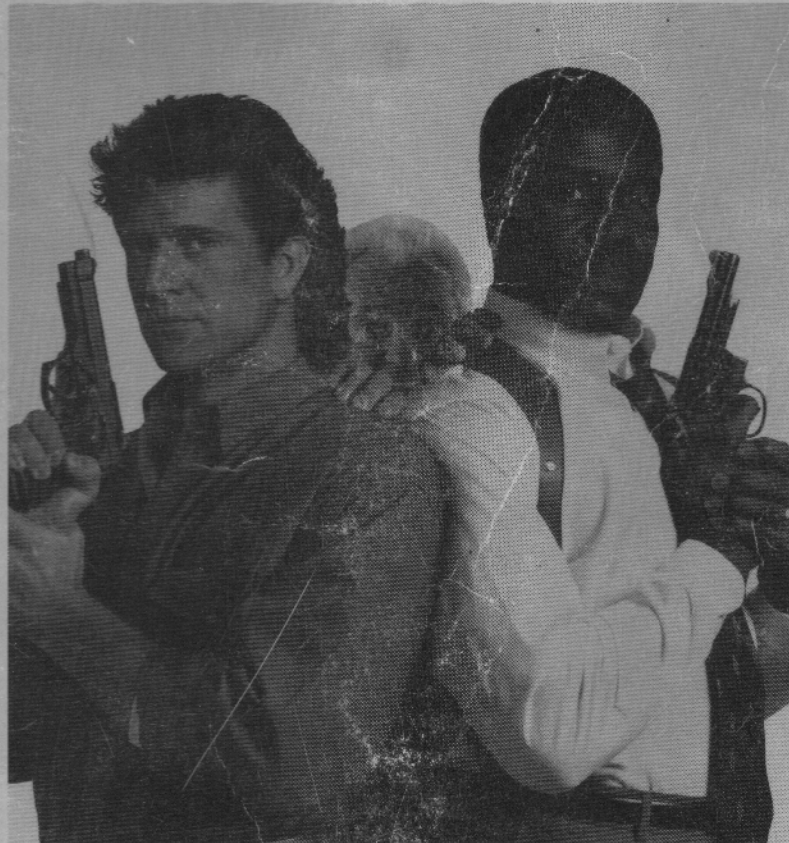


DE DATA
EAST

LETHAL WEAPON 3



DATA EAST PINBALL®

1990 Janice Avenue
Melrose Park, IL 60160
708-345-7700
FAX 708-345-7718
1-800-KICKERS

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
Robocop	Ver 2	5B,5C	J1b,J3,J4,J5b,J6b,J7b,&J8	J1a,J2,J5,J5a,J6a,&J7a
Phantom of the Opera	Ver 2	5B,5C	J1b,J3,J4,J5b,J6b,J7b,&J8	J1a,J2,J5,J5a,J6a,&J7a
Back to the Future	Ver 3	5B,5C	J1b,J3,J4,J5b,J6b,J7b,&J8	J1a,J2,J5,J5a,J6a,&J7a
The Simpsons	Ver 3	5B,5C	J1b,J3,J4,J5b,J6b,J7b,&J8	J1a,J2,J5,J5a,J6a,&J7a
Checkpoint	Ver 3	5B,5C	J1b,J3,J4,J5b,J6b,J7b,&J8	J1a,J2,J5,J5a,J6a,&J7a
Teen. Mut. Ninja Turtles	Ver 3	5B,5C	J1b,J3,J4,J5b,J6b,J7b,&J8	J1a,J2,J5,J5a,J6a,&J7a
Batman	Ver 3	5B,5C	J1b,J3,J4,J5b,J6b,J7b,&J8	J1a,J2,J5,J5a,J6a,&J7a
Star Trek	Ver 3	5C	J1b,J3,J5,J5b,J6b,J7b,&J8	J1a,J2,J4,J5a,J6a,&J7a
Hook	Ver 3	5C	J1b,J3,J5,J5b,J6b,J7b,&J8	J1a,J2,J4,J5a,J6a,&J7a
Lethal Weapon 3	Ver 3	5C	J1b,J3,J5,J5b,J6b,J7b,&J8	J1a,J2,J4,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

Stays On
Flashes 1 Time
Flashes 2 Times
Flashes 3 Times

SUSPECT COMPONENT

One of the 6821 PIAs
6064 RAM at location D5.
EPROM at location B5.
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 5A 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 Not Used
F4 8A Slo-Blo Switched Illumination Buss (18VDC)
F5 5A Slo-Blo Solenoid Buss (34VDC)
F6 5A Slo-Blo Solenoid Buss (34VDC)
F7 0.5A Slo-Blo Display Reg. Input (90VAC)

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SHARP DRESSED MAN

Written by Billy Gibbons, Dusty Hill and Frank Beard

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"Gonna Make You Sweat (Everybody Dance Now)"

Robert Clivilles / Freedom Williams

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(ASCAP) Under license by Virgin Special Products, Inc.

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 5C

Sound Board: Locations U17 (Voice ROM 1), U21 (Voice ROM 2), and U7 (Sound ROM)

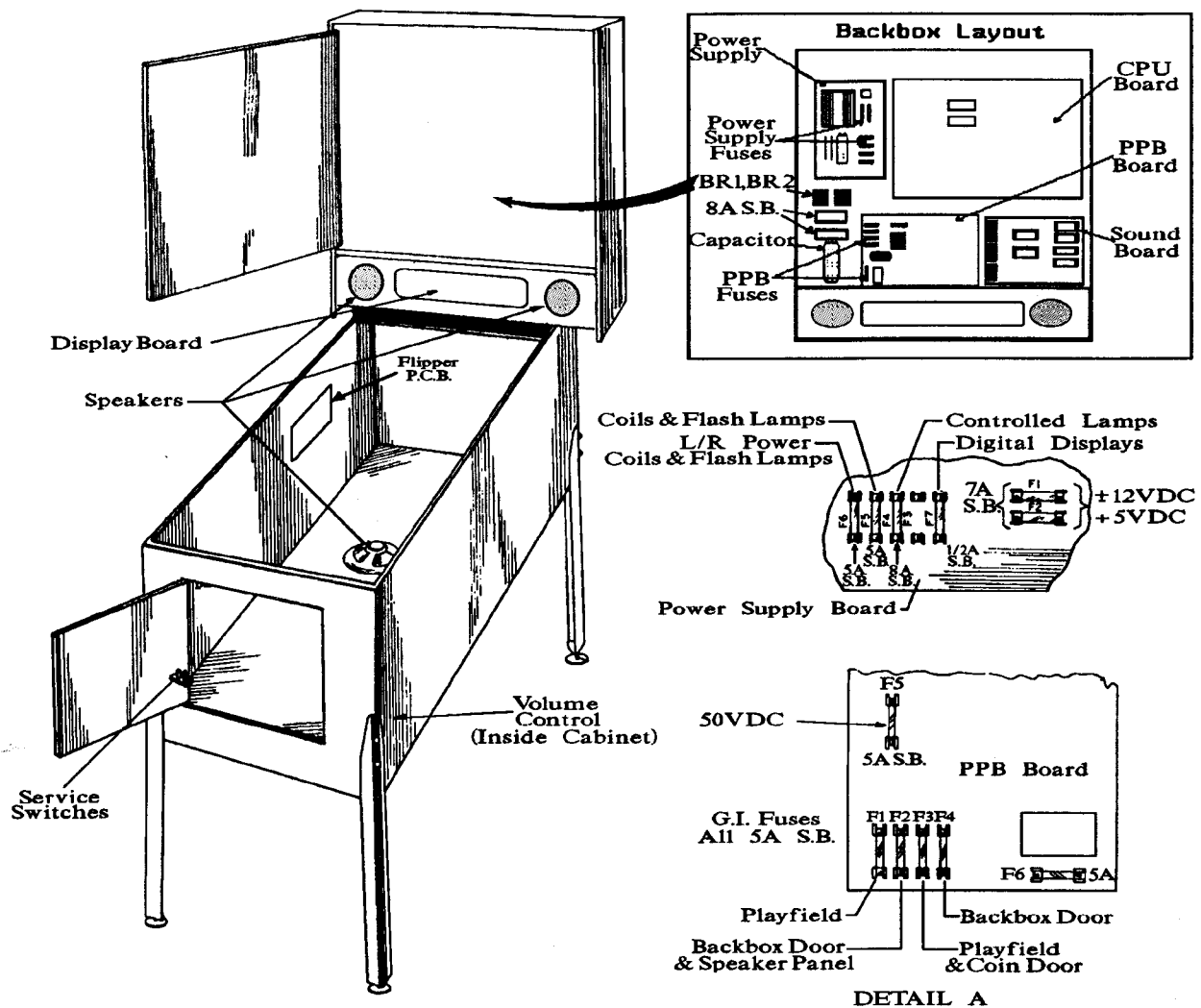
Display Controller Board: Locations U12 & U14

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, three pinballs and a large Allen Wrench used for securing the backbox.
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 secure it in its upright position by inserting the Allen Wrench in the hole in the back of the cabinet and rotating the wrench 270 degrees(3/4 turn).



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. Check all connectors in the backbox for loose wire terminations. Reseat any loose wire by pushing in on the terminal.
10. 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.
11. Check that the fuses on the Power Supply board, PPB board and fuse panel are seated properly.
12. 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.
13. Check all cabinet cable and playfield lamp board connector terminations.

14. 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.

15. Lower the playfield and level the playfield side-to-side by adjusting leg levelers and using the 2 Way Level located beneath the pricing card on the bottom arch.

16. Using the 2 Way Level below the pricing card, adjust the pitch of the playfield to approximately 6.5 degrees.

NOTE

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

17. Check the plumb tilt and adjust as required.

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

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

20. 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 makes a sound 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 make a sound 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

Skill Shot

Pull trigger of gun handle located at the front of cabinet when moving lit target(display) is in sharpshooter's sights.

Multiball

Clear either of drop target banks (1) to light red, yellow, and then blue lights. (2). This lights Multiball ready at VUK hole (3). Shoot ball into VUK hole to begin Auto 3 Ball.

Second Multiball may be initiated by satisfying above criterion on other Drop Target bank (1).

Jackpot

Multiball only- Hitting ramp (4) awards Jackpot. Two balls on the ramp at the same time awards Double Jackpot. Following Double Jackpot with two consecutive shots around the subway (5) awards Quadruple Jackpot. hit lit saucer (6, 3, or 7) to re-qualify Jackpot.

Multiplier

Completing the three top lanes (8) advances Bonus Multiplier. Shooting subway (5) spots a lane.

Laser Kick

Laser Kick (9) is lit at the start of each ball. Re-light Laser Kick by hitting lit target (10).

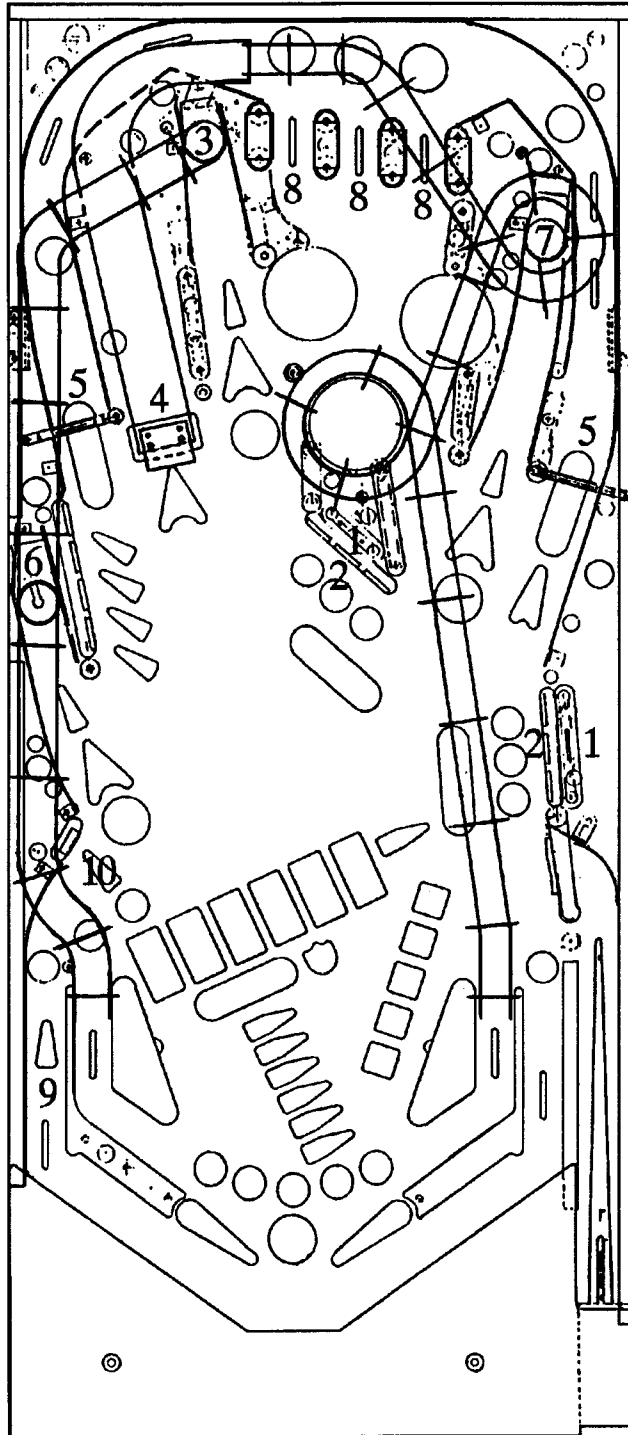
Light target (10) by completing two consecutive trips around the subway (5).

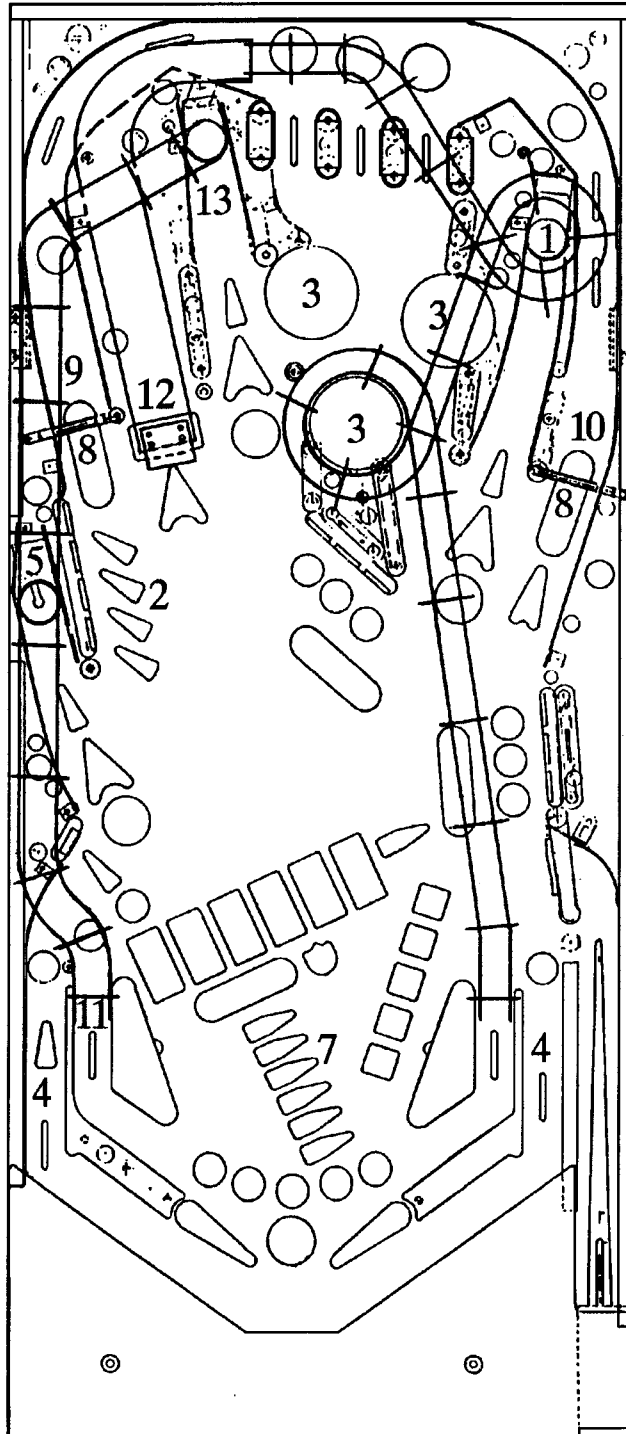
Red Wire / Blue Wire

Initiate Red Wire/Blue Wire by hitting center target at either Drop Target Bank (1). Then choose either remaining target to find the right wire (chosen randomly). Correct choice leads to lighting Unlimited Millions light on target (10).

Lethal Weapon 1-2-3

Shooting all three saucers (6, 3, 7) awards a stunt. Each stunt awards points and a short display animation.





Leo Getz

Light Leo Getz on saucer (1) by completing bullet targets (2). Shoot saucer (1) to win Leo Getz. Leo Getz scores one of the following

(random choice):

- a) Maximum Multiplier and Bonus Hold.
- b) Super Pops-Turbo bumpers (3) worth 100K or 1 Million.
- c) Murtaugh's Retirement- Lights outlanes (4) for a random value between 3 and 5 Million.
- d) Mystery score- scores a random value.
- e) 1 Million points.
- f) Lights Multiball ready.
- g) Lights Extra Ball for saucer (5).
- h) Awards stunt.

Shoot-Out

Shooting subway (9,10) lights Bullets on Uzi (7). Filling Uzi clip (lighting all six bullets) begins Shoot-out. Pull trigger of gun handle at front of cabinet to shoot adversary (pictured in display) before he opens fire. The later you wait (without being shot) and the more bullets you use, the higher the score awarded.

Winning Shoot-Out awards (in order):

- a) 3 Million.
- b) 1 Million & Bonus Hold.
- c) Lights Super Leo Getz and Super Spinners. Super Spinner timer begins when either spinner (8) is hit. Hitting spinners by shooting subway (9, 10) before timer expires awards Unlimited points.
- d) Lights Video and Getaway. Getaway-shooting left ball return (11) and then right subway (10) scores Getaway bonus.
- e) Crazy Riggs.
- f) Looping- Start looping timer by shooting Freeway (12). Each trip on the Freeway before timer expires awards 10 Million.
- g) Super Lethal Weapon- Shoot saucers (1, 5, 13) for 10 Million before timer expires.

Super Leo Getz

Score Super Leo Getz in saucer (1) while Leo Getz light is flashing. Super Leo Getz awards one of the following (random selection):

- a) Special.
- b) Extra Ball
- c) Crazy Riggs- a timed -fast scoring mode with every switch closed scores 250K.

Video

Enter Video Mode by hitting VUK hole (2) with video lamp lit. Pull trigger on gun handle at front of cabinet when a spinning target (display) shows a criminal. Exits video mode when ten shots have been fired, ten targets have been displayed or the player shoots a civilian target.

Bonus

Bonus is increased by 5K with every switch closure. Bonus awarded at end of ball.

Special

Special is awarded by Super Leo Getz.

Victory Laps

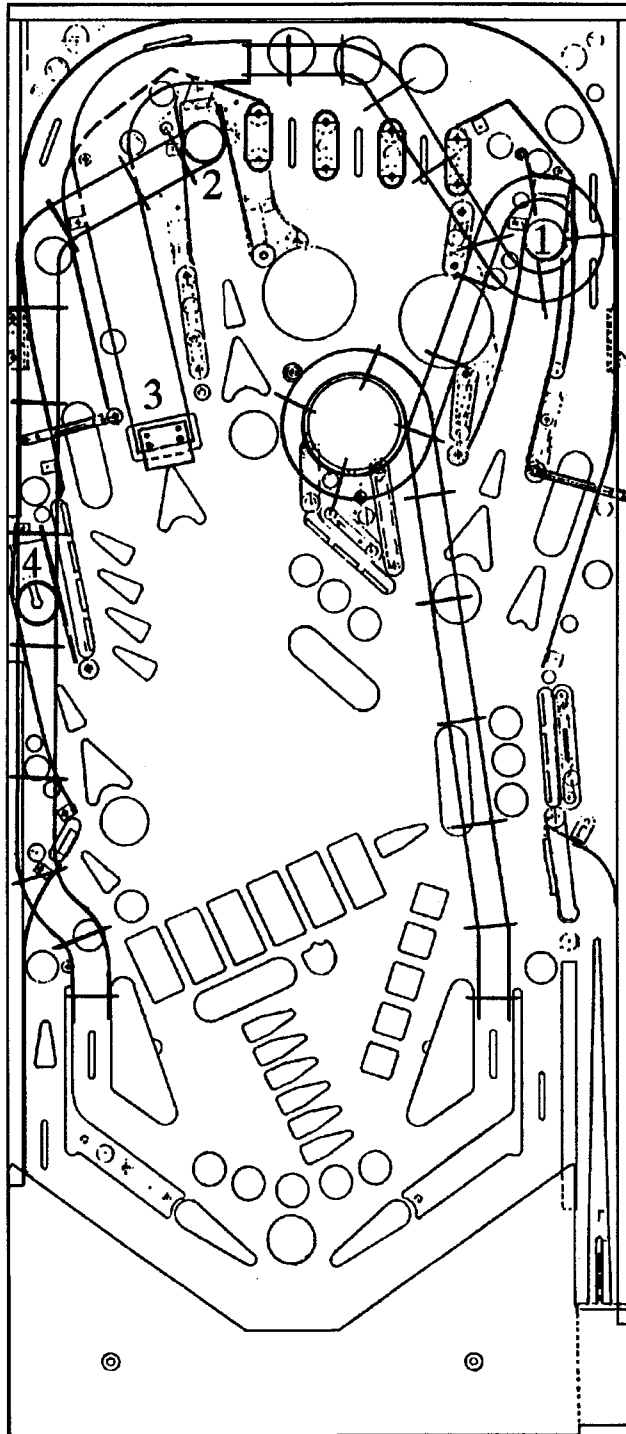
Shoot Freeway (3) after Special is awarded and before victory lap timer expires to score 25 Million.

Freeway

Consecutive shots on the Freeway ramp (3) scores Millions & Extra Ball lit. Extra Ball lights on saucer (4), and is scored by shooting saucer (4) with light lit.

Fight Mode

Fight mode is awarded randomly upon entering one of the holes (1, 2, 4). Fight begins on display. Press Flipper buttons rapidly to command Riggs to throw punches. Throwing more punches than the adversary wins fight and scores big.



AUDIT FUNCTIONS

GENERAL

There are 97 audit functions provided for accounting purposes and for evaluation of game difficulty adjustments. Audit functions are split into two groups. There are nine most-used audits (AU01 through AU09) in a 'quick look' group and 87 less-used audits (E AU11 through E AU97), 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 AU10, 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 AU11 is displayed. When you exit audits and adjustments, the AU10 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 **Ad11**, Audits Reset. Game adjustments (Ad01 to Ad13 and E Ad14 to E Ad56) begin after the last audit function (AU10 or E AU97). 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 AU24) divided by Plays Total (E AU25).

Ball Time Average (in seconds) (AU03) is Total Play Time divided by Total Balls Played (AU10).

Average Game Time (AU04) is the Average Game Time expressed in minutes and seconds.

Coins (AU05, 06, 07 and 08) - These four audit totals are provided to show the amount of coins registered for the left, right, center, and 4th coin chutes, respectively.

Total Coins (AU09) is the total number of coins dropped through all 4 coin chutes.

Expand Audits (AU010) permits viewing of expanded audits.

LETHAL WEAPON 3

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)
AU 01	Lethal Weap.3 PROM ID	E AU 50	Extraball Lit from Ramp
AU 02	Total Paid Credits	E AU 51	Extraball Lit from Leo
AU 03	Free Game Percentage	E AU 52	2X Made
AU 04	Average Ball Time	E AU 53	4X Made
AU 05	Av Game Time	E AU 54	6X Made
AU 06	Coins Left	E AU 55	8X Made
AU 07	Coins Right	E AU 56	# of Bonus Holds
AU 08	Coins Center	E AU 57	Super Leo ExBall
AU 09	Coins 4th Chute	E AU 58	Laser Kick Used
E AU 10	Total Coins	E AU 59	Freeze Used
E AU 11	Expand Audits (ON/OFF)	E AU 60	Multiball Lit
E AU 12	Balls Total	E AU 61	Multiball Award
E AU 13	Extra Balls Total	E AU 62	Rerace Award
E AU 14	Extra Ball Percent	E AU 63	Jackpot Lit
E AU 15	Replay 1 Awards	E AU 64	1 Jackpot Award
E AU 16	Replay 2 Awards	E AU 65	2 Jackpot Award
E AU 17	Replay 3 Awards	E AU 66	3 Jackpot Award
E AU 18	Replay 4 Awards	E AU 67	4 or More Jackpots
E AU 19	Total Replays	E AU 68	Ramp Double Jackpot
E AU 20	Replay Percent	E AU 69	Timer Double Jackpot
E AU 21	Total Specials	E AU 70	Quad Jackpot
E AU 22	Special Percent	E AU 71	Stunt 1
E AU 23	Total Matches	E AU 72	Stunt 2
E AU 24	Hi Score Wins	E AU 73	Stunt 3
E AU 25	High Score Percent	E AU 74	Stunt 4
E AU 26	Total Free Plays	E AU 75	Stunt 5
E AU 27	Total Games	E AU 76	Super Stunt
E AU 28	0.0 - 19.9 Million	E AU 77	Super Spinner Ready
E AU 29	20.0 - 39.9 Million	E AU 78	Crazy Riggs
E AU 30	40.0 - 59.9 Million	E AU 79	Leo Getz Award
E AU 31	60.0 - 79.9 Million	E AU 80	Super Leo Getz
E AU 32	80.0 - 99.9 Million	E AU 81	Getaway Award
E AU 33	100 Million Plus	E AU 82	Looping Award
E AU 34	Average Scores	E AU 83	Max # of Ramps
E AU 35	Games 1Player	E AU 84	Super Lethal Weapon
E AU 36	Games 2Player	E AU 85	MPlus to 5M Award
E AU 37	Games 3Player	E AU 86	Start Fight
E AU 38	Games 4Player	E AU 87	Left Orbits
E AU 39	Attract Minutes	E AU 88	Right Orbits
E AU 40	Cycles H.S. Reset	E AU 89	Showdown Victories
E AU 41	Coins No Credit	E AU 90	Showdown Defeats
E AU 42	Service Credits	E AU 91	Showdown Bonus
E AU 43	Proprietary	E AU 92	Video Mode
E AU 44	Proprietary	E AU 93	Victory Ramps Awarded
E AU 45	Proprietary	E AU 94	Music 1
E AU 46	Proprietary	E AU 95	Music 2
E AU 47	Total Buyin Games	E AU 96	Music 3
E AU 48	Drains Left	E AU 97	Won Fight
E AU 49	Drains Center		
	Drains Right		

EXPANDED FUNCTIONS

Balls Total (E AU11) is the total of regular and extra balls.

Extra Balls Total (E AU12) is the total number of extra balls awarded.

Extra Ball Percentage (AU13) is AU12 divided by Plays Total (AU26).

Replay Awards (E AU14 through 17) provide the total awards (credit, extra ball, or audit) for replay levels 1 through 4, respectively.

Total Replays (E AU18) is the total awards (credits, extra balls, or audit only) for exceeding replay score levels.

Replay Percentage (E AU19) is the Replay Total awards for exceeding replay score levels (E AU18) divided by Plays Total (E AU26).

Total Specials (E AU20) is the total awards (credits, extra balls, or scores) for making specials.

Special Percentage (E AU21) is Special Total (E AU20) divided by Plays total (E AU26).

Match Total (E AU22) 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 adjustable from 0% to 10%, by **E Ad 14** if enabled.

High Score Wins (E AU23) is the total credits awarded for exceeding the high-score-to-date scores.

High Score Percentage (E AU24) is High Score Wins (E AU23) divided by Plays Total (E AU26).

Total Free Plays (E AU25) is the total free credits for replays, high-score-to-date, specials, and match.

Total Games (E AU26) is the sum of Total Paid Credits (AU01) and Free Total (E AU25). Note that free credits are not recorded in the audits until they are actually used.

0.0 - 19.9 Million (E AU27) provides the total number of games the Player's final score was between 0 and 19,999,990 points.

20.0 - 39.9 Million (E AU28) provides the total number of games the Player's final score was between 20,000,000 and 39,999,990 points.

40.0 - 59.9 Million (E AU29) provides the total number of games the Player's final score was between 40,000,000 and 59,999,990 points.

60.0 - 79.9 Million (E AU30) provides the total number of games the Player's final score was between 60,000,000 and 79,999,990 points.

80.0 - 99.9 Million (E AU31) provides the total number of games the Player's final score was between 80,000,000 and 99,999,990 points.

100 Million Plus (E AU32) provides the total number of games the Player's final score was over 100,000,000 points.

Average Scores (E AU33) provides the Average Score by adding the Final Score of each game to a table and dividing this sum by the Total Plays.

Games - Player (E AU34 through 37) provide individual totals of 1-player, 2-player, 3-player, and 4-player games, respectively.

Attract Minutes (E AU38) provides the number of minutes the game is in Attract Mode (Factory use).

Cycles High Score Reset (E AU39) provides the number of times that the high score levels have been automatically reset (if enabled).

Coin No Credit (E AU40) provides the number of times the coin switch was closed without awarding credit(s)-This option is used in multiple coin conditions.(ie. 2 quarters 1 Play)

Service Credits (E AU41) provides the total number of Service credits added to the game. *See Game Diagnostics on page 19 for instructions regarding entry of Service Credits.*

Proprietary (E AU42 - E AU45) provide information to the game designer to aid in design development. (Factory use only.)

Total BuyIn Games (E AU46) provides the number of times a player utilized the Buy In Feature. (See E Ad 40)

Drains Left (E AU47) provides the number of times the ball drained out the left drain.

Drains Center (E AU48) provides the number of times the ball drained out the center drain.

Drains Right (E AU49) provides the number of times the ball drained out the right drain.

GAME SPECIFIC FUNCTIONS

Extra Ball Lit From Ramp (E AU50) provides the total number of times the Ramp lit the Extra Ball light.

Extra Ball Lit From Leo (E AU51) provides the total number of times the Leo Getz feature lit the Extra Ball light.

2X Made (E AU52) provides the number of times 2X bonus was enabled.

4X Made (E AU53) provides the number of times 4X bonus was enabled.

6X Made (E AU54) provides the number of times 6X bonus was enabled.

8X Made (E AU55) provides the number of times 8X bonus was enabled.

of Bonus Holds (E AU56) provides the number of times Bonus Hold was enabled.

Super Leo ExBall (E AU57) provides the number of times the Super Leo Getz feature lit the Extra Ball light.

Laser Kick Used (E AU58) provides the number of times the Laser Kick returned a ball into play.

Freeze Used (E AU59) provides the number of times the Freeze Feature was enabled.

Multiball Lit (E AU60) provides the number of times the Multiball Feature was lit.

Multiball Award (E AU61) provides the number of times the Multiball Feature was awarded.

Rerace Award (E AU62) provides the number of times the Rerace Feature was awarded.

Jackpot Lit (E AU63) provides the number of times the Jackpot Feature was lit.

1 Jackpot Award (E AU64) provides the number of times 1 Jackpot were awarded.

2 Jackpot Award (E AU65) provides the number of times 2 Jackpots were awarded.

3 Jackpot Award (E AU66) provides the number of times 3 Jackpots were awarded.

4 or More Jackpots (E AU67) provides the number of times 4 Jackpots or more were awarded.

Ramp Double Jackpot (E AU68) provides the number of times the Ramp Double Jackpot was awarded.

Timer Double Jackpot (E AU69) provides the number of times the Timer Double Jackpot was awarded.

Quad Jackpot (E AU70) provides the number of times the Quad Jackpot was awarded.

Stunt 1 (E AU71) provides the number of times the Stunt 1 Feature was awarded.

Stunt 2 (E AU72) provides the number of times the Stunt 2 Feature was awarded.

Stunt 3 (E AU73) provides the number of times the Stunt 3 Feature was awarded.

Stunt 4 (E AU74) provides the number of times the Stunt 4 Feature was awarded.

Stunt 5 (E AU75) provides the number of times the Stunt 5 Feature was awarded.

Super Stunt (E AU76) provides the number of times the Super Stunt Feature was awarded.

Super Spinner Ready(E AU77) provides the number of times the Super Spinner Feature was started.

Crazy Riggs (E AU78) provides the number of times the Crazy Riggs Feature was awarded.

Leo Getz Award (E AU79) provides the number of times the Leo Getz Feature was awarded.

Super Leo Getz (E AU80) provides the number of times the Super Leo Getz Feature was awarded.

Getaway Award (E AU81) provides the number of times the Getaway Feature was awarded

Looping Award (E AU82) provides the number of times the Looping Feature was awarded

Max # of Ramps (E AU83) provides the maximum number of Ramps completed in a single game.

Super Lethal Weapon (E AU84) provides the number of times the Super Lethal Weapon Feature was awarded.

MPlus to 5M Award (E AU85) provides the number of times the Million plus Feature was increased to 5 Million.

Start Fight (E AU86) provides the number of times the Boxing match Feature was started.

Left Orbits (E AU87) provides the total number of left orbits completed.

Right Orbits (E AU88) provides the total number of right orbits completed.

Showdown Victories (E AU89) provides the number of times the Showdown Feature was won by the player.

Showdown Defeats (E AU90) provides the number of times the Showdown Feature was lost by the player.

Showdown Bonus (E AU91) provides the number of times the Showdown Feature awarded a bonus for completing all six shots.

Video Mode (E AU92) provides the number of times the Video Mode was enabled.

Victory Ramps Awarded (E AU93) provides the number of times the Victory Ramp was Awarded.

Music 1 (E AU94) provides the number of times Music 1 was selected.

Music 2 (E AU95) provides the number of times Music 2 was selected.

Music 3 (E AU96) provides the number of times Music 3 was selected.

Won Fight (E AU97) provides the number of times the player won the Boxing Match.

Notes

GAME ADJUSTMENTS

GENERAL

There are 56 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 Ad56 (Expanded Adjustment 56) is shown in the Player 3 display, FACTORY RESTORE is shown in the Player 1 & 2 displays, and OFF is shown in the Player 4 display. With the audits displaying AU10 (or expanded E AU97) 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 a sound is made 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 and 03 for fixed replay levels.

Ad 02 Start Replay

- **Manual:** Adjust the starting Replay 1 setting to between 20,000,000 and 9,999,000,000.

Ad 03 Levels Replay/Level 1,2,3 & 4 Replay

- 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
- Adjust Replay 1 level to between 20,000,000 and 9,999,000,000. (Same as Start Replay)
If Ad 03 is set for 2, adjust Replay 2 level to between 20,000,000 and 9,999,000,000.
If Ad 03 is set for 3, adjust Replay 3 level to between 20,000,000 and 9,999,000,000.
If Ad 03 is set for 4, adjust Replay 4 level to between 20,000,000 and 9,999,000,000.

LETHAL WEAPON 3

Game Adjustment Table

Adjustment Number (Player 3)	Description (Players 1 & 2)	Factory Setting (Player 4)
Ad 01	Replay/Manual	10%
Ad 02	Start Replay	125,000,000
Ad 03	Levels Replay *	01
Ad 04	Game Awards	CREDIT
Ad 05	Limit Freegame	03
Ad 06	Limit Extraball	03
Ad 07	Game Rules	FACTORY
Ad 08	Game Price*	USA2
Ad 09	Game Cleaned	NO
Ad 10	Coin Reset	NO
Ad 11	Audits Reset	NO
Ad 12	Restore H.S.T.D.	NO
Ad 13	Expand Adjustments	NO
E Ad 14	Match Percent	08
E Ad 15	Balls Per Game	03
E Ad 16	Tilt Warnings	01
E Ad 17	Replay Boost	NO
E Ad 18	Credits Limit	30
E Ad 19	High Scores Allowed	YES
E Ad 20	Hiscore 1 Awards	03
E Ad 21	Hiscore 2 Awards	01
E Ad 22	Hiscore 3 Awards	00
E Ad 23	Hiscore 4 Awards	00
E Ad 24	Backup World Record	300,000,000
E Ad 25	Backup Hiscore 2	280,000,000
E Ad 26	Backup Hiscore 3	270,000,000
E Ad 27	Backup Hiscore 4	260,000,000
E Ad 28	Backup Hiscore 5	250,000,000
E Ad 29	Backup Hiscore 6	240,000,000
E Ad 30	Reset H.S.T.D. Every	700
E Ad 31	Clean Game Every	1500
E Ad 32	Free Play	NO
E Ad 33	Custom Mesage	ON
E Ad 34	Attract Mode Music	ON
E Ad 35	Flash Lamps	NORMAL
E Ad 36	Coils Pulse	NORMAL
E Ad 37	Level Adjust By	ANY
E Ad 38	Install Country	USA
E Ad 39	Next Game Promo	ON
E Ad 40	Buy In Enabled	NO
E Ad 41	Game Restart	NO
E Ad 42	Extra Ball Percentage	25
E Ad 43	Background Volume	100
E Ad 44	Bill Validator	NO
E Ad 45	Police Light	YES
E Ad 46	Gun Enabled	YES
E Ad 47	Save 3 Banks	YES
E Ad 48	Save Uzi	YES
E Ad 49	Save Ramp Ex.Ball	YES
E Ad 50	Earning LW 1,2,3	FACTORY
E Ad 51	Save Stunts	YES
E Ad 52	3 Bank Style	EASY
E Ad 53	Spot 3 Banks	EASY
E Ad 54	Rerace Criterion	HARD
E Ad 55	Save LW 1,2,3	YES
E Ad 56	Factory Restore	OFF

* Some settings result in Drop-Down Tables- See Text

Ad 04 Game Awards Set for replays to award: **CREDIT, EXTRA BALL, NONE** or **SPECIAL** (when score threshold is achieved a playfield special is lit).

Ad 05 Limit FreeGame - Adjust for the maximum number of free games that may be accumulated per game; 0 to 9 .

Ad 06 Limit Extra Balls - Adjust for the maximum number of extra balls that may be accumulated per game; 1 to 9 or OFF.

SINGLE-FUNCTION DIFFICULTY ADJUSTMENT (Ad 07)

Any one of five INSTALL settings for this adjustment may be activated to automatically select settings for multiple adjustments affecting game difficulty. Use the Start button to choose the difficulty level you require and press the step button to activate the setting. After activation, the individual adjustments may be readjusted if desired. Refer to Install Adjustment Table for details.

Ad 07 Game Rules - Set to **EXTRA EASY, EASY, FACTORY, HARD** or **EXTRA HARD**.

(Note - Additional game features not variable by the Expanded Adjustments may also change using this setting.)

Install Adjustment	E Ad07 Extra Easy	E Ad07 Easy	E Ad07 Factory	E Ad07 Hard	E Ad07 Extra Hard
E Ad 47 Save 3 Banks	YES	YES	YES	NO	NO
E Ad 49 Save Ramp Xballs	YES	YES	YES	NO	NO
E Ad 50 Earning LW 1,2,3	EXEASY	EASY	FACTORY	HARD	EXHARD
E Ad 51 Save Stunts	YES	YES	YES	NO	NO
E Ad 52 3 Bank Style	EXEASY	EASY	EASY	FACTORY	HARD
E Ad 53 Spot 3 Banks	EXEASY	EASY	EASY	HARD	EXHARD
E Ad 54 Rerace Criterion	EXEASY	EASY	HARD	HARD	EXHARD
E Ad 55 Save LW 1,2,3	YES	YES	YES	NO	NO

NOVELTY / 5-BALL/ADD-A-BALL SETTINGS

The following three combinations are recommended for situations where local laws restrict certain game features regarding the use of replays or the number of balls per game:

Novelty Play Rules - Set to establish recommended settings for no free play or extra balls:

Ad 01 Manual Replay = Fixed

Ad 06 Limit Extra Balls = 0

Ad 02 Start Replay = 00

E Ad 14 Match Percent = Off

Ad 03 Levels Replay = None

E Ad 20 World Record Awards= 0

Ad 04 Game Awards = None

E Ad 21-23 Todays 1-3 Awards= 0

Ad 05 Limit Freegame = 0

5-Ball Play Rules - Set to establish recommended settings for 5-ball play:

Ad 01 Manual Replay = 07%

E Ad 14 Match Percent = 04

E Ad 50 Earning LW 1,2,3 = Hard

Ad 02 Replay Start = 145,000,000

E Ad 15 Balls/Game = 5

E Ad 51 Save Stunts = No

Ad 03 Replay Levels = 01

E Ad 20 World Record Awards = 3

E Ad 52 3 Bank Style = Hard

Ad 04 Game Awards = Credit

E Ad 21 Todays 1 Award= 1

E Ad 53 Spot 3 Banks = Factory

Ad 05 Limit Freegame = 3

E Ad 47 Save 3 Banks = No

E Ad 54 Rerace Criterion = Hard

Ad 06 Limit Extra Balls = 3

E Ad 49 Save Ramp Xballs = No

E Ad 55 Save LW 1,2,3 = No

Extra Ball Settings-To disable awarding of credits and provide awards with an extra ball make the following adjustments:

Ad 04 Game Awards = Extra Ball

E Ad 19 Scores Highest = No

Ad 05 Limit Freegame = 0

E Ad 20 to 23 World Record & Todays High Awards= 0

E Ad 14 Match Percent = OFF

GAME PRICING (Ad 08)

There are two methods available for coin switch programming; Standard and Custom. Standard pricing uses a single adjustment (Ad 08) to select a pricing scheme shown in the **Standard /CustomPricing Table**. Custom pricing is used to select additional pricing schemes defined by a Drop Down menu .

