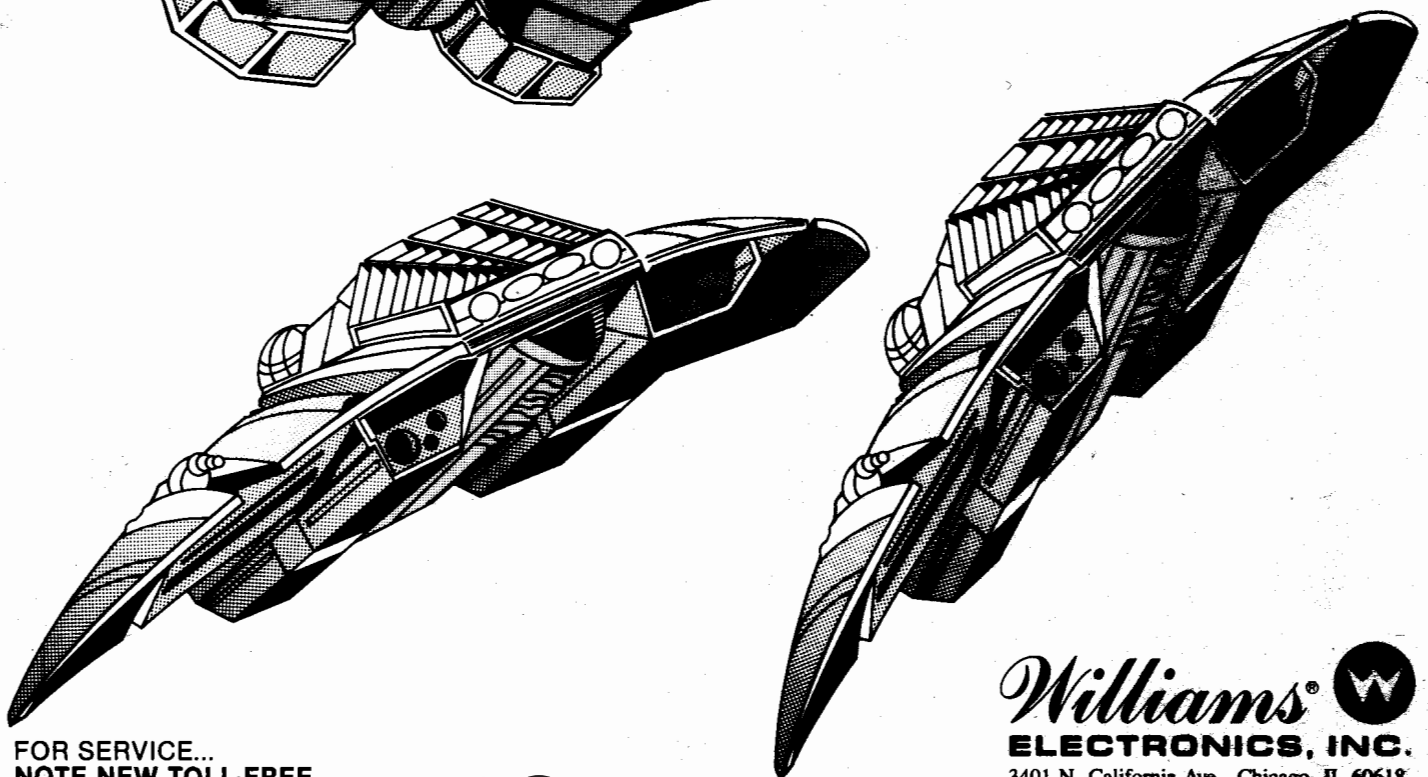
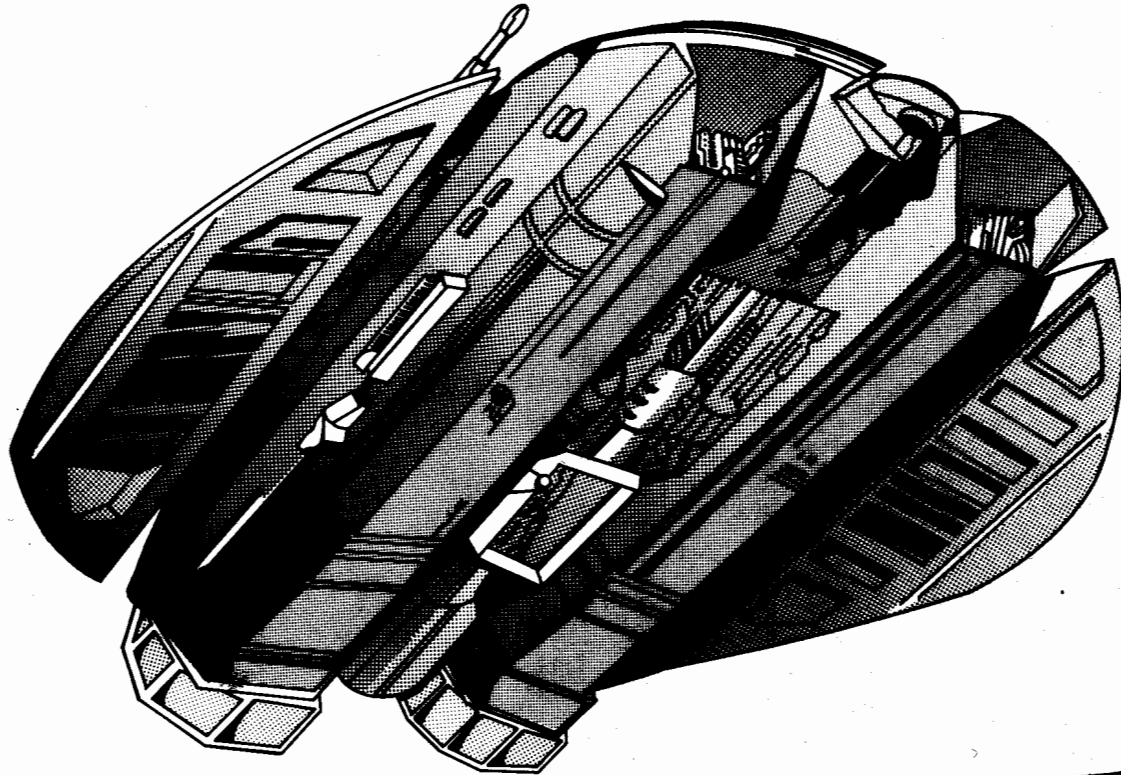


Williams[®]

168-507-101
Game No. 507
July, 1981

SOLAR FIRE



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FOREWORD

This instruction and drawing set provides essential installation information unique to SOLAR FIRE. For game operation, bookkeeping, game adjustment, diagnostic and self-test and basic troubleshooting procedures, refer to the instruction booklet located in the envelope inside the coin door. For detailed troubleshooting and interconnection information, refer to Williams Solid State Flipper Maintenance Manual and Supplements.

SPECIAL CONSIDERATIONS WHEN REPLACING CIRCUIT BOARDS

CPU Board

1. Revision level 7 CPU Boards (batteries located on lower left corner at board) of later boards must be used.
2. Must be equipped with blue-labeled Flipper ROMs and blue-labeled Game ROMs.
3. Jumpers W3, W10, W11, W14, W17, W19, W20, and W22 must be connected. Jumpers W4, W9, W12, W15, W16, W18, W21, and W23 must be removed. With the exception of W25, (Factory Setting Jumper) all other jumpers are not changed.

Driver Board

Must be equipped with zero-ohm resistors or wire jumpers (W9-W16) in place of switch matrix drive series resistors R204-R211.

Sound Board

Must be jumpered for ROM operation and be equipped with Sound ROM 7. (Jumpers W3, W5, W7, W9, W10, W12, and W15 connected; W2, W4, W6, W8, W11, and W13 removed).

Power Supply Board

1. Model D 8345 board required (equipped with relay).
2. Fuse F4 (20A SB) for flipper solenoids and magnets must be installed.

Display Boards

Model C 8363 Master Display and 7-digit Slave Displays required.

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Assembly and Interconnection

With legs attached to cabinet and backbox positioned face-down on top of cabinet with the opening facing the rear of the cabinet proceed as follows:

- A. Pull five cables from backbox.
- B. Reach into right side of pedestal hole, pull up ground strap, and push it into backbox.
- C. Remove ties securing cabinet and playfield cables to cabinet and pull up these cables.
- D. Interconnect five cables. They are size and color coded.
- E. Insert line cord into notch in cabinet. DO NOT PLUG IN AT THIS TIME.
- F. Push remote volume control cable, White-Red solenoid ground cable, and transformer cable (terminated with four plugs) into backbox.
- G. Lift up backbox and position on cabinet pedestal, engaging brackets for support.
- H. Remove shipping blocks from insert door.
- I. Secure backbox to cabinet using two bolts and washers.
- J. Connect ground braid and White-Red wires under wing nut and washer at bottom of backbox.
- K. Loosely position remote volume cable and Sound Board power cable in harness and plug connector into 10J4 and 10J1, respectively.
- L. Connect bridge rectifier connector 6P1/6J1, and plug remaining two transformer connections into 3J1 and 3J9 on the Power Supply Board.

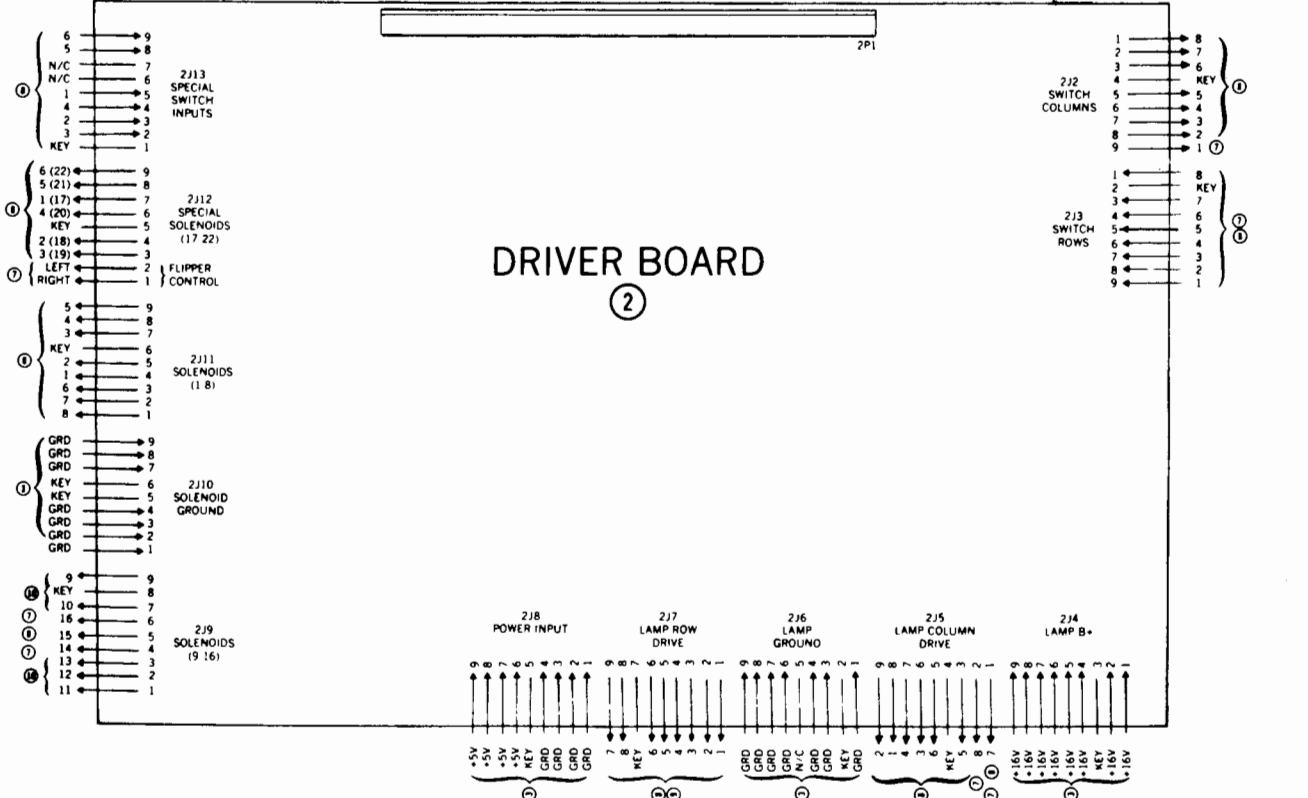
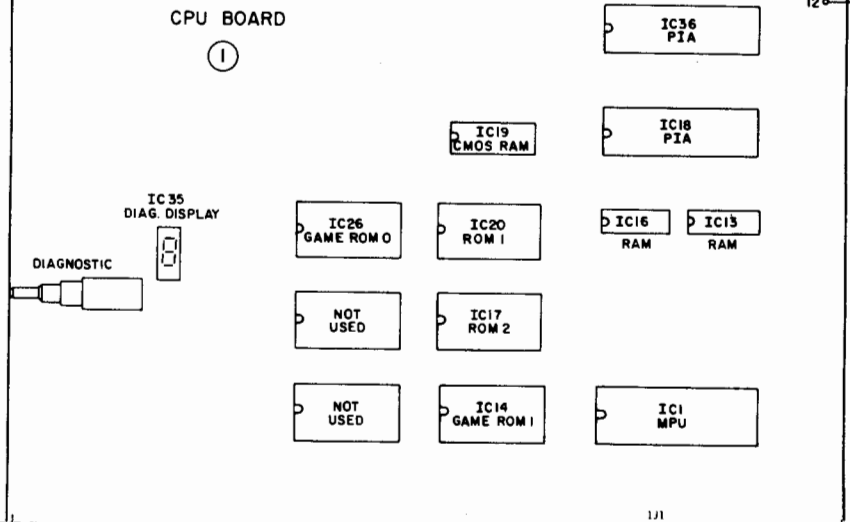
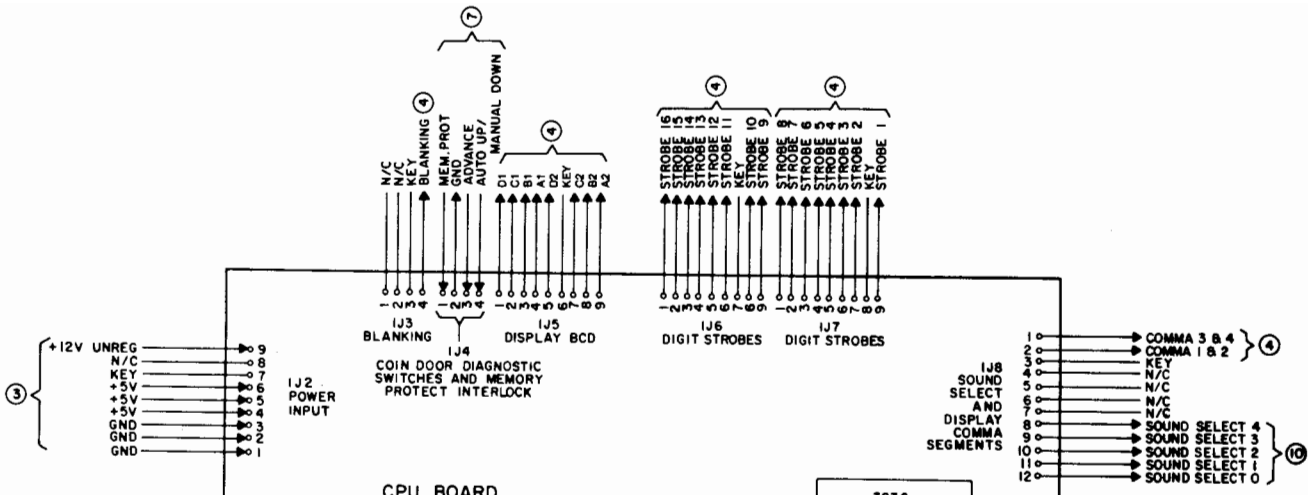
Inspection

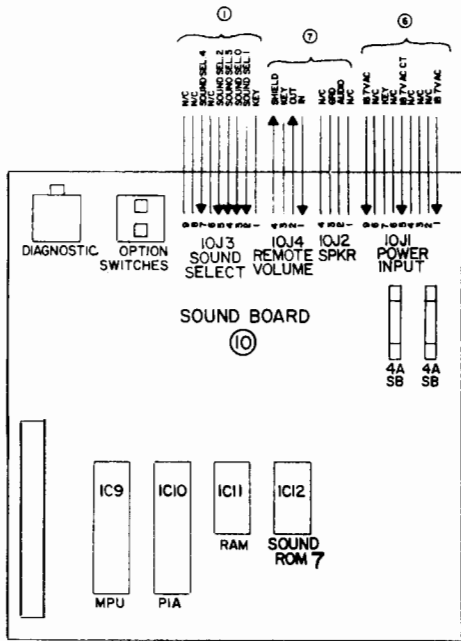
- A. Check all connectors in backbox for loose wire termination. Reseat any loose wires by pushing in on the terminal.
- B. Push on all connectors attached to Master Display, CPU, Driver, and Sound Boards, and check terminations on capacitor and bridge rectifier at the lower right of the backbox.
- C. Gently press on all the socketed IC packages on the CPU and Sound Boards.
- D. Check that two fuses on the Sound Board, seven fuses on Power Supply Board, and two fuses on Insert Board are secure.
- E. Push on the connector attached to Slave Display Boards.
- F. Check that the line fuse in the bottom of the cabinet is secure.
- G. Check the transformer input connector in bottom of cabinet for loose wire termination. Reseat any loose wires by pushing in on the termination.
- H. Check the cabinet to coin door connector for loose wire termination. Reseat any loose wires by pushing in on the termination.

Power Turn-On and Game Setup

This machine MUST BE PLUGGED INTO A PROPERLY GROUNDED OUTLET to PREVENT SHOCK HAZARD to ensure PROPER GAME OPERATION. DO NOT use a "cheater" plug to defeat the ground pin on the line cord, and DO NOT cut off the ground pin. The line voltage MUST agree with that specified on the back of the cabinet or serious damage to the machine could occur. For low-line applications (105 or 210V ac), refer to the power wiring diagram.

1. With the coin door closed, plug the game in and turn it ON. The game should come on in the game over mode as indicated by the player 1 score reading zero, game over lights lit, and the high score to date alternating with the player scores.
2. If the game comes on in the diagnostic mode (number of credits display showing 04, ball in play display showing 00, and player 1 display showing game identification) turn the game OFF and ON again.
 - a. If the game now comes on in the game over mode the bookkeeping and game evaluation totals have been reset to zero.
 - b. If the game still comes on in the diagnostic mode, open the coin door and turn the game OFF, and ON twice. This is an indication of the batteries being removed with the power OFF or coming loose during shipment. This has also resulted in features reverting to factory settings. Any changes from factory settings must be reentered using procedures provided in the instruction booklet.
3. If the game still comes on in the diagnostic mode, refer to troubleshooting procedures in the maintenance manual.
4. Lift plastic at the left of the right ramp and insert captive ball through opening underneath. Place three balls on playfield next to outhole.
5. Perform diagnostic tests and make any desired changes to features as described in the instruction booklet.



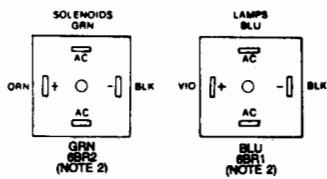
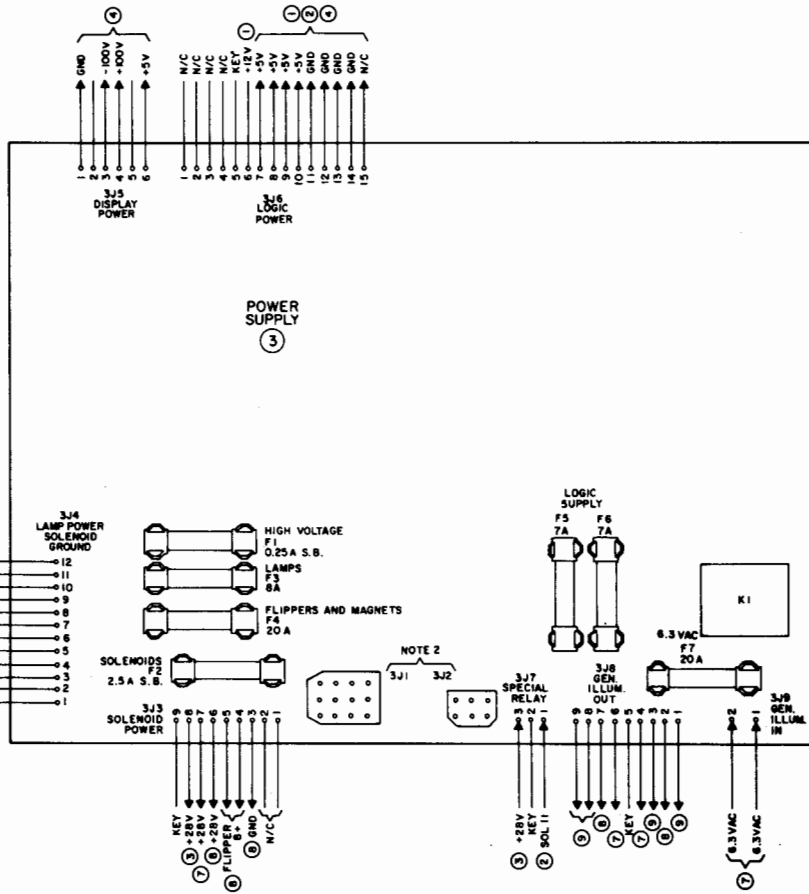


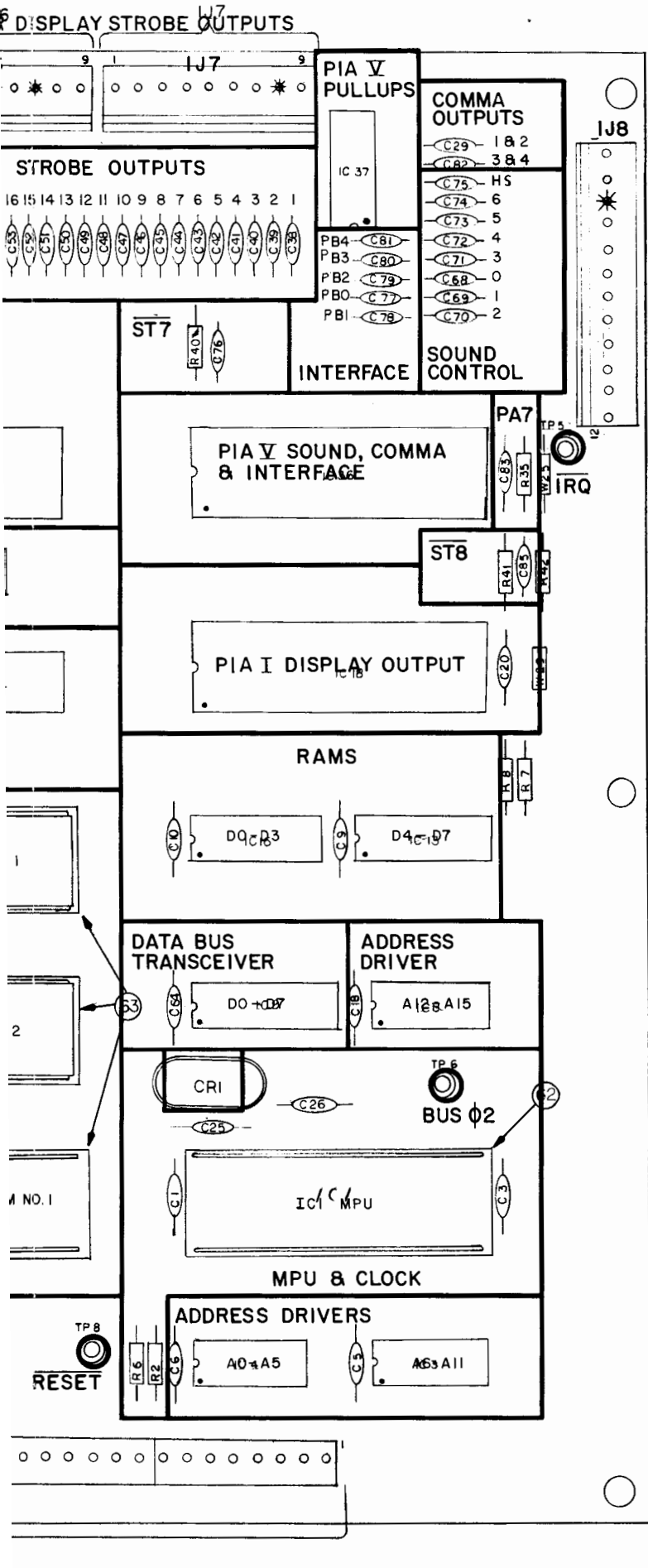
NOTES:

1. CONNECTIONS ARE INDICATED BY CIRCLED NUMBERS AS FOLLOWS:

- ① CPU BOARD
- ② DRIVER BOARD
- ③ POWER SUPPLY BOARD
- ④ MASTER DISPLAY BOARD
- ⑤ SLAVE DISPLAY BOARD
- ⑥ BACKBOX
- ⑦ CABINET
- ⑧ PLAYFIELD
- ⑨ INSERT BOARD
- ⑩ SOUND BOARD
- ⑪ NOT ASSIGNED

