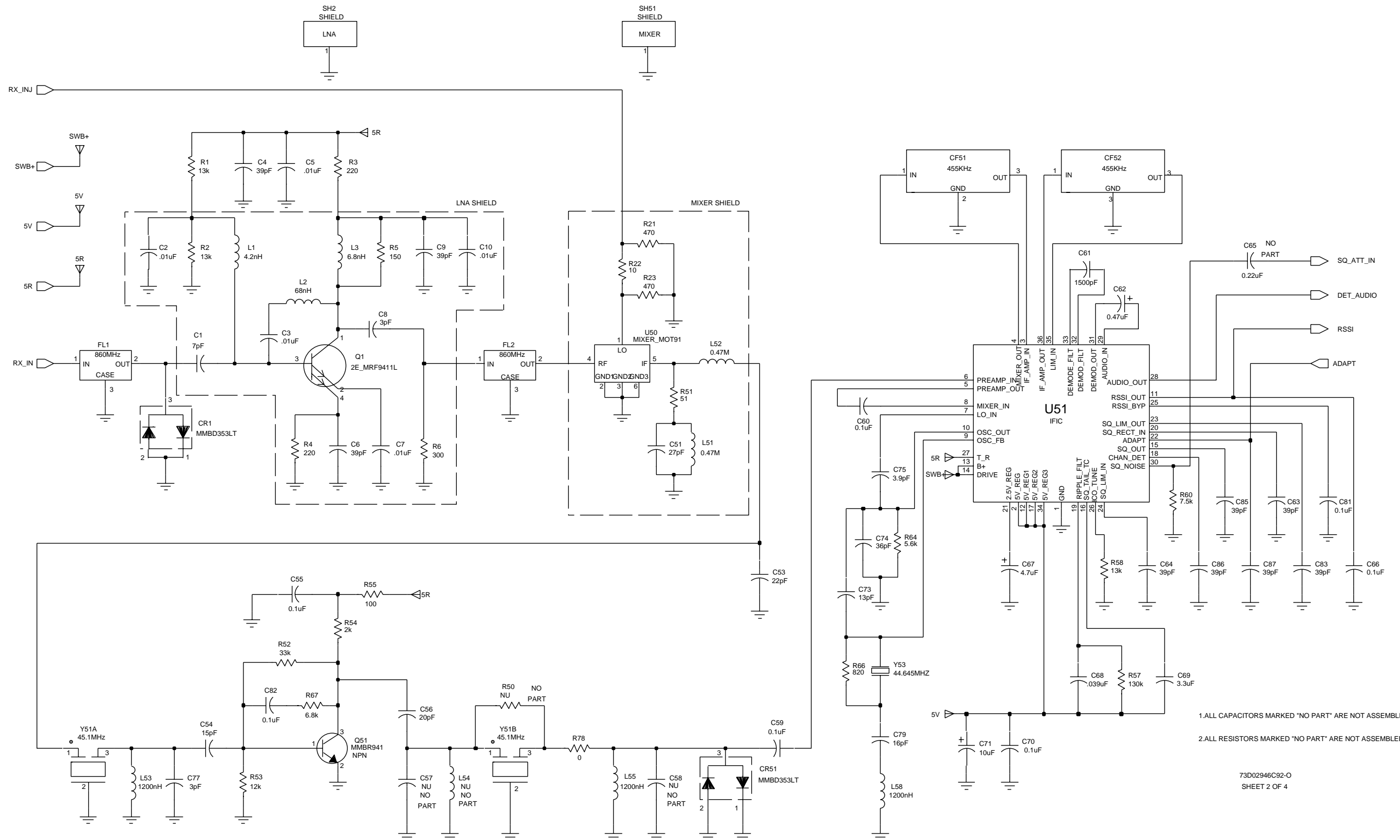


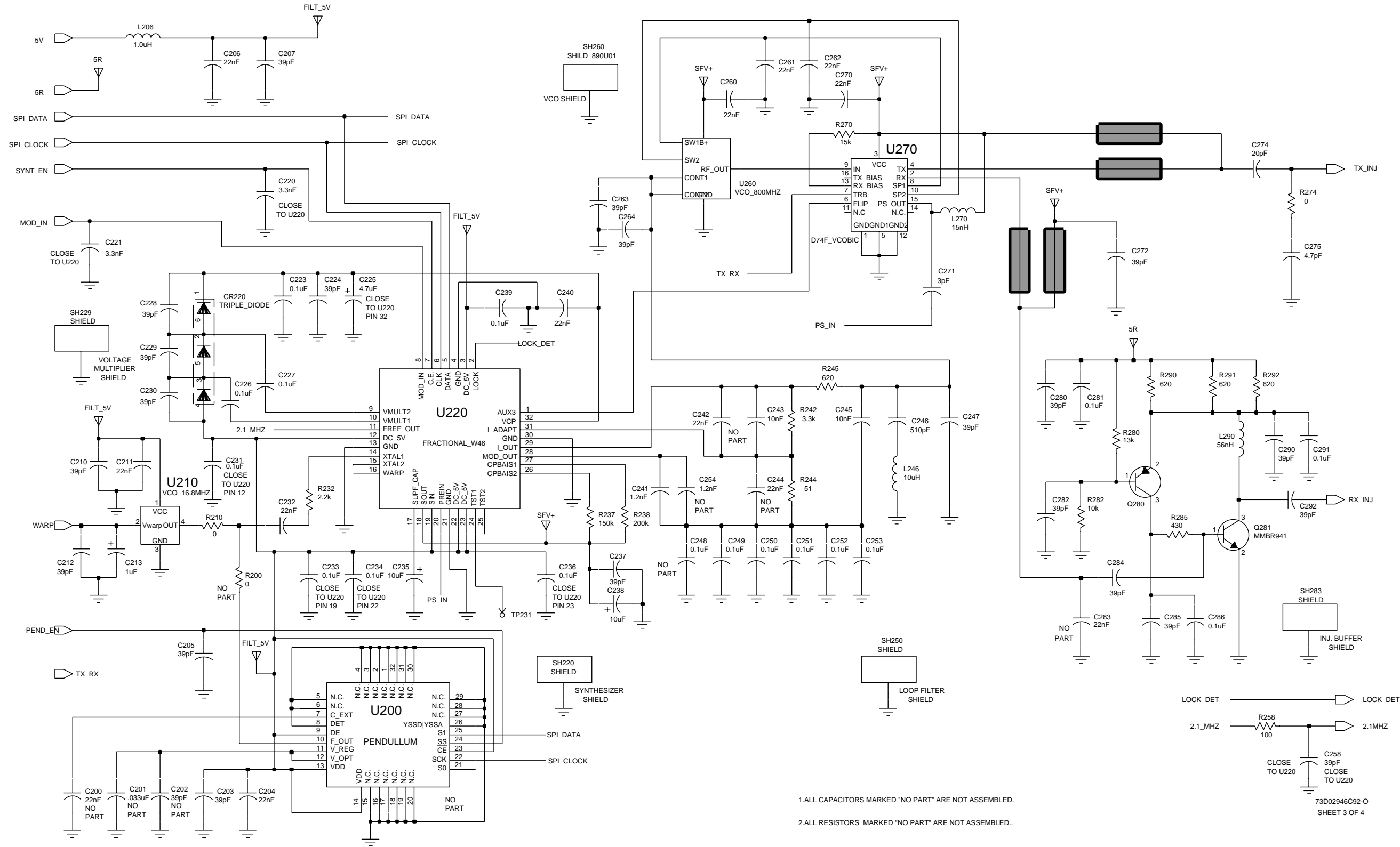
