

# Dual-Band Service Manual

## Introduction

### The Scope for the Manual

This manual is for the technicians who know well about the communication and have some experiences of maintenance. All necessary information of maintenance and actual published date are included in this manual.

If there is any change after publishing, we will complement it by “Maintenance Aviso” or “Manual Revision” according to the requirements.

### Personal Safety

- Please pay attention to the below proceedings for your safety:

Don't transmit before you carefully check all plugs for TX Frequency, or any of the unfolded plugs doesn't connect to the relative ends.

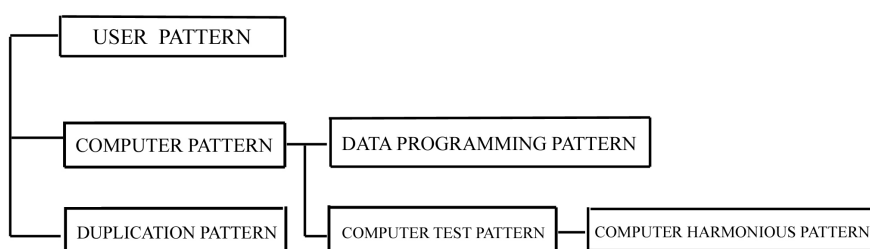
- Please turn off the power, and don't operate the equipment when you are near the electric detonator or on flammability gas station.
- Only the qualified technicians can maintain the equipment.

### Maintenance Service

In order to maintain the equipment easily and establish the complete maintenance system, we supply the information including principium chart, printing circuitry chart and the settings of the equipment.

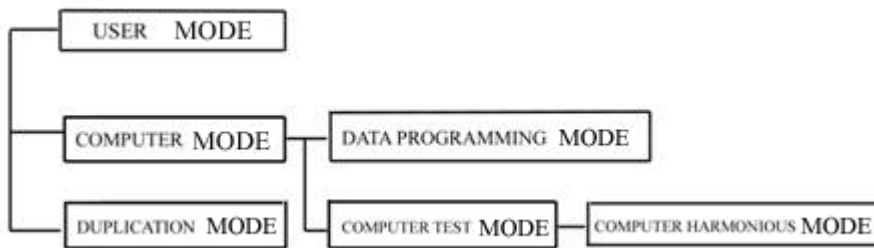
### Mode Combination

#### 1. Mode Combination



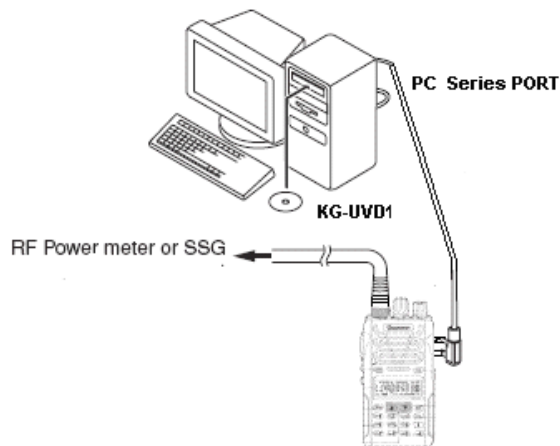
PATTERN	FUNCTION
USER PATTERN	For normal use
COMPUTER PATTERN	Correspondence between the handset user and computer (IBM Compatible Machine)
DATA PROGRAMMING PATTERN	For reading out or reading in the frequency data and other functions
COMPUTER TEST PATTERN	For examining handset by computer
DUPLICATION PATTERN	For programming data reproduction from a handset to another

## 2. Enter the Mode



## 3. Computer Mode

This handheld transceiver programs by computer, the programming connection and the programming software. The programming software can be used in the IBM computer or compatible machine.



## Duplication Mode

1. "Duplication Mode" can copy the data of a handheld transceiver to another one.

The dealers can do this duplication without a personal computer.

### 2. Operating Method

① Connecting the duplicated source radio with waiting-duplicated target radio by cloning Line

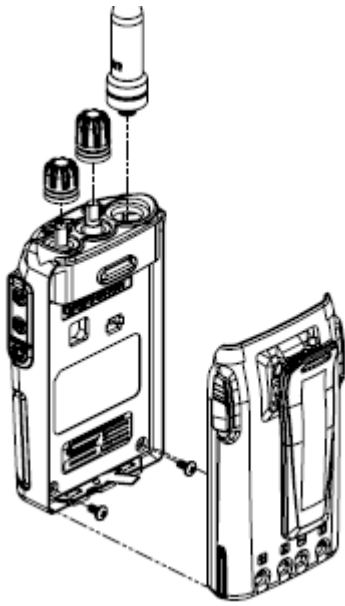
(The waiting-duplicated target radio need to be putting through the power source)

② Pressing [MONI] key on duplicated source radio, the duplication starts.

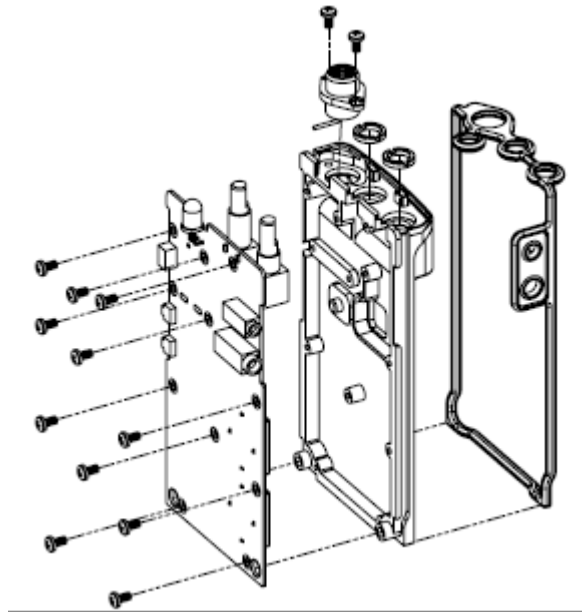
When duplicating, the flickering red light means sending data. After duplicating successfully, the red light extinguishes, and the source radio enters the standby mode. If the red light keeps flickering, it means the duplication failed.

The green light flickers when the target radio duplicates. The duplication finishes when the green light extinguishes.

# Assembling & Disassembling Chart

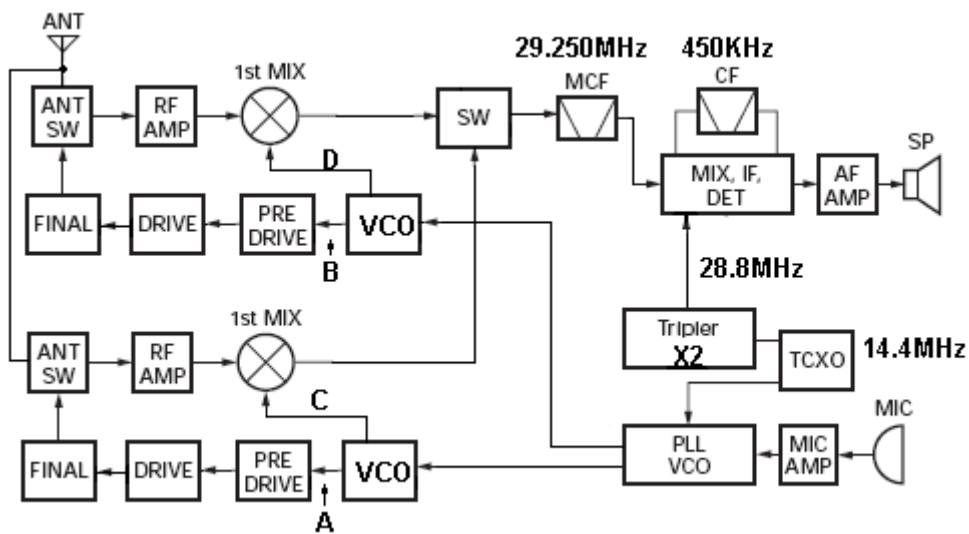


Disassembling Shell Chart



Disassembling TX/RX Board Chart

## I Frequency Structure



Pic 1

Frequency Structure	A	C	B	D
(1)	136~ 174.995MHz	165.250~ 204.245MHz	400~ 470.995MHz	429.25~ 500.245MHz
(2)	136~ 174.995MHz	165.250~ 204.245MHz	450~ 520.995MHz	479.25~ 550.245MHz
(3)	136~	165.250~	245~	274.25~

	174.995MHz	204.245MHz	245.995MHz	275.245MHz
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Chart 1

Please refer the frequency of A.B.C.D points of PIC 1 on Chart 1.

The 1<sup>st</sup> intermediate frequency of this radio is 29.250MHz, the 2<sup>nd</sup> is 450KHz.

