

Service Manual



Model: KG-689

Frequency: 136-174MHz

Version: KG-689-0801-V1

QUANZHOU WOUXUN ELECTRONICS CO., LTD

KG-689 transceiver service manual

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Introduction

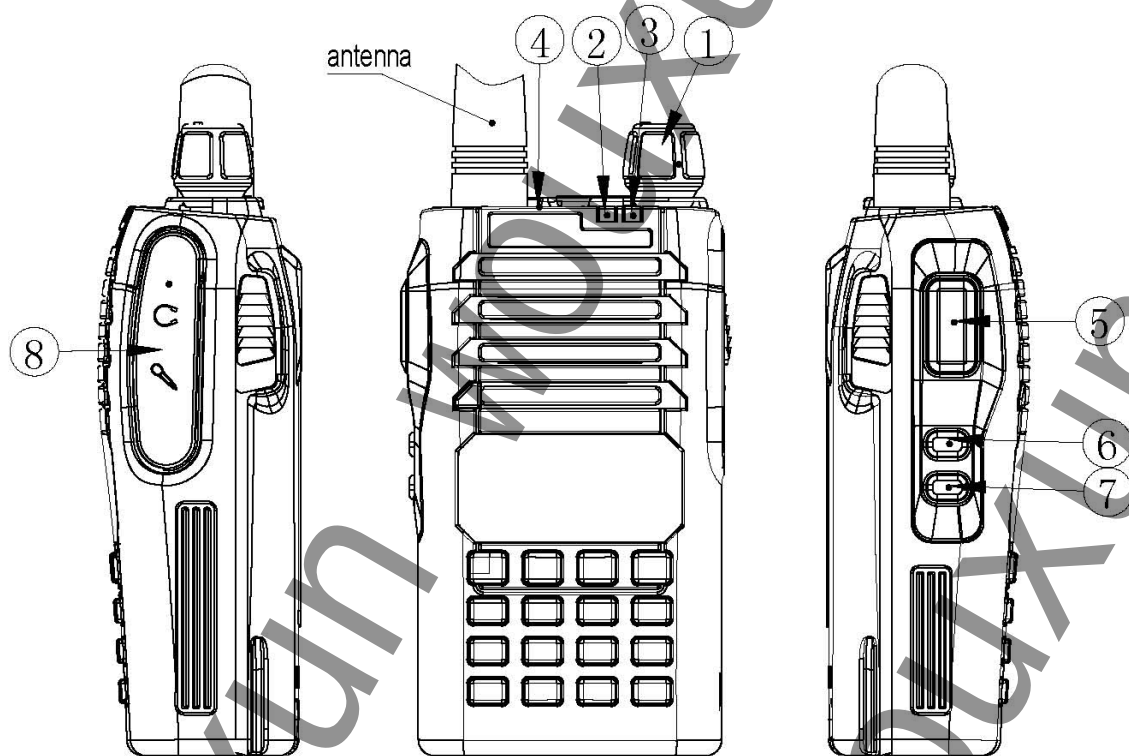
Scope of this manual

This manual is intended for use by experienced technicians familiar with similar types of commercial grade communications equipment. It contains all required service information the equipment and is current as of the publication date. This manual almost correct and complete, if there is something oversight, WOUXUN company keeps the right of explanation. And we also keep the right of change the design and the specification.

Personal Safety:

- Do not transmit, if you don't check all transmitting pins or one of the opening pins hasn't connect to the correspond port.
- Switch off power when you are on flammability gas condition.
- Do not take it apart, or have it repaired by a nonprofessional.
- Turn off the radio before of detonator and blasting area.
- In order to avoid the problem arising by Electromagnetic interference and/or Electromagnetic Compatibility, please turn off the radio where there has a mark: Turn off radio, such as hospital or other health care place and enplane.

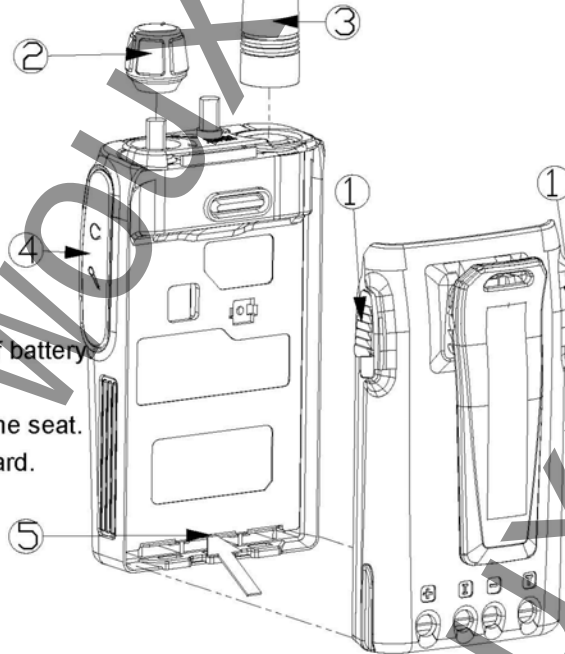
Disassembly for repair



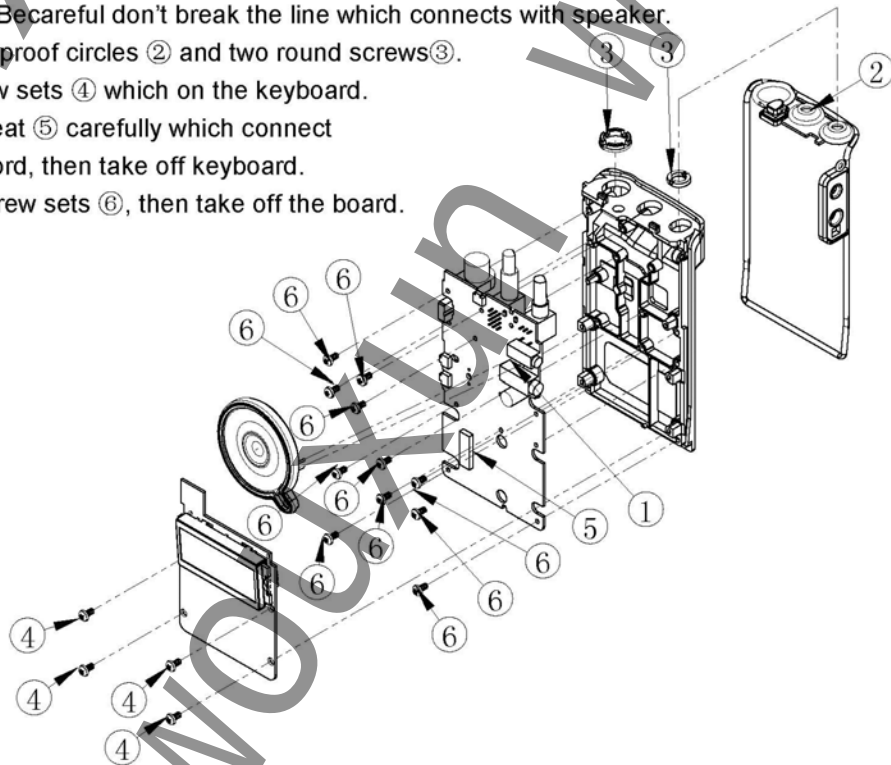
- ① Power / Voice Switch
Turning by clockwise to switch on radio; Turning to bottom by counter-clockwise to switch off radio; Turning by clockwise to turn up voice; Counter-clockwise to turn down .
- ② LED indicator light (A light)
A light is corresponding to the A frequency range. Red light means radio transmitting signal, green light means radio receiving signal, then red light and green light flicker alternate means someone transmits urgency alarm.
- ③ LED indicator light (B light)
B light is corresponding to the B frequency range. Red light means radio transmitting signal, green light means radio receiving signal, then red light and green light flicker alternate means someone transmits urgency alarm.
- ④ Top-key (PF2)
Programming function key-press, press this key to turn on accessorial function.
- ⑤ PTT switch
Press this switch, then you can transmit through speaker.
- ⑥ Side-key 1 (PF1)
Programming function key-press, press this key-press to turn on accessorial function.
- ⑦ MONI key
On this mode the speaker will be opened in force, using to receive the signal on frequency. If there is not any signal on frequency, then you will hear a background noise, or you will receive audio frequency.
- ⑧ Speaker/Mic.faucet
On this position you can connect with speaker/Mic.

Disassembly for repair

1. Pull down the button of the battery ① both side at the same time, then take off battery.
2. Take off the knob ② and antenna ③.
3. Take the earphone plug ④ from earphone seat.
4. Open the Aluminum shell ⑤, then get board.



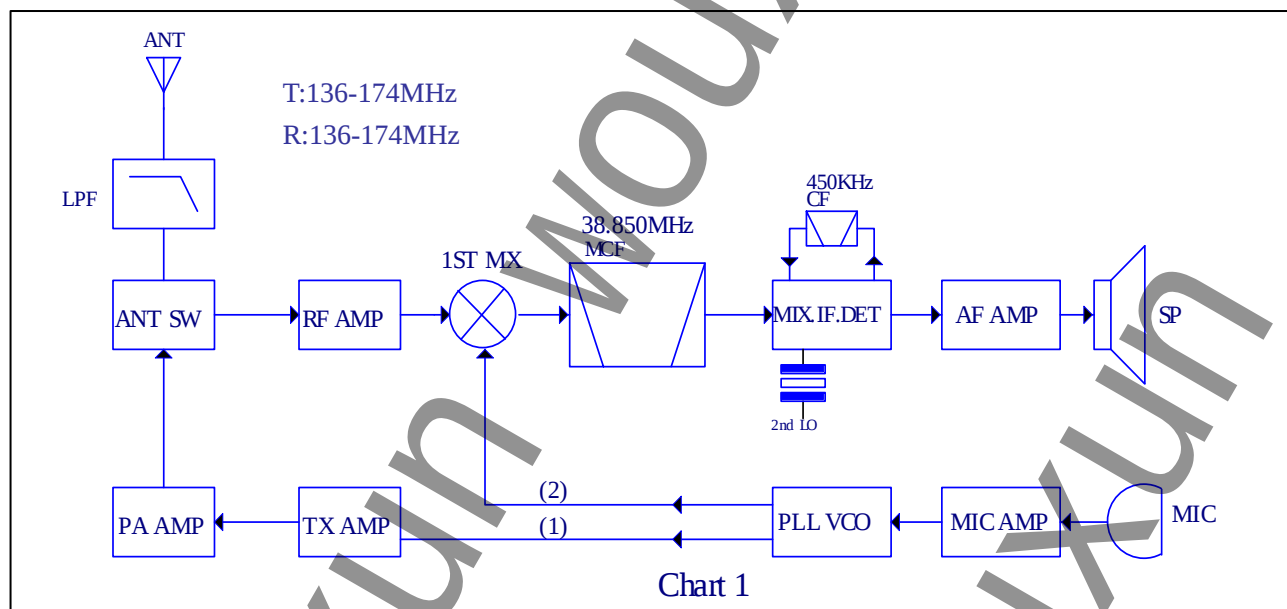
1. Use an electric iron to weld the welding ① which connect the speaker with board, then get the speaker. Be careful don't break the line which connects with speaker.
2. Take off the two waterproof circles ② and two round screws ③.
3. Take off the four screw sets ④ which on the keyboard.
4. Take off the bottom seat ⑤ carefully which connect the keyboard with board, then take off keyboard.
5. Take off the twelve screw sets ⑥, then take off the board.



