



DRAWING SET

including ...

- block diagrams
- schematics
- assembly diagrams
- parts information

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ELECTRONICS, INC.
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HOW TO USE THIS BOOK

LOCATORS: Most schematics in this drawing set include a system to find signals going from one page to another. To understand the **locator system**, carefully observe: (1) the open arrow (2) its direction (3) the signal name or I.C. and (4) pin no. (U -). The code is:

- 1st digit Sheet no. of schematic (Sht 1 of 2)
- 2nd digit Horizontal reference (A,B,C or D)
- 3rd digit Vertical reference (1,2,3 or 4)

EXAMPLE: The locator IDI on the V.G.G. schematic with the signal name \overline{IF} . It means on sheet 1 (of 5 for the V.G.G.) in the upper right corner you'll find a signal called \overline{IF} . When signals aren't named, often a U - (chip designation) will be included.

CONNECTOR NUMBERS: We continue to use the INTERBOARD WIRING DIAGRAM and its chart to provide the first number in a connector (eg., 10P3-6).

EXAMPLE

WHAT IT MEANS

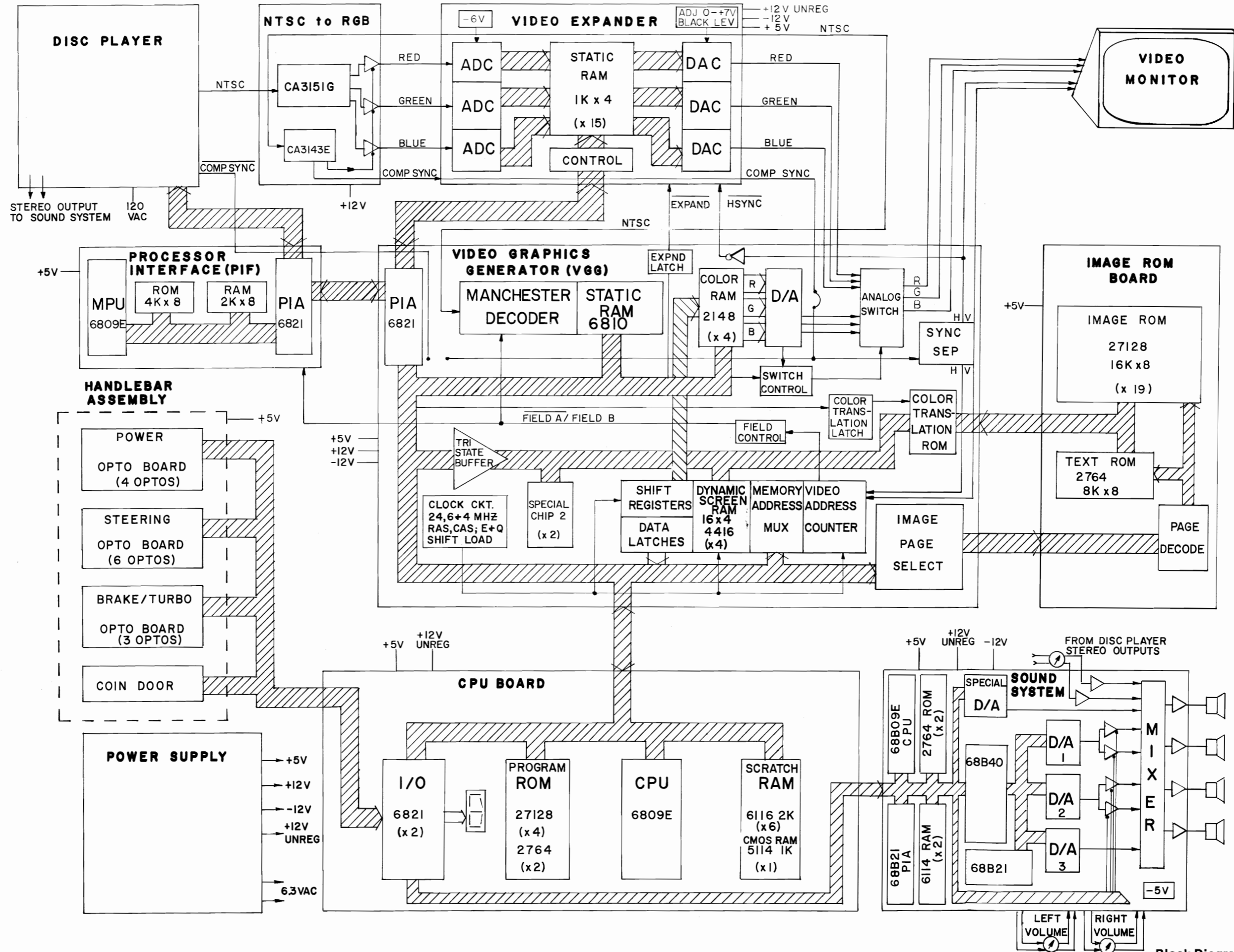
10	1st number = Board or Area
P	Only letter = J jack (male pins) P plug (female pins)
3	Next number = Connector no.
6	Last number = Pin number

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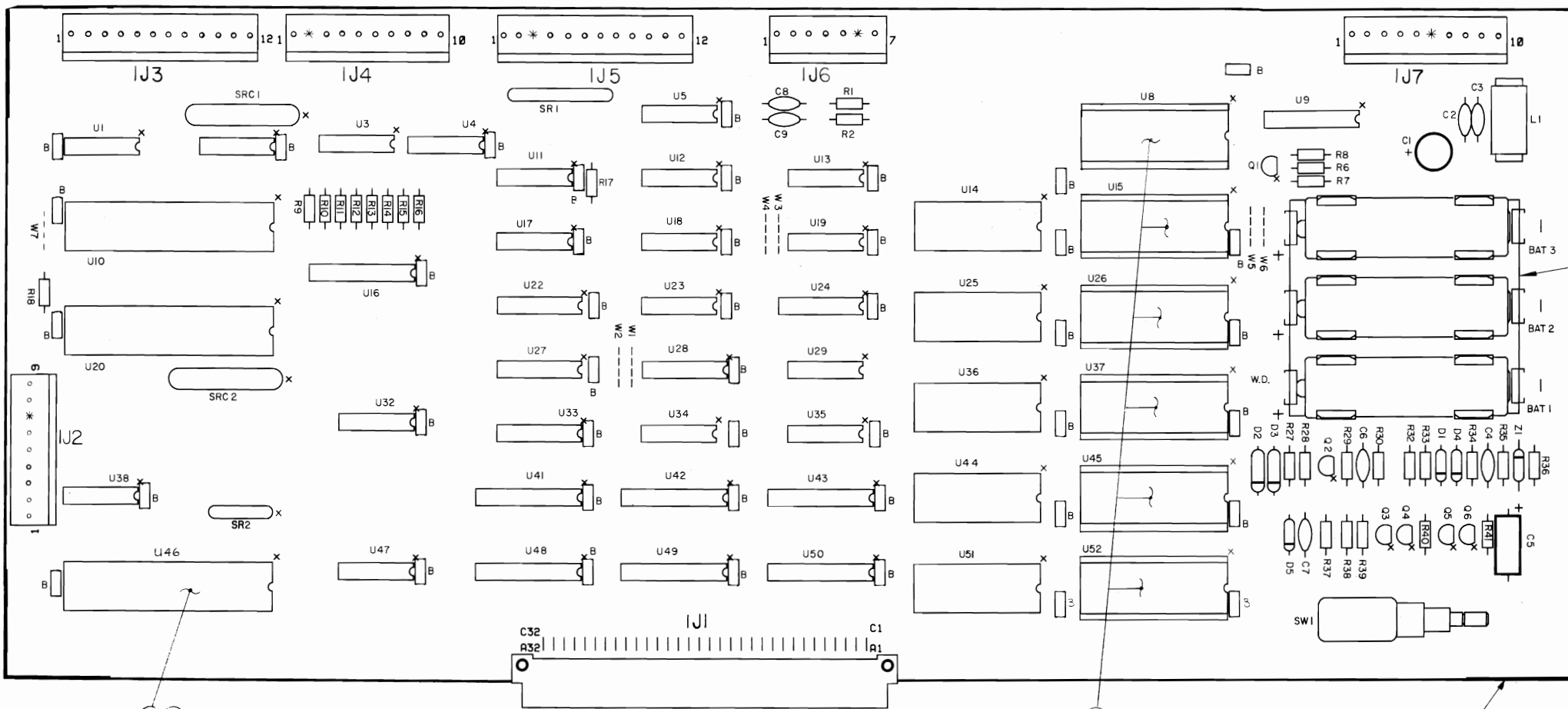
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Interboard, Cabinet, and Power Wiring Diagrams to follow in supplement.

DISCAN SYSTEM BLOCK DIAGRAM



Block Diagram

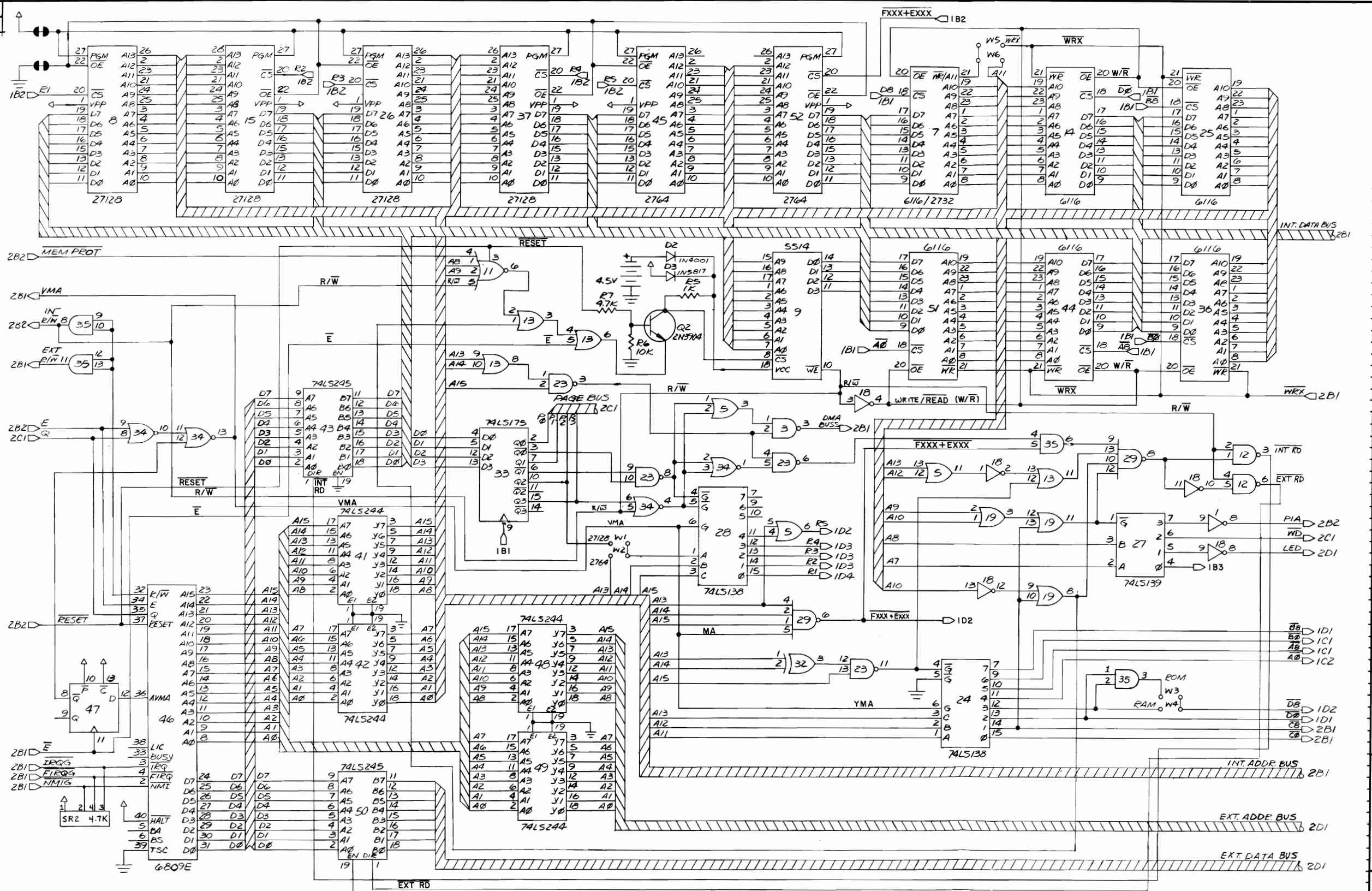


NOTES: 1. 'B' INDICATES BYPASS CAPACITORS.
 2. * INDICATES PIN CUT FOR KEYING.
 3. 'x' INDICATES PIN 1 OR EMITTER (E).

GAME NAME	STAR RIDER				
ASSY. NO.	D-9922				
U8	A-5343-10652				
U15	A-5343-10653				
U26	A-5343-10654				
U37	A-5343-10655				
U45	A-5343-10656				
U52	A-5343-10657				
JUMPERS	W1, W4, W5, W7				

ITEM	PART NO.	PART DESIGNATION	DESCRIPTION	QTY.	ITEM	PART NO.	PART DESIGNATION	DESCRIPTION	QTY.	ITEM	PART NO.	PART DESIGNATION	DESCRIPTION	QTY.
56	5881-09021-00	-	BATTERY HOLDER #17	1	30	5010-10003-00	R39	RESISTOR, 390 OHM 5% 1/4W	1					
55	5880-09022-00	BAT.1, BAT.2, BAT.3	BATTERY, 1.5V AA ALK.	3	29	5010-09224-00	R9 THRU R16	RESISTOR, 270 OHM 5% 1/4 W	8					
54	-	-	-	-	28	5010-09160-00	R30, R32	RESISTOR, 220 OHM, 5% 1/4 W	2					
53	5075-09018-00	Z1	ZENER, 1N5996A 6.8V 5W	1	27	5010-10171-00	R38	RESISTOR, 56 OHM, 5%, 1/4W	1					
52	5070-09266-00	D3	DIODE, 1N5817 1.0 A	1	26	5010-10178-00	R28	RESISTOR, 47 OHM, 5%, 1/4 W	1					
51	5070-06258-00	D2	DIODE, 1N4001 1.0 A	1	25	5010-09039-00	R36	RESISTOR, 10 OHM, 5%, 1/4 W	1					
50	5070-08919-00	D1, D4, D5	DIODE, 1N4148 .5A	3	24	-	-	-	-					
49	-	-	-	-	23	-	-	-	-					
48	5190-09016-00	Q2	TRANSISTOR, 2N4403 PNP	0	22	5430-08972-00	U10, U20	I.C., 6820/21 PIA	2					
	5190-10270-00		TRANSISTOR, 2N3906 PNP	0	21	5400-09490-00	U46	I.C., MPU. 6809E	1					
	5190-10590-00		TRANSISTOR, 2N4126 PNP	1	20	5671-09411-00	U3	DSPL. LED 7 SEG.	1					
47	5140-08938-00	Q1, Q3, Q4	TRANSISTOR, 2N4401 NPN	0	19	5340-09689-00	U9	RAM/S 5514 1K X 4 C	1					
	5140-10269-00	Q5, Q6	TRANSISTOR, 2N3904 NPN	0	18	5340-09878-00	U4, U25, U36, U44, U51	RAM/S 2016 2K X 8	5					
	5160-10589-00		TRANSISTOR, 2N4124 NPN	5	17	5281-09486-00	U16	I.C., 74LS374	1					
46	-	-	-	-	16	5281-09308-00	U43, U50	I.C., 74LS245 TRNCV	2					
45	5251-09822-00	L1	INDUCTOR, 4.7 UH 3A	1	15	5281-09867-00	U41, U42, U48, U49	I.C., 74LS244 OCT. BUF	4					
44	-	-	-	-	14	5281-10043-00	U33	I.C., 74LS175	1					
43	5043-08980-00	C6, C7, B	CAPACITOR, .01M SOV +80/-20	45	13	5281-09735-00	U22	I.C., 74LS161 BIN CTR	1					
	5043-09845-00	C2, C3, C4, C8, C9	CAPACITOR, 1KP SOV +/-20 A	5	12	5281-09246-00	U27	I.C., 74LS139 2-4 DEC.	1					
66	5700-08985-00		SOCKET, I.C. 40 PIN	1	41	5281-09745-00	U24, U28	I.C., 74LS138 DMLTPX	2					
65	5700-10176-00		SOCKET, I.C. 28 PIN	6	40	5281-09737-00	U32	I.C., 74LS86 QUAD XOR	1					
64	-	-	-	-	39	5281-09487-00	U47	I.C., 74LS74 DUAL D F/F	1					
63	5791-09043-00	J3, J5	CONNECTOR, 12H2391 09-65-1121	2	38	566-09396-00	SRC2	SIP, 4.7K OHM 1/2W 8R 1/2C	1					
62	5791-09444-00	J4, J7	CONNECTOR, 18H2391 09-65-1101	2	37	566-10334-00	SRC1	SIP, 1K OHM 1.001MA 8R 1/2C	1					
61	5791-09497-00	J2	CONNECTOR, 9H2391 09-75-1091	1	36	5791-09786-00	SR2	SIP, 4.7K OHM SR 6 5%	1					
60	5791-09497-00	J6	CONNECTOR, 7H2391 09-75-1071	1	35	5019-10387-00	SR1	SIP, 10K OHM, 9R 10 5%	1					
59	5791-10027-00	J1	CONNECTOR, 64 PIN MALE.	1	34	-	-	-	-					
58	-	-	-	-	33	5010-09034-00	R6, R41	RESISTOR, 10K OHM 5% 1/4 W	2					
57	5641-09371-00	SW1	SWITCH, P SPDT 115V, 25A	0	32	5010-08991-00	R17, R7, R18, R33	RESISTOR, 4.7K OHM 5% 1/4 W	4					
	5641-09312-00		SWITCH, P DPDT 100V, 5A.	1	31	5010-09358-00	R1, R2, R6, R27, R29, R34, R35, R31, R40	RESISTOR, 1K OHM 5% 1/4 W	9					
42	-	-	-	-	30	5010-09034-00	R39	RESISTOR, 390 OHM 5% 1/4 W	1					
29	-	-	-	-	29	5010-09224-00	R9 THRU R16	RESISTOR, 270 OHM 5% 1/4 W	8					
28	-	-	-	-	28	5010-09160-00	R30, R32	RESISTOR, 220 OHM, 5% 1/4 W	2					
27	-	-	-	-	27	5010-10171-00	R38	RESISTOR, 56 OHM, 5%, 1/4W	1					
26	-	-	-	-	26	5010-10178-00	R28	RESISTOR, 47 OHM, 5%, 1/4 W	1					
25	-	-	-	-	25	5010-09039-00	R36	RESISTOR, 10 OHM, 5%, 1/4 W	1					
24	-	-	-	-	24	-	-	-	-					
23	-	-	-	-	23	-	-	-	-					
22	-	-	-	-	22	5430-08972-00	U10, U20	I.C., 6820/21 PIA	2					
21	-	-	-	-	21	5400-09490-00	U46	I.C., MPU. 6809E	1					
20	-	-	-	-	20	5671-09411-00	U3	DSPL. LED 7 SEG.	1					
19	-	-	-	-	19	5340-09689-00	U9	RAM/S 5514 1K X 4 C	1					
18	-	-	-	-	18	5340-09878-00	U4, U25, U36, U44, U51	RAM/S 2016 2K X 8	5					
17	-	-	-	-	17	5281-09486-00	U16	I.C., 74LS374	1					
16	-	-	-	-	16	5281-09308-00	U43, U50	I.C., 74LS245 TRNCV	2					
15	-	-	-	-	15	5281-09867-00	U41, U42, U48, U49	I.C., 74LS244 OCT. BUF	4					
14	-	-	-	-	14	5281-10043-00	U33	I.C., 74LS175	1					
13	-	-	-	-	13	5281-09735-00	U22	I.C., 74LS161 BIN CTR	1					
12	-	-	-	-	12	5281-09246-00	U27	I.C., 74LS139 2-4 DEC.	1					
11	-	-	-	-	11	5281-09745-00	U24, U28	I.C., 74LS138 DMLTPX	2					
10	-	-	-	-	10	5281-09737-00	U32	I.C., 74LS86 QUAD XOR	1					
9	-	-	-	-	9	5281-09487-00	U47	I.C., 74LS74 DUAL D F/F	1					
8	-	-	-	-	8	5281-09500-00	U5, U13, U19	I.C., 74LS32 QUAD OR	3					
7	-	-	-	-	7	5280-09551-00	U11	I.C., 7425 DUAL NOR.	1					
6	-	-	-	-	6	5281-10014-00	U17, U29	I.C., 74LS20 NAND 4IP	2					
5	-	-	-	-	5	5281-09743-00	U35	I.C., 74LS08 QUAD AND.	1					
4	-	-	-	-	4	5281-09215-00	U1, U2, U18	I.C., 74LS04 HEX. INV.	3					
3	-	-	-	-	3	5281-09247-00	U34	I.C., 74LS02 QUAD NOR	1					
2	-	-	-	-	2	5281-09499-00	U4, U12, U23, U38	I.C., 74LS00 QUAD NAND	4					
1	-	-	-	-	1	5770-10342-00		BARE P.C. BOARD	1					