With Ad 08 set to **CUSTOM** operating the step button again initiates a drop down menu representing coin switch pulses for the left, right, and center coin slots. The prescribes the number of pulses required for one credit. For example, if *Left Coin Pulses*, was set to 02 and *Coin Switch Pulses Required for 1 Credit*, to 01 a coin in the left slot would produce two credits. Further, if *Left Coin Pulses*, was set to 01 and *Coin Switch Pulses Required for 1 Credit*, to 02, two coins in the left slot would be required for one credit.

Coin Switch Pulses Required for Bonus Credit may be set to post bonus credits when a minimum amount of coins are inserted at one time. For example, if *Left Coin Pulses* was set to 01, *Coin Switch Pulses Required for 1 Credit* to 01 and *Coin Switch Pulses Required for Bonus Credit* 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.

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, the following adjustments are utilized to tailor each individual coin chute.

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

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

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

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

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

CUSTOM PRICING TABLE

Left	Coin Mechs			Plays/Coins	Ad08	Adjustments				Pulses / Credit	Pulses / bonus
	Right	Center	4th			Left Pulses	Right Pulses	Mid Pulses	4th Pulses		
25¢	25¢	\$1.00	n/u	1/25¢ 3/50¢	Custom	01	01	04	00	01	02
				1/25¢ 5/\$1.00	Custom	01	01	04	00	01	04
				1/25¢/ 6/\$1.00	Custom	05	05	20	00	04	20
5SCH	10SCH	10SCH	n/u	1/10 SCH	Custom	01	02	02	00	02	00
				1/10 SCH 4/30SCH	Custom	04	08	08	00	06	00
10P	£1	50P	20P	1/30P 2/50P 5/£1	Custom	01	15	06	02	03	00
				1/50P 3/£1	Custom	01	15	05	02	05	00
				1/30P 4/£1	Custom	01	12	05	02	03	00
20¢	\$1.00	n/u	n/u	1/60¢ 2/\$1.00	Custom	01	05	00	00	03	05

STANDARD PRICING TABLE

Ad 08 Standard Pricing Select			Coin Mechs			Plays/Coins		
			Left	Center	Right	Left	Center	Right
1	2	4						
USA1	1COIN	1PLAY	25¢	\$1.00	25¢	1 PLAY/ 1COIN	4 PLAY/ 1COIN	1 PLAY/ 1COIN
USA2	4 COINS	3PLAYS	25¢	\$1.00	25¢	1 PLAY/ 2COIN 2 PLAY/ 3COIN 3 PLAY/ 4COIN	3 PLAY/ 1COIN	1 PLAY/ 2COIN 2 PLAY/ 3COIN 3 PLAY/ 4COIN
USA3	2 COINS	1 PLAY	25¢	\$1.00	25¢	1 PLAY/ 2COIN	2 PLAY/ 1COIN	1 PLAY/ 2COIN
USA4	2COINS	1 PLAY 1COIN BUY-IN	25¢		25¢	2 COINS FOR THE 1st PLAY 1PLAY/ 1 COIN <i>ONLY DURING</i> BUY-IN		
AUSTRIA COINAGE			5 SCH	10 SCH	10SCH	1 PLAY/ 2COIN 2 PLAY/ 3COIN 3 PLAY/ 4COIN	1 PLAY/ 1COIN 3 PLAY/ 2COIN	1 PLAY/ 1COIN 3 PLAY/ 2COIN
AUSTRALIA COINAGE			20¢	\$1.00	\$2.00	1 PLAY/ 3COIN	2 PLAY/ 1 COIN	4 PLAY/ 1COIN
UK COINAGE			10P	50P	£1	1 PLAY/ 3COIN	2 PLAY/ 1COIN	5 PLAY/ 1COIN
SWISS 1 SWISS 2			1 SFR	2 SFR	5 SFR	Same as German 1 Same as German 2		
BELGIUM COINAGE			20f	50f	20f	1 PLAY/ 1COIN	3 PLAY/ 1COIN	1 PLAY/ 1COIN
GERMAN	5DM	7 PLAYS	1DM	2DM	5DM	1 PLAY/ 1COIN	2 PLAY/ 1COIN	7 PLAY/ 1COIN
GERMAN	5DM	9 PLAYS	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	2.5Guilder	1 PLAY/ 1COIN	1 PLAY/ 1COIN	3 PLAY/ 1COIN
SWEDEN COINAGE			1KR	5KR	5KR	1 PLAY/ 3COIN 2 PLAY/ 5COIN	2 PLAY/ 1COIN	2 PLAY/ 1COIN
FRANCE 1 COINAGE			1f	5f	10f	1 PLAY/ 3COIN 2 PLAY/ 5COIN	2 PLAY/ 1COIN	5 PLAY/ 1COIN
FRANCE 2 COINAGE			1f	5f	10f	1 PLAY/ 5COIN	1 PLAY/ 1COIN	3 PLAY/ 1COIN
ITALY COINAGE			500L		500L	1 PLAY/ 1COIN		1 PLAY/ 1COIN
SPAIN COINAGE			100 Pts		500 Pts	1 PLAY/ 1COIN		6 PLAY/ 1COIN
JAPAN COINAGE					100¥			1 PLAY/ 1COIN 3 PLAY/ 2COIN

ADDITIONAL GENERIC FEATURES

Ad 09 Game Cleaned - When enabled (set to **YES**) the game cleaning counter will be reset to zero and Game Clean-Me message in Tech Alert will go out when STEP is depressed.(Also see E Ad31.)

Ad 10 Coin Reset - When enabled (set to **YES**) all coin and paid credit totals will be reset to zero when STEP is depressed.

Ad 11 Audits Reset - When enabled (set to **YES**) all audit totals except for coins and paid credits will be reset to zero when STEP is depressed.

Ad 12 Restore High Score - When enabled (set to **YES**) the High Score Levels and associated initials will be restored to backup settings when STEP is depressed .

Ad 13 Expand Adjustments - When set to **NO**, depressing the STEP push-button advances directly to E Ad 46, FACTORY RESTORE. When set to **YES**, 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 14 Match Percent- Set Match percent from **00%** to **10%** or **OFF**. At 00% the match display occurs at the end of the game but never awards a credit.

E Ad 15 Balls Per Game - Adjust the number of balls per game; **2** to **5**.

E Ad 16 Tilt Warnings - Adjust the number of plumb bob tilt switch closures before the ball in play is tilted; **1** to **3** or **OFF**.

E Ad 17 Replay Boost - Set to **YES** or **NO**. When set to **YES**, exceeding a replay will set a temporary replay level for each time a replay level is surpassed. This new level will equal the player's final score (when the replay was awarded) for each following game, until the replays have all been played. At this time the previous level is resumed.

E Ad 18 Credits Limit - Adjust the maximum number of credits that may be posted; **4** to **50**.

HIGH SCORE LEVELS (E Ad 19 through 30)

There are four of the six 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 19 Hiscores Allowed - Set to enable or disable the four high score levels; **YES** or **NO**.

E Ad 20 World Record - Adjust the number of credits awarded for exceeding level 1 (the highest of the four levels); **0** to **5**.

E Ad 21 Highscore 2 Award- Adjust the number of credits awarded for exceeding level 1; **0** to **3**.

E Ad 22 Highscore 3 Award - Adjust the number of credits awarded for exceeding level 2; **0** to **2**.

E Ad 23 Highscore 4 Award - Adjust the number of credits awarded for exceeding level 3; **0** to **1**.

E Ad 24 Backup World Record - Adjust the score level to which the world record (the highest of the four levels) may be altered. This adjustment is not affected by E Ad30 (Factory Reset defaults to 7,500,000).

E Ad 25 Backup Highscore 2 - Adjust the backup score level to which level 1 may be reset.

E Ad 26 Backup Highscore 3- Adjust the backup score level to which level 2 may be reset.

E Ad 27 Backup Highscore 4- Adjust the backup score level to which level 3 may be reset.

E Ad 28 Backup Highscore 5- Adjust the backup score level to which level 4 may be reset.

E Ad 29 Backup Highscore 6- Adjust the backup score level to which level 5 may be reset.

E Ad 30 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 31 Clean Game Every- Adjust the number of games in which the Clean Game message appears in Tech Alert to indicate the playfield needs cleaning. Adjustable from 100 to 2000.

E Ad 32 Free Play - When set to **YES**, no coins are required for games.

E Ad 33 Custom Message - 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 34.

E Ad 34 Attract Mode Music - Set to **ON** (approximately every 3 minutes), or **OFF**.

E Ad 35 Flash Lamps- Set to **NORMAL**, **DIM** or **OFF**. When set to **NORMAL** the Flash Lamps are active, when **DIM** the Flash Lamps impulse power is reduced by 25% and when **OFF** the Flash Lamps do not flash.

E Ad 36 Coils Pulse- Set To **NORMAL**, **HARD** or **SOFT**. When **HARD** the coil pulse power is increased by 12.5% of the normal pulse rate. When set to **SOFT** the coil pulse power is reduced by 12.5% of the normal pulse rate. These adjustments are provided to compensate for Low Line or High Line voltage conditions where the solenoids appear to kicking too weak or too hard.

E Ad 37 Level Adjust by - When set to **OPERATOR**, the Manual Percentage Replay Adjustment can only be altered with the front door open (see manual page 3). When set to **ANY**, the Manual Percentage Replay Adjustment will display the message "PRESS START TO CHANGE REPLAY LEVEL" on power up if a change is recommended, and anyone operating the replay button will initiate the change to the replay score.

E Ad 38 Install Country- Set to **USA**, **GERMAN**, **FRENCH**, **AUSTRIA**, **BELGIUM**, **SWISS** or **CANADA**. Determines the default settings for the respective country for game pricing etc.

E Ad 56 Factory Restore-Depressing STEP without changing the value shown in the Player 4 Display locks in any custom message set with E Ad33 and returns the game to GameOver. 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 39 TO E Ad 54)

E Ad 39 Next Game Promo- Set to **ON** or **OFF**. When set to **ON**, the game, in attract mode will randomly display a short promotion for our next game. When set to **OFF**, the game in attract mode will not generate any sounds or graphics referring to the next game.

E Ad 40 Buy in Enabled - Set to **YES** or **NO**. When set to **YES**, the game will display a countdown timer at the end of each game allowing the player to "Buy in" most of the features accumulated during the previous game. When set to **NO**, none of the previous game features will be retained and no countdown timer will appear.

E Ad 41 Game Restart -Set to **YES** or **NO**. When set to **YES**, a new game may be started during any ball after the first ball is completed. (Note-Pressing start during the first ball will add additional players.) When set to **NO**, The game disables the start button after the first ball until the final ball is in play.

E Ad 42 Extra Ball Percentage -Set from **0** to **50**. Allows the operator to adjust how frequently the Extra Ball feature is made available to the player.

E Ad 43 Background Volume - Set to **0**, **25**, **50**, **75** or **100** percent. Allows the operator to adjust the background music volume independantly from the normal game sounds.

E Ad 44 Bill Validator - Set to **YES** or **NO**. When set to **YES**, the display, in game attract mode, will show an "Insert Bill Animation". When set to **NO**, the display, in game attract mode will show "Insert Coin Animation".

E Ad 45 Police Light -Set to **ON** or **OFF**. When set to **ON**, the flashing police light on the top of the Backbox will be active during Multiball. When set to **OFF**, the light will be disabled.

E Ad 46 Gun Enabled -Set to **YES** or **NO**. When set to **YES**, The ball launch kicker will fire during video mode every time the trigger is operated. When set to **NO**, the ball launch kicker will not operate during video mode.

E Ad 47 Save 3 Banks - Set to **YES** or **NO**. When set to **YES**, the status of the Drop Target lamps lit will be retained from ball to ball for the same player. When set to **NO**, the lamps will be reset with each new ball in play.

E Ad 48 Save UZI - Set to **YES** or **NO**. When set to **YES**, the status of the UZI lamps lit will be retained from ball to ball for the same player. When set to **NO**, the lamps will be reset with each new ball in play.

E Ad 49 Save Ramp Xballs - Set to **YES** or **NO**. When set to **YES**, the number of ramps completed will be retained in memory from ball to ball for the same player. When set to **NO**, the number of ramps completed will be reset with each new ball in play.

E Ad 50 Earning LW 1,2,3 - Set to **EXEASY,EASY,FACTORY, HARD** or **EXHARD**. Determines how the 1,2 & 3 holes must be completed to award a stunt.

EXEASY	EASY	FACTORY	HARD	EXHARD
Any order	Any order	Any order	In Sequence after 2nd Stunt	In Sequence

E Ad 51 Save Stunts -Set to **YES** or **NO**. When set to **YES**, the number of stunts completed will be retained in memory from ball to ball for the same player. When set to **NO**, the number of stunts completed will be reset with each new ball in play.

E Ad 52 3 Bank Style -Set to **EXEASY,EASY,FACTORY, HARD** or **EXHARD**. Determines how the Drop Targets must be completed to advance their Value.

EXEASY	EASY	FACTORY	HARD	EXHARD
Completing either bank advances the value on both banks	Same as EXEASY until the 3rd Multiball then same as HARD	Same as EXEASY until Multiball then same as HARD	Completing either bank advances its own lit value	Completing both banks advances both lit values

E Ad 53 Spot 3 Banks -Set to **EXEASY,EASY,FACTORY, HARD** or **EXHARD**. Determines when the game will automatically "spot" a lit value on the Drop Target banks.

EXEASY	EASY	FACTORY	HARD	EXHARD
Always	Always, before Multiball	Always, except when completing either bank advances both banks	Before 1st Multiball, except when completing either bank advances both banks	Never

E Ad 54 Rerace Criterion -Set to **EXEASY,EASY,FACTORY, HARD** or **EXHARD**. Determines during multiball, when a drained ball will be kicked back into play.

EXEASY	EASY	FACTORY	HARD	EXHARD
If no Jackpot was completed <u>or</u> Multiball time is low.	If no Jackpot was completed	If multiball time is low.	If no Jackpot was completed <u>and</u> Multiball time is low.	Never

E Ad 55 Save LW 1,2,3 - Set to **YES** or **NO**. When set to **YES**, the holes (1,2,&3) completed will be retained in memory from ball to ball for the same player. When set to **NO**, the holes completed will be reset with each new ball in play.

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 50 games it is considered bad. When operation of a coil should close or open a switch and does not, the coil is considered bad. In Game over attract mode, bad switches and coils (if any) are reported (See Tech Alert Description below). 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 & 4 Displays. 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 (WHT-YEL) and column (GRN-BRN) wire color codes shown in the Player 3 display, and the switch number shown in the Player 4 display.

BLK=Black
BRN=Brown
RED=Red
ORN=Orange
YEL=Yellow

GRN=Green
BLU=Blue
VIO=Violet
GRY=Grey
WHT=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 (U.S. including Illinois) and the toll number (708) 345-7700 (Outside the United States). this indicates entry into game diagnostics.

Service Credits

With the phone number displayed depress the STEP push-button switch. The game now gives the technician the option of adding 1 to 5 service credits. These credits allow the technician to test-play the game without adding any counts to the coin audits (AU 01 & AU 05-AU 08). When the message appears, press and hold the Game Start pushbutton until the desired number of credits are shown on the display. Then press the step button again to add these credits to the game and enter Tech Alert. If no Service Credits are desired, press the step button with the initial message displayed.

Tech Alert

The player displays will now indicate if there are any Bad Switches (Switches that are closed, that should not be or switches that have not been activated in 50 games) it also indicates if the game requires cleaning, based on the number set in E Ad 31.

Burn-In Minutes

Pressing the step button while in Tech Alert mode will step game into Burn-in Mode(Factory use). At this stage pressing the game start button will cause the game to exercise all CPU I/O functions. This is provided to constantly exercise sounds, solenoids, etc...

To stop the test press the start button again. Cumulative Burn-In minutes will be displayed. To reset Burn-In minutes to 00, you must perform a Audit Reset Ad 11 or a Factory Restore E Ad 56.

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 bottom display shows the sound board circuit under test and the corresponding sounds are selected by operating the left and right flipper buttons to choose the circuit to be tested. Now press the start button to initiate the sound. Refer to the Sound Test Chart for the sound circuits displayed and the sounds produced.

The sound 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 SPEAKER CENTER SPEAKER RIGHT SPEAKER VOICE ROM1 (Loc U17) VOICE ROM2 (Loc U21) MUSIC TEST (Sound ROM Loc U7)	Left Sine (Left Speaker Only) Center Sine (All speakers) Right Sine (Right Speaker Only) "Here comes Trouble" "We're back in action!" Level 1 Through Level 3 Music

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 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

The Digital display utilizes a Dot Matrix Display Control board mounted in piggyback fashion to the display driver Board. The purpose behind this board is to provide more information (32 X 64 Dots) to the operator as well as displaying graphics to the player.

The board is controlled by a 68B09E microprocessor and its personality ROMs (Unique to the Game) . It receives Data, Reset & Clock information from the CPU Board via the ribbon cable and sends back multiple Status and Busy signals to the CPU . This is to insure synchronized communication between the CPU and the Display Controller board.

The Drivers for the rows and columns are provided on 4 surface mounted integrated circuits on the Display driver board.

Automatic Test

To enter Display tests, operate the STEP push-button switch from the Sound Manual test. The displays will first illuminate one vertical column of dots in the Display. After a slight delay it will cycle one column from left to right. After a period of time, it will begin the Row test by lighting the top row of the display, then turning it off and illuminating the next row, until each row has been individually lit, while the other rows are off. The test will then turn all the dots in the display on except for one column. It will then cycle this blank column from left to right. After a period of time, it will begin the second Row test by blanking the top row of the display, then turning it on and blanking the next row, until each row has been individually blanked, while the other rows are on. The next test begins with every other dot lit, in both the rows and columns. These dots then go out, and the unlit dots light, resulting in an alternating checkerboard pattern. The test will then repeat these cycles again until advanced to the next test or until the power is removed. (Please Note- these tests may be interrupted at any time by operating the STEP push-button switch to advance to the next test.)

Laser Kick Test

This test provided to insure proper interaction between certain switches and their associated solenoids without entering game play. For example, by rolling the ball over the left outlane switch the Laser Kick should fire. If it kicks too early or too late, the switch actuator should be adjusted to compensate for this error. If it fails to fire, use the switch test or coil test to help determine the the cause of failure. Note: During this function, similar tests may be performed on Vertical Up Kickers or Saucers in the game.

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 Laser Kick 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.

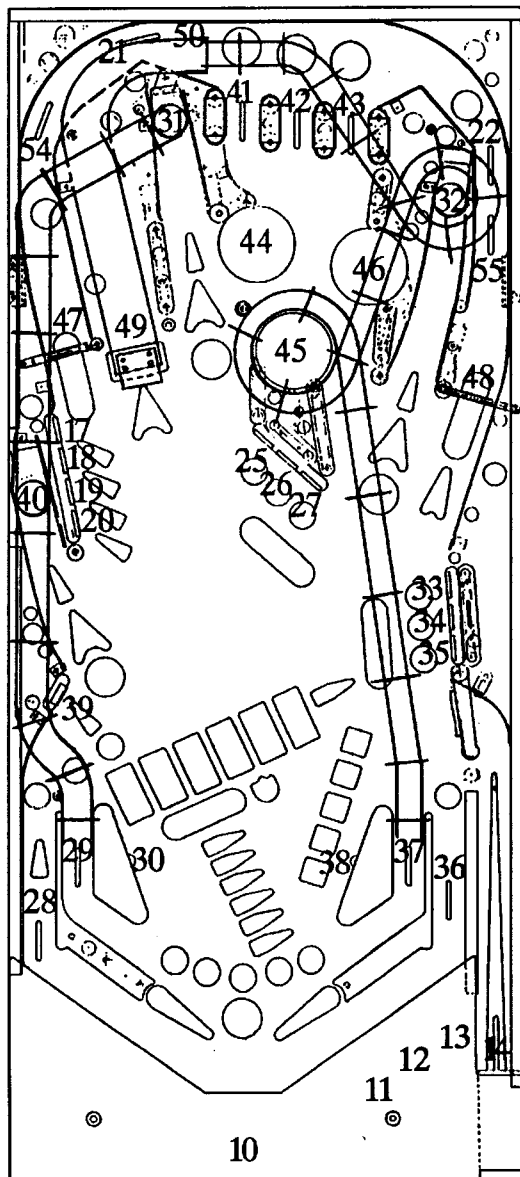
SWITCH MATRIX CHART

ROW \ COLUMN	1 GRN-BRN CN8-1	2 GRN-RED CN8-2	3 GRN-ORN CN8-3	4 GRN-YEL CN8-4	5 GRN-BLK CN8-5	6 GRN-BLU CN8-7	7 GRN-VIO CN8-8	8 GRN-GRY CN8-9
1 WHT-BRN CN10-9	Plumb Tilt 1	Launch Trigger 9	Left 4 Bank Top 4 17	Center Drop Tar. Left 25	Right Drop Tar. Top 33	Left Top Lane 41	Ramp Entrance 49	Not Used 57
2 WHT-RED CN10-8	4th Coin 2	Outhole 10	Left 4 Bank Mid. 3 18	Center Drop Tar. Mid. 26	Right Drop Tar. Mid. 34	Center Top Lane 42	Ramp Exit 50	Not Used 58
3 WHT-ORN CN10-7	Credit Button 3	Trough #1 Left 11	Left 4 Bank Mid. 2 19	Center Drop Tar. Right 27	Right Drop Tar. Bot. 35	Right Top Lane 43	Not Used 51	Not Used 59
4 WHT-YEL CN10-6	Right Coin 4	Trough #2 Center 12	Left 4 Bank Bot. 1 20	Left Outlane 28	Right Outlane 36	Left Turbo Bumper 44	Right 10 Point 52	Not Used 60
5 WHT-GRN CN10-5	Center Coin 5	Trough #3 Right 13	Left Orbit Rollover 21	Left Return 29	Right Return 37	Center Turbo Bumper 45	Not Used 53	Not Used 61
6 WHT-BLU CN10-3	Left Coin 6	Shooter Lane 14	Right Orbit Rollover 22	Left Slingshot 30	Right Slingshot 38	Right Turbo Bumper 46	Left Orbit R.O. BackUp 54	Not Used 62
7 WHT-VIO CN10-2	Slam Tilt 7	Left EOS 15	Not Used 23	VUK 31	Left Stand-Up Target 39	Left Spinner 47	Right Orbit R.O. BackUp 55	Not Used 63
8 WHT-GRY CN10-1	Not Used 8	Right EOS 16	Not Used 24	Right Saucer 32	Left Saucer 40	Right Spinner 48	Not Used 56	Not Used 64

Lethal Weapon 3- Switch Part Numbers

Switch Number	Description	Part No.
01*	Plumb Tilt	See Cabinet
02*	4th Coin	-
03*	Credit Button	500-5097-02
04*	Right Coin	180-5024-00
05*	Center Coin	180-5024-00
06*	Left Coin	180-5024-00
07*	Slam Tilt	180-5022-00
08	Not Used	-
09	Launch Trigger	180-5040-01

Switch Number	Description	Part No.
10	Outhole	180-5011-00
11	Trough #1 Left	180-5009-00
12	Trough #2 Center	180-5009-00
13	Trough #3 Right	180-5010-00
14	Shooter Lane	180-5053-00
15*	Left Flip. Cab	180-5048-01
16*	Right Flip. Cab.	180-5048-01
17	† Left 4 Bank Top 4	180-5082-06
18	† Left 4 Bank Mid. 3	180-5082-06
19	† Left 4 Bank Mid. 2	180-5082-06
20	† Left 4 Bank Bot. 1	180-5082-06
21	Left Orbit Rollover	500-5142-00
22	Right Orbit Rollover	515-5138-00
23	Not Used	-
24	Not Used	-
25	Center Drop Tar. Left	180-5092-01
26	Center Drop Tar. Mid.	180-5092-01
27	Center Drop Tar. Bot.	180-5092-01
28	Left Outlane	500-5142-00
29	Left Return	500-5142-00
30	Left Slingshot	180-5054-00
31	Vertical Up Kicker	180-5064-00
32	Right Saucer	180-5027-00
33	Right Drop Tar. Top	180-5092-01
34	Right Drop Tar. Mid.	180-5092-01
35	Right Drop Tar. Bot.	180-5092-01
36	Right Outlane	515-5138-00
37	Right Return	515-5138-00
38	Right Slingshot	180-5054-00
39	† Left Stand-up Tar.	500-5252-06
40	Left Saucer	180-5027-00
41	Left Top Lane	500-5142-00
42	Center Top Lane	500-5142-00
43	Right Top Lane	500-5142-00
44	Left Turbo Bumper	180-5015-00
45	Center Turbo Bumper	180-5015-00
46	Right Turbo Bumper	180-5015-00
47	Left Spinner	180-5010-04
48	Right Spinner	180-5010-04
49	Ramp Entrance	180-5087-00
50	Ramp Exit	180-5101-00
51	Not Used	-
52	Right 10 Point	500-5033-00
53	Not Used	-
54	Left Orbit R.O.Backup	500-5142-00
55	Right Orbit R.O. Backup	515-5138-00
56	Not Used Through 64	-



Switch Locations

†Misc.- Back-up plates 535-5116-00
for Stand-Up Targets

* 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 Active 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. The top display indicates LAMP RETURNS and the Bottom display indicates wire color and the LAMP RETURN driver transistor. 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 RETURNS test, depress the STEP push-button switch. The Top display indicates LAMP COLUMNS and the bottom display indicates wire color and the LAMP DRIVES driver transistor. All controlled lamps in column 1 should be lit. Operating the Game Start push-button switch, cycles through each of the columns separately.

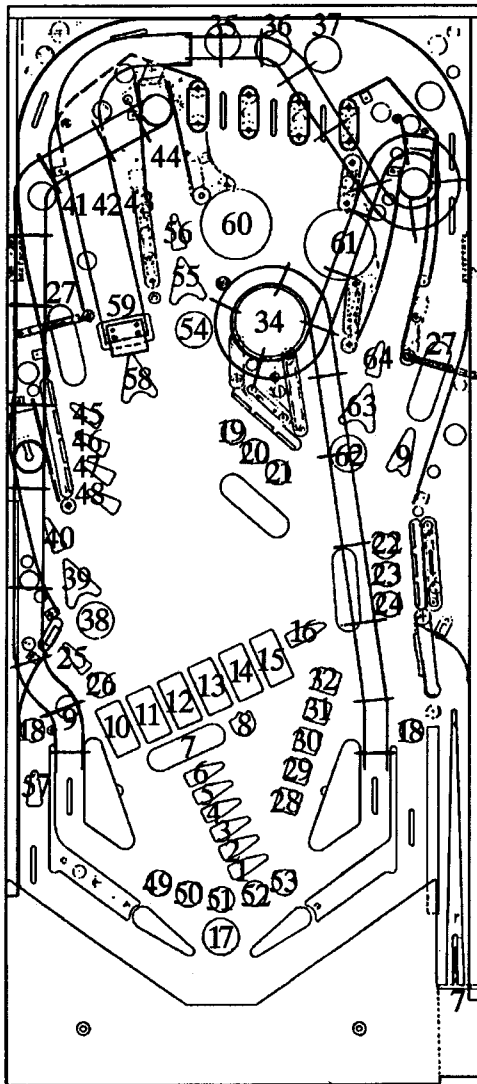
Single Lamp

From the LAMP DRIVES test, depress the STEP push-button switch. The top display indicates lamp name. The bottom display indicates the row and column wire colors and the lamp matrix number. 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 CN7-1	2 YEL-RED CN7-2	3 YEL-ORN CN7-3	4 YEL-BLK CN7-4	5 YEL-GRN CN7-6	6 YEL-BLU CN7-7	7 YEL-VIO CN7-8	8 YEL-GRY CN7-9
1 RED-BRN CN6-1	UziClip Bottom 1	Start Getaway ₉	Shoot Again ₁₇	Lite Karate Kick ₂₅	Cab.- Start Button ₃₃	Ramp Looping ₄₁	3 Million ₄₉	Karate Kick ₅₇
2 RED-BLK CN6-2	UziClip 2	3 Million ₁₀	Murtough's Retire ₁₈	Million Plus ₂₆	Center Turbo Bumper ₃₄	Double Jackpot ₄₂	6 Million ₅₀	Collect Jackpot ₅₈
3 RED-ORN CN6-3	UziClip 3	Bonus Multiplier ₁₁	Center DropTar. Left ₁₉	Subway ₂₇	Top Left Lane ₃₅	Victory Lap ₄₃	9 Million ₅₁	Freeway For Extra Ball ₅₉
4 RED-YEL CN6-5	UziClip 4	Lite SuperLeo Getz ₁₂	Center DropTar. Mid. ₂₀	2X ₂₈	Top Middle Lane ₃₆	Silent Alarm ₄₄	12 Million ₅₂	Left Turbo Bumper ₆₀
5 RED-GRN CN6-6	UziClip 5	Lite Video ₁₃	Center DropTar. Right ₂₁	4X ₂₉	Top Right Lane ₃₇	Left Bank 1 Top ₄₅	15 Million ₅₃	Right Turbo Bumper ₆₁
6 RED-BLU CN6-7	UziClip Top 6	Start Crazy Riggs ₁₄	Right DropTar. Top ₂₂	6X ₃₀	Collect 1 L.W.123 ₃₈	Left Bank 2 ₄₆	Collect 2 L.W.123 ₅₄	Collect 3 L.W.123 ₆₂
7 RED-VIO CN6-8	Fire Uzi ₇	Freeway Loops ₁₅	Right DropTar. Mid. ₂₃	8X ₃₁	Lite Jackpot 1 ₃₉	Left Bank 3 ₄₇	Lite Jackpot 2 ₅₅	Lite Jackpot 3 ₆₃
8 RED-GRY CN6-9	Bullet Proof Vest ₈	Lethal Weap.1,23 10 Mill ₁₆	Right DropTar. Bot. ₂₄	Bonus Multiplier & Hold ₃₂	Extra Ball ₄₀	Left Bank 4 Bot. ₄₈	Video Mode ₅₆	Leo Getz ₆₄

Lamp Number	Description
01	Uzi Clip Bottom
02	Uzi Clip 1
03	Uzi Clip 2
04	Uzi Clip 3
05	Uzi Clip 4
06	Uzi Clip 5
07	Fire Uzi
08	Bullet Proof Vest
09	Start Getaway
10	3 Million
11	Bonus Multiplier



Lamp Locations

12	Lite Super Leo Getz
13	Lite Video
14	Start Crazy Riggs
15	Freeway Loops
16	Lethal Weapon 1,2,3 10 Million
17	Shoot Again
18	Murtough's Retire
19	Center Drop Target Left
20	Center Drop Target Mid.
21	Center Drop Target Right
22	Right Drop Target Top
23	Right Drop Target Mid.
24	Right Drop Target Bottom
25	Lite Karate Kick
26	Million Plus
27	Subway
28	2X
29	4X
30	6X
31	8X
32	Bonus Multiplier & Hold
33	Cab. Start Button
34	Center Turbo Bumper
35	Top Left Lane
36	Top Middle Lane
37	Top Right Lane
38	Collect 1 L.W. 1,2,3
39	Lite Jackpot 1
40	Extra Ball
41	Ramp Looping
42	Double Jackpot
43	Victory Lap
44	Silent Alarm
45	Left Bank 1 Top
46	Left Bank 2
47	Left Bank 3
48	Left Bank 4 Bottom
49	3 Million
50	6 Million
51	9 Million
52	12 Million
53	15 Million
54	Collect 2 L.W. 1,2,3
55	Lite Jackpot 2
56	Video Mode
57	Karate Kick
58	Collect Jackpot
59	Freeway for Extra Ball
60	Left Turbo Bumper
61	Right Turbo Bumper
62	Collect 3 L.W. 1,2,3
63	Lite Jackpot 3
64	Leo Getz

FLASH LAMP COIL TESTS

Twenty-Two regular (pulsed under microprocessor control) coil drivers are provided to switch ground to coils. The Left/Right relay 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". This relay is located on the PPB board which provides isolation diodes and current limiting resistors. This effectively provides 29 regular coils.

Flash Lamp

From the Single Lamp test, depress the STEP push-button switch. All Flash lamps will fire randomly. This allows the Technician to easily spot any burned out bulbs and replace them without stepping through the tests below.

Automatic Test

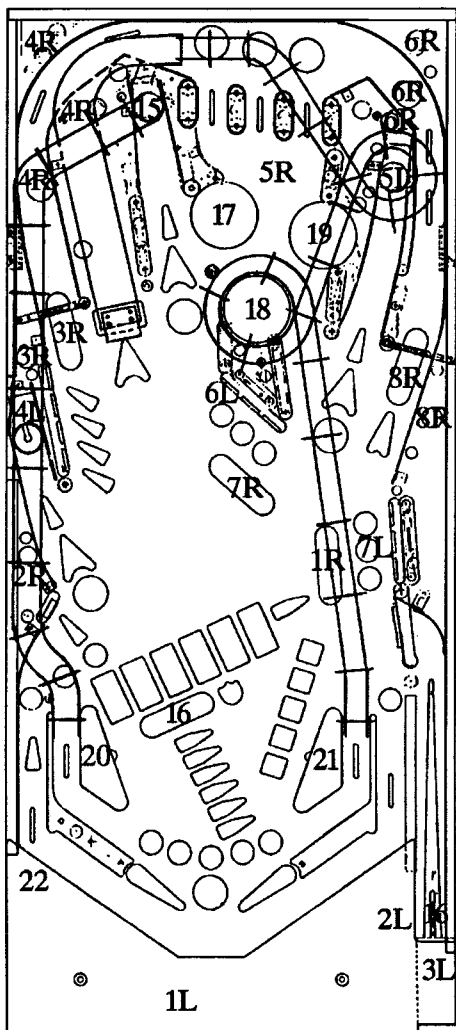
From the Flash Lamps test, depress the STEP push-button switch. Player 1 and 2 displays indicate ALL COILS. The test pulses each regular solenoid or flash lamp sequentially with the coil/flash lamp name indicated in the Player 1 and 2 displays and the wire colors in the Player 3 and 4 displays.

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 1st drive, the wire colors are indicated in the Player 3 and 4 displays. Operate either Flipper 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 START 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 once. The game returns to the game-over mode.

