

# SIMBAD

SOLID STATE

## Instruction Manual

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# SINBAD (SOLID STATE) GENERAL GAME OPERATING INSTRUCTIONS

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## **I. INSTALLATION**

To assemble the game, first bolt the legs to the cabinet. Place the lightbox atop the pedestal and insert the four #10-32 truss-head screws into the back of the pedestal. Open the lightbox and secure it to the cabinet with the long lightbox bolts. Connect all cables and gently but fully insert the connectors onto the printed circuit boards. Be sure to touch only the edges of the boards.

NOTE: TOUCHING THE STATIC-SENSITIVE MOS COMPONENTS ON THE CPU CONTROL BOARD CAN DAMAGE THEM, MAKING THE GAME INOPERATIVE AND INVALIDATING THE WARRANTY.

CAUTION: IF GAME WAS SUBJECTED TO EXTREME COLD, ALLOW GAME TO WARM UP TO ROOM TEMPERATURE BEFORE PLUGGING IN LINE CORD.

Inspecting the following items before plugging in the line cord may prevent future trouble:

1. Check that cables are clear of moving parts.
2. Look for any disconnected wires.
3. Check switches for loose solder or other foreign matter.
4. Check the soldering generally for cold joints.
5. Be certain all fuses are firmly seated.
6. Check the transformers for foreign matter across the terminals.
7. Be sure that the transformer wiring corresponds to the supply voltage.
8. Check the setting of the tilt switch on the underside of the playfield. One blade of this switch is free-floating with a weight on the end.

After levelling the machine, adjust the plumb-bob tilt (on left side of cabinet near front door) to the sensitivity desired.

## **II. GAME OPERATION**

With the line cord unplugged drop a coin into one of the chutes. It should be rejected. Plug the line cord *only* into a properly-grounded 3-wire receptacle of the correct voltage. Turn on the game by pressing the main switch located on the cabinet bottom near the front right corner.

After a five-second delay all score displays will light and read zeros. The credit display will show the number of credits remaining and the ball in play display will show "70." If the credits fail to light, turn off the game and inspect the normally closed switch on the ball-roll tilt and on the front door. Turn on the game; if the problem remains, refer to Section VII. (Troubleshooting).

Five seconds after the score displays light, they will flash "High Game to Date" score for one second. This cycle continues until the game is started. All playfield lights controlled by the micro-processor will be off.

Insert one or more coins and note that the correct number of credits are added on the credit display according to the information on the coin entrance plate. Press the credit button to reset the game; the ball should now be at the shooter. The first player score reads "0" and flashes, indicating that that player is now scoring. The other player displays are blank and a "1" appears on the ball-in-play display.

Additional players are indicated by a "0" showing in each corresponding player display. Thus if there are three players, a "0" will show in the first three player displays. After the fourth player has been added (or when the credit display reads "0"), the credit button has no effect.

The game features are described in a later section. When the ball enters the outhole, the bonus is scored, the ball is kicked to the shooter, and the display of the player now scoring begins to flash and continues to flash until a score is made. All playfield features reset after each ball. When the "Shoot Again" light is lit, neither the player designation (the flashing display) nor the ball-in-play display changes when the ball enters the outhole. Only one extra ball per ball in play can be given.

The number of balls per game is adjustable. When the last ball enters the outhole, the "Game Over" and "Number to Match" lights come on. A random number appears in the ball-in-play display and if this number matches the last two digits in the player's score, a replay is added to the credit display. At this time a "High Game to Date" score is periodically flashed in all four player displays. When this score is achieved, three replays are given. This feature is adjustable.

Tilting the machine results in the loss of the ball in play or the entire game, depending upon the Tilt Reset adjustment. With this adjustment "on," the game comes on again when the ball enters the outhole, and play resumes. There is a normally-closed switch on the front door and one in the ball-roll tilt. If either of these switches opens from raising the front of the cabinet or pounding the front door, the entire game is ended. The "Game Over" light comes on and for three seconds the coin chute switches and replay button are inactive. This prevents accidental closing of these switches from residual vibration.

### **III. SINBAD (SOLID STATE)**

#### **GAME FEATURES (5 BALL)**

The red drop targets score 3000 points and increase the bonus value. The white, yellow and purple drop targets score 500 points and increase the bonus value.

Hitting the white drop target lights 2x bonus light. Hitting the white and both of the yellow drop targets lights 3x bonus value. Hitting the white, 2 yellow and 3 purple drop targets lights 4x bonus value. Completing all drop targets, white, yellow, purple and red, lights 5x bonus, resets all drop targets, scores bonus as indicated and resets 5x bonus light.

Completing groups of white and purple drop targets lights corresponding rollovers and target features. Completing the yellow drop targets lights corresponding rollovers alternately for increased score. Completing the red drop targets lights red rollover alternately for "special." "Special" and "extra ball" feature reset when hit awarding one of each per ball in play.

The swinging target and rollover buttons score 10 points and add one advance. 5 advances adds one bonus and 1000 points.

Bonus is scored and features reset after each ball.

#### **FEATURE CHANGES FOR 3 BALL OPERATION**

All drop targets score 3000 points.

The yellow and red rollovers do not alternate.

The 5x bonus does not reset until ball leaves the playfield.

The swinging target and rollover buttons score 100 points.

#### IV. BOOKKEEPING FUNCTIONS AND SELF-TESTING

The circuitry in this game helps the operator perform many bookkeeping functions. The information is shown one step at a time on the first player score display while the step number is shown in the credit display. Pressing the button on the inside of the front door (the play/test button) begins the bookkeeping and advances it to the next step each time the button is pressed. If the button is not pressed within sixty seconds of each step, the machine returns to normal playing condition.

The data in any bookkeeping step may be reset to zero while it is displayed by pressing Switch Button #25 on A1, the CPU control board in the lightbox. Then the play/test button must be pressed to enter the zero.

| <b>STEP</b><br><b>(Credit Display)</b> | <b>INFORMATION SHOWN</b><br><b>(First Player Display)</b>                                                                                                                    |
|----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0                                      | Total coins through #1 coin chute (left chute).                                                                                                                              |
| 1                                      | Total coins through #2 coin chute.*                                                                                                                                          |
| 2                                      | Total plays.                                                                                                                                                                 |
| 3                                      | Total replays given.                                                                                                                                                         |
| 4                                      | Number of times anti-cheat switches on front door and on ball-roll tilt have opened.                                                                                         |
| 5                                      | Total extra balls.                                                                                                                                                           |
| 6                                      | Number of tilts.                                                                                                                                                             |
| 7                                      | First high score replay.                                                                                                                                                     |
| 8                                      | Second high score replay.                                                                                                                                                    |
| 9                                      | Third high score replay.                                                                                                                                                     |
| 10                                     | Current "High Game to Date" score.                                                                                                                                           |
| 11                                     | Display test: All digits in first and third player displays step "0" through "9."**                                                                                          |
| 12                                     | Display test: All digits in second and fourth player displays step "0" through "9."**                                                                                        |
| 13                                     | Self-test: All CPU-controlled lights come on for five seconds. Each solenoid is energized one at a time. All closed switches noted by a code number in ball-in-play display. |

\*If chutes are adjusted to be the same, coins deposited in either chute add only to the #1 chute total.

\*\*If button is not pressed within two 0-9 cycles, machine returns to normal playing condition.

### **TO CHANGE REPLAY SCORES OR "HIGH GAME TO DATE" SCORE:**

- 1) Press the play/test button on the front door at one-second intervals to advance to step 7 (first high score replay).
- 2) Reset the display by pressing Switch Button #25 on A1, the CPU control board.
- 3) Press the replay button. This causes the display to advance by 10,000's. Hold in the replay button until the desired replay score is shown.
- 4) The new score is entered by advancing to the next function by pressing the play/test button.

To eliminate entirely one or more replay scores, set step 7, 8, or 9 at zero (as in #2 above), then press the play/test button to enter the value.

The switches and solenoids are checked in Step 13 in the order given in the following lists. A faulty solenoid or a closed switch that should be open will not stop the test sequence; the code number of the component will be shown in the ball-in-play display. The machine returns to the normal playing condition at the end of the test. It will do so also if a tilt switch is closed, if an anti-cheat switch is opened, or if the power is interrupted.

#### **SOLENOID NUMBER**

#### **SOLENOID**

|   |                                     |
|---|-------------------------------------|
| 1 | Outhole                             |
| 2 | Knocker                             |
| 3 | Tens Chime                          |
| 4 | Hundreds Chime                      |
| 5 | Thousands Chime                     |
| 6 | White-Yellow Drop Target Bank Reset |
| 7 | Purple Drop Target Bank Reset       |
| 8 | Red Drop Target Bank Reset          |

## SWITCH NUMBER

## SWITCH CODE LIST

## SWITCH

|    |                                   |
|----|-----------------------------------|
| 00 | Play/test button (on front door)  |
| 01 | #1 Coin Chute (on front door)     |
| 02 | #2 Coin Chute (on front door)     |
| 03 | Replay Button (on front door)     |
| 04 | Tilt Switches                     |
| 10 | Swinging Target                   |
| 11 | Not Used                          |
| 12 | Not Used                          |
| 13 | Not Used                          |
| 14 | Pop Bumpers (2)                   |
| 20 | White Drop Target                 |
| 21 | Yellow Drop Target                |
| 22 | Not Used                          |
| 23 | Not Used                          |
| 24 | Yellow Drop Target                |
| 30 | Purple Drop Target                |
| 31 | Purple Drop Target                |
| 32 | Not Used                          |
| 33 | Not Used                          |
| 34 | Purple Drop Target                |
| 40 | Top and Left Yellow Rollovers (2) |
| 41 | White Rollover and Target         |
| 42 | Not Used                          |
| 43 | Not Used                          |
| 44 | Right Yellow Rollovers (2)        |
| 50 | Red Drop Target                   |
| 51 | Red Drop Target                   |
| 52 | Not Used                          |
| 53 | Not Used                          |
| 54 | 10 Point Switches (8)             |
| 60 | Red Drop Target                   |
| 61 | Red Drop Target                   |
| 62 | Not Used                          |
| 63 | Not Used                          |
| 64 | Not Used                          |
| 70 | Red Rollover                      |
| 71 | Purple Rollover                   |
| 72 | Not Used                          |
| 73 | Not Used                          |
| 74 | Rollover Buttons (4)              |

## V. GAME ADJUSTMENTS

### A. Playfield Adjustments

Posts controlling access to the left and right outlanes can be adjusted. See page 35. The "conservative" (easier entry) position decreases playing time and scoring while the "liberal" position has the opposite effect.

The game is shipped with adjustable posts in the position found to be suitable for the greatest number of players. Therefore the posts should not be changed unless the need is clearly evident.

### B. Lightbox Adjustments

There are 24 switches on the CPU control board (A1). These allow many features of the game to be adjusted to fit the location. The switches are contained in three "packages" of eight switches each, as shown in the following illustration.



**WARNING: TURN OFF POWER BEFORE MAKING ADJUSTMENTS!**  
**BE CAREFUL TO TOUCH ONLY THE SWITCHES. DO NOT TOUCH THE STATIC-SENSITIVE MOS COMPONENTS.**

#### 1. Coin and Credit

The number of plays (credits) and the number of coins are adjustable. Switches #1 through #4 adjust the first coin chute (#1 chute, on the left). Switches #5 through #8 adjust #2 coin chute.

The two chutes can be adjusted to be the same. When this is done, both chutes are adjusted using switches #1 through #4.

| COIN CHUTES    | SWITCH 19 |
|----------------|-----------|
| Separate ..... | OFF       |
| Same .....     | ON        |

## COIN CHUTE ADJUSTMENTS

|                     |           |           |           |           |
|---------------------|-----------|-----------|-----------|-----------|
| #1 Coin Chute ..... | <b>S1</b> | <b>S2</b> | <b>S3</b> | <b>S4</b> |
| #2 Coin Chute ..... | <b>S5</b> | <b>S6</b> | <b>S7</b> | <b>S8</b> |

### Coins/Credits

|        |           |     |     |     |     |
|--------|-----------|-----|-----|-----|-----|
|        | 1/1 ..... | OFF | OFF | OFF | OFF |
|        | 1/2 ..... | OFF | OFF | OFF | ON  |
|        | 1/3 ..... | OFF | OFF | ON  | OFF |
|        | 1/4 ..... | OFF | OFF | ON  | ON  |
|        | 1/5 ..... | OFF | ON  | OFF | OFF |
|        | 1/6 ..... | OFF | ON  | OFF | ON  |
|        | 1/7 ..... | OFF | ON  | ON  | OFF |
|        | 1/8 ..... | OFF | ON  | ON  | ON  |
|        | 1/9 ..... | ON  | OFF | OFF | OFF |
| Note 1 | 2/1 ..... | ON  | OFF | OFF | ON  |
|        | 2/2 ..... | ON  | OFF | ON  | OFF |
|        | 2/3 ..... | ON  | OFF | ON  | ON  |
|        | 2/4 ..... | ON  | ON  | OFF | OFF |
|        | 2/5 ..... | ON  | ON  | OFF | ON  |
| Note 2 | 2/3 ..... | ON  | ON  | ON  | OFF |
| Note 3 | 3/1 ..... | ON  | ON  | ON  | ON  |

Note 1: No credits until second coin is deposited.

Note 2: First coin gives one credit. Second coin gives two credits provided that no score is made between first and second coin. If scoring occurred, second coin becomes a "first" coin, giving one credit.

Note 3: No credit until third coin is deposited.

## 2. Maximum Credits

This adjustment determines the maximum number of games which may be accumulated on the credit display, whether by adding replays or by inserting coins.

| MAXIMUM CREDITS | SWITCHES |     |
|-----------------|----------|-----|
|                 | 17       | 18  |
| 5 .....         | OFF      | OFF |
| 8 .....         | OFF      | ON  |
| 10 .....        | ON       | OFF |
| 15 .....        | ON       | ON  |

|    |                       |                 |
|----|-----------------------|-----------------|
| 3. | <b>BALLS PER GAME</b> | <b>SWITCH 9</b> |
|    | 3 .....               | ON              |
|    | 5 .....               | OFF             |

|    |                      |                  |
|----|----------------------|------------------|
| 4. | <b>MATCH FEATURE</b> | <b>SWITCH 10</b> |
|    | IN .....             | ON               |
|    | OUT .....            | OFF              |

|    |                          |                  |
|----|--------------------------|------------------|
| 5. | <b>CREDITS DISPLAYED</b> | <b>SWITCH 13</b> |
|    | YES .....                | ON               |
|    | NO .....                 | OFF              |

|    |                            |                  |
|----|----------------------------|------------------|
| 6. | <b>CHIMES WHEN SCORING</b> | <b>SWITCH 20</b> |
|    | YES .....                  | ON               |
|    | NO .....                   | OFF              |

|    |                         |                  |
|----|-------------------------|------------------|
| 7. | <b>TILT</b>             | <b>SWITCH 12</b> |
|    | BALL IN PLAY ONLY ..... | ON               |
|    | GAME OVER .....         | OFF              |

## 8. Score Feature

This adjustment determines game mode. (Replay or Extra Ball).

### SWITCH 11

REPLAY..... ON  
EXTRA BALL.....OFF

## 9. Chimes When Resetting Game (Tune)

The game may be adjusted to play a tune when the credit button is pressed and a different tune when a coin is dropped.

### CREDIT BUTTON TUNE

### SWITCH 14

ON ..... ON  
OFF .....OFF

### COIN SWITCH TUNE

### SWITCH 23

ON ..... ON  
OFF.....OFF

## 10. High Game to Date Feature

When the High Game to Date score is reached, three replays are given and that score becomes the new High Game to Date. That score is flashed periodically on all four player displays at the end of the game.

### HIGH GAME TO DATE

### SWITCH 21

IN ..... ON  
OUT.....OFF

### SWITCH 22

11. HIGH GAME TO DATE FEATURE GIVES 3 REPLAYS..... ON  
HIGH GAME TO DATE FEATURE GIVES NO REPLAYS ..... OFF

## **VI. ROUTINE MAINTENANCE**

After a successful completion of the self-test, check the playfield for dirt or particles. The playfield should be cleaned frequently with a non-abrasive wax-based cleaner. Any of the polishes made specifically for use on pinball machine playfields may be used. Make certain that kicker fulcrums and all pivot points receive a drop of fine oil. The pop bumper cup switches, the drop target shanks and the discs of Vari-targets should be lightly coated with White Lube, a special Gottlieb lubricant available at distributors.

When the playboard is clean and all components are working properly, start the game and try each feature. Make certain each rollover operates, that each pop bumper scores and kicks correctly and that in general everything works as it should. If an intermittent or dirty switch is found, clean the points by pressing them together with a piece of paper or a business card between them, moving the card back and forth.

**WARNING: DO NOT FILE, BURNISH OR IN ANY WAY ABRASE GOLD-PLATED SWITCH CONTACTS.**

The only switches whose points may be burnished are the pop bumper cup switches, the rubber-actuated switches on kicking rubber units, and the flipper button switches.

## **VII. TROUBLE-SHOOTING**

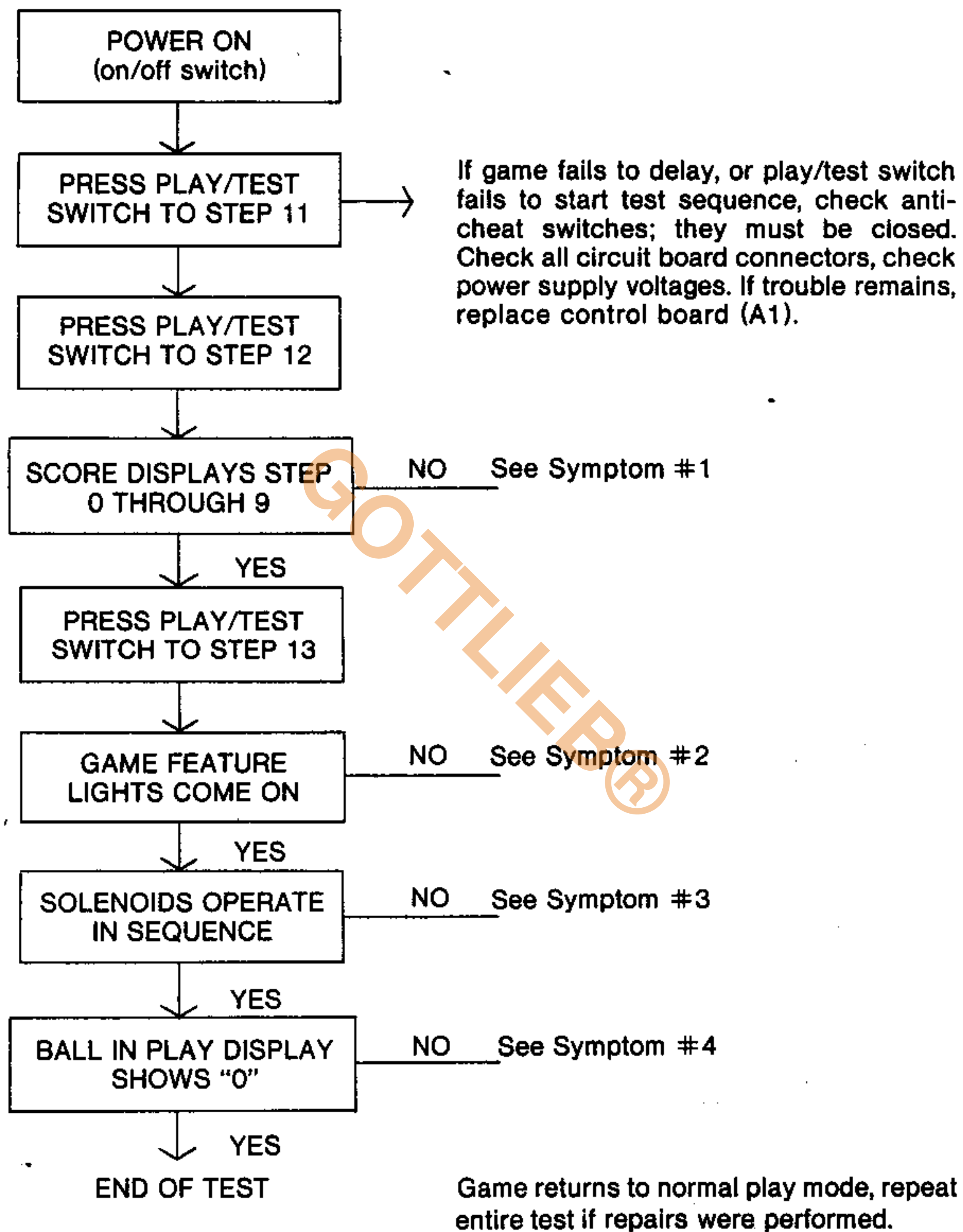
Trouble-shooting of the mechanical devices in the game can be held to a minimum by diligent maintenance. Trouble-shooting of the solid-state components is very seldom required and in fact on location is limited to inspection and replacement of entire boards. Detailed diagnosis and repair of boards can be made at a service center or properly equipped shop.

Before replacing the CPU board or driver board, measure the voltages on the power supply board (A2) after first disconnecting the two connectors A2J2 and A2J3. If any fault is found here, replace this board and recheck power supply voltages before reconnecting A2J2 and A2J3. Before replacing anything, check carefully all connectors, crimp connectors and wires. Make certain all grounds are intact.

After any repairs, all connectors *must* be re-connected before the game is turned on.

**WARNING! TURN OFF POWER BEFORE REMOVING OR REPLACING ANY OF THE BOARDS.**

## GAME TEST AND TROUBLE SHOOTING GUIDE



## **SYMPTOM #1      DISPLAYS**

**Note:** Before replacing a display, check the connector and the individual crimped wires.

**1A) Symptom:** One or several display segments or digits always off, always on, or mottled. May appear on one or more players but *not all*.

**Action:**

1. Open front door and press play/test button until step 11 or 12 is reached. Note any defective display boards.
2. Turn power off.
3. Replace defective score display board (see parts list). Turn power on and repeat 1. If trouble persists, go to 1B2.

**1B) Symptom:** All player displays improper; segments or digits always on or always off.

**Action:**

1. Repeat 1A-1.
2. Check power supply voltages.
3. Turn power off.
4. Replace CPU board A1. (see parts list)
5. Turn power on and repeat 1.

## **SYMPTOM #2      FEATURE LIGHTS**

**2A) Symptom:** Not all feature lights come on during play.

**Action:**

1. Check the wiring and bulb, of lights not working.
2. Check connectors and crimped wires on the driver board (A3).
3. Open the front door and press play/test button until step 13 is reached. Feature lights come on.
4. Turn power off.
5. Replace driver board A3. (see parts list)
6. Turn power on and repeat 3. If not correct, turn power off.
7. Replace CPU board A1. (see parts list)
8. Turn power on and repeat 3.

**2B) Symptom:** One or more feature lights always on.

**Action:** 1. Perform 2A-2 through 2A-8.

### **SYMPTOM #3      SOLENOIDS**

**3A) Symptom:**      Controlled solenoid does not operate during play (may be one or more). **NOTE:** Flipper, kicking rubber and pop bumper solenoids are non-CPU controlled. They have nothing to do with boards A1 and A3.

- Action:**
1. Open front door and press play/test button until step 13 is reached. Each solenoid operates once. (See solenoid list in Section III).
  2. Turn power off.
  3. Raise the playfield and check the solenoid not operating. Replace if damaged. Check for free movement of the device operated by the solenoid. Check 24 VDC fuse.
  4. Inspect connectors and crimped wires on driver board (A3).
  5. Replace driver board A3. (see parts list)
  6. Turn power on and repeat 3A-1. If solenoid does not operate, turn power off.
  7. Inspect connectors and crimped wires on CPU control board (A1). Repeat 3A-1.
  8. Turn power off and replace CPU control board A1. (see parts list)
  9. Turn power on and repeat 3A-1.

**3B) Symptom:**      One or more controlled solenoids always energized.  
**NOTE:** Solenoids other than flippers will overheat if kept energized continuously. Do not allow more than 20 seconds of operation. Follow this with several minutes with the power off.

- Action:**
1. Turn power off.
  2. Check coil for shorted or open diode and/or shorted coil. Replace if defective, carefully noting diode polarity.
  3. Turn power on and test solenoid. If a problem still exists, turn game off. Refer to symptom 3A2.