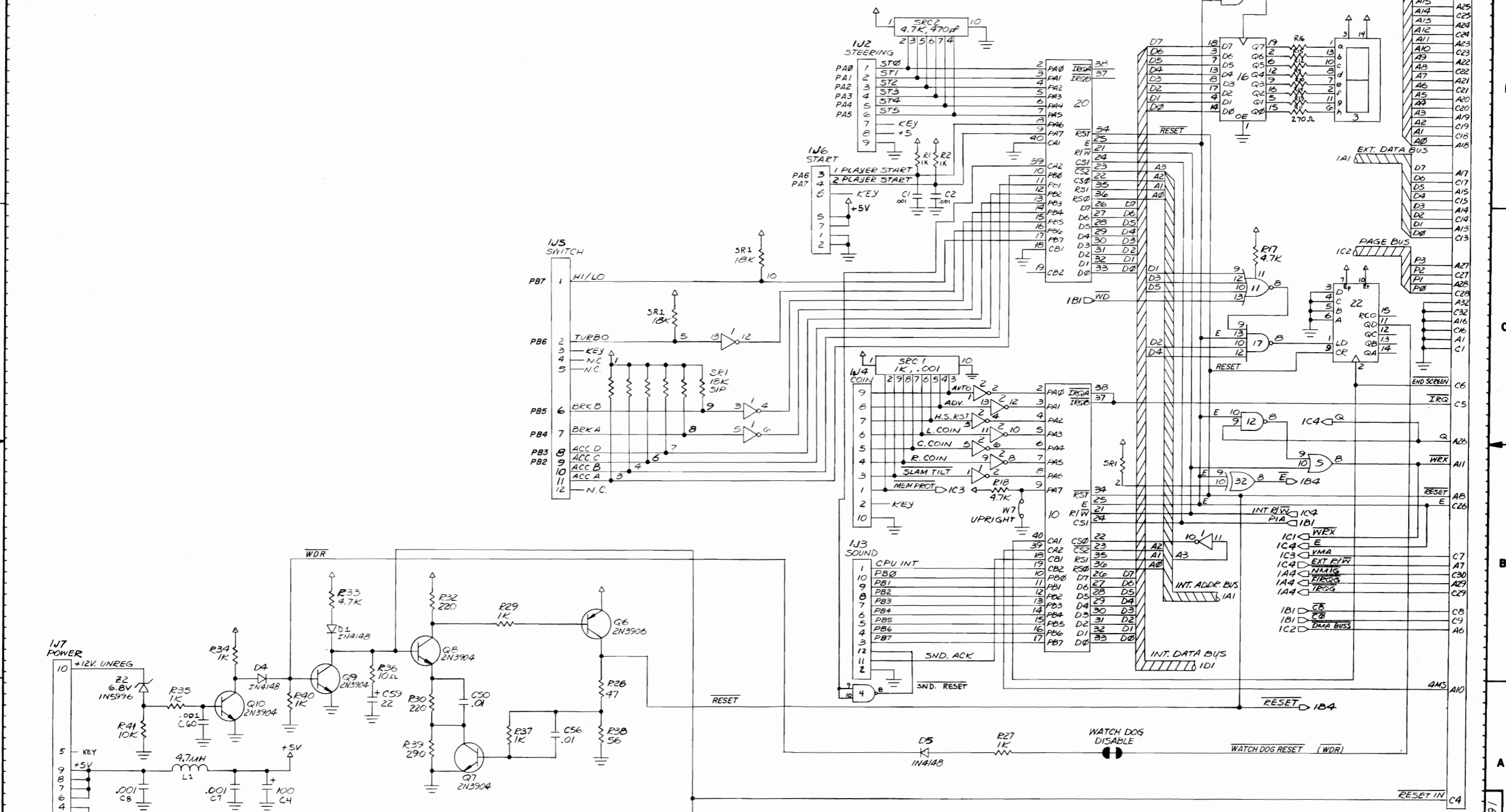
REV	DESCRIPTION OF CHANGE	ECN NO	DATE
1	NPR	12 089	12-7-83



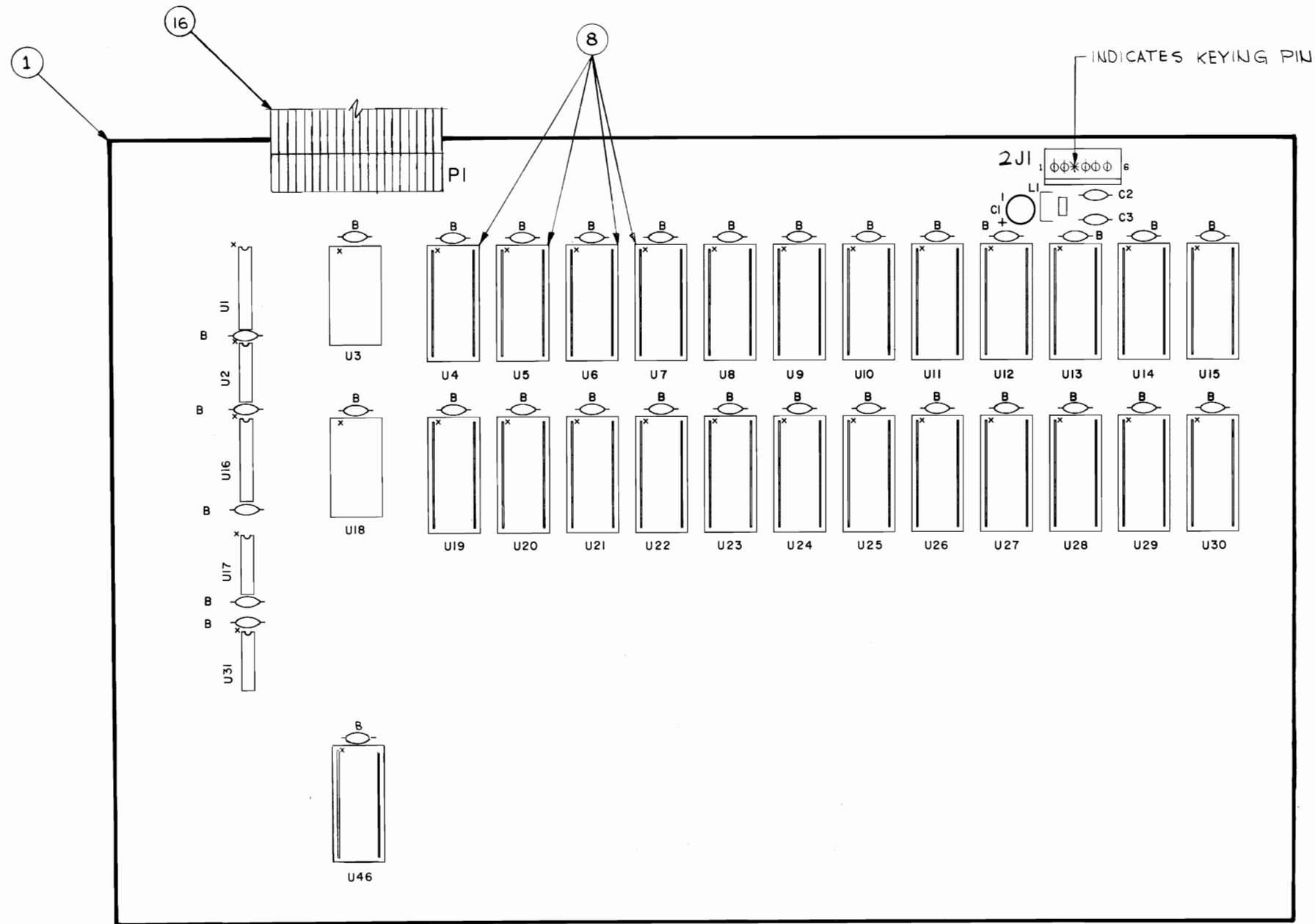
ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY
<p>PROJ ENGR: Don Drygalski DOWN BY: DATE: 11/17/83 CHECKED BY: DATE: 11/17/83 APPROVAL: DATE: 11/17/83</p>							
<p>DO NOT SCALE WORK TO DIMENSIONS SHOWN</p>				<p>REMOVE BURRS - BREAK SHARP EDGES TOLERANCES UNLESS OTHERWISE SPECIFIED FRACTIONAL: ±1/64 ANGULAR: ±1° DECIMAL: ±0.005 FILLETS: 0.020 MAX</p>			
<p>WILLIAMS ELECTRONICS, INC. 3401 N. CALIFORNIA AVE. CHICAGO IL. 60618 NAME: 3016 CPU SCHEMATIC</p>							
SCALE: 1/1		SHT: 1 OF 2		PART NO: 16-5584		REV: 1	

CPU Schematic Sht. 1 of 2

REV	DESCRIPTION OF CHANGE	ECN NO	DATE
NPR		12009	11-1-83



ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY
PROJ ENGR DWN DRNGALSKI		DO NOT SCALE WORK TO DIMENSIONS SHOWN		REMOVE BURRS - BREAK SHARP EDGES		WILLIAMS ELECTRONICS, INC.	
DWN BY DATE 11/17/83		FIRST PROJECT NO 3016		TOLERANCES UNLESS OTHERWISE SPECIFIED FRACTIONAL ±1/64 ANGULAR ±1° DECIMAL ±.005 FILLETS .020 MAX		3401 N. CALIFORNIA AVE. CHICAGO IL 60618	
CHECKED BY DATE 11/17/83		FIRST USAGE DATE 11/17/83		MATERIAL		NAME 3016 CPU SCHEMATIC	
APPROVAL DATE 11/17/83		QTY 1		SCALE 1/1		SHT. 2 OF 2 PART NO. 16-8884 REV	

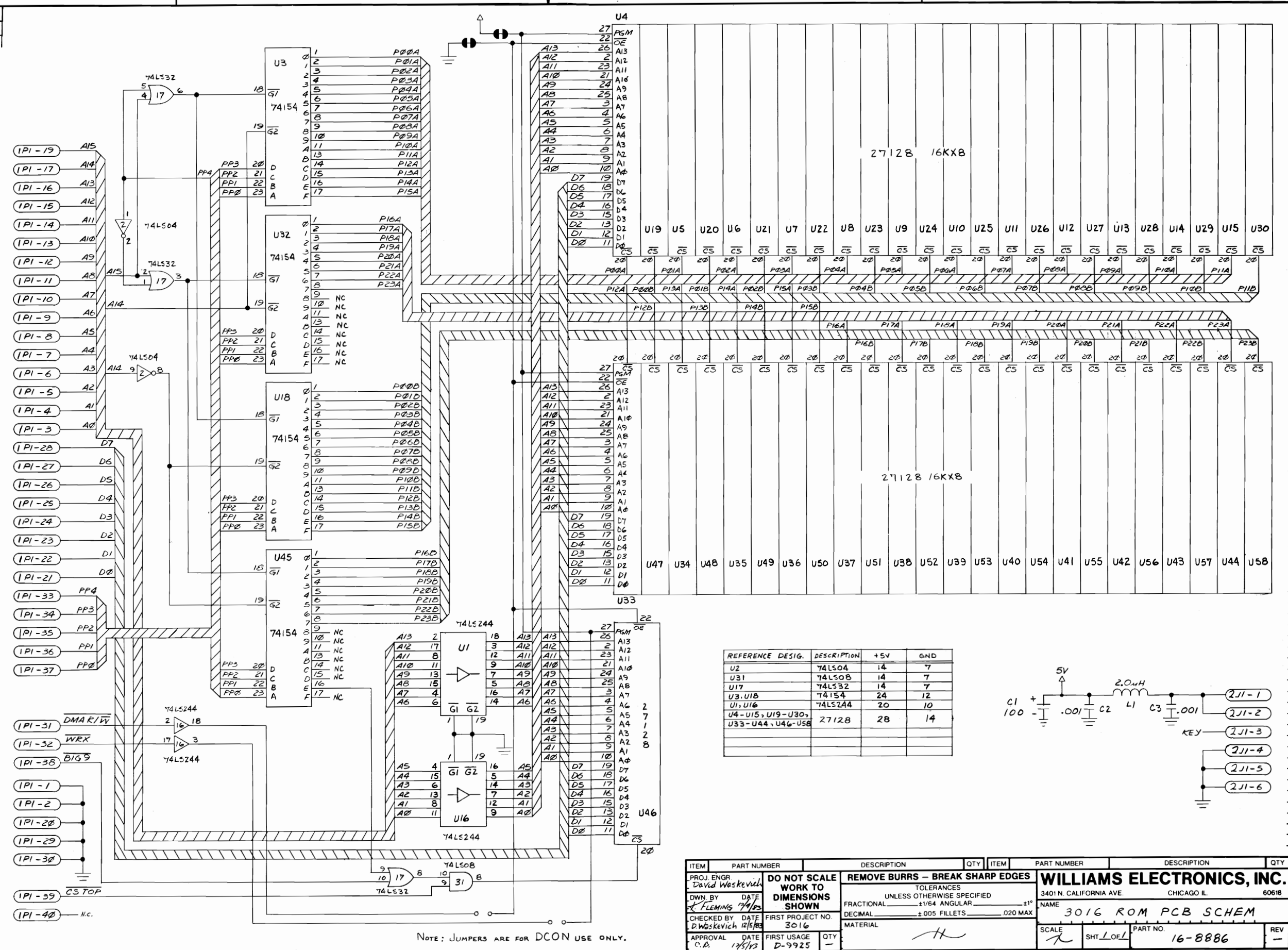


NOTE:
1. FOR SCHEMATIC REFER TO DWG# 16-8886

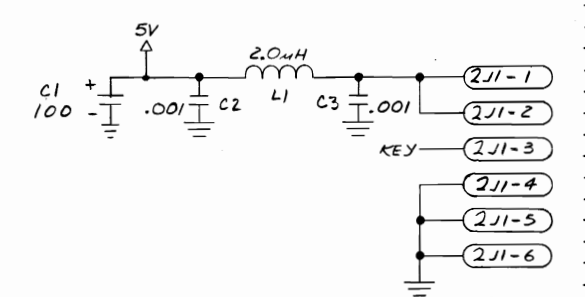
GAME NAME	STAR RIDER
ASSY NO.	D-9926
U4	A-5341-10607
U5	A-5341-10609
U6	A-5341-10611
U7	A-5341-10613
U8	A-5341-10615
U9	A-5341-10617
U10	A-5341-10619
U11	A-5341-10621
U12	A-5341-10623
U13	A-5341-10625
U14	NOT USED
U15	NOT USED
U19	A-5341-10608
U20	A-5341-10610
U21	A-5341-10612
U22	A-5341-10614
U23	A-5341-10616
U24	A-5341-10618
U25	A-5341-10620
U26	A-5341-10622
U27	A-5341-10624
U28	
U29	NOT USED
U30	NOT USED
U46	A-5343-10658
JUMPERS	NONE USED

ITEM	PART No	PART DESIGNATION	DESCRIPTION	QTY
16	5795-09352-00	P1	RIBBON CABLE ASSY., 40 PIN, 3"	1
15	5791-09038-00	J1	6-PIN HEADER 09-65-1061	1
14	---			---
13	5043-09845-00	C2, C3	CAPACITOR, .001 MFD, 50V, ±20%	2
12	5043-08980-00	BYPASS (8)	CAPACITOR, .01 MFD, 50V, +80-20%	32
11	5040-09421-00	C1	CAPACITOR, 100 MFD, 25V, +50-10%	1
10	---			---
9	555-10161-00	L1	INDUCTOR 20μH, 3A	1
8	5700-10176-00		SOCKET 28-PIN IC	25
7	---			---
6	5281-09867-00	U1, U16	IC 74LS244 OCTAL BUFFER	2
5	5280-09010-00	U3, U18	IC 74154 4-16 LINE DECODER	2
4	5281-09500-00	U17	IC 74LS32 QUAD OR	1
3	5281-09743-00	U31	IC 74LS08 QUAD AND	1
2	5281-09215-00	U2	IC 74LS04 HEX INVERTER	1
1	5771-10364-00		BARE P.C BOARD ROM	1

REV	DESCRIPTION OF CHANGE	ECN NO. DATE
		11986 12-6-83



REFERENCE DESIG.	DESCRIPTION	+5V	GND
U2	74LS04	14	7
U31	74LS08	14	7
U17	74LS32	14	7
U3, U18	74LS154	24	12
U1, U16	74LS244	20	10
U4-U15, U19-U30, U33-U44, U46-U58	27128	28	14



NOTE: JUMPERS ARE FOR DCON USE ONLY.

ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY
PROJ ENGR	David Woskevich	DO NOT SCALE WORK TO DIMENSIONS SHOWN		REMOVE BURRS - BREAK SHARP EDGES			
DNW BY	DATE	FLEMING 7/1/83		TOLERANCES UNLESS OTHERWISE SPECIFIED			
CHECKED BY	DATE	D.Woskevich 12/5/83		FRACTIONAL: ±1/64 ANGULAR: ±1°			
APPROVAL	DATE	C.A. 12/5/83		DECIMAL: ±.005 FILLETS: .020 MAX			
FIRST USAGE		D-9925		MATERIAL			
WILLIAMS ELECTRONICS, INC.				3401 N. CALIFORNIA AVE. CHICAGO IL. 60618			
NAME				3016 ROM PCB SCHEM			
SCALE				SHT. LOCL			
PART NO.				16-8886			
REV				-			

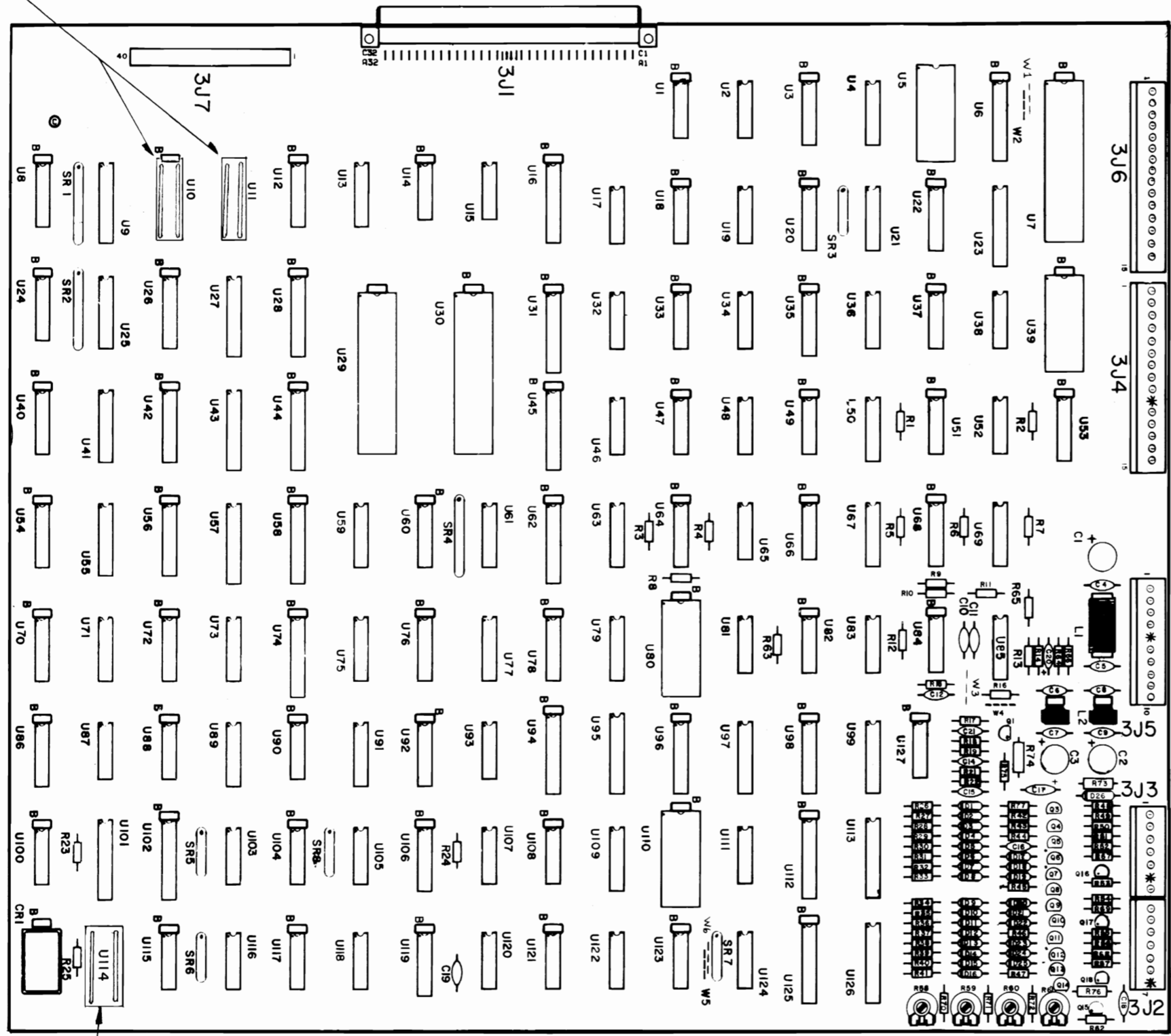
NOTES:

- RESISTOR, 4.7K OHM 1/4W
R1, R2, R3, R4, R5, R6, R7, R8,
R9, R11, R63
- CAPACITORS, .001 UF
C4, C5, C6, C7, C8, C9, C10, C11,
C14, C15
- TRANSISTORS, 2N3904
Q1, Q3, Q5, Q6, Q7, Q9, Q10,
Q12, Q13, Q16, Q17, Q18,
- DIODES, IN4148
D1, D2, D3, D4, D5, D6, D7, D8,
D9, D10, D11, D12, D13, D14, D15,
D16, D17, D18, D19, D20, D21, D22,
D23, D24, D25
- I.C.S, 74LS161
U3, U20, U53, U63, U64, U67,
U68, U69, U79, U91, U92, U106,
U119
- I.C.S, 74LS244
U6, U9, U28, U31, U44, U45,
U58, U62, U95, U108

