

**DE** DATA  
EAST

# TALES FROM THE CRYPT



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**DATA EAST PINBALL®**

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## CPU JUMPER TABLE

Game	CPU*	ROM	Jumpers	
	Version	Location	Installed	Removed
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
Star Wars	Ver 3	5C	J1b,J3,J5,J5b,J6b,J7b,&J8	J1a,J2,J4,J5a,J6a,&J7a
Rocky & Bullwinkle	Ver 3	5C	J1b,J3,J5,J5b,J6b,J7b,&J8	J1a,J2,J4,J5a,J6a,&J7a
Jurassic Park	Ver 3	5C	J1b,J3,J5,J5b,J6b,J7b,&J8	J1a,J2,J4,J5a,J6a,&J7a
Last Action Hero	Ver 3	5C	J1b,J3,J5,J5b,J6b,J7b,&J8	J1a,J2,J4,J5a,J6a,&J7a
Tales From the Crypt	Ver 3	5C	J1b,J3,J5,J5b,J6b,J7b,&J8	J1a,J2,J4,J5a,J6a,&J7a

\*Version 2 & 3 have 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

#### SUSPECT COMPONENT

One of the 6821 PIAs  
6264 RAM at location D5.  
EPROM at location C5.

DISPLAY READS "OPEN THE DOOR" -- This indicates a faulty memory condition in RAM. Opening the Coin Door will initiate a Factory Restore, by opening the Memory Protect Switch. Check battery voltage at CMOS RAM with power off.

### 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 & 50Volt coils  
F6 5A Slo-Blo Flash Lamps (34VDC)  
F7 3A Slo-Blo Flipper Power & 32Volt coils  
F8 4A Slo-Blo 50Volt coils  
F9 5A Slo-Blo 50Volt coils

#### 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 (34VDC) Bumpers Slingshots etc.  
F6 5A Slo-Blo Solenoid Buss (34VDC)  
F7 0.5A Slo-Blo Display Reg. Input (90VAC)

# Tales from the Crypt

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# GAME & FEATURE 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)-- European, International

**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 C5

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

Display Controller Board: Location U12, ROM 0

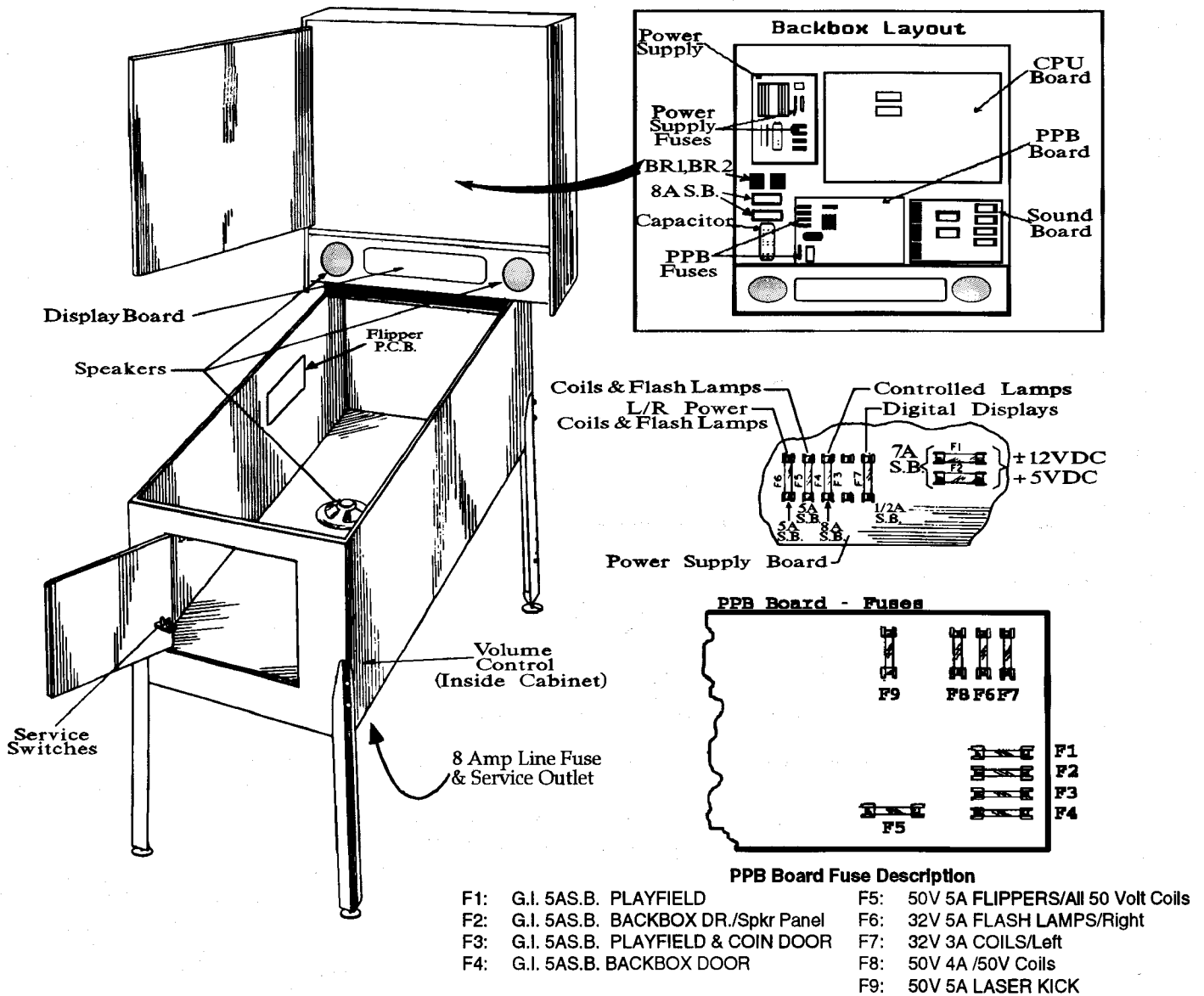
## TRANSPORTATION

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. Cabinet legs are located on top of the front moulding above the coin door and the assembly parts package is in the cashbox. There should be four leg levelers, eight leg bolts, six pinballs and a large Allen Wrench, used for securing the backbox, is inserted & taped to the rear of cabinet.
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 with the Allen Wrench in the hole in the back of the cabinet and rotating the wrench 270 degrees(3/4 turn).
7. Remove the backbox keys from the playfield glass, unlock and carefully remove the backglass. Set the backglass aside.
8. Check all connectors in the backbox for loose wire terminations. Reseat any loose wire by pushing in on the terminal. 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.

9. Check that the fuses on the Power Supply board, PPB board and fuse panel are seated properly.
10. Carefully remove the playfield glass and set it aside.
11. Raise the playfield and support it, by connecting the strap located in the rear of the cabinet, to the eyebolt on the playfield, or the Stay Arm on the Right Side of the Cabinet. (Use the instruction sheet provided in the game to see alternative methods of accessing the playfield bottom.)
12. Check all cabinet cable and playfield lamp board connector terminations.
13. Remove all shipping tie downs.
14. Remove the Plumb Bob tilt from the parts package and install on the pendulum wire on the inside left of the cabinet. (See Cabinet Parts Illustration.)



## GENERIC LAYOUT ILLUSTRATION

15. Lower the playfield and level the playfield side-to-side by adjusting leg levelers and using the 2 Way Level located beneath the instruction 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.

**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 six 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 display indicates the number of credit(s) posted. Depress the credit button and a start-up sound is produced, the posted credit(s) are reduced by one. The display now indicates the player or # of players selected from the total depressions of the credit button. The display indicates the ball in play, and a ball is served to the shooter lane. Additional players may be added by depressing the Credit button before the end of ball 1. At game start, an introduction is shown followed by Skill Shot Graphics.

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 02.

# GAMES SPECIFIC FEATURES

## "CREATURE FEATURES"

Note: With Creature Feature(s) the visual display and playfield are interactive. Collect Creature Feature by shooting the ball in play into the scoop (see Playfield - Major Assemblies Illustration).

### **1) SUPER KEEPER TARGETS**

---

Shoot the K E E P E R Eye Ball Targets for 1mil plus 1mil added for additional strikes.

### **2) THUNDER STORM**

---

Shoot left and right ramps for 1mil, each completion raises the next completion another million.

### **3) SKULL CRACKING**

---

Shoot the Captive Ball to add additional balls into play.

### **4) DOOR PRIZE**

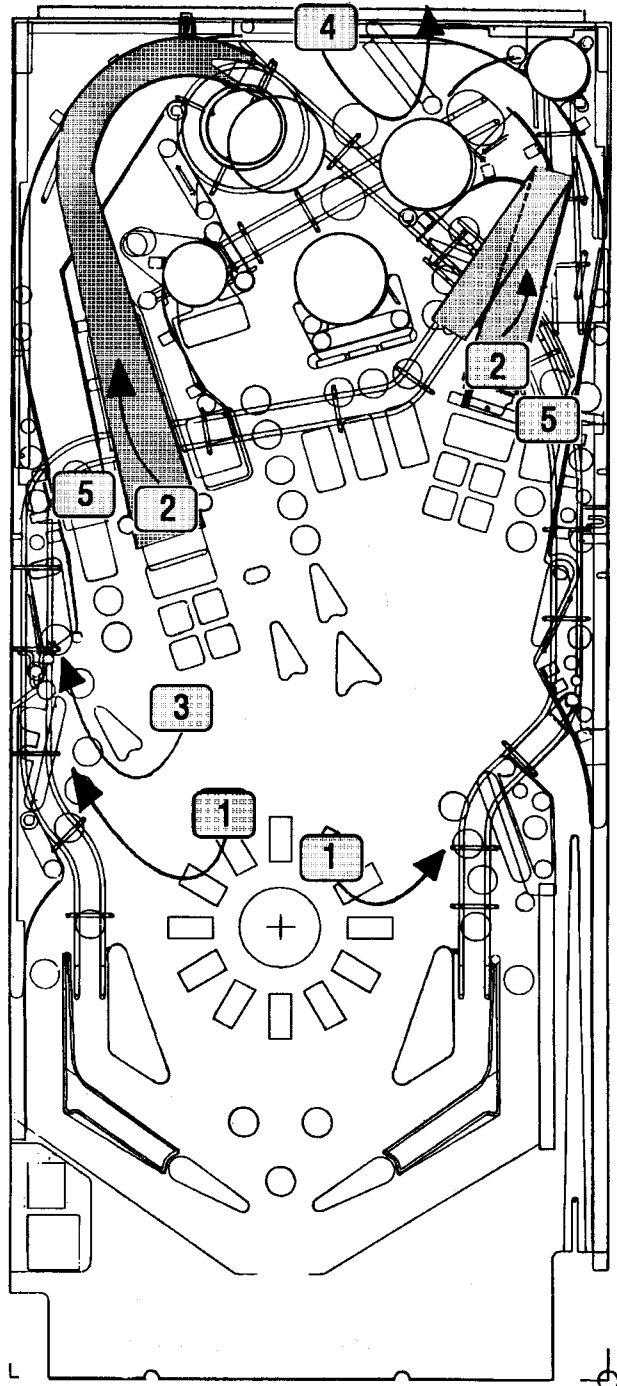
---

Select one of three doors shown on the Visual Display, using the flipper buttons to pick the desired door to open. Open the door by using the Crypt Keeper Door Handle located on the front of the cabinet. Search as many doors as you can for point values and special features. If the player opens a door with a ZOMBIE behind it, the round is terminated and the player goes back to regular play.

### **5) FRIGHTMARE (SuperSpin)**

---

Shoot any or all of the spinners and try to build up your 30 spins for Frightmare value of 25mil.





## GAMES SPECIFIC FEATURES - "CREATURE FEATURES"

### 6) PSYCO POPS

---

Scoring 20 Pop Bumpers scores 25mil.

### 7) ROBBING THE CRYPT

---

Shoot balls into the Crypt for 5mil per shot.

### 8) LITE "AXE-TRA" BALL

---

Lites Extra Ball shot on the playfield.

### 9) SUPER GUILLOTINE

---

Guillotine Drop Targets all start at 3mil. If a target or targets are knocked down, the targets drop into the display. When the target resets the next value is shown on the display for the next completion.

### 10) WEREWOLF COUNTDOWN

---

This round starts a 30mil bonus at the left spinner. The bonus counts down until the player shoots the left spinner. The player will then be awarded remaining points.

### 11) VIDEO MODE

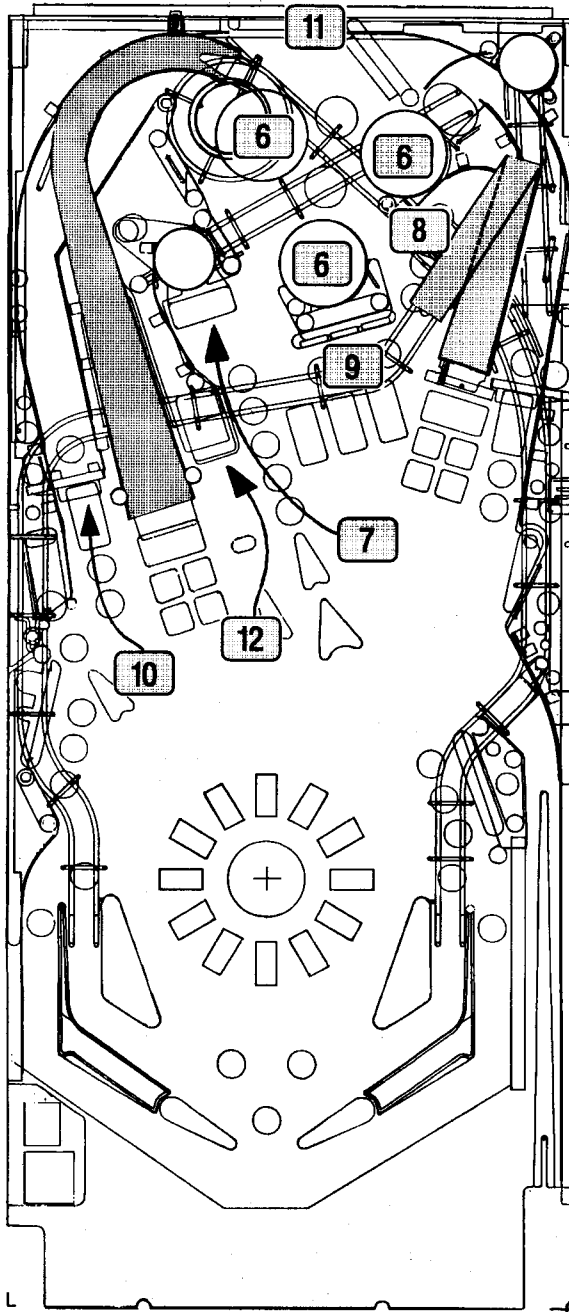
---

Player will interface with the Display to help the Crypt Keeper defeat foes.

### 12) Electric Chair

---

Player shoots the scoop to collect 1mil times the number of balls remaining in play.



# GAMES SPECIFIC FEATURES

## NOTES:

### A:

---

Lit Left (A1) or Right (A3) Spinner will lite the Creature Feature Scoop (A2). Any additional shot or shots will change the value to be collected at the scoop.

### B:

---

When the ball rolls thru the right return lane, the scoop lites on a short timer only to collect the flashing creature feature.

### C:

---

If the player has a creature feature lit and does not want it to change via the spinner, the player may lock the feature with the Door Handle (it can be unlocked again the same way).

### D: CRYPT JAM

---

When all the creature features have been completed, shooting the ball into the scoop starts the Crypt Jam (6-Ball Play, 1mil per switch, during Multiball).

### 13) LITE MYSTERY DOOR

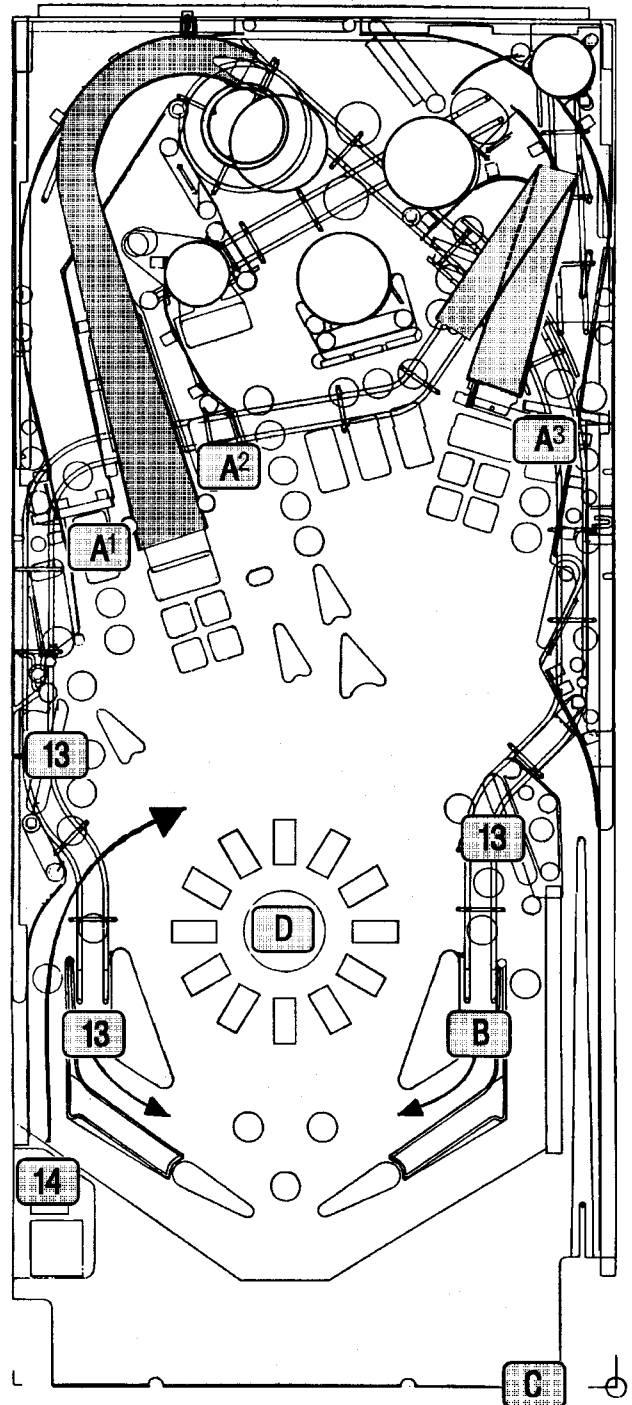
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When the ball rolls thru the left return lane, the 3-Bank Eyeball Targets are lit for Mystery Million Point Values. If the shot into the targets misses, the mystery doors go off.

### 14) CRYPT KICKER

---

When lit, and the ball rolls thru the left outlane, the ball will be kicked back into play.



## 15) LITE CHOP

---

When the ball rolls thru the right return lane, the Turbo Pop Bumper Pops are lit for 1mil per hit.

## 16) SCARED TO DEATH

---

When the ball rolls out the right outlane, the player is awarded a point value and loses the ball.

## 17) PLAY THE ORGAN

---

When flashing, shoot the right ramp or the completion of BATS, RATS, GHOSTS and GOBBLINS on the left ramp, will start this round. As switches are being completed, musical notes will pass thru the display. Each switch collects a note. Notes are worth 250K. As notes pass thru they may be accompanied by higher displayed point values and/or completion of other playfields rounds and/or special features.

## 18) LIVING DEAD

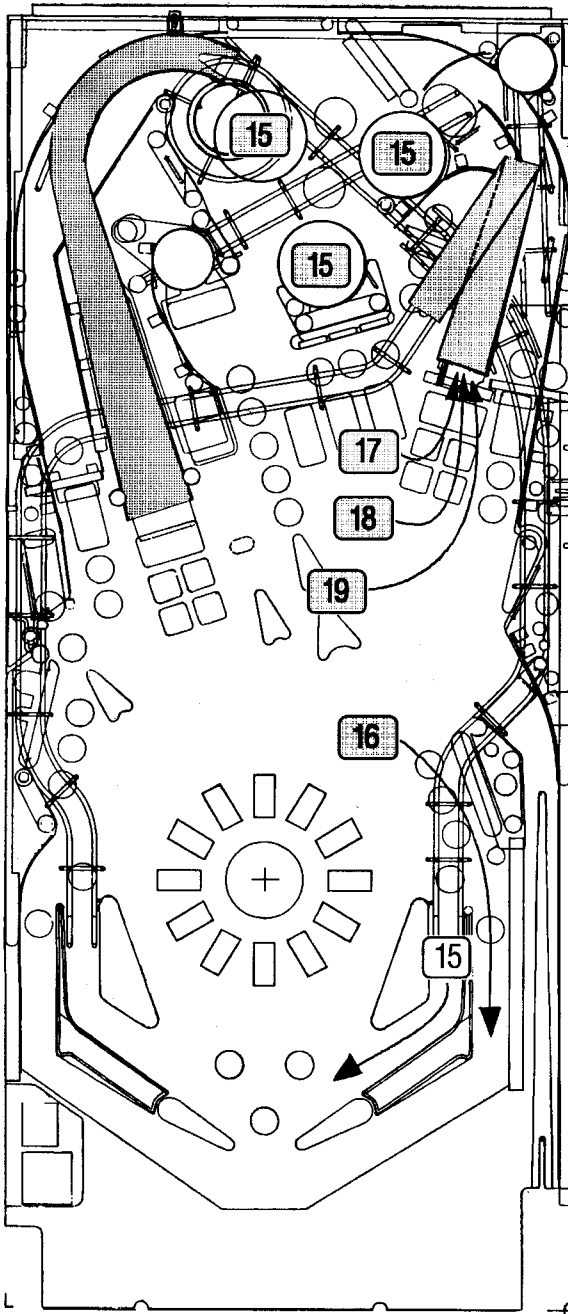
---

When flashing, shoot the right ramp or the completion of BATS, RATS, GHOSTS, and GOBBLINS on the left ramp will start this round. Each switch closure brings a ZOMBIE to life. Zombies are worth 250K, 300K, 350K, et cetera...

## 19) CHAINSAW MODE

---

When flashing, shoot the right ramp or the completion of BATS, RATS, GHOSTS, and GOBBLINS on the left ramp will start this round. Switch closures run the Chainsaw. Switches score 250K plus.



# GAMES SPECIFIC FEATURES

## 20) GRAVE DIGGER

---

When flashing, shoot the right ramp or the completion of BATS, RATS, GHOSTS, and GOBBLINS on the left ramp will start this round. Switches help the digger dig down to the coffin. Switches score 250K plus.

## 21) BATS

---

1mil for shooting the left ramp once.

## 22) RATS

---

2mil for shooting the left ramp once.

## 23) GHOSTS

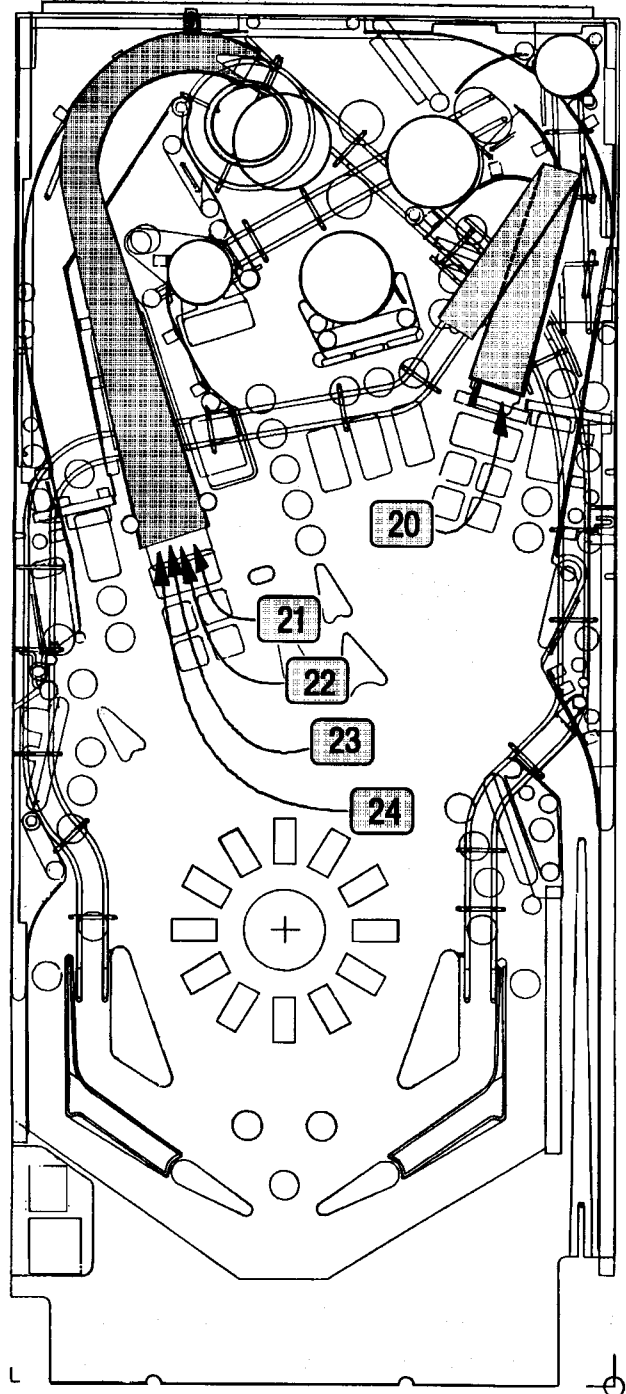
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3mil for shooting the left ramp once.

## 24) GOBBLINS

---

4mil for shooting the left ramp once.



## GAMES SPECIFIC FEATURES

### MULTIBALL AND JACKPOTS

**D:**

---

Shoot **C R Y P T** to lower the Tombstone for Multi-Ball ready. Shoot the **CRYPT** to start Multi-Ball.

**E:**

---

In Multi-Ball, shoot the left ramp to collect the Jackpot (increase the jackpot by shooting the left spinner).

**F:**

---

After collecting the Jackpot, the right ramp is worth double the jackpot (The Double Jackpot can also be increased by the right spinner).

**G:**

---

When the Double Jackpot is completed, the Tombstone (**CRYPT**) is ready. Each letter completed adds a ball into play. When the **CRYPT** is completed, the Tombstone drops for the Monster Jackpot, times the number of balls in play.

**H - KILL SHOT:**

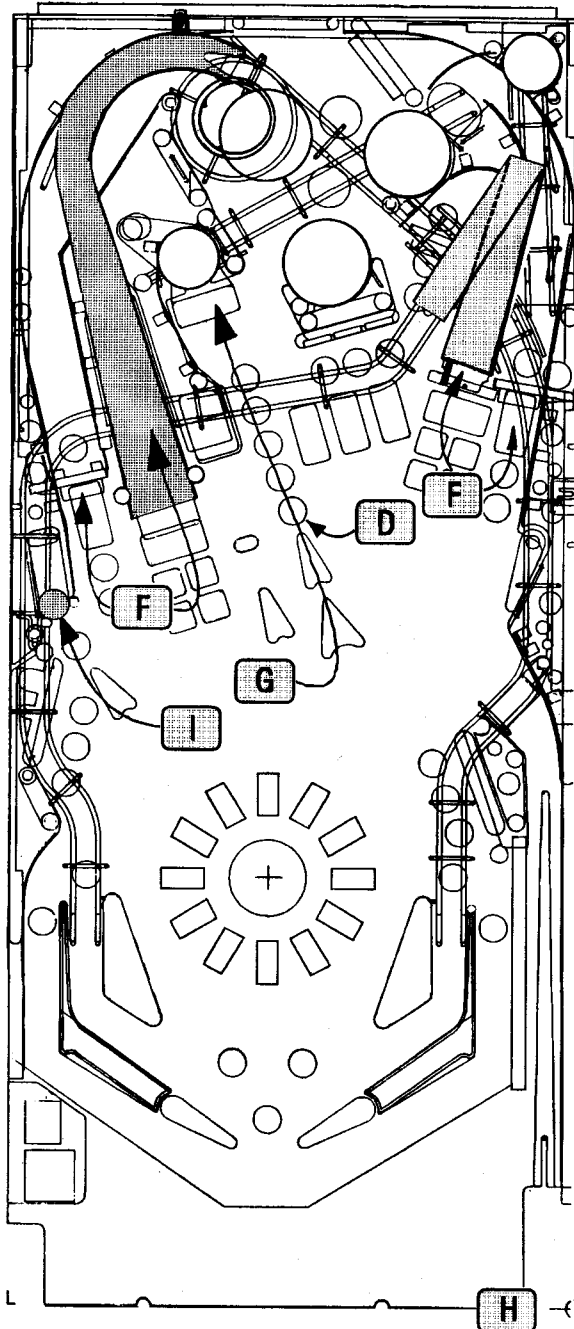
---

Shoot the Lit Drop Target Bank with the door handle (located on the front of the cabinet). Awards 2mil times the number of balls in play.

**I - CLONE:**

---

Shooting the captive ball target will award the player 5mil and add 1mil for additional shots and award features. Resets each ball to 5mil.



## **GAMES SPECIFIC FEATURES**

### **HIGHSCORE**

To enter your initials, use the left and right flipper button to choose letter or character as seen on the Visual Display. Hitting the start button locks the letter or character in. Proceed with the 2nd and 3rd letter.

### **NOTES:**

# AUDIT FUNCTIONS

## GENERAL

There are 99 audit functions provided for accounting purposes and for evaluation of game difficulty adjustments. Audit functions are split into two groups. There are 9 most-used audits (1 through 9) in a 'quick look' group and 89 less-used audits (10 through 99), 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 top of the display, the *Description* is shown next and the *Audit Total* in the display. bottom 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 display indicates AUDITS & ADJUSTMENTS. 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 AUDIT 10, EXPAND AUDITS is displayed. Set the choice to YES as indicated in the lower display by depressing the Game Start push-button and then depress the step push-button. The request is installed and Audit 10 is displayed. When you exit audits and adjustments, the Audit 10 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, **ADJUSTMENT 11, AUDITS RESET**. Game adjustments (1 to 13 and 14 to 61) begin after the last audit function (10 or 99). 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 (AUDIT 1)** - the total number of paid credits is displayed.

**Free Game Percentage (AUDIT 2)** is Total Free Plays (Ex. AUDIT 25) divided by Total Plays (Ex. AUDIT 26).

**Average Ball Time (in seconds) (AUDIT 3)** is Total Play Time divided by Balls Total (AUDIT 11).

**Average Game Time (AUDIT 4)** is the Average Game Time expressed in minutes and seconds.

**Coins (AUDIT 5, 6, 7 and 8)** - 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 (AUDIT 9)** is the total number of coins dropped through all 4 coin chutes.

**Expand Audits (On/Off) (AUDIT 10)** permits viewing of expanded audits.

## Tales from the Crypt Game Audit Table

Item/Description		Item/Description		Item/Description	
1	Total Paid Credits	34	Games 1-Player	67	Jackpot Awards
2	Free Game Percentage	35	Games 2-Player	68	Double Jackpots
3	Average Ball Time	36	Games 3-Player	69	Monster Jackpots
4	Average Game Time	37	Games 4-Player	70	Combo Shots
5	Coins Left	38	Attract Minutes	71	Left Return to Drops
6	Coins Right	39	Cycles Hi-Score Reset	72	Crypt Jam
7	Coins Center	40	Coins No Credit	73	Right Return to Pops
8	Coins 4th Chute	41	Service Credit	74	Psycho Pops
9	Total Coins	42	Meter Clicks	75	Left Spinner
10	Expand Audits (On/Off)	43	Proprietary	76	Middle Spinner
11	Balls Total	44	Proprietary	77	Right Spinner
12	Extra Balls Total	45	Proprietary	78	Scoop Shot
13	Extra Balls Percentage	46	Proprietary	79	Left VUK
14	Replay 1 Awards	47	Total Buy-In Games	80	Right SVUK
15	Replay 2 Awards	48	Slam Tilts	81	Small Under Trough
16	Replay 3 Awards	49	Drains Left	82	Large Under Trough
17	Replay 4 Awards	50	Drains Center	83	"KEEPER" Targets
18	Total Replays	51	Drains Right	84	Werewolf Countdown
19	Replay Percentage	52	Laser Kick Used	85	Frightmare
20	Total Specials	53	Freeze Used	86	Thunder Storm
21	Special Percentage	54	Death Saves	87	Robbing The Crypt
22	Total Matches	55	Extra Ball Lit	88	Keeper Targets
23	Hi-Score Wins	56	Right to Left Orbits	89	Super Guillotine
24	Hi-Score Percentage	57	Left Ramp	90	Right Ramp Features
25	Total Free Plays	58	Right Ramp	91	Got Deepest Doors
26	Total Plays	59	Trick Shot	92	Use Diverter
27	000.0 - 049.9 Million	60	Multi-Ball Lit	93	Well Lock Used
28	050.0 - 099.9 Million	61	3-Ball Start	94	Door Prize Select
29	100.0 - 199.9 Million	62	6-Ball Start	95	Left Turbo Bumper
30	200.0 - 299.9 Million	63	Multi-Ball Restart	96	Center Turbo Bumper
31	300.0 - 399.9 Million	64	Captive Ball	97	Right Turbo Bumper
32	Over 400 Million	65	Skull Cracking	98	Complete Drop Targets
33	Average Scores	66	Super Laser Kick	99	Grave Stone Hit

**NOTE: THIS PAGE CAN BE PHOTO-COPIED AND USED FOR FIELD AUDIT TRACKING PERFORMANCE.**



## **EXPANDED FUNCTIONS**

**BALLS TOTAL** (Audit 11) is the total of regular and extra balls.

**EXTRA BALLS TOTAL** (Audit 12) is the total number of extra balls awarded.

**EXTRA BALLS PERCENTAGE** (Audit 13) is Extra Balls Total (Audit 12) divided by Total Plays (Audit 26).

**REPLAY 1-4 AWARDS** (Audit 14 - 17) provide the total awards (credit, extra ball, or audit) for replay level 1 or 2 through 4, respectively.

**TOTAL REPLAYS** (Audit 18) is the total awards (credits, extra balls, or audit only) for exceeding replay score levels.

**REPLAY PERCENTAGE** (Audit 19) is the Replay Total awards for exceeding replay score levels, Total Replays (Audit 18) divided by Total Plays (Audit 26).

**TOTAL SPECIALS** (Audit 20) is the total awards (credits, extra balls, or scores) for making specials.

**SPECIAL PERCENTAGE** (Audit 21) is Total Specials (Audit 20) divided by Total Plays (Audit 26).

**TOTAL MATCHES** (Audit 22) 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 Adj. 13 if enabled.

**HI-SCORE WINS** (Audit 23) is the total credits awarded for exceeding the high-score-to-date scores.

**HI-SCORE PERCENTAGE** (Audit 24) is Hi-Score Wins (Audit 23) divided by Total Plays (Audit 26).

**TOTAL FREE PLAYS** (Audit 25) is the total free credits for replays, high-score-to-date, specials, and match.

**TOTAL PLAYS** (Audit 26) is the sum of Total Paid Credits (Audit 1) and Total Free Plays (Audit 25). Note that free credits are not recorded in the Audit until they are actually used.

**0.0 - 49.9 MILLION** (Audit 27) provides the total number of games the Player's final score was between 0 and 49,999,990 points.

**50.0 - 99.9 MILLION** (Audit 28) provides the total number of games the Player's final score was between 50,000,000 and 99,999,990 points.

**100.0 - 199.9 MILLION** (Audit 29) provides the total number of games the Player's final score was between 100,000,000 and 199,999,990 points.

**200.0 - 299.9 MILLION** (Audit 30) provides the total number of games the Player's final score was between 200,000,000 and 299,999,990 points.

**300.0 - 399.9 MILLION** (Audit 31) provides the total number of games the Player's final score was between 300,000,000 and 399,999,990 points.

**OVER 400 MILLION** (Audit 32) provides the total number of games the Player's final score was over 400,000,000 points.

**AVERAGE SCORES** (Audit 33) provides the Average Score by adding the Final Score of each game to a table and dividing this sum by the Total Plays .

**1-4 PLAYER GAMES** (Audits 34-37) provides the individual totals of 1, 2, 3, or 4 player games, respectively.

**ATTRACT MINUTES** (Audit 38) provides the number of accumulative minutes the game was in Attract Mode. Attract Mode is the timer countdown when a game is completed and is awaiting Player to add more credits before the timer runs out.

**CYCLES HI-SCORE RESET** (Audit 39) provides the number of times that the high score levels have been automatically reset (if enabled).

**COINS NO CREDIT** (Audit 40) provides the number of times the coin switch was closed without awarding credit(s). This option is used in multiple coin conditions (e.g. 2 quarters - 1 Play).

**SERVICE CREDIT** (Audit 41) provides the total number of Service credits added to the game. See *Game Diagnostics on page 21 for instructions regarding entry of Service Credits.*

## **GAME SPECIFIC FUNCTIONS**

**METER CLICKS** (Audit 42) provides the total number of money clicks accumulated, based on the country's lowest coin denomination used for game credit.

**PROPRIETARY** (Audit 43-46) provides information to the game designer to aid in design development (not for consumer use).

**TOTAL BUY-IN GAMES** (Audit 47) provides the number of times a player utilized the Buy-In Feature.

**SLAM TILTS** (Audit 48) provides the number of times the Slam Tilt switch was activated.

**DRAINS LEFT** (Audit 49) provides the number of times the ball drained out the left drain.

**DRAINS CENTER** (Audit 50) provides the number of times the ball drained out the center drain.

**DRAINS RIGHT** (Audit 51) provides the number of times the ball drained out the right drain.

**LASER KICK USED** (Audit 52) provides the number of times the Laser Kick returned a ball into play.

**FREEZE USED** (Audit 53) provides the number of times the Freeze feature was enabled. Freeze Feature is when the ball-in-play drains after just a short play, the same ball will be returned back into play.

**DEATH SAVES** (Audit 54) provides the number of times the ball was returned back into play by the Player physically slamming the front of the cabinet after a ball had drained.

**EXTRA BALL LIT** (Audit 55) provides the number of times the Extra Ball feature was lit.

**RIGHT TO LEFT ORBITS** (Audit 56) provides the number of accumulative orbits completed.

**RAMPS (LEFT & RIGHT)** (Audits 57, 58) provides the number of accumulative ramps completed.

**TRICK SHOT** (Audit 59) provides the number of times the ball "fell of the right ramp" and Player awarded the right ramp value at time of shot.

**MULTI-BALL LIT** (Audit 60) provides the number of times Multi-ball was lit.

**3-BALL START** (Audit 61) provides the total number of times Multi-ball was started with 3 balls.

**6-BALL START** (Audit 62) provides the total number of times Multi-ball was started with 6 balls.

**MULTI-BALL RESTART** (Audit 63) provides the total number of times Multi-ball Restart feature was completed.

**CAPTIVE BALL** (Audit 64) provides the accumulative number of switch closures in the captive ball lane..

**SKULL CRACKING** (Audit 65) provides the number of times the Skull Crackin' feature was enabled. Skull Crackin' adds an extra ball into play (up to 6) when this feature is enabled.

**SUPER LASER KICK** (Audit 66) provides the number of times the Laser Kick Feature was lit.

**JACKPOT AWARDS** (Audit 67) provides the number of times Jackpot feature was awarded.

**DOUBLE JACKPOTS** (Audit 68) provides the number of times the Double Jackpot feature was awarded.

**MONSTER JACKPOTS** (Audits 69) provides the number of times the Monster Jackpot feature was awarded.

**COMBO SHOT** (Audit 70) provides the number of times the Combo Shot (TBD) was enabled.

**LEFT RETURN TO DROPS** (Audit 71) provides the number of times the Mystery Door feature was completed.

**CRYPT JAM** (Audit 72) provides the accumulative number of times all the Creature Features were completed.

**RIGHT RETURN TO POPS** (Audit 73) provides the number of time the ball rolls thru the right return lane and was successfully shot directly up to the Turbo Pop Bumpers.

**PSYCHO POPS** (Audit 74) provides the number of times the Psycho Pops feature was enabled. This feature is a special round to complete accumulative Pop Bumper switch closures for points.

**LEFT SPINNER** (Audit 75) provides the number of times the Left Spinner was enabled.

**MIDDLE SPINNER** (Audit 76) provides the number of times the Middle Spinner was enabled.

**RIGHT SPINNER** (Audit 77) provides the number of times the Right Spinner was enabled.

**SCOOP SHOT** (Audit 78) provides the number of times the Scoop was enabled.

**LEFT/ RIGHT VUKs** (Audits 79, 80) provides the number of times the vertical up kickers were enabled.

**SMALL UNDER TROUGH** (Audit 81) provides the number of times the small trough was used.

**LARGE UNDER TROUGH** (Audit 82) provides the number of times the large trough was used.

**"KEEPER " COMPLETE** (Audit 83) provides the number of times all the letters were completed in KEEPER.

**WEREWOLF COUNTDOWN** (Audit 84) provides the number of times the Werewolf Countdown feature was enabled. This feature starts at 30mil and starts to subtract points on a timer until the Player successfully enables the left spinner switch. Player is awarded the remaining points.

**FRIGHTMARE** (Audit 85) provides the number of times the Frightmare feature was enabled. This feature the player has to complete 30 switch closures to collect the Frightmare award.

**THUNDER STORM** (Audit 86) provides the number of accumulative times this feature (completion of left and right ramps) was completed. Each completion of a ramp in the time frame allowed, increases by 1mil plus.

**ROBBING THE CRYPT** (Audit 87) provides the number of times the ball was shot into the Gravestone VUK after the Gravestone was lowered (5mil per shot).

**KEEPER TARGETS** (Audit 88) provides the number of times the Keeper Targets feature was completed. This feature is collected after shooting the scoop, and then all the targets are lit to collect 1mil per switch closure.

**SUPER GUILLOTINE** (Audit 89) provides the number of times the Super Guillotine feature was completed.

**RIGHT RAMP FEATURES** (Audit 90) provides the accumulative number of times the Right Ramp features were enabled.

**GOT DEEPEST DOORS** (Audit 91) provides the accumulative number of times that all the Door Prizes were collected.

**USE DIVERTER** (Audit 92) provides the number of times the diverter was enabled.

**WELL LOCK USED** (Audit 93) provides the number of times the Door Handle was used to Lock a Creature Feature.

**DOOR PRIZE SELECT** (Audit 94) provides the accumulative total of successive number of Doors selected were a prize was awarded and not receiving a Zombie.

**TURBO POP BUMPERS, LEFT, CENTER, & RIGHT** (Audits 95-97) provides the acumulative number of times the bumper switches were closed for each one.

**COMPLETED DROP TARGETS** (Audit 98) provides the number of times the targets were completed.

**GRAVE STONE** (Audit 99) provides the number of times the gravestone feature was enabled.

# GAME ADJUSTMENTS

## GENERAL

There are 58 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 top of the display, the *Description* is shown next, and the setting, in the bottom of the 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 AUDIT 1 and the FORWARD/REVERSE switch in the REVERSE (down) position, depress the STEP switch and ADJUSTMENT 58 is shown at the top of the display, FACTORY RESTORE is shown in the middle of the display, and NO is shown in the bottom of the display. With the audits displaying AUDIT 10 or 99 and the FORWARD/REVERSE switch in the FORWARD (up) position, depress the STEP switch and ADJUSTMENT 1 is shown in the top of the display, REPLAY/MANUAL is shown in the middle of the display, and the setting is shown in the bottom of the 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 display indicates 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 (Adjustment 1 through 6)

### Adj. 1 Replay Manual/Fixed

- **Manual:** Adjust for percentage of awards for replay levels (1% through 50%). Proceed to Adj. 2 and 3 for starting replay levels.
- **Fixed:** Lower the automatic value to 0% and the display will indicate Fixed. Proceed to Adj. 2 and 3 for fixed replay levels.

### Adj. 2 Start Replay

- **Manual:** Adjust the starting Replay 1 setting to between 50,000,000 and 9,999,000,000.

### Adj. 3 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 50,000,000 and 9,999,000,000. (Same as Start Replay)
  - If Adj. 3 is set for 2, adjust Replay 2 level to between 50,000,000 and 9,999,000,000.
  - If Adj. 3 is set for 3, adjust Replay 3 level to between 50,000,000 and 9,999,000,000.
  - If Adj. 3 is set for 4, adjust Replay 4 level to between 50,000,000 and 9,999,000,000.

## Tales from the Crypt Game Adjustment Table

Adj. No.	Description	Factory Setting	Adj. No.	Description	Factory Setting
1	<b>Replay/Manual</b>	10%	32	Free Play	NO
2	Start Replay	300,000,000	33	Custom Message	ON
3	Replay Levels *	01	34	Attract Music	ON
4	Game Awards	CREDIT	35	Flash Lamps	NORMAL
5	Limit Freegame	03	36	Coils Pulse	NORMAL
6	Limit Extra Balls	03	37	Level Adjust By	OPERATOR EXTERNAL
7	Game Rules	MODERATE	38	Extra Adjustment	NO
8	Game Price *	USA7	39	Next Game Promo	ON
9	Game Cleaned	NO	40	Buy-In Type	OFF
10	Coins Reset	NO	41	Restart Game	NO
11	Audits Reset	NO	42	Extra Ball Percentage	25%
12	Restore Hi-Scores	NO	43	Volume Control	100%
13	Expand Adjustments	NO	44	Bill Validator	NO
14	Match Percentage	08	45	Tournament Style	NONE
15	Balls Per Game	03	46	Learn-it Style	50
16	Tilt Warnings	01	47	Trigger Enable	NO
17	Replay Boost	YES	48	Shaker Motor	ON
18	Credits Limit	30	49	Reduced Realism	YES
19	Hi-Scores Allowed	YES	50	Stuck Tilt Option	ON
20	Hi-Score 1 Awards	03	51	Multi-Ball Ready Style	MODERATE
21	Hi-Score 2 Awards	01	52	Rerace Criterion	EASY
22	Hi-Score 3 Awards	00	53	Jackpot Criterion	HARD
23	Hi-Score 4 Awards	00	54	Extra Adjustment	NO
24	Backup Hi-Score 1	500,000,000	55	Extra Adjustment	NO
25	Backup Hi-Score 2	450,000,000	56	Software Meter	00
26	Backup Hi-Score 3	400,000,000	57	Total Earnings	\$00.00
27	Backup Hi-Score 4	350,000,000	58	Location ID Number	00
28	Backup Hi-Score 5	300,000,000	59	Game ID Number	00
29	Backup Hi-Score 6	250,000,000	60	Number of Copies Printed	00
30	Reset Hi-Score-To-Date	700	61	Printer Interface	PRESS START TO PRINT
31	Clean Game Every...	1,500	<b>99</b>	<b>Factory Restore</b>	<b>NO</b>

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

**Adj. 4 Game Awards** Set for replays to award: **CREDIT, EXTRA BALL, NONE** or **SPECIAL** (when score threshold is achieved a playfield special is lit).

**Adj. 5 Limit Freegame** - Adjust for the maximum number of free games that may be accumulated per game; 0 to 9 .

**Adj. 6 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 (Adj. 7)

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.

**Adj. 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	ADJ 7 Extra Easy	ADJ 7 Easy	ADJ 7 Moderate	ADJ 7 Hard	ADJ 7 Extra Hard
Multi-Ball Ready Style	04	03	02	01	01
Rerace Criterion	04	04	03	00	00
Jackpot Criterion	YES	YES	YES	YES	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:

Adj.	Adj. Name	Setting	Adj.	Adj. Name	Setting
1	Manual Replay	Fixed	6	Limit Extra Balls	00
2	Start Replay	00	14	Match Percentage	Off
3	Replay Levels	None	20	Hi-Score 1 Awards	03
4	Game Awards	None	21	Hi-Score 2 Awards	01
5	Limit Freegame	00			

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

Adj.	Adj. Name	Setting	Adj.	Adj. Name	Setting
1	Manual Replay	07%	15	Balls Per Game	05
2	Start Replay	400,000,000	20	Hi-Score 1 Awards	03
3	Replay Levels	01	21	Hi-Score 2 Awards	01
4	Game Awards	Credit			
5	Limit Freegame	03			
6	Limit Extra Balls	03			
14	Match Percentage	04			

#### Extra Ball Settings - To disable awarding of credits and provide awards with an extra ball:

Adj.	Adj. Name	Setting	Adj.	Adj. Name	Setting
4	Game Awards	Extra Ball	19	Hi-Scores Allowed	No
5	Limit Freegame	00	20-23	Hi-Score 1-4	00
14	Match Percentage	Off			

## GAME PRICE (Adj. 8)

There are two methods available for coin switch programming; Standard and Custom. Standard pricing uses a single adjustment (Adj. 8) to select a pricing scheme shown in the **Standard /Custom Pricing Table**. Custom pricing is used to select additional pricing schemes defined by a Drop Down menu .

With Adj. 8 set to **CUSTOM** operating the step button again initiates a drop down menu representing coin switch pulses for the left, right, center and fourth 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 on the dot matrix display. 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.

**4th Coin Switch Pulses** - Set the number of pulses registered for closure of the fourth 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 the 1st bonus credit(s); 00 to 99.

**Coin Switch Pulses Required for 2nd Bonus Credit**- Set the number of coin switch pulses required to award the 2nd bonus credit; 00 to 99.

