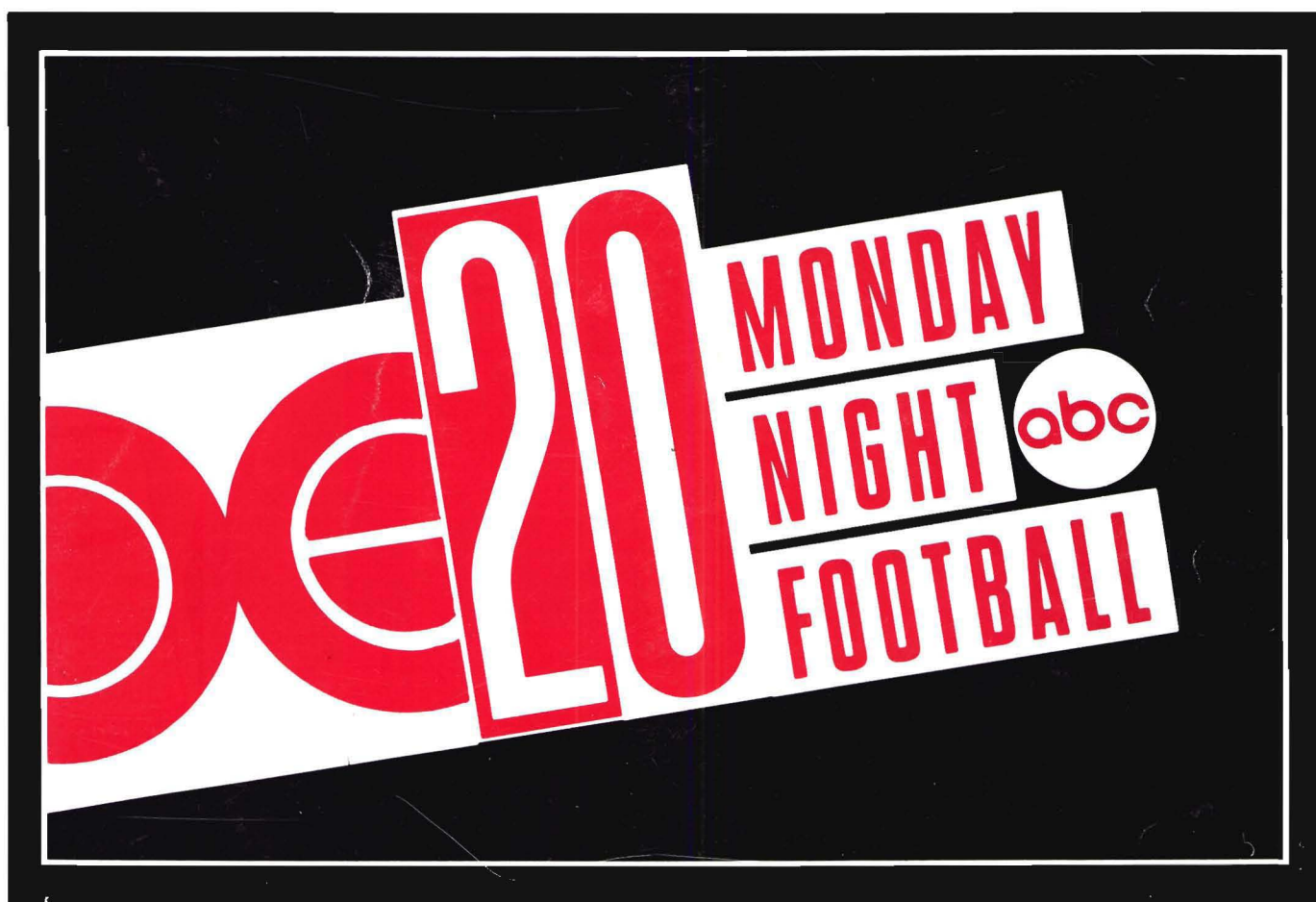




MONDAY NIGHT FOOTBALL



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DATA EAST PINBALL

CPU JUMPER TABLE

Game	CPU* Version	ROM Location	Jumpers	
			Installed	Removed
Laser Wars	Ver 1	5C	J1b,J3,J4,J6a,J7a,&J8	J1a,J2,J5,J6,&J7b
	Ver 2	5C	J1b,J3,J4,J5a,J6a,J7b,&J8	J1a,J2,J5,J5b,J6b,&J7a
Secret Service	Ver 2	5B,5C	J1b,J3,J4,J5b,J6b,J7b,&J8	J1a,J2,J5,J5a,J6a,&J7a
Torpedo Alley	Ver 2	5B,5C	J1b,J3,J4,J5b,J6b,J7b,&J8	J1a,J2,J5,J5a,J6a,&J7a
Time Machine	Ver 2	5B,5C	J1b,J3,J4,J5b,J6b,J7b,&J8	J1a,J2,J5,J5a,J6a,&J7a
Playboy	Ver 2	5B,5C	J1b,J3,J4,J5b,J6b,J7b,&J8	J1a,J2,J5,J5a,J6a,&J7a
ABC M.N. Football	Ver 2	5B,5C	J1b,J3,J4,J5b,J6b,J7b,&J8	J1a,J2,J5,J5a,J6a,&J7a

*Version 1 has a 2K RAM which is a 24-pin IC at location 5D.

*Version 2 has an 8K RAM which is a 28-pin IC at location 5D.

Power-up CPU Self Tests

Upon power-up, the CPU board performs a series of self tests of major components. Turn the game on while observing the LEDs on the CPU board. Tests of the PIAs, RAM, and EPROMs are performed automatically and results of the test are indicated by the PIA LED.

With all tests passed, the LEDs illuminate in the following sequence at power turn-on. The PIA and +5V LEDs illuminate immediately. Approximately 1/2-second later the PIA LED goes out and the Blanking LED illuminates; the +5V and Blanking LEDs remain illuminated until the game is turned off. Test failures are indicated with the PIA LED:

PIA LED	SUSPECT COMPONENT
Stays On	One of the 6821 PIAs
Flashes 1 Time	6064 RAM at location D5.
Flashes 2 Times	EPROM at location B5.
Flashes 3 Times	EPROM at location C5.

QUICK REFERENCE FUSE CHART

PPB BOARD

F1 5A Slo-Blo G.I. 6.3VAC
 F2 5A Slo-Blo G.I. 6.3VAC
 F3 5A Slo-Blo G.I. 6.3VAC
 F4 5A Slo-Blo G.I. 6.3VAC
 F5 5A Slo-Blo Flipper Power 48VAC
 F6 3A Slo-Blo PPB Solenoids/Flash Lamps (34VDC)

POWER SUPPLY BOARD

F1 7A Slo-Blo +5VDC Regulator Input (9VAC)
 F2 7A Slo-Blo +5VDC Regulator Input (9VAC)
 F3 0.25A Slo-Blo Display Reg. Input (90VAC)
 F4 8A Slo-Blo Switched Illumination Buss (18VDC)
 F5 4A Slo-Blo Solenoid Buss (34VDC)
 F6 5A Slo-Blo Solenoid Buss (34VDC)

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DATA EAST LIMITED WARRANTY

Data East USA, Inc., ("Seller") warrants only to the initial purchaser of its products that the items listed below are free from defects in material and workmanship under normal use and service for the warranty period specified:

PRINTED CIRCUIT BOARDS (GAME LOGIC) 60 DAYS

No other parts of Seller's product are warranted.

Warranty periods are effective from the initial date of shipment from Seller to its authorized distributors.

Seller's sole liability shall be, at its option, to repair or replace products which are returned to Seller during the warranty periods specified, provided:

1. Seller is notified promptly upon discovery by purchaser that stated products are defective.
2. Such products are properly packaged and then returned freight prepaid, to Seller's plant.

This warranty does not apply to any parts damaged during shipment and/or due to improper handling, or due to improper installation or usage, or alteration. In no event shall the Seller be liable for any anticipated profits, loss of profits, loss of use, accidental or consequential damages or any other losses incurred by the customer in connection with the purchase of a Data East USA., product.

WARRANTY DISCLAIMER

EXCEPT AS SPECIFICALLY PROVIDED IN A WRITTEN CONTRACT BETWEEN SELLER AND PURCHASER, THERE ARE NO OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

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.

GAME SPECIFICATIONS

POWER REQUIREMENTS

This game is provided with a 3-prong plug and **must be connected to a properly grounded outlet to reduce shock hazard** and insure proper game operation. Refer to AC Power Wiring Diagram for transformer connections required for normal, high, and low line conditions.

Normal Line: 109 to 129 Vac (211 to 225 Vac)

High Line: (226 to 235 Vac)

Low Line: 95 to 108 Vac (200 to 210 Vac)

MAJOR ASSEMBLY AND FUSE LOCATIONS

Refer to the Game Illustration (page 2) to identify locations of the major assemblies, and fuse values and locations.

PROM SUMMARY

CPU Board: Location 5B, 5C

Sound Board: Locations 6F (Voice ROM 1), 4F (Voice ROM 2), and 7F (Sound ROM)

TRANSPORTATION

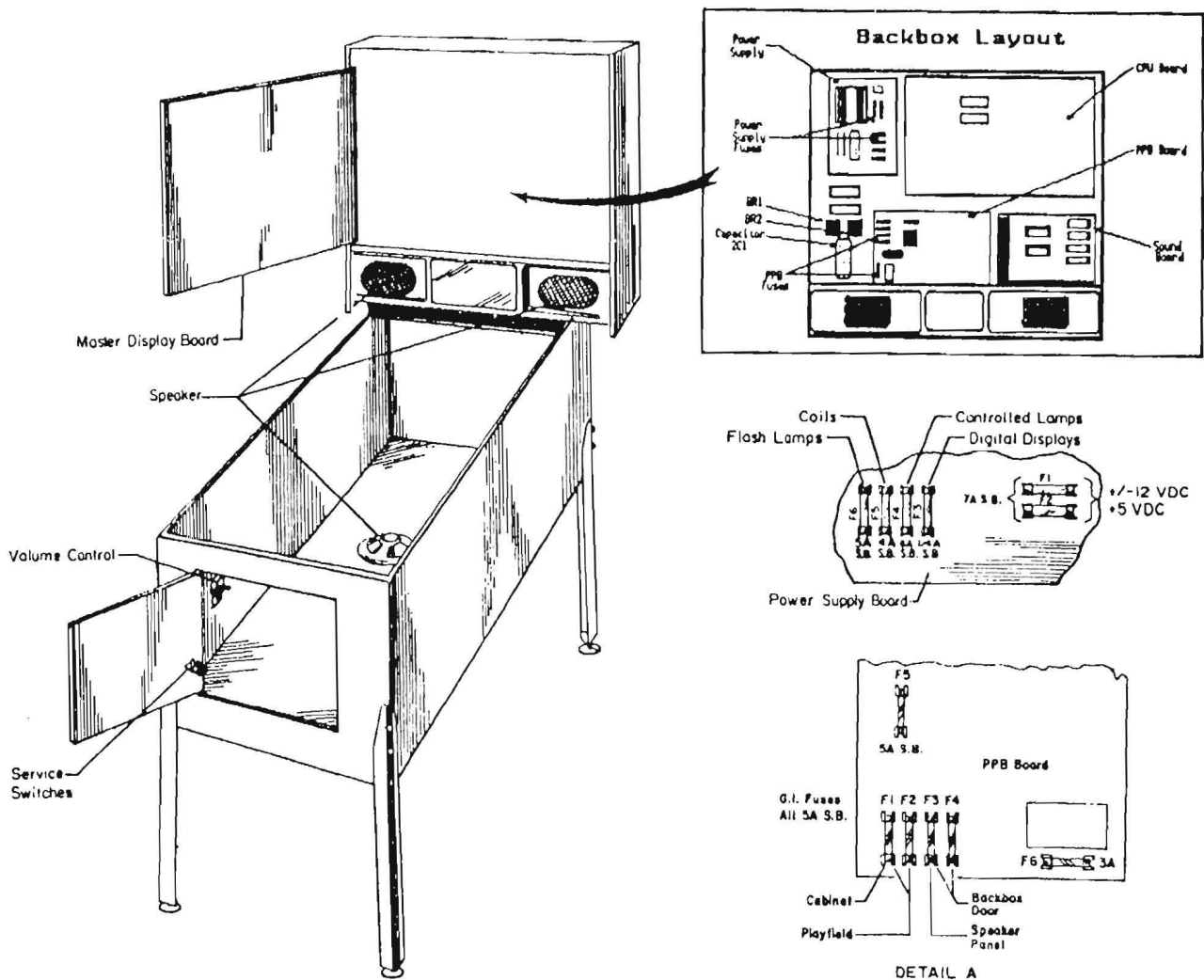
To reduce the possibility of damage, observe the following precautions whenever transporting the game. Lower the backbox and secure it to the cabinet. Remove the legs and secure the game within the transporting vehicle.

GAME ASSEMBLY PROCEDURES (Refer to the Game Illustration on page 2)

1. Open the top of the carton and lay it on its side with the bottom of the cabinet down. Using the plastic banding strip as a handle, slide the game out of the carton.
2. Remove all packing material. Locate cabinet legs in filler packing inserts and assembly parts package in the cashbox. There should be four leg levelers, eight leg bolts, two head bolts with washers, and three pinballs.
3. Attach leg leveler from the parts package to each leg, make sure that each leveler is threaded through a hex nut before threading it into the leg.
4. Support rear of cabinet and attach rear legs using two leg bolts for each leg.
5. Support front of cabinet and attach front legs using two leg bolts for each leg.
6. While assuring that no cables are being pinched, carefully raise the backbox and temporarily secure it in its upright position with the clamps provided on the rear of the cabinet.

WARNING

Do not attempt to move the game with the backbox secured in this temporary manner. If moved, the backbox could come unclamped and suddenly fall to the lowered position resulting in possible **injury to personnel and equipment damage**.



GAME ILLUSTRATION

7. Remove the backbox keys from the clip on the inside of the coin door and unlock and carefully remove the backglass. Set the backglass aside.
8. Carefully remove the playfield glass and set it aside.
9. Obtain the two bolts and washers from the parts package and open the backbox insert board. Secure the backbox to the cabinet pedestal with the two bolts and washers.
10. Check all connectors in the backbox for loose wire terminations. Reseat any loose wire by pushing in on the terminal.
11. Push on all connectors plugged into the CPU board, Sound Board, Power Supply Boards, and (on Insert board) Display board to check that they are properly seated.
12. Check that the fuses on the Power Supply board, PPB board and fuse panel are seated properly.
13. Raise the playfield and the support bar on the right side of the cabinet; support the playfield by inserting the support bar into the countersunk notch on the bottom side.
14. Check all cabinet cable and playfield lamp board connector terminations.

15. Remove the Plumb tilt from the parts package and install on the panel on the inside left of the cabinet. Note that this game is not equipped with a ball roll tilt.

16. Lower the playfield and level the playfield side-to-side by adjusting leg levelers.

17. The playfield front-to-back incline is factory set at approximately 6 degrees. If a pitch indicating meter is not available, adjust the front and rear levelers to the lowest position for the proper pitch. Readjust side-to-side level as required.

NOTE

The playfield incline affects difficulty of play. Use the recommended incline; game difficulty is best varied using game adjustments.

18. Check the plumb tilt and adjust as required.

19. If desired, perform any self tests at this time. With the insert door closed, carefully reinstall and lock the backglass.

20. Place the three pinballs on the playfield near the outhole and carefully reinstall the playfield glass.

21. If desired, make game pricing and Add-A-Ball, Novelty, or 5-Ball Play adjustments at this time.

GAME OPERATION

STANDARD FEATURES

Insert coin(s), the game plays the Star Spangled Banner and says "Press Start" for the first credit and generates sounds for each subsequent coin and the Player 4 display indicates the number of credits posted. Depress the credit button and a start-up sound is produced, the posted credits are reduced by one, Player 1 display flashes, Player 4 display indicates BALL 1, and a ball is served to the plunger trough. Additional players may be added by depressing the Credit button before the end of ball 1.

The second closure (adjustable) of the plumb bob tilt switch tilts the ball in play. Closure of the slam tilt switch in the coin door ends the current game(s).

At the end of each ball, earned bonuses are collected. At the end of the last ball for the last player and after bonuses are collected, the system produces a random 2-digit number (a multiple of 10; 00 to 90) for a Match feature (adjustable). Matching the last two digits of a player score with this number awards a credit. Players exceeding high score levels receive free credits (adjustable) and are able to enter their initials with the new High Score achieved. The game then proceeds into the game-over mode and then to the attract mode. A custom message (adjustable) can be displayed during the attract mode.

MANUAL PERCENTAGING

This game is equipped with Manual Percentage Adjustment.

As previously with our games, you can either set operator adjustments for a replay percent or you can set a fixed replay score.

If you set operator adjustments for a particular replay percent, the game will compute a recommended score to keep the game at that replay percentage. If a change is recommended and the game coin door is opened, the displays will indicate a recommended replay score to beat and knock the Kicker to alert the operator. By pressing the start button, the score to beat will be changed to the recommended level. If you close the coin door or go into audit or adjustment mode, no score change will be made.

You may choose to ignore the recommended change; for example, you may not think last week's players were the usual crowd. Just close the door and the message will disappear without altering the existing level. Or you may choose to make a different score to beat adjustment; this is done by utilizing adjustment AD02.

GAME SPECIFIC FEATURES

Football Kick Off- The shooter lane provides a Kick Off Shot in which the player attempts to score a Touchdown by completing the shot to the flashing light on the Kick Off Ramp. If the touchdown is not completed the appropriate yardage will be awarded for the hole the ball enters (10, 20, 30, or 40 yards). If the shot misses all four holes and exits through the Right Ramp 20 yards are awarded for a Touchback.

Top Lanes -Completing **A - B- C** steps up the bonus Multiplier to 2x, 3x, 4x, &5x. Upon the 5th completion one of the Extra Ball Outlanes will become enabled, alternating with each operation of the flipper. Every time the B lane (eject) is operated it awards the random yardage displayed on the back panel.

Drop Targets -When the game is started there will be a flashing light adjacent to one of the Drop Targets. Completing either Drop Target Bank will qualify the associated Locked Ball. Completing the Bank with the flashing light awards 50,000 points and increases the value of the flashing light to by 25,000 points up 100k. When all flashing Lamps of a bank are on, completing the targets again awards an extra ball. When the targets are completed with no flashing lamps the game awards 25,000 points and moves the flashing lamp to that Bank

Multiball- After qualifying each Locked Ball kicker, lock a ball in the kicker and then release the balls by making the Bomb Shot on the Right Ramp. During multiball hit the "UP" Targets to raise the center ramp and shoot for the Jackpot Backglass Value.

Field Goal- Advance the lamps on the playfield to the 30 Yard line and shoot the "UP" targets to raise the Ramp for a field goal. The field Goals score multiples of 50k points up to 200k.

Touchdown & Million Shot- Advance the Yardage Lamps 100 yards to score a Touchdown, kick the Extra Point through the uprights then loop it again and again to light One Million on the "Bomb Ramp" If the Bomb ramp is completed during the countdown it will require an additional loop to light it the next time during the same game.

Light Everything- Completing 7 loops in succession up the center Ramp lites all features: **Special, Extra Ball** and **Bonus Hold**. While these features are lit, you can collect the Special by completing the right ramp, Extra ball by shooting at the Right Ball Lock, and Bonus Hold by shooting at the Left Ball Lock.

Special, Bonus Hold, & Extra Ball- These features may also be lit individually by scoring or exceeding the correct number of Football Points. See Adjustment Table for Factory settings.

Touchdown = 6 Football Points

Extra Point = 1 Football Point

Field Goal = 3 Football Points

Refer to the Game Specific Adjustments on page 18 for additional information.

AUDIT FUNCTIONS

GENERAL

There are 99 audit functions provided for accounting purposes and for evaluation of game difficulty adjustments. Audit functions are split into two groups. There are eleven most-used audits (AU01 through AU11) in a 'quick look' group and 87 less-used audits (E AU13 through E AU99), in an 'expanded' group. The various auditing functions are summarized in the **AUDITING FEATURES TABLE** and, when accessed, are shown on the player score displays. The *Audit Number* is shown in the Player 3 Display, the *Description* in the Player 1 and 2 Displays, and the *Audit Total* in the Player 4 Display. Access and control is provided from switches located on the inside of the coin door.

To access audit functions, open the coin door and make sure that the FORWARD/REVERSE switch is in the FORWARD (up) position. Depress the STEP switch and the game name is shown in the Player 1 and 2 displays, the Player 3 display is blank, and the PROM revision level is shown in the Player 4 display. This indicates access to audit functions.

With the FORWARD/REVERSE push-button switch still in the FORWARD (up) position, depressing the STEP push-button switch advances through the audit functions one at a time. To review lower-numbered functions, set the forward/reverse push-button switch to the REVERSE (down) position and operate the STEP push-button switch.

To access expanded audits, operate the step push-button until AU12, EXPAND AUDITS is displayed. Set the choice to ON as indicated in the Player 4 display by depressing the Game Start push-button and then depress the step push-button. The request is installed and E AU13 is displayed. When you exit audits and adjustments, the AU12 setting is returned to off for the next time that a review of audits are required.

Audit totals may be reset to zero using Game Adjustment Ad17, Audits Reset. Game adjustments (Ad01 to Ad19 and E Ad20 to E Ad60) begin after the last audit function (AU12 or E AU99). Once audits functions have been recorded, and if no adjustments are required, you may return the game to the attract mode. If adjustments are required, continue pressing the STEP button until the game adjustments are reached. See Game Adjustments for details.

'QUICK LOOK' FUNCTIONS

Total Paid Credits (AU01) - the total number of paid credits is displayed.

Free Percent (AU02) is Free Total (E AU14) divided by Plays Total (E AU13).

Ball Time Average (in seconds) (AU03) is Total Play Time (in minutes) (E AU20) divided by Total Balls Played (E AU21) with the result multiplied by 60.

Coins (AU04, 05, and 06) - These three audit totals are provided to show the amount of coins registered for the left, right, and center coin chutes, respectively.

Replay Percentage (AU07) is the Replay Total awards for exceeding replay score levels (E AU15) divided by Plays Total (E AU13).

High Score Percentage (AU08) is High Score Total (E AU19) divided by Plays Total (E AU13).

Extra Ball Total (AU09) is the total number of extra balls awarded.

Extra Ball Percentage (AU10) is AU09 divided by Balls Total (E AU21).

Cycles Burn In (AU11) provides the number of diagnostic burn-in cycles (factory use).

Expand Audits (AU12) permits viewing of expanded audits.

ABC M.N. Football Audit Table

Audit Number (Player 3 Display)	Audit Description (Players 1 & 2 Displays: totals in Player 4 Display)	Audit Number (Player 3 Display)	Audit Description (Players 1 & 2 Displays: totals in Player 4 Display)
	ABC Football PROM ID		
AU 01	Total Paid Credits	E AU 51	Jackpot 1
AU 02	Percent Free	E AU 52	Jackpot 2
AU 03	Ball Time Average	E AU 53	Jackpot 3
AU 04	Coins Left	E AU 54	Jackpot 4
AU 05	Coins Right	E AU 55	Jackpot 5
AU 06	Coins Center	E AU 56	Jackpot 6
AU 07	Replay Percent	E AU 57	Jackpot 7
AU 08	High Score Percent	E AU 58	Drain Left
AU 09	Extra Ball Total	E AU 59	Drain Center
AU 10	Extra Ball Percent	E AU 60	Drain Right
AU 11	Cycles Burn-In	E AU 61	2x Bonus
AU 12	Expand Audits (ON/OFF)	E AU 62	3x Bonus
E AU 13	Plays Total	E AU 63	4x Bonus
E AU 14	Free Total	E AU 64	5x Bonus
E AU 15	Replay Total	E AU 65	Lane Ex Ball
E AU 16	Special Total	E AU 66	2X Scores
E AU 17	Special Percent	E AU 67	Buy In Games
E AU 18	Match Total	E AU 68	Average Game Time
E AU 19	Hi Score Wins	E AU 69	Ex Point Lit
E AU 20	Playtime	E AU 70	Ex Point Scored
E AU 21	Balls Total	E AU 71	Field Goal Lit
E AU 22	1 Replay Awards	E AU 72	Field Goal Scored
E AU 23	2 Replay Awards	E AU 73	Bonus Hold
E AU 24	3 Replay Awards	E AU 74	Million Lit
E AU 25	4 Replay Awards	E AU 75	Million Scored
E AU 26	Games 1Player	E AU 76	3 Ball Lit
E AU 27	Games 2Player	E AU 77	Multiple Shots
E AU 28	Games 3Player	E AU 78	Shooter 10 Yards
E AU 29	Games 4Player	E AU 79	Shooter 20 Yards
E AU 30	All Features	E AU 80	Shooter 30 Yards
E AU 31	Cycles H.S. Reset	E AU 81	Shooter 40 Yards
E AU 32	Enter 3 Ball	E AU 82	Shooter Touchdown
E AU 33	Percent 3 Ball	E AU 83	Touchback
E AU 34	Percent Lock Ball	E AU 84	Audit
E AU 35	Left Lock Lit	E AU 85	Audit
E AU 36	Left Locked	E AU 86	Audit
E AU 37	Right Lock Lit	E AU 87	Audit
E AU 38	Right Locked	E AU 88	Audit
E AU 39	Left Bank 25K	E AU 89	Audit
E AU 40	Left Bank 50K	E AU 90	Audit
E AU 41	Left Bank 75K	E AU 91	Audit
E AU 42	Left Bank 100K	E AU 92	Audit
E AU 43	Right Bank 25K	E AU 93	Audit
E AU 44	Right Bank 50K	E AU 94	Audit
E AU 45	Right Bank 75K	E AU 95	Audit
E AU 46	Right Bank 100K	E AU 96	Audit
E AU 47	Right Ramp	E AU 97	Audit
E AU 48	Left Return	E AU 98	Audit
E AU 49	Right Return	E AU 99	Audit
E AU 50	Special Lit		

EXPANDED FUNCTIONS

Plays Total (E AU13) is the sum of Total Pald Credits (AU01) and Free Total (E AU14). Note that free credits are not recorded in the audits until they are actually used.