2. REFER TO POWER WIRING DIAGRAM FOR CONNECTIONS TO 3P1.

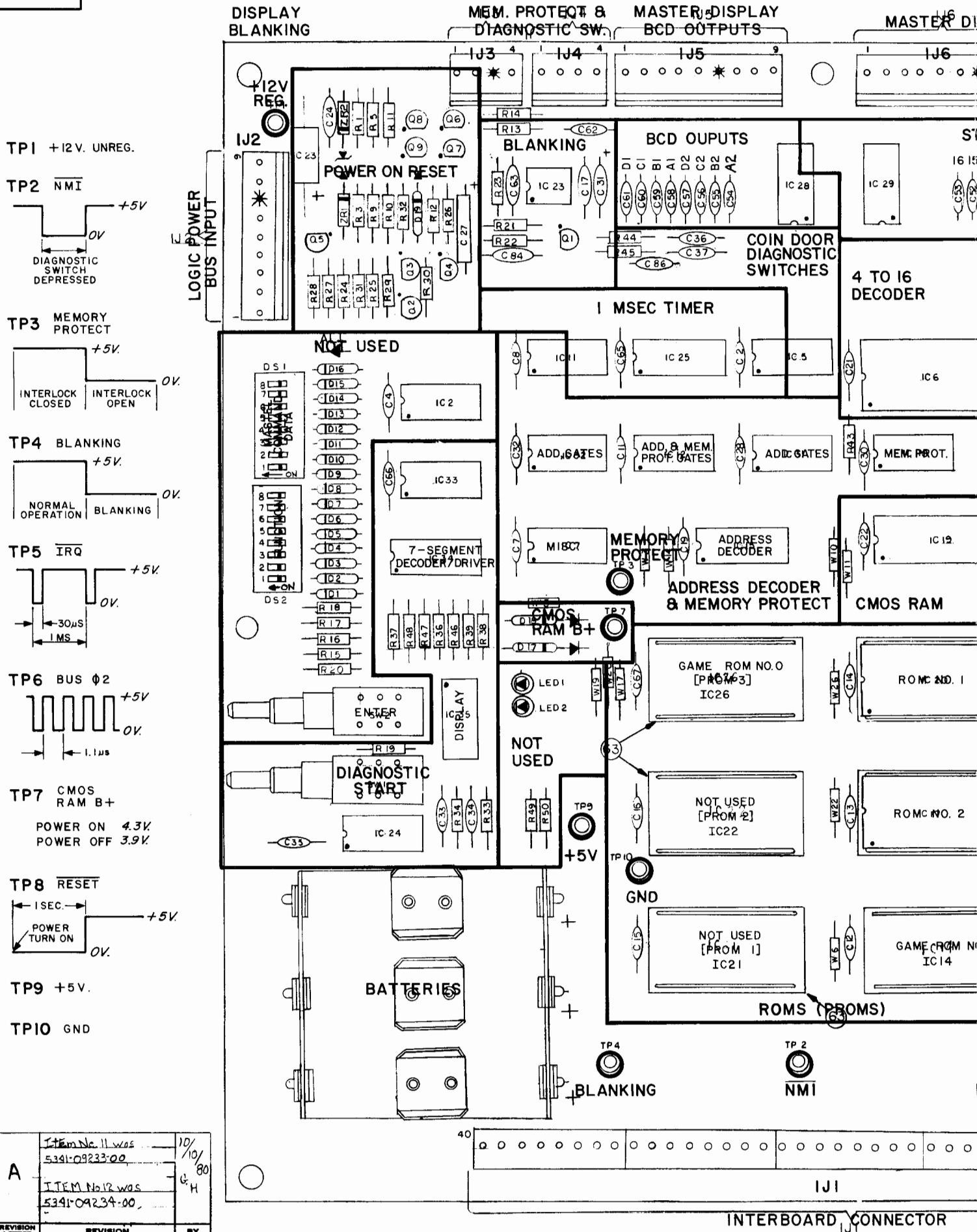




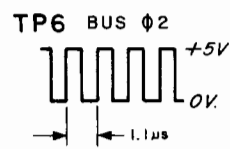
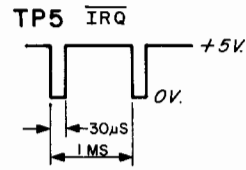
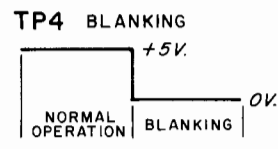
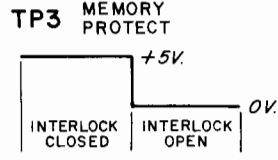
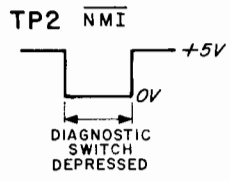
BILL OF MATERIAL				
ITEM NO.	PART NO.	PART DESIGNATION	DESCRIPTION	REQD. QTY.
1	5764-09465-XO	IC2	BARE PC. BOARD CPU	1
2	5280-09408-XO	IC2	74125 HEX TRISTATE BUFFER	1
3	5370-08999-00	IC3,IC4,IC8	8T97 HEX TRISTATE BUFFER	3
4	5281-09308-XO	IC9	74LS245 OCTAL BUFFER	1
5	5280-09010-00	IC6	74154 4 TO 16 DECODER	1
6	5280-09013-00	IC7	7404 HEX INVERTER	1
7	5281-09235-00	IC11	74LS10 TRIPPLE 3 INVERTER	1
8	5280-08973-00	IC12	7408 QUAD AND	1
9	5340-09409-XO	IC13,IC16	2114-45 1K X4 STATIC RAM	2
10	5281-09246-00	IC15	74LS139 DUAL 2 TO 4 LINE DECODER	1
11	5341-09553-00	IC20	ROM 2K X8 LOWER	1
12	5341-09554-00	IC17	ROM 4K X8 UPPER	1
13	5430-08972-00	IC18,IC36	MG6821 PIA	2
14	5340-09017-00	IC19	MC 5101 CMOS RAM	1
15	5431-09449-00	IC23	MC 1455 PI TIMER	1
16	5280-09073-00	IC24,IC32,IC33	7400 QUAD 2 INPUT NAND	3
17	5310-09236-00	IC25	4020 CMOS 14 BIT COUNTER	1
18	5310-09237-00	IC10	4071 CMOS QUAD 2 INPUT NOR	1
19	5281-09247-00	IC5,IC31	74LS02 QUAD 2 INPUT NOR	2
20	5280-09407-XO	IC34	7447 BCD TO 7 SEG LED DISP	1
21	5671-09411-00	IC35	MAN 72A 7 SEG LED DISP	1
22	5019-09238-00	IC28,IC29	13 DIP RES./PACK 4.7K OHM	2
23	5019-09223-00	IC37	15 DIP RES./PACK 10K OHM	1
24	5645-09025-00	DS1,DS2	8 STD DIP SWITCHES	2
25	5075-09018-00	ZR1	IN5996 ZENER DIODE 6.8V	1
26	5075-09059-00	ZR2	IN5990 ZENER DIODE 3.9V	1
27	5070-08919-00	D1-D17,D19	1N4148 DIODE	18
28	5160-08938-00	Q3-Q9	2N4401 NPN TRANSISTOR	7
29	5190-09016-00	Q1,Q2	2N4403 PNP TRANSISTOR	2
30	5070-09266-00	D18	1N5817 DIODE	1
31	5520-09020-00	CR1	CRYSTAL 3.58 MHZ	1
32	5010-09358-00	R5,R9,R20	RESISTOR FC 1K OHM 5% 1/4W	3
33	5010-08983-00	R2,R6-R8,R21,R28	RESISTOR FC 3.3K OHM 5% 1/4W	6
34	5010-08991-00	R13-R18,R29,R33-R35,R40,R42	RESISTOR FC 4.7K OHM 5% 1/4W	13
35	5010-09086-00	R22	RESISTOR FC 6.8K OHM 5% 1/4W	1
36	5010-09036-00	R19,R30	RESISTOR FC 100 OHM 5% 1/4W	2
37	5010-09187-00	R36-R39,R46-R50	RESISTOR FC 150 OHM 5% 1/4W	9
38	5010-09113-00	R23,R26	RESISTOR FC 33K OHM 5% 1/4W	2
39	5010-09034-00	R1,R3	RESISTOR FC 10K OHM 5% 1/4W	2
40	5010-09241-00	R25,R32,R10,R11	RESISTOR FC 22K OHM 5% 1/4W	4
41	5010-08998-00	R27	RESISTOR FC 2.2K OHM 5% 1/4W	1
42	5010-09039-00	R12	RESISTOR FC 10 OHM 5% 1/4W	1
43	5010-09442-00	R43	RESISTOR FC 330K OHM 5% 1/4W	1
44	5010-08997-00	R24,R31	RESISTOR FC 2.7K OHM 5% 1/4W	2
45	5010-09083-00	R44,R45	RESISTOR FC 470 OHM 5% 1/4W	2
46	5043-08980-00	C1-C22,C28,C30,C32-C37,C63-C67,C83	CAPACITOR CERAMIC 101MFD 50V	36
47	5040-08986-00	C23	CAPACITOR ELECT. 100MFD 10V	1
48	5043-08996-00	C24	CAPACITOR CERAMIC 1MFD 50V	1
49	5043-09169-00	C25,C26	CAPACITOR CERAMIC 27PFD 1KV	2
50	5041-09243-00	C27	CAPACITOR TANT. 10 MFD 10V	1
51	5041-09031-00	C31	CAPACITOR TANT. 1MFD 25V	1
52	5043-09030-00	C84	CAPACITOR CERAMIC .047MFD 50V	1
53	5043-09065-00	C29,C38,C62,C65,C82,C85,C86	CAPACITOR CERAMIC 470PFD 50V	43
54	5671-09019-00	LED1,LED2	LED RED	2
55	SEE NOTE	SW1,SW2	SWITCH MOMENTARY	2
56	5881-09021-00		BATTERY HOLDER #171	1
57	5791-09026-00	U1	HEADER 09-64-1083 8 PIN	5
58	5791-09028-00	U3,U4	HEADER 09-65-1041 4 PIN	2
59				
60	5791-09027-00	U2,U5-U7	HEADER 09-65-1091 9 PIN	4
61	5791-09043-00	U8	HEADER 09-65-1121 12 PIN	1
62	5700-08985-00		40 PIN IC SOCKET	1
63	5700-09004-00		24 PIN IC SOCKET	6
64	5010-09534-00	W3,W5,W8,W10,W11,W14,W17,W19,W20,W25,W26,W29,W22	RESISTOR FC 0 OHM 1/4W	13
65	5824-09248-00	TP1-TPI0	TEST TERMINALS #1502-1	10

NOTE: USE EITHER 5641-09312-00, 5641-09024-00 OR 5641-09371-00

TOLERANCES		QTY.	ASSEMBLE ON
UNLESS OTHERWISE SPECIFIED			
FRACTIONAL	±.015"		
DECIMAL	±.0005 - .0008"		
HOLE DIA.	+.0008 - .0010"		
ANGULAR	±1/8°		
CONCENTRICITY	±.001" DIA.		
SCREW THREADS	CLASS 2		
WILLIAMS ELECTRONICS, INC.		3401 N. CALIFORNIA CHICAGO, ILL. 60618 267-2240	
NAME		PIN BALL CPU SUB-ASSEMBLY	
MATERIAL	HEAT TREATMENT	FINISH	
DWN. G.HOBBS	DATE 9-20-80	APP'D.	SCALE D-8342

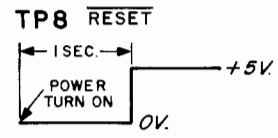


TP1 +12V. UNREG.



TP7 CMOS RAM B+

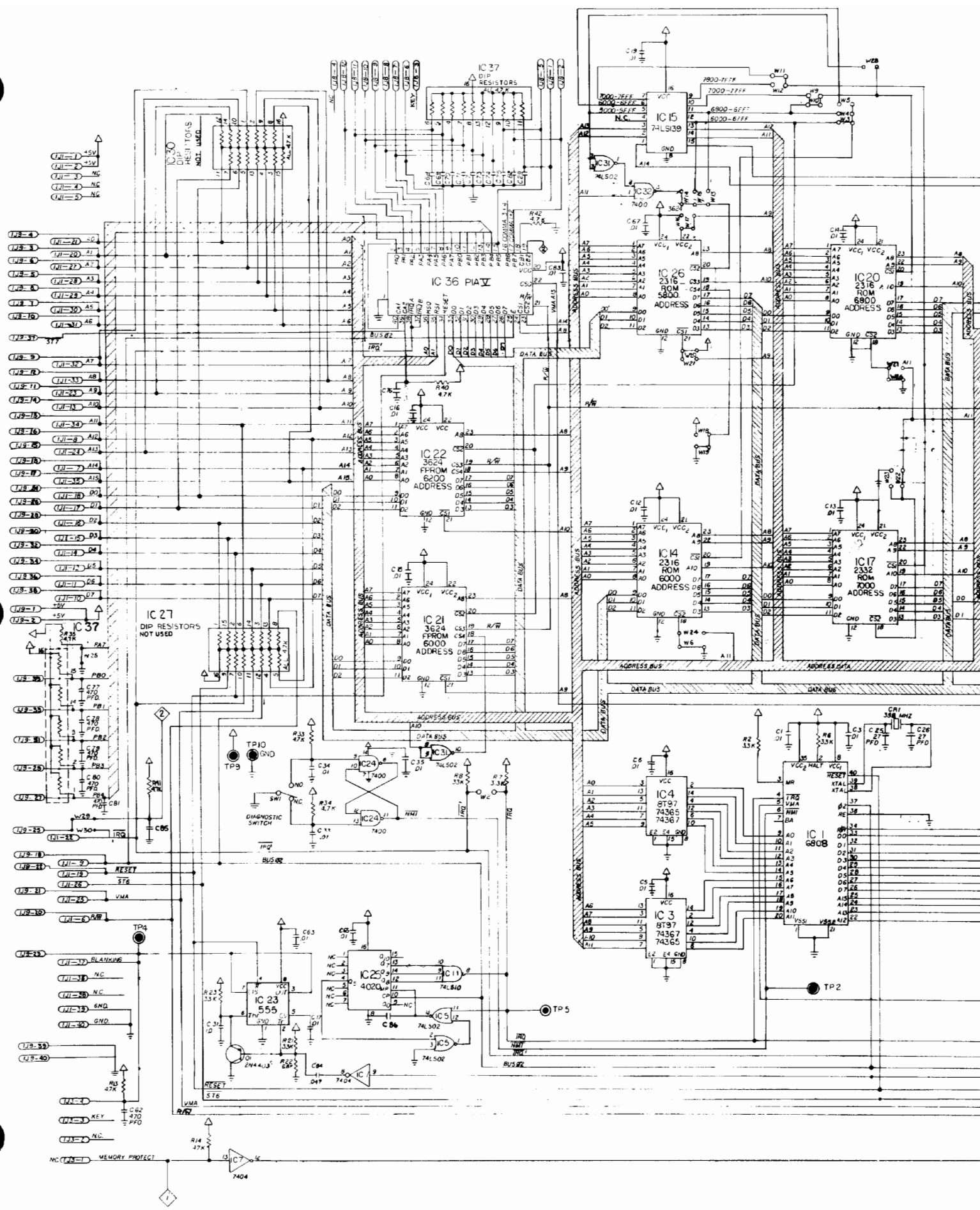
POWER ON 4.3V
POWER OFF 3.9V



TP9 +5V.

TP10 GND

A	ITEM No. 11 was	10/10/80
	5341-09233-00	
A	ITEM No. 12 was	G.H
	5341-09234-00	
REVISION LETTER	REVISION	BY



- U1-1 - +5V
- U1-2 - +5V
- U1-3 - NC
- U1-4 - NC
- U1-5 - NC

- U2-4 (U1-21) - D0
- U2-5 (U1-20) - A1
- U2-6 (U1-22) - A2
- U2-7 (U1-28) - A3
- U2-8 (U1-23) - A4
- U2-9 (U1-30) - A5
- U2-10 (U1-31) - A6
- U2-11 (U1-32) - A7
- U2-12 (U1-33) - A8
- U2-13 (U1-24) - A9
- U2-14 (U1-34) - A10
- U2-15 (U1-35) - A11
- U2-16 (U1-8) - A12
- U2-17 (U1-25) - A13
- U2-18 (U1-7) - A14
- U2-19 (U1-36) - A15
- U2-20 (U1-18) - D1
- U2-21 (U1-17) - D2
- U2-22 (U1-16) - D3
- U2-23 (U1-15) - D4
- U2-24 (U1-12) - D5
- U2-25 (U1-11) - D6
- U2-26 (U1-10) - D7
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IC 27
DIP RESISTORS
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IC 23
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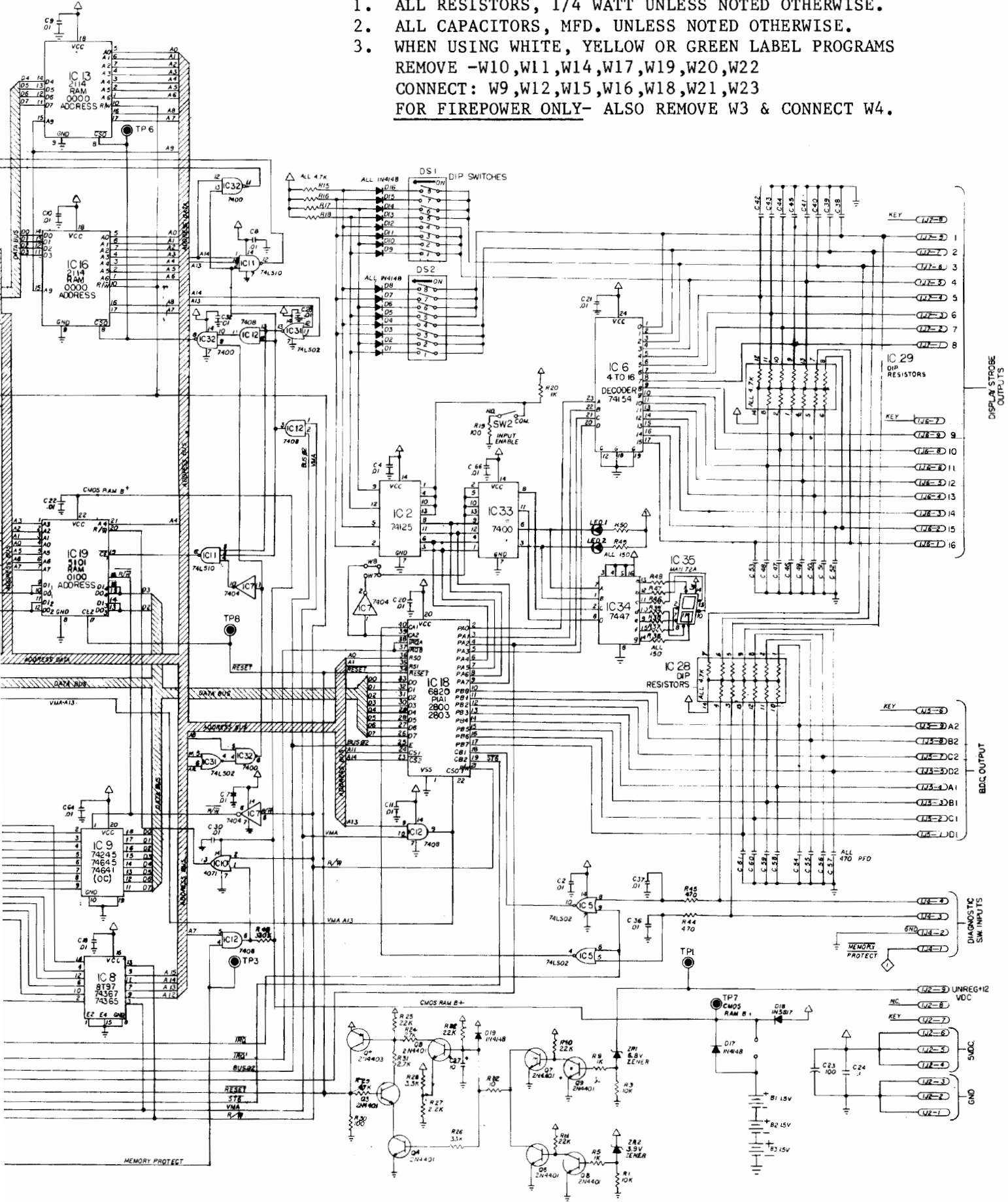
IC 183
7410

IC 184
7410

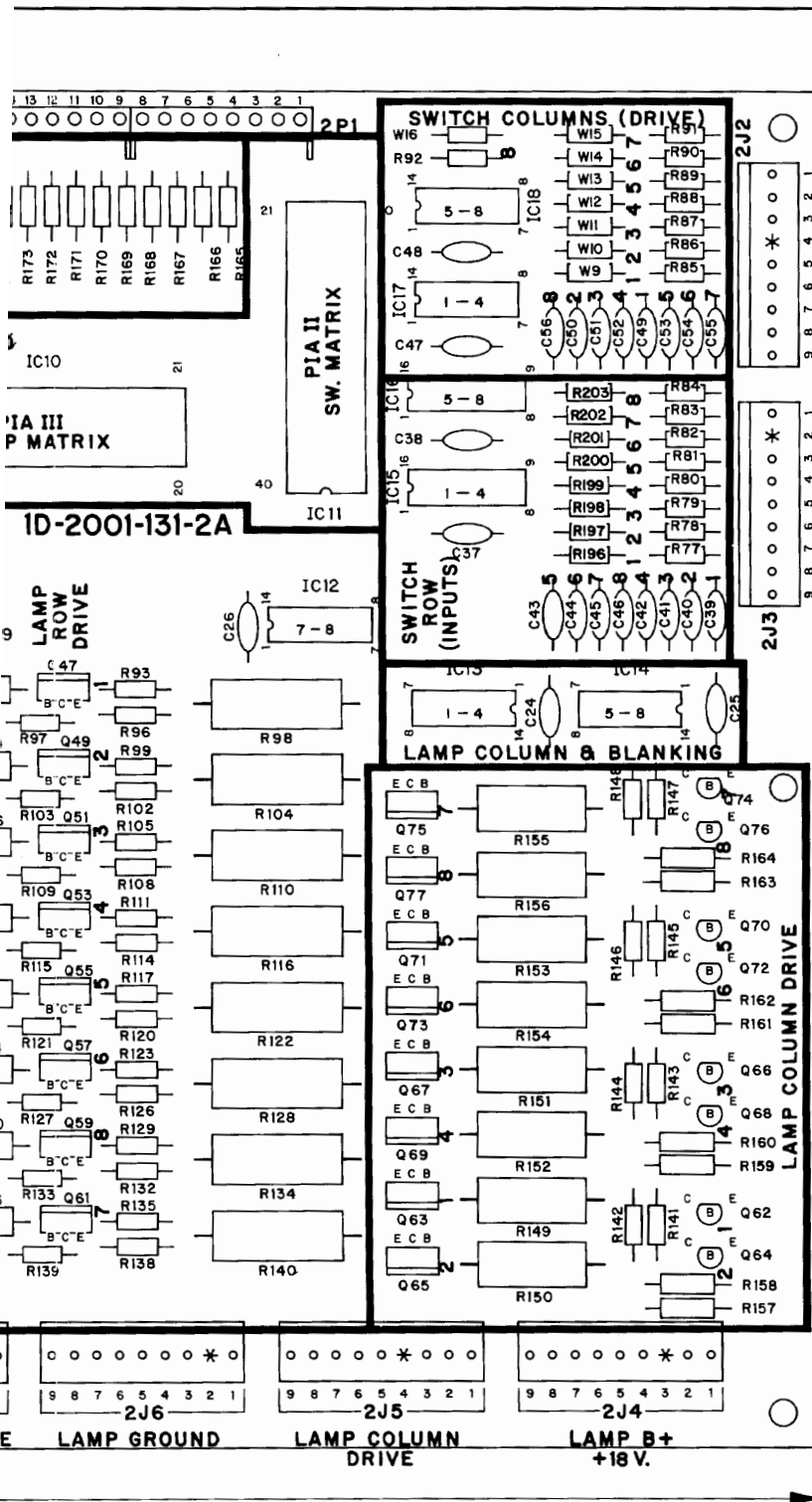
IC 185
7410

NOTES:

1. ALL RESISTORS, 1/4 WATT UNLESS NOTED OTHERWISE.
2. ALL CAPACITORS, MFD. UNLESS NOTED OTHERWISE.
3. WHEN USING WHITE, YELLOW OR GREEN LABEL PROGRAMS REMOVE -W10,W11,W14,W17,W19,W20,W22 CONNECT: W9,W12,W15,W16,W18,W21,W23 FOR FIREPOWER ONLY- ALSO REMOVE W3 & CONNECT W4.