**Credits awarded for 1st Bonus** - Set the number of credits awarded for achieving the first Bonus level; 00 to 99.

CUSTOM PRICING TABLE													
Coin Mechs				Plays/Coins	Adjustments								
Left	Right	Center	4th		Left Pulses	Right Pulses	Mid Pulses	4th Pulses	Pulses /Credit	Pulses /Bonus	Pulses /2nd BONUS	Credit /1st BONUS	
25¢	25¢	\$1.00	N/U	1/25¢ 3/50¢	01	01	04	00	01	02	00	01	
				1/25¢ 5/\$1.00	01	01	04	00	01	04	00	01	
				1/25¢ 6/\$1.00	05	05	20	00	04	20	00	01	
5SCH	10SCH	10SCH	N/U	1/10SCH	01	02	02	00	02	00	00	00	
				1/10SCH 4/30SCH	04	08	08	00	06	00	00	00	
10p	£1	50p	20p	1/30p 2/50p 5/£1	01	15	06	02	03	00	00	00	
				1/50p 3/£1	01	15	05	02	05	00	00	00	
				1/30p 4/£1	01	12	05	02	03	00	00	00	
20¢	\$1.00	N/U	N/U	1/60¢ 2/\$1.00	01	05	00	00	03	05	00	01	



# STANDARD PRICING TABLE

Adj. 8 Standard Pricing Select	Coin Mechs				Plays Per Coin			
	Left 1st	Center 2nd	Right 3rd	4th	1st	2nd	3rd	4th
USA 1-1 Coin 1 Play	25¢	\$1.00	25¢		1PLAY/1COIN	4PLAY/1COIN	1PLAY/1COIN	
USA 2-4 Coin 3 Play	25¢	\$1.00	25¢		1PLAY/2COIN 2PLAY/3COIN 3PLAY/4COIN	3PLAY/1COIN 6PLAY/2COIN 9PLAY/3COIN	1PLAY/2COIN 2PLAY/3COIN 3PLAY/4COIN	
USA 3-2 Coin 1 Play	25¢	\$1.00	25¢		1PLAY/2COIN	2PLAY/1COIN	1PLAY/2COIN	
USA 4-2 Coin 1 Play	25¢		25¢			1PLAY/2COIN For the 1st Play 1PLAY/1COIN during BUY-IN		
USA 5-\$2.00 5 Plays	25¢	\$1.00	25¢		1PLAY/2COIN 5PLAY/8COIN	2PLAY/1COIN 5PLAY/2COIN	1PLAY/2COIN 5PLAY/8COIN	
USA 6- 50¢ - 3/\$1Bill	25¢	\$1.00	25¢		1PLAY/2COIN 2PLAY/4COIN	3PLAY/1COIN 6PLAY/2COIN	1PLAY/2COIN 2PLAY/4COIN	
USA 7-\$2.00 6 Plays	25¢	\$1.00	25¢		1PLAY/2COIN 2PLAY/4COIN	2PLAY/1COIN 6PLAY/2COIN	1PLAY/2COIN 2PLAY/4COIN	
Austria	5 SCH	10 SCH	10 SCH		1PLAY/2COIN 2PLAY/3COIN 3PLAY/4COIN	1PLAY/1COIN 3PLAY/2COIN	1PLAY/1COIN 3PLAY/2COIN	
Australia	20¢	\$1.00	\$2.00		1PLAY/5COIN	1PLAY/1COIN	3PLAY/1COIN	
Belgium	5f	20f	50f		1PLAY/4COIN	1PLAY/1COIN	3PLAY/1COIN	
Canada	25¢	25¢	\$1.00		1PLAY/2COIN 2PLAY/3COIN 3PLAY/4COIN	1PLAY/2COIN 2PLAY/3COIN 3PLAY/4COIN		
Denmark	1Kr	5Kr	10Kr	20Kr	1PLAY/3COIN	2PLAY/1COIN	4PLAY/1COIN	8PLAY/1COIN
French 1	1f	5f	10f	20f	1PLAY/3COIN 2PLAY/5COIN 5PLAY/10COIN	2PLAY/1COIN 5PLAY/2COIN 11PLAY/4COIN	5PLAY/1COIN 11PLAY/2COIN	11PLAY/1COIN
French 2	1f	5f	10f	20f	1PLAY/5COIN 3PLAY/10COIN 7PLAY/20COIN	1PLAY/1COIN 3PLAY/2COIN 7PLAY/4COIN	3PLAY/1COIN 7PLAY/2COIN	7PLAY/1COIN
French 3	1f	5f	10f	20f	1PLAY/3COIN 2PLAY/5COIN 4PLAY/10COIN	2PLAY/1COIN 4PLAY/2COIN 9PLAY/4COIN	4PLAY/1COIN 9PLAY/2COIN	9PLAY/1COIN
German 1	1 DM	2 DM	5 DM		1PLAY/1COIN 2PLAY/2COIN 3PLAY/3COIN	2PLAY/1COIN 4PLAY/2COIN 6PLAY/3COIN	6PLAY/1COIN	
German 2	1 DM	2 DM	5 DM		1PLAY/1COIN 2PLAY/2COIN 3PLAY/3COIN	2PLAY/1COIN 4PLAY/2COIN 6PLAY/3COIN	7PLAY/1COIN 21PLAY/3COIN	
German 3	1 DM	2 DM	5 DM		1PLAY/2COIN 2PLAY/3COIN 3PLAY/4COIN	1PLAY/1COIN 3PLAY/2COIN 5PLAY/3COIN	5PLAY/1COIN 10PLAY/2COIN 15PLAY/3COIN	
Italy 1	500L		500L		1PLAY/1COIN		1PLAY/1COIN	
Italy 2	500L		500L		1PLAY/2COIN 3PLAY/4COIN		1PLAY/2COIN 3PLAY/4COIN	
Japan			100¥				1PLAY/1COIN 3PLAY/2COIN	
Korea	100 Won		100 Won		1PLAY/1COIN		1PLAY/1COIN	
Netherland 1	1 Guilder	1 Guilder	2.5Guilder		1PLAY/1COIN	1PLAY/1COIN	3PLAY/1COIN	
Netherland 2	1 Guilder	2.5Guilder	5 Guilder		1PLAY/1COIN	3PLAY/1COIN	6PLAY/1COIN	
New Zealand 1	\$1.00		\$2.00		1PLAY/1COIN		2PLAY/1COIN	
New Zealand 2	\$1.00		\$2.00		1PLAY/1COIN		3PLAY/1COIN	
Spain	100Pts		500Pts		1PLAY/1COIN		6PLAY/1COIN	
Sweden	1 SEK	5 SEK	10 SEK		1PLAY/10COIN	2PLAY/3COIN	3PLAY/2COIN	
Swiss 1	1 SFR	2 SFR	5 SFR		1PLAY/1COIN	2PLAY/1COIN	6PLAY/1COIN	
Swiss 2	1 SFR	2 SFR	5 SFR		1PLAY/1COIN	3PLAY/1COIN	9PLAY/1COIN	
UK 1	10P	50P	£1	20P	1PLAY/5COIN 3PLAY/10COIN	1PLAY/1COIN 3PLAY/2COIN	3PLAY/1COIN	3PLAY/5COIN
UK 2	10P	50P	£1	20P	1PLAY/4COIN 2PLAY/8COIN 3PLAY/10COIN	1PLAY/1COIN 3PLAY/2COIN	3PLAY/1COIN	1PLAY/2COIN 2PLAY/4COIN 3PLAY/5COIN
UK 3	10P	50P	£1	20P	1PLAY/5COIN 2PLAY/10COIN	1PLAY/1COIN 2PLAY/2COIN	2PLAY/1COIN	2PLAY/5COIN
Yugoslavia	5 Dur		5 Dur		1PLAY/1COIN		1PLAY/1COIN	

## **ADDITIONAL GENERIC FEATURES**

**Adj. 9 Game Cleaned** - When enabled (set to **YES**) the game cleaning counter will be reset to zero and the Game-Clean-Me message in Tech Alert will go out when **STEP** is depressed. (Also see Adj. 31).

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

**Adj. 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.

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

**Adj. 13 Expand Adjustments** - When set to **NO**, depressing the **STEP** push-button advances directly to Adj. 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.

**Adj. 14 Match Percentage** - 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.

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

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

**Adj. 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 previous replay level (when the replay was awarded) plus 50 Million for each following game, until the replays have all been played. At this time the previous level is resumed.

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

## **HIGH SCORE LEVELS (Adj. 19 through 29)**

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.

**Adj. 19 Hi-Scores Allowed** - Set to enable or disable the four high score levels; **00**.

**Adj. 20 Hi-Score 1 Awards** - Adjust the number of credits awarded for exceeding level 1 (the highest of the four levels); **0 to 4**.

**Adj. 21 Hi-Score 2 Awards** - Adjust the number of credits awarded for exceeding level 1; **0 to 3**.

**Adj. 22 Hi-Score 3 Awards** - Adjust the number of credits awarded for exceeding level 2; **0 to 2**.

**Adj. 23 Hi-Score 4 Awards** - Adjust the number of credits awarded for exceeding level 3; **0 to 1**.

**Adj. 24 Backup Hi-Score 1** - Adjust the score level to which the world record (the highest of the four levels) may be altered. This adjustment is not affected by Adj.30, Reset HSTD (Factory Reset defaults to 7,500,000).

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

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

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

**Adj. 28 Backup Hi-Score 5** - Adjust the backup score level to which level 4 may be reset.

**Adj. 29 Backup Hi-Score 6** - Adjust the backup score level to which level 5 may be reset.

**Adj. 30 Hi-Score-To-Date** - 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).

**Adj. 31 Clean Game Every...** - Set to 1,500. 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 2,000.

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

**Adj. 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 in the 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 character. Repeat this procedure until the desired message is completed in the display. At this time, depress the STEP push-button switch to advance to Adj. 34.

**Adj. 34 Attract Music** - Set to **ON** (approximately every 3 minutes) or **OFF**.

**Adj. 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.

**Adj. 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.

**Adj. 37 Level Adjust By** - The Manual Percentage Replay Adjustment can only be altered with the front door open (see manual page 3).

**Adj. 38 Extra Adj.** - Provides information to the game designer to aid in design development (not for consumer use).

**Adj. 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.

**Adj. 40 Buy-in Type** - Set to **02**. When set to **02**, the game is set to Extra Ball Buy-in. When set to **01**, the game is set to Game Buy-in. Set to **OFF** to make Buy-in Type inoperative.

**Adj. 41 Restart Game** -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.

**Adj. 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.

## **GAME SPECIFIC FEATURES (Adj. 43 TO Adj. 61)**

**Adj. 43 Volume Control** - Set to **0**, **25**, **50**, **75** or **100** percent. Allows the operator to adjust the background music volume independently from the normal game sounds.

**Adj. 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".

**Adj. 45 TOURNAMENT STYLE** - Set to **NONE**, **PINBALL EXPO**, **IFPA-PAPA** or **HOME**. This function determines the default conditions to quickly prepare a game for tournament play. When this setting is changed all audits will be reset and all adjustments will be initiated to the particular style selected. The game will then return

**Adj. 45 TOURNAMENT STYLE (cont.) -**

to game over attract mode, as if a Factory Restore had been performed.

**NONE** - Same as a Factory Reset conditions.

**IFPA** - Straight 50¢ play, no replay, no Extra Ball, no High Scores , 2 Tilt Warnings and No Match.

**PINBALL EXPO-PAPA**- Same as IFPA settings except Free Play is enabled.

**HOME**-Sets game for Free Play, extra ball play, no replay, 10% Match and Extra Ball percentage = 30%.

**Adj. 46 LEARN-IT STYLE** - Set from 0 to 9.990 games in increments of 10. Determines how frequently the Manual Percentage Adjustment evaluates whether or not to recommend a change to the score. When set to 0, a change may be recommended at the end of each game.

**Adj. 47 TRIGGER ENABLE** - Set to YES or NO. When set to YES, the ball launch kicker will fire each time the launch button is pressed. When set to NO, the ball launch kicker will not operate.

**Adj. 48 SHAKER MOTOR** - Set to ON or OFF. Allows operation of the vibrating Shaker Motor during certain events in game play.

**Adj. 49 REDUCED REALISM** - Set to YES or NO. When set to YES, the Visual Display will display less "gorey" scenes.

**Adj. 50 STUCK TILT OPTION** - Set to ON or OFF. When set to ON, if the tilt switch is closed, the game will tilt when the average ball time is reached.

**Adj. 51 MULTI-BALL READY STYLE** - Determines how Multiball Ready is achieved.

**Adj. 52 RERACE CRITERION** - Set to EXEASY, EASY, MODERATE, HARD or EXHARD. Determines how Multiball can restart.

EXEASY	EASY	MODERATE	HARD	EXHARD
If no Jackpot was completed <u>or</u> TRI-BALL time is low.	If no Jackpot was completed.	If TRI-BALL time is low.	If no Jackpot was completed <u>and</u> TRI-BALL time is low.	Never

**Adj. 53 JACKPOT CRITERION** - Determines how the Jackpot is lit.

**Adj. 54/ 55 PROPRIETARY** - Provides information to the game designer to aid in design development (not for consumer use).

**Adj. 56 SOFTWARE METER** - Provides the operator with the total number of Meter Clicks.

**Adj. 57 TOTAL EARNINGS** - Provides the operator with the total cash value accumulated since the last Factory Restore occurred.

**Adj. 58 LOCATION I.D. NUMBER** - 0 to 9999. Allows the operator to assign a location identification number to the audit print-out sheet.( Will not be affected by Factory Restore.)

**Adj. 59 GAME I.D. NUMBER**.- 0 to 9999. Allows the operator to assign a game identification number to the Audit print-out sheet.( Will not be affected by Factory Restore.)

**Adj. 60 NO. OF COPIES PRINTED** - Provides the operator with the total number of copies that were printed.

**Adj. 61 PRINTER INTERFACE** - Allows the operator to print by pressing the Start Button.

**Adj. 99 FACTORY RESTORE** - Allows the operator to reset all adjustments to the factory settings.

# 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 faulty. When operation of a coil should close or open a switch and does not, the coil is considered faulty. In Game Over Attract Mode, faulty 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 Dot Matrix Display. For example, making the right coin switch during the Switch Test results in the switch functional name (RIGHT COIN), the row (WHT-YEL) and column (GRN-BRN) wire color codes, and the switch number are shown in the display.

0	BLK	= BLACK	5	GRN	= GREEN
1	BRN	= BROWN	6	BLU	= BLUE
2	RED	= RED	7	VIO	= VIOLET
3	ORN	= ORANGE	8	GRY	= GREY
4	YEL	= YELLOW	9	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 display will now indicate if there are any faulty switches (i.e., Switches that are normally closed but remain open or open switches that have not been closed (activated) in 50 games. The display will also indicate if the game requires cleaning, based on the number set in Adj. 31.

## Easy Trough Clear

Pressing the step button again displays the EASY TROUGH CLEAR message and instructs the player to operate either flipper button to easily remove the balls from the trough. This is provided, to allow the technician a simple method of removing the balls from the trough prior to entering the Active Switch Test, thereby reducing the number of switches closed. Also, test functionality of trough, ensure proper trough operation.

## 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, Adj. 11 or a Factory Restore, Adj. 99.

## 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.

Auto/Manual Tests	Sounds Produced
LEFT SPEAKER	Left Sine
CENTER SPEAKER	Center Sine
RIGHT SPEAKER	Right Sine
VOICE ROM1 (Loc U17)	"Engore!"
VOICE ROM2 (Loc U21)	"Come on into the Crypt!"
MUSIC TEST (Sound ROM, Loc U7)	Level 1-3 Music

## SOUND TEST CHART 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 128 Dots) to the operator as well as displaying graphics to the player.

The board is controlled by a 68B09E microprocessor and it's 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.

## Dot Matrix Display Test

To enter Dot Matrix Display Test, operate the STEP push-button switch from the Sound Manual test. The display will immediately illuminate one vertical column of dots, turning it off and illuminating the next column, until each column has been individually lit, while the other columns are off. It will make one pass. The display will then illuminate the top horizontal row of dots, and test by lighting the 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 illuminate all the dots in the display, except for one column. It will cycle this blank column from left to right for one pass. The display will then again illuminate all the dots except for the top row, and then turning it on and blanking the next row, until each row has been individually blanked, while the other rows are on. It will cycle this blank row for one pass. 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 for approximately 4 seconds. The test will repeat these cycles indefinitely 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.

## Gravestone Up & Down Test

This game has a feature which lowers a Target Switch (Gravestone) to allow a shot to the Vertical Up Kicker (VUK) below the playfield. The motor on this mechanism is controlled by a relay driven by Q23 on the CPU and there are 2 Limit Switchs (Gravestone Motor Up & Gravestone Motor Down) used by the CPU to determine the status of the Gravestone Motor.

After entering this test, press and hold the game's Start Button. This will cause the relay to pulse repeatedly as long as the Start Button is depressed. At the same time you will notice that the switch status (ON & OFF) will be indicated in the Dot Matrix Display (Gravestone Up & Down). The appropriate switch should be closed just prior to the limit of the Gravestone Motor Mechanism and both switches should not be closed (ON) at the same time.

This test is located before the Switch Tests so the technician can move the mechanism until both switches read OFF. This will help eliminate erroneous readings while trying to trace a problem during the Active Switch Test.

# SWITCH TESTS

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. The display should indicate SWITCH TEST. Close each switch and observe the displays. The display will indicate the switch name, the display indicates the row and column wire colors, and 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. The display will indicate ACTIVE SWITCHES. If any switches are stuck closed (or made from the presence of a ball), the display sequences through switch names, and indicates the row and column wire colors, and the switch numbers are indicated in the display. This cycle continues until all switches are cleared or until the STEP push-button switch is depressed.

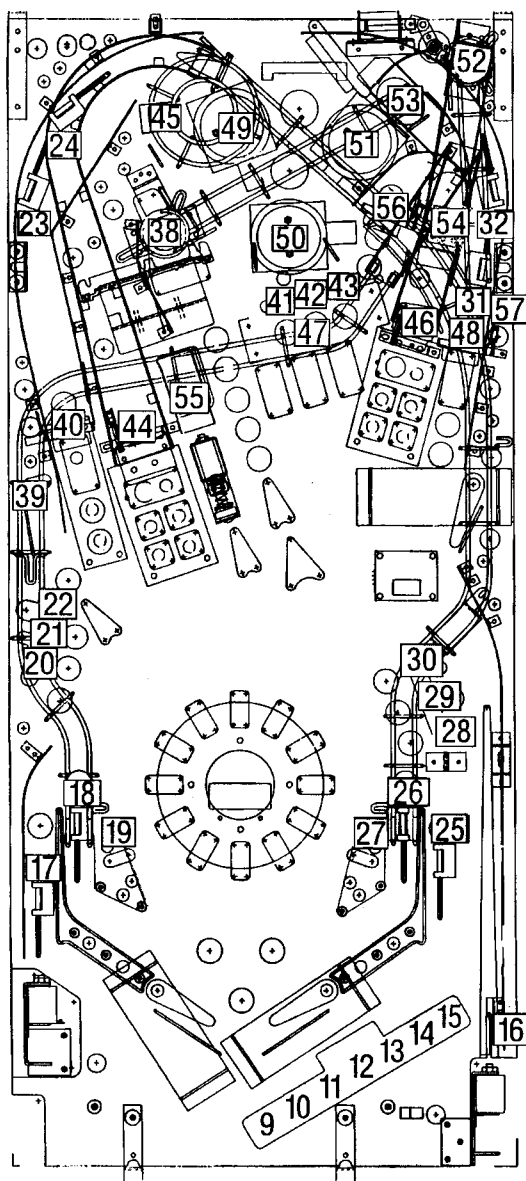
### SWITCH MATRIX CHART

Column \ Row	1 Q55 GRN-BRN CN8-1	2 Q54 GRN-RED CN8-2	3 Q53 GRN-ORN CN8-3	4 Q52 GRN-YEL CN8-4	5 Q51 GRN-BLK CN8-5	6 Q50 GRN-BLU CN8-7	7 Q49 GRN-VIO CN8-8	8 Q48 GRN-GRY CN8-9
1 WHT-BRN CN10-9	Plumb Tilt 1	Trough #1 Left 9	Left Outlane 17	Right Outlane 25	Up 33	Left Drop 41	Left Turbo 49	Lamp Ramp Exit 57
2 WHT-RED CN10-8	4th Coin 2	Trough #2 10	Left Return 18	Right Return 26	Not Used 34	Middle Drop 42	Bottom Turbo 50	Not Used 58
3 WHT-ORN CN10-7	Credit Button 3	Trough #3 11	Left Slingshot 19	Right Slingshot 27	Not Used 35	Right Drop 43	Right Turbo 51	Not Used 59
4 WHT-YEL CN10-6	Right Coin 4	Trough #4 12	Left Bottom 3-Bank 20	Right Bottom 3-Bank 28	Down 36	Left Ramp Enter 44	Super VUK Right 52	Not Used 60
5 WHT-GRN CN10-5	Center Coin 5	Trough #5 13	Left Middle 3-Bank 21	Right Middle 3-Bank 29	Grave-Stone 37	Left Ramp Middle 45	Small Trough 53	Not Used 61
6 WHT-BLU CN10-3	Left Coin 6	Trough #6 14	Left Top 3-Bank 22	Right Top 3-Bank 30	VUK Left 38	Right Ramp Enter 46	Large Trough 54	Launch Button 62
7 WHT-VIO CN10-2	Slam Tilt 7	Trough #7 Right 15	Left Bottom Orbit 23	Right Bottom Orbit 31	Captive Ball 39	Right Ramp Exit 47	Power Scoop 55	Left End of Stroke 63
8 WHT-GRY CN10-1	Buy-In Type 8	Shooter Lane 16	Left Top Orbit 24	Right Top Orbit 32	Left Spinner 40	Right Spinner 48	Middle Spinner 56	Right End of Stroke 64



## Switch Matrix Locations, Descriptions & Switch Part Numbers

Switch Matrix No. & 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* Buy-In Button	180-5073-00
09 Trough #1 Left	180-5119-00
10 Trough #2	180-5119-00
11 Trough #3	180-5119-00



Switch Locations

\* = Location is in the cabinet.

Switch Matrix No. & Description	Part No.
12 Trough #4	180-5119-00
13 Trough #5	180-5119-00
14 Trough #6	180-5119-00
15 Trough #7 Right	180-5118-00
16 Shooter Lane	180-5100-01
17 Left Outlane	500-5706-00
18 Left Return	500-5706-00
19 Left Slingshot	180-5023-00
20 Left Bottom 3 Bank	180-5130-02
21 Left Mid 3 Bank	180-5130-01
22 Left Top 3 Bank	180-5130-00
23 Left Bottom Orbit	500-5706-00
24 Left Top Orbit	500-5707-00
25 Right Outlane	500-5707-00
26 Right Return	500-5707-00
27 Right Slingshot	180-5023-00
28 Right Bottom 3 Bank	180-5130-02
29 Right Mid 3 Bank	180-5130-01
30 Right Top 3 Bank	180-5130-02
31 Right Bottom Orbit	500-5706-00
32 Right Top Orbit	500-5707-00
33* Up (Tomb)	180-5052-00
34 Not Used	--
35 Not Used	--
36* Down (Tomb)	180-5052-00
37* Tombstone Score	180-5083-00
38 VUK Left	180-5064-00
39 Captive Ball Trgt. Switch	180-5114-08
40 Left Spinner	180-5010-04
41 Left Drop Target	180-5092-01
42 Mid Drop Target	180-5092-01
43 Right Drop Target	180-5092-01
44 Left Ramp Enter	180-5090-00
45 Left Ramp Middle	180-5090-00
46 Right Ramp Enter	180-5090-00
47 Right Ramp Exit	180-5093-00
48 Right Spinner	180-5010-04
49 Left Turbo Bumper	180-5015-01
50 Bottom Turbo Bumper	180-5015-01
51 Right Turbo Bumper	180-5015-01
52 Super VUK Right	180-5064-01
53 Small Trough	180-5093-00
54 Large Trough	180-5093-00
55 Power Scoop	500-5057-00
56 Middle Spinner	180-5010-04
57 Left Ramp Exit	180-5090-00
58 Not Used	--
59 Not Used	--
60 Not Used	--
61 Not Used	--
62 Launch Button	180-5073-00
63 Left End of Stroke	180-5124-00
64 Right End of Stroke	180-5124-00

## 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. The dot matrix display will indicate ALL LAMPS and all controlled lamps will light.

### Lamp Returns

From the ALL LAMPS test, depress the STEP push-button switch. The display indicates LAMP RETURNS, 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 display will indicate LAMP COLUMNS, 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 display will indicate the lamp name. The 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

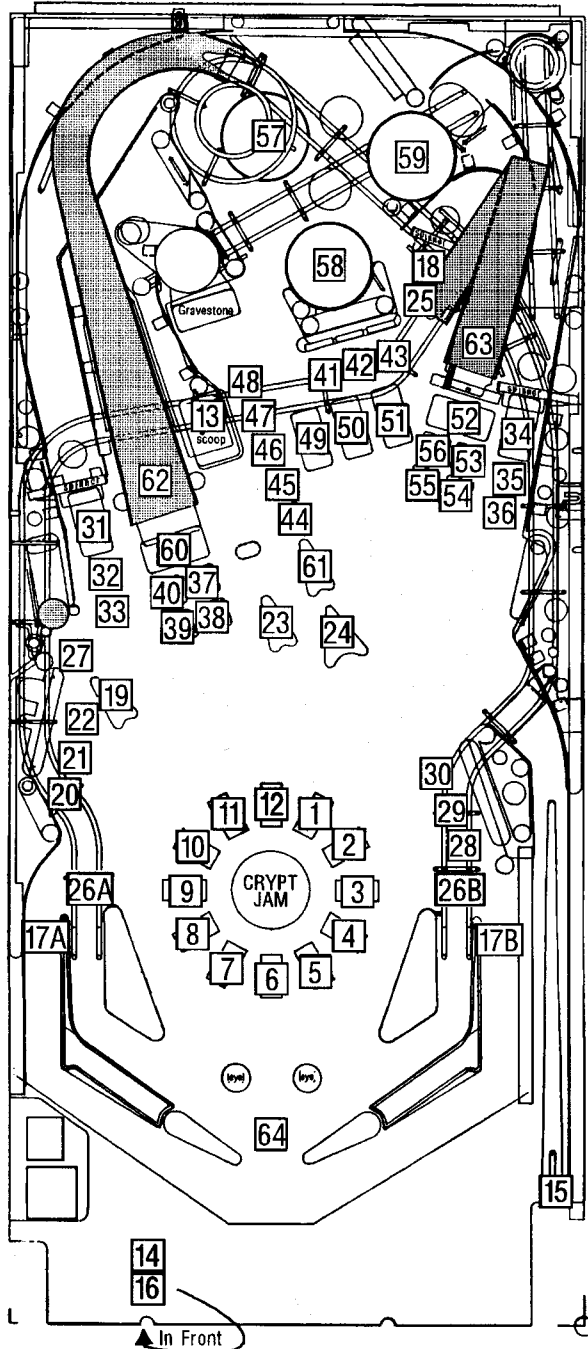
Column \ Row	1 Q71 YEL-BRN CN7-1	2 Q70 YEL-RED CN7-2	3 Q69 YEL-ORN CN7-3	4 Q68 YEL-BLK CN7-4	5 Q67 YEL-GRN CN7-6	6 Q66 YEL-BLU CN7-7	7 Q65 YEL-VIO CN7-8	8 Q64 YEL-GRY CN7-9
1 Q72 RED-BRN CN6-1	Thunder Storm 1	Werewolf Count-down 9	Left/Right Outlane 17	Multiball 25	Life Creature Feature33	Left Drop Trgt. 41	Mystery Door 1 49	Left Turbo 57
2 Q73 RED-BLK CN6-2	Skull Crackin' 2	Video Mode 10	Extra Ball 18	Right/Left Return 26	Fright-mare 34	Middle Drop Trgt. 42	Mystery Door 2 50	Bottom Turbo 58
3 Q74 RED-ORN CN6-3	Door Prize Select 3	Electric Chair 11	Skull Crush 19	Clone 27	Increase Double Jackpot35	Right Drop Trgt. 43	Mystery Door 3 51	Right Turbo 59
4 Q75 RED-YEL CN6-5	Frightmare 4	Keeper Targets 12	K 20	R 28	Life Creature Feature36	T 44	Double Jackpot 52	Jackpot 60
5 Q76 RED-GRN CN6-6	Psycho Pops 5	Scoop 13	E 21	E 29	Rats 37	P 45	Living Dead 53	Multiball 61
6 Q77 RED-BLU CN6-7	Robbing the Crypt 6	Buy-In Type 14	E 22	P 30	Goblins 38	Y 46	Grave-digger 54	Left Ramp Enter 62
7 Q78 RED-VIO CN6-8	Extra Ball 7	Launch 15	Collect Creature Feature23	Werewolf Count-down 31	Ghosts 39	R 47	Chainsaw Mode 55	RightRamp Enger 63
8 Q79 RED-GRY CN6-9	Super Guillotine Targets 8	Start Button 16	Monster Jackpot 24	Increase Jackpot 32	Bats 40	C 48	Play the Organ 56	"Axe-tra" Ball 64

## Lamp Matrix Location and Descriptions

Lamp Matrix No. & Description	
01	Thunderstorm
02	Skull Crackin'
03	Door Prize Select
04	Frightmare
05	Psycho Pops
06	Robbing the Crypt
07	Lite Extra Ball
08	Super GuillotineTargets
09	Werewolf Countdown
10	Video Mode
11	Electric Chair

Lamp Matrix No. & Description	
12	Keeper Targets
13	Over Scoop
14	Buy-In Type
15	Launch
16	Start Button
17A	Crypt Kick(Left Outlane)
17B	Scared to Death(Rt.Outln.)
18	Extra Ball
19	Skull Crush
20	....K
21	....E

Lamp Matrix No. & Description	
22	....E
23	Collect CreatureFeature
24	Monster Jackpot
25	Multiball
26A	Lite Mystery Door (Lt.Return)
26B	Chop Pops (Right Return)
27	Clone
28	....R
29	....E
30	....P
31	Werewolf Countdown
32	Increase Jackpot
33	Lite CreatureFeature
34	Frightmare
35	Increase Double Jackpot
36	Lite CreatureFeature
37	Rats
38	Goblins
39	Ghosts
40	Bats
41	Guillotine DropTarget Left
42	Guillotine Drop Target Mid
43	Guillotine Drop Target Right
44	....T
45	....P
46	....Y
47	....R
48	....C
49	Mystery Door 1
50	Mystery Door 2
51	Mystery Door 3
52	Double Jackpot
53	Living Dead
54	Gravedigger
55	Chainsaw Mode
56	Play the Organ
57	Left Turbo Bumper
58	Bottom Turbo Bumper
59	Right Turbo Bumper
60	Jackpot
61	Multiball
62	Left Ramp Enter
63	Right Ramp Enter
64	"Axe-tra" Ball



**Notes:**

General Illumination Lamps Not Shown  
For Bulb Type & Part Number, see Page 39

# 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

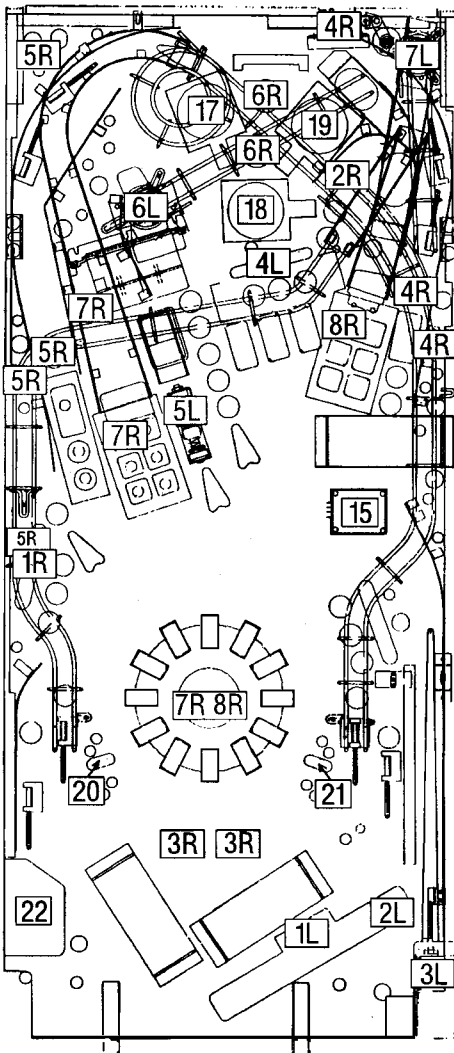
From the Flash Lamps test, depress the STEP push-button switch. The dot matrix display will indicate ALL COILS. The test pulses each regular solenoid or flash lamp sequentially with the coil/flash lamp names and the wire colors indicated in the display.

## Select Coil

From the Coil Test, depress the STEP push-button switch. The display will indicate SELECT COIL and then the name of 1st drive and the wire colors. 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.

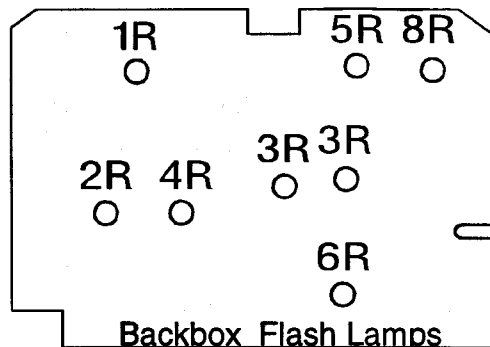
## RETURN TO GAME OVER

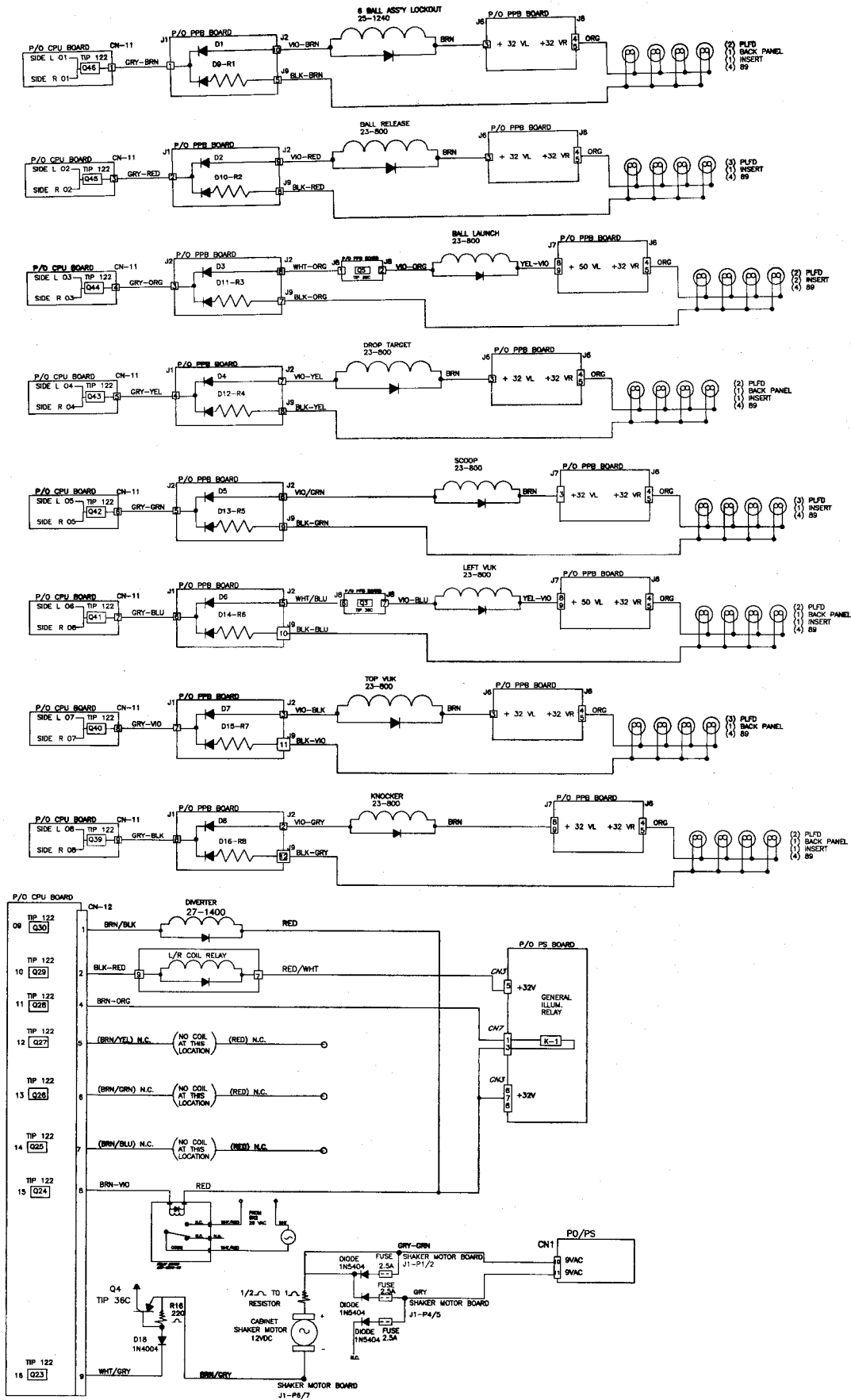
From the Select Coil test, depress the STEP push-button switch once. The game returns to the game-over mode.



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	Laser Kickback (See Schematic)	WHT-VIO CPU CN19-9	VIO-YEL PPB J7-3	Q13	23-800

Flipper Solenoids					
Coil Description	Flipper GND (CPU to Flip. Sw. to Flip. PCB)	Power Line (Flip PCB to Coil)	Coil Type	Power Input To Flip. PCB	
Left Flipper 090-5032-00	ORN-GRY CPU CN19-2	BLU-GRY CN1-10	GRY-YEL CN2-1,2	22-1080	BLK-WHT 50VDC
Right Flipper Lwr. 090-5032-00	ORN-VIO CPU CN19-1	BLU-VIO CN1-7	BLU-YEL CN2-4,5	22-1080	GRY/GRY-GRN 8VAC
Right Flipper Upr. 090-5044-00	ORN-VIO CPU CN19-1	GRY-VIO CN1-12	BLK-YEL CN2-1,2	25-1800	- - -

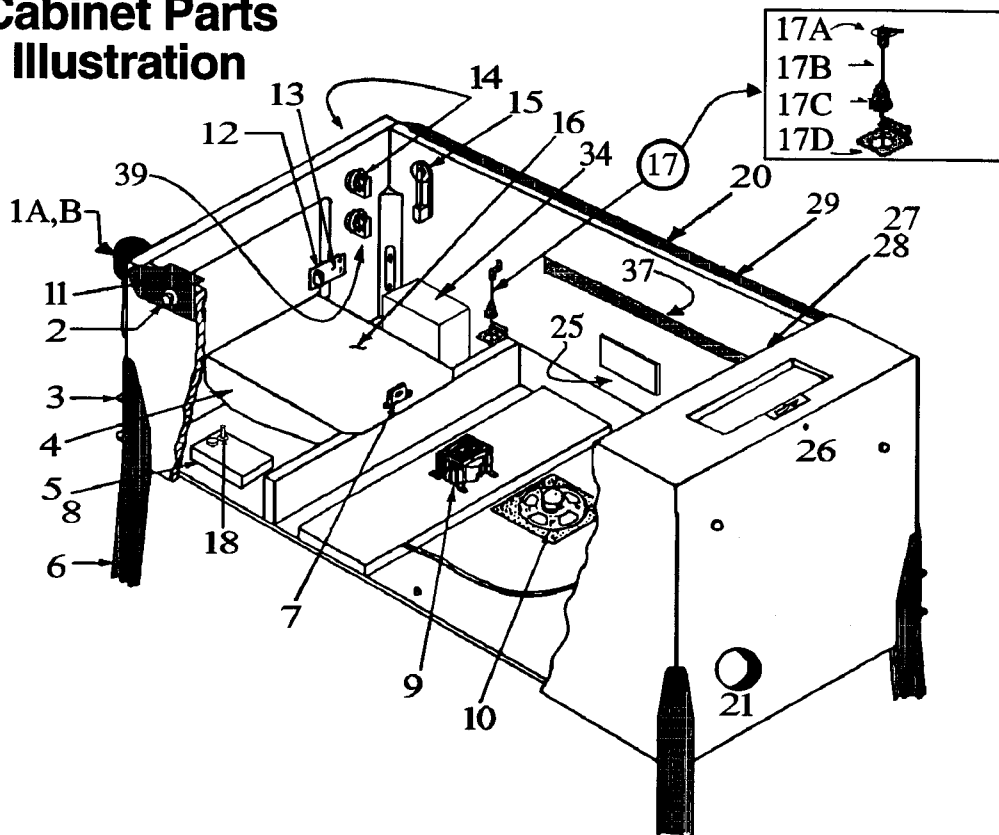




# NOTES

# PARTS IDENTIFICATION

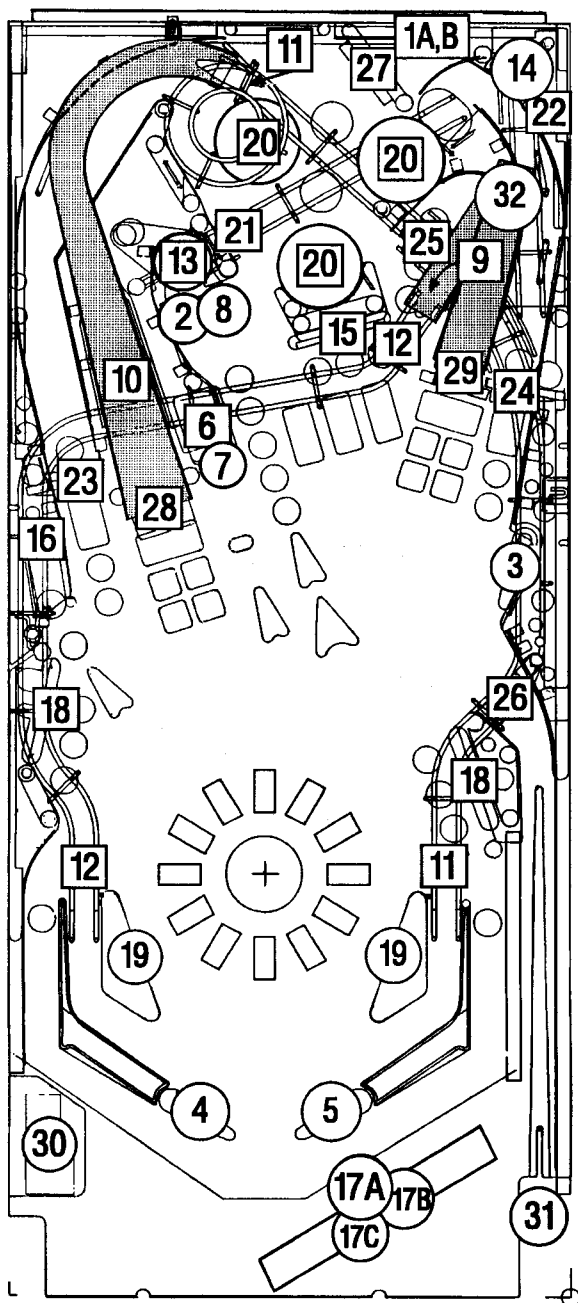
## Cabinet Parts Illustration



Item	Description	Part No.	Item	Description	Part No.
1A	Ball Launch Door Handle Ass'y.	515-5937-00	18	Volume Control Single 10K Log	123-5000-02
1B	Door Handle Switch Plate Ass'y	515-5936-00	19	Playfield Glass (Tempered) * 21" x 43"	660-5001-00
2	Flipper Button	500-5026-32	20	Side Armor - Left	535-5010-36
3	Leg Bolt (Black) 3/8-16 x 2-3/8 Hex Hd.	231-5000-01	21	Recessed Cup for Line Cord	545-5122-00
4	Cash Box Plastic Bottom	545-5090-00	22	Service Switch Set *	180-5012-00
5	Power Switch DPST Toggle	180-5001-00	23	Front Molding Lockdown Assy*	500-5020-00
6	Leg (Black)	535-5020-30	24	Front Molding - Black *	500-5021-10
7	Cash Box Lock Bracket	535-5215-00	25	Solid State 3 - Flipper Board	520-5033-03
8	Power Input Box Ass'y (Crypt)	515-5360-00	26	#1 Roto Lock Male	355-5006-01
9	Transformer	010-5003-00	27	Rear Plastic Ext. P/F Glass	545-5038-00
10	Speaker-Round - 8"	031-5005-00	28	Mounting Fm. Rubber for Ext.	626-5004-00
11	Side Armor - Right	535-5010-35	29	Plastic Channel Left & Right	545-5017-00
12	Memory Protect Switch	180-5000-00	30	Backbox Hinge Left *	535-6172-00
13	Memory Protect Switch Bracket	535-6409-00	31	Backbox Hinge Right *	535-6172-01
14	Start Button Switch Ass'y (Red)	500-5728-02	32	Leg Leveler * 8-16x3"	500-5017-00
15	Flipper Switch (Left)	180-5048-01	33	Coin Door (w/Validator) USA	500-5018-17
15A	Flipper Switch, Double (Right)	180-5122-00	34	Shaker Motor	515-5893-00
16	Cash Box Cover (Validator)	535-5013-03	35	Shaker Motor P.C. Board	520-5065-00
17	Plumb Bob Tilt Assembly	500-5023-00	36	Slide & Pivot Support Brkt. Right*	535-5989-00
17A	Hanger Braket (tilt)	535-5221-00	37	Slide & Pivot Spt. Brkt. Left	535-5990-00
17B	Hanger Wire (tilt) (Attach to *17A*)	535-5319-00	38	Playfield Support Bar *	535-5019-00
17C	Plumb Bob (tilt) (Attach to *17B*)	535-5029-00	39	Extra Ball Switch	500-5779-07
17D	Contact Bracket (tilt)	535-5319-00			

NOTE 1: An asterisk (\*) indicates item is not shown in above illustration.


# PLAYFIELD - MAJOR ASSEMBLIES



Item	Description	Part No.
1A	Diverter Assembly	500-5654-00
1B	Diverter Plunger & Crankarm Ass'y	515-5453-00
2.	Motor, Cam & Switch Ass'y	500-5742-01
3.	Flipper Ass'y (Top Right)	500-5756-01
4.	Flipper Ass'y (Lower Right)	500-5755-01
5.	Flipper Ass'y (Lower Left)	500-5755-02
6.	Power Scoop Assembly	500-5741-00
7.	Kick Big Assembly	500-5740-00
8.	Target Back Plate Guide Ass'y	515-5905-00
9.	Steel Ramp Assembly (Right)	500-5650-00
10.	Steel Ramp Assembly (Left)	500-5651-00
11.	Loop Wire Ramp Ass'y (Right)	500-5649-00
12.	Long Wire Ramp Ass'y (Left)	500-5648-00
13.	Vertical Up Kicker (VUK) Ass'y	500-5306-03
14.	Super VUK Assembly	500-5116-06
15.	Drop Target Bank Assembly	500-5621-03
16.	Stand-up Target Assembly	500-5640-18
17A	6-Ball Switch Assembly	500-5683-01
17B	Lock Ball Assembly	500-5684-01
17C	Deflector For 6-Ball Assembly	535-6606-01
18.	3-Bank Stand-Up Target Ass'y	500-5765-00
19.	Slingshot Assemblies	500-5226-00
20.	Turbo Bumper Assemblies	500-5227-00
21.	Wire Ramp Gravestone	535-6741-00
22.	Short Wire Ramp VUK	535-6572-00
23.	Spinner, Left	500-5655-00
24.	Spinner, Right	500-5656-00
25.	Spinner, Middle	500-5656-01
26.	Flap Gate Assembly	500-5494-00
27.	1-Way Gate Assembly	515-5895-00
28.	Lt. Ramp Roll Under Gate Ass'y	500-5657-00
29.	Rt. Ramp Roll Under Gate Ass'y	500-5658-00
30.	Kickback & Kocker Assembly	500-5081-00
31.	Ball Launch Assembly	500-5477-01
32.	Trough Assembly	500-5652-00

## NOTES:

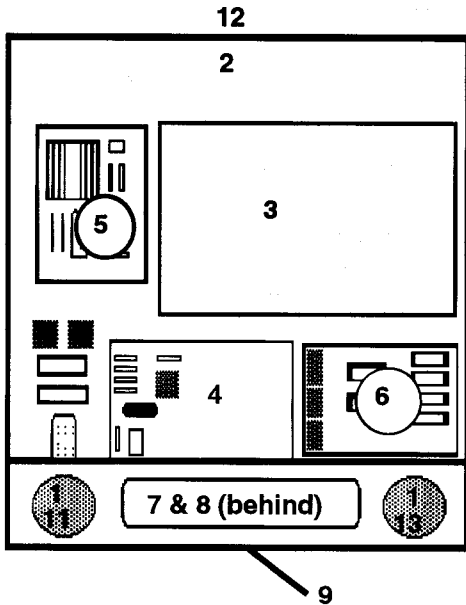
1. Items in a  are below the Playfield.

Items in a  are above the Playfield.

