

Williams[®]

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December, 1981

STARGATE

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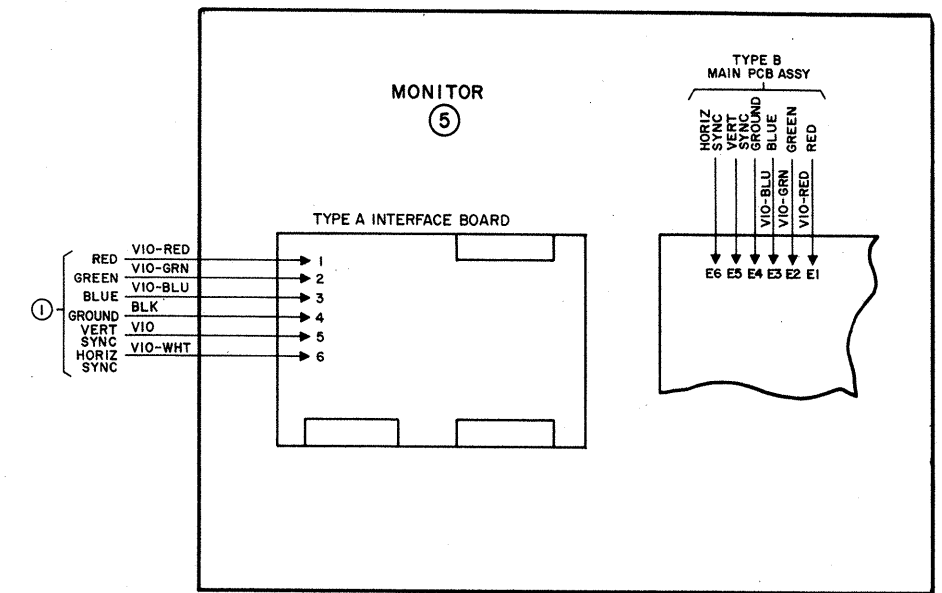
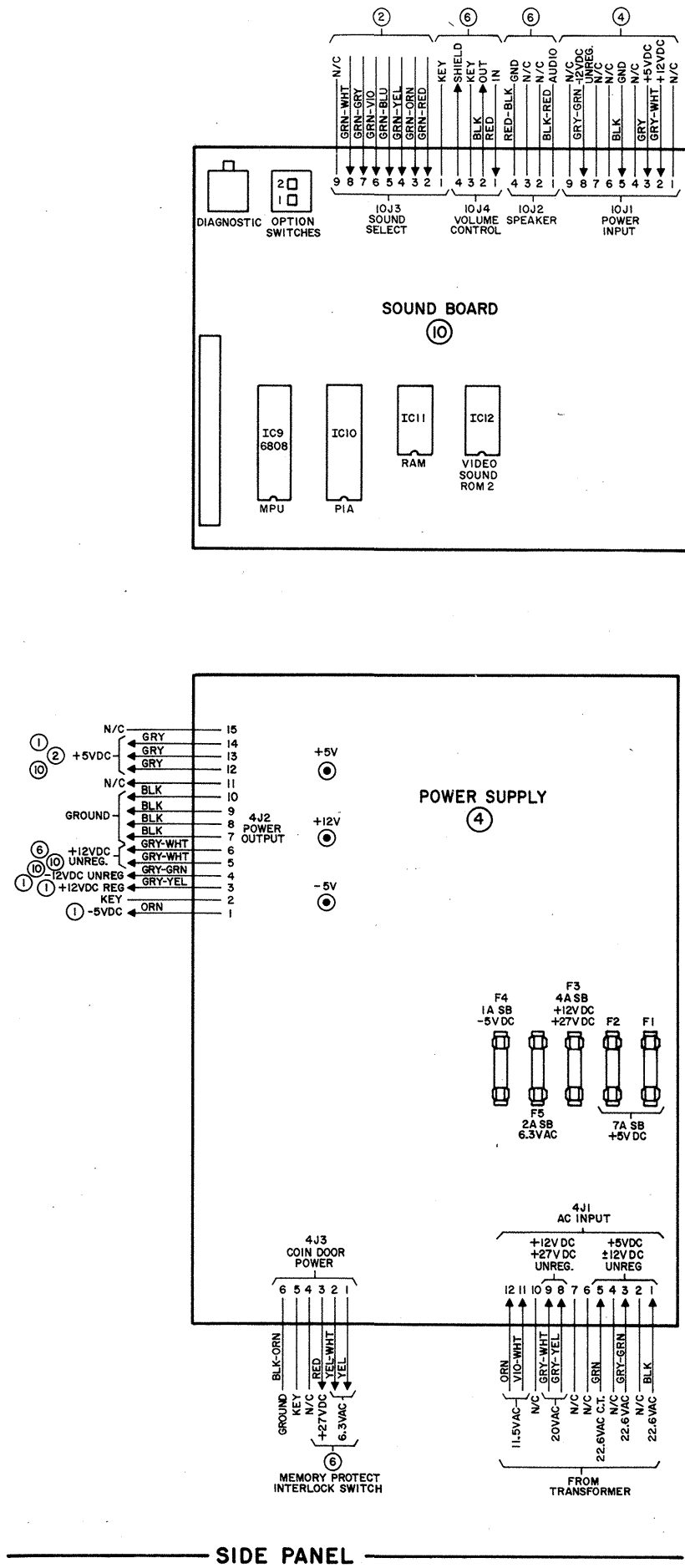
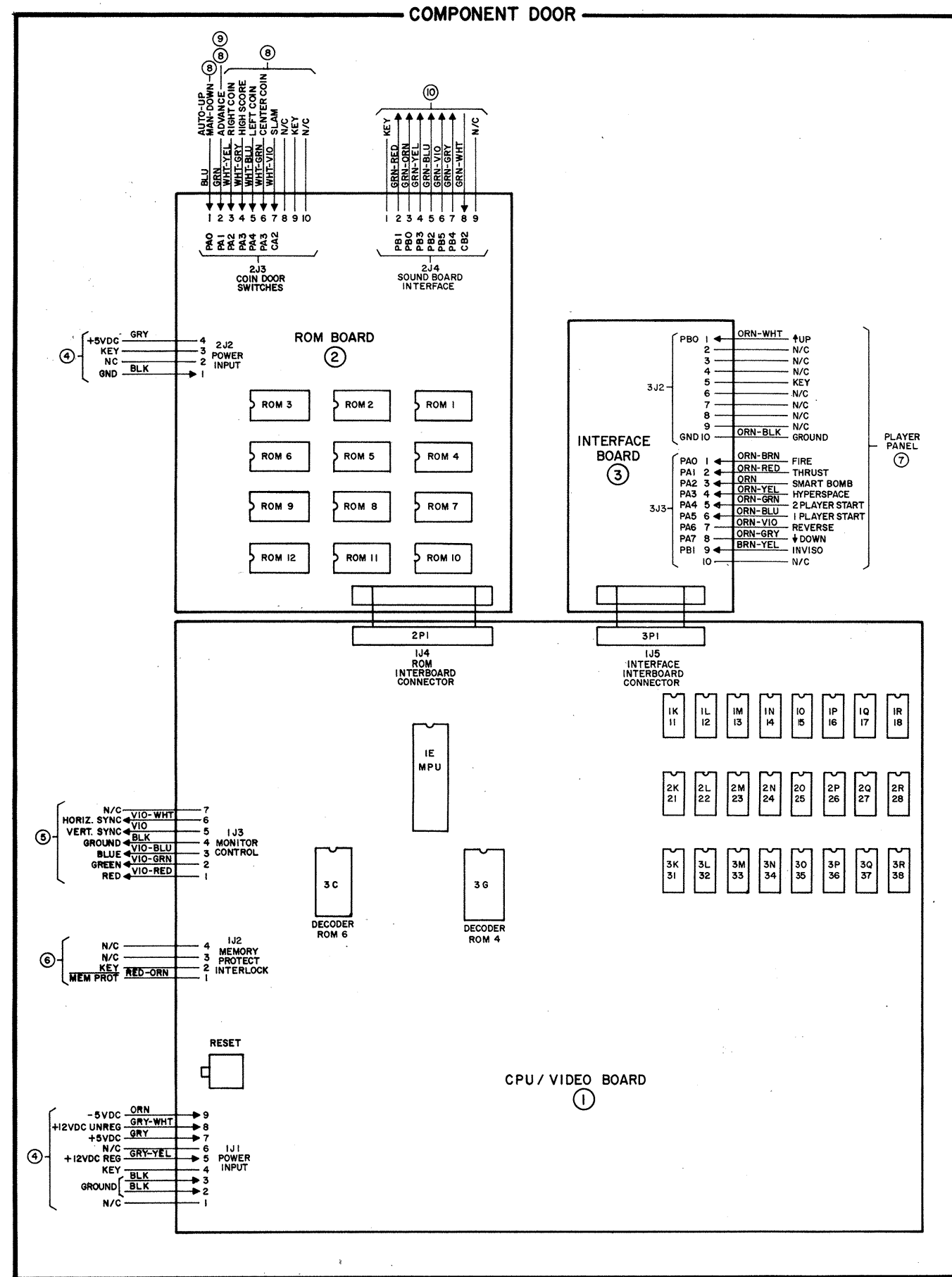
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Williams[®] 
ELECTRONICS, INC.

3401 N. California Ave., Chicago, IL 60618
Cable Address: WILCOIN, CHICAGO
(312) 267-2240

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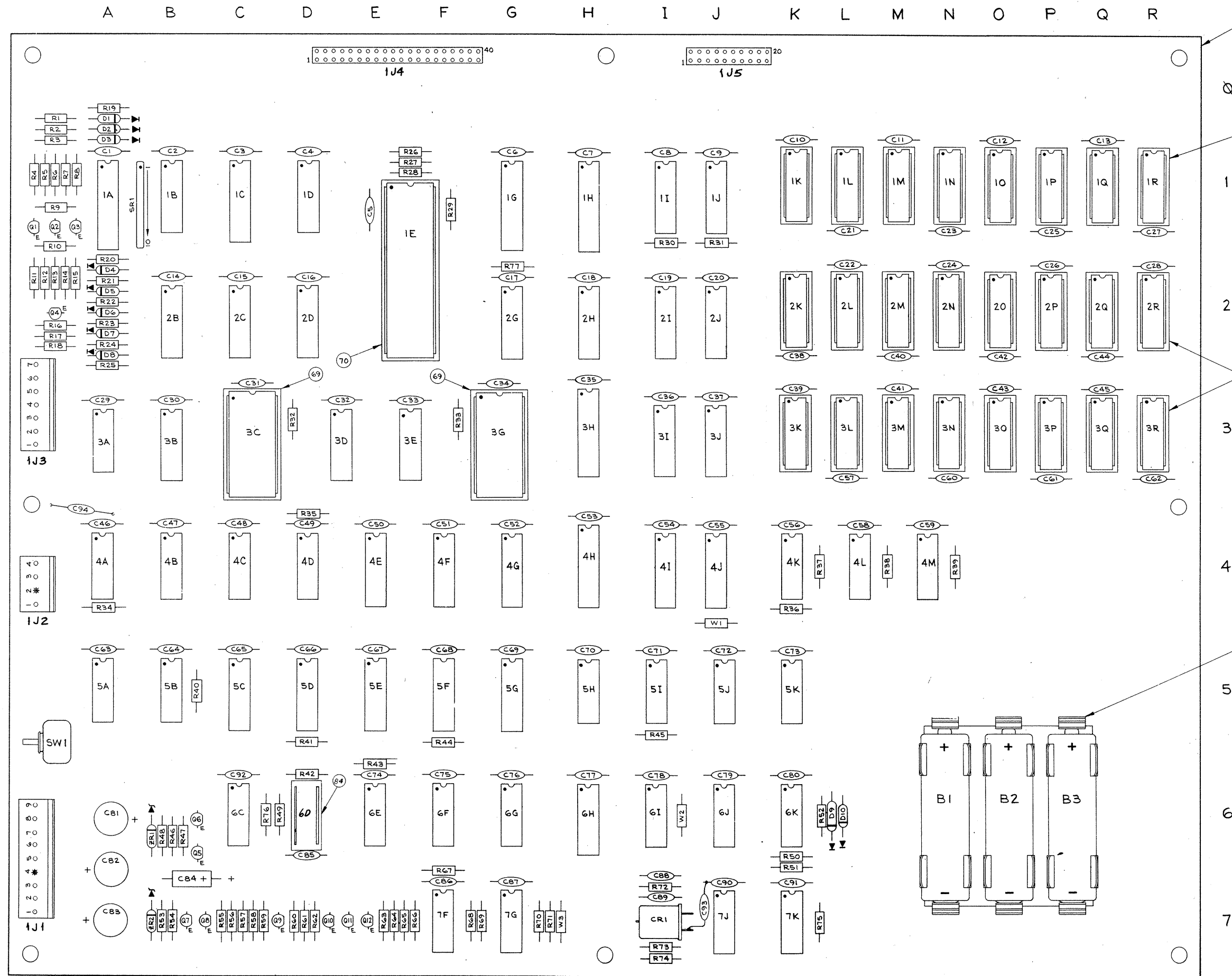
- ① CPU / VIDEO BOARD
- ② ROM BOARD
- ③ INTERFACE BOARD
- ④ POWER SUPPLY
- ⑤ MONITOR
- ⑥ CABINET
- ⑦ PLAYER PANEL
- ⑧ COIN DOOR
- ⑨ CASH BOX
- ⑩ SOUND BOARD