# Section 8

## Schematic Diagrams, Circuit Board Details, and Parts Lists

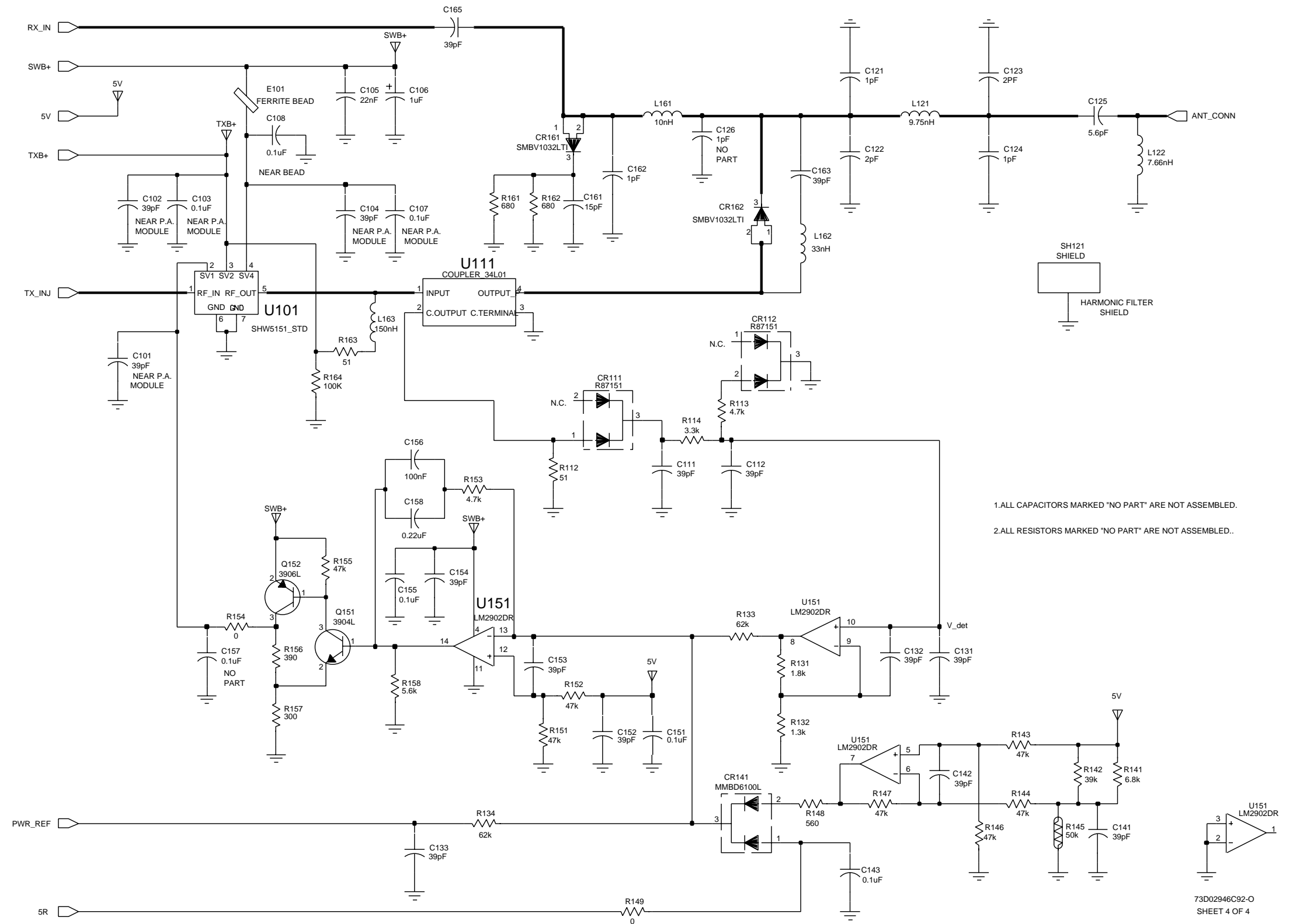




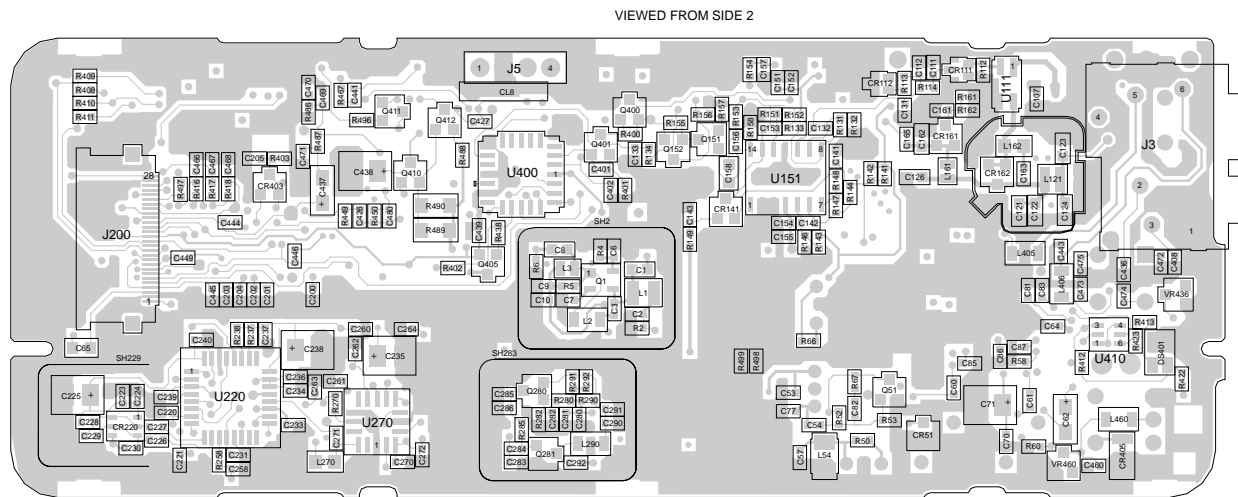
