HF/VHF/UHF

Full mode SDR station

Q900

User manual2.1

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Catelogue

Generation

Q900 is an ultra portable full frequency full mode SDR radio launched by us. The receiving frequency is 300kHz ~ 1.6GHz, and the amateur transmitting band covers 160m ~ 70cm. **All amateur segments are locked at the factory. If you need an experimental test, open it in the setting menu on the premise of complying with local regulations.**

Q900 operation modes include FT8, SSB, CW, AM, FM, RTTY and DMR. It includes all the advanced functions and features of all radio stations.

Q900 is designed with three power supply modes, including built-in battery, USB port power supply and DC port power supply. The power supply voltage range is 5VDC ~ 32VDC. At the same time, all power ports support anti reverse connection protection.

The display adopts high-resolution LCD with adjustable backlight brightness, which can be clearly displayed outdoors. The panel adopts full keyboard design to facilitate various operations. The keyboard backlight is adjustable, which can operate the radio station in dark environment.

QRadioBLE mobile app can remotely control the radio station, making the radio station operation more convenient and fast. It has built-in Bluetooth module, USB cable, integrated sound card and serial port. One USB cable can control the radio station.

The Q900 has many advanced functions that are only available in large base stations. The machine has dual VFO mode, different frequency working function, IF offset adjustment, receiving frequency fine adjustment, IF noise suppression, AGC speed selection, RF gain adjustment, squelch control, pre attenuator, AM broadcast reception, built-in telegraph automatic key, automatic key point ratio adjustment, built-in CTCSS analog sub tone, automatic shutdown function (APO), transmission timeout function (TOT), connection with computer, computer-aided control function, and copy function, etc.

In addition, the Q900 has a wide range of options.

Q900 has the following features:

1. Real time spectrum.

2. Waterfall map.

3. Doppler frequency tracking.

4. Software Defined Radio (SDR) technology is adopted, and the full frequency band supports FT8, SSB, CW, RTTY, am and FM.

5. Dual frequency conversion circuit structure.

6. IF width and IF displacement hardware and software can be modified to provide strong if interference suppression.

7. DSP digital noise reduction.

8. Built in (6 ~ 160) m high-speed automatic antenna tuner.

9. Built in electronic key controller, all parameters can be set flexibly.

10. Built in sound card with IQ and audio output.

11. Internal 4.9ah battery.

12. USB typec3.1 interface for power supply and connection to the computer.

13. High precision TXCO ± 0.5ppm (-10 ℃ ~ 60 ℃).

14. Ultra wide working voltage range: 5VDC ~ 32vdc, partial voltage emission is limited

15. Anti reverse connection protection of power supply.

16. Built in GPS / compass, GSM and electronic compass (acceleration and angle sensor) (optional).

17. GPS timing (optional GPS module is required).

18. UTC clock can be set.

19. Voltage display.

20. Ultra light weight: ≤ 2kg.

21. Bluetooth wireless remote control

Application

emergency communication

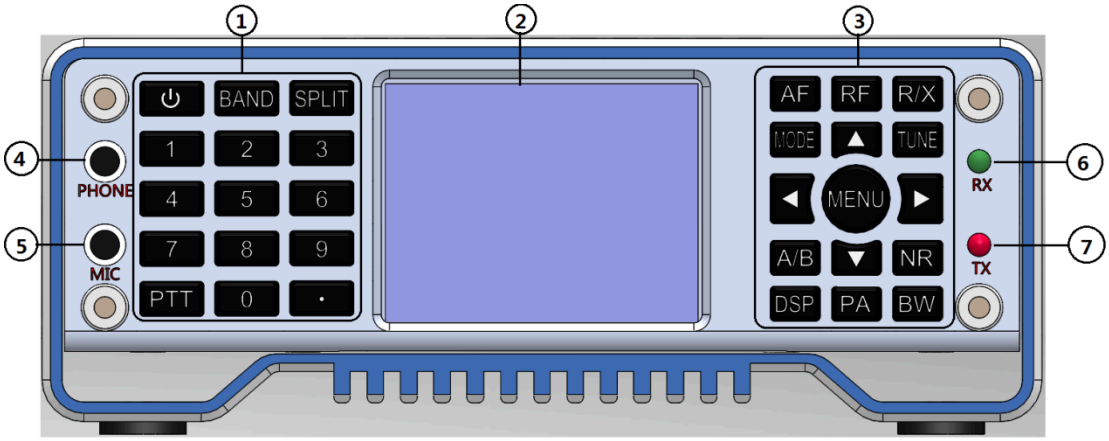
Remote spectrum monitoring sensing

Radio direction finding

Amateur radio

Panel control and operation

Front panel



① Numeric keypad.

② LCD.

③ Function keyboard.

④ Headphone connector.

⑤ Wired hand microphone interface.

⑥ Receive indicator.

⑦ Emission indicator.

Key function

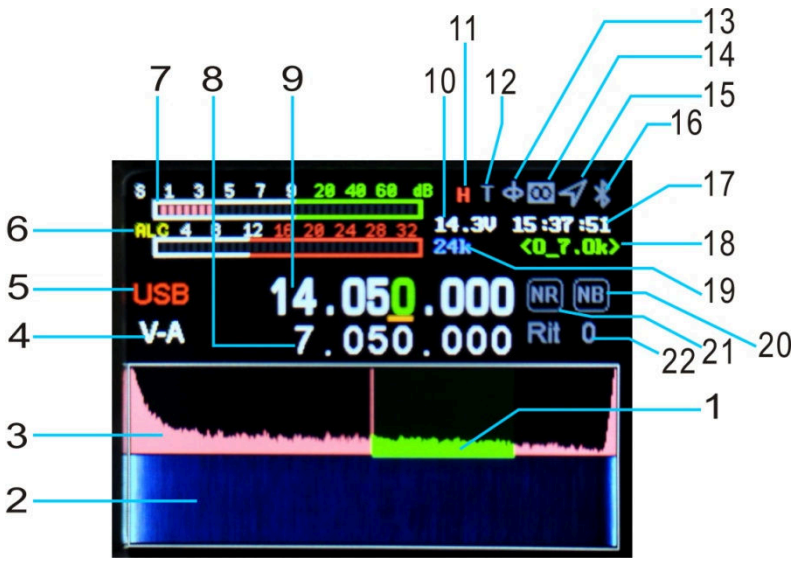
Key	Short press	Long press
Power supply	Switching VSWR, ALC, MIC audio indication	Power on / off
BAND	Band selection	CW settings
SPLIT	Different frequency on, different frequency off	Sub tone settings
AF	Volume, MIC gain, MIC audio widening, bass, treble	Frequency mode and channel mode switching
RF	RF gain, IF gain, AGC, SQL, ATT	USB data output format selection

R/X	RIT receiving frequency offset, xit transmitting frequency offset	Transceiver frequency offset switch
MODE	Mode setting	USB / LSB, NFM / WFM, CWR / CWL switching
TUNE	Turn on / off AH	Tuning start / stop
A/B	A frequency or B frequency	A = B frequency
NR	NB or NR selection	Show only spectrum, show only waterfall chart, show spectrum and waterfall chart at the same time, and turn off spectrum
DSP	NR, NB, PEAK threshold setting	Close NR or NB
PA	Power adjustment	High and low power switching L / h
BW	Digital filter selection	Spectrum bandwidth setting, spectrum reference level setting and spectrum refresh rate setting
.	*	5W turn on CW long tone transmission for debugging antenna standing wave
Direction key left	Left selection or impairment operation	*
Direction key right	Right selection or addition operation	*
Direction key up	Upper selection	Fast frequency addition
Direction key down	Next selection	Fast frequency reduction
MENU	Confirm	Application interface, return

Indicator light

Status	Red light	Green light	
On	Launch		
Off		Receive	
Flash		Program exception	

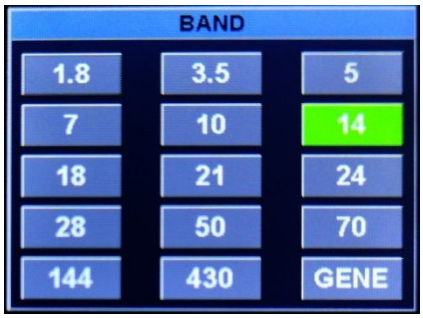
SDR main interface



1. Digital filter 2. Waterfall diagram
3. Spectrum 4.Section A / B indication
5. Mode display 6. SWR, AUD, ALC instrument
7. S meter (transmission time to power meter) 8. Different frequency transmission frequency
9.Main frequency display (different frequency reception frequency) 10.Voltage display
11. The high power of the radio station is H, the low power is L 12. AH enable display
13. Electronic compass 14. LORA display
15. GPS display 16. Bluetooth display
17. Time indication 18.Digital filter bandwidth
19.Spectrum bandwidth 20\21. NR,NB indication
22.RIT/XIT frequency offset

Band selection operation

Short press the band key to pop up the frequency band selection interface, press the direction key to select the frequency band, and press the menu key to confirm.



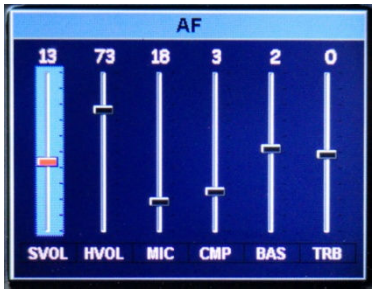
Different frequency operation

Short press [SPLI] to display the different frequency, then press to close the different frequency, press the left and right direction keys to select the frequency bit, and press the up and down direction keys to add and subtract the frequency. The upper row is the receiving frequency and the lower row is the transmitting frequency. Press the [A / B] key for switching.

AF audio frequency setting

Short press the [AF] key to enter the AF interface, select the setting item with the left and right direction keys, and press the up and down keys to set the value.

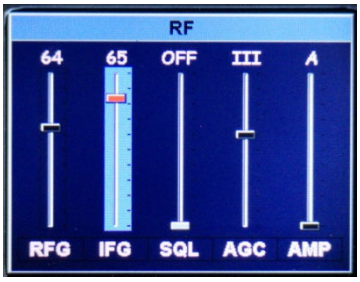
SVOL：volume
HVOL：panel headphone volume
MIC：MIC gain
CMP：MIC companding ratio
BAS：bass
TRB：treble



RF setting

Short press the [RF] key to enter the RF parameter setting interface. Select the setting item with the left and right direction keys, and press the up and down keys to set the value.

RFG： RF gain
IFG： IF gain
AGC: automatic gain adjustment speed
SQL: squelch level (FM mode)
AMP： front stage amplification



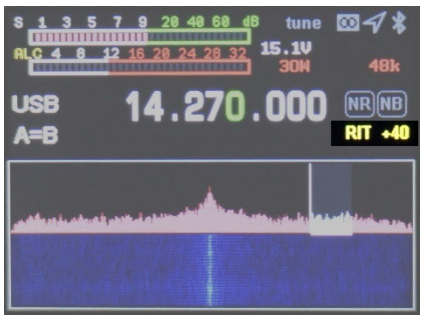
USB sound card data output format setting

Long press the [RF] key to enter the USB sound card data output format selection interface, and press the up and down keys to select the output mode. Press and hold again to exit.

USB： selected in digital modes such as FT8/HRD/N1MM/LOG32/RTTY
SDR： selected when using CNSDR software

Transceiver frequency offset setting

Long press [R / X] to open the transceiver frequency offset setting interface, and then long press to exit. Short press to select the received frequency offset RIT, Short press again to set the transmission frequency offset XIT. Set the frequency offset with the left and right direction keys. Frequency offset frequency = key display value * 20Hz.



