



HF TRANSCEIVER

# CS108G+

Outdoor version Operating Manual



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### **Important reminder:**

Before operating the equipment, please read our operating manual carefully and keep the manual where it will not be lost.

### **Features:**

- Lownoise, single conversion HF transceiver. Double balanced diode mixer for extended dynamic range.
- 0.25 $\mu$ V receive sensitivity (preamp on).
- Narrow band double tuned band-pass filters covering all HF amateur frequencies including WARC bands.
- Built NC APC circuit.
- Circuit standard with high quality 0.5ppm TCXO clock source.
- 500 Hz narrow band CW filter configuration.

### **Security considerations:**



Do not use equipment during a lightning storm.



Protect against moisture!



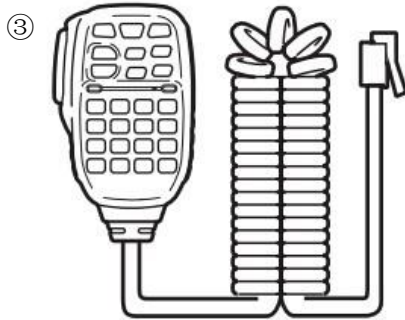
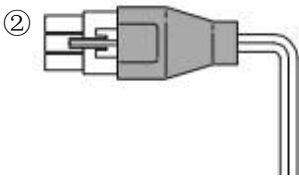
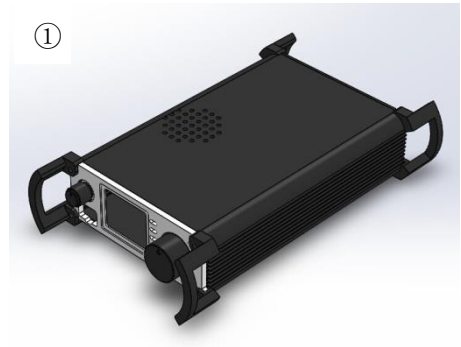
Do not operate illegally!



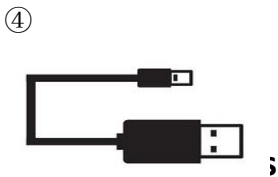
Caution! There is high-voltage RF on

**Packing list:**

	Quantity
① CS108G+.....	1
② Power supply cable.....	1
③ Hand microphone.....	1



⑤



## Basic specifications

### I. Specification:

#### General Specifications

Frequency range: Receive:0.5~30MHz (Continuous)

Transmitting: All HF Amateur bands including WARC bands

Operating mode: SSB (J3E)

CW (A1A)

AM (A3E)

Minimum frequency step: 10Hz

Antenna impedance: 50  $\Omega$

Maximum operating temperature: 55°C(131° F)

Frequency stability:  $\pm 0.5$ ppm @ 5 minutes after applying power

Operating voltage: 12~14.5V DC

Current draw: Receiving: 600mA @Max

Transmitting: 7.5A @ Max

Dimensions (mm): 120\*45\*180 (mm) [Does not include the front and rear handles or knobs.]

#### Transmitter

Transmitter power: More than 15W (@13.8V)

Modulation mode: SSB balanced modulation:

AM Low level modulation

Spurious response rejection:  $\geq 40$ dBc

Carrier suppression:  $\geq 45$ dBc

IF filter: SSB 2.4kHz(-6dB)

CW 500Hz(-6dB)

## Receiving

IF Frequency: 10.7MHz

receive sensitivity: 0.5uV @ 12dB SINAD (PRE ON,  $\leq 2.0\text{MHz}$ )

0.35uV @ 12dB SINAD (PRE ON,  $> 2.0\text{MHz}$ )

Receive Frequency bands:

