Circuit Description

1.RECEIVER

The signal from the antenna is passed through a transmission/reception selector circuit and is amplified by T217. The signal after amplified enter to 1846 for processing then output the audio, the audio signal is amplified by UTC2822 and output by the speaker at last.

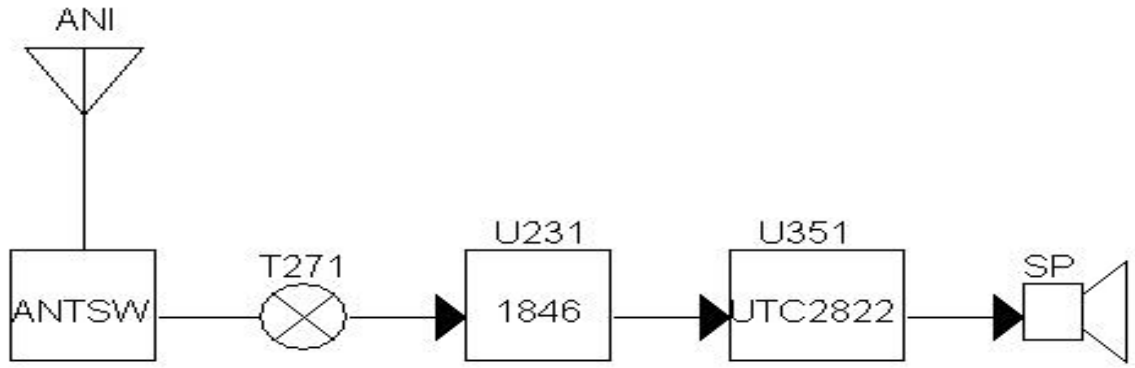


Figure1. RECEIVER CIRCUIT

2.TRANSMITTER

The signal from the microphone passes through 1846, after modulation in the carrier modulation, the modulation signal with the carrier promotes by buffer T111、T121、T131 and amplified by T141 then sends to the antenna terminals.

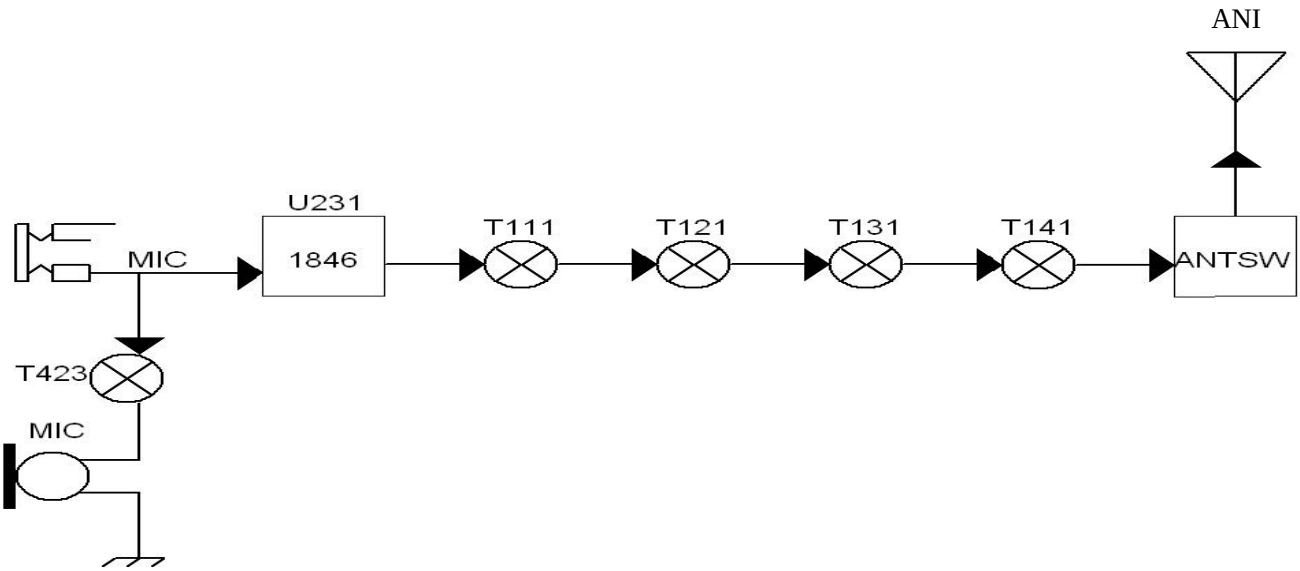


Figure2.TRANSMITTER CIRCUIT

3.TRANSMISSION/RECEPTION SELECTOR CIRCUIT

The transmission output is passed through the transmission/reception selector circuit and low-pass filter to the antenna. The transmission/reception selector circuit, which consists of diodes D161, D160, D261 and D262, is turned on during transmission and off during reception to switch the signal.

4.DIGITAL CONTROL CIRCUIT

SIDE KEY AND ENCODER CIRCUIT

The signal from side key and encoder is directly input to the processor.

Reset and backup circuit

When turn on the power, a positive pulse is output from the reset circuit consisting of U821 、D821 and R821to the 64feed of reset terminal on U821 microprocessor. When turn off the power, MCU detects a 3.3 V drop, and output a low signal, it outputs data to U898 and enter backup mode.

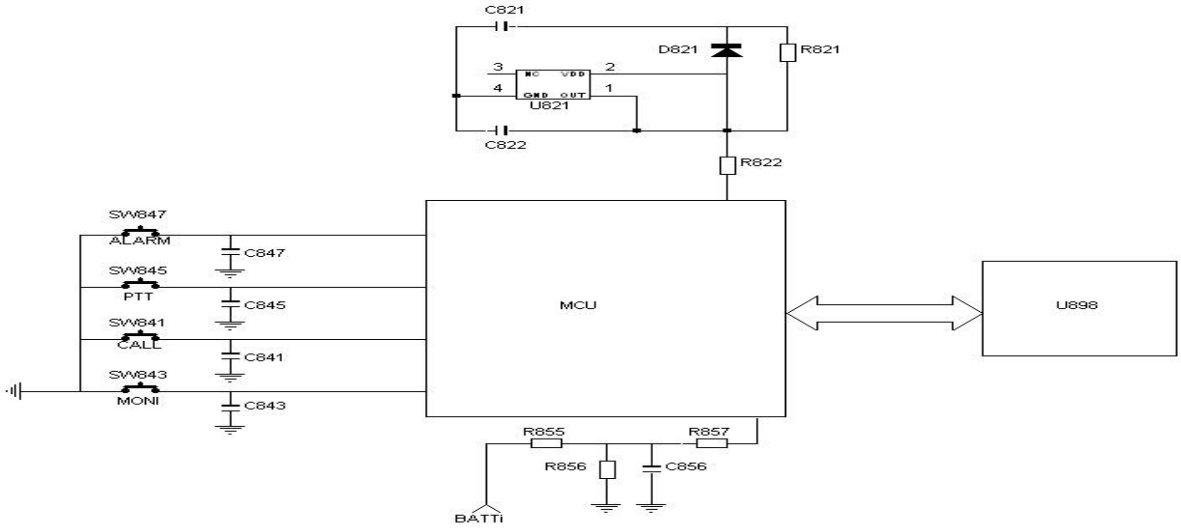


Figure3，digital control circuit

BATTERY VOLTAGE TEST CIRCUIT

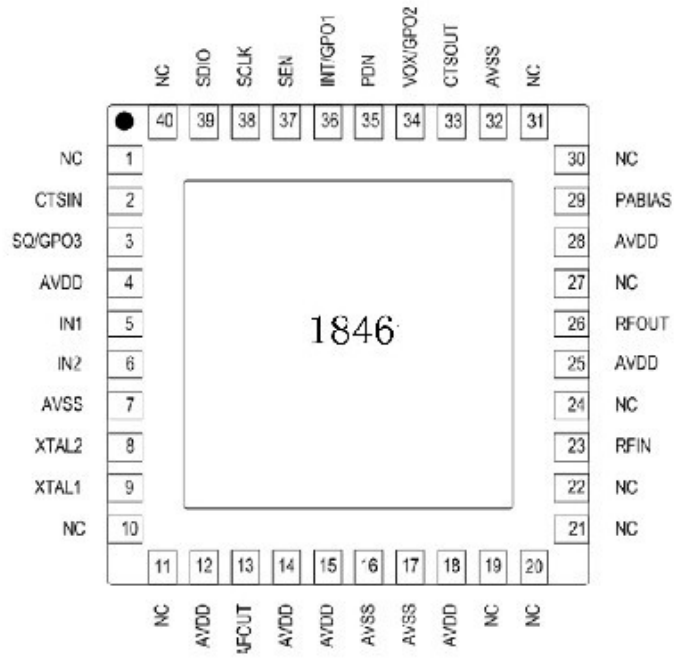
Power supply voltage after partial pressure input to the microprocessor analog interface

BATTERY SAVE CIRCUIT

The squelch is off during receive. The power circuit enters battery save mode if no key has been pressed for five seconds.

The circuit is controlled by microprocessor directly.

5.1846 DESCRIPTION



MAINLY SECTION DESCRIPTION

1.DSP consists of IF amplifier, FM modulation, RSSI calculator, AFC control circuit, audio/audio mixer filter, CTCSS/DCS filter and so on.

2.Synthesizer mainly functions：

① **The synthesizer produces a local oscillator signal, used to switch the RF input to a continuous low medium frequency.**