Transceiver mode setting

Short press the [MODE] key to select the mode
Short press the [mode] key to select the mode.

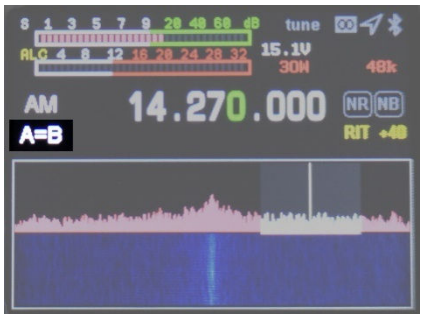
In FM mode: press and hold to select NFM / WFM.
In SSB mode: press and hold to select USB / LSB.
In CW mode: press and hold to select CWL / CWR
Short press to cycle AM, FM, USB (LSB), CW, RTTY and DMR successively

AH operation

1. Short press the [power] key to switch to SWR standing wave instrument.
2. Long press the [TUNE] key, Q900 will automatically enter the tuning mode, and the machine will make a short click sound. The T word on the screen interface turns green. If you want to exit the tuning state halfway, long press [TUNE] again, the tuning failure T word is gray, and the success is green. In the green state, short press [TUNE] to turn off the sky tune.
3. Long press [.] Q900 to directly enter 5W CW long tone transmission. With the local standing wave, you can directly observe the antenna standing wave SWR value to facilitate the adjustment of your antenna feeder system. Short press [.] again to exit.

A/B frequency operation

Short press the [A / B] key to switch A / B frequency, long press A frequency = B frequency.



NR/NB noise suppression setting

Short press the [NR] key to start, and short press to switch NR / Nb. Generally, NR is used.
Short press the [BW] key to turn on the digital filter (green display), adjust the left and right direction keys and turn down the bandwidth to 4.8k. At this time, NR works. Press and hold the [DSP] key to close NR / NB.

Spectrum and waterfall display setting

Long press the [NR] key to select switching display → waterfall diagram → spectrum diagram → waterfall diagram and spectrum diagram are displayed at the same time → waterfall diagram and spectrum diagram are closed.

Spectrum parameter display setting

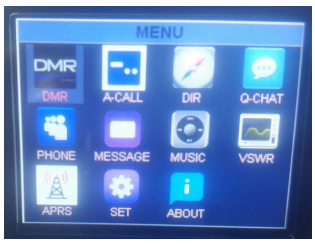
Long press the [BW] key to set the spectrum bandwidth, reference level and refresh rate; The direction up and down keys can select the setting item, and the direction left and right keys can set the value.
SPAN: spectrum bandwidth.
REF: spectrum reference level.
SPEED: spectrum ref resh rate.

Digital filter operation

Short press the [BW] key to select the digital filter (as shown in the figure below, green is selected), and press the left and right keys to select the filter bandwidth; Short press the [BW] key to exit the filter bandwidth adjustment (at this time, the green part becomes white).

Application menu operation

Long press the [MENU] key to enter the menu interface, long press the [MENU] key to exit the menu interface, press the left, right, up and down keys to select application, and short press the [MENU] key to select application.



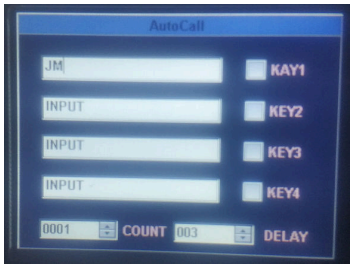
1. DMR setting (optional)
2. A-CALL automatic call setting

The content of automatic call setting is used for CW automatic call and RTTY automatic call at the same time.

2.1. KEY1 ~ KEY: automatic call content, select the input item with up and down keys, and short press [MENU] to select. Please use the radio numeric keypad or USB keyboard for input. Refer to Appendix 1 for input method

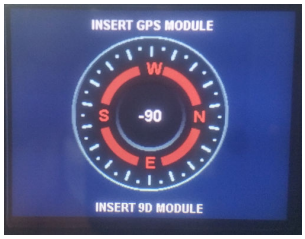
2.2. COUNT the number of consecutive calls, select the input item with the up and down keys, and adjust the number with the left and right keys.

2.3. DELY automatic call interval, in seconds. Press the up and down keys to select the input item, and press the left and right keys to adjust the interval time.



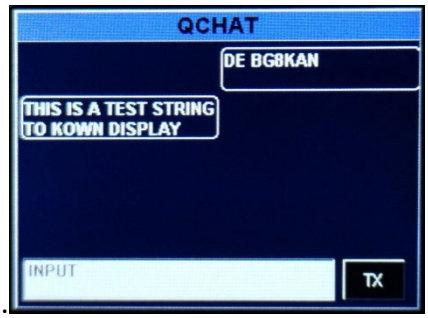
3. GPS and electronic compass operation DIR (optional)

Enter the menu to directly display the UTC time, longitude and latitude, speed, direction, altitude, etc. received by the GPS module.



4. LORA operation Q-CHAT（optional）

After receiving the short message, display it directly, press the keyboard to enter the information, and click TX to transmit the information



5. Telephone function * PHONE (temporarily unavailable)

6. SMS * MESSAGE (temporarily unavailable)

7. Music player * MUSIC.

Mobile search station, Bluetooth connection and play audio with mobile music player.

8. VSWR standing wave scanning (long press MENU to exit)

7.1. Select BABD Marker START with the left and right direction keys, and short press the MENU key for confirmation.

7.2. BAND select scan band.

7.3. After selecting Marker, press the left and right direction keys to view the frequency standing wave value of the band.

7.4.START start scanning antenna standing wave

9. APRs (optional)

10. Set * SET

10-0 KEY-LED keyboard backlight on / off

10-1 OUT-BAND-EN OFF lock band pool data

10-2 TX-EN transmitting switch (it needs to be on to transmit after the new machine is activated)

10-3 KEY-VOLUME keyboard key volume

10-4 BACKLIGHT LCD brightness

10-5 LED_ BRIGHNESS adjustment of transceiver indicator light

10-6 HOUR time setting: hour

10-7 MINUTE time setting: minute

10-8 SECOND time setting: second

10-9 FAN-EN-TEMP fan temperature control

10-10 FAN-AUTO automatic temperature control

10-11 VSWR-THRESHOLD standing wave protection threshold off does not limit the size of standing wave

10-12 VSWR-TUNER AH standing wave cut-off threshold, which means that the AH stops adjusting SWR to less than this number

10-13 TOT-TIMER limited launch time

10-14 AUTO-SLEEP backlight turns off automatically

10-15 VOX_ EN USB port data voice control on / off

10-16 VOX_ Threshold value of voice control for threshold USB port data

10-17 EX_ SQL full mode squelch on / off

10-18 DBM_ EN signal DBM display on / off

10-19 FW-VERSION version number

11.ABOUT

11-1 CALLING calling input (displayed on the boot screen)

Calling input operation method: refer to Appendix 1 input method.

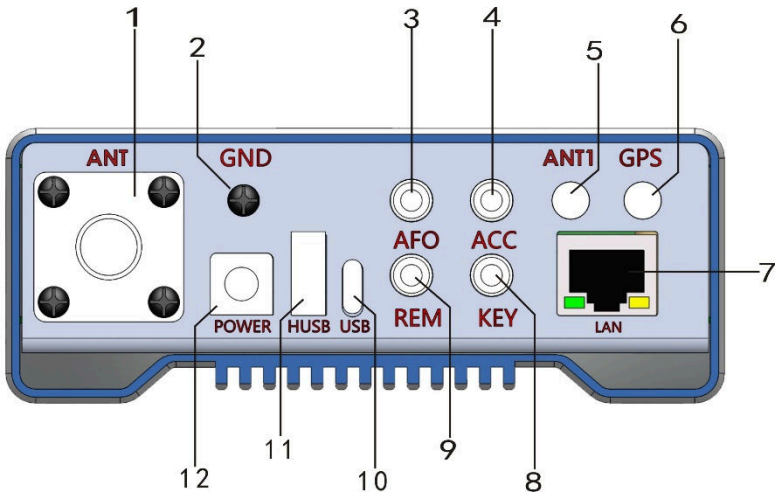
11-2 MODEL machine model

11-3 SN machine serial number

11-4 HW hardware version number

11-5 SW software version number

Rear panel interface



1. Antenna interface
HF / 50MHz / 144MHz / 430MHz antenna port (M type), with output impedance of 50 Ω.
Note: there is no optional DMR module 144MHz / 430MHz input and output from ANT.

2. Grounding column
For best performance and safety, this ground terminal can be well connected to the ground with a short and thick copper strand.

3. Audio output
Demodulated audio output.

4. PTT control output.
PTT transceiver for controlling power amplifier.

5. ANT1
Optional DMR module 144MHz / 430MHz input and output from ANT1.

6. GPS antenna port
Connect the active GPS antenna.

7. Network port

8. Key interface
This interface is a 3.5mm three core interface, which is used to connect the electronic automatic key controller or ordinary hand key.

9. RS232 serial port

10. USB port
It is used to connect USB cable to computer and output audio, digital and IQ signals.

11. Host USB port

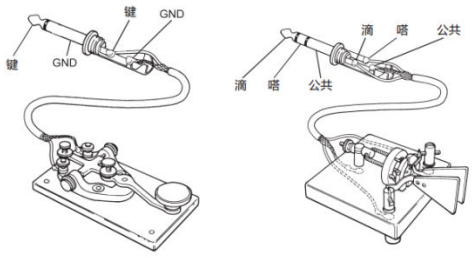
It is used to connect peripheral intelligent devices, such as external wave wheel, keyboard and USB flash disk. It is used to charge external devices carefully.

12. DC power interface

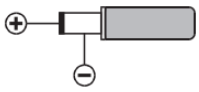
Radio power interface, specification: 5.5 * 2.5. Use the standard DC power cord to connect to a regulated power supply or battery. The power supply must be able to provide full power output of 6A (13.8 ~ 16.8) V radio station; For HF to use higher power, please use 15V-16.8V power supply, but the calorific value is higher, the UV is limited to less than 15V, and the above limits UV emission; Stations with voltages below 12V and above 18V limit power output.

Interface definition

Key

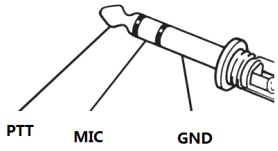


Power supply



Audio output / headphone connector

Hand microphone



Receive advanced operation

Q900 power on status is the receiving status. In order to get a better listening experience, you need to follow me to understand the advanced operation of the machine.
1. Select the desired frequency mode, for example: 14.270MHz \ USB.

2. Short press [AF] key to call up Vol volume adjustment; Press the up and down direction keys to adjust the volume, adjust the appropriate volume, and short press the [AF] key again to save and exit.

3. Short press the [RF] key to call up the RF parameter setting interface. Select the setting item with the left and right direction keys, press the up and down keys to set the value, and then short press the [RF] key again to save and exit.

3-1. RFG: RF gain.

3-2. IFG: if gain.
Through the combination of RFG and IFG, the receiver achieves the highest sensitivity and the lowest noise volume; Usually, if you want to hear a very weak signal, you need to raise these two parameters, but the noise also increases; Achieving a balanced state requires careful adjustment. Usually, the IF gain can be higher than the RF gain.

3-3. Amp front stage power amplifier, divided into A / B section

3-4. MIC gain. If this gain is turned on too high, it will greatly increase the pickup sensitivity and cause mic overload. It shows that when the radio station presses the hand microphone, the transmission power comes out and there is noise. Therefore, it is just right to press hand microphone and the radio station will come out without power in SSB.