BILL OF MATERIAL					ITEM NO.	PART NO.	PART DESIGNATION	DESCRIPTION	REQ'D NO.
1	5770-09656-00	4B	BARE P.C. BOARD 3V. A	1	49	5010-09001-00	R2, R21, R24	RESISTOR, C.F. 330 OHM 5% 1/4 W.	3
2	5280-09473-00	4B	7400 QUAD 2-INPUT NAND	1	50	5010-09039-00	R56	RESISTOR, C.F. 10 OHM 5% 1/4 W.	1
3	5280-09488-00	5H	7402 QUAD 2-INPUT NOR	1	51	5043-09491-00	C89, C93	CAPACITOR, AXIAL 22 PFD. 1K V. 210%	2
4	5281-09215-00	7J	74LS04 HEX. INVERTER	1	52	5043-09492-00	C88	CAPACITOR, AXIAL 100 PFD. 50 V. 210%	1
5	5280-09019-00	5A, 5K	7404 HEX. INVERTER	2	53	5040-09545-00	C84	CAPACITOR, AXIAL 22 MFD. 10 V. 220%	1
6	5280-08973-00	6F	7408 QUAD AND	1	54	5043-09065-00	C94	CAPACITOR, AXIAL 470 PFD. 50 V. XTR 220%	1
7	5280-09011-00	4L, 4M, 6I	7410 TRIPLE 3-INPUT NAND	3	55	5043-08996-00	SEE NOTE #3	CAPACITOR, AXIAL 100 MFD. 25 V. +50-10%	86
8	5280-09475-00	3A, 6J	7411 TRIPLE 3-INPUT AND	2	56	5040-09421-00	C81, C82, C83	CAPACITOR, RADIAL 100 MFD. 25 V. +50-10%	3
9	5280-09530-00	5B	7420 DUAL 4-INPUT NAND	1	57	5075-09059-00	ZR2	IN5990A 3.9 V. ZENER DIODE	1
10	5280-09476-00	4C	7421 DUAL 4-INPUT AND	1	58	5075-09018-00	ZR1	IN5990A 6.8 V. ZENER DIODE	1
11	5280-09477-00	4E, 6G	7432 QUAD 2-INPUT OR	2	59	5070-08919-00	D1, D2, D3, D4, D5, D6, D7, D8	IN4148 DIODE, SILICON	8
12	5280-09478-00	4D, 4K, 6K, 6C, 7F, 7G	7474 DUAL D-TYPE FLIP-FLOP	6	60	5070-09266-00	D9	IN5817 DIODE, SILICON	1
13	5280-09479-00	4A, 5J	7486 QUAD 2-INPUT EX-OR	2	61	5160-08938-00	Q5, Q6, Q7, Q8, Q9, Q10, Q11	2N4401, TO-92 TRANSISTOR, NPN	7
14	5281-09480-00	7K	74LS107 DUAL J-K FLIP-FLOP	1	62	5190-09016-00	Q1, Q2, Q3, Q4, Q12	2N4403, TO-92 TRANSISTOR, PNP	5
15	5281-09532-00	5G	74LS133 13-INPUT NAND	1	63	5520-09495-00	CR1	12 MHZ CRYSTAL	1
16	5281-09246-00	4G, 6H	74LS139 DUAL 2 to 4 LINE DECODER	2	64				
17	5281-09481-00	3D, 3E, 4E, 4F	74LS153 DUAL 4 to 1 DATA INVERT	4	65	5880-09022-00	B1, B2, B3	BATTERY ALKALINE 1.5 V. (AA)	3
18	5280-09468-00	1I, 1J, 2I, 2J, 3I, 3J, 4I, 4J	74166 8-BIT SHIFT REGISTER	8	66	5881-09021-00		BATTERY HOLDER #11	1
19	5281-09308-00	1G	74LS245 OCTAL BUS TRANSCEIVER	1	67	5700-09006-00		16-PIN IC SOCKET	24
20	5281-09485-00	2C, 2H	74LS257 QUAD DATA MUX.	2	68	5700-09004-00		24-PIN IC SOCKET	2
21	5370-08989-00	1D, 2D, 2G, 3B	8T9T HEX. TS BUFFER	0	69	5700-08985-00		40-PIN IC SOCKET	1
22	5281-09385-00	74LS367	HEX. BUS DRIVER	4	70	5791-09437-00	IJ5	20 PIN RIBBON CABLE HEADER	1
23	5281-09386-00	1A, 1H, 3H, 4H	74LS374 OCTAL D-TYPE FLIP-FLOP	4	71	5791-09349-00	IJ4	40 PIN RIBBON CABLE HEADER	1
24	A-5342-09695	3C	UNIVERSAL VERT. DECODER ROM 5	1	72	5791-09028-00	IJ2	4 PIN HEADER 09-65-1041	1
25	A-5342-09694	3G	UNIVERSAL HORZ. DECODER ROM 4	1	73	5791-09497-00	IJ3	7 PIN HEADER 09-65-1071	1
26	B-9072	6D	CMOS MOD. ASSY BOARD	1	74	5791-09027-00	IJ1	9 PIN HEADER 09-65-1091	1
27	5281-09533-00	5I	74LS393 DUAL 4-BIT BIN. COUNTER	1	75	5019-09669-00	SRI	RESISTOR, 1K OHM 10 PIN SIP	1
28	5340-09488-00	SEE NOTE #1	4116 (450 ns ACCESS) 16 K X 1 DYNAMIC RAM	24	76	5010-09534-00	W1, W2, W3	RESISTOR, C.F. 0 OHM 1/4 WATT	3
29	5070-06258-00	D10	IN4001 DIODE	1	77	5340-09489-00	IC	514 1K X 4 CMOS STATIC RAM	1
30	5280-09489-00	5C, 5D, 5E, 5F	9316 4-BIT BIN. COUNTER	4	78	5340-09490-00		6514 1K X 4 CMOS STATIC RAM	0
31	5400-09490-00	1E	4809 E MICROPROCESSOR	1	79	5281-09483-00	1B; 2B	74LS189 16 X 4 RAM	0
32	5010-09548-00	R10, R12, R14	RESISTOR, C.F. 68 OHM 2% 1/4 W.	3		5281-09484-00		74LS189 16 X 4 RAM	0
33	5010-09036-00	R65	RESISTOR, C.F. 100 OHM 5% 1/4 W.	1	80	5281-09485-00		74LS189 16 X 4 RAM	0
34	5010-09187-00	R4, R6, R7, R16, R19, R25	RESISTOR, C.F. 150 OHM 5% 1/4 W.	6		5281-09486-00		74LS189 16 X 4 RAM	0
35	5010-09508-00	R11, R13, R15	RESISTOR, C.F. 210 OHM 2% 1/4 W.	3		5281-09487-00		74LS189 16 X 4 RAM	0
36	5010-09416-00	R18	RESISTOR, C.F. 470 OHM 5% 1/4 W.	1		5281-09488-00		74LS189 16 X 4 RAM	0
37	5010-08992-00	R1, R20, R23	RESISTOR, C.F. 560 OHM 5% 1/4 W.	3		5281-09489-00		74LS189 16 X 4 RAM	0
38	5010-09358-00	R5, R8, R9, R17, R48, R54, R74	RESISTOR, C.F. 1K OHM 5% 1/4 W.	7		5281-09490-00		74LS189 16 X 4 RAM	0
39	5010-09314-00	R3, R22	RESISTOR, C.F. 1.2 K OHM 5% 1/4 W.	2		5281-09491-00		74LS189 16 X 4 RAM	0
40	5010-08998-00	R59, R72, R73	RESISTOR, C.F. 2.2 K OHM 5% 1/4 W.	3		5641-09371-00	SW1	PUSH BUTTON SW. SPST	0
41	5010-08997-00	R60, R63	RESISTOR, C.F. 2.7 K OHM 5% 1/4 W.	2		5641-09372-00		PUSH BUTTON SW. DPDT MOM.	1
42	5010-08983-00	R30, R31, R40, R44, R55	RESISTOR, C.F. 3.3 K OHM 5% 1/4 W.	5		5700-09813-00		14 PIN IC SOCKET	1
43	5010-08991-00	SEE NOTE #2	RESISTOR, C.F. 4.7 K OHM 5% 1/4 W.	27					
44	5010-09034-00	R46, R53	RESISTOR, C.F. 10 K OHM 5% 1/4 W.	2					
45	5010-08174-00	R47, R55, R57, R62	RESISTOR, C.F. 22 K OHM 5% 1/4 W.	4					
46	5010-09113-00	R61	RESISTOR, C.F. 33 K OHM 5% 1/4 W.	1					
47	5010-09559-00	R64	RESISTOR, C.F. 47 K OHM 5% 1/4 W.	1					
48	5010-09442-00	R42, R49	RESISTOR, C.F. 330 K OHM 5% 1/4 W.	2					

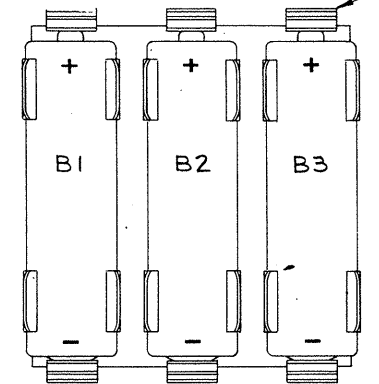
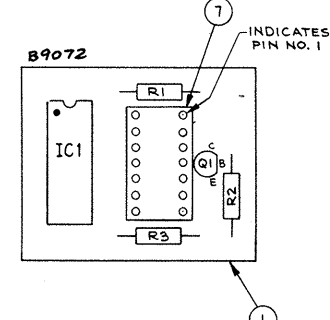
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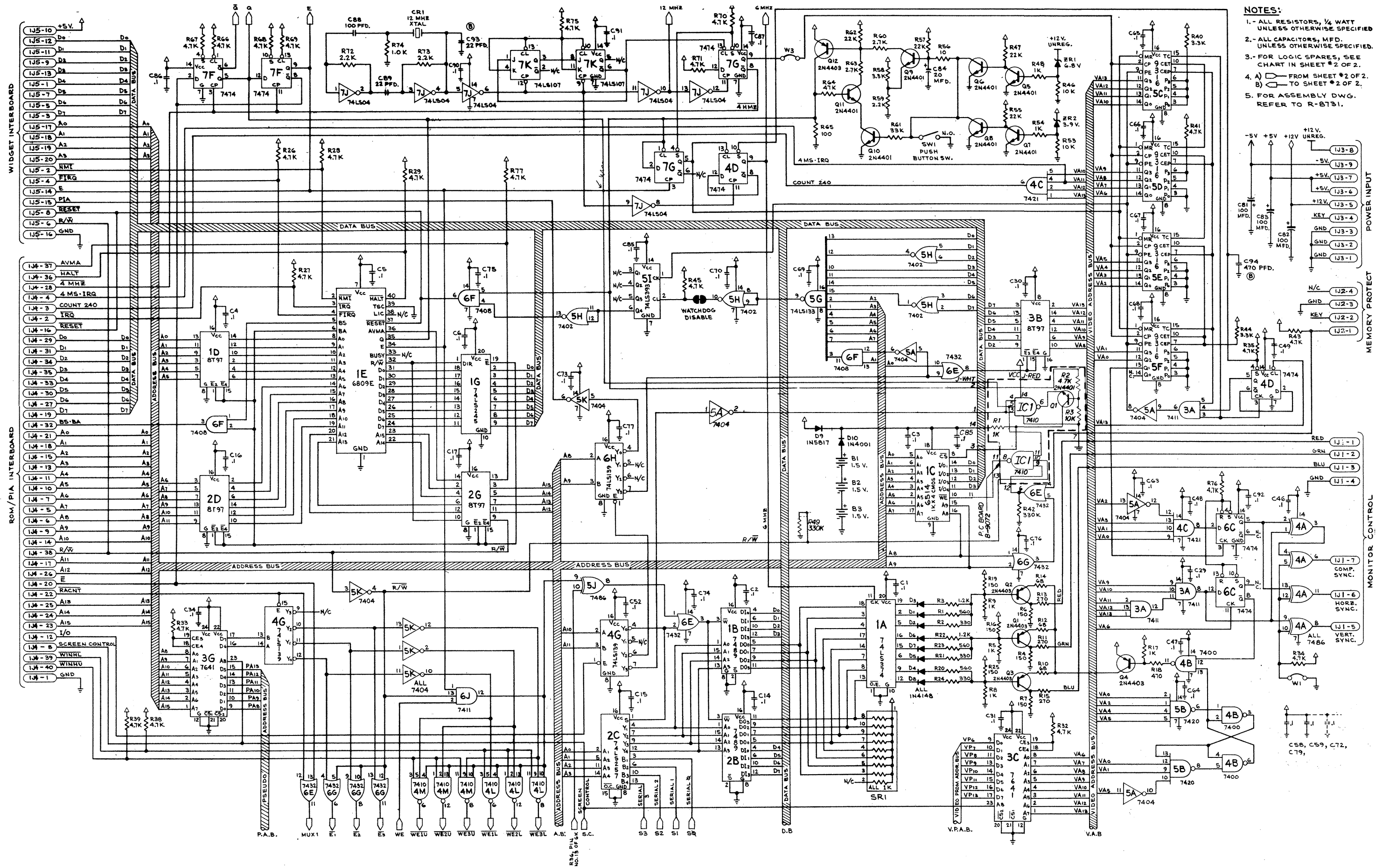
- 4116: 1K, 1L, 1M, 1N, 1O, 1P, 1Q, 1R, 2K, 2L, 2M, 2N, 2O, 2P, 2Q, 2R, 3K, 3L, 3M, 3N, 3O, 3P, 3Q, 3R
- 3.3K 4 RESISTOR: R26, R27, R28, R29, R32, R33, R35, R36, R37, R38, R39, R41, R43, R45, R50, R51, R52, R66, R67, R68, R69, R70, R71, R75, R84, R76, R77
- 1 MFD. CAPACITORS: C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C13, C14, C15, C16, C17, C18, C19, C20, C21, C22, C23, C24, C25, C26, C27, C28, C29, C30, C31, C32, C33, C34, C35, C36, C37, C38, C39, C40, C41, C42, C43, C44, C45, C46, C47, C48, C49, C50, C51, C52, C53, C54, C55, C56, C57, C58, C59, C60, C61, C62, C63, C64, C65, C66, C67, C68, C69, C70, C71, C72, C73, C74, C75, C76, C77, C78, C79, C80, C85, C86, C87, C90, C91, C92