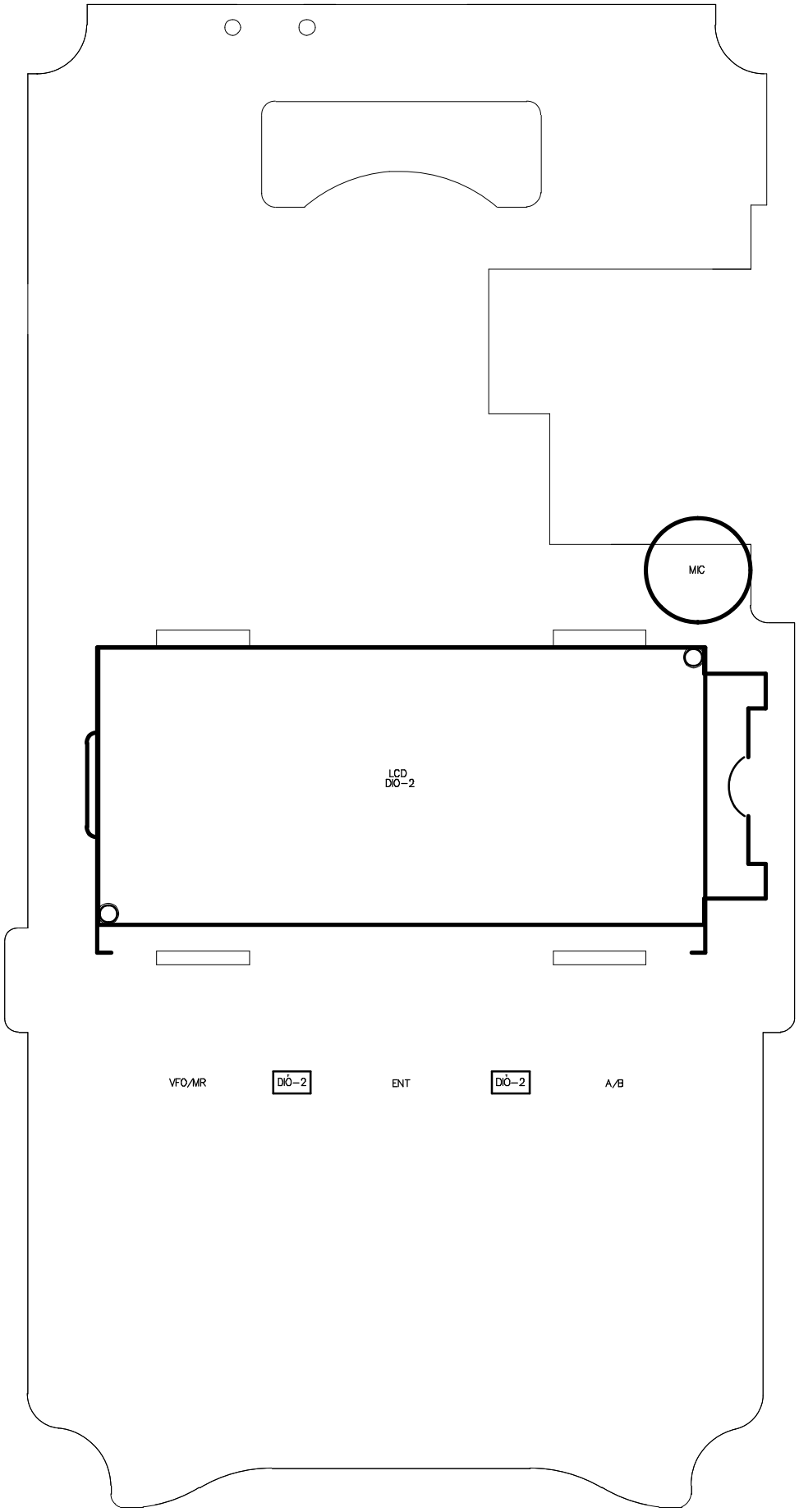
② **Synthesizer provides the base clock to adjust the VCO frequency.**

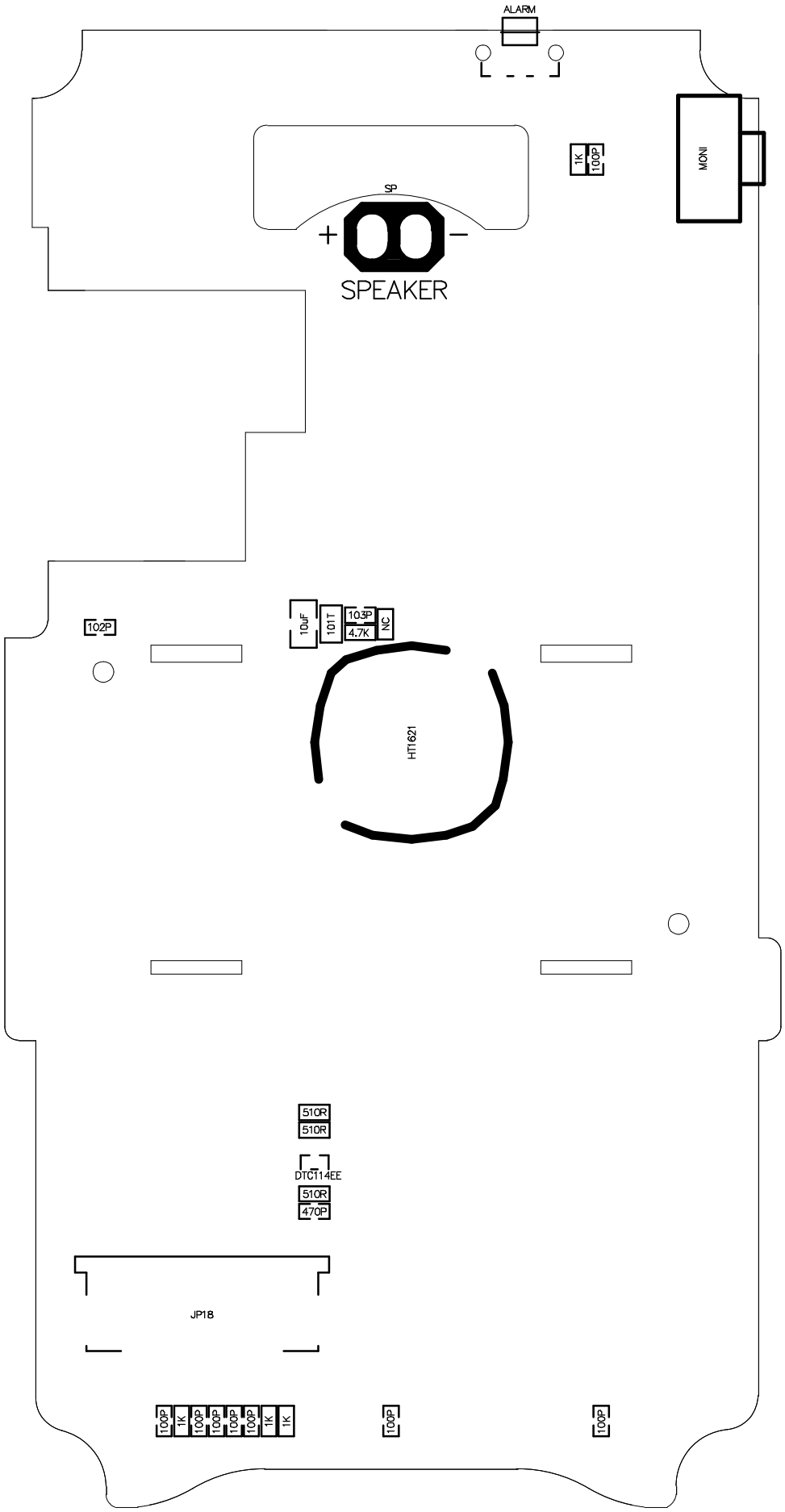
3.BASE CLOCK

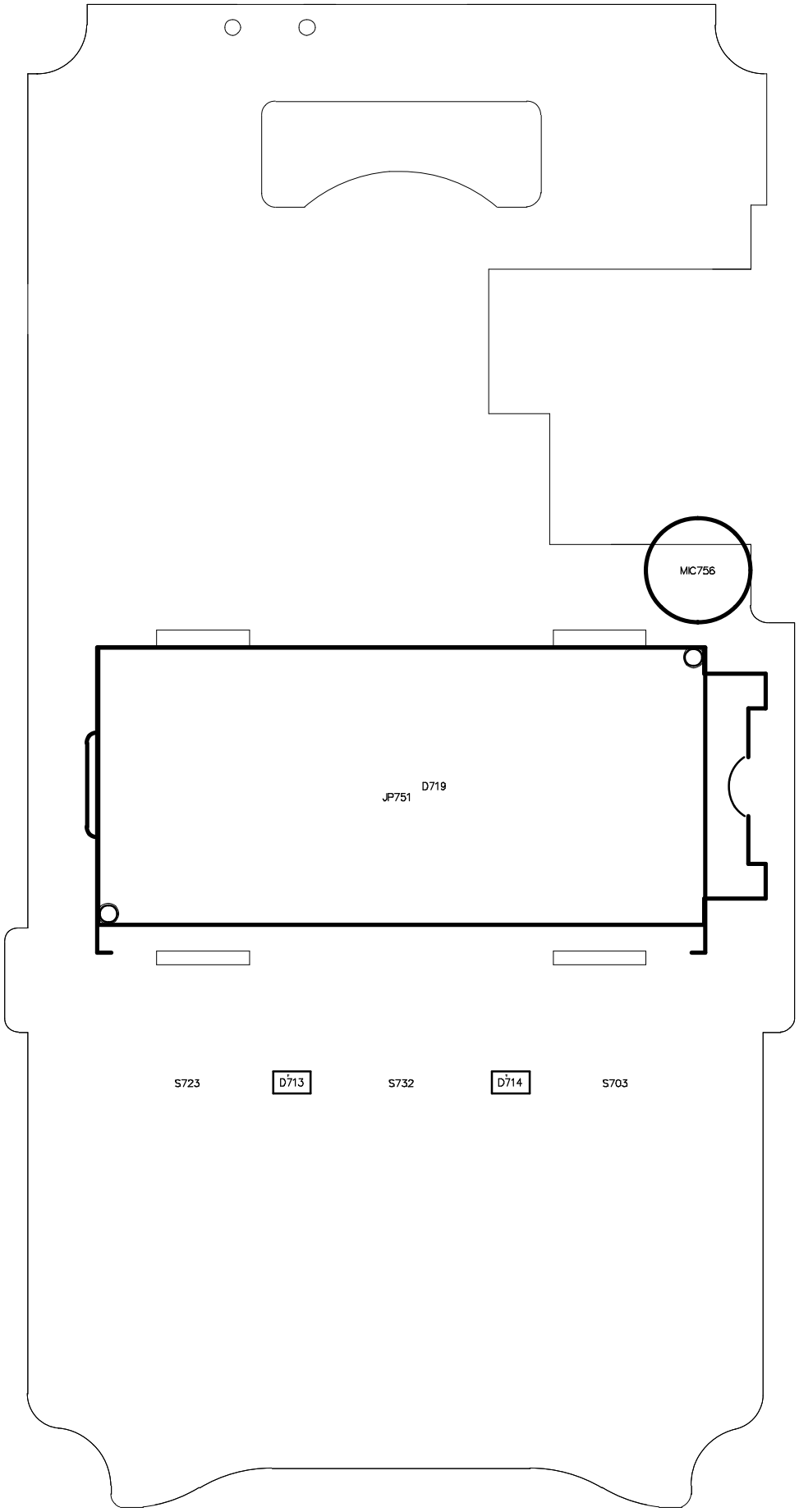
1846 ports more base clocks, for example, 12.8 MHz,13MHz and so on.

