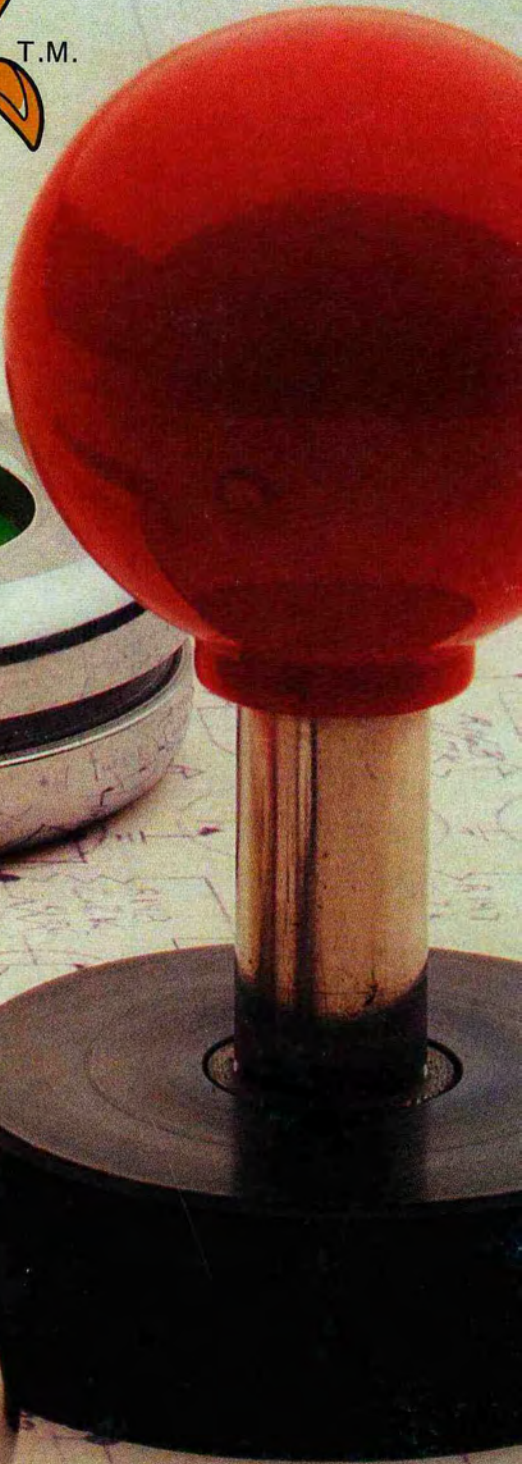


16-3008-103
May 15, 1984

**MASTIC
ARRATHOR** T.M.
**DRAWING
SET**

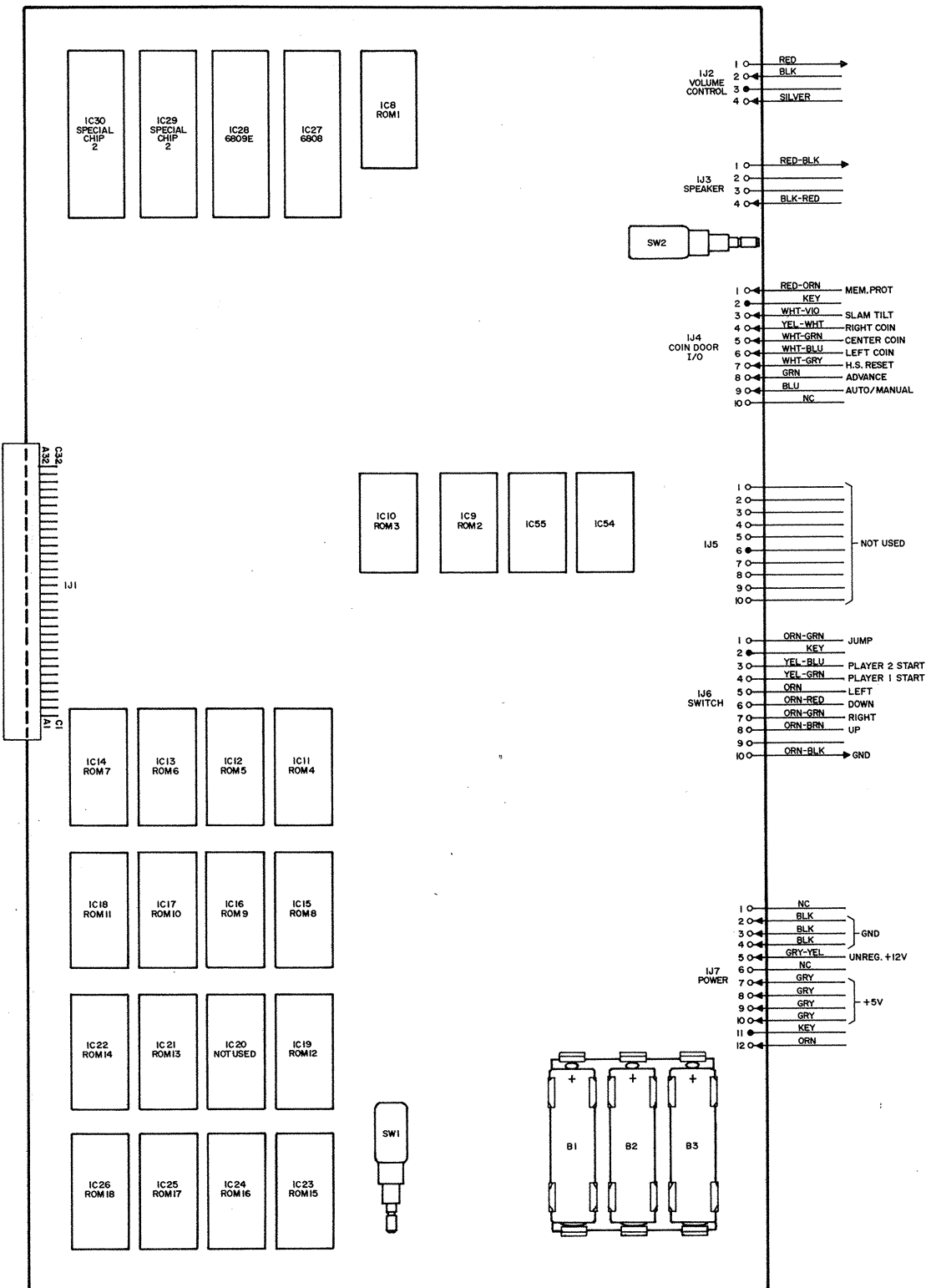
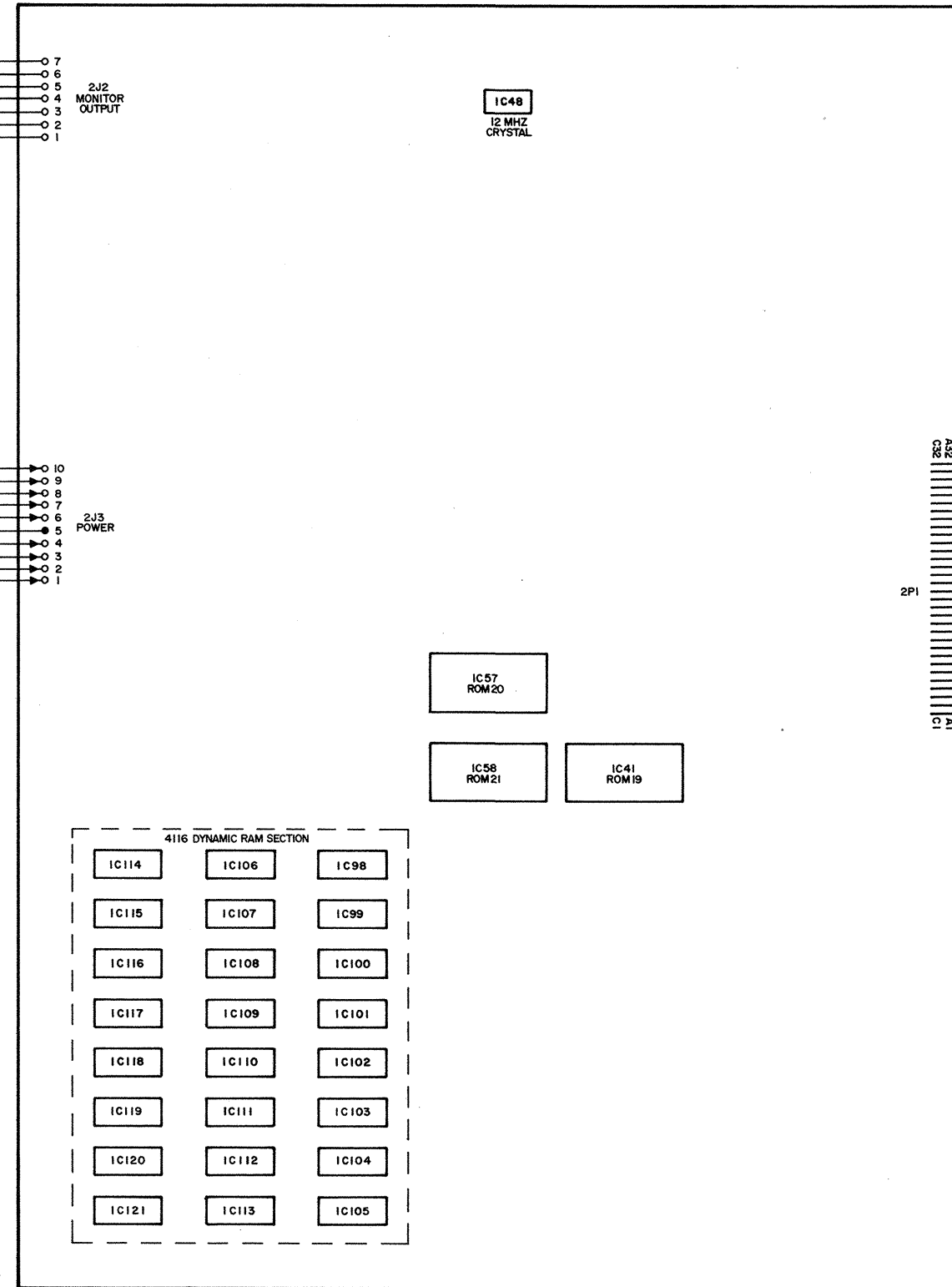
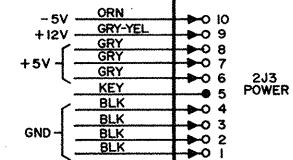
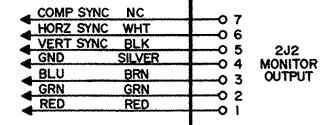
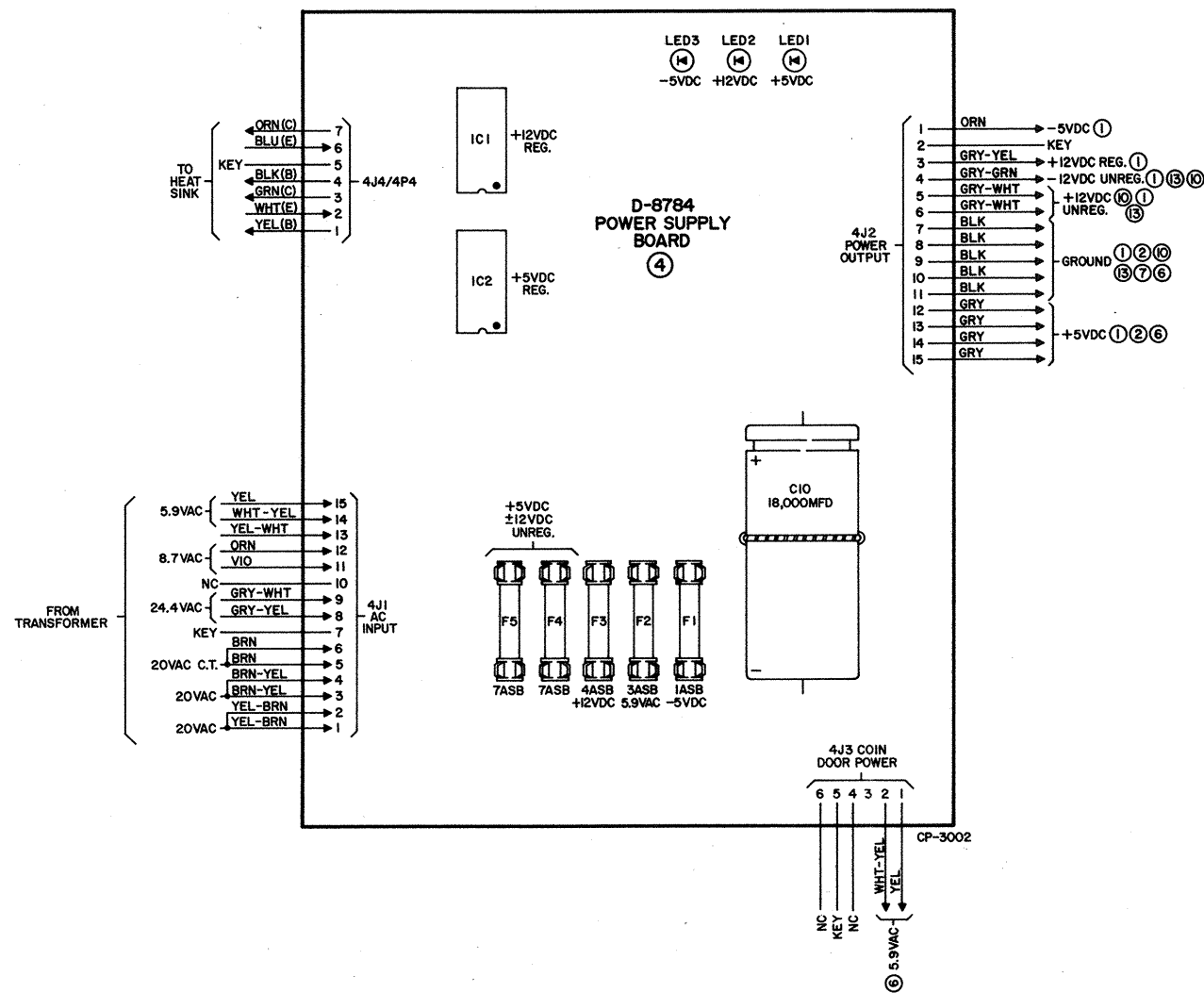


Williams®



C O N T E N T S

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REV	DESCRIPTION OF CHANGE	EON NO.
	NEW PART RELEASE	10859 6-7-83
A	ITEM 48 5041-09243-00 WAS 5040-09243-00	11380 8-14-83
B	ITEM 80 W1 WAS W2	12996 3-27-84