4. Long press the [BW] key to set the spectrum bandwidth, reference level and refresh rate; Press the up and down keys to select the setting item, press the left and right keys to set the value, and long press the [BW] key again to exit. Other signals within the bandwidth can be seen through the spectrum display.

4-1. Span: spectrum bandwidth, 1.5k, 3k, 6K, 12K, 24K and 48K respectively
4-2. Ref: spectrum reference level.

4-3. Speed: spectrum refresh rate.

5. Spectrum and waterfall display settings
Long press the NR key to select the display of waterfall diagram, long press to select the display of spectrum diagram, and long press the tile diagram and waterfall diagram to display at the same time.

6. Digital filter operation, Q900 provides powerful digital filters.
Short press BW key to select digital filter. After selecting to turn on digital filter, the original white horizontal line on the spectrum is displayed in green; Press the left and right buttons to select the filter bandwidth, and then short press the BW button again to determine the filter bandwidth and exit.
Different band widths can effectively avoid interference signals to achieve excellent listening effect.

7. NR / NB noise suppression setting, usually this option should be combined with digital filter to achieve excellent results.

7-1. Short press the [NR] key to start, and short press to switch NR / NB. Press and hold [DSP] key to close NR / Nb. Short press [DSP] to set NR / NB / peak threshold value, press up and down keys to select NR / NB / peak setting item, press left and right keys to set value, and then short press [DSP] again to exit.

7-2. Find the required signal and turn on NR. generally, the effect of NR is more obvious, and then turn on the digital filter to the maximum bandwidth according to the operation of ⑥; Then slightly reduce the bandwidth of the digital filter. When it is adjusted to 4.8k, you will find that the noise will be greatly suppressed; At this time, the combination of RFG and IFG can also be adjusted to achieve the optimal reception effect.

Through the above settings, you have mastered the advanced receiving settings of Q900. Now, let Q900 swim in the ocean of radio waves with you.

Launch operation (factory locked)

If you need experimental launch test, please comply with local laws and regulations before launch, and voluntarily go to the menu setting to start launch.

TX opening method: long press MENU - direction key to select SET - click MENU - find TX-EN - left and right direction keys to select on - long press MENU to exit - long press MENU again to exit the menu interface

Please follow my instructions to learn how to quickly set up and use your new equipment Q900. You must want to use it to communicate. Let's guide you to QSO for the first time. You will get an unparalleled experience from this new walkie talkie. Now, let's start to understand how to operate!

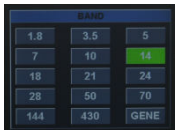
- **Start and shut Q900**

1. To turn on the walkie talkie, just press and hold the power button for one second.

2. To turn off the walkie talkie, just press the power button for one second.

3. Q900 has power-off data saving function. For example, if you operate power-off on 7.050MHz LSB, you will directly restore the state before power-off without going through the power switch after power-on again. This function is helpful to select remote control operation.

- **Band selection**



1. The frequency range of Q900 is very wide. Short press [BAND] to call up the frequency band menu

2. Short press the direction key to select, and short press [MENU] to confirm the frequency band.

- **Frequency selection**

1. Short press the left and right direction keys to select the position of the cursor, short press the up direction key to adjust the required frequency, and long press the up and down direction keys to quickly select the required frequency.

2. Enter the desired frequency directly from the numeric keypad.
For example, if you want to input 14.270MHz, press 014270000 or 14.270000 respectively on the numeric keypad, and then press the menu key [MENU] to confirm.

- **Mode selection**

1. Q900 supports FT8, LSB, USB, CW, FM and RTTY in the whole section. Short press the [MODE] key to select, long press the [MODE] key for LSB and USB, and long press the [mode] key for CW and CWR. Long press [MODE] to switch between WFM and NFM.

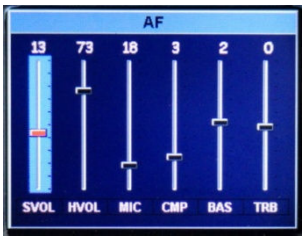
- **Power output selection**

1. Short press [PA] to enter the transmission power adjustment, and press the up and down direction keys to adjust the value.

2. Long press [PA] to quickly select 5W and 20W sections, and the power of each section can be fine adjusted by up and down direction keys.

- **Receive volume, MIC gain**

1. Short press the [AF] key to enter the AF interface, select the setting item with the left and right direction keys, and press the up and down keys to set the value.



SVOL: volume； HVOL： Front headphone volume

MIC： MIC gain

CMP:MIC companding ratio

BAS: bass

TRB： treble

- Hand microphone

1. When a wired hand microphone is selected, it is directly inserted into the mic port of the front panel.

2. When the wired hand microphone is connected to the radio station, the mic gain cannot be adjusted too much; Under SSB, if the wired hand microphone PTT is pressed, if the radio power meter has an output, the hand microphone gain is too large. It needs to be reduced to no power output when the hand microphone is pressed under quiet conditions.

Simple setup is complete, and you can now communicate happily. Generally, LSB mode is used below 7Mh, USB mode is used above 14mhz, and FM mode is used above 28MHz. **Please check your radio license before launching and abide by local laws and regulations. Q900 will be locked before delivery (launch is prohibited). Please open it after meeting the legal provisions.**

FT8 communication

1. Press [MODE] key, select FT8 mode, connect the computer with USB cable, open FT8 software, select CAT protocol device as FT-817, audio device as Q900, and other parameters are default.

SSB communication

1. Press the [mode] key to select one of the SSB (LSB or USB) modes. If you are operating in 7MHz or below frequency band, please select LSB mode. If you are operating in the frequency band of 14MHz or above, please select USB mode.

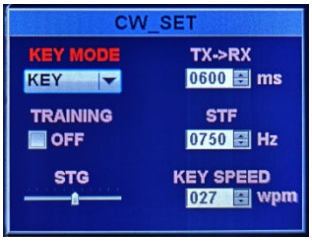
2. Short press the [power] key to switch the display of ALC, SWR and AUD

instruments on the screen.

3. Press the PTT button on the microphone to speak to the microphone with normal voice, and observe the display of ALC instrument at the same time. When the microphone inputs the actual voice level, the corresponding amplitude will be displayed on the ALC table. Release the PPT key to return to receiving mode.

4. If the ALC table displays too high or too low, you can reset the gain value of the microphone as follows: long press the [AF] key for one second to enter the selection mode, select the MIC item in the left and right directions, press the up direction key to set the value, and long press the [AF] key again to exit. Speak to the microphone until the ALC indicates when your voice peaks

CW communication



When using hand keys, automatic keys, semi-automatic keys, external electronic keying unit or computer-generated keyboard equipment, please operate as follows:

1. Insert your 3.5mm (three-phase or two-phase) plug into the key jack on the rear panel.

2. Short press [MODE] to select a CW mode (CW or CWR); "CW" mode uses the carrier input on the USB side, while CWR (reverse) mode uses the input on the LSB side.

3. Long press [BAND] key to enter CW setting. The up and down direction keys on the keyboard select options, and the left and right direction keys adjust the settings in the options.

3-1. KEY MODE selection contents of left and right direction keys : manual key and automatic key

3-2. KEY SPEED automatic key code rate. The larger the value, the faster the speed

3-3. TX-RX CW transmit and receive conversion time. The greater the value, the greater the delay.

3-4. STF CW sidetone audio.

3-5. STG CW sidetone volume.

3-6. TRAINING practice mode, launch is not enabled.

3-7. DECODE CW, RTTY decoding display switch.

3-7. THRESHOLD CW decoding threshold.

4. CW automatic call, long press the [MENU] key to enter the menu, select a-call with the direction key, short press the [MENU] key to select A-CALL, and use the numeric keypad or USB keyboard to input the automatic call content. Press and hold

the [MENU] key continuously to exit the main interface, set the key mode to the manual KEY mode, and press and hold the corresponding 5 items of input on the numeric keypad 1 ~ 5.

FM communication

Q900 supports full segment FM mode transmission and reception, and is usually used for FM communication above 28MHz in short wave communication; 29.6HMz is called the magic band by the HAM community. It will be opened for a short time in the summer of a year. It is a very challenging communication.

1. Short press the [MODE] key to find the FM mode, and long press the [mode] key to switch between WFM mode and NFM mode.

2. Q900 includes UV segment FM. You can communicate with ordinary walkie talkie or go to local relay station.

3. Short press the [RF] key, press the left and right direction keys to select SQL and mute options, and press the up and down direction keys to set the mute level.

Relay operation

1. Set the required frequency. For example, the relay station parameters (downlink 145.670MHz, uplink 144.130MHz, uplink and downlink analog mute 88.5) are set as follows:

1-1. Press SPLI to display different frequencies, and then press turn off different frequencies. The frequency in the upper row is the receiving frequency, that is, the relay downlink; Press the left and right direction keys to select the frequency bit, press the up and down direction keys to add or subtract the frequency, or enter directly from the numeric keypad: 14567000; The frequency in the lower row is displayed as the transmission frequency, that is, the relay uplink frequency; You need to press the A / B key to switch to the upper row, directly enter 14413000 on the keyboard, and then press the A / B key to switch to the lower row.

1-2. Mute setting mode: long press [SPLIT], press the up and down keys to select the setting items, and press the left and right keys to select the parameters.

T-CTSS emit sub tone

R-CTSS receive sub tone

L-Voice preamble frequency

L-Time preamble duration

AM communication

1. Press [MODE] to select AM mode and set the required frequency
2. The input RF power in AM mode is 5W

Data communication RTTY

The "RTTY" working mode of Q900 is realized on the basis of LSB carrier according to the long-term use of amateur radio. If you want to use USB carrier for "RTTY" operation, you need to set the user. Please refer to the following introduction.

1. Computer RTTY operation:

1-1. Connect your computer with Q900 through USB.

1-2. Long press the RF key to enter the USB sound card data output format selection interface, and press the up and down keys to select the output mode. Press and hold again to exit.

1-3. Short press [mode] to select RTTY mode.

Select [USB] digital mode.

1-3. At this time, you can search on the frequency. If there is RTTY signal, the relevant computer software can decode it.

2. Radio independent RTTY communication:

2-1. Short press [MODE] to select RTTY mode.

2-2. Long press the [BAND] key to start the decode display.

2-3. Connect the USB keyboard to the HUSB port, press the tab key on the

keyboard to launch, enter characters on the keyboard to launch, and press the tab key to stop launching.

3. RTTY automatic call.

Short press [mode] to select RTTY mode. Long press the [MENU] key to enter the menu, select a-call with the direction key, short press the [MENU] key to select A-CALL, and use the numeric keypad or USB keyboard to input the automatic call content. Press and hold the [MENU] key continuously to exit the main interface, and press and hold the numeric keypad 1 ~ 5 to input 5 items.

Custom digital mode

Q900 cooperates with the mobile APP software HAM-BOX to realize a user-defined digital communication mode, which needs to be set by both sides of the communication.

1. Open the mobile phone Bluetooth, search Q900 and connect it.

2. Open the mobile APP software HAM-BOX and set the relevant communication mode (both sides need to be the same). Then use the mobile phone to send text, pictures, coordinates, etc

The software is provided separately with the Q900 instructions, which can be accessed under the QQ group.

Channel storage

1. Long press AF to enter channel mode

2. Long press the left and right direction keys to make the number (channel number) next to CH turn red, short press menu to turn green, and press the up and down direction keys to operate the channel mode when the channel number is green.