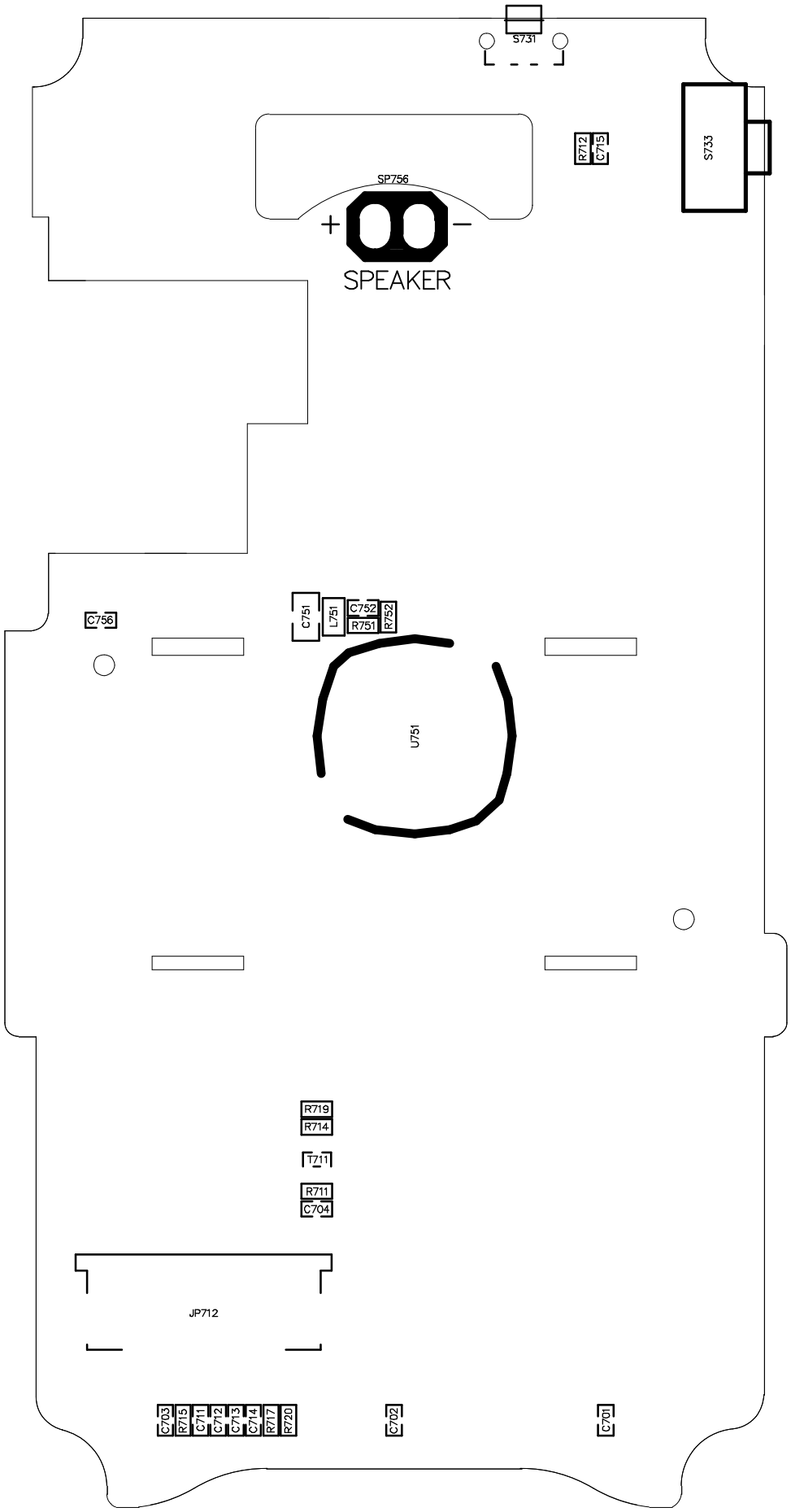
4.SERIAL CONTROL INTERFACE

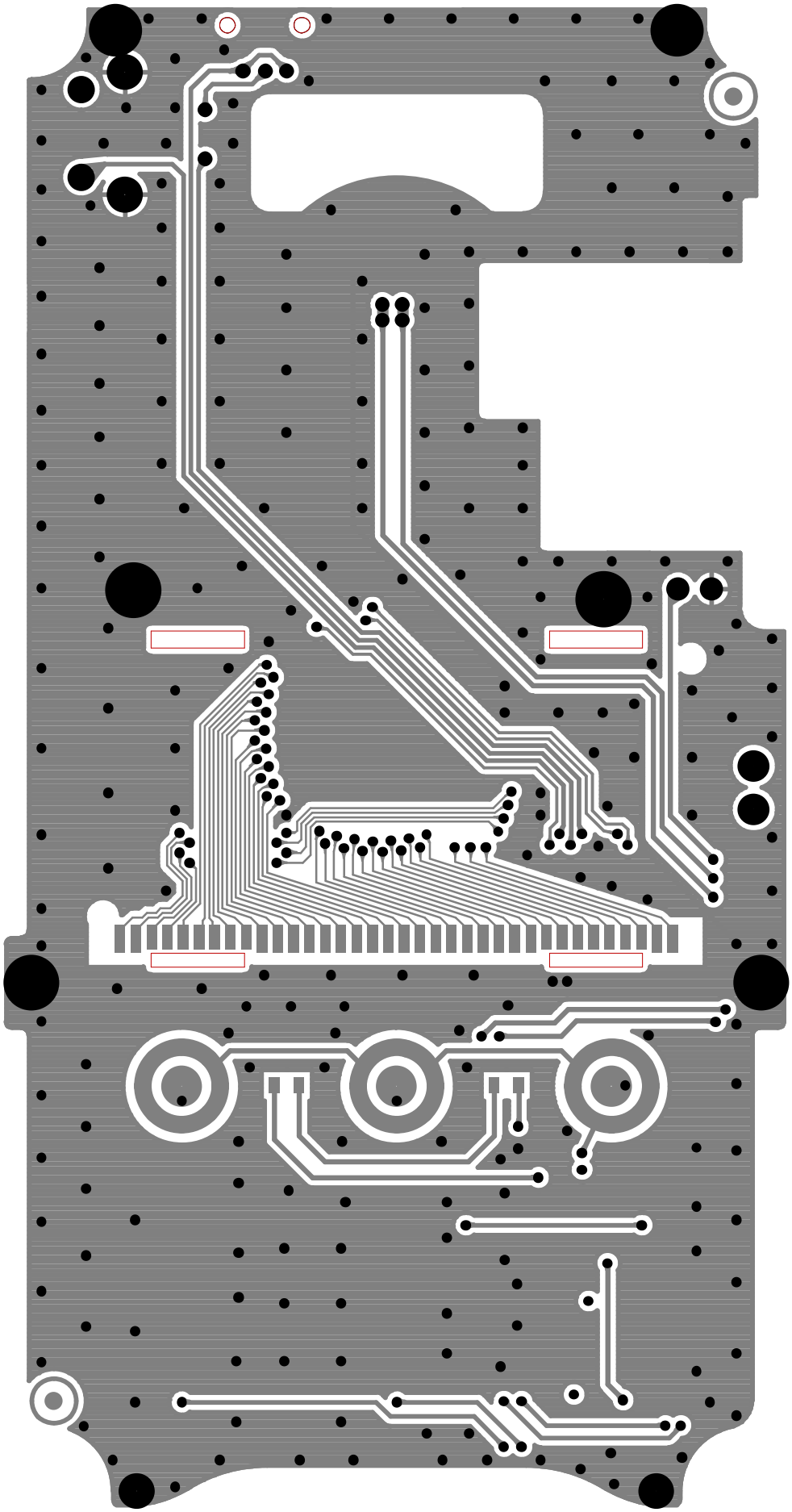
A three lines serial control interface is used to read the main IC and 1846 control record. Serial control is 24 characters in length, 18 bit numeric string and 6 bit address string.

