74LS139N	XO-419
			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

[illegible]

The image displays 14 logic gate diagrams, organized into two columns. Each diagram shows a specific gate configuration with inputs and outputs labeled with numbers and algebraic expressions.

Left Column:

- Diagram 1:** An inverter with input 9 and output 8. The output is labeled with the expression Z^3 and the value 7404.
- Diagram 2:** An inverter with input 5 and output 6. The output is labeled with the expression Z^{12} and the value 7404.
- Diagram 3:** An inverter with input 9 and output 8. The output is labeled with the expression Z^{27} and the value 7404.
- Diagram 4:** An inverter with input 5 and output 6. The output is labeled with the expression Z^{29} and the value 7416.
- Diagram 5:** An inverter with input 9 and output 8. The output is labeled with the expression Z^{29} and the value 7416.
- Diagram 6:** An inverter with input 3 and output 4. The output is labeled with the expression Z^{36} and the value 4069.
- Diagram 7:** An inverter with input 5 and output 6. The output is labeled with the expression Z^{36} and the value 4069.

Right Column:

- Diagram 8:** An inverter with input 9 and output 8. The output is labeled with the expression Z^{30} and the value 7416.
- Diagram 9:** An inverter with input 5 and output 6. The output is labeled with the expression Z^{32} and the value 7417.
- Diagram 10:** An inverter with input 9 and output 8. The output is labeled with the expression Z^{32} and the value 7417.
- Diagram 11:** An AND gate with inputs 9 and 10, and output 8. The output is labeled with the expression Z^9 and the value 7400.
- Diagram 12:** An AND gate with inputs 12 and 13, and output 11. The output is labeled with the expression Z^9 and the value 7400.
- Diagram 13:** An OR gate with inputs 11 and 10, and output 10. The output is labeled with the expression Z^{36} and the value 4069.
- Diagram 14:** An OR gate with inputs 13 and 12, and output 12. The output is labeled with the expression Z^{36} and the value 4069.

DELAY CIRCUIT

Components and values:

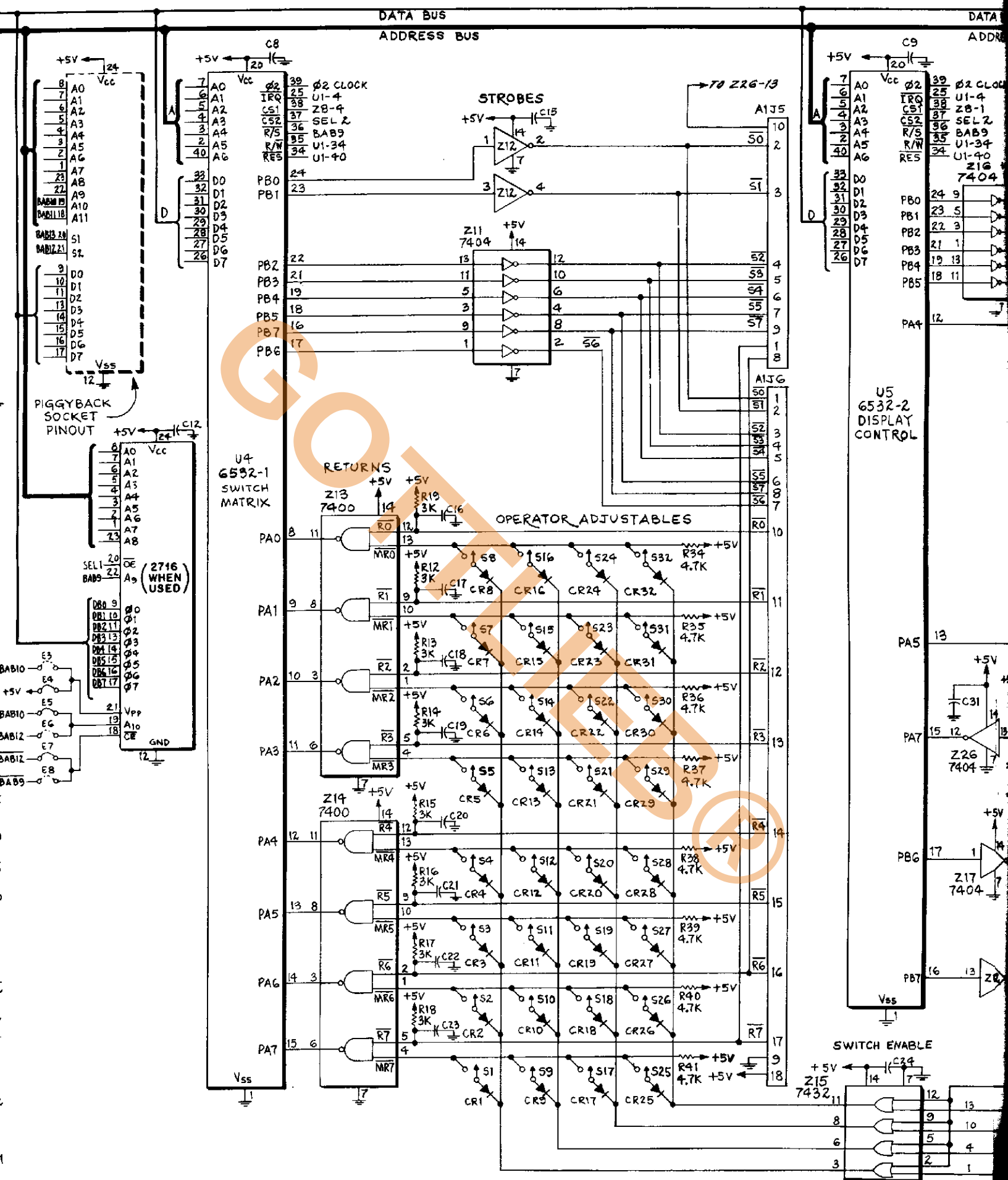
- CR33: Diode
- C36: 10UF, 10V capacitor
- R43: 5.6K resistor
- R44: 2K resistor
- R45: 3K resistor
- R46: 3K resistor
- R47: 24K resistor
- R48: 3K resistor
- R49: 5.6K resistor
- R50: 180 resistor
- Q2: 2N4400 transistor
- Q3: 2N4400 transistor
- Q4: MP3-A70 transistor

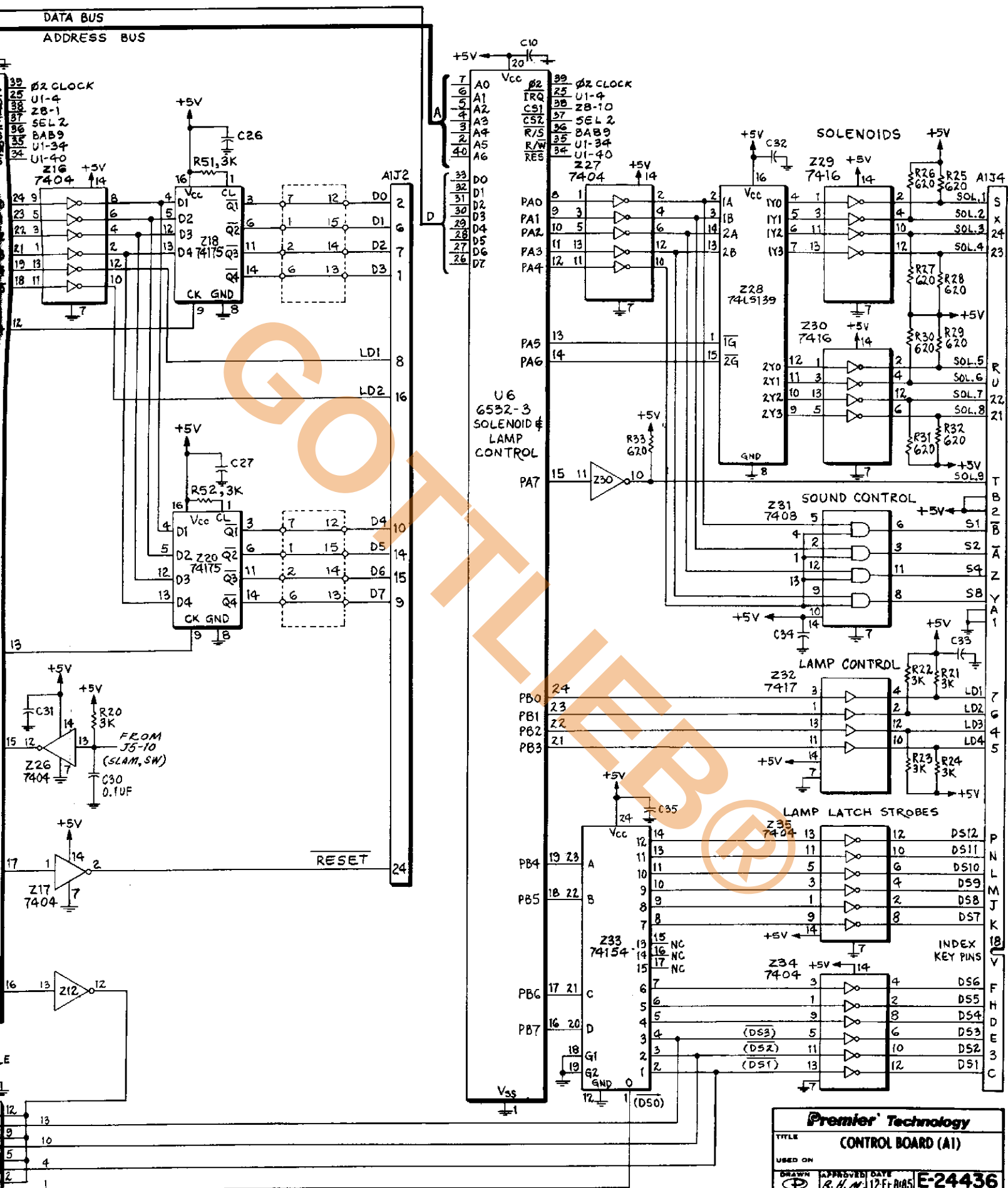
Power supply: +5V

[illegible]

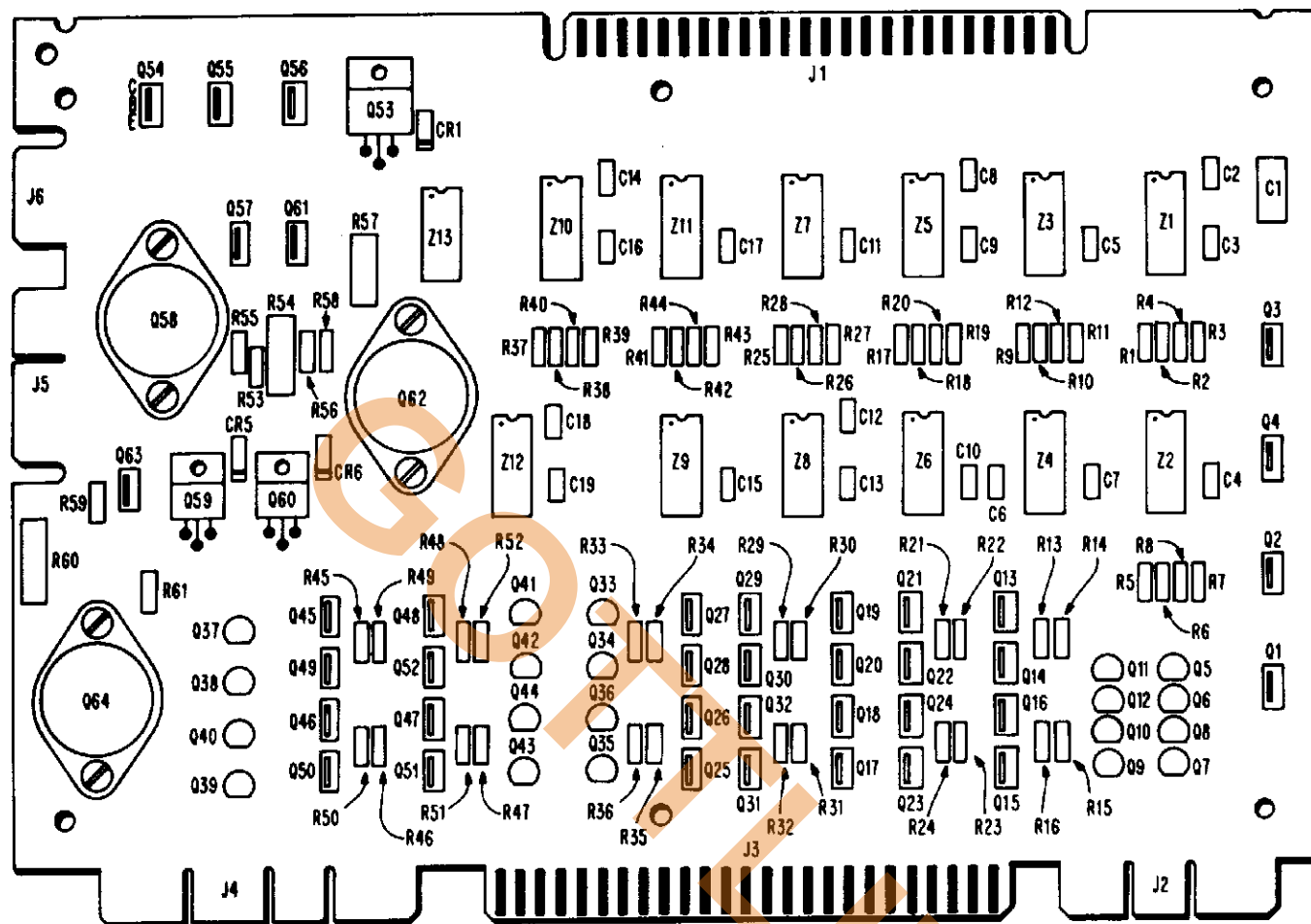
The circuit diagram illustrates the output decoder for the 7400, 7404, and 7400 chips. It shows the internal logic of these chips, including inverters (Z10, Z12, Z7, Z9), NAND gates (Z10, Z12, Z9), and OR gates (Z9). The inputs are AB9, AB10, AB11, AB12, and AB13. The outputs are BAB9, BAB10, BAB11, BAB12, BAB13, SEL 2, and SEL 1. The circuit uses 74LS05, 7404, and 7400 chips. Power is supplied by +5V and ground.

