
KN-990 HF ALL MODE TRANSCEIVER
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KN990A HF All Mode Transceiver Operating Manual

Based on the original KN990 manual, this manual is update by CRKITS.COM, good for KN990A hardware and firmware V112 or later
September 2, 2020

The KN990A is the hardware upgrade version of KN990 while keeping the software compatibility. To identify your hardware version, please check the rear panel.

KN990A Introduction:
KN990A is an IF DSP technology HF All mode transceiver with 3.5-inch color LCD and real time spectrum display (refresh rate 30 fps). The specifications are similar to KN850, but the operating experience is improved due to the digital IF technology.

KN990A Japan Version:
The TX frequency coverage is customized for Japan to pass TSS certification. Some functions and menu items are disabled.

KN990A Brief Specifications:

Frequency Coverage:	RX: 3~30MHz
	TX: HF Amateur Bands (160m not included)
Mode:	SSB/CW/AM/FM/WFM(RX only)/DIGITAL
RX Sensitivity:	0.2 uV
Min. Freq. Stepping:	10 Hz
Power Supply:	12~15V DC
Current Draw:	RX 0.4A
	TX 4A @Max
Dimensions:	160 x 80 x 220 (mm) [Not including protruding parts]
TX RF Power:	15W
Modulations:	Digital modulation and demodulation for all modes
Spurious Suppression:	>= 45 dBc
Carrier Suppression:	>= 45 dBc
Selectivity:	Bandwidth adjustable for all modes (10 Hz min stepping)

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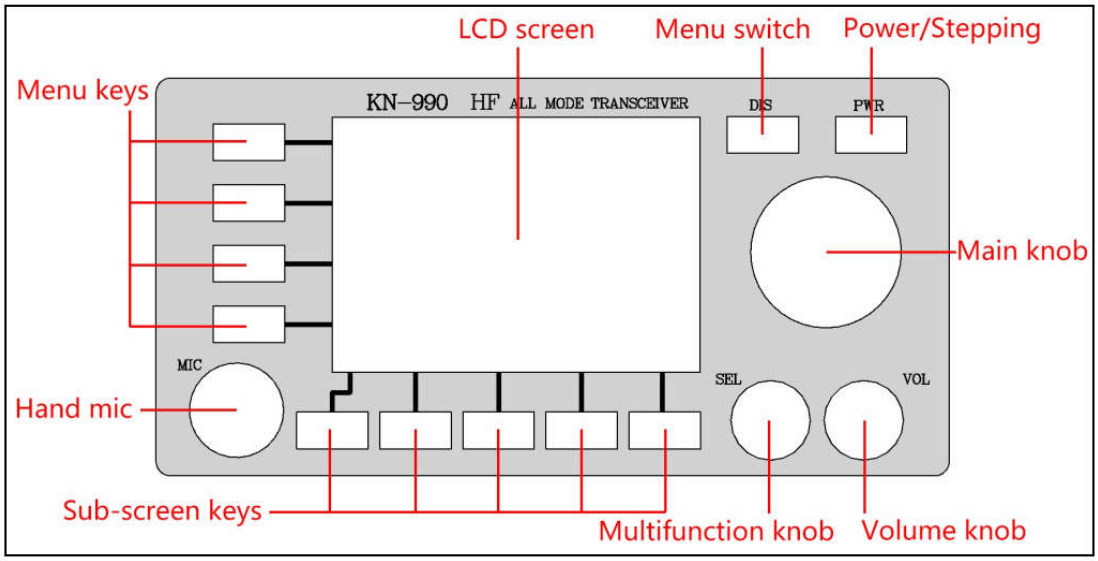
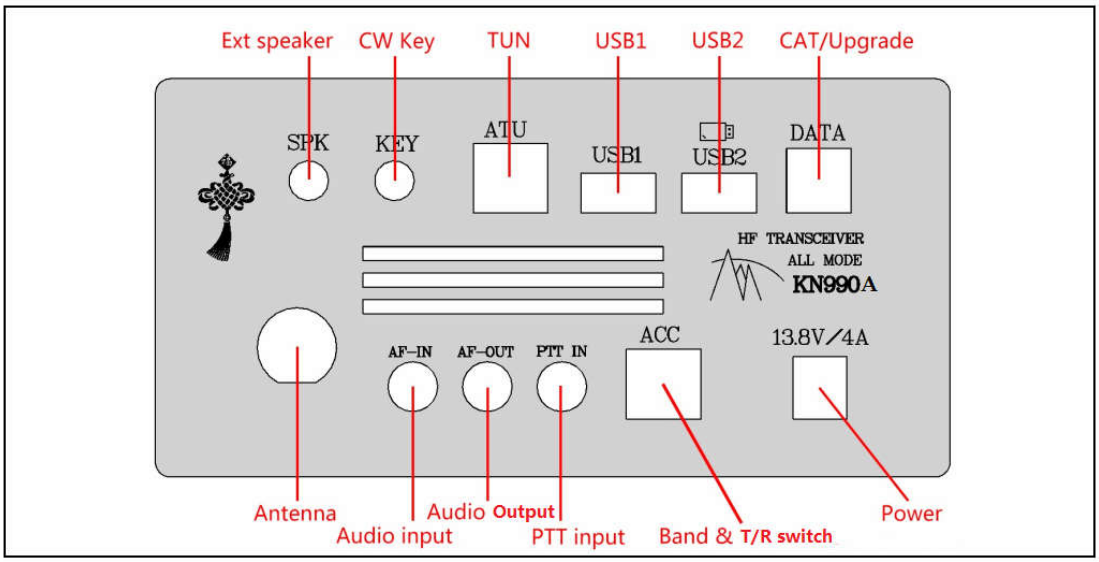
1. Front and rear panels





Note: USB flash drive can only work properly when plugged into USB2 port.

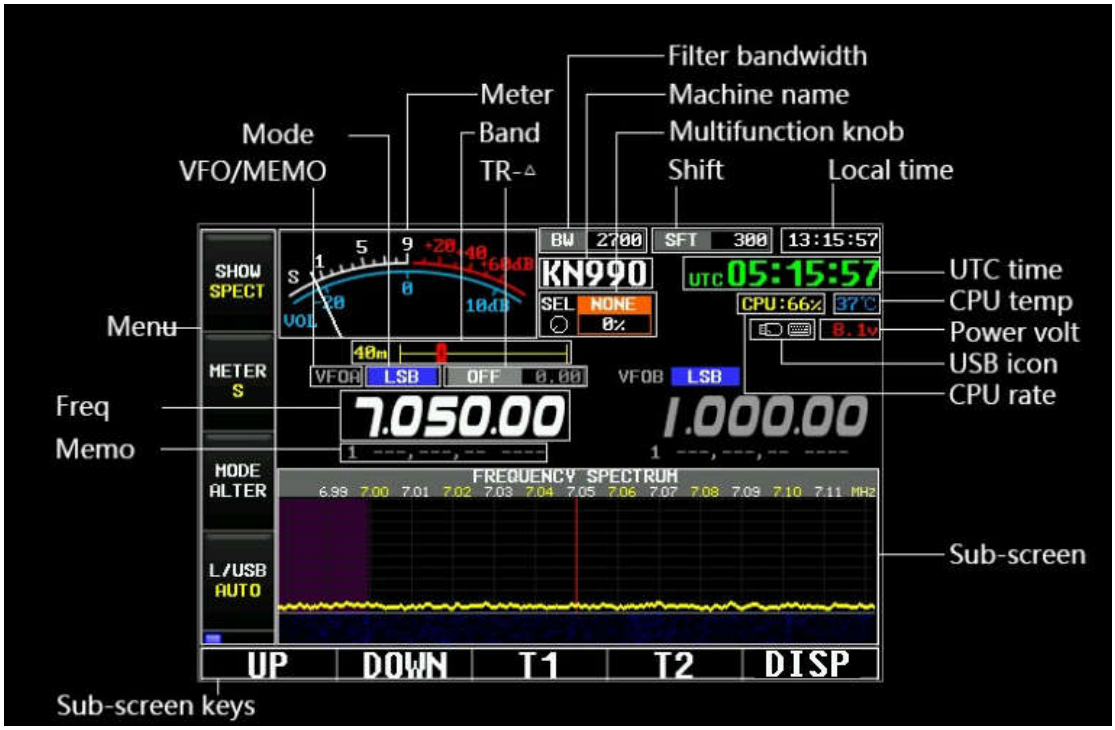
2. Turn on/off the transceiver

1. Power on: Click the power button to turn on the transceiver.

2. Power off: Press the power button and hold it for about 1 second to turn off the transceiver.

3. Note: All changes to the Settings of the transceiver after starting up will only be saved when the power button is shut down with long press. If the power is cut off directly, the changes before power off will not be saved (the recording is an exception which is saved in real time).