#### **SYMPTOM #4      GAME FEATURES**

4A) Symptom:    Game feature does not score.

- Action:
1. Open front door and press play/test button until step 13 is reached. Each switch is checked automatically and any closed switch is indicated in code in the ball-in-play display (see Section III and switch code list).
  2. Raise the playfield and locate the faulty switch indicated by the code. The switch should have an approximate 1/16" gap. Check for loose solder or other foreign matter across the points or terminals. Make sure that the device operating the switch operates freely. The code may represent several parallel switches; be sure to check all similar (such as yellow rollovers) switches.
  3. Repeat 4A1. If trouble persists, replace personality prom.
  4. If trouble still exists, replace control board. (A1)

#### **SYMPTOM #5      GENERAL**

5A) Symptom: A Fuse or fuses blow repeatedly.

- Action:
1. Inspect the circuits controlled by each fuse which blows for shorts, loose wires, etc.
  2. If either 5 amp fuse blows, check the bridge rectifiers located on the bottom board.

#### **VIII. SERVICE AND PARTS**

All solid-state components are listed in the parts catalog and are available at Gottlieb distributors. When making replacements of any components, always use Gottlieb parts to assure infrequent service calls. The parts catalog lists all current components and their prices, enabling the repairman to quickly and easily select the item he needs. Whenever parts are ordered, state the part number, the part name, the game for which it is intended and, if applicable, the color or design.

# SINBAD (SOLID STATE)

## Lamp Assignments

| Latch | Position | Lamp Number | Function                    |
|-------|----------|-------------|-----------------------------|
| L1    | 1        | 1           | Game over relay             |
|       | 2        | 2           | Tilt relay                  |
|       | 3        | 3           | High game to date           |
|       | 4        | 4           | Same player shoots again    |
| L2    | 1        | 5           | Red rollover                |
|       | 2        | 6           | Purple rollover             |
|       | 3        | 7           | Top yellow rollover         |
|       | 4        | 8           | Bottom left yellow rollover |
| L3    | 1        | 9           | White rollover              |
|       | 2        | 10          | Top white target            |
|       | 3        | 11          | Bottom white target         |
|       | 4        | 12          | Not used                    |
| L4    | 1        | 13          | Not used                    |
|       | 2        | 14          | Advance                     |
|       | 3        | 15          | Advance                     |
|       | 4        | 16          | Advance                     |
| L5    | 1        | 17          | Advance                     |
|       | 2        | 18          | Advance                     |
|       | 3        | 19          | 5x bonus                    |
|       | 4        | 20          | 3x bonus                    |
| L6    | 1        | 21          | 4x bonus                    |
|       | 2        | 22          | 2x bonus                    |
|       | 3        | 23          | 1000 bonus                  |
|       | 4        | 24          | 2000 bonus                  |
| L7    | 1        | 25          | 3000 bonus                  |
|       | 2        | 26          | 4000 bonus                  |
|       | 3        | 27          | 5000 bonus                  |
|       | 4        | 28          | 6000 bonus                  |
| L8    | 1        | 29          | 7000 bonus                  |
|       | 2        | 30          | 8000 bonus                  |
|       | 3        | 31          | 9000 bonus                  |
|       | 4        | 32          | 10,000 bonus                |
| L9    | 1        | 33          | Right yellow rollover       |
|       | 2        | 34          | Bottom yellow rollover      |
|       | 3        | 35          | Not used                    |
|       | 4        | 36          | Not used                    |

## WIRE COLOR ASSIGNMENTS

| LAMP | COLOR              |
|------|--------------------|
| 1    | White-Blue         |
| 2    | White-Orange       |
| 3    | White-Brown        |
| 4    | White-Green        |
| 5    | White-Purple       |
| 6    | White-Yellow       |
| 7    | Blue-White-Red     |
| 8    | Orange-White-Red   |
| 9    | Brown-White-Red    |
| 10   | Green-White-Red    |
| 11   | Purple-White-Red   |
| 12   | Yellow-White-Red   |
| 13   | Blue-White-Black   |
| 14   | Orange-White-Black |
| 15   | Brown-White-Black  |
| 16   | Green-White-Black  |
| 17   | Purple-White-Black |
| 18   | Yellow-White-Black |
| 19   | White-Blue-Red     |
| 20   | White-Orange-Red   |
| 21   | White-Brown-Red    |
| 22   | White-Green-Red    |
| 23   | White-Purple-Red   |
| 24   | White-Yellow-Red   |
| 25   | White-Blue-Black   |
| 26   | White-Orange-Black |
| 27   | White-Brown-Black  |
| 28   | White-Green-Black  |
| 29   | White-Purple-Black |
| 30   | White-Yellow-Black |
| 31   | Blue-White-White   |
| 32   | Orange-White-White |
| 33   | Brown-White-White  |
| 34   | Green-White-White  |
| 35   | Purple-White-White |
| 36   | Yellow-White-White |

## WIRE COLOR ASSIGNMENTS (continued)

| STROBE | COLOR  |
|--------|--------|
| 0      | Blue   |
| 1      | Orange |
| 2      | Brown  |
| 3      | Green  |
| 4      | Purple |

| RETURNS |              |
|---------|--------------|
| 0       | Yellow       |
| 1       | Blue-White   |
| 2       | Orange-White |
| 3       | Brown-White  |
| 4       | Green-White  |
| 5       | Purple-White |
| 6       | Yellow-White |
| 7       | Yellow-Black |

| SOLENOIDS |              |
|-----------|--------------|
| 1         | Blue-Red     |
| 2         | Orange-Red   |
| 3         | Orange-Black |
| 4         | Green-Red    |
| 5         | Purple-Red   |
| 6         | Yellow-Red   |
| 7         | Blue-Black   |
| 8         | Orange-Black |

### Flipper Switches

Left: Green-Black  
Right: Purple-Black

### Anti-Cheat Switches

Blue-Black  
Orange-Black

## CABLE PLUGS FOR SOLID-STATE GAMES

### PLUG A1-J1

| PIN | WIRE COLOR | FUNCTION |
|-----|------------|----------|
| 1   | _____      | Spare    |
| 2   | *Blue      | -12 VDC  |
| 3   | *Black     | Ground   |
| 4   | *Black     | Ground   |
| 5   | *Red       | +5 VDC   |
| 6   | *Red       | +5 VDC   |

### PLUG A1-J2

|    |                    |   |       |
|----|--------------------|---|-------|
| 1  | White-Blue-Red     | f | A     |
| 2  | White-Orange-Red   | g | A     |
| 3  | White-Brown-Red    | a | A     |
| 4  | White-Green-Red    | b | A     |
| 5  | White-Purple-Red   | c | A     |
| 6  | White-Yellow-Red   | d | A     |
| 7  | White-Blue-Black   | e | A     |
| 8  | _____              |   | Spare |
| 9  | _____              |   | Spare |
| 10 | _____              |   | Spare |
| 11 | White-Purple       | f | B     |
| 12 | White-Yellow       | g | B     |
| 13 | Brown-White-White  | a | B     |
| 14 | Green-White-White  | b | B     |
| 15 | Blue-White-Red     | c | B     |
| 16 | Orange-White-Red   | d | B     |
| 17 | White-Green-Black  | e | B     |
| 18 | White-Purple-Black | h | A     |
| 19 | White-Yellow-Black | h | B     |

All wires #22 gauge unless specified \* (#18 gauge)

## CABLE PLUGS FOR SOLID-STATE GAMES

### PLUG A1-J3

| PIN | WIRE COLOR   | FUNCTION |
|-----|--------------|----------|
| 1   | _____        | Spare    |
| 2   | _____        | Spare    |
| 3   | _____        | Spare    |
| 4   | Black        | Ground   |
| 5   | *Red         | +5 VDC   |
| 6   | Blue         | D 3      |
| 7   | Orange       | D 4      |
| 8   | Brown        | D 2      |
| 9   | Green        | D 1      |
| 10  | Purple       | D 10     |
| 11  | Yellow       | D 9      |
| 12  | Blue-White   | D 11     |
| 13  | Orange-White | D 12     |
| 14  | Brown-White  | D 7      |
| 15  | Green-White  | D 8      |
| 16  | Purple-White | D 6      |
| 17  | Yellow-White | D 5      |
| 18  | Blue-Red     | D 14     |
| 19  | Orange-Red   | D 13     |
| 20  | Brown-Red    | D 15     |
| 21  | Green-Red    | D 16     |

All wires #22 gauge unless specified \* (#18 gauge)

## **CABLE PLUGS FOR SOLID-STATE GAMES**

### **PLUG A1-J5**

| <b>PIN</b> | <b>WIRE COLOR</b> | <b>FUNCTION</b>    |
|------------|-------------------|--------------------|
| 1          | Blue-Black        | Solenoid 7         |
| 2          | Orange-Black      | Solenoid 8         |
| 3          | White-Green       | LD 4               |
| 4          | White-Brown       | LD 3               |
| 5          | White-Orange      | LD 2               |
| 6          | White-Blue        | LD 1               |
| 7          | Green-Red         | Hundreds chime     |
| 8          | Purple-Red        | Thousands<br>chime |
| 9          | Yellow-Red        | Solenoid 6         |
| 10         | Blue-White-Red    | Tens chime         |
| 11         | Orange-Red        | Knocker            |
| 12         | Blue-Red          | Outhole            |
| 13         | Brown-White       | DS 9               |
| 14         | Orange-White      | DS 7               |
| 15         | Blue-White        | DS 8               |
| 16         | Yellow            | DS 6               |
| 17         | Purple            | DS 5               |
| 18         | Green             | DS 4               |
| 19         | Brown             | DS 3               |
| 20         | Orange            | DS 2               |
| 21         | Blue              | DS 1               |
| 22         | —                 | Spare              |
| 23         | *Red              | +5 VDC             |
| 24         | *Black            | Ground             |

All wires #22 gauge unless specified \* (#18 gauge)

## CABLE PLUGS FOR SOLID-STATE GAMES

### PLUG A1-J6

| PIN | WIRE COLOR | FUNCTION          |
|-----|------------|-------------------|
| 1   | Black      | Ground            |
| 2   | Blue-Black | Anti-cheat switch |
| 3   | Yellow     | Return 0          |
| 4   | Orange     | Strobe 1          |
| 5   | Brown      | Strobe 2          |
| 6   | Green      | Strobe 3          |
| 7   | Purple     | Strobe 4          |
| 8   | Blue       | Strobe 0          |
| 9   | _____      | Spare             |

### PLUG A1-J7

|    |                   |          |
|----|-------------------|----------|
| 1  | White-Green-Black | Outhole  |
| 2  | Blue              | Strobe 0 |
| 3  | Orange            | Strobe 1 |
| 4  | Brown             | Strobe 2 |
| 5  | _____             | Spare    |
| 6  | Purple            | Strobe 4 |
| 7  | Green             | Strobe 3 |
| 8  | *Black            | Ground   |
| 9  | _____             | Spare    |
| 10 | Yellow-Black      | Return 7 |
| 11 | Yellow-White      | Return 6 |
| 12 | Yellow            | Return 0 |
| 13 | Blue-White        | Return 1 |
| 14 | Orange-White      | Return 2 |
| 15 | Purple-White      | Return 5 |
| 16 | Green-White       | Return 4 |
| 17 | Brown-White       | Return 3 |

All wires #22 gauge unless specified \* (#18 gauge)

## CABLE PLUGS FOR SOLID-STATE GAMES

### PLUG A2-J1

| PIN | WIRE COLOR       | FUNCTION        |
|-----|------------------|-----------------|
| 1   | White-Blue       | 11.5 VAC        |
| 2   | White-Orange     | 11.5 VAC Return |
| 3   | *Black           | Ground          |
| 4   | White-Brown      | 14 VAC          |
| 5   | White-Purple     | 14 VAC Return   |
| 6   | Blue-White-Red   | 69 VAC          |
| 7   | Orange-White-Red | 69 VAC Return   |

### PLUG A2-J2

|   |        |         |
|---|--------|---------|
| 1 | *Red   | +5 VDC  |
| 2 | *Red   | +5 VDC  |
| 3 | _____  | Spare   |
| 4 | *Black | Ground  |
| 5 | *Black | Ground  |
| 6 | *Blue  | -12 VDC |

### PLUG A2-J3

|   |                  |         |
|---|------------------|---------|
| 1 | White-Blue       | +60 VDC |
| 2 | _____            | Spare   |
| 3 | White-Orange     | +42 VDC |
| 4 | _____            | Spare   |
| 5 | Black            | Ground  |
| 6 | _____            | Spare   |
| 7 | Blue-White-Black | +4 VDC  |
| 8 | Green-White-Red  | +8 VDC  |

All wires #22 gauge unless specified \* (#18 gauge)

## CABLE PLUGS FOR SOLID-STATE GAMES

### PLUG A3-J1

| PIN | WIRE COLOR     | FUNCTION           |
|-----|----------------|--------------------|
| 1   | White-Orange   | LD 2               |
| 2   | White-Brown    | LD 3               |
| 3   | White-Blue     | LD 1               |
| 4   | White-Green    | LD 4               |
| 5   | Blue           | DS 1               |
| 6   | Orange         | DS 2               |
| 7   | Brown          | DS 3               |
| 8   | Blue-Red       | Outhole            |
| 9   | Yellow-Red     | Solenoid 6         |
| 10  | Green          | DS 4               |
| 11  | Blue-Black     | Solenoid 7         |
| 12  | Orange-Black   | Solenoid 8         |
| 13  | Purple         | DS 5               |
| 14  | Yellow         | DS 6               |
| 15  | Orange-White   | DS 7               |
| 16  | Blue-White     | DS 8               |
| 17  | Brown-White    | DS 9               |
| 18  | Purple-Red     | Thousands<br>chime |
| 19  | Green-Red      | Hundreds chime     |
| 20  | Blue-White-Red | Tens chime         |
| 21  | Orange-Red     | Knocker            |
| 22  | *Black         | Ground             |
| 23  | *Red           | +5 VDC             |
| 24  | _____          | Spare              |

### PLUG A3-J2

|   |               |                    |
|---|---------------|--------------------|
| 1 | *Orange-Red   | Knocker            |
| 2 | *Orange-Black | Tens chime         |
| 3 | *Green-Red    | Hundreds chime     |
| 4 | *Purple-Red   | Thousands<br>chime |
| 5 | *Black        | Ground             |
| 6 | _____         | Spare ground       |
| 7 | _____         | Spare ground       |

All wires #22 gauge unless specified \* (#18 gauge)

## CABLE PLUGS FOR SOLID-STATE GAMES

### PLUG A3-J3

| PIN | WIRE COLOR         | FUNCTION |
|-----|--------------------|----------|
| 1   | Yellow-White-White | L36      |
| 2   | Purple-White-White | L35      |
| 3   | Green-White-White  | L34      |
| 4   | Brown-White-White  | L33      |
| 5   | Orange-White-White | L32      |
| 6   | Blue-White-White   | L31      |
| 7   | White-Purple-Black | L29      |
| 8   | White-Yellow-Black | L30      |
| 9   | White-Green-Black  | L28      |
| 10  | *Black             | Ground   |
| 11  | White-Brown-Black  | L27      |
| 12  | White-Blue-Black   | L25      |
| 13  | White-Orange-Black | L26      |
| 14  | White-Yellow-Red   | L24      |
| 15  | White-Purple-Red   | L23      |
| 16  | White-Brown-Red    | L21      |
| 17  | White-Green-Red    | L22      |
| 18  | White-Orange-Red   | L20      |
| 19  | *Black             | Ground   |
| 20  | White-Blue-Red     | L19      |
| 21  | *Black             | Ground   |

### PLUG A3-J4

|   |                          |              |
|---|--------------------------|--------------|
| 1 | (#16 Gauge) Black        | Ground       |
| 2 | (#16 Gauge) Orange-Black | Solenoid 8   |
| 3 | _____                    | Spare ground |
| 4 | *Blue-Black              | Solenoid 7   |
| 5 | *Yellow-Red              | Solenoid 6   |
| 6 | *Blue-Red                | Outhole      |
| 7 | (#16 Gauge) Black        | Ground       |
| 8 | _____                    | Spare ground |

All wires #22 gauge unless specified \* (#18 gauge)

## CABLE PLUGS FOR SOLID-STATE GAMES

### PLUG A3-J5

| PIN | WIRE COLOR         | FUNCTION |
|-----|--------------------|----------|
| 1   | Purple-White-Black | L17      |
| 2   | Yellow-White-Black | L18      |
| 3   | Green-White-Black  | L16      |
| 4   | Brown-White-Black  | L15      |
| 5   | Blue-White-Black   | L13      |
| 6   | Orange-White-Black | L14      |
| 7   | Yellow-White-Red   | L12      |
| 8   | Purple-White-Red   | L11      |
| 9   | Brown-White-Red    | L9       |
| 10  | Green-White-Red    | L10      |
| 11  | Orange-White-Red   | L8       |
| 12  | Blue-White-Red     | L7       |
| 13  | White-Purple       | L5       |
| 14  | White-Yellow       | L6       |
| 15  | White-Green        | L4       |
| 16  | *Black             | Ground   |
| 17  | White-Brown        | L3       |
| 18  | White-Blue         | L1       |
| 19  | White-Orange       | L2       |

All wires #22 gauge unless specified \* (#18 gauge)

## CABLE PLUGS FOR SOLID-STATE GAMES

### PLUG 1A4-J1

| PIN | WIRE COLOR         | FUNCTION     |
|-----|--------------------|--------------|
| 1   | Purple-White       | D 6          |
| 2   | Yellow-White       | D 5          |
| 3   | Orange             | D 4          |
| 4   | Blue               | D 3          |
| 5   | Brown              | D 2          |
| 6   | Green              | D 1          |
| 7   | White-Purple-Black | h A          |
| 8   | White-Orange-Red   | g A          |
| 9   | White-Blue-Red     | f A          |
| 10  | White-Blue-Black   | e A          |
| 11  | White-Yellow-Red   | d A          |
| 12  | White-Purple-Red   | c A          |
| 13  | White-Green-Red    | b A          |
| 14  | White-Brown-Red    | a A          |
| 15  | Brown-White-Red    | 5 VAC        |
| 16  | Purple-White-Red   | 5 VAC Return |
| 17  | White-Blue         | +60 VDC      |
| 18  | —                  | Spare        |
| 19  | Black              | Ground       |

All wires #22 gauge unless specified \* (#18 gauge)

## CABLE PLUGS FOR SOLID-STATE GAMES

### PLUG 2A4-J1

| PIN | WIRE COLOR         | FUNCTION     |
|-----|--------------------|--------------|
| 1   | Blue-Red           | D 14         |
| 2   | Orange-Red         | D 13         |
| 3   | Orange-White       | D 12         |
| 4   | Blue-White         | D 11         |
| 5   | Purple             | D 10         |
| 6   | Yellow             | D 9          |
| 7   | White-Purple-Black | h A          |
| 8   | White-Orange-Red   | g A          |
| 9   | White-Blue-Red     | f A          |
| 10  | White-Blue-Black   | e A          |
| 11  | White-Yellow-Red   | d A          |
| 12  | White-Purple-Red   | c A          |
| 13  | White-Green-Red    | b A          |
| 14  | White-Brown-Red    | a A          |
| 15  | Brown-White-Red    | 5 VAC        |
| 16  | Purple-White-Red   | 5 VAC Return |
| 17  | White-Blue         | +60 VDC      |
| 18  | _____              | Spare        |
| 19  | Black              | Ground       |

All wires #22 gauge unless specified \* (#18 gauge)

## CABLE PLUGS FOR SOLID-STATE GAMES

### PLUG 3A4-J1

| PIN | WIRE COLOR         | FUNCTION     |
|-----|--------------------|--------------|
| 1   | Purple-White       | D 6          |
| 2   | Yellow-White       | D 5          |
| 3   | Orange             | D 4          |
| 4   | Blue               | D 3          |
| 5   | Brown              | D 2          |
| 6   | Green              | D 1          |
| 7   | White-Yellow-Black | h B          |
| 8   | White-Yellow       | g B          |
| 9   | White-Purple       | f B          |
| 10  | White-Green-Black  | e B          |
| 11  | Orange-White-Red   | d B          |
| 12  | Blue-White-Red     | c B          |
| 13  | Green-White-White  | b B          |
| 14  | Brown-White-White  | a B          |
| 15  | Brown-White-Red    | 5 VAC        |
| 16  | Purple-White-Red   | 5 VAC Return |
| 17  | White-Blue         | +60 VDC      |
| 18  | _____              | Spare        |
| 19  | Black              | Ground       |

All wires #22 gauge unless specified \* (#18 gauge)

## CABLE PLUGS FOR SOLID-STATE GAMES

### PLUG 4A4-J1

| PIN | WIRE COLOR         | FUNCTION     |
|-----|--------------------|--------------|
| 1   | Blue-Red           | D 14         |
| 2   | Orange-Red         | D 13         |
| 3   | Orange-White       | D 12         |
| 4   | Blue-White         | D 11         |
| 5   | Purple             | D 10         |
| 6   | Yellow             | D 9          |
| 7   | White-Yellow-Black | h B          |
| 8   | White-Yellow       | g B          |
| 9   | White-Purple       | f B          |
| 10  | White-Green-Black  | e B          |
| 11  | Orange-White-Red   | d B          |
| 12  | Blue-White-Red     | c B          |
| 13  | Green-White-White  | b B          |
| 14  | Brown-White-White  | a B          |
| 15  | Brown-White-Red    | 5 VAC        |
| 16  | Purple-White-Red   | 5 VAC Return |
| 17  | White-Blue         | +60 VDC      |
| 18  | —                  | Spare        |
| 19  | Black              | Ground       |

All wires #22 gauge unless specified \* (#18 gauge)

## CABLE PLUGS FOR SOLID-STATE GAMES

### PLUG A5-J1

| PIN | WIRE COLOR         | FUNCTION     |
|-----|--------------------|--------------|
| 1   | _____              | Spare        |
| 2   | Green-Red          | D 16         |
| 3   | Brown-Red          | D 15         |
| 4   | _____              | Spare        |
| 5   | Green-White        | D 8          |
| 6   | Brown-White        | D 7          |
| 7   | White-Purple-Red   | c A          |
| 8   | White-Green-Red    | b A          |
| 9   | White-Purple-Black | h A          |
| 10  | White-Orange-Red   | g A          |
| 11  | White-Blue-Red     | f A          |
| 12  | White-Blue-Black   | e A          |
| 13  | White-Yellow-Red   | d A          |
| 14  | White-Brown-Red    | a A          |
| 15  | Yellow-White-Red   | 3 VAC        |
| 16  | Orange-White-Black | 3 VAC Return |
| 17  | White-Orange       | +42 VDC      |
| 18  | *Red               | +5 VDC       |
| 19  | Black              | Ground       |

All wires #22 gauge unless specified \* (#18 gauge)

## CABLE PLUGS FOR SOLID-STATE GAMES

### PLUG A6-J1

| PIN | WIRE COLOR    | FUNCTION                                |
|-----|---------------|-----------------------------------------|
| 1   | Yellow        | Return 0                                |
| 2   | Blue-White    | Play/test switch                        |
| 3   | Orange-White  | #1 coin chute                           |
| 4   | Brown-White   | #2 coin chute                           |
| 5   | Green-White   | Replay button                           |
| 6   | Purple-White  | Tilt pendulum                           |
| 7   | *Brown-Red    | Coin chute lights                       |
| 8   | Blue-Black    | Anti-cheat<br>switches                  |
| 9   | *Brown-Black  | Left flipper<br>switch                  |
| 10  | *Green-Black  | Flipper return                          |
| 11  | *Red          | Coin lockout                            |
| 12  | *Black        | Ball roll tilt<br>ground                |
| 13  | Spare         |                                         |
| 14  | *White-Black  | Coin chute lights<br>return             |
| 15  | *Green-Yellow | Earth ground and<br>coin lockout return |

### PLUG A6-J2

|   |               |                    |
|---|---------------|--------------------|
| 1 | *Orange-Red   | Knocker            |
| 2 | *Green-Red    | Hundreds chime     |
| 3 | *Purple-Red   | Thousands<br>chime |
| 4 | *Orange-Black | Tens chime         |
| 5 | *Red          | 24 VDC             |
| 6 | *Red          | 24 VDC             |

All wires #22 gauge unless specified \*(#18 gauge)

