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TS-990S

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Safety Check after Repairs

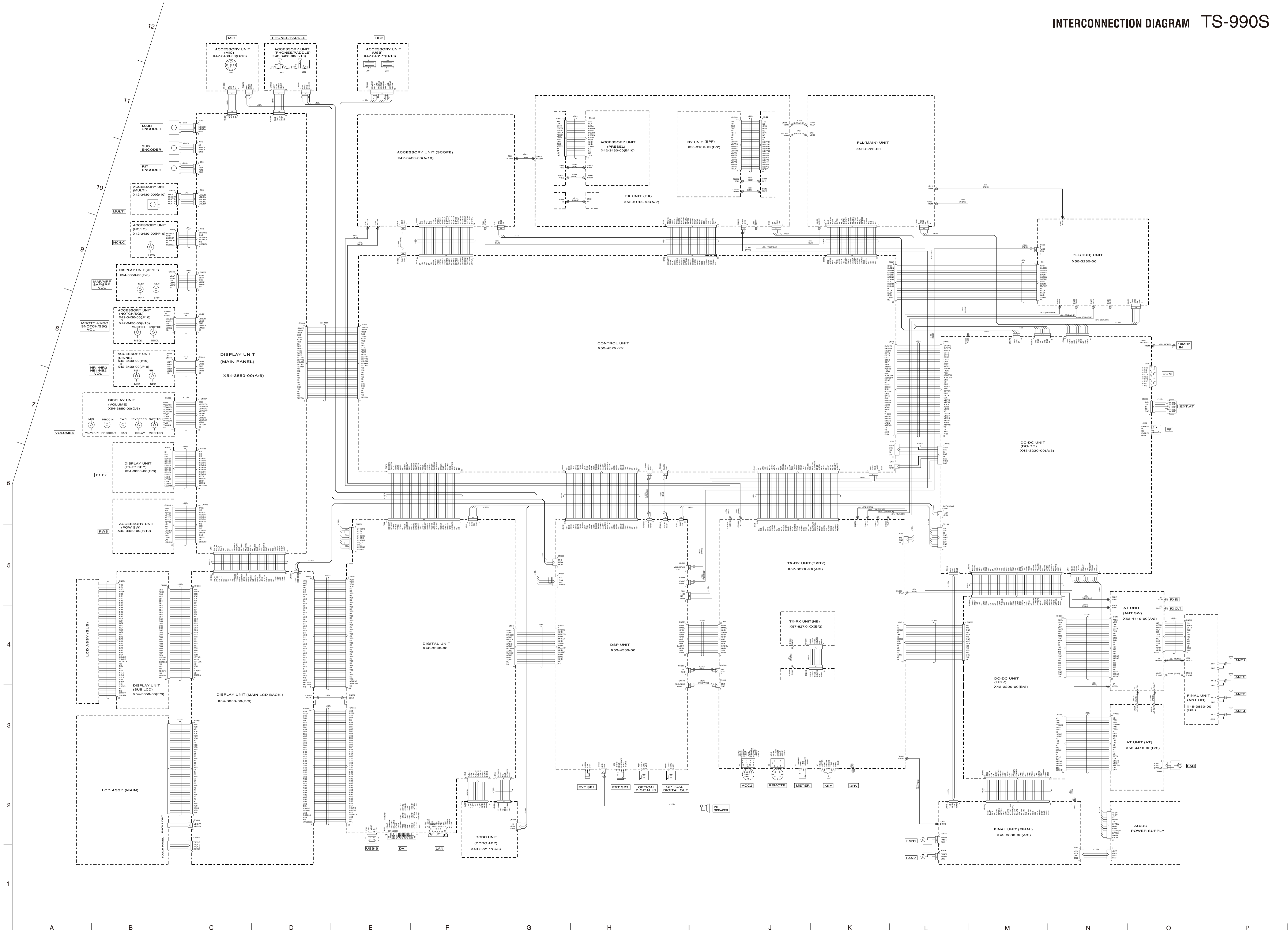
Perform the insulation resistance test for the security of the product, after repairs.

■ Point to be checked

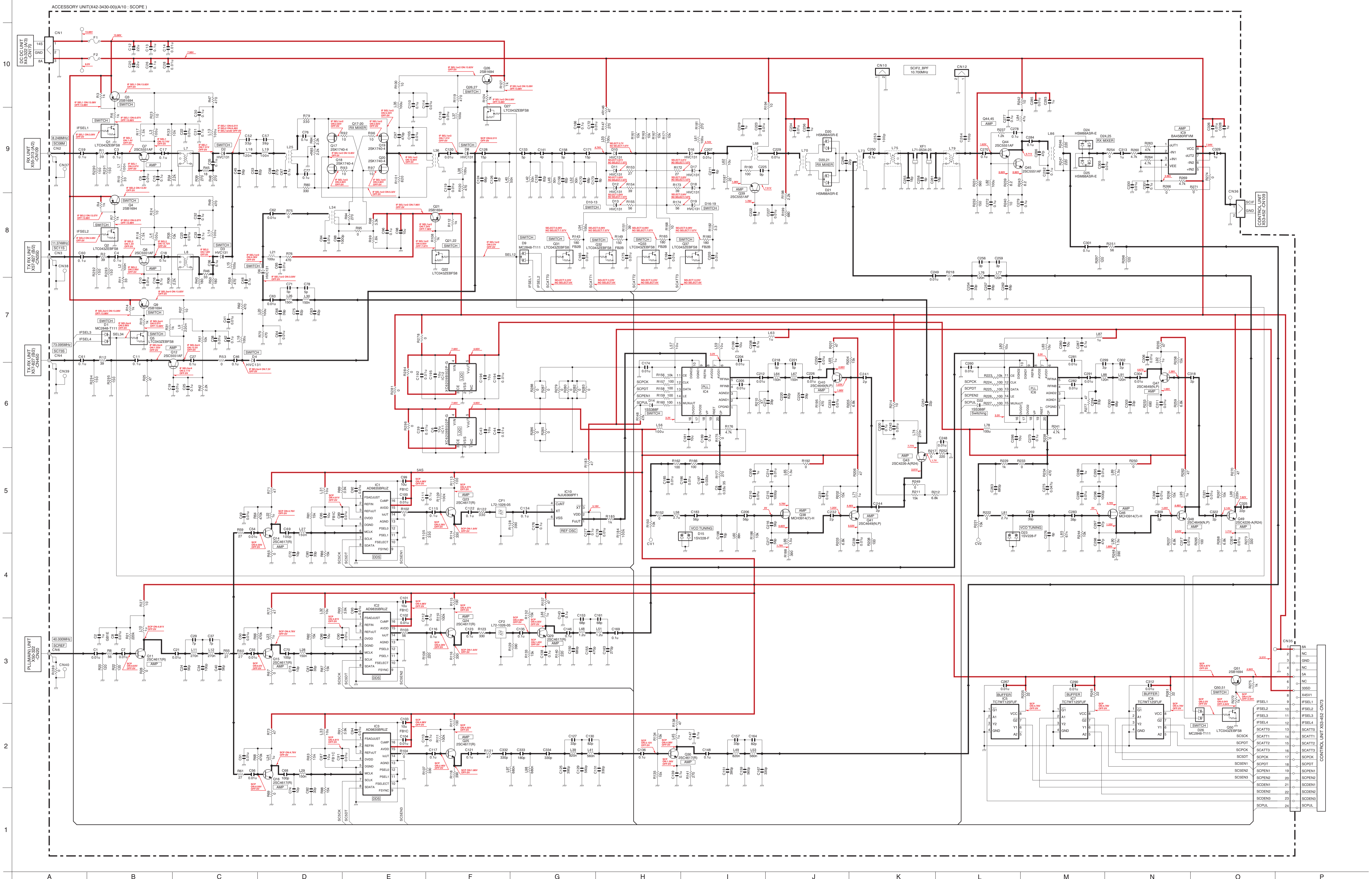
Check that the power supply plug does not have poor contacts and that there is no garbage or conductive materials stuck between the terminals. If the power supply cord is damaged, do not repair it using tape; replace it with the specified part.

■ Safety study

After repairs have been completed, remove the power supply cord from the outlet, the antenna, the outside connection cable, etc., and insert the power switch. Using a 500V DC insulation resistance meter, check the insulation between each terminal of the attachment plug and the antenna terminal and other outside metal parts, and ensure that the insulation resistance levels are more than $4M\Omega$. When the insulation resistance level is lower than this value, check repair of the transceiver is required.

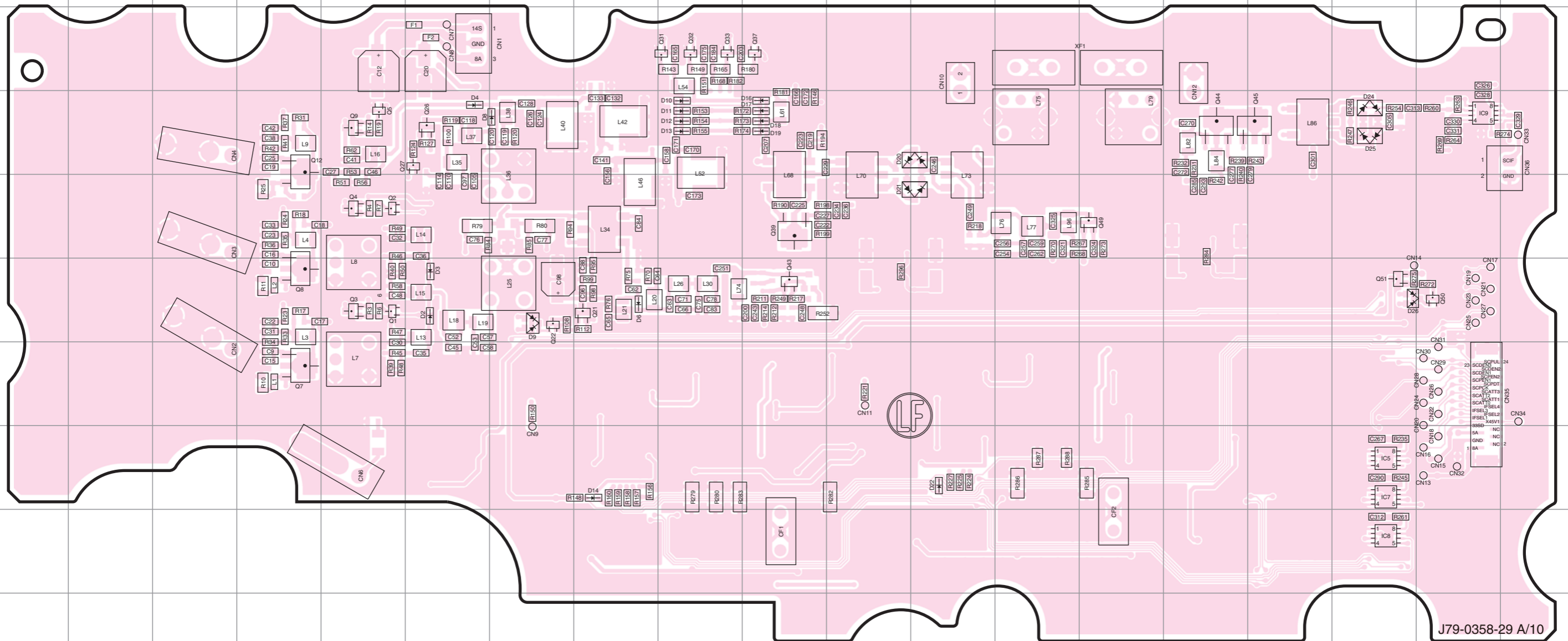


12 TS-990S SCHEMATIC DIAGRAM



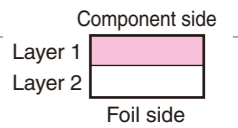
PC BOARD TS-990S

ACCESSORY UNIT (X42-3430-00) (A/10:SCOPE)
Component side view (J79-0358-29)



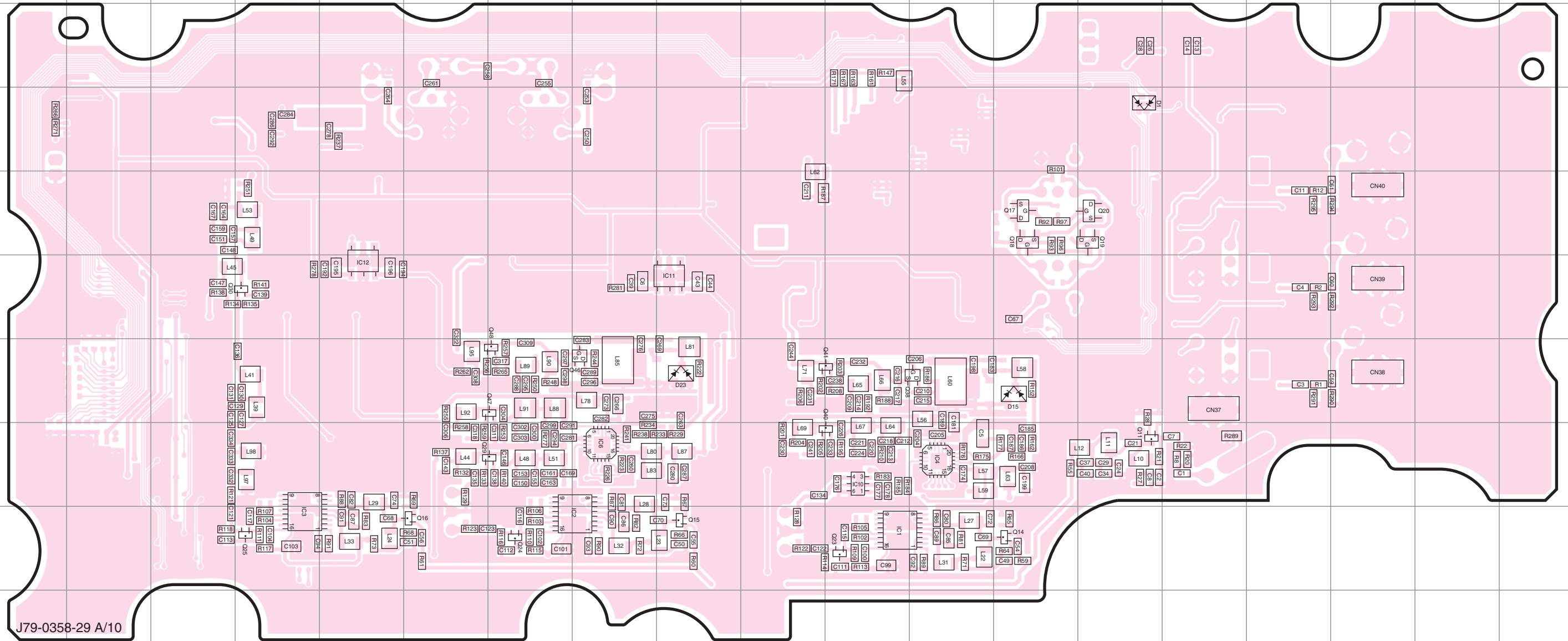
J79-0358-29 A/10

Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
D2	6F	D13	4I	D24	4Q	Q3	6E	Q26	4F	Q45	4P
D3	6F	D14	8H	D25	4Q	Q4	5E	Q27	4F	Q49	5N
D4	4F	D16	4J	D26	6Q	Q5	4E	Q31	3I	Q50	6R
D6	6H	D17	4J	IC5	8Q	Q7	7D	Q32	3I	Q51	6Q
D8	4G	D18	4J	IC7	8Q	Q8	6D	Q33	3I		
D9	6G	D19	4J	IC8	9Q	Q9	4E	Q37	3J		
D10	4I	D20	4L	IC9	4R	Q12	4D	Q39	5J		
D11	4I	D21	5L	Q1	6E	Q21	6H	Q43	6J		
D12	4I	D22	8L	Q2	5E	Q22	6G	Q44	4O		



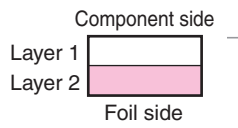
TS-990S PC BOARD

ACCESSORY UNIT (X42-3430-00)(A/10:SCOPE)
Foil side view (J79-0358-29)



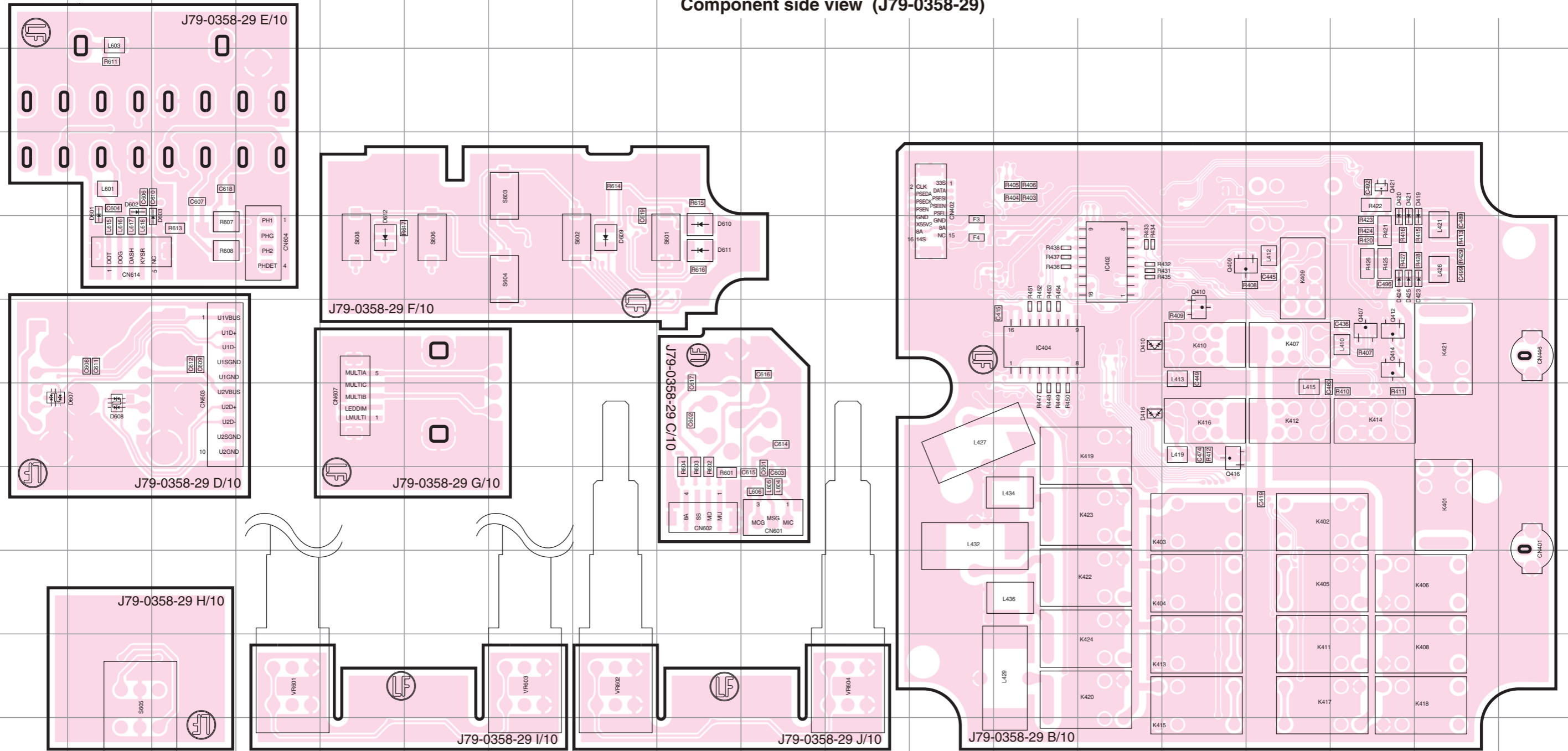
J79-0358-29 A/10

Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
D1	4N	Q11	8N	Q24	9G	Q48	7G
D15	7M	Q14	9M	Q25	9D		
D23	7I	Q15	9I	Q29	8G		
IC1	9K	Q16	9F	Q30	6D		
IC2	9H	Q17	5M	Q38	7L		
IC3	9D	Q18	5M	Q40	8K		
IC4	8L	Q19	5N	Q41	7K		
IC6	8H	Q20	5N	Q46	7H		
IC10	8K	Q23	9K	Q47	7G		


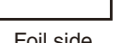


PC BOARD TS-990S

ACCESSORY UNIT (X42-3430-00)(B/10:PRESEL, C/10:MIC, D/10:USB:USB, E/10:PHONES/PADDLE,
F/10:POW SW, G/10:MULTI, H/10:HC/LC, I/10:NR/NB, J/10:NOTCH/SQL)
Component side view (J79-0358-29)



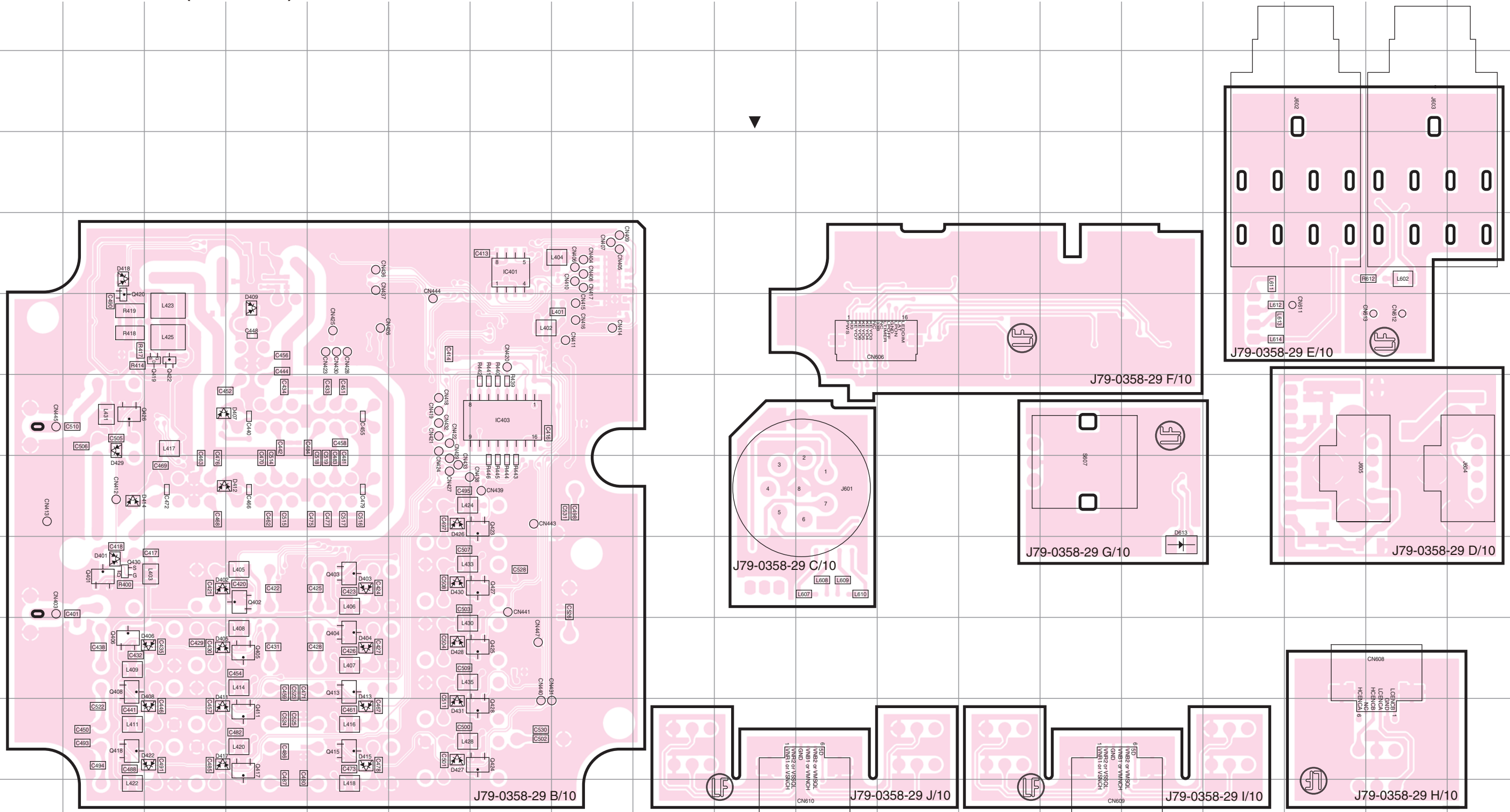
Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
D410	6N	D601	4B	D612	5E	Q416	7O
D416	7N	D602	4B	IC402	5N	Q421	4Q
D419	4R	D603	4C	IC404	6M		
D420	4Q	D607	7A	Q407	6Q		
D421	4Q	D608	7B	Q409	5P		
D423	5R	D609	5H	Q410	6O		
D424	5Q	D610	5I	Q412	6Q		
D425	5Q	D611	5I	Q414	6Q		

Component side
Layer 1 
Layer 2 
Foil side


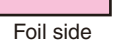
TS-990S PC BOARD

ACCESSORY UNIT (X42-3430-00)(B/10:PRESEL, C/10:MIC, D/10:USB, E/10:PHONES/PADDLE, F/10:POW SW, G/10:MULTI, H/10:HC/LC, I/10:NR/NB, J/10:NOTCH/SQL)

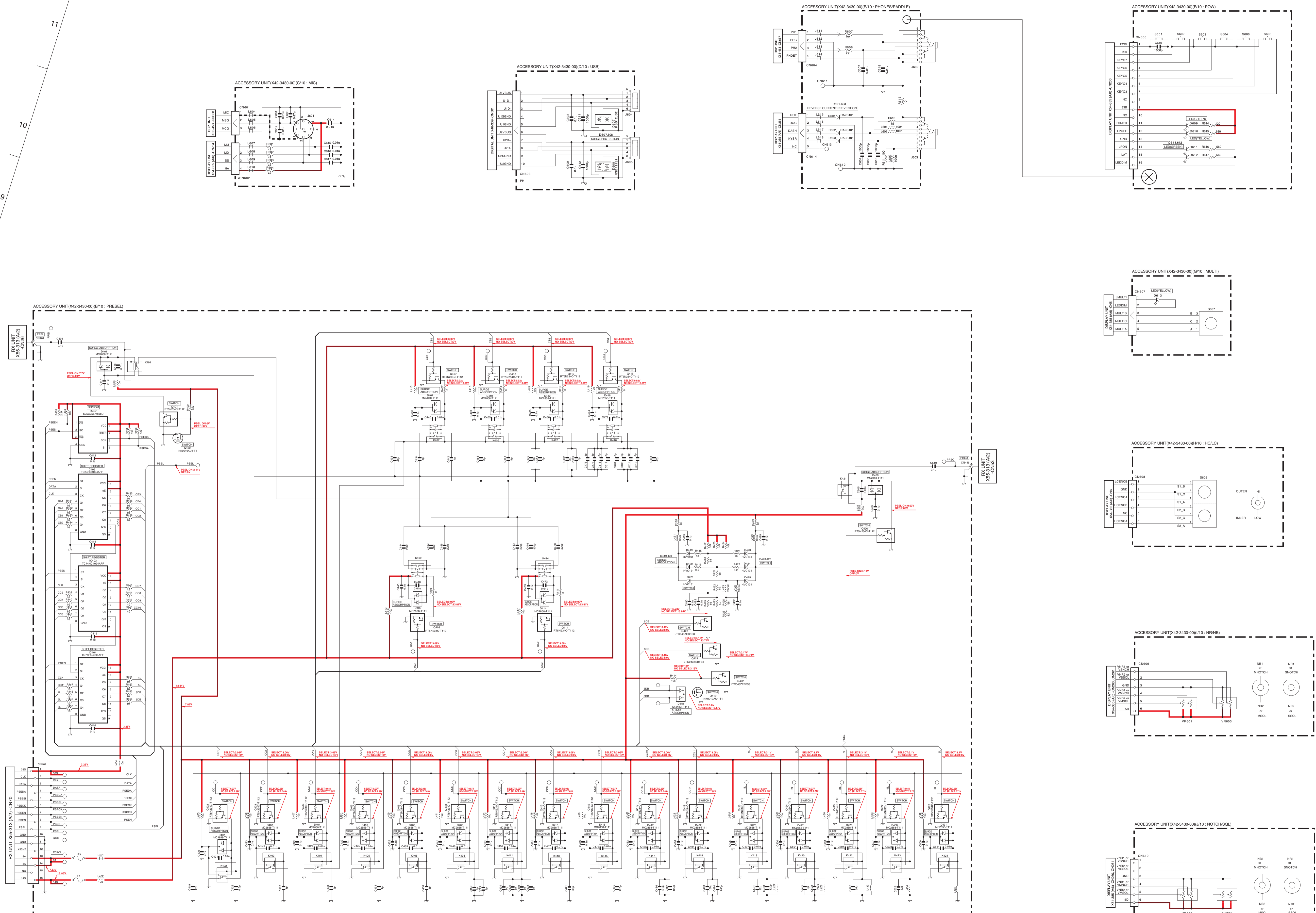
Foil side view (J79-0358-29)



Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC401	5G	Q405	10D	Q417	11D	Q424	11G	D401	9B	D407	7C	D414	8B	D427	11F
IC403	7G	Q406	10B	Q418	11B	Q425	10G	D402	9C	D408	11C	D415	11E	D428	10F
Q401	9B	Q408	10B	Q419	6C	Q426	7B	D403	9E	D409	6D	D417	11C	D429	7B
Q402	9D	Q411	11D	Q420	6B	Q427	9G	D404	10E	D411	11C	D418	5B	D430	9F
Q403	9E	Q413	10E	Q422	6C	Q428	11G	D405	10C	D412	8C	D422	11C	D431	11F
Q404	10E	Q415	11E	Q423	8G	Q430	9B	D406	10C	D413	11E	D426	8F	D613	9O