3. Introduction to the interface

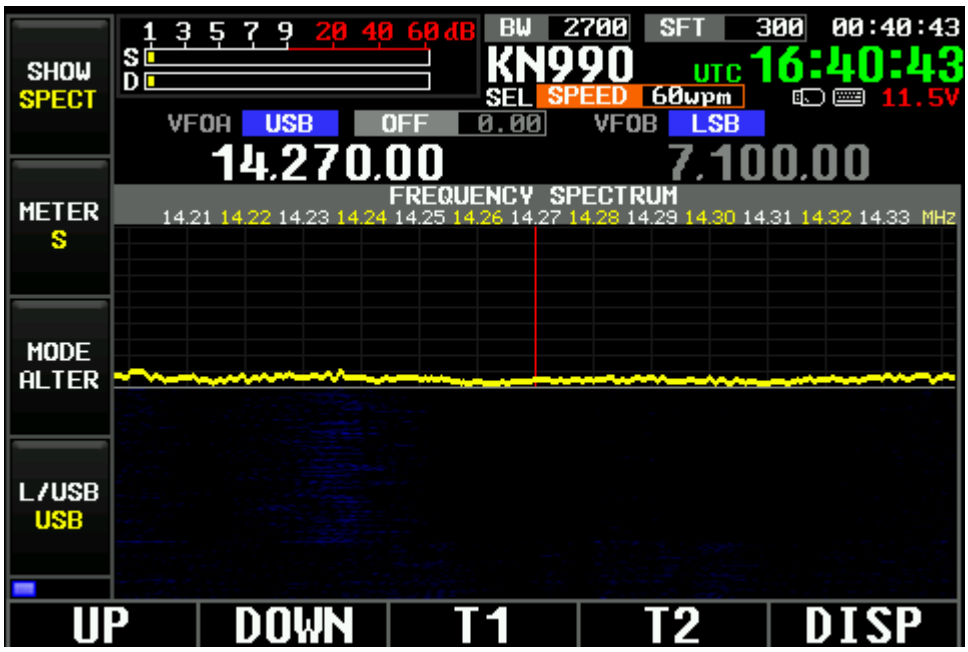


1. The four buttons on the left side of the interface are called "menu", which are corresponding to the four physical" menu" keys in the front panel. Press DIS button to switch menu items.

2. The lower part of the interface is called "sub-screen".

3. Five "sub-screen" buttons are displayed at the bottom of the sub-screen are corresponding to the five physical "sub-screen" buttons in the front panel. Press red power button briefly to switch sub-screen buttons.

4. Press DISP button to switch UI.



4. Operating frequency (VFO)

1. Modify VFO: turn the main knob, VFO range: 3-30M.
2. Modify stepping: click the power button and turn the main knob.
3. The modification of stepping can be directly switched between VFOA and VFOB.
4. By default, VFOA is both the receiving frequency and the transmitting frequency. When "Split" is enabled, VFOA is the receiving frequency and VFOB is the transmitting frequency.

5. Modulation mode

1. There are six modulation modes: SSB, CW, AM, FM, WFM(RX only) and DIG.
2. Switch modulation mode: click the menu "MODE ALTER".
3. Switch sideband: click the menu button "L/USB".
4. There are three types of sideband settings:

USB: force USB.

LSB: force LSB.

AUTO: LSB when VFO<10M, USB when VFO>=10M

6. Menu items

The menu has four buttons, the "SHOW" button is fixed, and using the DIS key can switch other three buttons.

6.1 SHOW

Switch sub – screen circularly, sub - screen will be described in detail below.

6.2 METER

There are two RX meters :" signal strength "and" sound scale ".

There are also two TX meters:" transmitting power "and" standing wave ratio".
Note: The TX meters can be switched only in TX mode.

6.3 MODE

Switch SSB, CW, AM, FM, WFM, DIG six modulation modes circularly. Note: DIG is similar to SSB but it turns off microphone.
SSB, DIG and CW will display USB, LSB, LDIG, UDIG, CW and CWR in different sideband.

6.4 L/USB

Switch "LSB","USB","AUTO".

6.5 ATU

It needs to work with the KT series automatic antenna tuner.
After clicking, it will start transmitting with the VFO, CW mode and 3W transmitting power and notify the automatic antenna tuner to start working.
When the tuning is completed, the transmission will stop automatically.

6.6 VFO/MEM

Switch VFO mode, Memory mode and VFO mode circularly: there are two sets of working parameters (VFOA,VFOB), they include frequency, modulation mode, receiving bandwidth, and receiving offset, these parameters can be modified at any time, and they will be automatically saved when the transceiver is powered off.
Memory mode: there are 99 sets of working parameters (MEM1~MEM99), they include frequency, modulation mode, receiving bandwidth, and receiving offset, which can be modified at any time, but they can only be saved by using the save button in the memory list interface.
Memory mode is the equivalent of a "favorites" function, which helps users record some favorite frequencies and its modulation mode.
Users can even set the name of the stored channel.

6.7 MEM->VFO

Copy the current memory channel to VFO. If the current memory channel is empty, do nothing.

6.8 VOX

Voice operated transmitting. After being turned on, it will automatically enter the TX state triggered by the volume of audio input. The sensitivity and delay of VOX can be adjusted (it will be described below).

6.9 BK-IN

CW transmission delay (break in).
The default state is off. Turn on to turn off the CW transmission delay.

6.10 RFPRE

RF pre-amplifier. Amplify the received signal 100 times.

6.11 SEL

Specifies which parameters being set currently by the front panel "multifunction knob".

NONE: multi-function knob is not used.
PO: 1~15W transmitting power.
SPEED: the sending speed when the paddle key is in CW mode is 4-60wpm.
BW: receive bandwidth, different modulation modes have different bandwidth ranges, even the bandwidth is not adjustable.
SHIFT: receive offset, different modulation modes have different offset ranges, even the offset is not adjustable.
TR-△: the increment will be described in detail below, the range: -9.99kHz~+9.99kHz.
VOX Ga: sensitivity of hands-free function (VOX): 1%~100%.
FM SQ: FM SQL sensitivity: 1%~100%.
WFM SQ: WFM SQL sensitivity: 1%~100%.
SPBR: Waterfall brightness: 10~190.
DIG MD: Digital modulation depth.
AM MD: AM modulation depth.
SSB MD: SSB modulation depth
RECORD: Recording volume.

6.12 TR-△

TR-△ can be divided into receiving and transmitting increments.
The receiving increment is similar to the "RIT" function of a traditional transceiver.
The transmitting increment is similar to the function of " ⊿TX " of a traditional transceiver.
This function is mainly used when the frequency of the radio you are contacting with is found to be inaccurate.
Receiving increment and transmitting increment cannot be enabled at the same time.
When the receiving increment is turned on, the actual receiving frequency =VFO+ increment value, and the transmitting frequency remains unchanged.
When the transmitting increment is turned on, the actual transmitting frequency =VFO+ increment value, and the receiving frequency remains unchanged.
Increment range: -9.99kHz ~+ 9.99kHz.

6.13 SPLIT

After it is turned on, VFOA will be used as the receiving frequency and VFOB will be used as the transmitting frequency.
The split frequency function can make the receiving and transmitting work in completely different frequency bands, but the increment is only within the offset range of ± 9.99kHz.

