

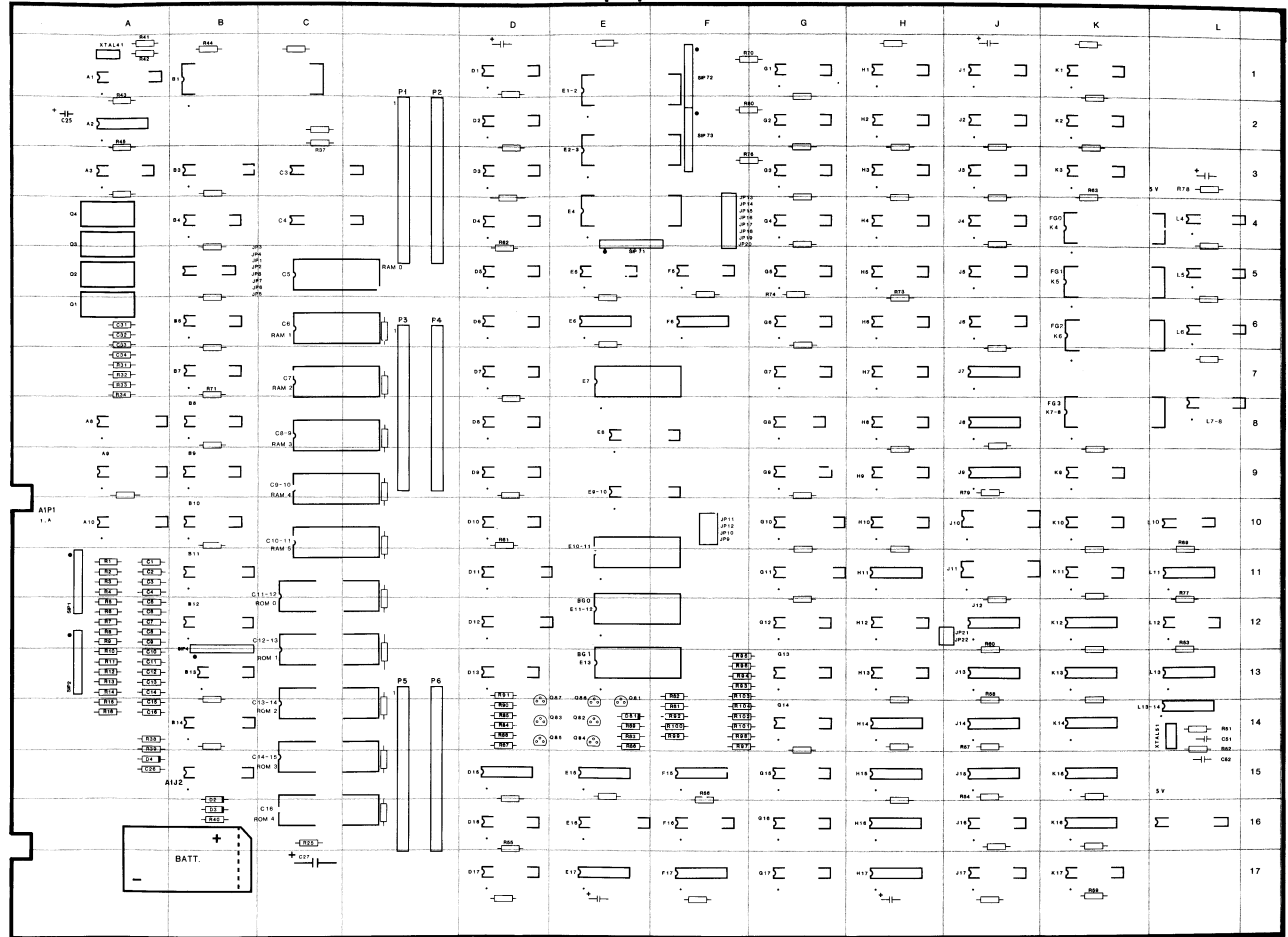
X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS

LOGIC BOARD ASSY. (A1), COMPONENT LOCATION

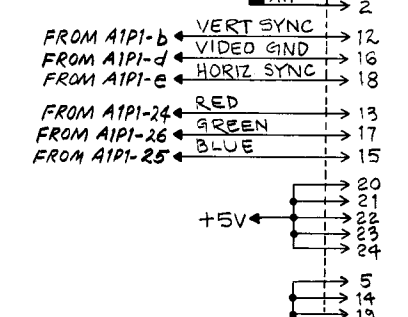
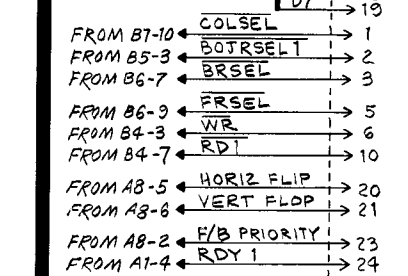
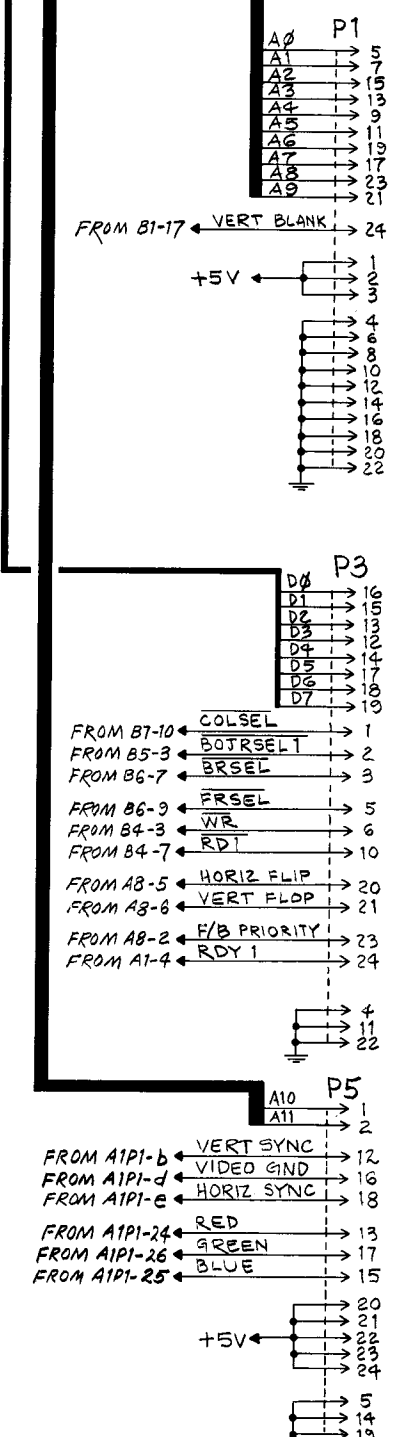
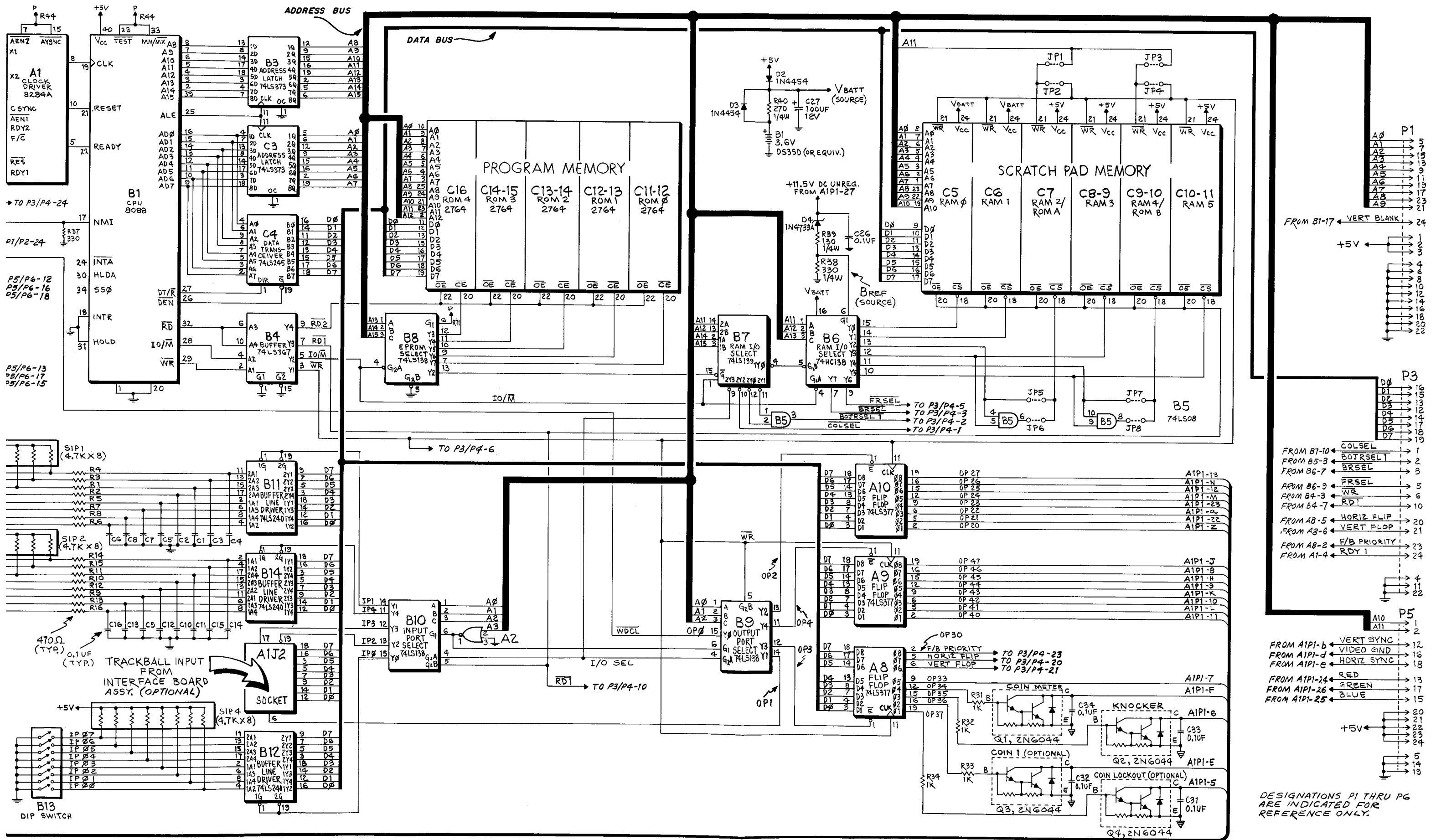
LOGIC BOARD ASSY. (A1), PARTS LIST

