

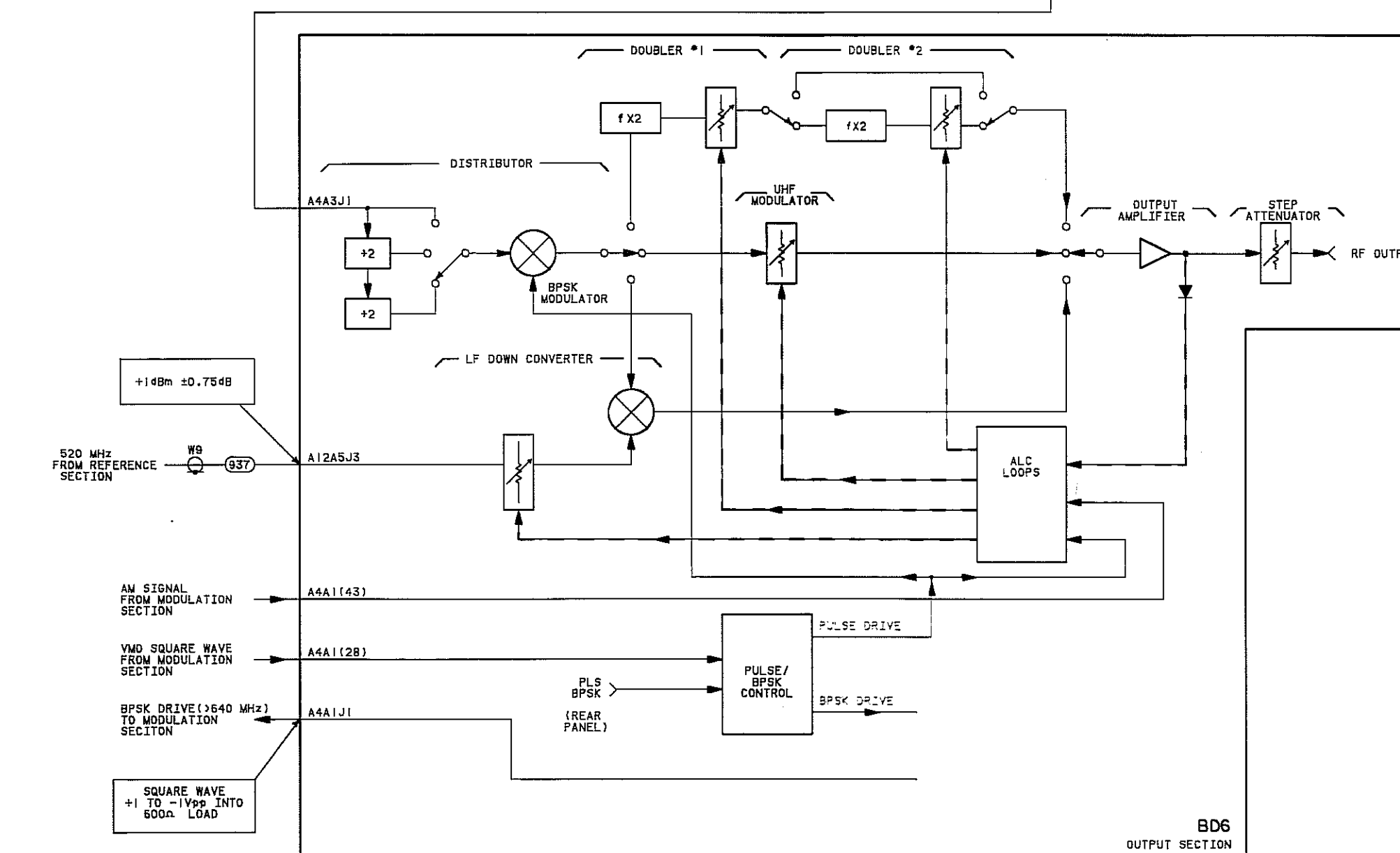
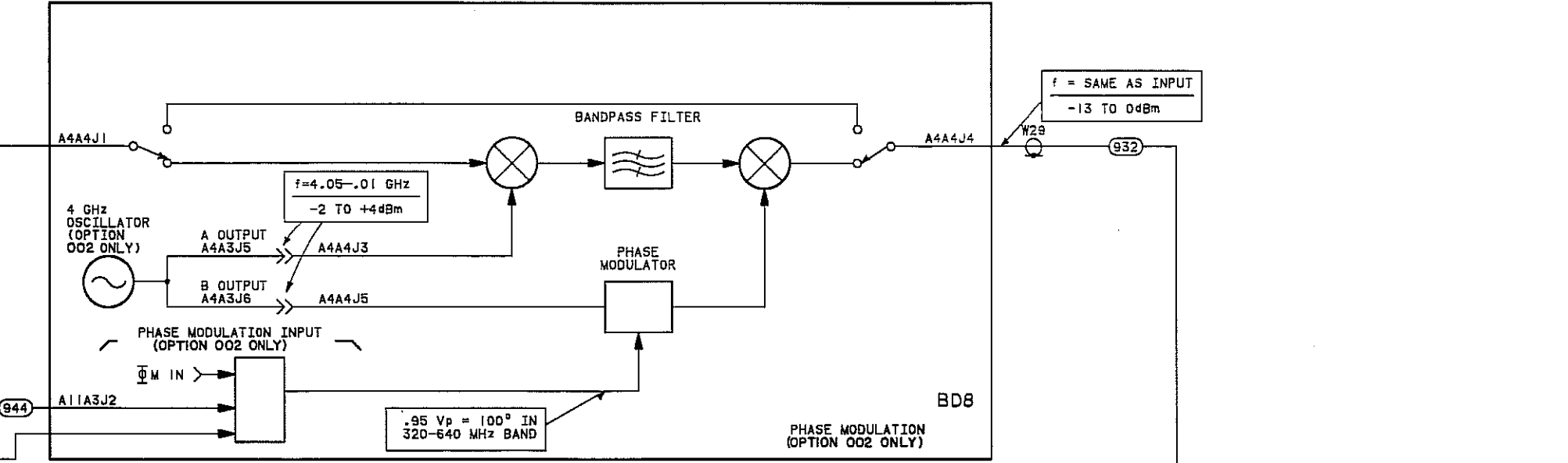
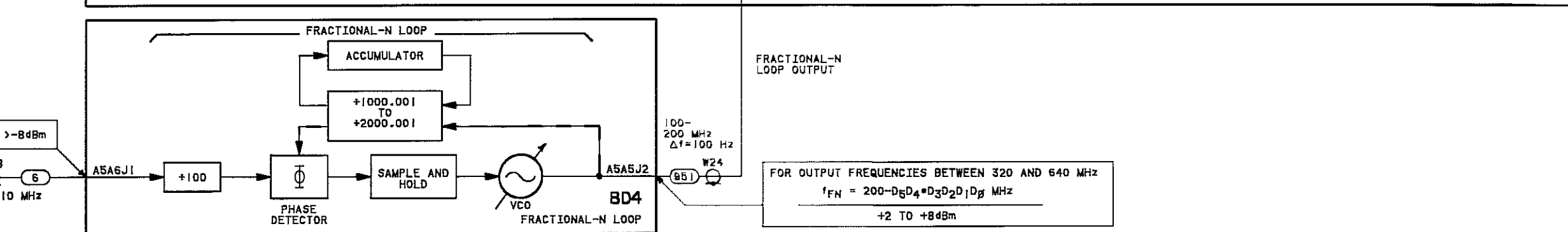
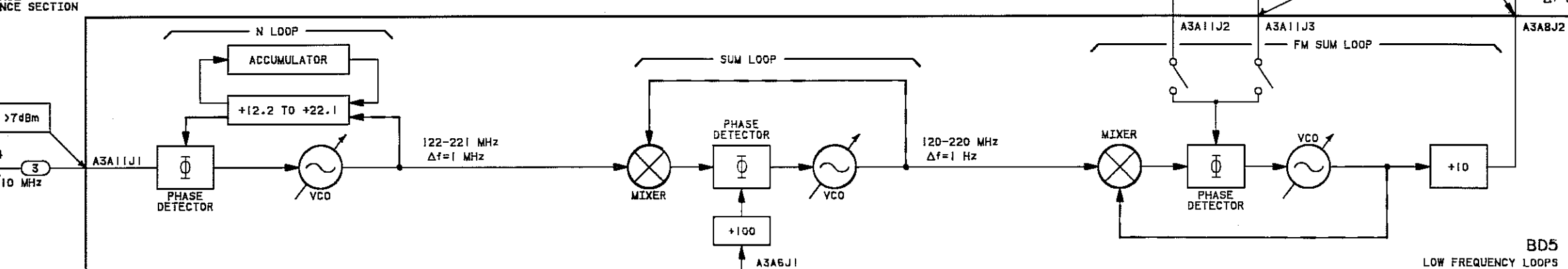
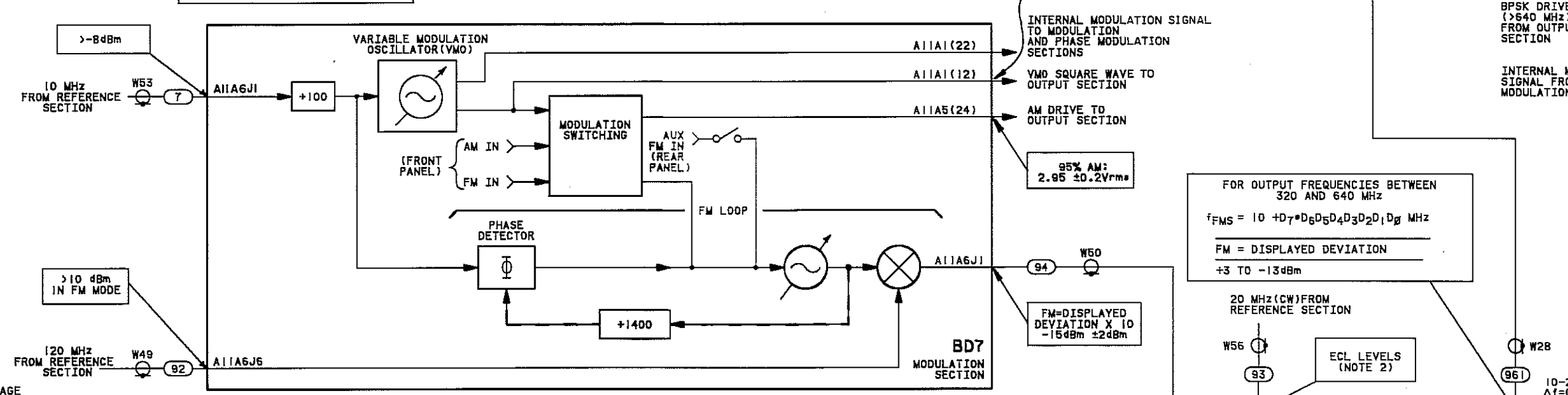
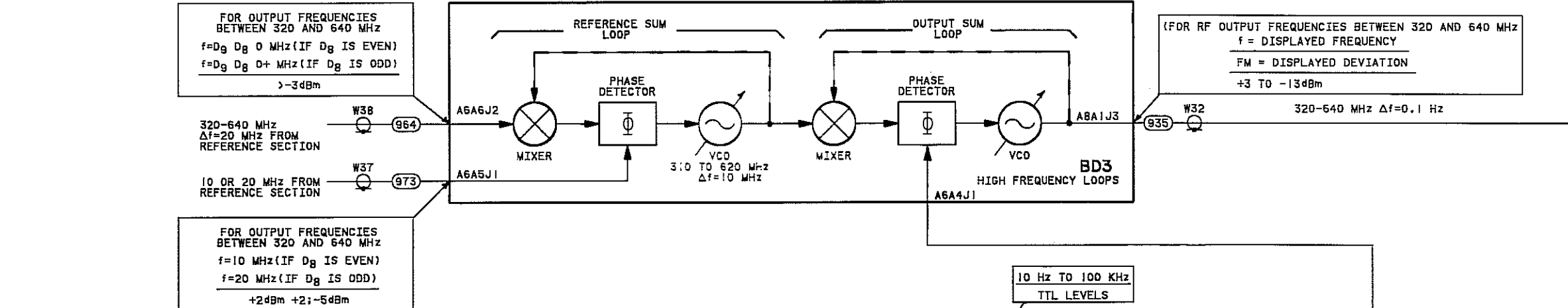
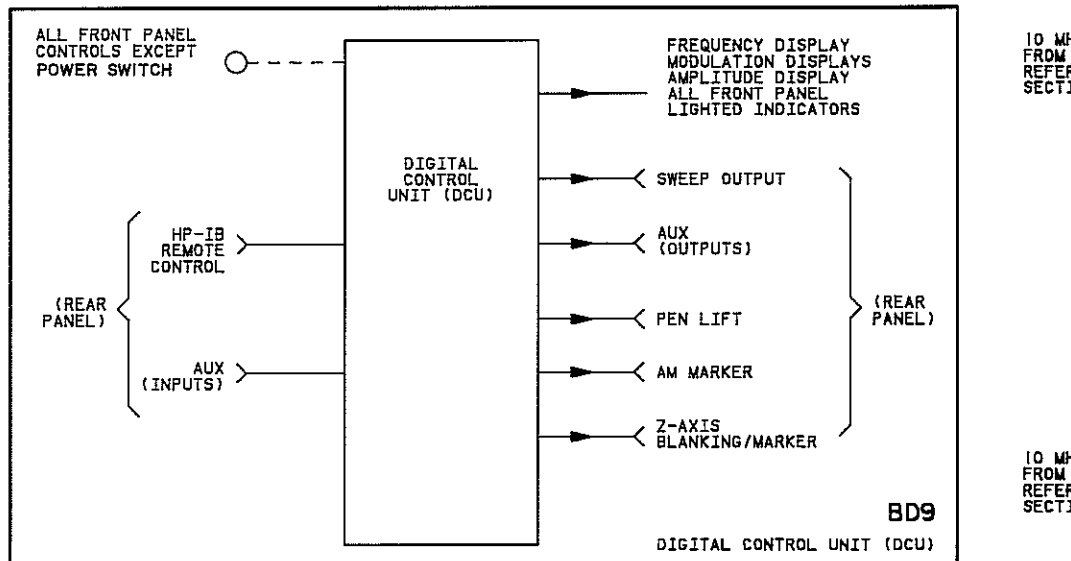
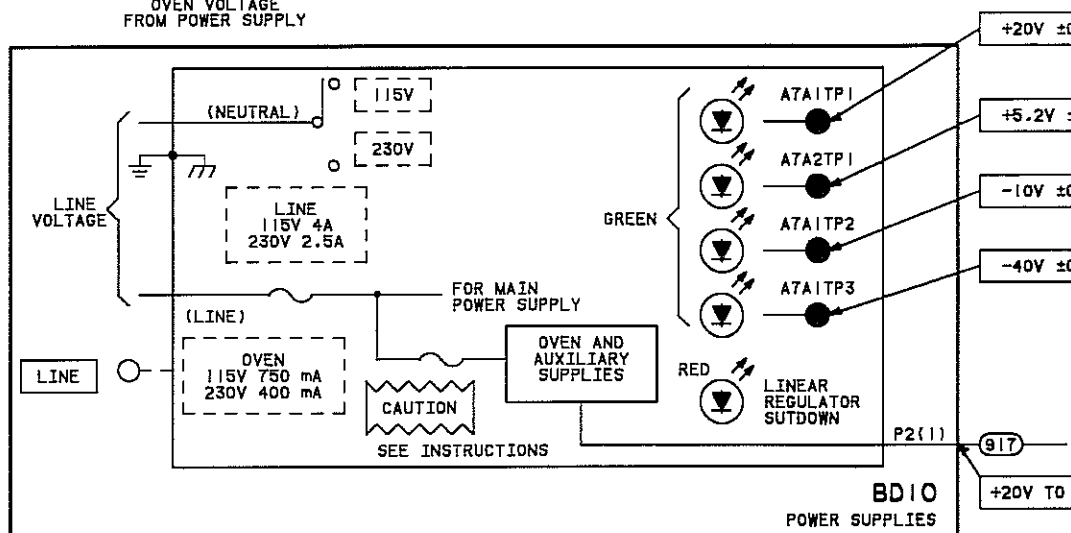
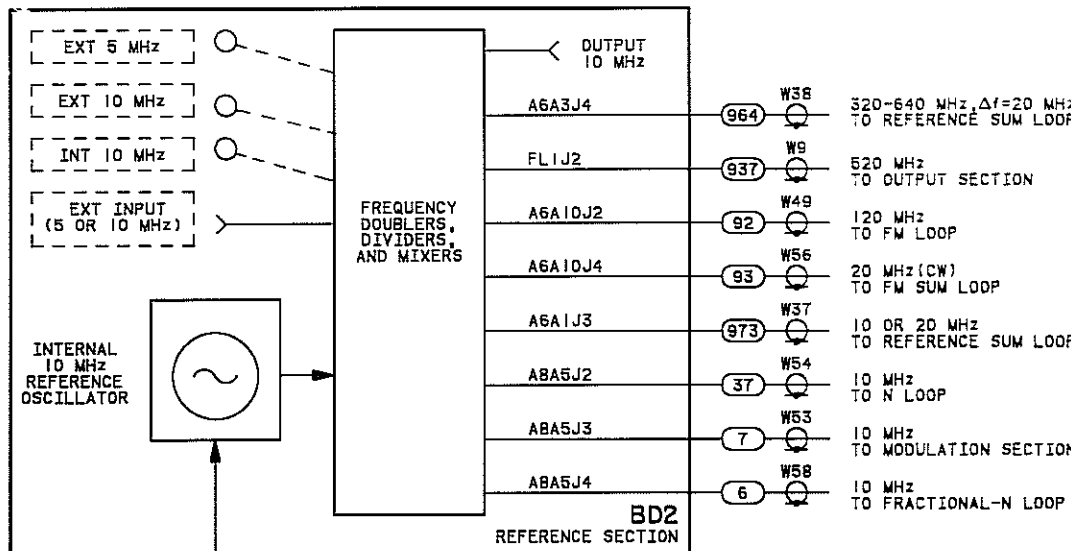
The set of columns below compares PCB and service sheet numbers between the HP-8663A and HP8662A

The following data is based on manual part No. 08663-90071, volumes 1 to 4 and assembly part numbers from HP-8663A with serial prefix 2419A00499 option 002 and 003 fitted

Some HP-8662A assembly numbers have the same assembly number as the HP-8663A, however there function is quite different, these are highlighted on **BOLD ITALIC** text

- denotes assemblies that are common across the 8662A and 8663A, however the schematic service sheet number may not be the same between both models. Each assembly service sheet is listed
- denotes assemblies that are only compatible with the 8663A
- denotes assemblies that are only compatible with the 8662A

HP-8662A service manual data only					HP-8663 service manual data only									
Index	HP-8662 Assembly No.	HP-8662A Assembly Part no.	Good Schematic Y/N	Schematic Service sheet No.	HP-8663 Assembly No.	HP-8663A Assembly Part no.	Good Schematic Y/N	Assembly or section description for the HP-8662A & HP-8663A	Schematic Service sheet No.	Block diagram	Theory/Trouble-shooting page No.	Located in Volume No.		
1				A			N	Overall block diagram (Instrument level)		BD1	8-201			
2				C			N	Reference level		BD2	8-213			
3				D			N	High frequency loops section		BD3	8-217			
4				G			N	Fractional-N loops section		BD4	8-223			
5				H			N	Low frequency loops section		BD5	8-223			
6				E			N	Output section		BD6	8-241			
7				F			N	Modulation section		BD7	8-249			
8							N	Phase modulation section		BD8	8-257			
9				B			N	Digital control unit (DCU) section		BD9	8-261			
10				B1				DCU diagnostics, part 1						
11				B2				DCU diagnostics, part 2						
12				B3				DCU diagnostics, part 3						
13				I			N	Power supply Section		BD10	8-289			
14	A8A3	10544-003	Y	SS18	A8A3	10811-60111	Y	10MHz reference oscillator	SS1	DB2	8-301	2		
15	A8A4	08662-60290	Y	SS18	A8A4	08666-60305	N	Reference buffer	SS1	DB2	8-301	2		
16	A6A1	08662-60115	Y	SS19	A6A1	08662-60115	Y	Reference section LF Multiplier	SS2	DB2	8-307	2		
17	A6A3	08662-60297	Y	SS20	A6A3	08662-60314	Y	Reference section HF Multiplier	SS3	DB2	8-313	2		
18	A6A2	08662-60114	Y	SS21	A6A2	08662-60114	Y	Reference section LO drive	SS4	DB2	8-319	2		
19	A6A9	08662-60101	Y	SS22	A6A9	08662-60101	Y	HP loops and reference section controller	SS5	DB3	8-325	2		
20	A6A6	08662-60105	Y	SS23	A6A6	08662-60105	Y	Reference sum loop RF mixer	SS6	DB3	8-331	2		
21	A6A5/A8A2	08662-60103	Y	SS24	A6A5/A8A2	08662-60103	Y	Reference sum loop phase detector	SS7	DB3	8-337	2		
22	A6A5	08662-60103	Y	SS25	A6A5	08662-60103	Y	Reference sum loop phase detector	SS8	DB3	8-347	2		
23	A6A7	08662-60106	Y	SS26	A6A7	08662-60106	Y	RF buffer	SS9	DB3	8-355	2		
24	A6A8	08662-60107	Y	SS27	A6A8	08662-60107	Y	Output sum loop RF mixer	SS10	DB3	8-361	2		
25	A6A4/A8A1	08662-60108	Y	SS28	A6A4/A8A1	08662-60108	Y	Output sum loop phase detector, part 1	SS11	DB3	8-367	2		
26	A6A4	08662-60108	Y	SS29	A6A4	08662-60108	Y	Output sum loop phase detector, part 2	SS12	DB3	8-377	2		
27	A5A4	08662-60151	Y	SS41	A5A4	08662-60151	Y	Fractional N loop reference divider	SS13	BD3	8-401	3		
28	A5A3	08662-60147	Y	SS42	A5A3	08662-60147	Y	Fractional N loop phase detector	SS14	BD4	8-407	3		
29	A5A5	08662-60149	Y	SS43	A5A5	08662-60149	Y	Fractional N loop VCO	SS15	BD4	8-417	3		
30	A5A2	08662-60148	Y	SS44	A5A2	08662-60148	Y	Fractional N loop N divider	SS16	BD4	8-425	3		
31	A5A1	08662-60146	Y	SS45	A5A1	08662-60146	Y	Fractional N loop accumulator	SS17	BD4	8-433	3		
32	A3A3	08662-60138	Y	SS46	A3A3	08663-60309	N	N loop divider/phase detector, part 1	SS18	BD5	8-445	3		
33	A3A3	08662-60138	Y	SS47	A3A3	08663-60309	N	N loop divider/phase detector, part 2	SS19	BD5	8-455	3		
36	A3A4	08662-60136	Y	SS48	A3A4	08662-60136	Y	N loop VCO	SS20	BD5	8-461	3		
37	A3A5	08662-60141	Y	SS49	A3A5	08662-60141	Y	Sum loop mixer	SS21	BD5	8-467	3		
38	A3A6	08662-60142	Y	SS50	A3A6	08662-60142	Y	Sum loop phase detector	SS22	BD5	8-473	3		
39	A3A7	08662-60140	Y	SS51	A3A7	08662-60140	Y	Sum loop VCO	SS23	BD5	8-479	3		
40	A3A9	08662-60139	Y	SS52	A3A9	08662-60139	Y	FM sum loop mixer	SS24	BD5	8-485	3		
41	A3A10	08662-60145	Y	SS53	A3A10	08662-60145	Y	FM sum loop phase detector	SS25	BD5	8-491	3		
42	A3A8	08662-60143	Y	SS54	A3A8	08662-60143	Y	FM sum loop VCO	SS26	BD5	8-495	3		
43	A3A1	08662-60135	Y	SS36				HP-8662A Reverse power driver assembly						
44	A2A11		Y	SS36				HP-8662A Attenuator assembly						
45					A4A3	08663-60304	N	Distributor, part 1	SS27	BD6	8-501	3		
46					A4A3	08663-60304	N	Distributor, part 2	SS28	BD6	8-505	3		
47					A4A3A1	08663-60033	Y	4GHz oscillator	SS45	BD6	8-630	3		
48					A12A5	08663-60308	N	Low frequency down converter	SS29	BD6	8-509	3		
49	A4A5	08662-60151	Y	SS31				HP-8662A Low frequency down converter assembly						
50					A12A3	08663-60345	N	Low frequency amplifier	SS30	BD6	8-515	3		
51	A4A3	08662-60130	Y	SS32				HP-8662A Low frequency amplifier assembly						
52					A12A2	08663-60303	N	UHF modulator	SS31	BD6	8-521	3		
53					A12A4	08663-60307	N	Doubler #1	SS32	BD6	8-525	3		
55	A4A2	08662-60081	Y	SS33	A4A2	08663-60351	N	Doubler #2	SS33	BD6	8-533	3		
56					A12A1	08663-60351	N	RF multiplexer and power amplifier	SS34	BD6	8-537	3		
57					A12A1	08663-60301	N	RF multiplexer and power amplifier	SS35	BD6	8-541	3		
58					AT1			Output attenuator				3		
59					AT2			Output attenuator				3		
60	A4A1	08662-60126	Y	SS34				HP-8662A output power amplifier assembly, part 1						
61	A4A1	08662-60126	Y	SS35				HP-8662A output power amplifier assembly, part 2						
62					A4A1	08663-60302	N	Automatic level control (ALC), part 1	SS36	BD6	8-545	3		
63					A4A1	08663-60302	N	Automatic level control (ALC), part 2	SS37	BD6	8-549	3		
64	A4A7	08662-60129	Y	SS37				HP-8662A Output section AGC assembly						
65					A11A4	08663-60344	Y	FM phase detector	SS38	BD7	8-601	4		
66					A11A1	08663-60321	Y	P/O A11A1 variable modulation oscillator, part 1	SS39	BD7	8-607	4		
67					A11A1	08663-60321	Y	P/O A11A1 variable modulation oscillator, part 2	SS40	BD7	8-611	4		
68					A11A5	08663-60323	Y	P/O A11A5 modulation drive, part 1	SS41	BD7	8-615	4		
69					A11A5	08663-60323	Y	P/O A11A5 modulation drive, part 2	SS42	BD7	8-619	4		
70					A11A2	08663-60343	Y	FM loop VCO	SS43	BD7	8-623	4		
71					A11A3	08663-60322	Y	P/O phase modulation input	SS44	BD8	8-631	4		
72					A4A4	08663-60011	Y	Phase modulator / detector, option 002 only	SS45	BD8	8-635	4		
73	A4A4	08662-60197	Y	SS30				HP 8662A Distributor assembly						
74					A4A4A1	08663-60312	Y	Input mixer	SS45	BD8		4		
75					A4A4A2	08663-60365	Y	IF amplifier	SS45	BD8		4		
76					A4A4A3	08663-60367	Y	LO 1 amplifier	SS45	BD8		4		
77					A4A4A4	08663-60324	Y	Phase modulator driver	SS45	BD8		4		
78					A4A4A5	08663-60366	Y	LO 2 Amplifier / bypass switch driver assembly	SS45	BD8		4		
79	A4A6	08662-60185	Y	SS39				HP-8662A FM loop VCO assembly						
80	A4A8	08662-60184	Y	SS38				HP-8662A Modulation divider assembly						
81	A4A9	08662-60183	Y	SS40				HP-8662A Modulation drive assembly						
82					A2A7	08663-60332	Y	P/O A2A7 Microprocessor, part 1	SS46	BD9	8-701	4		
83					A2A7	08663-60332	Y	P/O A2A7 Microprocessor, part 2	SS47	BD9	8-705	4		
84	A2A7	08662-60298	Y	SS10				HP-8662A RAM assembly only						
85					S2A8	08663-60329	Y	RAM/ROM serial Prefix 2537A	SS48	BD9	8-709	4		
86					S2A8	08663-60365	Y	RAM/ROM serial Prefix 2234A to 2536A	SS48	BD9	8-711	4		
87	A2A8	08662-60245	Y	SS8				HP-8662A ROM 1 Serial prefixes 2021 assembly						
88	A2A9	08662-60296	Y	SS9				HP-8662A ROM 2 assembly						
89					A2A9	08663-60331	Y	ROM	SS49	BD9	8-713	4		
90					A2A3	08663-60328	Y	P/O A2A3 peripheral RAM, part 1	SS50	BD9	8-717	4		
91					A2A3	08663-60328	Y	P/O A2A3 peripheral RAM, part 2	SS51	BD9	8-721	4		
92	A2A3	08662-60294	Y	SS14				HP-8662A Level/modulation output assembly, part 1						
93	A2A3	08662-60294	Y	SS15				HP-8662A Level/modulation output assembly, part 2						
94					A2A5	08663-60341	Y	P/O A2A5 frequency Control assembly, part 1	SS52	BD9	8-725	4		
95					A2A5	08663-60341	Y	P/O A2A5 frequency Control assembly, part 2	SS53	BD9	8-729	4		
96	A2A5	08662-60299	Y	SS5				HP-8662A HP-IB assembly						
97					A2A10	08663-60335	Y	Level control assembly	SS54	BD9	8-733	4		
98					A2A4	08663-60334	Y	Modulation control assembly	SS55	BD9	8-737	4		
99	A2A4	08662-60167	Y	SS12				HP-8662A Frequency output board assembly, part 1						
100	A2A4	08662-60167	Y	SS13				HP-8662A Frequency output board assembly, part 2						
101	A2A2	08662-60171	Y	SS15				HP-8662A P/O sweep board assembly, part 1						
102	A2A2	08662-60171	Y	SS16				HP-8662A P/O sweep board assembly, part 2						
103	A2A2	08662-60171	Y	SS17				HP-8662A P/O sweep board assembly, part 3						
104					A2A2	08663-60337	Y	P/O sweep control assembly, part 1	SS56	BD9	8-741	4		
105					A2A2	08663-60337	Y	P/O sweep control assembly, part 2	SS57	BD9	8-745	4		
106					A2A6	08663-60333	Y	HP-IB assembly	SS58	BD9	8-749	4		
107	A2A6	08662-60236	Y	SS6				HP-8662A Microprocessor/Decoder assembly, part 1						
108	A2A6	08662-60236	Y	SS7				HP-8662A Microprocessor/Decoder assembly, part 2						
109	A1A3	08662-60169	Y	SS1	A1A3	08663-60339	Y	Main keyboard	SS59	BD9	8-753	4		
110	A1A2	08662-60168	Y	SS2	A1A2	08663-60168	Y	Sweep keyboard	SS60	BD9	8-757	4		
111	A2A1	08662-60235	Y	SS3	A2A1	08663-60336	Y	P/O keycode assembly, part 1	SS61	BD9	8-761	4		
112	A2A1	08662-60235	Y	SS4	A2A1	08663-60336	Y	P/O keycode assembly, part 2	SS62	BD9	8-765	4		
113	A1A1	08662-60173	Y	SS11	A1A1	08663-60338	Y	P/O display assembly, part 1	SS63	BD9	8-769	4		
114					A1A1	08663-60338	Y	P/O display assembly, part 2	SS64	BD9	8-773	4		
116	A7A3	08662-60289	Y	SS55	A7A3	08662-60289	Y	Power supply Inverter	SS65	BD10	8-901	4		
117	A7A4	08662-60156												



- NOTES
- INTERCONNECTIONS BETWEEN THE DCU AND THE OTHER SECTIONS ARE NOT SHOWN ON THIS BLOCK DIAGRAM. REFER TO THE APPROPRIATE SECTION BLOCK DIAGRAM (BD2-BD10) OR SCHEMATIC FOR THIS INFORMATION.
 - ECL LOGIC LEVELS IN THIS INSTRUMENT ARE NON-STANDARD DUE TO THE SUPPLY VOLTAGE USED. A HIGH LEVEL IS ≥ +4.0V; A LOW LEVEL IS ≤ +3.5V.
 - FREQUENCY FORMULAS GIVEN FOR BLOCK DIAGRAMS BD3, BD4 AND BD5, APPLY ONLY WHEN THE FRONT PANEL FREQUENCY SETTING IS BETWEEN 320 AND 640 MHz (THAT IS, THE BASIC BAND). THE FORMULAS DO NOT APPLY IF A FREQUENCY FAILURE OCCURS OUTSIDE THE BASIC BAND. FREQUENCY FAILURES OUTSIDE THE BASIC BAND ARE PROBABLY IN THE OUTPUT SECTION (REFER TO BD6 TO BEGIN TROUBLESHOOTING).

THE FORMULAS RELATE TO THE FRONT PANEL FREQUENCY DISPLAY. THE DISPLAY DIGITS ARE DESIGNATED D₁₀ THROUGH D₀ AS FOLLOWS:

D ₁₀	D ₉	D ₈	D ₇	D ₆	D ₅	D ₄	D ₃	D ₂	D ₁	D ₀
.

ENTER THE VALUE OF EACH DIGIT INTO THE FORMULAS AND USE THE DECIMAL POINT SHOWN IN THE FORMULA INSTEAD OF THE DISPLAYED DECIMAL POINT.

FOR EXAMPLE IF THE DISPLAYED FREQUENCY IS 532.876 401 9 MHz

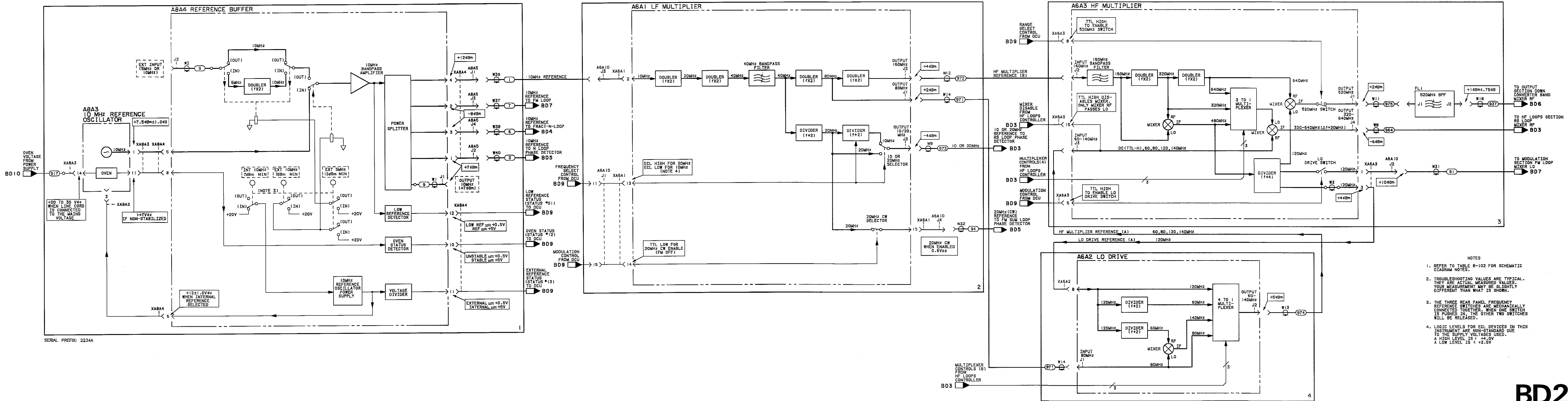
- THE OUTPUT OF BD3 WOULD BE: 532.876 401 9 MHz
- THE OUTPUT OF BD4 WOULD BE: 200-76.401 9 MHz OR 123.5981 MHz
- THE OUTPUT OF BD5 WOULD BE: 10 + 2.876 401 9 MHz OR 12.876 401 9 MHz

CAUTION

IF THE LINE FUSE BURNS OUT DO NOT REPLACE IT UNTIL THE CAUSE OF THE FAILURE HAS BEEN DETERMINED AND REPAIRED BY A QUALIFIED SERVICE PERSON AND SPECIFICALLY WITH RESISTANCE CHECKS IN THE POWER SUPPLY. REFER TO SERVICE SHEET 65. REPLACING THIS FUSE IN A DAMAGED SIGNAL GENERATOR CAN RESULT IN ADDITIONAL DAMAGE

BD1

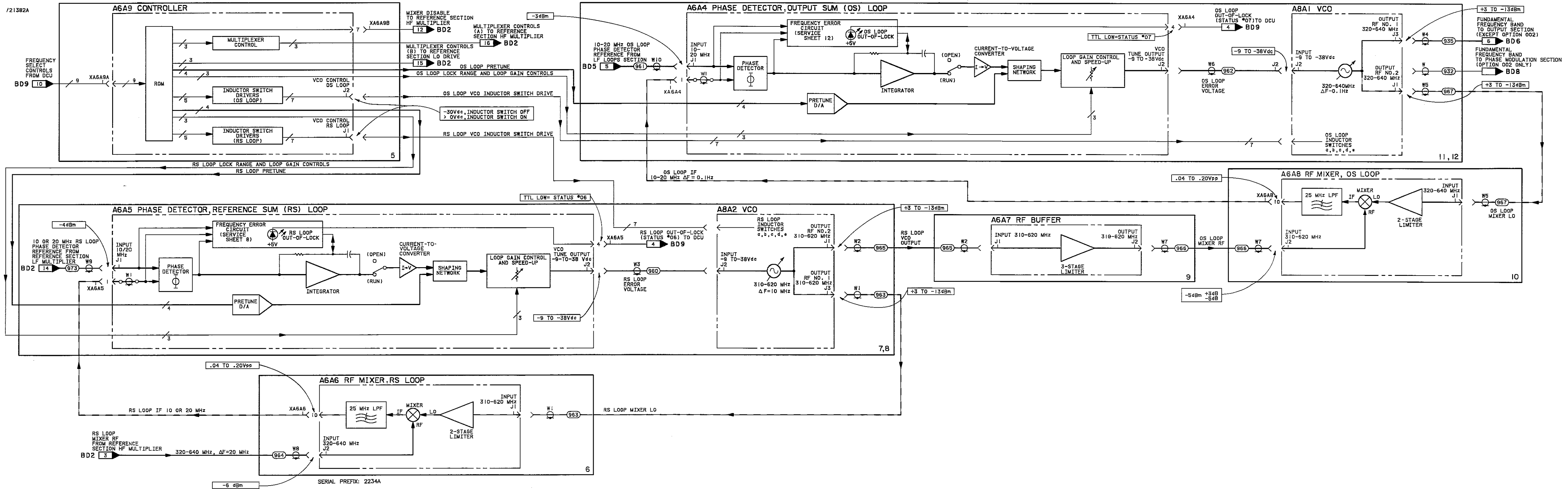
Figure 8-201. Overall Block Diagram



BD2

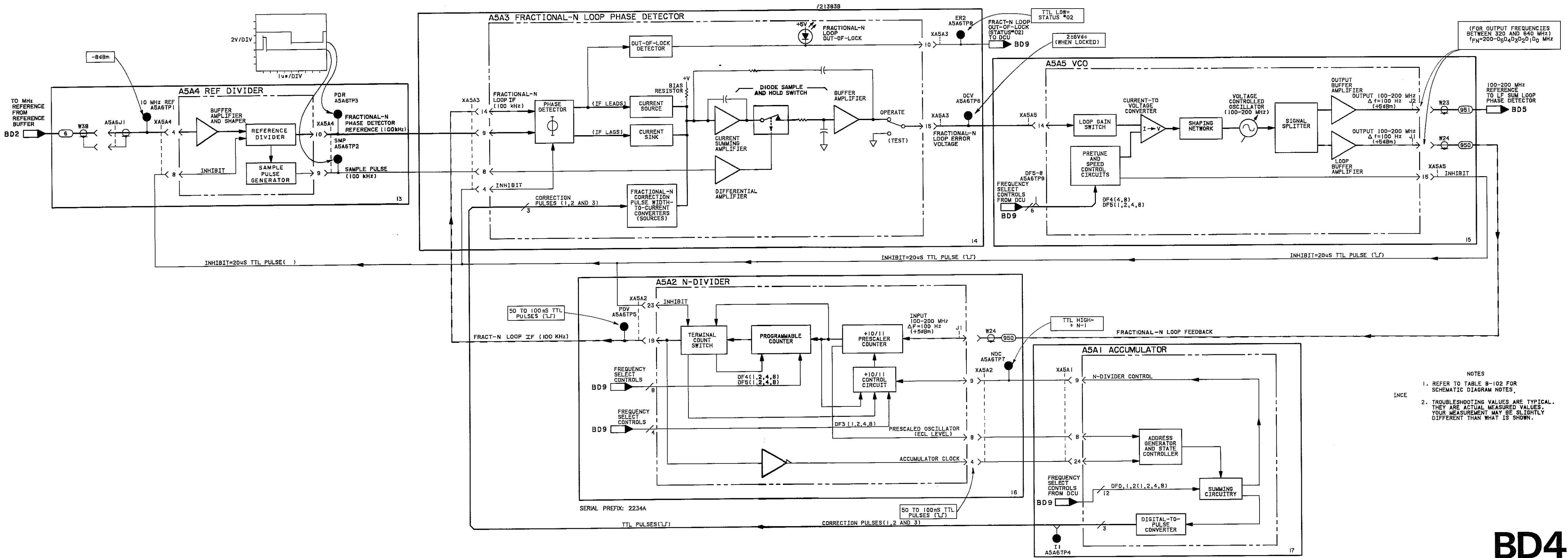
Figure 8-202. Reference Section Block Diagram

/21382A



BD3

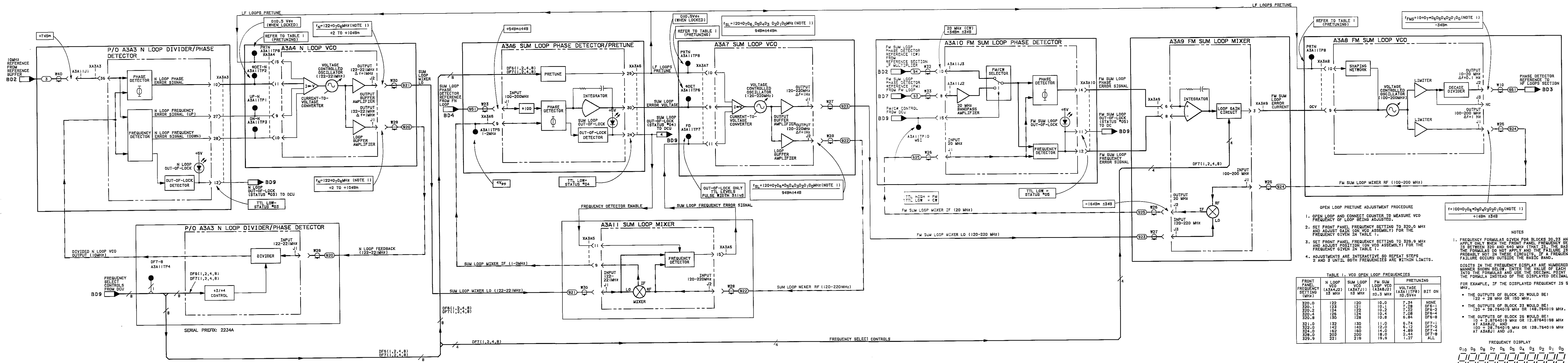
Figure 8-204. High Frequency Loops Block Diagram



- NOTES
1. REFER TO TABLE 9-102 FOR SCHEMATIC DIAGRAM NOTES.
 2. TROUBLESHOOTING VALUES ARE TYPICAL. THEY ARE ACTUAL MEASURED VALUES. YOUR MEASUREMENT MAY BE SLIGHTLY DIFFERENT THAN WHAT IS SHOWN.

BD4

Figure 8-209. Fractional-N Loops Block Diagram
8-231/232



- OPEN LOOP PRETUNE ADJUSTMENT PROCEDURE
1. OPEN LOOP AND CONNECT COUNTER TO MEASURE VCO FREQUENCY OF LOOP BEING ADJUSTED.
 2. SET FRONT PANEL FREQUENCY SETTING TO 320.0 MHz AND ADJUST GAIN (ON VCO ASSEMBLY) FOR THE FREQUENCY GIVEN IN TABLE I.
 3. SET FRONT PANEL FREQUENCY SETTING TO 329.9 MHz AND ADJUST POSITION (ON VCO ASSEMBLY) FOR THE FREQUENCY GIVEN IN TABLE I.
 4. ADJUSTMENTS ARE INTERACTIVE SO REPEAT STEPS 2 AND 3 UNTIL BOTH FREQUENCIES ARE WITHIN LIMITS.

TABLE I. VCO OPEN LOOP FREQUENCIES

FRONT PANEL FREQUENCY SETTING (MHz)	N LOOP VCO (A3A4J2) ±3 MHz	SUM LOOP VCO (A3A7J1) ±3 MHz	FM SUM LOOP VCO (A3A8J2) ±0.3 MHz	VOLTAGE (A3A11TP8) 20.5Vdc	PRETUNING BIT ON
320.0	120	120	10.0	7.34	NONE
320.1	123	121	10.1	7.28	DF6-1
320.2	124	122	10.2	7.22	DF6-2
320.4	126	124	10.4	7.08	DF6-4
320.8	130	128	10.8	6.84	DF6-8
321.0	130	130	11.0	6.74	DF7-1
322.0	142	140	12.0	6.12	DF7-2
324.0	162	160	14.0	4.89	DF7-4
328.0	200	200	18.0	2.44	DF7-8
329.9	221	219	19.9	1.27	ALL

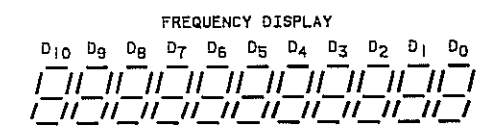
NOTES

1. FREQUENCY FORMULAS GIVEN FOR BLOCKS 20, 23 AND 26 APPLY ONLY WHEN THE FRONT PANEL FREQUENCY SETTING IS BETWEEN 320 AND 640 MHz (THAT IS, THE BASIC BAND). THE FORMULAS DO NOT APPLY AND THE FAILURE IS PROBABLY NOT IN THESE CIRCUITS, IF A FREQUENCY FAILURE OCCURS OUTSIDE THE BASIC BAND.

DIGITS IN THE FREQUENCY DISPLAY ARE NUMBERED IN THE MANNER SHOWN BELOW. ENTER THE VALUE OF EACH DIGIT INTO THE FORMULAS AND USE THE DECIMAL POINT SHOWN IN THE FORMULA INSTEAD OF THE DISPLAYED DECIMAL POINT.

FOR EXAMPLE, IF THE DISPLAYED FREQUENCY IS 532.8764019 MHz,

- THE OUTPUTS OF BLOCK 20 WOULD BE: 122 + 28 MHz OR 150 MHz.
- THE OUTPUTS OF BLOCK 23 WOULD BE: 120 + 28.764019 MHz OR 148.764019 MHz.
- THE OUTPUTS OF BLOCK 26 WOULD BE: 10 + 2.8764019 MHz OR 12.87640198 MHz AT A3A8J2, AND 100 + 28.764019 MHz OR 128.764019 MHz AT A3A8J1 AND J3.



BD5

Figure 8-210. Low Frequency Loops Block Diagram

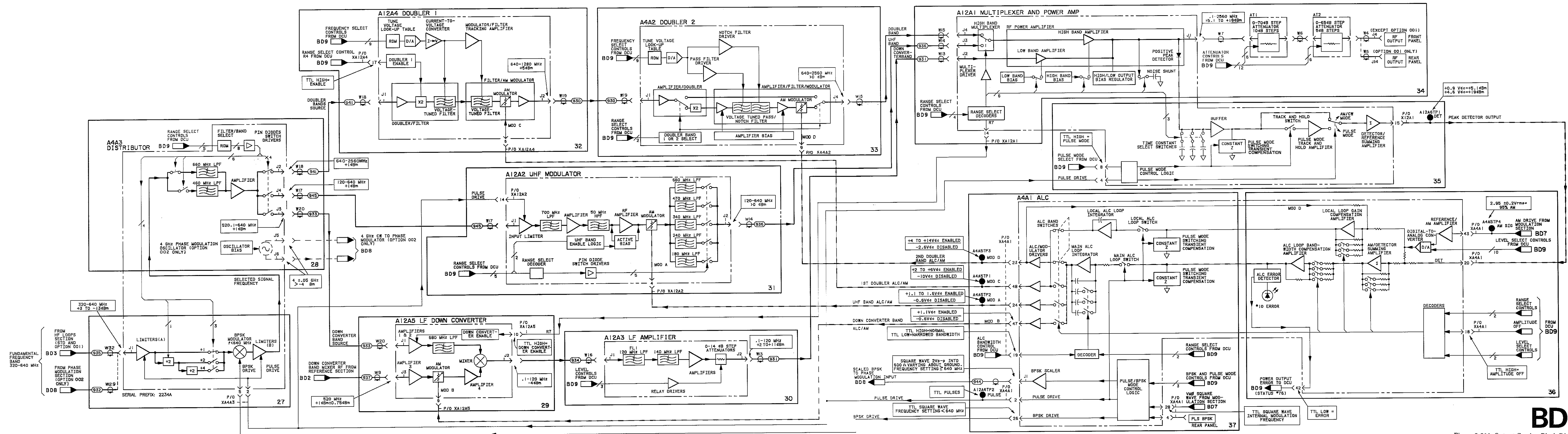
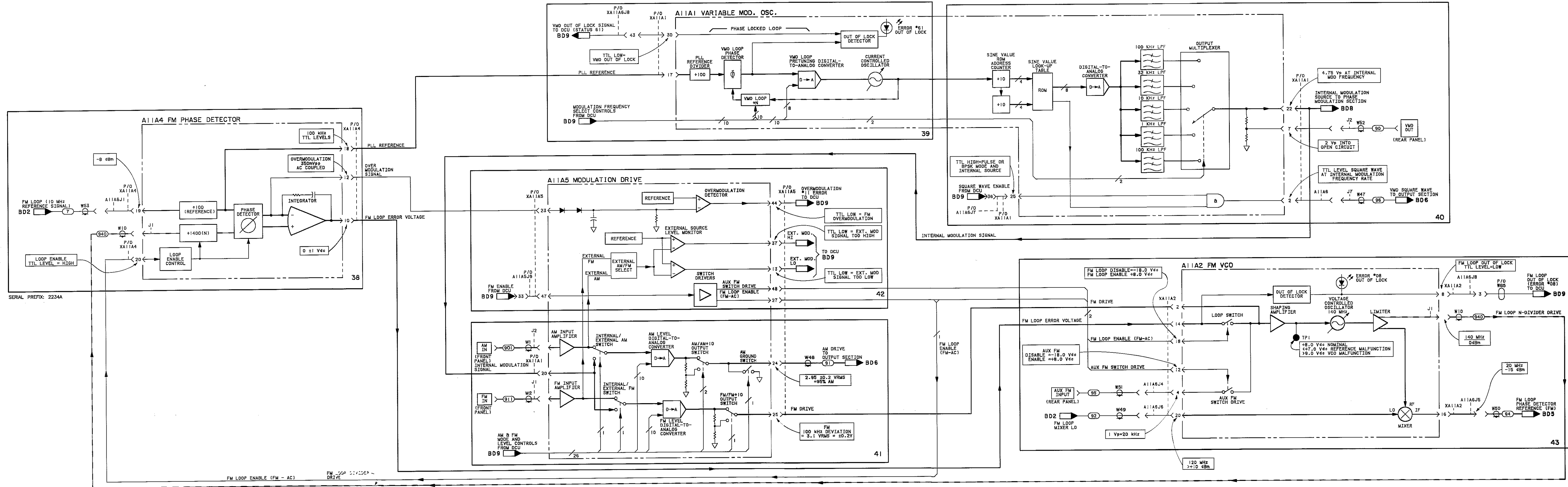


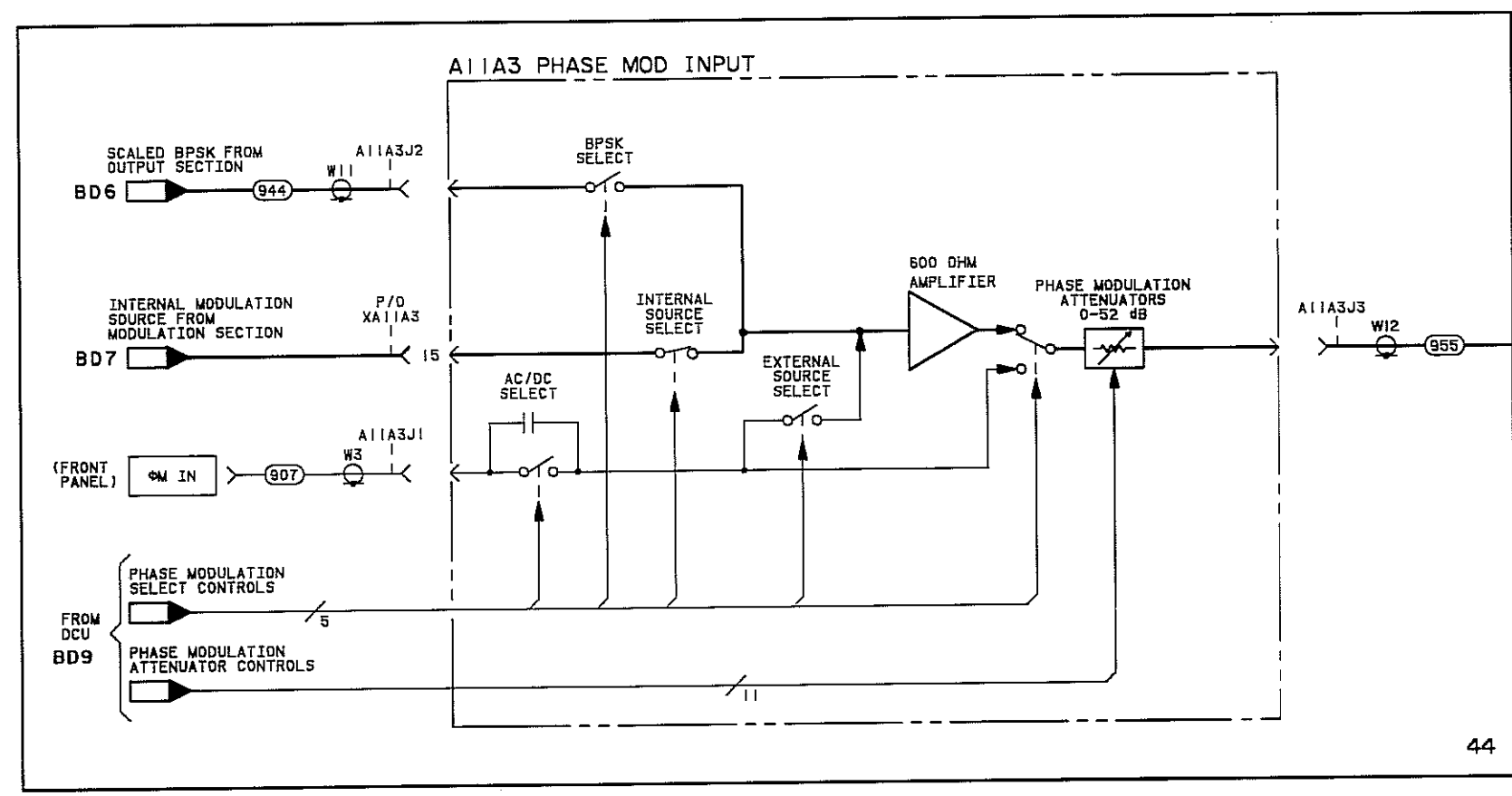
Figure 8-211. Output Section Block Diagram

BD6



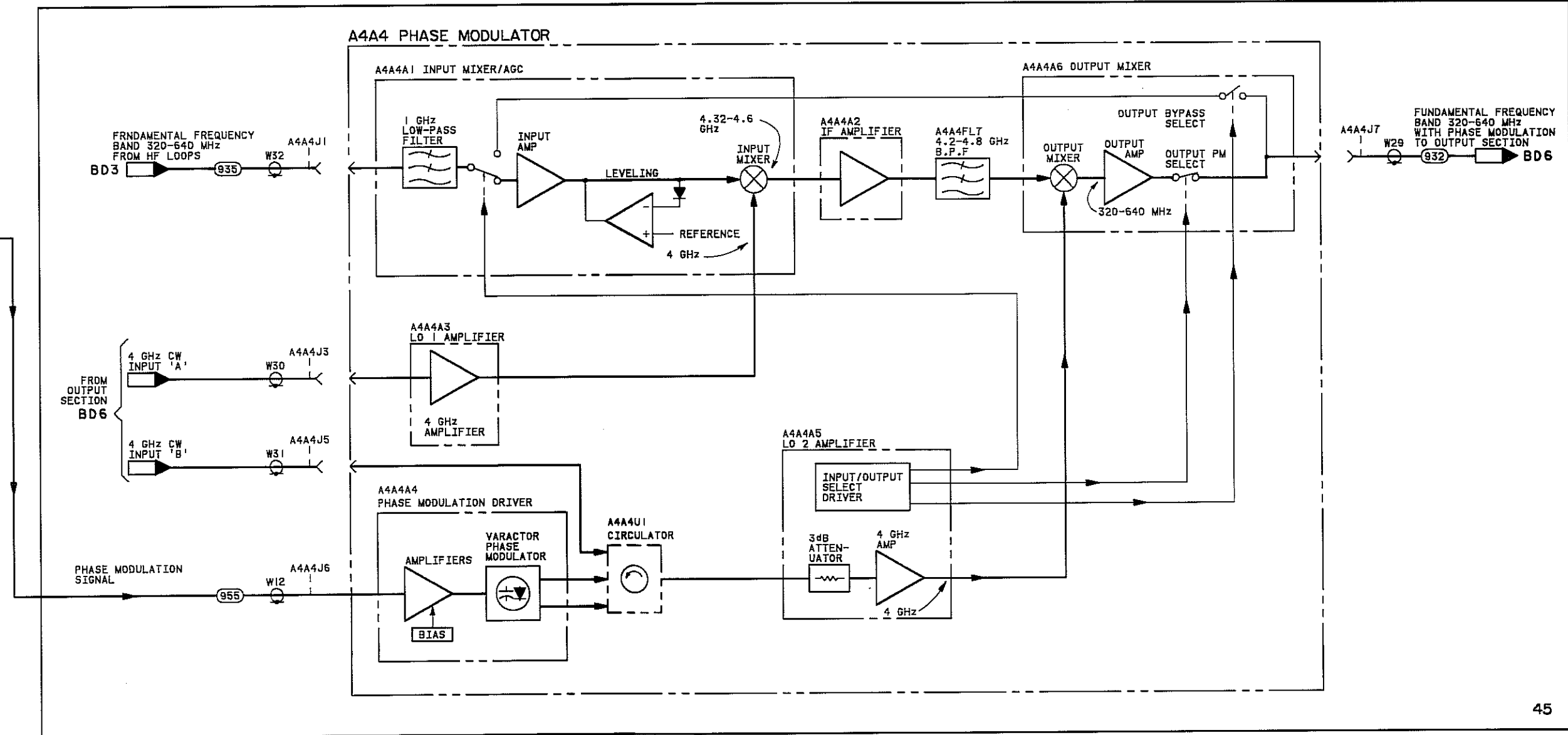
BD7

Figure 8-212. Modulation Section Block Diagram



SERIAL PREFIX: 2234A

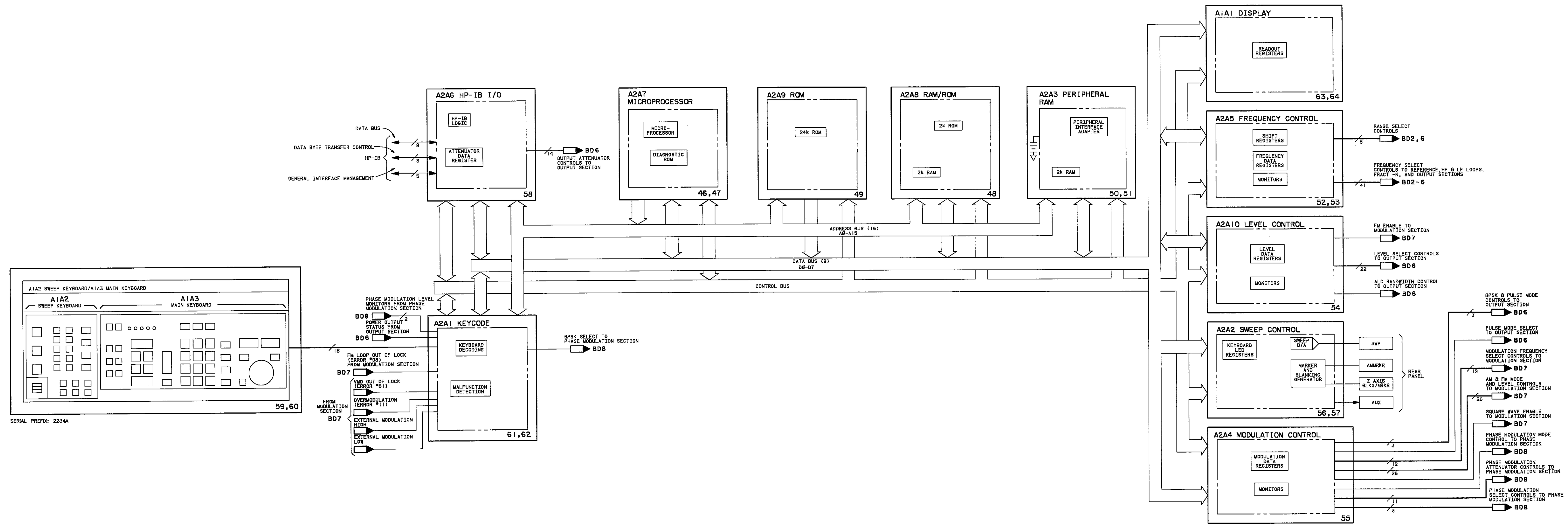
44



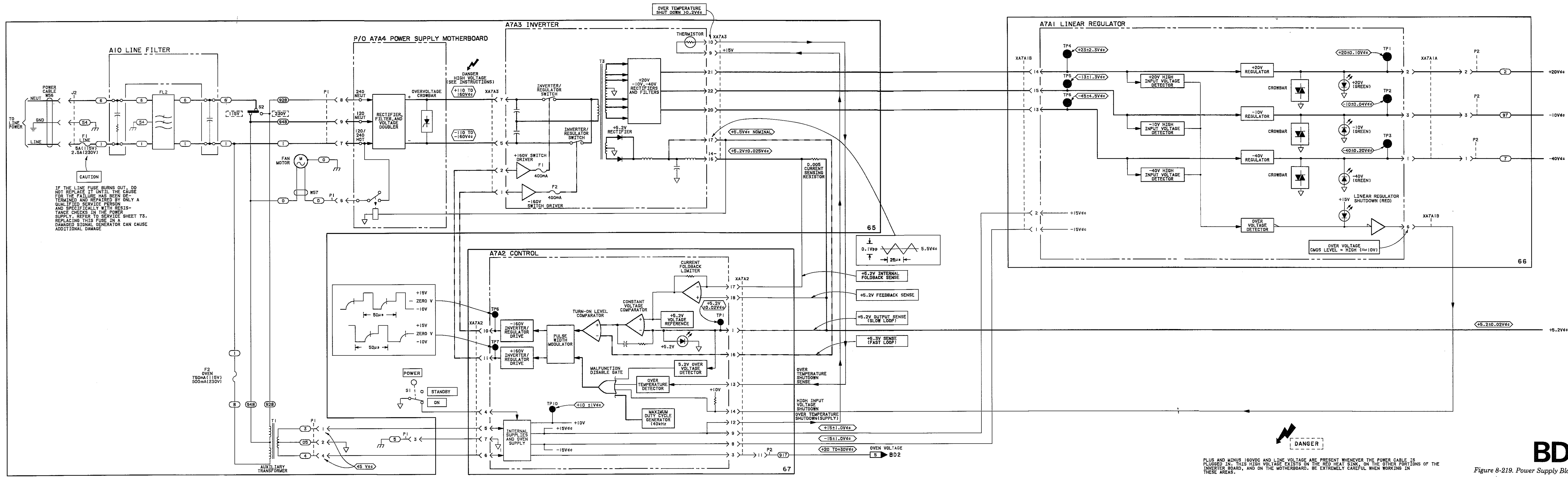
45

BD8

Figure 8-213. Phase Modulation Section Block Diagram



BD9
 Figure 8-217. Digital Control Unit (DCU)
 Block Diagram
 8-287/288



SERIAL PREFIX: 2234A

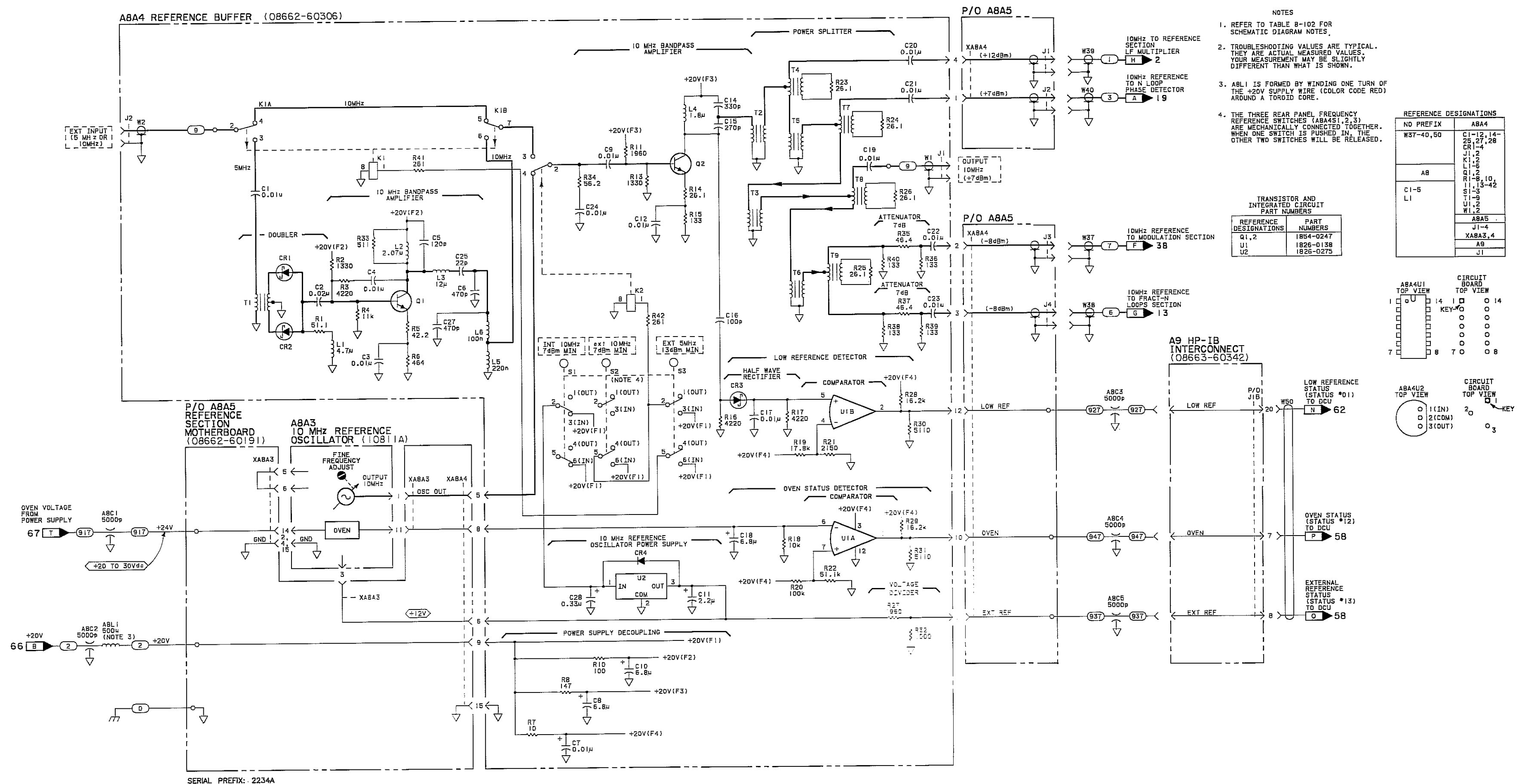
DANGER

PLUS AND MINUS 160VDC AND LINE VOLTAGE ARE PRESENT WHENEVER THE POWER CABLE IS PLUGGED IN. THIS HIGH VOLTAGE EXISTS ON THE RED HEAT SINK, ON THE OTHER PORTIONS OF THE INVERTER BOARD, AND ON THE MOTHERBOARD. BE EXTREMELY CAREFUL WHEN WORKING IN THESE AREAS.

BEFORE REMOVING OR INSERTING POWER SUPPLY PLUG-IN BOARDS, DISCONNECT THE AC POWER CABLE AND ALLOW 30 SECONDS FOR THE FILTER CAPACITORS TO DISCHARGE.

FAILURE TO OBSERVE THESE PRECAUTIONS MAY RESULT IN INJURY TO PERSONNEL OR DAMAGE TO THE EQUIPMENT.

BD10
Figure 8-219. Power Supply Block Diagram



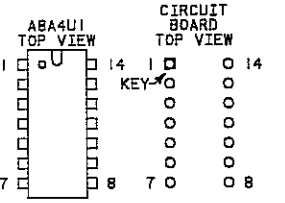
- NOTES
- REFER TO TABLE 8-102 FOR SCHEMATIC DIAGRAM NOTES.
 - TROUBLESHOOTING VALUES ARE TYPICAL. THEY ARE ACTUAL MEASURED VALUES, YOUR MEASUREMENT MAY BE SLIGHTLY DIFFERENT THAN WHAT IS SHOWN.
 - ABL1 IS FORMED BY WINDING ONE TURN OF THE +20V SUPPLY WIRE (COLOR CODE RED) AROUND A TOROID CORE.
 - THE THREE REAR PANEL FREQUENCY REFERENCE SWITCHES (ABA4S1,2,3) ARE MECHANICALLY CONNECTED TOGETHER. WHEN ONE SWITCH IS PUSHED IN, THE OTHER TWO SWITCHES WILL BE RELEASED.