4. FOR SCHEMATIC REFER TO 16-8809

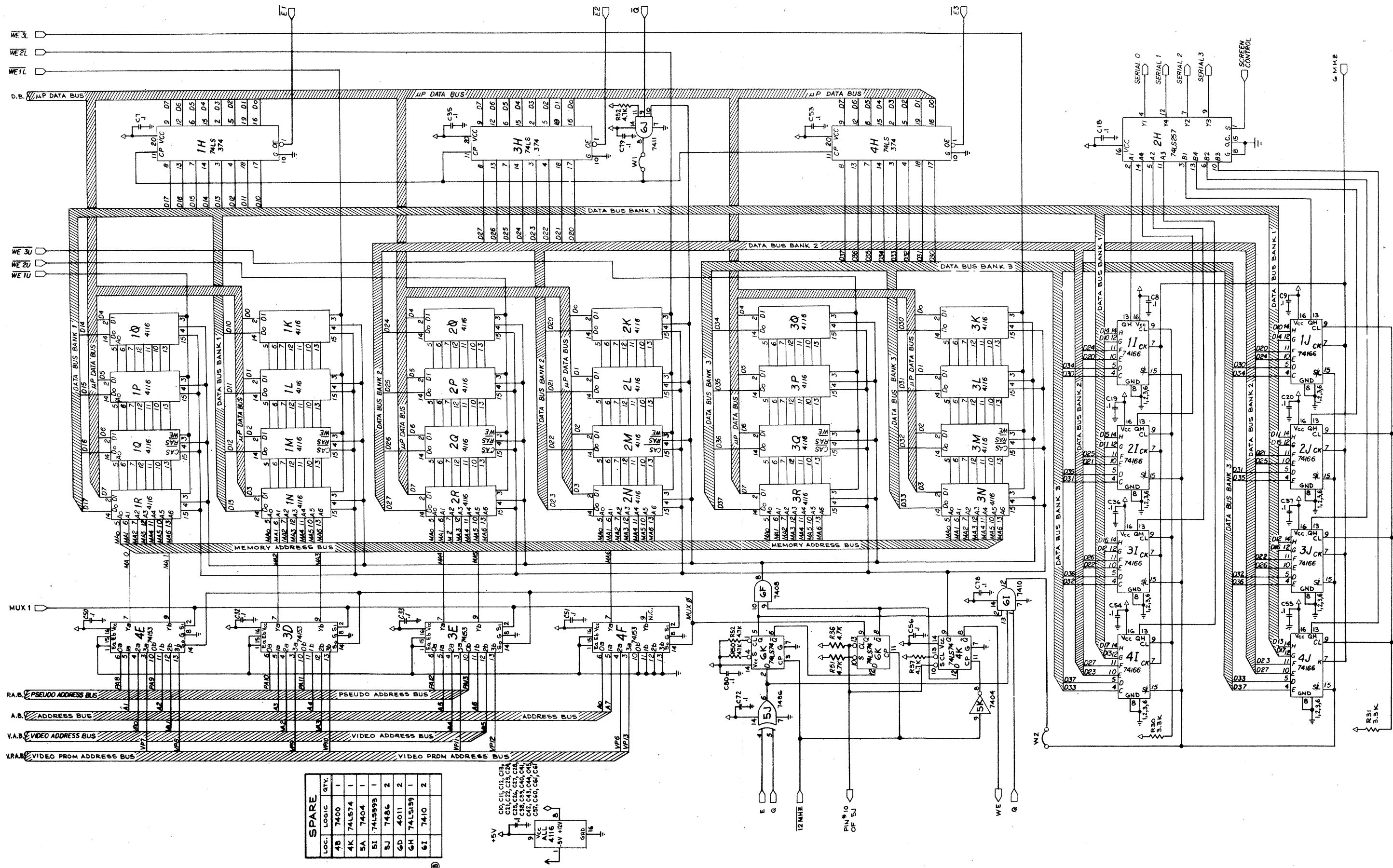


B9072 BILL OF MATERIAL				
ITEM NO.	PART NO.	PART DESIGNATION	DESCRIPTION	REQ'D NO.
1	5770-09810-00		BARE P.C. BOARD	1
2	5280-09011-00	IC1	7410 TRIPLE 3-INPUT NAND	1
3	5160-08938-00	Q1	2N4401, TO-92 TRANSISTOR, NPN	1
4	5010-09358-00	R1	RESISTOR, C.F. 1K ± 5% 1/4 WATT	1
5	5010-08991-00	R2	RESISTOR, C.F. 4.7 K ± 5% 1/4 WATT	1
6	5010-09534-00	R3	RESISTOR, C.F. 10 K ± 5% 1/4 WATT	1
7	5701-09812-00		14 PIN I.C. HEADER	1

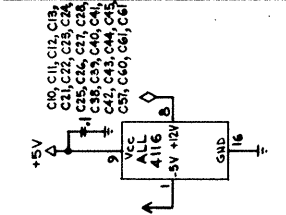




- NOTES:**
1. - ALL RESISTORS, 1/4 WATT UNLESS OTHERWISE SPECIFIED
 2. - ALL CAPACITORS, MFD. UNLESS OTHERWISE SPECIFIED.
 3. - FOR LOGIC SPARES, SEE CHART IN SHEET #2 OF 2.
 4. A) FROM SHEET #2 OF 2. B) TO SHEET #2 OF 2.
 5. FOR ASSEMBLY DWG. REFER TO R-8731.

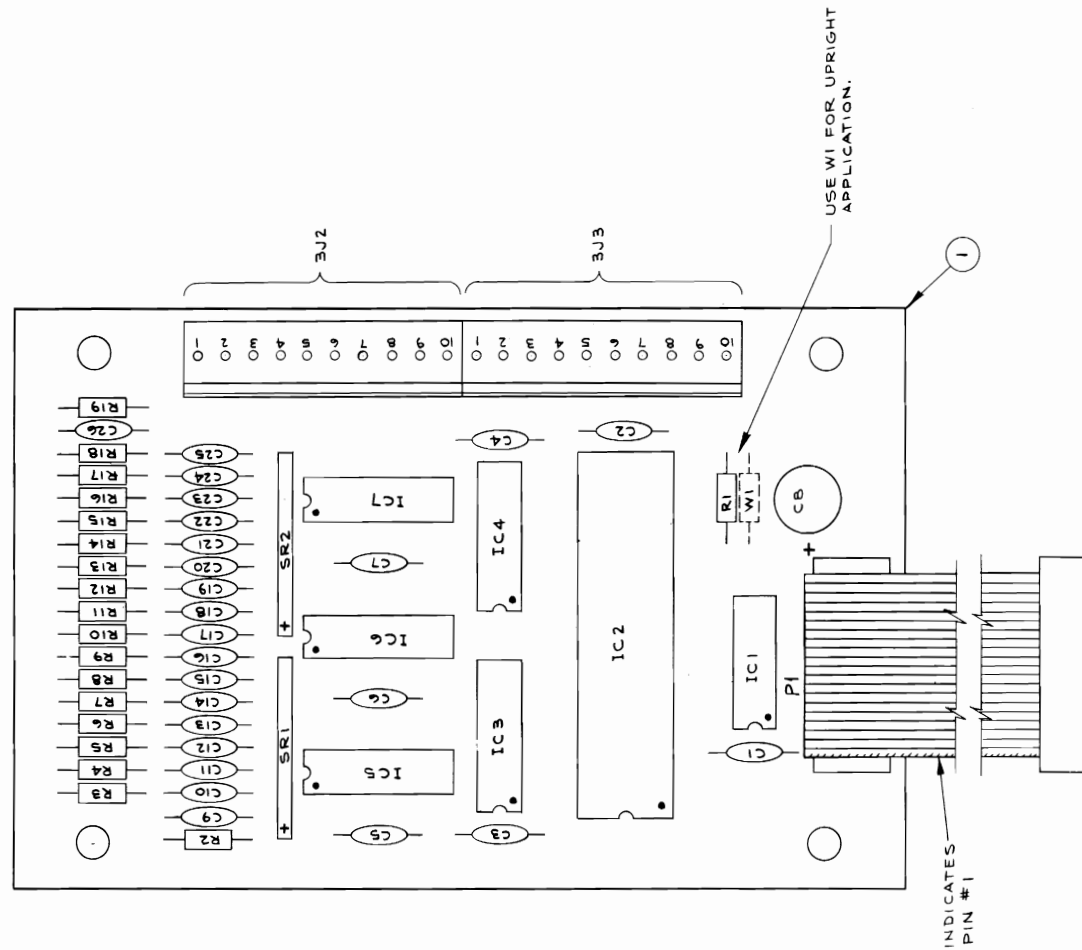


LOC.	LOGIC	QTY.
4B	7400	1
4K	74LS74	1
5A	7404	1
5I	74LS993	1
5J	7486	2
6D	4011	2
6H	74LS199	1
6I	7410	2



BILL OF MATERIAL

ITEM NO.	PART NO.	PART DESIGNATION	DESCRIPTION	NO. REQD.
1	577Z-09680-00		BARE P.C. BOARD	1
2	5430-08972-00	IC2	6821 PIA	1
3	5310-08975-00	IC5, IC6, IC7	4049 CMOS HEX INVERTER	3
4	5280-09013-00	IC1	7404 HEX INVERTER	1
5	5281-09485-00	IC3, IC4	74LS257 QUAD DATA MULTIPLEXER	2
6	5019-09362-00	SR1, SR2	4.7K OHM 9 RES. 10 PIN SIP	2
7	5010-09388-00	R2 THRU R19	RESISTOR, C.F. 1K OHM 5% 1/4 WATT	18
8	5010-08991-00	R1	RESISTOR, C.F. 4.7K OHM 5% 1/4 WATT	1
9	5010-09534-00	W1	RESISTOR, C.F. 0 OHM 1/4 WATT	1
10	5043-09065-00	C9 THRU C26	CAPACITOR, CERAMIC DISC 470 PFD. 50 V. XTR 220%	18
11	5040-09421-00	C8	CAPACITOR, ELECT. RADIAL 100 MFD. 25 VOLT, +50-10%	1
12	5043-08980-00	C1 THRU C7	CAPACITOR, CERAMIC DISC, .01 MFD. 50 V. +80-20%	7
13	5795-09540-00	P1	20 PIN RIBBON CABLE ASSY.	1
14	5791-09444-00	3J2, 3J3	10 PIN HEADER 09-65-1101	2



INDICATES PIN #1

USE W1 FOR UPRIGHT APPLICATION.