Free Total (E AU14) is the total free credits for replays, high-score-to-date, specials, and match.

Replay Total (E AU15) is the total awards (credits, extra balls, or audit only) for exceeding replay score levels.

Special Total (E AU16) is the total awards (credits, extra balls, or scores) for making specials.

Special Percentage (E AU17) Is Special Total (E AU16) divided by Plays total (E AU13).

Match Total (E AU18) Is the total credits awarded for matching the last two digits of the score with the system-generated Match Number at the end of the game. Percentage of match credits will be approximately 8%, if enabled.

High Score Wins (E AU19) is the total credits awarded for exceeding the high-score-to-date scores.

Play Time (E AU20) is the cumulative time of balls in play (in minutes).

Balls Total (E AU21) is the total of regular and extra balls.

Replay Awards (E AU22 through 25) provide the total awards (credit, extra ball, or audit) for replay levels 1 through 4, respectively.

Games - Player (E AU26 through 29) provide individual totals of 1- player, 2-player, 3-player, and 4-player games, respectively.

Cycles High Score Reset (E AU31) provides the number of times that the high score levels have been automatically reset (if enabled).

GAME SPECIFIC FUNCTIONS

All Features Lit (E AU30) provides the number of times all features were lit by setting a new Jackpot record.

Enter 3 Ball (E AU32) provides the number of times three ball multi-ball was accomplished.

Percent 3 Ball (E AU33) provides the percentage of games that three ball multi-ball was accomplished.

Percent Lock Ball (E AU34) provides the total percentage of times Left Locked & Right Locked were accomplished divided by the total games played.

Left Lock Lit (E AU35) provides the total number of times the left Lock Ball lamp was enabled.

Left Locked (E AU36) provides the total number of times a ball was locked in the left kicker when the feature was enabled.

Right Lock Lit (E AU37) provides the total number of times the left Lock Ball lamp was enabled.

Right Locked (E AU38) provides the total number of times a ball was locked in the left kicker when the feature was enabled.

Left Bank 25k (E AU39) provides the total number of times completing the Left Drop Targets awarded 25,000 points.

Left Bank 50k (E AU40) provides the total number of times completing the Left Drop Targets awarded 50,000 points.

Left Bank 75k (E AU41) provides the total number of times completing the Left Drop Targets awarded 75,000 points.

Left Bank 100k (E AU42) provides the total number of times completing the Left Drop Targets awarded 100,000 points.

Right Bank 25k (E AU43) provides the total number of times completing the Right Drop Targets awarded 25,000 points.

Right Bank 50k (E AU44) provides the total number of times completing the Right Drop Targets awarded 50,000 points.

Right Bank 75k (E AU45) provides the total number of times completing the Right Drop Targets awarded 75,000 points.

Right Bank 100k (E AU46) provides the total number of times completing the Right Drop Targets awarded 100,000 points.

Right Ramp (E AU47) provides the total number of times the Right Ramp was completed.

Left Return (E AU48) provides the total number of times the Left Return switch was closed .

Right Return (E AU49) provides the total number of times the Right Return switch was closed .

Special Lit (E AU50) Provides the total number of times the Special Lamp is enabled.

Jackpot 1(E AU51) provides the total number of times the Jackpot feature awarded 1 Million points.

Jackpot 2(E AU52) provides the total number of times the Jackpot feature awarded 1.25 Million points.

Jackpot 3(E AU53) provides the total number of times the Jackpot feature awarded a Special & 500,000 points.

Jackpot 4(E AU54) provides the total number of times the Jackpot feature awarded 1.5 Million points.

Jackpot 5(E AU55) provides the total number of times the Jackpot feature awarded an Extra Ball & 500,000 points.

Jackpot 6 (E AU56) provides the total number of times the Jackpot feature awarded 2 Million points.

Jackpot 7(E AU57) provides the total number of times the Jackpot feature awarded Double Score & Bonus Hold.

Drain Left (E AU58) provides the number of times the ball drained out the left drain.

Drain Center (E AU59) provides the number of times the ball drained out the center drain.

Drain Right (E AU60) provides the number of times the ball drained out the right drain.

2X Bonus (E AU61) provides the number of times 2x bonus was made.

3X Bonus (E AU62) provides the number of times 3x bonus was made.

4X Bonus (E AU63) provides the number of times 4x bonus was made.

5X Bonus (E AU64) provides the number of times 5x bonus was made.

Lanes Extra Ball (E AU65) provides the number of times the Lane Extra Ball Feature was awarded.

2x Scores (E AU66) provides the number of times 2x Playfield Values feature was awarded.

Buy-In-Games(E AU67) provides the total number of times a game was bought into retaining Locked Balls etc.

Average Game Time (E AU68) provides the average length of a game in seconds.

Extra Point Lit (E AU69) provides the total number of times the Extra Point lamp is enabled.

Extra Point Scored (E AU70) provides the total number of times the Extra Point shot was completed.

Field Goal Lit (E AU71) provides the total number of times the Field Goal feature is enabled.

Field Goal Scored (E AU72) provides the total number of times the Field Goal shot was completed.

Bonus Hold (E AU73) provides the total number of times the Bonus Hold Feature was awarded.

Million Lit (E AU74) provides the total number of times the Million lamp is enabled.

Million Scored (E AU75) provides the total number of times the Million Ramp shot was completed.

3 Ball Lit (E AU76) provides the total number of times the Multiball lamp is enabled.

Multiple Shots (E AU77) provides the total number of times the Goal Post shot was repeated.

Shooter 10 Yards (E AU78) provides the total number of times the shooter lane shot awarded 10 Yards.

Shooter 20 Yards (E AU79) provides the total number of times the shooter lane shot awarded 20 Yards.

Shooter 30 Yards (E AU80) provides the total number of times the shooter lane shot awarded 30 Yards.

Shooter 40 Yards (E AU81) provides the total number of times the shooter lane shot awarded 40 Yards.

Shooter TD (E AU82) provides the total number of times the shooter lane shot awarded a Touchdown.

Touchback (E AU83) provides the total number of times the shooter lane shot missed the 10, 20, 30 & 40 Yard holes and exited the Right Ramp awarding 20 Yards.

Scoring History

Audit (E AU84) provides the total number of games the Player's final score was between 0 and 499,990 points.

Audit (E AU85) provides the total number of games the Player's final score was between 500,000 and 999,990 points.

Audit (E AU86) provides the total number of games the Player's final score was between 1,000,000 and 1,499,990 points.

Audit (E AU87) provides the total number of games the Player's final score was between 1,500,000 and 1,999,990 points.

Audit (E AU88) provides the total number of games the Player's final score was between 2,000,000 and 2,499,990 points.

Audit (E AU89) provides the total number of games the Player's final score was between 2,500,000 and 2,999,990 points.

Audit (E AU90) provides the total number of games the Player's final score was between 3,000,000 and 3,999,990 points.

Audit (E AU91) provides the total number of games the Player's final score was between 4,000,000 and 4,999,990 points.

Audit (E AU92) provides the total number of games the Player's final score was between 5,000,000 and 5,999,990 points.

Audit (E AU93) provides the total number of games the Player's final score was between 6,000,000 and 7,999,990 points.

Audit (E AU94) provides the total number of games the Player's final score was between 8,000,000 and 9,999,990 points.

Audit (E AU95) provides the total number of games the Player's final score was over 10,000,000 points.

Audit (E AU96) provides the total number of games the Player's Football score was between 0 and 9 points.

Audit (E AU97) provides the total number of games the Player's Football score was between 10 and 19 points.

Audit (E AU98) provides the total number of games the Player's Football score was between 20 and 29 points.

Audit (E AU99) provides the total number of games the Player's Football score was over 30 points.

GAME ADJUSTMENTS

GENERAL

There are 60 adjustable functions provided to vary difficulty of play and to periodically reset audits and the high score levels. The various game adjustments are summarized in the **Game Adjustments Table** and, when accessed, are shown on the player score displays. The *Adjustment Number* is shown in the Player 3 Display, the *Description* in the Player 1 and 2 Displays, and the setting in the Player 4 Display. Access and control is provided from switches located on the inside of the coin door.

Game adjustments are accessed from the audit mode. With the audits displaying game identification and the FORWARD/REVERSE switch in the REVERSE (down) position, depress the STEP switch and E Ad60 (Expanded Adjustment 60) is shown in the Player 3 display, FACTORY RESET is shown in the Player 1 & 2 displays, and OFF is shown in the Player 4 display. With the audits displaying AU12 (or expanded E AU99) and the FORWARD/REVERSE switch in the FORWARD (up) position, depress the STEP switch and Ad01 is shown in the Player 3 display, REPLAY MANUAL/FIXED is shown in the Player 1 and 2 displays, and the setting is shown in the Player 4 display.

With the FORWARD/REVERSE switch in the FORWARD (up) position, depressing the STEP switch advances through the game adjustments one at a time. With it in the REVERSE (down) position, the STEP switch selects lower-numbered adjustments. To rapidly scroll through adjustments, hold the STEP switch depressed. Adjustment values are changed by operating the GAME START push-button. The FORWARD/REVERSE switch setting determines whether the values are increased or decreased. (With the FORWARD/REVERSE switch up, the value increases, with it down, the value decreases). When the STEP switch is depressed the Player 1 and 2 displays indicate REQUEST INSTALLED.

REPLAY AND GENERIC FEATURES

Replays may be adjusted either for fixed levels or for a system-adjusted manual percentage of replay awards. Four levels may be selected. Adjustments allow awarding of a credit or an extra ball as each level is exceeded. With the manual percentage feature, if the actual replay percentage is higher or lower than that desired, the game computes new recommended manual percentage score(s). When the coin door is subsequently opened the player displays indicate the recommended level and the KNOCKER knocks to alert the operator of a potential change. This new level is entered into adjustments simply by pressing the game start push-button. (If the coin door is closed or you enter audits/adjustments or diagnostics, the replay level is not changed.)

REPLAYS (Ad 01 through 06)

Ad 01 Replay Manual/Fixed

Manual: Adjust for percentage of awards for replay levels (1% through 50%). Proceed to Ad 02 and 03 for starting replay levels.

Fixed: Lower the automatic value below 1% and Player 1 display indicates FIXED. Proceed to Ad 02 through 05 for fixed replay levels.

Ad 02 Start Replay/Level 1 Replay

Manual: With Ad 01 set for manual, adjust the starting Replay 1 setting to between 800,000 and 9,900,000.

Fixed: With Ad 01 set for fixed, adjust Replay 1 level to between 100,000 and 9,900,000. To disable Replay 1, lower the setting to 00.

Ad 03 Levels Replay/Level 2 Replay

Manual: With Ad 01 set for manual, adjust the number of replay levels to be active (1 to 4). Any additional starting replay levels are automatically set to values higher than Replay 1. Proceed to Ad 06.

Fixed: With Ad 01 set for fixed, adjust Replay 2 level to between 100,000 and 9,900,000. To disable Replay 2, lower the setting to 00.

Game Adjustment Table

Adjustment Number (Player 3)	Description (Players 1 & 2)	Factory Setting (Player 4)
AD 01	Replay/Manual	15%
AD 02	Start Replay/Level 1 Replay	2,400,000
AD 03	Levels Replay/Level 2 Replay	01
AD 04	Level 3 Replay	-
AD 05	Level 4 Replay	-
AD 06	Extra Easy Rules	OFF
AD 07	Easy Rules	OFF
AD 08	Factory Rules	ON
AD 09	Hard Rules	OFF
AD 10	Extra Hard Rules	OFF
AD 11	Novelty Rules	OFF
AD 12	5 Ball Rules	OFF
AD 13	Addaball Rules	OFF
AD 14	Standard/Custom Pricing	USA 1
AD 15	Time Setting	-
AD 16	Coin Reset	OFF
AD 17	Audits Reset	OFF
AD 18	Restore Hiscr	OFF
AD 19	Expand Adjustments	OFF
E Ad 20	Awards Replay	CREDITS
E Ad 21	Awards Special	CREDITS
E Ad 22	Match Feature	ON
E Ad 23	Balls/Game	03
E Ad 24	Warning Tilt	01
E Ad 25	Maximum Extra Balls	03
E Ad 26	Credits Limit	30
E Ad 27	Scores Highest	ON
E Ad 28	Credits High Score 1	03
E Ad 29	Credits High Score 2	00
E Ad 30	Credits High Score 3	00
E Ad 31	Credits High Score 4	00
E Ad 32	High Score 1 Backup	5,000,000
E Ad 33	High Score 2 Backup	4,000,000
E Ad 34	High Score 3 Backup	3,000,000
E Ad 35	High Score 4 Backup	2,500,000
E Ad 36	High Score Reset Every	700
E Ad 37	Free Play	OFF
E Ad 38	Left Coin Pulses	-
E Ad 39	Right Coin Pulses	-
E Ad 40	Center Coin Pulses	-
E Ad 41	Pulses For Credit	-
E Ad 42	Pulses For Bonus Credit	-
E Ad 43	Message Custom	ON
E Ad 44	Text	ENGLISH
E Ad 45	Attract Mode Music	ON
E Ad 46	Buy In Feature	ALL
E Ad 47	Bozo Ball	ON
E Ad 48	Flash Lamps	ON
E Ad 49	General Scores	FACTORY
E Ad 50	General Timer	FACTORY
E Ad 51	Spots Lock Lit	ON
E Ad 52	General Memory	ON
E Ad 53	Bonus Lit	14
E Ad 54	Ex Ball Lit	28
E Ad 55	Special Lit	49
E Ad 56	Yardage Memory	OFF
E Ad 57	Lane Percent	FACTORY
E Ad 58	Lane Extra Ball	ON
E Ad 59	Alert Operator	ON
E Ad 60	Factory Restore	OFF

Ad 04 Level 3 Replay (Fixed Only) - With Ad 01 set for fixed, adjust Replay 3 level to between 100,000 and 9,900,000. To disable Replay 3, lower the setting to 00.

Ad 05 Level 4 Replay (Fixed Only) - With Ad 01 set for fixed, adjust Replay 4 level to between 100,000 and 9,900,000. To disable Replay 4, lower the setting to 00.

SINGLE-FUNCTION DIFFICULTY ADJUSTMENTS (Ad 06 to 10)

Any one of these five INSTALL adjustments may be activated to automatically select settings for multiple adjustments affecting game difficulty. After activation, the individual adjustments may be readjusted if desired. Refer to Install Adjustment Table for details.

Ad 06 Extra Easy Rules - Set to ON or OFF.

Ad 07 Easy Rules - Set to ON or OFF.

Ad 08 Factory Rules - Set to ON or OFF.

Ad 09 Hard Rules - Set to ON or OFF.

Ad 10 Extra Hard Rules - Set to ON or OFF.

NOVELTY / 5-BALL/ADD-A-BALL RULES (Ad 11, 12, 13)

One of these three INSTALL adjustments may be activated to automatically select settings for multiple adjustments. After activation, the individual adjustments may be readjusted if desired.

NOTE: When more than one of these features is required (for example, Add-A-Ball rules with 5-Ball Play) set only one of these rule features and then change additional adjustments. For the Add-A-Ball and 5-Ball Play example:

Ad 13 Add a Ball Rules = On
E Ad 23 Balls per Game = 5
E Ad 49 General Scores = Factory
E Ad 50 General Timer = Factory

E Ad 52 General Memory = On
E Ad 56 Yardage Memory = On
E Ad 57 Lane Percentage = Factory
E Ad 58 Lane Extra Ball = On

By setting the game up in this fashion, all specials and replay levels will award an extra ball. However, because the operator desires 5-ball play, all game play features are set to 5 Ball settings.

Ad 11 Novelty Play Rules - Set to establish settings for no free play or extra balls; ON or OFF. If ON the following settings are established:

Ad 01 Manual Replay = Fixed
Ad 02 to Ad 05 Replays 1 to 4 = Off
E Ad 20 Awards Replay = Audit
E Ad 21 Awards Special = Score
E Ad 22 Match Feature = Off

E Ad 25 Maximum Extra Balls = 00
E Ad 27 Scores Highest = Off
E Ad 28 to 31 Credits High Score = 00
E Ad 58 Lane Extra Ball = Off

Ad 12 5-Ball Play Rules - Set to establish recommended settings for 5-ball play; ON or OFF. If ON the following settings are established

Ad 01 Manual Replay = 07%
Ad 02 Replay Start = 4,800,000
Ad 03 Replay Levels = 01
E Ad 23 Balls Per Game = 05
E Ad 49 General Scores = Factory

E Ad 50 General Timer = Factory
E Ad 52 General Memory = On
E Ad 56 Yardage Memory = On
E Ad 57 Lane Percentage = Factory
E Ad 58 Lane Extra Ball = On

INSTALL ADJUSTMENT TABLE

Install Adjustment	Ad 06 Extra Easy	Ad 07 Easy	Ad 08 Factory	Ad 09 Hard	Ad 10 Extra Hard
E Ad 49 General Scores	EASY	FACTORY	FACTORY	FACTORY	HARD
E Ad 50 General Timer	EASY	EASY	FACTORY	FACTORY	HARD
E Ad 52 General Memory	ON	ON	ON	OFF	OFF
E Ad 56 Yardage Memory	ON	ON	OFF	OFF	OFF
E Ad 57 Lane Percentage	EASY	FACTORY	FACTORY	HARD	HARD
E Ad 58 Lane Extra Ball	ON	ON	ON	ON	OFF

Ad 13 Add-A-Ball Rules - Set to disable awarding of credits, replacing replay and Special awards with an extra ball; **ON** or **OFF**. If **ON** the following settings are established:

E Ad 20 Awards Replay = Extra Ball
 E Ad 21 Awards Special = Extra Ball
 E Ad 22 Match Feature = OFF
 E Ad 27 Scores Highest = OFF
 E Ad 28 to 31 High Score Credits = 00

GAME PRICING (Ad 14 and E Ad 38 to 42)

There are two methods available for coin switch programming; Standard and Custom. Standard pricing uses a single adjustment (Ad 14) to select a pricing scheme shown in the **Standard Pricing Table**. Custom pricing is used to select additional pricing schemes defined by expanded adjustments E Ad 38 to 42. In order to program E Ad 38 to 42, Ad 14 must be set to **CUSTOM** and Ad 19 must be set to **ON** for expanded adjustments.

With Ad 14 set to **CUSTOM** and expanded adjustments selected, E Ad 38, 39, and 40 represent coin switch pulses for the left, right, and center coin slots. E Ad 41 prescribes the number of pulses required for one credit. For example, if E Ad 38 was set to 02 and E Ad 41 to 01 a coin in the left slot would produce two credits. Further, if E Ad 38 was set to 01 and E Ad 41 to 02, two coins in the left slot would be required for one credit.

E Ad 43 may be set to post bonus credits when a minimum amount of coins are inserted at one time. For example, if E Ad 38 was set to 01, E Ad 41 to 01 and E Ad 42 to 04, one credit would be posted for each of the first three coins in the left slot and two credits for the fourth coin.

Ad 14 Standard/Custom Pricing - Set for the desired pricing scheme from the Standard Pricing Table as indicated in the Player 1 and 2 displays. For Custom Pricing, set to **CUSTOM**. When set to **CUSTOM**, Expanded adjustments E Ad 38 to 42 are utilized to tailor each individual coin chute.

E Ad 38 Left Coin Switch Pulses - Set the number of pulses registered for closure of the left coin switch; 00 to 99.

E Ad 39 Right Coin Switch Pulses - Set the number of pulses registered for closure of the right coin switch; 00 to 99.

E Ad 40 Center Coin Switch Pulses - Set the number of pulses registered for closure of the center coin switch; 00 to 99.

E Ad 41 Coin Switch Pulses Required for 1 Credit - Set the number of coin switch pulses required to post one credit; 00 to 99.

E Ad 42 Coin Switch Pulses Required for Bonus Credit - Set the number of coin switch pulses required to award a bonus credit; 00 to 99.

STANDARD PRICING TABLE

Ad 14 Standard Pricing Select			Coin Mechs			Plays/Coins		
			Left	Center	Right	Left	Center	Right
1	2	4	25¢	\$1.00	25¢	1 PLAY/ 1COIN	4 PLAY/ 1COIN	1 PLAY/ 1COIN
USA1	1COIN	1PLAY	25¢	\$1.00	25¢	1 PLAY/ 2COIN 2 PLAY/ 3COIN 4PLAY/5COINS	3 PLAY/ 1COIN	1 PLAY/ 2COIN 2 PLAY/ 3COIN 4PLAY/5COINS
USA2	4 COINS	3PLAYS	25¢	\$1.00	25¢	1 PLAY/ 2COIN	2 PLAY/ 1COIN	1 PLAY/ 2COIN
USA3	2 COINS	1 PLAY	25¢	\$1.00	25¢	2 COINS FOR THE 1st PLAY 1PLAY/ 1 COIN ONLY DURING BUY-IN		
USA4	2COINS	1 PLAY 1COIN BUY-1N	25¢		25¢	1 PLAY/ 2COIN 2 PLAY/ 3COIN 3 PLAY/ 4COIN	2 PLAY/ 1COIN 3 PLAY/ 2COIN	2 PLAY/ 1COIN 3 PLAY/ 2COIN
AUSTRIA COINAGE			5 SCH	10 SCH	10SCH	1 PLAY/ 2COIN		3 PLAY/ 1COIN
AUSTRALIA COINAGE			20¢		\$1.00	1 PLAY/ 2COIN		3 PLAY/ 1COIN
UK COINAGE			10P	5P	10P	1 PLAY/ 1COIN	5 PLAY/ 1COIN	1 PLAY/ 1COIN
SWISS 1 SWISS 2			1 SFR	2 SFR	5 SFR	Same as German 1 Same as German 2		
BELGIUM COINAGE			20f	20f	20f	1 PLAY/ 1COIN	1 PLAY/ 1COIN	1 PLAY/ 1COIN
GERMAN 5DM 1			1DM	2DM	5DM	1 PLAY/ 1COIN 7 PLAY/ 5COIN	2 PLAY/ 1COIN 8 PLAY/ 3COIN	7 PLAY/ 1COIN
GERMAN 5DM 2			1DM	2DM	5DM	1 PLAY/ 1COIN 3 PLAY/ 2COIN 5 PLAY/ 3COIN 7 PLAY/ 4COIN 9 PLAY/ 5COIN	3 PLAY/ 1COIN 7 PLAY/ 2COIN 10 PLAY/ 3COIN 14 PLAY/ 4COIN	9 PLAY/ 1COIN
NETHERLAND COINAGE			1 Guilder		1 Guilder	1 PLAY/ 2COIN		1 PLAY/ 2COIN
SWEDEN COINAGE			1KR	5KR	2KR	1 PLAY/ 3COIN 2 PLAY/ 5COIN	2 PLAY/ 1COIN	2 PLAY/ 1COIN
FRANCE COINAGE			1f	5f	10f	1 PLAY/ 3COIN 2 PLAY/ 5COIN	2 PLAY/ 1COIN	4 PLAY/ 1COIN
ITALY COINAGE			500L		500L	1 PLAY/ 1COIN		1 PLAY/ 1COIN
SPAIN COINAGE			25P		100P	1 PLAY/ 1COIN		5 PLAY/ 1COIN
JAPAN COINAGE				100¥			1 PLAY/ 1COIN	

CUSTOM PRICING TABLE

Coin Mechs			Plays/Coins	Adjustment Numbers						
Left	Right	Center		14	19	38	39	40	41	42
25¢	25¢	\$1.00	1/25¢ 3/50¢	Custom	ON	01	01	04	01	02
			1/25¢ 5/\$1.00	Custom	ON	01	01	04	01	04
			1/25¢/ 6/\$1.00	Custom	ON	05	05	20	04	20
5SCH	10SCH	10SCH	1/10 SCH	Custom	ON	01	02	02	02	00
			1/10 SCH 4/30SCH	Custom	ON	04	08	08	06	00
20¢	\$1.00	--	1/20¢	Custom	ON	01	05	00	01	00
			1/60¢ 2/\$1.00	Custom	ON	01	05	00	03	05
10P	10P	50P	1/10P 6/50P	Custom	ON	01	01	05	01	05
			1/20P 3/50P	Custom	ON	01	01	05	02	05

ADDITIONAL GENERIC FEATURES

Ad 15 Average Ball Time - Not Used in this game.

Ad 16 Coin Reset - When enabled (set to **ON**) all coin and paid credit totals will be reset to zero when STEP is depressed.