3. In the channel mode, press the up and down direction keys to save the channel (or the existing channel is overwritten again). At this time, there is the word RENAME. Long press the right direction key, RENAME turns red, and short press MENU to display the channel name input box.

3-1. Input method: at present, it only supports the input of letters and numbers, and the Chinese input is post production.

3-2. Long press the number 1 key to switch the input of uppercase letters, lowercase letters, numbers and symbols, and short press the mode delete key.

3-3. Under the symbol ,.?, press the decimal point on the left keyboard, briefly press once, and continuously press twice. Press continuously for a short time, and the characters are [,.?!:; '"() < > [] {} $% @ * + - = ~]. Remember to press continuously. If you press wrong, click mode to delete the last input.

3-4. In the alphabetic state, the number key 2 is short pressed once as A, short pressed twice as B, and three times as C, which is the same in lowercase.

2=ABC 3=DEF 4=GHI 5=JKL 6=MNO 7=PQRS 8=TUV 9=WXYZ

3-5. In the digital state, the corresponding numbers are corresponding respectively. After input, press menu to confirm. At this time, adjust the frequency, mode and other corresponding parameters on the interface, and shut down and store them automatically.

4. Enter the next group of channels and repeat the above operation.

CAT control

Q900 compatible with CAT protocol:

The Q900 has a CAT system, so you can control the walkie talkie with a personal computer. Multiple control operations can be completed automatically by clicking with the mouse. It also supports the control of third-party software packages (such as radio log software for competition), so that Q900 can be used for communication without (additional) operators. The CAT protocol is compatible with FT-817, so the ft-817 radio model is selected during CAT control. Usually, the computer only needs to determine the corresponding COM port number, stop bit and baud rate do not need to be set.

CAT control uses a TYPE-C USB cable to connect to the computer, and the serial port driver is only applicable to windows 10 system. The USB cable integrates the sound card function at the same time, and only one USB is needed to realize CAT control and data transmission. Because there are too many kinds of computers, operating systems and application software, Guohe electronics does not develop the control software of the system. However, Q900 widely supports various third-party control software packages.

Q900 cat protocol:

Q900 supports independent self owned protocols. All protocols have open interfaces, can be developed freely, and can provide technical support. See Appendix 2 for the agreement

Firmware upgrade instruction

Instructions for firmware upgrade v1.2

Description:

The new firmware is different from the original firmware in terms of upgrade modes. The new firmware adopts U disk upgrade mode. The firmware is divided into Boot Loader and application program. The extension of Bootloader is. DFU and the application program name is fixed as fw-new.bin. You need to use dfusedemo software to download the bootloader file, and then copy the application fw-new.bin to the USB flash disk and insert it into the husb port behind the radio station to update the application programs.

Notes:

1. The Boot Loader merely needs to be downloaded once. it's unnecessary to download firmware every time you upgrade. Afterwards, unless we make special instructions. the upgrade program merely needs to copy the application to the USB flash disk for upgrade.
2. At present, the USB flash disk firmware upgrade method is merely applicable to the second generation machines. The first generation will be updated to the USB flash disk firmware upgrade method before the next firmware upgrade. To check whether your machine is the first generation or the second generation, long press Menu > select about > HW: the display is 2.0 to be the second generation machine, otherwise it is the first generation machine.

Naming rules for Boot Loader file name and application file name:

The Boot Loader file name naming rules: Boot Loader_ Version number.dfu
Naming rules for application files: the fixed file name is fw-new.bin
Note: the file name of the application cannot be changed, otherwise Boot Loader cannot recognize it.

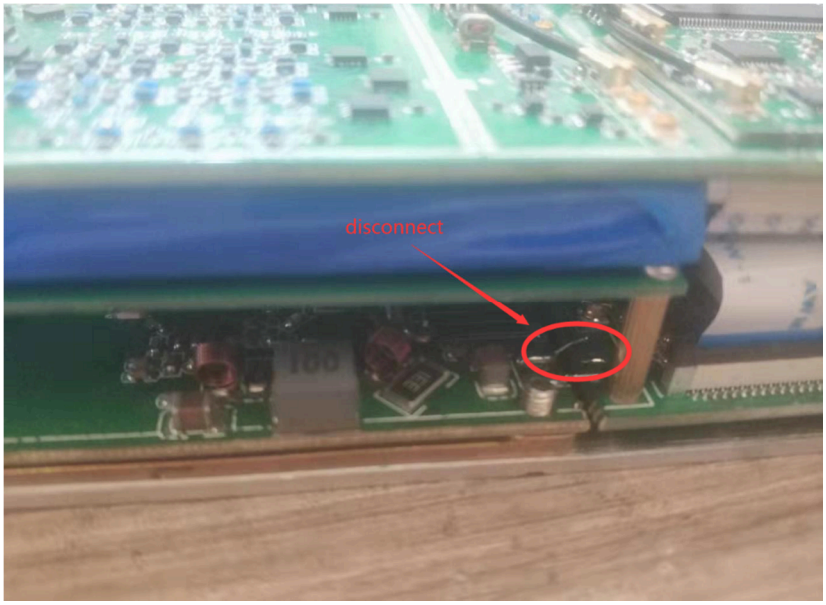
Bootloader file name and application storage methods: the application fw-new.bin can merely be stored in the U disk for firmware upgrade. The bootloader file can be stored in any location of the computer. However, in order to find it quickly, it is recommended to store it in the U disk together with the bootloader file. Do not store files other than the application and bootloader in the USB flash disk, otherwise the bootloader may not recognize the application and the firmware cannot be upgraded. The capacity of USB flash disk needs to be less than or equal to 8g. The bootloader of USB flash disk exceeding 8g cannot recognize it.

Tools required for upgrade: one computer, one USB flash disk, one TYPE-C USB cable, dfusedemo software, with current limiting regulated power supply.

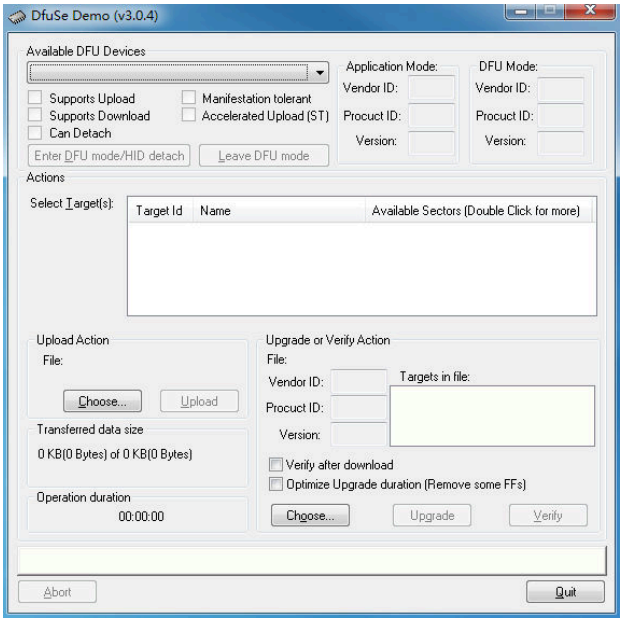
Document reading instructions: the notes listed in this document are important items, which must be carefully read and noted. All operations need to be read and mastered before operation. This document is provided with operation video. Please check the document and video carefully.

Download steps of bootloader:

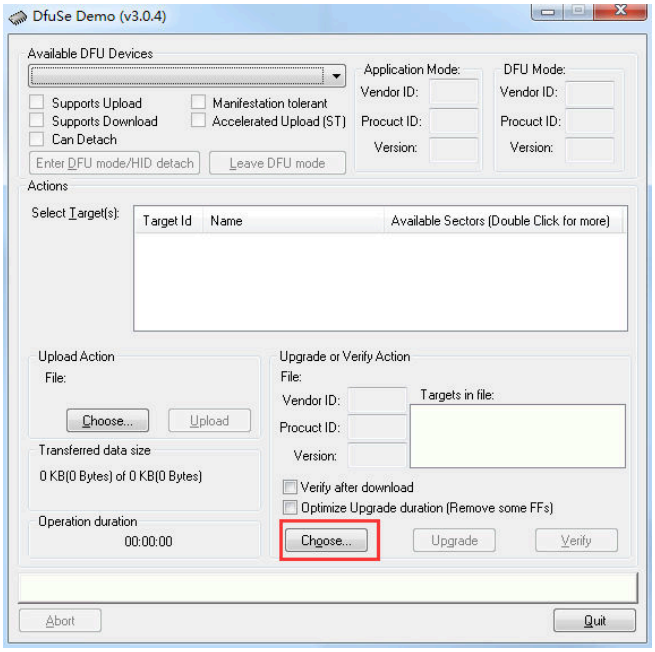
Notes: the bootloader can be downloaded merely powered by the internal battery, and the DC port power supply cannot be connected. In order to download the bootloader, the UV power amplifier needs to be disconnected. Refer to the figure, otherwise the radio station will be damaged. Before downloading bootloader, the internal battery of the radio station needs to be fully charged and charged through the USB cable. The DC port cannot be charged. The charging power of the radio station is 5V2A. The radio station is designed with a battery charging management circuit. The radio station can be charged by using an adapter with an output voltage of 5V and a current greater than or equal to 2A. Built in 2S polymer battery, the actual battery capacity is 4.9AH, the charging time is more than 3 hours, and the full voltage is about 8.4V. When charging, try to charge in the off state. The internal power management circuit may not charge the battery in the on state.

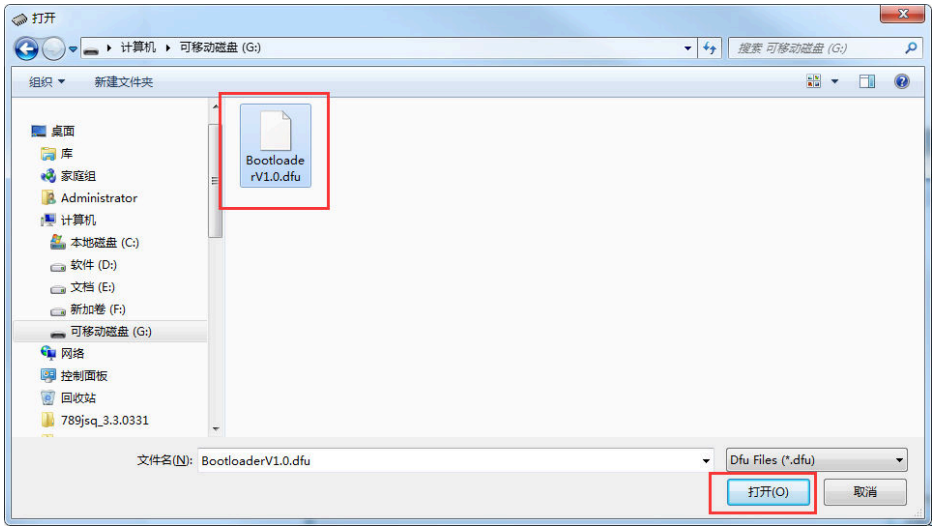


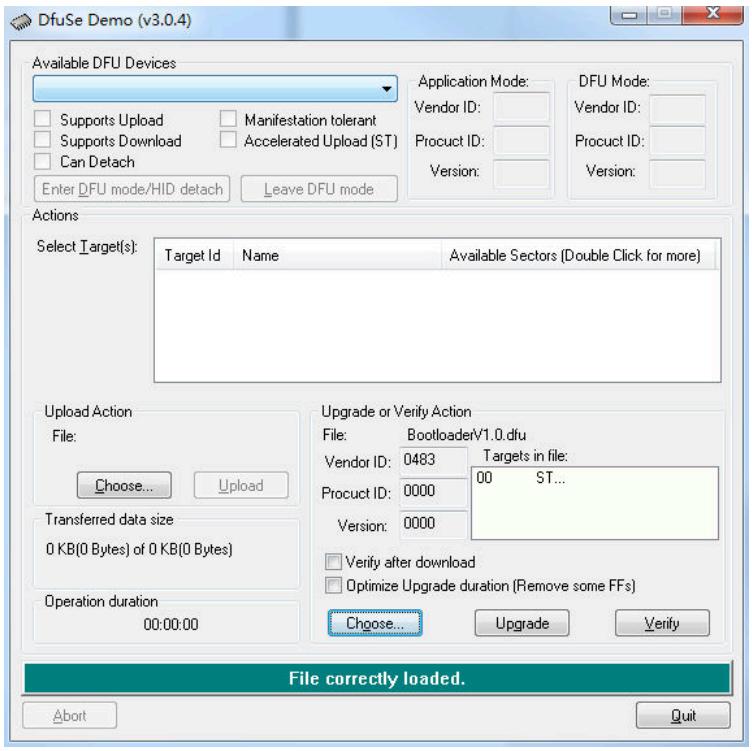
Step 1: Open the dfusedemo software.



