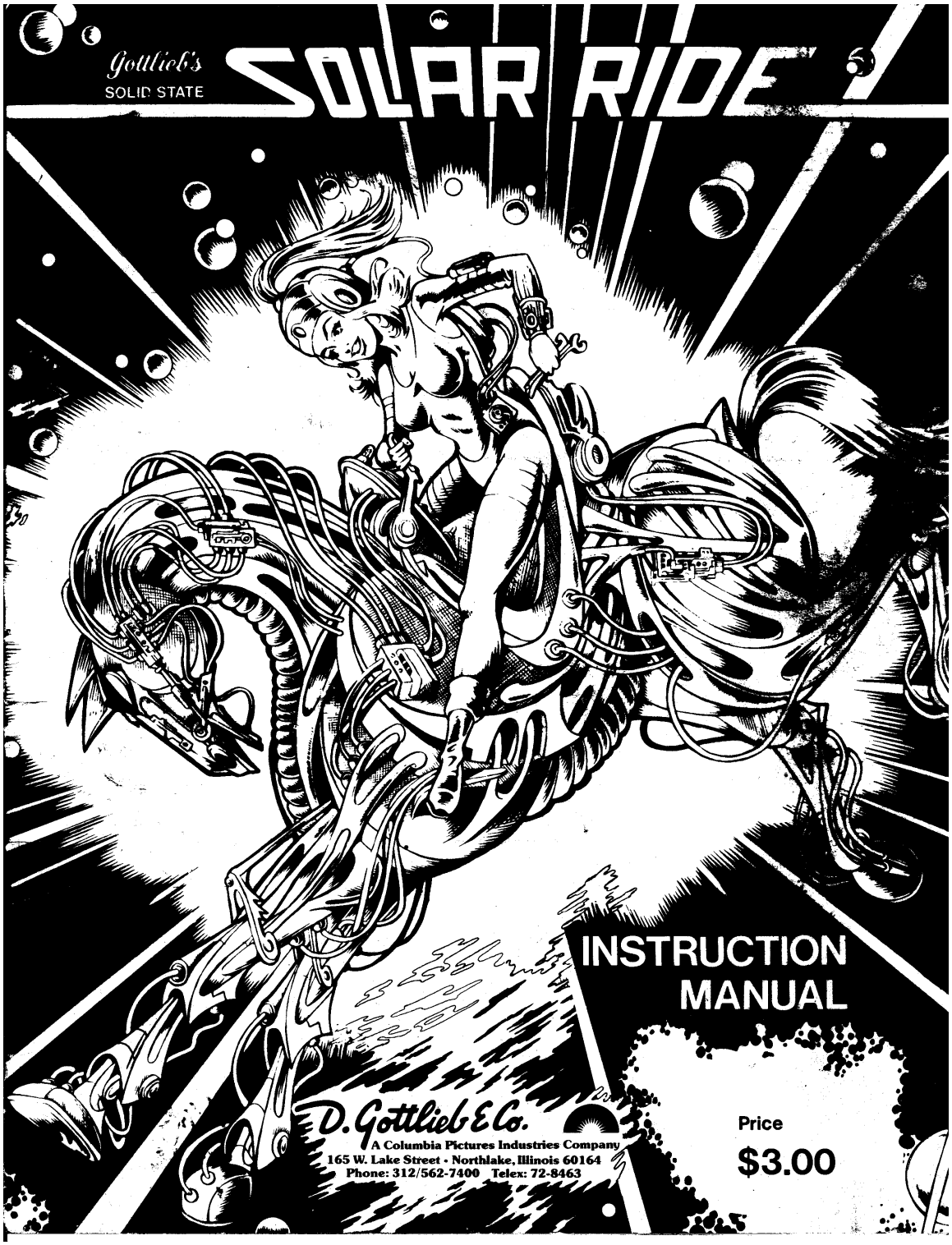

Gottlieb's
SOLID STATE
SOLAR RIDE
INSTRUCTION
MANUAL
D. Gottlieb & Co.
A Columbia Pictures Industries Company
165 W. Lake Street - Northlake, Illinois 60164
Phone: 312/562-7400 Telex: 72-8463
Price
$3.00

SOLAR RIDE

USES PROM MARKED

"E"

INSERT PROM WITH
INDENT NOTCH UP

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.

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 ADJUSTMENTS

A. Playfield Adjustments

Posts controlling access to the left and right outlanes can be adjusted. See page 8. The "conservative" (easier entry) position decreases playing time and scoring while the "liberal" position has the opposite effect.

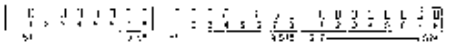
The game is shipped with adjustable posts in the position found to be suitable for the greatest number of players. Therefore the posts should not be changed unless the need is clearly evident.

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.

B. Lightbox Adjustments

There are 24 switches on the Control Board (A1) which permit adjustment of the game parameters. These switches are contained in three packages of eight switches each, as shown below.



WARNING: TURN OFF POWER BEFORE MAKING ADJUSTMENTS!

SWITCHES				COIN CHUTE ADJUSTMENTS
S1	S2	S3	S4	#1 Coin Chute
S5	S6	S7	S8	#2 Coin Chute

Coins/Credits				
OFF	OFF	OFF	OFF	1/1
OFF	OFF	OFF	ON	1/2
OFF	OFF	ON	OFF	1/3
OFF	OFF	ON	ON	1/4
OFF	ON	OFF	OFF	1/5
OFF	ON	OFF	ON	1/6
OFF	ON	ON	OFF	1/7
OFF	ON	ON	ON	1/8
ON	OFF	OFF	OFF	1/9
ON	OFF	OFF	ON	2/1
ON	OFF	ON	OFF	2/2
ON	OFF	ON	ON	2/3 Note 1
ON	ON	OFF	OFF	2/4
ON	ON	OFF	ON	2/5
ON	ON	ON	OFF	2/3 Note 2
ON	ON	ON	ON	3/1 Note 3

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.