Circuit Description

1. Frequency association

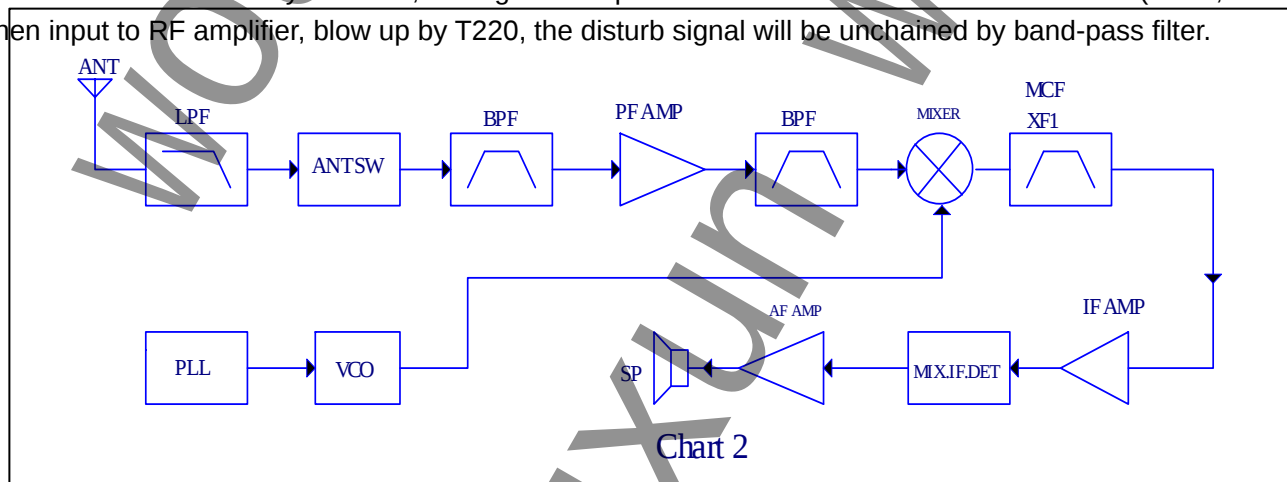
Frequency association is shown in Chart 1.



2. Receive system

(1). RF amplifier is shown in Chart 2.

The radio wave enter by antenna, through a low-pass and a transmit/receive switch circuit(D215,D216), then input to RF amplifier, blow up by T220, the disturb signal will be unchained by band-pass filter.



(2). The first mixer

The receive signal and the first PLL unit output root flap signal will mix on the first mixer T233, then give birth to the first intermediate frequency(IF) signal, except that all disturb signals will be unchained by crystal filter..

Circuit Description

(3). Intermediate amplifier

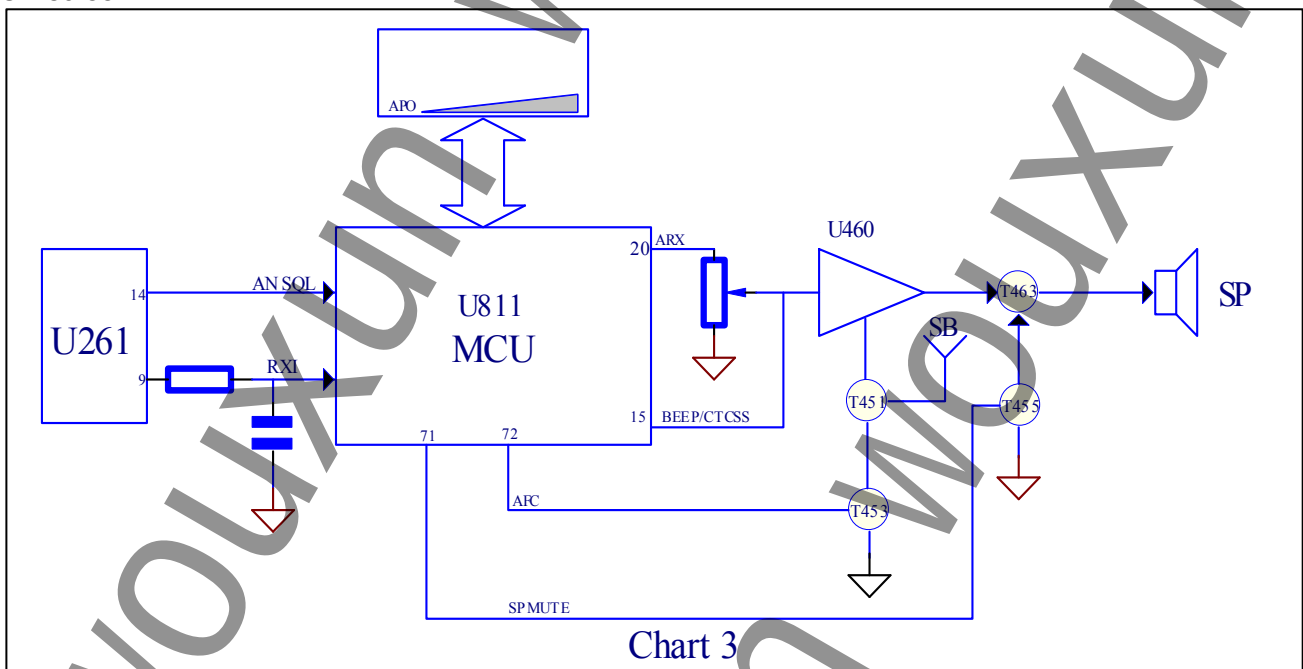
As Chart 3 show, the first intermediate frequency blow up by T253, then enter U261(FM signal frequency modulation integrate circuit). At time signal will mix with second root flap, switch to second IF signal. Through 450K filter, except that all disturb signals will be unchained, then be blew up and inspected.

Audio frequency amplifier

The audio frequency signal comes from inspected filter and be aggravated, then input to MCU(U811), then through adjust potentiometer, blow up by U460, get the audio frequency power, contact with MIC via T463.

Squelch circuit and signal intensity list

Check by U261: Output yawp signal, then put it into CPU (U811) and deal with it by the 25 feet interior. According to the electricity level signal which MCU get, one side, it can control SP MUTE, APX and AFC, to completed to control audio frequency output circuit (The level of CPU inside control system is from 1 to 9 grade, it can program by software or by keyboard). On the other side, it can control the signal strong list of LCD screen.



3. Transmit system

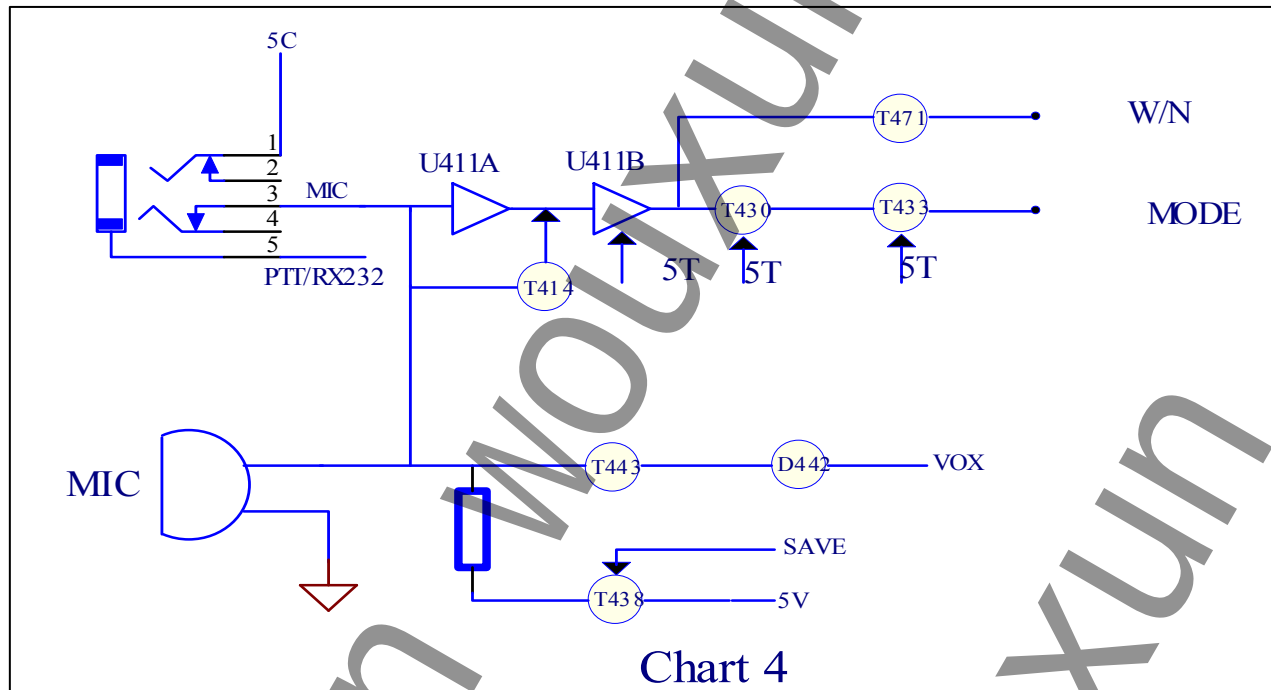
(1). Speaker amplifier

As show in Chart 4, audio frequency signal comes from MIC will be aggravated, then limited blow up by U411-A, all distortion audio frequency signals will be unchained by adjacent filter which makes up with U411-B caused by limited blow up.

Modulate circuit

The signal comes from speaker amplifier modulated by adjust potentiometer VR382, then modulating changeable reactance by varactors tube D348.

Circuit Description



(2). VOX circuit

Blow up audio frequency signal comes from the speaker's by T443, change the AC audio frequency to DC electricity level signal by D442, then put it into the CPU (U811) the 21 feet to manage.

Blow up drive and end level

The goal signal produce by VCO and cushion blow up by T113, then send it to a two grade FEI amplifier after invigorative blow up T117, and blow up the power about 4W.