INDICATES PIN #1

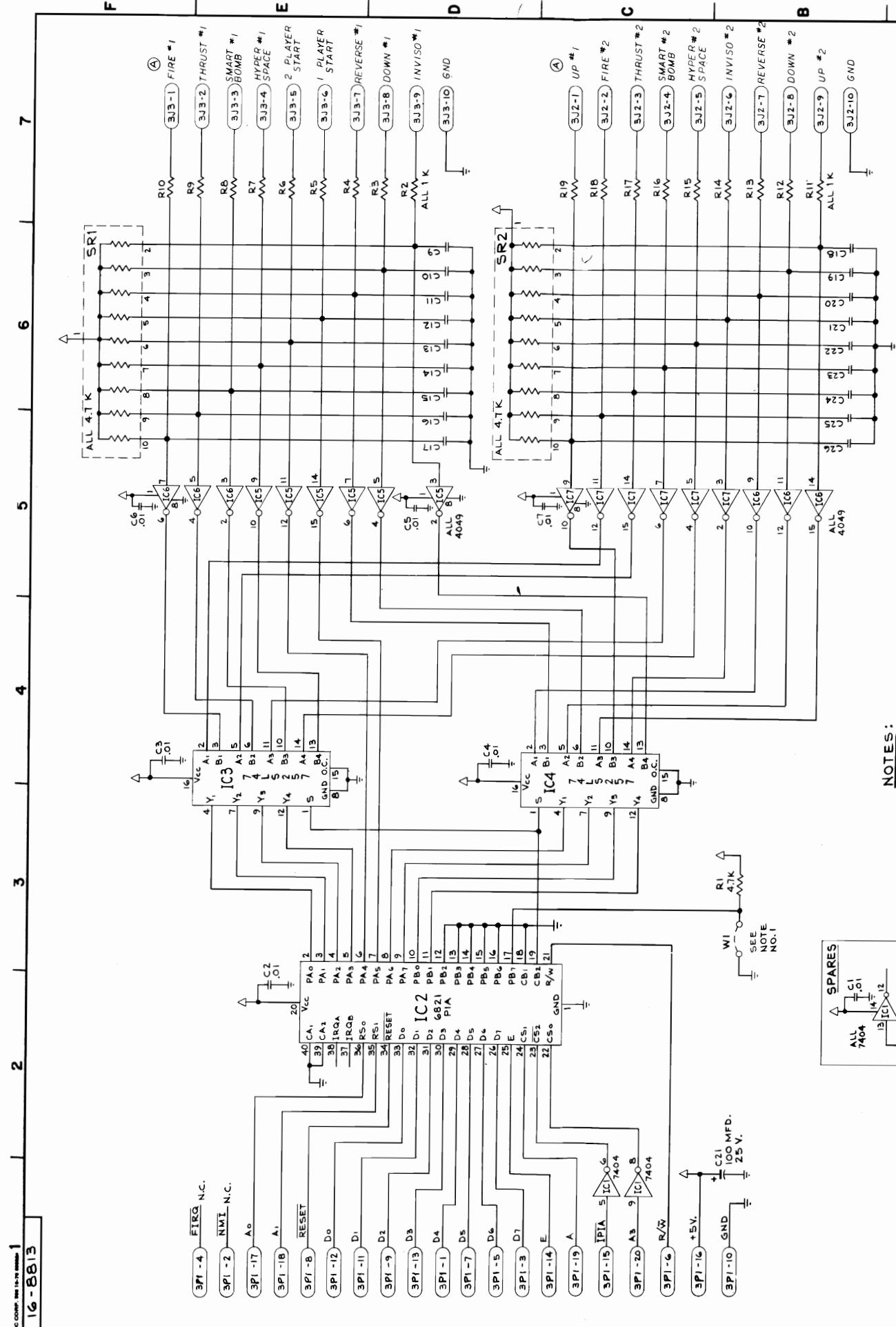
USE W1 FOR UPRIGHT APPLICATION.

REVISION LETTER	REVISION	BY
	NEW PARTS RELEASE 7212	

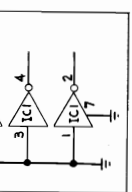
TOLERANCES UNLESS OTHERWISE SPECIFIED	FRAC. DECIMAL	ANGULAR	SCREEN FINISH
	FRACTIONAL	DEGREES	CLASS 2

WILLIAMS ELECTRONICS, INC.	CHICAGO, ILL. 60618	CORNELIA 72240
3401 N. CALIFORNIA	CHICAGO, ILL. 60618	CORNELIA 72240
NAME VIDEO WIDGET ASSEM (389 SYSTEM)		
MATERIAL	HEAT TREATMENT	FINISH
NONE	NONE	NONE
DATE 12-11-71	BY R.GAY	SCALE 2:1
REV. 1	D-8618	ASSEMBLY ON

C-8783



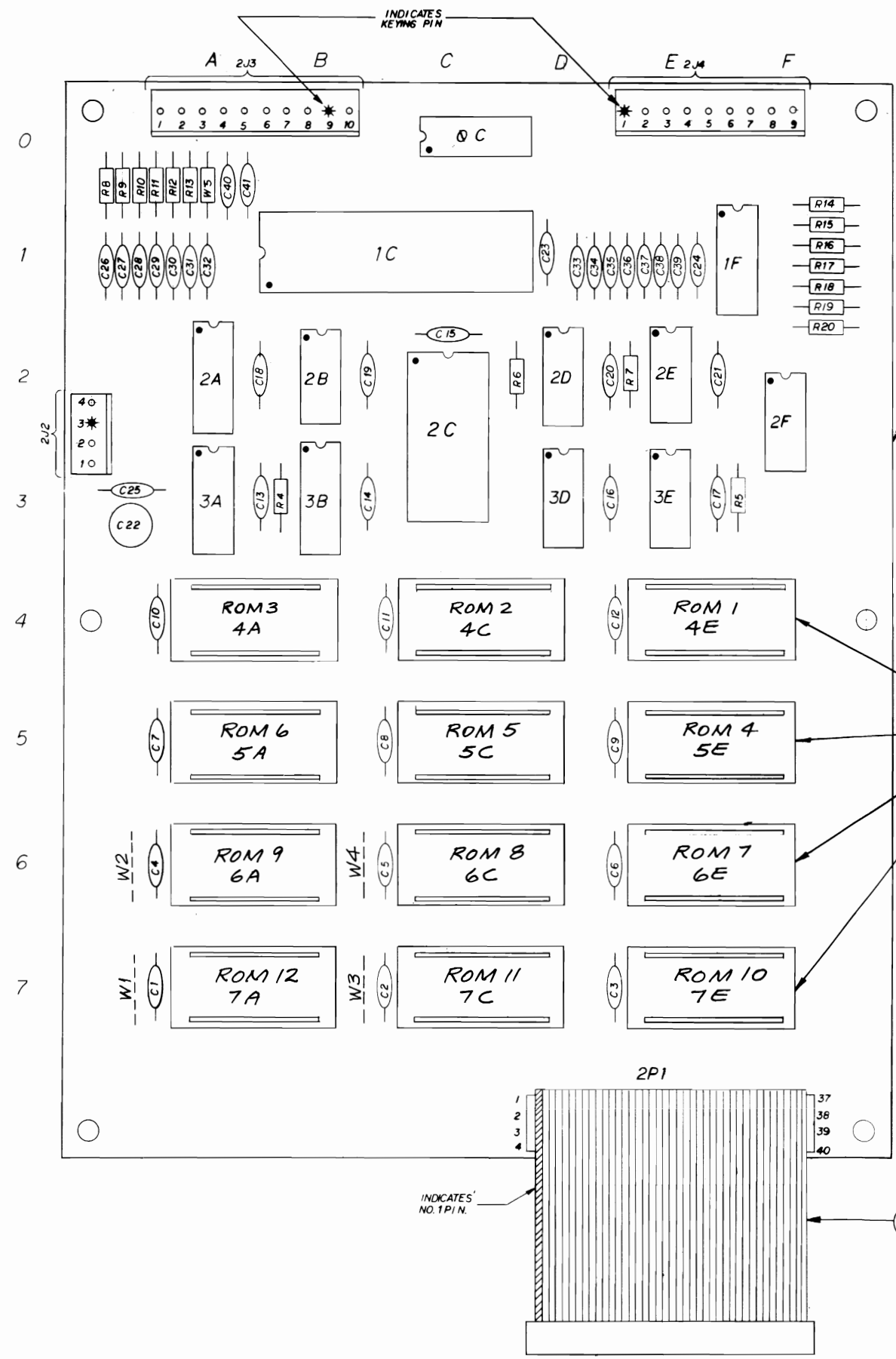
NOTES:
1. USE W1 FOR UPRIGHT APPLICATION.
2. FOR ASSEMBLY DWG REFER TO C-8783



ADDED SWITCH DESCRIPTION TO PIN 5 3J3-1 THRU 3J3-10 3J2-1 THRU 3J2-10 3J2-5 3J2-10 3J2-5	REVISION	BY
NEW PARTS RELEASE 7211		

TOLERANCES UNLESS OTHERWISE SPECIFIED	FRAC. DECIMAL	ANGULAR	SCREEN FINISH
	FRACTIONAL	DEGREES	CLASS 2

WILLIAMS ELECTRONICS, INC.	CHICAGO, ILL. 60618	CORNELIA 72240
3401 N. CALIFORNIA	CHICAGO, ILL. 60618	CORNELIA 72240
NAME SCHEMATIC, VIDEO WIDGET BD (389 SYS)		
MATERIAL	HEAT TREATMENT	FINISH
NONE	NONE	NONE
DATE 12-11-71	BY R.GAY	SCALE 16:1
REV. 1	D-8813	ASSEMBLY ON



BILL OF MATERIALS				
ITEM NO.	PART NO.	PART DESIGNATION	DESCRIPTION	REQ'D NO.
1	5771-09657-00		BARE P.C. BOARD	1
2	5280-09407	1F	7447 BCD TO 7 SEG LED DISPLAY	1
3	5280-09478-00	3A, 2E	7474 DUAL-D TYPE FLIP-FLOP	2
4	5281-09246-00	3B	74LS139 DUAL 2 TO 4 LINE DECODER	1
5	5280-09530-00	2B	7420 DUAL 4-INPUT NAND	1
6	5280-09475-00	2D	7411 TRIPLE 3 INPUT AND	1
7	5280-09013-00	3D	7404 HEX INVERTERS	1
8	5280-09551-00	3E	DUAL 4 INPUT 7425 NOR GATE WITH STROBE	1
9	5280-09010-00	2C	74154 4 TO 16 LINE DEC./DEMULT.	1
10	5430-08972-00	1C	MC 6821 PIA	1
11	5019-09239-00	0C	4.7K 15 RES 16 PIN DIP PACK	1
12	5010-09187-00	R14 THRU R20	RESISTOR C.F. 150 OHM 5% 1/4 W	7
13				
14	5010-08991-00	R4 THRU R7	RESISTOR C.F. 4.7K OHM 5% 1/4 W	4
15	5671-09411-00	2F	MAN 72A 7SEG LED DISPLAY	1
16	5043-08980-00	C1-C21, C23, C24	CAP CERAMIC .01 MFD 50V +80-20%	23
17	5040-09421-00	C22	CAP ELEC 100 MFD 25V RAD +50%-10%	1
18	5043-08996-00	C25	CAP TANTALUM .1MFD 50V +20%	1
19	5043-09065-00	C26 THRU C41	CAP CERAMIC 470 PFD 50V AXIAL +/-20%	16
20	5700-09004-00		24 PIN SOCKET	12
21	5795-09611-00	2P1	40 PIN RIBBON CABLE ASS'Y. 5"	1
22	5791-09028-00	2J2	4PIN MALE CONN. 09-65-1041	1
23	5791-09444-00	2J3	10 PIN MALE CONN. 09-65-1101	1
24	5791-09027-00	2J4	9 PIN CONN. 09-65-1091-	1
25	5310-08975	2A	4049 INVERTING HEX BUF.	1
26	5010-09358-00	R8 THRU R13	RESISTOR C.F. 1K OHM 5% 1/4 W	6
27	5010-09534-00	W5	RESISTOR, C.F., 0 OHM	1
28	SEE CHART	4A THRU 7E	GAME ROM ASSY.	AS REQ'D
29	5010-09534-00	W1 THRU W4	RESISTOR C.F. 0 OHM 1/4 WATT.	AS REQ'D