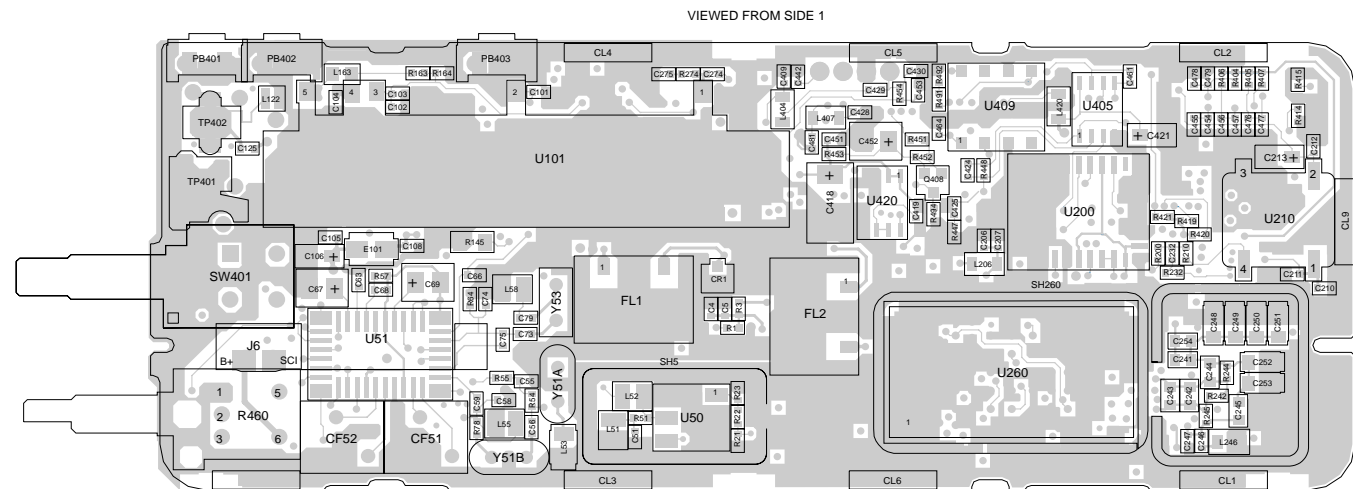
Schematic Diagram for FUF5590A/FUF5591A RF Board Receiver Module