## CABLE PLUGS FOR SOLID-STATE GAMES

### PLUG A6-J3

| PIN | WIRE COLOR              | FUNCTION                   |
|-----|-------------------------|----------------------------|
| 1   | Yellow-Black            | Game over light            |
| 2   | White-Brown             | High game to<br>date light |
| 3   | White-Green             | Shoot Again light          |
| 4   | Brown-White-Red         | 5 VAC                      |
| 5   | Green-White-Red         | +8 VDC offset              |
| 6   | Purple-White-Red        | 5 VAC Return               |
| 7   | Yellow-White-Red        | 3 VAC                      |
| 8   | Blue-White-Black        | +4 VDC offset              |
| 9   | Orange-White-Black      | 3 VAC Return               |
| 10  | White-Brown-Black       | Tilt light                 |
| 11  | *White                  | 6 VDC                      |
| 12  | (#16 Gauge) White-Red   | 6.3 VAC<br>(lightbox)      |
| 13  | (#16 Gauge) White-Black | 6.3 VAC Return             |
| 14  | *Green-Yellow           | Earth ground               |
| 15  | _____                   | Spare                      |

### PLUG A6-J4

|   |                         |                            |
|---|-------------------------|----------------------------|
| 1 | White-Brown             | High game to<br>date light |
| 2 | *Black                  | Ground                     |
| 3 | *Black                  | Ground                     |
| 4 | *Black                  | Ground                     |
| 5 | *Black                  | Ground                     |
| 6 | (#16 Gauge) White       | 6 VDC                      |
| 7 | (#16 Gauge) White-Black | 6.3 VAC Return             |
| 8 | _____                   | Spare                      |
| 9 | _____                   | Spare                      |

All wires #22 gauge unless specified \* (#18 gauge)

## CABLE PLUGS FOR SOLID-STATE GAMES

### PLUG A6-J5

| PIN | WIRE COLOR            | FUNCTION               |
|-----|-----------------------|------------------------|
| 1   | (#16 Gauge) Brown-Red | 6.3 VAC<br>(playboard) |
| 2   | *Brown-Black          | Flipper switch         |
| 3   | *Brown-Black          | Flipper switch         |
| 4   | *Green-Black          | Left flipper sw.       |
| 5   | *Purple-Black         | Right flipper sw.      |
| 6   | Yellow-Black          | Game Over light        |
| 7   | White-Green           | Shoot Again light      |
| 8   | White-Brown-Black     | Tilt light             |
| 9   | (#16 Gauge) Red       | 24 VDC                 |
| 10  | (#16 Gauge) Black     | Ground                 |
| 11  | (#16 Gauge) Black     | Ground                 |
| 12  | (#16 Gauge) Black     | Ground                 |

All wires #22 gauge unless specified \* (#18 gauge)

## PLAYBOARD INFORMATION

### RUBBER RINGS

|             |           |
|-------------|-----------|
| A - A-10217 | (9) White |
| B - A-10219 | (2) White |
| C - A-10220 | (3) White |
| D - A-10221 | (3) White |
| E - A-10222 | (3) White |
| F - A-13151 | (4) Red   |
| G - A-14793 | (1) White |

### PARTS LIST

1. A-3290 Ball Gate.
2. A-9143 Ball Rebound Rubber.
3. A-8215 Ball Deflector.
4. C-17512 Plastic Shield Set.
5. Blue Pop Bumper A-13904 and A-11425 White Cap Stamped in Red.
6. B-8246 Pop Bumper Platter.-(2)
7. A-9393 Yellow Plastic Guide Rail.-(3)
8. A-9394 Yellow Plastic Guide Rail.-(3)
9. A-9395 Yellow Plastic Guide Rail.-(2)
10. 1-Pos. Drop Target White, with A-13179 Stamped in Red.
11. 2-Pos. Drop Target Yellow, with A-13179 Stamped in Black.
12. 3-Pos. Drop Target Purple, with A-13179 Stamped in White.
13. 4-Pos. Drop Target Bank, Red with A-13179 Stamped in White.
14. D-11966 Green Rollover Insert.-(4)
15. D-11968 White Rollover Button.-(4)
16. A-9383 Bulls-Eye Target. (B-17974 Sw. & Target Assem.)-(2)
17. C-15707 White Hole Base Plate with C-15708 White Sw. Arm.
18. A-11151 Hole Liner.
19. A-18151 Swing Target, Stamped in Blue.
20. A-4246 Ball Guide Rail.-(Wire Form)-(1)
21. A-6612 Ball Guide Rail.-(Wire Form)-(2)
22. A-13798 Ball Snubber Rail.-(Wire Form)-(2)
23. A-16991 Ball Guide Rail.-(1)
24. B-16992 Ball Guide Rail.-(1)
25. B-18070 Ball Guide Rail.-(3)
26. A-6509 Metal Flat Rail.-(1)
27. C-13150 White Flipper.-(4)
28. A-10542 Steel Pin.-(2)
29. C-7393 Wood Rail. (Left Side)
30. C-9771 Wood Rail. (Center)
31. C-13977 Wood Rail. (Right Side)
32. D-4806 Top Arch. (With "G" & "4"."5" Pos.)
33. D-13647-1A Card Holder.
34. C-9767 Ball Shooter Gage.
35. C-17492 White Siamese Post.-(2)
36. A-14792 Mini Post Screw.

A-14487 White Split Post Base.-(2)  
A-14488 White Split Post Cap.-(2)  
C-11561 White Plastic Post 1" High.-(36)

LIB. = LIBERAL.  
CON. = CONSERVATIVE.

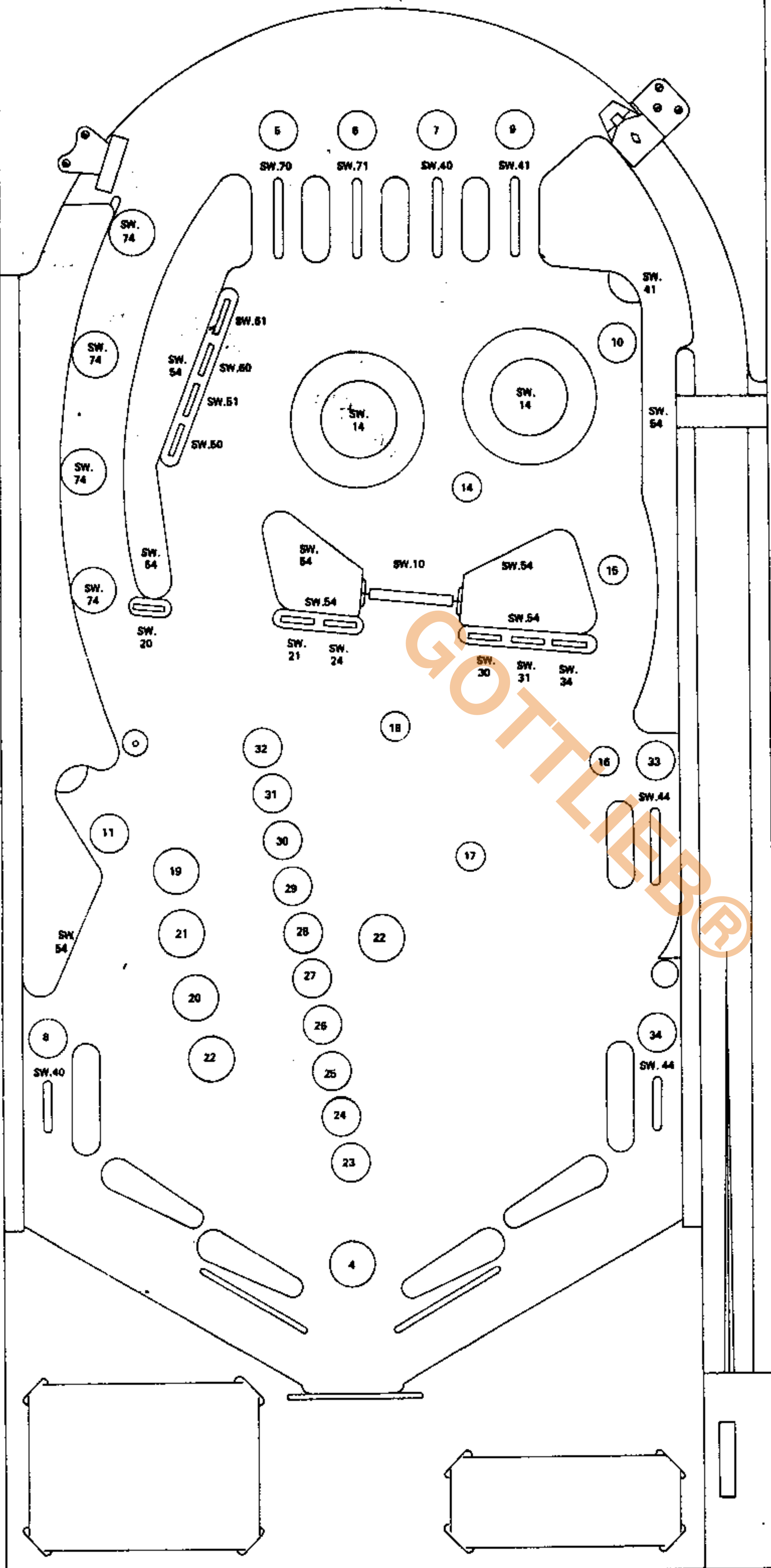
## SWITCH MATRIX AND LAMP LOCATION

### SWITCHES ON MATRIX

| SW. MATRIX<br>NUMBER | SW. FUNCTION                     |
|----------------------|----------------------------------|
| SW.00                | Test Button (On Front Door)      |
| SW.01                | #1 Coin Chute (On Front Door)    |
| SW.02                | #2 Coin Chute (On Front Door)    |
| SW.03                | Replay Button (On Front Door)    |
| SW.04                | Tilt Switches                    |
| SW.10                | Swinging Target                  |
| SW.14                | Pop Bumpers - (2)                |
| SW.20                | White Drop Target                |
| SW.21                | Yellow Drop Target               |
| SW.24                | Yellow Drop Target               |
| SW.30                | Purple Drop Target               |
| SW.31                | Purple Drop Target               |
| SW.34                | Purple Drop Target               |
| SW.40                | Top and Left Yellow Rollover-(2) |
| SW.41                | White Rollover and Target        |
| SW.44                | Right Yellow Rollovers-(2)       |
| SW.50                | Red Drop Target                  |
| SW.51                | Red Drop Target                  |
| SW.54                | 10 Point Switches-(8)            |
| SW.60                | Red Drop Target                  |
| SW.61                | Red Drop Target                  |
| SW.70                | Red Rollover                     |
| SW.71                | Purple Rollover                  |
| SW.74                | Rollover Buttons-(4)             |

### CPU CONTROLLED LAMPS

| LAMP<br>NUMBER | LAMP FUNCTION                                      |
|----------------|----------------------------------------------------|
| 1              | Game Over Relay (Lamp in Lightbox)                 |
| 2              | Tilt Relay (Lamp in Lightbox)                      |
| 3              | High Game To Date (In Lightbox)                    |
| 4              | Same Player Shoots Again<br>(Playfield & Lightbox) |
| 5              | Red Rollover                                       |
| 6              | Purple Rollover                                    |
| 7              | Top Yellow Rollover                                |
| 8              | Bottom Left Yellow Rollover                        |
| 9              | White Rollover                                     |
| 10             | Top White Target                                   |
| 11             | Bottom White Target                                |
| 14             | Advance                                            |
| 15             | Advance                                            |
| 16             | Advance                                            |
| 17             | Advance                                            |
| 18             | Advance                                            |
| 19             | 5 X Bonus                                          |
| 20             | 3 X Bonus                                          |
| 21             | 4 X Bonus                                          |
| 22             | 2 X Bonus                                          |
| 23             | 1000 Bonus                                         |
| 24             | 2000 Bonus                                         |
| 25             | 3000 Bonus                                         |
| 26             | 4000 Bonus                                         |
| 27             | 5000 Bonus                                         |
| 28             | 6000 Bonus                                         |
| 29             | 7000 Bonus                                         |
| 30             | 8000 Bonus                                         |
| 31             | 9000 Bonus                                         |
| 32             | 10,000 Bonus                                       |
| 33             | Right Yellow Rollover                              |
| 34             | Bottom Yellow Rollover                             |



## **PARTS LIST**

### **ELECTRONIC COMPONENTS**

|                    |                                         |
|--------------------|-----------------------------------------|
| <b>PB00-D100</b>   | Control Board (A1) (Less Prom)          |
| <b>S520</b>        | Power Supply Board (A2)                 |
| <b>PB00-D110</b>   | Master Driver Board (A3)                |
| <b>PB00-D140</b>   | Display Board—Score (A4)                |
| <b>PB00-D150</b>   | Display Board—Ball in Play, Credit (A5) |
| <b>MMI-6351-1J</b> | Prom (Must have name of game)           |
| <b>#5K1</b>        | Line Filter                             |
| <b>#VK-438</b>     | Bridge Rectifier                        |
| <b>#VL-038</b>     | Bridge Rectifier                        |
| <b>#1N-270</b>     | Germanium Diode                         |
| <b>#1N-4004</b>    | Diode                                   |

### **MECHANICAL COMPONENTS**

|                  |                                    |
|------------------|------------------------------------|
| <b>A-17906</b>   | Bracket and Stop—Pop Bumper        |
| <b>A-17907</b>   | Bracket and Stop—Hole Kickers      |
| <b>A-17908</b>   | Bracket and Stop—Flipper           |
| <b>A-17958</b>   | Bracket and Stop—Target Bank Reset |
| <b>B-17543</b>   | Ball Roll Tilt Switch Assembly     |
| <b>B-17838</b>   | Flipper Button Switch Assembly     |
| <b>B-18079</b>   | Rubber Contact Switch Assembly     |
| <b>B-18080</b>   | Rollover Button Switch Assembly    |
| <b>B-18081</b>   | Rollover Button Switch Assembly    |
| <b>B-18083</b>   | Rollover Switch Assembly           |
| <b>B-18084</b>   | Rollover Switch Assembly           |
| <b>B-18085</b>   | Ball Return Switch Assembly        |
| <b>B-18089</b>   | Pop Bumper Switch Assembly         |
| <b>B-18091</b>   | Coin Chute Switch Assembly         |
| <b>B-18092</b>   | Replay Button Switch Assembly      |
| <b>B-18364</b>   | Swinging Target Switch Assembly    |
| <b>#E-69-01A</b> | Play/Test Switch                   |
|                  | Carbon Tilt Bob                    |

# PARTS LIST

## CONTROL BOARD

### PB00-D100

|    |                |                                                                                 |
|----|----------------|---------------------------------------------------------------------------------|
| 1  | MMI-6351-1J    | Prom — Monolithic Memories                                                      |
| 2  | 15-24-1151     | Molex Connector — (TC1, TC2)                                                    |
| 1  | CA-08P02       | Plug                                                                            |
| 1  | CA-08-160-000  | Cover                                                                           |
| 1  | 41B901CD05-1   | Battery Pack — 3.6V. General Electric                                           |
| 2  | V-1003         | Battery Clip-Richo                                                              |
| 1  | 44-111-021     | Switch-Push Button — (S 25)                                                     |
| 3  | 10040-008      | Molex-Switch Matrix — (Dip Sw. 1, 2, 3)                                         |
| 1  | CA-18SE-10SD   | IC Socket — 18 Pin-Circuit Ass'y                                                |
| 1  | 333R08-001     | Crystal — 3.579545 MHZ.                                                         |
| 1  | 11660CF        | MOS/LSI-CPU-(U1)                                                                |
| 2  | 10696EE        | MOS/LSI-GPIØ-(U2, U3)                                                           |
| 1  | A1753CE        | MOS/LSI-ROM/RAM/IØ (U4)                                                         |
| 1  | A1752CF        | MOS/LSI-ROM/RAM/IØ (U5)                                                         |
| 1  | 10788PA        | MOS/LSI-GPKD (U6)                                                               |
| 1  | SCL4081BE      | IC-Quad and — Sol. St. Scientific (Z1)                                          |
| 1  | SN74154N       | IC-4 to 16 Decoder — T.I. (Z30)                                                 |
| 4  | SN7405N        | IC-Hex Inverter — OC — T.I. (Z9, 27, 28, 29)                                    |
| 1  | SN7416N        | IC-Hex Inverter — OC/HV. — T.I. (Z26)                                           |
| 5  | SN7404N        | IC-Hex Inverter — T.I. (Z8, Z13, 14, 25, 24)                                    |
| 4  | SN7417N        | IC-Hex Buffer — OC (Z6, 7, 11, 12)                                              |
| 1  | SN74H21N       | IC-Dual 4-Input and — T.I. (Z15)                                                |
| 2  | SN7448N        | IC-4 to 7 Decoder T.I. (Z16, 17)                                                |
| 4  | SN7408N        | IC-Quad 2 Input and — T.I. (Z18, 19, 20, 21)                                    |
| 1  | P5101L-3       | CMOS-Static Ram (256X4) (Z22)                                                   |
| 2  | CD4049AE       | IC-Hex Buffer/Conv. — National (Z3, 4)                                          |
| 1  | SN74LS05N      | IC-LP Hex Inverter — OC — T.I. (Z5)                                             |
| 1  | SCL4528BE      | IC-Dual One Shot — Sol. St. Scientific (Z2)                                     |
| 6  | 461RO2-001     | Transistor, PNP (MPS-A70) (Q1-6)                                                |
| 36 | 742RO1-001     | Diode, GP (1N4148) (CR1-24, 26-37)                                              |
| 2  | 721RO1-025     | Resistor-1 OHM, 1/4 W. 5% (R107-R108)                                           |
| 1  | 721RO1-068     | Resistor-62 OHM, 1/4 W. 5% (R133)                                               |
| 12 | 721RO1-092     | Resistor-620 OHM, 1/4 W. 5% (R45-R56)                                           |
| 3  | 721RO1-097     | Resistor-1K OHM, 1/4 W. 5% (R109, 156, 157)                                     |
| 27 | 721RO1-107     | Resistor-2.7K OHM, 1/4 W. 5% (R11-16, 73-80, 99-106, 110, 113, 116, 119, 147)   |
| 8  | 721RO1-113     | Resistor-4.7K OHM, 1/4 W. 5% (R25-32)                                           |
| 54 | 721RO1-117     | Resistor-6.8K OHM, 1/4 W. 5% (R3-10, 33-44, 57-62, 82-98, 122-131, 162)         |
| 17 | 721RO1-123     | Resistor-12K OHM, 1/4 W. 5% (R134-145, 149-153)                                 |
| 21 | 721RO1-130     | Resistor-24K OHM, 1/4 W. 5% (R1, 2, 17-24, 65-72, 81, 154, 155)                 |
| 11 | 721RO1-131     | Resistor-27K OHM, 1/4 W. 5% (R111-112, 114-115, 117-118, 120-121, 160-161, 163) |
| 1  | 10/40/80000    | Capacitor — 10 Micro-Farad, 40V. — Siemens (C20)                                |
| 1  | ECE-B25V100L   | Capacitor — 100 Micro-Farad, 25V. — Matsushita (C17)                            |
| 1  | ECE-B10V100L   | Capacitor — 100 Micro-Farad, 10V. — Matsushita (C16)                            |
| 26 | C320C103MIR5CA | Capacitor — .01 Micro-Farad, 100V. — Sprague/Kemet (C1-15, 18, 19, 22-30)       |
| 3  | 703RO1-003     | Capacitor — 0.1 Micro-Farad, 100V. (C31-33)                                     |
| 1  | 1N703          | Diode — Motorola/Siemens (CR38)                                                 |
| 1  | 721RO1-175     | Resistor — 1.8M, 1/4 W. 5% (R158)                                               |
| 1  | 721RO1-179     | Resistor — 2.7M, 1/4 W. 5% (R159)                                               |
| 1  | CA-08SE-10SD   | Socket (TC3)                                                                    |

**PARTS LIST**  
**MASTER DRIVER BOARD**  
**PB00-D110**

|    |                |                                                        |
|----|----------------|--------------------------------------------------------|
| 9  | SN74175N       | Integrated Circuit, Quad "D" Flip-Flop-T.I. (Z1-Z9)    |
| 38 | 721R01-097     | Resistor-1K OHM, 5%, 1/4 W. (R1-R38)                   |
| 1  | 721R01-052     | Resistor-13 OHM, 5%, 1/4 W. (R39)                      |
| 14 | C320C103MIR5CA | Capacitor-.01 Micro-Farad, 20%, 100V. — Kemet (C2-C15) |
| 1  | T320B106-010AS | Capacitor-10 Micro-Farad, 10V. — Kemet (C1)            |
| 5  | MPS-U45        | Transistor, NPN — Motorola (Q1-Q4, Q29)                |
| 32 | MPS-A13        | Transistor, NPN — Motorola (Q5-Q24, Q33-Q44)           |
| 7  | 2N6043         | Transistor, NPN — Motorola (Q25-Q28, Q30-Q32)          |
| 1  | 2N3055         | Transistor, NPN — RCA (Q45)                            |
| 1  | 43-03-4        | Insulator — Thermalloy (Q45 Ref.)                      |

GOTTlieb®

# **PARTS LIST**

## **6 DIGIT DISPLAY**

### **PB00-D140**

|   |                |                                               |
|---|----------------|-----------------------------------------------|
| 1 | RC20GF103      | Resistor, 10K, 1/2 W., 5% (R1)                |
| 1 | TE1400         | Capacitor — 1 Micro-Farad 100V. (C3)          |
| 2 | C320C103MIR5CA | Capacitor — .01 Micro-Farad, 100V. (C1, C2)   |
| 2 | UDN6118A       | IC-Fluorescent Dis. Driver — Sprague (Z1, Z2) |
| 1 | 6-JS-01        | 6 Digit Display — Futaba Ind. U.S.A.          |

## **4 DIGIT DISPLAY**

### **PB00-D150**

|   |                |                                                     |
|---|----------------|-----------------------------------------------------|
| 1 | TE1400         | Capacitor — 1 Micro-Farad, 100V. — Sprague (C1)     |
| 2 | C320C103MIR5CA | Capacitor — .01 Micro-Farad, 100V. — Kemet (C2, C3) |
| 2 | UDN6118A       | IC — Fluorescent Dis. Driver — Sprague (Z2, Z3)     |
| 1 | SN7432N        | IC — Quad or Gate — T.I. (Z1)                       |
| 1 | 4-LT-11        | 4 Digit Display — Futaba Ind. U.S.A. (DS1)          |