MISCELLANEOUS ELECTRONIC COMPONENTS

REFERENCE	DESCRIPTION	PART NO.
Bat. 1	Battery, 3.6V	XO-458
C1-C16	Capacitor, 0.1 UF, 50V AX. CR. +80%-20%	XO-230
C25	Capacitor, 100 UF, 25V EL-AX	XO-212
C26	Capacitor, 0.1 UF, 50V AX. CR. +80%-20%	XO-230
C27	Capacitor, 100 UF, 25V EL-AX	XO-212
C31-34	Capacitor, 0.1 UF, 50V AX. CR. +80%-20%	XO-230
C51	Capacitor, 100 PF, 100V CMD 5%	XO-198
C52	Capacitor, 0.1 UF, 100V CMD 5%	XO-196
ALL UNMARKED CAPACITORS	01 UF, 50V AX. CR. +80%-20%	XO-229
ALL POLARIZED UNMARKED CAPACITORS	10 UF, 25V AX. TANT. 10%	XO-127
D2	Diode, 1N4454	XO-275
D4	Diode, 1N4733A	XO-274
D81	Diode, 1N4148	XO-261
Q1-Q4	Transistor, 2N6044	XO-120
Q81-Q87	Transistor, MPSA70	XO-309
R1-R16	Resistor, 470 OHM, 5% 1/4W	XO-35
R37, R38	Resistor, 330 OHM, 5% 1/4W	XO-34
R39	Resistor, 130 OHM, 5% 1/4W	XO-172
R40	Resistor, 270 OHM, 5% 1/4W	XO-68
R41, R42	Resistor, 510 OHM, 5% 1/4W	XO-25
R43	Resistor, 130 OHM, 5% 1/4W	XO-172
R44, R45	Resistor, 1K OHM, 5% 1/4W	XO-5
R51, R52	Resistor, 330 OHM, 5% 1/4W	XO-34
R53, R54, R56	Resistor, 1K OHM, 5% 1/4W	XO-5
R57, R58	Resistor, 560 OHM, 5% 1/4W	XO-36
R59-R61	Resistor, 1K OHM, 5% 1/4W	XO-5
R63, R64	Resistor, 1K OHM, 5% 1/4W	XO-5
R70	Resistor, 1K OHM, 5% 1/4W	XO-5
R73, R74	Resistor, 1K OHM, 5% 1/4W	XO-5
R76-R80	Resistor, 1K OHM, 5% 1/4W	XO-5
R81	Resistor, 820 OHM, 5% 1/4W	XO-174
R82	Resistor, 100 OHM, 5% 1/4W	XO-28
R83, R84	Resistor, 15 OHM, 5% 1/4W	XO-171
R85	Resistor, 180 OHM, 5% 1/4W	XO-24
R86, R87	Resistor, 15 OHM, 5% 1/4W	XO-171
R88	Resistor, 180 OHM, 5% 1/4W	XO-24
R89, R90	Resistor, 15 OHM, 5% 1/4W	XO-171
R91	Resistor, 180 OHM, 5% 1/4W	XO-24
R92	Resistor, 1K OHM, 5% 1/4W	XO-5
R93	Resistor, 2K OHM, 5% 1/4W	XO-14
R94	Resistor, 1K OHM, 5% 1/4W	XO-5
R95	Resistor, 470 OHM, 5% 1/4W	XO-35
R96	Resistor, 240 OHM, 5% 1/4W	XO-173
R97	Resistor, 2K OHM, 5% 1/4W	XO-14
R98	Resistor, 1K OHM, 5% 1/4W	XO-5
R99	Resistor, 470 OHM, 5% 1/4W	XO-35
R100	Resistor, 240 OHM, 5% 1/4W	XO-173
R101	Resistor, 2K OHM, 5% 1/4W	XO-14
R102	Resistor, 1K OHM, 5% 1/4W	XO-5
R103	Resistor, 470 OHM, 5% 1/4W	XO-35
R104	Resistor, 240 OHM, 5% 1/4W	XO-173
SIP 1, SIP 2, SIP 4	Resistor, Dip, 4.7K, 9 Pin	XO-492
SIP 71, SIP 72, SIP 73	Resistor, Dip, 1K, 9 Pin	XO-493
X-TAL 1	Crystal, 15 MHZ	XO-482
XTAL 51	Crystal, 20 MHZ	XO-494
	Dip Switch	XO-505
	20 Pin Dip Socket	XO-491
	22 Pin Dip Socket	XO-467
	24 Pin Dip Socket	XO-529
	28 Pin Dip Socket	XO-536
	40 Pin Dip Socket	XO-530



X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS



DESIGNATIONS P1 THRU P6 ARE INDICATED FOR REFERENCE ONLY.

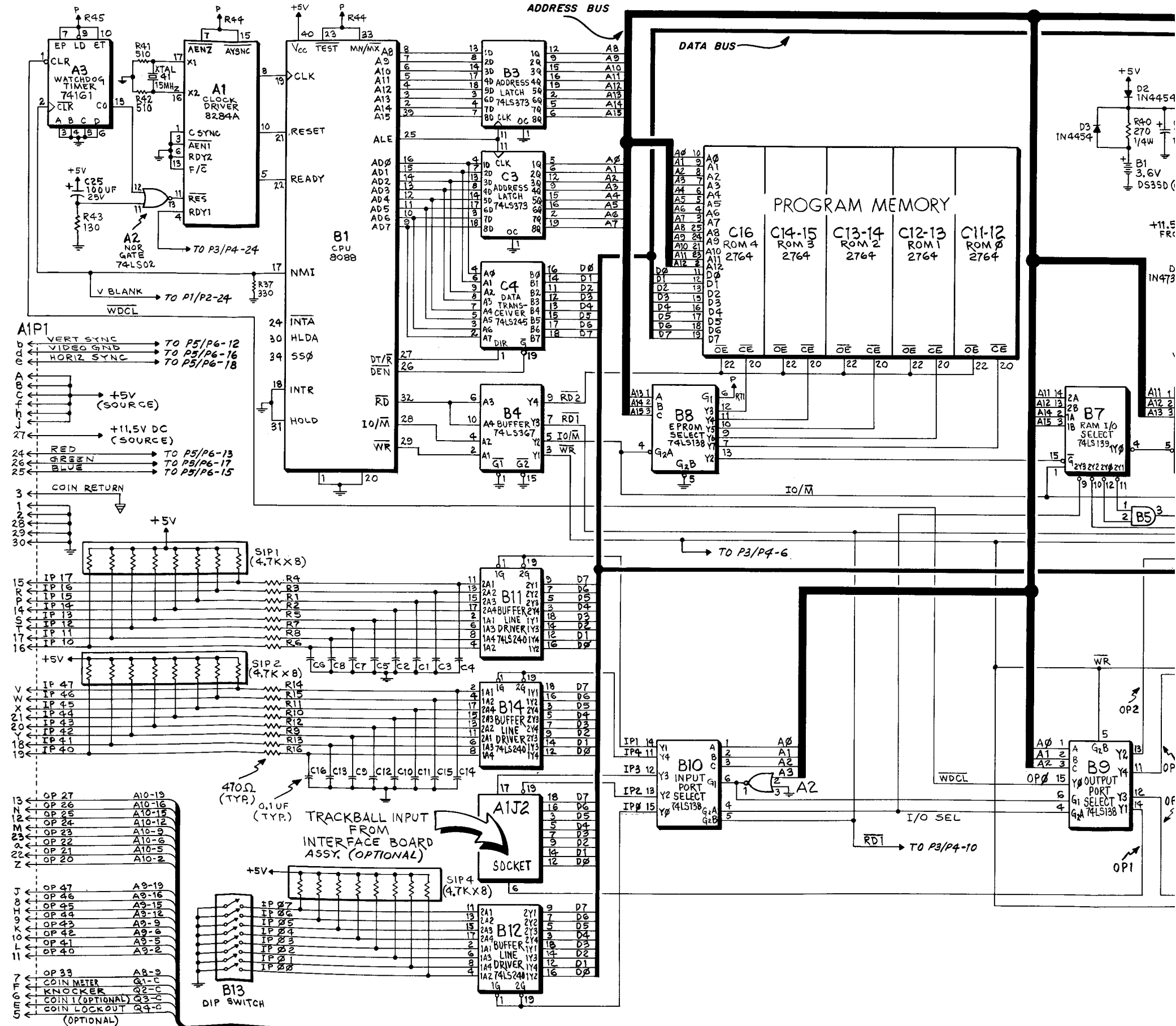
LOGIC BOARD ASSY. (A1), SCHEMATIC DIAGRAM, SHEET 1 OF 3