GAME	STARGATE				
ASSEM. NO.	D-8730				
4E	A-5343-09700				
4C	A-5343-09701				
4A	A-5343-09702				
5E	A-5343-09703				
5C	A-5343-09704				
5A	A-5343-09705				
6E	A-5343-09706				
6C	A-5343-09707				
6A	A-5343-09708				
7A	A-5343-09709				
7C	A-5343-09710				
7E	A-5343-09711				
JUMPER	W2, W4				

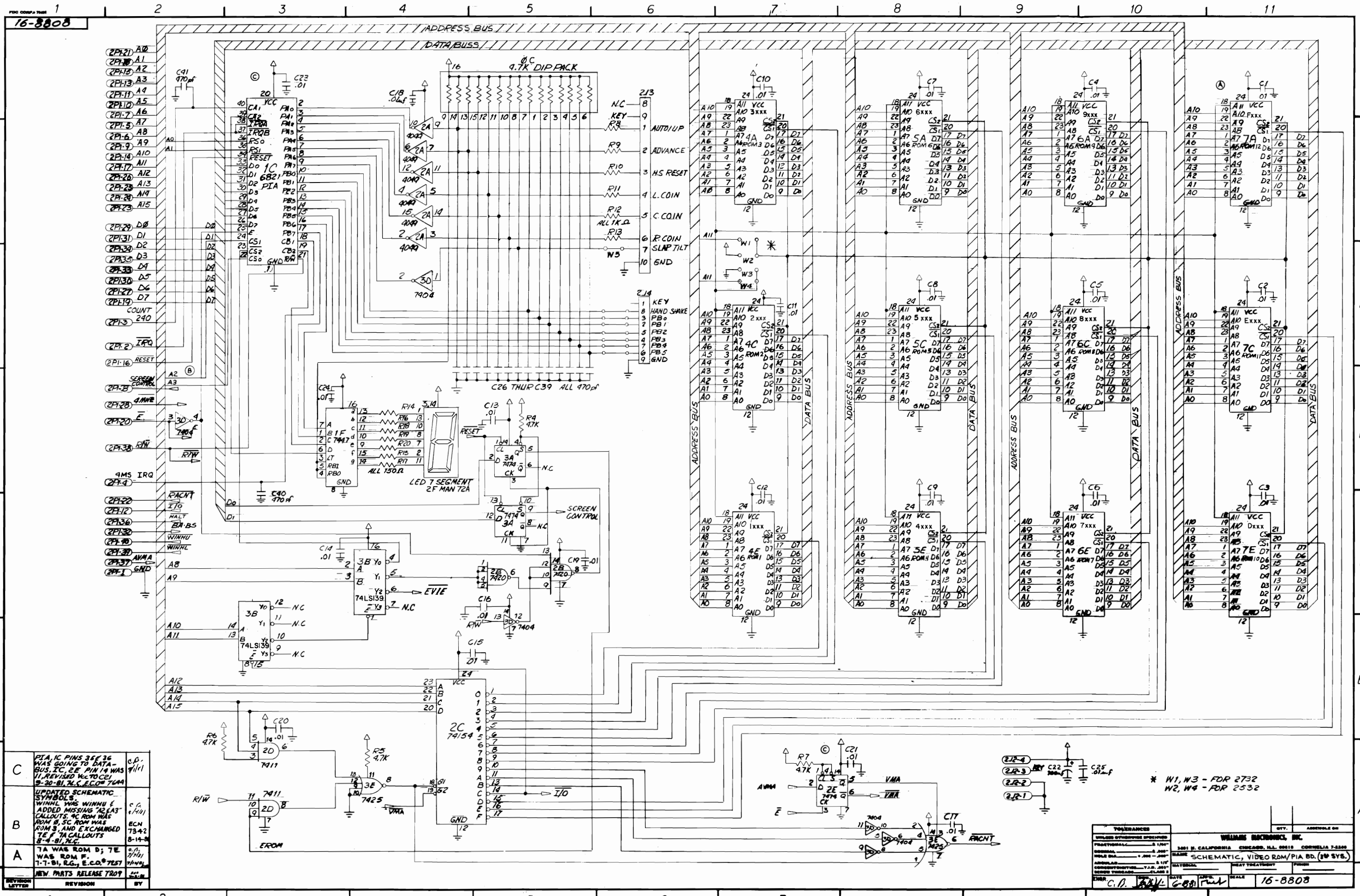
REVISION LETTER	REVISION	BY
A	ITEM #27, W5 WAS W25 B-5-BI, R.G., E.C.O.# 7341 NEW PARTS RELEASE 7210	C.A. 1/1/81

TOLERANCES UNLESS OTHERWISE SPECIFIED:
 FRACTIONAL: ± .004"
 DECIMAL: ± .002"
 HOLE DIA: + .002 - .000"
 ANGULAR: ± .5°
 CONCENTRICITY: ± .002"
 SCREW THREADS: CLASS 1

WILLIAMS ELECTRONICS, INC.
 2801 N. CALIFORNIA CHICAGO, ILL. 60618 CORNELIA 7-2240

NAME: ROM/PIA BOARD SUB-ASSEMBLY
 MATERIAL: FRIB
 FINISH: NONE

DATE: 5-7-81
 SCALE: 2:1
 D-8729



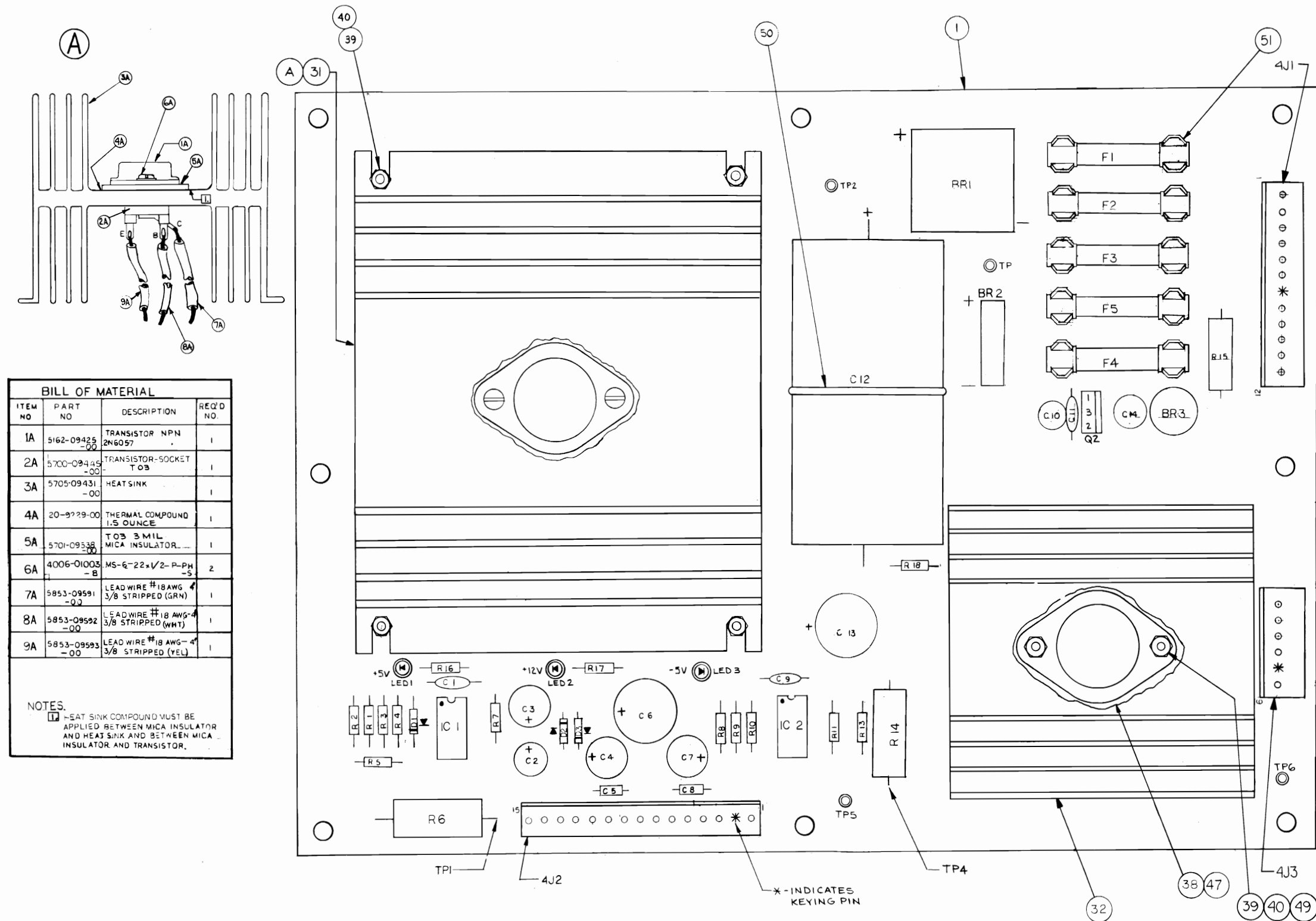
C	PIA, IC PINS 36 & 36 WAS GOING TO DATA-BUS. IC 2E, PIN 14 WAS VI, REVISED W/ TO CEI 9-20-81, R.G., E.C.O. TMA	C.D. 11/11
B	UPDATED SCHEMATIC SYMBOLS. WINNIE WAS WINNIE & ADDED MISSING 74LS13 CALLOUTS. 7C ROM WAS ROM B, SC ROM WAS ROM 3, AND EXCHANGED TE F 7A CALLOUTS 8-4-81, R.G.	C.D. 11/11 ECN 7342 8-14-81
A	7A WAS ROM B; 7E WAS ROM F. T-7-B, R.G., E.C.O. TEST	C.D. 11/11 HANDY
	NEW PARTS RELEASE TROY	11/11
	REVISION	BY

TOLERANCES		QTY.		ASSEMBLY ON	
UNLESS OTHERWISE SPECIFIED					
FRACTIONAL	± 1/100	WILLIAMS ELECTRONICS, INC.			
DECIMAL	± .005	3801 N. CALIFORNIA CHICAGO, ILL. 60618 CORNELIA 7-2500			
ANGLE	± .005	NAME SCHEMATIC, VIDEO ROM/PIA BD. (10 SYS.)			
CONTOUR	± .005	DATE			
DRILL	± .005	DRAWN			
		16-8808			