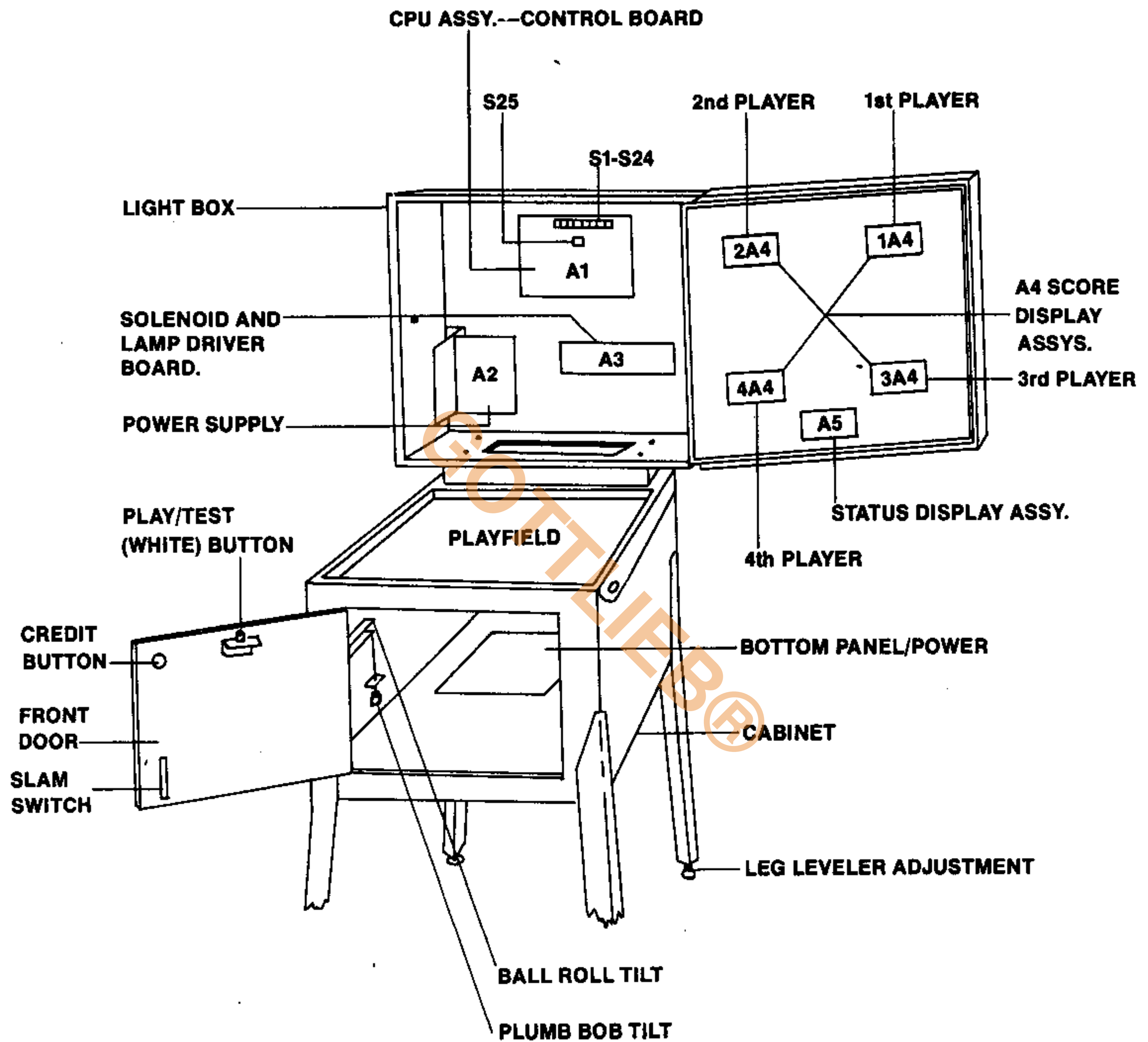
# PARTS LIST

## POWER SUPPLY

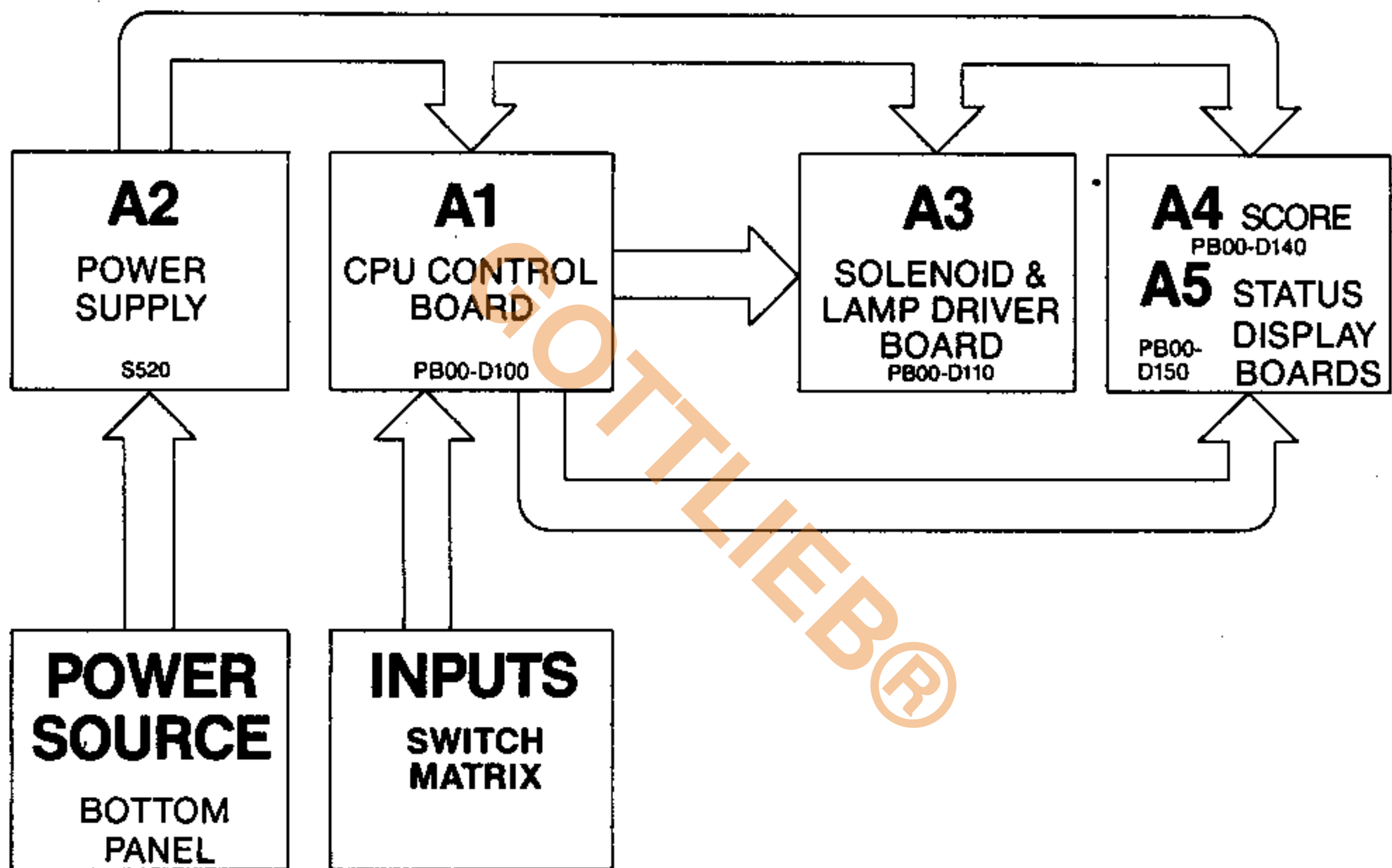
### S520

|   |                  |                                                                |
|---|------------------|----------------------------------------------------------------|
| 1 | RC42GF18R2       | Resistor, .18 OHM, 2 W. $\pm 5\%$ (R1)                         |
| 3 | RC20GF101        | Resistor, 100 OHM, $\frac{1}{2}$ W. $\pm 5\%$ (R2, R101, R201) |
| 1 | RC20GF431        | Resistor, 430 OHM, $\frac{1}{2}$ W. $\pm 5\%$ (R3)             |
| 1 | RC20GF681        | Resistor, 680 OHM, $\frac{1}{2}$ W. $\pm 5\%$ (R21)            |
| 1 | C173BNA          | Resistor, 1.2K OHM, $\frac{1}{2}$ W. $\pm 1\%$ (R5) MEPCO      |
| 1 | RC20GF202        | Resistor, 2K OHM, $\frac{1}{2}$ W. $\pm 5\%$ (R6)              |
| 2 | RC20GF152        | Resistor, 1.5K OHM, $\frac{1}{2}$ W. $\pm 5\%$ (R7, R8)        |
| 1 | RC20GF222        | Resistor, 2.2K OHM, $\frac{1}{2}$ W. $\pm 5\%$ (R9)            |
| 2 | RC20GF153        | Resistor, 15K OHM, $\frac{1}{2}$ W. $\pm 5\%$ (R10, R11)       |
| 1 | RC20GF102        | Resistor, 1K OHM, $\frac{1}{2}$ W. $\pm 5\%$ (R12)             |
| 1 | RC20GF330        | Resistor, 33 OHM, $\frac{1}{2}$ W. $\pm 5\%$ (R13)             |
| 1 | RC20GF123        | Resistor, 12K OHM, $\frac{1}{2}$ W. $\pm 5\%$ (R14)            |
| 2 | RC20GF103        | Resistor, 10K OHM, $\frac{1}{2}$ W. $\pm 5\%$ (R15, R18)       |
| 1 | RC20GF242        | Resistor, 2.4K OHM, $\frac{1}{2}$ W. $\pm 5\%$ (R17)           |
| 2 | RC20GF201        | Resistor, 200 OHM, $\frac{1}{2}$ W. $\pm 5\%$ (R102, R202)     |
| 1 | RC20GF471        | Resistor, 470 OHM, $\frac{1}{2}$ W. $\pm 5\%$ (R22)            |
| 1 | 115R102A         | Pot. 1K OHM, 2 W. 10% (R4) CTS                                 |
| 1 | 115R501A         | Pot. 500 OHM, 2W. 10% (R16) CTS                                |
| 1 | PMD12K40         | Transistor (Q1) Power Monolithics                              |
| 1 | MJE340K          | Transistor (Q2) Motorola                                       |
| 1 | 2N3416           | Transistor (Q3)                                                |
| 1 | MPSA43           | Transistor (Q4) Motorola                                       |
| 2 | MR751            | Diode, 3 AMP (CR1, CR2) Motorola                               |
| 2 | 1N4002           | Diode, 1 AMP, 100 V. (CR3, CR4) Motorola                       |
| 3 | 1N914            | Diode (CR5, CR22, CR23)                                        |
| 4 | 1N4004           | Diode, 1 AMP, 400 V. (CR6, CR7, CR8, CR9)                      |
| 1 | 1N4753           | Diode (CR10) Motorola                                          |
| 1 | 1N4742A          | Diode (CR11) Motorola                                          |
| 1 | 1N4746A          | Diode (CR12) Motorola                                          |
| 1 | 1N4738A          | Diode (CR21) Motorola                                          |
| 1 | 1N4734A          | Diode (CR101) Motorola                                         |
| 2 | S0306SL3         | Rectifier (SCR101, SCR201)                                     |
| 1 | UA723CL          | + 5 V. Regulator (IC1) TI                                      |
| 1 | UA79MI2CKC       | -12 V. Regulator (LIC1) TI                                     |
| 1 | 7735             | Capacitor 2.9K Micro-Farad 30 V. (C1)                          |
| 1 | 8101-100W5RO221K | Capacitor 220 Pico-Farad 16 V. (C2) Erie                       |
| 1 | 7545             | Capacitor 470 Micro-Farad 10 V. (C3) TI                        |
| 1 | 7732             | Capacitor 1K Micro-Farad 35 V. (C4) TI                         |
| 1 | 7345             | Capacitor 47 Micro-Farad 50 V. (C5) TI                         |
| 1 | CEO2W            | Capacitor 200 Micro-Farad 150 V. (C6) Towa                     |
| 1 | 8121-050651104M  | Capacitor 0.1 Micro-Farad 10 V. (C7)                           |
| 1 | 7745             | Capacitor 10 Micro-Farad 160 V. (C8)                           |
| 2 | UK10-204         | Capacitor 0.2 Micro-Farad 10 V. (C101, C201)                   |
| 1 | 09-60-1071       | Connector (J1) Molex                                           |
| 1 | 09-67-1061       | Connector (J2) Molex                                           |
| 1 | 09-67-1081       | Connector (J3) Molex                                           |
| 1 | 1N4743A          | Diode (CR201) Motorola                                         |

# COMPONENT LOCATION DIAGRAM

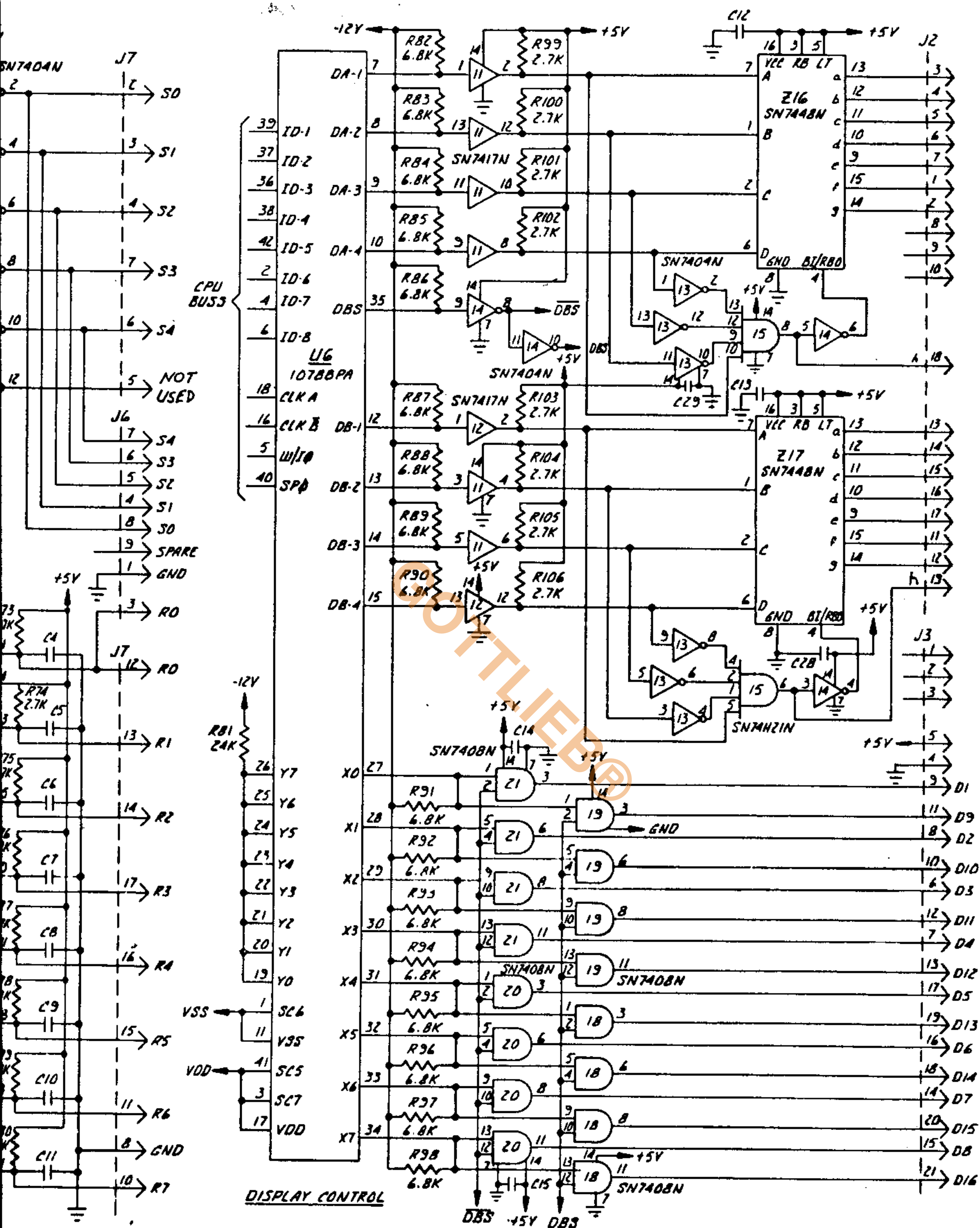


# BLOCK DIAGRAM



**SOLENOID CONTROL**

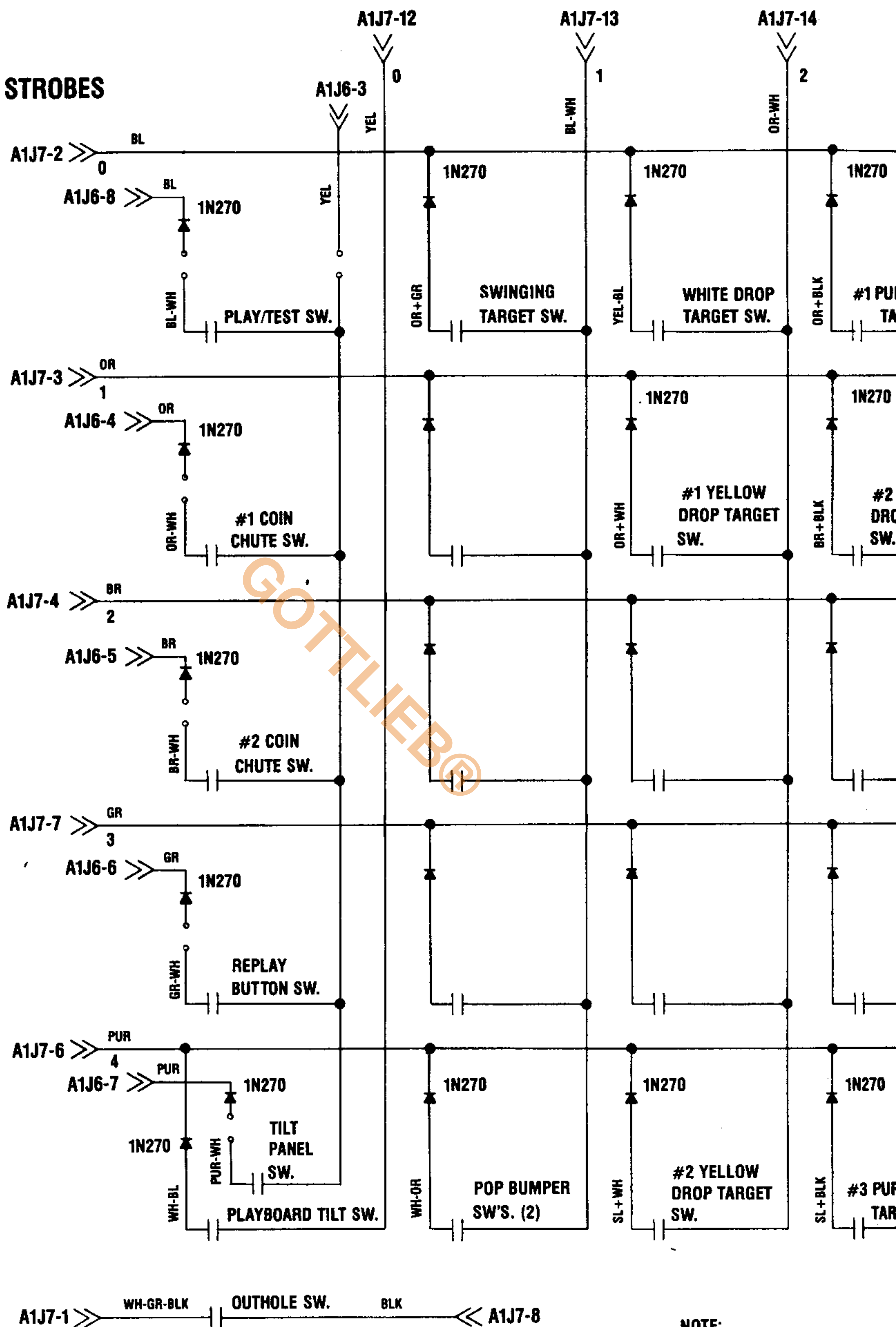
**SWITCH MATRIX**



PAGE 2 OF 3

|                      |        |          |  |                                 |  |
|----------------------|--------|----------|--|---------------------------------|--|
| DO NOT SCALE DRAWING |        | SCALE    |  | D. GOTTLIEB & CO.               |  |
| TOLERANCES ±         |        | MATERIAL |  | TITLE SCHEMATIC DIAGRAM-        |  |
| DECIMAL              |        | HARDNESS |  | USED ON CONTROL BOARD           |  |
| FRACTION             |        | FINISH   |  | DRAWN [ ] APPROVED [ ] DATE [ ] |  |
| ANGULAR              |        |          |  | DRAWN V404                      |  |
| 1                    | 2-1-78 | REVISED  |  |                                 |  |

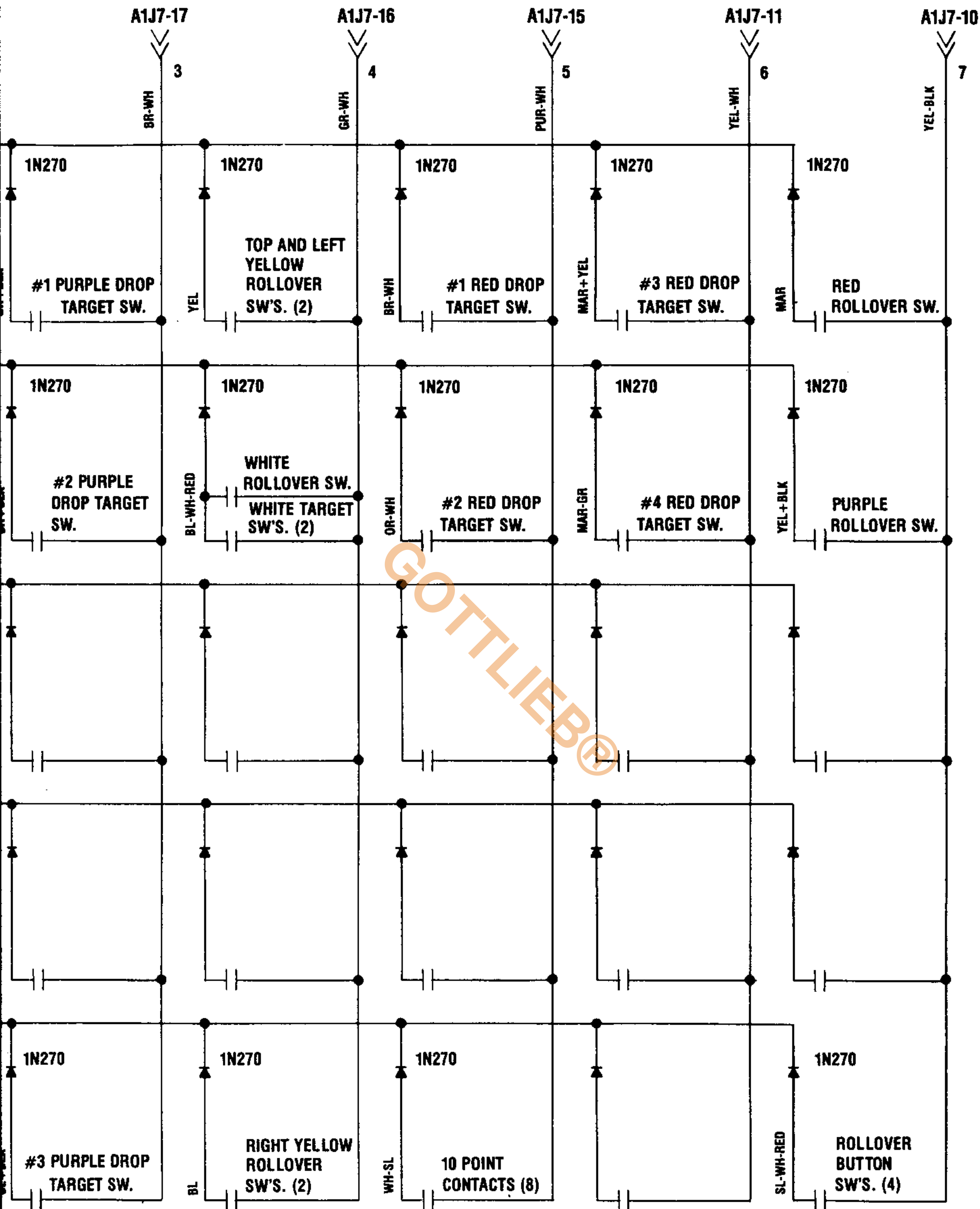
## STROBES



NOTE:

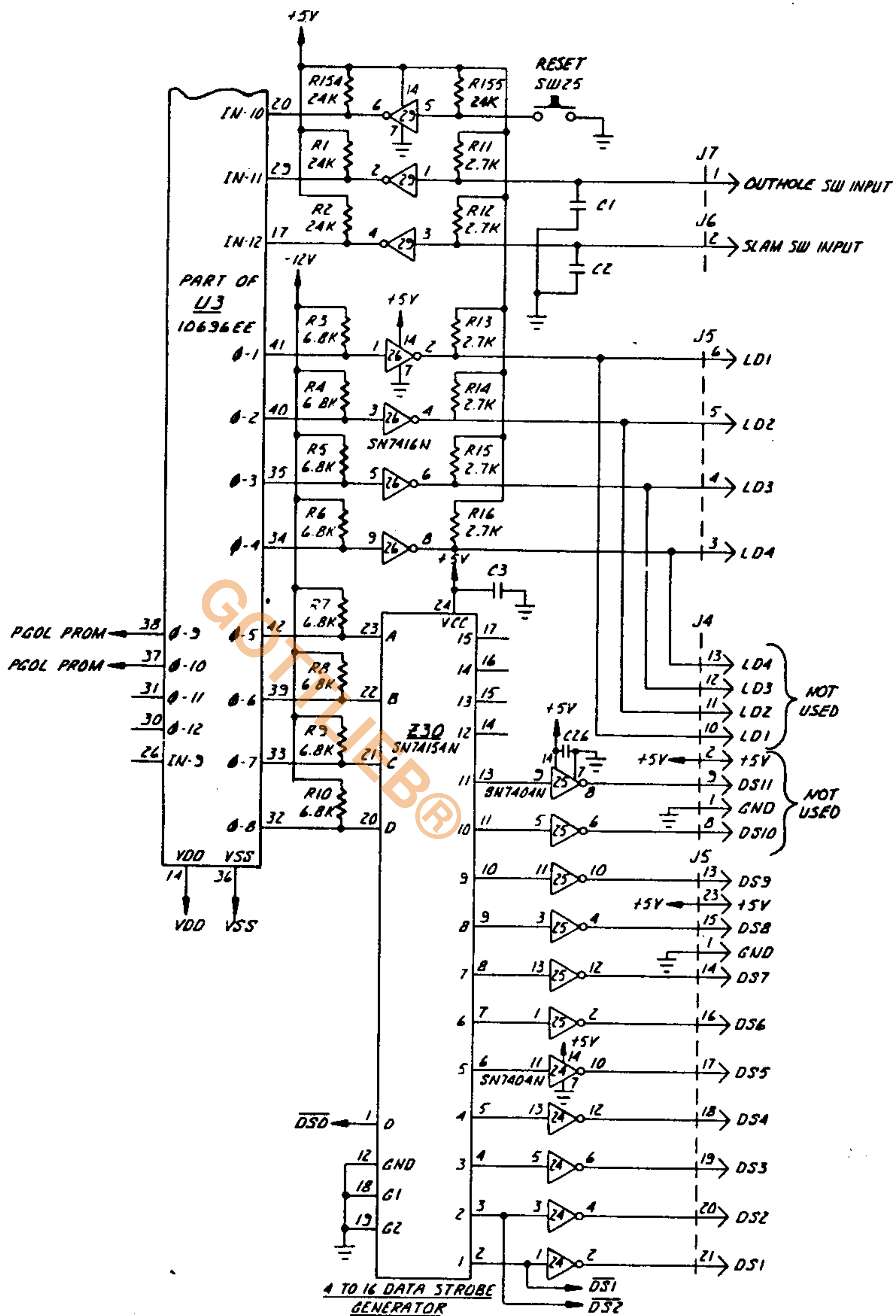
&gt;&gt; FROM LIGHTBOX

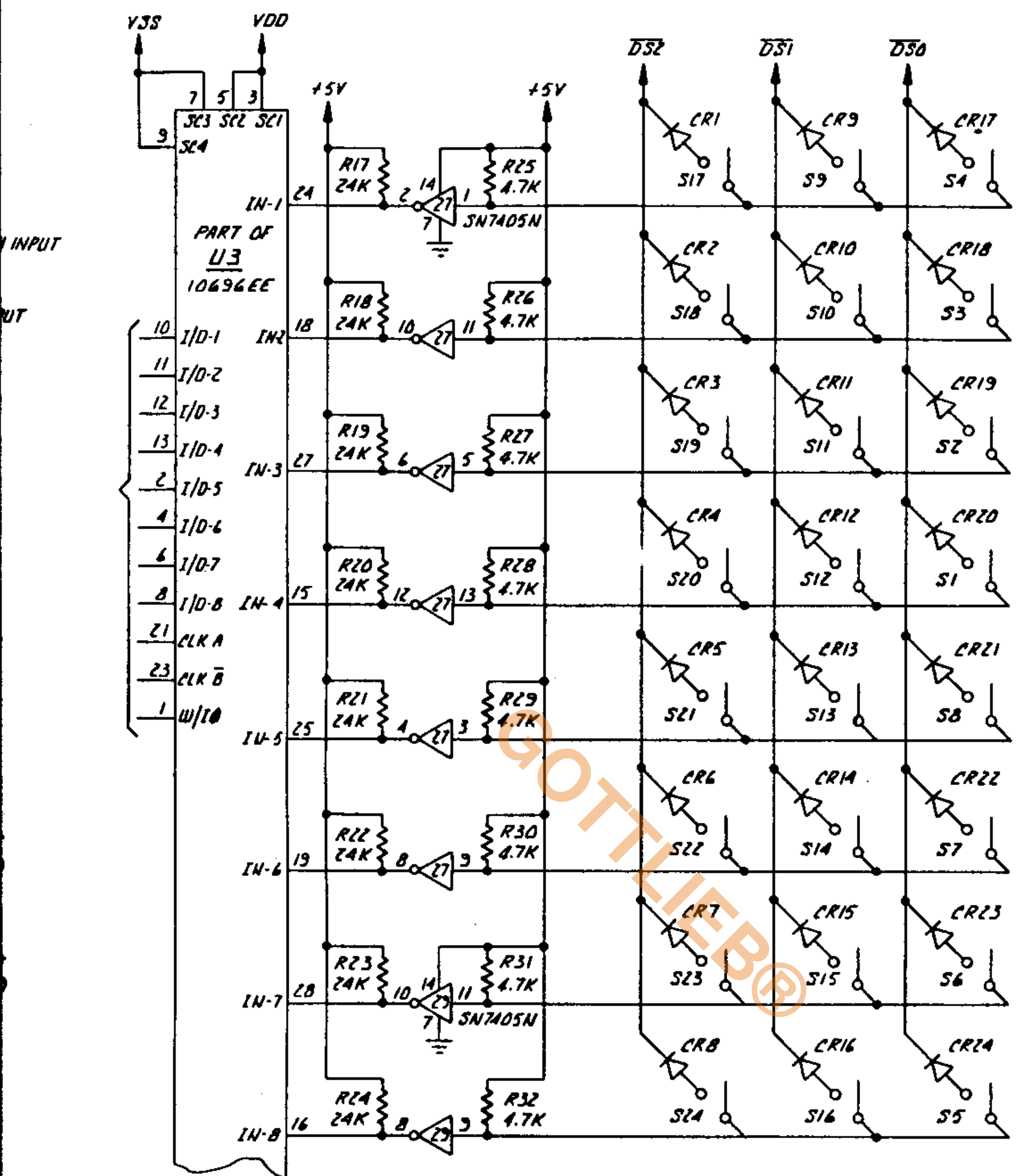
## RETURNS



|                                                               |      |           |                       |          |      |
|---------------------------------------------------------------|------|-----------|-----------------------|----------|------|
| <div> <div>DO NOT SCALE DRAWING</div> <div>SCALE</div> </div> |      |           | D. GOTTLIEB & CO.     |          |      |
|                                                               |      |           | TITLE SWITCH MATRIX   |          |      |
|                                                               |      |           | USED ON SINBAD #412SS |          |      |
|                                                               |      |           | DRAWN                 | APPROVED | DATE |
| ISSUE                                                         | DATE | REVISIONS | C- 18037              |          |      |

# PB00-X101 SCHEMATIC DIAGRAM—CONTROL BOARD



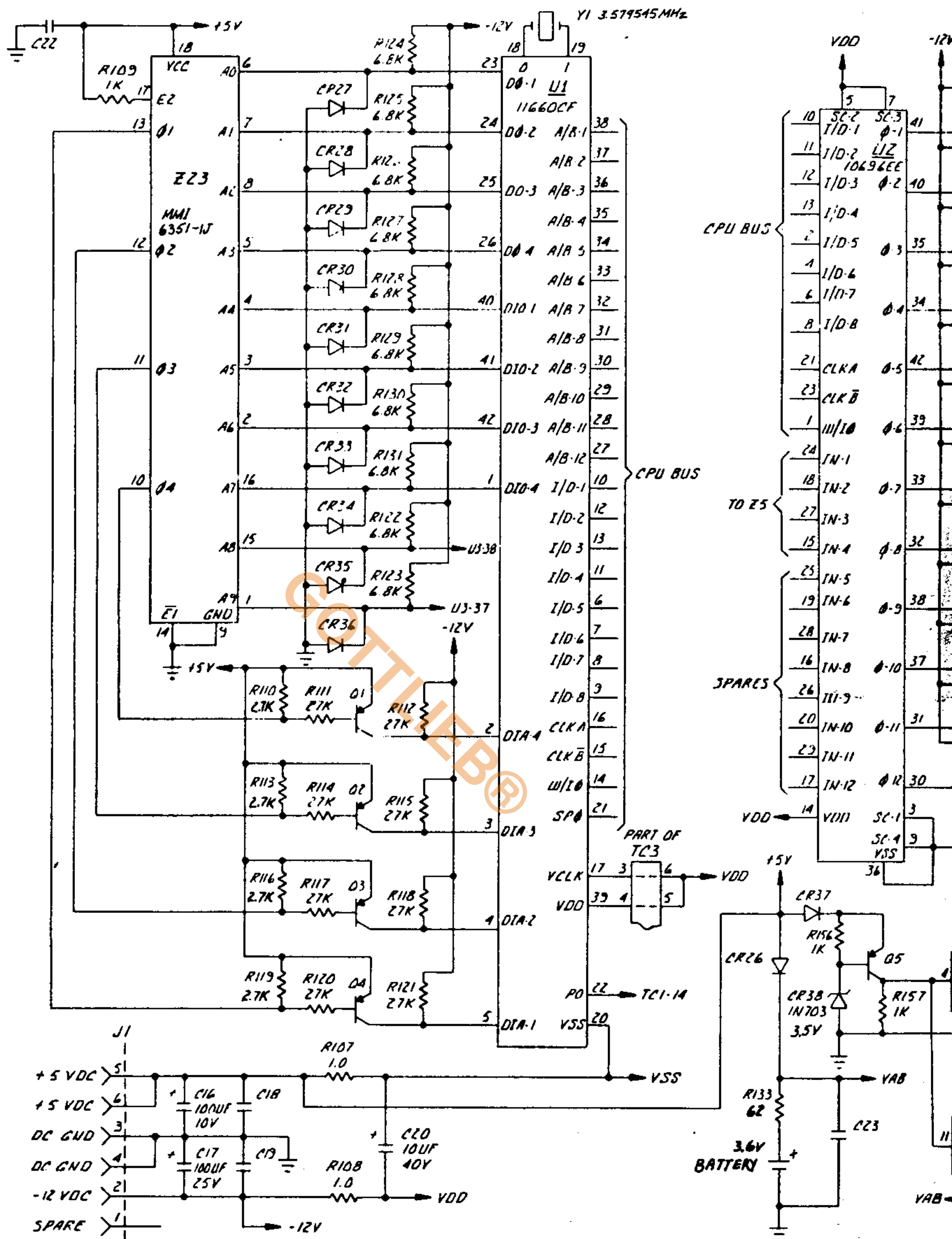


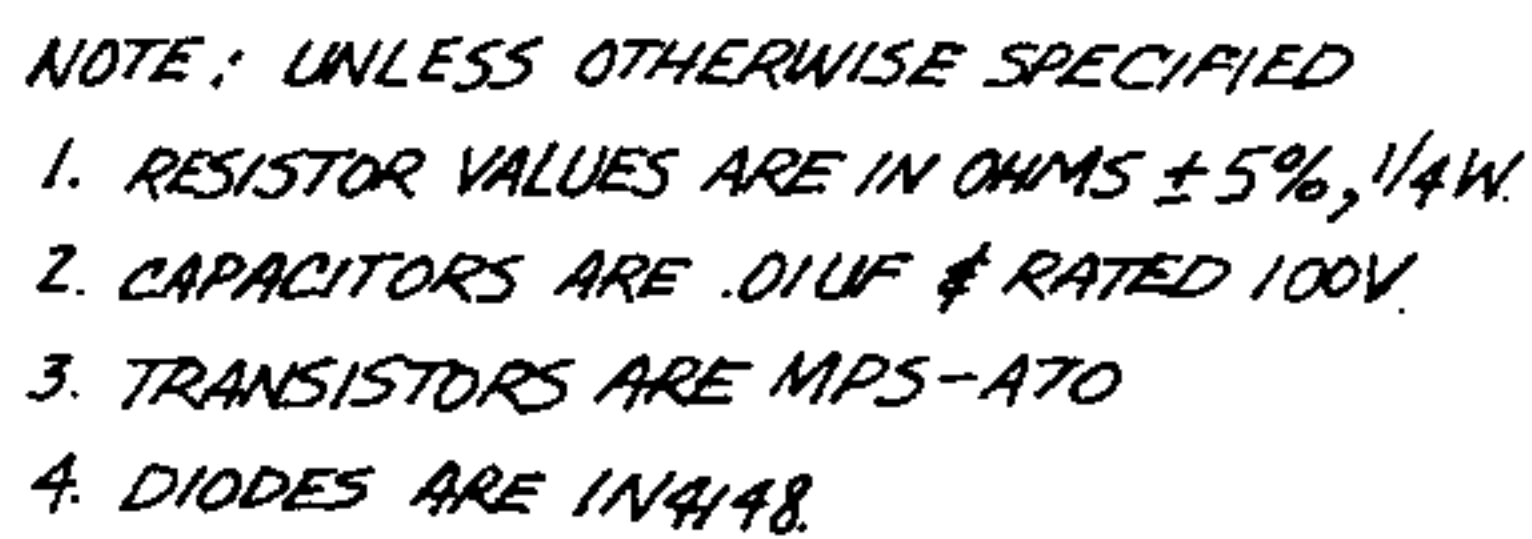
LAMP & APM CONTROL

ADJUSTABLE PARAMETER MATRIX

|                      |  |  |                  |  |                          |  |  |  |
|----------------------|--|--|------------------|--|--------------------------|--|--|--|
| DO NOT SCALE DRAWING |  |  | SCALE            |  | D. GOTTLIEB & CO.        |  |  |  |
| TOLERANCES ±         |  |  | MATERIAL         |  | TITLE SCHEMATIC DIAGRAM- |  |  |  |
| DECIMAL              |  |  | HARDNESS         |  | USED ON CONTROL BOARD    |  |  |  |
| FRACTION             |  |  | FINISH           |  | DRAWN                    |  |  |  |
| ANGULAR              |  |  | UNLESS OTHERWISE |  | APPROVED                 |  |  |  |
| 1                    |  |  | 2-1-78           |  | REVISED                  |  |  |  |
|                      |  |  |                  |  | DATE                     |  |  |  |
|                      |  |  |                  |  | nnnn v4m                 |  |  |  |

# PB00-X101 SCHEMATIC DIAGRAM—CONTROL BOARD

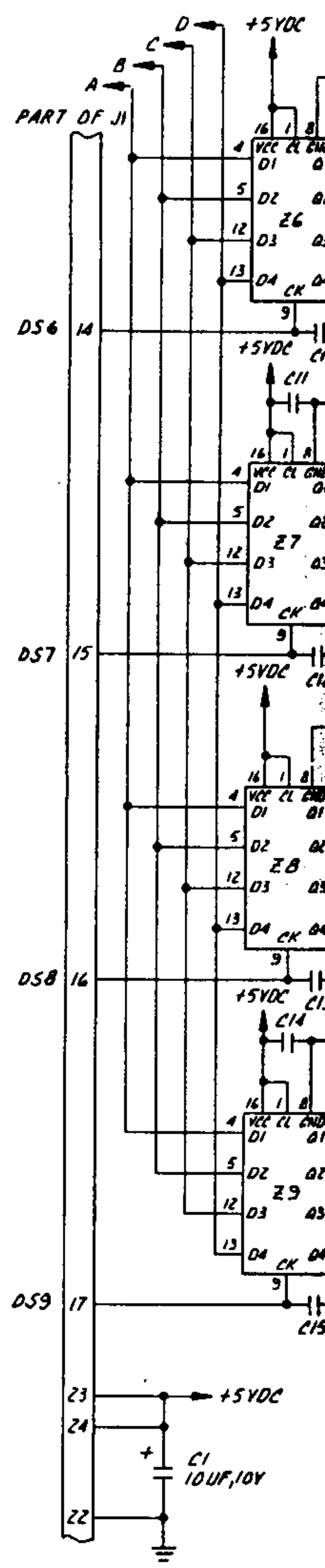
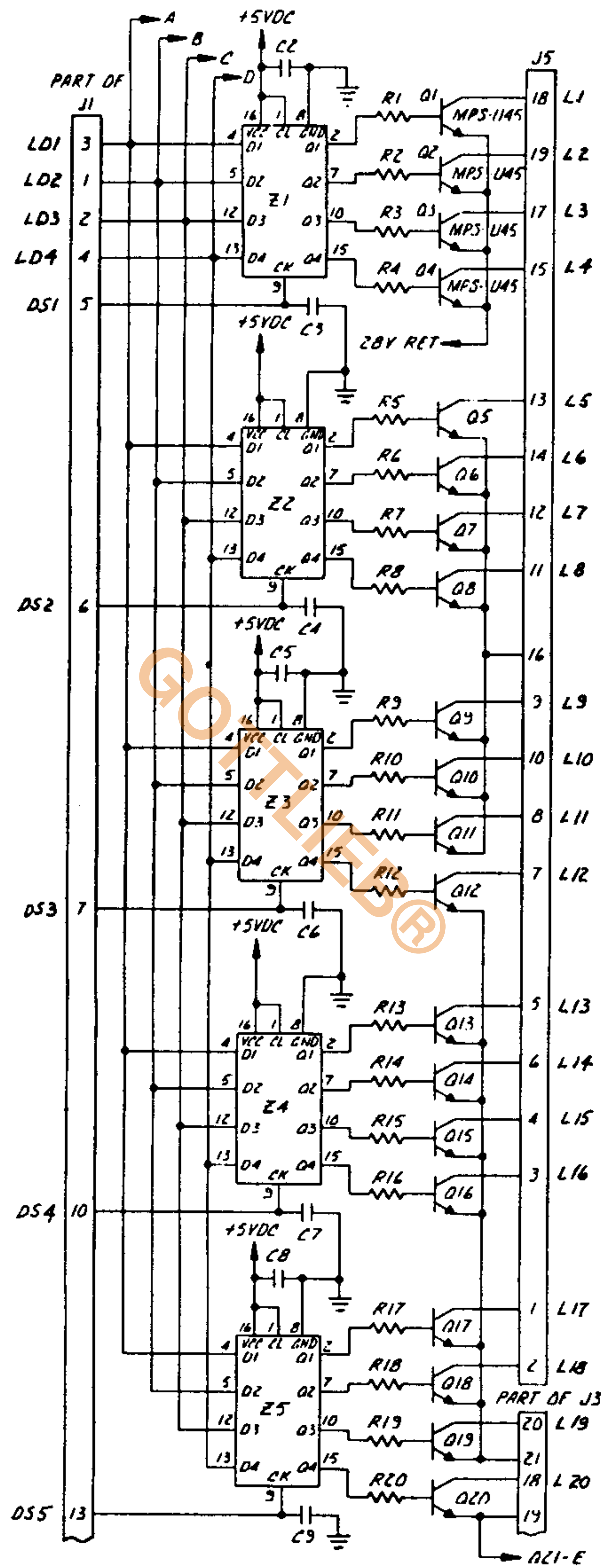


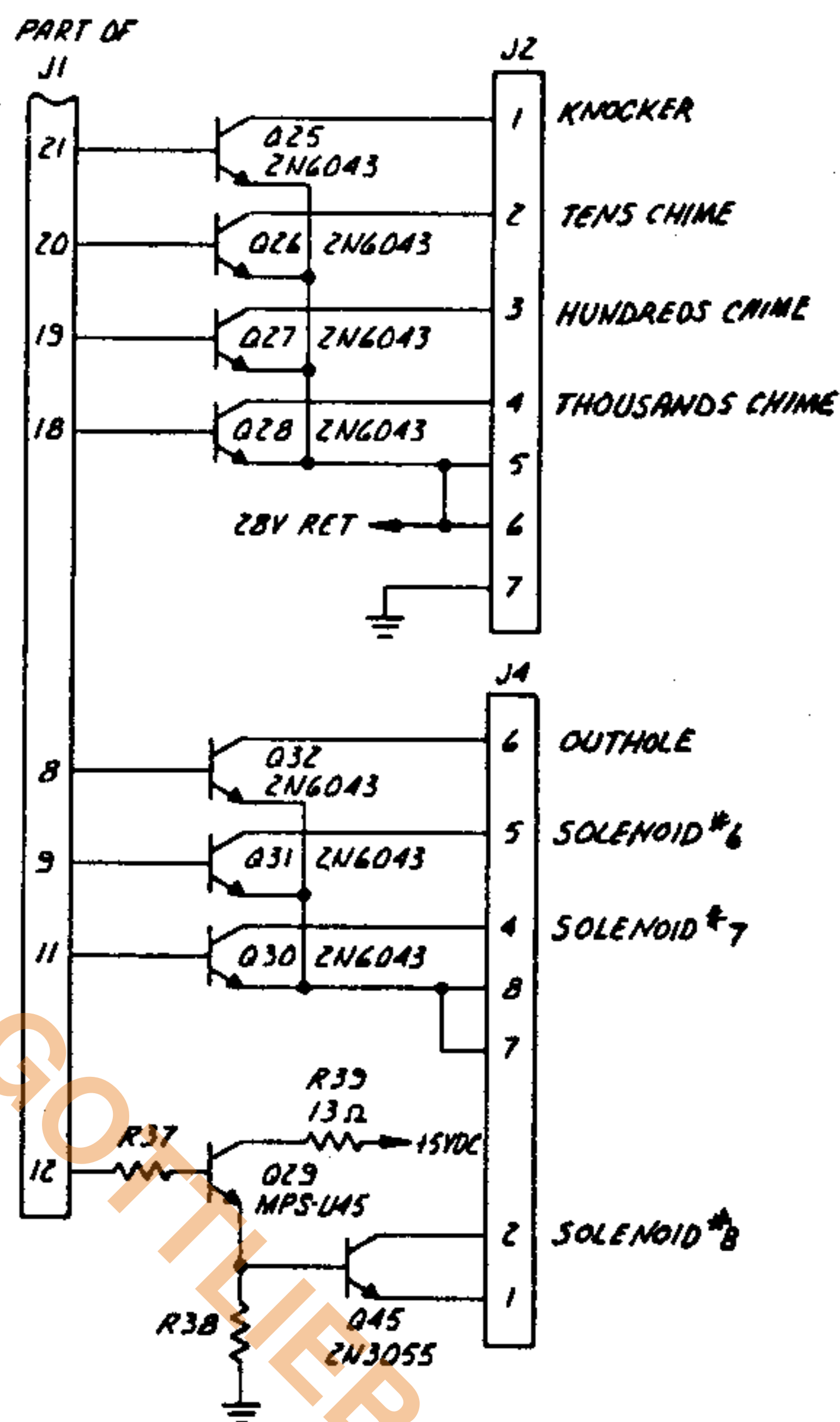
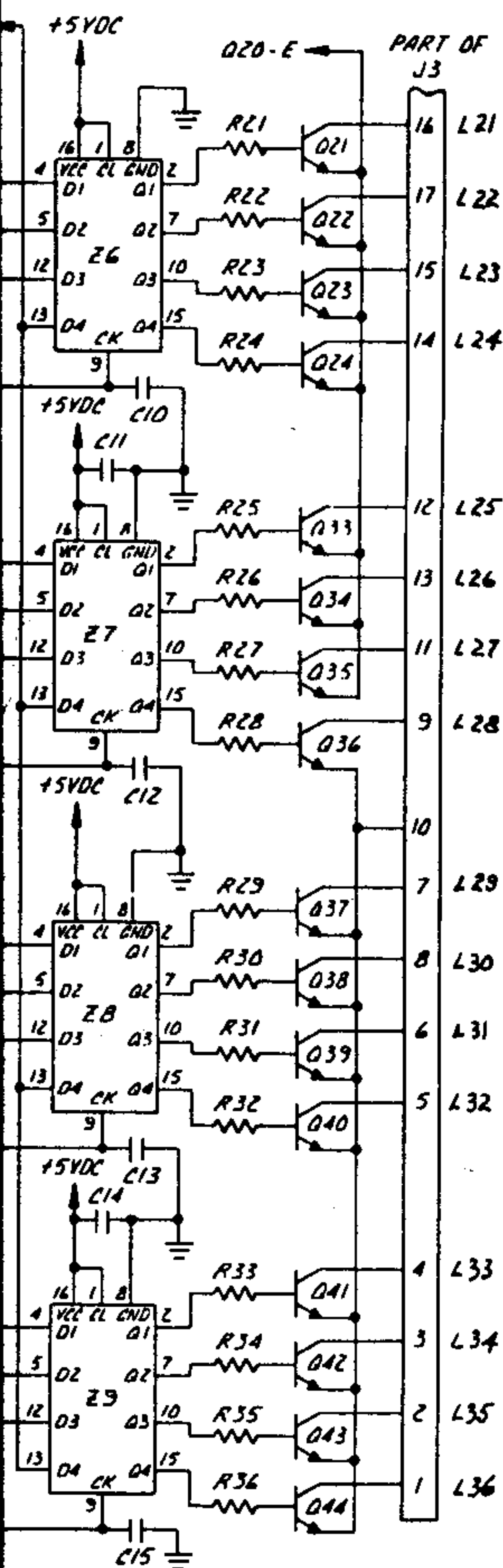