X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS

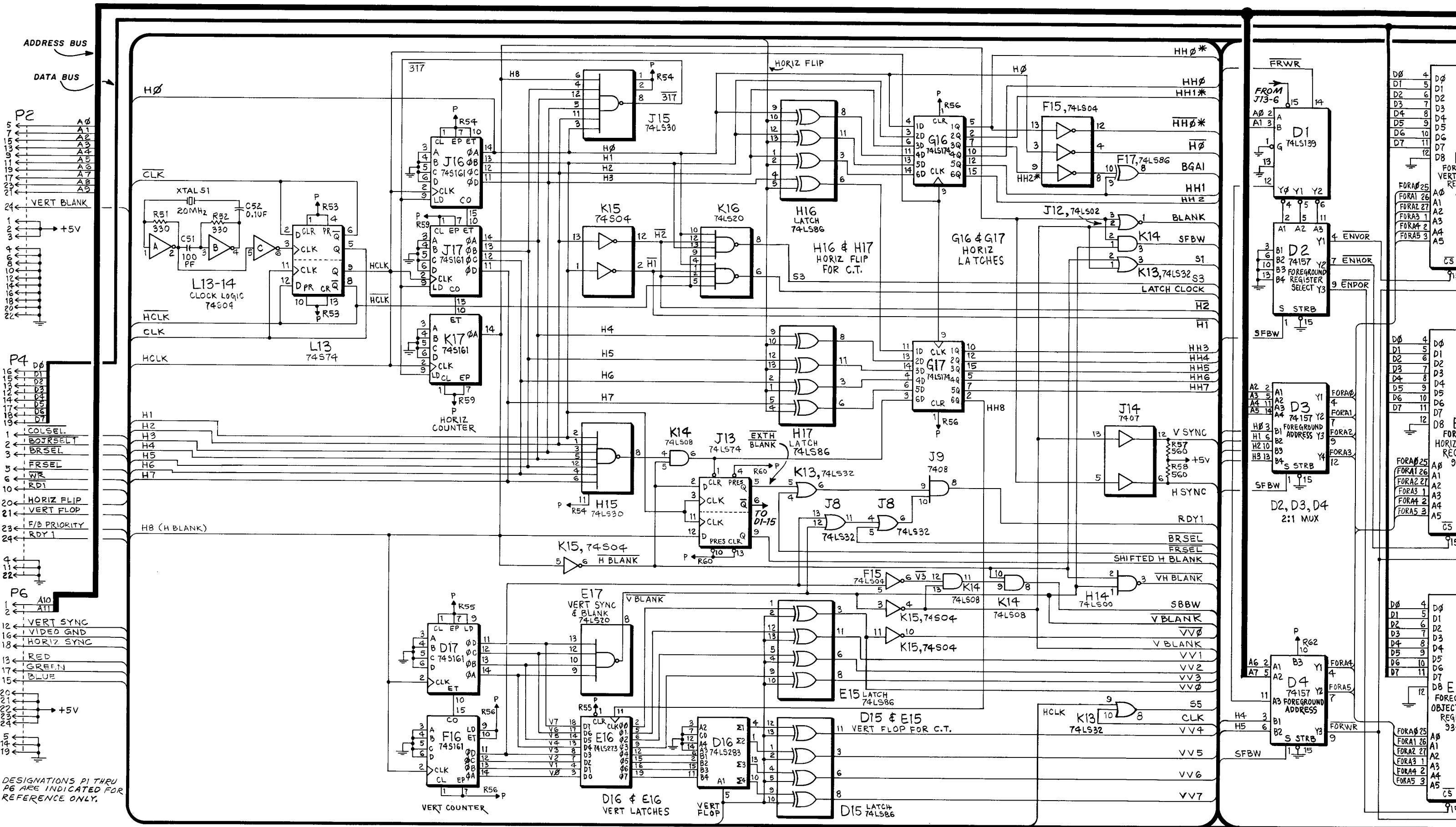
LOGIC BOARD ASSY. (A1), PARTS LIST (CONT.)

