



144-148/430-440MHz CW/FM KC1050

Beacon Transmitter User Manual

1. Overview

The KC1050 is a radio beacon transmitter that transmits low-power RF signals in the VHF (2 m) and UHF (0.7 m) bands. It can be used as a search target for radio direction-finding training or as a Morse code trainer. Supported signal modes include automatic continuous-wave (CW) telegraphy, automatic FM telegraphy, manual CW or FM telegraphy using a straight key or paddle key, single-tone FM, MP3 audio playback from a TF card, and voice transmission using an external hand microphone. The KC1050 also supports random intermittent transmission and random power variation to increase the difficulty of direction-finding training.

2. Package Contents

Upon receipt of the beacon transmitter, verify that the package is intact before opening it, and then check the contents against the list below. The KC1050 package includes:

KC1050 Beacon Transmitter	x 1
RF Antenna (UHF)	x 1

User Manual x 1

USB Charging Cable x 1 (charger not included)

The firmware update cable is available separately and is included only if specified in the order configuration.

Check the items against the list above for completeness, inspect the device for visible damage, and gently shake it to ensure that no abnormal sound is present.

If no abnormalities are found, the device may be powered on and used.

3. Safety Information

The KC1050 is not a consumer product. It must be operated by professionals or users with an appropriate level of technical knowledge.

The KC1050 is intended for applications such as radio direction finding and Morse code practice, where a failure would not result in serious consequences.

Users must comply with all applicable laws and regulations.

WARNING

The product must be serviced by qualified personnel. Do not disassemble or modify the device, including the battery. The device contains a lithium battery with a capacity of approximately 25 Wh. Follow all applicable lithium battery safety requirements.

Do not use the device if water has entered it, if an abnormal sound is heard when it is shaken, or if any other obvious abnormality is observed.

The device must be supervised while charging. Keep it away from flammable or explosive materials, and ensure adequate ventilation for heat dissipation.

Observe the specified storage and operating temperature ranges. Do not leave the device in a vehicle exposed to direct sunlight.

Do not use this product for any improper purpose. Do not use it in sensitive areas such as airports, hospitals, or gas stations.

For field deployment, protect the device with a canvas bag, plastic bag, or similar enclosure.

Do not use the device during thunderstorms or in other severe

environmental conditions.

After field deployment, retrieve the device promptly to prevent access by unqualified persons.

Do not transmit without an antenna connected. Replace the antenna promptly if it is damaged.

IMPORTANT NOTICE

The KC1050 transmits in amateur radio bands and is intended only for amateur radio operators or professional organizations requiring radio direction-finding and localization training, for use as a component of a training system. Users must not modify or alter the transmitter section to increase the output power or operate outside the permitted frequency range. Regardless of the parameter settings, users must comply with local laws and regulations and bear sole responsibility for all consequences. All parties involved in the design, manufacture, and sale of the KC1050 have fulfilled their obligation to inform users of compliance requirements and accept no liability for unlawful or noncompliant use by users.

To the extent permitted by law, the supplier shall under no circumstances be liable for losses exceeding the purchase price of the product, nor for any loss of time, business, convenience, profit, any loss arising from misuse, or any indirect loss. Repair, replacement, return, or refund of the purchase price, as determined by the supplier, shall be the sole remedy available to the user and purchaser. The supplier's responsibility for the product is limited to the warranty period.

The manufacturer makes no warranty under any circumstances regarding the suitability, reliability, or safety of the KC1050 for military, medical, aerospace, or aviation applications. Any commitment made by a distributor does not indicate the manufacturer's knowledge or approval.

This manual is subject to change without notice.

4. Basic Operations

4.1. Operating Modes

1. CW

CW mode supports automatic CW telegraphy, automatic FM

telegraphy, manual CW telegraphy, and manual FM telegraphy.

a. Automatic CW Telegraphy

The transmitter sends Morse code by switching the RF carrier on and off. The keying speed and message content can be edited on the KC1050. Set the receiver to CW demodulation to receive this signal.

b. Automatic FM Telegraphy

The transmitter uses frequency modulation and sends Morse code by switching the modulation signal on and off. Set the receiver to FM demodulation to receive this signal.

c. Manual Telegraphy

Connect a straight key or paddle key to send telegraphy manually. The user must provide the key and connect it while the device is powered off before powering it on; otherwise, the device may not correctly identify whether a straight key or paddle key is connected.

2. TN

TN (TONE) mode is a single-tone FM mode that transmits a 300 Hz-5 kHz single-tone FM signal. The modulation frequency is adjustable.