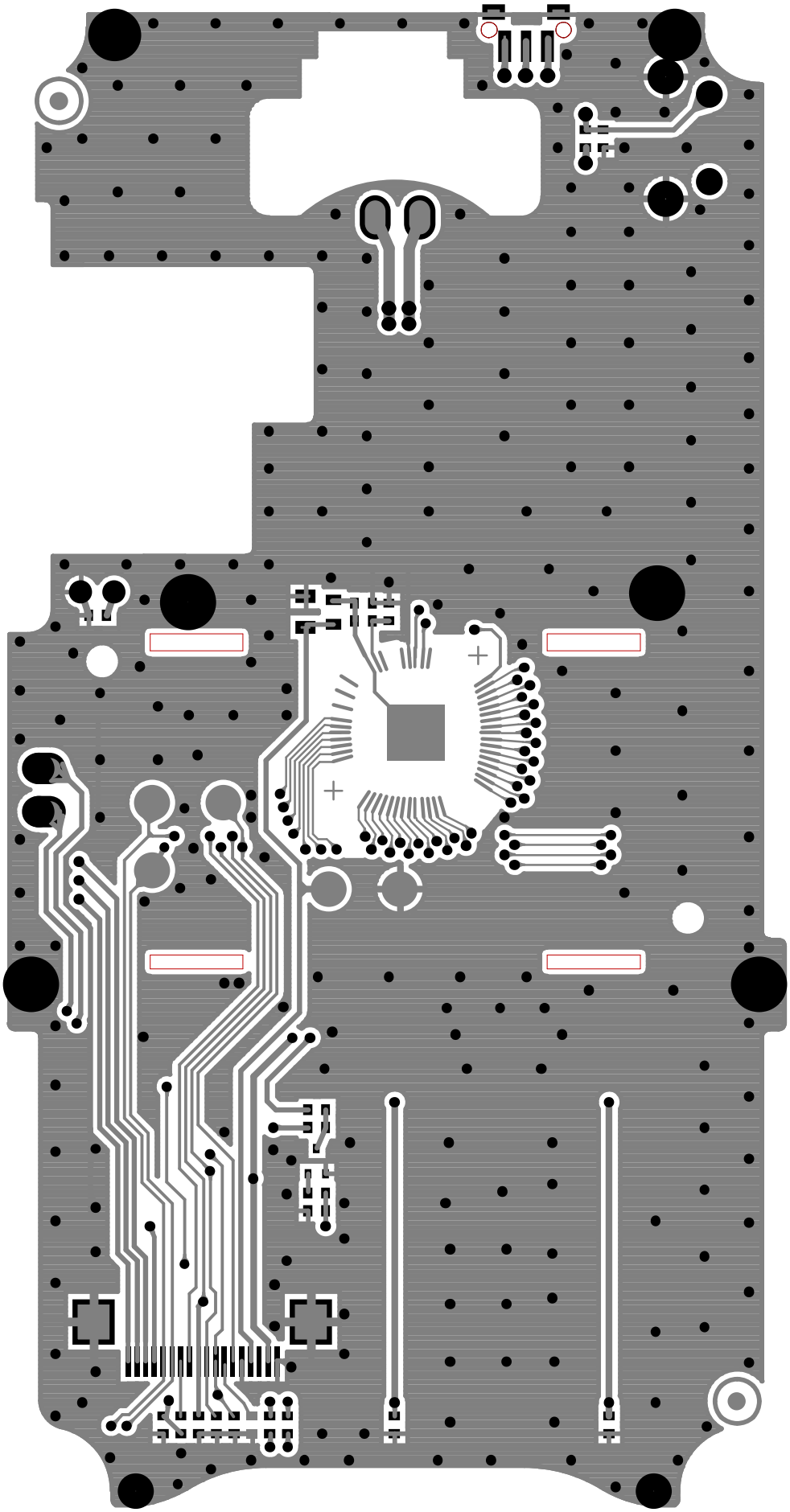

MIC
LCD
DIO-2
VFO/MR
DIO-2
ENT
DIO-2
A/B

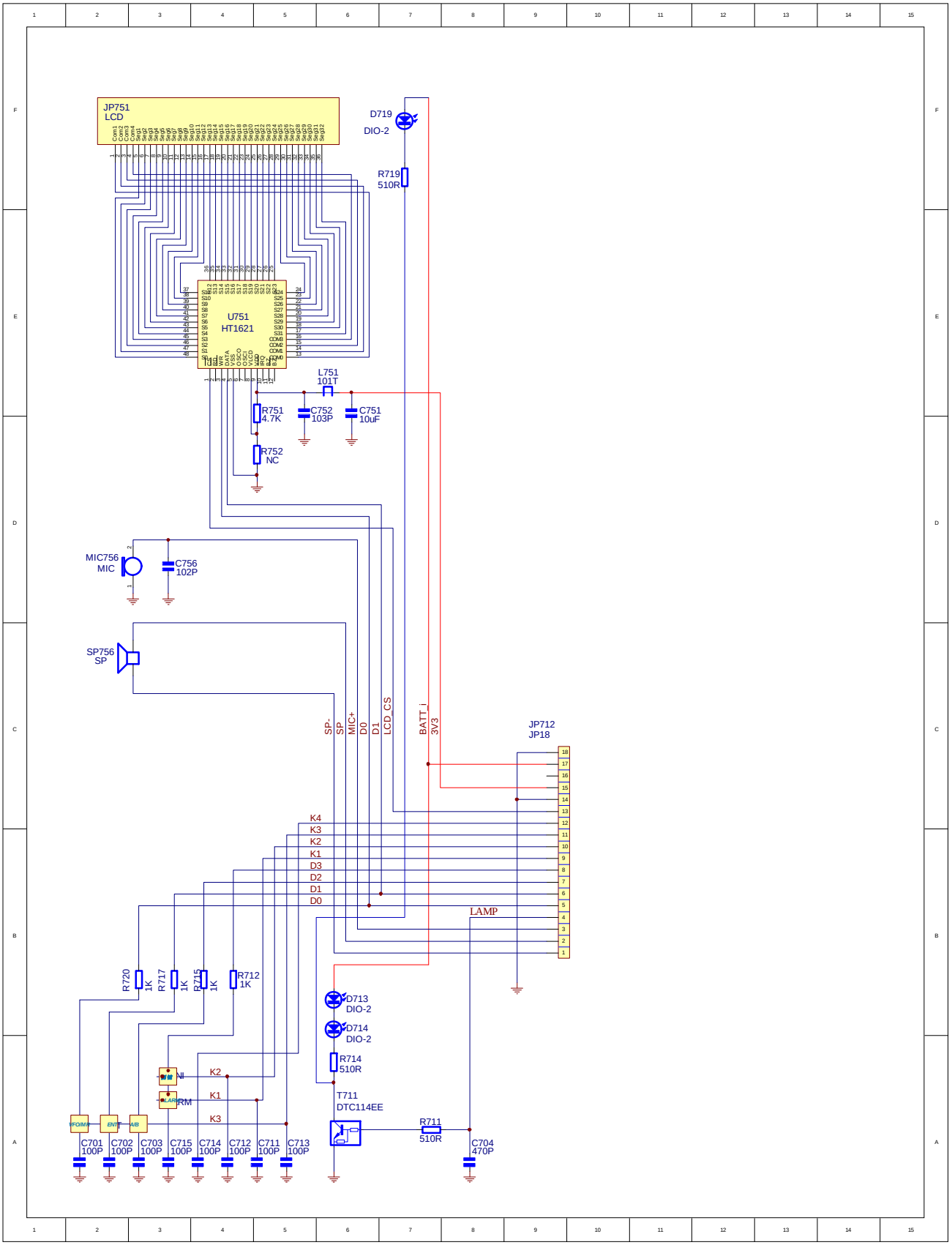

ALARM
SP
SPEAKER
MONI
1K
100P
102P
10uF
101T
10.3P
4.7K
NC
HT1621
510R
510R
DTC114EE
510R
470P
JP18
100P
1K
100P
100P
100P
100P
1K
1K
100P
100P

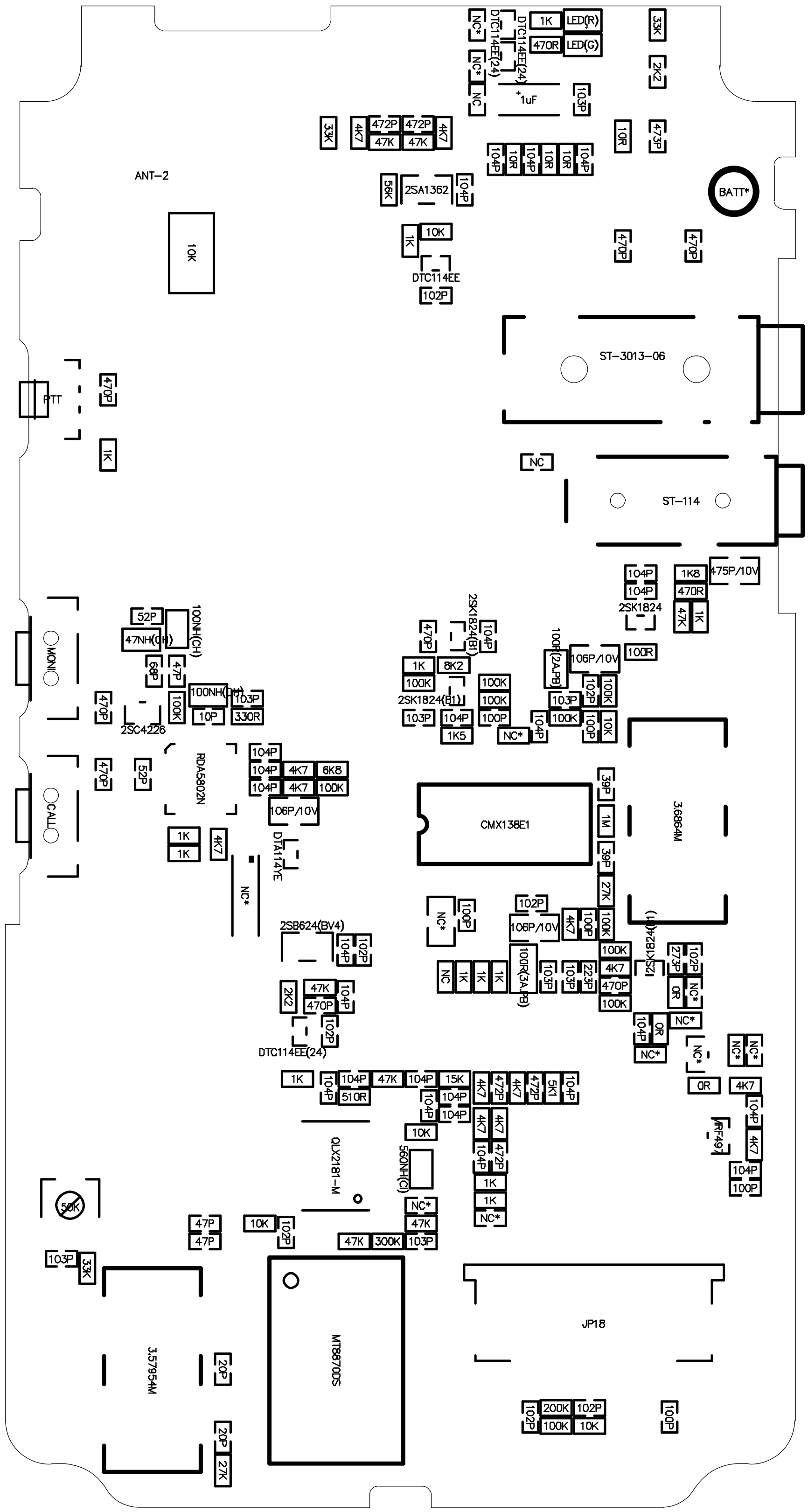

MIC756
D719
JP751
S723
D713
S732
D714
S703

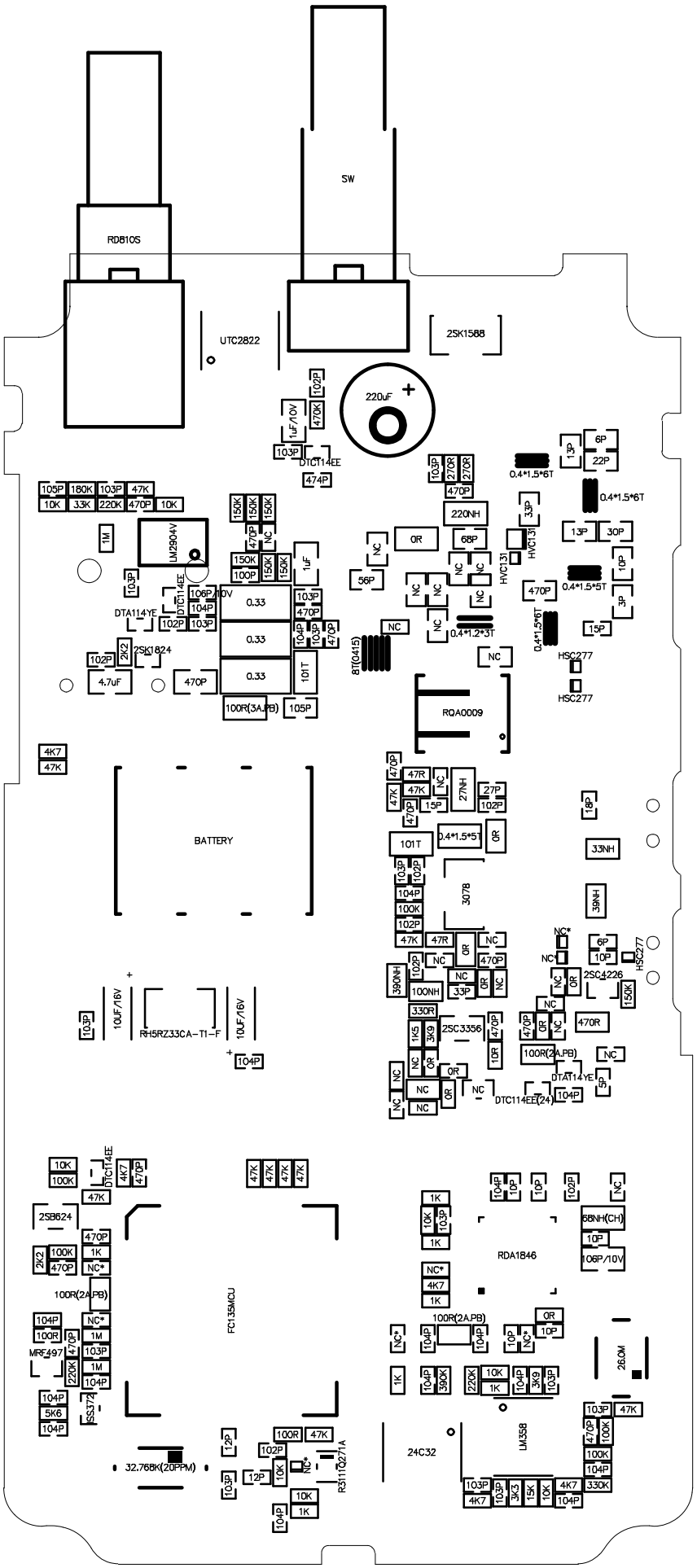

S731
S733
R712
C715
SP756
+
−
SPEAKER
C756
C751
L751
C752
R751
R752
U751
R719
R714
T711
R711
C704
JP712
C703
R715
C711
C712
C713
C714
R717
R720
C702
C701