X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS





DRIVER BOARD (A3) COMPONENT LOCATION



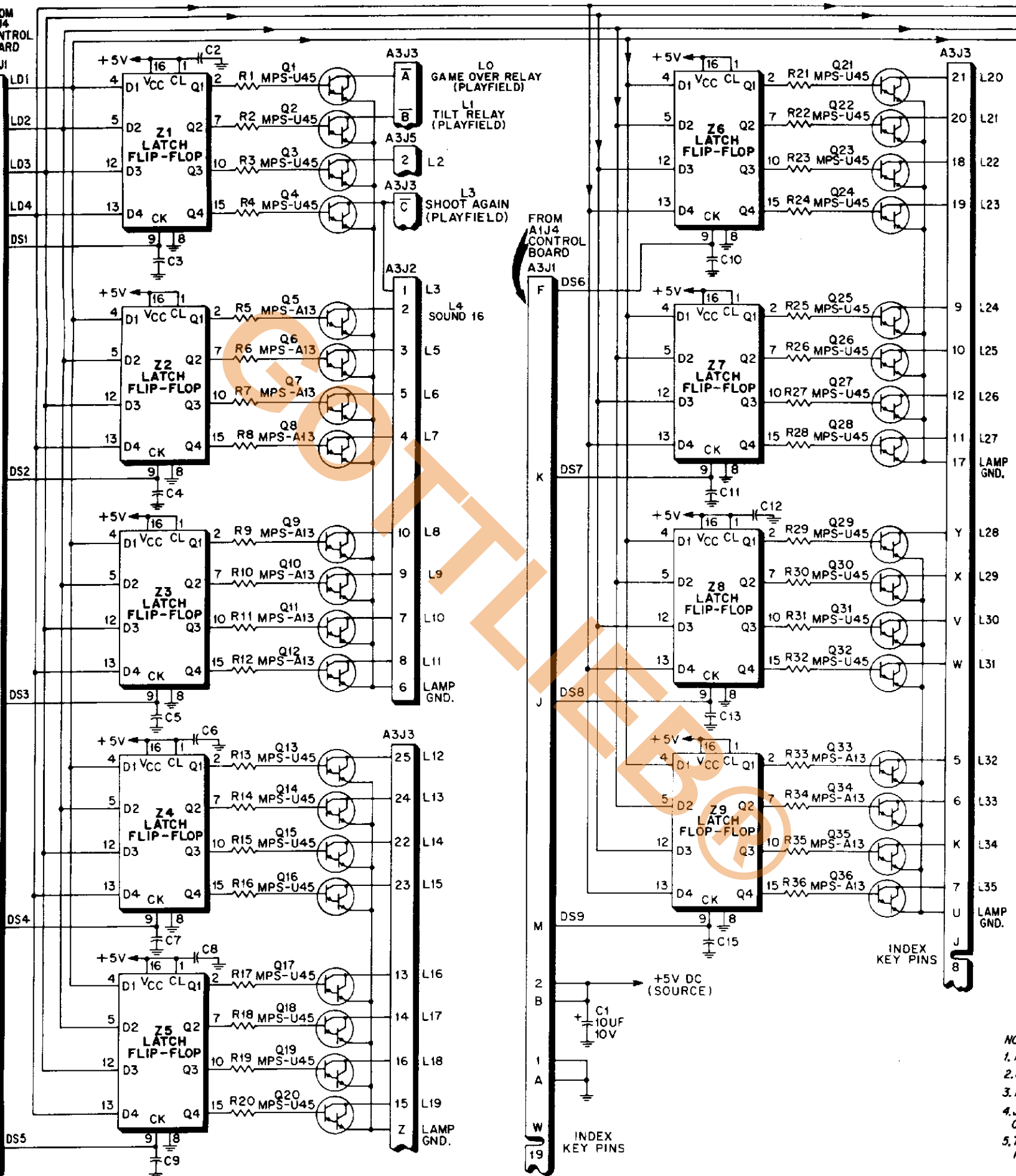
DRIVER BOARD (A3) PARTS LIST

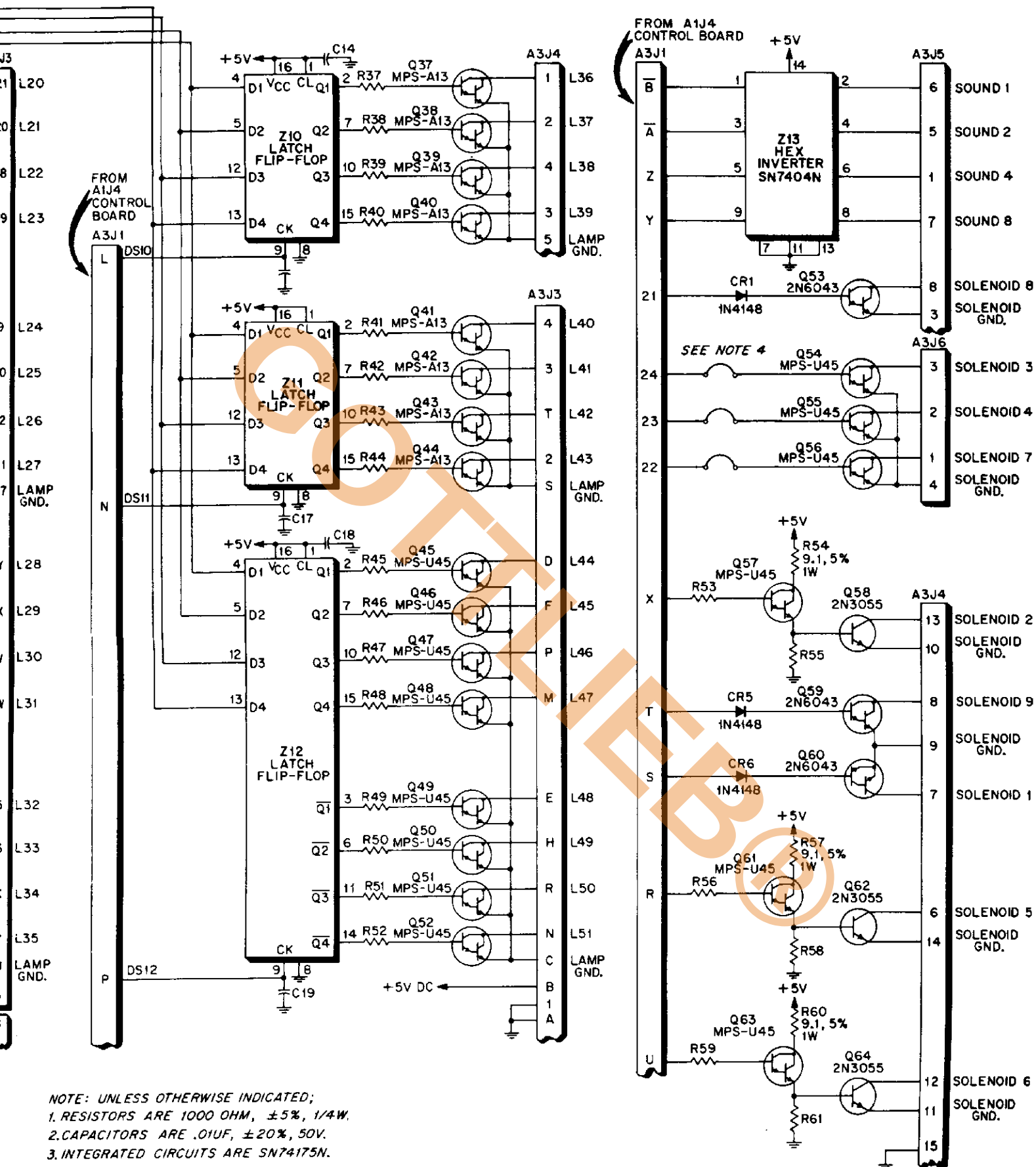
REFERENCE	DESCRIPTION	PART NUMBER
	DRIVER BOARD	MA-295
C1	Capacitor, 10 mfd., 10V Tantalum	XO-209
C2-C19	Capacitor, 01 mfd., 50V Ceramic	XO-229
CR1-CR6	Diode—Silicon 1N4148	XO-261
R1-R53, R61, R55, R56, R58, R59	Resistor 1.0K ohm, 5%, 1/4W	XO-5
R54, R57, R60	Resistor, 91 ohm, 5%, 1W	XO-158
Q1-Q4, Q13- 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:

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

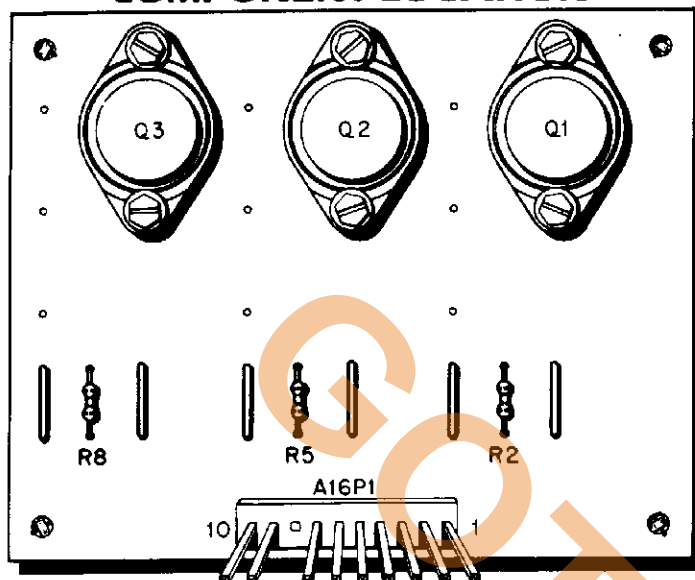






- NOTE: UNLESS OTHERWISE INDICATED;
 1. RESISTORS ARE 1000 OHM, $\pm 5\%$, 1/4W.
 2. CAPACITORS ARE .01UF, $\pm 20\%$, 50V.
 3. INTEGRATED CIRCUITS ARE SN74175N.
 4. JUMPER WIRES REPLACED DIODES CR2, CR3 AND CR4 FOR SYSTEM 80A AND 80B GAMES.
 5. TRANSISTOR TYPES MPS-U45 AND NDS-U45 ARE INTERCHANGEABLE.

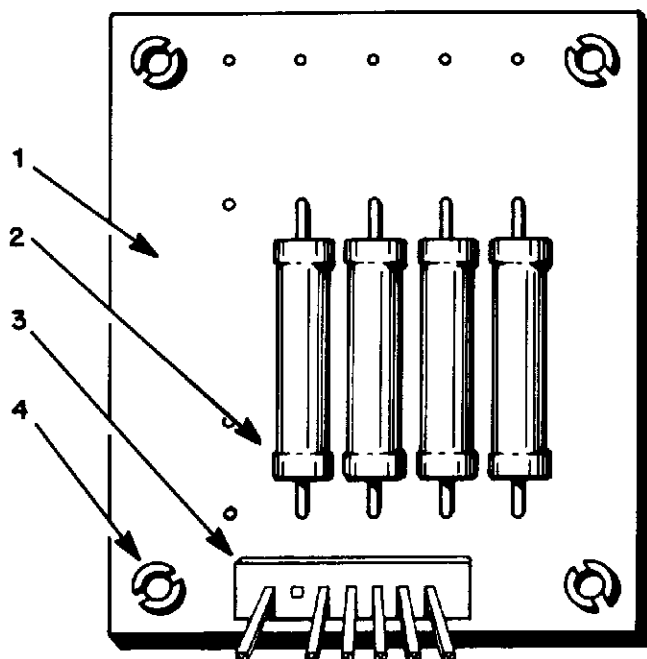
TRANSISTOR DRIVER BOARD (A16) COMPONENT LOCATION



TRANSISTOR DRIVER BOARD (A16) PARTS LIST

REFERENCE	DESCRIPTION	PART NUMBER
	Transistor Driver Board Assembly (1A16)	MA-1051
Q1	Transistor, MJ2955	XO-799
Q2,Q3	Transistor, 2N5879	XO-323
R2,R5,R8	Resistor, 4.7K Ohm, 5%, 1/4W	XO-7
P1	10 Position Connector	XO-879
	Circuit Board Support (4)	MP-40

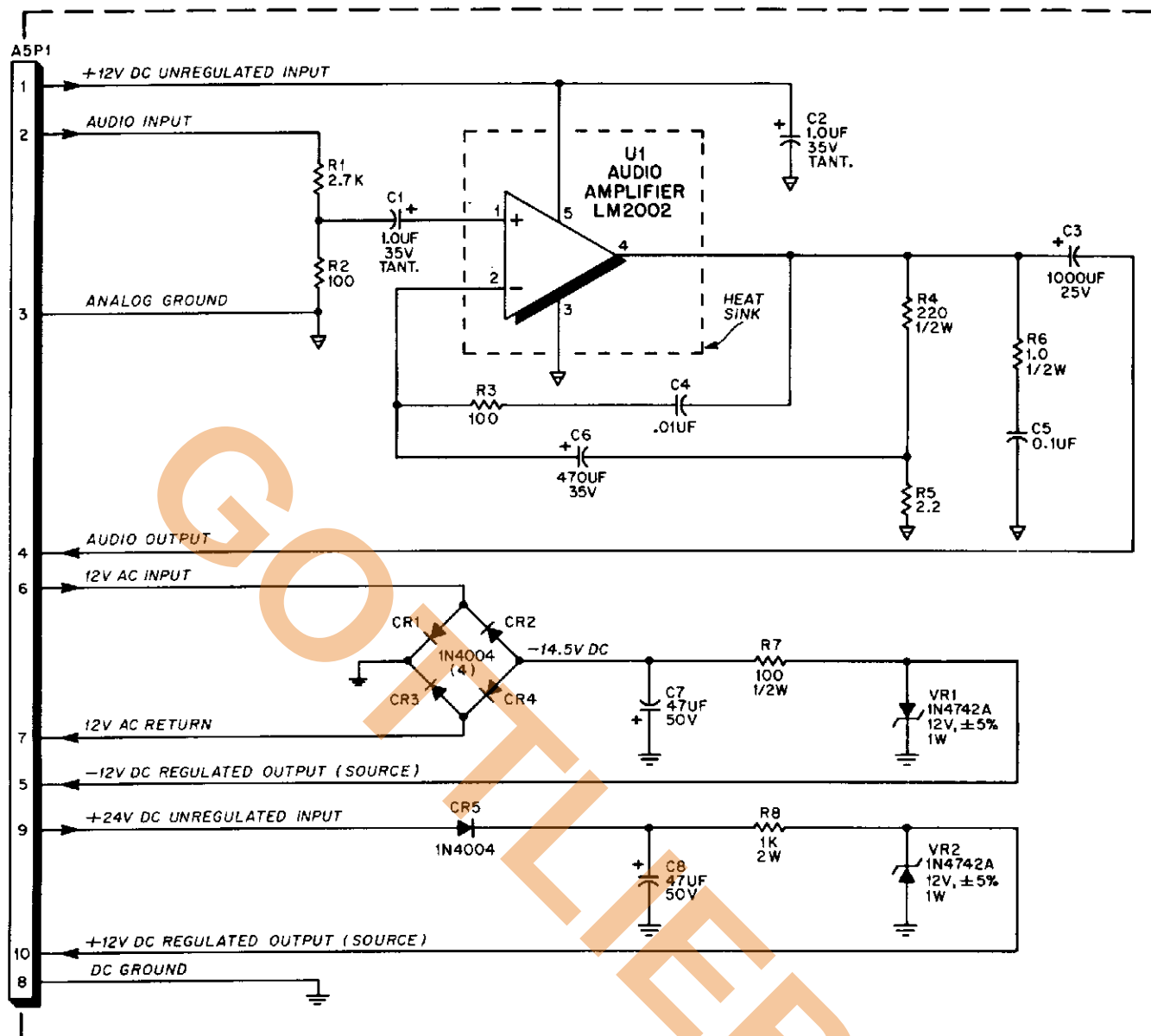
RESISTOR BOARD (A13)



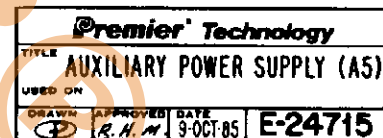
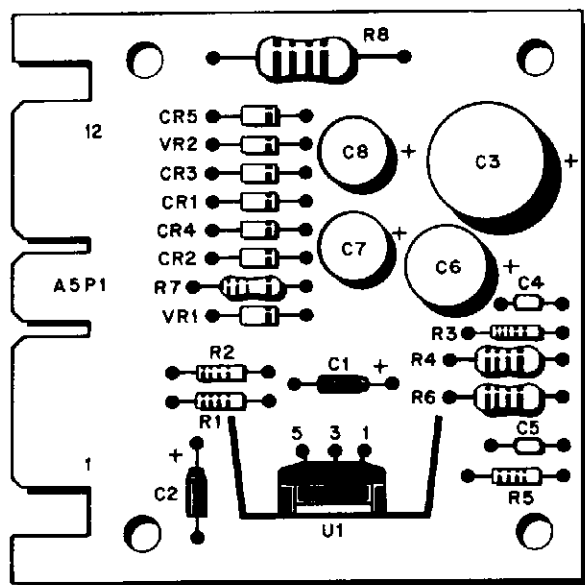
RESISTOR BOARD (A13) PARTS LIST

ITEM	DESCRIPTION	PART NO.
1	RESISTOR BOARD ASSEMBLY (A13)	25231
2	RESISTOR, 4 OHM, 7W, WW, (4)	XO-878
3	7 POSITION CONNECTOR (A13P1)	XO-879
4	SPACER (4)	23984

X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS



AUXILIARY POWER SUPPLY (A5) COMPONENT LOCATION

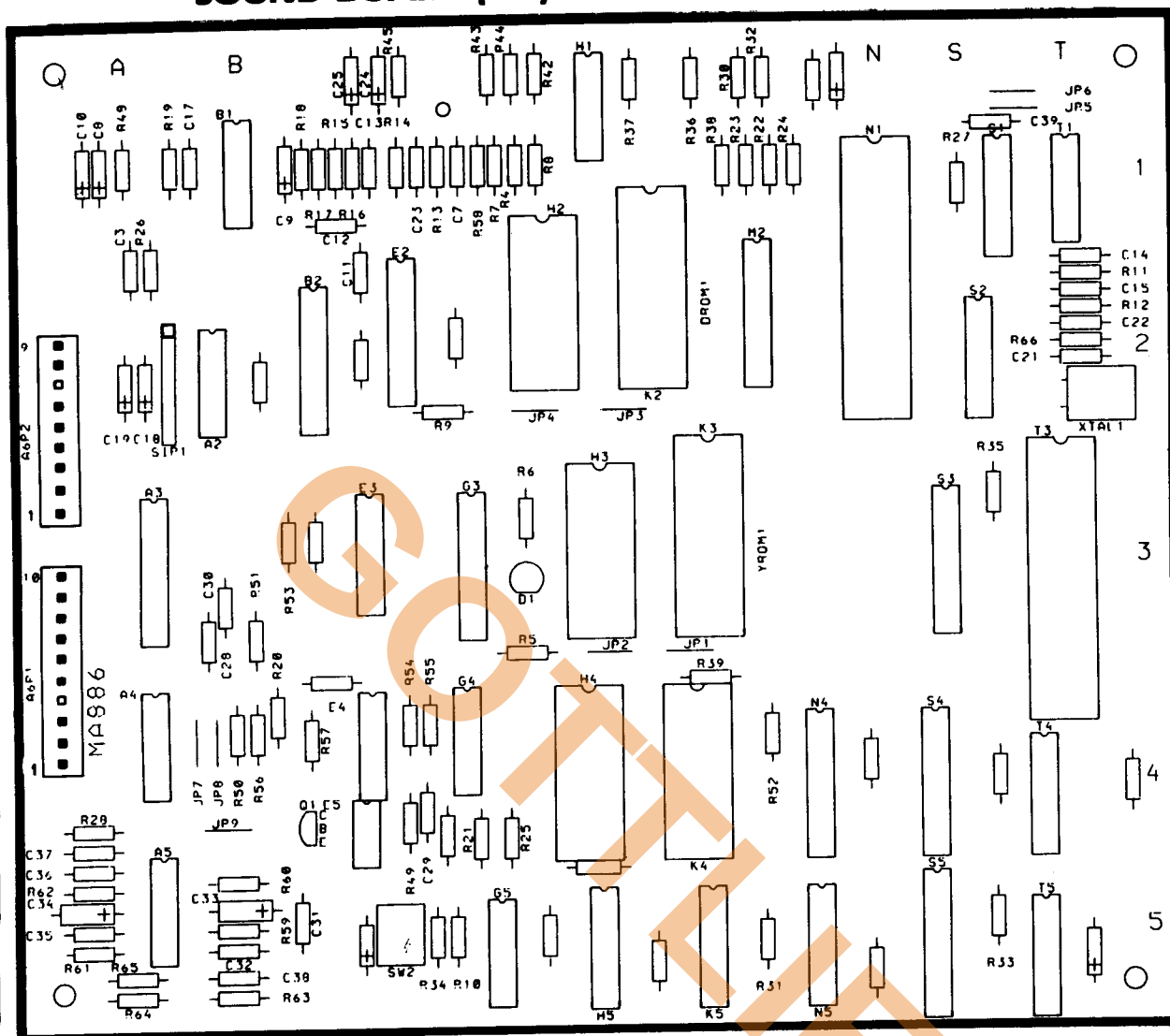


AUXILIARY POWER SUPPLY (A5) PARTS LIST

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

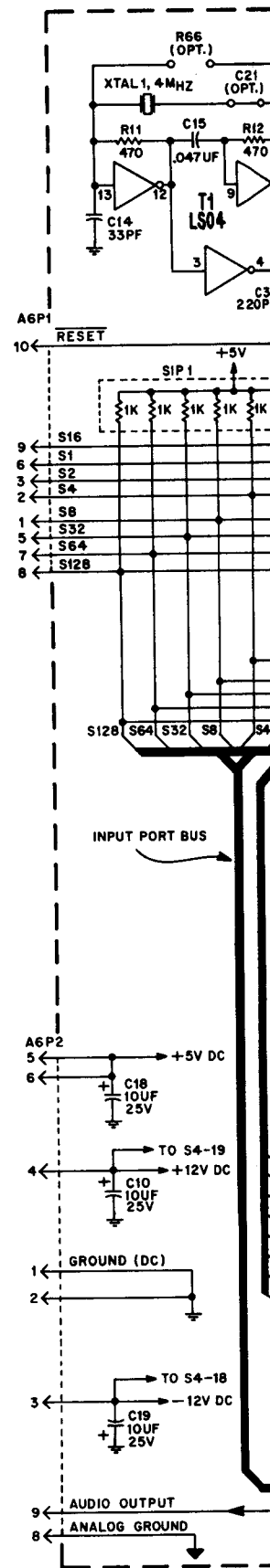
X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS

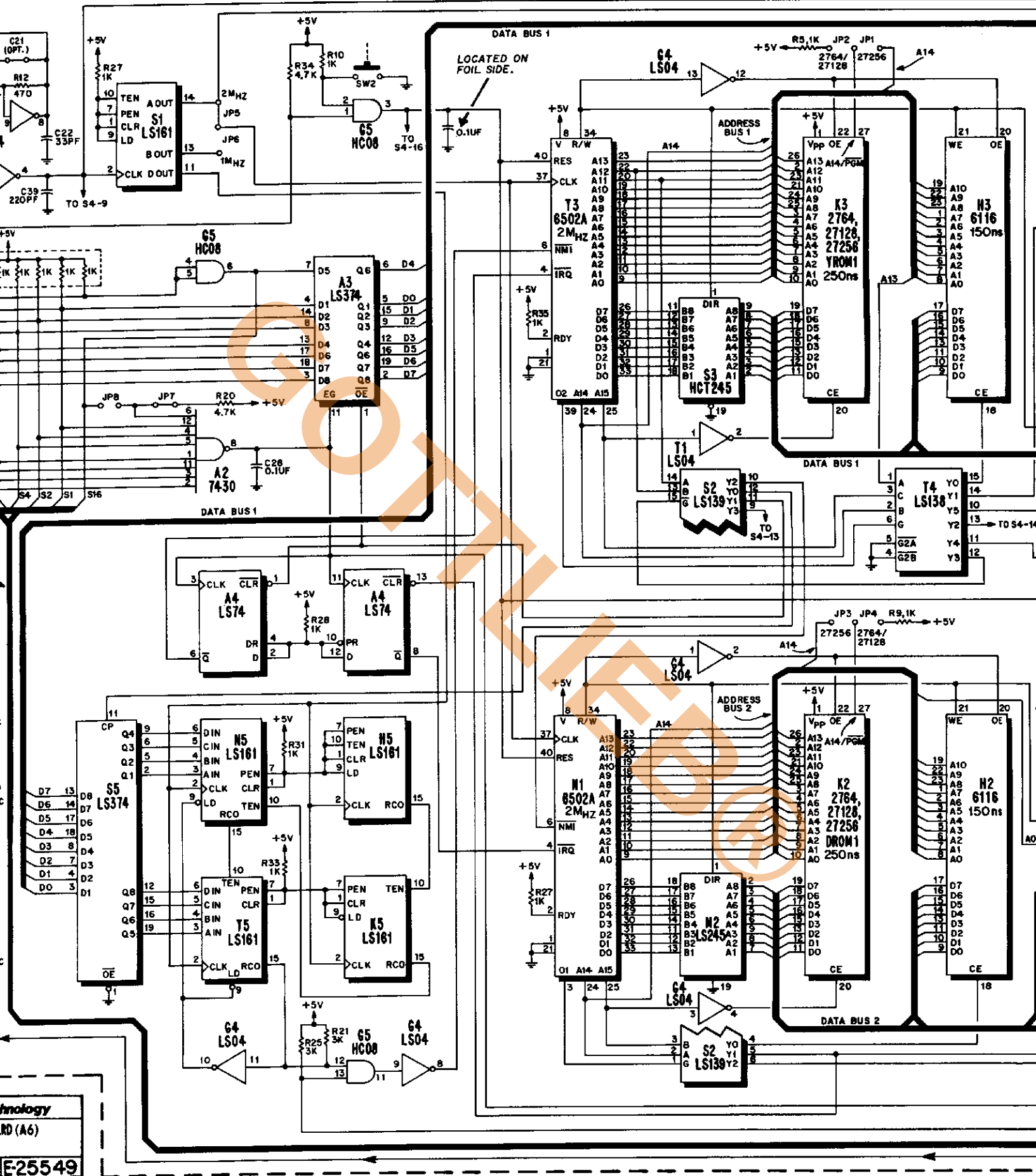
SOUND BOARD (A6) COMPONENT LOCATION

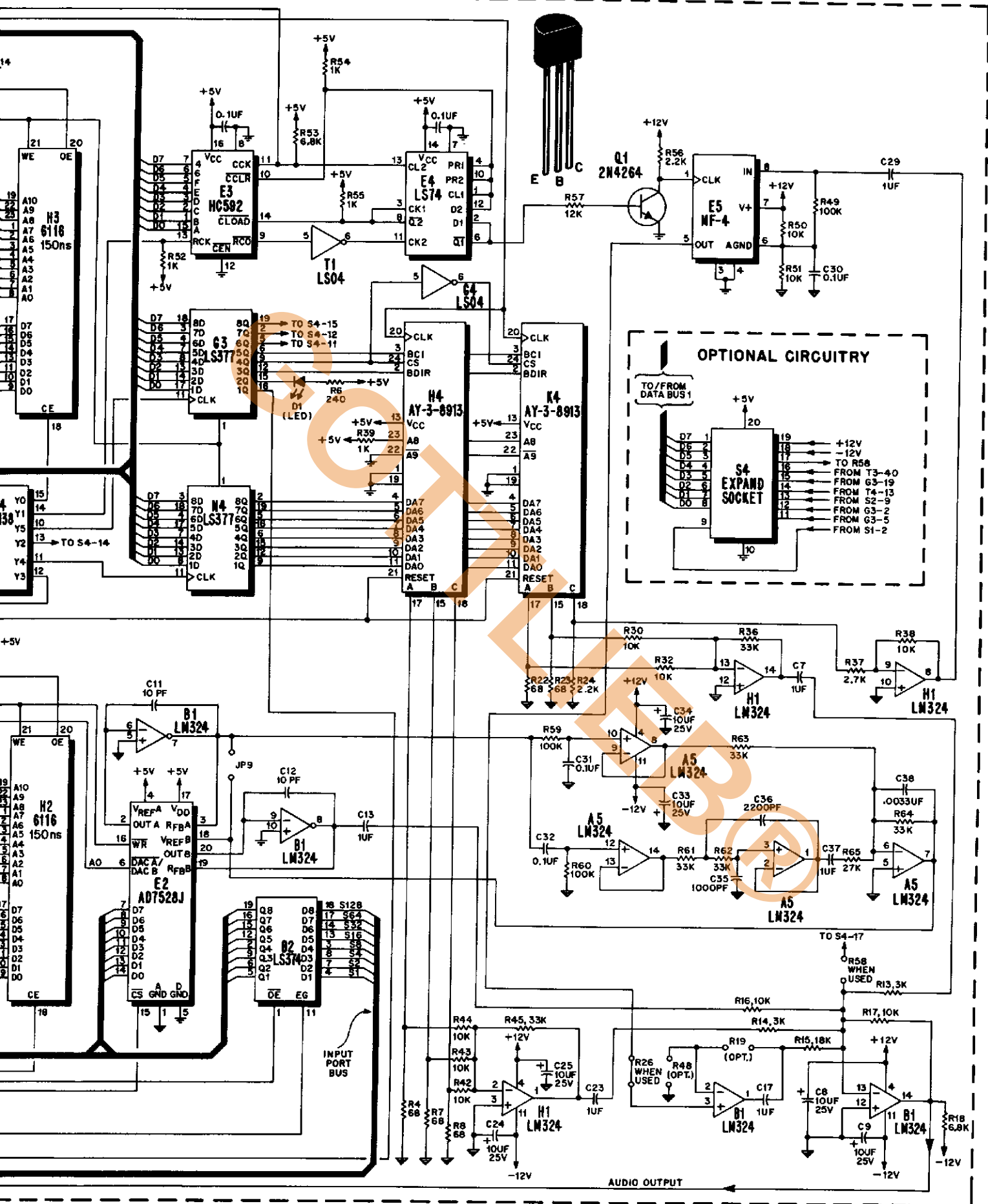


SOUND BOARD (A6) PARTS LIST

REFERENCE	DESCRIPTION	PART NUMBER	REFERENCE	DESCRIPTION	PART NUMBER
C7,C13,C17, C23,C29,C37 C8,C9,C10, C18,C19,C24, C25,C33,C34 AND THREE UNMARKED CAPACITORS	Sound Board Assembly Capacitor, 1UF, 20%, 50V (Non-Polarized)	MA-886 XO-746	R20,R34 R24,R56 R36,R45,R61, R62,R63,R64 R37 R49,R59,R60 R57 R65 A2	Resistor, 4.7K Ohm, 5%, 1/4W Resistor, 2.2K Ohm, 5%, 1/4W Resistor, 33K Ohm, 5%, 1/4W Resistor, 2.7K Ohm, 5%, 1/4W Resistor, 100K Ohm, 5%, 1/4W Resistor, 12K Ohm, 5%, 1/4W Resistor, 27K Ohm, 5%, 1/4W IC, 7430, 8 Input NAND Gate	XO-7 XO-27 XO-43 XO-6 XO-45 XO-9 XO-11 XO-643
CAPACITORS C11,C12 C14,C22 C15 C28,C30,AND FOURTEEN UNMARKED CAPACITORS	Capacitor, 10PF, +80%-20%, 50V Capacitor, 33PF, 10%, 100V Capacitor, .047UF, 20%, 50V Capacitor, 0.1UF, +80%-20%, 50V	XO-635 XO-896 XO-638 XO-230	A3,B2,S5 A4,E4, A5,B1,H1 E2 E3 E5 G3,N4 G4,T1 G5 H2,H3 H4,K4 H5,K5,N5, S1,T5 K2,K3 M2 N1,T3 S2 S3 T4 Q1 S1P 1 SW2 XTAL 1 A6PI,A6P2	IC, 74LS374, Octal "D" Flip Flop IC, 74LS74, Dual "D" Flip Flop IC, LM324, Quad Op-Amp IC, AD7528J, Multiplier DAC IC, 74HC592, 8 Bit Counter IC, MF-4CN-50, Switched Capacitor Filter IC, 74LS377, Octal "D" Flip Flop IC, 74LS04, Hex Inverter IC, 74HC08, Quad 2 Input "AND" Gate IC, 6116P-3, 2K x 1 RAM IC, AY-3-8913, Sound Generator IC, 74LS161, Synchronous Presettable Binary Counter IC, Specified Per Game IC, 74LS245, Octal Bus Transceiver IC, 65024, CPU IC, 74LS139, Dual 1 of 4 Decoder IC, 74HCT245, Octal Bus Transceiver IC, 74LS138, 1 of 8 Decoder Transistor, 2N4264, Level Shifter Resistor Pack 8 x 1K Ohm Switch, Pushbutton Crystal, 4 MHz Connector (2)	XO-96 XO-434 XO-644 XO-647 XO-892 XO-894 XO-97 XO-418 XO-872 XO-193 XO-646 XO-440 XO-79 XO-893 XO-419 XO-891 XO-437 XO-895 XO-493 XO-897 XO-366 XO-879
R1 R4,R7,R8, R22,R23 R5,R9,R10, R27,R28,R31, R33,R35,R39, R52,R54,R55 R6 R11,R12 R13,R14, R21,R25 R15 R16,R17,R30, R32,R38,R42, R43,R44, R50,R51 R18,R53	Resistor, 68 Ohm, 5%, 1/4W Resistor, 1K Ohm, 5%, 1/4W Resistor, 240 Ohm, 5%, 1/4W Resistor, 470 Ohm, 5%, 1/4W Resistor, 3K Ohm, 5%, 1/4W Resistor, 18K Ohm, 5%, 1/4W Resistor, 10K Ohm, 5%, 1/4W Resistor, 6.8K Ohm, 5%, 1/4W	XO-784 XO-296 XO-289 XO-600 XO-694 XO-270 XO-748 XO-5 XO-173 XO-35 XO-23 XO-762 XO-18 XO-8	28 Pin Dip Socket (2) Jumper, 22 Gauge (7)	XO-536 XO-469	

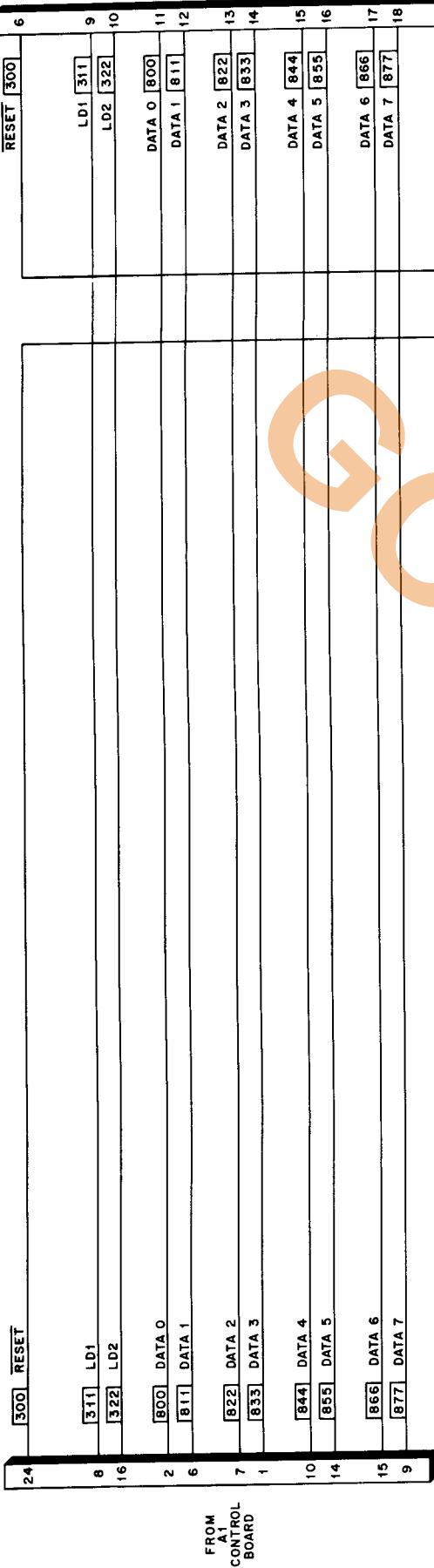






1A4J1

A1J2



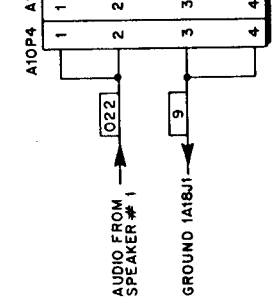
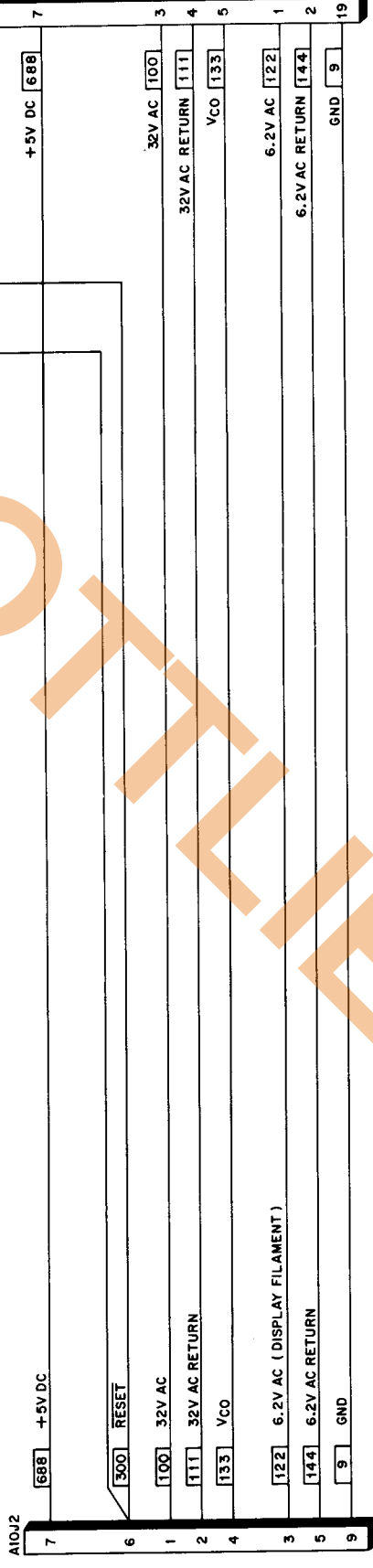
FROM
A1J2
CONTROL
BOARD