3. AF

AF mode is used to play audio files and transmit FM signals. Only MP3 audio files are supported. Insert a TF card containing MP3 files into the card slot before using this mode. Wait until the transmitter recognizes the TF card before starting playback. If the TF card is removed during playback, MP3 playback must be restarted manually.

4.2. Adjusting the Operating Status

The beacon can be in either the stopped or transmitting state. In the stopped state, the beacon does not output an RF signal. To switch between the two states, move the cursor to the Run/Stop symbol (the square or triangle on the first row of the display), and then press ENTER.

4.3. Operating Procedures

4.3.1. Frequency Setting

The KC1050 supports the UHF and VHF amateur radio bands. To set the frequency, first move the cursor to FQ, and then press ENTER to display the frequency setting. Move the cursor to the digit to be changed, and press ENTER again. When the cursor at that digit changes to an

underline, use PREV and NEXT to adjust the value. After setting the digit, press ENTER to save it. After all digits have been set, move the cursor to the right until it returns to FQ. The new frequency setting then takes effect.

The procedure is shown in the following figure:

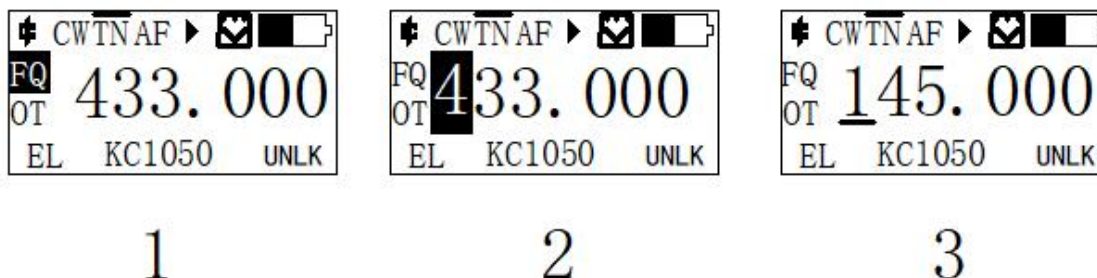


Figure 1

4.3.2. Mode Settings

4.3.2.1. CW Mode

Move the cursor to CWTNAF on the first row of the display. Press ENTER once or repeatedly to move the cursor among CW, TN, and AF until it is positioned above CW.

Use PREV and NEXT to move the cursor to OT. The detailed CW mode settings are then displayed. Press ENTER to open the telegraphy parameter settings. The item on the right indicates the keying mode and

displays one of the following: FMAT (Automatic FM Telegraphy), CWAT (Automatic CW Telegraphy), CWHK (Manual CW Telegraphy), or FMHK (Manual FM Telegraphy). Use NEXT to move the cursor to this item. Press ENTER so that the cursor changes to an underline, and then use PREV and NEXT to switch the keying mode. Press ENTER to exit the keying mode setting, and press and hold ENTER to exit the OT settings.

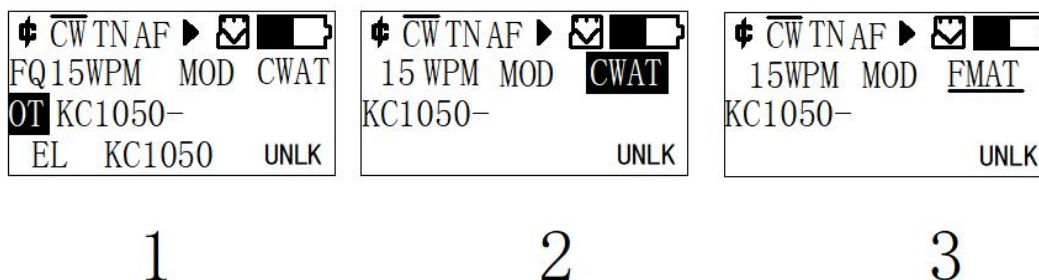


Figure 2

If automatic FM telegraphy or automatic CW telegraphy is selected, the device automatically transmits the configured message when it is running. The message can be edited by the user; the factory-default message is “KC1050-”. To edit the message, use the cursor and ENTER to select the character position to be changed, use PREV and NEXT to select a character, and briefly press ENTER to confirm the change at that position. Press and hold ENTER to save the message settings. **NOTE: Before**

pressing and holding ENTER, move the cursor to the position immediately after the last valid character. Any characters to the right of the cursor will be discarded when the message is saved.