2. Switch part numbers are located on Page 29.



# BACKBOX ILLUSTRATION



Item	Description	Part No.
1	Speakers	031-5004-00
2	Back Box Lock	355-5008-00
3	CPU †	520-5003-04
4	PPB Board	520-5021-05
5	Power Supply	520-5047-02
6	Sound Board †	520-5050-02
7	Dot Matrix ‡	520-5052-00
8	Display Controller Board †	520-5055-01
9	Speaker Housing	545-5180-02
10	Backglass Artwork *	830-5218-00
11	Speaker Grill Crypt (Left)	830-5616-00
12	Backbox Crypt "Head"	545-5444-00
13	Speaker Grill Crypt (Right)	830-5616-01
14	Static Shield *	535-6437-00
15	Backglass Clear *	660-5008-00
16	26" Plastic Extrusion *	545-5018-04
17	21 3/8" Plastic Extr. (2) *	545-5018-07
18	Glass Channel 26-1/16" *	545-5021-01

\* Not Shown

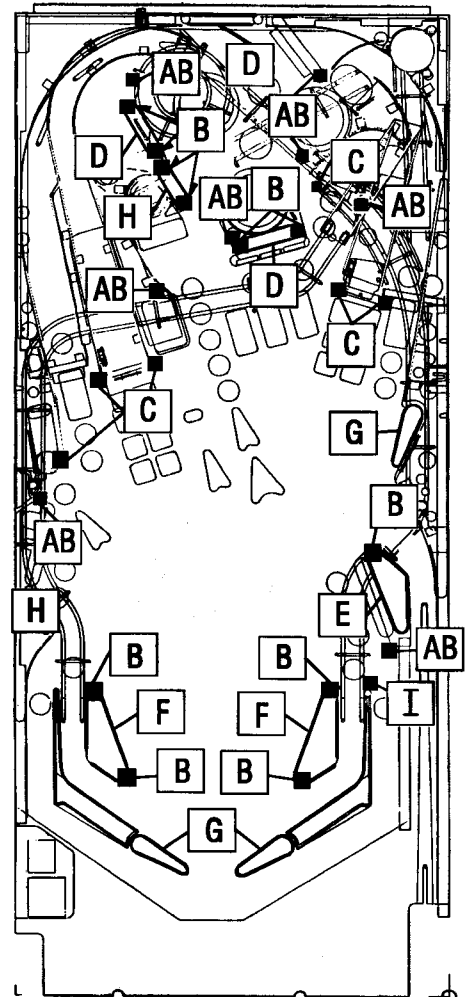
† When ordering PC Boards with ROMs please specify game name

‡ Indicate Manufacturer

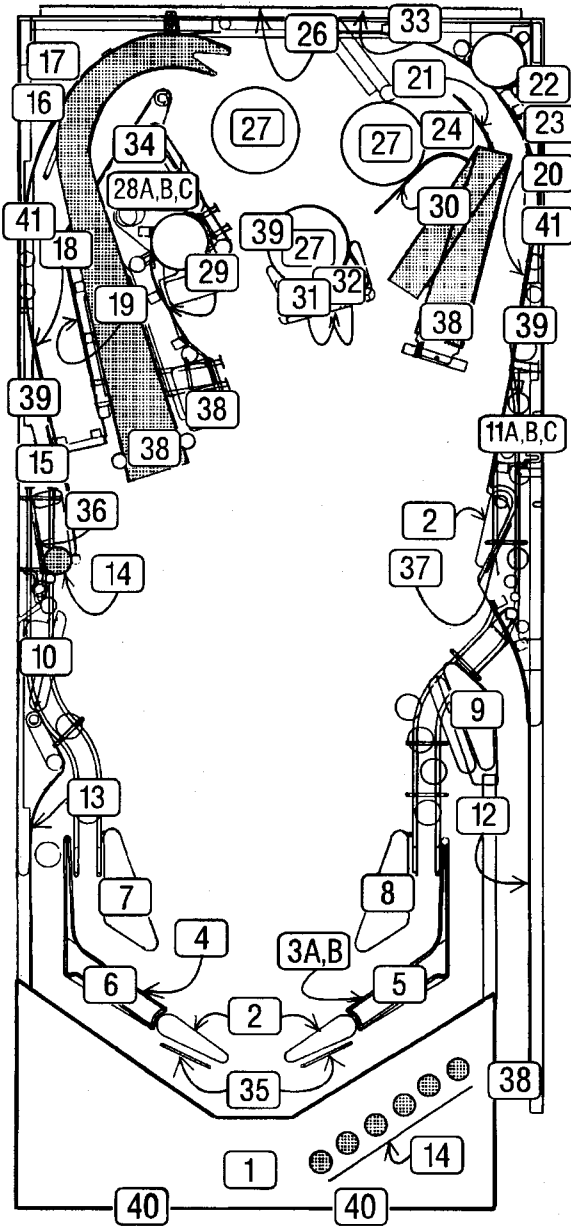
# RUBBER PARTS ILLUSTRATION

Item	Description	Part #
A	3/16" I.D. Rubber Ring (8)	545-5348-01
B	Sponge Sleeve (16)	545-5151-00
C	Rubber Sleeve (6)	545-5308-00
D	1-1/2" I.D. Rubber Ring (2)	545-5348-07
E	2" I.D. Rubber Ring (1)	545-5025-08
F	2-3/4" I.D. Rubber Ring (2)	545-5348-20
G	Flipper Rubber Ring (3)	545-5277-00
H	1-1/4" I.D. Rubber Ring (2)	545-5348-06
I	3/8" I.D. Rubber Ring (1)	545-5348-19

Note: Where "A" & "B" are together, B sits under A.



# PLAYFIELD TOP PARTS



Item	Description	Part Number
1	Bottom Arch Assembly for Crypt	500-5782-00
2	Flippers & Shaft Ass'y (White)	515-5133-01
3A	Return Lane Clear Guide, Long/Right	550-5037-01
3B	Rtrn. Ln. Clr. Gd. Rt. (Piggyback on 3)	550-5046-01
4	Return Lane Clear Guide, Left	550-5042-01
5	Right Return Butyrate	830-5435-02
6	Left Return Butyrate	830-5435-01
7	Slingshot Butyrate Left	830-5435-03
8	Slingshot Butyrate Right	830-5435-04
9	3-Bank Target Butyrate Right	830-5435-15
10	3-Bank Target Butyrate Left	830-5435-05
11A	Top Flipper Lower Butyrate	830-5435-09
11B	Top Flipper Middle Butyrate	830-5435-16
11C	Top Flipper Upper Butyrate	830-5435-27
12	Flat Rail Shooter Lane Right	515-5760-00
13	Flat Rail Outlane Left	515-5761-00
14	Pinballs (7)	260-5000-00
15	Single Stand-up Target Butyrate	830-5435-06
16	Upper Left Lane Butyrate-Upper	830-5435-20
17	Upper Left Lane Butyrate-Lower	830-5435-11
18	Flat Rail Upper Left Lane, Left Side	515-5908-00
19	Flat Rail Upper Left Lane, Right Side	515-5763-00
20	Flat Rail Right Orbit, Right Side	515-5907-00
21	Flat Rail Right Orbit, Left Side	515-5768-00
22	Right Orbit Bi-Level Butyrate, Upper	830-5435-08
23	Right Orbit Bi-Level Butyrate, Lower	830-5435-17
24	Right Orbit Butyrate, Left	830-5435-14
25	Right Orbit Butyrate, Top	830-5435-12
26	Backpanel Butyrate	830-5435-10
27	Turbo Bumper Caps, Red, (3)	550-5057-02
28A	Left Ramp over VUK Butyrate, Upper	830-5435-21
28B	Left Ramp over VUK Butyrate, Lower	830-5435-13
28C	Clear Butyrate Perpendicular to 28A	830-5435-25
29	Flat Rail Left of VUK	515-5909-00
30	Flat Rail Middle Spinner into Trough	515-5911-00
31	Middle Bumper Butyrate Lower	830-5435-07
32	Middle Bumper Butyrate Upper	830-5435-19
33	Mini Mars Clear Backpanel/SVUK	550-5025-01
34	Mini Mars Clear VUK/Gravestone	550-5055-01
35	Snubbers Lower Flippers (2)	535-5373-01
36	Wire Form 2-1/4" S/U Trgt., Left	535-5300-12
37	Wire Form 2" Upper Flipper	535-5300-10
38	Lite Cover Red (3)	545-5014-02
39	Lite Cover Reflector (3)	545-5409-00
40	Playfield Hanger Bracket (2)	535-5216-01
41	Pivot Pin Bracket Assembly (2) with Pivot Bracket Screws (4) and T-Nut (4)	500-5329-00 237-5907-00 240-5101-00

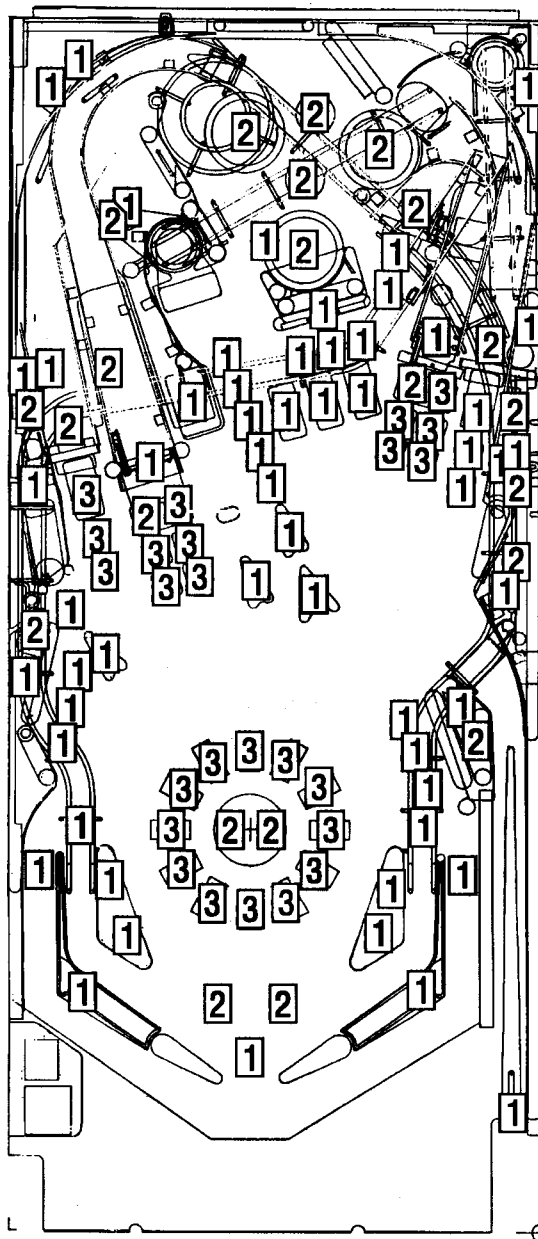
Posts	Part No.	Qty.
Metel Standoff	530-5035-01	34
Bumper Post-Mach	530-5007-00	7
<b>Decals/Mylar</b>		
<b>Part No.</b>		
Arch Decals (Left)	820-6103-12	
Arch Decals (Right)	820-6103-13	
Full Playfield Mylar	820-5831-00	
Individual P/F Mylar Pieces	820-5832-XX	

NOTE: See page 29 for Switch Part Numbers and Locations.

## LAMP BULBS & SOCKETS PART NUMBERS, QUANTITIES & LOCATIONS

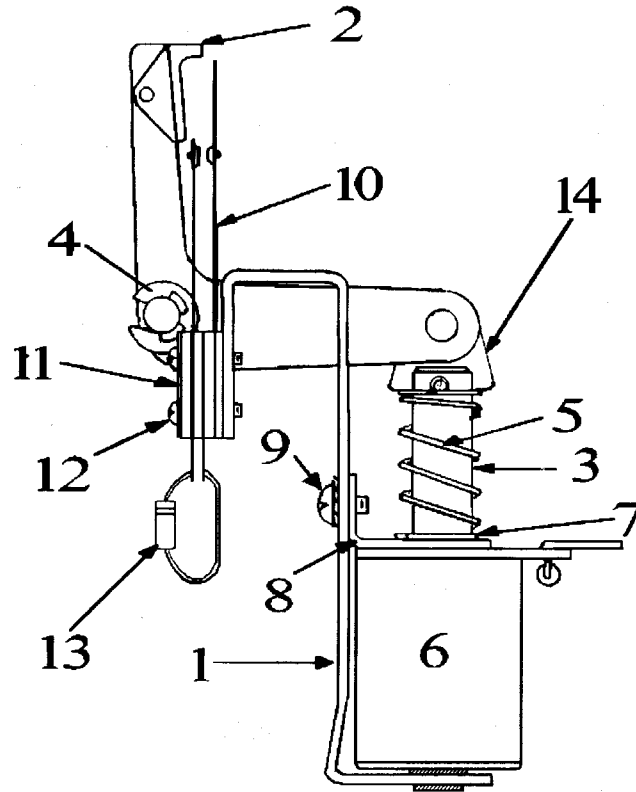
Item*	Bulb Description/ Part No.	Bulb Qty.	Socket Description	Socket Part No.	Socket Location	Socket Qty.
1	#44 Bulb - 165-5000-44	91	2 Lug Staple Down	077-5000-00	On Playfield	21
			2 Lug Staple Down	077-5000-00	On Backpanel	2
			2 Lug Staple Down	077-5000-00	On Insert	36
			3 Lug Lay-Down	077-5006-00	On Playfield	2
			3 Lug Stand-Up Large	077-5009-00	On Playfield	30
2	#89 Bulb - 165-5000-89	31	Lay-Down Socket	077-5100-00	On Backpanel	4
			2 Lug Stand-Up Small	077-5101-00	On Playfield	7
			2 Lug Stand-Up Small	077-5101-00	On Backbox	8
			2 Lug Stand-Up Large	077-5102-00	On Playfield	11
			Stand-Up Straight Leg	077-5107-00	On Backpanel	1
3	#555 Bulb - 165-5002-00	34	Wedge	077-5007-00	On Playfield	25
			Lay-Down Wedge Black	077-5026-00	On Playfield	9

**\* Note:** This diagram represents the physical location of the bulbs (including the General Illumination Bulbs [G.I.] on the Playfield).



## NOTES

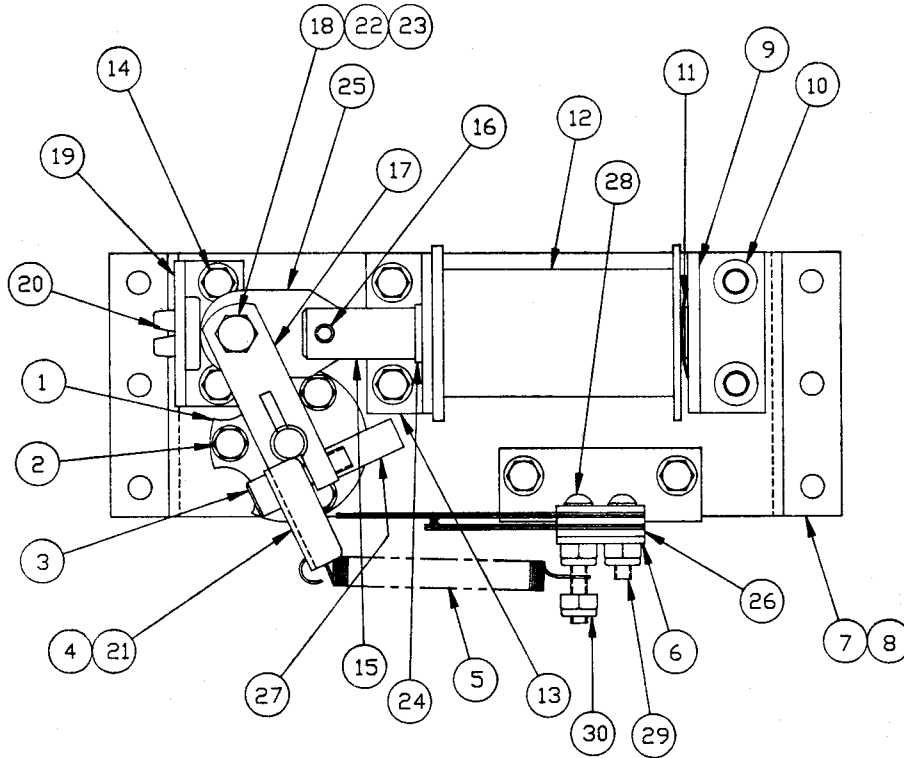
# UNIQUE PARTS



**Slingshot Assembly  
500-5226-00**

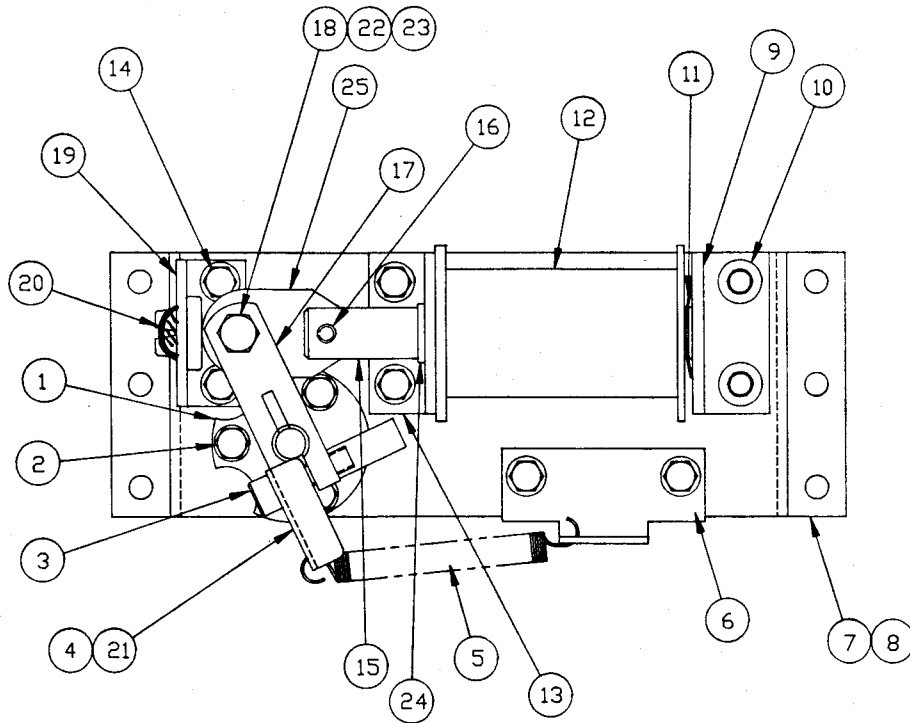
Item	Description	Part No.
1	Slingshot Bracket	515-5339-00
2	S. S. Arm & Tip Assembly	515-5340-00
3	Plunger & Link Assembly	515-5338-00
4	1/4 Retaining Ring (2)	270-5002-00
5	Spring	266-5020-00
6	23-800 Coil	090-5001-00
7	Coil Sleeve	260-0004-00
8	Coil Retainer	535-5203-03
9	#8-32 X 1/4" Screw (2)	232-5300-00
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

## Flipper Assembly Lower 500-5755-01 (Right), - 02 (Left)



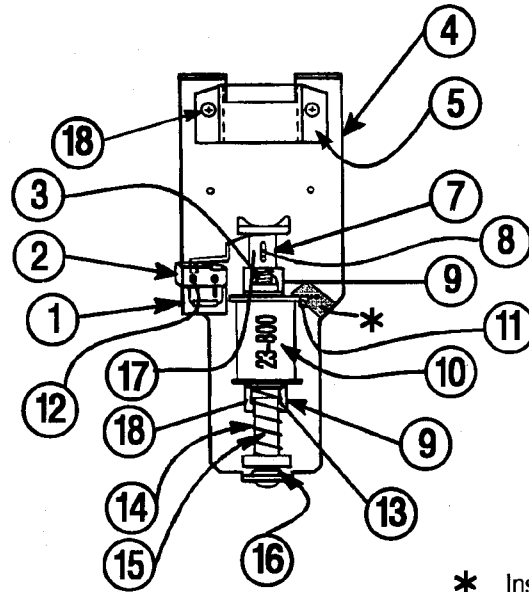
Item	Part No.	Description	Qty.
1	545-5070-00	Flipper Bushing	1
2	234-5000-00	#6-32 x .38 LG. HWH TF	3
3	232-2206-12	#10-32 SOC HD x .75 LG.	1
4	535-6663-02	Spring Bracket (Left)	1
5	265-5029-02	Flipper Return Spring	1
6	535-6664-00	Switch Mounting Bracket	1
7	515-5077-02	Flipper Base (Left)	1
8	515-5077-01	Flipper Base (Right)	1
9	515-5346-00	Coil Stop Bracket	1
10	231-2507-06	1/4-20 SOC HD x .38 LG.	2
11	269-5002-00	Spring Washer	1
12	090-5032-00	Coil 22-1080	1
13	515-5129-00	Front Bracket	1
14	234-5100-00	#8-32 x .38 LG. HWH TF	6
15	515-5822-00	Plunger and Link Assembly	1
16	251-5000-00	Roll Pin	1
17	530-5070-00	Pawl	1
18	231-5019-00	#10-32 x .75 LG. Shoulder Bolt	1
19	535-5279-01	Plunger Stop Bracket	1
20	545-5445-00	Nylon Stop	1
21	535-6663-01	Spring Bracket (Right)	1
22	530-5139-00	Bushing	1
23	238-1306-00	#10-32 Elastic Stop Nut	1
24	260-0003-00	Coil Sleeve	1
25	545-5401-00	Flipper Link	1
26	180-5124-00	End of Stroke Switch	1
27	545-5084-00	Plastic Cap	1
28	237-5506-00	#6-32 x 1" LG. PPH	1
29	237-5899-00	#6-32 x .63 LG PPH	1
30	240-5005-00	#6-32 Elastic Stop Nut	3

## Flipper Assembly Upper 500-5756-01 (Right)



Item	Part No.	Description	Qty.
1	545-5070-00	Flipper Bushing	1
2	234-5000-00	#6-32 x .38 LG. HWH TF	3
3	232-2206-12	#10-32 SOC HD x .75 LG.	1
4	535-6663-02	Spring Bracket (Left)	1
5	265-5029-02	Flipper Return Spring	1
6	535-6664-00	Switch Mounting Bracket	1
7	515-5077-02	Flipper Base (Left)	1
8	515-5077-01	Flipper Base (Right)	1
9	515-5346-00	Coil Stop Bracket	1
10	231-2507-06	1/4-20 SOC HD x .38 LG.	2
11	269-5002-00	Spring Washer	1
12	090-5032-00	Coil 22-1080	1
13	515-5129-00	Front Bracket	1
14	234-5100-00	#8-32 x .38 LG. HWH TF	6
15	515-5822-00	Plunger and Link Assembly	1
16	251-5000-00	Roll Pin	1
17	530-5070-00	Pawl	1
18	231-5019-00	#10-32 x .75 LG. Shoulder Bolt	1
19	535-5279-00	Plunger Stop Bracket	1
20	545-5105-00	Rubber Stop	1
21	535-6663-01	Spring Bracket (Right)	1
22	530-5139-00	Bushing	1
23	238-1306-00	#10-32 Elastic Stop Nut	1
24	260-0003-00	Coil Sleeve	1
25	545-5401-00	Flipper Link	1

# Super VUK Ass'y 500-5116-06

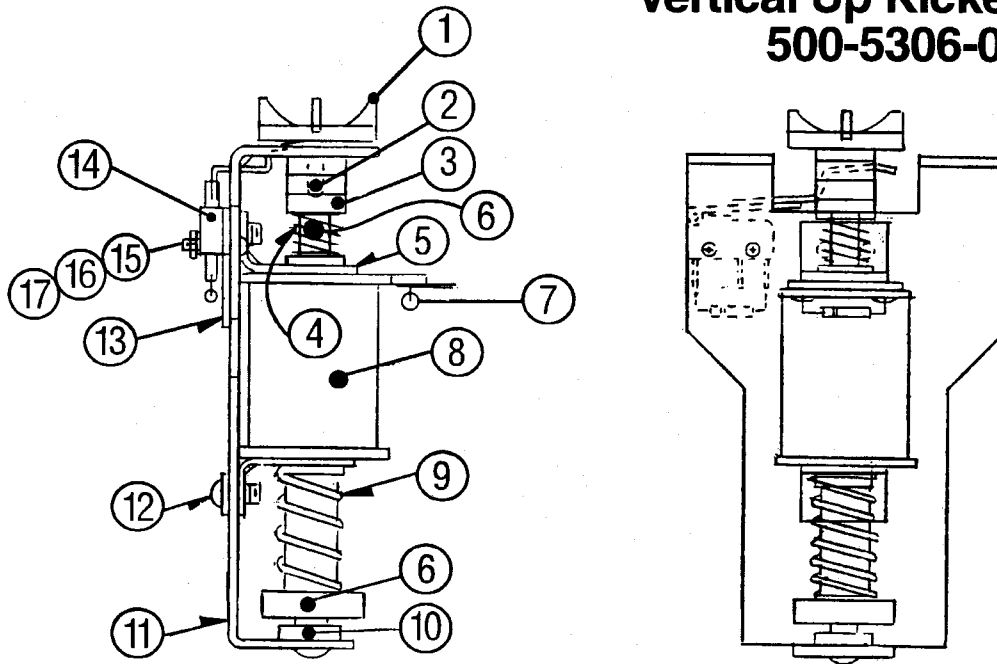


\*\_ Insulator Tape  
to prevent short.

Item	Description	Part No.
1	Switch Insulator	535-5051-00
2	Microswitch	180-5064-01
3	Cap Spring	266-5025-00
4	Ball Kickup Mounting Bracket	535-5298-00
5	Ball Guide Bracket	535-6047-00
6	#6-32 x 3/8 SEMS (2)*	232-5201-00
7	Vertical Kicker Cap	545-5227-00
8	Pin 3/32/x 7/16	251-5004-00
9	Rear Coil Retainer Bracket (2)	535-5203-03
10	Coil 23-800	090-5001-01
11	1N4004 Diode	112-5003-00
12	2-56 x 1/2 Screw (2)	237-5806-00
13	#6-32 x 1/4 Phil. M.S.	232-5200-00
14	Spring	266-5009-00
15	Plunger Assembly	515-5352-00
16	Bumper	545-5105-00
17	Compression Ring (3)	270-5010-00
18	#6-32 x 1/4 SEMS (3)	232-5200-00

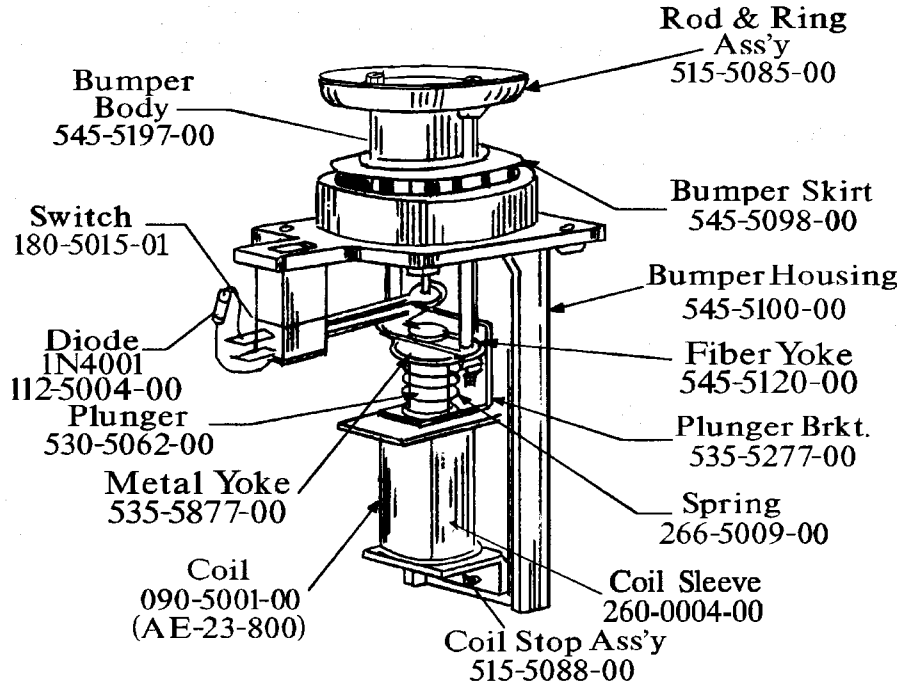


## Vertical Up Kicker Ass'y 500-5306-04

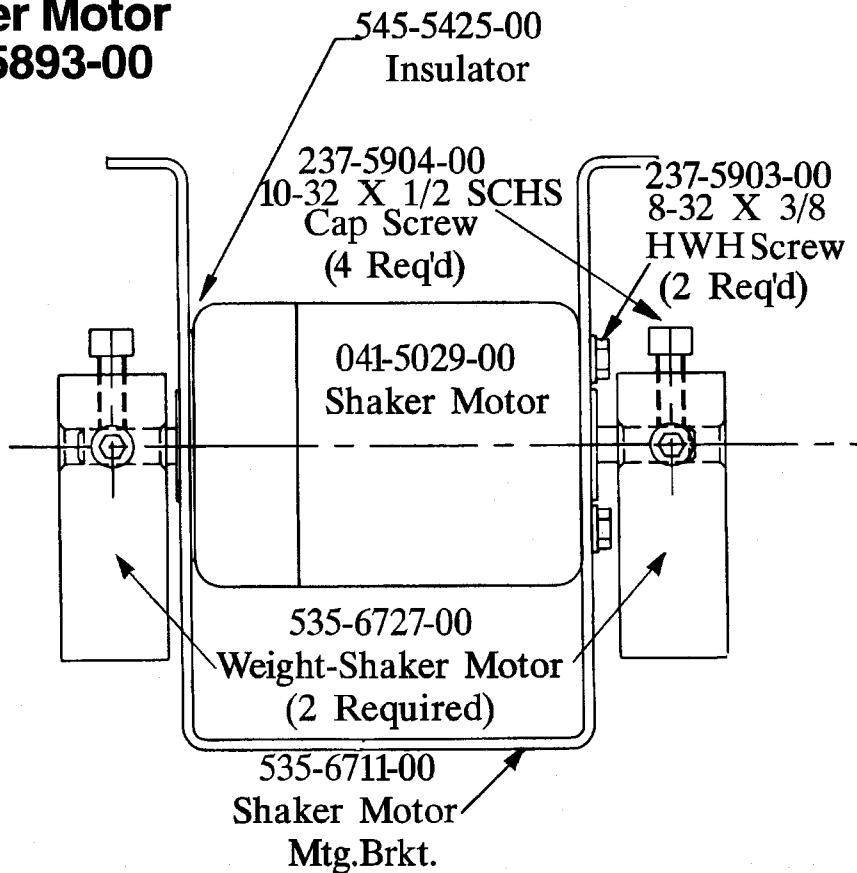


Item	Description	Part No.
1	Vertical Kicker	545-5227-00
2	Pin	535-5111-00
3	Comp. Ring (3)	270-5010-00
4	Spring	266-5025-00
5	Coil Bracket (2)	535-5001-01
6	Plunger Assembly	515-5352-00
7	IN4004 Diode	112-5003-00
8	23-800 Coil	090-5001-01
9	Spring	266-5009-00
10	Bumper	280-5003-00
11	Bracket	535-5271-00
12	8-32 x 1/4 SEMS (4)	232-5300-00
13	Insulator	545-5193-00
14	Micro Switch Assembly	180-5063-00
15	2-56 x 1/2 SCR (2)	237-5806-00
16	Lockwasher (2)	244-5001-00
17	Hex Nut (2)	240-5301-00

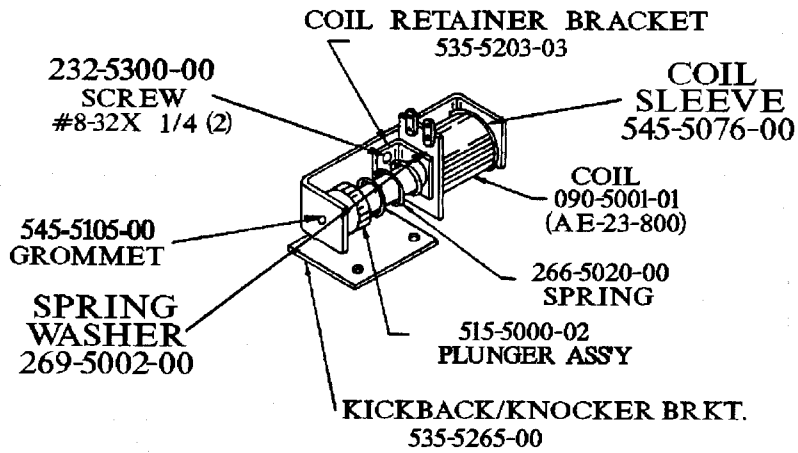
# Turbo Bumper 500-5227-00



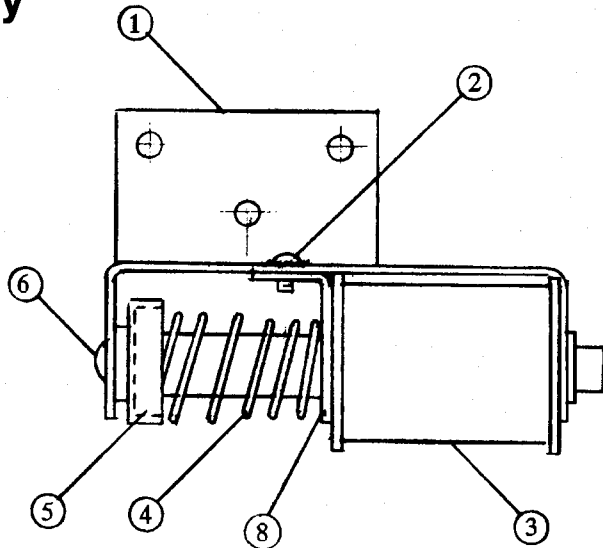
# Shaker Motor 515-5893-00



# Kickback & Knocker Assembly 500-5081-00

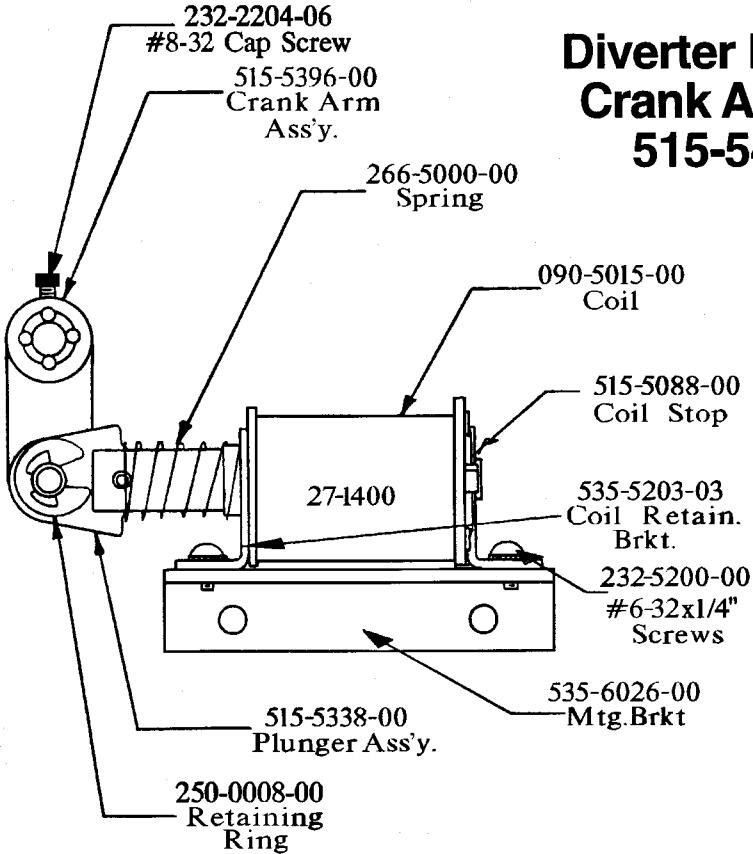


# Ball Launch Ass'y 500-5477-01

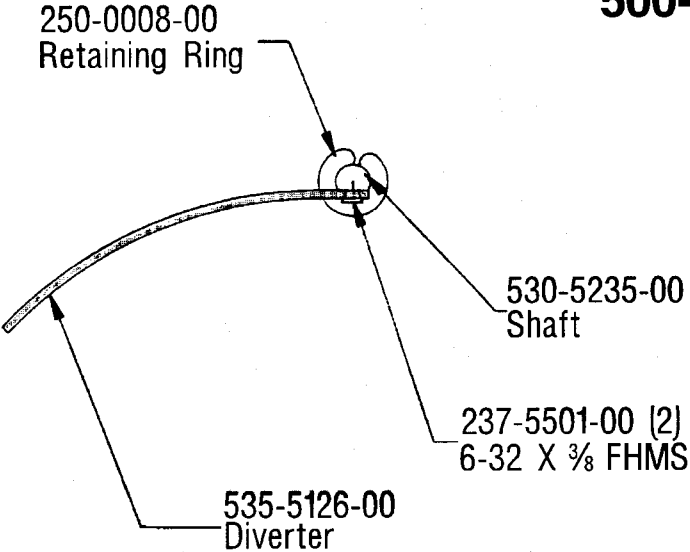


Item	Description	Part No.	Item	Description	Part No.
1	Coil Mounting Bracket	535-6385-00	5	Plunger Assembly	515-5000-02
2	8-32 x 1/4 Sems. (2)	232-5300-00	6	Grommet	545-5105-00
3	Coil 24-940	090-5036-01	7	1N4004 Diode	112-5003-00
4	Spring	266-5020-00	8	Coil Retainer Bracket	535-5203-03

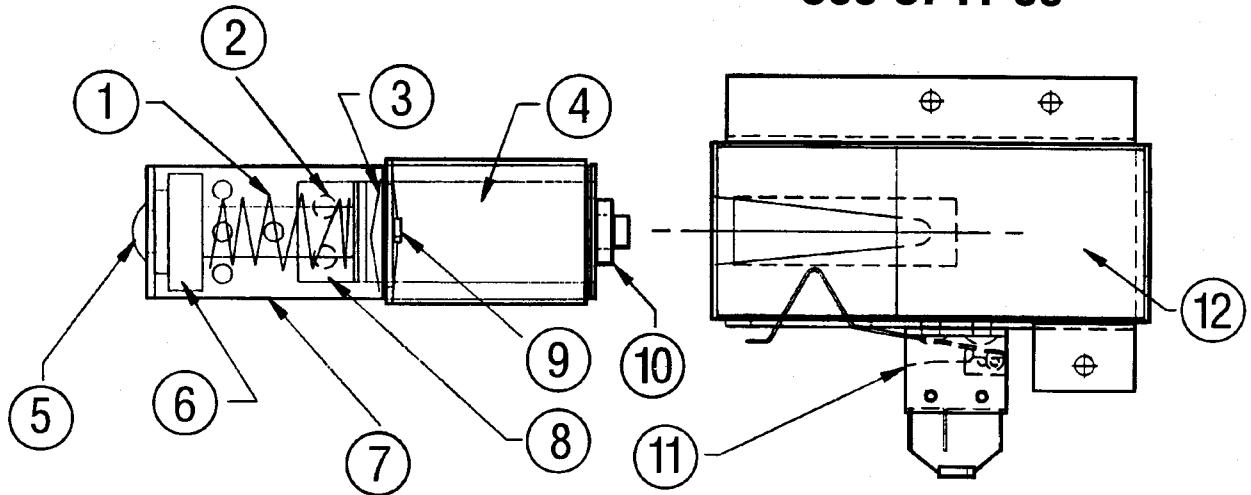
**Diverter Plunger &  
Crank Arm Ass'y  
515-5453-00**



**Diverter Ass'y  
500-5654-00**

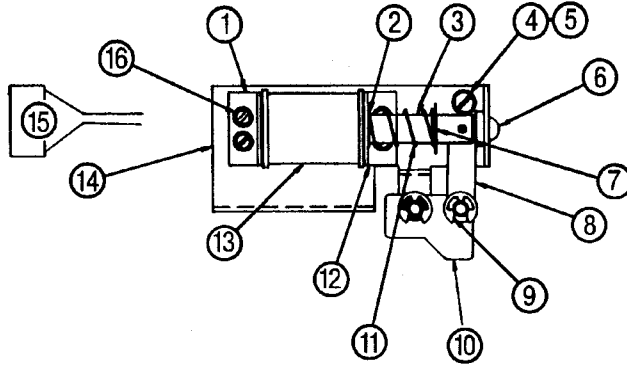


## Kick Big Assembly 500-5740-00 & Power Scoop Assembly 500-5741-00

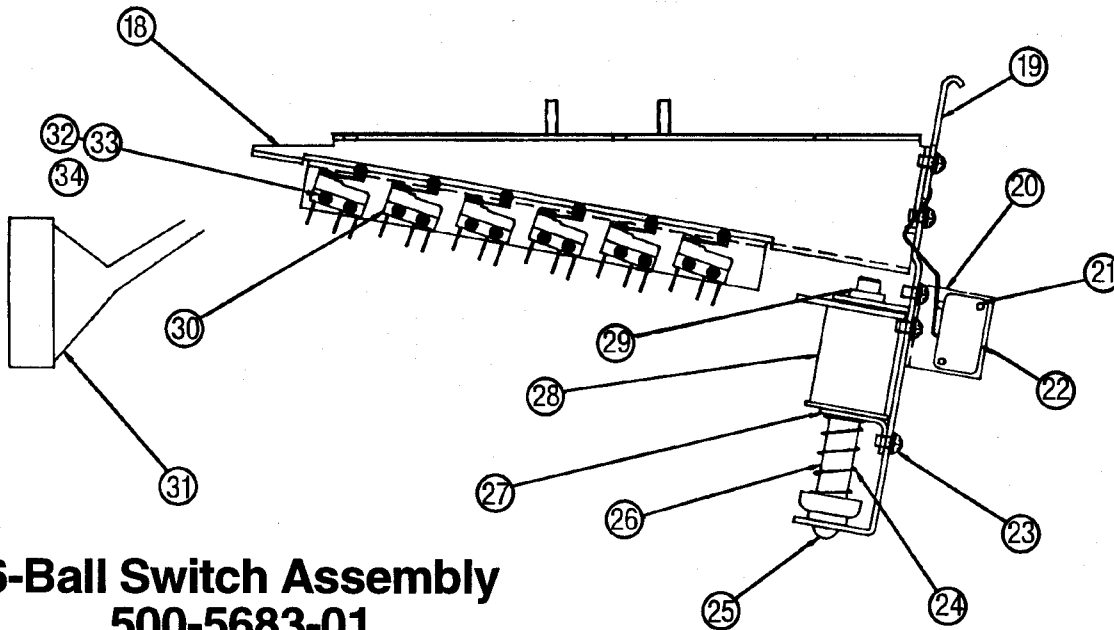
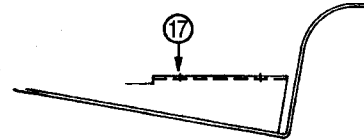


Item	Description	Part No.
1	Spring	266-5020-00
2	8-32 X 1/4 SEMS (TYP 2)	232-5300-04
3	Spring Washer	269-5002-00
4	Coil 23-800	090-5001-00
5	Rubber Grommet	545-5101-00
6	Plunger Assembly	515-5000-02
7	Frame	535-6730-00
8	Bracket	535-5203-01
9	Diode	112-5003-00
10	Coil Sleeve	545-5076-00
11	Micro Switch	180-5057-00
	Diode	112-5003-00
	Switch Protect Plate	535-6539-00
	#2 Lockwasher	244-5001-00 (2)
	2-56 Hex Nut	240-5301-00 (2)
	Micro Bracket	535-6163-00
	2-56 PHMS	237-5806-00 (2)
	6-32 PHMS	232-5200-00 (2)
12	Power Scoop Weld Assembly	515-5899-00

## Lock Ball Assembly 500-5684-01



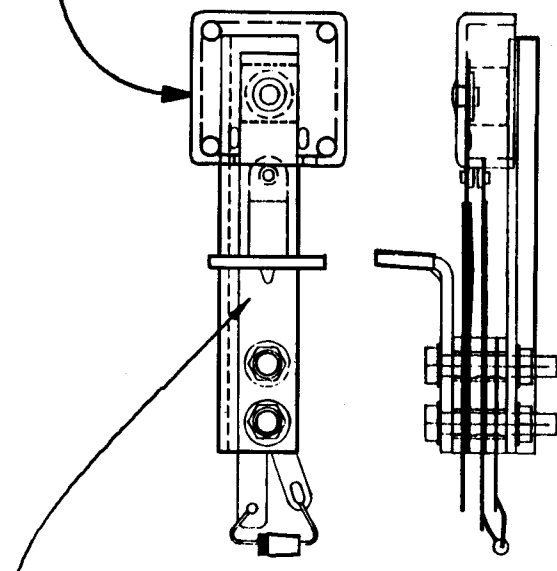
## Deflector 535-6606-01



## 6-Ball Switch Assembly 500-5683-01

Item	Description	Part No.	Item	Description	Part No.
1	Core Stop Assembly	515-5088-00	18	Outhole Mounting Bracket	535-6621-01
2	Coil Sleeve	545-5411-00	19	Coil Mounting Bracket	535-6622-01
3	Plunger *7/16 X 2-1/4 LG	530-5250-01	20	Switch Mounting Bracket	535-6623-00
4	Spacer	545-5400-00	21	#4-40 PPH X .62 LG (2)	237-5806-00
5	#8-32 PPH X 1" LG	232-1104-16	22	Switch, Miniature	180-5119-00
6	Rubber Bumper	545-5105-00	23	#8-32 PPH w/SEM X .25 LG (8)	232-5300-00
7	E-Ring .44 Shaft	270-5005-00	24	Spring	266-5020-00
8	Link, Lock Ball	545-5058-00	25	Rubber Bumper	545-5105-00
9	E-Ring, .25 Shaft (2)	250-0008-00	26	Plunger Assembly	515-5000-02
10	Lock Ball Cam Assembly	515-5815-01	27	Coil Retaining Bracket	535-5203-01
11	Spring	266-5000-00	28	Coil, 23-800	090-5001-00
12	Coil Retaining Bracket	535-6658-00	29	Coil Sleeve	545-5076-00
13	Coil, 25-1240	090-5034-00	30	Switch, Subminiature (6)	180-5119-00
14	Lock Ball Bracket Assembly	515-5817-01	31	Wire Harness	036-5301-00
15	Wire Harness	036-5301-01	32	#2-56 PPH X .5 LG (12)	237-5806-00
16	#6-32 HWH TC X .38 LG (4)	237-5898-00	33	#2 Split LW (12)	244-5001-00
17	Deflector	535-6606-01	34	Switch Protector (6)	535-6539-00

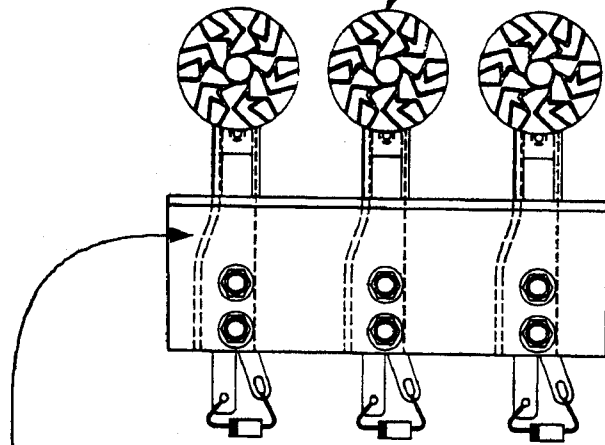
535-5934-18  
Target & Switch  
Assembly



535-5282-00  
Mounting Bracket

**1-Bank Stand-Up  
Target Assembly  
500-5640-18**

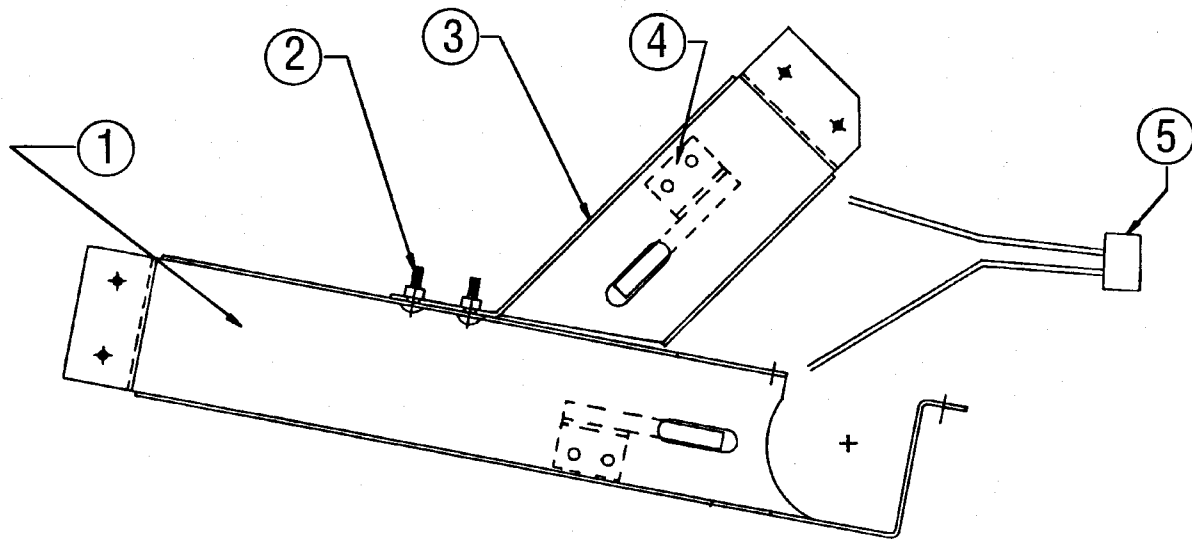
515-5935-00  
Target & Switch  
Assembly



535-5275-00  
Mounting Bracket

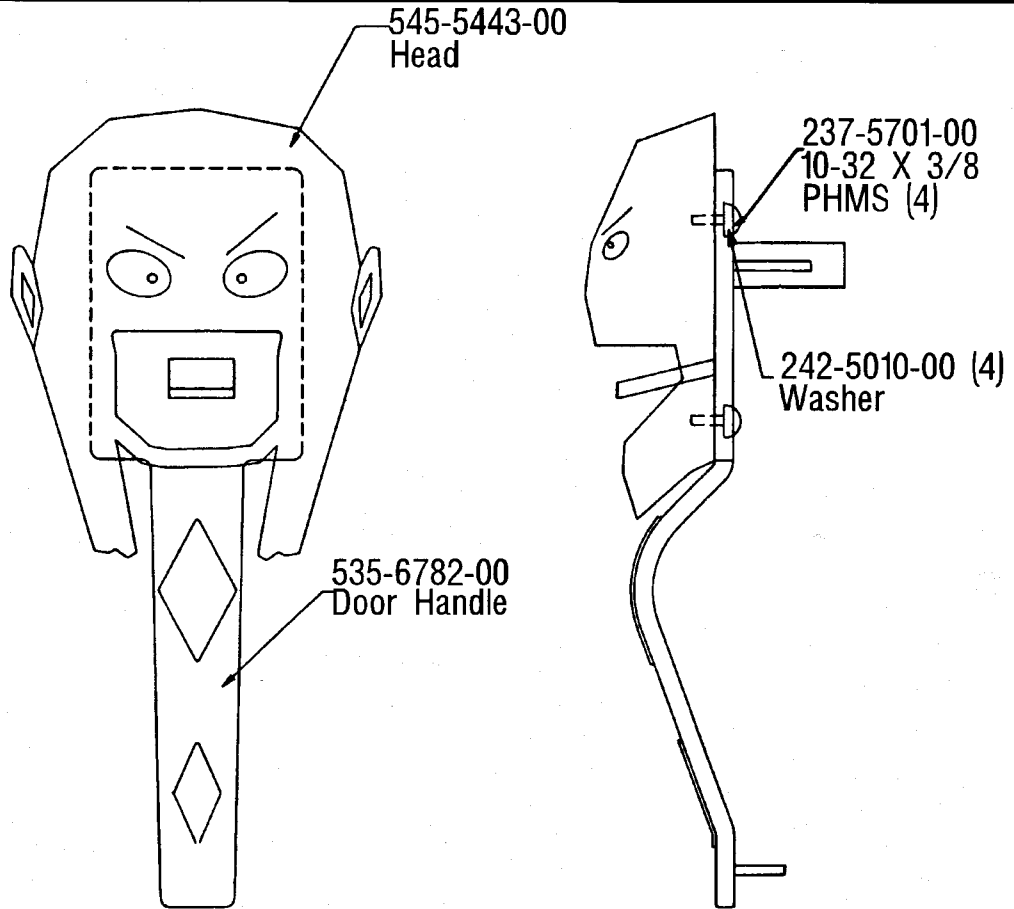
**3-Bank Stand-Up  
Target Assembly  
500-5765-00**

