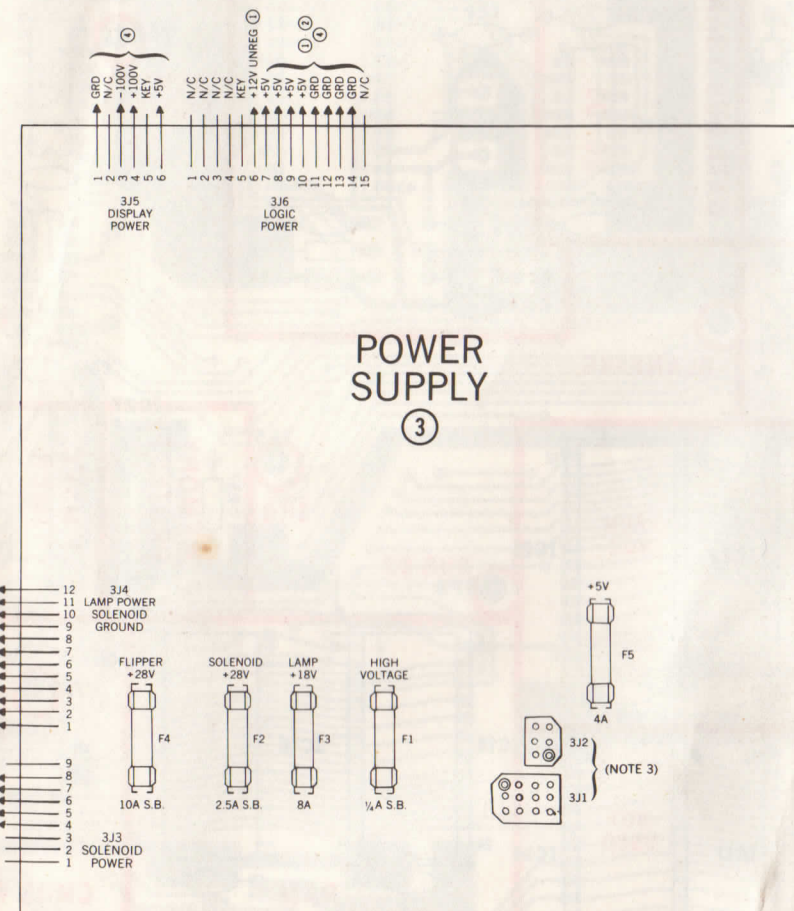
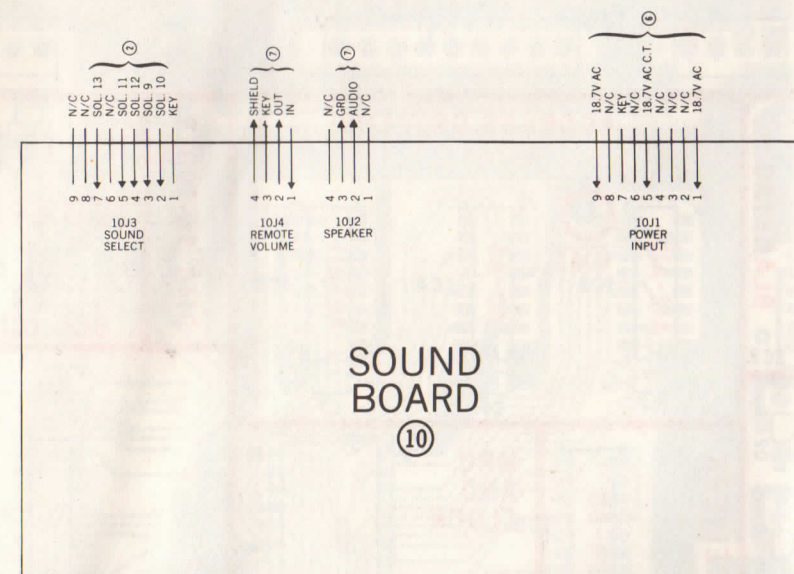
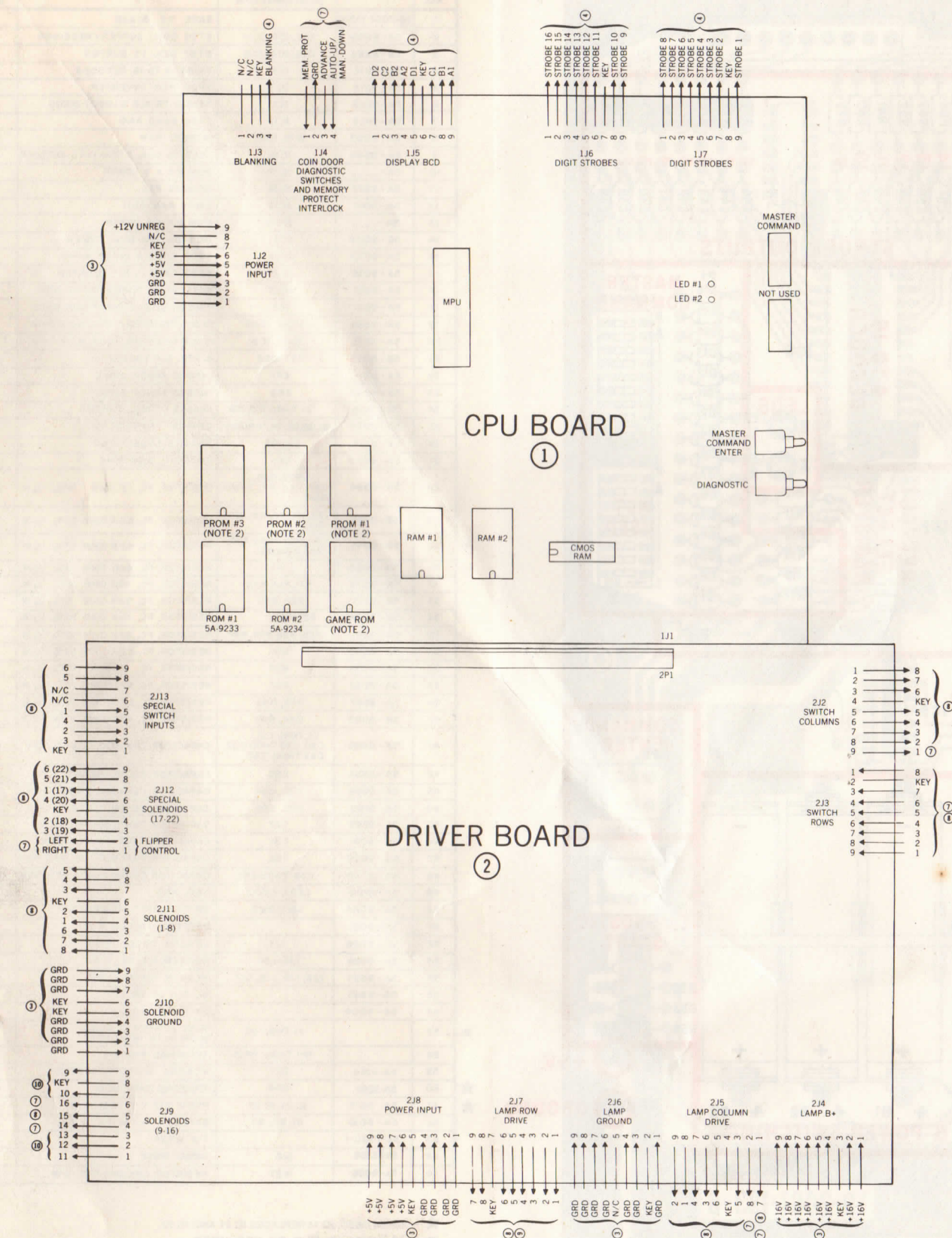




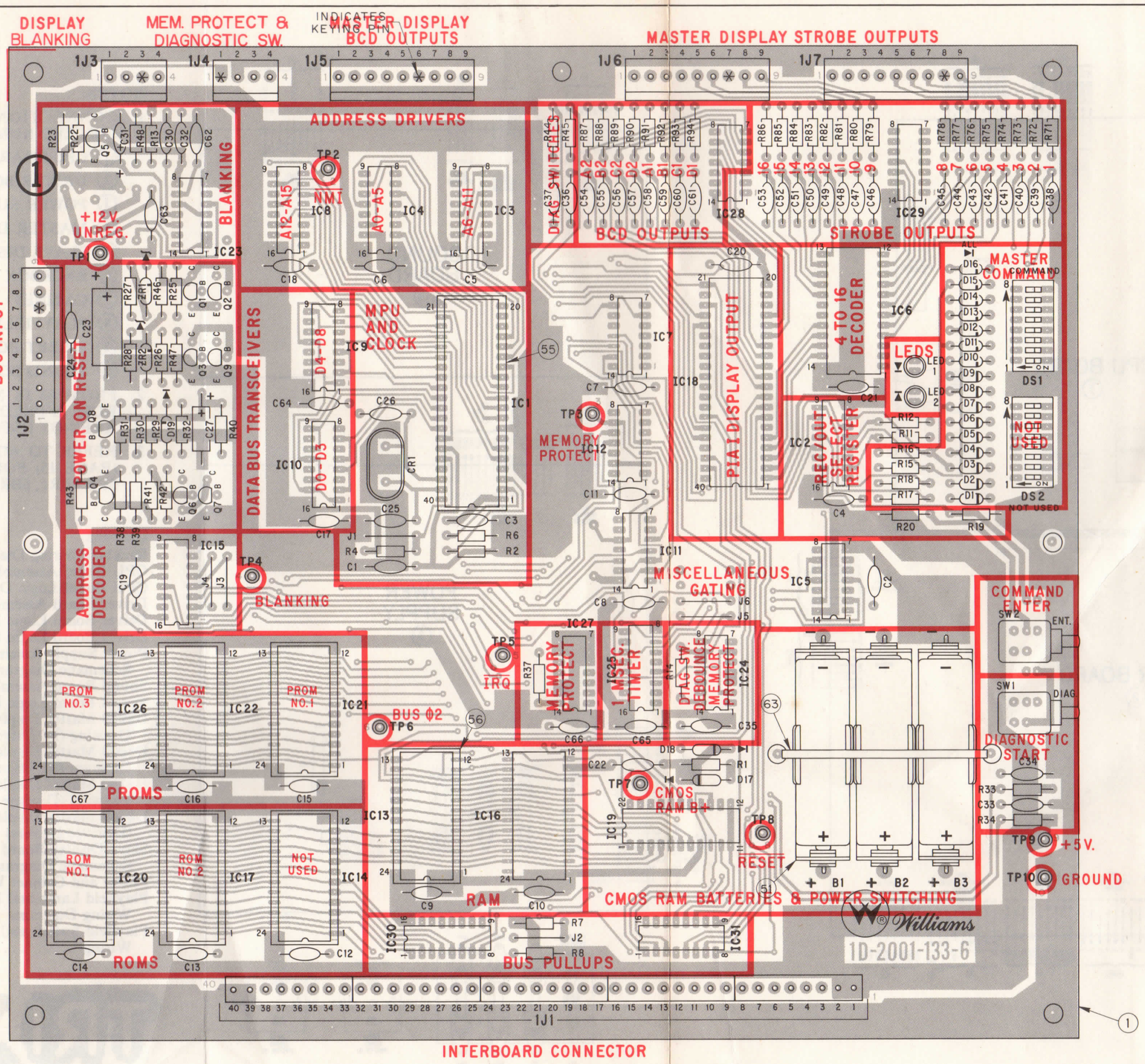
NOTES:

- CONNECTIONS ARE INDICATED BY CIRCLED NUMBERS AS FOLLOWS:
 - CPU BOARD
 - DRIVER BOARD
 - POWER SUPPLY BOARD
 - MASTER DISPLAY BOARD
 - SLAVE DISPLAY BOARD
 - BACKBOX
 - CABINET
 - PLAYFIELD
 - INSERT BOARD
 - SOUND BOARD
- PROM #3 IS NOT USED. WHEN GAME ROM IS USED, PROM #1 AND PROM #2 ARE NOT USED.
- REFER TO POWER WIRING DIAGRAM (PAGE 15) FOR CONNECTIONS TO 3P1, 3P2, 6BR1, 6BR2, 6F1, 6F2, AND 6F3.