GAMENAME	STAR RIDER
ASSY. NO.	D-9924
U10	A-5282-10595
U11	A-5282-10595
U114	A-5282-10295
ITEM 4	W1, W3, & W5

ITEM	PART NO.	PART DESIGNATION	DESCRIPTION	QTY.	ITEM	PART NO.	PART DESIGNATION	DESCRIPTION	QTY.	ITEM	PART NO.	PART DESIGNATION	DESCRIPTION	QTY.	ITEM	PART NO.	PART DESIGNATION	DESCRIPTION	QTY.
	90	—				60	5283-10551-00	U115	I.C., 74F00 NAND	1	30	5019-09786-00	SR3, SR5, SR6, SR7, SR8	SIP 4.7K 5R	5				
	89	5281-09746-00	U22	I.C., 74LS368 Hex Inverter	1	59	5281-09499-00	U2, U51, U90, U108, U118, U122	I.C., 74LS00 NAND	6	29	5019-09362-00	SR1, SR4	SIP 4.7K 9R	2				
	88	5281-09486-00	U23, U94, U113, U126	I.C., 74LS374 D Flip Flop 3 State	4	58	5340-10018-00	U96, U97, U98, U99	I.C., 2148 RAM	4	28	5019-09669-00	SR2	SIP 1K 9R	1				
	87	5283-10470-00	U101	I.C., 74F374 D Flip Flop 3 State	1	57	5310-10498-00	U85	I.C., 4049 UB Hex Inverter	1	27	5010-08846-00	R66	RESISTOR, 220K OHM 1/4W	1				
	86	5281-09856-00	U27, U43, U57	I.C., 74LS373 Transparent Latch	3	56	5340-10344-00	U25, U26, U41, U42, U55, U56	I.C., 4416 D-RAM	6	26	5010-10271-00	R16	RESISTOR, 110K OHM 1/4W	1				
	85	5281-10479-00	U50, U109	I.C., 74LS279 Set / Reset Latch	2	55	A-5410-10083	U29, U30	I.C., DMA (NON-INVERTING)	2	25	5013-10548-00	R77	RESISTOR, 20K OHM 1/4W 2%	1				
	84	5281-09308-00	U16, U112, U125	I.C., 74LS245 Octal Bus Transceiver	3	54	5340-09003-00	U5	I.C., 6810 Static Ram	1	24	5010-09034-00	R13	RESISTOR, 10K OHM 1/4W	1				
	83	5281-09867-00	SEE NOTE 6	I.C., 74LS244 Octal Driver	10	53	5430-08972-00	U7	I.C., 6821 PIA	1	23	5013-10545-00	R26, R30, R34, R38	RESISTOR, 8.2K OHM 1/4W 2%	4				
	82	5281-09733-00	U12, U13	I.C., 74LS174 Hex D Flip Flop	2	52	A-5282-10637	U74	I.C., M PROM (HMI-6349-2)	1	22	5010-10000-00	R15	RESISTOR, 3.9K OHM 1/4W	1				
	81	5280-09668-00	U8, U24, U40, U54	I.C., 8 bit Serial In / Parallel Out Shift Register	4	51	—			—	21	5010-08991-00	SEE NOTE 1	RESISTOR, 4.7K OHM 1/4W	11				
	80	5281-10447-00	U38	I.C., 8 bit Serial In / Parallel Out Shift Reg.	1	50	—			—	20	5013-10543-00	R27, R31, R35, R39	RESISTOR, 3.9K OHM 1/4W 2%	4				
	79	5281-09735-00	SEE NOTE 5	I.C., 74LS161 4 bit Binary Counter	13	49	5551-10161-00	L2, L3	COIL, 2 UH	2	19	5010-10256-00	R10	RESISTOR, 2.4K OHM 1/4W	1				
	78	5281-09738-00	U4, U21, U78	I.C., 74LS157 2 input Mux.	3	48	5551-09822-00	L1	COIL 4.7 UH 3A	1	18	5010-08998-00	R65	RESISTOR, 2.2K OHM 1/4W	1				
	77	5280-09010-00	U39, U80, U110	I.C., 74154 4 to 16 Decoder	3	47	—			—	17	5010-10205-00	R28, R32, R36, R40, R62	RESISTOR, 2K OHM 1/4W 2%	5				
	76	5280-09481-00	U70, U71, U72, U73	I.C., 74153 4 input Multiplexer	4	46	5070-06258-00	D26	DIODE, IN4001	1	16	5010-09117-00	R42	RESISTOR, 1.8K OHM 1/4W 2%	1				
	75	5281-09246-00	U86, U89	I.C., 74LS139 1 of 4 Decoder/De Mux	2	45	5070-08919-00	SEE NOTE 4	DIODE, IN4148	25	15	5013-10635-00	R43	RESISTOR, 1.6K OHM 1/4W 2%	1				
	74	5281-09745-00	U35	I.C., 74LS138 1 of 8 Decoder/De Mux	1	44	—			—	14	5010-09428-00	R45, R46, R47, R52, R54, R56	RESISTOR, 1.5K OHM 1/4W 2%	6				
	73	5281-09737-00	U49	I.C., 74LS86 Exclusive OR	1	43	5190-10270-00	Q4, Q8, Q11, Q14, Q15	TRANSISTOR, 2N3906	5	13	5010-10204-00	R29, R33, R37, R41	RESISTOR, 1K OHM 1/4W 2%	4				
	72	5281-09853-00	U59, U60, U61, U75, U76, U77	I.C., 74LS85 4 bit Mag. Comparator	6	42	5160-10269-00	SEE NOTE 3	TRANSISTOR, 2N3904	12	12	5010-09358-00	R18, R19, R21, R22, R24, R53, R55, R57	RESISTOR, 1K OHM 1/4W	8				
	71	5281-09487-00	U32, U88, U104, U111, U116, U117, U123	I.C., 74LS74 D type Flip Flop	7	41	—			—	11	5010-09061-00	R73	RESISTOR, 680 OHM 1/2W	1				
	70	5282-10190-00	U103, U124	I.C., 74LS74 D type Flip Flop	2	40	5040-09421-00	C1, C2, C3	CAPACITOR, 100 UF RADIAL	3	10	5010-09033-00	R14	RESISTOR, 680 OHM 1/4W	1				
	69	5280-09309-00	U34	I.C., 7407 Buffer	1	39	5041-09163-00	C17	CAPACITOR, 2.2 UF TANT	1	9	5010-10437-00	R44, R48, R50	RESISTOR, 470 OHM 1/4W 2%	3				
	68	5280-09551-00	U107	I.C., 7425 DUAL NOR	1	38	5041-09031-00	C20	CAPACITOR, 1 UF TANT	1	8	5010-09001-00	R17	RESISTOR, 330 OHM 1/4W	1				
	67	5281-09500-00	U1, U46, U47, U52, U66, U93, U100, U127	I.C., 74LS32 2 input OR	8	37	5043-08996-00	C21	CAPACITOR, .1 UF	1	7	5010-09508-00	R49, R51	RESISTOR, 270 OHM 1/4W 2%	2				
	66	5281-10014-00	U14, U81, U105	I.C., 74LS20 4 input NAND	3	36	5043-08980-00	B	CAPACITOR, .01 UF	68	6	5010-09361-00	R76	RESISTOR, 220 OHM 1/2W	1				
	65	5281-09851-00	U84	I.C., 74LS14 Hex Schmitt Trigger	1	35	5043-09845-00	SEE NOTE 2	CAPACITOR .001 UF	10	5	5010-09768-00	R10, R11, R72	RESISTOR, 180 OHM 1/4W	3				
	64	5281-09235-00	U18, U33, U82	I.C., 74LS10 3 input NAND	3	34	5043-09065-00	C18, C19	CAPACITOR, 470 PF	2	4	5010-09187-00	R74	RESISTOR, 150 OHM 1/2W	1				
	63	5281-09743-00	U19, U87	I.C., 74LS08 AND	2	33	5043-09492-00	C16	CAPACITOR, 100 PF	1	3	5010-09036-00	R23, R25, R64, R67, R68, R69	RESISTOR, 100 OHM 1/4W	6				
	62	5281-09215-00	U17, U37, U48, U83, U120	I.C., 74LS04 Hex Inverter	5	32	—			—	2	5010-09548-00	R75	RESISTOR, 68 OHM 1/4W 2%	1				
	61	5281-09247-00	U15, U36, U65, U121	I.C., 74LS02 NOR	4	31	5015-10419-00	R58, R59, R60, R61	RESISTOR, 500 OHM VARIABLE	4	1	5777-10363-00		BARE P.C. BOARD	1				

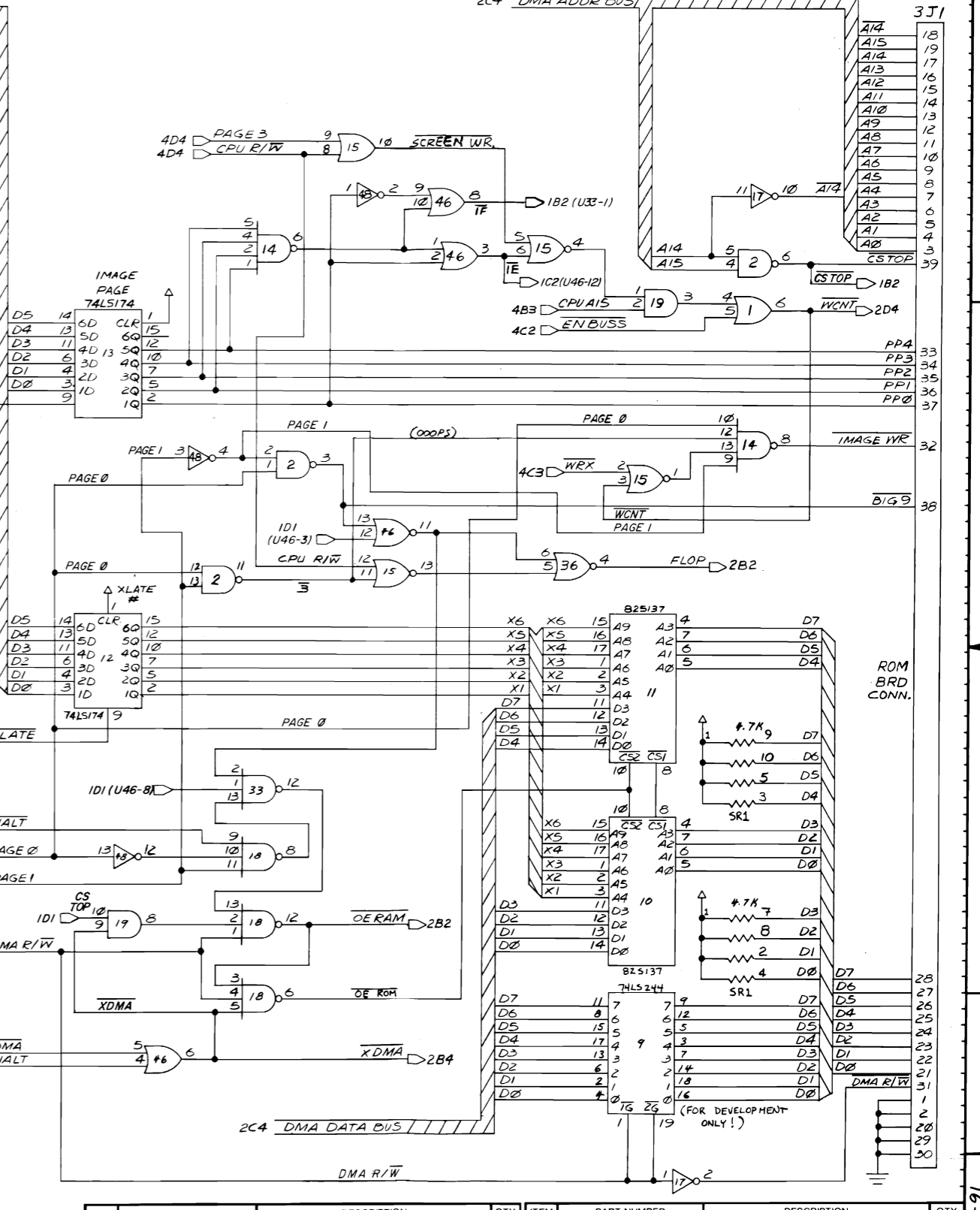
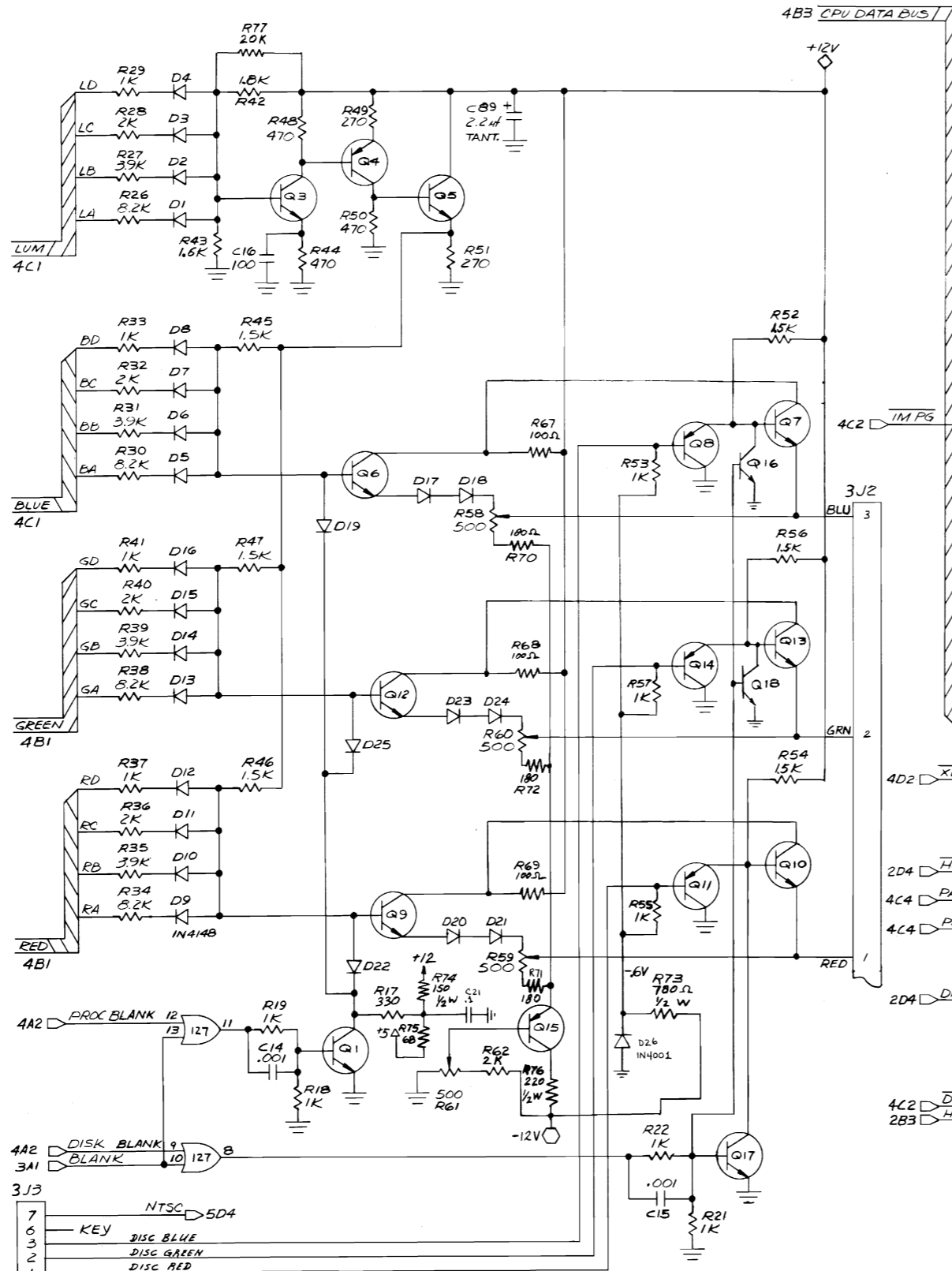
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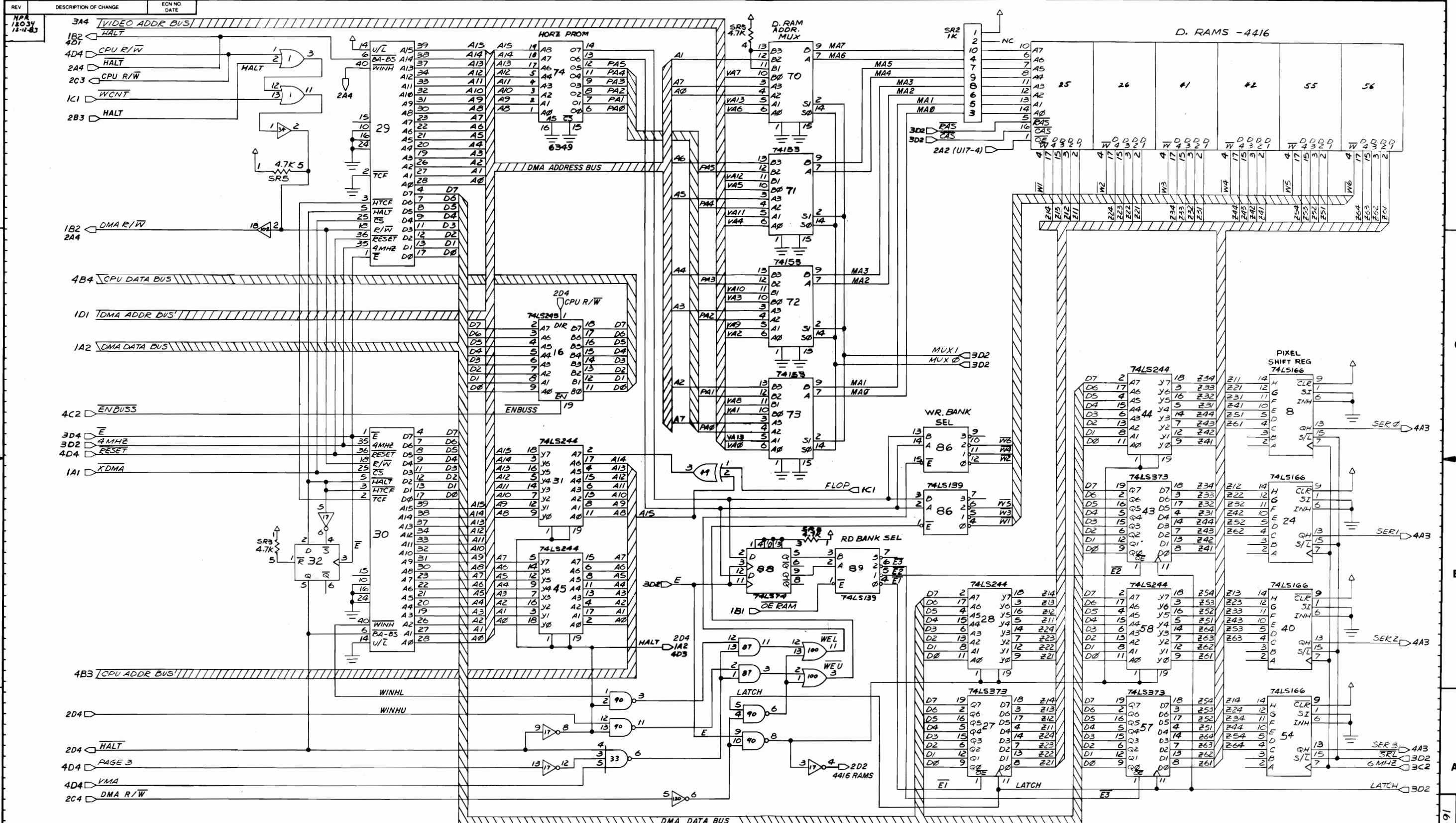
NOTES: 1. 'B' INDICATES BYPASS CAPACITOR.
 2. '*' INDICATES PIN CUT FOR KEYING.
 3. '•' INDICATES PIN | OR EMITTER 'E'.

66

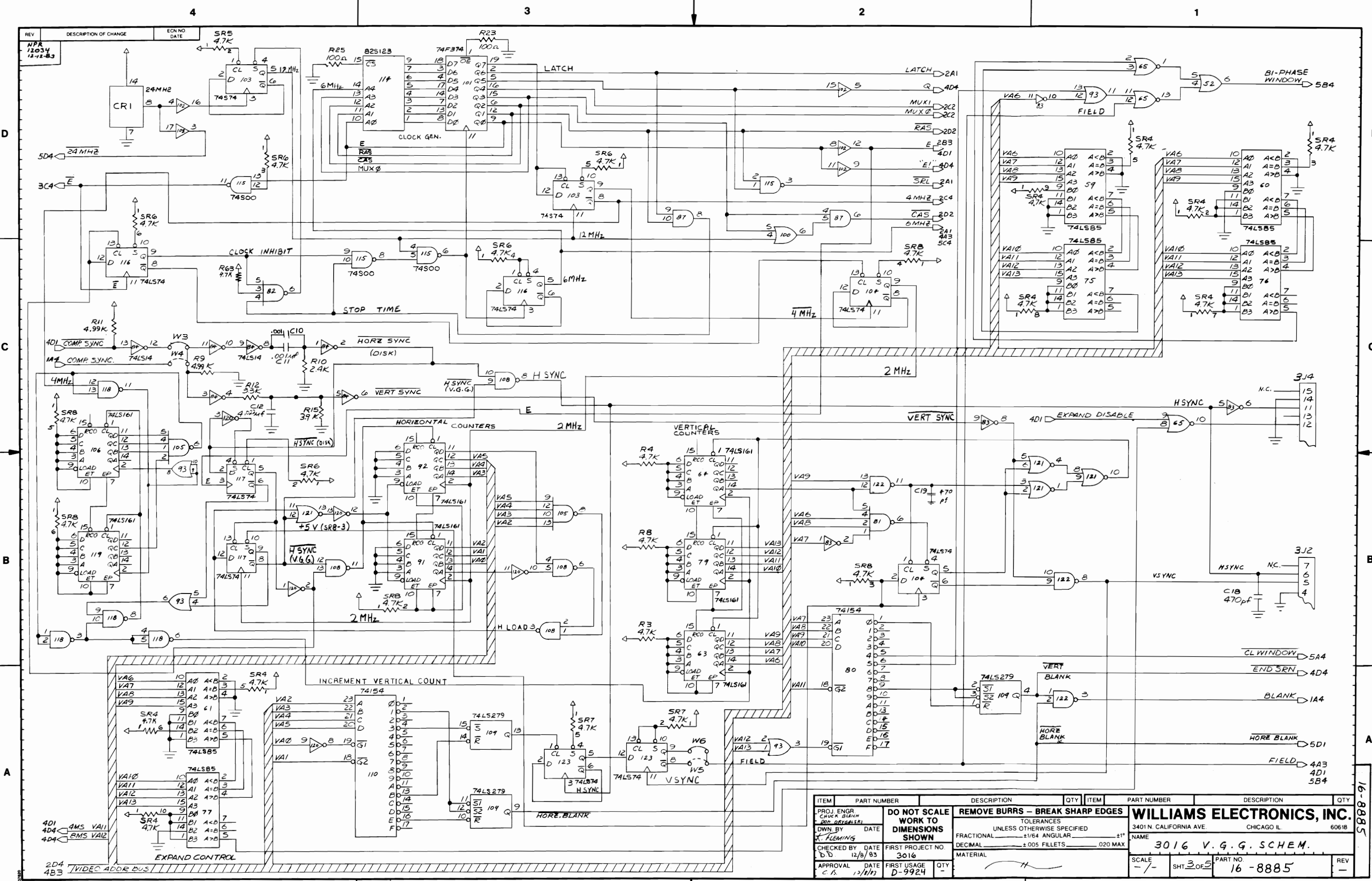
REV	DESCRIPTION OF CHANGE	ECN NO	DATE
NPA		12034	12-12-83



ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY
PROJ ENGR	CHUCK BLENCH	DO NOT SCALE WORK TO DIMENSIONS SHOWN		REMOVE BURRS - BREAK SHARP EDGES			
CHK'D BY	DATE	TOLERANCES UNLESS OTHERWISE SPECIFIED		WILLIAMS ELECTRONICS, INC.			
CHECKED BY	DATE	FRACTIONAL ±1/64 ANGULAR ±1°		3401 N. CALIFORNIA AVE. CHICAGO IL. 60618			
APPROVAL	DATE	DECIMAL ±.005 FILLETS .020 MAX		NAME 3016 V.G.G. SCHEM.			
		MATERIAL		SCALE SHT 1 OF 5 PART NO 16-8885 REV			
		FIRST PROJECT NO. 3016					
		FIRST USAGE D-9924					