SWITCH 9 — BALLS PER GAME
- ON 3
- OFF 5

SWITCH 10 — MATCH FEATURE
- ON ..... IN
- OFF ..... OUT

SWITCH 11 — GAME MODE (See Note A)
- ON ..... REPLAY
- OFF ..... EXTRA BALL

SWITCH 12 — TILT EFFECT
- ON ..... BALL IN PLAY ONLY
- OFF ..... GAME OVER

SWITCH 13 — CREDITS DISPLAYED?
- ON ..... YES
- OFF ..... NO

SWITCH 14 — CREDIT BUTTON TUNE?
- ON ..... YES
- OFF ..... NO

SWITCH 15, SWITCH 16 — NOT USED—MAY BE ON OR OFF

SWITCHES 17, 18 — MAXIMUM CREDITS

17	18	
OFF	OFF	5
OFF	ON	8
ON	OFF	10
ON	ON	15

SWITCH 19 — COIN CHUTE CONTROL (See Note B)
- ON ..... CHUTES SAME
- OFF ..... CHUTES SEPARATE

SWITCH 20 — CHIMES WHEN SCORING?
- ON ..... YES
- OFF ..... NO

SWITCH 21 — HIGH GAME TO DATE DISPLAYED?
- ON ..... YES
- OFF ..... NO

SWITCH 22 — BEATING HIGH GAME TO DATE AWARDS.
- ON ..... 3 REPLAYS
- OFF ..... NO REPLAYS

SWITCH 23 — COIN SWITCH TUNE?
- ON ..... YES
- OFF ..... NO

SWITCH 24—NOT USED—MAY BE ON OR OFF

Note A: IF SWITCH 11 IS OFF, SWITCHES 10 AND 22 HAVE NO EFFECT. THE MATCH FEATURE IS DISABLED AND NO REPLAYS ARE AWARDED FOR BEATING HIGH GAME TO DATE.

Note B: WHEN SWITCH 19 IS ON, SWITCHES 5-8 HAVE NO EFFECT. SWITCHES 1-4 CONTROL BOTH COIN CHUTES.

III. SOLAR RIDE
GAME FEATURES (5 BALL)

The top rollovers light in sequence to increase bonus multiplier.

The pop bumpers score 100 points.

Completing drop targets also increases bonus multiplier. Center drop target lights for "special" when other four drop targets are down.

Extra bonus adds 3 to bonus value.

Feature changes for 3 ball operation are:

The pop bumpers score 1000 points.

Extra bonus adds 5 to bonus value.

IV. 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 assembly and on the front door. Turn on the game; if the problem remains, refer to Section VI. (Trouble-shooting).

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 Section III. 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 assembly. 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.

V. BOOKKEEPING FUNCTIONS AND SELF-TESTING

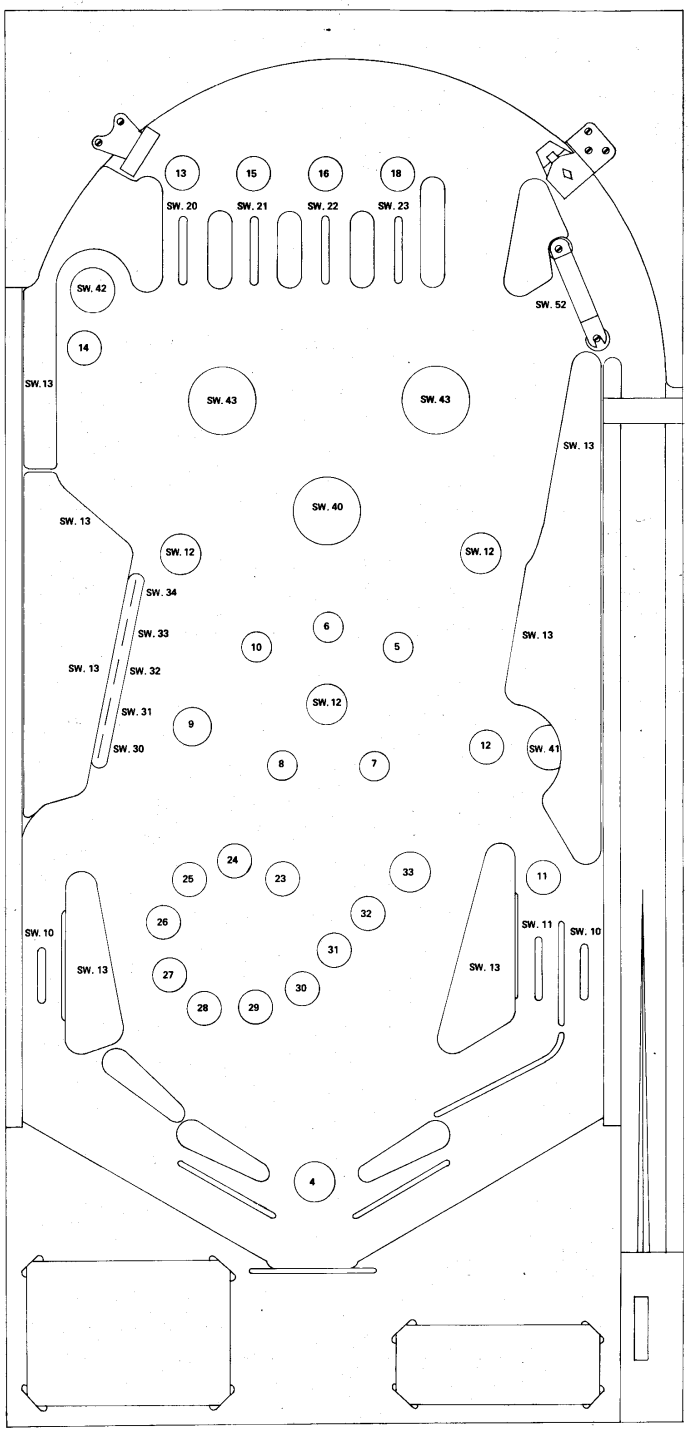
The circuitry in this game helps the operator perform many bookkeeping functions. The information is shown one step at a time on the first player score display while the step number is shown in the credit display. Pressing the button on the inside of the front door (the play/test button) begins the bookkeeping 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.

STEP (Credit Display)	INFORMATION SHOWN (First Player Display)
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 assembly 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.