1.8~2.0MHz

3.5~4.0MHz

5.0~5.5MHz

7.0~7.3MHz

10.0~10.2MHz

14.0~14.5MHz

18.0~18.2MHz

21.0~21.6MHz

24.8~25.0MHz

28.0~28.8MHz

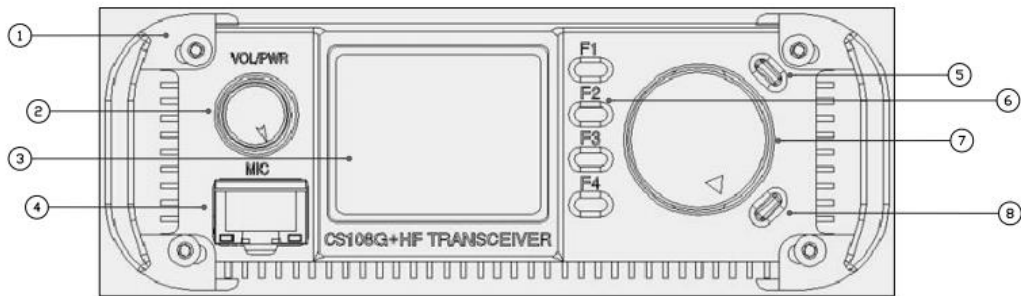
Dynamic range :Better than 90db

RIT (Receiver Incremental Tuning) Frequency control range:  $\pm 1\text{kHz}$

audio output: 0.5W@8  $\Omega$

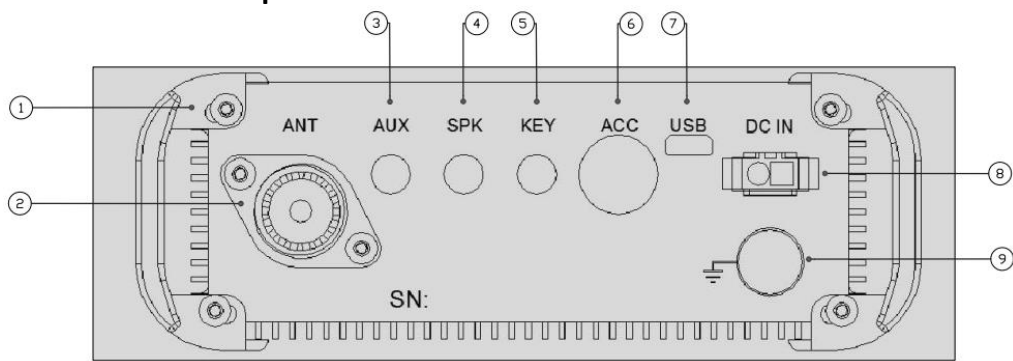
## II. Description of equipment

### 2.1 Front Panel Description



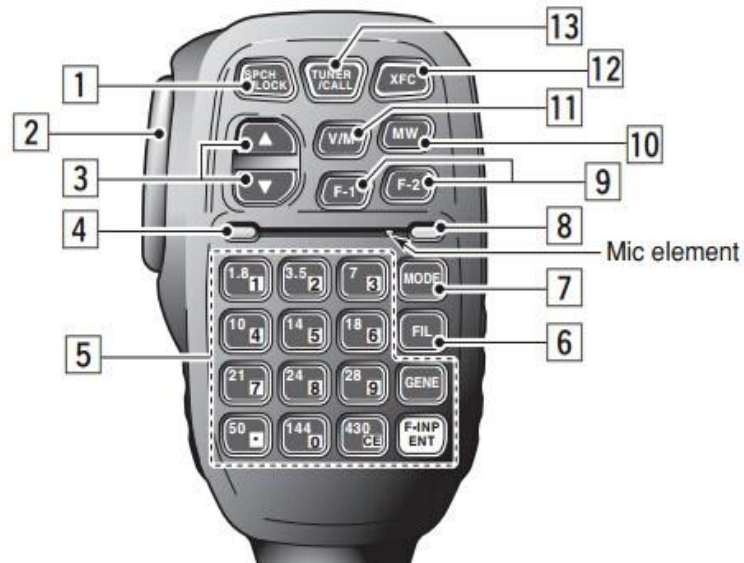
1. Metal handle
2. Power switch/Volume knob
3. Color OLED display screen
4. Microphone port
5. UP Key
6. Multi-function Key
7. Main function knob (frequency knob)
8. DOWN Key

## 2.2 Rear Panel Description



1. Back metal handle
2. Antenna interface
3. AUX port
4. External speaker output
5. KEY port
6. ACC port
7. USB port
8. DC power input
9. Ground connection.