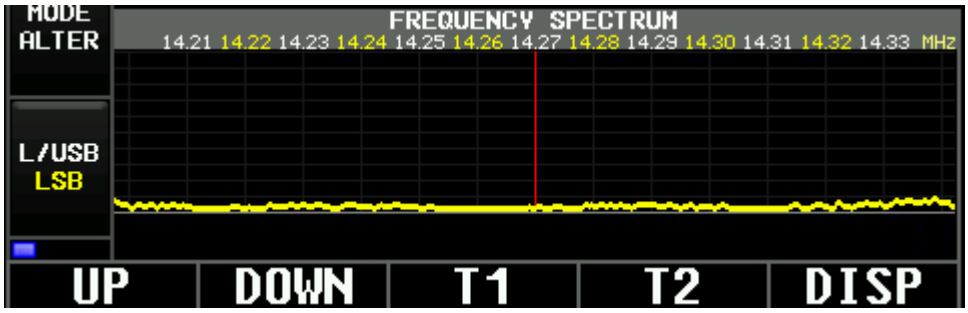
6.14 AMP

For each band, different power fine tune parameters will be applied when AMP is ON to compensate the AMP gain difference on each band. This function is disabled on Japan version.

7. Sub-screen

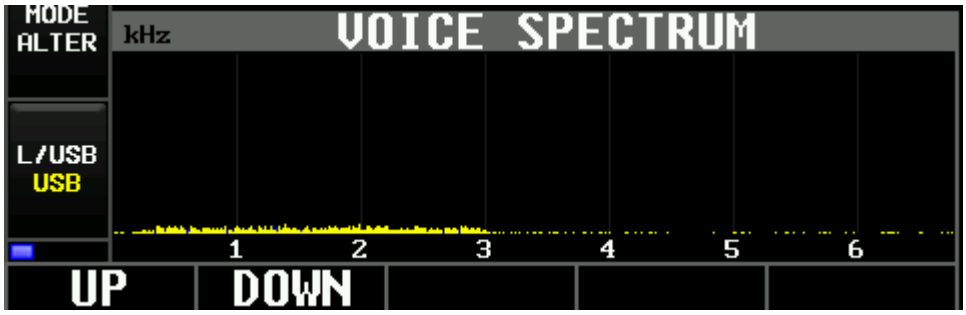
1. Switch the sub-screen: click the menu "SHOW".
2. Each sub-screen has 5 corresponding sub-screen buttons, most of which are related to the current sub-screen.

7.1 FREQUENCY SPECTRUM



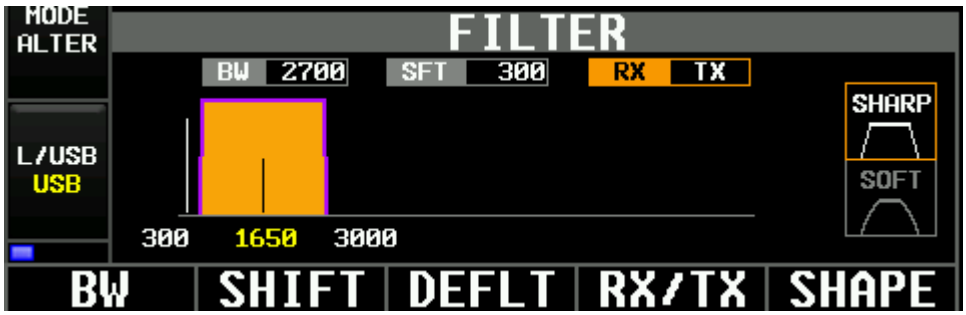
UP: Switch the band in VFO mode; switch the memory channel in memory mode.
DOWN: it has the same function as the "up" key, and the switch direction is opposite.
T1: transmit the T1 recording content circularly.
T2: transmit the T2 recording content circularly.
DISP: Switch big/small waterfall display mode.
The center red bar indicates the current position of VFO.
The interval between two adjacent vertical lines is 10kHz.
The frequency (accurate to 10kHz) will be displayed above the vertical line, but it will not be displayed when the frequency >=100M.
The signal height will adapt to the screen height automatically to avoid strong signals spilling over the screen range, or signals are too weak to observe, so the height of the spectrum does not represent the absolute signal strength, but the relative signal strength of all signals in the current range of spectrum.

7.2 VOICE SPECTRUM



UP: Switch the band in VFO mode; switch the memory channel in memory mode.
DOWN: it has the same function as the "up" key, and the switch direction is opposite.
The interval between adjacent vertical lines is 1kHz.

7.3 FILTER



BW: enter the mode of editing bandwidth, the main knob adjusts the bandwidth, and click again to exit this mode.

SHIFT: enter the mode of editing offset, the main knob adjusts the offset, and click again to exit this mode.

DEFLT: restore the current filter to the default parameters.

RX/TX: Switch transmitting filter and receiving filter.

SHAPE: Switch the shape displayed by band-pass graphics, which can be sharp or soft.

The bandwidth and offset stepping are both 10Hz.

The filter parameters of all modulated modes are independent and do not affect each other.

The transmitting and receiving filters of all modulated modes are also independent and do not affect each other.

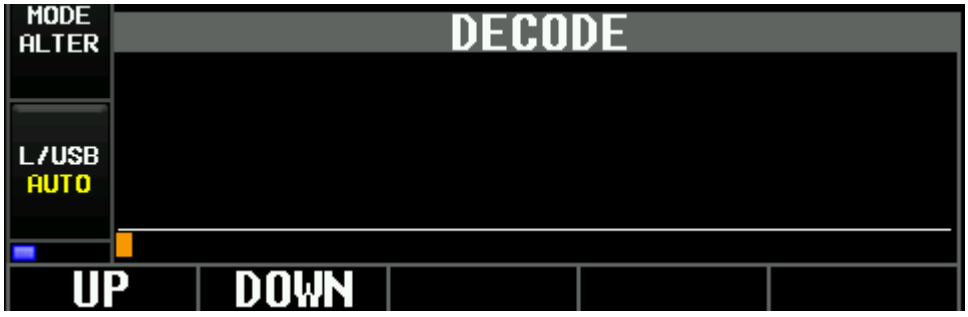
Different modulation modes will have different band-pass patterns.

The white vertical line represents the VFO position in the band-pass graph, and the black vertical line represents the band-pass center.

The white number below the band-pass figure represents the left and right boundary frequencies of the band-pass range, and the yellow number represents the band-pass center frequency.

Special note: the default transmission offset in SSB mode is 300Hz. If the setting is too low, there will be carrier leakage during transmission.

7.4 DECODE



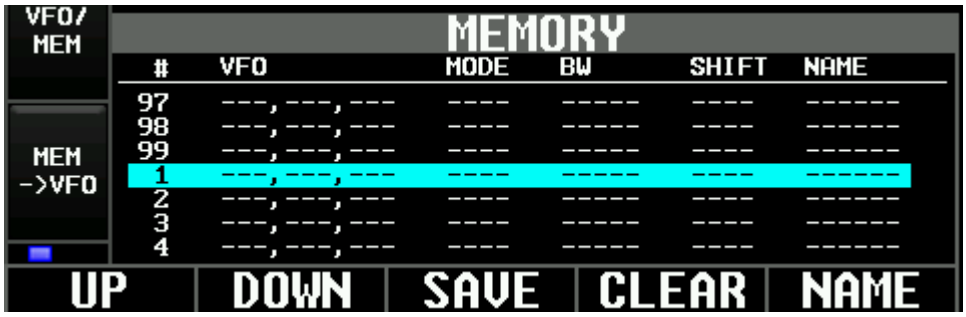
UP: Switch the band in VFO mode; switch the memory channel in memory mode.

DOWN: it has the same function as the "up" key, and the switch direction is opposite.

Decoding function only supports CW decoding currently, which requires CW mode (sideband independent).