INTEGRATED CIRCUITS

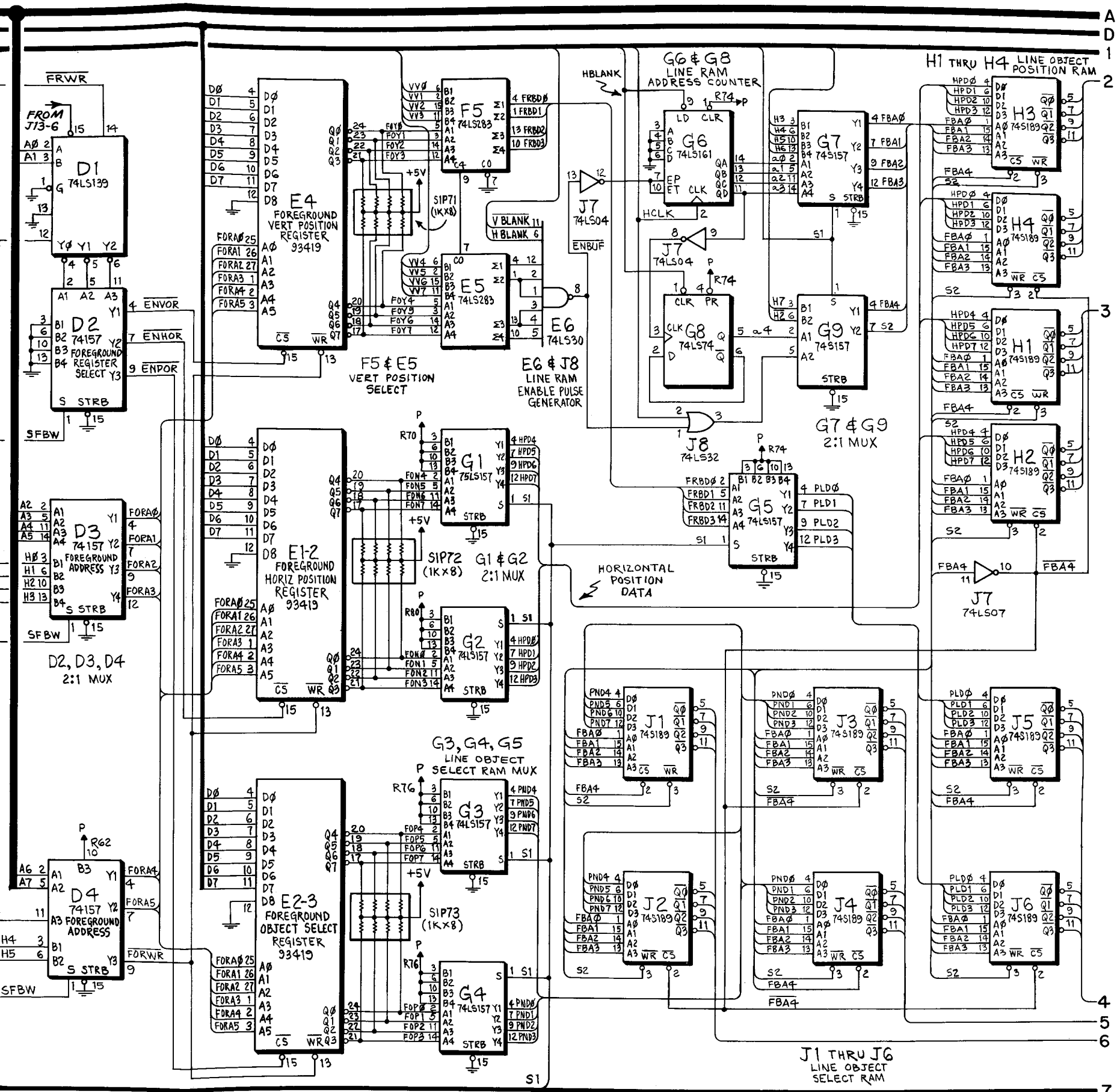
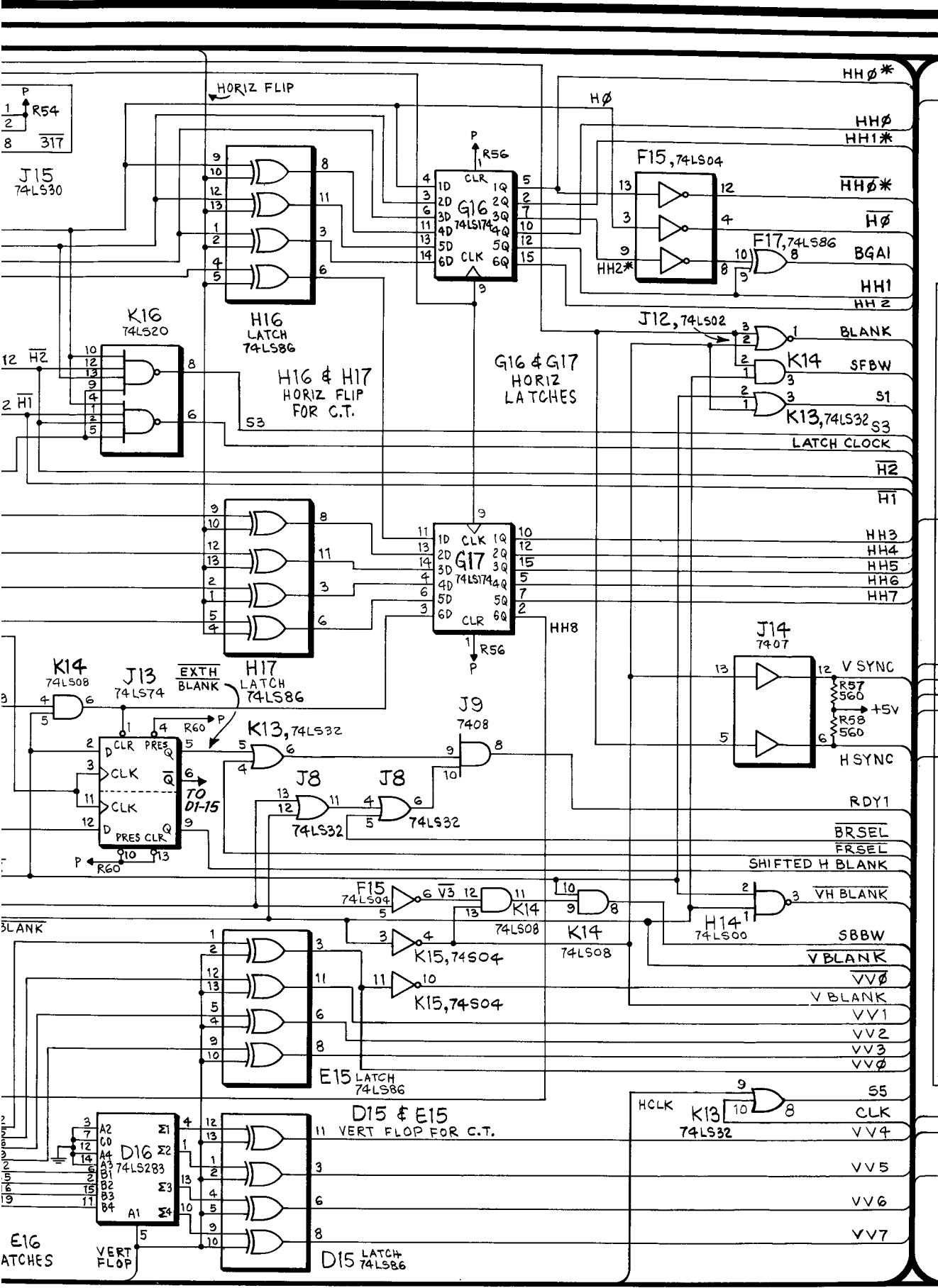
REFERENCE	DESCRIPTION	PART NO.	REFERENCE	DESCRIPTION	PART NO.
A1	Logic Board Assy.	MA-378	G7	74157 Quad 2-input multiplexer	XO-114
A2	8284 CLK Driver	XO-478	G8	74LS74 Dual D-type flip flop	XO-434
A3	74LS02 Quad 2-input "NOR" gate	XO-428	G9	74S157 Quad 2-input multiplexer	XO-124
A8, A9, A10	74161 Synchronous 4-bit counter	XO-192	G10	74LS245 Octal bus transceiver	XO-79
B1	74LS377 Octal "D" Flip Flop	XO-97	G11	74LS374 Octal D-type flip flop	XO-96
B3	8088 CPU	XO-490	G12	74LS157 Quad 2-input multiplexer	XO-390
B4	74LS373 Octal D-type flip flop	XO-445	G13, G14, G15	7489 64-bit RAM	XO-88
B5	74LS367 Hex 3-state buffer	XO-444	G16, G17	74LS174 Hex D flip flop	XO-442
B6	74LS08 Quad 2-input "AND" gate	XO-86	H1, H2, H3, H4	74S189 64-bit RAM	XO-89
B7	74HC138 Decoder/demultiplexer	XO-190	H5, H6,	74S161 Synchronous presettable binary counter	XO-488
B8, B9, B10	74LS139 Dual 1 of 4 decoder	XO-419	H7, H8, H9, H10	74LS157 Quad 2-input multiplexer	XO-390
B11, B12, B14	74LS138 1 of 8 decoder	XO-437	H11	74LS260 Dual 5-input "NOR" gate	XO-93
C3	74LS240 Octal Buffer/line driver	XO-91	H12	74LS298 Quad 2-port register	XO-118
C4	74LS245 Octal Bus transceiver	XO-79	H13	74LS157 Quad 2-input multiplexer	XO-390
C5	RAM 6116LP-4	XO-191	H14	74LS00 Quad 2-input "NAND" gate	XO-427
C6	RAM 1 6116LP-4	XO-191			
C7	RAM 2 2128-2	XO-195	H15	74LS30 8 input "NAND" gate	XO-432
C8-9	RAM 3 2128-2	XO-195	H16, H17	74LS86 Dual 2-input exclusive "OR" gate	XO-435
C11-12	ROM 2764 8K x 8 EPROM	XO-489			
C12-13	ROM 1 2764 8K x 8 EPROM	XO-489	J1, J2, J3,	74S189 64-bit RAM	XO-89
C13-14	ROM 2 2764 8K x 8 EPROM	XO-489	J4, J5, J6	74LS04 Hex inverter	XO-418
D1	74LS139 Dual 1 of 4 Decoder	XO-419	J7	74LS32 Quad 2-input "OR" gate	XO-433
D2, D3, D4, D5, D6, D7, D8, D9,			J8	7408 Quad 2-input "AND" gate	XO-404
D10	74157 Quad 2-input multiplexer	XO-114	J9	93422 256 x 2 bipolar RAM	XO-100
D11	74LS374 Octal D-type flip flop	XO-96	J10, J11	74LS02 Quad 2-input "NOR" gate	XO-428
D12	74LS244 Octal buffer/line driver	XO-117	J12	74LS74 Dual D-type flip flop	XO-434
D13	74LS157 Quad 2-input multiplexer	XO-390	J13	7407 Hex buffer/driver	XO-384
D15	74LS86 Quad 2-input exclusive "OR" gate	XO-435	J14	74LS30 8 input "NAND" gate	XO-432
D16	74LS283 4-bit binary full adder	XO-95	J15	74S161 Synchronous presettable binary counter	XO-488
D17	74S161 Synchronous presettable binary counter	XO-488	J16, J17	74LS260 Dual 5-input "NOR" gate	XO-93
E1-2, E2-3, E4	93419 64 x 9 bipolar RAM	XO-99	K1, K2, K3	74LS379 Quad D-type flip flop	XO-98
E5	74LS283 4-bit binary full adder	XO-95	K4	FG0 2764-3 8K x 8 EPROM	XO-489
E6	74LS30 8-input "NAND" gate	XO-432	K5	FG1 2764-3 8K x 8 EPROM	XO-489
E7	4801 1K x 8 RAM	XO-193	K6	FG2 2764-3 8K x 8 EPROM	XO-489
E8, E9-10	74LS245 Octal Bus Transceiver	XO-79	K7-8	FG3 2764-3 8K x 8 EPROM	XO-489
E10-11	4801 1K x 8 RAM	XO-193	K9, K10, K11	74LS157 Quad 2-input multiplexer	XO-390
E11-12	2732A (BG0) 4K x 8 EPROM	XO-485	K12	74LS260 Dual 5-input "NOR" gate	XO-93
E13	2732A (BG1) 4K x 8 EPROM	XO-485	K13	74LS32 Quad 2-input "OR" gate	XO-433
E15	74LS86 Quad 2-input exclusive "OR" gate	XO-435	K14	74LS08 Quad 2-input "AND" gate	XO-86
E16	74LS273 8-bit register	XO-94	K15	74S04 Hex inverter	XO-400
E17	74LS20 Dual 4-input "NAND" gate	XO-430	K16	74LS20 Dual 4-input "NAND" gate	XO-430
F5	74LS283 4-bit binary full adder	XO-95	K17	74S161 Synchronous presettable binary counter	XO-488
F6	74LS32 Quad 2-input "OR" gate	XO-433	L4, L5, L6, L7	74LS166 8-bit shift register	XO-391
F15	74LS04 Hex inverter	XO-418	L10	74LS74 Dual flip flop	XO-434
F16	74S161 Synchronous presettable binary counter	XO-488	L11	74LS20 Dual 4-input "NAND" gate	XO-430
F17	74LS86 Quad 2-input exclusive "OR" gate	XO-435	L12	74LS161 Synchronous presettable binary counter	XO-440
G1, G2, G3, G4, G5, G6	74LS157 Quad 2-input multiplexer	XO-390	L13	74S74 Dual D-type pos. edge trig. flip flop (T. I. only)	XO-87
	74LS161 Synchronous presettable binary counter	XO-440	L13-14	74S04 Hex inverter	XO-400