REFERENCE DESIGNATIONS

NO PREFIX	ABA4
W37-40,50	CR1-2,14-25,27,28 CR1-4 J1,2 K1,2 L1-5 Q1,2 R1-5,10,11,13-42 S1-3 T1-3 U1,2 W1,2
AB	J1-4 XABA3,4
CI-5 LI	A9
	J1

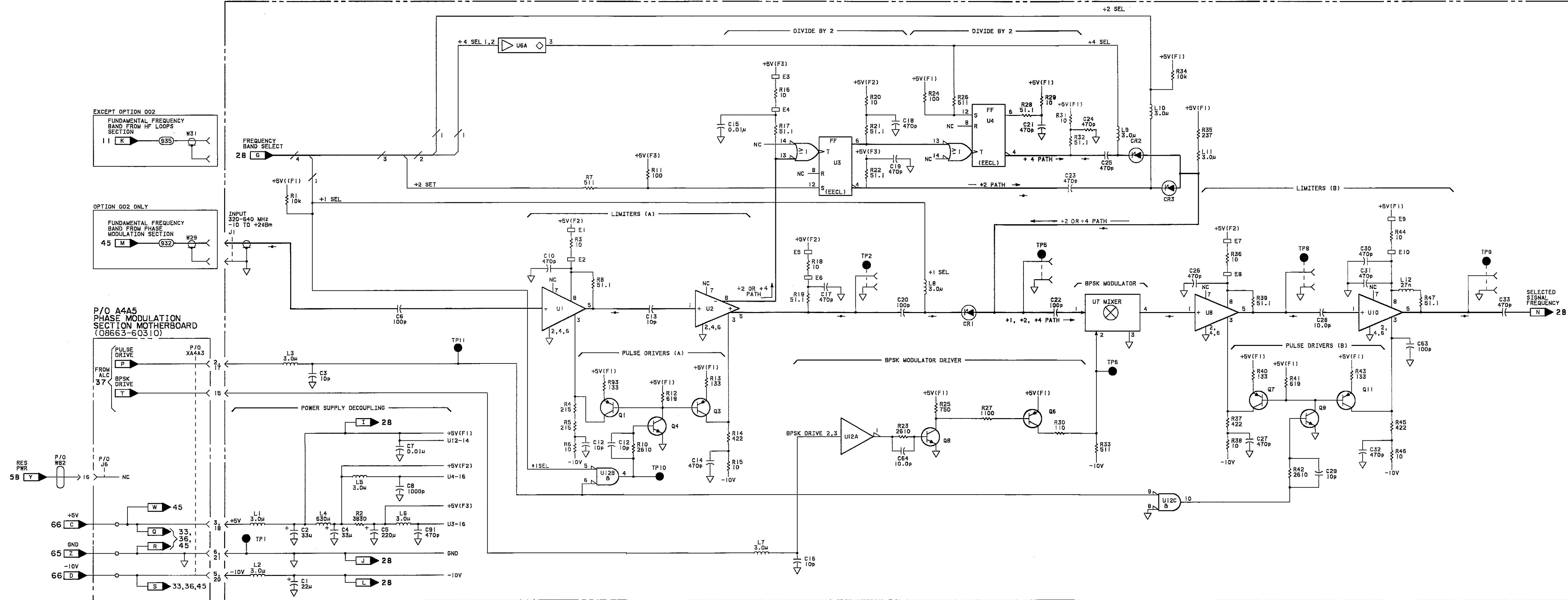
TRANSISTOR AND INTEGRATED CIRCUIT PART NUMBERS

REFERENCE DESIGNATIONS	PART NUMBERS
Q1,2	1854-0247
U1	1826-0138
U2	1826-0275



SERVICE SHEET 1
A8A3, A8A4

Figure 8-303. ABA3 and ABA4 10 MHz Reference Oscillator & Buffer Schematic
8-305/306



SERIAL PREFIX: 2234A

- NOTES
- REFER TO TABLE 8-102 FOR SCHEMATIC DIAGRAM NOTES.
 - TROUBLESHOOTING VALUES ARE TYPICAL. THEY ARE ACTUAL MEASURED VALUES. YOUR MEASUREMENTS MAY BE SLIGHTLY DIFFERENT THAN WHAT IS SHOWN.
 - THE A4A3 DISTRIBUTOR ASSEMBLY PART NUMBER IS 08663-60346 FOR STANDARD AND OPTION 001 INSTRUMENTS, AND 08663-60304 FOR OPTION 002 INSTRUMENTS. OPTION 002 A4A3 ASSEMBLIES INCLUDE 4 GHz PHASE MODULATION OSCILLATOR A4A4A1. (SEE SERVICE SHEET 45)

LOGIC LEVELS

TTL	
HIGH	>+2V
LOW	<+0.5V
< IS MORE NEG. THAN	
> IS MORE POS. THAN	
OPEN	HIGH
GROUND	LOW

REFERENCE DESIGNATIONS

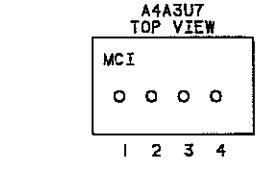
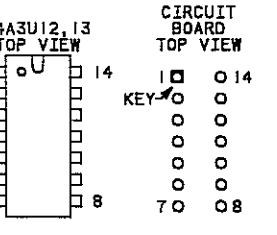
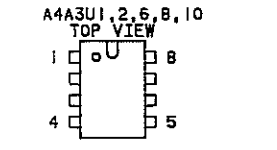
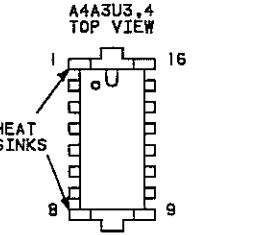
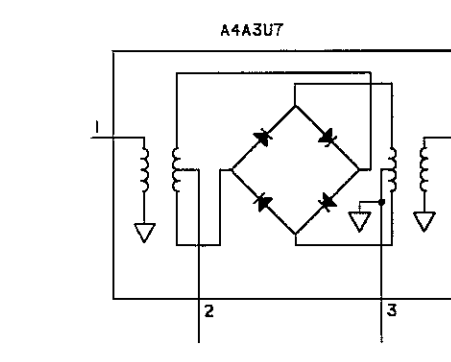
NO PREFIX	U1-4, 7, 8, 10, 12
W29, 31, 82	R1-7, TP1, 2, 5, 6, 8-11
A4A3	
C1-33, 63, 64	A4A5
CR1-3	XA4A3
C1-10	
C1-12	
Q1, 3, 4, 6-9, 11	

TRANSISTOR AND INTEGRATED CIRCUIT PART NUMBERS

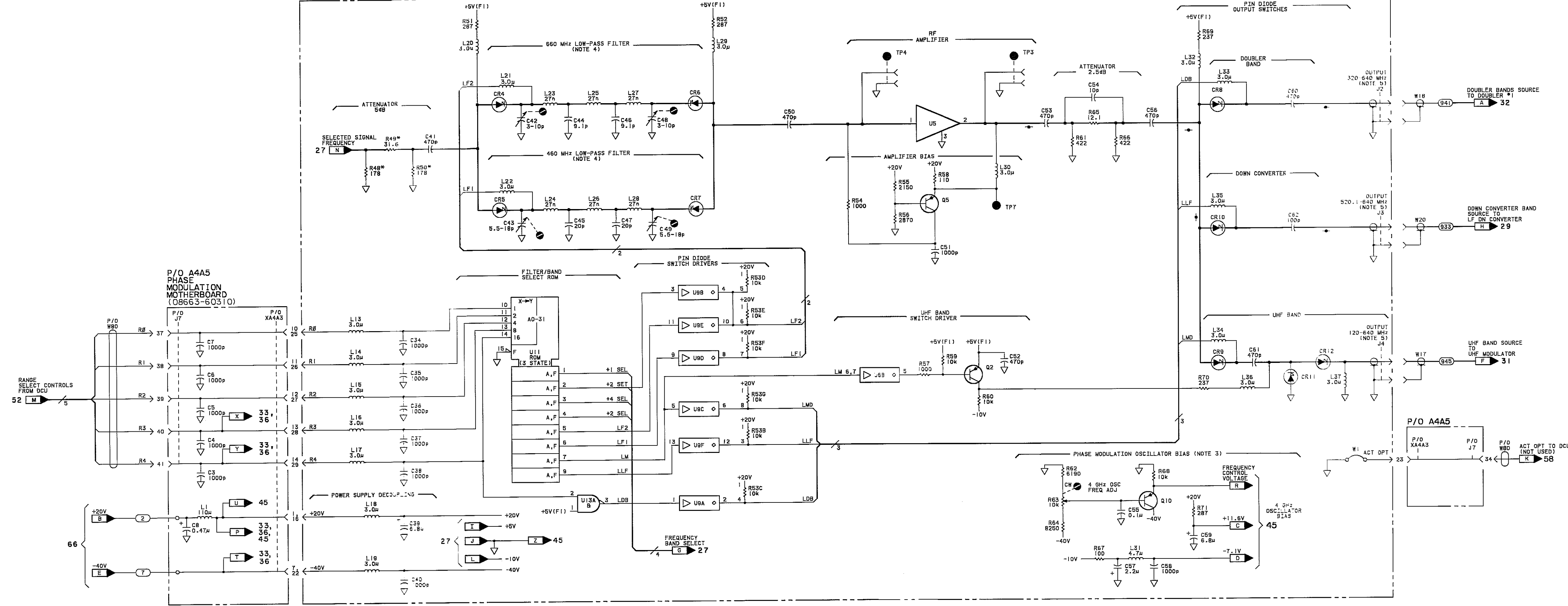
REFERENCE DESIGNATIONS	PART NUMBERS
Q1, 3, 6, 7, 11	1853-0405
Q4, 8, 9	1854-0809
U1, 2, 8, 10	1826-0372
U3, 4	1820-1940
U6	1820-0855
U7	0955-0147
U12	1820-1322
U13	1820-1197

INTEGRATED CIRCUIT VOLTAGE AND GROUND CONNECTIONS

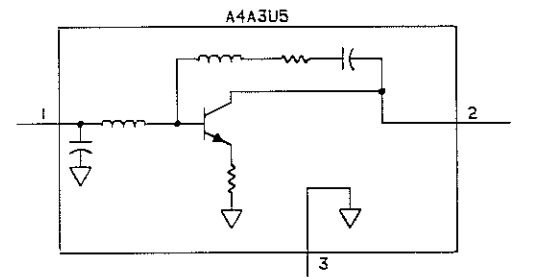
REFERENCE DESIGNATIONS	PIN NUMBERS
U3, 4	1, 3, 5, 9-11
U6	+5V(F1) - 8
U12	- 7



P/O A4A3 DISTRIBUTOR ASSEMBLY (08663-60346; EXCEPT OPTION 002) (08663-60304; OPTION 002 ONLY) (NOTE 3)



- NOTES
- REFER TO TABLE 8- FOR SCHEMATIC DIAGRAM NOTES.
 - TROUBLESHOOTING VALUES ARE TYPICAL. THEY ARE ACTUAL MEASURED VALUES. YOUR MEASUREMENTS MAY BE SLIGHTLY DIFFERENT THAN WHAT IS SHOWN.
 - A4A3 DISTRIBUTOR PART NUMBER IS 08663-60346 FOR STANDARD AND OPTION 001 INSTRUMENTS AND 08663-60304 FOR OPTION 002 INSTRUMENTS. OPTION 002 A4A3 ASSEMBLIES INCLUDE 4 GHz PHASE MODULATION OSCILLATOR A4A5A1. SEE SERVICE SHEET 45. ALL A4A3 ASSEMBLIES INCLUDE OSCILLATOR BIAS NETWORK SHOWN.
 - VARIABLE CAPACITORS AT INPUT AND OUTPUT NODES OF LOW-PASS FILTERS PROVIDE FOR FILTER FREQUENCY RESPONSE ADJUSTMENT. SEE SECTION V FOR PROCEDURES.
 - FOR 320-640 MHz AT J2, SET GENERATOR'S OUTPUT FREQUENCY TO 640-2560 MHz. FOR 520.1-640 MHz AT J3, SET OUTPUT TO 10 kHz-120 MHz. FOR 120-640 MHz AT J4, SET OUTPUT TO 120-640 MHz.

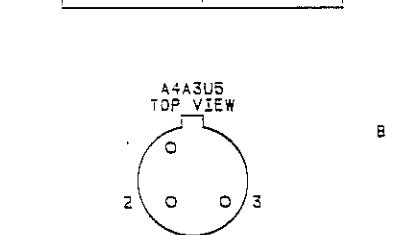


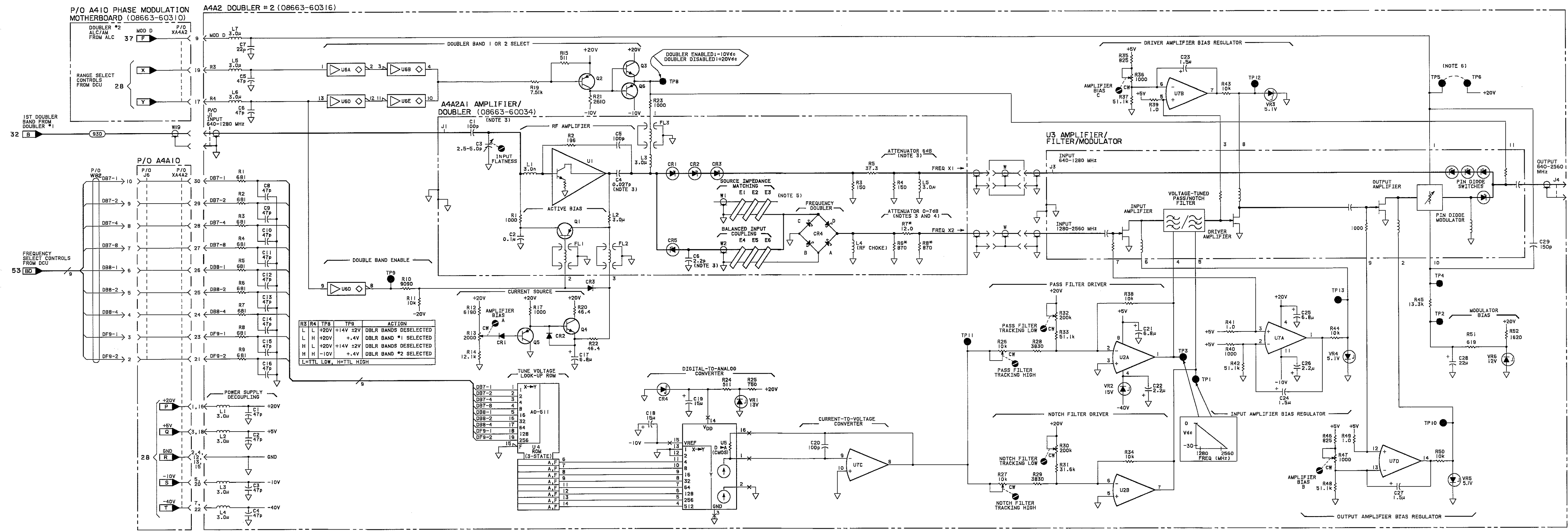
REFERENCE DESIGNATIONS	
NO PREFIX	A4A5
W17,18,20,80	C3-B
A4A3	J7
	L1
C34-62	XA4A3
CR4-12	
L3-37	
Q2,5,10	
R48-7	
TP2,4,7	
U5,6,9	
U11,3	

LOGIC LEVELS	
TTL	
HIGH	>+2.0V
LOW	<+0.8V
< IS MORE NEG. THAN	
> IS MORE POS. THAN	
OPEN	HIGH
GROUND	LOW

INTEGRATED CIRCUIT VOLTAGE AND GROUND CONNECTIONS	
REFERENCE DESIGNATIONS	PIN NUMBERS
U5	+5V(F1) - 8
U9,13	+5V(F1) - 14
	+5V(F1) - 7
U11	+5V(F1) - 16
	+5V(F1) - 8

TRANSISTOR AND INTEGRATED CIRCUIT PART NUMBERS	
REFERENCE DESIGNATIONS	PART NUMBERS
Q2,5	1853-0459
Q10	1853-0281
U5	08662-67002
U9	1820-0655
U11	1820-0668
U13	08663-80003
J14	1823-1157
	08665-60033





- NOTES
- REFER TO TABLE 8-102 FOR SCHEMATIC DIAGRAM NOTES.
 - TROUBLESHOOTING VALUES ARE TYPICAL. THEY ARE ACTUAL MEASURED VALUES. YOUR MEASUREMENTS MAY BE SLIGHTLY DIFFERENT THAN WHAT IS SHOWN.
 - THE SMALL CHIP COMPONENTS ON THIS ASSEMBLY REQUIRE LOW TEMPERATURE SOLDERING TECHNIQUES. USE SILVER SOLDER.
 - ASTERISK (*) INDICATES THAT PARTS ARE SELECTED IN TEST. THE VALUES SHOWN ARE TYPICAL AND REPRESENT 0dB ATTENUATION. REFER TO SECTION V FOR PROCEDURES.
 - FERRITE BEADS E2-E3 CREATE AN INDUCTIVE REACTANCE, ENABLING THE IMPEDANCE TO GROUND AT THE JUNCTION OF CR4C AND D TO MATCH THAT AT THE JUNCTION OF CR5A AND B. ONLY THE OUTER SHIELD OF COAX W1 IS USED.
 - JUMPER WIRE IS INSTALLED FOR TROUBLESHOOTING ONLY. TO TURN PIN DIODE MODULATOR FULLY ON.

LOGIC LEVELS

HIGH	>+2V
LOW	<+0.2V
<	IS MORE NEG. THAN
>	IS MORE POS. THAN
OPEN	HIGH
GROUND	LOW

TRANSISTOR AND INTEGRATED CIRCUIT PART NUMBERS

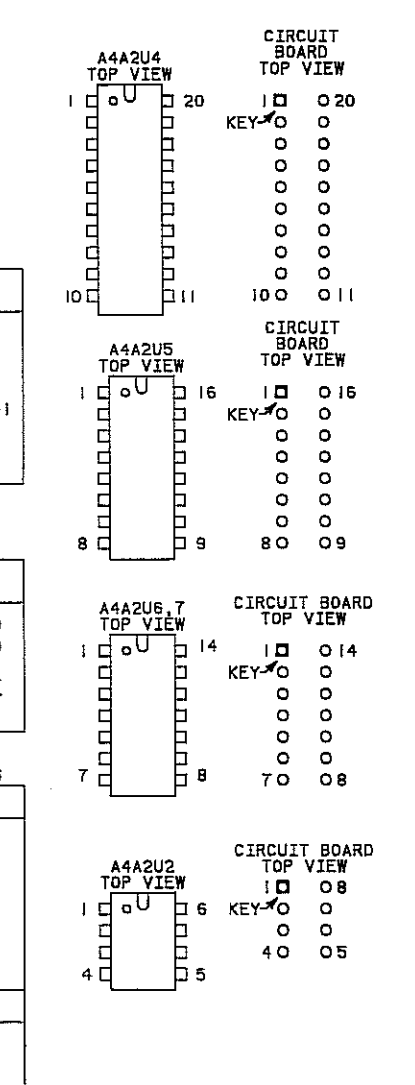
REFERENCE DESIGNATIONS	PART NUMBERS
Q1, 2, 5, 6	1853-0459
Q3	1854-0810
Q4	1854-0637
U2	8226-0547
U3	08663-67001
U4	1815-100B
U5	8226-0931
U6	8220-0471
U7	8226-0600

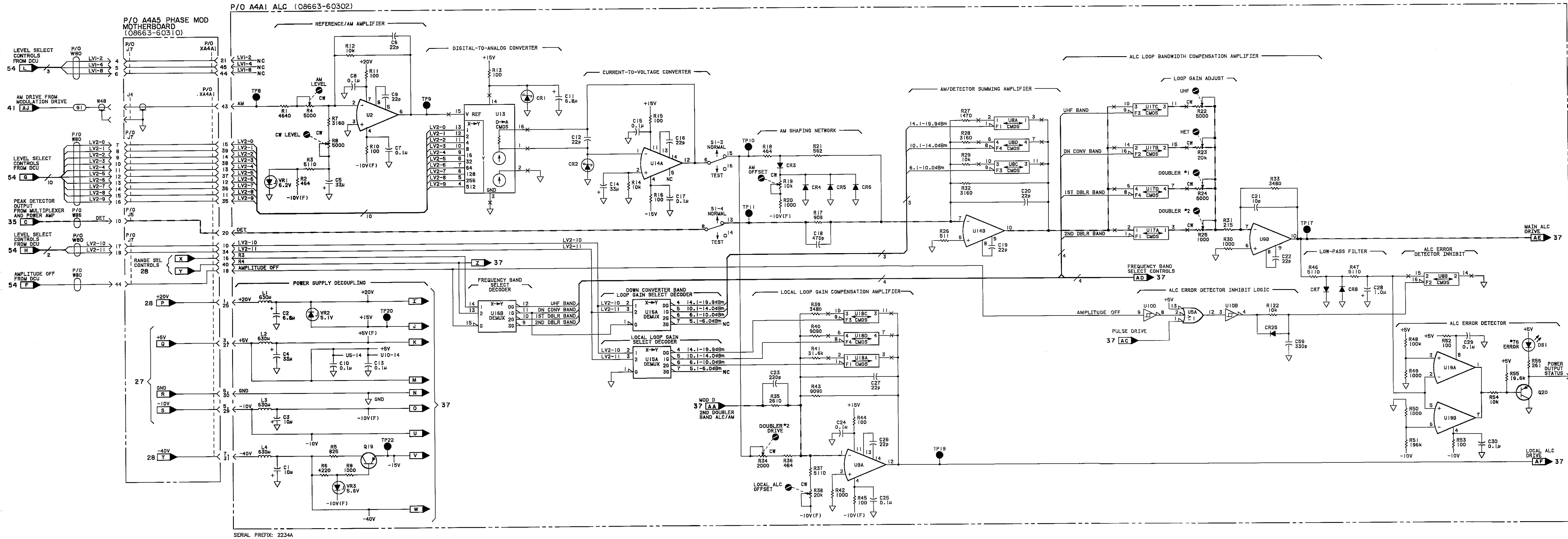
INTEGRATED CIRCUIT VOLTAGE AND GROUND CONNECTIONS

REFERENCE DESIGNATIONS	PIN NUMBERS
U4	+5V - 20
	-10 - 10
U6	+5V - 14
	-17

REFERENCE DESIGNATIONS

NO PREFIX	A4A2A1
W	C1-6
	CR1-5
	FL1-3
	J1-3
	L1-5
	R1-8
	U1, 2
	W1, 2
C1-28	CR1-5
CR1-5	L1-7
L1-7	R1-8
R1-8	U1, 2
TP1-8, 10-13	A4A10
U2-7	J6
VR1-6	XA4A2



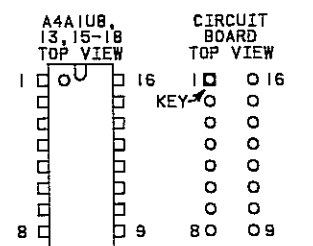
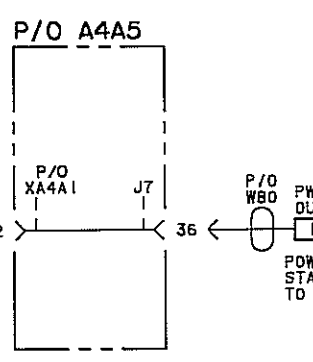
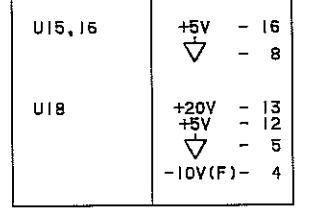


- NOTES
- SEE TABLE 8-102 FOR SCHEMATIC DIAGRAM NOTES.
 - TROUBLESHOOTING VALUES ARE TYPICAL. THEY ARE ACTUAL MEASURED VALUES. YOUR MEASUREMENTS MAY BE SLIGHTLY DIFFERENT THAN WHAT IS SHOWN.

REFERENCE DESIGNATIONS		LOGIC LEVELS	
NO PREFIX	ATA4	HIGH	TTL
W48,80,86	X4A1	LOW	<+2V
A4A1	X4A1	< IS MORE NEG. THAN	> IS MORE POS. THAN
C1-30, 59		OPEN	HIGH
CR1-8, 25		GROUND	LOW
DS1			
LI-4			
Q19, 20			
R1-56, 122			
TP8-11, 17,			
TP9, 10, 22			
U2, 5, 8-10,			
U3-18			
VR1, 5			

INTEGRATED CIRCUIT VOLTAGE AND GROUND CONNECTIONS	
REFERENCE DESIGNATIONS	PIN NUMBERS
U8, 17	+15V - 13
	+5V - 12
	↓ - 5
	-10V(F) - 4
U15, 16	+5V - 16
	↓ - 8
U18	+20V - 13
	+5V - 12
	↓ - 5
	-10V(F) - 4

TRANSISTOR INTEGRATED CIRCUIT PART NUMBERS	
REFERENCE DESIGNATIONS	PART NUMBERS
Q19	1853-0314
Q20	1853-0405
U2	1826-0783
U5	1820-1002
U8, 17, 18	1826-0850
U9, 14	1826-0850
U10	1820-1415
U13	1826-0264
U15, 16	1820-1281
U19	1826-0412

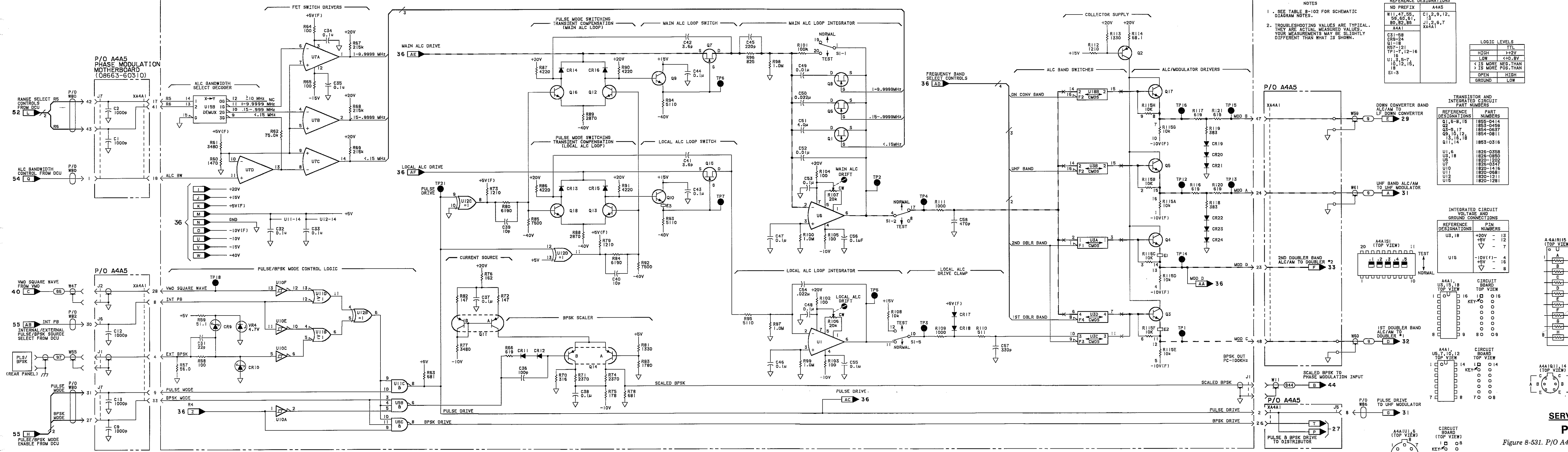


SERVICE SHEET 36

P/O A4A1

Figure 8-530. P/O A4A1 Automatic Level Control Schematic
8-547/548

P/O A4A1 ALC (08663-60302)



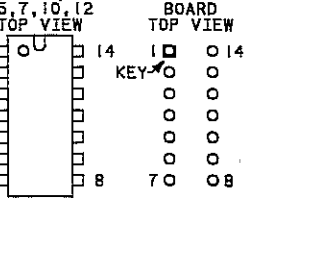
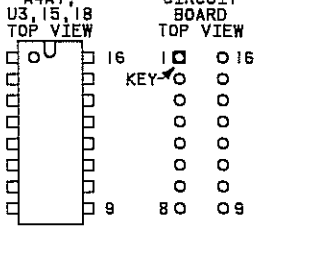
NOTES
 1. SEE TABLE 8-102 FOR SCHEMATIC DIAGRAM NOTES.
 2. TROUBLESHOOTING VALUES ARE TYPICAL. THEY ARE ACTUAL MEASURED VALUES. YOUR MEASUREMENTS MAY BE SLIGHTLY DIFFERENT THAN WHAT IS SHOWN.

REFERENCE DESIGNATIONS	
NO PREFIX	A4A5
W1, 47, 55, 59, 60, 61, 80, 82, 86	C1, 2, 9, 12, 13, 14, 15, 7
A4A1	X4A1
C31-58	J1, 2, 3, 4, 5, 6, 7
CR9-24	
Q1-18	
RF1-12	
TP1-12, 15-16	
U1, 5, 6, 7, 12, 15, 18	
E1-5	

LOGIC LEVELS	
HIGH	V _{CC}
LOW	<+0.8V
< IS MORE NEG. THAN > IS MORE POS. THAN	
OPEN	HIGH
GROUND	LOW

TRANSISTOR AND INTEGRATED CIRCUIT PART NUMBERS	
REFERENCE DESIGNATIONS	PART NUMBERS
Q1, 6-8, 15	1855-0414
Q2	1853-0459
Q5-5, 17	1854-0837
Q9, 10, 12, 13, 16, 18	1854-0811
Q11, 14	1853-0316
U1, 6	1826-0358
U3, 18	1826-0850
U5	1820-1202
U7	1826-0347
U10	1820-1416
U11	1820-0681
U12	1820-1211
U15	1820-1281

INTEGRATED CIRCUIT VOLTAGE AND GROUND CONNECTIONS	
REFERENCE DESIGNATIONS	PIN NUMBERS
U3, 18	+20V - 13
	+5V - 12
	-10V(f) - 4
	+5V - 16
	-10V - 8

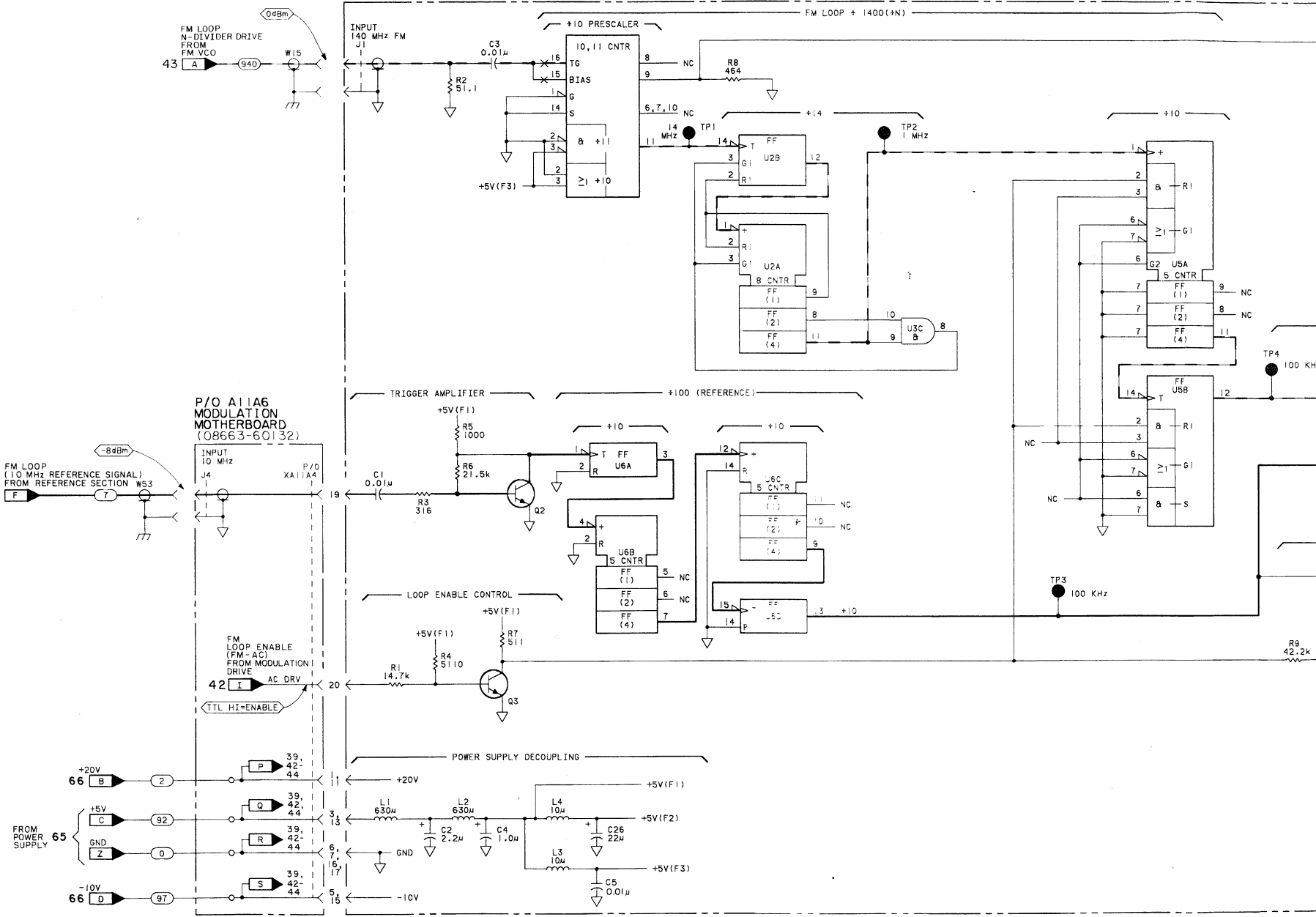


SERVICE SHEET 37
P/O A4A1

Figure 8-531. P/O A4A1 Automatic Level Control Schematic
 8-551/552

SERIAL PREFIX: 2234A

A11A4 FM PHASE DETECTOR (08663-60344)



A11A4

NOTES

- REFER TO TABLE 8-102 FOR SCHEMATIC DIAGRAM NOTES.
 - TROUBLESHOOTING VALUES ARE TYPICAL. THEY ARE ACTUAL MEASURED VALUES. YOUR MEASUREMENTS MAY BE SLIGHTLY DIFFERENT THAN WHAT IS SHOWN.
- BACKDATING INFORMATION IN SECTION VII.

REFERENCE DESIGNATIONS

NO PREFIX	A4A10
W15,37	J4 TP2 XA11A4
A4A6	
C1-15 J1,2 L1-4 Q1-3 R1-24 TP1-4 U1-6,9 VR1	

LOGIC LEVELS

TTL	
HIGH	>+2V
LOW	<+0.8V
< IS MORE NEG. TH/	> IS MORE POS. TH/
OPEN	HIGH
GROUND	LOW

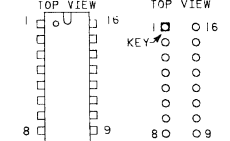
TRANSISTOR AND INTEGRATED CIRCUIT PART NUMBERS

REFERENCE DESIGNATIONS	PART NUMBERS
Q1,3	1854-0404
Q2	1854-0019
U1	1820-1780
U2	1820-1478
U3	1820-1201
U4	1820-0630
U5	1820-1490
U6	1820-1463
U9	1826-0013

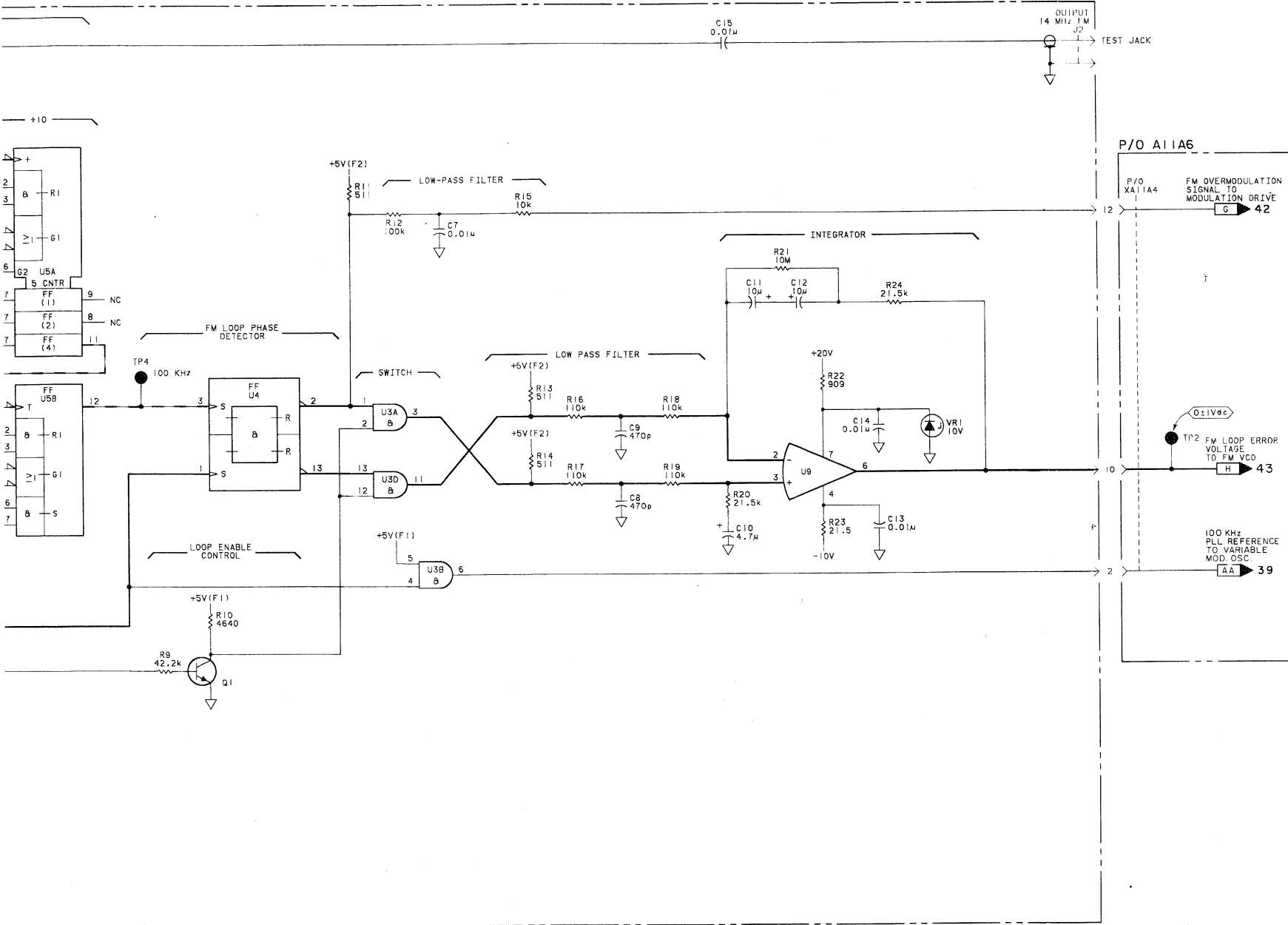
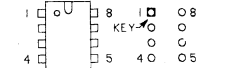
INTEGRATED CIP VOLTAGE AN GROUND CONNEC

REFERENCE DESIGNATIONS	NI
U1	+5V() ▽
U2	+5V() ▽
U3	+5V() ▽
U4	+5V() ▽
U5	+5V() ▽
U6	+5V() ▽

CIRCUIT BOARD TOP VIEW



CIRCUIT BOARD TOP VIEW



A11A4 38

NOTES

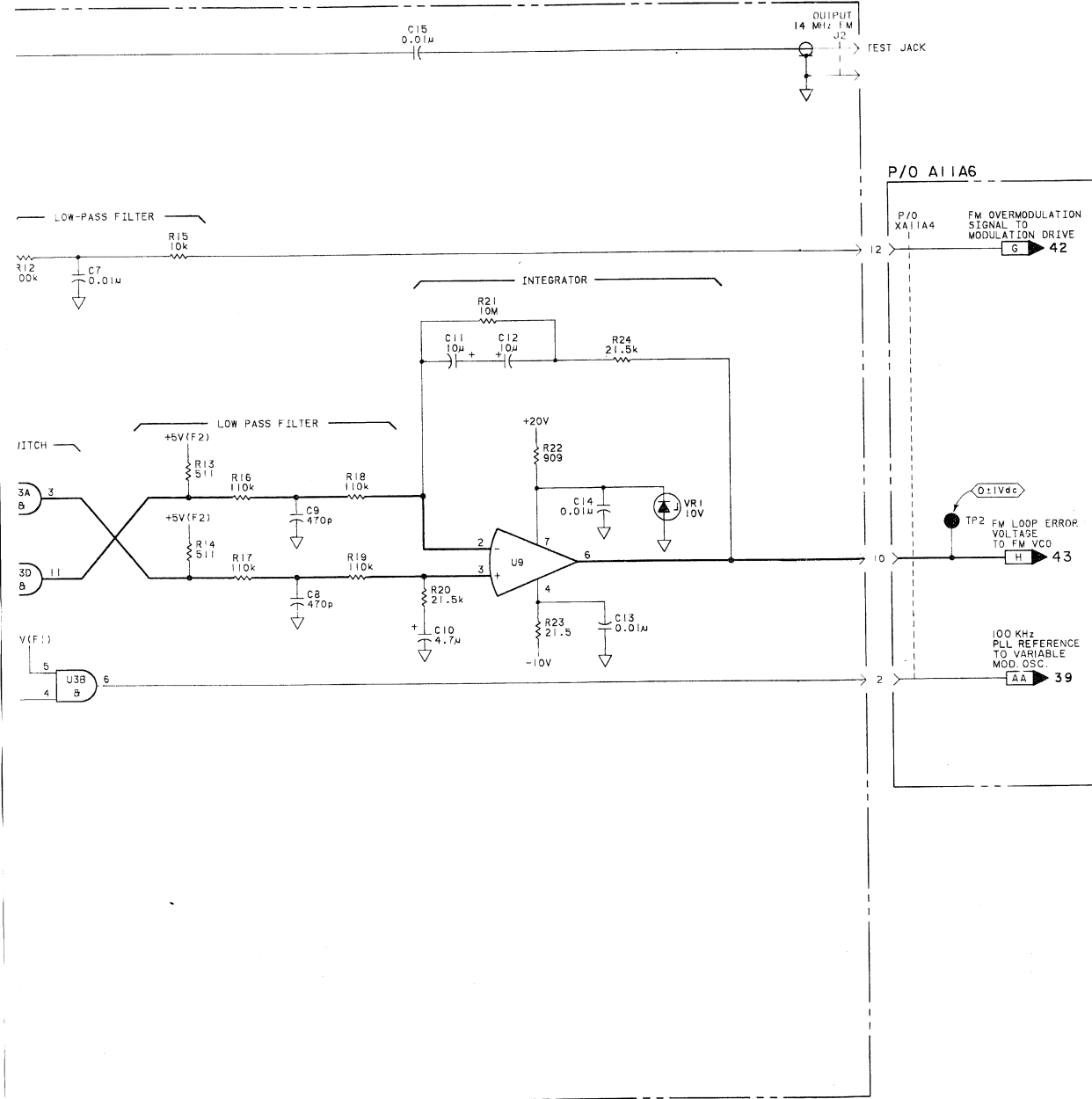
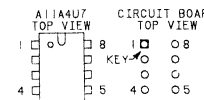
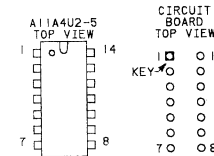
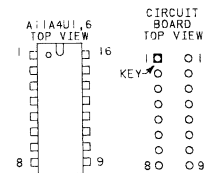
1. REFER TO TABLE 8-102 FOR SCHEMATIC DIAGRAM NOTES.
 2. TROUBLESHOOTING VALUES ARE TYPICAL. THEY ARE ACTUAL MEASURED VALUES. YOUR MEASUREMENTS MAY BE SLIGHTLY DIFFERENT THAN WHAT IS SHOWN.
- : BACKDATING INFORMATION IN SECTION VII.

REFERENCE DESIGNATIONS	
NO PREFIX	A4A10
W15, 37	J4
	TP2
	XA11A4
C1-15	
J1-2	
L1-4	
Q1-3	
R1-24	
TP1-4	
U1-6, 9	
VR1	

LOGIC LEVELS	
	TTL
HIGH	>+2V
LOW	<+0.8V
<	IS MORE NEG. THAN
>	IS MORE POS. THAN
OPEN	HIGH
GROUND	LOW

TRANSISTOR AND INTEGRATED CIRCUIT PART NUMBERS	
REFERENCE DESIGNATIONS	PART NUMBERS
Q1, 3	1854-0404
Q2	1854-0019
U1	1820-1760
U2	1820-1478
U3	1820-1201
U4	1820-0630
U5	1820-1430
U6	1820-1463
U9	1826-0013

INTEGRATED CIRCUIT VOLTAGE AND GROUND CONNECTIONS	
REFERENCE DESIGNATIONS	PIN NUMBERS
U1	+5V(F3)- 4, 5 - 12, 13
U2	+5V(F1)- 5 - 10
U3	+5V(F1)- 14 - 7
U4	+5V(F2)- 14 - 7
U5	+5V(F2)- 5 - 10
U6	+5V(F1)- 16 - 8



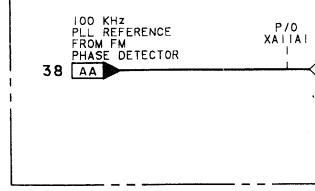
SERVICE SHEET
A11A4 38

Figure 8-603. A11A4 FM Phase Detector Schematic

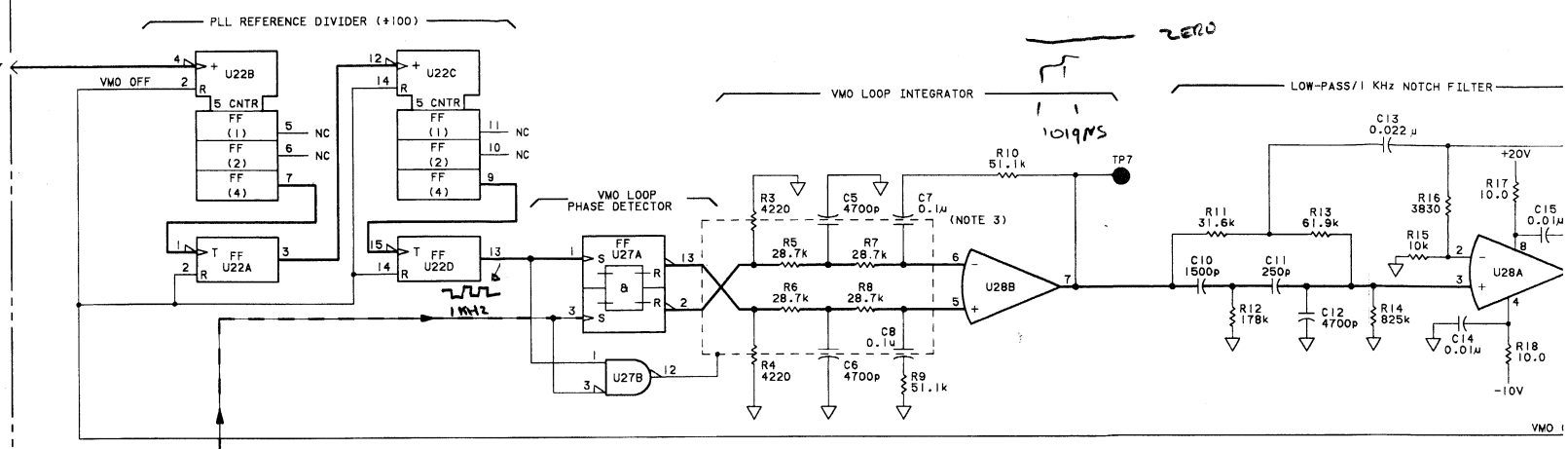
8-605/606

A11A4

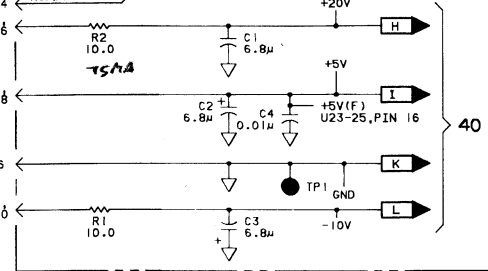
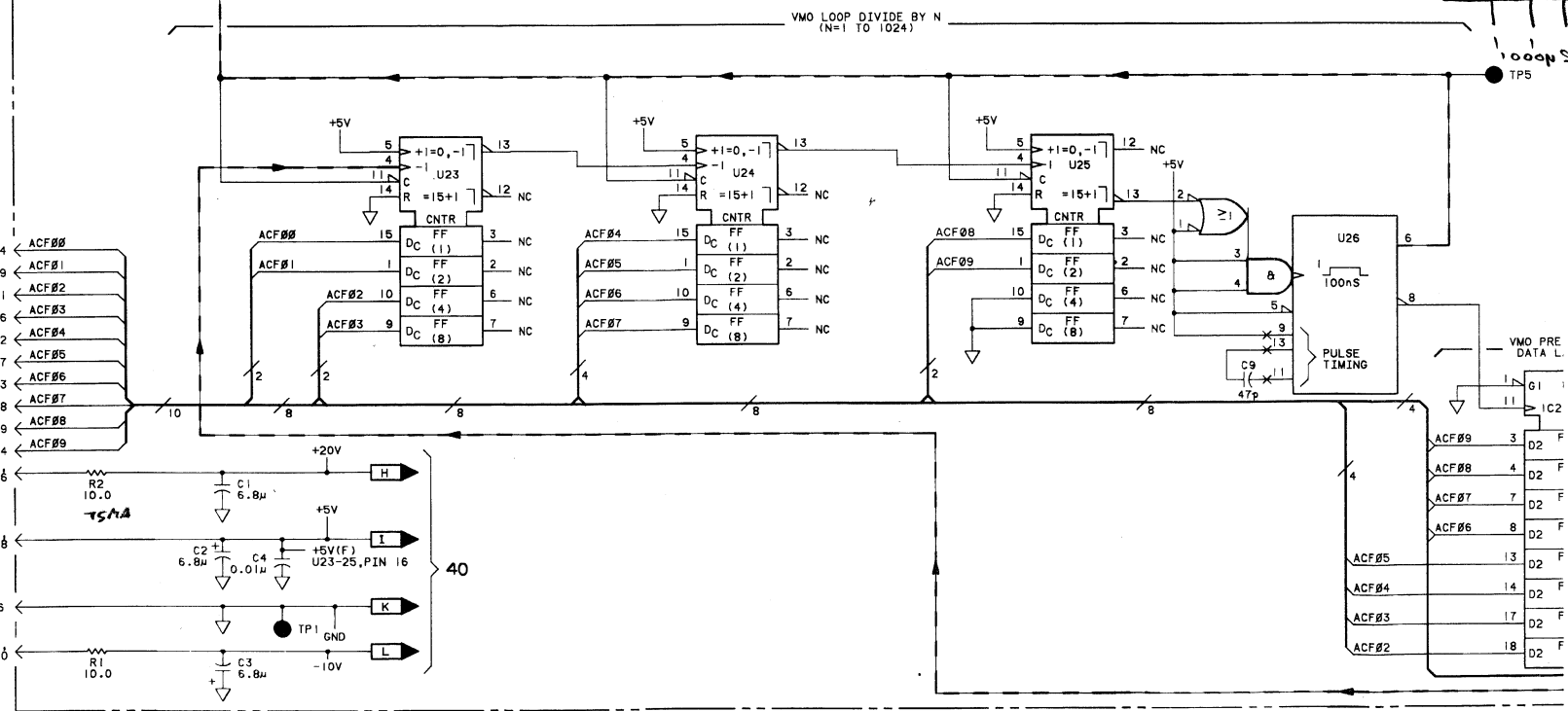
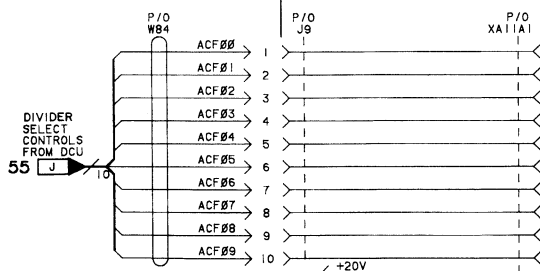
P/O A11A6 MODULATION MOTHERBOARD (08663-60320)



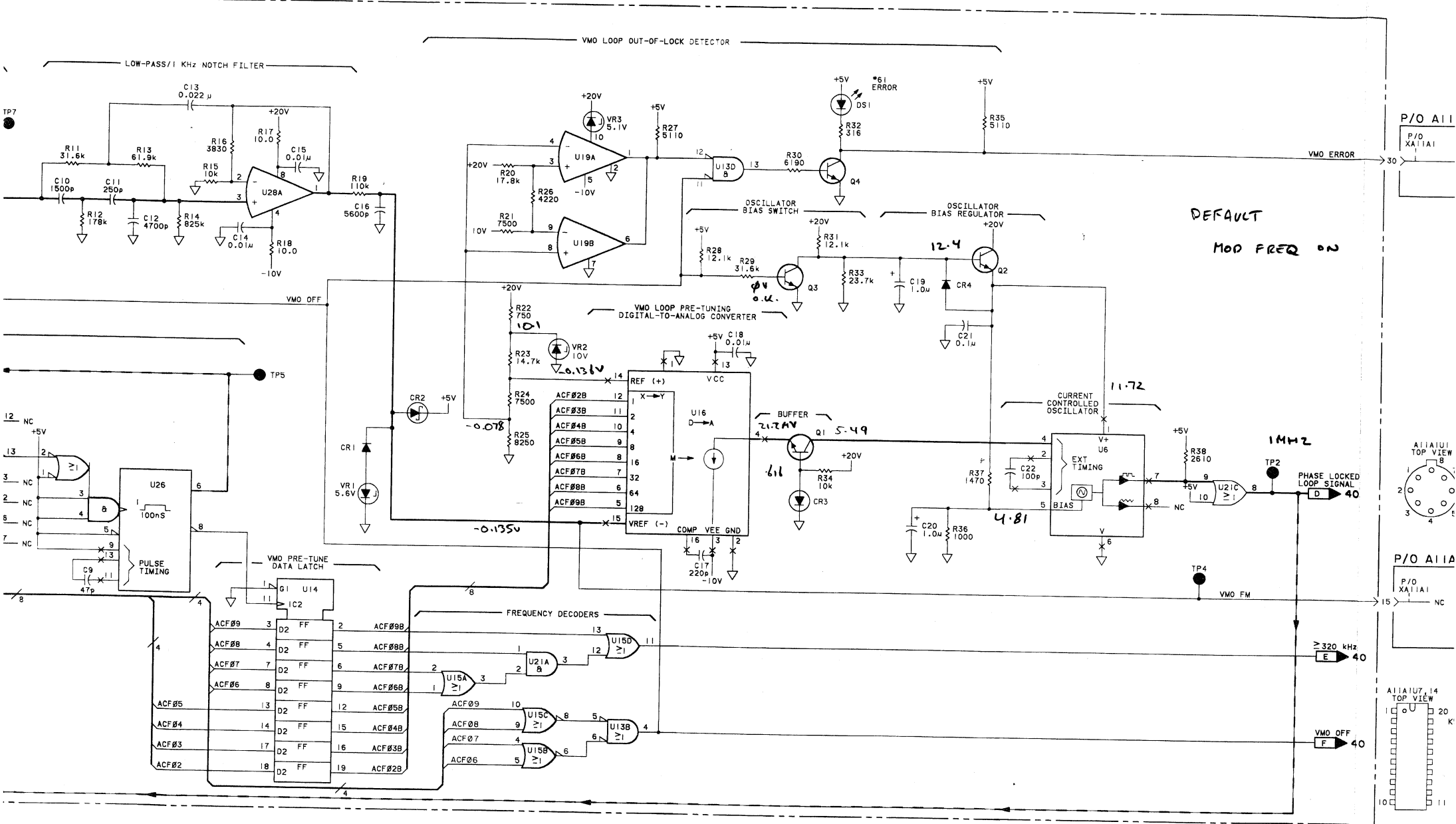
P/O A11A1 VMO (08663-60321)

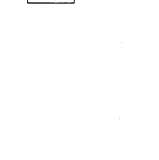
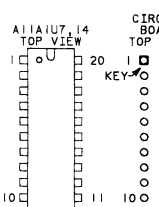
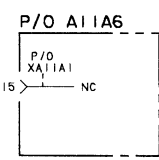
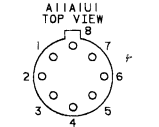
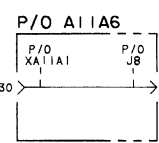
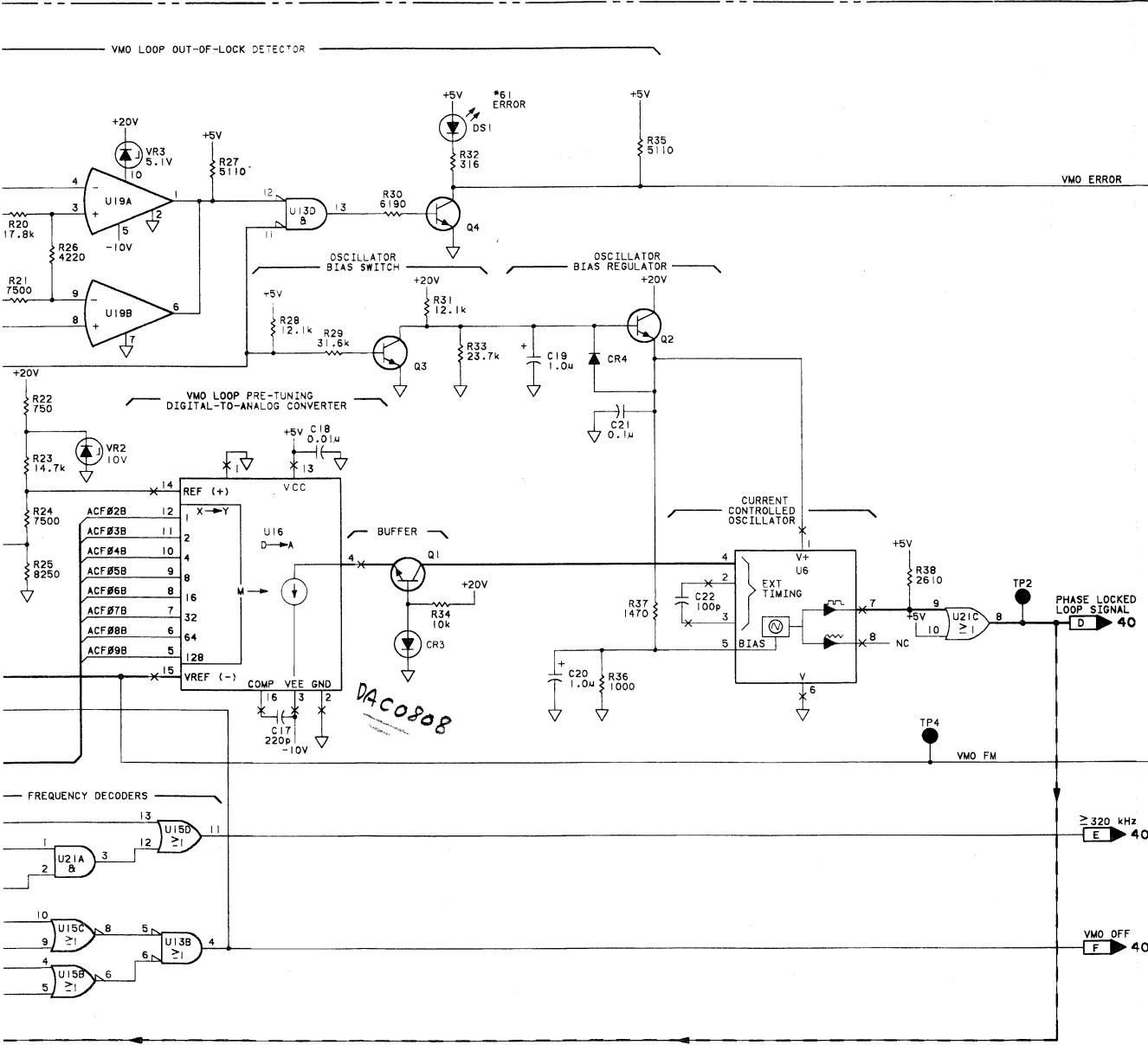


P/O A11A6 MODULATION SECTION MOTHERBOARD (08663-60320)



A11A1 39



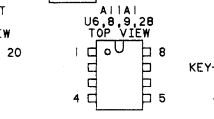
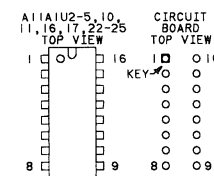


REFERENCE DESIGNATIONS

NO PREFIX	A11A6
W 84,85	J8, 9 XA11A1
A11A1	
C1-22	
CR1-4	
DS1	
Q1-4	
R1-38	
TP1, 2, 4, 5, 7	
U6, 13-16, 19, 21-28	
VR1-3	

TRANSISTOR AND INTEGRATED CIRCUIT PART NUMBERS

REFERENCE DESIGNATIONS	PART NUMBERS
Q2, 4	1854-0810
Q3	1854-0477
U6	1826-0873
U13	1820-1144
U14	1820-1858
U15	1820-1208
U16	1826-0188
U19	1826-0191
U21	1820-1201
U22	1820-1991
U23-25	1820-1194
U26	1820-1422
U27	1820-0530
U28	1826-0547



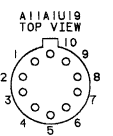
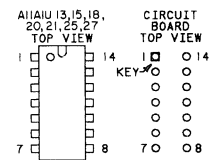
- REFER TO TABLE 8-102 FOR SCHEMATIC DIAGRAM NOTES.
- TROUBLESHOOTING VALUES ARE TYPICAL. THEY ARE ACTUAL MEASURED VALUES. YOUR MEASUREMENTS MAY BE SLIGHTLY DIFFERENT THAN WHAT IS SHOWN.
- INDICATED SHIELD IS A PRINTED CIRCUIT TRACE.

LOGIC LEVELS

HIGH	>+2V
LOW	<+0.8V
< IS MORE NEG. THAN	
> IS MORE POS. THAN	
OPEN	HIGH
GROUND	LOW

INTEGRATED CIRCUIT VOLTAGE AND GROUND CONNECTIONS

REFERENCE DESIGNATIONS	PIN NUMBERS
U13, 15, 21, 26, 27	+5V - 14 ▽ - 7
U14	+5V - 20 ▽ - 10
U22	+5V - 16 ▽ - 8



SERVICE SHEET P/O A11A1 39

Figure 8-608. P/O A11A1 Variable Modulation Oscillator Schematic

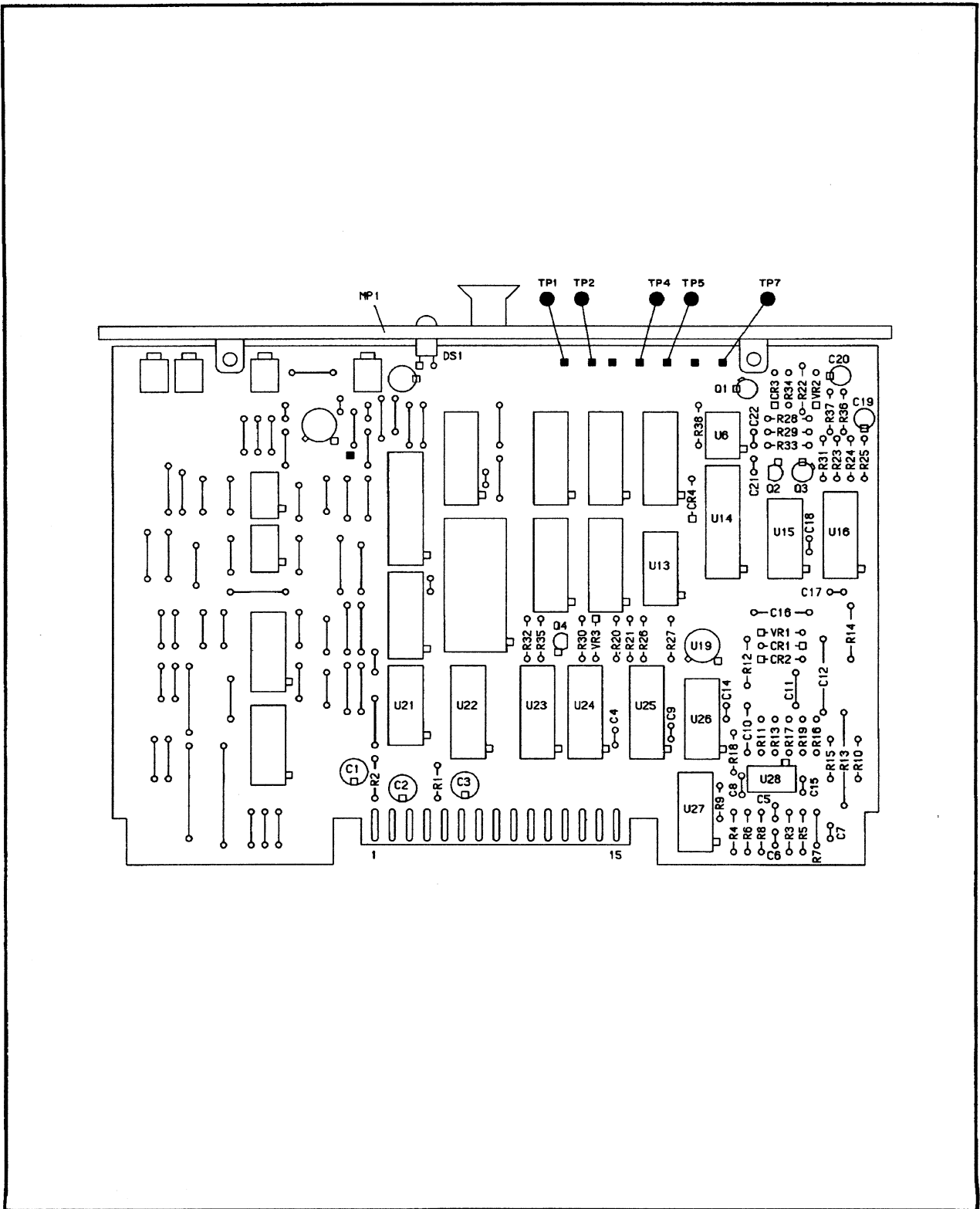
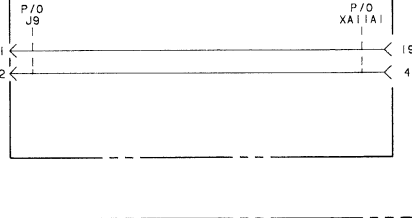


Figure 8-607. P/O A11A1 Variable Modulation Oscillator Component Locator

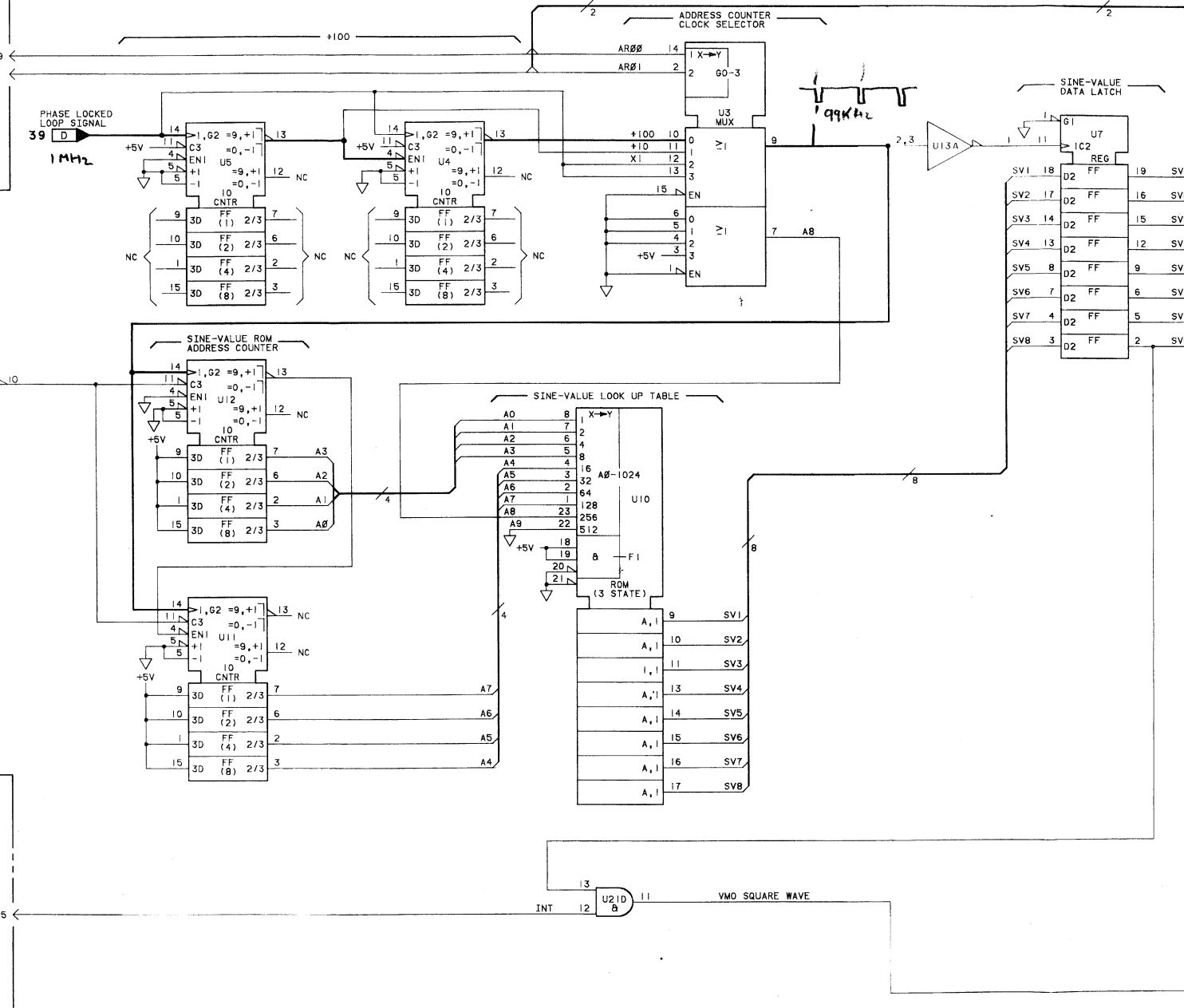
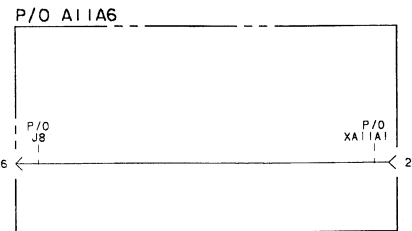
AI1A1 VARIABLE MODULATION OSCILLATOR (08663-60321)

P/O AI1A6 MODULATION MOTHERBOARD (08663-60320)

MODULATION FREQUENCY RANGE SELECT CONTROLS FROM DCU
 P/O W84 AR00 11
 AR01 12
 55 G

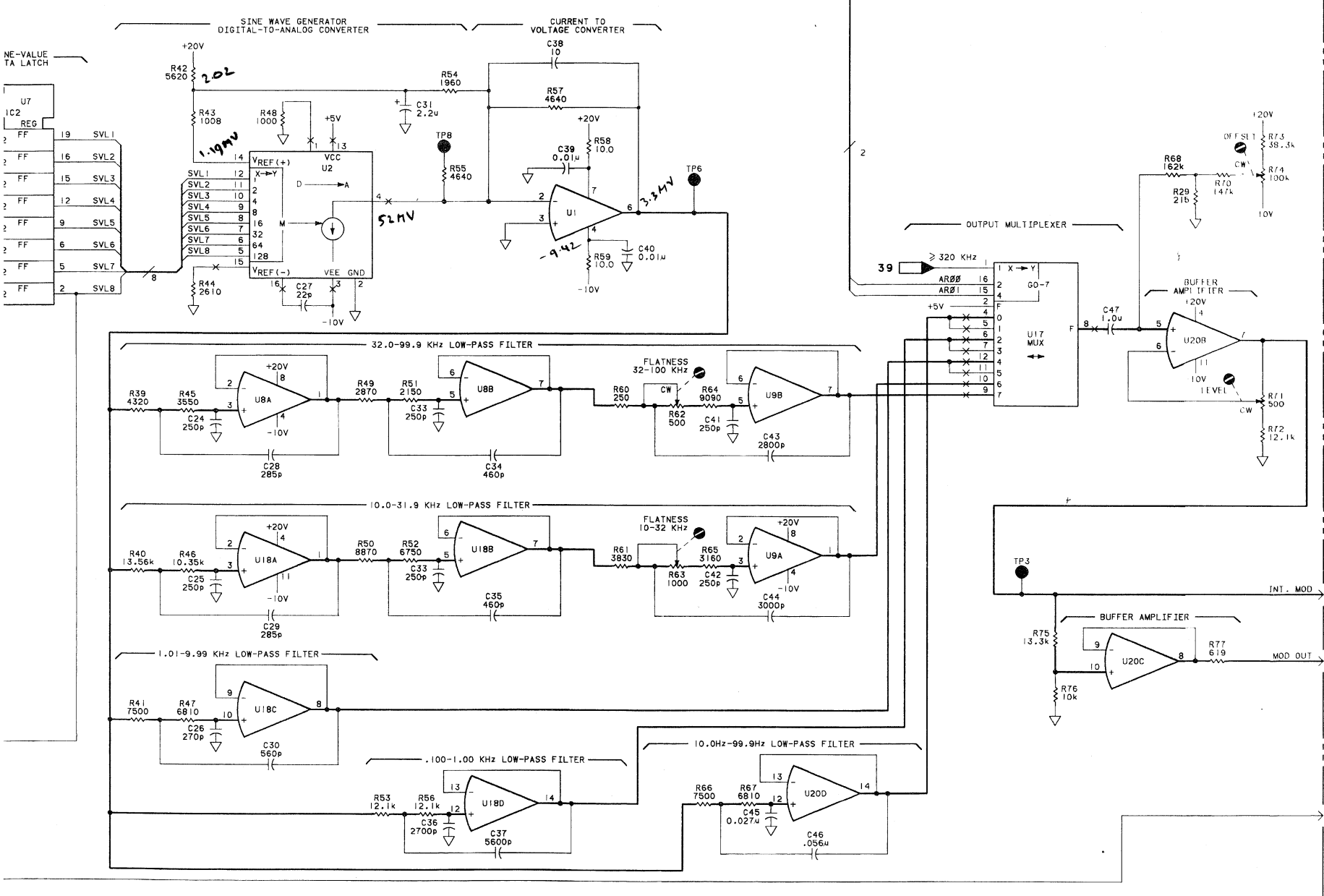


VMO SQUARE WAVE ENABLE FROM DCU
 P/O W85
 36
 55 M



NOTES

1. REFER TO TABLE 8-102 FOR SCHEMATIC DIAGRAM NOTES.
2. TROUBLESHOOTING VALUES ARE TRY THEY ARE ACTUAL MEASURED VALUE YOUR MEASUREMENTS MAY BE SLIGHTLY DIFFERENT THAN WHAT IS SHOWN.