Step 2: Click the choose button to select the bootloader file. After finding the file, click open and wait for the file to load.







Step 2: Connect the radio stations

After the radio station is fully charged, turn off the power supply of the radio station, use the type-C USB cable to connect the radio station to the USB port of the computer, and connect the radio station to the USB port on the rear panel of the radio station.

Step 3: Download bootloader.

Firstly， press the BAND KEY of the radio station and then press the power key. At this time, the dfusedemo software will recognize the DUF device. Click upgrade and select Yes in the pop-up dialog box to start downloading the bootloader file. The power key cannot be released during the download process. The upgrade progress will be displayed below the downloaded software. When upgrade successful is displayed, it indicates that the upgrade is successful. Release the power button. the bootloader download is completed at this time.

Notes: each step noted here is very important. Be sure to read it carefully before operation.

1.The bootloader can be downloaded merely powered by the internal battery, and the DC port power supply cannot be connected. To download bootloader, you need to disconnect the UV power amplifier power supply. Refer to the figure, otherwise the radio station will be damaged. Before downloading bootloader, the internal battery of the radio station needs to be fully charged and charged through the USB cable. The DC port cannot be charged. The charging power of the radio station is 5V2A. The radio station is designed with a battery charging management circuit. The radio station can be charged by using an adapter with an output voltage of 5V and a current greater than or equal to 2A. Built in 2S polymer battery, the actual battery capacity is 4.9AH, the charging time is more than 3 hours, and the full voltage is about 8.4V.

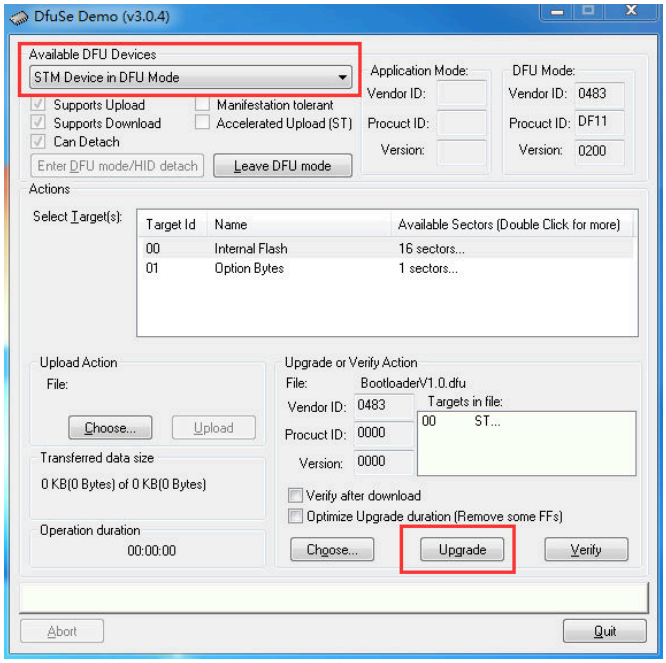
When charging, try to charge in the off state. The internal power management circuit may not charge the battery in the on state.

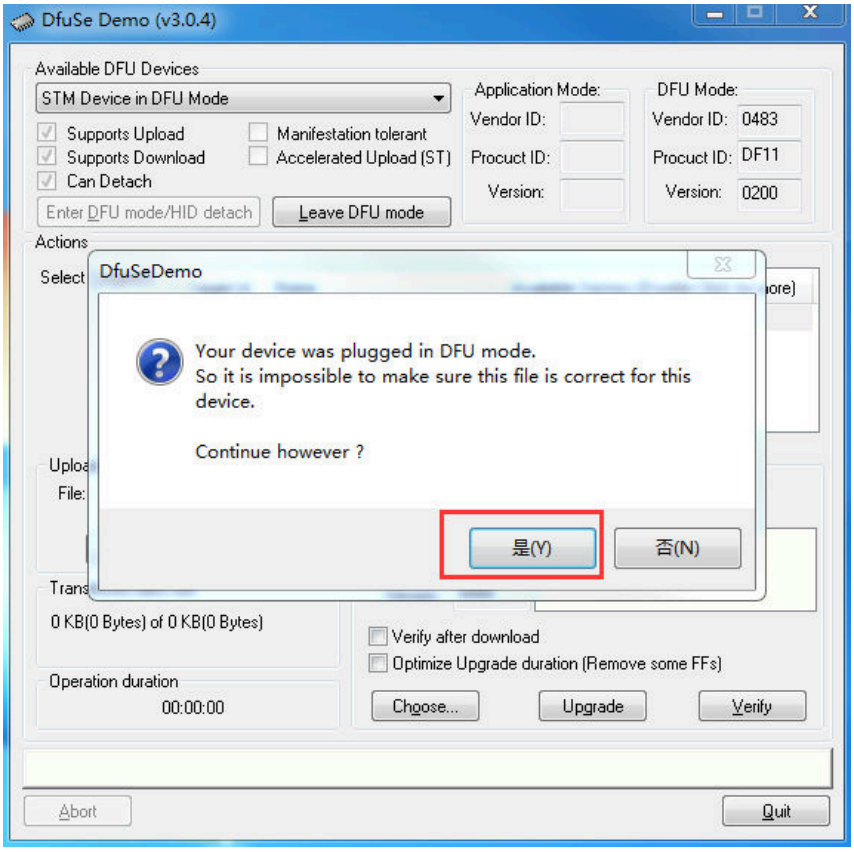
2. Press the BAND KEY and then press the power supply to download the bootloader for a long time. Press the key dfusedemo and click upgrade immediately after the software recognizes the DUF device. Do not press the BAND KEY and power key for a long time, otherwise the radio station will be damaged. Release the key immediately after the prompt is successful. Press the BAND KEY and then press the power supply for no more than 10 seconds.

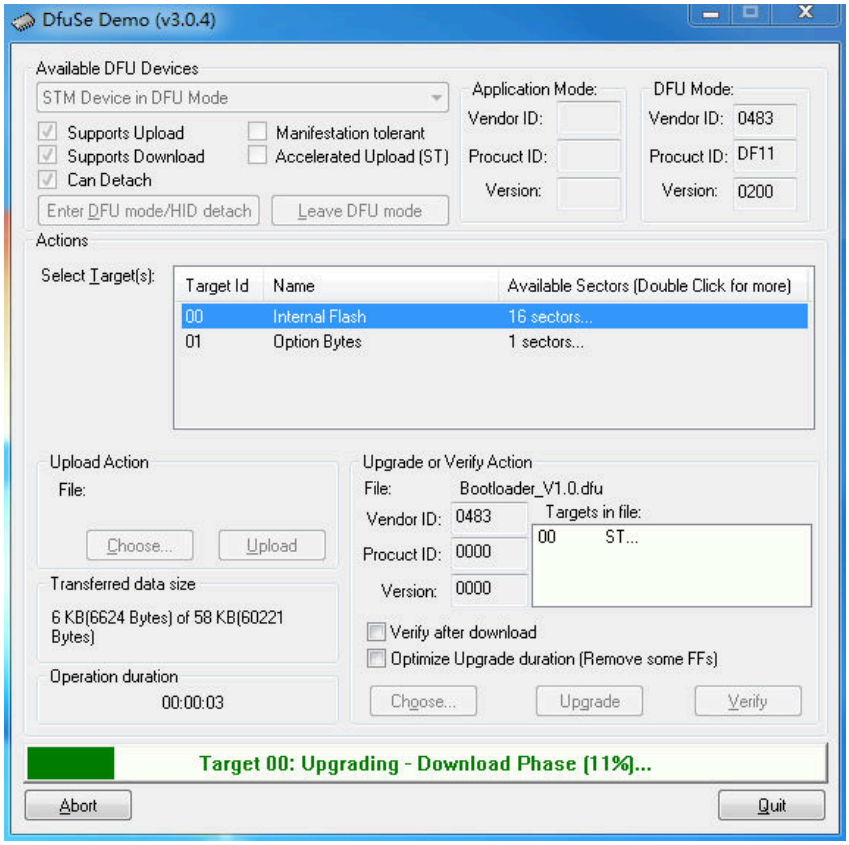
3. Press the BAND KEY and then press the power key. The dfusedemo software cannot recognize the DUF device. Please release all the keys immediately. It cannot be pressed all the time. Generally, it will be recognized within 3 seconds after pressing. There are two cases of unrecognizability.

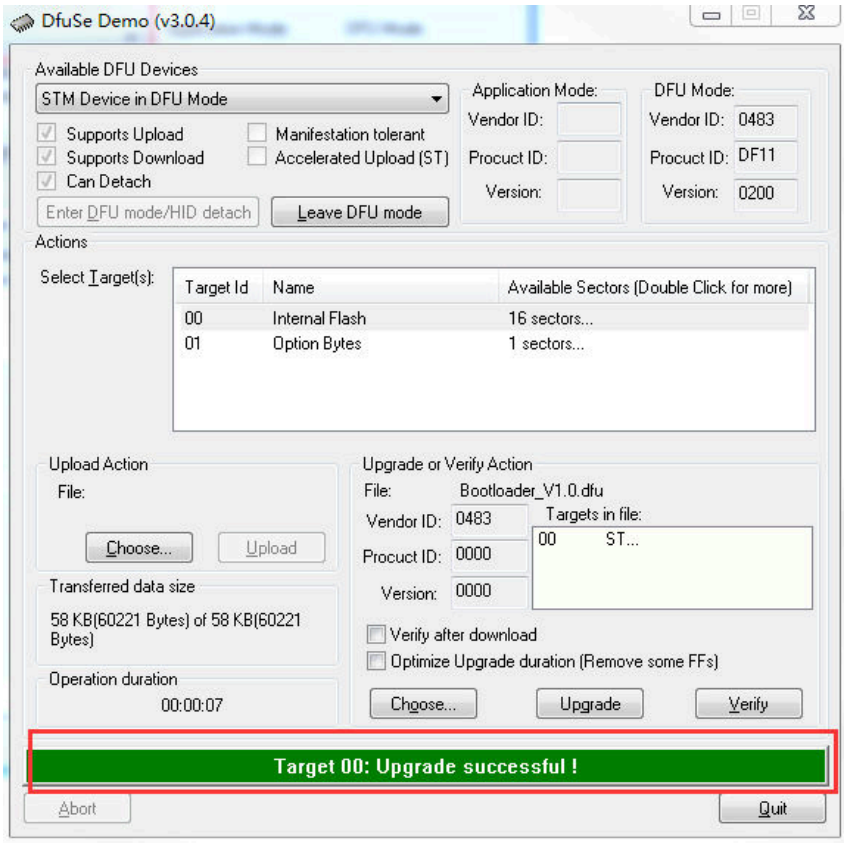
The first case is that the driver is not installed. If you use it for the first time, you will be noted to install the driver. For the installation of the driver, please refer to the radio driver installation document and video radio driver installation. The computer prompts that you can release the key when installing the driver. You can't press the key all the time. Press the BAND KEY and then press the power supply for no more than 10 seconds.