Schematic Diagram for FUF5590A/FUF5591A RF Board,  
Synthesizer Module



Schematic Diagram for FUF5590A/FUF5591A RF Board,  
Transmitter Module



# parts lists

## FUF5590A RF Board

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
capacitors: pF, $\pm 5\%$ 50V, unless otherwise specified		
C1	2103689A10	7
C2-3	2113741F49	0.01 $\mu$ F
C4	2113740F41	39
C5	2113741F49	0.01 $\mu$ F
C6	2113740F41	39
C7	2113741F49	0.01 $\mu$ F
C8	2103689A09	3
C9	2113740F41	39
C10	2113741F49	0.01 $\mu$ F
C51	2113740F37	27
C53	2113740F35	22
C54	2113740F31	15
C55	2113743K15	0.1 $\mu$ F
C56	2113740F34	20
C59-60	2113743K15	0.1 $\mu$ F
C61	2113741F29	1500
C62	2311049A05	0.47 $\mu$ F
C63-64	2113740F41	39
C66	2113743K15	0.1 $\mu$ F
C67	2311049J11	4.7 $\mu$ F
C68	2113743K05	0.039 $\mu$ F
C69	2311049A11	3.3 $\mu$ F
C70	2113743K15	0.1 $\mu$ F
C71	2311049A63	10 $\mu$ F
C73	2113740F30	13
C74	2113740F40	36
C75	2113740F17	3.9
C77	2113740F14	3
C79	2113740F32	16
C81-82	2113743K15	0.1 $\mu$ F
C83	2113740F41	39
C85-87	2113740F41	39
C101-102	2113740F41	39
C103	2113743K15	0.1 $\mu$ F
C104	2113740F41	39
C105	2113743E07	22 nF
C106	2311049A07	1 $\mu$ F
C107-108	2113743K15	0.1 $\mu$ F
C111-112	2113740F41	39
C121	2103689A15	1
C122-123	2103689A02	2
C124	2103689A15	1
C125	2113740F21	5.6
C131-133	2113740F41	39
C141-142	2113740F41	39
C143	2113743K15	0.1 $\mu$ F
C151	2113743K15	0.1 $\mu$ F
C152-154	2113740F41	39
C155	2113743K15	0.1 $\mu$ F
C156	2113743E20	100 nF
C158	2113743A23	0.220 $\mu$ F
C161	2113740F31	15
C162	2103689A15	1

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
C163	2113740F41	39
C165	2113740F41	39
C203	2113740F41	39
C204	2113743E07	22 nF
C205	2113740F41	39
C206	2113743E07	22 nF
C207	2113740F41	39
C210	2113740F41	39
C211	2113743E07	22 nF
C212	2113740F41	39
C213	2311049A07	1 $\mu$ F
C220-221	2113741F37	3.3 nF
C223	2113743K15	0.1 $\mu$ F
C224	2113740F41	39
C225	2311049J11	4.7 $\mu$ F
C226-227	2113743K15	0.1 $\mu$ F
C228-230	2113740F41	39
C231	2113743K15	0.1 $\mu$ F
C232	2113743E07	22 nF
C233-234	2113743K15	0.1 $\mu$ F
C235	2311049A63	10 $\mu$ F
C236	2113743K15	0.1 $\mu$ F
C237	2113740F41	39
C238	2311049A63	10 $\mu$ F
C239	2113743K15	0.1 $\mu$ F
C240	2113743E07	22 nF
C241	2105248W02	1.2 nF
C243	2109720D01	10 nF
C245	2109720D01	10 nF
C246	2113741F18	510
C247	2113740F41	39
C249-253	2109720D14	0.1 $\mu$ F
C258	2113740F41	39
C260-262	2113743E07	22 nF
C263-264	2113740F41	39
C270	2113743E07	22 nF
C271	2113740F14	3
C272	2113740F41	39
C274	2113740F34	20
C275	2113740F19	4.7
C280	2113740F41	39
C281	2113743K15	0.1 $\mu$ F
C282	2113740F41	39
C284-285	2113740F41	39
C286	2113743K15	0.1 $\mu$ F
C290	2113740F41	39
C291	2113743K15	0.1 $\mu$ F
C292	2113740F41	39
C401-402	2113740F41	39
C408-409	2113740F41	39
C418	2311049C09	10 $\mu$ F
C419	2113743E05	18 nF
C421	2311049A05	0.47 $\mu$ F
C424	2113740F59	220
C425	2113743E12	47 nF
C426-427	2113743E05	18 nF
C428	2113740F41	39
C429	2113741F41	4700
C430	2113740F41	39
C436	2113740F41	39