SWITCH MATRIX AND LAMP LOCATION

SW. MATRIX NUMBER	SWITCHES ON MATRIX SWITCH 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	Left & Right Rollover—(2)
SW. 11	Return Rollover
SW. 12	Rollover Button—(3)
SW. 13	10 Point Switches—(7)
SW. 20	#1 Rollover
SW. 21	#2 Rollover
SW. 22	#3 Rollover
SW. 23	#4 Rollover
SW. 30	#1 Drop Target
SW. 31	#2 Drop Target
SW. 32	#3 Drop Target
SW. 33	#4 Drop Target
SW. 34	#5 Drop Target
SW. 40	Center Pop Bumper
SW. 41	Right Hole
SW. 42	Left Hole
SW. 43	Right & Left Pop Bumper—(2)
SW. 52	Rollunder Gate

CPU CONTROLLED LAMPS

LAMP 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 (Playfield & Lightbox)
5	1X Bonus
6	5X Bonus
7	2X Bonus
8	3X Bonus
9	Special
10	4X Bonus
11	Extra Ball
12	Right Hole
13	#1 Rollover
14	Left Hole
15	#2 Rollover
16	#3 Rollover
18	#4 Rollover
23	1,000 Bonus
24	2,000 Bonus
25	3,000 Bonus
26	4,000 Bonus
27	5,000 Bonus
28	6,000 Bonus
29	7,000 Bonus
30	8,000 Bonus
31	9,000 Bonus
32	10,000 Bonus
33	20,000 Bonus

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
4	Hundreds
5	Thousands
6	Right Hole
7	Left Hole
8	Target Bank Reset

VI. TROUBLE-SHOOTING GUIDE

Trouble-shooting the solid-state pinball game on location includes inspection and repair of the electro-mechanical devices and wiring, and inspection and replacement of printed circuit boards. Repair of printed circuit boards on location, while possible, is best done in a properly equipped shop.

Before replacing the control board (A1) or the driver board (A3), measure the voltages on the power supply (A2) after first disconnecting the two connectors A2J2 and A2J3. Before replacing any printed circuit board, check all connectors, crimp connections, and wire continuity.

WARNING! TURN OFF POWER BEFORE REMOVING ANY WIRE CONNECTORS OR REPLACING ANY PRINTED CIRCUIT BOARDS. ALL CONNECTORS MUST BE RECONNECTED BEFORE TURNING POWER ON AGAIN.

Basic game troubleshooting involves determining that the game powers up 5 seconds after power is turned on. If the 5 second delay does not occur, check the TILT and SLAM (anti-cheat) switches. Cycle the game through the self-test procedures described in SECTION V and observe any malfunctions. Detailed troubleshooting procedures and diagrams are in the Solid-State Pinball Game Service Manual.

VII. 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 ABRADE GOLD-PLATED SWITCH CONTACTS.

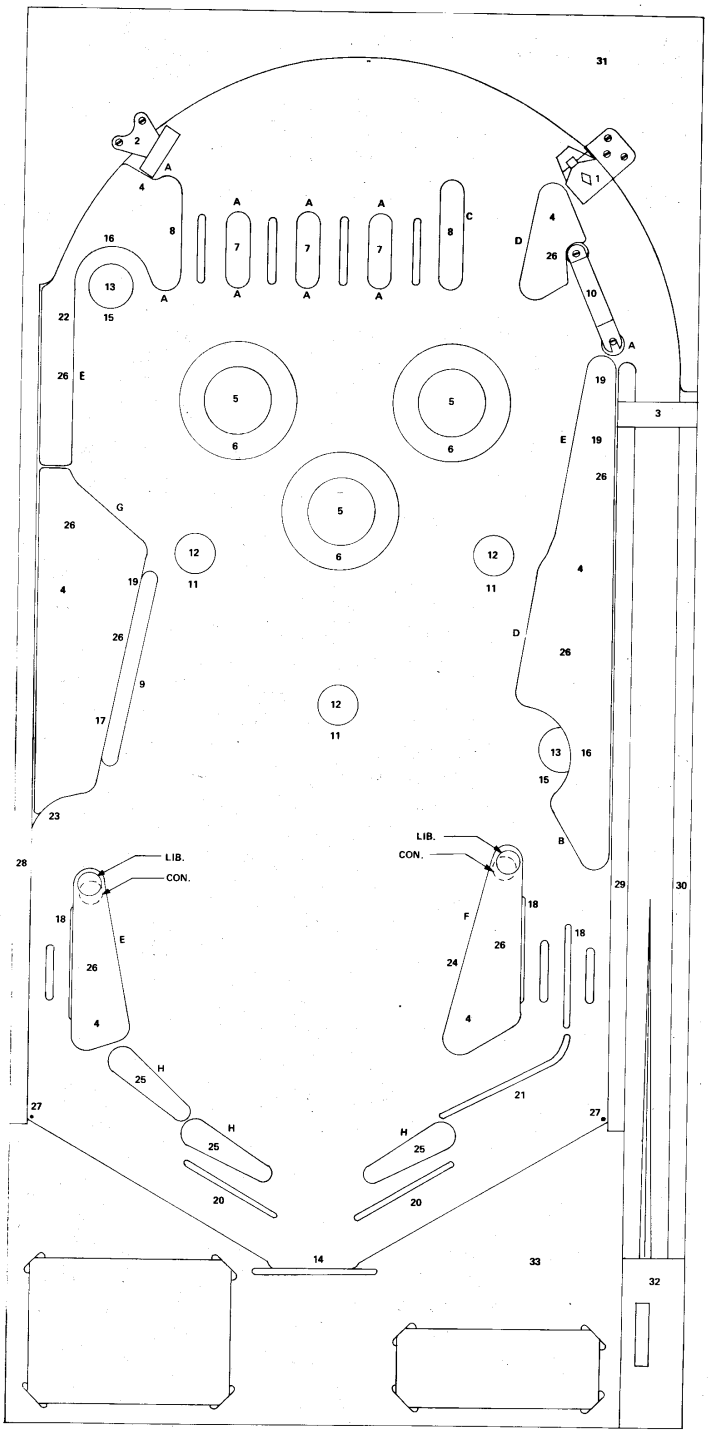
The only switches whose points may be burnished are the pop bumper cup switches, the rubber-actuated switches on kicking rubber units, and the flipper button switches.