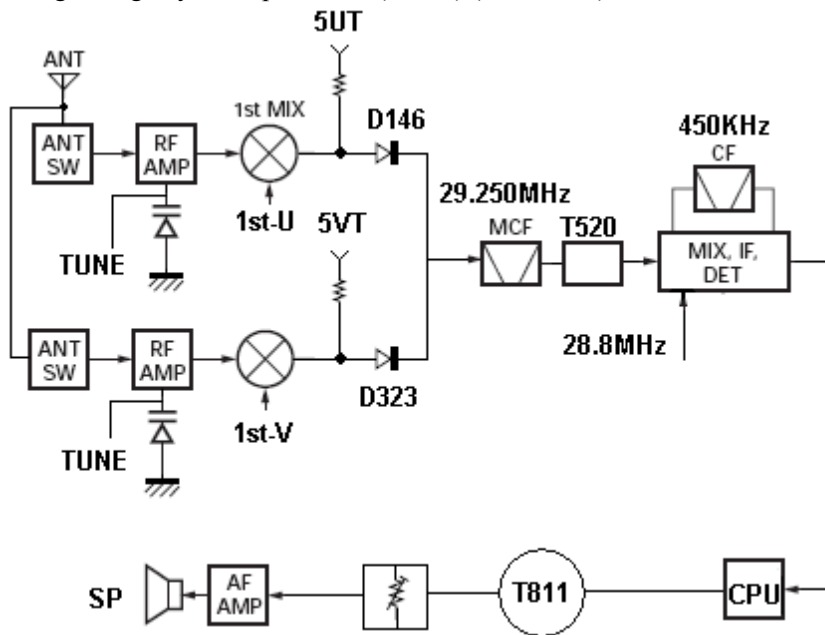
## II Receiving

### (1) The front end of U Band (RF Amplifier)

The signal which is received from the antenna enters the transmission/receive change-over switch diode circuit (D148, D137, D138 and D147), then goes through BPF (L191 and L192), and is enlarged by RF amplifier (T322). The signal goes through the BPF(L185,L189,L187,L188), and then enters the mixing. These BPF (D142, D143, D144, D145) is adjusted by the variable condenser. The input voltage by variable condenser is adjusted by the outputting voltage by microprocessor (IC811).( See PIC 2)

### (2)The front end of V Band(RF Amplifier)

The signal which is received from the antenna enters the transmission/receive change-over switch diode circuit (D322, D315, D316 和 D443), then goes through BPF(L344 and L345), and is enlarged by RF amplifier (T324).The signal goes through the BPF(L320, L342, L341 L340), and then enters the mixing. These BPF (D318 D319, D320,D321)adjusted by the variable condenser. The input voltage by variable condenser is adjusted by the outputting voltage by microprocessor (IC811).( See PIC 2)



PIC2

### (3) The 1<sup>st</sup> Mixer

The signals from the front end of U Band and the Rx LO produced by PLL electrocircuit create the 1<sup>st</sup> immediate frequency signal of 29.250MHz on T144 Mixing. The created signal is sent to the changeover on-off on U/V Band.

The signals from the front end of V Band and the Rx LO produced by PLL electrocircuit create the 1<sup>st</sup> immediate frequency signal of 29.250MHz on T323 Mixing. The created signal is sent to the changeover on-off on U/V Band.

The changeover on-off switches the signals according to the working state of U/V Band on microprocessor (IC811).

After switching, the signals are sent to MCF(FL515,FL516) (See PIC2)

#### (4) The enlarging circuit on Intermediate Frequency

The first signal from intermediate frequency eliminate the signals from adjacent channels through MCF(FL515,FL516). The amplifier (T520) enlarges and enters the I-F system chip (U516). The I-F system chip provides the second mixer, the second LO signal, limiting amplifier, orthogonal detector and RSSI (received signal intensity indicator).The second mixer sends and mixes the first intermediate frequency signal and the second LO signal of 28.8MHz, and then creates the second LO signal of 450kHz.

The second intermediate frequency signal keeps eliminating the signals of the adjacent channels by the chinaware wave filter. The second signal through filter is enlarged by limiting amplifier and demodulated by orthogonal detector with chinaware discriminator. The demodulated signal enters the tone circuit on microprocessor (IC811) and processes.(See PIC2)

#### (5) Wide/Narrow Switch Circuit

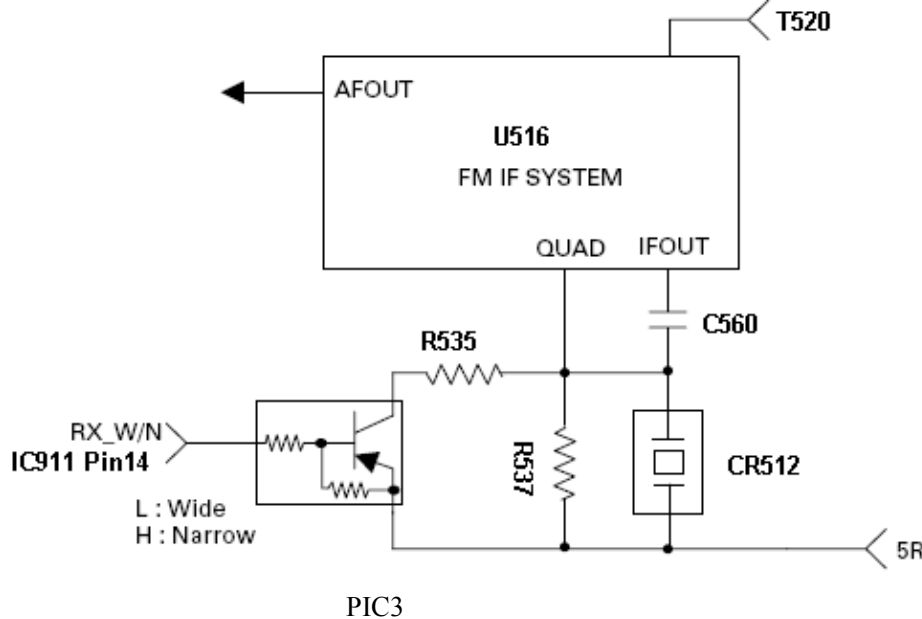
We can set the bandwidth of all channels by turning on the Wide/Narrow switch.

The data from Wide (low level) and Narrow (high level) is outputted by the 14<sup>th</sup> pin on microprocessors.

T528 is connected when receiving the data from WIDE (low level).

T528 is disconnected when receiving the data from NARROW (high level).

T528 is connected/ disconnected by WIDE/NARROW data.The regular changing level from U516 detector is used to maintain the constant output level on WIDE/NARROW signals. (See PIC3)



#### (6) Tone Amplifier Circuit

The demodulated signal is sent to the tone amplifier by T811 from the 25<sup>th</sup> feet tube of microprocessor (IC811),after entering the tone circuit and being processed.

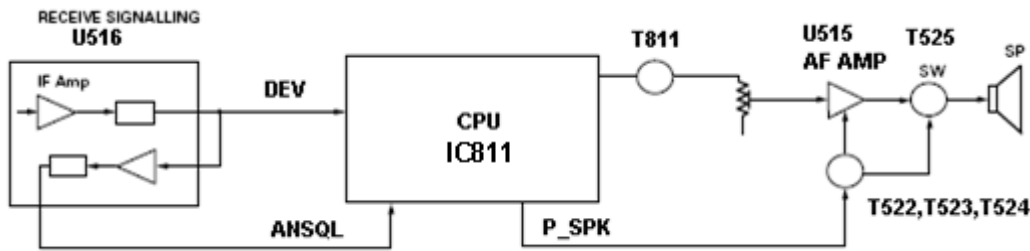
After being enlarged by the tone power amplifier, the signal is outputted to the loudhailer by AF volume control.

(See PIC 2)

#### (7) Squelch

A part of AF signals from FM IC (U516) enter IC again. The noise components are enlarged and revised by the filter, and then creates the DC voltage corresponded to the noise level.

The DC signal is sent to the simulated port (Pin28) of microprocessor through FM IC. IC405 decides whether outputs the sound from the speaker by testing the outputted voltage is higher or lower than the default value. (See PIC4)



PIC4

### (8) Receiving Signaling (QT/DQT)

The signal from FM IC (U516) enters and is processed by microprocessor (IC811). (See PIC4) Microprocessor (IC811) determines whether QT or DQT matches the setting value, and control the output of P-SPK and loudhail by this result. (See PIC 4)

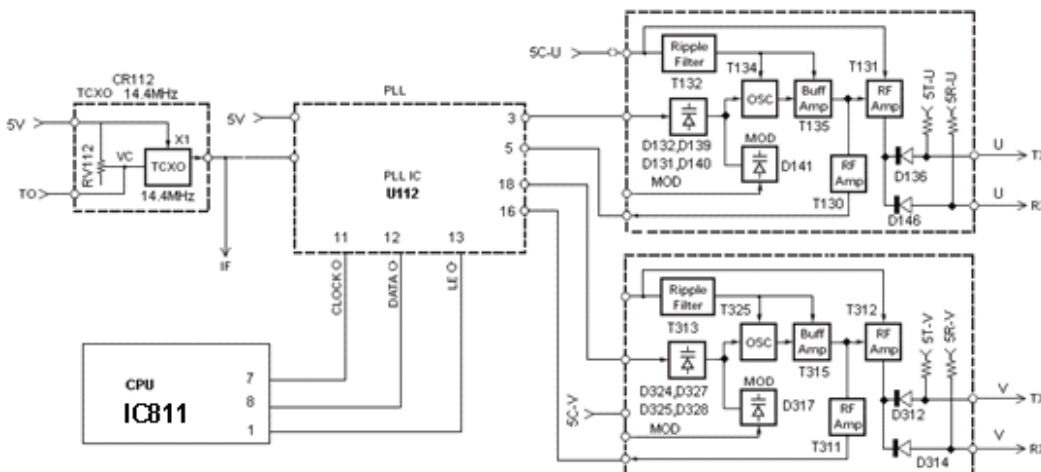
## III PLL Frequency Syntheses

PLL circuit produces the Rx LO for receiving and the RF signal for transmitting. This transceiver is adopted double channel integrate circuit, which can simultaneously produce two different Rx LO and RF signal.