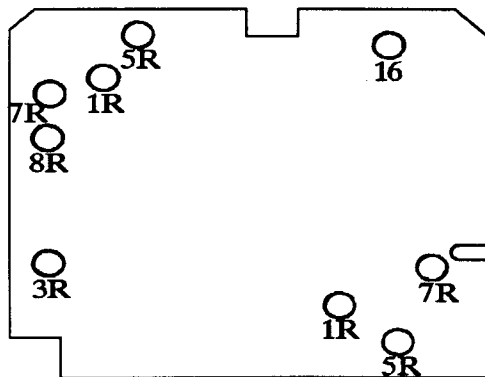


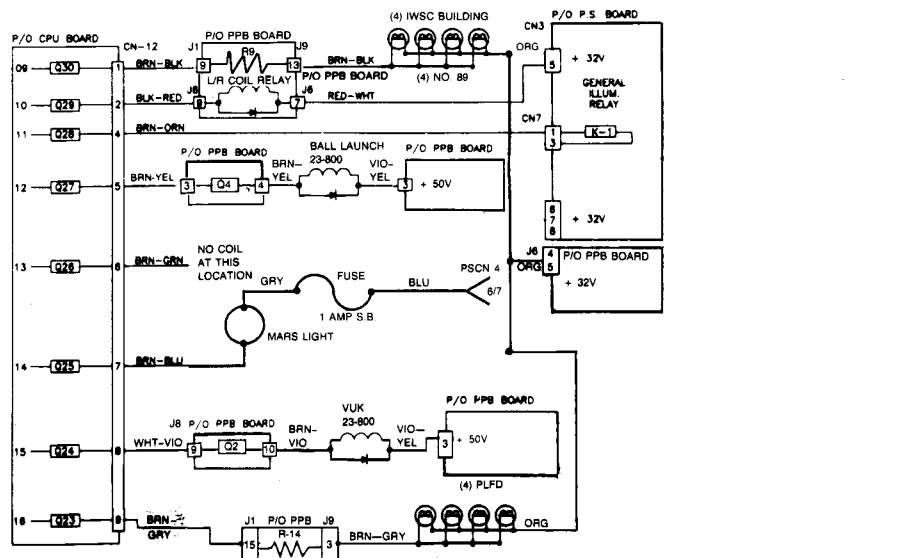
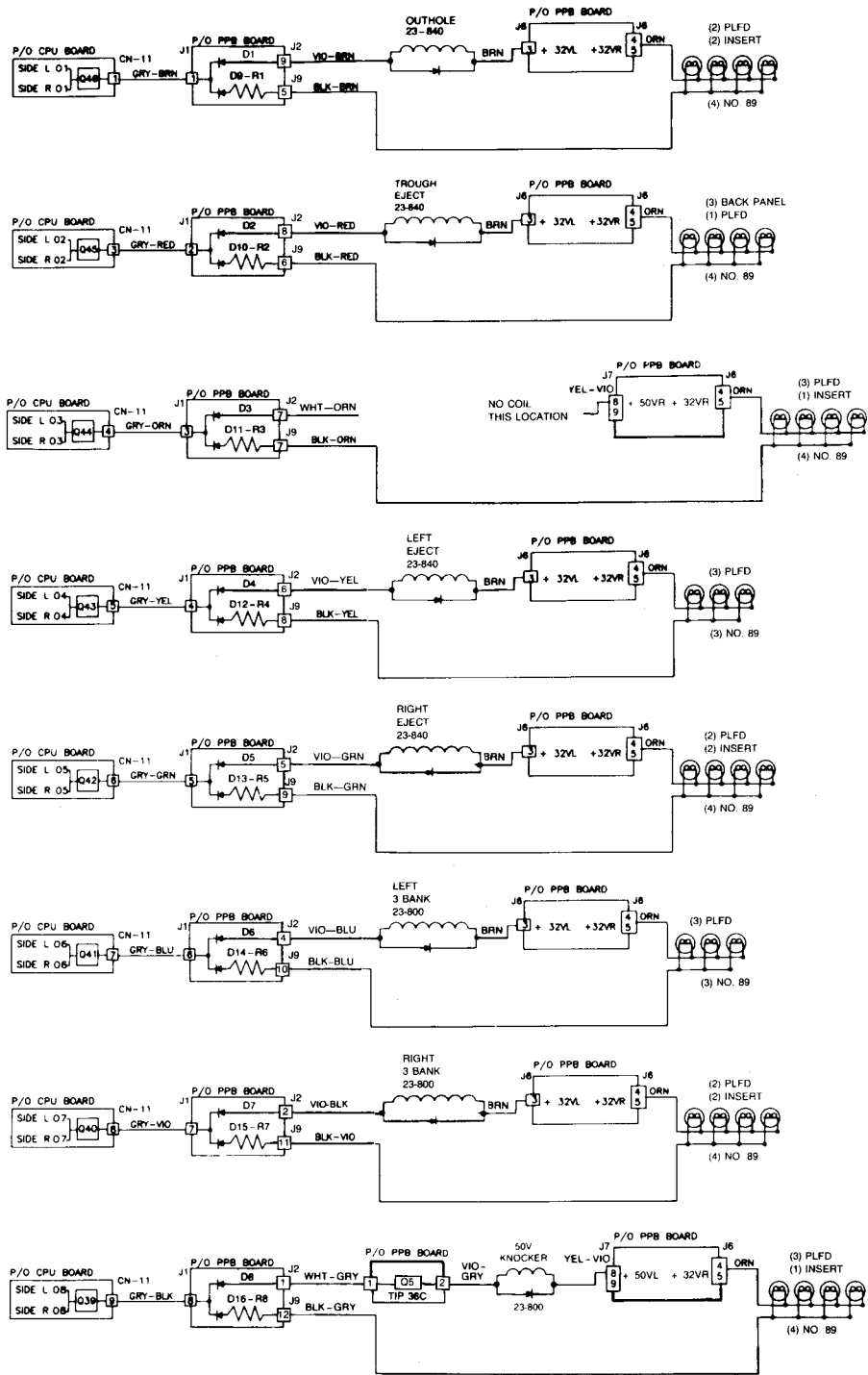
CPU Controlled Auxillary Solenoids

Coil Number	Coil Description	Control Line (CPU to Coil)	Power Line (PS to Coil)	Drive Transistor	Coil Type
17	Left Turbo Bumper	BLU-BRN CPU CN19-7	RED PS CN3-6	Q11	23-800
18	Center Turbo Bumper	BLU-RED CPU CN19-4	RED PS CN3-6	Q9	23-800
19	Right Turbo Bumper	BLU-ORN CPU CN19-3	RED PS CN3-6	Q8	23-800
20	Left Slingshot	BLU-YEL CPU CN19-6	RED PS CN3-6	Q10	23-800
21	Right Slingshot	BLU-GRN CPU CN19-8	RED PS CN3-6	Q12	23-800
22	Kickback (See Schematic)	BLU-BLK CPU CN19-9	RED PS CN3-6	Q13	23-800

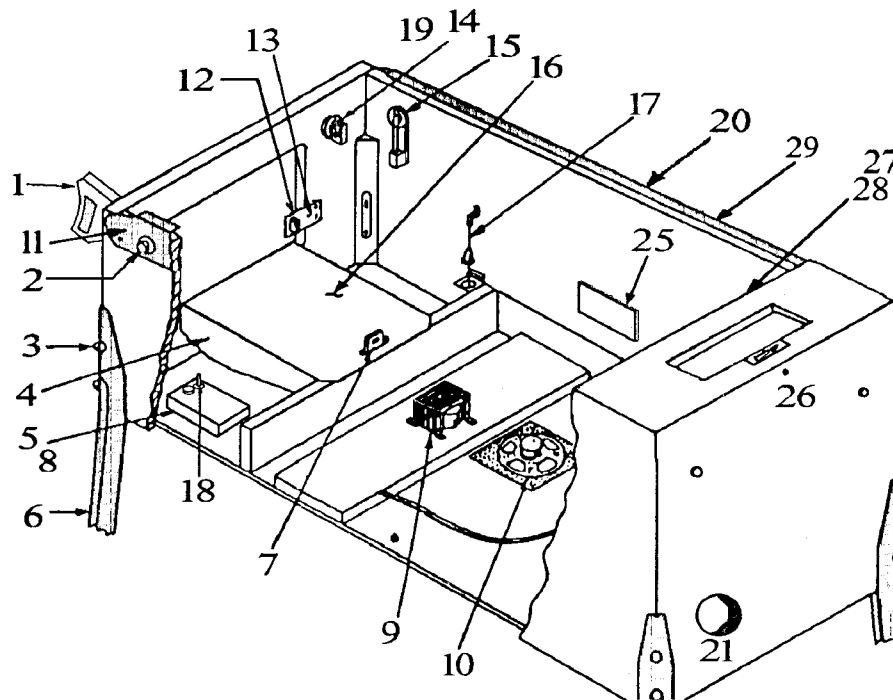
Flipper Solenoids

Coil Description	Flipper GND CPU to Coil	Flipper GND Sw. to Flip.PCB	Power Lines FlipPc toCoil	Coil Type	Power Input To Flip PCB
Left Flipper 090-5030-00	ORN-GRY CPU CN19-2	BLU-GRY CN1-9	GRY-YEL CN2-1,2	23-1100	BLK-WHT 50VDC
Right Flipper 090-5030-00	ORN-VIO CPU CN19-1	BLU-VIO CN1-1	BLK-WHT CN1-1	23-1100	GRY, GRY-GRN 8VAC



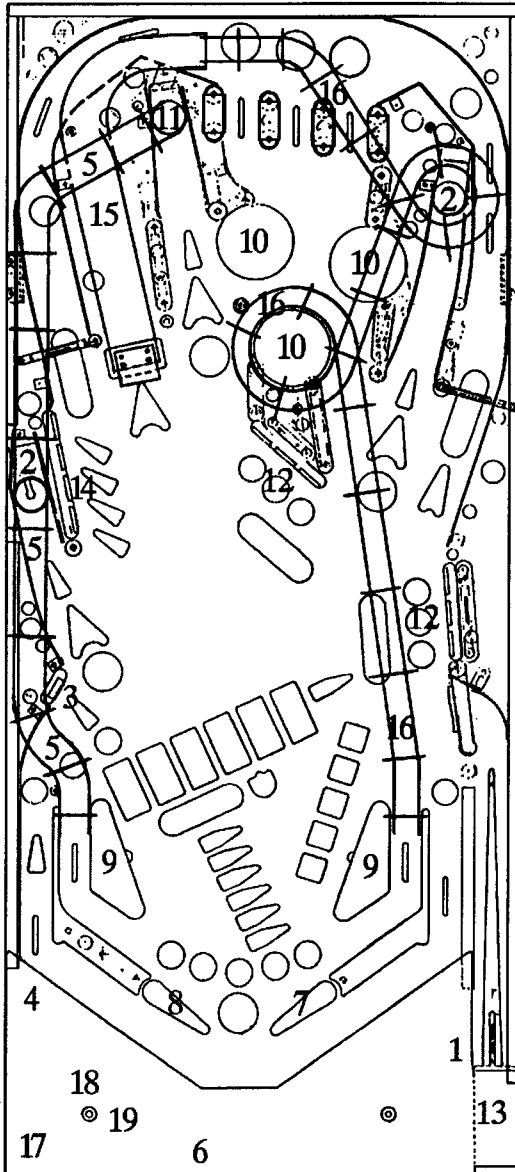


CABINET PARTS ILLUSTRATION



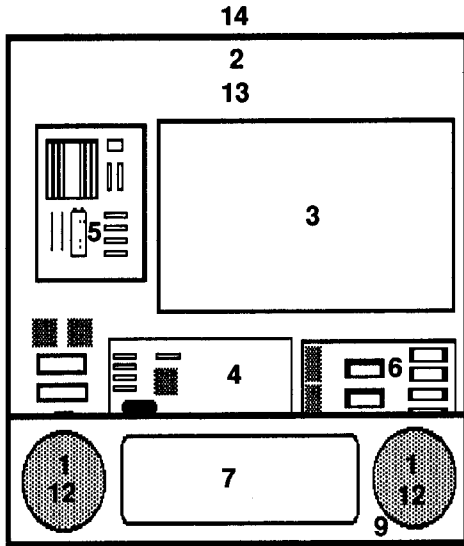
Item	Description	Part No.
1	Gun Assembly	500-5487-00
2	Flipper Button	500-5026-22
3	Leg Bolt (Black)	231-5000-01
4	Cash Box Bottom	545-5090-00
5	On/Off Switch DP/ST	180-5001-00
6	Leg (Black)	535-5020-30
7	Lock Bracket-Cash Box	535-5215-00
8	Power Input Box Assy	515-5360-00
9	Transformer	010-5003-00
10	Speaker-Round (8")	031-5005-00
11	Side Armor-Right	535-5010-31
12	Memory Protect Switch	180-5000-00
13	Memory Protect Switch Bracket	535-6409-00
14	Start Switch Assembly	500-5407-02
15	Flipper Leaf Switch	180-5048-01
16	Cash Box Top	535-5013-03
17	Plumb Bob Tilt Assembly	500-5023-00
18	Volume Control	123-5000-00
19	Playfield Glass (Tempered) *	660-5001-00
20	Side Armor -Left	535-5010-32
21	Recessed cup for Line cord	545-5122-00
22	Service Switch (Not Shown)	180-5012-00
23	Front Molding Lockdown Assy.*	500-5020-00
24	Front Molding -Black *	500-5021-10
25	S.S.Flipper P.C.B.	520-5033-02
26	Roto Lock Bottom	355-5006-01
27	Rear Plastic Extrusion for Playfield Glass	545-5038-00
28	Mounting Foam for Extrusion	626-5004-00
29	Plastic Channel (Right & Left)	545-5017-00
30	Backbox Hinge Left *	535-6172-00
31	Backbox Hinge Right *	535-6172-01
32	Leg Leveler *	500-5017-00
33	1/4 -20 Nut (Gun) *	240-5300-00
34	1/4 -20 X 1" Bolt (Gun)*	231-5023-00
35	Coin Door with Validator Blank*	500-5018-10
36	Gun Wrench (7/16 Open End) *	535-6410-00

Playfield - Major Assemblies



Item	Description	Part No.
1.	Ball Feed Assy.(Trough)	500-5012-01
2.	Ball Eject Assy.(Saucer)	500-5051-11
3.	Stand Up Switch	500-5252-06
4.	Kick Back Assy.	500-5080-00
5.	Left Wire Ramp	535-6214-00
6.	Outhole Assy.	500-5082-00
7.	Flipper Assy. Right	500-5606-71
8.	Flipper Assy Left	500-5606-72
9.	Sling Shot Assy.	500-5226-00
10.	Pop Bumper Assy.	500-5227-00
11.	Vertical Up Kicker	500-5326-00
12.	3 Bank Drop Target	500-5437-01
13.	Ball Kicker Assy.	500-5477-00
14.	4 Bank Stand Up	500-5482-06
15.	Steel Ramp Assy.	500-5490-00
16.	Loop Ramp	535-6217-00
17.	Bottom Arch Assy.	545-5302-03
18.	Level (horizontal)	670-5000-00
19.	Level (vertical)	670-5001-00

Individual part breakdowns for most of these assemblies can be found on pages 34 through 41.



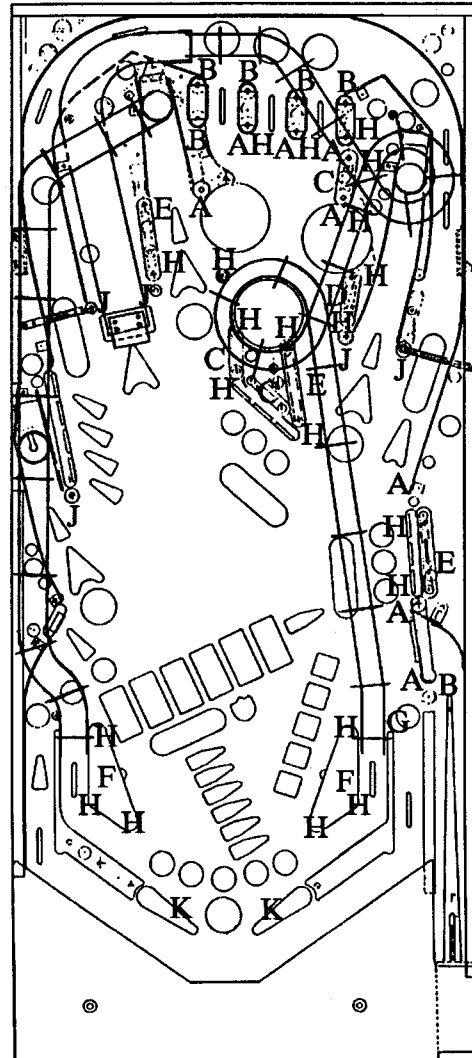
† When ordering PC Boards with ROMs
please specify game name

Item	Description	Part No.
1	Speakers	031-5004-00
2	Back Box Lock	355-5008-00
3	CPU	520-5003-03
4	PPB Board	520-5021-05
5	Power Supply	520-5047-01
6	Sound Board	520-5050-01
7	Dot Matrix	520-5052-00
8	Display Controller Board *	520-5055-00
9	Speaker Housing	545-5180-01
10	Clear BackGlass *	660-5008-00
11	Glass Artwork *	830-5226-00
12	Speaker Grill	830-5618-00
13	Back Box Lock Plate	535-5860-00
14	Spinning Light Ass'y.	500-5365-00

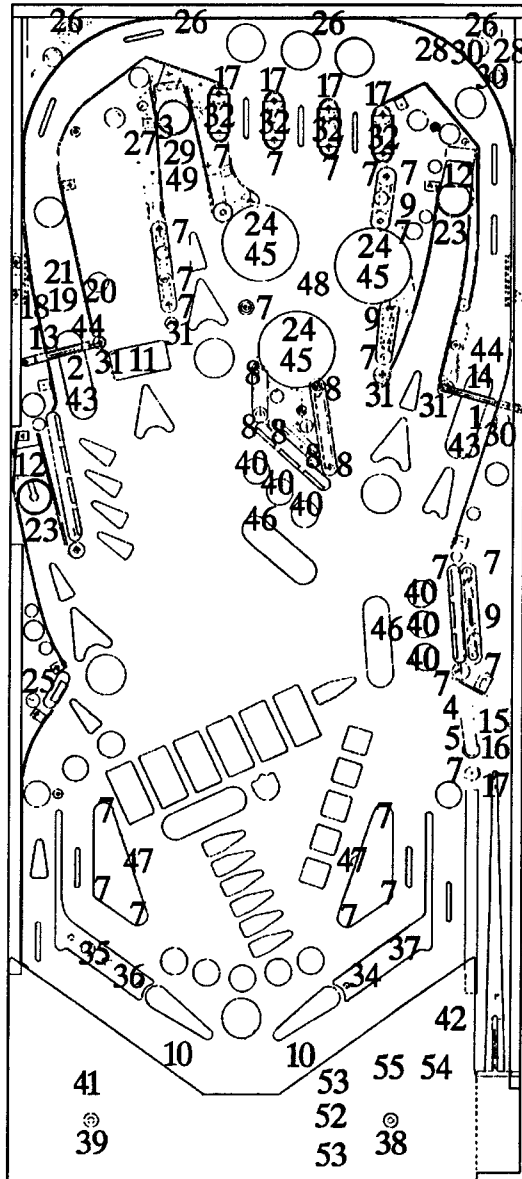
* Not Shown

RUBBER PARTS ILLUSTRATION

Item	Description	Part #
A	3/16" (8)	545-5348-01
B	5/16" (5)	545-5348-02
C	1" (5)	545-5348-05
D	1 1/4" (1)	545-5348-06
E	1 1/2" (4)	545-5348-07
F	2 1/2" (2)	545-5348-09
G	7/16" (1)	545-5348-17
H	Post Rubber (22) Short	545-5151-00
I	Post Rubber (5) Long	545-5260-00
J	Flipper Rubber (2)	545-5277-00



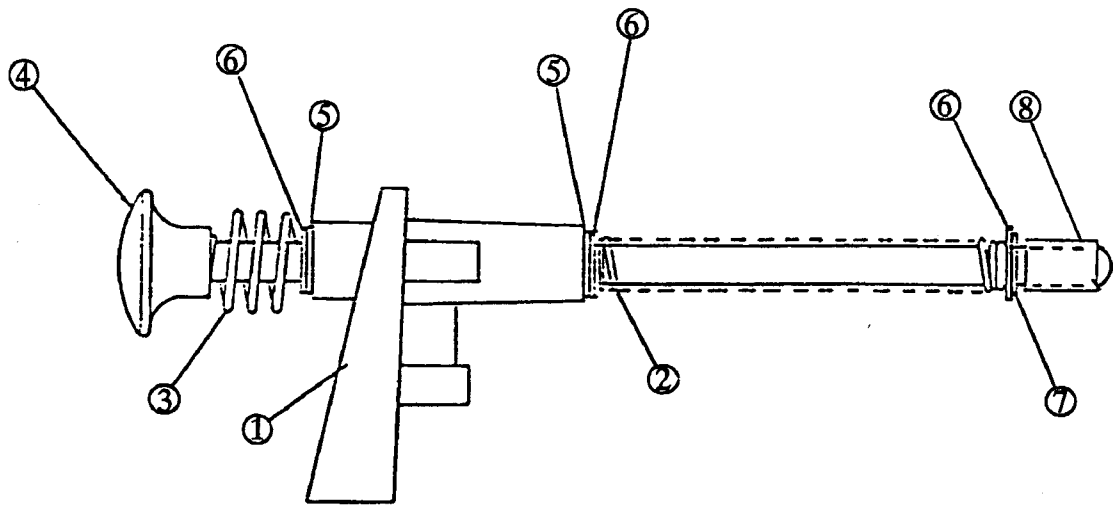
Playfield Parts



* Indicates not shown

Note:
See page 25 for switch part numbers

No.	Description	Part Number
1.	Spinner Assy Right	500-5475-00
2.	Spinner Assy Left	500-5475-01
3.	Joes Joint Assy.	500-5489-00
4.	Gate and Brkt. Assy.	500-5493-00
5.	Flap Gate Assy.	500-5494-00
6.	Complete Playfield Assy.	505-6006-26
7.	Metal Standoff W/Groove (23)	530-5035-01
8.	Double Rubber Post (6)	530-5102-01
9.	Wire Form #1 (4)	535-5300-05
10.	Snubber Wire (2)	535-5373-01
11.	Wire Gate	535-5659-00
12.	Ball Deflector (2)	535-6017-00
13.	Spinner Hat Bracket Left	535-6320-00
14.	Spinner Hat Bracket Right	535-6320-01
15.	Flap Gate	535-6386-00
16.	Flap Gate Brkt	535-6387-00
17.	Mini Post Clear (5)	550-5034-01
18.	Lite Cover Red	545-5014-02
19.	Lite Cover Green	545-5014-04
20.	Lite Cover Yellow	545-5014-06
21.	Lite Cover White	545-5014-08
22.	Spinner Washers (4)	545-5037-00
23.	Eject Hole Base Yellow	545-5060-06
24.	Bumper Cap	545-5225-02
25.	Lite Shield	545-5255-00
26.	Mirrored Backpanel	545-5321-00
27.	Joes Joint Plastic	545-5326-00
28.	SB Mini Mars Red	550-5031-02
29.	SB Mini Mars Amber	550-5031-03
30.	SB Mini Mars Blue	550-5031-05
31.	Metal Standoff	530-5035-01
32.	Light Hood Red	550-5035-02
33.	Light Hood Red	550-5036-02
34.	Return Lane Guide Right	550-5037-01
35.	Return Lane Guide Lft	550-5037-01
36.	Return Lane Lower Lft	550-5042-01
37.	Return Lane Lower Right	550-5046-01
38.	Instruction Card	755-5032-00
39.	Coinage Card	755-5034-00
40.	Drop Target Decals	820-5136-01
41.	Bottom Arch Decal Left	820-5138-01
42.	Bottom Arch Decal Right	820-5138-02
43.	Spinner Decal	820-5214-01
44.	Spinner Target	515-5553-00
45.	Pop Bumper Decal	820-5315-00
46.	Mylar Pad (2)	820-5815-00
47.	Sling Shot Protector (2)	820-5821-00
48.	Pop Bumper Mylar	820-5824-00
49.	Joes Joint Decal	820-6091-00
50.	Playfield Screened	830-5126-00
51.	Screened Plastic Set	830-5440-00
52.	Wire Gate Bottom Arch	535-5393-00
53.	Gate Retaining Clips	270-5011-00
54.	Trough Switch Actuator	535-5316-00
55.	Trough Switch Actuator	535-5320-00
56.	Gun Barrel Assy.	500-5492-00



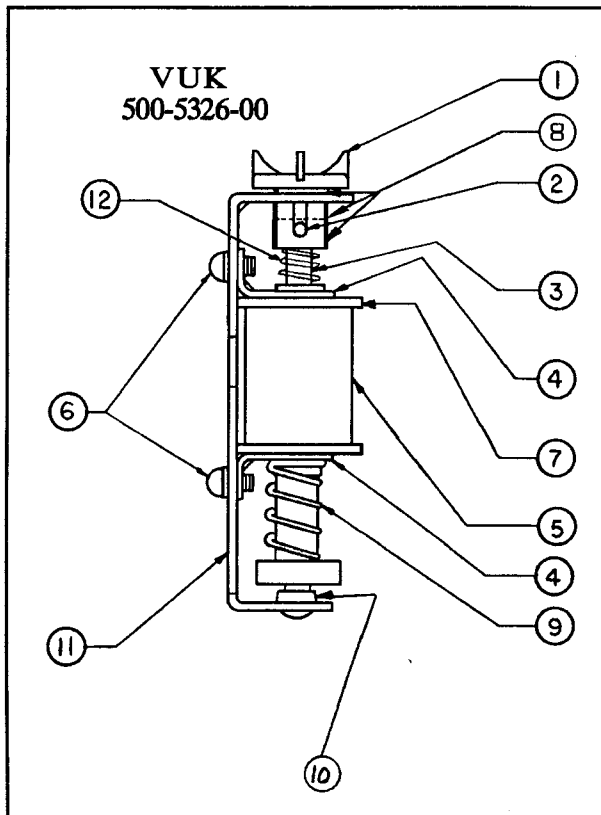
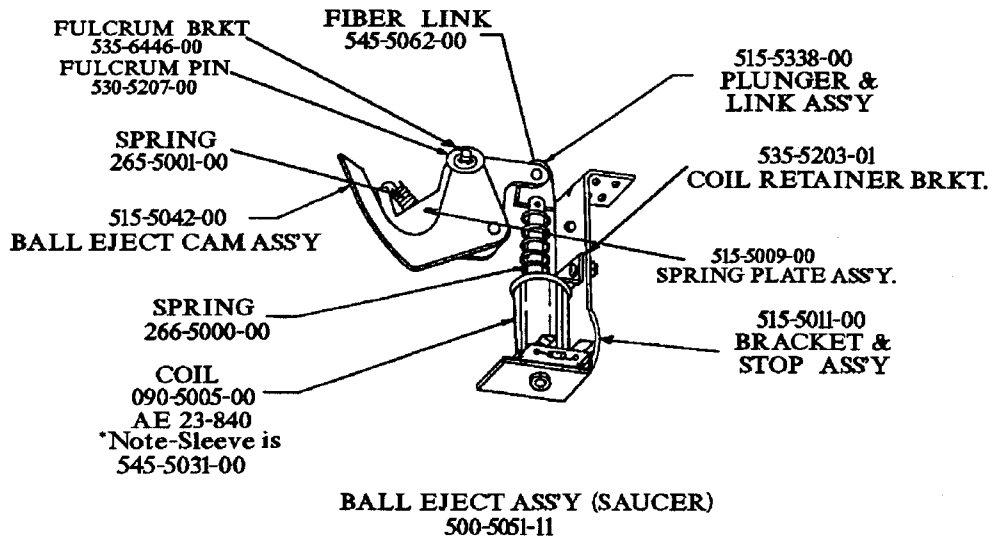
Item	Part #	Description
1	Housing	535-5067-00
2	Spring (large)	266-5001-XX
3	Spring (small)	266-5010-00
4	Rod Assembly	530-5023-XX
5	Bushing (oilite)(2)	280-5010-00
6	Washer (3)	242-5014-00
7	Retaining Ring	270-5012-00
8	Plunger Tip	545-5276-00

Knob Color Code	
01	Clear
02	Red
03	Amber
04	Green
05	Blue
06	Yellow
07	Orange
08	White
09	Purple
10	Flo. Orange
11	Flo. Green
12	Flo. Blue

Spring Color Code		
Part No.	Wire Dia.	Color
266-5001-XX	-	-
-01	-	-
-02	.042	Red
-03	.037	Black
-04	.035	Green
-05	.031	Blue
-06	.047	Yellow
-07	.038	Orange
-08	.039	1/2 Red
-09	.041	Basic

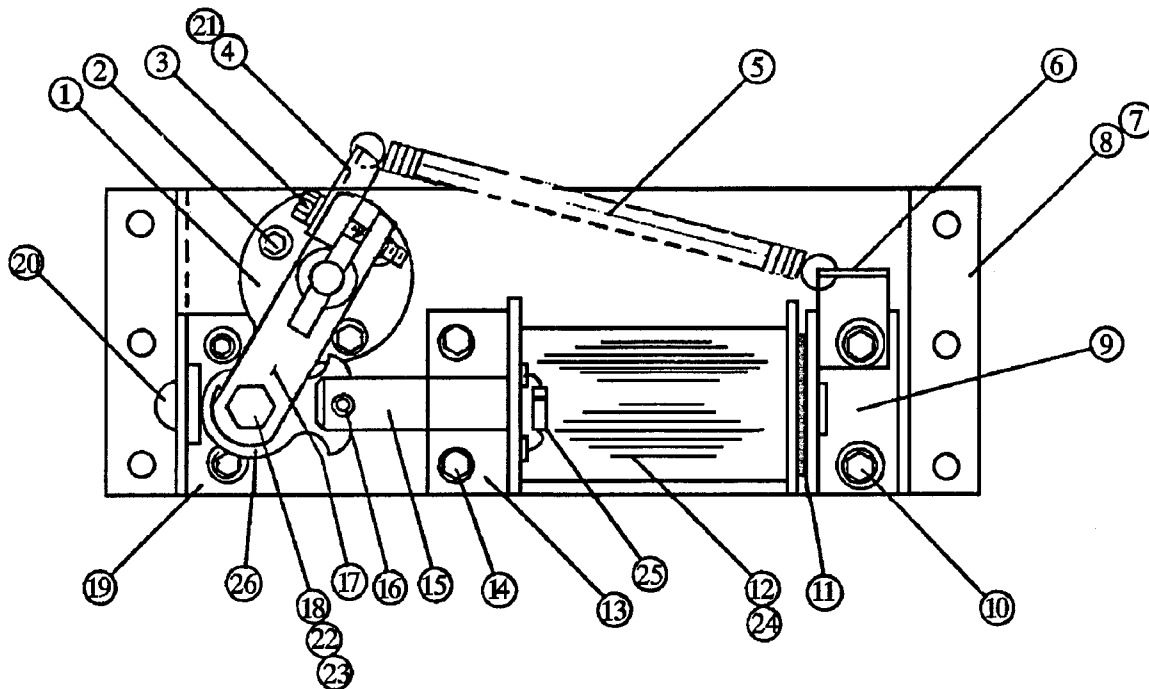
**Shooter Assembly
Long Shaft
500-5409-XX-XX**

1st XX- Denotes Rod Ass'y.
2nd XX Denotes Spring



Item	Description	Part #
1	Vert.Kick.Cap	545-5227-00
2	Pin $\frac{3}{32} \times \frac{7}{16}$	251-5004-00
3	Plunger Assy.	515-5352-00
4	Coil Retainer Brkt.(2)	535-5203-01
5	Coil 23-800	090-5001-01
6	#8-32 X $\frac{1}{4}$ "	232-5300-00
7	1N4004 Diode	112-5003-00
8	Compression Ring(3)	270-5010-00
9	Spring	266-5009-00
10	Bumper	545-5105-00
11	VUK Bracket	535-5271-00
12	Cap Spring	266-5025-00
13*	Sw.Insulator	545-5193-00
14*	Micro Switch	180-5063-00
15*	2-56x $\frac{1}{2}$ Screw(2)	237-5806-00
16*	Lock Washer	244-5001-00
17*	Hex Nut	240-5301-00

* Indicates not shown



Item	Description	Part #	Item	Description	Part #
1	Flipper Bushing	545-5070-00	14	#8 x ³ / ₈ Hex Hd.Scr.	234-5100-00
2	#6 x ³ / ₈ Hex Hd.scr.	234-5000-00	15	Plunger, Link & Pawl	515-5051-01
3	#10-32 x ³ / ₄ Soc.Hd.scr.	237-5864-00	16	Pin	251-5000-00
4	Spring Brkt. (left)	535-6421-00	17	Pawl	530-5070-00
5	Flipper Return Spring	265-5029-00	18	10-32x ³ / ₄ Shoulder Bolt	231-5019-00
6	Spring Bracket	535-6420-00	19	Rebound Brkt.	535-5939-00
7	Flipper Base (left)	515-5077-01	20	Rubber Bumper	280-5003-00
8	Flipper Base (right)	515-5077-02	21	Spring Brkt. (right)	535-6422-00
9	Coil Stop Brkt.	515-5346-00	22	Bushing	530-5139-00
10	1/4-20x ³ / ₈ Soc.Hd.scr.	237-5861-00	23	10-32 Elastic Stop Nut	240-5206-00
11	Spring Washer	269-5002-00	24	Coil Sleeve	545-5031-00
12	Coil 23-1100	090-5030-00	25	1N4004 Diode	112-5003-00
13	Front Brkt.	515-5129-00	26	Flipper Link	545-5219-00

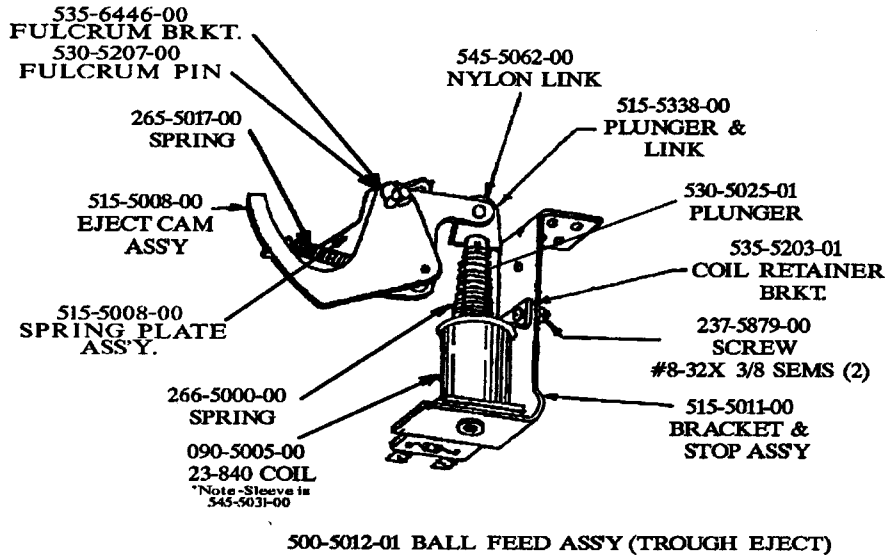
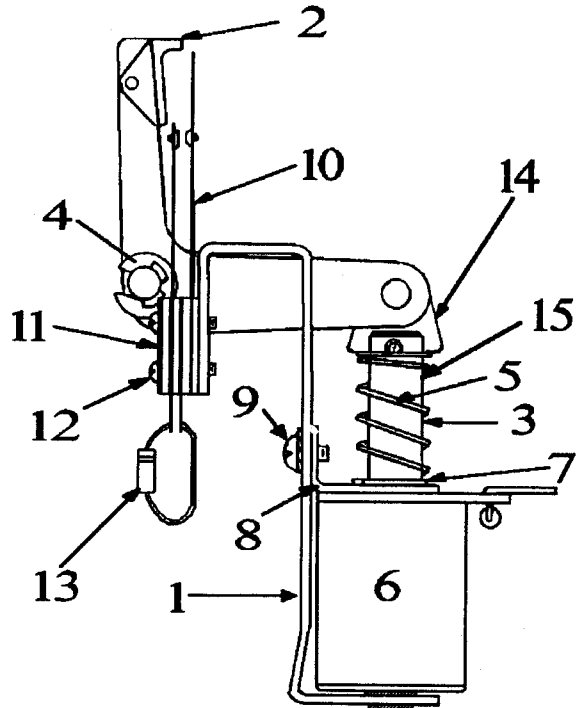
Flipper Assemblies

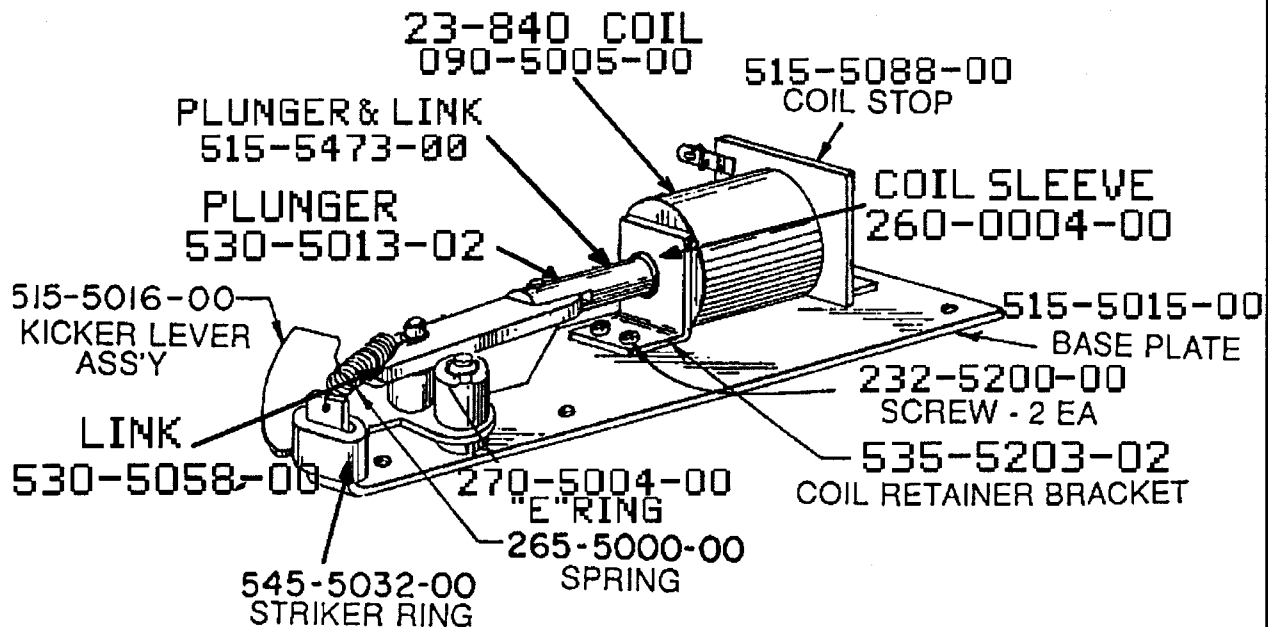
500-5606-71 Right

500-5606-72 Left

Slingshot Assembly 500-5226-00

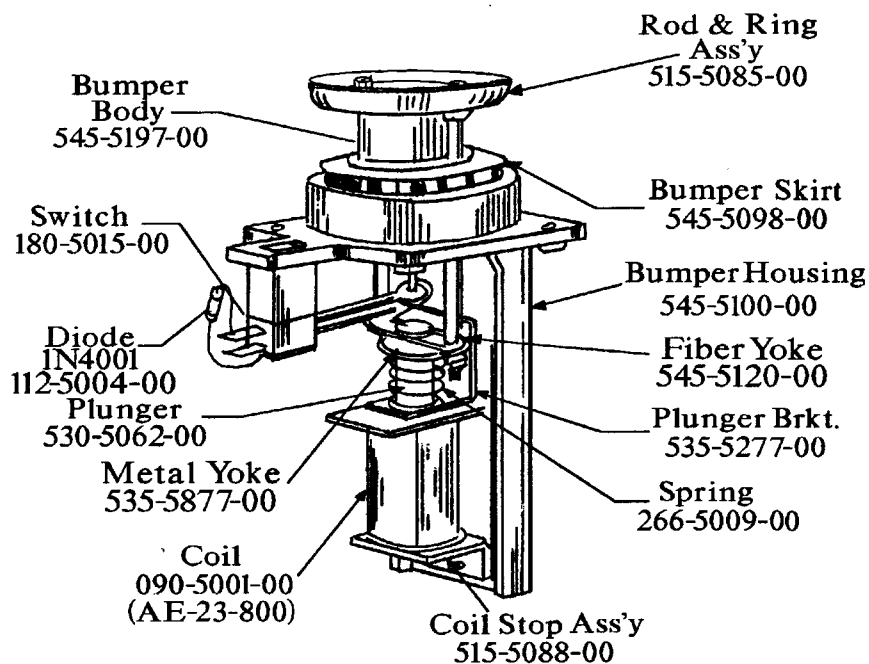
Item	Description	Part No.
1	Slingshot Bracket	515-5339-00
2	S.S. Arm & Tip Assy.	515-5340-00
3	Plunger & Link Assy.	515-5338-00
4	1/4 Retaining Ring (2)	270-5002-00
5	Spring	266-5020-00
6	23-800 Coil	090-5001-02
7	Coil Sleeve	260-0004-00
8	Coil Retainer	535-5203-01
9	#8-32 X 1/4" Screw (2)	232-5300-00
10	Slingshot Switch (2)	180-5054-00
11	Tension Plate (2)	535-5846-00
12	#4-40 X 1/2" Screw (4)	237-5837-00
13	Diode 1N4004 (2)	112-5004-00
14	Link	545-5062-00
15	Plunger	530-5025-01

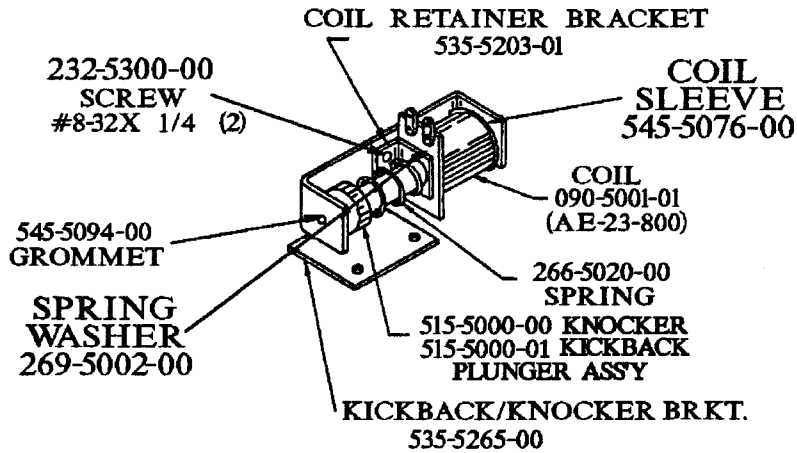




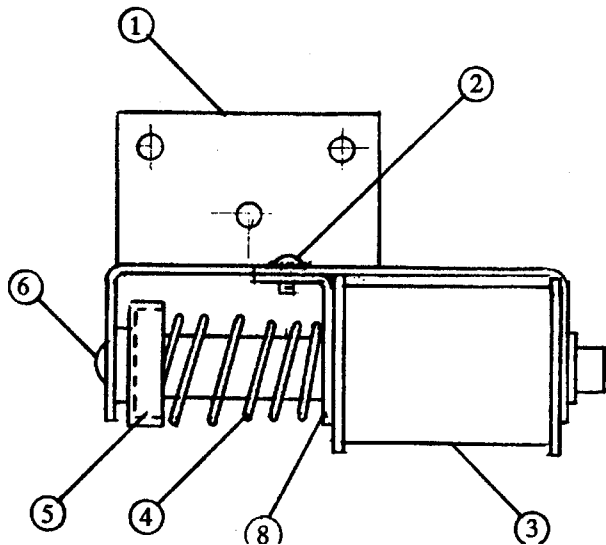
500-5082-00 OUTHOLE BALL RETURN ASSY

Turbo Bumper
500-5227-00





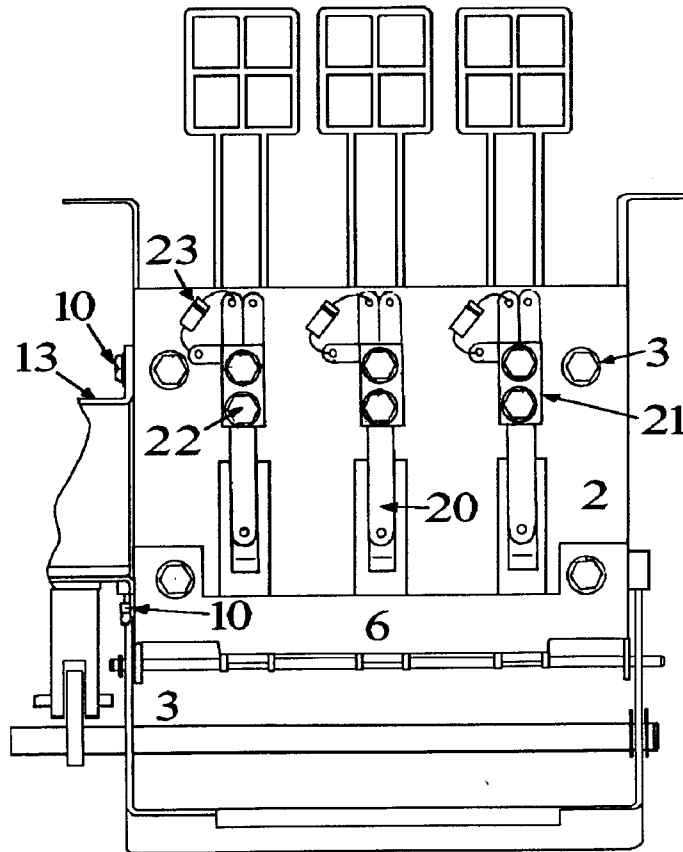
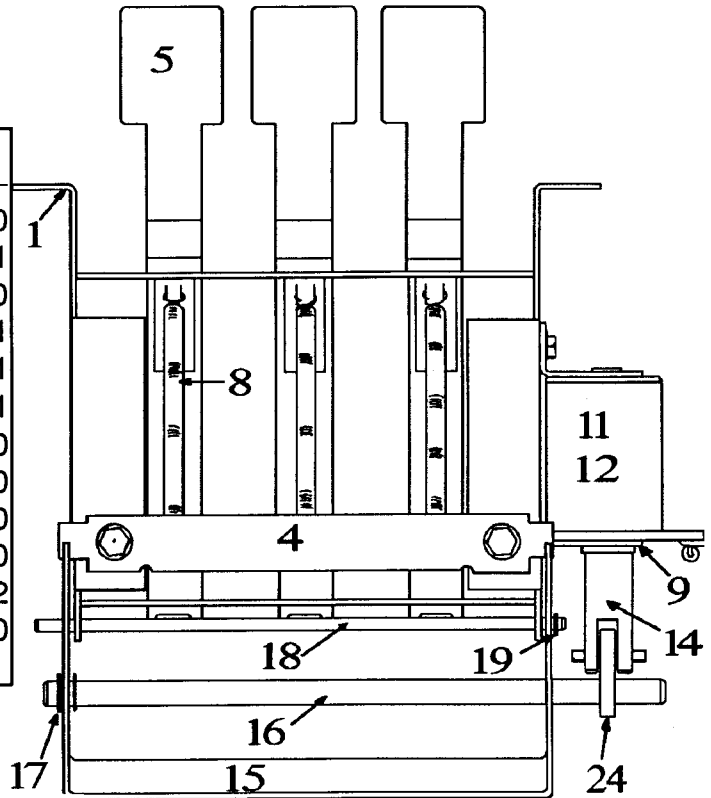
KICKBACK ASSEMBLY 500-5080-00 (COIL LUGS ON THE SIDE)
KNOCKER ASSEMBLY 500-5081-00 (PICTURED)