CPU Board Logic Diagram



BILL OF MATERIAL

ITEM NO.	PART NO.	PART DESIGNATION	DESCRIPTION	REQ'D. NO.
1	1B-2001-131		BARE P.C. BOARD	1
2	5A-8948	IC8, IC9	N7402 QUADRUPLE 2 INPUT POSITIVE NOR GATE	2
3	5A-8974	IC12, IC17, IC18, IC19	N7406 HEX. INVERTER BUFFER DRIVERS W/ OPEN COLLECTOR HIGH VOLTAGE OUTPUTS	4
4	5A-8973	IC1 THRU IC4, IC6, IC7, IC13, IC14	N7408 QUADRUPLE 2 INPUT POSITIVE AND GATE	8
5	5A-8975	IC15, IC16	MC14049 INVERTING HEX. BUFFER	2
6	5A-8972	IC5, IC10, IC11	MC6820 PERIPHERAL INTERFACE ADAPTER	3
7	5A-8938	Q1, Q3, Q5, Q7, Q9, Q11, Q13, Q14, Q16, Q18, Q20, Q22, Q24, Q26, Q28, Q30, Q32, Q34, Q36, Q38, Q40, Q42, Q44	2N4401 NPN TRANSISTOR	23
8	5A-8976	Q46, Q48, Q50, Q52, Q54, Q56, Q58, Q60, Q62, Q64, Q66, Q68, Q70, Q72, Q74, Q76	2N6427 DARLINGTON NPN TRANSISTOR	16
9	5A-8977	Q2, Q4, Q6, Q8, Q10, Q12, Q15, Q17, Q19, Q21, Q25, Q27, Q29, Q31, Q33, Q35, Q37, Q39, Q41, Q43, Q45	T1P122 DARLINGTON NPN POWER TRANSISTOR	22
10	5A-8978	Q63, Q65, Q67, Q69, Q71, Q73, Q75, Q77	T1P42 PNP POWER TRANSISTOR	8
11	5A-8979	Q47, Q49, Q51, Q53, Q55, Q57, Q59, Q61	2N6122 NPN POWER TRANSISTOR	8
12	5A-6258	D1	1N4001 DIODE	1
13	5A-8919	D2 THRU D9	1N4148 DIODE	8
14	5A-9014	S1 THRU S8	2N5060 SCR	8
15	5A-8980	C1 THRU C14, C24, THRU C26, C30, C37, C38, C47, C48	CAPACITOR, CERAMIC, 01 MFD. +80 -20% 50 V.	22
16	5A-8995	C16 THRU C23	CAPACITOR, POLYESTER FILM, 1 MFD. 10%	7
17	5A-9065	C37 THRU C46, C49 THRU C56	CAPACITOR, CERAMIC, 470 PFD. 20% 50 V.	16
18	5A-8986	C15	CAPACITOR, ELECT., 100 MFD. 10 V.	1
19	5A-8996	C36	CAPACITOR, CERAMIC, 1 MFD. +80 -20% 50 V.	1
20	5A-8991	R1 THRU R6, R27, R77 THRU R92, R157 THRU R195	RESISTOR, FC, 4.7 K OHM 10% 1/4 W	62
21	5A-8983	R27	RESISTOR, FC, 3.3 K OHM 10% 1/4 W	1
22	5A-8984	R96, R97, R102, R103, R108, R109, R114, R115, R121, R122, R126, R127, R132, R133, R138, R139, R196 THRU R203	RESISTOR, FC, 1 K OHM 10% 1/4 W	24
23	5A-8992	R7, R10, R13, R16, R19, R22, R29, R32, R35, R38, R41, R44, R47, R50, R53, R56, R59, R62, R65, R68, R71, R74	RESISTOR, FC, 560 OHM 10% 1/4 W	22
24	5A-8993	R8, R11, R14, R17, R20, R23, R30, R33, R36, R39, R42, R45, R48, R51, R54, R57, R60, R63, R66, R69, R72, R75	RESISTOR, FC, 68 OHM 10% 1/4 W	22
25	5A-8997	R9, R12, R15, R18, R21, R24, R25, R31, R34, R37, R40, R43, R46, R49, R52, R55, R58, R61, R64, R67, R70, R73, R76	RESISTOR, FC, 2.7 K OHM 10% 1/4 W	23
26	5A-8817	R26	RESISTOR, FC, 10 K OHM 10% 1/4 W	1
27	5A-8998	R141 THRU R148	RESISTOR, FC, 2.2 K OHM 10% 1/4 W	8
28	5A-8999-1	R149 THRU R156	RESISTOR, FC, 27 OHM 10% 2 W	8
29	5A-9084	R95, R100, R106, R112, R118, R124, R130, R136	RESISTOR, FC, 100 OHM 10% 3 W	8
30	5A-9085	R93, R99, R105, R111, R117, R123, R129, R135	RESISTOR, FC, 1.5 K OHM 10% 1/4 W	8
31	5A-9086	R94, R101, R107, R113, R119, R125, R131, R137	RESISTOR, FC, 6.8 K OHM 10% 1/4 W	8
32	5A-9037	R98, R104, R110, R116, R122, R128, R134, R140	RESISTOR, WIREWOUND, .4 OHM 10% 3 WATT	8
33	5A-8994	Z1	RELAY - 4 POLE - 5 AMP. CONTACTS 40 OHM CDIL 6 V.D.C.	1
34	5A-9066	2P1	8 PIN RECEPTACLE	6
35	5A-9027	2J2 THRU 2J13	9 PIN HEADER	12
36	5A-5534	W9 THRU W16	RESISTOR, FC, 0 OHM, 1/4 W	8

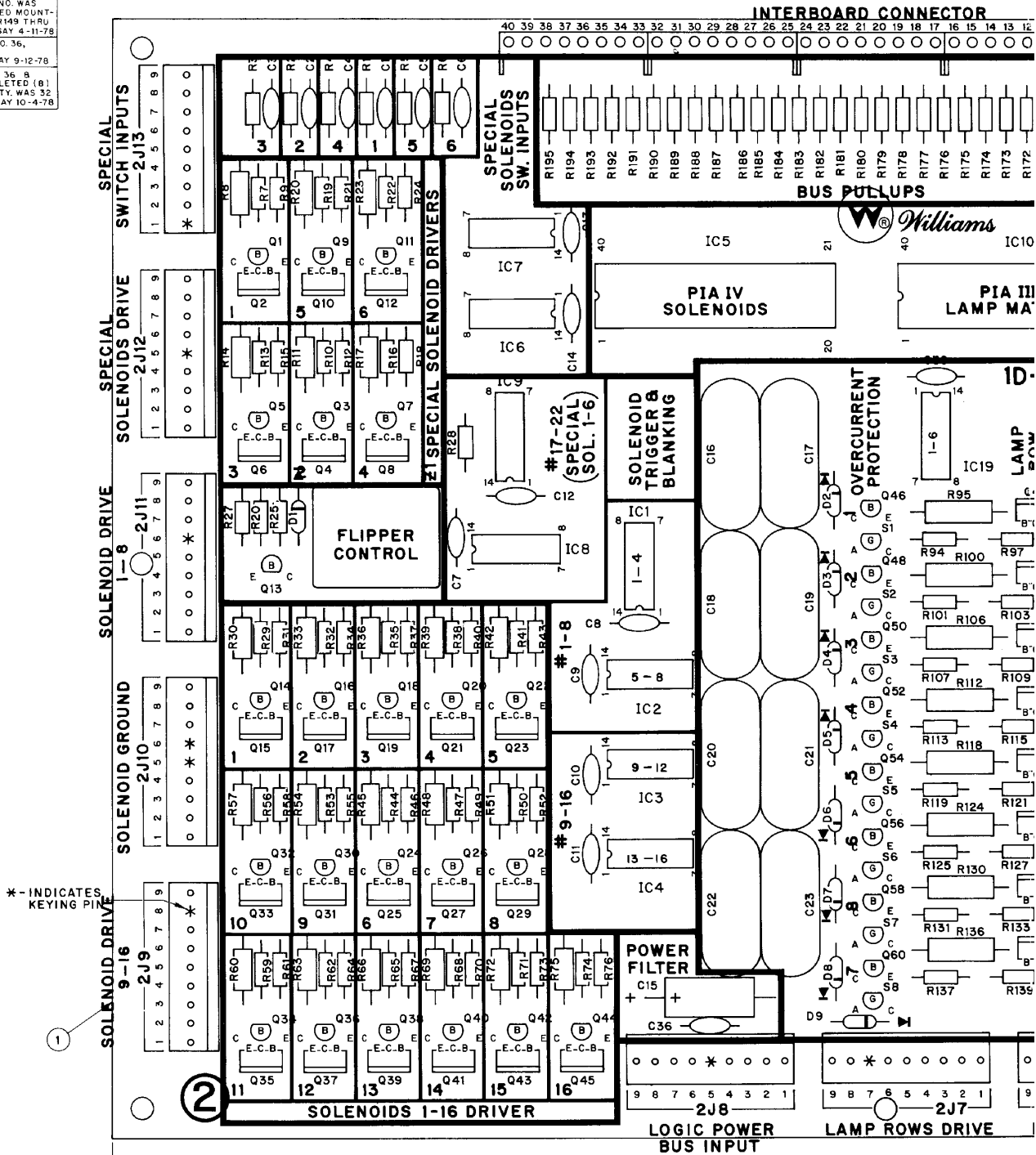
★ R149 THRU R156 MUST BE MOUNTED 1/8" ABOVE SURFACE OF BOARD.



WILLIAMS ELECTRONICS, INC.
 SUBSIDIARY OF XCOR CORPORATION
 3401 N. CALIFORNIA CHICAGO, ILL. 60618 CORNELIA, 7-2240

PART NAME: DRIVER BOARD ASSEMBLY
 DWN: R. Gay DATE: 8-16-77 APPD. SCALE: 2:1 PART NO: D-7997

REVISION LETTER	REVISION
C	REVISED AND REDRAWN R. GAY 11-28-77
D	ITEM NO. 28, PT. NO. WAS 5A-8999 & ADDED MOUNT- ING NOTE FOR R449 THRU R156. R. GAY 4-11-78
E	DELETED ITEM NO. 36, PT. NO. 5A-8985, E.C.O. R. GAY 9-12-78
F	ADDED ITEM NO. 36 B ITEM NO. 22, DELETED (B) RESISTORS & QTY. WAS 32 E.C.O. 4624 R. GAY 10-4-78

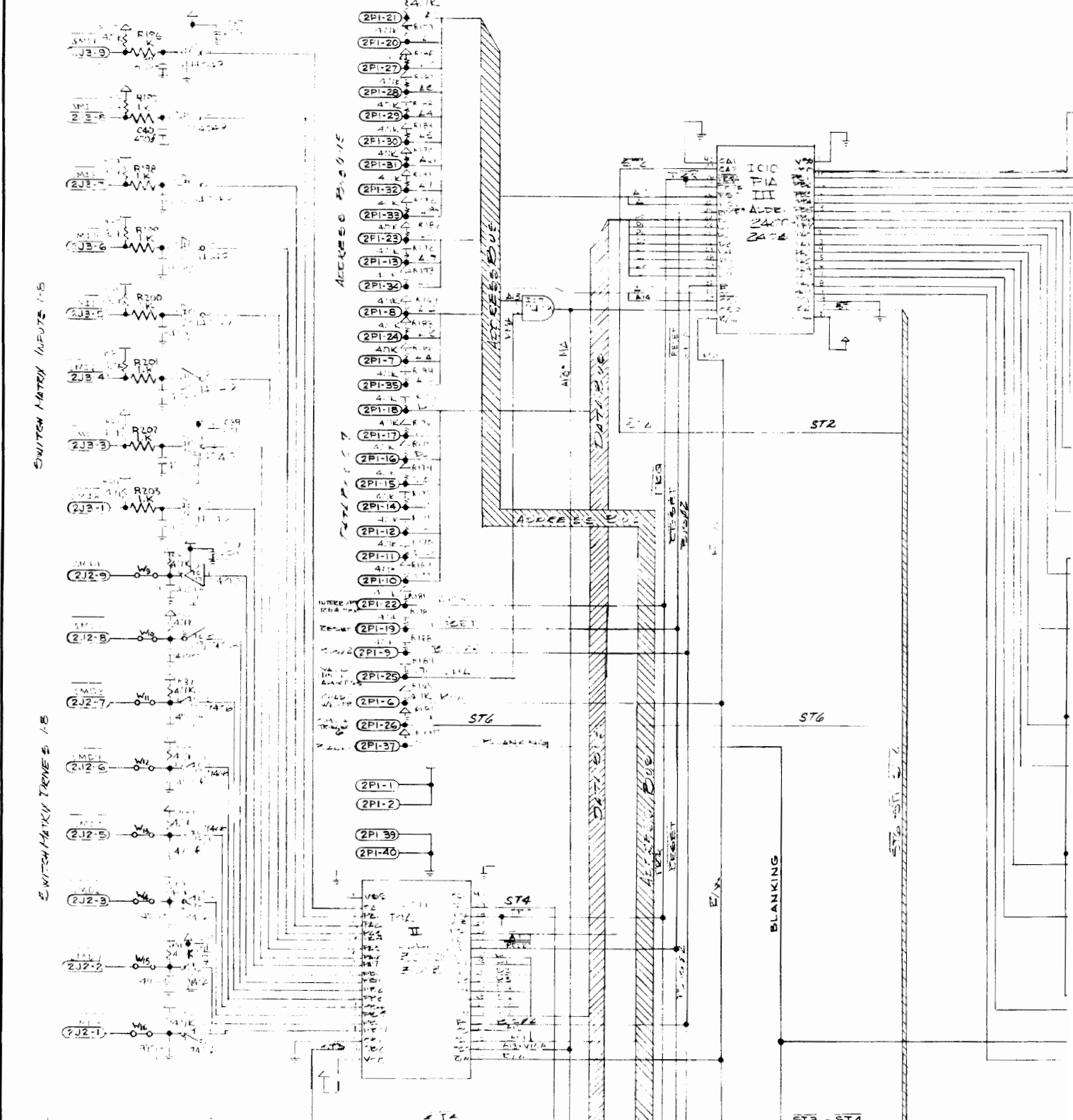


* - INDICATES KEYING PINE

1

2

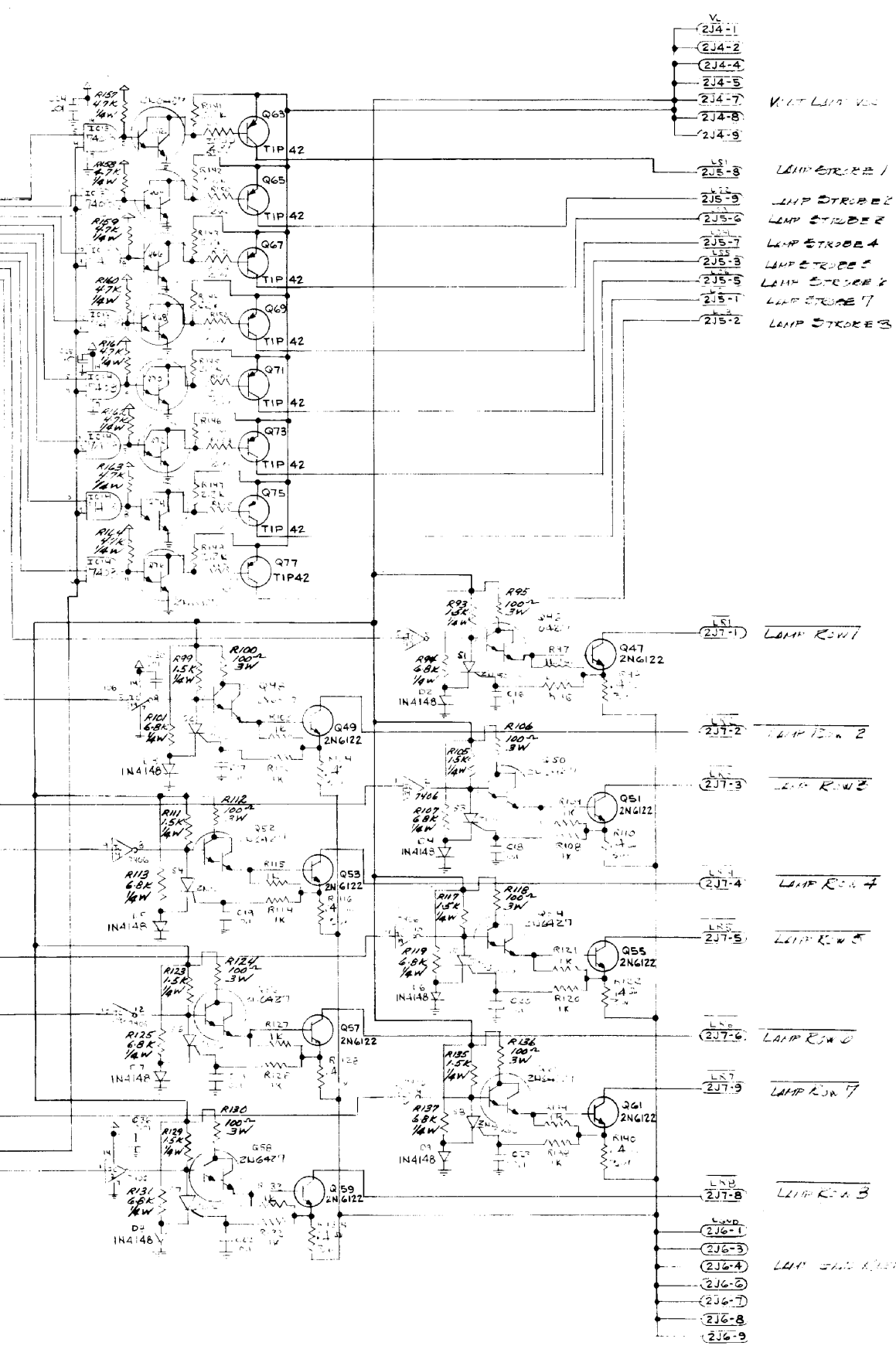
REDUCE TO EXACTLY 13.000"



D	R 204 THRU R 211, 3014 WAS 1K J2	ECO # 4624 AR
C	2PI-1 WAS P1, 2PI-2 WAS A1, 2PI-3 WAS B1, 2PI-4 WAS C1, 2PI-5 WAS D1, 2PI-6 WAS E1, 2PI-7 WAS F1, 2PI-8 WAS G1, 2PI-9 WAS H1, 2PI-10 WAS I1, 2PI-11 WAS J1, 2PI-12 WAS K1, 2PI-13 WAS L1, 2PI-14 WAS M1, 2PI-15 WAS N1, 2PI-16 WAS O1, 2PI-17 WAS P1, 2PI-18 WAS Q1, 2PI-19 WAS R1, 2PI-20 WAS S1, 2PI-21 WAS T1, 2PI-22 WAS U1, 2PI-23 WAS V1, 2PI-24 WAS W1, 2PI-25 WAS X1, 2PI-26 WAS Y1, 2PI-27 WAS Z1, 2PI-28 WAS AA1, 2PI-29 WAS AB1, 2PI-30 WAS AC1, 2PI-31 WAS AD1, 2PI-32 WAS AE1, 2PI-33 WAS AF1, 2PI-34 WAS AG1, 2PI-35 WAS AH1, 2PI-36 WAS AI1, 2PI-37 WAS AJ1, 2PI-38 WAS AK1, 2PI-39 WAS AL1, 2PI-40 WAS AM1	R/GH
B	DEFERRED TO VCC LEAD & ADDED VOLT LAMP Vcc LEAD TO R93-R95, R99-R101, R106-R107, R111-R113, R117-R119, R123-R125, R129-R131 & R135-R137	R/GH
A	REDUCE POWER SUPPLY CURRENT	DLP
REVISION LETTER	REVISION	BY

F	R196 THRU R 203 WAS ECO # W1 THRU W6 (11-17-80) 5064
E	W1 THRU W6 WAS ECO # R196 THRU R 211 5013 TAN/TA

TO / FROM SHEET 2



TOLERANCES UNLESS OTHERWISE SPECIFIED		WILLIAMS ELECTRONIC MFG. CORP. SUBSIDIARY OF THE RESBURG CORP.	
FRACTIONS	± 1/64	3401 N. CALIFORNIA	CHICAGO 18, ILL. CORNELIA 7-2840
DECIMALS	± .005	NAME SCHEMATIC, DRIVER BOARD	
HOLES	+ .008	MATERIAL	
ANGULAR	± 1/2°	HEAT TREATMENT FINISH	
APP'D.	W.E.	DATE	10-7-57

Driver Board Logic Diagram
(Sheet 1 of 2) 11/12

SOLENOID 1 DRIVE

SOLENOID 2 DRIVE

SOLENOID 3 DRIVE

SOLENOID 4 DRIVE

SOLENOID 5 DRIVE

SOLENOID 6 DRIVE

SOLENOID 7 DRIVE

SOLENOID 8 DRIVE

SOLENOID 9 DRIVE

SOLENOID 10 DRIVE

SOLENOID 11 DRIVE

SOLENOID 12 DRIVE

SOLENOID 13 DRIVE

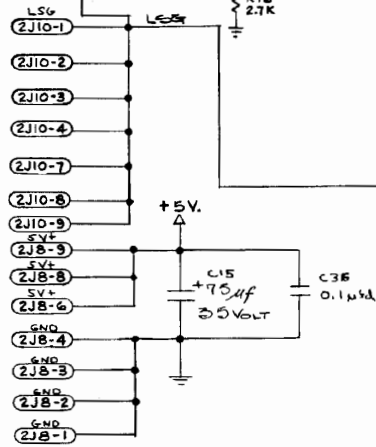
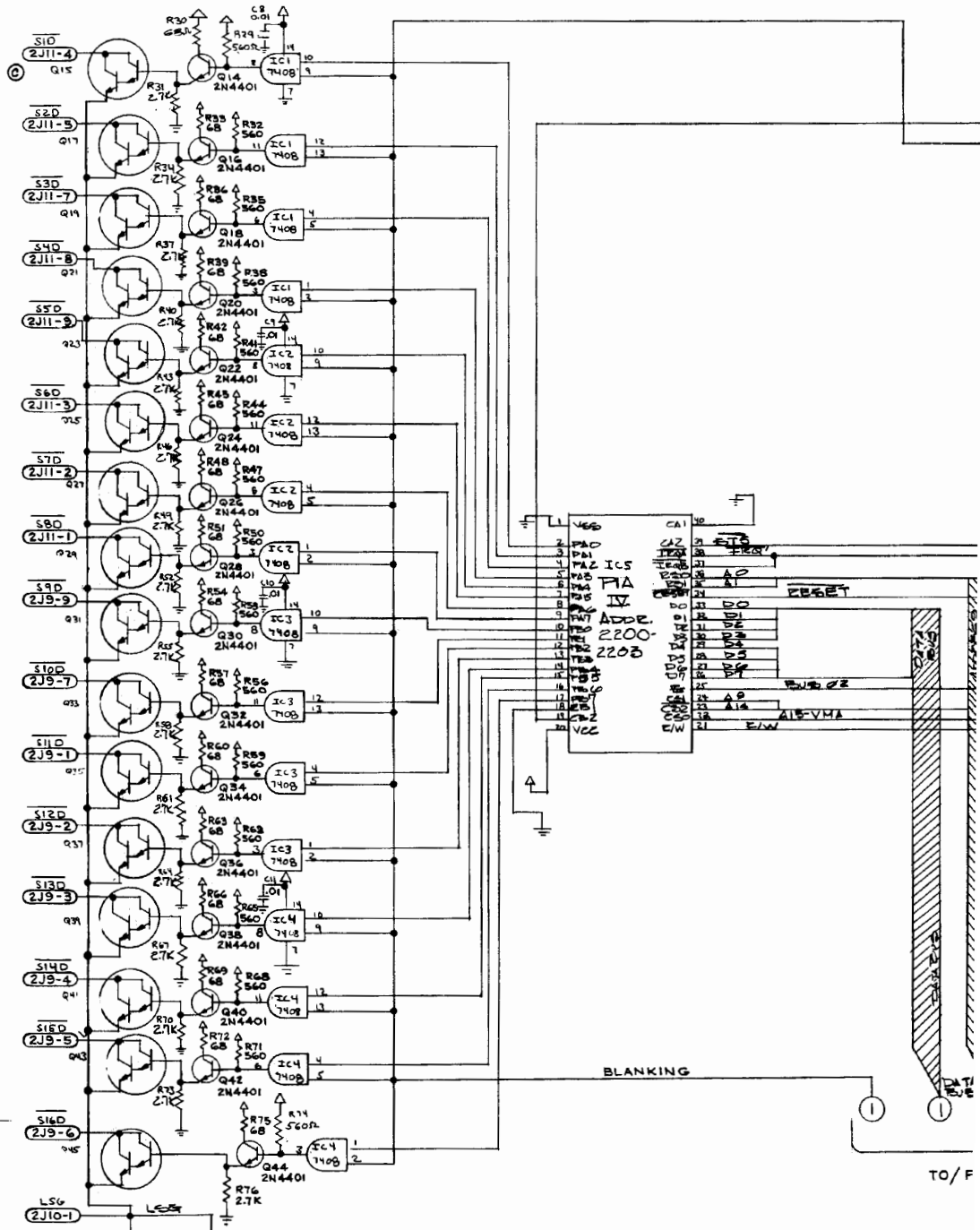
SOLENOID 14 DRIVE

SOLENOID 15 DRIVE

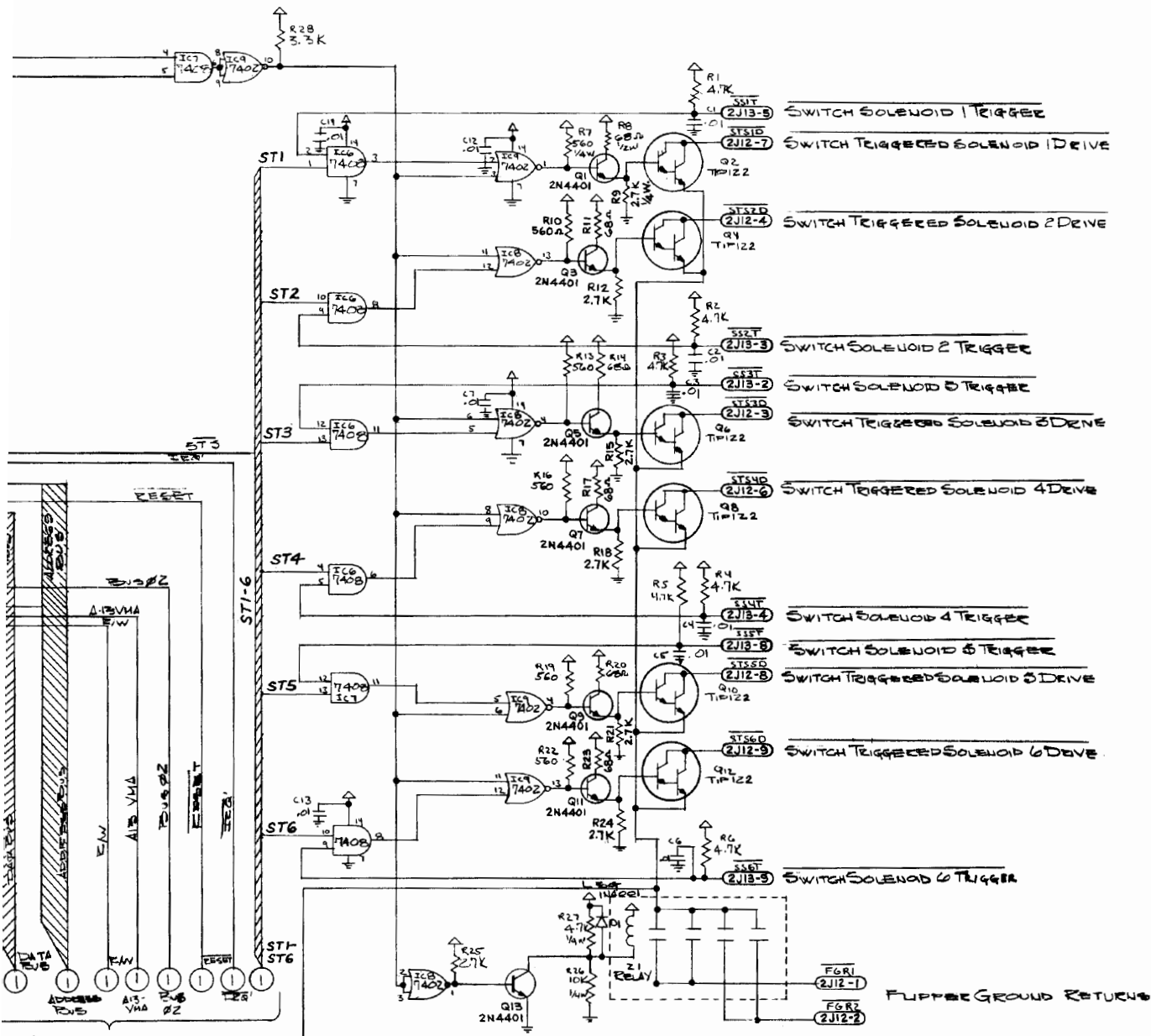
SOLENOID 16 DRIVE

LAMP & SOLENOID GROUND

LAMP & SOLENOID GND.