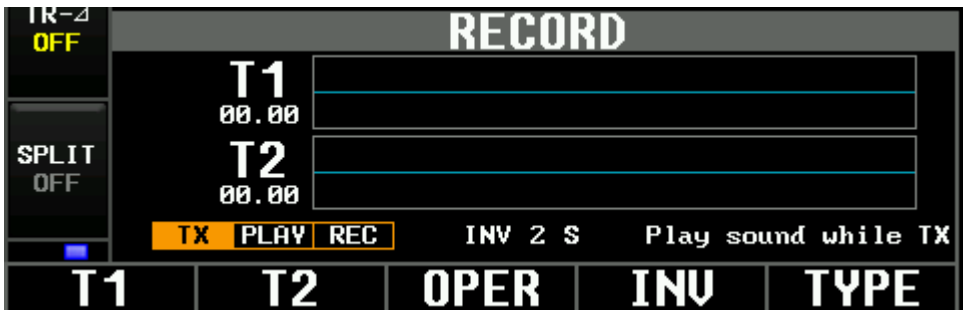
The information of dot dash is displayed at the top of the interface, decoded characters are displayed in the middle, and characters input by USB keyboard are displayed at the bottom.
Decoding accuracy depends on stability of signal strength and standard sending technique.
In this interface you can use USB keyboard to input characters and press enter key to send automatically.
When the last message is not yet sent out, press the enter button to enter the waiting state, and the current message will be sent automatically after the last message is sent out.

7.5 MEMORY



UP: switch memory channels.
DOWN: switch memory channels in opposite direction.
SAVE: store the current operating frequency, modulation mode, receiving bandwidth, receiving offset into the currently selected channel.
CLEAR: clear the currently selected channel.
NAME: enter the mode of channel name editing, change the character with the big knob, move the cursor up and down, and click exit again to exit mode of channel name editing.
Menu "VFO/ MEM "can be switched to memory mode, at this time the current channel information will be used as operating parameters (including operating frequency, modulation mode, receiving bandwidth, receiving offset).
Up to 99 channels can be saved.
Only when the sub-screen stays in the memory can it be switched to a blank channel. When the sub-screen is in the spectrum interface and is in memory mode currently, clicking the up and down keys will only switch in the non-blank channels.
MEMO+n will be displayed when channels are not named, otherwise the name set will be displayed.

7.6 RECORD



When the working mode is not CW mode, recording interface displays recording function.

T1:

Transmitting mode -> transmitting T1 recording content circularly (the speaker will not play the recording content during transmission);

Play mode -> local speaker plays T1 recording content in a loop, but it will not transmit;

Recording mode -> clear the old recording and ready to start the new recording. The recording will only be started when the PTT key of the microphone is pressed and the recording will be suspended when the PTT key is released.

T2: the same function as T1, but it operates T2 recording.

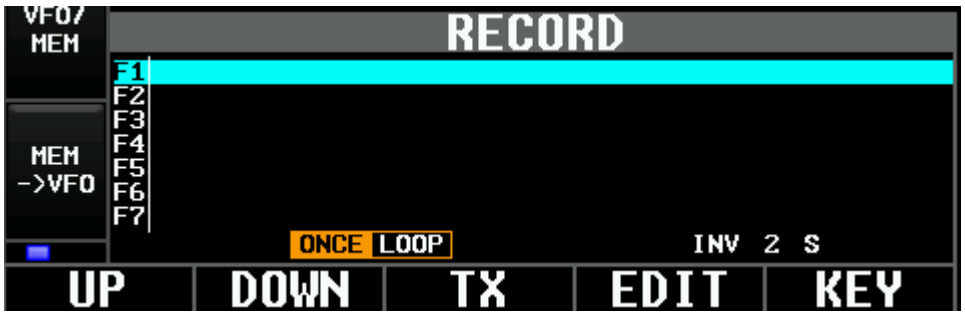
OPER: the loops among transmission mode/play mode/recording mode.

INV: cycle interval between launch mode and play mode. In launch mode, only when recording is launched will the transceiver be in the launch state. In the interval time, the transceiver is in the receiving state and the sound will be demodulated normally.

TYPE: select whether the transmitting recording and playing synchronously or not.

Maximum support for T1 and T2 recording, each recording can record about 15.977 seconds.

The interface displays a graphical preview of the recording, and the height of the line indicates the sound.



When the working mode is CW, the recording interface displays the pre-saved message function.

UP/DOWN: move the cursor.

TX: launch the selected message content currently.

EDIT: edit the selected message content currently.

KEY: edit the selected message shortcut currently, the main knob and USB keyboard can be used to edit a single message witch up to 50 characters.

7.7 SETTING

UP: move the cursor up.

DOWN: moves the cursor down.

CLICK: to enter a selected project or start editing a value, most edits use the big knob to adjust the value and move the cursor up and down (if the cursor can be moved).

BACK: back up beyond level.

Explanations for all Settings are explained below.

8. CAT

KN990's CAT protocol is compatible with Yaesu FT817.

In other words, any CAT software that supports FT817 can be used to operate KN990, such as "Ham Radio Deluxe".

Interface: square port USB on the back of the transceiver (USB-B type, printer USB port).

Baud rate: 38400.

9. USB

KN990 currently supports three USB devices U disk, keyboard and gamepad.

The back of the transceiver provides two USB ports that can work at the same time, but note that the USB disk can only work properly when plugged into the USB2, and other devices support both ports.

When the inserted USB device is properly recognized, the interface will display ICONS.

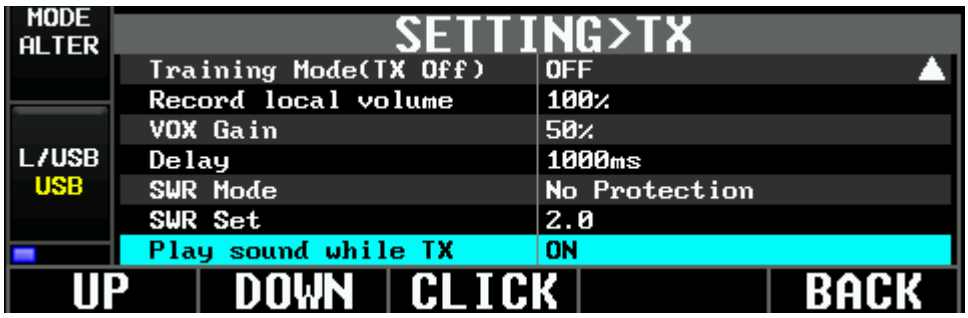
The following icon will be displayed when the inserted USB device is not properly recognized.

At present, the USB driver is not very stable, and sometimes it can be recognized or not. If plugging and unplugging repeatedly still doesn't work, you can restart the transceiver and generally the problem will be solved.

10. System setting

The system setting a multi-level menu. The name of each option which is followed by the symbol ">" is the entrance to the next level of menu, for example:

10.1 TX



TX Power: 1~15W, stepping 1W.

Training Mode (TX Off): Nothing will be transmitted under any circumstances except ATU after this option is turned on. This option is linked to Training Mode in the CW setting (they are equivalent to the same option, which is shown in both menus).

VOX Gain: It will work when you turn on VOX. This option controls how much input volume you can trigger VOX.

Delay: this option controls how long should VOX and CW wait to close transmission after the transmission is finished at the same time. This option and Delay in CW setting are linked (they are equivalent to the same option, which is displayed in both menus).

SWR Mode:

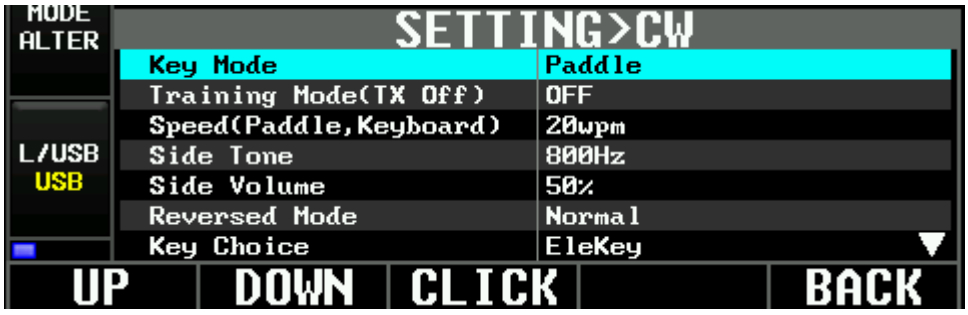
Shut Down Mode: turn off transmission when standing wave is greater than or equal to threshold value, and turn off ATU and VOX simultaneously;

Reduce PWR Mode: reduce power gradually when the SWR is increasing. When the standing-wave ratio is greater than the threshold value plus 1, the actual transmitted power will decrease to 3W and no longer continue to reduce.