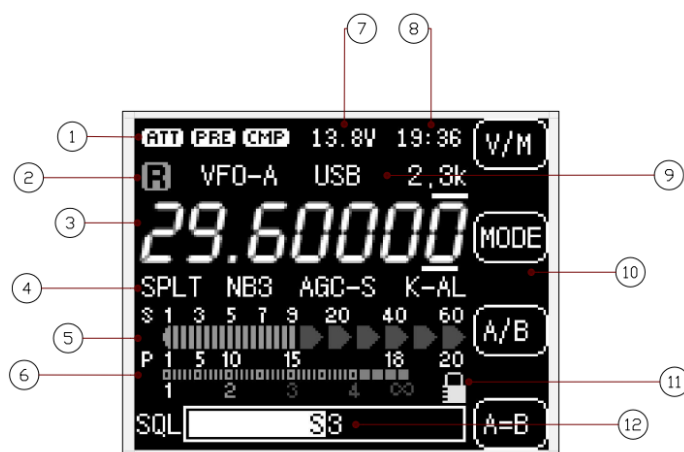
## 2.3 Microphone



1. Lock button/Press it again unlock
2. PTT button:Launch control button
3. Up / Down: In the system settings menu, upper and lower entry selection
4. Receiving indicator
5. Multi-function
6. Filter selection buttons: Selection of built-in filter
7. Mode selection button: Selection of working mode of the host
8. No indication
9. F1/F2 Custom set key
10. Memory write button
11. Frequency/Channel switching button
12. VFO-A / VFO-B switching button
13. No function



## 2.4 Display information description



1. Pre-attenuator/Preamplifier/Voice compression
2. Receiving / transmitting status
3. Current operating frequency value
4. Current functional status: SPLIT, NB Suppressor, AGC, Key mode
5. Received signal strength indicator
6. Real time power/SWR indicators
7. The current input voltage display
8. Time display
9. Current working mode/Filter bandwidth
10. Multi-function key
11. Lock indication
12. Parameter setting

### III. Operating instructions

To go between different screens, press the Main Function Knob.

#### 3.1 Screen display instructions



**【TS+】** Increase frequency step

This moves the frequency marker from right to left. When it gets to the far left it wraps around to the lowest digit. When you turn the frequency knob clockwise, you increase the frequency based on the frequency step you are under. When you turn the frequency knob counter clockwise, you decrease the frequency based on the frequency step you are under.

**【TS-】** Reduce frequency step

This moves the frequency marker from left to right. When it gets to the far right it wraps around to the highest digit. When you turn the frequency knob clockwise, you increase the frequency based on the frequency step you are under. When you turn the frequency knob counter clockwise, you decrease the frequency based on the frequency step you are under.

**【ATT】** Switch receive signal attenuator on or off

When the attenuator is on, the signal is attenuated about 10 dBm. You would typically keep the attenuator on when you are trying to listen to a very strong signal or there are strong signals around the frequency you are listening to. Keep the attenuator off if you are trying to listen to very weak signals. When the attenuator is on, there is a small ATT indication on the top left of the screen.

**【PRE】** Switch receive preamp on or off

When the Preamp is on, the sensitivity is increased about 10 dBm. You would typically keep the preamp on when you want to listen to very weak signals. The preamp increases the background noise as well as the weak signals. When the preamp is on, there is a small PRE indication near the top left of the screen



**【MODE】** Select desired operating mode – CW/AM/LSB/USB.

Select CW for Morse Code, AM for amplitude modulation, LSB for lower side band when using single sideband modulation, and USB for upper sideband when using single sideband modulation. The modulation choice is shown on the second line about the middle of the screen.