Ad 17 Audits Reset - When enabled (set to **ON**) all audit totals except for coins and paid credits will be reset to zero when STEP is depressed.

Ad 18 Restore High Score - When enabled (set to **ON**) the High Score Levels and associated initials will be restored to backup settings when STEP is depressed.

Ad 19 Expand Adjustments - When set to **OFF**, depressing the STEP push-button advances directly to E Ad 59, FACTORY RESET. When set to **ON**, depressing the STEP push-button sequences through the expanded adjustments. When exiting from expanded adjustments, this function is reset to **OFF** for the next time that adjustments are required.

E Ad 20 Awards Replay - Set for replays to award: **CREDIT, EXTRA BALL, or AUDIT** (no award but recorded in the audit totals).

E Ad 21 Awards Special - Set for Special to award: **CREDIT, EXTRA BALL, or SCORE LEVEL**.

E Ad 22 Match Feature- Set Match **ON** or **OFF**.

E Ad 23 Balls Per Game - Adjust the number of balls per game; 2 to 9.

E Ad 24 Warning Tilt - Adjust the number of plumb bob tilt switch closures before the ball in play is tilted; 1 to 3 or **OFF**.

E Ad 25 Maximum Extra Balls - Adjust for the maximum number of extra balls that may be accumulated per ball; 1 to 9 or **OFF**.

E Ad 26 Credits Limit - Adjust the maximum number of credits that may be posted; 5 to 99.

HIGH SCORE LEVELS (E Ad 27 through 36)

There are four high score levels with associated player initials that are displayed during the attract mode. This provides a high-score-to-date feature. When players exceed these levels, the player initials may be entered to replace the previous ones. These levels may be adjusted to award credits and to be reset to backup values after a selected number of games.

E Ad 27 Scores Highest - Set to enable or disable the four high score levels; ON or OFF.

E Ad 28 Credits High Score Level 1 - Adjust the number of credits awarded for exceeding level 1 (the highest of the four levels); 0 to 9.

E Ad 29 Credits High Score Level 2 - Adjust the number of credits awarded for exceeding level 2; 0 to 9.

E Ad 30 Credits High Score Level 3 - Adjust the number of credits awarded for exceeding level 3; 0 to 9.

E Ad 31 Credits High Score Level 4 - Adjust the number of credits awarded for exceeding level 4; 0 to 9.

E Ad 32 High Score 1 Backup - Adjust the backup score level to which level 1 (the highest of the four levels) may be reset.

E Ad 33 High Score 2 Backup - Adjust the backup score level to which level 2 may be reset.

E Ad 34 High Score 3 Backup - Adjust the backup score level to which level 3 may be reset.

E Ad 35 High Score 4 Backup - Adjust the backup score level to which level 4 may be reset.

E Ad 36 High Score Reset Every - Adjust the number of games between automatic resets of high score levels to backup settings and ball time averager adjustments; 100 to 900 or OFF (no reset or adjustment).

E Ad 37 Free Play - When set to ON, no coins are required for games.

E Ad 38 to 42 Custom Pricing - Described previously in Game Pricing.

E Ad 43 Message Custom - When desired, this function is used to establish a custom message periodically displayed during the attract mode. Set the feature to **CHANGE** using the Credit button and depress STEP. The letter **A** is indicated in the first position of the Player 1 display. Vary the letter by operating the left and right flippers. With the desired letter indicated, depress the CREDIT button to lock in the letter and advance to the next display character. Repeat this procedure until the desired message is indicated in the Player 1 and 2 displays. At this time, depress the STEP push-button switch to advance to E Ad 44.

NOTE

To lock in the custom message, the game must be returned to Game Over by depressing STEP with E Ad 59 displayed.

E Ad 44 English/French/German Text - Select English, French, or German for display during Audits, Adjustments, and Game Diagnostics.

E Ad 45 Attract Mode Music - Set to ON (once every seven attract mode cycles), or OFF.

E Ad 59 Alert Operator-When the game is first powered up and after it has passed its self test, any suspect switches or coils are displayed in the Player Displays. With this feature enabled (set to ON), a sound is generated to alert the location attendant if there are any suspect switches or coils. With this feature disabled (set to OFF), no sound is generated during indications of suspect switches or coils.

E Ad 60 Factory Restore-Depressing STEP without changing the value shown in the Player 4 Display locks in any custom message set with E Ad43 and returns the game to Game Over. Set the value to ON and depress STEP switch to revert all game adjustments to factory settings, clear the Custom Message and return to Game Over.

GAME SPECIFIC FEATURES (E Ad 46 TO 54)

E Ad 46 Buy In Feature- Set to **ALL**, **BALLS** or **OFF**. When set to **ALL** the top Lanes Feature and lit locked balls feature will be retained if a player immediately buys into a game. When set to **BALLS** the Locked Balls feature is carried over to the next game if the player buys in immediately at the end of a game.

E Ad 47 Bozo Ball- Set To **ON** or **OFF**. When **ON** the game will lite an Extra Ball outlane on the last ball for any player not acheiving 500,000 points by his last ball.

E Ad 48 Flash Lamps- Set to **ON** or **OFF**.When set to **ON** the Flash Lamps are active, when **OFF** the Flash Lamps do not flash.

E Ad 49 General scores- Set to **EASY,FACTORY** or **HARD**.

Feature Affected	Easy	Factory	Hard
Pop Bumpers	1000	500	250

E Ad 50 General Timer- Set to **EASY,FACTORY** or **HARD**.

Feature Affected	Easy	Factory	Hard
Double Scores	35 seconds	25 seconds	15 seconds
Touchdown	35 seconds	25 seconds	15 seconds
Field Goal	35 seconds	25 seconds	15 seconds
Jackpot Shot	15 seconds	15 seconds	15 seconds
All Features Lit	35 seconds	25 seconds	15 seconds

EAd 51 Spots Lock Lit-Set to **ON** or **OFF**. When **ON** the Locked Ball feature remains enabled through the game.

E Ad 52 General Memory- Set to **ON** or **OFF**. When **ON** Lamps lit in the Top Lanes Feature carry over to the next Ball.

E Ad 53 Bonus Lit -Set from **3** to **14**. Determines the Football Point value which enables the left Bonus Hold Light.

E Ad 54 Extra Ball Lit-Set from **15** to **35**. Determines the Football Point value which enables the Right Extra Ball Light.

E Ad 55 Special Lit- Set from **36** to **81**. Determines the Football Point value which enables the Ramp Special Lite.

E Ad 56 Yardage Memory- Set to **ON** or **OFF**. When **ON** the Yards accumulated on the playfeild, carry over from ball to ball .

E Ad 57 Lane Percent-Set to **EASY,FACTORY** or **HARD**.

Scoring B Eject Awards	Easy	Factory	Hard
Sacked	0%	5%	15%
10 Yards	5%	5%	25%
20 Yards	10%	15%	25%
30 Yards	15%	20%	10%
40 Yards	30%	25%	15%
50 Yards	35%	30%	10%
Shooter Lane Touchdown Lit	Easy	Factory	Hard
10 Yard Touchdown Lit	30%	30%	10%
20 Yard Touchdown Lit	20%	20%	40%
30 Yard Touchdown Lit	20%	20%	40%
40 Yard Touchdown Lit	30%	30%	10%

E Ad 58 Lane Extra Ball-Set to **ON** or **OFF**.When set to **ON**, completing the Top Lanes 5 times lights one of the outlanes that award an Extra Ball.

GAME DIAGNOSTICS

The Data East Pinball system provides tests for sounds, digital displays, lamps, switches, and solenoids. Each feature may be tested manually or automatically using the STEP and FORWARD/REVERSE push-button switches inside the coin door and the Game Start push-button switch on the front of the cabinet. The automatic tests may be used for a quick verification of automatic test functions and the manual tests, for troubleshooting.

During game play, activation of switches and operation of coils with associated switches are monitored. If a switch is not made for 100 games it is considered bad. When operation of a coil should close or open a switch and does not, the coil is considered bad. Each time the game is powered up, bad switches and coils (if any) are reported; to alert the location attendant, the credit knocker is pulsed. Note that reporting of an unused switch does not constitute a problem and that a bad coil could mean that the associated switch requires adjustment.

Wiring to switches, solenoids and controlled lamps uses color-coded wires that basically follows a resistor color-code scheme for the eight rows and eight columns. During the switch tests and during the discrete lamp test, identification of the color of the row and column wires are indicated in the Player 3 Display. For example, making the right coin switch during the Switch Test results in the switch functional name (RIGHT COIN) shown in the Player 1 and 2 Displays, the row (94) and column (51) wire color codes shown in the Player 3 display, and the switch number shown in the Player 4 display. The 94 code (refer to the chart below) indicates a White wire with Yellow stripe for the row wire and the 51 code indicates a Green wire with Brown stripe.

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

ENTERING DIAGNOSTICS

With the game in the game-over mode, open the coin door and make sure that the FORWARD/REVERSE push-button switch is set to REVERSE (down) and depress the STEP push-button switch. The Player displays will show the tollfree Customer Service number 1-800-KICKERS, that is 1-800-542-5377 (outside Illinois) and the toll number (312) 345-7700 (inside Illinois). This indicates entry into game diagnostics.

SOUND TESTS

The Data East Pinball sound system produces true digital stereo sound on left and right speakers and mono on a center speaker. During Sound tests, the Player 1 and 2 displays show the sound board circuit under test and the corresponding sounds are produced. Refer to the Sound Test Chart for the sound circuits displayed and the sounds produced.

The sine wave functions allow verification that all channels are functioning properly and that the speaker connections are correct. Speaker Phase Testing procedures follow for checking speaker connections.

SOUND TEST CHART

Auto/Manual Tests (Player 1 & 2)	Sounds Produced
LEFT SINE	60 CYCLE TONE (Left Speaker Only)
CENTER SINE	60 CYCLE TONE (All speakers)
RIGHT SINE	60 CYCLE TONE (Right Speaker Only)
VOICE ROM1 (Loc F6)	"Live from Chicago","Kill","Big yards","Extra Ball"
VOICE ROM2 (Loc F4)	"Get another warning from the officials","It's good","Go for..","Shoot..."," the Bomb"
MUSIC TEST (Sound ROM Loc F7)	MUSIC

Automatic Test

With Customer Service telephone numbers displayed, depress the STEP push-button switch. Player 1 and 2 displays indicate SOUNDS AUTO and the system sequences through the test producing the sounds indicated in the Sound Test Chart.

Manual Test

Operate the STEP push-button switch during the Automatic tests until SOUNDS MANUAL is indicated in the Player 1 and 2 displays. Depressing the Game Start push-button switch allows you to advance through each sound function.

Speaker Phase Testing

Connections to each of the three speakers are polarized and each must be connected appropriately for the best quality sound. If one speaker has the positive and negative connections reversed with respect to the other two, bass frequencies will not be produced properly and the overall sound quality will be poor.

To test for proper speaker phasing,, use the manual sound test to cycle through the Left, Center, and Right Sine functions. If the Center Sine produces more volume and bass than the Left and Right Sines, the speakers are connected properly. If it produces the same or less, one speaker is connected improperly. To isolate and correct reversed speaker connections, one of two methods may be used.

1. Check each speaker for polarity markings. If the speakers have polarity markings, verify that the single-color wire (BLK, YEL or RED) is connected to the negative (-) terminal.
2. Disconnect the speaker output connector from the Sound Board and connect a 1.5-volt battery across each speaker pair one at a time while observing the speakers. Make sure that the positive battery terminal is connected to the positive lead (CN1-pin 1, 3, or 6) each time. As the connection is made, check speaker cone movement; proper connections are indicated by outward movement.

DIGITAL DISPLAY TEST

Digital displays are driven by digit and segment driver circuits. Digit drivers sequentially select individual character positions (Player 1 and 2 displays) and digit positions (Player 3 and 4 displays). Segment drivers (16 for Player 1 and 2 characters; 7 for Player 3 and 4 digits) select the individual segments of each position.

Automatic Test

To enter Display tests, operate the STEP push-button switch from the Sound Manual test. Player 1 and 2 displays indicate DISPLAY AUTO. The displays will sequence from all ZEROS to all nines in the four displays. Next all segments are lit for each digit position in sequence.

Manual Test

Operate the TEST push-button switch from the automatic test; Player 1 and 2 displays indicate DISPLAY MANUAL and then display ZEROS in all positions. Operate the Game Start push-button switch to cycle through each portion of the test.

GOAL TEST

This Game has a feature which raises a ramp and goal posts to allow for a Field Goal, an Extra Point shot or a Super Jackpot shot. The motor on this mechanism is controlled by a relay driven by Q24 and there are 2 Limit switches (Ramp Up & Ramp Down) used by the CPU to determine the status of the ramp.

After entering Goal Test press and hold the game's Start Button. This will cause the motor relay to pulse repeatedly as long as the button is depressed. At the same time you will notice that the switch status will be shown in the Player 3 & 4 Displays - UP in the Left display and DOWN in the Right display. The appropriate switch should be closed just prior to the limit of the goal mechanism and both switches should not be closed at the same time.

This test is located before the Switch tests so the technician can raise the mechanism half way until both UP & DOWN switches are open. This will help eliminate erroneous readings while trying to trace a problem during Active Switch Test .

Switches

Switches are configured in an 8 x 8 matrix of columns (switch drives) and rows (switch returns) with up to 64 switches possible. The switch tests include three parts; switch test, active switches, and bad switches. Row and column wire colors are indicated in each test using corresponding resistor color code numbers.

Switch Test

From the Display Manual test, operate STEP push-button switch. Player 1 and 2 displays indicate SWITCH TEST. Close each switch and observe the displays. The Player 1 and 2 displays will indicate the switch name, the Player 3 display indicates the row and column wire colors, and the Player 4 display indicates the switch number. When a switch is released, the name and number disappear until another switch is closed or the test is exited.

Active Switches

Operate the STEP push-button switch from the Switch Test. Player 1 and 2 Displays indicate ACTIVE SWITCHES. If any switches are stuck closed (or made from the presence of a ball), the Player 1 and 2 displays sequence through switch names, the Player 3 display indicates the row and column wire colors, and the switch numbers are indicated in the Player 4 display. This cycle continues until all switches are cleared or until the STEP push-button switch is depressed.

Bad Switches

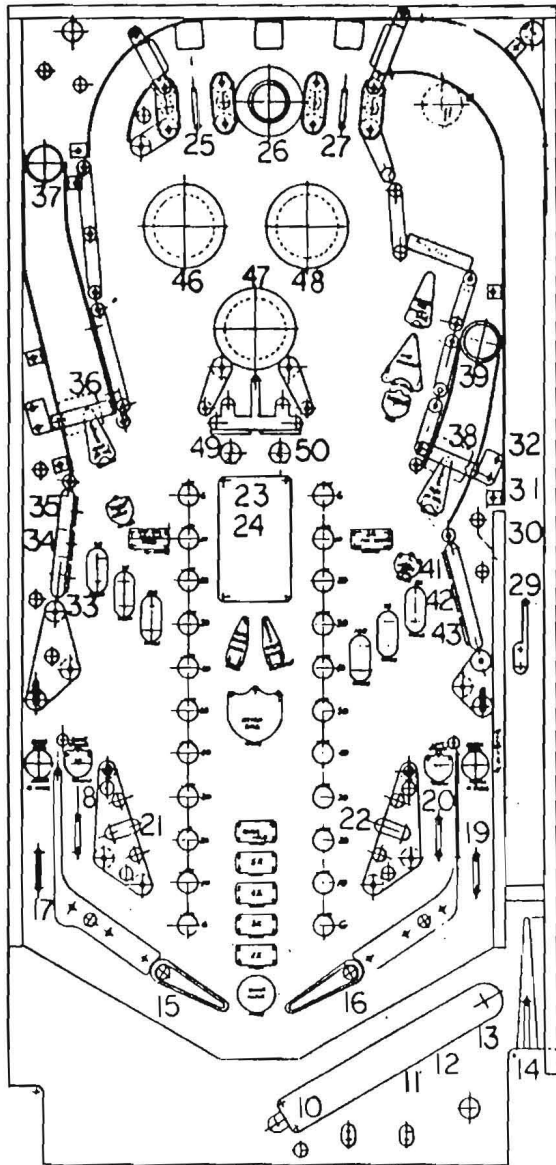
Operate the STEP push-button switch from the Switch Test. Player 1 and 2 Displays indicate BAD SWITCHES. During game play, the system keeps track of the last game in which each switch was made. Should a switch not be made for 100 games, it is considered to be bad. If there are any, the Player 1 and 2 displays sequence through switch names, the Player 3 display indicates the row and column wire colors, and the switch numbers are indicated in the Player 4 display. This cycle continues until the STEP push-button switch is depressed.

SWITCH MATRIX CHART

ROW (*)	COLUMN (*)	1 GRN-BRN (51) Q55	2 GRN-RED (52) Q54	3 GRN-ORN (53) Q53	4 GRN-YEL (54) Q52	5 GRN-BLK (50) Q51	6 GRN-BLU (56) Q50	7 GRN-VIO (57) Q49	8 GRN-GRY (58) Q48
1 WHT-BRN (91)	Plumb Tilt 1	Not Used 9	Left Outlane 17	A Lane 25	Left Bank 1 33	Right Bank 1 41	U Target 49	Not Used 57	
2 WHT-RED (92)	Not Used 2	Outhole 10	Left Return 18	B Eject 26	Left Bank 2 34	Right Bank 2 42	P Target 50	Not Used 58	
3 WHT-ORN (93)	Credit Button 3	Trough #1 11	Right Outlane 19	C Lane 27	Left Bank 3 35	Right Bank 3 43	Left Ramp Bottom 51	Not Used 59	
4 WHT-YEL (94)	Right Coin 4	Trough #2 12	Right Return 20	Not Used 28	Left Spinner 36	Left Ramp Top 44	Not Used 52	Not Used 60	
5 WHT-GRN (95)	Center Coin 5	Trough #3 13	Left Slingshot 21	Kick-Off 10 Yards 29	Left VUK 37	Right Ramp 45	Not Used 53	Not Used 61	
6 WHT-BLU (96)	Left Coin 6	Shooter Lane 14	Right Slingshot 22	Kick-Off 20 Yards 30	Right Spinner 38	Left Pop Bumper 46	Not Used 54	Not Used 62	
7 WHT-VIO (97)	Slam Tilt 7	Left EOS 15	Ramp Up 23	Kick-Off 30 Yards 31	Right Eject 39	Center Pop Bumper 47	Not Used 55	Not Used 63	
8 WHT-GRY (98)	Not Used 8	Right EOS 16	Ramp Down 24	Kick-Off 40 Yards 32	Not Used 40	Right Pop Bumper 48	Not Used 56	Not Used 64	

(*) 2 DIGIT NUMBER IN PARENTHESES INDICATES RESISTOR/WIRE COLOR CODE NUMBER DISPLAYED DURING DIAGNOSTICS.

Number	Description	Part No.	Number	Description	Part No.
01*	Plumb Tilt	500-5023-00	10	Out Hole	180-5011-00
02	Not Used	--	11	Trough #1	180-5009-00
03	Credit Button	500-5097-00	12	Trough #2	180-5009-00
04*	Right Coin	180-5024-00	13	Trough #3	180-5010-00
05*	Center Coin	180-5024-00	14	Shooter Lane	500-5142-00
06*	Left Coin	180-5024-00	15	Left Flip. Instant Info.	180-5026-00
07*	Slam Tilt	180-5022-00	16	Right Flip. Instant Info.	180-5026-00
08	Not Used	--		Left EOS	180-5018-00
09	Not Used	--		Right EOS	180-5018-00
			17	Left Outlane	500-5142-00
			18	Left Return Lane	500-5142-00
			19	Right Outlane	515-5133-00
			20	Right Return Lane	515-5133-00
			21	Left Slingshot Trigger Sw.	180-5054-00
				Left Slingshot Point Sw.	180-5055-00
			22	Right Slingshot Trgger Sw.	180-5054-00
				Right Slingshot Point Sw.	180-5055-00
			23	Ramp Up	180-5056-00
			24	Ramp Down	180-5056-00
			25	A Lane	500-5142-00
			26	B Eject	515-5079-00
			27	C Lane	500-5142-00
			28	Not Used	--
			29	Kick-Off 10 Yards	515-5138-00
			30	Kick-Off 20 Yards	515-5138-00
			31	Kick-Off 30 Yards	515-5138-00
			32	Kick-Off 40 Yards	515-5138-00
			33	Left Bank 1 (Top)	180-5025-01
			34	Left Bank 2 (Center)	180-5025-01
			35	Left Bank 3 (Bottom)	180-5025-01
			36	Left Spinner	500-5119-00
			37	Left VUK	180-5041-00
			38	Right Spinner	500-5193-00
			39	Right Eject	515-5079-00
			40	Not Used	--
			41	Right Bank 1 (Top)	180-5025-01
			42	Right Bank 2 (Center)	180-5025-01
			43	Right Bank 3 (Bottom)	180-5025-01
			44	Left Ramp Top	180-5053-00
			45	Right Ramp	180-5057-00
			46	Left Pop Bumper	180-5036-00
			47	Center Pop Bumper	180-5036-00
			48	Right Pop Bumper	180-5036-00
			49	U Target	515-5252-00
			50	P Target	515-5252-00
			51	Left Ramp Bottom	180-5053-00
			52	Not Used Thru 64	



Switch Locations

*INDICATES CABINET SWITCHES.

LAMP TESTS

Controlled lamps are configured in an 8 x 8 matrix of columns (lamp drives) and rows (lamp returns) with up to 64 lamps possible. The lamp tests include four parts, all lamps, lamp return (row), lamp drive (column), and discrete (Individual) lamps. Row and column wire colors are indicated in the discrete lamp test using corresponding resistor color code numbers.

All Lamps

From the Bad Switch test, operate the STEP push-button switch. Player 1 and 2 displays Indicate ALL LAMPS and all controlled lamps will light.

Lamp Returns

From the ALL LAMPS test, depress the STEP push-button switch. Player 1 and 2 displays Indicate LAMP ROWS and the Player 4 display indicates 01 for row 1. All controlled lamps in row 1 should be lit. Operating the Game Start push-button switch cycles through each of the rows separately.

Lamp Drives

From the LAMP ROWS test, depress the STEP push-button switch. Player 1 and 2 displays Indicate LAMP COLUMNS and the Player 4 display indicates 01 for column 1. All controlled lamps in column 1 should be lit. Operating the Game Start push-button switch, cycles through each of the columns separately.

Discrete Lamp

From the LAMP COLUMNS test, depress the STEP push-button switch. Player 1 and 2 displays Indicate LAMP TEST and then the name assigned to lamp 01; the Player 1 and 2 displays indicate the lamp name, the Player 3 display indicates the row and column wire colors, and the Player 4 display indicates 01. Lamp 01 should light. With the FORWARD/REVERSE push-button switch in the FORWARD (up) position, operating the Game Start push-button switch selects higher-numbered lamps; with it in the REVERSE (down) position, Game Start selects lower-numbered lamps.