VIII. SERVICE AND PARTS

PARTS LIST

A-9430	Plunger Link
A-18354	Assembly Ball Striker Arm
A-18356	Assembly of Track Frame and Studs
B-18358	Ball Return Fence
C-18359	Ball Return Fence
A-18549	Ball Return Plunger
C-18638	Complete Ball Return Unit (Less Fences)
A-18687	Assembly of Plunger and Link
A-18688	Assembly Rollover Wire, Switch and Bracket
A-18702	Assembly of Coil Stop Bracket

NOTE Solar Ride Uses Prom Marked "E"



PLAYBOARD INFORMATION

RUBBER RINGS

A-A-10217	(9) White
B-A-10219	(1) White
C-A-10220	(1) White
D-A-10221	(2) White
E-A-10222	(3) White
F-A-10223	(1) White
G-A-10226	(1) White
H-A-13151	(3) Red

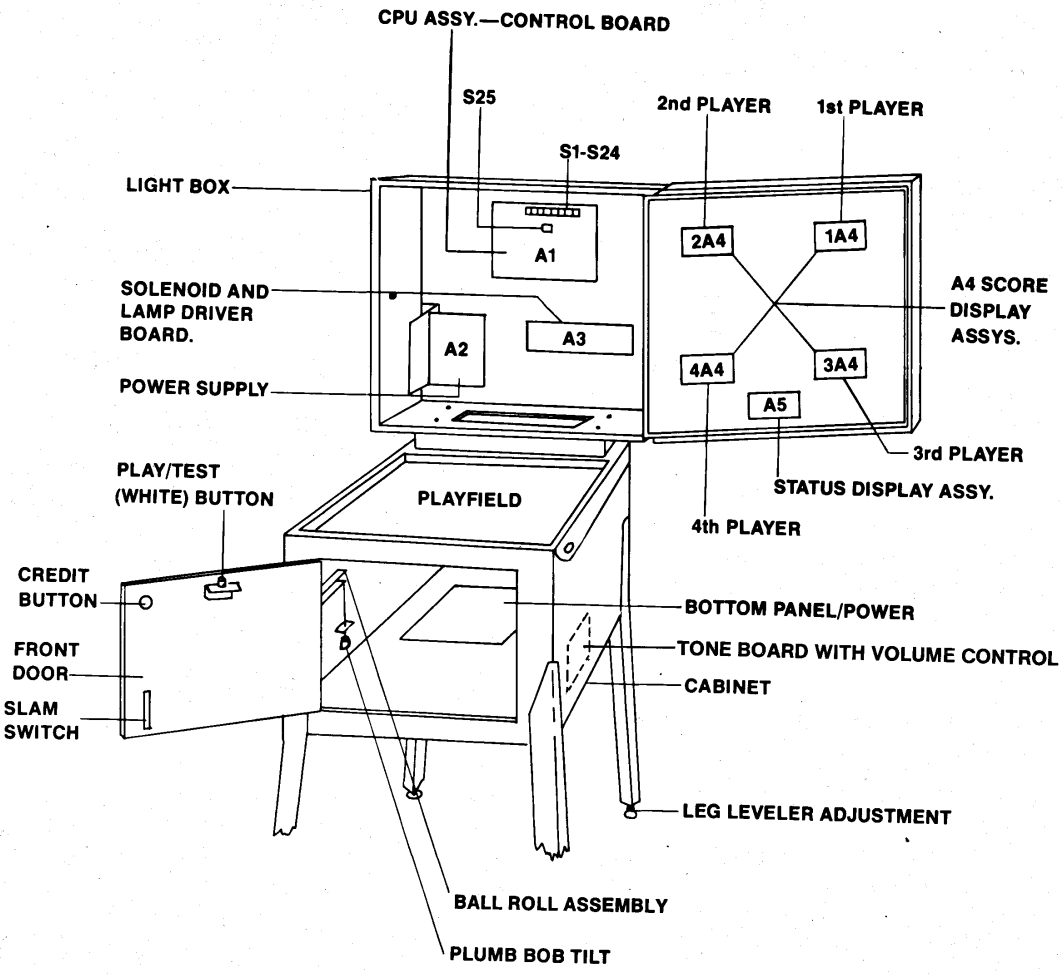
PARTS LIST

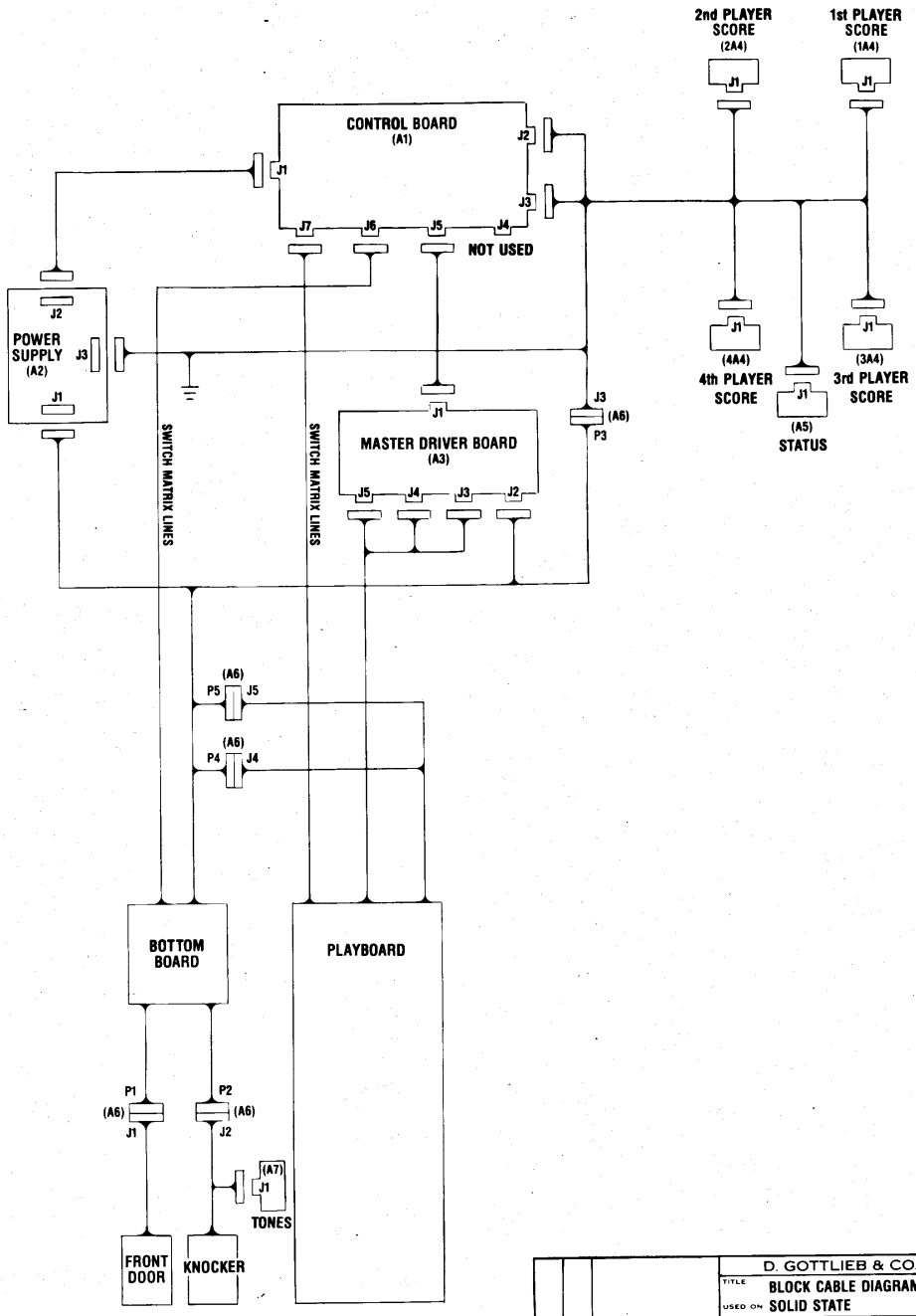
1. A-3290 Ball Gate.
2. A-9143 Ball Rebound Rubber.
3. A-8215 Ball Deflector.
4. C-18124 Plastic Shield Set.
5. Red Pop Bumper A-13904 and A-16838 White Cap Stamped in Blue. — (3)
6. B-8246 Pop Bumper Platter. — (3)
7. A-9394 Red Plastic Guide Rail. — (3)
8. A-9397 White Plastic Guide Rail. — (2)
9. 5 Pos. Drop Target Bank with A-13179, (4-Stamped in Blue) (1-Stamped in White)