C	CHANGE TIP 120 TO VENDOR SELECTED DARLINGTON	E.C.O. 4889
B	2J8'S WAS G's, 2J9'S WAS H's, 2J10'S WAS J's, 2J11 WAS K's, 2J12 WAS L's 2J13'S WAS M's & ADDED 1 TO / FROM SHEET 1 & CIRCLED TO ALL 2N4401 TRANSISTORS	R. Giff 10-28-77
A	REVISION "A"	
REVISION LETTER	REVISION	BY



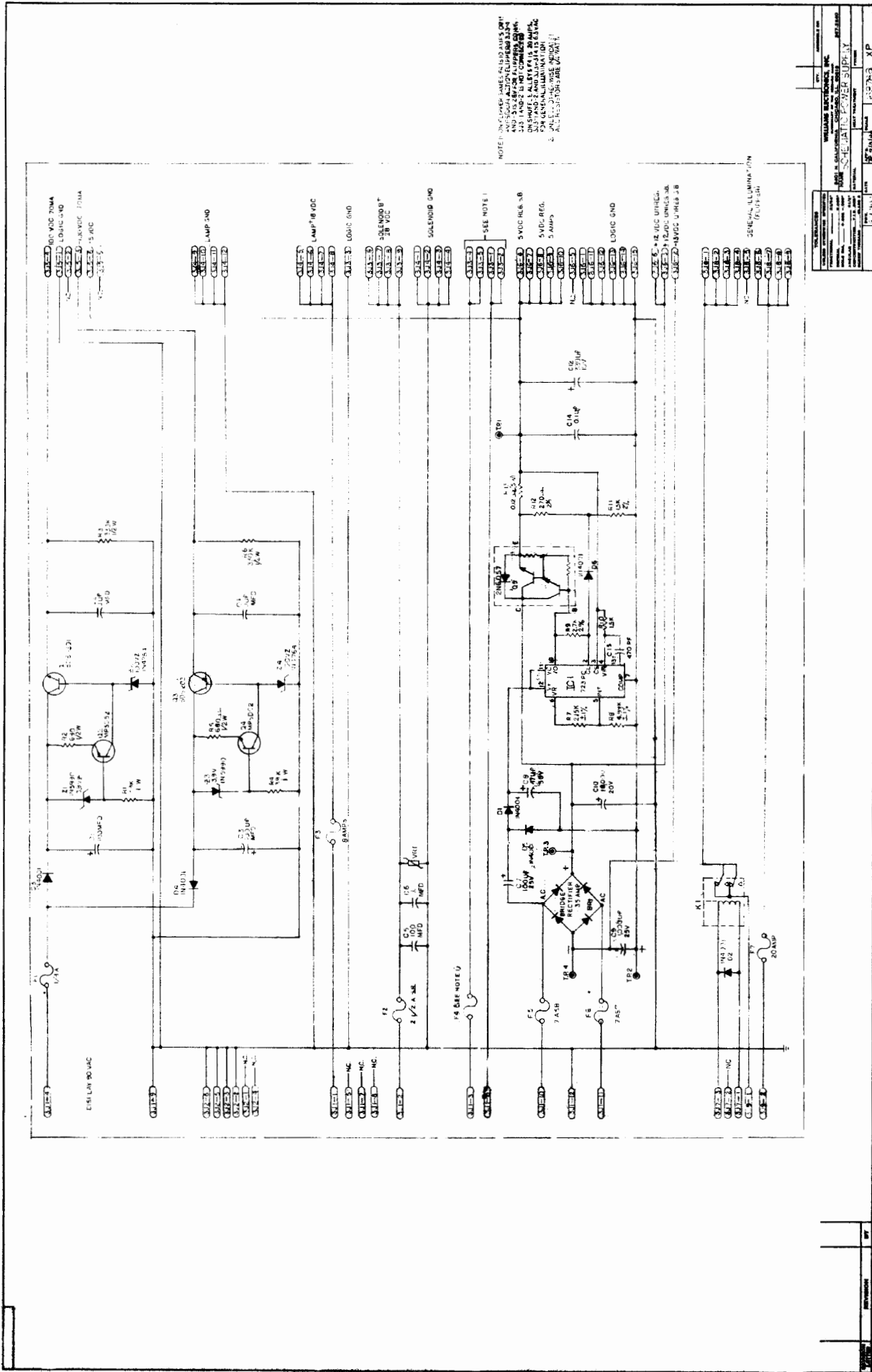
TO/FROM SHEET 1

- SWT (2J13-8) SWITCH SOLENOID 1 TRIGGER
- STSD (2J12-7) SWITCH TRIGGERED SOLENOID 1 DRIVE
- STSD (2J12-4) SWITCH TRIGGERED SOLENOID 2 DRIVE
- SWT (2J13-3) SWITCH SOLENOID 2 TRIGGER
- SWT (2J13-2) SWITCH SOLENOID 3 TRIGGER
- STSD (2J12-3) SWITCH TRIGGERED SOLENOID 3 DRIVE
- STSD (2J12-6) SWITCH TRIGGERED SOLENOID 4 DRIVE
- SWT (2J13-4) SWITCH SOLENOID 4 TRIGGER
- SWT (2J13-8) SWITCH SOLENOID 5 TRIGGER
- STSD (2J12-8) SWITCH TRIGGERED SOLENOID 5 DRIVE
- STSD (2J12-9) SWITCH TRIGGERED SOLENOID 6 DRIVE
- SWT (2J13-9) SWITCH SOLENOID 6 TRIGGER

FLIP-FLOP RETURNS

TOLERANCES UNLESS OTHERWISE SPECIFIED		WILLIAMS ELECTRONIC MFG. CORP. SUBSIDIARY OF THE SERRUS CORP.		
FRACTIONS	± 1/64	3401 N. CALIFORNIA	CHICAGO 18, ILL.	CORNELIA 7-2840
DECIMALS	± .008	NAME SCHEMATIC, DRIVER BOARD		
HOLES	+ .008	MATERIAL	HEAT TREATMENT	FINISH
ANGULAR	± 1/2°	DATE	APPD.	SCALE
		1-3-77		16D-7997

SHEET 2 OF 2

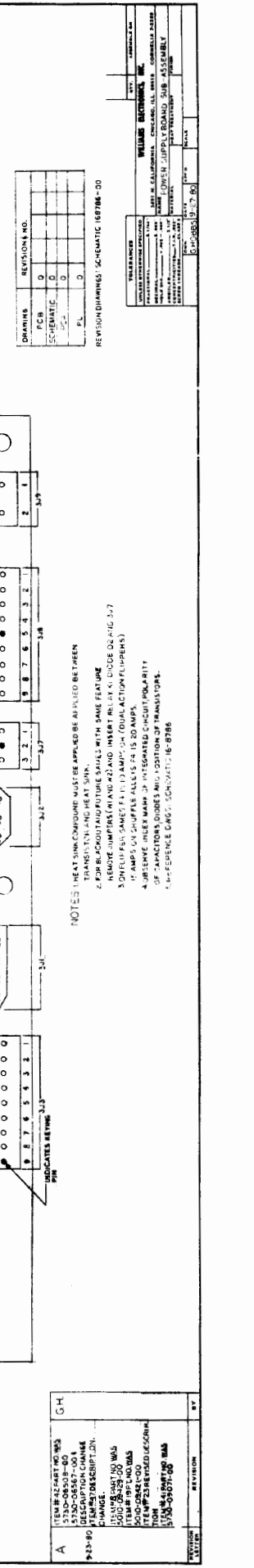


NOTE: ON LOWER AMPLIFIED PARTS ONLY AND 50% FOR ALL OTHERS. THE 1.5VDC 70MA AND 1.5VDC 70MA ARE THE SAME AS THE 1.5VDC 70MA AND 1.5VDC 70MA. ALL RESISTORS ARE 1/4 WATT.

DATE	REV	BY	CHKD
10/10/78	1	W. J. B.	W. J. B.
WILLIAMS ELECTRONICS, INC.			
1001 E. SHAWANEE AVENUE, SUITE 100			
SCHEMATIC POWER SUPPLY			
PROJECT NO.	DATE	BY	CHKD
87918	10/10/78	W. J. B.	W. J. B.
REVISIONS			
NO.	DESCRIPTION	DATE	BY
1	ISSUED FOR FABRICATION	10/10/78	W. J. B.

BILL OF MATERIAL

EX	QTY	PART NO.	DESCRIPTION	REV.
1	1	5750-0048-00	WAKE UP BOARD	1
2	1	5750-0048-00	RESISTOR 2.2K 1/4W 5% MIN	1
3	1	5750-0048-00	RESISTOR 10K 1/4W 5% MIN	1
4	1	5750-0048-00	RESISTOR 100K 1/4W 5% MIN	1
5	1	5750-0048-00	RESISTOR 100K 1/4W 5% MIN	1
6	1	5750-0048-00	RESISTOR 100K 1/4W 5% MIN	1
7	1	5750-0048-00	RESISTOR 100K 1/4W 5% MIN	1
8	1	5750-0048-00	RESISTOR 100K 1/4W 5% MIN	1
9	1	5750-0048-00	RESISTOR 100K 1/4W 5% MIN	1
10	1	5750-0048-00	RESISTOR 100K 1/4W 5% MIN	1
11	1	5750-0048-00	RESISTOR 100K 1/4W 5% MIN	1
12	1	5750-0048-00	RESISTOR 100K 1/4W 5% MIN	1
13	1	5750-0048-00	RESISTOR 100K 1/4W 5% MIN	1
14	1	5750-0048-00	RESISTOR 100K 1/4W 5% MIN	1
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22	1	5750-0048-00	RESISTOR 100K 1/4W 5% MIN	1
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54	1	5750-0048-00	RESISTOR 100K 1/4W 5% MIN	1
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62	1	5750-0048-00	RESISTOR 100K 1/4W 5% MIN	1
63	1	5750-0048-00	RESISTOR 100K 1/4W 5% MIN	1
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73	1	5750-0048-00	RESISTOR 100K 1/4W 5% MIN	1
74	1	5750-0048-00	RESISTOR 100K 1/4W 5% MIN	1
75	1	5750-0048-00	RESISTOR 100K 1/4W 5% MIN	1
76	1	5750-0048-00	RESISTOR 100K 1/4W 5% MIN	1
77	1	5750-0048-00	RESISTOR 100K 1/4W 5% MIN	1
78	1	5750-0048-00	RESISTOR 100K 1/4W 5% MIN	1
79	1	5750-0048-00	RESISTOR 100K 1/4W 5% MIN	1
80	1	5750-0048-00	RESISTOR 100K 1/4W 5% MIN	1
81	1	5750-0048-00	RESISTOR 100K 1/4W 5% MIN	1
82	1	5750-0048-00	RESISTOR 100K 1/4W 5% MIN	1
83	1	5750-0048-00	RESISTOR 100K 1/4W 5% MIN	1
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92	1	5750-0048-00	RESISTOR 100K 1/4W 5% MIN	1
93	1	5750-0048-00	RESISTOR 100K 1/4W 5% MIN	1
94	1	5750-0048-00	RESISTOR 100K 1/4W 5% MIN	1
95	1	5750-0048-00	RESISTOR 100K 1/4W 5% MIN	1
96	1	5750-0048-00	RESISTOR 100K 1/4W 5% MIN	1
97	1	5750-0048-00	RESISTOR 100K 1/4W 5% MIN	1
98	1	5750-0048-00	RESISTOR 100K 1/4W 5% MIN	1
99	1	5750-0048-00	RESISTOR 100K 1/4W 5% MIN	1
100	1	5750-0048-00	RESISTOR 100K 1/4W 5% MIN	1



REVISION DIMENSIONS - SCHEMATIC (6/7/86 - 00)

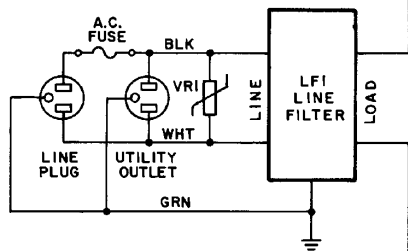
REVISION NO.	DESCRIPTION
0	INITIAL DESIGN
1	REVISED FOR MANUFACTURING
2	REVISED FOR MANUFACTURING
3	REVISED FOR MANUFACTURING
4	REVISED FOR MANUFACTURING
5	REVISED FOR MANUFACTURING
6	REVISED FOR MANUFACTURING
7	REVISED FOR MANUFACTURING
8	REVISED FOR MANUFACTURING
9	REVISED FOR MANUFACTURING
10	REVISED FOR MANUFACTURING

NOTES: HEAT SINK COMPOUND MUST BE APPLIED BETWEEN TRANSISTORS AND HEAT SINK.
 2. FOR BLACKOUT AND FUTURE SAVES WITH SAME FEATURE REMOVE JUMPER (R1 AND R2) AND INSERT RELAY K1. DO NOT DO LINE 3-7.
 3. ON FUTURE SAVES F1 TO F7 AMP/5K (DUAL ACTION FUSES).
 4. 15 AMPS ON SHIPPER FUSES IS 20 AMPS.
 5. 4.0 AMP FUSE MARKED 1.000 IN THE CATALOG.
 6. 1.0 AMP FUSE MARKED 1.000 IN THE CATALOG.
 7. 1.0 AMP FUSE MARKED 1.000 IN THE CATALOG.

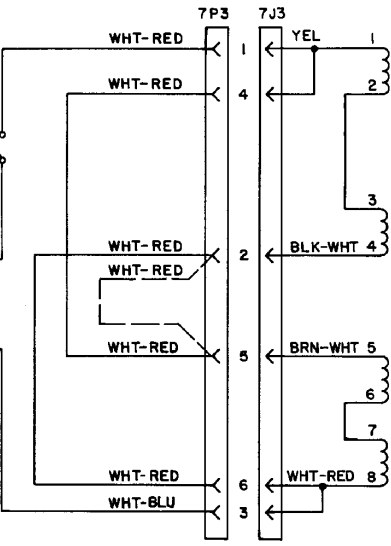
REVISION

REVISION	DESCRIPTION
0	INITIAL DESIGN
1	REVISED FOR MANUFACTURING
2	REVISED FOR MANUFACTURING
3	REVISED FOR MANUFACTURING
4	REVISED FOR MANUFACTURING
5	REVISED FOR MANUFACTURING
6	REVISED FOR MANUFACTURING
7	REVISED FOR MANUFACTURING
8	REVISED FOR MANUFACTURING
9	REVISED FOR MANUFACTURING
10	REVISED FOR MANUFACTURING

WILLIAM BROWN INC.
 1000 W. CALIFORNIA, CHICAGO, ILL. 60606
 PHONE: 312-344-1100
 TELETYPE: 312-344-1100
 FAX: 312-344-1100
 CIRCLE 100 ON READER SERVICE CARD

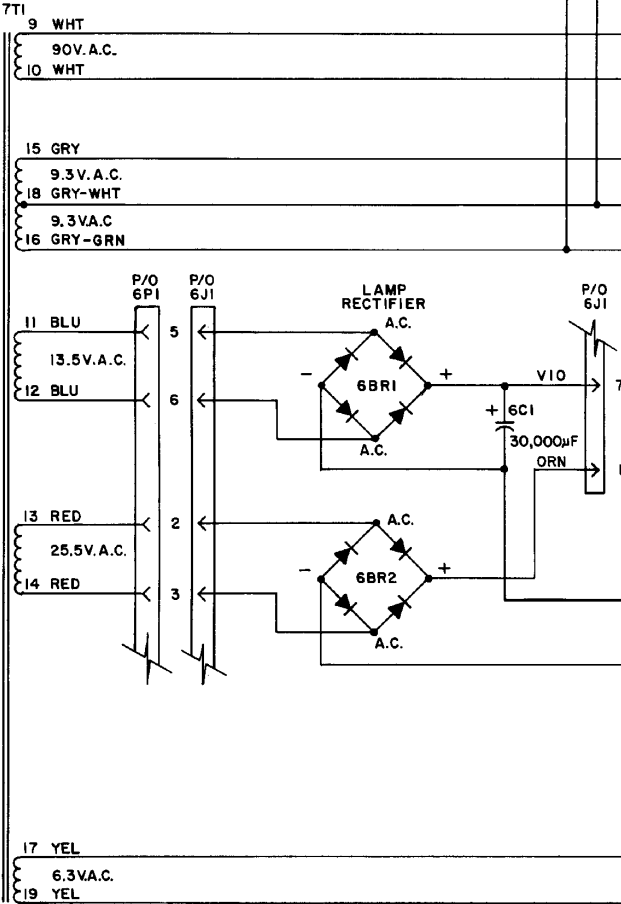


NOTE 3



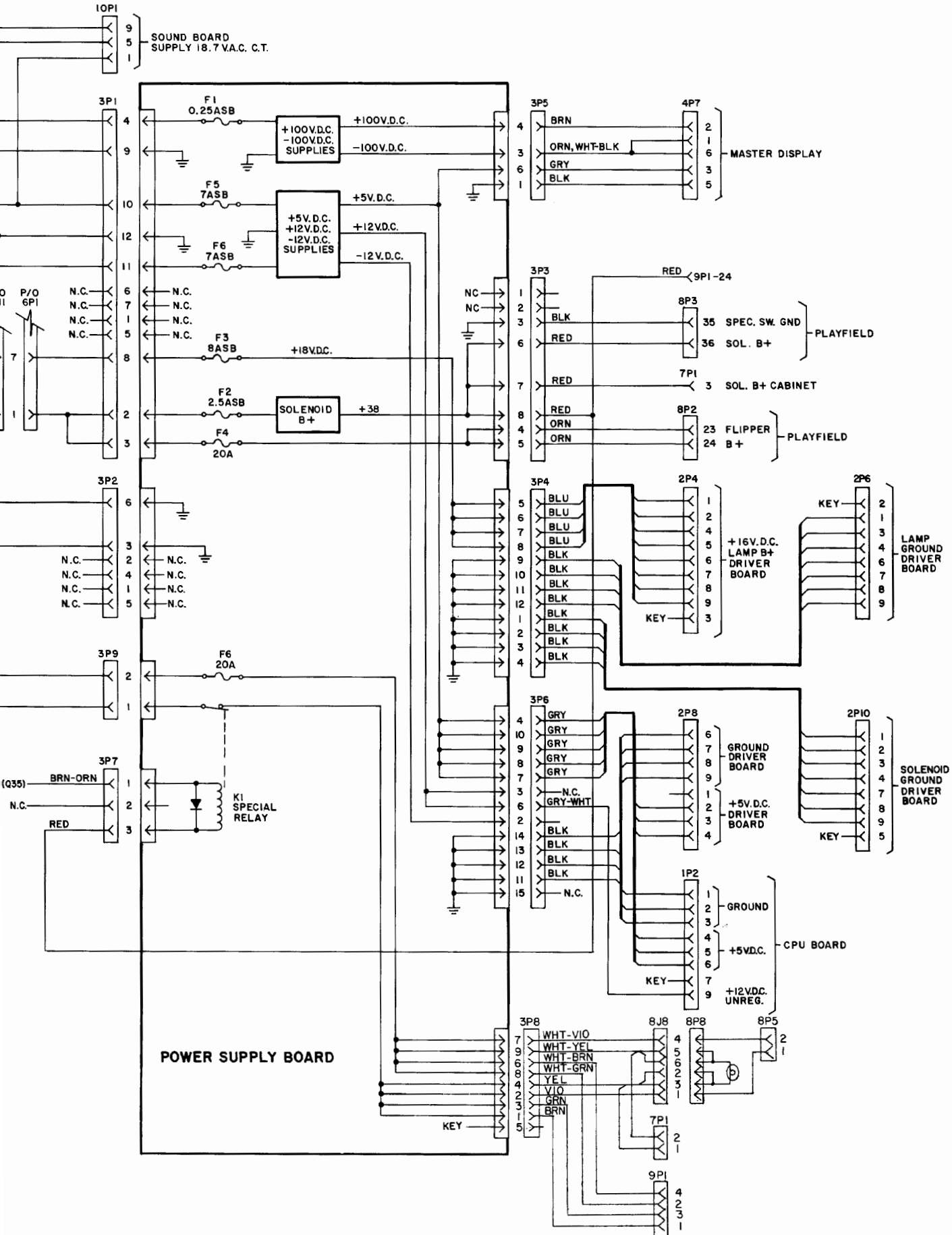
NOTE 4

POWER WIRING



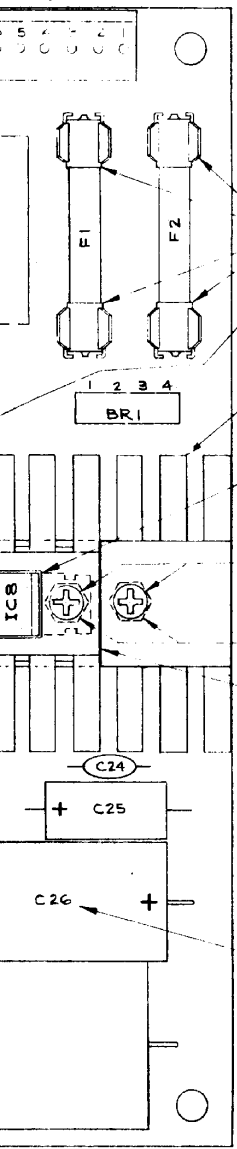
NOTES:

1. FOR 105 OR 117V.A.C., 7.5A FUSE & 130V. VARISTOR #5A-9044 ARE USED.
2. FOR 210 OR 235V.A.C., 4A FUSE & 275V. VARISTOR #5A-9063 ARE USED.
3. JUMPER WIRES ON 6P1 SHOWN WITH SOLID LINES ARE CONNECTED FOR 117V.A.C. OPERATION. ONLY THE ONE SHOWN WITH A DASHED LINE IS CONNECTED FOR 220 V.A.C. OPERATION.
4. FOR LOW-LINE CONDITIONS (105 OR 210V.A.C.) MOVE BLK-WHT WIRE FROM 6T1-4 TO 6T1-3) & MOVE 2 WHT-RED WIRES FROM 6T1-8 TO 6T1-7.