PAGE 1 OF 3

|                  |  |  |                      |  |          |  |                          |  |  |  |
|------------------|--|--|----------------------|--|----------|--|--------------------------|--|--|--|
|                  |  |  | DO NOT SCALE DRAWING |  | SCALE    |  | D. GOTTLIEB & CO.        |  |  |  |
|                  |  |  | TOLERANCES ±         |  | MATERIAL |  | TITLE SCHEMATIC DIAGRAM- |  |  |  |
|                  |  |  | DECIMAL              |  | HARDNESS |  | USED ON CONTROL BOARD    |  |  |  |
|                  |  |  | FRACTION             |  | FINISH   |  | DRAWN APPROVED DATE      |  |  |  |
| 1 2-6-70 REVISED |  |  | ANGULAR              |  |          |  |                          |  |  |  |

PB00-X111 SCHEMATIC DIAGRAM—MASTER DRIVER





NOTE: UNLESS OTHERWISE SPECIFIED

1. RESISTORS ARE 1.0K OHMS  $\pm 5\%$ , 1/4W.
2. TRANSISTORS ARE MPS-A13
3. CAPACITORS ARE .01UF, 20%, 100V
4. INTEGRATED CIRCUITS ARE SN74175N

DO NOT SCALE DRAWING

SCALE

TOLERANCES  $\pm$   
 DECIMAL  
 FRACTION  
 ANGULAR

MATERIAL  
 HARDNESS  
 FINISH

D. GOTTLIEB &amp; CO.

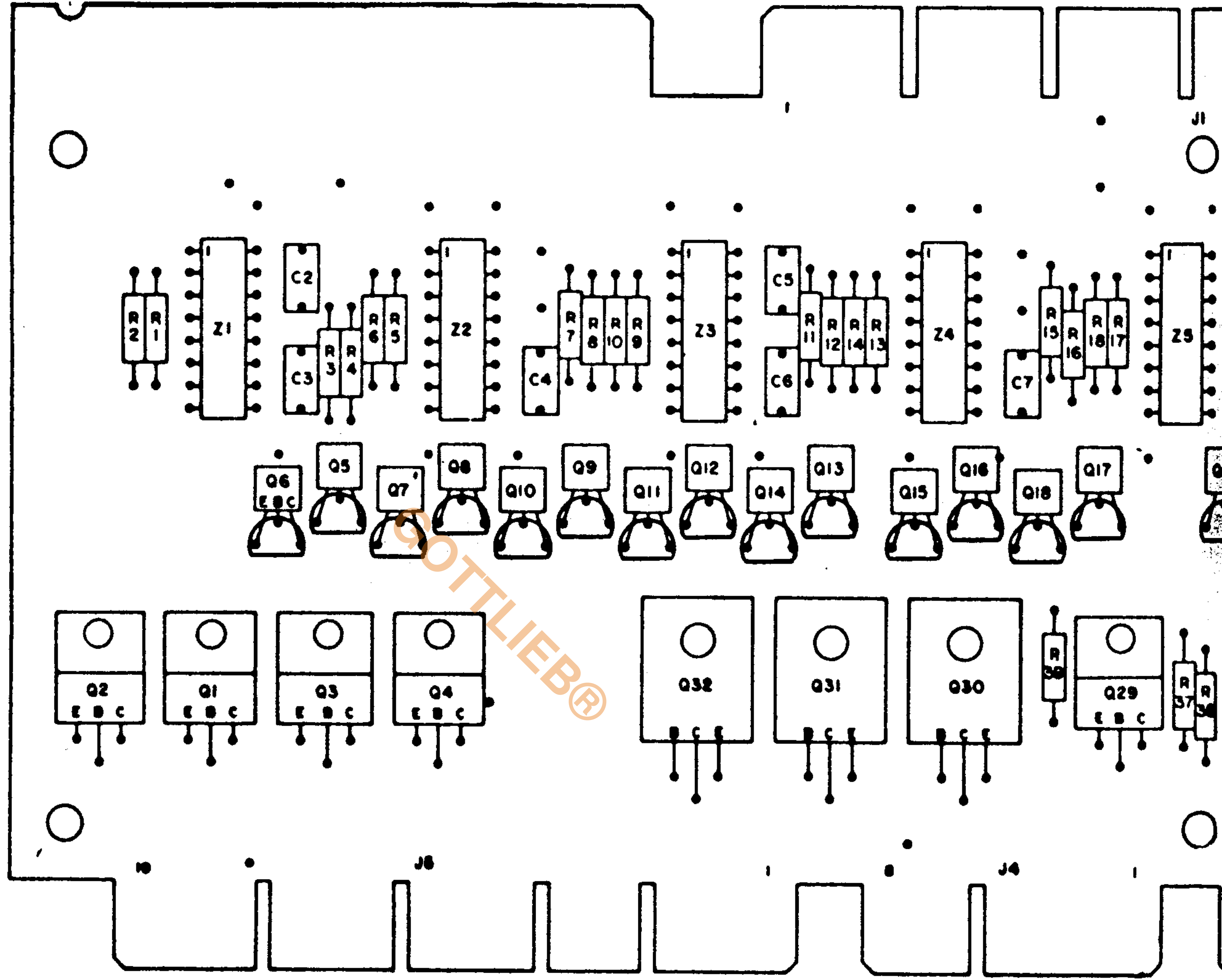
TITLE SCHEMATIC DIAGRAM-

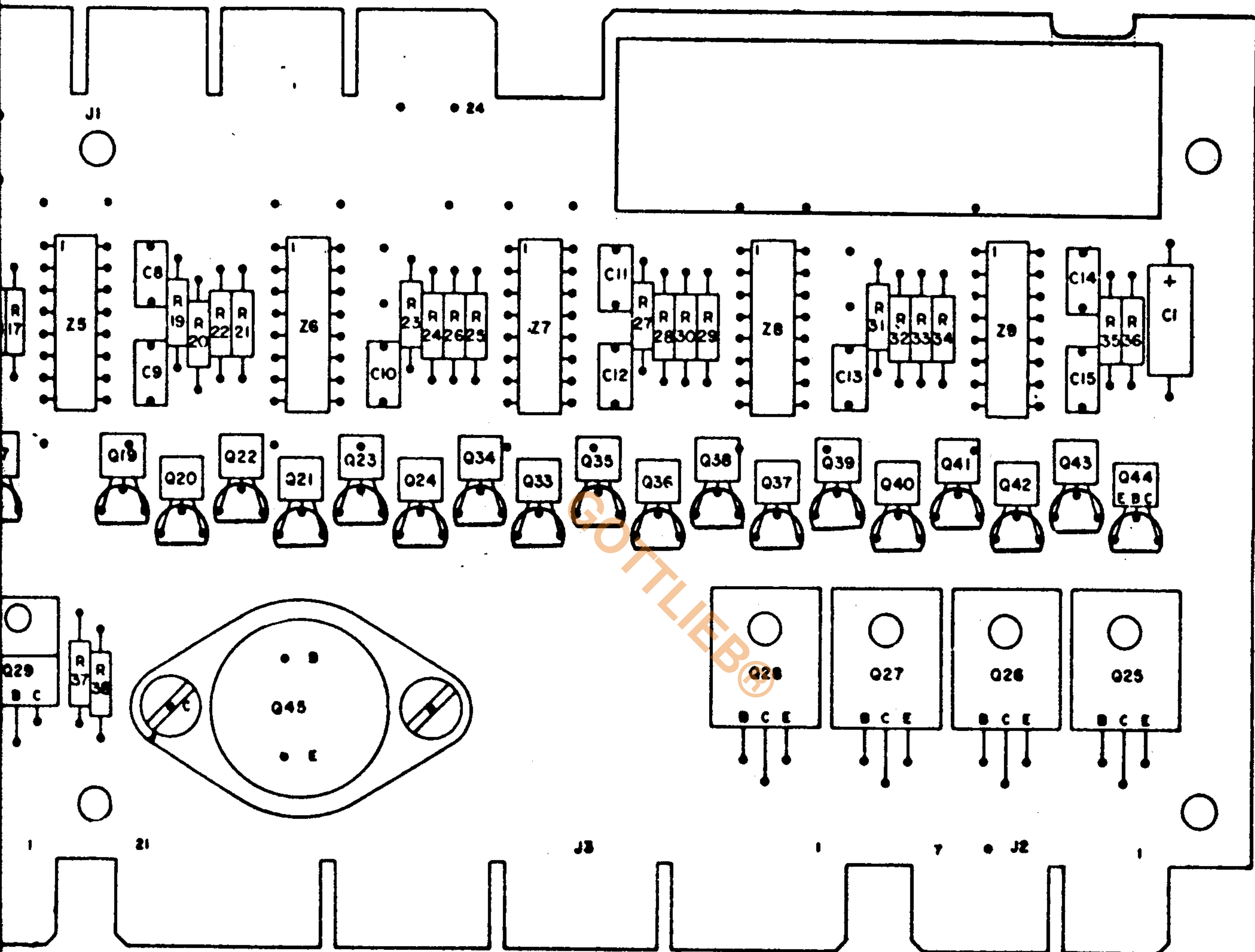
USED ON MASTER DRIVER

DRAWN APPROVED DATE

1 2-1-78 REVISED

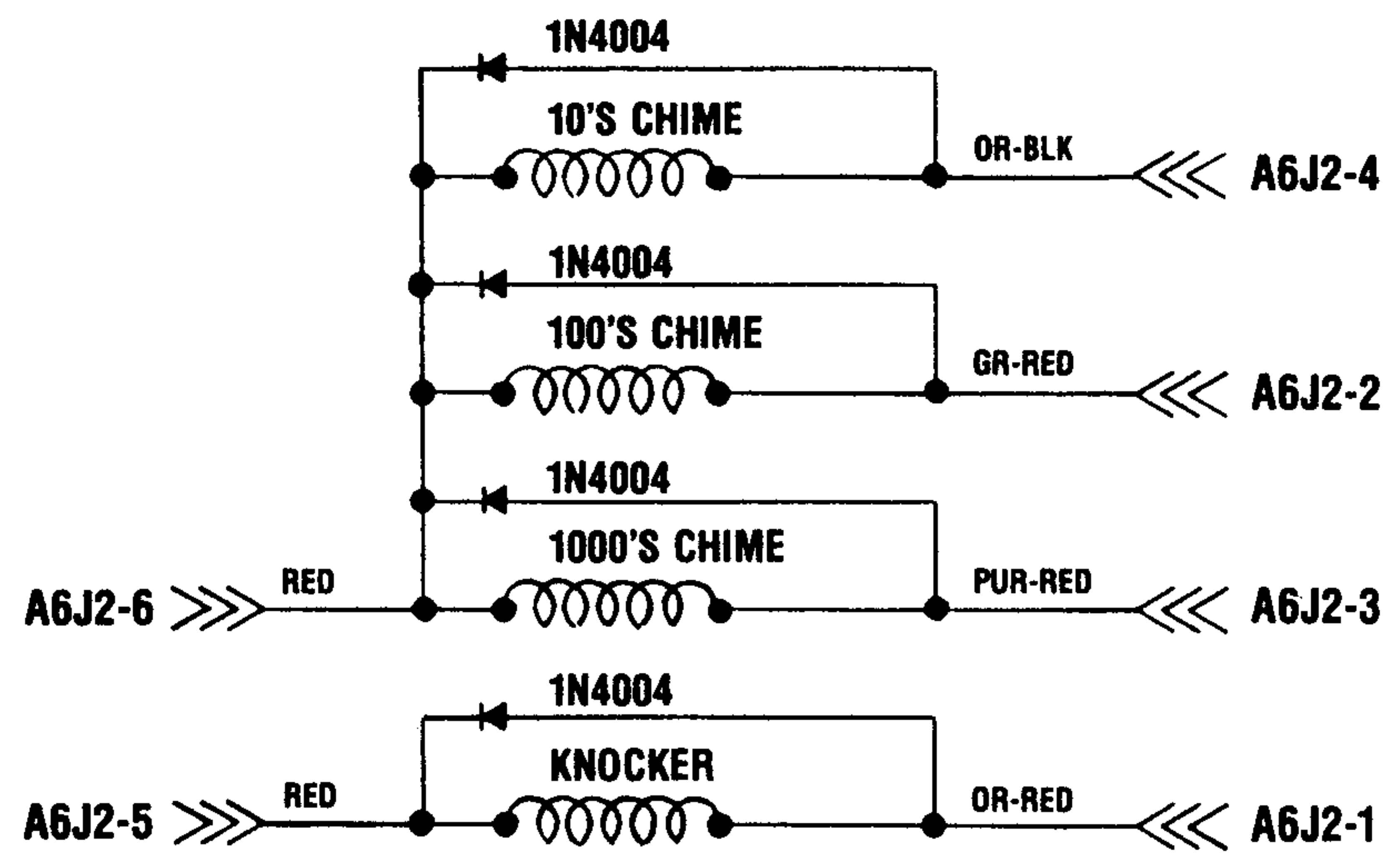
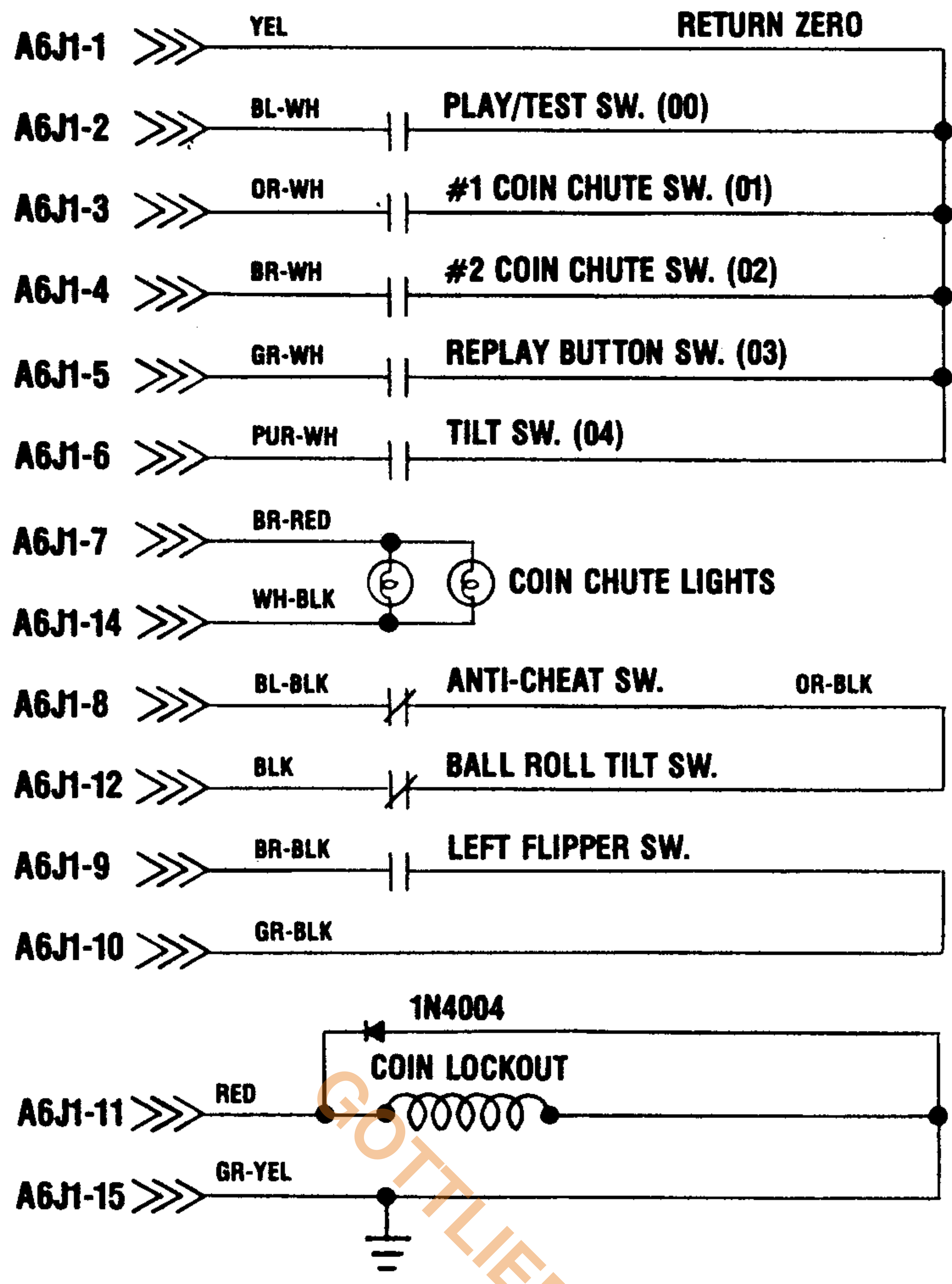
PB00-D110 MASTER DRIVER

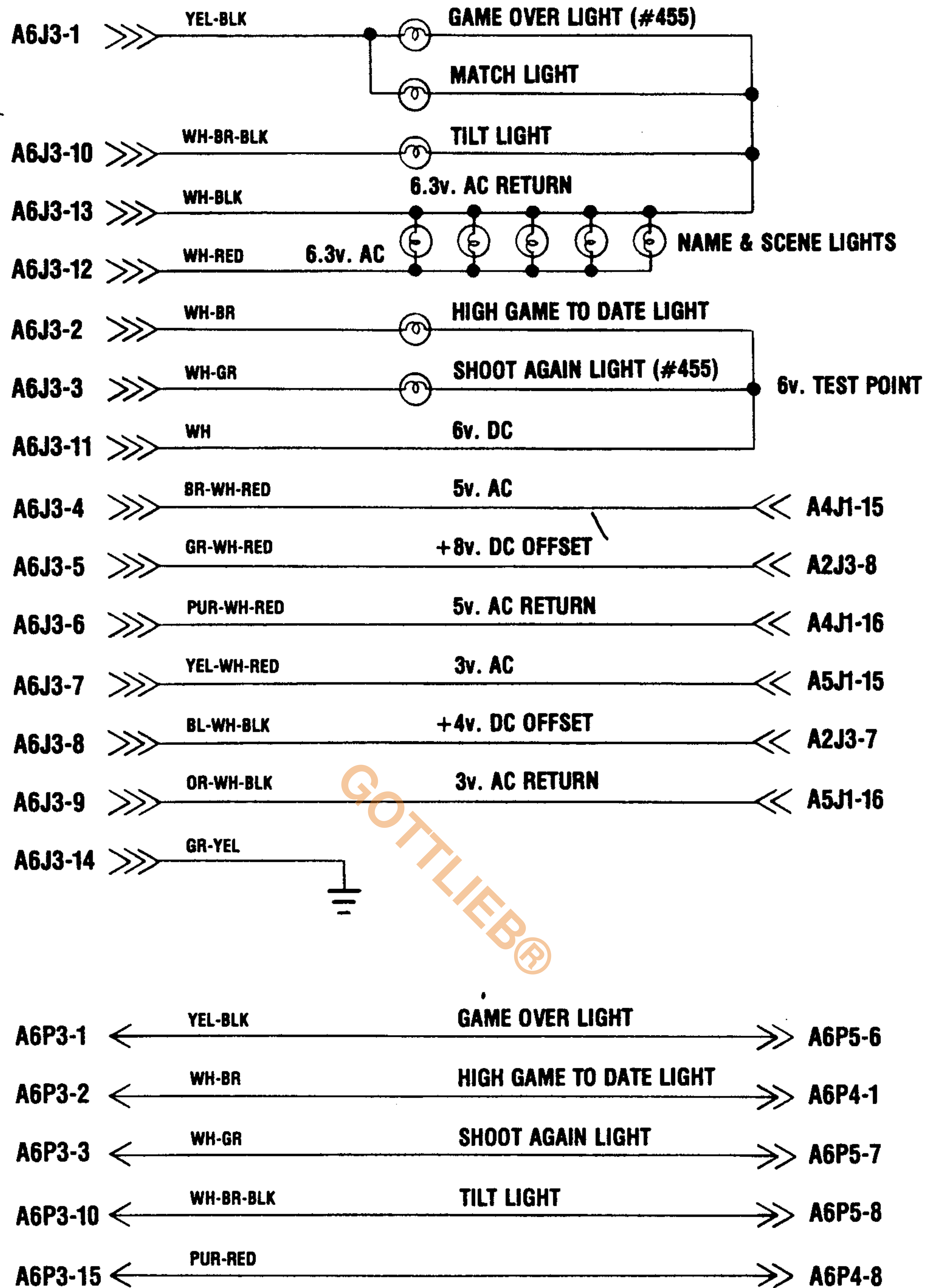




|                                                |          |       |                                                      |
|------------------------------------------------|----------|-------|------------------------------------------------------|
| DO NOT SCALE DRAWING                           |          | SCALE | D. GOTTLIEB & CO.                                    |
| TOLERANCES ±<br>DECIMAL<br>FRACTION<br>ANGULAR | MATERIAL |       | TITLE SCHEMATIC DIAGRAM-<br>MASTER DRIVER<br>USED ON |
|                                                | HARDNESS |       |                                                      |
|                                                | FINISH   |       |                                                      |

C-18014 BOTTOM BOARD & LIGHT BOX SCHEMATIC



**COILS USED**

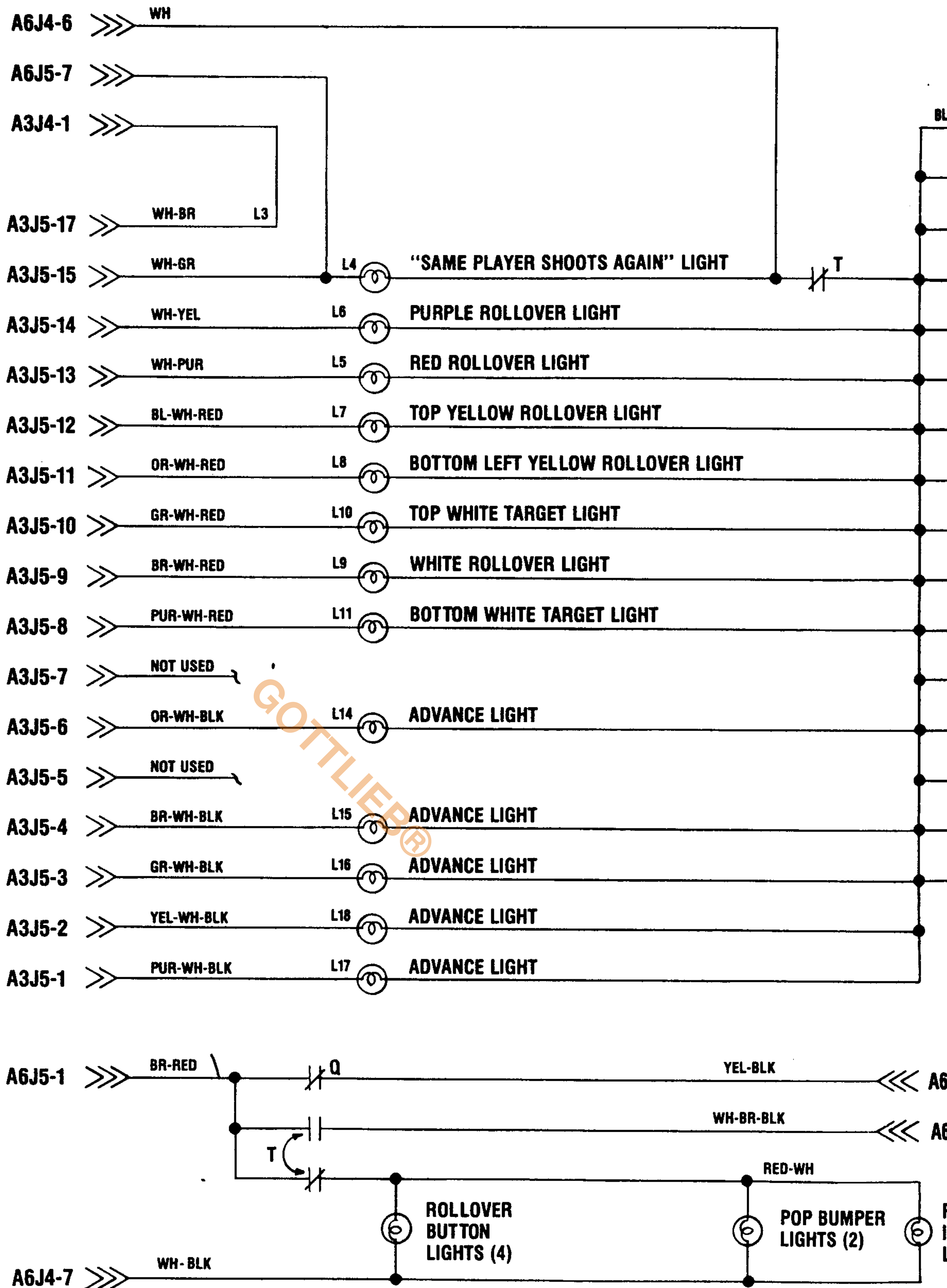
| PART NO. | DESCRIPTION       |
|----------|-------------------|
| A-17876  | CHIME COILS       |
| A-5195   | KNOCKER COIL      |
| A-16890  | COIN LOCKOUT COIL |