The second case is that the internal battery cannot allow the radio station to enter DFU mode. At this time, refer to the precautions for power use in the first item ofthis section.




DfuSe Demo (v3.0.4)
Available DFU Devices
STM Device in DFU Mode
Supports Upload
Supports Download
Can Detach
Manifestation tolerant
Accelerated Upload (ST)
Enter DFU mode/HID detach
Leave DFU mode
Application Mode:
Vendor ID:
Procuct ID:
Version:
DFU Mode:
Vendor ID: 0483
Procuct ID: DF11
Version: 0200
Actions
Select
DfuSeDemo
Your device was plugged in DFU mode.
So it is impossible to make sure this file is correct for this device.
Continue however ?
是(Y)
否(N)
File:
0 KB(0 Bytes) of 0 KB(0 Bytes)
Operation duration
00:00:00
Verify after download
Optimize Upgrade duration (Remove some FFs)
Choose...
Upgrade
Verify
Abort
Quit


DfuSe Demo (v3.0.4)
Available DFU Devices
STM Device in DFU Mode
Supports Upload
Supports Download
Can Detach
Manifestation tolerant
Accelerated Upload (ST)
Enter DFU mode/HID detach
Leave DFU mode
Application Mode:
Vendor ID:
Procuct ID:
Version:
DFU Mode:
Vendor ID: 0483
Procuct ID: DF11
Version: 0200
Actions
Select Target(s):
Target Id
Name
Available Sectors (Double Click for more)
00 Internal Flash 16 sectors...
01 Option Bytes 1 sectors...
Upload Action
File:
Choose...
Upload
Transferred data size
6 KB(6624 Bytes) of 58 KB(60221 Bytes)
Operation duration
00:00:03
Upgrade or Verify Action
File: Bootloader_V1.0.dfu
Vendor ID: 0483
Procuct ID: 0000
Version: 0000
Targets in file:
00 ST...
Verify after download
Optimize Upgrade duration (Remove some FFs)
Choose...
Upgrade
Verify
Target 00: Upgrading - Download Phase (11%)...
Abort
Quit



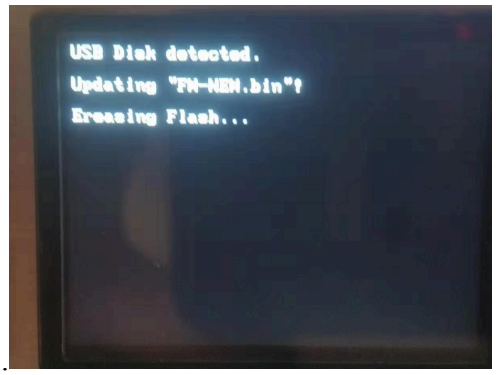
Step 4: Update the radio station application.

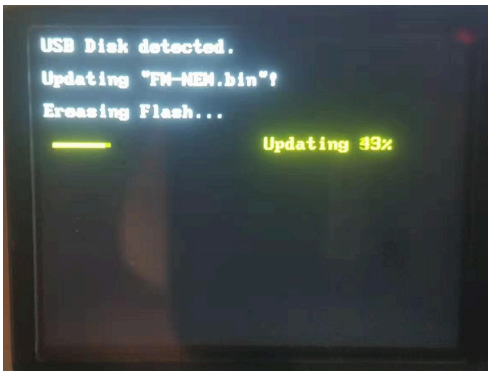
Insert the USB flash disk storing the application fw-new.bin into the husb port of the radio station, and briefly press the power key. The bootloader of the radio station will automatically recognize the application of the USB flash disk and update it automatically. The radio screen will prompt the update progress. When updating 100%, remove USB drive to reboot is displayed, the update is completed automatically. Unplug the USB flash disk and long press the power key to start up, and then you can automatically enter the main interface of the radio station. If the update fails, the station screen will prompt error code and failure information. Check whether the USB flash disk capacity or fw-new.bin file name is correct, or copy fw-new.bin to the USB flash disk after replacing the USB flash disk to update the application again.

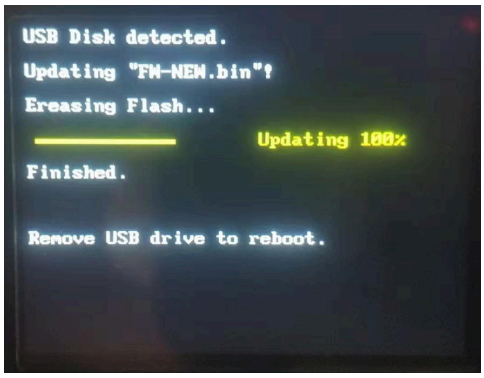
Notes:

1. Bootloader merely needs to be downloaded once. You don't need to download firmware every time you upgrade. Afterwards,unless we make special instructions, the upgrade program merely needs to copy the new version of the application to the USB flash disk for upgrade.

2.After the update is completed, the USB flash disk cannot be inserted again, otherwise the application will be updated again







The upgrade of bootloader and application upgrade are completed .

After-sale service

1. The product cannot be returned without reason after activation.

2. The product has quality problems within 15 days, and the appearance is free of damage and scratch. The product of the same model can be replaced. The buyer shall send it within 3 days from the date when the manufacturer is clearly informed, and it will be deemed invalid if it expires! The express fee shall be borne by each party

3. The packaging, connecting wires, documents, gifts and other accessories of the product are not covered by the warranty.

4. The product shall be repaired free of charge within 12 months from the sales date (except for damage caused by human or improper operation), and the battery, accessories and LCD shall be guaranteed for 1 month. The express fee shall be borne by each party.

5. After the product is insured, it will be repaired at a cost. If the product is paid for repair, the same problem will be repaired free of charge within 1 month from the date of repair. Please keep your repair certificate. The courier fee shall be borne by the buyer.

6. The products purchased and sold by the distributor are guaranteed by us. Please keep the distributor's sales certificate for us to check.

7. We do not assume any responsibility or obligation for other commitments made by the distributor to you beyond the scope of this warranty.

Special attention:

The following situations belong to automatic de insurance, and we will not provide free maintenance services:

1. The customer disassembles the machine and changes the circuit function and performance.

2. Dismantle the repaired equipment.

3. Lightning struck equipment.

4. Equipment damaged by external voltage far beyond the allowable working voltage range of the equipment.

5. Equipment with serious falls and within the warranty period.

6. Equipment falling into water or eroded and soaked by other corrosive gases and liquids.

After sales service charge standard:

1. Repair cost for non-human damage within the warranty period: Free

2. The maintenance cost after de insurance shall be priced according to the actual situation.

3. The firmware update is free of charge, and the round-trip postage shall be borne by the buyer.

4. Express delivery is not supported.

After sales process:

1. Contact Guohe electronics when there is a problem with the product. We will communicate with you when we see it.

2. If you want to return to the factory after communication, please fill in the after-sales form and send it back together with the machine. No damaged accessories are required.

3. After receiving the inspection and confirming the cause, we will inform the treatment method and cycle.

4. The after-sales time shall be postponed from Monday to Friday, weekends and national legal holidays.

After sales contact information:

Contact: BG8KAH
Chongqing Guohe Electronic Technology Co.,Ltd.
023-68877912
902 Baosheng Avenue, Yubei District, Chongqing
www.guohedz.com

Appendix 1：Input method

1. Radio keyboard input method

Key	Short press	Long press
MODE	Delete key	*
.	Symbol input	*
0	Blank key	*
1	*	Subtitle case, number and symbol switching
2	ABC	
3	DEF	
4	GHI	
5	JKL	
6	MNO	
7	PQRS	
8	TUV	
9	WXYZ	

2. USB keyboard input method

Key	Short press	Key value of corresponding radio station
F1	Power control	PA
F2	Band selection	BAND
F3	Filter bandwidth selection	BW short press
F4	RF parameter setting	RF-RFG
F5	RF parameter setting	RF-IFG
F6	Mode selection	MODE
F7	Spectrum setting	BW long press
F8	Audio parameter setting	AF
F9	Select confirm and return	Menu short press
F10	Select confirm and return	Menu long press
ENTER	Select confirm	Menu short press
TAB	RTTY transceiver control	PTT in RTTY mode
ALT+ F1	Automatic call content 1	Long press the number key 1
ALT+ F2	Automatic call content 2	Long press the number key 2
ALT+ F3	Automatic call content 3	Long press the number key 3
ALT+ F4	Automatic call content 4	Long press the number key 4
ALT+ F5	Automatic call content 5	Long press the number key 5
Direction key up	Add or up selectin	Direction key down
Direction key down	Minus or down selection	Direction key up

Direction key left	Minus or left selection	Direction key left
Direction key right	Add or right selection	Direction key right
Others not listed	Comply with keyboard definition rules	

Appendix 2：Q900 control protocol

Q900 control protocol V1.5

1. Data communication is transmitted through Q900 built-in sound card, and data can be transmitted, read and written through sound card. When the radio station is set to USB mode, it transmits modulation data, and when the radio station is set to SDR mode, it transmits IQ data.

2. The control protocol data can be controlled through Bluetooth SPP, BLE, RS232 and USB interfaces, and the protocol follows the serial port standard.

Note：BLE

V1.0 hardware

Service UUID: 0000FFF0-0000-1000-8000-00805F9B34FB

Write feature：0000FFF2-0000-1000-8000-00805F9B34FB

Notify feature：0000FFF1-0000-1000-8000-00805F9B34FB

V2.0 hardware

UUID list

Service UUID：FFE0

Feature UUID：FFE1 （For serial port transparent transmission, property notify, write）

Feature UUID：FFE2 （For audio Bluetooth or SD card music playback control, property Write）

Protocol format：

0XA5	0XA5	0XA5	0XA5	Packet length	Command type	DATA	CRC HIGH	CRC LOW

Packet head: use four 0XA 5 as packet head respectively.

0XA5	0XA5	0XA5	0XA5

A byte indicates the byte length from the next byte of packet length to the end of the packet.

Command type: see the protocol

DATA: see the agreement.

Verification: CRC verification method is adopted, from packet length to the previous byte of CRC high byte. See Appendix I for the algorithm.

1. PTT command， used to control the PTT of the radio station, press and release.

APP sending：

0XA5	0XA5	0XA5	0XA5	Packet length	07	PTT	CRC HIGH	CRC LOW

PTT:0X00, press PTT. 0X01， PTT release。

Radio station reply：

0XA5	0XA5	0XA5	0XA5	Packet length	07	PTT	CRC HIGH	CRC LOW

2. Frequency setting command, for setting radio station frequency。

APP sending：

0XA5	0XA5	0XA5	0XA5	Packet length	09	VFOA frequency	VFOB frequency	CRC HIGH	CRC LOW

Frequency: maximum decimal 2000000000, four byte length.