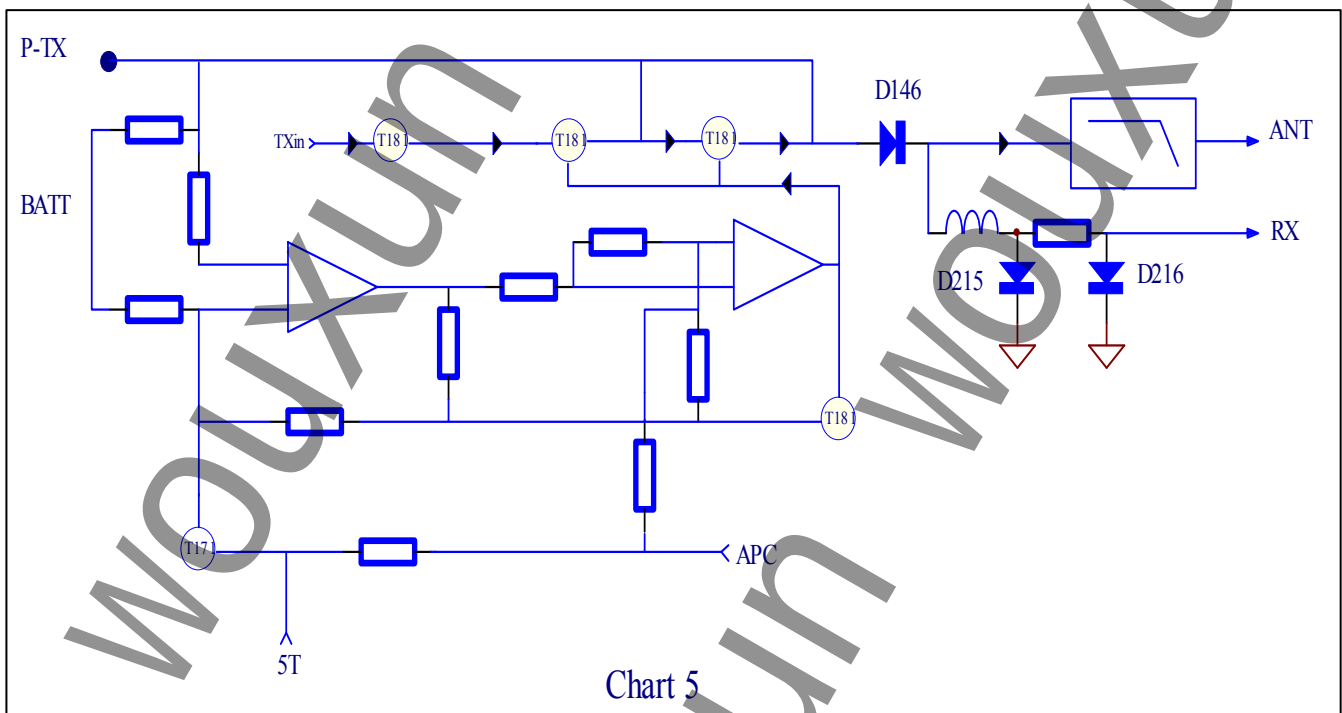
Circuit Description

4. Select transmit and receive circuit

As shown in Chart 5. Output transmit signal will pass transmit and/or receive switch circuit and low-pass, then send to antenna. Transmit and/or receive circuit has made up of D146 D145 D216. Start during transmitting and stop during receiving, switch transmitting system and receiving system.

Auto power control circuit APC, use for get a reliable transmit power and transmit control output. This circuit check out power discreteness end terminal current exhaust and control transmit output. Two reference voltage from U170, one is give birth to the voltage which use for adjust the power output(AD1 give birth to), the other one is get the R171-R173 two terminal and end terminal exhaust current be direct ratio check out voltage. On the output terminal of U181 can get a reference voltage and check out voltage dispersion be direct ratio voltage signal. This signal by reverse then as APC voltage. This voltage be use control power discreteness' power control feet and make transmit output level off.

As show in Chart 5



Circuit Description

5. PLL Circuit

(1) PLL

19.25MHz reference oscillator output through PLL IC(U311) reference frequency then bring 5KHz and 6.5 KHz reference frequency.

VCO output signal blew up by T337, then bring compare frequency by U311 dispart frequency. Use different dispart frequency ratio by CR311, and get different inspect posture consult frequency. According referenced frequency and comparable frequency value, then bring 5, 6.25, 10, 12.5 and 25KHz for step frequency value of PLL synthesizer. According referenced frequency and comparable frequency discrepancy value, the output correspond pulse voltage from the fifth feet of U311, change it to direct current signal direct current signal by filter after through Charge Pump, then bring lock voltage.

(2) VCO

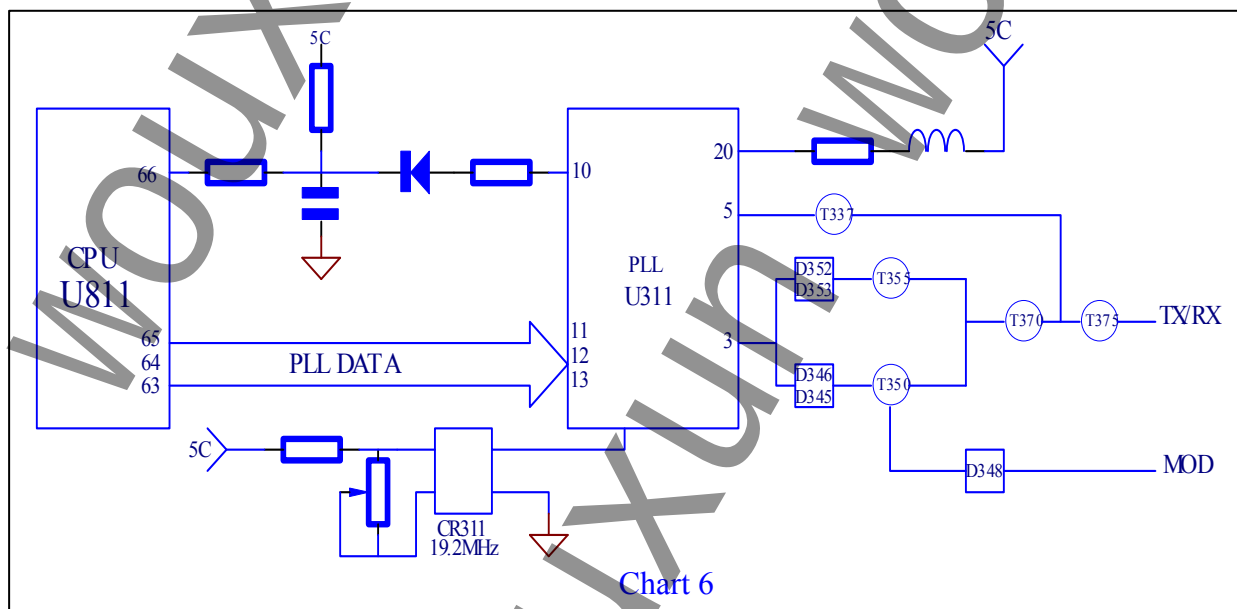
Goal frequency is make up of FETT355 and T350 directly produced by Rapids oscillator. Lock controllable voltage and then modify oscillator frequency by D353, D352, D346 and D345.

(3) Lose lock detection circuit

When PLL is on lose lock, one pulse will be plastic by R312 D312 C312 and R313, then add to LD side of PLL (tenth LD side), and the voltage of LD side will be rose, CPU will control transmitting and receiving by detecting the voltage of LD side.

(4) Digital control circuit

Conformation of Keyboard circuit: Directly input the signal come From the keyboard to CPU (U811).



Circuit Description

6. Reset and reserve circuit

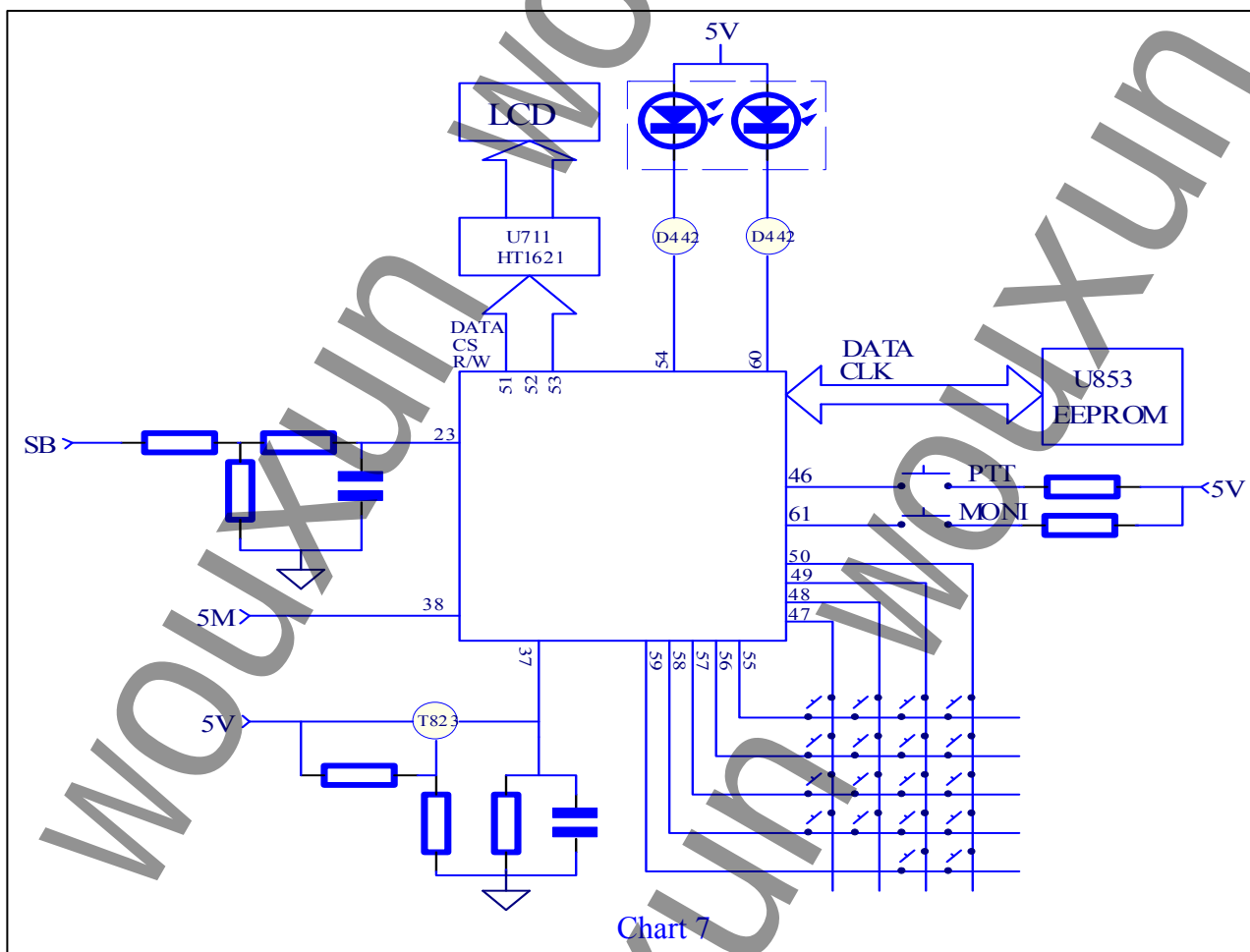
When connect with power, one reset circuit made up of T823 R823 R825 C825 output a positive impulse, this impulse signal add to the 37th feet reset side of U81. When turn off the power, the 37th feet side of U811 turn low, and CPU send all data to U835 to store, then go into reserve.

Detect battery voltage circuit

Input SB to the 23th side A/D switch port of CUP(U811) after be disparted, and after disposal by CUP, drive LCD battery level indicator.