### (1) PLL

The frequency step of PLL circuit is 5 or 6.25kHz.

The referring surge signal of 14.4MHz is divided frequency by a fixed arithmometer in U112. The signal from the oscillator (VCO) is cushioned and enlarged by T130 and T311 separately, and is divided frequency by programmable double modulation arithmometer separately in U112. In the U112 phase comparator, the frequency division processes compare. After being filtered by the different lowpass, the two created signals separately are sent to the two independent VCO controlling frequency of oscillator. See PIC 5



PIC5

### (2) VCO

#### ① U Band VCO on the Transceiver

The frequency that is used in U Band on the transceiver is produced by T134 vibration when it is transmitting or

receiving frequency points.

Through the phase comparator will receive transportation to the VCO control voltage variable diode (D132, D139, D131, D140) to control the oscillation frequency. Oscillation frequency of the signal by the T135, T135 amplification levels, with the D136 and D135 were sent to the RF amplifiers and receivers for the first points of the vibration frequency. See PIC5.

## ② V Band VCO on the Transceiver

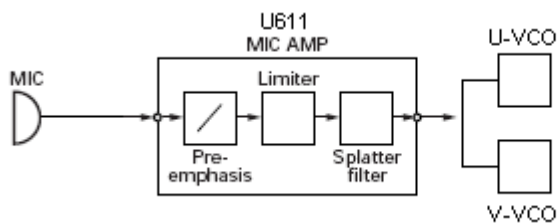
The frequency that is used in V Band on the transceiver is produced by T325 vibration when it is transmitting or receiving frequency points.

Through the phase comparator will receive transportation to the VCO control voltage variable diode (D324, D325, D327, D328) to control the oscillation frequency. Oscillation frequency of the signal by the T135, T135 amplification levels, with the D136 and D135 were sent to the RF amplifiers and receivers for the first points of the vibration frequency. See PIC5.

## IV Transmitting Part System

### (1) Speaker Amplifier

The signal from speaker processes regulation of the maximum frequency deviation by tone processor (U611). And then it is sent to VCO on U Band or V Band for modulating and inputting. See PIC 6



PIC6

### (2) Drives and Terminal Amplifier

This transceiver has two separation drives and terminal amplifiers on U Band and V Band.

#### ① Drives and Terminal Amplifier on U Band

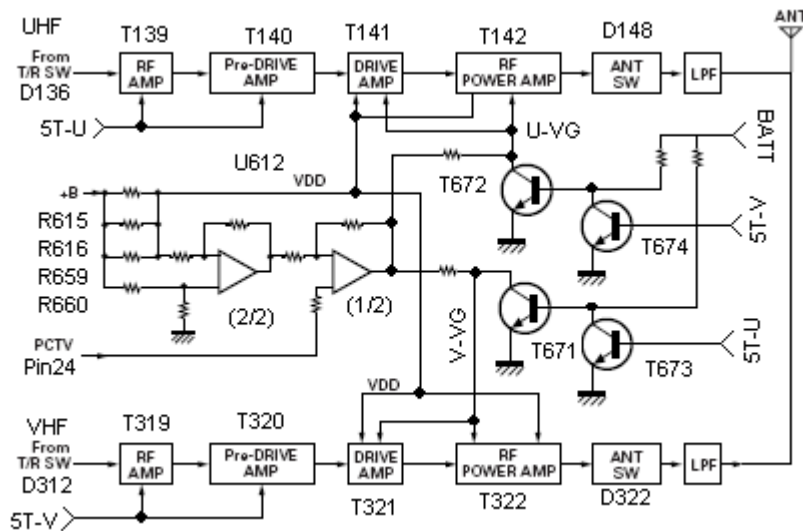
The signal from T/R Switch (D136 ON) is enlarged to 50mW by pre-drive amplifier (T139, T140) and drive amplifier (T141). The output of drive amplifier is enlarged to 4.0W by the RF power amplifier (T142) (works as when low power is 1W). The output of RF power amplifier is through the harmonic filter (LPF) and the antenna switch (D148), and is sent to the terminal of the antenna .

See PIC 7

#### ② Drives and Terminal Amplifier on V Band

The signal from T/R Switch (D312 ON) is enlarged to 50mW by pre-drive amplifier (T319, T320) and drive amplifier (T322). The output of drive amplifier is enlarged to 4.0W by the RF power amplifier (T322) ((works as when low power is 1W). The output of RF power amplifier is through the harmonic filter (LPF) and the antenna switch, and is sent to the terminal of the antenna (D322).

See PIC 7



PIC 7

### (3) Automatic Power Control Circuit (APC)

APC circuit always monitor the circuit that is through the radio frequency RF amplifier (T142 or T322),and maintain the stable electric current. The diversification of electronic current that is enlarged by radio frequency power amplifier can cause the lower voltage of R615, R616, R659 and R660. The voltage is sent to difference amplifier U612(2/2) U612(1/2), and compares the outputting voltage of IC101(2/2) with the reference voltage from IC405.

The output voltage of U612 (1/2) control the radio frequency RF amplifier, drive amplifier, VG of pre-drive amplifier to keep the voltage consistent.

The changes of high/low power are realized by changing the reference voltage.

The two terminal amplifiers of this transceiver use the same APC circuit. So they are switched on the output VG voltage from APC. When U Band transmitting, the VG voltage that sends APC to V Band resists to ground short circuit. On the contrary, when V Band transmitting, the VG voltage that sends APC to U Band resists to ground short circuit. See PIC7

### (4) Coding Signaling

#### QT/DQT

The DQT/QT data outputs from the CPU 23 base pins. The signal through the low pass CR filter, a partial signal delivers TCXO CR112. Another part of signal and the tone signaling mix, then inputs separately to U or V Band of VCO.

## V Electrical Power

10 electrical power of 5V is used in this transceiver.

They respectively provide to the microprocessor: 5V,5M

When connecting, 5M always keep outputting. Although 5M is the regular output,it is closed when turn off the electrical power to prevent the microprocessor from malfunction.

5C-V is the public 5V on V Band,which keeps output on non-save mode.

5C-U is the public 5V on U Band,which keeps output on non-save mode.

5R-U is the receiving 5V on U Band,which keeps output during receiving.

5T-U is the transmitting 5V on U Band,which keeps output during transmitting.

5R-V is the receiving 5V on V Band,which keeps output during receiving.



5T-V is the transmitting 5V on V Band, which keeps output during transmitting.

5R is the shared 5V by the intermediate frequency circuit. (U band and V band of receiving use in common the partial power source).

The electrical power is used in enlarging the speaker (The shared partial electrical source on U Band and V Band)

There are another two overall electrical sources, BATT+ and BATT.

BATT+ is input electronic source. BATT is electronic source by controlled by power switch.

## VI Controlled Electrical Circuit

The controlled circuit is made up of microprocessor(IC811) and exterior circuit.

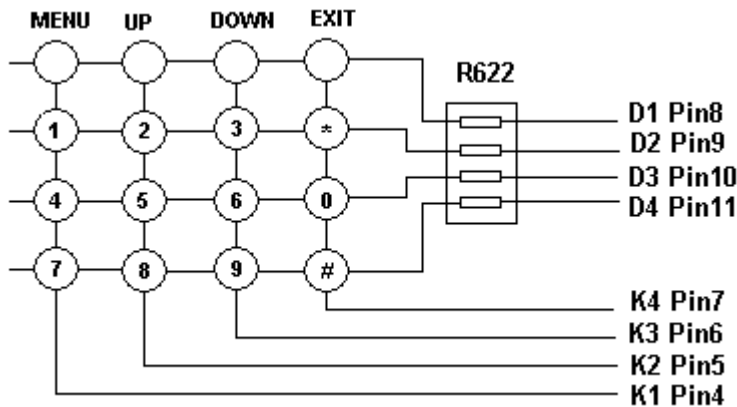
It controls the TX-RX unit. The main functions of IC811 are as follows:

- (1) Transforming the transmitting and receiving states according to PTT input signal
- (2) Numerating system, group, frequency and program data from the stored circuit
- (3) Sending frequency data to PLL
- (4) Controlling the open and close of squelch according to the output DC voltage from squelch circuit.
- (5) Controlling the tone frequency mute according to the decoding data