REFERENCE DESIGNATIONS

NO PREFIX	A11A6
W47,52,84,85	J2,7,8,9
J9	
A11A1	XA11A1
C23-47	
R39-77	
U1-5,7-12,17,18,20,21	

LOG

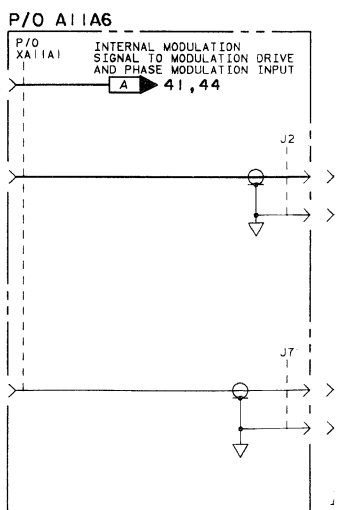
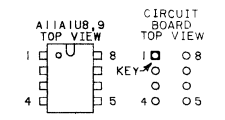
LOG
HIGH
LOW
< IS MC
> IS MC
OPEN
GROUND

TRANSISTOR AND INTEGRATED CIRCUIT PART NUMBERS

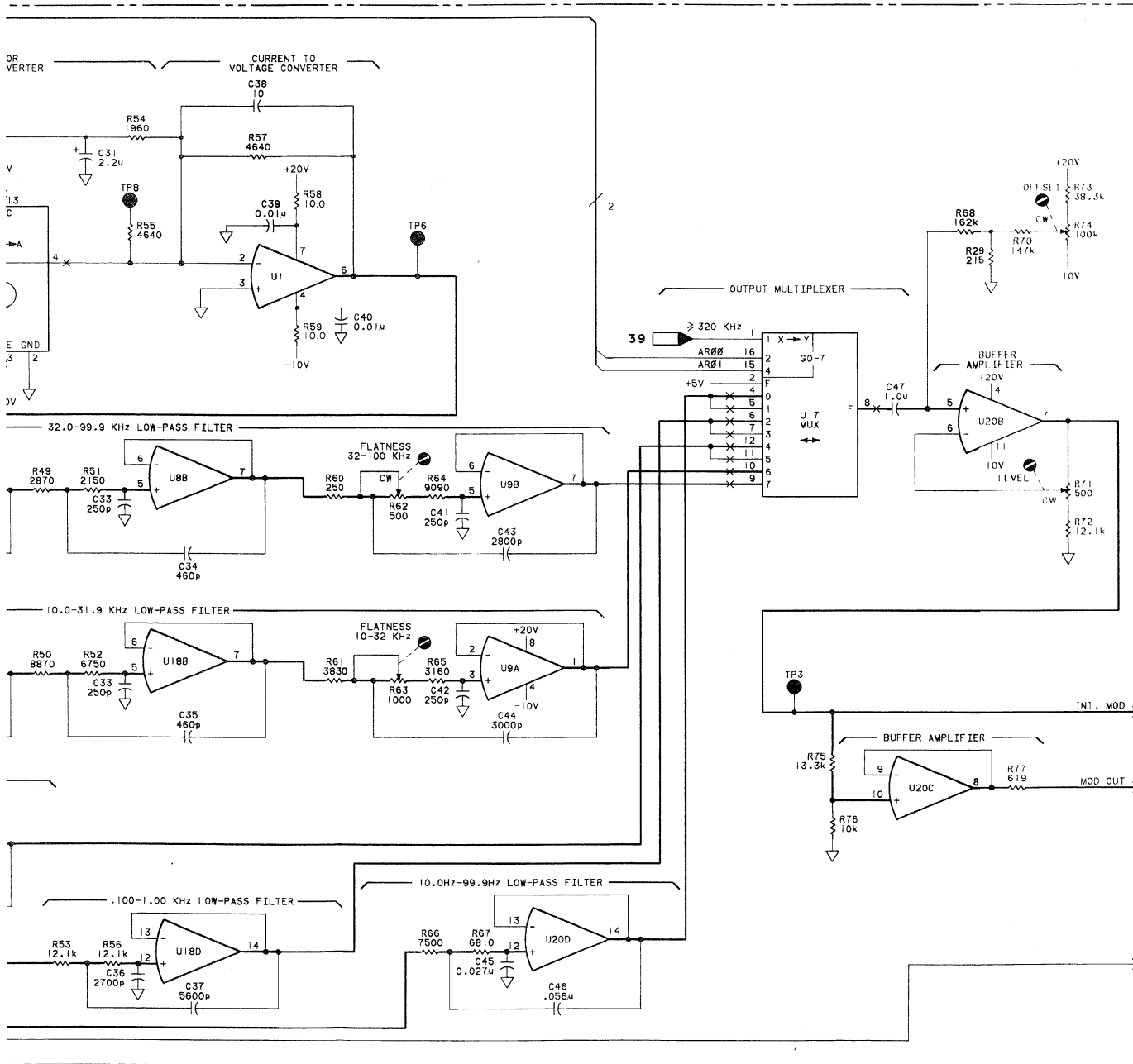
REFERENCE DESIGNATIONS	PART NUMBERS
U1	1826-0488
U2	1826-0188
U3	1820-1244
U4,5,11,12	1820-1279
U7	1820-1858
U8,9	1826-0716
U10	08663-80004
U13	1820-1144
U17	1826-0609
U18,20	1826-0753
U21	1820-1201

INTEG VC GROUND

REFEREN DESIGNAT
U3-5,11
U7
U10
U13,21



A11A1 40
2/3



NOTES

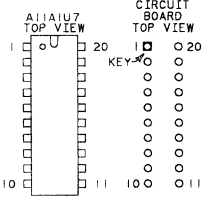
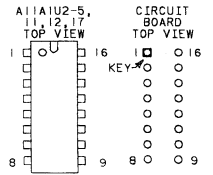
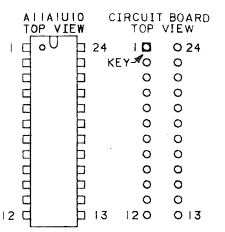
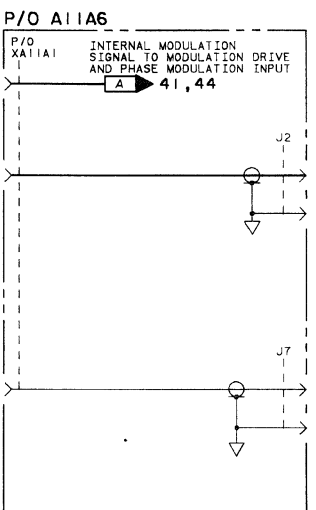
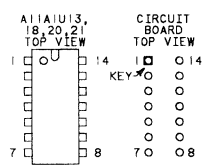
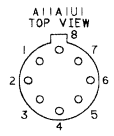
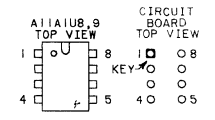
1. REFER TO TABLE 8-102 FOR SCHEMATIC DIAGRAM NOTES.
2. TROUBLESHOOTING VALUES ARE TYPICAL. THEY ARE ACTUAL MEASURED VALUES. YOUR MEASUREMENTS MAY BE SLIGHTLY DIFFERENT THAN WHAT IS SHOWN.

REFERENCE DESIGNATIONS	
NO PREFIX	A11A6
W47,52,84,85	J2,7,8,9
J9	
A11A1	XA11A1
C23-47	
R39-77	
U1-5,7-12,17,18,20,21	

LOGIC LEVELS	
	TTL
HIGH	>+2.0V
LOW	<+0.8V
< IS MORE NEG. THAN	
> IS MORE POS. THAN	
OPEN	HIGH
GROUND	LOW

TRANSISTOR AND INTEGRATED CIRCUIT PART NUMBERS	
REFERENCE DESIGNATIONS	PART NUMBERS
U1	1826-0488
U2	1826-0188
U3	1820-1244
U4,5,11,12	1820-1278
U7	1820-1858
U8,9	1826-0716
U10	08663-80004
U13	1820-1144
U17	1826-0609
U18,20	1826-0753
U21	1820-1201

INTEGRATED CIRCUIT VOLTAGE AND GROUND CONNECTIONS	
REFERENCE DESIGNATIONS	PIN NUMBERS
U3-5,11,12	+5V - 16
	- 8
U7	+5V - 20
	- 10
U10	+5V - 24
	- 12
U13,21	+5V - 14
	- 7



SERVICE SHEET
P/O A11A1 40

Figure 8-611. P/O A11A1 Variable Modulation Oscillator Schematic

3/3

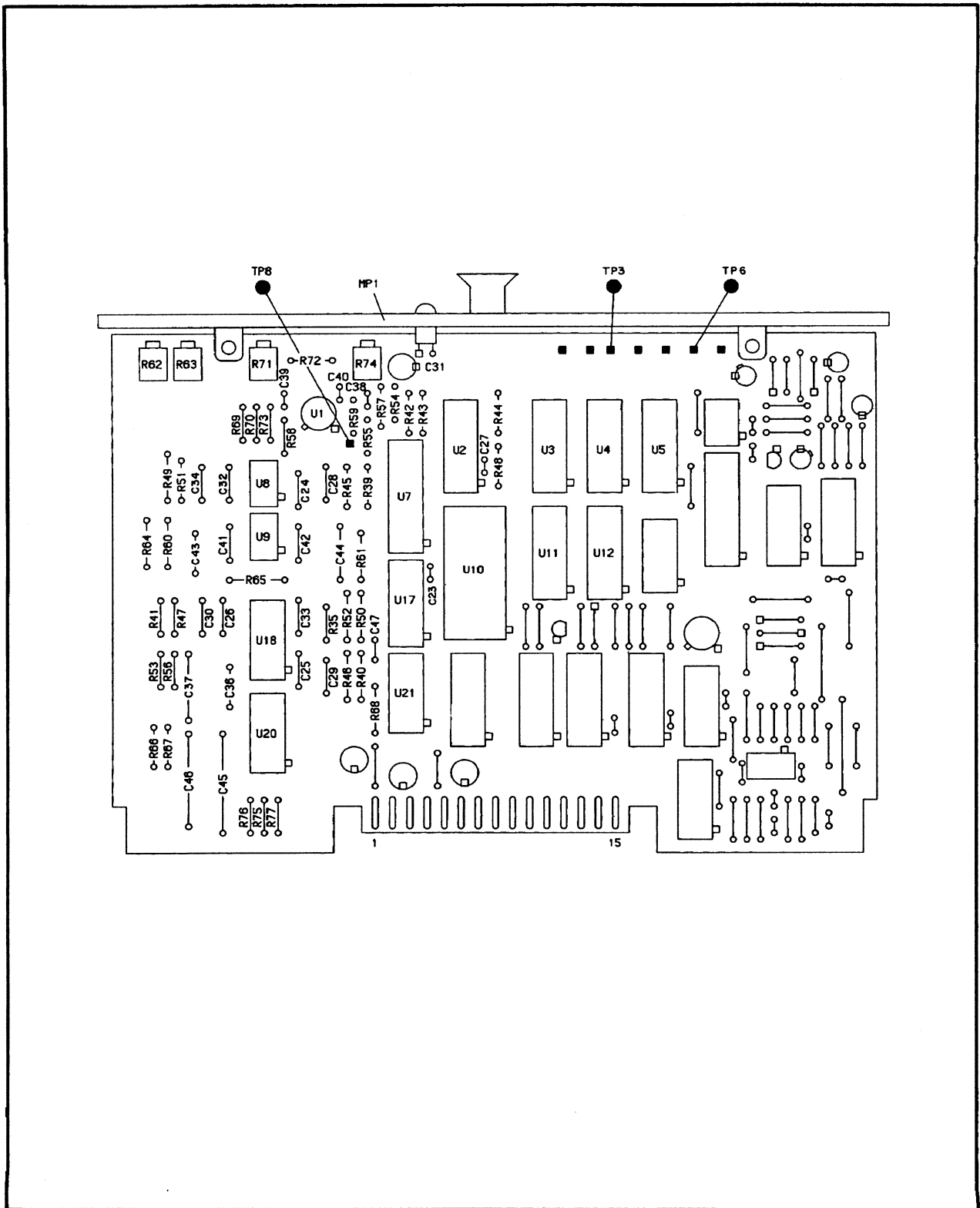
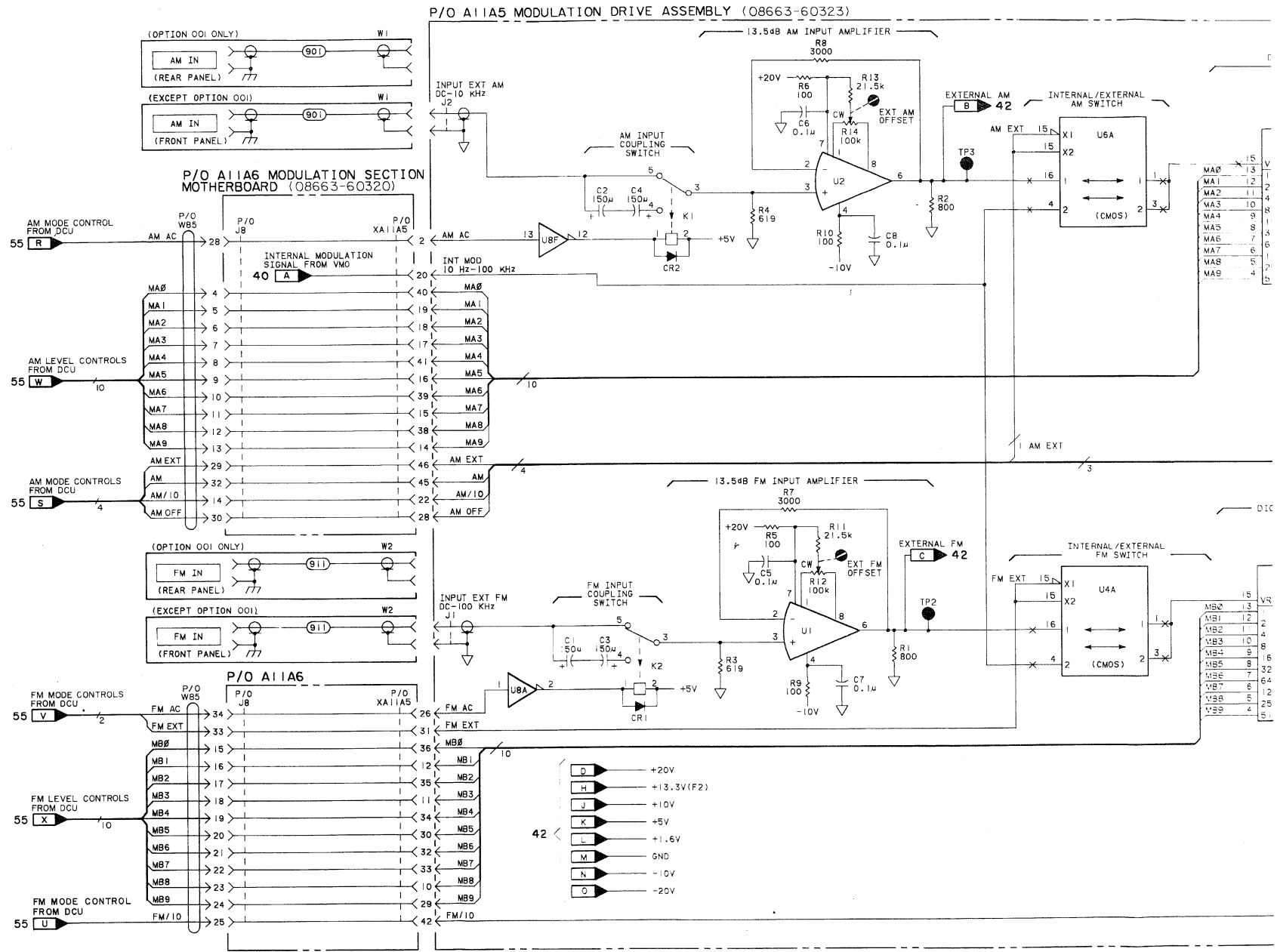


Figure 8-610. P/O A11A1 Variable Modulation Oscillator Component Locator



A11A5 41

NOTES

1. REFER TO TABLE 8-102 FOR DIAGRAM NOTES.
2. TROUBLESHOOTING VALUES ARE THEY ARE ACTUAL MEASURED YOUR MEASUREMENTS MAY BE DIFFERENT THAN WHAT IS SHOWN

LOGIC LEVELS	
TTL	
HIGH	>+2.0V
LOW	<+0.8V
< IS MORE NEG. THAN >	IS MORE POS. THAN
OPEN	HIGH
GROUND	LOW

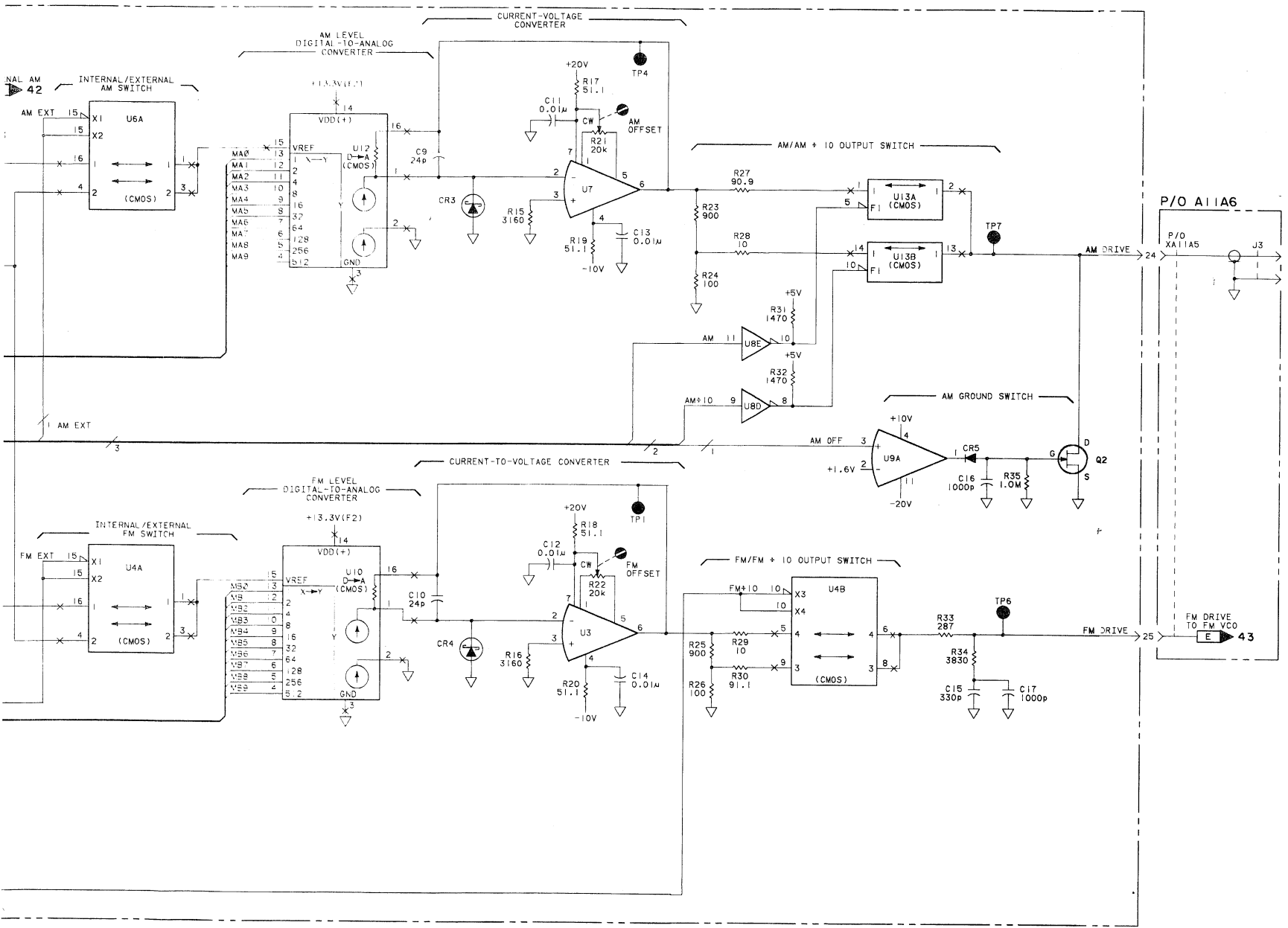
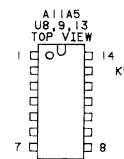
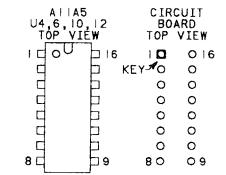
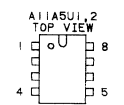
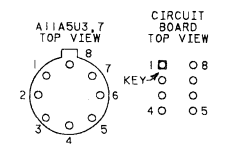
TRANSISTOR AND INTEGRATED CIRCUIT PART NUMBERS

REFERENCE DESIGNATIONS	PART NUMBER
Q2	1885-0C
U1, 2	1826-07
U3, 7	1826-02
U4, 6	1826-06
U8	1820-11
U9	1826-01
U10, 12	1826-02
U13	1826-05

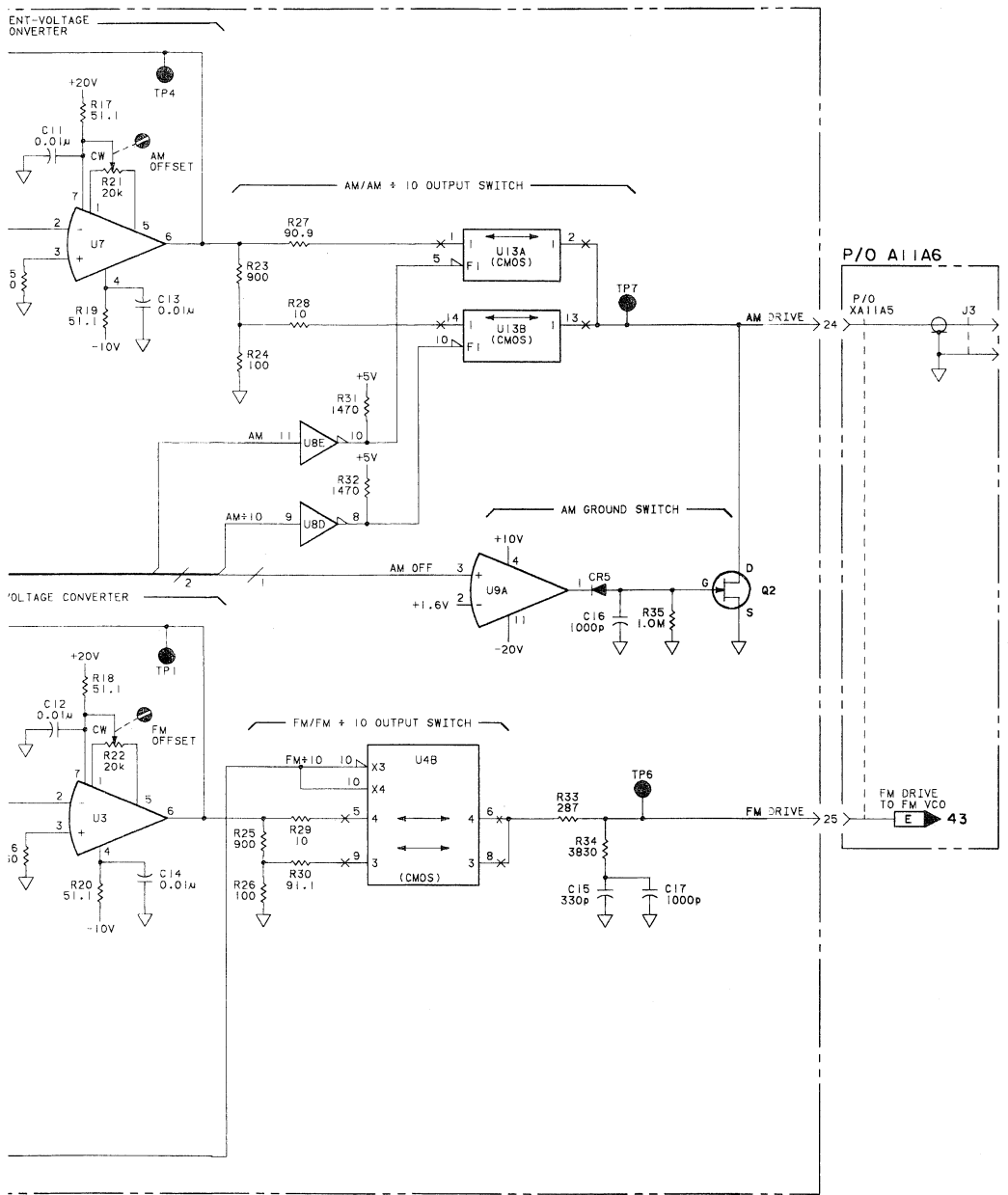
INTEGRATED CIRCUIT VOLTAGE AND GROUND CONNECTIONS

REFERENCE DESIGNATIONS	PIN NUMBER
U4, 6	+10V
	+5V
	-20V
	▽
U8	+5V
	▽
U13	+10V
	+5V
	-20V
	▽

NO PREFIX	A11A6
W1, 2, 48, 85	J3, 8 XA11A5
A11A5	
C1-17	
CR1-5	
J1, 2	
K1, 2	
Q2	
R1-35	
TP1-4, 6, 7	
U1-4, 6-8, 10, 12, 13	



A11A5 41



NOTES

1. REFER TO TABLE 8-102 FOR SCHEMATIC DIAGRAM NOTES.
2. TROUBLESHOOTING VALUES ARE TYPICAL. THEY ARE ACTUAL MEASURED VALUES. YOUR MEASUREMENTS MAY BE SLIGHTLY DIFFERENT THAN WHAT IS SHOWN.

LOGIC LEVELS

	TTL
HIGH	>+2.0V
LOW	<+0.8V
<	IS MORE NEG. THAN
>	IS MORE POS. THAN
OPEN	HIGH
GROUND	LOW

TRANSISTOR AND INTEGRATED CIRCUIT PART NUMBERS

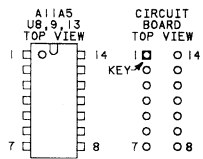
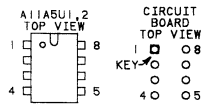
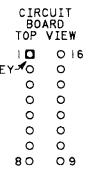
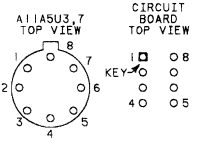
REFERENCE DESIGNATIONS	PART NUMBERS
Q2	1885-0020
U1, 2	1826-0783
U3, 7	1826-0358
U4, 6	1826-0950
U8	1820-1199
U9	1826-0161
U10, 12	1826-0264
U13	1826-0951

INTEGRATED CIRCUIT VOLTAGE AND GROUND CONNECTIONS

REFERENCE DESIGNATIONS	PIN NUMBERS
U4, 6	+10V - 11
	+5V - 12
	-20V - 14
U8	▽ - 13
	+5V - 14
U13	▽ - 7
	+10V - 14
	+5V - 7
	-20V - 9
	▽ - 8

REFERENCE DESIGNATIONS

NO PREFIX	A11A6
W1, 2, 4, 8, 85	J3, 8
	XA11A5
A11A5	
C1-17	
CR1-5	
J1, 2	
K1, 2	
Q2	
R1-35	
TP1-4, 6, 7	
U1-4, 6-8, 10, 12, 13	



SERVICE SHEET **P/O A11A5 41**

Figure 8-614. P/O A11A5 Modulation Drive Schematic

8-617/618

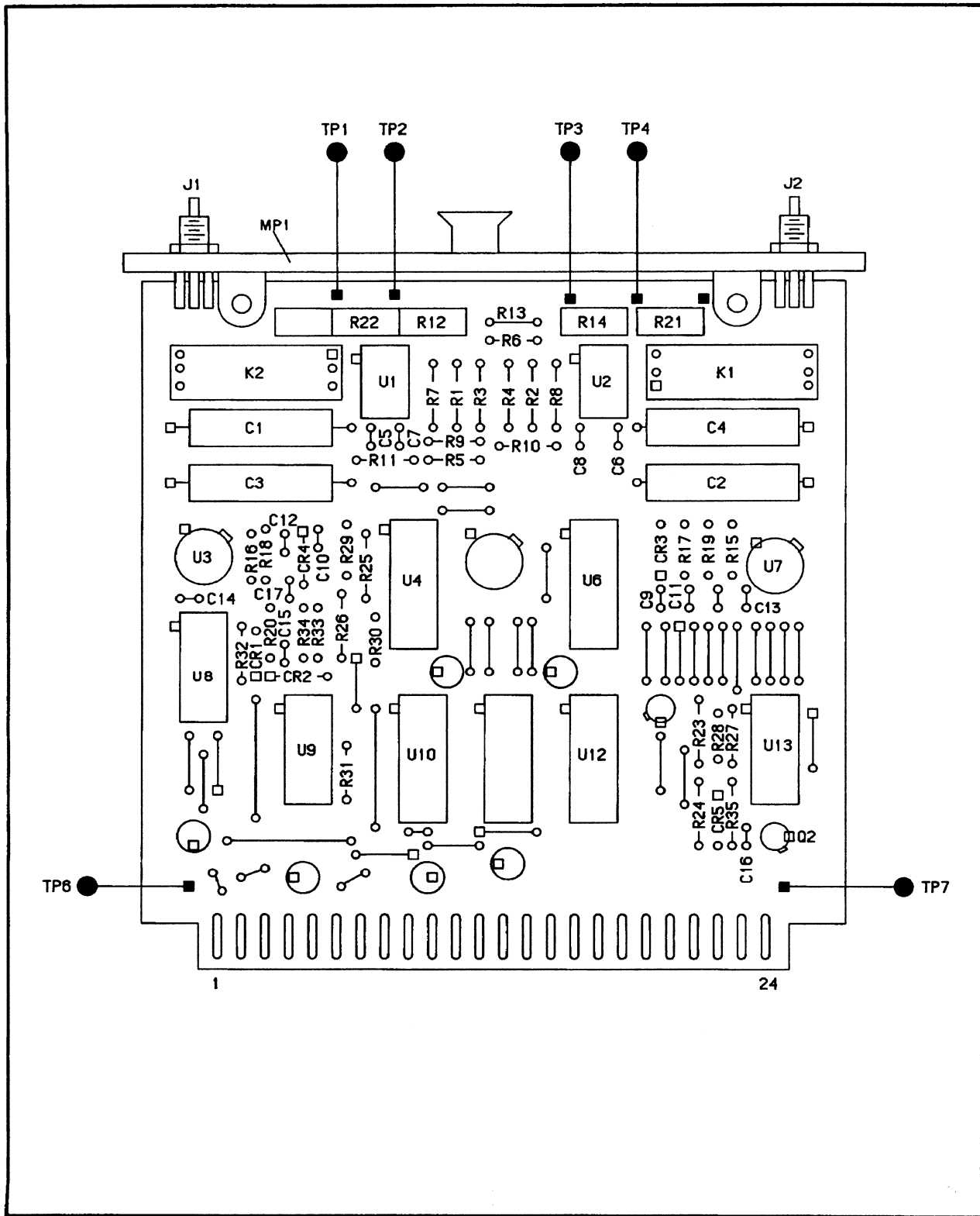
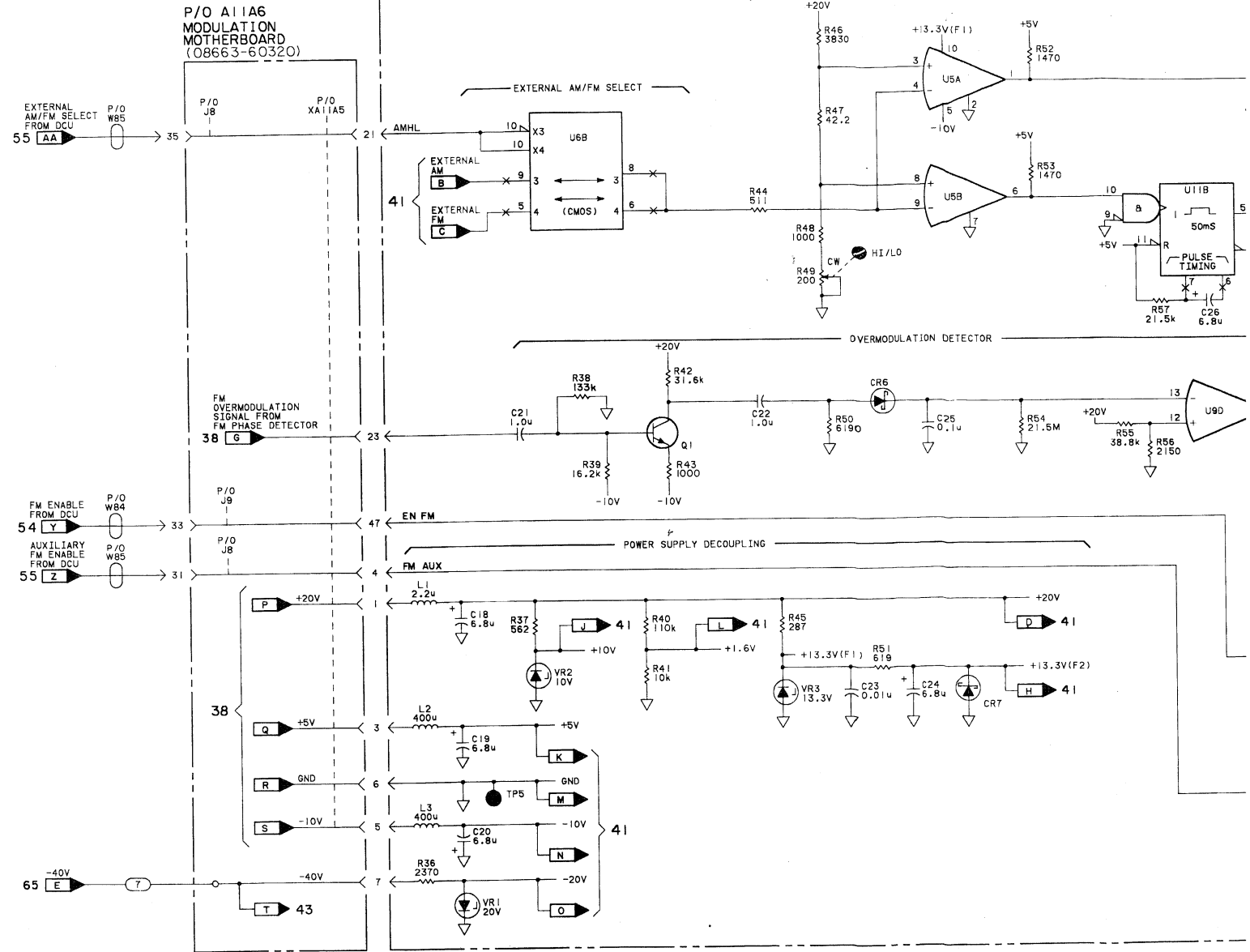


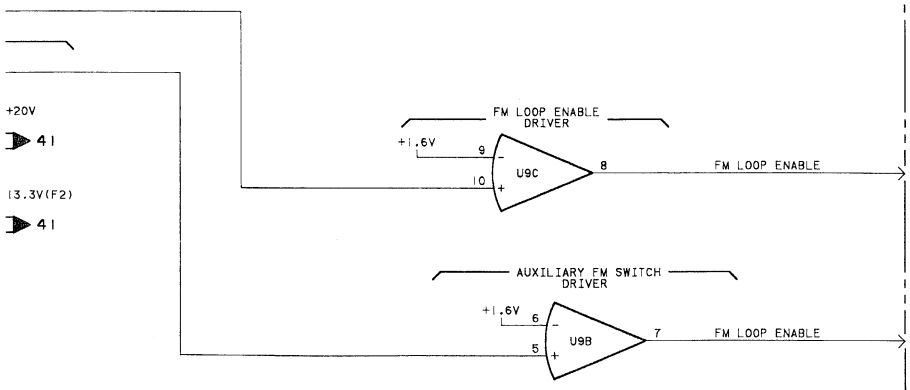
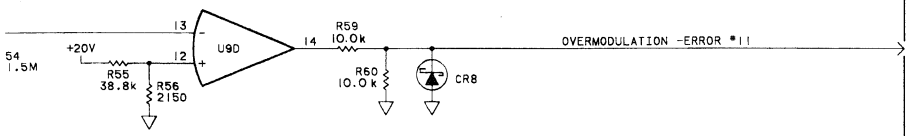
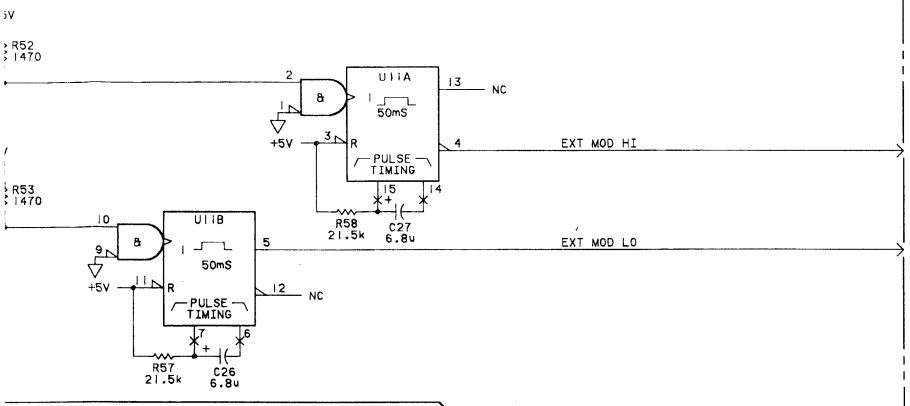
Figure 8-613. P/O A11A5 Modulation Drive Component Locator

P/O A11A5 MODULATION DRIVE ASSEMBLY (08663-60323)

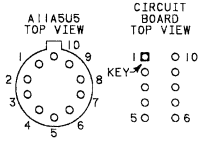
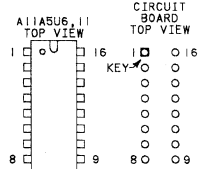
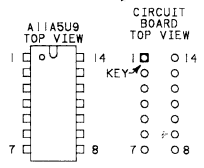
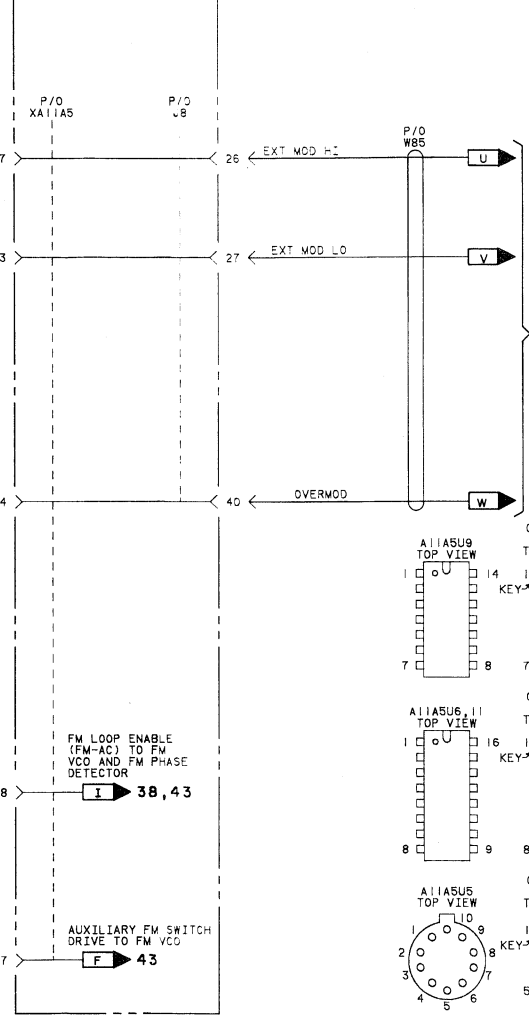


A11A5 42

EXTERNAL SOURCE LEVEL MONITOR



P/O A11A6



NOTES

- REFER TO TABLE 8-102 FOR SCHEMATIC DIAGRAM NOTES.
- TROUBLESHOOTING VALUES ARE TYPICAL. THEY ARE ACTUAL MEASURED VALUES. YOUR MEASUREMENTS MAY BE SLIGHTLY DIFFERENT THAN WHAT IS SHOWN.

REFERENCE DESIGNATIONS

NO PREFIX	A11A6
W84,85	J8,9 XA11A5
A11A5	
C18-27 CR6-8 L1-3 Q1 R36-60 TP5 US,6,9,11 VR1-3	

TRANSISTOR INTEGRATED CIRCUIT PART NUMBERS

REFERENCE DESIGNATIONS	PART NUMBERS
Q1	1854-0810
U5	1826-0191
U6	1826-0950
U9	1826-0161
U11	1820-1423

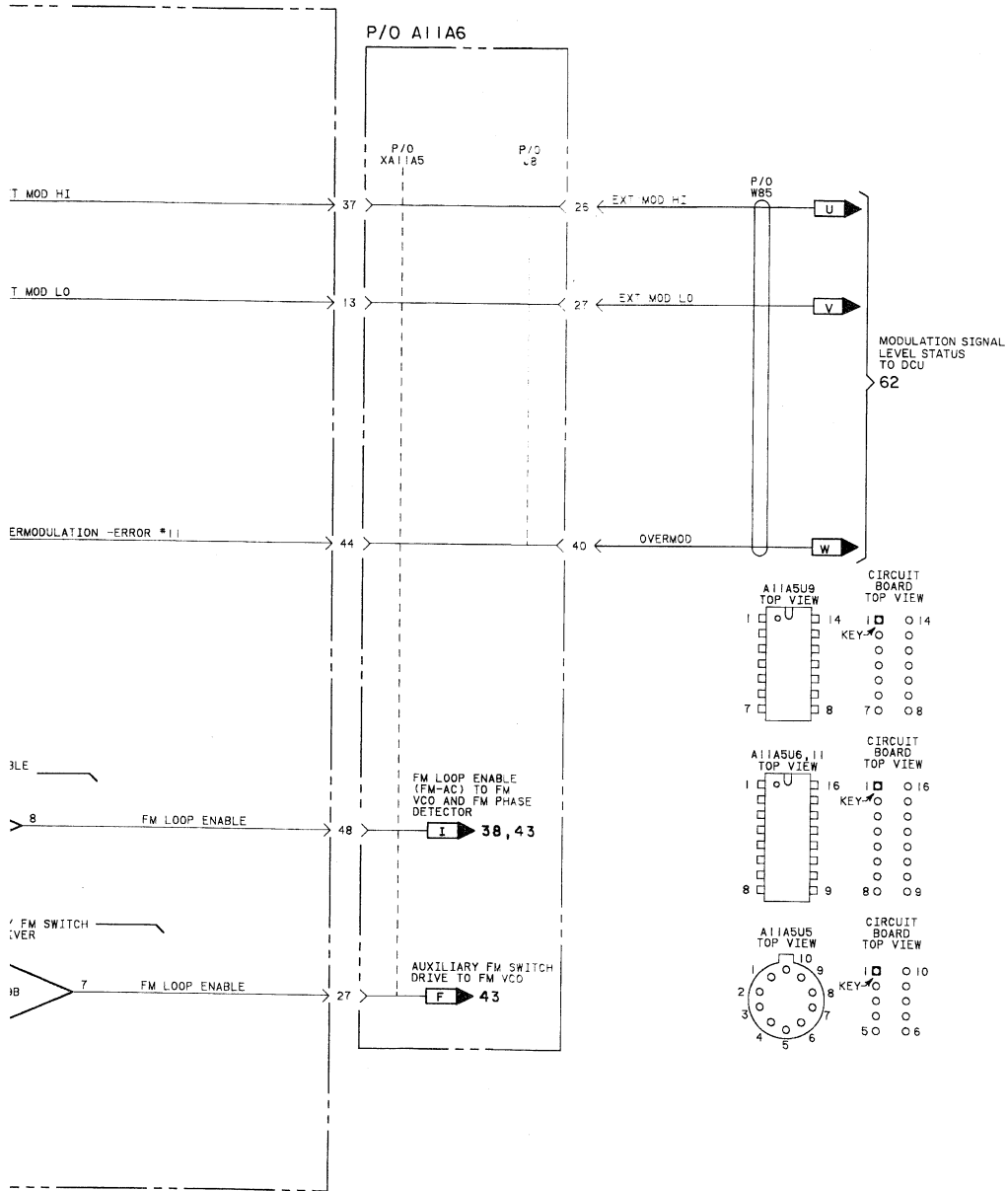
LOGIC LEVELS

	TTL
HIGH	>+2V
LOW	<+0.8V
<	IS MORE NEG. THAN
>	IS MORE POS. THAN
OPEN	HIGH
GROUND	LOW

INTEGRATED CIRCUIT VOLTAGE AND GROUND CONNECTIONS

REFERENCE DESIGNATIONS	PIN NUMBERS
U6B	+10V - 11
	+5V - 12
	-20V - 14
	- 13
U11	+5V - 16
	- 8

A11A5 42



NOTES

1. REFER TO TABLE 8-102 FOR SCHEMATIC DIAGRAM NOTES.
2. TROUBLESHOOTING VALUES ARE TYPICAL. THEY ARE ACTUAL MEASURED VALUES. YOUR MEASUREMENTS MAY BE SLIGHTLY DIFFERENT THAN WHAT IS SHOWN.

REFERENCE DESIGNATIONS

NO PREFIX	A11A6
W84,85	J8,9 XA11A5
A11A5	
C18-27 CR6-8 L1-3 Q1 R36-60 TFS U5,6,9,11 VR1-3	

TRANSISTOR INTEGRATED CIRCUIT PART NUMBERS

REFERENCE DESIGNATIONS	PART NUMBERS
Q1	1854-0810
U5	1826-0191
U6	1826-0950
U9	1826-0161
U11	1820-1423

LOGIC LEVELS

	TTL
HIGH	>+2V
LOW	<+0.8V
<	IS MORE NEG. THAN
>	IS MORE POS. THAN
OPEN	HIGH
GROUND	LOW

INTEGRATED CIRCUIT VOLTAGE AND GROUND CONNECTIONS

REFERENCE DESIGNATIONS	VOLTAGE	PIN NUMBERS
U6B	+10V	11
	+5V	12
	-20V	14
	▽	13
U11	+5V	16
	▽	8

SERVICE SHEET **42**
P/O A11A5

Figure 8-617. P/O A11A5 Modulation Drive Schematic
8-621/622

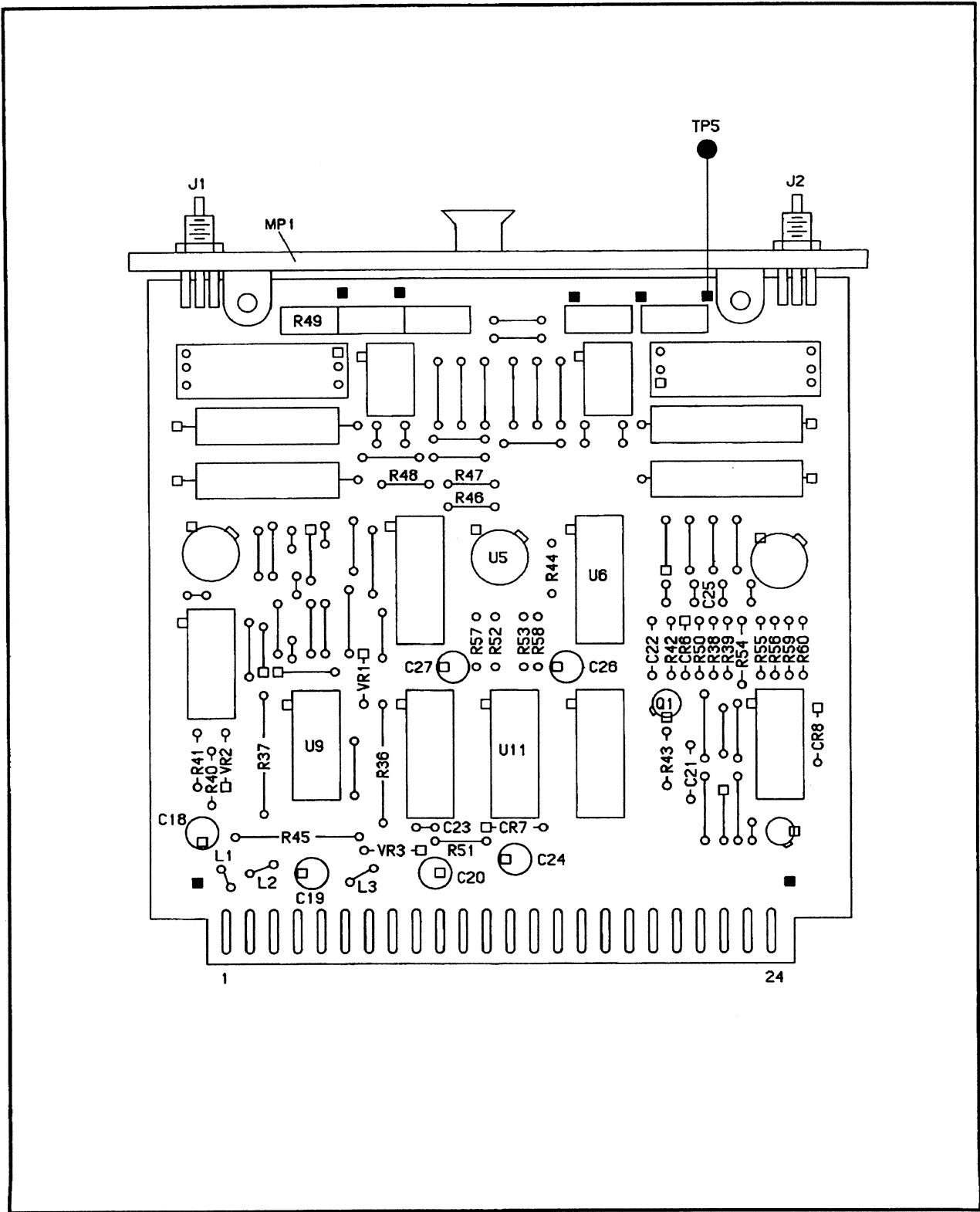
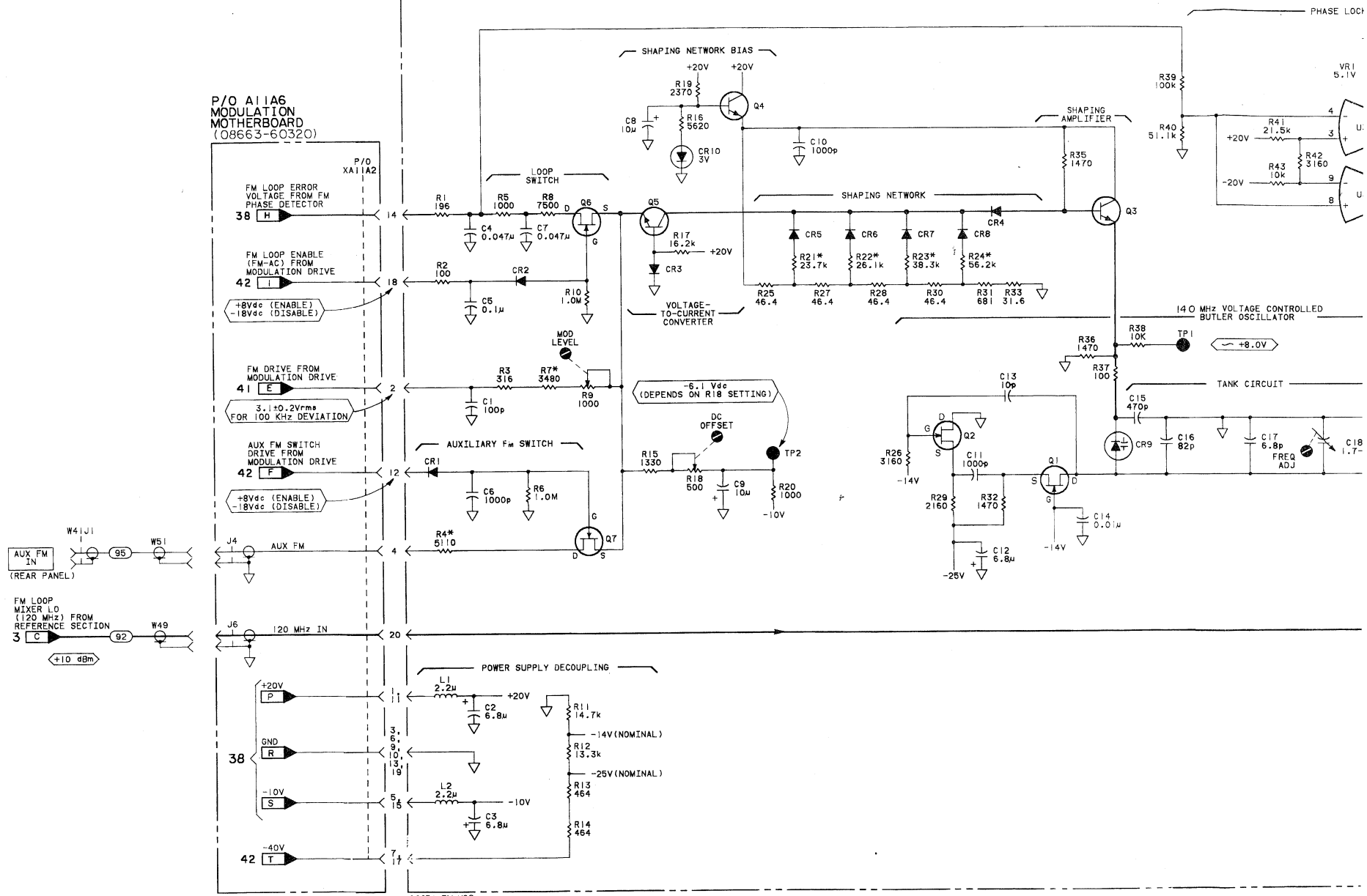


Figure 8-616. P/O A11A5 Modulation Drive Component Locator

A11A2 FM VCO (08663-60343)

P/O A11A6
MODULATION
MOTHERBOARD
(08663-60320)



8663A FM VCO

A11A2 43

1/3

NOTES

1. REFER TO TABLE 8-102 FOR SCHEMATIC DIAGRAM NOTES.
2. TROUBLESHOOTING VALUES ARE TYPIC THEY ARE ACTUAL MEASURED VALUES. YOUR MEASUREMENTS MAY BE SLIGHTLY DIFFERENT THAN WHAT IS SHOWN.
3. ASTERISK (*) INDICATES THAT THESE ARE SELECTED IN TEST. THE VALUES SHOWN ARE TYPICAL ONLY. SEE SECT FOR PROCEDURE.

LOGIC LEVELS

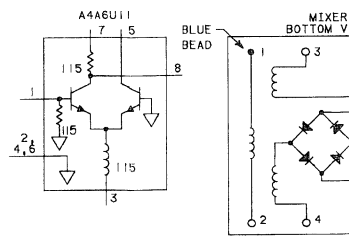
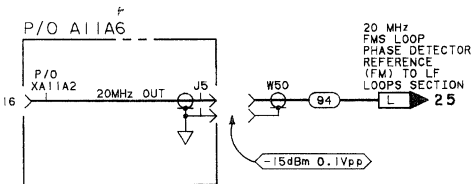
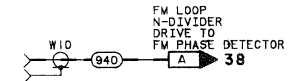
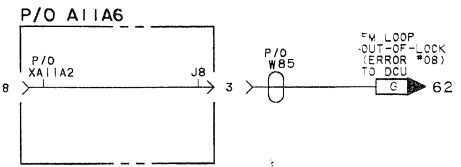
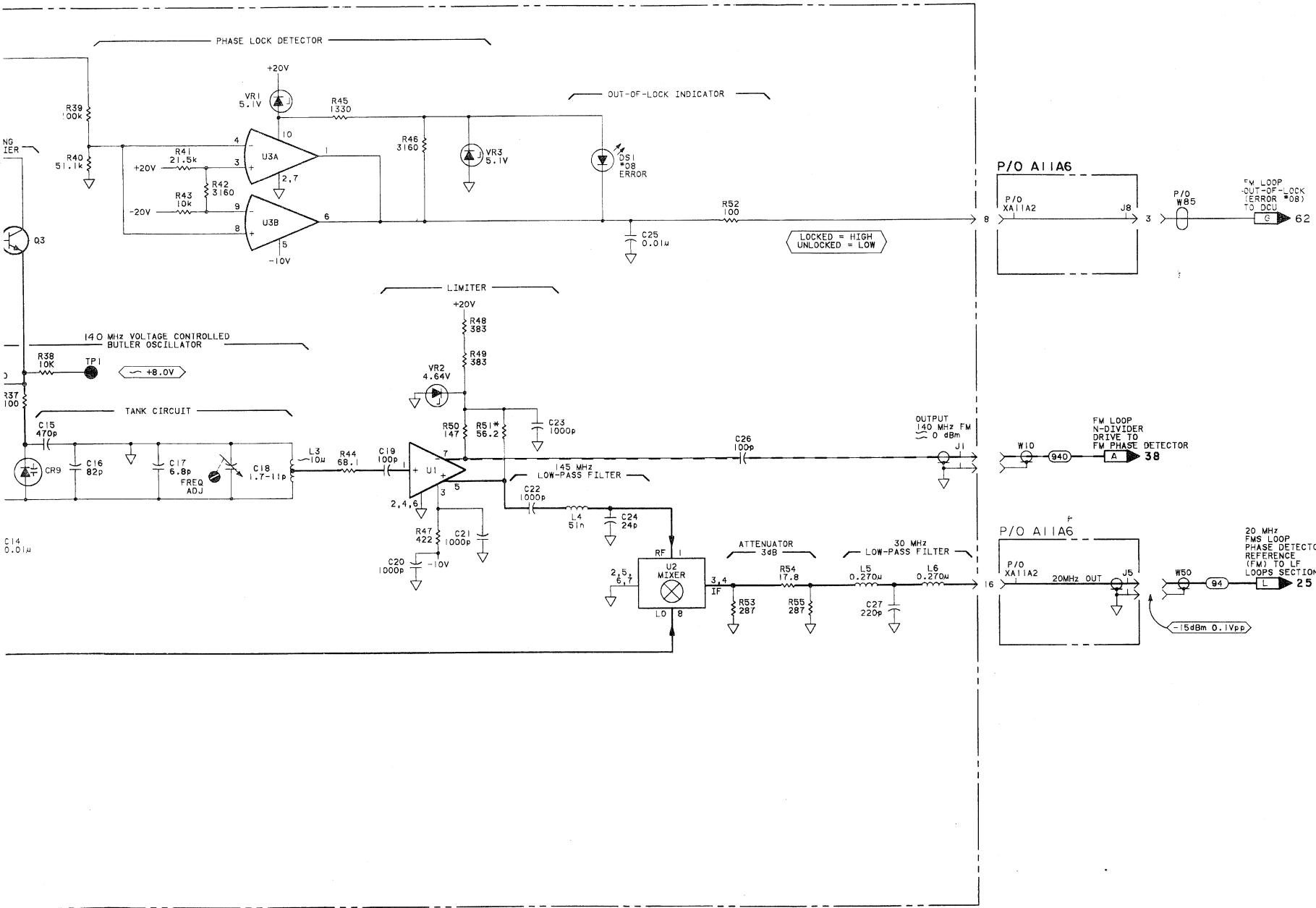
LOGIC LEVEL	TTL
HIGH	>+2V
LOW	<+0.8V
< IS MORE NEG. THAN	
> IS MORE POS. THAN	
OPEN	HIGH
GROUND	LOW

TRANSISTOR AND INTEGRATED CIRCUIT PART NUMBERS

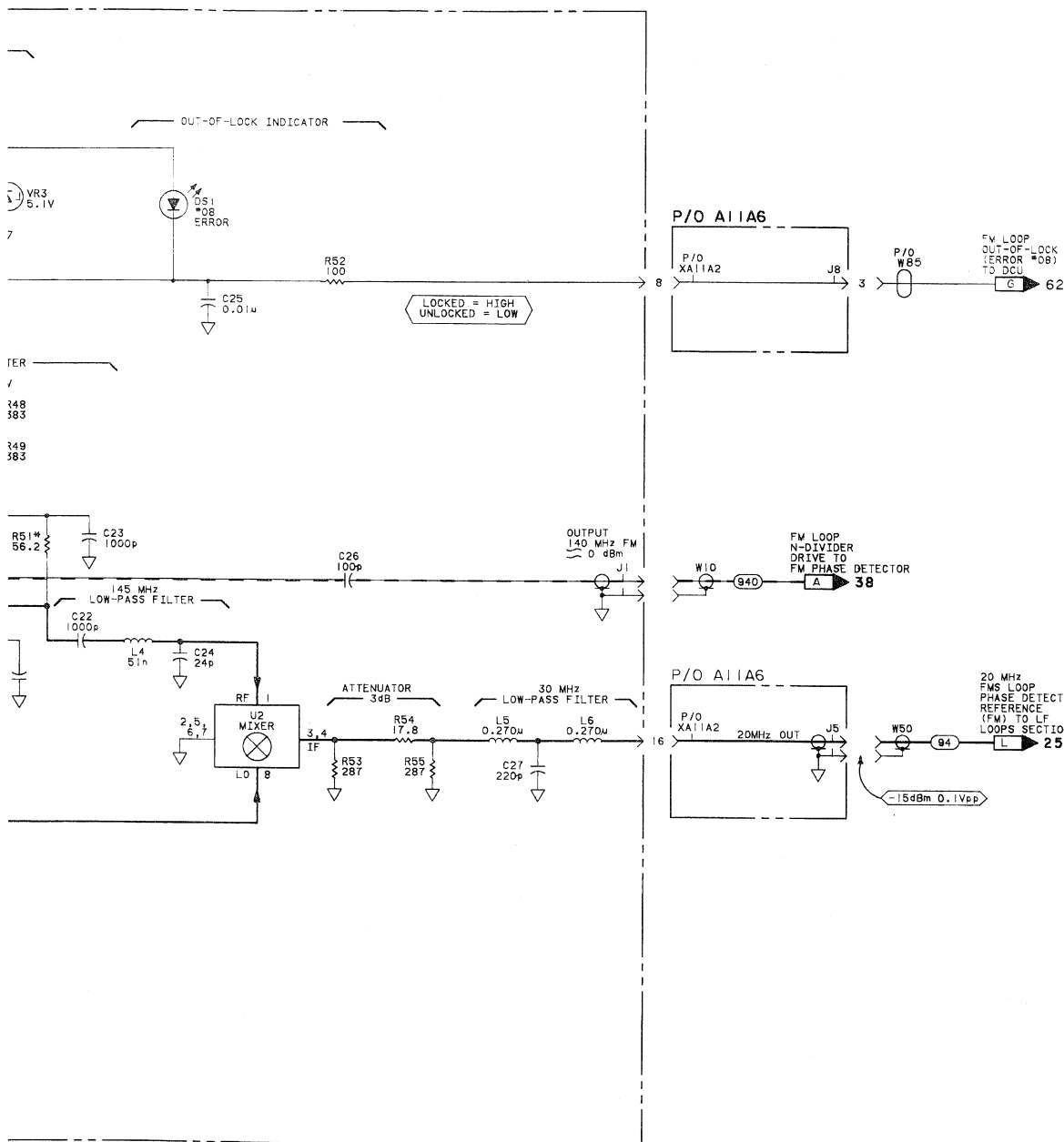
REFERENCE DESIGNATIONS	PART NUMBERS
Q1,2	1855-0235
Q3-5	1854-0404
Q6,7	1855-0020
U1	1826-0372
U3	1826-0191

REFERENCE DESIGNATIONS

NO PREFIX	A11A2
W	C1-27
W41J1	CR1-70
	DS1
	L1-6
	Q1-7
	R1-33,35-55
	TP1-3,2
	U1-3
	VR1-3
	A11A6
	J4-6,8
	XA11A2
	XA11A4



A11A2 43



- NOTES
1. REFER TO TABLE 8-102 FOR SCHEMATIC DIAGRAM NOTES.
 2. TROUBLESHOOTING VALUES ARE TYPICAL. THEY ARE ACTUAL MEASURED VALUES. YOUR MEASUREMENTS MAY BE SLIGHTLY DIFFERENT THAN WHAT IS SHOWN.
 3. ASTERISK (*) INDICATES THAT THESE PARTS ARE SELECTED IN TEST. THE VALUES SHOWN ARE TYPICAL ONLY. SEE SECTION V FOR PROCEDURE.