ROM Board Logic Diagram

BILL OF MATERIAL

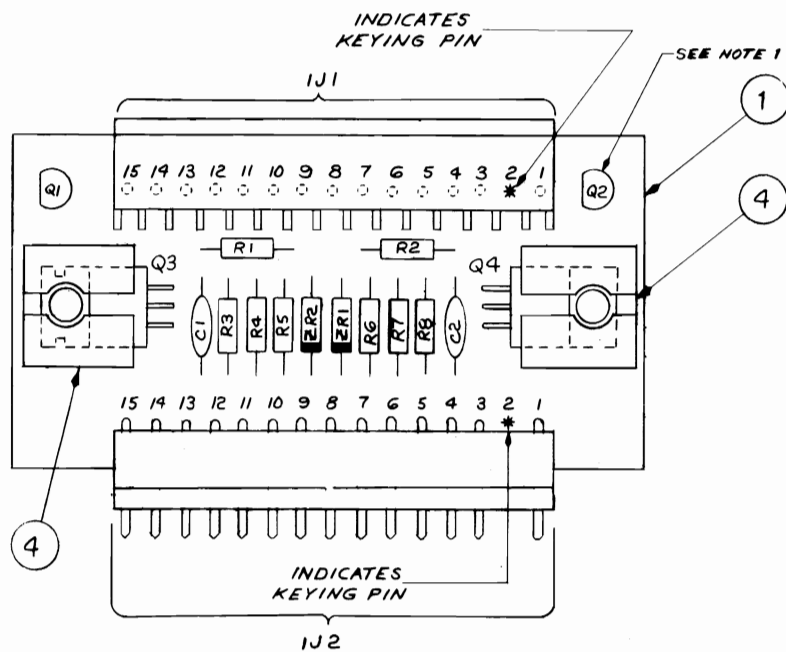
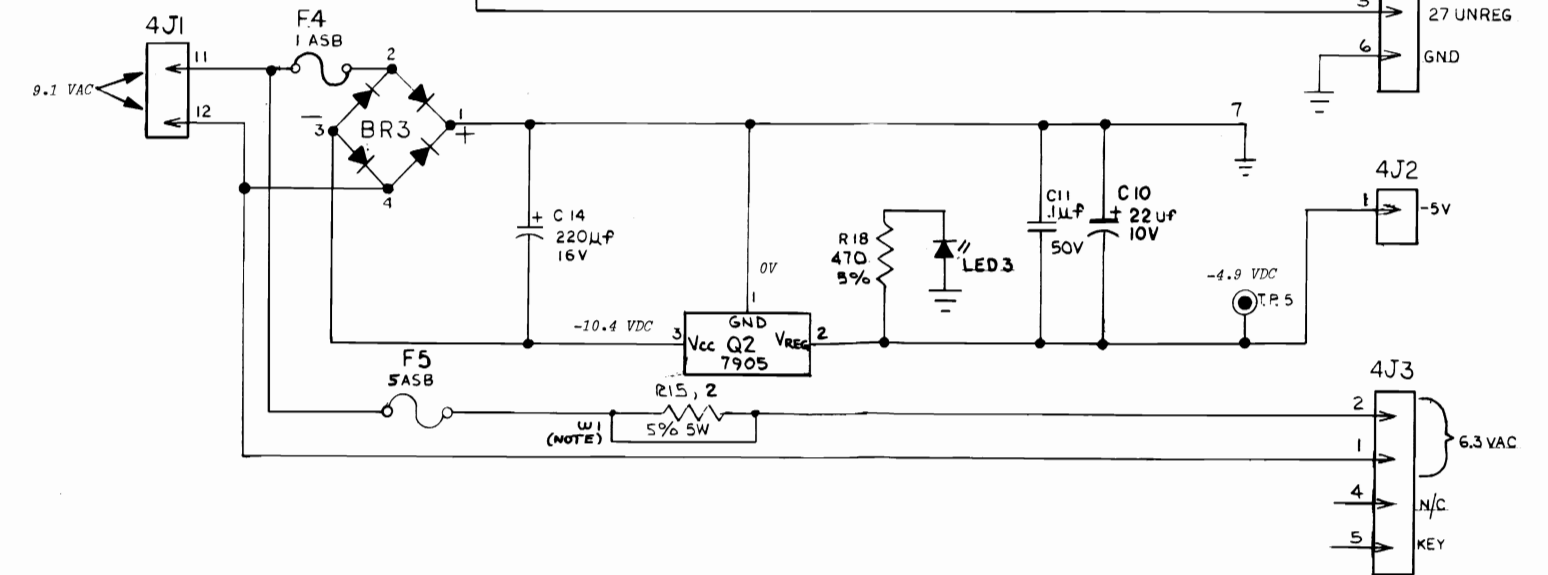
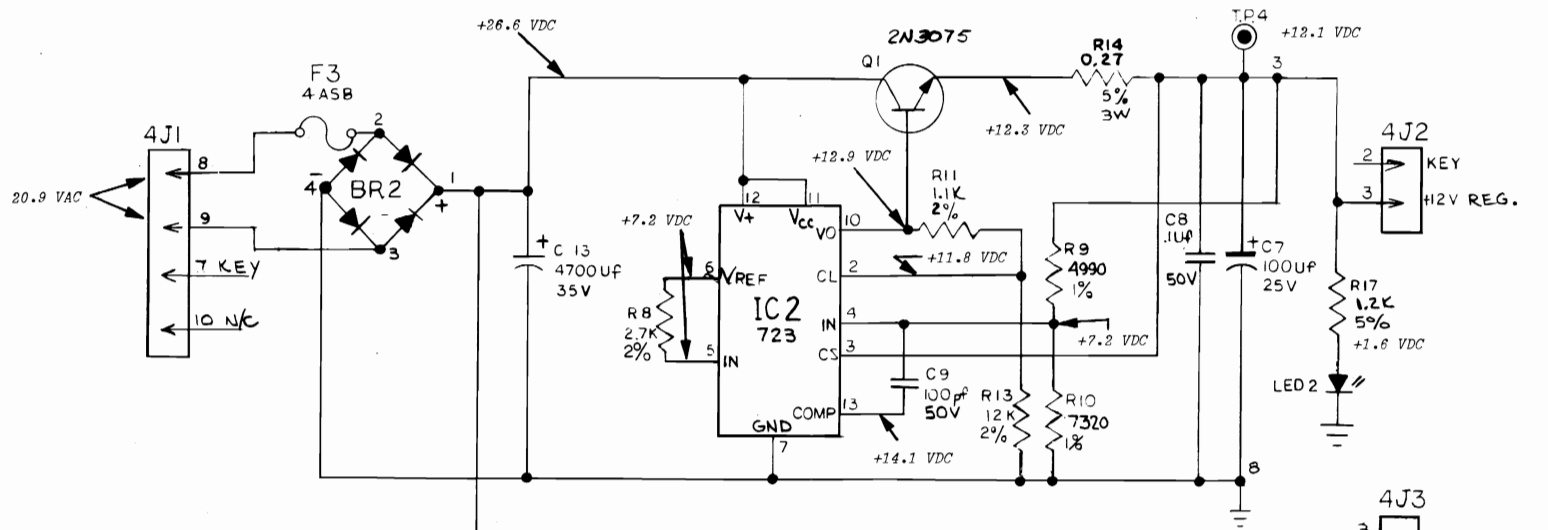
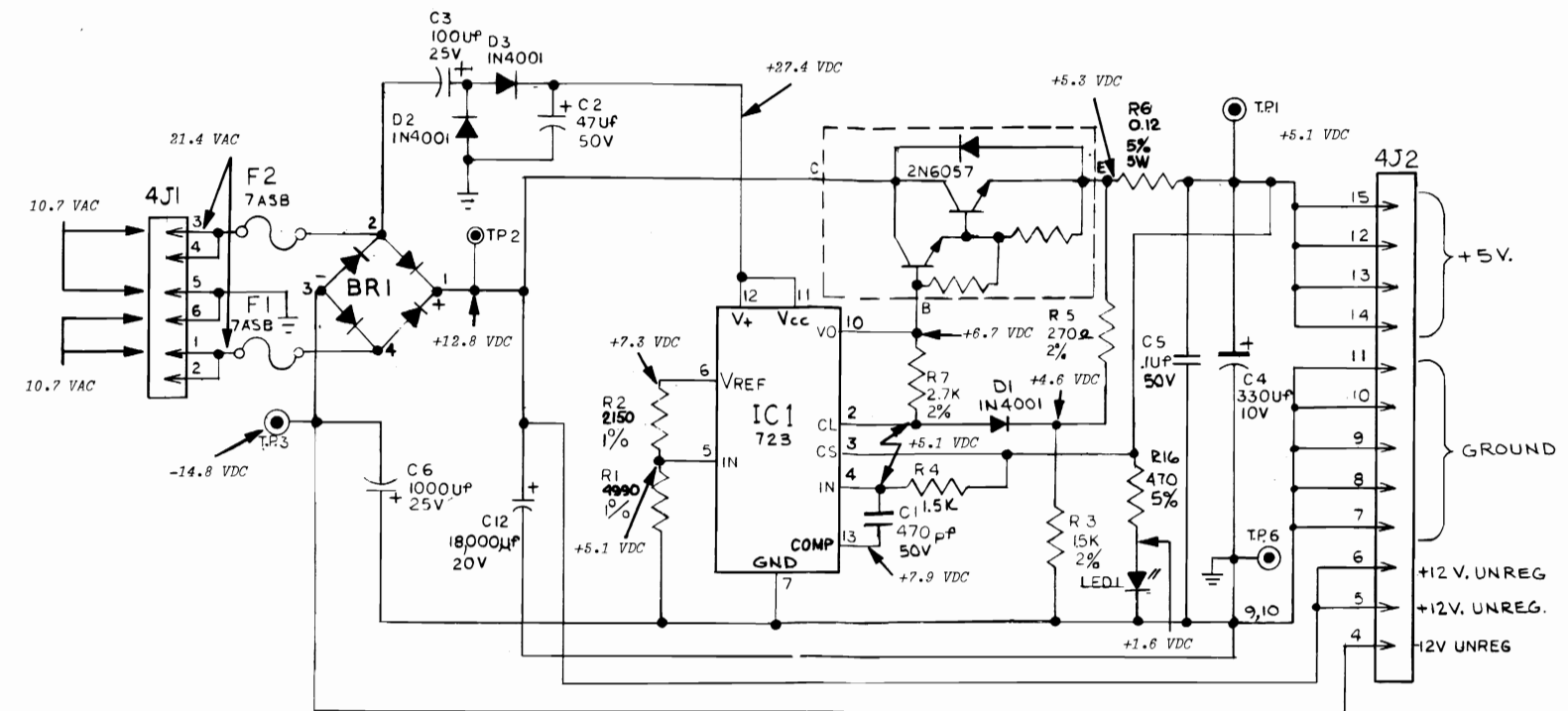
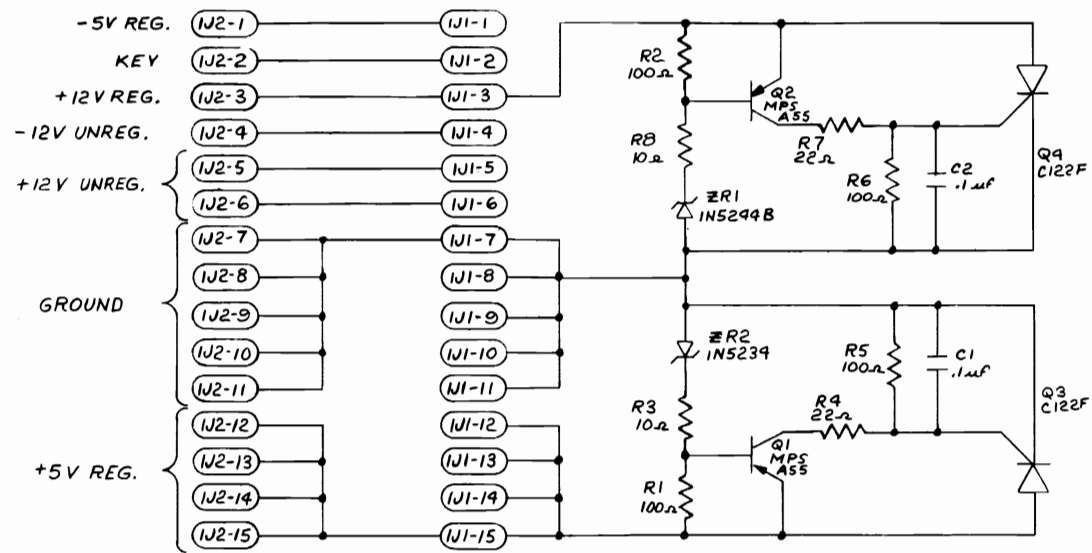
ITEM NO.	PART NO.	PART DESIGNATION	DESCRIPTION	REQ'D NO.
1	5113-09414-00		BARE P.C. BOARD	1
2	5010-09085-00	R4	RESISTOR, 1.5K 5%, 1/4W	1
3	5010-09541-00	R8, R7	RESISTOR, 2.7K 2%, 1/4W	2
4	5010-09508-00	R5	RESISTOR, 270 2%, 1/4W	1
5	5010-09428-00	R3	RESISTOR, 1.5K 2%, 1/4W	1
6	5010-09509-00	R11	RESISTOR, 1.1K 2%, 1/4W	1
7	5010-09510-00	R13	RESISTOR, 12K 2%, 1/4W	1
8	5013-09542-00	R10	RESISTOR, 732K 1%, 1/4W	1
9	5013-09427-00	R1 & R9	RESISTOR, 499K 1%, 1/4W	2
10	5013-09426-00	R2	RESISTOR, 2.15K 1%, 1/4W	1
11	5012-08429-00	R6	RESISTOR, 12Ω, 5%, 5W	1
12	5012-09512-00	R14	RESISTOR, .27 5%, 5W	1
13	5040-09421-00	C3 & C7	CAPACITOR, 100MFD, 25V, RADIAL	2
14	5040-09422-00	C2	CAPACITOR, 47MFD, 50V, RADIAL	1
15	5040-09420-00	C6	CAPACITOR, 1000MFD, 25V, RADIAL	1
16	5040-09419-00	C12	CAPACITOR, 18,000MFD, 20V, RADIAL	1
17	5040-09423-00	C4	CAPACITOR, 330MFD, 10V, RADIAL	1
18	5040-09504-00	C13	CAPACITOR, 4700MFD, 35V, RADIAL	1
19	5043-08996-00	C5, C8, C11	CAPACITOR, 1MFD, 50V, AXIAL .25U	3
20	5043-09065-00	C1	CAPACITOR, 470 PFD, 50V, AXIAL XTR	1
21	5043-09492-00	C9	CAPACITOR, 100 PFD, 50V, AXIAL 52L	1
22	5040-09506-00	C14	CAPACITOR, 220MFD, 16V, RADIAL	1
23	5040-09493-00	C10	CAPACITOR, 22MFD, 10V, RADIAL	1
24	5070-06258-00	D1, D2, D3	DIODE, IN4001	3
25	5100-09418-00	BR1	BRIDGE RECTIFIER, 35AMP 100V	1
26	5100-09513-00	BR2	DIODE BRIDGE, 4.0A, 50V	1
27	5100-09514-00	BR3	DIODE BRIDGE, 1.0A, 50V	1
28	5731-09432-00	F1, F2	FUSE, 7A 5B	2
29	5731-06314-00	F3	FUSE, 4A, 5B, 250 V.	1
30	5731-06569-00	F4	FUSE, 1A, 5B	1
31	B-8416-00		HEAT SINK ASSEMBLY (SEE A)	1
32	5705-09543-00		HEAT SINK	1
33	5791-09074-00	4J2	HEADER, 15 PIN, 09-65-1151	1
34	5791-09043-00	4J1	HEADER, 12 PIN, 09-65-1121	1
35	5250-09515-00	Q2	VOLTAGE REGULATOR 7905	1
36	5460-09424-00	IC1, IC2	VOLTAGE REGULATOR 783	2
37	5824-09248-00	TP2, TP3, TP5, TP6	TERMINAL #1502-1 (TEST POST)	4
38	20-9229-00		THERMAL COMPOUND .02 OUNCE	AR
39	4005-01051-07		5-40x7/16 RH. MECH. SCREW	6
40	4405-01117-00		5-40 HEX NUT	6
41	5141-09552-00	Q1	2N3055 TRANSISTOR NPN	1
42	5731-09651-00	F5	FUSE, 5A, 5B	1
43	5791-09038-00	4J3	HEADER, 6 PIN, 09-65-1061	1
44	5012-09544-00	R15	RESISTOR, 2.0Ω, 5%, 5W	1
45	5010-09416-00	R16, R18	RESISTOR, 470Ω, 5%, 1/4W	2
46	5010-09314-00	R17	RESISTOR, 1.2K, 5%, 1/4W	1
47	5701-09538-00		INSULATOR, MICA, 3mil	1
48	5671-09019-00	LED1, LED2, LED3	LED, RED	3
49	03-7598		INSULATOR, NYLON	2
50	03-7520		TIE WRAP	1
51	6732-09178-00		FUSEHOLDER	10