DESCRIPTION	REQ'D. NO.	ITEM NO.	PART NO.	PART DESIGNATION	DESCRIPTION	REQ'D. NO.
SCREW HEAD SCREW	3	48	5A-6314	F1, F2	4 AMP SLOW BLOW FUSE	2
FUSE	3	49	5A-917B		FUSE HOLDER	4
INSULATION	7	50	5A-9172		HEAT SINK THERMALLOY*6072B	1
INSULATION	1	51	5A-9173		HEAT SINK THERMALLOY*6071B	1
RESISTOR, 5.6 KOHM	1	52	5A-9199		HEAT SINK THERMALLOY*6030	1
RESISTOR, 4.7K OHM	1	53	5A-9004		24 PIN SOCKET	1
RESISTOR, 4.7K OHM	1	54	5A-8985		40 PIN SOCKET	1
RESISTOR, 4.7K OHM	1	55	5A-9027	10J1, 10J3	9 PIN MALE CONNECTOR	2
RESISTOR, 4.7K OHM	1	56	5A-9028	10J2, 10J4	4 PIN MALE CONNECTOR	2
RESISTOR, 4.7K OHM	1	57	5A-9349	10J5	40 PIN RIBBON HEADER	1

BILL OF MATERIAL				
ITEM NO.	PART NO.	PART DESIGNATION	DESCRIPTION	REQ'D. NO.
1	IC-2001-146-3		BARE P.C. BOARD	1
2	5A-9156	IC1	TDA2002 V AUDIO AMPLIFIER	1
3	5A-9012	IC2	7442 BCD-DEC DECODER	1
4	5A-9073	IC3	7400 QUAD 2 INPUT NAND	1
5	5A-8973	IC4	7408 QUAD 2 INP. AND GATE	1
6	5A-9153	IC5	4050 BUFFER	1
7	5A-9154	IC6	4068 BINPUT NAND GATE	1
8	5A-8971	IC7	14069 HEX INVERTER	1
9	5A-9157	IC8	7805 5 VOLT REG. W/TO220 CASE	1
10	5A-8972	IC10	6821 P.I.A.	1
11	5A-9003	IC11	6810 RAM	1
12	5A-9152	IC13	1408 D/A CONVERTER	1
13	5C-8938	Q2, Q3, Q4	2N4401 NPN TRANSISTOR	3
14				
15	5A-9018	ZR1	1N5996 6.8V. ZENER DIODE	1
16				
17	5A-9158 OR 5A-9357	BR1	MDA 200/3N253 BRIDGE RECTIFIER	1
18	5A-9020	Y1	3.58 MHZ CRYSTAL	1
19	5B-8991	R1, R18, R19, R21, P22, R27, R30, R31, R32	RESISTOR, FC, 4.7K OHM 5% 1/4 WATT	9
20	5B-9036	R2 THRU R10	RESISTOR, FC, 100 OHM 10% 1/4 WATT	9
21	5A-8984	R12, R15, R28, R36, R38	RESISTOR, FC, 1K OHM 10% 1/4 WATT	5
22	5A-9181	R14	RESISTOR, FC, 1 OHM 10% 1/2 WATT	1
23	5A-9161	R16	RESISTOR, FC, 2.2 OHM 10% 1/4 WATT	1
24	5A-9361	R17	RESISTOR, FC, 220 OHM 10% 1/2 WATT	1
25				
26	5B-8983	R23, R24, R26	RESISTOR, FC, 3.3K OHM 10% 1/4 WATT	3
27	5A-9179	R25	RESISTOR, FC, 3.3M OHM 10% 1/4 WATT	1
28	5A-9359	R29	RESISTOR, FC, 47K OHM 5% 1/4 WATT	1
29	5B-8817	R33, R35, R37	RESISTOR, FC, 10K OHM 10% 1/4 WATT	3
30	5B-9039	R34	RESISTOR, FC, 10 OHM 10% 1/4 WATT	1
31	5A-8980	C1, C16 THRU C23, C31	CAPACITOR, CERAMIC, .01 MFD. 50 V. ±20%	11
32	5A-9065	C2 THRU C10	CAPACITOR, CERAMIC, .470 PFD. 50 V. ±20%	9
33	5A-9345	C11	CAPACITOR, CERAMIC, .001 MFD. 20% 100 V.	1
34	5A-9305	C12, C30, C36	CAPACITOR, ELECTROLYTIC 1 MFD. 6.3 V. 10% 50%	3
35	5A-8996	C13, C24, C35	CAPACITOR, CERAMIC, .1 MFD. 50 V. ±20%	3
36	5A-9165 5A-9165-1	C14	CAPACITOR, ELECTROLYTIC, 800 MFD. 16 V. OR 1,000 MFD. 15 V. ±20%	1
37	5A-9164 5A-9164-1	C15	CAPACITOR, ELECTROLYTIC, 500 MFD. 15 V. OR 470 MFD. 25 V. ±20%	1
38	5A-8986	C25	CAPACITOR, ELECTROLYTIC, 100 MFD. 10 V. ±20%	1
39	5A-8893	C26	CAPACITOR, ELECTROLYTIC, 1,000 MFD. 25 V. ±20%	1
40	5A-9046	C27	CAPACITOR, ELECTROLYTIC, 12,000 MFD. 16 V. ±20%	1
41	5A-9180	C28	CAPACITOR, CERAMIC, 47 PFD. 1K V. ±20%	1
42	5A-9343	C29	CAPACITOR, ELECTROLYTIC, 10 MFD. 25 V. LOW LEAK 20%	1
43	5A-9169	C32, C33	CAPACITOR, CERAMIC DISC, 27 PFD. 1K V. ±10%	2
44	5A-9163	C34	CAPACITOR, TANTALUM, 2.2 MFD. 15 V. ±20%	1
45	5A-9031	C37	CAPACITOR, TANTALUM, 1 MFD. 25 V. ±20%	1
46	5A-9024	SW1	MOMENTARY SWITCH SPDT	1
47	5A-9330	DS1	2 STD. DIP SWITCH	1



NOTES:

- USE THERMAL COMPOUND BETWEEN IC'S AND HEAT SINK.
- CAUTION: AVOID STATIC DISCHARGE DAMAGE TO MOS LOGIC.
- SYMBOLS SHOWN ON COMPONENTS ARE FOR REFERENCE ONLY.
- DO NOT SCREEN OR STAMP.
- OBSERVE INDEX MARK OF ALL INTEGRATED CIRCUITS, DIODES D1, D2, AND ZR1.
- CAPACITORS C12, C14, C15, C25, C27, C29, C27.
- CONNECTORS 10J1, 10J2, 10J3, 10J3, 10J5.
- POSITION OF TRANSISTORS Q1, Q2, Q3, Q4.
- DS1 - 1 SELECTS SOUNDS/NOTES
- DS1 - 2 SELECTS SPEECH/NO SPEECH (W9/W1)
- W1 - SPEECH MODULE STATUS
- IN - SPEECH MODULE NOT ATTACHED
- OUT - SPEECH MODULE ATTACHED
- W14 - MPU INTERNAL RAM ENABLE
- W7 & W8 - MEMORY MAP CONTROL
- W12 & W13 - PB7 STATUS CONTROL (W13 NEVER USED)
- W4 & W9 - PB5 STATUS CONTROL
6. SOLDERED ON TOP OF BOARD
- INSTALL THESE JUMPERS FOR FOLLOWING GAMES:
 W15, W6, W12, W4, W1, W3, W6, W11 FOR:
 WORLD CUP
 DISCO FEVER
 CONTACT
 POKERNO
 PHOENIX
 ARISTOCRAT SHUFFLE
 POMPELLI SHUFFLE
 KING TUT SHUFFLE
 TACRUS SHUFFLE
 SOUND ROM 1
- W15, W8, W12, W4, W1, W2, W5, W10, FOR:
 FLASH
 STELLAR WARS
 TRI ZONE
 TIME WARP
 SOUND ROM 1
 5A-9198
- W7, W15, W9, W1, (SEE NOTE #5) W2, W5, W10 FOR:
 GORGAR
 SOUND ROM 2 - 5A-9198
- IC12 SELECTION STRAPPING:
 (2K x 3) (1K x 4) (512 x 5)
 W2 W3 W3
 W6 IN W3 IN W6 IN
 W1 W1 W11

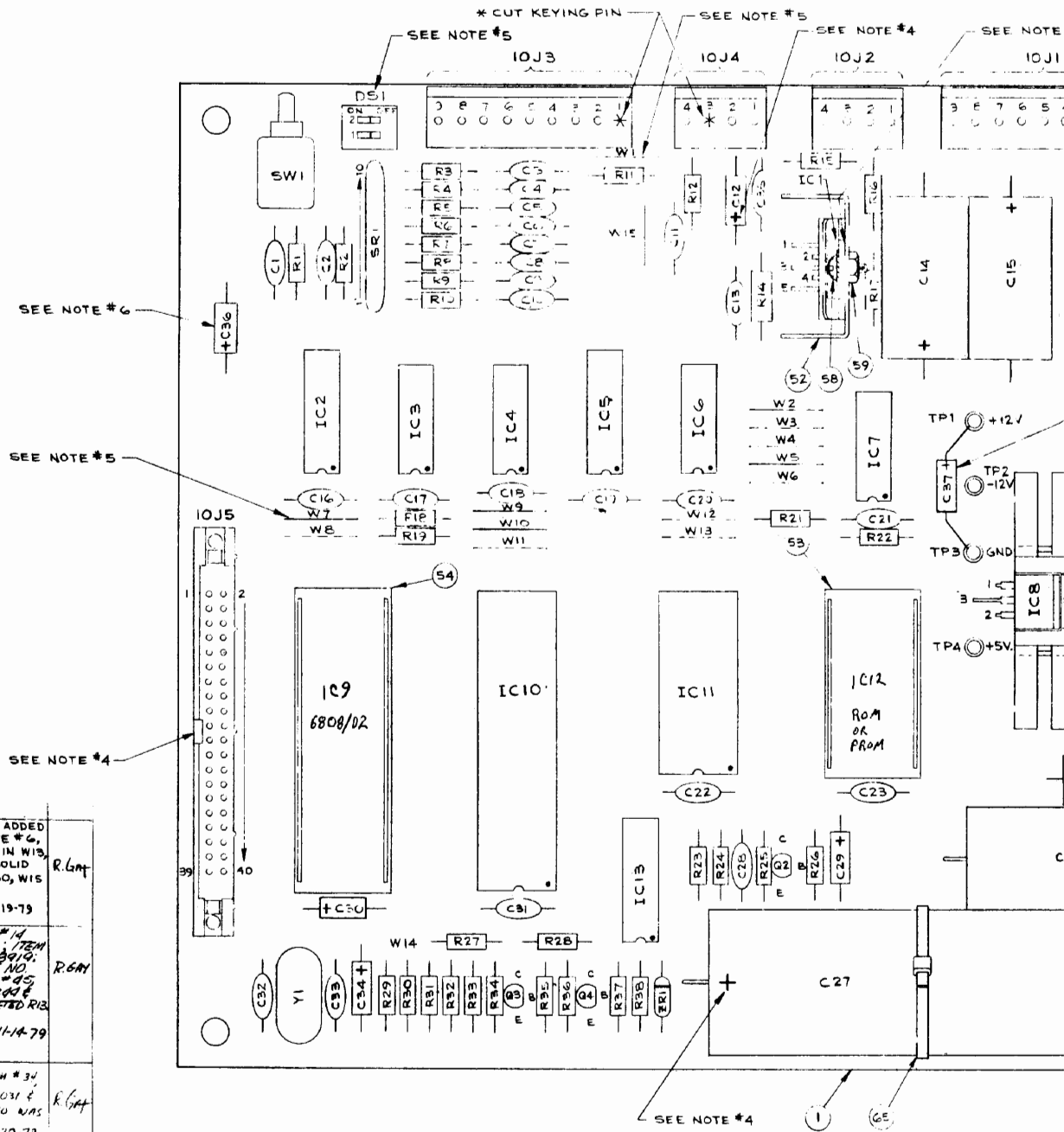
SEE NOTE #6

SEE NOTE #1

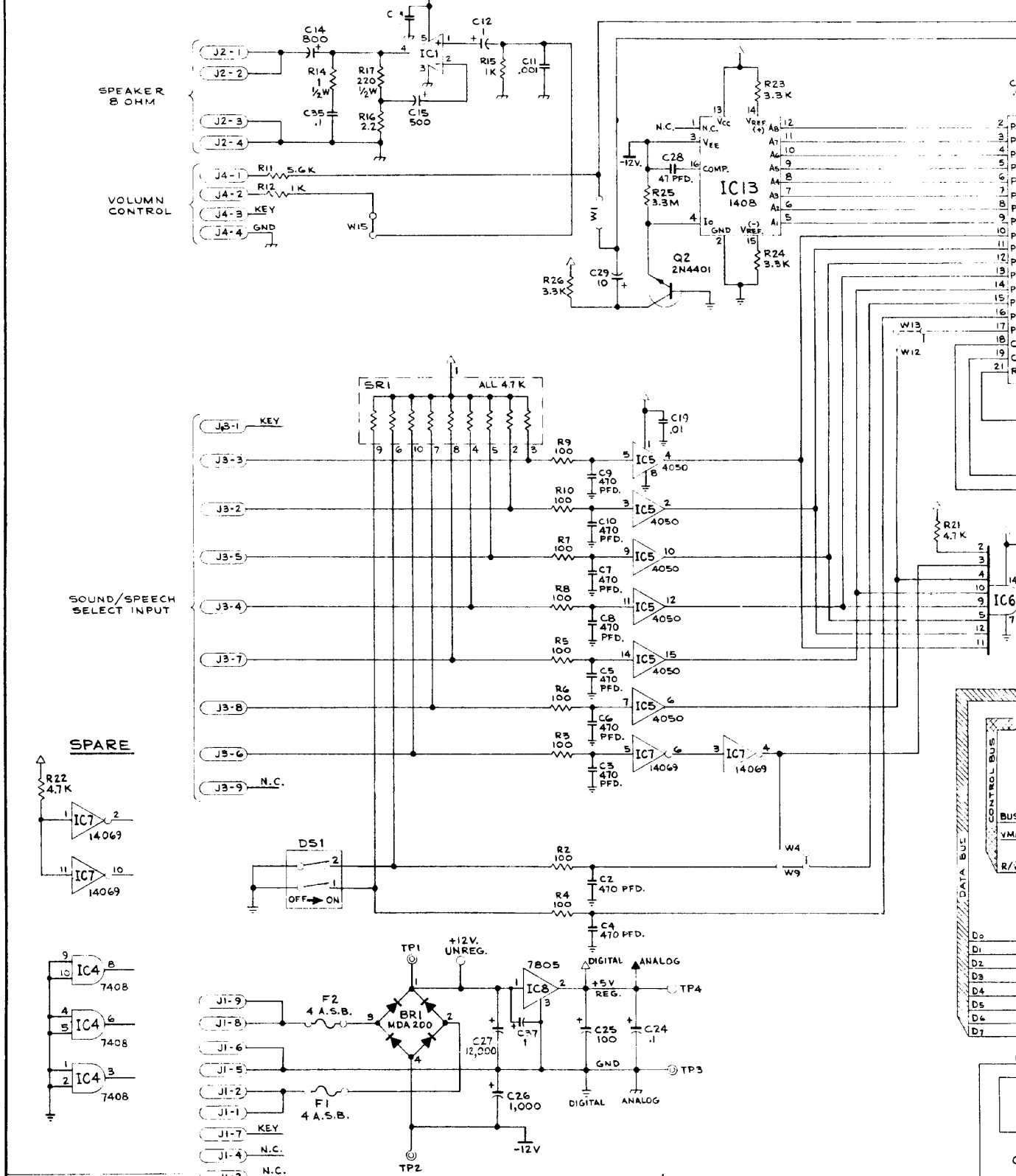
SEE NOTE #3

TOLERANCES		QTY.	ASSEMBLE ON
UNLESS OTHERWISE SPECIFIED		WILLIAMS ELECTRONICS, INC.	
FRACTIONAL	21/64"	HOURSLEY OF THE REPAIR SHOP	
DECIMAL	±.0005"	8401 N. CALIFORNIA CHICAGO, ILL. 60618	
HOLE DIA.	+.002 - .000"	NAME	
ANGULAR	±1/8°	SOUND BOARD SUB-ASSEM	
CONCENTRICITY	T.I.B. .005"	MATERIAL	HEAT TREATMENT
SCREW THREADS	CLASS 8		FINISH
DATE	9-23-79	SCALE	D-822B

ITEM NO.	PART NO.	PART DESIGNATION	DESCRIPTION
58			6-32 x 3/8" BINDER H
59			6-32 HEX NUT
60		W1, W2, W6, W7, W9, W10, W15	WIRE JUMPER 22 WIRE WITH INSUL
61	5A-924B	TP1 THR TPA	TERMINAL # 150
62	5A-936B	R11	RESISTOR, F.C. 5 5% 1/4 WATT
64	5A-936Z	SRI	RESISTOR, 4.7K 10 PIN SIP
65	3A-7520-1		TIE WRAP

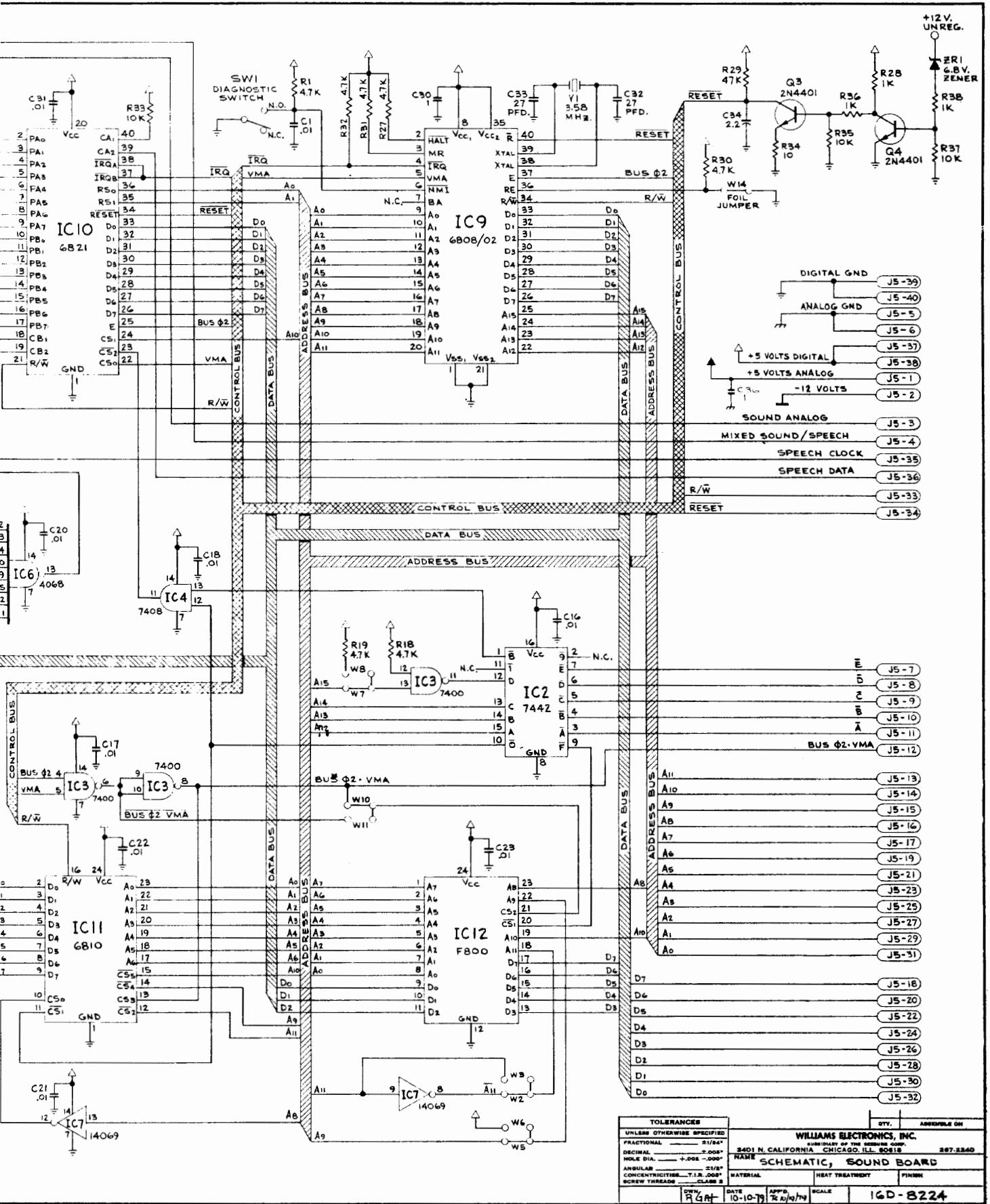


REVISION LETTER	REVISION	BY
E	REVISED NOTES, ADDED ITEM #45 & NOTE #6, RELOCATED W15, IN W15, DASH LINE WAS SOLID LINE & ITEM #60, W15 WAS W18 E.C.O. 11-19-79	R.GM
D	DELETED ITEM #14, PT. NO. SA-9016, ITEM #18, PT. NO. SA-9419, ITEM #25, PT. NO. SA-9314, ITEM #45, PT. NO. SA-936Z & IN ITEM #21, DELETED R13, QTY. WAS 6 E.C.O. 4764 11-14-79	R.GM
C	ADDED C36, ITEM #34, PT. NO. WAS SA-9031 & QTY. WAS 1, & C30 WAS 01 MFD. E.C.O. 4760 10-29-79	R.GM
B	COLLECTED TEST #42, ADDED KIT # AIR TO ITEM #31, QTY. WAS 1, 10-1-79	R.GM
A	ITEM #11, A, QTY. WAS 1, ITEM #52, A, QTY. WAS 1, ITEM #62, NOTES	R.GM



REVISION LETTER	REVISION	BY	REVISION LETTER	REVISION	BY
C	DELETED R1, R2, J1, D14, D1, C11, C12, C15, C16, C17, C18, R13, R14 & R28 (1.2K) ADDED W15 E.C.O. 1/26/79	R.G.			
E	ADDED C26 & C27 W15, C12, C14, C15, POLARITY REVERSE W15 10/23/79				
A	C12, C14, C15, POLARITY REVERSE 11-12-79		D	ADDED C37 & IN W13, DASH LINE WAS SOLID LINE E.C.O. 11-12-79	R.G.M.

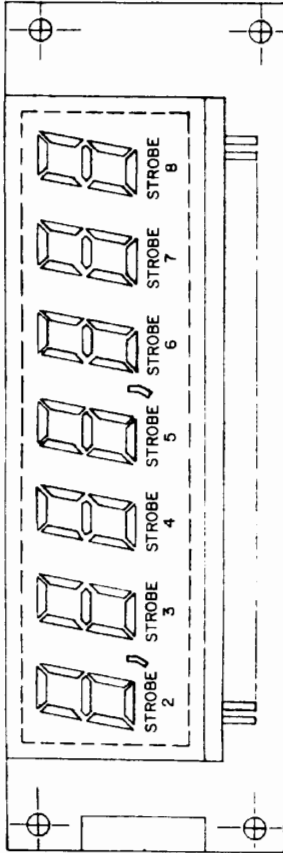
- NOTES:**
1. ALL RESISTORS, 1/4 WATT UNLESS OTHERWISE NOTED.
 2. ALL CAPACITORS, MFD. UNLESS OTHERWISE NOTED.