LOGIC LEVELS

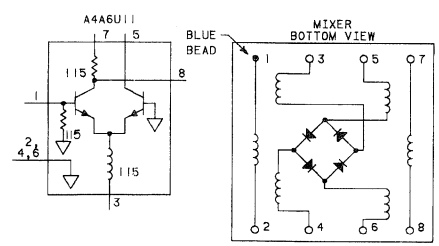
HIGH	TTL
LOW	>+2V
<	<+0.8V
>	IS MORE POS. THAN
OPEN	HIGH
GROUND	LOW

TRANSISTOR AND INTEGRATED CIRCUIT PART NUMBERS

REFERENCE DESIGNATIONS	PART NUMBERS
Q1, 2	855-0235
Q3, 5	854-0404
Q6, 7	855-0020
U1	1826-0372
U3	1826-0191

REFERENCE DESIGNATIONS

NO PREFIX	A11A2
W	C1-27
W41J1	CR1-10
	DS1
	J1
	L1-6
	Q1-7
	R1-33, 35-55
	TP1, 2
	U1-3
	VR1-3
	A11A6
	J4-6, 8
	XA11A2
	XA11A4



SERVICE SHEET
A11A2 43

Figure 8-620. A11A2 FM Loop Voltage Controlled Oscillator Schematic

3/3

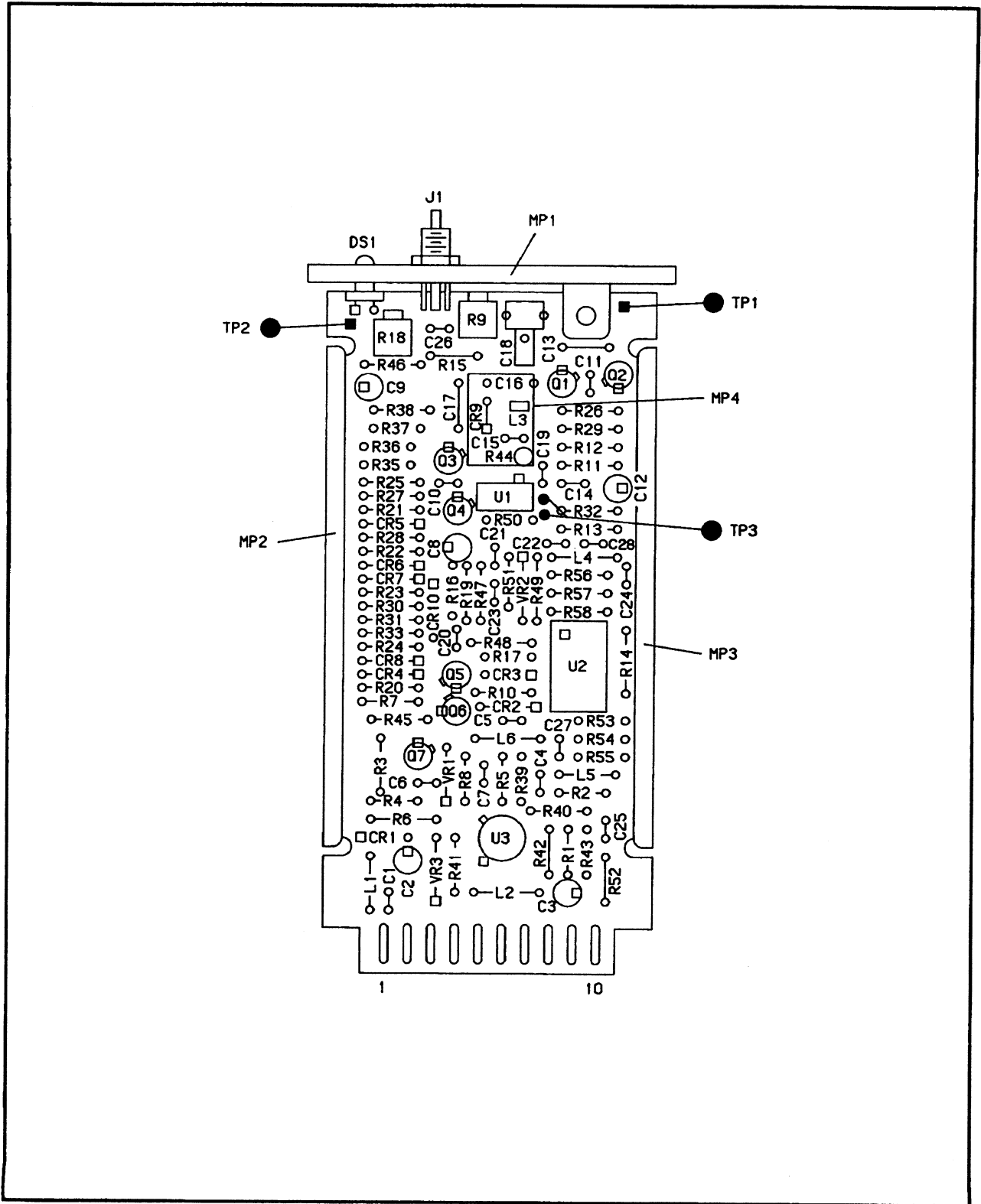
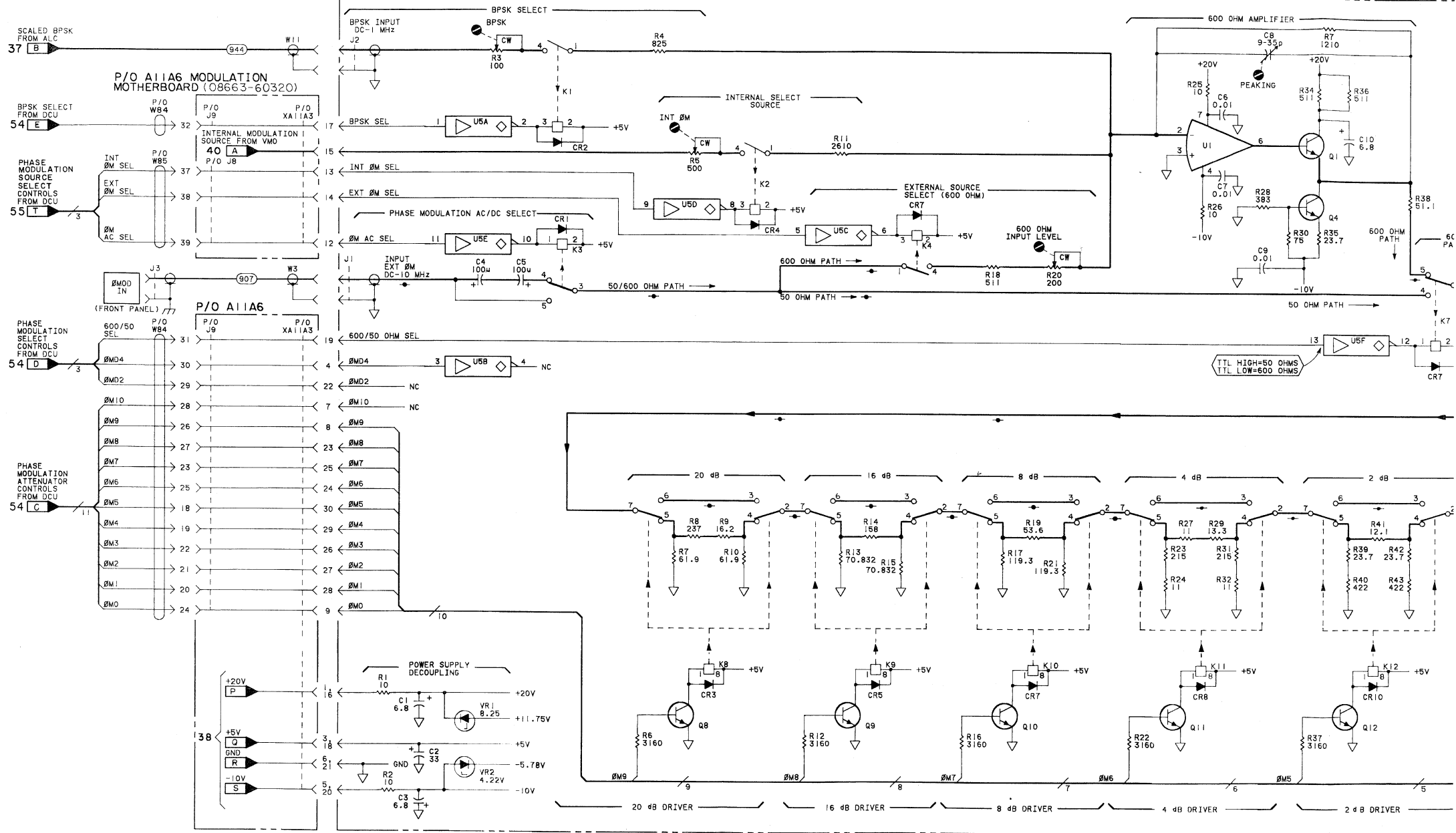
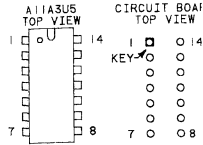
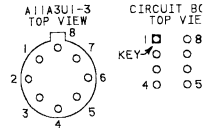
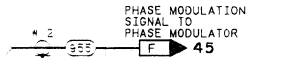
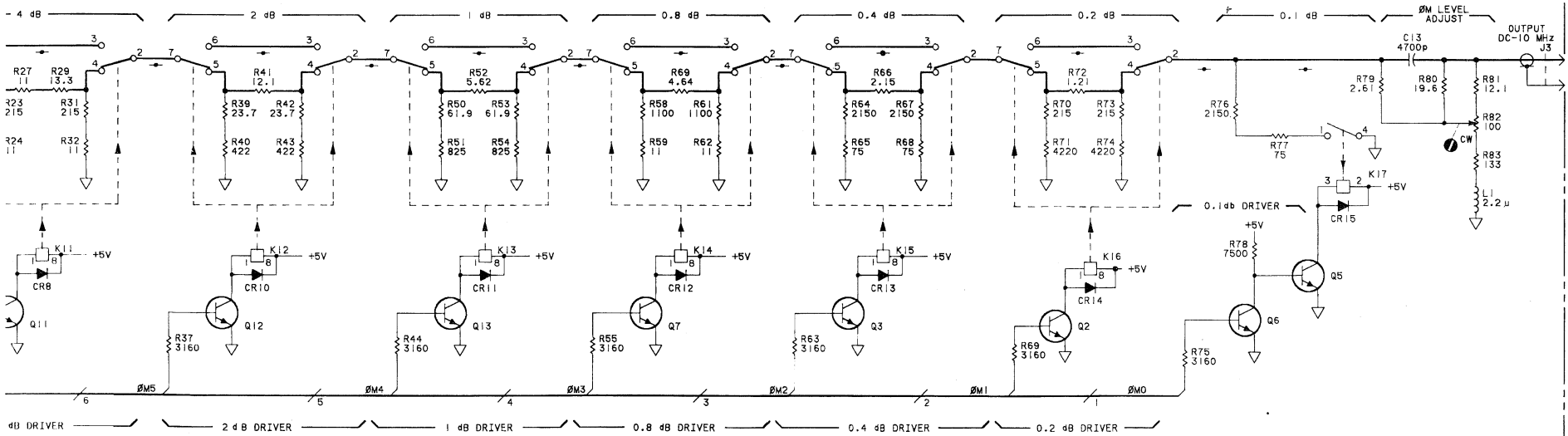
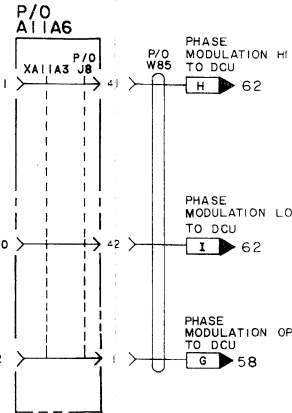
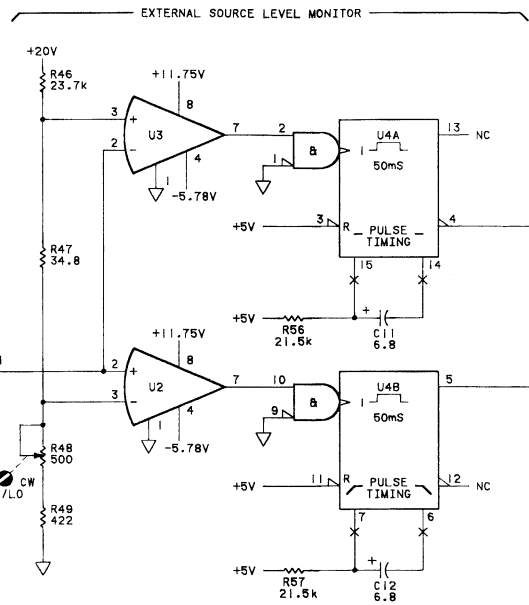
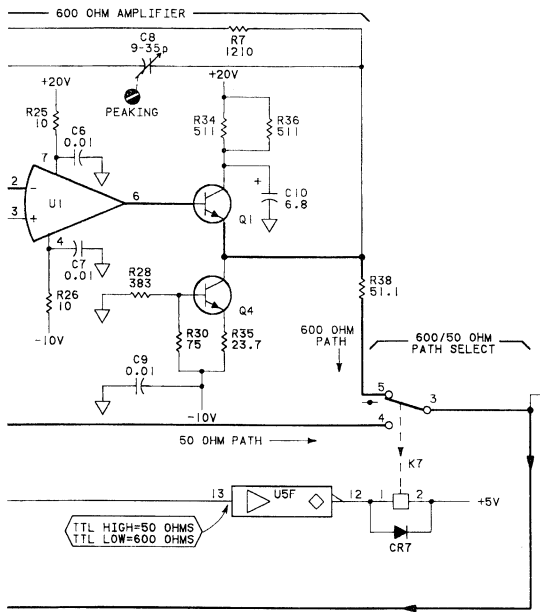


Figure 8-619. A11A2 FM Loop Voltage Controlled Oscillator Component Locator

A11A3 PHASE MOD INPUT (08663-60322)



A11A3 44
1/3



A11A3 44

1. REFER TO TABLE 8-102 FOR SCHEMATIC DIAGRAM NOTES.
2. TROUBLESHOOTING VALUES ARE TYPICAL. THEY ARE ACTUAL MEASURED VALUES. YOUR MEASUREMENTS MAY BE SLIGHTLY DIFFERENT THAN WHAT IS SHOWN.

LOGIC LEVELS

TTL	
HIGH	>+2V
LOW	<+0.8V
< IS MORE NEG. THAN	
> IS MORE POS. THAN	
OPEN	HIGH
GROUND	LOW

REFERENCE DESIGNATIONS

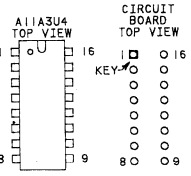
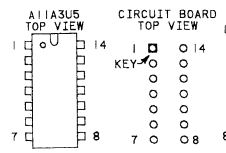
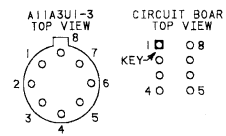
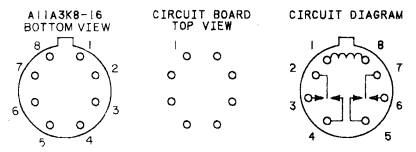
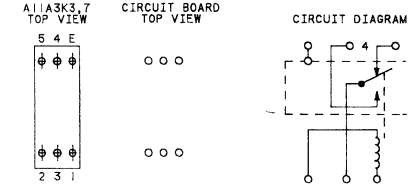
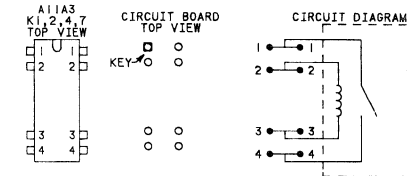
NO PREFIX	A11A6
W3, 11, 12, 84, 85	J8, 9 XA11A6
A11A3	
C1-13	
CR1-15	
J1-3	
K1-4, 7-17	
L1	
Q1-13	
R1-85	
U1-5	
VR1, 2	

TRANSISTOR AND INTEGRATED CIRCUIT PART NUMBERS

REFERENCE DESIGNATIONS	PART NUMBERS
Q1, 4	1854-0721
Q2, 3, 5-13	1854-0477
U1	1826-0488
U2, 3	1820-0321
U4	1820-1423
U5	1820-1200

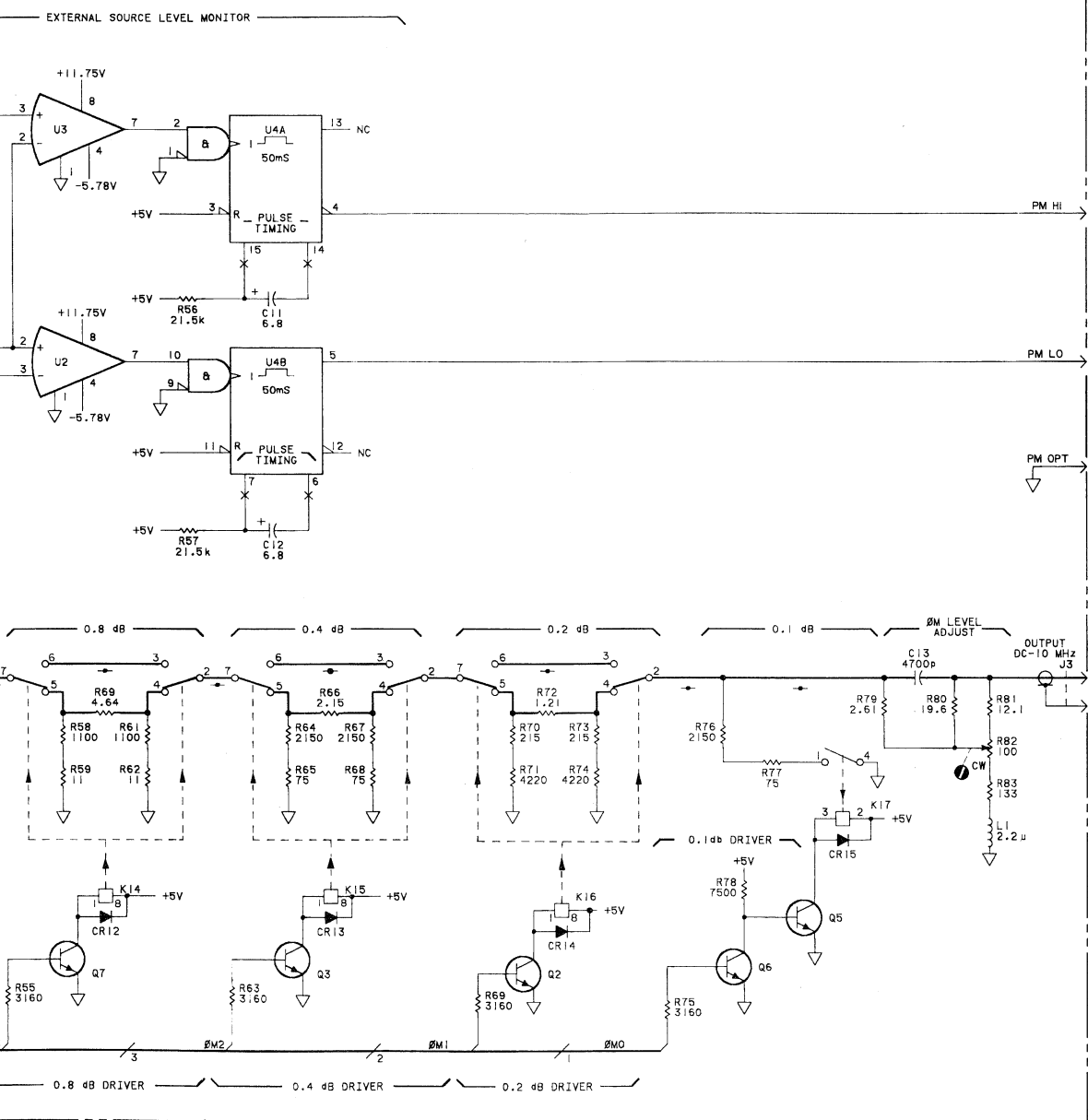
INTEGRATED CIRCUIT VOLTAGE AND GROUND CONNECTIONS

REFERENCE DESIGNATIONS	PIN NUMBERS
U4	+5V - 16 ▽ - 8
U5	+5V - 14 ▽ - 8



SERVICE SHEET A11A3 44

Figure 8-623. A11A3 Phase Modulation Input Schematic



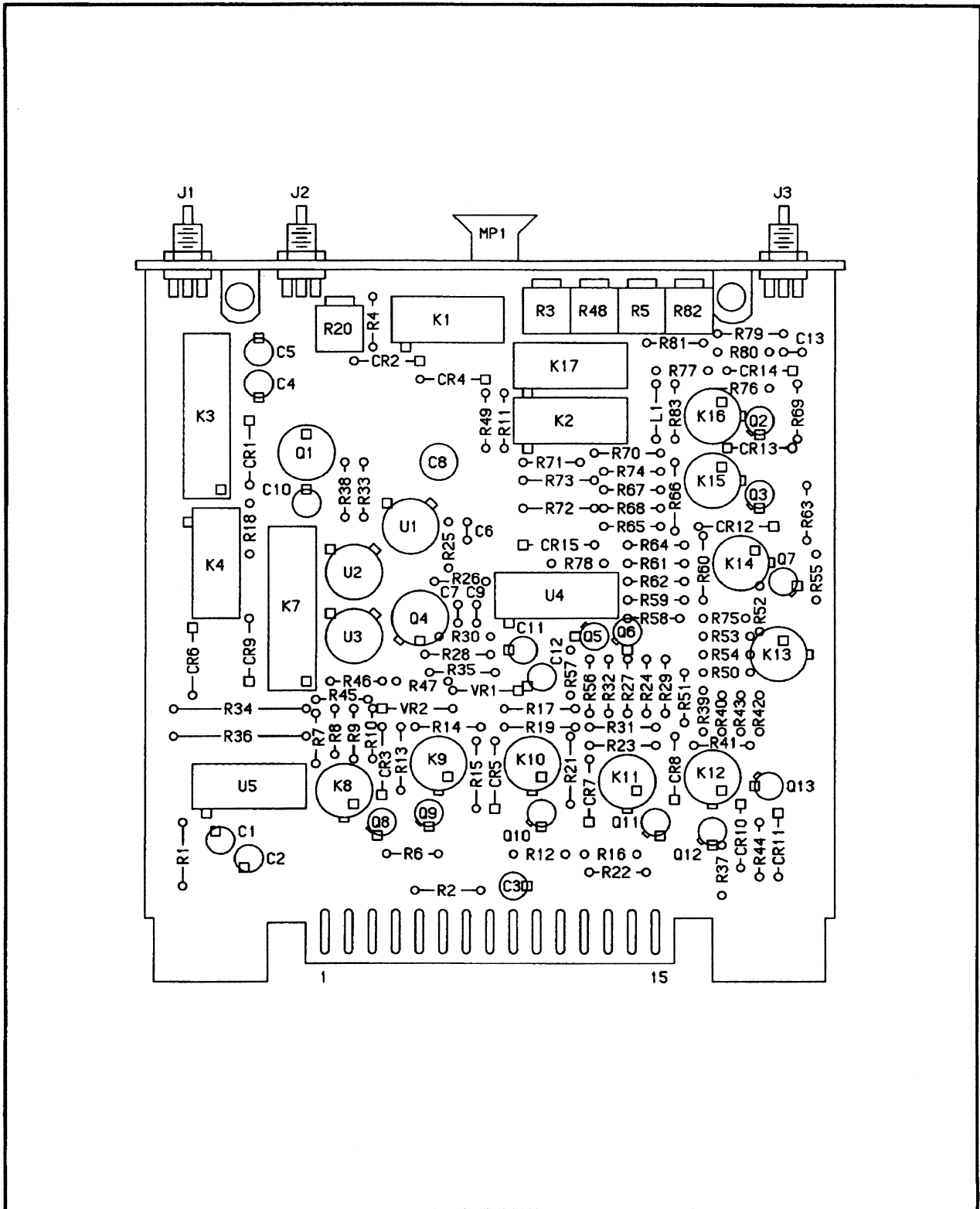
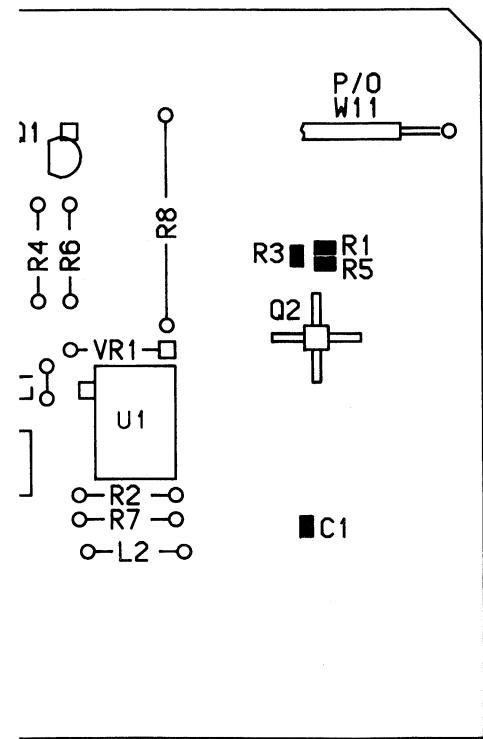
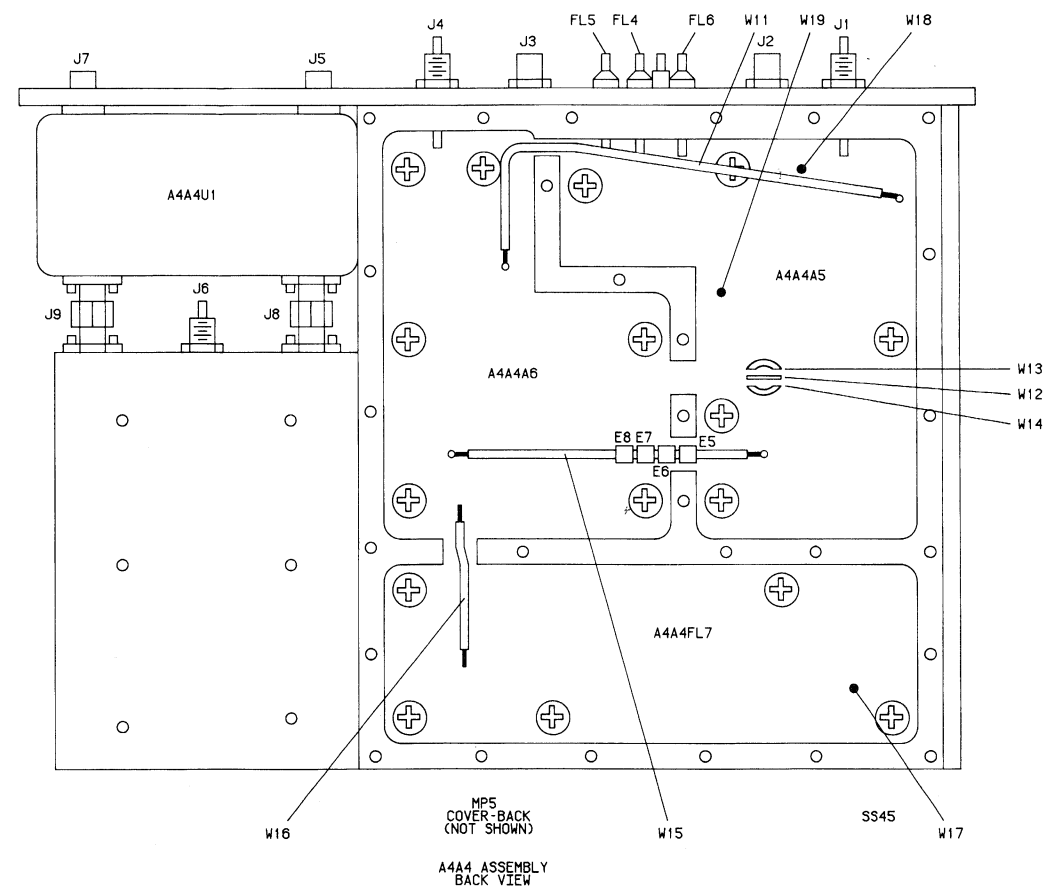


Figure 8-622. A11A3 Phase Modulation Input Component Locator



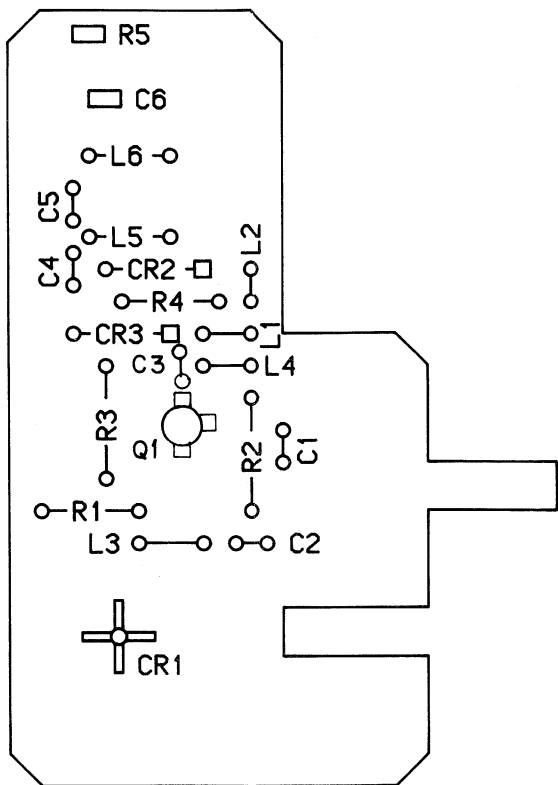
A4A4A5



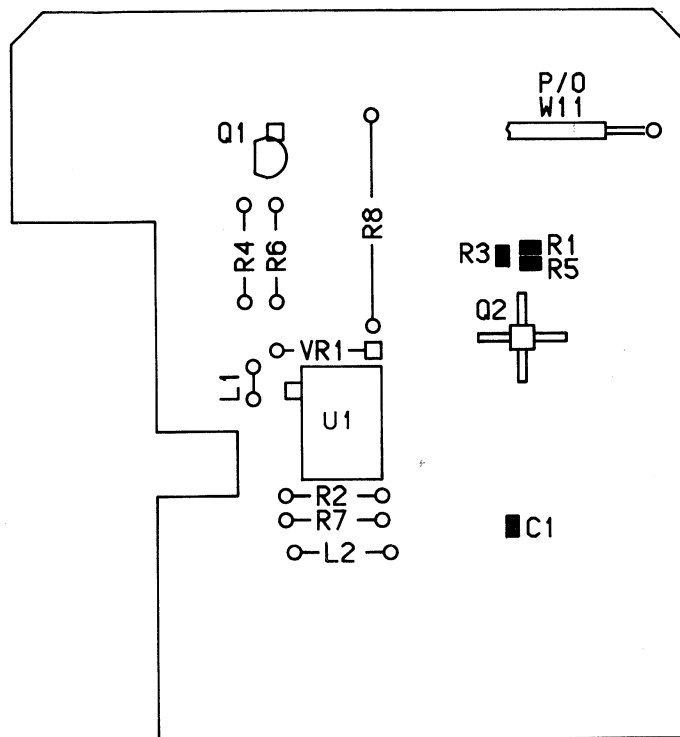
MP5
COVER-BACK
(NOT SHOWN)

A4A4 ASSEMBLY
BACK VIEW

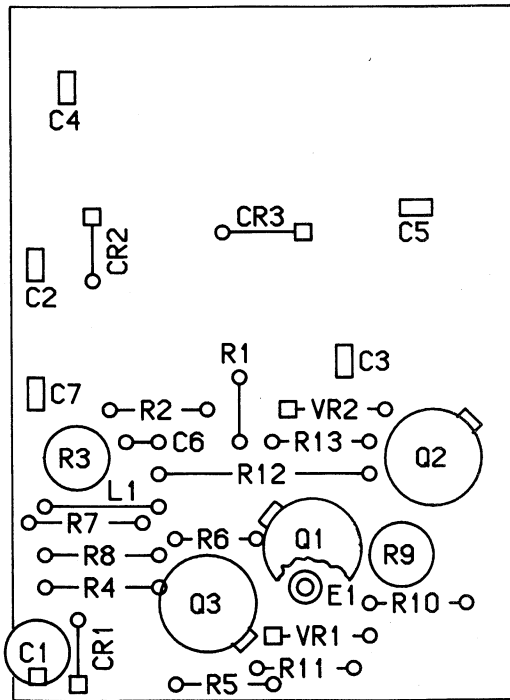
Figure 8-625. A4A4 Phase Modulator Component Locator (1 of 2)



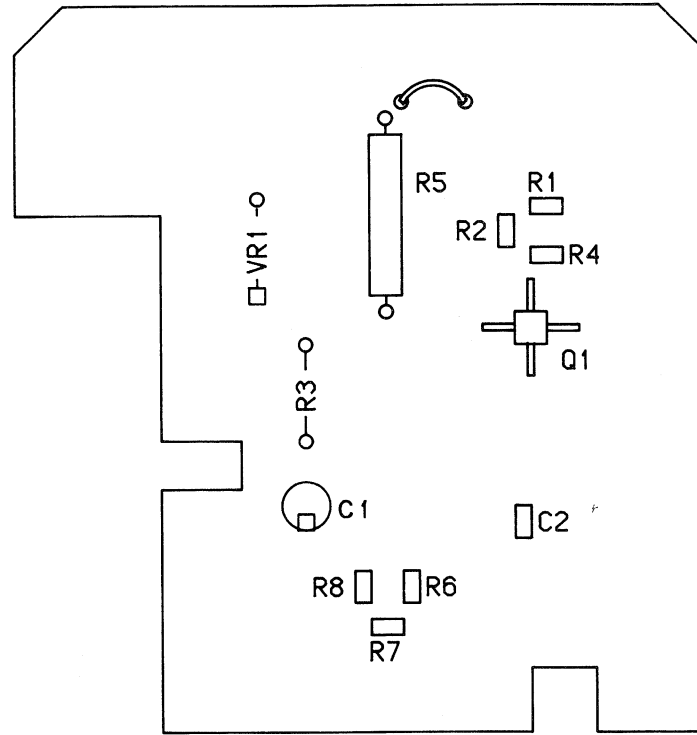
A4A4A6



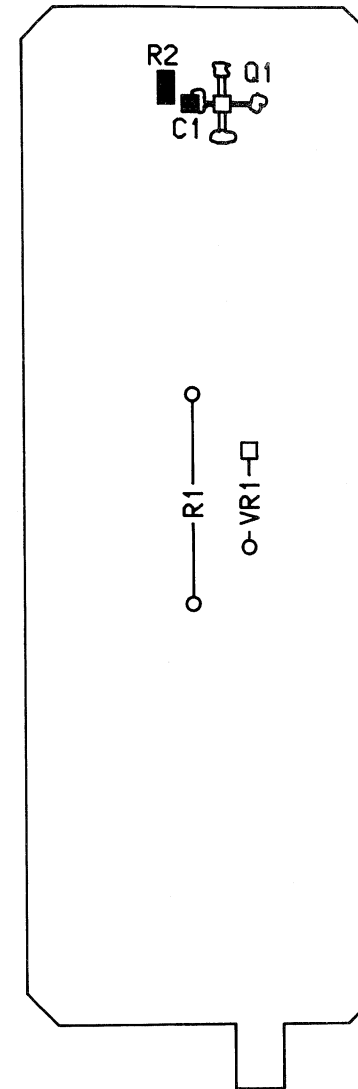
A4A4A5



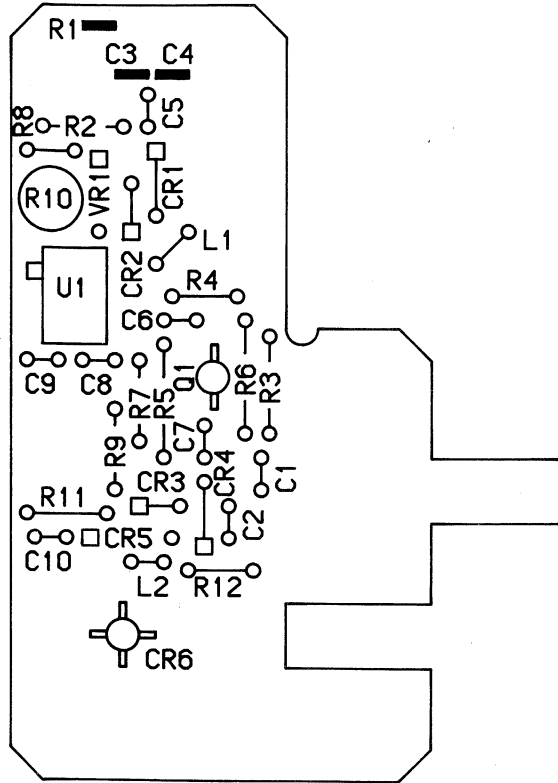
A4A4A4



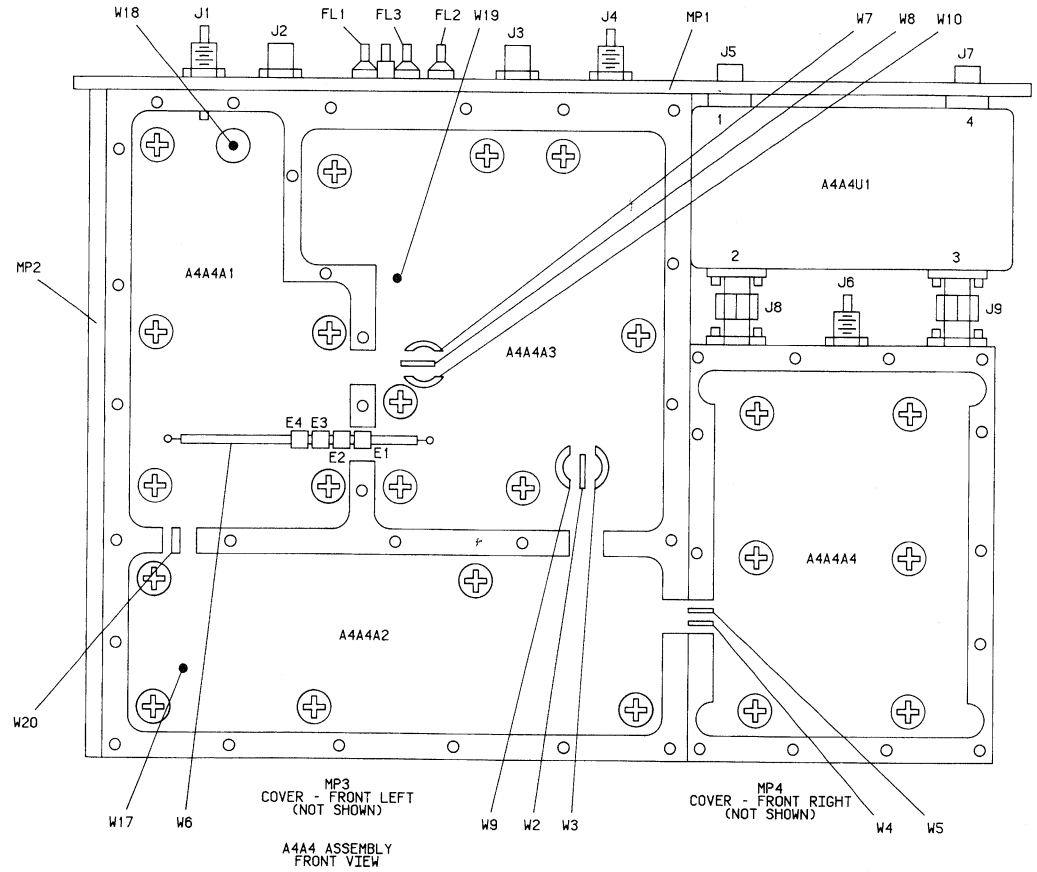
A4A4A3



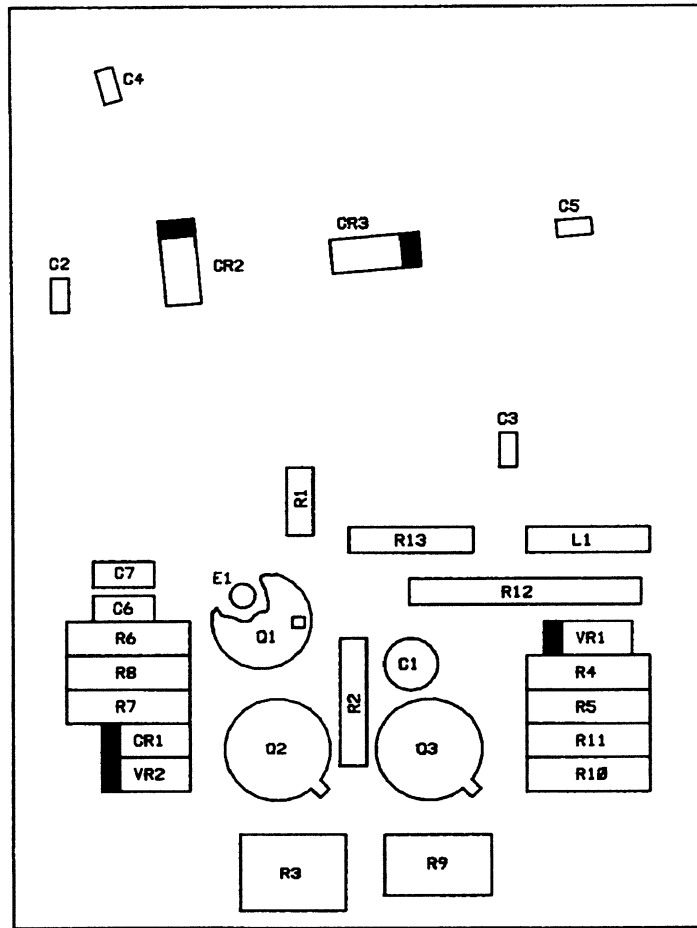
A4A4A2



A4A4A1

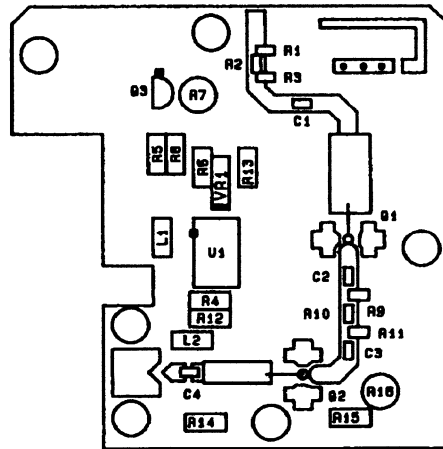


A4A4 ASSEMBLY
FRONT VIEW

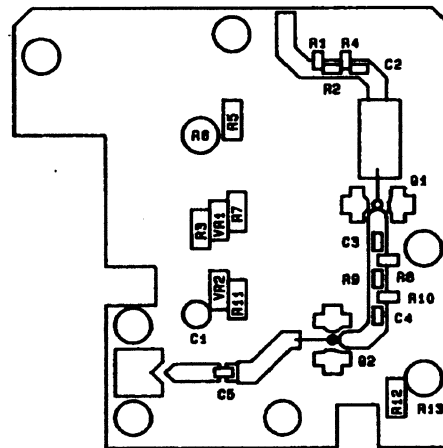


A4A4A4

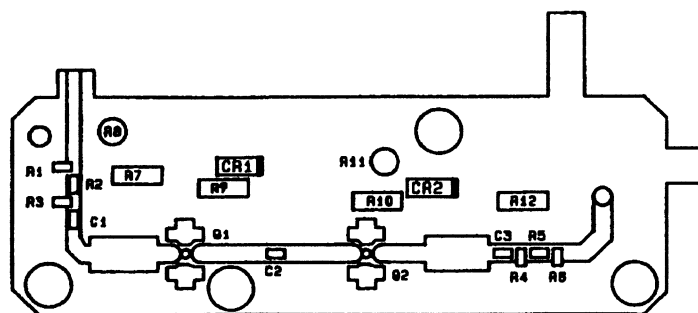
P/O Figure 8-625. A4A4 Phase Modulator Component Locator (2 of 2) (2323A)



60366

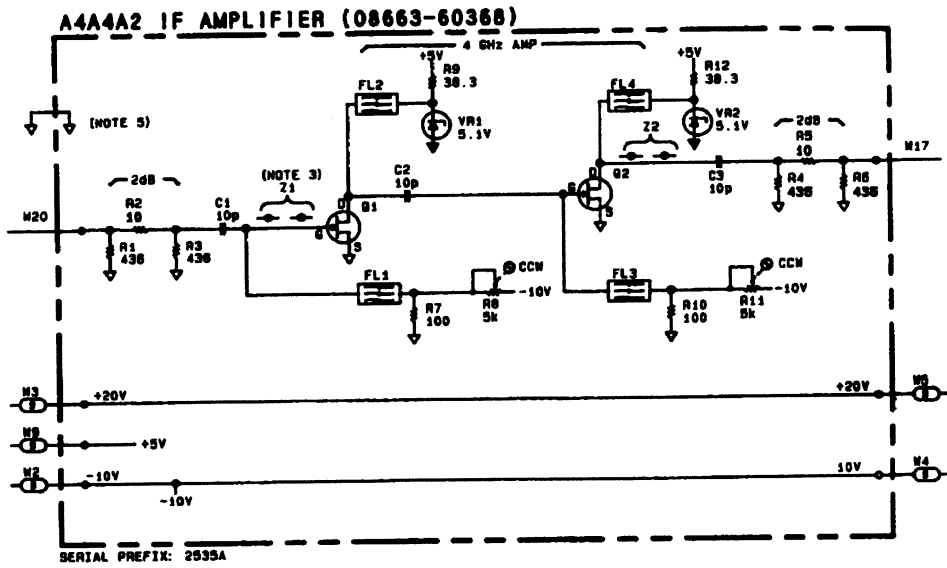


60367

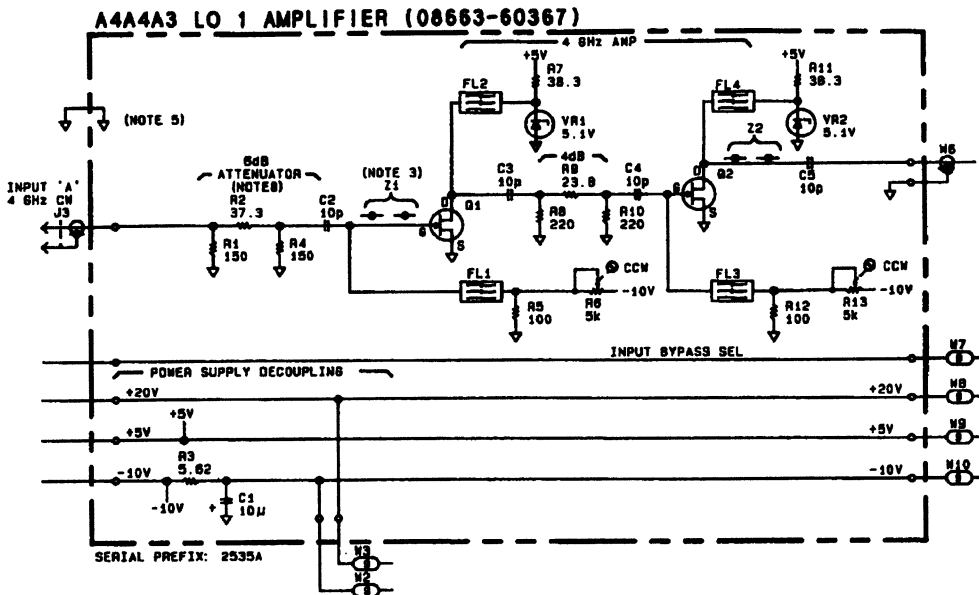


60368

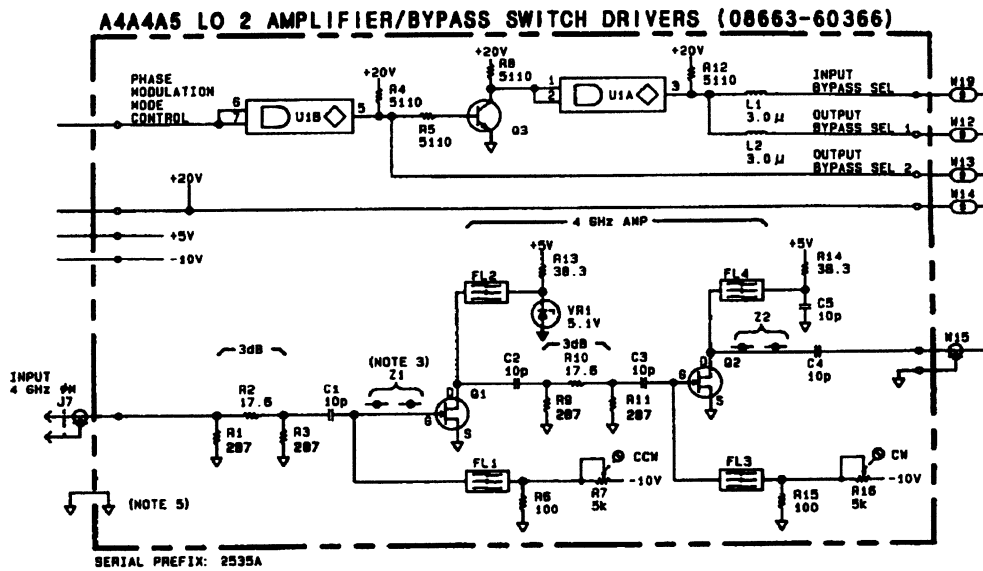
A4A4A2, A4A4A3, and A4A4A5 Component Location Diagrams (2535A)



P/O Figure 8-626. A4A4A2 Schematic (2535A)



P/O Figure 8-626. A4A4A3 Schematic (2535A)



P/O Figure 8-626. A4A4A5 Schematic (2535A)

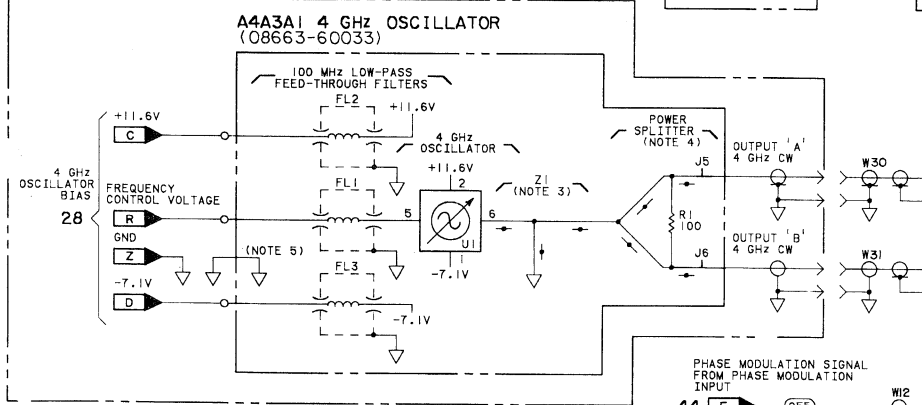
CAUTION

ELD EFFECT TRANSISTORS
A4A201, A4A43Q1 AND
A4A45Q2 ARE HIGHLY
SUSCEPTIBLE TO DAMAGE OR
DESTRUCTION FROM STATIC
DISCHARGES. OBSERVE
APPROPRIATE PRECAUTIONS
BEFORE CONTACTING THESE
PARTS.

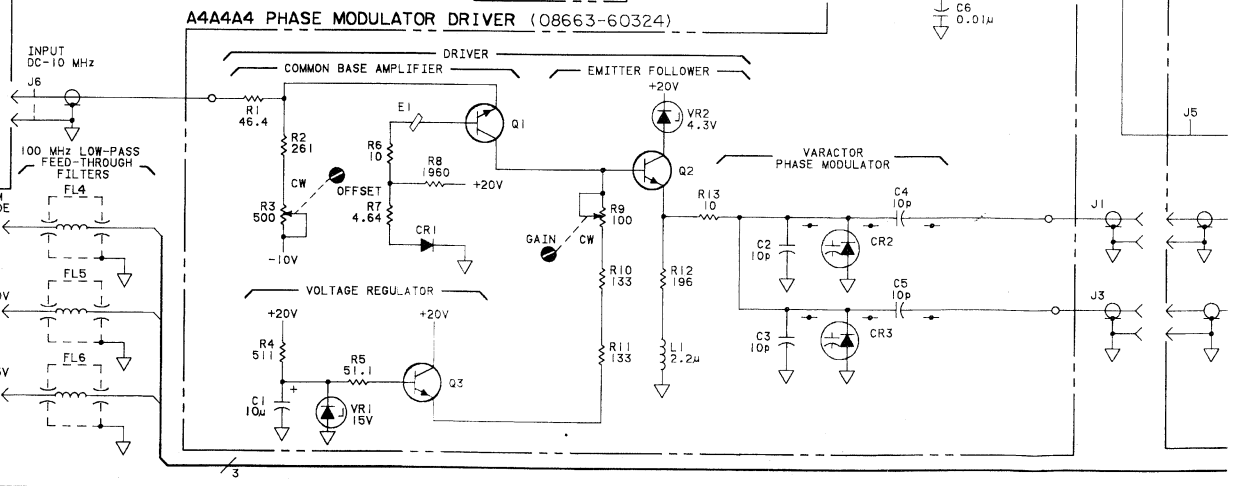
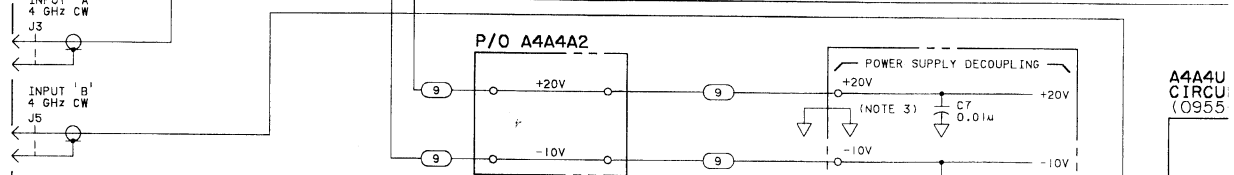
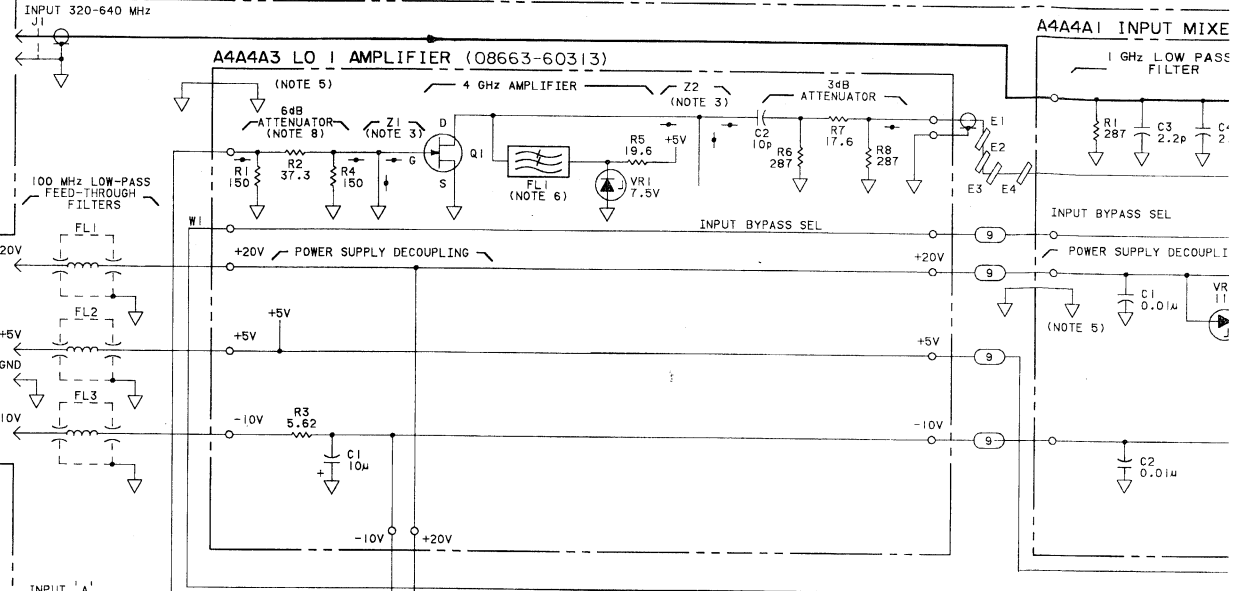
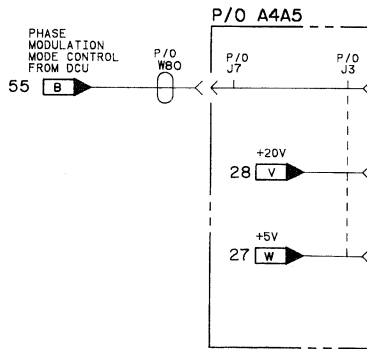
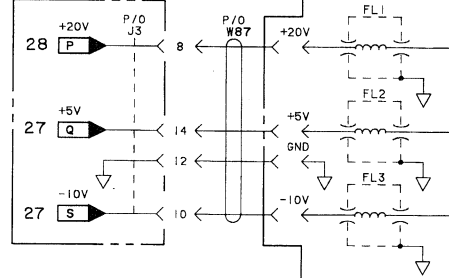
FUNDAMENTAL FREQUENCY
BAND (320-640 MHz FROM
OS LOOP VCO)

A4A4 PHASE MODULATOR (08663-60011) (OPTION 002 ONLY)

P/O A4A3 DISTRIBUTOR ASSEMBLY
(08663-60304) (OPTION 002 ONLY)

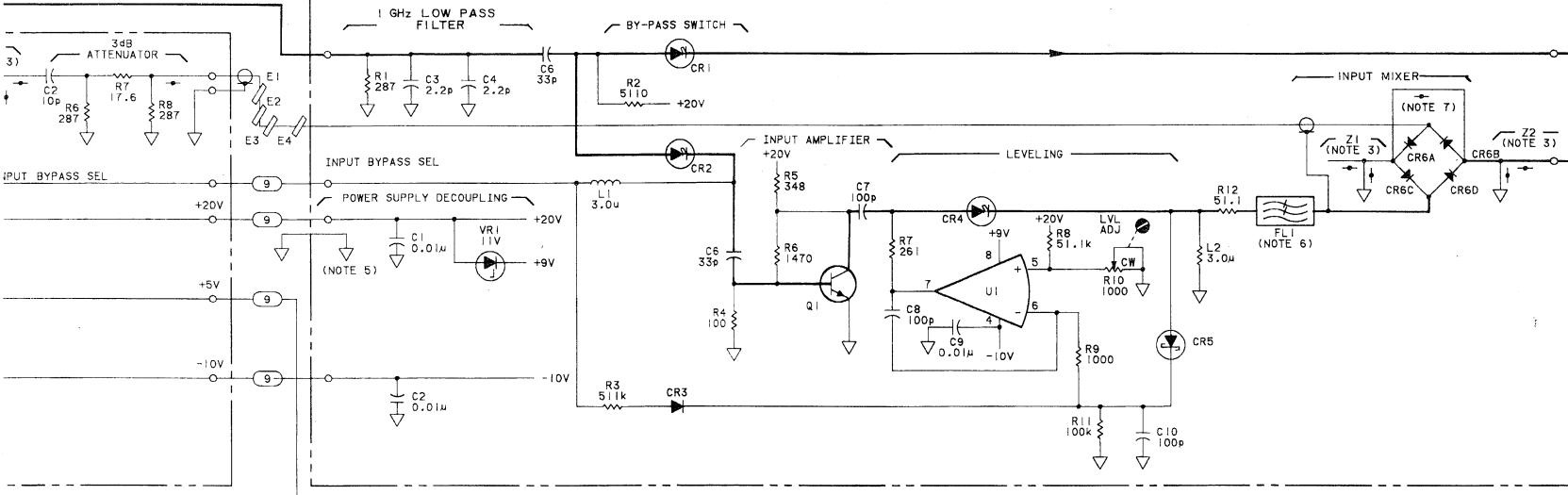


P/O A4A5 PHASE
MODULATION
MOTHERBOARD
(08663-60310)

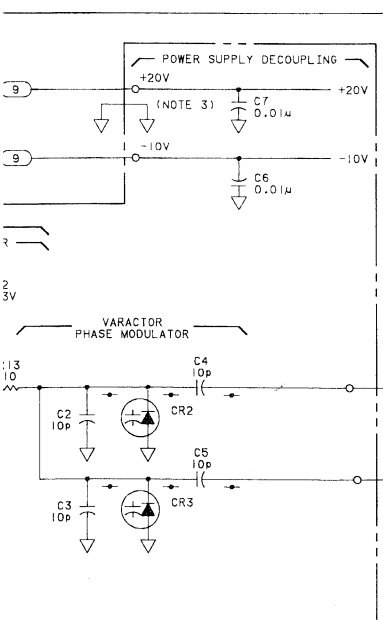
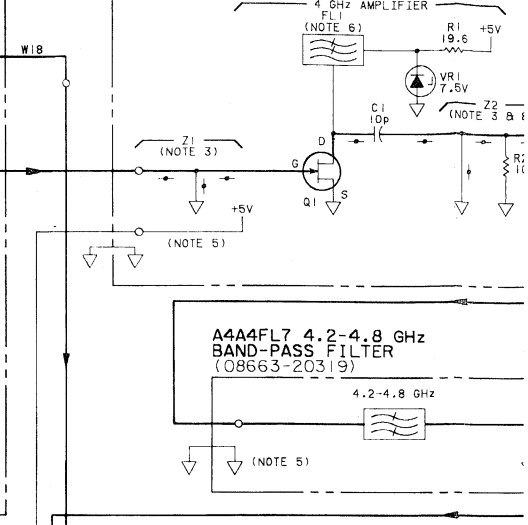


A4A4 45
1/3

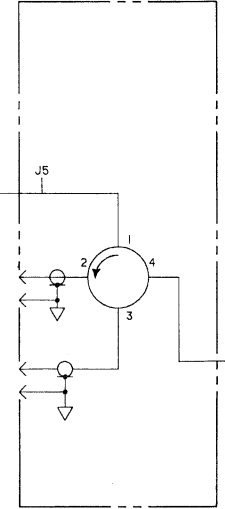
A4A4A1 INPUT MIXER/AGC (08663-60312)



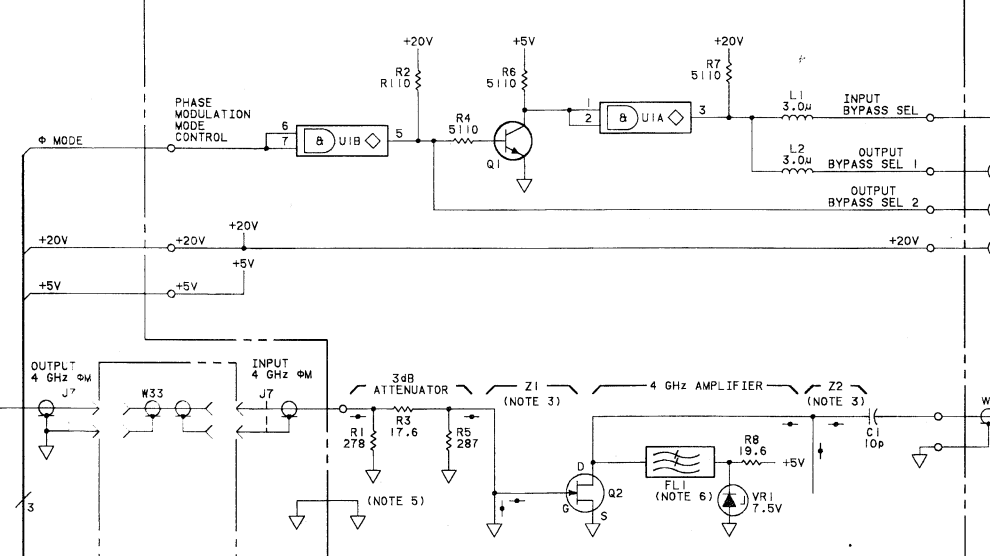
P/O A4A4A2 IF AMPLIFIER (08663-60314)



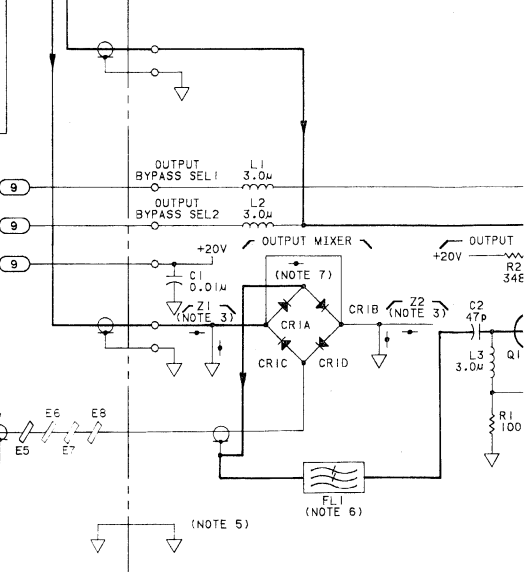
A4A4U1 CIRCULATOR (0955-0045)



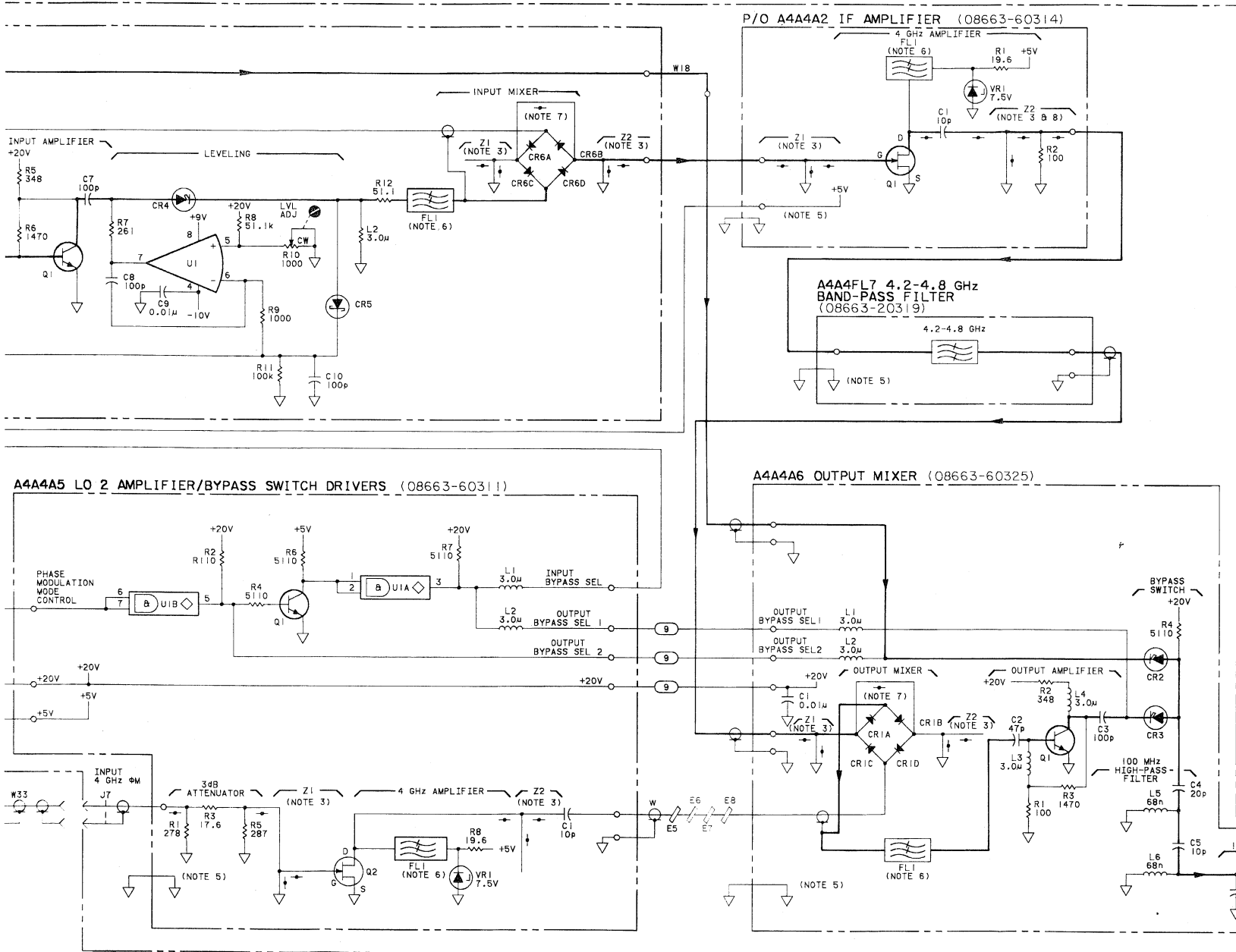
A4A4A5 LO 2 AMPLIFIER/BYPASS SWITCH DRIVERS (08663-60311)



A4A4A6 OUTPUT MIXER (08663-60325)



A4A4 45
2/3



- NOTES
- REFER TO TABLE 8-102 FOR SCHEMATIC DIAGRAM NOTES.
 - TROUBLESHOOTING VALUES ARE TYPICAL. THEY ARE ACTUAL MEASURED VALUES. YOUR MEASUREMENTS MAY BE SLIGHTLY DIFFERENT THAN WHAT IS SHOWN.
 - PC BOARD STRIPLINE TYPE IMPEDANCE NETWORK.
 - PC BOARD STRIPLINE TYPE POWER SPLITTER.
 - CHASSIS GROUND IS ACHIEVED THROUGH MECHANICAL CONTACT WITH FASTENERS HOLDING PC BOARDS TO CASTING AND CASTING TO FRAME.
 - PC BOARD STRIPLINE TYPE 4 GHz DECOUPLING.
 - PC BOARD STRIPLINE TYPE PHASE INVERTER.
 - THE SMALL "CHIP" COMPONENTS ON THIS ASSEMBLY REQUIRE LOW TEMPERATURE SOLDERING TECHNIQUES. USE SILVER SOLDER.