BILL OF MATERIAL

ITEM NO.	PART NO.	DESCRIPTION	REQ'D NO.
1A	5162-09425-00	TRANSISTOR NPN 2N6057	1
2A	5700-09445-00	TRANSISTOR-SOCKET TO3	1
3A	5705-09431-00	HEAT SINK	1
4A	20-9229-00	THERMAL COMPOUND 1.5 OUNCE	1
5A	5701-09338-00	TO3 3 MIL MICA INSULATOR	1
6A	4006-01003-8	MS-6-22xV/2-P-PH	2
7A	5853-09591-02	LEAD WIRE #18AWG 3/8 STRIPPED (GRN)	1
8A	5853-09592-00	LEAD WIRE #18 AWG 3/8 STRIPPED (WHT)	1
9A	5853-09593-00	LEAD WIRE #18 AWG 3/8 STRIPPED (VEL)	1

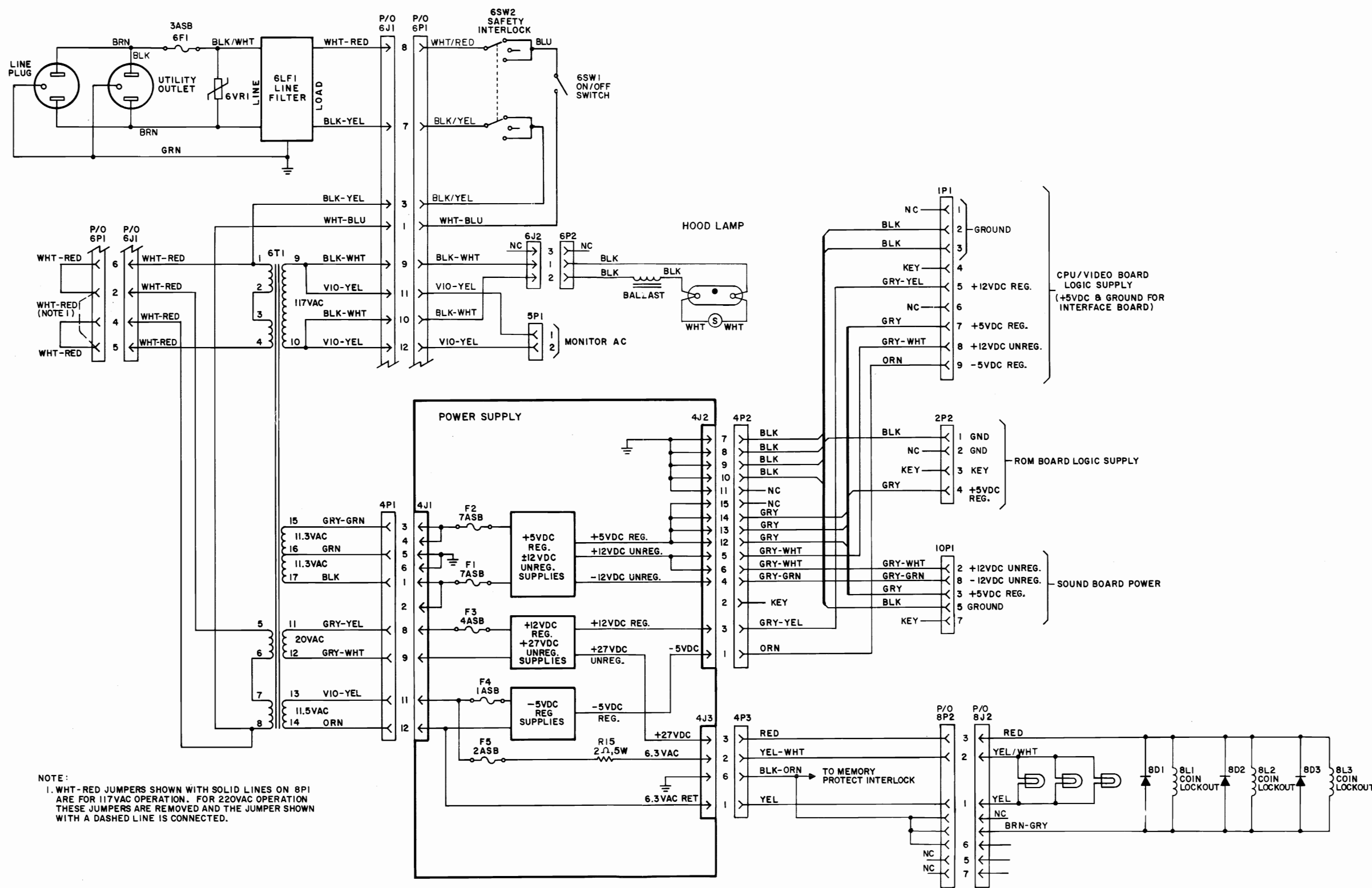
NOTES:
 1. HEAT SINK COMPOUND MUST BE APPLIED BETWEEN MICA INSULATOR AND HEAT SINK AND BETWEEN MICA INSULATOR AND TRANSISTOR.

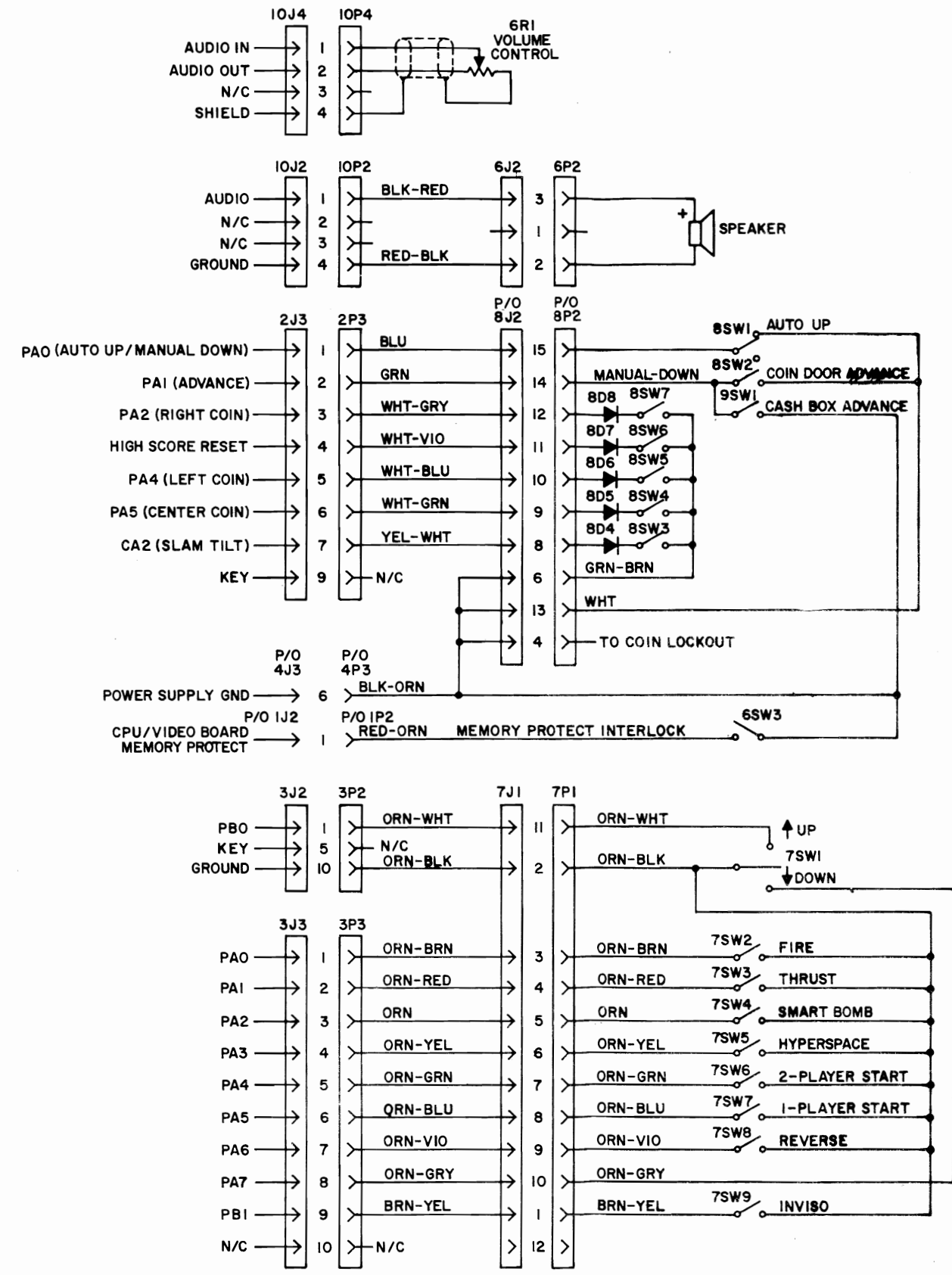


BILL OF MATERIALS				
ITEM NO.	PART NO.	PART DESIGNATION	DESCRIPTION	REQ'D NO.
1	5773-09664-00		BARE P.C. BOARD	1
2	5792-09676-00	IJ1	RIGHT ANGLE CONNECTOR, 15 PIN	1
3	5791-09670-00	IJ2	HEADER CONNECTOR, 15 PIN	1
4	5705-09663-00		HEAT SINK, AAVID 5741	2
	5705-09688-00		HEAT SINK, THERMALLOY 6043	0
7	5130-09661-00	Q3, Q4	SCR 122F (100V)	2
8	5190-09430-00	Q1, Q2	TRANSISTOR MPS A55	2
9	5075-09662-00	ZR1	ZENER 1N5244 ± 5% (14V)	1
10	5075-09406-00	ZR2	ZENER 1N5234 ± 5% (6.2V)	1
11	5010-09036-00	R1, R2, R5, R6	RESISTOR C.F. 100 Ω ± 5% 1/4W	4
12	5010-09039-00	R3, R8	RESISTOR C.F. 10 Ω ± 5% 1/4W	2
13	5010-09434-00	R4, R7	RESISTOR C.F. 22 Ω ± 5% 1/4W	2
14	5043-08996-00	C1, C2	CAPACITOR 0.1 μF CERAMIC +80% -20% 50V	2

NOTES:
 1. OBSERVE POLARITY OF CAPACITORS, DIODES AND POSITION OF TRANSISTORS.
 2. REFERENCE DWG: SCHEMATIC 16-8810

NOTE:
 W1 CONNECTED ONLY FOR COCKTAIL APPLICATIONS.