Item	Description	Part #
1	Coil Mtg. Brkt.	535-6385-00
2	8-32x1/4 Sems.(2)	232-5300-04
3	Coil 23-800	090-5001-01
4	Spring	266-5020-00
5	Plunger Ass'y.	515-5000-02
6	Grommet	545-5105-00
7	1N4004 Diode	112-5003-00
8	Coil Retainer Brkt.	535-5203-01

Ball Launch Ass'y
500-5477-00

Item	Description	Part No.
1	Target End Plate (2)	535-6162-00
2	Bank Target Frame	535-6159-01
3	#8-32 X $\frac{3}{8}$ Screw (6)	237-5879-00
4	Spring Mounting Plate	535-6160-01
5	Target (3)	545-5048-01
6	Drop Tgt.Retain.Brkt.	535-5042-01
7	Washer $\frac{13}{64}$ X $\frac{1}{2}$ (2)	242-5018-00
8	Target Reset Spring (3)	265-5003-00
9	Coil Support Bracket	535-6154-00
10	#6-32 X $\frac{3}{8}$ Screw (4)	237-5877-00
11	23-800-Coil	090-5001-02
12	Coil Sleeve	545-5076-00

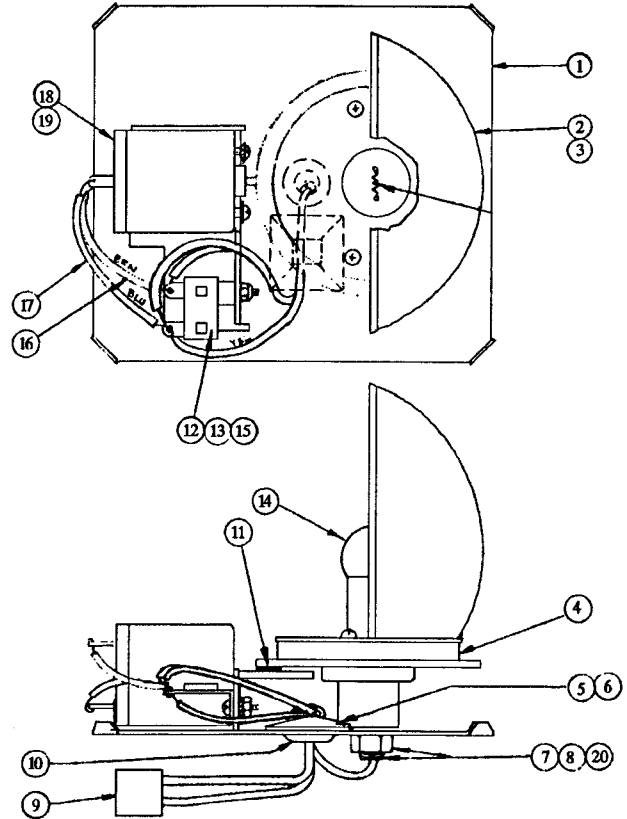


Item	Description	Part No.
13	Plunger Stop Assy.	515-5088-00
14	Plunger & Link Assy.	515-5338-00
15	Target Lift Bracket	535-6169-01
16	Target Shaft	530-5179-01
17	Retaining Ring (2)	270-5002-00
18	Pivot Shaft	530-5180-01
19	Retaining Ring (2)	270-5000-00
20	Switch (3)	180-5092-01
21	SwitchPlate (3)	535-5045-00
22	#6-32 X $\frac{1}{2}$ " (6)	237-5878-00
23	Diode 1N4001 (3)	112-5001-00
24	Link,Plunger	545-5062-00

3 Bank Drop Target Ass'y
500-5437-01

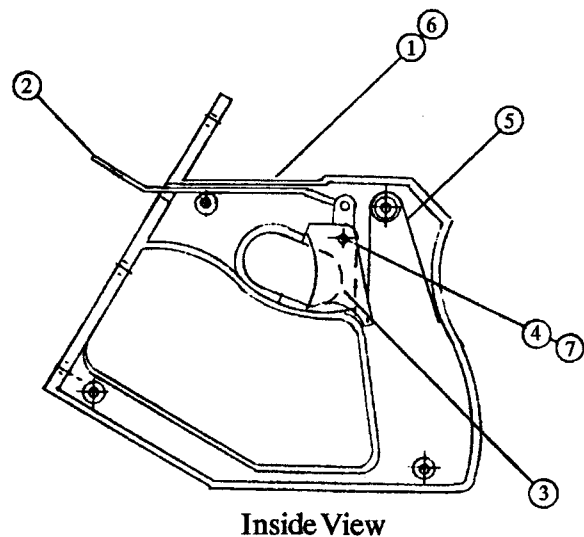
Spinning Light Ass'y. 500-5365-01

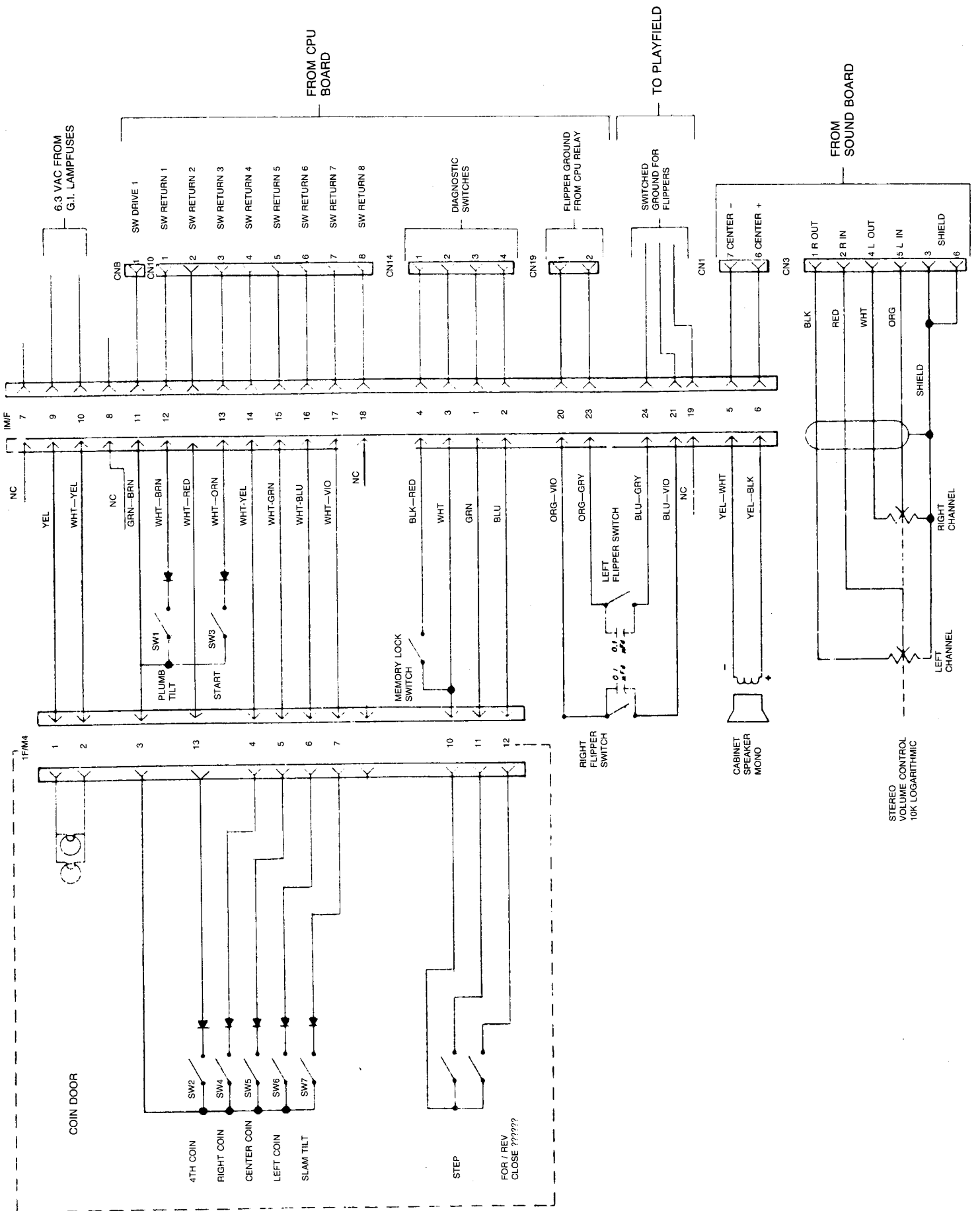
Item	Description	Part No.
1	Base	535-6360-00
2	Reflector	545-5264-00
3	Screw #4 x 1/4	237-5886-00
4	Hub	545-5263-00
5	Tie Wrap	040-5001-01
6	Tie Holder	040-5002-00
7	Lamp Socket Ass'y.	515-5422-00
8	Nut 1/4-20	240-5300-00
9	Cable Ass'y.	036-5258-00
10	Grommet	545-5268-00
11	Drive Pad	545-5324-00
12	Terminal Strip	055-5203-00
13	Screw #4-40 x 5/16	237-5882-00
14	Bulb	165-5000-89
15	Nut #4-40	240-5303-00
16	Jumper Brn. (.3ft.)	601-5001-11
17	Jumper Blu. (.3ft.)	601-5001-00
18	Motor	041-5017-00
19	Screw #4-40 x 3/16 (2)	237-5884-00
20	Spring Washer	269-5003-00

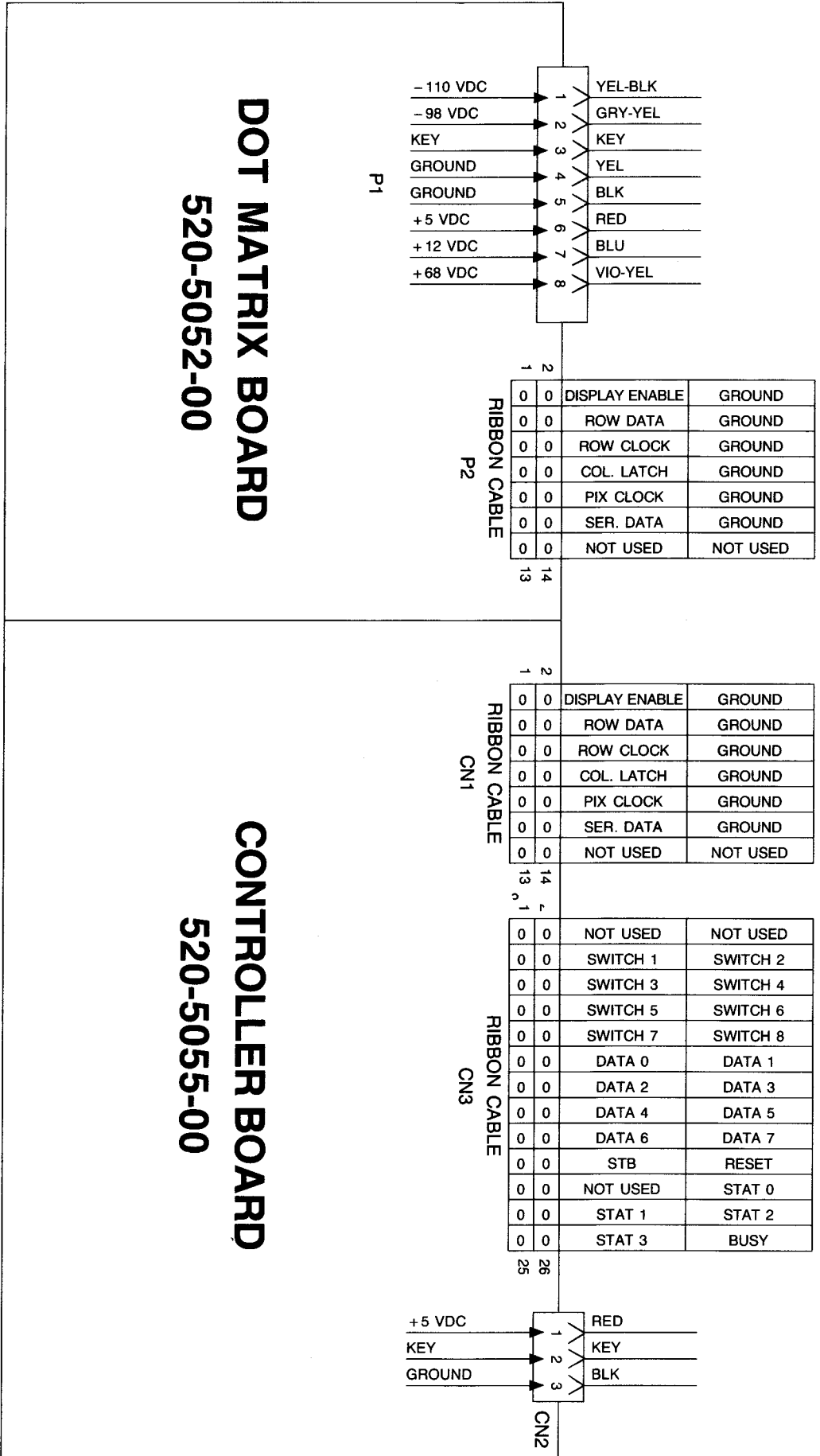


Gun Assembly 500-5487-00

Item	Description	Part #
1	Gun Frame Right	535-5158-00
2	Switch Actuator Wire	535-5663-00
3	Trigger	535-6383-00
4	5/32x5/8 Roll Pin	251-5011-00
5	Trigger Spring	265-5025-00
6	Gun Frame Left	535-5159-00
7	Flatwasher	242-5015-00
8	8-32x3/4 Torx Hd.	237-5814-00
9	Decal *	820-5081-00

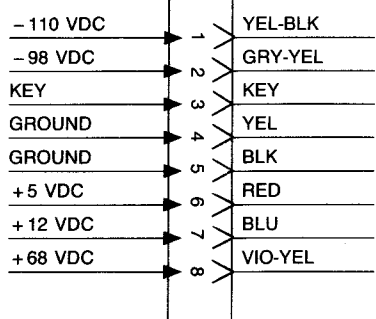






DOT MATRIX BOARD
520-5052-00

CONTROLLER BOARD
520-5055-00



RIBBON CABLE P2

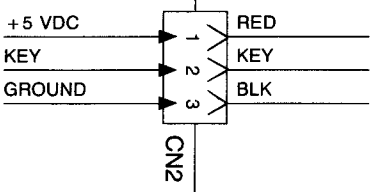
1	2	0	0	DISPLAY ENABLE	GROUND
0	0	0	0	ROW DATA	GROUND
0	0	0	0	ROW CLOCK	GROUND
0	0	0	0	COL. LATCH	GROUND
0	0	0	0	PIX CLOCK	GROUND
0	0	0	0	SER. DATA	GROUND
0	0	0	0	NOT USED	NOT USED

RIBBON CABLE CN1

1	2	0	0	DISPLAY ENABLE	GROUND
0	0	0	0	ROW DATA	GROUND
0	0	0	0	ROW CLOCK	GROUND
0	0	0	0	COL. LATCH	GROUND
0	0	0	0	PIX CLOCK	GROUND
0	0	0	0	SER. DATA	GROUND
0	0	0	0	NOT USED	NOT USED

RIBBON CABLE CN3

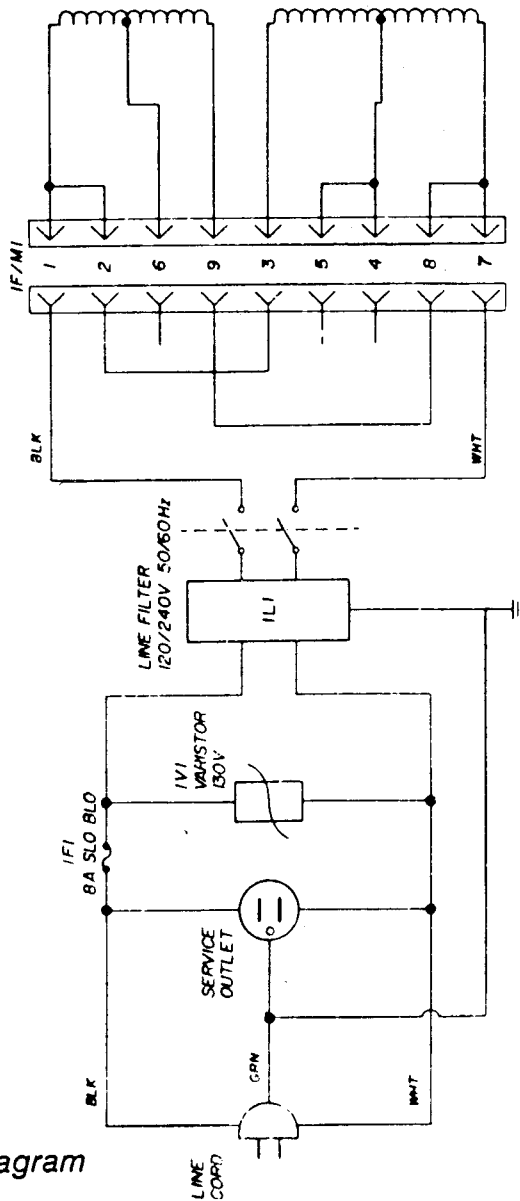
1	2	0	0	NOT USED	NOT USED
0	0	0	0	SWITCH 1	SWITCH 2
0	0	0	0	SWITCH 3	SWITCH 4
0	0	0	0	SWITCH 5	SWITCH 6
0	0	0	0	SWITCH 7	SWITCH 8
0	0	0	0	DATA 0	DATA 1
0	0	0	0	DATA 2	DATA 3
0	0	0	0	DATA 4	DATA 5
0	0	0	0	DATA 6	DATA 7
0	0	0	0	STB	RESET
0	0	0	0	NOT USED	STAT 0
0	0	0	0	STAT 1	STAT 2
0	0	0	0	STAT 3	BUSY



44 Power Wiring Diagram

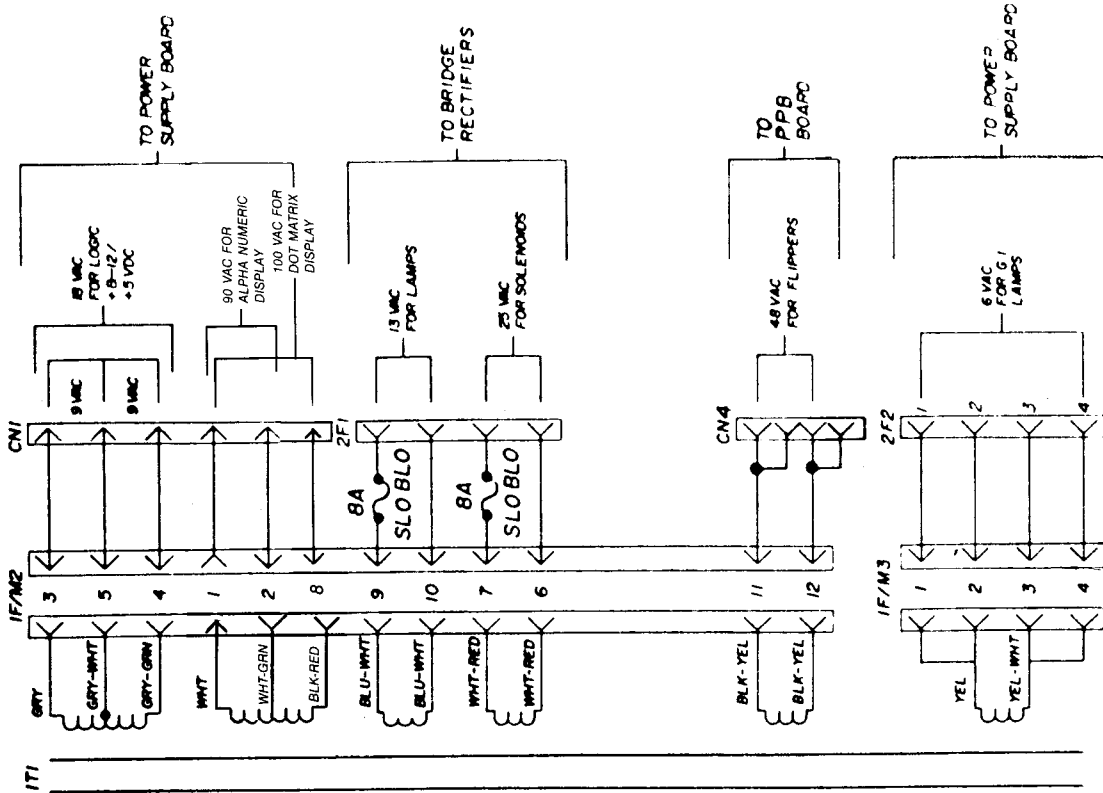
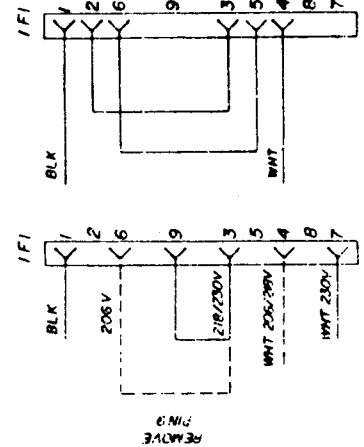
THIS CONFIGURATION FOR 115V

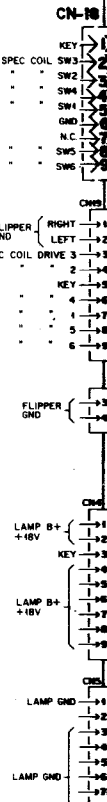
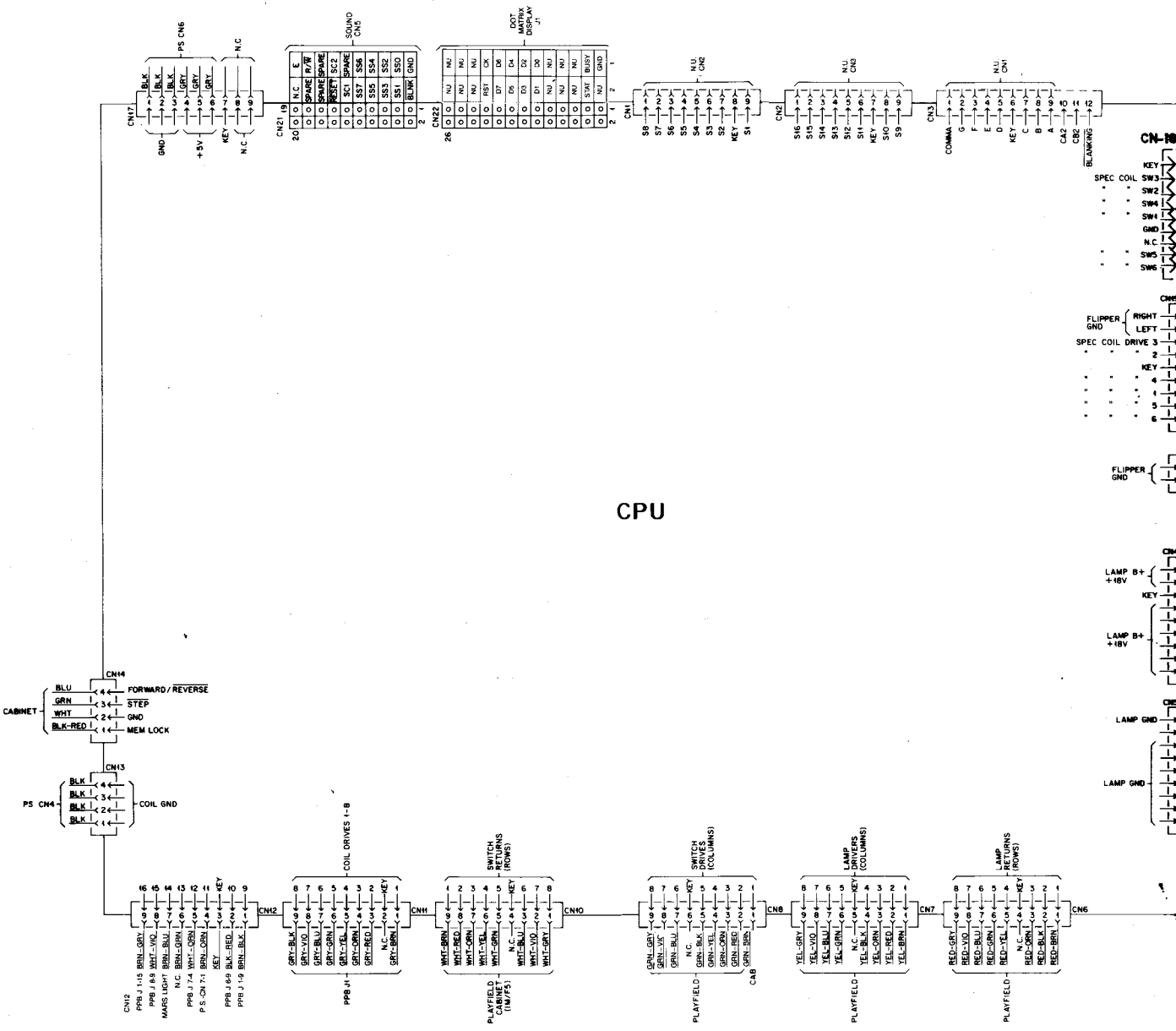
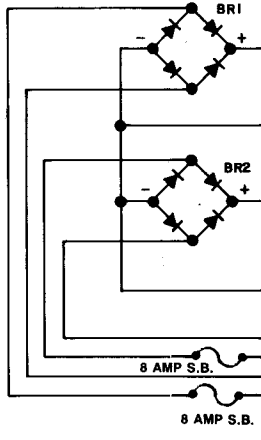
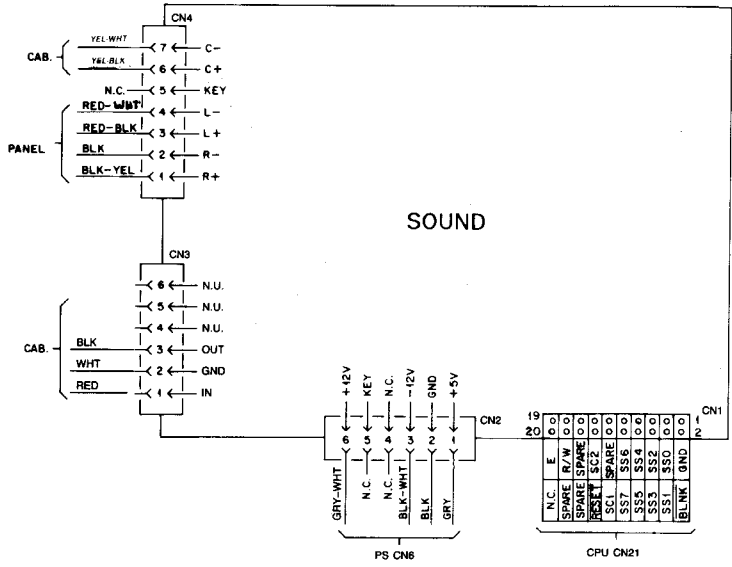
FOR LOWER LINE VOLTAGES
OR 230 VOLT OPERATION
SEE SAMPLES BELOW

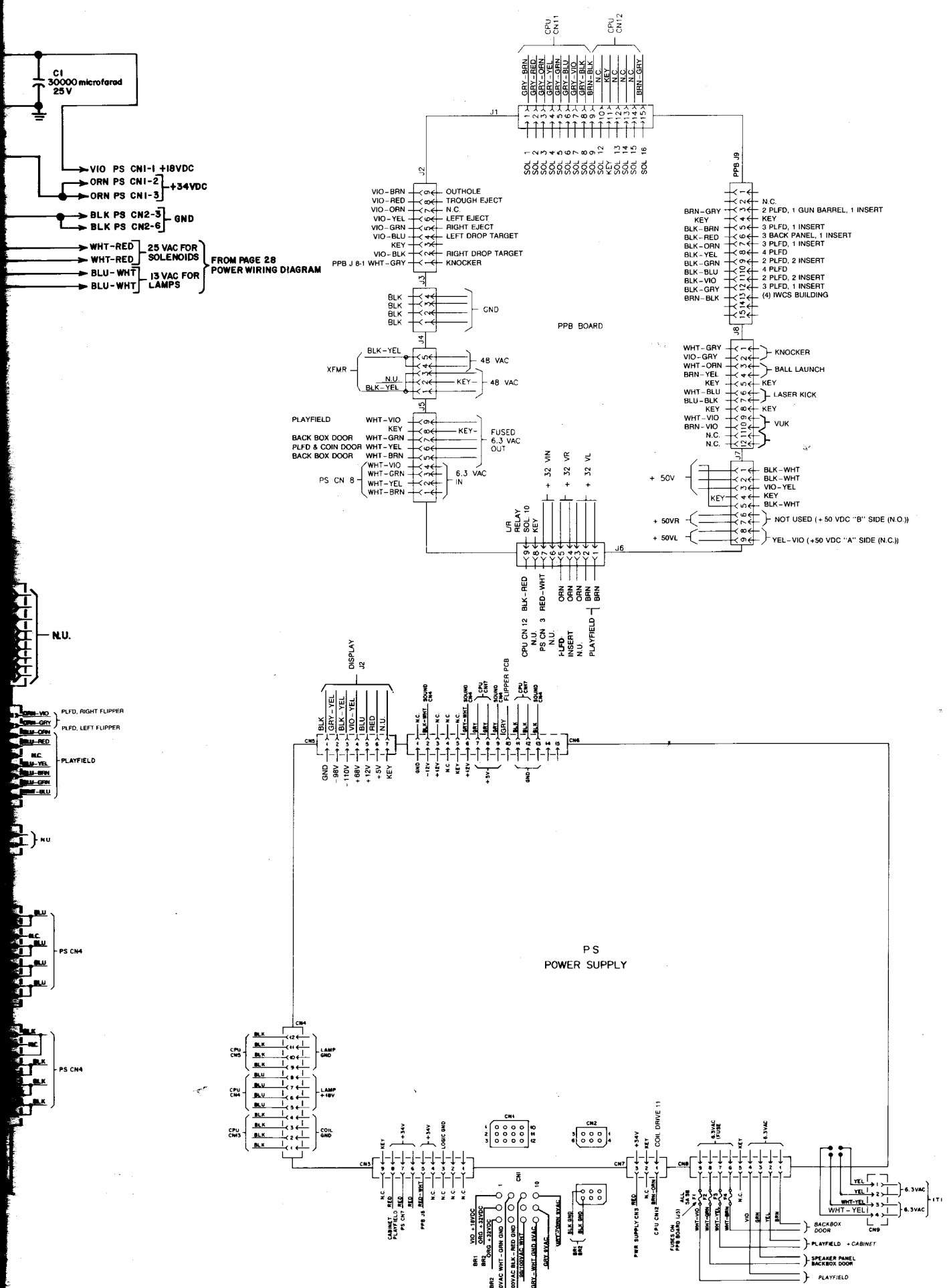


JUMPERS FOR VOLTAGE VARIATION

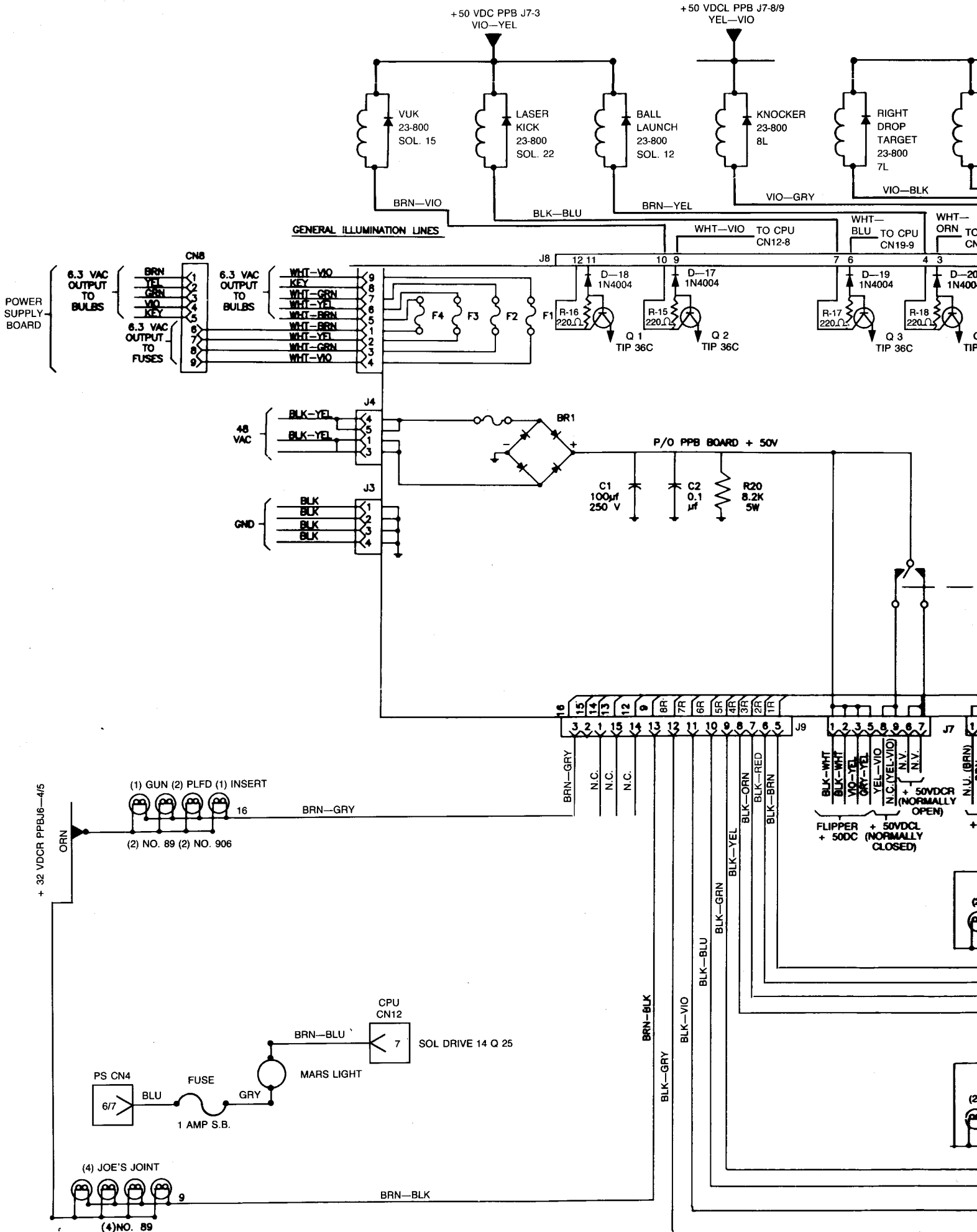
230/218/206 VOLTS
IF1 = 4A SLO BLO
IV1 = 275V VARIATOR