# Trough Assembly 500-5652-00

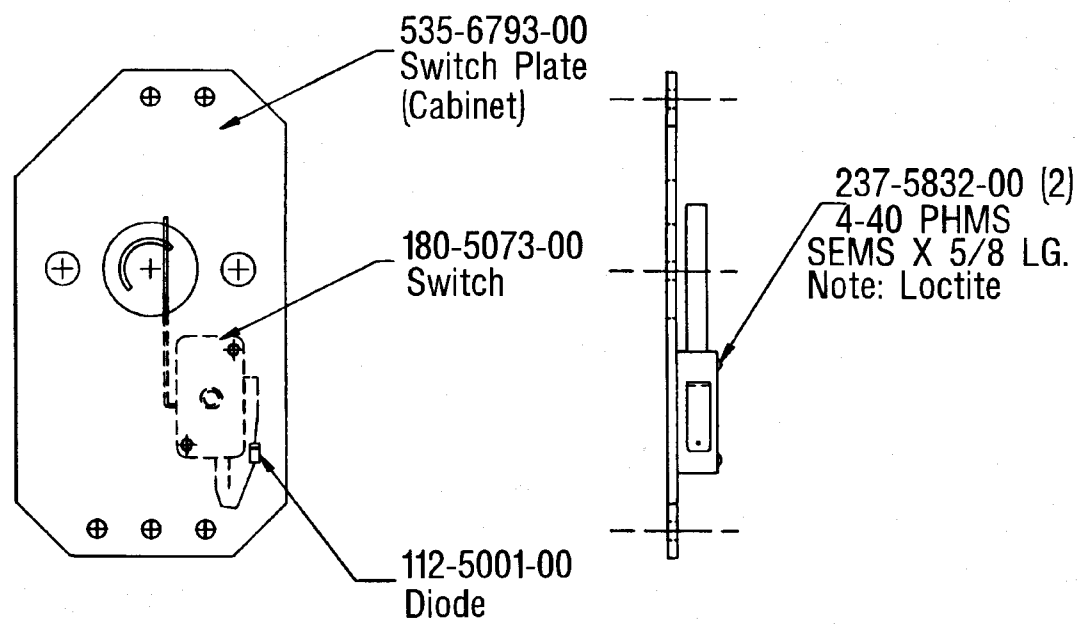


Item	Description	Part No.
1	Trough (Large)	535-6581-00
2	4-440 PHMS 4-40 STOP NUT	237-5882-00 (2) 238-1102-00 (2)
3	Trough (Small)	535-6582-00
4	Micro Switch Diode 2-56-PHMS #2 Split Lock Washer Switch Protect Plate Switch Bracket Rivet	180-5093-00 (2) 112-5001-00 (2) 237-5806-00 (4) 244-5001-00 (4) 535-6539-00 (2) 535-5794-00 (2) 249-5009-00 (4)
5	Cable	





**Ball Launch Door Handle Assembly - 515-5937-00 &  
Door Handle Switch Plate Assembly - 515-5936-00**

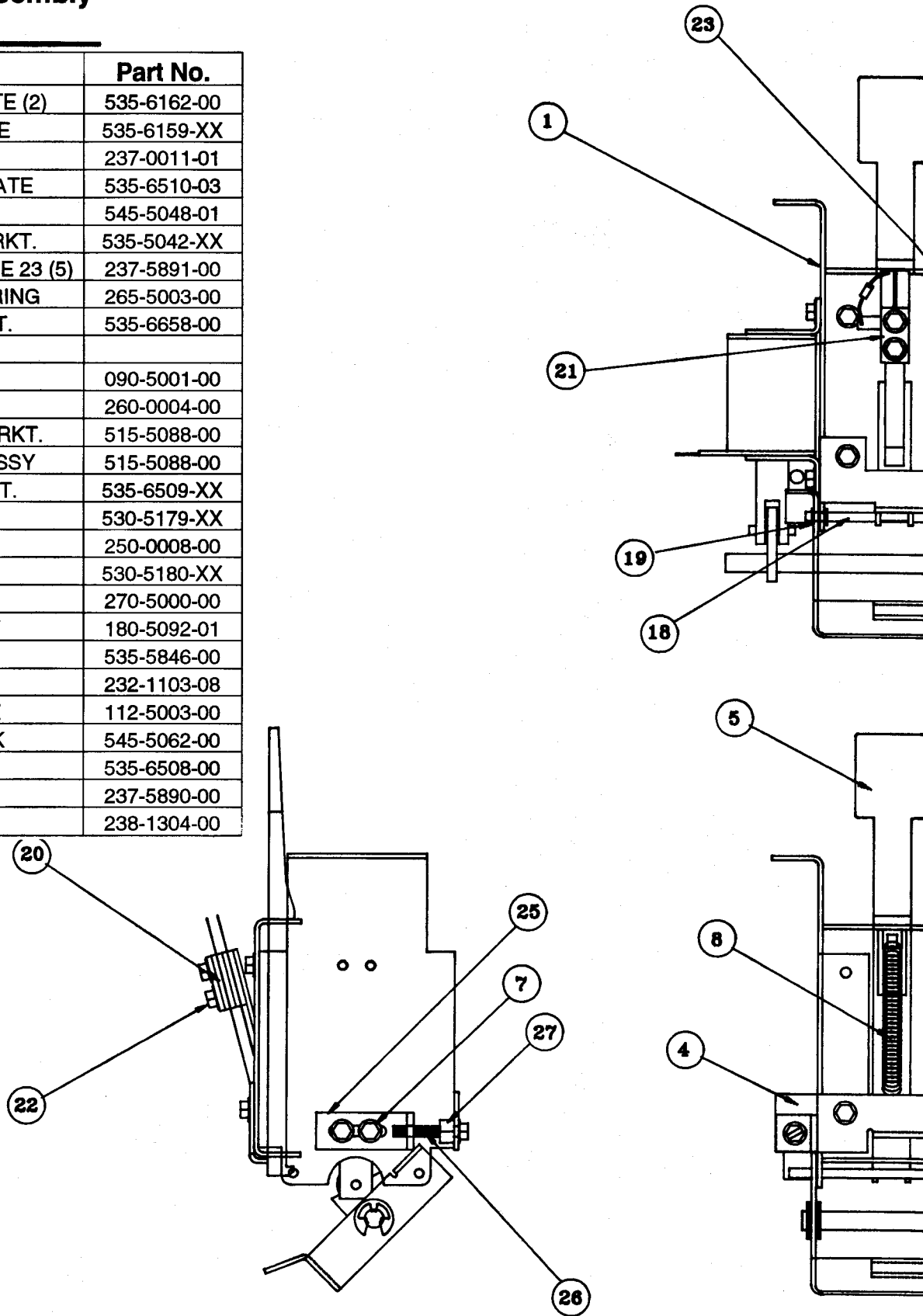


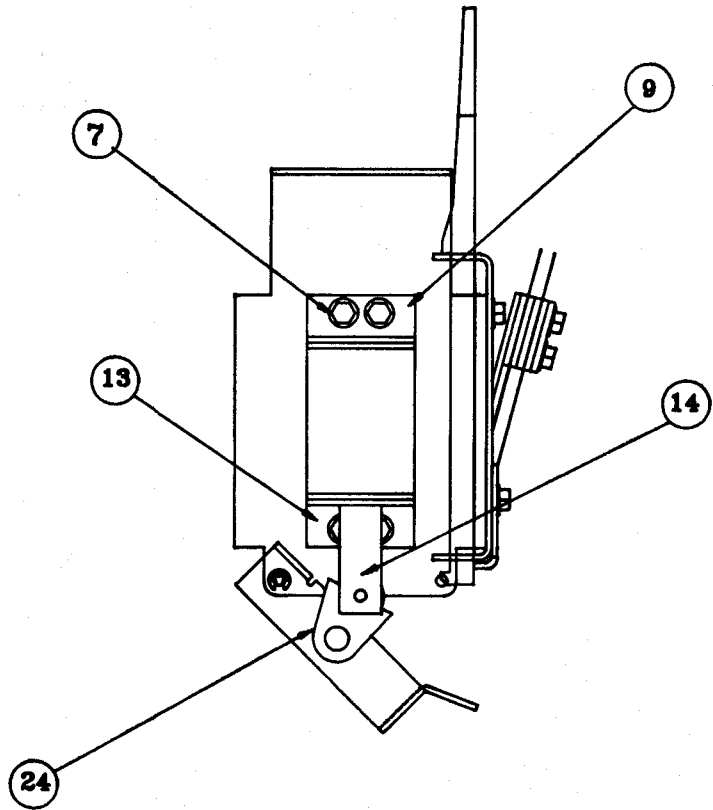
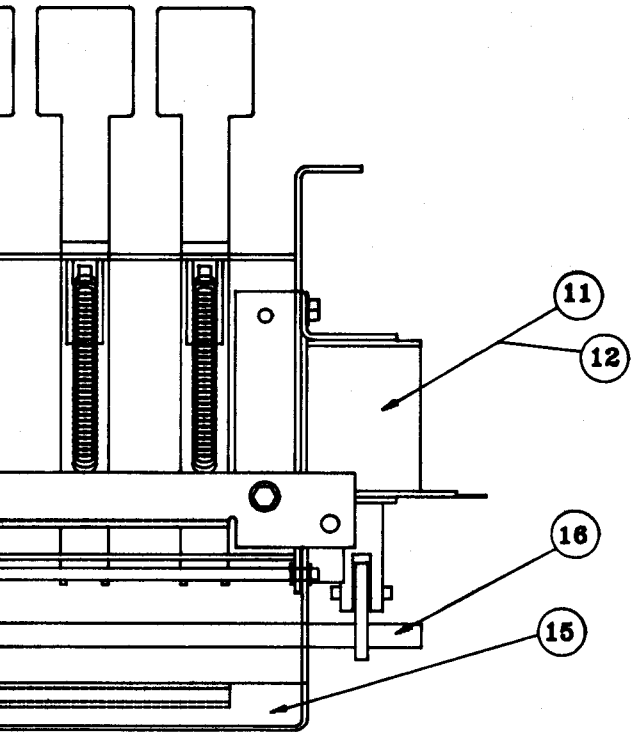
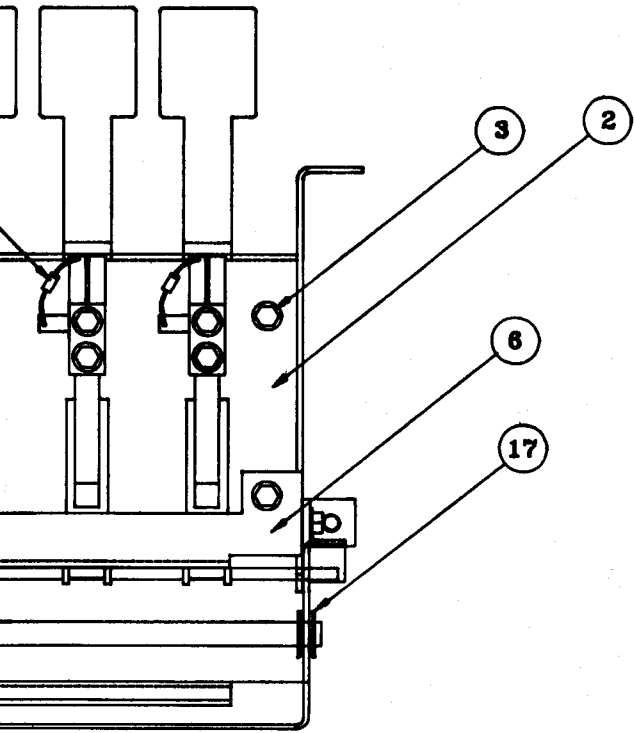
# Notes

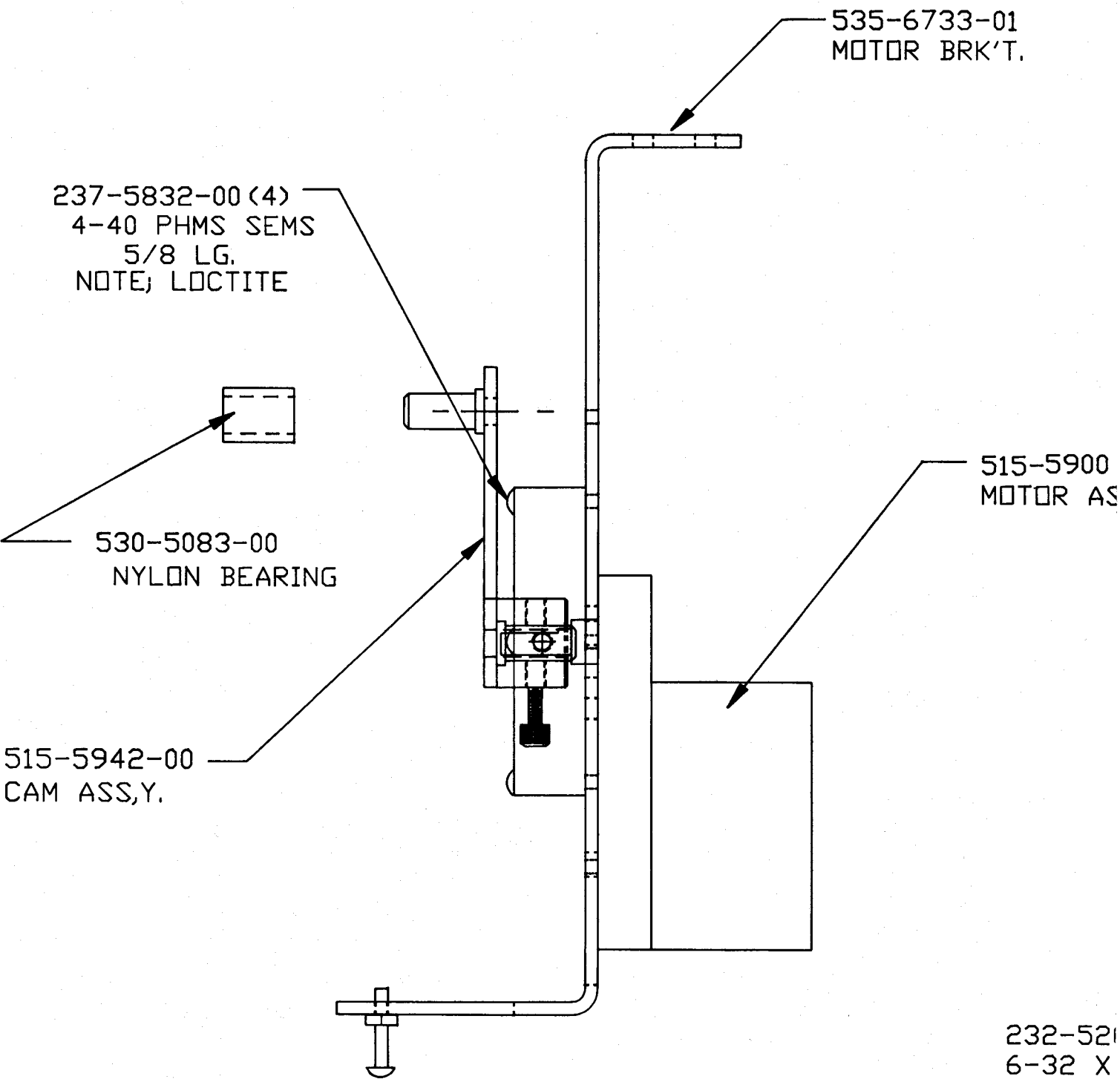
# Drop Target Bank Assembly

## 500-5621-03

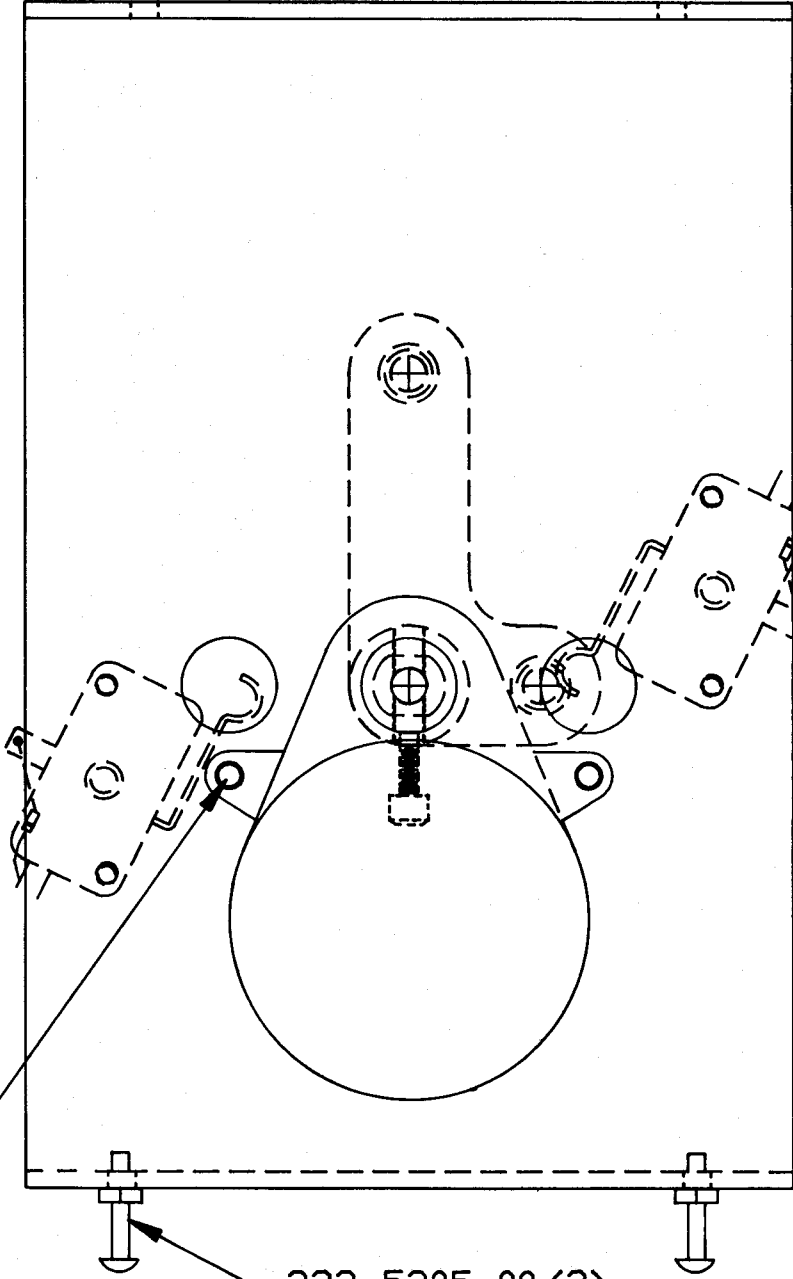
Item	Description	Part No.
1	TARGET END PLATE (2)	535-6162-00
2	TARGET FRAME	535-6159-XX
3	8-32 X 3/8 (6)	237-0011-01
4	SPRING MTG. PLATE	535-6510-03
5	TARGET	545-5048-01
6	TRGT. RETAIN. BRKT.	535-5042-XX
7	8-32 I 3/8 SHWHT TYPE 23 (5)	237-5891-00
8	TRGT. RESET SPRING	265-5003-00
9	COIL SPT. BRKT.	535-6658-00
10		
11	23-800 COIL	090-5001-00
12	COIL SLEEVE	260-0004-00
13	PLUNGER STOP BRKT.	515-5088-00
14	PLUNGER/LINK ASSY	515-5088-00
15	TRGT. LIFT BRKT.	535-6509-XX
16	TRGT. SHAFT	530-5179-XX
17	E-RING (1/4)	250-0008-00
18	PIVOT SHAFT	530-5180-XX
19	E-RING (1/8)	270-5000-00
20	SWITCH ASSY	180-5092-01
21	SWITH PLATE	535-5846-00
22	6-32 X 1/2	232-1103-08
23	IN 4004 DIODE	112-5003-00
24	PLUNGER LINK	545-5062-00
25	ADJ. BRKT.	535-6508-00
26	8-32 X7/6 (1)	237-5890-00
27	8-32 NYLOC	238-1304-00







**Motor, Cam & Switch Assembly**  
**500-5742-01**



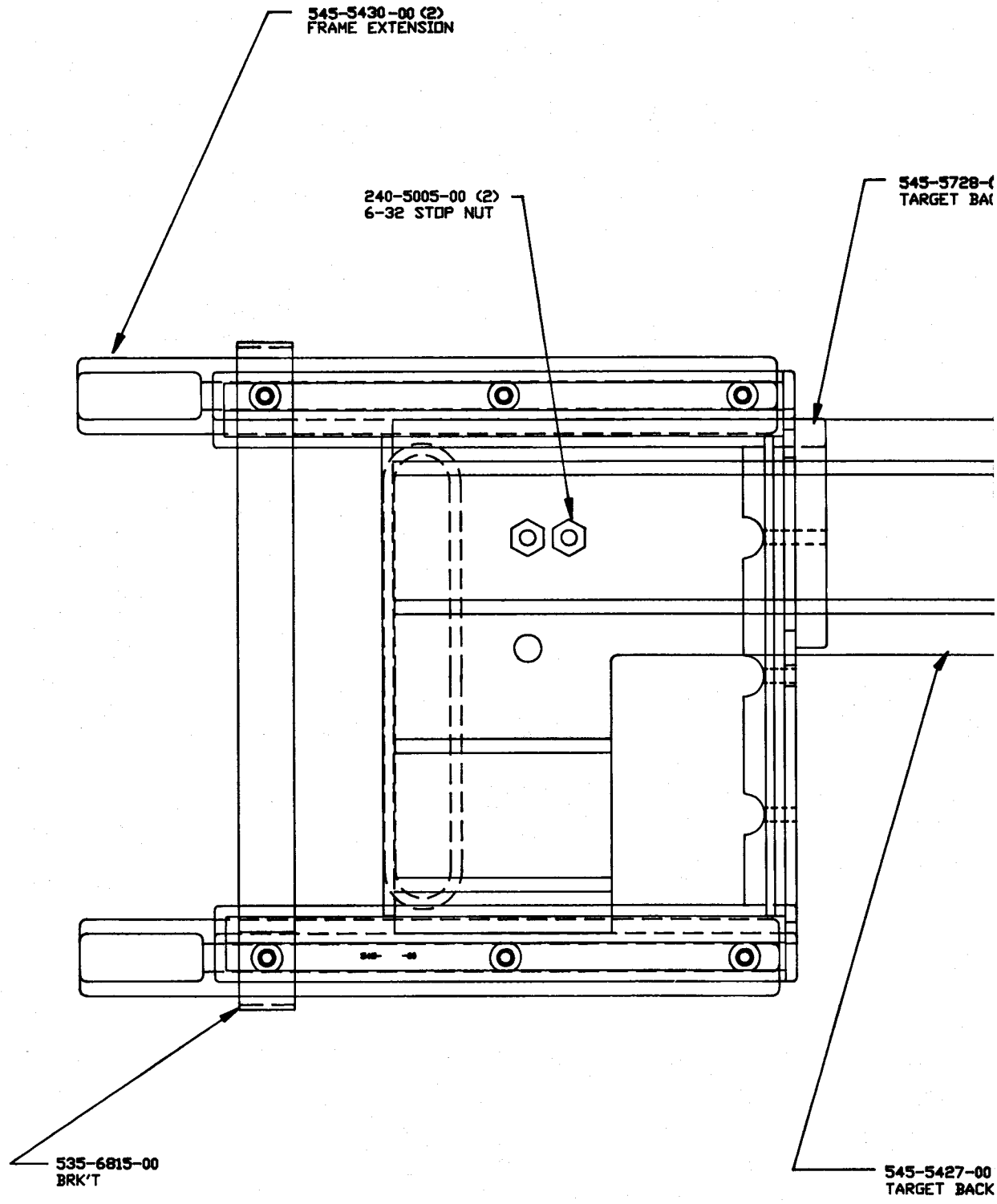
180-5052-00 (2)  
SWITCH  
112-5001-00 (2)  
DIODE

-00  
S'Y.

01-00  
3/8 PHMS

232-5205-00 (2)  
6-32 PHMS  
240-5004-00 (2)  
HEX NUT 6-32

# Target Back Plate Guide Assembly 515-5905-XX

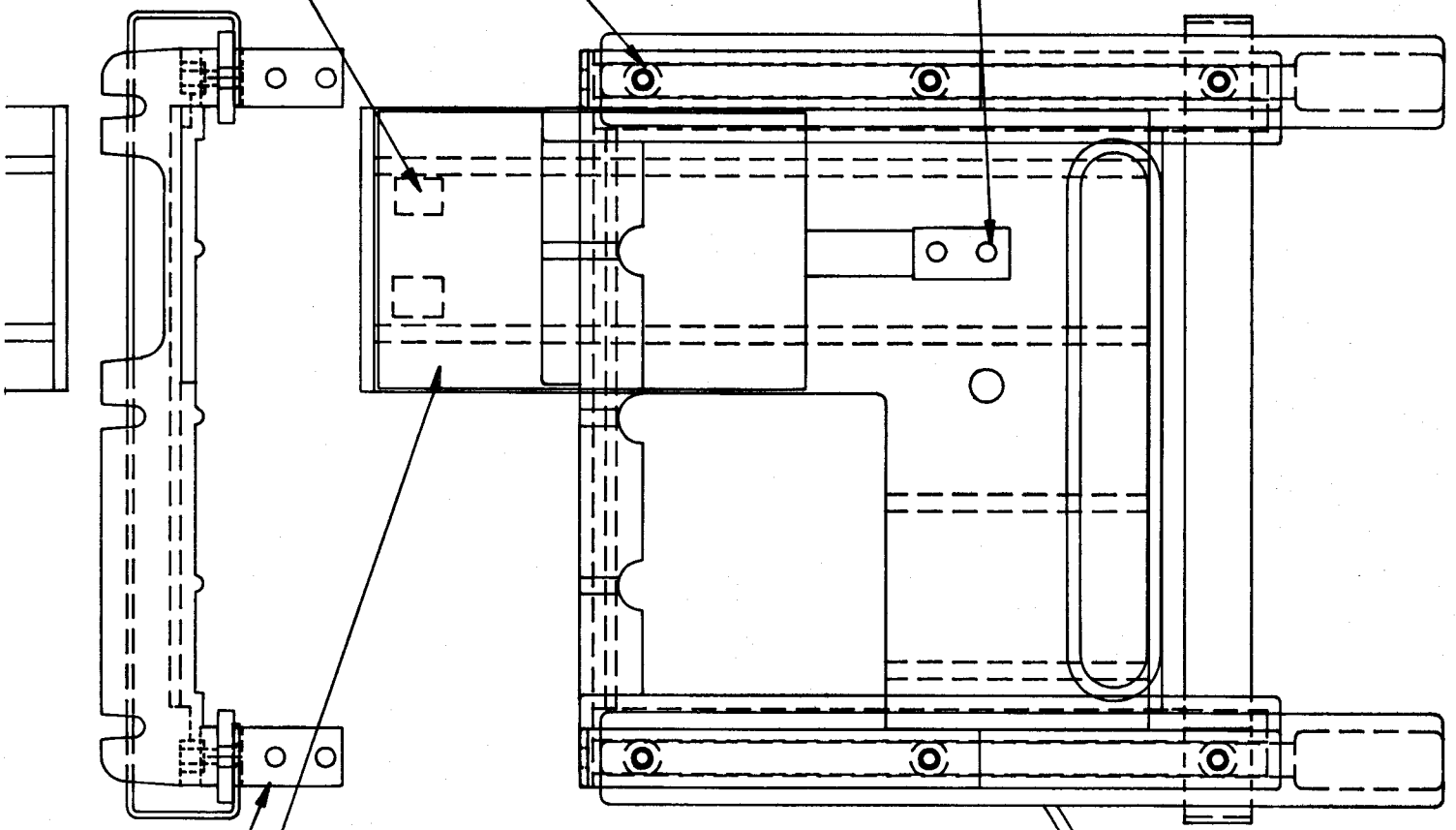


626-5011-00 (2)  
FOAM PAD

237-5870-00 (6)  
6 X 5/8 HWHMS

237-5503-00 (2)  
6-32 5/8 PHMS

10  
X PLATE GUIDE



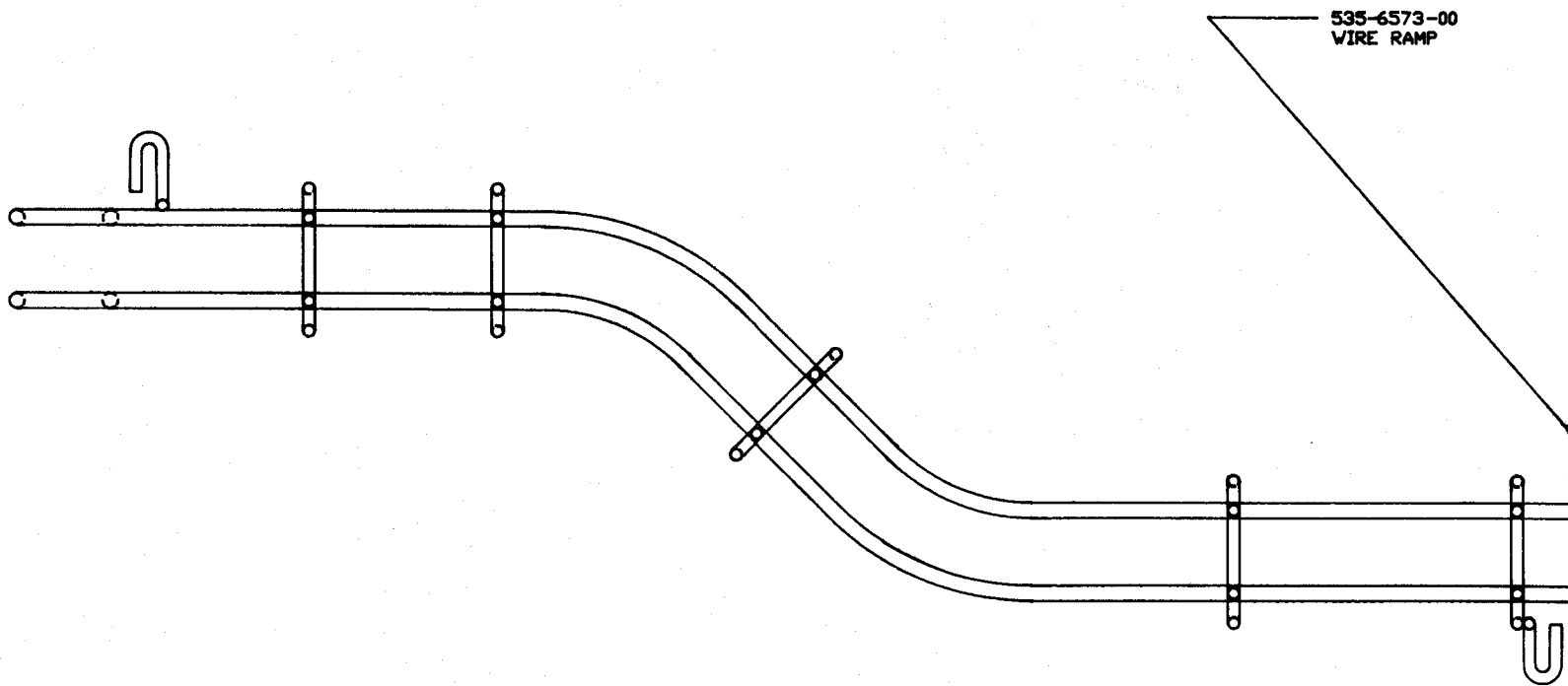
535-6794-00(2)  
SUPPORT BRK'T.

515-5906-XX  
GRAVESTONE TARGET ASS'Y.

PLATE

PART NO#.	TARGET ASS'Y. NO#.
-00	515-5906-00 CRYPT





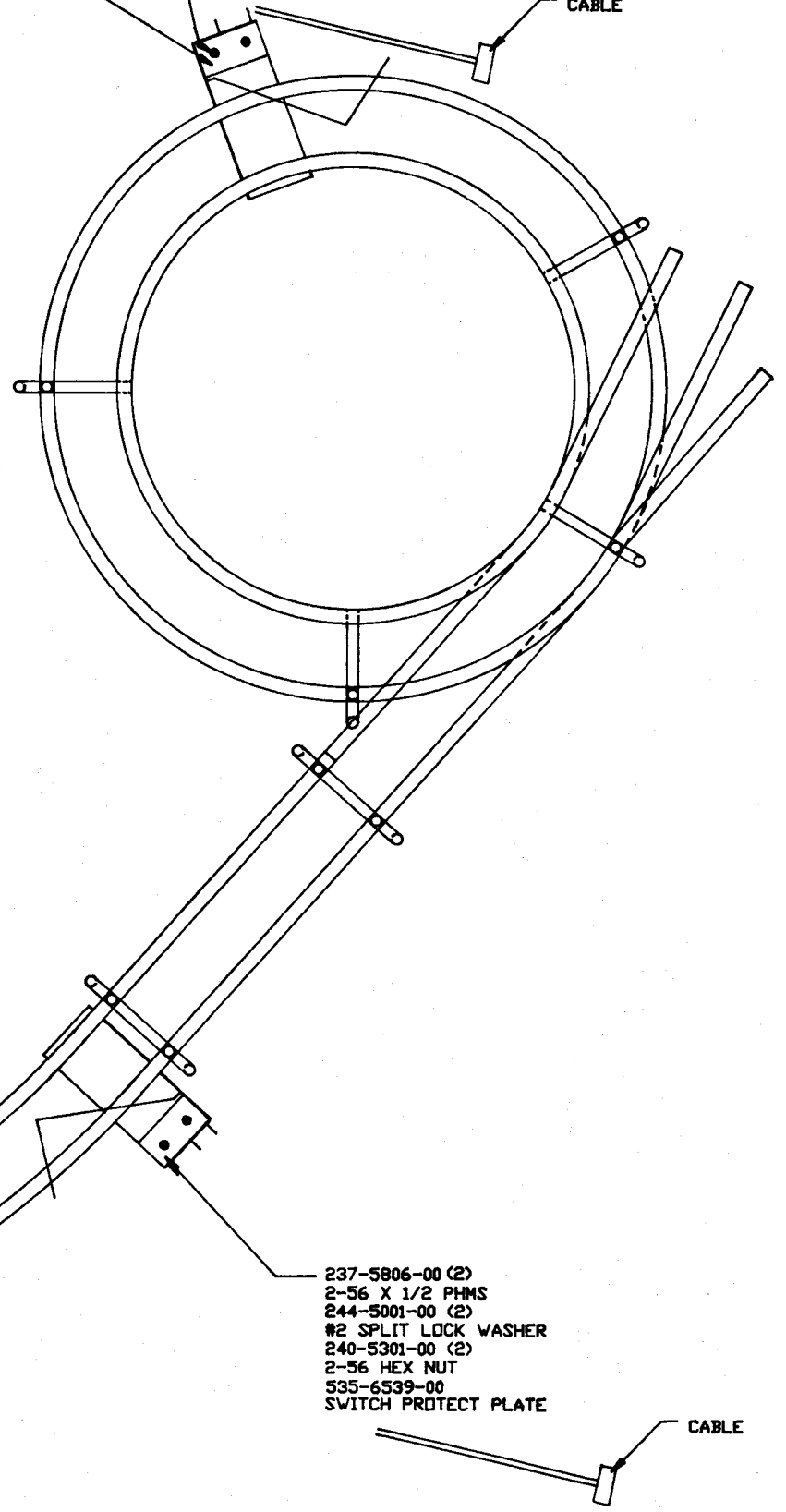
535-6573-00  
WIRE RAMP

**Right) Assembly**

180-5093-00  
MICRO SWITCH

237-5806-00 (2)  
2-56 X 1/2 PHMS  
244-5001-00 (2)  
#2 SPLIT LOCK WASHER  
240-5301-00 (2)  
2-56 HEX NUT  
535-6539-00  
SWITCH PROTECT PLATE

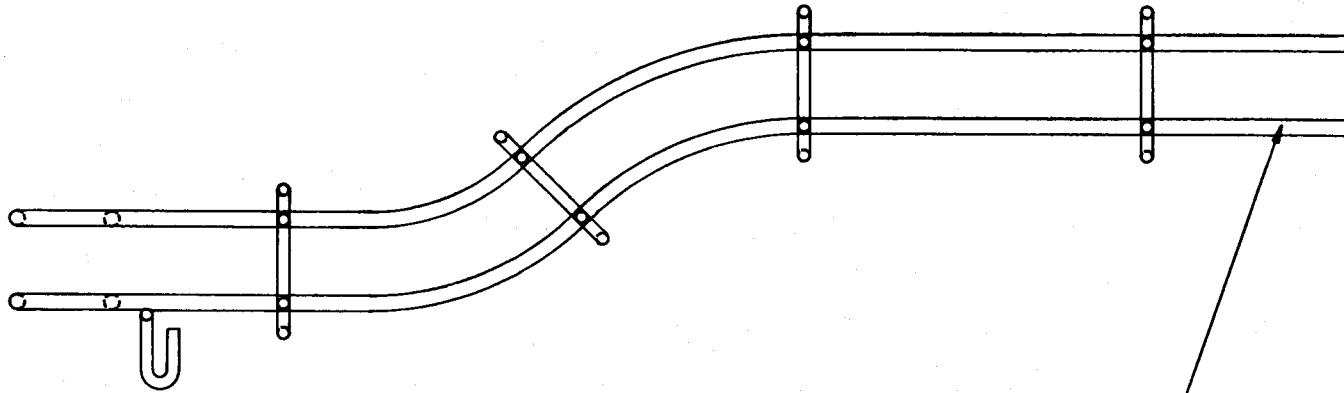
CABLE



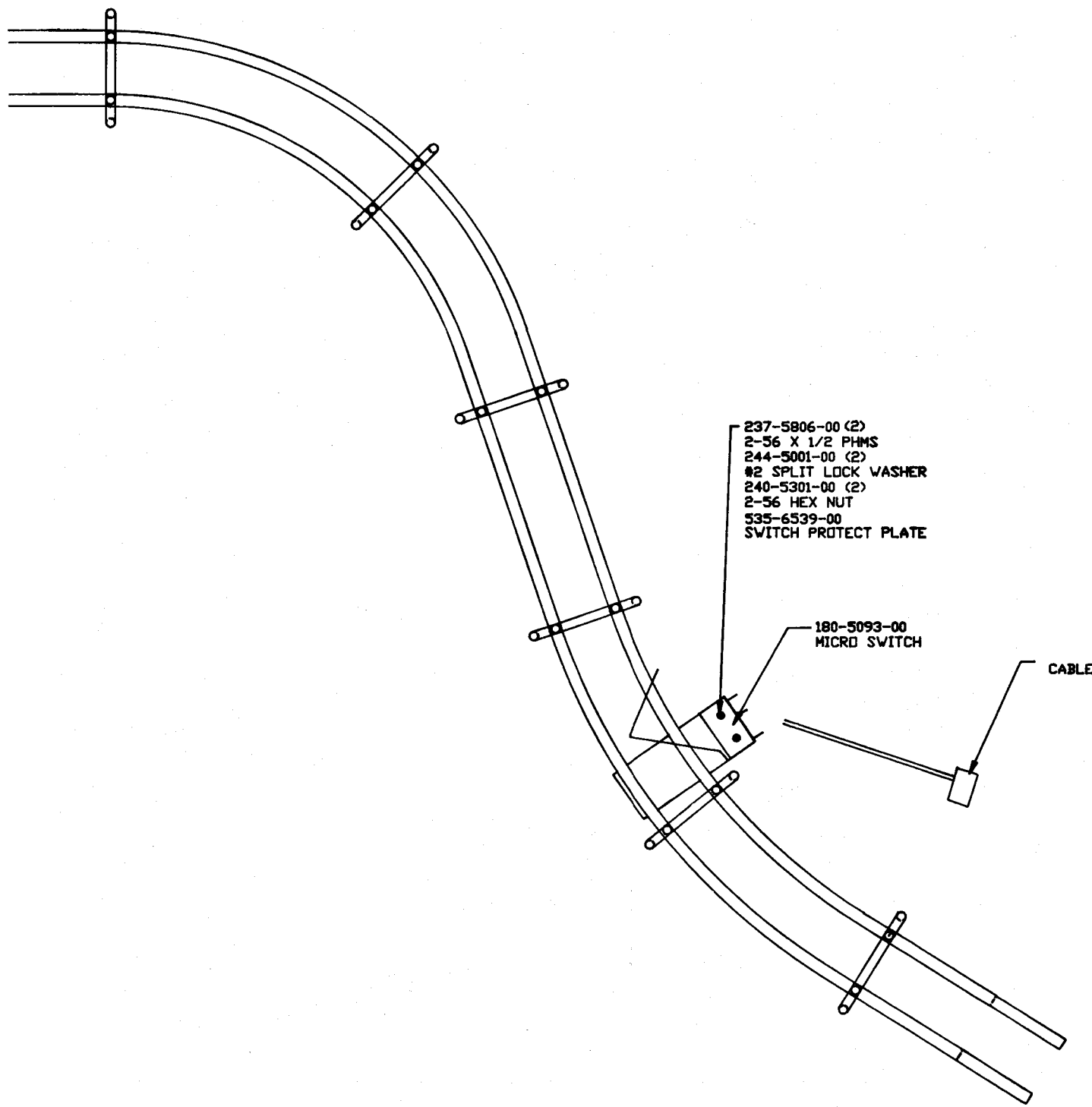
237-5806-00 (2)  
2-56 X 1/2 PHMS  
244-5001-00 (2)  
#2 SPLIT LOCK WASHER  
240-5301-00 (2)  
2-56 HEX NUT  
535-6539-00  
SWITCH PROTECT PLATE

CABLE

**Ramp (Left) Assembly**  
**500-5648-00**



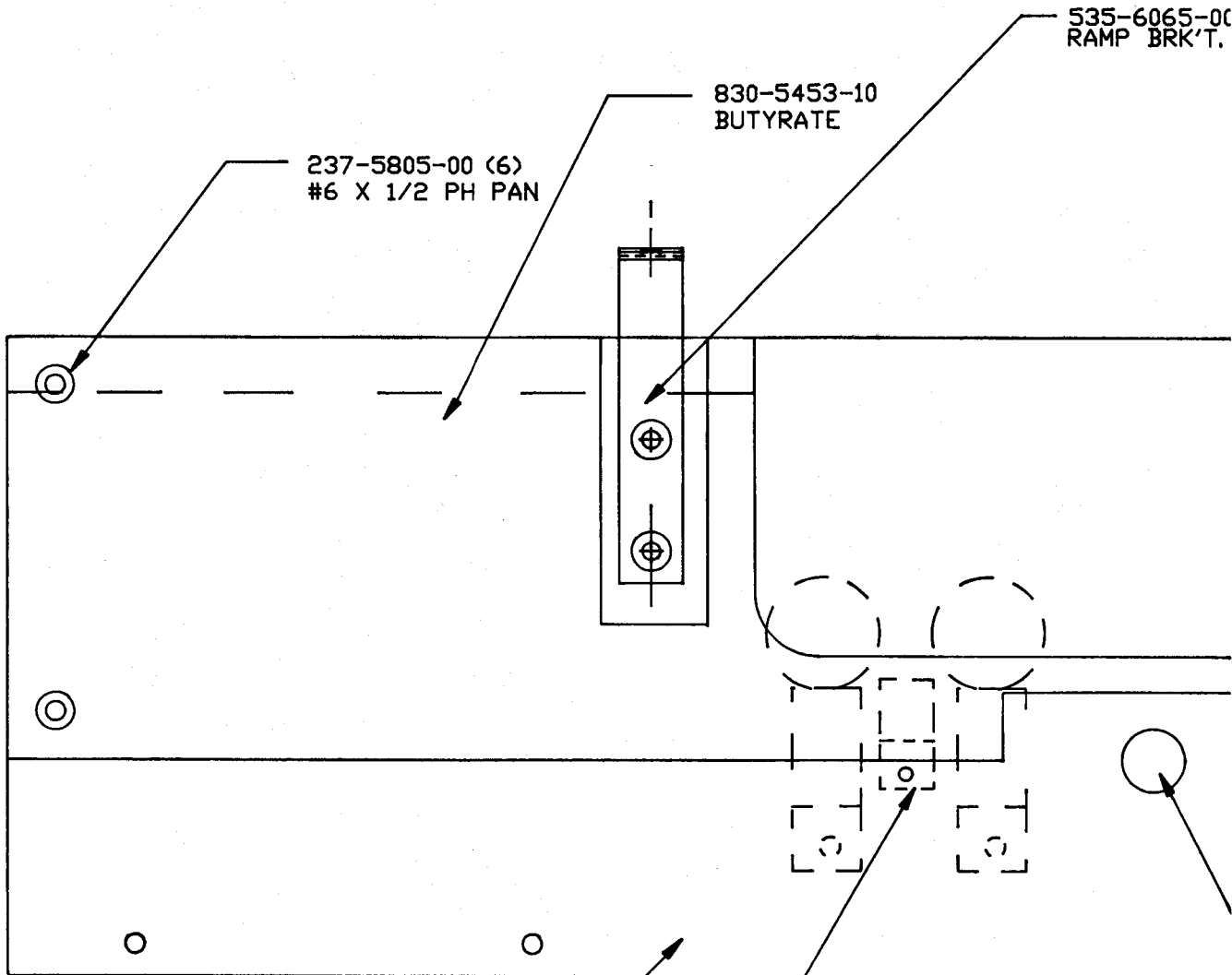
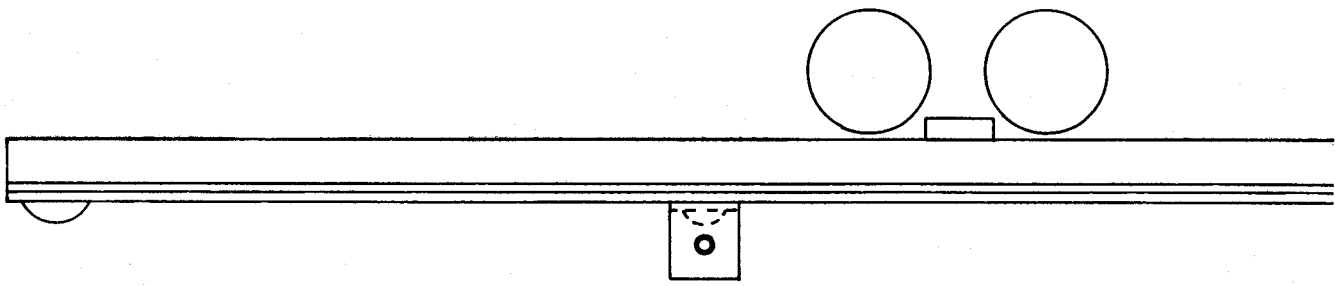
535-6574-00  
WIRE RAMP



- 237-5806-00 (2)
- 2-56 X 1/2 PHMS
- 244-5001-00 (2)
- #2 SPLIT LOCK WASHER
- 240-5301-00 (2)
- 2-56 HEX NUT
- 535-6539-00
- SWITCH PROTECT PLATE

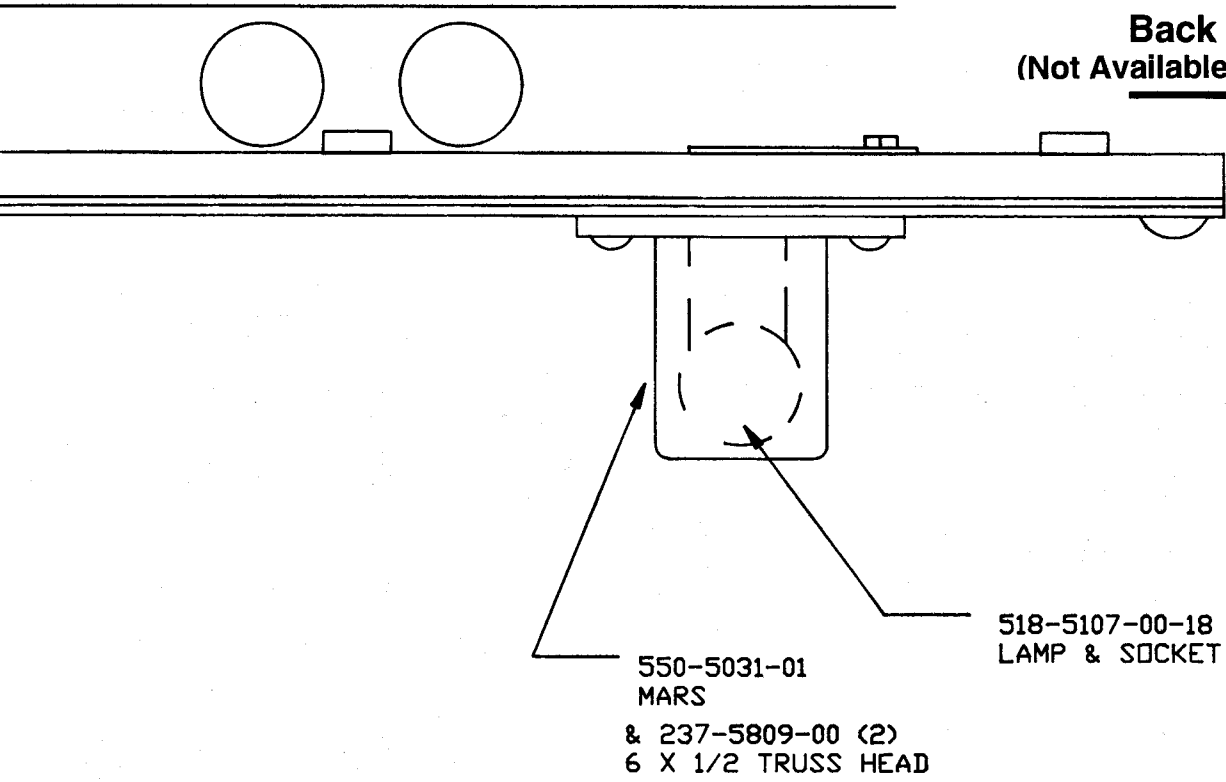
180-5093-00  
MICRO SWITCH

CABLE



Unique Parts

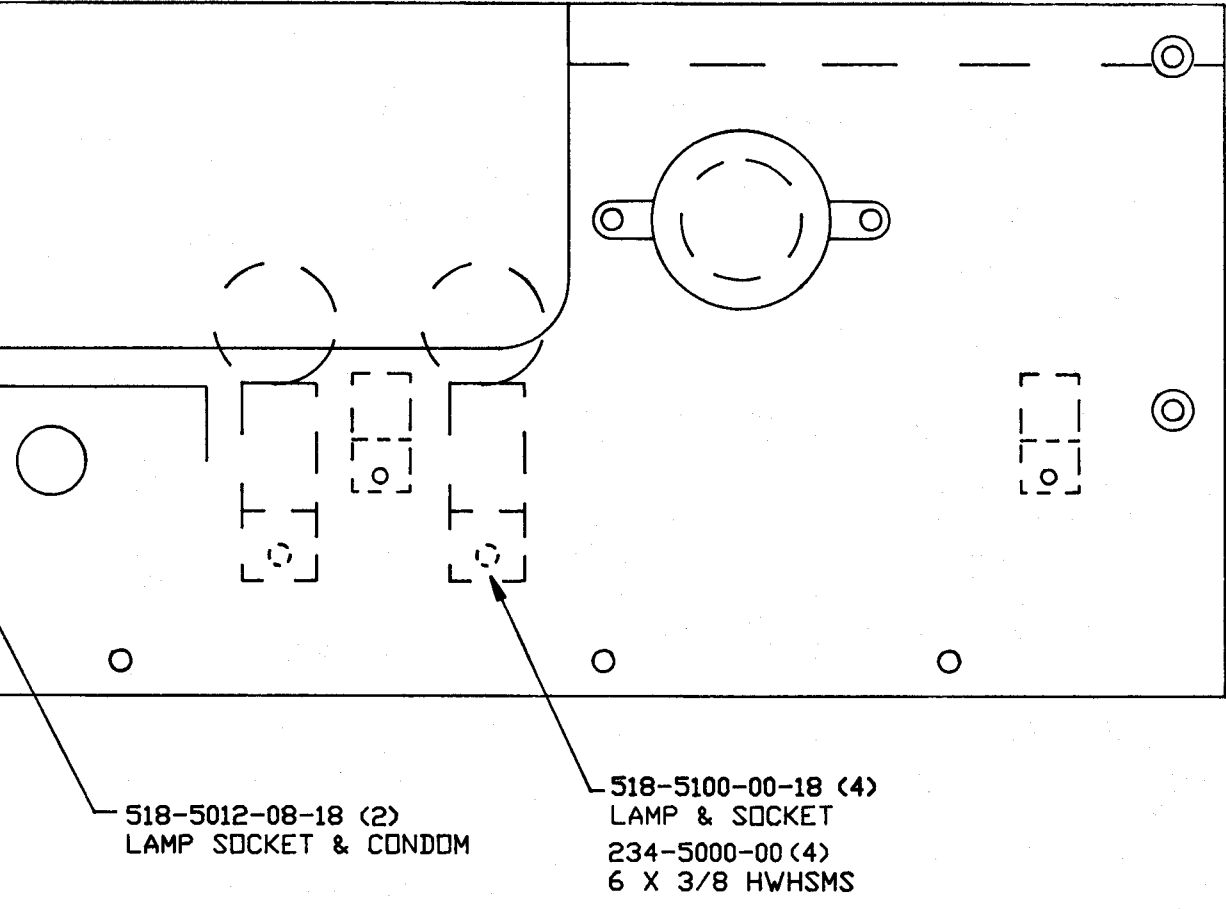
**Back Panel Drawing**  
**(Not Available as an Assembly)**