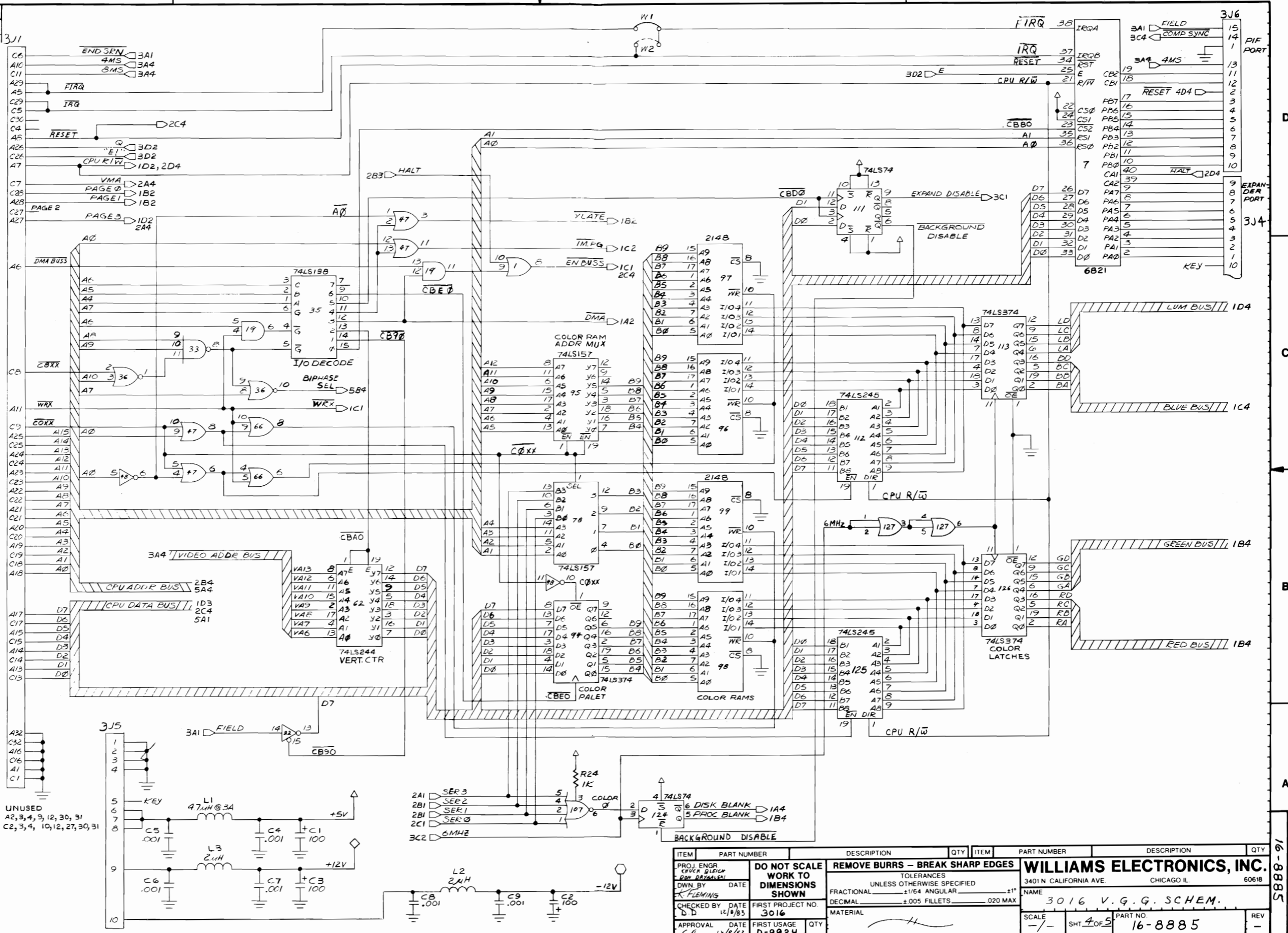


ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY
PROJ ENGR		DO NOT SCALE		REMOVE BURRS - BREAK SHARP EDGES		WILLIAMS ELECTRONICS, INC.	
CHKR DESIG		WORK TO		TOLERANCES		3401 N. CALIFORNIA AVE. CHICAGO IL. 60618	
OWN BY DATE		DIMENSIONS		UNLESS OTHERWISE SPECIFIED		NAME	
S. FLEMING		SHOWN		FRACTIONAL ±1/64 ANGULAR ±1°		3016 V.G.G. SCHEM.	
CHECKED BY DATE		FIRST PROJECT NO.		DECIMAL ±.005 FILLETS .020 MAX		SCALE	
D.D. 12/8/83		3016		MATERIAL		SHT 2 OF 2 PART NO	
APPROVAL DATE		FIRST USAGE		QTY		16-8885	
C.B. 12/8/83		D-9924		-		REV -	



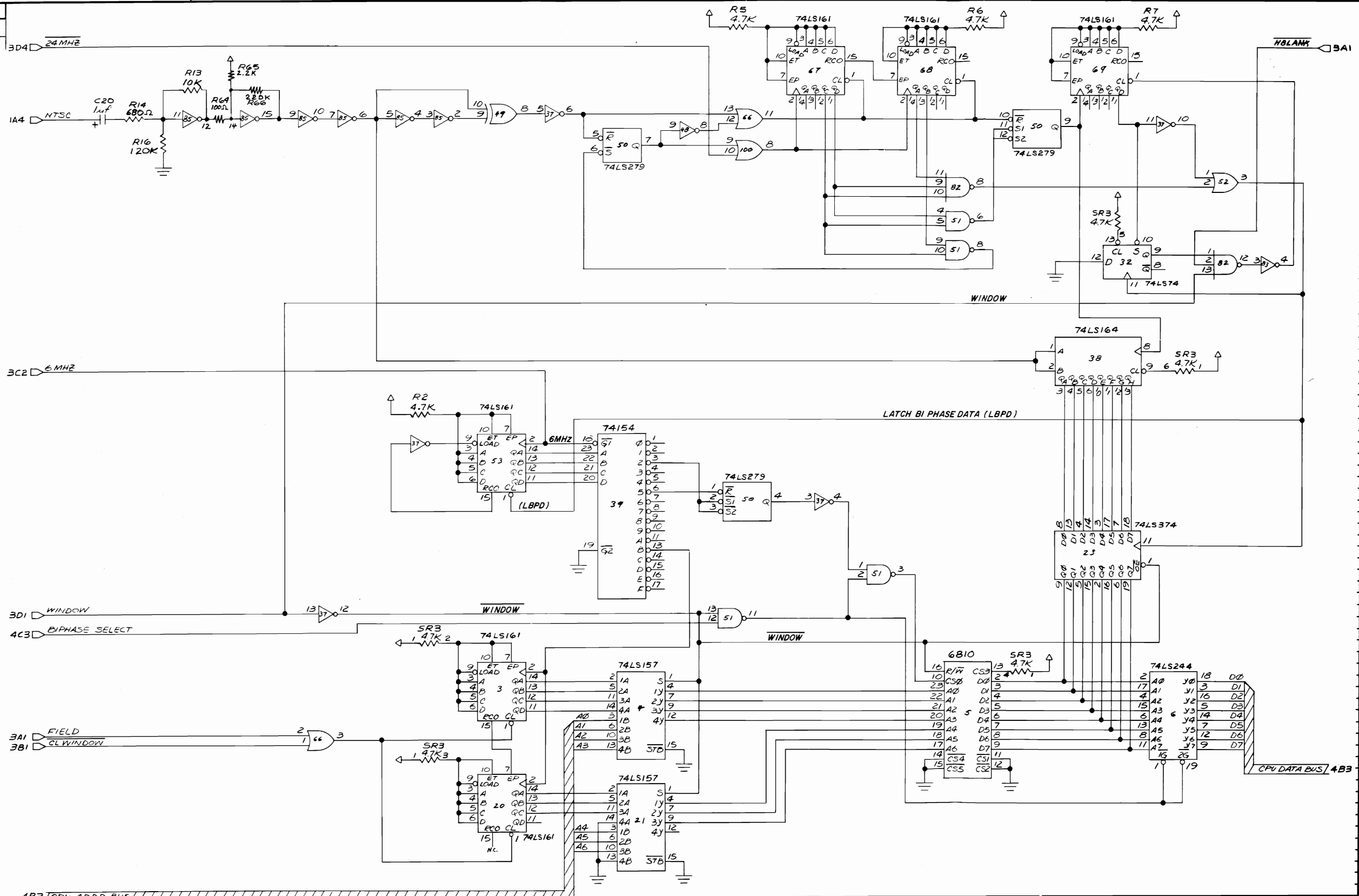
ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY
PROJ ENGR	CHUCK GLENN	DO NOT SCALE		WILLIAMS ELECTRONICS, INC. 3401 N. CALIFORNIA AVE. CHICAGO IL 60618 NAME: 3016 V.G.G. SCHEM.			
CHK'D BY	DATE	WORK TO DIMENSIONS SHOWN					
CHECKED BY	DATE	FIRST PROJECT NO.		SCALE: - / - SHT 3 OF 5 PART NO: 16-8885 REV: -			
APPROVAL	DATE	FIRST USAGE	QTY				

REV	DESCRIPTION OF CHANGE	ECN NO.	DATE
NPA		12034	12-18-83



ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY
PROJ ENGR	DO NOT SCALE	REMOVE BURRS - BREAK SHARP EDGES		WILLIAMS ELECTRONICS, INC.			
CHECK DIRCH	WORK TO	TOLERANCES		3401 N. CALIFORNIA AVE. CHICAGO IL. 60618			
DOWN BY	DIMENSIONS	UNLESS OTHERWISE SPECIFIED		NAME 3016 V.G.G. SCHEM.			
CHECKED BY	SHOWN	FRACTIONAL ±1/64 ANGULAR ±1°		SCALE - / - SHT 4 OF 5 PART NO. 16-8885 REV -			
DATE 12/18/83	FIRST PROJECT NO. 3016	DECIMAL ±.005 FILLETS .020 MAX					
APPROVAL DATE 12/18/83	FIRST USAGE D-9924	MATERIAL					

REV	DESCRIPTION OF CHANGE	ECN NO.	DATE
	NPR	12034	12-12-83
A	R66 WAS 210K		



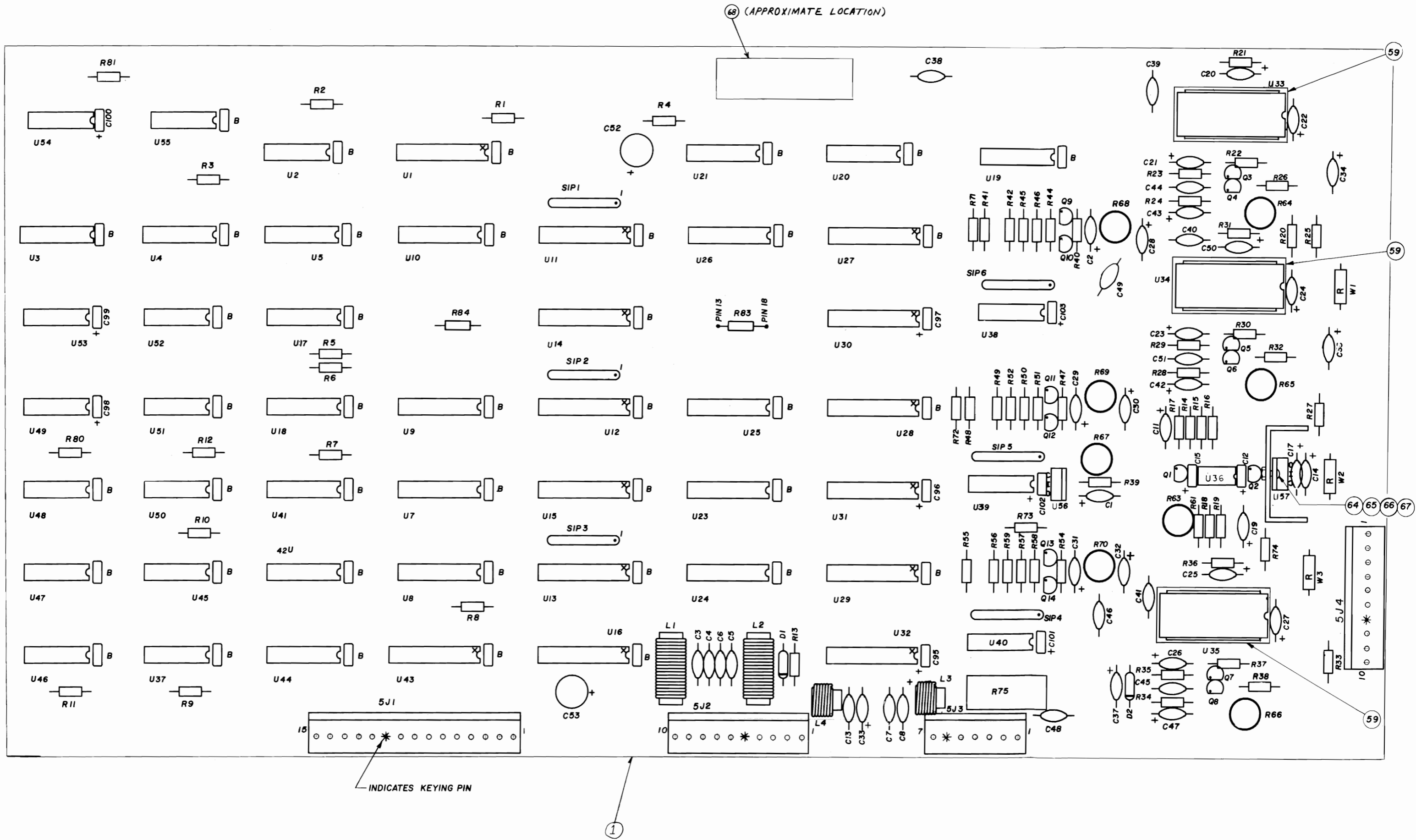
ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY
PROJ ENGR CHUCK BLECH		DO NOT SCALE		REMOVE BURRS - BREAK SHARP EDGES		WILLIAMS ELECTRONICS, INC.	
DWN BY S. FLEMING		WORK TO DIMENSIONS SHOWN		TOLERANCES UNLESS OTHERWISE SPECIFIED		3401 N. CALIFORNIA AVE. CHICAGO IL 60618	
CHECKED BY D.D.		FIRST PROJECT NO. 3016		FRACTIONAL ±1/64 ANGULAR ±1°		NAME 3016 V.G.G. SCHEM.	
APPROVAL DATE C.H. 12/18/83		FIRST USAGE D-9924		DECIMAL ±.005 FILLETS .020 MAX		SCALE -/- SHT 3 OF 5 PART NO. 16-8885	
				MATERIAL		REV A	

NOTES:

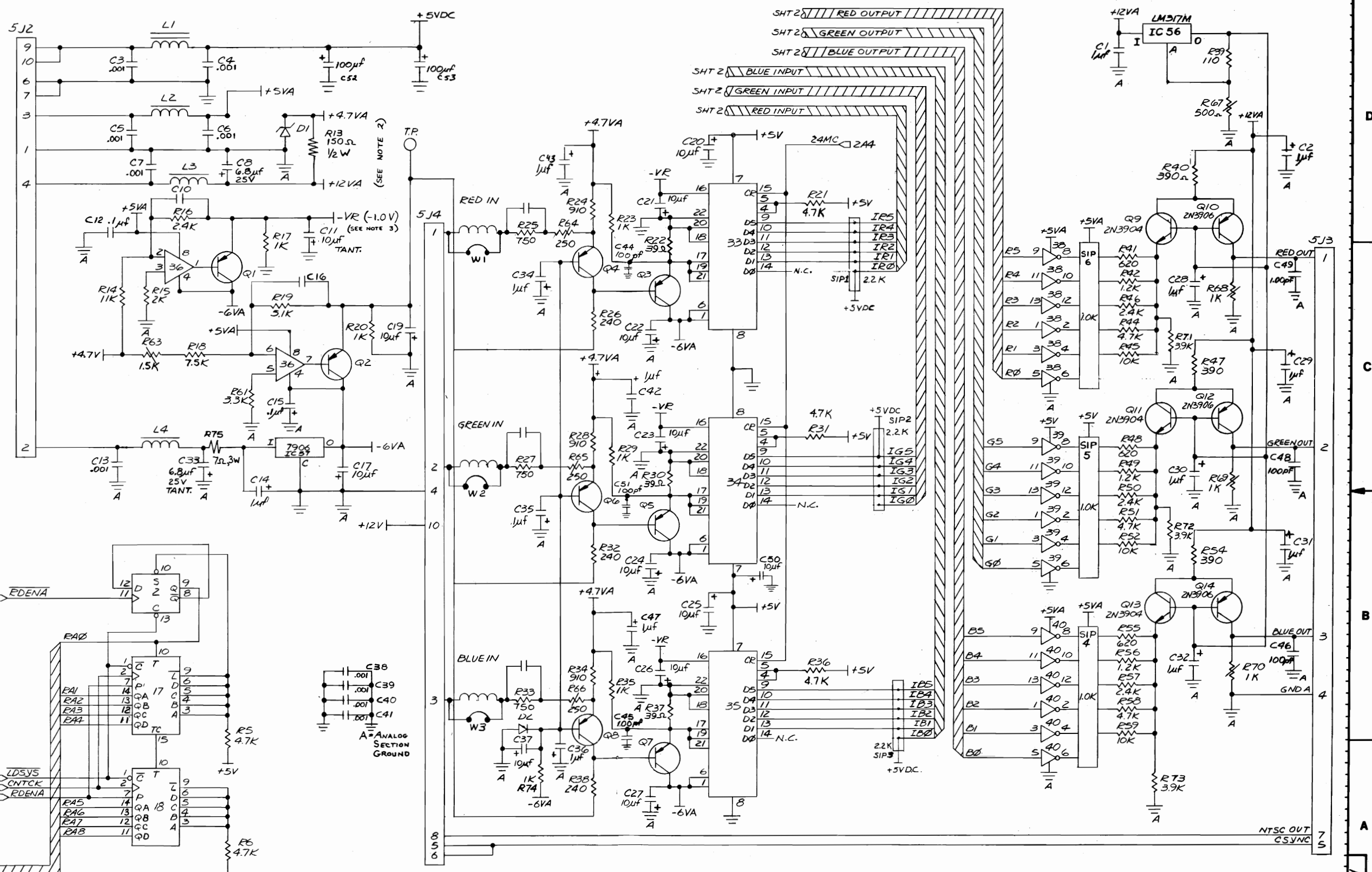
1. 1.KPF CAPS.
C3, C4, C5, C6, C7, C13, C38,
C39, C40, C41.
2. "B" BYPASS CAPS. .01MF ON IC'S
NUMBER 1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13,
14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 25, 26,
27, 28, 29, 37, 42, 43, 44, 45, 46, 47, 48, 50,
51, 52, 55
3. 10MF CAPS.
C11, C17, C19, C20, C21, C22, C23, C24, C25,
C26, C27, C37, C50.
4. 1MF CAPS.
C2, C12, C14, C15, C29, C30, C31, C32, C34,
C38, C42, C43, C47, C95, C96, C97, C98,
C99, C100, C101, C102, C103, C1, C28, C35
5. TRANSISTORS 2N4126
Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8, Q12, Q14, Q10
6. RESISTORS 1.0K 1/4W 5%
R17, R20, R23, R29, R35, R74, R83, R84
7. RESISTORS 4.7K 2%
R1, R2, R3, R4, R5, R6, R7, R8, R9, R10, R11,
R12, R21, R31, R36, R44, R51, R58, R80, R81
8. IC 2148 S.RAMS
U7, U8, U9, U10, U23, U24, U25,
U26.
9. IC 74F374
U11, U12, U13, U14, U15, U16, U27,
U28, U29, U30, U31, U32.
10. IC 74F74
U2, U37, U45, U46, U47, U50,
U51, U54, U55

ITEM	PART NO.	PART DESIGNATION	DESCRIPTION	QTY.	ITEM	PART NO.	PART DESIGNATION	DESCRIPTION	QTY.	ITEM	PART NO.	PART DESIGNATION	DESCRIPTION	QTY.
				55	5041-10588-00	C8, C33	CAPACITOR, 6.8M 25V 20%	2	25	5012-10586-00	R75	RESISTOR, 7 OHMS 3W	1	
				54	5041-09243-00	SEE NOTE 3	CAPACITOR, 10M 10V +/-10	13	24	5010-10206-00	R40, R47, R54	RESISTOR, 390 OHMS 1/4W 2%	3	
				53	5041-09031-00	SEE NOTE 4	CAPACITOR, 1M 25V +/-20	25	23	5010-10204-00	SEE NOTE 6	RESISTOR, 1.0K OHMS 1/4W 2%	8	
				52	5040-09421-00	C52, C53	CAPACITOR, 100M 25V +50-10	2	22	5010-09534-00	W1, W2, W3	RESISTOR, 0 OHMS	3	
				51	5075-10476-00	D1	DIODE, ZENER 1N5230B	1	21	—			—	
				50	5070-08919-00	D2	DIODE, SILICON 1N4148	1	20	5010-09212-00	R22, R30, R37	RESISTOR, 39 OHMS 1/4W 5%	3	
				49	5190-10590-00	SEE NOTE 5	TRANSISTOR, 2N4126	11	19	5010-09187-00	R13	RESISTOR, 150 OHMS 1/4W 5%	1	
				48	5160-10589-00	Q9, Q11, Q13	TRANSISTOR, 2N4124	3	18	5013-10497-00	SEE NOTE 7	RESISTOR, 4.7K OHMS 1/4W 2%	20	
				47	5551-10161-00	L3, L4	COIL, 2μh 3A	2	17	5010-08983-00	R61	RESISTOR, 3.3K OHM 1/4W 5%	1	
				46	5551-09822-00	L1, L2	COIL, 4.7μh 3A	2	16	5280-09489-00	U17, U18	IC, 9316 CNTR	2	
				45	5019-10601-00	SIP1, SIP2, SIP3	SIP, 2.2K OHMS 7R 8P 5%	3	15	5521-10421-00	U53	IC, OSC 48MHZ 1%	1	
				44	5019-10600-00	SIP4, SIP5, SIP6	SIP, 1K OHMS 7R 8P 5%	3	14	5250-10478-00	U56	REGULATOR, LM317K ADJ POS	1	
				43	5015-10587-00	R63	TRIM POT, 1.5K	1	13	5250-10477-00	U57	REGULATOR, 7906 1.0A 6V	1	
				42	5015-10420-00	R68, R69, R70	TRIM POT, 1K OHMS	3	12	5372-10467-00	U33, U34, U35	IC, TDC1014J ADC	3	
				41	5015-10419-00	R67	TRIM POT, 500 OHMS	1	11	5370-09321-00	U36	IC, 1458 OP-AMP	1	
				40	5015-10418-00	R64, R65, R66	TRIM POT, 250 OHMS	3	10	5340-10433-00	SEE NOTE 8	S/RAM, 1Kx4 35NS	8	
				39	5010-08998-00	R15	RESISTOR, 2.2K OHMS 1/4W 5%	1	9	5283-10551-00	U48, U52	IC, 74F00 NAND GATE	2	
68	16-8850-92		LABEL- PCB ID	1	38	—		—	8	5282-10189-00	U49	IC, D 74S37 2IP	1	
67	4703-0007-00		LW #6 EXTERNAL	1	37	5013-10547-00	R14	RESISTOR, 11K OHMS 1/4W 2%	1	7	5283-10470-00	SEE NOTE 9	IC, 74F374 OCT LCH	12
66	4006-01003-06		MS 6-32 x 3/8 P-PH-S	1	36	5013-10546-00	R45, R52, R59	RESISTOR, 10K OHMS 1/4W 2%	3		5282-10432-00		IC, 74S374 OCT F/F	
65	4406-01117-00		NUT 6-32 HEX	1	35	5010-10022-00	R18	RESISTOR, 7.5K OHMS 1/4W	1	6	5282-10430-00	U41, U42	IC, 74S161 CNTR	3
64	20-9229		THERMAL COMPOUND	A.R.	34	5013-10544-00	R19	RESISTOR, 5.1K OHMS 1/4W 2%	1		5283-10554-00	U44	IC, 74F161 SYNC CTR	
63	5791-09074-00	J1	HEADER, 15H2391 09-65-1151	1	33	5013-10543-00	R71, R72, R73	RESISTOR, 3.9K OHMS 1/4W 2%	3	5	5283-10469-00	U3, U4, U5	IC, 74F257 2TO1 MUX	6
62	5791-09497-00	J3	HEADER, 7H2391 09-65-1071	1	32	5013-10542-00	R16, R46, R50, R57	RESISTOR, 2.4K OHMS 1/4W 2%	4		5282-10431-00	U19, U20, U21	IC, 74S257A MLTPX	
61	5791-09444-00	J4, J2	HEADER, 10H2391 09-65-1101	2	31	5013-10541-00	R42, R49, R56	RESISTOR, 1.2K OHMS 1/4W 2%	3	4	5283-10468-00	SEE NOTE 10	IC, 74F74 DUAL F/F	9
60	5705-09199-00		H/SINK, 6030 B	1	30	5013-10540-00	R24, R28, R34	RESISTOR, 910 OHMS 1/4W 2%	3		5282-10190-00		IC, 74S74 DUAL F/F	
59	5700-09004-00		SOCKET, IC 24 PIN	3	29	5013-10539-00	R25, R27, R33	RESISTOR, 750 OHMS 1/4W 2%	3	3	5283-10552-00	U38, U39	IC, 74F04 INVERTER	3
58	5043-09845-00	SEE NOTE 1	CAPACITOR, 1KPF 50V +/-20A	10	28	5013-10538-00	R41, R48, R55	RESISTOR, 620 OHMS 1/4W 2%	3		5282-10186-00	U40	IC 74S04 HEX INV	
57	5043-09492-00	C44, C45, C51 C46, C48, C49	CAPACITOR, 100PF 50V +/-10	6	27	5013-10537-00	R26, R32, R38	RESISTOR, 240 OHMS 1/4W 2%	3	2	5281-09736-00	U1, U43	IC, 74LS273 OCT F/F	2
56	5043-08980-00	SEE NOTE 2	CAPACITOR, .01M 50V +80-20	40	26	5013-10536-00	R39	RESISTOR, 110 OHMS 1/4W 2%	1	1	5779-10366-00	—	BARE PC BOARD	1