TOLERANCES		QTY.		ASSEMBLY ON	
UNLESS OTHERWISE SPECIFIED					
FRACTIONAL	±.005"	WILLIAMS ELECTRONICS, INC.		3401 N. CALIFORNIA CHICAGO, ILL. 60618 287-2340	
DECIMAL	±.005"	NAME		SCHEMATIC, SOUND BOARD	
HOLE DIA.	±.002 - .005"	MATERIAL	HEAT TREATMENT	FINISH	
ANGULAR	±.010"	DATE		SCALE	
CONCENTRICITY	T.I.R. .005"	10-10-79		16D-8224	
SCREW THREADS	CLASS 2	APP'D		%	
		R 48			

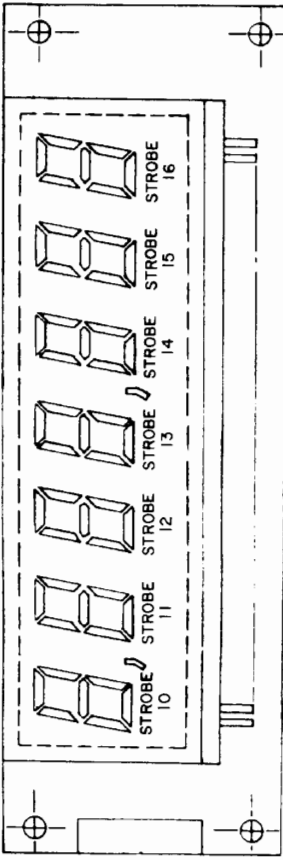
Sound Board Logic Diagram
17/18

PLAYERS #1 & #3



5J1
5J3

PLAYERS #2 & #4



5J2
5J4

**4J1/5J1 (PLAYER 1)
4J3/5J3 (PLAYER 3)**

- 1 100,000's
- 2 -100V KEEP ALIVE
- 3 1,000,000's
- 4 f SEGMENT
- 5 N/C
- 6 g SEGMENT
- 7 +100V (N/C)
- 8 e SEGMENT
- 9 10,000's
- 10 d SEGMENT
- 11 1,000's
- 12 +100V KEEP ALIVE
- 13 100's
- 14 COMMA
- 15 10's
- 16 c SEGMENT
- 17 N/C
- 18 b SEGMENT
- 19 UNITS
- 20 a SEGMENT

**4J2/5J2 (PLAYER 2)
4J4/5J4 (PLAYER 4)**

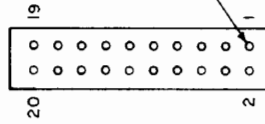
- 1 100,000's
- 2 -100V KEEP ALIVE
- 3 1,000,000's
- 4 f SEGMENT
- 5 N/C
- 6 g SEGMENT
- 7 +100V (N/C)
- 8 e SEGMENT
- 9 10,000's
- 10 d SEGMENT
- 11 1,000's
- 12 +100V KEEP ALIVE
- 13 100's
- 14 COMMA
- 15 10's
- 16 c SEGMENT
- 17 N/C
- 18 b SEGMENT
- 19 UNITS
- 20 a SEGMENT

4J8/5J5 (CREDIT/MATCH)

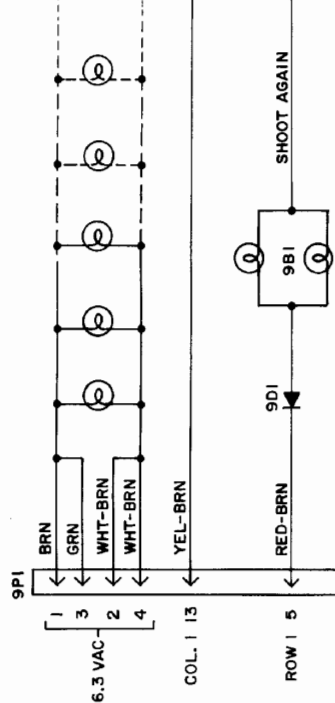
- 1 f Segment (Credit)
- 2 -100V Keep Alive
- 3 e' Segment
- 4 g' Segment
- 5 c' Segment
- 6 d' Segment
- 7 b' Segment
- 8 10's
- 9 Units
- 10 a' Segment
- 11 e Segment
- 12 f Segment
- 13 10's
- 14 d Segment
- 15 +100V Keep Alive
- 16 c Segment
- 17 g Segment
- 18 b Segment
- 19 Units
- 20 a Segment

DETAIL A

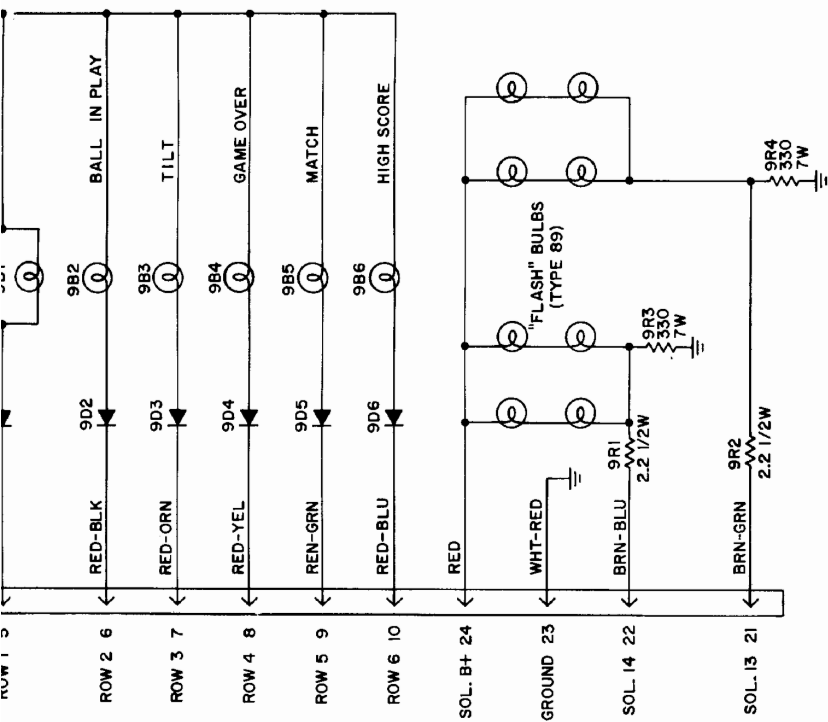
4J1 - 4J4, 4J8
5J1 - 5J5
CONNECTORS



PIN 1
RED LEAD

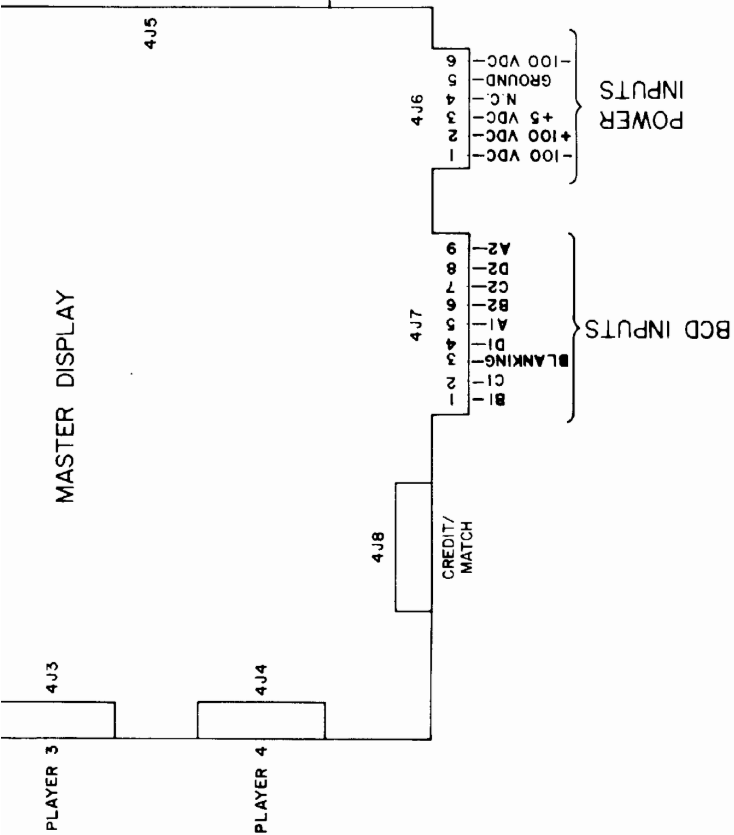


18 - COMMA 1 & 2
17 - STROBE 14
16 - STROBE 15
15 - STROBE 11

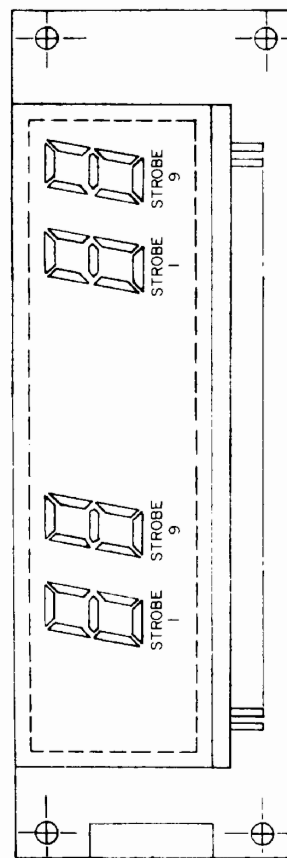


STROBE INPUTS

- 17 - STROBE 14
- 16 - STROBE 15
- 15 - STROBE 11
- 14 - STROBE 16
- 13 - STROBE 13
- 12 - STROBE 12
- 11 - STROBE 7
- 10 - STROBE 6
- 9 - STROBE 5
- 8 - STROBE 4
- 7 - STROBE 3
- 6 - STROBE 2
- 5 - STROBE 1
- 4 - STROBE 9
- 3 - STROBE 8
- 2 - STROBE 10
- 1 - COMMA 3 & 4

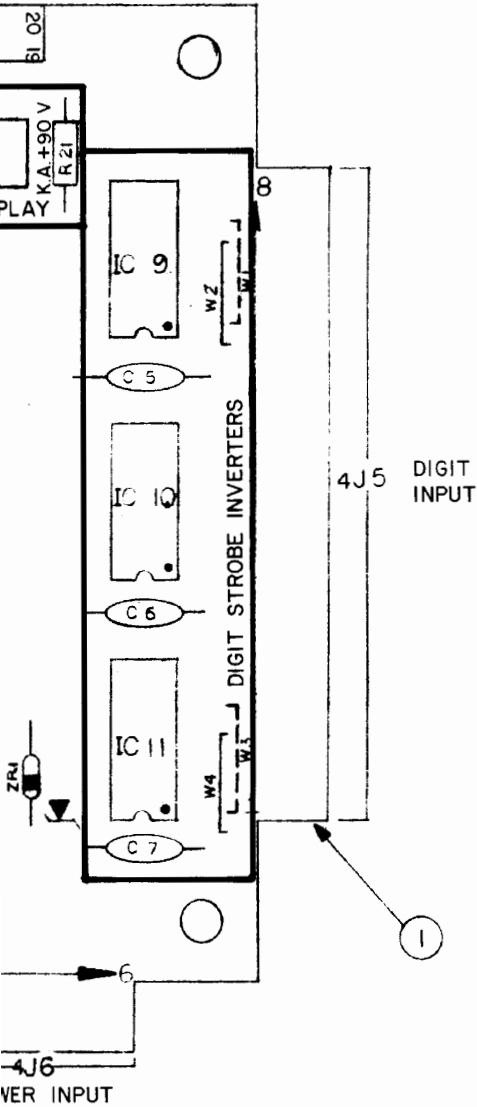


CREDITS / BALL IN PLAY



BILL OF MATERIAL

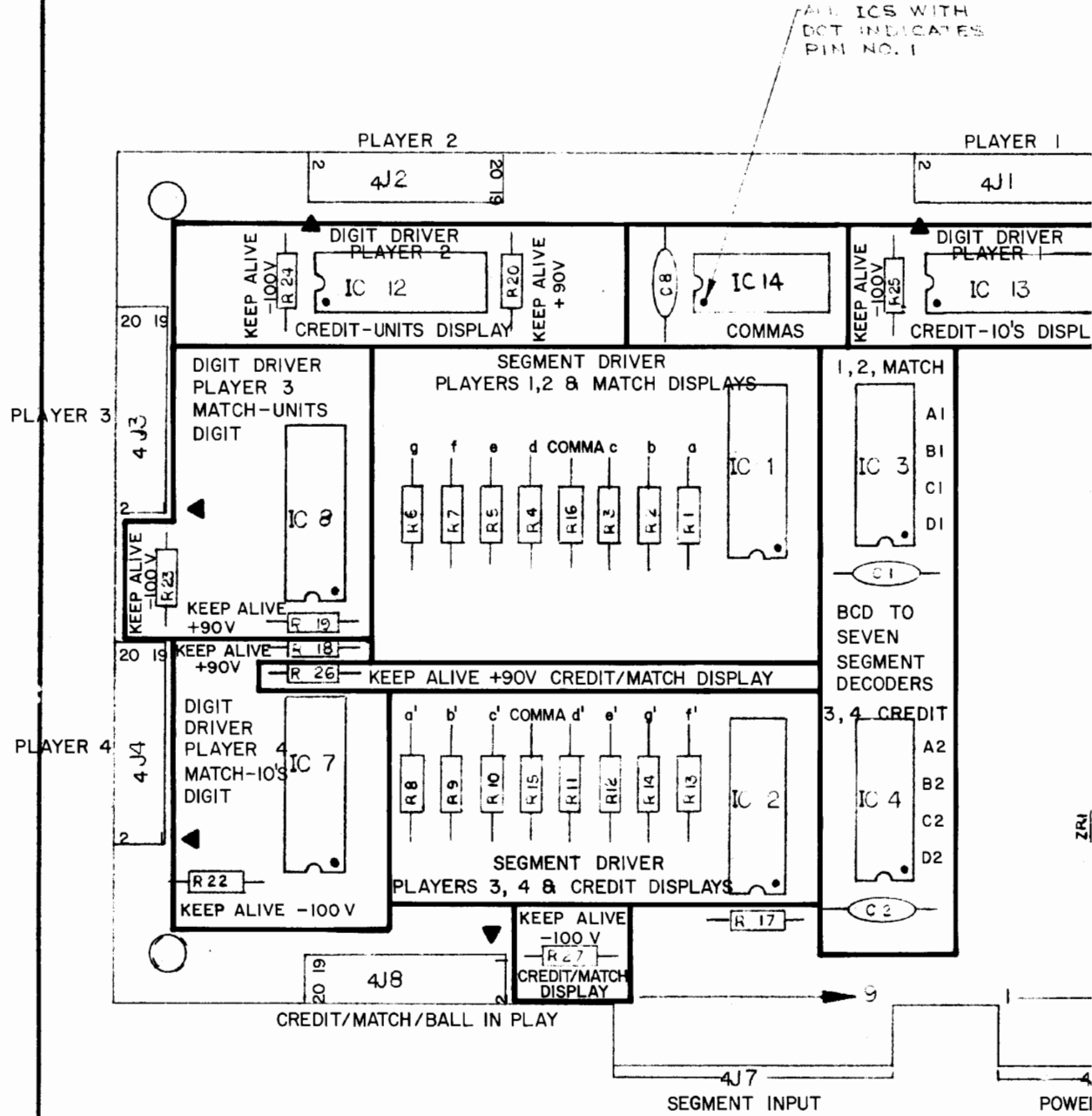
ITEM NO.	PART NO.	PART DESIGNATION	DESCRIPTION	REQ'D U.O.
1	LC-2001-152-B		BARE P.C. BOARD	1
2	5A-8971	IC9, IC10, IC11	MC14069 HEX. INVERTER	3
3	5A-8970	IC3, IC4	MC14543 BCD TO SEVEN SEGMENT LATCH DECODER/DRIVER	2
4	5A-8969	IC1, IC2	UDN-7190 GAS DISCHARGE DISPLAY SEGMENT DRIVER	2
5	5A-8968	IC7, IC8, IC12, IC13	UDN-6184A OR UDN-6184A GAS DISCHARGE DISPLAY SEGMENT DR.	4
6		IC14	MC14081 QUAD 2-INPUT AND GATE	1
7	5B-8981	R1-R14	RESISTOR, FC, 10K OHM 10% 1/2 WATT	14
8	5A-9135	2R1	IN4740A ZENER DIODE 10V, 5% 1W	1
9	5A-8980	C1, C2, C5 THRU C8	CAPACITOR CERAMIC, 01 MFD, 50V	6
10		W2, W4	JUMPER #22 GA SOLID WIRE	2
11	5A-9086	R17	RESISTOR, FC, 6.8K OHM 10% 1/4 WATT	1
12	5B-8982	R18 THRU R27	RESISTOR, FC, 3 MEG. OHM 10% 1/4 WATT	10
13		J8, J1 THRU J4	20 PIN RIBBON HEADER	5
14		R15, R16	RESISTOR, 15K OHM, 10% 1/2 WATT	2



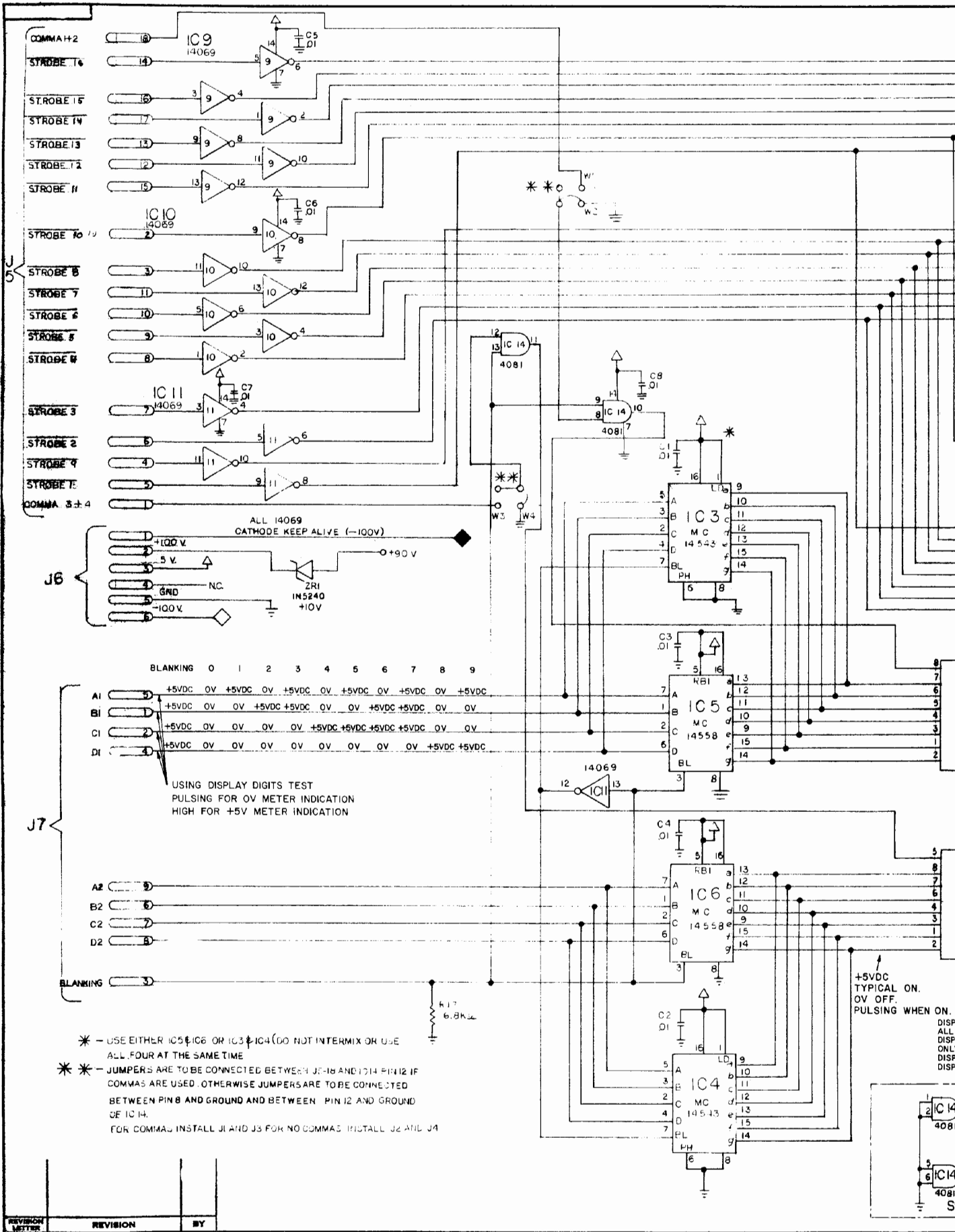
DIGIT CROSS REFERENCE

DIGIT	7-SEGMENT DECODER/DRIVER	STROBE (DRIVER)
Credit 10's	IC4/IC2	1 (IC13)
Credit Units	IC4/IC2	9 (IC12)
Match 10's	IC3/IC1	1 (IC7)
Match Units	IC3/IC1	9 (IC8)
#1 1,000,000	IC3/IC1	2 (IC13)
#1 100,000's	IC3/IC1	3 (IC13)
#1 10,000's	IC3/IC1	4 (IC13)
#1 1,000's	IC3/IC1	5 (IC13)
#1 100's	IC3/IC1	6 (IC13)
#1 10's	IC3/IC1	7 (IC13)
#1 Units	IC3/IC1	8 (IC13)
#2 1,000,000's	IC3/IC1	10 (IC12)
#2 100,000's	IC3/IC1	11 (IC12)
#2 10,000's	IC3/IC1	12 (IC12)
#2 1,000's	IC3/IC1	13 (IC12)
#2 100's	IC3/IC1	14 (IC12)
#2 10's	IC3/IC1	15 (IC12)
#2 Units	IC3/IC1	16 (IC12)
#3 1,000,000's	IC4/IC2	2 (IC8)
#3 100,000's	IC4/IC2	3 (IC8)
#3 10,000's	IC4/IC2	4 (IC8)
#3 1,000's	IC4/IC2	5 (IC8)
#3 100's	IC4/IC2	6 (IC8)
#3 10's	IC4/IC2	7 (IC8)
#3 Units	IC4/IC2	8 (IC8)
#4 1,000,000's	IC4/IC2	10 (IC7)
#4 100,000's	IC4/IC2	11 (IC7)
#4 10,000's	IC4/IC2	12 (IC7)
#4 1,000's	IC4/IC2	13 (IC7)
#4 100's	IC4/IC2	14 (IC7)
#4 10's	IC4/IC2	15 (IC7)
#4 Units	IC4/IC2	16 (IC7)
#1 Comma	-/IC1	2,5 (IC13)
#2 Comma	-/IC2	10,13 (IC12)
#3 Comma	-/IC1	2,5 (IC8)
#4 Comma	-/IC2	10,13 (IC7)

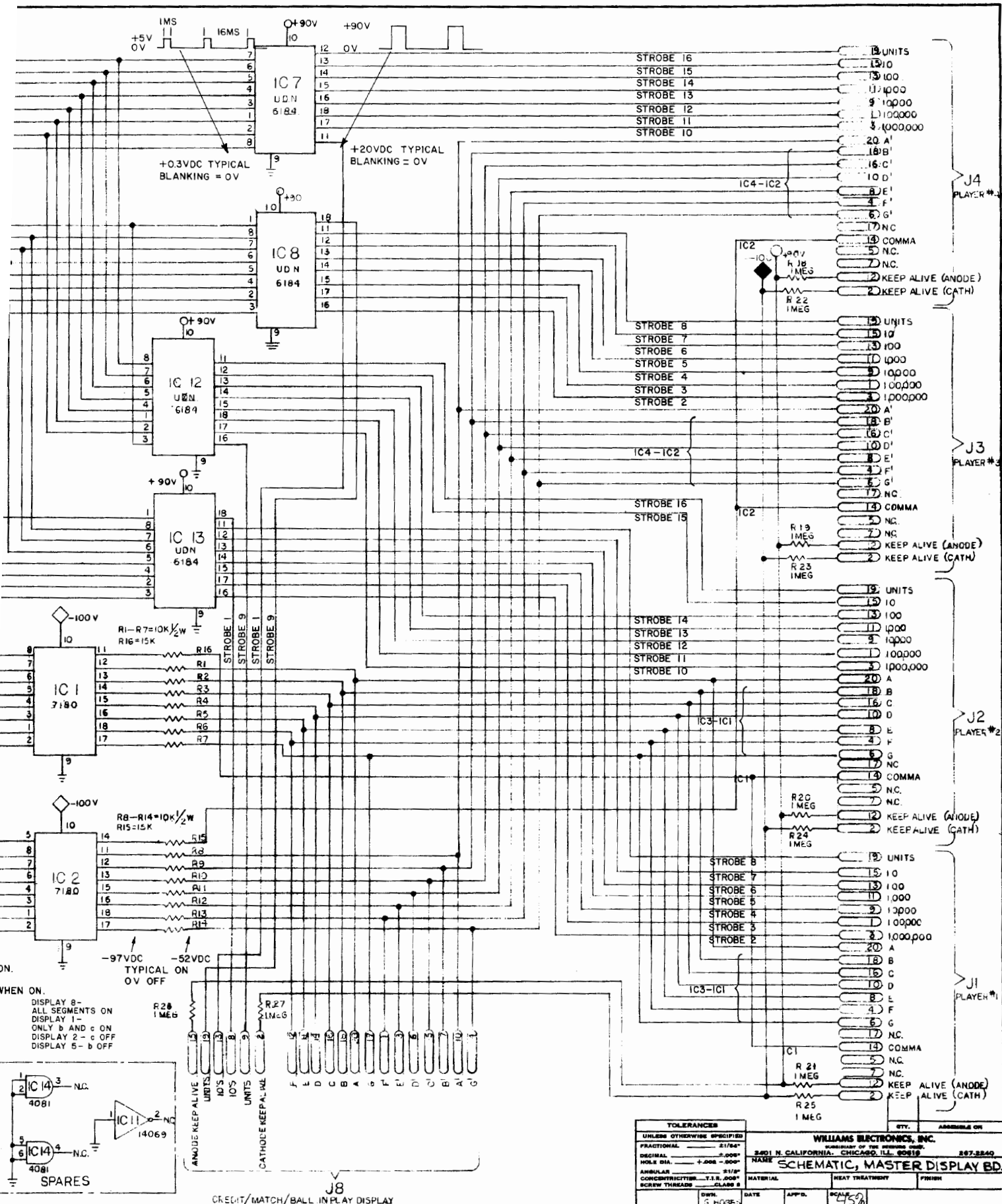
TOLERANCES		QTY.	ASSEMBLE ON
UNLESS OTHERWISE SPECIFIED			
FRACTIONAL	± 1/64"		
DECIMAL	± .005"		
HOLE DIA.	± .002 - .000"		
ANGULAR	± 1/8"		
CONCENTRICITIES	T.Y.R. .005"		
SCREW THREADS	CLASS 2		
WILLIAMS ELECTRONICS, INC. SUBSIDIARY OF THE SECURITY CORP. OF DELAWARE 3401 N. CALIFORNIA CHICAGO, ILL. 60618 CORNELIA 7-2240			
NAME MASTER DISPLAY BOARD ASSEMBLY			
MATERIAL		HEAT TREATMENT	FINISH
DWN. G.H.	DATE 5-23-80	APP'D.	SCALE 2:1 5/10