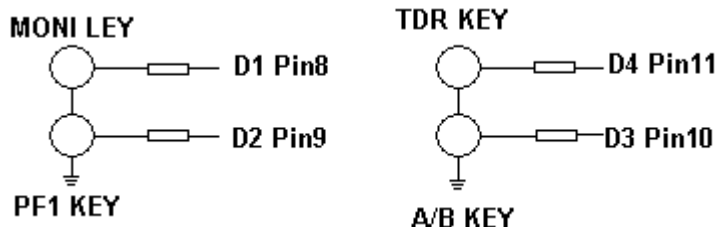
## VII Keypad and display circuit

- (1) Keyboard entry examination

K1,K2,K3,K4 are keypad fan-out,D1,D2,D3,D4 are keypad input end. They are managed after examining by microprocessor (IC811). See PIC8



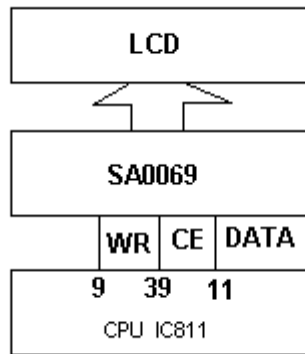
PIC8



PIC9

- (2) Display Circuit

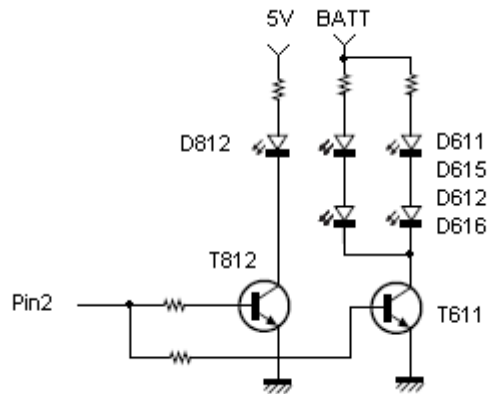
LCD demonstrated the information (IC811) controls the screen by the microprocessor (liquid crystal) to demonstrate that the actuation integrated circuit causes the screen (liquid crystal) the monitor demonstration corresponding information. See PIC 10



PIC10

(3) Backlight Circuit

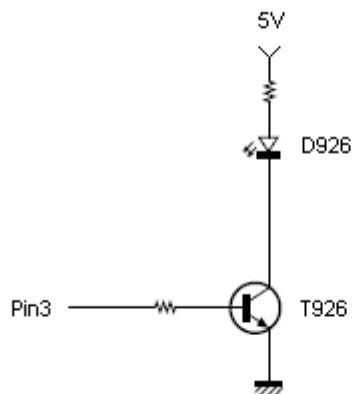
The backlight of LCD and keypad is single-colored, which is controlled by the pin of microprocessor. See PIC11



PIC11

(4) Illumination Circuit

The illumination circuit is controlled by the pin of the microprocessor(IC811). See PIC12



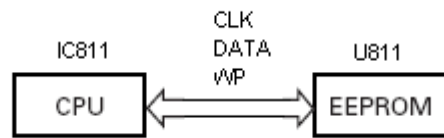
PIC 12

## VIII Memorizer Circuit

The memorizer circuit is made up of CCPU (IC811) and EEPROM (U811)

The capacitance is 64k bits, including the handset controlling program by CPU and the operation function data.

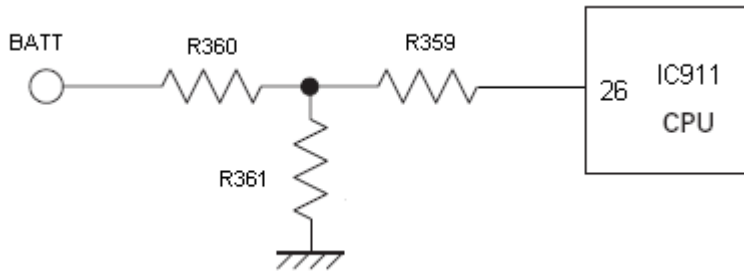
See PIC13



PIC 13

## IX Batterypack Low Voltage Prompt

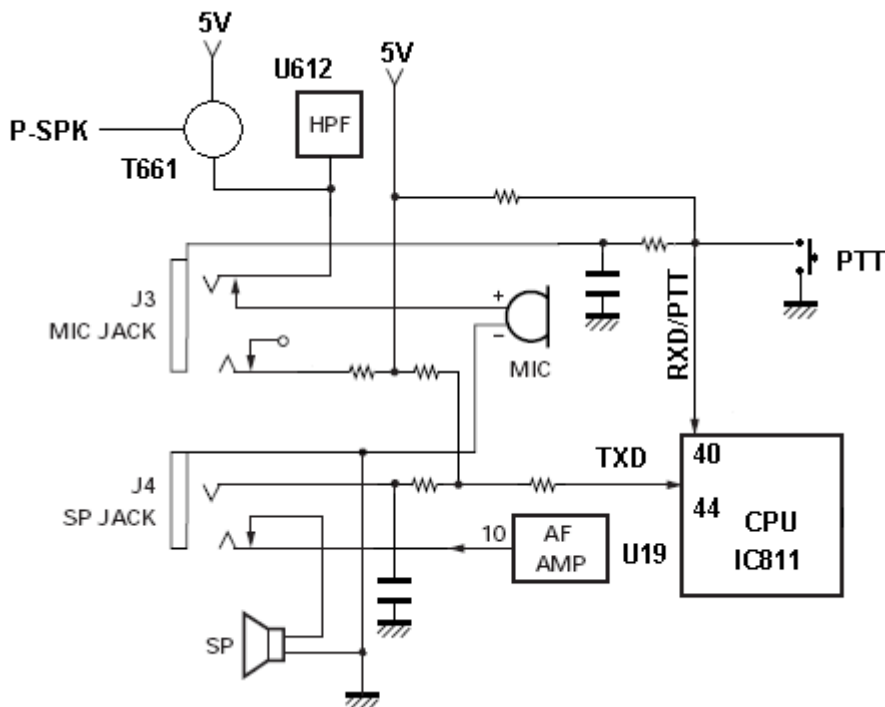
Monitoring the batterypack voltage by microprocessor. The transceiver will sound when the voltage is lower than the alarm voltage. See PIC14



PIC 14

## X Programming Communication

The transceiver communicates data with PC through RXD TXD on earphone seat. See PIC 15



PIC 15

## XI JP811 Terminal Function

Terminal Pin No.	NAME	INPUT & OUTPUT	Function Description
1	SP+	Output	SPK Output
2	MIC+	Input	MIC Input
3	BATT	Input	Input Electronic Source of Keypad backlight
4	5V	Input	LCD Drive IC & Input Electronic Source of LCD Backlight
5	GND		
6	GND		
7	GND		
8	LCD-CS	Output	
9	(BATT-TEST) / LCD-RS	Output	Electronic Source Voltage Examination/ Read-Write End Control of LCD Drive IC
10	LAMP1	Output	Electronic Source Control of LCD Backlight
11	GND		
12	K1	Input	Keypad Matrix Input
13	K2	Input	Keypad Matrix Input
14	K3	Input	Keypad Matrix Input
15	K4	Input	Keypad Matrix Input
16	D1	Output	Keypad Matrix Output
17	D2	Output	Keypad Matrix Output
18	D3	Output	Keypad Matrix Output
19	D4	Output	Keypad Matrix Output
20	GND		

## XII Terminal Function of Microprocessor (IC811)

Pin NO.	Tube Feet Name	Function Description
1	PLL-LE/ROM-WP	Phase-locked loop Data End/ Stored IC Write Protection Board
2	LAMP1	LCD Backlight Control
3	5SC-UHF	Control by (UHF) VCO Electrical Source
4	K1	Row Line 1 on K1 Keypad
5	K2	Row Line 2 on K2 Keypad
6	K3	Row Line 3 on K3 Keypad
7	K4	Row Line 4 on K4 Keypad
8	D1/PLL-CLK/ROM-CLK/MONI/LCD-D0	Line 1 on Keypad/Phase-locked Loop Clock/ Squelch Key/LCD Drive Data
9	D2/PLL-DATA/PF1/LCD-D1	Row Line 2 on Keypad/Phase-locked Loop Data/ Sidekey1/LCD Drive Data
10	D3/Viose-CLK/ (A/B) /LCD-D2	Row Line 3 on keypad/ Voice Clock/(A/B) Button/ LCD Drive Data
11	D4/PF2/LCD-D3	Row Line 4 on keypad/Topkey PF2/ LCD Drive Data
12	CN2	CN2 Channel Decoding Bit