LOGIC LEVELS

	TTL
HIGH	>+2V
LOW	<+0.8V
<	IS MORE NEG. THAN
>	IS MORE POS. THAN
OPEN	HIGH
GROUND	LOW

TRANSISTOR AND INTEGRATED CIRCUIT PART NUMBERS

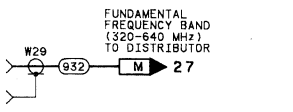
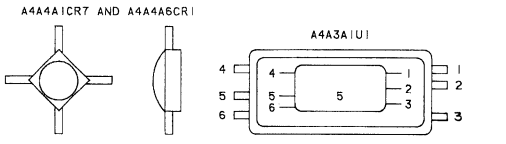
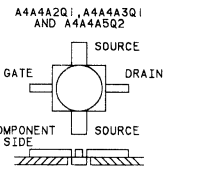
REFERENCE DESIGNATIONS	PART NUMBERS
A4A3A1	
U1	11661-67002
A4A4	
U1	0955-0045
A4A4A1	
Q1	1854-0720
U1	1826-0547
A4A4A2	
Q1	1855-0483
A4A4A3	
Q1	1855-0483
A4A4A4	
Q1-3	1854-0597
A4A4A5	
Q1	1854-0810
Q2	1855-0483
U1	1820-0535
A4A4A6	
Q1	1820-0720

REFERENCE DESIGNATION

NO.	PREFIX	A4A4A1	A4A4A4
W2,29-32, 80,87		C1-10 CR1-6 FL1	C1-7 CR1-3 E1
A4A3		L1,2 R1-12 U1 VR1,2 Z1,2	L1-3 R1-13 VR1,2
J5, J6			
A4A3A1			A4A4A5 C1 FL1 L1,2 Q1,2 R1-6 U1 VR1,2 Z1,2
FL1-3 R1 U1 Z1		A4A4A2	
A4A4			A4A4A6 C1-6 CR1-3 L1-6 Q1-5 R1-5 Z1,2
E1-8 FL1-7 U1 W		A4A4A3	
			A4A5 J3

INTEGRATED CIRCUIT VOLTAGE AND GROUND CONNECTIONS

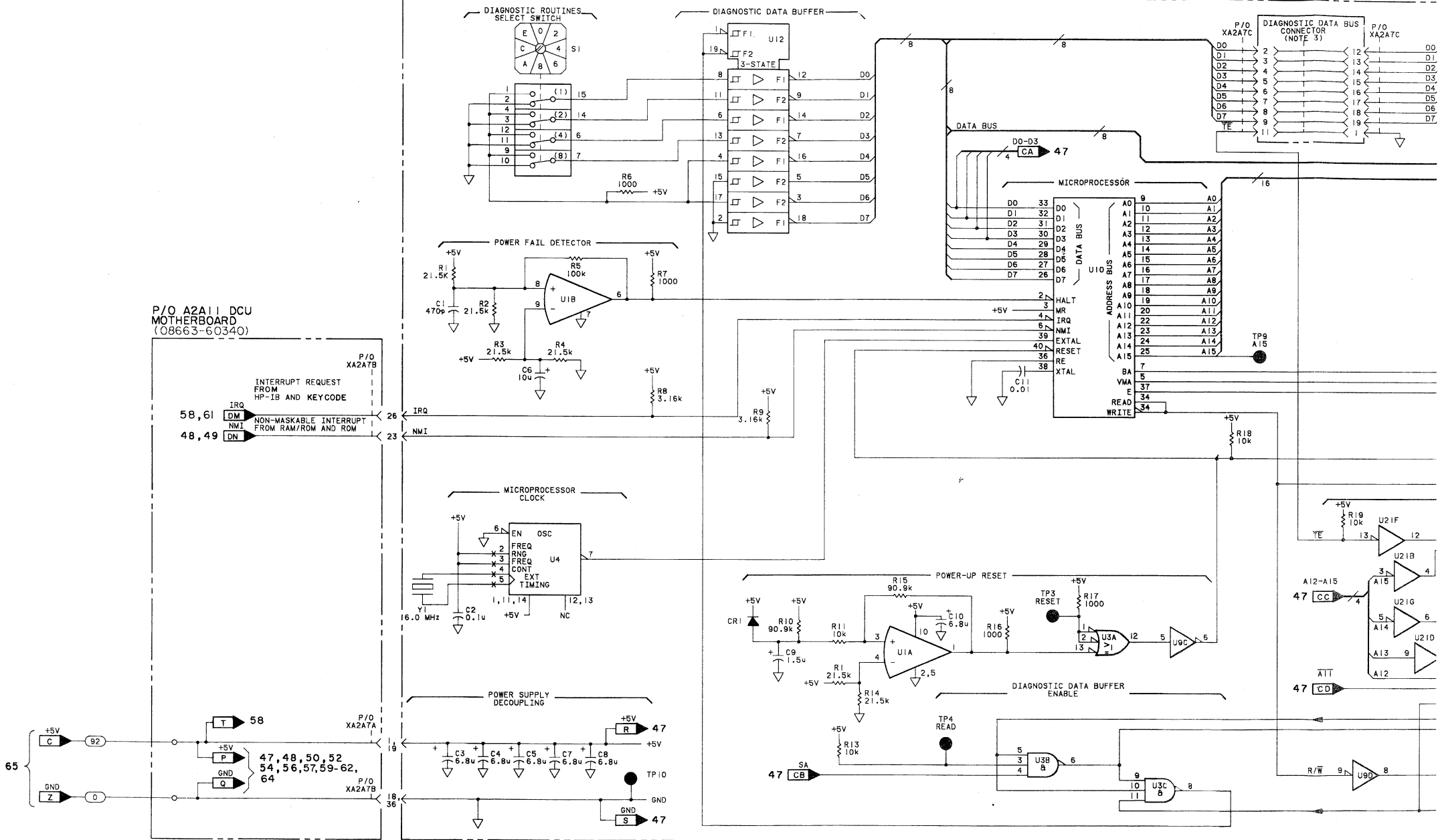
REFERENCE DESIGNATIONS	PIN NUMBERS
A4A4A5	
U1	+5V - 8
	△ - 4



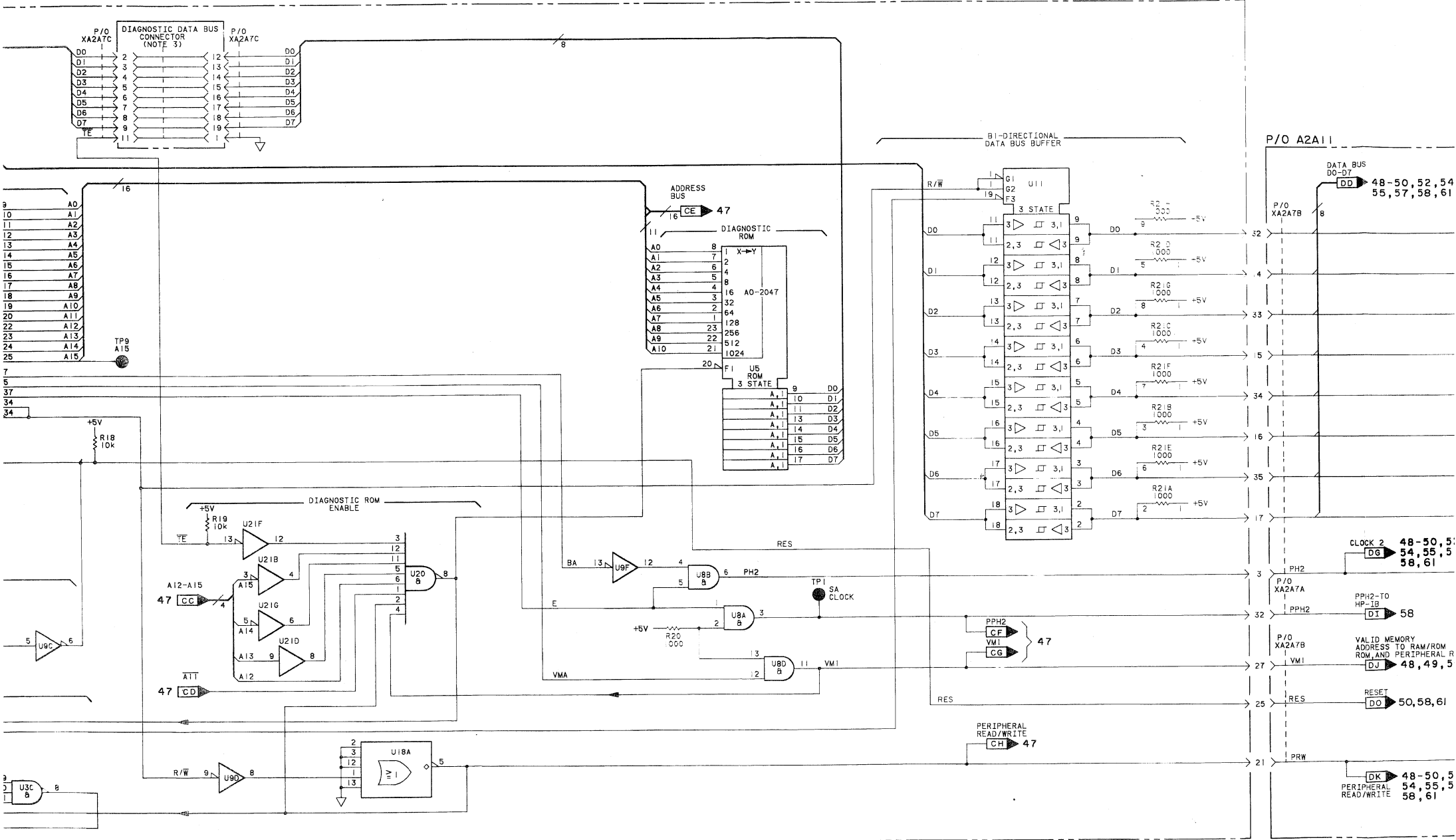
SERVICE SHEET
A4A4 45

Figure 8-626. A4A4 Phase Modulator Schematic
8-639/641

P/O A2A7 MICROPROCESSOR (08663-60332)



A2A7 46



A2A7 46

2/3

CLOCK 2 48-50, 51, 54, 55, 58, 61

PPH2-TO HP-IB 58

VALID MEMORY ADDRESS TO RAM/ROM AND PERIPHERAL R 48, 49, 5

RESET 50, 58, 61

PERIPHERAL READ/WRITE 54, 55, 58, 61

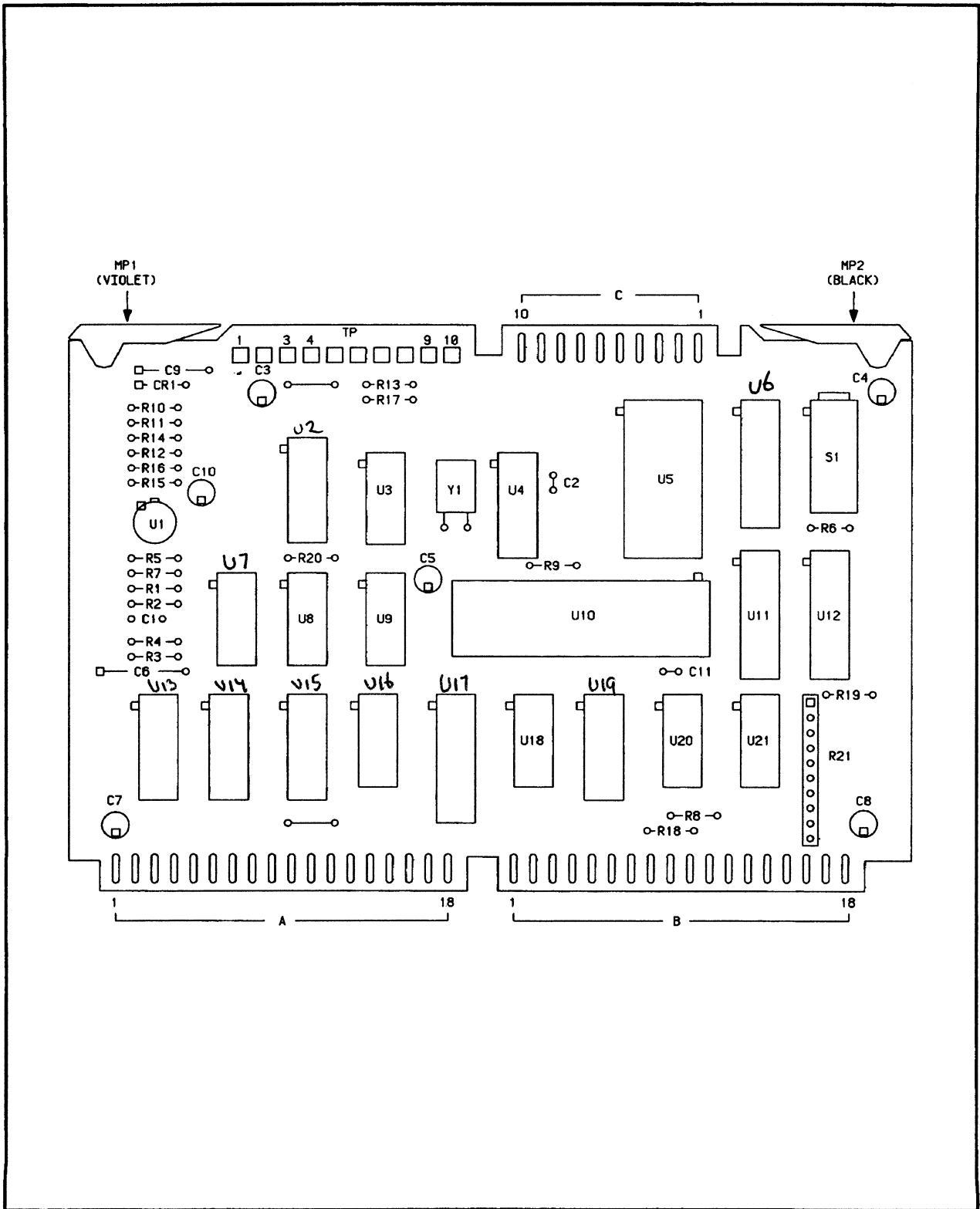
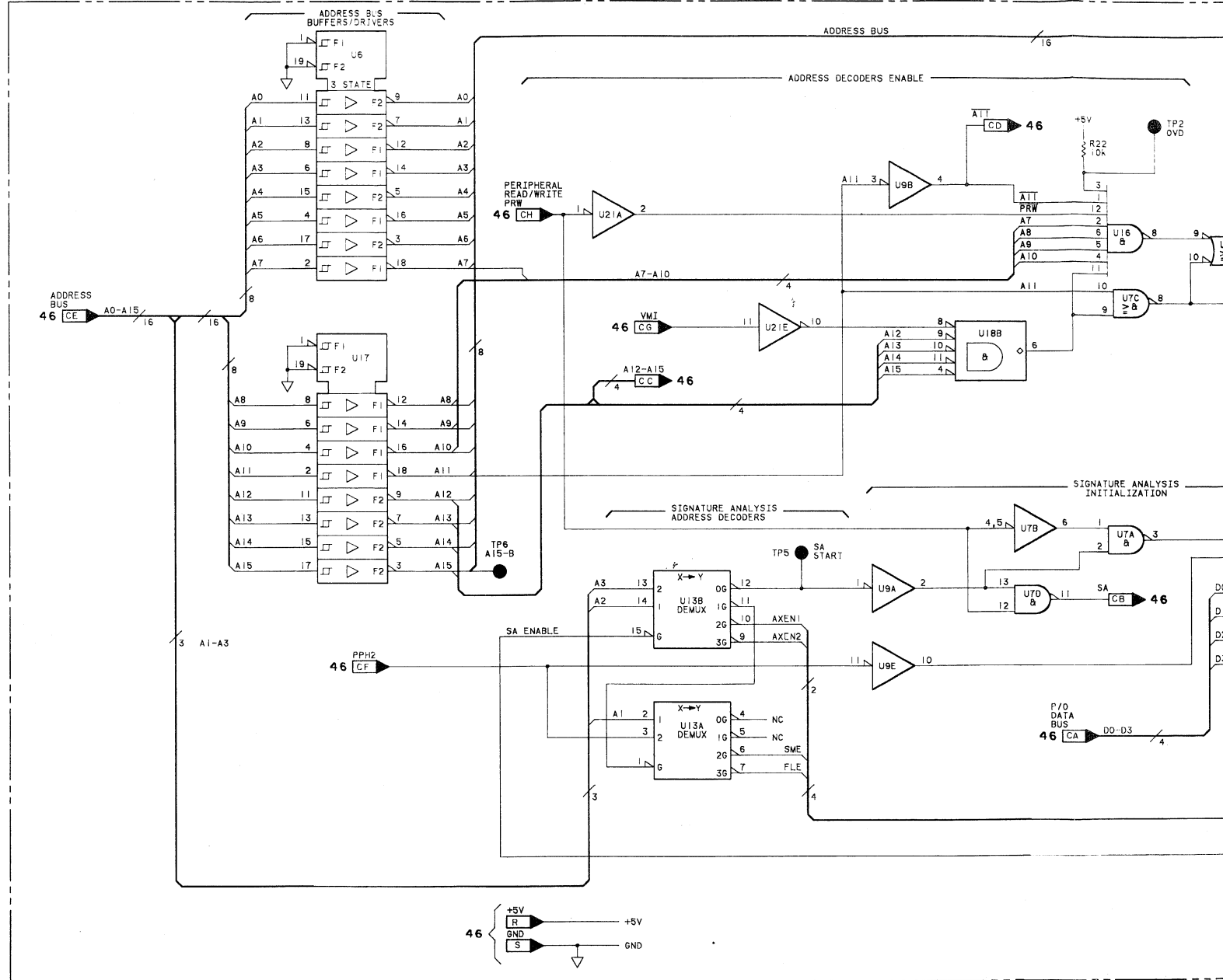
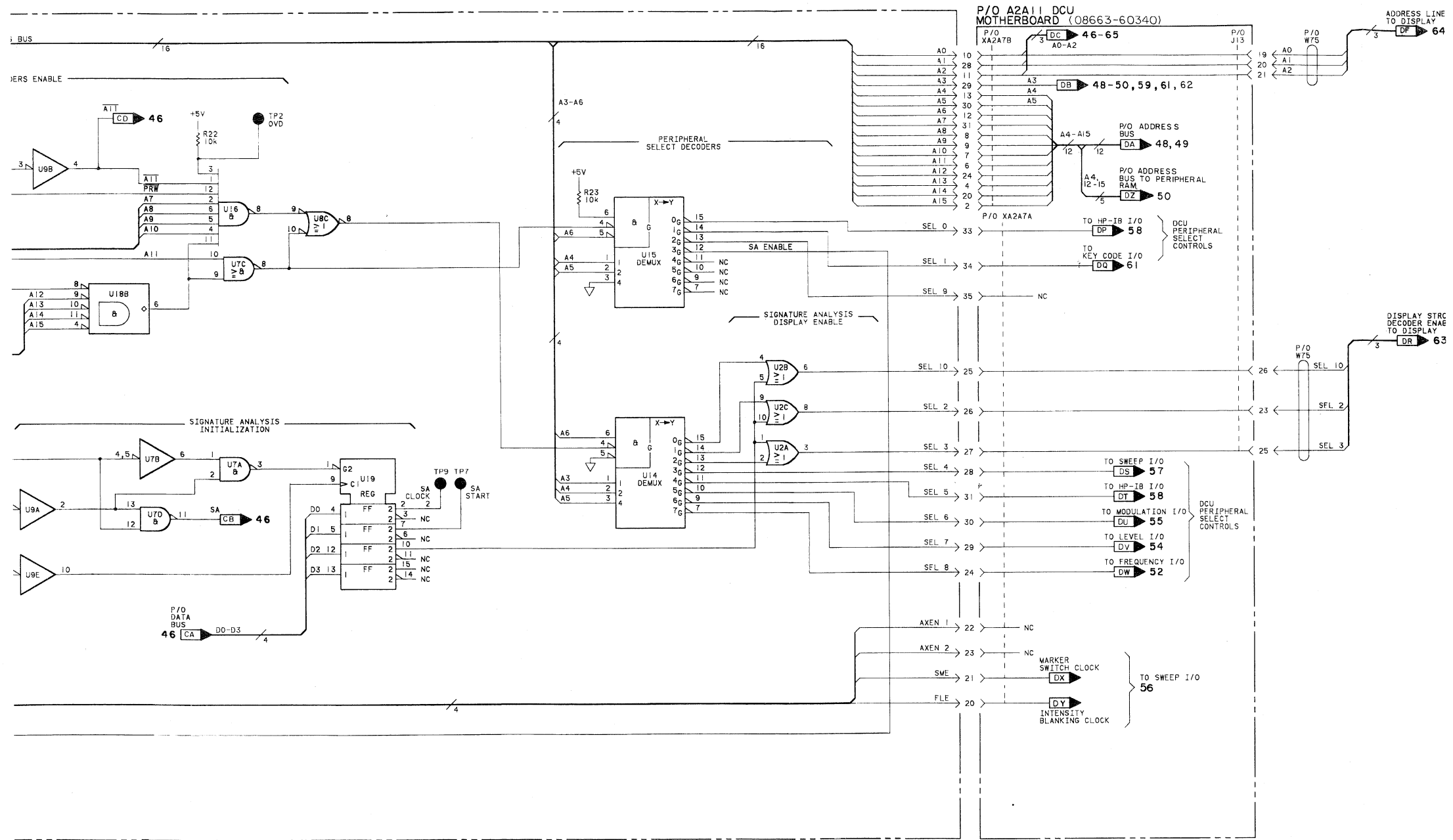


Figure 8-702. P/O A2A7 Microprocessor Component Locator

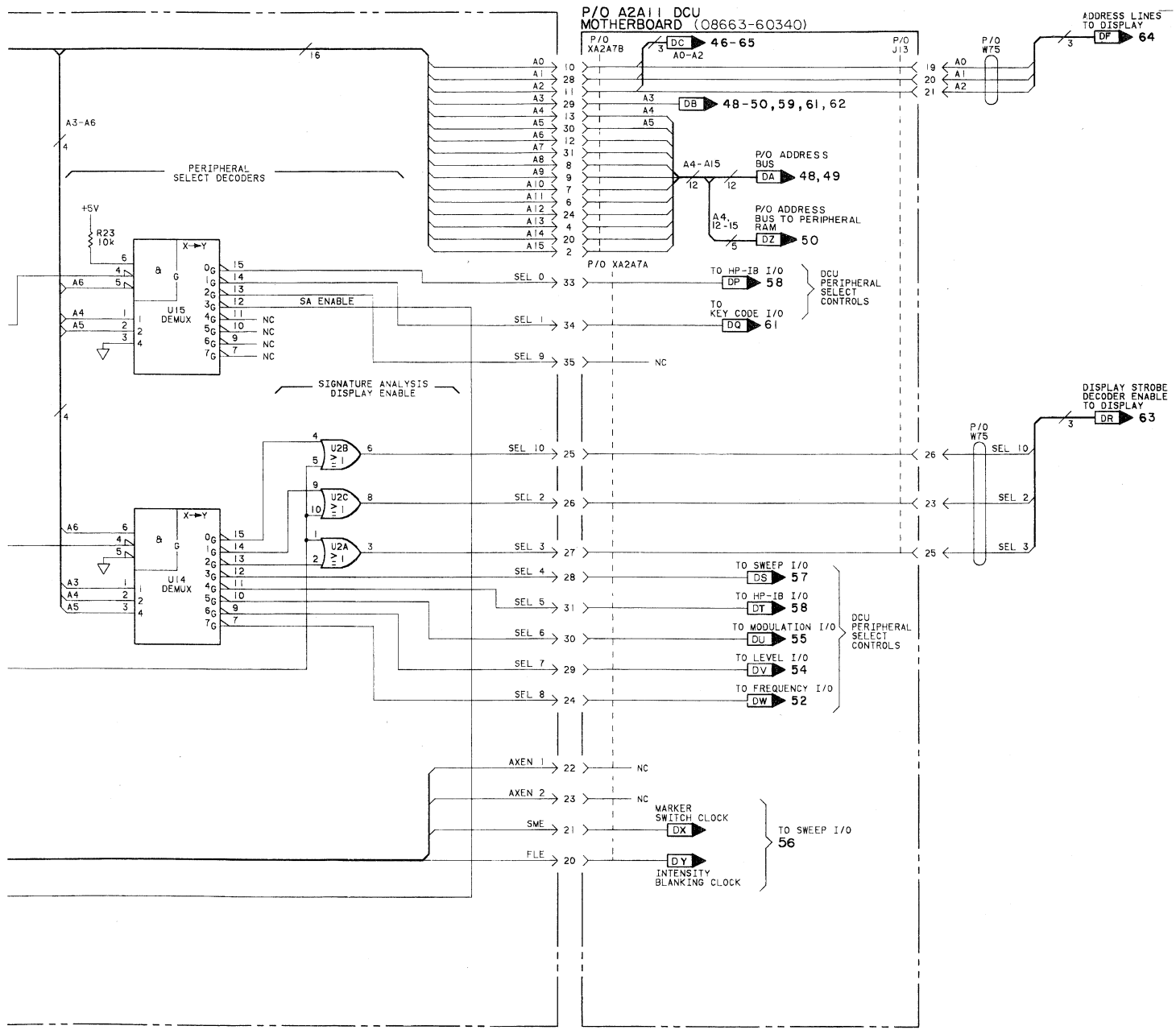
A2A7 MICROPROCESSOR (08663-60332)



A2A7 47



A2A7 47
2/3



SERVICE SHEET 47
P/O A2A7

Figure 8-706. P/O A2A7 Microprocessor Schematic

8-707/708

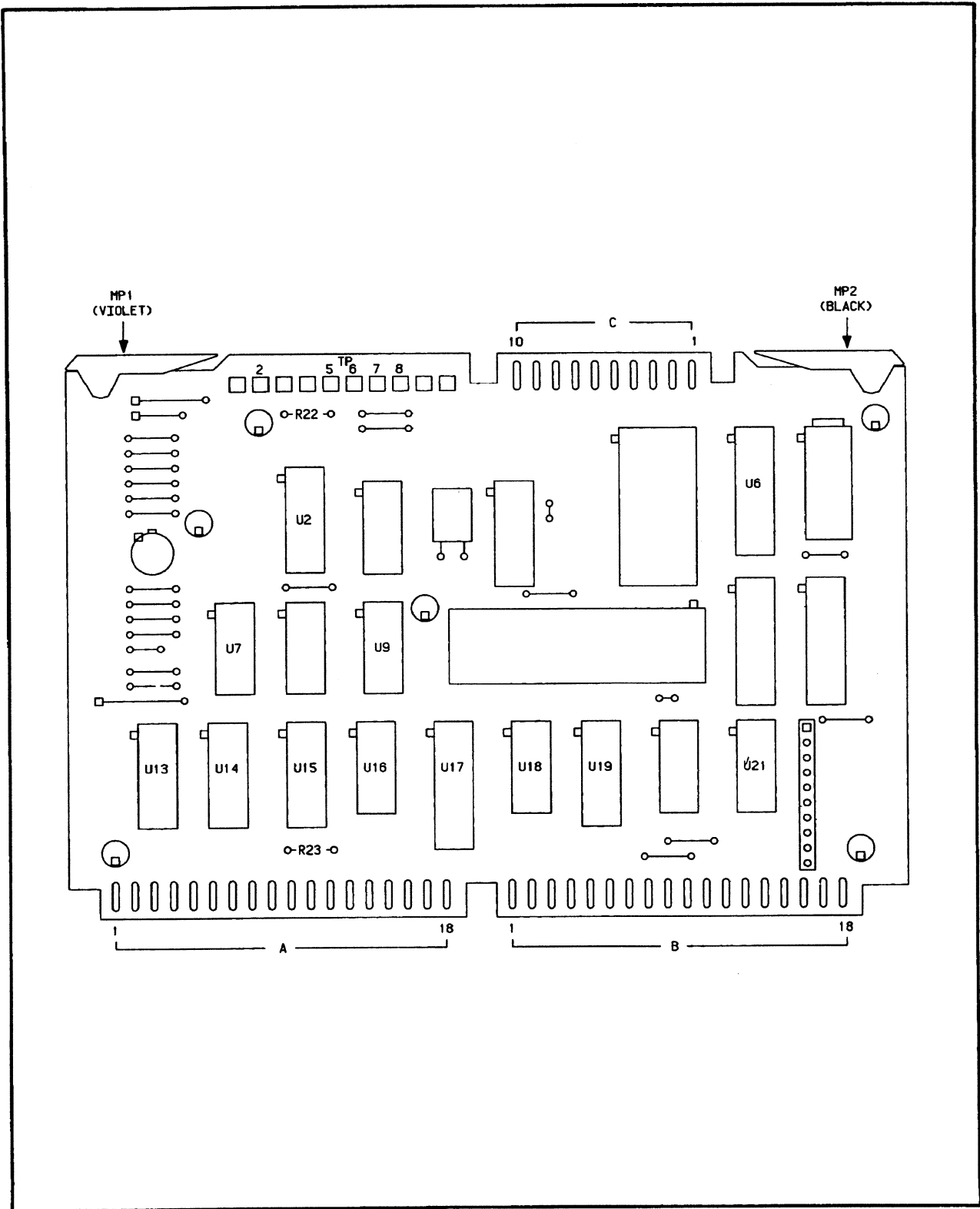
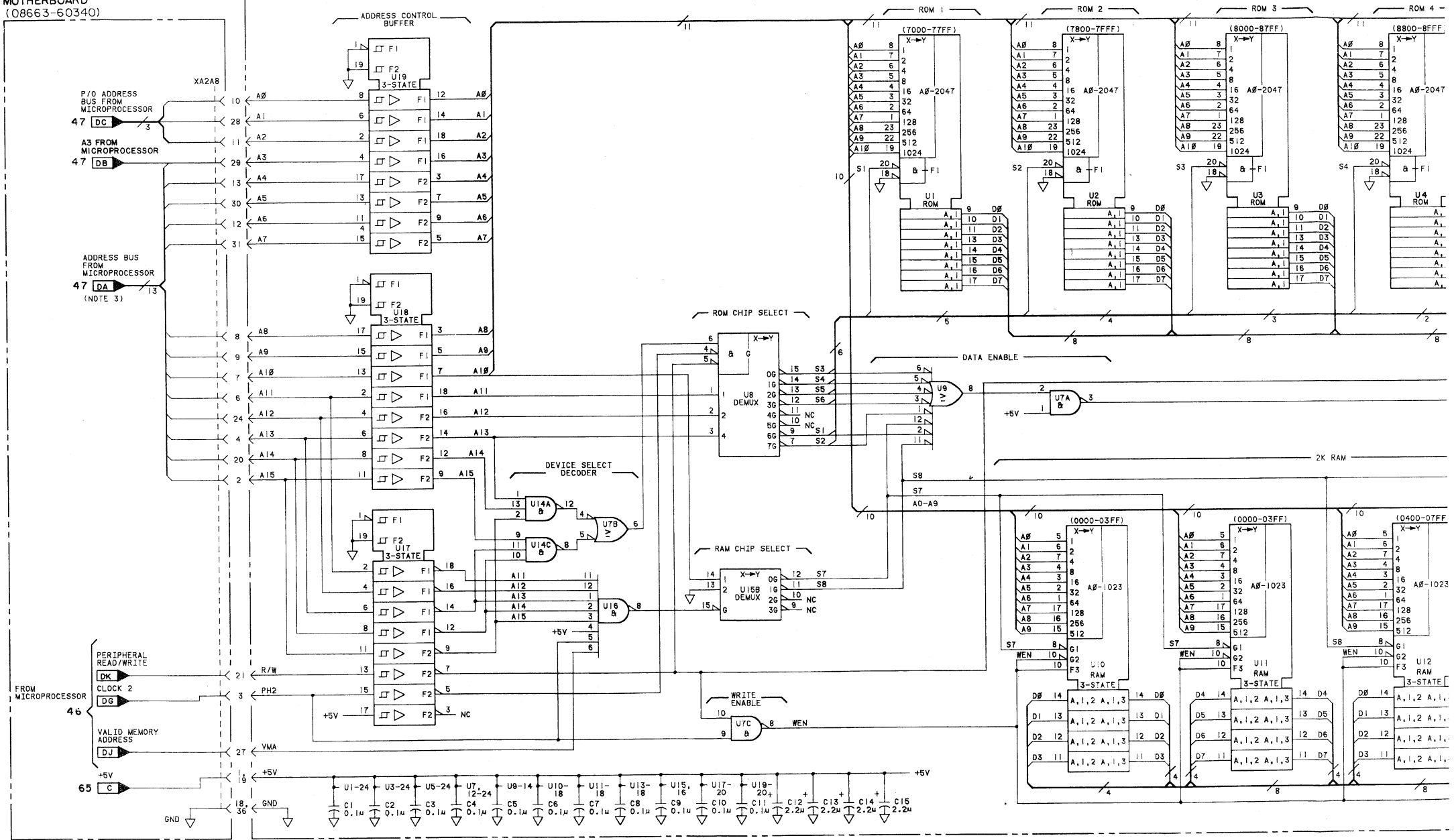


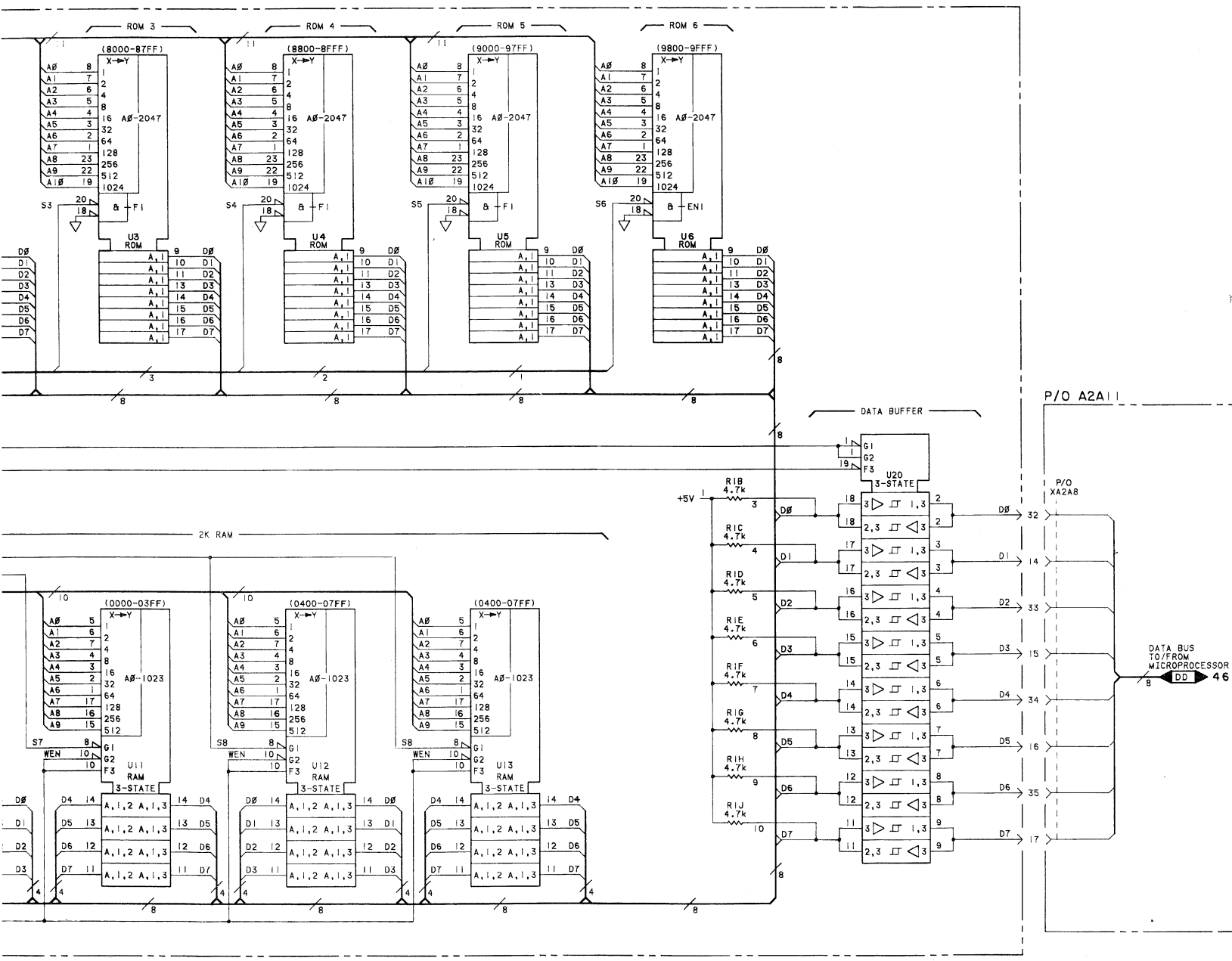
Figure 8-705. P/O A27 Microprocessor Component Locator

P/O A2A11 DCU
MOTHERBOARD
(08663-60340)

A2A8 RAM/ROM ASSEMBLY (08663-60329)



A2A8 48
1/3



INTEGRATED CIRCUIT PART NUMBERS

REFERENCE DESIGNATIONS	PART NUMBERS
U1	08663-80005
U2	08663-80007
U3	08663-80007
U4	08663-80008
U5	08663-80009
U6	08663-80010
U7	1820-1197
U8	1820-1216
U9, 16	1820-1207
U10-13	1818-0443
U14	1820-1202
U15	1820-1281
U17	1820-1917
U18, 19	1820-2024
U20	1820-2075

- REFER TO IA DIAGRAM NOT
- TROUBLESHOOT THEY ARE AC YOUR MEASUR DIFFERENT
- ADDRESS DAT TRUE FROM T ADDRESS BUS
- DATA IS TRA FROM ROM OR MICROPROCES

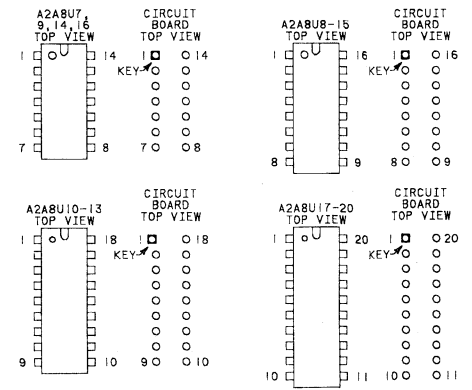
INTEGRATED CIRCUIT VOLTAGE AND GROUND CONNECTIONS

REFERENCE DESIGNATIONS	PIN NUMBERS
U1-6	+5V - 21, 24
	▽ - 12
U8, 15	+5V - 16
	▽ - 8
U7, 9, 14, 15	+5V - 14
	▽ - 7
U10-13	+5V - 18
	▽ - 9
U17-20	+5V - 20
	▽ - 10

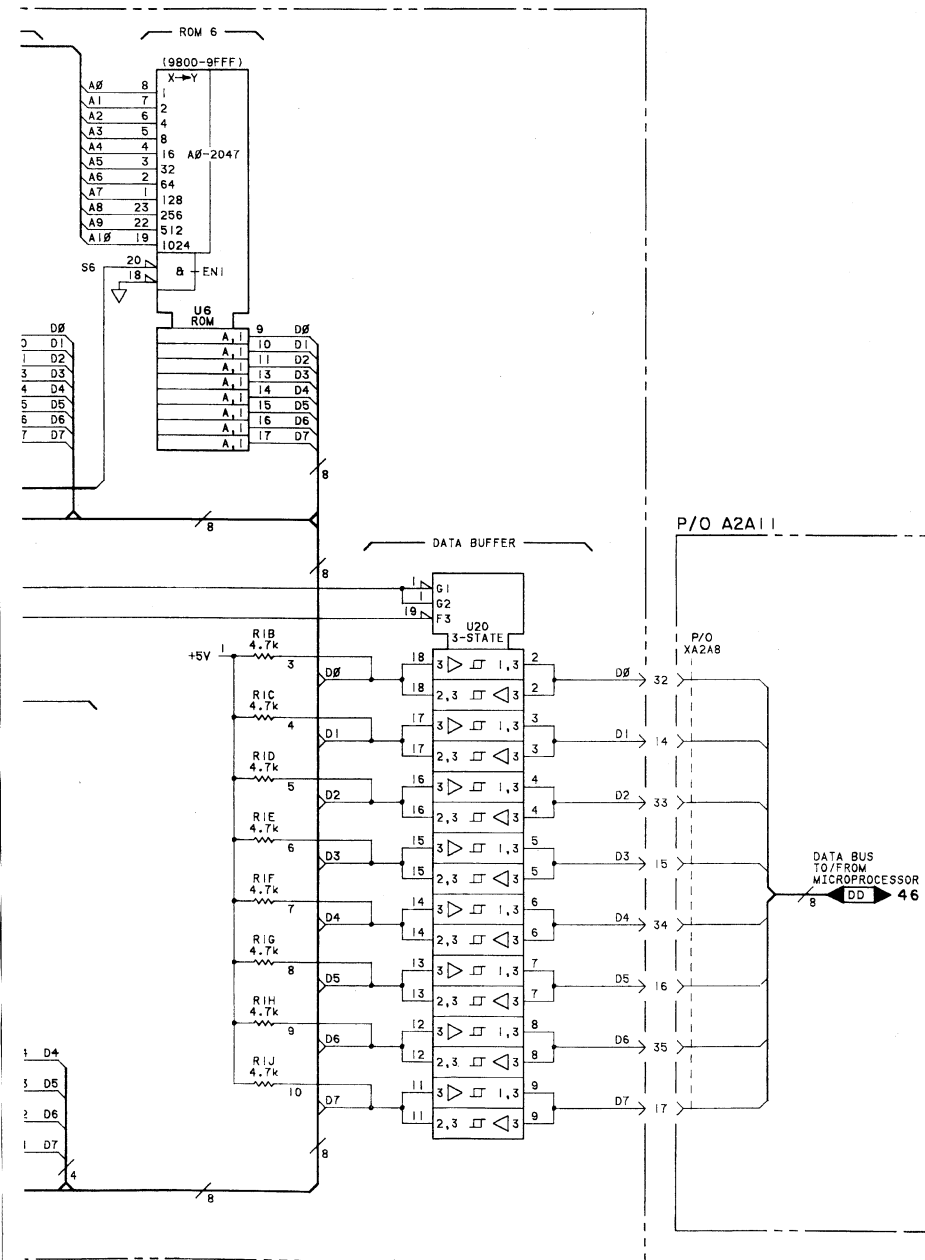
LOGIC	TTL
HIGH(1)	≥ 2V
LOW(0)	≤ 0.8
≤	EQUAL TO
≥	EQUAL TO
INPUT	TTL
GROUND	LOW(0)
OPEN	HIGH(1)
GROUND	- 0V;

REFERENCE DESIGNATIONS

A2A8	A2A11
C1-15	XA2A8
R1	
U1-20	



A2A8 48



INTEGRATED CIRCUIT PART NUMBERS

REFERENCE DESIGNATIONS	PART NUMBERS
U1	08663-80005
U2	08663-80006
U3	08663-80007
U4	08663-80008
U5	08663-80009
U6	08663-80010
U7	1820-1197
U8	1820-1216
U9, 16	1820-1207
U10-13	1818-0443
U14	1820-1202
U15	1820-1281
U17	1820-1917
U18, 19	1820-2024
U20	1820-2075

- NOTES
- REFER TO TABLE 8-102 FOR SCHEMATIC DIAGRAM NOTES.
 - TROUBLESHOOTING VALUES ARE TYPICAL. THEY ARE ACTUAL MEASURED VALUES. YOUR MEASUREMENTS MAY BE SLIGHTLY DIFFERENT THAN WHAT IS SHOWN.
 - ADDRESS DATA IS TRANSFERRED POSITIVE TRUE FROM THE MICROPROCESSOR ON THE ADDRESS BUS (A0-A15).
 - DATA IS TRANSFERRED POSITIVE TRUE FROM ROM OR RAM MEMORY TO THE MICROPROCESSOR ON THE DATA BUS (D0-D7).

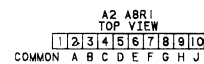
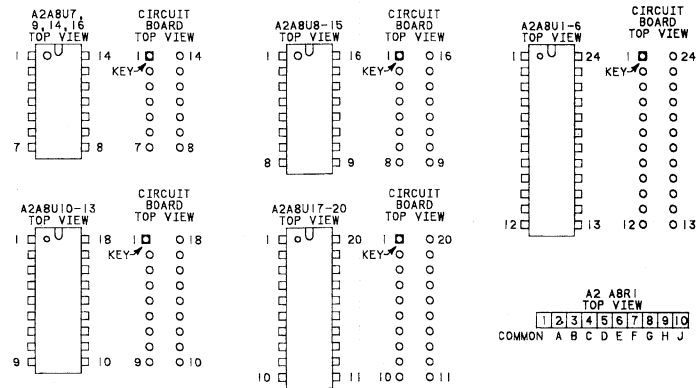
INTEGRATED CIRCUIT VOLTAGE AND GROUND CONNECTIONS

REFERENCE DESIGNATIONS	PIN NUMBERS
U1-6	+5V - 21, 24 ▽ - 12
U8, 15	+5V - 16 ▽ - 8
U7, 9, 14, 16	+5V - 14 ▽ - 7
U10-13	+5V - 18 ▽ - 9
U17-20	+5V - 20 ▽ - 10

LOGIC	TTL	ECL	EECL	CMOS
HIGH(1)	≥ 2V	≥ +4.0V	≥ +4.0V	≤ VDD
LOW(0)	≤ 0.8V	≤ +3.5V	≤ +4.4V	≤ 0.1V
	≤ = EQUAL TO OR MORE NEGATIVE THAN			
	≥ = EQUAL TO OR MORE POSITIVE THAN			
INPUT	TTL	ECL	EECL	CMOS
GROUND	LOW(0)	HIGH(1)	HIGH(1)	LOW(0)
OPEN	HIGH(1)	LOW(0)	LOW(0)	X
GROUND - 0V; X = UNDEFINED				

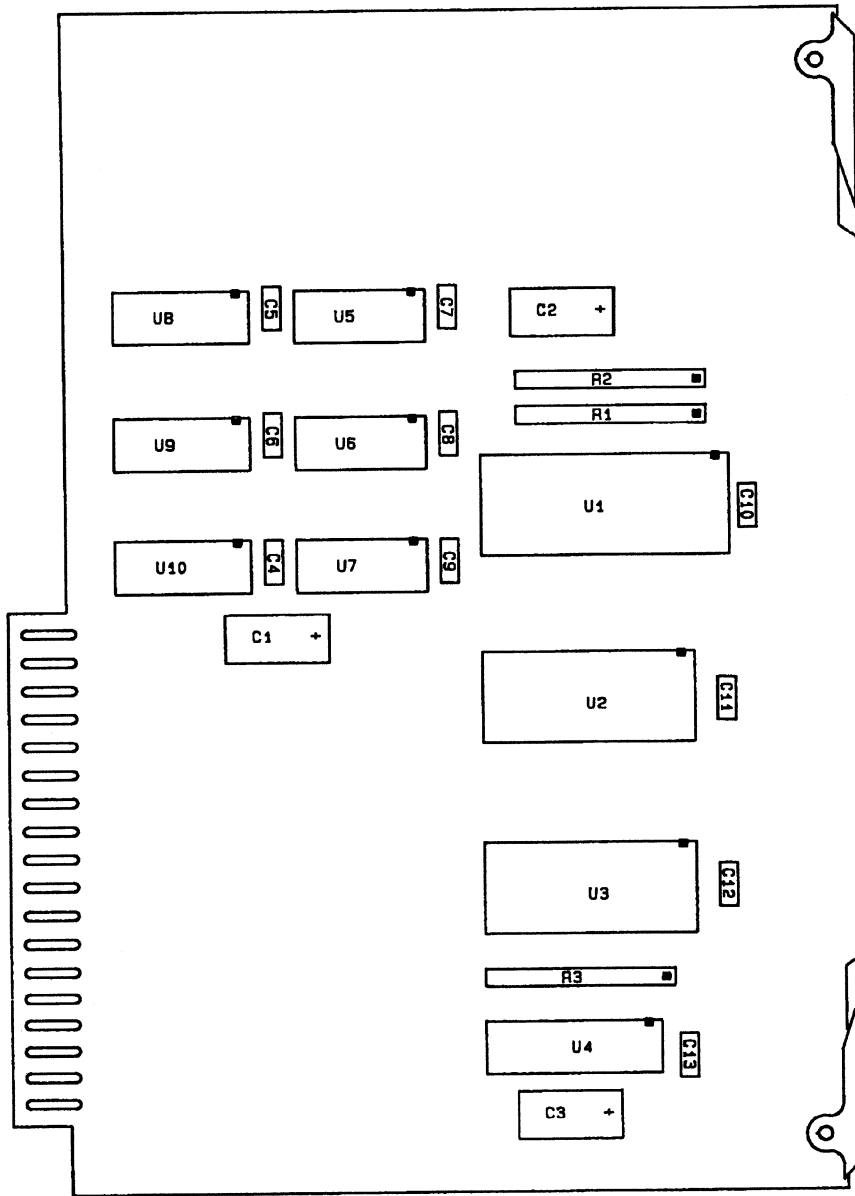
REFERENCE DESIGNATIONS

A2A8	A2A11
C1-15	
R1	
U1-20	XA2A8



SERVICE SHEET
A2A8 48

Figure 8-709. A2A8 RAM/ROM Schematic



A2A8

Figure 8-708. A2A8 RAM/ROM Component Locator (2537A)

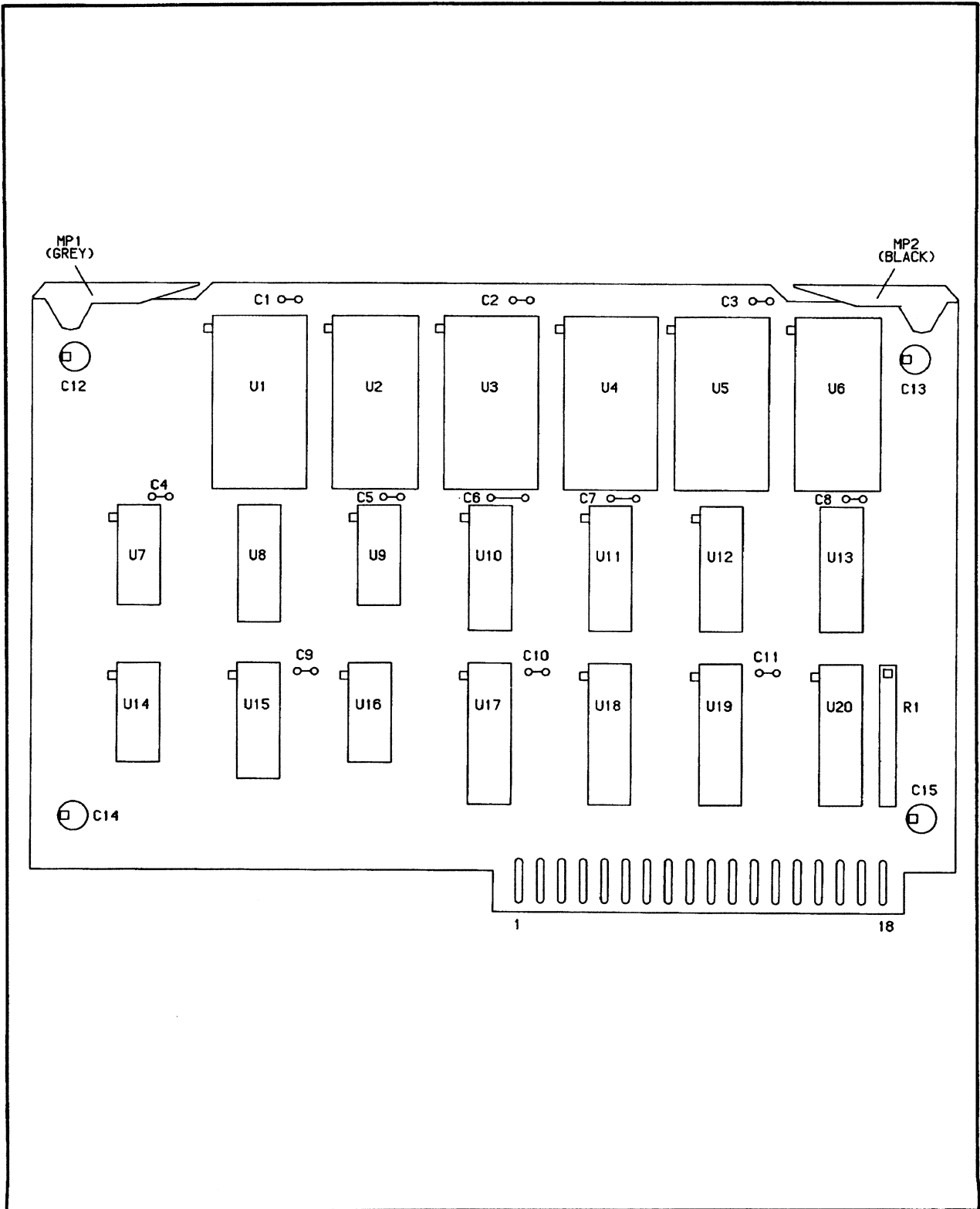
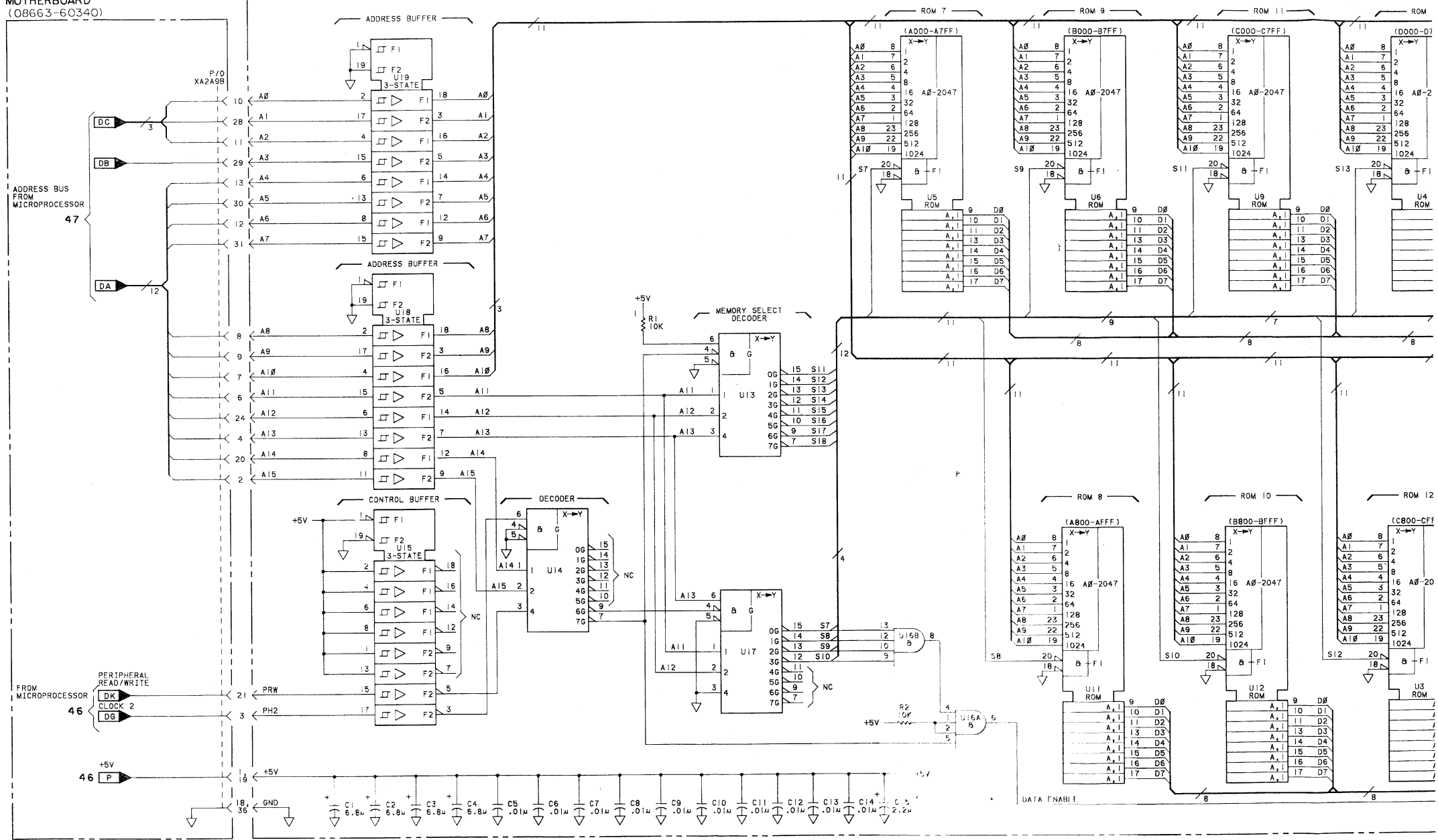


Figure 8-708. A2A8 RAM/ROM Component Locator

P/O A2A11 DCU
MOTHERBOARD
(08663-60340)

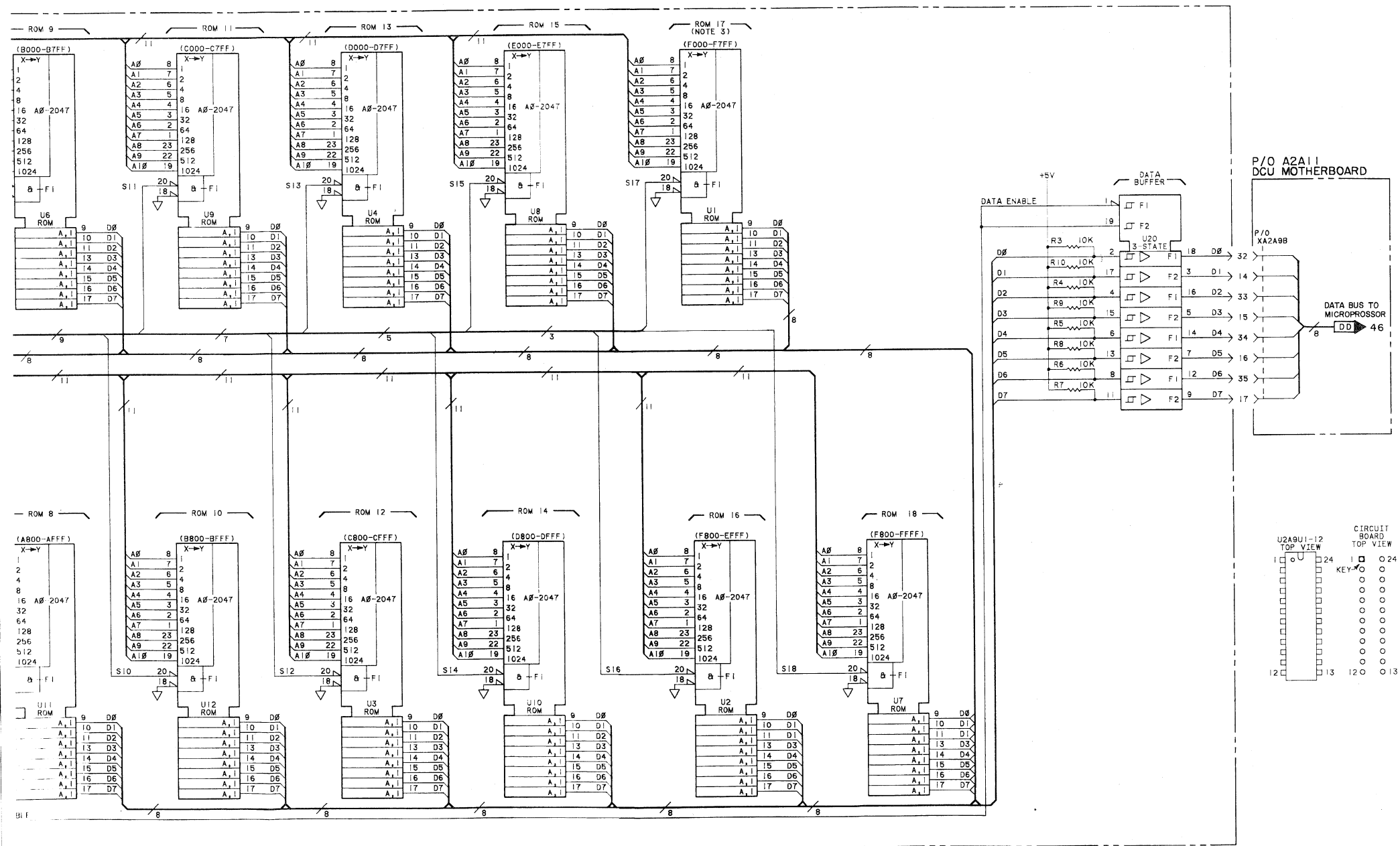
A2A9 ROM ASSEMBLY (08663-60331)



8663

A2A9 49
1/3

1. REFER TO DIAGRAM
2. TROUBLE THEY ARE YOUR ME DIFFERE
3. UI (ROM THE COR FOR FUT

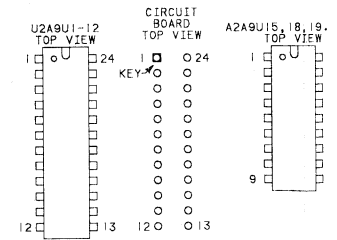
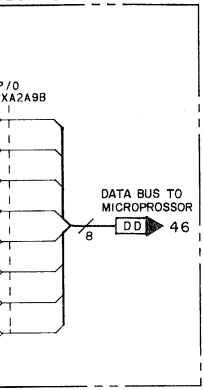


REFE
A:
C1-1
R1-1
U1-2

LO
HIG
LO
< IS
> IS
OPE
GROU

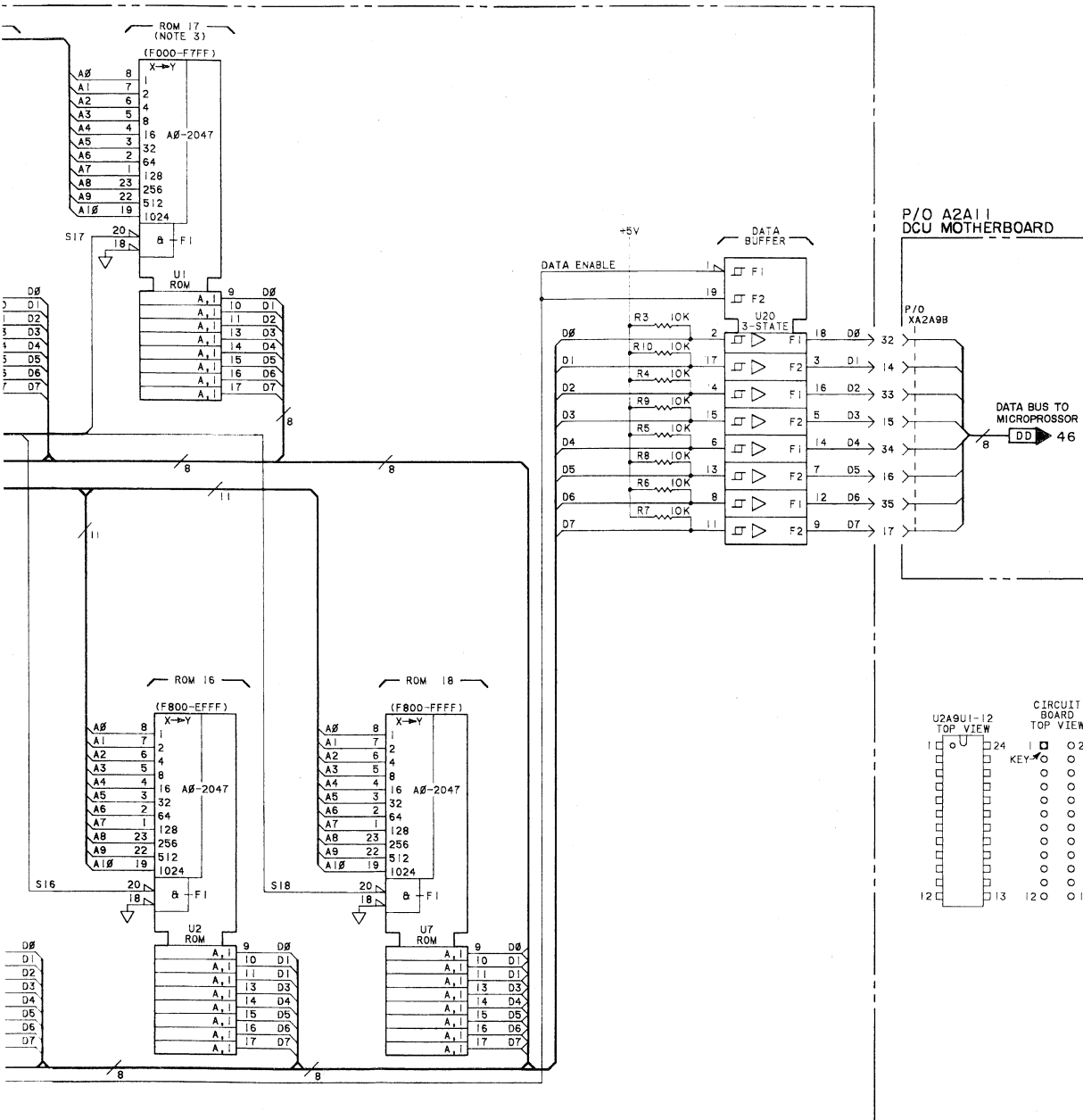
IN
REFE
DESIG
U1-1
U1-3
U1-5
20
U1-6

P/O A2A11
DCU MOTHERBOARD



A2A9 49

2/3



NOTES

1. REFER TO TABLE 8-102 FOR SCHEMATIC DIAGRAM NOTES.
2. TROUBLESHOOTING VALUES ARE TYPICAL. THEY ARE ACTUAL MEASURED VALUES. YOUR MEASUREMENTS MAY BE SLIGHTLY DIFFERENT THAN WHAT IS SHOWN.
3. U1 (ROM 7) IS NOT CURRENTLY SUPPLIED. THE CORRESPONDING SOCKET IS RESERVED FOR FUTURE USE.

REFERENCE DESIGNATIONS

A2A9	A2A11
C1-15	XA2A9
R1-10	
U1-20	

LOGIC LEVELS

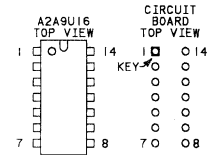
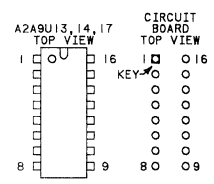
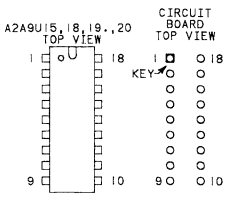
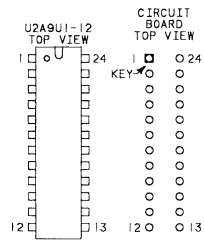
	TTL
HIGH	>+2V
LOW	<+0.5V
< IS MORE NEG. THAN	> IS MORE POS. THAN
OPEN	HIGH
GROUND	LOW

INTEGRATED CIRCUIT PART NUMBERS

REFERENCE DESIGNATIONS	PART NUMBERS
U1-12	1818-0851
U13, 14, 17	5081-2483
U15, 18, 19, 20	1820-2024
U16	1820-1205

INTEGRATED CIRCUIT VOLTAGE AND GROUND CONNECTIONS

REFERENCE DESIGNATIONS	VOLTAGE	PIN NUMBERS
U1-12	+5V	- 24
		▽ - 12
U13, 14, 17	+5V	- 16
		▽ - 8
U15, 18, 19, 20	+5V	- 20
		▽ - 10
U16	+5V	- 14
		▽ - 7



SERVICE SHEET **A2A9 49**

Figure 8-712. A2A9 ROM Schematic

8-715/716

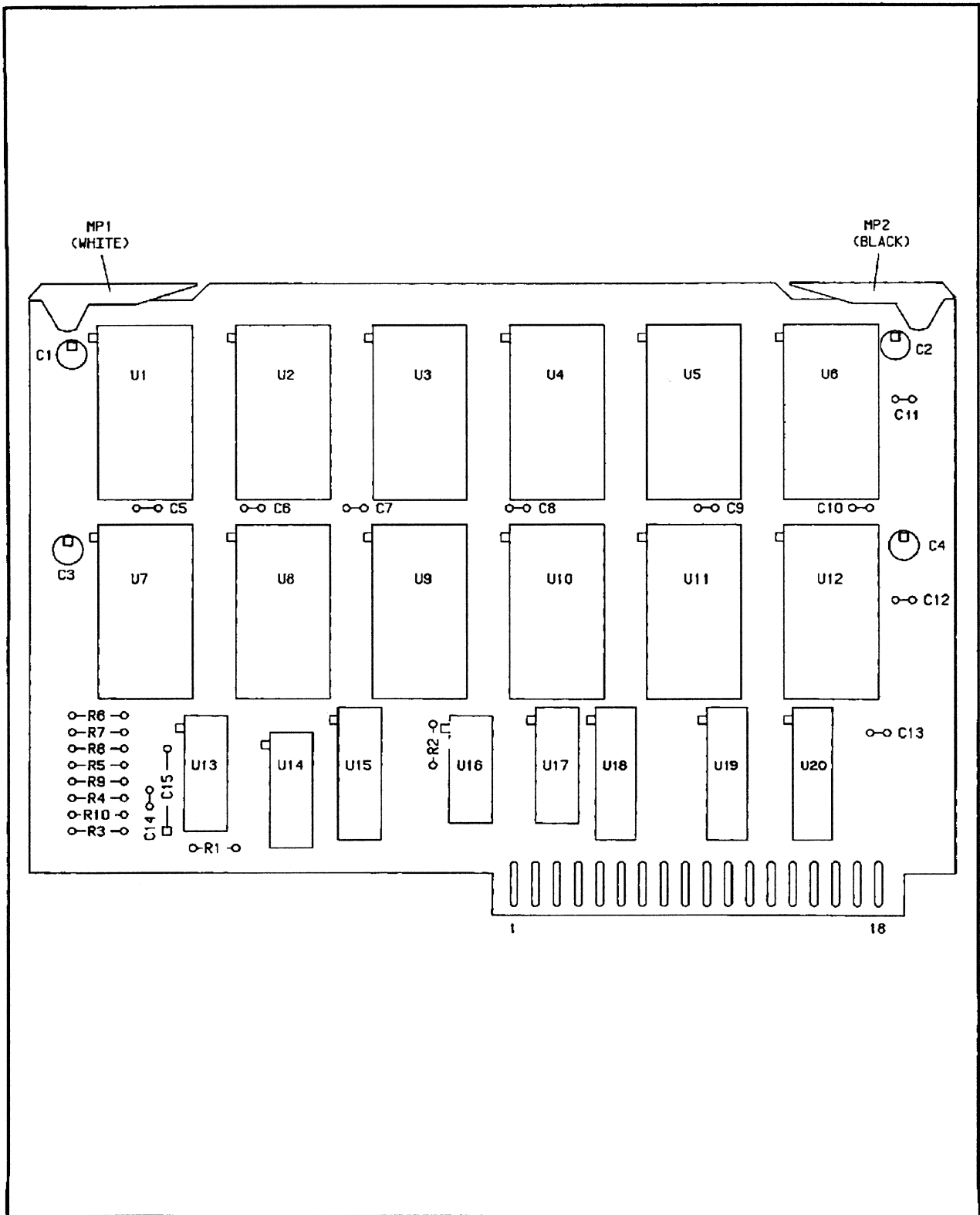
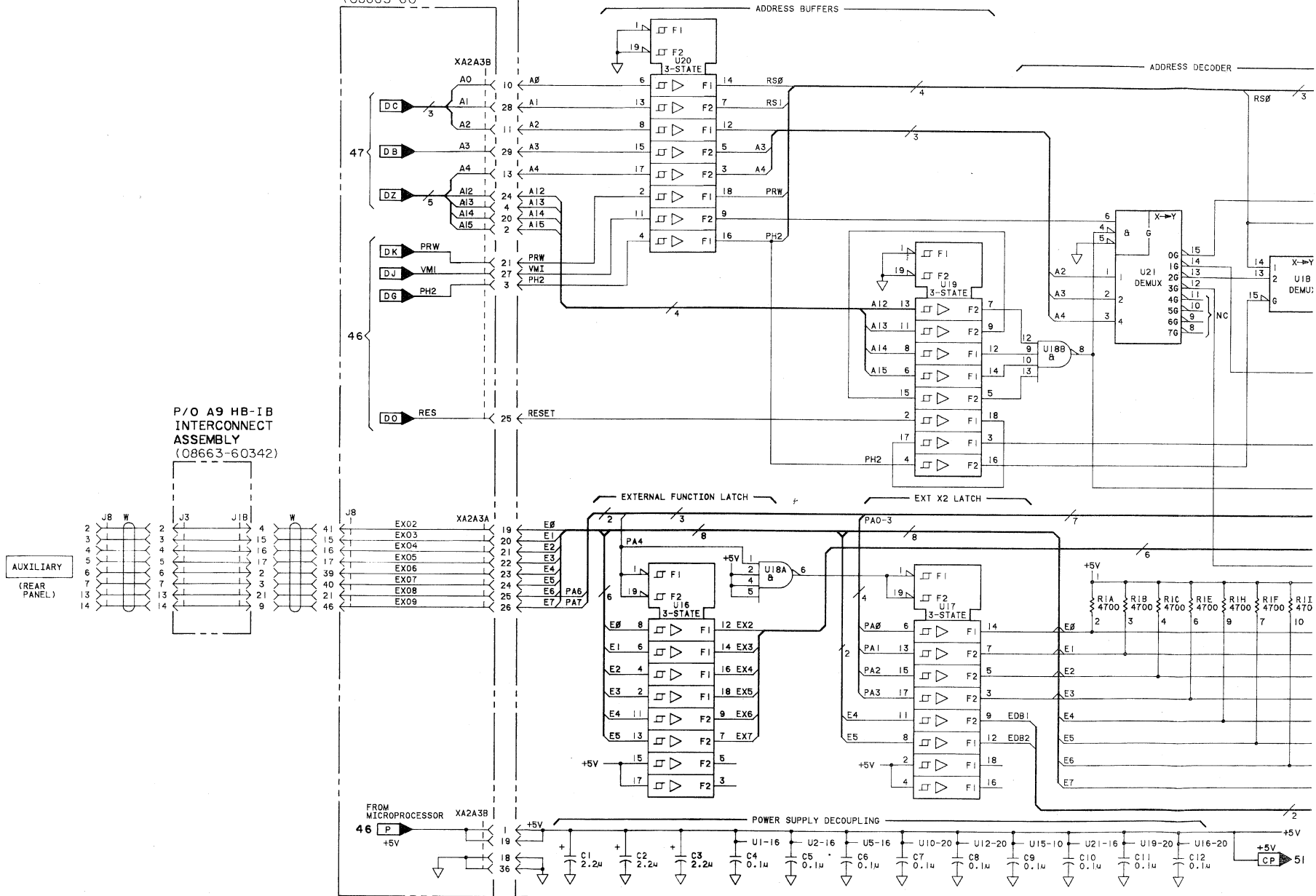


Figure 8-711. A2A9 ROM Component Locator

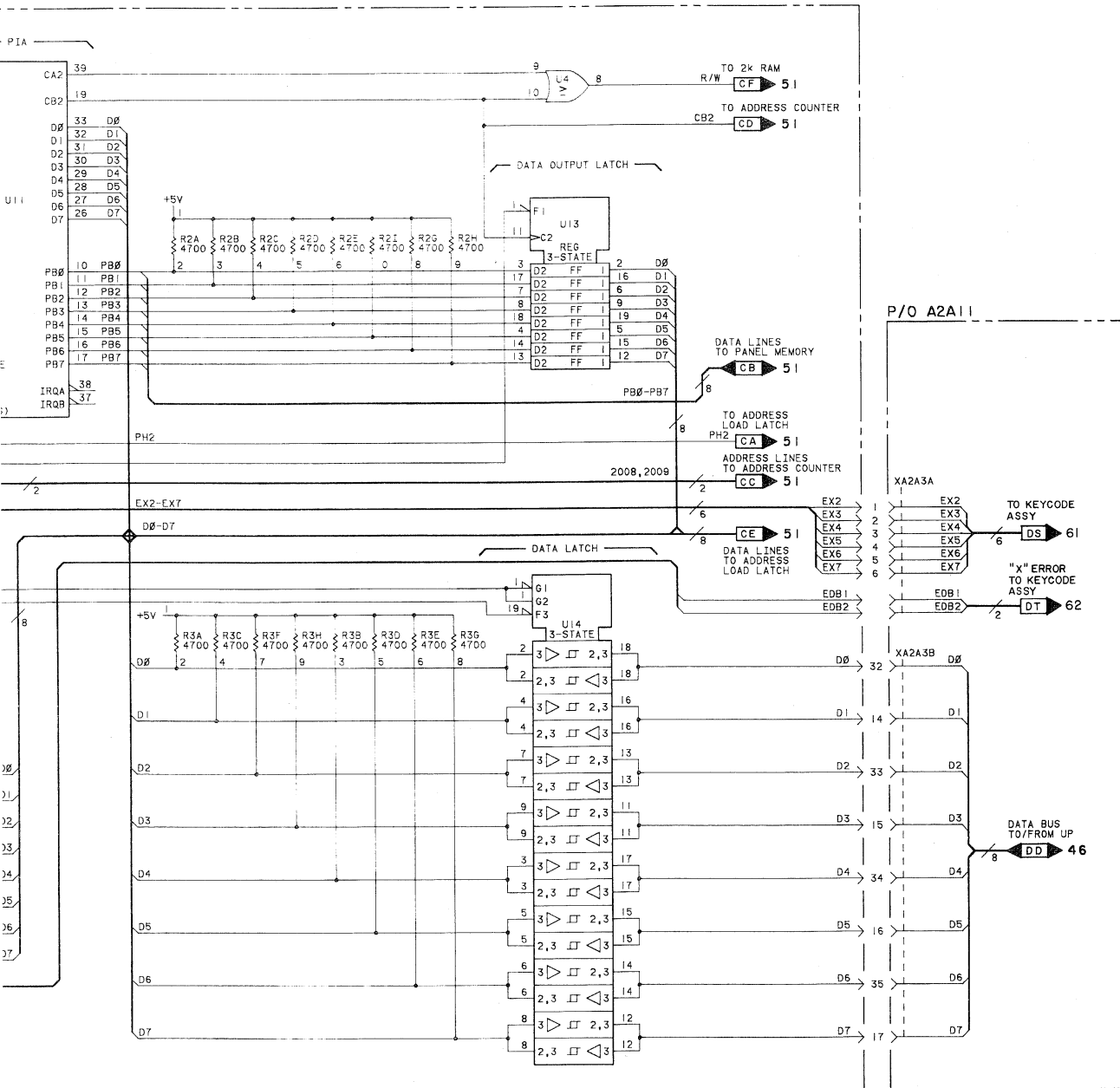
P/O A2A11
DCU MOTHERBOARD
(08663-60)

P/O A2A3 PERIPHERAL RAM (08663-60328)