REVISION LETTER	REVISION	BY



REVISION	REVISION	BY
METER		



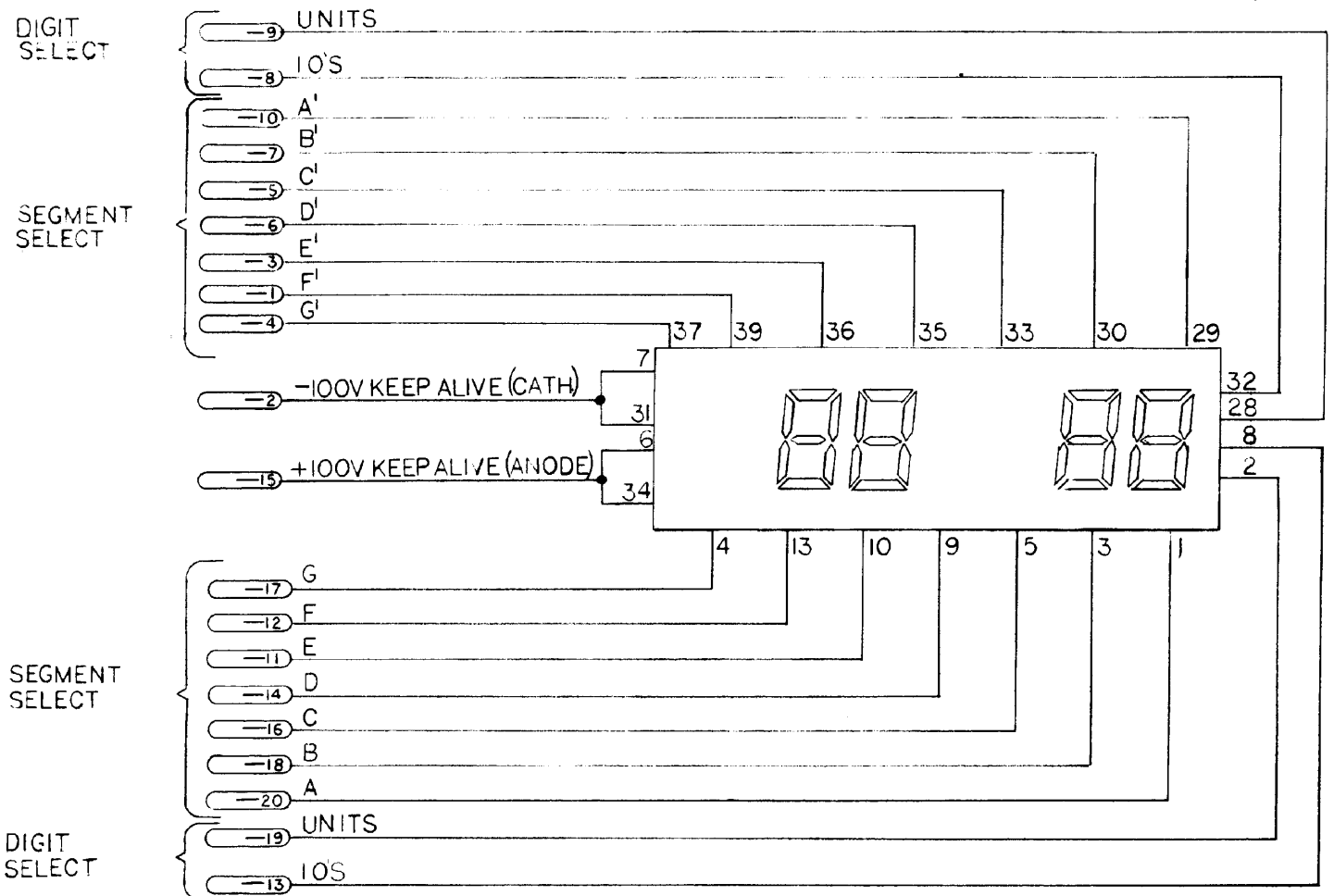
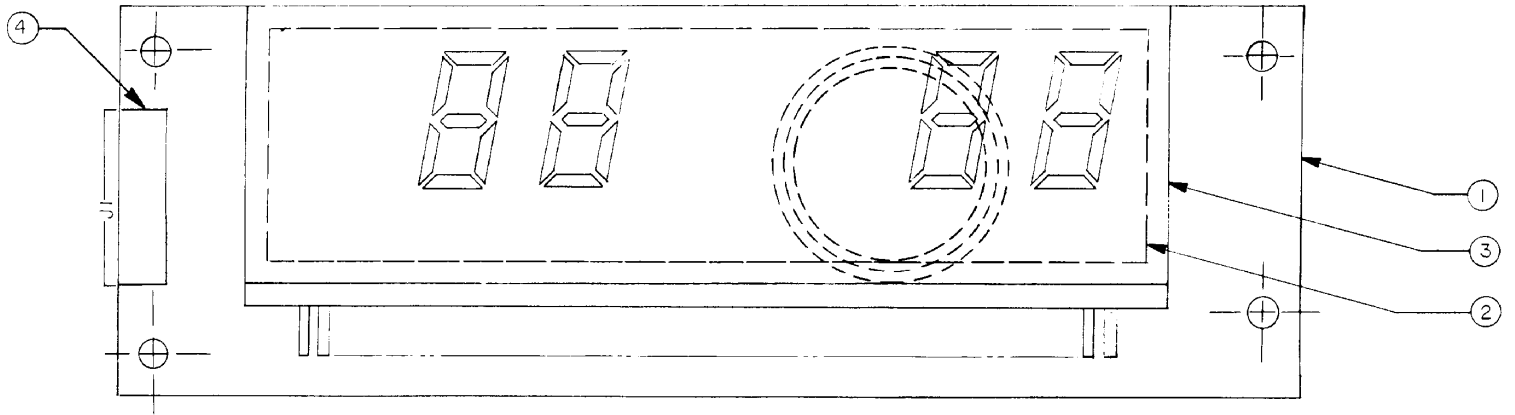
CREDIT/MATCH/BALL IN PLAY DISPLAY

TOLERANCES		UNLESS OTHERWISE SPECIFIED	
FRACTIONAL	21/64"		
DECIMAL	±.0008"		
HOLE DIA.	+.0008"		
ANGULAR	±1/2°		
CONCENTRICITY	±.001"		
SCREW THREADS	CLASS 2		

WILLIAMS ELECTRONICS, INC.			
SUBSIDIARY OF THE SPERRY CORP.			
2401 N. CALIFORNIA - CHICAGO, ILL. 60618		897-8840	
NAME: SCHEMATIC, MASTER DISPLAY BD.			
MATERIAL	HEAT TREATMENT	FINISH	
DATE	APP'D.	SCALE	
3, 1963		45%	

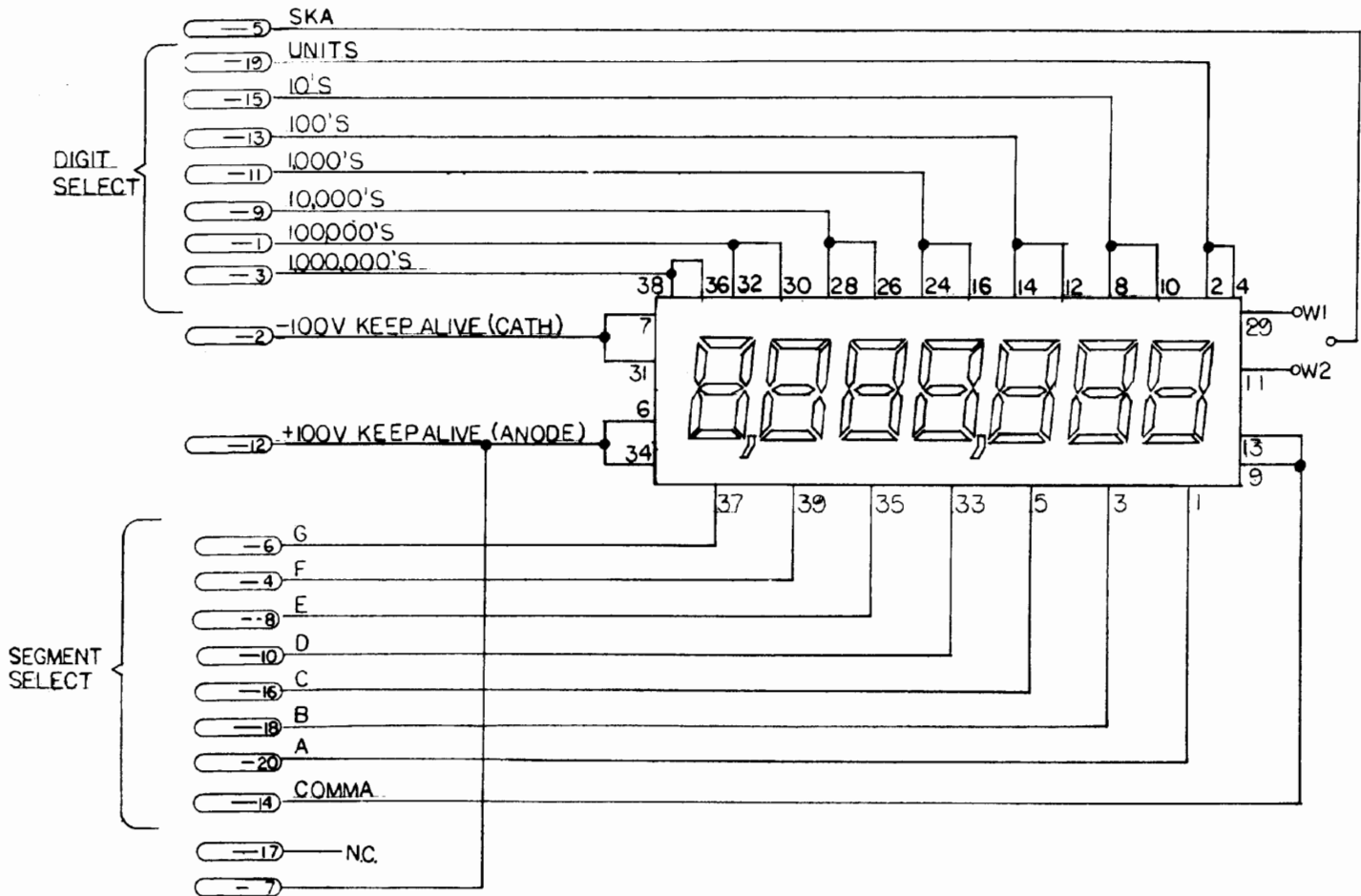
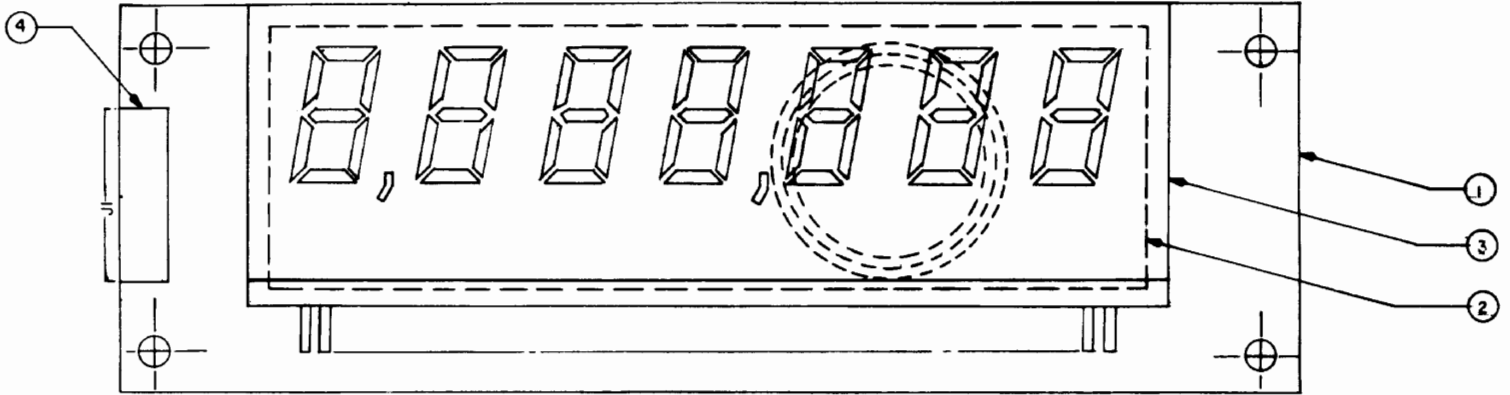
C 8363 Master Display Board Logic Diagram

BILL OF MATERIAL				
ITEM	PART NO.	PART DESIGNATION	DESCRIPTION	REQ'D
1	5767-0946B-00		CREDIT/MATCH SLAVE PC BOARD	1
2	23-6545		FOAM DISPLAY - BACK	1
3	5610-0944B-00		4-DIGIT DISPLAY	1
4	5791-0941B-00	J1	20 PIN RIBBON HEADER	1
5	23-6546		FOAM DISPLAY - FRONT	1
6	03-1513-2		CAPLUG	1

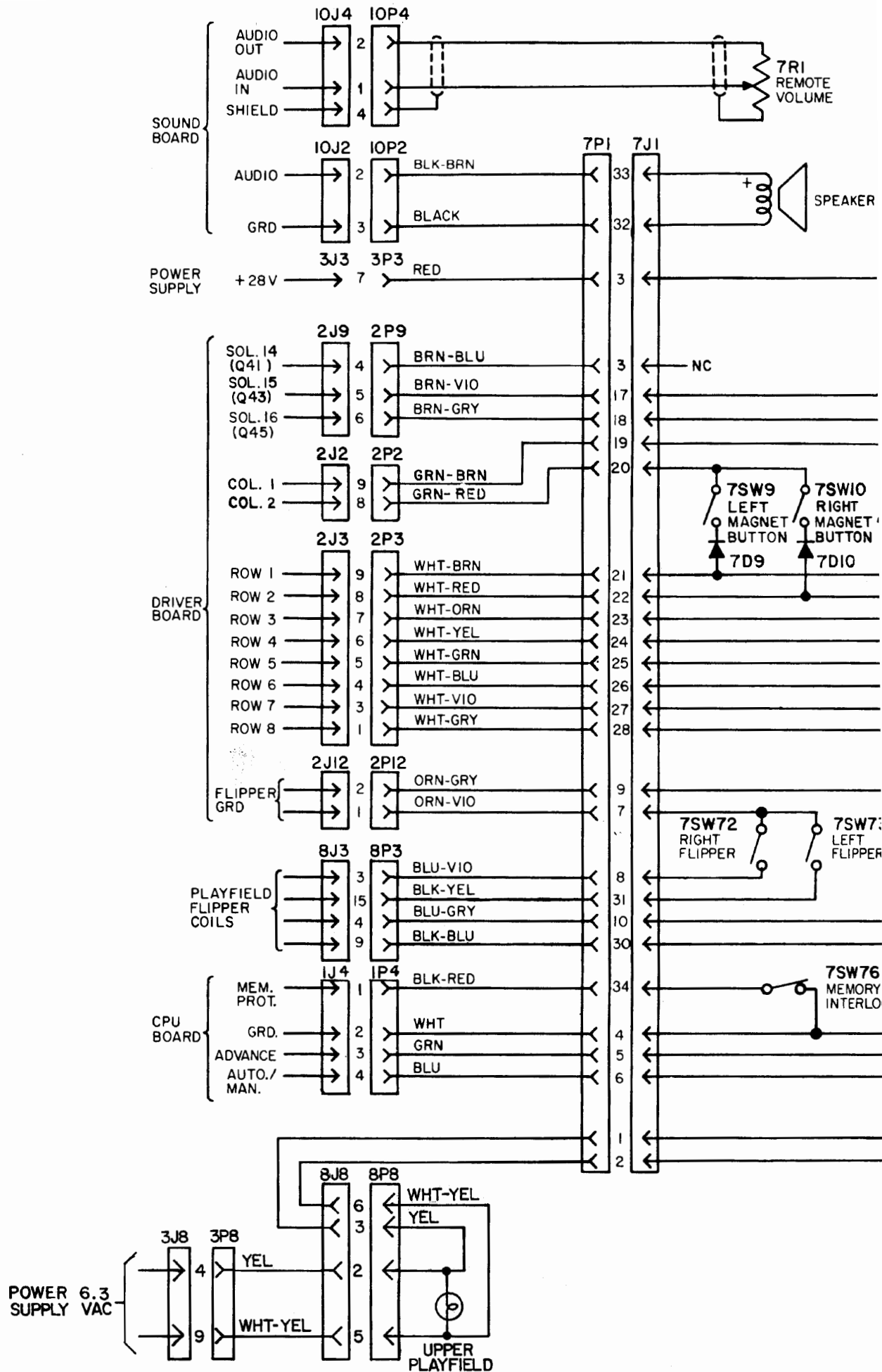


C 8365 CREDIT/MATCH SLAVE DISPLAY

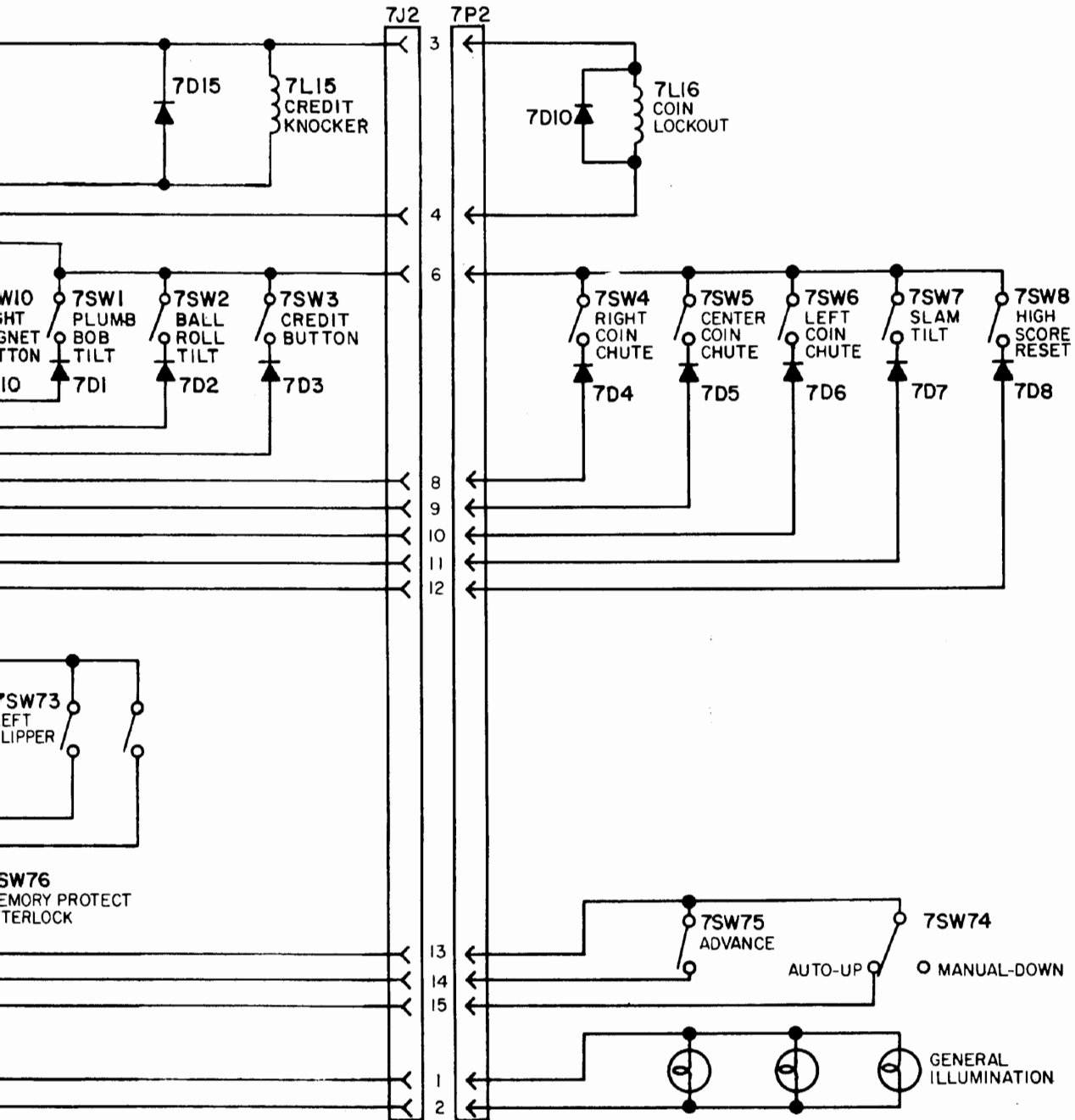
BILL OF MATERIAL				
ITEM	PART NO.	PART DESIGNATION	DESCRIPTION	REQ'D.
1	5162-0844B-KP		SLAVE DISPLAY P.C. BOARD	1
2	23-664B		DISPLAY MTG ADHESIVE FOAM	1
3	2470-0847B-KP		7 DIGIT DISPLAY	1
4	5781-0847B-KP	J1	20 PIN RIBBON HEADER	1
5	05-7812-2		CAPLUG	1

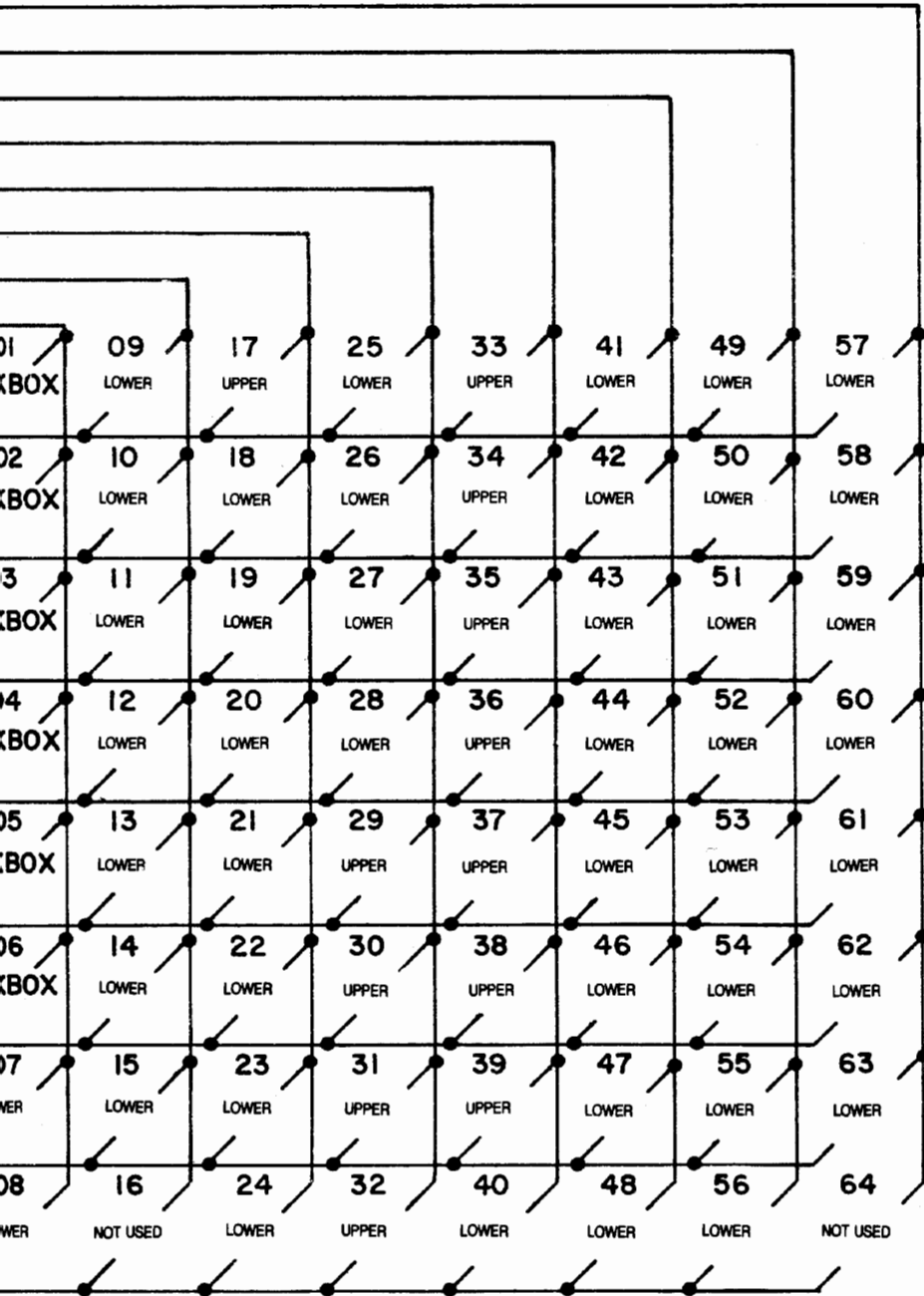
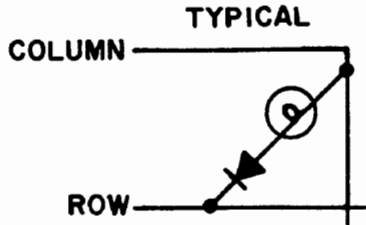