Floodlight and LCD circuit

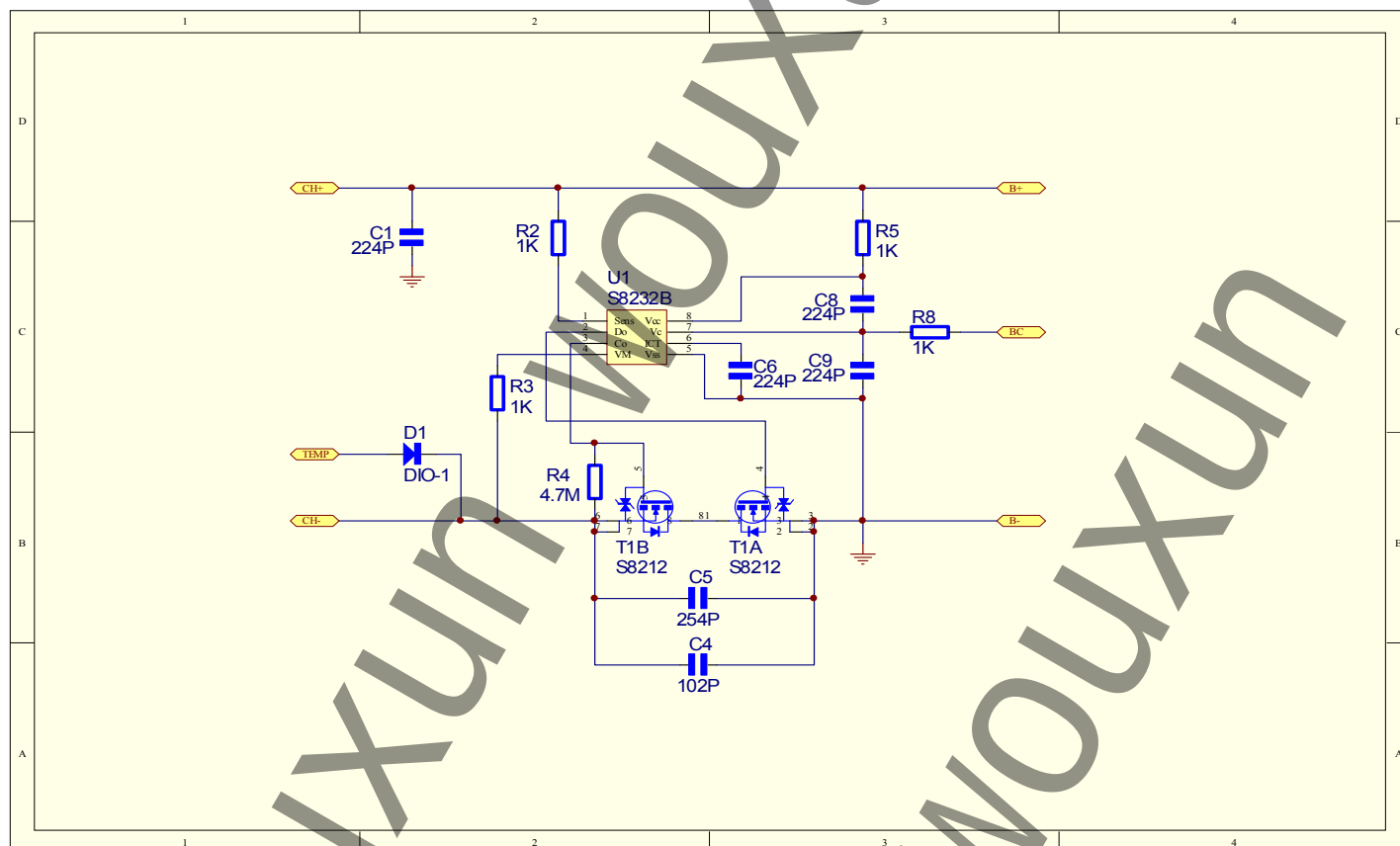
Floodlight and LCD directly be controlled on of off by CPU port circuit



Circuit Description

7. Battery save circuit

One receive state the squelch turn off, if not press any key within 5 second, the power circuit will enter save state mode, This control circuit through CPU directly control.

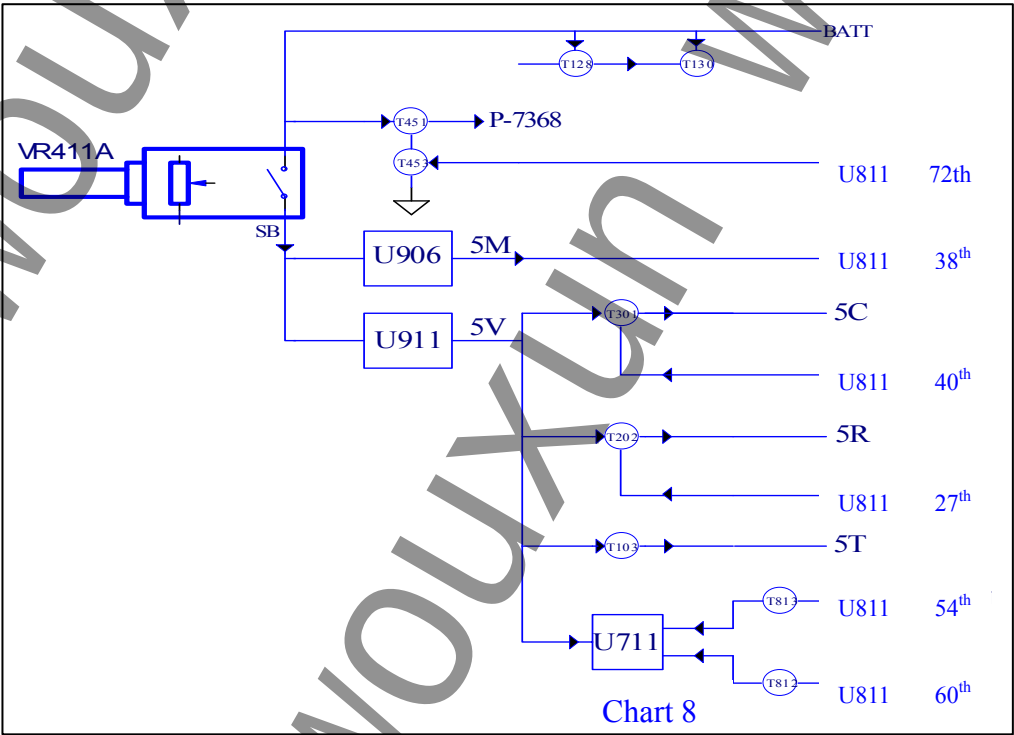


Circuit Description

8. Select power circuit

Power offset circuit as following:

POWER		TX POWER		Power voltage of power amplifier
	→	5V	→	Output 5V by U906 regulator circuit, used for reset circuit power VDD of U511 U853 D711 and U8111.
	→	5M	→	Output 5M by U911 regulator circuit, used for CPU power VDD.
	→	5C	→	T301 be controlled by the 40th side of CPU (811), output 5C by 5V, used for PLL circuit, VCO circuit and CR311 power circuit VDD.
	→	5R	→	T202 be controlled by the 27th side of CPU (811), output 5R by 5V, used for U261, T233, T253, T220 power VDD.
	→	5T	→	T103 be controlled by the 26th of CPU (811), output 5T by 5V, used for T113 T117 T430 T433 T171 U411 U170 and D146 D216 switch (transmit and/or receive transform switch voltage).
	→	P-7368	→	T451 and T453 be controlled by the 72th side of CPU, output P-7368 power by BATT, used for U460 power.



Circuit Description

9. CTCSS / DCS circuit

DCS signal output CTCSS audio frequency signal from the 15th feet of CPU (U811), and output DCS signal from the 29th. When transmit CTCSS, the DCS output from CPU be modulated by low-pass; When receive, directly disposed by CUP after through detection frequency.

PARTS LIST

Designators	Name and specifications		Footprint
C211	Capacitance	0.5P	C0402
C358 C351 C348	Capacitance	1P	C0402
C213 C226	Capacitance	1.5P	C0402
C251	Capacitance	2P	C0402
C219 C228 C338	Capacitance	3P	C0402
C217 C230	Capacitance	4P	C0402
C349 C337 C335 C334	Capacitance	5P	C0402
C372	Capacitance	7P	C0402
C356	Capacitance	8P	C0402
C216 C231	Capacitance	9P	C0402
C321 C357 C229 C289 C377 C350 C332	Capacitance	10P	C0402
C232 C227 C371 C117	Capacitance	12P	C0402
C113 C111	Capacitance	15P	C0402
C114	Capacitance	20P	C0402
C115	Capacitance	22P	C0402
C116	Capacitance	24P	C0402
C117	Capacitance	27P	C0402
C118	Capacitance	39P	C0402
C119	Capacitance	51P	C0402
C120 C1086	Capacitance	82P	C0402
C121 C336 C461 C329 C327 C326 C325 C224	Capacitance	100P	C0402
C122 C138 C212 C902 C328 C220 C222 C296 C322 C102 C439 C410 C376 C370 C365 C342 C123 C319 C121 C120 C115 C128 C125 C127 C1083 C1084 C1051 C1138	Capacitance	102P	C0402
C124 C233 C901 C454 C1156 C4455 C224 C440 C451 C374 C364 C361 C331 C1128	Capacitance	103P	C0402
C125 C137 C442 C444 C279 C298 C294 C281 C103 C445 C443 C1552 C435 C373 C366 C339 C126 C318 C303 C455 C101 C1056 C1023 C1127 C221 C1130 C133 C297 C1039 C301	Capacitance	104P	C0402
C127	Capacitance	105P	C0402
C128	Capacitance	180P	C0402

PARTS LIST

Designators	Name and specifications		Footprint
C129	Capacitance	200P	C0402
C130	Capacitance	222P	C0402
C131 C324	Capacitance	223P	C0402
C132	Capacitance	224P	C0402
C133 C286	Capacitance	332P	C0402
C134	Capacitance	333P	C0402
C135 C136 C234 C235 C375 C223 C225 C1131 C453 C452 C367 C363 C362 C118 C112 C145 C136 C126	Capacitance	470P	C0402
C137	Capacitance	473P	C0402
C138	Capacitance	474P	C0402
C139 C237 C246 C355 C368 C352 C1017 C1019 C1020 C1015 C1012 C1009 C569 C572 C1014 C1040 C140 C1145	Capacitance	NC	C0402
C141 C1150	Capacitance	5P	C0603
C142	Capacitance	8P	C0603
C143 C153	Capacitance	10P	C0603
C144	Capacitance	15P	C0603
C145 C1038	Capacitance	18P	C0603
C146 C143	Capacitance	22P	C0603
C147	Capacitance	27P	C0603
C148	Capacitance	30P	C0603
C149 C129 C122	Capacitance	33P	C0603
C150	Capacitance	47P	C0603
C151 C130	Capacitance	102P	C0603
C152	Capacitance	470P	C0603
C153	Capacitance	680P	C0603
C154 C1037 C140 C139 C131 C158 C142	Capacitance	NC	C0603
C155	Capacitance	104P	C0805
C156	Capacitance	470P	C0805
C157 R437 R341 R460 R454 R1082 R1026	Resistance	0R	R0402
C158 R366 R462	Resistance	10R	R0402
C162 R357 R221 R224 R376 R373 R371 R1086	Resistance	100R	R0402
C159 R121	Resistance	22R	R0402
C160 R118 R116 R124	Resistance	47R	R0402

PARTS LIST

Designators	Name and specifications		Footprint
C161	Resistance	91R	R0402
C163	Resistance	150R	R0402
C164 R1550	Resistance	180R	R0402
C165 R145	Resistance	270R	R0603
C166 R444	Resistance	330R	R0402
C167	Resistance	470R	R0402
C168 R338	Resistance	560R	R0402
C169	Resistance	680R	R0402
C170 R323 R336 R453 R349 R303 R203 R1122 R1053 R119 R114 R375	Resistance	1K	R0402
C171	Resistance	1.5K	R0402
C172	Resistance	1.8K	R0402
C173 R452	Resistance	2K2	R0402
C174 R377 R325 R1070	Resistance	3.3K	R0402
C175 R1152 R212 R102 R361 R112 R111 R372 R113	Resistance	4K7	R0402
C176	Resistance	5K6	R0402
C177 R439 R380 R374 R342 R115 R1121 R571 R1137	Resistance	10K	R0402
C178	Resistance	15K	R0402
C179	Resistance	22K	R0402
C180	Resistance	27K	R0402
C181	Resistance	30K	R0402
C182 R1022	Resistance	33K	R0402
C183	Resistance	39K	R0402
C184 R220 R133 R320 R101 R125 R450 R857	Resistance	47K	R0402
C185 R1055	Resistance	51K	R0402
C186 R464	Resistance	56K	R0402
C187	Resistance	82K	R0402
C188 R345 R337 R1024	Resistance	100K	R0402
C189 R313	Resistance	150K	R0402
C190	Resistance	270K	R0402
C191	Resistance	330K	R0402
C192	Resistance	470K	R0402
C193 R1021 R1031 R1016 R573 R572 R1018 R326	Resistance	NC	R0402
C194	Resistance	10R	R0603
C195	Resistance	47R	R0603