SWR Set: controls the value that triggers high standing wave protection.

Play sound while TX: The switch that when T1/T2 recording is transmitted automatically, the local speaker will also play the recorded content.

10.2 CW



Key Mode:

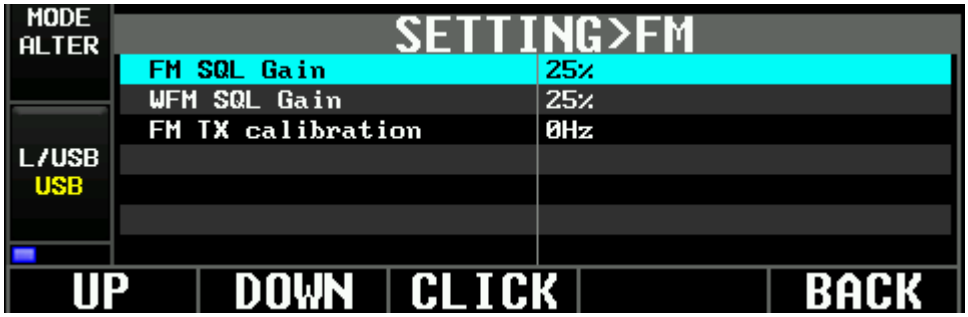
Straight key: send out the signal with straight key. When it is pressed, the side tone is transmitted, and when it is released, the side tone will be stopped.

Paddle: press paddle Keys to send messages, press the dot key to send dots continuously, press the dash key to send dashes continuously, and generate the standard interval automatically;

KN990 has the same keyer mode as FT817. Both of them belong to the buffer-one-key mode.

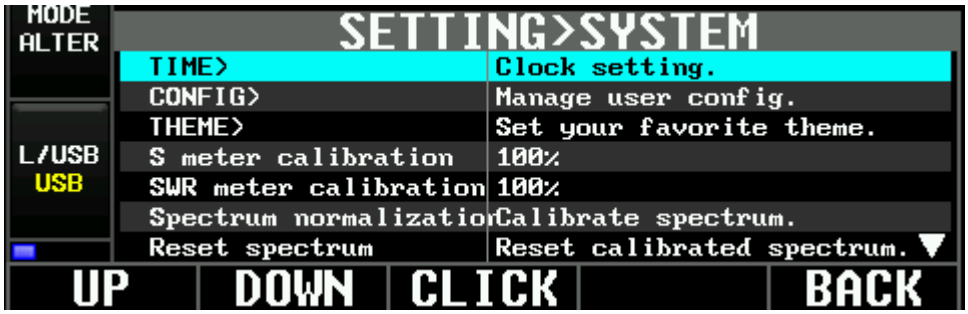
Training Mode(TX Off): Nothing will be transmitted except for ATU when this option is turned on.
This option is associated with Training Mode in the TX setting (equivalent to the same option was shown in both menus).
Speed: Speed of paddle and USB keyboard, 4~60wpm, stepping 1wpm.
Side Tone: Control the local Side Tone at the time of transmission and the Side Tone at the time of reception simultaneously, 300~1200Hz, and stepping 50Hz.
Side Volume: Control the volume of local side at the time of transmission, 0%~100%.
Reversed Mode: Exchange the dot and dash of paddle key.
Key Choice: The electronic key-> uses the Key socket on the back of the transceiver to send messages.
Microphone key -> uses the plus and minus keys of the microphone to send messages.
Delay: this option controls how long VOX and CW should wait to close transmission after the transmission is finished. This option and Delay in TX setting are linked (equivalent to the same option, which is displayed in both menus).

10.3 FM

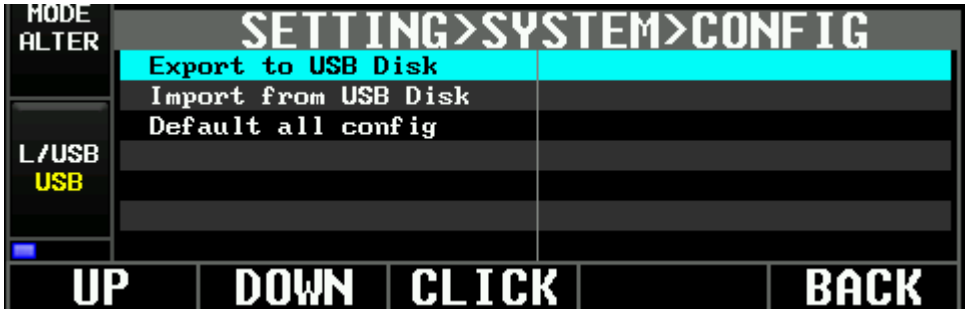


FM sensitivity of SQL: 1%~100%. Control when the signal strength in FM mode is lower than a certain value, the mute will start.
WFM sensitivity of SQL: 1%~100%. Control when the signal strength in WFM mode is lower than a certain value, the mute will start.
FM TX calibration: Calibrate frequency in FM.

10.4 SYSTEM



TIME: enter the time and date setting menu, this menu is very easy to understand without explanation, note: the time and time zone are local time and local time zone, UTC time will be calculated according to the set local time zone.
CONFIG:



Export to USB Disk: Export all the user configuration and calibration parameters before delivery of the transceiver to the root directory of U Disk"config. Rtf" file, please make sure that all users must export configuration and reserve it properly after receiving transceivers, let the transceiver can restore to the factory state after some unpredictable situations (this is almost impossible, but it's always good to leave an insurance).

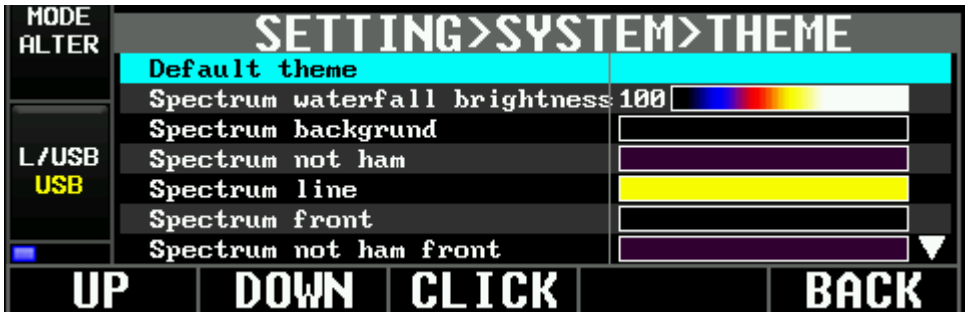
Import from USB Disk: "config.rtf" file in the root directory of U Disk and apply all the configuration in it to the local transceiver. Please do not Import the configuration of other transceivers, because the configuration contains the pre-factory calibration parameters, each transceiver is different.

Default all config: restore all user configurations to the factory state, and the calibration parameters before delivery will not be restored.

Note: only USB sticks which support FAT or FAT32. If your USB stick is not in this format (such as NTFS), use Windows to format the USB stick into FAT32.

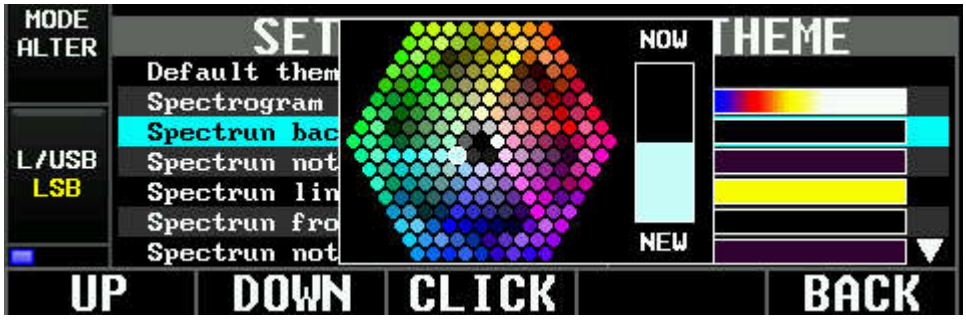
Usb flash drive can only be used normally at USB2 port on the back of the transceiver. If USB flash drive is inserted at USB1 port, it can be identified as USB flash drive, but files cannot be read or written.