10. A-4869 Rollunder Gate Shield.
11. D-11966 Red Rollover Insert. — (3)
12. D-11968 White Rollover Button. — (3)
13. C-15707 Red Hole Base Plate with C-15708 Red Sw. Arm. — (2)
14. C-18638 Ball Return Unit Assembly.
15. A-11151 Metal Hole Liner. — (2)
16. A-5891 Metal Hole Guard. — (2)
17. A-3722 Ball Guide Rail. — (Wire Form) — (1)
18. A-4832 Ball Guide Rail. — (Wire Form) — (3)
19. A-6931 Ball Guide Rail. — (Wire Form) — (3)
20. A-13798 Ball Snubber Rail. — (Wire Form) — (2)
21. A-14571 Ball Guide Rail. — (Wire Form) — (1)
22. A-18070 Ball Guide Rail. — (Wire Form) — (1)
23. A-17960 Metal Flat Rail. — (1)
24. A-15838 Ball Kicking Rubber.
25. C-13150 White Jumbo Flipper. — (3)
26. 4 Penny Finishing Nail. — (8)
27. A-10542 Steel Pin. — (2)
28. C-7393 Wood Rail. — (Left Side)
29. C-9771 Wood Rail. — (Center)
30. C-13977 Wood Rail. — (Right Side)
31. D-4806 Top Arch. (with "F" & "6-7" Pos.)
32. C-9767 Ball Shooter Gage.
33. D-13647-IE Card Holder.

C-11561 White Plastic Post 1" High. — (30)
C-11562 White Plastic Post $1\frac{3}{16}$" High. — (2)