FROM
BOTTOM
CABINET

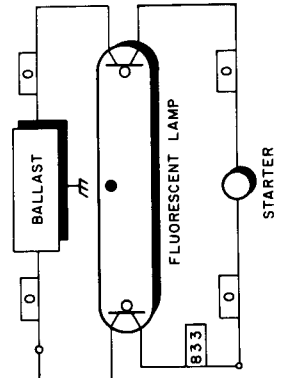
POWER
INPUT
FROM
A12J9

A10J2

A12P9

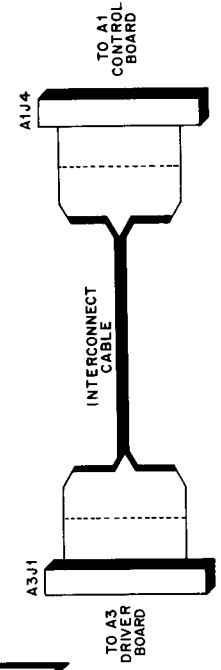


AUDIO FROM
SPEAKER #1
GROUND 1A18J1



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

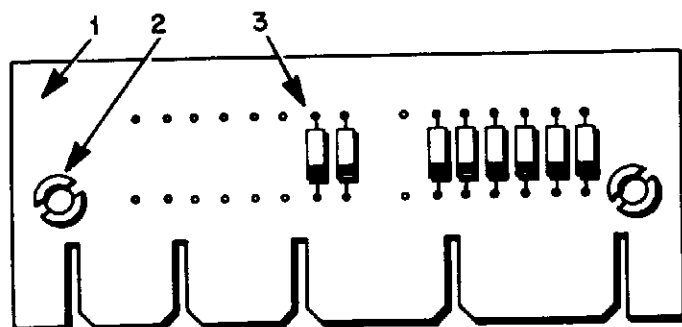
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3	ORANGE
4	YELLOW
5	GREEN
6	BLUE
7	VIOLET
8	GRAY
9	WHITE



Premier Technology
TITLE: LIGHTBOX, SCHEMATIC/
WIRING DIAGRAM
DRAWN: R.H.M.
APPROVED DATE: NOV-6-87
E-256672

E28672
NOV 68

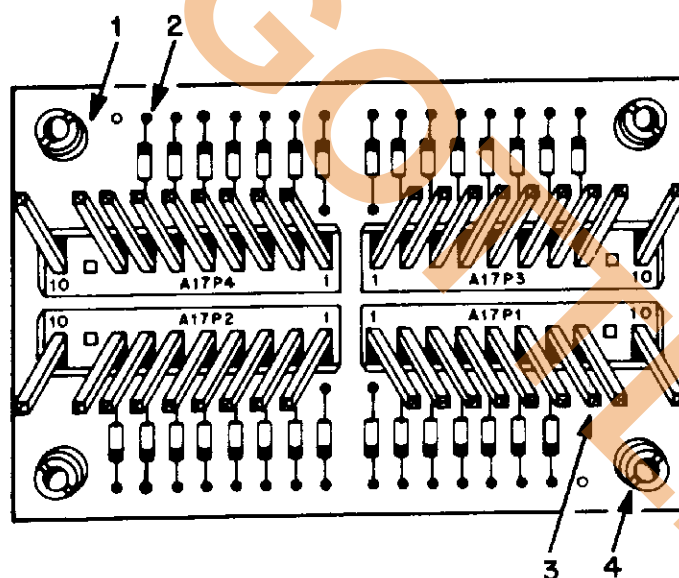
DIODE BOARD (A7)



DIODE BOARD (A7)

ITEM	DESCRIPTION	PART NO.
1	Diode Board Assembly (A7)	24252
2	Spacer (2)	23984
3	Diode, 1N270 (8)	XO-265

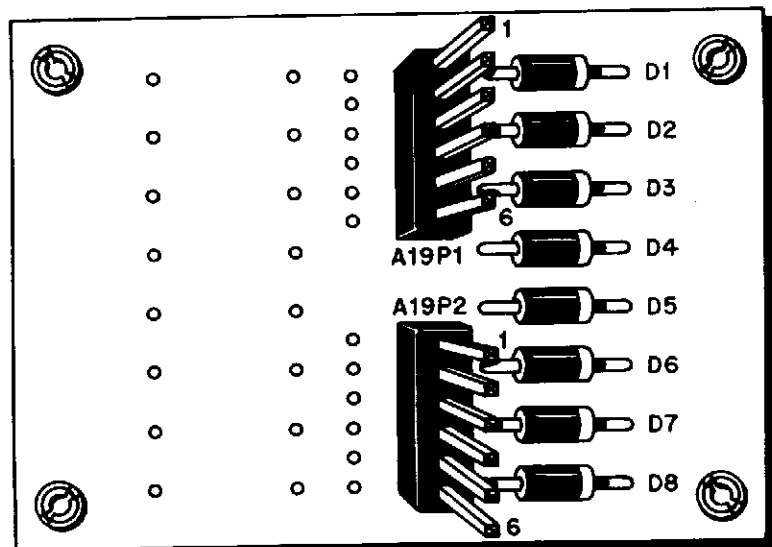
DIODE BOARD (A17)



DIODE BOARD (A17)

ITEM	DESCRIPTION	PART NO.
1	Diode Board Assembly (1A17)	MA-987
2	Diode, 1N270 (30)	XO-265
3	10 Position Connector (4)	XO-879
4	Spacer (4)	23984

SWITCHING DIODE BOARD (A19)

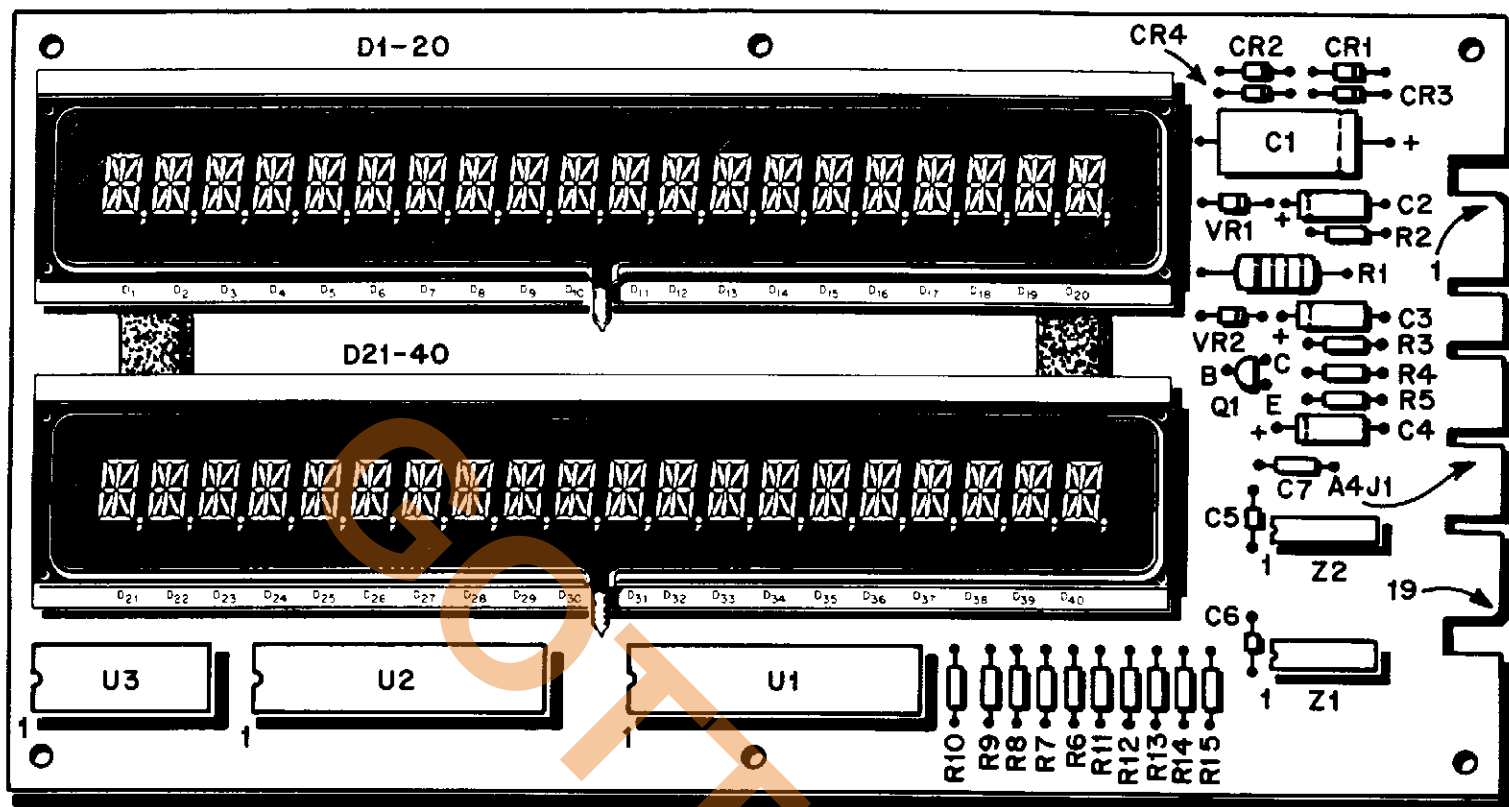


SWITCHING DIODE BOARD (A19)

ITEM	DESCRIPTION	PART NO.
	Switching Diode Assembly (A19)	MA-1050
D1-D8	Diode, 1N5401 (8)	XO-263
A19P1, A19P2	6 Position Connector (2)	XO-879
	Spacer (4)	23984

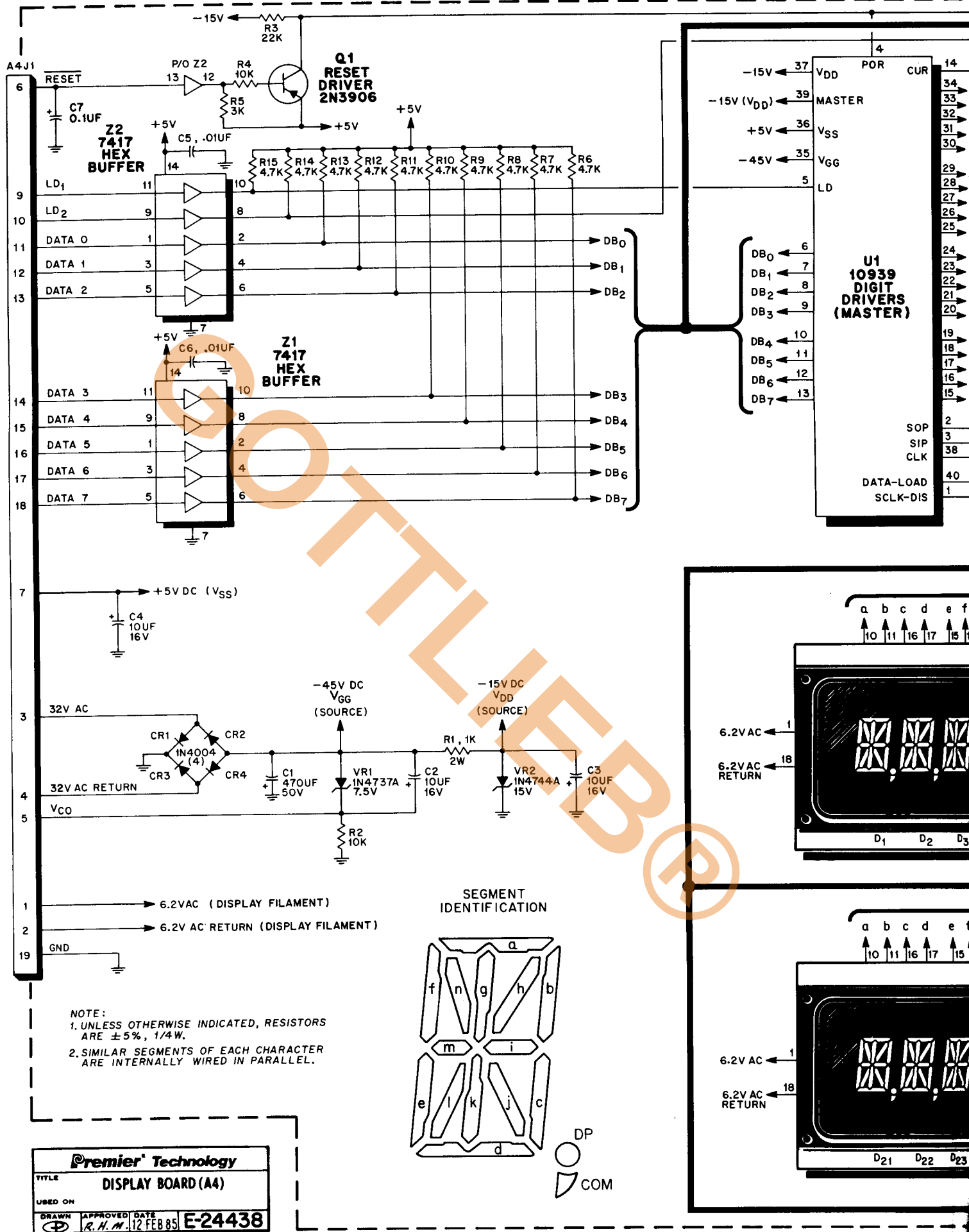
X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS

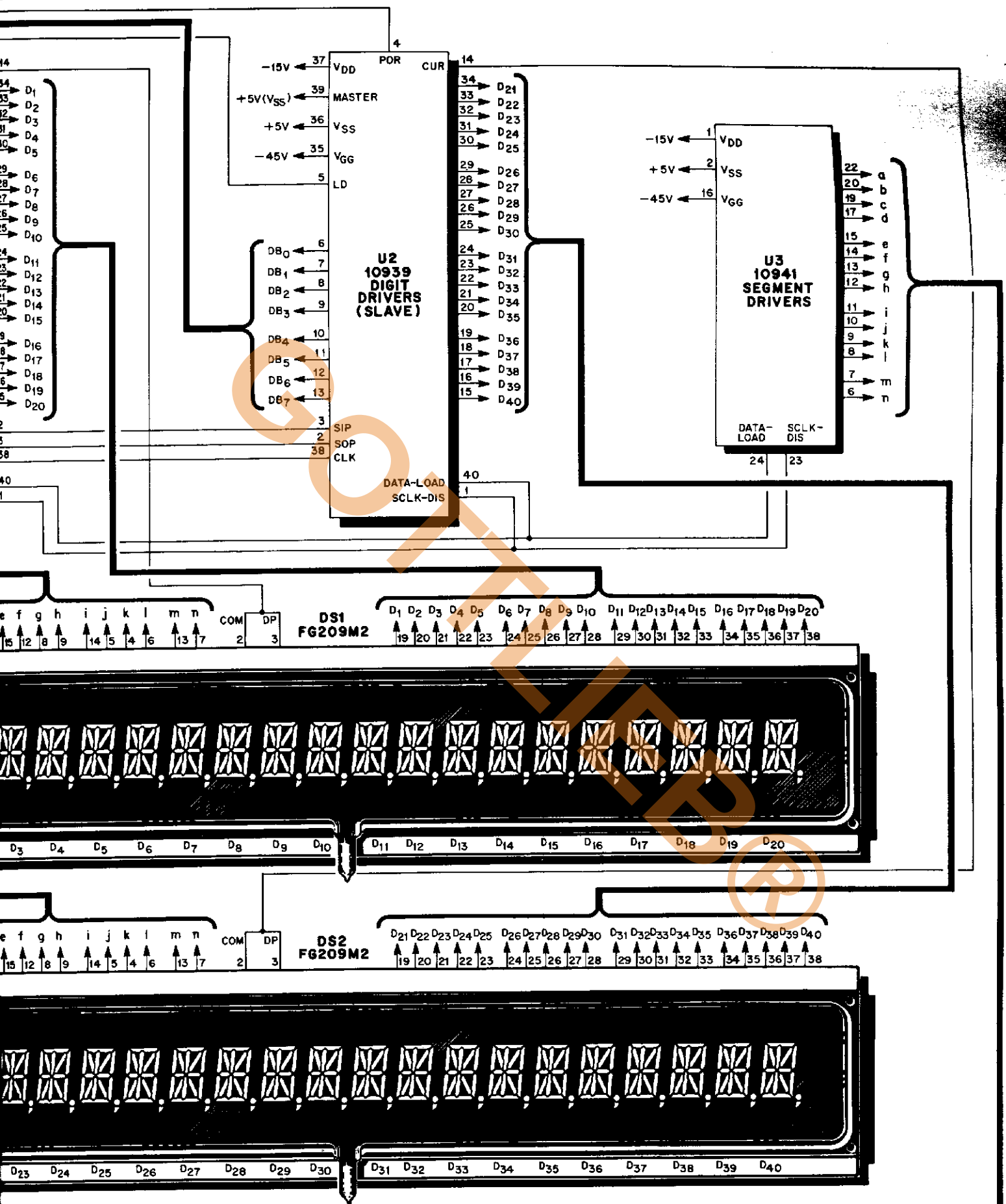
DISPLAY BOARD (A4) COMPONENT LOCATION



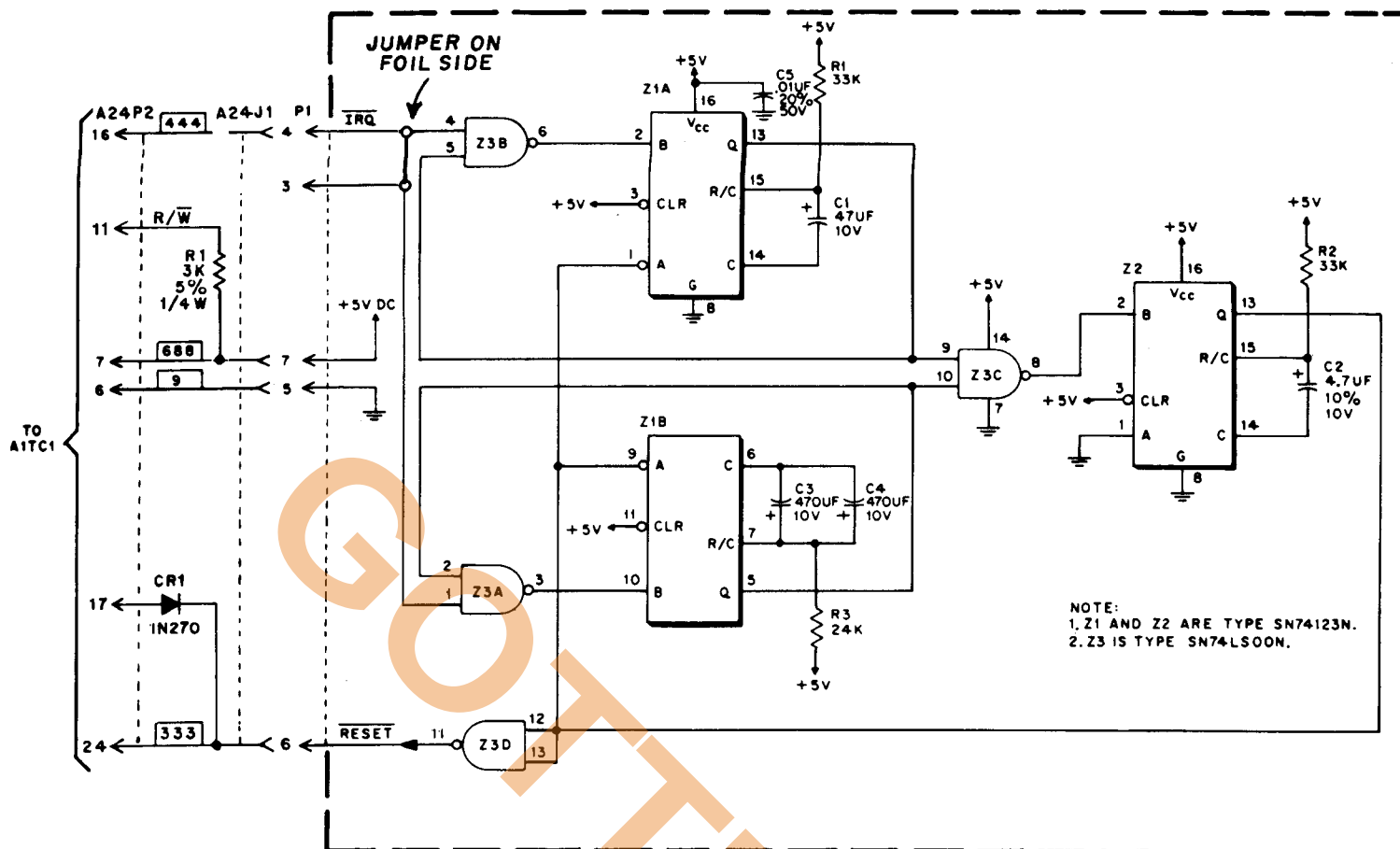
DISPLAY BOARD (A4) PARTS LIST

REFERENCE	DESCRIPTION	PART NUMBER
	Display Board (A4)	MA644
C1	Capacitor, 470UF, 50V	XO-847
C2, C3, C4	Capacitor, 10UF, 16V	XO-846
C5, C6	Capacitor, .01UF, +80% -20%	XO-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



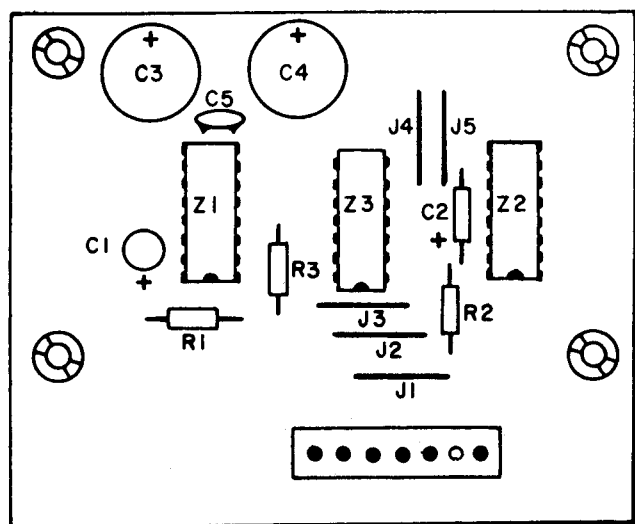


X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS



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

RESET BOARD (A24) COMPONENT LOCATION



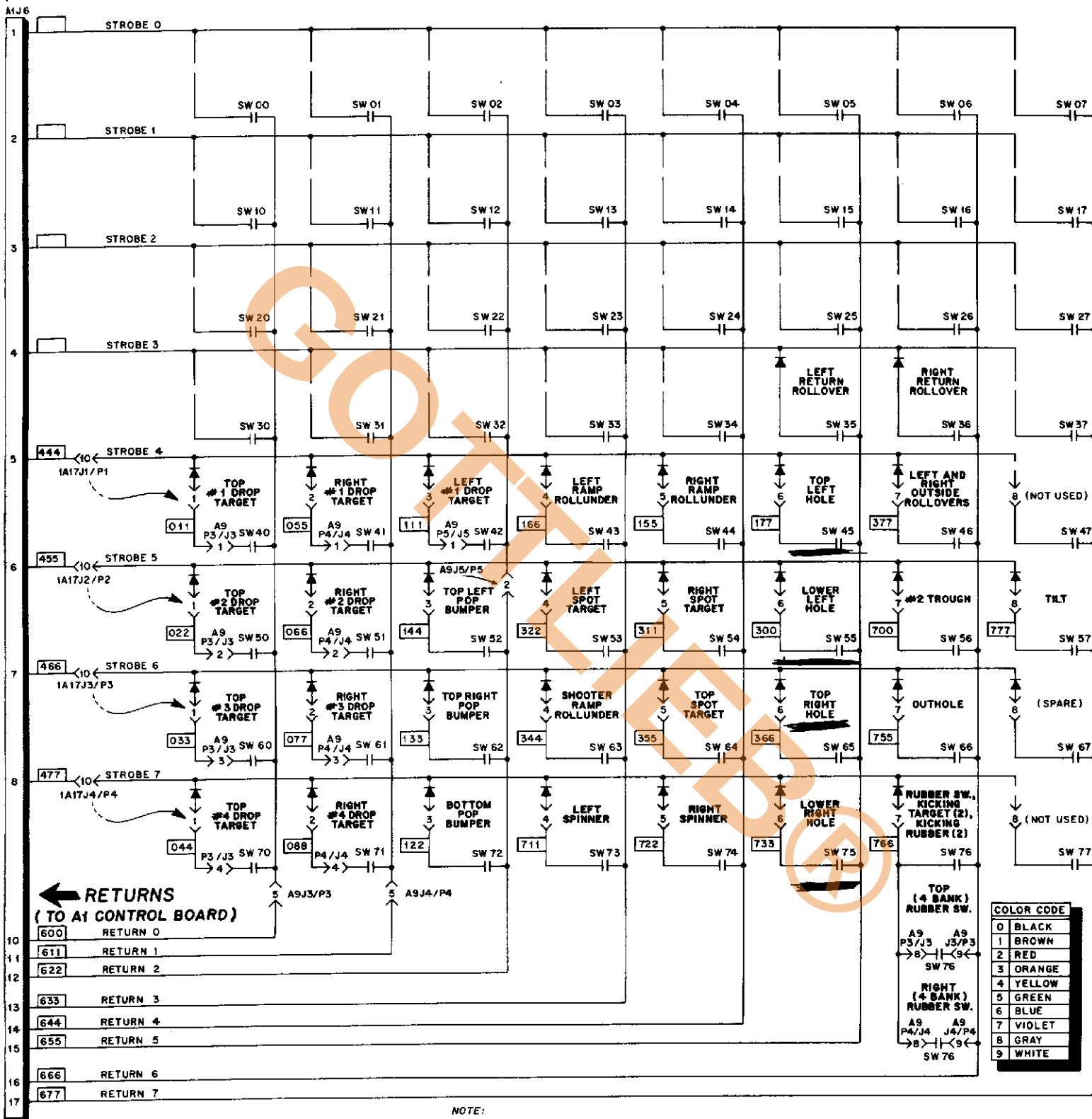
RESET BOARD (A24) PARTS LIST

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

STROBES →

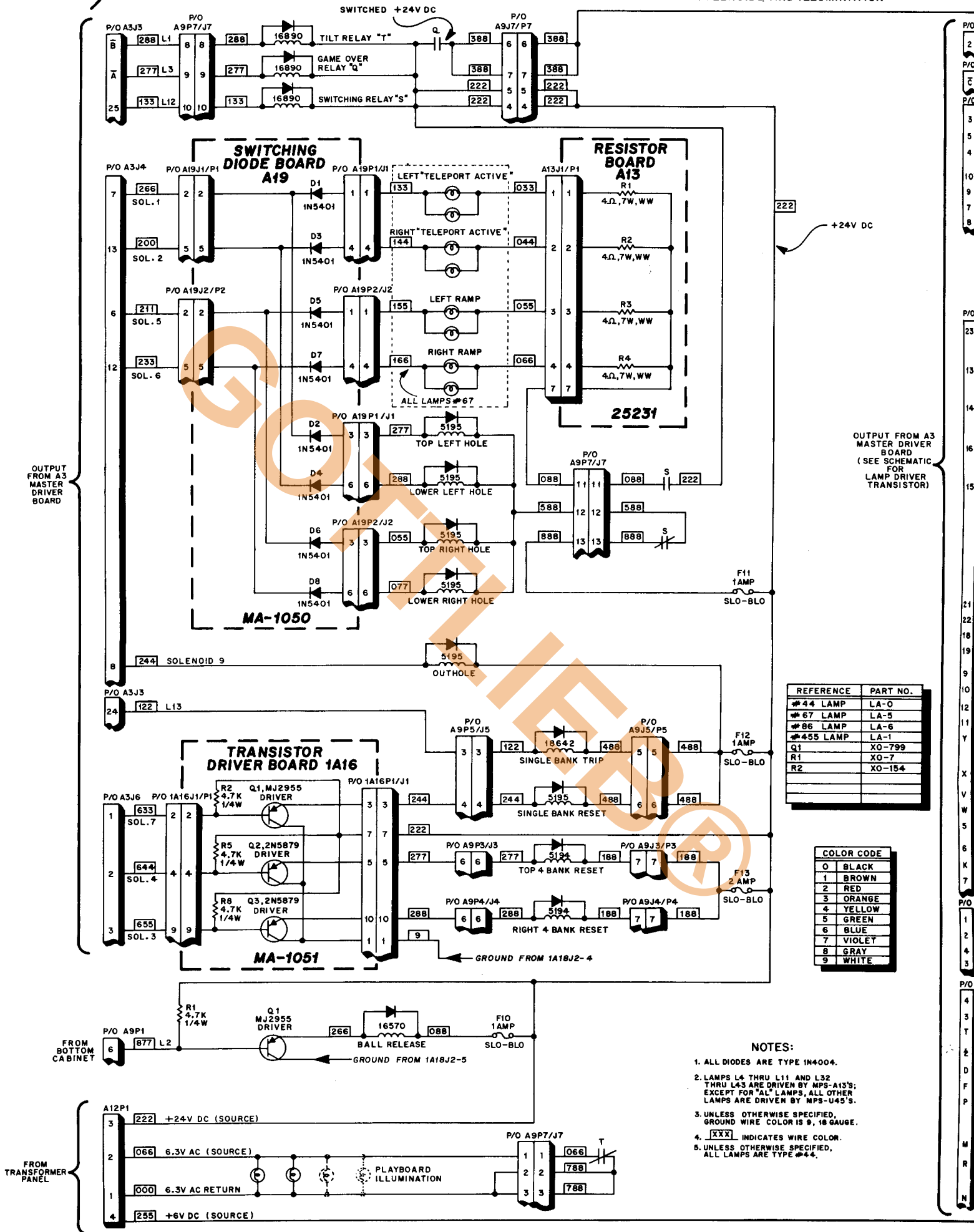
(FROM A1 CONTROL BOARD)

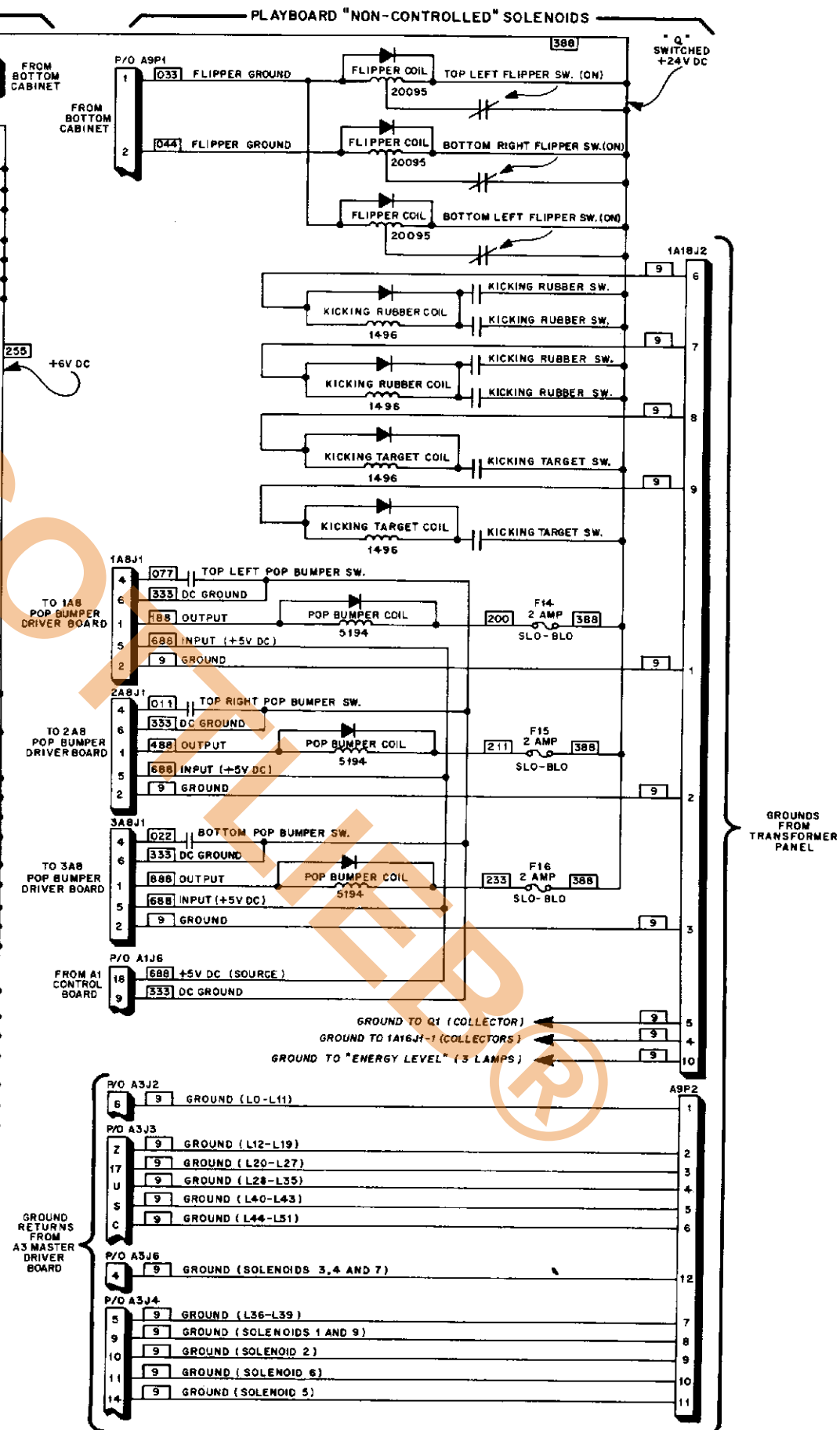


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3	ORANGE
4	YELLOW
5	GREEN
6	BLUE
7	VIOLET
8	GRAY
9	WHITE

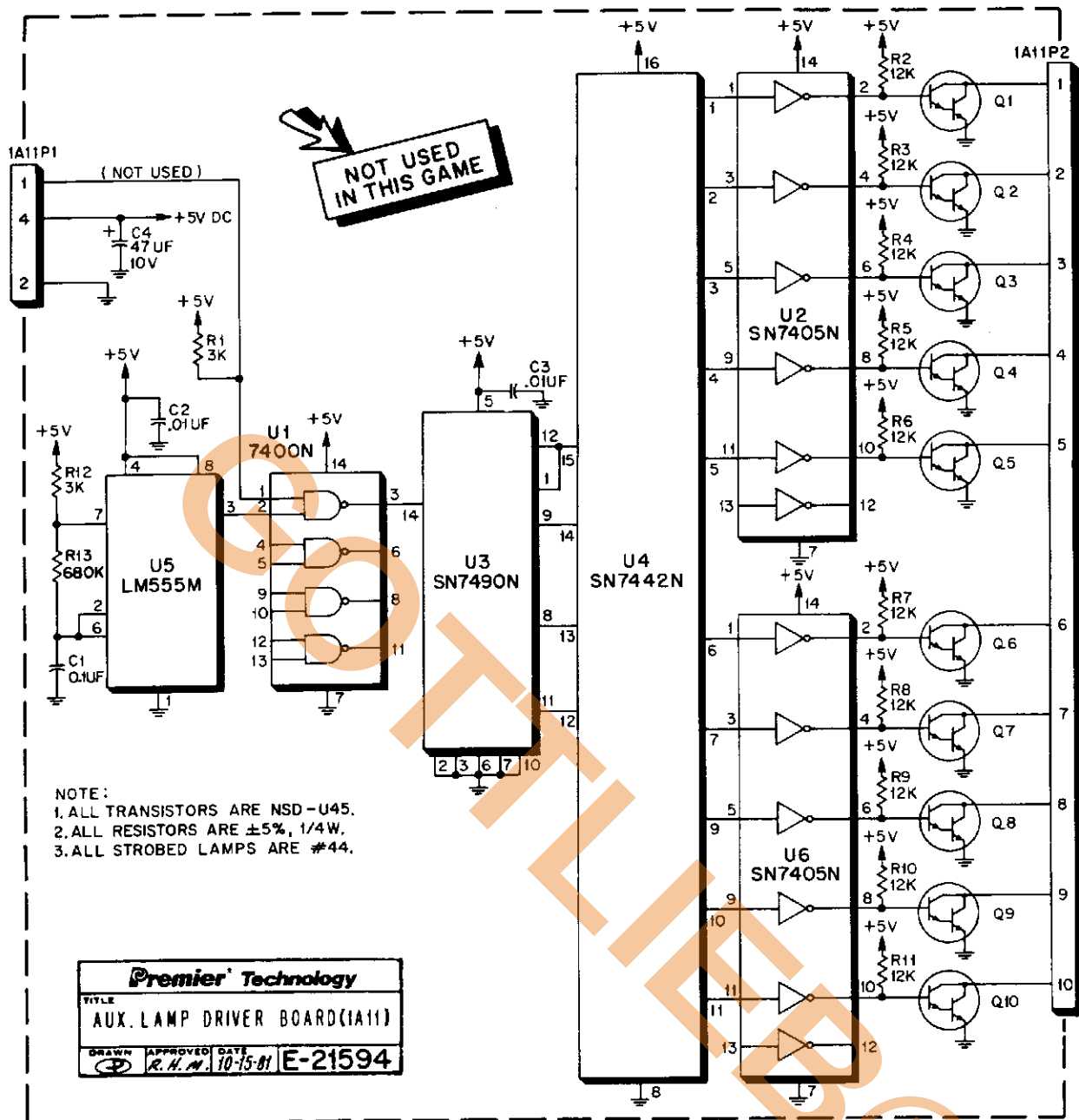
Premier Technology	
TITLE	SWITCH MATRIX
USED ON	GAME #712
DRAWN	APPROVED DATE
R.H.M.	JAN 68
E-25803	