BILL OF MATERIALS



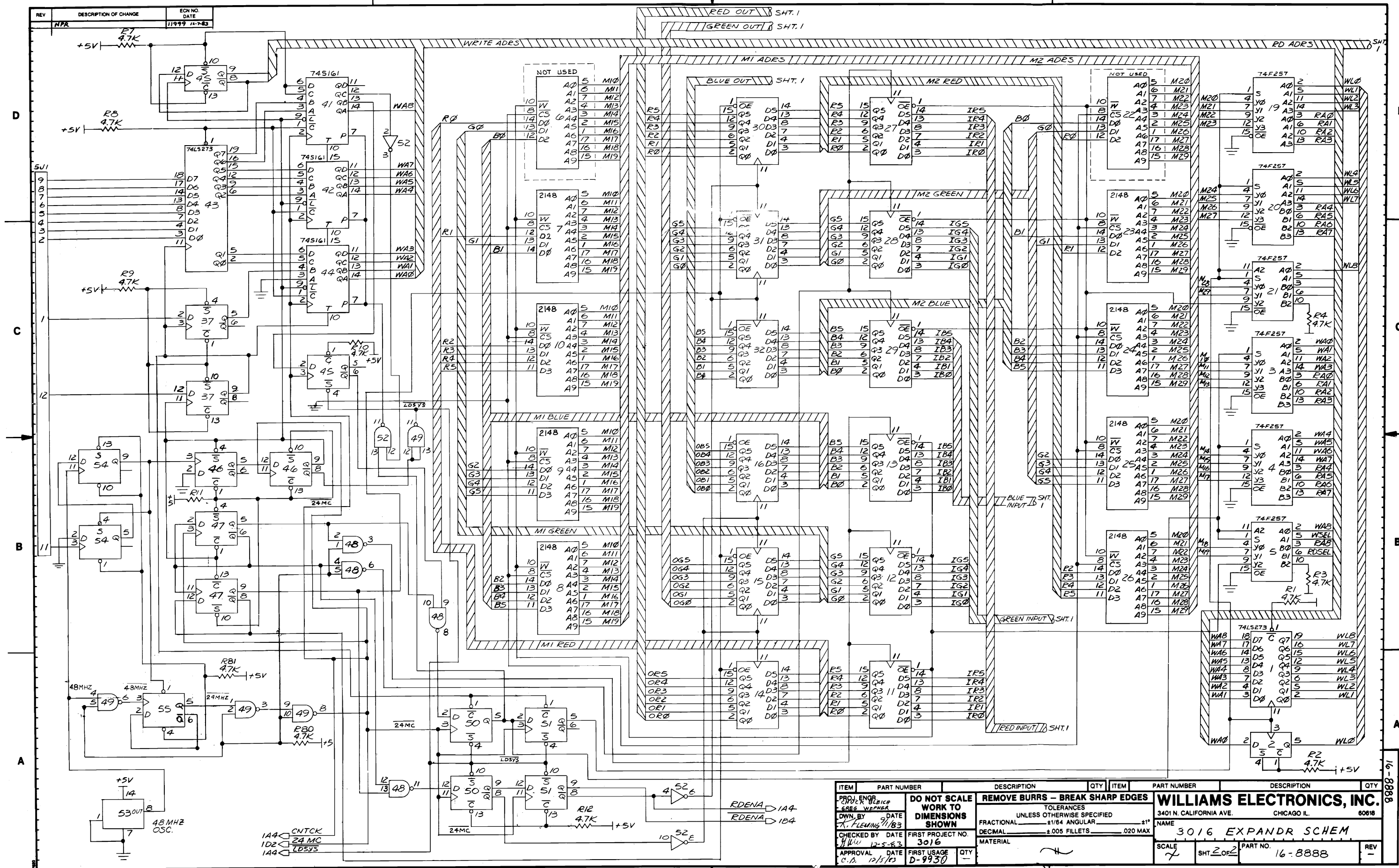
REV	DESCRIPTION OF CHANGE	ECN NO	DATE
NPR		11999	12-7-83



NOTES:
 1) LAST N# USED
 IC57
 R81
 C100
 L4
 Q14
 SIP6
 2) VA = VOLTS FOR ANALOG SECTION
 3) VR = VOLTAGE REFERENCE

ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY
PROL ENGR		DO NOT SCALE		WILLIAMS ELECTRONICS, INC. 3401 N. CALIFORNIA AVE. CHICAGO IL. 60618 NAME: 3016-EXPANDR SCHEM SCALE: SHT_L02 PART NO. 16-8888 REV: -			
DOWN BY	DATE	WORK TO DIMENSIONS SHOWN					
CHECKED BY	DATE	FIRST PROJECT NO. 3016					
APPROVAL	DATE	FIRST USAGE	QTY				

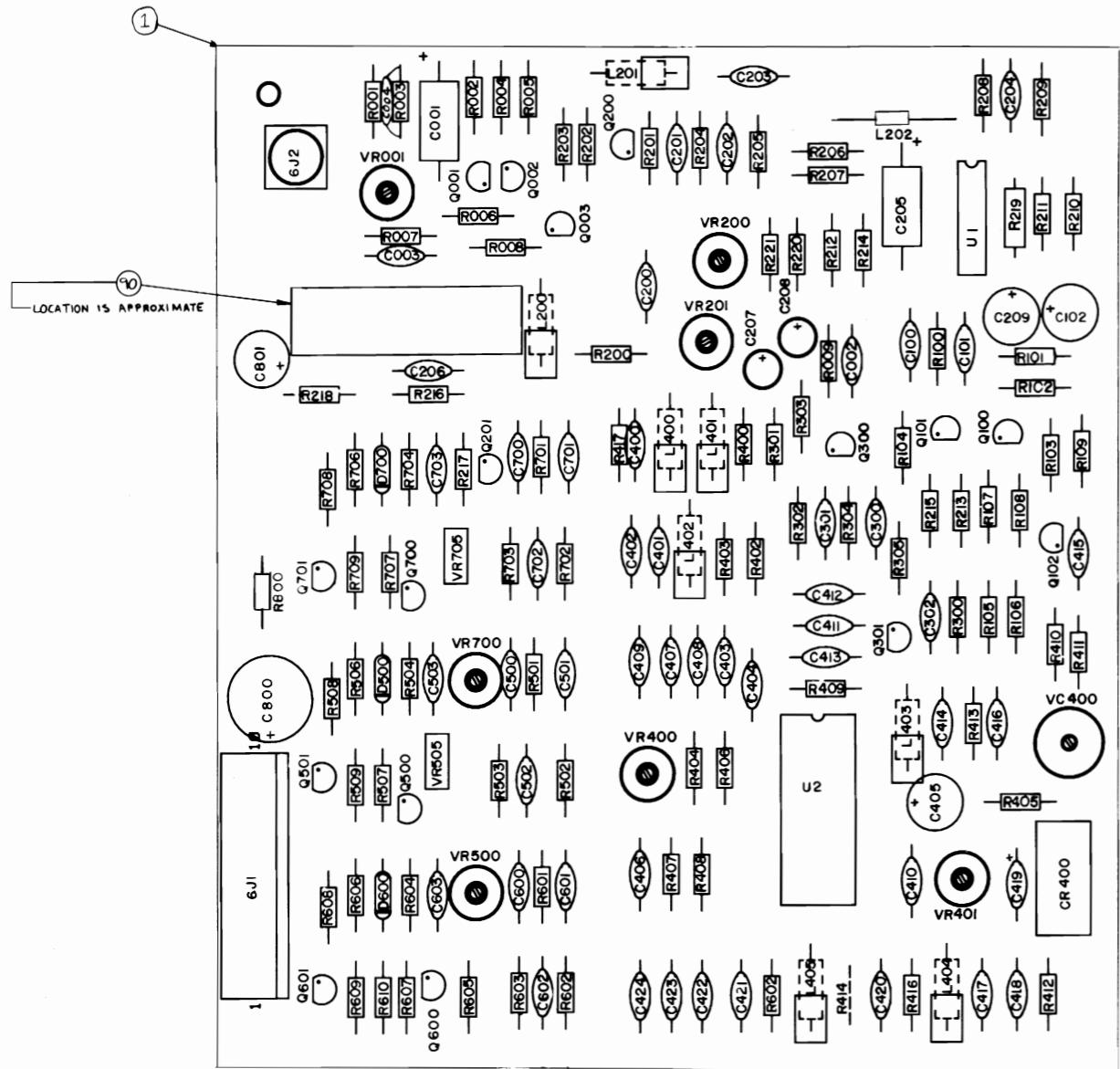
REV	DESCRIPTION OF CHANGE	ECN NO.	DATE
NPA	E7 4.7K	11999	12-7-83



ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY
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 3016 EXPANDR SCHEM			
SCALE 7				SHT 2 OF 2 PART NO. 16-8888 REV -			

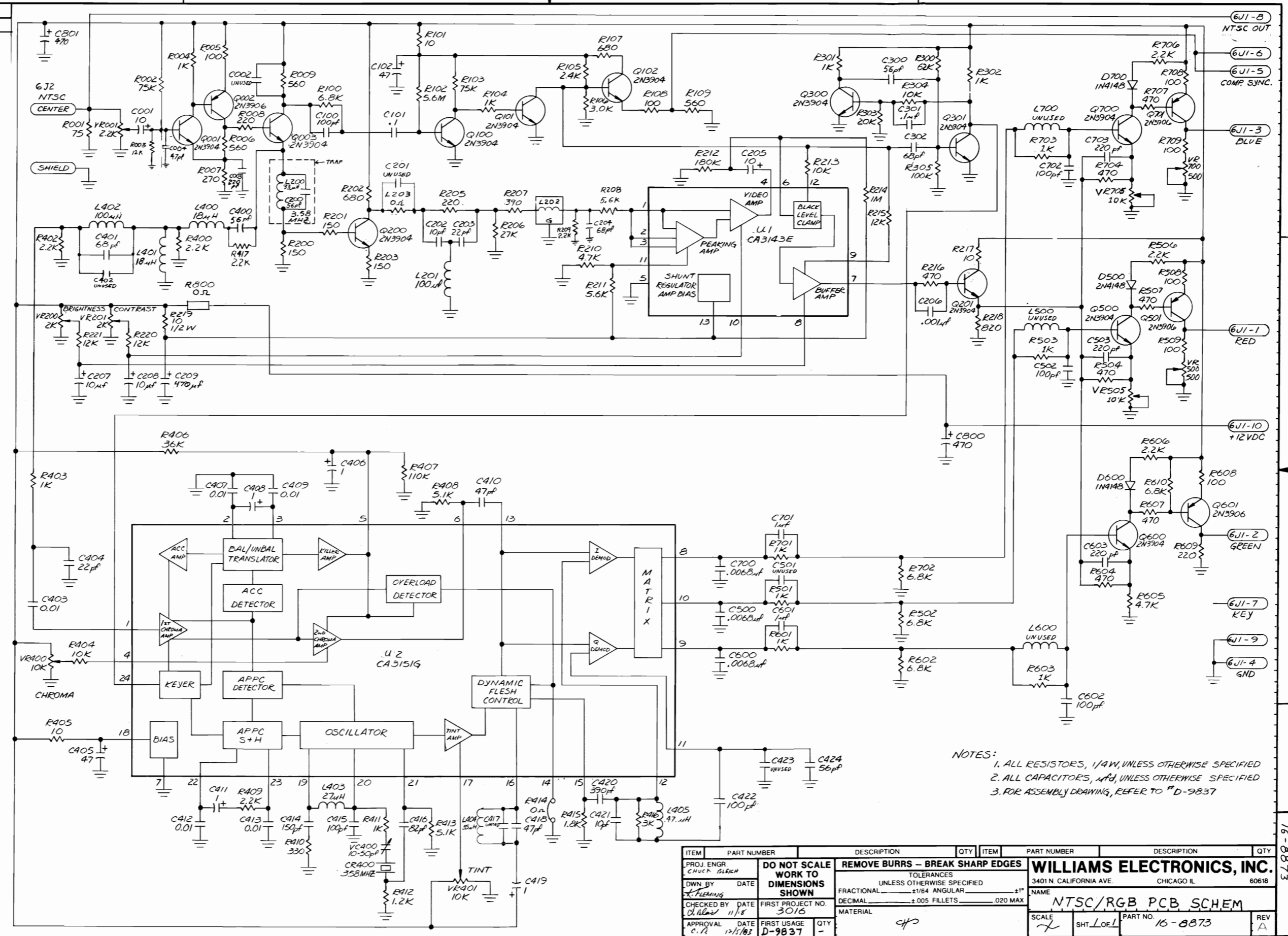
NOTES:

1. TRANSISTORS, 2N3904;
Q001, Q003, Q100, Q101, Q102,
Q200, Q201, Q300, Q301,
Q500, Q600, Q700.
2. RESISTORS, 1K OHM 1/4W
R004, R104, R301, R302, R403,
R411, R501, R503, R601, R603,
R701, R703.
3. ITEM 79 (TRAP 3.58 MHz) IS AN
APPROVED SUBSTITUTE FOR
ITEM 45 (C200) AND ITEM 74 (L200).
4. ITEM 83-IC ECG 1177 LUM. PROC.
WILLIAMS PART NO. 5370-10664-00
IS AN APPROVED SUBSTITUTE FOR
ITEM 83.



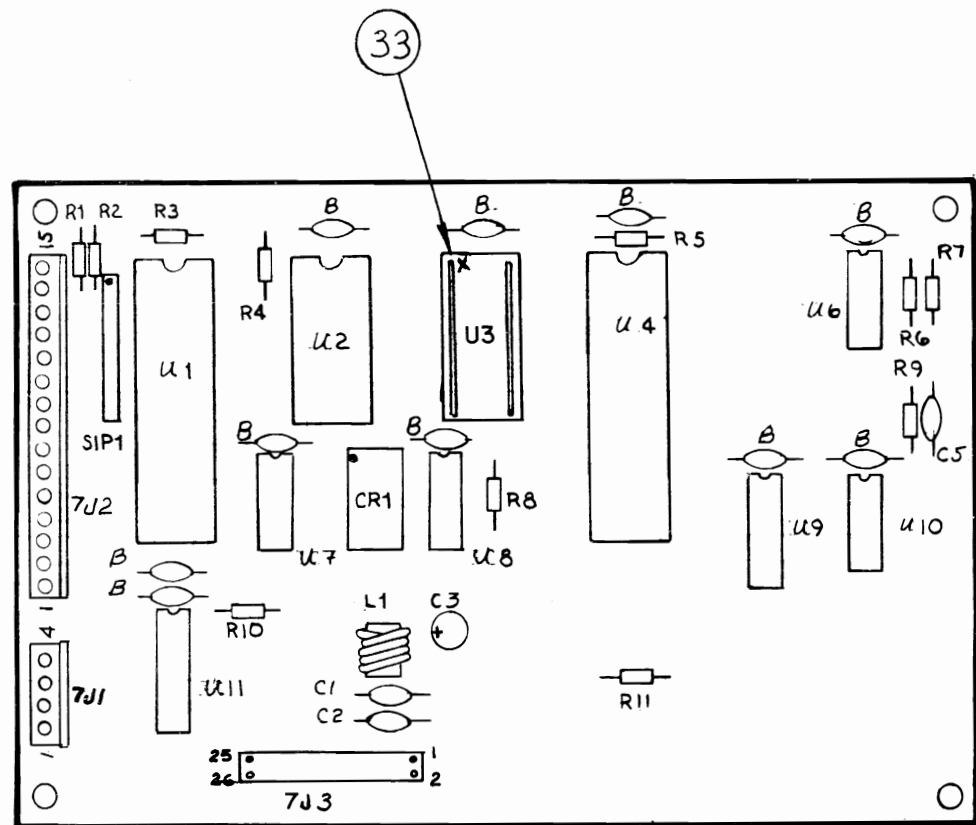
ITEM	PART NO.	PART DESIGNATION	DESCRIPTION	QTY.	ITEM	PART NO.	PART DESIGNATION	DESCRIPTION	QTY.	ITEM	PART NO.	PART DESIGNATION	DESCRIPTION	QTY.
90	16-8850-93		LABEL-PCB ID	1	60	---			---	30	5010-10650-00	R300	RESISTOR, 62K OHM 1/4W	1
89	5320-09020-00	CR400	XTAL./OSC. 3.58 MHz XTAL.	1	59	5040-09422-00	C102, C405	CAPACITOR, 47 UF 25V	2	29	5010-09342-00	R406	RESISTOR, 36K OHM 1/4W	1
88					58	5041-09343-00	C001, C205	CAPACITOR, 10 UF 25V LOW LEAK	2	28	5010-09324-00	R206	RESISTOR, 27K OHM 1/4W	1
87	5791-09444-00	J1	CONNECTOR 10P MALE MOLEX	1	57	5040-09031-00	C406, C411 C419, C40B	CAPACITOR, 1UF 25V TANT	4	27	5013-10548-00	R303	RESISTOR, 20K OHM 1/4W	1
86	5797-10274-00	J2	CONNECTOR, BNC P.C. MOUNT STYLE	1	56	5043-10642-00	C601, C701	CAPACITOR, .1 UF 50V	2	26	5010-09269-00	R003, R215 R221, R220	RESISTOR, 12K OHM 1/4W	4
85	---			---	55	5043-08996-00	C101, C301	CAPACITOR, .1 UF	2	25	5010-09034-00	R213, R304, R404	RESISTOR, 10 KOHM 1/4W	3
84	5370-10273-00	U2	I.C. CA3151G	1	54	5043-08980-00	C403, C407, C409 C412, C413	CAPACITOR, .01 UF	5	24	5010-09086-00	R100, R502, R602 R702, R610	RESISTOR, 6.8K OHM 1/4W	5
83	5370-10272-00	U1	I.C. CA3143E (SEE NOTE 4)	1	53	5043-10641-00	C500, C600 C700	CAPACITOR, .0068 UF 50V	3	23	5010-08991-00	R605, R210	RESISTOR, 4.7K OHM 1/4W	2
82	---			---	52	5043-09845-00	C206	CAPACITOR, .001 UF	1	22	5013-09665-00	R408, R413	RESISTOR, 5.1K OHM 1/4W	2
81	---			---	51	5043-10263-00	C420	CAPACITOR, 390 PF	1	21	5010-10002-00	R106, R416	RESISTOR, 3 KOHM 1/4W	2
80	---			---	50	5043-10644-00	C503, C603 C703, C003	CAPACITOR, 220 PF 50V	4	20	5010-10236-00	R105	RESISTOR, 2.4K OHM 1/4W	1
79	5551-10279-00	(SEE NOTE 3)	TRAP 3.58 MHz	0	49	5043-10267-00	C414	CAPACITOR, 150 PF	1	19	5010-08998-00	R209, R400, R402, R403, R417, R501, R606, R706	RESISTOR, 2.2K OHM 1/4W	8
78	---			---	48	5043-09492-00	C415, C422, C502 C602, C702, C100	CAPACITOR, 100 PF	6	18	5010-09117-00	R415	RESISTOR, 1.8K OHM 1/4W	1
77	---			---	47	5043-10266-00	C416	CAPACITOR, 82 PF	1	17	5010-09314	R412	RESISTOR, 1.2K OHM 1/4W	1
76	5551-10648-00	L201, L402, L203, L202	COIL, 100 UH	4	46	5043-10264-00	C302, C401, C204	CAPACITOR, 68 PF	3	16	5010-09358-00	SEE NOTE #2	RESISTOR, 1K OHM 1/4W	12
75	5551-10277-00	L405	COIL, 47 UH	1	45	5043-10643-00	C200, C300, C400, C424 (SEE NOTE 3)	CAPACITOR, 56 PF 50V	4	15	5010-09356-00	R218	RESISTOR, 820 OHM 1/4W	1
74	5551-10647-00	L404, L200 (SEE NOTE 3)	COIL, 33 UH	2	44	5043-09844-00	C410 C418, C004	CAPACITOR, 47 PF	3	14	5010-09033-00	R107, R202	RESISTOR, 680 OHM 1/4W	2
73	5551-10276-00	L403	COIL, 27 UH	1	43	5043-09491-00	C203 C404	CAPACITOR, 22 PF	2	13	5010-08992-00	R006, R009, R109	RESISTOR, 560 OHM 1/4W	3
72					42	5043-10640-00	C202, C421	CAPACITOR, 10 PF 50V	2	12	5010-09416-00	R216, R504, R604 R704, R507, R607 R707	RESISTOR, 470 OHM 1/4W	7
71	5551-10645-00	L400, L401	COIL, 18 UH	2	41	5010-09363-00	R208, R211	RESISTOR, 5.6K OHM 1/4W 50 MW 20%	2	11	5010-10003-00	R207	RESISTOR, 390 OHM 1/4W	1
70	---			---	40	5015-10639-00	VR301, VR701	POT., 10K OHM UPRIGHT	2	10	5010-09001-00	R410	RESISTOR, 330 OHM 1/4W	1
69	5070-08919-00	D500, D600 D700	DIODE, IN4148	3	39	5014-10241-00	VR400, VR401	POT., 10K OHM	2	9	5010-09224-00	R007	RESISTOR, 270 OHM 1/4W	1
68	5070-06258-00	D800	DIODE, IN4001	1	38	5014-10260-00	VR001, VR200 VR201	POT., 2K OHM	3	8	5010-09160-00	R008, R609	RESISTOR, 220 OHM 1/4W	2
67	---			---	37	5015-10419-00	VR500, VR700	POT., 500 OHM	2	7	5010-09187-00	R200, R201, R203	RESISTOR, 150 OHM 1/4W	3
66	5190-10270-00	Q002, Q501 Q601, Q701	TRANSISTORS, 2N3906 PNP	4	36	5010-10259-00	R102	RESISTOR, 5.6M OHM 1/4W	1	6	5010-09036-00	R005, R108, R508, R604, R608, R708, R709, R205	RESISTOR, 100 OHM 1/4W	8
65	5160-10269-00	SEE NOTE #1	TRANSISTOR, 2N3904 NPN	12	35	5010-10258-00	R214	RESISTOR, 1M OHM 1/4W	1	5	5010-10254-00	R001	RESISTOR, 75 OHM 1/4W	1
64	5040-09177-00	C207, C208	CAPACITOR, 10 UF RAD	2	34	5010-09333-00	R212	RESISTOR, 180K OHM 1/4W	1	4	5010-09039-00	R101, R217, R405	RESISTOR, 10 OHM 1/4W	3
63	---			---	33	5010-10271-00	R407	RESISTOR, 110K OHM 1/4W	1	3	5010-10255-00	R219	RESISTOR, 10 OHM 1/2W	1
62	5049-10268-00	VC400	TRIMMER, 10-60 PF	1	32	5010-09162-00	R305	RESISTOR, 100K OHM 1/4W	1	2	5010-09334-00	R414, R204	RESISTOR, 0 OHM 1/4W	2
61	5040-09776-00	C209, C800, C801	CAPACITOR, 470 UF 16V	3	31	5010-10257-00	R002, R103	RESISTOR, 75K OHM 1/4W	2	1	5799-10275-00		BARE P.C. BOARD	1