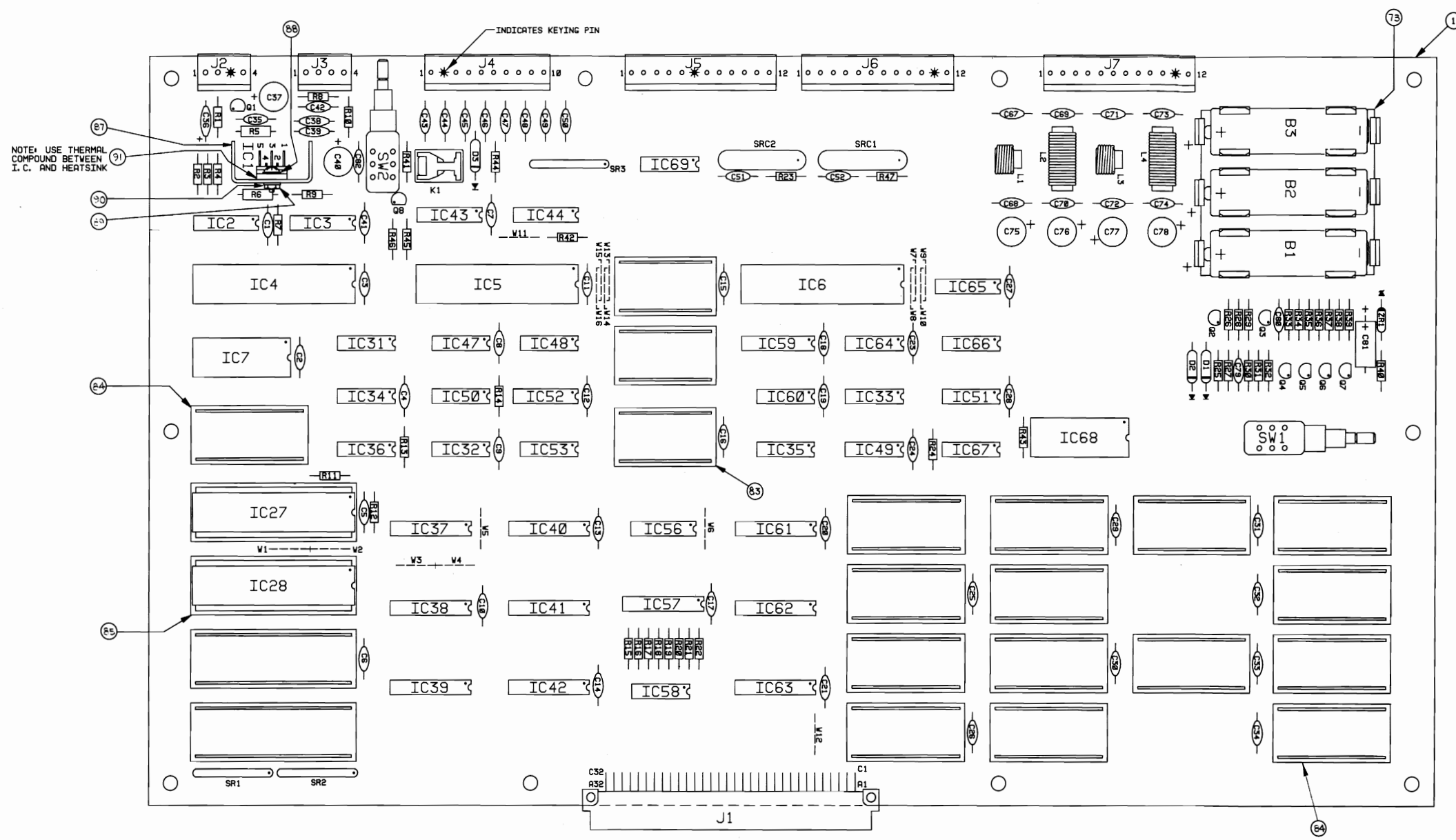
ITEM NO.	PART NO.	PART DESIGNATION	DESCRIPTION	REQ'D. NO.	ITEM NO.	PART NO.	PART DESIGNATION	DESCRIPTION	REQ'D. NO.	BILL OF MATERIAL				
										ITEM NO.	PART NO.	PART DESIGNATION	DESCRIPTION	REQ'D. NO.
73	5700-09004-00		24-PIN I.C. SOCKET	4	37	5010-09224-00	SEE NOTE #2	RESISTOR, C.F., 270 OHM 5% 1/4 WATT	8	5770-09959-00		BARE P.C. BOARD	1	
74	5105-09199-00		HEAT SINK THERMALLOY #6030	1	38	5010-08991-00	R23, R28, R42, R56	RESISTOR, C.F., 4.7 K OHM 5% 1/4 WATT	4	5370-09196-00	IC1	I.C., TDA 2002A AUDIO AMPLIFIER	1	
75	4006-01003-06		6-32 x 3/8" P-PH-S	1	39	5010-09416-00	R24	RESISTOR, C.F., 470 OHM 5% 1/4 WATT	1	5371-09152-00	IC2	I.C., 1408, D/A CONVERTER	1	
76	4406-01117-00		6-32 HEX NUT	1	40	5010-09034-00	R25, R40	RESISTOR, C.F., 10 K OHM 5% 1/4 WATT	2	5281-09745-00	IC3	I.C., 74LS138, 3 TO 8 LINE DECODERS/DEMULT.	1	
77	4703-00007-00		# 6 EXT. LOCKWASHER	1	41	5010-10171-00	R27	RESISTOR, C.F., 56 OHM 5% 1/4 WATT	1	5430-08972-00	IC4, IC5, IC6	I.C., 6821, P.I.A.	3	
78	20-9229		THERMAL COMPOUND	.01	42	5010-10170-00	R29	RESISTOR, C.F., 47 OHM 5% 1/4 WATT	1	5400-09250-00	IC7	I.C., 6810 RAM	1	
79	5700-08985-00		40 PIN I.C. SOCKET	4	43	5010-10003-00	R31, R32	RESISTOR, C.F., 390 OHM 5% 1/4 WATT	2	5400-09490-00	IC28	I.C., 6809E MICROPROCESSOR	1	
80	5010-09539-00	W1, W3, W6, W7, W10, W11	RESISTOR, 0 OHM	6	44	5010-09160-00	R33, R35	RESISTOR, C.F., 220 OHM 5% 1/4 WATT	2	5281-09499-00	IC31, IC32, IC33	I.C., 74LS00 QUAD 2-INPUT NAND	3	
					45	5010-09001-00	R43	RESISTOR, C.F., 330 OHM 5% 1/4 WATT	1	5281-09215-00	IC34, IC35	I.C., 74LS04 HEX. INVERTER	2	
					46	5010-09039-00	R37	RESISTOR, C.F., 10 OHM 5% 1/4 WATT	1	5281-09487-00	IC36	I.C., 74LS74 DUAL-D-TYPE FLIP-FLOP	1	
					47	5043-08980-00	SEE NOTE #3	CAPACITOR, CERAMIC, .01 MFD. 50V. +80-20%	38	5281-09867-00	IC37, IC38, IC39, IC40, IC41, IC42	I.C., 74LS244, OCTAL BUFFS/LINE DRVS/LINE RECEIVERS	6	
					48	5041-09243-00	C36	CAPACITOR, 10 MFD. 10V. ±10%	1	5310-08975-00	IC43, IC44, IC45, IC46	I.C., 4049, CMOS HEX. INVERTOR	4	
					49	5040-09776-00	C37	CAPACITOR, RADIAL, 470 MFD. 16V. +50-10%	1	5281-09500-00	IC47, IC48, IC49, IC69	I.C., 74LS32 QUAD 2-INPUT OR	4	
					50	5043-08996-00	C38, C39	CAPACITOR, CERAMIC, .1 MFD. 50V. ±20%	2	5280-09551-00	IC50, IC51	I.C., 7425, DUAL 4-INPUT POSITION-NOR GATE WITH STROBE	2	
					51	5040-09421-00	C40, C75, C76, C77, C78	CAPACITOR, ELECT. RAD. 100 MFD. 25V. +50-10%	5	5281-09246-00	IC52	I.C., 74LS139 DUAL 2 TO 4 LINE DECODER	1	
					52	5043-09844-00	C41	CAPACITOR, AXIAL 47 PFD. 50V. ±20%	1	5281-09247-00	IC53	I.C., 74LS02 QUAD 2-INPUT NOR	1	
					53	5043-09845-00	SEE NOTE #4	CAPACITOR, AXIAL .001 MFD. 50V.	33					
					54	5040-09545-00	C81	CAPACITOR, AXIAL 22 MFD. 10V. ±20%	1					
					55	5160-10269-00	Q1, Q2, Q4, Q5, Q6, Q7	TRANSISTOR, 2N3904 NPN TO-92	6					
					56	5190-10270-00	Q3	TRANSISTOR, 2N3906 PNP TO-92	1	5281-10015-00	IC56	I.C., 74LS75 4-BIT BISTABLE LATCHES	1	
					57	5070-09266-00	D1	DIODE, SILICON IN5817	1	5281-09486-00	IC57	I.C., 74LS374 OCTAL D-TYPE FLIP-FLOP	1	
					58	5070-09258-00	D2	DIODE, SILICON IN4001	1	5671-09411-00	IC58	I.C., MAN 72A 7 SEG LED DISPLAY	1	
					59	5075-09018-00	ZR1	ZENER DIODE, 6.8V IN5996A	1	5340-09689-00	IC59	I.C., 5114 1K X 4 CMOS SRAM 450NS	1	
					60	5019-09362-00	SR1, SR2, SR3, SR4	RESISTOR, 4.7 K OHM 10 PIN SIP	4	5281-09743-00	IC60	I.C., 74LS08 QUAD 2-INPUT AND	1	
					61	5019-09786-00	SR5	RESISTOR, 4.7 K OHM 6 PIN SIP	1	5281-09308-00	IC61, IC62, IC63	I.C., 74LS245 OCTAL BUS TRANSCEIVER	3	
					62					5281-09235-00	IC64	I.C., 74LS10 TRIPLE 3-INPUT NAND GATES	1	
					63	5551-09822-00	L2, L4	COIL, RADIAL 4.7 UH. 3A.	2	5281-09735-00	IC65	I.C., 74LS161 BINARY COUNTER	1	
					64	5551-10161-00	L1, L3	COIL, RADIAL 2.0 UH. 3A.	2	5281-10014-00	IC66	I.C., 74LS20 DUAL 4-INPUT NAND	1	
					65	5880-09022-00	B1, B2, B3	BATTERY, ALKALINE 1.5V. (AA)	3	5280-09309-00	IC67	I.C., 7407 HEX. BUF. OPEN-COLLECTOR	1	
					66	5881-09021-00		BATTERYHOLDER #171	1	5280-09010-00	IC68	I.C., 74164 4 TO 16 LINE DEC./DEMULT.	1	
					67	5641-09371-00	SW1	PUSH BUTTON SW. SPST	0	5010-09363-00	R1	RESISTOR, C.F., 5.6 K OHM 5% 1/4 WATT	1	
						5641-09312-00	SW2	PUSH BUTTON SW. DPDT MOM.	2	5010-08983-00	R2, R3, R7	RESISTOR, C.F., 3.3 K OHM 5% 1/4 WATT	3	
					68	5791-10027-00	HJ1	64 PIN R.N. HEADER (MALE)	1	5010-09179-00	R4	RESISTOR, C.F., 3.3 M OHM 5% 1/4 WATT	1	
					69	5791-09028-00	HJ2, HJ3	4 PIN HEADER 09-65-1041	2	5010-09181-00	R5	RESISTOR, C.F., 1 OHM, 10% 1/2 WATT	1	
					70	5791-09444-00	HJ4, HJ5, HJ6	10 PIN HEADER 09-65-1101	3	5010-09361-00	R6	RESISTOR, C.F., 220 OHM 5% 1/2 WATT	1	
					71	5791-09043-00	HJ7	12 PIN HEADER 09-65-1121	1	5010-09358-00	SEE NOTE #1	RESISTOR, C.F., 1 K OHM 5% 1/4 WATT	12	
					72	5700-10176-00		28-PIN I.C. SOCKET	17	5010-09161-00	R9	RESISTOR, C.F., 2.2 OHM 5% 1/4 WATT	1	

NOTES:

- 1K Ω RESISTOR:**
R8, R10, R11, R12, R13, R14, R26, R30, R34, R38, R39, R41
- 270 Ω RESISTOR:**
R15, R16, R17, R18, R19, R20, R21, R22.
- .01 MFD. CAPACITOR:**
C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13, C14, C15, C16, C17, C18, C19, C20, C21, C22, C23, C24, C25, C26, C27, C28, C29, C30, C31, C32, C33, C34, C35, C79, C80, C82.
- .001 MFD. CAPACITOR:**
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.
- FOR SCHEMATIC REFER TO DWG. NO. 16-8843.
- USE THERMAL COMPOUND BETWEEN IC1 AND HEATSINK.
- JUMPER W11 IS TO BE CUT FOR COCKTAIL GAMES.

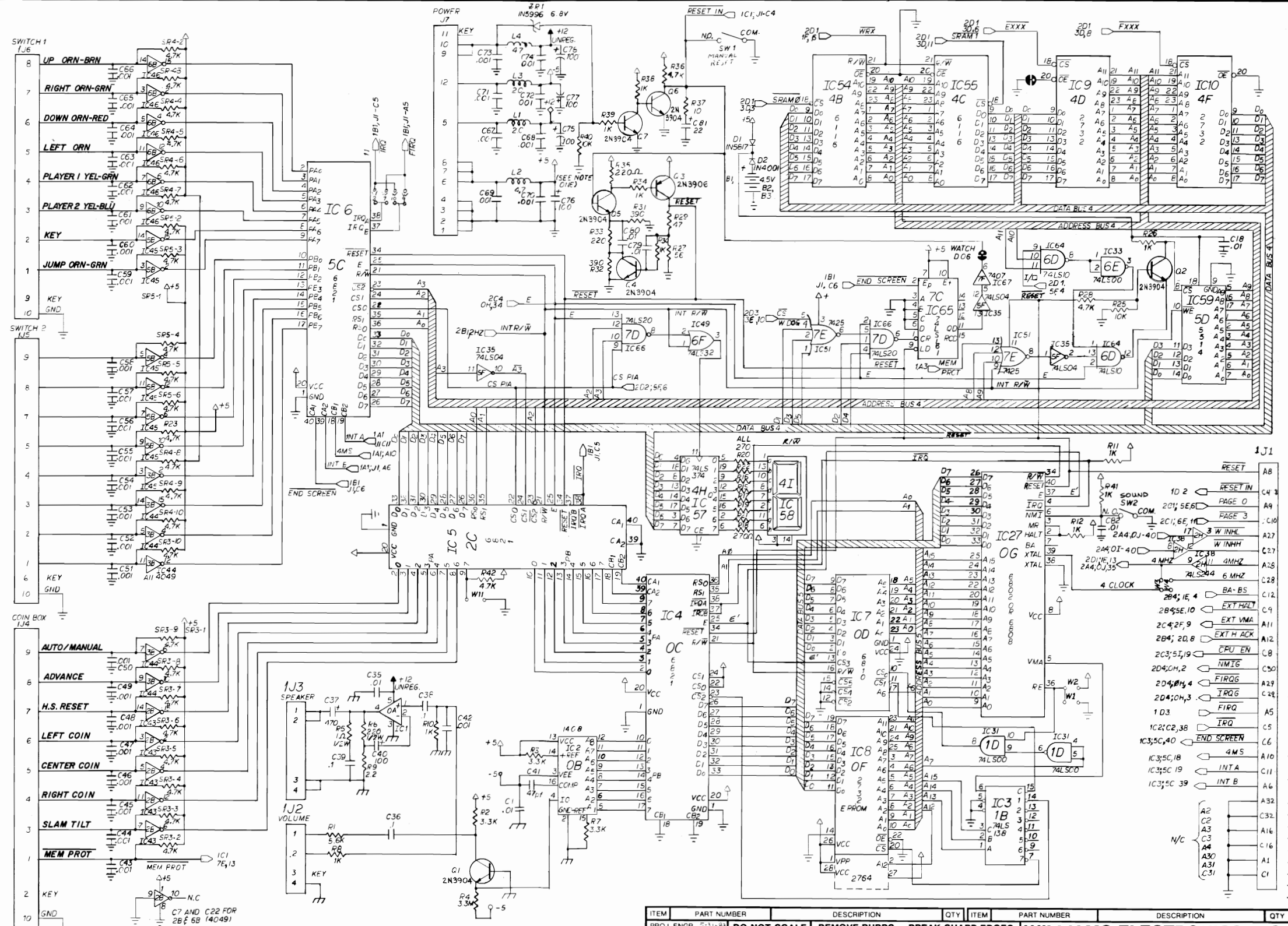
ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY
PROJ. ENGR. 7/31/83 D. DRYANOWSKI		DO NOT SCALE WORK TO DIMENSIONS SHOWN		REMOVE BURRS - BREAK SHARP EDGES		TOLERANCES UNLESS OTHERWISE SPECIFIED	
DWN BY / DATE RGT 5/19/83		FIRST PROJECT NO. 3008-K		FRACTIONAL ±1/64 ANGULAR ±1°		DECIMAL ±.005 FILLETS .020 MAX	
CHECKED BY DATE D.D. 5/31/83		APPROVAL DATE RGT 6/7/83		MATERIAL		WILLIAMS ELECTRONICS, INC. 3401 N. CALIFORNIA AVE. CHICAGO IL. 60618	
APPROVAL DATE D-9411		FIRST USAGE QTY 1		SCALE N/S		SHT. 2 OF 2	
				CPU P.C. BOARD SUB-ASSEMBLY		PART NO. D-9410	
						REV B	