PARTS LIST

Designators	Name and specifications		Footprint
C196	Resistance	150R	R0603
C197	Resistance	47K	R0603
C198	Resistance	NC	R0603
C199	Resistance	0R	R0805
C200	Resistance	0R	R1206
C196	Resistance	150R	R0603
C201	Magnetic bead	10R	R1206
C202	Exclusion Resistance	1K	RP-1206-4
C203	Adjustable Resistance	50K	RV1208
C204 E454	Multi-layer Capacitance	1uF	C0805
C205	Multi-layer Capacitance	2.2uF	C0805
C206	Multi-layer Capacitance	4.7uF	C0805
C207	Multi-layer Capacitance	10uF	C0805
C208 E1035E910 E912	Multi-layer Capacitance	22uF	C0805
C209 E1134	Multi-layer Capacitance	NC	C0805
C210	Multi-layer Capacitance	NC	C1206
C211 E461	Tantalum Capacitance	10uE/10V	EIA3216
C212	Tantalum Capacitance	100uF	EIA3216
C213	High frequency multi-layer inductance	CH27nH	L0603
C214 L283 L282 L337	High frequency multi-layer inductance	CH68nH	L0603
C215 L1139 L117 L113	High frequency multi-layer inductance	CH100nH	L0603
C216 L366 L350 L341	High frequency multi-layer inductance	CH120nH	L0603
C217 L370	High frequency multi-layer inductance	CH220nH	L0603
C218	Low-frequency multi-layer inductance	CI1uH	L0603
C219 L363	Low-frequency multi-layer inductance	CI3.3uH	L0603
C220 L345 L345 L1148 L1029	Low-frequency multi-layer inductance	CI6.8uH	L0603
C221	Low-frequency multi-layer inductance	CI100nH	L0603
C222	Low-frequency multi-layer inductance	CI270nH	L0603

PARTS LIST

Designators	Name and specifications		Footprint
C223	Low-frequency multi-layer inductance	CI560nH	L0603
C224		NC	L0603
C225	Low-frequency multi-layer inductance	CI100nH	L0805
C226	Low-frequency multi-layer inductance	CI560nH	L0805
C227 L223 L229	Winding Inductance	CH68NH	L0805
C228	Winding Inductance	CH85NH	L0805
C229 L1163	Winding Inductance	CH120NH	L0805
C230 L128 L145 L237	Winding Inductance	CH220NH	L0805
C231	Winding Inductance	CH560NH	L0805
C232 L354		NC	L0805
C233	High temperature without high loop	0.31*1.4*4T	LC032319
C234		0.31*1.4*5T	LC042125
C235 L215		0.31*1.4*7T	LC-031638
C236		0.31*1.4*8T	LC032334
C237 L154		0.31*1.7*4T	LC032121
C238		0.4*1.0*3T	LC032319
C239 D572 D326	Diode	NC	D-ESC
C240 D211 D111 D215	Diode	HSC277	D-ESC
C241 D353 D352 D345 D345	Diode	B9	D-ESC
C242	Diode	MA2S11	D-ESC
C243	Diode	BA592	D-USC
C244 T361	Dynatron	2SC4617	T-ESM
C245	Dynatron	2SJ243	T-ESM
C246	Dynatron	DTA114EE	T-ESM
C247 T202	Dynatron	DTA114YE	T-ESM
C248 T455 T453 T1123	Dynatron	DTC114EE	T-ESM
C249	Dynatron	2SC3357	T-SOT89
C250	Dynatron	2SK1588	T-SOT89
C251 T451	Dynatron	5B1	T-TSM
C252	Dynatron	R25	T-TSM
C253 T375 T370	Dynatron	2SC4226	T-USM
C254	Dynatron	2SC4215	T-USM
C255	Dynatron	ISS4181	T-USM
C256	Dynatron	UMC4	T-USV
C257	Dynatron	NC	T-USV
C258	Dynatron	ISS372	D-USM

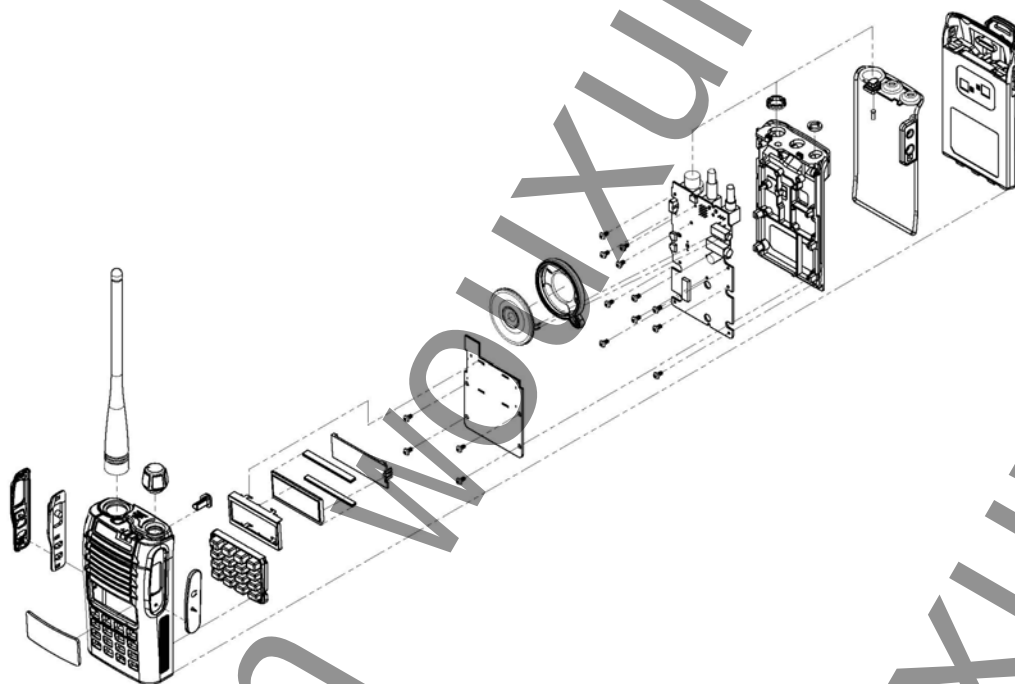
PARTS LIST

Designators	Name and specifications		Footprint
C259	Impel Tube	RD01	T-SOT89
C260 T350	Single valve	K52	T-TSM
C261 T220	Bigrid Valve	U72	T-TSQ
C262	Power Tube	2SK3476	T-PD
C263	5V S	POOU	U-TSV
C264	Integrate Circuit	7088	U-SOP16
C265	Integrate Circuit	8870	SSOP-20
C266	Integrate Circuit	TA7368	U-SSOP10
C267	Integrate Circuit	LMX2331	U-SSOP20
C268	Integrate Circuit	NC	264
C269 FL252	Crystal	38.850MHz	FL-UM
C270	Crystal	19.2MHz	FX-DS0507
C271	Patch Ceramic	NC	ZTA/ZTTCC
C272	Patch Ceramic	3.58MHz	ZTA/ZTTCC
C273	Potentiometers	RD91	S-RD810S
C274	Antenna seat	ANTENNA	ANT-KX01

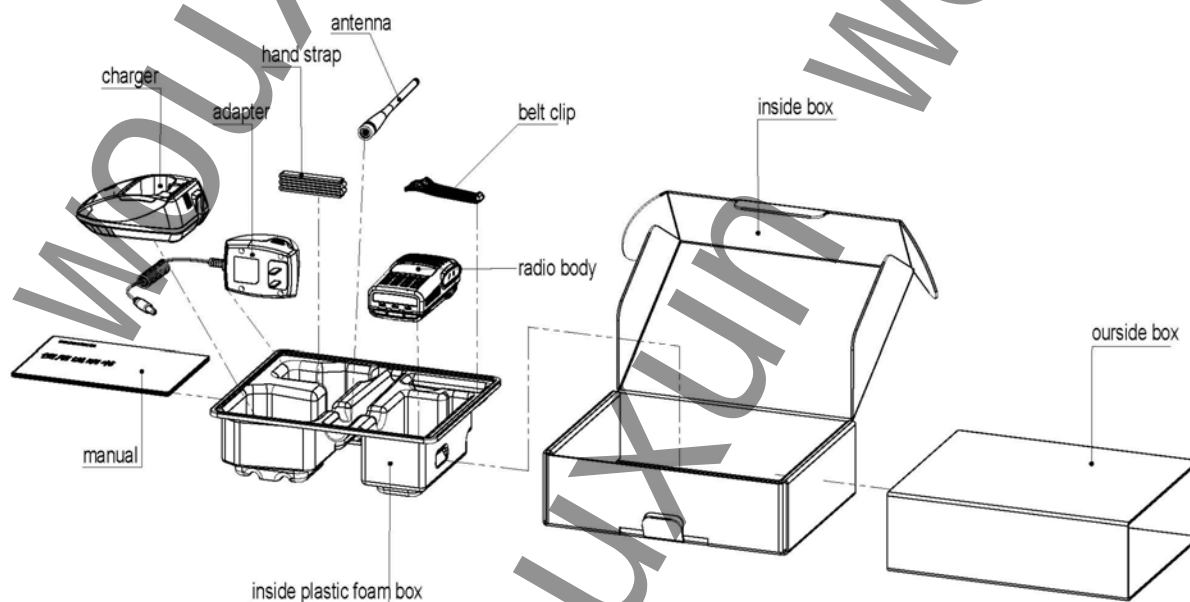
KG-689 LCD PARTS LIST

Comment	Footprint	Quantity	Designators				
102P	C0603	2	C722	C723			
103P	C0603	1	C725				
104P	C0603	1	C721				
1. 8K	R0402	1	R730				
2. 2K	R0402	4	R726	R727	R728	R731	
100R	R0603	1	R725				
510R	R0603	4	R736	R732	R733	R737	
820R	R0603	2	R740	R729			
1K	R0603	4	R734	R735	R738	R739	
4. 7K	R0603	4	R723	R724	R721	R722	
91K	R0603	1	R719				
10uF	C0805	1	E721				
White	D0603	5	D704	D701	D702	D703	D705
RLS4148	D-ESC	2	D721	D722			
CI100NH	L0603	1	L721				
DTC114EE	T-ESM	3	T703	T722	T723		
HT44780	HT44780	1	U701				
20PIN	JP-20	1	JP701				

Exploded view



Packing



Adjustment Description

The radio can be adjusted by PC programming software or by keypad adjustment.

Adjustment procedure as follows,

Instrument:

Radio Communication Test Set	1 set
Scanner	1 set
3A/12V Power Supply	1 set
Digital Voltmeter	1 set

Adjustment:

The PC programming software can download from WOUXUN website or ask for your WOUXUN dealer. Install in your PC

Connect the radio with PC by programming cable; Select the right correspond port by edit software; Turn the radio on.