REV	DESCRIPTION OF CHANGE	EON NO. DATE
NPR	SCHEMATIC CHANGED TO REFLECT CHANGES TO D-9837 REV A (DOCUMENT NUMBER 12103)	11996 12-6-83



NOTES:
 1. ALL RESISTORS, 1/4W, UNLESS OTHERWISE SPECIFIED
 2. ALL CAPACITORS, μ F, UNLESS OTHERWISE SPECIFIED
 3. FOR ASSEMBLY DRAWING, REFER TO #D-9837

ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY
PROJ. ENGR. CHUCK BIRCH		DO NOT SCALE WORK TO DIMENSIONS SHOWN		REMOVE BURRS - BREAK SHARP EDGES		WILLIAMS ELECTRONICS, INC.	
DOWN BY DATE		TOLERANCES UNLESS OTHERWISE SPECIFIED		FRACTIONAL $\pm 1/64$ ANGULAR $\pm 1^\circ$		3401 N. CALIFORNIA AVE. CHICAGO, IL. 60618	
CHECKED BY DATE		FIRST PROJECT NO. 3016		DECIMAL ± 0.05 FILLETS 0.020 MAX		NAME NTSC/RGB PCB SCHEM	
APPROVAL DATE		FIRST USAGE D-9837		MATERIAL		SCALE SHT. 1 OF 1 PART NO. 16-8873 REV A	



GAME NAME	STAR RIDER
ASSY NO.	C-9928
U3	A-5343-10636

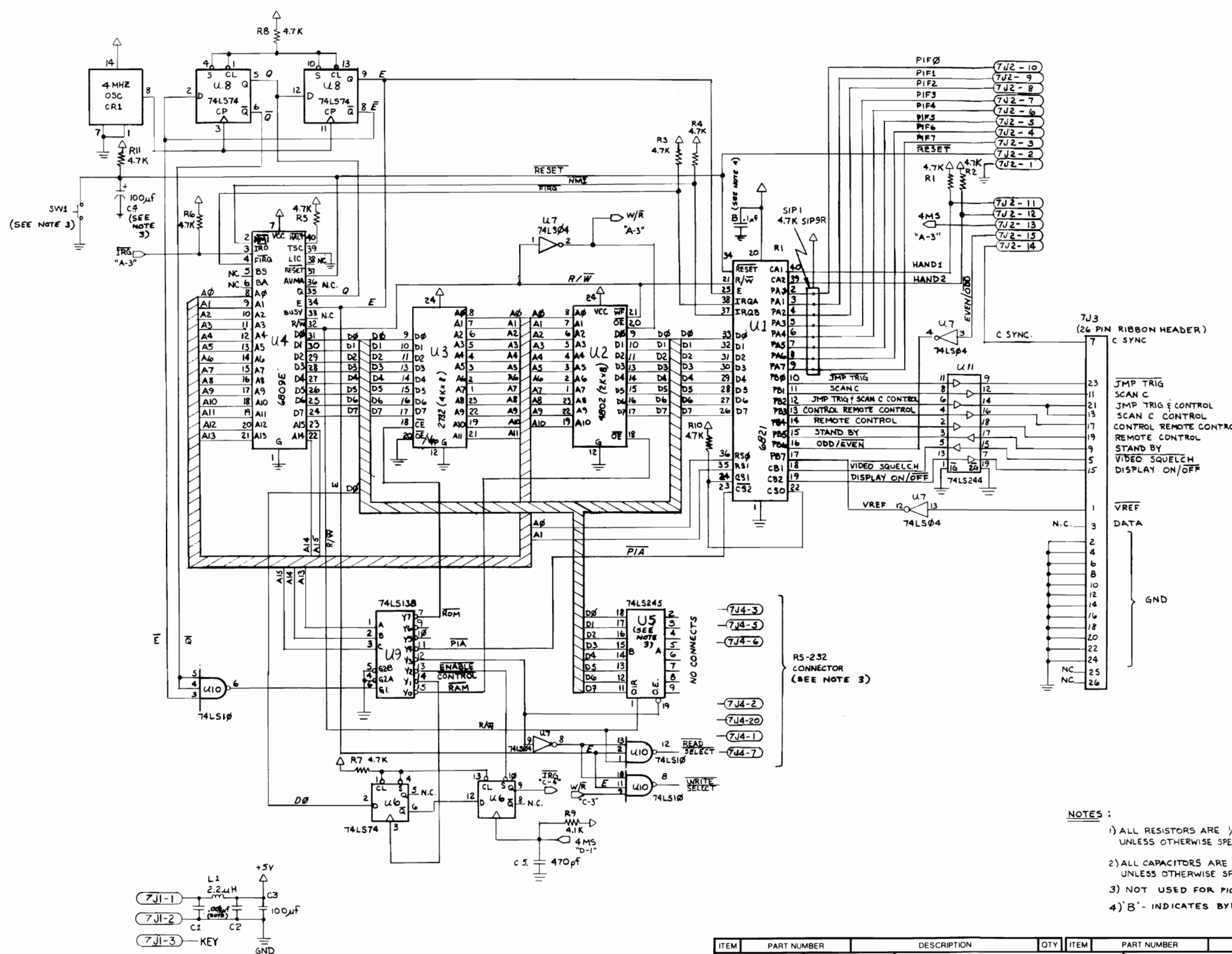
NOTES:

- 1) 'B' - INDICATES BYPASS CAPACITORS.
- 2) FOR SCHEMATIC REFER TO DWG. 16-8887.

33	5700-09004-00	IC3	SOCKET, 24 PIN	1	5	---			---
32	---			---	4	5010-08991-00	R1 THRU R11	RESISTORS, 4.7K OHM 1/4 W	11
31	---			---	3	5019-09362-00	SIP1	RESISTOR, 4.7K OHM SIP 3R	1
30	---			---	2	---			---
29	5551-10161-00	L1	COIL, 2.2 UH	1	1	5772-10365-00		BARE P.C. BOARD	1
ITEM	PART NO.	PART DESIGNATION	DESCRIPTION	QTY.	ITEM	PART NO.	PART DESIGNATION	DESCRIPTION	QTY.

28	5521-10506-00	CR1	XTAL / OSC., 4MHZ OSC.	1					
27	---			---					---
26	---			---					---
25	5791-10604-00	J3	CONNECTOR, 26PIN RIB. HEADER /SHROUD	1					
24	5791-09074-00	J2	CONNECTOR, 15P MALE MOLEX	1					
23	5791-09028-00	J1	CONNECTOR, 4P MALE MOLEX	1					
22	---			---					---
21	5281-09215-00	U7	I.C. 74LS04	1					
20	5281-09867-00	U11	I.C. 74LS244	1					
19	5281-09235-00	U10	I.C. 74LS10	1					
18	5281-09487-00	U6, U8	I.C. 74LS74	2					
17	5340-09878-00	U2	I.C. 2KX8 RAM	1					
16	---			---					---
15	---			---					---
14	5281-09745-00	U9	I.C. 74LS138	1					
13	5430-08972-00	U1	I.C. 6821 PIA	1					
12	5400-09490-00	U4	I.C. 6809E MPU	1					
11	---			---					---
10	---			---					---
9	5043-09845-00	C1, C2	CAPACITOR, .001 UF	2					
8	5043-08980-00	B (SEE NOTE 1)	CAPACITORS, .01 UF	10					
7	5040-09421-00	C3	CAPACITOR, 100 UF 25V	1					
6	5043-09065-00	C5	CAPACITOR, 470 PF	1					
5	---			---					---

REV	DESCRIPTION OF CHANGE	ECN NO	DATE
	NPR	11987	12-4-83



- NOTES:**
- 1) ALL RESISTORS ARE 1/4 WATT UNLESS OTHERWISE SPECIFIED.
 - 2) ALL CAPACITORS ARE IN uF UNLESS OTHERWISE SPECIFIED.
 - 3) NOT USED FOR PIONEER V.D. PLAYER.
 - 4) 'B' - INDICATES BYPASS CAPACITOR, TYPICAL .01 uF

ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY
PROJ ENGR	CHUCK BLICK			WILLIAMS ELECTRONICS, INC. 3401 N. CALIFORNIA AVE. CHICAGO IL 60618 NAME: 3016 P.I.F. SCHEM.			
CHK'D BY	DATE						
CHECKED BY	DATE	FIRST PROJECT NO		SCALE			
APPROVAL	DATE	FIRST USAGE	QTY	SHT. OF 1 PART NO. 16-8887 REV			

NOTES:

1.- FOR SCHEMATIC REFER TO DWG.# 16-8890

2.- RESISTOR, 4.7KΩ

R6, R21, R27, R28, R43, R50, R64, R65
R66, R113, R119, R121, R123, R125,
R128, R140

3.- RESISTOR, 1KΩ:

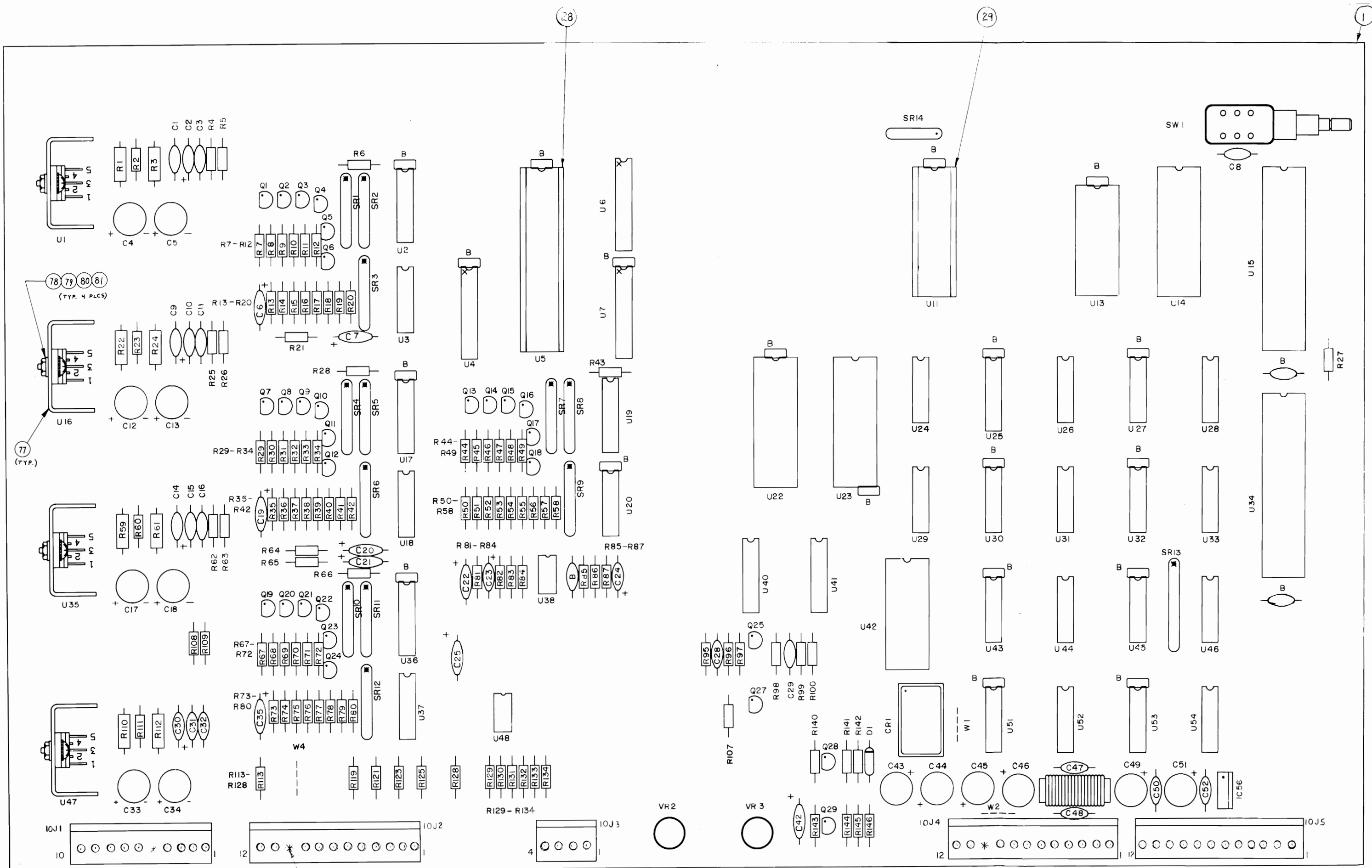
R4, R5, R25, R26, R62, R63, R108, R109
R141, R142, R145

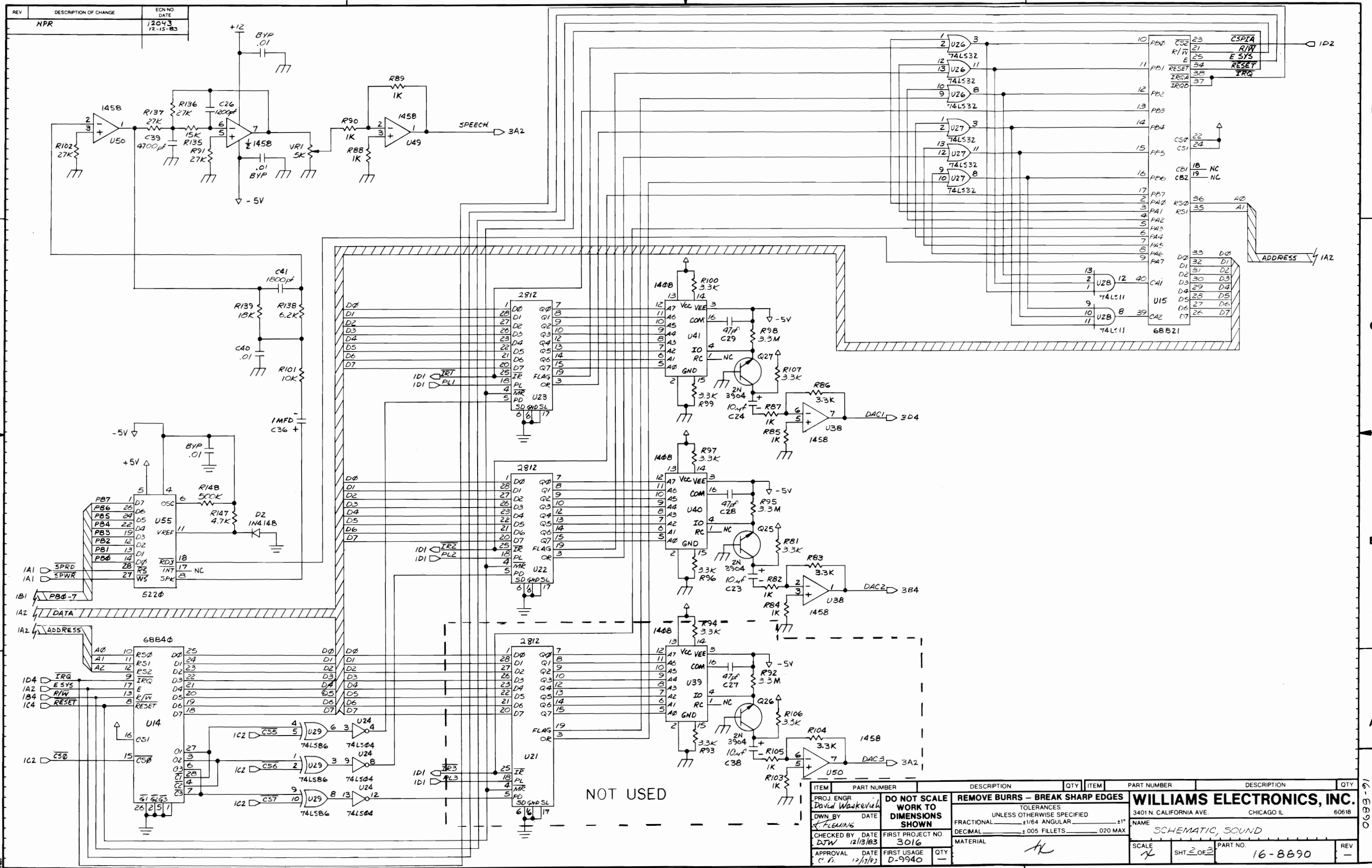
4.- CAPACITOR, 10MFD.:

C2, C6, C7, C10, C15, C19, C20, C21, C22,
C23, C24, C25, C31, C35

					60	5014-10261-00	VR2, VR3	TRIM POT, PC MOUNT 10K OHM	2	30	A-5343 10663	U11	SOUND ROM (ROM 27) 2764	#
					59	#			#	29	5700-10176-00		SOCKET, 28-PIN IC	1
					58	5010-09181-00	R3, R24, R61, R112	RESISTOR, 1 OHM 1/2W 5%	4	28	5700-08985-00		SOCKET, 40-PIN IC	1
					57	5010-09361-00	R1, R22, R59, R110	RESISTOR, 220 OHM 1/2W 5%	4	27	5400-10320-00	U5	MPU, 68B09E	#
82	5344-10440-00		IC, 2812 FIFO	2	56	5010-10437-00	R11, R14, R33, R36, R48, R52, R76, R74	RESISTOR, 470 OHM 1/4W 2%	8	26	5250-09515-00	U56	IC, 7905 REG. -5V 1A	1
	5344-10429-00		IC, 2812 FIFO 2 MHZ	0	55	5010-10204-00	R3, R16, R31, R38, R46, R54, R69, R76	RESISTOR, 1.0K OHM 1/4W 2%	8	25	5370-09156-00	U1, U16, U35, U47	IC, TDA2002 AUD AMP	4
#				#	54	5010-10203-00	R12, R19, R34, R41, R49, R57, R72, R79	RESISTOR, 2.2K OHM 1/4W 2%	8	24	5370-09321-00	U38, U48	IC, 1458 OP-AMP, DUAL	2
81	20-9229		THERMAL COMPOUND	A/R	53	5013-10497-00	R10, R20, R32, R42, R47, R58, R70, R80	RESISTOR, 4.7K OHM 1/4W 2%	8	23	5371-09152-00	U40, U41	IC, 1408 D/A CONV	2
80	4703-00007-00		LOCK WASHER, #6 EXT. TOOTH	4	52	5013-10546-00	R17, R18, R39, R40, R55, R56, R77, R78	RESISTOR, 10K OHM 1/4W 2%	8	22	5340-09878-00	U13	IC, 2016 RAM/S 2KXB	1
79	4406-01117-00		HEX NUT 6-32	4	51	5013-10548-00	R8, R15, R30, R37, R45, R53, R68, R75	RESISTOR, 20K OHM 1/4W 2%	8	21	#			#
78	4006-01003-06		SCREW 6-32 X 3/8" P-PH-S	4	50	5010-09161-00	R2, R23, R60, R111	RESISTOR, 2.2 OHM 1/4W 5%	4	20	5433-10439-00	U14	IC, 68B40 PROG TIMER 2MHZ	1
77	5705-09199-00		HEAT SINK THERMALLOY #6030	4	49	5010-09534-00	W1, W2, W4	RESISTOR, 0 OHM 1/4W WIRE JUMPER	3	19	5430-10322-00	U15, U34	IC, 68B21 PIA 2MHZ	2
76	5791-09028-00	U3	4-PIN HEADER 09-65-1041	1	48	5010-09039-00	R143	RESISTOR, 10 OHM 1/4W 5%	1	18	#			#
75	5791-09444-00	U1	10-PIN HEADER 09-65-1101	1	47	5010-09358-00	SEE NOTE 3	RESISTOR, 1K 1/4W 5%	11	17	5281-09533-00	U46	IC, 74LS393 4-BIT COUNTER	1
74	5791-09043-00	U2, U4, U5	12-PIN HEADER 09-65-1121	3	46	5010-08983-00	R81, R83, R86, R96 R97, R99, R100, R107	RESISTOR, 3.3K 1/4W 5%	8	16	5281-09308-00	U6	IC, 74LS245 OCT TRNCV	1
73	5641-09312-00	SW1	SW P DPDT 100V 5A	1	45	5010-08991-00	SEE NOTE 2	RESISTOR, 4.7K 1/4W 5%	16	15	5281-09867-00	U4, U7	IC, 74LS244 OCTAL BUFFER	2
	5641-09371-00		SW P SPDT 115V 25A	0	44	5010-09034-00	R144, R146	RESISTOR, 10K 1/4W 5%	2	14	5281-09733-00	U2, U17, U19, U36	IC, 74LS174 HEX F/F	4
72	#			#	43	5010-09325-00	R7, R13, R29, R35, R44, R51, R67, R73	RESISTOR, 39K 1/4W 5%	8	13	5280-09010-00	U42	IC, 74LS154 4-16 DECODER	1
71	5043-09844-00	C28, C29	CAPACITOR, 47PF 50V ±20%	2	42	5010-09162-00	R130, R131, R133, R134	RESISTOR, 100K 1/4W 5%	4	12	5281-09246-00	U25	IC, 74LS139 2-4 DECODER	1
70	5043-09845-00	C3, C11, C16, C32	CAPACITOR, .001MFD 50V ±20%	4	41	5010-09442-00	R129, R132	RESISTOR, 330K 1/4W 5%	2	11	5281-09737-00	U29	IC, 74LS86 QUAD XOR	1
69	5043-08980-00	C8, C47, C48 BYPASS (B)	CAPACITOR, .01MFD 50V +80-20	25	40	5010-09179-00	R95, R98	RESISTOR, 3.3M 1/4W 5%	2	10	5281-09487-00	U43, U51-U54	IC, 74LS174 DUAL D F/F	5
68	5043-08996-00	C1, C9, C14, C30, C50, C52	CAPACITOR, .1MFD 50V ±20%	6	39	#			#	9	5281-09500-00	U26, U27, U31, U33	IC, 74LS32 QUAD OR	4
67	5041-09163-00	C42	CAPACITOR, 2.2MFD	1	38	5019-09780-00	SR1- SR12	SIP, 1K 4R8 5%	12	8	5281-09850-00	U28	IC, 74LS11 TRIPLE AND	1
66	5040-09343-00	SEE NOTE 4	CAPACITOR, ELECT, AXIAL 10MFD 25V ±20%LL	0	37	5019-09786-00	SR14	SIP, 4.7K SR6 5%	1	7	5281-09235-00	U45	IC, 74LS10 TRIPLE NAND	1
	5041-09243-00		CAPACITOR, TANT, AXIAL 10MFD 10V	14	36	5019-09362-00	SR13	SIP, 4.7K SR10 5%	1	6	5281-09743-00	U44	IC, 74LS08 QUAD AND	1
65	5040-09422-00	C51	CAPACITOR, ELECT, RAD 47MFD 50V +50-10%	1	35	#			#	5	5280-09309-00	U3, U18, U20, U37	IC, 7407 HEX BUF OC	4
64	5040-09421-00	C4, C12, C17, C33, C43, C44, C45, C46, C49	CAPACITOR, ELECT, RAD 100MFD 25V, +50-10%	9	34	5520-10438-00	CRI	OSCILLATOR, 8 MHZ	1	4	5281-09215-00	U24	IC, 74LS04 HEX INVERTER	1
63	5040-09776-00	C5, C13, C18, C34	CAPACITOR, ELECT, RAD 470MFD 16V +50-10%	4	33	5075-09018-00	DI	ZENER DIODE, 1N5996A 6.8V	1	3	5281-09247-00	U32	IC, 74LS02 QUAD NOR	1
62	#			#	32	5160-10269-00	Q25, Q27, Q28, Q29	TRANSISTOR, NPN 2N3904	4	2	5281-09499-00	U30	IC, 74LS00 QUAD NAND	1
61	5551-09822-00	L1	INDUCTOR, 4.7MH 3A	1	31	5190-10270-00	Q1-Q24	TRANSISTOR, PNP 2N3906	24	1	5778-10369-00		BARE PC BOARD, SOUND	1