550-5031-01  
MARS

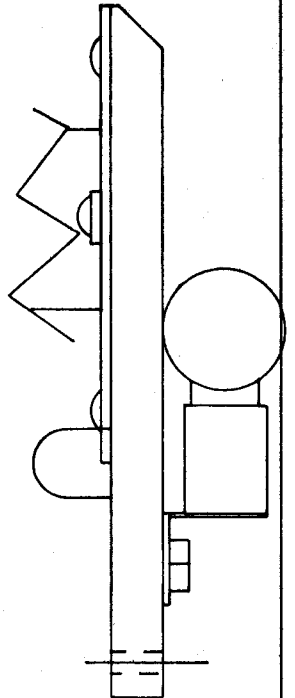
518-5107-00-18  
LAMP & SOCKET

& 237-5809-00 (2)  
6 X 1/2 TRUSS HEAD



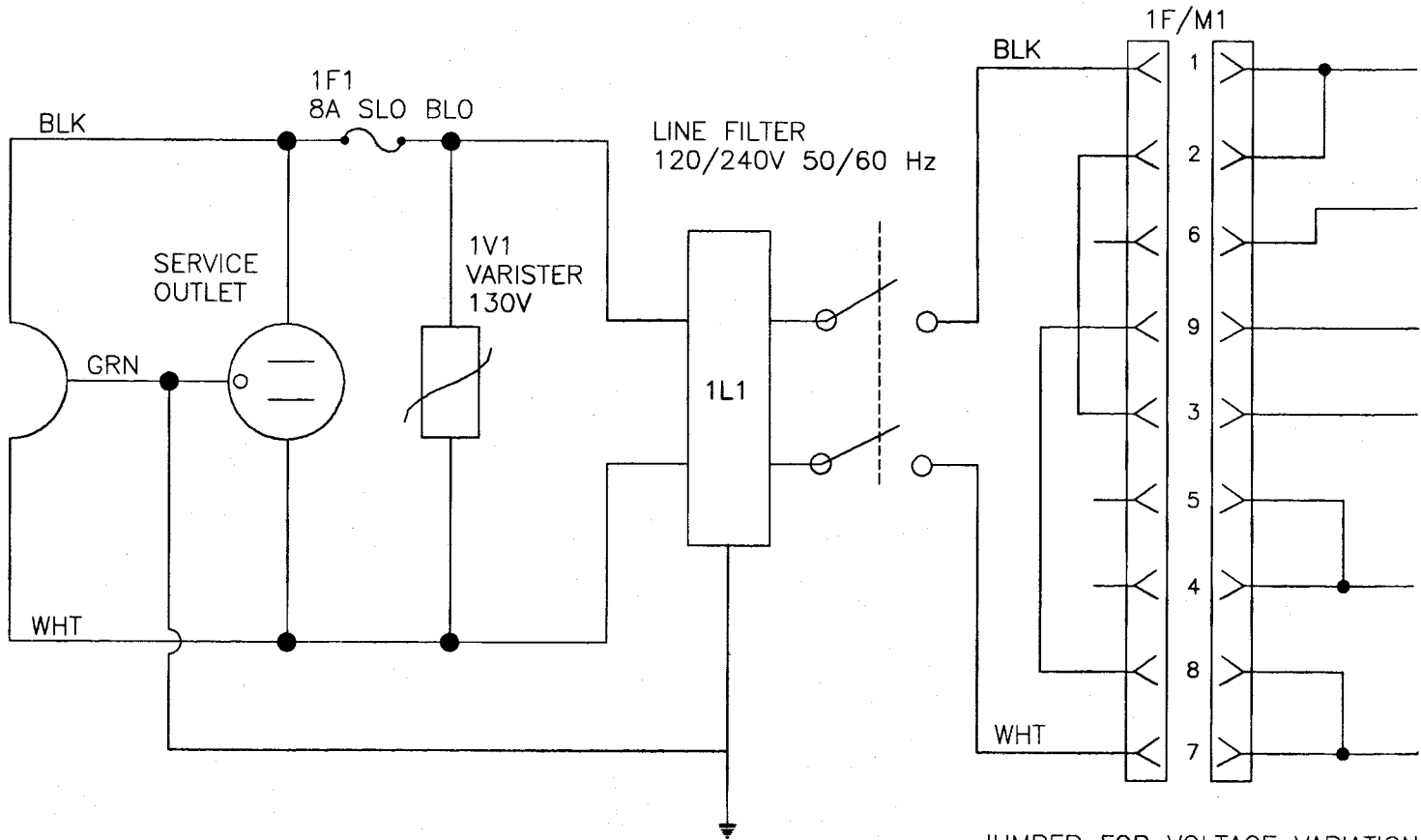
518-5012-08-18 (2)  
LAMP SOCKET & CONDOM

518-5100-00-18 (4)  
LAMP & SOCKET  
234-5000-00 (4)  
6 X 3/8 HWHSMS



THIS CONFIGURATION FOR 115V

FOR LOWER LINE VOLTAGES  
OR 220 VOLT OPERATION  
SEE SAMPLES BELOW



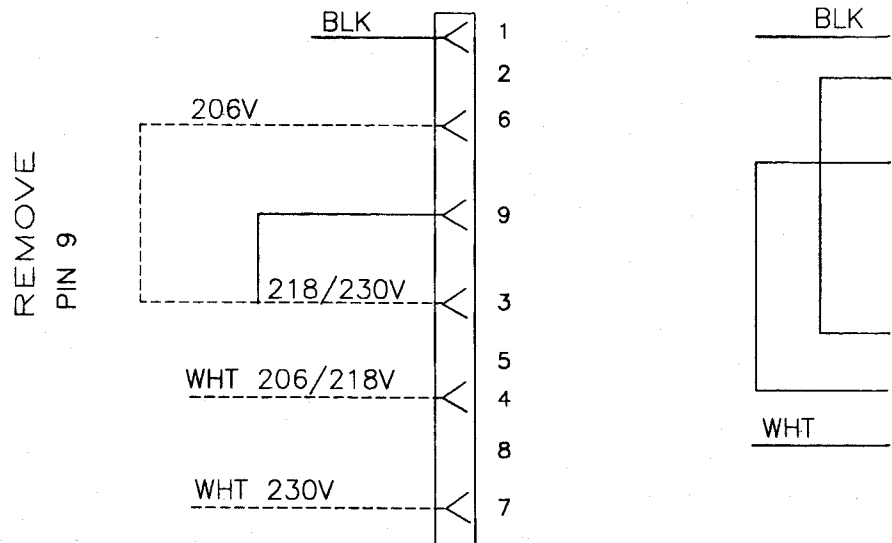
JUMPER FOR VOLTAGE VARIATION

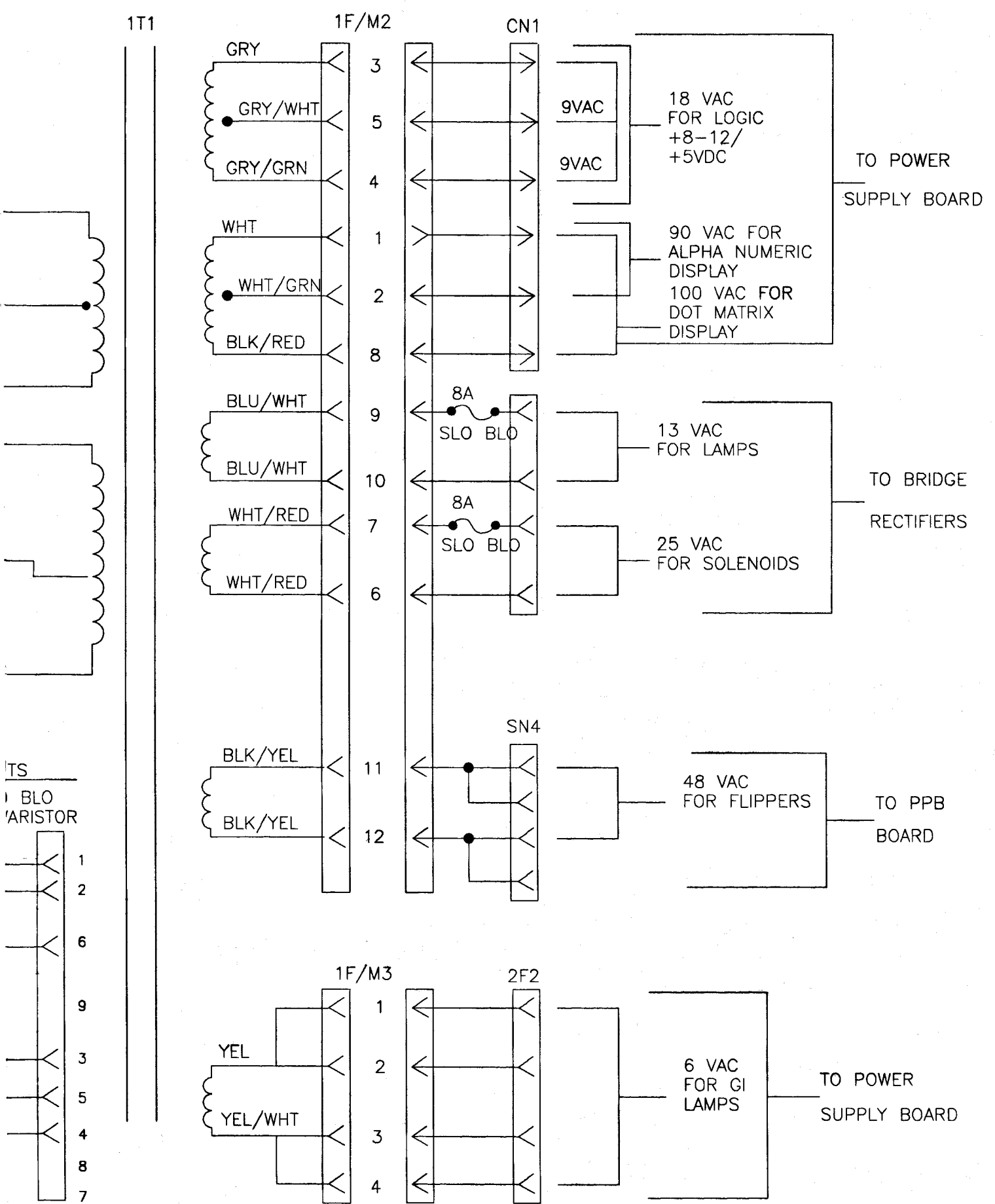
230/218/206 VOLTS

1F1= 4A SLO BLO  
1V1=275V VARISTOR

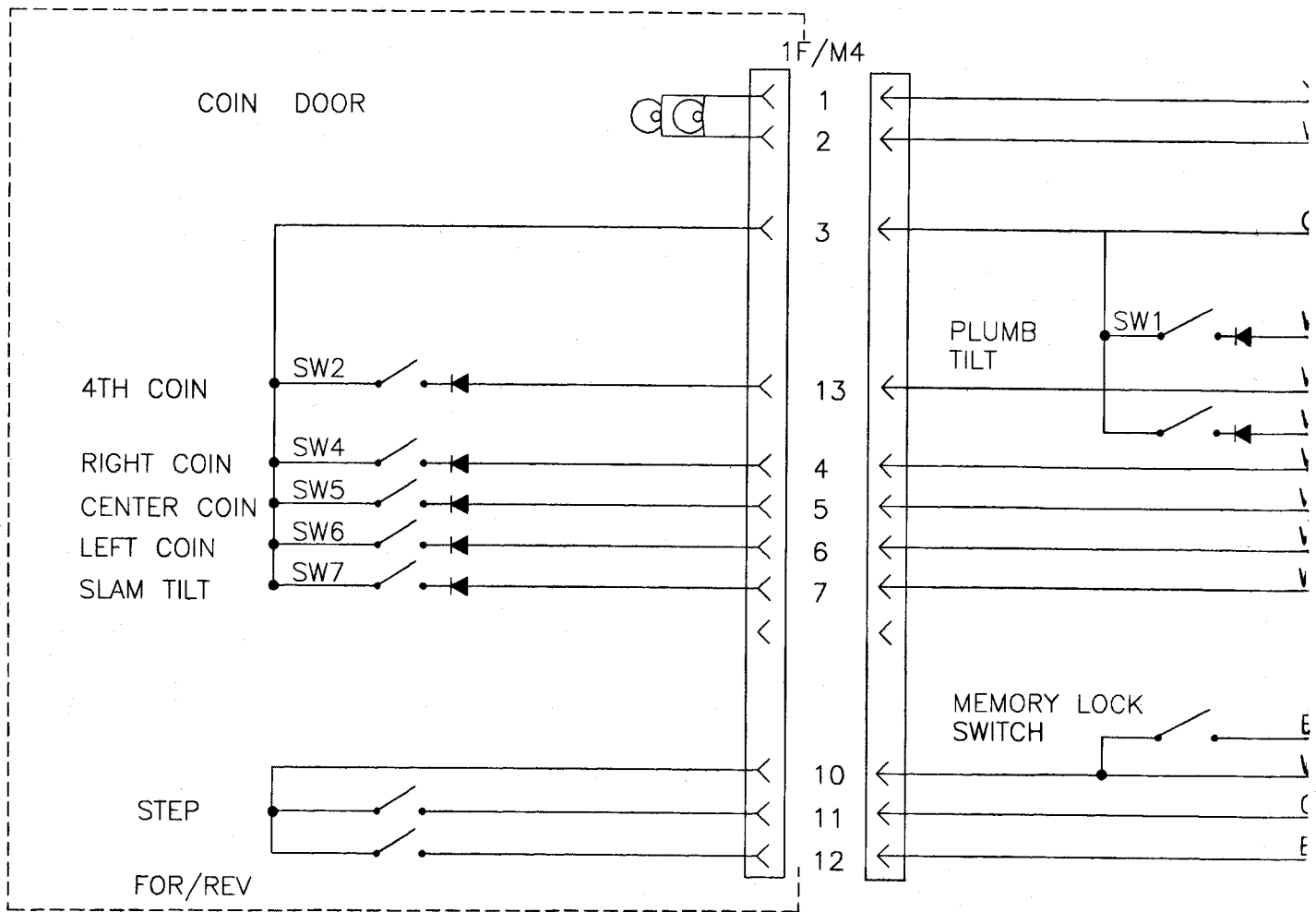
100/105 VOLTS

1F1= 8A SLO BLO  
1V1= 130V VARISTOR

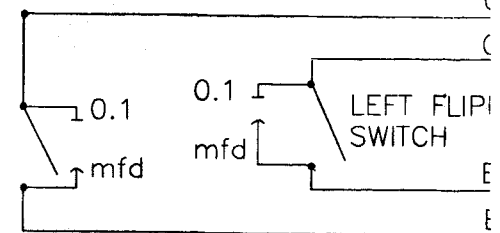




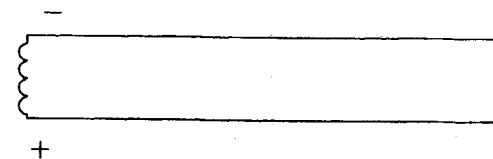
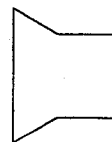




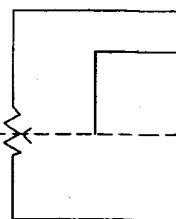
RIGHT FLIPPER SWITCH



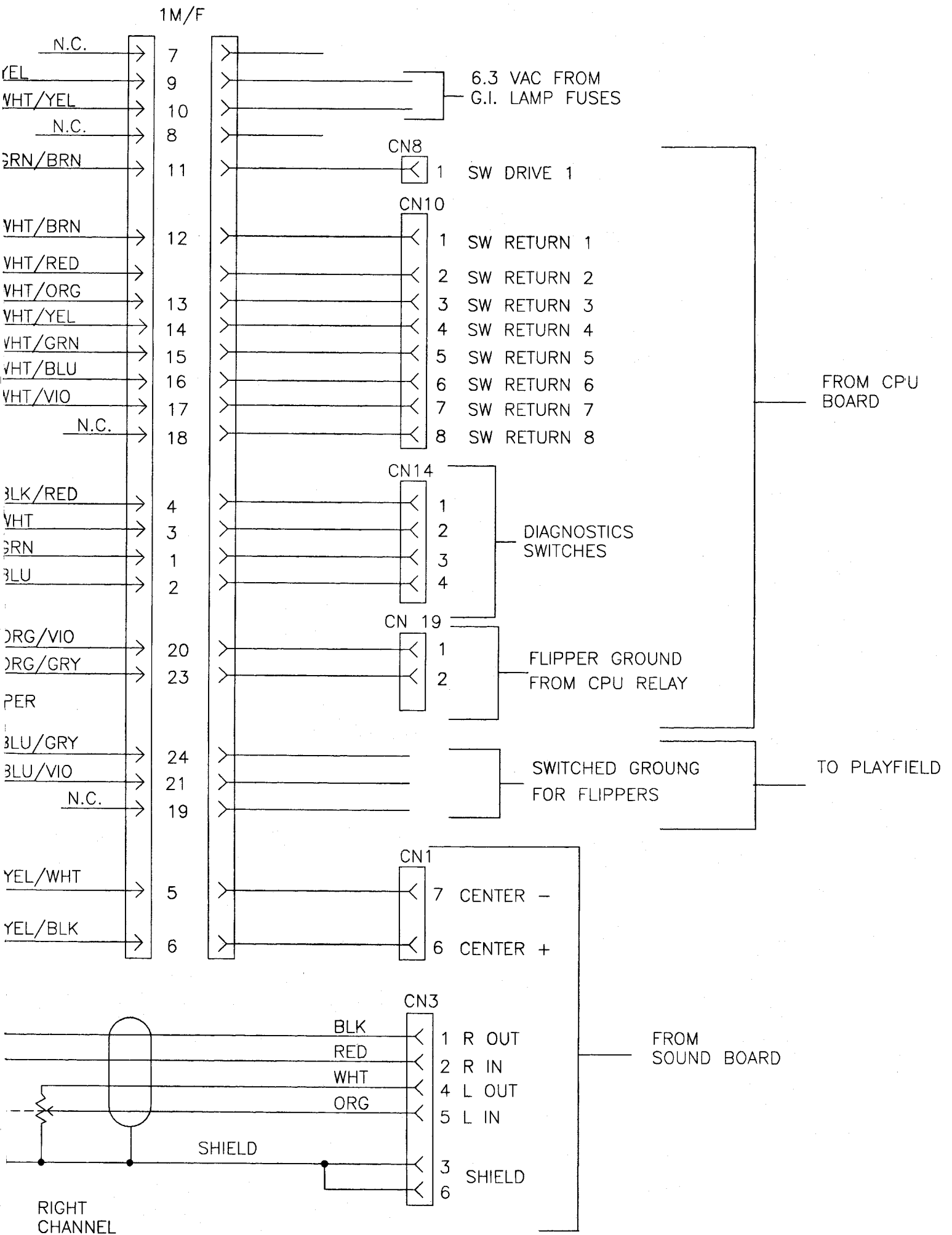
CABINET SPEAKER MONO

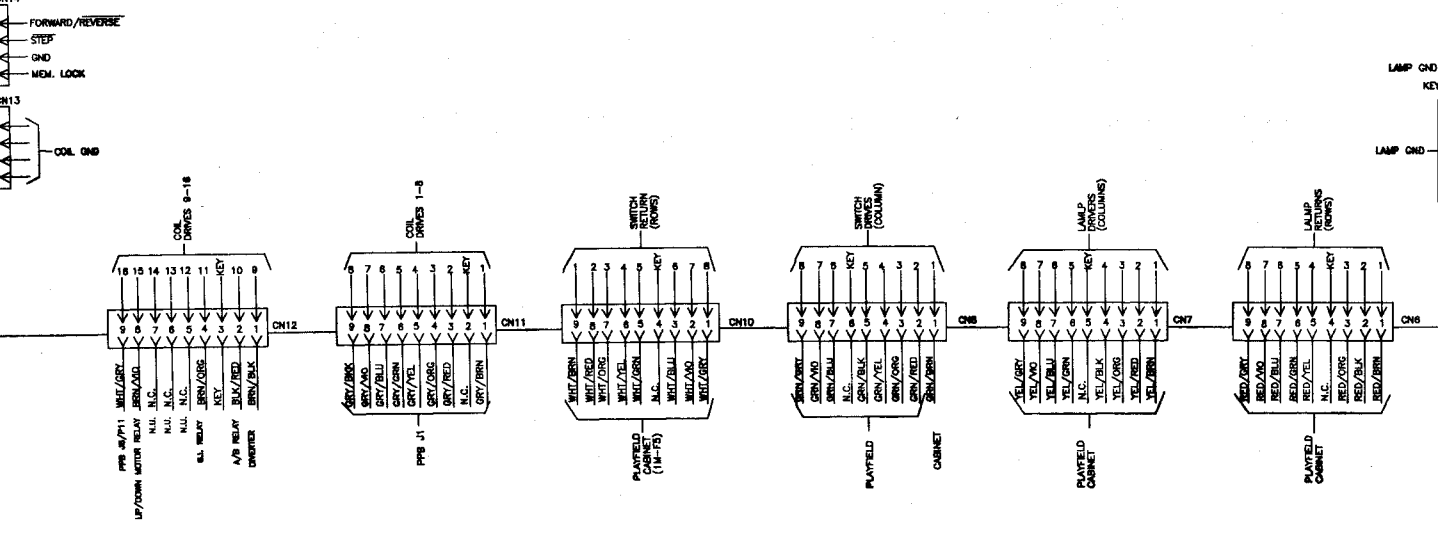
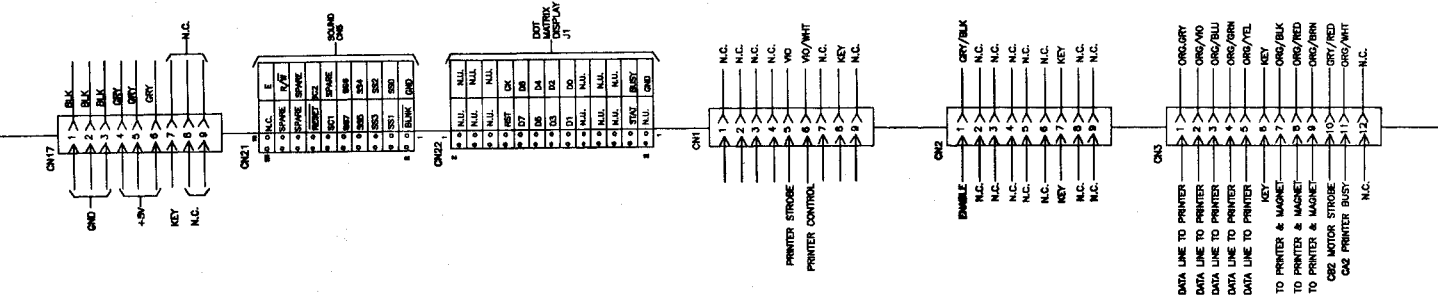
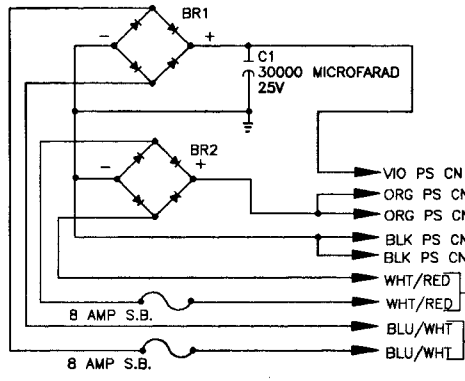
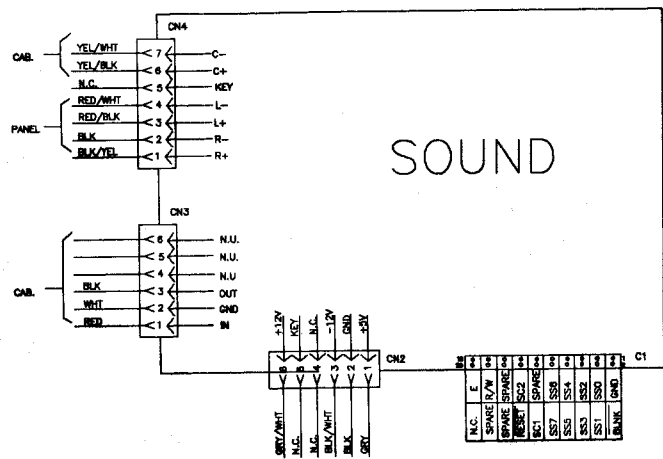


STEREO VOLUME CONTROL 10K LOGARITHMIC



LEFT CHANNEL





- KEY
- SPEC COIL SW3
- SPEC COIL SW2
- SPEC COIL SW4
- SPEC COIL SW1
- GND
- N.C.
- SPEC COIL SW5
- SPEC COIL SW6

- RIGHT
- LEFT
- SPEC COIL DRIVE 3
- SPEC COIL DRIVE 2
- KEY
- SPEC COIL DRIVE 4
- SPEC COIL DRIVE 1
- SPEC COIL DRIVE 5
- SPEC COIL DRIVE 6

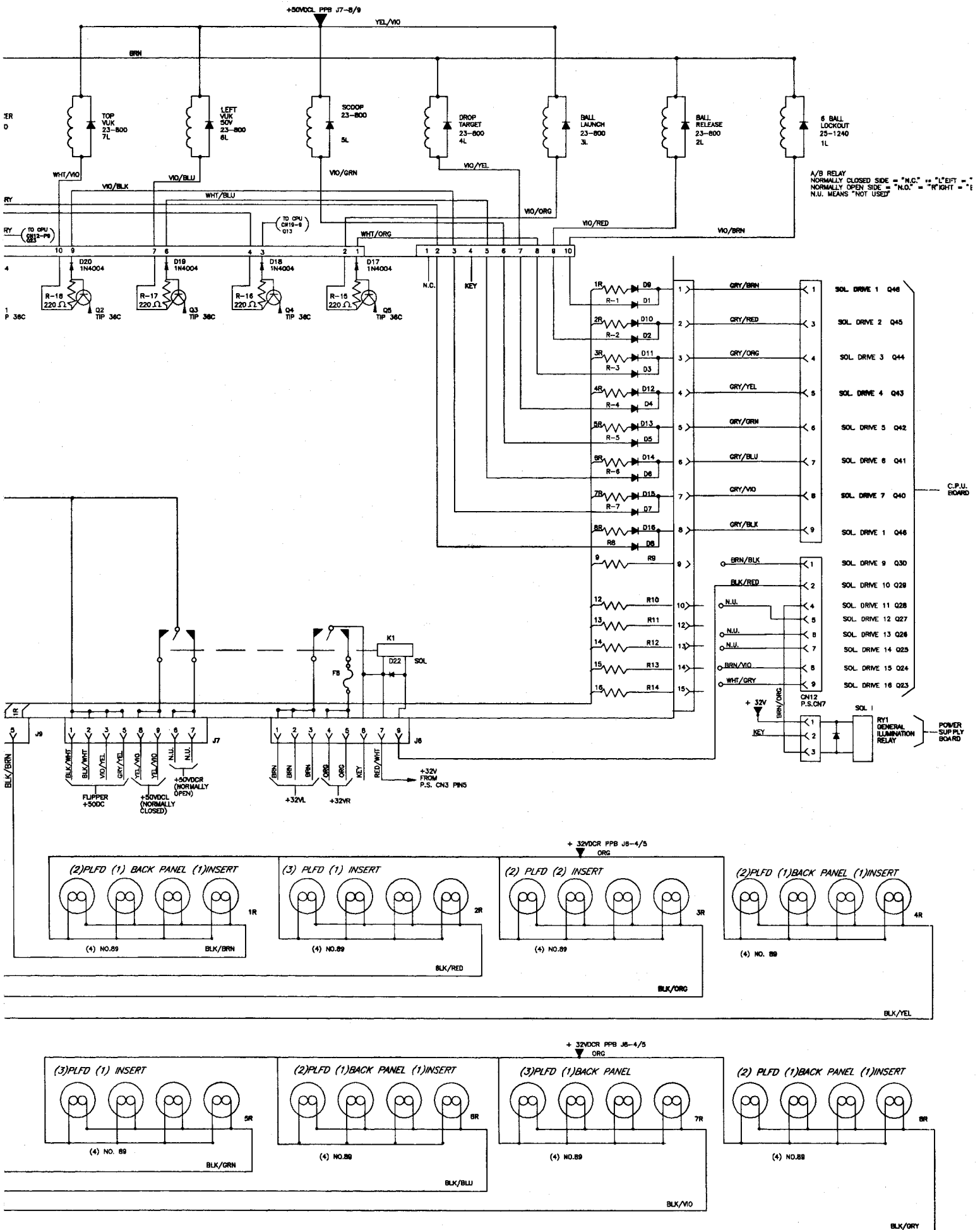
- FLIPPER
- GND
- LAMP B+ +18V
- KEY
- LAMP B+ +18V
- LAMP GND
- KEY
- LAMP GND
- KEY

CPU

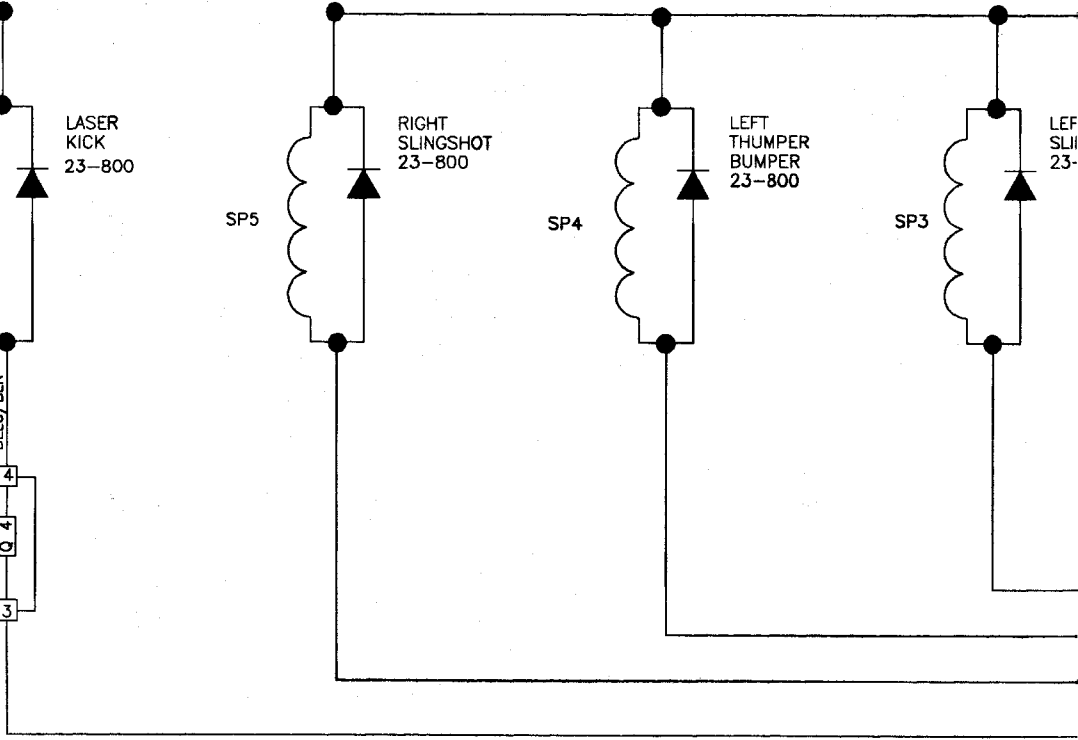
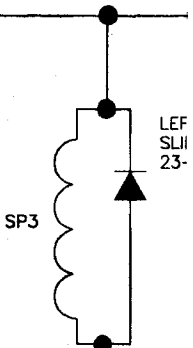
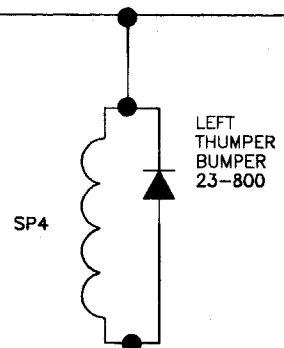
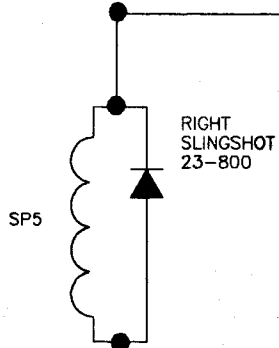
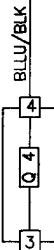
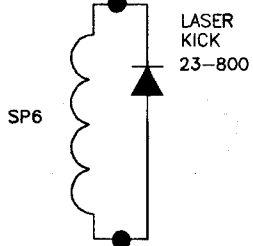
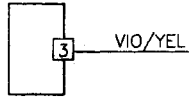
SOUND



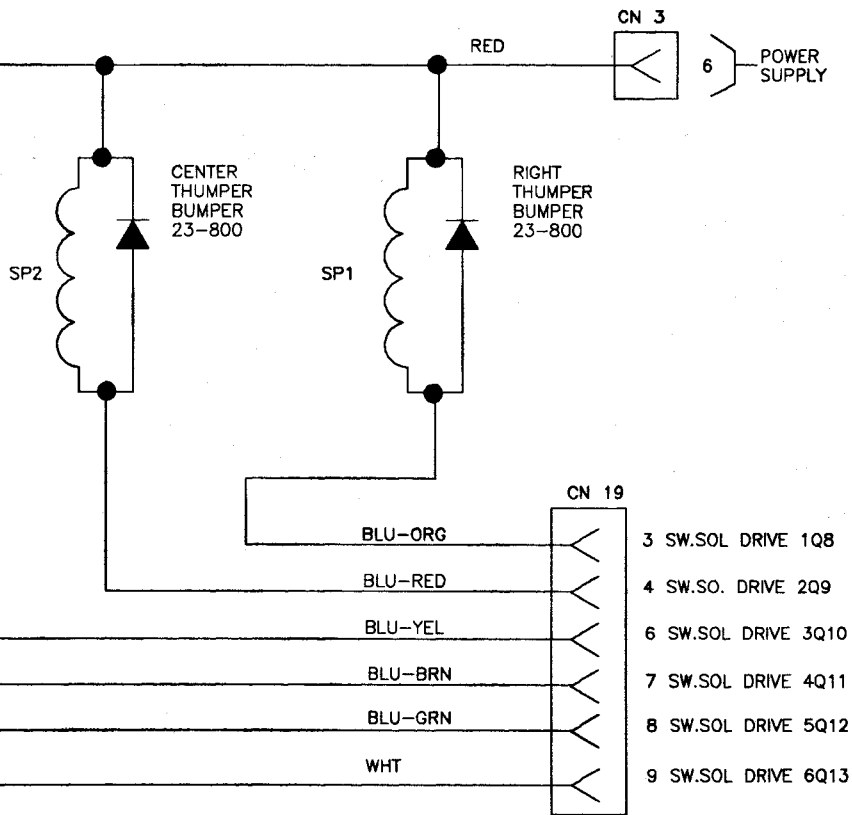




+50 VDC PPB J7-3

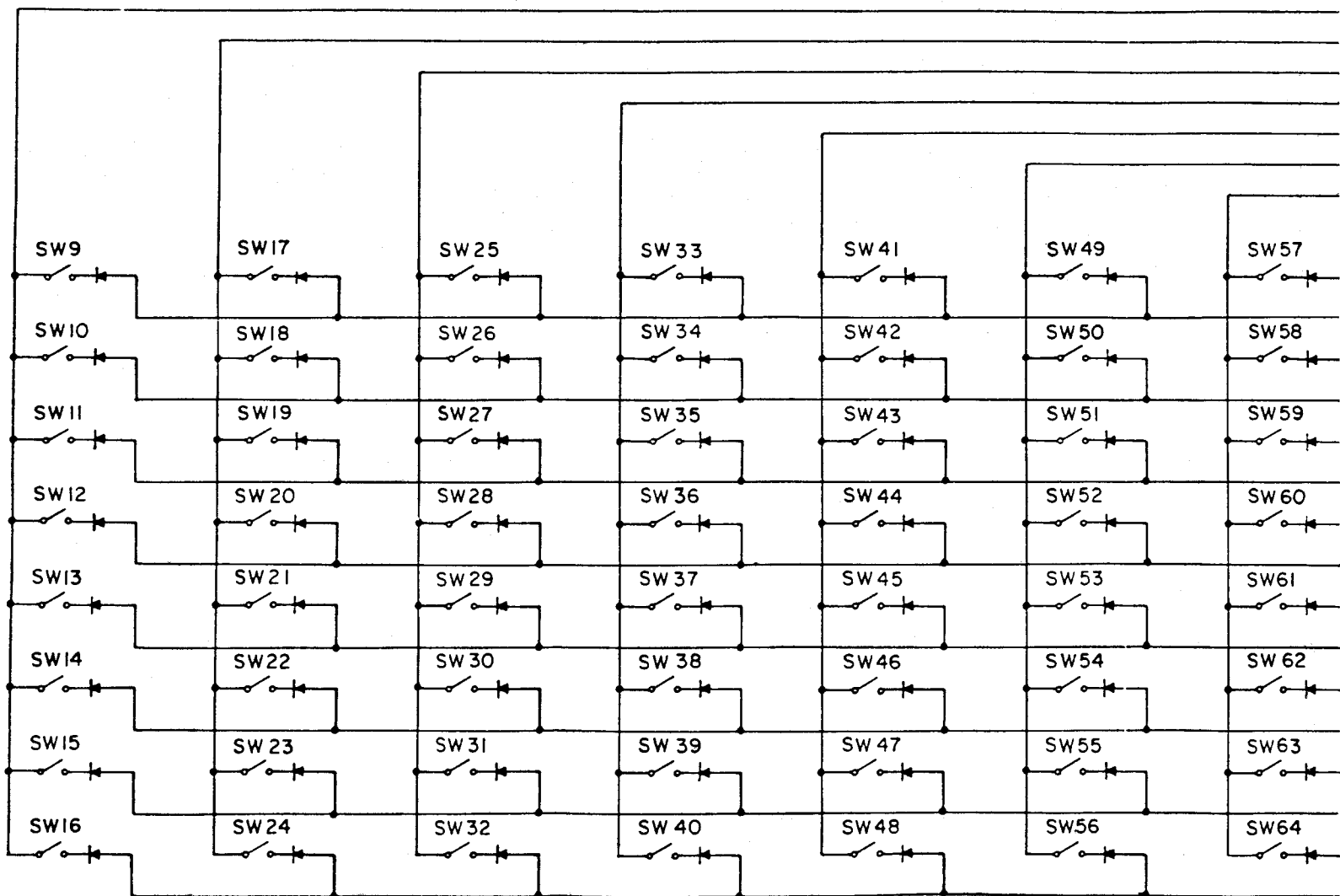


T  
NGSHOT  
-800

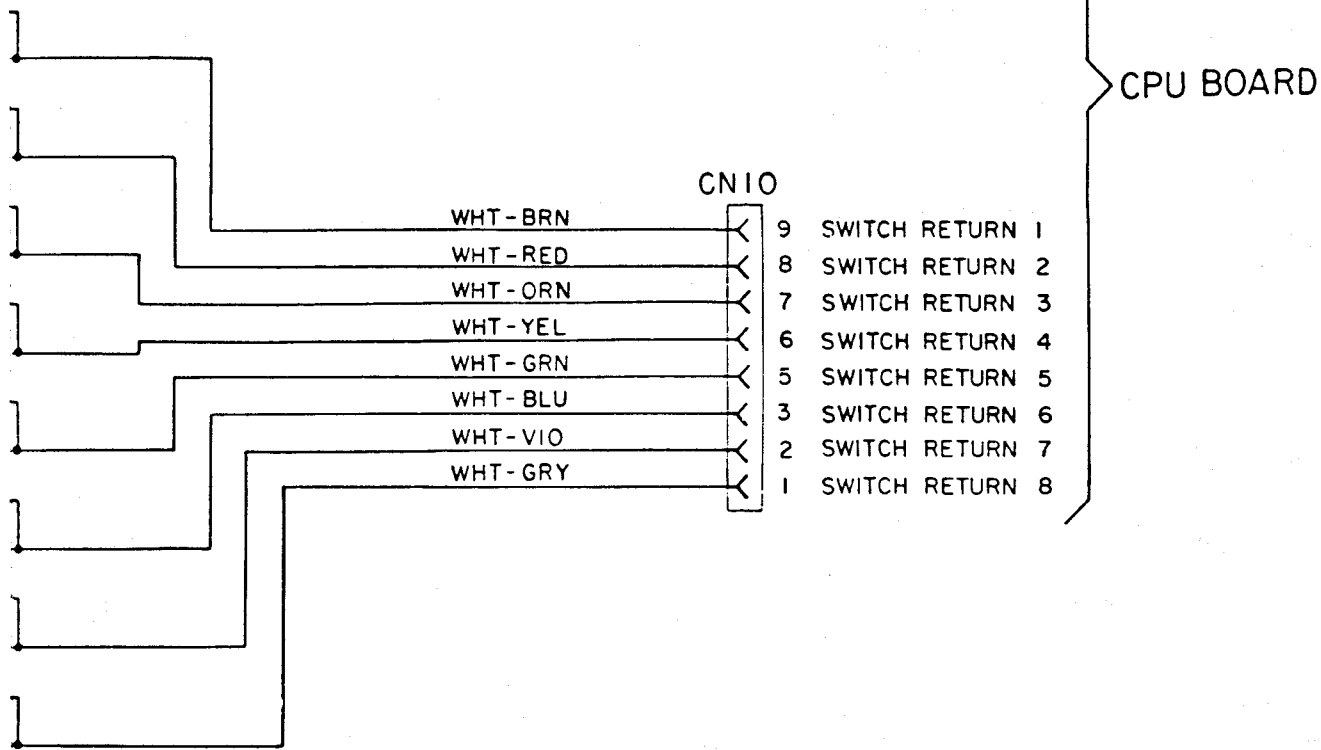
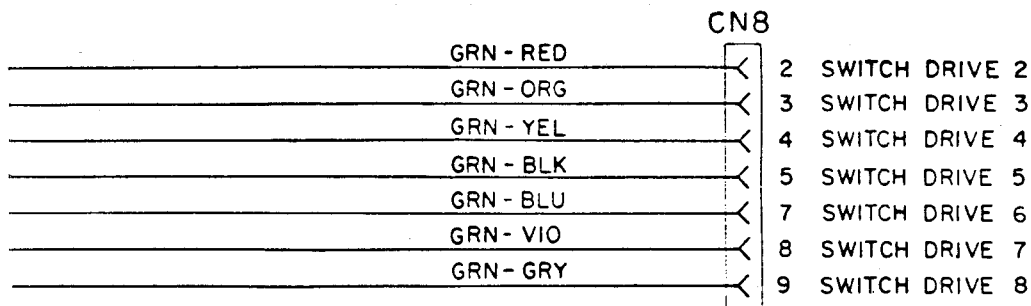




Switch Number	Description	Part No.	Switch Number	Description	Part No.	Switch Number	Description
01*	Plumb Tilt	See Cabinet	17	Left Outlane	500-5706-00	33*	Up (Tom)
02*	4th Coin	-	18	Left Return	500-5706-00	34	Not Usec
03*	Credit Button	500-5097-02	19	Left Slingshot	180-5023-00	35	Not Usec
04*	Right Coin	180-5024-00	20	Left Bottom 3 Bank	180-5130-02	36*	Down (T)
05*	Center Coin	180-5024-00	21	Left Mid 3 Bank	180-5130-01	37*	Tombstor
06*	Left Coin	180-5024-00	22	Left Top 3 Bank	180-5130-00	38	VUK Left
07*	Slam Tilt	180-5022-00	23	Left Bottom Orbit	500-5706-00	39	Captive E
08*	Buy-In Button	180-5073-00	24	Left Top Orbit	500-5707-00	40	Left Spin
09	Trough #1 Left	180-5119-00	25	Right Outlane	500-5707-00	41	Left Drop
10	Trough #2	180-5119-00	26	Right Return	500-5707-00	42	Mid Drop
11	Trough #3	180-5119-00	27	Right Slingshot	180-5023-00	43	Right Drc
12	Trough #4	180-5119-00	28	Right Bottom 3 Bank	180-5130-02	44	Left Ram
13	Trough #5	180-5119-00	29	Right Mid 3 Bank	180-5130-01	45	Left Ram
14	Trough #6	180-5119-00	30	Right Top 3 Bank	180-5130-02	46	Right Ra
15	Trough #7 Right	180-5118-00	31	Right Bottom Orbit	500-5706-00	47	Right Ra
16	Shooter Lane	180-5100-01	32	Right Top Orbit	500-5707-00	48	Right Spi



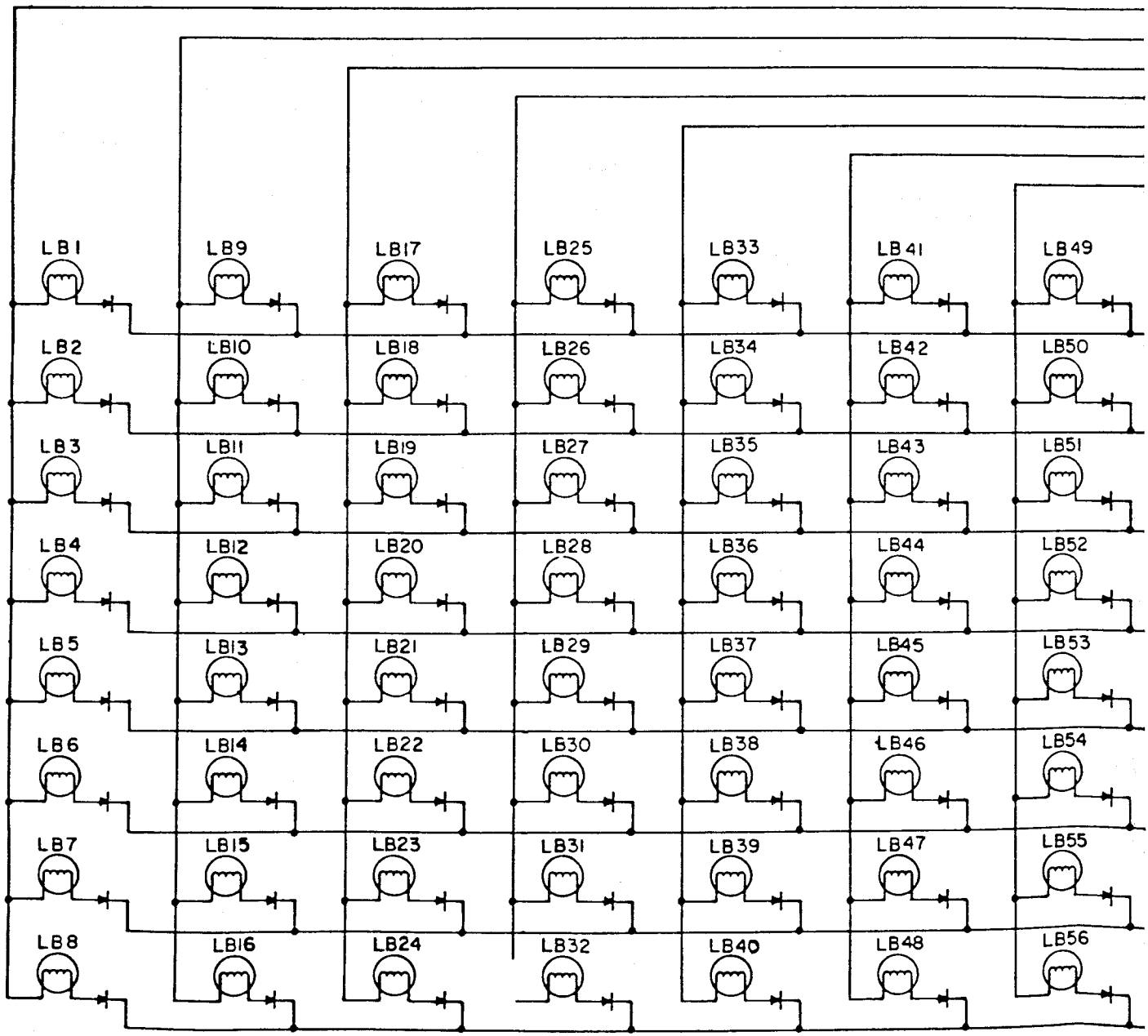
ion	Part No.			
o)	180-5052-00	49	Left Turbo Bumper	180-5015-01
	-	50	Bottom Turbo Bumper	180-5015-01
	-	51	Right Turbo Bumper	180-5015-01
omb)	180-5052-00	52	Super VUK Right	180-5064-01
ne Score	180-5083-00	53	Small Trough	180-5093-00
	180-5064-00	54	Large Trough	180-5093-00
Ball Trgt. Switch	180-5114-08	55	Power Scoop	500-5057-00
ner	180-5010-04	56	Middle Spinner	180-5010-04
Target	180-5092-01	57	Left Ramp Exit	180-5090-00
Target	180-5092-01	58	Not Used	-
op Target	180-5092-01	59	Not Used	-
p Enter	180-5090-00	60	Not Used	-
p Middle	180-5090-00	61	Not Used	-
mp Enter	180-5090-00	62*	Launch Button	180-5073-00
mp Exit	180-5093-00	63*	Left End of Stroke	180-5124-00
inner	180-5010-04	64*	Right End of Stroke	180-5124-00