Drawing	Page No.
Backbox Wiring Diagram	1
CPU Board Assembly Drawing	2
CPU Board Logic Diagram	3
Driver Board Assembly Drawing	4
Driver Board Logic Diagram (Sheet 1 of 2)	5
Driver Board Logic Diagram (Sheet 2 of 2)	6
Power Supply Assembly and Schematic Diagrams	7
Sound Board Assembly Drawing	8
Sound Board Logic Diagram	9
D8000 Master Display Board Assembly Drawing (IC Drivers)	10
D8000 Master Display Board Logic Diagram (IC Drivers)	11
D8169 Master Display Board Assembly Drawing (Discrete Drivers)	12
D8169 Master Display Board Logic Diagram (Discrete Drivers)	13
Slave Display Board Assembly and Schematic Diagrams	14
Power and Cabinet Wiring Diagrams	15
Playfield Lamp and Solenoid Wiring Diagrams	16
Playfield Switch and Insert Board Wiring	17

TRI ZONE

REVISION LETTER	REVISION
D	REVISED AND REDRAWN REVISED DWG. TO CONFORM TO ARTWORK NO. 1B-2001-133 LATEST ISSUE NO. 6. R. GAY, 1-8-79
E	ITEM NO. 3, MFG'S PT. NO. WAS IN5991. E.C.O. 4670 R. GAY, 1-31-79

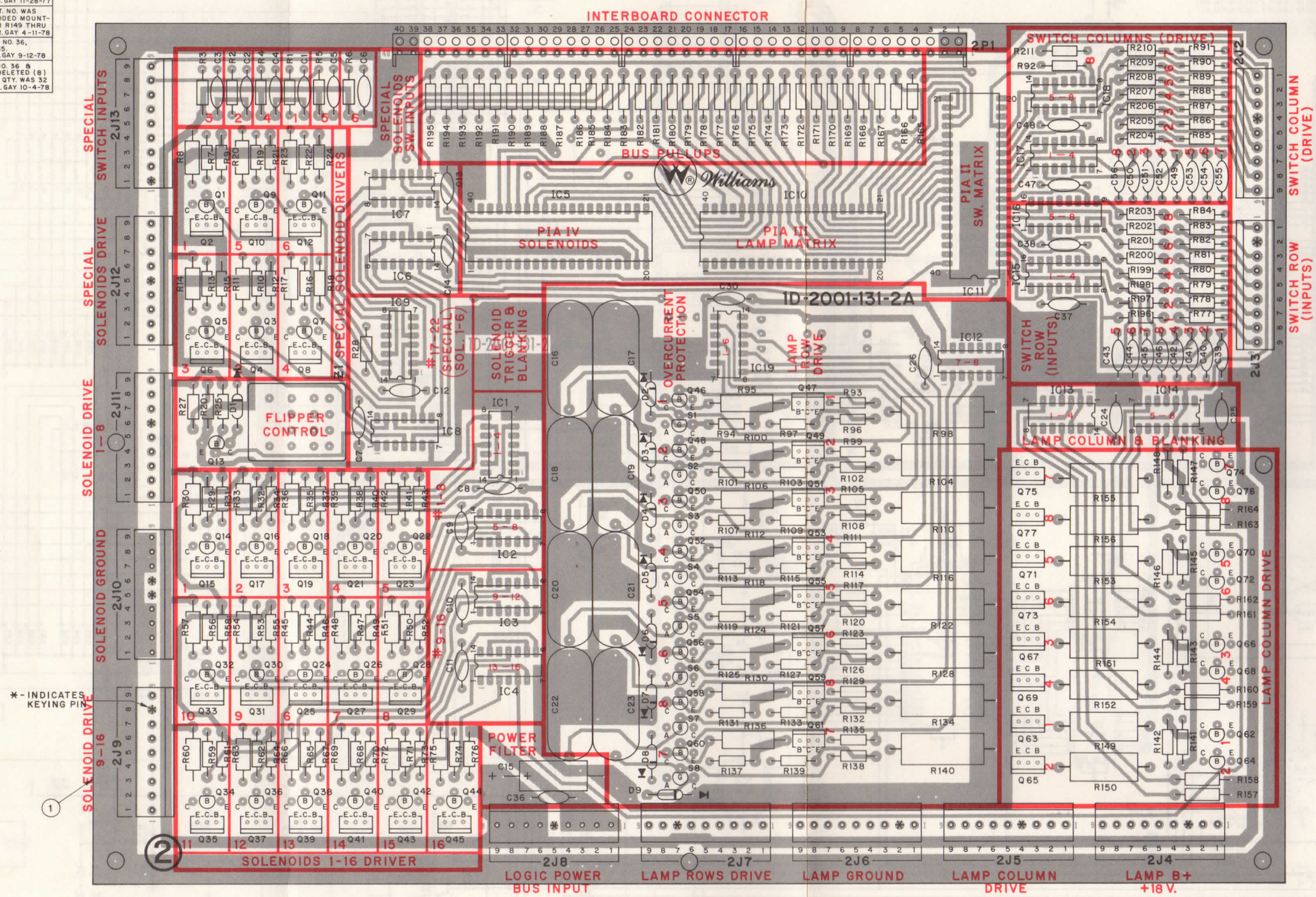


BILL OF MATERIAL				
ITEM NO.	PART NO.	PART DESIGNATION	DESCRIPTION	REQ'D. NO.
1	1B-2001-133-6		BARE P.C. BOARD	1
2	5A-8990	IC2, IC9, IC10	8T28 QUAD BUFFER/RECEIVER	3
3	5A-8989	IC3, IC4, IC8	8T97 HEX. TS BUFFER	3
4	5A-9010	IC6	74154 4 TO 16 DECODER	1
5	5A-9013	IC7	7404 HEX. INVERTER	1
6	5A-9235	IC11	74LS10 TRIPLE 3 INPUT NAND	1
7	5A-8973	IC12	7408 QUAD AND	1
8	5A-9003	IC13, IC16	MC6810 RAM	2
9	5A-9246	IC15	74LS139 DUAL 2 TO 4 LINE DECODER	1
10	5A-9017	IC17	ROM 2K X 8 LOWER	1
11	5A-8972	IC18	MC6820 PIA	1
12	5A-9017	IC19	CMOS RAM 5101	1
13	5A-9017	IC20	ROM 2K X 8 UPPER	1
14	5C-9002	IC23	MC3456/556 DUAL TIMER	1
15	5A-9073	IC24	7400 QUAD 2 INPUT NAND	1
16	5A-9236	IC25	4020 CMOS 14 BIT COUNTER	1
17	5A-9237	IC27	4071 CMOS QUAD 2 INPUT NOR	1
18	5A-9247	IC5	74LS02 QUAD 2 INPUT NOR GATE	1
19	5A-9238	IC28, IC29	13 DIP RESISTOR/PACK, 4.7K OHM	2
20	5A-9239	IC30, IC31	15 DIP RESISTOR/PACK, 4.7K OHM	2
21	5B-9025	DS1, DS2	8 STN. DIP SWITCH	2
22	5A-9018	ZR1	1N5996 ZENER DIODE	1
23	5A-9240	ZR2	1N5990 ZENER DIODE	1
24	5A-8919	D1 THRU D17, D19	1N4148 DIODE, SILICON	19
25	5C-8938	Q1, Q2, Q3, Q6 THRU Q9	2N4401 TRANSISTOR	9
26	5C-9016	Q4, Q5	2N4403 TRANSISTOR	2
27	5A-9020	CR1	CRYSTAL, 3.58 MHZ	1
28	5B-8984	R20, R25, R26, R48, R71 THRU R94	RESISTOR, FC, 1K OHM 10% 1/4 W.	28
29	5B-8983	R2, R6, R7, R8, R23, R30	RESISTOR, FC, 3.3K OHM 10% 1/4 W.	6
30	5B-8991	R4, R13 THRU R19, R33, R34, R41	RESISTOR, FC, 4.7K OHM 10% 1/4 W.	11
31	5A-9033	R1	RESISTOR, FC, 680 OHM 5% 1/4 W.	1
32	5B-9036	R11, R12, R42	RESISTOR, FC, 100 OHM 10% 1/4 W.	3
33	5B-9113	R22, R40	RESISTOR, FC, 33K OHM 5% 1/4 W.	2
34	5B-9034	R27, R28	RESISTOR, FC, 10K OHM 10% 1/4 W.	2
35	5A-9241	R29, R38, R46, R47	RESISTOR, FC, 22K OHM 10% 1/4 W.	4
36	5A-8998	R31	RESISTOR, FC, 2.2K OHM 10% 1/4 W.	1
37	5A-9039	R32	RESISTOR, FC, 10 OHM 10% 1/4 W.	1
38	5A-9242	R37	RESISTOR, FC, 300K OHM 10% 1/4 W.	1
39	5A-8997	R39, R43	RESISTOR, FC, 2.7K OHM 10% 1/4 W.	2
40	5B-9083	R44, R45	RESISTOR, FC, 470 OHM 10% 1/4 W.	2
41	5A-8980	C1, THRU C21, C30, C33 THRU C37, C63 THRU C67	CAPACITOR, CERAMIC, .01 MFD. 50 V.	30
42	5A-8986	C23	CAPACITOR, ELECT., 100 MFD. 10 V.	1
43	5A-8996	C22, C24	CAPACITOR, CERAMIC, 1 MFD. 50 V.	2
44	5A-9169	C25, C26	CAPACITOR, CERAMIC, 27 PFD. 1K V.	2
45	5A-9243	C27	CAPACITOR, TANT., 10 MFD. 10 V.	1
46	5A-9031	C31	CAPACITOR, TANT., 1 MFD. 25 V.	1
47	5A-9030	C32	CAPACITOR, CERAMIC, .047 MFD. 50 V.	1
48	5A-9065	C38 THRU C62	CAPACITOR, CERAMIC, 470 PFD. 50 V.	25
49	5A-9019	LED1, LED2	LED, RED	2
50	5A-9024	SW1, SW2	SWITCH, SPDT MOMENTARY	2
51	5A-9021		BATTERY HOLDER #171	1
52	5A-9026	J1	HEADER 09-64-1083	5
53	5A-9028	J3, J4	HEADER 09-65-1041	2
54	5A-9027	J2, J5, J6, J7	HEADER 09-65-1091	4
55	5A-8985		40 PIN IC SOCKET	1
56	5A-9004		24 PIN IC SOCKET	7
57		J1 THRU J6	WIRE JUMPER 22 GAUGE WIRE WITH INSULATION	6
58		TP1 THRU TP10	TERMINAL #1502-1	10
59	5A-9250	IC1	MC6808 MICROPROCESSOR	1
60	5A-9286	IC14	TRI-ZONE GAME ROM	1
61	5A-9015	IC21, IC22	PROM 512 X 8 7641/6341	2
62	5A-9022	B1, B2, B3	BATTERY, ALKALINE, 1.5 V.	3
63	3A-7520-1		TIE WRAP	1
64	5A-9266	D18	1N5817 DIODE	1
65	5A-9086	R97	RESISTOR, 68K OHM 10% 1/4 W.	1

★ - WHEN USED, IC 14 REPLACES IC 21 AND IC 22.
 ✱ - J2 THRU J4, R1 & R4 NOT USED.

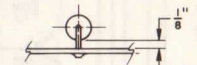
WILLIAMS ELECTRONICS, INC.				
SUBSIDIARY OF XCOR CORPORATION				
3401 N. CALIFORNIA CHICAGO, ILL. 60618 CORNELIA, 7-2240				
PART NAME CPU BOARD ASSEMBLY				
DWN. R. Gay	DATE 1-11-79	APP'D.	SCALE 2=1	PART NO. D-8161

REVISION LETTER	REVISION
C	REVISED AND REDRAWN R. GAY 11-28-77
D	ITEM NO. 28, PT. NO. WAS 5A-8999 B. ADDED MOUNT- ING NOTE FOR R149 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



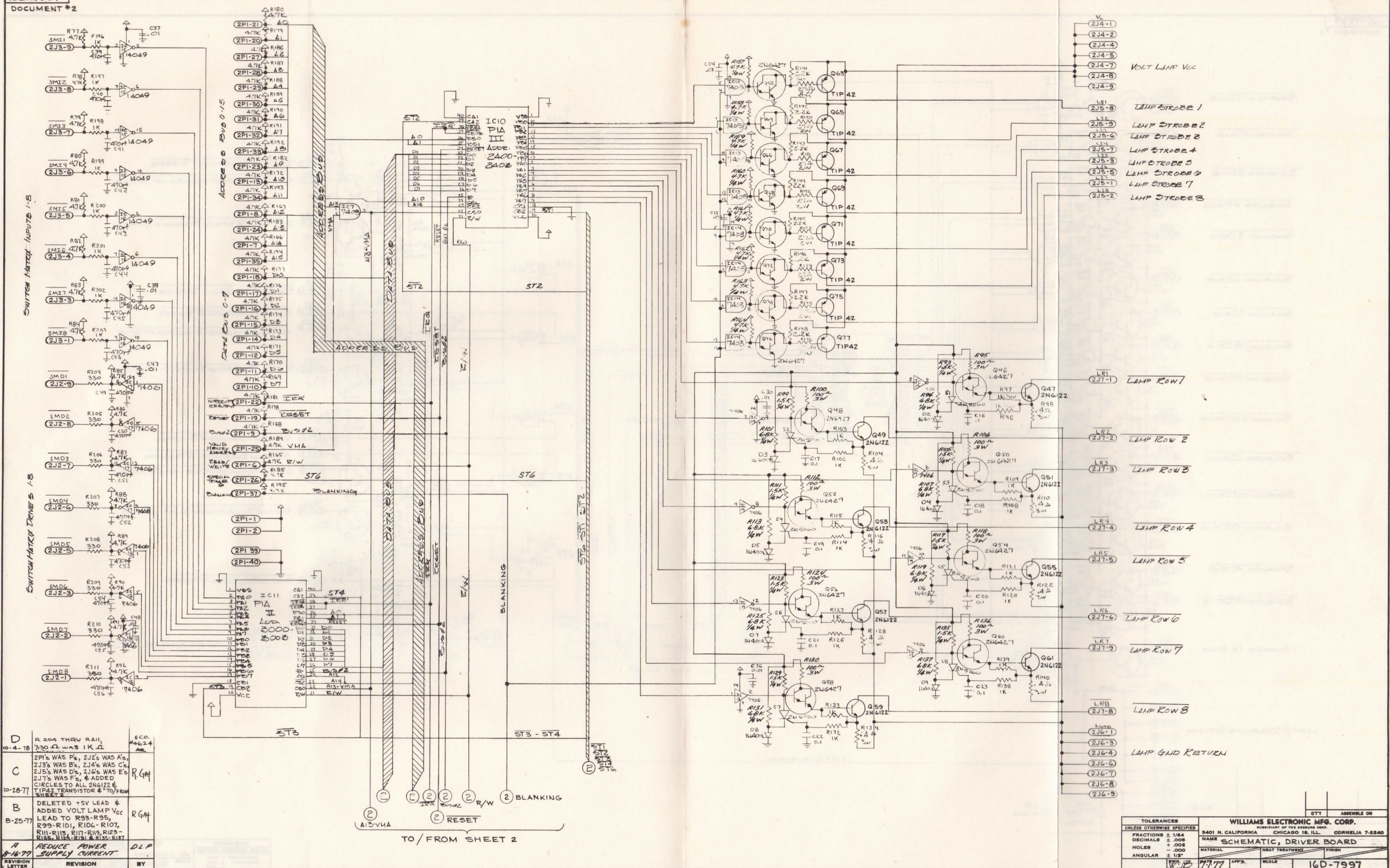
BILL OF MATERIAL				
ITEM NO.	PART NO.	PART DESIGNATION	DESCRIPTION	REQ'D. NO.
1	1B-2001-131		BARE P.C. BOARD	1
2	5A-8948	IC8, IC9	N7402 QUADRUPLE 2 INPUT POSITIVE NOR GATE	2
3	5A-8974	IC12, IC17, IC18, IC19	N7405 HEX. INVERTER BUFFER DRIVERS W/ OPEN COLLECTOR HIGH VOLTAGE OUTPUTS	4
4	5A-8973	IC1 THRU IC4, IC6, IC7, IC13, IC14	N7408 QUADRUPLE 2 INPUT POSITIVE NOR 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-8959	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, Q14, Q16, Q18, Q20, Q22, Q24, Q26, Q28, Q30, Q32, Q34, Q36, Q38, Q40, Q42, Q44	TIP120 DARLINGTON NPN POWER TRANSISTOR	22
10	5A-8978	Q65, Q66, Q67, Q69, Q71, Q73, Q75, Q77	TIP42 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, 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, R136, 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% 1/2 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	R98, 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	R95, 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 COIL 6 V.D.C.	1
34	5A-9066	2P1	8 PIN RECEPTACLE	5
35	5A-9027	2J2 THRU 2J13	9 PIN HEADER	12
36	5A-9001	R204 THRU R211	RESISTOR, FC, 330 OHM 10% 1/4 W	8