**【AGC】** Select AGC (Automatic Gain Control) level-FAST/SLOW/OFF

Use automatic gain control when you want to have the audio output at a constant level even when the people speaking vary how loud or soft they are speaking. It is recommended to keep this feature off when you have a very weak signal. The choice of fast or slow is dependent on the noise and type of signal you are listening to. When the AGC is set to OFF, the S meter is disabled. The AGC choice is shown below the frequency readout in the middle of the screen.

**【NB】** Select NB (Noise Blanker) level between 1 and 4 and OFF

This feature is used to minimize hearing ignition type of noise. The NB indication is shown below the frequency and to the left of the AGC indication.

**【A/B】** Switch between VFO A & VFO B.

This feature allows you to quickly toggle between two discrete frequencies. It is very useful if you want to monitor two separate conversions or possibly monitor both the input and output frequencies of a repeater. The VFO indication is shown on the second line of the display towards the left.



**【A=B】** Set VFO A the same as VFO B.

You would keep VFO A and VFO B the same when you want to transmit and receive on the same frequency. This minimizes the spectrum usage and is a good practice when speaking to one other person but is not always the optimum way of doing things.

**【SPLT】** Select SPLIT operating mode on or off.

Split allows you to separate your transmit frequency from your receive frequency. This is a good strategy where there is a "pileup" or there are many people trying to reach you at the same time. When multiple people try to reach you at the same time and you try to answer on the same frequency, you will probably have collisions. By separating the transmit and receive paths, while you are transmitting, you will not be interfering with other people and you will be able to hear all the traffic directed at you.

**【RIT】** Select RIT (receiver incremental tuning) mode-adjust

This feature allows you to move the receiver frequency slightly offset from the transmitter frequency. When in this mode, the transmitter frequency is locked in but the receiver frequency can be moved slightly. When the RIT button is pressed, the Power Output display is used for the RIT display and using the up key and down key sets the frequency offset.

**【POW】** Set RF output power-adjust.

This feature is used to adjust the output power of the transmitter. The up key and the down key is used to set the power level. The power output part of the display shows the current transmitter power.



**【V/M】** Select VFO or Memory mode.

When in the VFO Mode, the frequency knob will change the frequency. When in the Channel Mode, the frequency knob will change the channel. In Frequency Mode, the VFO can be continually adjusted to a resolution of 10 Hz. In the channel mode, the frequency is whatever the channel was programmed for. There are 127 channels available for use.

**【M>V】** In memory mode, move current frequency to VFO and switch to VFO mode.

This allows the user to select a known frequency and then use the frequency knob to search for traffic around that frequency.

**【MW】** In VFO mode, store current frequency and settings in memory

This will allow you to make up a new channel. By experimenting with the different bands, once you find something interesting, you can store it as a new channel.

**【MC】** In memory mode, clear selected memory channel

By clearing the existing memory, you can now store a different frequency in the channel than what was there before.



**【FIL】** Select filter

The radio has three filters optimized for different modes. There is a 500 Hz narrow band filter which is used for CW. There is a 2.3 KHz filter which is used for SSB. There is a 6 KHz filter used for AM.

**【KEY】** Select keyer-Manual/Auto L/Auto R

**【KSPD】** Select keying speed –

Speed is displayed where the power output used to be. The speed can be adjusted from 5 Words per minute to 75 words per minute. The up key and down key is used to adjust speed.

**【TIME】** Set internal Clock

When the time key is first pressed, the year will be selected. Use the up key and down key to change the Year. When the time key is pressed again the month is selected. Use the up key and down key to change the month. When the time key is pressed again, the day is selected. Use the up key and down key to change the day. When the time key is pressed again, the hour is selected. Use the up key and down key to change the hour. The hour can be between 0 and 23. When the time key is pressed again, the minute is selected. Use the up key and down key to change the minute. When the time key is pressed one more time, the time setting function is exited.



**【SQL】** Select to adjust Squelch level.

Squelch is displayed where the power output used to be. The speed can be adjusted from 0 to 10. The up key and down key is used to adjust the squelch.