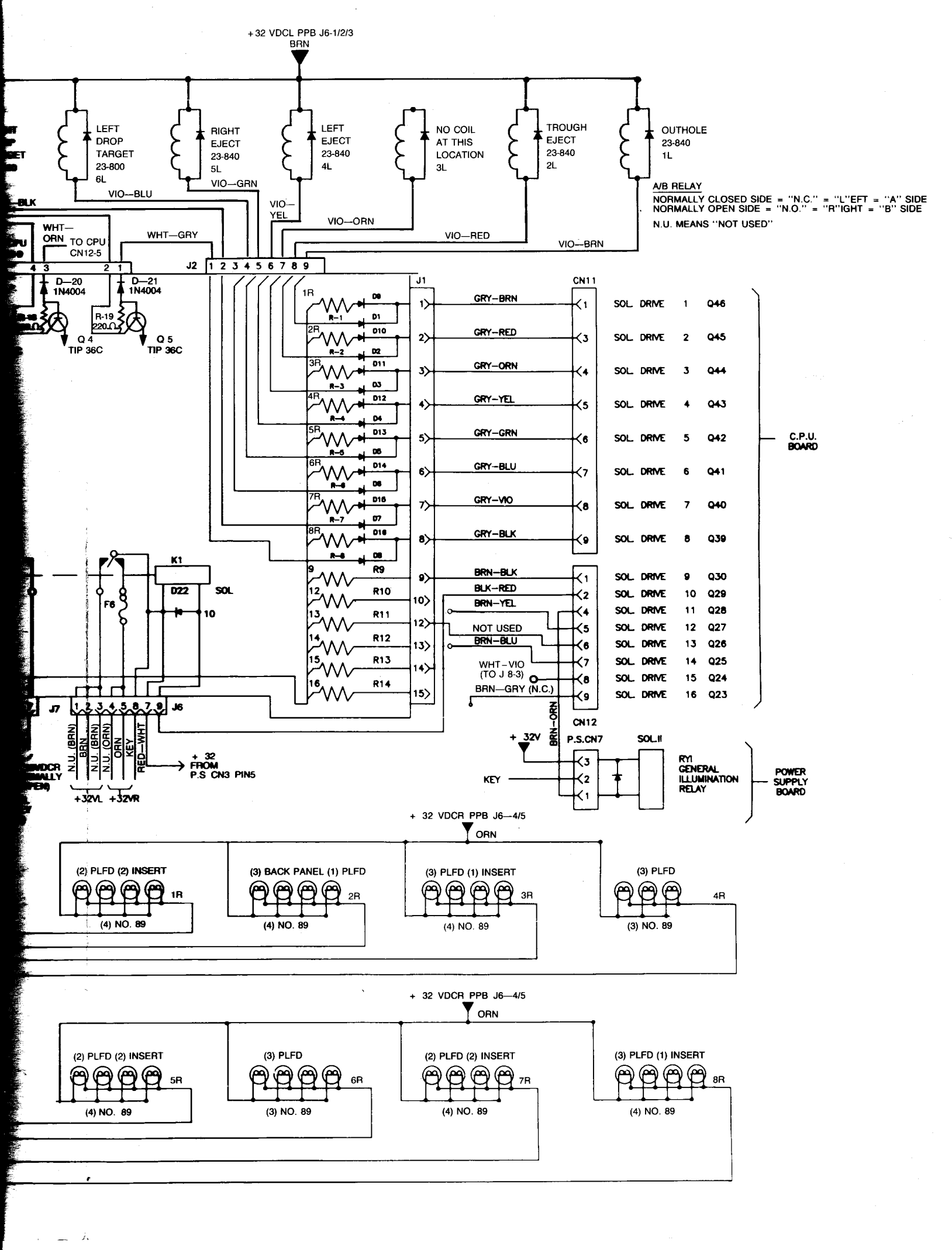




Backbox Wiring Diagram 45



46 Playfield Coil / Flash Lamp Wiring Diagram



50 VDC PPB J7-3
VIO - YEL

RED

SP6

LASER KICK
23-800

SP5

RIGHT
SLINGSHOT
23-800

SP4

LEFT
THUMPER
BUMPER
23-800

SP3

BLK - BLU

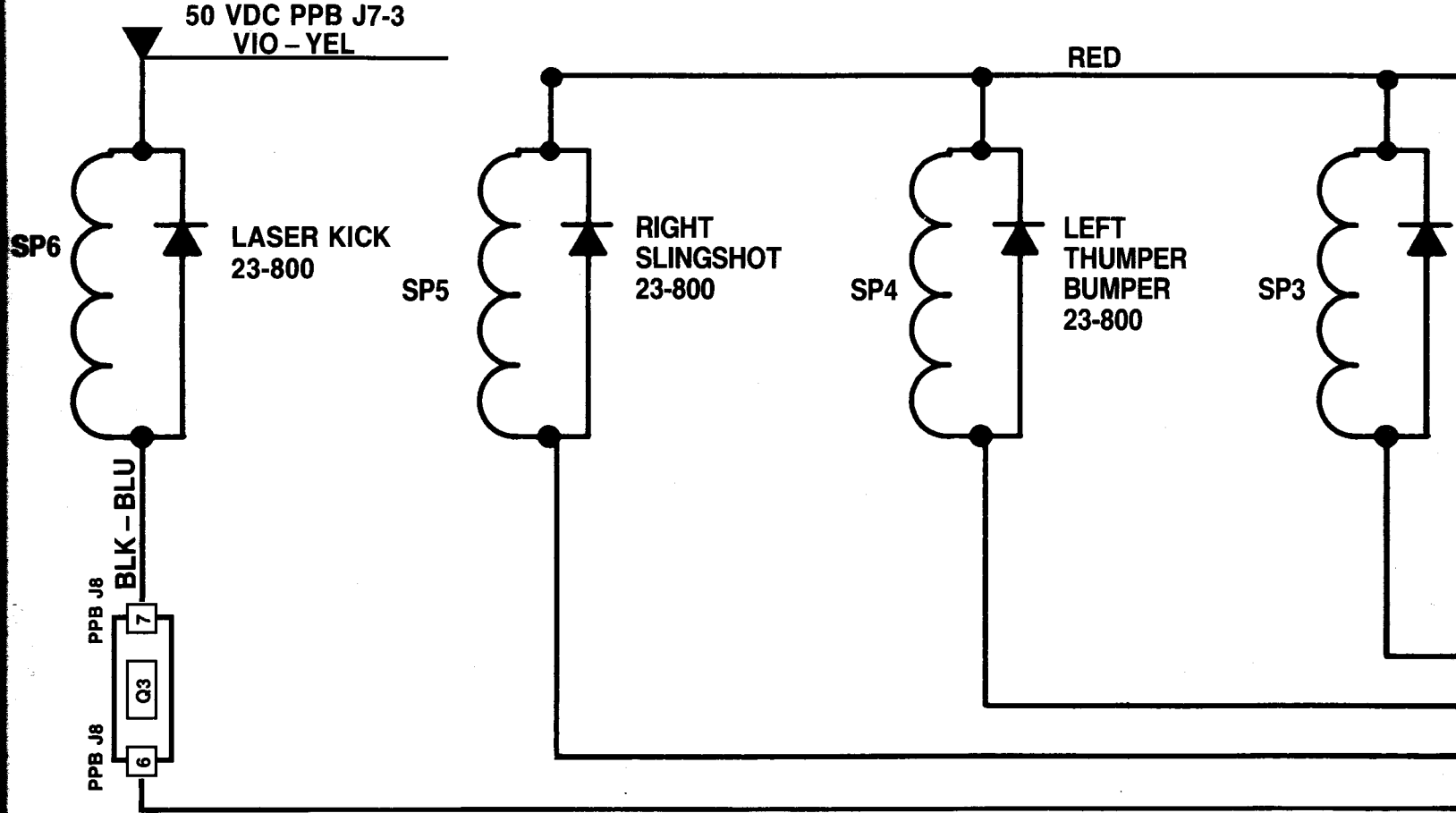
PPB J8

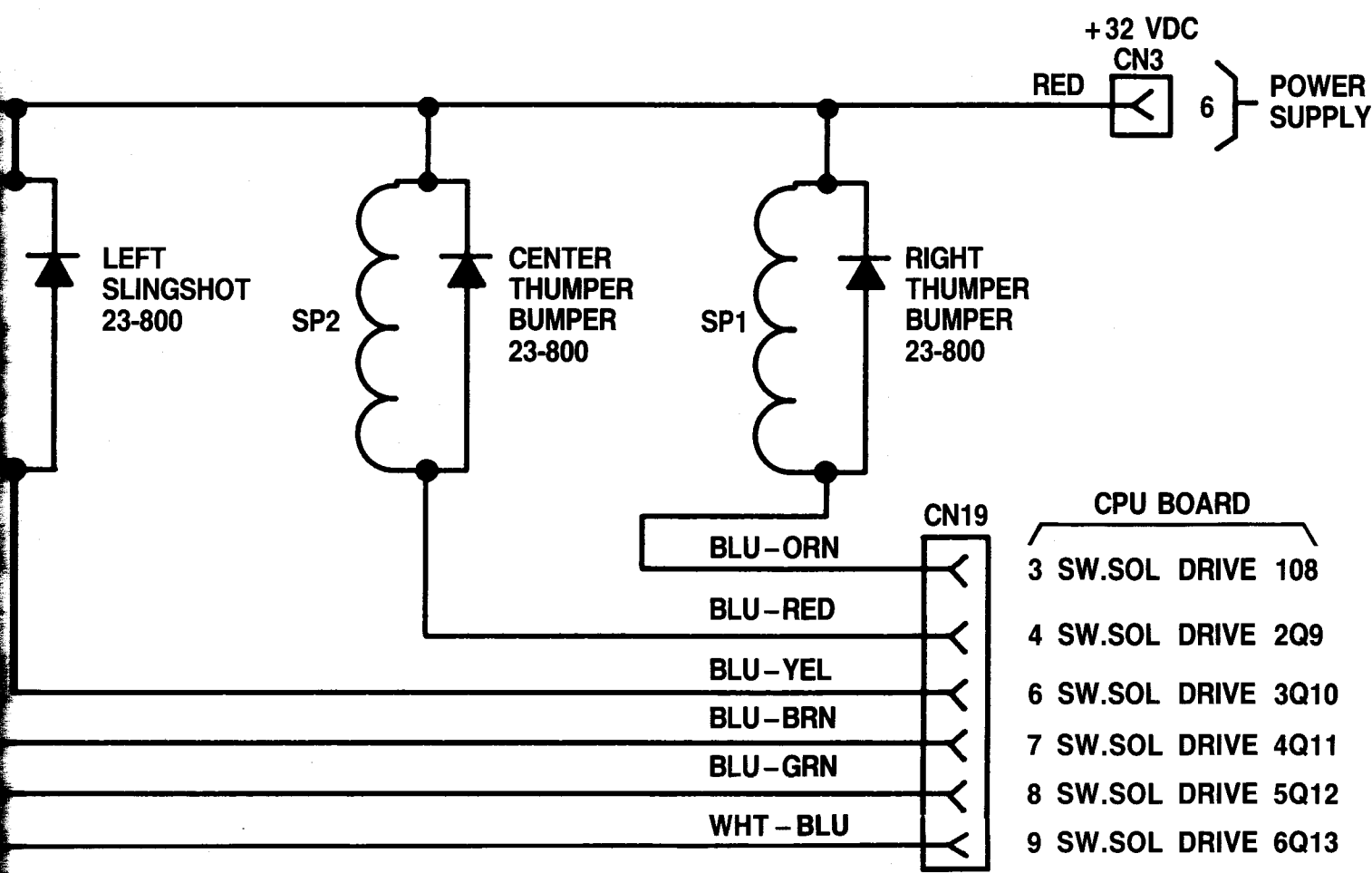
7

Q3

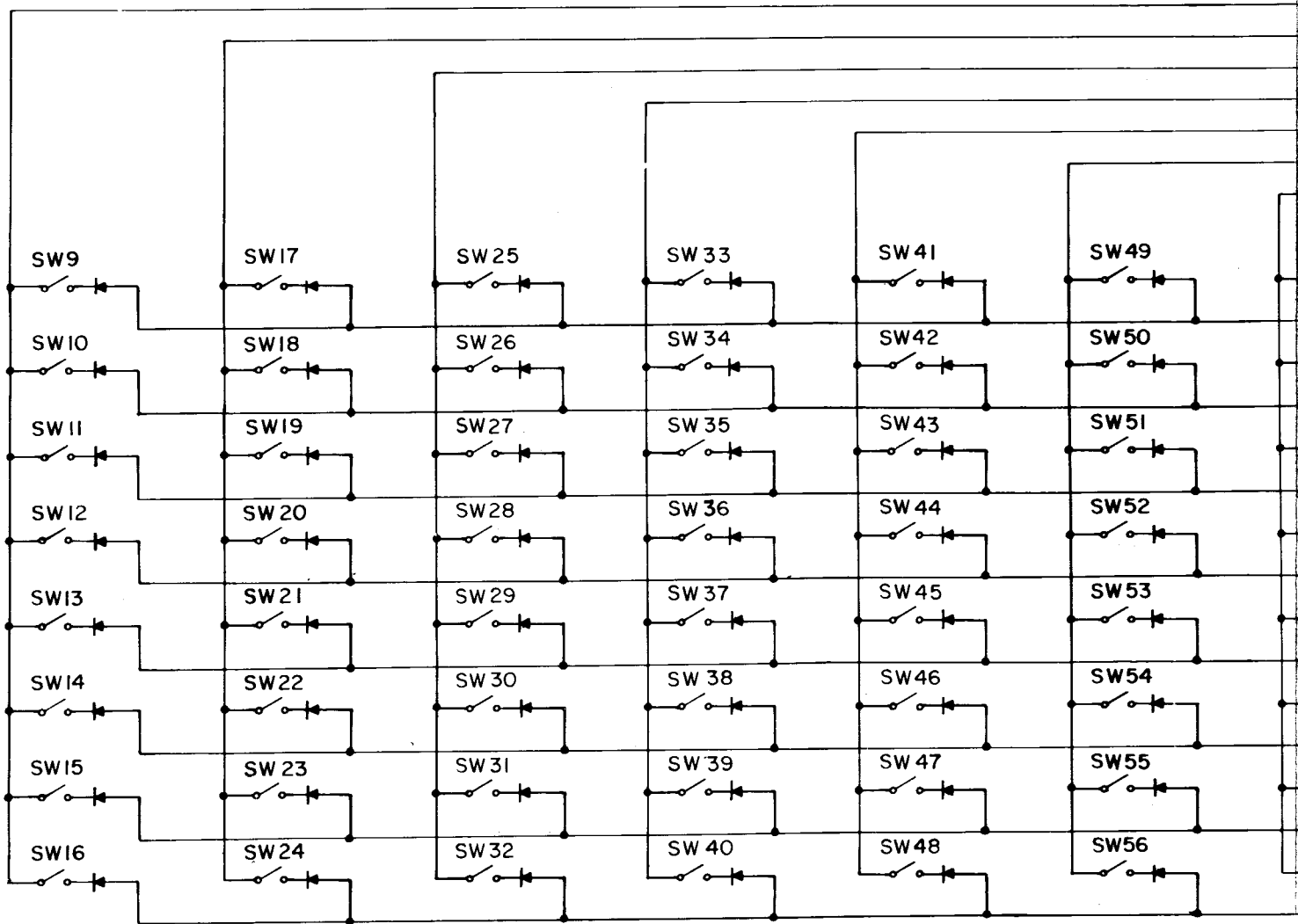
PPB J8

6





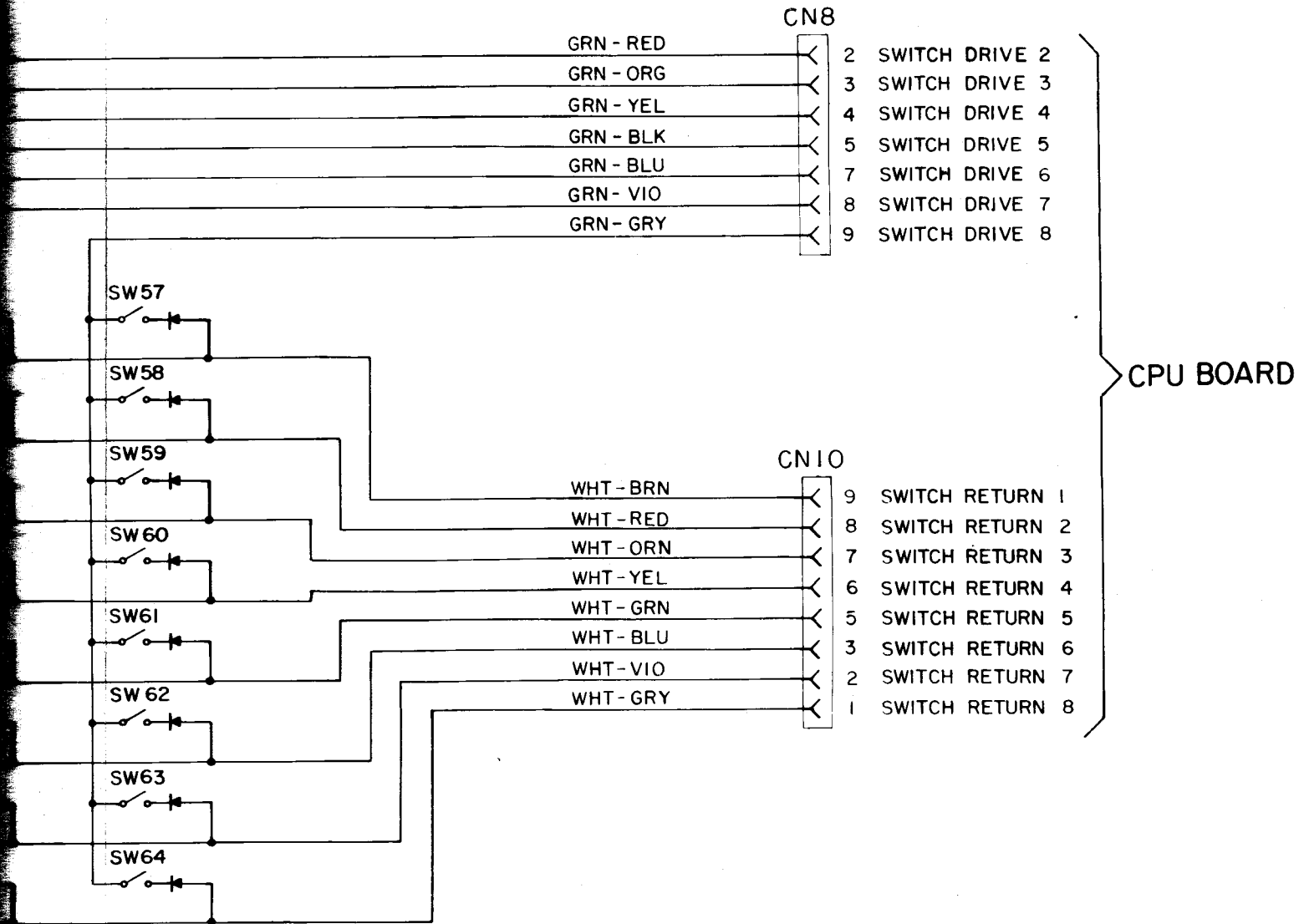
Switch Number	Description	Part No.				
01*	Plumb Tilt	See Cabinet	16*	Right Flip. Cab.	180-5048-01	31
02*	4th Coin	—	17	Left 4 Bank Top 4	180-5082-06	32
03*	Credit Button	500-5097-02	18	Left 4 Bank Mid. 3	180-5082-06	33
04*	Right Coin	180-5024-00	19	Left 4 Bank Mid. 2	180-5082-06	34
05*	Center Coin	180-5054-00	20	Left 4 Bank Bot. 1	180-5082-06	35
06*	Left Coin	180-5054-00	21	Left Orbit Rollover	500-5142-00	36
07*	Slam Tilt	180-5022-00	22	Right Orbit Rollover	515-5138-00	37
08	Not Used	—	23	Not Used	—	38
09	Launch Trigger	180-5040-00	24	Not Used	—	39
10	Outhole	180-5011-00	25	Center Drop Tar. Left	180-5092-00	40
11	Trough #1 Left	180-5009-00	26	Center Drop Tar. Mid.	180-5092-00	41
12	Trough #2 Center	180-5009-00	27	Center Drop Tar. Bot.	180-5092-00	42
13	Trough #3 Right	180-5010-00	28	Left Outlane	500-5142-00	43
14	Shooter Lane	180-5053-00	29	Left Return	500-5142-00	44
15*	Left Flip. Cab	180-5048-01	30	Left Slingshot	180-5054-00	45



48 Playfield Switch Wiring Diagram

31	Vertical Up Kicker	180-5064-00	46	Right Turbo Bumper	180-5015-00
32	Right Saucer	180-5027-00	47	Left Spinner	180-5010-04
33	Right Drop Tar. Top	180-5092-00	48	Right Spinner	180-5010-04
34	Right Drop Tar. Mid.	180-5092-00	49	Ramp Entrance	180-5087-00
35	Right Drop Tar. Bot.	180-5092-00	50	Ramp Exit	180-5101-00
36	Right Outlane	515-5138-00	51	Not Used	—
37	Right Return	515-5138-00	52	Right 10 Point	500-5033-00
38	Right Slingshot	180-5054-00	53	Not Used	—
39	Left Stand-Up Tar.	180-5082-06	54	Left Orbit R.O. Backup	500-5142-00
40	Left Saucer	180-5027-00	55	Right Orbit R.O. Backup	515-5138-00
41	Left Top Lane	500-5142-00	56	Not Used Through 64	
42	Center Top Lane	500-5142-00			
43	Right Top Lane	500-5142-00			
44	Left Turbo Bumper	180-5015-00			
45	Center Turbo Bumper	180-5015-00			

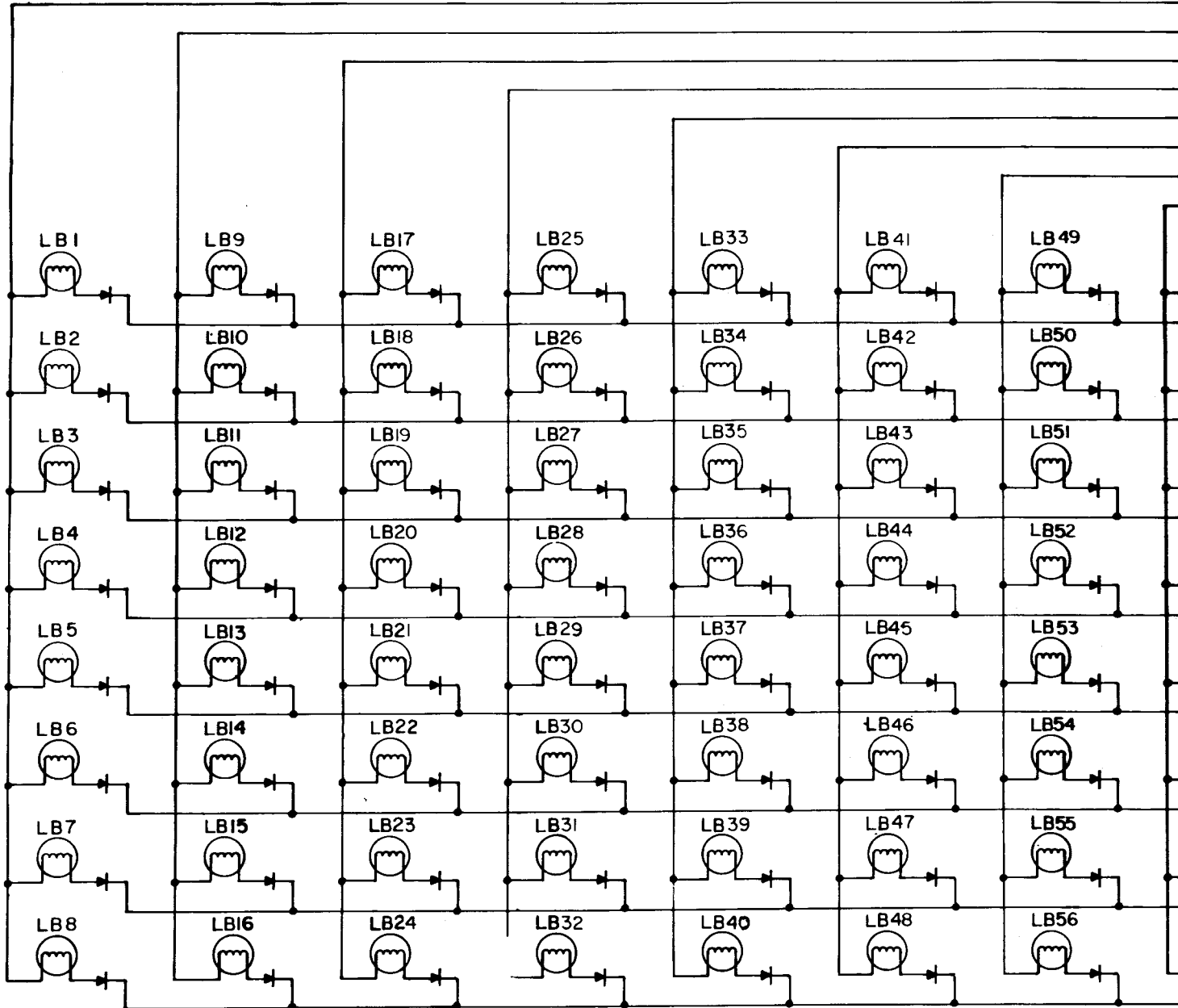
*Indicates Cabinet Switches



Lamp Number Description

01	Uzi Clip Bottom	17	Shoot Again	3
02	Uzi Clip 1	18	Murtough's Retire	3
03	Uzi Clip 2	19	Center Drop Target Left	3
04	Uzi Clip 3	20	Center Drop Target Mid.	3
05	Uzi Clip 4	21	Center Drop Target Right	3
06	Uzi Clip 5	22	Right Drop Target Top	3
07	Fire Uzi	23	Right Drop Target Mid.	3
08	Bullet Proof Vest	24	Right Drop Target Bottom	4
09	Start Getaway	25	Lite Karate Kick	4
10	3 Million	26	Million Plus	4
11	Bonus Multiplier	27	Subway	4
12	Lite Super Leo Getz	28	2X	4
13	Lite Video	29	4X	4
14	Start Crazy Riggs	30	6X	4
15	Freeway Loops	31	8X	4
16	Lethal Weapon 1,2,3 10 Million	32	Bonus Multiplier & Hold	4

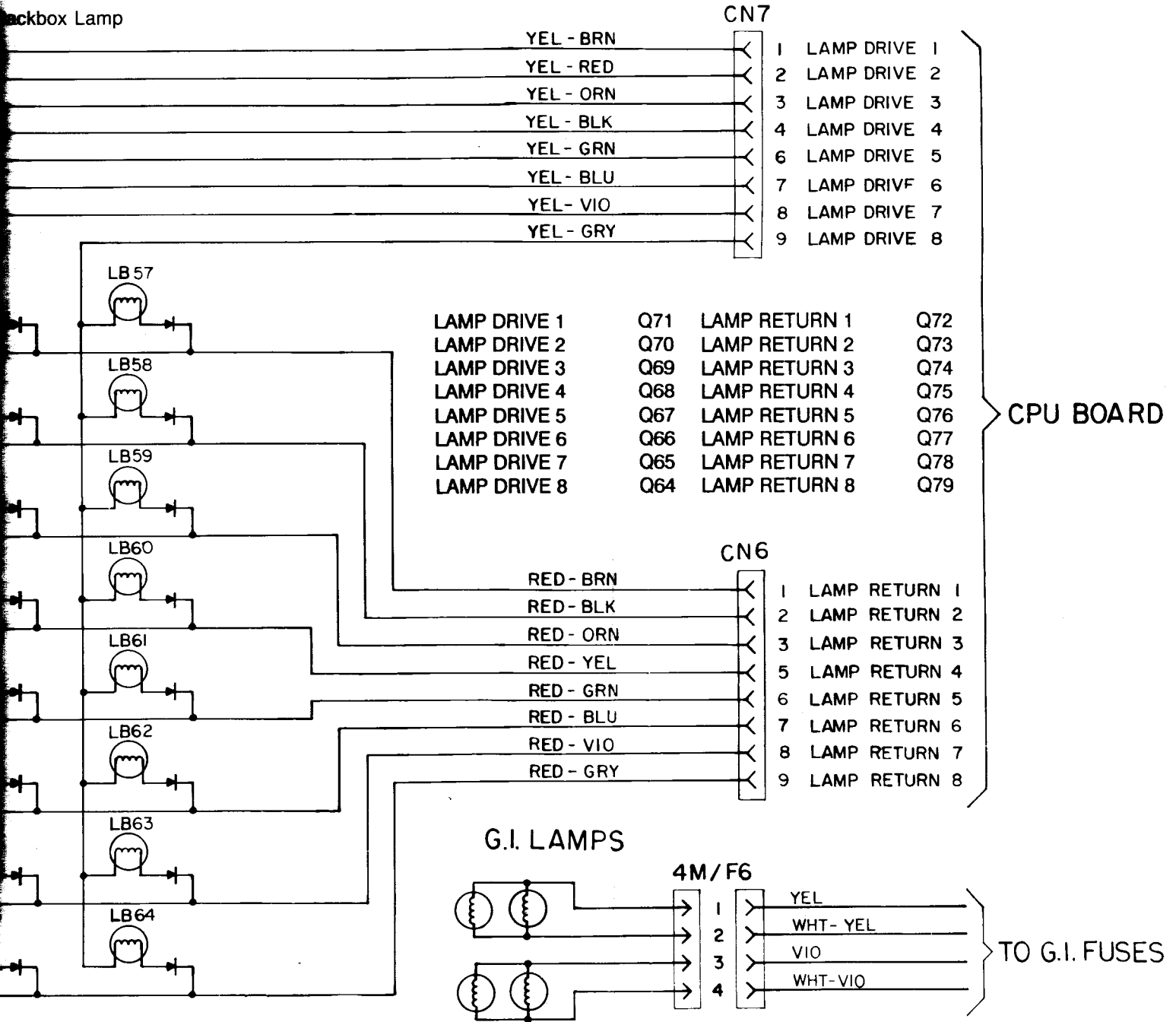
*Indicates Speaker or Backbox La

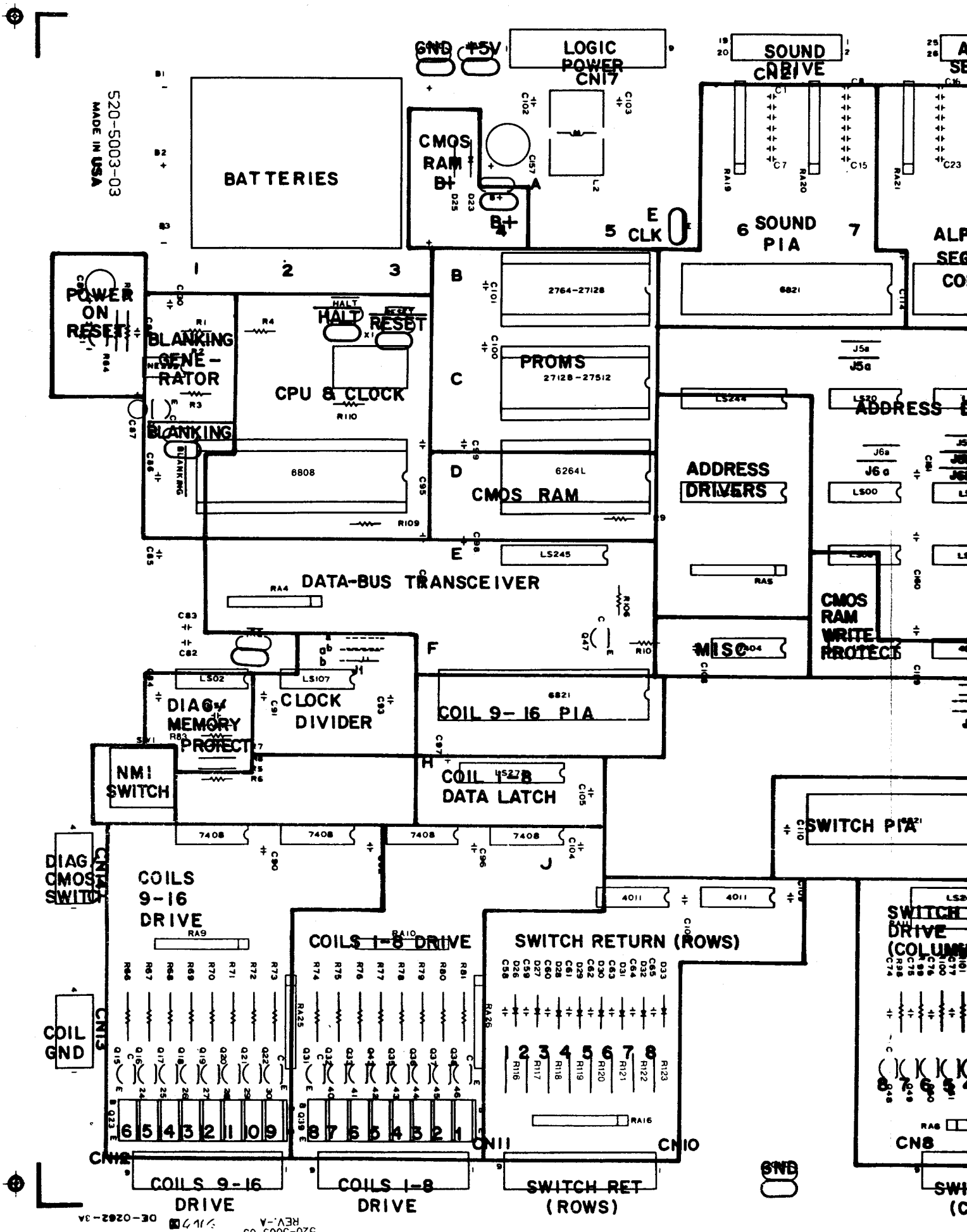


- 33 Cab. Start Button
- 34 Center Turbo Bumper
- 35 Top Left Lane
- 36 Top Middle Lane
- 37 Top Right Lane
- 38 Collect 1 L.W. 1,2,3
- 39 Lite Jackpot 1
- 40 Extra Ball
- 41 Ramp Looping
- 42 Double Jackpot
- 43 Victory Lap
- 44 Silent Alarm
- 45 Left Bank 1 Top
- 46 Left Bank 2
- 47 Left Bank 3
- 48 Left Bank 4 Bottom

- 49 3 Million
- 50 6 Million
- 51 9 Million
- 52 12 Million
- 53 15 Million
- 54 Collect 2 L.W. 1,2,3
- 55 Lite Jackpot 2
- 56 Video Mode
- 57 Karate Kick
- 58 Collect Jackpot
- 59 Freeway for Extra Ball
- 60 Left Turbo Bumper
- 61 Right Turbo Bumper
- 62 Collect 3 L.W. 1,2,3
- 63 Lite Jackpot 3
- 64 Leo Getz

Backbox Lamp





ALPHANUMERIC SEGMENT DRIVE

DIGIT STROBE S1-S9

DIGIT STROBE S9-S16

7-SEGMENT DRIVE

DISPLAY STROBE OUTPUT

7-SEGMENT OUTPUT

ALPHANUMERIC 9 SEGMENT/SOUND CONTROL PIA

DISPLAY STROBE 10 DECODER

SPECIAL COIL SWITCH 12 INPUT

SPEC COIL SWITCH INPUT

ADDRESS DECODER

NON REFLEXIVE SOLENOID CONTROL

SPECIAL COIL DRIVE

SPEC COIL DRIVES FLIPPER GND

LAMP PIA

DIAG LEDs

FLIPPER GROUND RELAY

FLIPPER 3, 4 GND

LAMP DRIVE

LAMP RETURN

LAMP B+ FILTER

SWITCH PIA

LAMP DRIVE (COLUMNS)

LAMP RETURN (ROWS)

LAMP B+ (+15V)

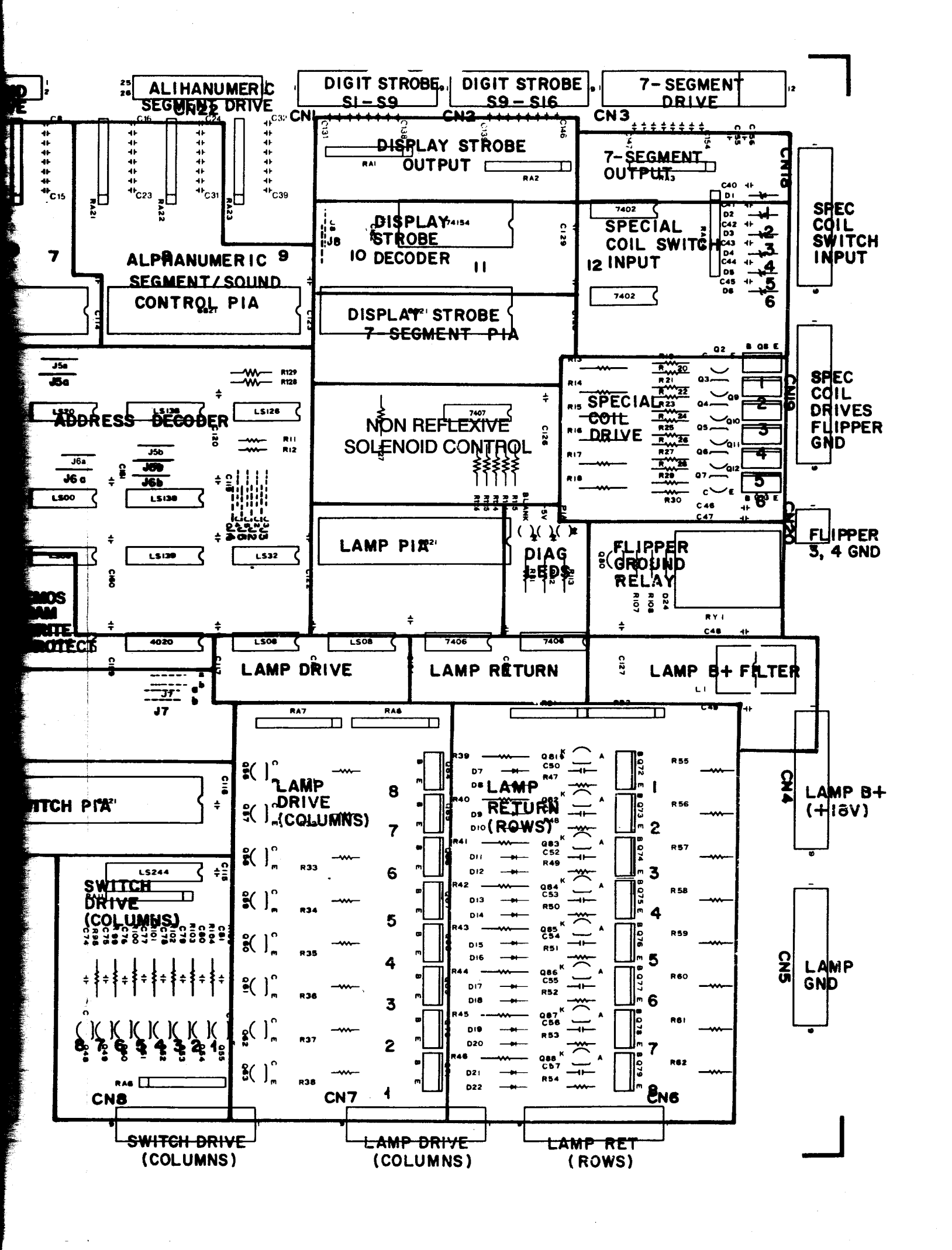
SWITCH DRIVE (COLUMNS)

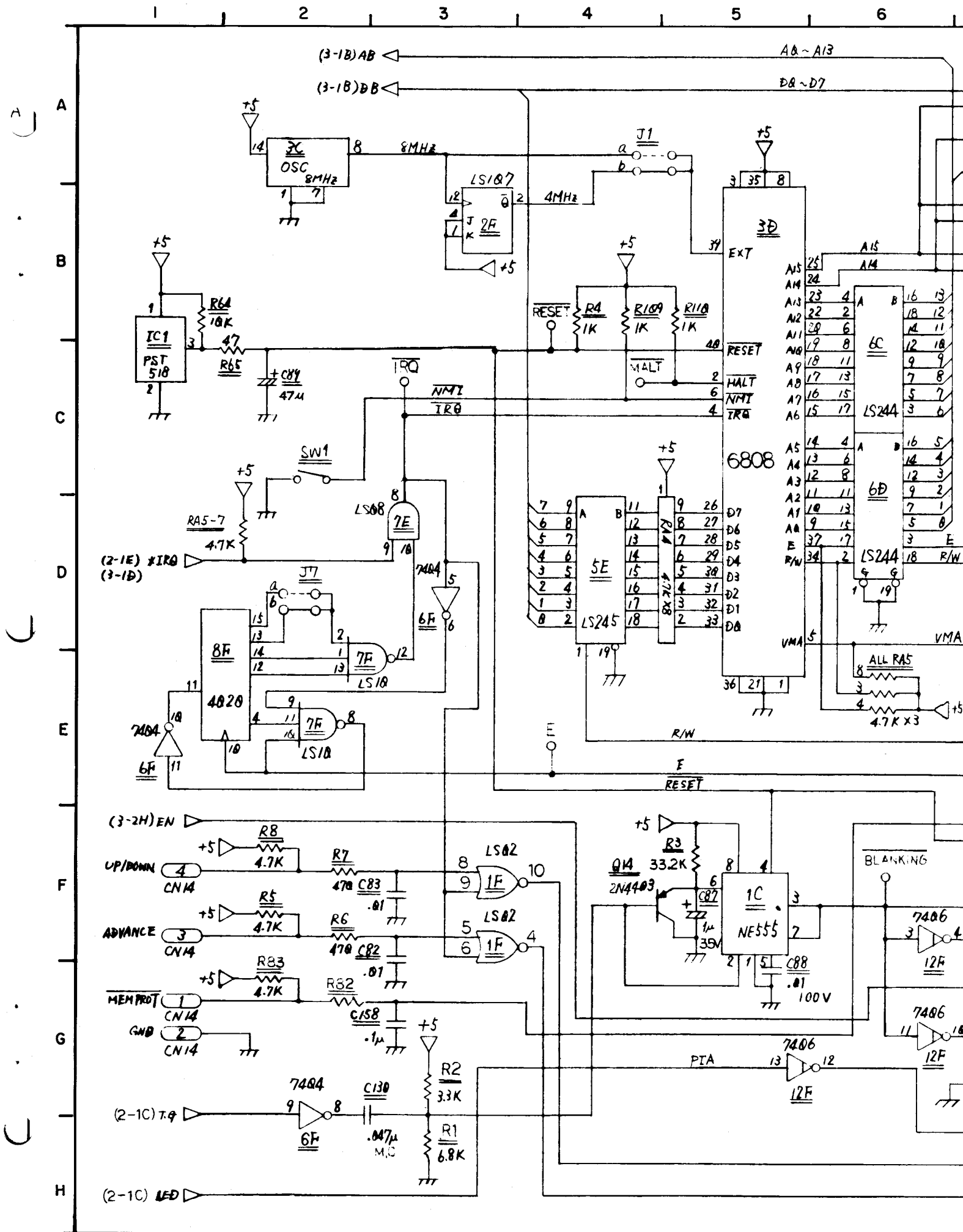
LAMP GND

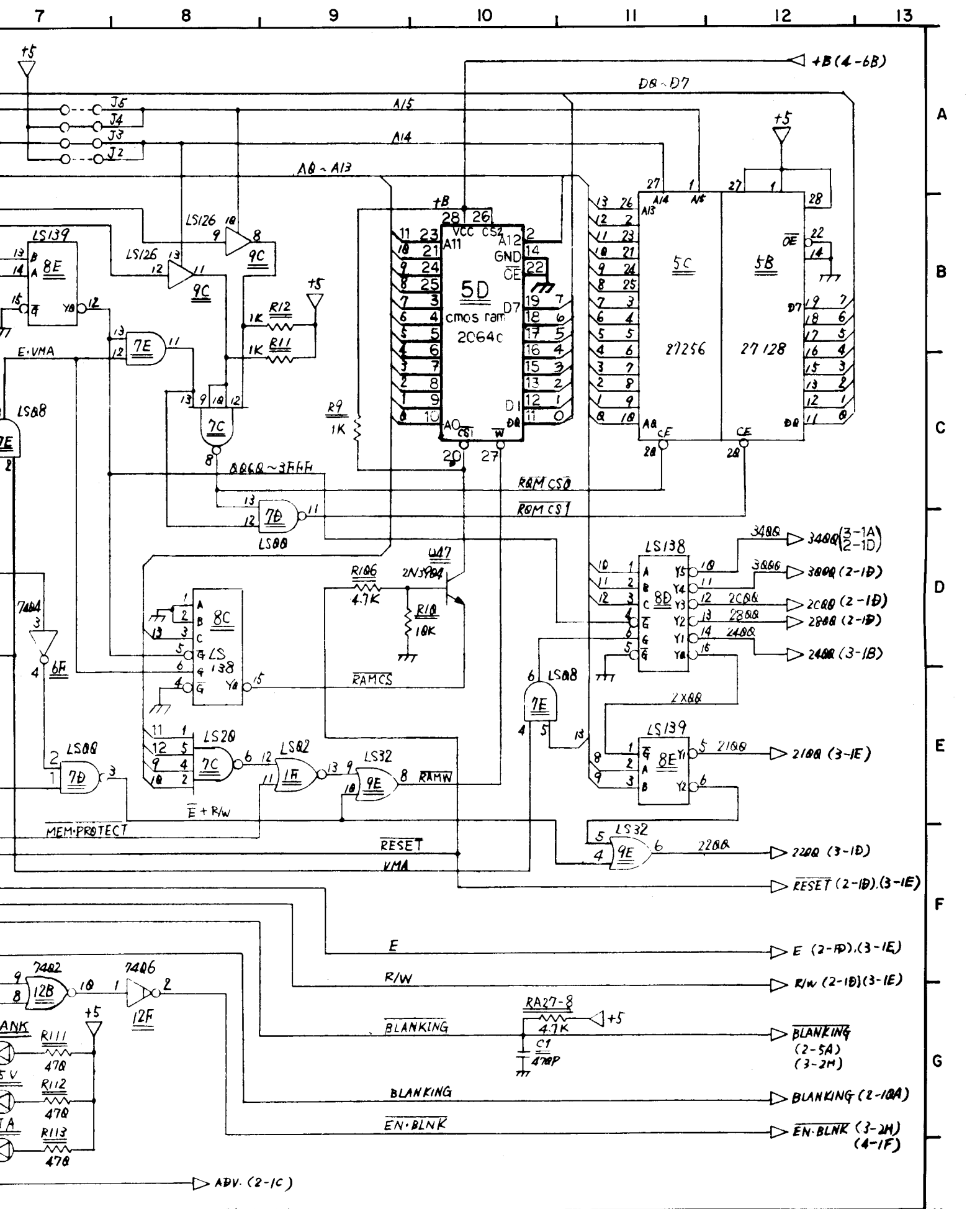
SWITCH DRIVE (COLUMNS)