Component side
 Layer 1 
 Layer 2 
 Foil side

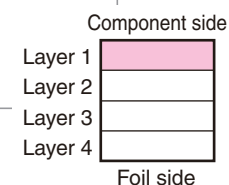
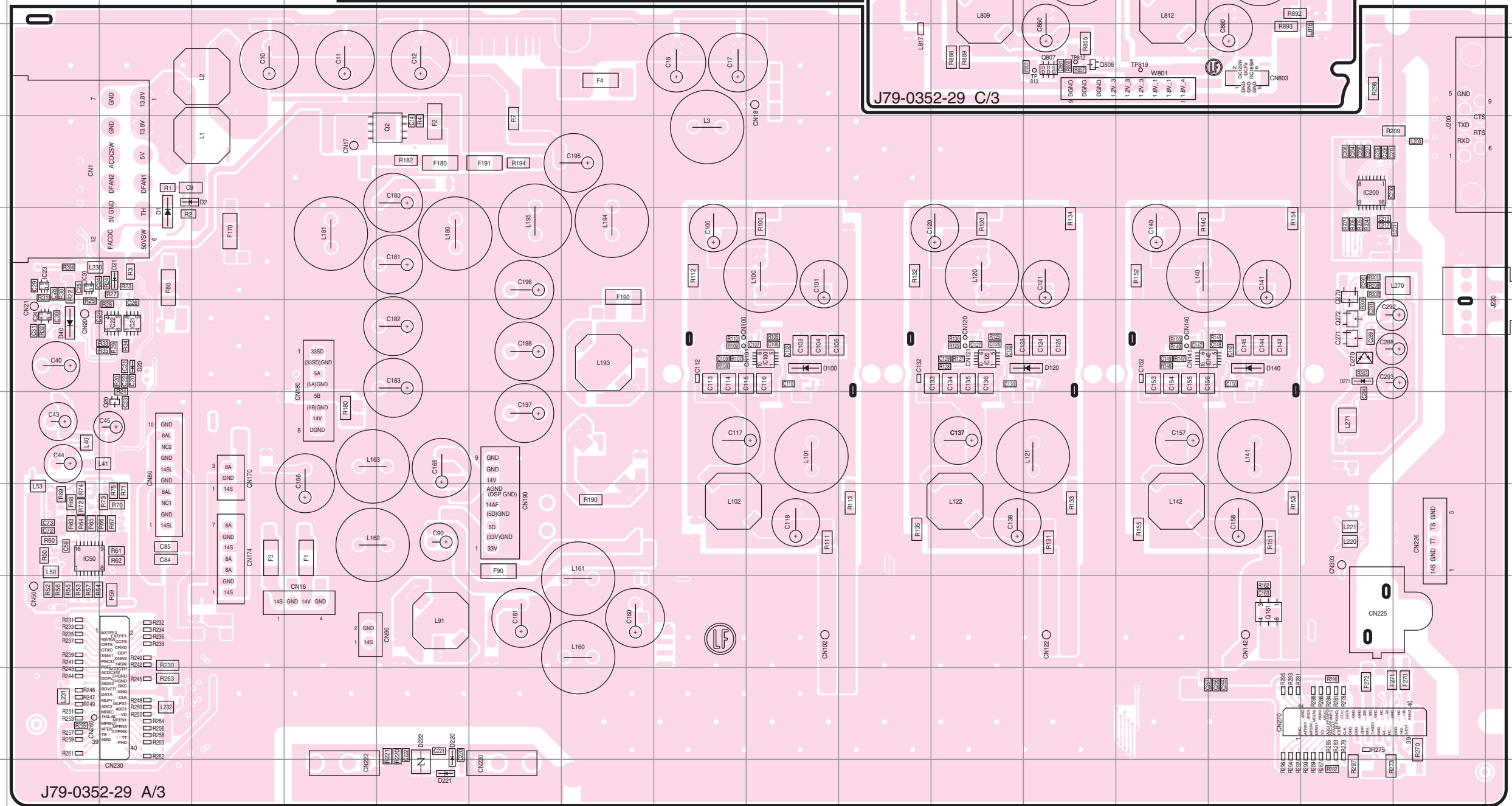
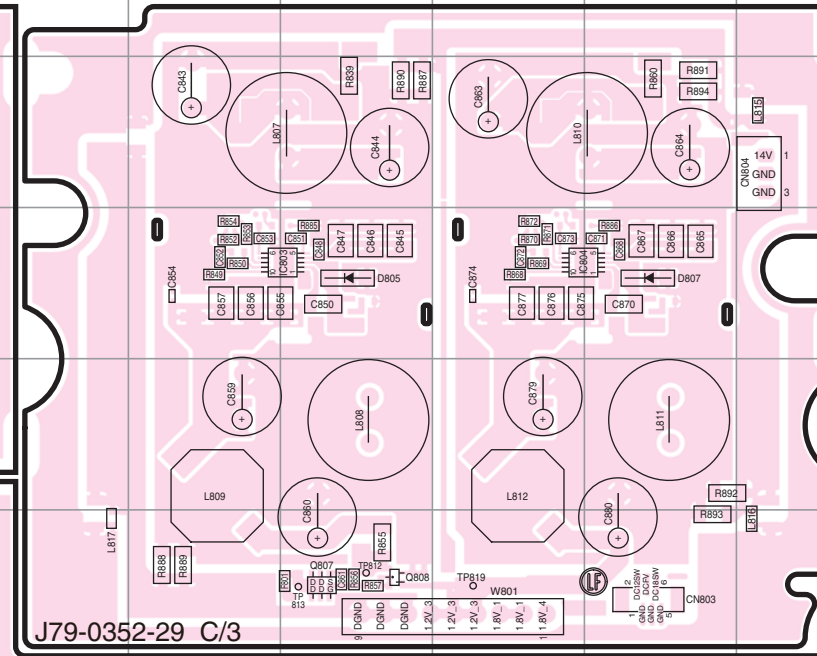
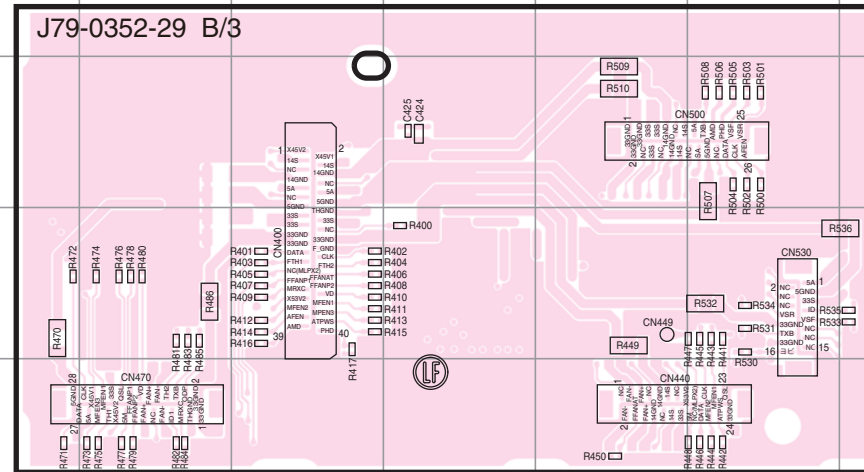
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A B C D E F G H I J K L M N O P



PC BOARD TS-990S

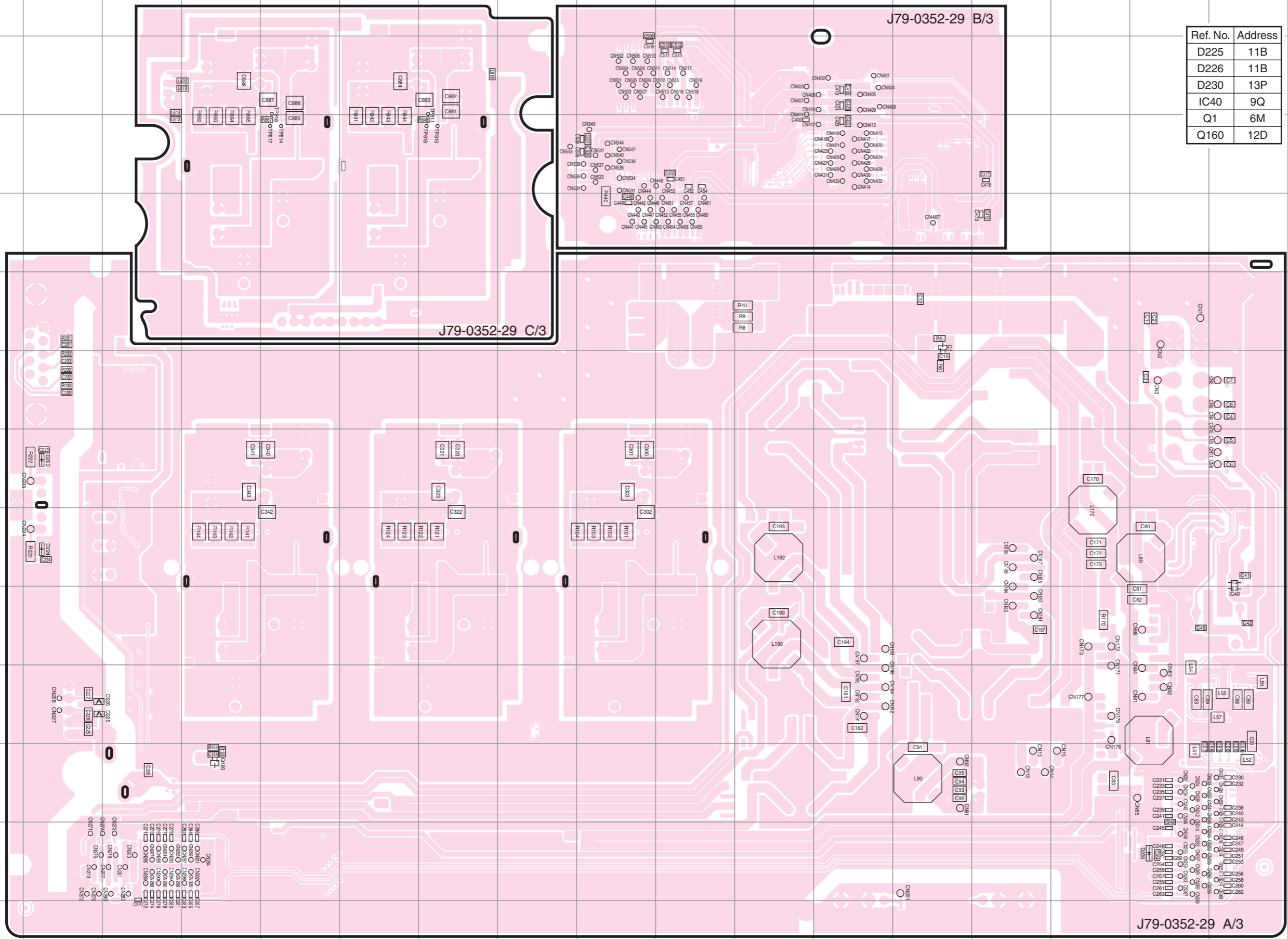
DC-DC UNIT (X43-3220-00, A/3, B/3:LINK, C/3:APP)
Component side view (J79-0352-29)

Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
D1	8D	D222	14G	IC23	8C	Q20	10D
D2	7D	D223	8R	IC24	9C	Q161	12P
D20	9D	D224	9R	IC50	11C	Q270	8Q
D21	8D	D270	9Q	IC100	9K	Q271	9Q
D40	9C	D271	9Q	IC120	9M	Q272	9Q
D100	9K	D805	4N	IC140	9P	Q807	6N
D120	9N	D807	4P	IC200	7Q	Q808	6N
D140	9P	IC20	8C	IC803	4N		
D220	13G	IC21	9D	IC804	4O		
D221	14G	IC22	9D	Q2	7G		

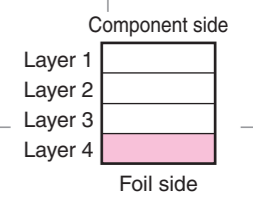


TS-990S PC BOARD

DC-DC UNIT (X43-3220-00)(A/3, B/3:LINK, C/3:APP)
Foil side view (J79-0352-29)

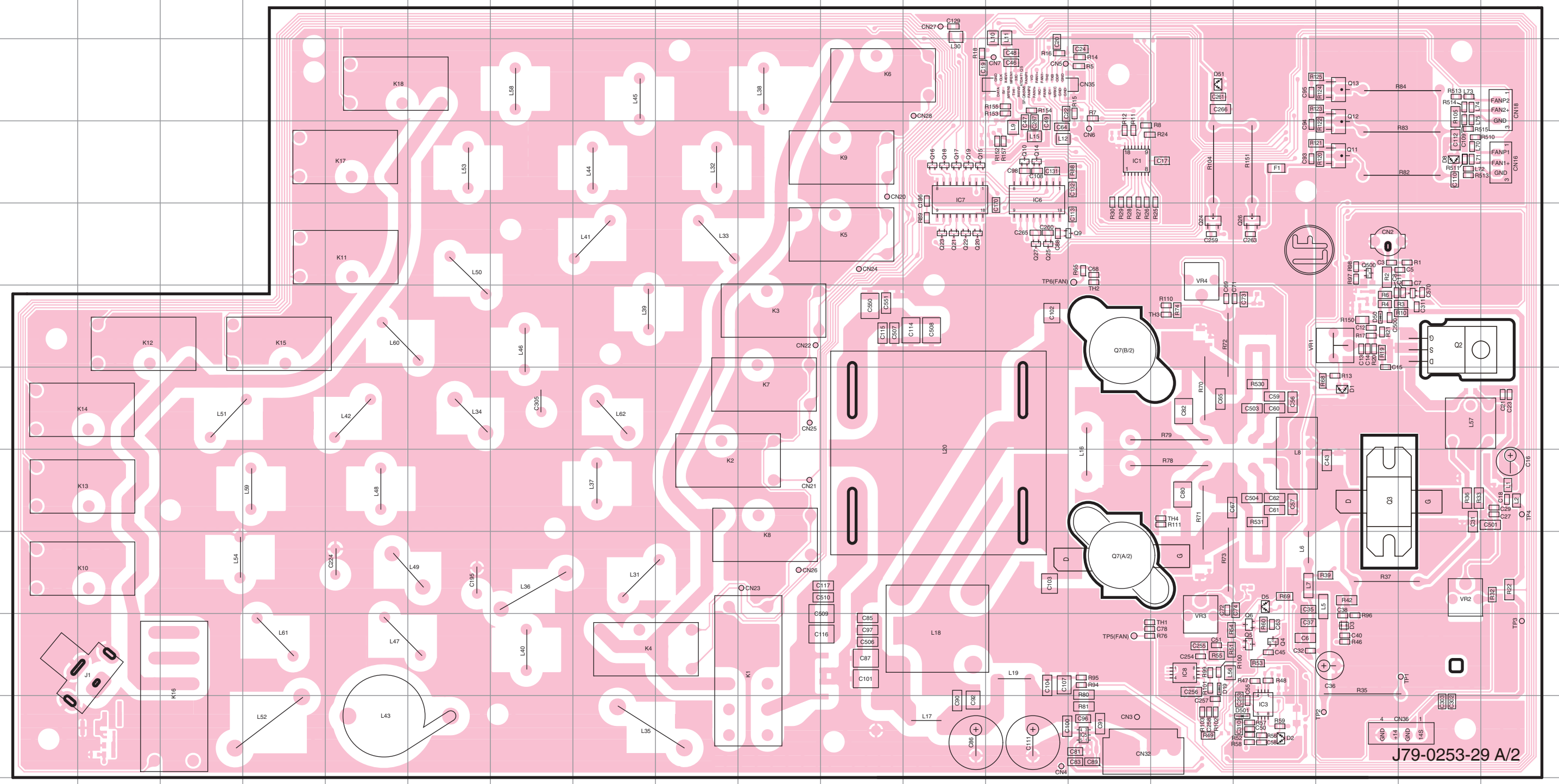


Ref. No.	Address
D225	11B
D226	11B
D230	13P
IC40	9Q
Q1	6M
Q160	12D



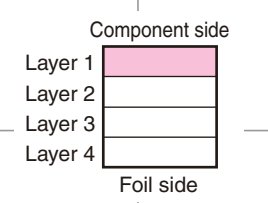
PC BOARD TS-990S

Final UNIT (X45-3880-00) (A/2)
Component side view (J79-0253-29)



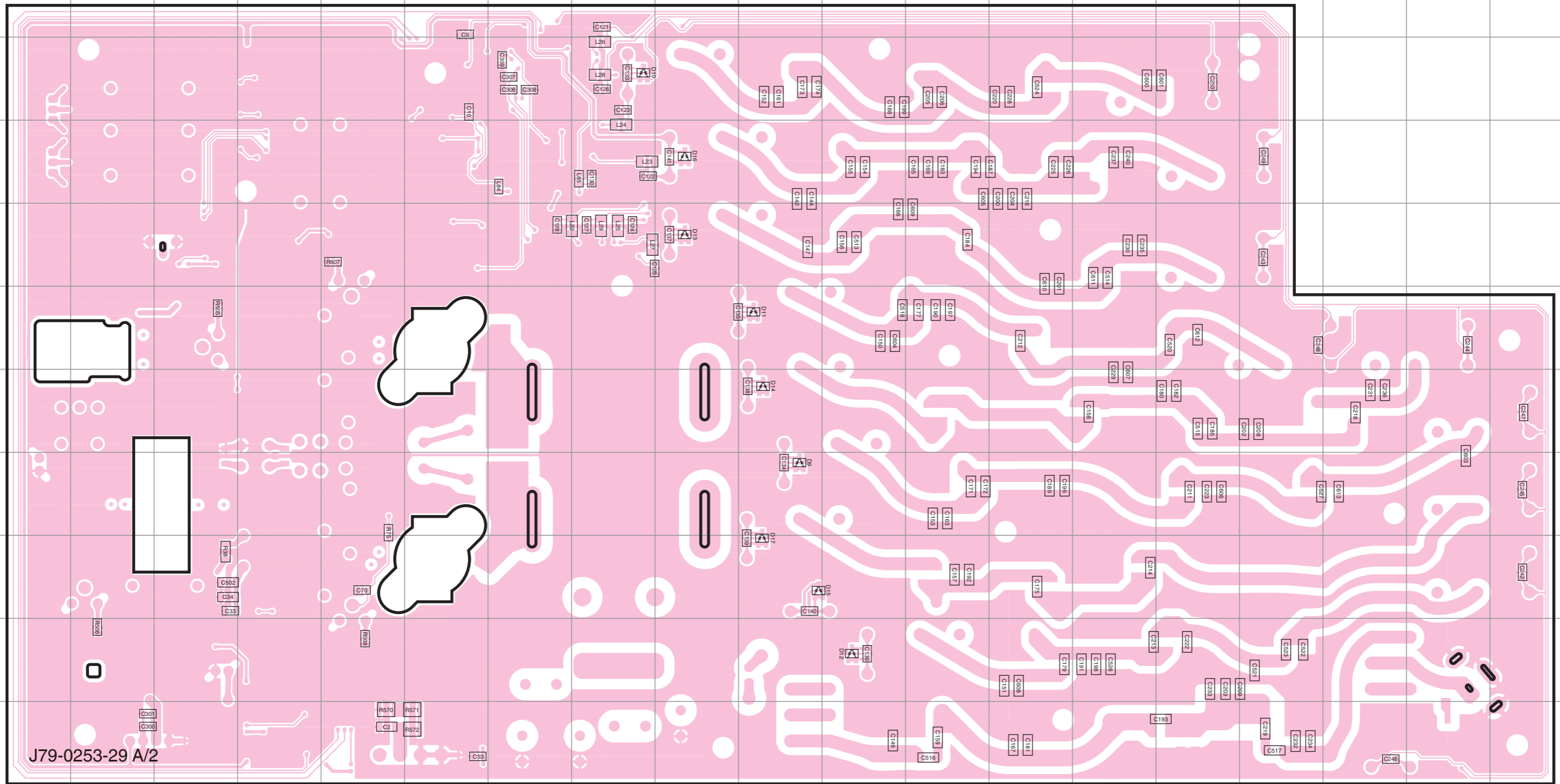
J79-0253-29 A/2

Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
D1	7Q	D501	11P	Q11	4Q	Q20	5L	Q5	10P
D2	11P	D502	11O	Q12	4Q	Q21	5L	Q6	10P
D3	10Q	IC1	4N	Q13	3Q	Q22	5L	Q7	9N
D5	9P	IC3	11P	Q14	4M	Q23	5L	Q8	6N
D8	4R	IC5	11N	Q15	4L	Q24	5O	Q9	5M
D18	11B	IC6	4M	Q16	4L	Q25	5M	Q500	5Q
D19	10O	IC7	4L	Q17	4L	Q26	5P		
D50	6Q	IC8	10O	Q18	4L	Q27	5M		
D51	3O	Q10	4M	Q19	4L	Q4	10P		



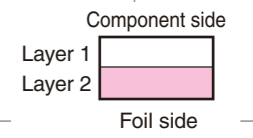
TS-990S PC BOARD

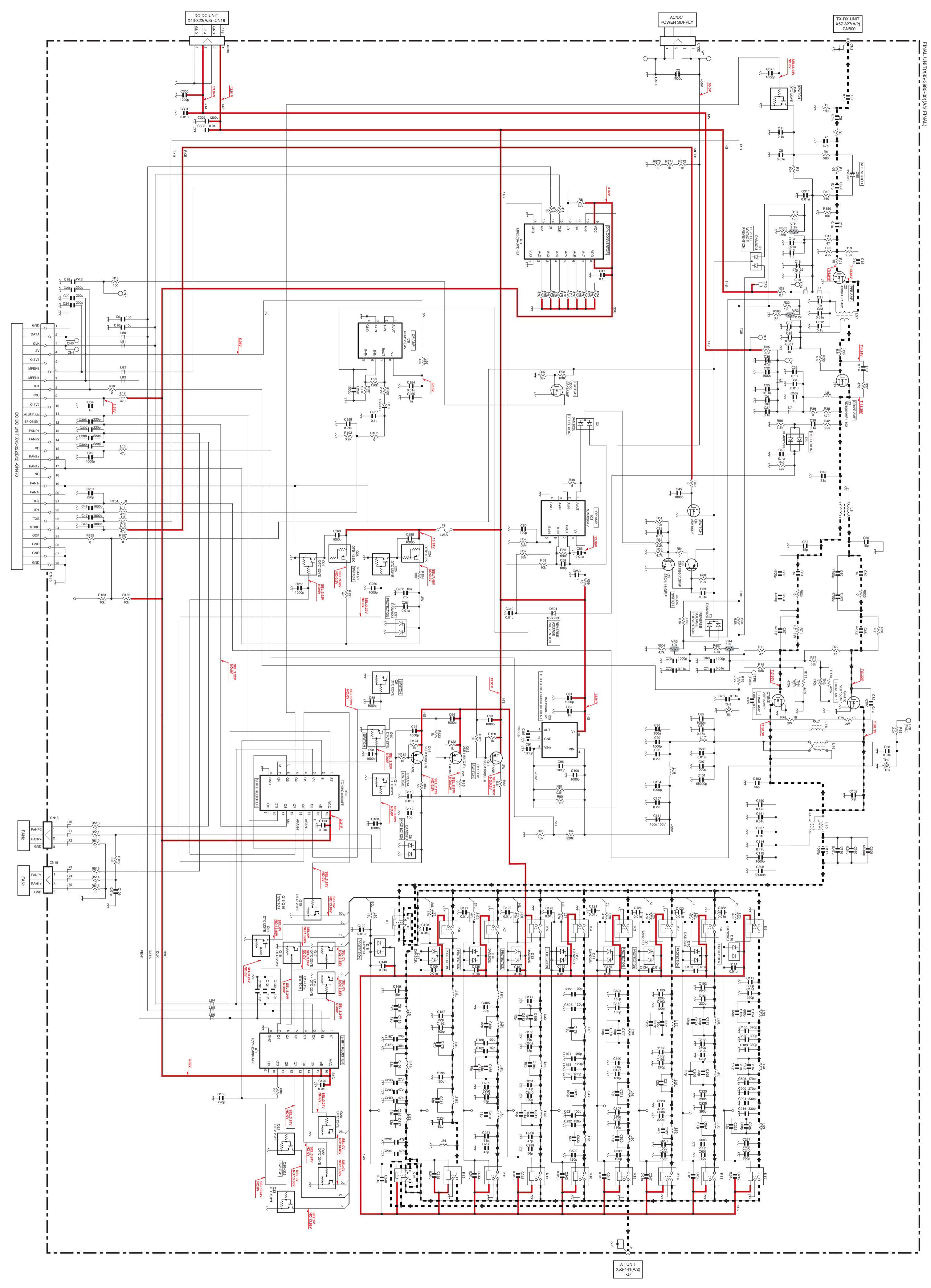
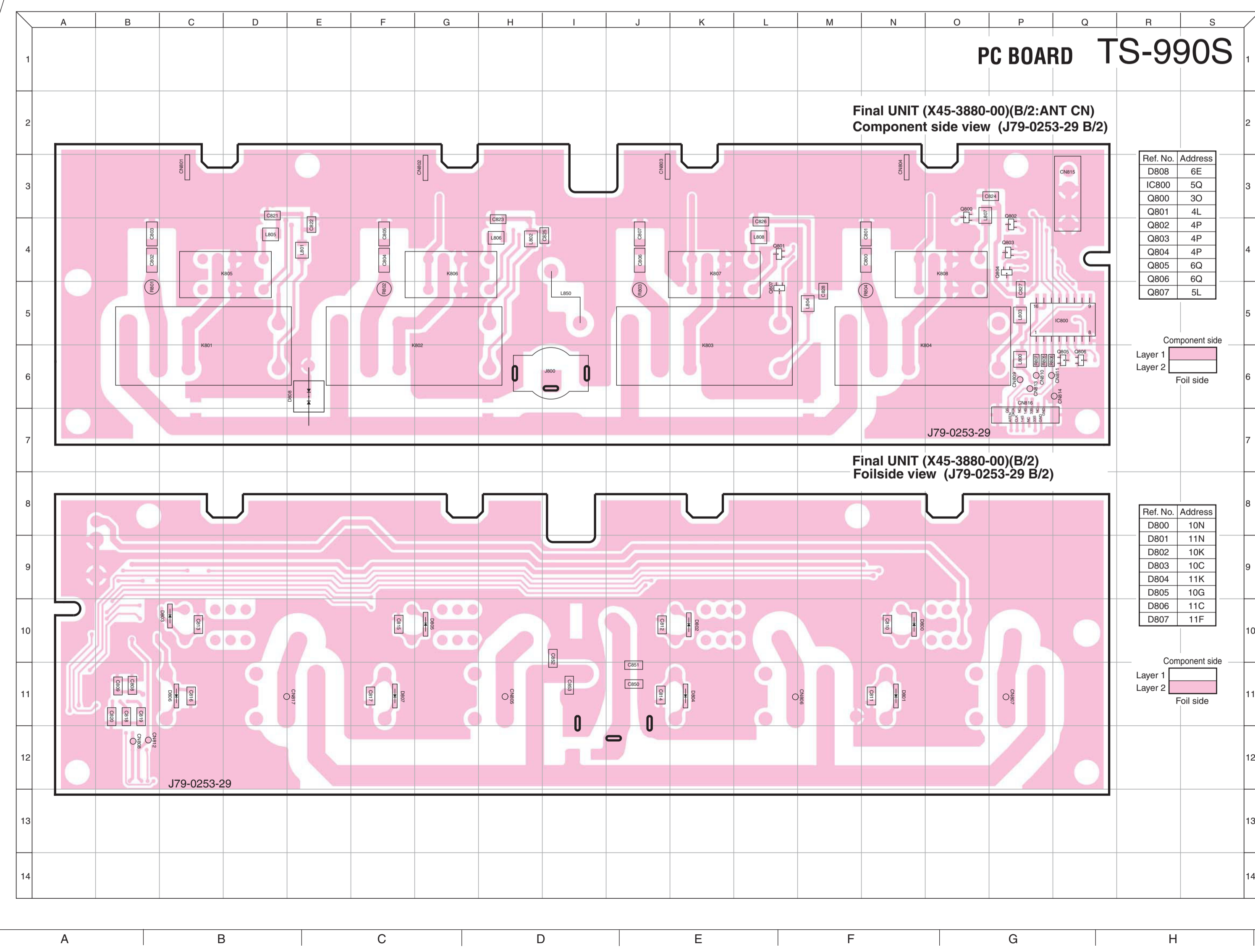
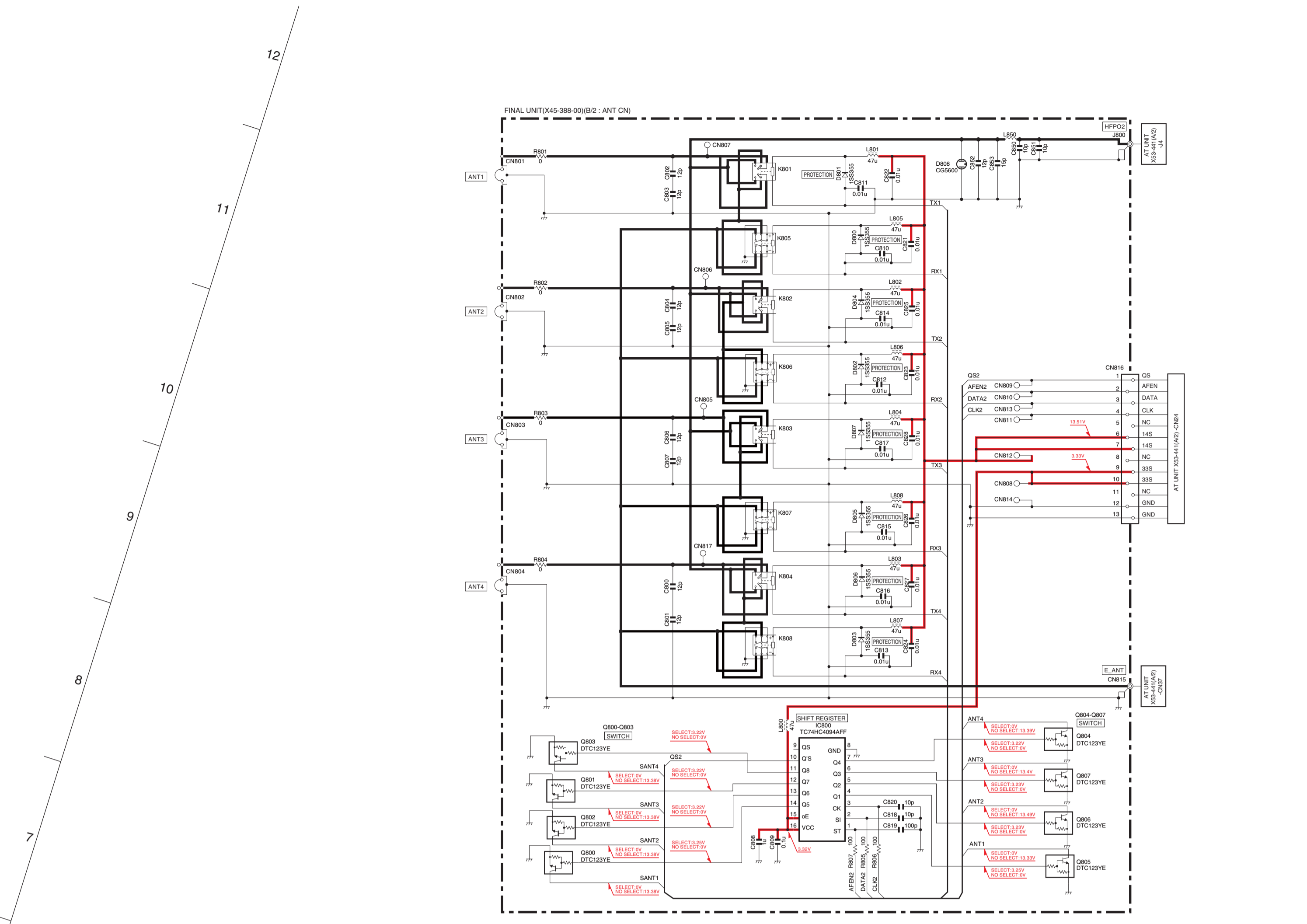
Final UNIT (X45-3880-00) (A/2)
Foil side view (J79-0253-29)