**【CMP】** Voice Compression settings.

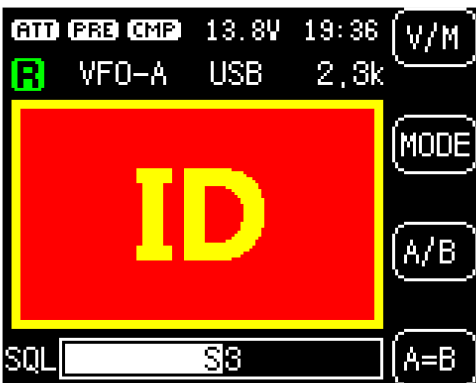
Compression is displayed where the power output used to be. The available compression ratios is 1:1, 2:1, 3:1, 5:1 and 10:1. The up key and down key is used to adjust the compression ratio.

**【SPEC】** Display Spectrum Analyzer screen

Pressing the SPEC key will get a new screen as described on the next page.

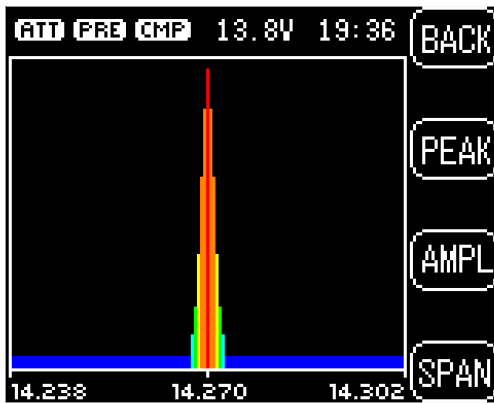
**【 ID 】** ID call-sign timer

The ID timeout is displayed where the power output used to be. The available times are 5 minutes, 10 minutes, 15 minutes, and 20 minutes and off. Pressing the ID key multiple times changes the timeout value. When the PTT is first pressed, the ID timer is started. After the timeout as specified is reached, the screen as shown right below is presented. Pressing the PTT will reset the screen.





Spectrum Analyzer display screen



**【BACK】** Close the spectrum screen and return to previous screen.

While you are in the spectrum analyzer mode, you cannot hear any audio. Pressing the BACK key allows you to hear what is on the center frequency.

**【PEAK】** Select the frequency of the strongest signal in the display

This allows you to automatically select the strongest frequency so you can hear what is at that point.

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**【AMPL】** Changes the screen vertical scale. The range for Steps 1 through Steps 5 is approximate as follows:

Step Number	Min Range	Max Range
1	S3	S4
2	S3	S5
3	S4	S8
4	S4	S9
5	S5	S9

**【SPAN】** Increases the band width of the display. The following table shows Bandwidth versus Total Range. The bandwidth is the width per pixel.

Bandwidth	Total Scanned Frequency Range
500 Hz	64 KHz
1000Hz	128 KHz
2500Hz	320 KHz
5000Hz	640 KHz

## 3.2 Using your CS108G+ from the Keypad

### 3.2.1 Set the current operating frequency from the keypad



On the microphone, press the function button

then input frequency directly, e.g. 14.27, then press the function button F-INPENT again, complete the setting.

### 3.2.2: Mode Switching from the keypad

On the multifunction digital microphone in hand, press to complete the mode switching.

### 3.2.3: Filter Switching from the keypad

On the multifunction digital microphone in hand, press to complete filter switching.



### 3.2.4: HRD Software

When you connect your computer via HRD, this radio is compatible with the IC7000 model.

### 3.3 Extended Interface



**【AUX】** No function

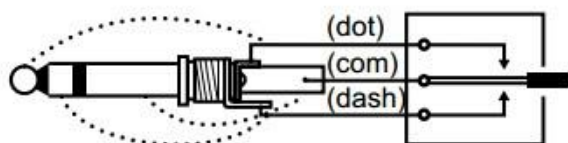
**【SPK】** External speaker output

Speaker or Headphone(3.5 stereo Socket); Otherwise it will damage the rig.