LAMP DRIVE (COLUMNS)

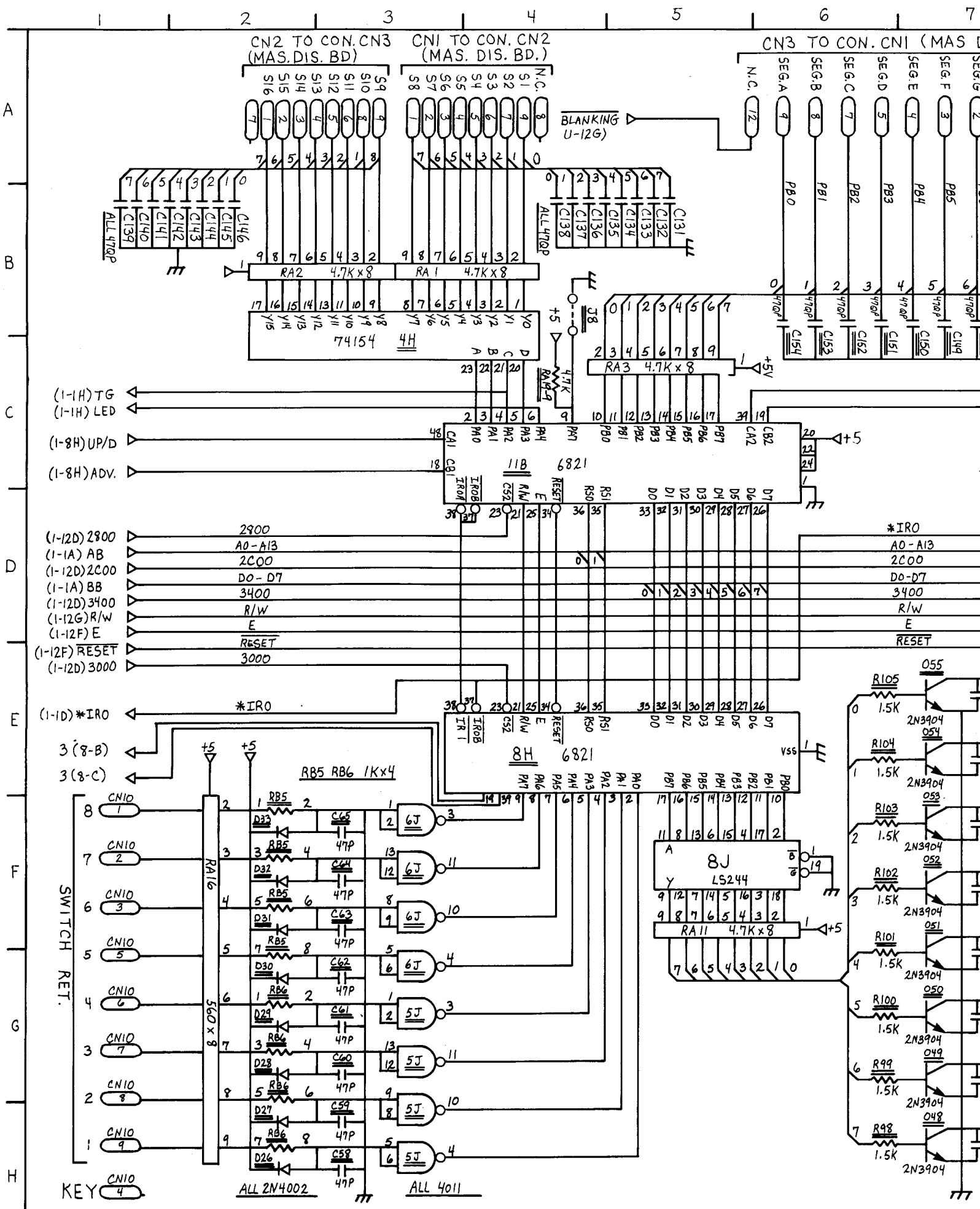
LAMP RET (ROWS)





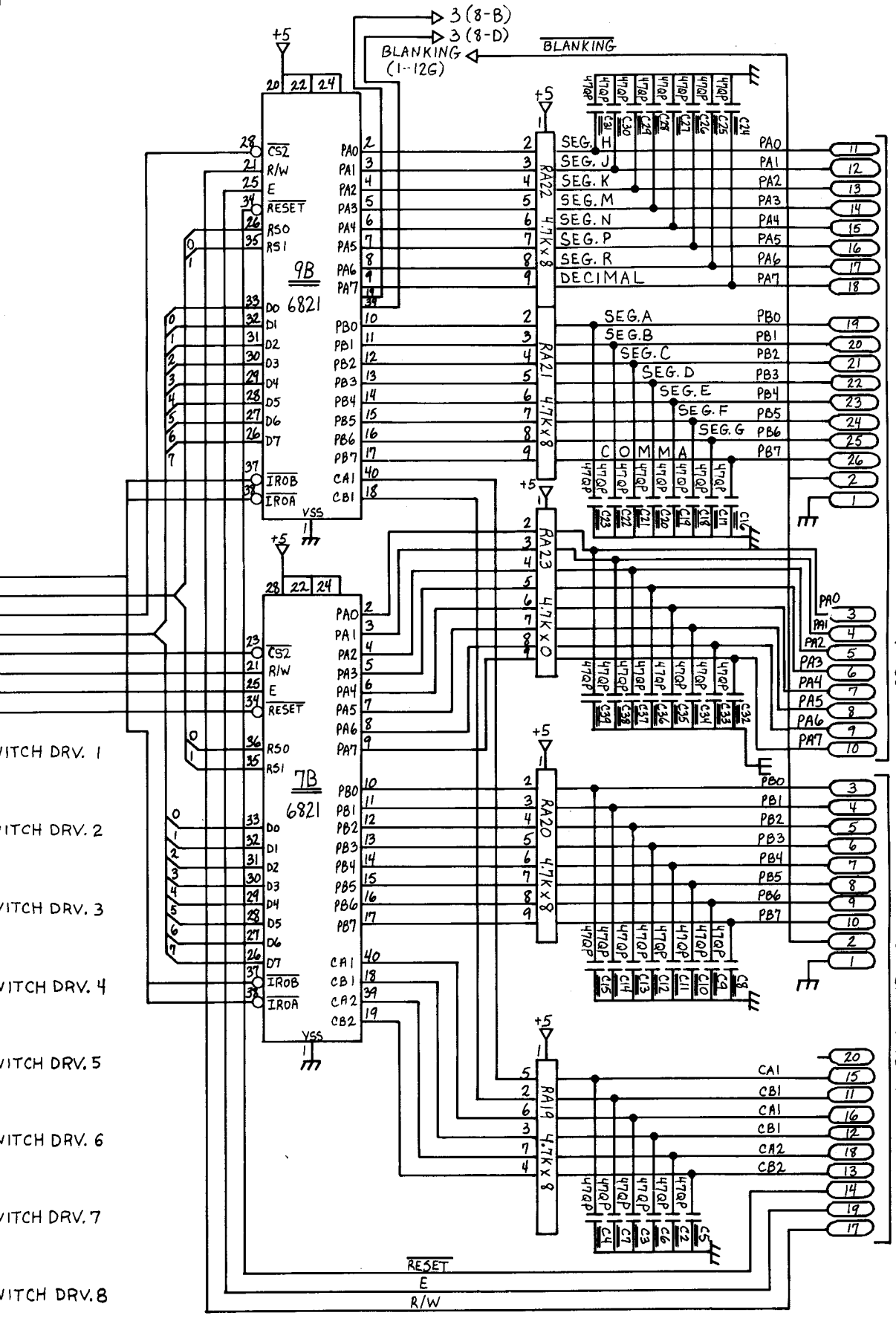
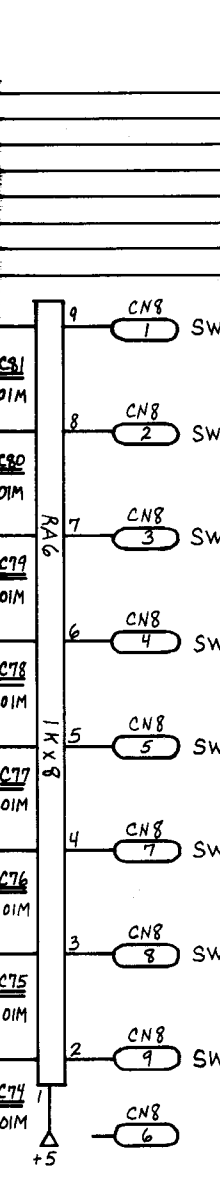


CPU BOARD 1 OF 4



52 CPU Board Logic Diagram (Sheet 2 of 4)

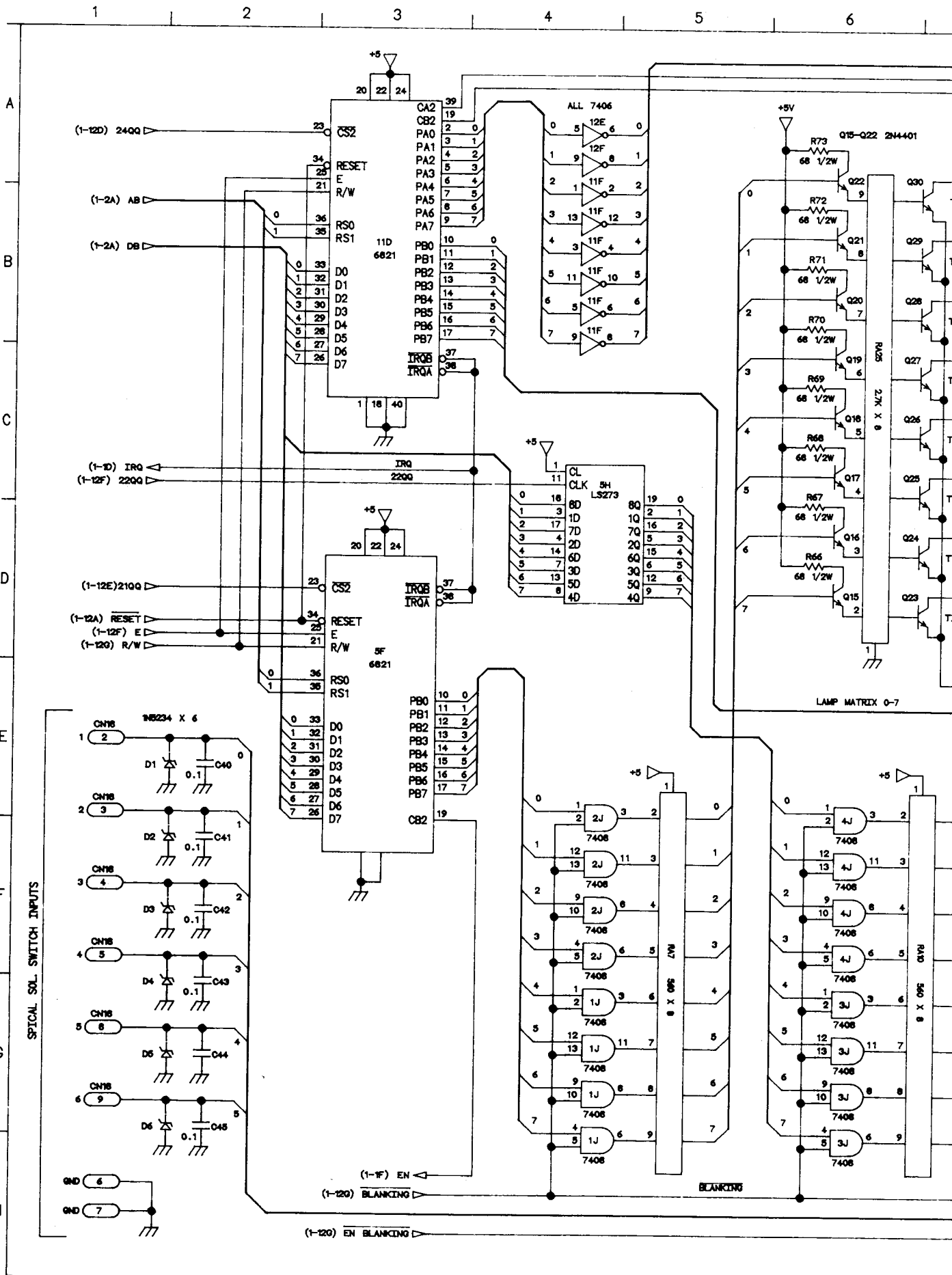
IS. BD)



CN22 ALPHANUMERIC SEGMENT DRIVERS

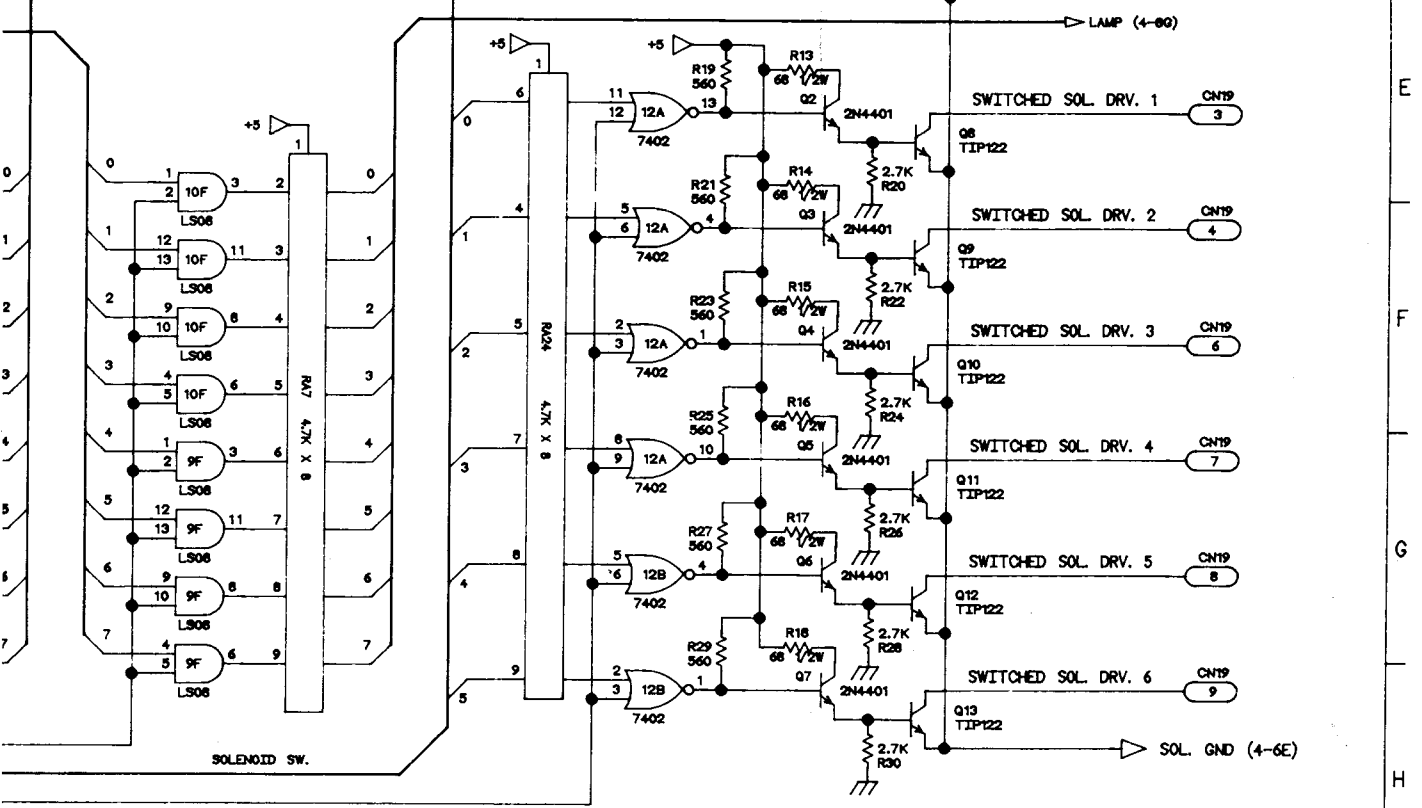
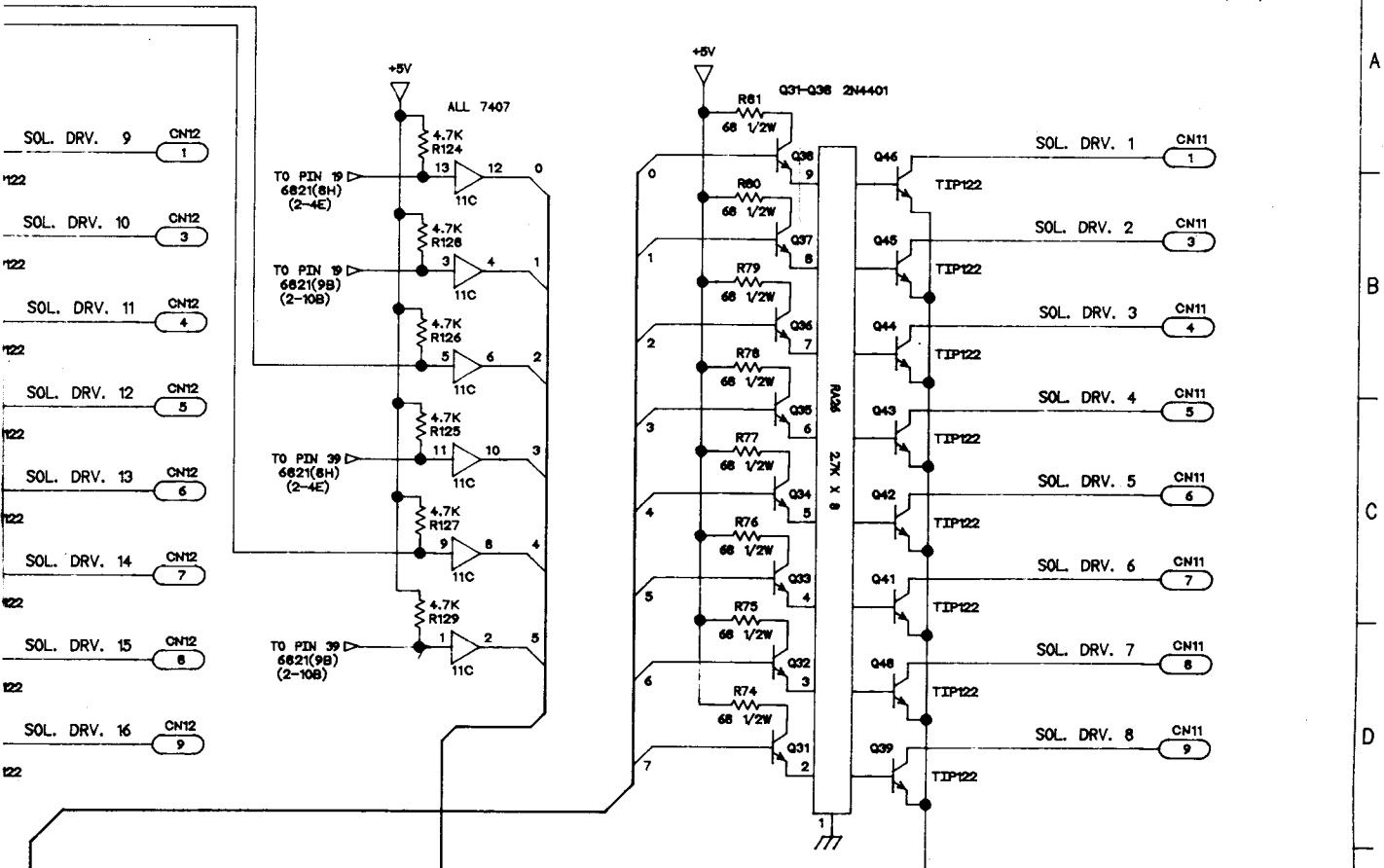
CN21 SOUND DRIVERS

A
B
C
D
E
F
G
H

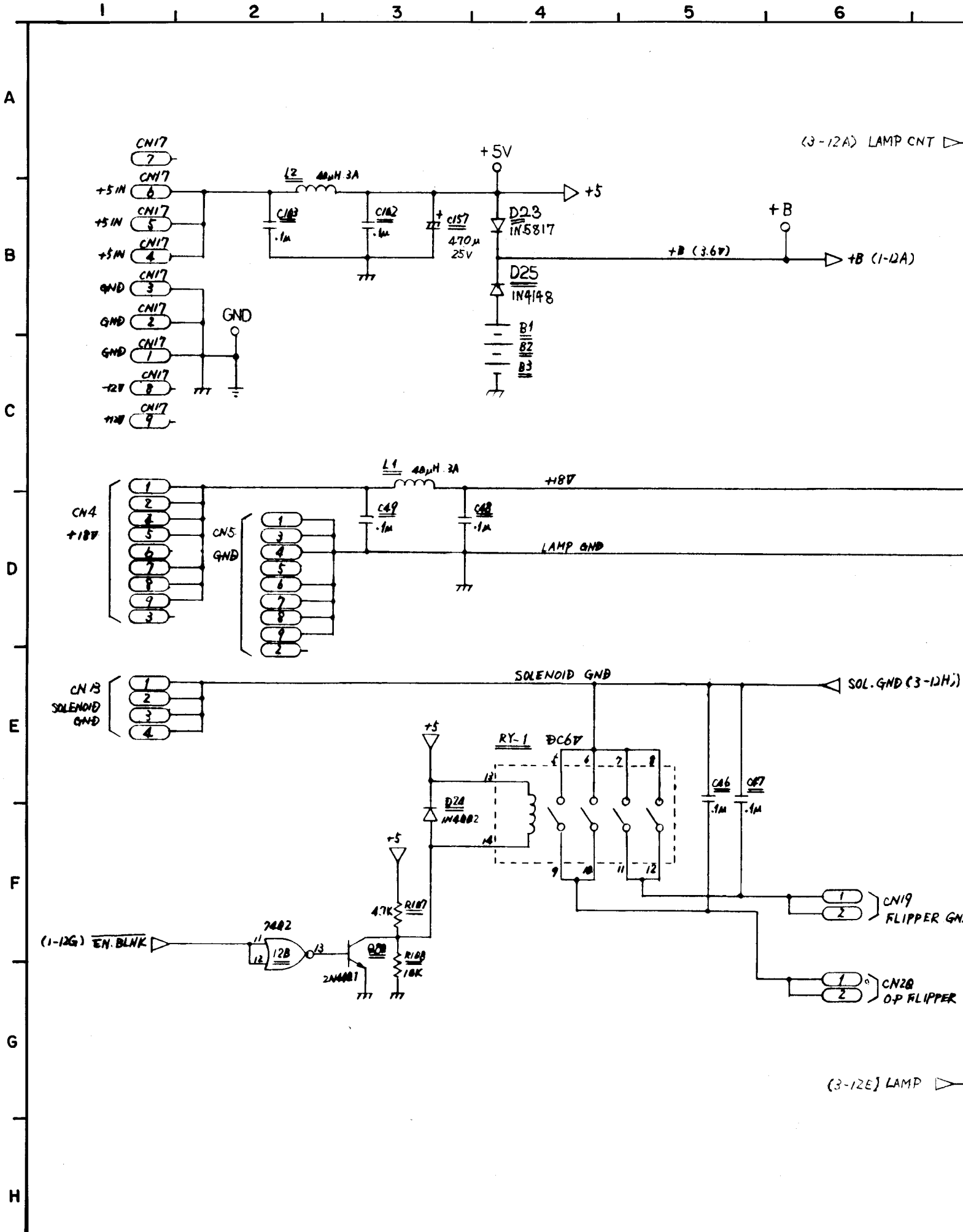


LAMP MATRIX CONT. 0-7

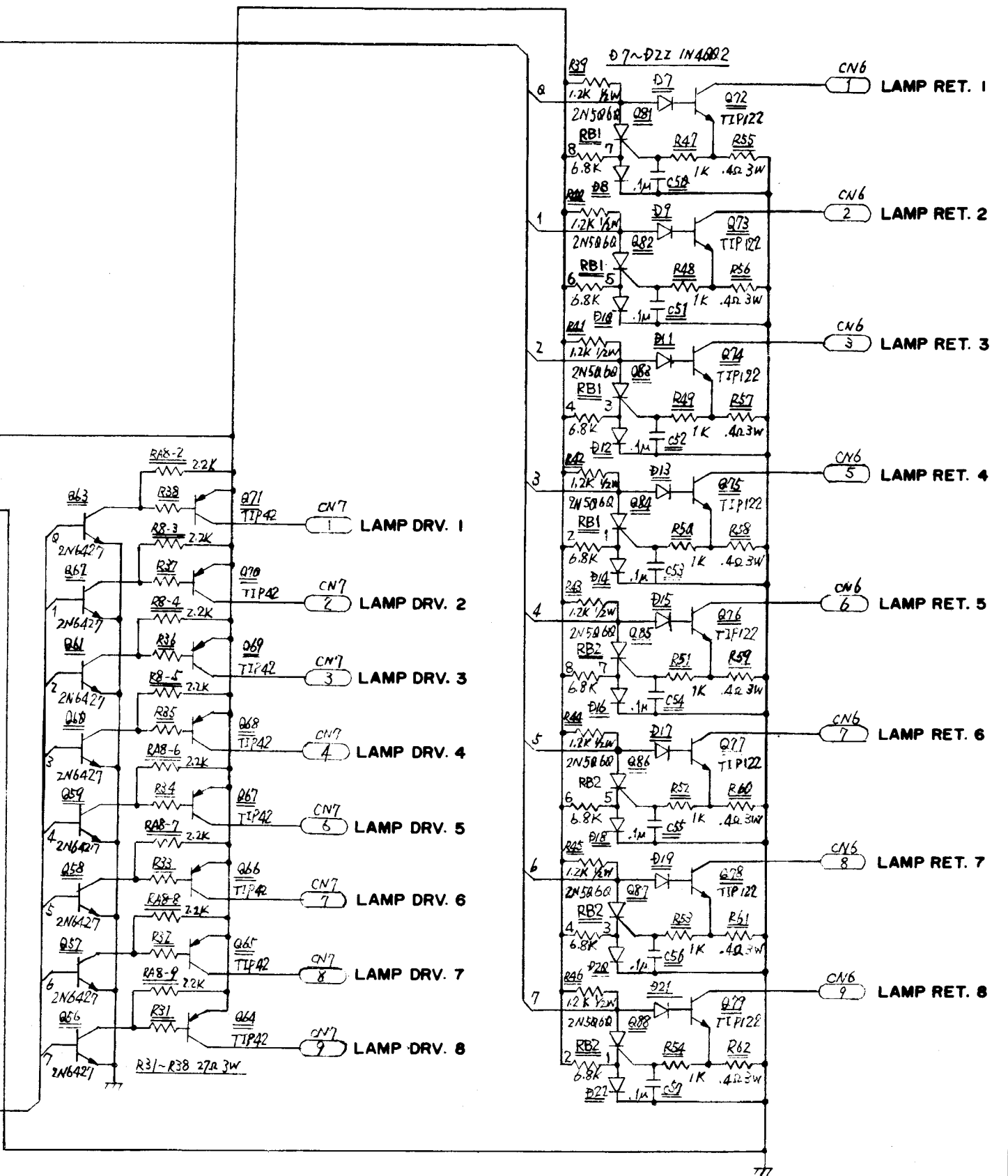
LAMP CNT (4-8A)

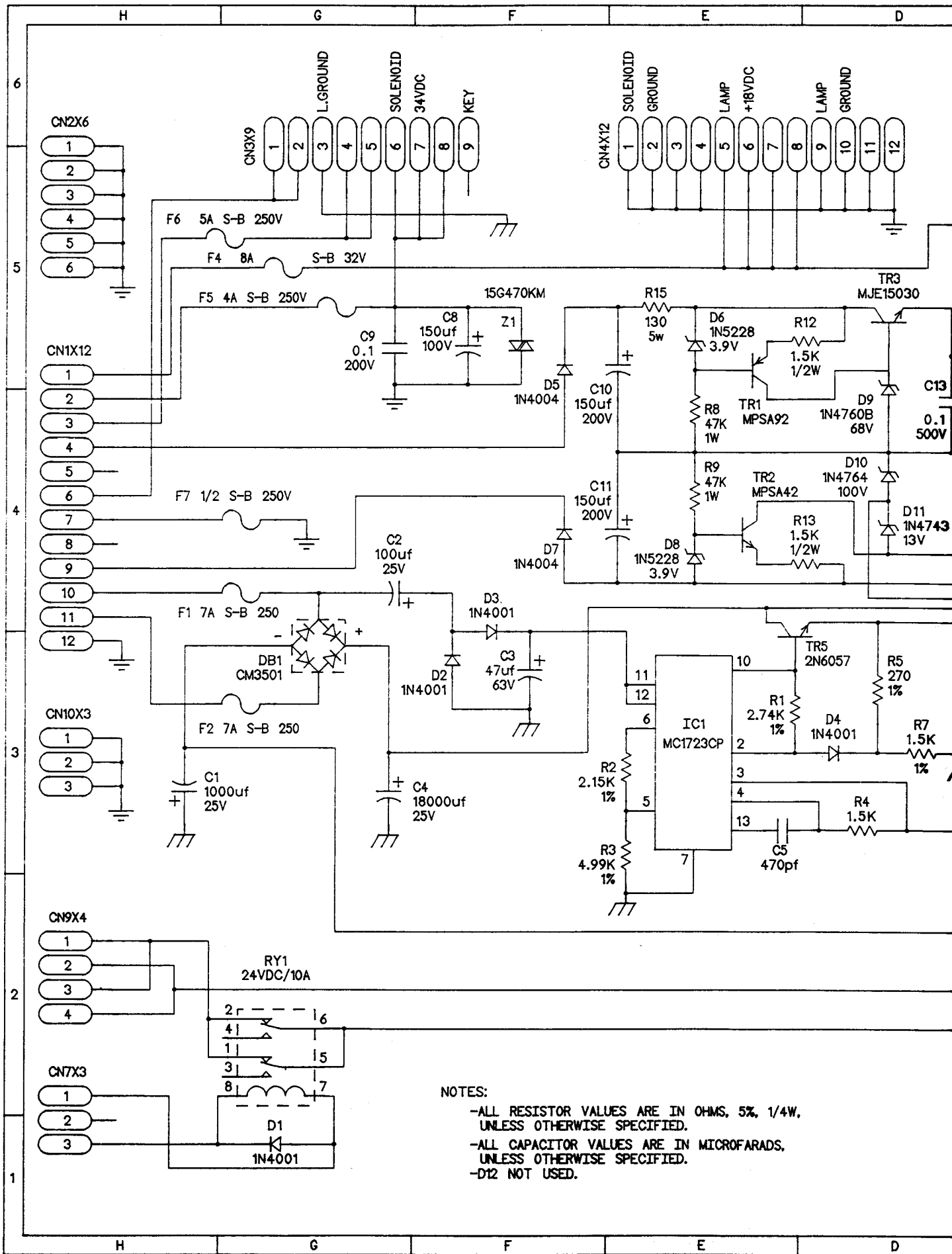


CPU BOARD 3 OF 4 REV.B

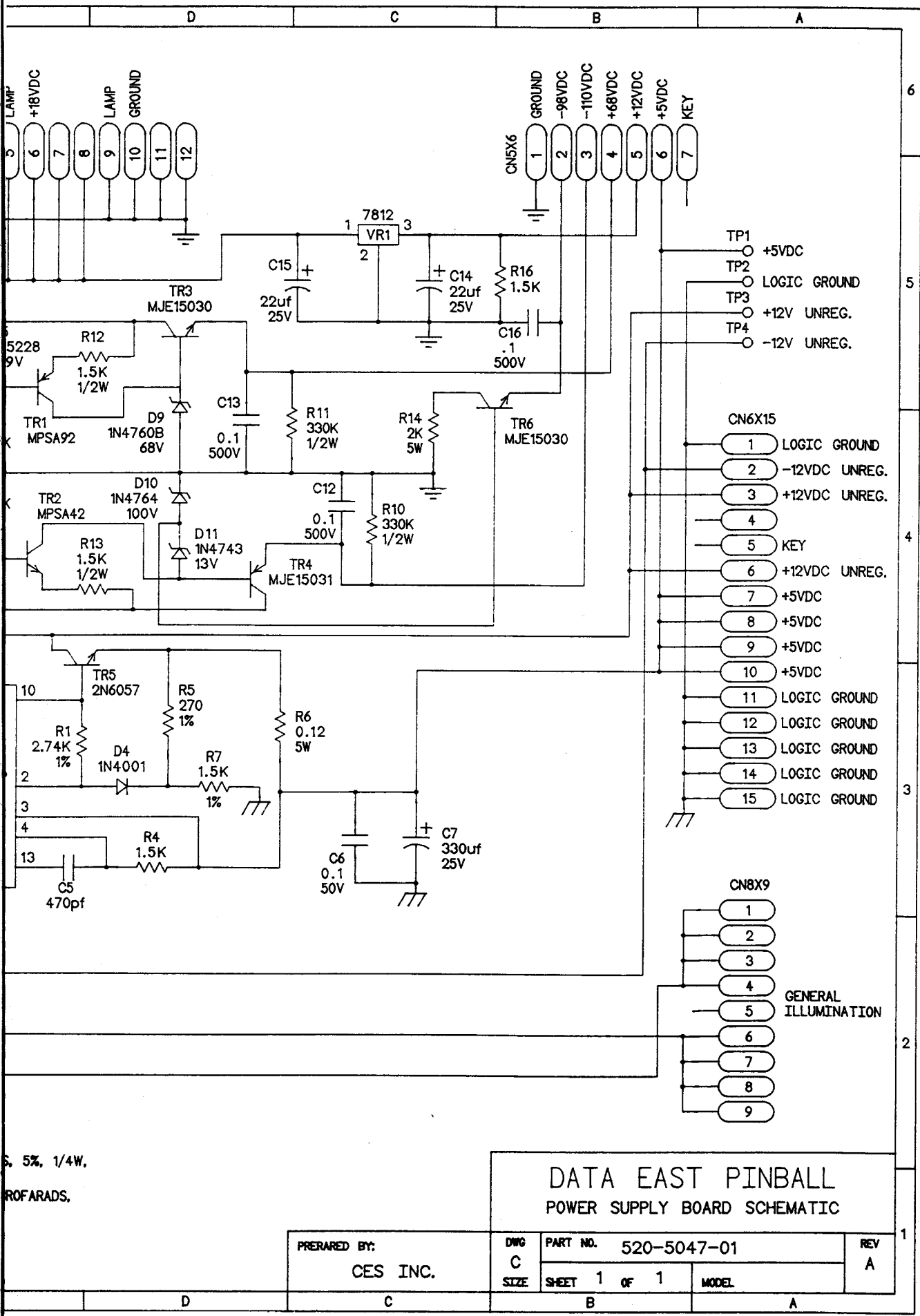


A
B
C
D
E
F
G
H





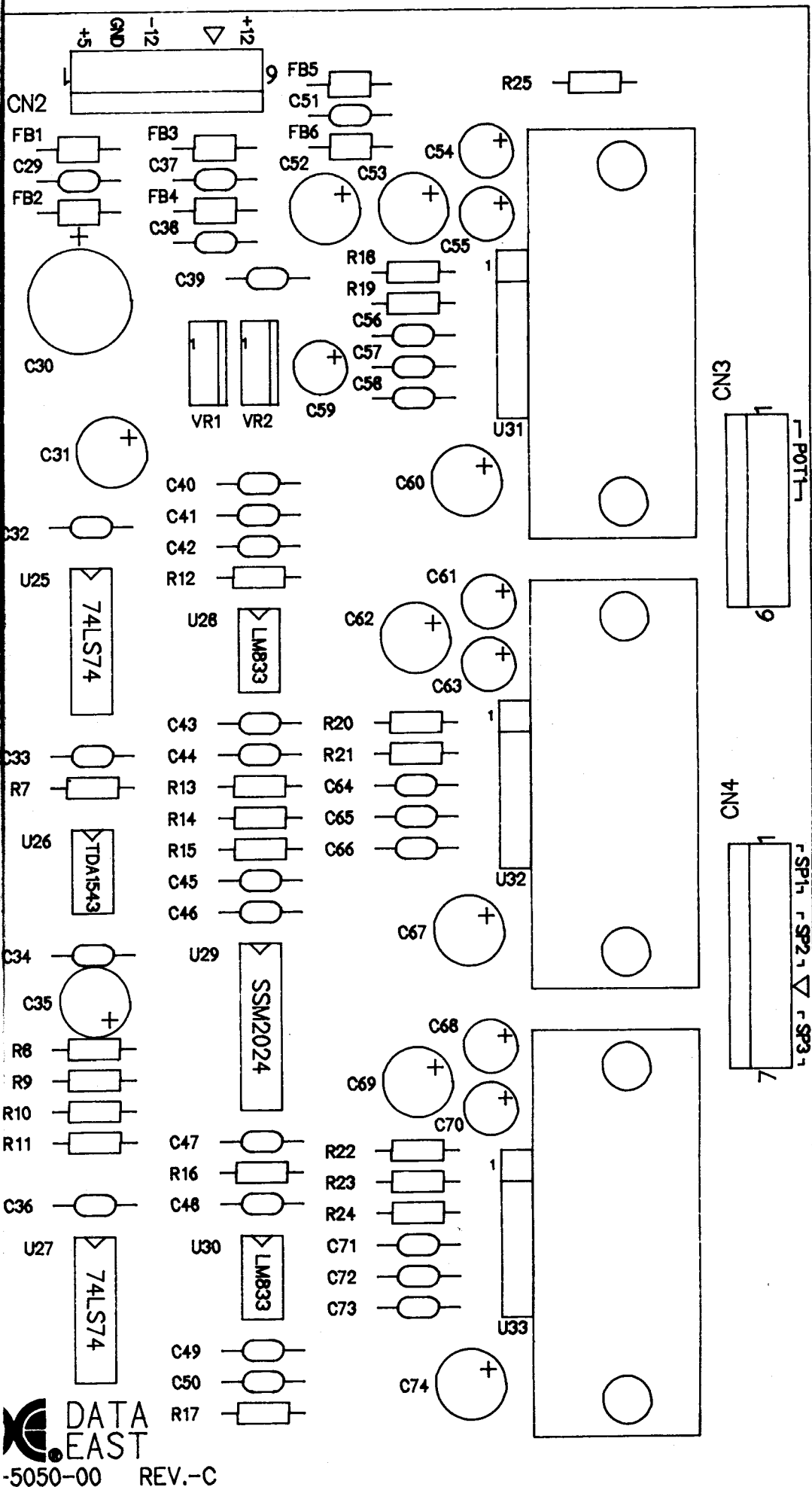
NOTES:
 -ALL RESISTOR VALUES ARE IN OHMS, 5%, 1/4W, UNLESS OTHERWISE SPECIFIED.
 -ALL CAPACITOR VALUES ARE IN MICROFARADS, UNLESS OTHERWISE SPECIFIED.
 -D12 NOT USED.