LAMP MATRIX CHART

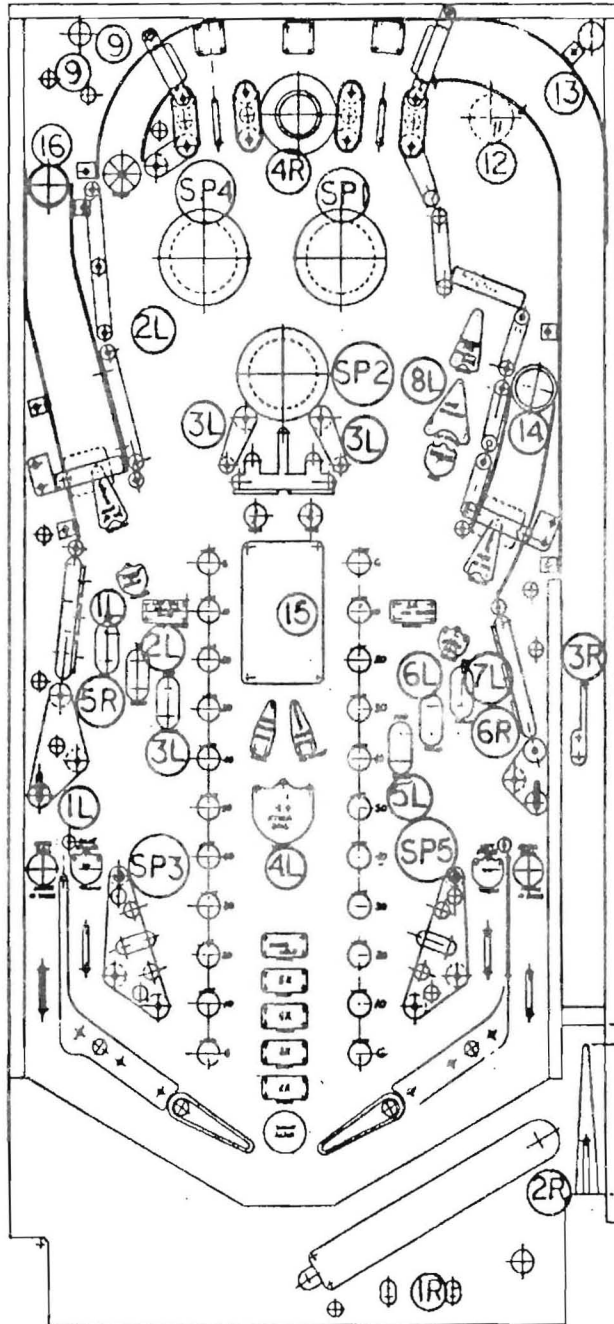
ROW (*) \ COLUMN (*)	1 YEL-BRN (41) Q71	2 YEL-RED (42) Q70	3 YEL-ORN (43) Q69	4 YEL-BLK (40) Q68	5 YEL-GRN (45) Q67	6 YEL-BLU (46) Q66	7 YEL-VIO (47) Q65	8 YEL-GRY (48) Q64
1 RED-BRN (21) Q72	10 Yard Bottom 1	Right Goal 9	5x 17	A Lane 25	10 Yard Lamp 33	Million Jackpot 41	Back Panel Sacked 49	Top Special 57
2 RED-BLK (20) Q73	2x 2	20 Yard Bottom 10	Bonus Hold 18	B Eject 26	20 Yard Lamp 34	Jackpot 1 42	Back Panel 10 Yard 50	Top Million 58
3 RED-ORN (23) Q74	3x 3	Shoot Again 11	30 Yard Bottom 19	C Lane 27	30 Yard Lamp 35	Jackpot 2 43	Back Panel 20 Yard 51	Right Release 59
4 RED-YEL (24) Q75	4x 4	Left Goal 12	Left Bank 100k 20	40 Yard Bottom 28	40 Yard Lamp 36	Jackpot 3 44	Back Panel 30 Yard 52	Jackpot 4 60
5 RED-GRN (25) Q76	Right Return 5	Right Bank 100k 13	Left Bank 75k 21	Top Goal 29	50 Yards 37	Center Extra Ball 45	Back Panel 40 Yard 53	Jackpot 5 61
6 RED-BLU (26) Q77	Right Extra Ball 6	Right Bank 75k 14	Left Bank 50k 22	Left Ball Lock 30	Right Arrow 38	40 Yard Top 46	Back Panel 50 Yard 54	Jackpot 6 62
7 RED-VIO (27) Q78	Left Extra Ball 7	Right Bank 50k 15	Bonus Shield 23	U Target 31	Left Arrow 39	Right Goal 47	30 Yard Top 55	10 Yard Top 63
8 RED-GRY (28) Q79	Left Return 8	Extra Ball Shield 16	Goal Targets 24	P Target 32	10 Yard Top 40	2x Scores 48	Right Ball Lock 56	20 Yard Top 64

(*) 2 DIGIT NUMBER IN PARENTHESES INDICATES RESISTOR/WIRE COLOR CODE DISPLAYED DURING DIAGNOSTICS.

Lamp Description

Lamp Number	Description
01	10 Yard Bottom
02	2x
03	3x
04	4x
05	Right Return
06	Right Extra Ball
07	Left Extra Ball
08	Left Return
09	Right Goal
10	20 Yard Bottom

11	Shoot Again
12	Left Goal
13	Right Bank 100k
14	Right Bank 75k
15	Right Bank 50k
16	Extra Ball Shield
17	5x
18	Bonus Hold
19	30 Yard Bottom
20	Left Bank 100k
21	Left Bank 75k
22	Left Bank 50k
23	Bonus Shield
24	Goal Targets
25	A Lane
26	B Eject
27	C Lane
28	40 Yard Bottom
29	Top Goal
30	Left Lock Ball
31	U Target
32	P Target
33	10 Yard Lamp
34	20 Yard Lamp
35	30 Yard Lamp
36	40 Yard Lamp
37	50 Yards
38	Right Arrow
39	Left Arrow
40	10 Yard Top
41*	Million Jackpot
42*	Jackpot 1
43*	Jackpot 2
44*	Jackpot 3
45	Center Extra Ball
46	40 Yard Top
47	Right Goal
48	2x Scores
49	Back Panel Sacked
50	Back Panel 10 Yard
51	Back Panel 20 Yard
52	Back Panel 30 Yard
53	Back Panel 40 Yard
54	Back Panel 50 Yard
55	30 Yard Top
56	Right Ball Lock
57	Top Special
58	Top Million
59	Right Release
60*	Jackpot 4
61*	Jackpot 5
62*	Jackpot 6
63	10 Yard Top
64	20 Yard Top



Lamp Locations

*Indicates Insert Lamp

COIL TESTS

Sixteen regular (pulsed under microprocessor control) and six switch-triggered coil drivers are provided to switch ground to coils. Coil number 10 is used in conjunction with drives 1 through 8 to switch +32 volts between coils or flash lamps; these sets are termed "left" and "right". Coil number 10 is located on the PPB board which provides isolation diodes and current limiting resistors. This effectively provides 23 regular coils.

Automatic Test

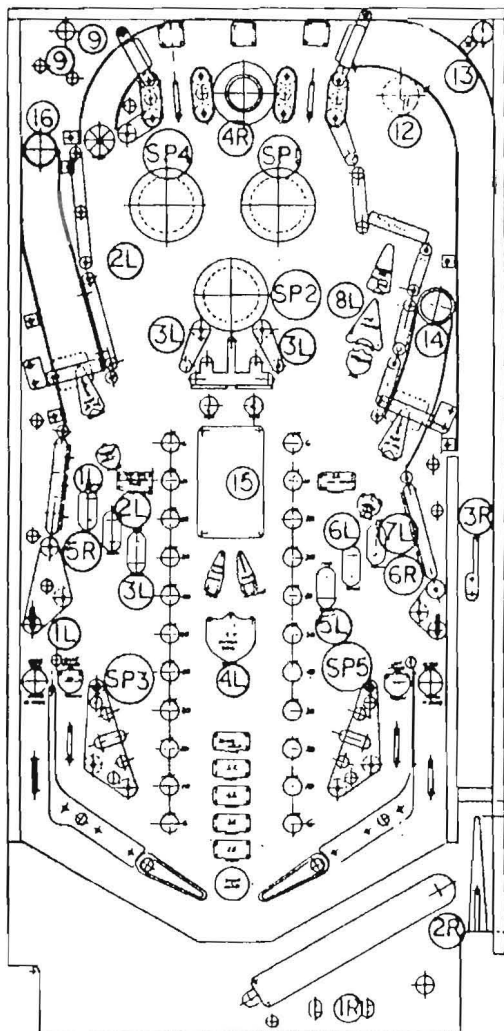
From the Discrete Lamps test, depress the STEP push-button switch. Player 1 and 2 displays indicate COIL TEST. The test pulses each regular solenoid or flash lamp sequentially with the coil/flash lamp name indicated in the Player 1 and 2 displays and the drive number in the Player 4 display.

Select Coil

From the Coil Test, depress the STEP push-button switch. Player 1 and 2 displays indicate SELECT COIL and then the name of drive 1L, the drive number is indicated in the Player 4 display. Operate the Game Start push-button switch to select the coil or flash lamp to be tested. With the desired drive number indicated in the Player 4 display, depress the STEP push-button switch to cause it to be pulsed repeatedly.

RETURN TO GAME OVER

From the Select Coil test, depress the STEP push-button switch one time if a selected coil is pulsing or two times if none is pulsing. The game returns to the game-over mode.



SWITCH TRIGGERED SOLENOIDS

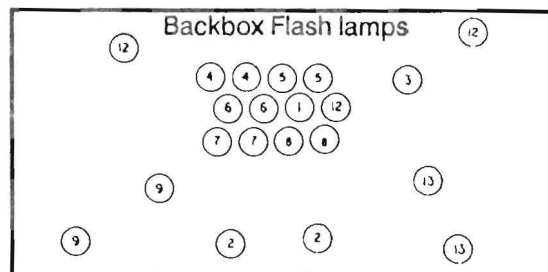
Coil Number	Coil Description	Control Line (CPU to Coil)	Power Line (PS to Coil)	Trigger Line (Coil Sw to CPU)	Drive Translator (TIP T22)	Coil Type
SP1	Right Pop Bumper	BLU-ORN CPU CN19-3	RED PS CN3-8	ORN-BLK CPU CN 18-2	Q8	23-800
SP2	Center Pop Bumper	BLU-RED CPU CN19-4	RED PS CN3-8	ORN-RED CPU CN 18-3	Q9	23-800
SP3	Left Slingshot	BLU-YEL CPU CN19-6	RED PS CN3-8	ORN-YEL CPU CN 18-4	Q10	23-800
SP4	Left Pop Bumper	BLU-BRN CPU CN19-7	RED PS CN3-8	ORN-BRN CPU CN 18-5	Q11	23-800
SP5	Right Slingshot	BLU-GRN CPU CN19-8	RED PS CN3-8	ORN-GRN CPU CN 18-8	Q12	23-800
SP6	NOT USED	- CPU CN19-9	- PS CN3-8	- CPU CN 18-9	Q13	-

FLIPPER SOLENOIDS

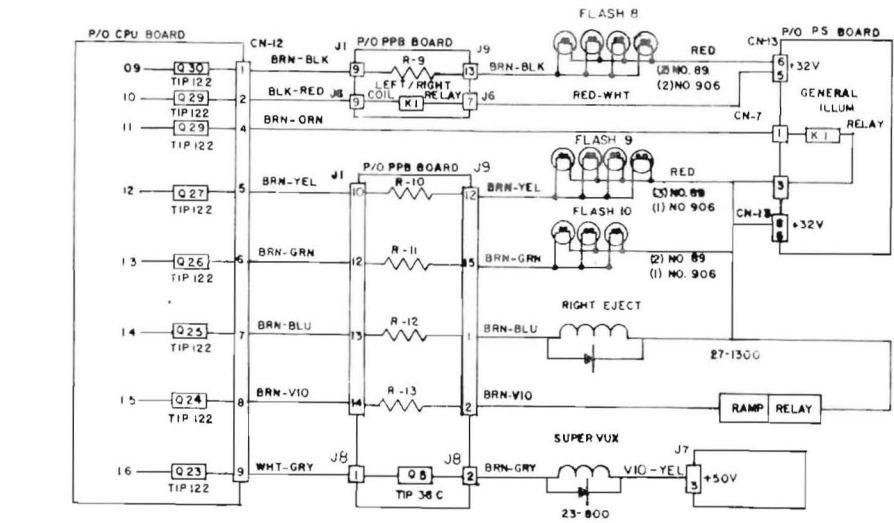
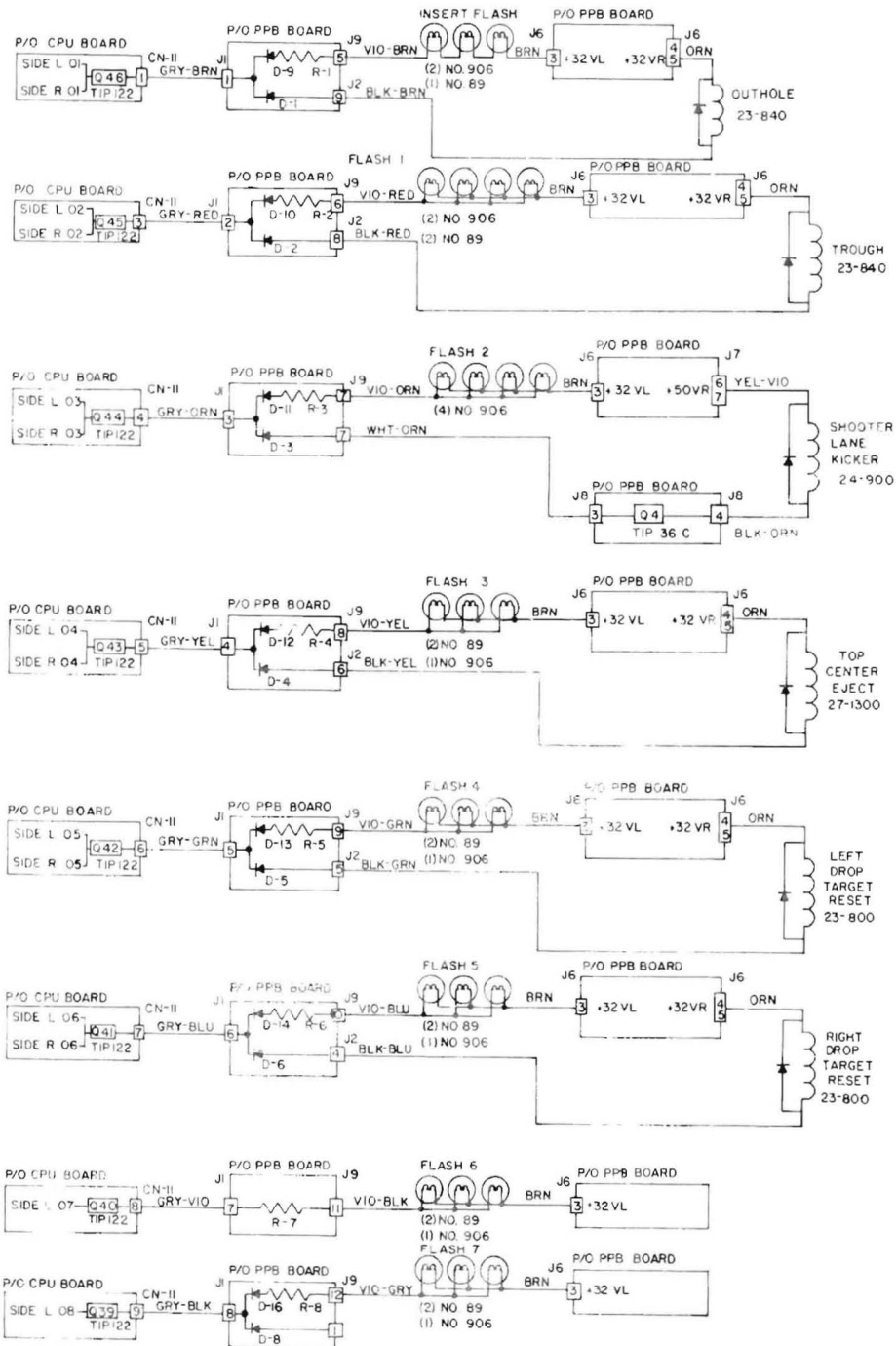
Coil Description	Flipper GND (CPU to Cab)	Power Lines (Cab to Coil)	Power Lines (PPB & PS to Coil)	Coil Type
Left Flipper	ORN-GRY CPU CN19-2	BLU-GRY 1M/F-24	GRY-YEL PPB J7-5 GRY-GRN PS CN1-10	22-900
Right Flipper	ORN-VIO CPU CN19-1	BLU-VIO 1M/F-21	BLK-WHT PPB J7-1,2 GRY-GRN PS CN1-10 50VDC 2VAC	22-900

ABC M.N. FOOTBALL COIL PART NUMBER CHART

QUANTITY USED	COIL TYPE	DATA EAST PINBALL PART NUMBER
8	23-800	090-5001-00
1	24-900	090-5002-00
2	27-1300	090-5003-00
2	23-840	090-5005-00
2	22-900	090-5020-21

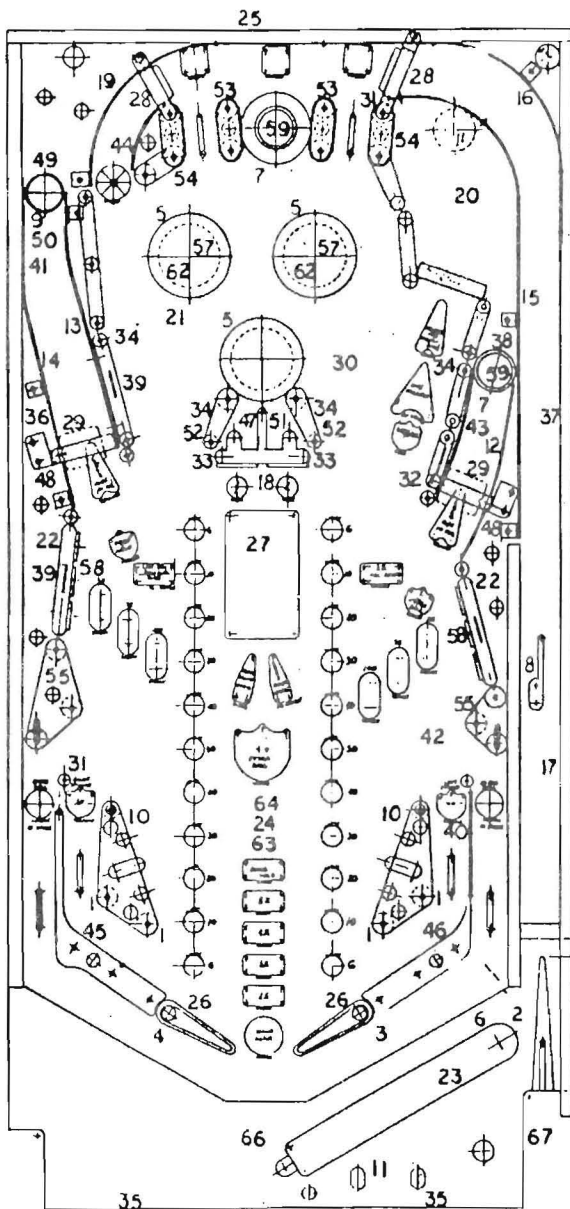


TOP



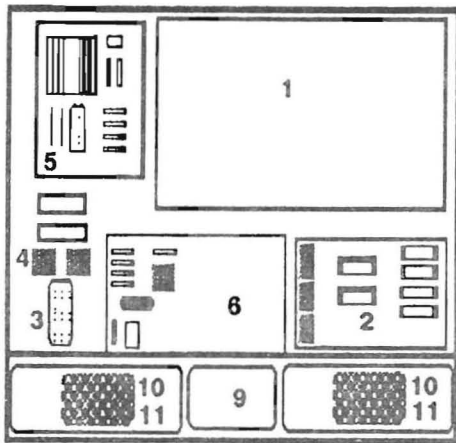
Playfield Top Parts

Item	Description	Part Number
1.	Acorn Nuts (26)	240-5000-00
2.	Ball Feed Cam	500-5012-00
3.	Right Flipper Assy.	500-5031-51
4.	Left Flipper Assy.	500-5031-52
5.	Pop Bumpers (3)	500-5034-10
6.	#3 Ball Trough Eject	500-5042-00
7.	Ball Eject Assy. (2)	500-5051-00
8.	Kick Big Assy.	500-5053-00
9.	Vertical Up Kicker Assy.	500-5067-00
10.	Slingshot Assy. (2)	500-5077-00
11.	Outhole Ball Return Assy.	500-5082-00
12.	Right Eject Ball Guide	500-5164-00



13.	Left VUK Ball Guide	500-5165-00
14.	Left VUK Ball Guide	500-5166-00
15.	Kickbig Inside Ball Guide	500-5167-00
16.	Top Ball Guide	500-5168-00
17.	Shooter Lane Ramp Assy.	500-5170-00
18.	Two Standup Target Assy.	500-5176-00
19.	Top Arch Vacu-form Assy.	500-5179-00
20.	Bomb Ramp Assy.	500-5184-00
21.	Touchdown Ramp Assy.	500-5185-00
22.	Drop Target Assy. (2)	500-5187-00
23.	Ball Trough Sw. Plate Assy.	500-5190-00
24.	Playfield Complete	505-6004-00
25.	Back Panel Assy. Complete	505-6007-07
26.	Flipper Bat & Shaft	515-5133-02
27.	Field Goal & Ex. Point Ramp	515-5196-00
28.	Flap Gate (2)	515-5205-00
29.	Spinner Target (2)	515-5236-00
30.	Relay Board	520-5010-00
31.	Wood Screw Mini-Post (2)	530-5004-00
32.	Machine Screw Mini-Post	535-5005-00
33.	Machine Bumper Post (7)	530-5007-00
34.	Metal Standoff -Groove (18)	530-5035-00
35.	Playfield Hanger Brkt. (2)	535-5216-00
36.	Left Playfield Hinge	535-5222-00
37.	Right Playfield Hinge	535-5223-00
38.	Right Eject Ball Stop Brkt.	535-5273-00
39.	1" Wire Form (4)	535-5300-05
40.	3 3/4" Wire Form	535-5300-06
41.	VUK Wire Ramp Feed	535-5342-01
42.	Bomb Wire Ramp	535-5369-00
43.	Right Eject Wire Guide	535-5370-00
44.	Top Left Wire Form	535-5371-00
45.	Left Return Ball Guide	535-5406-01
46.	Right Return Ball Guide	535-5407-01
47.	Ramp Support	535-5736-00
48.	Spinner Support Brkt. (2)	535-5744-01
49.	VUK Ball Stop Brkt.	535-5744-01
50.	VUK Rmp. Feed Support	535-5753-00
51.	Center Two Tgt. Cover	535-5755-00
52.	Red Mini Mars (7)	545-5004-02
53.	2 Sided Light Hood (2)	545-5011-02
54.	1 Sided Light Hood (2)	545-5012-02
55.	Red 1/32 Jeweled Post (26)	545-5013-02
56.	Red Lamp Cover (4)	545-5014-02
57.	Pop Bumper Cap (2)	545-5035-32
58.	Drop Target (6)	545-5048-01
59.	Yellow Eject Hole (2)	545-5060-06
60.	Ramp Decal Sheet	820-5027-XX
61.	Target Decal Sheet	820-5107-00
62.	Pop Bumper Decal (2)	820-5307-00
63.	Playfield Mylar	820-5806-00
64.	Screened Playfield	830-5107-00
65.	Screened Plastic Set	830-5408-00
66.	Bottom Arch	830-5507-01
67.	Shooter Gauge	830-5507-02

BACKBOX PARTS ILLUSTRATION

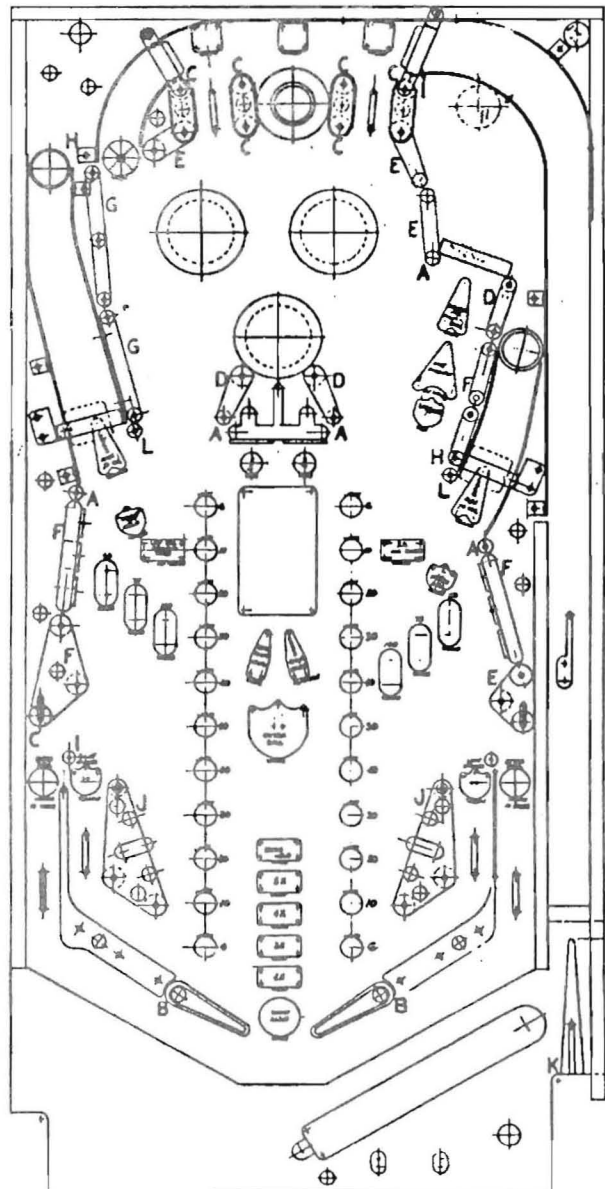


Item	Description	Part No.
1	CPU Board Assy.	520-5003-07
2	Sound Board Assy	520-5002-07
3	Capacitor 2C1	125-5000-00
4	Bridge Rectifiers	112-5000-00
5	Power Supply Bd. Assy	520-5000-00
6	PPB Board	520-5021-05
7	Combined Display Bd Assy*	520-5030-00
8	Display Ribbon Cable*	036-5001-30
9	Speaker Housing	500-5133-05
10	Speakers (2)	031-5003-00
11	Speaker Grill (2)	545-5086-00
12	Back Box Glass*	830-5207-00