Reading the administer code into the frequency mode

Switch the transceiver to the frequency mode

1.VOC

Item	Condition	Test frequency band	Test Instrument	Terminal	VCO	Specification /Remarks
Receiver	Power supply voltage DC7.4V	136-174MHz	Digital Voltmeter	CV	DC1.1-3.3V	
Transmitter	Power supply voltage DC7.4V	136-174MHz	Digital Voltmeter	CV	DC1.1-3.6V	

2. Receiver

Item	Condition	Operation of Test Instrument	Test frequency band	Terminal	Test data	Specification /Remarks
Sensitivity	Power supply voltage DC7.4V	Setting Level: -118dbm MOD FREQ: 1KHz LEVEL: 3KH	136-174MHz	Connect Headset with Radio Communication Test Set AF GENOUTUT by SPK	SINAD: ≥22dbm	

Adjustment Description

Item	Adjustment		Factory set	Specification /Remarks
	Method	Part		
Squelch Sensitivity	Entering MENU 2	1-9 level 0 is ON	On 5 level	
VOX Level	Entering MENU 7	0-10 level 0 is OFF	OFF	
Receive CTCSS	Entering MENU 10	50 groups	OFF	
Receive DCS	Entering MENU 11	105 groups	OFF	

3.Transmitter

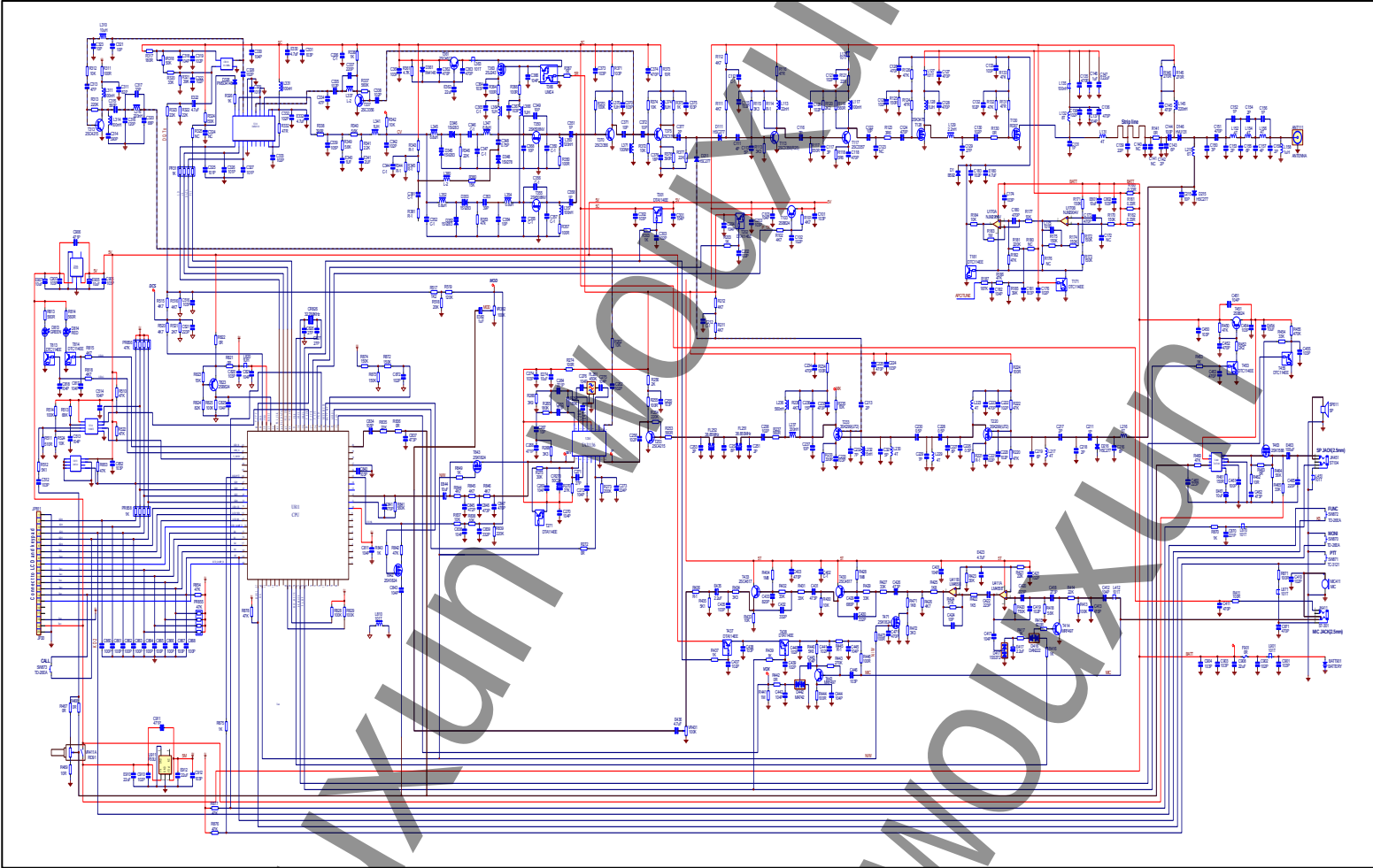
Item	Adjustment		Factory set	Specification /Remarks
	Method	Part		
Transmit Power	Entering MENU 4	10 levels	On 10 level	
Overtime prompt	Entering MENU 6	Has 15-600 seconds each level 15s difference	On 90 seconds	
Transmit W&N	Entering MENU 8		WIDE	WIDE Modulate 5KHz NARROW Modulate 2.5KHz
Transmit CTCSS	Entering MENU 10	50 groups	Full modulate band :0.5-0.75KHz	Same to W&N
Transmit DCS	Entering MENU 11	105groups	Full modulate band :0.5-0.75KHz	Same to W&N
Speaker/MIC	WIDE Modulate 5KHz NARROW Modulate 2.5KHz	MOD FREQ: 1KHz LEVEL: 3KH		WIDE Modulate 5KHz NARROW Modulate 2.5KHz
DTMF		1-3KHz	WIDE Modulate 2.5-3.5KHz NARROW Modulate 1.5-2KHz	

Adjustment Description

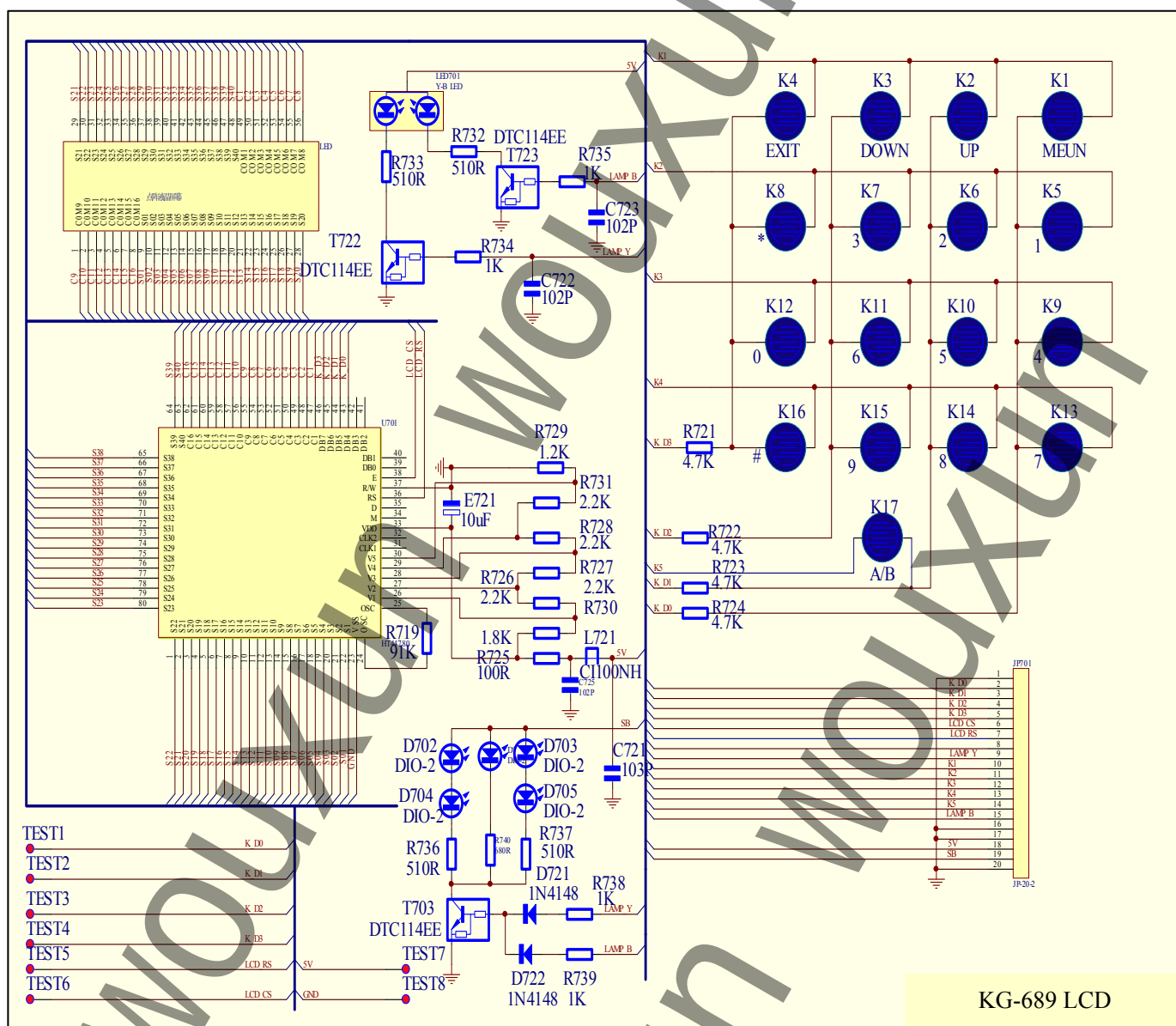
4.Setting programmed software functions and parameter

Item	Edit Method	Adjustment band	Specification /Remarks
ANI	Entering the page of programmed software which has available ANI	ANI can be programmed 3-5 bits info codes	See the user's manual
DTMF	Entering the DTMF set page which has available signal		See the user's manual