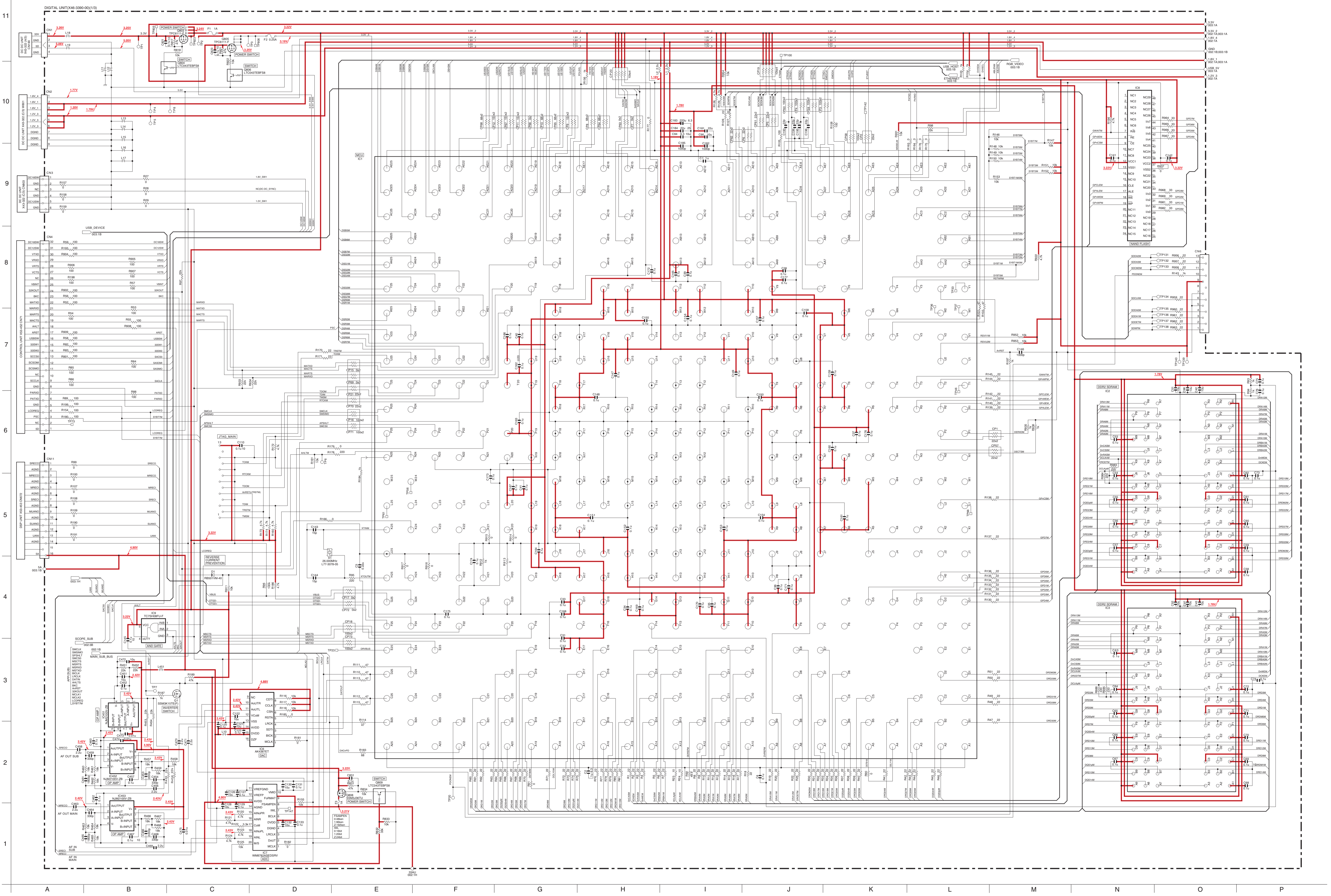
J79-0253-29 A/2

Ref. No.	Address	Ref. No.	Address
D9	8J	D14	7J
D10	3H	D15	9J
D11	6J	D16	4I
D12	10K	D17	9J
D13	5I		



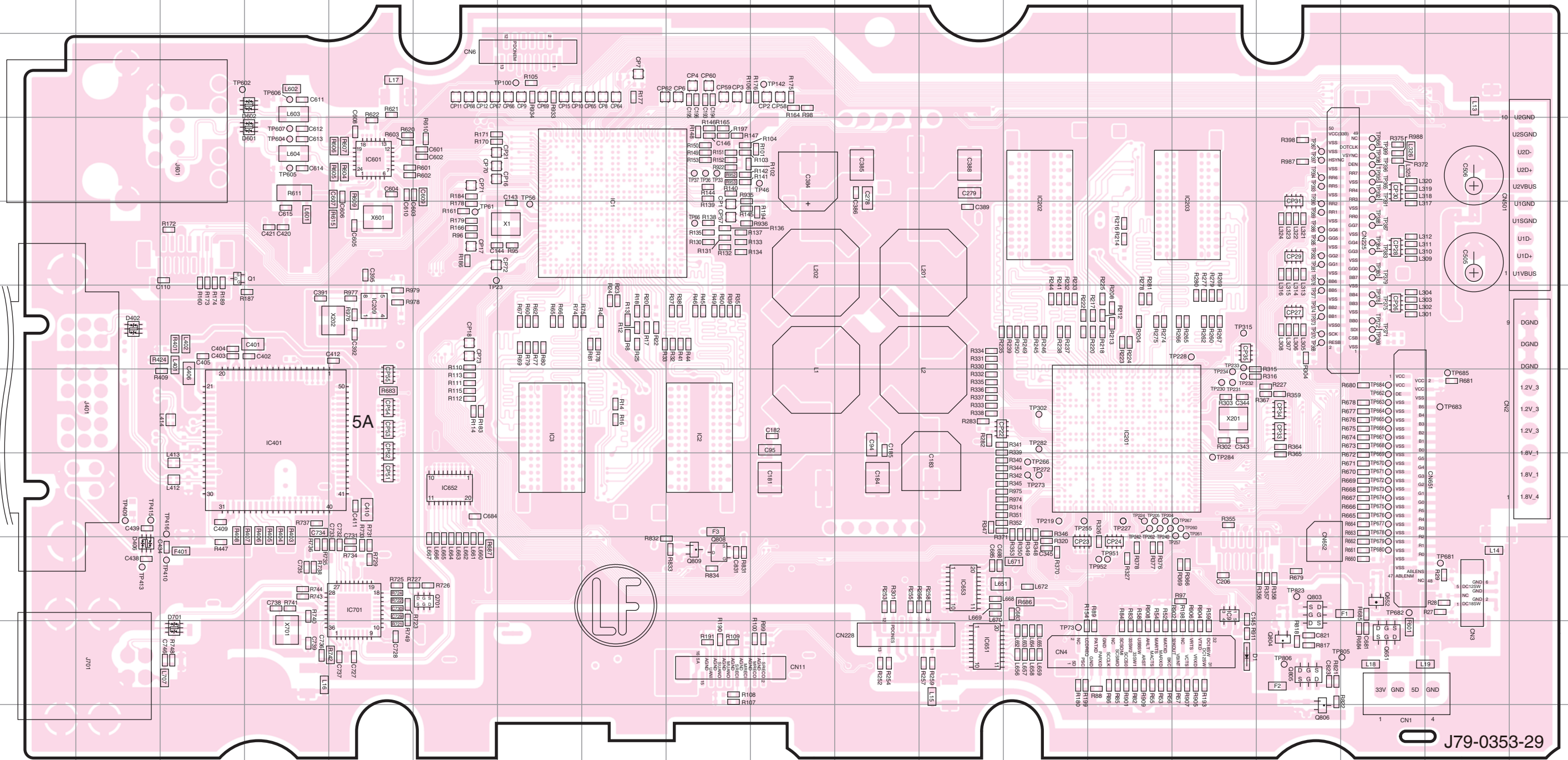


12 TS-990S SCHEMATIC DIAGRAM

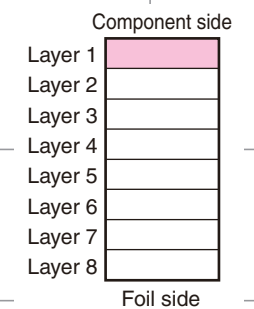


PC BOARD TS-990S

DIGITAL UNIT (X46-3390-00)
Component side view (J79-0353-29)

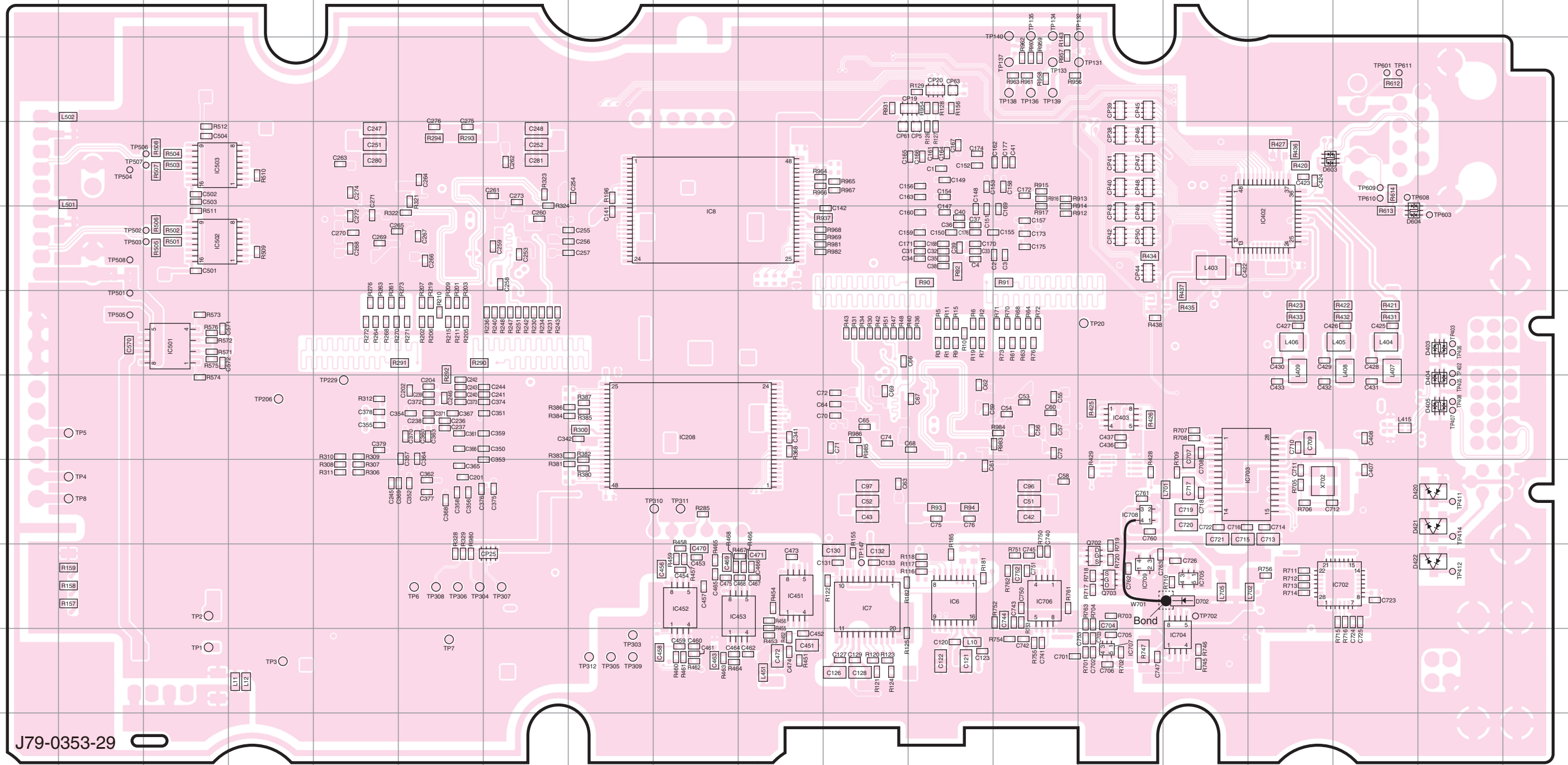


Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
D1	10O	IC203	5O	Q1	5C
D402	6B	IC209	6E	Q651	10Q
D406	9B	IC3	7G	Q652	Q9
D601	4D	IC401	7D	Q701	9F
D602	3D	IC601	4E	Q803	9P
D701	10C	IC651	10L	Q804	10P
IC1	5H	IC652	8F	Q805	10P
IC2	7I	IC653	9L	Q806	11P
IC201	7N	IC701	9E	Q808	9I
IC202	5M	IC9	9O	Q809	9I



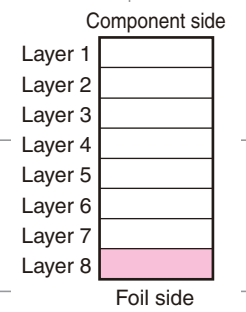
TS-990S PC BOARD

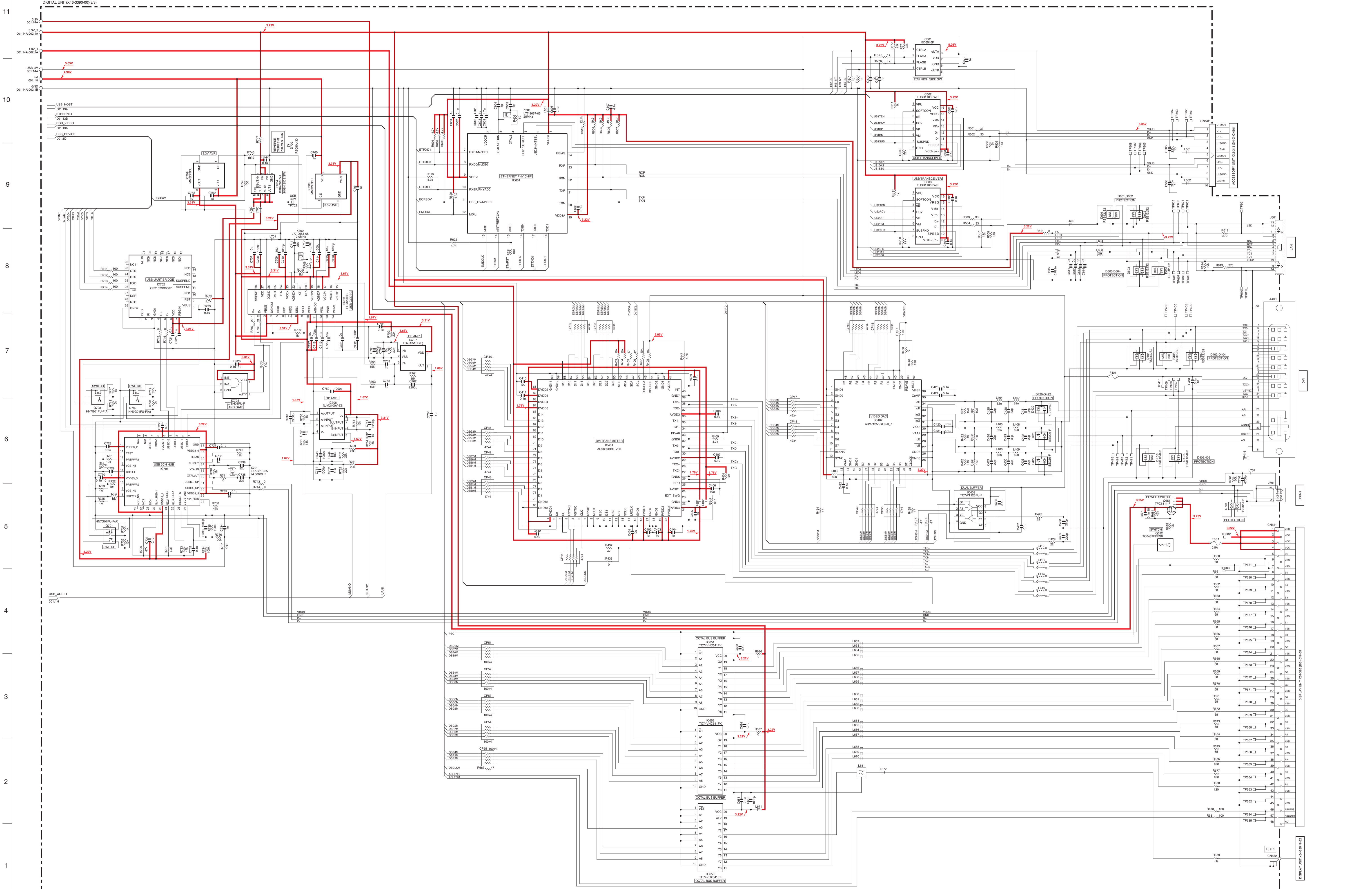
DIGITAL UNIT (X46-3390-00)
Foil side view (J79-0353-29)



J79-0353-29

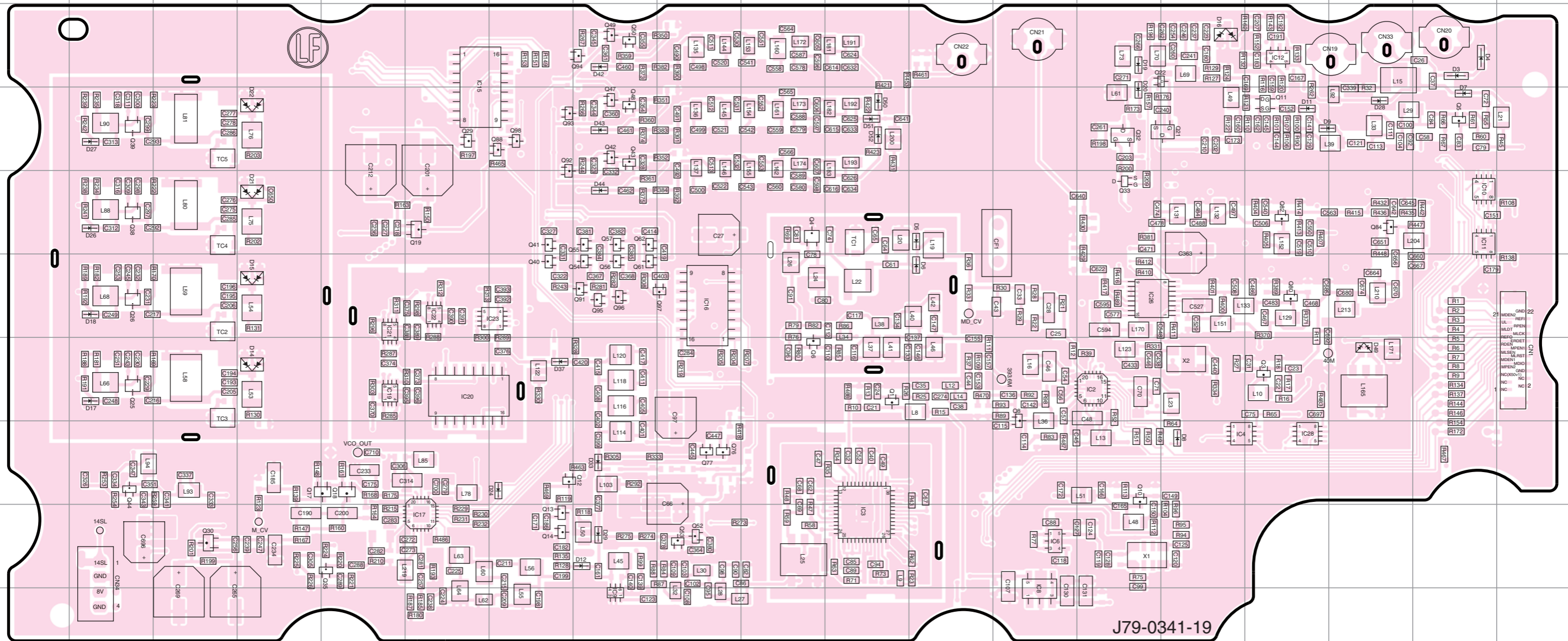
Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC6	9L	IC451	9J	IC702	9Q	IC708	8N	D405	7R
IC7	9K	IC452	9I	IC703	8O	IC709	9N	D420	8R
IC8	5I	IC453	9J	IC704	10O	Q702	9N	D421	8R
IC208	7I	IC501	6C	IC705	9O	Q703	9N	D422	9R
IC402	5P	IC502	5C	IC706	9M	D403	6R	D603	4P
IC403	7N	IC503	4C	IC707	10N	D404	7R	D604	5Q



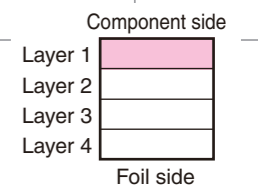


PC BOARD TS-990S

PLL(MAIN) UNIT (X50-3220-00)
Component side view (J79-0341-19)

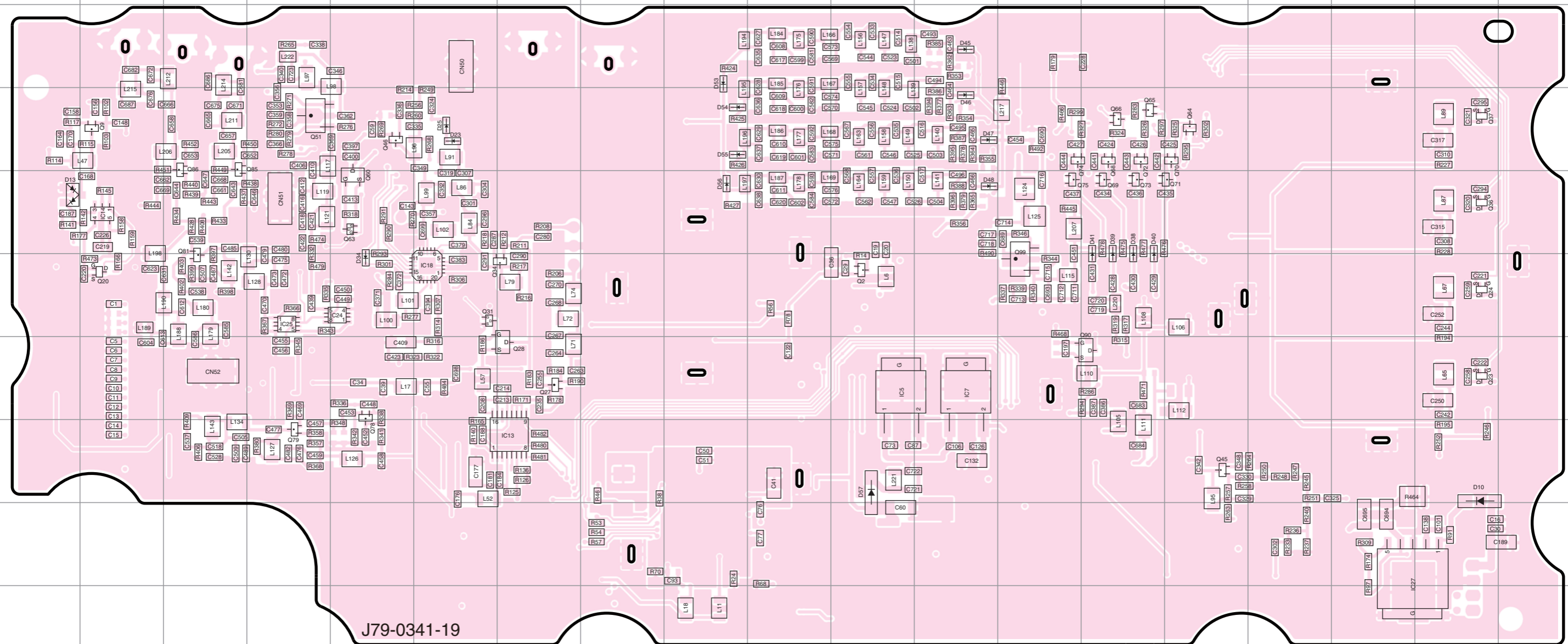


Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address		
D3	3R	D14	7D	D24	8G	D37	7G	IC3	9K	IC16	6I	Q1	7K	Q13	9G	Q29	4F	Q42	4H	Q54	6H	Q76	8I	Q93	4G
D4	3R	D15	6D	D26	5B	D42	3H	IC4	8O	IC17	9F	Q3	7P	Q14	9G	Q30	9C	Q43	4H	Q55	5H	Q77	8I	Q94	3H
D5	5L	D16	3O	D27	4B	D43	4H	IC6	9M	IC19	7E	Q4	5J	Q17	8E	Q32	4N	Q44	8B	Q56	6H	Q80	6P	Q95	6H
D6	6L	D17	7B	D28	4Q	D44	5H	IC8	10M	IC20	7F	Q5	4R	Q18	8E	Q33	5N	Q47	4H	Q57	5H	Q82	5P	Q96	6H
D7	4R	D18	6B	D29	9H	D49	7Q	IC9	10H	IC21	6E	Q6	7J	Q19	5F	Q35	9E	Q48	4H	Q58	8I	Q83	5M	Q97	6I
D8	8O	D19	3N	D30	3G	D50	4K	IC10	5R	IC22	6F	Q8	7M	Q21	4O	Q38	5B	Q49	3H	Q59	8I	Q84	5Q	Q98	4G
D9	4P	D20	4N	D32	8H	D51	4K	IC11	5R	IC23	6G	Q10	8N	Q22	3O	Q39	4B	Q50	3H	Q61	6H	Q88	4G		
D11	4P	D21	5D	D33	8H	D52	4K	IC12	3P	IC26	6N	Q11	4P	Q25	7B	Q40	6G	Q52	9I	Q62	5H	Q91	6H		
D12	9H	D22	4D	D36	7G	IC2	7N	IC15	3F	IC28	8P	Q12	8G	Q26	6B	Q41	5G	Q53	9I	Q67	7I	Q92	5G		