**NOTE:**

- > FROM PLAYBOARD
- >> FROM LIGHT BOX
- >>> FROM BOTTOM BOARD

|       |      |           |                            |  |          |                                |  |  |  |
|-------|------|-----------|----------------------------|--|----------|--------------------------------|--|--|--|
|       |      |           | DO NOT SCALE DRAWING       |  | SCALE    | D. GOTTLIEB & CO.              |  |  |  |
|       |      |           | TOLERANCES ±               |  | MATERIAL | TITLE BOTTOM BOARD & LIGHT BOX |  |  |  |
|       |      |           | DECIMAL                    |  | HARDNESS | USED ON SOLID STATE            |  |  |  |
|       |      |           | FRACTION                   |  | FINISH   | DRAWN APPROVED DATE            |  |  |  |
|       |      |           | ANGULAR                    |  | NOTE     | C-18014                        |  |  |  |
|       |      |           | UNLESS OTHERWISE SPECIFIED |  |          |                                |  |  |  |
| ISSUE | DATE | REVISIONS |                            |  |          |                                |  |  |  |

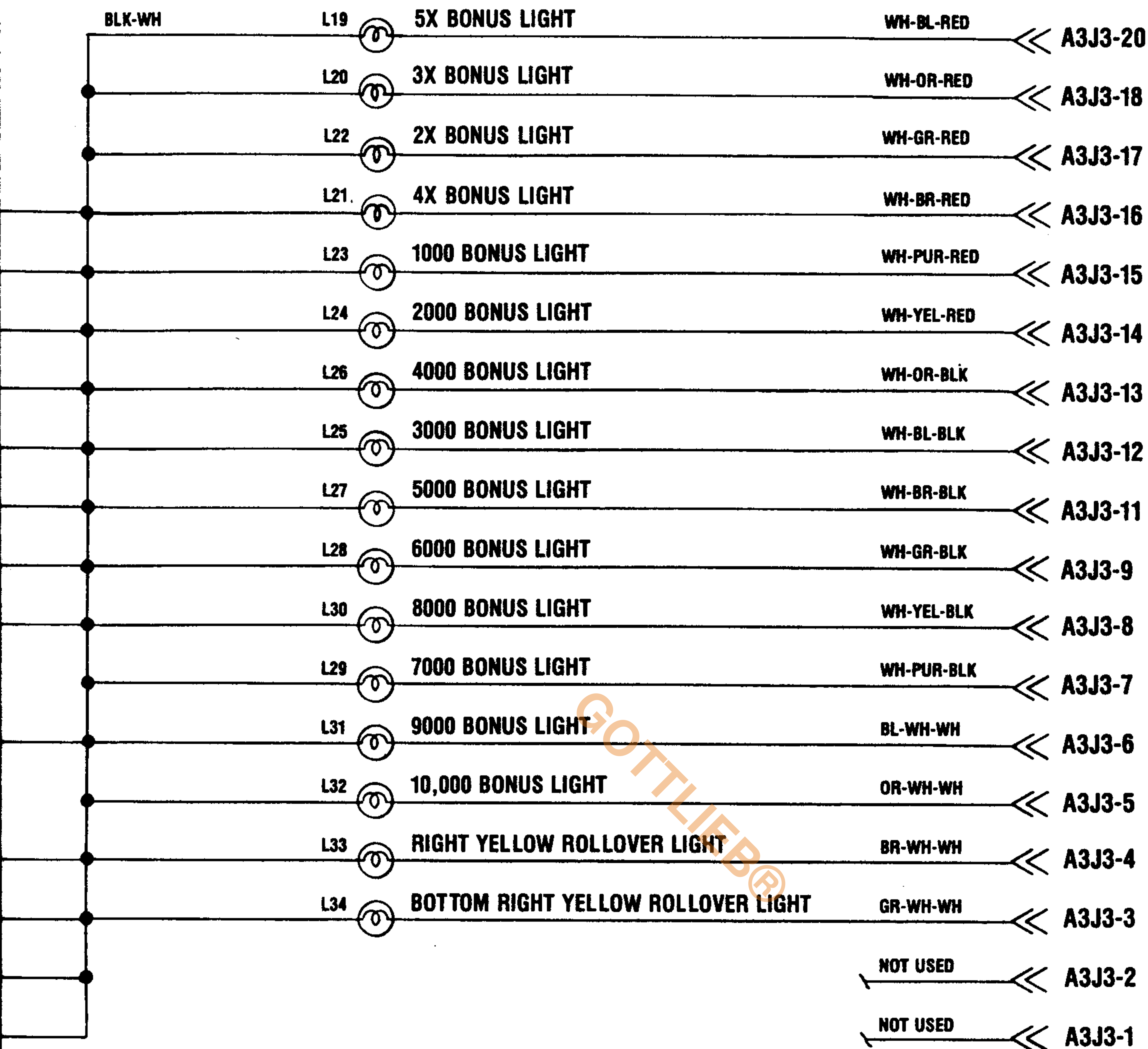
# C-18035 PLAYBOARD ILLUMINATION



NOTE:

>> FROM LIGHTBOX

>>> FROM BOTTOM BOARD



←← A6J5-6  
←← A6J5-8

MPER (2) PLAYBOARD ILLUMINATION LIGHTS (20)

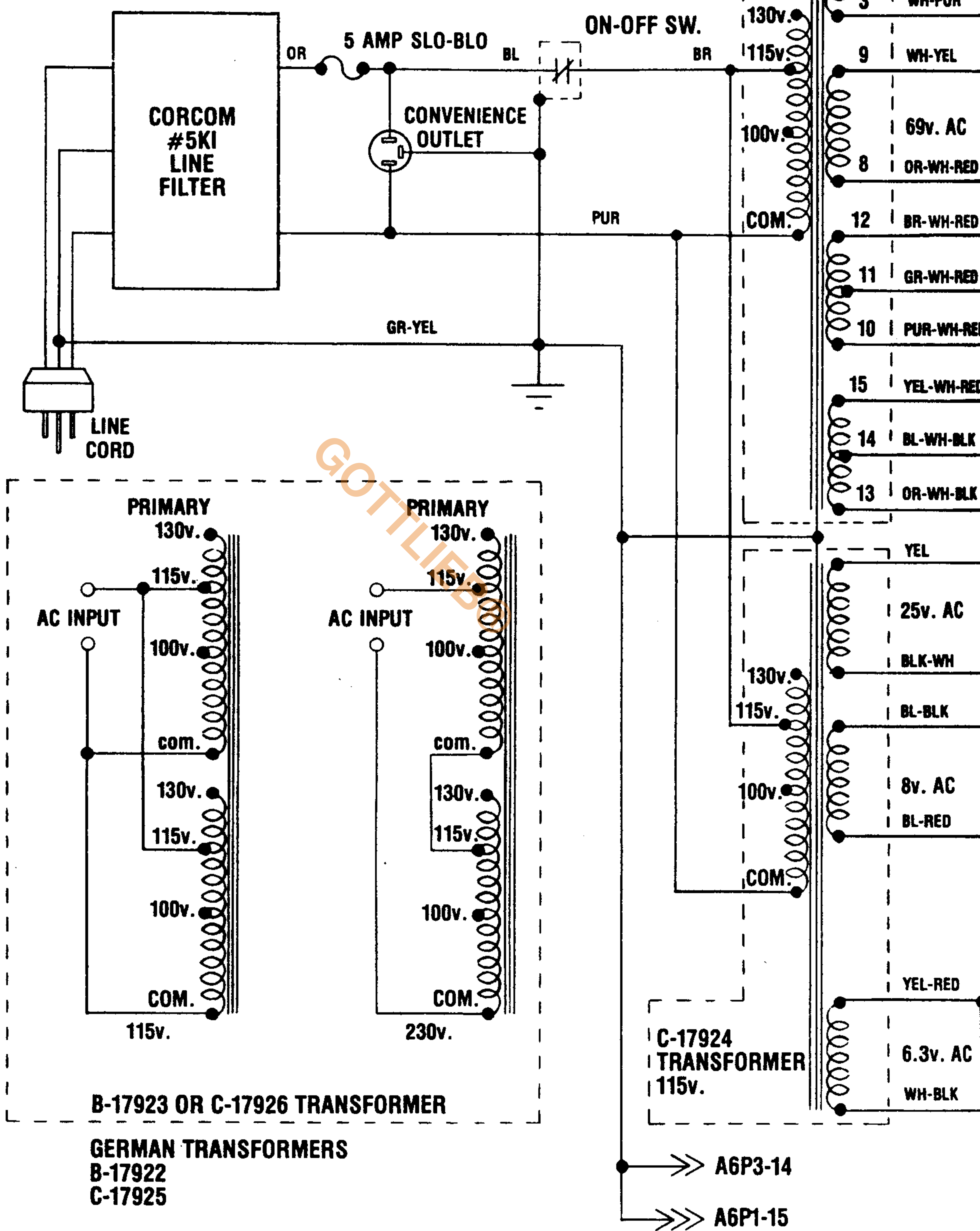
A6J4-2 >>> BLK <<< A3J3-21  
A6J4-3 >>> BLK <<< A3J5-16  
A6J4-4 >>> BLK <<< A3J3-10  
A6J4-5 >>> BLK <<< A3J3-19  
A6J5-11 >>> BLK <<< A3J4-1  
A6J5-12 >>> BLK <<< A3J4-7

|       |      |           |                                                                                 |          |       |  |                              |          |      |          |
|-------|------|-----------|---------------------------------------------------------------------------------|----------|-------|--|------------------------------|----------|------|----------|
|       |      |           | DO NOT SCALE DRAWING                                                            |          | SCALE |  | D. GOTTLIEB & CO.            |          |      |          |
|       |      |           | TOLERANCES ±<br>DECIMAL<br>FRACTION<br>ANGULAR<br>UNLESS OTHERWISE<br>SPECIFIED | MATERIAL |       |  | TITLE PLAYBOARD ILLUMINATION |          |      |          |
|       |      |           |                                                                                 | HARDNESS |       |  | USED ON SINBAD #412SS        |          |      |          |
|       |      |           |                                                                                 | FINISH   |       |  | DRAWN                        | APPROVED | DATE | C- 18035 |
| ISSUE | DATE | REVISIONS |                                                                                 | NOTE     |       |  |                              |          |      |          |

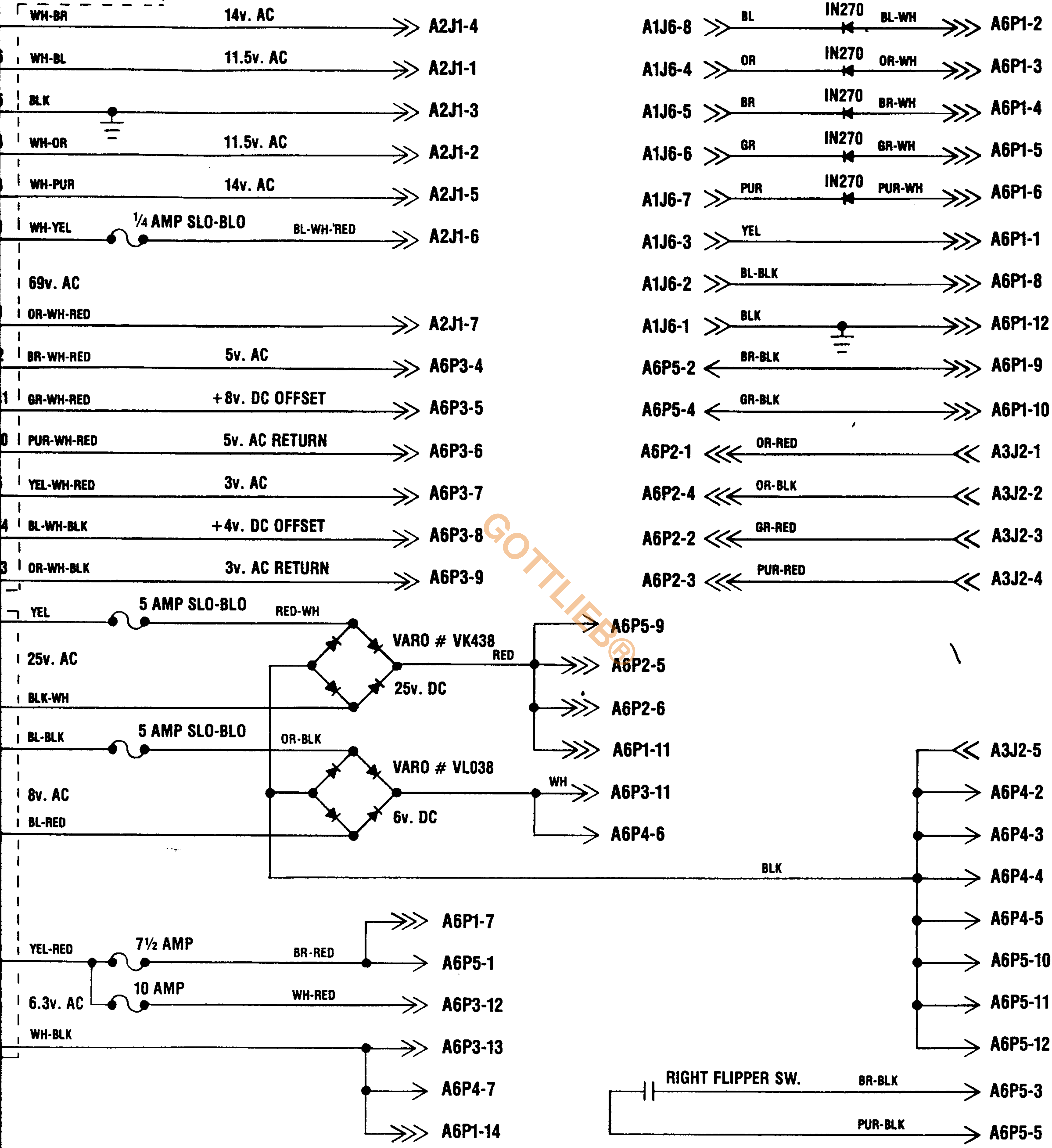
# C-18013 BOTTOM BOARD SCHEMATIC

NOTE:

- > TO PLAYBOARD
- >> TO LIGHTBOX
- >>> TO BOTTOM PANEL

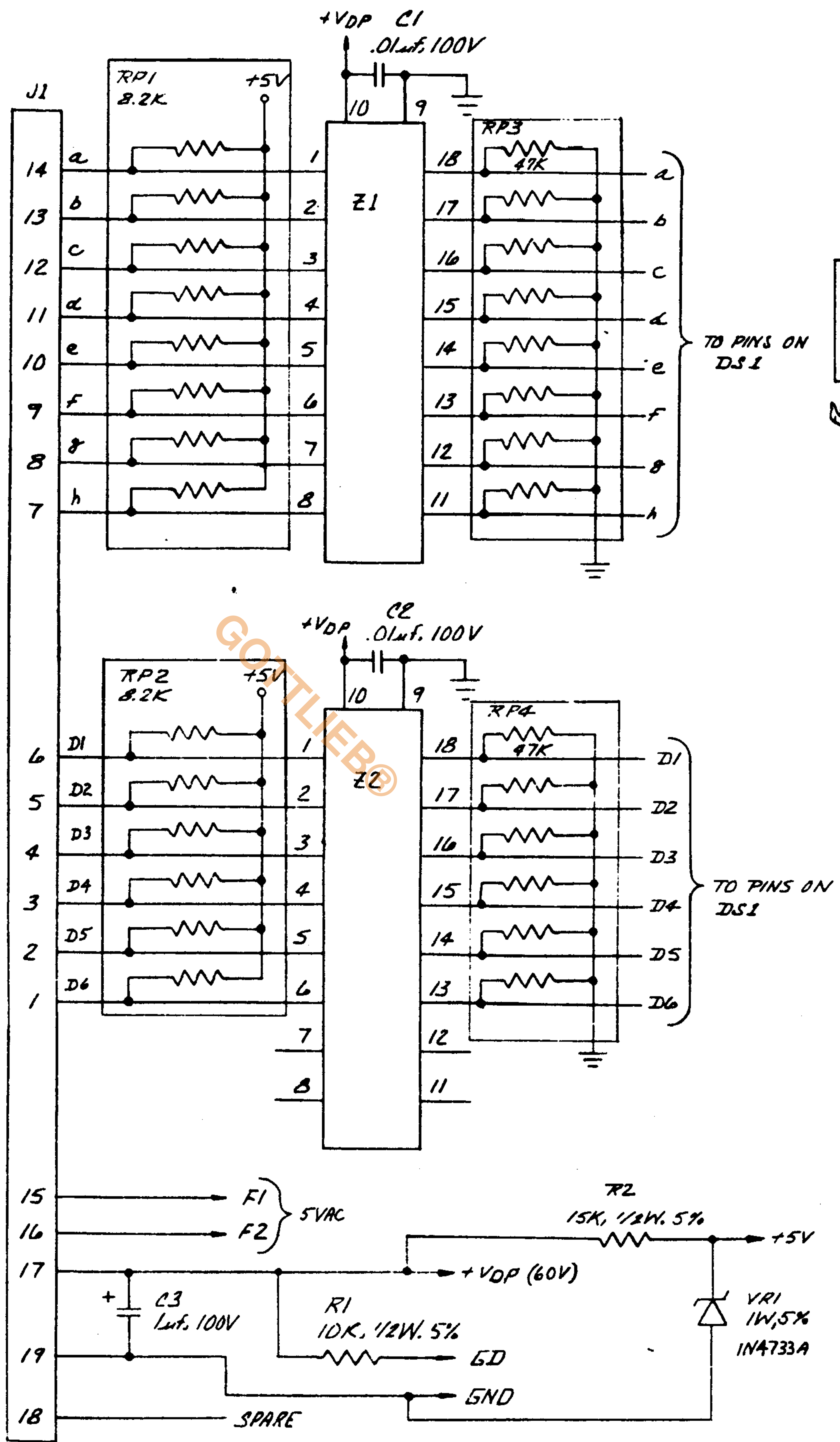


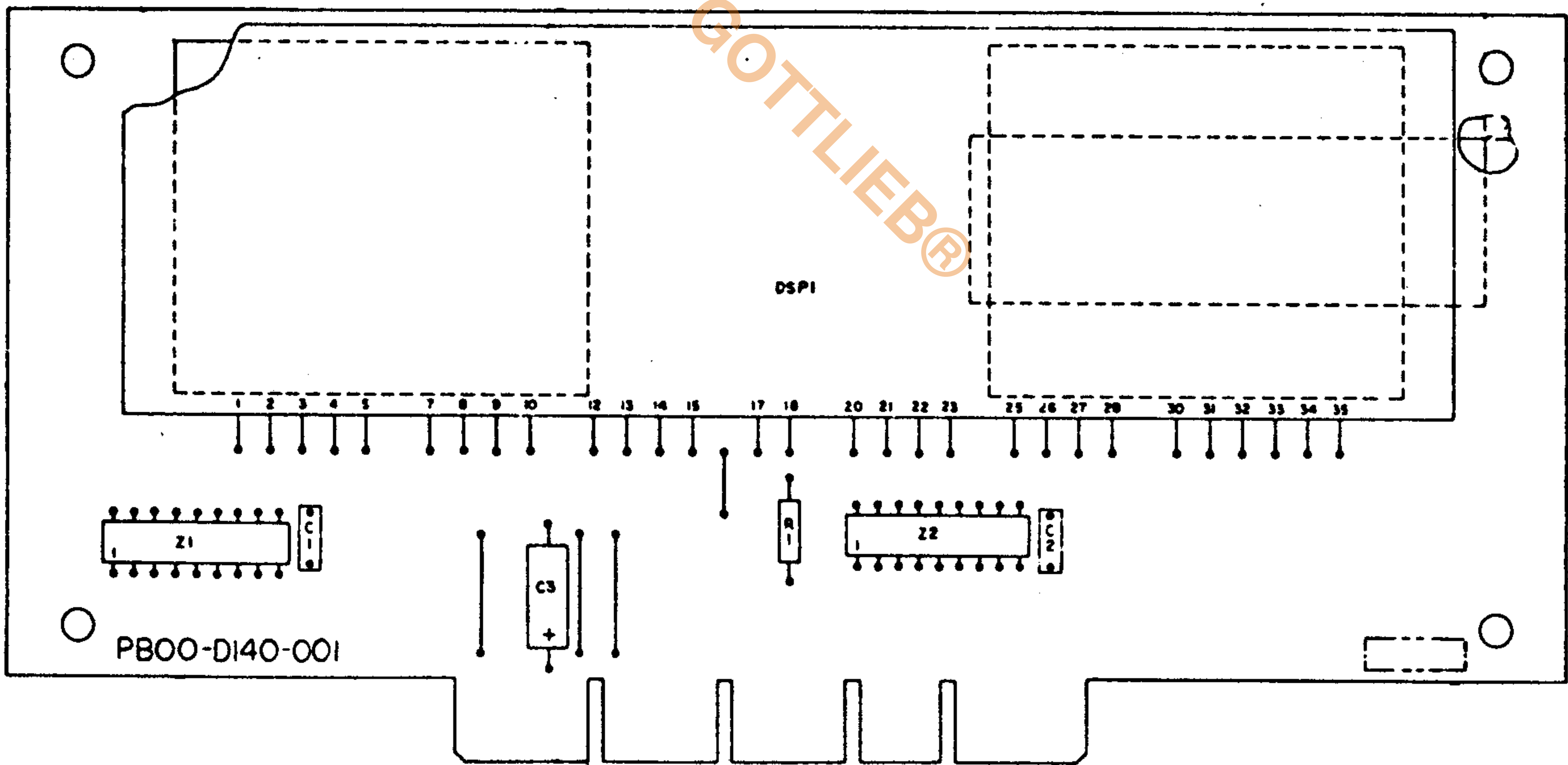
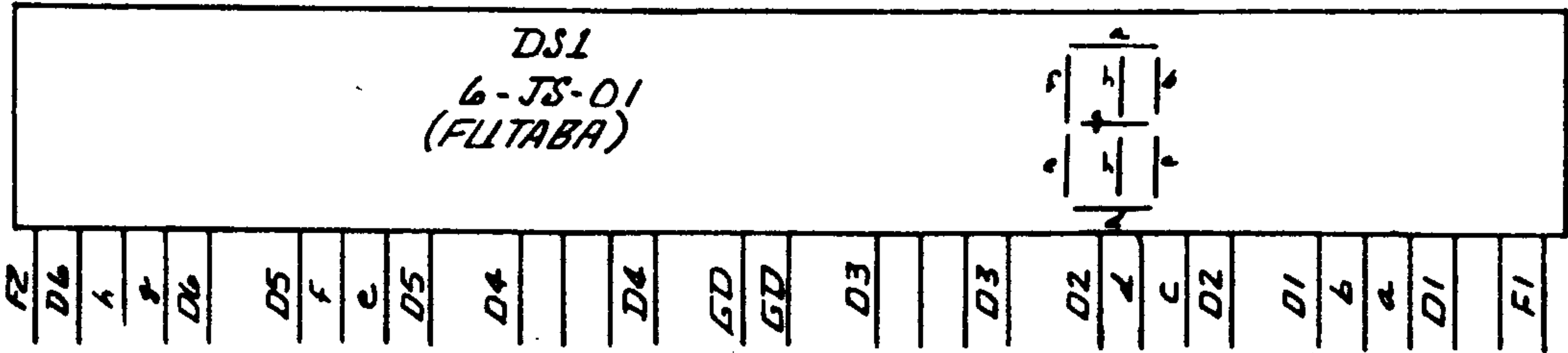
TRANSFORMER 115v.