BILL OF MATERIALS

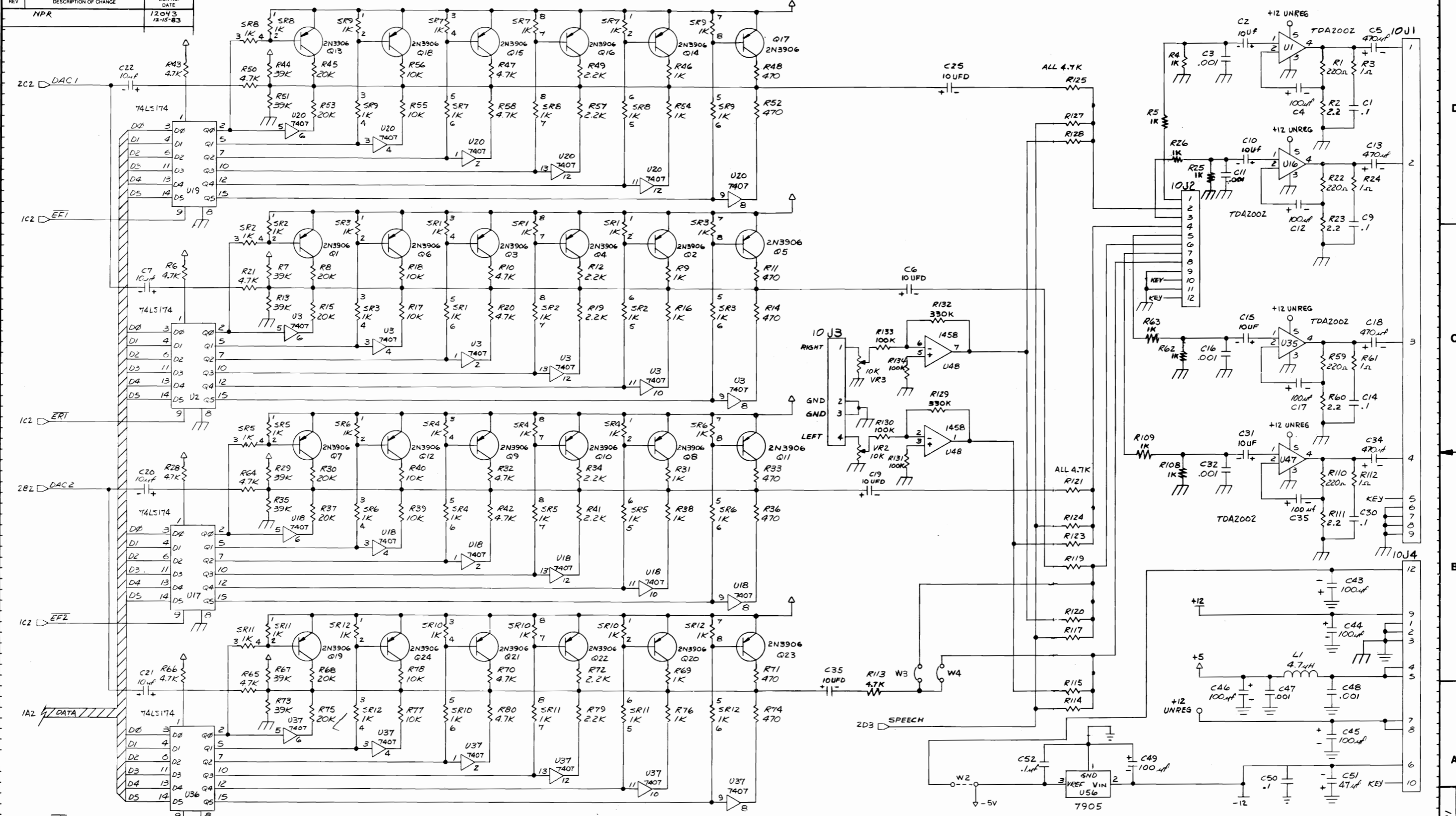




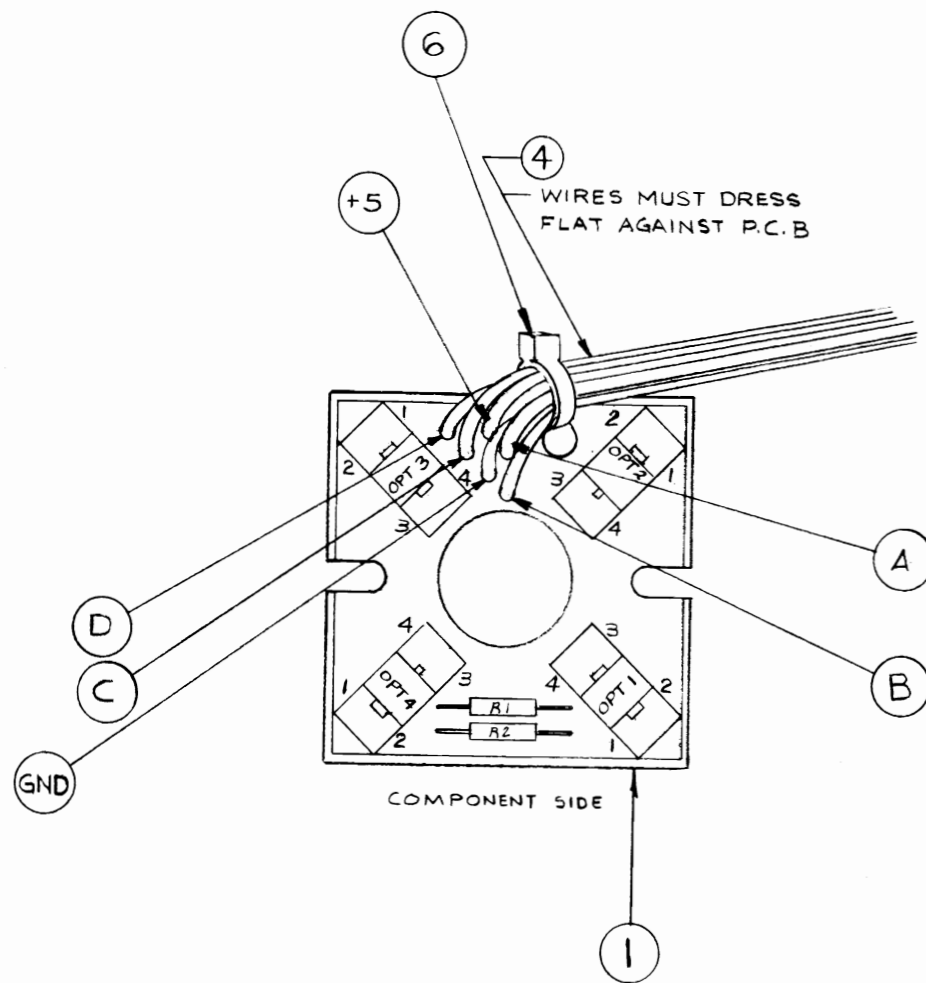
REV	DESCRIPTION OF CHANGE	ECN NO	DATE
NPR		12043	12-15-83

ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY
<p>PROJ ENGR David Waukevel DOWN BY DATE CHECKED BY DJW DATE 12/13/83 APPROVAL DATE 12/17/83</p>							
<p>DO NOT SCALE WORK TO DIMENSIONS SHOWN</p>				<p>REMOVE BURRS - BREAK SHARP EDGES TOLERANCES UNLESS OTHERWISE SPECIFIED FRACTIONAL ±1/64 ANGULAR ±1° DECIMAL ±.005 FILLETS .020 MAX</p>			
<p>WILLIAMS ELECTRONICS, INC. 3401 N. CALIFORNIA AVE. CHICAGO IL 60618 NAME SCHEMATIC, SOUND SCALE 1:1 SHT 2 OF 3 PART NO. 16-8890 REV -</p>							

REV	DESCRIPTION OF CHANGE	ECN NO	DATE
NPR		12043	12-15-83



ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY
PROJ ENGR	David Woskeruk	DO NOT SCALE WORK TO DIMENSIONS SHOWN		REMOVE BURRS - BREAK SHARP EDGES			
DWN BY	DATE	TOLERANCES UNLESS OTHERWISE SPECIFIED		WILLIAMS ELECTRONICS, INC.			
C. Flemons		FRACTIONAL ±1/64 ANGULAR ±1°		3401 N. CALIFORNIA AVE CHICAGO IL 60618			
CHECKED BY	DATE	DECIMAL ±.005 FILLETS .020 MAX		NAME SCHEMATIC, SOUND			
DJW	12/13/83	MATERIAL		SCALE 7			
APPROVAL	DATE	FIRST PROJECT NO. 3016		SHT 3 OF 3			
C.A.	12/13/83	FIRST USAGE D-9940		PART NO. 16-8890			
		QTY		REV			

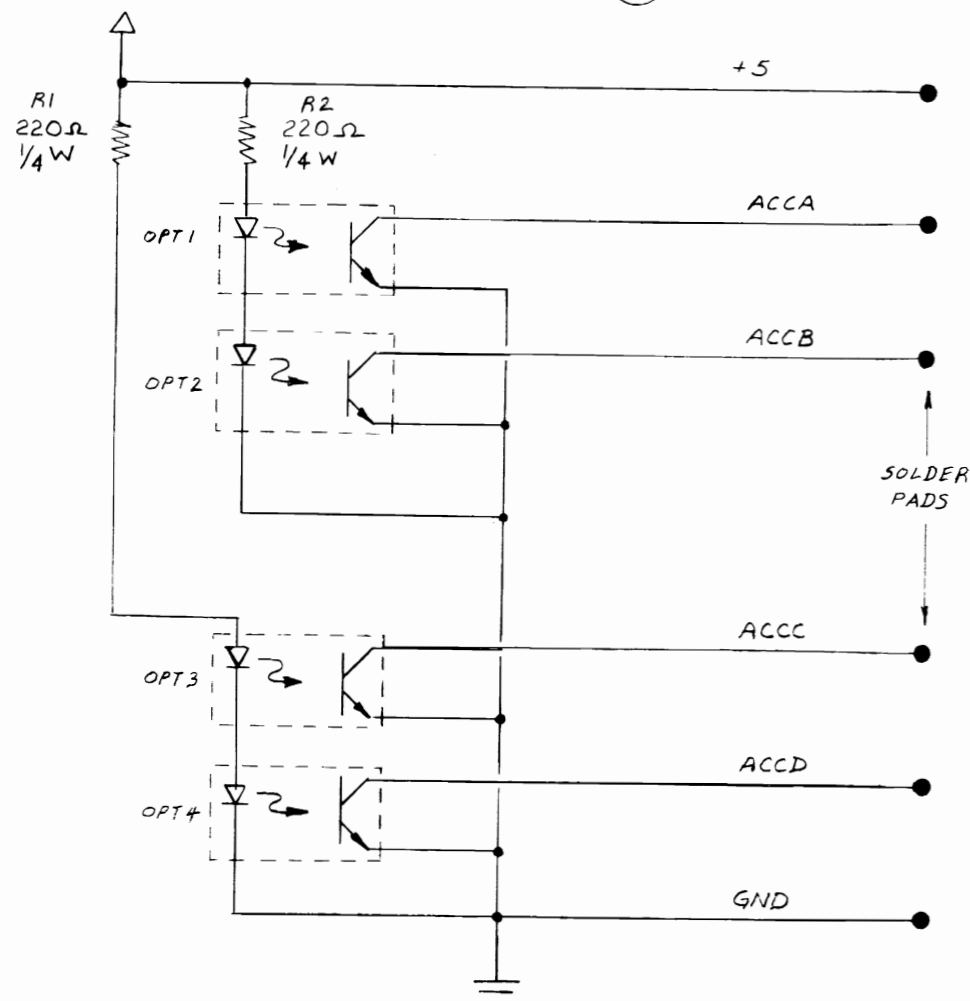
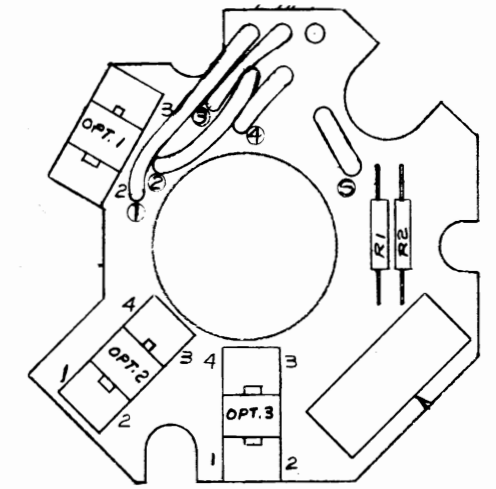


SOLDER PAD	WIRE COLOR	FUNCTION
+5V	GRAY	+5VDC
GND	BLACK	GROUND
A (OPT 1)	ORANGE/VIOLET	THROTTLE A (L.S.B.)
B (OPT 2)	ORANGE/BLUE	THROTTLE B
C (OPT 3)	ORANGE/GREEN	THROTTLE C
D (OPT 4)	ORANGE/YELLOW	THROTTLE D (M.S.B.)

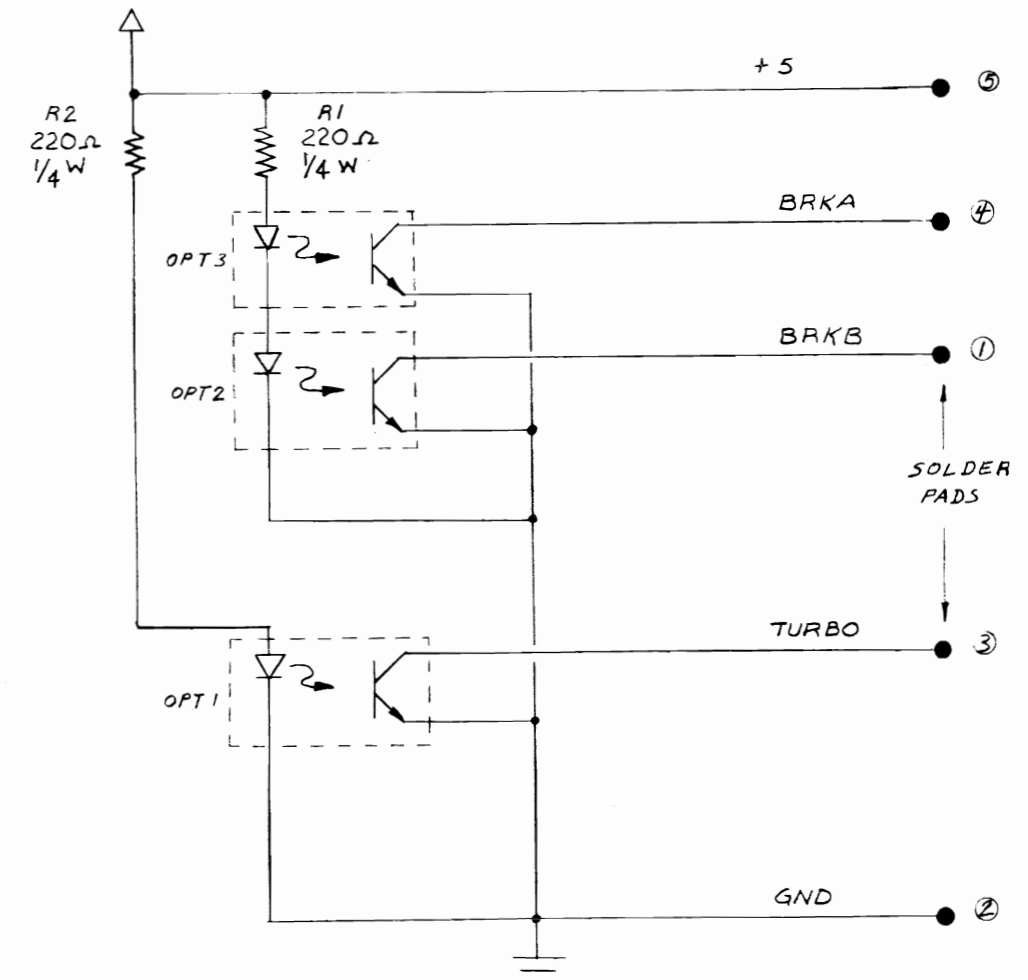
ITEM	PART NO.	PART DESIGNATION	DESCRIPTION	QTY.
5	H-10282		H/BAR BRAKE CABLE	1
4	16-8850-97		LABEL-PCB ID	1
3	5010-09160-00	R1, R2	RESISTOR, 220 OHM 5% 1/4 W	2
2	5490-10159-00	OPT01, OPT02 OPT03	OPTO INTERRUPTER	3
1	5779-10436-00		BARE P.C. BOARD	1

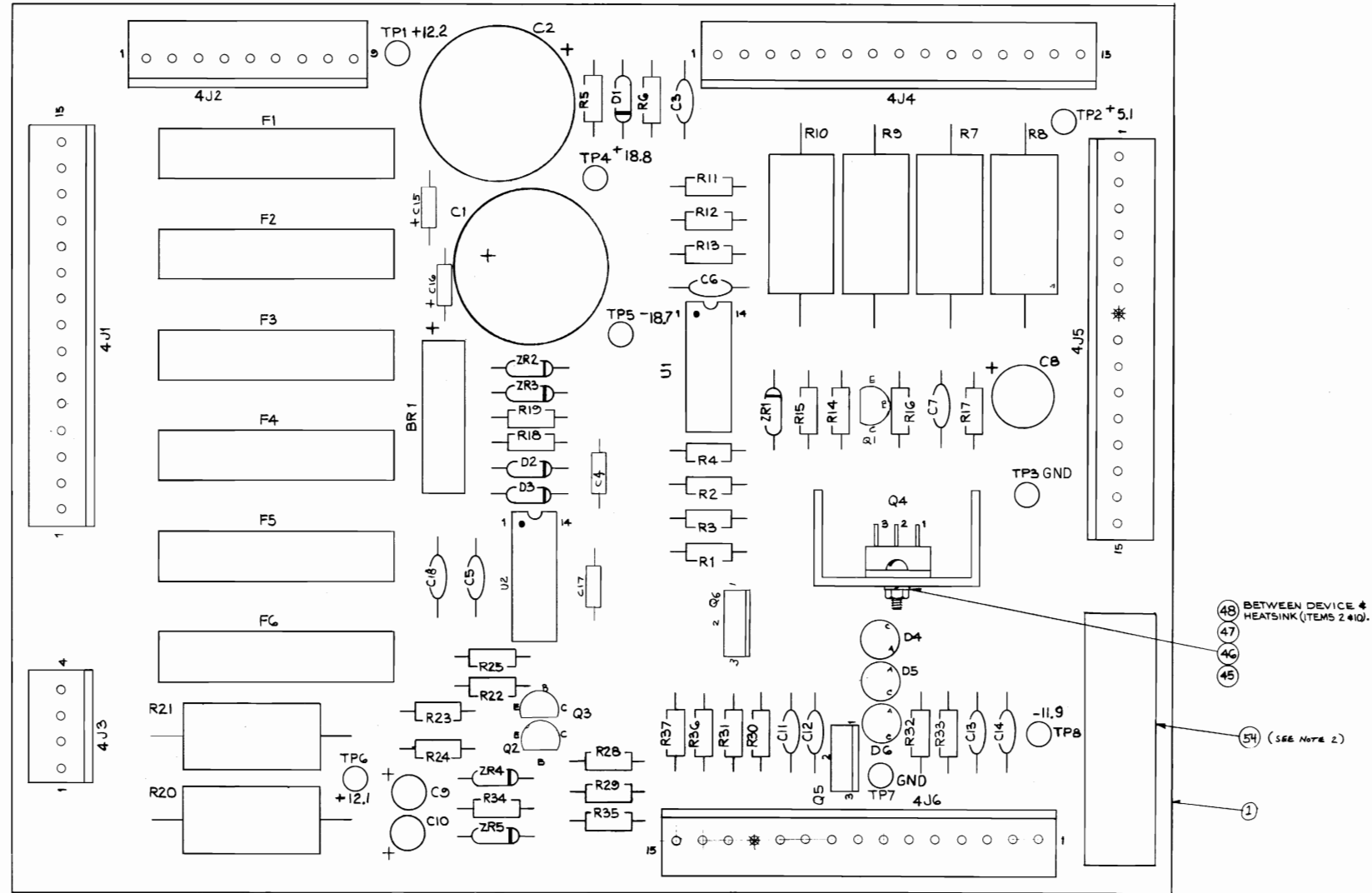
ITEM	PART NO.	PART DESIGNATION	DESCRIPTION	QTY.
6	03-7520-?		NYLON TY-WRAP	1
5	16-8850-95		LABEL-PCB ID	1
4	H-10283		H/BAR THROT CABLE	1
3	5010-09160-00	R1, R2	RESISTOR, 220 OHM 5% 1/4 W	2
2	5490-10159-00	OPT1, OPT2, OPT3, OPT4	OPTO INTERRUPTER	4
1	5779-10434-00		BARE P.C. BOARD	1

PAD	SIGNAL	WIRE COLOR
①	BRKB	ORG-RED
②	GND	BLK
③	TURBO	ORG-BLK
④	BRKA	ORG
⑤	+5	GREY



NOTE:
SEE ASS'Y DRAWING
C-9994 FOR LOCATIONS.