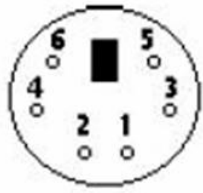
Before using the headphone, please decrease the volume.

**【KEY】** Telegraph Key

The telegraph key is automatic or manual operation.You can switch the keyer mode in the corresponding menu.



## 【ACC】 ACC port



### Pin Definitions

- 1: 9V Power Output
- 2: PTT Signal Output
- 3: Wave Bands voltage output
- 4: ALC voltage output
- 5: External Audio input
- 6: Ground

### Band voltage parameter

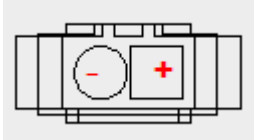
BAND	LEVEL	BAND	LEVEL	BAND	LEVEL
1.8MHz	0.33V	10MHz	1.33V	21MHz	2.33V
3.5MHz	0.67V	14MHz	1.67V	24MHz	2.67V
7MHz	1.00V	18MHz	2.00V	28MHz	3.00V

## 【USB】 USB port

PC controller firmware update

**【DC IN】 Power port**

Power socket polarity, as shown:



**Note:** Power input range: 12~14.5V DC

**Do not exceed the input voltage range or Reversepolarity.**

**【Ground hole】**



**【Ground screw】**



### 3.4. Advanced Menu Settings

CAUTION: THESE SETTINGS ARE DIRECTLY RELATED TO THE CORRECT OPERATION OF THIS RADIO.

PLEASE EXERCISE CAUTION. PLEASE RECORD AND SAVE ALL ORIGINAL FACTORY SETTINGS BEFORE MAKING ANY ADJUSTMENTS.

#### 3.4.1

In the shutdown state, press and hold the F1 key on the host and turn on (note, do not release) until the screen displays the data of the engineering menu, as shown below:



1. IF SSB: SSB IF
2. IF CW: CW IF
3. BFO LSB: BFO value LSB mode
4. BFO USB: BFO value USB mode
5. BFO CW: BFO value of the CW mode
6. CW Tone: CW side tone pitch frequency adjustment
7. CW TDly: CW launch delay
8. TOT: Time Out Timer
9. Britns: Brightness:
10. Cntrst: Contrast
11. DDSCLK: System Clock
12. DCLKx6: DDS multiplier settings
13. ST VOL: System Audio Settings

14. F1 DEF: Custom Key

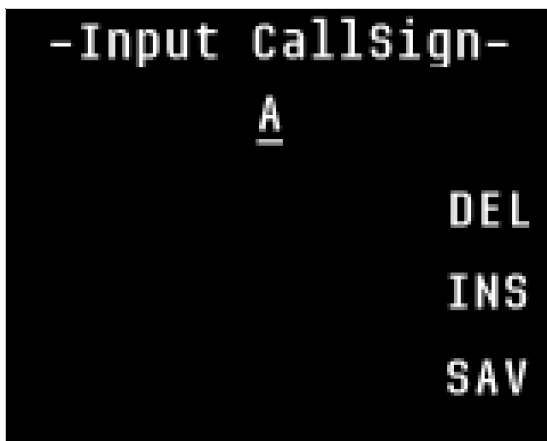
15. F2 DEF: Custom Key

**PLEASE SEE ON LINE MANUAL FOR MORE DETAILS OF THE ABOVE PARAMETERS**

### 3.4.2 user-defined on call sign display

When the power is first applied to the radio, a splash screen is shown that has the name of the company underneath its trademark. You can change the name of your company to your call sign as follows:

- a. With the power off, hold down the F3 key, and then turn on the power until the special screen is shown.
- b. use the frequency knob to adjust the display character, use the INS key to save that character and move on to the next character, use the DEL key to erase a character, and use the SAV key to save the results when you are happy.
- c. If you want to use the default, erase all characters and save the blank screen.
- d. If you want to just abort the operation before it is saved turn off the power



**PLEASE SEE ON LINE MANUAL FOR MORE DETAILS OF SETTING THE CALL SIGN**



### 3.4.3 ADC on the system check value (It is strictly prohibited to modify or delete the data!!)

With the power off, hold down the F3 key, and then turn on the power until the special screen is shown.