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
C437	2311049A05	0.47 $\mu$ F
C438	2311049J11	4.7 $\mu$ F
C439	2113741F49	0.01 $\mu$ F
C441	2113743K15	0.1 $\mu$ F
C442-443	2113741F25	1000
C444	2113740F41	39
C445	2113741F49	0.01 $\mu$ F
C446	2113740F41	39
C449	2113740F41	39
C451	2113740F41	39
C452	2311049J11	4.7 $\mu$ F
C453	2113740F41	39
C454	2113741F49	0.01 $\mu$ F
C455	2113740F41	39
C456	2113741F49	0.01 $\mu$ F
C457	2113740F41	39
C460	2113740F41	39
C461	2113743K15	0.1 $\mu$ F
C464	2113743K15	0.1 $\mu$ F
C466-468	2113740F41	39
C469	2113743E12	47 nF
C470	2113741F17	470
C471	2113740F43	47
C472-475	2113740F41	39
C476	2113741F49	0.01 $\mu$ F
C477	2113740F41	39
C478	2113741F49	0.01 $\mu$ F
C479	2113740F41	39
C480	2113740F57	180
C481	2113740F41	39
<b>diodes: (see note)</b>		
CR1	4880154K03	353L
CR51	4880154K03	353L
CR111-112	4805218N57	Schottky R87151
CR141	4813833C02	MMBD6100L
CR161-162	4805129M96	SMBV1032LTI
CR220	4802233J09	triple diode
CR405	4880107R01	BYD17D
<b>filters, ceramic:</b>		
CF51	9180098D06	filter, 455 KHz
CF52	9180098D05	filter, 455 KHz
<b>LEDs:</b>		
DS401	4805729G49	LED
<b>ferrite bead:</b>		
E101	2484657R01	ferrite bead
<b>filters:</b>		
FL1-2	9102603S24	860
<b>connectors, receptacle:</b>		
J3	0180417C01	external microphone/speaker
J5	0180195R03	flat cable
J6	0180965Z01	connector, B+
J200	0904358J02	edge

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
<b>coils:</b>		
L1	2460591A01	4.2 nH
L2	2462587T13	68 nH
L3	2413926E09	6.8 nH
L51, L52	2483411T69	0.47 $\mu$ H
L53	2462587M19	1200 nH
L55	2483411T74	1.2 $\mu$ H
L58	2483411T74	1.2 $\mu$ H
L121	2460591A50	9.75 nH
L122	2460591A11	7.66 nH
L161	2413926E11	10.0 nH
L162	2462587V28	33 nH
L163	2462587V36	150 nH
L206	2462587T30	1.0 $\mu$ H
L246	2462587P24	10 $\mu$ H
L270	2462587V24	15 nH
L290	2462587T12	56 nH
L404-407	2462587T17	150 nH
L420	2462587T17	150 nH
L460	2462587T17	150 nH
<b>pushbutton switches:</b>		
PB1-PB3	4080447U05	pushbutton switch
<b>transistors: (see note 1)</b>		
Q1	4813827A18	NPN, 2E_MRF9411L
Q51	4813827A07	NPN, MMBR941
Q151	4813824A10	NPN, 3904L
Q152	4813824A17	PNP, 3906L
Q280	4813824A17	PNP, 3906L
Q281	4813827A07	NPN, MMBR941
Q400	4880141L03	PNP, BCW68GLT1
Q401	4813824A10	NPN, 3904L
Q405	4813824A17	PNP, 3906L
Q408	4813824A17	PNP, 3906L
Q410	4880141L03	PNP, BCW68GLT1
Q411	4813824A06	NPN, Darlington BTA13
Q412	4813824A17	PNP, 3906L
<b>resistors: <math>\Omega</math>, 5%, 1/16 W unless otherwise stated</b>		
R1	0662057A76	13K
R2	0662057A76	13K
R3	0662057A33	220
R4	0662057A33	220
R5	0662057A29	150
R6	0662057A36	300
R21	0662057A41	470
R22	0662057A01	10
R23	0662057A41	470
R51	0662057A18	51
R52	0662057A85	33K
R53	0662057A75	12K
R54	0662057A56	2K
R55	0662057A25	100
R57	0662057B01	130K
R58	0662057A76	13K
R60	0662057A70	7.5K



REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
R64	0662057A67	5.6K
R66	0662057A47	820
R67	0662057A69	6.8K
R78	0662057B47	0
R112	0662057A18	51
R113	0662057A65	4.7K
R114	0662057A61	3.3K
R131	0662057A55	1.8K
R132	0662057A52	1.3K
R133	0662057A92	62K
R134	0662057A92	62K
R141	0662057A69	6.8K
R142	0662057A87	39K
R143	0662057A89	47K
R144	0662057A89	47K
R145	0605621T02	thermistor, 50K
R146	0662057A89	47K
R147	0662057A89	47K
R148	0662057A43	560
R149	0662057B47	0
R151-152	0662057A89	47K
R153	0662057A65	4.7K
R154	0662057B47	0
R155	0662057A89	47K
R156	0662057A39	390
R157	0662057A36	300
R158	0662057A67	5.6K
R161-162	0662057A45	680
R163	0662057A18	51
R164	0662057A97	100K
R210	0662057B47	0
R232	0662057A49	1K
R237	0662057B02	150K
R238	0662057B05	200K
R242	0662057A61	3.3K
R244	0662057A18	51
R245	0662057A44	620
R258	0662057A25	100
R270	0662057A77	15K
R274	0662057B47	0
R280	0662057A76	13K
R282	0662057A73	10K
R285	0662057A40	430
R290-292	0662057A44	620
R400	0662057A45	680
R401	0662057A27	120
R402	0662057B47	0
R404-407	0662057A73	10K
R408	0662057A80	20K
R409	0662057A88	43K
R410	0662057A80	20K
R411	0662057A88	43K
R412	0662057A52	1.3K
R413	0662057A39	390
R414-415	0662057B14	470K
R416-418	0662057A25	100
R419-421	0662057A81	22K
R422	0662057A52	1.3K
R423	0662057A39	390
R438	0662057A61	3.3K

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
R447	0662057A67	5.6K
R448	0662057A90	51K
R449	0662057A97	100K
R450	0662057A73	10K
R451	0662057A57	2.2K
R452	0662057B05	200K
R453	0662057A37	330
R454	0662057A56	2K
R460	1880143S03	potentiometer, 50.0K
R467	0662057A01	10
R486	0662057A65	4.7K
R487	0662057A55	1.8K
R488	0662057A49	1K
R489	0611077A12	2.7
R490	0611077A12	2.7
R491	0662057A99	120K
R492	0662057A97	100K
R494	0662057A97	100K
R496	0662057A37	330
R497	0662057A41	470
R499	0662057B47	0
<b>shields:</b>		
SH2	2680456K01	LNA shield
SH51	2605417V01	mixer shield
SH121	2680471K01	harmonic filter shield
SH220	2680510K01	synthesizer shield
SH229	2605259V01	voltage multiplier shield
SH250	2680470K01	loop filter shield
SH260	2605890U01	VCO shield
SH283	2680456K01	RX injection buffer shield
SH401	0780511B01	rotary switch shield
<b>switch:</b>		
SW401	4080650D01	rotary switch
<b>test points, contacts:</b>		
TP401	3980442K02	antenna ground
TP402	3980443K02	antenna contact
<b>integrated circuits: (see note 1)</b>		
U50	0108106L10	MIXER_MOT93
U51	5180207R01	IFIC
U101	5108038H15	SHW5151
U111	5880334L01	COUPLER
U151	5113819A02	LM2902DR
U210	5102845C11	VCO, 16.8 MHz
U220	5105457W46	SCW39129ZP
U260	5105238U94	VCO, 800MHZ
U270	5105662U76	D74F_VCOBIC
U400	5105226P38	D/A
U405	5113818A01	LM2904DR
U409	5180175R01	TDA7052
U410	5180159R01	POLARITY_IMX1
U420	5113816A29	LP2951AC
<b>Zener diodes: (see note 1)</b>		
VR436	4813830A23	MMBZ5240BL
VR460	4813830A18	MMBZ5235L

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
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**crystals:** (see note 2)

Y51A, Y51B	9180112R03	filter, 45.1 MHz (set of 2)
Y53	4880008K02	crystal, 44.645 MHz

**Qty**                      **non-referenced items:**

9	4280138R03	butterfly clip
1	1405160A02	crystal insulator
1	4280429K01	PA clip

**Notes:**

1. For optimum performance, diodes, transistors and integrated circuits must be ordered by MOTOROLA part numbers.
2. When ordering quartz crystal units or ceramic resonators, specify carrier frequency, crystal (or resonator) frequency, and crystal (or resonator) type number.