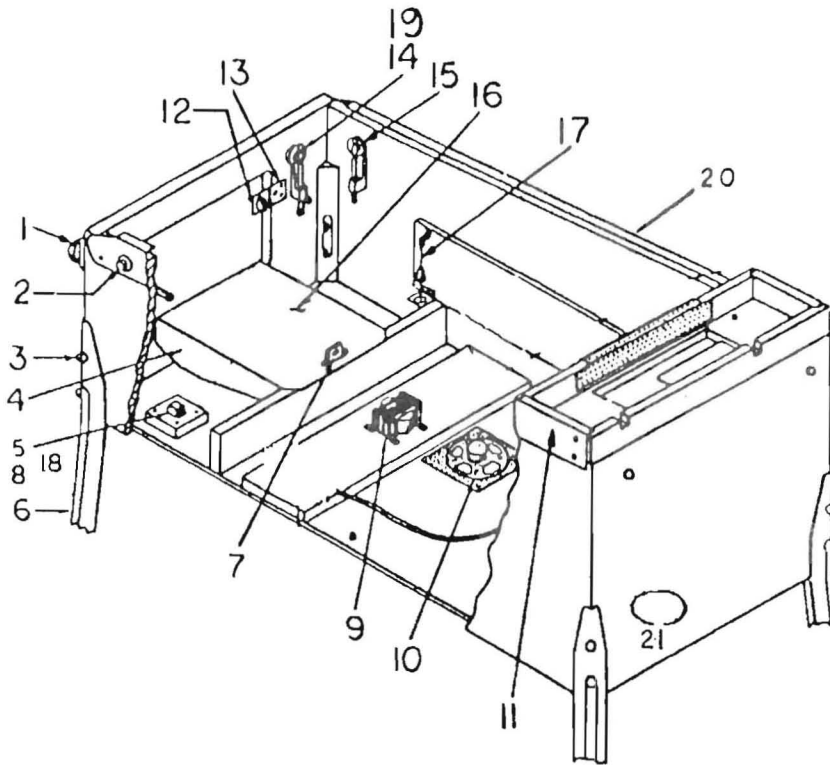
* Not Shown

RUBBER PARTS ILLUSTRATION

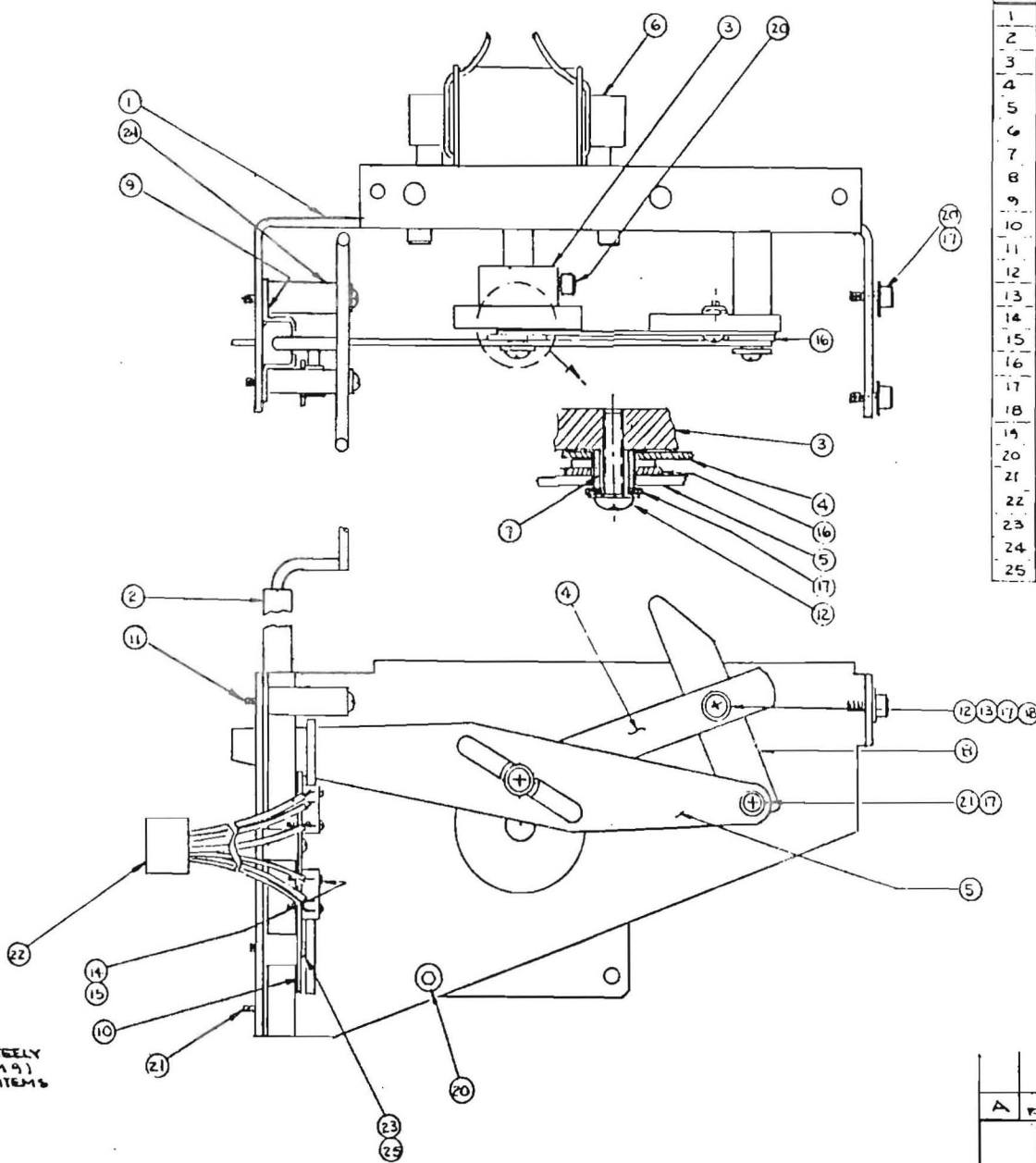
Item	Description	Part #
A.	Black Rubber Post (5)	545-5009-00
B.	Red Flipper (2)	545-5024-02
C.	$\frac{5}{16}$ " (7)	545-5025-02
D.	$\frac{3}{4}$ " (3)	545-5025-04
E.	1" (4)	545-5025-05
F.	$1\frac{1}{2}$ " (4)	545-5025-07
G.	2" (2)	545-5025-08
H.	$\frac{7}{16}$ " Outer Diameter (2)	545-5025-17
I.	$\frac{3}{8}$ " Outer Diameter (2)	545-5025-19
J.	$2\frac{3}{4}$ " (2)	545-5025-20
K.	Shooter Tip (1)	545-5027-00
L.	Conical Rubber (2)	545-5150-00



CABINET PARTS ILLUSTRATION



Item	Description	Part No.
1	Ball-shooter Assy	500-5019-04
2	Flipper Button	500-5026-02
3	Leg Bolt (Chrome)	231-5000-01
4	Cash Box Bottom	545-5090-00
5	On/Off Switch DP/ST	180-5001-00
6	Leg (Black)	535-5020-30
7	Lock Bracket-Cash Box	535-5215-00
8	Power Input Box Assy	515-5153-01
9	Transformer	010-5002-00
10	Speaker-Round (6")	031-5000-00
11	Side Armor-Right	535-5010-11
12	Memory Protect Switch	180-5000-00
13	Memory Protect Switch Bracket	535-5225-00
14	Start Switch	500-5026-02
15	Tungston Switch-Flipper	180-5048-00
16	Cash Box Top	535-5013-01
17	Plumb Bob Tilt Mech. Assy	500-5023-00
18	Volume Control	123-5000-00
19	Playfield Glass (Tempered)	660-5001-00
20	Side Armor -Left	535-5010-12
21	Line Cord Receptacle	545-5122-00
22	Service Switch (Not Shown)	180-5012-00
23	Front Molding Lockdown Assy.	500-5020-00
24	Front Molding -Black (Not Shown)	500-5021-10



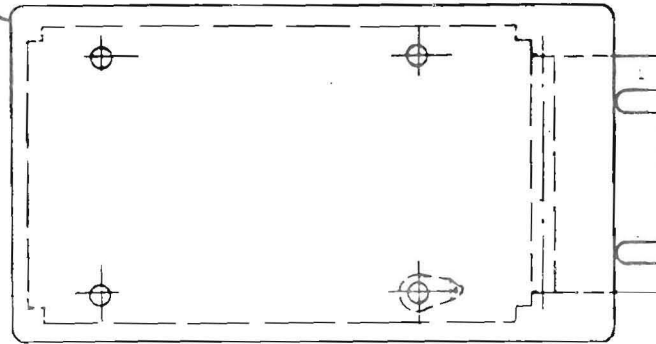
ITEM	PT. No.	DESCRIPTION	QTY
1	515-522B-00	BRKT-POST SUB ASSY	1
2	515-5229-00	GOAL POST-SUP S'ASSY	1
3	535-5137-00	DRIVE COUPLING	1
4	535-5134-00	RAMP LIFT LINK	1
5	535-5136-00	GOAL POST LIFT LINK	1
6	515-5222-00	MOTOR ASSY	1
7	530-5089-01	SPACER 3/16 THK	1
8	545-5139-00	LIFT CAM	1
9	555-5155-04	GUIDE BRKT	2
10	535-5163-00	SWITCH MTG BRKT	1
11	237-550B-00	SCR #6-32 x 1/4	2
12	237-5502-00	SCR #8-32 x 1/2	2
13	240-5102-00	NUT #8-32 NYLOC	1
14	180-5056-00	SWITCH	2
15	237-5806-00	SCREW 2-5/16 x 1/2	4
16	242-500B-00	WASHER 3/8 O.D. 1/4 I.D.	2
17	242-5010-00	WASHER 1/2 O.D. 7/32 I.D.	5
18	530-5089-02	SPACER .01 THK	1
19			
20	237-5845-00	SOC HD C SCK 10-32 x 3/8	6
21	231-5501-00	SCRW 6-32 x 3/8	3
22	036-5091-00	CABLE ASSY	1
23	254-5000-01	SPACER	2
24	254-5000-04	SPACER	2
25	232-5203-00	SCRW #6-32 x 3/8	2

NOTES:
 1. ITEM 2 MUST MOVE FREELY
 WITHIN ITS GUIDES (ITEM 9)
 2. APPLY LOCTITE (RED) TO ITEMS
 13, 11, 21, 20

A	REVIEWED	6-5-89
 DATA EAST PINBALL, INC 1880 JANICE AVE., MELROSE PARK, IL 60180		
SCALE: 1:1	APPROVED BY	DRAWN BY: JLL
DATE: 4-20-89		
GOAL POST TOP ASS'Y		
		DRAWING NUMBER 500-5146-00

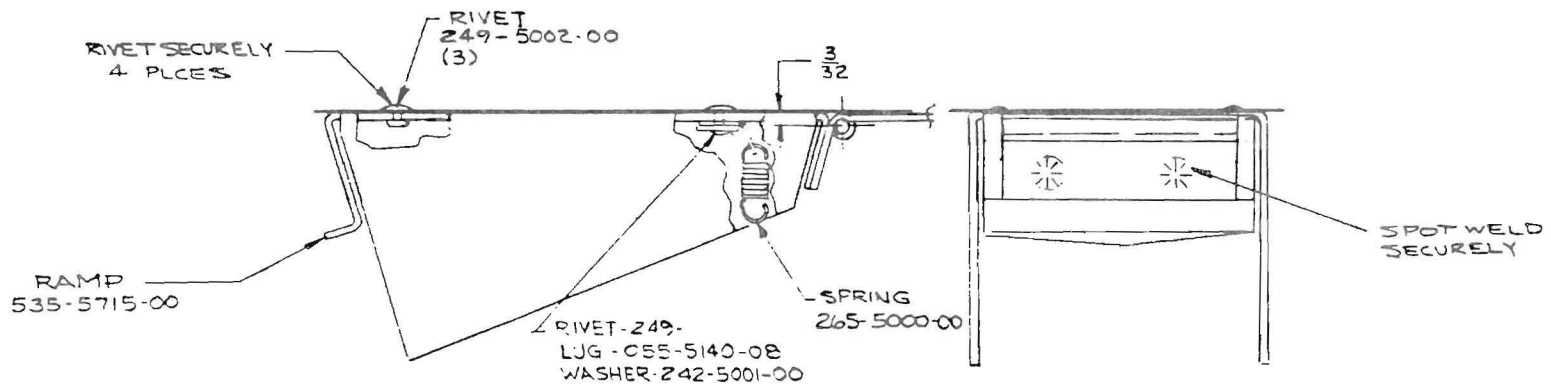
REV	DESCRIPTION	BY	DATE	APP
A	ADD NOTE	JLL	4-25-88	
B	ADD STRANG	JLL	5-19-89	

RAMP COVER
535-5124-00



HINGE
390-5003-00

NOTE:
RAMP PLATE MUST LAY FLAT ON
RAMP, SHOWING NO DISTORTION DUE
TO RIVETING.



TOLERANCE UNLESS
OTHERWISE SPECIFIED

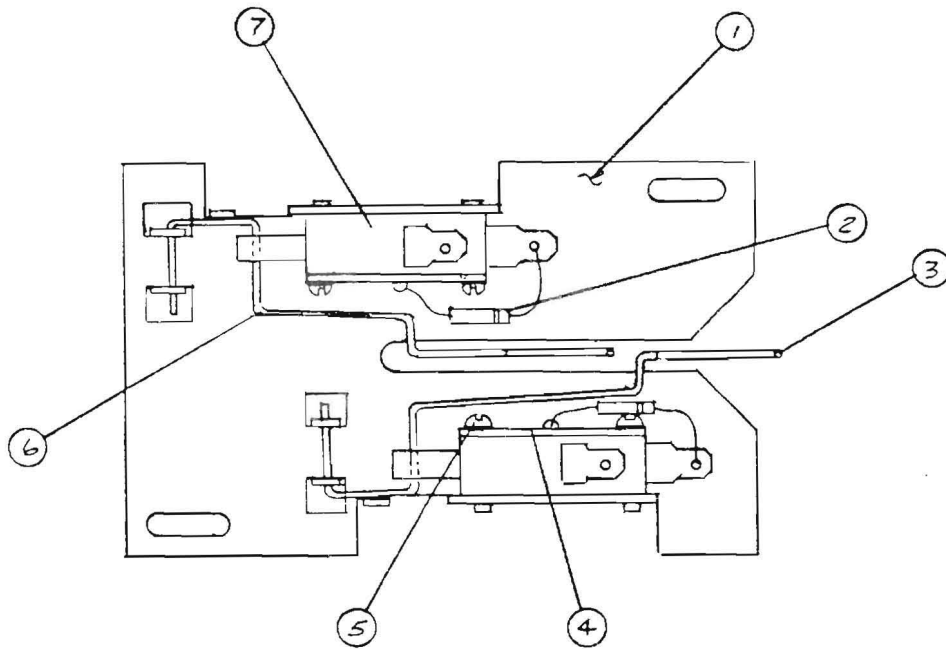
DIM XXX ± .05 XXXX ± .075
 XXX ± .015 XXXXX ± .1

ANGULAR
 0 ± .5°
 XXX ± .1°

FRACTIONAL ± .001

REQ. 1	NEXT ASSEM. 2/2-20	DWM. JLL	DATE 12-12-88	TITLE RAMP SUB-ASSY
MAT. X	CHKD.	SCALE III		
H.T. X	DE DATA EAST PINBALL, INC.		PART NO. 515-5196-00	
FIN. PAINT RAMP ELEG. BLACK AFTER WELDING.		1990 JANICE AVE., MELROSE PARK, IL 60160		

REV	DESCRIPTION	BY	DATE	APP
ITEM	PART. No.	DESCRIPTION	QTY.	
1	535-5786-00	SWITCH PLATE	1	
2	112-5001-00	1N4004 DIODE	2	
3	535-5320-00	ROLLOVER WIRE	1	
4	515-5249-00	DIODE BOARD Assy	2	
5	237-5832-00	4-40X 3/8 M.S.	4	
6	535-5316-00	ROLLOVER WIRE	1	
7	180-5009-00	MICRO SWITCH	2	



TOLERANCE UNLESS OTHERWISE SPECIFIED

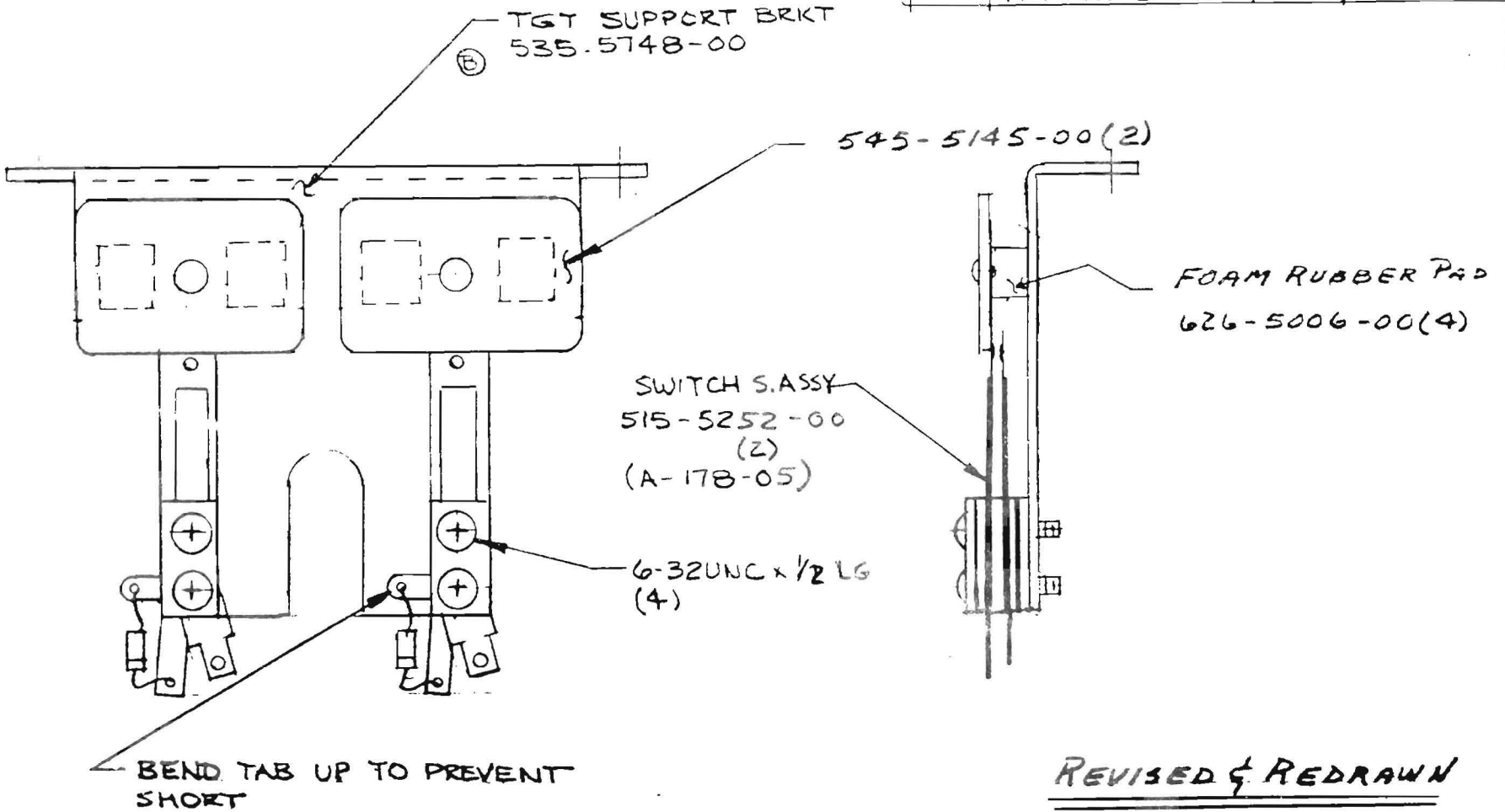
DIM XXX ± .05 XXXX ± .005
 XXX ± .015 XXXX ± .001

ANGULAR
 1/2° ± .01
 1/4° ± .01

FRACTIONAL ± .001

REQ. ONE	NEXT ASSEM.	OWN. E.D.C	DATE 6-27-89	TITLE SWITCH PLATE ASSEMBLY
MAT. NOTED		CHKD.	SCALE	
H.T. —		DE DATA EAST PINBALL, INC.		PART NO. 500-5135-00
FIN. —		1990 JANICE AVE., MELROSE PARK, IL 60160		

REV	DESCRIPTION	BY	DATE	APP
A	REVISED & REDRAWN	ED C	4-4-89	
B	REVISED	JLL	5-20-89	
C	RELOCATED FOAM ADD NOTE	JLL	8-10-89	



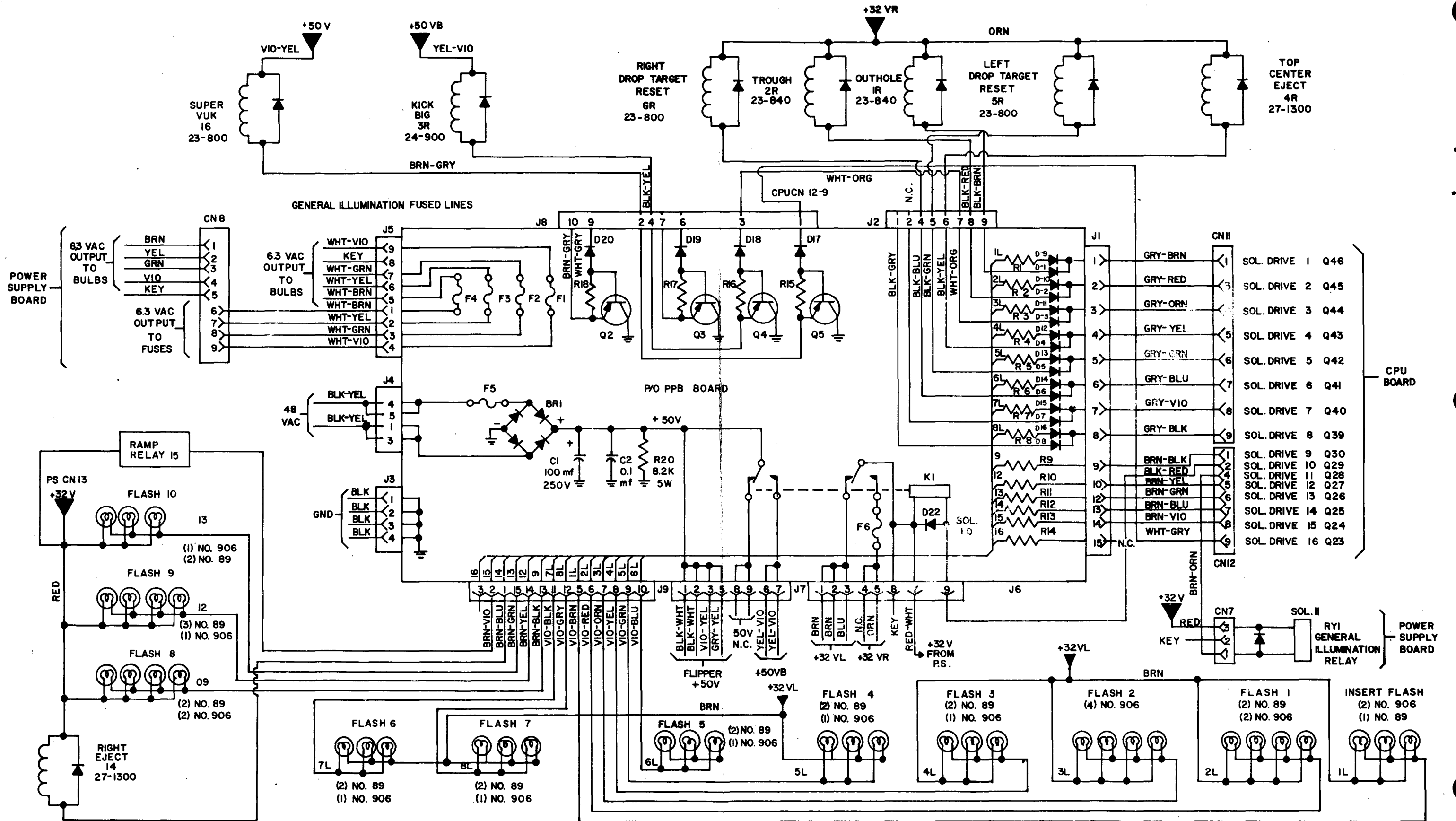
TOLERANCE UNLESS
OTHERWISE SPECIFIED

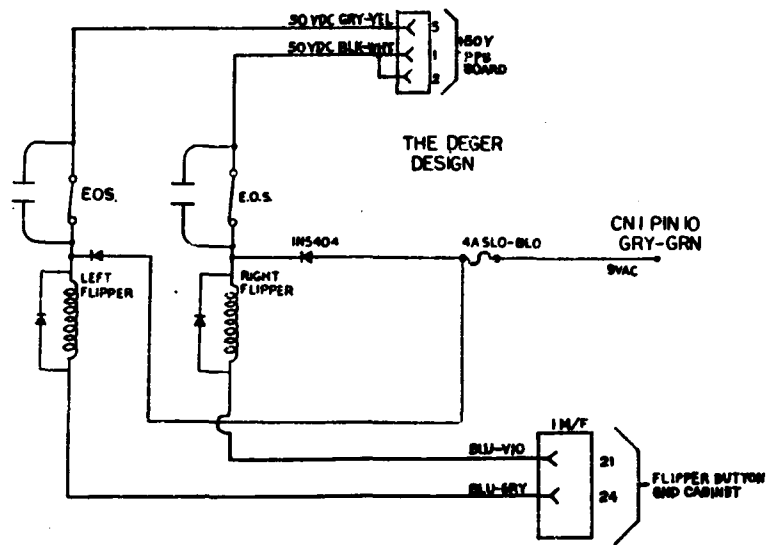
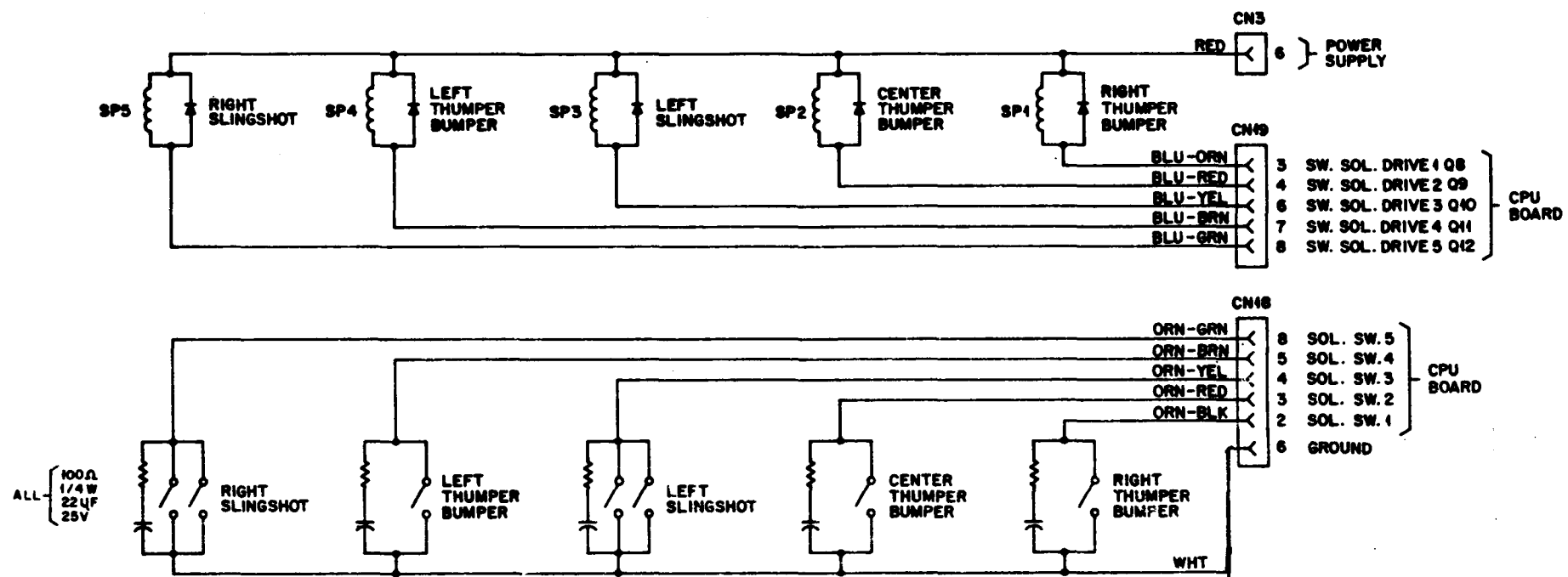
DIM. XX ± .05 X.XXX ± .005
 XX ± .015 X.XXXX ±