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

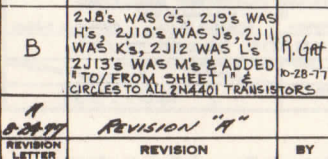


WILLIAMS ELECTRONICS, INC.				
SUBSIDIARY OF XCOR CORPORATION				
3401 N. CALIFORNIA CHICAGO, ILL. 60618 CORNELIA 7-2240				
PART NAME				
DRIVER BOARD ASSEMBLY				
OWN.	DATE	APP'D.	SCALE	PART NO.
R. Gay	8-16-77		2=1	D-7997

DOCUMENT #1



Driver Board Logic Diagram
(Sheet 1 of 2) 5



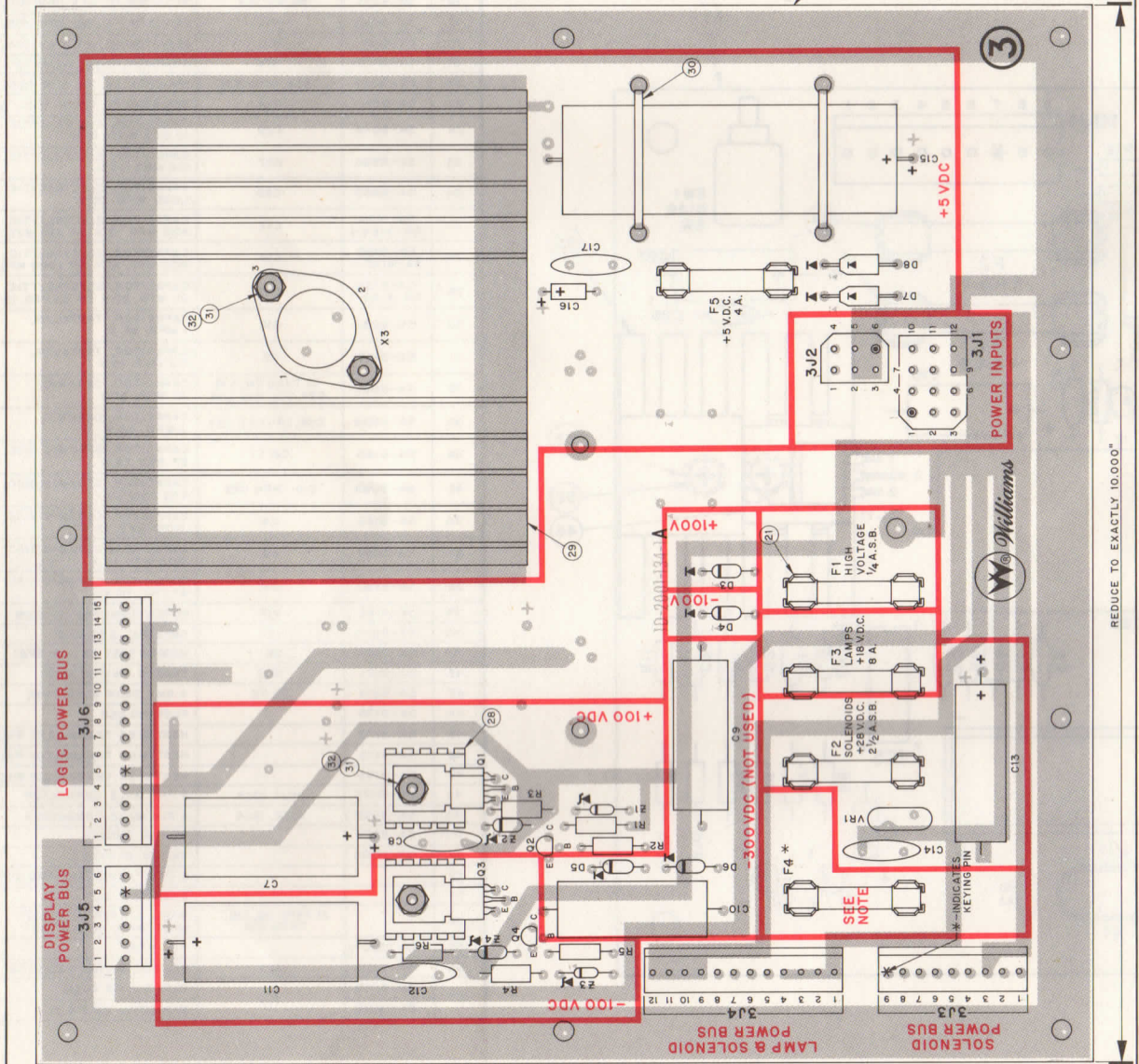
TOLERANCES		WILLIAMS ELECTRONIC MFG. CORP.		
UNLESS OTHERWISE SPECIFIED		SUBSIDIARY OF THE REEDER CORP.		
FRACTIONS ± 1/64		3401 N. CALIFORNIA CHICAGO 18, ILL. CORNELIA 7-8340		
DECIMALS ± .003		NAME SCHEMATIC, DRIVER BOARD		
HOLES ± .002		MATERIAL		
ANGULAR ± 1/2°		HEAT TREATMENT FINISH		
QTY	DATE	APP'D.	SCALE	
100	7-5-77			16D-7997

REVISION	REVISION
1	REVISED AND REDRAWN JULY 1978

ITEM NO.	PART NO.	PART DESIGNATION	DESCRIPTION	REQ'D NO.
1	10-2201-154	PC BOARD	PC BOARD	1
2	5A-9049	Q1	SDS-201 POSITIVE VOLTAGE REGULATOR	1
3	5A-9049	Q2	SDS-201 PNP TRANSISTOR	1
4	5C-9055	Q3	SDS-202 PNP TRANSISTOR	1
5	5A-9048	Q4	SDS-202 PNP TRANSISTOR	1
6	5A-9048	Q5	SDS-202 PNP TRANSISTOR	1
7	5B-9054	D3 THRU D6	1N4001 DIODE	4
8	5B-9045	D7, D8	MR500 DIODE	2
9	5A-9059	E1, E2	IN5950 ZENER DIODE	2
10	5B-9060	E2, E4	IN4764 ZENER DIODE	2
11	5B-9064	VRI	VARIABLE	1
12	5B-9062	R1, R2	RESISTOR, 1/2 W, 10% TOL	2
13	5B-9062	R3, R4	RESISTOR, 1/2 W, 10% TOL	2
14	5B-9069	R5, R6	RESISTOR, 1/2 W, 10% TOL	2
15	5A-9043	C7, C11	CAPACITOR, ELECT., 100 MFD, 150 V.	2
16	5A-9070	C13	CAPACITOR, ELECT., 100 MFD, 100 V.	1
17	5A-9046	C15	CAPACITOR, ELECT., 2200 MFD, 16 V.	1
18	5A-9072	C6, C10, C14, C17	CAPACITOR, ELECT., 100 MFD, 100 V.	4
19	5A-9047	C16	CAPACITOR, POLYESTER FILM, 22 MFD, 400 V.	2
20	5A-9031	C18	CAPACITOR, ELECT., 1 MFD, 25 V.	1
21	5A-9068	J1	12 PIN CONNECTOR	1
22	5A-9067	J2	6 PIN HEADER CONNECTOR	1
23	5A-9027	J3	9 PIN HEADER CONNECTOR	1
24	5A-9043	J4	12 PIN HEADER CONNECTOR	1
25	5A-9038	J5	15 PIN HEADER CONNECTOR	1
26	5A-9074	J6	6 PIN CIRCUIT CONNECTOR	1
27	5A-9044	J7	4 X 1/2" HEAT SINK	2
28	5B-9041	J8	4 X 1/2" HEAT SINK	2
29	5A-7250-1	TIE WRAP	TIE WRAP	2
30	5A-7250-1	TIE WRAP	TIE WRAP	2
31	5A-9049	F1	5-40 X 1/4" H.H. MECH. SCREW	4
32	5A-9049	F2	5-40 X 1/4" H.H. MECH. SCREW	4
33	5A-9049	F3	5-40 X 1/4" H.H. MECH. SCREW	4
34	5A-9049	F4	5-40 X 1/4" H.H. MECH. SCREW	4
35	5A-9071	F5	FUSE, 8 AMP	1
36	5A-4508	F6	FUSE, 10 AMP (FLIPPER)	1
37	5A-4508	F7	FUSE, 15 AMP (DUAL ACTION FLIPPER)	1
38	5A-4508	F8	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
39	5A-4508	F9	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
40	5A-4508	F10	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
41	5A-4508	F11	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
42	5A-4508	F12	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
43	5A-4508	F13	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
44	5A-4508	F14	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
45	5A-4508	F15	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
46	5A-4508	F16	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
47	5A-4508	F17	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
48	5A-4508	F18	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
49	5A-4508	F19	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
50	5A-4508	F20	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
51	5A-4508	F21	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
52	5A-4508	F22	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
53	5A-4508	F23	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
54	5A-4508	F24	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
55	5A-4508	F25	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
56	5A-4508	F26	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
57	5A-4508	F27	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
58	5A-4508	F28	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
59	5A-4508	F29	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
60	5A-4508	F30	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
61	5A-4508	F31	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
62	5A-4508	F32	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
63	5A-4508	F33	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
64	5A-4508	F34	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
65	5A-4508	F35	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
66	5A-4508	F36	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
67	5A-4508	F37	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
68	5A-4508	F38	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
69	5A-4508	F39	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
70	5A-4508	F40	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
71	5A-4508	F41	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
72	5A-4508	F42	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
73	5A-4508	F43	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
74	5A-4508	F44	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
75	5A-4508	F45	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
76	5A-4508	F46	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
77	5A-4508	F47	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
78	5A-4508	F48	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
79	5A-4508	F49	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
80	5A-4508	F50	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
81	5A-4508	F51	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
82	5A-4508	F52	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
83	5A-4508	F53	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
84	5A-4508	F54	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
85	5A-4508	F55	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
86	5A-4508	F56	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
87	5A-4508	F57	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
88	5A-4508	F58	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
89	5A-4508	F59	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
90	5A-4508	F60	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
91	5A-4508	F61	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
92	5A-4508	F62	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
93	5A-4508	F63	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
94	5A-4508	F64	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
95	5A-4508	F65	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
96	5A-4508	F66	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
97	5A-4508	F67	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
98	5A-4508	F68	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
99	5A-4508	F69	FUSE, 20 AMP (SHUFFLE ALLEYS)	1
100	5A-4508	F70	FUSE, 20 AMP (SHUFFLE ALLEYS)	1