JP751
LCD
D719
DIO-2
R719
510R
U751
HT1621
L751
101T
R751
4.7K
C752
103P
C751
10uF
R752
NC
MIC756
MIC
C756
102P
SP756
SP
SP-
SP
MIC+
D0
D1
LCD_CS
BATT_I
3V3
JP712
JP18
K4
K3
K2
K1
D3
D2
D1
D0
LAMP
R720
1K
R717
1K
R715
1K
R712
1K
D713
DIO-2
D714
DIO-2
R714
510R
T711
DTC114EE
R711
510R
C704
470P
K2
K1
K3
RM
C701
100P
C702
100P
C703
100P
C715
100P
C714
100P
C712
100P
C711
100P
C713
100P


ANT-2
10K
PTT
MONI
CALL
2SC4226
RDA5802N
DTA114YE
2SB624(BV4)
DTC114EE(24)
DTC114EE
2SA1362
BATT*
ST-3013-06
ST-114
2SK1824
2SK1824(B1)
CMX138E1
3.6864M
QLX2181-M
560NH(C)
50K
3.579545M
MT8870DS
JP18
LED(R)
LED(G)
1uF
475P/10V
106P/10V
100R(2A,PB)
100R(3A,PB)
47NH(CH)
100NH(CH)
NC*
IRF497


SW
RDB10S
UTC2822
2SK1588
220uF
1uF/10V
470K
102P
103P
DTC114EE
474P
105P
180K
33K
220K
470P
10K
47K
LM2904V
1M
150K
100P
1uF
106P/10V
0.33
DTA114YE
104P
102P
2K2
2SK1824
4.7uF
101T
100R(3A,PB)
105P
BT(0415)
RQA0009
BATTERY
4K7
0.4*1.2*3T
0.4*1.5*5T
0.4*1.5*6T
HVC131
HSC277
220NH
68P
56P
0R
NC
22P
13P
30P
10P
3P
15P
18P
33NH
39NH
27NH
27P
15P
3078
2SC3356
2SC4226
RH5RZ33CA-T1-F
10UF/16V
330R
1K5
3K9
100NH
390NH
33P
470R
100R(2A,PB)
DTA114YE
DTC114EE(24)
5P
2SB624
FC135MCU
RDA1846
68NH(CH)
106P/10V
4K7
MRF497
SS372
26.0M
32.768K(20PPM)
R3110Q271A
24C32
LM358
330K
15K
3K3