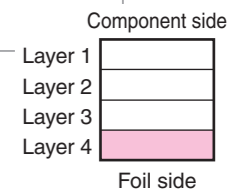


TS-990S PC BOARD

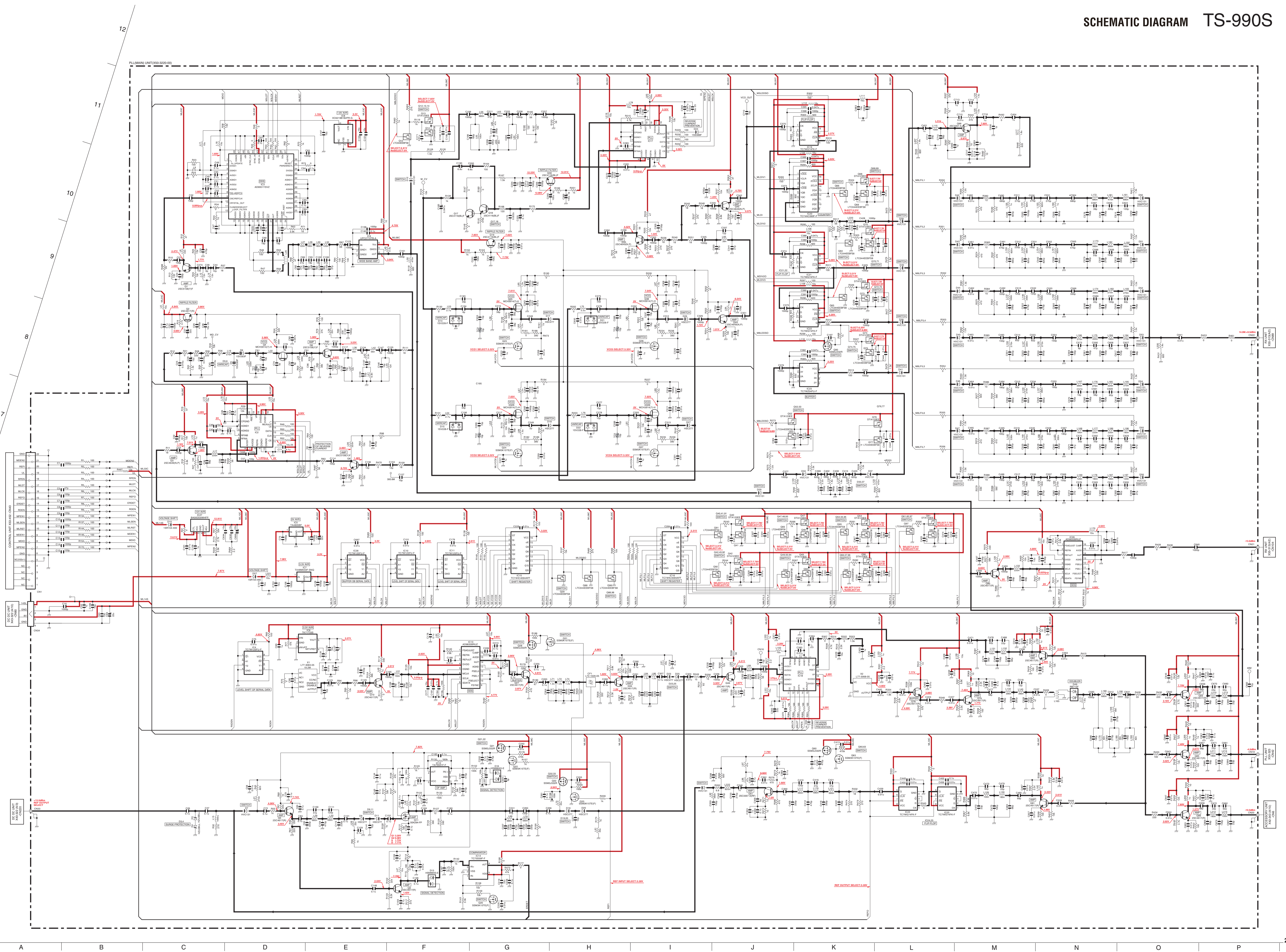
PLL(MAIN) UNIT (X50-3220-00)
Foil side view (J79-0341-19)



Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
D10	8R	D45	3L	IC5	7K	Q9	4B	Q37	4R	Q68	4N	Q79	8D
D13	5A	D46	4L	IC7	7L	Q20	6B	Q45	8O	Q69	5N	Q81	6C
D23	4F	D47	4L	IC13	8G	Q23	7R	Q46	4E	Q70	4O	Q85	4C
D25	4F	D48	5L	IC14	5B	Q24	6R	Q51	4D	Q71	5O	Q86	4C
D34	6E	D53	3I	IC18	6F	Q27	7G	Q60	5E	Q72	4N	Q90	7N
D38	5N	D54	4I	IC24	6E	Q28	7G	Q63	5E	Q73	5N	Q99	5M
D39	5N	D55	4I	IC25	6D	Q31	6F	Q64	4O	Q74	4M		
D40	5N	D56	5I	IC27	9Q	Q34	6G	Q65	4N	Q75	5M		
D41	5N	D57	8K	Q2	6K	Q36	5R	Q66	4N	Q78	7E		

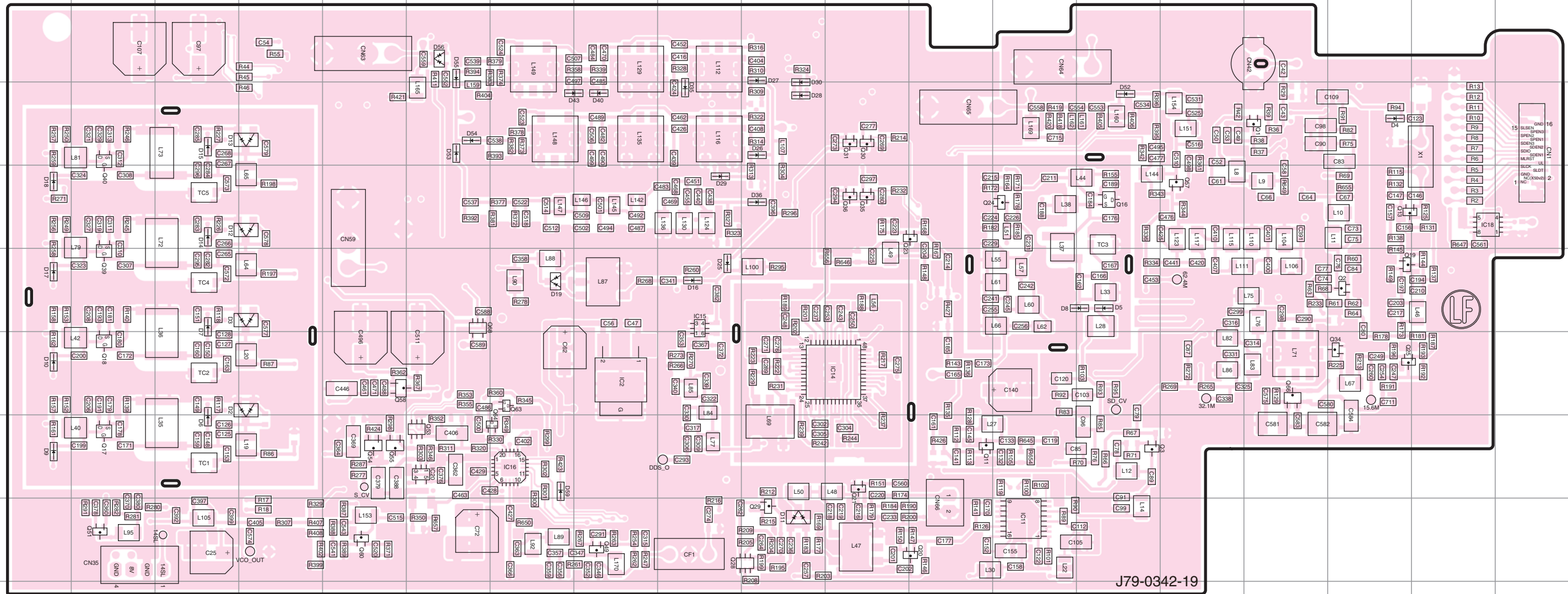


PLI(MAIN) UNIT(X50-3225-00)

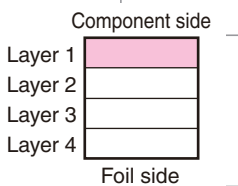


PC BOARD TS-990S

PLL(SUB) UNIT (X50-3230-00)
Component side view (J79-0342-19)

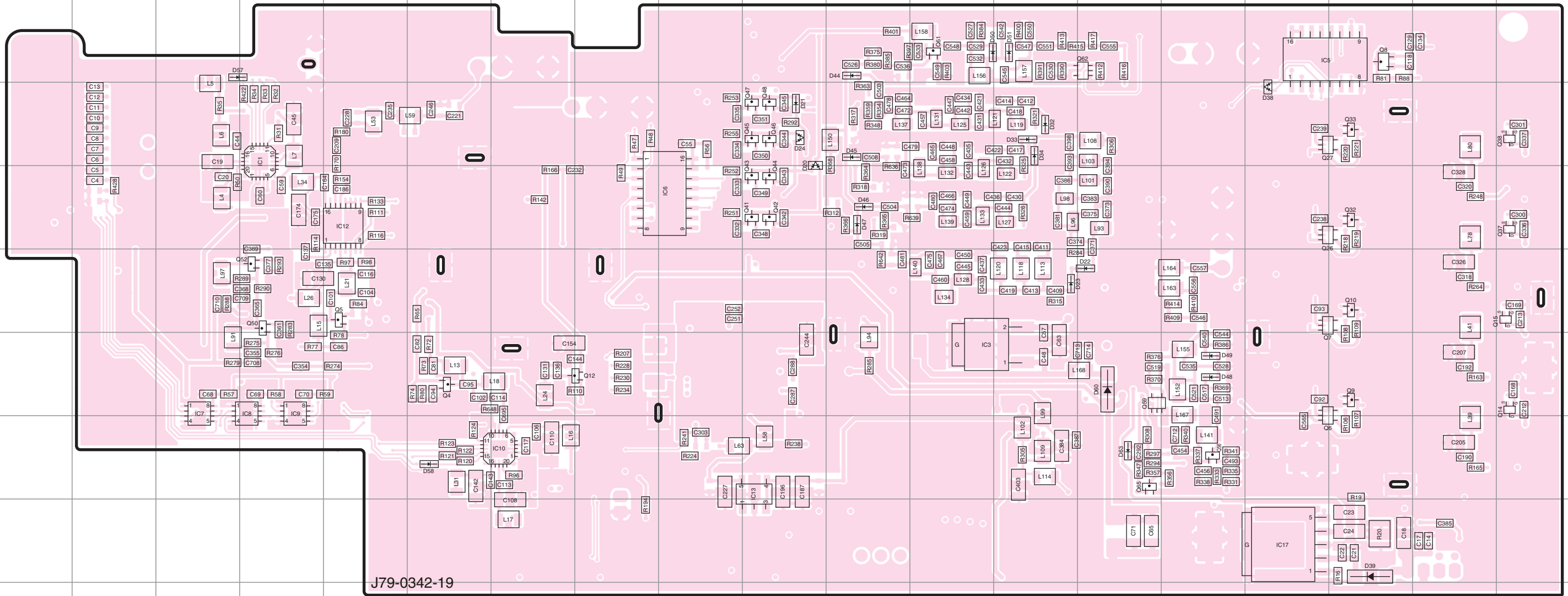


Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address		
IC2	7H	Q1	4P	Q18	7B	Q28	9J	Q39	6B	Q57	5O	D2	7D	D9	8A	D16	6I	D28	4J	D52	4N
IC11	9M	Q2	6Q	Q19	6Q	Q29	9J	Q40	4B	Q58	7E	D3	6D	D10	7A	D17	6A	D29	5I	D53	4F
IC14	7K	Q3	8N	Q20	9L	Q30	4K	Q49	9H	Q60	9E	D4	4Q	D11	9J	D18	5A	D30	4J	D54	4F
IC15	6I	Q11	8L	Q21	8K	Q31	4K	Q51	9B	Q63	7G	D5	6N	D12	5D	D19	6G	D35	4I	D55	3F
IC16	8G	Q13	5Q	Q23	5L	Q34	7Q	Q53	8F	Q64	8G	D6	8C	D13	4D	D25	6I	D36	5J	D56	3F
IC18	5R	Q16	5N	Q24	5M	Q35	5K	Q54	8E	Q66	7P	D7	6C	D14	5C	D26	4J	D40	4H	D59	8G
IC20	8F	Q17	8B	Q25	7Q	Q36	5K	Q55	8E	Q68	6F	D8	6N	D15	4C	D27	3J	D43	4H		

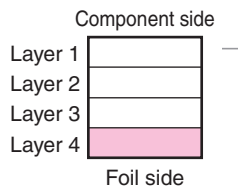


TS-990S PC BOARD

PLL(SUB) UNIT (X50-3230-00)
Foil side view (J79-0342-19)



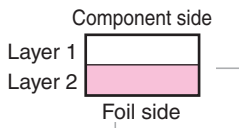
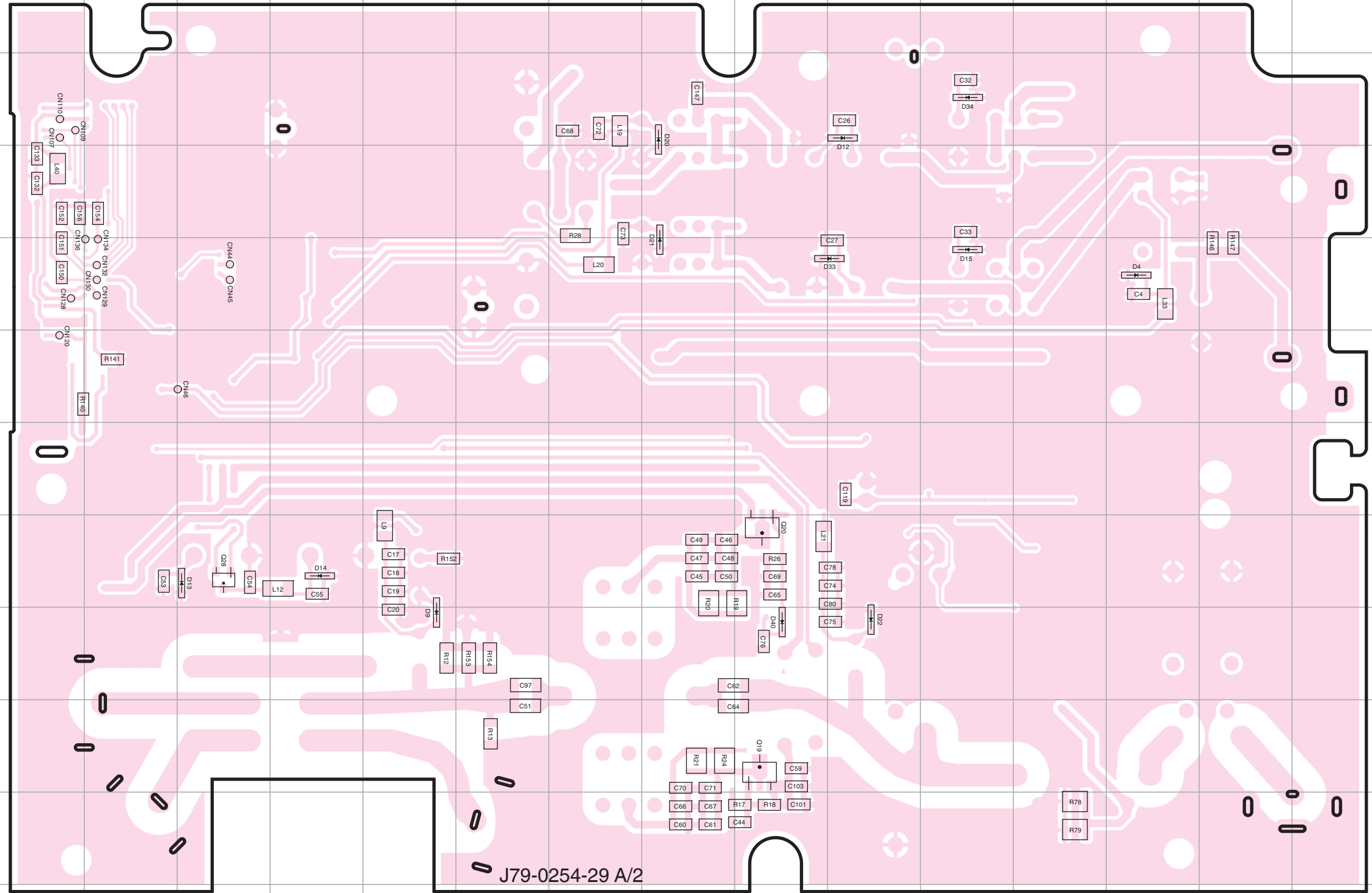
Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC1	4D	IC10	8G	Q7	6P	Q22	4E	Q41	5J	Q48	4J	Q65	8N	D33	4M	D47	5K
IC3	7L	IC12	5E	Q8	3Q	Q26	5P	Q42	5J	Q50	6D	D20	4J	D34	4M	D48	7O
IC5	3P	IC13	8J	Q9	7Q	Q27	4P	Q43	5J	Q52	6D	D21	4J	D38	4P	D49	7O
IC6	5I	IC17	9P	Q10	6Q	Q32	5Q	Q44	5J	Q56	8O	D22	6N	D39	9Q	D50	3L
IC7	7C	Q4	7F	Q12	7H	Q33	4Q	Q45	4J	Q59	7N	D23	6M	D44	3K	D51	3M
IC8	7D	Q5	6E	Q14	7S	Q37	5S	Q46	4J	Q61	3L	D24	4J	D45	4K	D57	3C
IC9	7D	Q6	8P	Q15	6S	Q38	4S	Q47	4J	Q62	3N	D32	4M	D46	5K	D58	8F



TS-990S PC BOARD

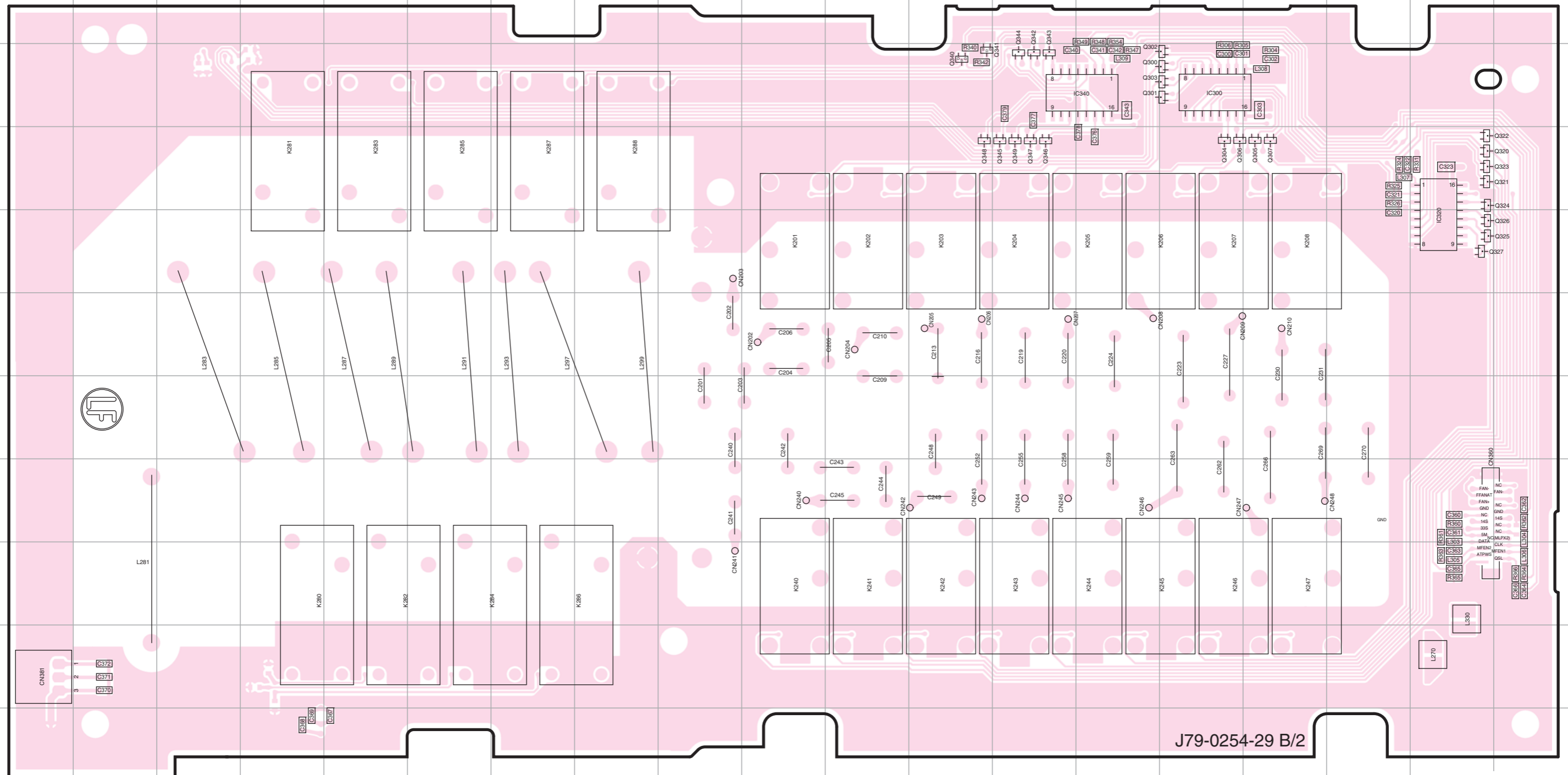
AT UNIT (X53-4410-00) (A/2:ANT SW)
Foil side view (J79-0254-29)

Ref. No.	Address
D4	5O
D9	9G
D12	3L
D13	8E
D14	8F
D15	5M
D20	3J
D21	5J
D22	9L
D33	5L
D34	3M
D40	9K
Q19	10K
Q20	8K
Q28	8E

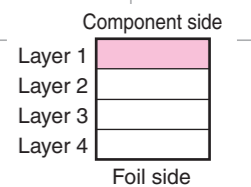


PC BOARD TS-990S

AT UNIT (X53-4410-00) (B/2)
Component side view (J79-0254-29)



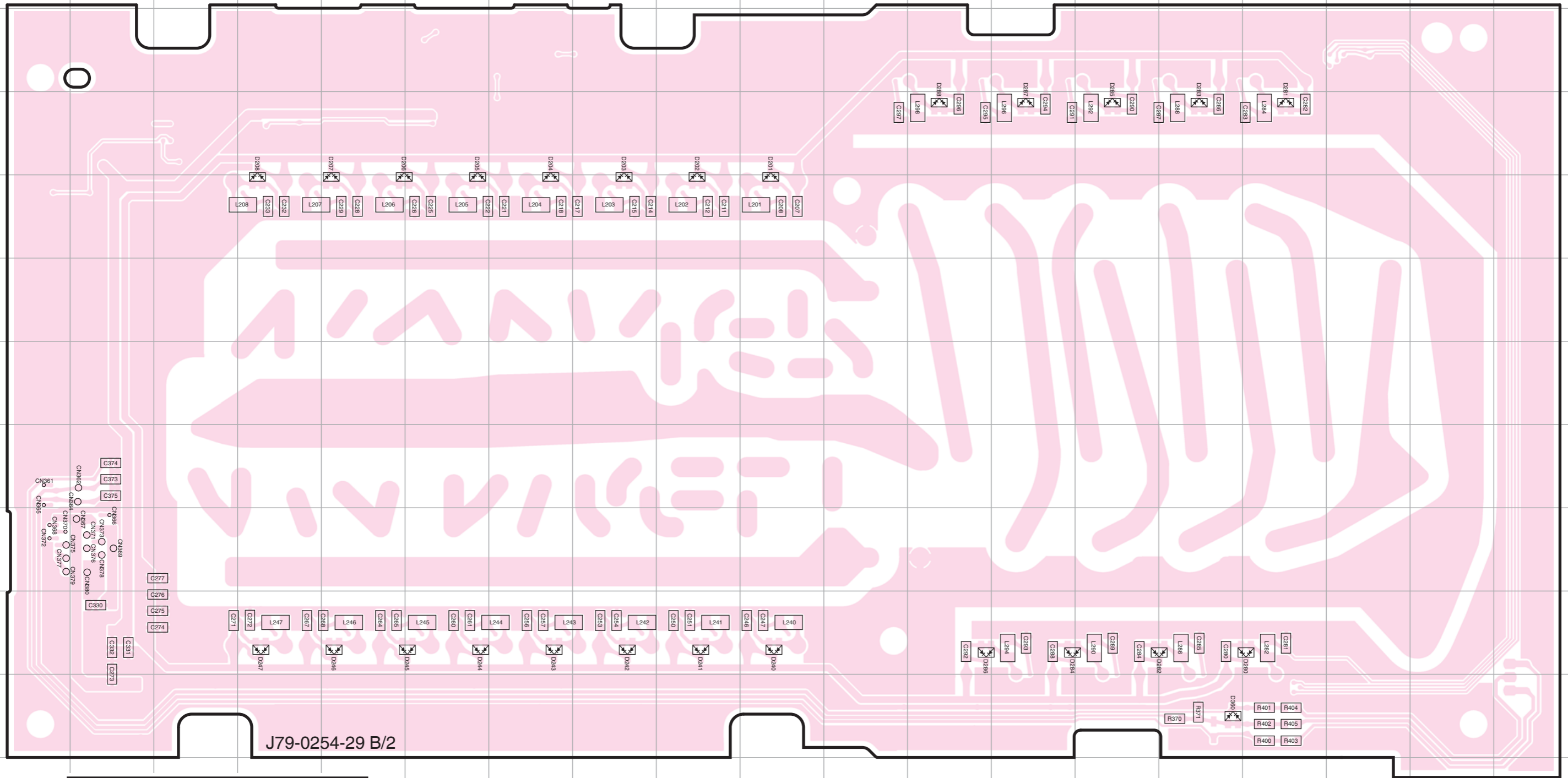
Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC300	3O	Q305	4P	Q325	5R	Q345	4M
IC320	5R	Q306	4O	Q326	5R	Q346	4M
IC340	3N	Q307	4P	Q327	5R	Q347	4M
Q300	3O	Q320	4R	Q340	3L	Q348	4L
Q301	3O	Q321	4R	Q341	3L	Q349	4M
Q302	3O	Q322	4R	Q342	3M		
Q303	3O	Q323	4R	Q343	3M		
Q304	4O	Q324	4R	Q344	3M		



J79-0254-29 B/2

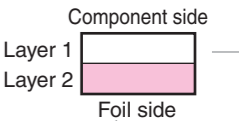
TS-990S PC BOARD

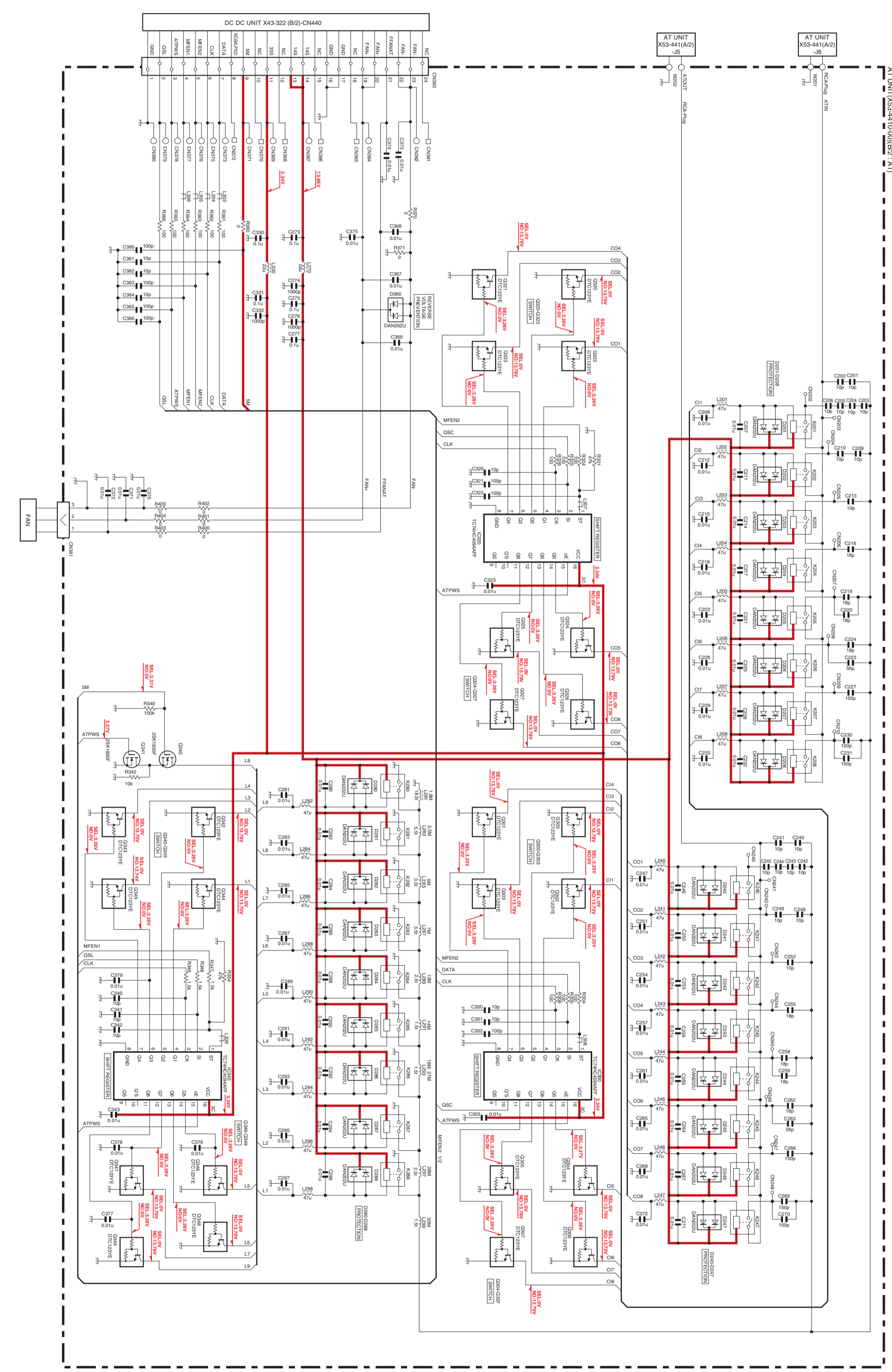
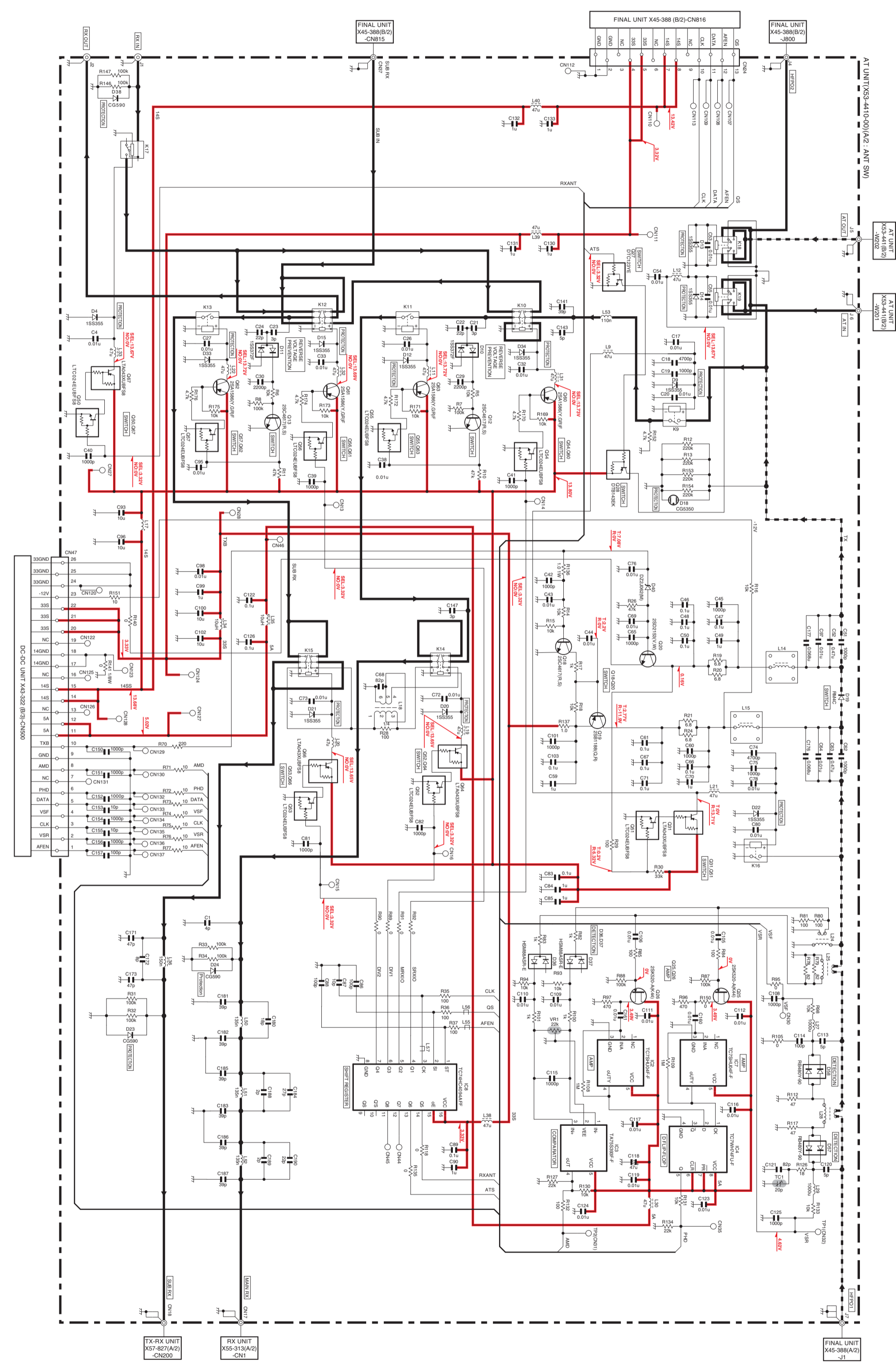
AT UNIT (X53-4410-00) (B/2)
Foil side view (J79-0254-29)