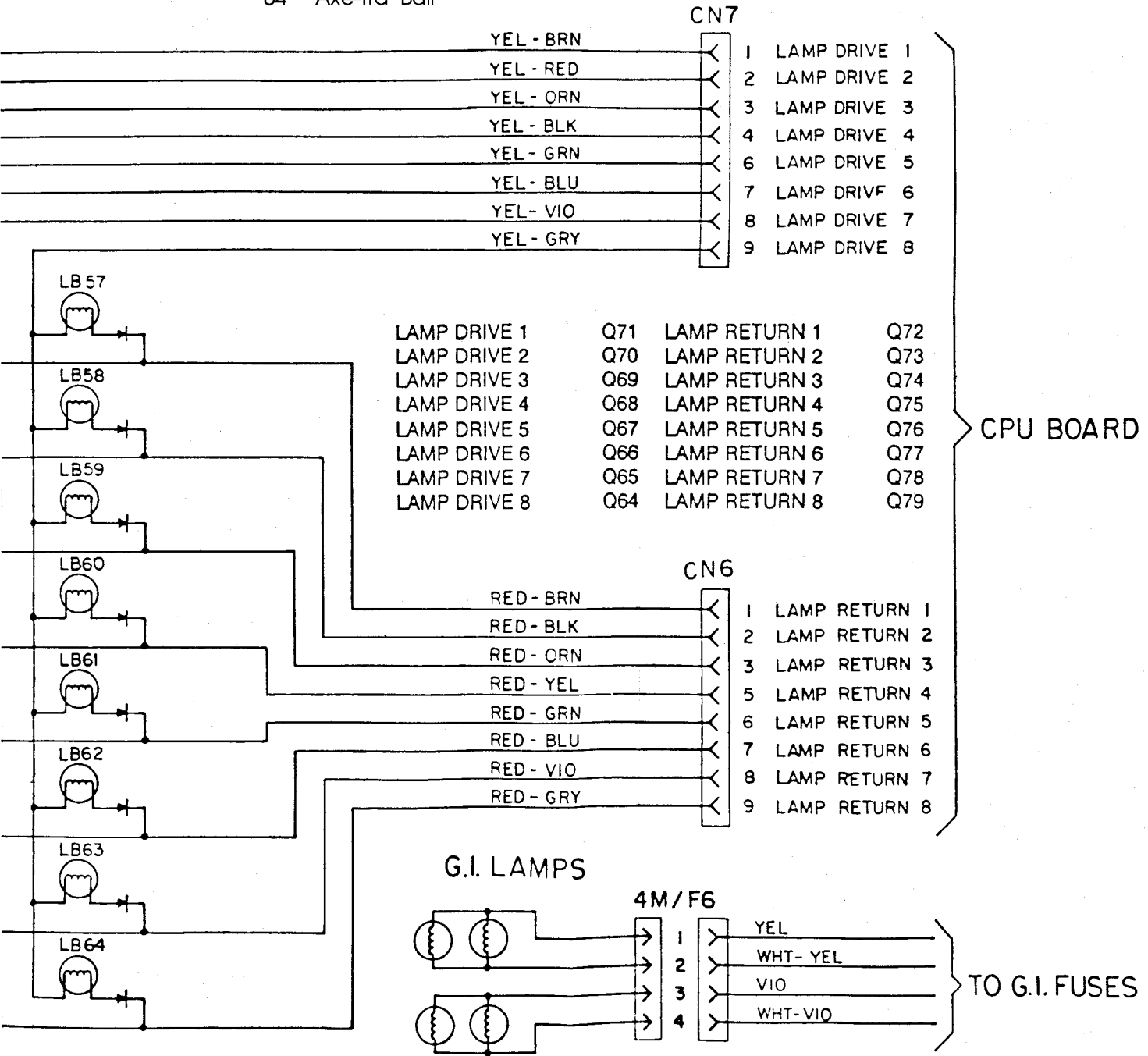
- 01 Thunderstorm
- 02 Skull Crackin'
- 03 Door PrizeSelect
- 04 Nightmare
- 05 Psycho Pops
- 06 Robbing the Crypt
- 07 Lite Extra Ball
- 08 Super GuillotineTargets
- 09 Werewolf Countdown
- 10 Video Mode
- 11 Electric Chair
- 12 Keeper Targets
- 13 Over Scoop
- 14 Buy-In Type
- 15 Launch
- 16 Start Button

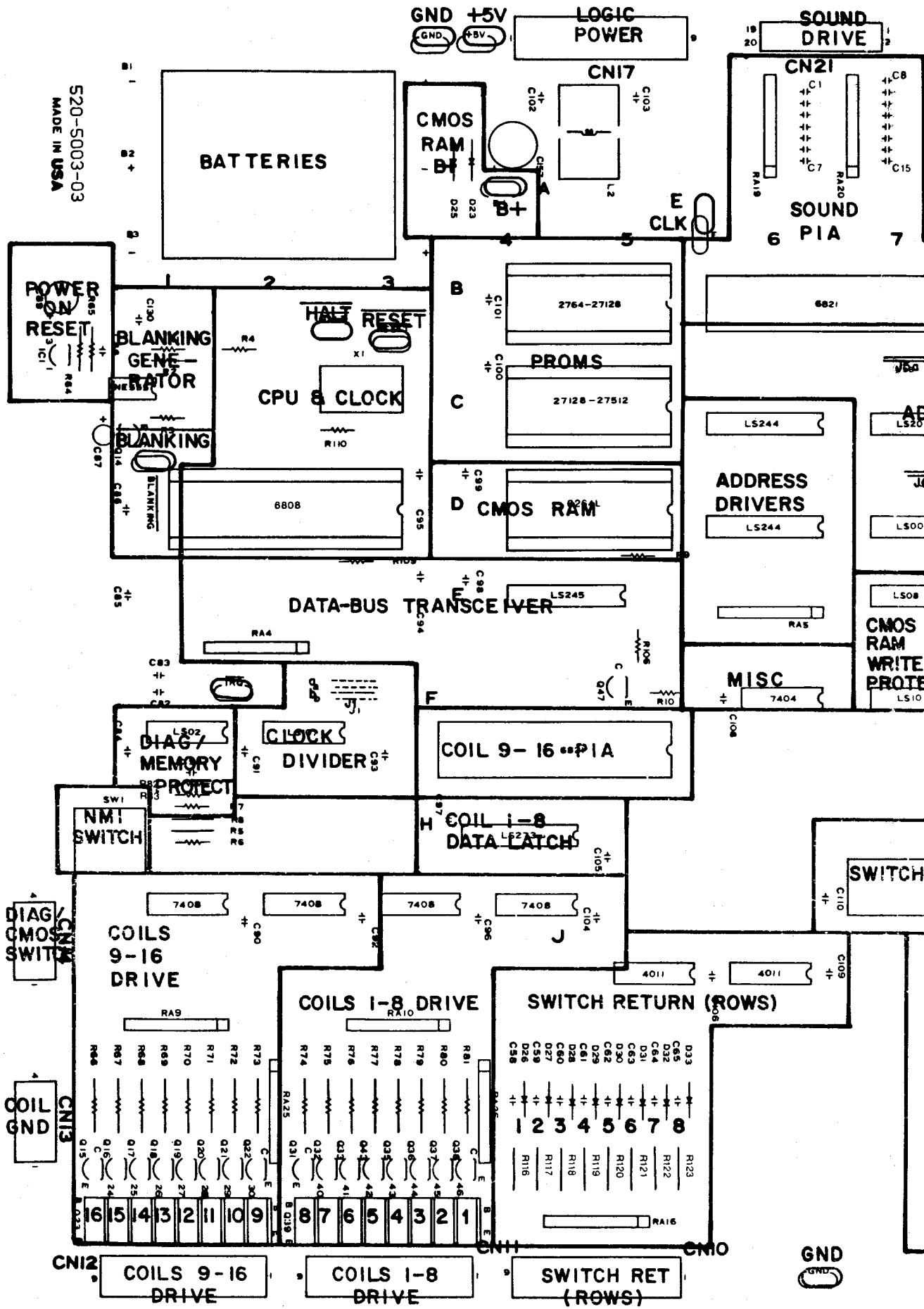
- 17 A-Crypt Kick
- 17 B-Scared to Death
- 18 Extra Ball
- 19 Skull Crush
- 20 ....K
- 21 ....E
- 22 ....E
- 23 Collect Creature Feature
- 24 Monster Jackpot
- 25 Multiball
- 26 A-Lite Mystery Door (Left Return)
- 26 B-Chop Pops (Right Return)
- 27 Clone
- 28 ....R
- 29 ....E
- 30 ....P
- 31 Werewolf Countdown

- 32 Increase Jac
- 33 Life Creature
- 34 Nightmare
- 35 Increase Dou
- 36 Life Creature
- 37 Rats
- 38 Goblins
- 39 Ghosts
- 40 Bats
- 41 Guillotine Drc
- 42 Guillotine Drc
- 43 Guillotine Drc
- 44 ....T
- 45 ....P
- 46 ....Y
- 47 ....R
- 48 ....C

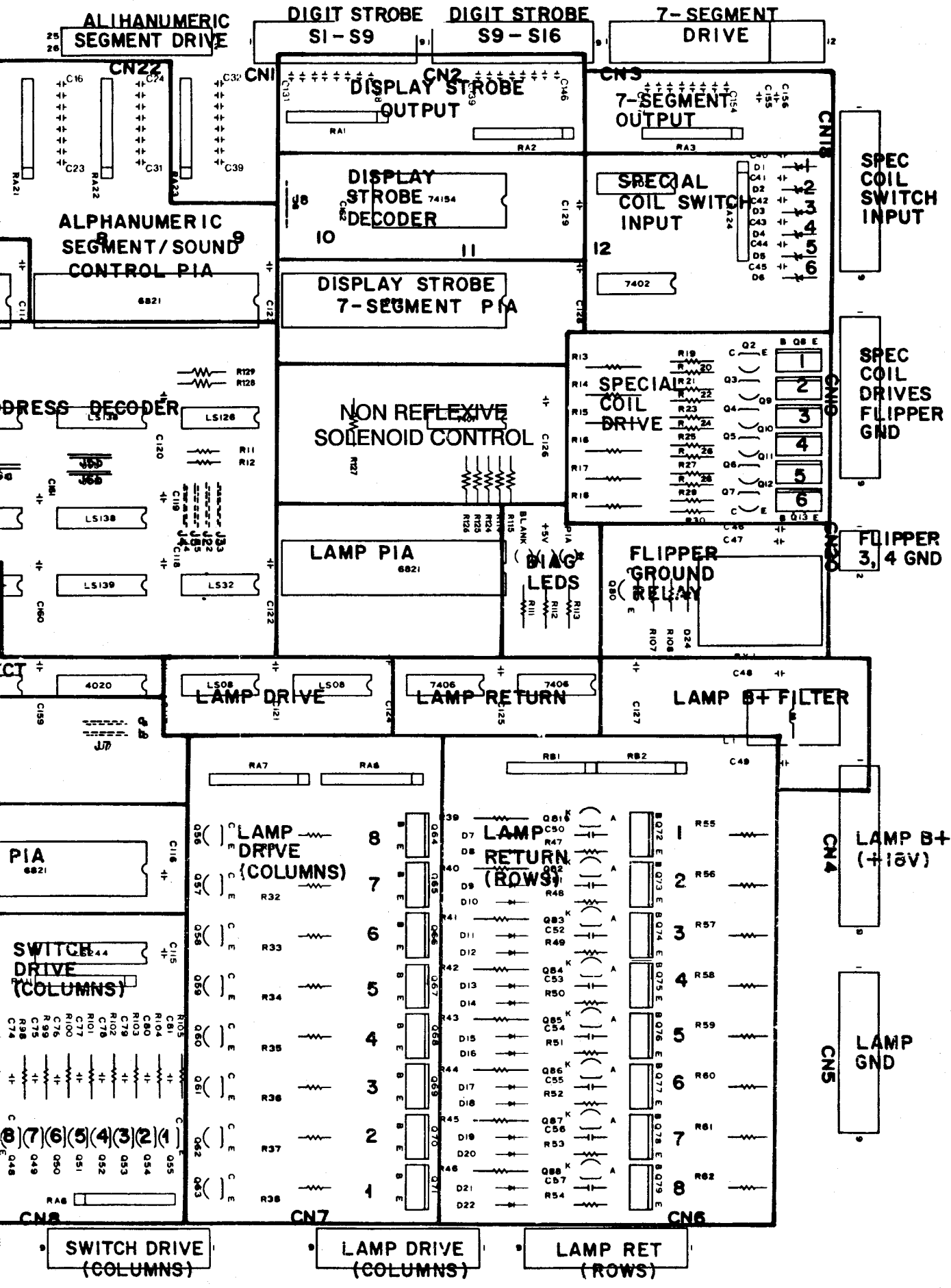


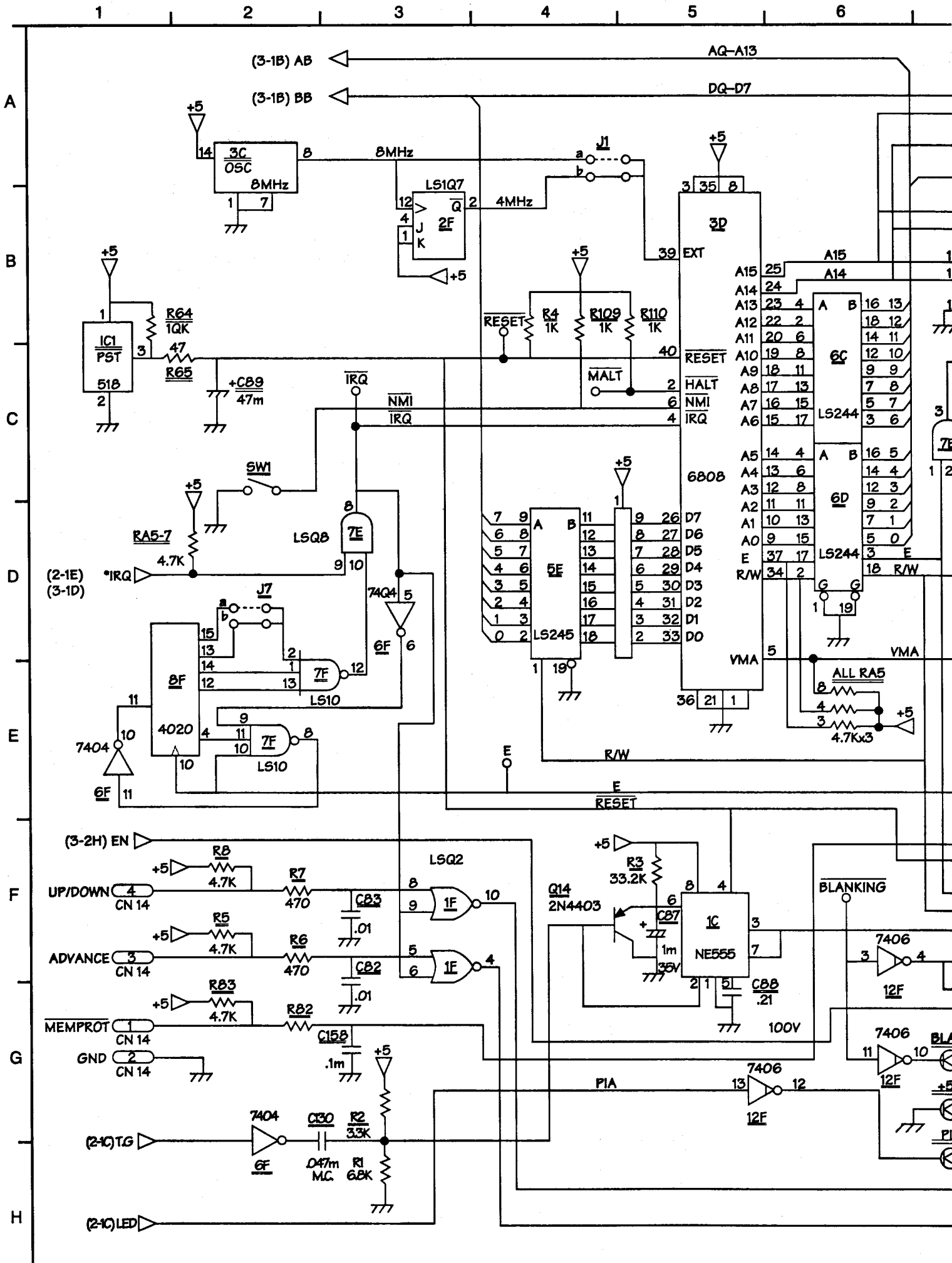
- Jackpot Feature 49 Mystery Door 1
- Jackpot Feature 50 Mystery Door 2
- Double Jackpot Feature 51 Mystery Door 3
- Living Dead 52 Double Jackpot
- Gravedigger 53 Living Dead
- Chainsaw Mode 54 Gravedigger
- Play the Organ 55 Chainsaw Mode
- Left Turbo Bumper 56 Play the Organ
- Bottom Turbo Bumper 57 Left Turbo Bumper
- Right Turbo Bumper 58 Bottom Turbo Bumper
- Jackpot 59 Right Turbo Bumper
- Multiball 60 Jackpot
- Left Ramp Enter 61 Multiball
- Right Ramp Enter 62 Left Ramp Enter
- "Axe-tra" Ball 63 Right Ramp Enter
- 64 "Axe-tra" Ball

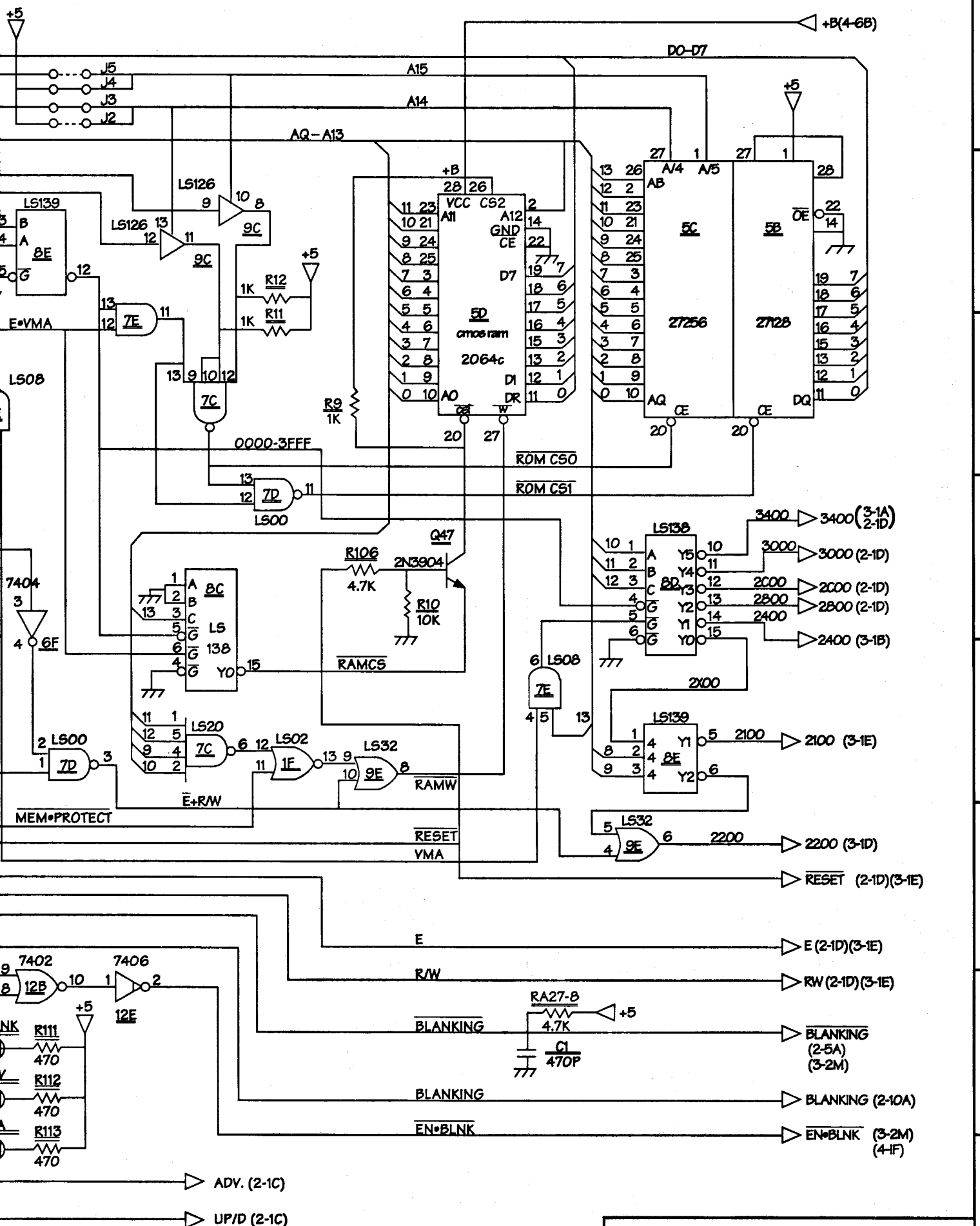




520-5003-03 REV-A 0E-0262-3A

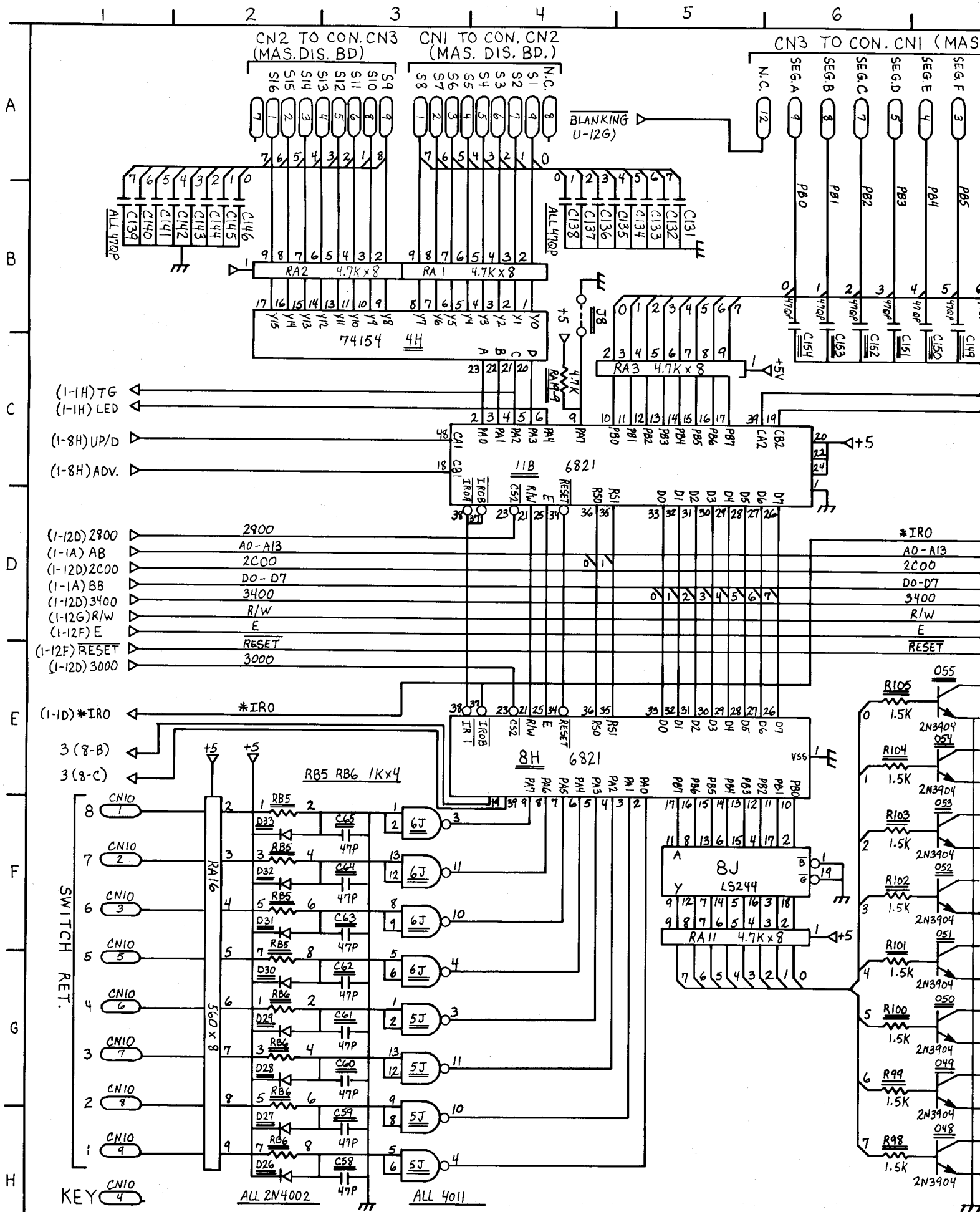






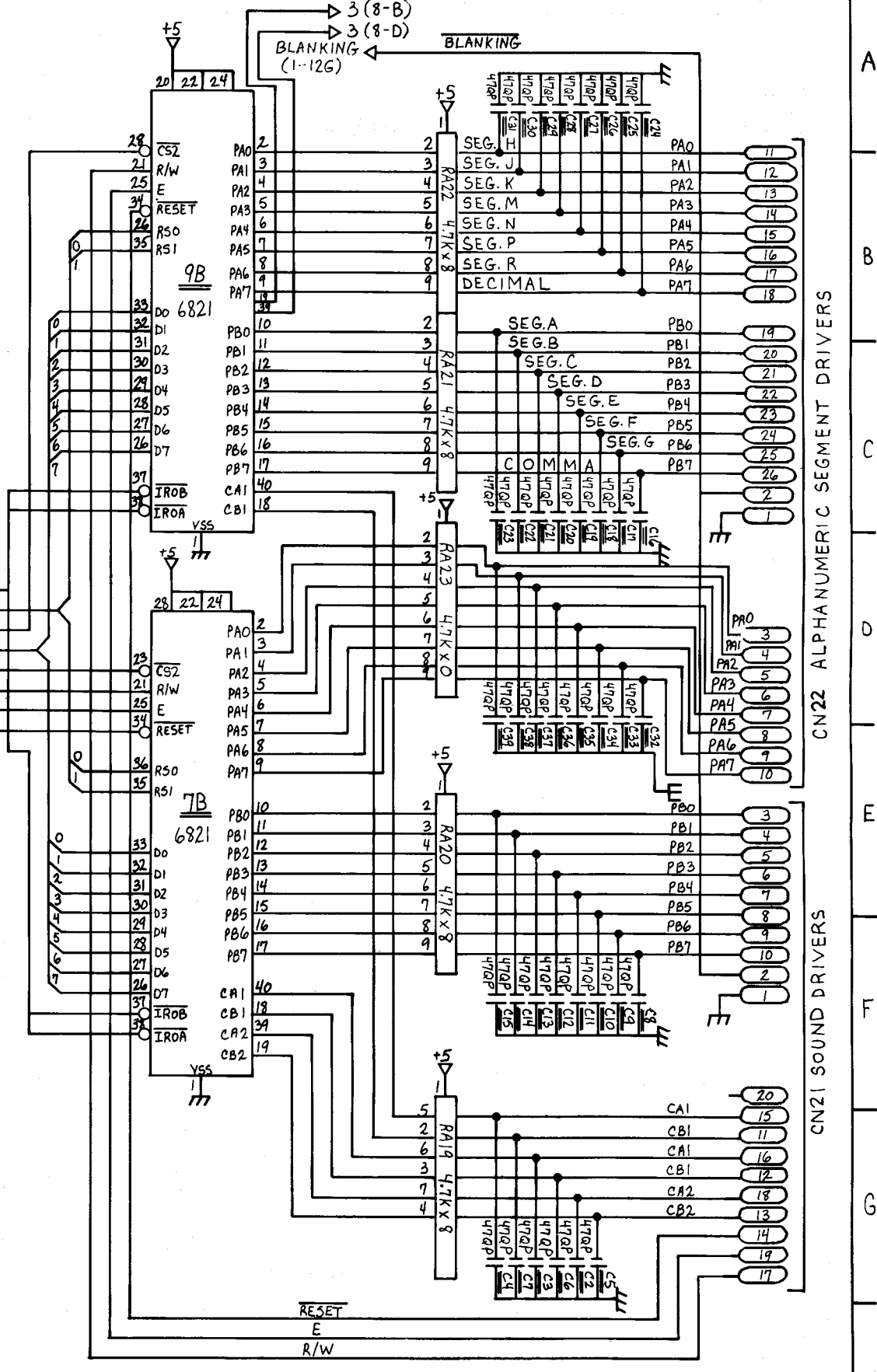
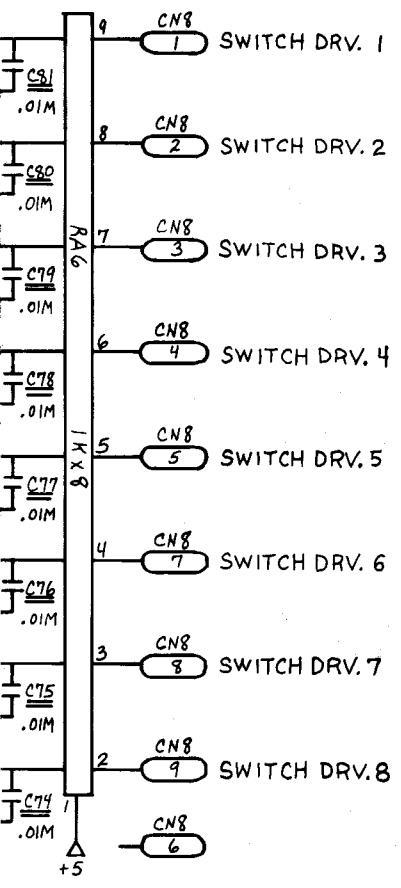
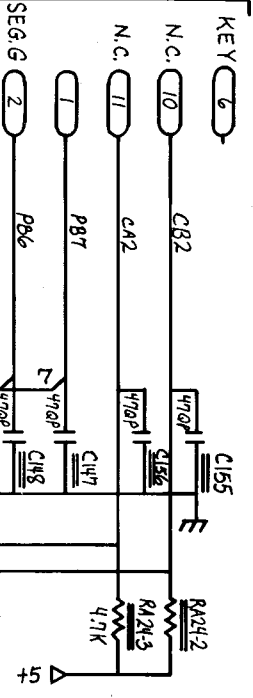
CPU BOARD 1 OF 4





70 CPU Board Logic Diagram (Sheets 1-4)

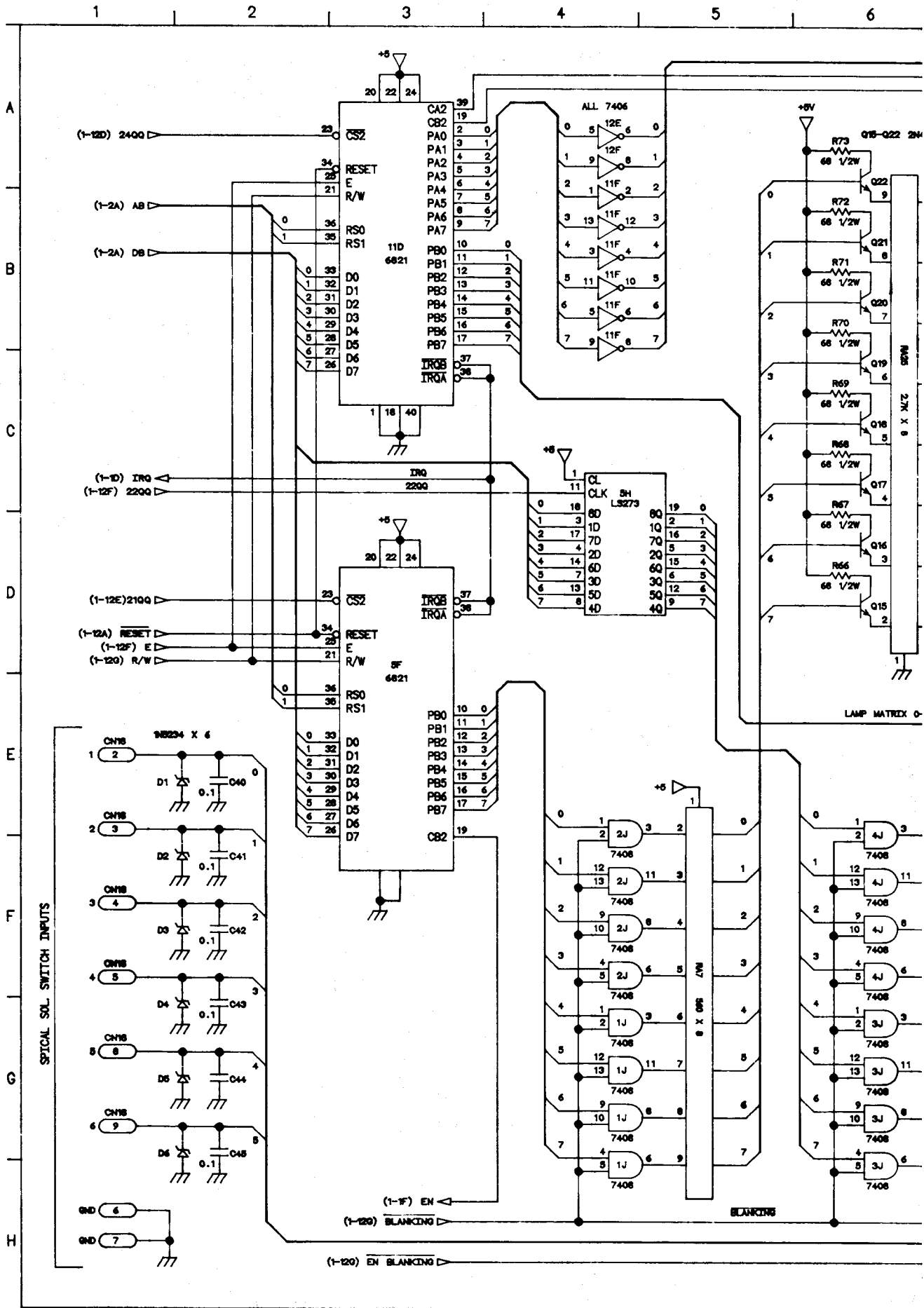
DIS. BD)



A  
B  
C  
D  
E  
F  
G  
H

CN22 ALPHANUMERIC SEGMENT DRIVERS

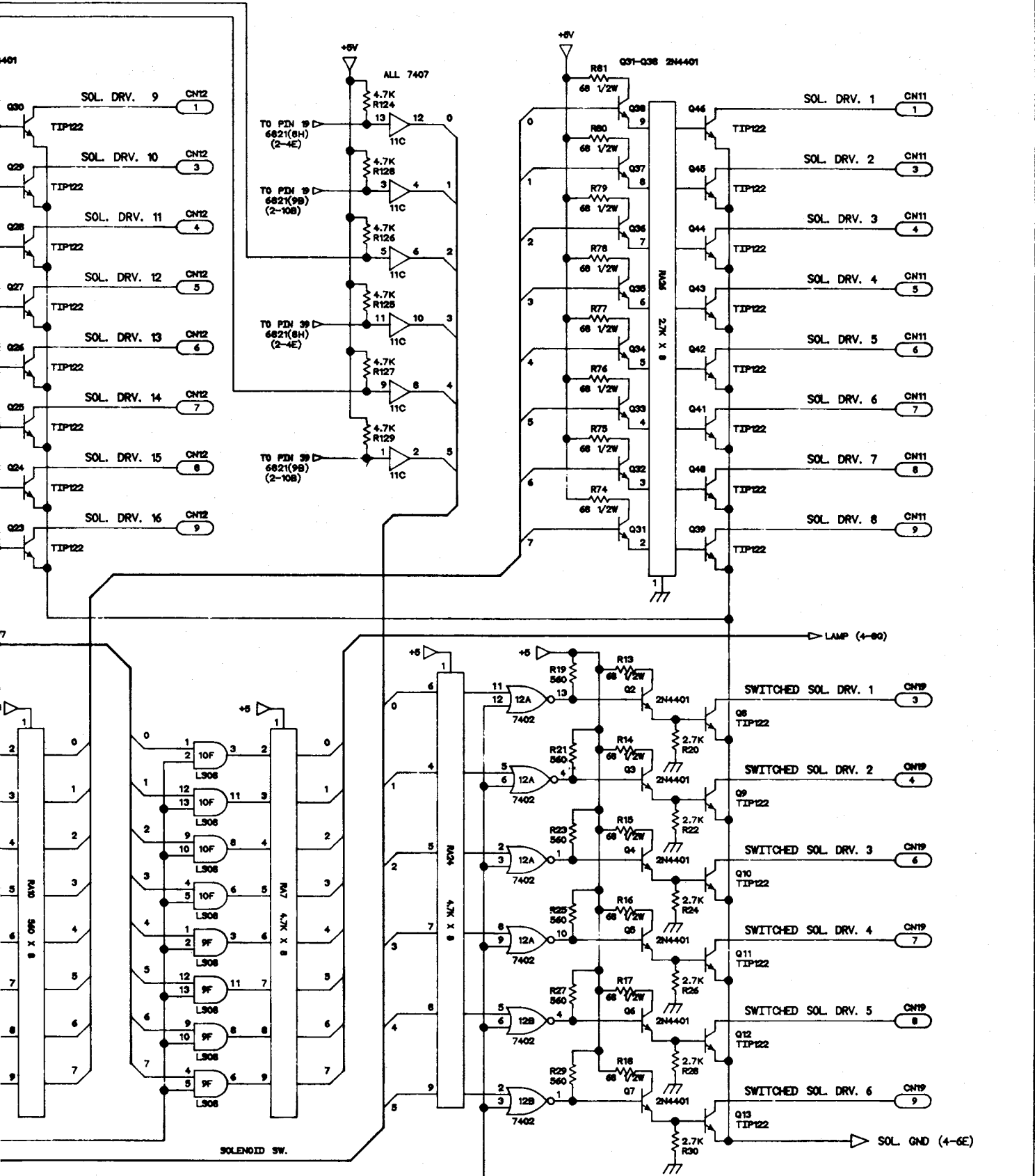
CN21 SOUND DRIVERS



LAMP MATRIX CONT. 0-7

LAMP CNT (4-8A)

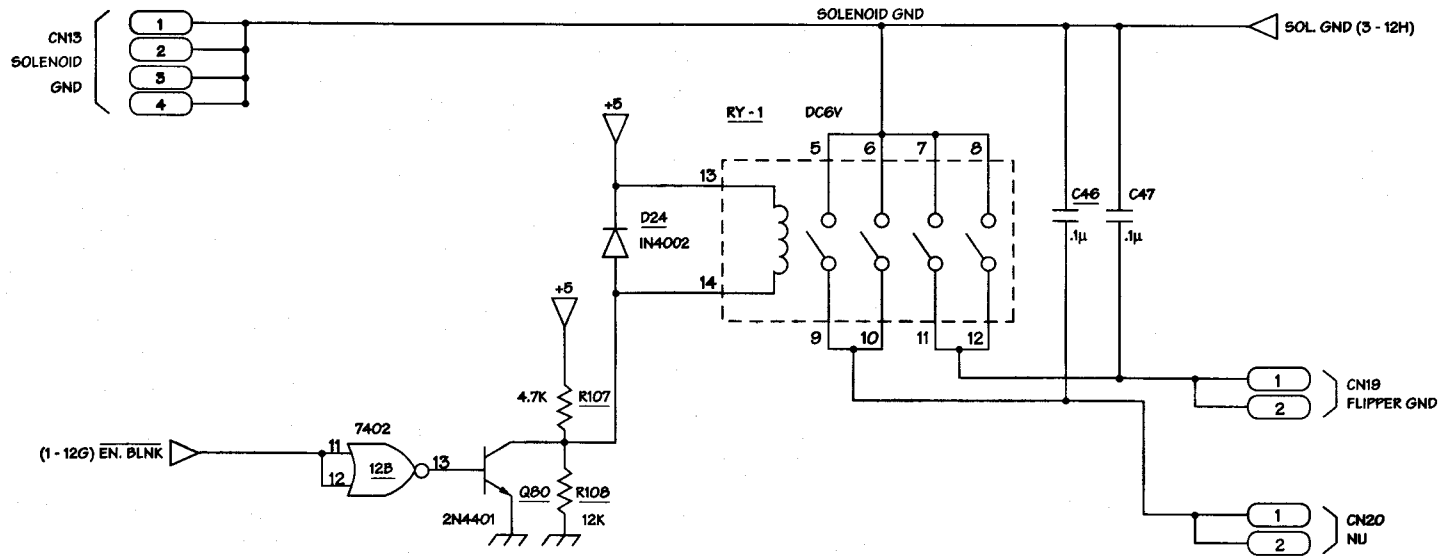
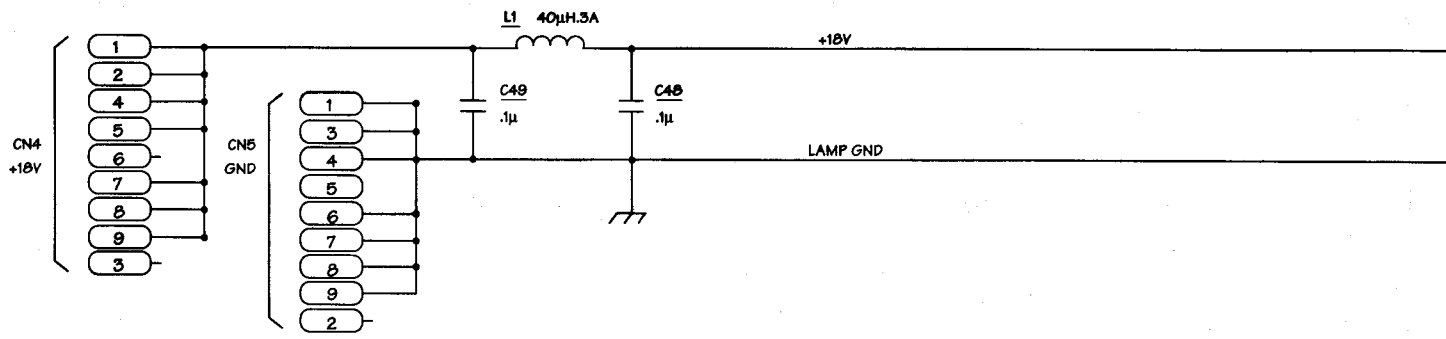
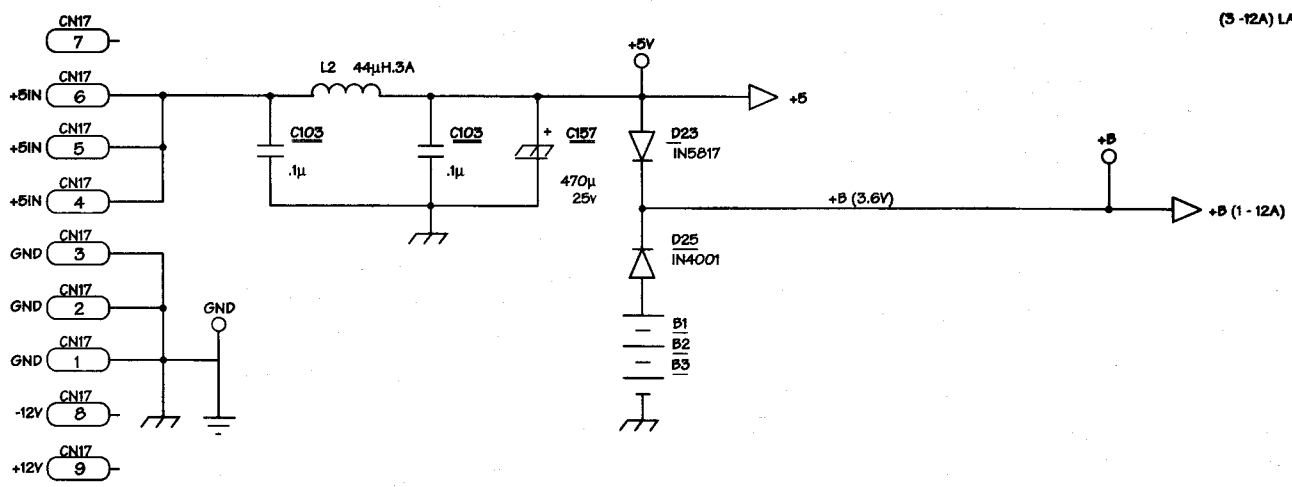
A  
B  
C  
D  
E  
F  
G  
H



CPU BOARD 3 OF 4 REV.B

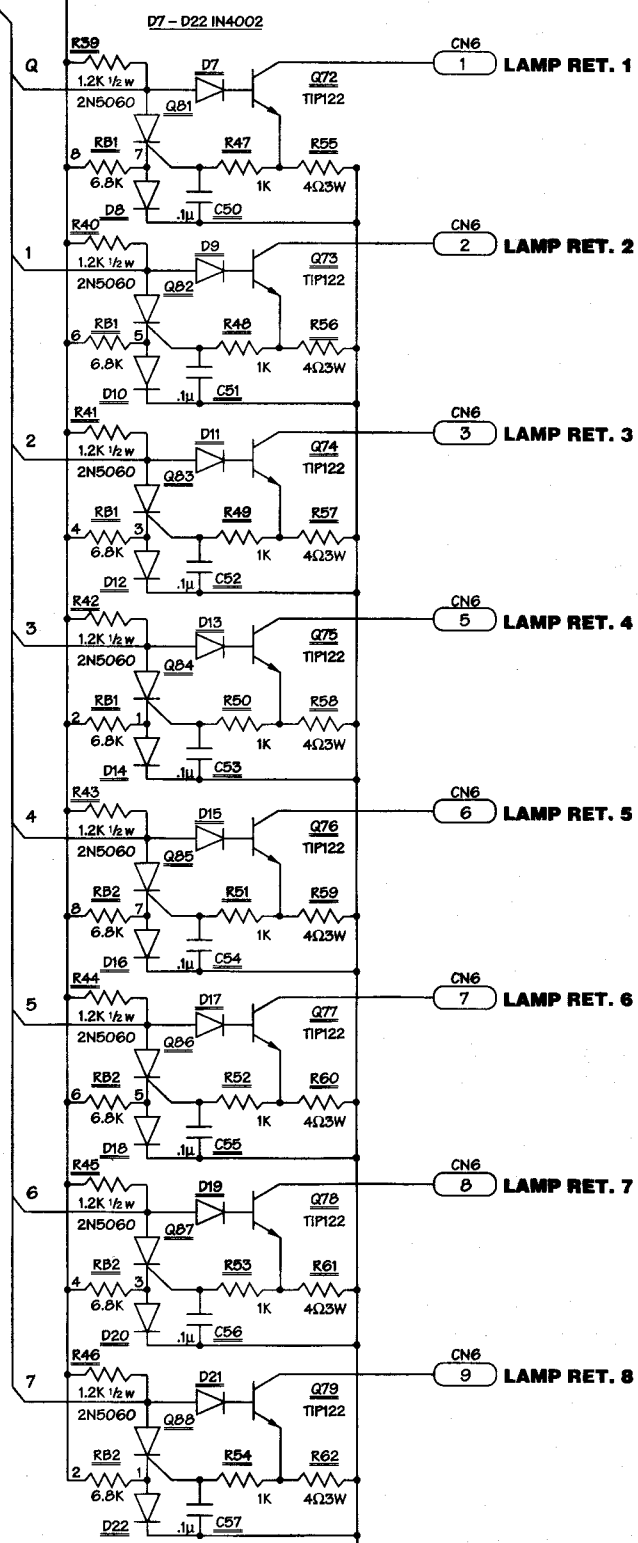
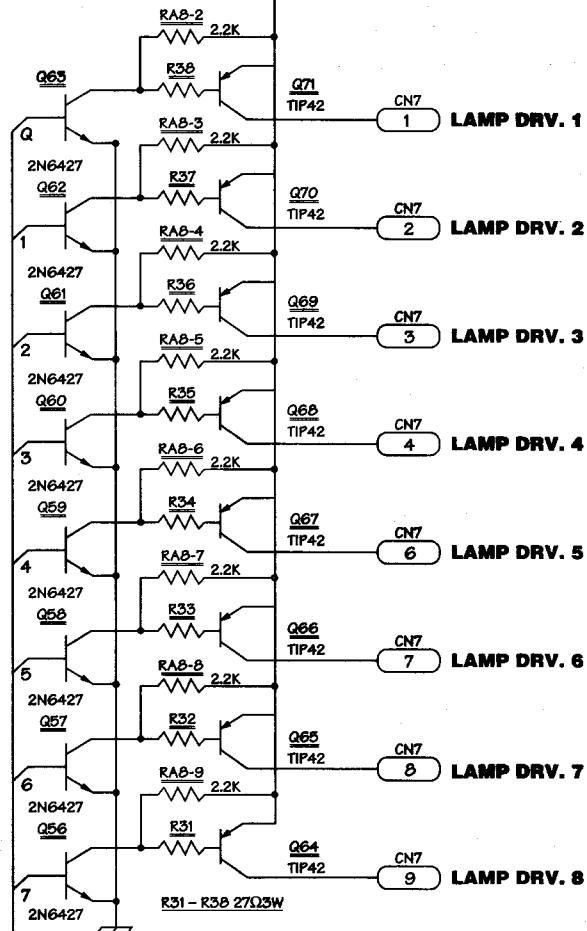
A  
B  
C  
D  
E  
F  
G  
H