Radio station reply：

0XA5	0XA5	0XA5	0XA5	Packet length	09	VFOA frequency	VFOB frequency	CRC HIGH	CRC LOW

3. Mode setting command， for setting radio station mode.

APP sending：

0XA5	0XA5	0XA5	0XA5	Packet length	0X0A	VFOA mode	VFOB mode	CRC HIGH	CRC LOW

mode:

0：USB
1：LSB
2：CWR
3：CWL
4：AM
5：WFM
6：NFM
7: DIGI
8: PKT

Radio station reply：

0XA5	0XA5	0XA5	0XA5	Packet length	0X0A	mode	CRC HIGH	CRC LOW

4. Spectrum data

APP sending：

0XA5	0XA5	0XA5	0XA5	Packet length	0X39	CRC HIGH	CRC LOW

Radio station sending：

0X7e	0X7e	0X7e	0X7e	Spectrum data

V1.0 hardware

Spectrum data: packet length 256 bytes, no packet head, no verification.

V2.0 hardware

Spectrum data: packet length80 bytes, no packet head, no verification.
Spectrum diagram:
The size represents the Y-axis height and the position represents the X-position drawing.
Waterfall diagram:
The size represents the colour (blue + current value), and the position represents the x position drawing.

5. Status synchronization command

APP sending：

0XA5	0XA5	0XA5	0XA5	Packet length	0X0B		CRC HIGH	CRC LOW

Radio station reply：

0XA5		0XA5	0XA5	0XA5	Packet length	0X0B	Transceiver status	VFOA mode	VFOB mode	VFOA frequency	VFOB frequency	A/B	NR/NB
RXT	XIT	Filter bandwidth	Spectrum band width	Voltage	UTC time		Status bar status	S table / PO table value		SWR/AUD/ALC		CRC HIGH	CRC LOW

Transceiver status: one byte
0: receive status
1: launch status
VFOA mode: one byte
0：USB
1：LSB
2：CWR
3：CWL
4：AM
5：WFM
6：NFM
7： DIGI
8： PKT
VFOB mode: one byte
0：USB
1：LSB
2：CWR
3：CWL
4：AM
5：WFM
6：NFM
7： DIGI

8: PKT

VFOA frequency: the maximum value is decimal 2000000000, four byte length.

VFOB frequency: the maximum value is decimal 2000000000, four byte length.

A/B: one byte

0:A frequency

1：B frequency

NR/NB：

0: NR/NB off

1：NR on

2：NB on

RIT: one byte

0~120

XIT: one byte

0~120

Filter bandwidth: one byte

0 ~ 50 (see attached table for filter corresponding to serial number)

Spectrum bandwidth： one byte

0：48K

1: 24K

2: 12K

3:6K

4:3K

5:1.5K

Voltage： one byte

Decimal value / 10.

UTC time: three bytes

Hour：0~24

Minute:0~60

Secord:0~60

Status bar： one byte

Bit0:1 Bluetooth connection succeeded 0 Bluetooth disconnection

Bit1:1 GPS module online 0 GPS module disconnected

Bit2: 1 LORA module online 0 LORA module disconnected

Bit3: 1 electronic compass module online 0 electronic compass module disconnected

Bit4:1 AH on 0 AH off

Bit5: 1 high power 0 low power

Table S/ table Po value: one byte

S table when receiving: 0 ~ 34 (S table when BIT7 is 0)

Po table for launch: 0 ~ 34 (PO table when BIT7 is 1)

SWR/AUD/ALC： one byte

SWR: 0 ~ 34 (SWR table when BIT7 and BIT6 are 00)

ADU: 0 ~ 34 (ALC table when BIT7 and BIT6 are 01)

ALC: 0 ~ 34 (ADU table when BIT7 and BIT6 are 10)

6. Shutdown command, turn off the radio station

APP sending：

0XA5	0XA5	0XA5	0XA5	Packet length	0X0C	0	CRC HIGH	CRC LOW

0： power off

1： power on

AF 菜单：

7. Speaker volume adjustment command

APP sending：

0XA5	0XA5	0XA5	0XA5	Packet length	0X0D	Volume	CRC HIGH	CRC LOW

Volume：0~30

8. Earphone volume adjustment command

APP sending：

0XA5	0XA5	0XA5	0XA5	Packet length	0X0E	Earphone volume	CRC HIGH	CRC LOW

Earphone volume：0~80

9. MIC gain adjustment command

APP sending：

0XA5	0XA5	0XA5	0XA5	Packet length	0X0F	MIC gain	CRC HIGH	CRC LOW

MIC gain：0~100

10. Voice compansion ratio adjustment command

APP sending：

0XA5	0XA5	0XA5	0XA5	Packet length	0X10	Compansion ratio	CRC HIGH	CRC LOW

Compansion ratio： 0~14

11. Bass EQ adjustment command

APP sending：

0XA5	0XA5	0XA5	0XA5	Packet length	0X11	Bass EQ	CRC HIGH	CRC LOW

Bass EQ： 0~40

12. Treble EQ adjustment command

APP sending：

0XA5	0XA5	0XA5	0XA5	Packet length	0X12	Treble EQ	CRC HIGH	CRC LOW

Bass EQ： 0~40

RF menu：

13. RF gain（RFG）adjustment command

APP sending：

0XA5	0XA5	0XA5	0XA5	Packet length	0X13	RF gain	CRC HIGH	CRC LOW

RF gain： 0~100

14. IF gain (RFG) adjustment command.

APP sending：

0XA5	0XA5	0XA5	0XA5	Packet length	0X14	IF gain	CRC HIGH	CRC LOW

IF gain： 0~80

15. Noise suppression (SQL) adjustment command

APP sending：

0XA5	0XA5	0XA5	0XA5	Packet length	0X15	Noise suppression	CRC HIGH	CRC LOW

Noise suppression： 0~20

16. Automatic gain control（AGC）command

APP sending：

0XA5	0XA5	0XA5	0XA5	Packet length	0X16	Automatic gain	CRC HIGH	CRC LOW

Automatic gain： 0~5

17. Preamplifier (AMP) command.

APP sending：

0XA5	0XA5	0XA5	0XA5	Packet length	0X17	Preamplifier	CRC HIGH	CRC LOW

Preamplifier： 0： AMPA 1:AMPB

18. Filter（filter） command

APP sending：

0XA5	0XA5	0XA5	0XA5	Packet length	0X18	Filter	CRC HIGH	CRC LOW

Filter：

FM mode

1-<7.2k>	2-<10.0k>	3-<12.0k>

CW/SSB mode

4-<250_550>	5-<250_575>	6-<300_600>	7-<325_625>	8-<350_650>
9-<375_675>	10-<400_700>	11-<425_725>	12-<450_750>	13-<475_775>
14-<275_775>	15-<325_825>	16-<375_875>	16-<375_875>	17-<425_925>
18-<475_975>	19-<0_1.4k>	20-<370_1.7k>	21-<0_1.6k>	21-<0_1.6k>
23-<500_2.3k>	24-<600_2.4K>	25-<700_2.5k>	26-<800_2.6k>	26-<800_2.6k>

28-<0_1.8k>	29-<0_2.1k>	30-<500_2.6k>	31-<600_2.9k>	31-<600_2.9k>
33-<800_3.1k>	34-<900_3.2k>	35-<0_2.3k>	36-<0_2.5k>	

SSB mode

37-<650_3.2k>	37-<650_3.2k>	39-<700_3.4k>	40-<0_2.9k>	41-<800_3.7K>
42-<0_3.2k>	43-<900_4.1k>	44-<0_3.4k>	45-<900_4.3k>	46-<0_3.6k>
47-<1.0k_4.6k>	48-<0_3.8K>	49-<1.1k_4.9k>	50-<0_4.0k>	51-<0_4.2k>
52-<0_4.4K>	53-<0_4.6k>	54-<0_4.8k>	55-<0_5.0k>	56<0_5.5k>
57-<0_6.0k>	58-<0_6.5k>	59-<0_7.0k>	60-<0_7.5k>	61-<0_8.0k>
62-<0_8.5k>	63-<0_9.0k>	64-<0_9.5k>	65-<0_10.0k>	

AM mode

66-<1.4k>	67-<1.6k>	68-<1.8k>	69-<2.0k>	70-<2.3k>
71-<2.5k>	72-<2.7k>	73-<2.8k>	74-<3.2k>	75-<3.4k>
76-<3.6k>	77-<3.8k>	78-<4.0k>	79-<4.2k>	80-<4.4k>
81-<4.6k>	82-<4.8k>	83-<5.0k>	84-<6.0k>	85-<7.5K>
86-<10.0k>				

Filters: 0x01 – 0x55, 85 filters in total, classified according to mode. 4-36 are filters that can be used in CW mode and SSB mode.

19. NR command

APP sending：

0XA5	0XA5	0XA5	0XA5	Packet length	0X19	NR	CRC HIGH	CRC LOW

NR: 0:NR off 1:NR on

20. NB command

APP sending：

0XA5	0XA5	0XA5	0XA5	Packet length	0X1A	NB	CRC HIGH	CRC LOW

NR: 0:NB off 1:NB on

21. AB frequency command

APP sending：

0XA5	0XA5	0XA5	0XA5	Packet length	0X1B	AB	CRC HIGH	CRC LOW

AB: 0:A frequency 1:B frequency 2： A=B frequency

22. Different frequency command。

APP sending

0XA5	0XA5	0XA5	0XA5	Packet length	0X1C	SPLIT	CRC HIGH	CRC LOW

SPLIT: 0:Different frequency off 1:Different frequency on

23. Band selection command

APP sending:

0XA5	0XA5	0XA5	0XA5	Packet length	0X1D	Band	CRC HIGH	CRC LOW

Band:

1.8	3．5	5	7	10	14	18
21	24	28	50	144	430	

24. NR threshold setting command

APP sending

0XA5	0XA5	0XA5	0XA5	Packet length	0X1E	NR threshold	CRC HIGH	CRC LOW

NR threshold: 1~200

25. NB threshold setting command。

APP sending:

0XA5	0XA5	0XA5	0XA5	Packet length	0X1F	NR threshold	CRC HIGH	CRC LOW

NR threshold: 0~15

26. PEAK threshold setting command。

APP sending:

0XA5	0XA5	0XA5	0XA5	Packet length	0X20	NR threshold	CRC HIGH	CRC LOW

NR threshold: 0~20

27. AH setting command。

APP sending:

0XA5	0XA5	0XA5	0XA5	Packet length	0X21	AH	CRC HIGH	CRC LOW

AH: 0:AH off 1：AH on 2：Start tuning

28. Spectrum bandwidth command。

APP sending:

0XA5	0XA5	0XA5	0XA5	Packet length	0X22	SPAN	CRC HIGH	CRC LOW

SPAN: 0~5

29. Spectrum reference level command。

APP sending:

0XA5	0XA5	0XA5	0XA5	Packet length	0X23	REF	CRC HIGH	CRC LOW

REF: 1~20

30. Spectrum refresh rate command。

APP sending：

0XA5	0XA5	0XA5	0XA5	Packet length	0X24	SPEED	CRC HIGH	CRC LOW

SPEED: 1~30

31. Spectrum display mode command。

APP sending：

0XA5	0XA5	0XA5	0XA5	Packet length	0X25	Spectrum display mode	CRC HIGH	CRC LOW

Spectrum display mode: 0: spectrum and waterfall are displayed at the same time 1: only spectrum 2: only waterfall 3: spectrum and waterfall diagram are closed

32. Simulate subsonic

APP sending：

0XA5	0XA5	0XA5	0XA5	Packet length	0X26	Launch subsonic	Receive subsonic	Leading tone	CRC HIGH	CRC LOW