J79-0254-29 B/2

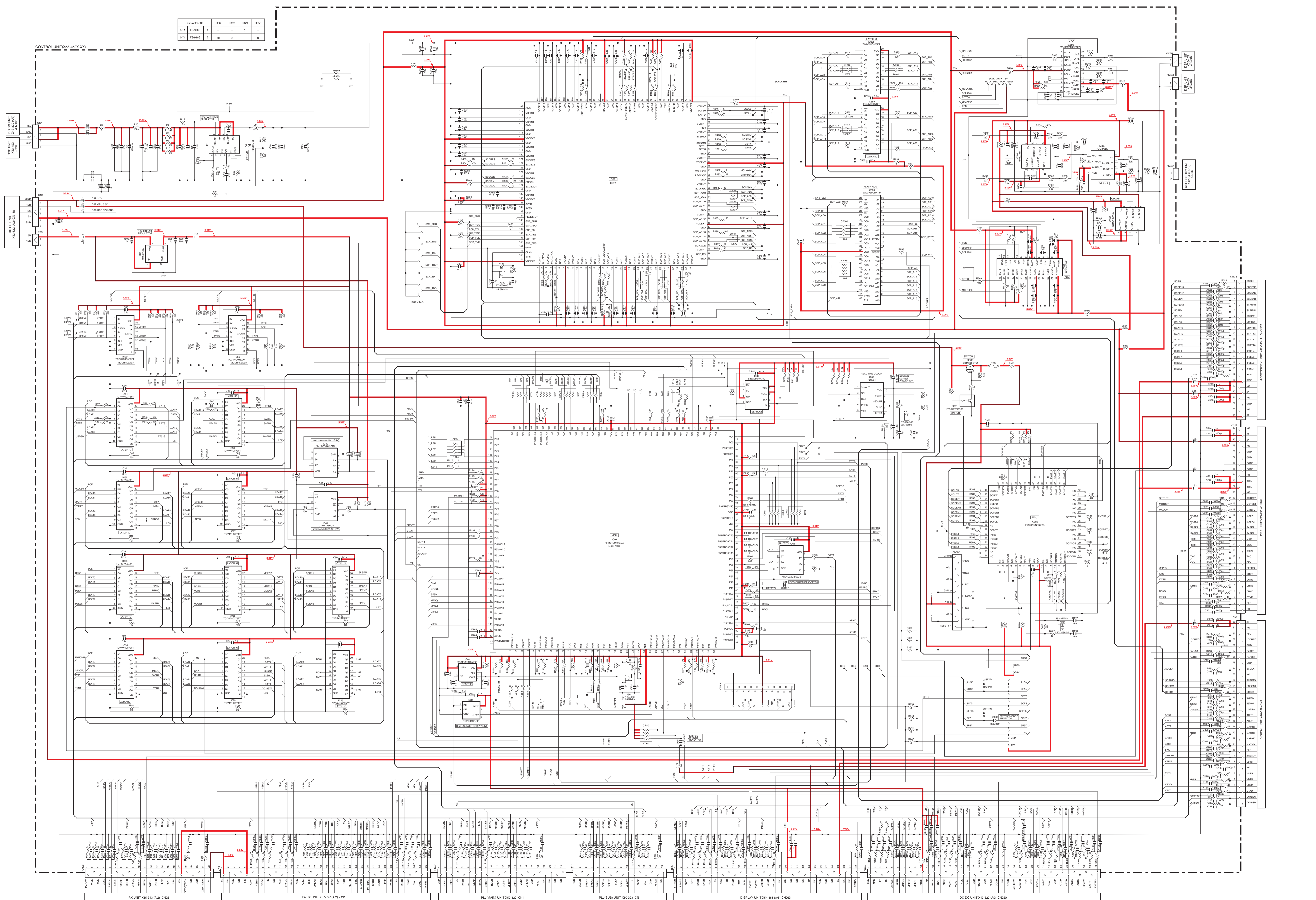
Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
D201	5J	D241	10I	D282	10O
D202	5I	D242	10H	D283	4O
D203	5H	D243	10G	D284	10M
D204	5G	D244	10F	D285	4N
D205	5F	D245	10F	D286	10L
D206	5E	D246	10E	D287	4M
D207	5E	D247	10D	D288	4L
D208	5D	D280	10P	D360	11O
D240	10J	D281	4P		





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A B C D E F G H I J K L M N O P

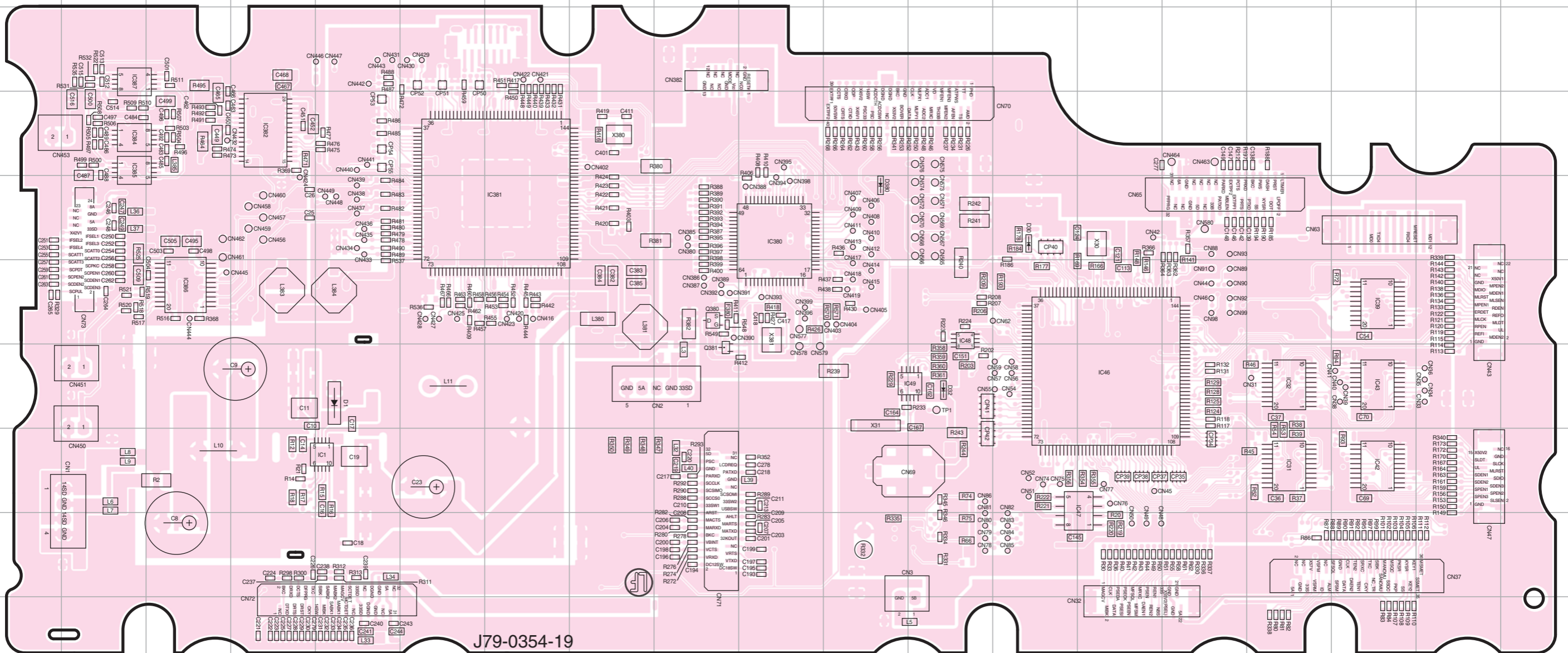
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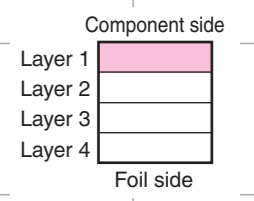
	XS-452X-XX	RM	R02	R04	R05
0.11	TS-990S	X	-	-	-
2.71	TS-990S	C	14	0	0

PC BOARD TS-990S

CONTROL UNIT (X53-452X-XX)
Component side view (J79-0354-19)

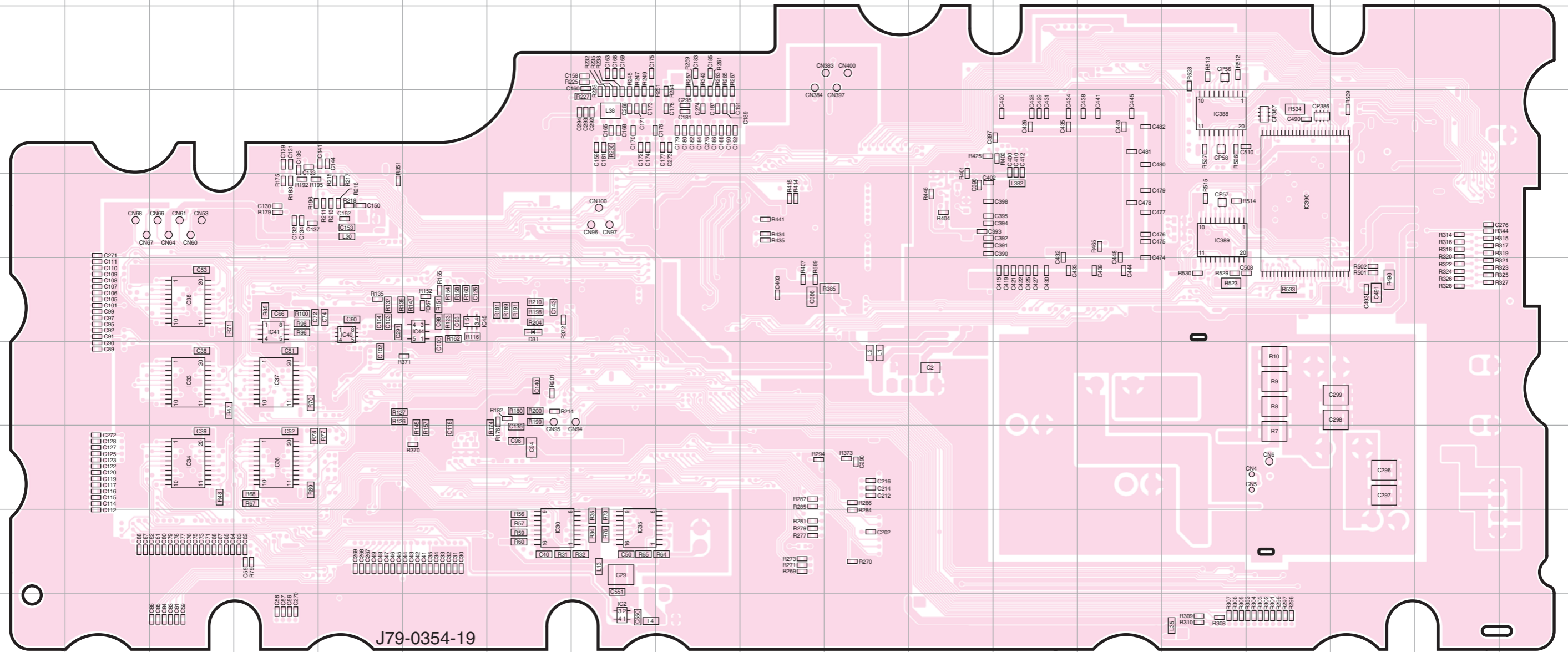


Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
D1	7E	IC32	7P	IC48	6L	IC385	4B
D30	5M	IC39	6Q	IC49	7L	IC386	6C
D32	7L	IC43	7Q	IC380	5J	IC387	3B
D380	5K	IC42	8Q	IC381	5G	Q380	6I
IC1	8E	IC46	7N	IC382	4D	Q381	7I
IC31	8P	IC47	8N	IC384	4B		

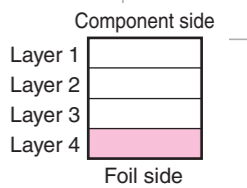


TS-990S PC BOARD

CONTROL UNIT (X53-452X-XX)
Foil side view (J79-0354-19)

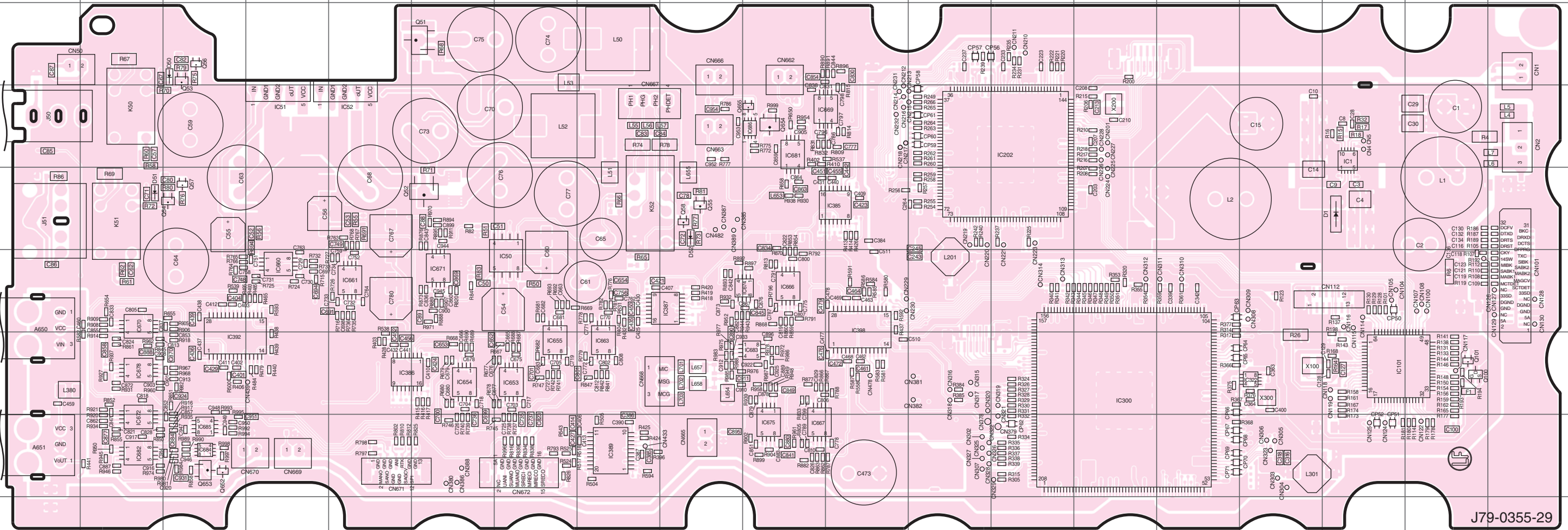


Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
D31	6G	IC34	8C	IC38	6C	IC45	6F
IC2	10H	IC35	9H	IC40	6E	IC388	4O
IC30	9G	IC36	8D	IC41	6D	IC389	5O
IC33	7C	IC37	7D	IC44	6F	IC390	5P



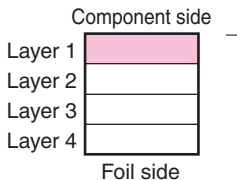
PC BOARD TS-990S

DSP UNIT (X53-4530-00)
Component side view (J79-0355-29)



J79-0355-29

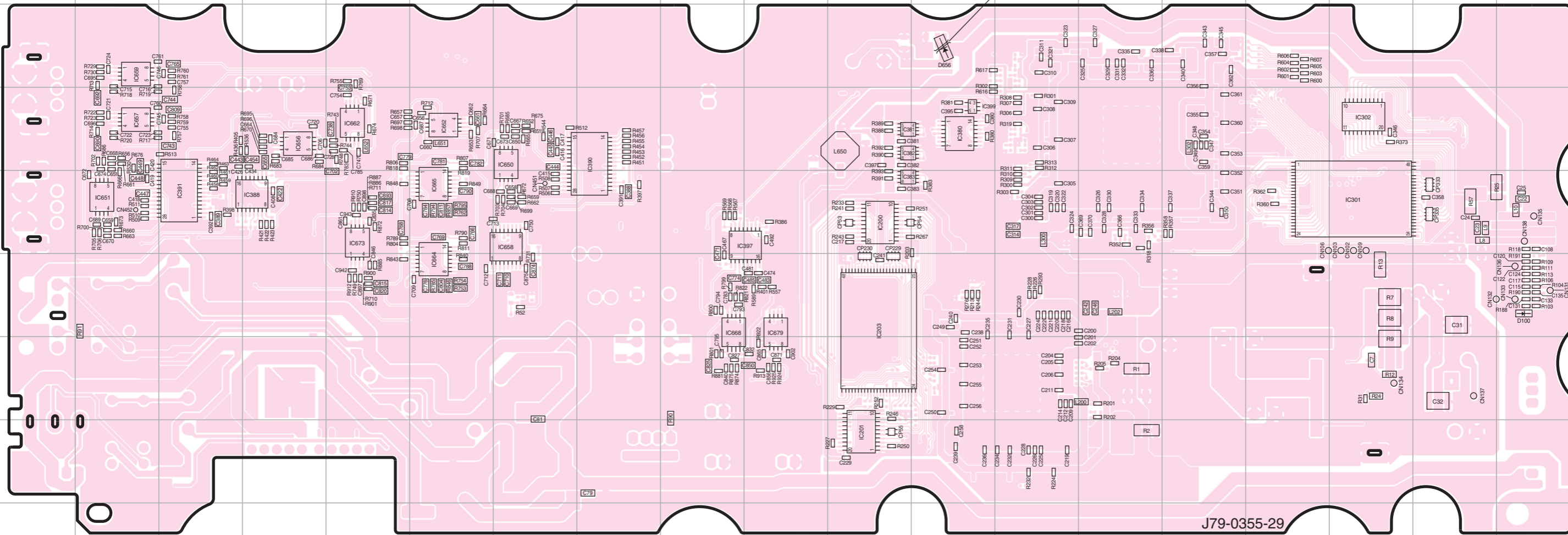
Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
D1	6Q	IC202	5M	IC654	8F	IC671	7F	IC685	9C	Q58	6I
D50	4C	IC300	8N	IC655	8G	IC672	9B	IC686	5J	Q100	8R
D51	6B	IC385	6K	IC660	7D	IC674	7J	Q51	4F	Q101	8R
D52	6I	IC386	8E	IC661	7E	IC675	9J	Q52	6F	Q652	9C
IC1	5Q	IC387	7I	IC663	8H	IC678	8B	Q53	4C	Q653	9C
IC50	7G	IC389	9H	IC666	7J	IC681	5J	Q54	6C	Q654	5J
IC51	5D	IC392	8C	IC667	9J	IC682	9B	Q55	6I	Q655	5J
IC52	5E	IC398	7K	IC669	5J	IC683	8J	Q56	4C		
IC101	8Q	IC653	8G	IC670	7B	IC684	9C	Q57	6C		



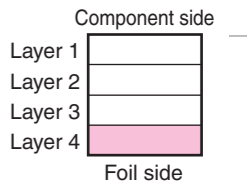
TS-990S PC BOARD

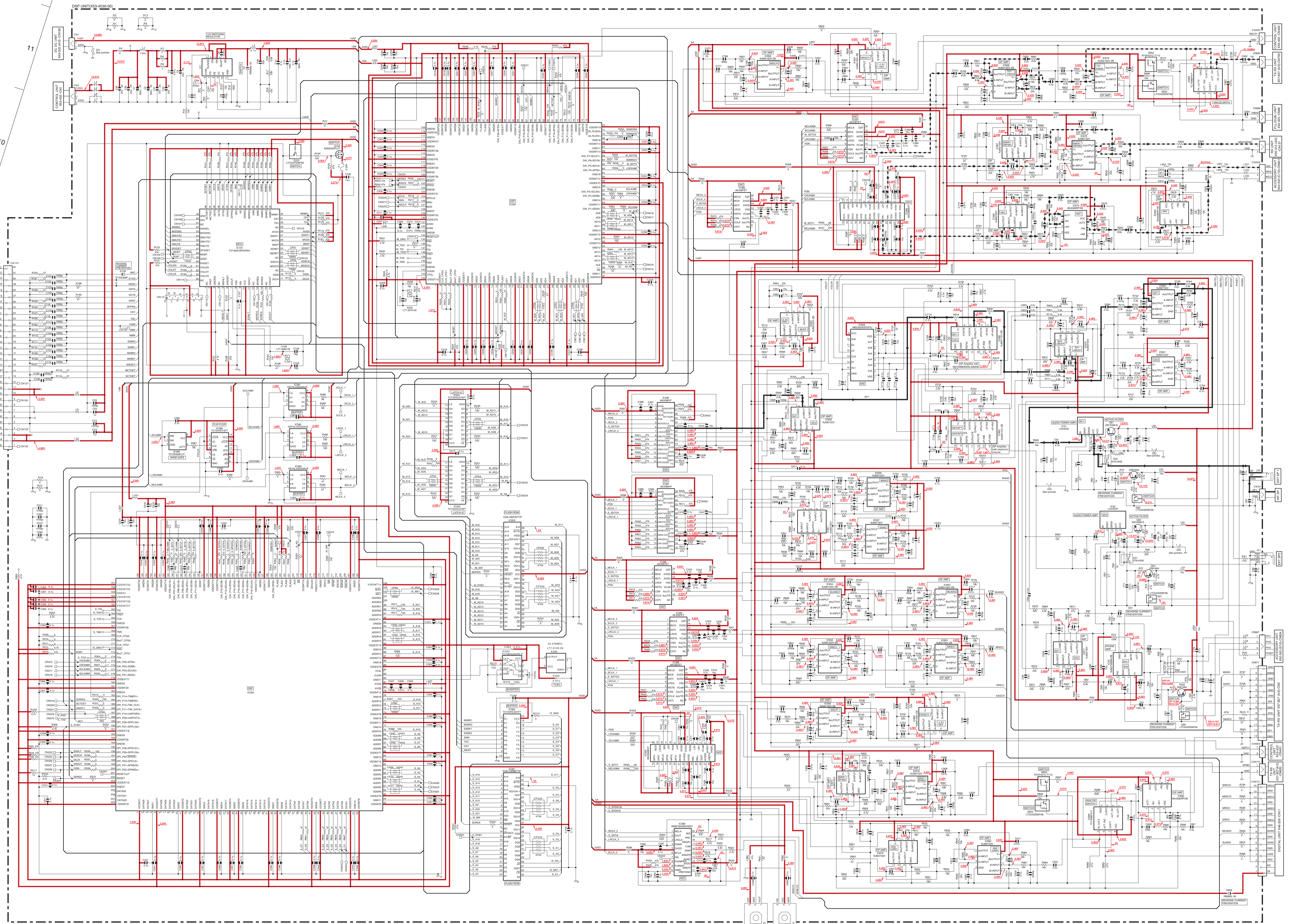
DSP UNIT (X53-4530-00)
Foil side view (J79-0355-29)