C852
T852
R852
D852
R851
D851
T851
C851
C360
E356
C356
C355
R355
R386
R861
C861
C862
R862
R863
R864
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C354
C357
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C358
R358
R359
C359
ANT160
R364
T351
C351
5
L169
R351
R352
T352
C352
C907
C906
JK351
SW881
C880
R877
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JK281
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C859
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T833
R833
R834
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R396
C393
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R395
U391
C391
C862
C387
SW886
R391
R902
C390
L391
CR392
U411
C427
R425
C428
R424
CR425
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C439
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C561
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R592
C595
C596
R598
C584
R584
R595
C583
R582
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C582
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R585
C585
C581
R898
U591
L531
R591
R543
C541
C631
R631
R633
R632
C632
RV535
C538
C539
R528
C594
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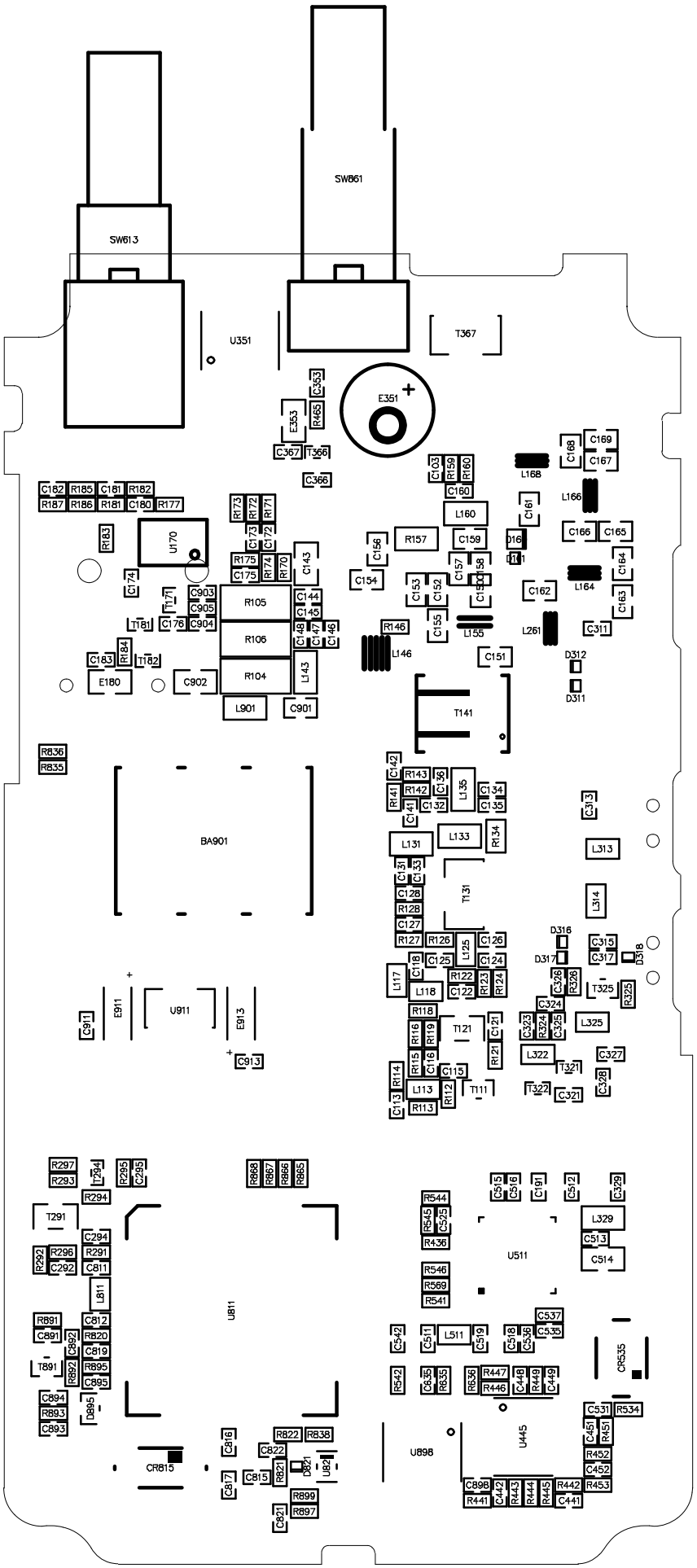
C639
R637
C855
R855
R856
C856
R857
C878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SW613
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E353
R465
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T366
C366
C182
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R187
R186
R181
C180
R177
R173
R172
R171
U170
R183
C173
C172
C143
R175
R174
R170
C175
C174
T171
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C905
C904
T181
C176
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R106
R104
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C147
C146
C183
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T182
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C902
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L155
L146
R146
C151
T141
L168
C168
C169
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D311
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R835
BA901
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C328
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L113
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T111
C113
R113
C321
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R294
T291
C294
R292
R296
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C895
C894
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C816
C817
C822
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R838
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D821
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C821
R544
R545
C525
R436
R546
R569
R541
U511
C515
C516
C191
C512
C329
L329
C513
C514
C537
C542
C511
L511
C519
C518
C536
C535
R542
C835
R835
R836
R447
R446
C448
R448
C449
CR535
C531
R534
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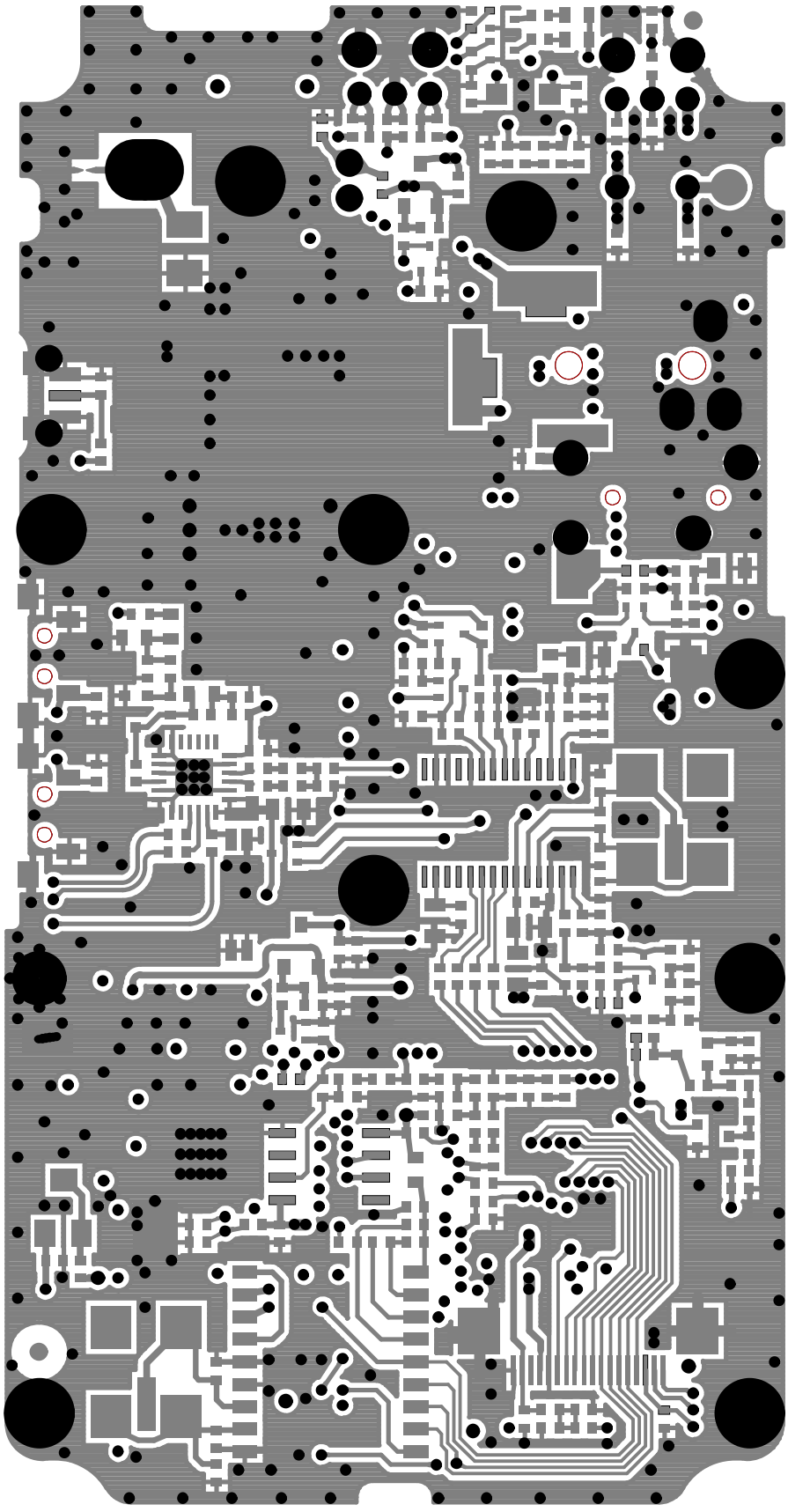
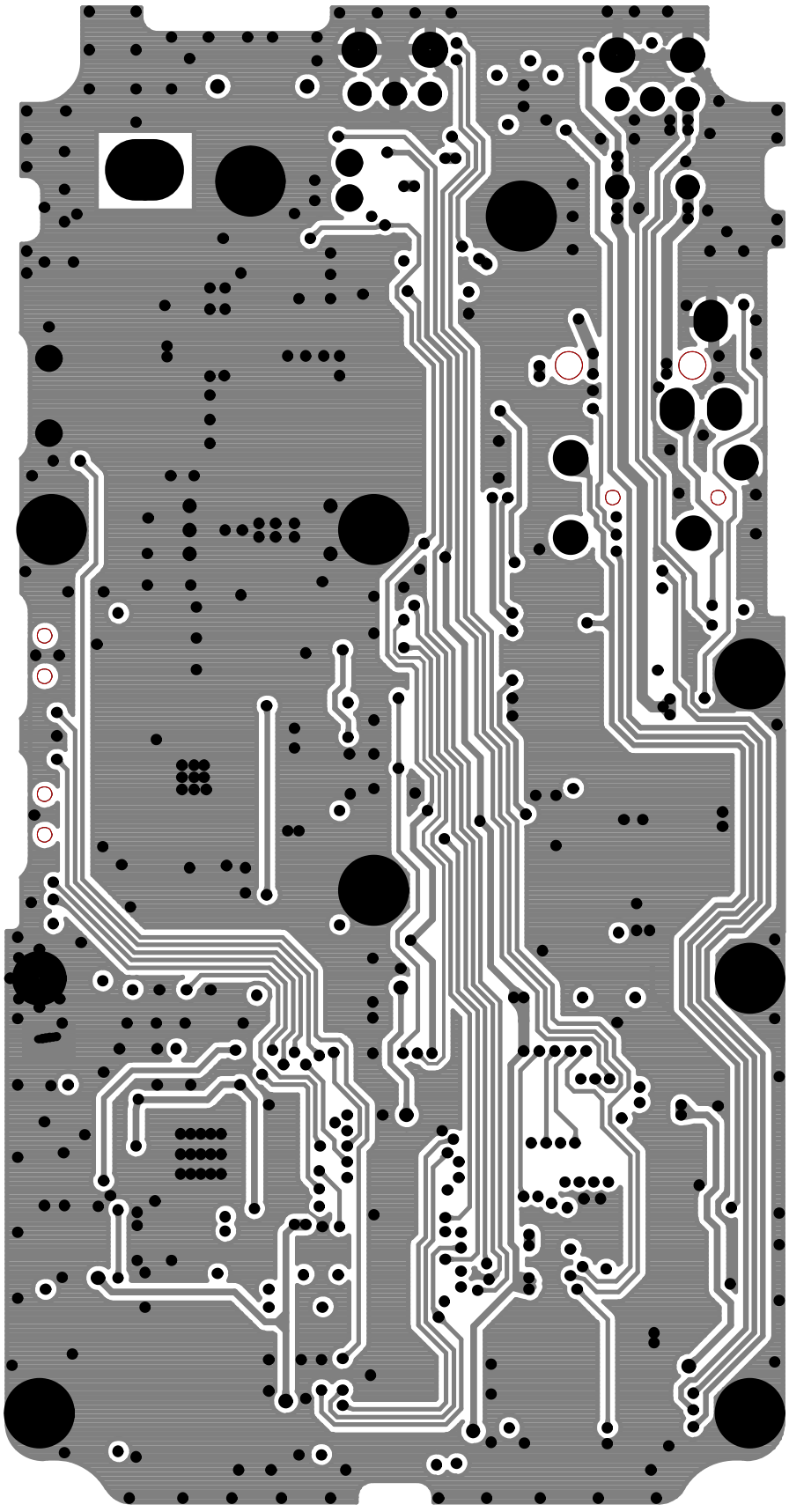
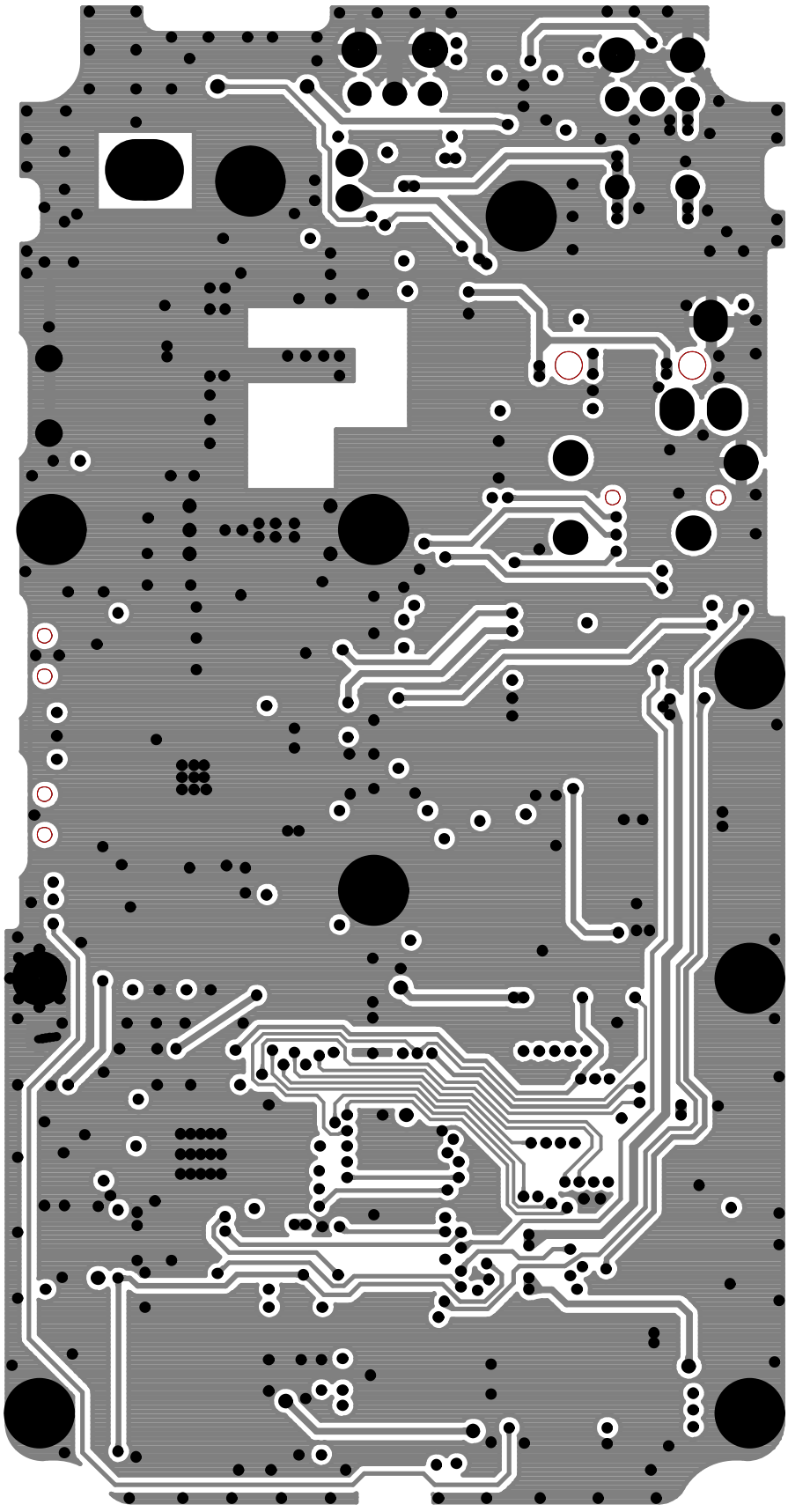
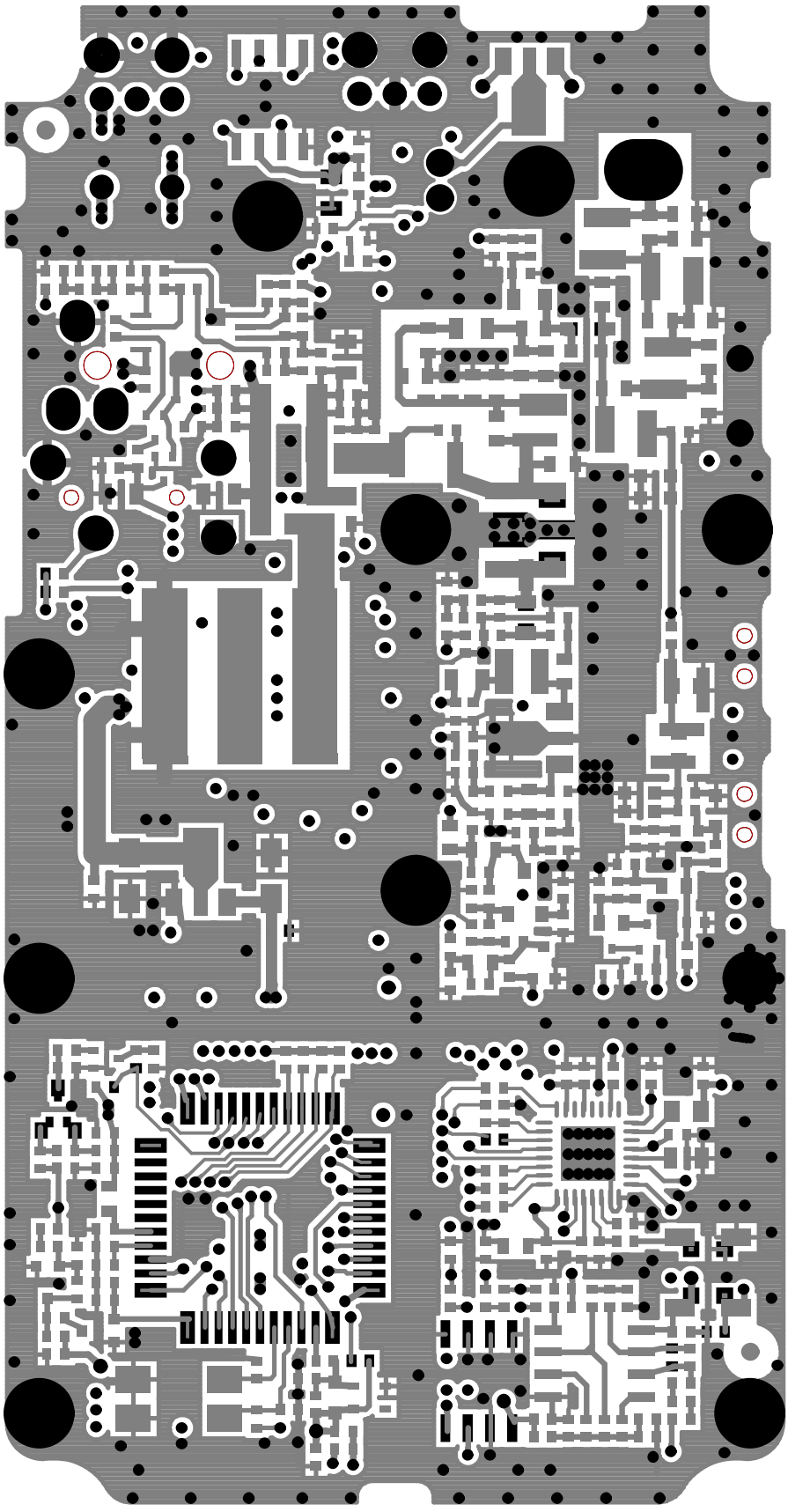
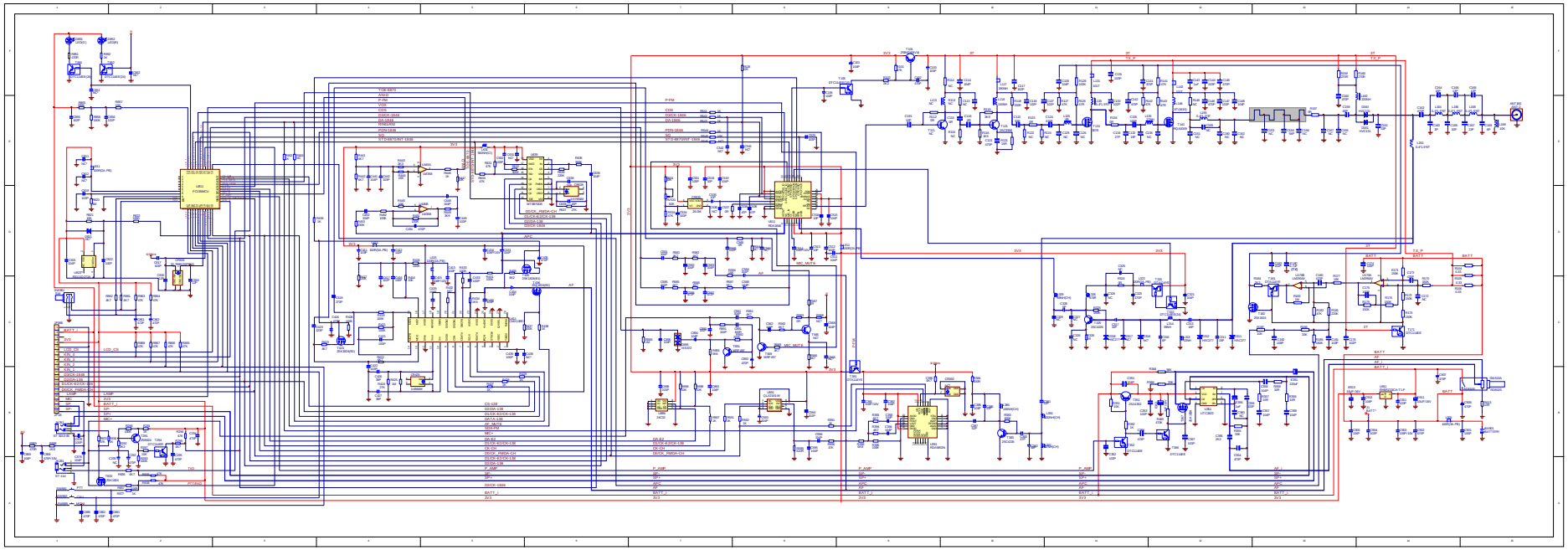