A2A3 50

113



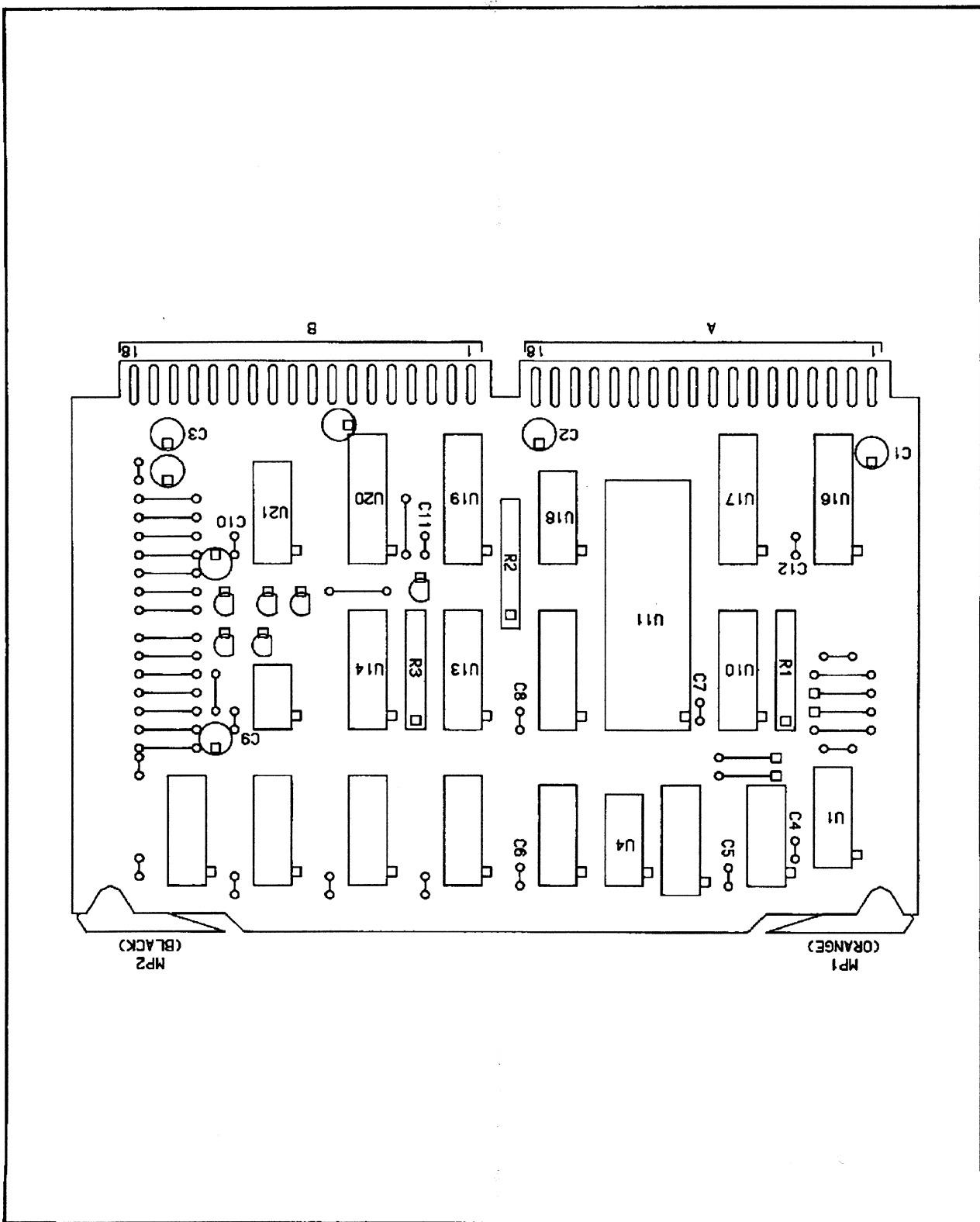
SERVICE SHEET
P/O A2A3 50

Figure 8-715. P/O A2A3 Peripheral RAM Schematic

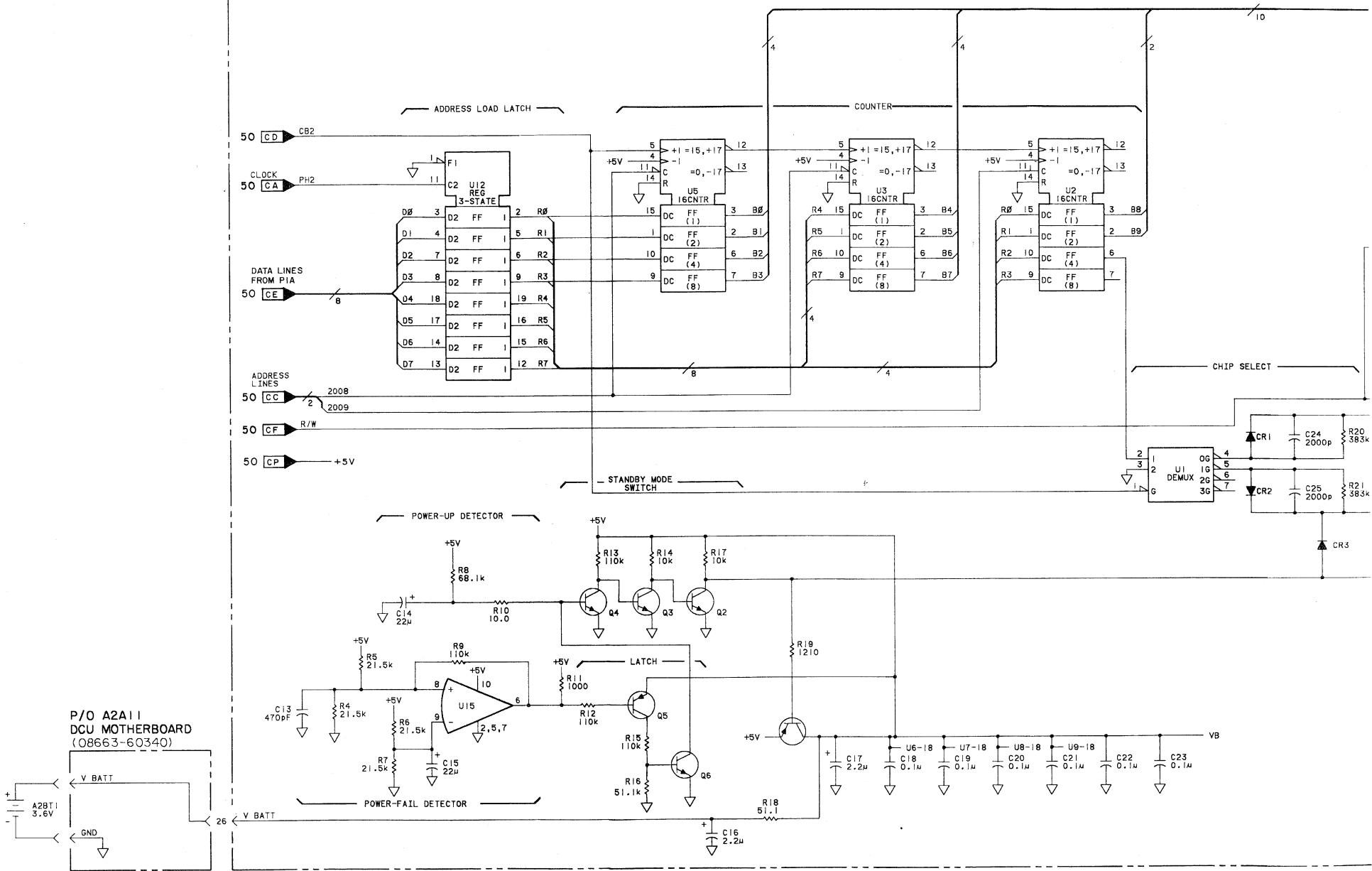
8-719/720

A2A3
 3/3

Figure 8-714. P/O A2A3 Peripheral RAM Component Locator

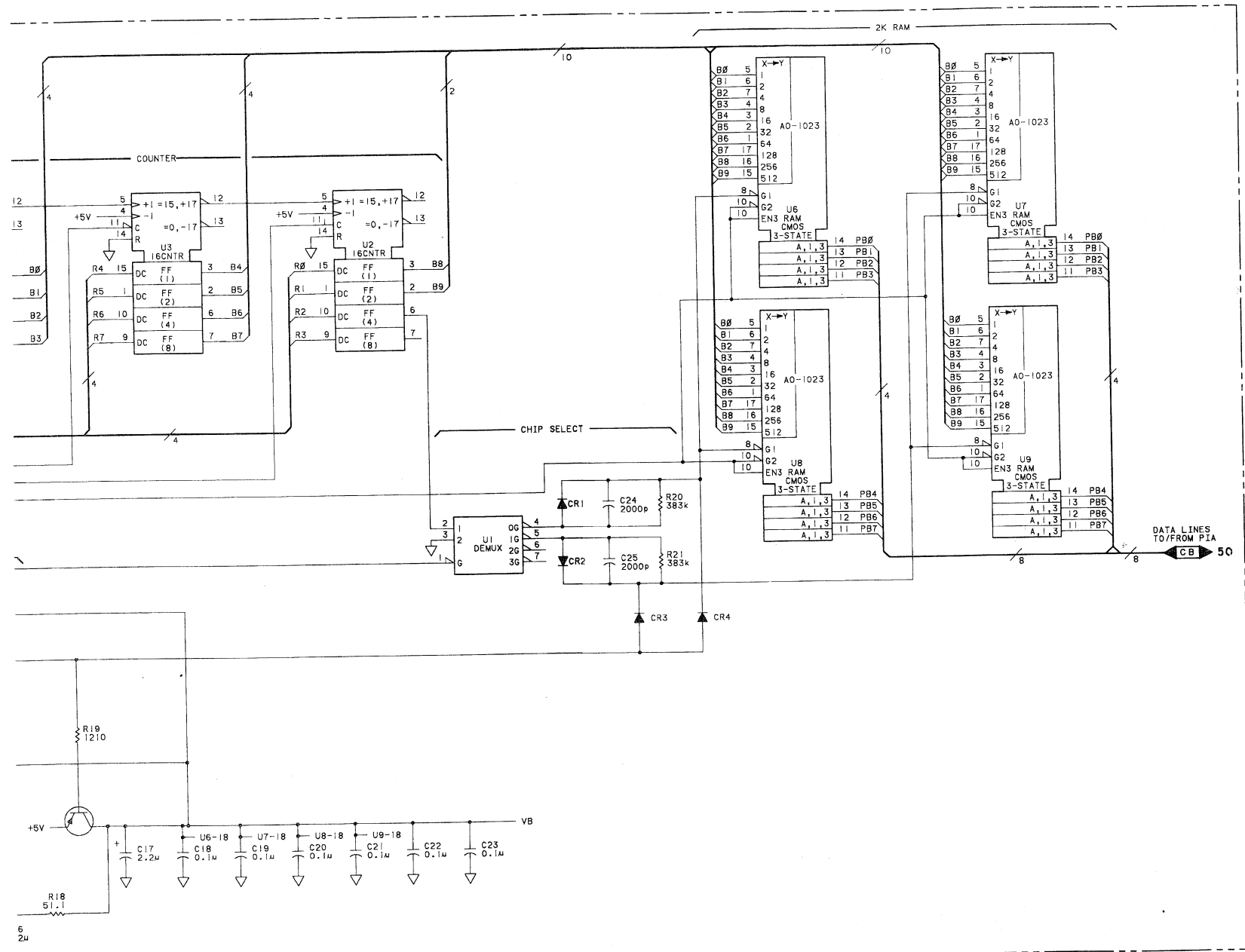


P/O A2A3 PERIPHERAL RAM (08663-60328)



P/O A2A11
DCU MOTHERBOARD
(08663-60340)

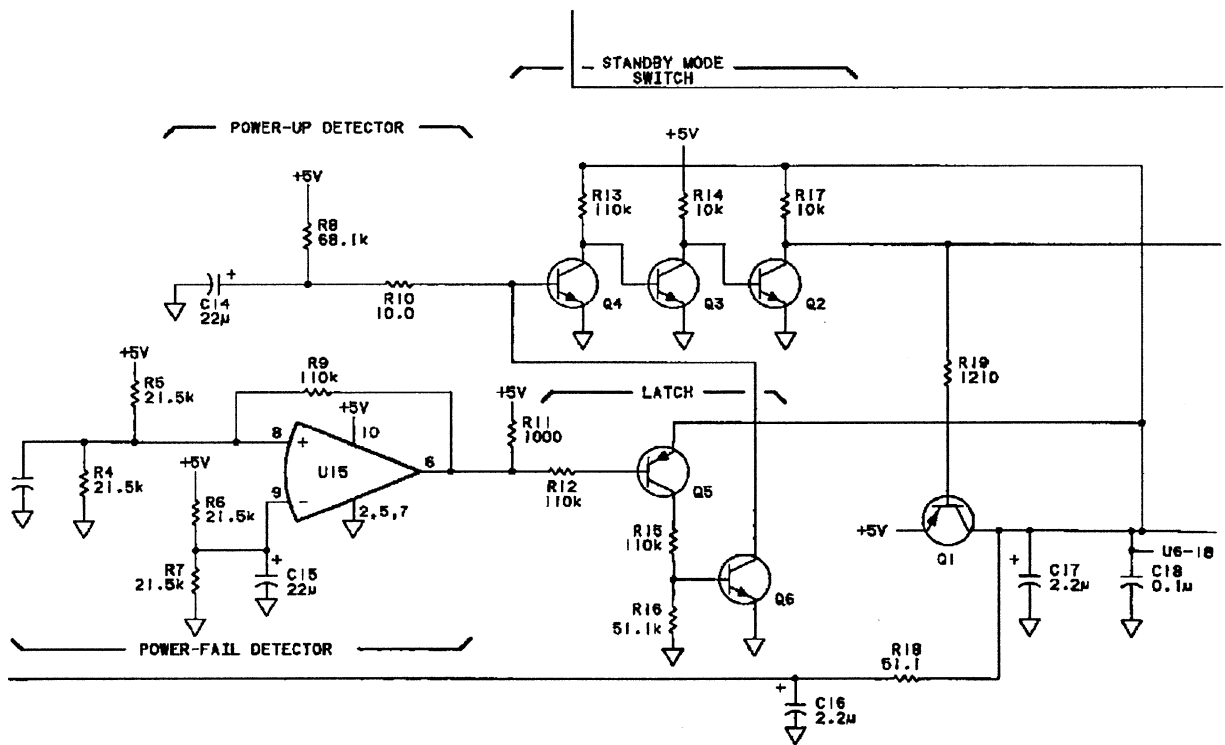
A2A3 S1



SERVICE SHEET
P/O A2A3 51

Figure 8-718. P/O A2A3 Peripheral RAM Schematic

2/2



P/O Figure 8-718. Peripheral RAM Schematic

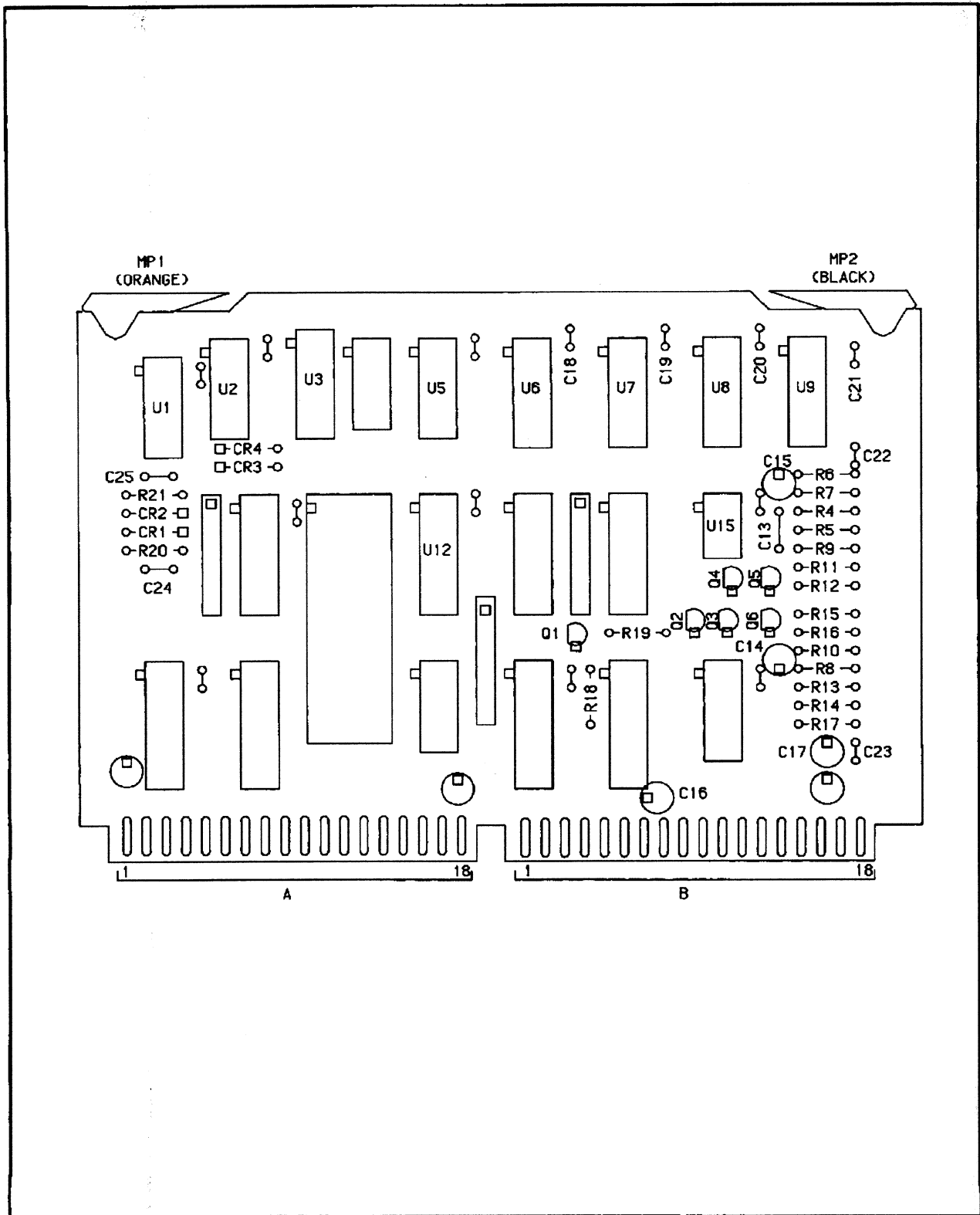
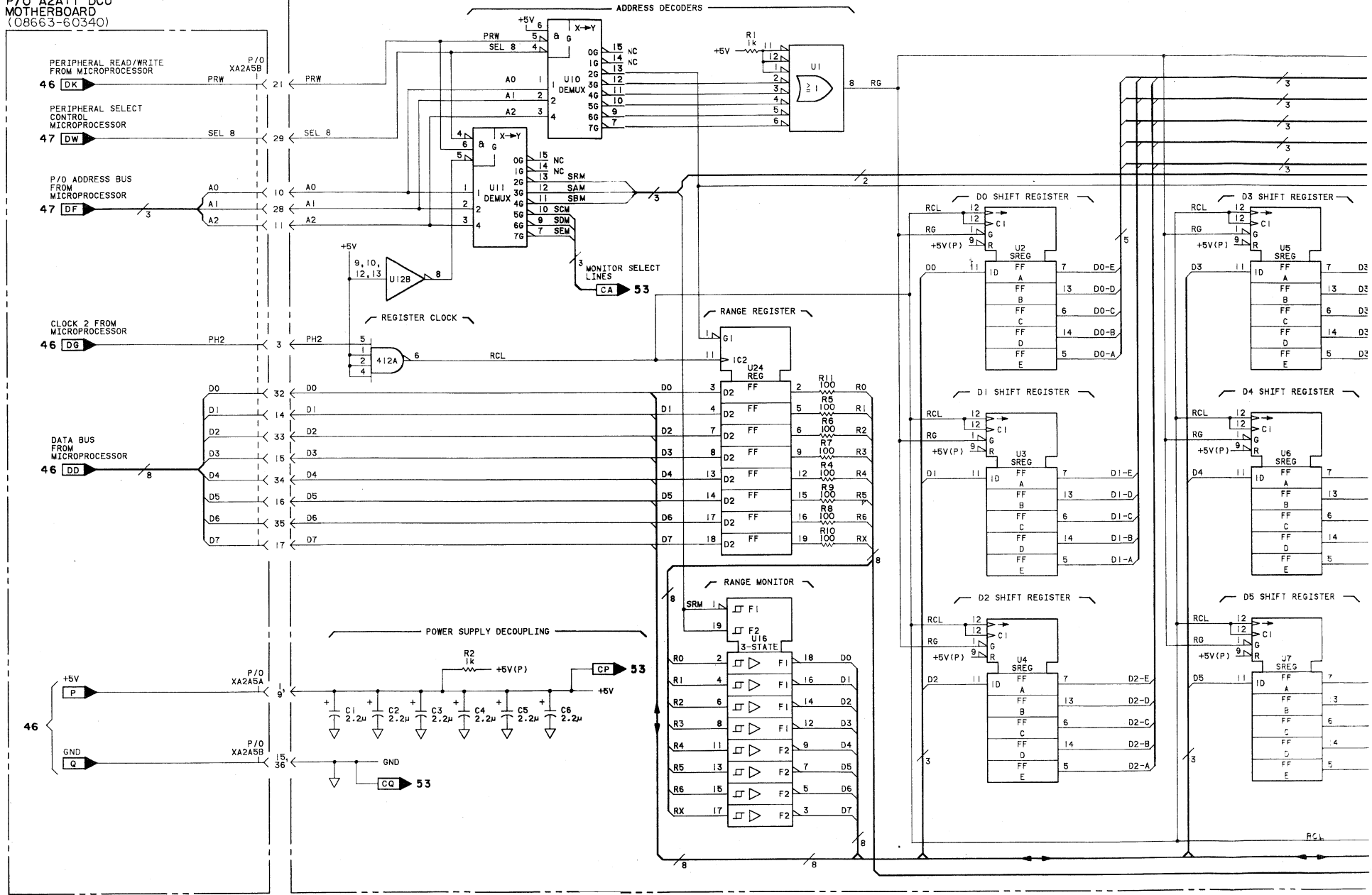


Figure 8-717. P/O A2A3 Peripheral RAM Component Locator

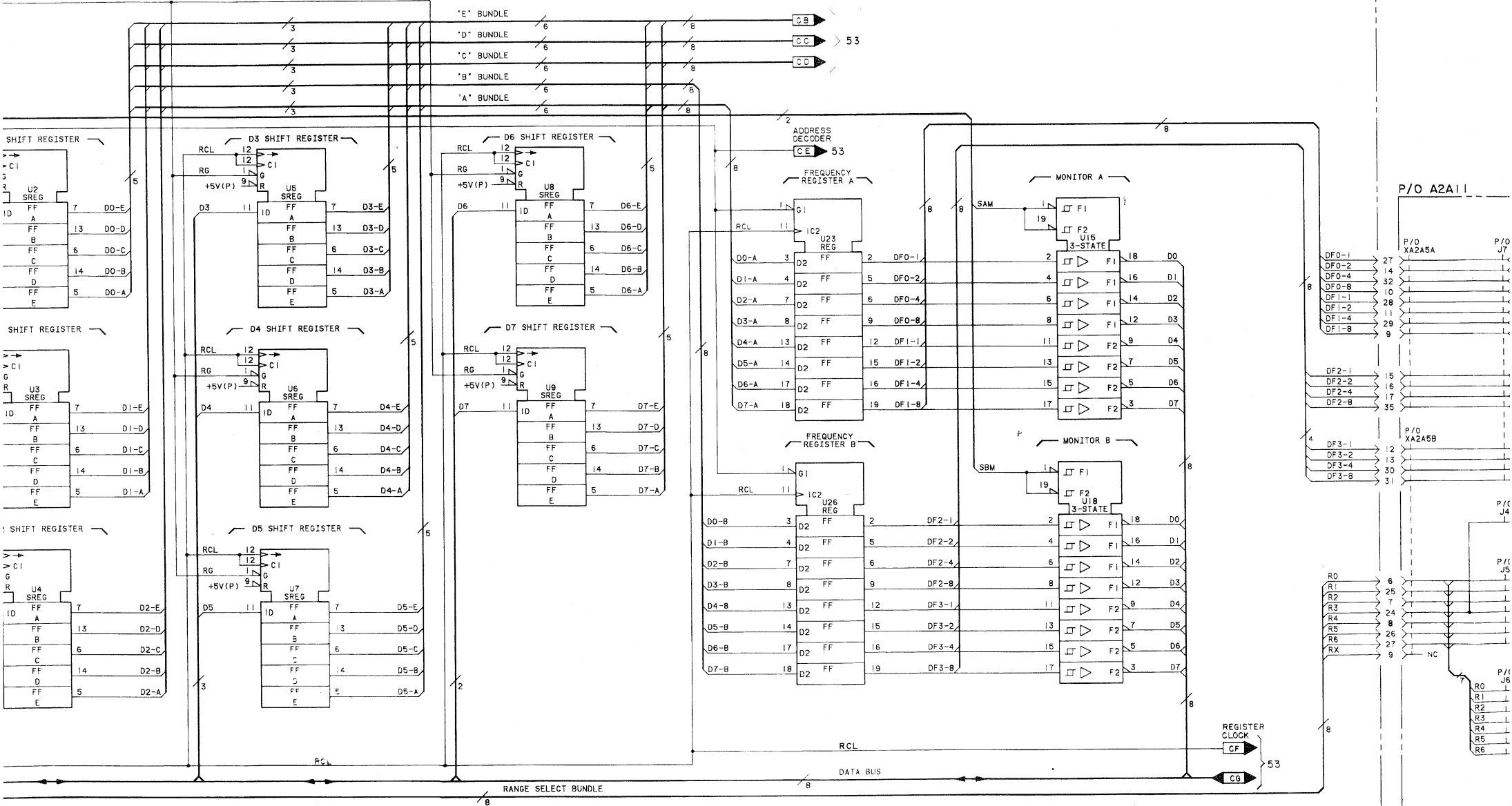
P/O A2A11 DCU
MOTHERBOARD
(08663-60340)

P/O A2A5 FREQUENCY CONTROL (08663-60341)

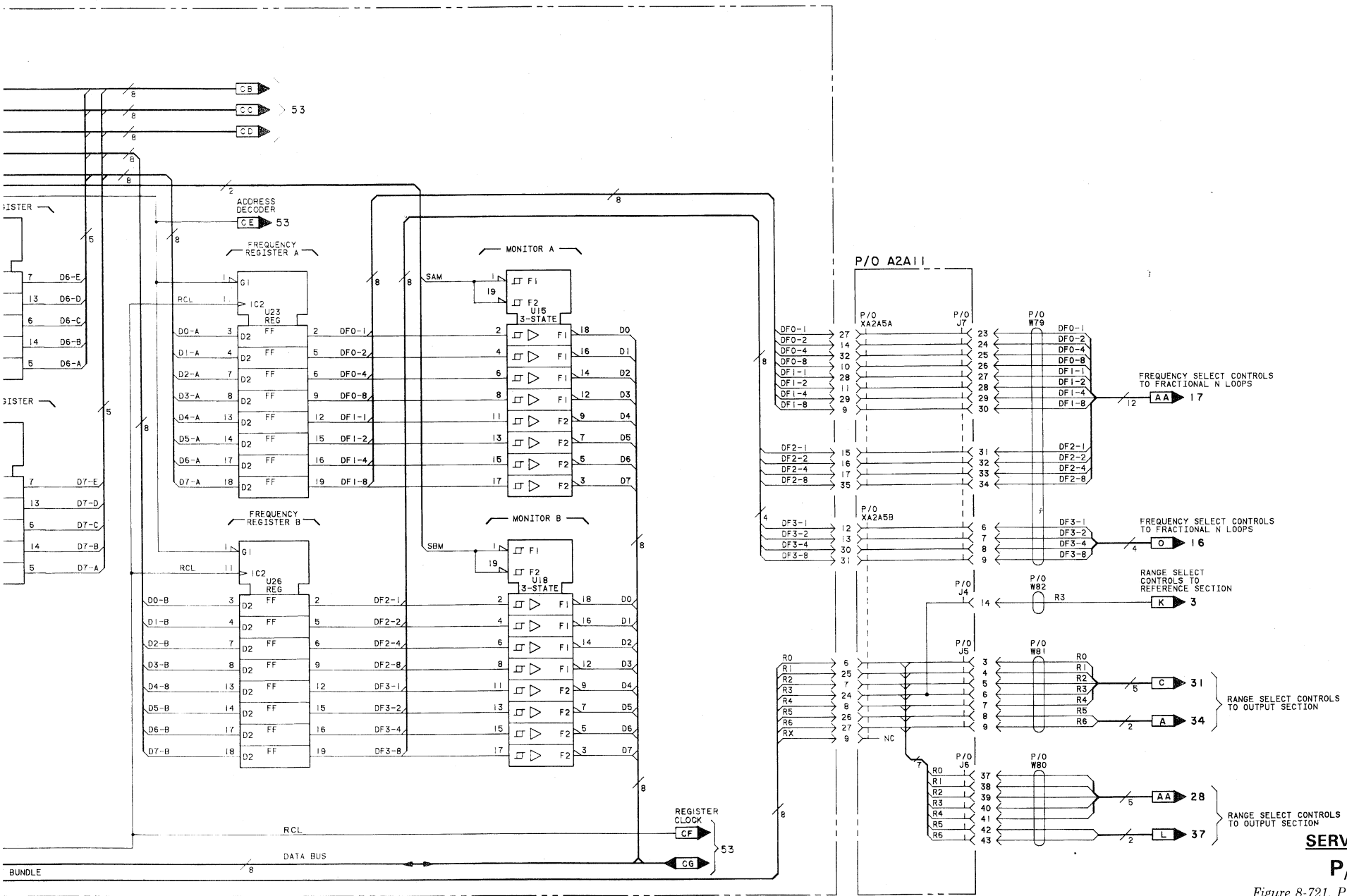


A2A5 52

113



ARAS S2
2/3



SERVICE SHEET 52
P/O A2A5

Figure 8-721. P/O A2A5 Frequency Control Assembly Schematic

3/3

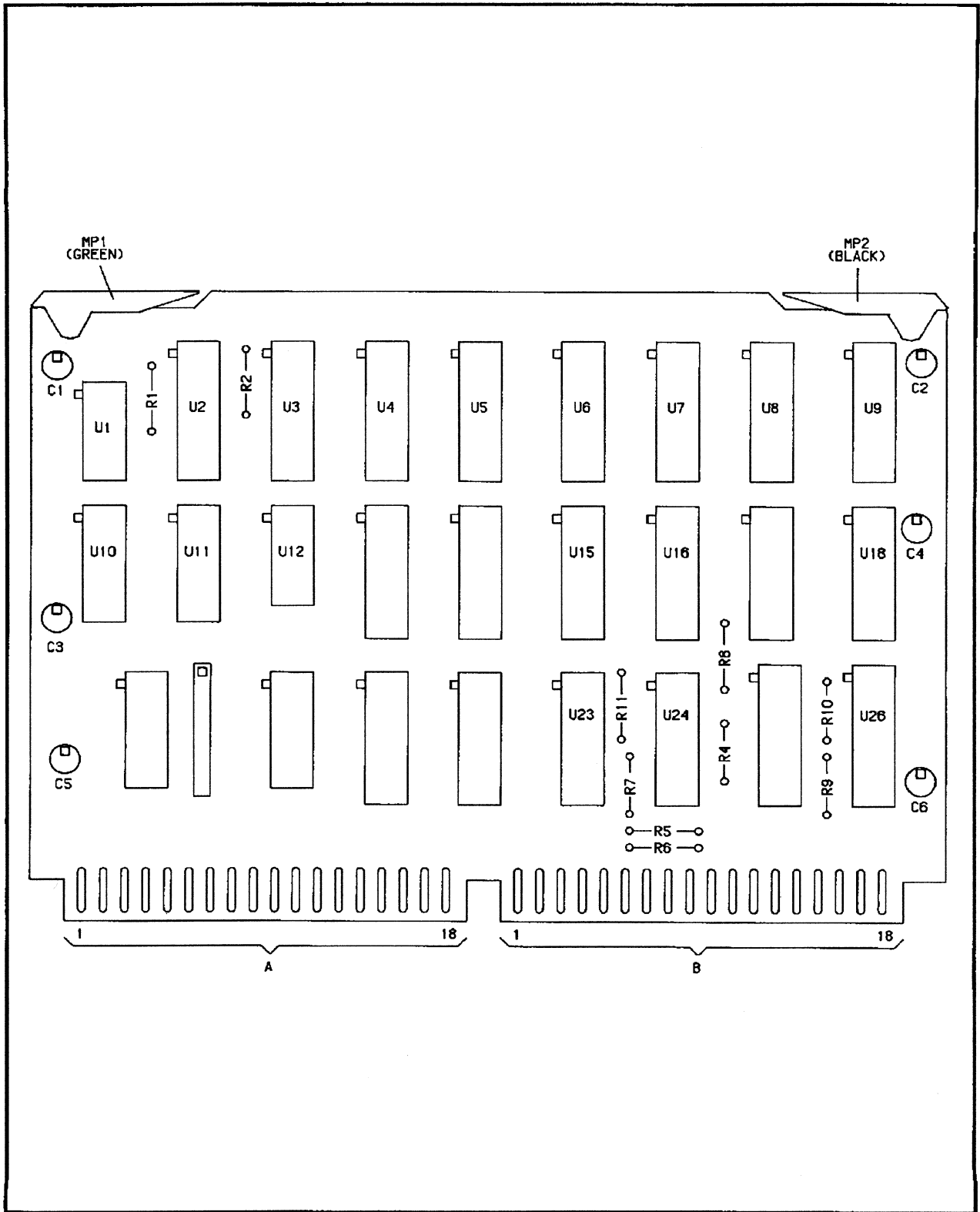
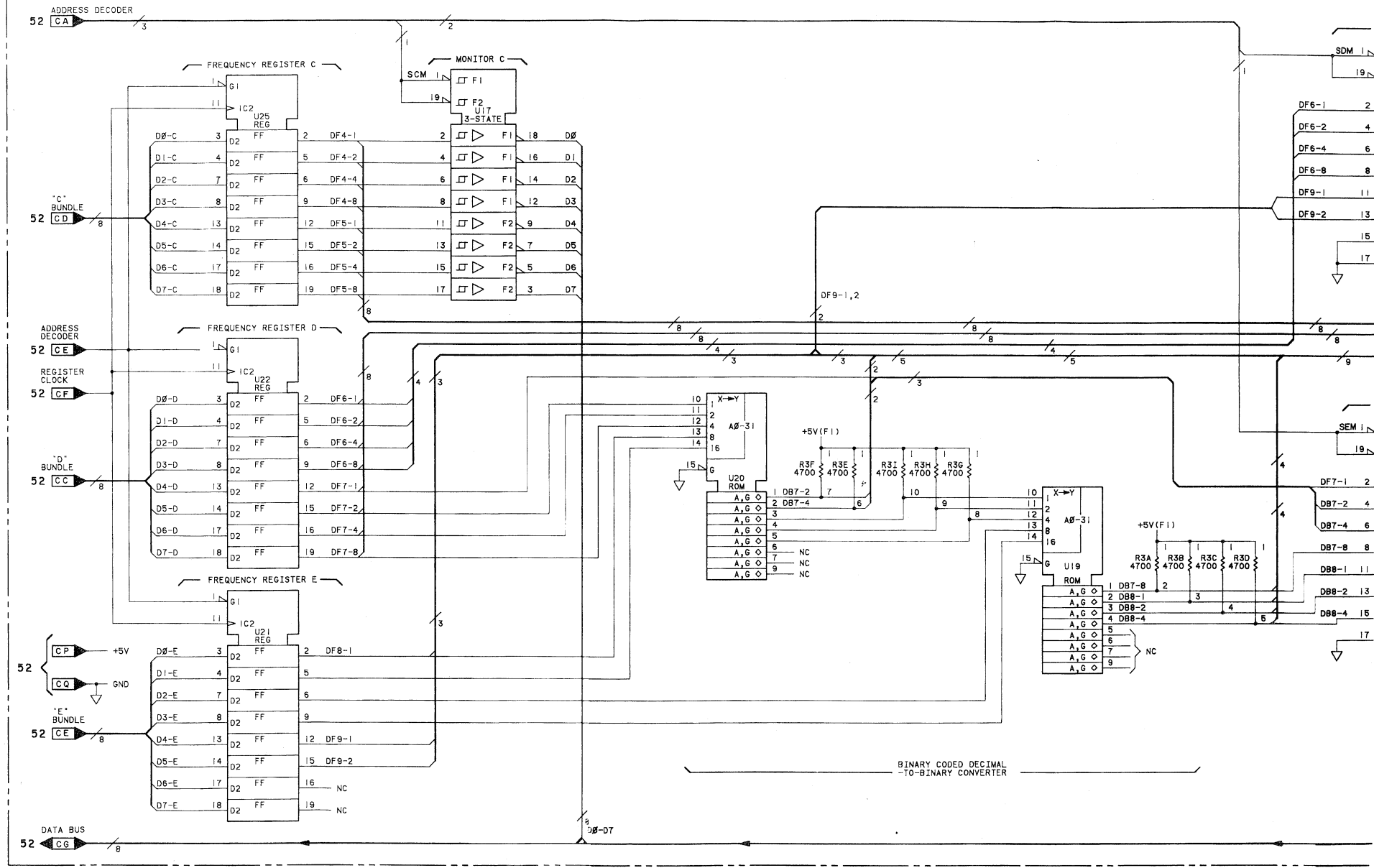
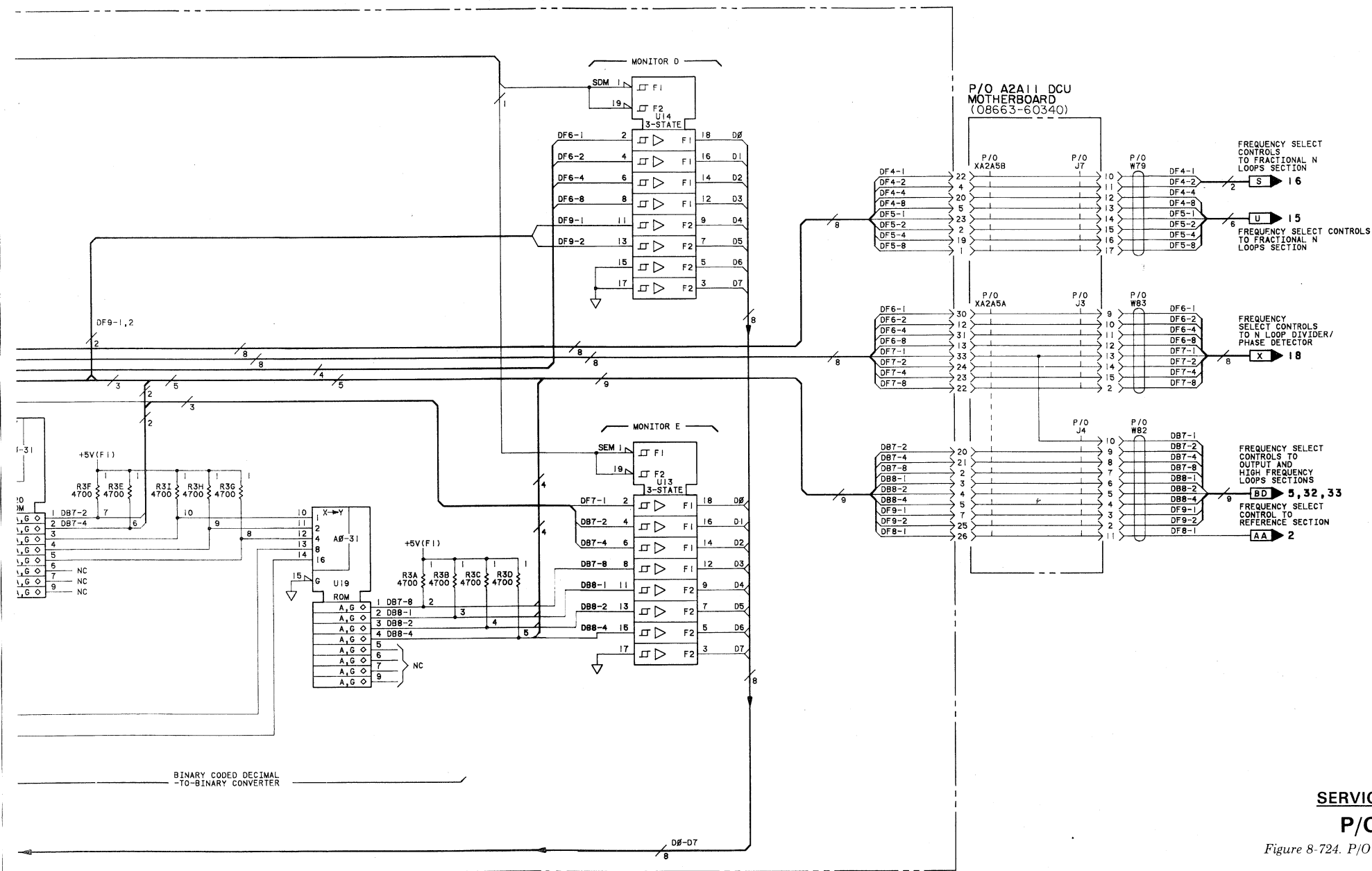


Figure 8-720. P/O A2A5 Frequency Control Assembly Component Locator

P/O A2A5 FREQUENCY CONTROL (08663-60341)



A2A5 53
1/3



SERVICE SHEET
P/O A2A5 53

Figure 8-724. P/O A2A5 Frequency Control Assembly Schematic

2/2

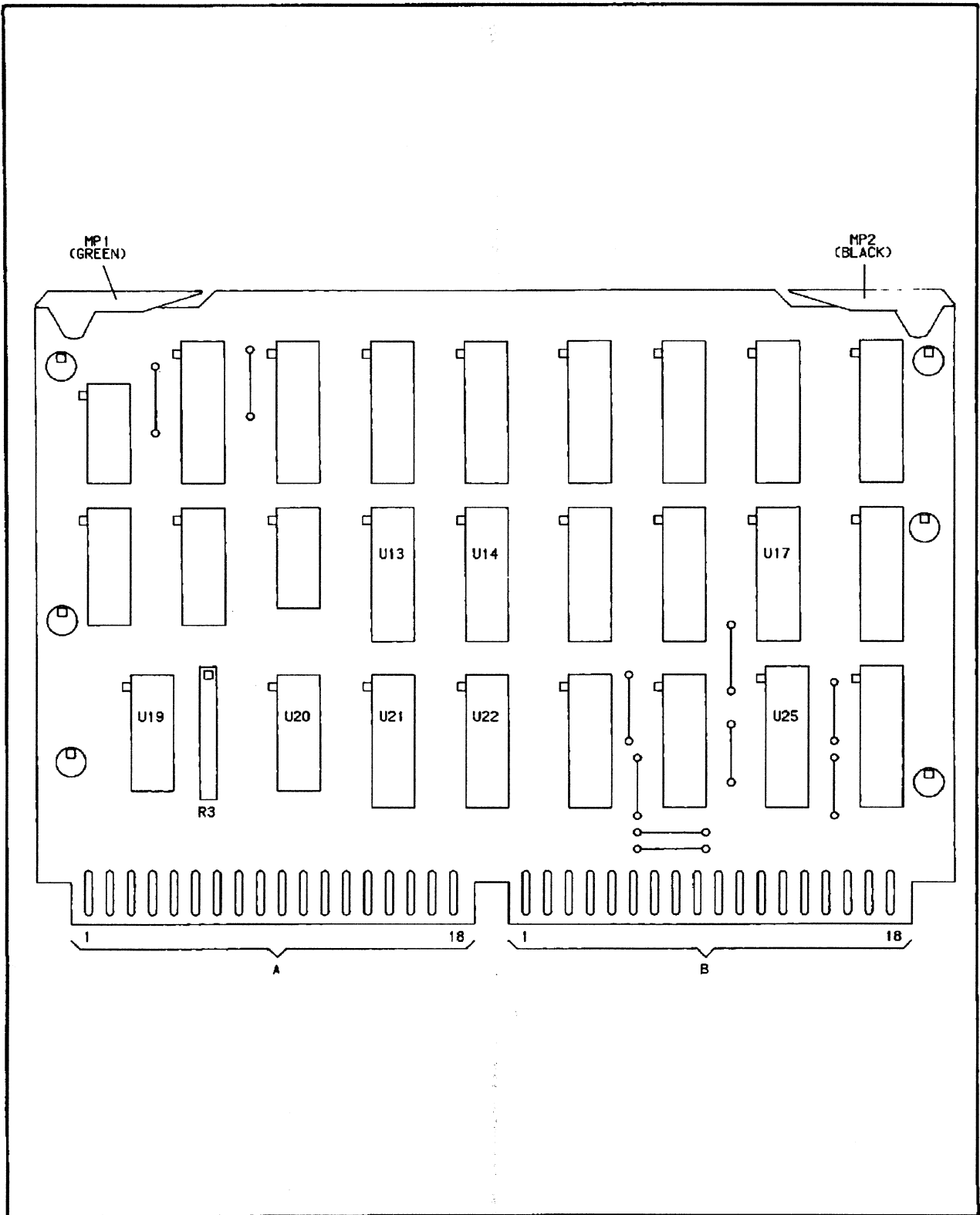
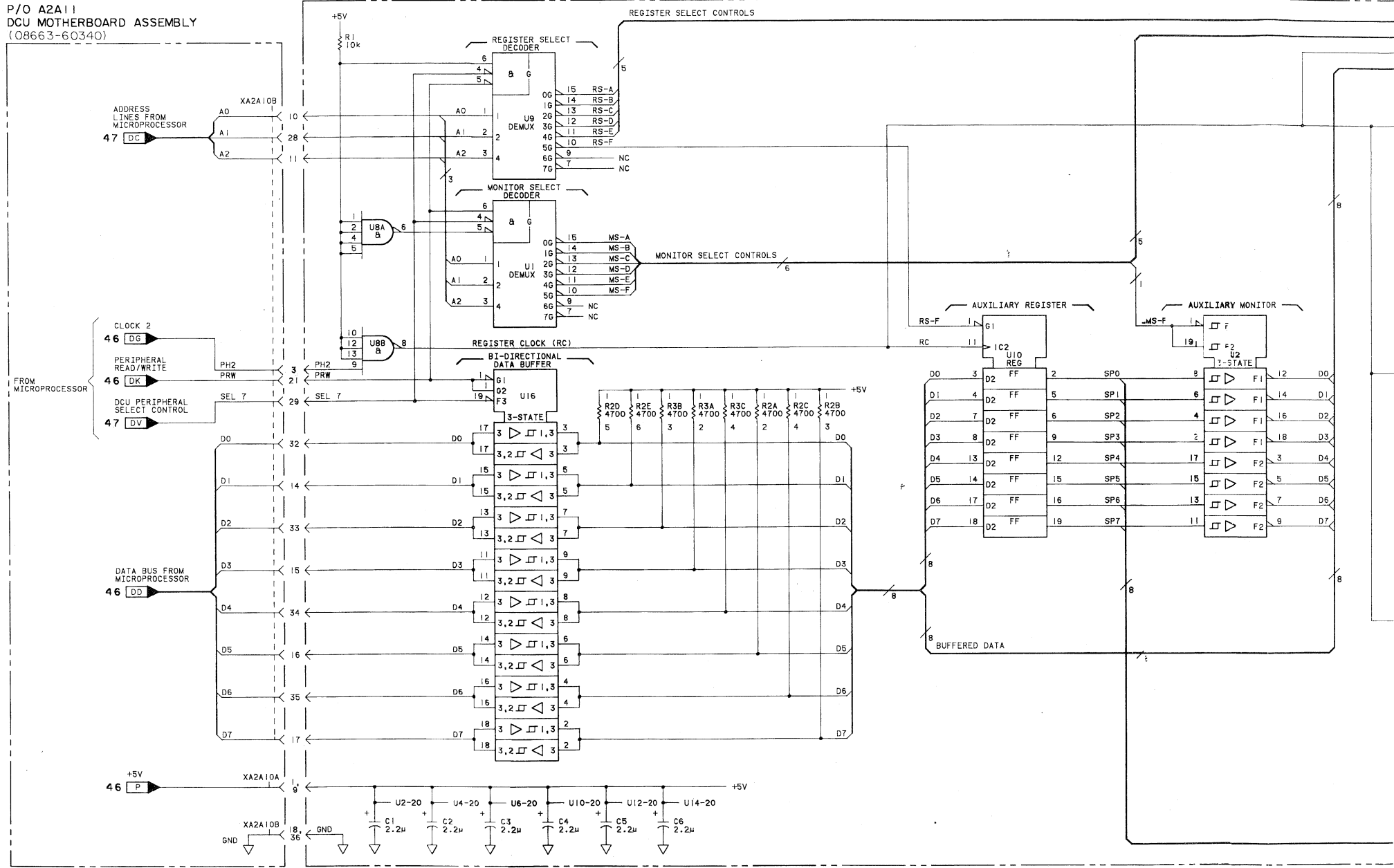


Figure 8-723. P/O A2A5 Frequency Control Assembly Component Locator

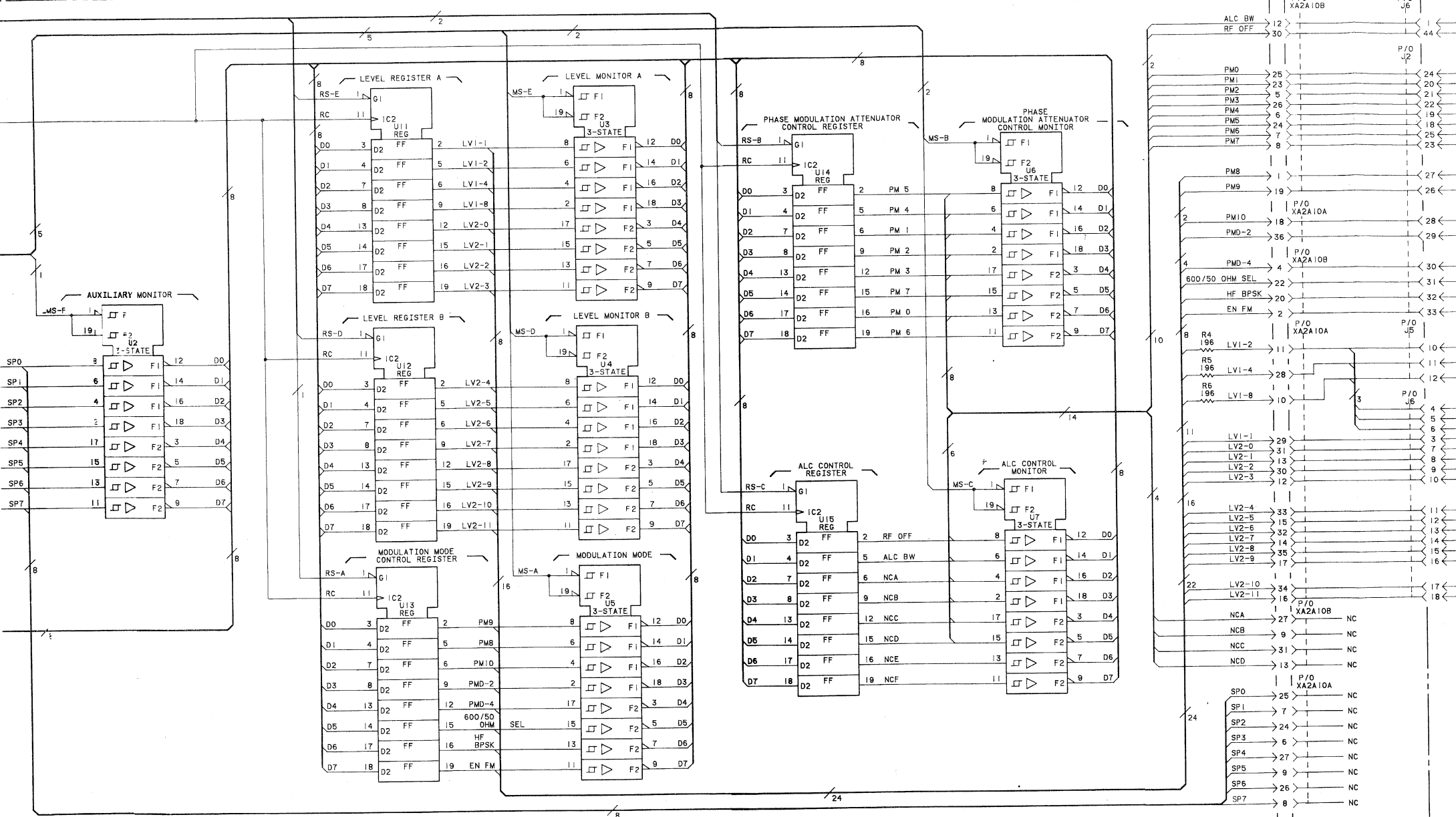
P/O A2A11
DCU MOTHERBOARD ASSEMBLY
(08663-60340)

A2A10 LEVEL CONTROL (08663-60335)

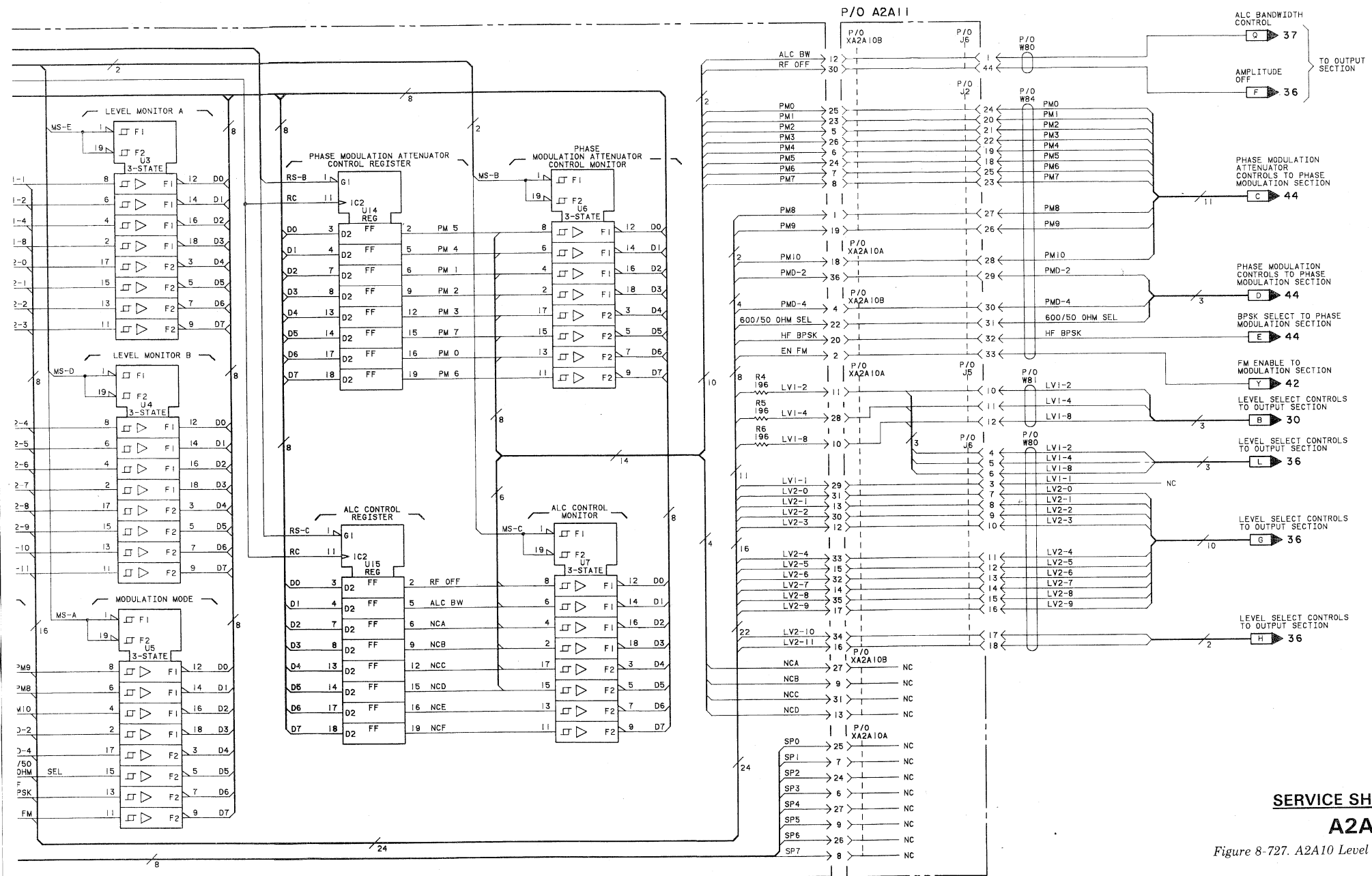


A2A10 54

1/3



A2A10 S4



SERVICE SHEET
A2A10 54

Figure 8-727. A2A10 Level Control Assembly Schematic
8-735/736

2/3

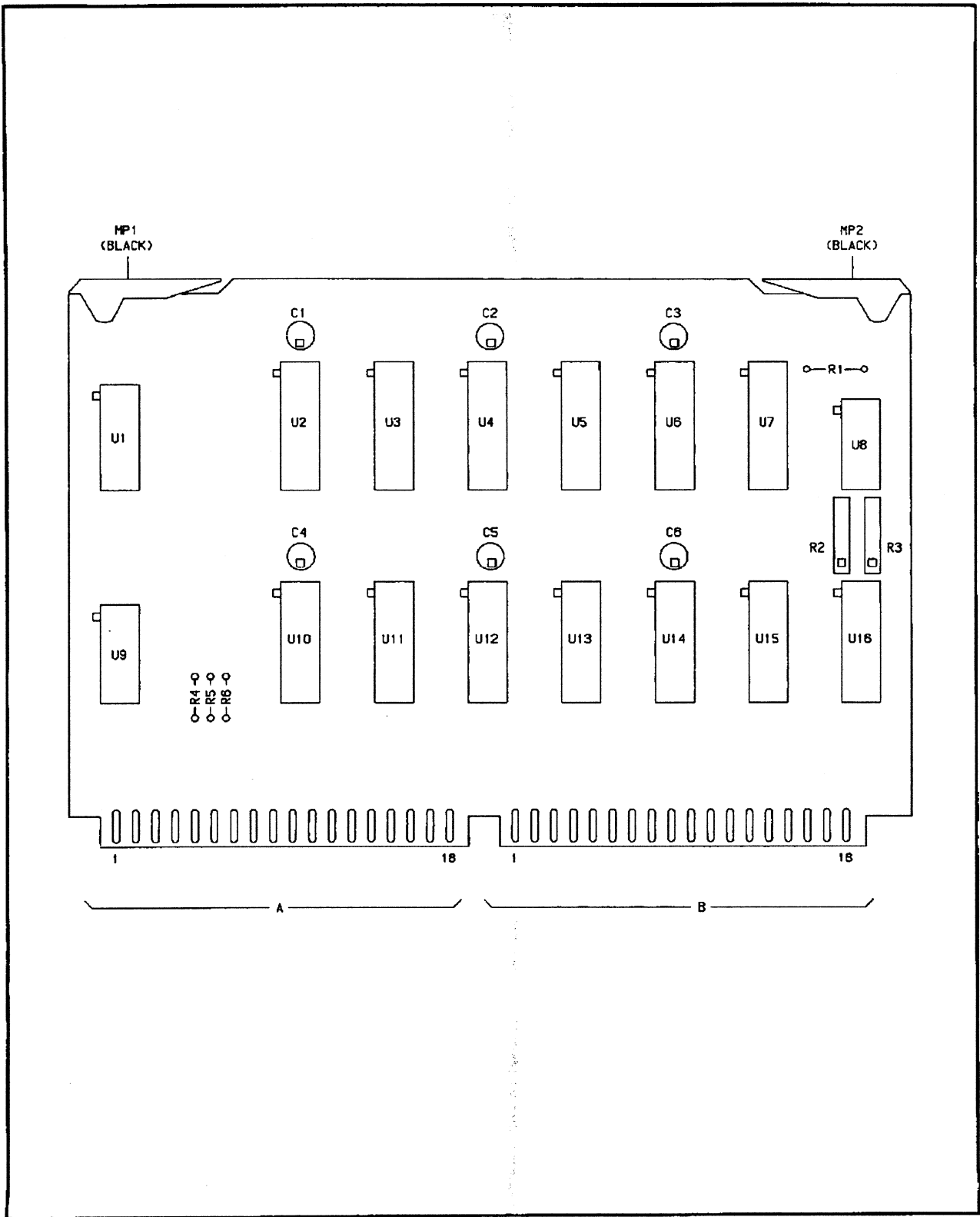
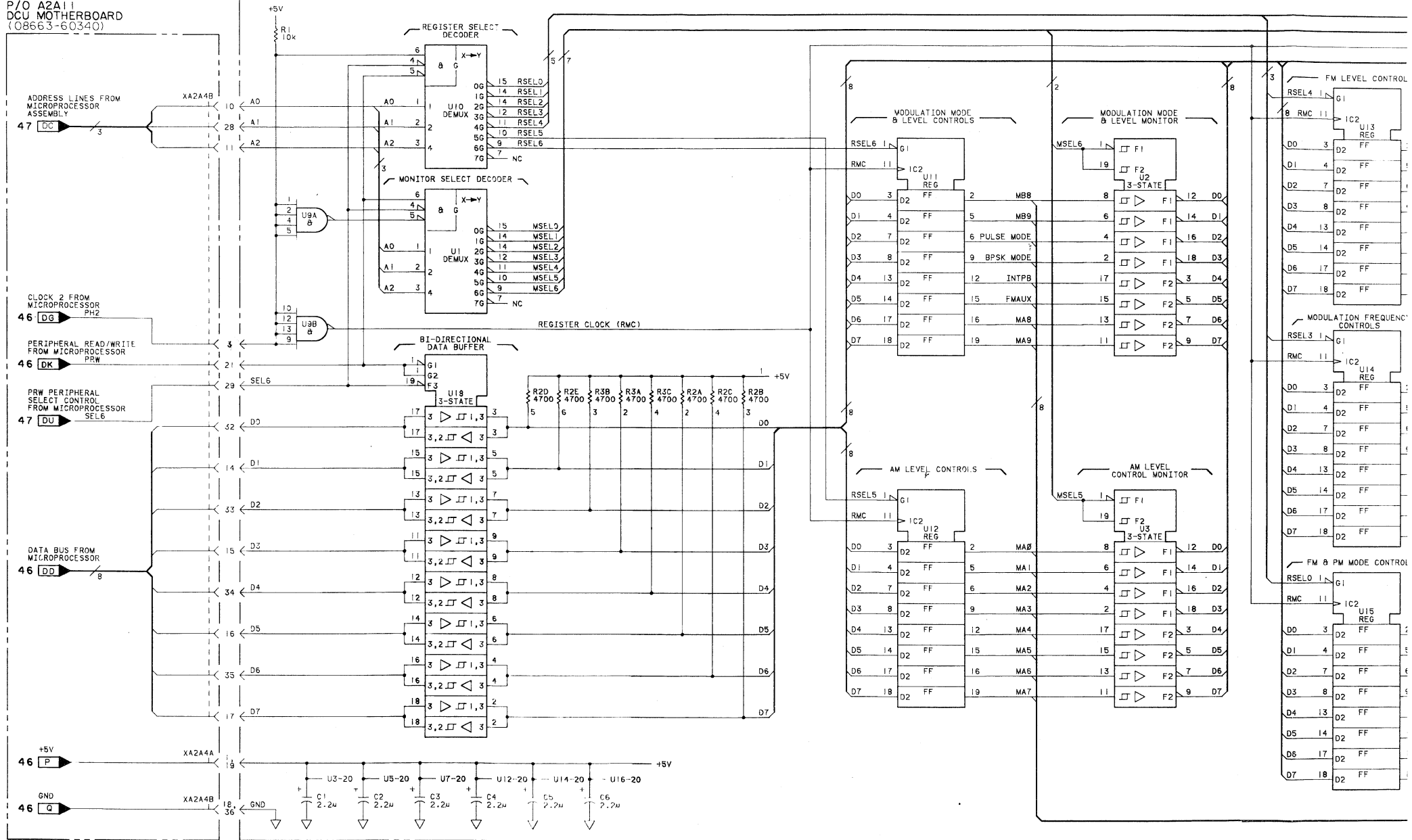


Figure 8-726. A2A10 Level Control Assembly Component Locator

A2A4 MODULATION CONTROL (08663-60334)

P/O A2A11
DCU MOTHERBOARD
(08663-60340)



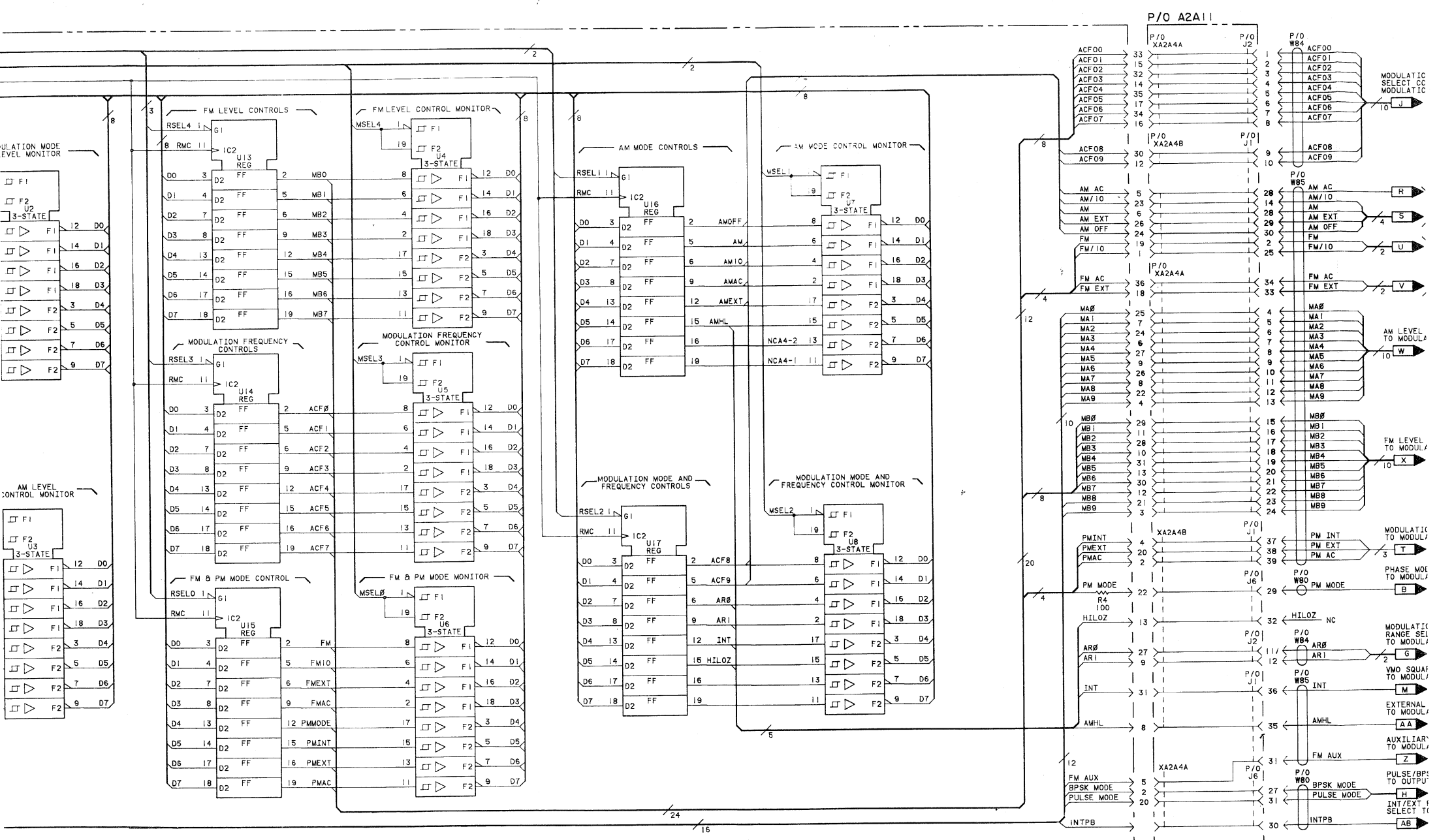
(08663-60340)

(08663-60334)

A2A4

SS

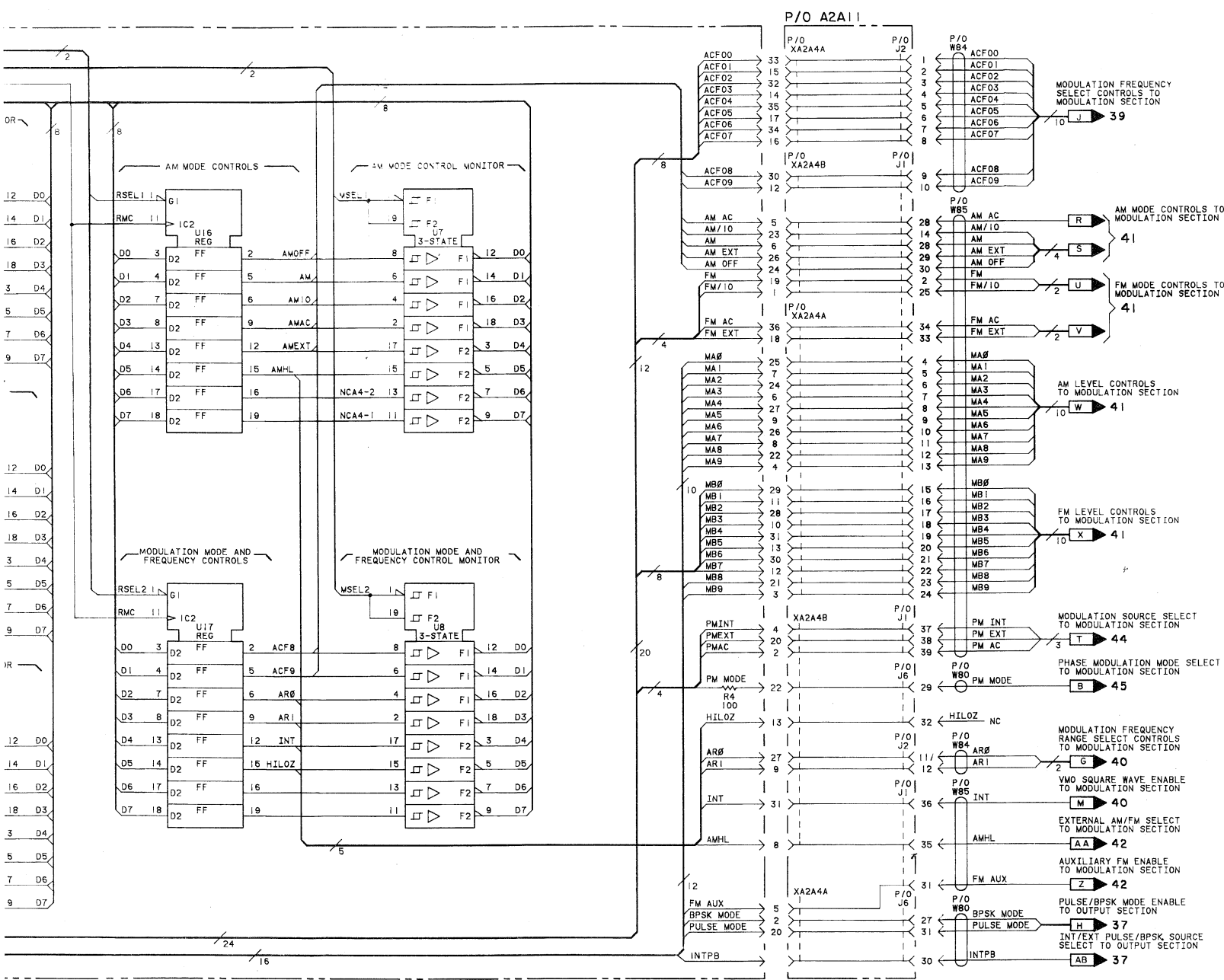
1/3



A2A4

SS

2/3



- NOTES
- REFER TO TABLE 8-102 FOR SCHEMATIC DIAGRAM NOTES.
 - TROUBLESHOOTING VALUES ARE TYPICAL. THEY ARE ACTUAL MEASURED VALUES. YOUR MEASUREMENTS MAY BE SLIGHTLY DIFFERENT THAN WHAT IS SHOWN.