ANGULAR
XX ± 5°
XXX ± .1°

FRACTIONAL ± 1/64

REQ. ONE	NEXT ASSEM.	DWN. ED.C	DATE 4-4-89	TITLE 2 TARGET S/U SW. ASSY
MAT. NOTED		CHKD.	SCALE H	
H.T. H	DATA EAST PINBALL, INC.			PART NO. 500-5176-00
FIN. H	1990 JANICE AVE., MELROSE PARK, IL. 60160			

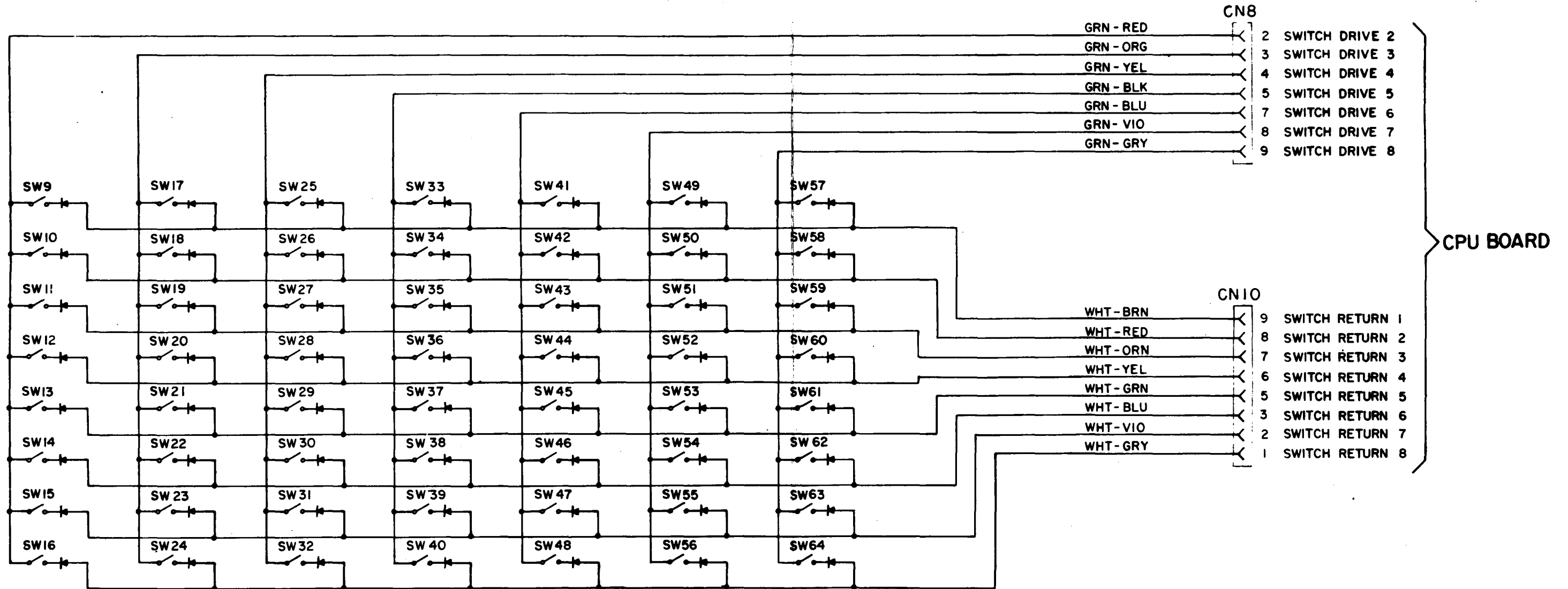




Switch Number Description

01*	Plumb Tilt	16	Right Flp. Instant Info.	31	Kick-Off 30 Yards	46	Left Pop Bumper	Switch Drive 1	Q55
02	Not Used		Right EOS	32	Kick-Off 40 Yards	47	Center Pop Bumper	Switch Drive 2	Q54
03	Credit Button	17	Left Outlane	33	Left Bank 1 (Top)	48	Right Pop Bumper	Switch Drive 3	Q53
04*	Right Coin	18	Left Return Lane	34	Left Bank 2 (Center)	49	U Target	Switch Drive 4	Q52
05*	Center Coin	19	Right Outlane	35	Left Bank 3 (Bottom)	50	P Target	Switch Drive 5	Q51
06*	Left Coin	20	Right Return Lane	36	Left Spinner	51	Left Ramp Bottom	Switch Drive 6	Q50
07*	Slam Tilt	21	Left Slingshot Trigger Sw.	37	Left VUK	52	Not Used Thru 64	Switch Drive 7	Q49
08	Not Used		Left Slingshot Point Sw.	38	Right Spinner			Switch Drive 8	Q48
09	Not Used	22	Right Slingshot Trigger Sw.	39	Right Eject				
10	Out Hole		Right Slingshot Point Sw.	40	Not Used				
11	Trough #1	23	Ramp Up	41	Right Bank 1 (Top)				
12	Trough #2	24	Ramp Down	42	Right Bank 2 (Center)				
13	Trough #3	25	A Lane	43	Right Bank 3 (Bottom)				
14	Shooter Lane	26	B Eject	44	Left Ramp Top				
15	Left Flp. Instant Info.	27	C Lane	45	Right Ramp				
		28	Not Used						
		29	Kick-Off 10 Yards						
		30	Kick-Off 20 Yards						

* Indicates cabinet switches.



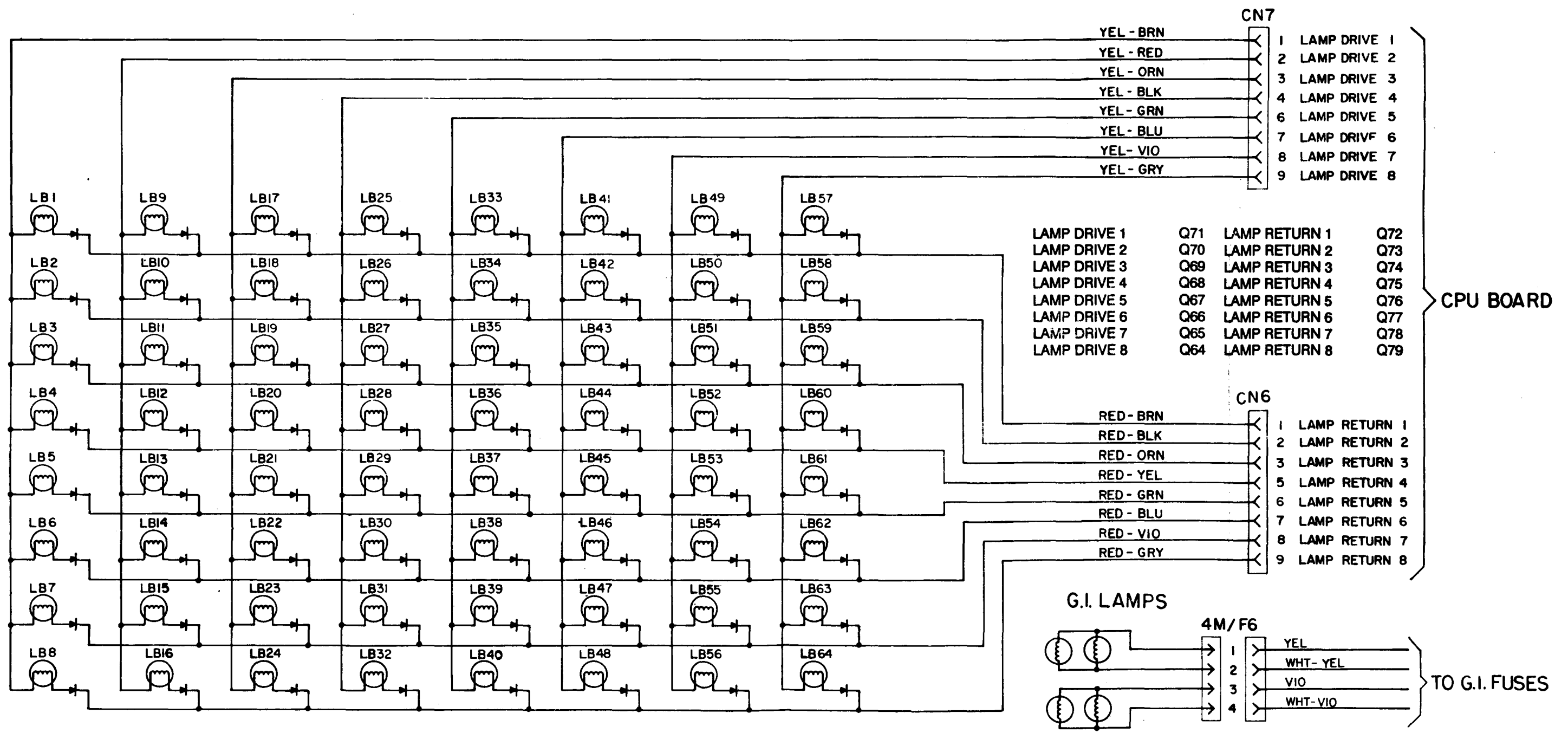
Lamp Number	Description
01	10 Yard Bottom
02	2x
03	3x
04	4x
05	Right Return
06	Right Extra Ball
07	Left Extra Ball
08	Left Return
09	Right Goal
10	20 Yard Bottom
11	Shoot Again
12	Left Goal
13	Right Bank 100k
14	Right Bank 75k
15	Right Bank 50k
16	Extra Ball Shield

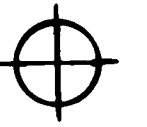
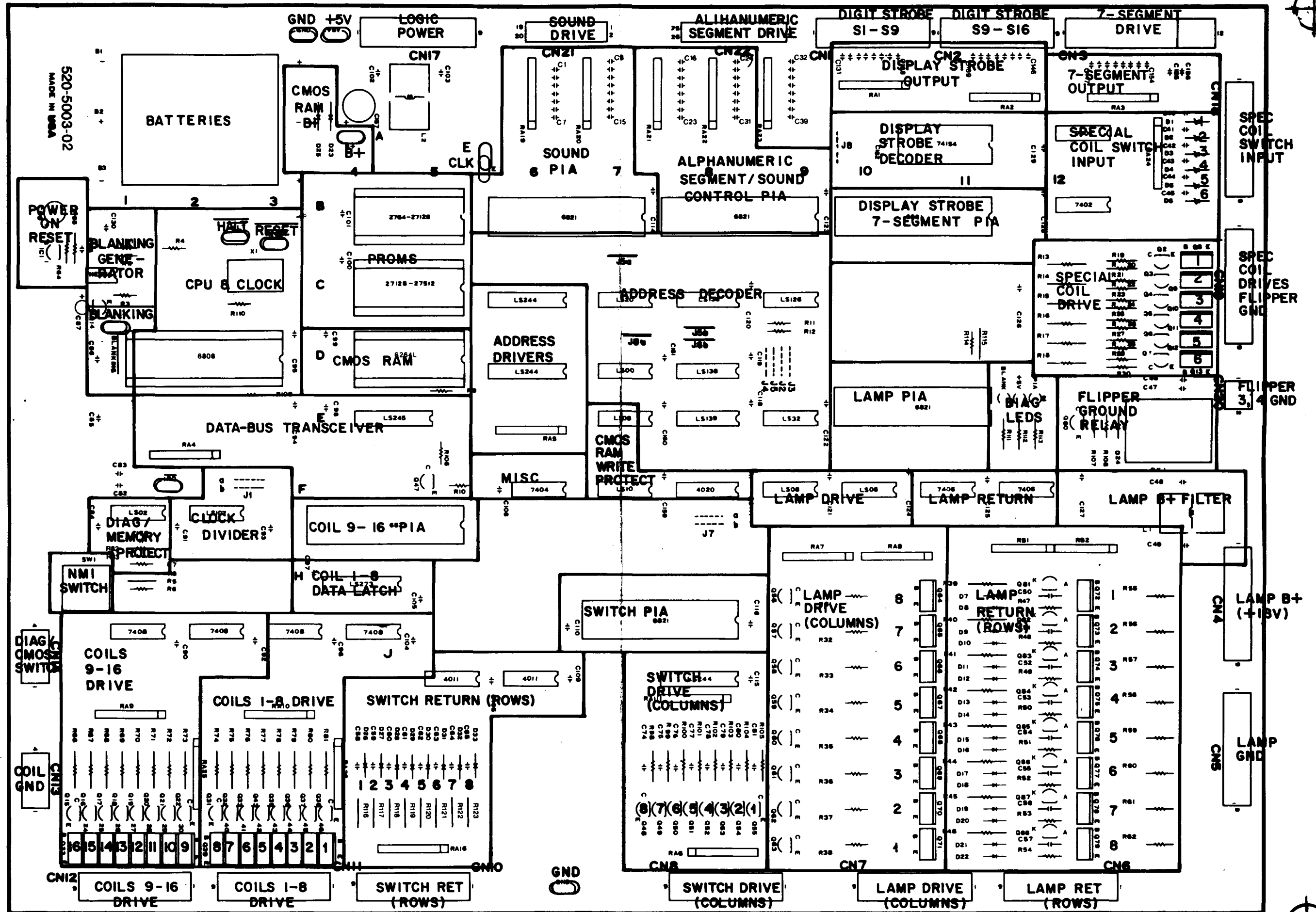
17	5x
18	Bonus Hold
19	30 Yard Bottom
20	Left Bank 100k
21	Left Bank 75k
22	Left Bank 50k
23	Bonus Shield
24	Goal Targets
25	A Lane
26	B Eject
27	C Lane
28	40 Yard Bottom
29	Top Goal
30	Left Lock Ball
31	U Target
32	P Target

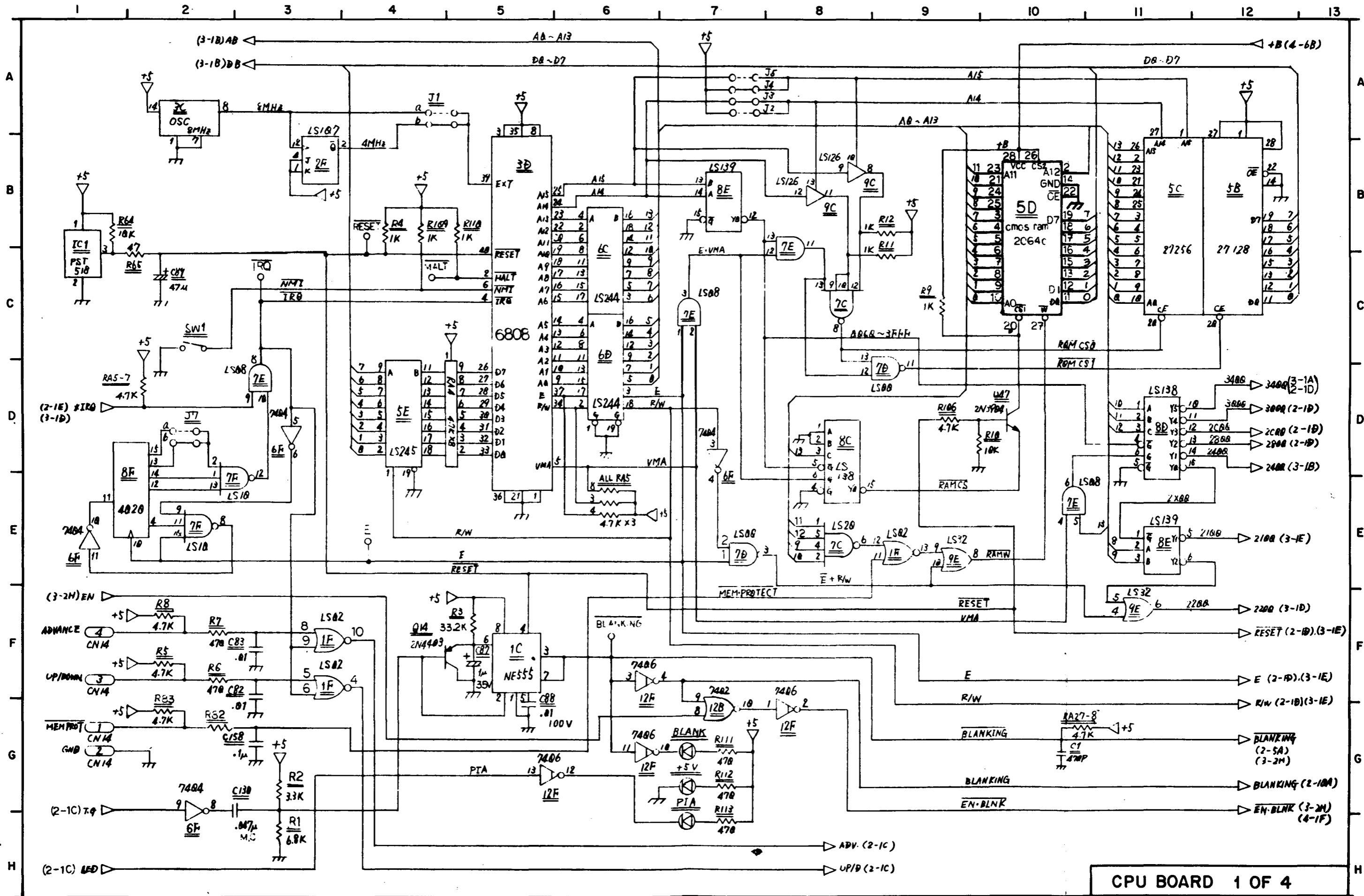
* Indicates insert board lamps.

33	10 Yard Lamp
34	20 Yard Lamp
35	30 Yard Lamp
36	40 Yard Lamp
37	50 Yards
38	Right Arrow
39	Left Arrow
40	10 Yard Top
41*	Million Jackpot
42*	Jackpot 1
43*	Jackpot 2
44*	Jackpot 3
45	Center Extra Ball
46	40 Yard Top
47	Right Goal
48	2x Scores

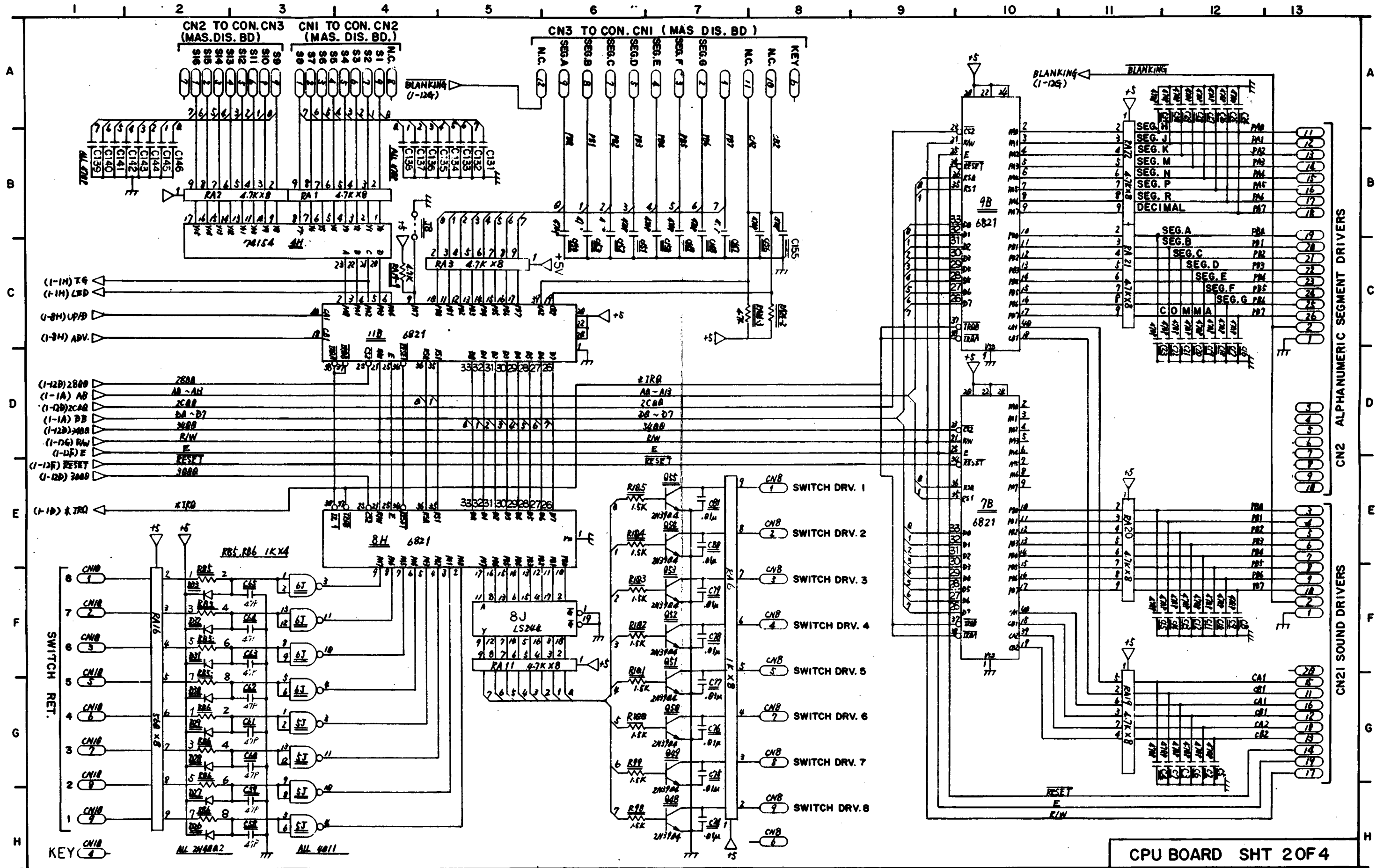
49	Back Panel Sacked
50	Back Panel 10 Yard
51	Back Panel 20 Yard
52	Back Panel 30 Yard
53	Back Panel 40 Yard
54	Back Panel 50 Yard
55	30 Yard Top
56	Right Ball Lock
57	Top Special
58	Top Million
59	Right Release
60*	Jackpot 4
61*	Jackpot 5
62*	Jackpot 6
63	10 Yard Top
64	20 Yard Top