**FUF5591A RF Board**

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
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All parts listed for FUF5591A are identical to those listed for FUF5590A with the following changes:

**resistor:**

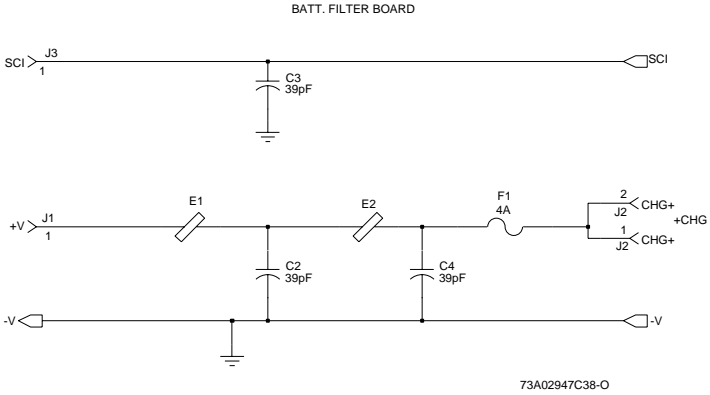
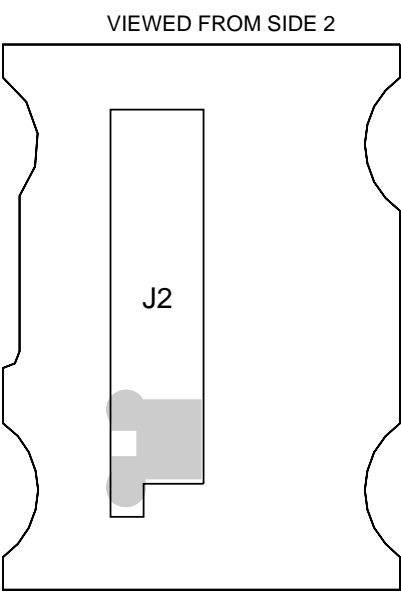
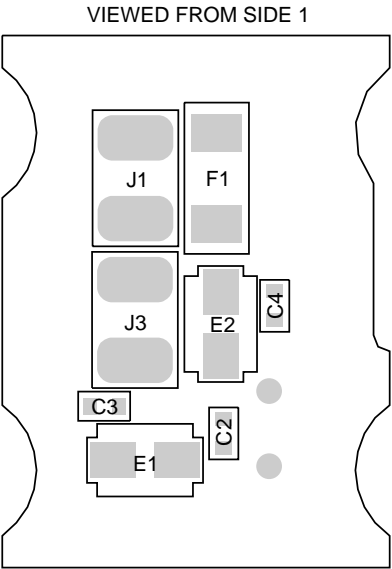
R498	0662057B47	0 $\Omega$
R499	No Part	

**integrated circuit:** (see note 1)

U210	4809863M01	VCO, 16.8 MHz
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**Note:**

For optimum performance, integrated circuits must be ordered by MOTOROLA part numbers.



FLN8517A Battery Filter Board		
REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
capacitors, fixed: pF, $\pm 5\%$ 50 V, unless otherwise specified		
C2-C4	2113740F41	39
coils, RF:		
L1, L2	2484657R01	ferrite bead
fuse:		
F1	6580561D02	fuse
non-referenced item:		
Qty	3980165S02	contact, B+
1		

A detailed grayscale photograph of a Motorola RAZR V3 flip phone, showing its internal components. The phone is open, revealing the keypad, screen, and internal circuitry. Various components are labeled with callouts: S01 through S16, J701, and S408012Y01. The Motorola logo is visible on the right side of the internal board.

Asterisk (\*) denotes parts not placed for the basic model radio.

***Circuit Board Details***  
***for FLN8514A, F LN9053A, FLN9064A, HLN9859, HLN9860, FEN1648, and FEN1656 Logic Board***