X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS



X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS

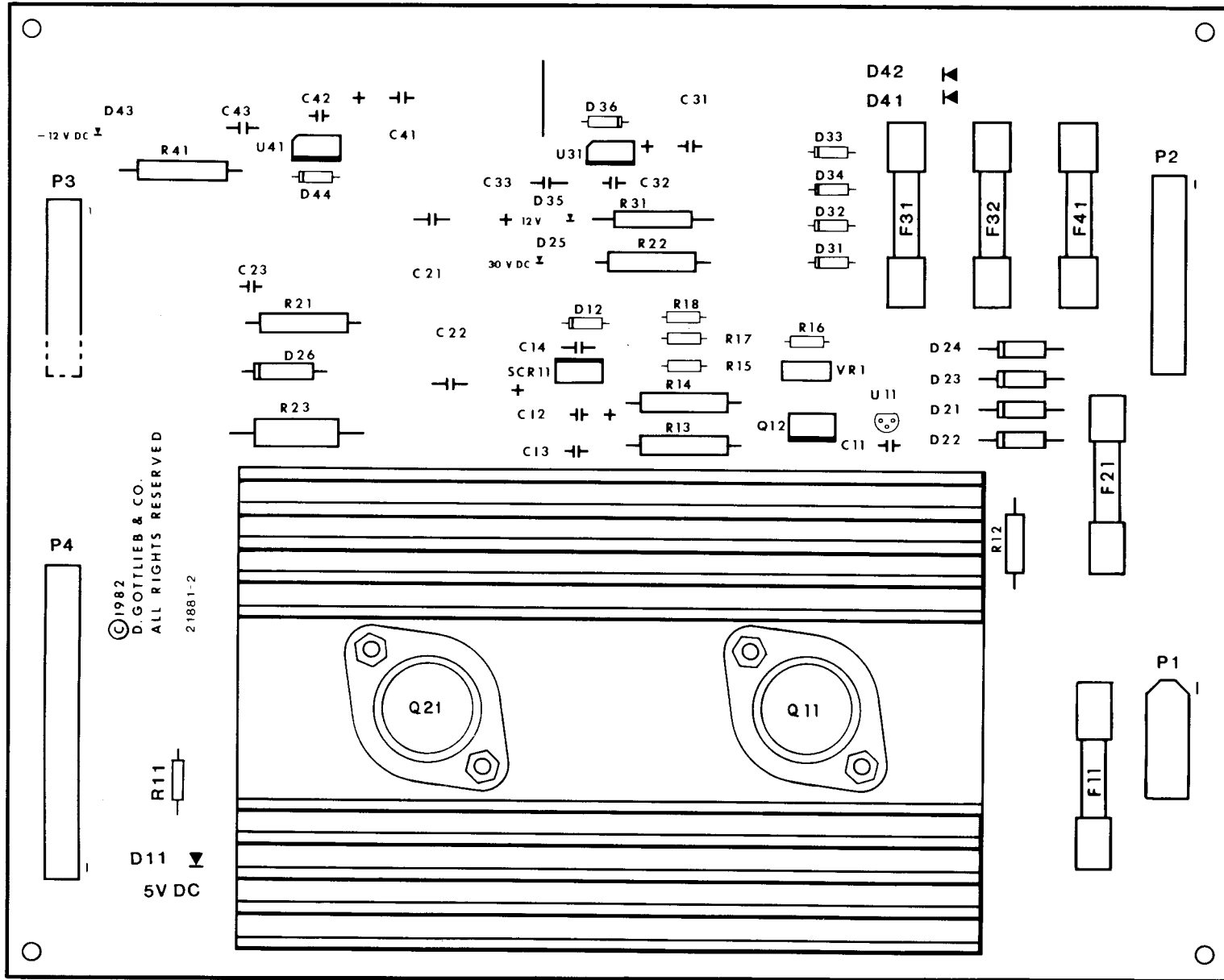


LOGIC BOARD ASSY. (A1), SCHEMATIC DIAGRAM, SHEET 2 OF 3

X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS

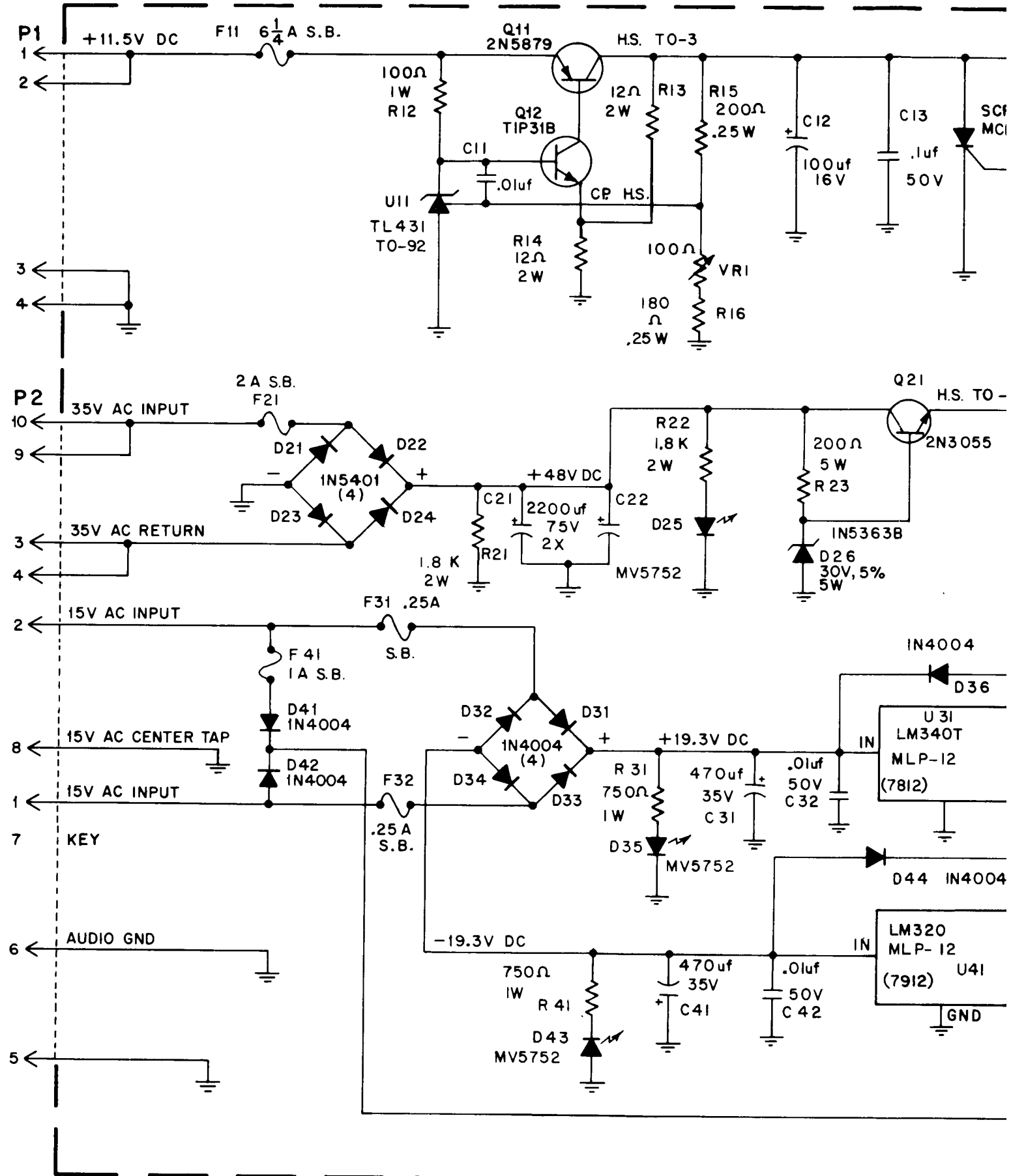
X. WIRING AND SCHEMATIC DIAGRAMS

POWER SUPPLY ASSY. (A3), COMPONENT LOCATION

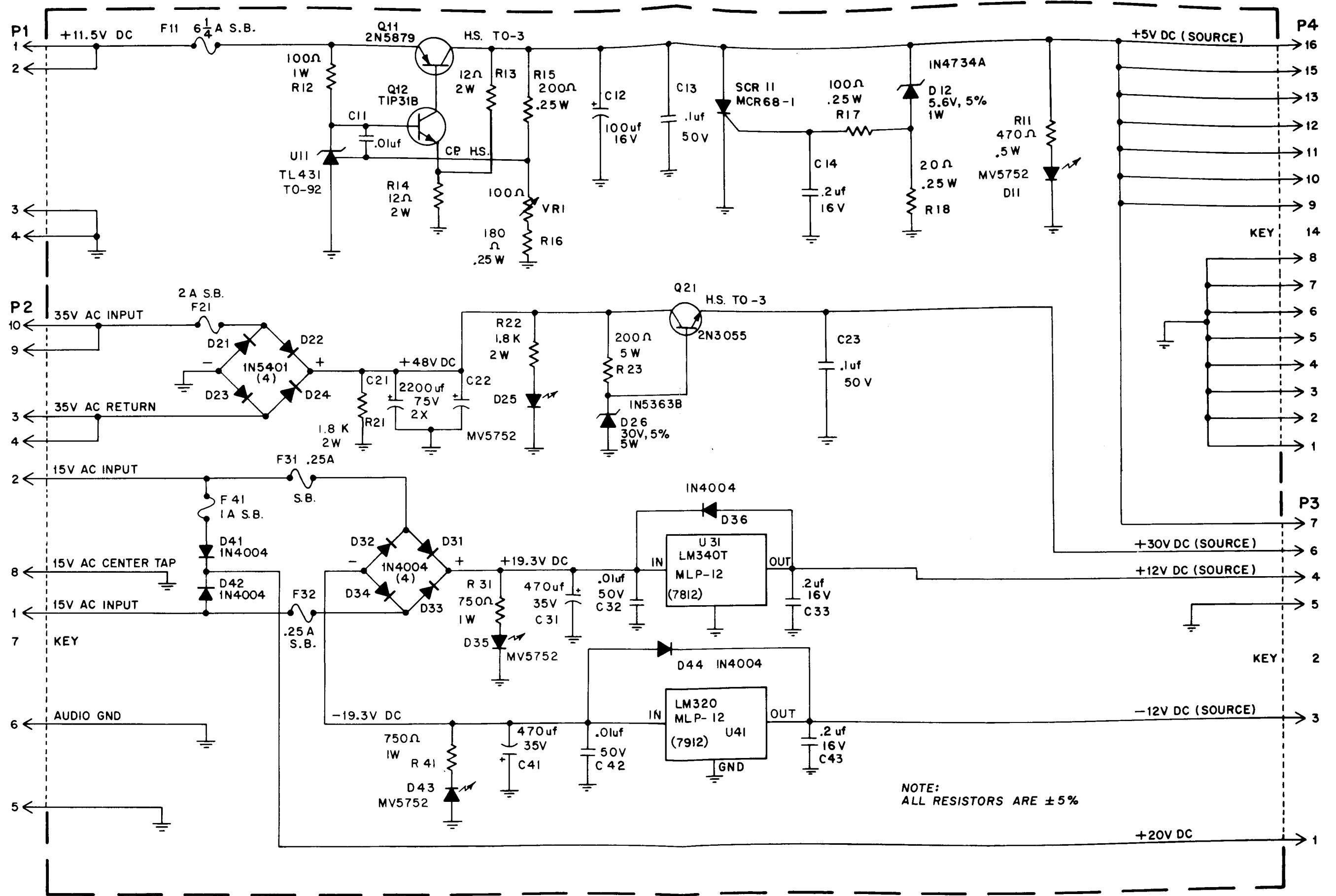


POWER SUPPLY ASSY. (A3), PARTS LIST

REFERENCE	DESCRIPTION	PART NO.	REFERENCE	DESCRIPTION	PART NO.
	Power Supply Assy.	MA-430	P2	Connector, 10 PIN	XO-531
C11, C32, C42	Capacitor, .01 mfd., 50V	XO-229	P3	Connector, 7 PIN	XO-526
C12	Capacitor, 100UF, 16V	XO-235	P4	Connector, 16 PIN	XO-372
C13, C23	Capacitor, 0.1UF, 100V	XO-234	Q11	Transistor, PNP, 2N5879	XO-323
C14, C33, C43	Capacitor, 0.2UF, 16V	XO-205	Q12	Transistor, NPN, TIP31B	XO-641
C21, C22	Capacitor, 2200UF, 75V	XO-132	Q21	Transistor, NPN, 2N3055	XO-301
C31, C41	Capacitor, 470UF, 35V	XO-284	R11	Resistor, 470 OHM, 5% 1/2W	XO-55
D11, D25			R12	Resistor, 100 OHM, 5% 1W	XO-137
D35, D43	Diode, Light Emitting MV-5752	XO-270	R13, R14	Resistor, 12 OHM, 5% 2W	XO-138
D12	Diode, Zener, 5.6V, 5%, 1W, 1N4734A	XO-255	R15	Resistor, 200 OHM, 5% 1/4W	XO-143