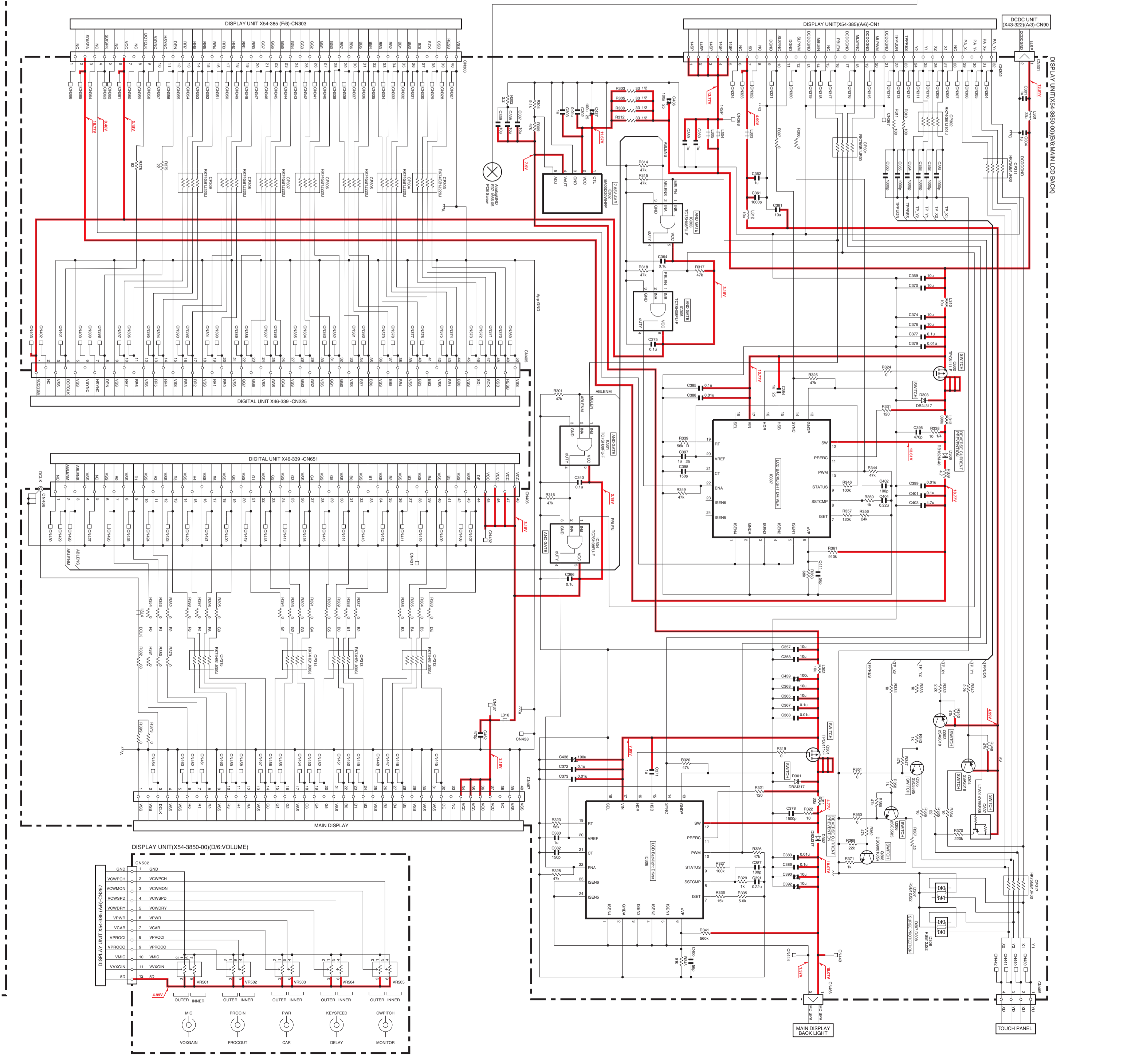
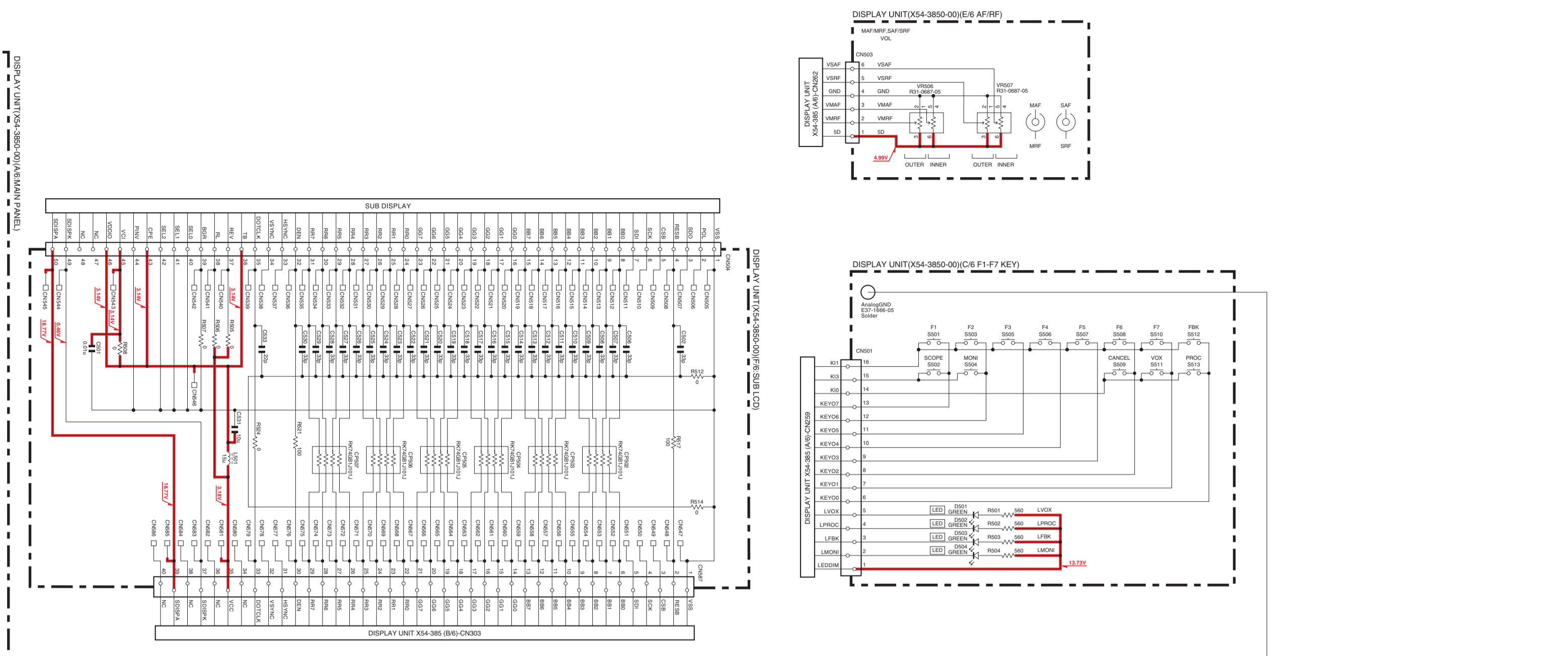
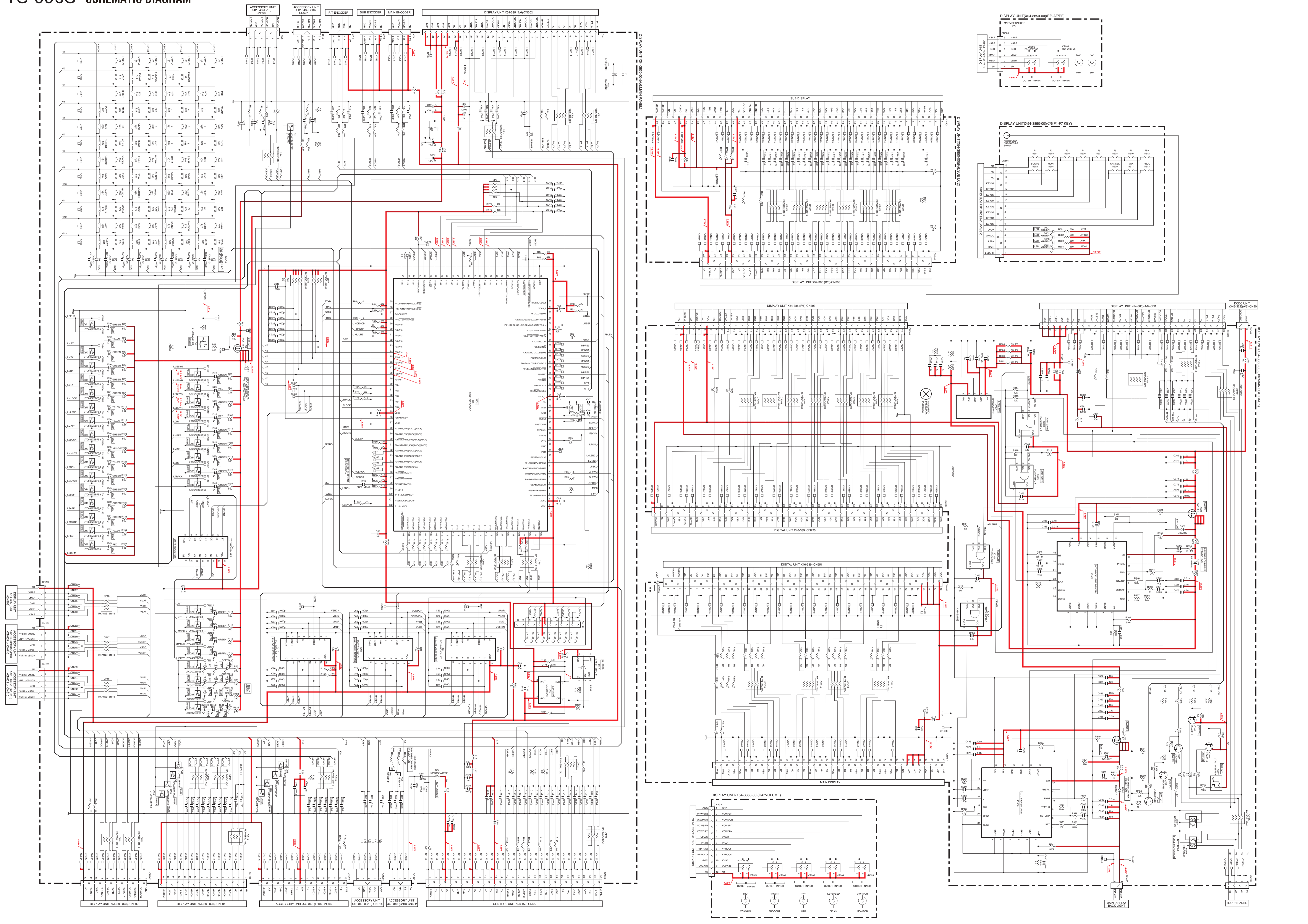
Pattern cut



Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
D100	7S	IC383	6K	IC656	5D	IC679	7J
IC200	6K	IC388	6D	IC657	5B		
IC201	9K	IC390	5H	IC658	6G		
IC203	7K	IC391	6C	IC659	4B		
IC301	6Q	IC397	6J	IC662	5E		
IC302	5Q	IC399	5L	IC664	7F		
IC380	5L	IC650	5G	IC665	6F		
IC381	5K	IC651	6B	IC668	7I		
IC382	5K	IC652	5F	IC673	6E		

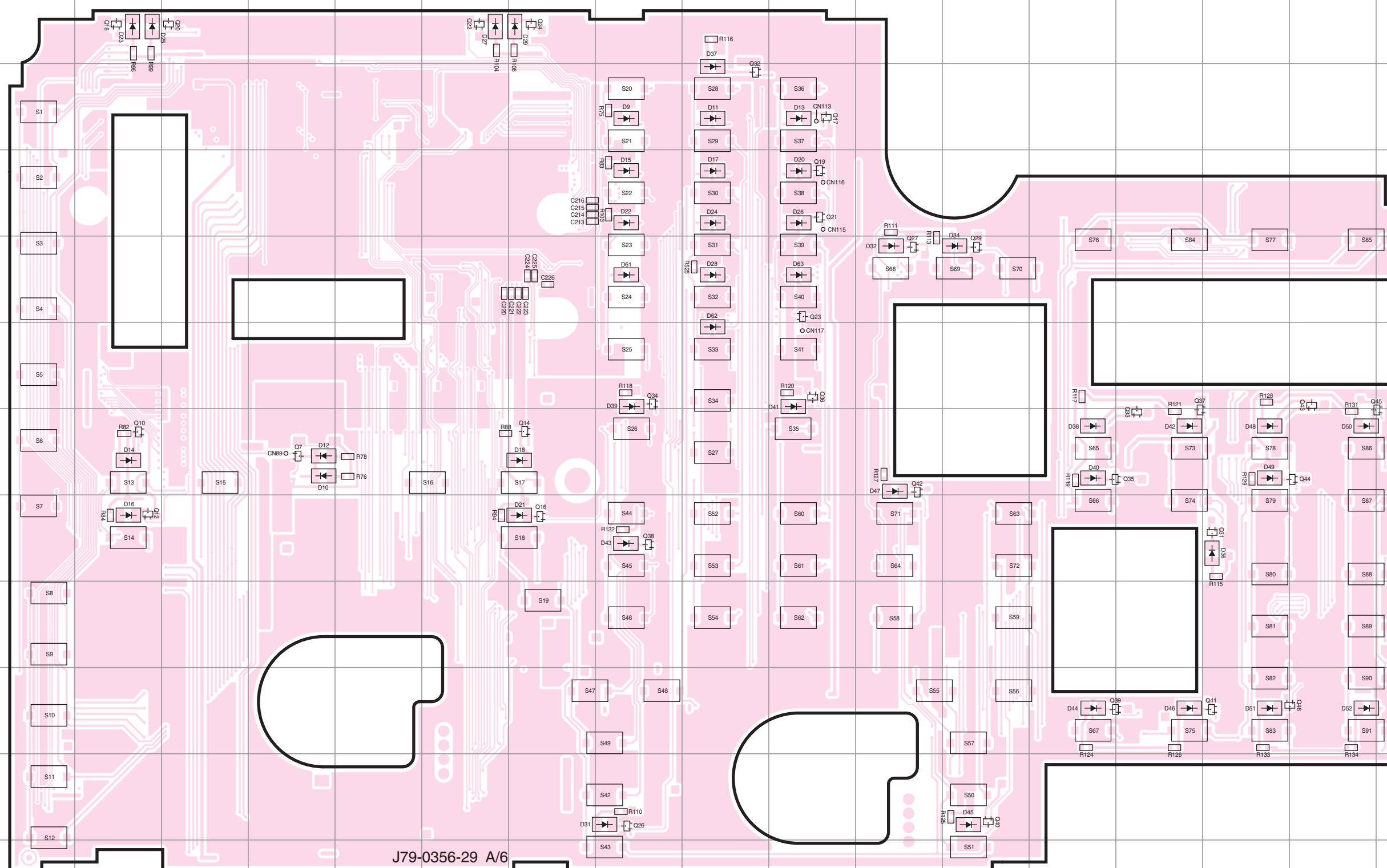




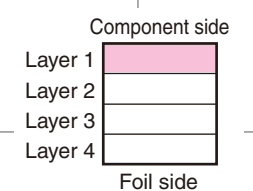


PC BOARD TS-990S

DISPLAY UNIT (X54-3850-00) (A/6:MAIN PANEL)
Component side view (J79-0356-29)



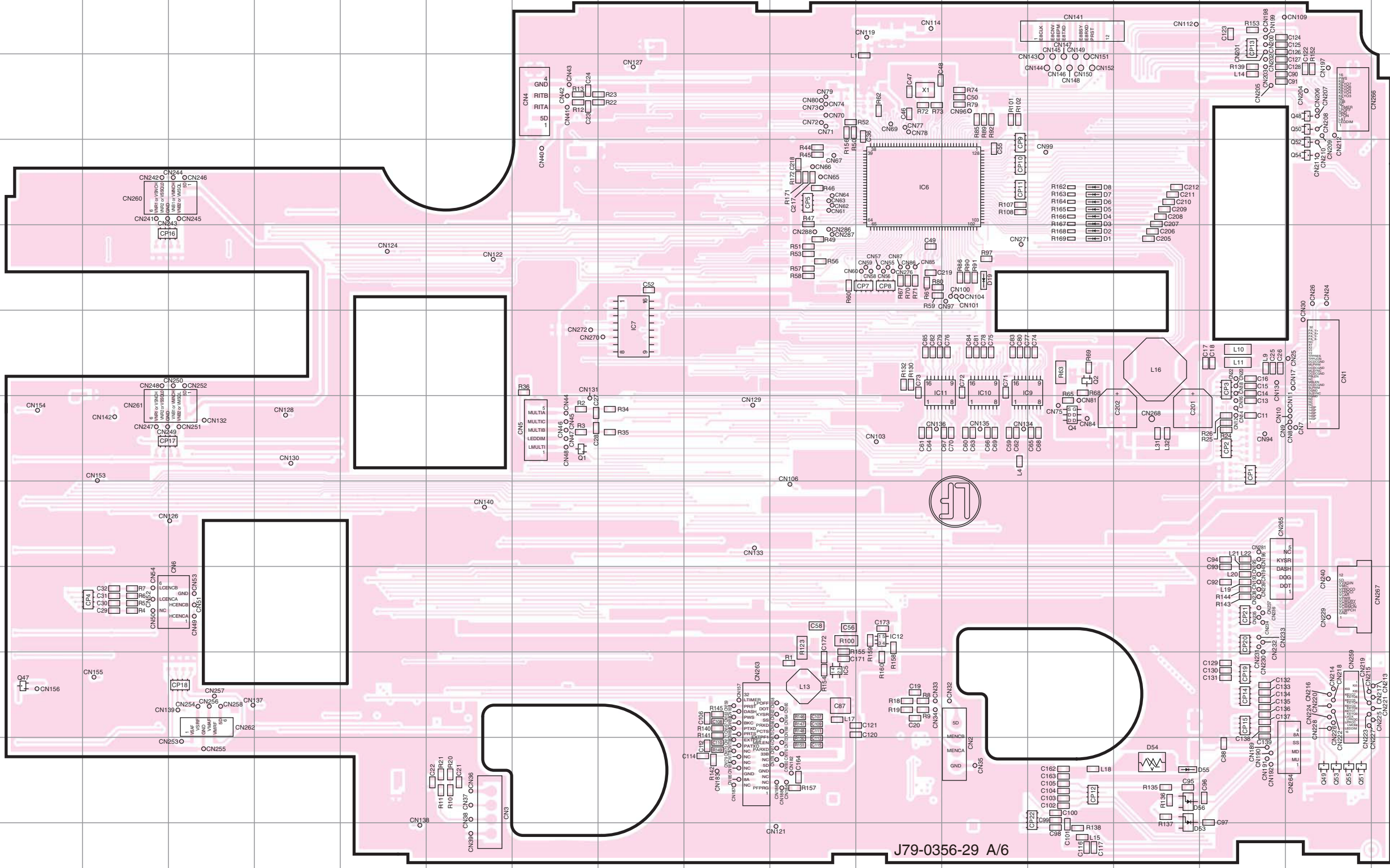
Ref. No.	Address	Ref. No.	Address
D9	4H	D51	11O
D10	8D	D52	11P
D11	4I	D61	6H
D12	8D	D62	7I
D13	4J	D63	6J
D14	8B	Q7	8D
D15	5H	Q10	8B
D16	9B	Q12	9B
D17	5I	Q14	8G
D18	8G	Q16	9G
D20	5J	Q17	4J
D21	9G	Q18	3B
D22	5H	Q19	5J
D23	3B	Q20	3C
D24	5I	Q21	5J
D25	3B	Q22	3F
D26	5J	Q23	6J
D27	3F	Q24	3G
D28	6I	Q26	12H
D29	3G	Q27	6K
D31	12H	Q29	6L
D32	6K	Q31	9O
D34	6L	Q32	4I
D36	9O	Q33	8N
D37	4I	Q34	7H
D38	8M	Q35	8M
D39	7H	Q36	7J
D40	8M	Q37	8N
D41	7J	Q38	9H
D42	8N	Q39	11M
D43	9H	Q40	12L
D44	11M	Q41	11O
D45	12L	Q42	8K
D46	11N	Q43	7P
D47	8K	Q44	8P
D48	8O	Q45	8P
D49	8O	Q46	11O
D50	8P		



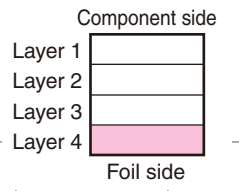
J79-0356-29 A/6

TS-990S PC BOARD

DISPLAY UNIT (X54-3850-00) (A/6:MAIN PANEL)
Foil side view (J79-0356-29)

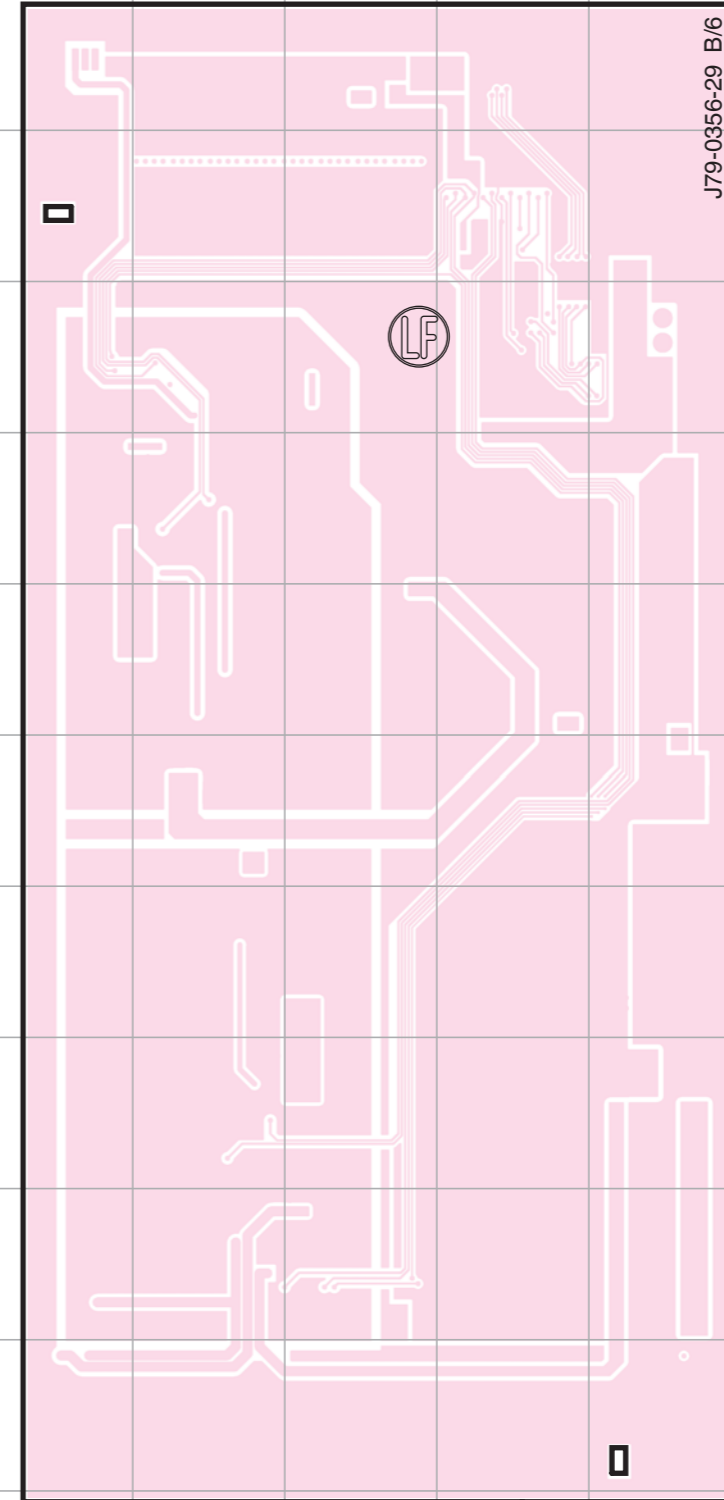


Ref. No.	Address
D1	6L
D2	6M
D3	5M
D4	5M
D5	5M
D6	5M
D7	5M
D8	5M
D19	6L
D53	12N
D54	12N
D55	12N
D56	12N
IC5	11J
IC6	5K
IC7	7H
IC9	7L
IC10	7L
IC11	7K
IC12	10K
Q1	8G
Q2	7M
Q4	8M
Q47	11A
Q48	4P
Q49	12P
Q50	4P
Q51	12P
Q52	5P
Q53	12P
Q54	5P
Q55	12P

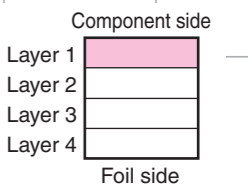
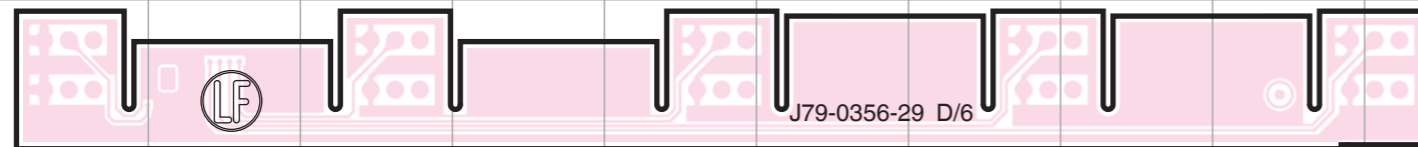
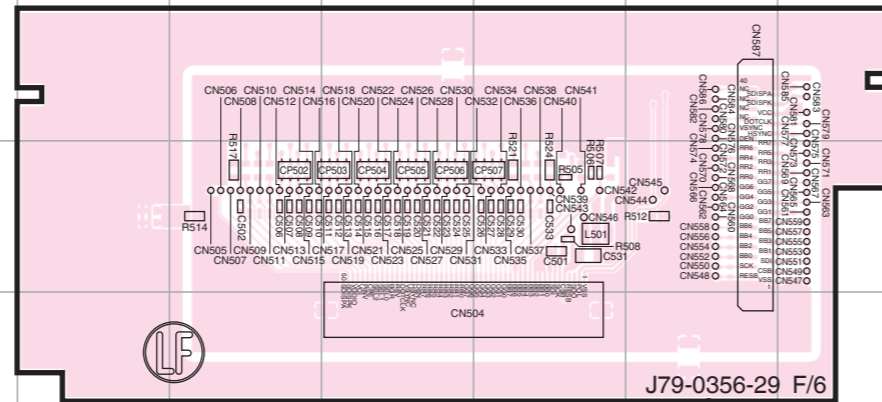
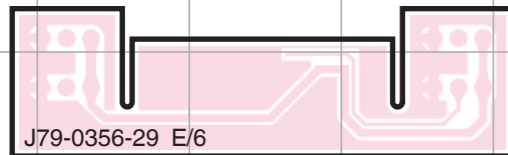


PC BOARD TS-990S

DISPLAY UNIT (X54-3850-00) (B/6:MAIN LCD BACK, C/6:F1-F7 KEY, D/6:VOLUME, E/6:AR/RF, F/6:SUB LCD)
Component side view (J79-0356-29)

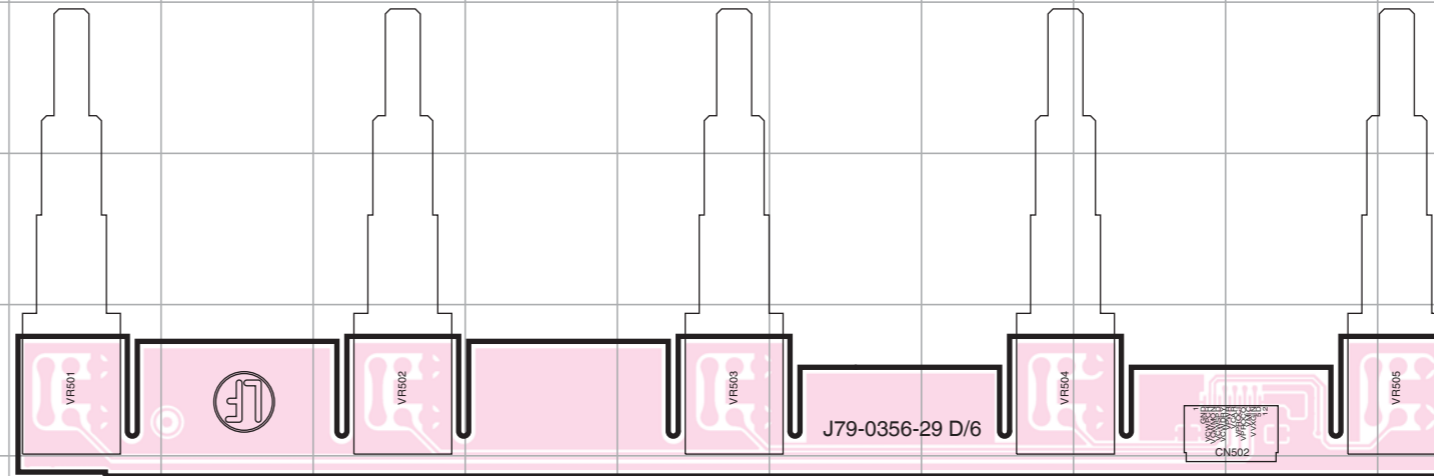
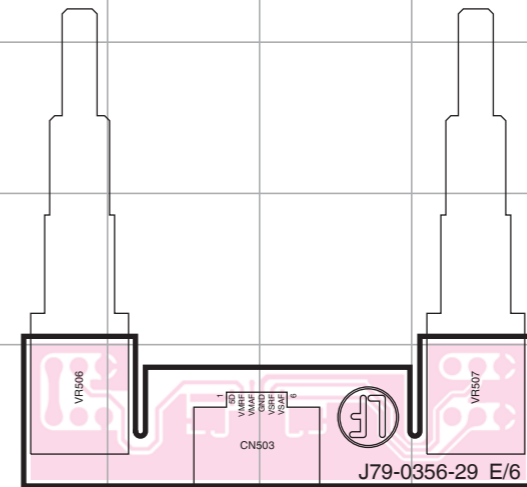
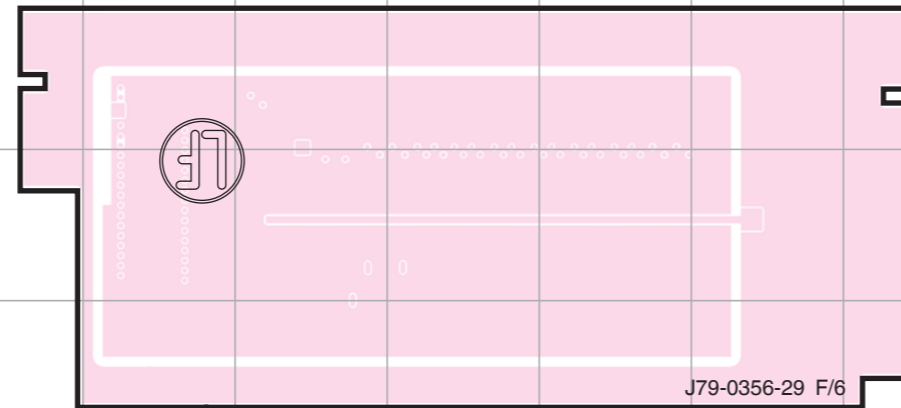
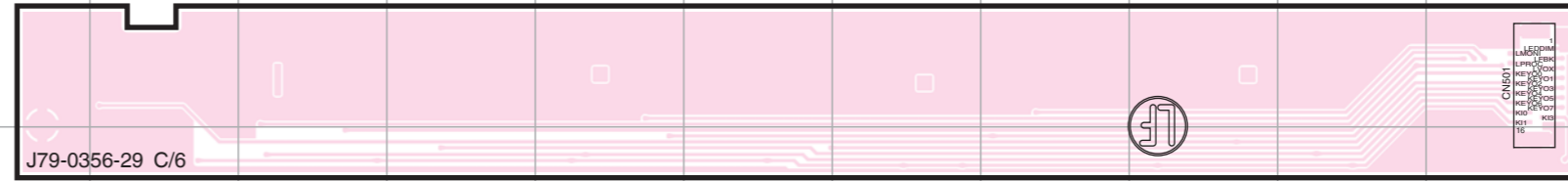
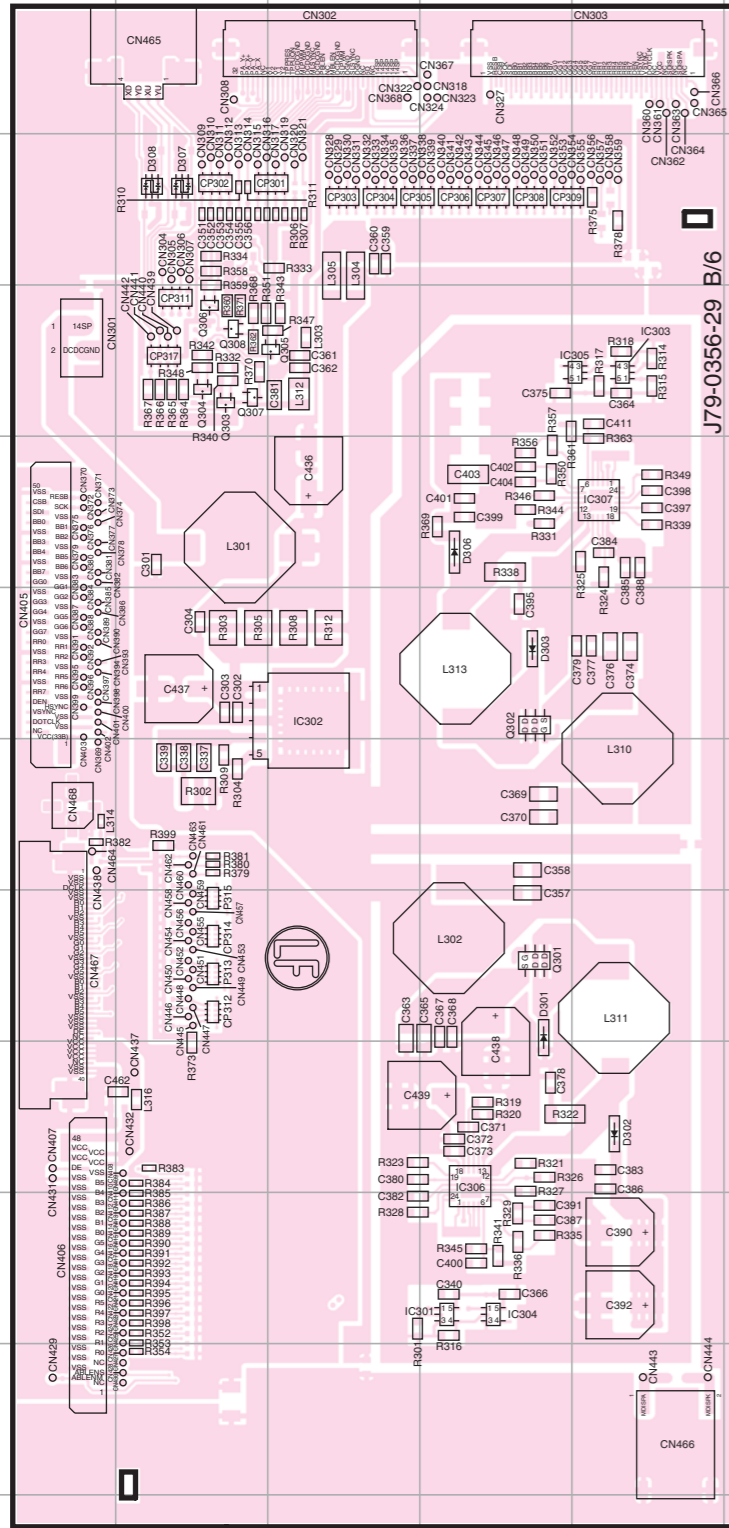