THEME:



Spectrum waterfall brightness: modify the overall brightness of waterfall (same as SPBR in SEL menu).

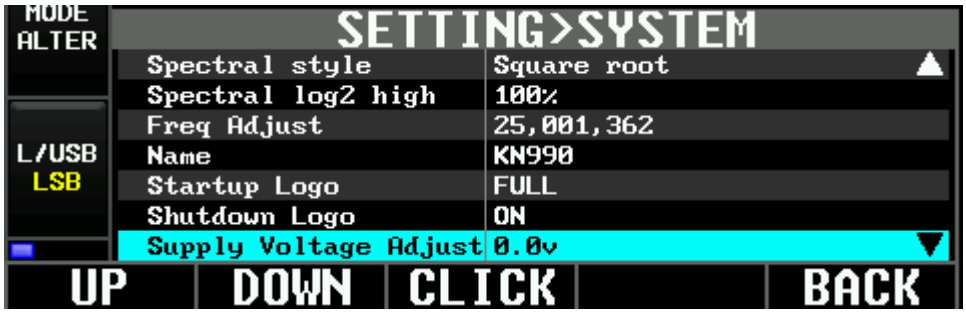
The remaining options are used to modify the color of display.



Press CLICK to open the color disk, use the main knob to select the color, press CLICK to save or BACK to return, all color changes will take effect directly after the confirmation.

Spectrum normalization: affected by band-pass curve of the band-pass filter, the default spectrum noise may not be smooth, remove the antenna, adjust the operating frequency to a clean frequency, and then use this option will normalized spectrum automatically to let the noise smooth.

Reset spectrum: It can be used if the spectrum normalized result is not ideal for some reasons.



Spectrum style: Choose from square root or log.

Spectrum log height: Adjust to the proper height.

Freq calibration: If you think your operating frequency is not accurate, you can calibrate here. The calibration range is +/-10kHz. UP/DOWN buttons controls stepping, and the main knob adjusts value.

Name: Modify the KN990 name in the main screen to your call sign. The new name will also appear in the startup screen.

Startup Animation: FULL or Pithy or OFF.

Shutdown Animation: ON or OFF.

Supply voltage cali.: Calibrate the supply voltage display.

Setting back to: Frequency spectrum or NONE.

DIS hold: Default UI or NONE. You may need this function to go back to frequency spectrum UI while in setting.

Upgrade: Upgrading with computer. Don't click this until you read the following firmware upgrade information.

10.5 NES [Not offered in Japan version]

Super Mario: Click OK to enter Super Mario.

U Disk ROM: This option shows "U Disk ROM" when transceiver is leaving factory, after the U Disk loads games, this option will display the name of last loaded game, and the game can run out of the U Disk.

Load NES rom from the U Disk, set up folder "ROM" in the root directory of U Disk, Put game files which are NES format in ROM folder, insert U Disk into the USB2 behind transceiver, this option will be able to browse ROM folder and run the games in it. Keyboard: set up the game key mapping of USB Keyboard keys.

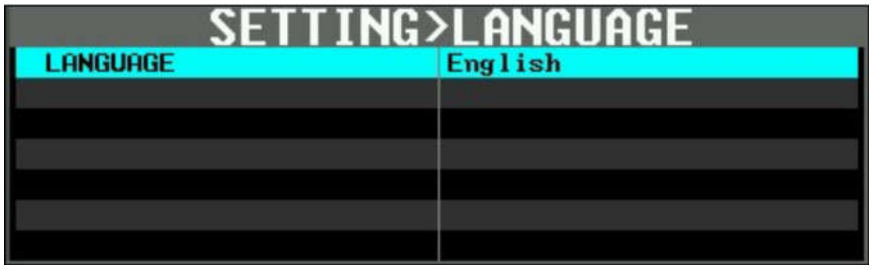
Joystick: Set the game key mapping of the USB gamepad.

Currently, only two built-in red and white machine games are supported. In the future, import games from USB flash drive freely will be supported.

Currently, only the keyboard can be used for Double game modes, and the gamepad only supports single player.

KN990 supports HID protocol gamepad with standard USB interface. If you are not sure which one you should choose, you can directly choose the WE-8400 model instead of WE-8600.

10.6 LANGUAGE



Language: switch display Language, support simplified Chinese and English.

10.7 ABOUT

Version: the Version number of the local firmware.

Hardware: BA6BF, the designer of Hardware.

Software: Droid Zhang, the programmer of Software.

Help: display the QR code of this manual. After scanning it, you can see this instruction, the language of the instruction and the display language of the transceiver are consistent.

Upgrade History: display the QR code of the update log. You can see the updated contents of all versions by scanning the QR code.

11. Firmware upgrade

Preparation:

1. Get a Windows computer with Internet access.

2. Download the upgrade tool "KN990 upgrade tool".

Web page download http://www.zhiqiangtech.com/kn/kn990/KN990 升级工具 V2.exe

QQ group sharing download: group number 124321052.

3. Prepare a square port USB cable (USB-B, printer USB cable).

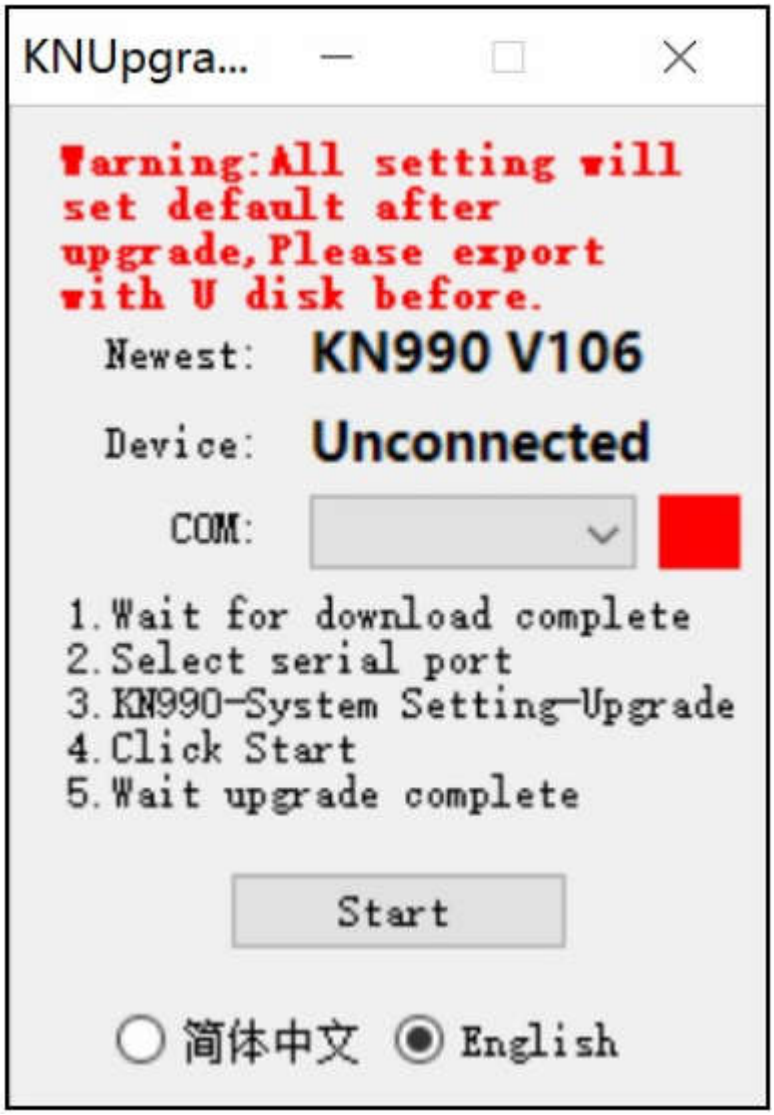
4. Prepare a USB flash drive.