REFERENCE DESIGNATIONS

NO PREFIX	
W80,84,85	
A2A4	A2A11
C1-6	XA2A4A
R1-3	XA2A4B
U1-18	J1,2,6,8

INTEGRATED CIRCUIT PART NUMBERS

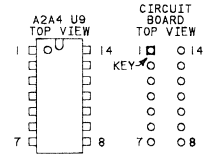
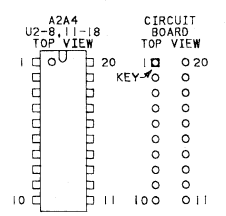
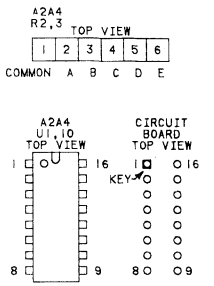
REFERENCE DESIGNATIONS	PART NUMBERS
U1,10	1820-1216
U2,8	1820-2024
U9	1820-1204
U11-17	1820-1858
U18	1820-2075

LOGIC LEVELS

	TTL
HIGH	>+2.0V
LOW	<+0.8V
< IS MORE NEG. THAN	> IS MORE POS. THAN
OPEN	HIGH
GROUND	LOW

INTEGRATED CIRCUIT VOLTAGE AND GROUND CONNECTIONS

REFERENCE DESIGNATIONS	PIN NUMBERS
U18	+5V - 20 - 10
U2-8	+5V - 20 - 10
U11-17	+5V - 20 - 10
U1,10	+5V - 16 - 8
U9	+5V - 14 - 7



SERVICE SHEET 55

A2A4

Figure 8-730. A2A4 Modulation Assembly Schematic

3/3

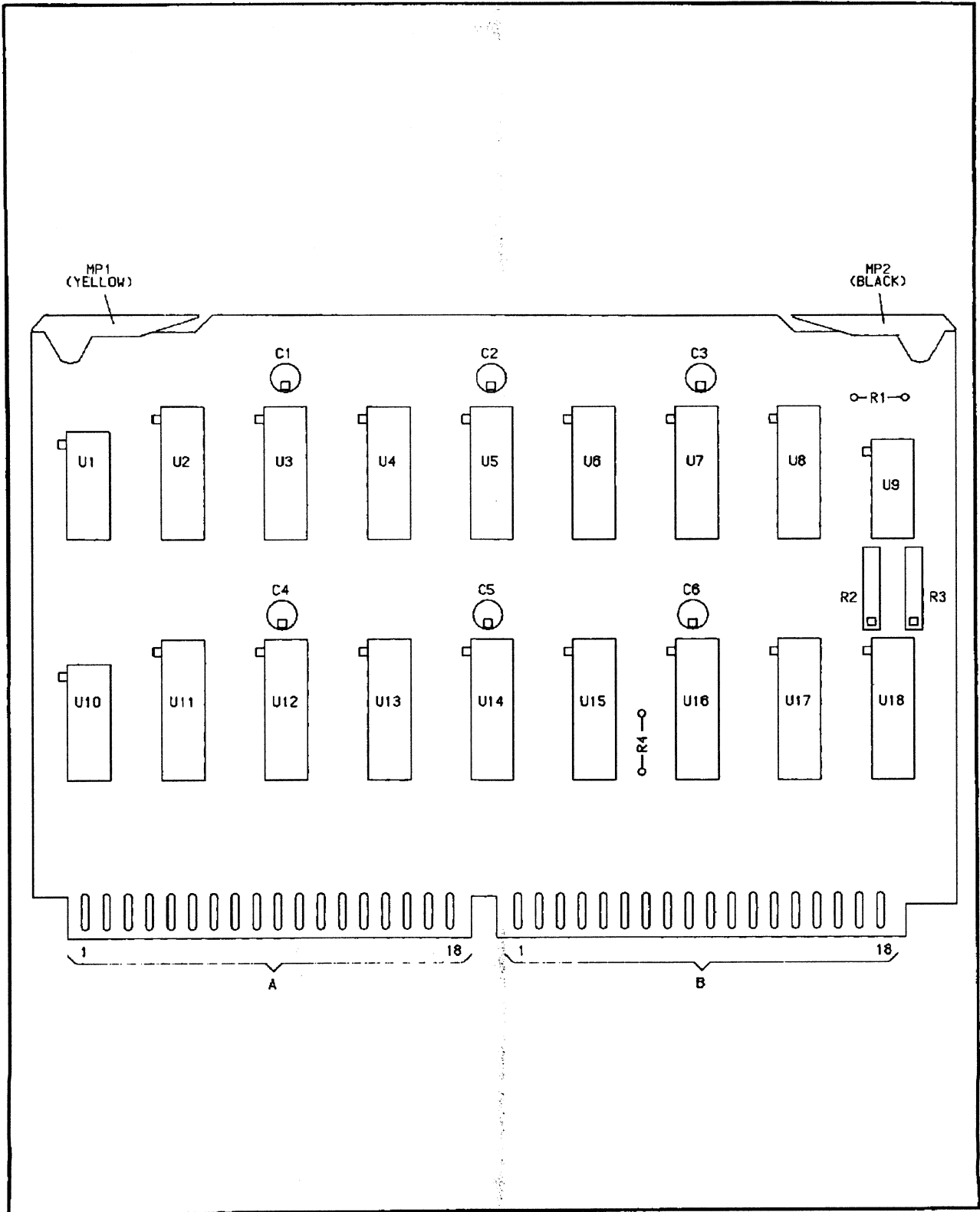
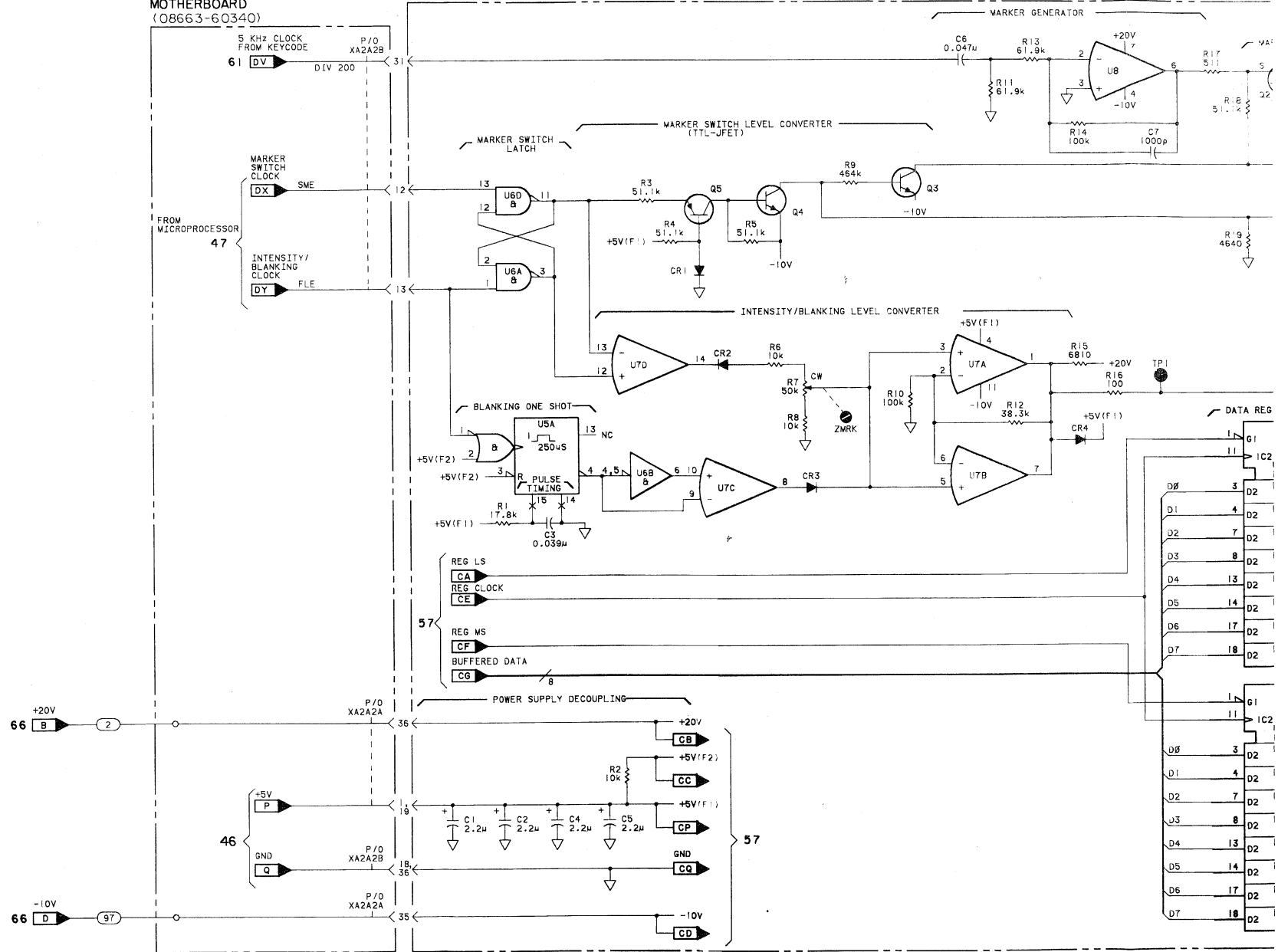


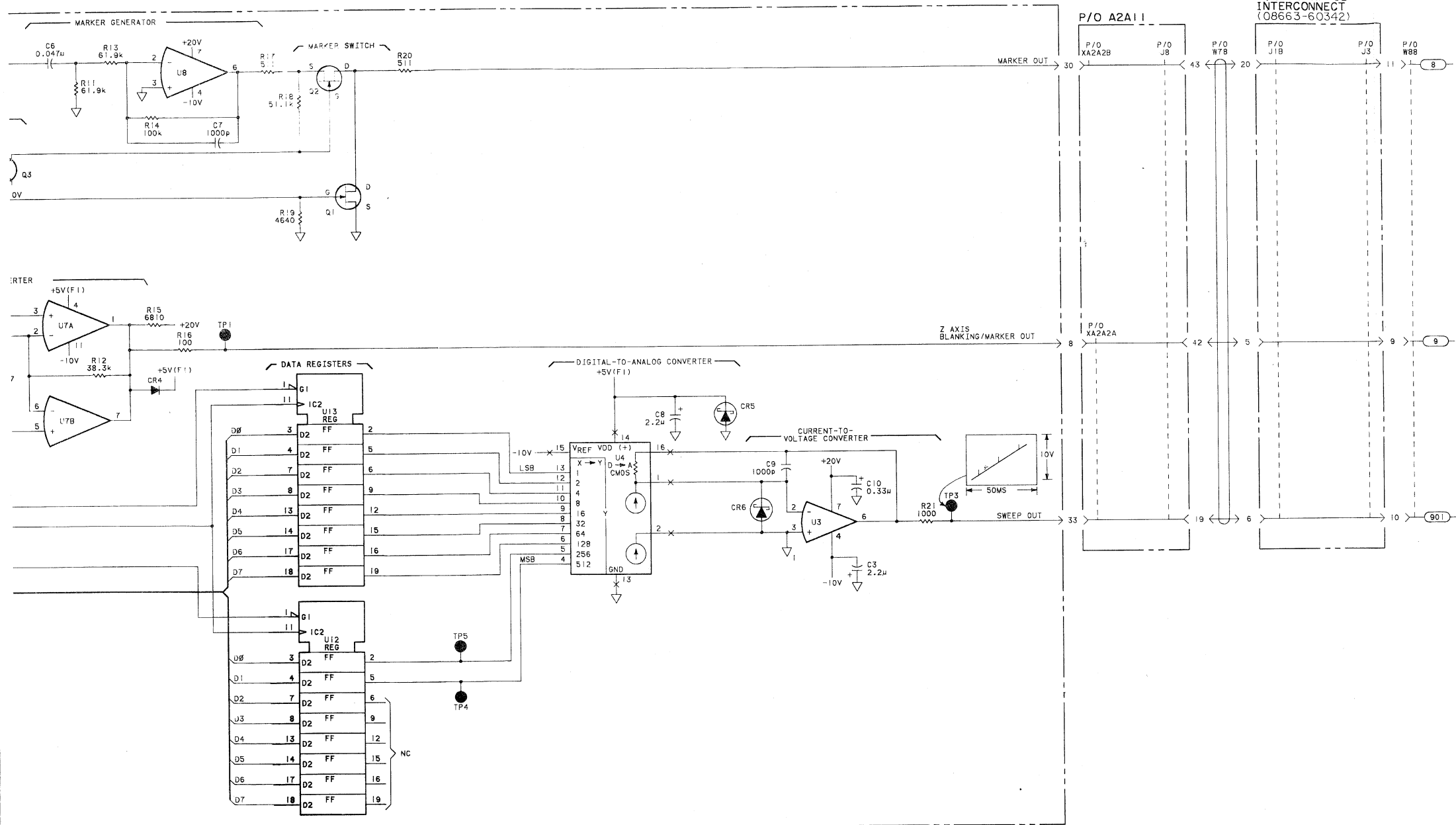
Figure 8-729. A2A4 Modulation Assembly Component Locator

P/O A2A11 DCU
MOTHERBOARD
(08663-60340)

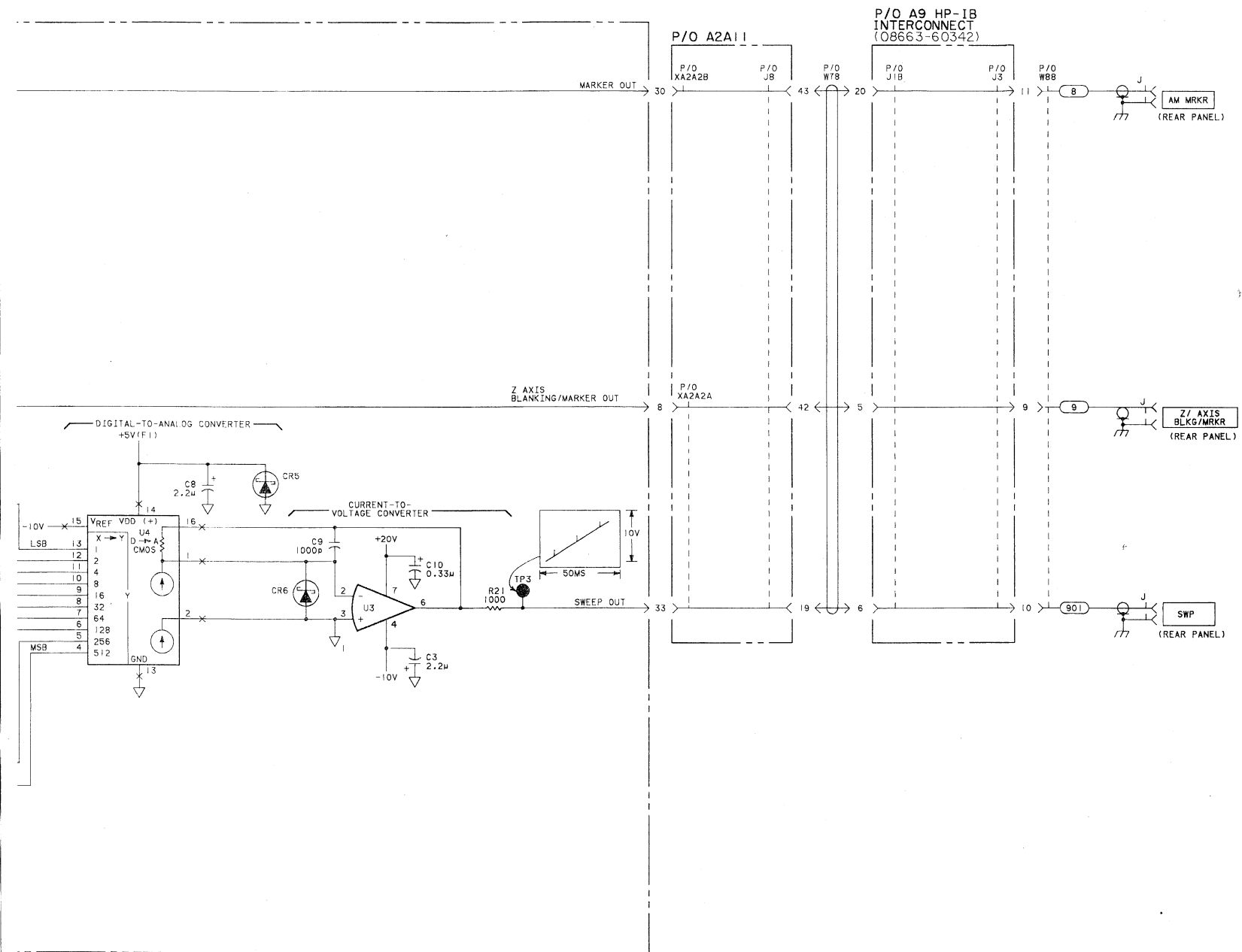
P/O A2A2 SWEEP CONTROL (08663-60337)



A2A2 56



A2A2 56



SERVICE SHEET
P/O A2A2 56

Figure 8-733. P/O A2A2 Sweep Control Assembly Schematic
 8-743/744

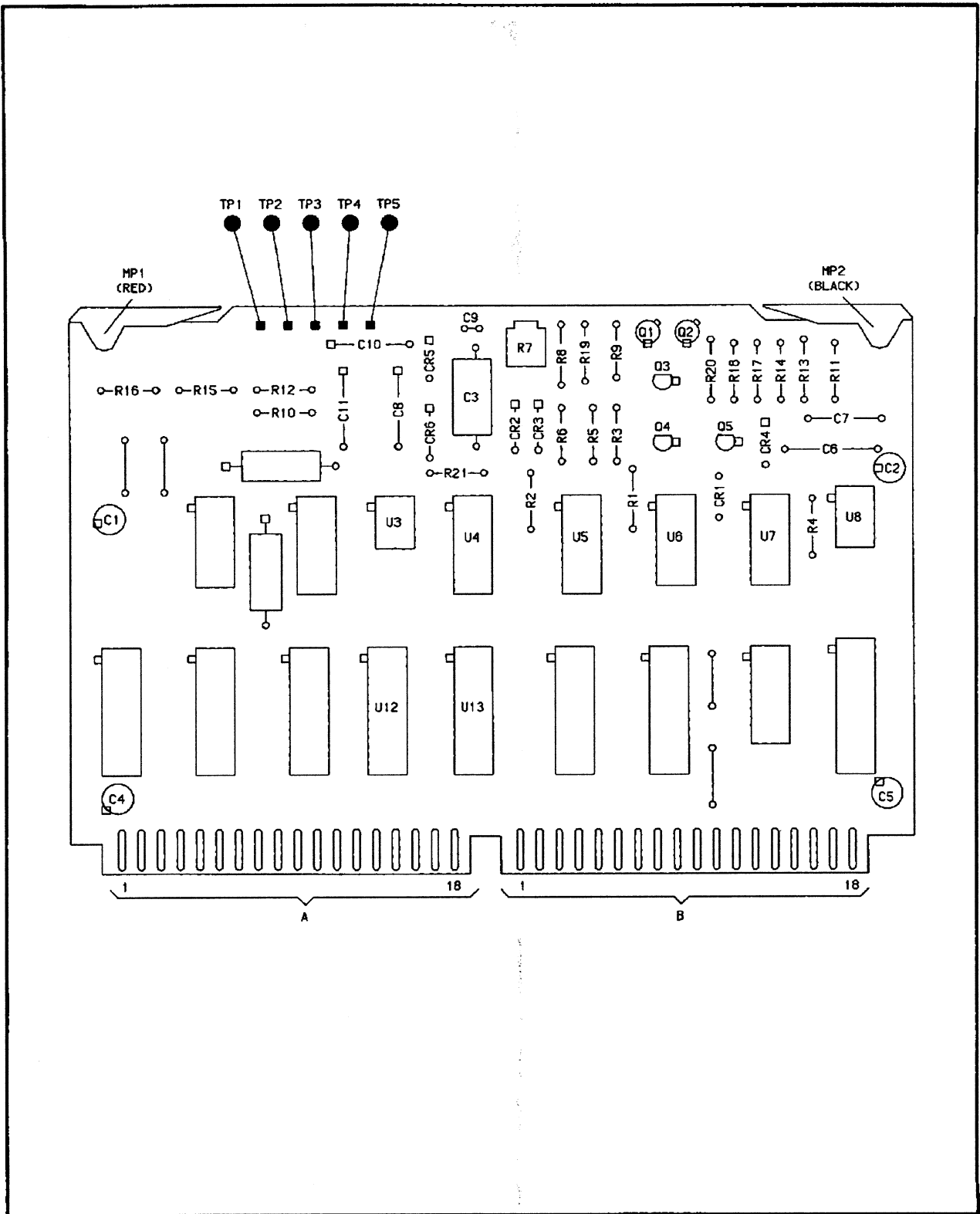
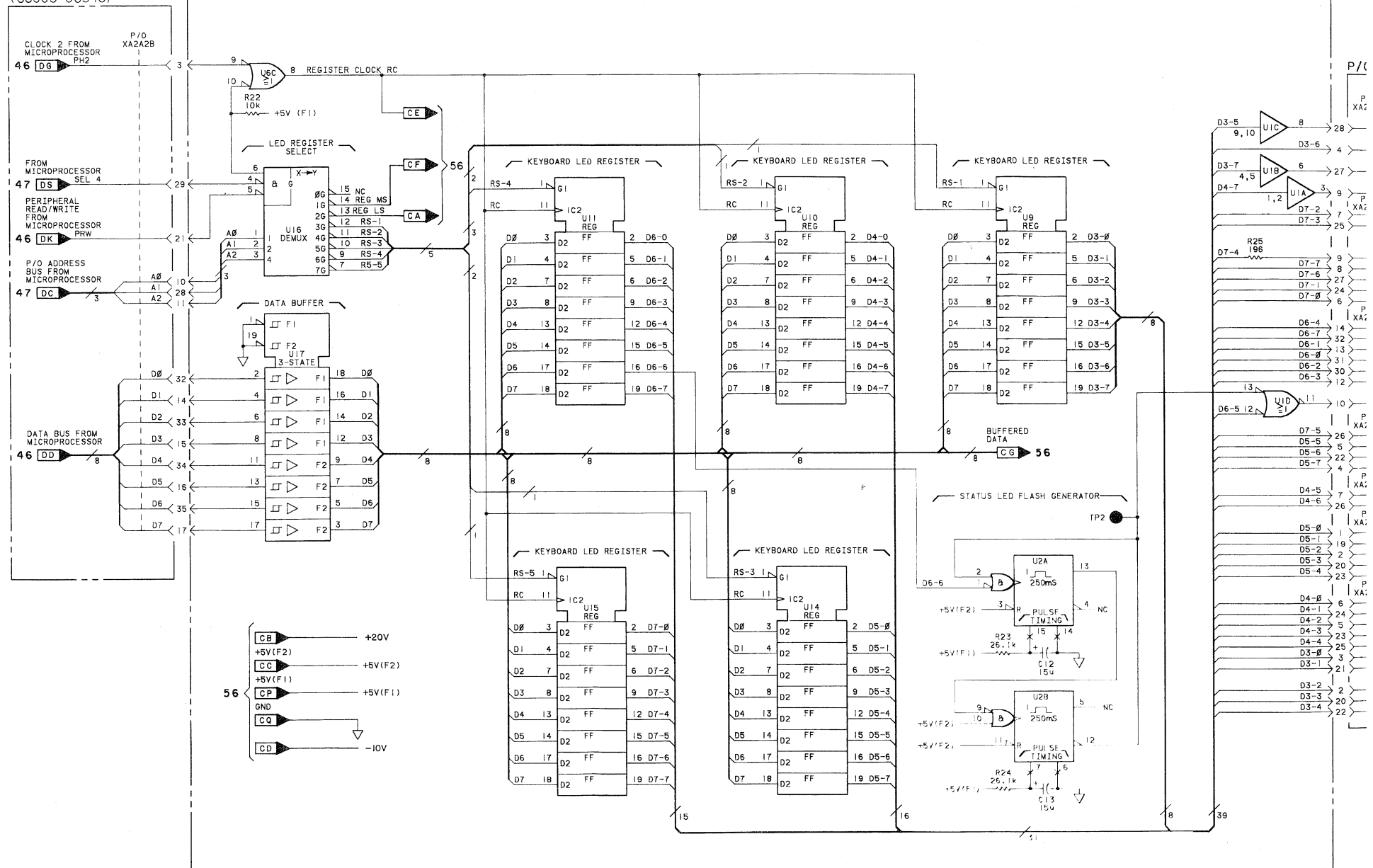


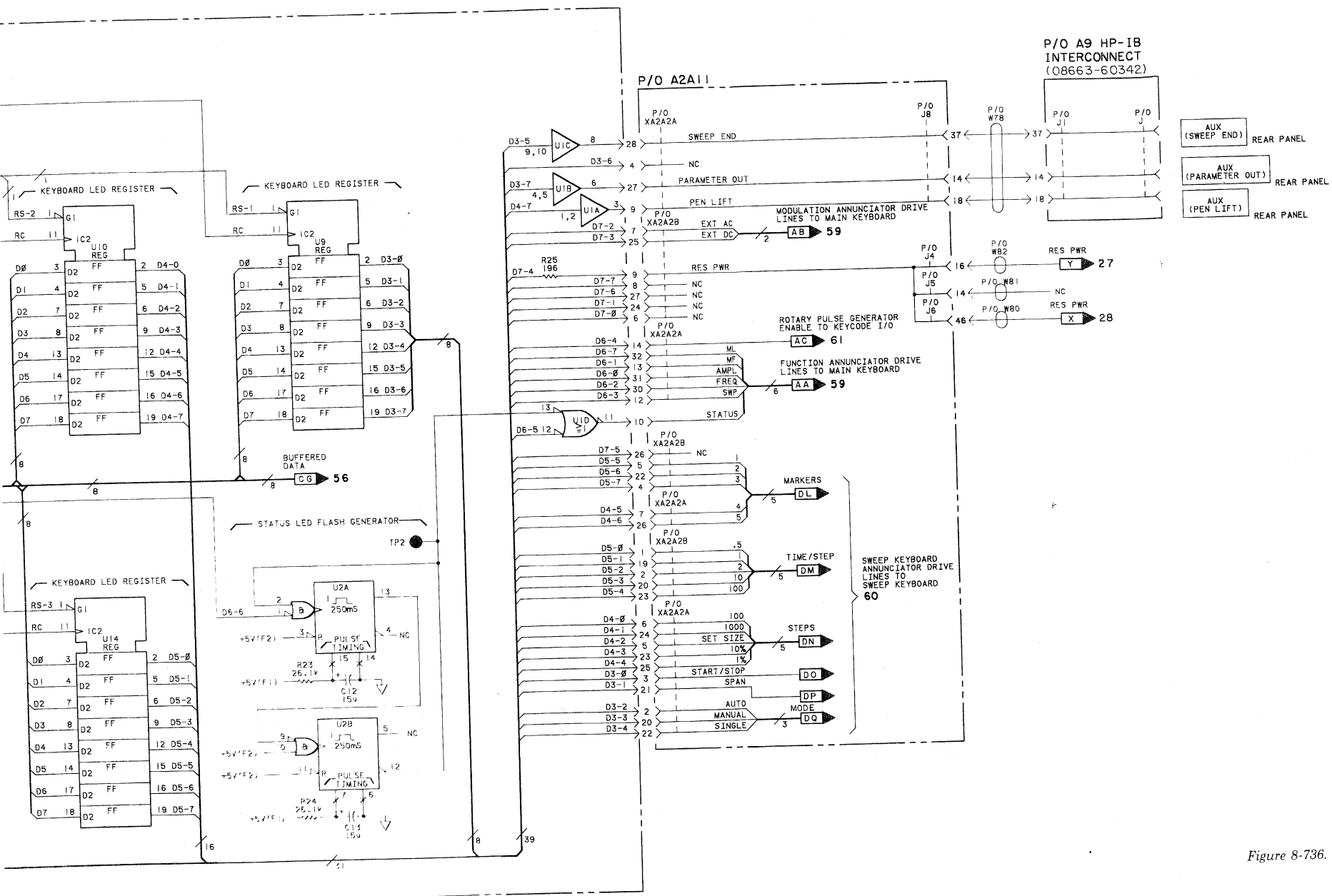
Figure 8-732. P/O A2A2 Sweep Control Assembly Component Locator

P/O DCU
MOTHERBOARD
(08663-60340)

P/O A2A2 SWEEP CONTROL (08663-60337)



A2A2 S7
1/2



SERVICE SHEET
P/O A2A2 57

Figure 8-736. P/O A2A2 Sweep Control Assembly Schematic
 8-747/748

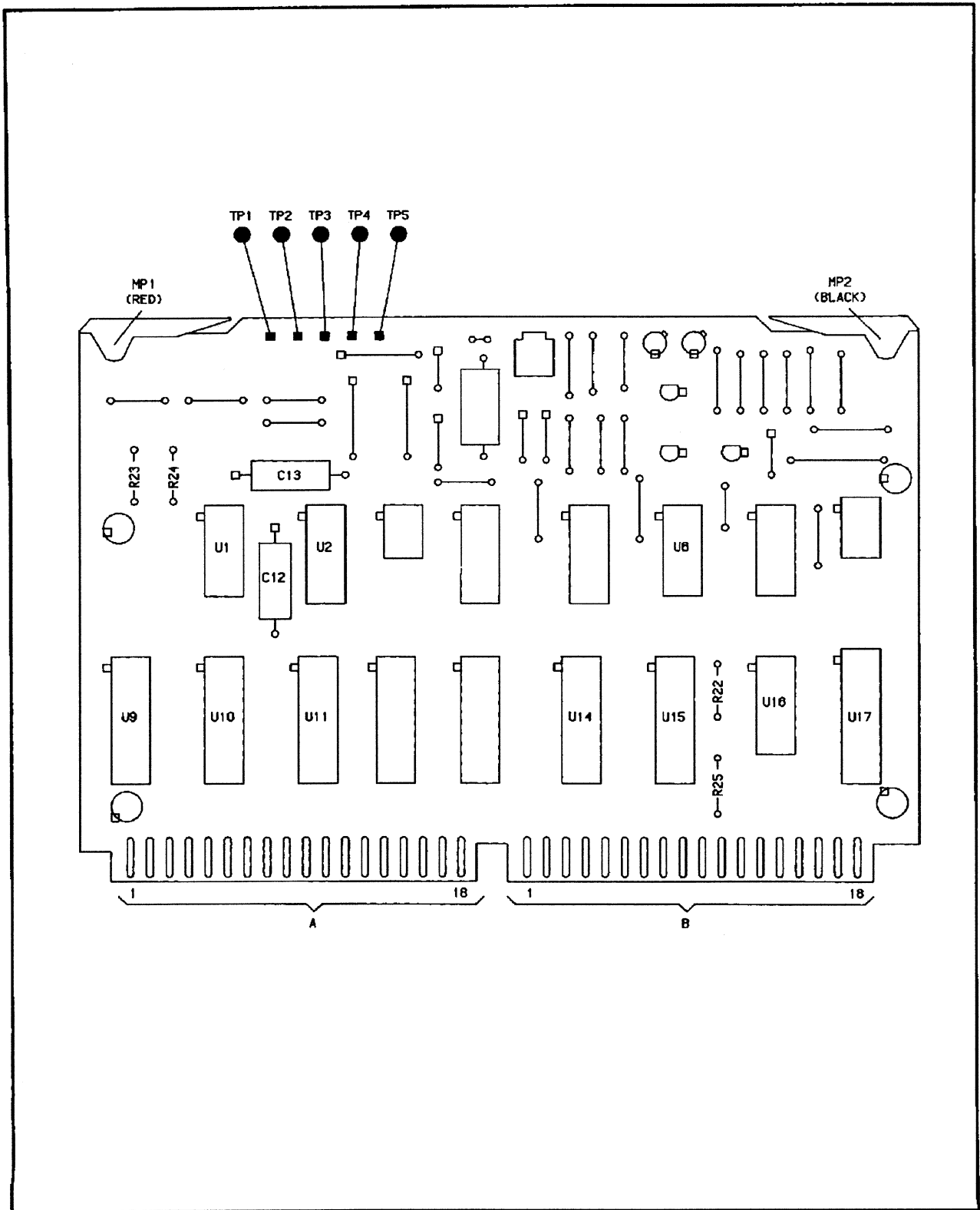
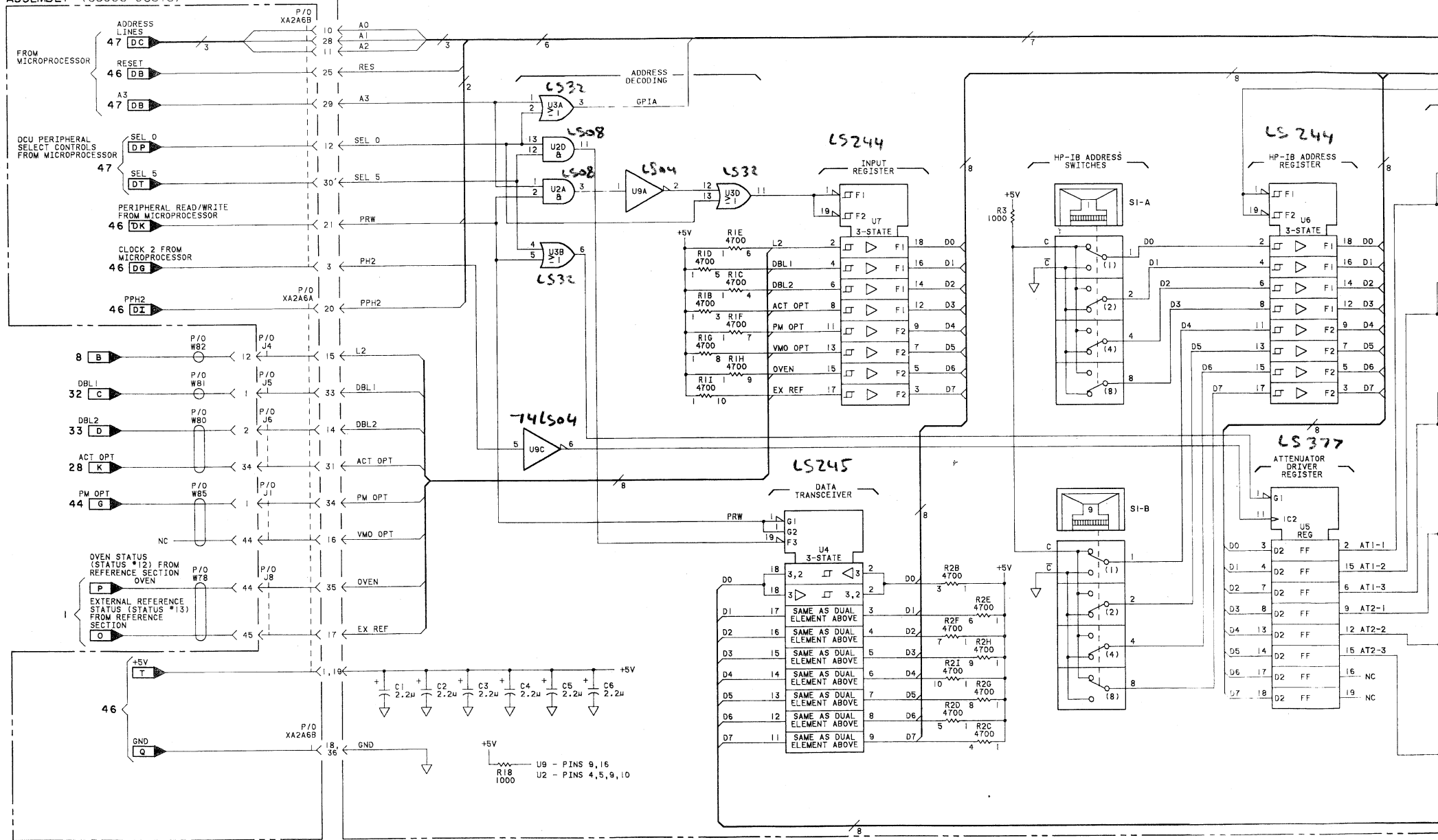


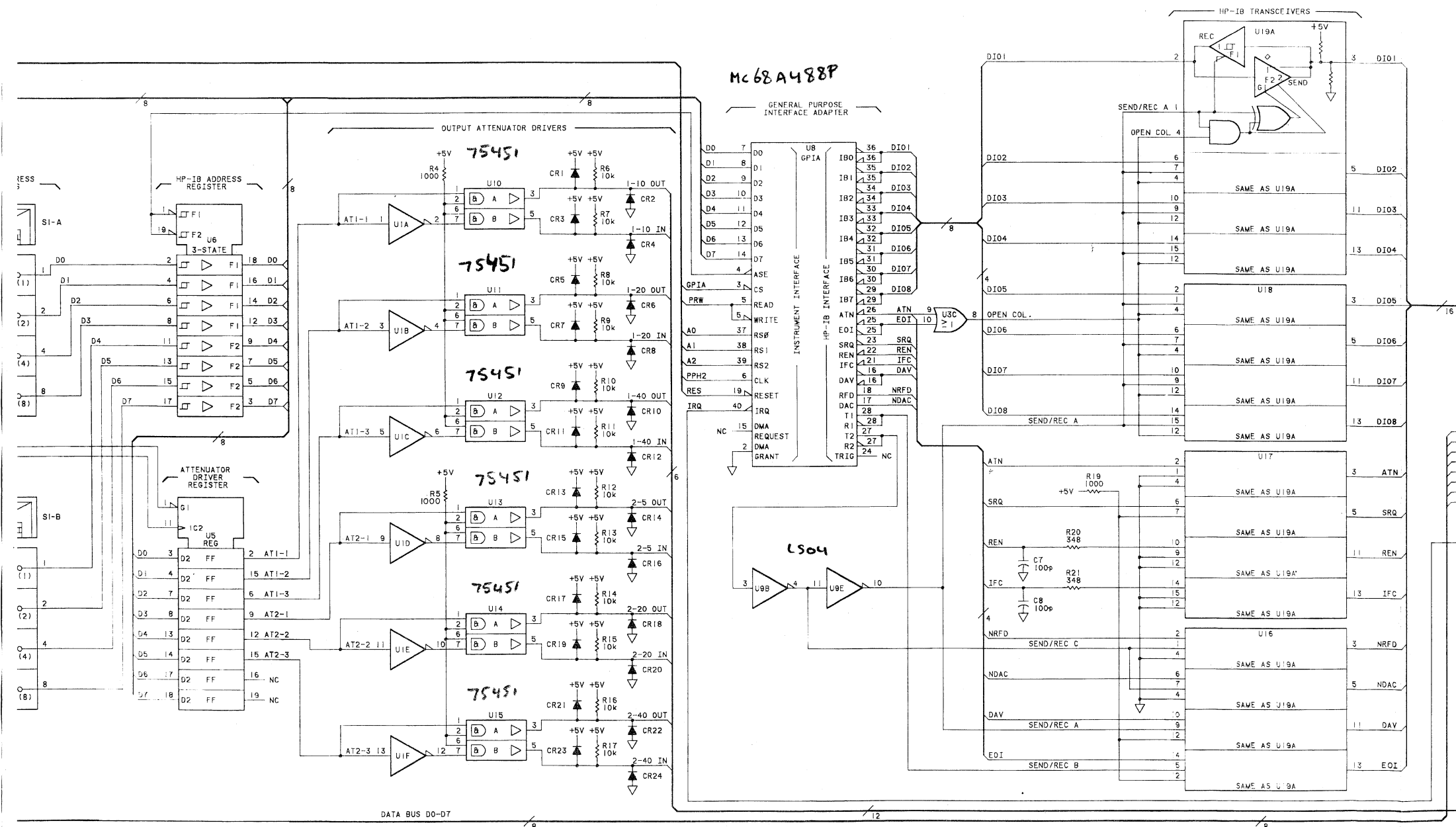
Figure 8-735. P/O A2A2 Sweep Assembly Component Locator

A2A6 HP-IB ASSEMBLY (08663-60333)

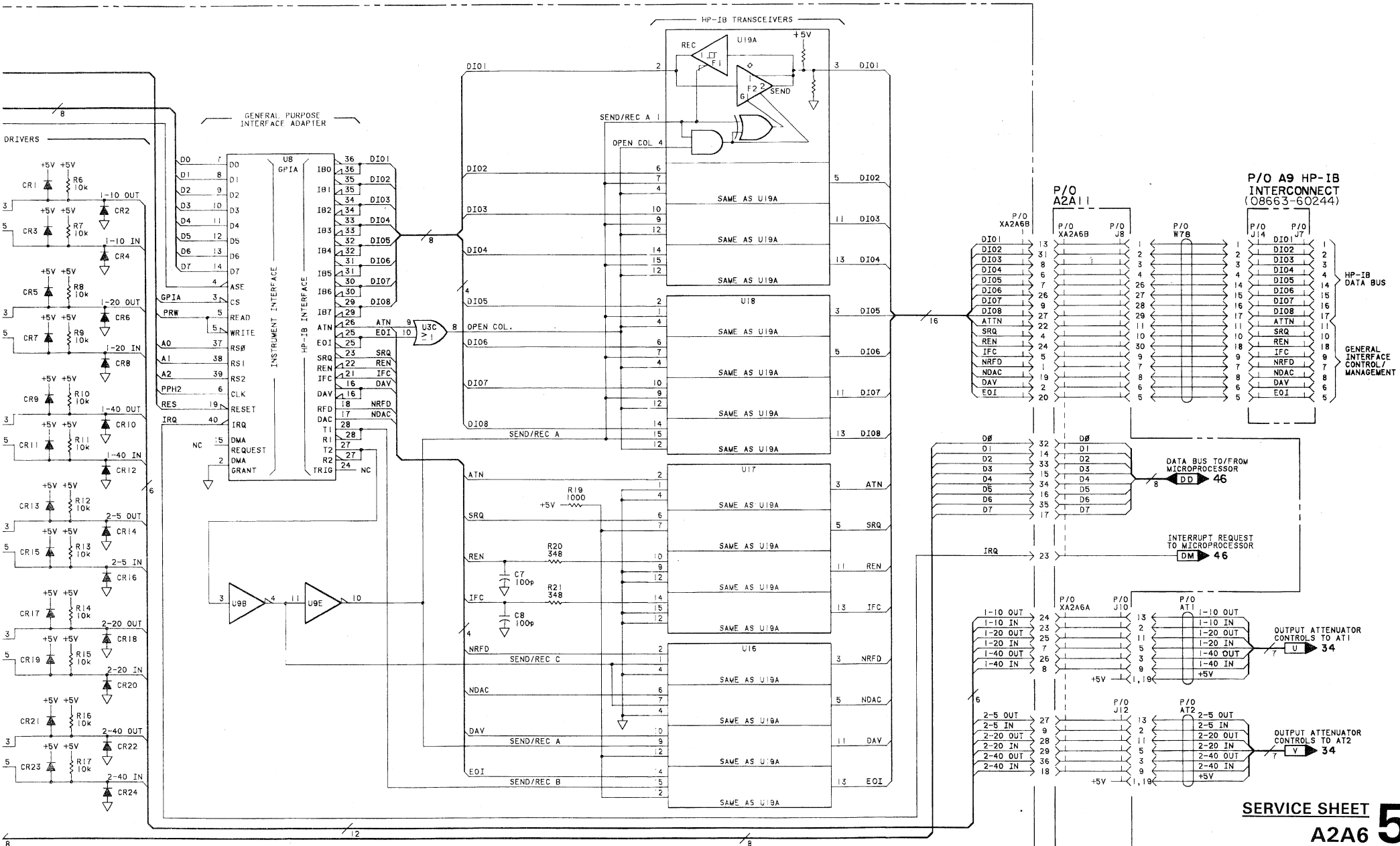
P/O A2A11 DCU ASSEMBLY (08663-60315)



A2A6 58



A2A6 S8



SERVICE SHEET
A2A6 58

Figure 8-739. A2A6 HP-IB Assembly Schematic
8-751/752

3/3

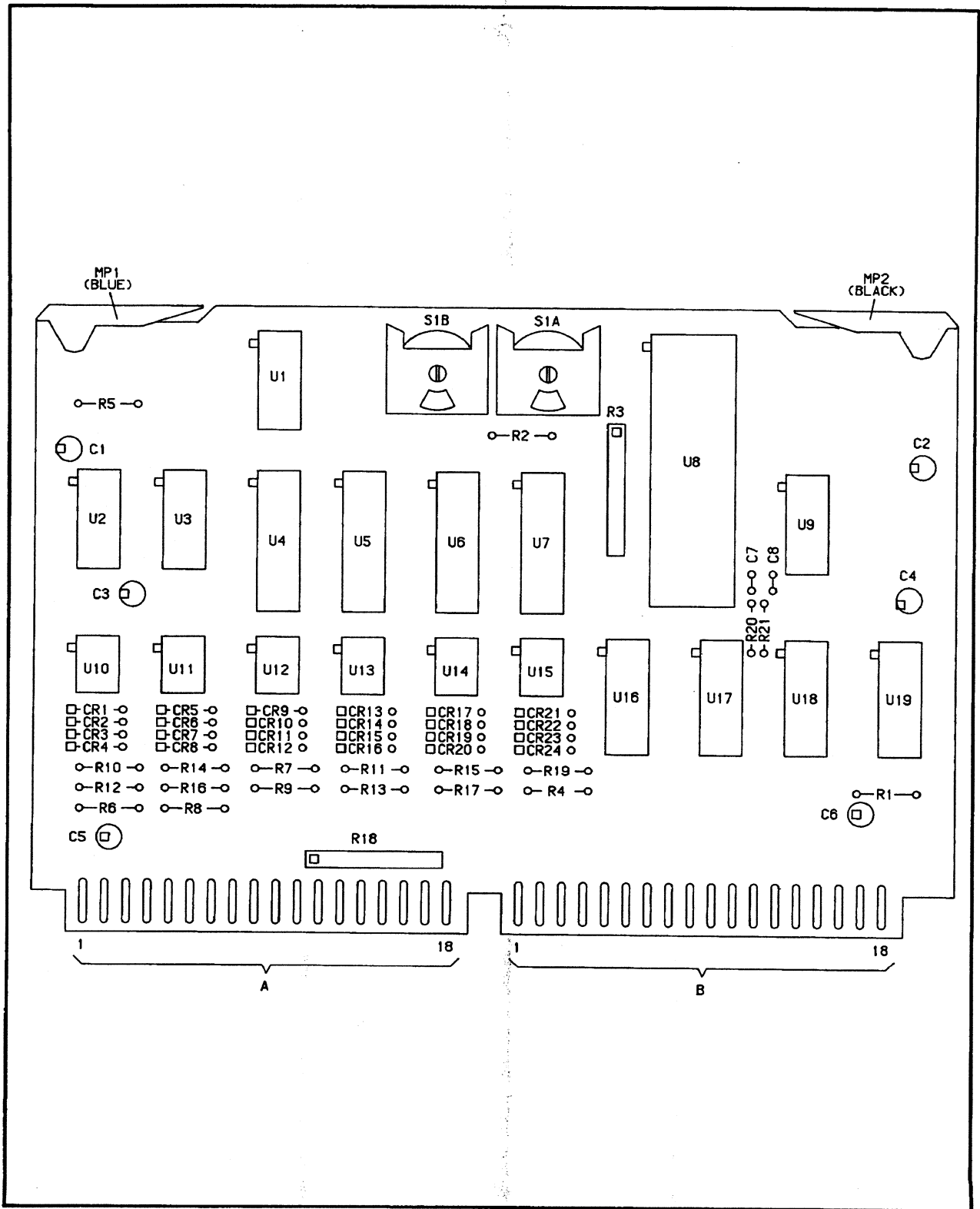
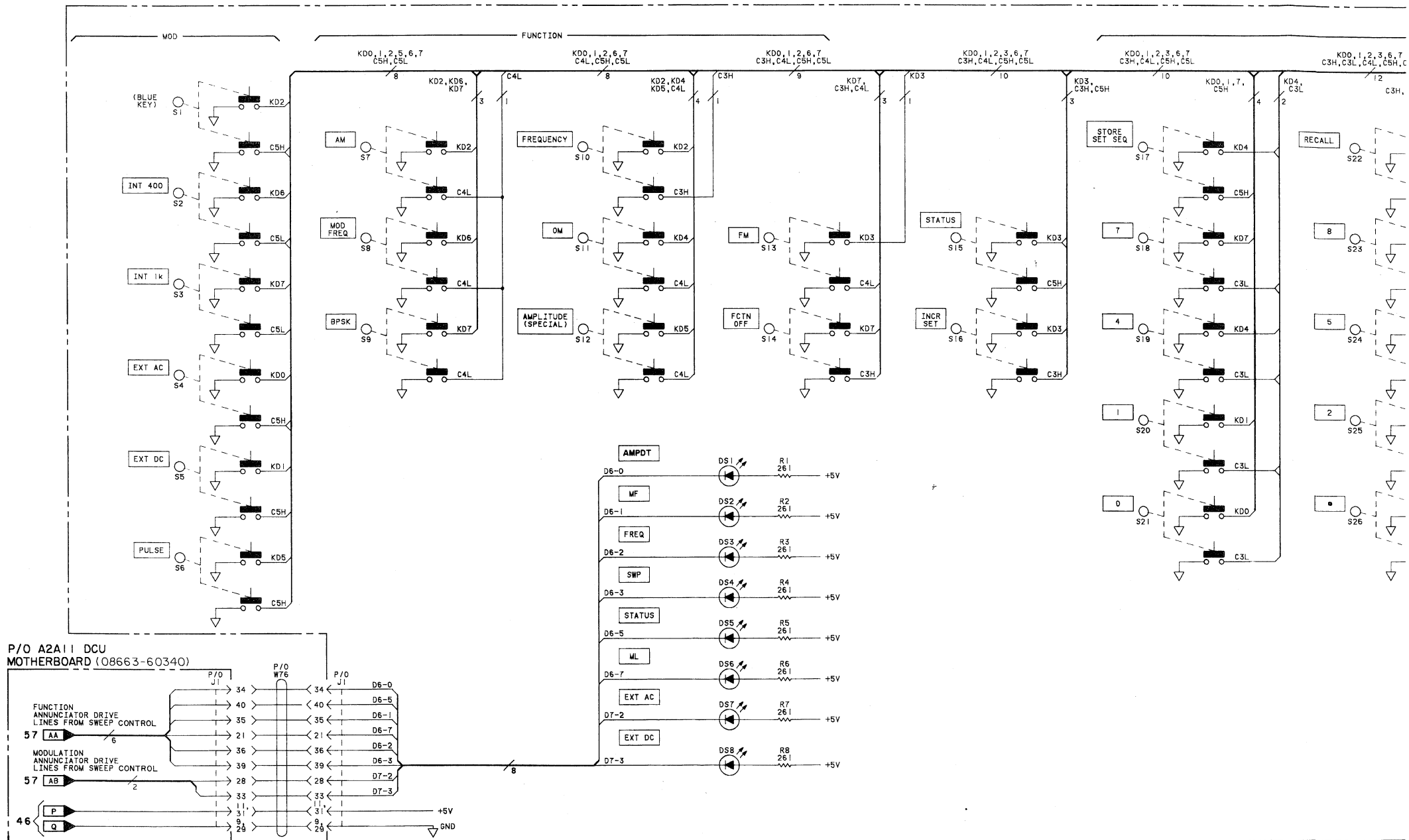
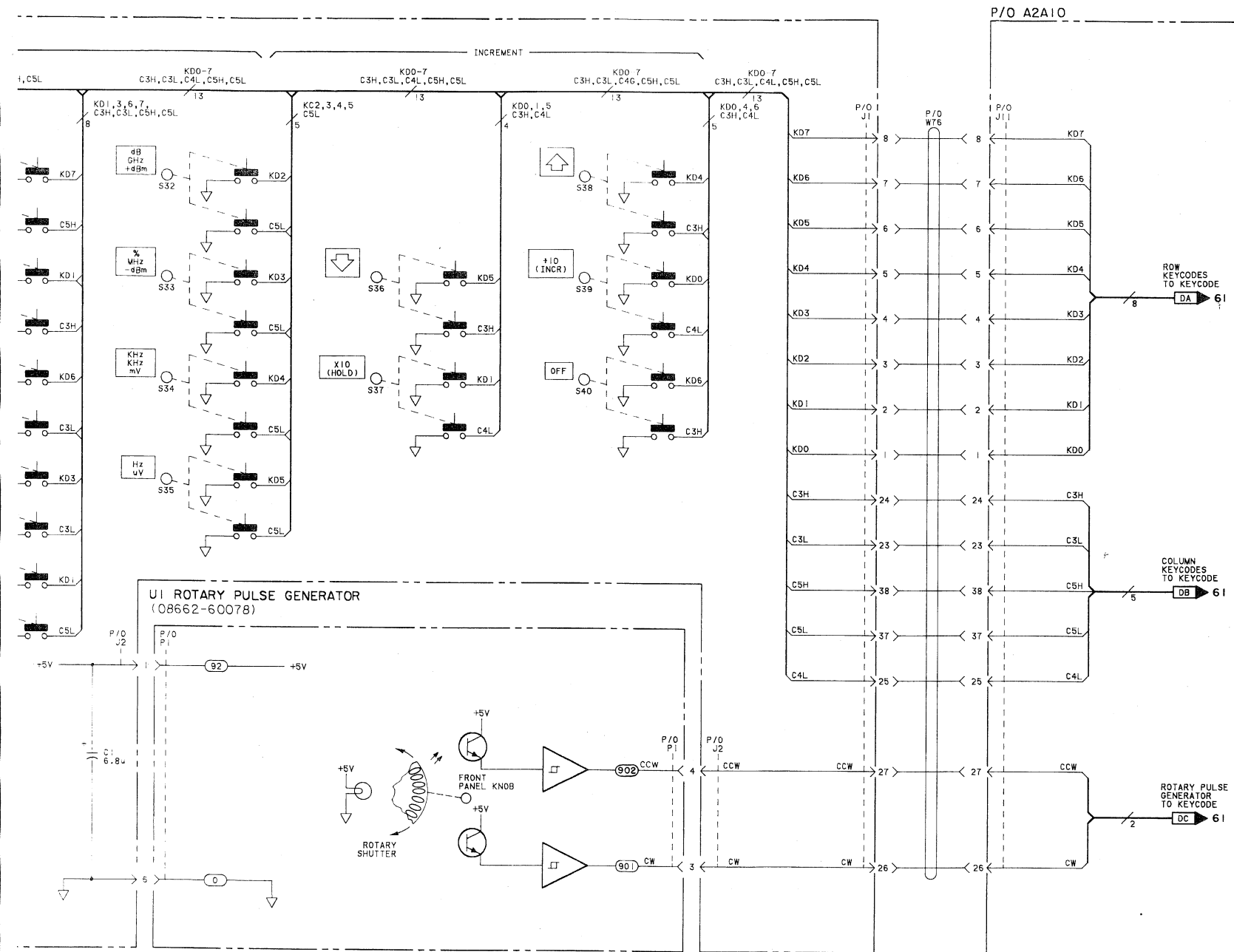


Figure 8-738. A2A6 HP-IB Assembly Component Locator

P/O A1A3 MAIN KEYBOARD ASSEMBLY (08663-60339)



A1A3 S9



SERVICE SHEET
A1A3 **59**

Figure 8-742. A1A3 Main Keyboard Schematic

8-755/756

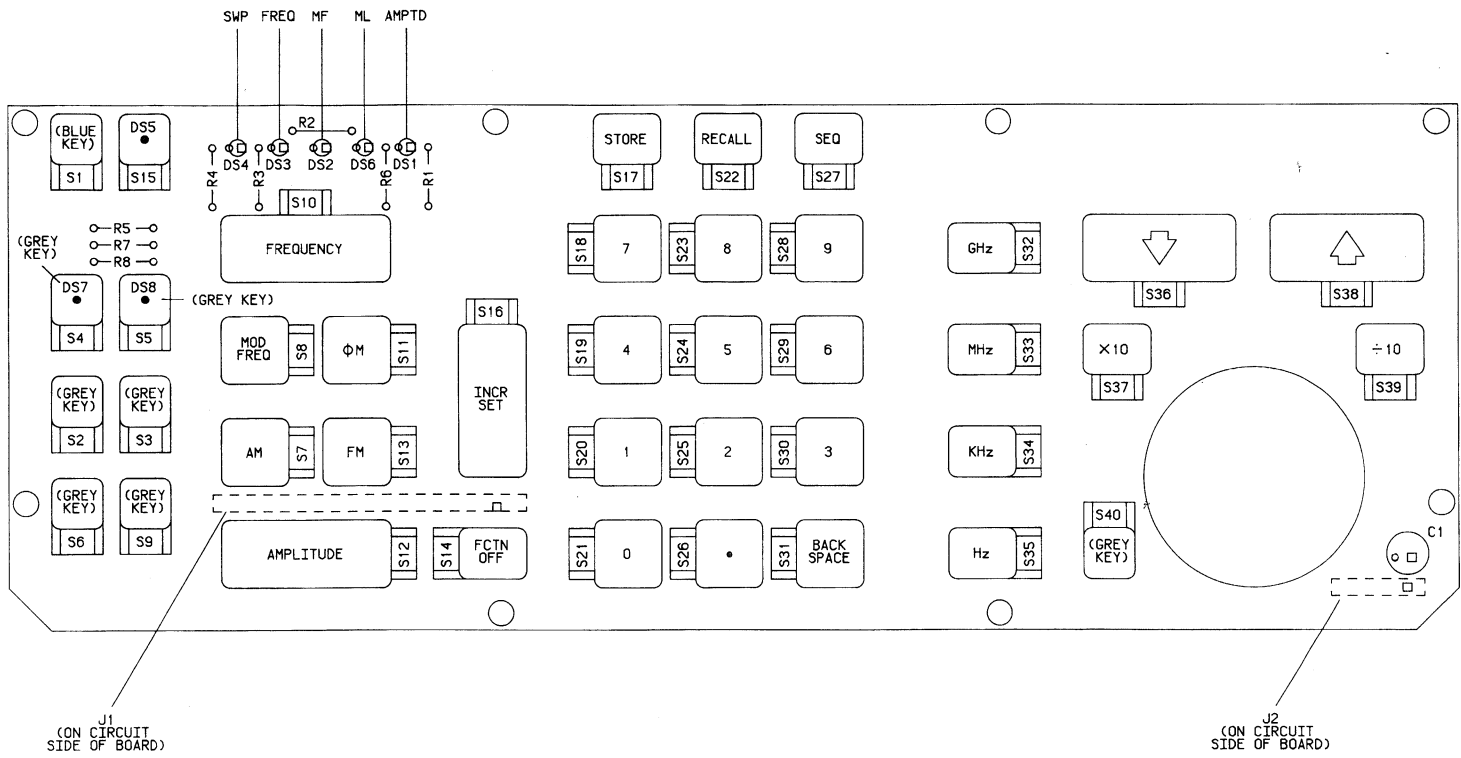


Figure 8-741. A1A3 Main Keyboard Component Locator

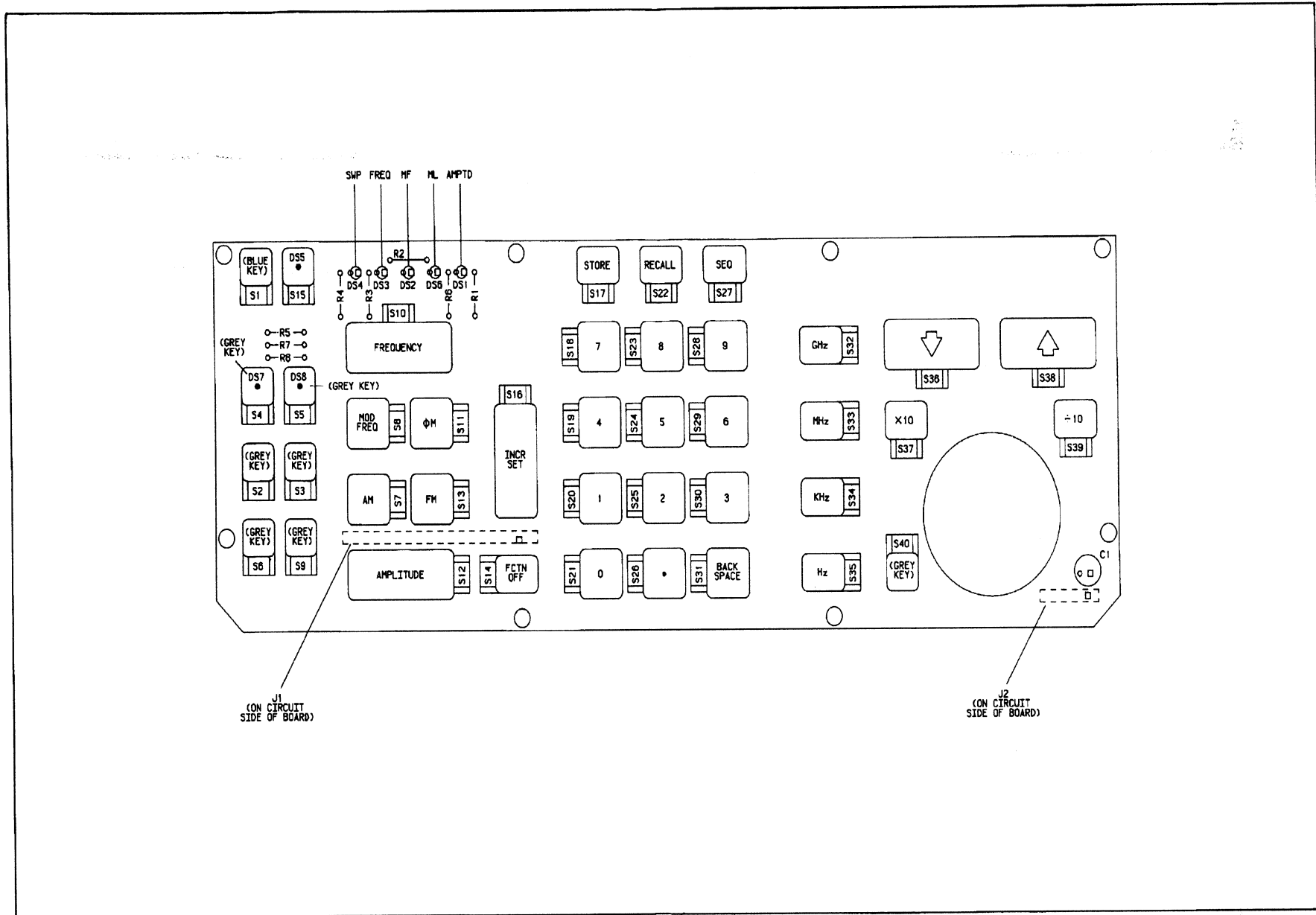
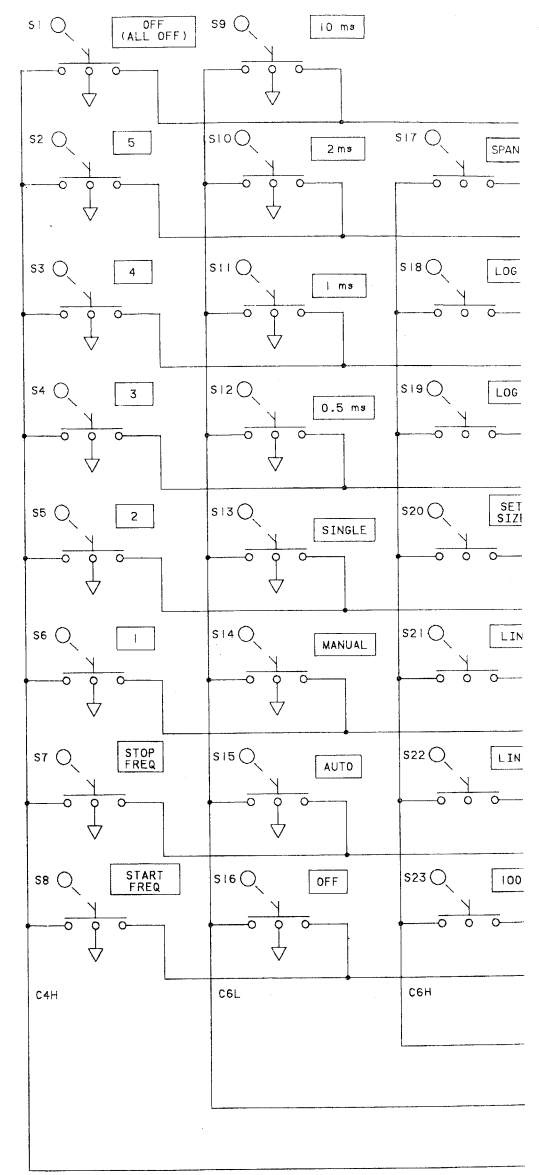
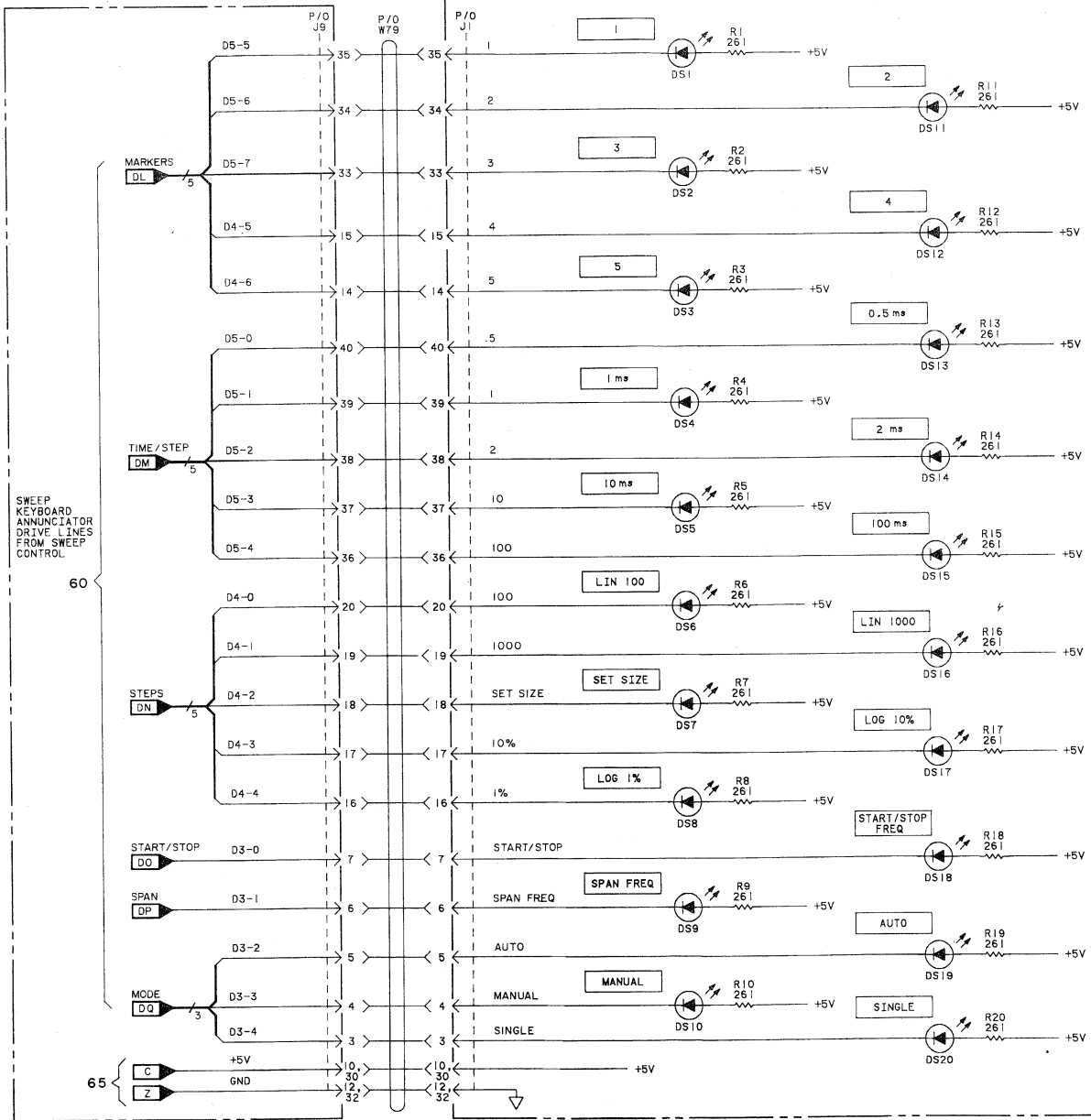


Figure 8-741. A1A3 Main Keyboard Component Locator

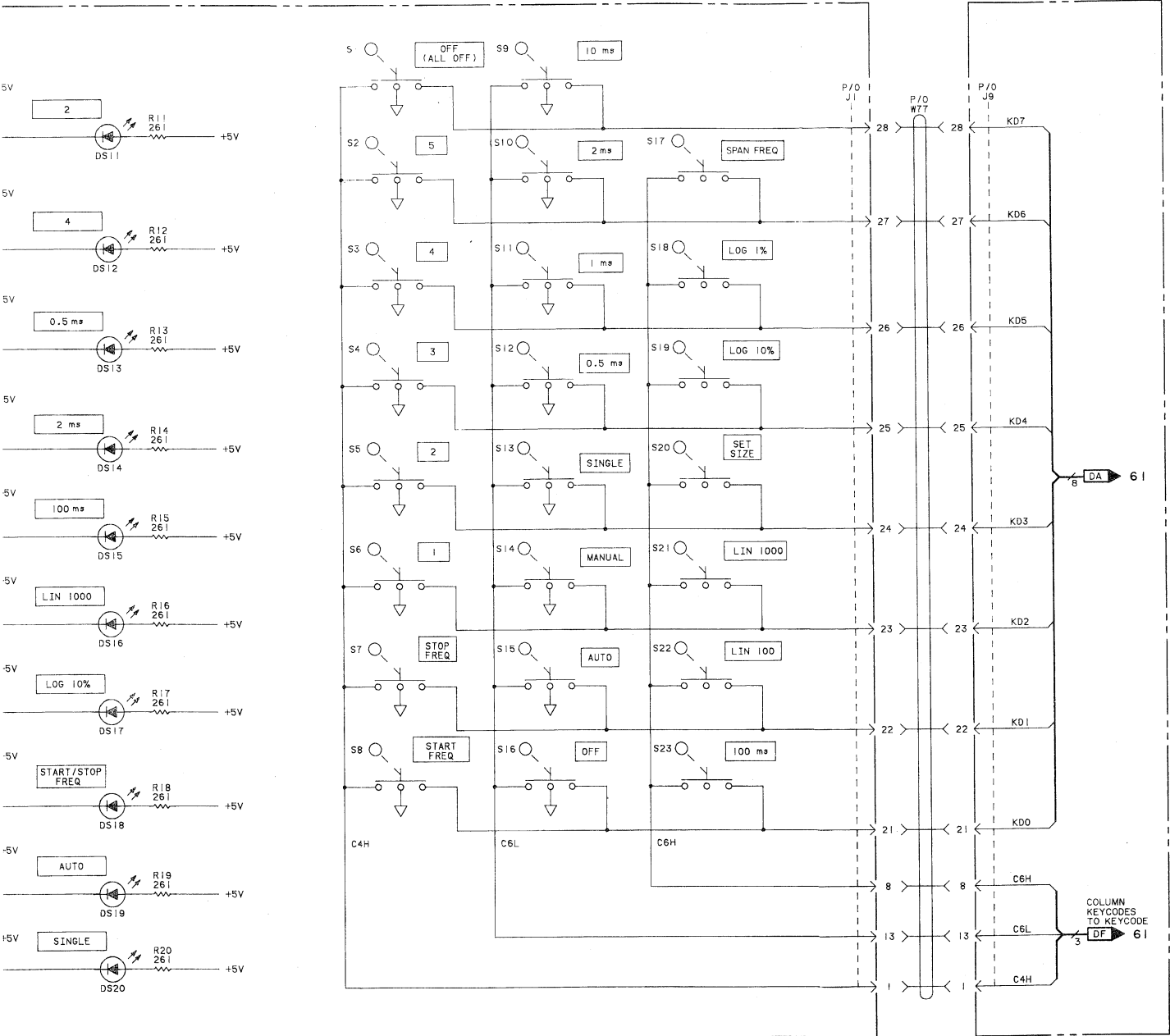
P/O A2A11 DCU
MOTHERBOARD
(08663-60340)

A1A2 SWEEP KEYBOARD (08663-60168)



A1A2 60
1/2

P/O A2A10



1. REFER TO TABLE 8-102 FOR SCHEMATIC DIAGRAM NOTES.
2. TROUBLESHOOTING VALUES ARE TYPICAL. THEY ARE ACTUAL MEASURED VALUES. YOUR MEASUREMENTS MIGHT BE SLIGHTLY DIFFERENT THAN WHAT IS SHOWN.
3. BLUE KEY FUNCTIONS ARE INDICATED IN PARENTHESES.