PLAYBOARD "CONTROLLED" SOLENOIDS AND ILLUMINATION

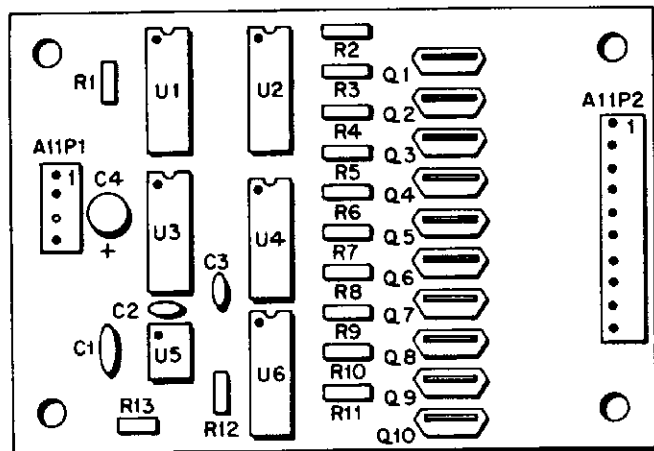




X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS



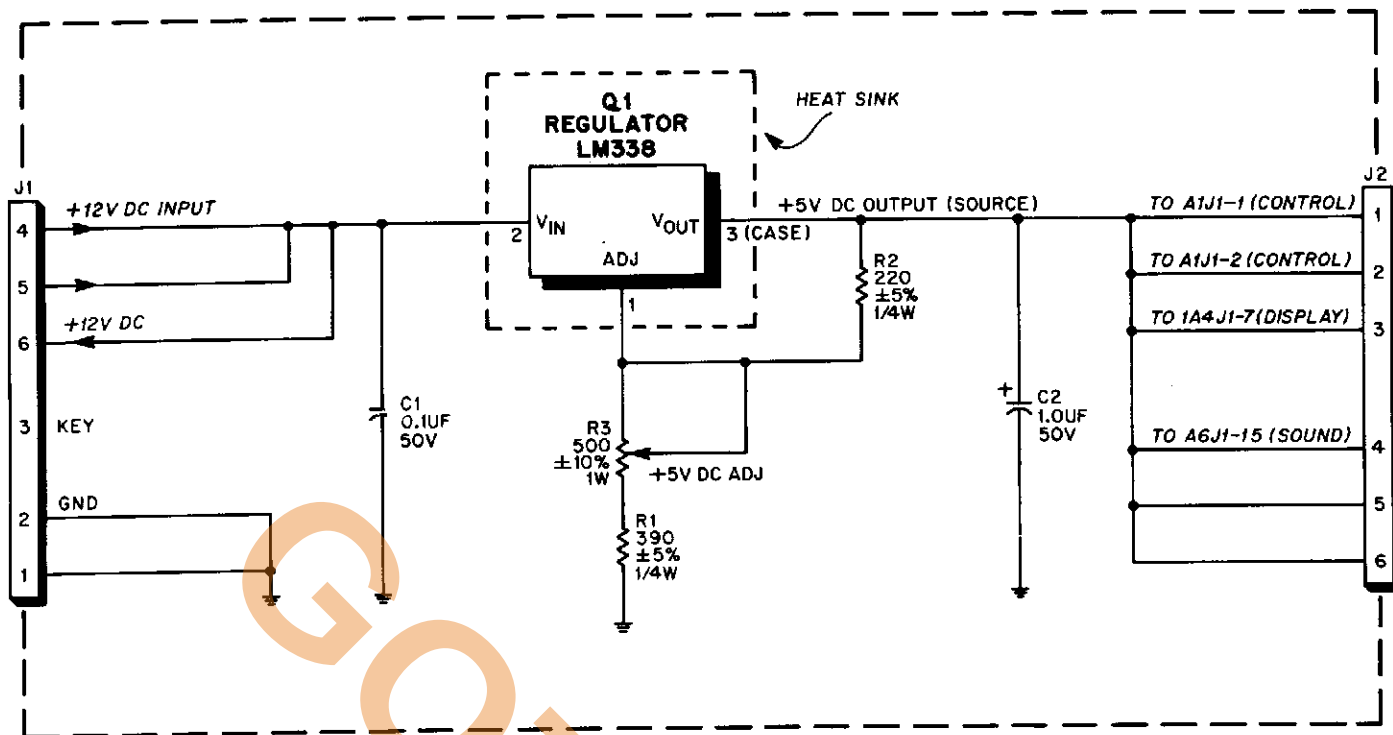
AUXILIARY LAMP DRIVER BOARD (A11) COMPONENT LOCATION



AUXILIARY LAMP DRIVER BOARD (A11) PARTS LIST

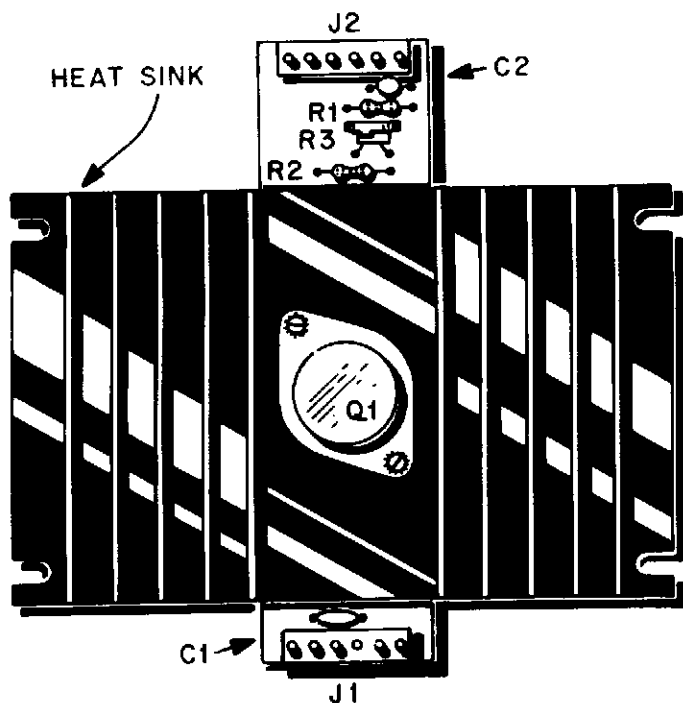
REFERENCE	DESCRIPTION	PART NUMBER
	AUXILIARY LAMP DRIVER ASSEMBLY	MA-789
C1	CAPACITOR, .1 MFD, 100V CERAMIC RADIAL LEAD	XO-626
C2-C3	CAPACITOR, .01 MFD, 100V RADIAL LEAD	XO-202
C4	CAPACITOR, 47 MFD, 10V ELECTROLYTIC RADIAL LEAD	XO-227
Q1-Q10	TRANSISTOR, NSD-U45 NPN DARLINGTON	XO-146
R1, R12	RESISTOR, 3K OHM, 5%, 1/4 W	XO-23
R2-R11	RESISTOR, 12K OHM, 5%, 1/4 W	XO-9
R13	RESISTOR, 680K OHM, 5%, 1/4 W	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



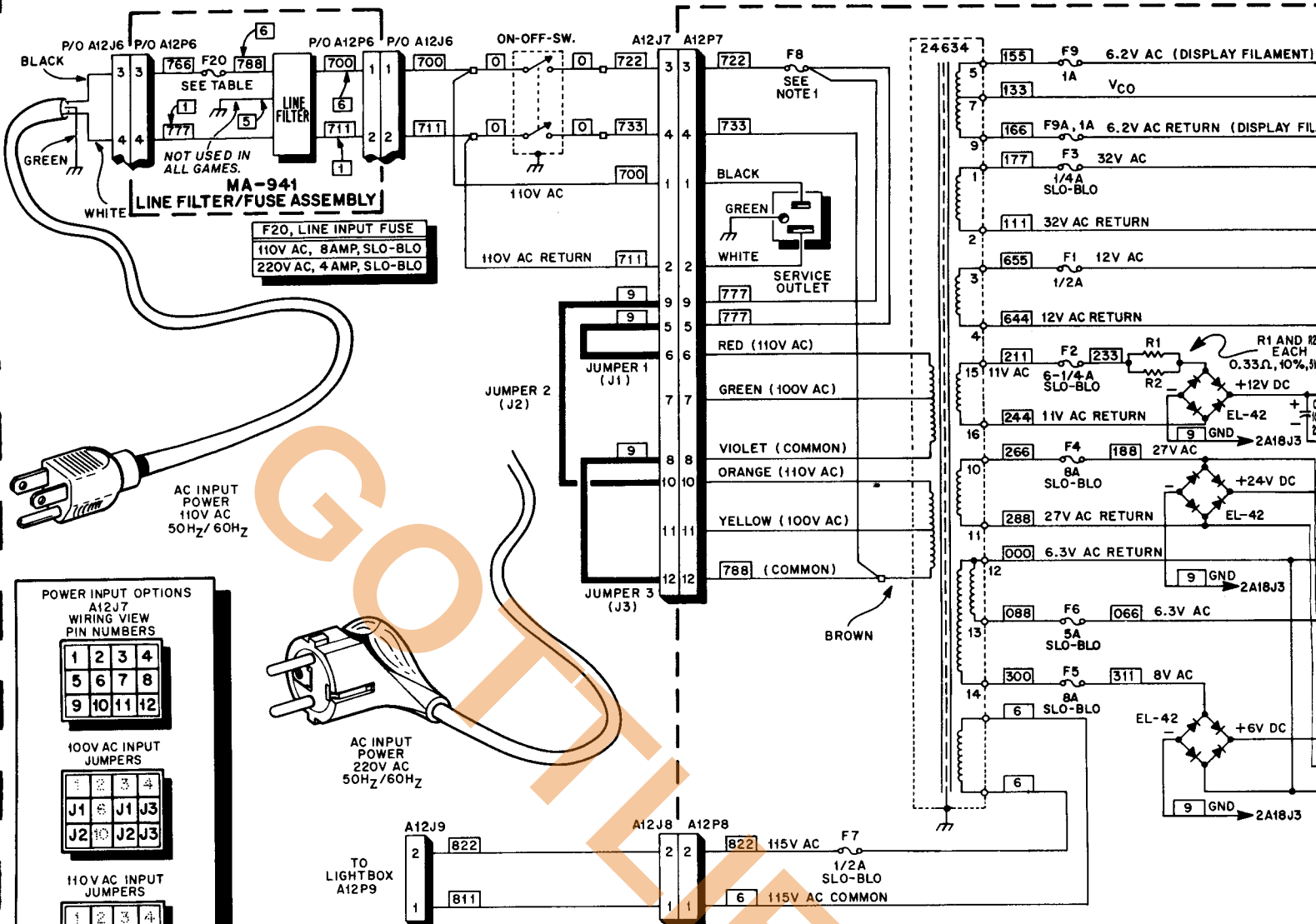
Premier Technology			
TITLE		POWER SUPPLY (A2)	
USED ON			
DRAWN	APPROVED	DATE	E-24441
	R.H.M.	12 FEB 85	

POWER SUPPLY (A2) COMPONENT LOCATION

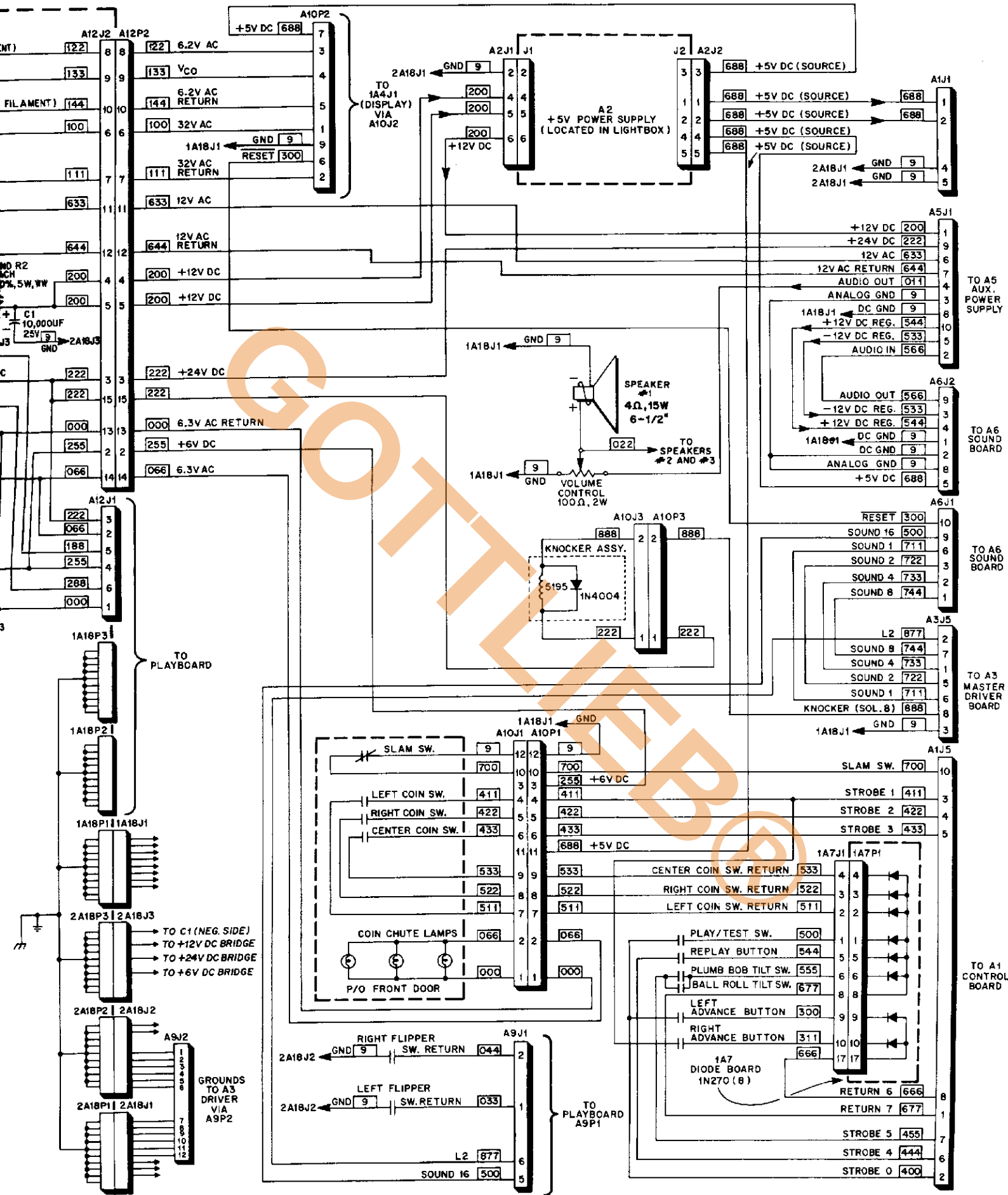


POWER SUPPLY (A2) PARTS LIST

REFERENCE	DESCRIPTION	PART NUMBER
	Power Supply (A2)	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