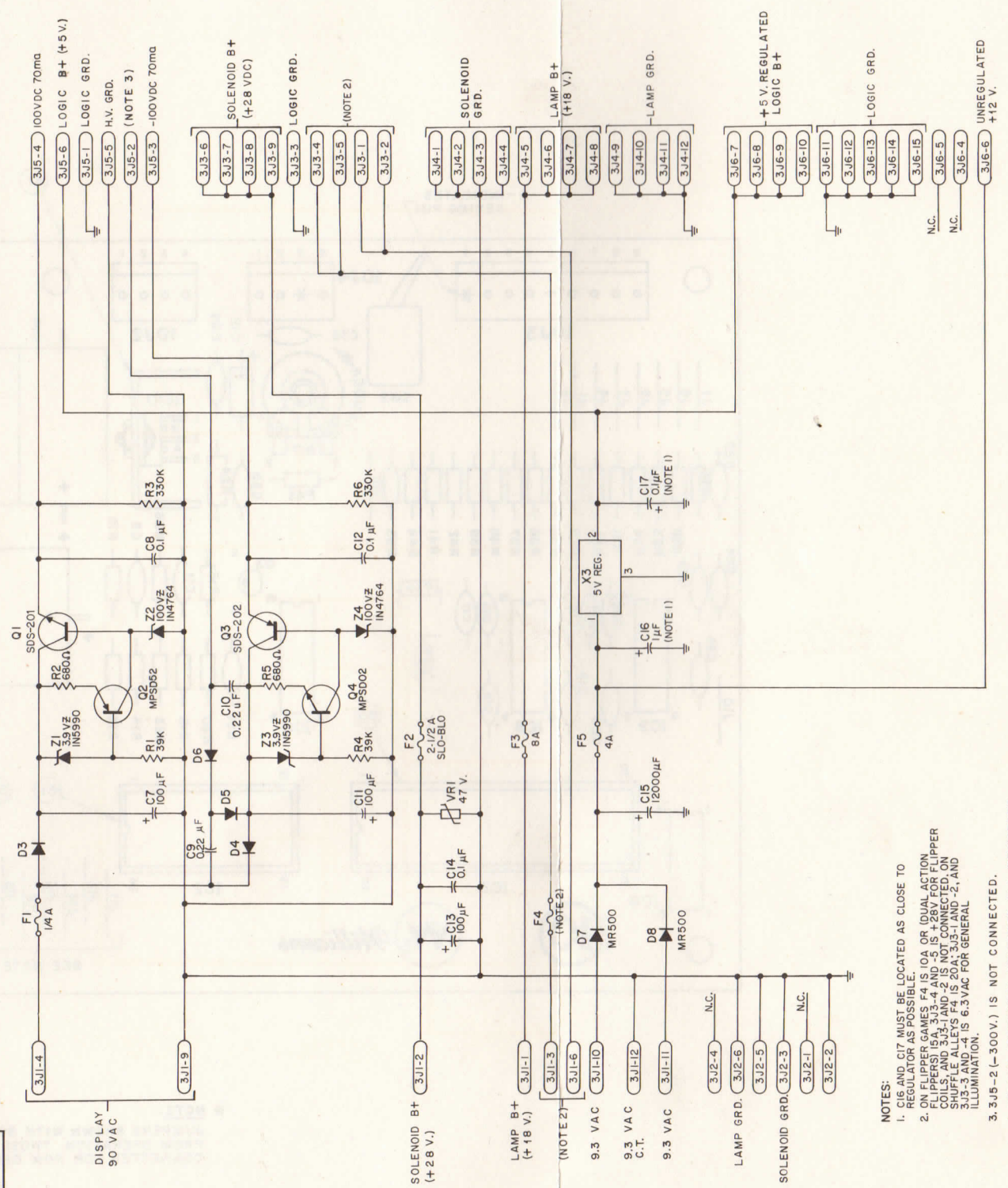
NOTE:
F4 IS FLIPPER FUSE ON FLIPPER
GAMES AND GENERAL ILLUMINATION
ON SHUFFLE ALLEYS.

WILLIAMS ELECTRONICS, INC. 3401 N. CALIFORNIA AVE., CORNELLIA 7-2840 CHICAGO, ILL. 60618
PART NAME POWER SUPPLY BOARD ASSEMBLY
REV. NO. D-7999
DATE 8-15-77
BY 2-1
DOCUMENT #1



REDUCE TO EXACTLY 10.000"

16C-7999

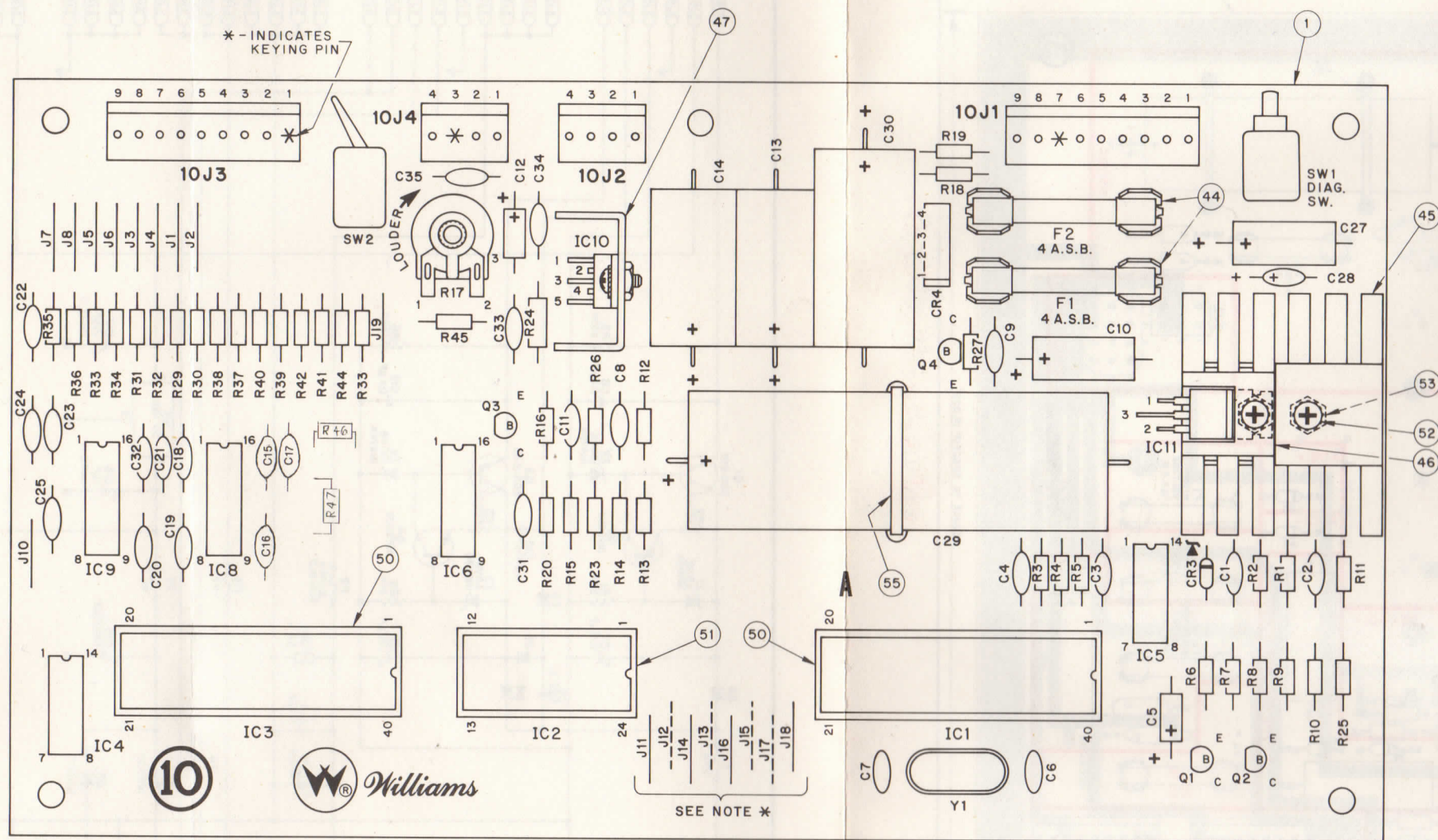


NOTES:
1. C16 AND C17 MUST BE LOCATED AS CLOSE TO
REGULATOR AS POSSIBLE.
2. OUTPUTS ARE: 10A OR (DUAL ACTION
FLIPPERS) 15A, 3J3-4 AND -5 IS +28V FOR FLIPPER
COILS, AND 3J3-1 AND -2 IS NOT CONNECTED ON
SHUFFLE ALLEYS F4 IS 20A; 3J3-1 AND -2, AND
3J3-3 IS 6.3 VAC FOR GENERAL
ILLUMINATION.
3. 3J5-2 (-300V.) IS NOT CONNECTED.
4. UNLESS OTHERWISE INDICATED ALL RESISTORS
ARE 1/2 W. AND ALL DIODES ARE TYPE IN4004.

REVISION LETTER	REVISION	BY
A	REDRAWN, WAS D SIZE. F4 AND NOTES 2,3,4 ADDED	5-9-79

UNLESS OTHERWISE SPECIFIED: FRACTIONAL: 1/16" HOLE DIA: .032 - .035" ANGULAR: .015" MAX SCREW THREAD: 1/8" - 32 UNF-2A	TOLERANCES	DATE 5-10-79	SCALE 1:1	APPROVED 16C-7999	DOCUMENT #2
--	------------	-----------------	--------------	----------------------	-------------

WILLIAMS ELECTRONICS, INC. SUBSIDIARY OF 3401 N. CALIFORNIA AVE., CORNELLIA 7-2840 CHICAGO, ILL. 60618	QTY.	ASSEMBLE ON
NAME SCHEMATIC POWER SUPPLY BOARD	MATERIAL	FINISH
HEAT TREATMENT		

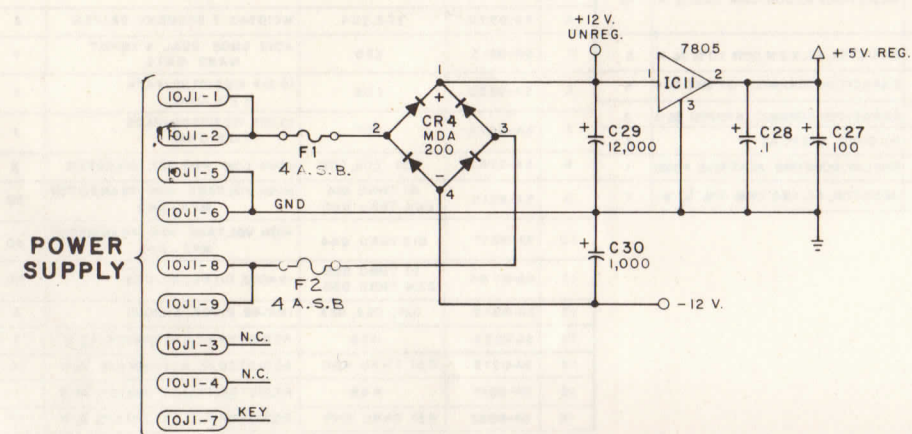


* NOTE:
JUMPERS SHOWN WITH SOLID LINES CONNECTED FOR
PROM OPERATION. THOSE SHOWN WITH DASHED LINES
CONNECTED FOR ROM OPERATION.