REV	DESCRIPTION OF CHANGE	EDN NO DATE
	NEW PART RELEASE	1288G 4-26-84



ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY
PROJ. ENGR S.G. HERSCHLER		DO NOT SCALE WORK TO DIMENSIONS SHOWN		REMOVE BURRS - BREAK SHARP EDGES		WILLIAMS ELECTRONICS, INC.	
DWN. BY DATE R.G.H. 4-16-84		TOLERANCES UNLESS OTHERWISE SPECIFIED		3401 N. CALIFORNIA AVE. CHICAGO, IL. 60618			
CHECKED BY DATE R.G.H. 4/26/84		FRACTIONAL 21/64 ANGULAR -1°		NAME CPU PC BOARD SUB-ASSEM.			
APPROVAL DATE H.G. 4/21/84		DECIMAL ±.005 FILLETS .020 MAX		MATERIAL		SCALE 1 3/8" = 1"	
FIRST PROJECT NO. 3025		FIRST USAGE D-10395		QTY 1		SHT. 1 OF 2	
						PART NO. D-10394	
						REV	

REV	DESCRIPTION OF CHANGE	ECN NO	DATE
	NEW PART RELEASE	10657	6-7-83
A	REVERSED W1 & W2 JUMPERS (LOCATED AT COORD B1)	12446	3-22-84



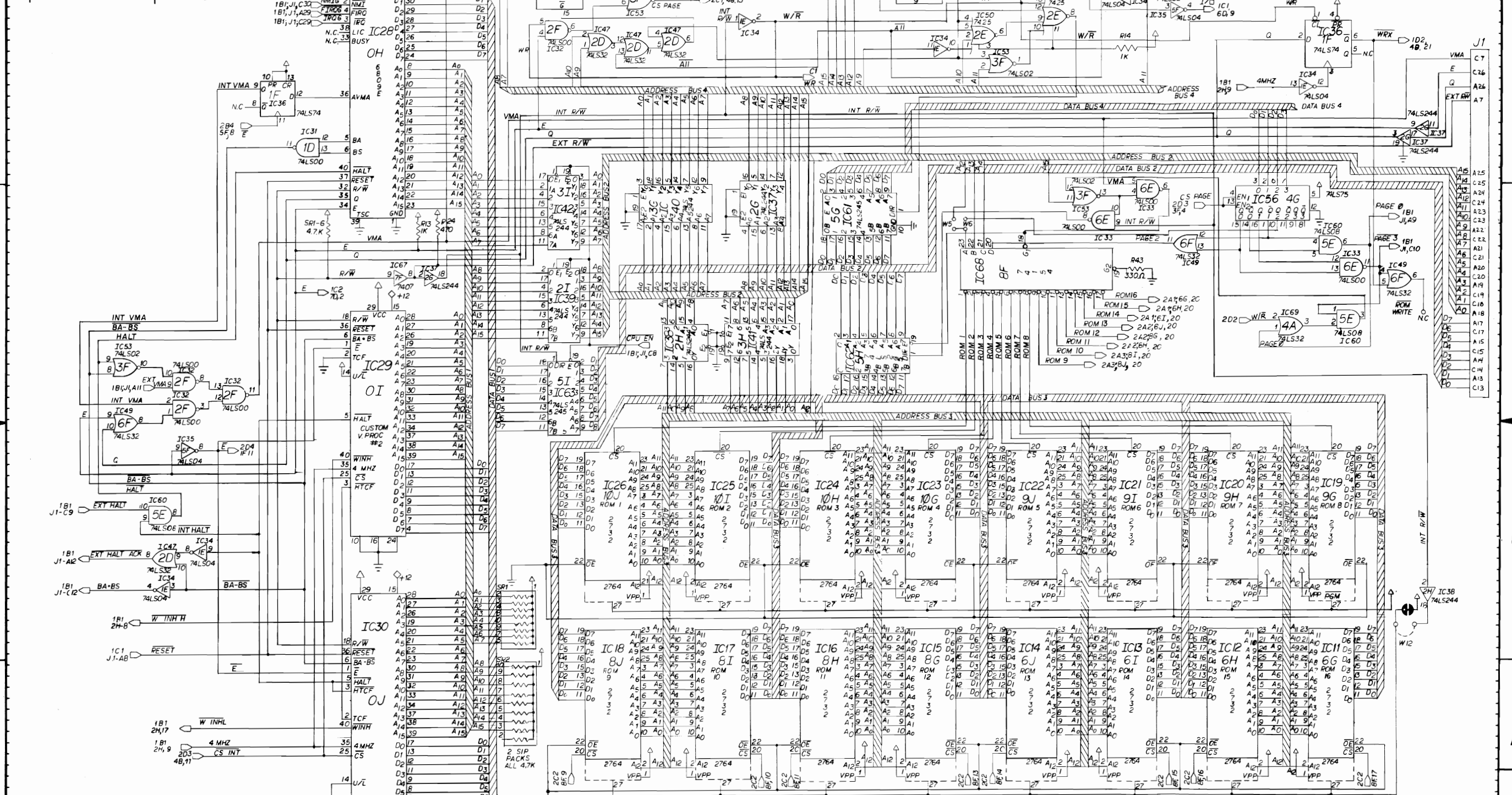
IC CHIPS NO.	VCC	GND
IC1	5	3
IC2	13	2
IC3	16	5,4
IC4, IC5	20, 24, 22	1
IC6	20	1
IC7	20	1
IC9 THRU IC26	26, 28	14
IC27	F, 35	1, 21
IC28	7	39, 1
IC29, IC30	29	10, 16, 24
IC31 THRU 35, IC47, IC48, IC49	14	7
IC50, IC52, IC53, IC60, IC64, IC66, IC67, IC81, IC69	1	9, 8
IC36, IC37, IC38, IC43, IC44, IC45, IC46	1	9, 8
IC39, IC40, IC61, IC62, IC63, IC41, IC42, IC57	20	10
IC54, IC55, IC68	24	12
IC58	13	NONE
IC59	18	9

NOTES:
1. C2-C34 ARE BY 5S CAPACITORS ON THE 5V LINE.

SPARE GATES		
IC'S	PIN NUMBERS	TYPES
IC31	1, 2, 3	74LS00
IC43	9, 10	4049
IC60	11, 12, 13	74LS08
IC67	1, 2, 3, 4, 10, 11, 12, 13	7407
IC69	4, 5, 6, 8, 9, 10, 11, 12, 13	74LS32

PROJ ENGR D. DRYGALSKI	DATE 5-31-83	CHECKED BY DATE 5-31-83	FIRST PROJECT NO. 3008-K	APPROVAL DATE 5-31-83	FIRST USAGE D-9410	QTY 1	DO NOT SCALE WORK TO DIMENSIONS SHOWN	REMOVE BURRS - BREAK SHARP EDGES	TOLERANCES UNLESS OTHERWISE SPECIFIED FRACTIONAL ±1/64 ANGULAR ±1° DECIMAL ±.005 FILLETS ±.020 MAX	WILLIAMS ELECTRONICS, INC. 3401 N. CALIFORNIA AVE. CHICAGO, IL 60618	NAME SCHEMATIC CPU MARATHON	SCALE N/S	SHT 1 OF 2	PART NO. 16-8843	REV A
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REV	DESCRIPTION OF CHANGE	EGN NO	DATE
NEW PART RELEASE		10859	12-4-83
A	SEE SHT 1 OF 2	12-4-83	12-22-83



ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY
WILLIAMS ELECTRONICS, INC.							
3401 N. CALIFORNIA AVE. CHICAGO, IL 60618 NAME: SCHEMATIC CPU SCALE: N/S SHT. 2 OF 2 PART NO: 16-8843 REV: A				DO NOT SCALE WORK TO DIMENSIONS SHOWN REMOVE BURRS - BREAK SHARP EDGES TOLERANCES UNLESS OTHERWISE SPECIFIED FRACTIONAL: .1164 ANGULAR: .1° DECIMAL: .005 FILLETS: .020 MAX MATERIAL:			
PROJ. ENGR	5-31-83	D. DRYGALSKI		CHECKED BY	DATE	FIRST PROJECT NO	300B-K
DWN BY	DATE	F. GRIFFIN	8-2-82	APPROVAL	DATE	FIRST USAGE	D-9-4-10

REV	DESCRIPTION OF CHANGE	ECN NO DATE
	NEW PART RELEASE	
A	SEE SHEET 1 OF 2	11379 8-16-83
B	REDRAWN (ITEM 37 QTY WAS 7 (ADDED R40, R41 & R42))	12286 4-13-84

NOTES:

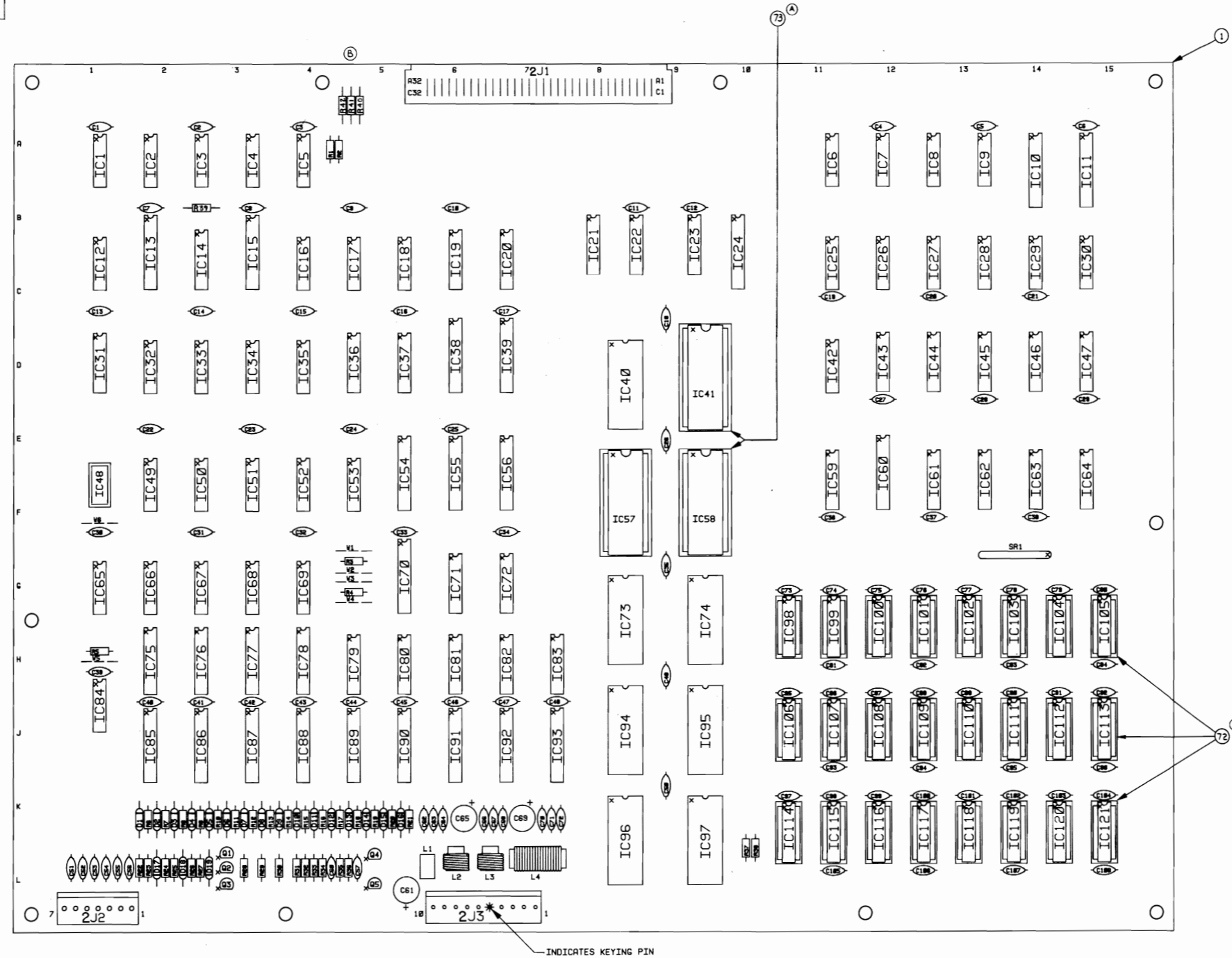
- FOR SCHEMATIC, REFER TO DWG. #16-8844
- I.C., 74LS86: IC3, IC26, IC27, IC28, IC29, IC33, IC84.
- I.C., 74LS74: IC6, IC12, IC25, IC50, IC52, IC53.
- I.C., 74LS374: IC11, IC15, IC38, IC39, IC55, IC56, IC70, IC86, IC88, IC89, IC90.
- I.C., 74LS157: IC21, IC22, IC23, IC80, IC81, IC82.
- I.C., 74LS161: IC31, IC43, IC44, IC45, IC46.
- I.C., 74198: IC73, IC74, IC94, IC95, IC96, IC97.
- I.C., 4116: IC98, IC99, IC100, IC101, IC102, IC103, IC104, IC105, IC106, IC107, IC108, IC109, IC110, IC111, IC112, IC113, IC114, IC115, IC116, IC117, IC118, IC119, IC120, IC121.
- RESISTOR, 1K OHM: R1, R2, R3, R4, R5, R32, R33, R37, R38.
- RESISTOR, 2K OHM: R8, R12, R16, R20, R28, R29, R30, R40, R41, R42.
- CAPACITOR, .01 MFD: C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, 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, C63, C67, C71, C73, C74, C75, C76, C77, C78, C79, C80, C81, C82, C83, C84, C85, C86, C87, C88, C89, C90, C91, C92, C93, C94, C95, C96, C97, C98, C99, C100, C101, C102, C103, C104, C105, C106, C107, C108.
- CAPACITOR, .001 MFD: C62, C64, C66, C68, C70, C72.
- DIODE, 1N4148: D1, D2, D3, D4, D5, D6, D7, D8, D9, D10, D11, D12, D13, D14, D15, D16, D17, D18, D19.