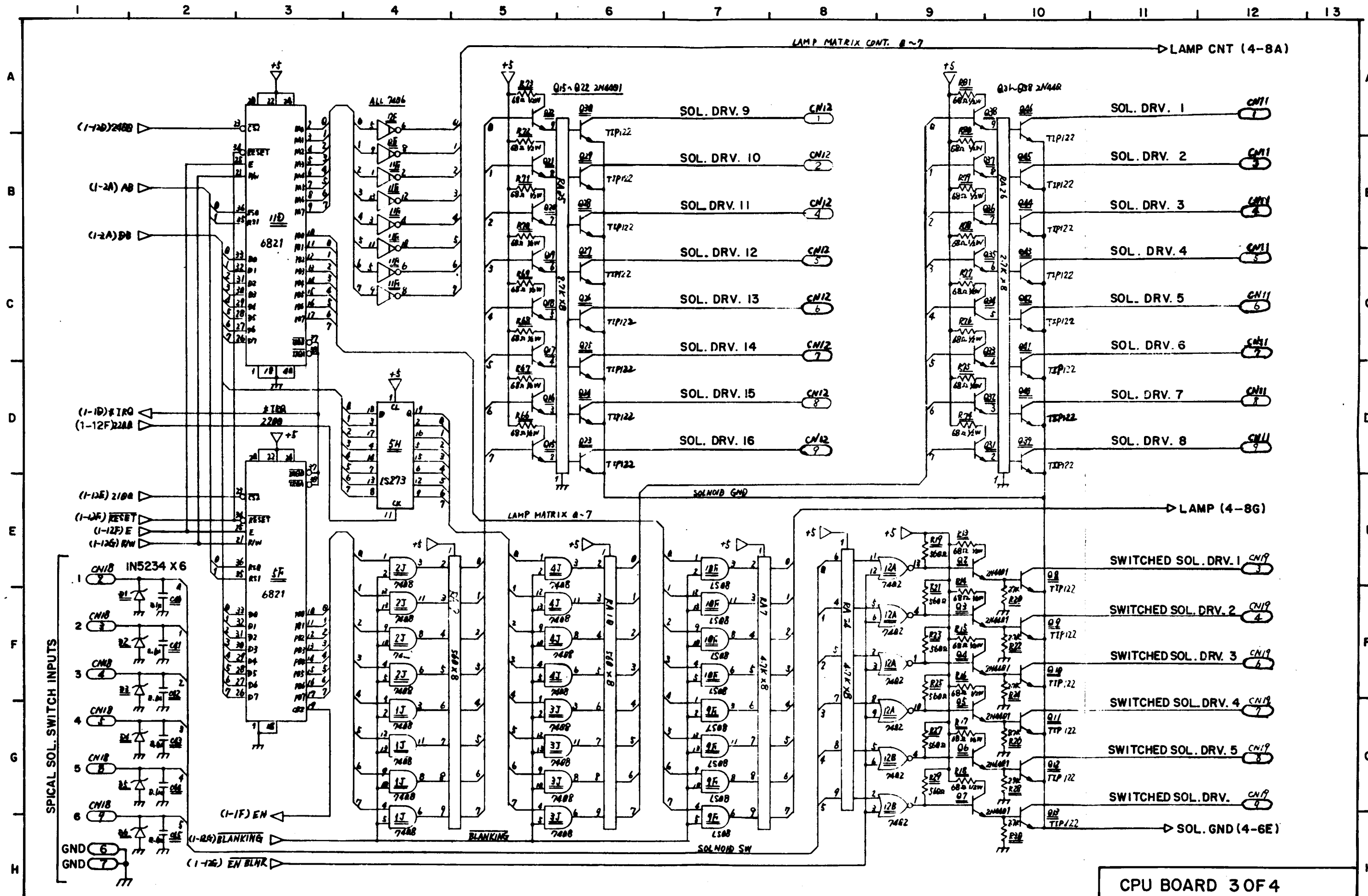




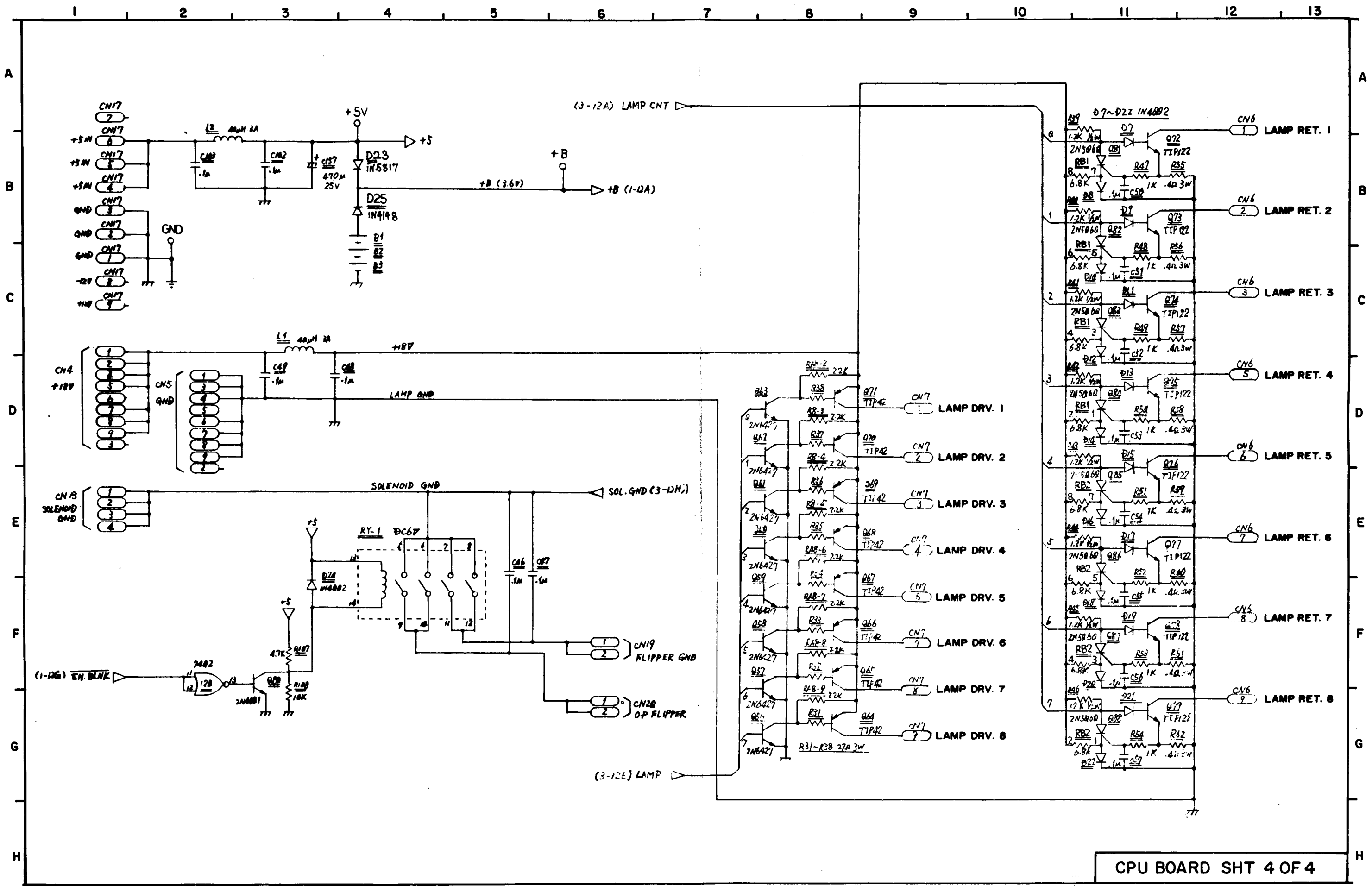


CPU BOARD 1 OF 4

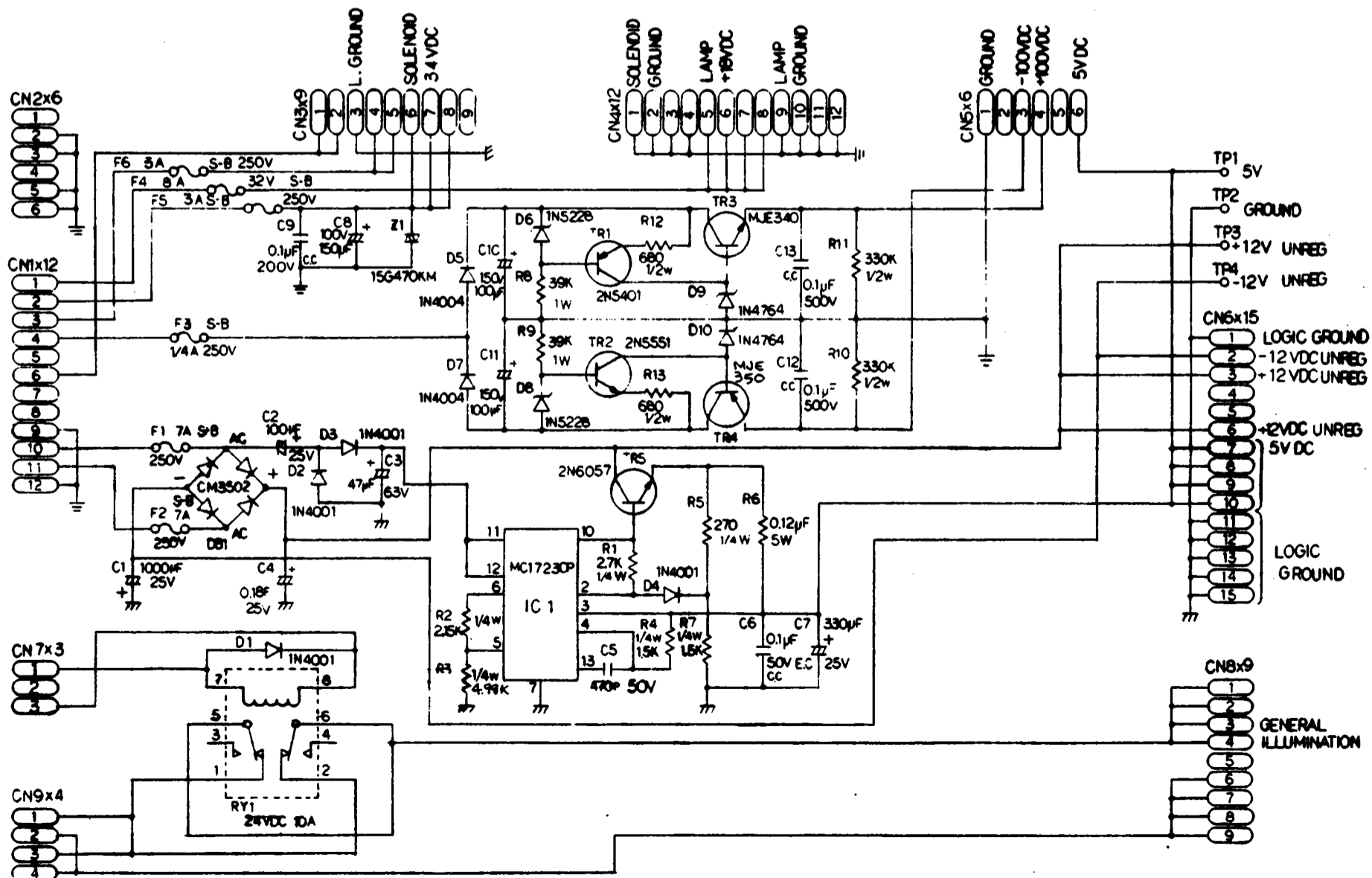
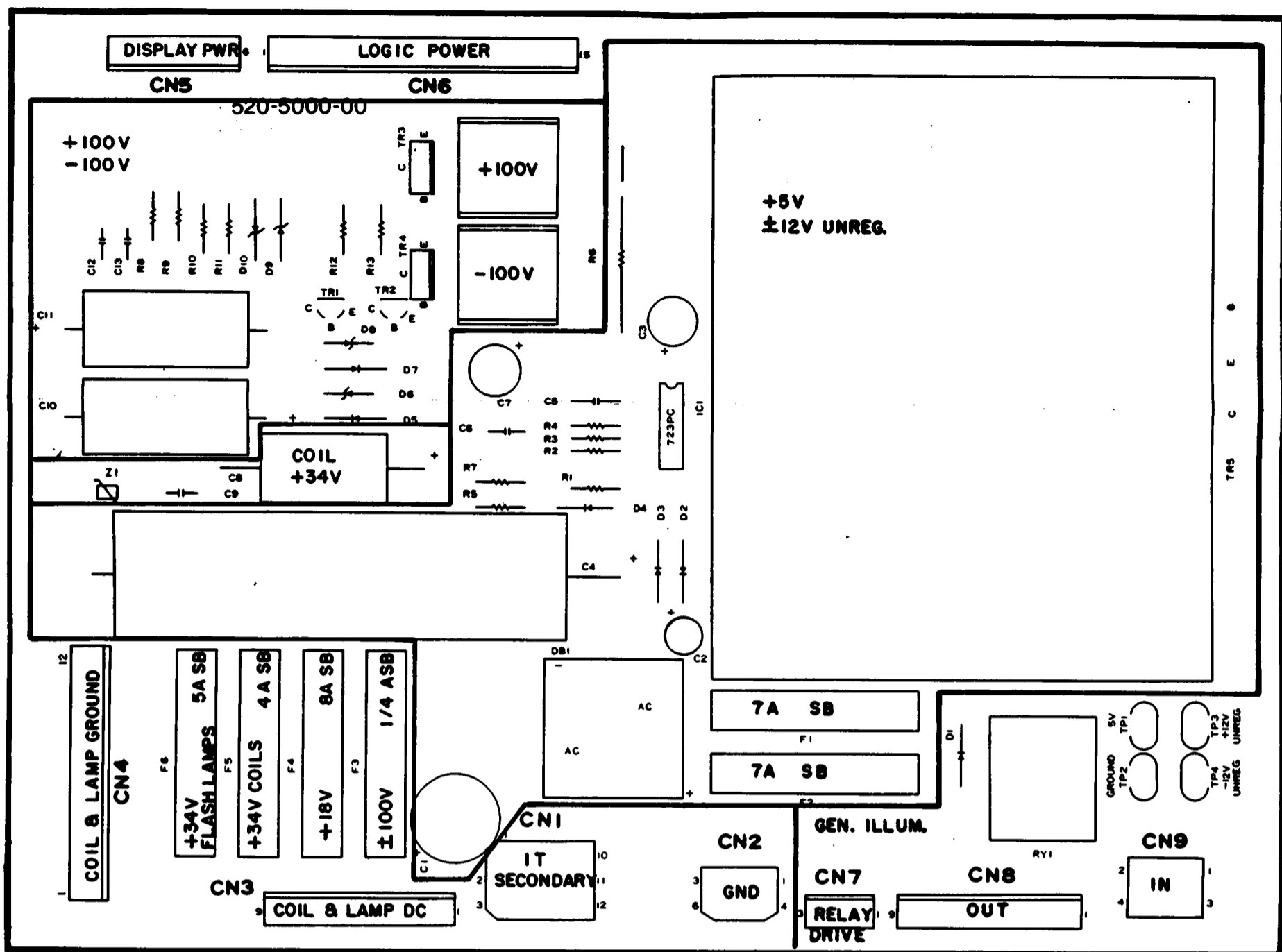


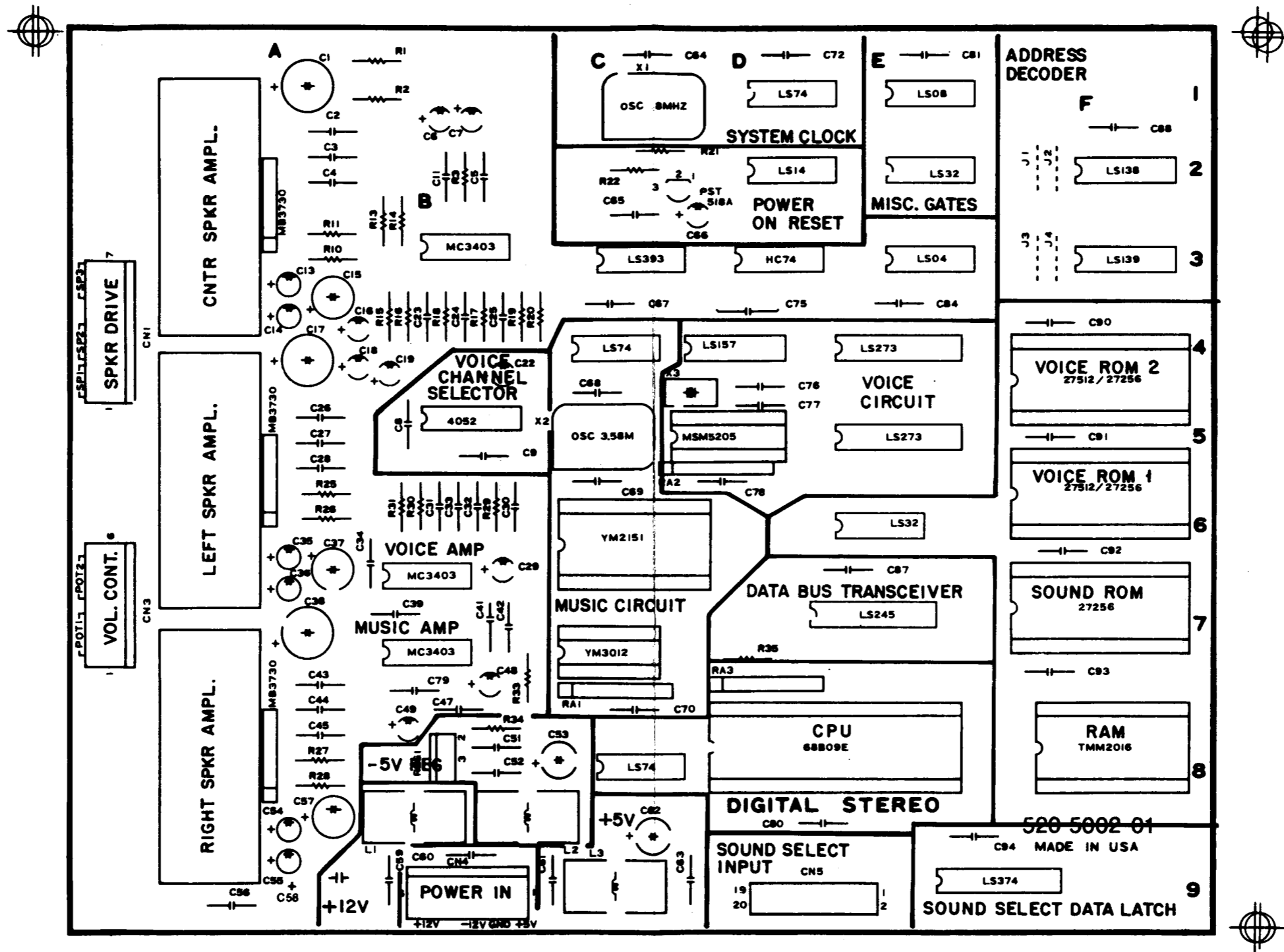


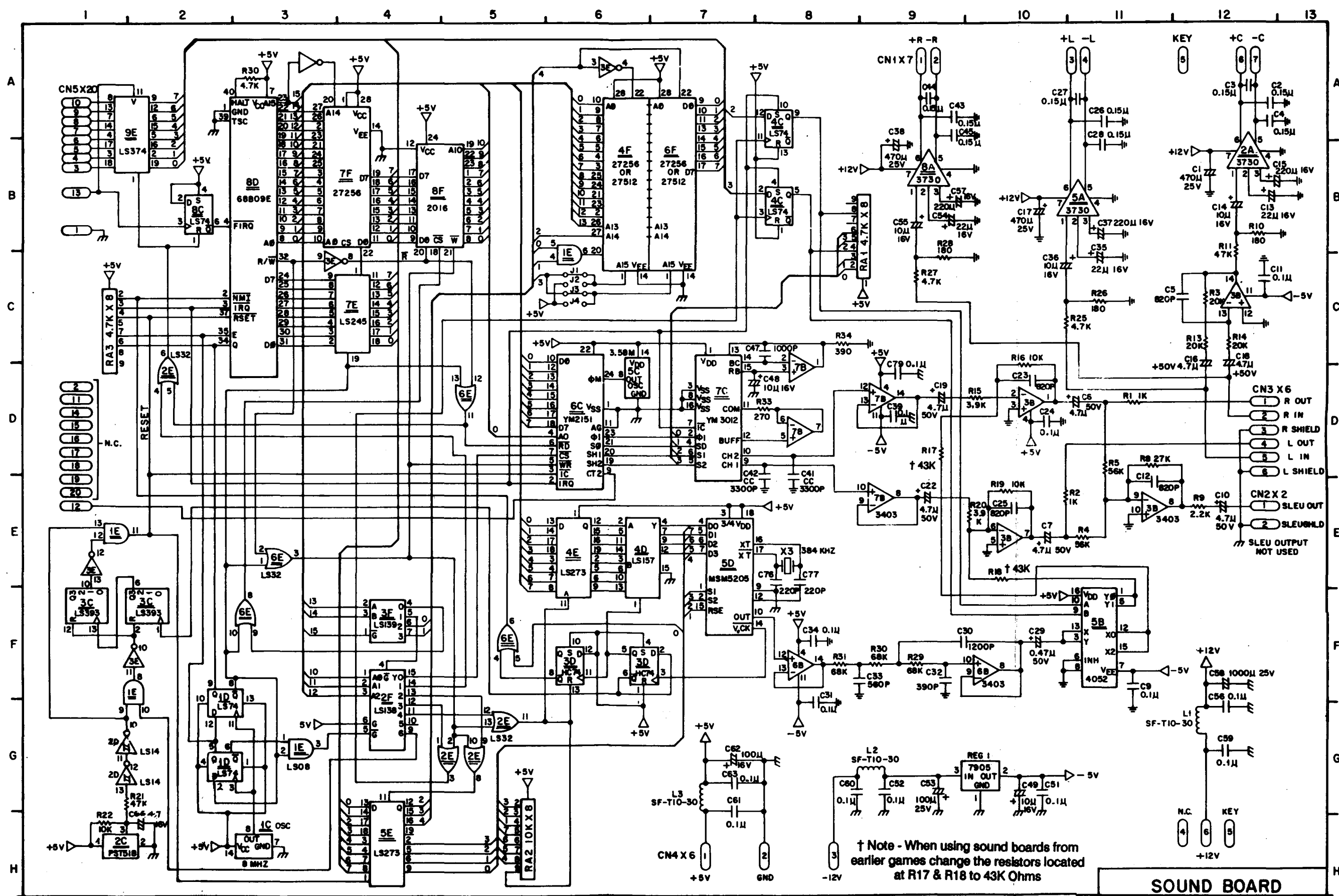
CPU BOARD 3 OF 4



CPU BOARD SHT 4 OF 4





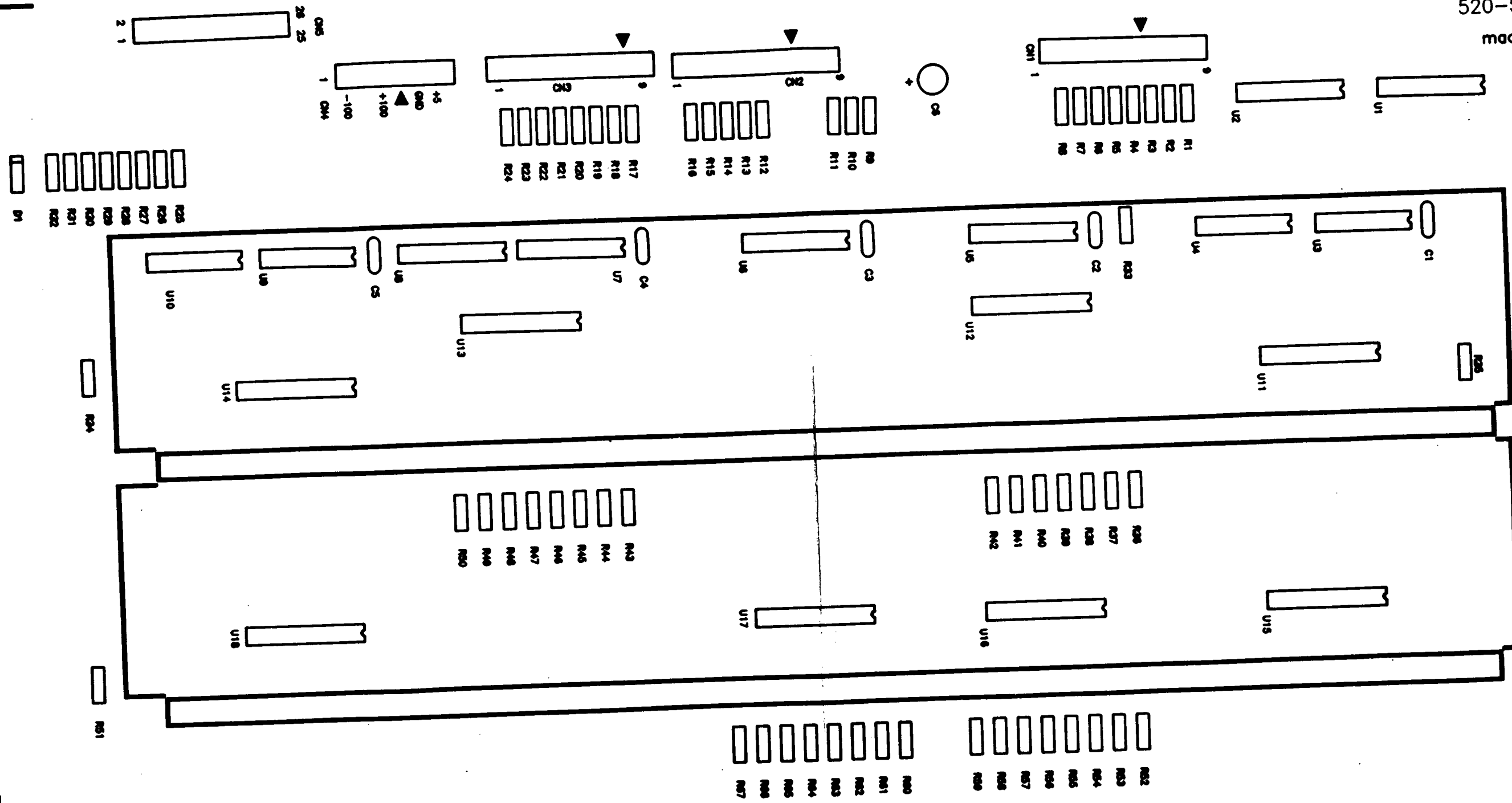


† Note - When using sound boards from earlier games change the resistors located at R17 & R18 to 43K Ohms