NOTES:
 1. FOR SCHEMATIC, REFER TO DWG # 16-8901
 2. ITEM 54 LOCATION IS APPROXIMATE.

ITEM	PART NUMBER	DESCRIPTION	DESIGN	QTY
15	5040-10488-00	CAP 47,000 MF 25V +50-10		1
14	HW-3001B-23	WIRE 18AWG RED/ORG		6"
13	RM-23-07	HS TUBING 1.0" POLY		2"
12	03-7520-2	NYLON TY-WRAP		1
11	5825-06523-00	SLD LG 2102-B		2
10	5705-10630-00	H/SINK 11.5/5 TO-3		1
9	5701-09652-00	THERMAL PAD TO-3		5
8	5700-09445-00	SOCKET, TRANS TO-3		5
7	5791-10491-00	TRANS MJ2955 PNP	Q3	1
6	5162-09425-00	TRANS 2N6057 NPN	Q4, Q1	2
5	5161-09552-00	TRANS 2N3055 NPN	Q10	1
4	5100-10008-00	BRDG 30 RECT 100V	BR2	1
3	4006-01003-10	M5 6-32 x 5/8 P-PH-S		10
2	RM-23-03	HS TUBING 3/16 DIA.		2.5"
1	H-10281	VD H/SINK & CAP CBL		1

HEAT SINK D-10069 BILL OF MATERIAL

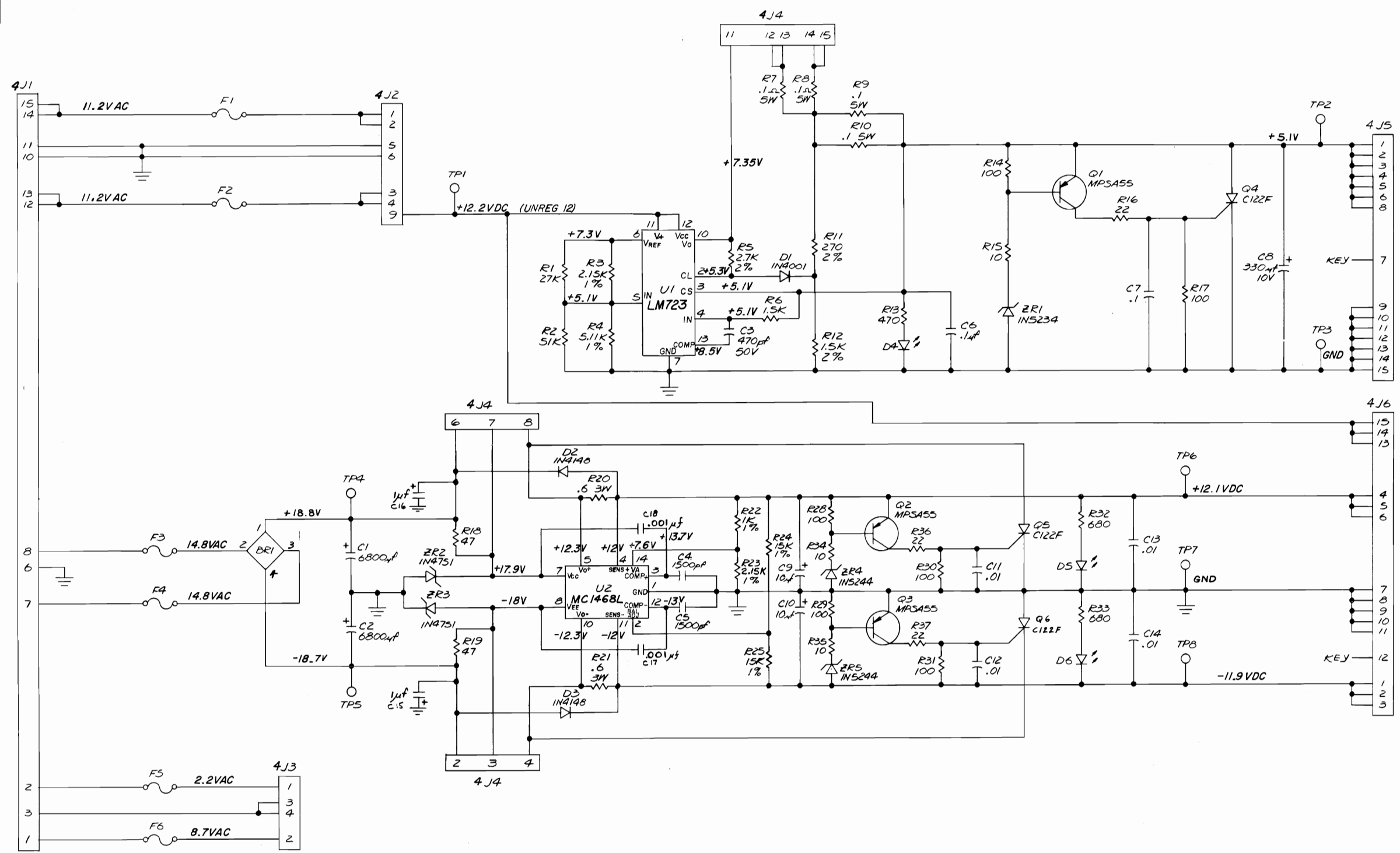
55	5824-09248-00	TP1-TP8	TEST POINT #1502-1	8
54	16-8850-98		LABEL-PCB ID	1
53	5731-10597-00	F1,2	FUSE, 5B15A 32V	2
52	5731-09432-00	F5,6	FUSE, 5B7A 250V	2
51	5731-08665-00	F3,4	FUSE, 5B 2A 250V	2
50	5043-09846-00	C17, C18	CAP, .001 MF 50V ±20%	2
49	5041-09031-00	C15, C16	CAP, 1.2 25V ±20%	2
48	20-5223		THERMAL COMPOUND	A.R.
47	4703-00007-00		#6 EXT. TOOTH LOCKWASHER	1
46	4406-01117-00		G-32 HEX NUT	1
45	4006-01003-06		G-32 X 3/8 P-PH-S SCREW	1
44	5043-08980-00	C11, C12, C13, C14	CAPACITOR, .01 MF	4
43	5040-09777-00	C9, C10	CAPACITOR, 10 MF, 20V, 20%	2
42	5040-09423-00	C8	CAPACITOR, 330 MF, 10V	1
41	5043-09446-00	C6, C7	CAPACITOR, .1 MF 50V ±20%	2
40	5048-10489-00	C4, C5	CAPACITOR, 1500 PF, CERAMIC	2
39	5043-09065-00	C3	CAPACITOR, 470 PF, 50V	1
38	5040-10487-00	C1, C2	CAPACITOR, 6800 MF, 25V	2
37	5010-09035-00	R32, R33	RESISTOR, 680 Ω, 5%, 1/4W	2
36				
35	5013-10486	R24, R25	RESISTOR, 15K, 1%, 1/4W	2

34				
33	5013-10484-00	R22	RESISTOR, 1K, 1%, 1/4W	1
32	5012-10483-00	R20, R21	RESISTOR, .68 Ω, 5%, 3W	2
31	5010-10170-00	R18, R19	RESISTOR, 47 Ω, 5%, 1/4W	2
30	5010-09424-00	R16, R26, R37	RESISTOR, 22 Ω, 5%, 1/4W	3
29	5010-09030-00	R15, R34, R35	RESISTOR, 10 Ω, 5%, 1/4W	3
28	5010-09034-00	R14, R17, R28, R29, R30, R31	RESISTOR, 100 Ω, 5%, 1/4W	6
27	5010-09416-00	R13	RESISTOR, 470 Ω, 5%, 1/4W	1
26	5010-09428-00	R12	RESISTOR, 1.5K, 2%, 1/4W	1
25	5010-09503-00	R11	RESISTOR, 270 Ω, 2%, 1/4W	1
24	5012-10003-00	R7, R8, R9, R10	RESISTOR, .1 Ω, 5%, 5W	4
23	5010-09085-00	R6	RESISTOR, 1.5K, 5%, 1/4W	1
22	5010-09541-00	R5	RESISTOR, 2.7K, 2%, 1/4W	1
21	5013-09665-00	R4	RESISTOR, 5.1K, 1%, 1/4W	1
20	5013-09426-00	R3/R23	RESISTOR, 2.15K, 1%, 1/4W	2
19	5010-09682-00	R2	RESISTOR, 51K, 5%, 1/4W	1
18	5010-09324-00	R1	RESISTOR, 27K, 5%, 1/4W	1
17	5100-09513-00	BR1	BRIDGE RECTIFIER, 4A	1
16	5075-09662-00	ZR4, ZR5	DIODE, ZENER, 1N5244	2
15	5075-10490-00	ZR2, ZR3	DIODE, ZENER, 1N4751	2
14	5075-09406-00	ZR1	DIODE, ZENER, 1N5234	1
13	5671-09013-00	D4, D5, D6	DIODE, LED	3
12	5070-08515-00	D2, D3	DIODE, SILICON, 1N4148	2
11	5070-06258-00	D1	DIODE, SILICON, 1N4001	1
10	5130-09661-00	Q4, Q5, Q6	SCR, C122F	3
9	5150-09430-00	Q1, Q2, Q3	TRANSISTOR, PNP, MPSA55	3
8	5250-10432-00	U2	MC1468L ±15V REGULATOR	1
7	5460-09424-00	U1	723 VOLTAGE REGULATOR	1
6	5791-10326-00	J1, J4, J5, J6	HEADER, CONNECTOR, 15 PIN	4
5	5791-10599-00	J2	HEADER, CONNECTOR, 3 PIN	1
4	5791-10598-00	J3	HEADER, CONNECTOR, 4 PIN	1
3	5732-09178-00		FUSE HOLDER	12
2	5705-09153-00		HEAT SINK	1
1	5773-10482-00		P.C. BOARD	1

ITEM NUMBER PART NUMBER PART DESIGNATION DESCRIPTION NUMBER REQ'D.

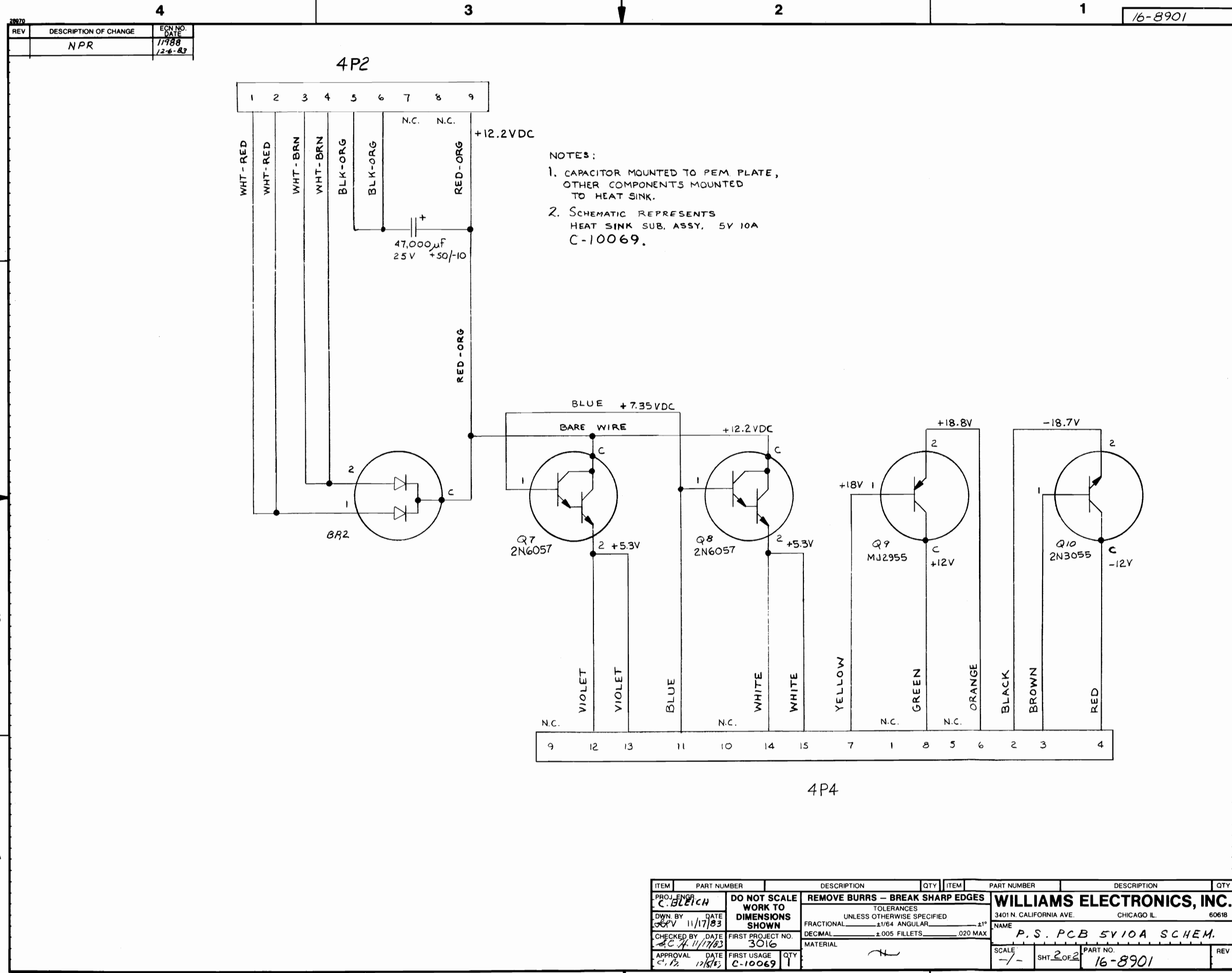
•BILL OF MATERIALS•

REV	DESCRIPTION OF CHANGE	ECN NO.	DATE
	NPR	11988	12-8-83



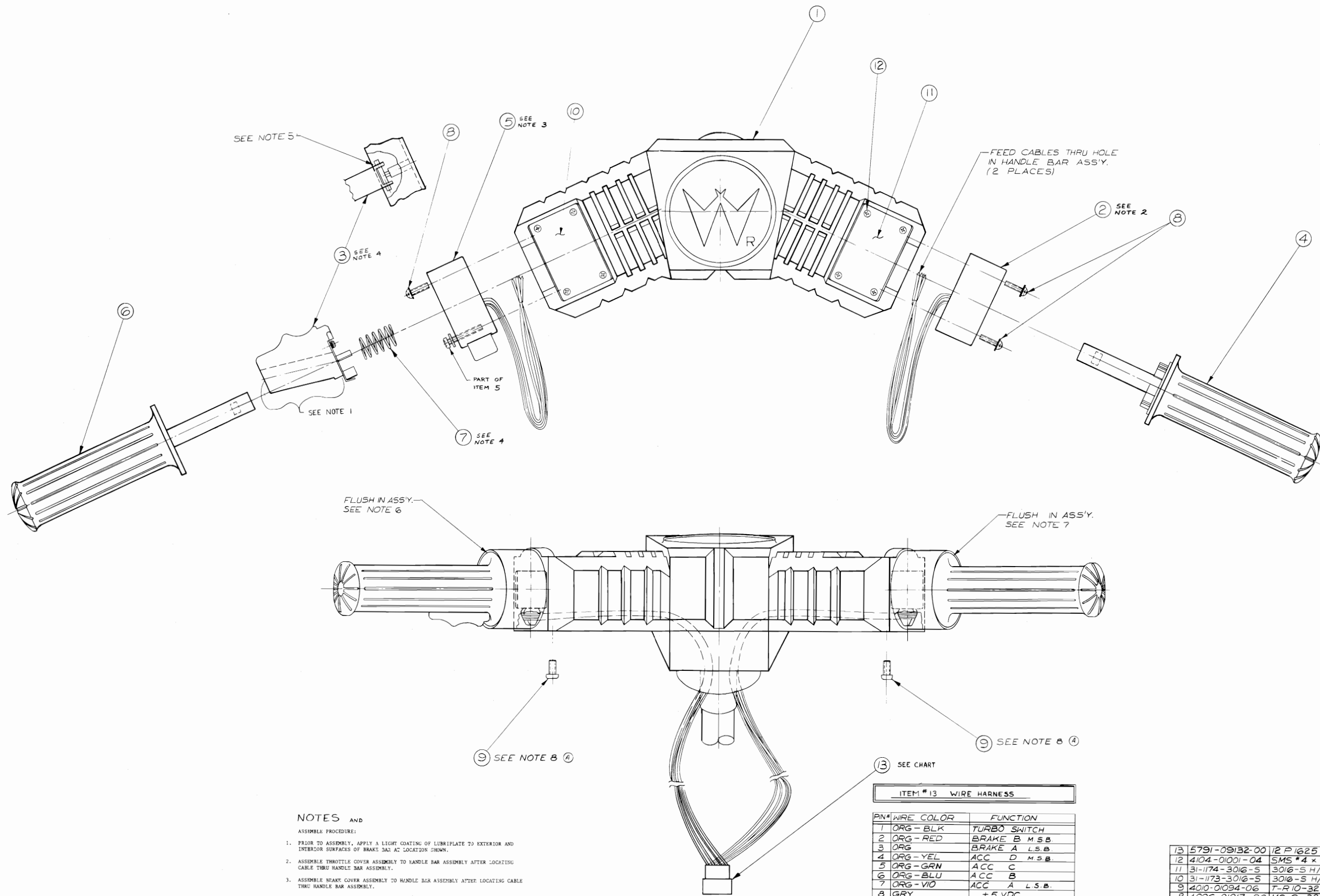
NOTE: AC VOLTAGE REFERENCED TO IT'S RETURN LINE.

ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY
PROJ ENGR	C. BLEICH	DO NOT SCALE WORK TO DIMENSIONS SHOWN		REMOVE BURRS - BREAK SHARP EDGES			
DOWN BY	DATE	FIRST PROJECT NO. 3016		TOLERANCES UNLESS OTHERWISE SPECIFIED			
CHECKED BY	DATE	FIRST USAGE D-10070		FRACTIONAL ±1/64 ANGULAR ±1°			
APPROVAL	DATE	QTY 1		DECIMAL ±.005 FILLETS .020 MAX			
WILLIAMS ELECTRONICS, INC.				3401 N. CALIFORNIA AVE. CHICAGO IL 60618			
P. S. PCB 5V10A SCHEM.				SCALE -/- SHT. OF 2 PART NO. 16-8901			



REV	DESCRIPTION OF CHANGE	ECN NO.	DATE
	NPR	11988	12-6-83

ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY
PROJ. ENGR	C. BLEICH	DO NOT SCALE WORK TO DIMENSIONS SHOWN		REMOVE BURRS - BREAK SHARP EDGES		WILLIAMS ELECTRONICS, INC.	
DOWN BY	DATE	FRACTIONAL UNLESS OTHERWISE SPECIFIED		TOLERANCES		3401 N. CALIFORNIA AVE.	CHICAGO, ILL. 60618
CHECKED BY	DATE	DECIMAL ±1/64 ANGULAR ±1°		DECIMAL ±.005 FILLETS .020 MAX		NAME P.S. PCB 5V10A SCHEM.	
APPROVAL	DATE	FIRST PROJECT NO.		MATERIAL		SCALE	PART NO.
C. 12	12/83	3016				-/-	16-8901
FIRST USAGE	QTY					SHT. 2 OF 2	REV
C-10069	1						



NOTES AND

ASSEMBLY PROCEDURE:

1. PRIOR TO ASSEMBLY, APPLY A LIGHT COATING OF LUBRICATE TO EXTERIOR AND INTERIOR SURFACES OF BRAKE BAR AT LOCATION SHOWN.
2. ASSEMBLE THROTTLE COVER ASSEMBLY TO HANDLE BAR ASSEMBLY AFTER LOCATING CABLE THRU HANDLE BAR ASSEMBLY.
3. ASSEMBLE BRAKE COVER ASSEMBLY TO HANDLE BAR ASSEMBLY AFTER LOCATING CABLE THRU HANDLE BAR ASSEMBLY.
4. ASSEMBLE BRAKE BAR ASSEMBLY & SPRING TO SHAFT OF BRAKE GRIP ASSEMBLY.
5. ALIGN BRAKE GRIP WITH POST IN COVER AS SHOWN.
6. PUSH BRAKE GRIP ASSEMBLY INTO COVER TILL FLANGE OF BRAKE GRIP IS FLUSH WITH COVER. ALIGN FLAT SHAFT WITH SCREW (9) AND TIGHTEN SECURELY.
7. ASSEMBLE THROTTLE GRIP ASSEMBLY INTO THROTTLE COVER UNTIL FLUSH WITH COVER. ALIGN FLAT SHAFT WITH SCREW (9) AND TIGHTEN SECURELY.

(A) 8. ASSEMBLE ITEM 9 TO ITEM 1 USING LOCTITE 242.

ITEM #13 WIRE HARNESS

PIN#	WIRE COLOR	FUNCTION
1	ORG - BLK	TURBO SWITCH
2	ORG - RED	BRAKE B M.S.B.
3	ORG	BRAKE A L.S.B.
4	ORG - YEL	ACC D M.S.B.
5	ORG - GRN	ACC C
6	ORG - BLU	ACC B
7	ORG - VIO	ACC A L.S.B.
8	GRY	+5 VDC
9	GRY	+5 VDC
10	BLK	GND
11	BLK	GND
12	NOT USED	

ITEM	PART NUMBER	DESCRIPTION	QTY.
13	5791-09132-00	12 P 1625 03-06-2122	1
12	4104-01001-04	SMS *4 x 1/4 P-PH-A	8
11	31-1174-3016-5	3016-S H/B INSR-R	1
10	31-1173-3016-5	3016-S H/B INSR-L	1
9	4010-01034-06	T-R10-32 x 3/8 TX PH	2
8	4006-01017-08	MS G-32 x 1/2 P-RH-S	3
7	10-383	BRAKE ARM SPRING	1
6	D-10223	BRAKE GRIP ASS'Y.	1
5	C-10008	BRAKE COVER ASS'Y.	1
4	B-10203	T/GRIP DISC ASS'Y.	1
3	B-10224	BRAKE BAR ASS'Y.	1
2	B-10005	THROT COV SUB ASS'Y.	1
1	R-10002	H/BAR W/MOLDED COV.	1