D21-D24	Diode, 1N5401	XO-263	R16	Resistor, 180 OHM, 5% 1/4W	XO-24
D26	Diode, Zener, 30V, 5%, 5W, 1N5363B	XO-273	R17	Resistor, 100 OHM, 5% 1/4W	XO-28
D31-D34, D36	Diode, 1N4004	XO-254	R18	Resistor, 20 OHM, 5% 1/4W	XO-29
D41, D42, D44			R21, R22	Resistor, 1.8KOHM, 5% 2W	XO-135
F11	Fuse, 6 1/4 AMP SLO-BLO	EL-8	R23	Resistor, 200 OHM, 5% 5W	XO-133
F21	Fuse, 2 AMP SLO-BLO	EL-7	R31, R41	Resistor, 750 OHM, 5% 1W	XO-136
F31, F32	Fuse, 1/4 AMP SLO-BLO	EL-5	SCR11	Silicon Controlled Rectifier	XO-131
F41	Fuse, 1 AMP SLO-BLO	EL-6	U11	Diode, Programmable Zener TL431	XO-272
P1	Connector, 4 PIN	PS-87	U31	Voltage Regulator -12V, LM 340T	XO-473
			U41	Voltage Regulator -12V, LM 320	XO-130
			VR1	Potentiometer, 100 OHM	XO-134



X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS



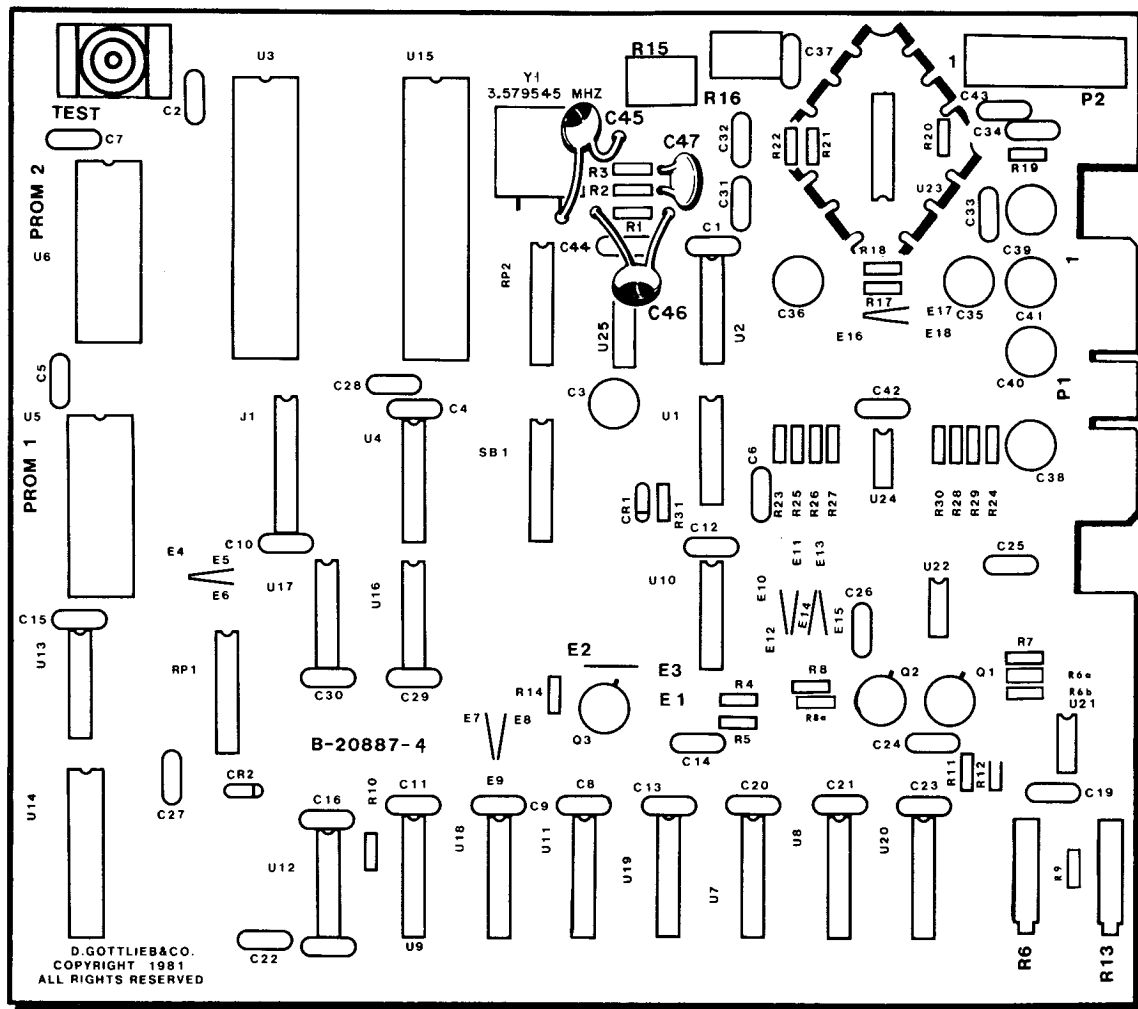
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 - >133
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 - >131
 - >272
 - >473
 - >130
 - >134

NOTE:
ALL RESISTORS ARE ±5%

POWER SUPPLY ASSY. (A3), SCHEMATIC DIAGRAM

X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS

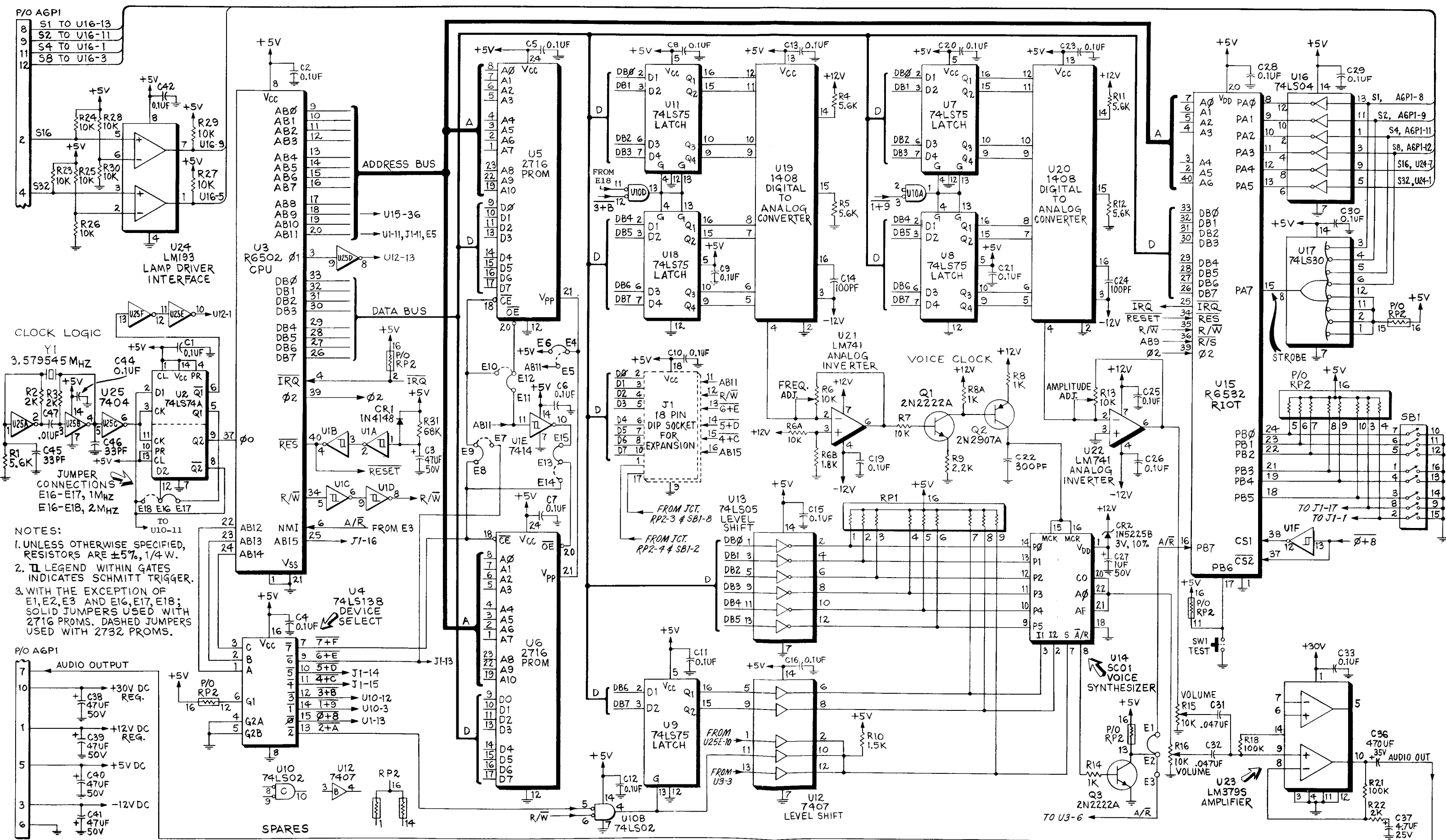
SOUND/SPEECH ASSY. (A6), COMPONENT LOCATION