13	CNI	CNI Channel Decoding Bit
14	(N/W) /ROM-Data	Wide/Narrow Bandwidth Control/Packet Data
15	AVDD	
16	RXO	Microprocessor Audio Amplifier Output
17	RXI	Microprocessor Audio Amplifier Input
18	MICI	Microprocessor Audio Amplifier Output
19	MICO	Microprocessor Audio Amplifier Input
20	TONE/DTMF/Beep	Audio Signal Output/Double Audio Signal Output/Prompt Output
21	PLLC	
22	AVSS	
23	CTCSS/DCS/TUNE	CTCSS/DCS/Receiving Auto Track Gain Output
24	APC	Auto Power Control Voltage Output
25	AURX	Input End of Microprocessor Audio Channel
26	Batt-TEST/LCD-RS	Battery Voltage Sampling Input/LCD Drive IC Control End
27	VOX	MIC Sampling Data Input
28	ANSQL	Squelch Voltage Sample Input End
29	XIN	
30	XOUT	
31	VSS	
32	RESET	
33	VDD	
34	5SC-VHF	(VHF) VCO Electronic Source Control
35	P-TX/RX-VHF	(VHF)Transmitting/Receiving electronic source control
36	P-SPK	Audio Power Amplifier Electronic Power Control
37	LAMP2	Illumination Control
38	P-TX/RX-UHF	UHF Transmit/Receive Electronic Source Control
39	LCD_CS	LCD Drive CMOS chip
40	RXD/PTT	Communication Data Foot Input/Transmit Key Examination
41	Voice-BUSY/DTMF-STD	Voice Chip Busy Line Double Audio Decoding Valid Data Receiving Symbol Bite
42	FM-SDIO/Voice-DATA	Reception Chip Serial Data/Voice Chip Serial Data
43	GREEN	Controlled by Receiving Indicator Light
44	RED/TXD	Receiving Indicator Light/serial communication data foot outputs

## XII Adjustment

Apparatus used in Adjustment: Lineless Integration Test Apparatus, Digital voltage-stabilized source, Digital Multimeters

Nominal Voltage:7.4V

6.2 Alarm Voltage Tone Power:0.5W

Test Contents	Test Points	Text Range	Test Value	Instrument/ Apparatus
VHF-VCO TX/RX	CV-V	136.000MHz	Higher than 0.8	Digital Multimeters

VHF-VCO TX/RX	CV-V	174.995MHz	Lower than 4.0V	Digital Multimeters
UHF-VCO TX/RX	CV-U	400.000MHZ	Higher than 1.0V	Digital Multimeters
UHF-VCO TX-RX	CV-U	470.995MHZ	Lower than 4.0V	Digital Multimeters

DCS Modulation Spoke		VHF/UHF	$0.3\text{KHz} \leq X \leq 0.7\text{KHz}$	Lineless Integration Test Apparatus
Debugging Characteristic		VHF/UHF	+3dB~-3dB	Lineless Integration Test Apparatus
VHF POWER		136~174.995MHz	$\cong 4.3\text{W}$	Lineless Integration Test Apparatus
UHF POWER		400~470.995MHz	$\cong 4.0\text{W}$	Lineless Integration Test Apparatus

## Components List

### Mainboard Top Layer Part Detailed List

NO.	Name	Item	Spec.	Dosage	Bit No.
1	Capacitance	2P	C0402	1	C5 35
2	Capacitance	8P	C0402	1	C5 34
3	Capacitance	10P	C0402	2	C8 51 C632
4	Capacitance	12P	C0402	1	C5 88
5	Capacitance	20P	C0402	1	C5 21
6	Capacitance	24P	C0402	1	C5 98
7	Capacitance	27P	C0402	2	C8 49 C848
8	Capacitance	68P	C0402	1	C5 94
9	Capacitance	100P	C0402	13	C8 23 C822 C821 C820 C657 C656 C653 C65 1
					C2 06 C160 C646 C397 C394
10	Capacitance	102P	C0402	10	C1 90 C838 C639 C611 C516 C373 C169 C16 5
					C6 45 R631
11	Capacitance	103P	C0402	22	C3 60 C847 C839 C837 C829 C815 C813 C612
					C5 96 C545 C541 C512 C168 C166 C388 C844
					C1 C159 C138 C644 C615 C393





12	Capacitance	104P	C0402	36	C83 3	C364	C846	C845	C389	C843	C842	C840
					R16 3	C652	C641	C640	C636	C634	C624	C599
					C51 1	C164	C162	C158	C617	C614	C841	C396
					C83 0	C827	C817	C814	C812	C655	C514	C513
					C59 2	C589	C518	C515				
13	Capacitance	105P	C0402	4	C67 5	C642	R840	R133				
14	Capacitance	200P	C0402	1	C59 0							
15	Capacitance	202P	C0402	1	C63 7							
16	Capacitance	220P	C0402	5	C85 0	C832	C831	C552	C927			
17	Capacitance	223P	C0402	7	C83 6	C816	C635	C633	C597	C216	C157	
18	Capacitance	224P	C0402	2	C52 3	C520						
19	Capacitance	332P	C0402	1	C62 6							
20	Capacitance	393P	C0402	1	C52 4							
21	Capacitance	470P	C0402	7	C65 8	C167	C163	C134	C643	C616	C390	
22	Capacitance	472P	C0402	3	C82 5	C625	C156					
23	Capacitance	473P	C0402	4	C63 8	C631	C628	C519				
24	Capacitance	680P	C0402	2	C63 0	C627						
25	Capacitance	683P	C0402	2	C82 8	C826						
26	Capacitance	NC	C0402	3	C82 4	C623	C237					
27	Capacitance	1P	C0603	1	C13 6							
28	Capacitance	30P	C0603	1	C43 1							
29	Capacitance	104P	C0603	2	C51 7	C647						
30	Capacitance	104P	C0805	1	C45							



31	Resistance	0R	R0402	5	R859	R838	R816	R641	R632			
32	Resistance	10R	R0402	1	R619							
33	Resistance	56R	R0402	1	R926							
34	Resistance	100R	R0402	5	R855	R664	R662	R617	R572			
35	Resistance	150R	R0402	1	R821							
36	Resistance	330R	R0402	2	R829	R665						
37	Resistance	560R	R0402	1	R822							
38	Resistance	1K	R0402	7	R824	R669	R668	R663	R359	R815	R814	
39	Resistance	1.2K	R0402	1	R595							
40	Resistance	2.2K	R0402	10	R820	R666	R639	R622	R573	R119	R115	R114
					R390	R378						
41	Resistance	3.3K	R0402	3	R842	R636	R626					
42	Resistance	3.9K	R0402	1	R624							
43	Resistance	4.7K	R0402	8	R854	R839	R630	R623	R618	R219	R927	C629
44	Resistance	5.6K	R0402	2	R845	R844						
45	Resistance	10K	R0402	14	R672	R671	R850	R813	R811	R643	R634	R633
					R627	R620	R144	R140	R651	R134		
46	Resistance	18K	R0402	1	R640							
47	Resistance	22K	R0402	8	R674	R673	R384	R852	R848	R613	R576	R862
48	Resistance	24K	R0402	1	R581							
49	Resistance	30K	R0402	1	R637							
50	Resistance	33K	R0402	3	R629	R628	R621					

51	Resistance	47K	R0402	12	R843 R817 R596 R135 R118 R116 R113 R648 R389 R379 R667 R861
52	Resistance	51K	R0402	1	R635
53	Resistance	56K	R0402	2	R841 R216
54	Resistance	68K	R0402	2	C233 R145
55	Resistance	82K	R0402	1	R853
56	Resistance	91K	R0402	1	R846
57	Resistance	100K	R0402	7	R818 R642 R139 R137 R650 R647 R646
58	Resistance	120K	R0402	3	R675 R851 R830
59	Resistance	150K	R0402	2	R655 R654
60	Resistance	180K	R0402	1	R131
61	Resistance	220K	R0402	6	R858 R828 R819 R578 R218 R112
62	Resistance	470K	R0402	1	R860
63	Resistance	680K	R0402	2	R110 R638
64	Resistance	1M	R0402	2	R645 R644
65	Resistance	1.8M	R0402	2	R612 R611
66	Resistance	NC	R0402	4	R625 R217 R138 R856
67	Resistance	270R	R0603	2	R358 R356
69	Resistance	15K	R0603	2	R361 R360
70	Resistance	150K	R0603	4	R658 R657 R656 R614
71	Resistance	0.39R	R1206	4	R660 R659 R615 R616
72	Rank Resistance	47K	RP-1206-4	2	RP81 RP81 2 1
73	Adjustable Resistance	50K	RV1008 (2*2)	1	RES6 11
74	Adjustable Resistance	50K	RV1206 (3*3)	1	RV11 2
75	Laminated Capacitance	2.2uF/16V	C0805	2	E615 E614
76	Laminated Capacitance	4.7uF/16V	C0805	3	E612 E611 E117
77	Laminated Capacitance	10uF/16V	C0805	8	C662 C661 E518 C196 C195 C193 C456 C457
78	Laminated Capacitance	22uF/16V	C0805	1	C194
79	High Frequency Laminated Inductance	CH68nH	L0603	1	L518
80	High Frequency Laminated Inductance	CH100nH	L0603	4	L811 L611 L520 L517
81	High Frequency Laminated Inductance	CH120nH	L0603	1	L519