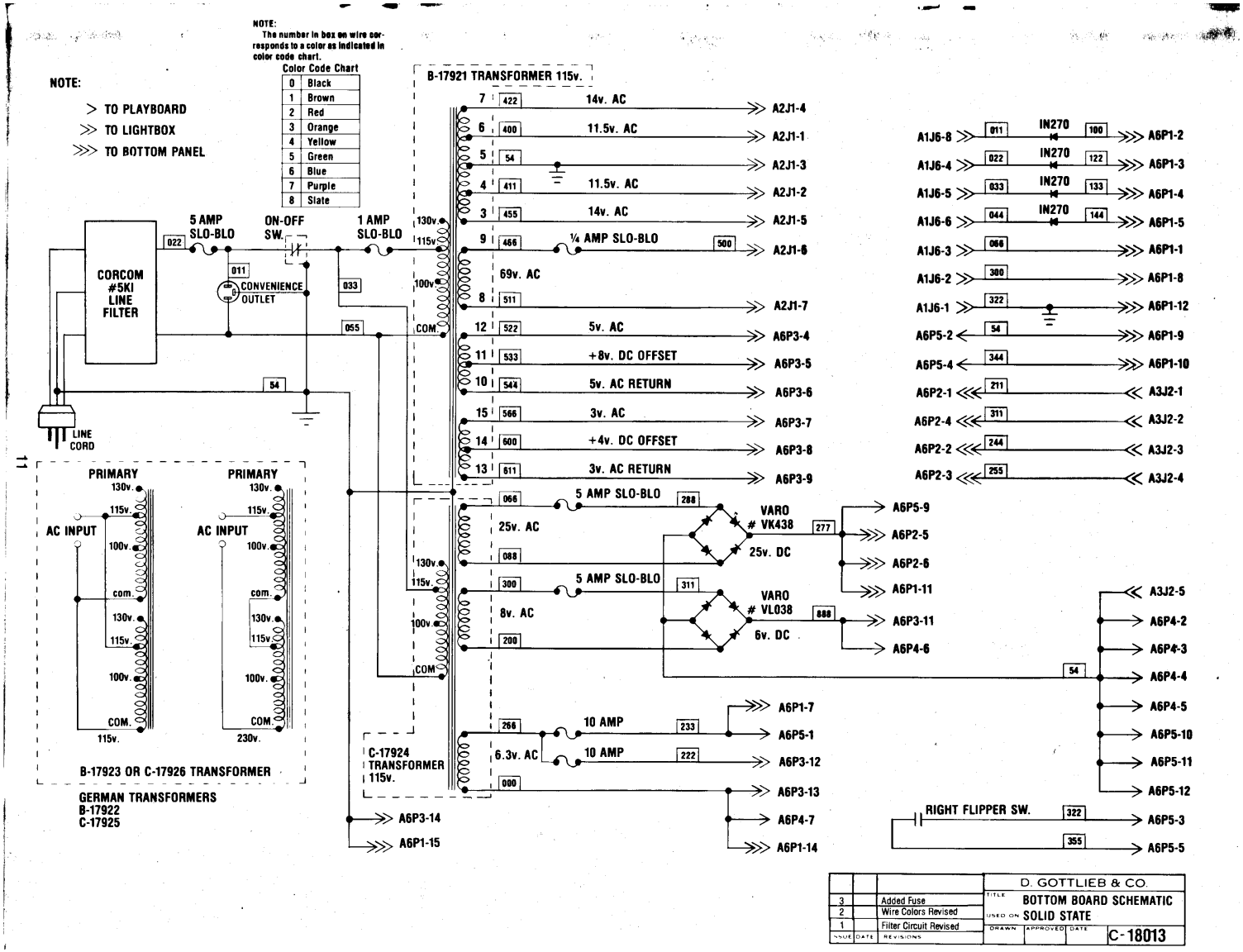
LIB. = LIBERAL
CON. = CONSERVATIVE

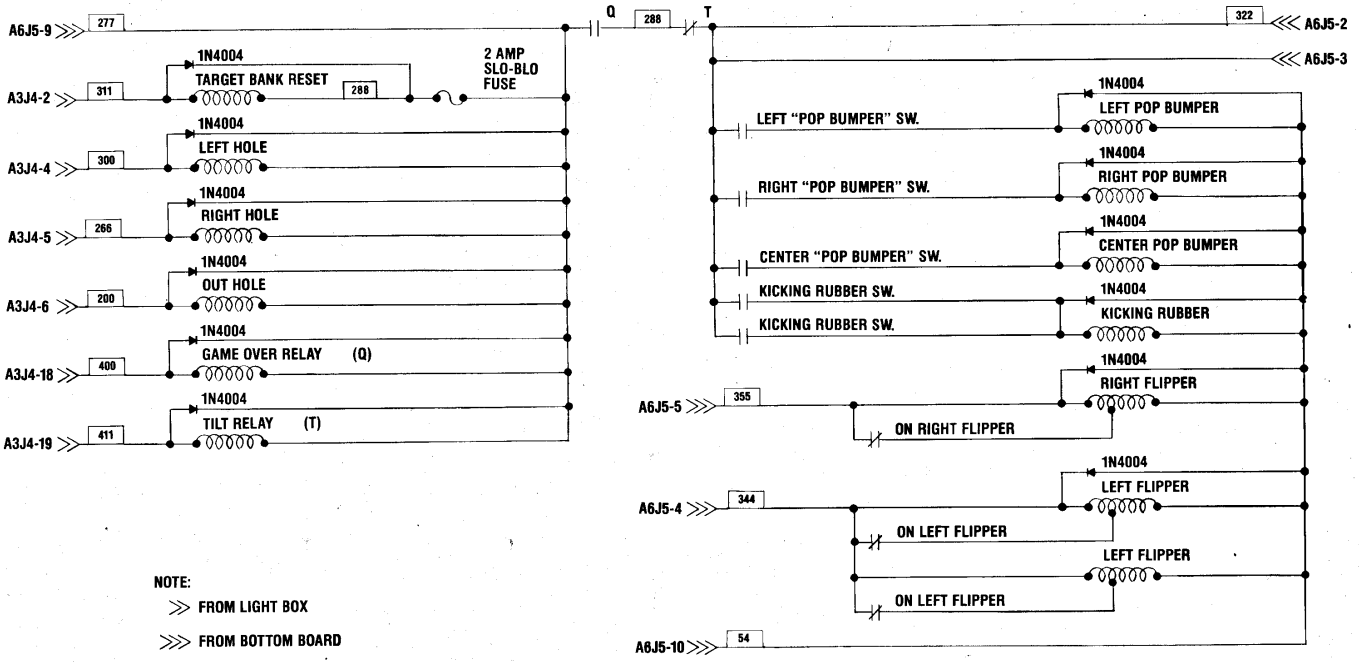
COMPONENT LOCATION DIAGRAM





			D. GOTTLIEB & CO.	
			TITLE: BLOCK CABLE DIAGRAM	
			USED ON: SOLID STATE	
ISSUE	DATE	REVISIONS	DRAWN / APPROVED / DATE	C-18012