87					57	5160-10269-00	Q1, Q2, Q3, Q4, Q5	TRANSISTOR, 2N3904 NPN TO-92	5	28	5280-10017-00	SEE NOTE #7	I.C., 74198, 8 BIT SHIFT REGISTER	6
86					56					27	5281-09739-00	IC71, IC72, IC83	I.C., 74LS158, QUAD 2 TO 1 MULTIPLEXER	3
85					55					26	5280-09481-00	IC61, IC62, IC63, IC64	I.C., 74153, DUAL 4 TO 1 MULTIPLEXER	4
84					54	5043-09845-00	C62, C64, C66, C68, C70, C72	CAPACITOR, AXIAL, .001 MFD. 50V +/-20%	6	25	A-5282-10293	IC60	I.C., HORZ. DECODE ROM 58	0
83					53	5040-09421-00	C61, C65, C69	CAPACITOR, RADIAL, 100 MFD. 25V +50-10%	3		A-5282-10292		I.C., HORZ. DECODE ROM 5A	1
82					52	5043-08996-00	C60	CAPACITOR, CERAMIC, .1 MFD. 50V +/-20%	1	24	5281-09308-00	IC54, IC85, IC87	I.C., 74LS245, OCTAL BUS TRANSCEIVER	3
81					51	5043-09844-00	C54, C55, C56, C57	CAPACITOR, CERAMIC, .1 MFD. 50V +/-20%	4	23	5521-10028-00	IC48	I.C., K1116, 12 MHZ OSC 1x	1
80					50	5043-09065-00	C51, C52, C53	CAPACITOR, CERAMIC, .1 MFD. 50V +/-20%	3	22	A-5282-10294	IC47	I.C., HORZ. SYNC. ROM	1
79					49	5043-08980-00	SEE NOTE #11	CAPACITOR, CERAMIC, .01 MFD. 50V +80-20%	89	21	5340-10139-00	IC40	I.C., TC5516AP-2 CMOS S RAM 2K X 8 200 NS	0
78					48						5340-09878-00		I.C., 2016 S RAM 2K X 8 200 NS	1
77					47	5019-09669-00	SR1	RESISTOR, C.F., 1K OHM 5x 10 PIN SIP	1	20	5281-09745-00	IC37	I.C., 74LS130, 3 TO 8 DECODER	1
76					46					19	5281-09246-00	IC36, IC59	I.C., 74LS139, DUAL 2 TO 4 DEC.	2
75					45	5010-09534-00	W2, W4, W5, W6	RESISTOR, 0 OHM	4	18	5281-10014-00	IC34, IC51, IC68	I.C., 74LS20, DUAL 4-INPUT NAND	3
74					44	5010-09541-00	R36	RESISTOR, C.F., 2.7K OHM 2x 1/4 WATT	1	17	5281-09735-00	SEE NOTE #6	I.C., 74LS161, BINARY COUNTER	5
73	5700-10176-00		28 PIN I.C. SOCKET	3	43	5010-10203-00	R35	RESISTOR, C.F., 2.2K OHM 2x 1/4 WATT	1	16	5281-09235-00	IC30, IC32, IC35	I.C., 74LS10, TRIPLE 3-INPUT NAND	3
72	5700-09006-00		16 PIN I.C. SOCKET	24	42	5010-10003-00	R34, R39	RESISTOR, C.F., 390 OHM 5x 1/4 WATT	2	15	5281-09738-00	SEE NOTE #5	I.C., 74LS157, QUAD 2 TO 1 MULTIPLEXER	6
71					41	5010-10170-00	R23, R25, R29	RESISTOR, C.F., 47 OHM 5x 1/4 WATT	3	14	5281-09734-00	IC19, IC20	I.C., 74LS203, 4 BIT ADDER	2
70					40	5010-09508-00	R31	RESISTOR, C.F., 270 OHM 2x 1/4 WATT	1	13	A-5282-10295	IC14	I.C., CLOCK ROM	1
69	5791-09444-00	J3	10 PIN HEADER 09-65-1101	1	39	5010-09416-00	R22, R24, R26	RESISTOR, C.F., 470 OHM 5x 1/4 WATT	3	12	5281-09867-00	IC13, IC24	I.C., 74LS244, OCTAL BUF	2
68	5791-09497-00	J2	7 PIN HEADER 09-65-1071	1	38	5010-10204-00	R9, R13, R17, R21	RESISTOR, C.F., 1K OHM 2x 1/4 WATT	4	11	5281-09486-00	SEE NOTE #4	I.C., 74LS374, OCTAL D F/F	11
67	5792-10026-00	J1	64 PIN R.N. HEADER FEMALE	1	37	5010-10205-00	SEE NOTE #10	RESISTOR, C.F., 2K OHM 2x 1/4 WATT	10	10	5281-09856-00	IC10, IC91, IC92, IC93	I.C., 74LS373, OCTAL D LATCH	4
66					36	5010-10000-00	R7, R11, R15, R19	RESISTOR, C.F., 3.9K OHM 5x 1/4 WATT	4	9	5281-09247-00	IC9, IC16	I.C., 74LS02, QUAD 2-INPUT NOR	2
65					35	5010-09219-00	R6, R10, R14, R18	RESISTOR, C.F., 8.2K OHM 5x 1/4 WATT	4	8	5281-09499-00	IC8, IC65	I.C., 74LS00, QUAD 2-INPUT NAND	2
64	5551-09822-00	L4	COIL, RADIAL, 4.7 UH 3 A.	1	34	5010-09358-00	SEE NOTE #9	RESISTOR, C.F., 1K OHM 5x 1/4 WATT	9	7	5281-09407-00	SEE NOTE #3	I.C., 74LS74, DUAL D F/F	6
63	5551-10161-00	L2, L3	COIL, RADIAL, 2.0 UH 3 A.	2	33					6	5280-09551-00	IC5	I.C., 7425, DUAL 4-INPUT W/STROBE NOR	1
62	5551-09825-00	L1	COIL, RADIAL, 4.7 UH 30 MA	1	32					5	5281-09743-00	IC4, IC7, IC49	I.C., 74LS08, QUAD 2-INPUT AND	3
61					31	5340-09488-00	SEE NOTE #8	I.C., 4116 RAM/D 16K X 1, 450 NS	24	4	5281-09737-00	SEE NOTE #2	I.C., 74LS86, QUAD 2-INPUT EXOR	7
60					30	5281-09853-00	IC79	I.C., 74LS85, 4 BIT COMPARATOR	1	3	5281-09500-00	IC2, IC7, IC42, IC66, IC67	I.C., 74LS32, QUAD 2-INPUT OR	5
59	5070-08919-00	SEE NOTE #13	DIODE, 1N4148 150 MA	19	29	5340-10019-00	IC75, IC76, IC77, IC78	I.C., 2149 RAM/S 1K X 4, 70 NS	0	2	5281-09215-00	IC1, IC18, IC69	I.C., 74LS04, HEX. INVERTER	3
58						5340-10018-00		I.C., 2148 RAM/S 1K X 4, 70 NS	4	1	5777-09960-00		BARE P.C. BOARD (REV. - A)	1

BILL OF MATERIALS

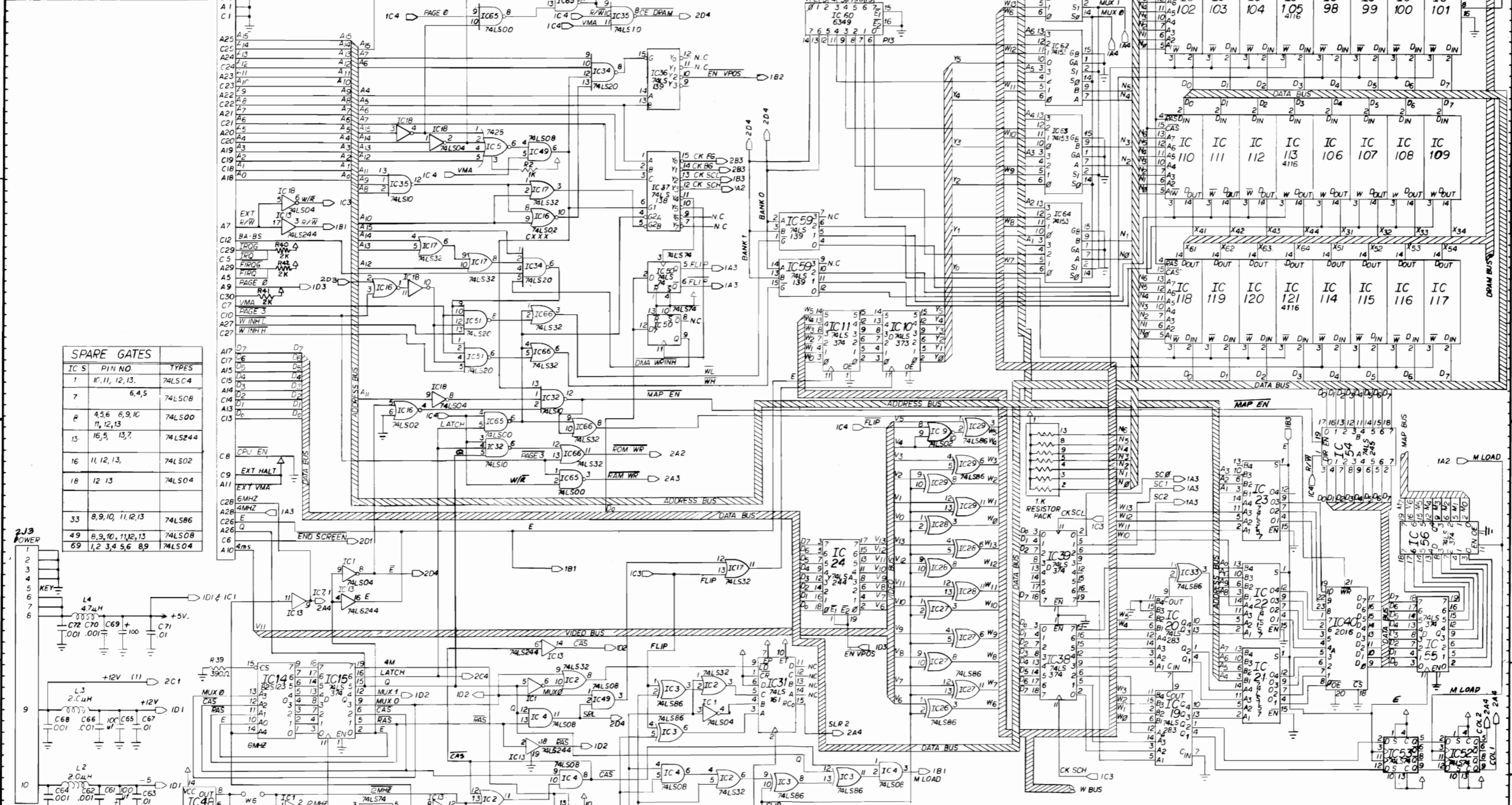
PROJ ENGR S. HERSCHLER	DO NOT SCALE WORK TO DIMENSIONS SHOWN	REMOVE BURRS - BREAK SHARP EDGES	WILLIAMS ELECTRONICS, INC.
DWN BY DATE R. GAY 5/20/83	FIRST PROJECT NO 3008	TOLERANCES UNLESS OTHERWISE SPECIFIED FRACTIONAL: 1/64 ANGULAR: .1° DECIMAL: .005 FILLETS: .020 MAX	3401 N. CALIFORNIA AVE. CHICAGO IL 60618
CHECKED BY DATE C. B. WILK 2/11/84	FIRST USAGE D-9413	MATERIAL NONE	NAME VIDEO P.C. BOARD SUB-ASSEMBLY
APPROVAL DATE W.E.S. 2/18/84	QTY 1	SCALE 1.25/1	SHT 2 OF 2 PART NO. D-9412 REV B

REV	DESCRIPTION OF CHANGE	EON NO DATE
	NEW PART RELEASE	
A	BALLOON WITH 73 WAS 59	11379
	BALLOON WITH 72 WAS 58 Rev.	8-16-83
B	SEE SHEET 2 OF 2	J2286 8-13-84



ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY
PROJ. ENGR S. HERSCHLER		DO NOT SCALE WORK TO DIMENSIONS SHOWN		REMOVE BURRS - BREAK SHARP EDGES		WILLIAMS ELECTRONICS, INC.	
DWN BY DATE H.C. 2-5-84		FIRST PROJECT NO 3008		TOLERANCES UNLESS OTHERWISE SPECIFIED		3401 N. CALIFORNIA AVE. CHICAGO IL 60618	
CHECKED BY DATE C. B. [Signature]		FIRST USAGE D-9413		FRACTIONAL ±1/64 ANGULAR ±1°		NAME VIDEO PC BOARD ASSEMBLY	
APPROVAL DATE W.E.S. 2/10/84		QTY 1		DECIMAL ±.005 FILLETS .020 MAX		SCALE 1 1/4" = 1"	
				MATERIAL //		SHT. 1 OF 2 PART NO. D-9413 REV B	

REV	DESCRIPTION OF CHANGE	ECD NO.	DATE
NPR		10854	7-7-83
A	SEE SHEET 2 FOR DETAILS	11093	6-30-83
B	ADDED 3 RESISTOR LOCATIONS: R40, R41 & R42	12286	2-13-84