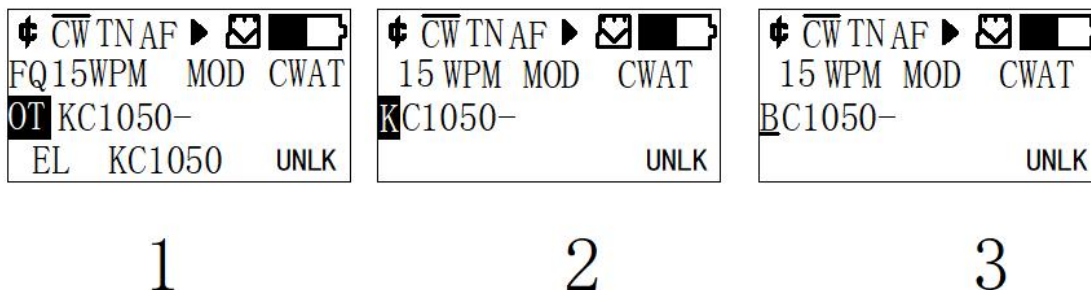


Figure 3

If a manual telegraphy mode is selected, press and hold ENTER to save the setting, power off the device, connect the key, and then power on the device again. If the standard connector shown in Figure 5 is used, the device automatically identifies it as a paddle key. When using a paddle key, set the keying speed using WPM under the OT settings.

When using a straight key, short KEY2 to GND; otherwise, the device will identify it as a paddle key.

WPM also controls the keying speed for automatic CW telegraphy

and automatic FM telegraphy. Press ENTER. When the cursor changes to an underline, use PREV and NEXT to adjust the speed. After completing the setting, press ENTER to exit. The keying speed range for automatic telegraphy is 5-99 WPM.

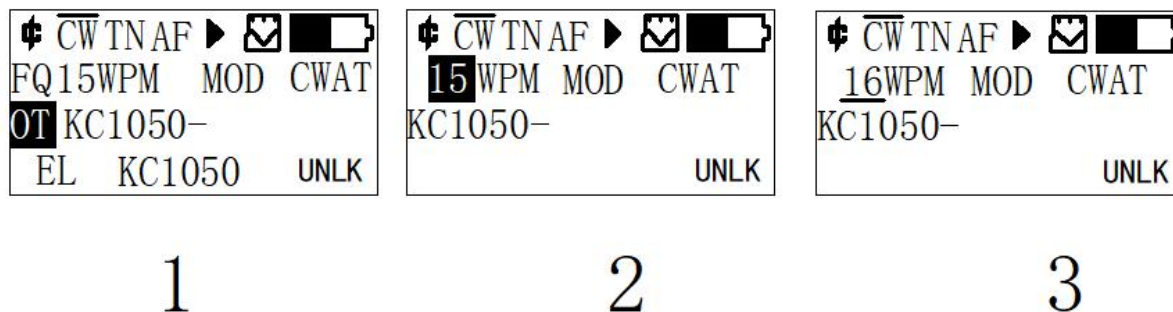


Figure 4

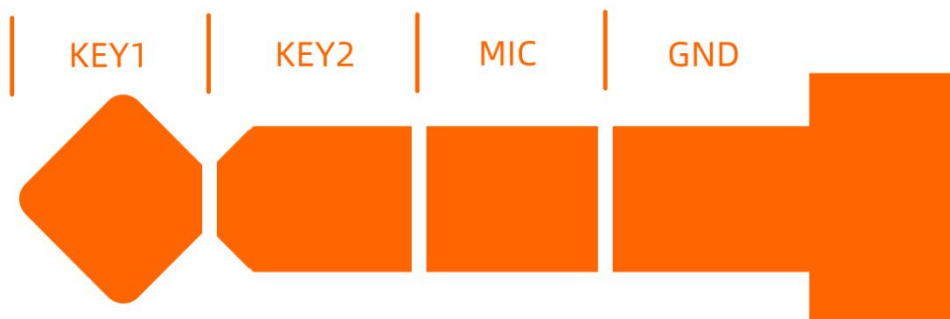


Figure 5. Key/Hand Microphone Connector Pinout

4.3.2.2. TN Mode

TN mode is used to transmit a single-tone FM signal.

Move the cursor to CWTNAF on the first row of the display. Press ENTER once or repeatedly to move the cursor among CW, TN, and AF until it is positioned above TN.

Move the cursor to OT, and then press ENTER to display the audio frequency. Select the digit to be set, and press ENTER again. When the cursor changes to an underline, use PREV and NEXT to adjust the frequency value. After completing the setting for the current digit, press ENTER again to exit. After all digits have been set, move the cursor to the right. The change takes effect when the cursor returns to OT.