C 8364 PLAYER SLAVE DISPLAY



AKER





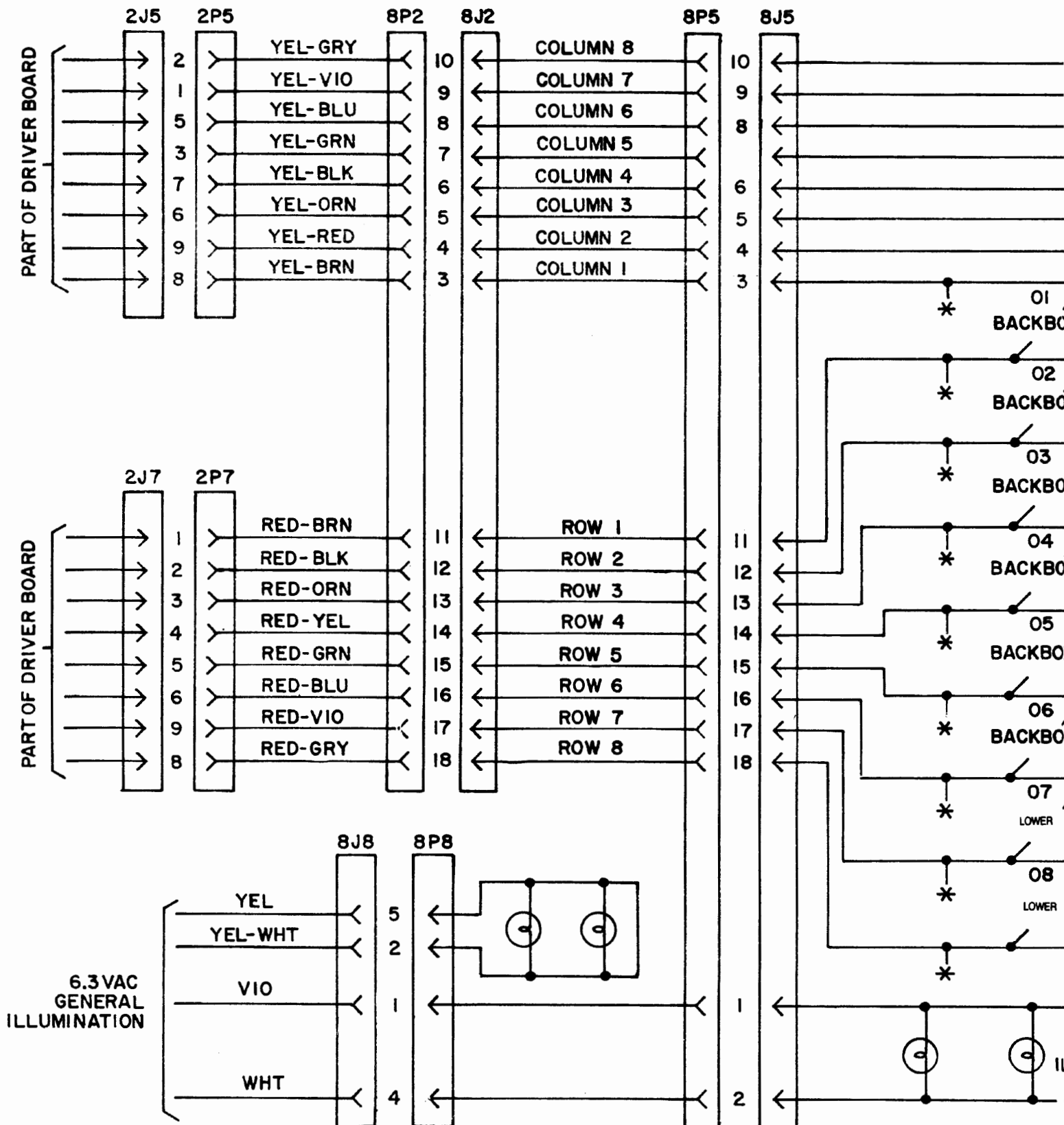
Bulb

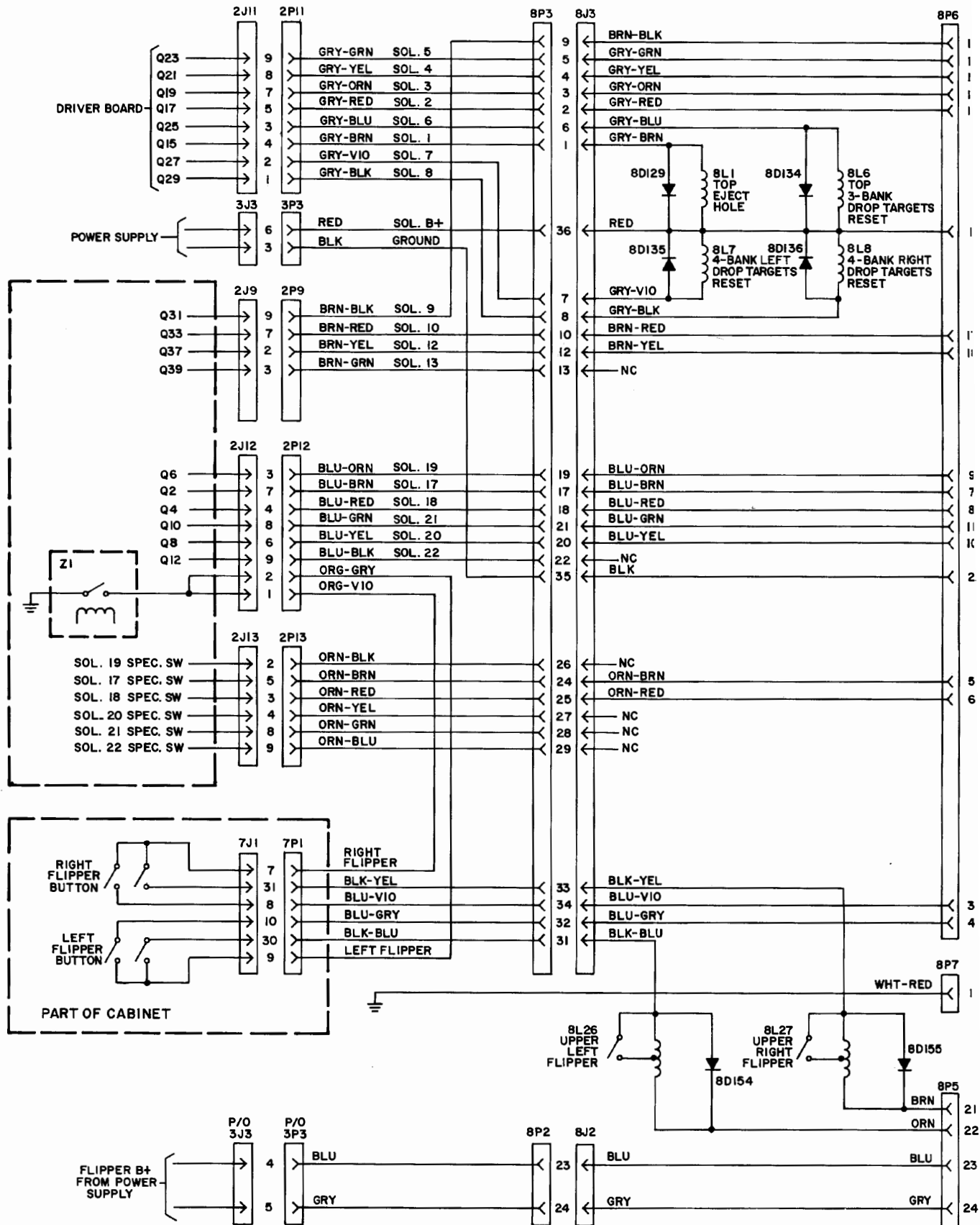
- | No. | Function |
|-----|------------------------------------|
| 01 | Same Player Shoots Again (Backbox) |
| 02 | Ball in Play |
| 03 | Tilt |
| 04 | Game Over |
| 05 | Match |
| 06 | High Score to Date |
| 07 | Left Magnet "1" |
| 08 | Left Magnet "2" |
| 09 | Left Magnet "3" |
| 10 | Right Magnet "1" |
| 11 | Right Magnet "2" |
| 12 | Right Magnet "3" |
| 13 | Let Drain Shield |
| 14 | Right Drain Shield |
| 15 | Shoot Again (Playfield) |
| 16 | Not Used |
| 17 | Top Eject Hole Lock Arrow |
| 18 | Bottom Right Eject Hole Lock Arrow |
| 19 | Bottom Left Eject Hole Lock Arrow |
| 20 | Ramp "S" |
| 21 | Ramp "O" |
| 22 | Ramp "L" |
| 23 | Ramp "A" |
| 24 | Ramp "R" |
| 25 | Right Bull's-Eye Special |
| 26 | Right Ramp Mystery |
| 27 | Bottom Left 3-Bank |
| 28 | Bottom Right 3-Bank |
| 29 | Top 3-Bank |
| 30 | Horseshoe "25" |
| 31 | Horseshoe "50" |
| 32 | Horseshoe Drain Shield |
| 33 | 4-Bank 2X |
| 34 | 4-Bank 3X |
| 35 | 4-Bank "20" |
| 36 | 4-Bank "40" |
| 37 | 4-Bank "60" |
| 38 | 4-Bank "80" |
| 39 | 4-Bank "100" |
| 40 | "F" |
| 41 | "I" |
| 42 | "R" |
| 43 | "E" |
| 44 | "S" |
| 45 | "O" |
| 46 | "L" |
| 47 | "A" |
| 48 | "R" |
| 49 | "1" Bonus |
| 50 | "2" Bonus |
| 51 | "4" Bonus |
| 52 | "8" Bonus |
| 53 | "16" Bonus |
| 54 | "32" Bonus |
| 55 | Multi-Ball "1" Bonus |
| 56 | Multi-Ball "2" Bonus |
| 57 | Multi-Ball "4" Bonus |
| 58 | Multi-Ball "8" Bonus |
| 59 | Multi-Ball "16" Bonus |
| 60 | Multi-Ball "32" Bonus |
| 61 | SOLAR Gun 3 Seconds |
| 62 | SOLAR Gun 5 Seconds |
| 63 | SOLAR Gun 10 Seconds |
| 64 | Not Used |

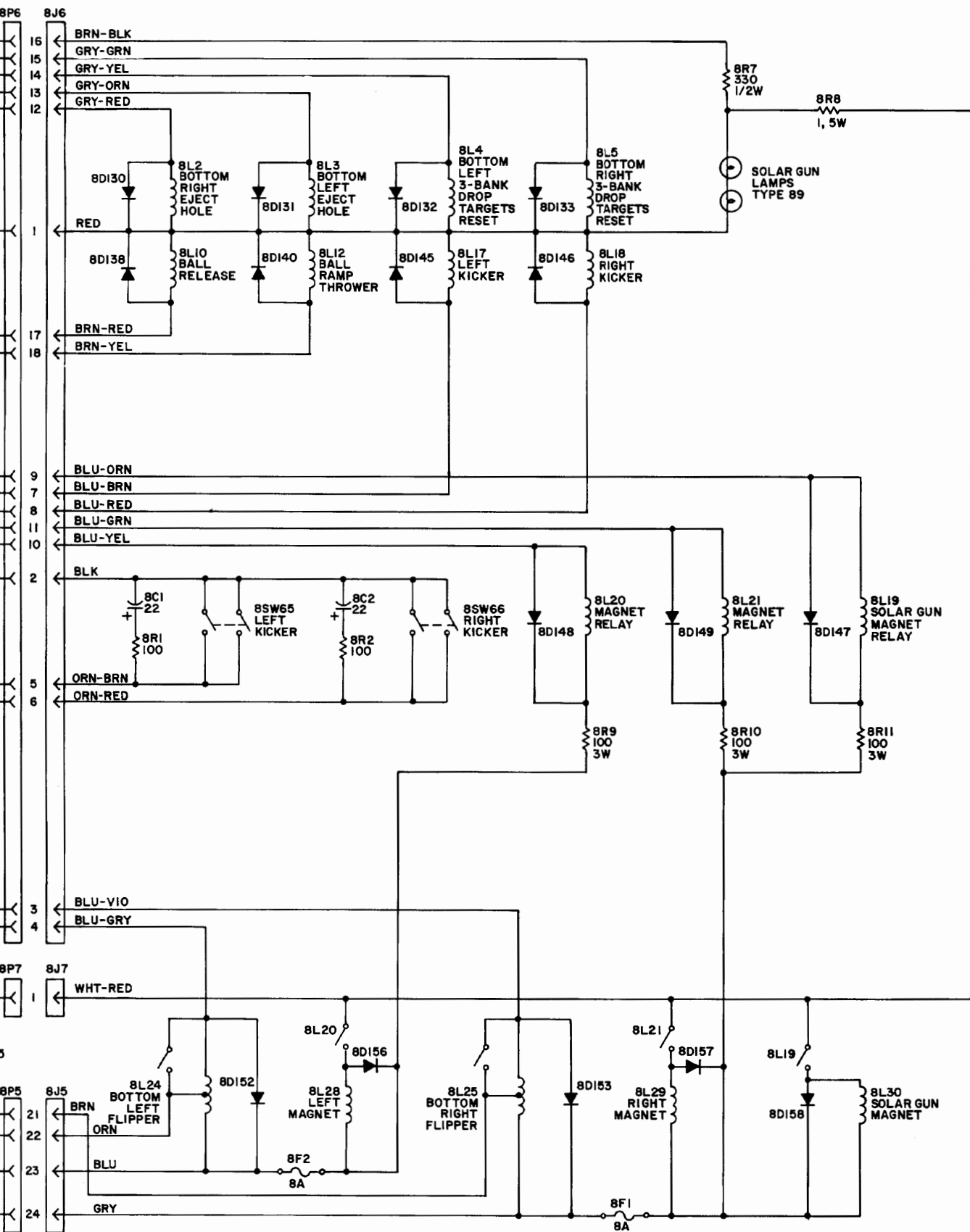
* SEE INSERT BOARD WIRING DIAGRAM FOR CONNECTIONS FOR BACKBOX LAMPS.

ONLY CONNECTIONS TO LAMPS IN LOWER PLAYFIELD ARE ROUTED THRU 8P5/8J5.

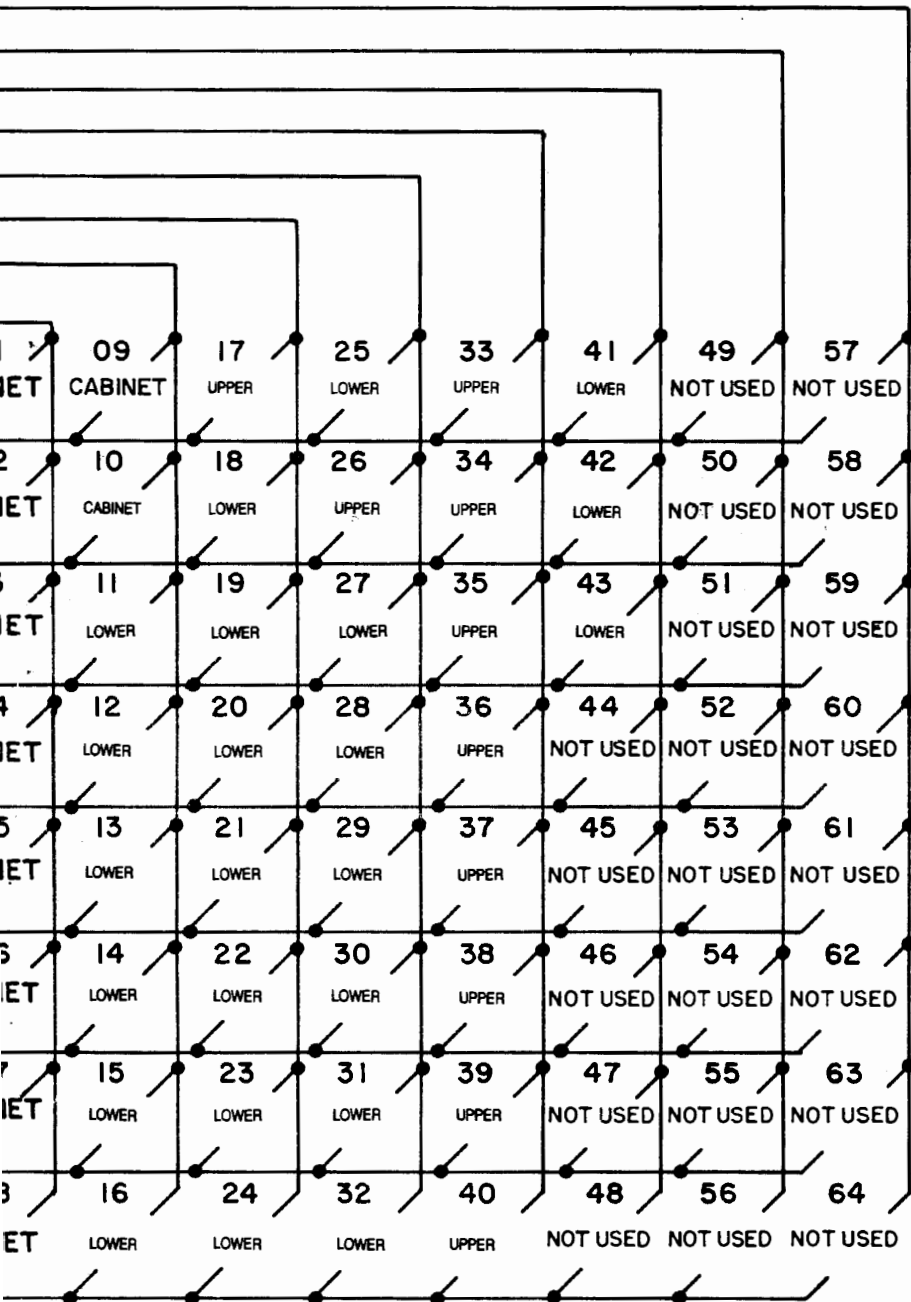
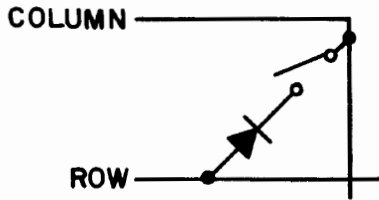
GENERAL ILLUMINATION







TYPICAL



Switch

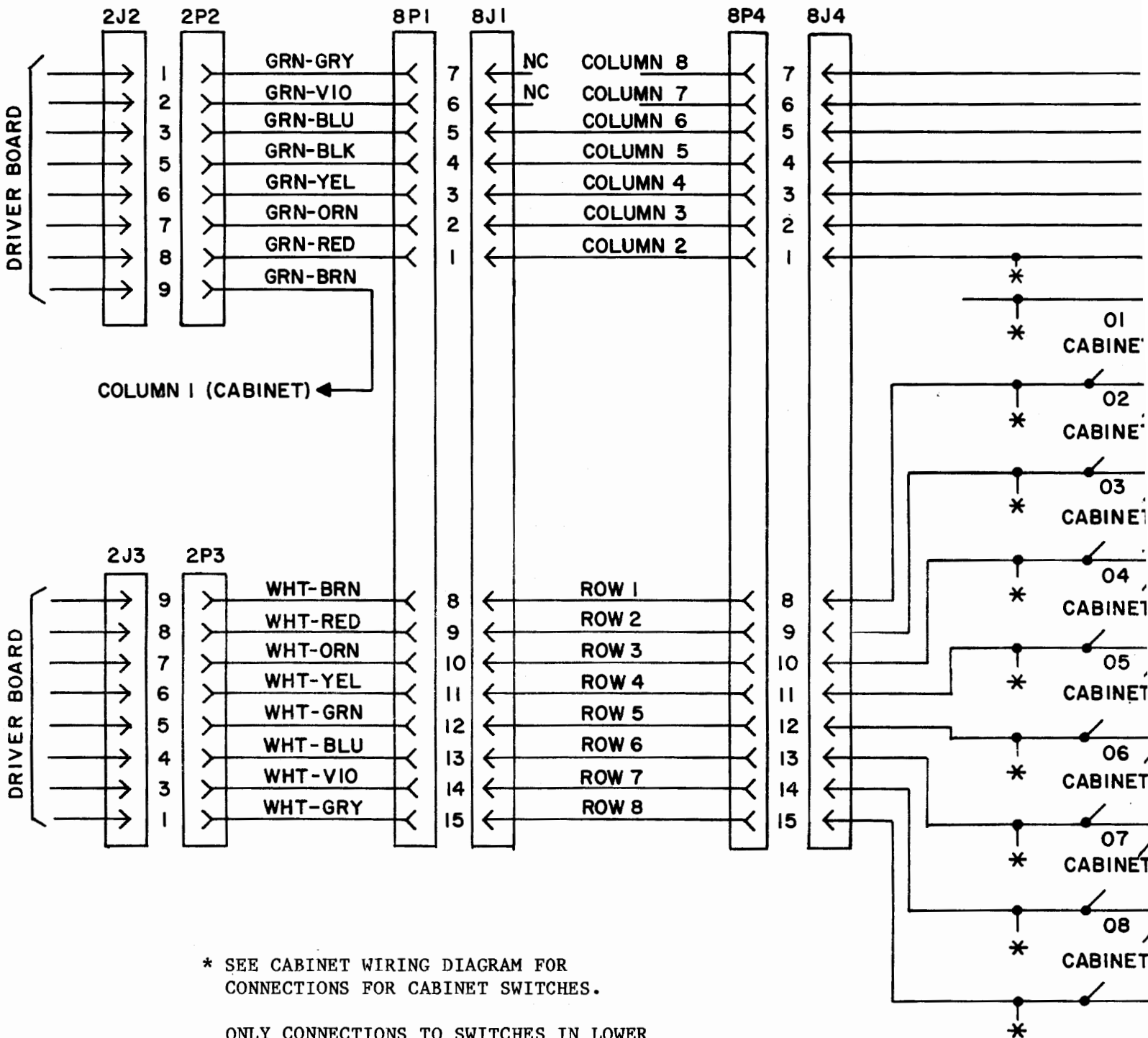
No. Function (Score*)

- 01 Plumb Bob Tilt
- 02 Ball Roll Tilt
- 03 Credit Button
- 04 Right Coin Switch
- 05 Center Coin Switch
- 06 Left Coin Switch
- 07 Slam Tilt
- 08 High Score Reset
- 09 Left Magnet Button
- 10 Right Magnet Button
- 11 Left Kicker (10)
- 12 Right Kicker (10)
- 13 Left Outlane (5,000)
- 14 Right Outlane (5,000)
- 15 Left Inside Rollover (1,000)
- 16 Right Inside Rollover (1,000)
- 17 Top Eject Hole (5,000/10,000)
- 18 Bottom Right Eject Hole (5,000/10,000)
- 19 Bottom Left Eject Hole (5,000/10,000)
- 20 Outhole
- 21 Ball Ramp Right Switch
- 22 Ball Ramp Center Switch
- 23 Ball Ramp Left Switch
- 24 Ballshooter Trough
- 25 Right Bulls-Eye Target (10,000)
- *26 Right Ramp Rollunder (5,000/Mystery)
- 27 Bottom Left 3-Bank, Bottom Target (1,000)
- 28 Bottom Left 3-Bank, Middle Target (1,000)
- 29 Bottom Left 3-Bank, Top Target (1,000)
- 30 Bottom Right 3-Bank, Top Target (1,000)
- 31 Bottom Right 3-Bank, Middle Target (1,000)
- 32 Bottom Right 3-Bank Bottom Target (1,000)
- 33 Top 3-Bank Bottom Target (1,000)
- 34 Top 3-Bank Middle Target (1,000)
- 35 Top 3-Bank Top Target (1,000)
- 36 4-Bank "1" (Left) Target (1,000)
- 37 4-Bank "2" Target (1,000)
- 38 4-Bank "3" Target (1,000)
- 39 4-Bank "4" (Right) Target (1,000)
- 40 Horseshoe Rollover (10,000/Lit Value)
- 41 SOLAR Ramp Target (10,000)
- 42 SOLAR Gun (5,000/10,000 Per Second)
- 43 Playfield Tilt

*All scores doubled when letter in F-I-R-E is flashing.

Mystery for switch 26 (awarded when lit) is spotting magnet lamps, letter in S-O-L-A-R, or Drain Shield, or scoring random point values.

With full bonus(es), 1,000 points is awarded in place of each bonus advance.



* SEE CABINET WIRING DIAGRAM FOR CONNECTIONS FOR CABINET SWITCHES.

ONLY CONNECTIONS TO SWITCHES IN LOWER PLAYFIELD ARE ROUTED THRU 8P4/8J4.