82	High Frequency Laminated Inductance	CH220mH	L0603	1	L522
83	Diode	RLS4148	D-ESC	4	D811 D518 D326 D169
84	Diode	RL4148	D-ESC	2	D611 D610
85	Dynatron	1SS372	D-USM	2	D812 D612
86	Dynatron	2SC4617	T-ESM	2	T615 T614
87	Dynatron	DTA114EE	T-ESM	1	T661
88	Dynatron	DTC114EE	T-ESM	12	T674 T673 T672 T671 T815 T814 T611 T146
					T613 T219 T862 T326
89	Dynatron	5B1	T-TSM	6	T812 T138 T137 T136 T318 T317
90	Dynatron	2SC2712	T-TSM	1	T926
91	Dynatron	2SC4116	T-USM	1	T811
92	Dynatron	2SC4226	T-USM	1	T521
93	Dynatron	1SS4181	T-USM	1	T616
94	Power Tube	2SK3476	T-2-5N1A	2	T322 T142
95	Integration	CL6010	U-QFN24- 0404-P050	1	U514
96	Integration	24C64	U-SOP8-157- P127	1	U811
97	Integration	LM4558	U-SOP8-157- P127-L1006	1	U611
98	Integration	LM358	U-SOP8-157- P127	1	U612
99	Touch On-Off	MONI KEY	S-TD-26EA	1	SW61 4
100	Touch On-Off	PF1	S-TD-26EA	1	SW61 5
101	Touch On-off	PTT KEY	S-TD-30EA	1	SW61 3
102	Ø2.5 Earphone Seat	2.5 mm	JK-ST-104	1	JK513
103	Ø3.5 Earphone Seat	3.5 mm	JK-ST-301	1	JK611
104	Ø5 White Lamp	LED	D-LED- 05025L	1	D926
105	排座	JP20	JP-20-2	1	JP811
106	Main CMOS Chip	EM78P568-44	U-QFP44- 1010-P100	1	IC811
107	Voice Chip	VOICE	U-VOICE-1	1	U812
108	Crystalloid	32.768KHz	FX-MC-146	1	CR81 1
109	Green Light	GREEN	D0603	1	D814
110	Red Light	RED	D0603	1	D815

Mainrboard first floor part detailed list

No.	Name	Item	Spec.	Dosage	Digit No.								
1	Capacitance	0.5P	C0402	2	C330	C250							
2	Capacitance	0.75P	C0402	1	C242								
3	Capacitance	1P	C0402	1	C191								
4	Capacitance	1.5P	C0402	3	C419	C418	C322						
5	Capacitance	2P	C0402	2	C445	C533							
6	Capacitance	3P	C0402	3	C188	C187	C111						
7	Capacitance	4P	C0402	4	C179	C178	C152	C229					
8	Capacitance	5P	C0402	4	C398	C263	C262	C260					
9	Capacitance	6P	C0402	4	C318	C232	C259	C182					
10	Capacitance	7P	C0402	5	C410	C246	C245	C265	C119				
11	Capacitance	8P	C0402	4	C452	C255	C175	C328					
12	Capacitance	10P	C0402	5	C526	C381	R335	C210	R341				
13	Capacitance	11P	C0402	2	C189	C186							
14	Capacitance	12P	C0402	5	C439	C395	C337	C333	C253				
15	Capacitance	18P	C0402	4	C313	C346	C180	C177					
16	Capacitance	20P	C0402	1	C530								
17	Capacitance	24P	C0402	2	C406	C112							
18	Capacitance	33P	C0402	1	C447								
19	Capacitance	51P	C0402	1	C211								
20	Capacitance	82P	C0402	1	C227								
21	Capacitance	100P	C0402	12	C557	C547	C539	C560	C215	C213	C212	C208	
					C204	C202	C192	C385					
22	Capacitance	102P	C0402	46	C666	C819	C317	C361	C139	C682	C574	C281	
					L339	C357	C355	C351	C350	C339	C332	C326	
					C129	C125	C120	C115	C283	C618	C348	C347	
					C555	C531	C429	C408	C405	C400	C391	C443	
					C258	C228	C220	C219	C286	C171	C170	C852	
					C127	C124	C130	C123	C331	C217			
23	Capacitance	103P	C0402	20	C622	C525	C363	C135	C345	C540	C536	C532	
					C426	C401	C221	C183	C650	C620	C538	C205	
					C354	C422	C113	C230					
24	Capacitance	104P	C0402	31	C667	C316	C353	C561	C684	C683	C573	C264	
					R364	C529	C621	C122	C114	C428	C424	C414	
					C251	C234	C595	C546	C543	C542	C562	C203	
					C402	C133	C387	C329	C323	C319	C218		
25	Capacitance	105P	C0402	2	C358	C131							
26	Capacitance	180P	C0402	1	C282								
27	Capacitance	220P	C0402	2	C528	C527							
28	Capacitance	223P	C0402	2	C550	C563							
29	Capacitance	470P	C0402	43	C665	C416	C137	C365	C572	C247	C240	C239	
					L186	C392	C375	C254	C252	C248	C236	C266	

					C144	C558	C556	C433	C413	C407	C403	C649
					C261	C257	C185	C184	C174	C172	C321	C147
					C648	C619	C366	C343	C285	C117	C231	C181
					C176	C384	C383					
30	Capacitance	473P	C0402	1	C554							
31	Capacitance	474P	C0402	1	C549							
32	Capacitance	NC	C0402	22	C818	C311	C423	C559	C442	C425	C404	C399
					C378	C376	C372	C235	C224	C222	C209	C244
					C284	C432	C225	C430	C280	C377		
33	Capacitance	0.5P	C0603	3	C446	C149	C143					
34	Capacitance	1P	C0603	1	C140							
35	Capacitance	3P	C0603	1	C154							
36	Capacitance	4P	C0603	1	C444							
37	Capacitance	5P	C0603	2	C371	C153						
38	Capacitance	6P	C0603	2	C150	C145						
39	Capacitance	7P	C0603	2	C151	D320						
40	Capacitance	9P	C0603	1	C155							
41	Capacitance	10P	C0603	2	C427	C116						
42	Capacitance	12P	C0603	2	C453	C450						
	Capacitance	13P	C0603	1	L319							
43	Capacitance	22P	C0603	3	C368	L340	L341					
44	Capacitance	24P	C0603	1	C436							
45	Capacitance	27P	C0603	1	C126							
46	Capacitance	33P	C0603	5	C420	C367	C349	C146	C141			
47	Capacitance	51P	C0603	1	C438							
48	Capacitance	56P	C0603	1	C238							
49	Capacitance	100P	C0603	1	C320							
50	Capacitance	220P	C0603	1	C356							
51	Capacitance	470P	C0603	3	C352	C128	C121					
52	Resistance	0R	C0402	12	C312	C449	C448	C440	C437	C374	C223	C421
					C417	C226	R214	R331				
53	Resistance	10R	R0402	5	R438	R339	R324	R147	R195			
54	Resistance	22R	R0402	2	R334	R193						
55	Resistance	47R	R0402	9	R418	R354	R350	R208	R202	R192	R205	R187
					R452							
56	Resistance	75R	R0402	1	R168							
57	Resistance	100R	R0402	14	R511	R524	R513	R380	R329	R326	R178	R176
					R173	R172	R149	R126	R136	C342		
58	Resistance	150R	R0402	3	R525	R456	R166					
59	Resistance	180R	R0402	2	R372	R319						
60	Resistance	220R	R0402	1	R327							
61	Resistance	330R	R0402	2	R444	R121						
62	Resistance	470R	R0402	1	R417							
63	Resistance	560R	R0402	4	R315	R313	R153	R151				

64	Resistance	680R	R0402	5	R316	R177	R194	R190	R188			
65	Resistance	820R	R0402	3	R516	R395	R120					
66	Resistance	1K	R0402	13	R835	R834	R320	R526	R538	R338	R330	R146
					R158	R143	R142	R141	C537			
67	Resistance	1.5K	R0402	2	R537	R154						
68	Resistance	1.8K	R0402	2	R317	R206						
69	Resistance	2K	R0402	1	R514							
70	Resistance	2.2K	R0402	10	R682	R681	R542	R541	R523	R518	R155	R191
					R376	R383						
71	Resistance	2.7K	R0402	2	R535	R455						
72	Resistance	3.3K	R0402	7	R536	R387	R377	R353	R175	R180	R517	
73	Resistance	3.9K	R0402	3	R520	R439	R196					
74	Resistance	4.7K	R0402	12	R823	R534	R161	R533	R388	R382	R184	R183
					R182	R181	R179	R322				
75	Resistance	5.6K	R0402	4	R352	R328	R174	R332				
77	Resistance	10K	R0402	7	R598	R532	R394	R349	R186	R185	R531	
78	Resistance	22K	R0402	1	R661							
79	Resistance	33K	R0402	1	R528							
80	Resistance	47K	R0402	12	R833	R832	R831	R683	R543	R522	R363	R348
					R162	R204	R201	R375				
81	Resistance	56K	R0402	1	R529							
82	Resistance	68K	R0402	1	R207							
83	Resistance	82K	R0402	4	R448	R447	R445	R362				
84	Resistance	100K	R0402	4	R463	R446	R198	R128				
85	Resistance	120K	R0402	5	R460	R458	R210	R209	R199			
86	Resistance	150K	R0402	5	R321	R325	R171	R200	R159			
87	Resistance	180K	R0402	3	R599	R512	R122					
88	Resistance	200K	R0402	2	R459	R123						
89	Resistance	220K	R0402	1	R160							
90	Resistance	330K	R0402	2	R515	R148						
91	Resistance	470K	R0402	1	R527							
92	Resistance	NC	R0402	6	R539	R392	R333	R127	R465	R464		
93	Resistance	1M	R0402	7	R215	R130	R129	R125	R124	R451	R450	
94	Resistance	0R	R0603	5	R203	L342	L344	L331	L318			
95	Resistance	10R	R0603	1	R197							
96	Resistance	270R	R0603	2	R213	R212						
97	Resistance	NC	C0603	8		C451	C435	C409	C142	C132	C118	C267
98	Resistance	NC	C0805	2	C256	C338						
99	Laminated Capacitance	1uF/16V	C0805	1	C571							
100	Laminated Capacitance	4.7uF/16V	C0805	1	E118							
101	Laminated Capacitance	10uF/16V	C0805	8	E665	E667	E519	E684	E574	E520	E521	C454