A12
TRANSFORMER PANEL
MA-1043
USED WITH
SYSTEM 80B



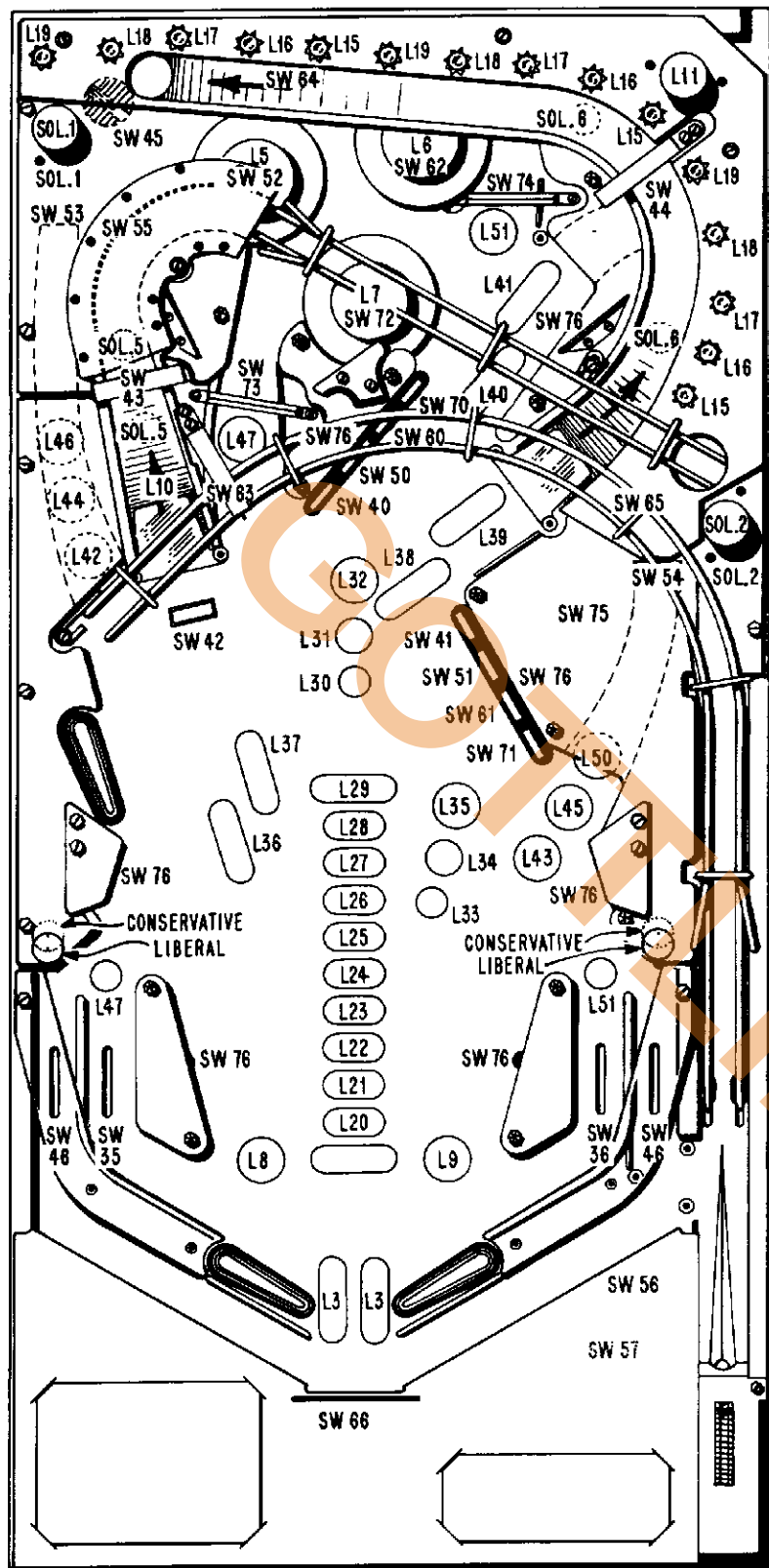
XI. PARTS INFORMATION

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XI. PARTS INFORMATION

PLAYBOARD SWITCH AND LAMP ASSIGNMENTS



NOTE:

1. L1 ENABLES RELAY "T", L2 ENABLES BALL RELEASE COIL, L3 ENABLES RELAY "Q", L12 ENABLES RELAY "S", L13 ENABLES SINGLE BANK TRIP COIL
2. THE FOLLOWING DEVICES ARE DEPENDENT UPON THE STATE OF THE "S" RELAY.

DEVICE	"S" ON	"S" OFF
SOL. 1	TOP LEFT HOLE	LEFT DOME (2) #67'S
SOL. 2	LOWER LEFT HOLE	RIGHT DOME (2) #67'S
SOL. 5	TOP RIGHT HOLE	LEFT RAMP (2) #67'S
SOL. 6	LOWER RIGHT HOLE	RIGHT RAMP (2) #67'S

3. *NEW SWITCHES USED (UNIQUE).

LAMP NUMBER

LAMP ASSIGNMENT

L4	Sound 16
L3	Shoot Again
L5	Top Left Pop Bumper
L6	Top Right Pop Bumper
L7	Bottom Pop Bumper
L8	"Teleport to Capture"
L9	"Shoot to Release"
L10	"Warning" Rollover Drop Target
L11	"Ball in Transit"
RIGHT RAMP LIGHT SHOW	
L15	#1, #6, #11
L16	#2, #7, #12
L17	#3, #8, #13
L18	#4, #9, #14
L19	#5, #10, #15
"ENERGY LEVEL"	
L20	Mega Level 1
L21	Mega Level 2
L22	Mega Level 3
L23	Mega Level 4
L24	Mega Level 5
L25	Mega Level 6
L26	Mega Level 7
L27	Mega Level 8
L28	Mega Level 9
L29	Lock
L30	1X Top 4 Bank
L31	2X Top 4 Bank
L32	3X Top 4 Bank
L33	1X Right 4 Bank
L34	2X Right 4 Bank
L35	3X Right 4 Bank
L36	"Tele" Left Ramp
L37	"Port" Left Ramp
L38	"Tele" Right Ramp
L39	"Port" Right Ramp
L40	"Tele" Right Hole (Top)
L41	"Port" Right Hole (Top)
L42	Extra Ball, Left Spot Target
L43	Extra Ball, Right Spot Target
L44	Special, Left Spot Target
L45	Special, Right Spot Target
L46	10,000 And Advance Left Spot Target
L47	Left Spinner,
	Left Return Rollover
L50	10,000 And Advance Right Spot Target
L51	Right Spinner,
	Right Return Rollover

SWITCH MATRIX NUMBER

SWITCH ASSIGNMENT

PART NO.

SW 35	Left Return Rollover	*25824
SW 36	Right Return Rollover	*25824
SW 40	Top #1 Drop Target	*25682
SW 41	Right #1 Drop Target	*25682
SW 42	Left #1 Rollover Drop Target	*25817
SW 43	Left Ramp Rollunder	22672
SW 44	Right Ramp Rollunder	21137
SW 45	Top Left Hole	18085
SW 46	Left and Right Outside Rollovers	*25824
SW 50	Top #2 Drop Target	*25682
SW 51	Right #2 Drop Target	*25682
SW 52	Top Left Pop Bumper	21356
SW 53	Left Spot Target	25460Z
SW 54	Right Spot Target	25460Z
SW 55	Lower Left Hole	18085
SW 56	#2 Trough	*25824
SW 57	Tilt (With Bracket)	9141
SW 60	Top #3 Drop Target	*25683
SW 61	Right #3 Drop Target	*25683
SW 62	Top Right Pop Bumper	21353
SW 63	Shooter Ramp Rollunder	21137
SW 64	Top Spot Target	25460Z
SW 65	Top Right Hole	18085
SW 66	Outhole	*25825
SW 70	Top #4 Drop Target	*25681
SW 71	Right #4 Drop Target	*25681
SW 72	Bottom Pop Bumper	21353
SW 73	Left Spinner	18627
SW 74	Right Spinner	18627
SW 75	Lower Right Hole	18085
SW 76	Kicking Rubber;	
	Scoring Switch (2)	18808
	Actuating Switch and Bracket(4)	22224
	Kicking Target (Left)	18808
	Kicking Target (Right)	16029
	Top (4 Bank) Rubber Switch,	20089
	Right (4 Bank) Rubber Switch	20089
	Top Right Rubber Switch	22227

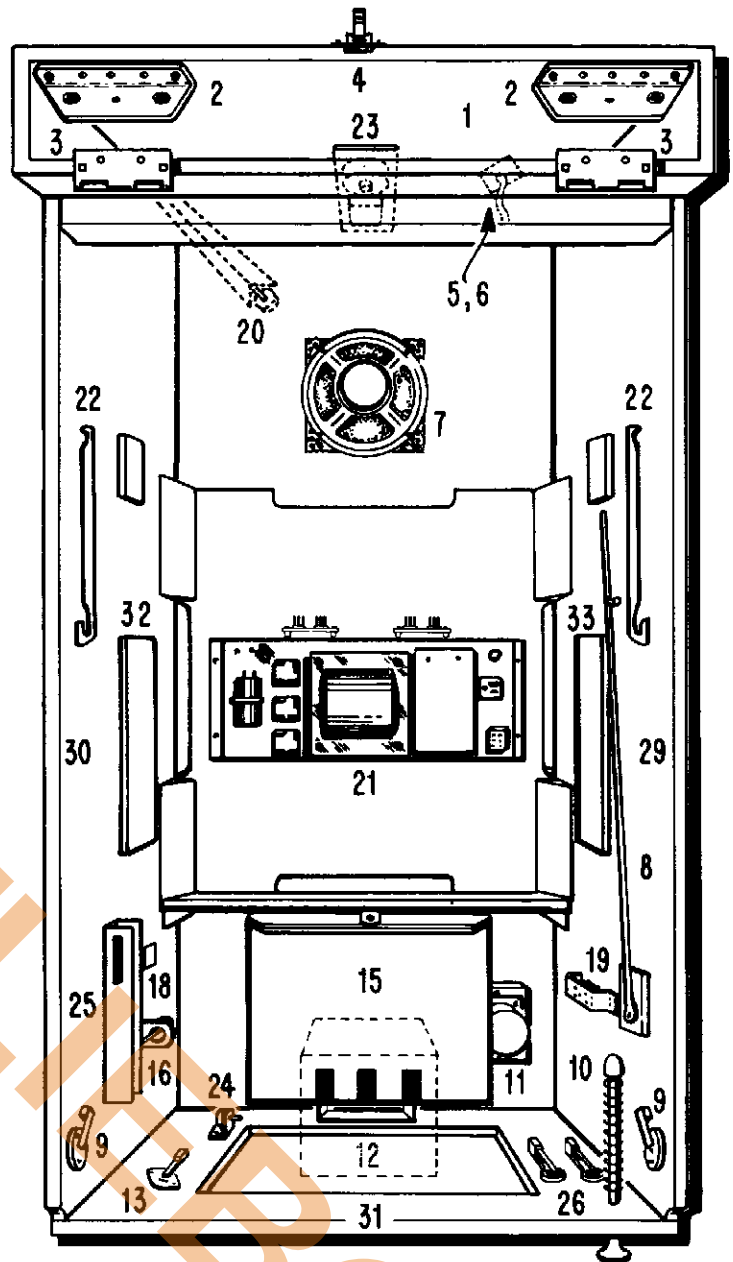
XI. PARTS INFORMATION

CABINET PARTS

ITEM DESCRIPTION

PART NO.

1. Cabinet 25694-712
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)
Latch Assembly (P/O Cabinet) 24659
21969
5. Cable Assembly, Domestic
(High Voltage) MA-1007
6. Line Cord (Domestic) 23365
Line Cord Cover Plate 21955
7. Speaker, 4 Ohm, 15W, 6-1/2" 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 24159
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 358
Strike Plate ME-30
Carbon, Tilt Bob 357
Rod, Tilt 22043
Bracket
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-1043
Bridge Rectifier (3) EL-42
Cable Assembly (Secondary) MA-1038
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 EL-28
F1, 1/2 Amp EL-29
F2, 6-1/4 Amp, SLO-BLO EL-5
F3, 1/4 Amp, SLO-BLO EL-26
F4, 8 Amp, SLO-BLO EL-26
F5, 8 Amp SLO-BLO EL-8
F6, 5 Amp SLO-BLO EL-20
F7, 1/2 Amp SLO-BLO EL-8
F8, 5 Amp, SLO-BLO (110V AC) EL-21
F8, 2.5 Amp, SLO-BLO (220V AC) EL-3
F9, 1 Amp EL-3
F9A, 1 Amp EL-3
Ground Bus Assembly (2) 25374
Outlet, Service 18133
Resistor, 0.33 Ohm, 10% XO-154
5W, Wire-Wound (2) 24634
Transformer 25658
22. Cabinet Pivot Bracket (Left) 25657
Cabinet Pivot Bracket (Right)



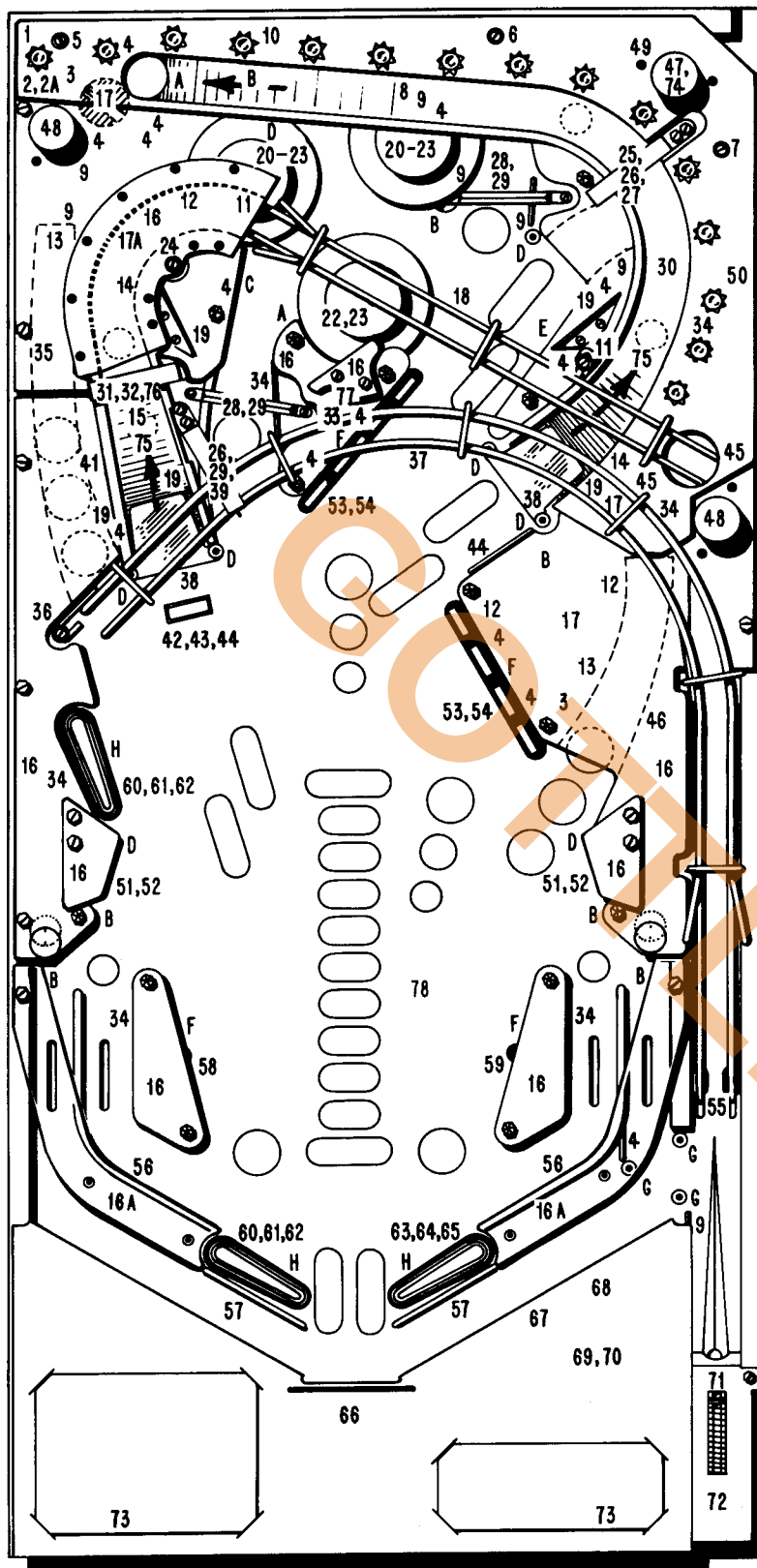
ITEM DESCRIPTION

PART NO.

23. 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
24. Mounting Bracket 24149
Control, Volume, 100 Ohm, 2W XO-199
Switch, PLAY/TEST EL-57
25. Ball Roll Tilt 24394
Housing and Switch Assembly 24393
Switch 23503
26. Button Holder and Switch (2) 24293Y
Pushbutton (2) (Black) 25635-712
28. Lightbox (Not Shown) 22735
29. Right Moulding (Not Shown) 22736
30. Left Moulding (Not Shown) 16951
31. Front Moulding (Not Shown) MA-1053
32. Mounting Board Assembly 25231
A13 Resistor Board MA-1050
A19 Switching Diode Board MA-1054
33. Mounting Board Assembly 19741
Pop Bumper Driver Board (3)

XI. PARTS INFORMATION

PLAYBOARD PARTS INFORMATION



PARTS LIST

ITEM	DESCRIPTION	PART NO.
1	Molded Ramp	25678
2	Wedge Base Socket (15)	25545
2A	#86 Lamps (15)	LA-6
3	Ball Guide Rail (2)	3722
4	Ball Guide Rail (13)	18070
5	Ramp Spacer	24880
6	Ramp Spacer	25705
7	Ramp Spacer	25089
8	Flat Rail	25707
9	Ball Guide Rail (8)	17650
10	Spot Target Assembly, White (3)	25460Z
11	Ramp Spacer (2)	25701
12	Ball Guide Rail (3)	6612
13	Ball Snubber Rail (2)	25706
14	Ball Guide Rail (2)	13782
15	Molded Ramp	25676
16	Plastic Shield Set	25812
16A	Part Of Plastic Shield Set	25812A
17	Ball Hole Kicker Assembly (3), (See Exploded View Illustration)	MA-1049
17A	Ball Hole Kicker Assembly, (See Exploded View Illustration)	MA-1061
18	Wireform Ramp	25677
19	Ball Deflector (5)	21158
20	Pop Bumper Cap, White (3)	10434Z
21	Pop Bumper Decal (3)	25836
22	Pop Bumper Skirt, White (3)	10433Z
23	Pop Bumper Body And Socket, White (3)	MA-27
24	Ramp Spacer	25702
25	Wireform Gate	25246
26	Rollunder Spring (2)	25807
27	Gate Shield (2)	25729
28	Target Shield (2)	14043
29	Swinging Target Assembly (2)	24494
	Swinging Target Rod (2)	20406
	Nylon Washer (4)	20407
30	Ball Guide Rail	6931
31	Wireform Gate	25730
32	Gate Shield	25731
33	Ramp Post	25395
34	Ball Guide Rail (6)	4832
35	Flat Rail	25733
36	Ramp Spacer	25695
37	Wireform Ramp	25679
38	Ramp Flap (2)	25056
39	Wireform Gate	25727
40	Ball Guide Rail	18764
41	Ball Guide Rail	8514
42	Rollover Drop Target Assembly	MA-1058
43	Rollover Drop Target, (White)	20892Z
44	Rollover Target Decal	25837
45	Ball Guide Rail (2)	4831
46	Flat Rail	25711
47	Plastic Dome Hat, Clear	25147P
48	Plastic Dome Hat, Amber (2)	25147N
49	Plastic Rivets	MP-10
50	Flat Rail	25710
51	Kicking Target Assembly (2), (See Exploded View Illustration)	MA-205A
52	Kicking Target Decal (2)	25835
53	Drop Target Assembly (2)	MA-1047
54	Drop Target Decal (8)	25834
55	Ramp Mounting Bracket	25746
56	Ball Guide Rail (2)	23833
57	Ball Snubber Rail (2)	13798
58	Contact Kicker Assembly	MA-135A
59	Contact Kicker Assembly	MA-135
60	Left Flipper Assembly (2)	MA-937A
61	Left Flipper Coil (2)	20095
62	Left Flipper Switch (2)	25743
63	Right Flipper Assembly	MA-938A
64	Right Flipper Coil	20095
65	Right Flipper Switch	25434
66	Cardholder	13657-712
67	Ball Return Unit Assembly	21622
68	Ball Return Gate Assembly	20607
69	Ball Return Fence	23855
70	Ball Return Gate Fence	23856
71	Ball Shooter Gauge	9767-712
72	Ball Shooter Assembly	8835
73	Playfield Rest Brackets (2), (Located on Playboard Bottom)	21194
74	Plastic Dome Hat Decal	25839
75	Ramp Decal (2)	25838
76	Rollunder Spring	25301
77	Post Base (2), Post Cap (2)	14487Z 14488Z
78	Mylar Overlay	25855