SOUND/SPEECH ASSY. (A6), PARTS LIST

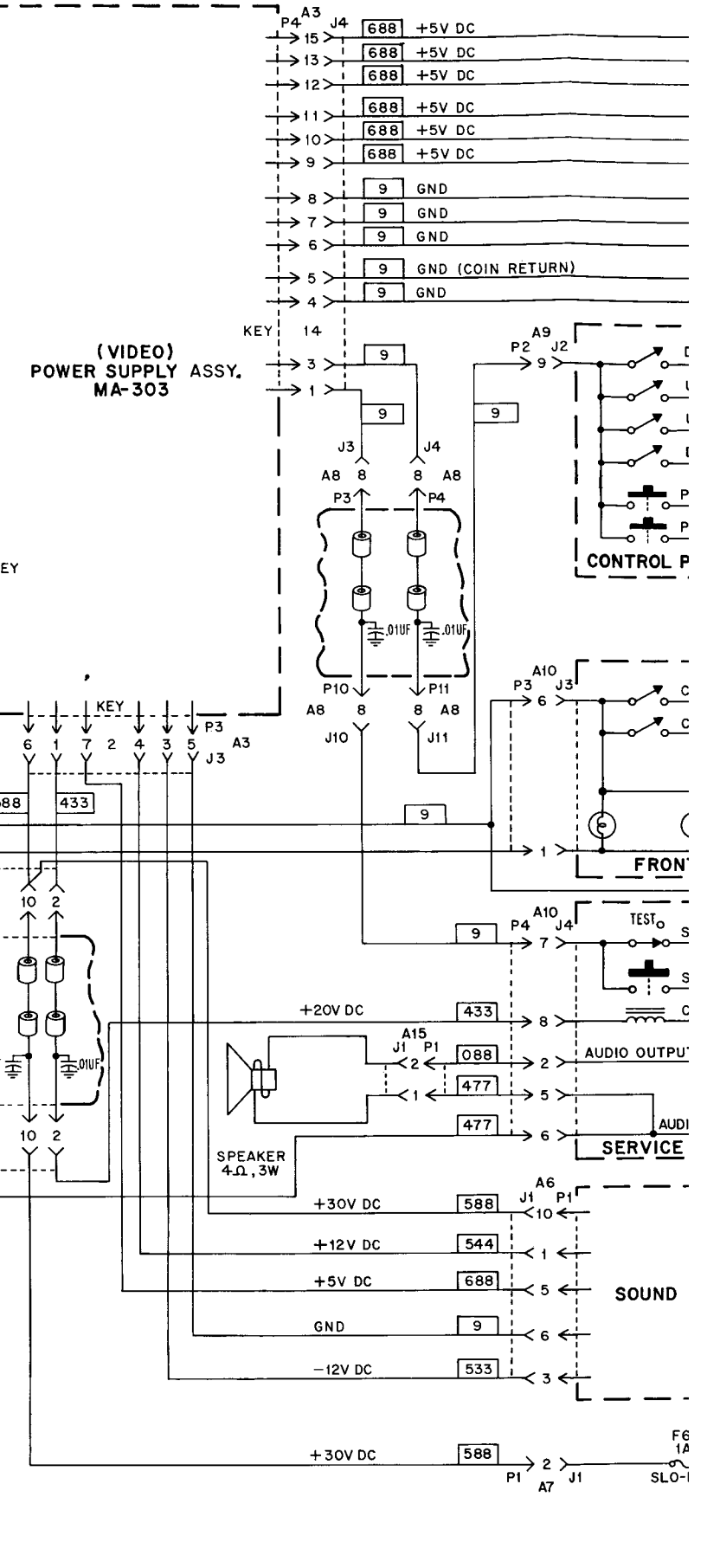
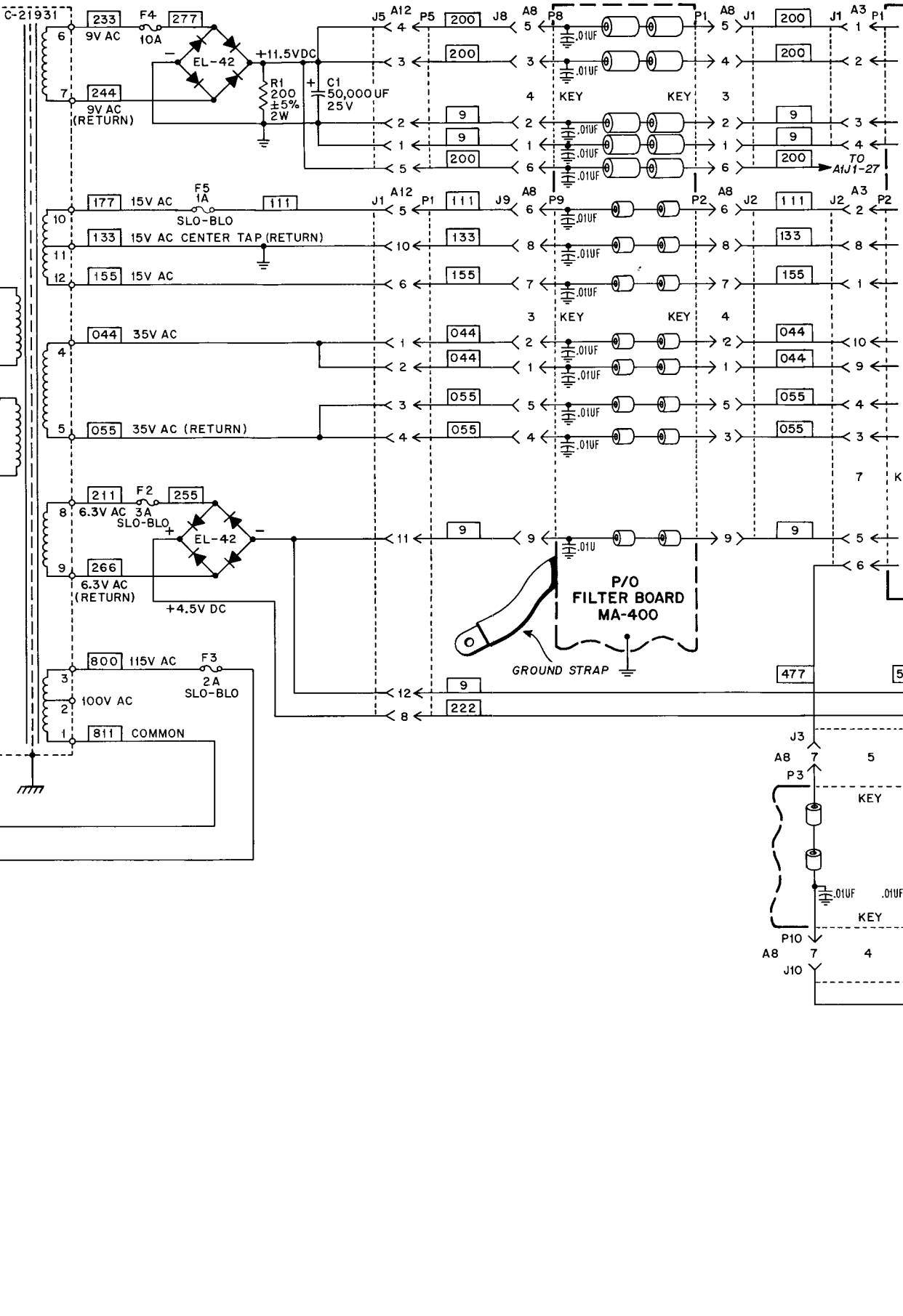
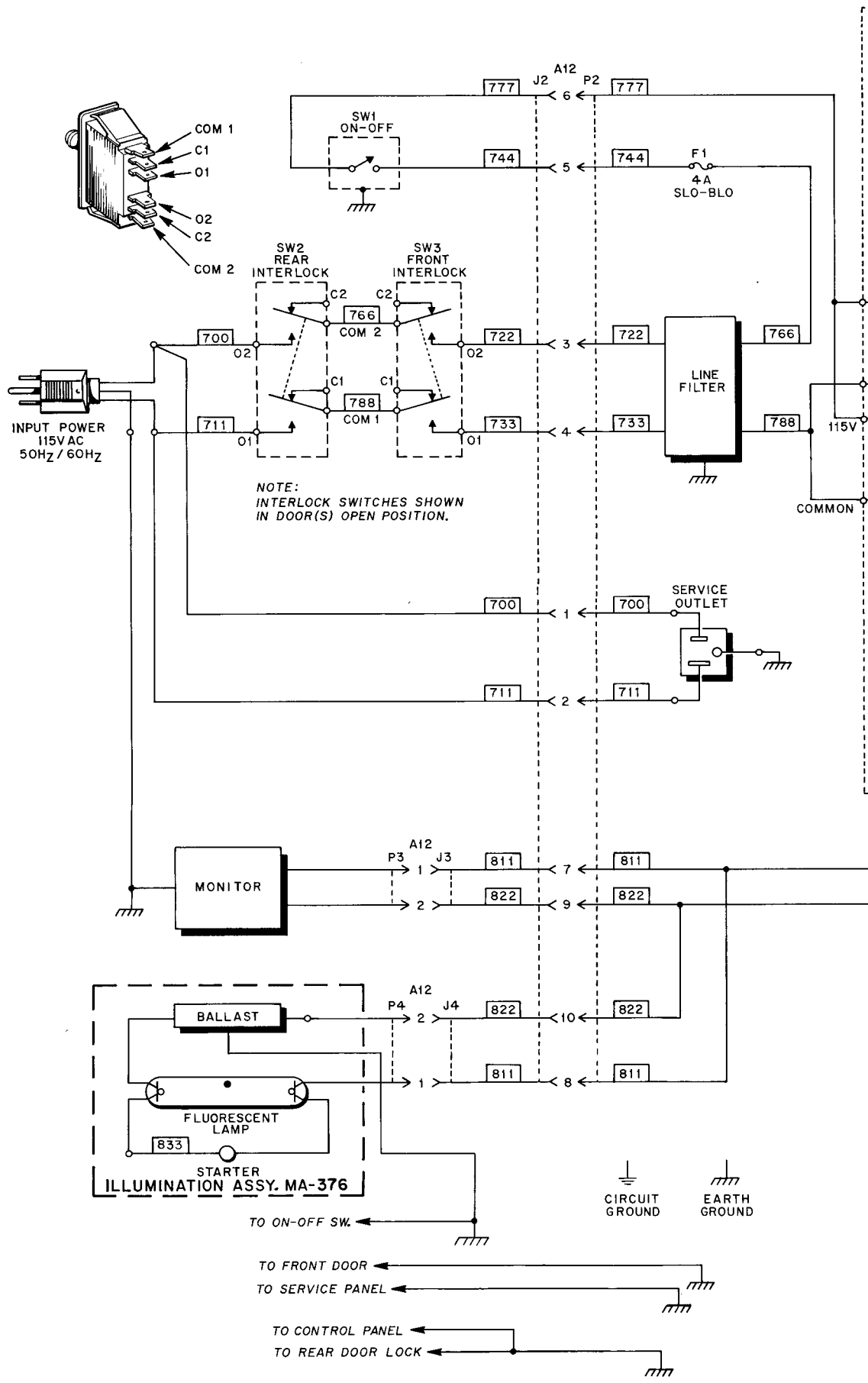
REFERENCE	DESCRIPTION	PART NUMBER	REFERENCE	DESCRIPTION	PART NUMBER
	Sound/Speech Assembly	MA-2 16	R 15, R 16	Potentiometer, 10K ohm	XO-109
C 1, C 2	Capacitor, 0.1UF, 25V	XO-248	R 18, R 21	Resistor, 100K ohm, 5%, 1/4W	XO-45
C 4, C 13			R 22	Resistor, 2K ohm, 5%, 1/4W	XO-14
C 15, C 16, C 19			R 31	Resistor, 68K ohm, 5%, 1/4W	XO-189
C 20, C 21, C 23			RP 1, RP 2	Resistor, Dip	XO-168
C 25, C 26			SB 1	Switch, Dip	XO-505
C 28-C 30, C 33			SW 1	Switch, Momentary Pushbutton	XO-5 15
C 42, C 44			U 1	IC, 74 14	XO-397
C 31-C 32	Capacitor, .047UF, 25V	XO-222	U 2	IC, SN74LS74N	XO-434
C 37	Capacitor, 4.7UF, 35V	XO-291	U 3	CPU, R6502-13	XO-360
C 3, C 38-C 4 1	Capacitor, 47UF, 50V	XO-2 10	U 4	IC, SN74LS 138N	XO-437
C 14, C 24	Capacitor, 100PF	XO-223	U 5, U 6	EPROM, 27 16	PR-53
C 22	Capacitor, 300PF	XO-283	U 7-U 9, U 11, U 18	IC, SN74LS75	XO-394
C 27	Capacitor, 1UF, 50V	XO-2 17	U 10	IC, SN74LS02N	XO-428
C 36	Capacitor, 470UF, 35V	XO-284	U 12	IC, SN7407N	XO-384
C 45, C 46	Capacitor, 33PF	XO-277	U 13	IC, Inverter, SN74LS05N	XO-4 11
C 47	Capacitor, .01 UF, 100V	XO-202	U 14	Voice Chip, SC0 1	XO468
CR 1	Diode, 1N4 148	XO-26 1	U 15	RRIOT, R6532-18	XO-36 1
CR 2	Diode, Zener, 1N5225B	XO-269	U 16	IC, SN74LS04N	XO-4 18
Q 1, Q 3	Transistor, NPN, 2N2222A	XO-320	U 17	IC, SN74LS30N	XO-432
Q 2	Transistor, PNP, 2N2907A	XO-32 1	U 19, 20	Converter, PMI, 1408A-6P	XO-4 16
R 1, R 4, R 5	Resistor, 5.6K ohm, 5%, 1/4W	XO-19	U 21, U 22	IC, LM74 1CP	XO-393
R 11, R 12			U 23	IC, LM379S	XO-395
R 2, R 3	Resistor, 2K ohm, 5%, 1/4W	XO-14	U 24	IC, Dual Comparitor, LM 193	XO-396
R 6, R 13	Potentiometer, 10K	XO-108	U 25	Inverter, 7404	XO-402
R 6A, R 7, R 23-R 30	Resistor, 10K ohm, 5%, 1/4W	XO-18	Y 1	Crystal, 3.579545MHZ	XO-456
R 8, R 8A, R 14	Resistor, 1K ohm, 5%, 1/4W	XO-5		Socket 22 Pin Dip	XO-467
R 6B	Resistor, 1.8K ohm, 5%, 1/4W	XO-37		Socket 24 Pin (2)	XO-529
R 9	Resistor, 2.2K ohm, 5%, 1/4W	XO-27		Socket 40 Pin (2)	XO-530
R 10	Resistor, 1.5K ohm, 5%, 1/4W	XO-20			