Upgrade steps:

1. Enter SETTING-SYSTEM-CONFIG-Export to USB Disk.

Since upgrading firmware will forces a factory recovery one time, the configuration must be exported manually to avoid missing previous Settings.

2. Run the upgrade tool and wait for the latest version to be automatically obtained.

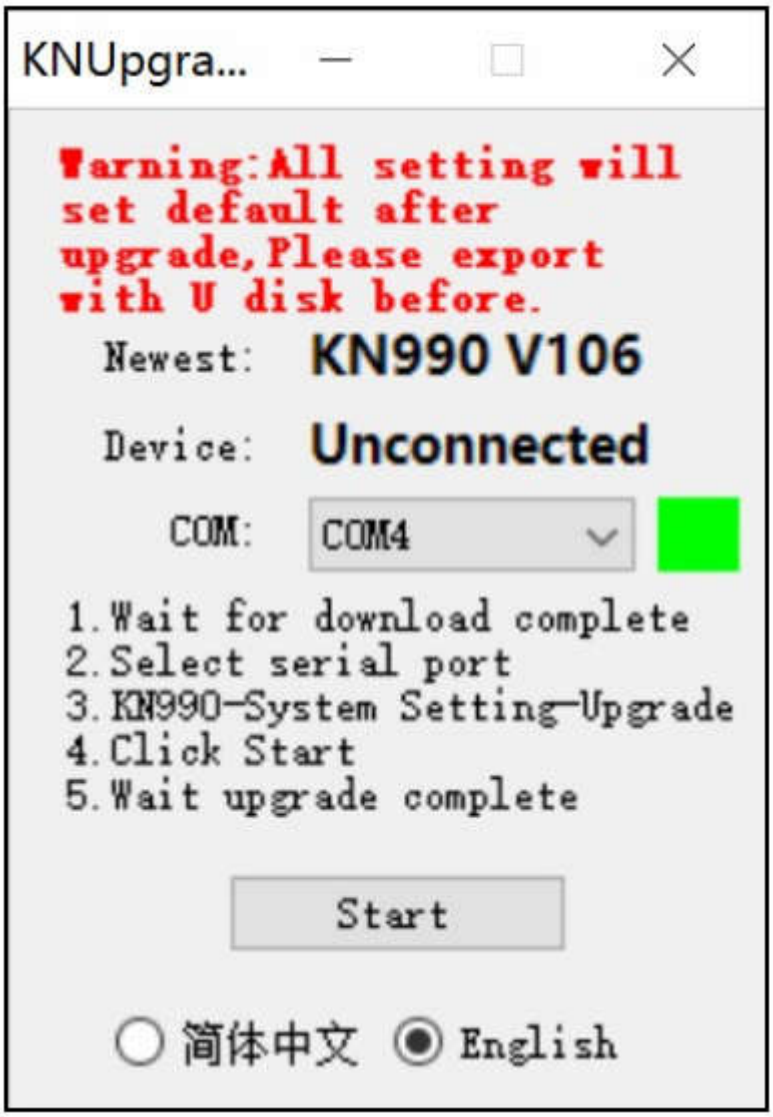


3. Use square USB cable to connect the radio to computer, and choose the serial port number.

If you can't find the serial port number of the radio station, you can check in the device manager of Windows whether it is because the CH340 driver is not installed. The driver has been uploaded by

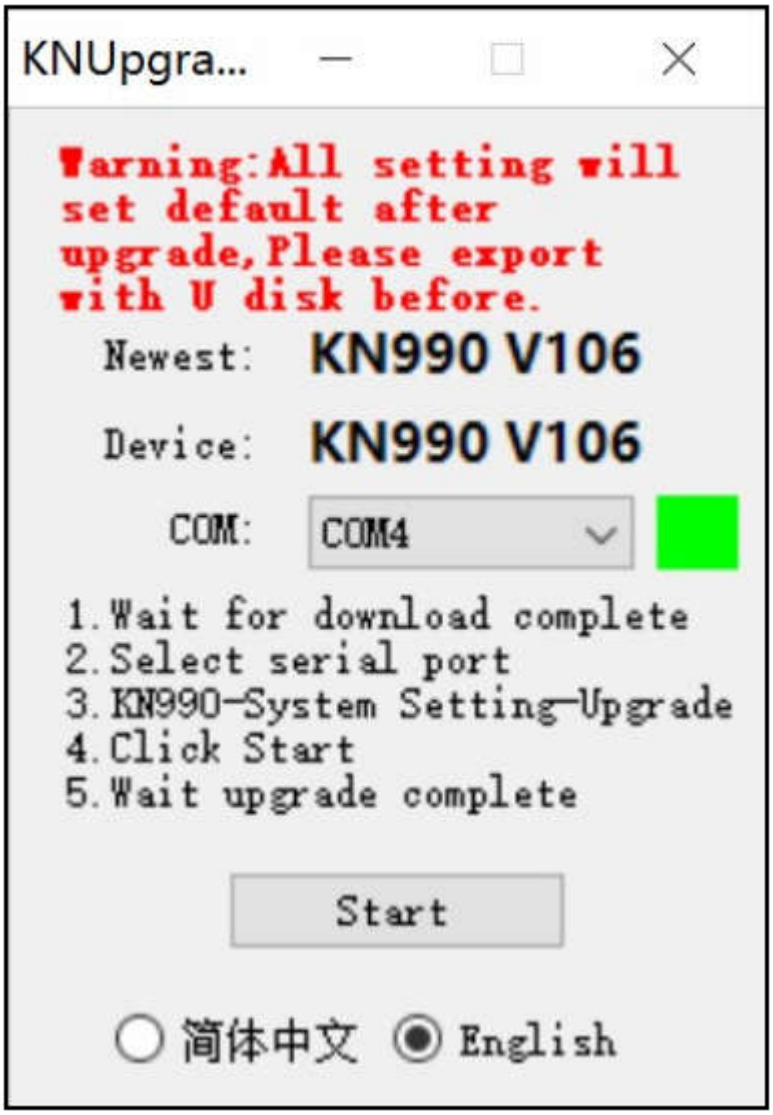
many users in the group file, so you can have a try.

If all goes well, the upgrade tool will display a green square.