RUBBER RINGS

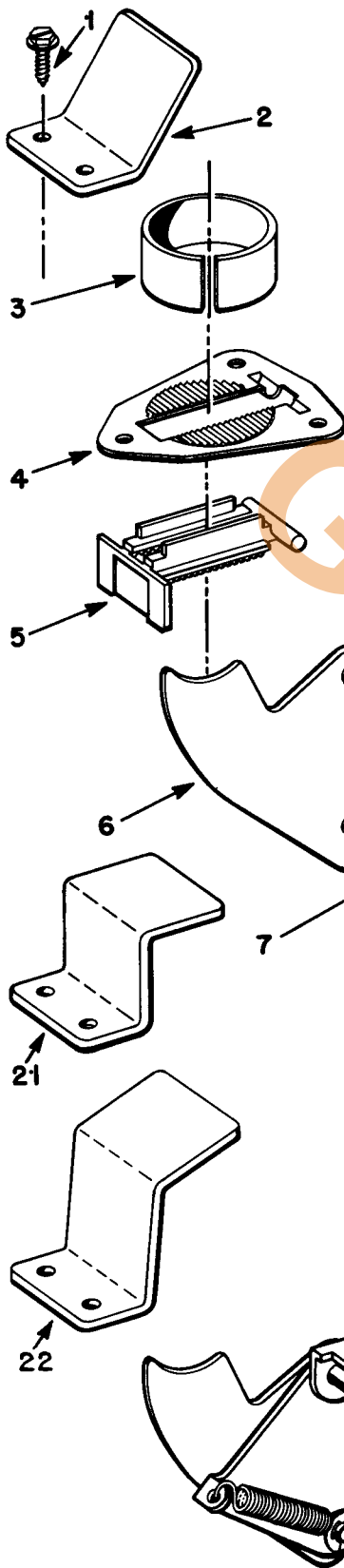
ITEM	DESCRIPTION	PART NO.
A	Siamese (2)	17493
B	5/16" (7)	10217
C	1"	10219
D	Mini-Post (8)	15705
E	2"	10221
F	2-1/2" (4)	10222
G	Small Mini-Post (3)	14793
H	Flipper, Red (3)	13151

MISCELLANEOUS PARTS

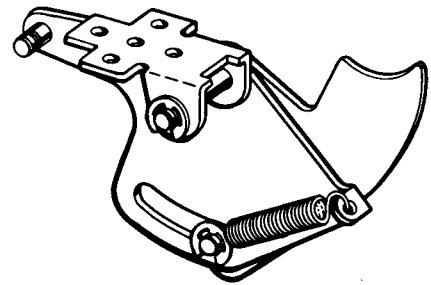
DESCRIPTION	PART NO.
Mini-Post Screw	14792
Siamese Post	17492
Plastic Post 1"	11561P
Plastic Post 1-3/16"	11562P
Plastic Support Post	20635
"Q" Relay	MA-23
"T" Relay	MA-25
"S" Relay	MA-1052

XI. PARTS INFORMATION

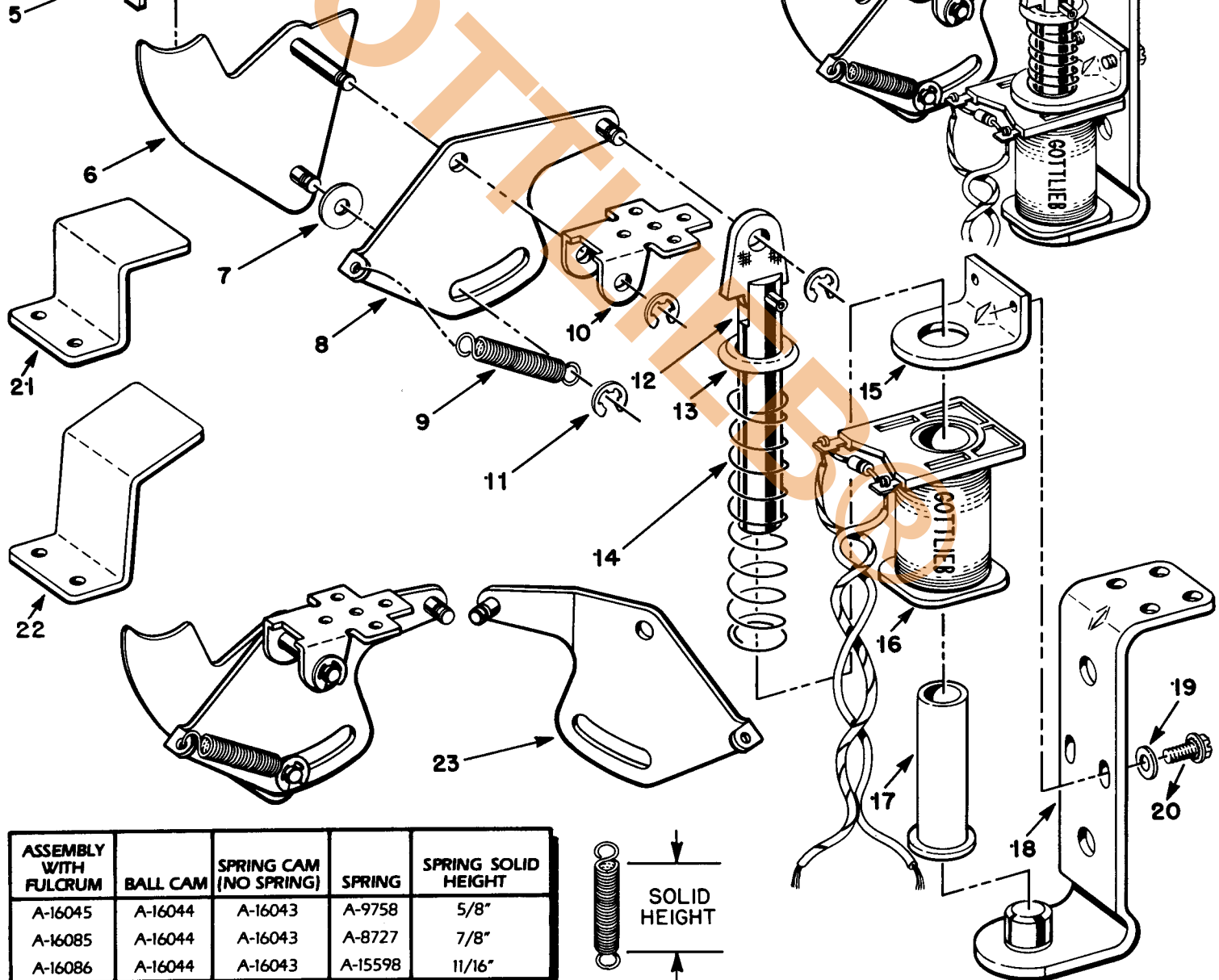
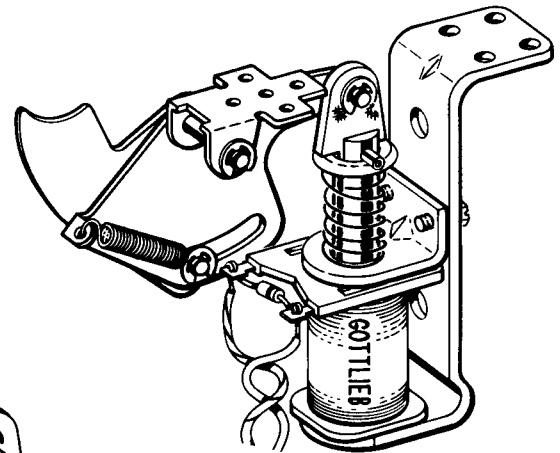
BALL HOLE KICKER PARTS



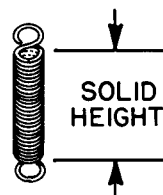
ITEM	DESCRIPTION	PART NO.
1	6 x 1/2" HWHSMS (2)	FA-270
2	Ball Snubber	16038
3	Metal Hole Liner	11151
4	Hole Base Plate	15707
5	Hole Switch Arm	15708
6	Ball Cam (See Tables)	
7	Nylon Washer	6443
8	Spring Cam (See Tables)	
9	Spring (See Tables)	
10	Fulcrum	15819
11	E-Ring (3)	FA-682
12	Link And Plunger Assy.	22234
13	Spring Retaining Washer	22233
14	Spring	1636
15	Mounting Bracket	15409
16	Coil With Diode	
17	(Specify Game)	
18	Coil Sleeve	5064
19	Coil Stop And Mounting Bracket	20597
20	#8 Washer (2)	FA-617
21	8-32 x 5/16" HWHMS SEMS (2)	FA-67
22	Ball Snubber	21532
23	Ball Snubber	21159
24	Spring Cam (15° OFFSET)	18993
25	(See Table)	



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"
A-25842	A-15822	A-18993	A-15598	11/16"

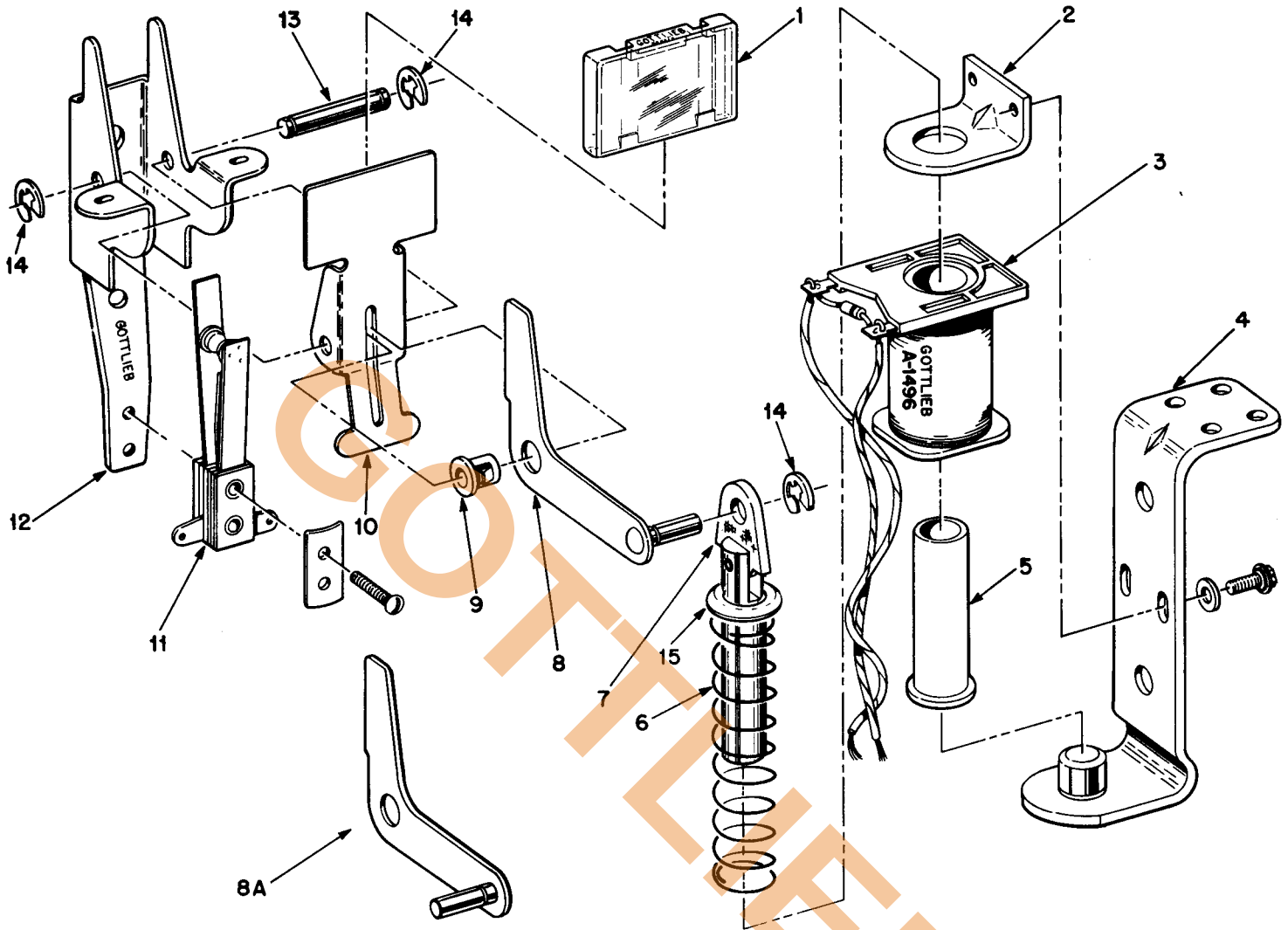


ASSEMBLY WITH FULCRUM	BALL CAM	SPRING CAM (NO SPRING)	SPRING	SPRING SOLID HEIGHT
A-16045	A-16044	A-16043	A-9758	5/8"
A-16085	A-16044	A-16043	A-8727	7/8"
A-16086	A-16044	A-16043	A-15598	11/16"



XI. PARTS INFORMATION

KICKING TARGET ASSEMBLY



ITEM	DESCRIPTION	PART NO.
	Kicking Target Assembly	MA-205A
1	Plastic Shield	20210
2	Mounting Bracket	15409
3	Coil	1496
4	Coil Stop And Mtg. Bracket	20597
5	Coil Sleeve	5064
6	Spring	1636
7	Link and Plunger Assembly	20212
8	Target Kicker Cam	20209 (ILLUSTRATED)
8A	Target Kicker Cam	20494 (USED)
9	Snap Bushing	MP-15
10	Target Arm	20207
11	Actuating Switch	20227
12	Target Housing	20206
13	Target Shaft	20211
14	E-Ring	FA-682
15	Spring Retaining Washer	22233
	Target Face Decal	25835

XI. PARTS INFORMATION

UNIQUE PARTS

The following listing denotes new parts and assemblies unique to TX-SECTOR, Game #712. Part Numbers prefixed with an asterisk *, will be illustrated or can be located on pages 48, 49, 50, 51 or 52. Numbers in parenthesis () indicate multiple quantities.

PLAYBOARD

<u>DESCRIPTION</u>	<u>PART NO.</u>
MOLDED RAMP.....	* 25676
WIREFORM RAMP.....	* 25677
MOLDED RAMP.....	* 25678
WIREFORM RAMP.....	* 25679
RAMP SPACER.....	* 25695
RAMP SPACER (2).....	* 25701
RAMP SPACER.....	* 25702
RAMP SPACER.....	* 25705
SNUBBER RAIL (2).....	* 25706
FLAT RAIL.....	* 25707
FLAT RAIL.....	* 25710
FLAT RAIL.....	* 25711
ROLLUNDER GATE WIREFORM.....	* 25727
GATE SHIELD (2).....	* 25729
ROLLUNDER GATE WIREFORM.....	* 25730
GATE SHIELD.....	* 25731
FLAT RAIL.....	* 25733
LEFT FLIPPER SWITCH (2).....	* 25743
RAMP MOUNTING BRACKET.....	* 25746
ROLLUNDER GATE SPRING (2).....	* 25807
PLASTICS SET.....	* 25812
RELAY STRIP ASSEMBLY, "T", "Q" AND "S"...	MA-1046
FOUR POSITION TARGET BANK ASSEMBLY (2)...	* MA-1047
DROP TARGET DECAL (8).....	* 25834
KICKING TARGET DECAL (2).....	* 25835
POP BUMPER CAP DECAL (3).....	* 25836
ROLLOVER TARGET DECAL.....	* 25837
RAMP DECAL (2).....	* 25838
PLASTIC DOME HAT DECAL.....	* 25839
BALL HOLE KICKER ASSEMBLY.....	* MA-1061
ASSEMBLY WITH FULCRUM.....	* 25842
SPRING CAM (15° OFFSET).....	* 18993
"S" RELAY.....	MA-1052
MYLAR OVERLAY.....	* 25855

LIGHTBOX

<u>DESCRIPTION</u>	<u>PART NO.</u>
STYRENE ARTWORK (BACKGLASS).....	24747-712
DISPLAY PANEL (SCREENED).....	25670
TRANSISTOR DRIVER BOARD (1A16).....	MA-1051

CABINET

<u>DESCRIPTION</u>	<u>PART NO.</u>
SWITCHING DIODE BOARD (A19).....	* MA-1050

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