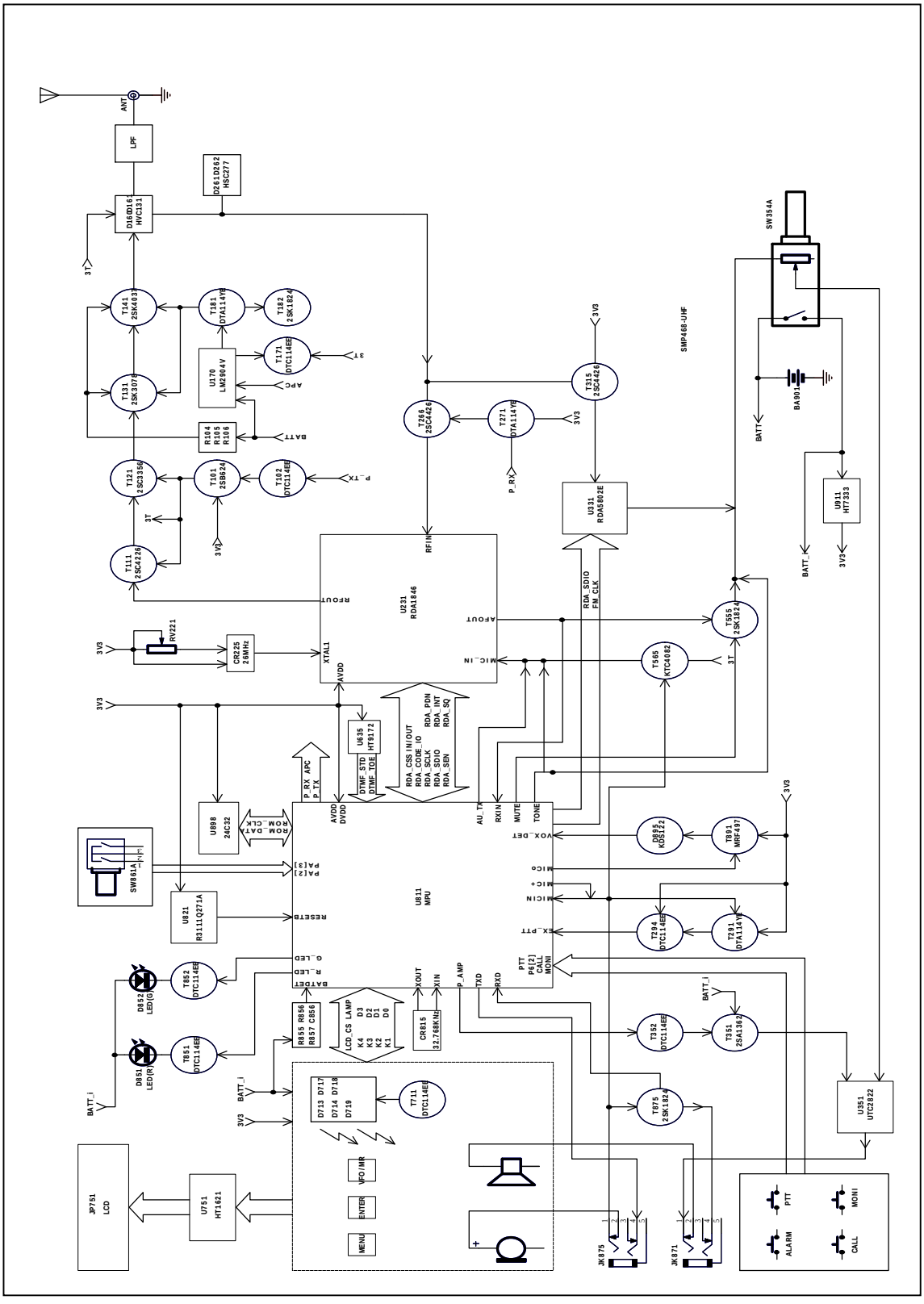








Block Diagram



B0M (1)

MODEL	speficition	qty	position number					
capacitance								
100P	C0402	8	C701	C702	C703	C711	C712	C713
			C714	C715				
102P	C0402	1	C756					
103P	C0402	1	C752					
470P	C0402	1	C704					
10uF	C0805	1	C751					
resistance								
1K	R0402	4	R715	R717	R720	R712		
4.7K	R0402	1	R751					
510R	R0402	3	R711	R714	R719			
induction								
101T	L0603	1	L751					
diode								
DIO-2	D0603	2	D714	D713				
DIO-2	LED-458	1	D719					
audion								
DTC114EE	T-ESM-DTC114EE	1	T711					
integration								
HT1621	U-CHIP48-W	1	U751					
other								
LCD	LCD-GD-6300W	1	JP751					
JP18	JP-18-2	1	JP712					
MIC	MIC60	1	MIC756					
A/B	S-ANT4	1	S703					
ENT	S-ANT4	1	S732					
VFO/MR	S-ANT4	1	S723					
SP	SP01	1	SP756					
MONI	S-SKHLLBA010	1	S733					
ALARM	S-SKRT	1	S731					

BOM (2)