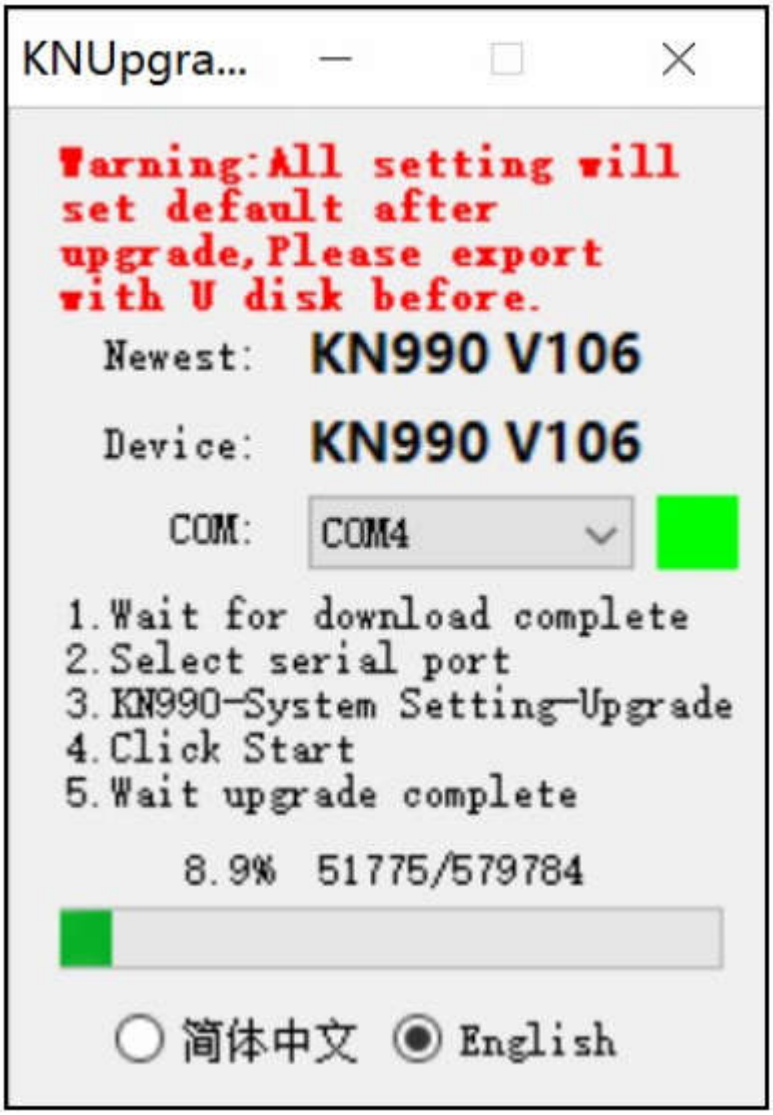
4. Enter SETTING-SYSTEM-UPGRADE

At this point, the upgrade tool interface can get the local version number of your radio.



5. Click the "Start" button of the upgrade tool. After a moment, the upgrade tool and the progress bar of the radio start to move.


SHOW
SET
S 1 5 9 +20 +40 +60dB
-20 0 10dB
VOL
BW 500
SFT 550
14:37:11
KN990
UTC06:37:11
SEL NONE
0%
CPU:14% 38°C
8.6v
40m
28%
L/USB
AUTO
Startup Logo OFF
Shutdown Logo OFF
Supply Voltage Adjust 8.0v
Setting back to Frequency Spectrum
DIS hold Default UI
Upgrade Upgrading with conputer
UP
DOWN
CLICK
BACK

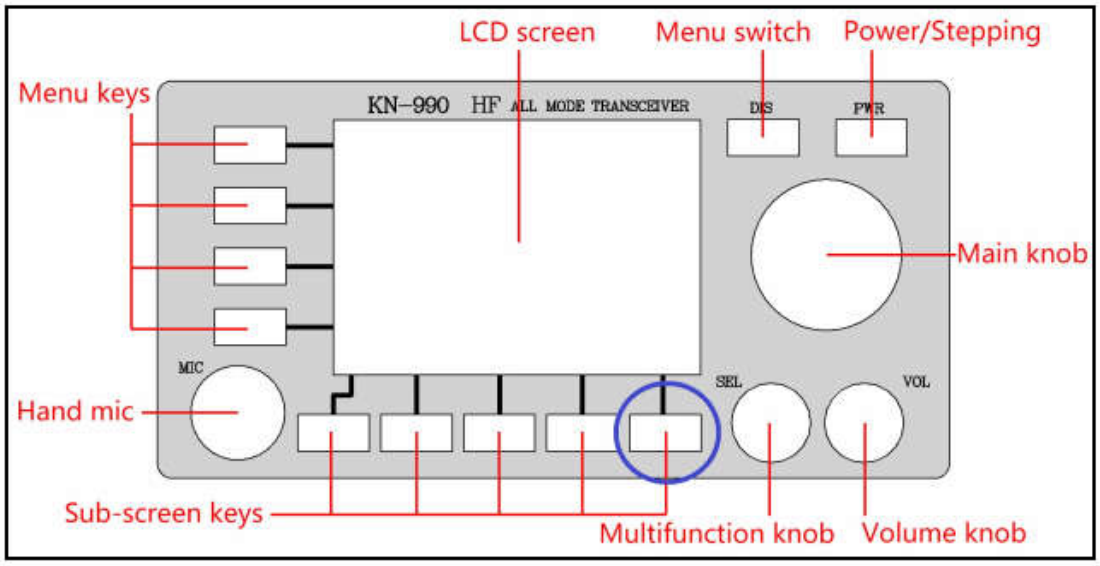


6. After the upgrade is completed, the transceiver will automatically restart and forcibly restore the factory settings, enter setting-systems-config-import from U Disk, and the upgrade is completed

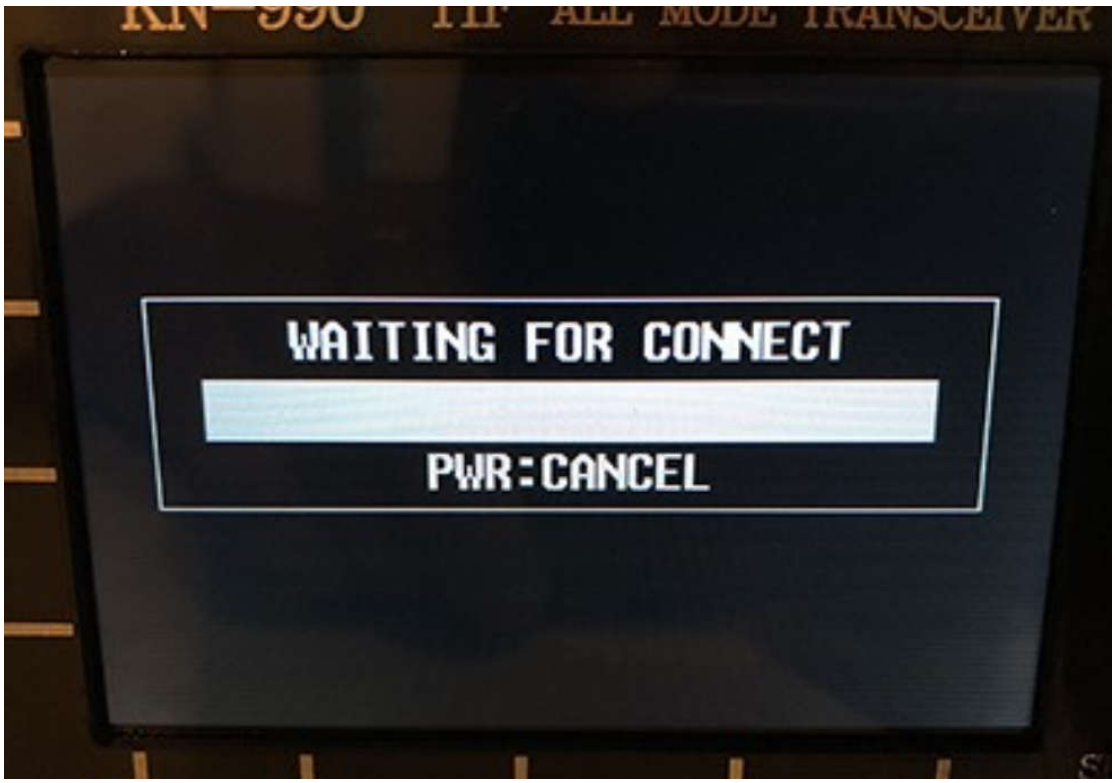
Upgrade failed:

If the upgrade process is interrupted due to power failure, poor USB contact, computer crash and other unexpected circumstances, then the transceiver will not be able to start up normally (bricked), and the upgrade cannot be resumed according to the above steps, please follow the following steps to save the transceiver.

1. Cut off the power of the radio station and force it to shut down.
2. Close the upgrade tool then reopen it.
3. Plug in the radio power supply and use the square USB cable to connect the radio to computer.
4. Hold down the last key on the right side of the sub-screen button at the bottom of the front panel of the radio station (shown in the figure below, as shown in the blue circle), at the same time click the power button quickly (note that it is a quick click, do not hold down or hold for too long).



At this point, the radio will be forced into a bootstrap program, and the interface is shown as follows:



5. Select serial port number for upgrade tool.

6. If the serial port number is selected, the firmware version of the radio station is read and the green square is displayed, which indicate that the connection is successful, then click “Start”. If the firmware of the radio station is not read normally, please go back to step 1 and Start again.

7. Wait patiently for the progress bar to finish after upgrading.

Note: no matter what happens in the normal upgrade process, you can use the above steps to save the transceiver. It would never become bricks. So please don’t worry about the upgrade.