Ref. No.	Address
D501	3I
D502	3G
D503	3E
D504	3C

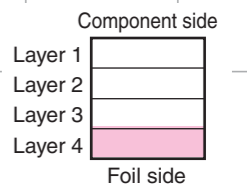


TS-990S PC BOARD

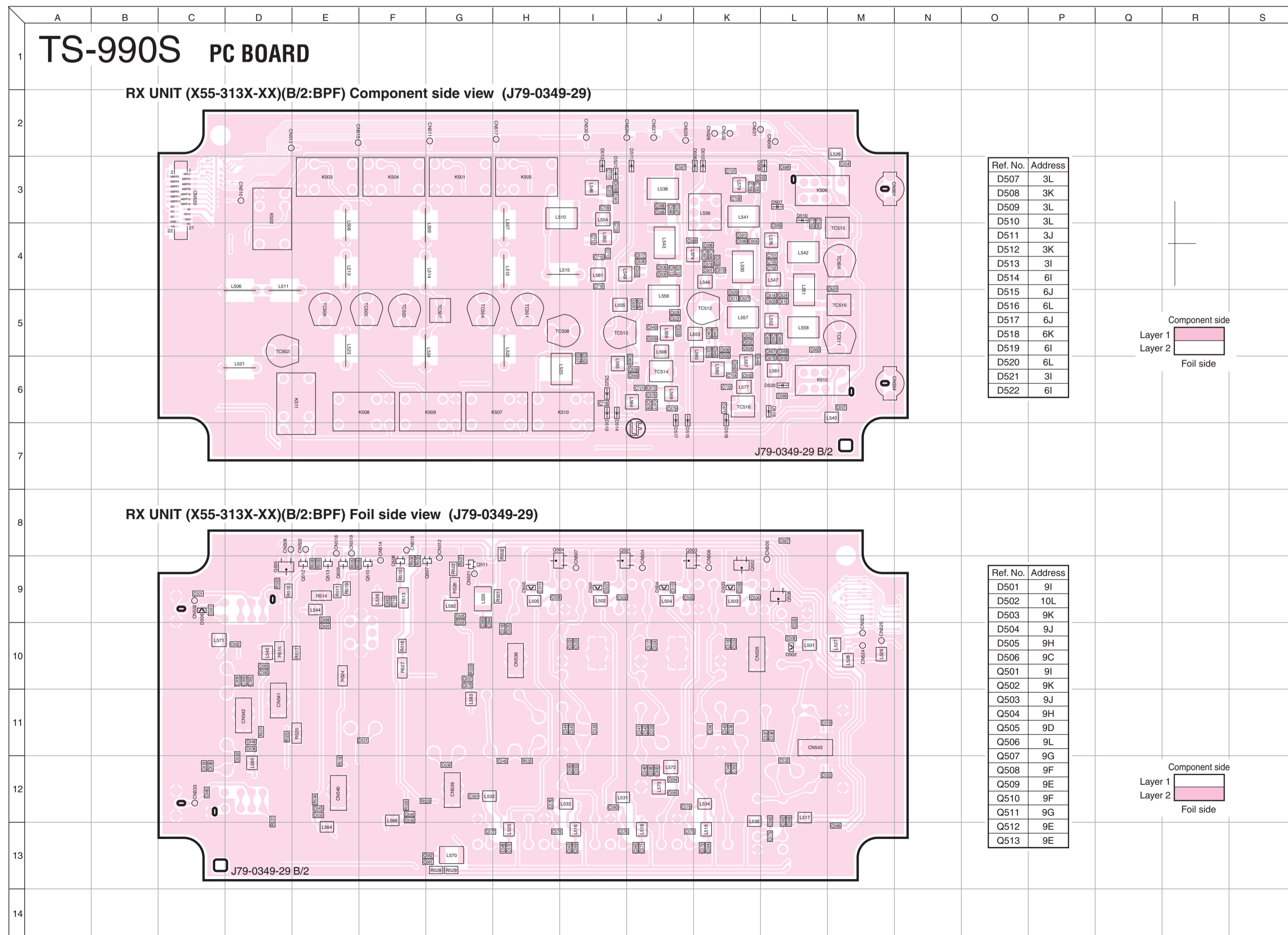
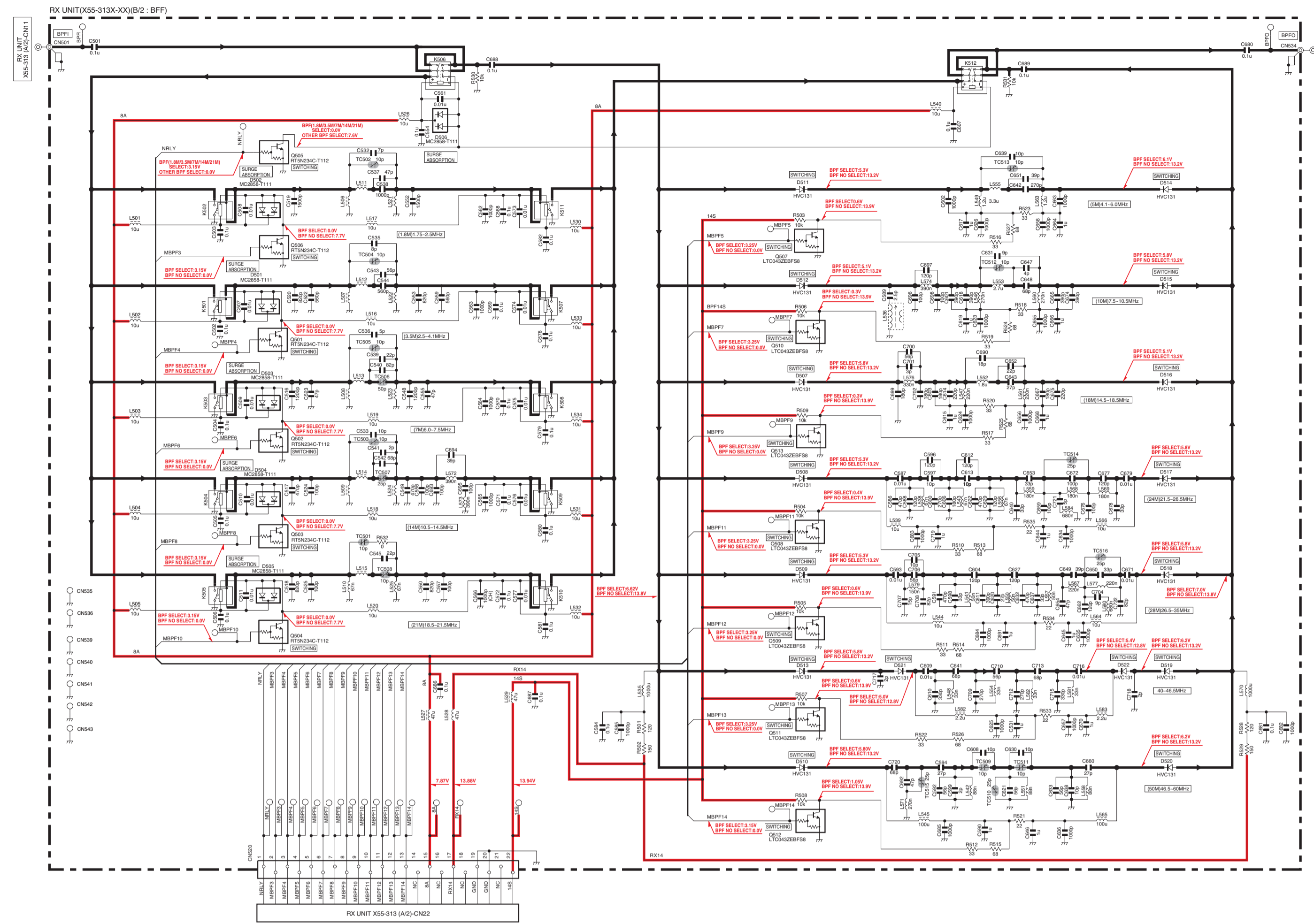
DISPLAY UNIT (X54-3850-00) (B/6:MAIN LCD BACK, C/6:F1-F7 KEY, D/6:VOLUME, E/6:AR/RF, F/6:SUB LCD)
Foil side view (J79-0356-29)



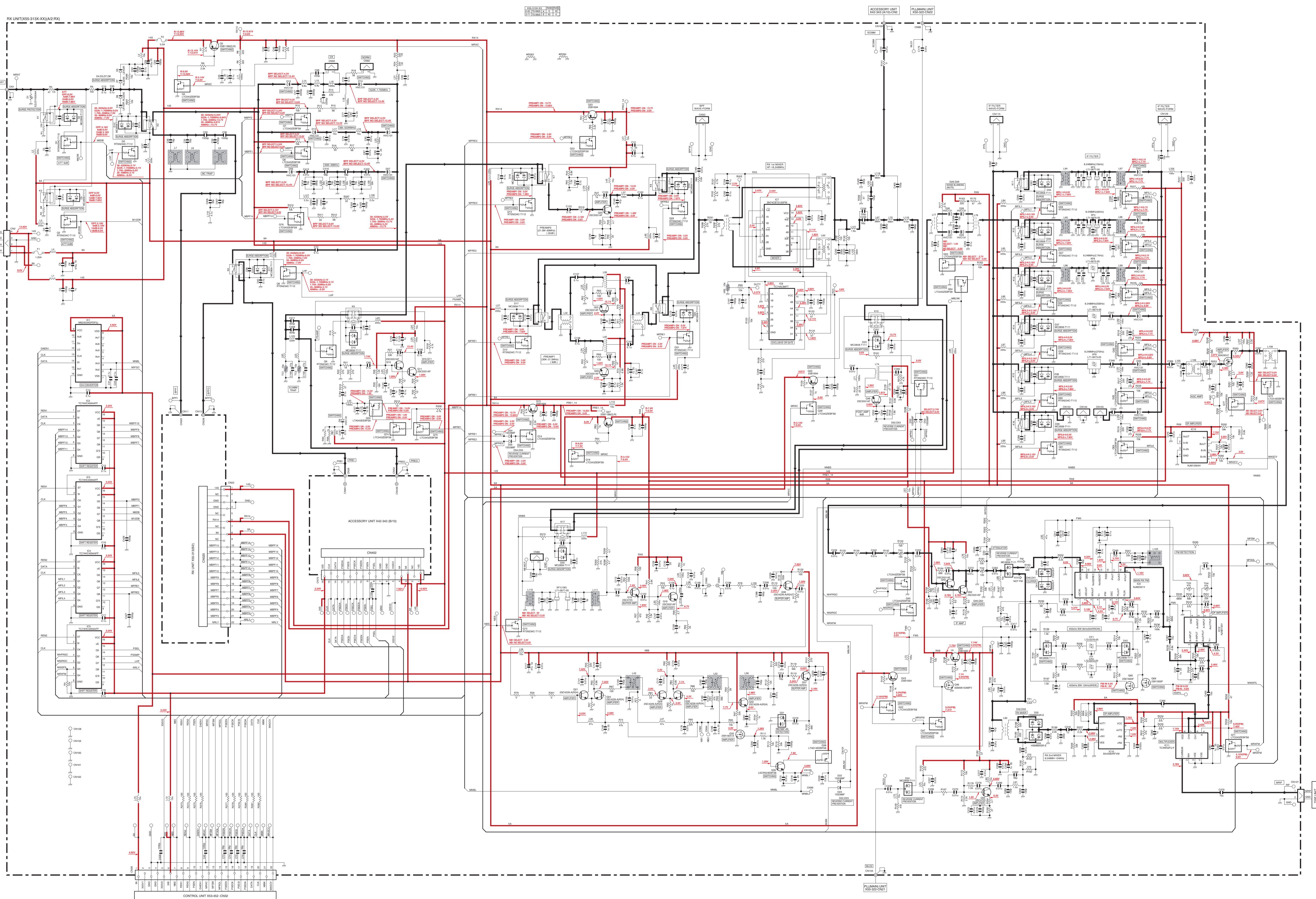
Ref. No.	Address
D301	9D
D302	10E
D303	7D
D306	6D
D307	4B
D308	4B
IC301	11D
IC302	7C
IC303	5E
IC304	11D
IC305	5E
IC306	10D
IC307	6E
Q301	9D
Q302	7D
Q303	5B
Q304	5B
Q305	5C
Q306	5B
Q307	5B
Q308	5B



TS-990S SCHEMATIC DIAGRAM



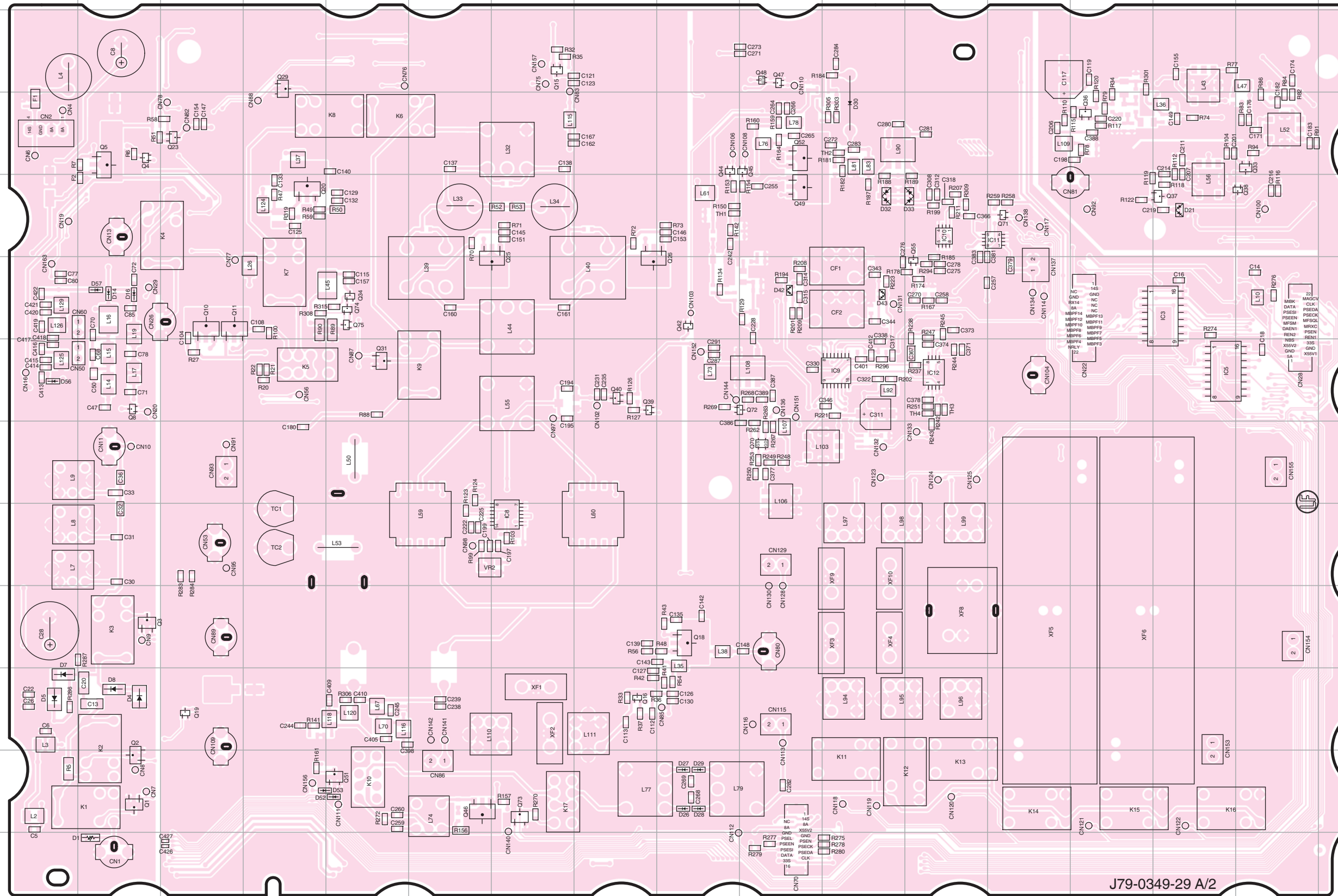
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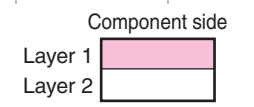
A B C D E F G H I J K L M N O P

PC BOARD TS-990S

RX UNIT (X55-313X-XX)(A/2)
Component side view (J79-0349-29)



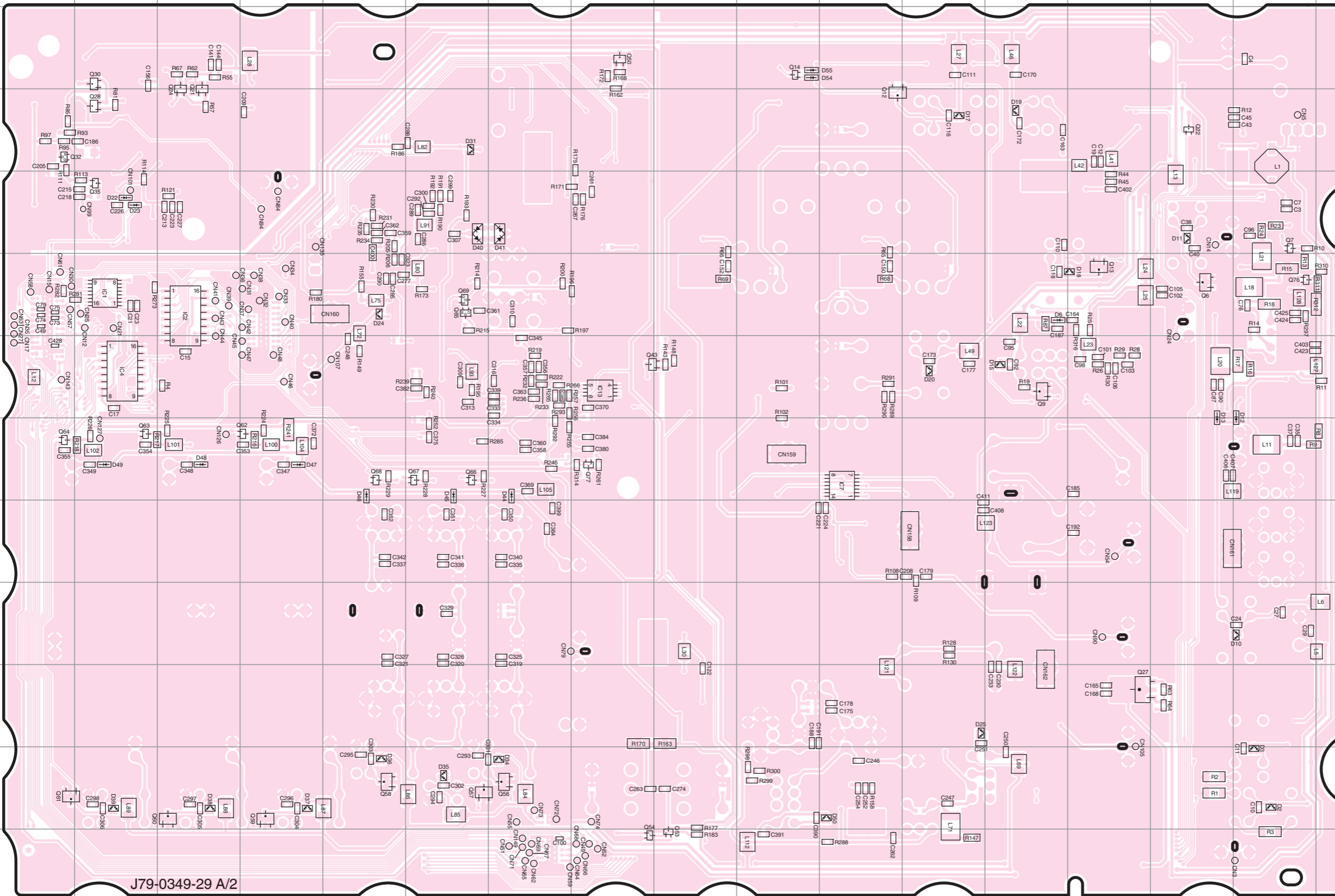
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D4	11B	Q15	3G
D5	11A	Q16	11H
D7	11A	Q18	10I
D8	11B	Q19	11C
D14	6B	Q20	5D
D16	6B	Q23	4C
D21	5O	Q25	6F
D26	12I	Q26	6H
D27	12I	Q29	3D
D28	12I	Q31	7E
D29	12I	Q33	4P
D30	4K	Q34	6E
D32	5K	Q36	4N
D33	5L	Q37	5O
D42	6J	Q38	5P
D43	6K	Q39	7H
D52	12E	Q40	7H
D53	12D	Q42	6I
D56	7A	Q44	4I
D57	6B	Q45	4J
IC3	6O	Q46	12F
IC5	7O	Q47	3J
IC8	9G	Q48	3J
IC9	7K	Q49	5J
IC10	5L	Q51	12E
IC11	5M	Q52	4J
IC12	7L	Q55	6L
Q1	12B	Q70	8J
Q2	12B	Q71	5M
Q3	10B	Q72	7J
Q4	4B	Q73	12G
Q5	4B	Q74	6E
Q8	7B	Q75	6E
Q10	6C		



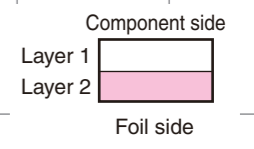
J79-0349-29 A/2

TS-990S PC BOARD

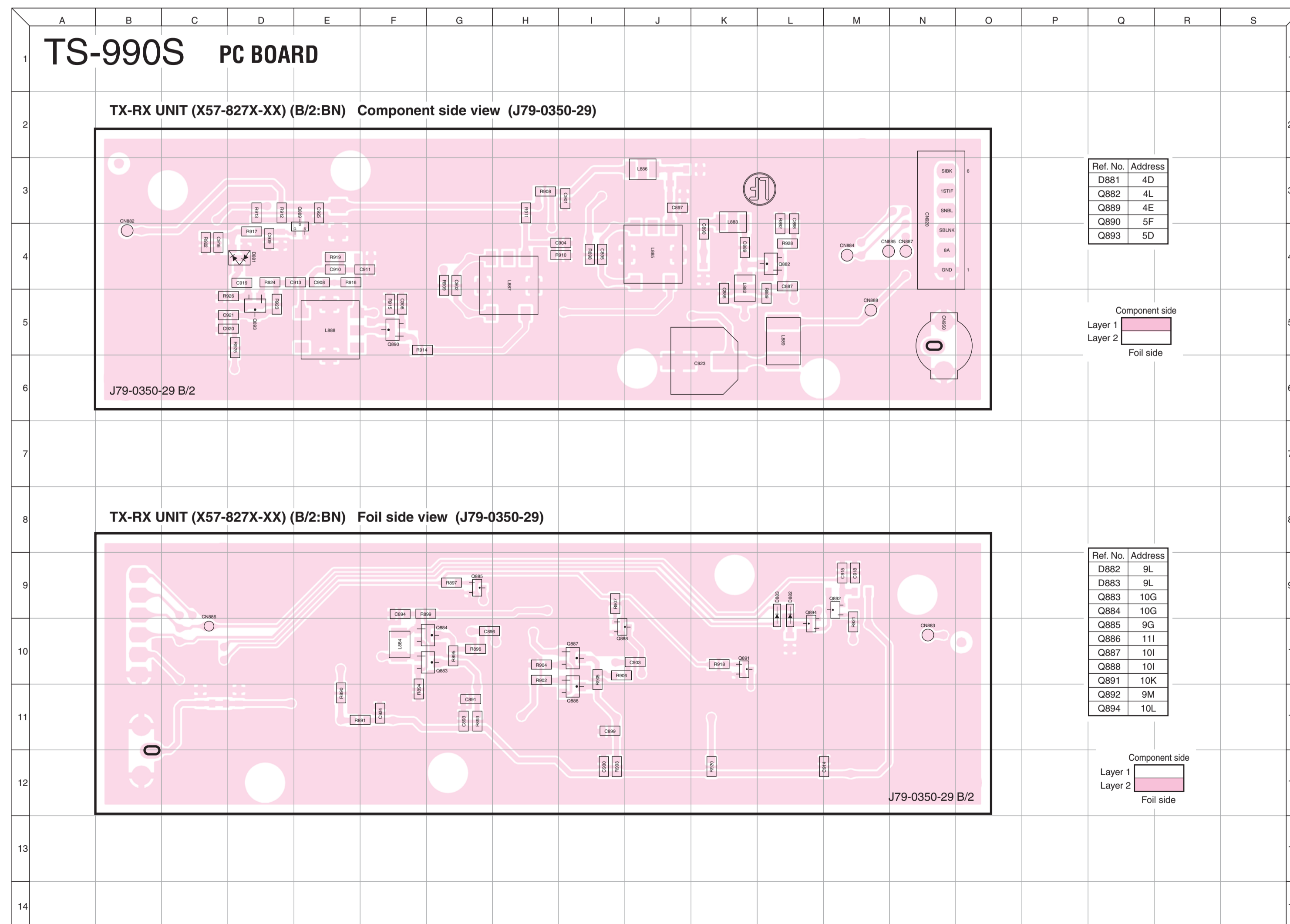
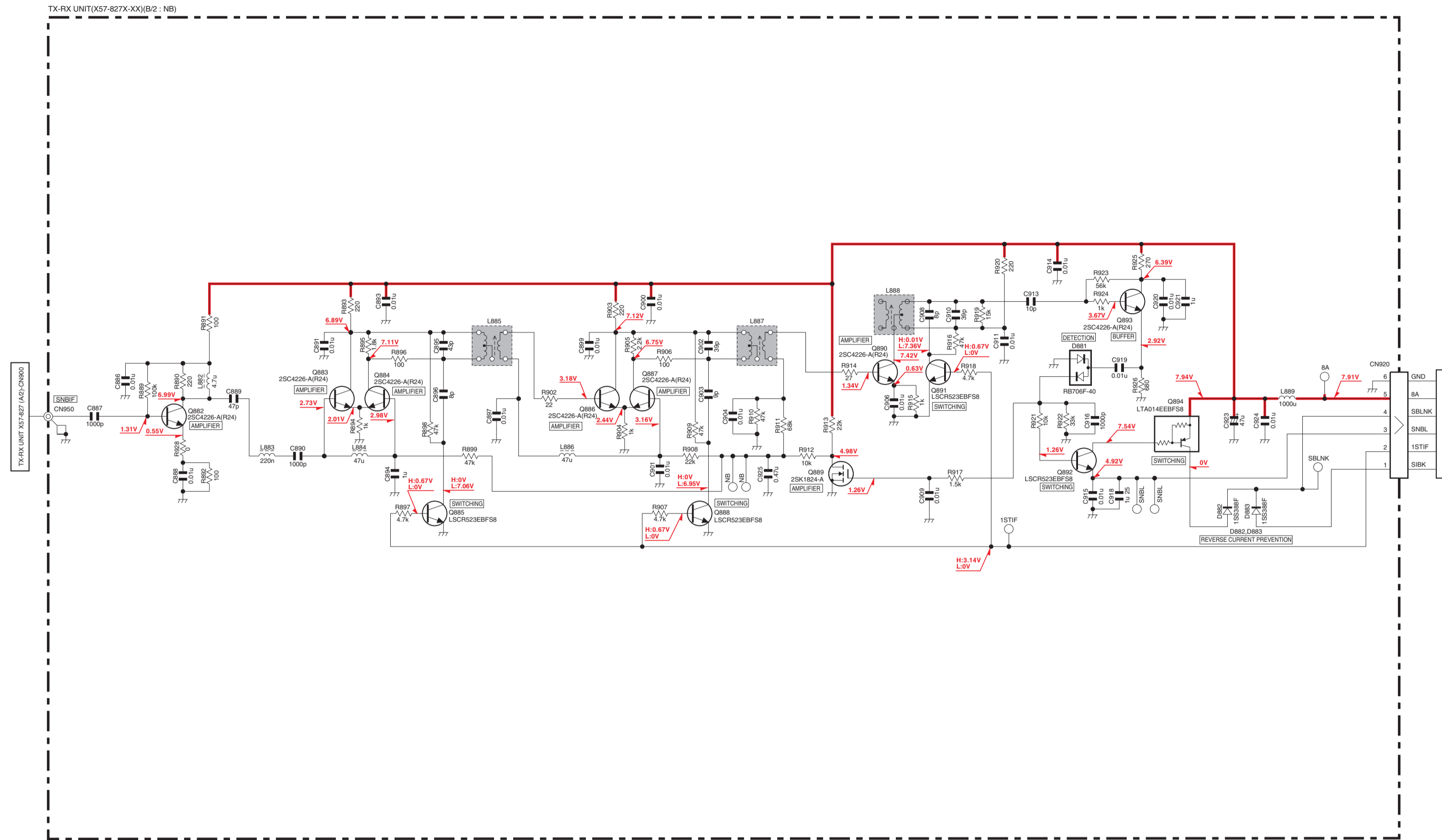
RX UNIT (X55-313X-XX) (A/2)
Foil side view (J79-0349-29)