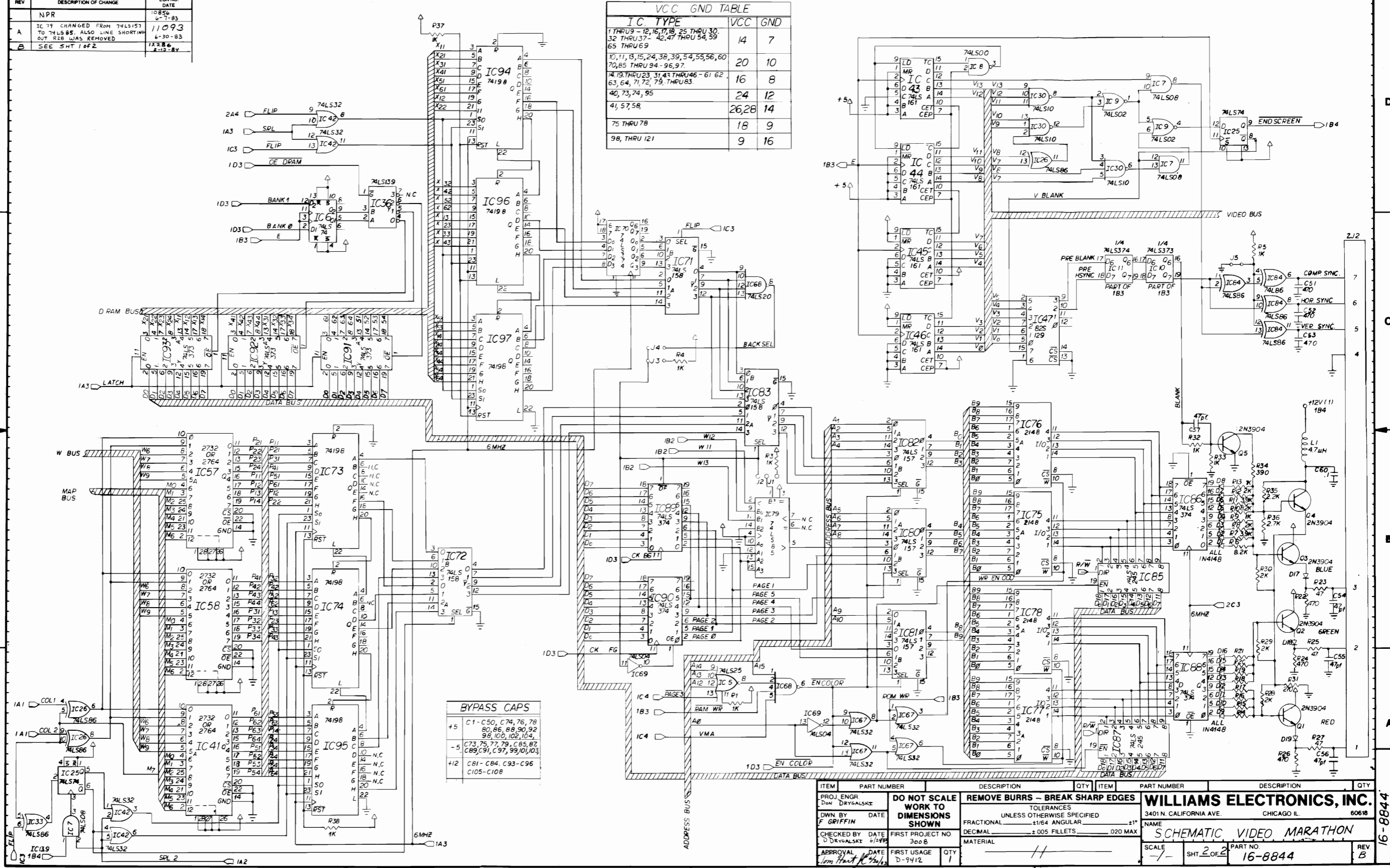


IC S	PIN NO	TYPES
1	11, 12, 13	74LS04
7	6, 4, 5	74LS08
R	4, 5, 6, 9, 10, 11, 12, 13	74LS00
13	16, 5, 13, 7	74LS244
16	11, 12, 13	74LS02
18	12, 13	74LS04
33	8, 9, 10, 11, 12, 13	74LS86
49	8, 9, 10, 11, 12, 13	74LS08
69	1, 2, 3, 4, 5, 6, 8, 9	74LS04

ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY
PROJ ENGR	DO NOT SCALE	REMOVE BURRS - BREAK SHARP EDGES		WILLIAMS ELECTRONICS, INC. 3401 N. CALIFORNIA AVE. CHICAGO ILL. 60618 NAME: <i>SCHEMATIC VIDEO MARATHON</i>			
DON DRYGALSKI	WORK TO	TOLERANCES					
DATE	DIMENSIONS	UNLESS OTHERWISE SPECIFIED					
F. GRIFFIN	SHOWN	FRACTIONAL	±1/64 ANGULAR ±1°	SCALE: /- SHT 1 OF 2 PART NO: 16-8844 REV B			
CHECKED BY	FIRST PROJECT NO	DECIMAL	±0.005 FILLETS ±0.020 MAX				
DATE	3008	MATERIAL					
APPROVAL	DATE	FIRST USAGE	QTY				
<i>[Signature]</i>	12/4/83	1	1				

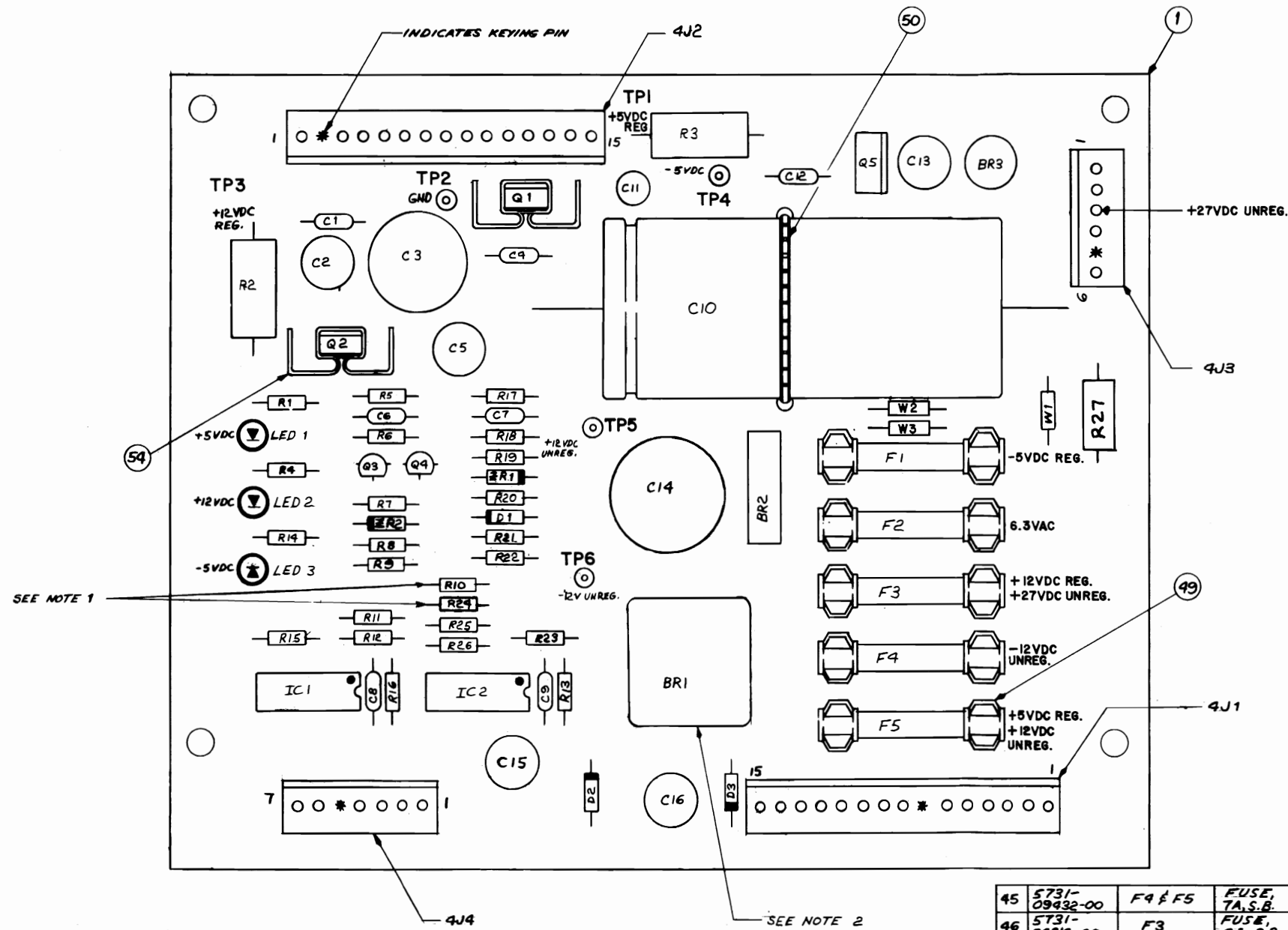
REV	DESCRIPTION OF CHANGE	ECN NO.
	NPR	10858 6-7-83
A	IC 79 CHANGED FROM 74LS151 TO 74LS85, ALSO LINE SHORTING OUT R28 WAS REMOVED	11093 6-10-83
B	SEE SHT 1 OF 2	12386 6-13-83

VCC GND TABLE		
IC TYPE	VCC	GND
1 THRU 9 - 12, 16, 17, 18, 25 THRU 30, 32 THRU 37 - 42, 47 THRU 54, 59, 65 THRU 69	14	7
10, 11, 13, 15, 24, 38, 39, 54, 55, 56, 60, 70, 85 THRU 94 - 96, 97	20	10
14, 19, THRU 23, 31, 43 THRU 46 - 61, 62, 63, 64, 71, 72, 79, THRU 83	16	8
40, 73, 74, 95	24	12
41, 57, 58	26, 28	14
75 THRU 78	18	9
98, THRU 121	9	16



BYPASS CAPS	
+5	C1 - C50, C74, 76, 78, 80, 86, 88, 90, 92, 98, 100, 102, 104, 106, 108, 110, 112, 114, 116, 118, 120, 122, 124, 126, 128, 130, 132, 134, 136, 138, 140, 142, 144, 146, 148, 150, 152, 154, 156, 158, 160, 162, 164, 166, 168, 170, 172, 174, 176, 178, 180, 182, 184, 186, 188, 190, 192, 194, 196, 198, 200
-5	C73, 75, 77, 79, C85, 87, C89, C91, C97, 99, 101, 103, 105, 107, 109, 111, 113, 115, 117, 119, 121, 123, 125, 127, 129, 131, 133, 135, 137, 139, 141, 143, 145, 147, 149, 151, 153, 155, 157, 159, 161, 163, 165, 167, 169, 171, 173, 175, 177, 179, 181, 183, 185, 187, 189, 191, 193, 195, 197, 199
+12	C81 - C84, C93 - C96, C105 - C108

ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY
<p>PROJ ENGR: DON DRYGALSKI DWN BY: F. GRIFFIN CHECKED BY: DATE: 6/14/83 APPROVAL: DATE: 6/14/83</p>							
<p>DO NOT SCALE WORK TO DIMENSIONS SHOWN</p>				<p>REMOVE BURRS - BREAK SHARP EDGES TOLERANCES UNLESS OTHERWISE SPECIFIED FRACTIONAL: .1164 ANGULAR: .21° DECIMAL: .005 FILLETS: .020 MAX</p>			
<p>WILLIAMS ELECTRONICS, INC. 3401 N. CALIFORNIA AVE. CHICAGO ILL. 60618 NAME: SCHEMATIC VIDEO MARATHON SCALE: 1/1 SHT: 2 OF 2 PART NO: 16-8844 REV: B</p>							



SEE NOTE 1

SEE NOTE 2

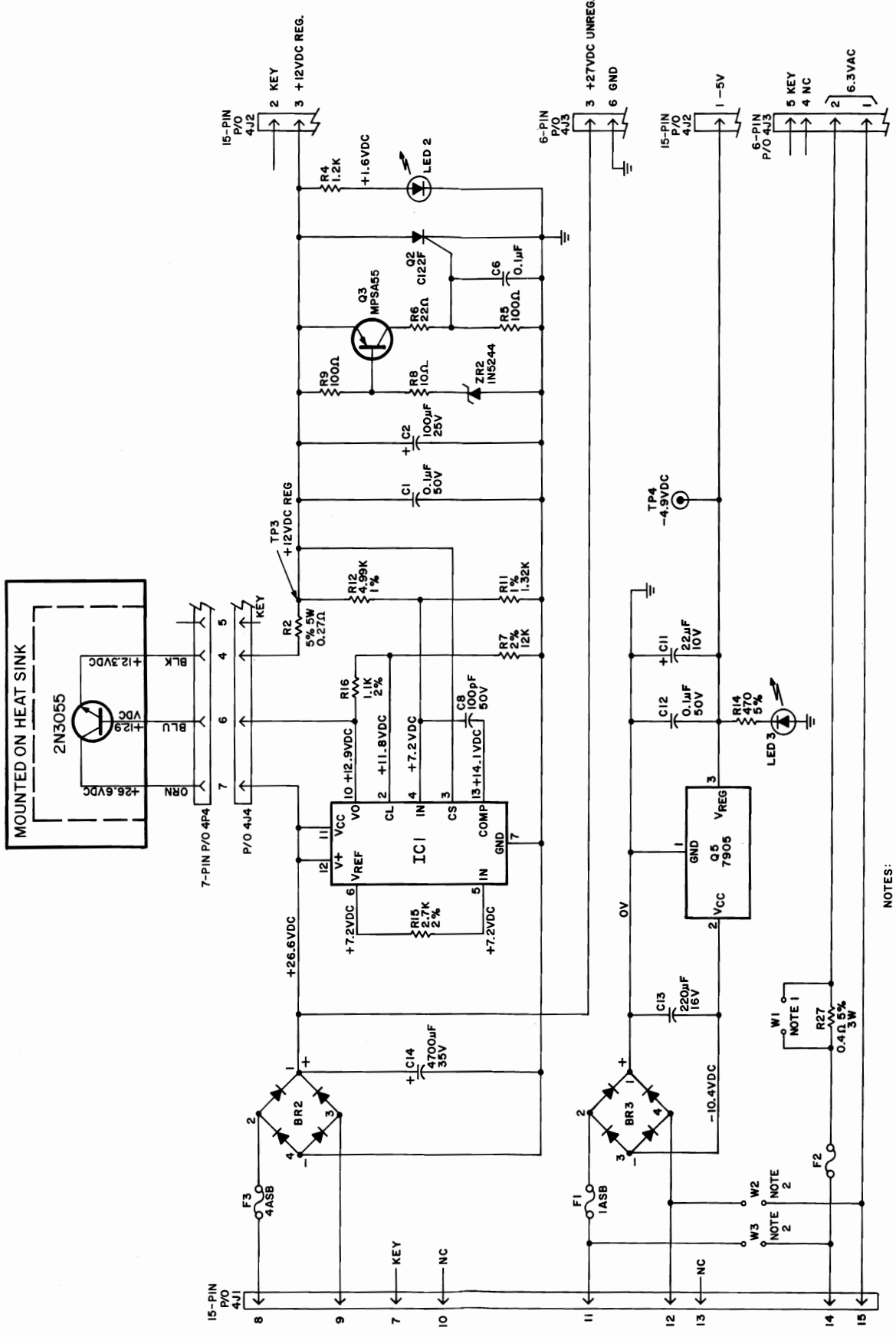
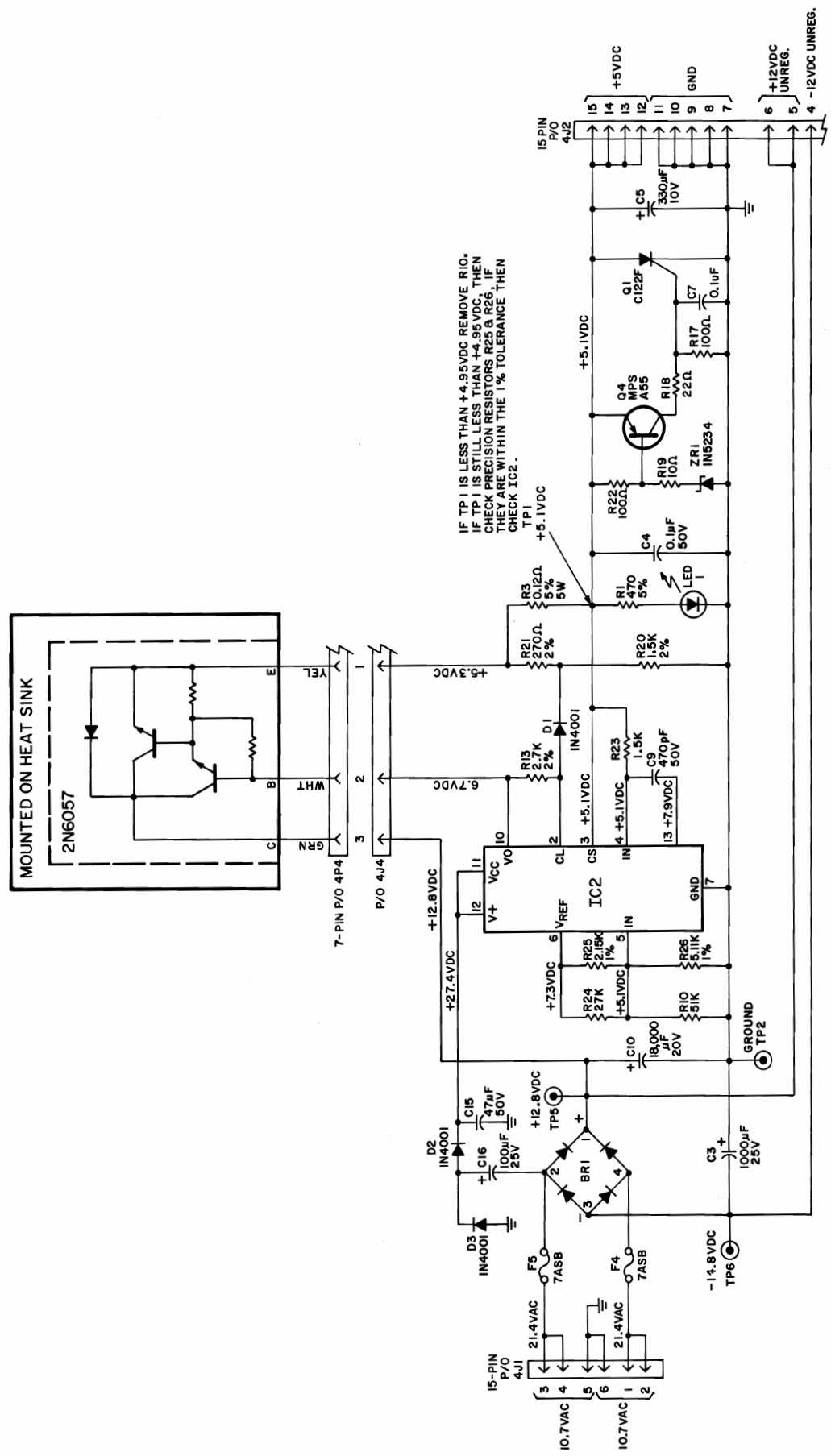
- NOTES:
 1. REMOVE R24 IF +5VDC IS GREATER THAN 5.25 VDC,
 REMOVE R10 IF +5VDC IS LESS THAN 4.75 VDC.
 2. BR1 MUST BE MOUNTED 1/8" ABOVE SURFACE OF
 BOARD.
 3. FOR SCHEMATIC REFER TO 16-8811.