X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS

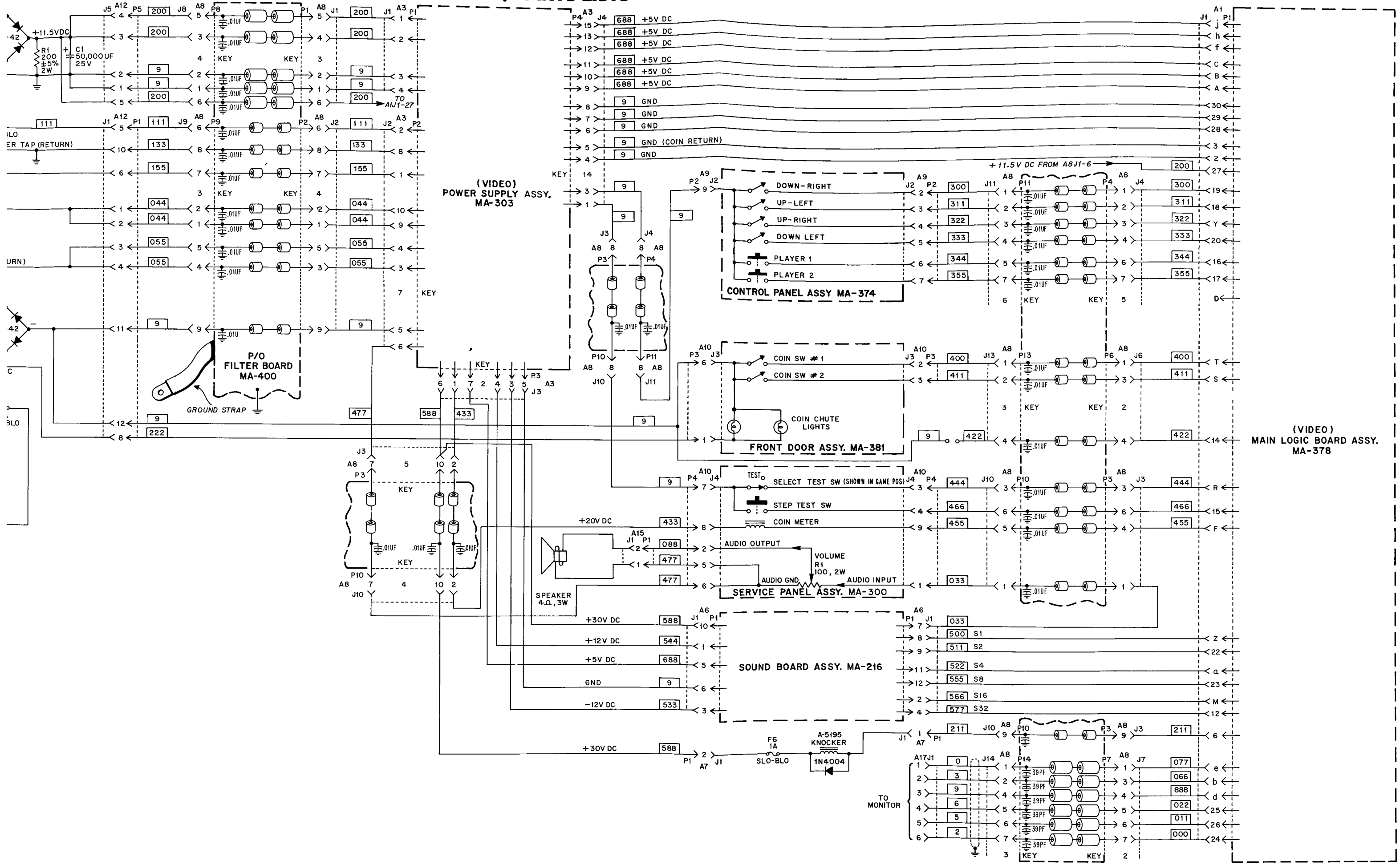


SOUND/SPEECH ASSY. (A6), SCHEMATIC DIAGRAM

X. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS



A. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS



PRIMARY POWER/FILTER BOARD/INTERCONNECTION DIAGRAM