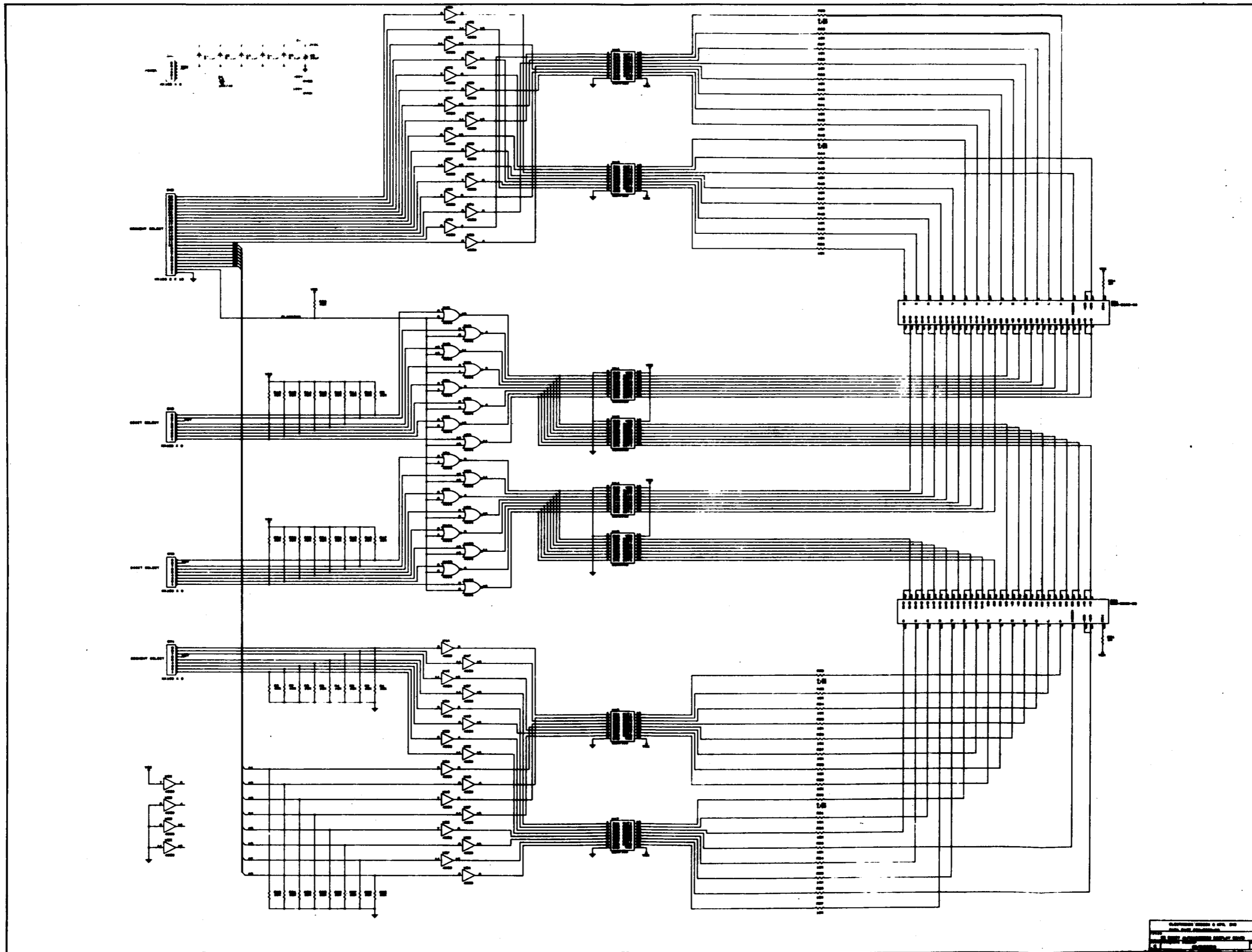
SOUND BOARD

Sound Board Logic Diagram

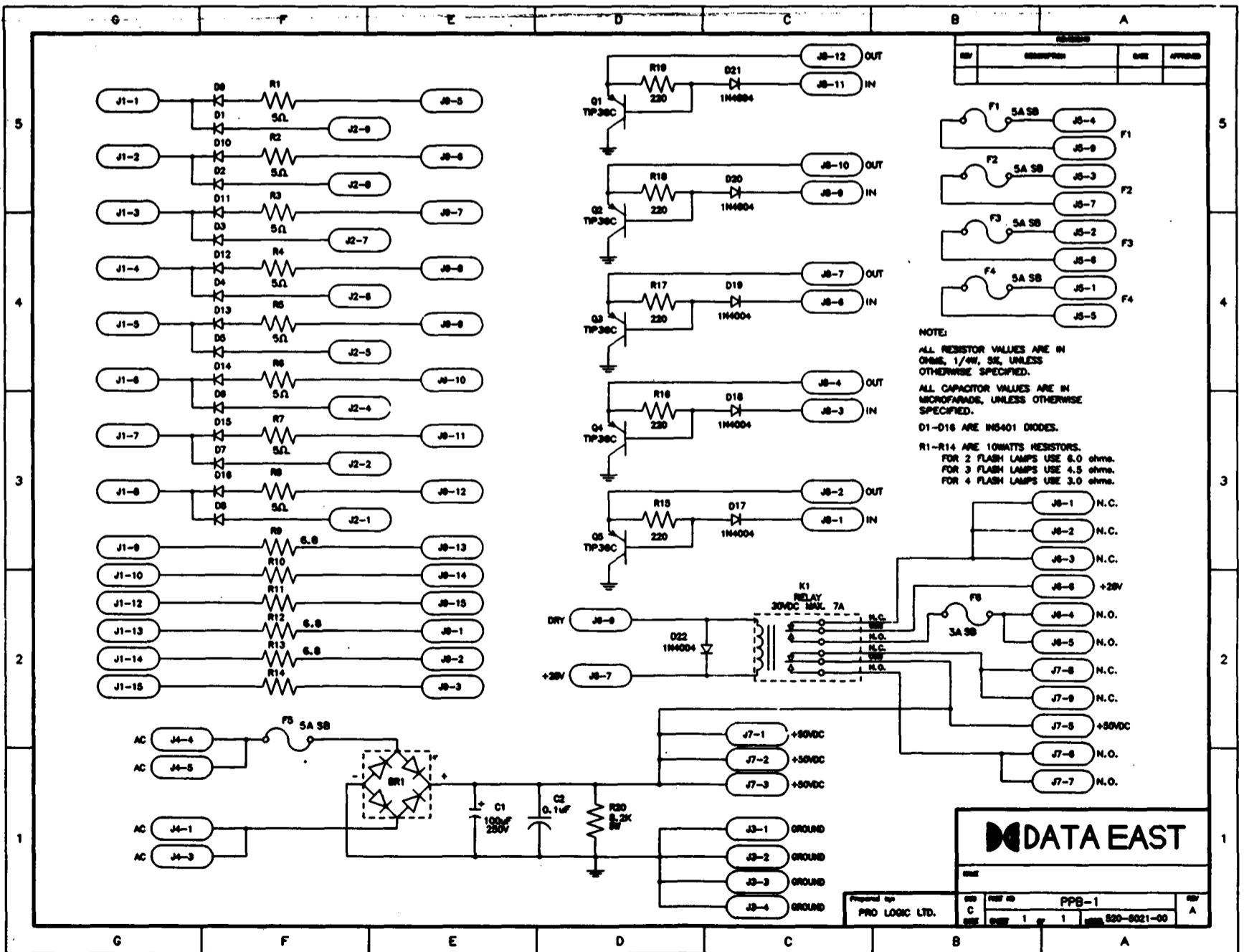
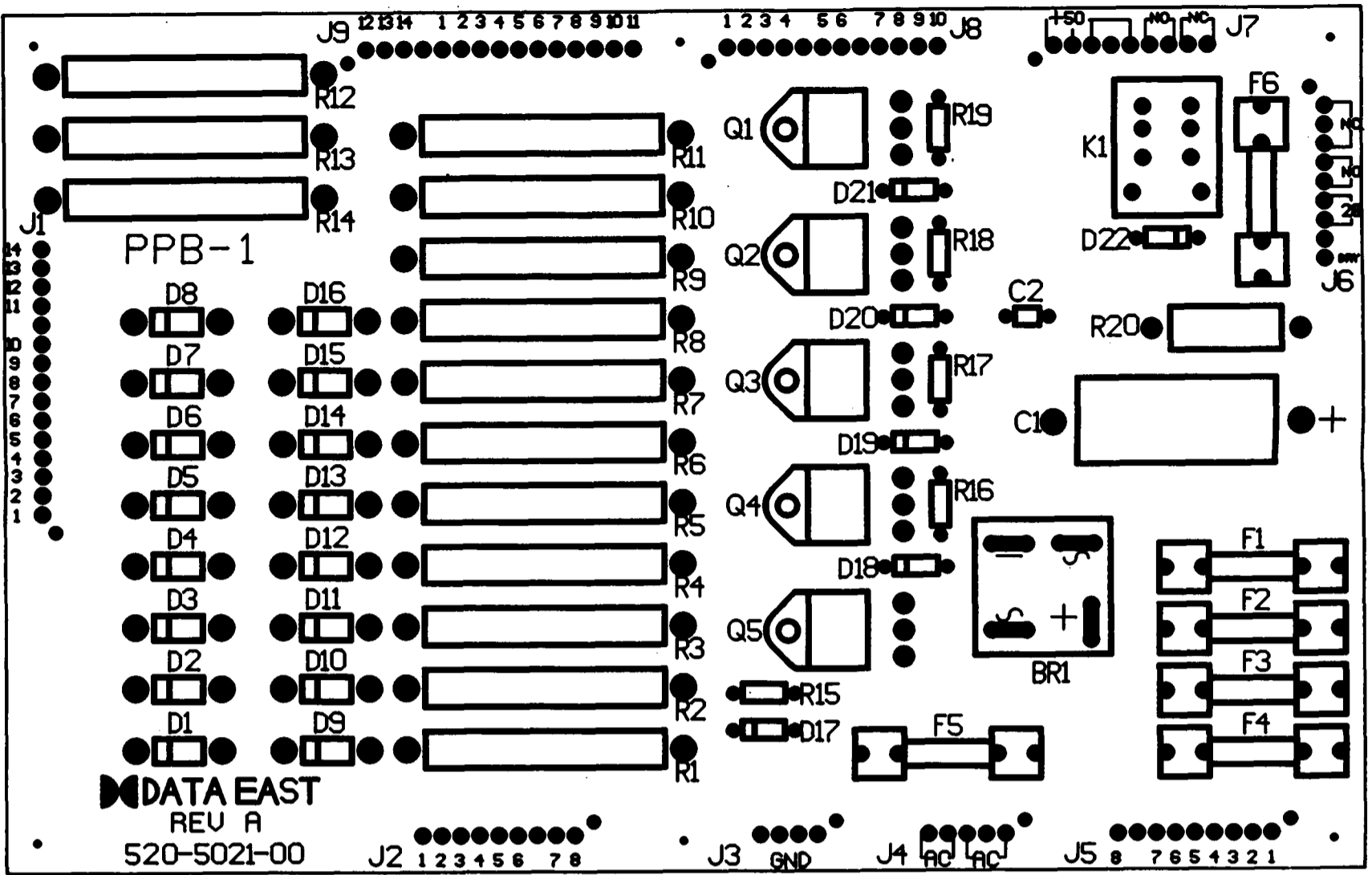
520-5030-00
made in USA

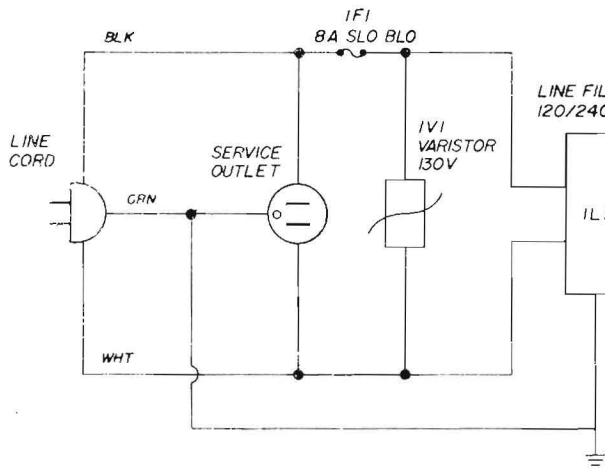


REV B



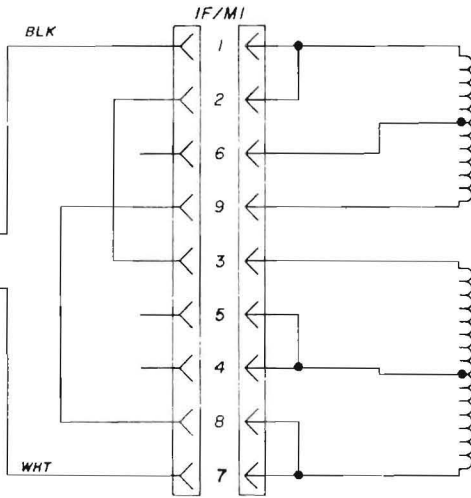
Combined Display Logic Diagram





THIS CONFIGURATION FOR 115V

FOR LOWER LINE VOLTAGES
OR 230 VOLT OPERATION
SEE SAMPLES BELOW



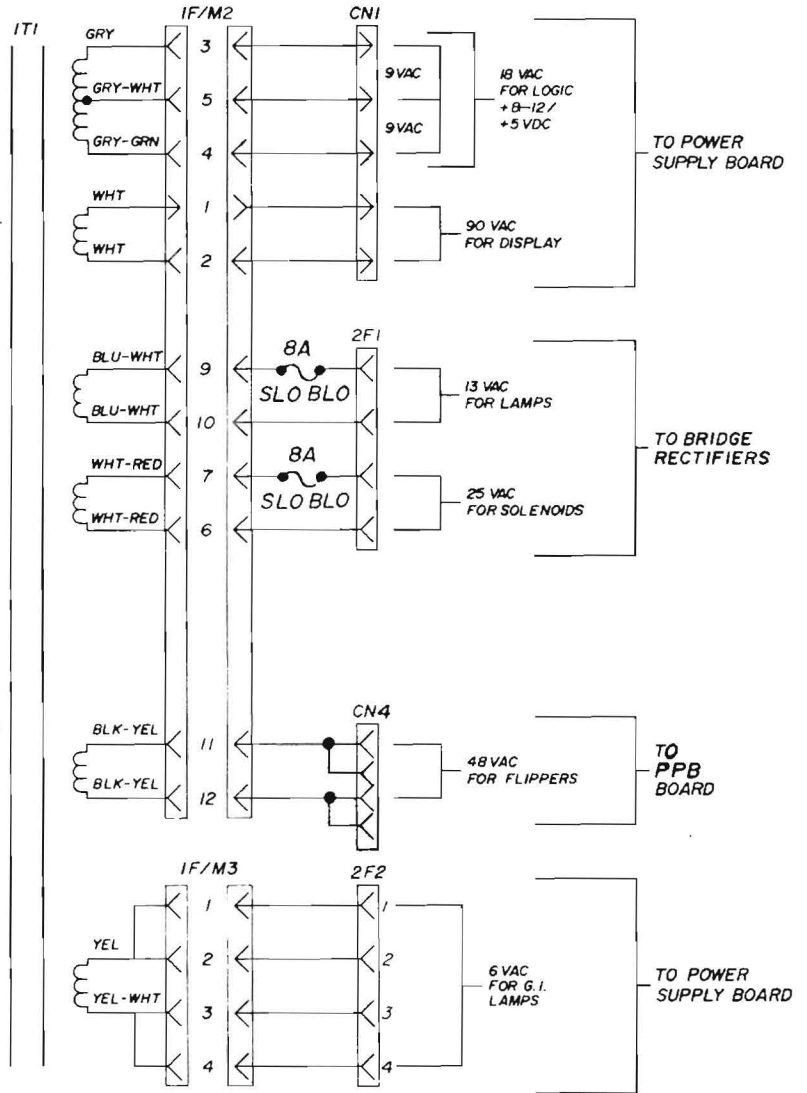
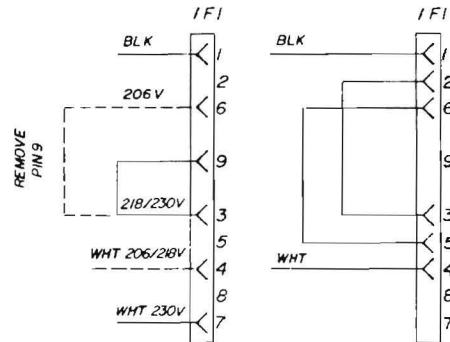
JUMPERS FOR VOLTAGE VARIATION

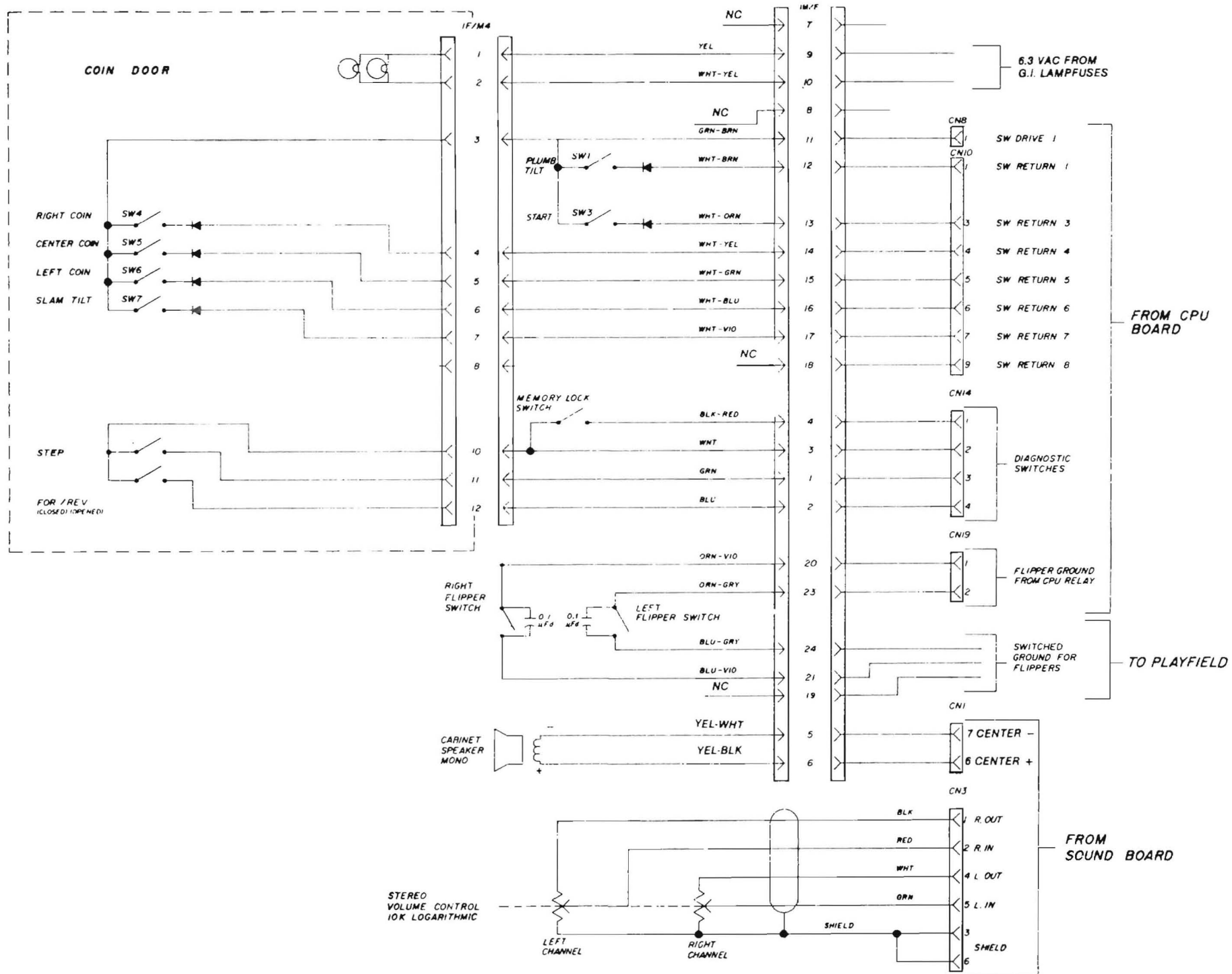
230/218/206 VOLTS

IF1 = 4A SLO BLO
IVI = 275V VARISTOR

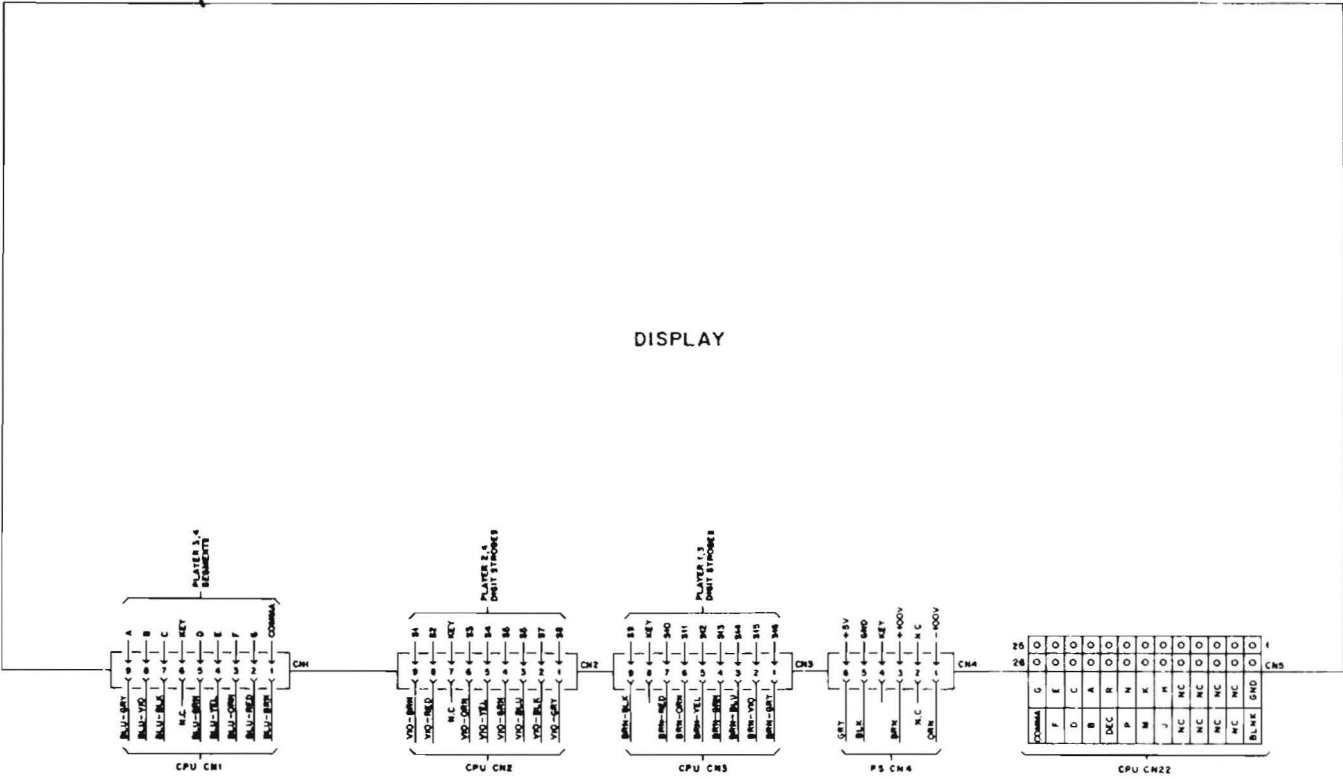
100 / 105 VOLTS

IF1 = 8A SLO BLO
IVI = 130V VARISTOR





DISPLAY





1
2



3
4





1

2



3

4