Schematic



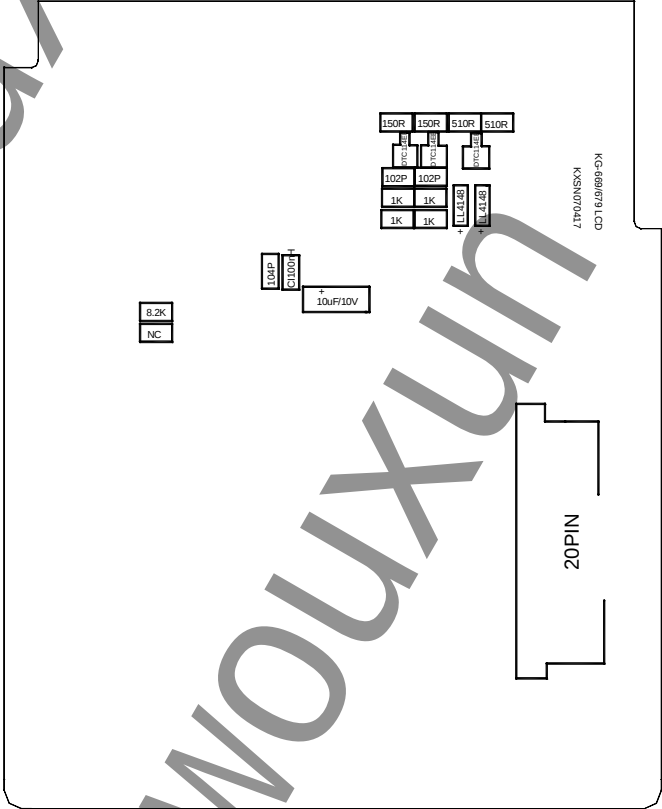
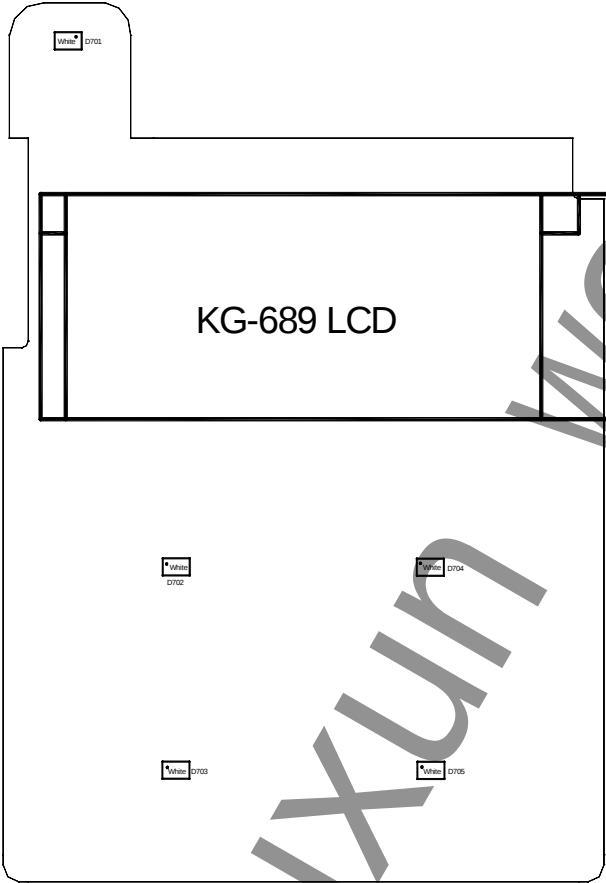
LCD Schematic