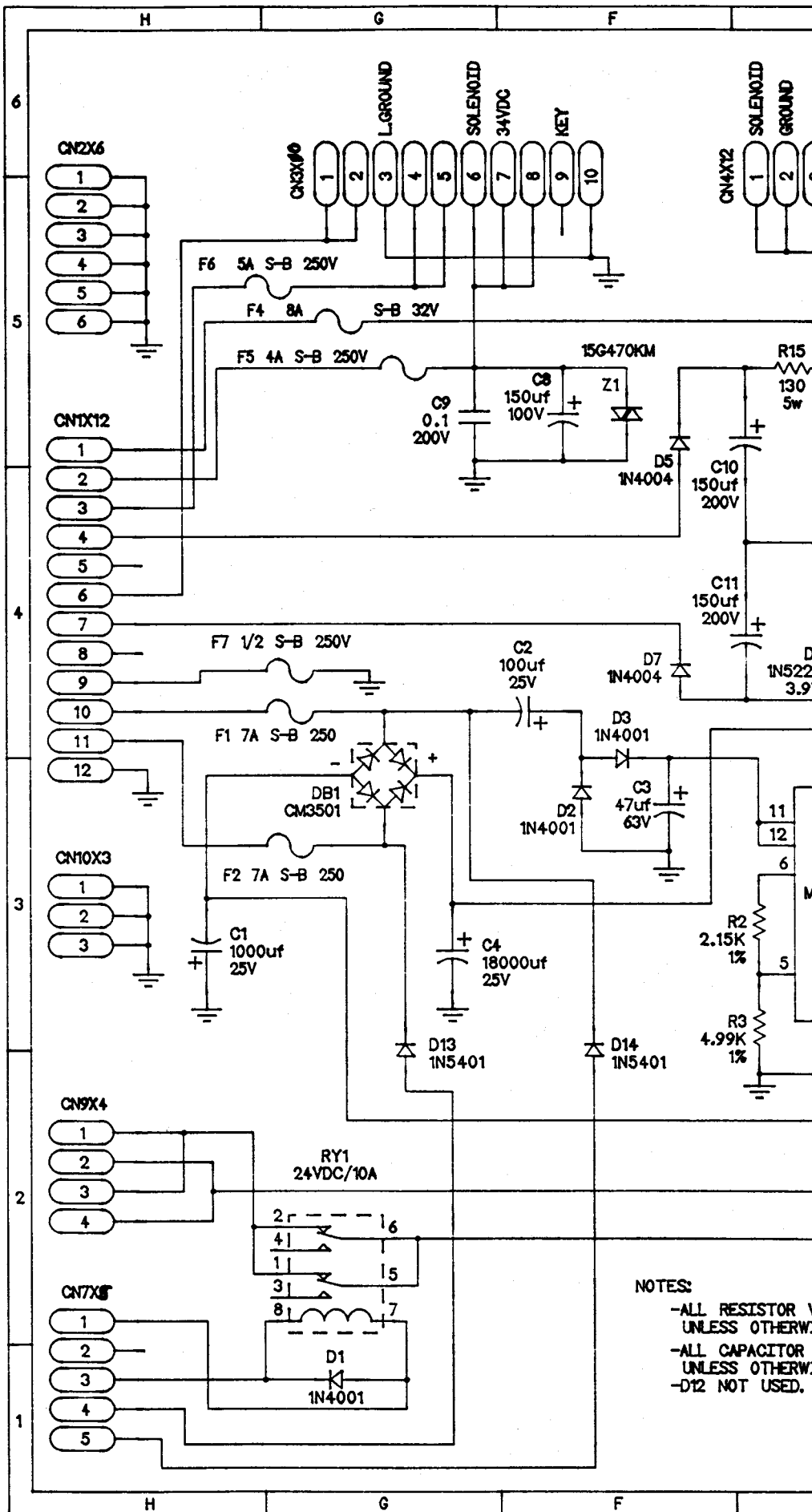
(3 - 12A) LAMP CNT

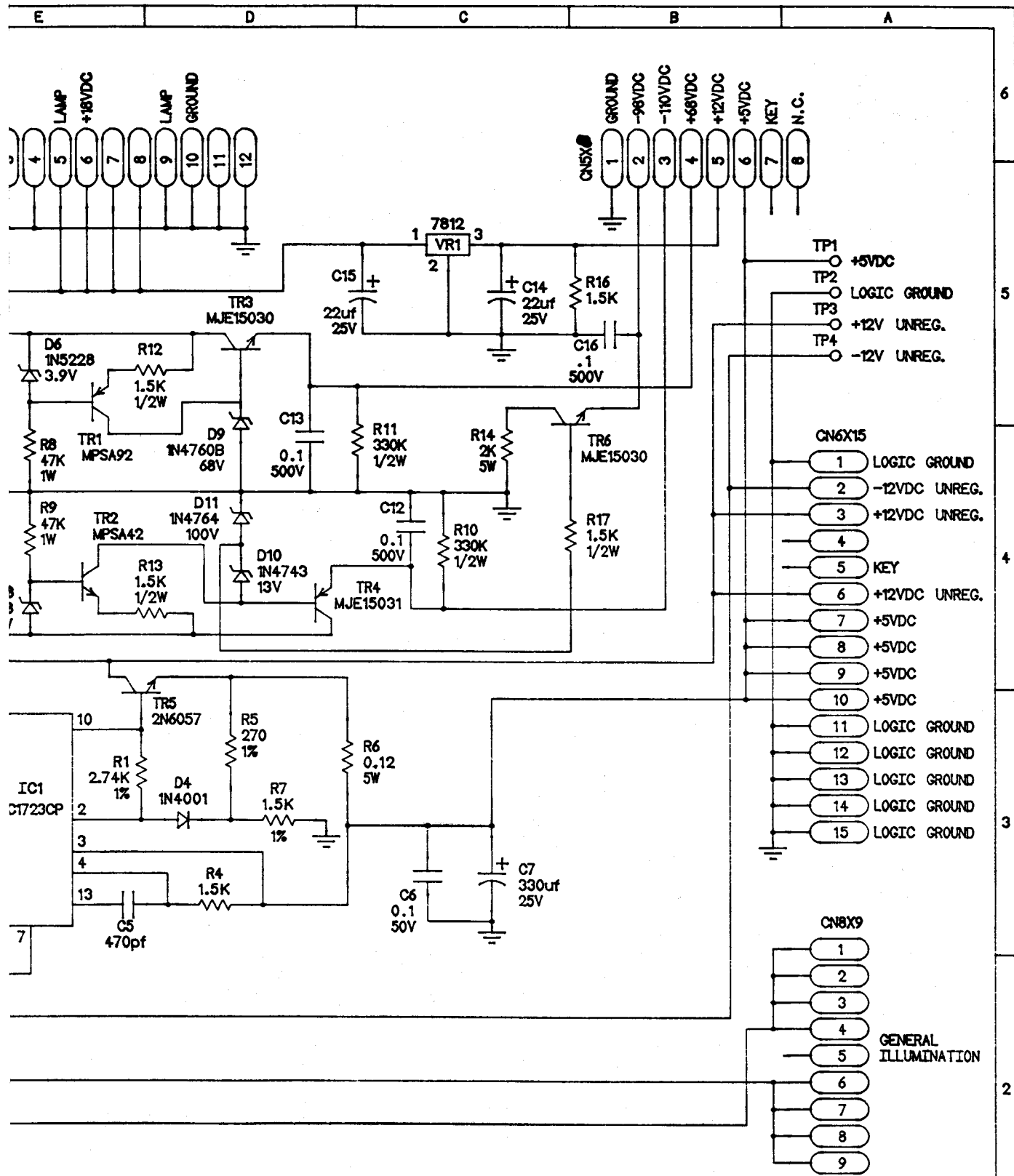


(3 - 12E) LAMP

A  
B  
C  
D  
E  
F  
G  
H





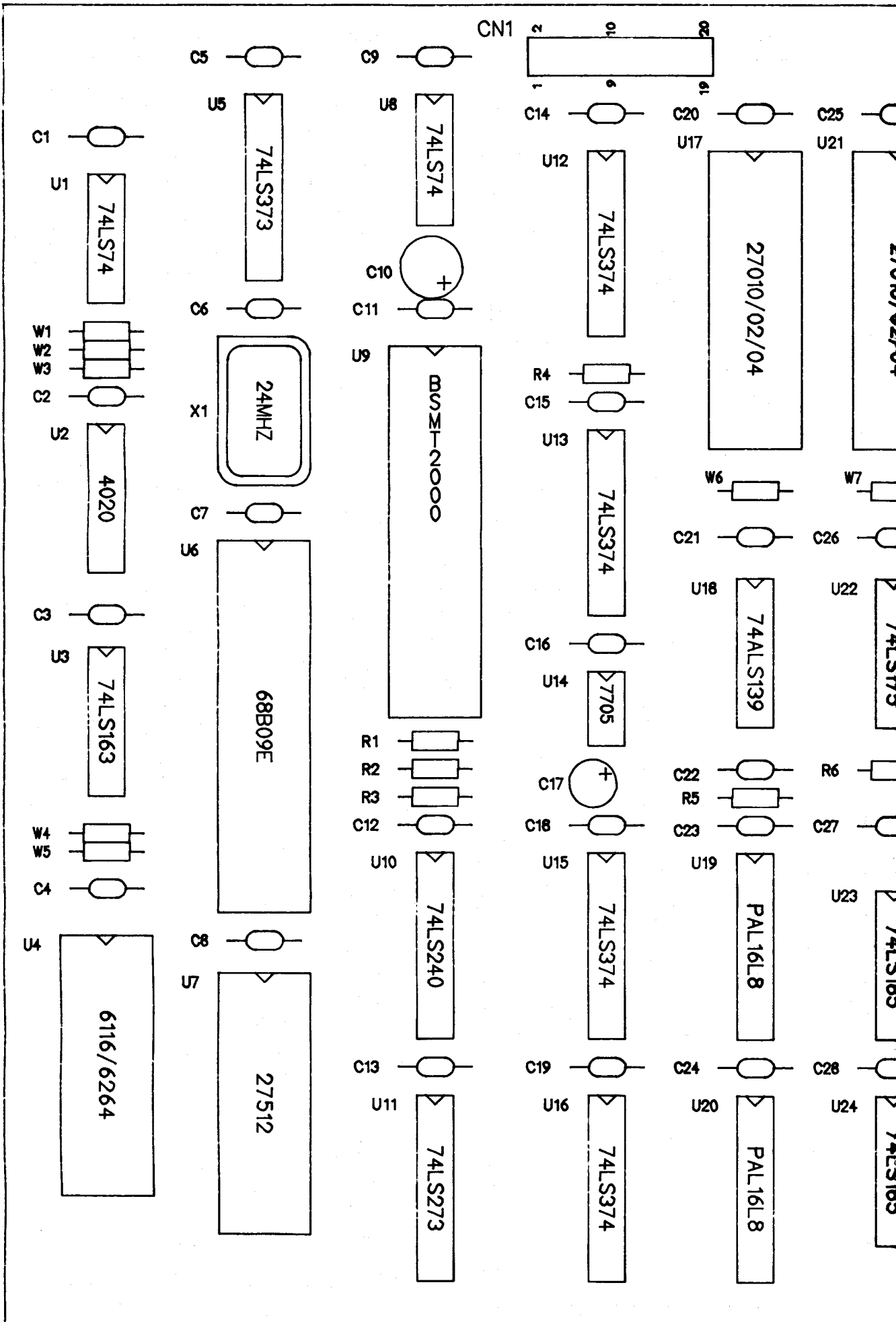


VALUES ARE IN OHMS, 5%, 1/4W, SE SPECIFIED.  
 VALUES ARE IN MICROFARADS, SE SPECIFIED.

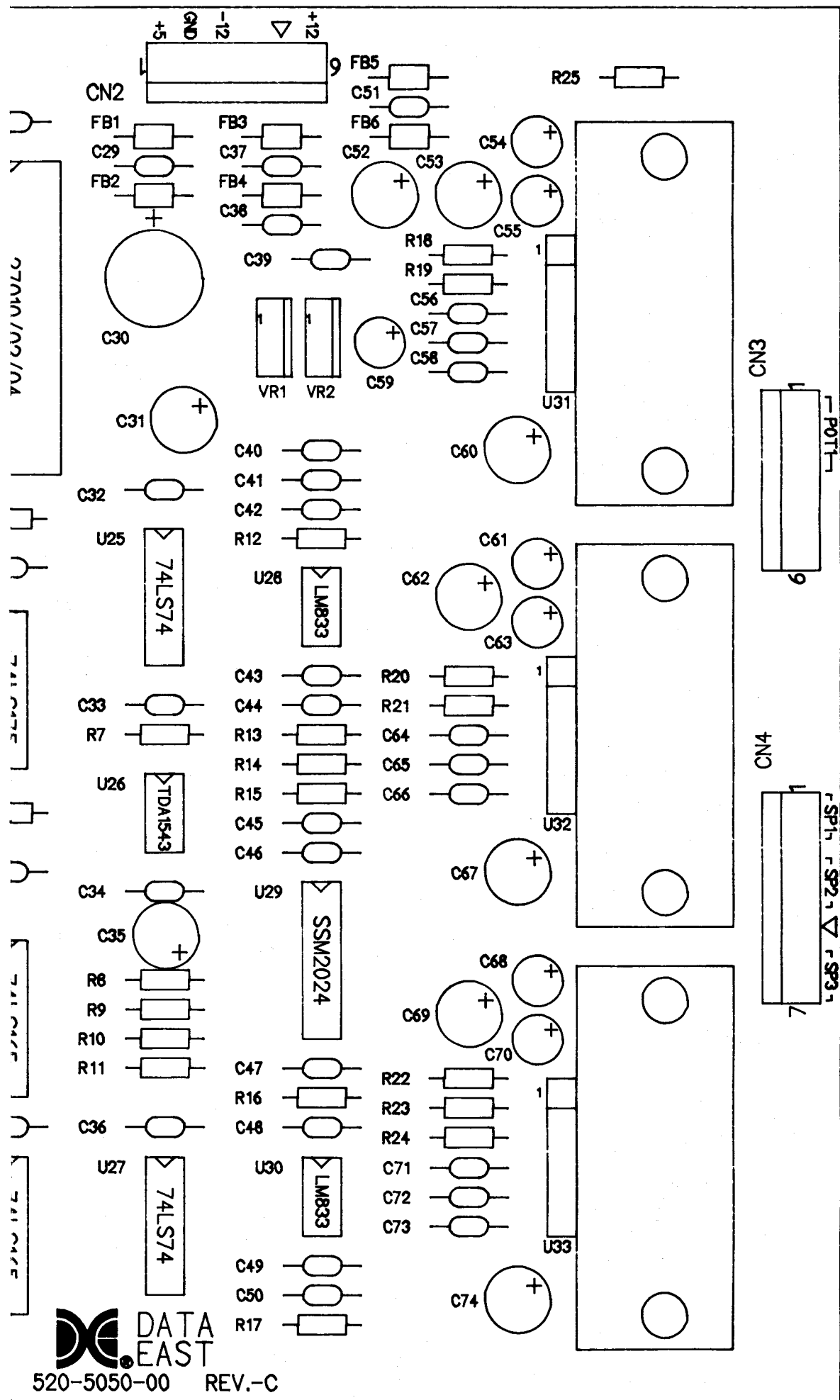
**DATA EAST PINBALL**  
 POWER SUPPLY BOARD SCHEMATIC

PREPARED BY: <b>CES INC.</b>	DWG <b>C</b>	PART NO. <b>520-5047-02</b>	REV <b>A</b>
	SIZE <b>SHEET 1 OF 1</b>	MODEL	

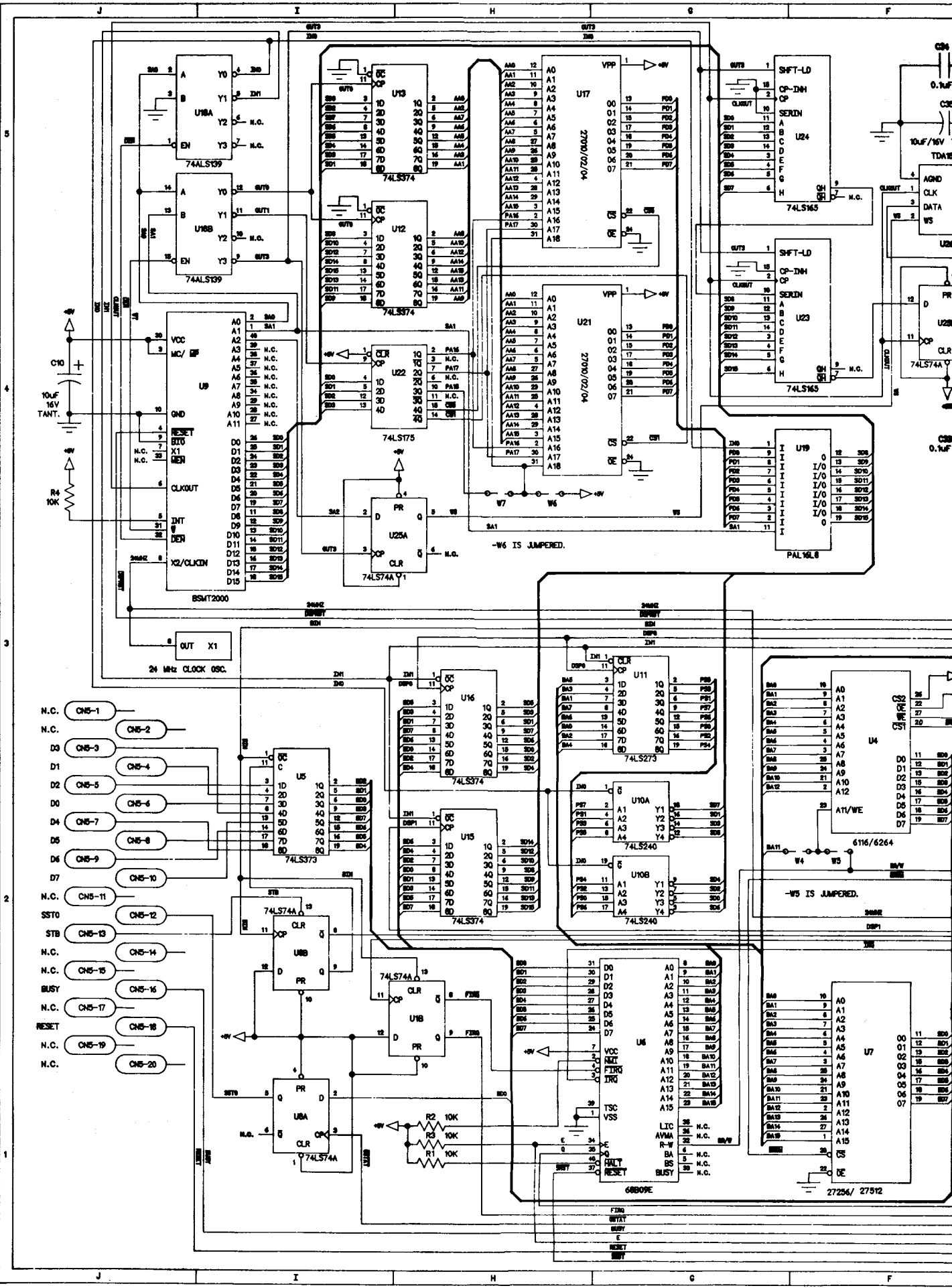


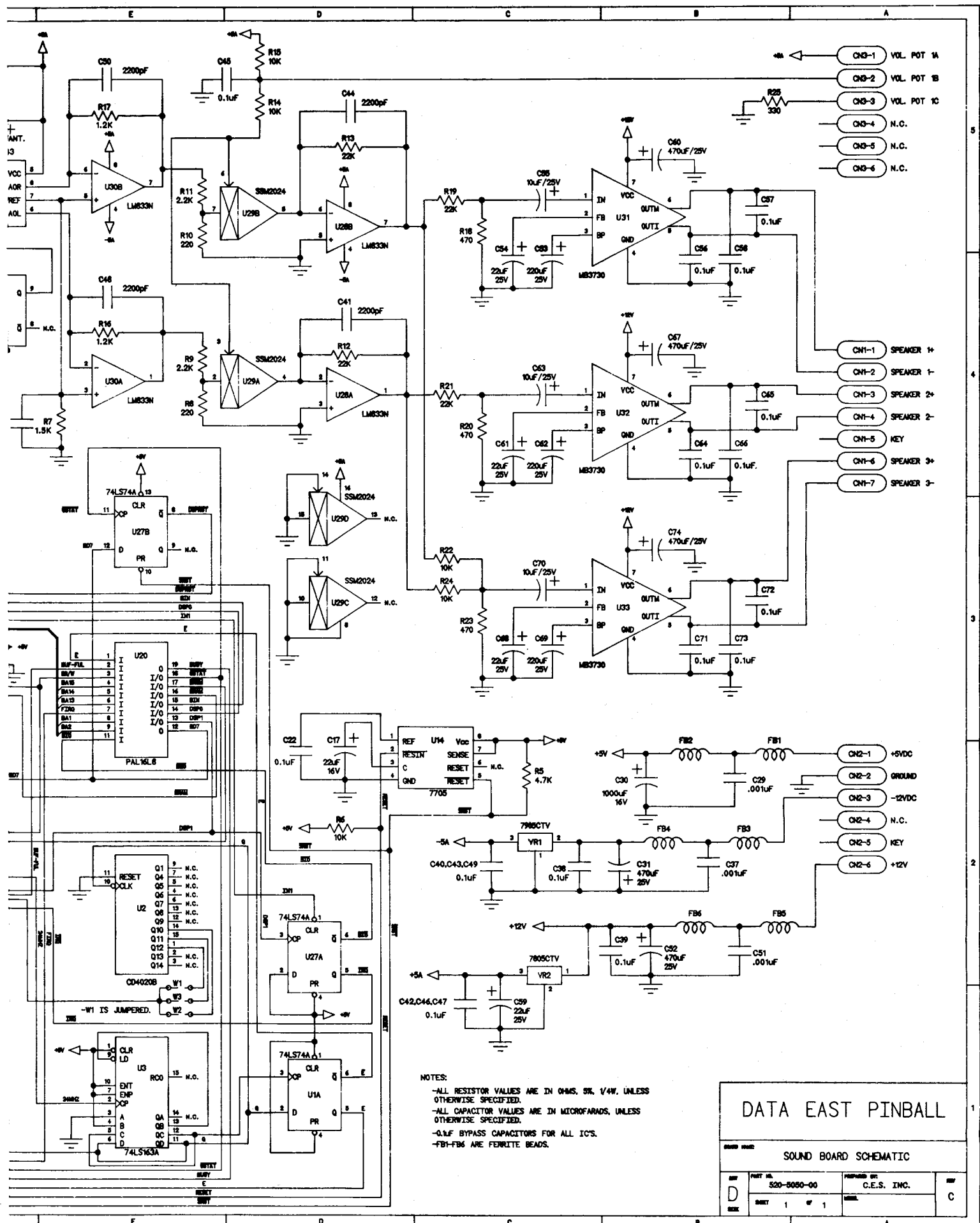


74 Sound Board Assembly Drawing



DATA EAST



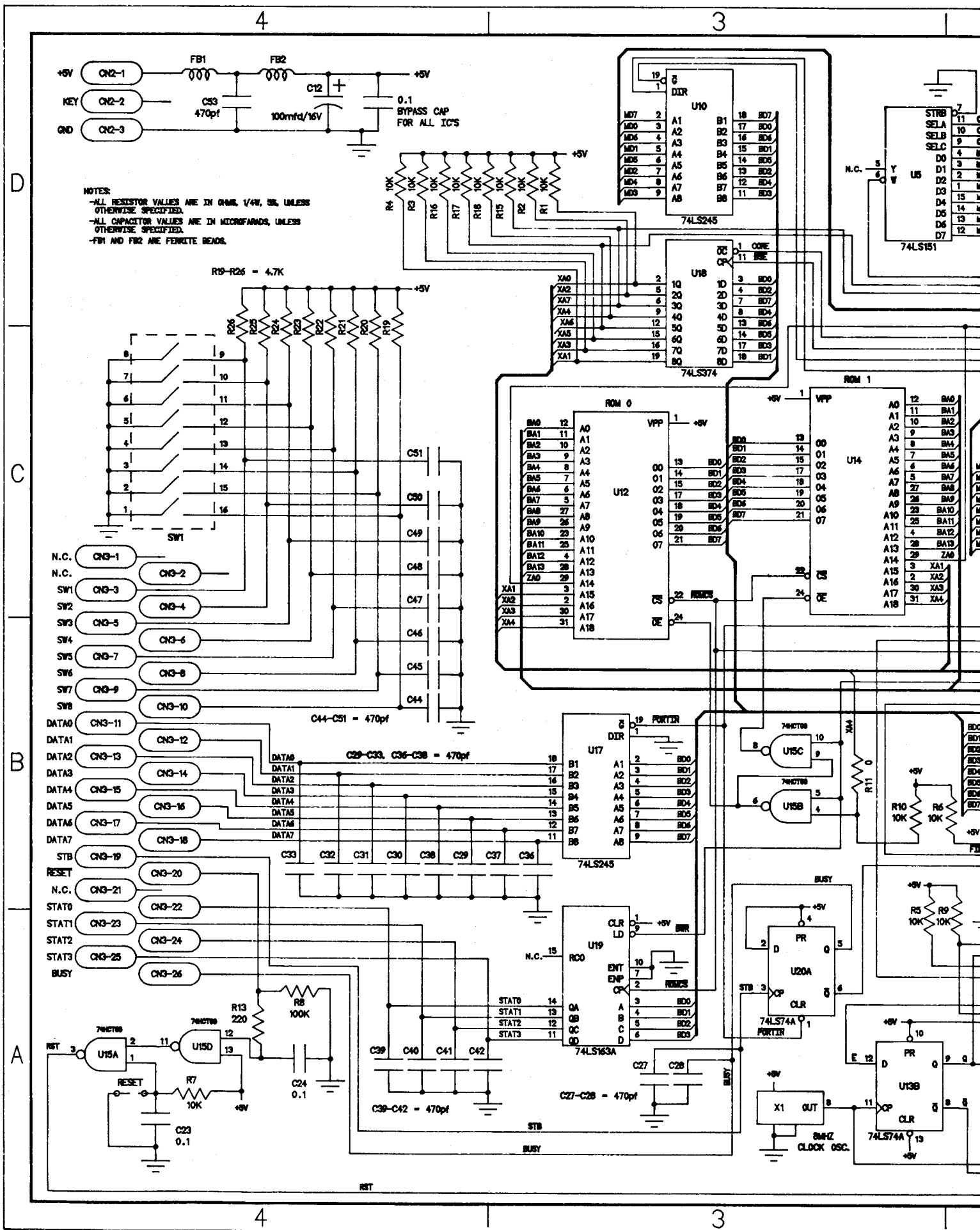


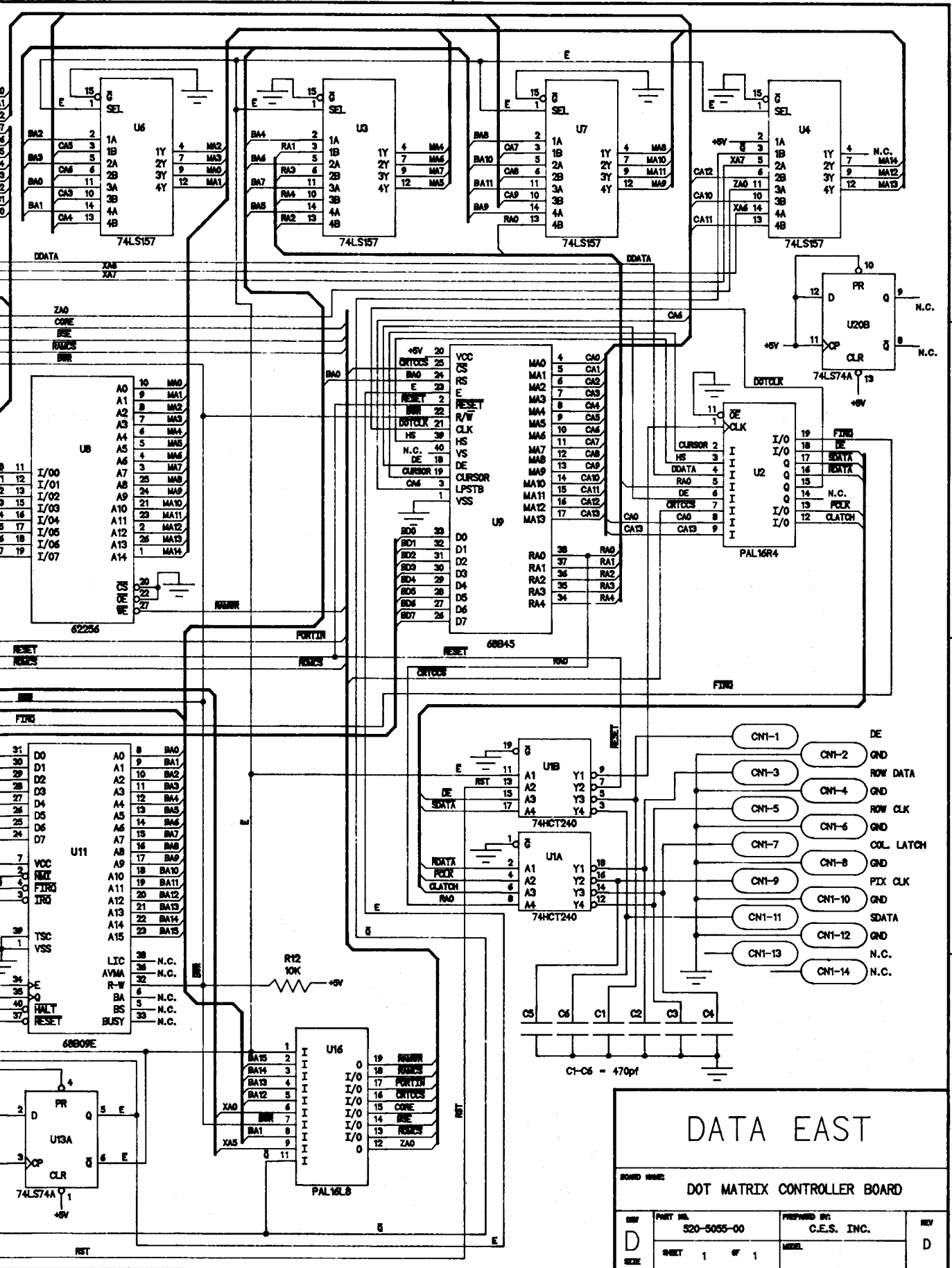
NOTES:  
 -ALL RESISTOR VALUES ARE IN OHMS, 5%, 1/4W, UNLESS OTHERWISE SPECIFIED.  
 -ALL CAPACITOR VALUES ARE IN MICROFARADS, UNLESS OTHERWISE SPECIFIED.  
 -.01uF BYPASS CAPACITORS FOR ALL IC'S.  
 -FB1-FB6 ARE FERRITE BEADS.

**DATA EAST PINBALL**

SOUND BOARD SCHEMATIC

REV	PART NO.	PREPARED BY
D	520-9050-00	C.E.S. INC.
DATE	SHEET	OF
	1	1





D

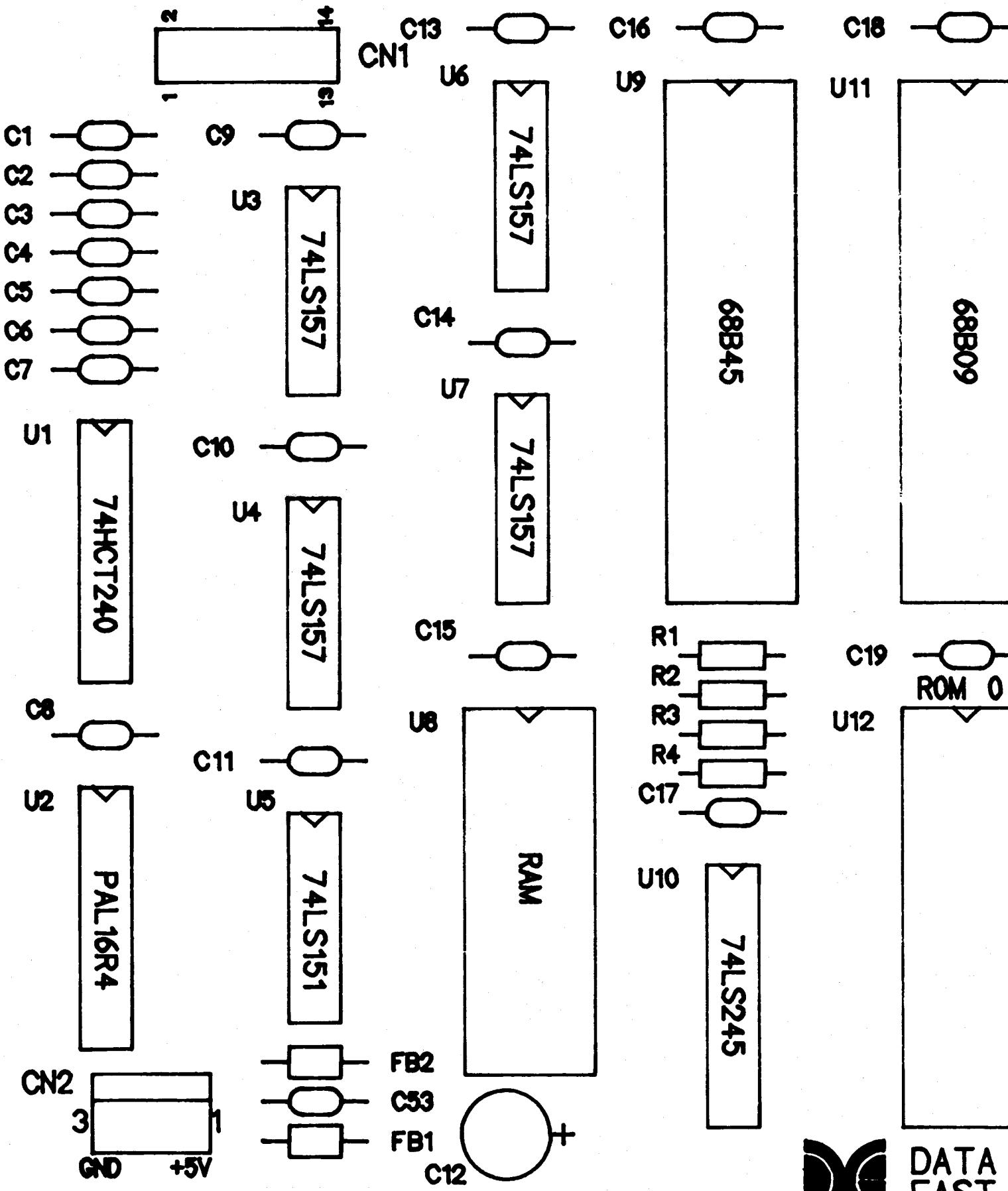
C

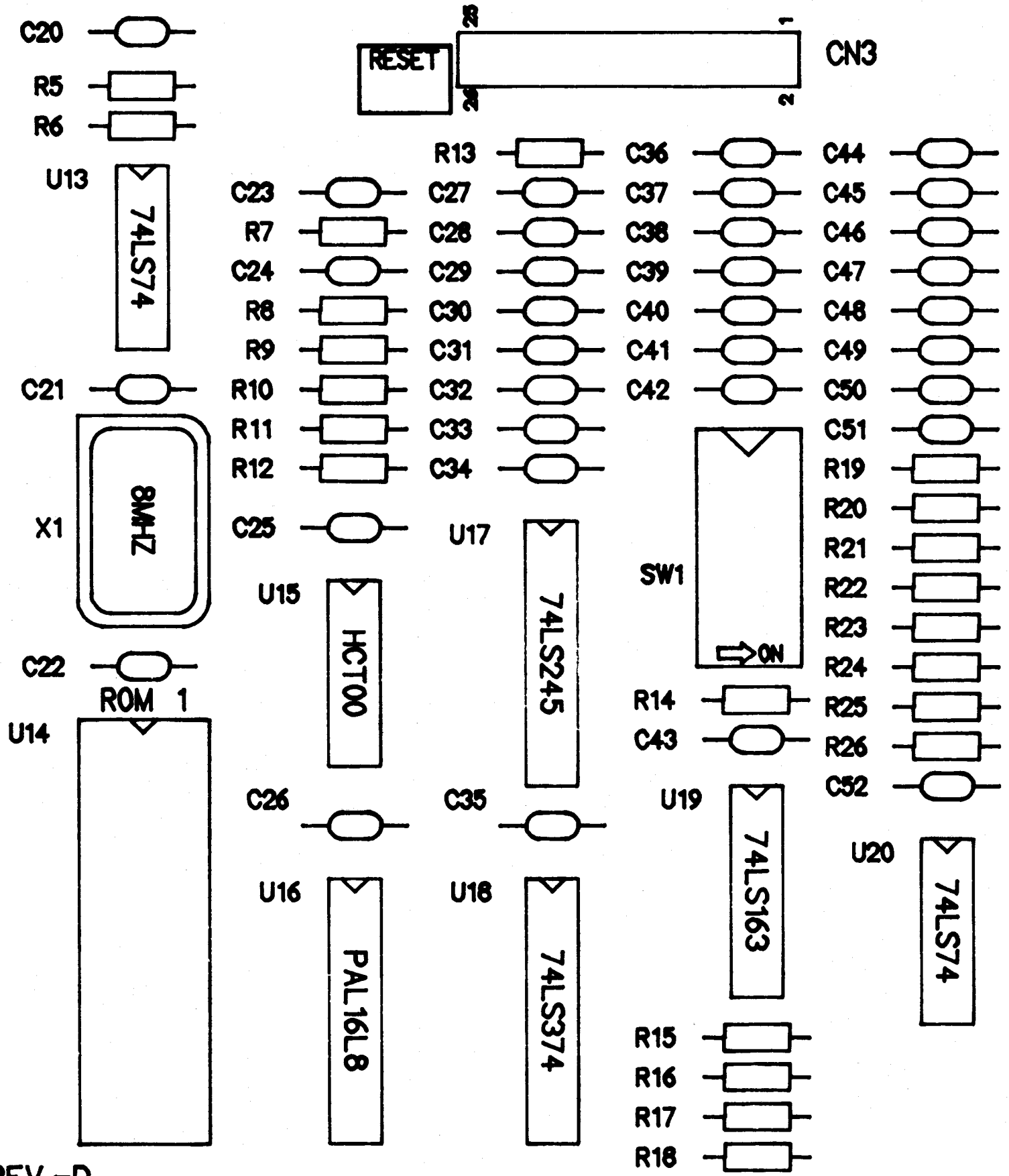
B

A

# DATA EAST

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

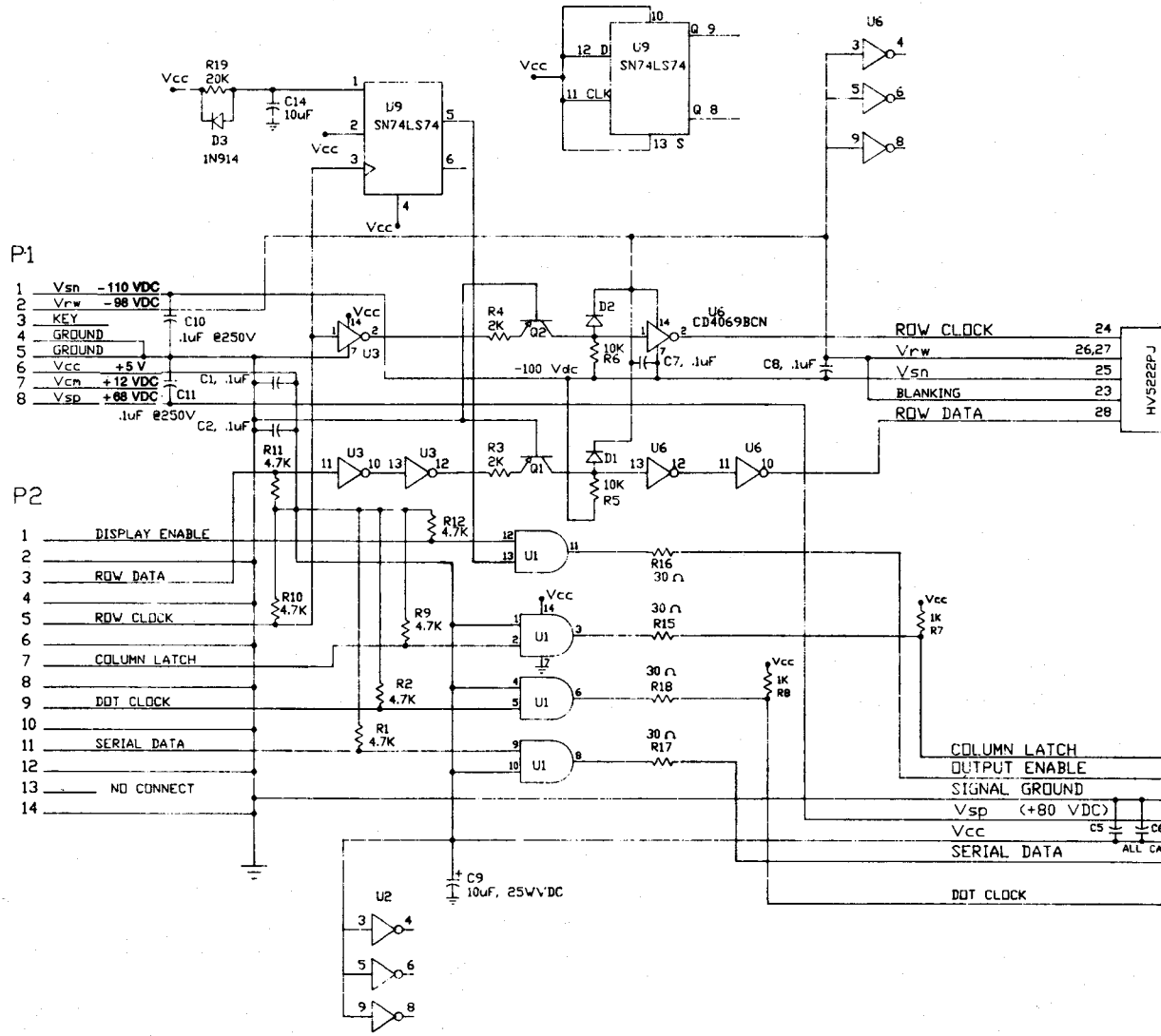




REV.-D  
520-5055-00



PART NO.	INTL CODE
281103-01	S

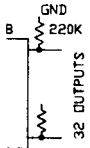


NOTES

REVISIONS				
ZONE	SYM	DESCRIPTION	DATE	APPROVED

D

C

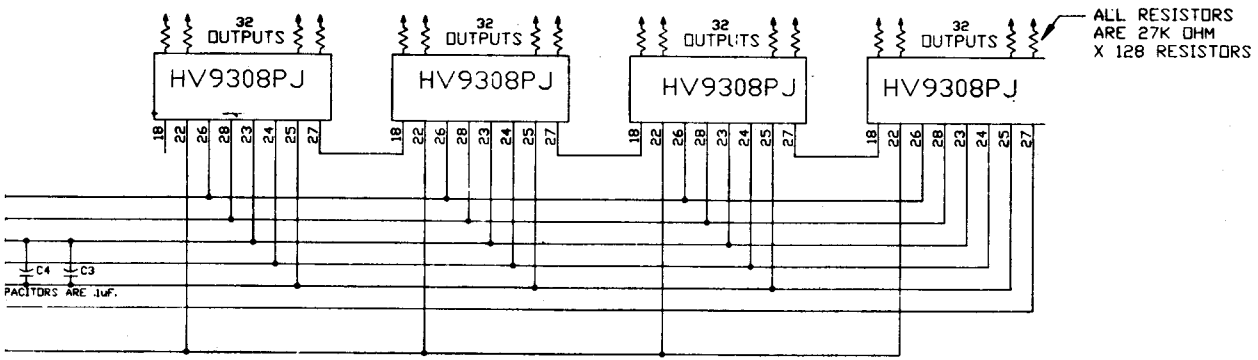


CATHODE CONNECTIONS

DALE PLASMA DISPLAY  
PD-128G032

ANODE CONNECTIONS

ANODE CONNECTIONS



FOLD

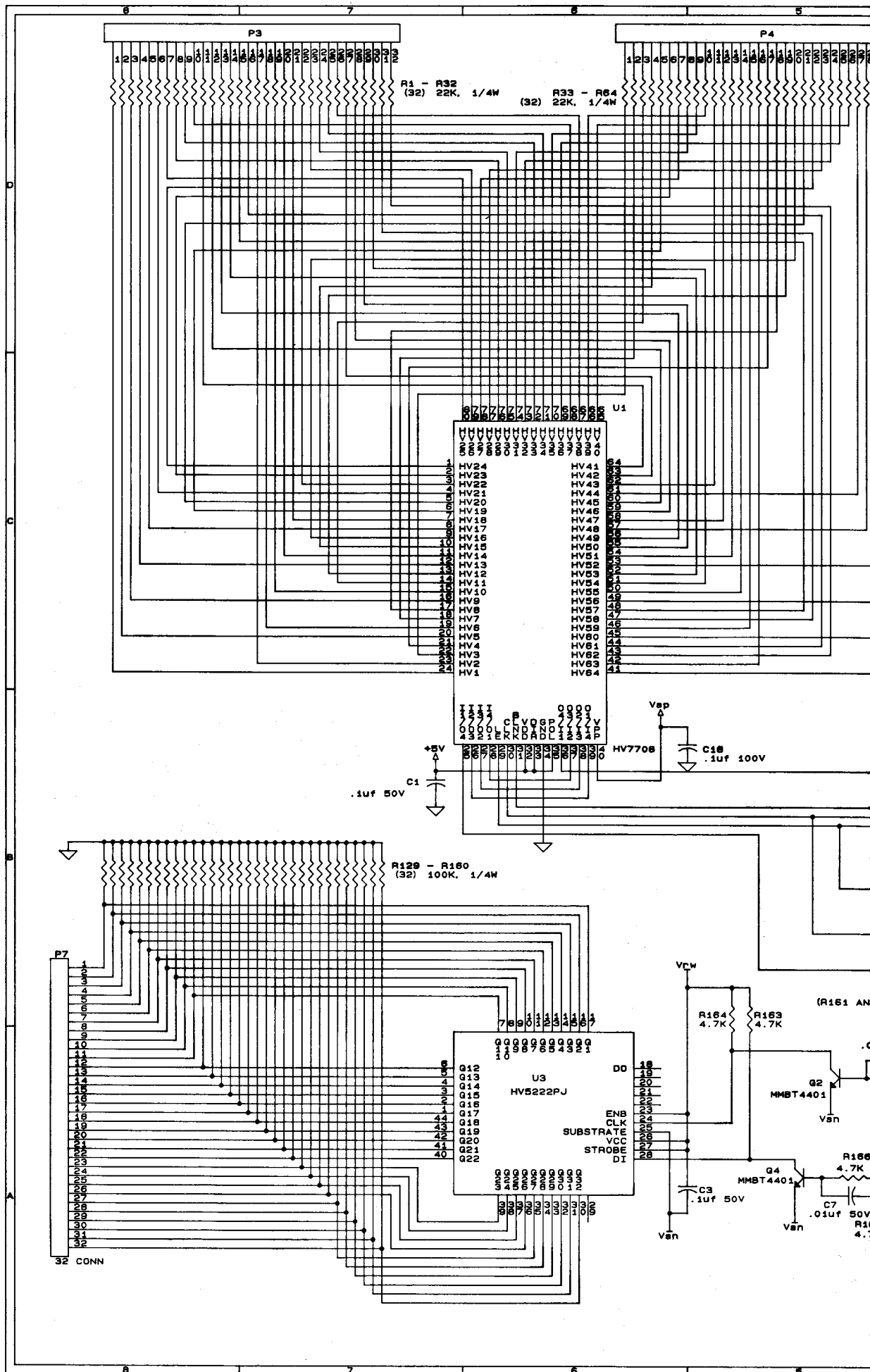
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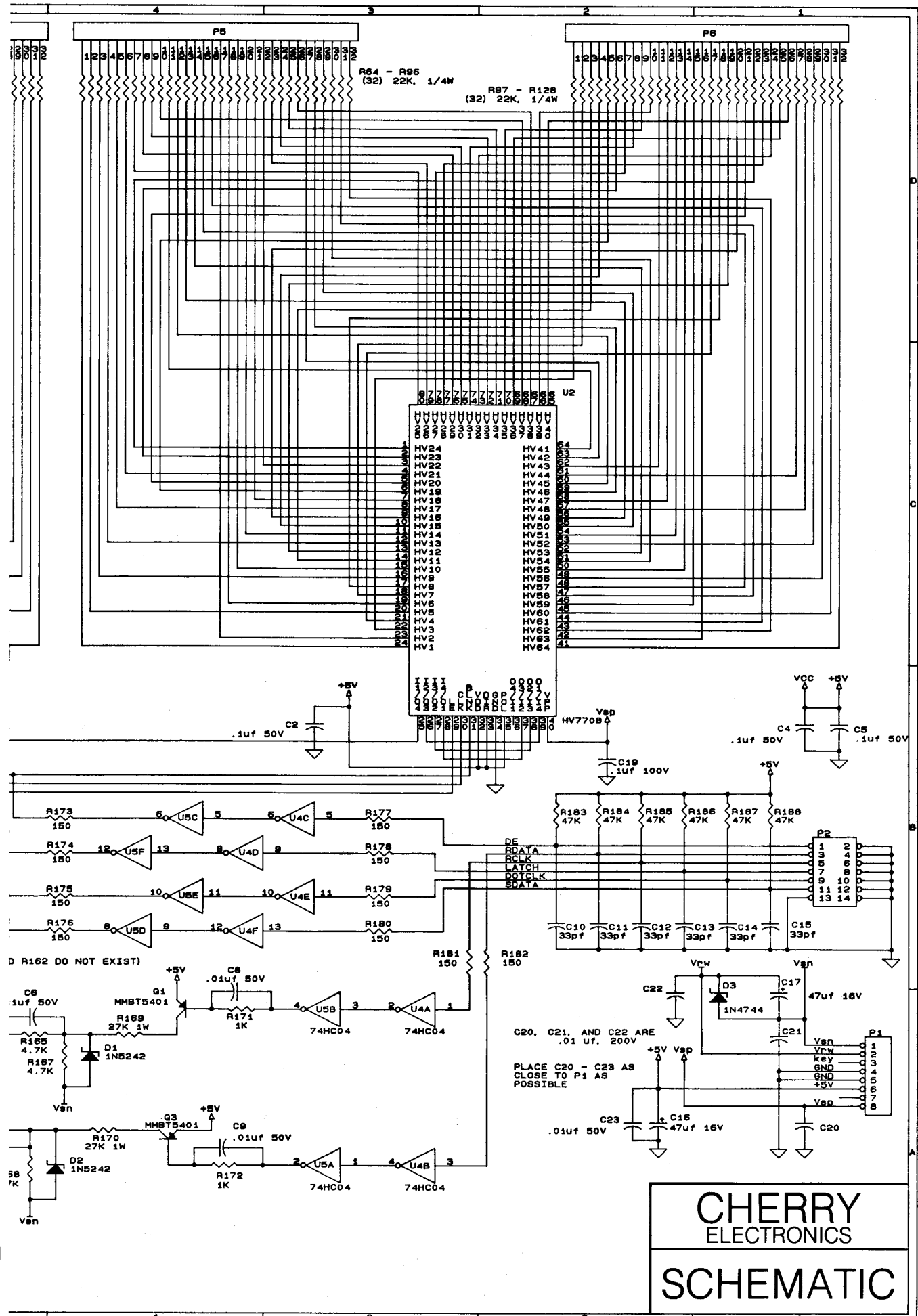
281103