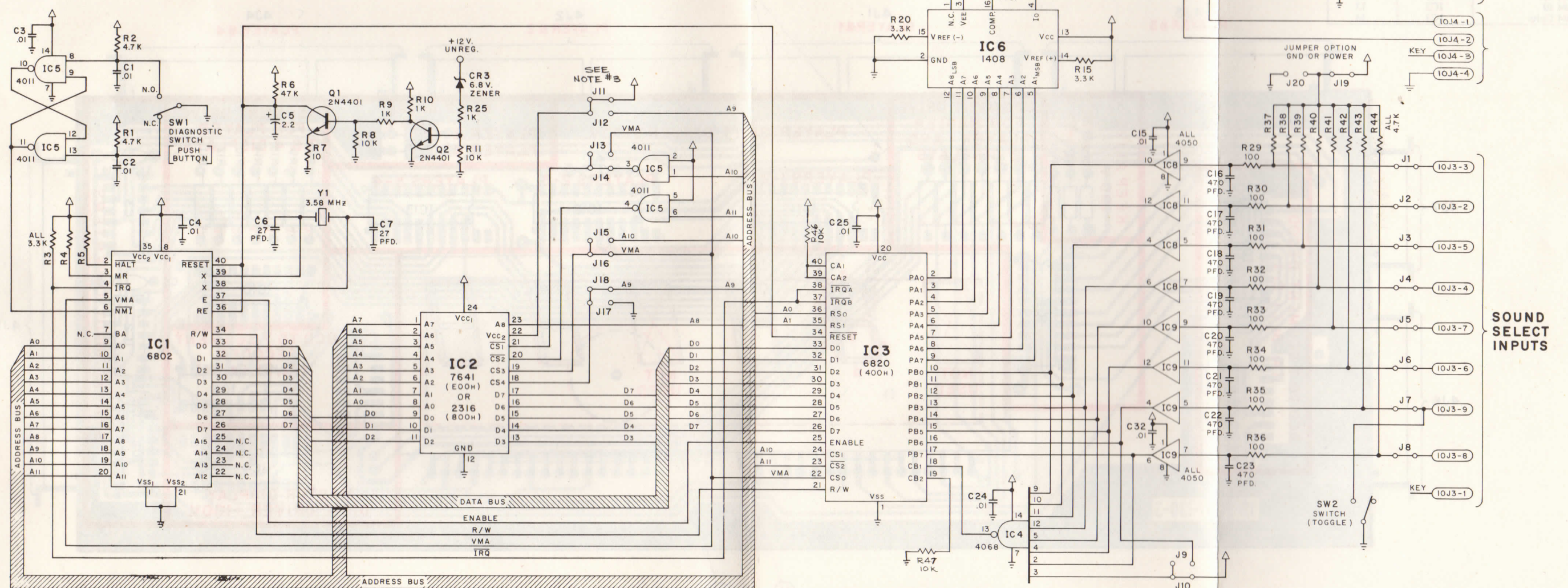
BILL OF MATERIAL

ITEM NO.	PART NO.	PART DESIGNATION	DESCRIPTION	REQ'D. NO.
1	1B-2001-137		BARE P.C. BOARD	1
2	5A-8972	IC3	MC6820 PIA	1
3	5A-9154	IC4	4068 8 INPUT NAND GATE	1
4	5A-9155	IC5	4011 QUAD 2 INPUT NAND GATE	1
5	5A-9152	IC6	MC1408 D/A CONVERTER	1
6	5A-9153	IC8, IC9	4050 BUFFER	2
7	5A-9156	IC10	TDA2002V AUDIO AMPLIFIER	1
8	5A-9157	IC11	7805 5 VOLT REG. W/TO220 CASE	1
9	5C-8938	Q1, Q2, Q3	2N4401 NPN TRANSISTOR	3
10	5A-8976	Q4	2N6427 NPN TRANSISTOR	1
11	5A-9018	CR3	1N5996 6.8V ZENER DIODE	1
12	5A-9158	CR4	MDA200/3N253 BRIDGE RECTIFIER	1
13	5B-8991	R1, R2, R14, R23, R37 THRU R45	RESISTOR, FC, 4.7 K OHM 10% 1/4 W	13
14	5B-8983	R3, R4, R5, R15, R16, R20	RESISTOR, FC, 3.3 K OHM 10% 1/4 W	6
15	5A-8984	R9, R10, R25, R27, R7	RESISTOR, FC, 1K OHM 10% 1/4 W	5
16	5B-9039	R7	RESISTOR, FC, 10 OHM 10% 1/4 W	1
17	5B-8817	R8, R11, R46, R47	RESISTOR, FC, 10 K OHM 10% 1/4 W	4
18	5B-9035	R6, R12, R13	RESISTOR, FC, 47 K OHM 10% 1/4 W	3
19	5A-9160	R18	RESISTOR, FC, 220 OHM 10% 1/4 W	1
20	5A-9161	R19	RESISTOR, FC, 2.2 OHM 10% 1/4 W	1
21	5A-9179	R26	RESISTOR, FC, 3.3 M OHM 10% 1/4 W	1
22	5B-9036	R29 THRU R36	RESISTOR, FC, 100 OHM 10% 1/4 W	8
23	5A-9181	R24	RESISTOR, FC, 1 OHM 10% 1/2 W	1
24	5A-9046	C29	CAPACITOR, ELECTROLYTIC, 12,000 MFD. 16 V.	1
25	5A-8986	C27	CAPACITOR, ELECTROLYTIC, 100 MFD. 10 V.	1
26	5A-8893	C30	CAPACITOR, ELECTROLYTIC, 1,000 MFD. 25 V.	1
27	5A-9164	C13	CAPACITOR, ELECTROLYTIC, 500 MFD. 15 V. OR 470 MFD. 25 V.	1
28	5A-9165	C14	CAPACITOR, ELECTROLYTIC, 800 MFD. 16 V. OR 1,000 MFD. 15 V.	1
29	5A-9168	C10	CAPACITOR, ELECTROLYTIC, 25 MFD. 20 V. OR 33 MFD. 16 V.	1
30	5A-9031	C12	CAPACITOR, TANTALUM, 1 MFD. 25 V.	1
31	5A-9163	C5	CAPACITOR, TANTALUM, 2.2 MFD. 15 V.	1
32	5A-8980	C1 THRU C4, C15, C24, C25, C32, C35	CAPACITOR, CERAMIC, .01 MFD. 50 V.	9
33	5A-8996	C28, C31, C33, C34	CAPACITOR, CERAMIC, .1 MFD. 50 V.	4
34	5A-9169	C6, C7	CAPACITOR, CERAMIC DISC, 27 PFD. 1K V.	2
35	5A-9065	C16 THRU C23	CAPACITOR, CERAMIC DISC, 470 PFD. 50 V.	8
36	5A-9166	C9	CAPACITOR, CERAMIC DISC, .0015 MFD. 1K V.	1
37	5A-9167	C8	CAPACITOR, CERAMIC DISC, .003 MFD. 1K V.	1
38	5A-9180	C11	CAPACITOR, CERAMIC DISC, 47 PFD. 1K V.	1
39	5A-9185	R17	POTENTIOMETER, 5K OHM	1
40	5A-9020	Y1	CRYSTAL, 3.58 MHZ.	1
41	5A-9024	SW1	MOMENTARY SWITCH SPDT	1
42	5A-9171	SW2	TOGGLE SWITCH SPDT	1
43	5A-6314	F1, F2	4 AMP. SLOW BLOW FUSE	2
44	5A-9178		FUSEHOLDER	4
45	5A-9172		HEAT SINK THERMALLOY #6072 B	1
46	5A-9173		HEAT SINK THERMALLOY #6071 B	1
47	5A-9199		HEAT SINK THERMALLOY #6030	1
48	5A-9027	10J1, 10J3	9 PIN MALE CONNECTOR	2
49	5A-9028	10J2, 10J4	4 PIN MALE CONNECTOR	2
50	5A-8985		40 PIN SOCKET	2
51	5A-9004		24 PIN SOCKET	1
52			6-32 X 3/8 BINDER HEAD SCREW	2
53			6-32 HEX. NUT	2
54		J1 THRU J8, J10, THRU J19	WIRE JUMPER 22 GAUGE WIRE WITH INSULATION	18
55	3A-7520-1		TIE WRAP	1
56	5A-9150	IC1	MC6802 MICROPROCESSOR	1
57	5A-9015	IC2	7641 512 X 8 PROM	1
	5A-9198		MCM68312 2 K X 8 ROM	1

WILLIAMS ELECTRONICS, INC.				
SUBSIDIARY OF XCOR CORPORATION				
3401 N. CALIFORNIA CHICAGO, ILL. 60618 CORNELIA 7-2240				
PART NAME				
SOUND BOARD ASSEMBLY				
DWN.	DATE	APP'D.	SCALE	PART NO.
R. Gay	12-20-78		2=1	

**NOTES:**

- UNLESS OTHERWISE SPECIFIED
1. ALL RESISTOR VALUES IN OHMS AND $\frac{1}{4}$ WATT
 2. ALL CAPACITOR VALUES IN MICROFARADS.
 3. J11, J14, J16 AND J18 CONNECTED V.I. WHEN IC2 IS A PROM (7641). J12, J13, J15 AND J17 CONNECTED WHEN IC2 IS A ROM (2316).



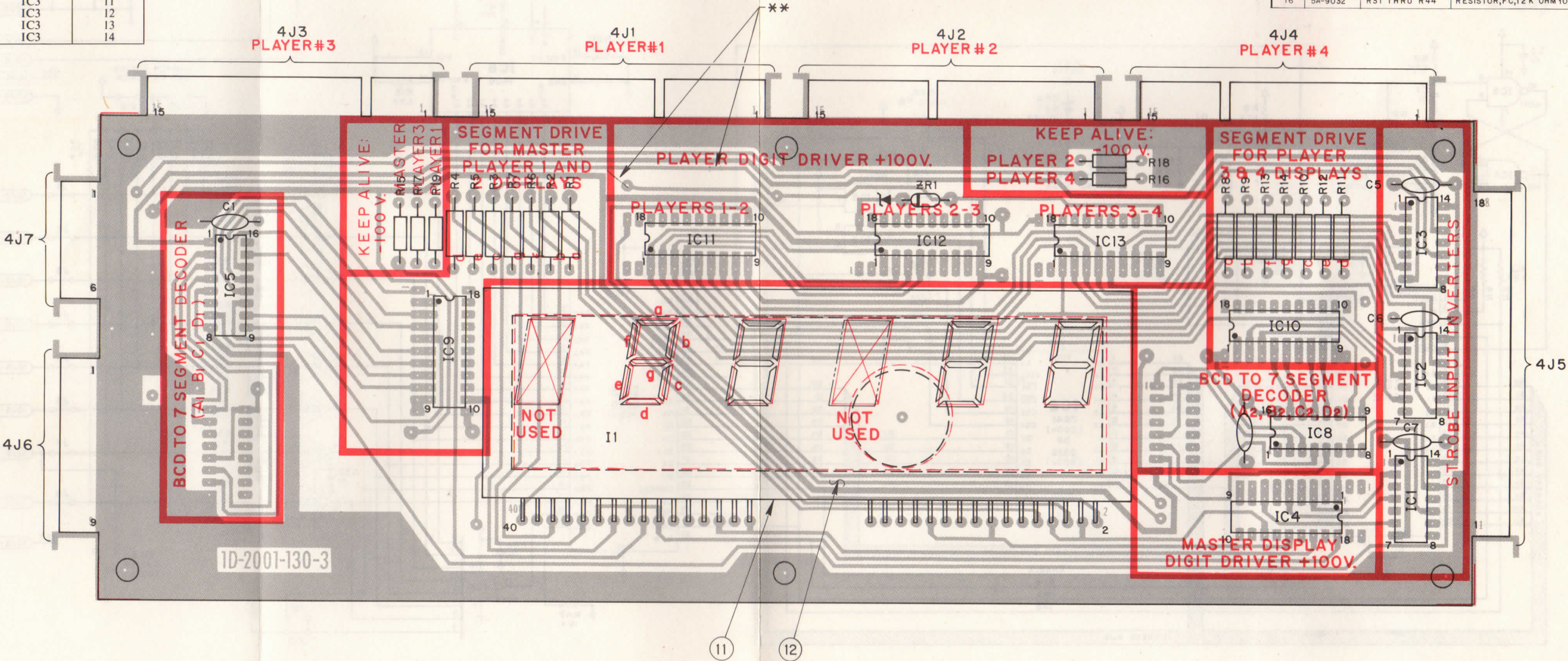
DIGIT CROSS-REFERENCE

DIGIT	7-SEGMENT DECODER	STROBE
Master 1 (Left)	IC4	15
Master 2	IC4	16
Master 3	IC4	7
Master 4 (Right)	IC4	8
#1 100,000	IC4	1
#1 10,000	IC4	2
#1 1,000	IC4	3
#1 100	IC4	4
#1 10	IC4	5
#1 Units	IC4	6
#2 100,000	IC4	9
#2 10,000	IC4	10
#2 1,000	IC4	11
#2 100	IC4	12
#2 10	IC4	13
#2 Units	IC4	14
#3 100,000	IC3	1
#3 10,000	IC3	2
#3 1,000	IC3	3
#3 100	IC3	4
#3 10	IC3	5
#3 Units	IC3	6
#4 100,000	IC3	9
#4 10,000	IC3	10
#4 1,000	IC3	11
#4 100	IC3	12
#4 10	IC3	13
#4 Units	IC3	14

BILL OF MATERIAL									
ITEM NO.	PART NO.	PART DESIGNATION	DESCRIPTION	REQ'D. NO.	ITEM NO.	PART NO.	PART DESIGNATION	DESCRIPTION	REQ'D. NO.
17	5A-8774	R45, R67	RESISTOR, FC, 22 K OHM 10% 1/4 W	2	1	1B-2000-140-3		BARE P.C. BOARD	1
18	5A-9035	R10, R12, R13, R15, R16, R18, R19, R21, R22, R24, R25, R27, R26, R30	RESISTOR, FC, 47 K OHM 10% 1/4 W	14	2	5A-9221	IC1	15 DIP RESISTOR/PACK 2.2 K OHM	1
19	5A-9162	R3 THRU R9, R11, R14, R17, R20, R23, R26, R29, R46	RESISTOR, FC, 100 K OHM 10% 1/4 W	15	3	5A-9222	IC2	15 DIP RESISTOR/PACK 1 K OHM	1
20	5A-9218	R1, R2, R47, R49, R50	RESISTOR, FC, 2.2 M OHM 10% 1/4 W	5	4	5A-8970	IC3, IC4	MC14543 7 SEGMENT DRIVER	2
21	5A-8980	C1, C2, C5, C6	CAPACITOR, CERAMIC, .01 MFD 50 V	4	5	5A-9213	IC5	4012 CMOS DUAL 4 INPUT NAND GATE	1
22	5A-9065	C3, C4	CAPACITOR, CERAMIC, .470 PFD 50 V	2	6	5A-9220	IC6	15 DIP RESISTOR/PACK 2.2 K OHM	1
23	5B-8966	I1	6-DIGIT DISPLAY	1	7	5A-9223	IC7	15 DIP RESISTOR/PACK 10 K OHM	1
24	23A-6542	F1	DISPLAY MOUNTING ADHESIVE FOAM	1	8	5A-9267	IC8, IC9, IC10	4069 LOW PWR. HEX. INVERTER	3
25	5A-9285	R69	RESISTOR, FC, 180 OHM 5% 1/2 W	1	9	5A-9216	Q1 THRU Q14 Q45 THRU Q60	HIGH VOLTAGE NPN TRANSISTOR MPS-A42	30
					10	5A-9217	Q15 THRU Q44	HIGH VOLTAGE NPN TRANSISTOR MPS-A42	30
					11	5A-8785	D1 THRU D20 D24 THRU D33	IN4003 DIODE, SILICON	30
					12	5A-8919	D21, D22, D23	IN4148 DIODE, SILICON	3
					13	5A-9224	R68	RESISTOR, FC, 270 OHM 10% 1/4 W	1
					14	5A-9219	R51 THRU R66	RESISTOR, FC, 8.2 K OHM 10% 1/4 W	16
					15	5A-8817	R48	RESISTOR, FC, 10 K OHM 10% 1/4 W	1
					16	5A-9032	R31 THRU R44	RESISTOR, FC, 12 K OHM 10% 1/4 W	14