LCD Board

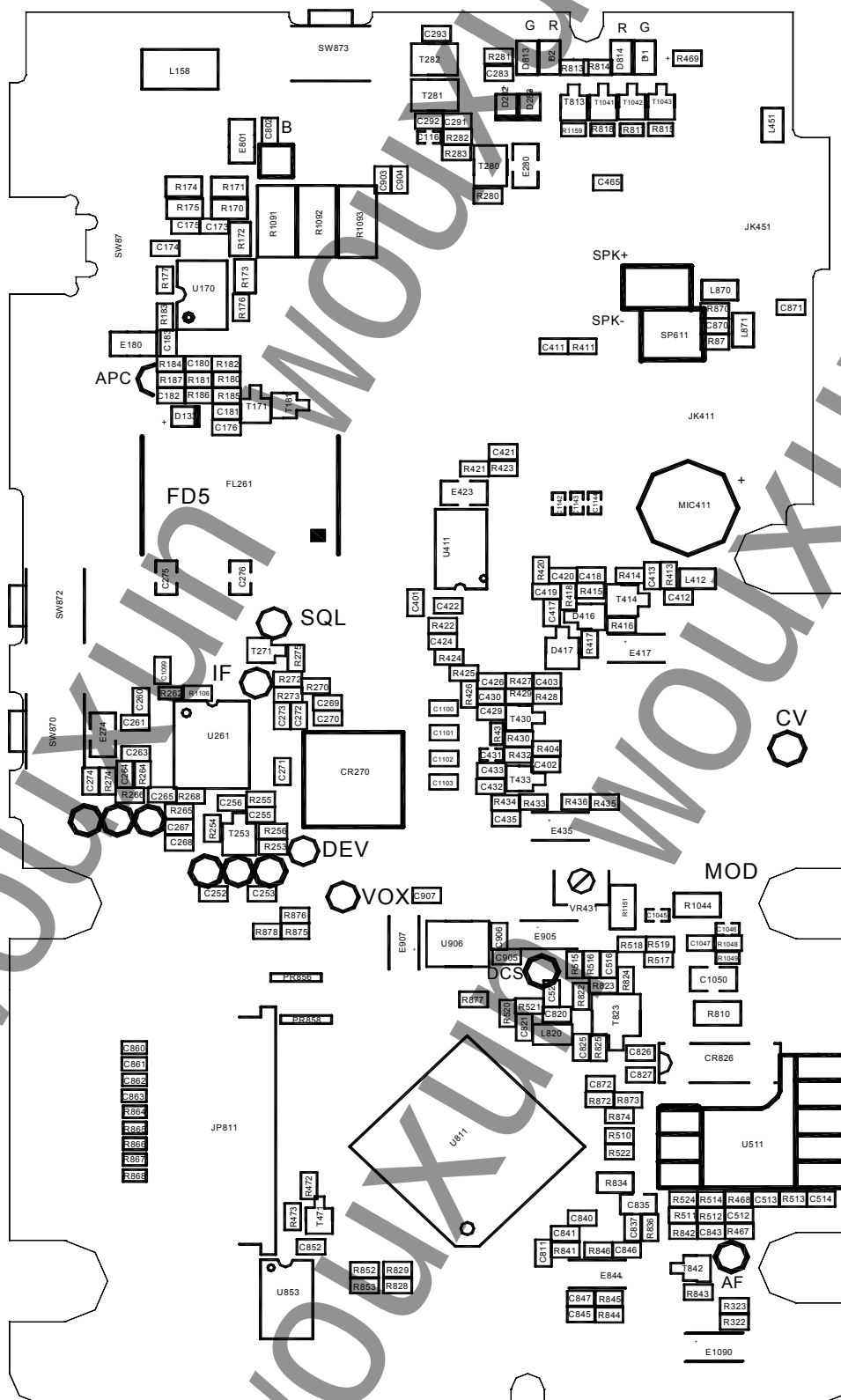
KG-689 LCD TOP

KG-689 LCD BOTTOM



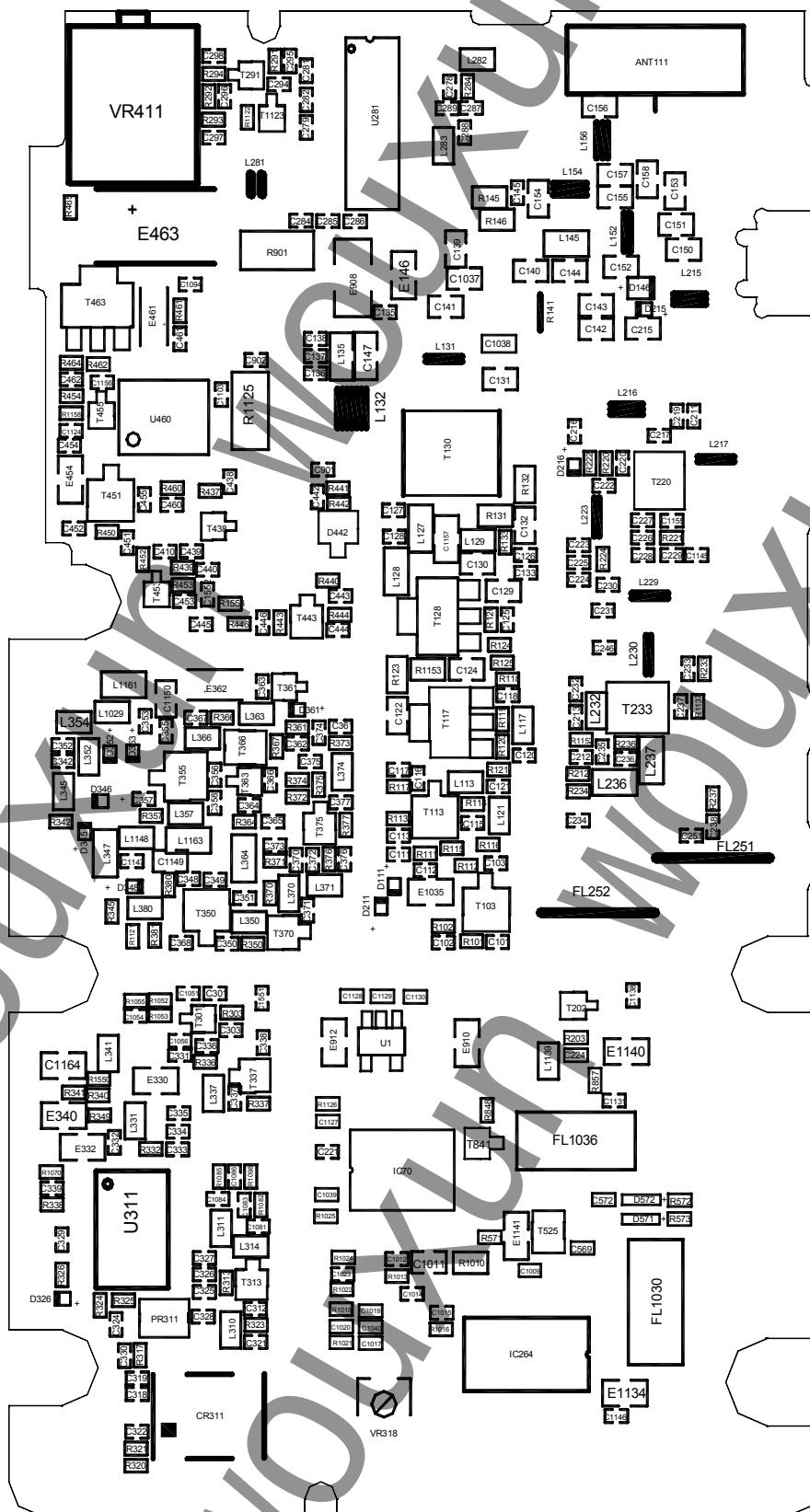
Layout Board

Layout Board View-----Top



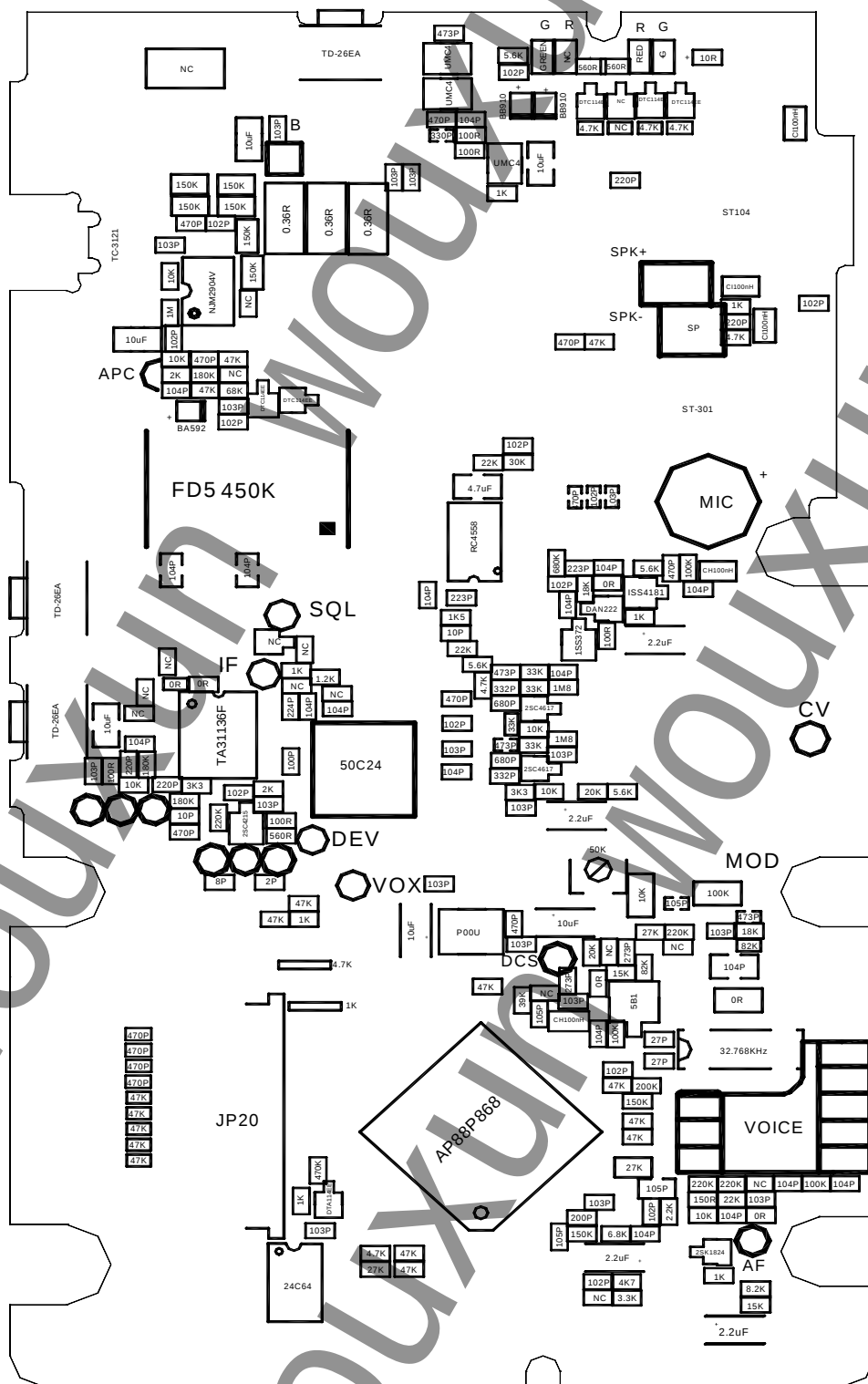
Layout Board

Layout Board View-----Bottom



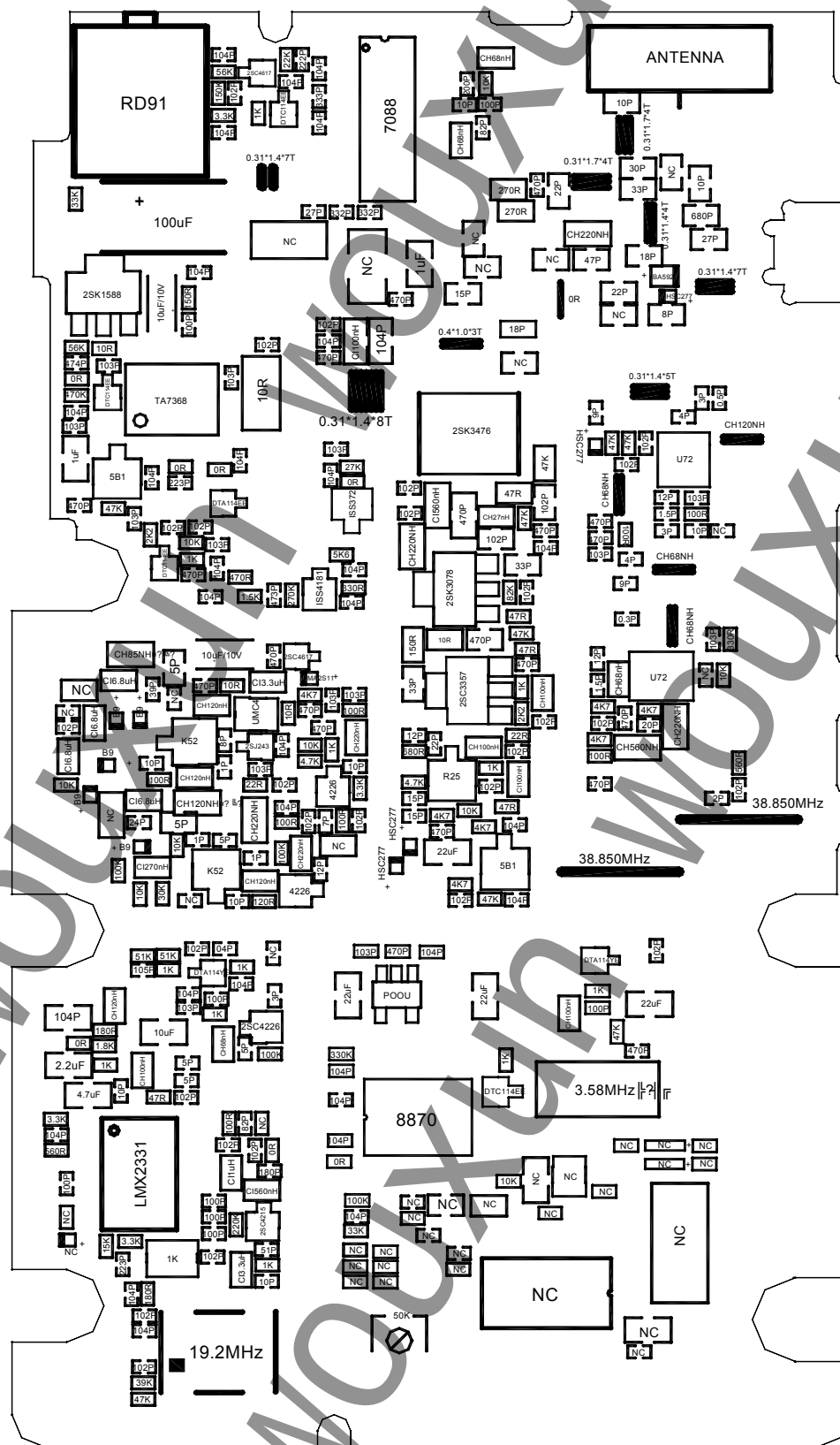
PCB Board

PCB Board View-----Top

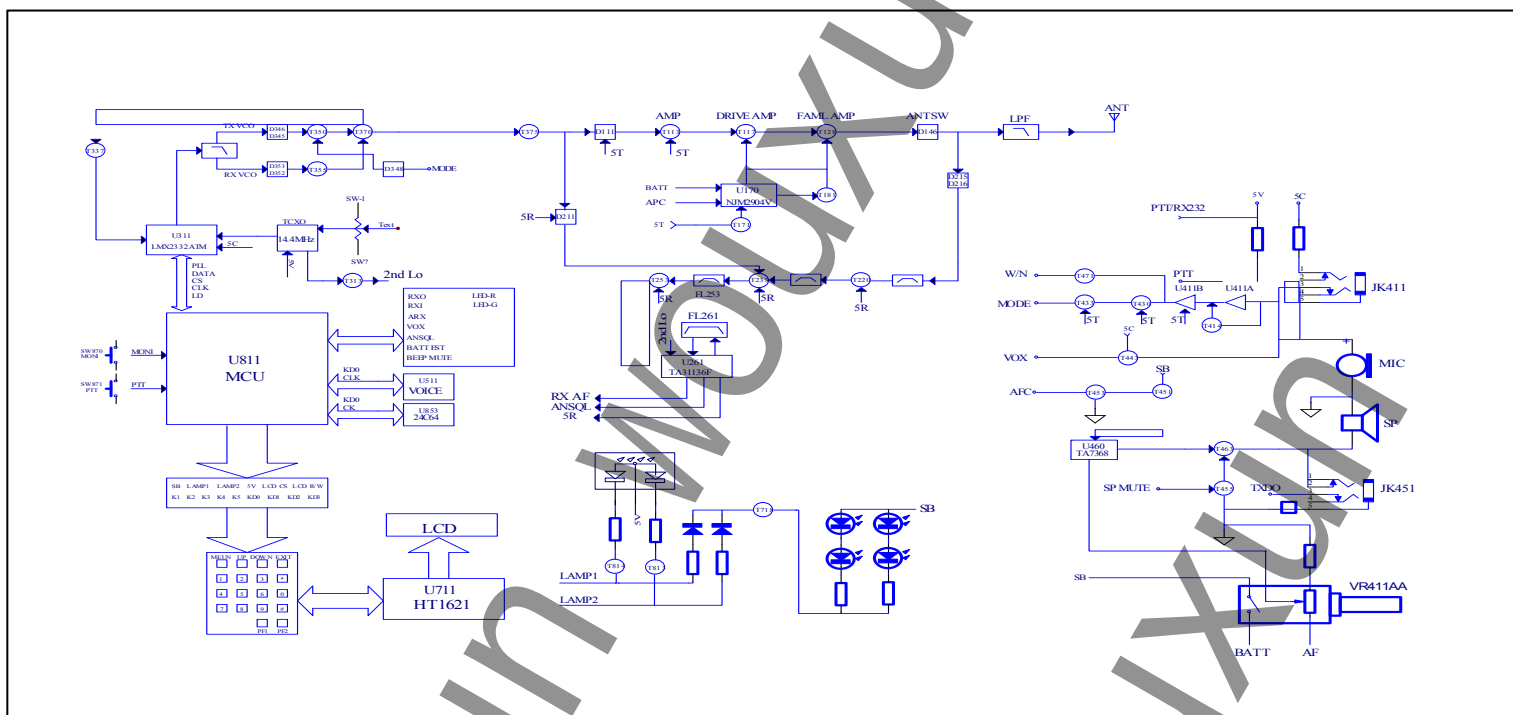


PCB Board

PCB Board View-----Bottom



Block diagram



Technology Specification

Frequencyrange	UHF:136-174MHz
Memory Channels	128 channel + 1 group urgency alarm
Voltage	7.4V
Battery Life(90-5-5)	8 hours
Working Temperature	-30℃ to +60℃
Antenna Impedance	50 ohms
Frequency Stability	±2.5ppm(-30℃ to +60℃)
Transmit part	
Max. Output Power	5W
Modulation Type	FM (F3E)
Frequency Error	≤2.5ppm
Mixed radio heft	≤7μW
Adjacent power	≥65dB
Modulation Fidelity	+3dB of 6db per octave pre-emphasis characteristics
Max Modulation	≤5KHz
Modulate Sensitivity	12mV+3mV
Receive part	
Sensitivity (12dB SINAD)	≤0.2μV
Squelch Sensitivity	≤0.2μV
Rated audio output frequency	≥500mW
Audio Distortion	≤5%
Signal to remaining output power rate	≥40dB
Channel Inhibition	≥-8dB
Adjacent Channel Selectivity	≥65dB
Spurious Immunity	≥55dB
InterModulation	≥55dB
Blocking	≥55dB
Receiver limited characteristics	≤3dB(between 6dBμV and100dBμV)
Modulate Audio Distortion	≤10%