NOTE:
The number in box on wire corresponds to a color as indicated in color code chart.
Color Code Chart
0 Black
1 Brown
2 Red
3 Orange
4 Yellow
5 Green
6 Blue
7 Purple
8 Slate
NOTE:
> TO PLAYBOARD
>> TO LIGHTBOX
>>> TO BOTTOM PANEL
B-17921 TRANSFORMER 115v.
CORCOM #5KI LINE FILTER
5 AMP SLO-BLO
ON-OFF SW.
1 AMP SLO-BLO
CONVENIENCE OUTLET
LINE CORD
7 422 14v. AC >> A2J1-4
6 400 11.5v. AC >> A2J1-1
5 54 >> A2J1-3
4 411 11.5v. AC >> A2J1-2
3 455 14v. AC >> A2J1-5
9 466 ¼ AMP SLO-BLO 500 >> A2J1-6
69v. AC
8 511 >> A2J1-7
12 522 5v. AC >> A6P3-4
11 533 +8v. DC OFFSET >> A6P3-5
10 548 5v. AC RETURN >> A6P3-6
15 566 3v. AC >> A6P3-7
14 600 +4v. DC OFFSET >> A6P3-8
13 611 3v. AC RETURN >> A6P3-9
066 5 AMP SLO-BLO 288
25v. AC
088
VARO # VK438
277
25v. DC
>> A6P5-9
>> A6P2-5
>> A6P2-6
>> A6P1-11
300 5 AMP SLO-BLO 311
8v. AC
200
VARO # VL038
888
6v. DC
>> A6P3-11
>> A6P4-6
266 10 AMP 233 >> A6P1-7
6.3v. AC
10 AMP 222 >> A6P5-1
>> A6P3-12
000 >> A6P3-13
>> A6P4-7
>> A6P1-14
>> A6P3-14
>> A6P1-15
A1J6-8 011 IN270 100 >>> A6P1-2
A1J6-4 022 IN270 122 >>> A6P1-3
A1J6-5 033 IN270 133 >>> A6P1-4
A1J6-6 044 IN270 144 >>> A6P1-5
A1J6-3 066 >>> A6P1-1
A1J6-2 300 >>> A6P1-8
A1J6-1 322 >>> A6P1-12
A6P5-2 54 >>> A6P1-9
A6P5-4 344 >>> A6P1-10
A6P2-1 211 << A3J2-1
A6P2-4 311 << A3J2-2
A6P2-2 244 << A3J2-3
A6P2-3 255 << A3J2-4
54
>> A3J2-5
>> A6P4-2
>> A6P4-3
>> A6P4-4
>> A6P4-5
>> A6P5-10
>> A6P5-11
>> A6P5-12
RIGHT FLIPPER SW. 322 >> A6P5-3
355 >> A6P5-5
PRIMARY
AC INPUT
130v.
115v.
100v.
com.
130v.
115v.
100v.
COM.
115v.
PRIMARY
AC INPUT
130v.
115v.
100v.
com.
130v.
115v.
100v.
COM.
230v.
B-17923 OR C-17926 TRANSFORMER
GERMAN TRANSFORMERS
B-17922
C-17925
C-17924 TRANSFORMER 115v.
D. GOTTLIEB & CO.
TITLE BOTTOM BOARD SCHEMATIC
USED ON SOLID STATE
DRAWN APPROVED DATE
C-18013
3 Added Fuse
2 Wire Colors Revised
1 Filter Circuit Revised
ISSUE DATE REVISIONS



NOTE:

≫ FROM LIGHT BOX

⋙ FROM BOTTOM BOARD

COILS USED

PART NO.	DESCRIPTION
A-1496	POP BUMPER COILS
A-5194	KICKING RUBBER COIL
A-16570	LEFT HOLE COIL
A-5195	RIGHT HOLE COIL
A-16570	OUT HOLE COIL
A-16890	GAME OVER RELAY COIL (Q)
A-16890	TILT RELAY COIL (T)
A-17875	FLIPPER COILS
A-17891	TARGET BANK RESET COIL

NOTE:
The number in box on wire corresponds to a color as indicated in color code chart.