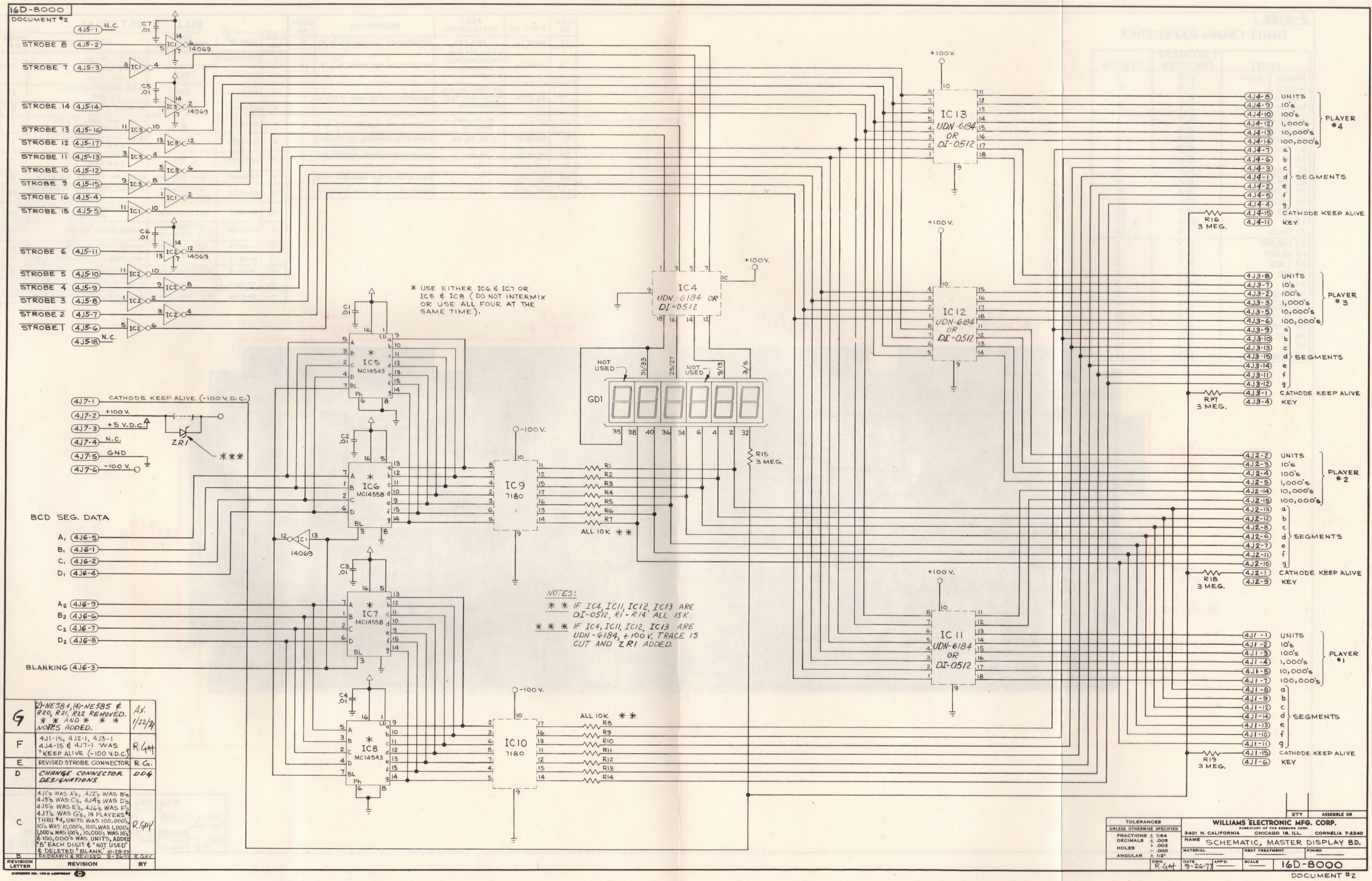
NOTES:

* - IF IC11, IC12, IC13 & IC14 ARE DIONICS-512 DRIVERS THEN R1 - R14 ARE 5A-9149 RES., F.C., 15K OHM ±10% 1/2 W. ZR1 NOT USED.
** - CUT & JUMP ON +100V. NOT IMPLEMENTED.



WILLIAMS ELECTRONICS, INC.				
SUBSIDIARY OF XCOR CORPORATION				
3401 N. CALIFORNIA CHICAGO, ILL. 60618 CORNELIA 7-2240				
PART NAME				
MASTER DISPLAY ASSEMBLY				
DWN.	DATE	APP'D.	SCALE	PART NO.
R. Gay	1-30-79		2=1	D-8000

D8000 Master Display Board Assembly Drawing
(IC Drivers)



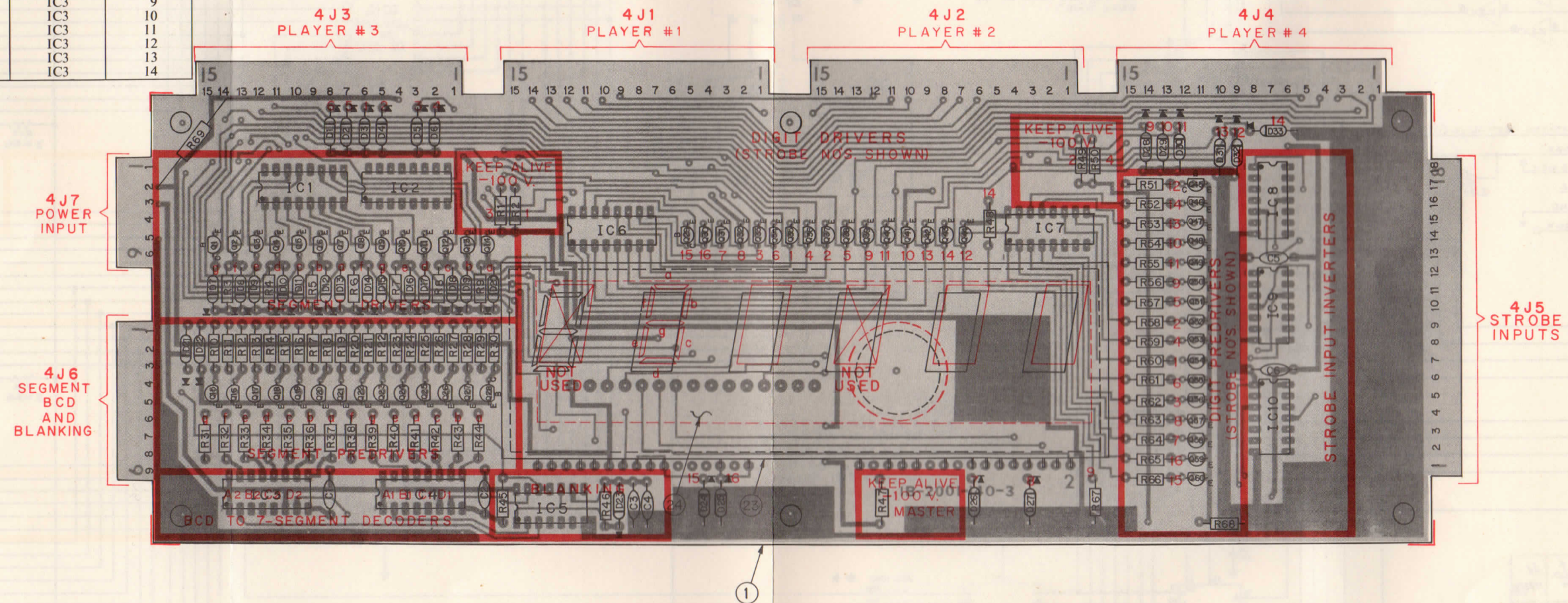
D8000 Master Display Board Logic Diagram (IC Drivers) 11

D-8168

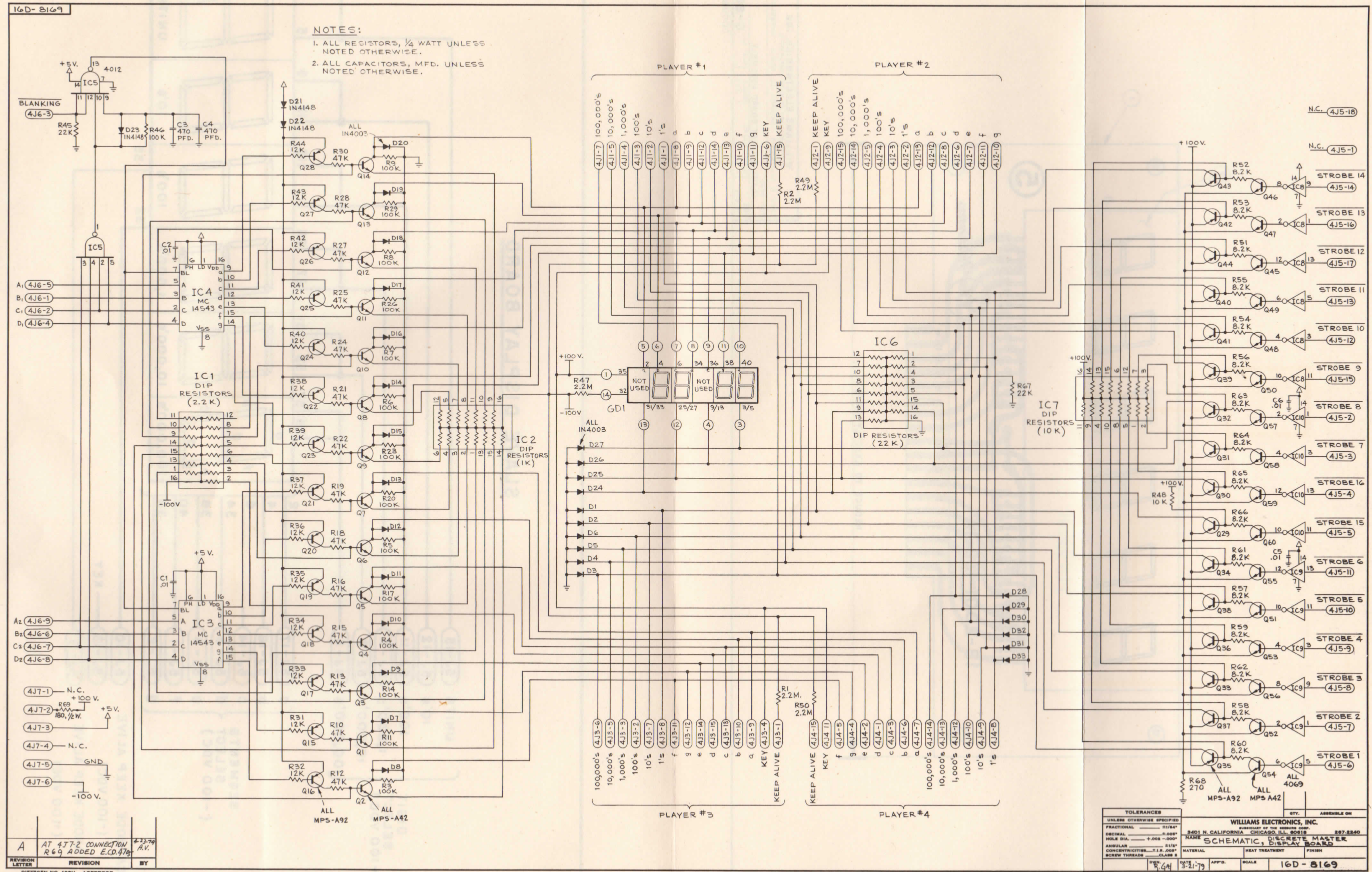
DIGIT CROSS-REFERENCE

DIGIT	7-SEGMENT DECODER	STROBE
Master 1 (Left)	IC4	15
Master 2	IC4	16
Master 3	IC4	7
Master 4 (Right)	IC4	8
#1 100,000	IC4	1
#1 10,000	IC4	2
#1 1,000	IC4	3
#1 100	IC4	4
#1 10	IC4	5
#1 Units	IC4	6
#2 100,000	IC4	9
#2 10,000	IC4	10
#2 1,000	IC4	11
#2 100	IC4	12
#2 10	IC4	13
#2 Units	IC4	14
#3 100,000	IC3	1
#3 10,000	IC3	2
#3 1,000	IC3	3
#3 100	IC3	4
#3 10	IC3	5
#3 Units	IC3	6
#4 100,000	IC3	9
#4 10,000	IC3	10
#4 1,000	IC3	11
#4 100	IC3	12
#4 10	IC3	13
#4 Units	IC3	14