ITEM NO.	PART NO.	PART DESIGNATION	DESCRIPTION	REQ'D NO.
55	5010-09682-00	R10	RESISTOR, C.F. 51K ± 5% 1/4W	1
56	5010-09324-00	R24	RESISTOR, C.F. 27K ± 5% 1/4W	1

45	5731-09432-00	F4 & F5	FUSE, 7A, S.B.	2
46	5731-06314-00	F3	FUSE, 9A, S.B., 250V	1
47	5731-06569-00	F1	FUSE, 1A, S.B., 250V	1
48	5731-09651-00	F2	FUSE, 3A, S.B., 250V	1
49	5732-09178-00		FUSEHOLDER,	10
50	03-7520		TIE WRAP	1
51	5791-09074-00	4J1 & 4J2	HEADER, 15 PIN 09-65-181	2
52	5791-03038-00	4J3	HEADER, 6 PIN 09-65-1061	1
53	5791-09427-00	4J4	HEADER, 7 PIN 09-65-1071	1
54	5705-09663-00		HEAT SINK	2
	5706-09668-00		HEAT SINK	0

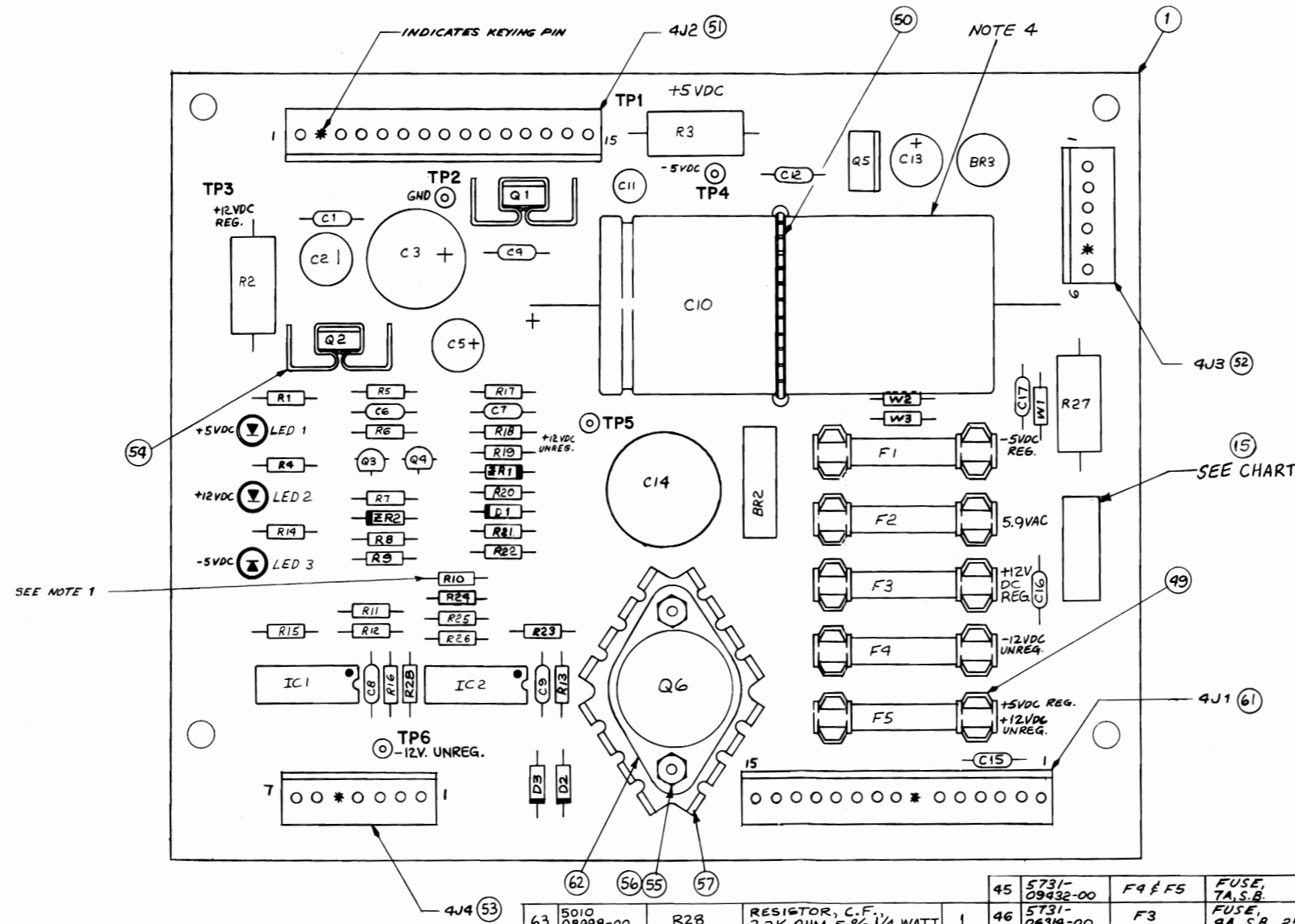
BILL OF MATERIAL

ITEM NO.	PART NO.	PART DESIGNATION	DESCRIPTION	REQ'D NO.
1	5773-09678-00		BARE P.C. BOARD	1
2	5010-09085-00	R23	RESISTOR, 1.5K 5% 1/4W	1
3	5010-09441-00	R13, R15	RESISTOR, 2.7K 2% 1/4W	2
4	5010-09508-00	R21	RESISTOR, 870Ω 2% 1/4W	1
5	5010-09428-00	R20	RESISTOR, 1.5K 2% 1/4W	1
6	5010-09509-00	R16	RESISTOR, 1.1K 2% 1/4W	1
7	5010-09510-00	R7	RESISTOR, 12K 2% 1/4W	1
8	5010-09314-00	R4	RESISTOR, 1.2K 5% 1/4W	1
9	5010-09416-00	R1, R14	RESISTOR, 470Ω 5% 1/4W	2
10	5013-09542-00	R11	RESISTOR, 7.32K 1% 1/4W	1
11	5013-09427-00	R12	RESISTOR, 4.99K 1% 1/4W	1
12	5013-09426-00	R25	RESISTOR, 2.15K 1% 1/4W	1
13	5012-09423-00	R3	RESISTOR, .12Ω 5% 5W	1
14	5012-09512-00	R2	RESISTOR, .27Ω 5% 5W	1
15	5012-09037-00	R27	RESISTOR, 0.4Ω 5% 3W	1
16	5013-09665-00	R26	RESISTOR, 5.11K 1% 1/4W	1
17	5010-09434-00	R6, R18	RESISTOR, C.F. 22Ω ± 5% 1/4W	2
18	5010-09036-00	R5, R9, R17 & R22	RESISTOR, C.F. 100Ω ± 5% 1/4W	4
19	5010-09039-00	R8, R19	RESISTOR, C.F. 10Ω ± 5% 1/4W	2
20	5010-09534-00	W1	RESISTOR, 0.1Ω	1
21	5043-08996-00	C6, C7	CAPACITOR, 0.1μF CERAMIC +80% -20% 50V	2
22	5040-09421-00	C2, C16	CAPACITOR, 100MFD, 25V RADIAL +50% -10%	2
23	5040-09422-00	C15	CAPACITOR, 47MFD, 50V RADIAL +50% -10%	1
24	5040-09420-00	C3	CAPACITOR, 1000MFD, 25V RADIAL +75% -10%	1
25	5040-09419-00	C10	CAPACITOR, 18,000MFD 20V AXIAL +75% -10%	1
26	5040-09423-00	C5	CAPACITOR, 330MFD 10V RADIAL +50% -10%	1
27	5040-09504-00	C14	CAPACITOR, 4700MFD 35V RADIAL +50% -10%	1
28	5043-09446-00	C1, C4 & C12	CAPACITOR, .1MFD 50V AXIAL 25V -20 +80%	3
29	5043-08065-00	C9	CAPACITOR, 470PF 50V AXIAL XTR ± 10%	1
30	5043-09492-00	C8	CAPACITOR, 100PF 50V AXIAL S2L ± 5%	1
31	5040-09506-00	C13	CAPACITOR, 220MFD 16V RADIAL +50% -10%	1
32	5040-09493-00	C11	CAPACITOR, 22MFD 10V RADIAL +50% -10%	1
33	5070-06258-00	D1, D2 & D3	DIODE, 1N4001	3
34	5075-09406-00	ZR1	ZENER, 1N5234 ± 5% (6.2V)	1
35	5075-09662-00	ZR2	ZENER, 1N5249 ± 5% (14V)	1
36	5190-09430-00	Q3, Q4	TRANSISTOR, MPS 655	2
37	5130-09661-00	Q1, Q2	SCR, 8 AMP, 100V	2
38	5250-09515-00	Q5	VOLTAGE REGULATOR, 7905	1
39	5460-09424-00	IC1, IC2	VOLTAGE REGULATOR, 723	2
40	5100-09490-00	BR1	BRIDGE RECTIFIER, 35 AMP, 200V	1
41	5100-09513-00	BR2	BRIDGE RECTIFIER, 4.0A, 50V	1
42	5100-09544-00	BR3	BRIDGE RECTIFIER, 1.0A, 50V	1
43	5671-09018-00	LED1, LED2, LED3	LED, RED	3
44	5824-09298-00	TP1 - TP6	TERMINAL #1502-1 (TEST POINT)	4