Color Code Chart

0	Black
1	Brown
2	Red
3	Orange
4	Yellow
5	Green
6	Blue
7	Purple
8	Slate
9	White

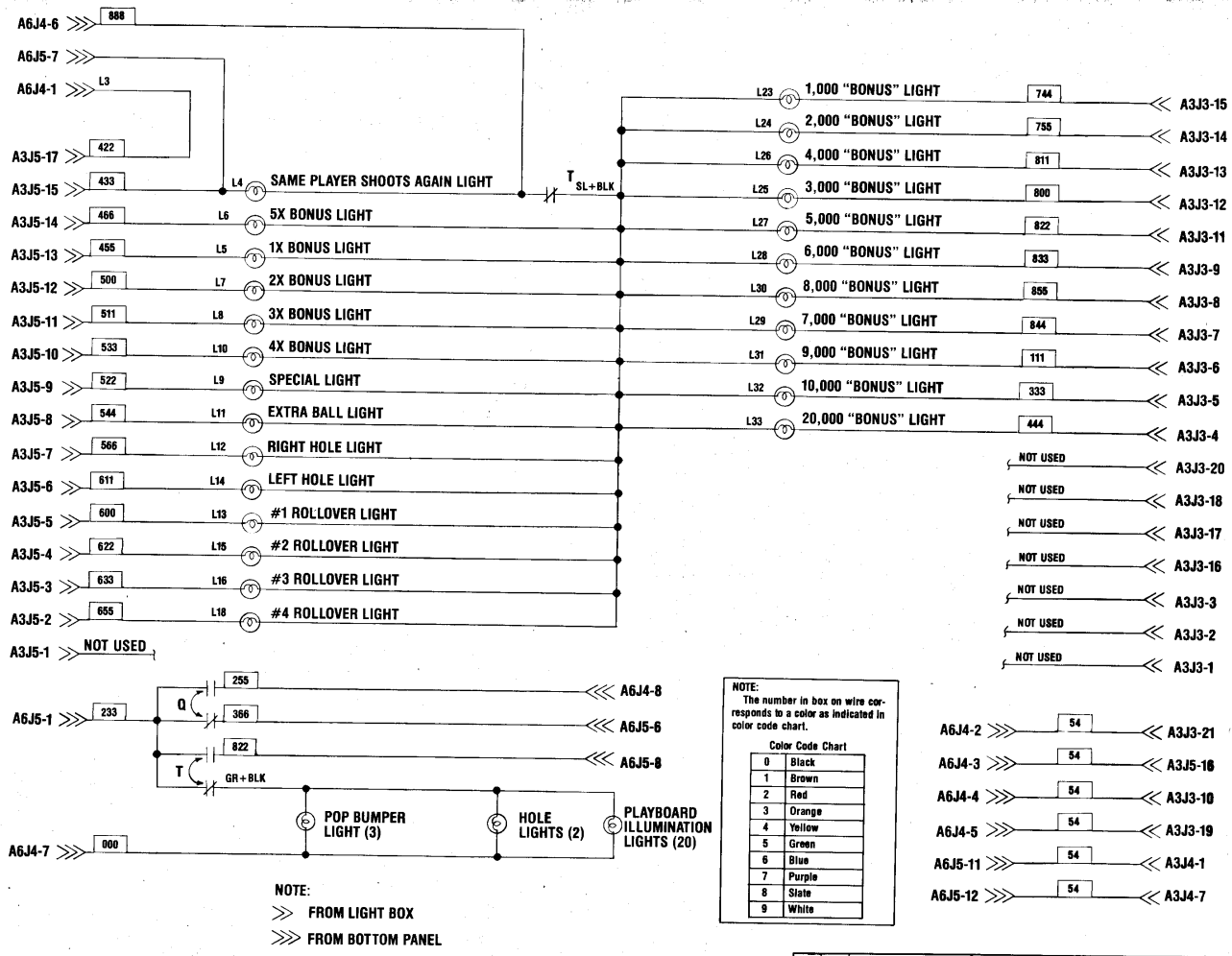
ISSUE	DATE	REVISIONS

D. GOTTLIEB & CO.

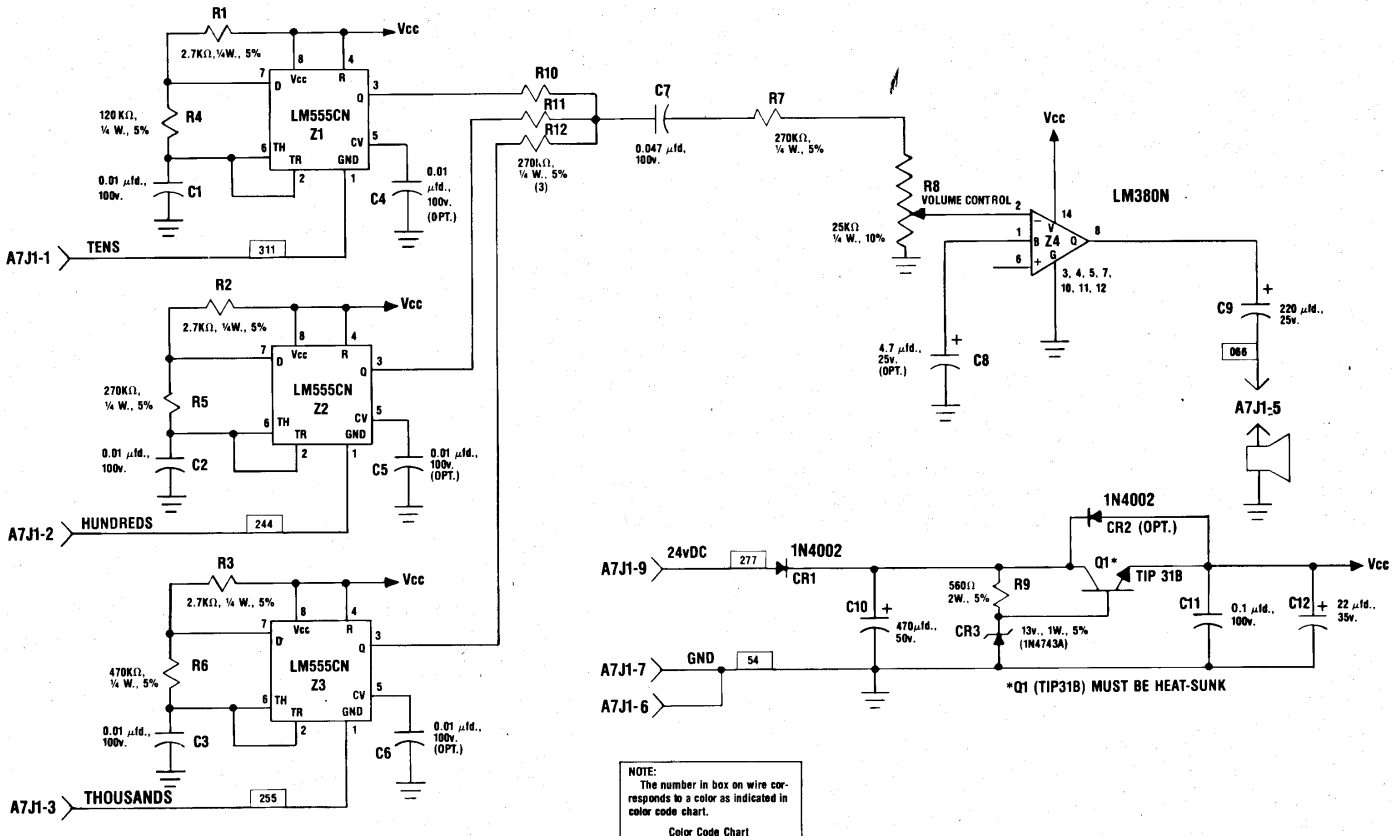
TITLE: PLAYBOARD SOLENOIDS

USED ON: SOLAR RIDE #421SS

DRAWN | APPROVED | DATE | C-18646



ISSUE	DATE	REVISIONS	D. GOTTLIEB & CO.			
			TITLE: PLAYBOARD ILLUMINATION			
			USED ON: SOLAR RIDE #421SS			
			DRAWN	APPROVED	DATE	C-18647



NOTE:
The number in box on wire corresponds to a color as indicated in color code chart.

Color Code Chart

0	Black
1	Brown
2	Red
3	Orange
4	Yellow
5	Green
6	Blue
7	Purple
8	Slate
9	White

ISSUE	DATE	REVISIONS
1	6-78	Added Colors

D. GOTTLIEB & CO.

TITLE: SYNTHESIZED TONES

USED ON

DRAWN | APPROVED | DATE

B-18555-1

Copyright © 1978
D. Gottlieb & Co.
All Rights Reserved
Printed in U.S.A.