Ref. No.	Address	Ref. No.	Address
D2	12P	IC7	8K
D3	12P	IC13	7H
D6	6M	Q6	6O
D10	10P	Q7	5P
D11	5O	Q9	7M
D12	8P	Q12	4K
D13	8O	Q13	6N
D15	7M	Q14	3J
D17	4L	Q21	4C
D18	6N	Q22	4O
D19	4M	Q24	4C
D20	7L	Q27	11N
D22	5B	Q28	4B
D23	5B	Q30	3B
D24	6E	Q32	4A
D25	11L	Q35	5B
D31	4F	Q43	7H
D34	12G	Q50	3H
D35	12F	Q53	13I
D36	12E	Q54	13H
D37	12D	Q56	12G
D38	12C	Q57	12F
D39	12B	Q58	12E
D40	5F	Q59	12D
D41	5G	Q60	12C
D44	8G	Q61	12A
D45	8F	Q63	8B
D46	8E	Q62	8D
D47	8D	Q64	8A
D49	8B	Q65	6F
D48	8C	Q67	8F
D50	12K	Q66	8F
D54	3J	Q68	8E
D55	3J	Q69	6F
IC1	6B	Q76	6P
IC2	6C	Q77	8H

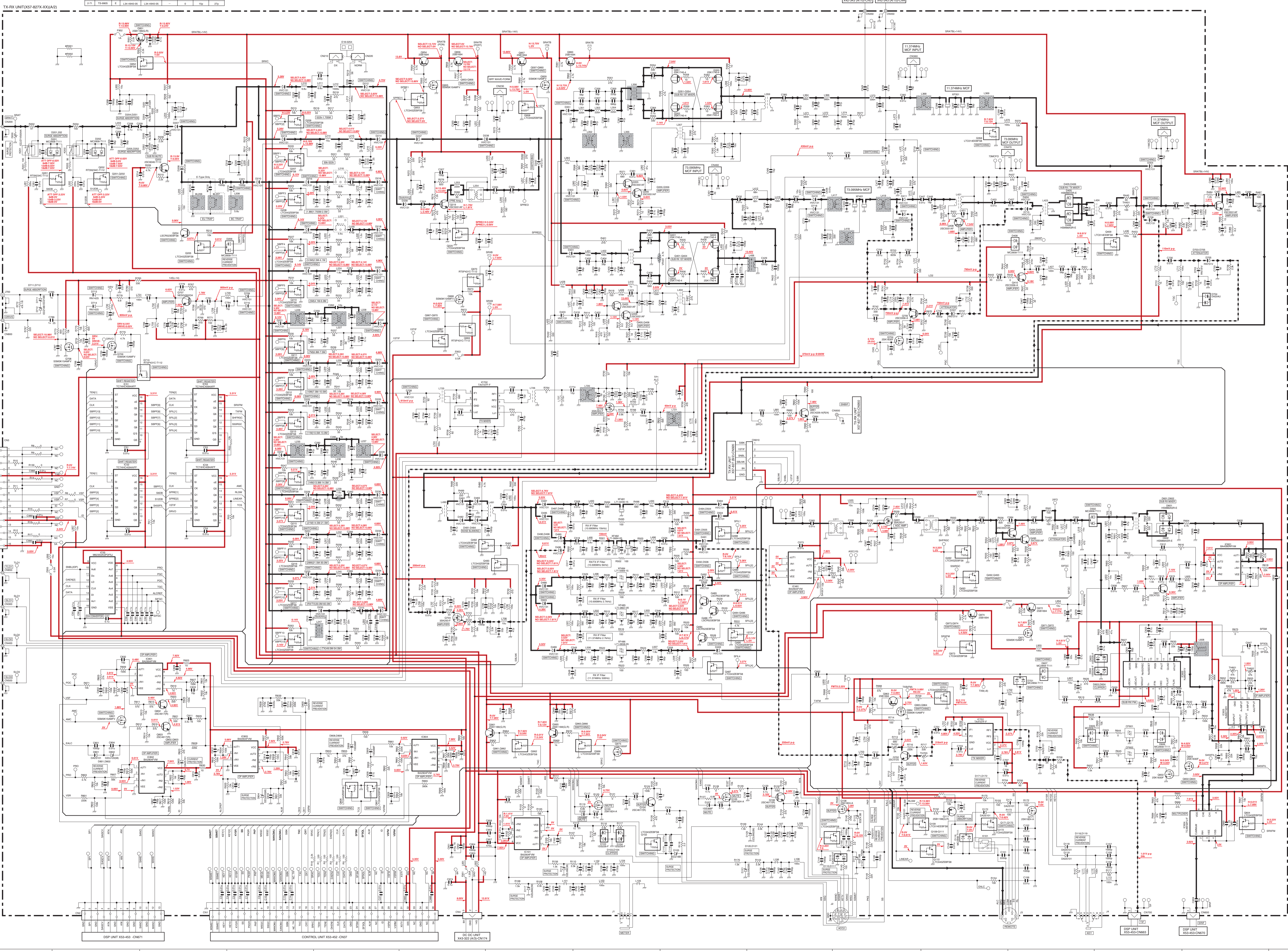


TS-990S SCHEMATIC DIAGRAM



TS-990S SCHEMATIC DIAGRAM

REV	DATE	BY	CHKD	APPD	DESCRIPTION
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1.1	03/09/99	TS	TS	TS	REVISION



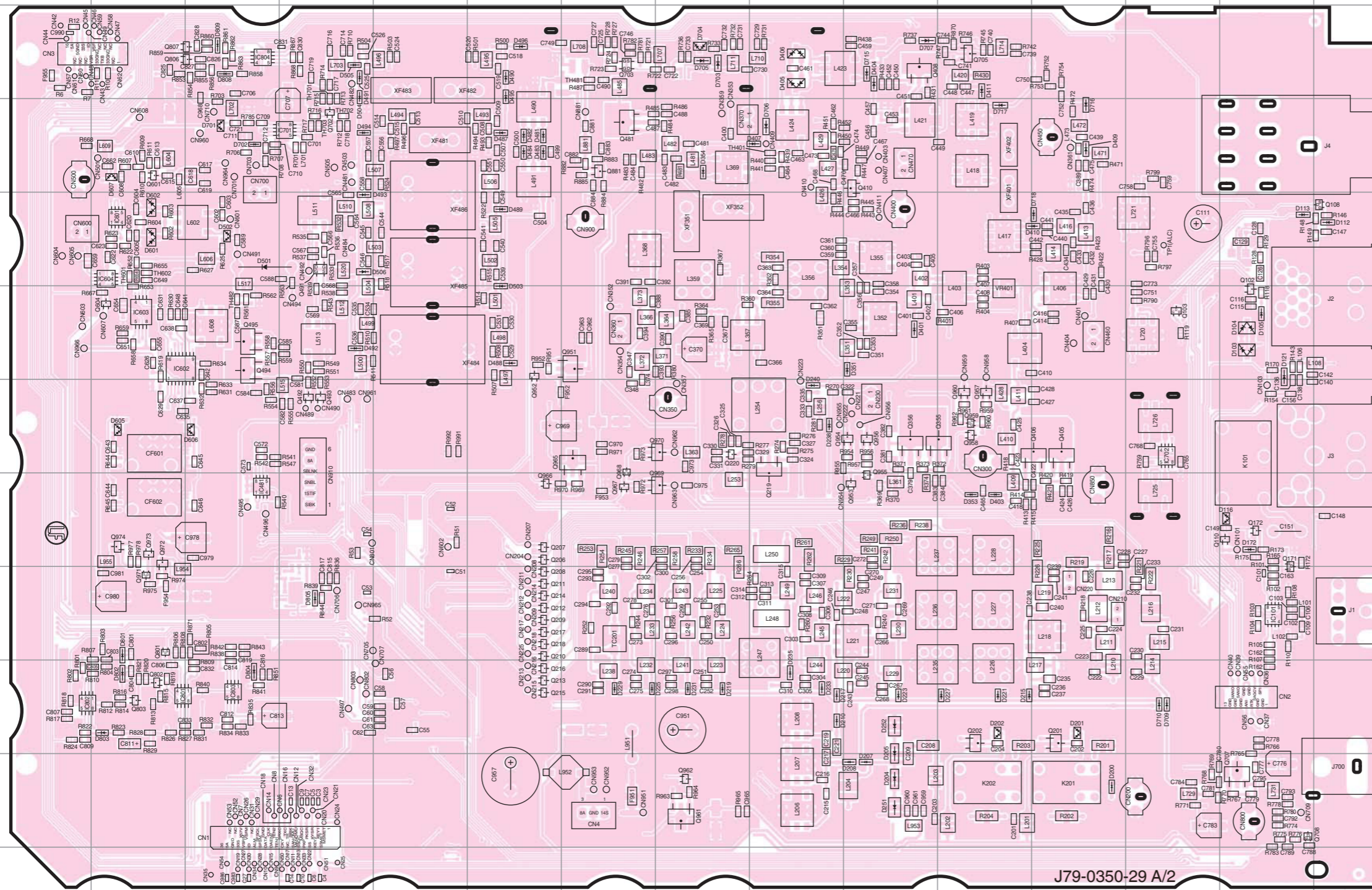
DSP UNIT X33-453 - CN171 CONTROL UNIT X33-452 - CN174 IC DC UNIT X43-322 (A/S)-CN174 DSP UNIT X33-453 - CN170 DSP UNIT X33-453 - CN160

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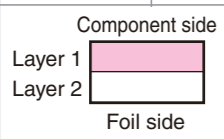
A B C D E F G H I J K L M N O P

PC BOARD TS-990S

TX-RX UNIT (X57-827X-XX) (A/2) Component side view (J79-0350-29)



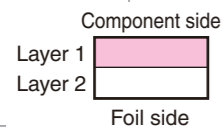
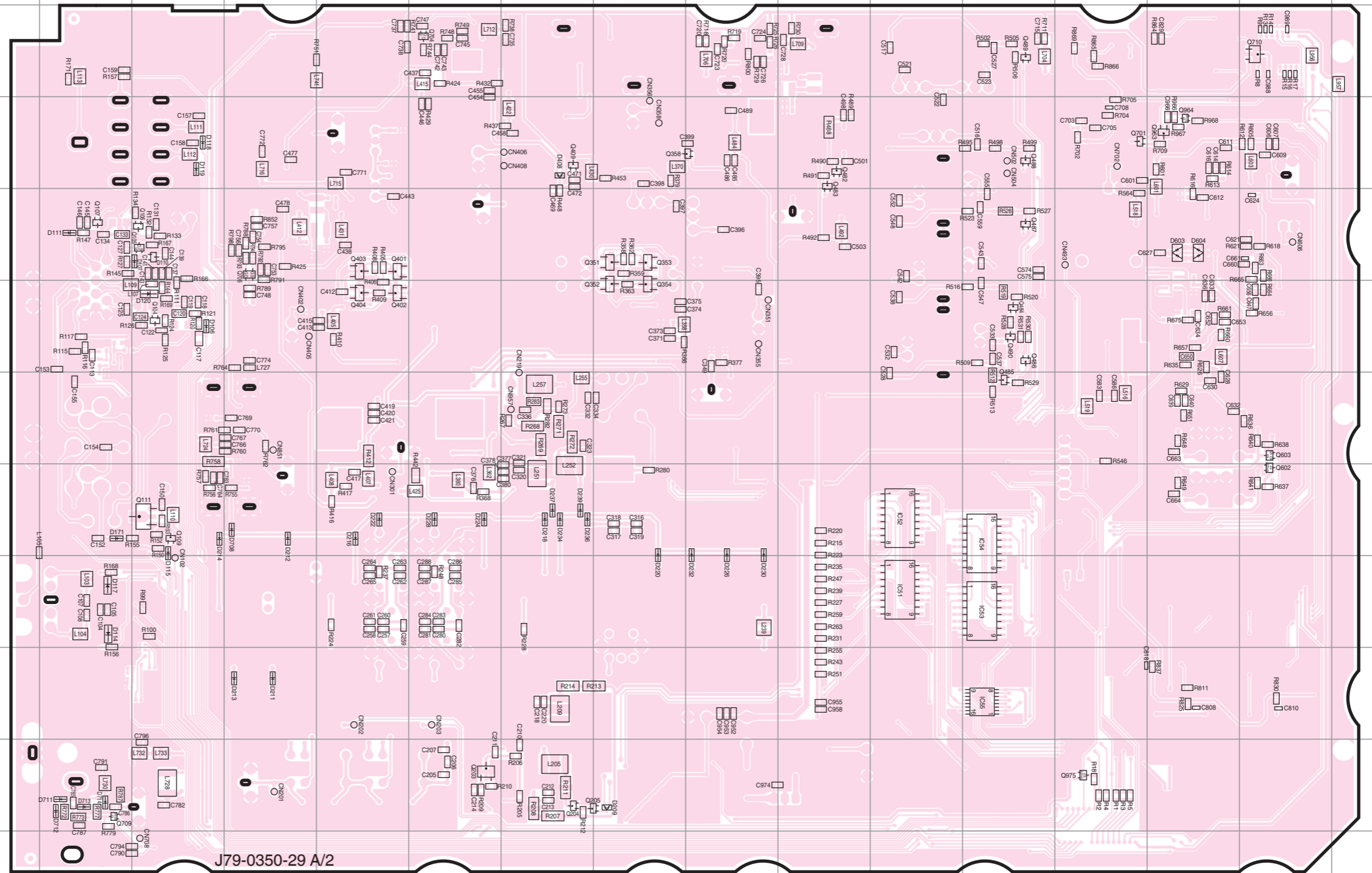
Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
D103	6N	D501	5C	Q212	9F
D104	6N	D502	5C	Q213	10F
D105	6N	D503	6F	Q214	9F
D112	5O	D504	3D	Q215	10F
D113	5N	D505	3D	Q216	10F
D116	8N	D506	5D	Q217	9F
D121	6N	D601	5B	Q218	9F
D172	8N	D602	5B	Q219	7I
D200	11L	D605	7B	Q220	7H
D201	10L	D606	7C	Q355	7K
D202	10K	D607	4B	Q356	7J
D204	11J	D701	4C	Q405	7L
D205	11J	D702	4C	Q406	7L
D207	11J	D703	3H	Q408	3J
D208	11J	D704	3H	Q410	4J
D210	10I	D705	3H	Q481	4G
D215	10K	D706	4I	Q491	5D
D217	10I	D707	3J	Q492	7D
D219	10H	D709	10M	Q493	7D
D221	10K	D710	10M	Q494	6C
D223	10J	D715	3J	Q495	6C
D225	10G	D716	4L	Q601	4B
D227	10K	D717	4K	Q604	6B
D229	10G	D718	5L	Q702	4D
D231	10H	D801	9B	Q703	3G
D233	10I	D802	10B	Q705	3K
D235	10I	D803	10B	Q707	11N
D238	7I	D804	10C	Q708	11N
D240	7I	D805	9D	Q801	9B
D251	11J	D808	3C	Q802	10B
D252	10J	D809	3C	Q803	10B
D351	6J	IC101	9N	Q806	3C
D353	8K	IC481	8C	Q807	3C
D354	4H	IC601	5B	Q881	4G
D401	6J	IC602	6B	Q951	6G
D403	8K	IC603	6B	Q952	6F
D404	3J	IC604	5B	Q953	8J
D405	3I	IC701	4D	Q954	7J
D406	3I	IC702	7M	Q955	8J
D407	4I	IC801	10B	Q956	7J
D409	4L	IC802	10A	Q957	7K
D410	5L	IC803	10C	Q958	7K
D411	3K	IC804	3C	Q959	7K
D481	4F	Q102	6N	Q960	7K
D482	4F	Q103	6M	Q961	11H
D483	4F	Q108	5O	Q962	11H
D484	4F	Q110	8N	Q965	7G
D487	4F	Q171	8N	Q966	8F
D488	6F	Q172	8N	Q967	8G
D489	5F	Q201	10L	Q968	7G
D490	3F	Q202	10K	Q969	8H
D491	3D	Q206	8F	Q970	7H
D492	6D	Q207	8F	Q971	9B
D493	5D	Q208	9F	Q972	8B
D494	4D	Q209	9F	Q973	8B
D495	3F	Q210	9F	Q974	8B
D496	3F	Q211	9F		

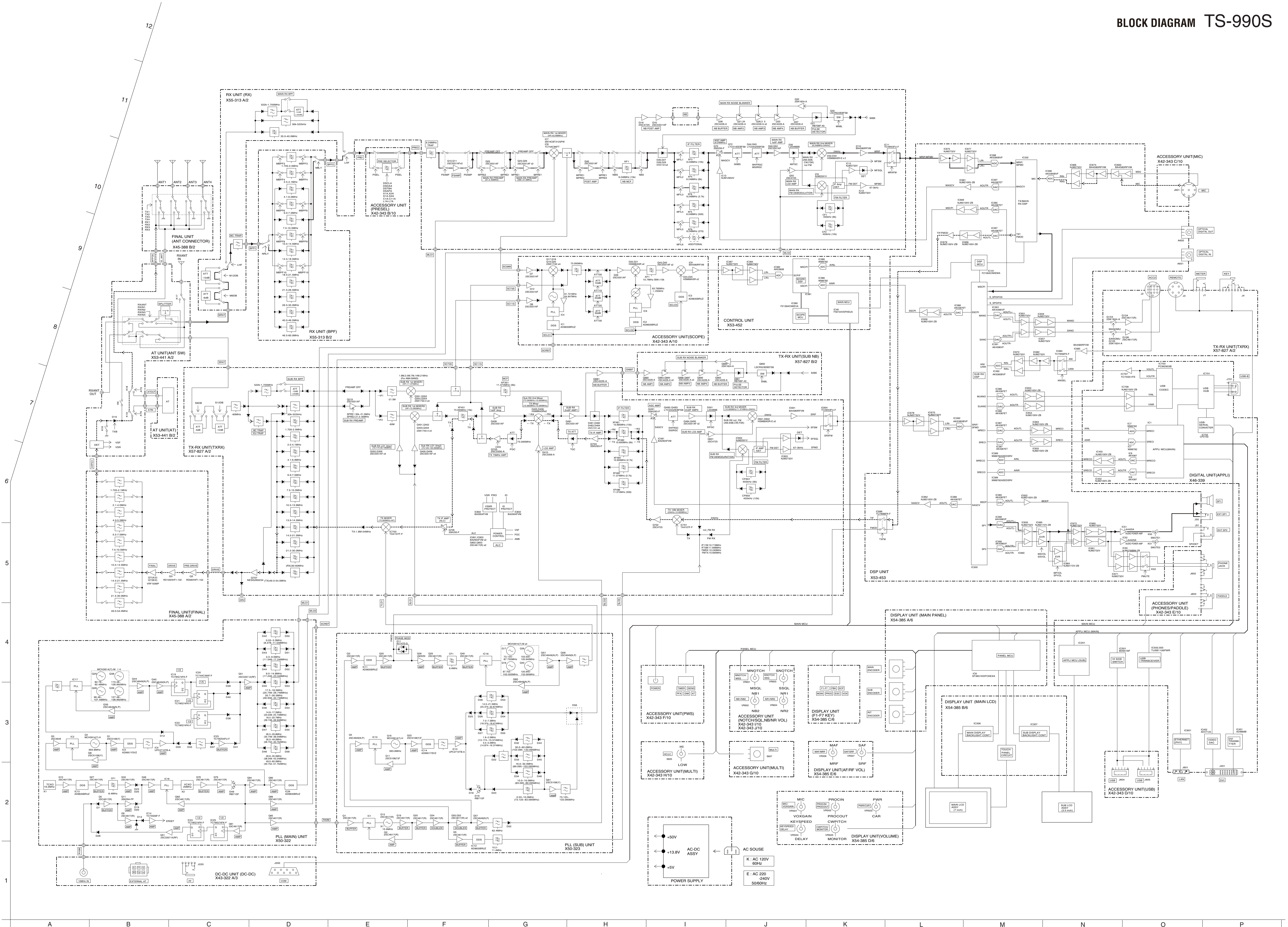


TS-990S PC BOARD

TX-RX UNIT (X57-827X-XX) (A/2)
Foil side view (J79-0350-29)

Ref. No.	Address	Ref. No.	Address
IC51	9N	Q963	4Q
IC52	8N	Q964	4Q
IC53	9O	Q975	11P
IC54	8O	D106	6F
IC55	10O	D107	5F
Q104	6F	D110	5F
Q105	5F	D111	5E
Q106	5F	D114	9E
Q107	5E	D115	8F
Q109	8F	D117	9E
Q111	8F	D118	4F
Q203	11I	D119	4F
Q204	11J	D120	6F
Q205	11J	D171	8E
Q351	5K	D209	11K
Q352	6K	D211	10G
Q353	5K	D212	8G
Q354	6K	D213	10G
Q358	4L	D214	8F
Q401	5H	D216	8H
Q402	6H	D218	8J
Q403	5H	D220	9K
Q404	6H	D222	8H
Q409	4J	D224	8I
Q482	4M	D226	9L
Q483	4M	D228	8I
Q484	6O	D230	9L
Q485	7O	D232	9L
Q486	6O	D234	8J
Q487	5O	D236	8J
Q488	4O	D237	8J
Q489	3O	D239	8J
Q490	6O	D408	4J
Q602	8R	D603	5Q
Q603	7R	D604	5Q
Q701	4P	D708	8G
Q704	3I	D711	11E
Q706	5G	D712	11E
Q709	11E	D713	11E
Q710	3R	D714	11E





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SPECIFICATIONS

General

Frequency range (Transmitter)	160 m band	1.8-2.0MHz (K type)/ 1.81-2.0MHz (E type)
	80 m band	3.5-4.0MHz (K type)/ 3.5-3.8MHz (E type)
	60 m band *4	5.1675MHz, 5.25-5.45MHz (K type)/ 5.25-5.45MHz (E type)
	40 m band	7.0-7.3MHz (K type)/ 7.0-7.2MHz (E type)
	30 m band	10.1-10.15MHz
	20 m band	14.0-14.35MHz
	17 m band	18.068-18.168MHz
	15 m band	21.0-21.45MHz
	12 m band	24.89-24.99MHz
	10 m band	28.0-29.7MHz
6 m band	50.0-54.0MHz (K type)/ 50.0-52.0MHz (E type)	
Frequency range (Receiver) *1	0.13-30MHz, 50-54MHz (VFO: Continuous 30kHz-60MHz)	
Mode	A1A (CW)/ A3E (AM)/ J3E (SSB)/ F3E (FM)/ F1B (FSK)/ G1B (PSK)	
Frequency stability	0°C - 50°C	Within ±0.1ppm
Antenna impedance	50 Ω	
Antenna tuner load range	16.7 Ω - 150 Ω	
Standard voltage	AC 120V (60Hz) (K type)/ AC 220-240V (50/60Hz) (E type)	
Supply voltage range	AC 90V - 132V (K type) AC 198V - 264V (E type)	
Power consumption	Transmit (max.)	720VA or less (K type)/ 840VA or less (E type)
	Receive (no signal)	120VA or less (K type)/ 200VA or less (E type)
Usable temperature range	0°C - 50°C (+32°F - +122°F)	
Dimensions	Without projection	W 460 x H 165 x D 400 mm (W 18.11 x H 6.50 x D 15.75 in)
	Include projection	W 460 x H 182 x D 449 mm (W 18.11 x H 7.17 x D 17.68 in)
	At front leg up position	Front panel: H 201 mm (H 7.91 in)/ Rear panel: H 173 mm (H 6.81 in)
Weight	Approx. 24.5 kg (54.01 lbs)	

Transmitter

Output power	SSB/CW/FSK/PSK/FM (AM)	200W (50W)
Modulation	SSB: Balanced, AM: Low power, FM: Reactance	
Maximum frequency deviation (FM)	Wide: ±5kHz or less, Narrow: ±2.5kHz or less	
Spurious emissions	HF (harmonics): -60dB or less HF (others): -50dB or less 50MHz: -66dB or less	
Carrier suppression (SSB)	-60dB or less	
Unwanted sideband suppression	-60dB or less	
Transmit frequency response	Within -6dB (300-2700Hz)	
Microphone impedance	600 Ω	
XIT variable range	±9.999kHz	

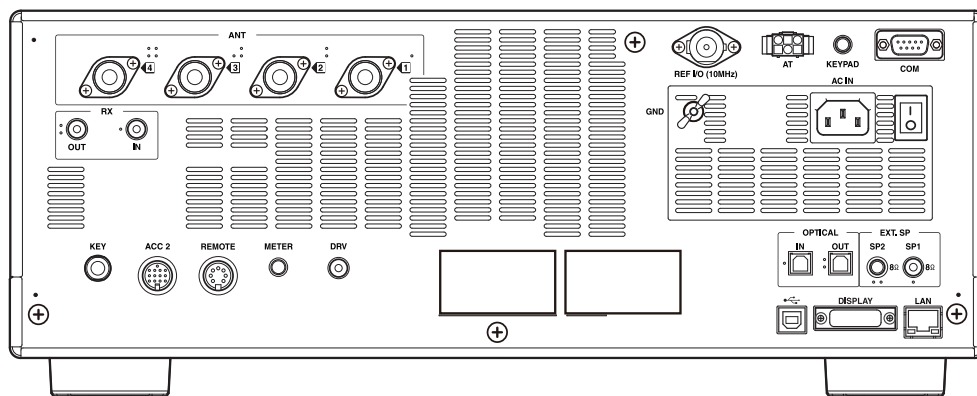
Receiver

		Main	Sub *2	Sub *3
Circuit type		Double superheterodyne	Double superheterodyne	Triple superheterodyne
Intermediate frequency	1st IF	8.248MHz	11.374MHz	73.095MHz
	2nd IF (FM)	24kHz/ (455kHz)	24kHz	10.695MHz
	3rd IF (FM)	-	-	24kHz/ (455kHz)
Sensitivity (typ.)	SSB/CW/FSK/PSK (S/N 10dB)	0.5µV (0.13-0.522MHz)		
		4µV (0.522-1.705MHz)		
		0.2µV (1.705-24.5MHz)		
	AM (S/N 10dB)	0.13µV (24.5-30MHz)		
		0.13µV (50-54MHz)		
		6.3µV (0.13-0.522MHz)		
FM (12dB SINAD)	32µV (0.522-1.705MHz)			
	2µV (1.705-24.5MHz)			
	1.3µV (24.5-30MHz)			
Image rejection ratio (50MHz)	70dB (60dB) or more			
IF rejection ratio	70dB or more			
Selectivity	SSB (LO: 200/ Hi: 2800Hz)	2.4kHz or more (-6dB)		
		4.4kHz or less (-60dB)		
	CW/FSK/PSK (WIDTH: 500Hz)	500Hz or more (-6dB)		
		1.2kHz or less (-60dB)		
	AM (LO: 100/ Hi: 3000Hz)	6.0kHz or more (-6dB)		
FM	12.0kHz or less (-50dB)			
	12.0kHz or more (-6dB)			
RIT variable range	±9.999kHz			
Notch filter attenuation	60dB or more (Auto), 70dB or more (Manual)			
Beat cancel attenuation	40dB or more			
Audio output	1.5W or more (8 Ω)			
Audio output impedance	8 Ω			

*1 MAIN BAND: Spec. guaranteed in amateur band 160 m through 6 m
 *2 In 150 m/ 60 m/ 40 m/ 20 m/ 15 m amateur bands, IF band width 2.7kHz or less (SSB/CW/FSK/PSK)
 *3 Except in above *2
 *4 60m band: Refer to applicable amateur radio regulations to your country (E type only).

Note: Specifications are subject to change without notice due to advancements in technology.

TS-990S



JVCKENWOOD Corporation

3-12, Moriyacho, Kanagawa-ku, Yokohama-shi,
Kanagawa, 221-0022 Japan

Kenwood U.S.A. Corporation

P.O. BOX 22745, 2201 East Dominguez Street, Long Beach,
CA 90801-5745, U.S.A.

Kenwood Electronics Canada Inc.

6070 Kestrel Road, Mississauga, Ontario, Canada L5T 1S8

Kenwood Electronics Deutschland GmbH

Konrad-Adenauer-Allee 1-11, D - 61118 Bad Vilbel, Germany

JVCKENWOOD Belgium N.V.

Leuvensesteenweg 248 J, 1800 Vilvoorde, Belgium

Kenwood Electronics France S.A.

L'Etoile Paris Nord 2, 50 Allée des Impressionnistes,
Bp 58416 Villepinte, 95944 Roissy Ch De Gaulle Cedex

Kenwood Electronics UK Limited

Kenwood House, Dwight Road, Watford, Herts.,
WD18 9EB United Kingdom

JVCKENWOOD Nederland B.V.

Amsterdamseweg 37, 1422 AC Uithoorn, The Netherlands

JVCKENWOOD Italia S.p.A.

Via G. Sirtori, 7/9 20129 Milano, Italy

JVCKENWOOD Ibérica S.A.

Carretera de Rubi, 88 Planta 1 A 08174 Sant Cugat del Vallès
Barcelona, Spain

JVCKENWOOD Australia Pty. Ltd.

Talavera Business Park Building A, 4 Talavera Road,
North Ryde NSW 2113 Australia

Kenwood Electronics (Hong Kong) Ltd.

Suite 2504, 25/F, Tower 2, Nina Tower, No. 8 Yeung Uk Road,
Tsuen Wan, New Territories, Hong Kong

JVCKENWOOD Singapore Pte. Ltd.

1 Ang Mo Kio Street 63, Singapore 569110