REFERENCE DESIGNATIONS

NO PREFIX	A2A10
W77	J1
A1A2	
DS1-20	
J1	
R1-20	
S1-23	

A1A2 LEFT KEYBOARD KEY CODE CHART

	KEY	KEY CODE DISPLAY		
		421	8421	HEX
SWEEP	START FREQ	100	1000	48
	STOP FREQ	100	1001	49
	SPAN FREQ	110	1110	6E
STEPS	LIN 100	110	1001	69
	LIN 1000	110	1010	6A
	SET SIZE	110	1011	6B
	LOG 10%	110	1100	6C
	LOG 1%	110	1101	6D
TIME/STEP	0.5 ms	110	0100	64
	1ms	110	0101	65
	2ms	110	0110	66
	10ms	110	0111	67
MODE	100ms	110	1000	68
	OFF	110	0000	60
	AUTO	110	0001	61
	MANUAL	110	0010	62
	SINGLE	110	0011	63
MARKERS	1	100	1010	4A
	2	100	1011	4B
	3	100	1100	4C
	4	100	1101	4D
	5	100	1110	4E
	OFF (ALL OFF)	100	1111	4F

SERVICE SHEET
A1A2 60

Figure 8-745. A1A2 Sweep Keyboard Schematic

8-759/760

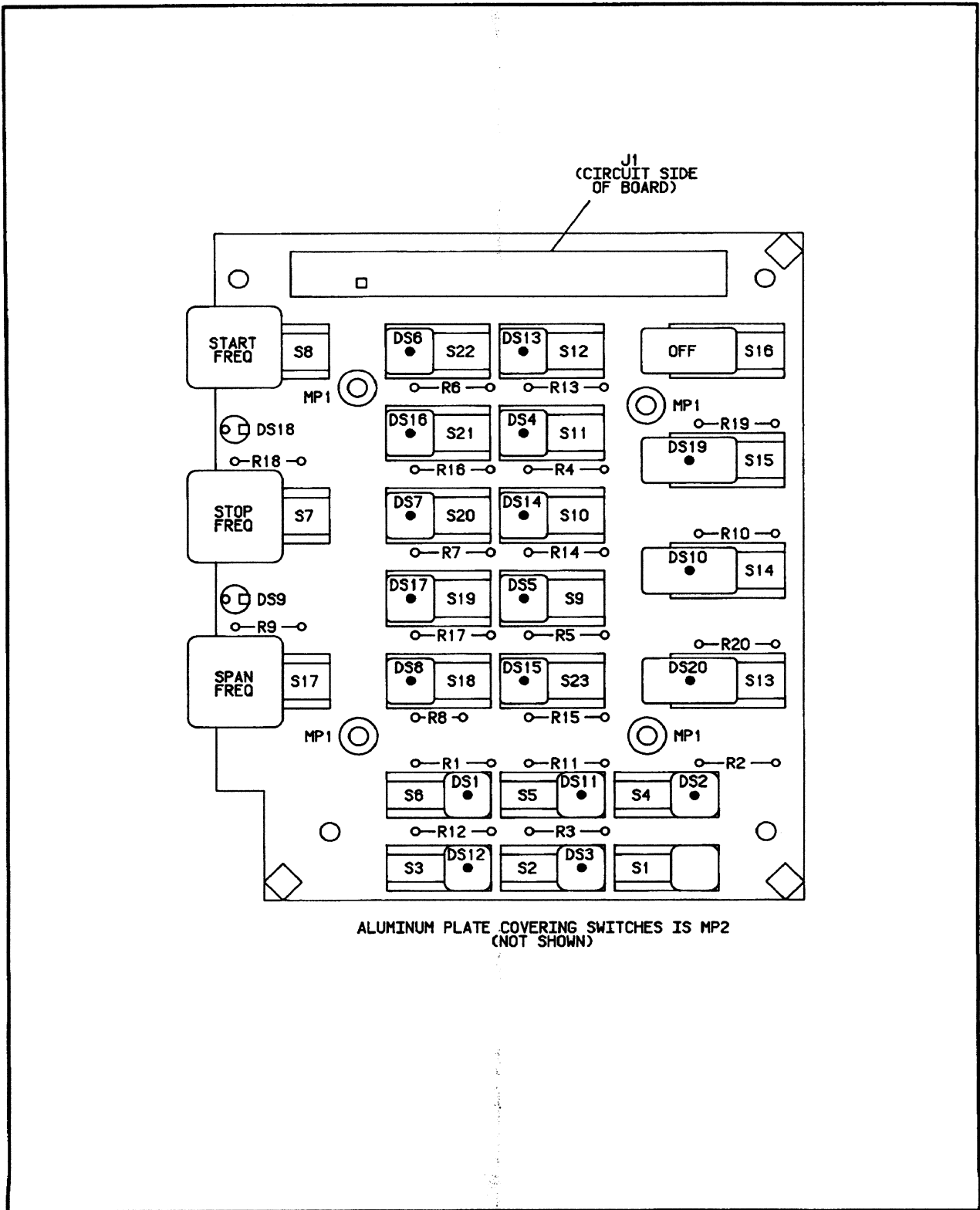
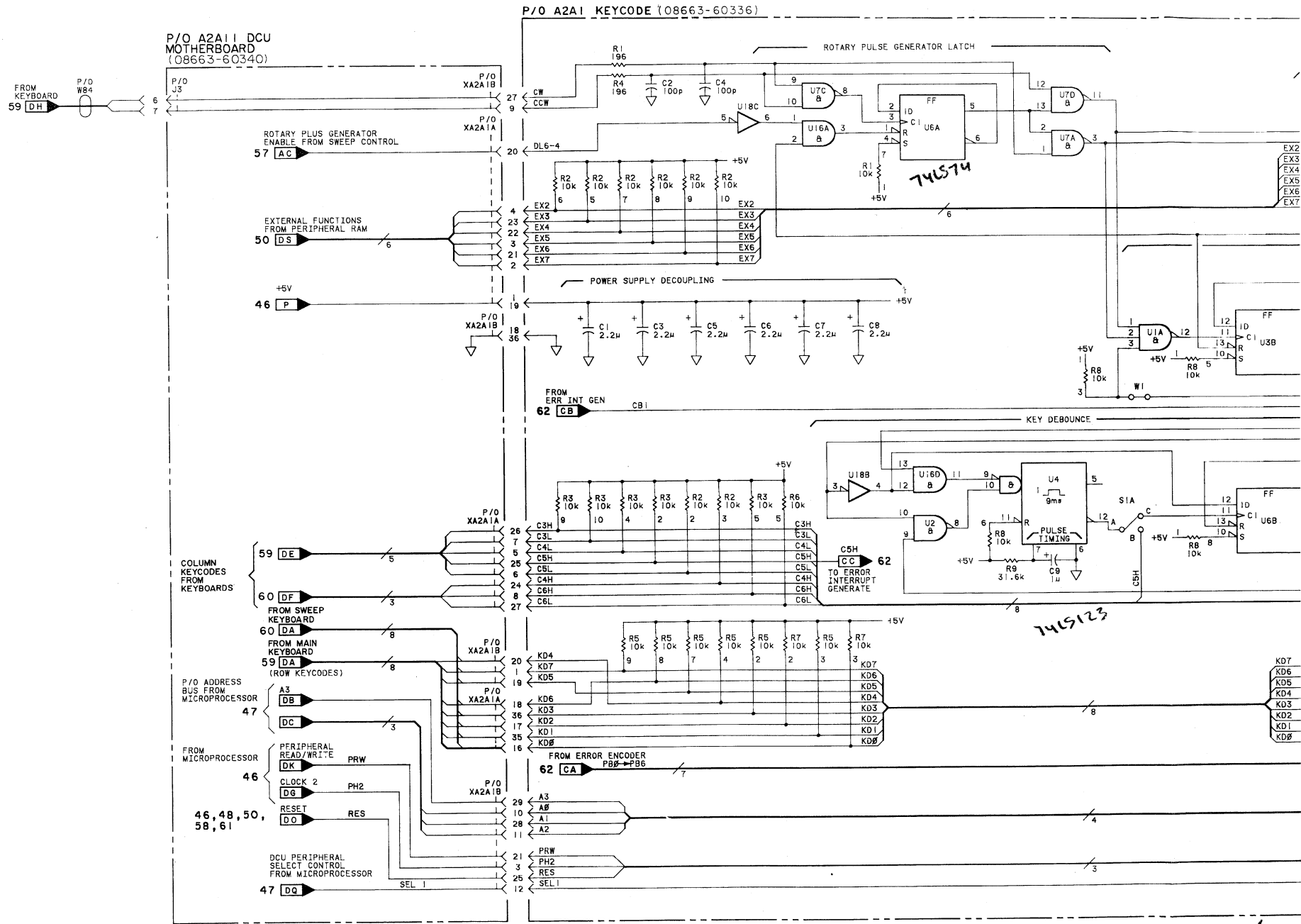
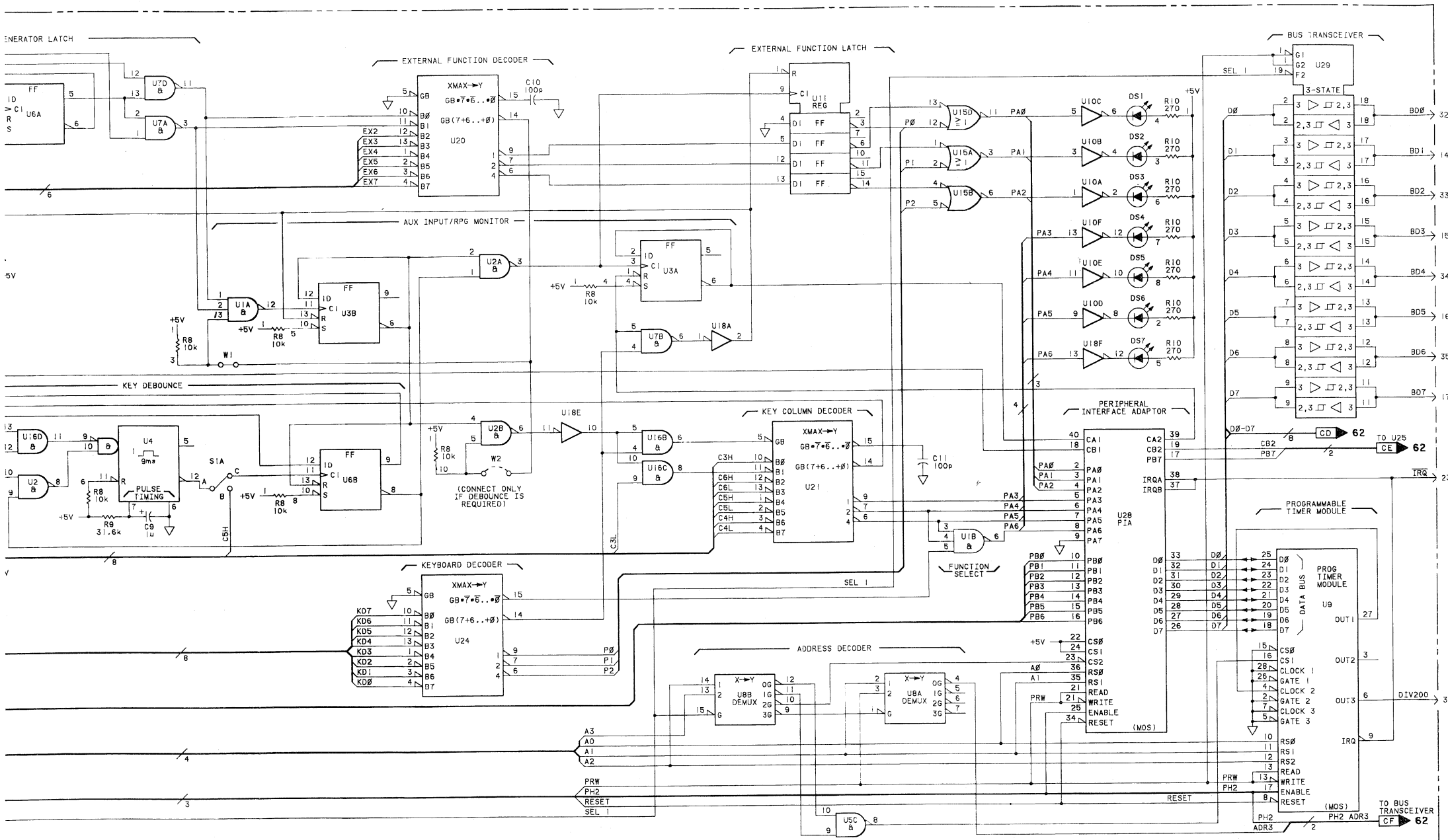


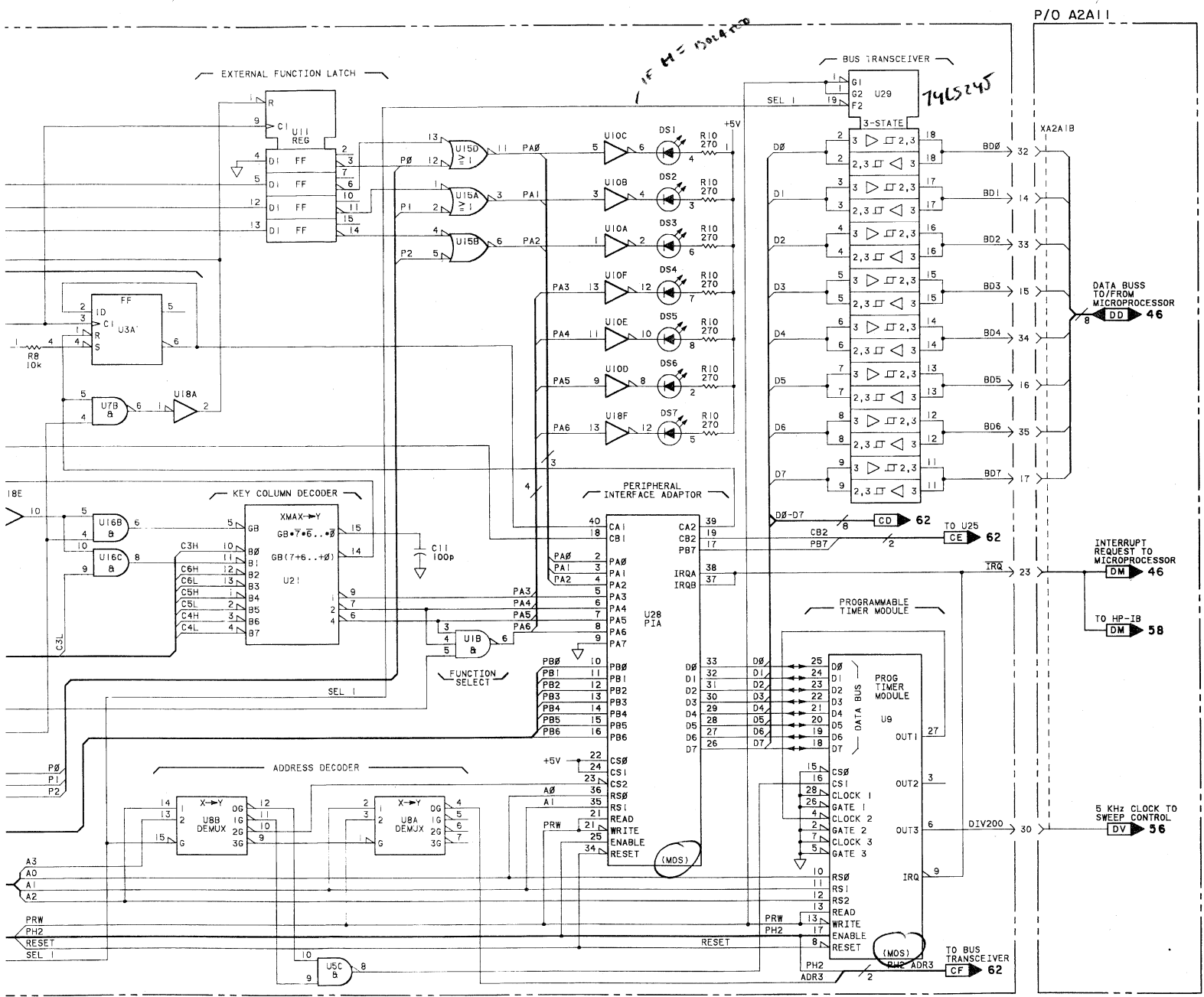
Figure 8-744. A1A2 Sweep Keyboard Component Locator



A2A1 61



A2A1 61
2/3



SERVICE SHEET 61
P/O A2A1

Figure 8-748. P/O A2A1 Keycode Assembly Schematic
8-763/764

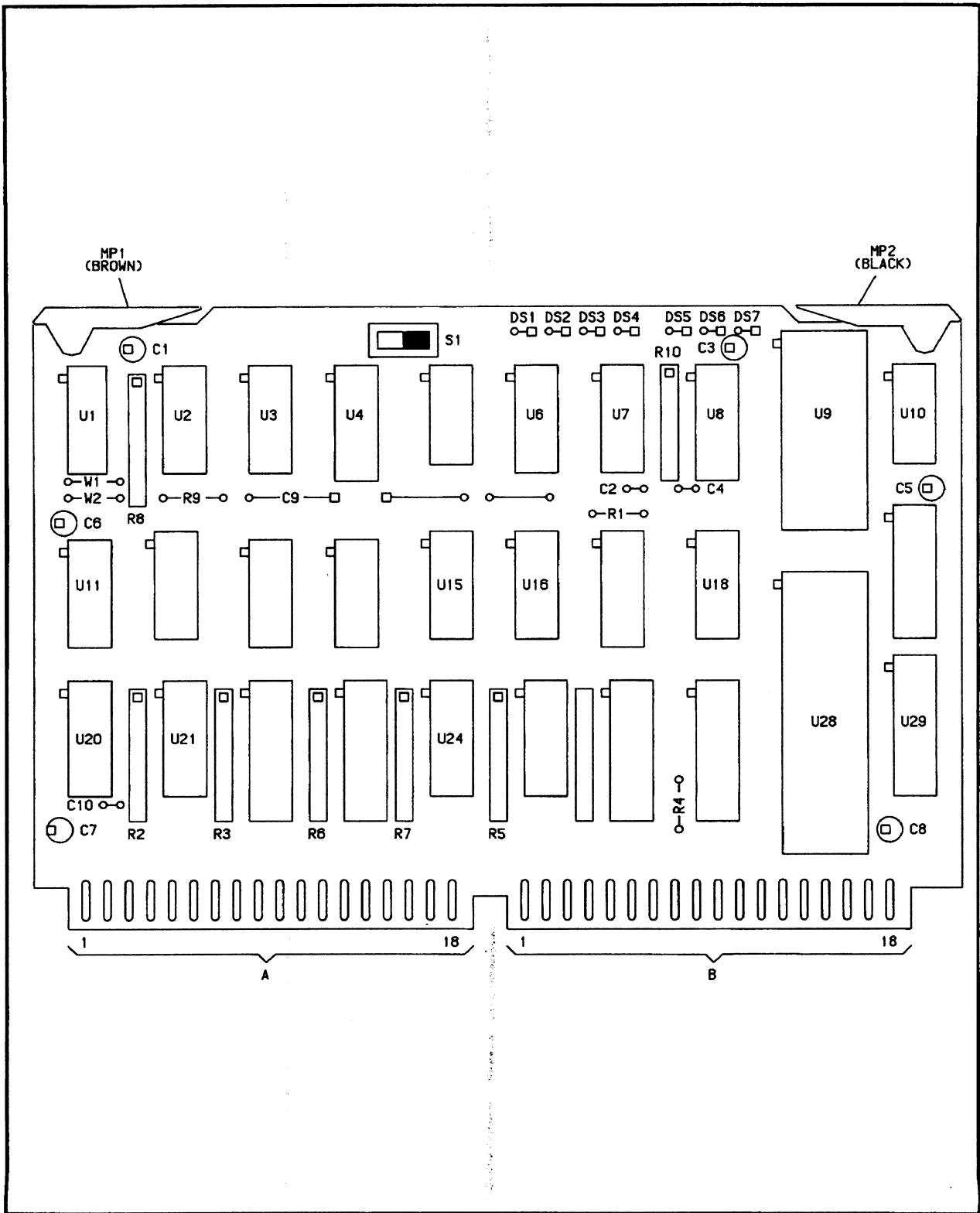
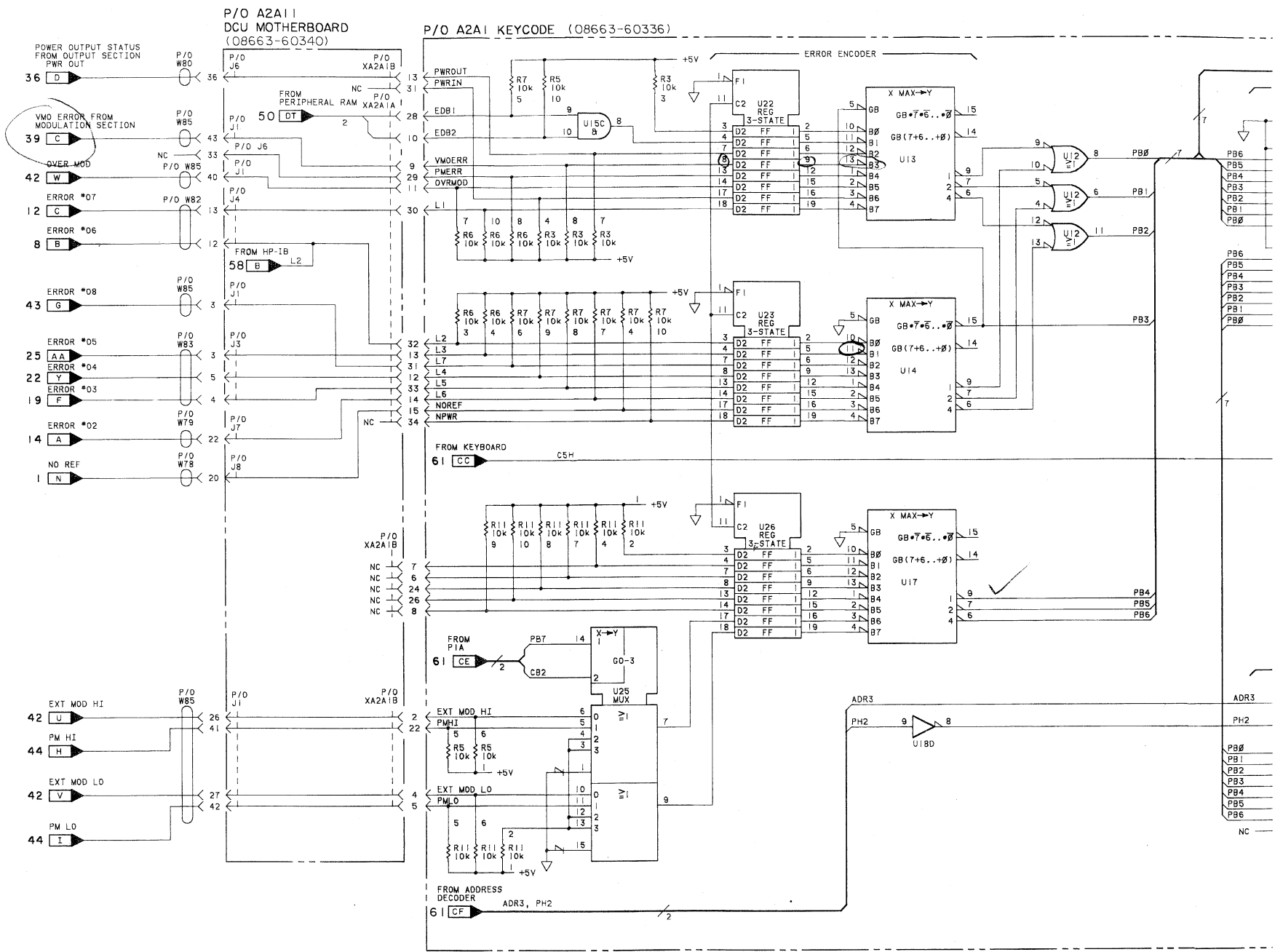
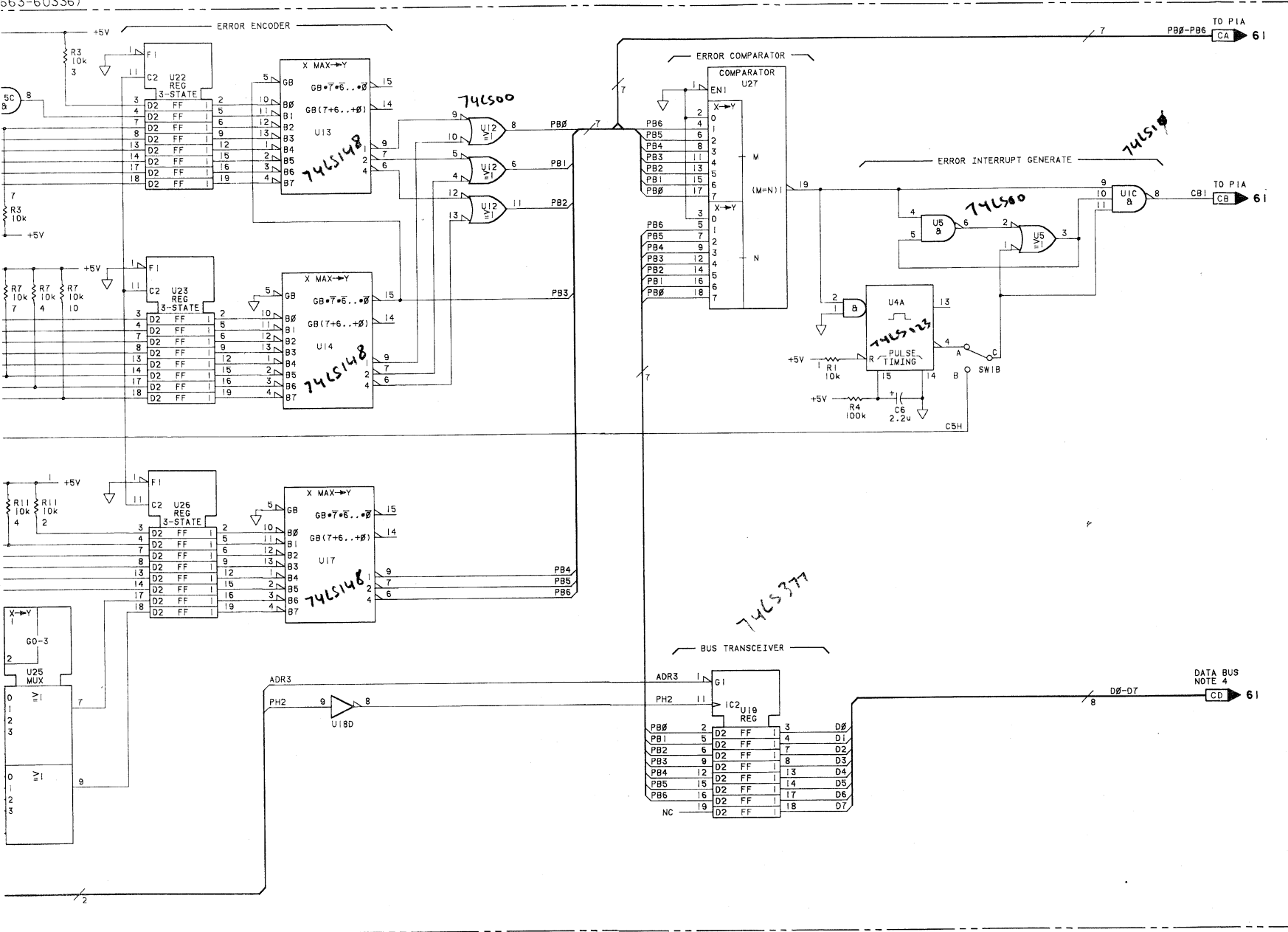


Figure 8-747. P/O A2A1 Keycode Assembly Component Locator



A2A1 62

1/2



SERVICE SHEET
P/O A2A1 62

Figure 8-751. P/O A2A1 Keycode Assembly Schematic
8-767/768

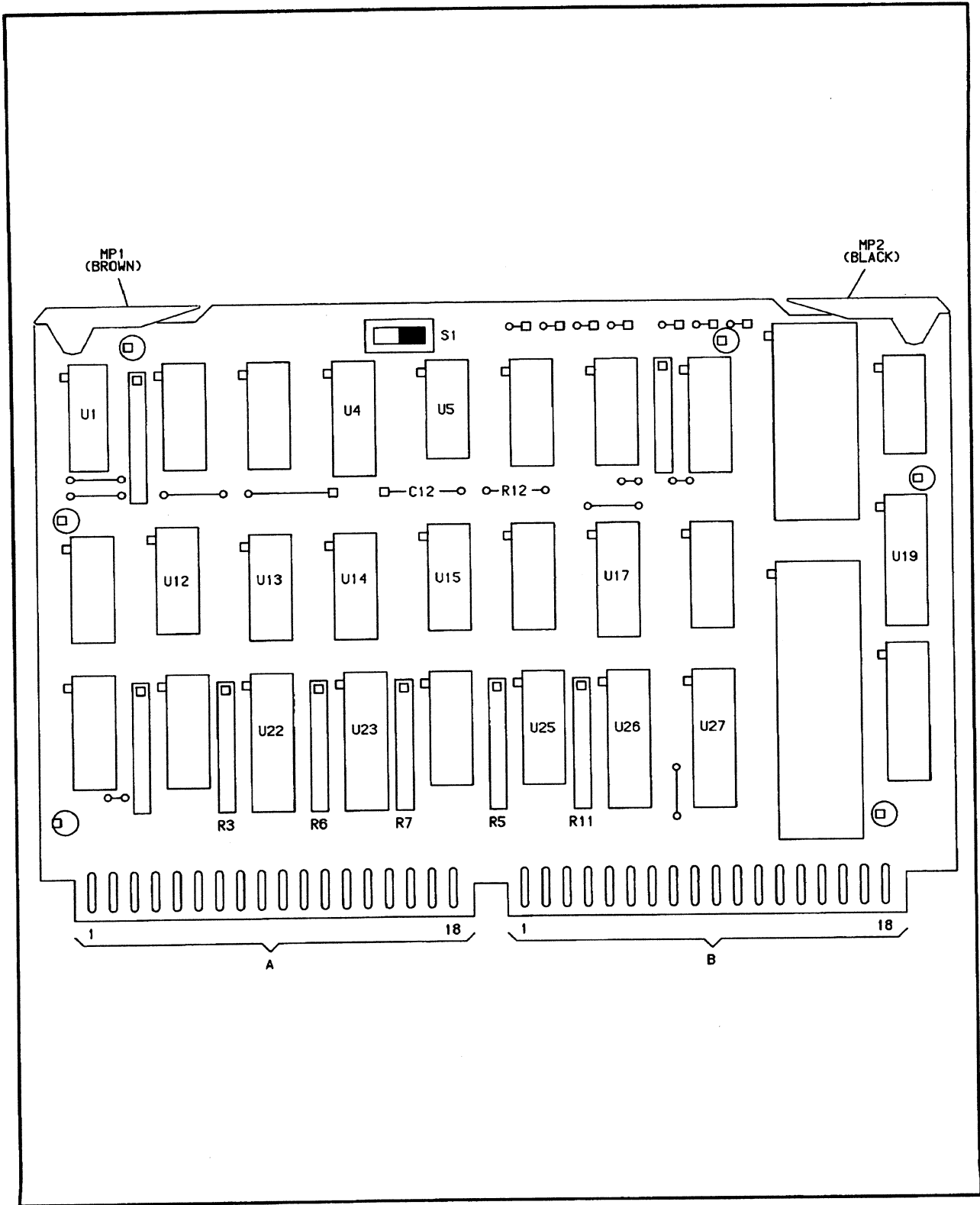
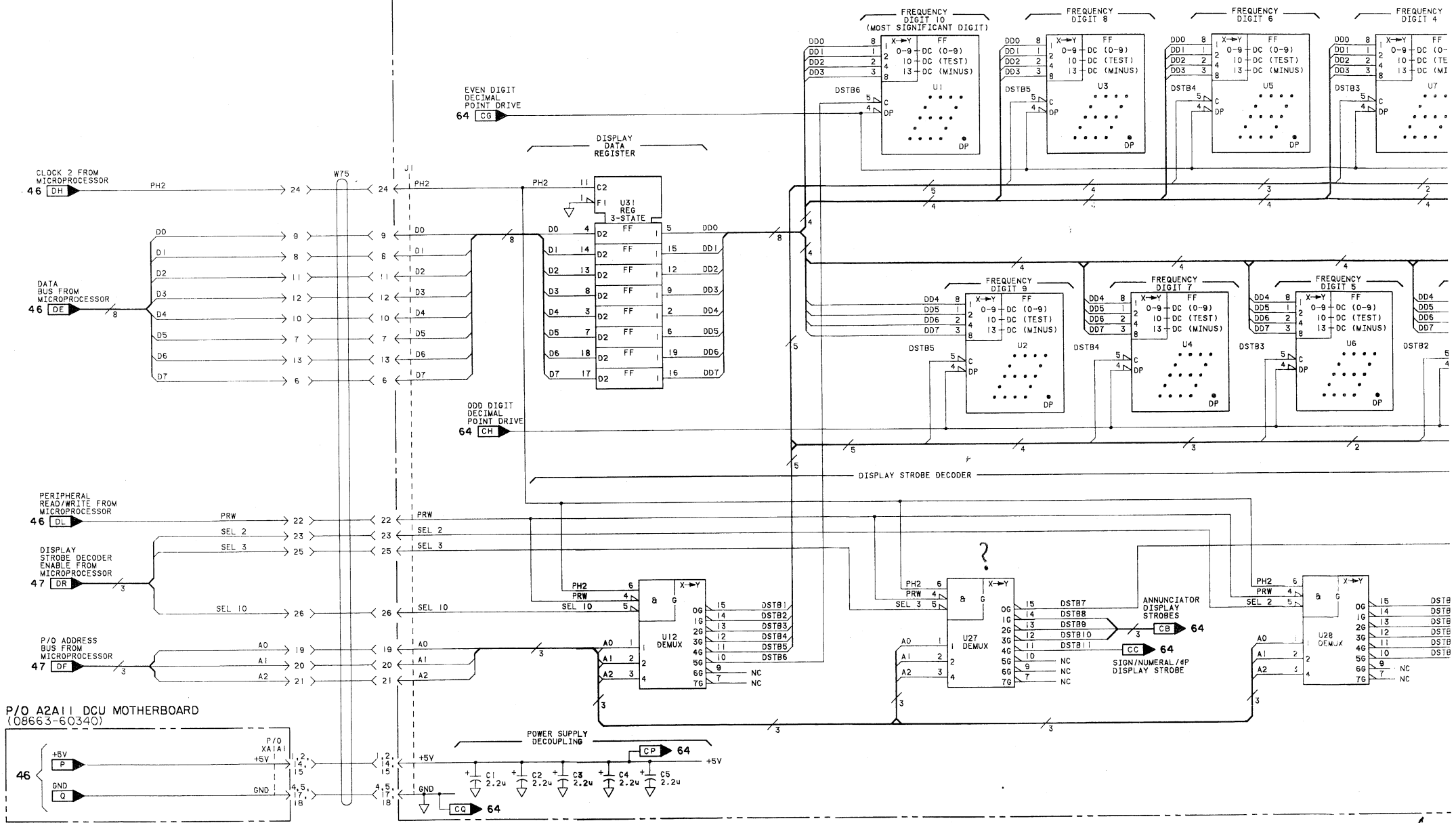
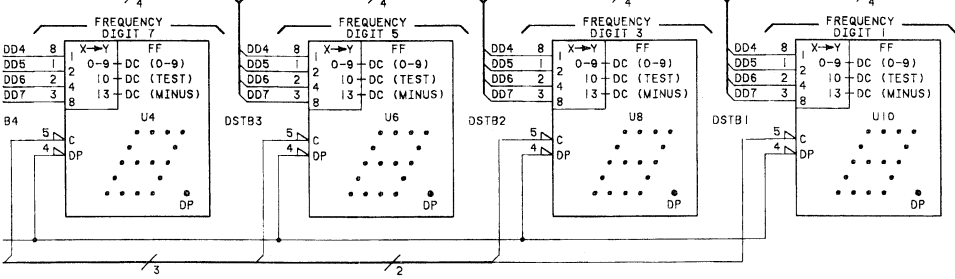
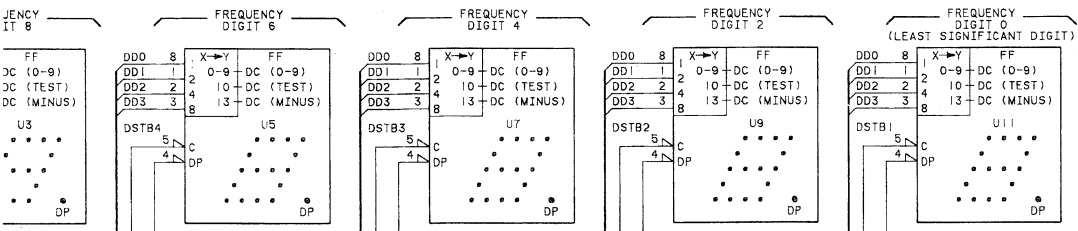


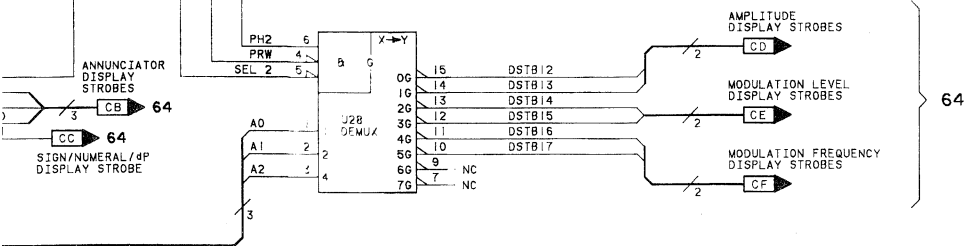
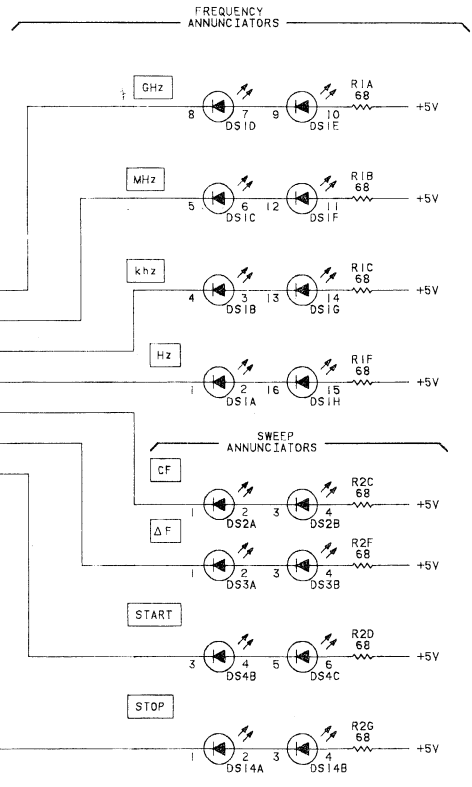
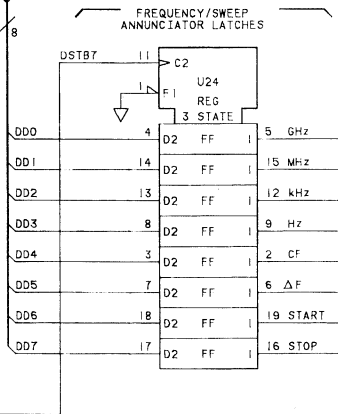
Figure 8-750. P/O A2A1 Keycode Assembly Component Locator

P/O A1A1 DISPLAY (08663-60338)



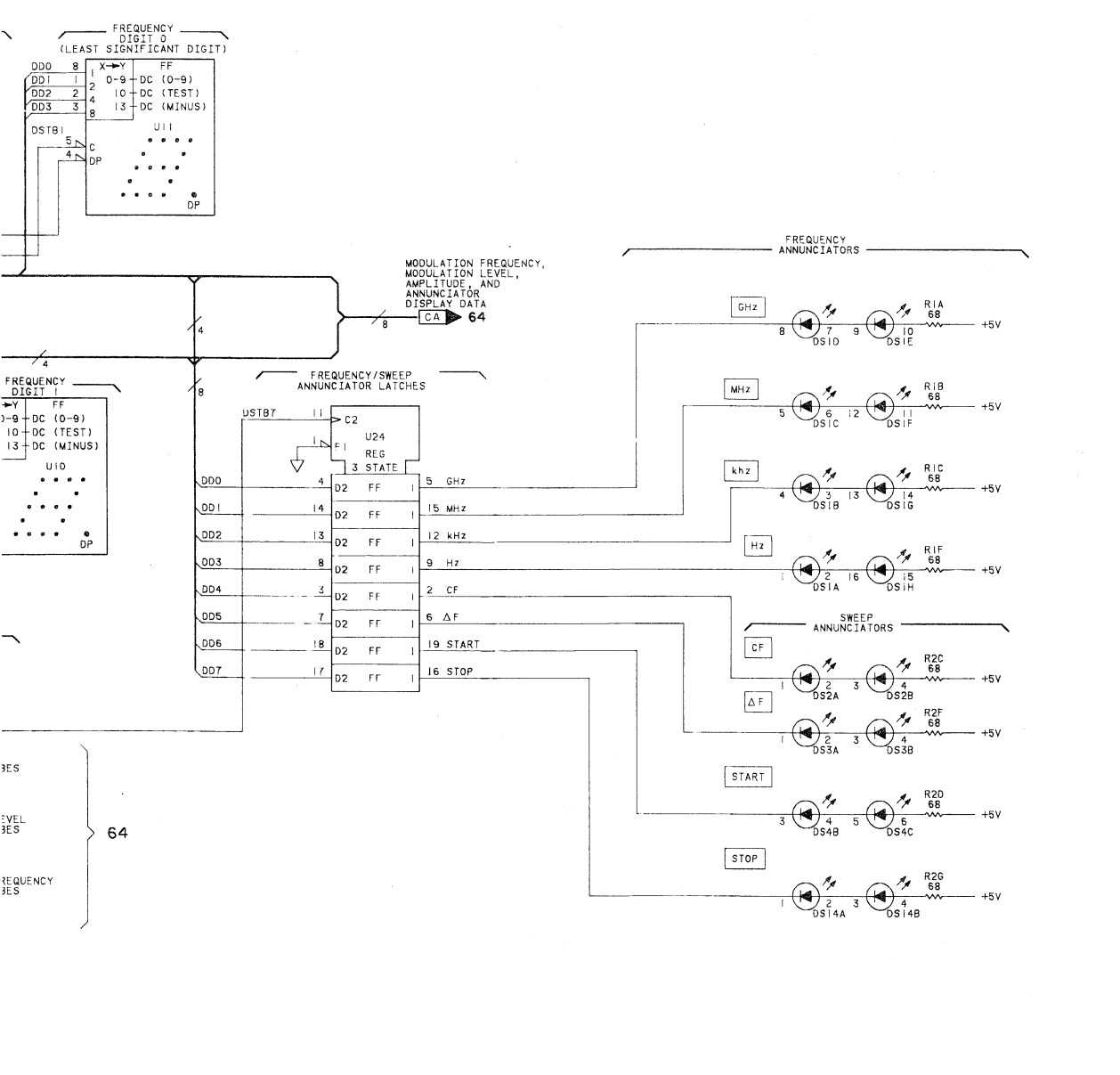


MODULATION FREQUENCY,
 MODULATION LEVEL,
 AMPLITUDE, AND
 ANNUNCIATOR
 DISPLAY DATA
 CA → 64



A1A1 TO 100
 A1A1 1 2 3 4 5 6 7 8

A1A1 63
 2/3



- NOTES
- SEE TABLE 8- FOR SCHEMATIC DIAGRAM NOTES.
 - TROUBLESHOOTING VALUES ARE TYPICAL. THEY ARE ACTUAL MEASURED VALUES. YOUR MEASUREMENTS MAY BE SLIGHTLY DIFFERENT THAN WHAT IS SHOWN.

REFERENCE DESIGNATIONS

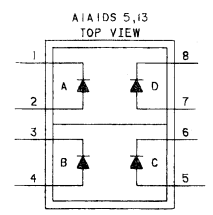
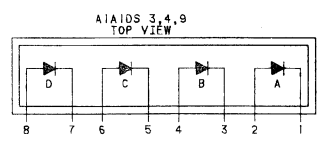
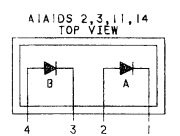
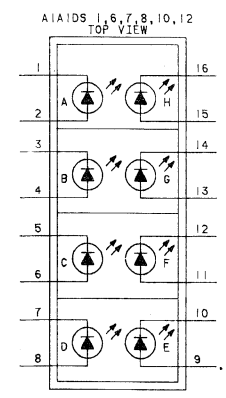
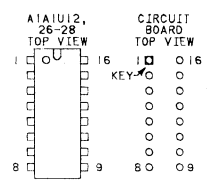
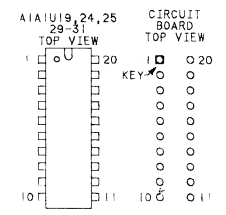
NO PREFIX	A1A1
W75	
A1A1	J6
C1-5	
DS1-14	
J1	
R1-11	
U1-31	

INTEGRATED CIRCUIT VOLTAGE AND GROUND CONNECTIONS

REFERENCE DESIGNATIONS	PIN NUMBERS
U1-11, 13-18, 21-23	+5V - 7 - 6
U2, 26-28	+5V - 16 - 8
U19, 24, 25, 29-31	+5V - 10 - 20
U20	+5V - 7 - 14

INTEGRATED CIRCUIT PART NUMBERS

REFERENCE DESIGNATIONS	PART NUMBERS
U1-11, 13-18, 21-23	1990-0330
U2, 26-28	1820-1216
U19, 24, 25, 29, 30	1820-1997
U20	1980-0399
U31	1820-2102



SERVICE SHEET
P/O A1A1 63

Figure 8-754. P/O A1A1 Display Assembly Schematic

3/3

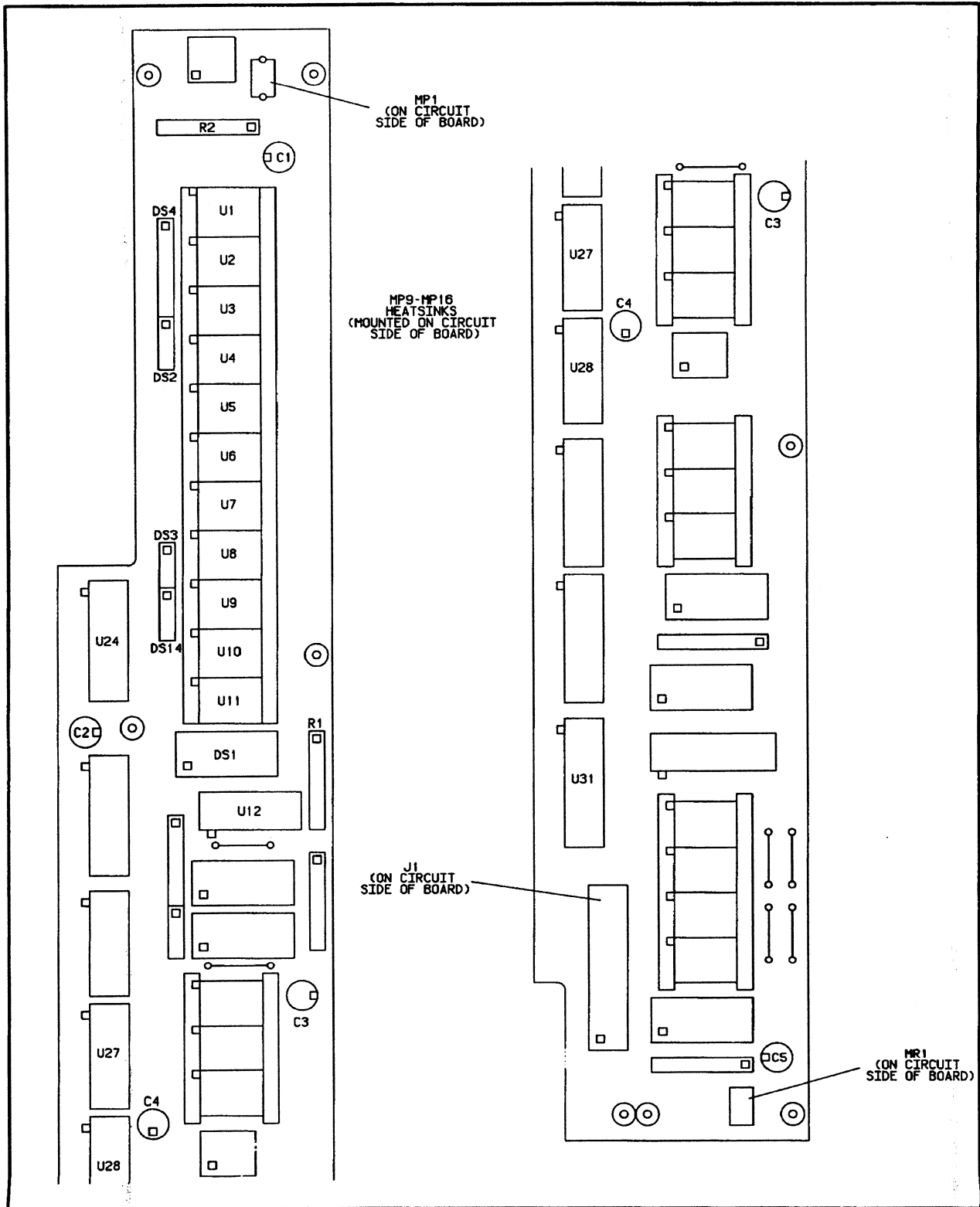
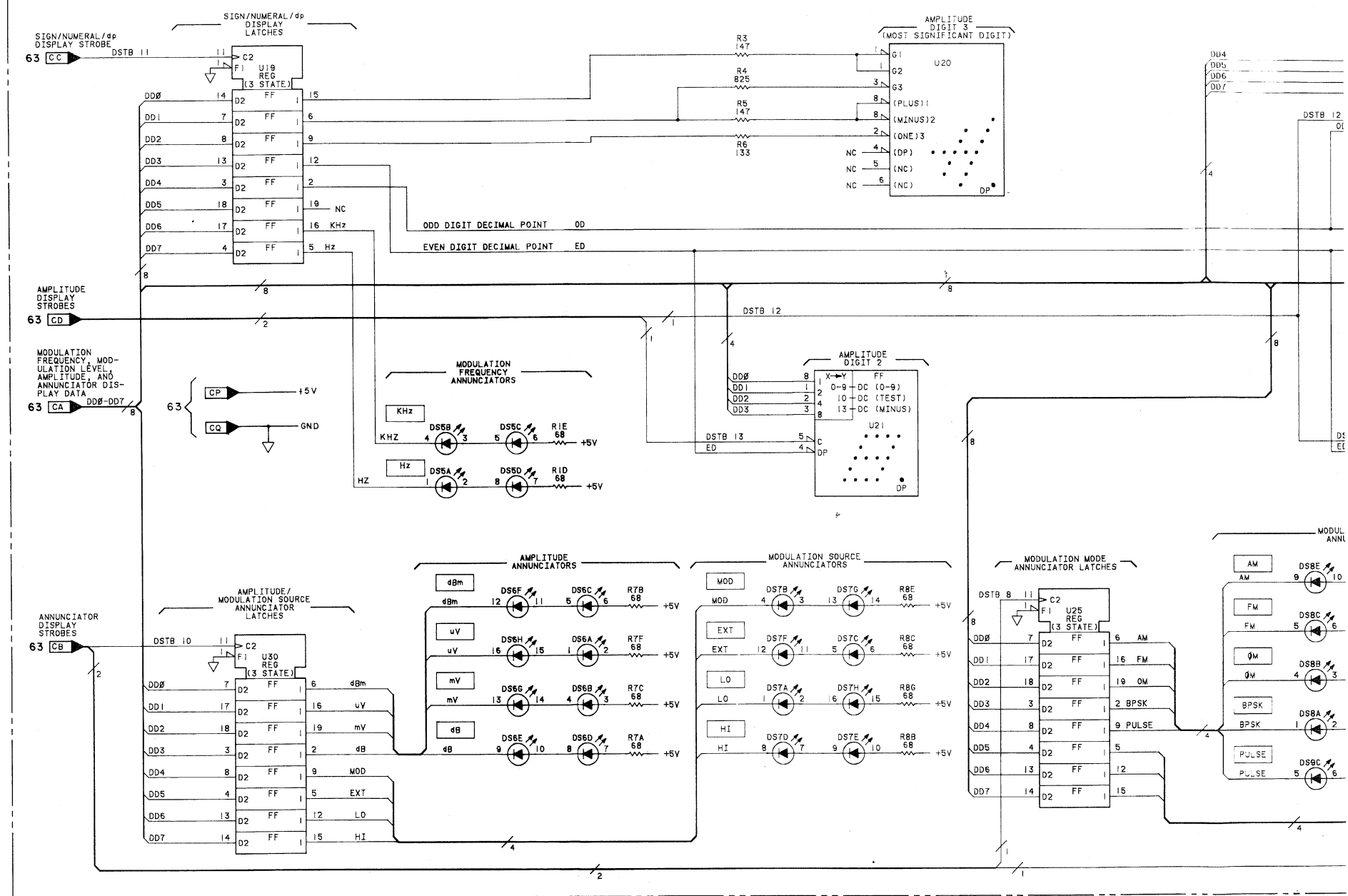
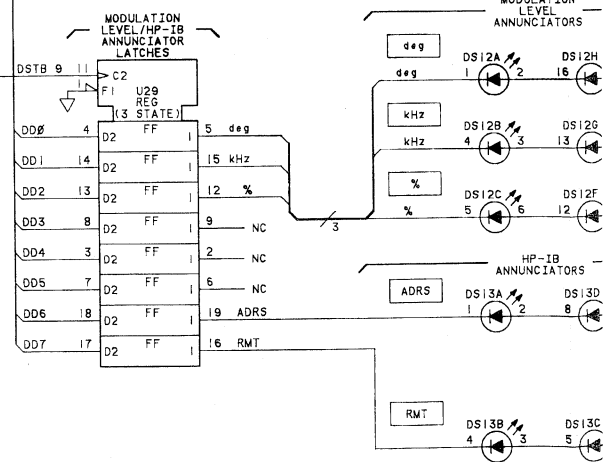
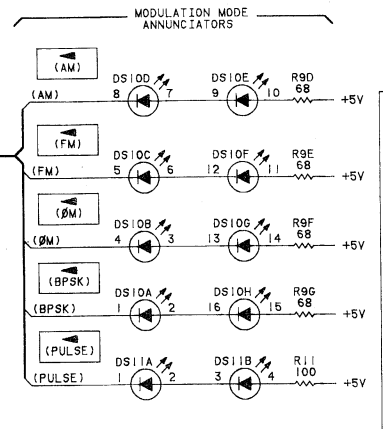
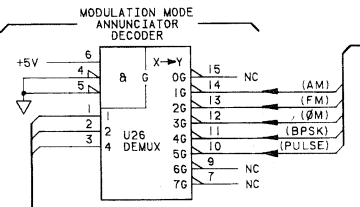
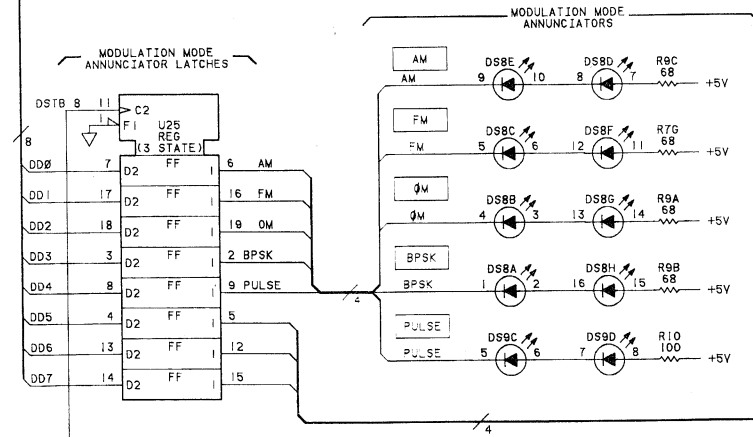
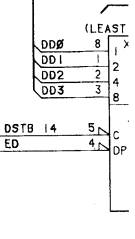
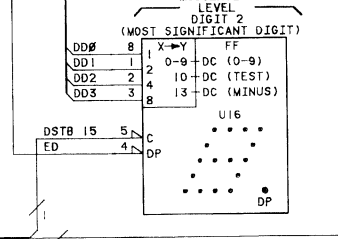
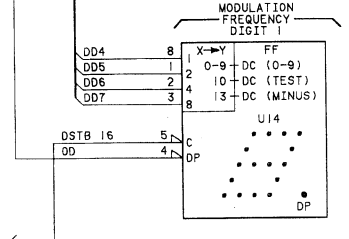
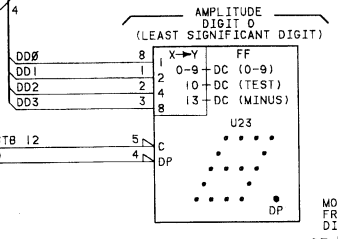
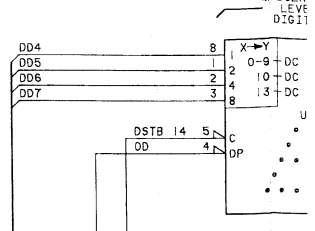
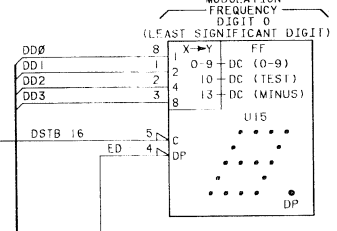
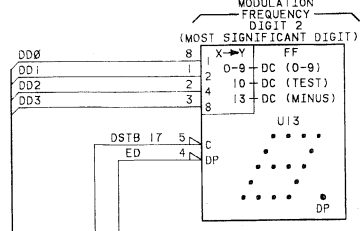
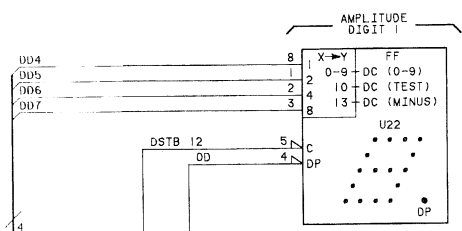
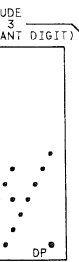


Figure 8-753. P/O A1A1 Display Assembly Component Locator

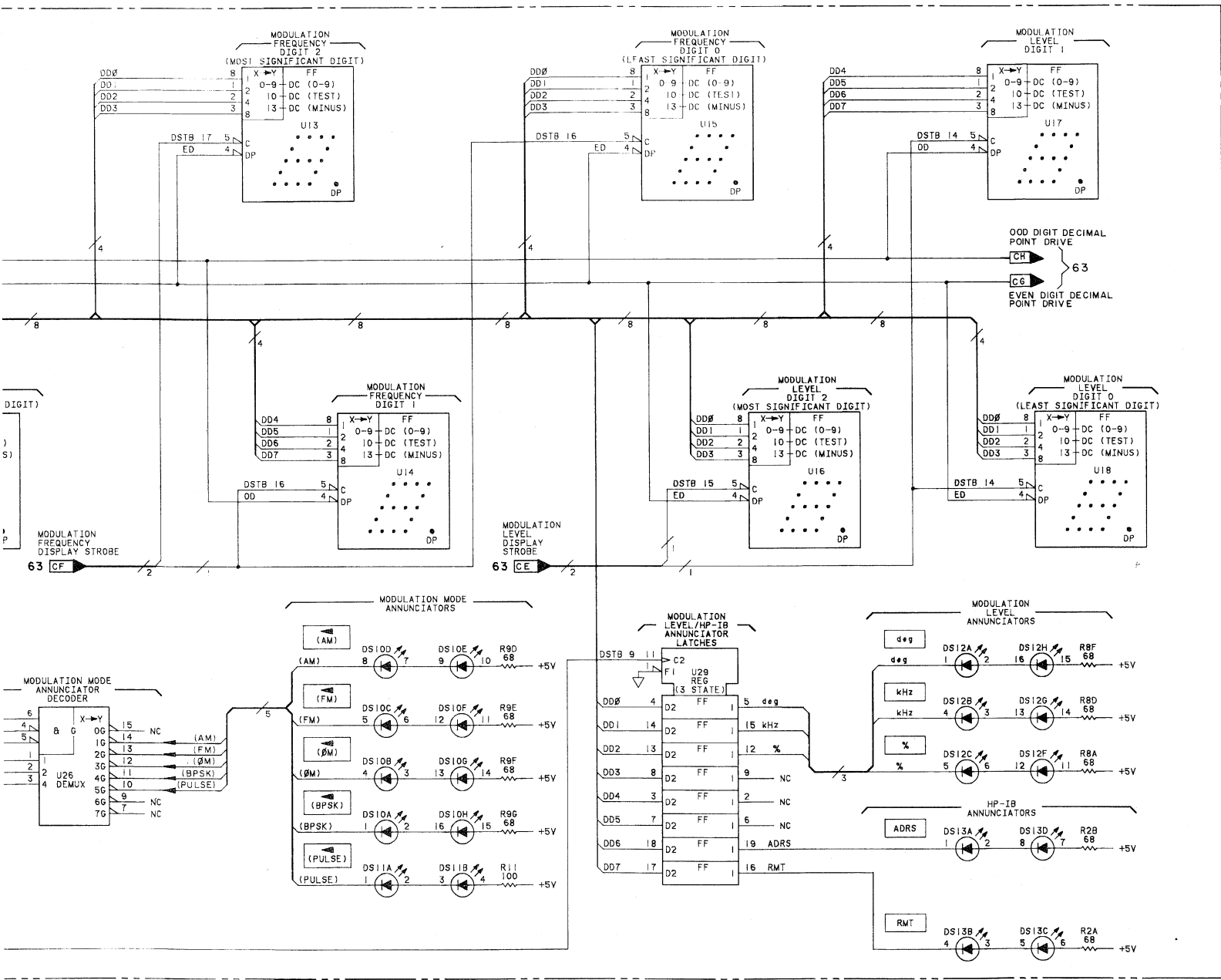
P/O AIAI DISPLAY (08663-60338)



AIAI 64
1/3



AIAI 64
2/3



SERVICE SHEET
P/O A1A1 64

Figure 8-757. P/O A1A1 Display Assembly Schematic

8-775/776

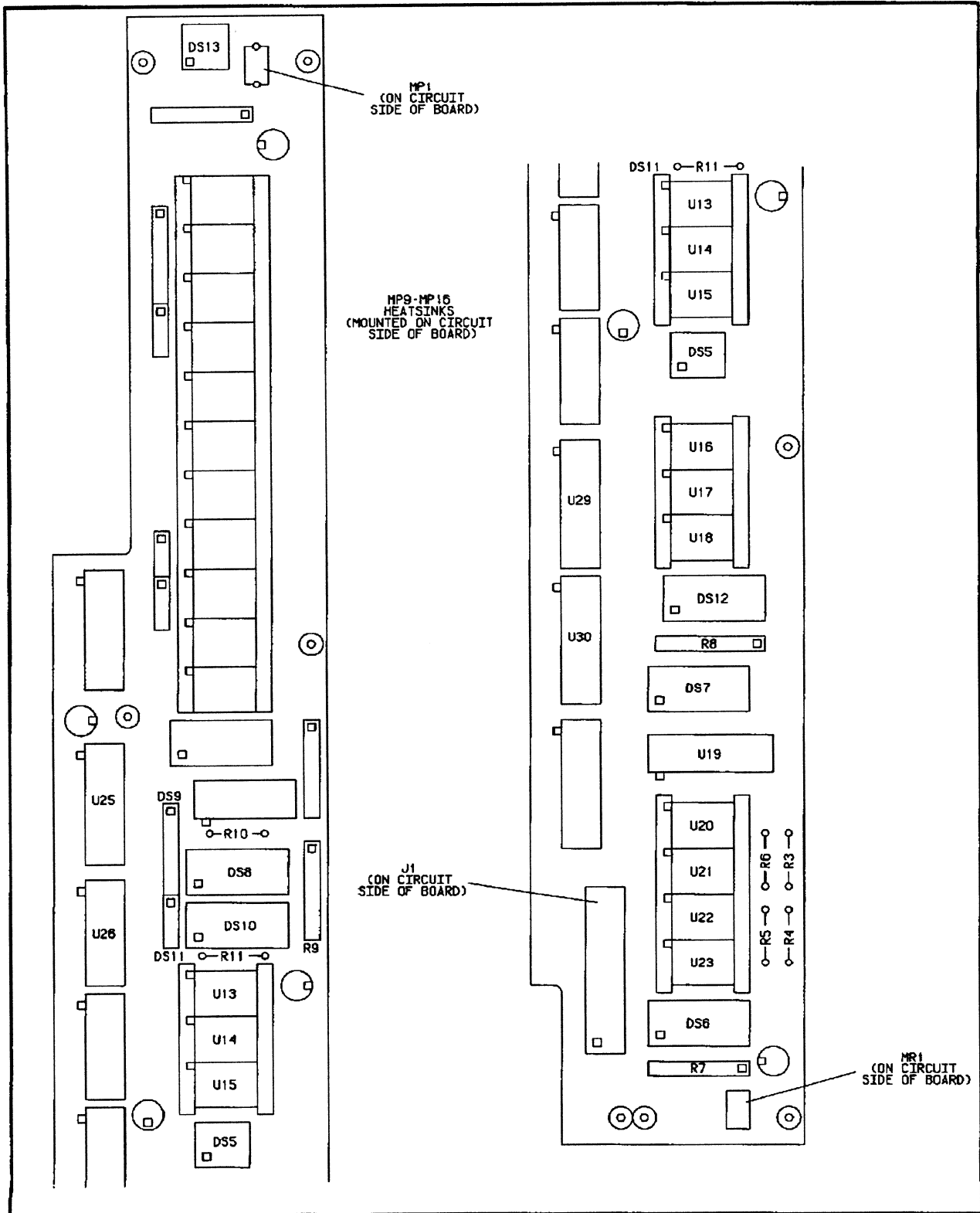


Figure 8-756. P/O A1A1 Display Assembly Component Locator

4100N Series

Tubeaxial

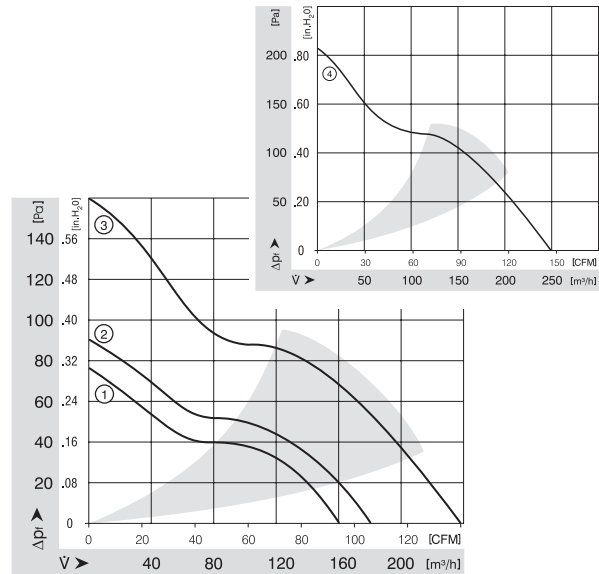
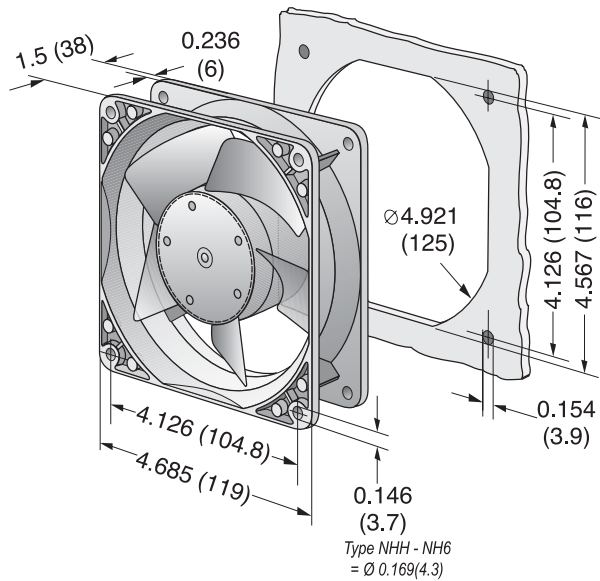
119x119x38mm



- DC fans with electronically commutated external rotor motor. Fully integrated commutation electronics.
- With electronic protection against reverse polarity, blocking and overloading by PTC resistor; partially impedance protected.
- Air intake over struts. Rotational direction CW looking at rotor.
- Metal fan housing. Impeller of fiberglass reinforced plastic PA. Housing with ground lug for screw M4 for M4 x 8 screws.
- Electrical connection via 2 flat pins 2.8 x 0.5 mm.
- UL, CSA, VDE approvals on some models, please contact application engineering.

Part Number	Curve	CFM @ 0	VDC	Volt. Range	Power (W)	dBA	Max Amb. Temp C	Bearing Type	Features	Wgt. (lbs)
4182NGX	1	94.2	12	7 to 15	3.5	44	75	Sintec	Terminals	0.86
4182NX	2	105.9	12	7 to 15	4.5	49	75	Ball	Terminals	0.86
4182NXH	3	139.5	12	7 to 14	11	57	55	Ball	Terminals	0.86
4184NGX	1	94.2	24	12 to 30	3.5	44	75	Sintec	Terminals	0.86
4184NX	2	105.9	24	12 to 29	4.5	49	75	Ball	Terminals	0.86
4184NXH	3	139.5	24	12 to 25	11	57	55	Ball	Terminals	0.86
4184NXHH	4	147.1	24	12 to 25	12.2	60	55	Ball	Terminals	0.86
4188NXM	1	94.2	48	36 to 56	3.5	44	75	Ball	Terminals	0.86

continued next page...



- New Types -



4100N Series cont. Tubeaxial

119x119x38mm High Performance

- DC fans with electronically commutated external rotor motor. Fully integrated commutation electronics.
- With electronic protection against reverse polarity, blocking and overloading by PTC resistor; partially impedance protected.
- Air intake over struts. Rotational direction CW looking at rotor.
- Metal fan housing. Impeller of fiberglass reinforced plastic PA. Housing with ground lug for screw M4 for M4 x 8 screws.
- Electrical connection via 2 flat pins 2.8 x 0.5 mm.
- UL, CSA, VDE approvals on some models, please contact application engineering.

Part Number	Curve	CFM @ 0	VDC	Volt. Range	Power (W)	dBA	Max Amb. Temp C	Bearing Type	Features	Wgt. (lbs)
4112NHH	5	152.9	12	9 to 15	15.5	60	65	Ball	Leads	0.86
4112NH3	6	182.4	12	9 to 15	19.5	65	65	Ball	Leads	0.86
4112NH4	7	208.9	12	9 to 14	32.0	67	65	Ball	Leads	0.86
4114NHH	5	152.9	24	16 to 30	15.5	60	65	Ball	Leads	0.86
4114NH3	6	182.4	24	16 to 30	19.5	65	65	Ball	Leads	0.86
4114NH4	7	208.9	24	16 to 30	30.0	67	65	Ball	Leads	0.86
4114NH5	8	229.5	24	16 to 30	45.0	70	65	Ball	Leads	0.86
4114NH6	9	259.0	24	16 to 30	60.0	73	65	Ball	Leads	0.86
4118NHH	5	152.9	48	36 to 60	15.5	60	65	Ball	Leads	0.86
4118NH3	6	182.4	48	36 to 60	19.5	65	65	Ball	Leads	0.86
4118NH4	7	208.9	48	36 to 60	28.0	67	65	Ball	Leads	0.86
4118NH5	8	229.5	48	36 to 60	42.0	70	65	Ball	Leads	0.86
4118NH6	9	259.0	48	36 to 60	55.0	73	65	Ball	Leads	0.86