ITEM NO.	PART NO.	PART DESIGNATION	DESCRIPTION	REQ'D. NO.	ITEM NO.	PART NO.	PART DESIGNATION	DESCRIPTION	REQ'D. NO.
17	5A-8774	R45, R67	RESISTOR, FC, 22 K OHM 10% 1/4 W	2	1	1B-2000-140-3		BARE P.C. BOARD	1
18	5A-9035	R10, R12, R13, R15, R16, R18, R19, R21, R22, R24, R25, R27, R26, R30	RESISTOR, FC, 47 K OHM 10% 1/4 W	14	2	5A-9221	IC1	15 DIP RESISTOR/PACK 2.2 K OHM	1
19	5A-9162	R3 THRU R9, R11, R14, R17, R20, R23, R26, R29, R46	RESISTOR, FC, 100 K OHM 10% 1/4 W	15	3	5A-9222	IC2	15 DIP RESISTOR/PACK 1 K OHM	1
20	5A-9218	R1, R2, R47, R49, R50	RESISTOR, FC, 2.2 M OHM 10% 1/4 W	5	4	5A-8970	IC3, IC4	MC14543 7 SEGMENT DRIVER	2
21	5A-8980	C1, C2, C5, C6	CAPACITOR, CERAMIC, .01 MFD. 50 V	4	5	5A-9213	IC5	4012 CMOS DUAL 4 INPUT NAND GATE	1
22	5A-9065	C3, C4	CAPACITOR, CERAMIC, 470 PFD. 50 V	2	6	5A-9220	IC6	15 DIP RESISTOR/PACK 2.2 K OHM	1
23	5B-8966	I1	6-DIGIT DISPLAY	1	7	5A-9223	IC7	15 DIP RESISTOR/PACK 10 K OHM	1
24	23A-6542	F1	DISPLAY MOUNTING ADHESIVE FOAM	1	8	5A-9267	IC8, IC9, IC10	4069 LOW PWR. HEX. INVERTER	3
25	5A-9285	R69	RESISTOR, FC, 180 OHM 5% 1/2 W	1	9	5A-9216	Q1 THRU Q14 Q45 THRU Q60	HIGH VOLTAGE NPN TRANSISTOR MPS-A42	30
					10	5A-9217	Q15 THRU Q44	HIGH VOLTAGE NPN TRANSISTOR MPS-A42	30
					11	5A-8785	D1 THRU D20 D24 THRU D33	IN4003 DIODE, SILICON	30
					12	5A-8919	D21, D22, D23	IN4148 DIODE, SILICON	3
					13	5A-9224	R68	RESISTOR, FC, 270 OHM 10% 1/4 W	1
					14	5A-9219	R51 THRU R66	RESISTOR, FC, 8.2 K OHM 10% 1/4 W	16
					15	5A-8817	R48	RESISTOR, FC, 10 K OHM 10% 1/4 W	1
					16	5A-9032	R31 THRU R44	RESISTOR, FC, 12 K OHM 10% 1/4 W	14

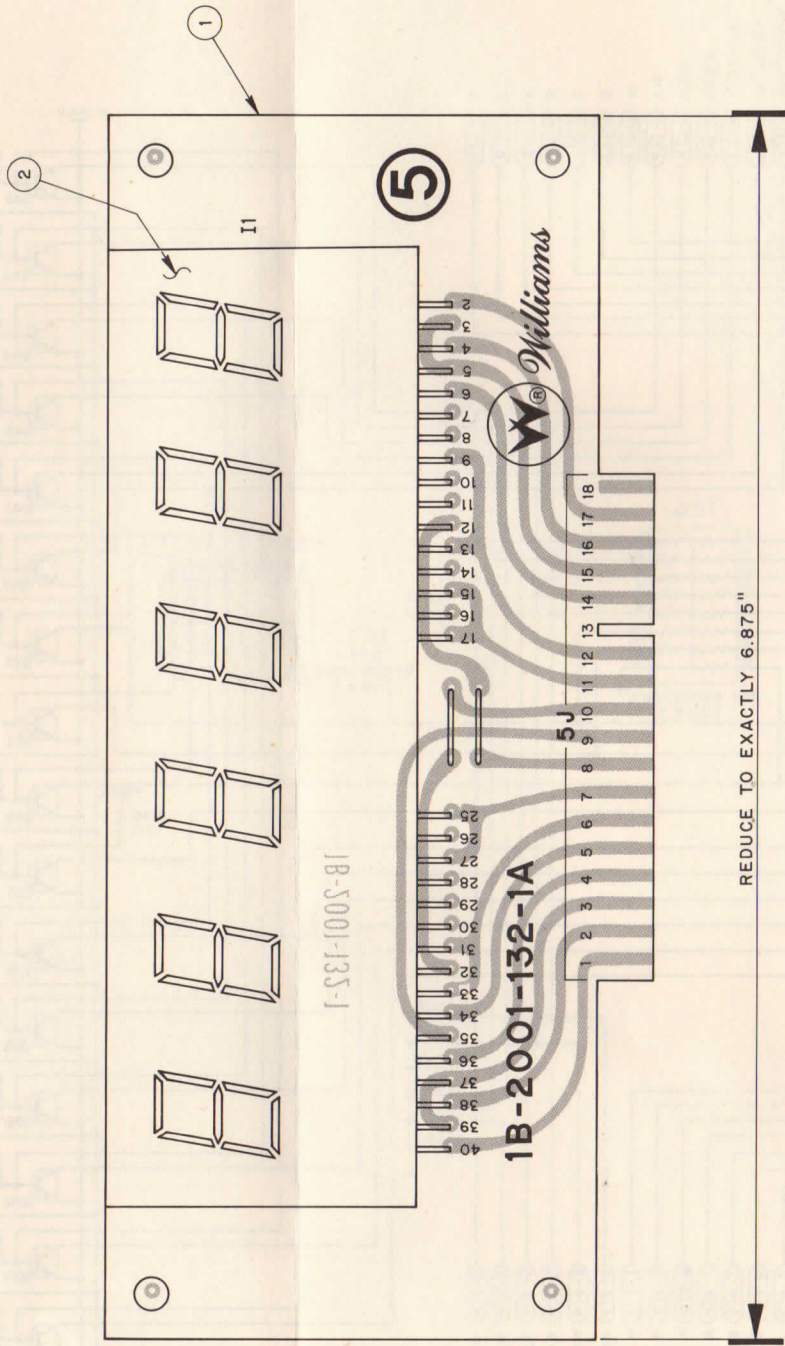


WILLIAMS ELECTRONICS, INC.				
SUBSIDIARY OF XCOR CORPORATION				
3401 N. CALIFORNIA CHICAGO, ILL. 60618 CORNELIA 7-2240				
PART NAME				
DISCRETE MASTER DISPLAY BD. ASSEM.				
DWN.	DATE	APP'D.	SCALE	PART NO.
A.V.	5-8-79		2=1	D-8168



REVISION LETTER	REVISION
	REVISED AND REDRAWN R. GAY 7-19-78

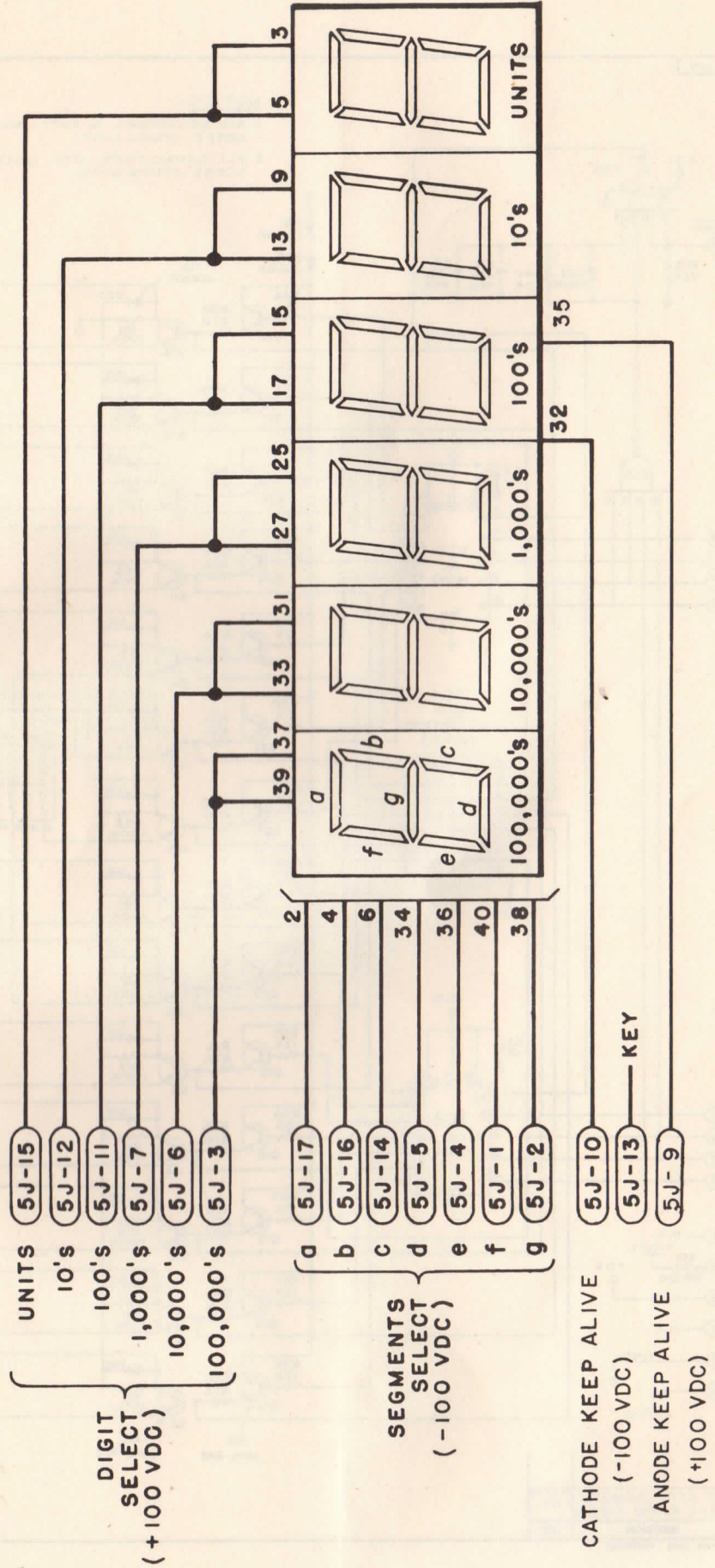
BILL OF MATERIAL				
ITEM NO.	PART NO.	PART DESIGNATION	DESCRIPTION	REQ'D. NO.
1	1B-2001-132		BARE P.C. BOARD	1
2	5A-8966	I1	6 DIGIT DISPLAY	1
3	23A-6534		DISPLAY MTG. ADHESIVE FOAM	1



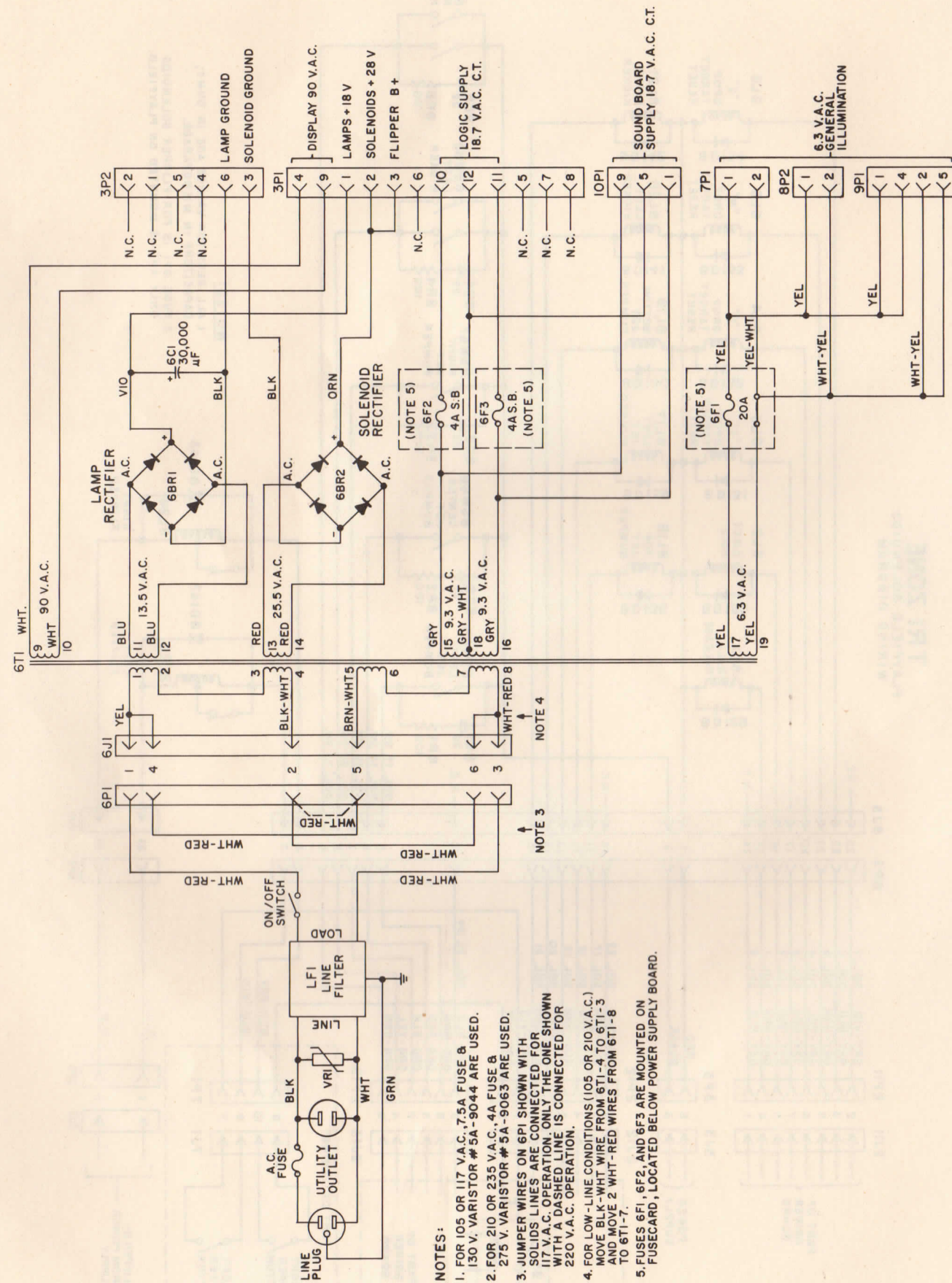
WILLIAMS ELECTRONICS, INC.				
SUBSIDIARY OF XCOR CORPORATION				
3401 N. CALIFORNIA CHICAGO, ILL. 60618 CORNELIA 7-2240				
PART NAME	DATE	APPRO.	SCALE	PART NO.
SLAVE DISPLAY BOARD ASSEMBLY			2=1	C-8019
DWN. R. Gay				