|                            |                        |          |  |                              |  |  |  |
|----------------------------|------------------------|----------|--|------------------------------|--|--|--|
| DO NOT SCALE DRAWING       |                        | SCALE    |  | D. GOTTLIEB & CO.            |  |  |  |
| TOLERANCES ±               |                        | MATERIAL |  | TITLE BOTTOM BOARD SCHEMATIC |  |  |  |
| DECIMAL                    |                        | HARDNESS |  | USED ON SOLID STATE          |  |  |  |
| FRACTION                   |                        | FINISH   |  | DRAWN                        |  |  |  |
| ANGULAR                    |                        | NOTE     |  | APPROVED                     |  |  |  |
| UNLESS OTHERWISE SPECIFIED |                        |          |  | DATE                         |  |  |  |
| 1                          | Filter Circuit Revised |          |  | C-18013                      |  |  |  |
| ISSUE DATE                 | REVISIONS              |          |  |                              |  |  |  |

PB00-D140 SCHEMATIC DIAGRAM—6 DIGIT DISPLAY  
PB00-X141

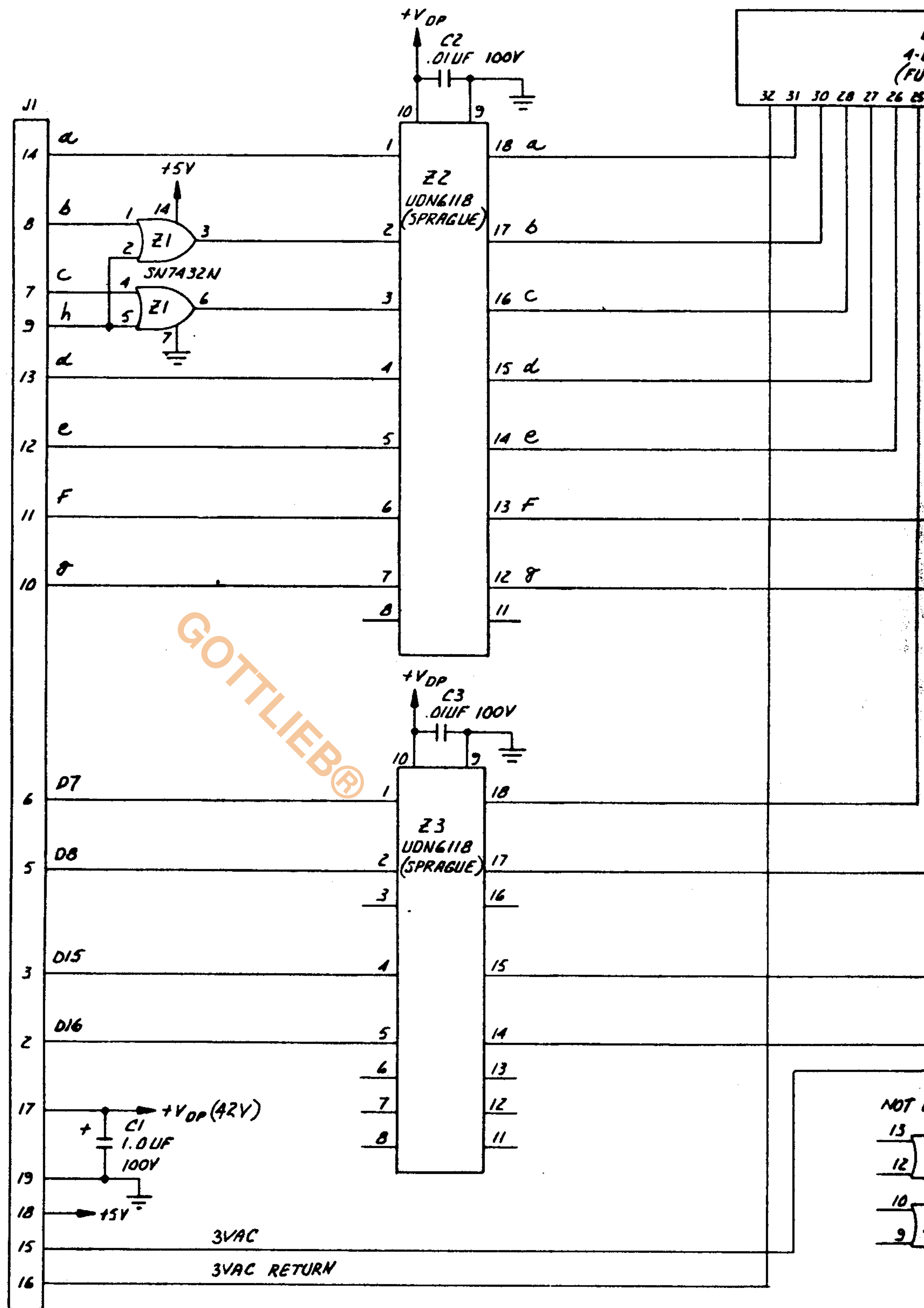




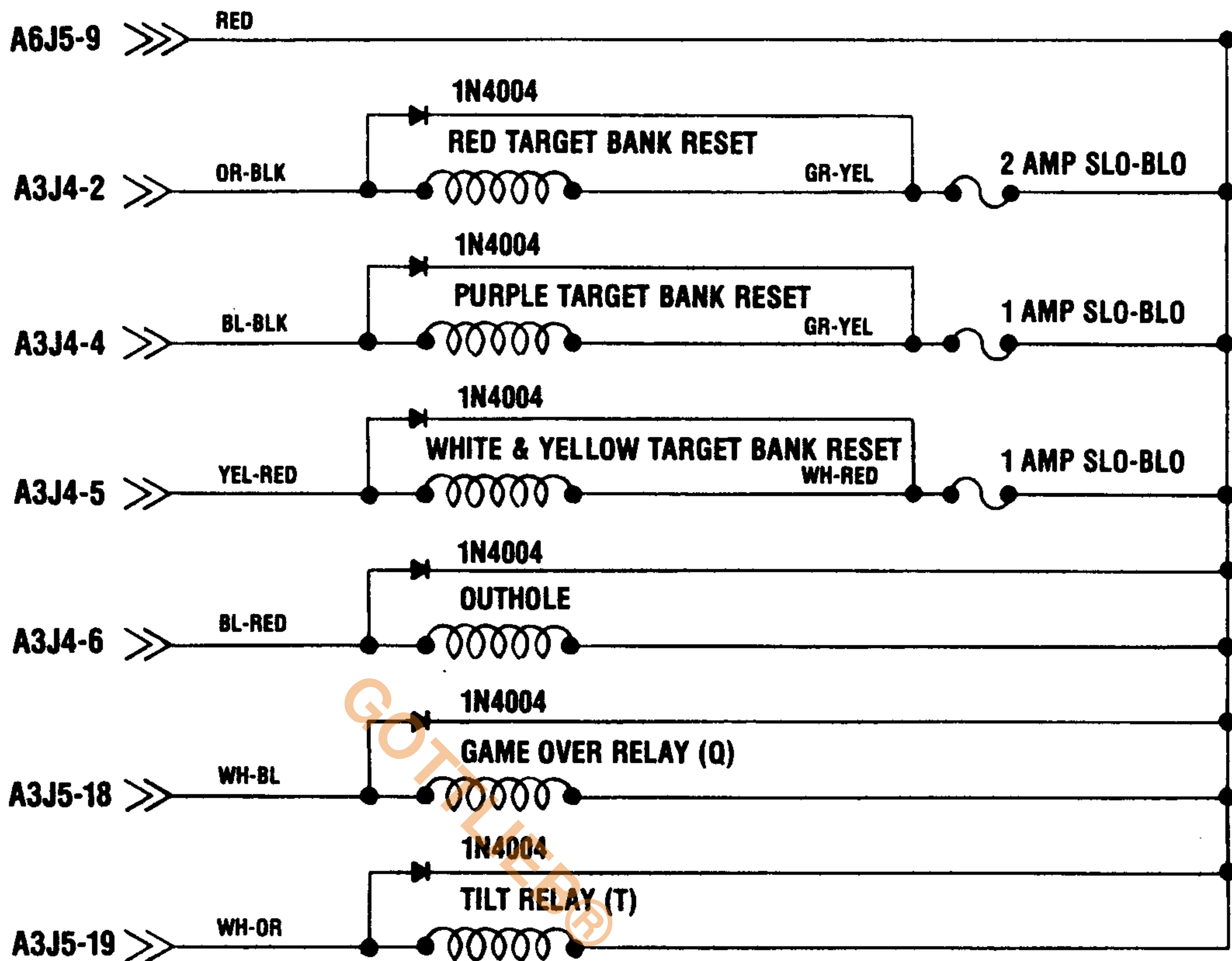
NOTE: UNLESS OTHERWISE SPECIFIED  
1. Z1 & Z2 ARE UD6118A (SPRAGUE) - I ONLY;  
Z1 & Z2 ARE DI513 (DIONICS) - II ONLY.  
2. RP1, RP2, RP3, RP4, R2 & VR1 ARE USED  
ON - II ASSY ONLY.

|   |        |         |                                                                    |          |       |                                             |          |      |           |
|---|--------|---------|--------------------------------------------------------------------|----------|-------|---------------------------------------------|----------|------|-----------|
|   |        |         | DO NOT SCALE DRAWING                                               |          | SCALE | D. GOTTLIEB & CO.                           |          |      |           |
|   |        |         | TOLERANCES ±<br>DECIMAL<br>FRACTION<br>ANGULAR<br>UNLESS OTHERWISE | MATERIAL |       | TITLE SCHEMATIC DIAGRAM-<br>6 DIGIT DISPLAY |          |      |           |
|   |        |         |                                                                    | HARDNESS |       |                                             |          |      |           |
|   |        |         |                                                                    | FINISH   |       | USED ON                                     |          |      |           |
| 1 | 2-1-78 | REVISED |                                                                    |          |       | DRAWN                                       | APPROVED | DATE | DD00 V444 |

# PB00—D150 4 DIGIT DISPLAY PB00-X151 SCHEMATIC DIAGRAM—4 DIGIT DISPLAY







NOTE:

>> FROM LIGHTBOX

>>> FROM BOTTOM BOARD

### COILS USED

#### PART NO.

#### DESCRIPTION

A-1496

POP BUMPER COILS

A-5195

OUTHOLE COIL

A-16890

GAME OVER RELAY COIL (Q)

A-16890

TILT RELAY COIL (T)

A-17875

FLIPPER COILS

A-17891

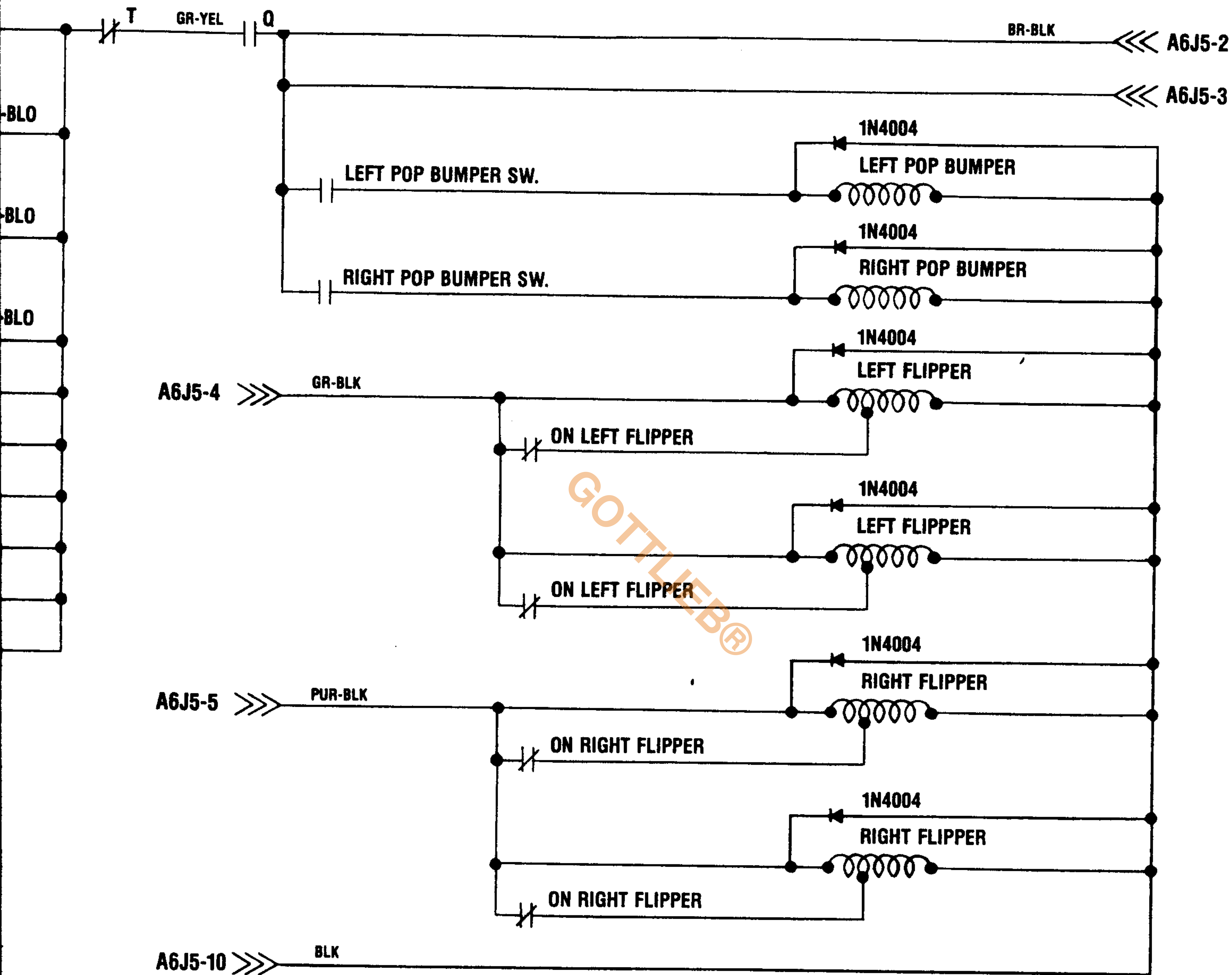
RED TARGET BANK RESET COIL

A-18102

WHITE & YELLOW TARGET BANK RESET COIL

A-18102

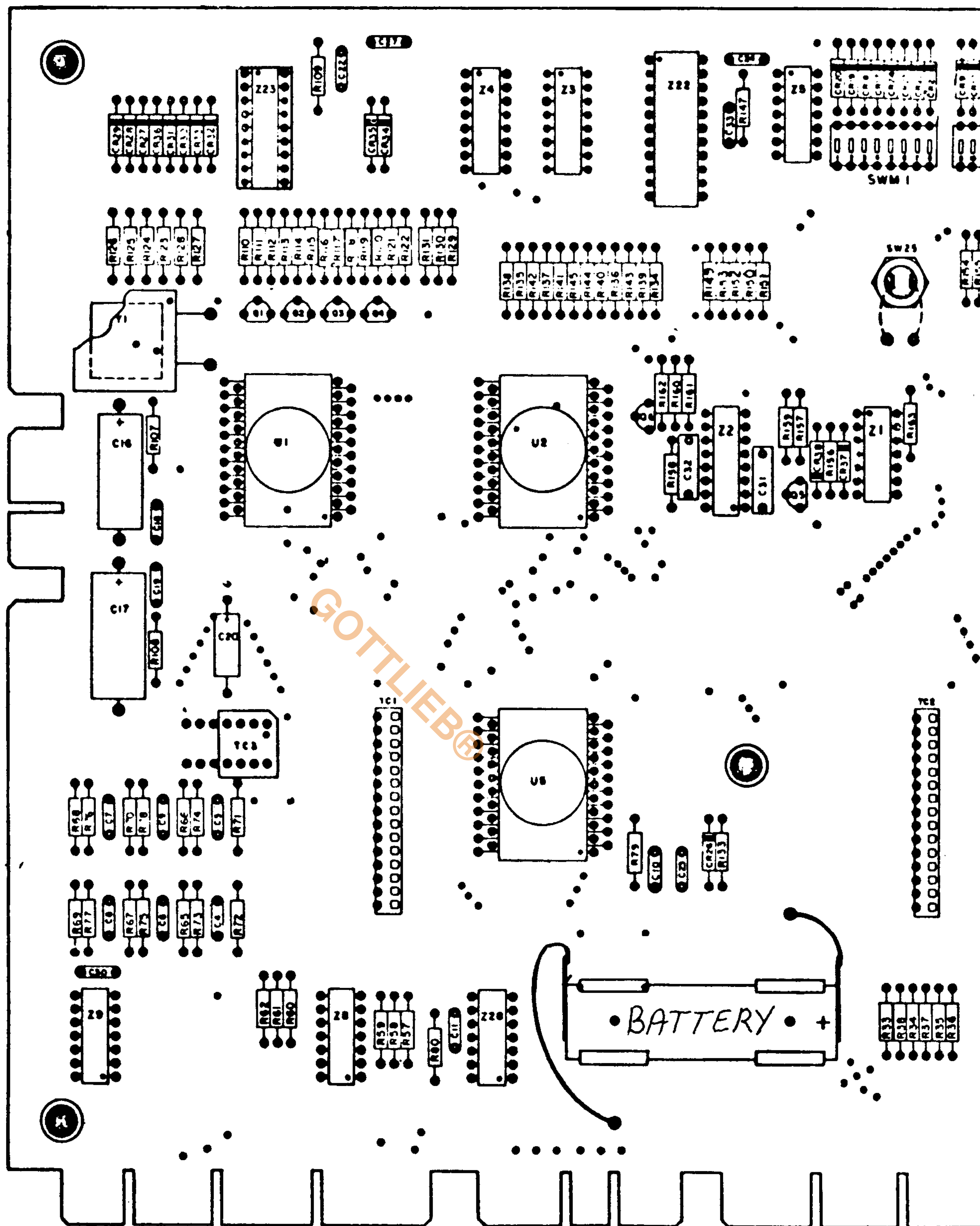
PURPLE TARGET BANK RESET COIL

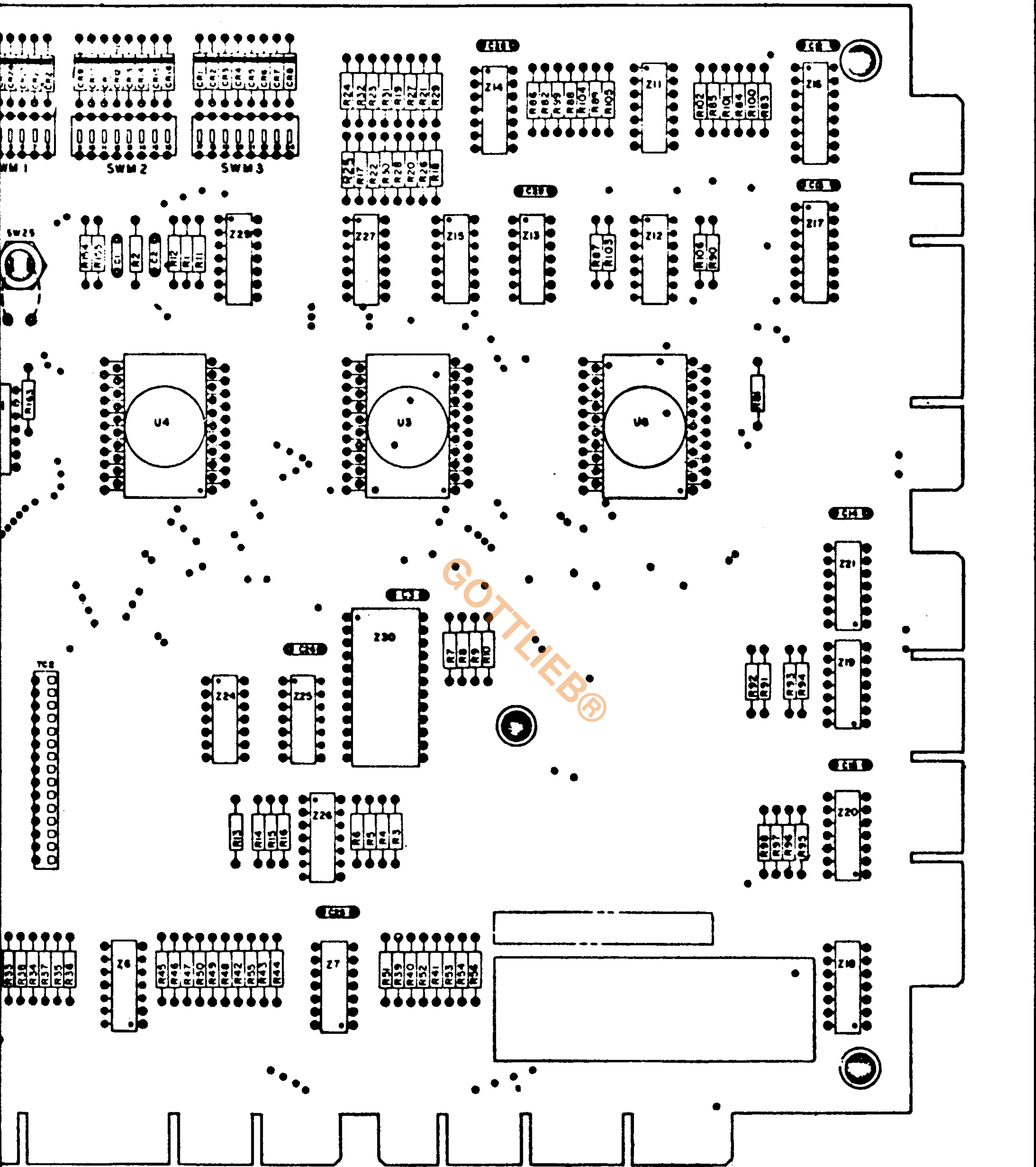


| ISSUE | DATE | REVISIONS |
|-------|------|-----------|
|       |      |           |
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|                                                                                 |          |       |                           |          |      |          |
|---------------------------------------------------------------------------------|----------|-------|---------------------------|----------|------|----------|
| DO NOT SCALE DRAWING                                                            |          | SCALE | D. GOTTLIEB & CO.         |          |      |          |
| TOLERANCES ±<br>DECIMAL<br>FRACTION<br>ANGULAR<br>UNLESS OTHERWISE<br>SPECIFIED | MATERIAL |       | TITLE PLAYBOARD SOLENOIDS |          |      |          |
|                                                                                 | HARDNESS |       | USED ON SINBAD #412SS     |          |      |          |
|                                                                                 | FINISH   |       | DRAWN                     | APPROVED | DATE | C- 18036 |
|                                                                                 | NOTE     |       |                           |          |      |          |

PB00-D100 CONTROL BOARD





|   |        |         |                                                                    |          |        |  |                                           |          |      |           |
|---|--------|---------|--------------------------------------------------------------------|----------|--------|--|-------------------------------------------|----------|------|-----------|
|   |        |         | DO NOT SCALE DRAWING                                               |          | SCALE  |  | D. GOTTLIEB & CO.                         |          |      |           |
|   |        |         | TOLERANCES ±<br>DECIMAL<br>FRACTION<br>ANGULAR<br>UNLESS OTHERWISE | MATERIAL |        |  | TITLE SCHEMATIC DIAGRAM-<br>CONTROL BOARD |          |      |           |
|   |        |         |                                                                    | HARDNESS |        |  |                                           |          |      |           |
|   |        |         |                                                                    |          | FINISH |  |                                           | USED ON  |      |           |
| 1 | 2-1-78 | REVISED |                                                                    |          |        |  | DRAWN                                     | APPROVED | DATE | DD00 D100 |

C-18012 BLOCK CABLE DIAGRAM