MODEL	speficition	qty	position number					
capacitance								
5P	C0402	1	C328					
6P	C0402	1	C315					
10P	C0402	7	C386	C317	C535	C518	C516	C513
			C191					
12P	C0402	2	C816	C815				
15P	C0402	2	C311	C132				
18P	C0402	1	C313					
20P	C0402	2	C639	C638				
27P	C0402	1	C134					
33P	C0402	1	C122					
39P	C0402	2	C427	C426				
47P	C0402	3	C539	C538	C383			
52P	C0402	2	C387	C381				
68P	C0402	1	C382					
100P	C0402	7	C890	C439	C433	C421	C416	C878
			C175					
102P	C0402	18	C352	R565	C855	C594	C417	C412
			C856	C117	C105	C512	C176	C183
			C118	C127	C133	C135	C822	C353
103P	C0402	24	C632	C534	C432	C422	C413	C411
			C385	C356	C367	C103	C911	C898
			C449	C442	C525	C174	C904	C181
			C131	C144	C147	C819	C817	C531
104P	C0402	42	C588	C351	C431	C859	C596	C595
			C593	C584	C583	C582	C581	C568
			C562	C561	C434	C429	C394	C393
			C392	C357	C358	C359	C876	C114
			C101	C913	C895	C511	C448	C441
			C321	C894	C893	C635	C519	C515
			R891	C905	C128	C148	C452	C821
105P	C0402	1	C182					
106P/10V	C0402	1	C903					
223P	C0402	1	C423					
273P	C0402	1	C419					
470P	C0402	23	C885	C882	C881	C906	C907	C102
			C424	C435	C294	C451	C323	C892
			C295	C292	C173	C180	C121	C124
			C141	C142	C145	C146	C160	
472P	C0402	5	C862	C861	C587	C586	C585	
473P	C0402	1	C354					
474P	C0402	1	C366					
3P	C0603	1	C163					
6P	C0603	1	C169					
10P	C0603	1	C164					
13P	C0603	2	C166	C168				
22P	C0603	1	C167					
30P	C0603	1	C165					
33P	C0603	1	C161					
56P	C0603	1	C154					
68P	C0603	1	C159					

105P	C0603	1	C901					
470P	C0603	1	C162					
106P/10V	C0805	4	C415	C414	C391	C514		
1uF	C0805	2	C143	E353				
470P	C0805	1	C902					
475P/10V	C0805	2	C858	E180				
1uF	EIA3216	1	E356					
10UF/16V	EIA3216(A)	2	E913	E911				
220uF	E-0602	1	E351					
resistance								
0R	R0402	10	R567	R563	C565	R326	R324	C537
			C115	C116	R112	R123		
1K	R0402	20	R592	R352	R902	R834	R591	R543
			R438	R429	R428	R427	R391	R852
			R877	R542	R897	R544	R446	R291
			R541	R436				
1K5	R0402	2	R434	R116				
1K8	R0402	1	R858					
2K2	R0402	4	R102	R292	R184	C355		
3K3	R0402	1	R443					
3K9	R0402	2	R449	R119				
4K7	R0402	18	R423	R862	R861	R586	R585	R582
			R581	R562	R561	R422	R394	R393
			C390	R836	R442	R441	R295	R569
5K1	R0402	1	R587					
5K6	R0402	1	R893					
6K8	R0402	1	R396					
8K2	R0402	1	R435					
10K	R0402	13	R351	R857	R528	R416	R898	R899
			R447	R297	R545	R177	R187	R445
			R821					
10R	R0402	5	R613	R357	R358	R359	R121	
15K	R0402	2	R584	R444				
27K	R0402	2	R637	R424				
33K	R0402	4	R366	R531	R355	R186		
47K	R0402	19	R864	R863	R833	R633	R631	R596
			R101	R835	R294	R182	R127	R141
			R142	R868	R867	R866	R865	R838
			R534					
47R	R0402	2	R126	R143				
56K	R0402	1	R364					
100R	R0402	3	R837	R822	C891			
100K	R0402	16	R437	R433	R431	R421	R419	R417
			R415	R395	R383	R856	R426	R451
			R293	R296	R128	R452		
150K	R0402	7	R325	R170	R171	R172	R173	R174
			R175					
180K	R0402	1	R185					
200K	R0402	1	R855					
220K	R0402	3	R892	R181	R636			
270R	R0402	2	R159	R160				
300K	R0402	1	R632					
330K	R0402	1	R453					

330R	R0402	2	R384	R118				
390K	R0402	1	R635					
470K	R0402	1	R465					
470R	R0402	2	R859	R851				
510R	R0402	1	R595					
1M	R0402	4	R425	R895	R183	R820		
0R	R0603	2	R134	L125				
470R	R0603	1	L325					
10K	R1206	1	L169					
0R	R0805	1	R157					
0.33	R1206	3	R104	R105	R106			
50K	RV-3*3	1	RV531					
induction								
27NH	L0603	1	L135					
33NH	L0603	1	L313					
39NH	L0603	1	L314					
47NH(CH)	L0603	1	L382					
68NH(CH)	L0603	1	L329					
100NH(CH)	L0603	3	L386	L381	L118			
220NH	L0603	1	L160					
390NH	L0603	1	L117					
560NH(CI)	L0603	1	L631					
100R(2A.PB)	L0603	4	L415	L322	L511	L811		
100R(3A.PB)	L0805	4	L411	L901	L131	L143		
0.4*1.5*5T	5T	2	L164	L133				
0.4*1.5*6T	6T	3	L166	L168	L261			
0.4*1.5*8T	8T	1	L146					
0.4*1.2*3T	3T	1	L155					
diode								
LED(G)	D0603	1	D851					
LED(R)	D0603	1	D852					
HSC277	D-ESC	3	D318	D312	D311			
HVC131	D-ESC	2	D161	D160				
ISS372	D-USM(D)	1	D895					
audion								
RQA0009	T-2N1A-2SK3476	1	T141					
DTA114YE	T-ESM(C)	3	T391	T321	T181			
DTC114EE(24)	T-ESM(C)	8	T852	T851	T105	T322	T294	T352
			T366	T171				
2SK1824(B1)	T-ESM(G)	5	T436	T423	T435	T833	T182	
2SK1588	T-SOT89-2SK1588	1	T367					
3078	T-SOT89-2SK3078	1	T131					
2SB624(BV4)	T-TSM(C)	2	T101	T291				
2SA1362	T-TSM-2SB624	1	T351					
2SC3356	T-TSM-2SC3356(R25)	1	T121					
R3111Q271A	T-US4-R3111QX	1	U821					
2SC4226	T-USM(C)	2	T383	T325				
MRF497	T-USM(C)	2	T569	T891				
integration								
RDA5802N	U-QFN24-0404-P050	1	U391					
RDA1846	U-QFN32(RDA1846)	1	U511					
FC135MCU	U-QFP44	1	U811					
MT8870DS	U-SOIC18	1	U635					

24C32	U-SOP8	1	U898					
LM358	U-SOP8	1	U445					
QLX2181-M	U-SOP8	1	U591					
UTC2822	U-SOP8	1	U351					
RH5RZ33CA-T1-F	U-SOT89(V)	1	U911					
CMX138E1	U-SSOP28(T)	1	U411					
LM2904V	U-SSOP8	1	U170					
other								
3.57954M	FX-11.8*5.5	1	CR638					
3.6864M	FX-11.8*5.5	1	CR425					
26.0M	FX-3.0*5.0	1	CR535					
32.768K(20PPM)	FX-8*3.8	1	CR815					
BATTERY	JK-C BC-47S-13-D	1	BA901					
ST-114	JK-ST-106	1	JK281					
ST-3013-06	JK-ST-3013-06	1	JK351					
JP18	JP-18-2	1	JP865					
ANT-2	PX-333-ANT	1	ANT160					
RD810S	S-R087FENS	1	SW613					
SW	S-RD81-T02	1	SW861					
PTT	S-SKRT-1	1	SW881					
CALL	S-SS208GS16	1	SW882					
MONI	S-SS208GS16	1	SW885					

CPU PIN FUNCTION LIST

Pin NO	Pin name	I/O	PORT NAME	FUN DES	Pin NO	Pin name	I/O	PORT NAME	function
1	XOUT			oscillator output	33	NC		NC	
2	XIN			oscillator input	34	NC		NC	
3	DVDD			power positive	35	NC		NC	
4	P6{0}		LAMP	backlight control	36	NC		NC	
5	P6{1}		LCD CS	LCD driver	37	DGND			power negative
6	P6{2}				38	MICBiasOUT			mic power output
7	P6{3}		RDA CIDE IO	1846data input/output	39	MICO			MIC amplify output
8	P6{4}		NC		40	MICIP			MIC+input
9	P6{5}		RXD	programme data receive	41	MICIN			MIC-input
10	P6{6}		RDA_CSS IN/OUT	1846data input/output	42	IntverfOUT			MIC power
11	P6{7}		TXD	send programme data	43	RXO			RX audio amplify output
12	P7{0}		K4	key scan input	44	RXIN			RX audio amplify input
13	P7{1}		K3	key scan input	45	AGND			power negative
14	P7{2}		K2	key scan input	46	PLLC			external capacitance
15	P7{3}		K1	key scan input	47	TONE		TONE	ring output
16	P7{4}		D3	key scan input	48	AVDD			power positive
17	P7{5}		D2	key scan input	49	P9{5}		G_LED	grenn indicator light
18	P7{6}		D1	key scan input	50	P9{6}		R_LED	red indicator light
19	P7{7}		D0	key scan output	51	P9{7}		AU-TX	modulation audio output
20	P8{0}		EX _PTT	external PTT key	52	PA{0}		AF-OUT	RX audio output
21	P8{1}		PTT	PTT key	53	PA{1}		NC	
22	P8{2}		CALL	call key	54	DA		APC	auto power control
23	P8{3}		MONI	monitor key	55	PA{2}			encoder input
24	P8{4}		P_AMP	audio amplifier power input control	56	PA{3}			encoder input
25	P8{5}		P_URX	RX power control	57	PA{4}		RDA_SCLK	1846 clock

26	P8{6}		ROM_CLK	memory clock	58	PA{5}		RDA_SDIO	1846 data
27	P8{7}		ROM_DATA	memory data	59	PA{6}		RDA_SEN	1846data control
28	P9{0}		MUTE	mute	60	PA{7}		RDA_PDN	1846data control
29	P9{1}		P_TX	TX power control	61	AD1		VOX_DET	VOX testing
30	P9{2}		NC		62	AD2		BATDET	battery testing
31	P9{3}		NC		63	AD3		RDA_SQ	squelch control
32	P9{4}		RDA INT	1846data control	64	RESETB			reset

SPECIFICATION

Frequency Range	**136-174MHz**
Channel Number	**256**
Channel Step	**12.5KHz**
Antenna Impedance	**50Ω**
Microphone Impedance	**2KΩ**
work voltage	**7.4V DC**
Frequency Stability	**$\pm 2.5\times10^{-6}$ppm**
Transmitter	
carrier output power	**≤5W**
modulation sensitivity	**8-12mV**
Modulation Distortion	**≤5%**
Modulation Limited	**≤5KHz**
Adjacent Channel Power	**≥65dB**
Intermodulatohn Rejection	**≥40dB**
RECEIVER	
Sensitivity	**≤0.224uV**
Audio Distortion	**≤5%**
SN RATE	**≤-40**
Co-Channel Rejection	**≥-8dB**
Blocking	**≥85dB**
Adjacent Channel Selectivity	**≥55dB**
Spurious Radiation	**≥55dB**