DOCUMENT #1

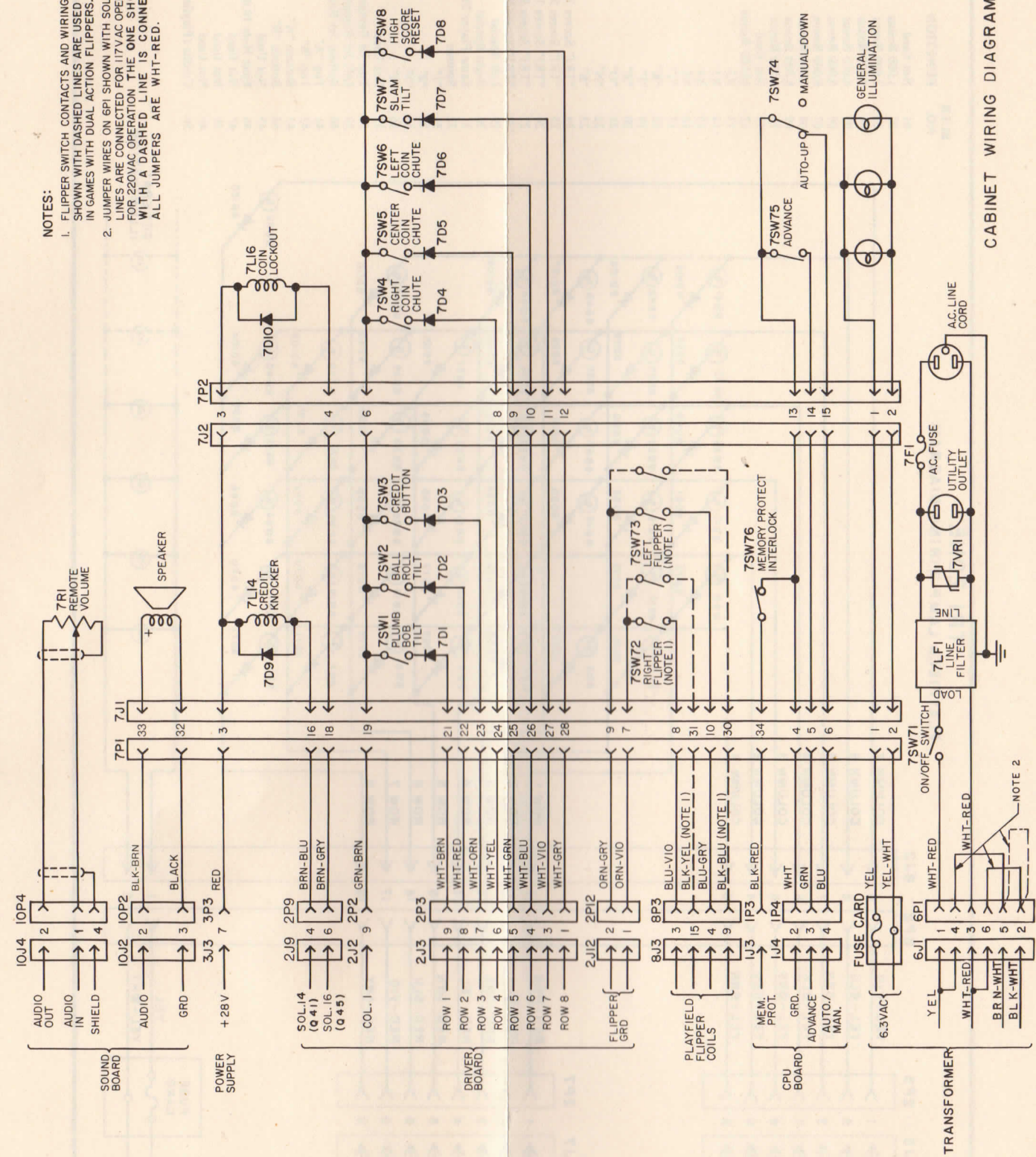
SLAVE DISPLAY BOARD



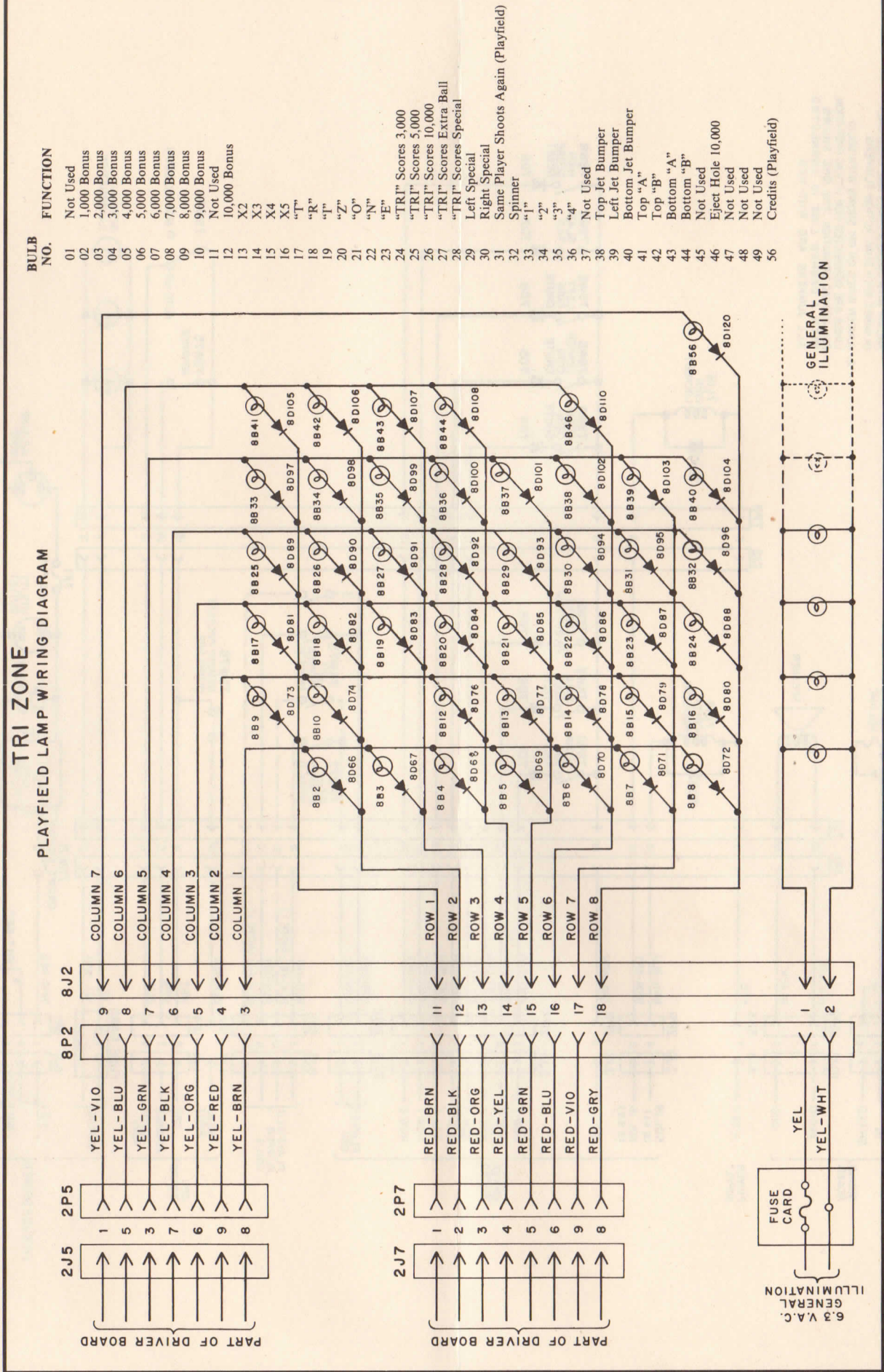
POWER WIRING



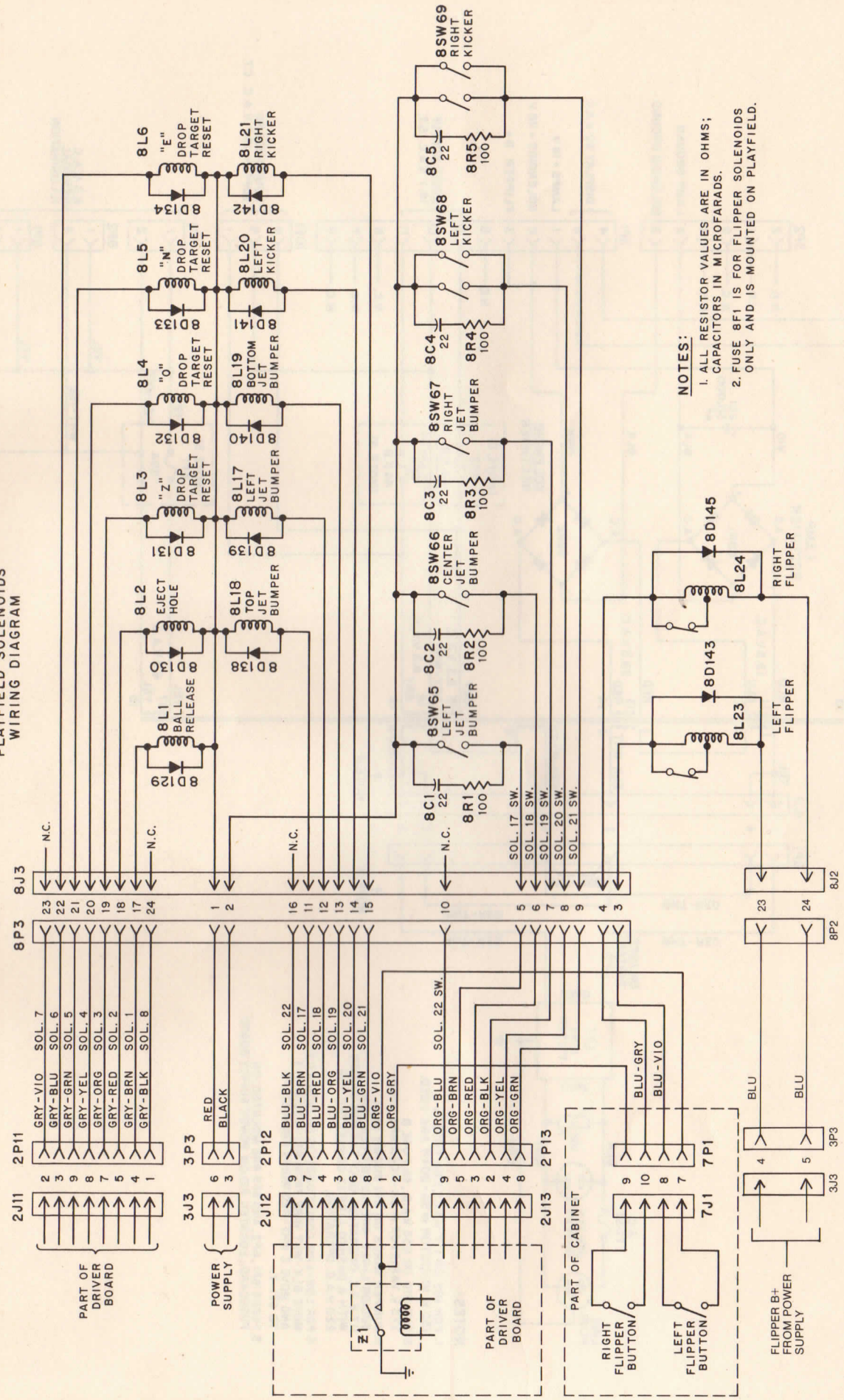
- NOTES:**
1. FLIPPER SWITCH CONTACTS AND WIRING SHOWN WITH DASHED LINES ARE USED ONLY IN GAMES WITH DUAL ACTION FLIPPERS.
 2. JUMPER WIRES ON 6PI SHOWN WITH SOLID LINES ARE CONNECTED FOR 117VAC OPERATION. FOR 220VAC OPERATION THE ONE SHOWN WITH A DASHED LINE IS CONNECTED. ALL JUMPERS ARE WHT-RED.



TRI ZONE
PLAYFIELD LAMP WIRING DIAGRAM



TRI ZONE
PLAYFIELD SOLENOIDS
WIRING DIAGRAM



TRI ZONE
PLAYFIELD SWITCH WIRING DIAGRAM