BILL OF MATERIAL

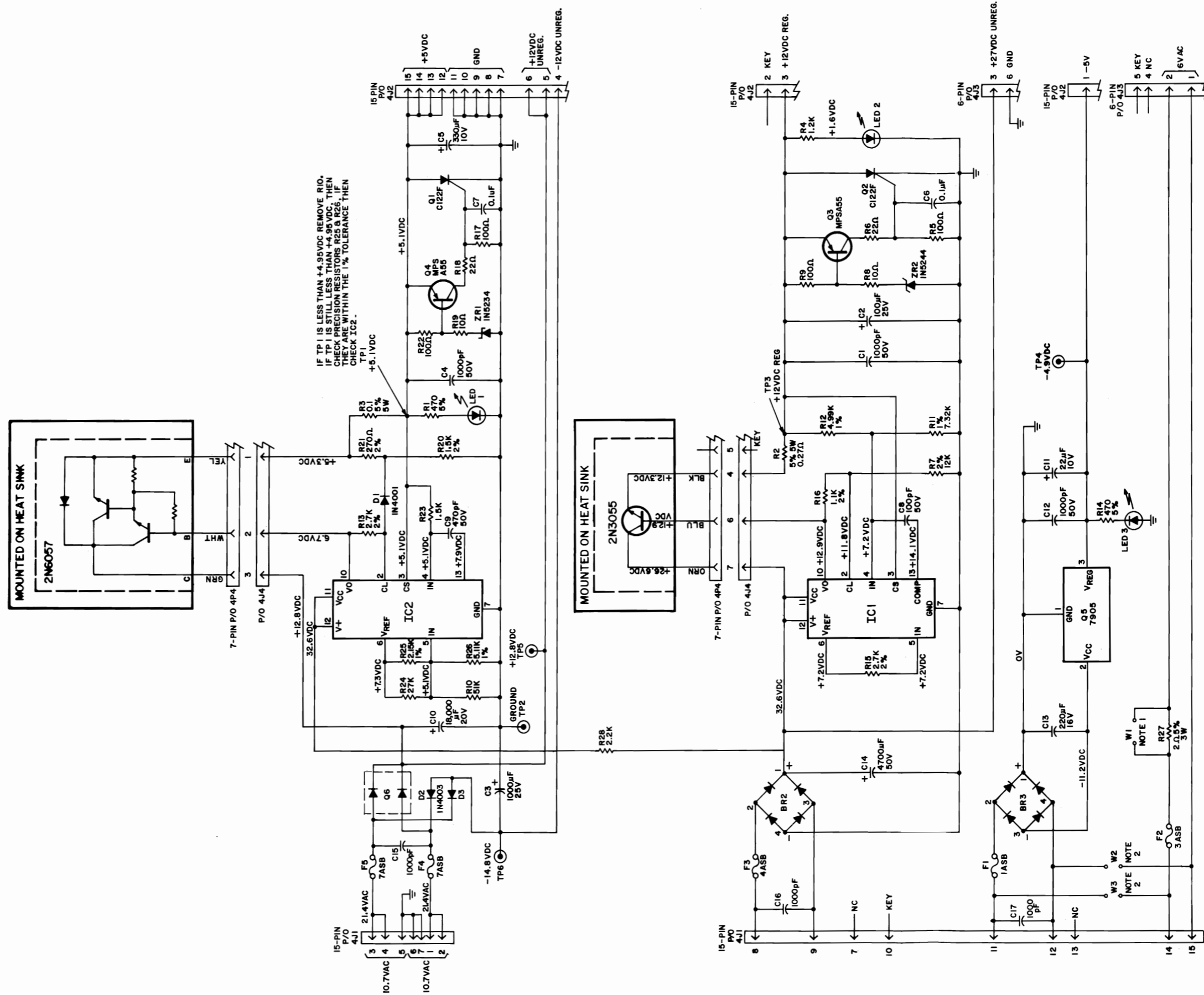
ITEM NO.	PART NO.	PART DESIGNATION	DESCRIPTION	REQ'D NO.
1	5773-09679-		BARE P.C. BOARD	1
2	5010-09085-00	R23	RESISTOR, 1.5K 5%, 1/4W	1
3	5010-09541-00	R13, R15	RESISTOR, 2.7K 2%, 1/4W	2
4	5010-09508-00	R21	RESISTOR, 270Ω 2%, 1/4W	1
5	5010-09428-00	R20	RESISTOR, 1.5K 2%, 1/4W	1
6	5010-09509-00	R16	RESISTOR, 1.1K 2%, 1/4W	1
7	5010-09510-00	R7	RESISTOR, 12K 2%, 1/4W	1
8	5010-09314-00	R4	RESISTOR, 1.2K 5%, 1/4W	1
9	5010-09416-00	R1, R14	RESISTOR, 470Ω 5%, 1/4W	2
10	5013-09542-00	R11	RESISTOR, 7.32K 1%, 1/4W	1
11	5013-09427-00	R12	RESISTOR, 9.99K 1%, 1/4W	1
12	5013-09426-00	R25	RESISTOR, 2.15K 1%, 1/4W	1
13	5012-09429-00	R3	RESISTOR, .12Ω 5%, 5W	1
14	5012-09512-00	R2	RESISTOR, .87Ω 5%, 5W	1
15	16-8850-75		LABEL PCB ASSEM ID	1
16	5013-09665-00	R26	RESISTOR, 5.11KΩ 1%, 1/4W	1
17	5010-09434-00	R6, R18	RESISTOR, C.F. 56Ω ± 5%, 1/4W	2
18	5010-09036-00	R5, R9, R17, R22	RESISTOR, C.F. 100Ω ± 5%, 1/4W	4
19	5010-09039-00	R8, R19	RESISTOR, C.F. 10Ω ± 5%, 1/4W	2
20	SEE CHART		RESISTOR, 0Ω	3
21	5043-08996-00	C6, C7	CAPACITOR, 0.1μF CERAMIC +80% -20% 50V	2
22	5040-09421-00	C2, C16	CAPACITOR, 100MFD, 25V RADIAL +50% -10%	2
23	5040-09422-00	D2, D3	DIODE, 1N4003	1
24	5040-09420-00	C9	CAPACITOR, 1000MFD, 25V RADIAL +75% -10%	1
25	5040-09419-00	C10	CAPACITOR, 18,000MFD 20V AXIAL +75% -10%	1
26	5040-09423-00	C5	CAPACITOR, 330MFD 10V RADIAL +50% -10%	1
27	5040-09504-00	C14	CAPACITOR 4700MFD 35V RADIAL +50% -10%	1
28	5043-09446-00	C1, C4, C12, C15, C16, C17	CAPACITOR .1MFD 50V AXIAL	3
29	5043-08065-00	C9	CAPACITOR 470PF 50V AXIAL XTR ± 10%	1
30	5043-09492-00	C8	CAPACITOR 100MFD 50V AXIAL S2L ± 5%	1
31	5040-09506-00	C13	CAPACITOR 220MFD 16V RADIAL +50% -10%	1
32	5040-09493-00	C11	CAPACITOR 22MFD 10V RADIAL +50% -10%	1
33	5070-06258-00	D1, D2 & D3	DIODE, 1N4001	3
34	5075-09406-00	ZR1	ZENER, 1N5239 ± 5% (6.2V)	1
35	5075-09662-00	ZR2	ZENER 1N5249 ± 5% (14V)	1
36	5190-09430-00	Q3, Q4	TRANSISTOR, MPS A55	2
37	5130-09661-00	Q1, Q2	SCR 8 AMP, 100V	2
38	5250-09515-00	Q5	VOLTAGE REGULATOR, 7905	1
39	5460-09424-00	IC1, IC2	VOLTAGE REGULATOR, 723	2
40	5100-09690-00	Q6	DUAL RECTIFIER, 30AMP, 100V	1
41	5100-09513-00	BR2	BRIDGE RECTIFIER, 4.0A, 50V	1
42	5100-09514-00	BR1	BRIDGE RECTIFIER, 1.0A, 50V	1
43	5671-09019-00	LED1, LED2, LED3	LED, (LIGHT EMITTING RED DIODE)	3
44	5824-09248-00	TP2, TP4, TP5, TP6	TERMINAL #1502-1 (TEST POINT)	4

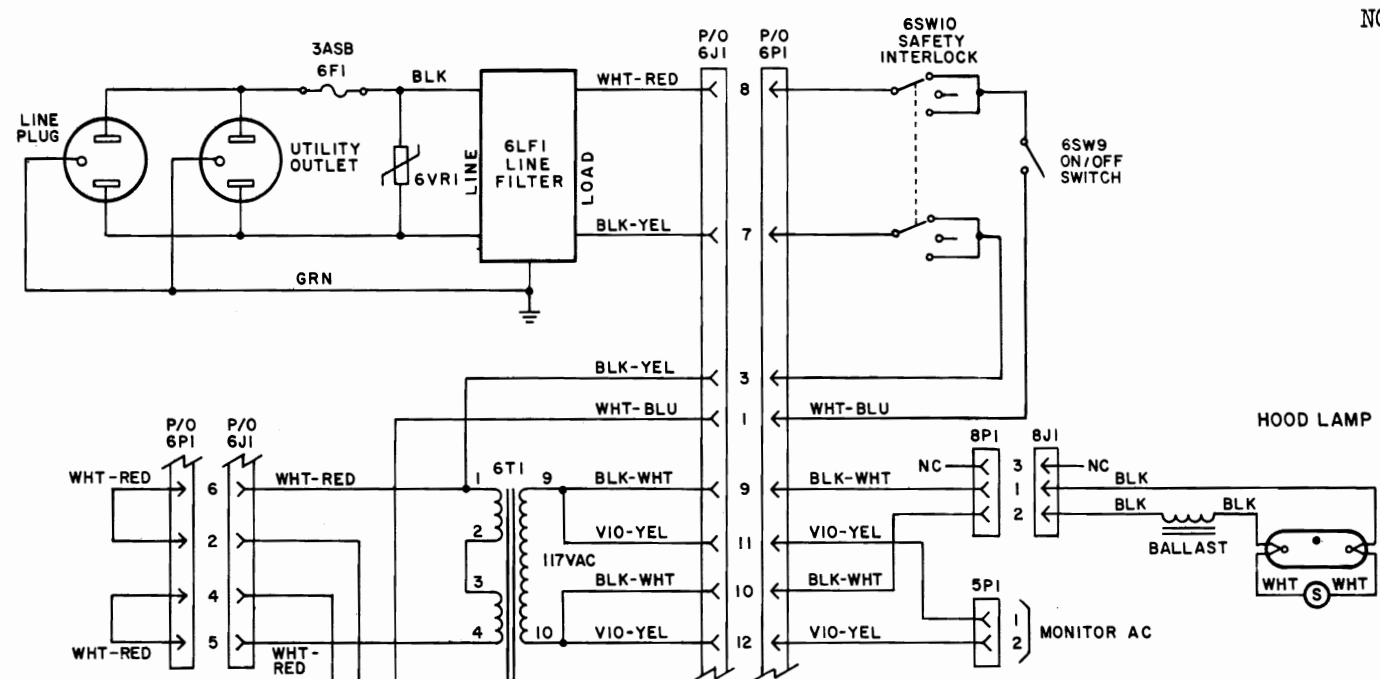


NOTE:

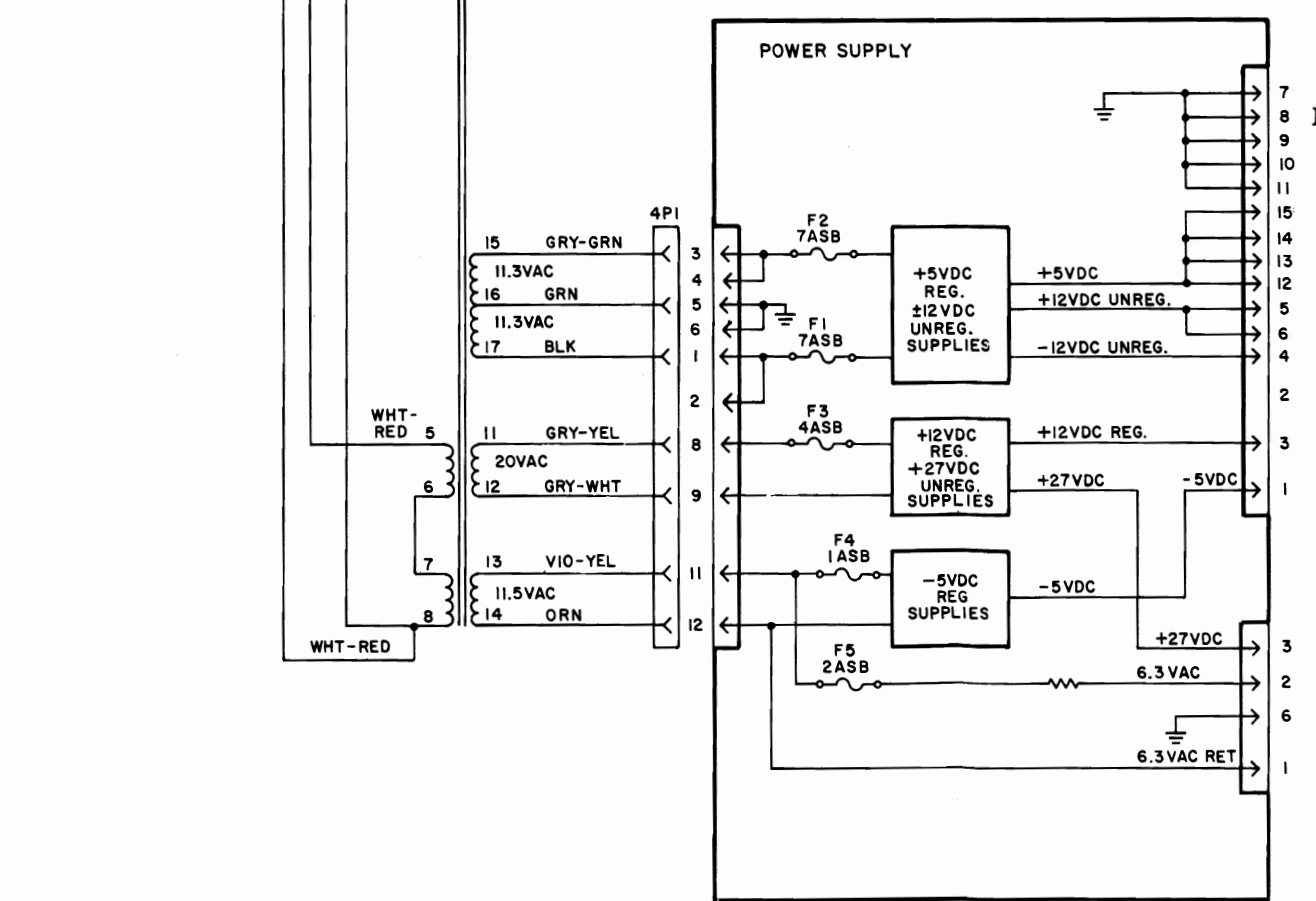
1. REMOVE R10 IF +5V DC IS LESS THAN 4.95V DC.
2. FOR SCHEMATIC REFER TO 16-8849.
3. APPLY RTV UNDER CAPACITOR A/R
4. LABEL LOCATION IS APPROXIMATE.

63	5010-08998-00	R28	RESISTOR, C.F. 2.2K OHM 5% 1/4 WATT	1	45	5731-09432-00	F4 & F5	FUSE, TA, S.B.	2
62	5701-09652-00		THERMAL PAD TO-3	1	46	5731-06314-00	F3	FUSE, 9A, S.B., 250V	1
61	5791-10326-00	4J1	HEADER 15 PIN 09-74-1151 09-74-1151	1	47	5731-06569-00	F1	FUSE, 1A, S.B., 250V	1
60	SEE CHART	R27	SEE CHART	1	48	SEE CHART	F2	3A, S.B.	1
59	4006-01003-06		6-32 x 3/8 P-PH-S	2	49	5732-09178-00		FUSEHOLDER,	10
56	4406-01117-00		6-32 HEX NUT	2	50	03-7520		TIE WRAP	1
57	SEE CHART	R27	SEE CHART	1	51	5791-09074-00	4J2	HEADER, 15 PIN 09-65-1151	2
55	5010-09682-00	R10	RESISTOR C.F. 51K ± 5% 1/4W	1	52	5791-09038-00	4J3	HEADER, 6 PIN 09-65-1061	1
56	5010-09329-00	R24	RESISTOR, C.F. 27K ± 5% 1/4W	1	53	5791-09028-00	4J4	HEADER, 7 PIN 09-65-1071	1
ITEM NO.	PART NO.	PART DESIGNATION	DESCRIPTION	REQ'D NO.	54	5705-09663-00		HEAT SINK	2
						5705-09688-00		HEAT SINK	0