Launch subsonic：

0	67.0	69.3	71.9	74.4	77.0	79.7
82.5	85.4	88.5	91.5	94.8	97.4	100.0
103.5	107.2	110.9	114.8	118.8	123.0	127.3
131.8	136.5	141.3	146.2	150.0	151.4	156.7
159.8	162.2	165.5	167.9	171.3	173.8	177.3
179.9	183.5	186.2	189.9	192.8	196.6	199.5
203.5	206.5	210.7	213.8	218.1	221.3	225.7
229.1	233.6	237.1	241.8	245.5	250.3	254.1

Receive subsonic：

0	67.0	69.3	71.9	74.4	77.0	79.7
82.5	85.4	88.5	91.5	94.8	97.4	100.0
103.5	107.2	110.9	114.8	118.8	123.0	127.3
131.8	136.5	141.3	146.2	150.0	151.4	156.7
159.8	162.2	165.5	167.9	171.3	173.8	177.3
179.9	183.5	186.2	189.9	192.8	196.6	199.5
203.5	206.5	210.7	213.8	218.1	221.3	225.7
229.1	233.6	237.1	241.8	245.5	250.3	254.1

Leading tone：

0	1750	2135	

33. Equipment type recognition command

APP sending：

0XA5	0XA5	0XA5	0XA5	Packet length	0X27	Equipment type	CRC HIGH	CRC LOW

Radio station reply：

0XA5	0XA5	0XA5	0XA5	Packet length	0X27	Equipment type	CRC HIGH	CRC LOW

Equipment type: 0： Q900

34. Transmit power level setting command

APP sending：

0XA5	0XA5	0XA5	0XA5	Packet length	0X28	Power level	CRC HIGH	CRC LOW

Power level：0~100

Radio station reply：

0XA5	0XA5	0XA5	0XA5	Packet length	0X28	Power level	CRC HIGH	CRC LOW

35. Receive frequency offset setting command

APP sending：

0XA5	0XA5	0XA5	0XA5	Packet length	0X29	RIT	CRC HIGH	CRC LOW

RIT：0~120

Radio station reply：

0XA5	0XA5	0XA5	0XA5	Packet length	0X29	RIT	CRC HIGH	CRC LOW

36. Transmit frequency offset setting command

APP sending：

0XA5	0XA5	0XA5	0XA5	Packet length	0X2A	XIT	CRC HIGH	CRC LOW

RIT：0~120

Radio station reply：

0XA5	0XA5	0XA5	0XA5	Packet length	0X2A	XIT	CRC HIGH	CRC LOW

37. Preamble emission duration setting command

APP sending：

0XA5	0XA5	0XA5	0XA5	Packet length	0X2B	L-TIME	CRC HIGH	CRC LOW

L-TIME：50 - 300

Radio station reply：

0XA5	0XA5	0XA5	0XA5	Packet length	0X2B	L-TIME	CRC HIGH	CRC LOW

38. High and low power level setting command

APP sending：

0XA5	0XA5	0XA5	0XA5	Packet length	0X2C	Power level	CRC HIGH	CRC LOW

Power level：

0：low power

1：high power

Radio station reply：

0XA5	0XA5	0XA5	0XA5	Packet length	0X2C	L-TIME	CRC HIGH	CRC LOW

39. Synchronous command of standing wave meter, S meter, ALC meter and transmit power meter (control end polling).

APP sending：

0XA5	0XA5	0XA5	0XA5	Packet length	0X2D	CRC HIGH	CRC LOW

Radio station sending：

0XA5	0XA5	0XA5	0XA5	Packet length	0X2D	Transmit power / S Meter	SWR/AUD/ALC	CRC HIGH	CRC LOW

Table S: 0 ~ 34 (table s when BIT7 is 0)

Transmit power: 0 ~ 34 (PO table when BIT7 is 1)

SWR/AUD/ALC： one byte

SWR: 0 ~ 34 (SWR table when BIT7 and BIT6 are 00)

ADU: 0 ~ 34 (ALC table when BIT7 and BIT6 are 01)

ALC: 0 ~ 34 (ADU table when BIT7 and BIT6 are 10)

40. Parameter synchronization command (timing polling for synchronization).

APP sending：

0XA5	0XA5	0XA5	0XA5	Packet length	0X2E	Data packet	CRC HIGH	CRC LOW

Radio station sending：

0XA5	0XA5	0XA5	0XA5	Packet length	0X2E	SVOL	HVOL	MIC	CMP	BAS	TRB	RFG	IFG

SQL	AGC	AMP	NR	NB	PEAK	SPAN	REF	SPEED	T-CTSS	R-CTSS

L-VOICE	L-TIME	KEY_MODE	TX_RX	TRANING	STF	STG	KEY_SPEED

DECODE	THRESHOLD	Data formant	CRC HIGH	CRC LOW

41. Key type setting command

APP sending：

0XA5	0XA5	0XA5	0XA5	Packet length	0X2F	Key type	CRC HIGH	CRC LOW

Key type： 0:AUTO-L 1:AUTO-R 2：KEY

Radio station sending：

0XA5	0XA5	0XA5	0XA5	Packet length	0X2F	Key type	CRC HIGH	CRC LOW

42. Side tone volume setting command

APP sending：

0XA5	0XA5	0XA5	0XA5	Packet length	0X30	Sidetone volume	CRC HIGH	CRC LOW

Sidetone volume：0~15 steps 1

Radio station sending：

0XA5	0XA5	0XA5	0XA5	Packet length	0X30	Sidetone volume	CRC HIGH	CRC LOW

43. Sidetone frequency setting command

APP sending：

0XA5	0XA5	0XA5	0XA5	Packet length	0X31	Sidetone frequency	CRC HIGH	CRC LOW

Sidetone volume：40~20 steps 2

Radio station sending：

0XA5	0XA5	0XA5	0XA5	Packet length	0X31	Sidetone frequency	CRC HIGH	CRC LOW

After radio station receives, it needs to be multiplied by 10

44. Transceiver conversion time setting command

APP sending：

0XA5	0XA5	0XA5	0XA5	Packet length	0X32	Conversion time	CRC HIGH	CRC LOW

Sidetone volume：0~50 steps 1

Radio station sending：

0XA5	0XA5	0XA5	0XA5	Packet length	0X32	Conversion time	CRC HIGH	CRC LOW

After radio station receives, it needs to be multiplied by 40

45. USB data format setting command。

APP sending：

0XA5	0XA5	0XA5	0XA5	Packet length	0X33	Data format	CRC HIGH	CRC LOW

Data format：0：Audio frequency 1：IQ

Radio station sending：

0XA5	0XA5	0XA5	0XA5	Packet length	0X33	Data format	CRC HIGH	CRC LOW

46. CW training mode setting command

APP sending：

0XA5	0XA5	0XA5	0XA5	Packet length	0X34	TRAINING	CRC HIGH	CRC LOW

Training mode：0：off 1： on

Radio station sending：

0XA5	0XA5	0XA5	0XA5	Packet length	0X34	TRAINING	CRC HIGH	CRC LOW

47. CW automatic key speed setting command

APP sending：

0XA5	0XA5	0XA5	0XA5	Packet length	0X35	KEY_SPEED	CRC HIGH	CRC LOW

Automatic key speed：5~48 steps 1

Radio station sending：

0XA5	0XA5	0XA5	0XA5	Packet length	0X35	KEY_SPEED	CRC HIGH	CRC LOW

48. CW decoding setting command

APP sending:

0XA5	0XA5	0XA5	0XA5	Packet length	0X36	DECODE	CRC HIGH	CRC LOW

Decoding switch：0：off 1：on

Radio station sending：

0XA5	0XA5	0XA5	0XA5	Packet length	0X36	DECODE	CRC HIGH	CRC LOW

49. CW decoding threshold setting command

APP sending：

0XA5	0XA5	0XA5	0XA5	Packet length	0X37	THERSHOLD	CRC HIGH	CRC LOW

CW decoding threshold： 1~50 steps 1

Radio station sending：

0XA5	0XA5	0XA5	0XA5	Packet length	0X37	THERSHOLD	CRC HIGH	CRC LOW

50. MESH data transmission communication（支持 LORA、2FSK、4FSK）。

APP sending：

0XA5	0XA5	0XA5	0XA5	Packet length	0X38	Data packet	C	CRC LOW

Data packet：

0x7e	0x7e	Source address	Destination address	MESH hops	Total number of packet	Packet number	Data	Destination address	

Source address: 2 bytes

Destination address: 2 bytes

MESH hops: 1 byte

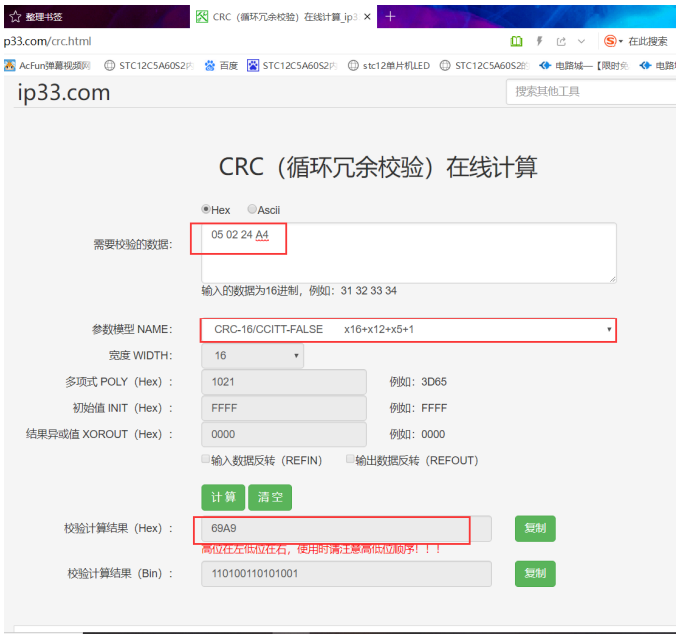
Total number of packet: 1 byte

Packet No.: 1 byte

Data: fixed 225 bytes

Appendix 2-1

10. CRC verification algorithm result verificationhttp://www.ip33.com/crc.html




```
//*****************************************************
//**Function name: CRC16Check
//**Input: buf the data to be verified;
//**            len length of data to be verified
//**Output: verification value
//**Function Description: CRC16 cyclic redundancy check

//**Note: the verification mode is CRC16 / CCITT-FALSE. Note the variable
type
//*****************************************************/
unsigned int CRC16Check(unsigned char *buf, unsigned char len)
{
    unsigned char    i, j;
    unsigned int uncrcReg = 0xFFFF;
    unsigned int uncur;
    for (i = 0; i < len; i++)
    {
        uncur = buf[i] << 8;
        for (j = 0; j < 8; j++)
        {
            if ((int)(uncrcReg ^ uncur) < 0)
            {
                uncrcReg = (uncrcReg << 1) ^ 0x1021;
            }
            else
            {
                uncrcReg <<= 1;
            }
            uncur <<= 1;
        }
    }
    return uncrcReg;
}
```

Change notification:
1.Exchange the content data of the 5th agreement
Original data format:
ALC: 0 ~ 34 (when BIT7 and BIT6 are 01, it is the ALC table)
ADU: 0 ~ 34 (ADU table when BIT7 and BIT6 are 10)
After change:
ADU: 0 ~ 34 (ALC table when BIT7 and BIT6 are 01)
ALC: 0 ~ 34 (ADU table when BIT7 and BIT6 are 10)

Chongqing Guohe Electronic Technology Co., Ltd