102	Ta Capacitance	0.1uF/16V	EIA3216	3	E313 E122 E121
103	Ta Capacitance	0.22uF/16V	EIA3216	1	E314
104	Ta Capacitance	2.2uF/16V	EIA3216	1	E119
105	Ta Capacitance	4.7uF/16V	EIA3216	2	E311 E120
106	Ta Capacitance	10uF/16V	EIA3216	3	E616 E613 E312
107	Ta Capacitance	100uF	EIA6032	1	E522
108	High Frequency Laminated Inductance	CH12nH	L0402	1	L159
109	High Frequency Laminated Inductance	CH15nH	L0402	1	L171
110	High Frequency Laminated Inductance	CH27nH	L0402	1	C173

111	High Frequency Laminated Inductance	CH47nH	L0402	1	L314
112	High Frequency Laminated Inductance	CH68nH	L0402	2	C412 L325
113	Low Frequency Laminated Inductance	CI2.2uH	L0402	1	R157
114	High Frequency Laminated Inductance	CH2.2nH	L0603	1	L177
115	High Frequency Laminated Inductance	CH12nH	L0603	1	L158
116	High Frequency Laminated Inductance	CH15nH	L0603	1	L155
117	High Frequency Laminated Inductance	CH18nH	L0603	4	L313 L170 L169 L154
118	High frequency Laminated Inductance	CH33nH	L0603	1	R351
119	High Frequency Laminated Inductance	CH68nH	L0603	1	R346
120	High Frequency Laminated Inductance	CH100nH	L0603	2	L153 L317
121	High Frequency Laminated Inductance	CH120nH	L0603	3	L316 L312 L311
122	High Frequency Laminated Inductance	CH220nH	L0603	2	L324 L323
123	High Frequency Laminated Inductance	CH270nH	L0603	4	L168 L162 L161 L160
124	Low Frequency Laminated Inductance	CI1uH	L0603	1	L156
125	Low Frequency Laminated Inductance	CI3.3uH	L0603	4	L166 L322 L167 L321

126	Low Frequency Laminated Inductance	CI6.8uH	L0603	1	L315
128	Low frequency Laminated Inductance	CI100nH	L0603	1	L152
129	Low Frequency Laminated Inductance	CI560nH	L0603	1	L157
130	Low Frequency Laminated Inductance	CI100nH	L0805	4	L333 L174 L328 L179
131	Line Inductance	HW4.7nH	L0603	1	L191
132	Line Inductance	HW6.8nH	L0603	2	L163 L192
133	Line Inductance	HW12nH	L0603	1	L190
134	Line Inductance	HW18nH	L0603	1	L164
135	Line Inductance	HW27nH	L0603	3	L345 L188 L187
136	Line Inductance	HW39nH	L0603	1	L343
137	Line Inductance	HW56nH	L0603	1	L189
138	Line Inductance	HW82nH	L0603	2	C415 L320
139	Line Inductance	HW120nH	L0603	2	L346 C336
140	Line Inductance	HW150nH	L0603	1	L165
141	Line Inductance	HW560nH	L0603	3	L326 L173 L172
142	Line Inductance	HW1uH	L0805	2	L329 L175
143	Line Inductance	HW220nH	L0805	2	L176 L330
144	Line Inductance	HW560nH	L0805	1	L327
145	High Temperature Not Rise	0.31*1.3*10T	LC035158T	2	L332 L178
146		0.35*1.6*7T	LC03155T	1	L335
147		0.35*1.6*8T	LC03155T	2	L338 L336
148		0.4*1.0*4T	LC04103T	2	R355 L334
149		0.4*1.2*4T	LC03155T	1	L181
150		0.4*1.3*5T	LC03157T	1	L183
151		0.4*1.5*4T	LC03155T	1	L185
152		04*1.5*5T	LC03155T	1	L182
153	Diode	1SV305	D-ESC	6	D145 D144 D143 D142 D319 D318
154	Diode	HVC376	D-ESC	8	D328 D327 D325 D324 D140 D139 D132 D131
155	Diode	HSC277	D-ESC	12	D133 D323 D316 D315 D314 D312 D148 D138 D137 D136 D135 D311
156	Diode	RLS4148	D-ESC	5	D682 D681 D542 D541 D661
157	Diode	BA592	D-USC	2	D322 D146
158	Diode	BB639	D-USC	1	D317
159	Diode	H	D-USC	1	D141
160	No Stick	NC	D-ESC	1	D321
161	Dynatron	HSM88A	D-TSM	2	D443 D147

162	Dynatron	2SC4617	T-ESM	2	T132 T313
163	Dynatron	DTA114EE	T-ESM	1	T526
164	Dynatron	DTC114EE	T-ESM	5	T681 T541 T523 T524 T383
165	Dynatron	2SC3357	T-SOT89	2	T320 T140
166	Dynatron	2SK1588	T-SOT89	1	T525
168	Dynatron	5B1	T-TSM	4	T684 T574 T522 T316
169	Dynatron	2SC3356	T-TSM	2	T319 T139
170	Dynatron	2SC4215	T-USM	2	T520 T129
171	Dynatron	2SC4226	T-USM	6	T311 T312 T135 T131 T130 T315
172	Power Tube	2SK3475	T-SOT89	2	T321 T141
173	Single Bar Tube	K52	T-TSM	2	T325 T134
174	Double Bar Tube	3SK318	T-US4	4	T324 T323 T144 T143
175	Integrate Circuit	TA7368	U-SSOP10-175-P10	1	U515
176	Integrate Circuit	TA31136F	U-SSOP16-175-P065	1	U516
177	Integrate Circuit	LMX2336	U-SSOP20-175-P065	1	U112
178	Filter	450K	FL-PBFC455R	1	FL51 4
179	Crystal	29.250MHz	FL-UM-5-3S	2	FL51 FL51 6 5
180	Crystal	14.4MHz	FX-19.2MHZ	1	CR11 2
181	Chinaware	C24	FX-6060-2S	1	CR51 2
182	5V5 Foot	5V	5V	2	U616 U613
183	Channel Potentiometer	ED08741O	S-ED08741O	1	SW8 11
184	Switch Potentiometer	R08710NS	S-R08710NS	1	SW6 12
185	Antenna Adapter	ANT-2	ANT-KX01	1	ANT 112

### LC Board Components List

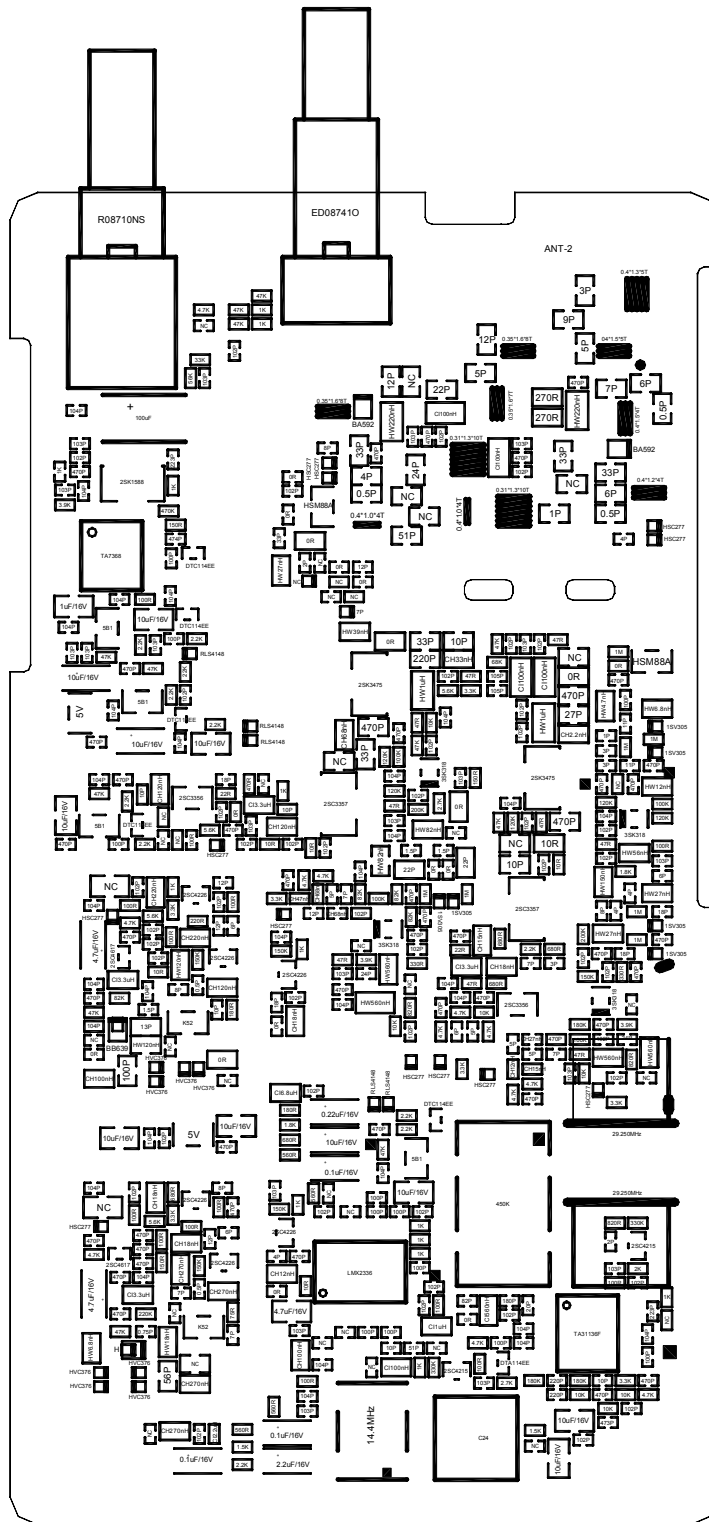
No.	Name	Item	Spec.	Dosage	Digit No.
1	Capacitance	100P	C0402	8	C611 C612 C613 C614 C615 C616 C617 C618
2	Capacitance	102P	C0402	1	C812
3	Capacitance	103P	C0402	1	C619
4	Capacitance	104P	C0402	1	C620
5	Capacitance	220P	C0402	1	C624