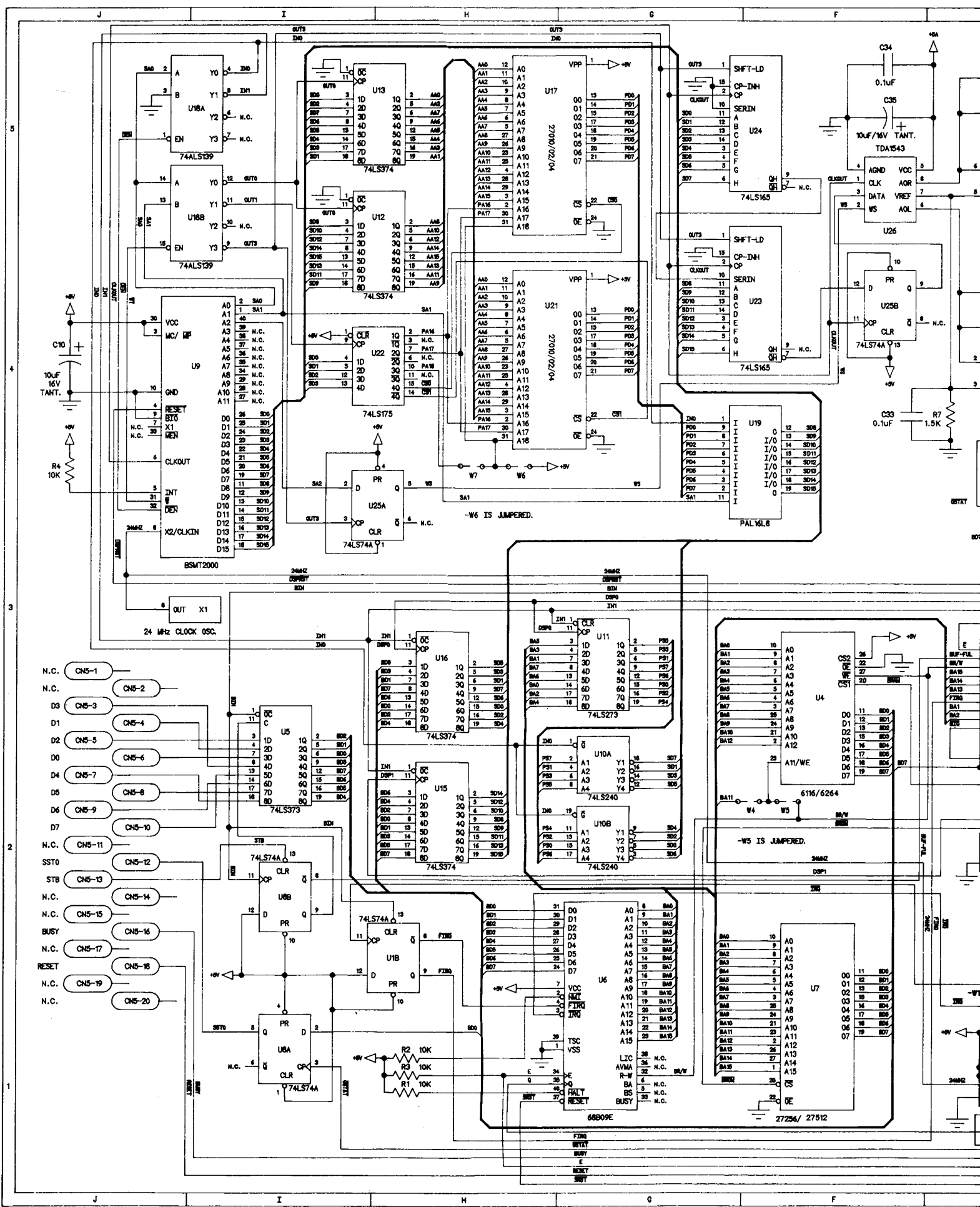


5%, 1/4W.
 MICROFARADS.

DATA EAST PINBALL POWER SUPPLY BOARD SCHEMATIC

PREPARED BY: CES INC.	DWG C SIZE	PART NO. 520-5047-01 SHEET 1 OF 1 MODEL	REV A
---------------------------------	-------------------------	--	-----------------





10uF 16V TANT.

R4 10K

BSMT2000

24 MHz CLOCK OSC.

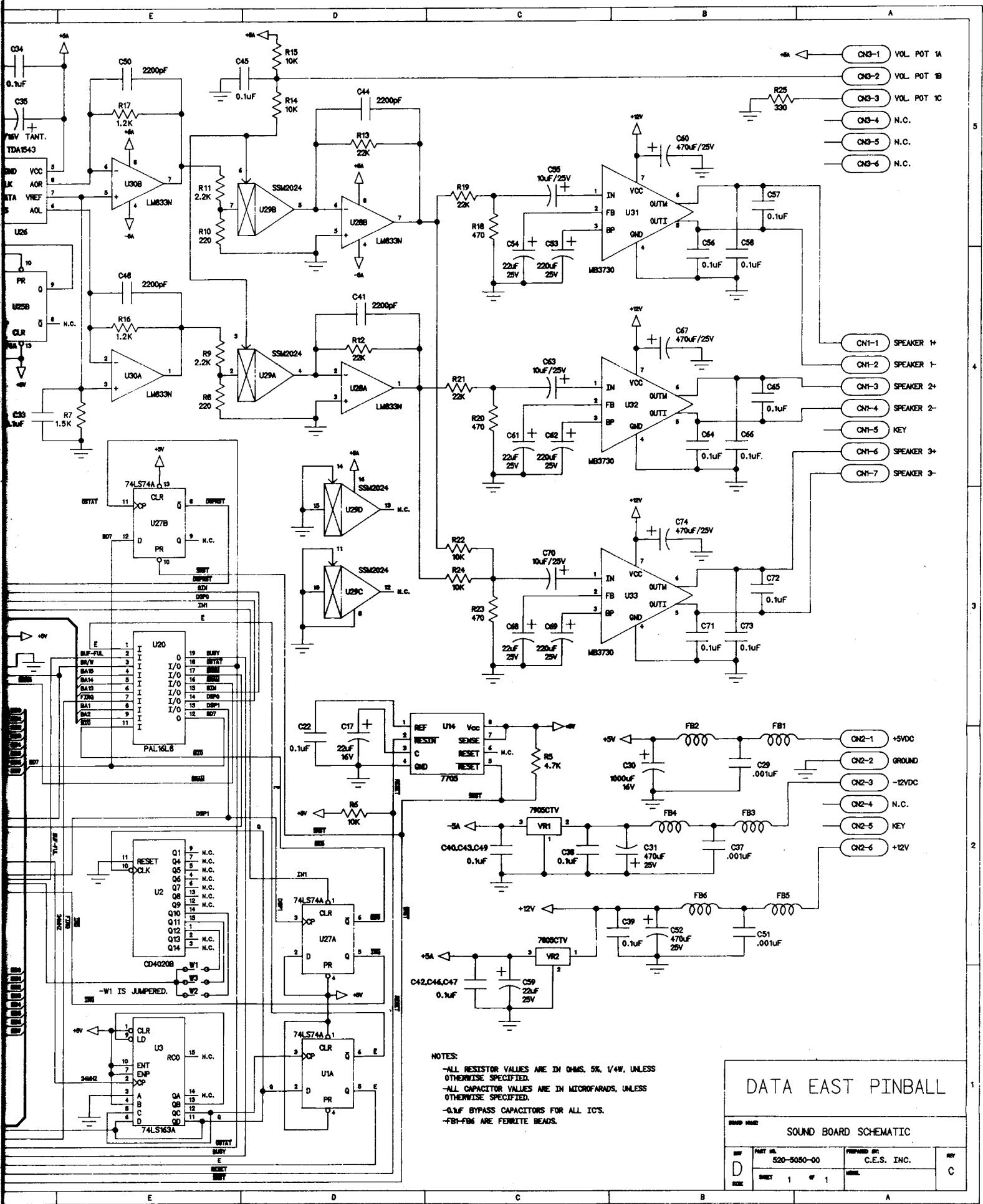
- N.C. CN5-1
- N.C. CN5-2
- D3 CN5-3
- D1 CN5-4
- D2 CN5-5
- D4 CN5-6
- D5 CN5-7
- D6 CN5-8
- D7 CN5-9
- D8 CN5-10
- N.C. CN5-11
- SST0 CN5-12
- STB CN5-13
- N.C. CN5-14
- N.C. CN5-15
- BUSY CN5-16
- N.C. CN5-17
- RESET CN5-18
- N.C. CN5-19
- N.C. CN5-20

-W6 IS JUMPED.

-W5 IS JUMPED.

68B09E

27256/ 27512

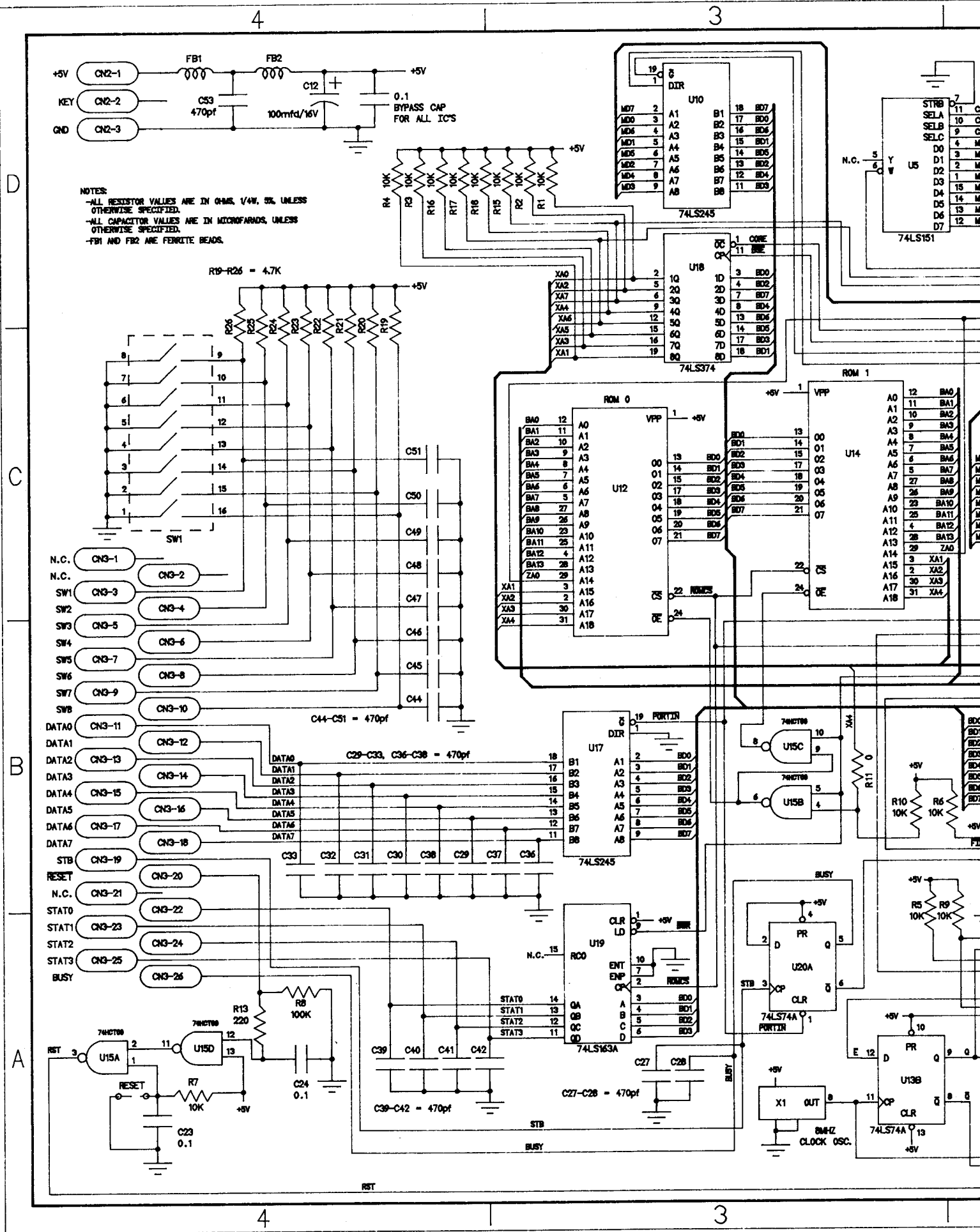


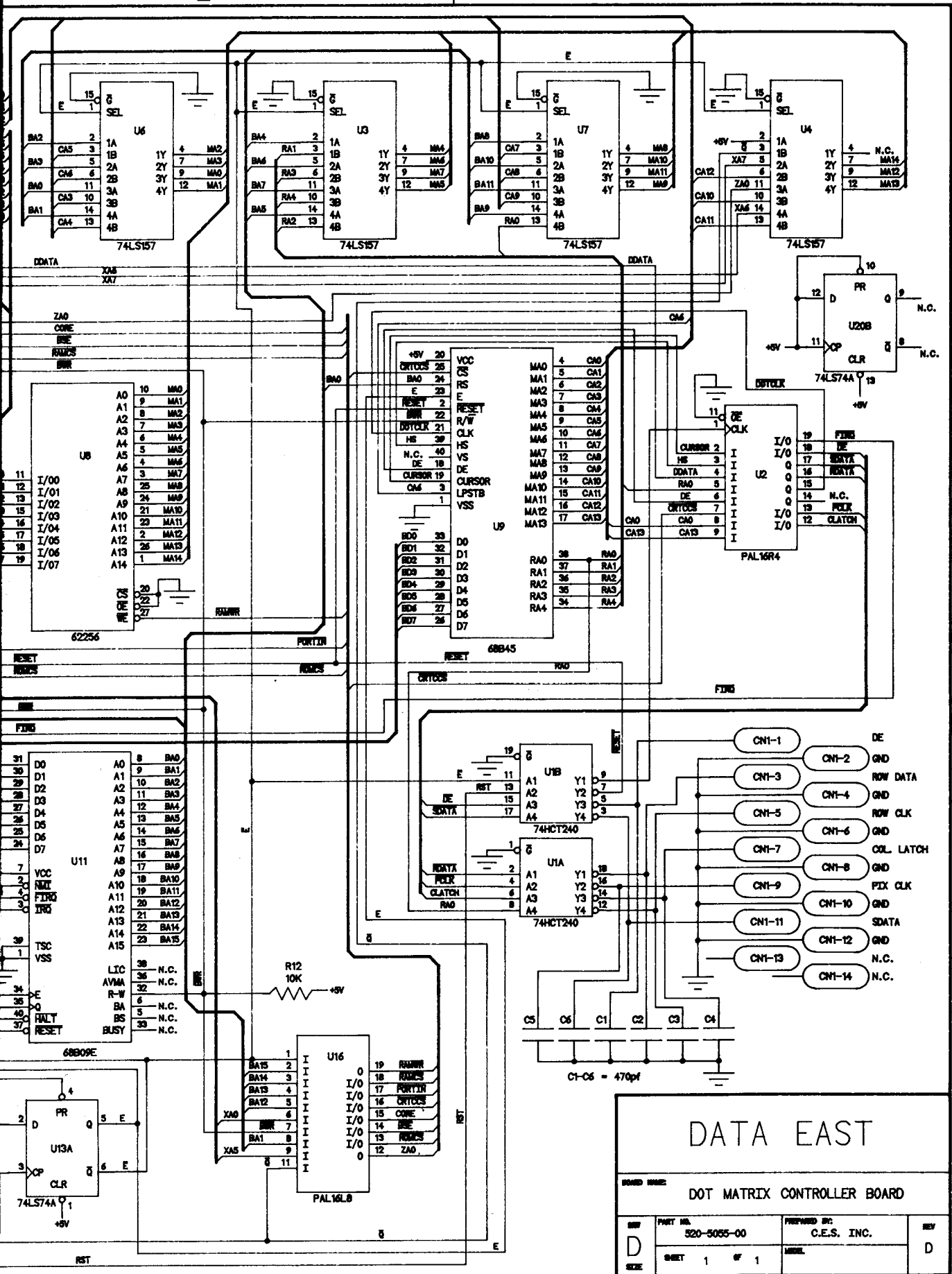
NOTES:
 -ALL RESISTOR VALUES ARE IN OHMS, 5%, 1/4W, UNLESS OTHERWISE SPECIFIED.
 -ALL CAPACITOR VALUES ARE IN MICROFARADS, UNLESS OTHERWISE SPECIFIED.
 -.01uF BYPASS CAPACITORS FOR ALL IC'S.
 -FB1-FB6 ARE FERRITE BEADS.

DATA EAST PINBALL

BOARD NAME: **SOUND BOARD SCHEMATIC**

REV	PART NO.	PREPARED BY	REV
D	520-5050-00	C.E.S. INC.	C
SIZE	SHEET 1 of 1	DATE	

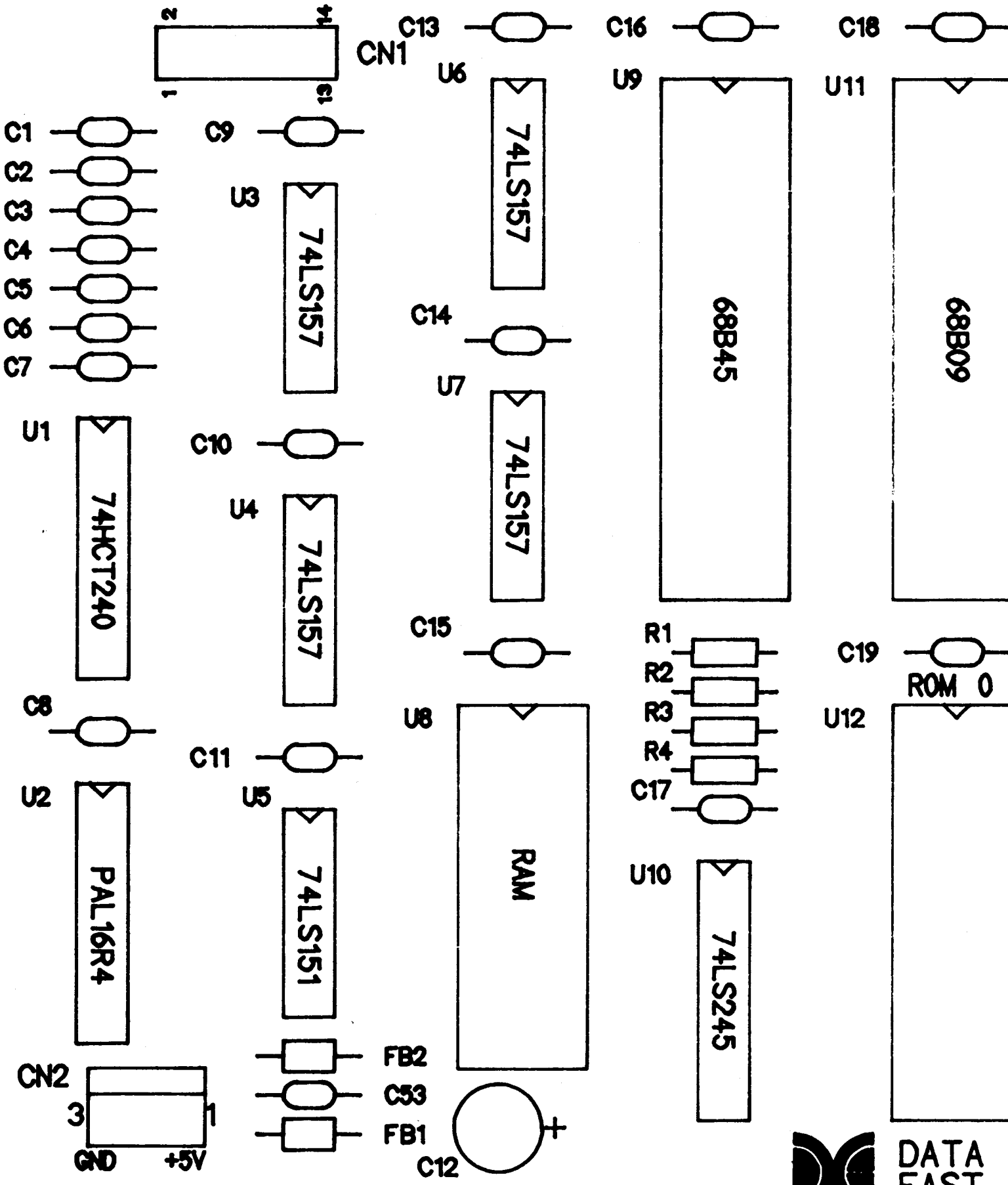


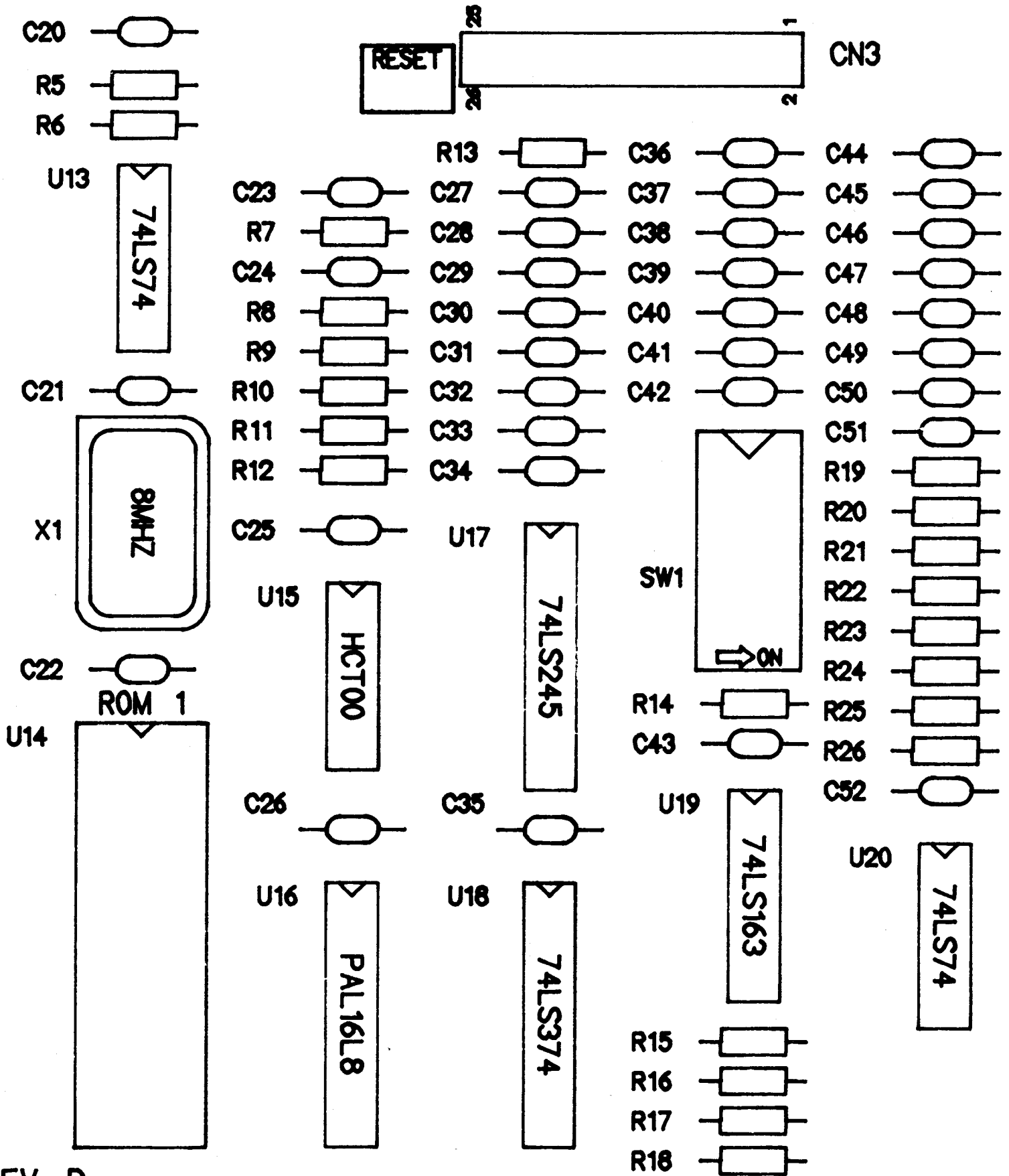


DATA EAST

BOARD NAME: **DOT MATRIX CONTROLLER BOARD**

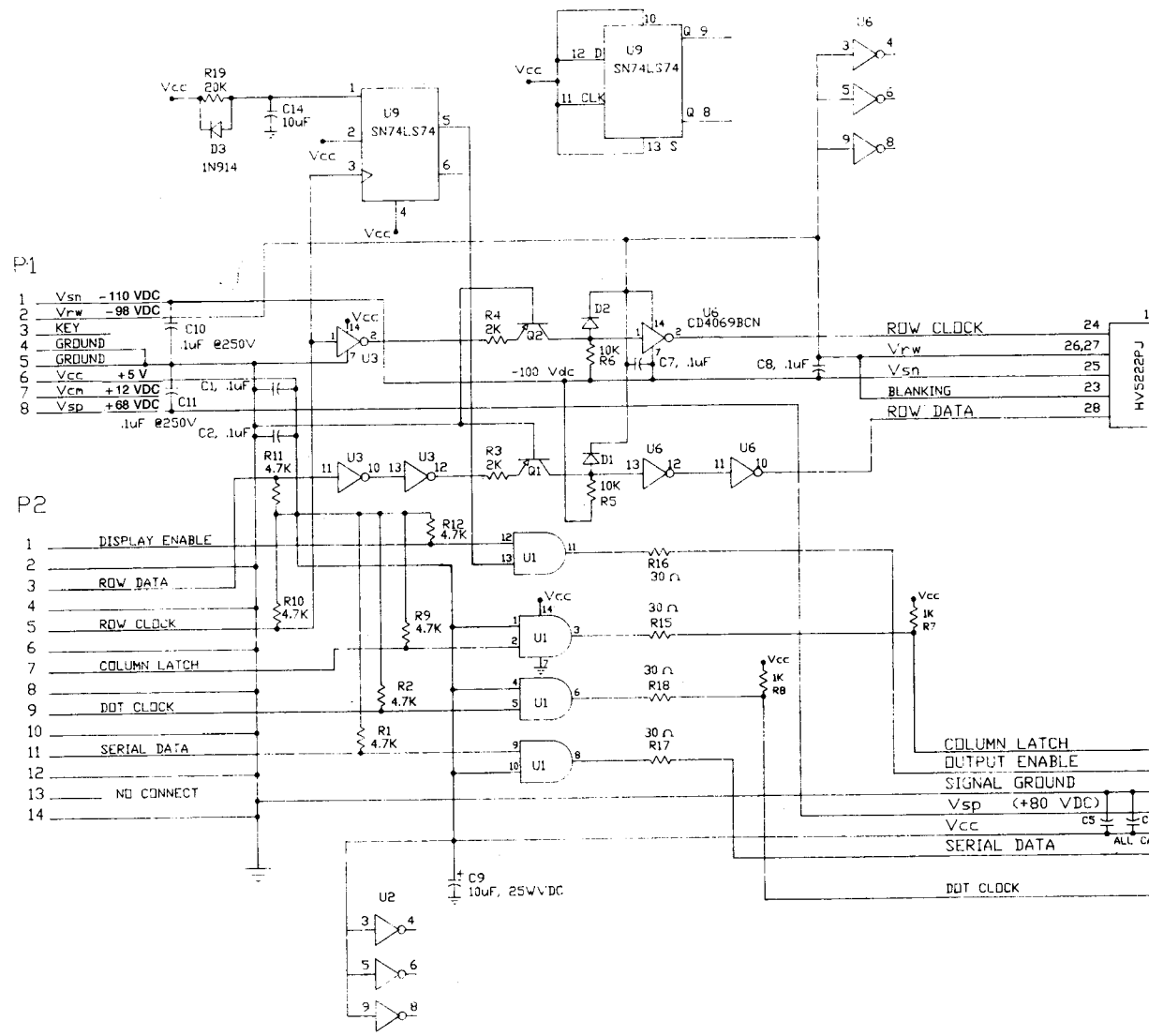
REV: D	PART NO.: 520-5055-00	PREPARED BY: C.E.S. INC.	REV: D
SIZE: 1	SHEET 1 OF 1		MODEL:





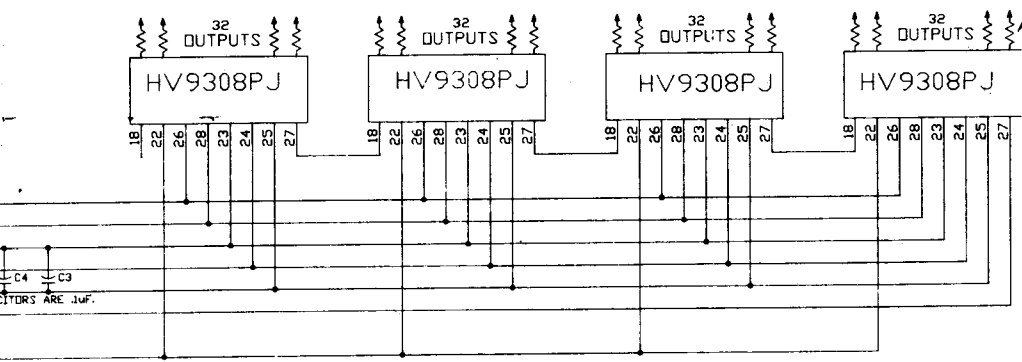
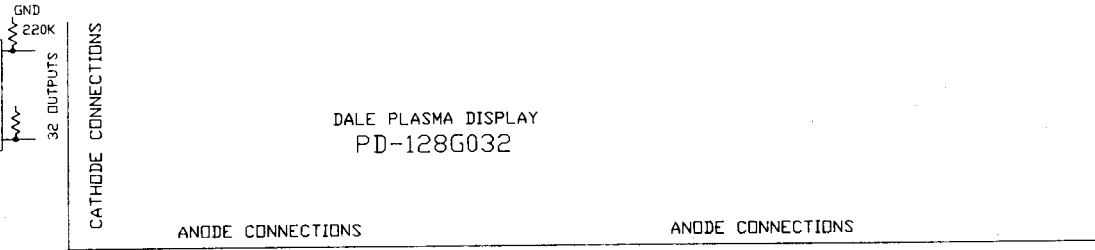
REV.-D
520-5055-00

PART NO.	INTL CODE
281103-01	S



NOTES

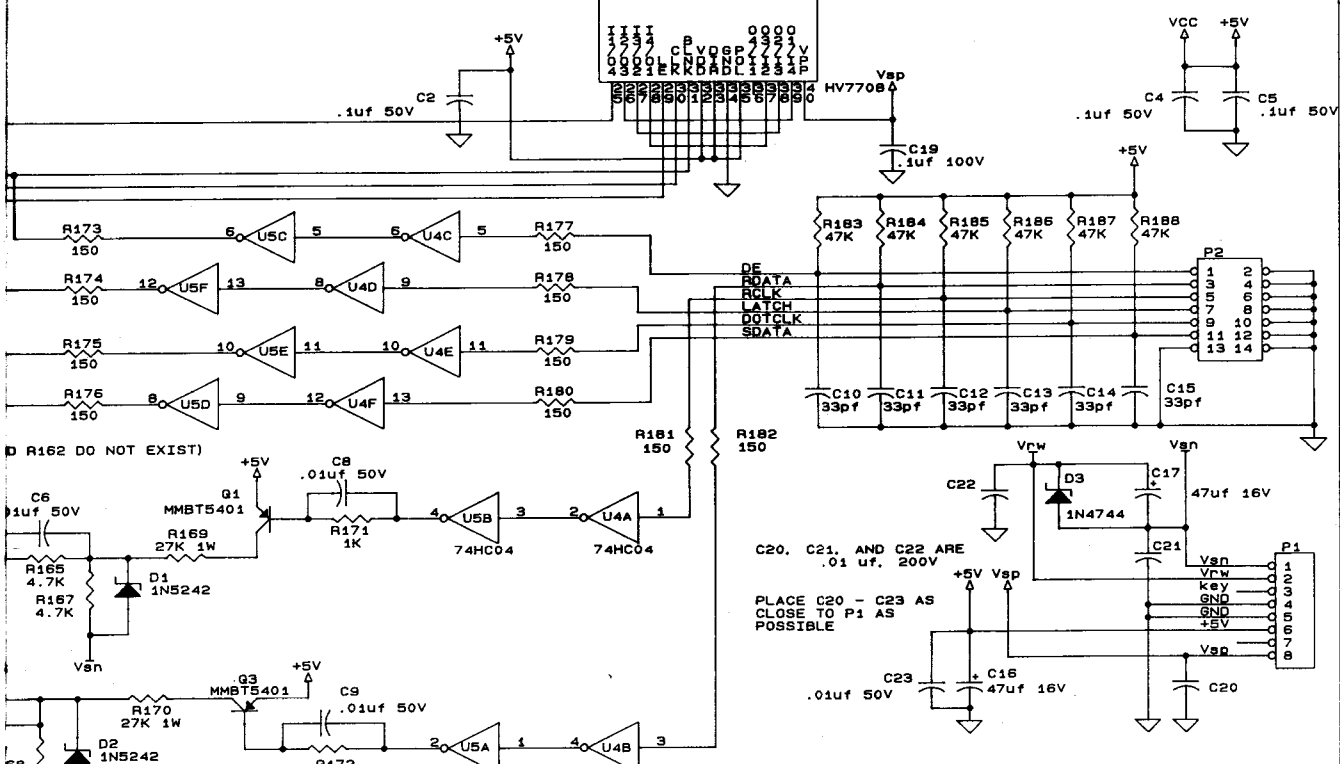
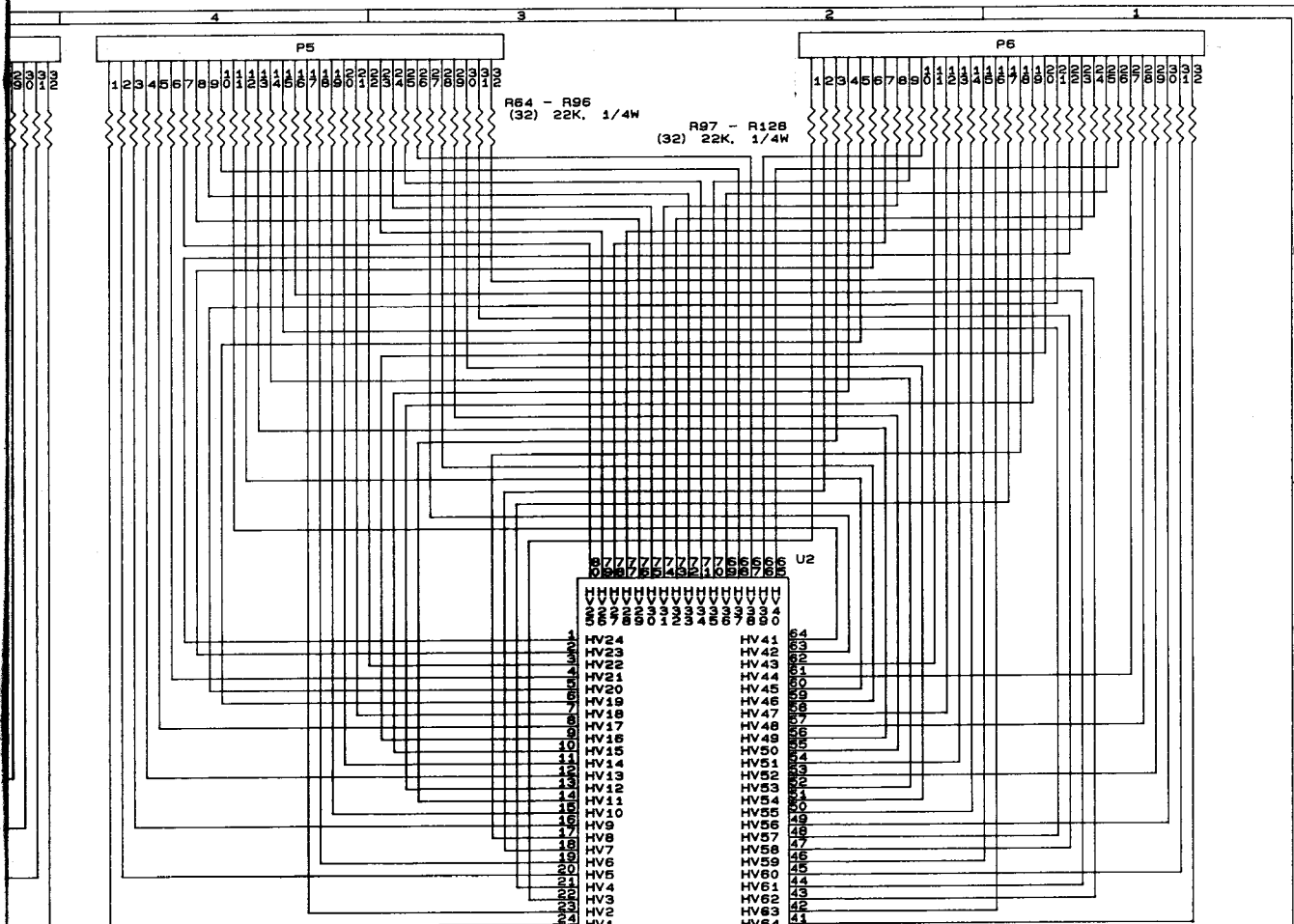
REVISIONS				
ZONE	SYM	DESCRIPTION	DATE	APPROVED



281103

CLASS 2

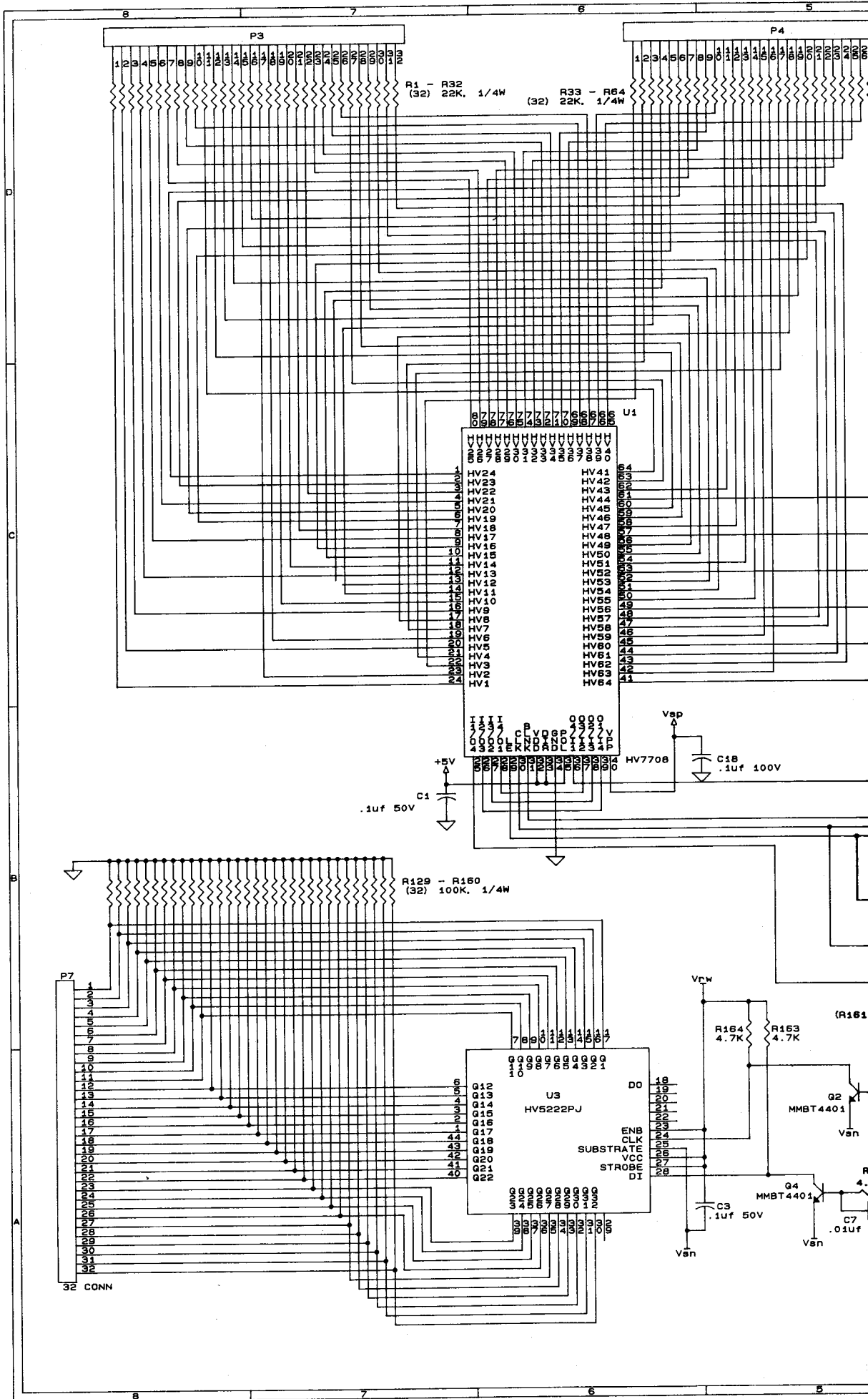
<small> THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF DALE ELECTRONICS, INC. AND ISSUED IN STRICT CONFIDENCE AND SHALL NOT BE REPRODUCED OR COPIED OR USED AS THE BASIS FOR THE MANUFACTURE OR SALE OF APPARATUS WITHOUT PERMISSION. THESE SHARP EDGES AND ROUNDS LIMITS APPLY OVER NON-PARTICULAR FINISHES COMMERCIAL TOLERANCES APPLY TO STOCK SIZES GEOMETRIC SYMBOLS PER ANSI Y14.5 ALL MACHINING SURFACES DIMENSIONS IN BRACKETS () ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED </small>	<small>UNLESS OTHERWISE SPECIFIED</small> <small>DIMENSIONS ARE IN INCHES</small> <small>TOLERANCES ON</small> <small>FRACTIONS DECIMALS ANGLES</small> <small>11/64 .005 0.30</small> <small>.005 .005 .005</small>	<small>SIGNATURES</small> <small>DATE</small> <small>DR [Signature] 92-02-21</small> <small>CHKD [Signature] 92-03-06</small> <small>DSGN [Signature] 92-02-06</small> <small>OR PROD [Signature]</small> <small>OR ENG [Signature]</small> <small>APPD [Signature] 92-03-07</small>	<small>DALE ELECTRONICS, INC.</small> <small>A COMPANY OF VISHAY</small> <small>COLUMBUS, NEBRASKA</small>	
	<small>MATERIAL</small> <small>FINISH</small>	<small>TITLE</small> ELECTRICAL SCHEMATIC APD-128G032	<small>SIZE</small> D	<small>CODE IDENT NO.</small> 91637
	<small>DRAWING NO.</small> 281103	<small>SCALE</small> NONE	<small>SHEET</small> 1 OF 1	