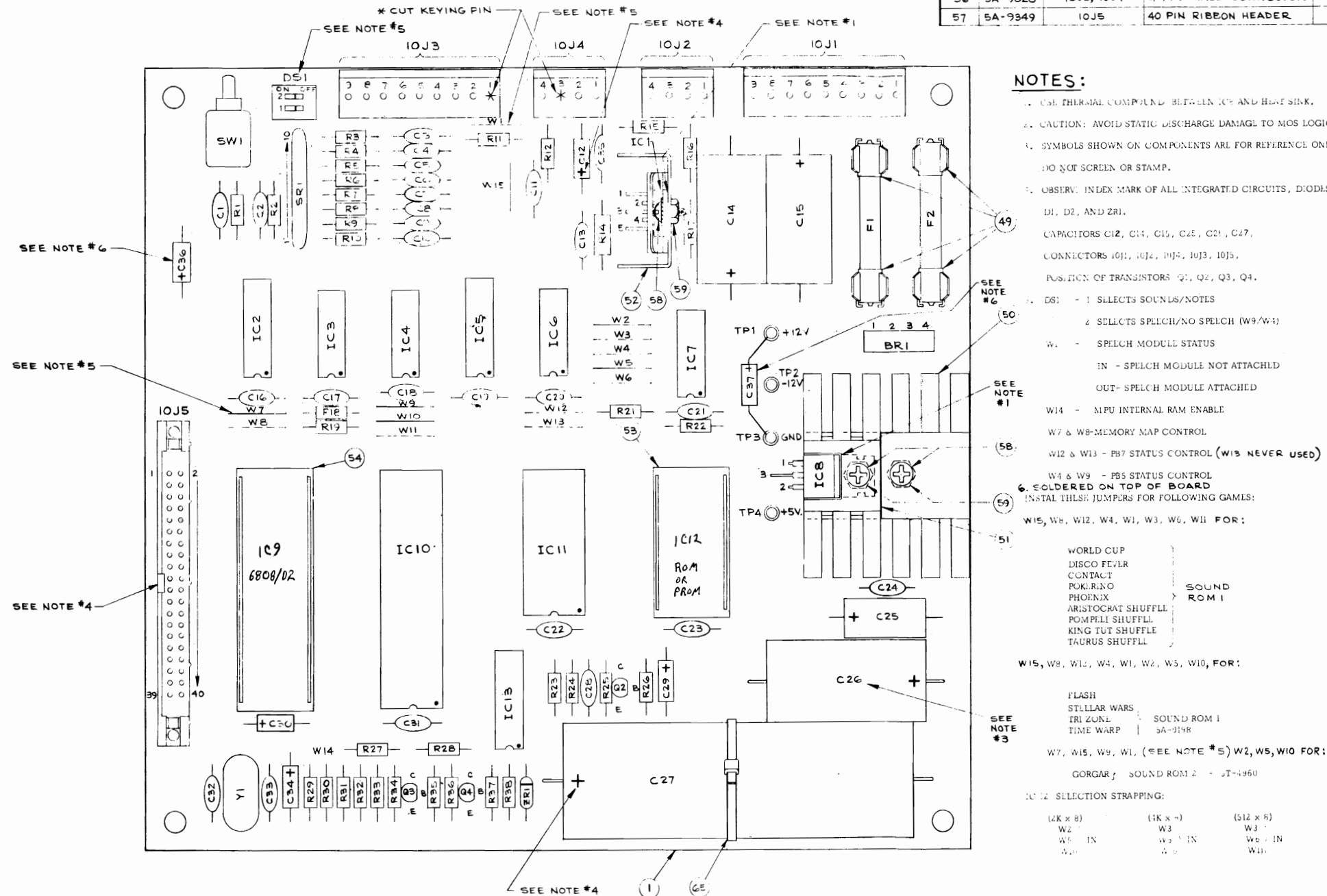




Cabinet Wiring Diagram

ITEM NO.	PART NO.	PART DESIGNATION	DESCRIPTION	REQ'D. NO.	ITEM NO.	PART NO.	PART DESIGNATION	DESCRIPTION	REQ'D. NO.
58			6-32 x 3/8" BINDER HEAD SCREW	3	48	5A-6314	F1, F2	4 AMP SLOW BLOW FUSE	2
59			6-32 HEX NUT	3	49	5A-9178		FUSE HOLDER	4
60		W1, W2, W6, W7, W9, W10, W15	WIRE JUMPER 22 GAUGE WIRE WITH INSULATION	7	50	5A-9172		HEAT SINK THERMALLOY #6072B	1
61	5A-9248	TP1 THRU TPA	TERMINAL #1502-1	4	51	5A-9173		HEAT SINK THERMALLOY #6071B	1
62	5A-9363	R11	RESISTOR, FC, 5.6 KOHM 5% 1/4 WATT	1	52	5A-9199		HEAT SINK THERMALLOY #6030	1
64	5A-9362	SRI	RESISTOR, 4.7 K OHM 10 PIN SIP	1	53	5A-9004		24 PIN SOCKET	1
65	3A-7520-1		TIE WRAP	1	54	5A-8985		40 PIN SOCKET	1
					55	5A-9027	10J1, 10J3	9 PIN MALE CONNECTOR	2
					56	5A-9028	10J2, 10J4	4 PIN MALE CONNECTOR	2
					57	5A-9349	10J5	40 PIN RIBBON HEADER	1

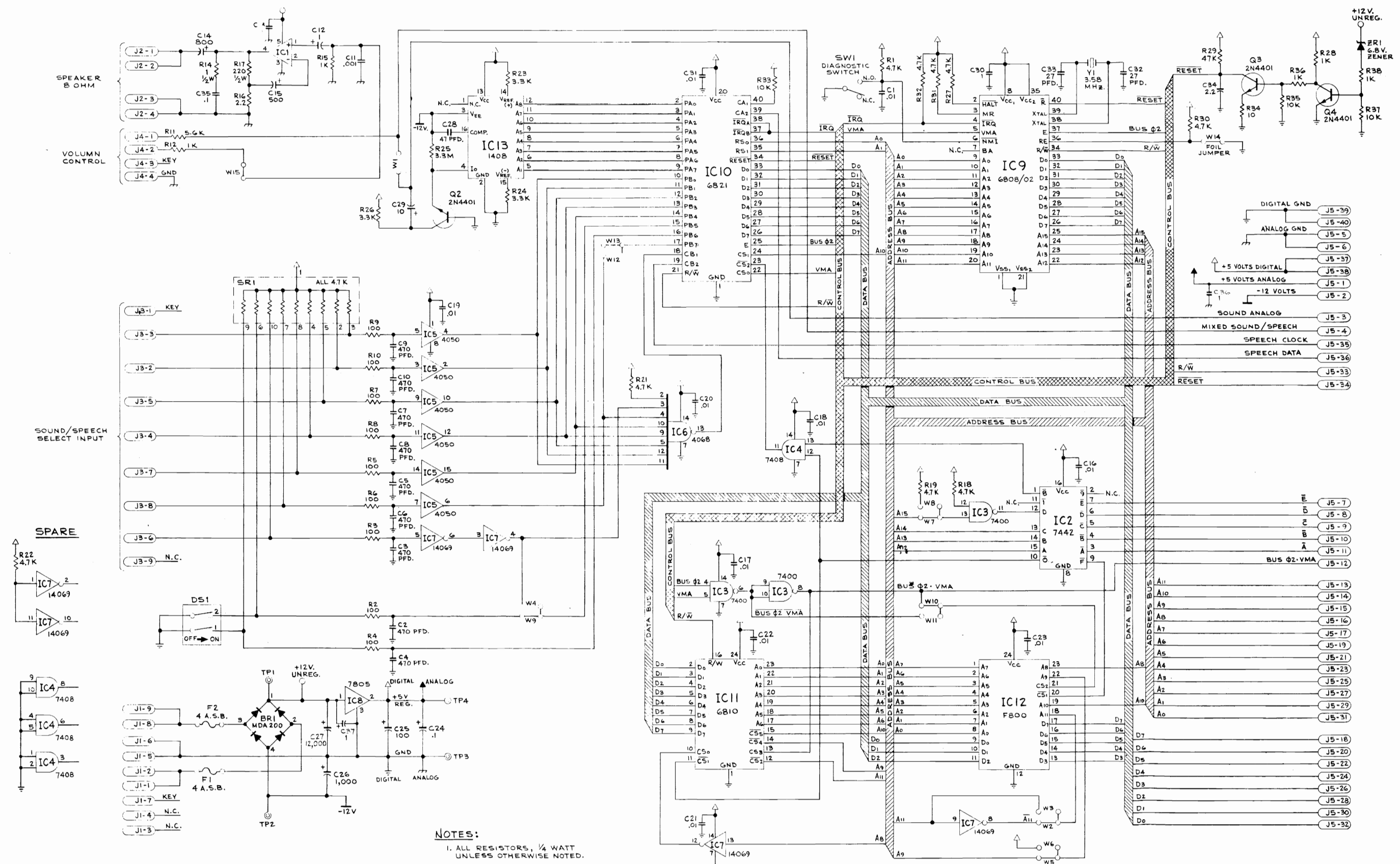
BILL OF MATERIAL				
ITEM NO.	PART NO.	PART DESIGNATION	DESCRIPTION	REQ'D. NO.
1	1C-2001-146-3	IC1	BARE P.C. BOARD	1
2	5A-9156	IC2	TDA2002 V AUDIO AMPLIFIER	1
3	5A-9012	IC2	7442 BCD-DEC DECODER	1
4	5A-9073	IC3	7400 QUAD 2 INPUT NAND	1
5	5A-8973	IC4	7408 QUAD 2 INP. AND GATE	1
6	5A-9153	IC5	4050 BUFFER	1
7	5A-9154	IC6	4068 8 INPUT 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-8936	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, R12, R19, R21, R22, 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	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-9365	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 OR 5A-9165-1	C14	CAPACITOR, ELECTROLYTIC, 800 MFD. 16 V. OR 1,000 MFD. 15 V. ±20%	1
37	5A-9164 OR 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 IC9 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, C29, C27.
- CONNECTORS 10J1, 10J2, 10J3, 10J4, 10J5.
- POSITION OF TRANSISTORS Q2, Q3, Q4.
- DS1 - 1 SELECTS SOUNDS/NOTES
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, W8, W12, W4, W1, W3, W6, W11 FOR:
 - WORLD CUP
 - DISCO FEVL
 - CONTACT
 - POKIRINO
 - PHOENIX
 - ARISTOCRAT SHUFFLE
 - POMPELI SHUFFLE
 - KING TUT SHUFFLE
 - TAURUS SHUFFLE
- W15, W8, W12, W4, W1, W2, W5, W10, FOR:
 - FLASH
 - STELLAR WARS
 - TRI ZONE
 - TIME WARP
- W7, W15, W9, W1, (SEE NOTE #5) W2, W5, W10 FOR:
 - GORGAR
 - SOUND ROM 2 - JT-4960
- IC12 SELECTION STRAPPING:
 - (2K x 8) W2 IN
 - (1K x 4) W3 IN
 - (512 x 8) W3 IN
 - W5 IN
 - W6 IN
 - W11

TOLERANCES		QTY.	ASSEMBLE ON
UNLESS OTHERWISE SPECIFIED			
FRACTIONAL	±1/100"	WILLIAMS ELECTRONICS, INC.	
DECIMAL	±0.001"	SUBSIDIARY OF THE BERING GROUP	
HOLE DIA.	±0.002 - 0.004"	3401 N. CALIFORNIA, CHICAGO, ILL. 60618	
ANGULAR	±1/16°	387-2240	
CONCENTRICITY	±1/16" DIA.	NAME	
SCREW THREADS	CLASS 2	MATERIAL	
		HEAT TREATMENT	
		FINISH	
DWG. R44	DATE 9-23-79	SCALE 2:1	D-822B



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