6	Resistance	100R	R0402	1	R623
7	Resistance	150R	R0402	2	R615 R616
8	Resistance	1.2K	R0402	1	R612
9	Resistance	2.2K	R0402	4	R613 R614 R617 R618
10	Resistance	1.8K	R0402	1	R621
11	Resistance	4.7K	R0402	2	R619 R814
12	Resistance	91K	R0402	1	R611
13	Resistance	150R	R0603	1	R812
14	Resistance	NC	R0603	1	R813
15	White Lamp	White	D0603	4	D611 D612 D615 D616
16	Dynatron	DTC114EE	T-ESM	2	T812 T611
17	Eliminating Resistance	1K	RP-1206-4	1	R622
18	Row Seate	JP20	JP-20-2	1	JP612
19	Ta Capacitance	10uF/16V	EIA3216	1	E611
20	High Frequency Lamineted Capacitance	CH100nH	L0603	1	L611
21	Tringle Singl- Colored White Lamp Board	LED	LED	1	D812
22	MIC	MIC	MIC60	1	MIC61 1
23	State Fix	HD44780	U-CHIP80-S6A0069	1	U611



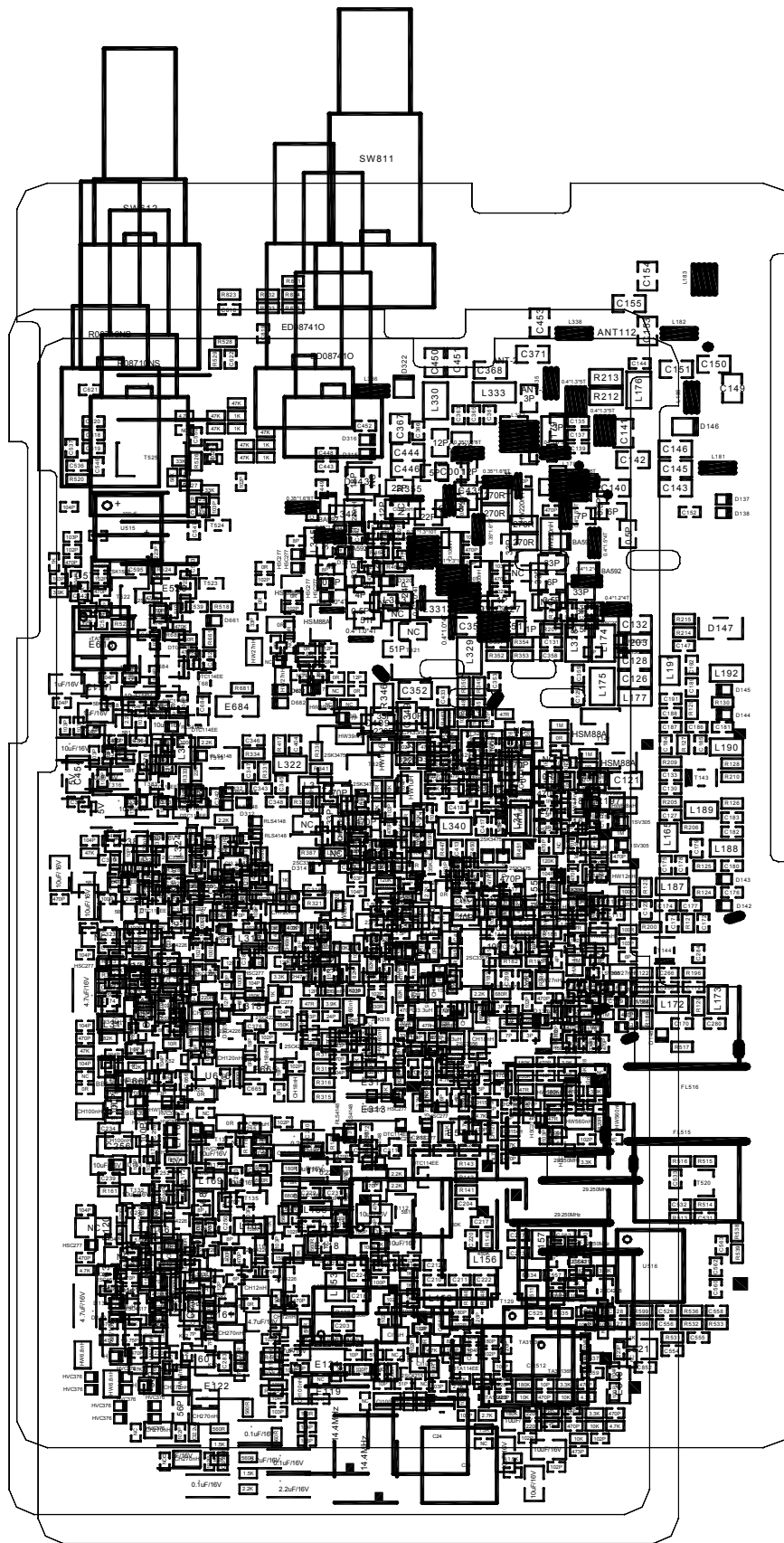


# Mainboard Bottom Layer Components Chart

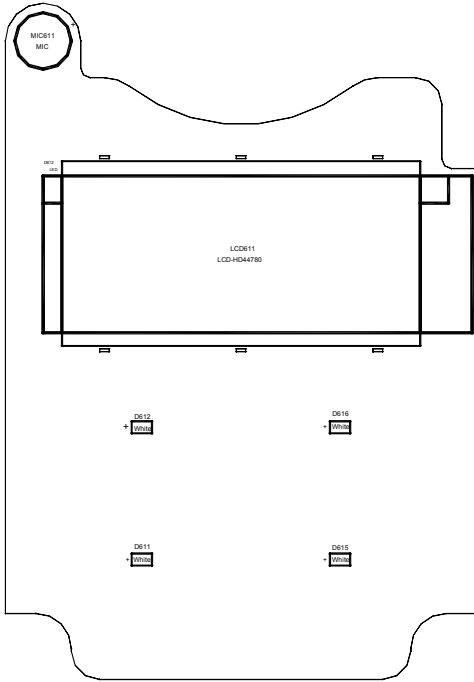




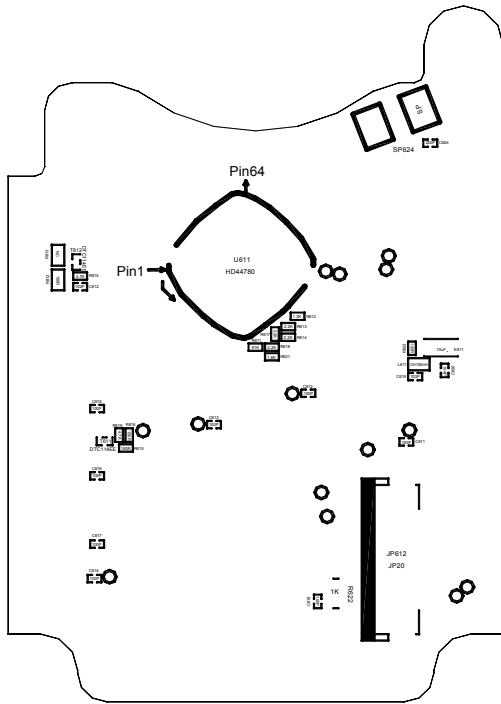
# Mainboard Bottom Layer Digit No. Chart



## Liquid Crystal Board Top Layer Components and Digit No. Chart



## Liquid Crystal Bottom Layer Chart & Digit No. Chart



## Circuit Chart