D R162 DO NOT EXIST)

C20, C21, AND C22 ARE
 .01 uf, 200V
 PLACE C20 - C23 AS
 CLOSE TO P1 AS
 POSSIBLE

CHERRY
 ELECTRONICS
SCHEMATIC



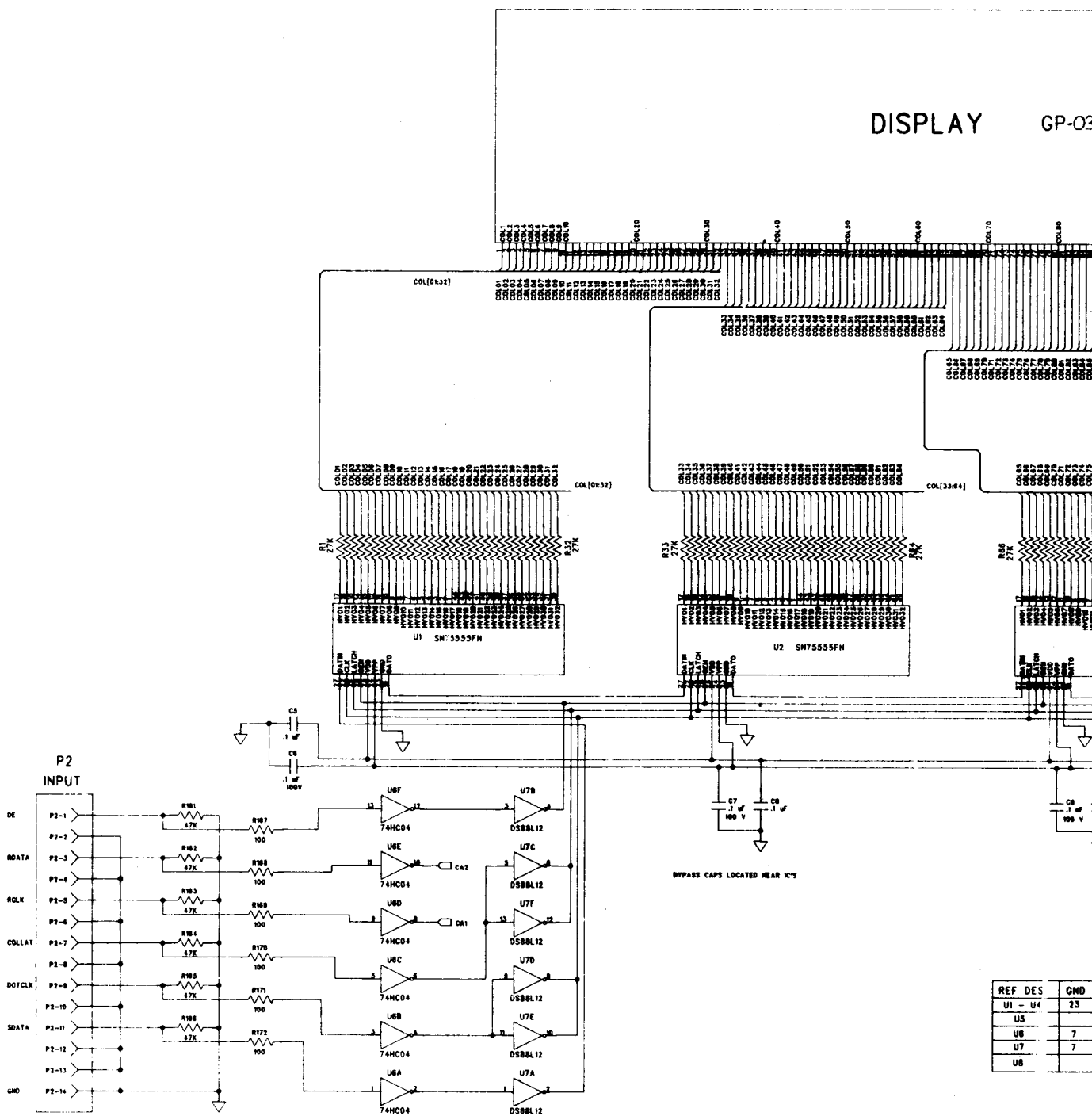
D

C

B

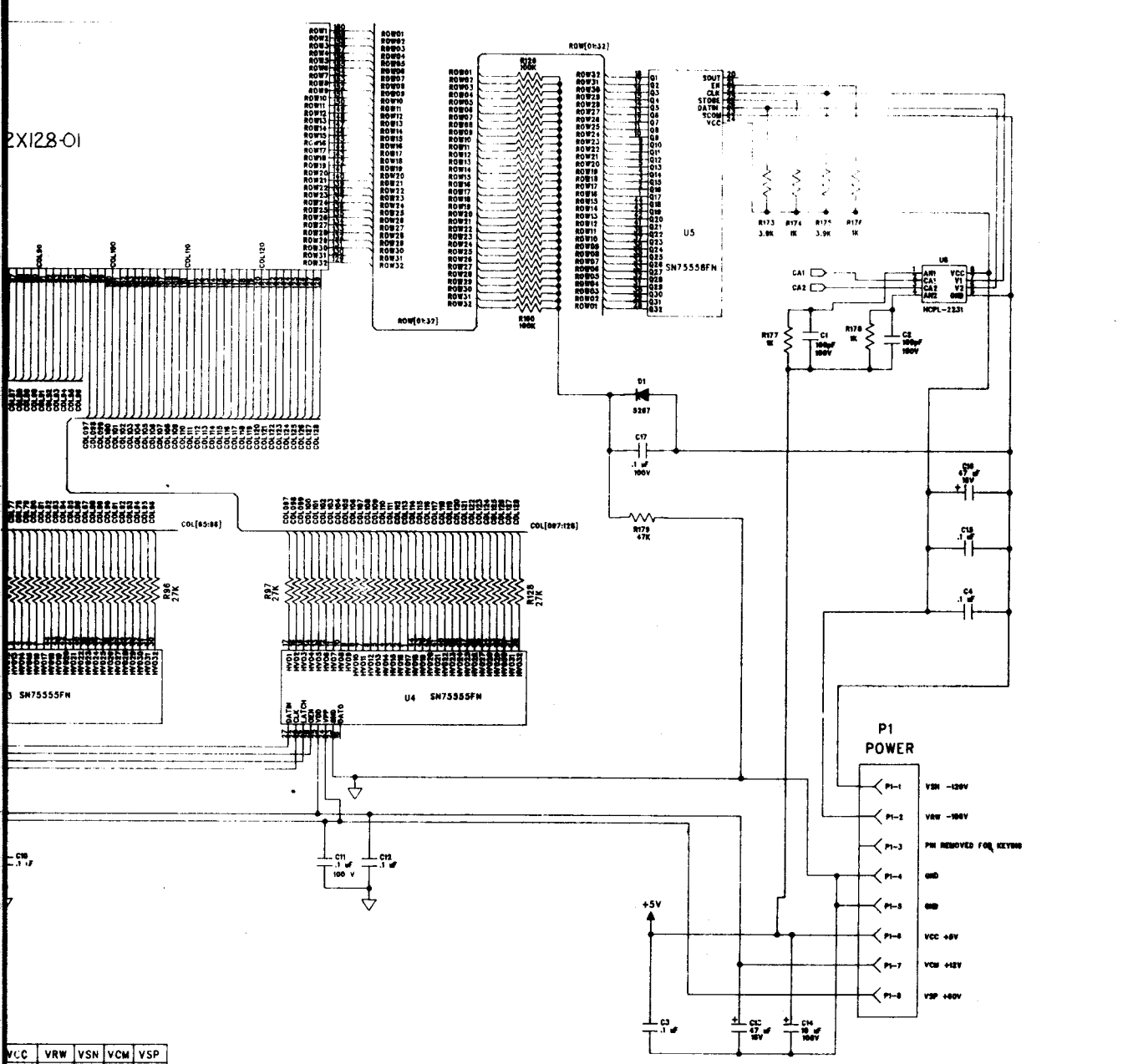
A

DISPLAY GP-03



REF	DES	QNT
U1 - U4		23
U5		7
U6		7
U7		7
U8		7

- 2. RESISTOR VALUES ARE IN OHMS, 1/8 WATT, 5%.
 - 1. CAPACITOR VOLTAGES ARE 50V, 20%.
- NOTES: UNLESS OTHERWISE SPECIFIED.



VCC	VRW	VSN	VCM	VSP
	24	23	20	24
14			14	
	8	5		

PADS LOGIC VER. 2.03 FILE: DM32128.SCH		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES: XX ± .005 XX ± .020 ANGLES ±		CONTR NO.		BABCOCK DISPLAY PRODUCTS, INC. 1091 S. EAST STREET ANAHEIM, CALIFORNIA 92805	
		<input type="checkbox"/> NATL <input type="checkbox"/> FINISH		DRAWN BY RAY DEESE CHECK BY DATE DATE			
NEXT ASSY 6-D-082D28-01		THIS DOCUMENT CONTAINS PROPRIETARY INFORMATION OF BABCOCK AND IS TO BE RELEASED SUBJECT TO THE CONDITIONS THAT THE INFORMATION (A) IS KEPT IN CONFIDENCE, (B) NOT BE REPRODUCED OR COPIED IN WHOLE OR IN PART AND (C) NOT BE USED OR INCORPORATED IN ANY PRODUCT, EXCEPT UNDER AN EXPRESS WRITTEN AGREEMENT WITH BABCOCK.		APPR BY DATE DO NOT SCALE PRINT		SCHEMATIC CODE IDENT. 1510-0106 00048	
APPLICATION				SCALE SIZE D SHEET 1 OF 1		REV. A	

4

3

2

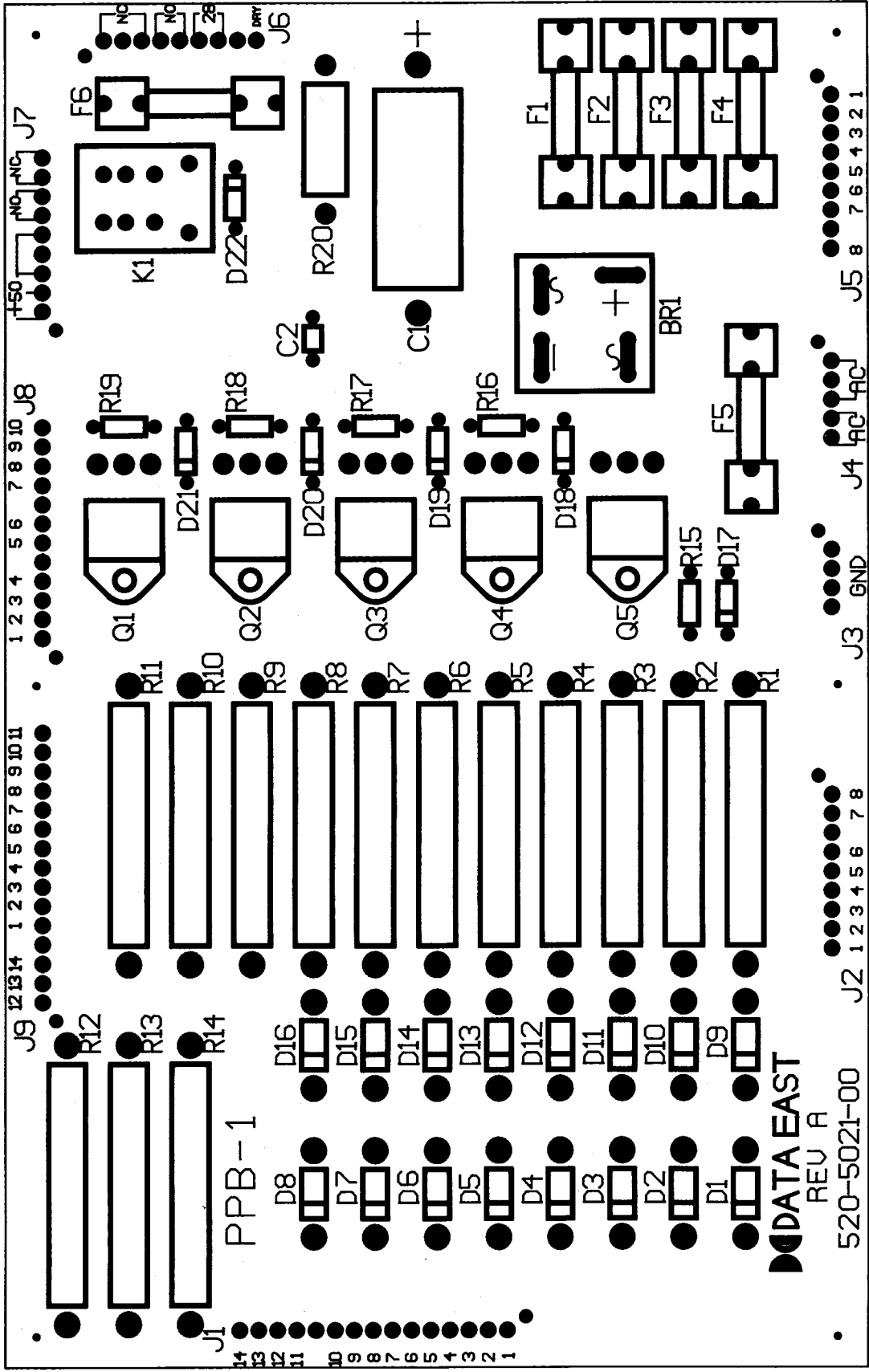
1

D

C

B

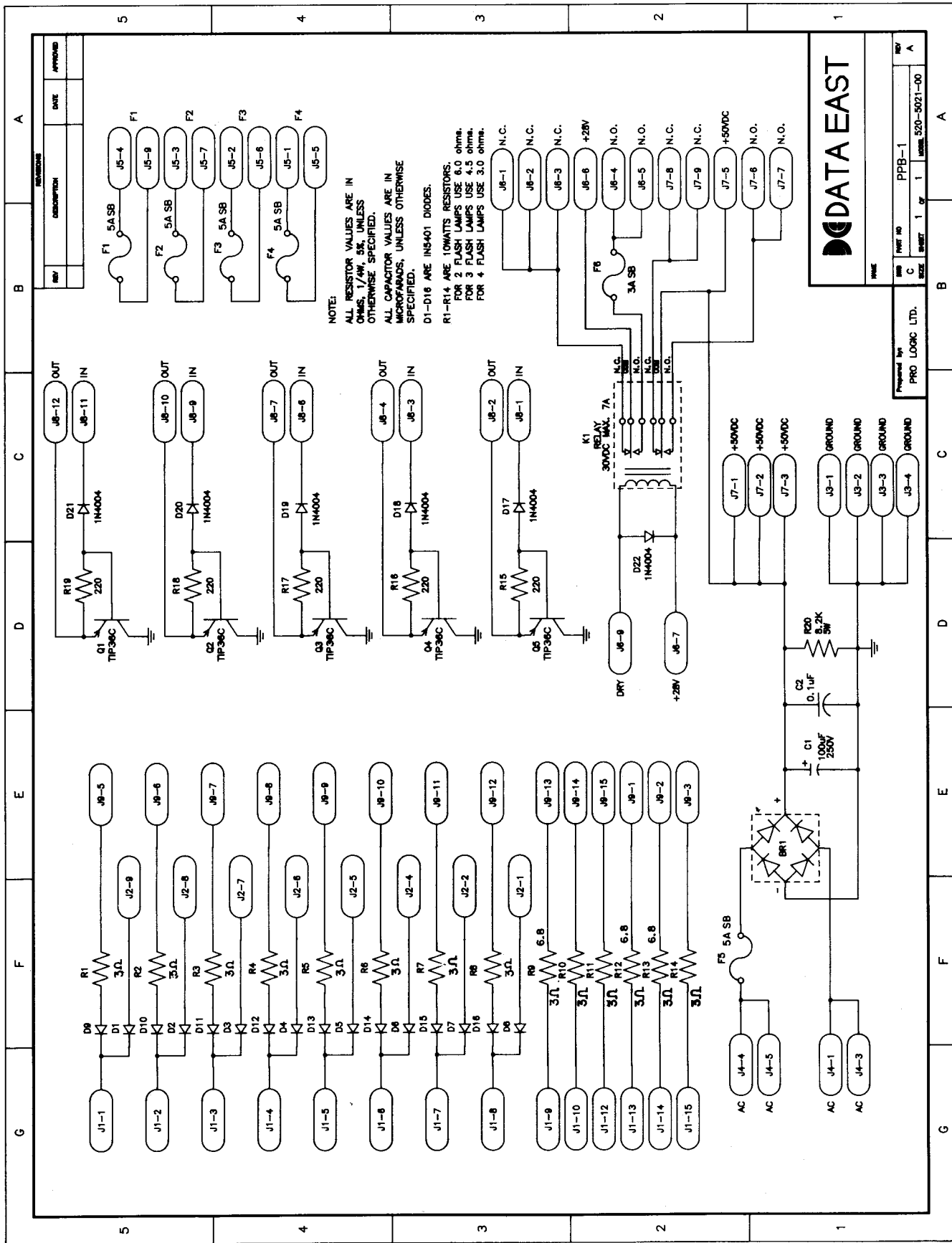
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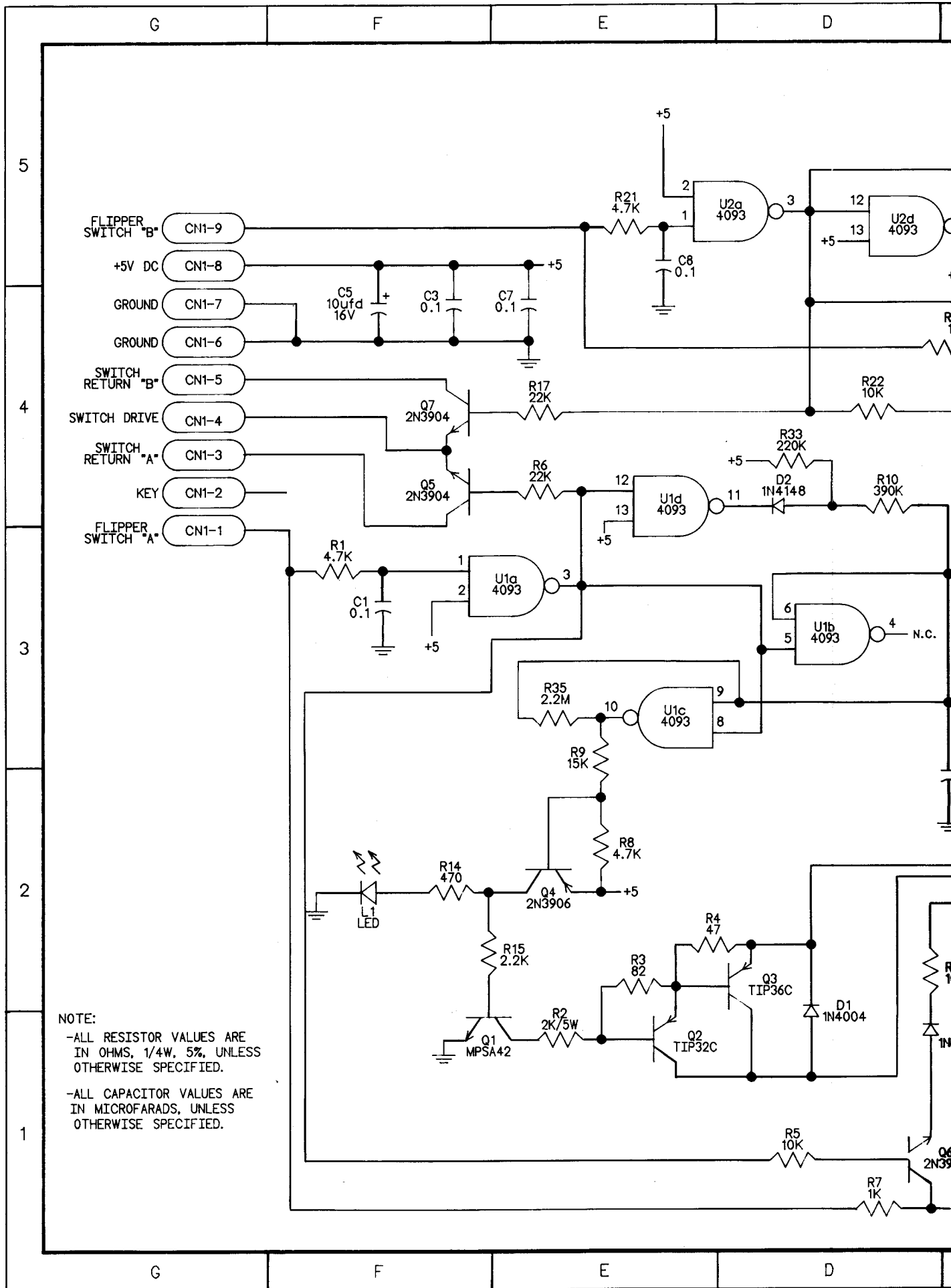


PPB-1

DATA EAST
REV. A

520-5021-00 J2 1 2 3 4 5 6 7 8 J3 GND J4 AC AC J5 8 7 6 5 4 3 2 1





D

C

B

A

REVISIONS

REV	DESCRIPTION	DATE	APPROVED
C	R10 AND R26 VALUES CHANGED.	11-30-89	
E	C10 AND C11 DELETED RESISTOR VALUES CHANGED Q6 & Q12 CHANGED	3-13-90	
F	REMOVE C4,C9,R12,R13,R28 AND R29. CONNECT PIN 5 AND 8 OF U1 AND U2	6-18-90	

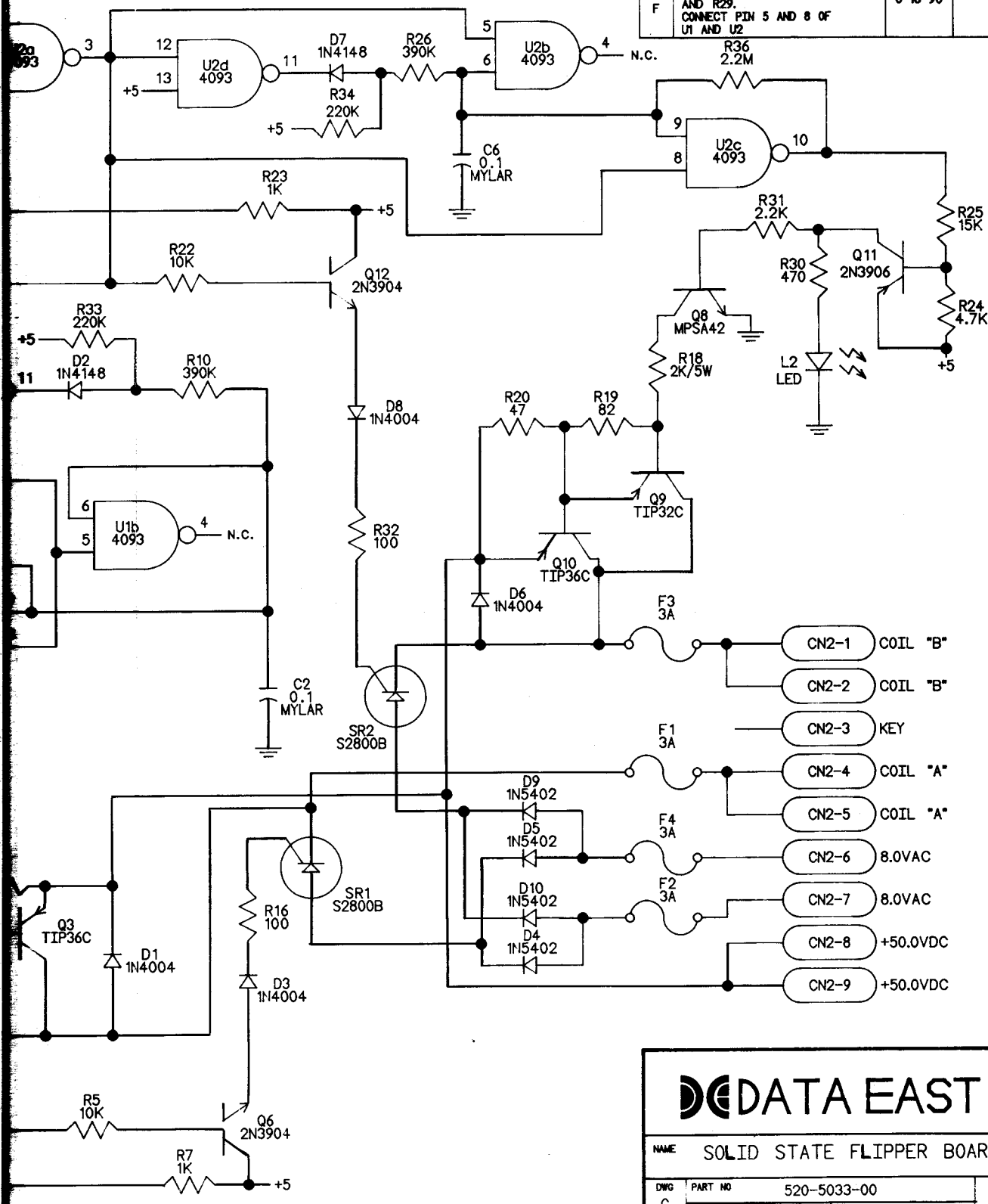
5

4

3

2

1



DATA EAST

NAME SOLID STATE FLIPPER BOARD

DWG	PART NO	520-5033-00	REV
C			F
SIZE	SHEET	1 OF 1	MODEL TY-FFASI-2006

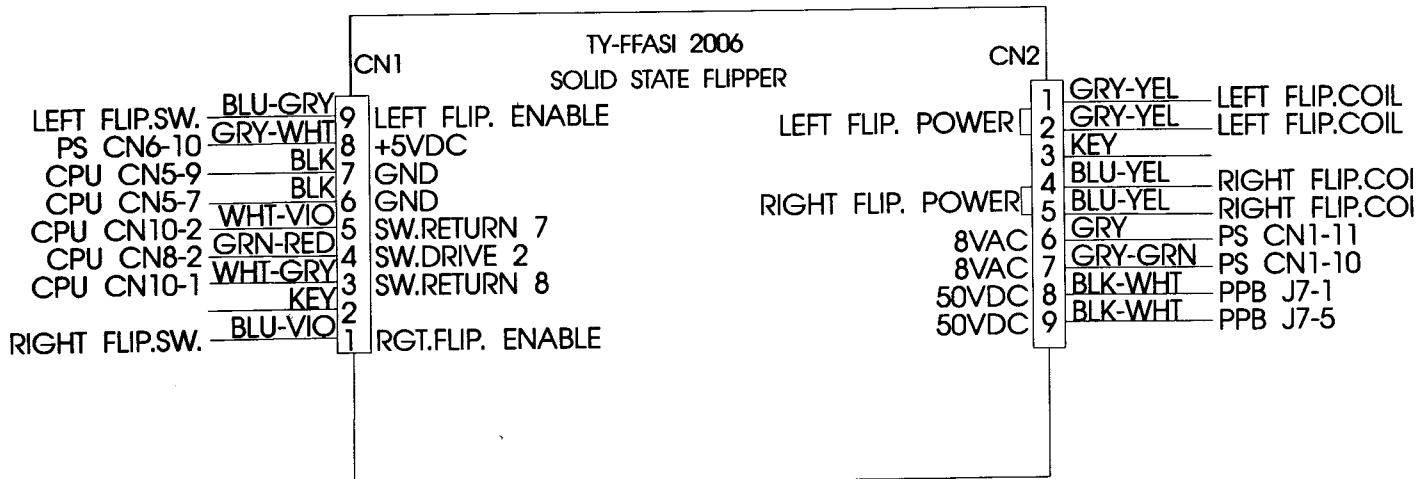


Theory of Operation for the Solid State Flippers

- The solid state flipper board is a dual flipper solenoid driver circuit. Each solenoid driver circuit contains a one shot timer, a 50V driver, and an 8V driver.

Looking at one circuit, Schmidt NAND gates U1A, U1B, and U1D make up the one shot timer. The timer length is controlled by R10, R33 and C2. The output of the timer is gated at U1C with the buffered switch input from Q6. The output of U1C controls the 50V driver circuit consisting of Q4, Q1, Q2, Q3, and D1. As long as the flipper button is activated, Q6 will keep the 8V driver circuit, SR1, on.

The 50V provides the actuation power to the flipper solenoid while the 8V provides the holding power.



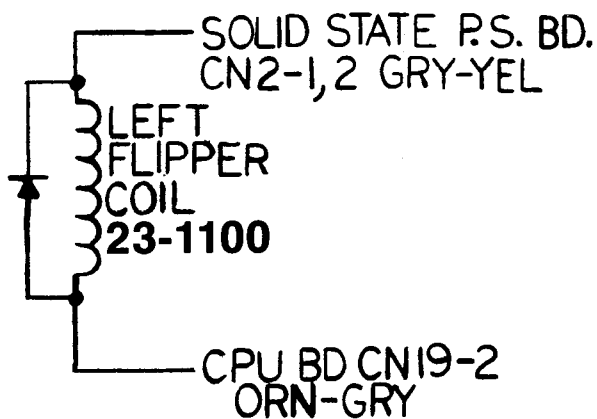
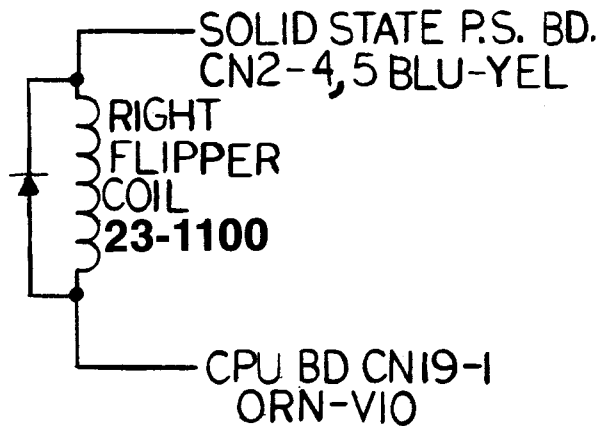
Solid State Flippers
PCB Wiring Diagram

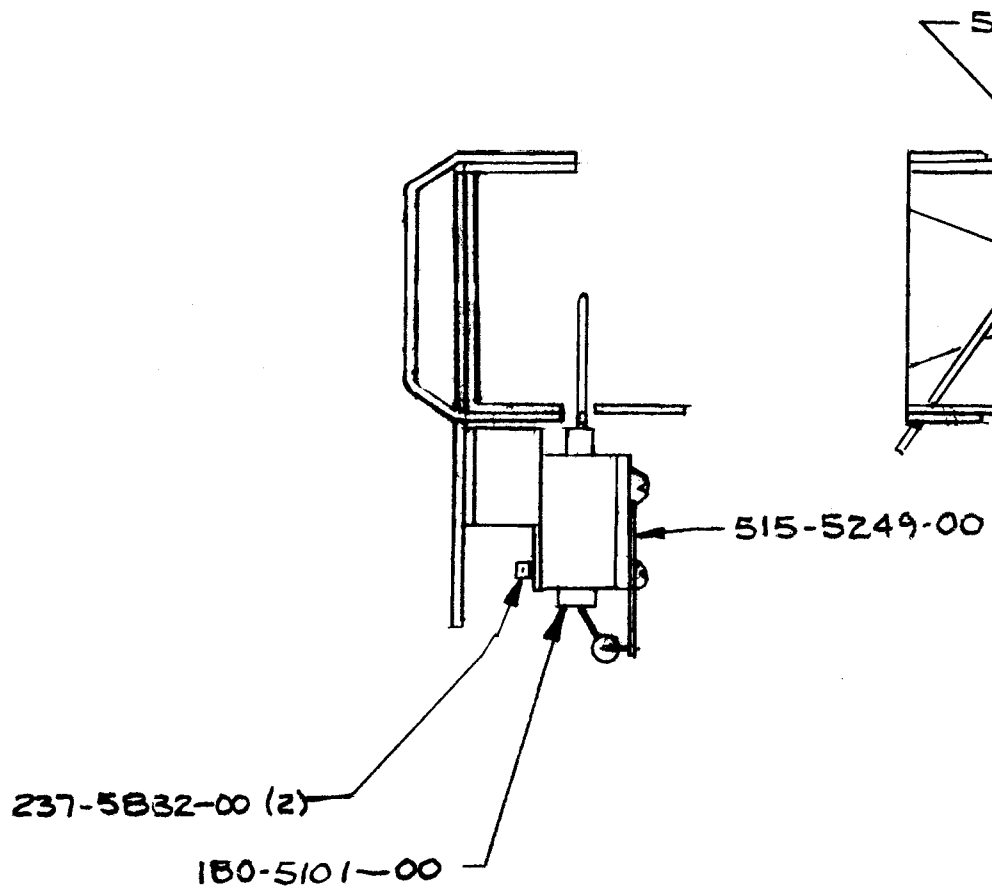
Connector CN 1

Pin #	Goes To	Wire Color	It Is
1	Rgt. Flipper Sw.	BLU-VIO	RGT. FLIP ENABLE
2			KEY
3	CPU CN10-1	WHT-GRY	SW. RET 8
4	CPU CN8-2	GRN-RED	SW. DRV 2
5	CPU CN10-2	WHT-VIO	SW. RET 7
6	CPU CN5-7	BLK	GND
7	CPU CN5-9	BLK	GND
8	PS CN6-10	GRY-WHT	+5VDC
9	Lft. Flipper Sw.	BLU-GRY	LFT. FLIP ENABLE

Connector CN 2

Pin #	Goes To	Wire Color	It Is
1	Lft. Flip Coil	GRY-YEL	LFT. FLIP POWER
2			KEY
3			
4	Rgt. Flip Coil	BLU-YEL	RGT. FLIP POWER
5			
6	PS CN1-11	GRY	9 VAC
7	PS CN1-10	GRY-GRN	9 VAC
8	PPB J7-1	BLK-WHT	50 VDC
9	PPB J7-5	BLK-WHT	50 VDC



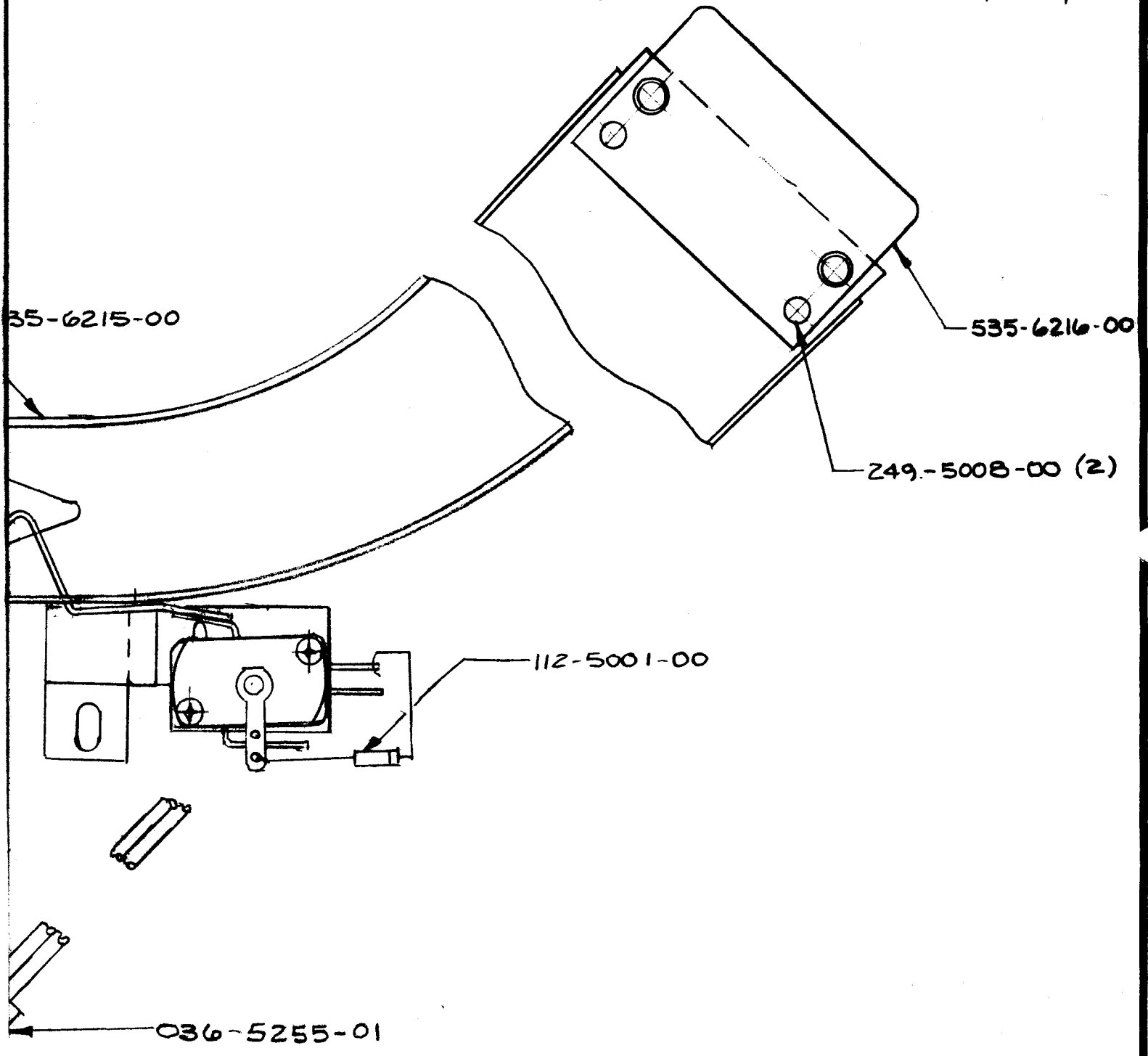


TOLERANCE UNLESS OTHERWISE SPECIFIED

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

ANGULAR	FRACTIONAL ± 1/64
XX ± 5°	
XX.X ± 1°	

REV	DESCRIPTION	BY	DATE	APP
A	REVISE SWITCH MOUNTING	ILL	1-13-92	
B	180-5101-00 WAS 180-5034-00	ILL	3-20-92	



REQ. 1	NEXT ASSEM.	DWN. ILL	DATE 1-21-92	TITLE STEEL RAMP ASS'Y
MAT. X		CHKD.	SCALE 1:1	
H.T. X		DATA EAST PINBALL, INC. 1990 JANICE AVE., MELROSE PARK, IL. 60160		PART NO. 500-5490-00
FIN. X				

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.