This screen is used to calibrate the S table.

**Do not modify or delete the data!! It may cause the S table display to be inaccurate or not appear.**

```
--Radio Calibration-- NEXT
ADC =xxxxx
-121dBm= xxxxx
-97dBm= xxxxx
-73dBm= xxxxx SET
-63dBm= xxxxx
-53dBm= xxxxx
-43dBm= xxxxx CLR
-33dBm= xxxxx
-23dBm= xxxxx
SAVE
```

**PLEASE SEE ON LINE MANUAL FOR MORE DETAILS OF THE ABOVE PARAMETERS**

## IV General troubleshooting

The following is a general troubleshooting guide. If you still cannot solve the problem, please call for assistance or RMA. Do not disassemble the machine or you will lose the warranty.

<b>Fault description</b>	<b>Possible reasons</b>	<b>Solution</b>
Unable to turn on your CS108G+	Power cord is not connected	Connect power cable
	Power is not turned on	Turn on the power
	Power cable connection is bad	Replace or repair power cord
	Power supply connection reversed	Properly connect the power supply
No reception	Antenna is not connected	Properly connect the antenna
	Antenna failure	Replace or repair antenna
	No communication	Please confirm the propagation characteristics of the current band
	Other circumstances	Needs repair
Does not transmit	Antenna is not connected	Properly connected antenna
	Low power supply voltage	Please replace the power supply
	Lack of power	Please replace the power supply
	Antenna SWR value is too large	Please check the antenna
	Modulation mode is not correct	Choose the right modulation mode
	Other circumstances	Needs repair
Screen has no display	Power cord is not connected	Connect power cable
	Power is not turned on	Turn on the power
	Other circumstances	Needs repair
Smoke comes from equipment	Defective component	Needs repair

Microphone  does not  operate	PTT pressed does not turn on transmitter	Re-connect microphone
	Please confirm that the current frequency is not in the forbidden band	Reset frequency
	No reaction when button is pressed	Re-connect microphone
	Other circumstances	Needs repair

# After sales service policy

## 1. Warranty clause:

The radio has warranty for one year from the date of purchase. This warranty covers only manufacturing and parts defects. It does not cover damage caused by lightning, excess voltage on the power supply, accidental damage, or purposeful damage.

If the radio needs warranty repair within two weeks of receiving the radio, Connect Systems Inc. will pay for the shipping both ways. After two weeks Connect Systems will pay only for return shipping.

If the radio is not covered under warranty, the customer pays for shipping both ways plus the cost of the repair.

Sales and Service is through an American Company. You need not send your radio to China if there is a problem. We fix most of the problems locally and if we cannot that is our problem and not yours.

## 2. Warranty limitations:

The following restrictions on warranty services are applicable to the radio and all accessories. Any other following circumstances, will cancel the warranty:

- A. Modification, removal, or maintenance of the internal circuitry, without permission and authorization;
- B. Unauthorized change of product's embedded software;
- C. Immersion in liquid or man-made external damage;
- D. Warranty period expired;
- E. Product's serial number is missing, torn or blurred so we cannot determine if the radio is under warranty;
- F. Product was not bought from Connect Systems Inc or authorized distributor of Connect Systems Inc.

None of the following conditions, are covered by the warranty:

- A. Damage caused by improper use by the user;
- B. Damage caused by an accident;
- C. Damage due to incorrect testing, maintenance, debugging, or other changes;

D. Damage is not caused by the material or the quality of production ;

E. Damage to the shell or other external components due to improper use.

**Contact us: [service@connectsystems.com](mailto:service@connectsystems.com)**



[www.connectsystems.com](http://www.connectsystems.com)