CLASS 2

<p>THESE DIMENSIONS ARE CRITICAL - DIMENSIONS ARE THE PROPERTY OF DALE ELECTRONICS, INC. AND USED IN STRICT CONFIDENCE AND SHALL NOT BE REPRODUCED OR COPIED OR USED AS THE BASIS FOR THE MANUFACTURE OR SALE OF APPARATUS WITHOUT PERMISSION.</p> <p>TYPICAL DIMENSIONS AND TOLERANCES:</p> <p>UNLESS OTHERWISE SPECIFIED</p> <p>FRAXIONS DECIMALS ANGLES DIMENSIONS IN INCHES METRIC DIMENSIONS IN MILLIMETERS</p> <p>1/4 1/8 1/16 3/32 1/8 3/16 1/4 3/8 1/2 5/8 3/4 7/8 1 1 1/4 1 1/2 1 3/4 2 2 1/2 3 3 1/2 4 4 1/2 5 5 1/2 6 6 1/2 7 7 1/2 8 8 1/2 9 9 1/2 10 11 12 14 16 18 20 22 24 26 28 30 32 36 40 45 50 56 63 72 80 90 100 112 125 140 160 180 200 225 250 280 315 360 400 450 500 560 630 720 800 900 1000</p> <p>1/4 1/8 1/16 3/32 1/8 3/16 1/4 3/8 1/2 5/8 3/4 7/8 1 1 1/4 1 1/2 1 3/4 2 2 1/2 3 3 1/2 4 4 1/2 5 5 1/2 6 6 1/2 7 7 1/2 8 8 1/2 9 9 1/2 10 11 12 14 16 18 20 22 24 26 28 30 32 36 40 45 50 56 63 72 80 90 100 112 125 140 160 180 200 225 250 280 315 360 400 450 500 560 630 720 800 900 1000</p> <p>1/4 1/8 1/16 3/32 1/8 3/16 1/4 3/8 1/2 5/8 3/4 7/8 1 1 1/4 1 1/2 1 3/4 2 2 1/2 3 3 1/2 4 4 1/2 5 5 1/2 6 6 1/2 7 7 1/2 8 8 1/2 9 9 1/2 10 11 12 14 16 18 20 22 24 26 28 30 32 36 40 45 50 56 63 72 80 90 100 112 125 140 160 180 200 225 250 280 315 360 400 450 500 560 630 720 800 900 1000</p> <p>1/4 1/8 1/16 3/32 1/8 3/16 1/4 3/8 1/2 5/8 3/4 7/8 1 1 1/4 1 1/2 1 3/4 2 2 1/2 3 3 1/2 4 4 1/2 5 5 1/2 6 6 1/2 7 7 1/2 8 8 1/2 9 9 1/2 10 11 12 14 16 18 20 22 24 26 28 30 32 36 40 45 50 56 63 72 80 90 100 112 125 140 160 180 200 225 250 280 315 360 400 450 500 560 630 720 800 900 1000</p>	<p>UNLESS OTHERWISE SPECIFIED</p> <p>TOLERANCES ON DIMENSIONS ARE IN INCHES</p> <p>FRAXIONS DECIMALS ANGLES DIMENSIONS IN INCHES METRIC DIMENSIONS IN MILLIMETERS</p> <p>1/4 1/8 1/16 3/32 1/8 3/16 1/4 3/8 1/2 5/8 3/4 7/8 1 1 1/4 1 1/2 1 3/4 2 2 1/2 3 3 1/2 4 4 1/2 5 5 1/2 6 6 1/2 7 7 1/2 8 8 1/2 9 9 1/2 10 11 12 14 16 18 20 22 24 26 28 30 32 36 40 45 50 56 63 72 80 90 100 112 125 140 160 180 200 225 250 280 315 360 400 450 500 560 630 720 800 900 1000</p>	<p>SIGNATURES</p> <p>DR <i>John Matijka</i> 92-02-21</p> <p>CHKD <i>Yara Kocman</i> 92-03-06</p> <p>DSGN <i>Z. SHANK</i> 92-02-06</p> <p>SR PROJ <i>DALE</i></p> <p>SECT <i>SRP/CR</i></p> <p>APPD <i>KEITH RAYSBY</i> 92-03-07</p>	<p>DATE</p> <p>92-02-21</p> <p>92-03-06</p> <p>92-02-06</p> <p>92-03-07</p>	<p>DALE ELECTRONICS, INC.</p> <p>A COMPANY OF VISHAY</p> <p>COLUMBUS, NEBRASKA</p>	
	<p>MATERIAL</p>	<p>TITLE</p> <p>ELECTRICAL SCHEMATIC</p> <p>APD-128G032</p>	<p>SIZE CODE IDENT NO. DRAWING NO.</p> <p>D 91637 281103</p>	<p>SCALE NONE</p>	<p>SHEET 1 OF 1</p>
	<p>FINISH</p>	<p>ALL HOLES SURFACES</p> <p>✓</p>	<p>DALE ELECTRONICS, INC.</p> <p>UNLESS OTHERWISE SPECIFIED</p>	<p>DALE ELECTRONICS, INC.</p> <p>UNLESS OTHERWISE SPECIFIED</p>	<p>DALE ELECTRONICS, INC.</p> <p>UNLESS OTHERWISE SPECIFIED</p>
	<p>DALE ELECTRONICS, INC.</p> <p>UNLESS OTHERWISE SPECIFIED</p>	<p>DALE ELECTRONICS, INC.</p> <p>UNLESS OTHERWISE SPECIFIED</p>	<p>DALE ELECTRONICS, INC.</p> <p>UNLESS OTHERWISE SPECIFIED</p>	<p>DALE ELECTRONICS, INC.</p> <p>UNLESS OTHERWISE SPECIFIED</p>	<p>DALE ELECTRONICS, INC.</p> <p>UNLESS OTHERWISE SPECIFIED</p>

A





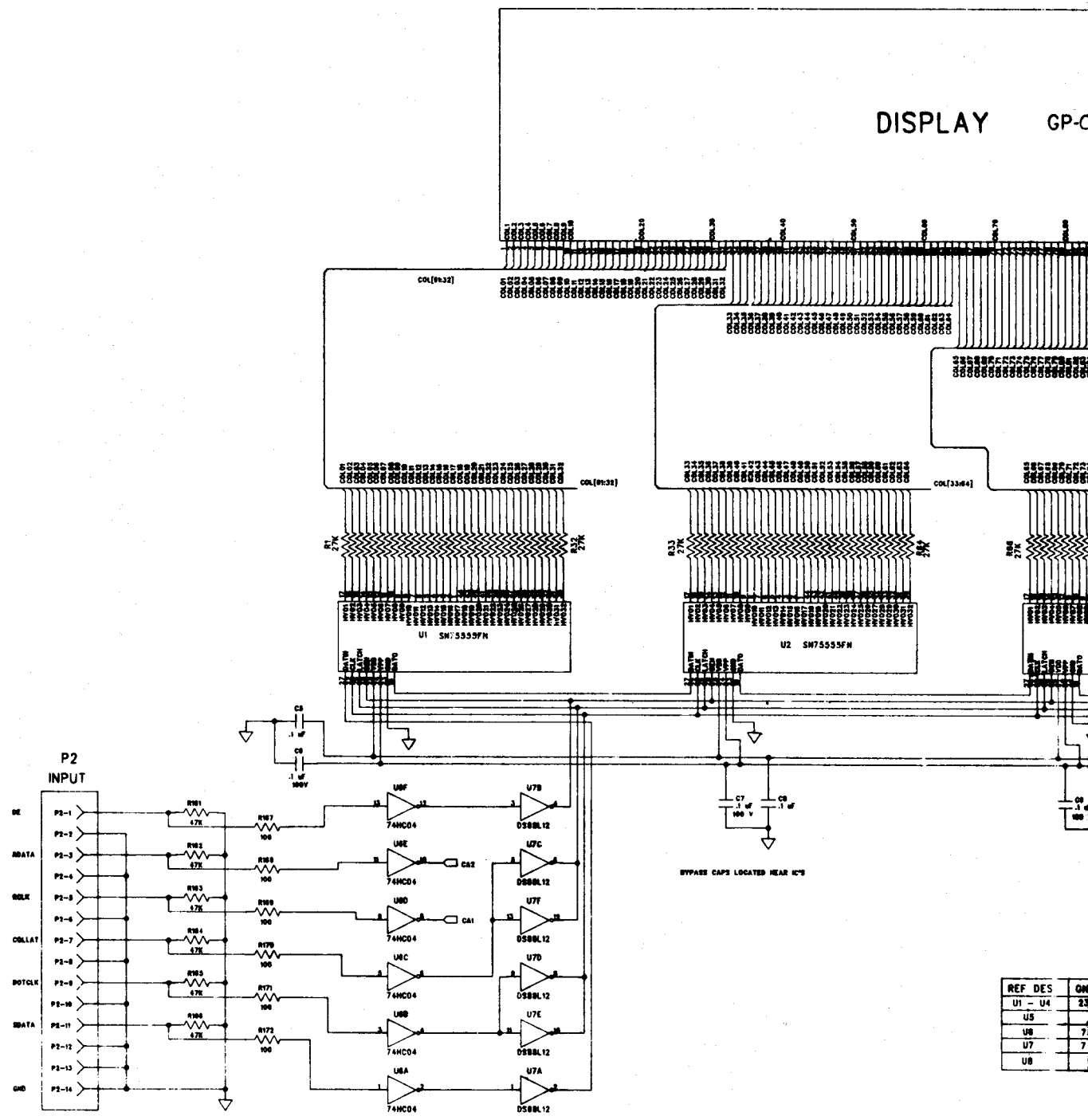
D

C

B

A

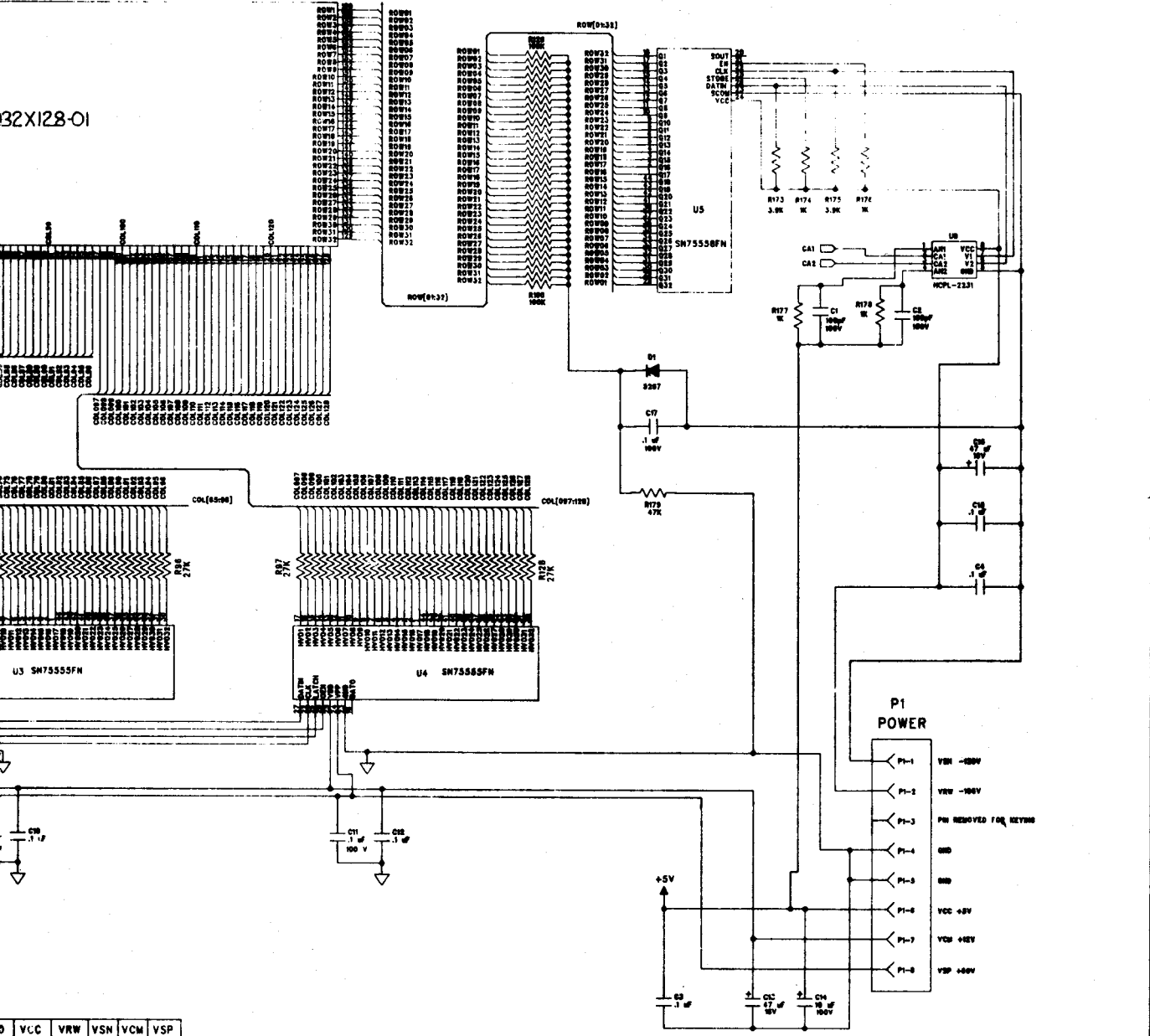
# DISPLAY GP-C



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

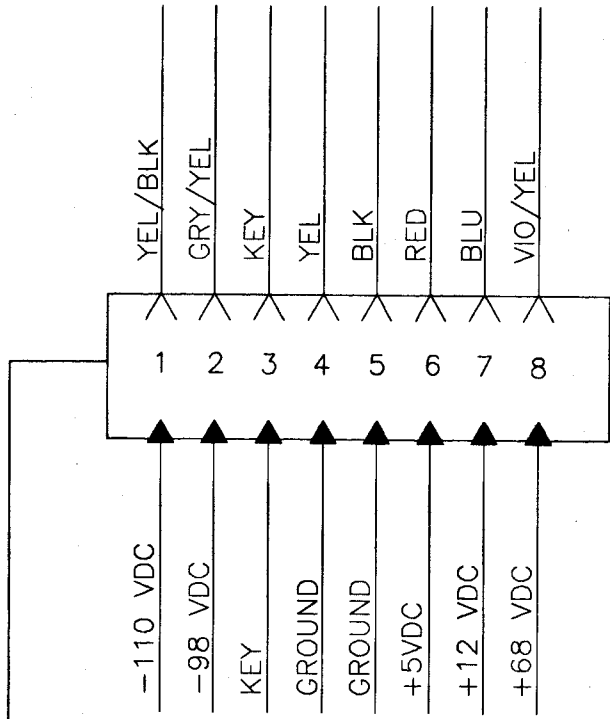
2. RESISTOR VALUES ARE IN OHMS, 1/8 WATT, 5%.  
 1. CAPACITOR VOLTAGES ARE 50V, 20%.  
 NOTES: UNLESS OTHERWISE SPECIFIED.

32X128-01



D	VCC	VRW	VSN	VCM	VSP
		24	23	25	24
	14				
		8	5	14	

PADS LOGIC VER. 2.03 FILE: DM32128.SCH	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES - MAX 1.005 MIN .820 ANGLES 2	CONTR NO.	<b>BABCOCK</b> DISPLAY PRODUCTS, INC. 1081 S. EAST STREET ANAHEIM, CALIFORNIA 92808
		DRAWN BY RAY DEESE	
NEXT ASSY 60-082128-01	MATL	CHECK BY	DATE
APPLICATION	FORM	APPR BY	DATE
THIS DOCUMENT CONTAINS PROPRIETARY INFORMATION OF BABCOCK AND IS FURNISHED SUBJECT TO THE CONDITIONS THAT THE INFORMATION (A) IS BEING FURNISHED 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.			CODE MINT 68646
SCALE		SIZE D	SHEET 1 OF 1



PI

DOT MATRIX BOARD  
520-5052-00

2  
1

0	0	0	0	0	0	0	0	14
0	0	0	0	0	0	0	0	13
DISPLAY ENABLE	ROW DATA	ROW CLOCK	COL. LATCH	PIX CLOCK	SER. DATA	NOT USED	NOT USED	
GROUND	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND	

RIBBON CABLE  
P2

2  
1

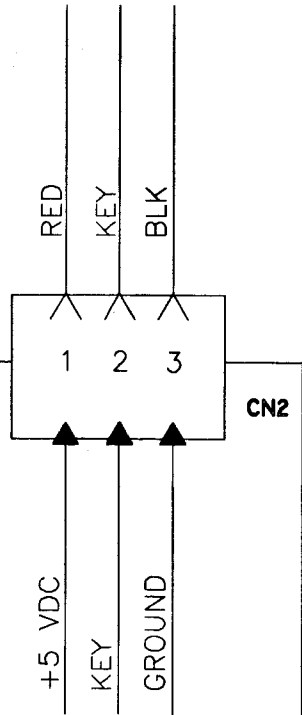
0	0	0	0	0
0	0	0	0	0
DISPLAY ENABLE	ROW DATA	ROW CLOCK	COL. LATCH	GROUND
GROUND	GROUND	GROUND	GROUND	GROUND

RIBBON CABLE  
CNI

0	0	PIX CLOCK	GROUND
0	0	SER. DATA	GROUND
0	0	NOT USED	NOT USED
13	1		
14	2		

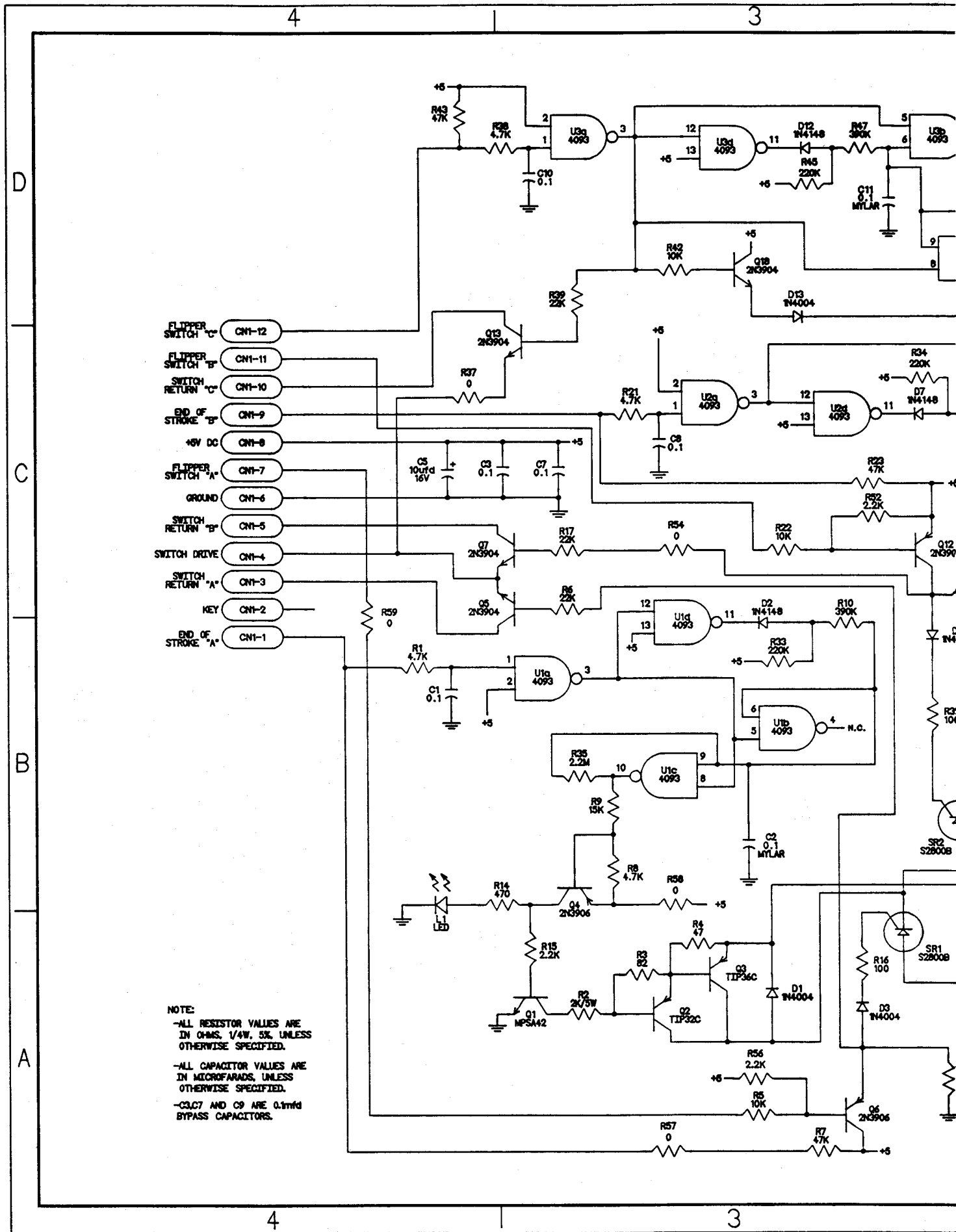
0	0	NOT USED	NOT USED
0	0	SWITCH 1	SWITCH 2
0	0	SWITCH 3	SWITCH 4
0	0	SWITCH 5	SWITCH 6
0	0	SWITCH 7	SWITCH 8
0	0	DATA 0	DATA 1
0	0	DATA 2	DATA 3
0	0	DATA 4	DATA 5
0	0	DATA 6	DATA 7
0	0	STROBE	RESET
0	0	NOT USED	STAT 0
0	0	STAT 1	STAT 2
0	0	STAT 3	BUSY

RIBBON CABLE  
CN3



CONTROLLER BOARD  
520-5055-00

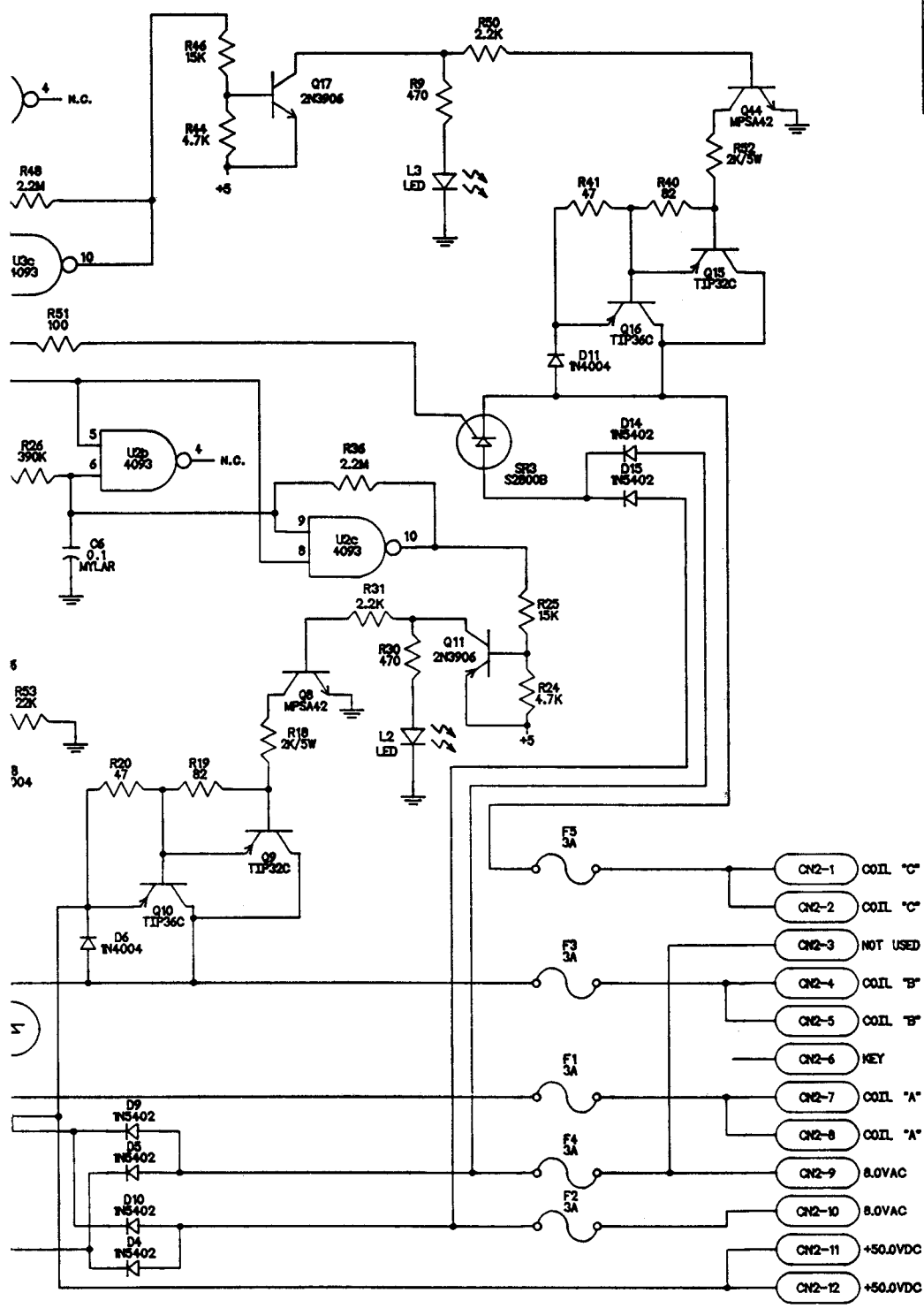




2

1

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
B	TRACE CHANGE ON ARTWORK	3-1-93	
C	ADD END OF STRONG CIRCUITS	4-20-93	



D  
C  
B  
A

**DATA EAST**

BOARD NAME: **SOLID STATE FLIPPER BOARD**

REV	PART NO.	PREPARED BY:	REV
D	520-5033-03	C.E.S. INC.	C
SIZE	SHEET 1 OF 1	MODEL TYFFAST-3006	

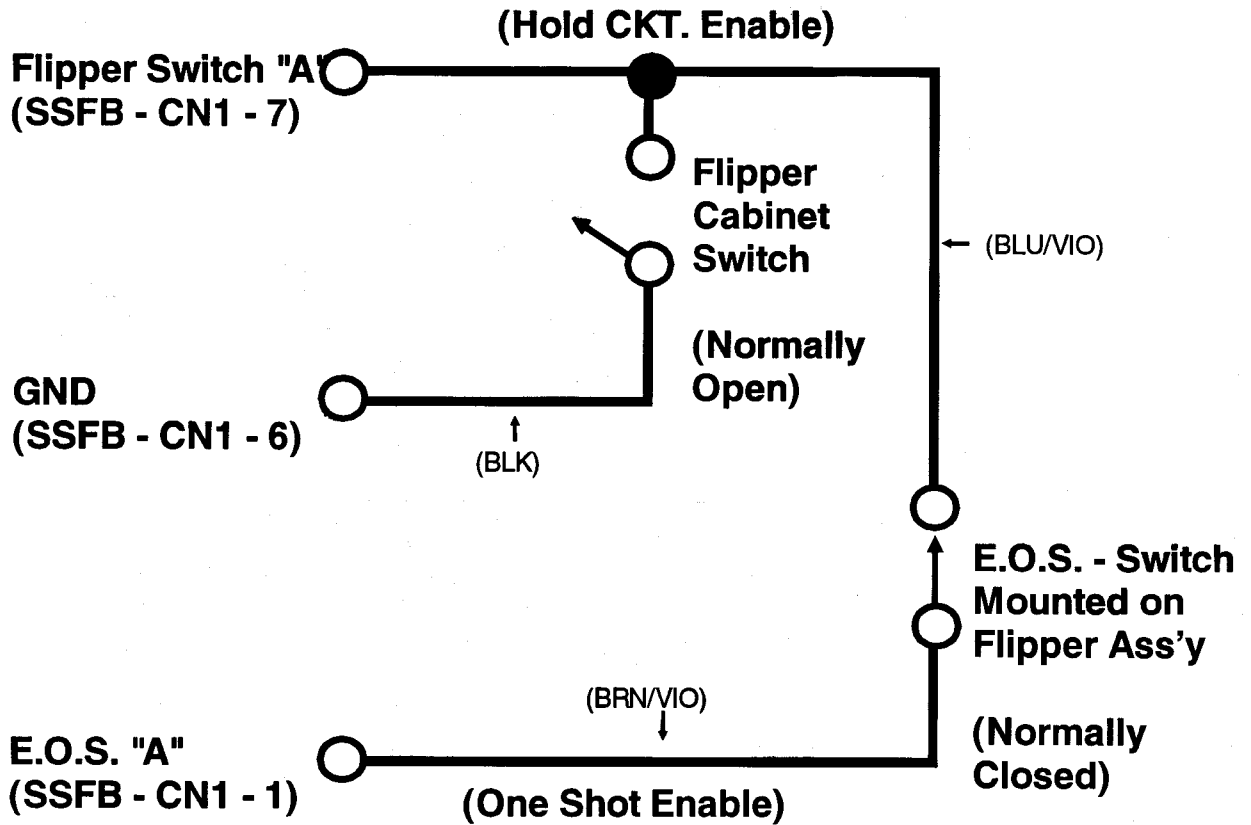
2

1

288  
28K

(Fig 1)

## Solid State Flipper Switch Wiring Diagram



### Theory of Operation for the Solid State Flippers

The Solid State Flipper Board is a Multiple 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 50 volts provides the actuation power to the flipper solenoid while the 8 volts provides the holding power.

# **E.O.S. Switch Theory of Operation**

The End of Stroke (E.O.S.) Switch used in our flipper circuit is a Gold Peened Contact, Blade Switch Assembly, mounted on the flipper assembly.

Electrically, it is connected in series with the Cabinet Flipper Switch and the Flipper E.O.S. input on the Solid State Flipper Board (S.S.F.B.) connector CN1 which enables the 50 Volt DC Drive Circuit.

Referring to Fig. 1, one side of the Flipper Cabinet Switch is connected to ground (BLK-Wire), the other side (BLU-VIO Wire) is connected to the flipper switch input on the S.S.F.B. connector CN1 which enables your 9 Volt DC holding voltage and is connected in series to the E.O.S. switch which is a normally closed switch.

The function of the E.O.S. switch is to prevent the flipper bat from being knocked back by a high velocity shot on the playfield. If while holding the flipper in the up position, the bat is moved back 1/16" or more, the E.O.S. switch will close giving the coil another 50 Volt pulse.

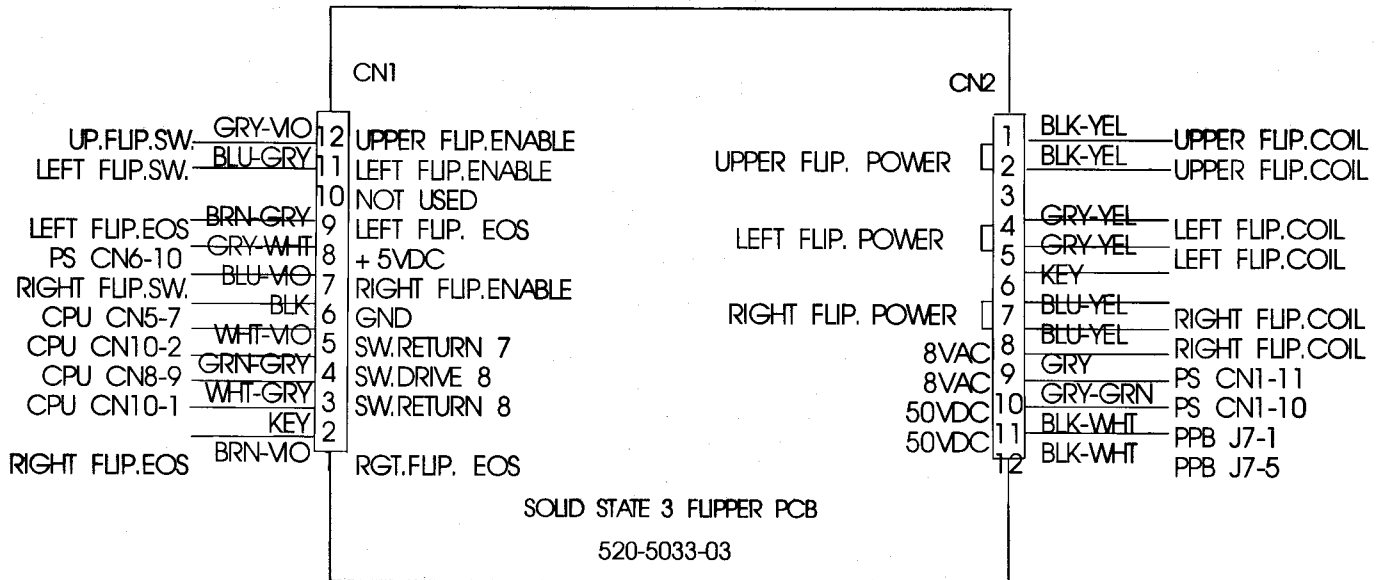
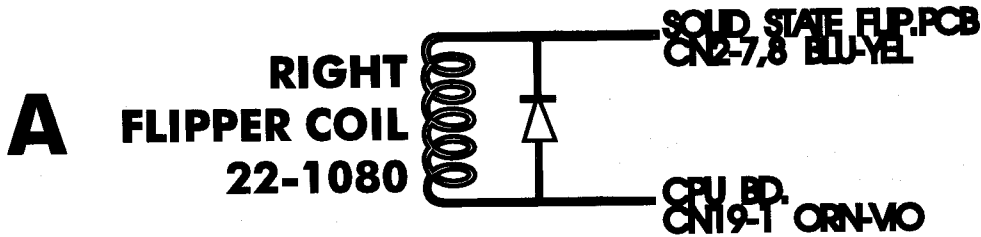
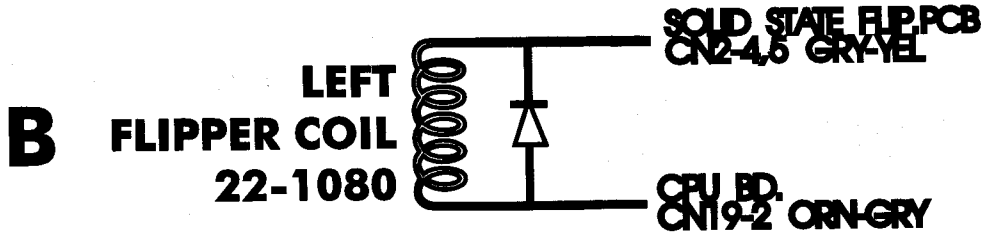
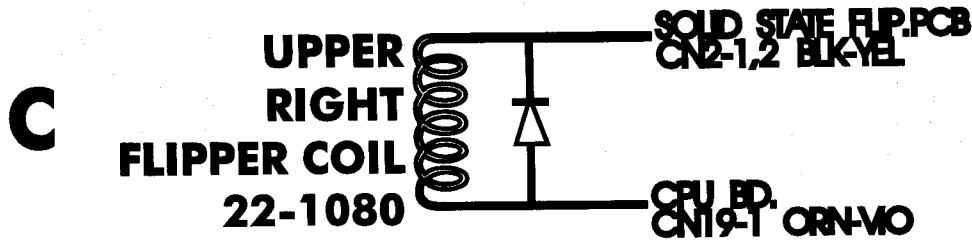
## **E.O.S. Switch Adjustment**

The switch contacts should be adjusted so that when the solenoid is energized, the contacts stay closed for almost the full travel of the plunger. The contacts should open 1/16" before the plunger bottoms out or reaches maximum travel.

## **Troubleshooting Tips**

If the switch contacts are not making, then the series circuit to the 50 Volt Drive Circuit Enable will be broken causing the flipper not to work at all. This is also indicated by the L.E.D. on the S.S.F.B. not flashing when the cabinet flipper switch is closed. This can be easily determined by taking a jumper wire and shorting the switch. If proper adjustment of the switch does not resolve the problem, then replacement will be necessary.

Note: You may solder the two wires together going to the switch and bypass it completely, until a replacement is installed.



## Solid State Flippers PCB Wiring Diagram

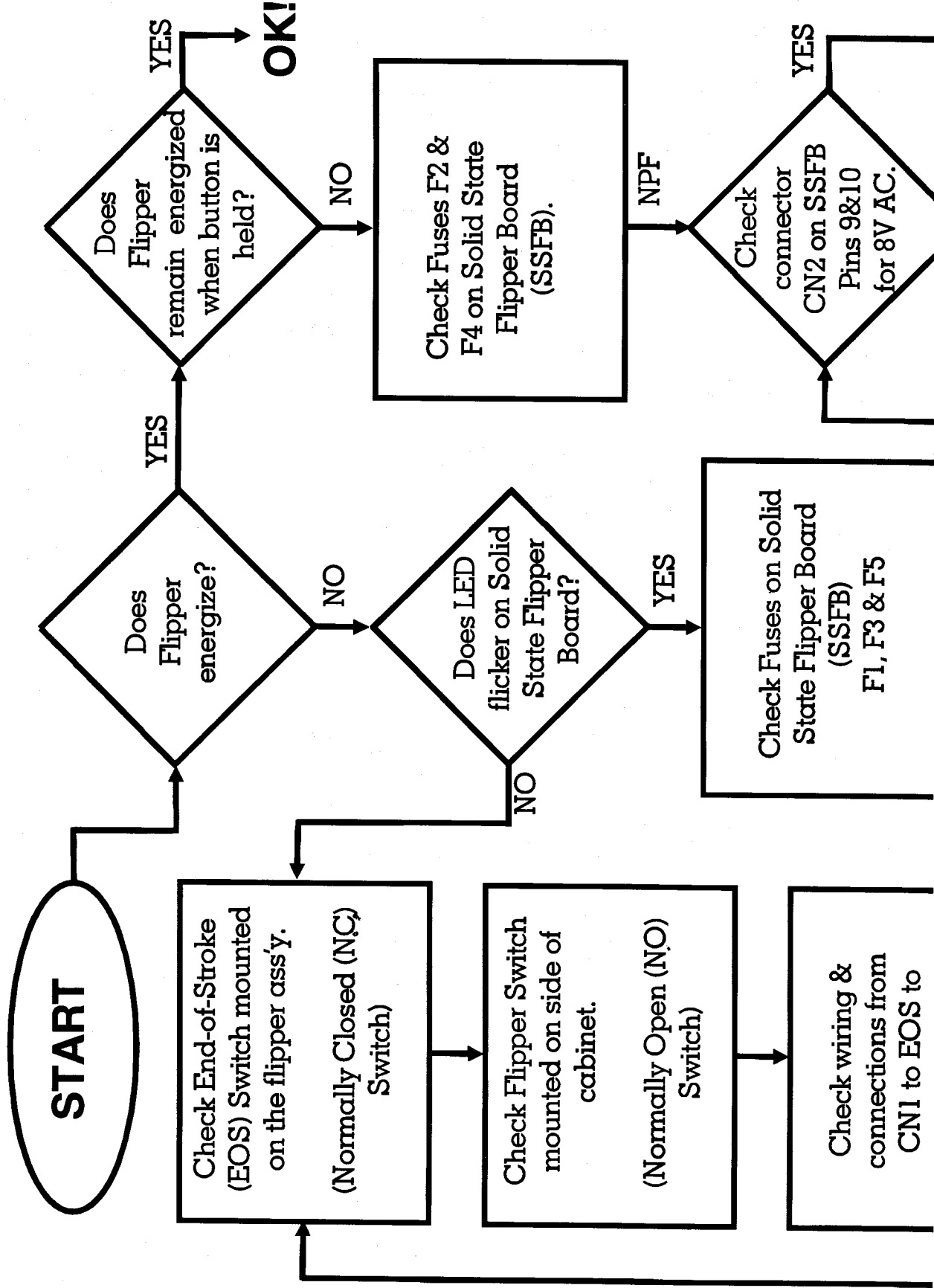
### Connector CN 1

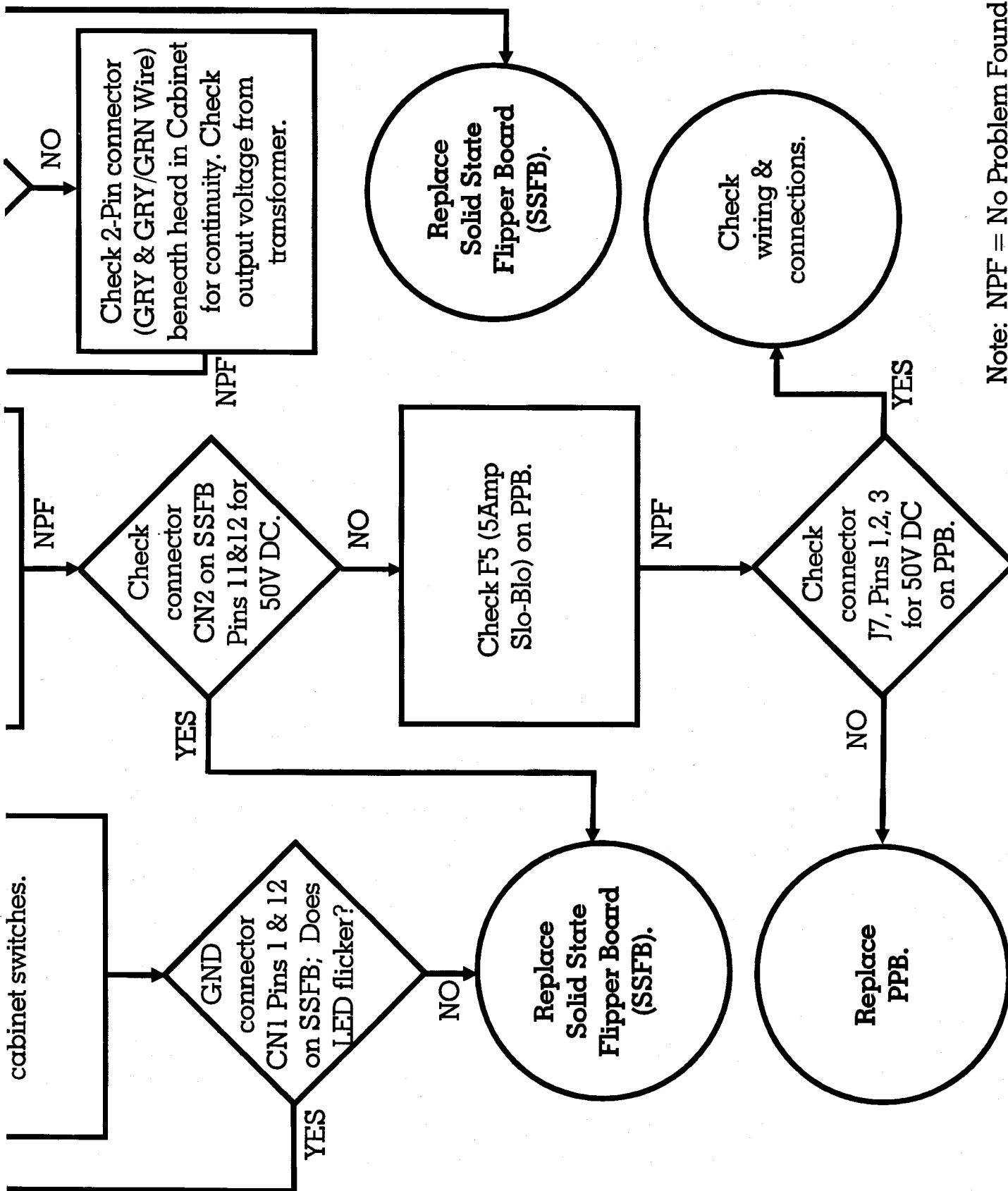
Pin#	Goes to	Wire Color	It Is
1	Rgt. Flipper EOS	BRN-GRY	Rgt. Flip. End of Stroke
2			Key
3	CPU CN 10-1	WHT-GRY	Sw. Ret. 8
4	CPU CN 8-9	GRN-GRY	Sw. Drive 8
5	CPU CN 10-2	WHT-VIO	Sw. Ret. 7
6	Rgt. Flip. Sw.	BLU-VIO	Rgt. Flip. Enable
7	CPU CN 5-9	BLK	GND
8	PS CN 6-10	GRY-WHT	+5V DC
9	Lft. Flip. EOS	BRN-GRY	Left Flip. End of Stroke
10			
11	Lft. Flip. Sw.	BLU-GRY	Lft. Flip. Enable
12	Upper Rgt. Flip. Sw.	GRY-VIO	Upper Rgt. Flip. Enable

### Connector CN 2

Pin #	Goes To	Wire Color	It Is
1	Upper Rgt. Flip. Coil	BLK-YEL	Upper Rgt. Flip. Power
2	Upper Rgt. Flip. Coil	BLK-YEL	Upper Rgt. Flip. Power
3			Not Used
4	Lft. Flip. Coil	GRY-YEL	Lft. Flip. Power
5	Lft. Flip. Coil	GRY-YEL	Lft. Flip. Power
6			Key
7	Rgt. Flip. Coil	BLU-YEL	Rgt. Flip. Power
8	Rgt. Flip. Coil	BLU-YEL	Rgt. Flip. Power
9	PS CN 1-11	GRY	9V AC
10	PS CN 1-10	GRY-GRN	9V AC
11	PPB J7-1	BLK-WHT	50V DC
12	PPB J7-5	BLK-WHT	50V DC

# Solid State Flipper Circuit Troubleshooting Flowchart





Note: NPF = No Problem Found



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2. Such products are properly packaged and then returned freight prepaid, to Seller's plant.

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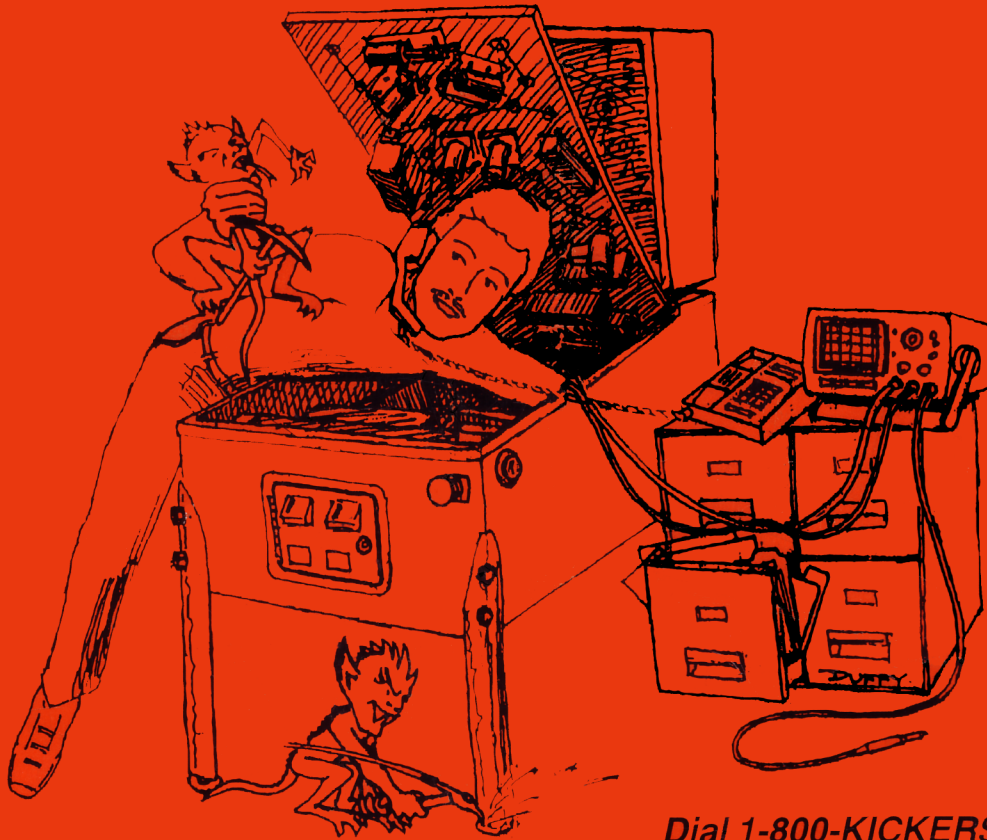
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