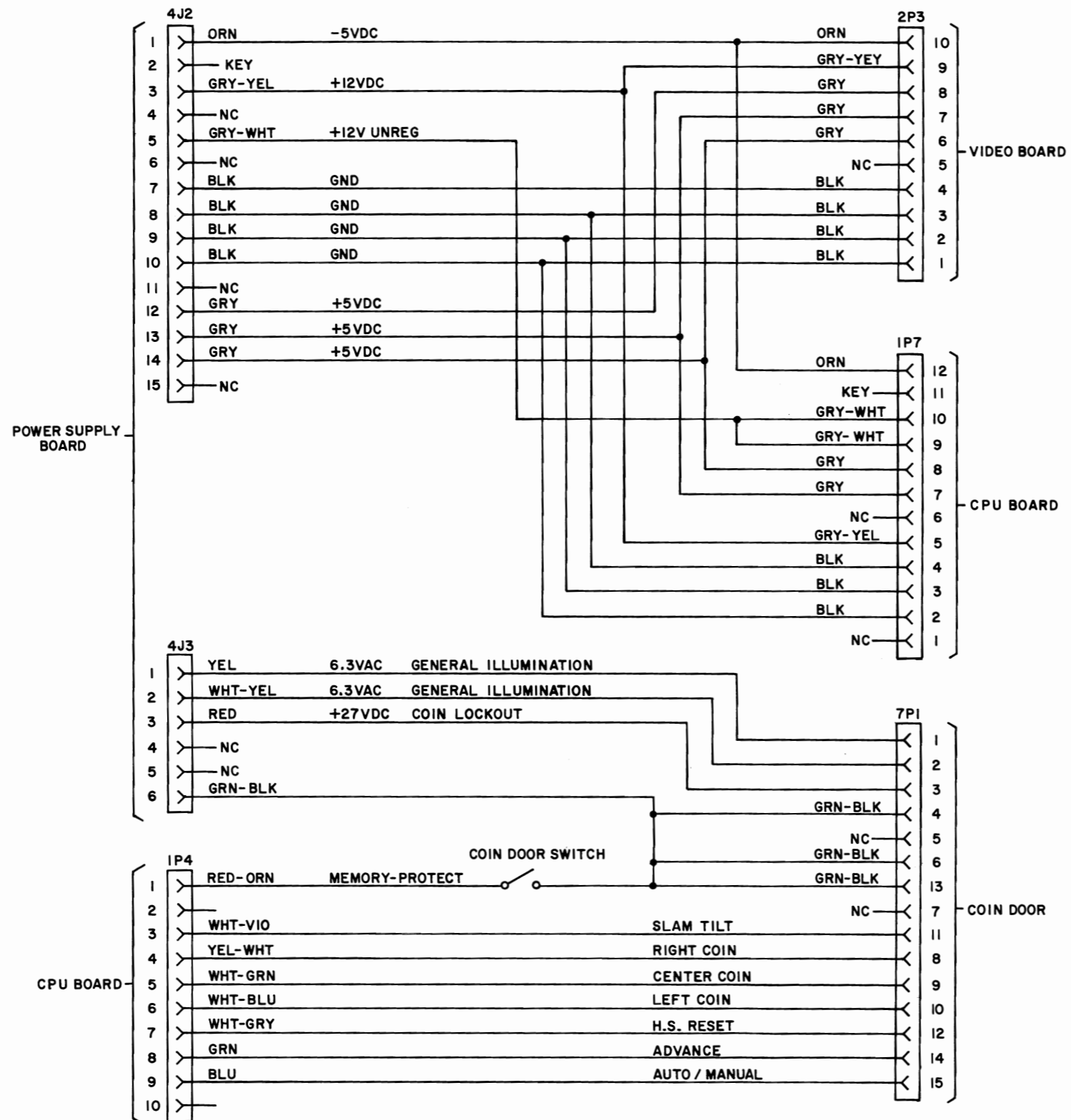


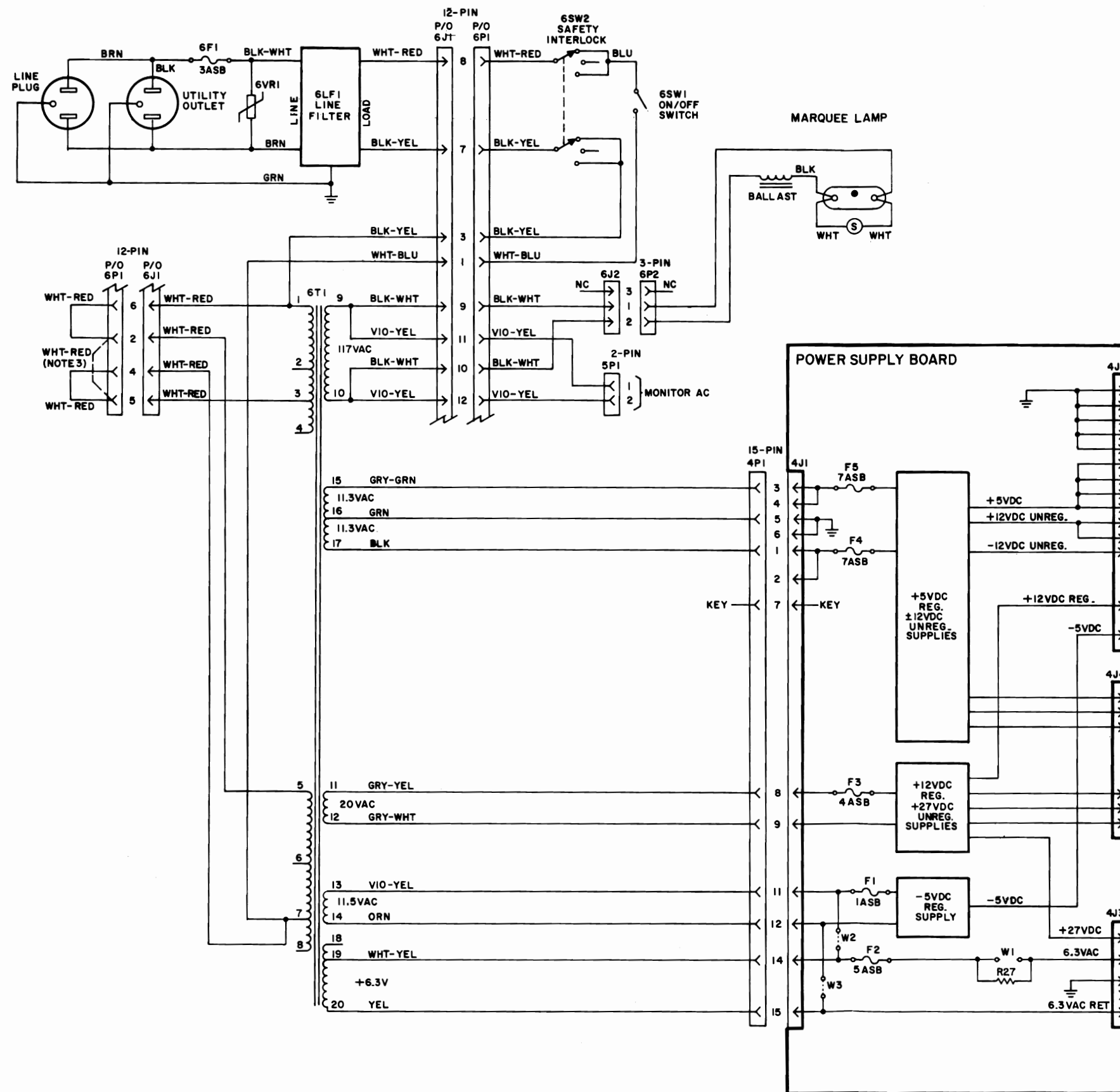


NOTE: STARGATE used either of two power supplies.
See power-supply data on page 21.



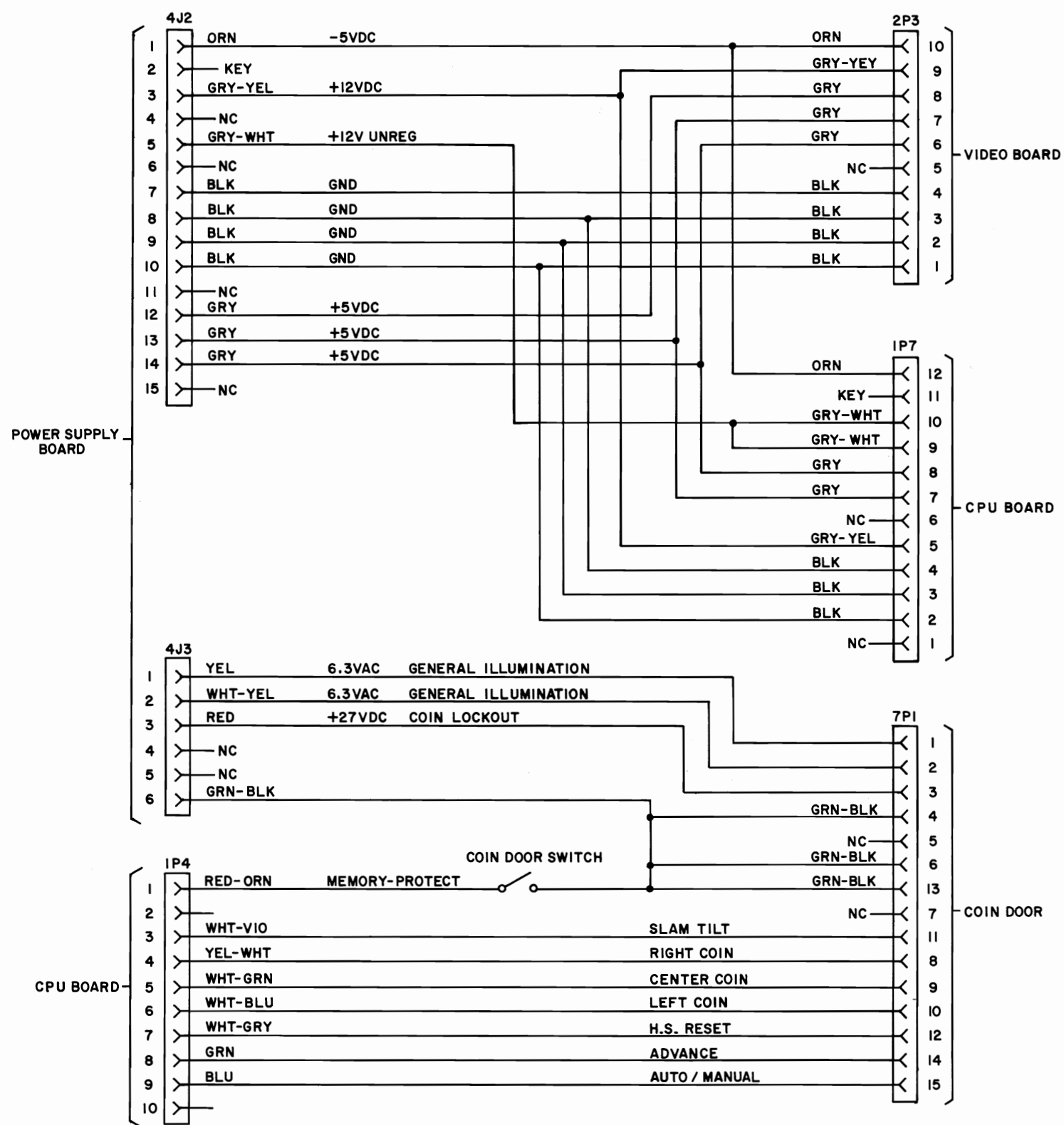
NOTE: Power-supply output connections are shown on the facing page.



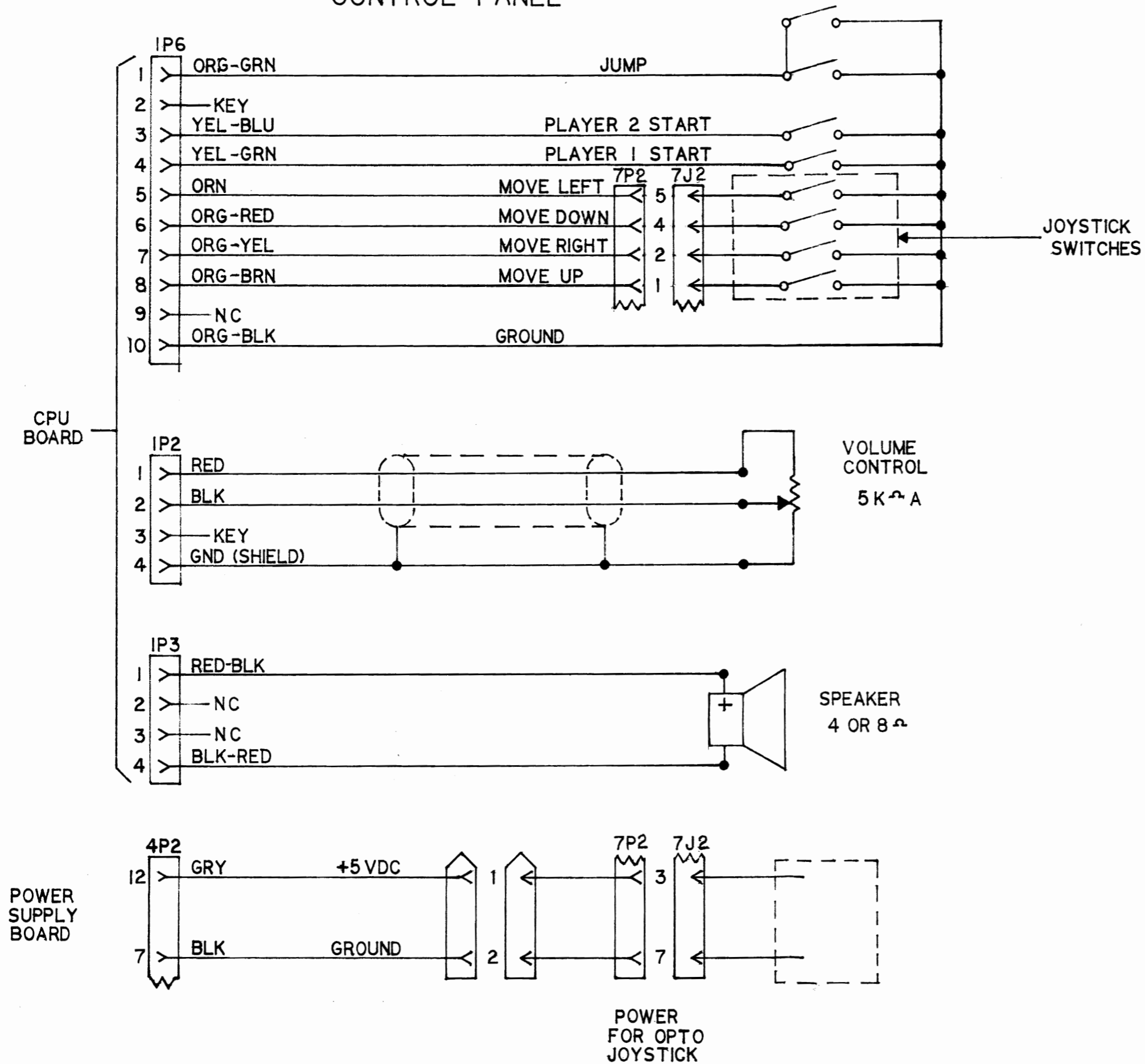


NOTE: STARGATE used either of two power supplies.
See power-supply data on page 21.

NOTE: Power-supply output connections are shown on the facing page.



CONTROL PANEL



NEW POWER SUPPLY BOARD

Early STARGATE games had a one-piece D-8359 Power Supply Board Assembly. In ROBOTRON and later STARGATE games, this assembly has been superseded by the new D-8474 Power Board and outboard heat sink assembly C-8807. The new board features crowbar over-voltage protection on the +12VDC and +5VDC regulated outputs.

NEW TRANSFORMER

On upright and cabaret-model games, a new power transformer with 8 primary and 12 secondary terminals (part no. 5610-09658) has also been substituted for the old transformer with 8 primary and 9 secondary terminals (part no. 5610-09535). The new transformer includes a 12.6V center-tapped secondary. Secondary terminal 20 and center-tap terminal 19 provide 6.3VAC general illumination power to pins 14 and 15 of plug 4P1. Cocktail table-model games continue to use a third power transformer with 6 primary and 9 secondary terminals (part no. 5610-09629).

UPRIGHT GAMES

New transformer - new Power Supply:
W1 in, W2 & W3 out.

Old transformer - new Power Supply:
W2 & W3 in, W1 out and 2 Ohm 5W resistor added at R27. Pins 13, 14, & 15 of 4J1 are left disconnected when transformer secondary plug is connected.

New transformer - old Power Supply:
Pins 13, 14, & 15 of 4P1 (transformer secondary connector) are unterminated at Power Supply 4J1 12-Pin connector.

COMPACT GAMES

New transformer - new Power Supply:
W1 in, W2 & W3 out.

Old transformer - new Power Supply:
W1, W2, & W3 in. Pins 13, 14, & 15 of 4J1 are left disconnected when transformer secondary plug is connected.

New transformer - old Power Supply:
Pins 13, 14, & 15 of 4P1 (transformer secondary connector) are unterminated at Power Supply 4J1 12-Pin connector.

BLANKING

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