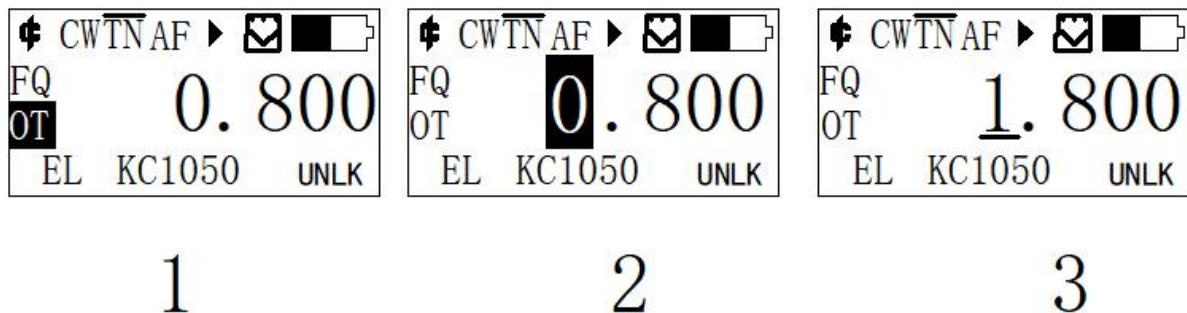


Figure 6

4.3.2.3. AF Mode

Move the cursor to CWTNAF on the first row of the display. Press

ENTER once or repeatedly to move the cursor among CW, TN, and AF until it is positioned above AF.

To use AF mode, insert a TF card containing MP3 audio files. In AF mode, the file repeat mode, playback start/pause, and previous/next track functions can be controlled. First move the cursor to OT and press ENTER. Then move the cursor to the desired control and use ENTER to operate it. The row below the control icons displays the number of the file currently playing and the total number of files.

In AF mode, stop MP3 playback and connect a hand microphone to transmit voice.

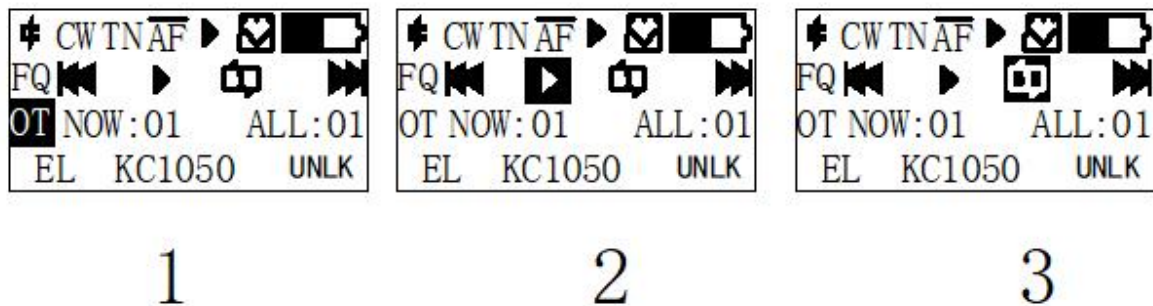


Figure 7

4.3.3. Power Setting

Move the cursor to the lower-left corner of the display, and press

ENTER to switch the power setting. The KC1050 provides four power levels: “EL” extremely low power (10 dBm, 0.01 W), “LOW” low power (20 dBm, 0.1 W), “MID” medium power (23 dBm, 0.2 W), and “HIG” high power (26 dBm, 0.4 W).

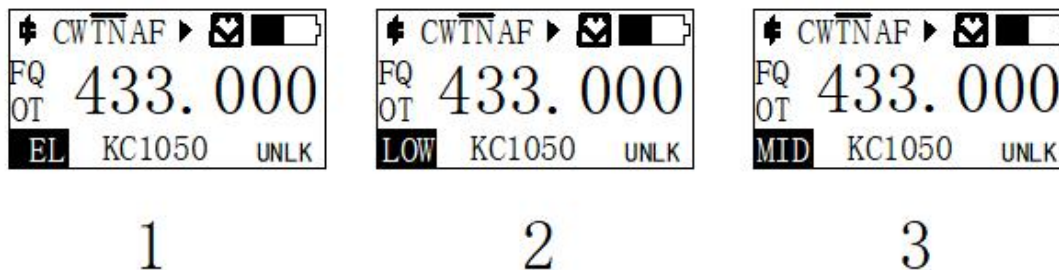


Figure 8

4.3.4. Locking the Interface

Move the cursor to UNLK and press ENTER to lock the interface. The screen turns off immediately. Press any key to wake the screen for 5 s. If no further operation is performed, the screen turns off again. Once the interface is locked, restarting the device does not unlock it, and the device continues operating in the same manner as before the restart. To unlock the interface, briefly press NEXT and then quickly press and hold ENTER. After unlocking, the cursor remains on UNLK. Press NEXT or PREV to

move the cursor away from UNLK. Do not press ENTER while the cursor is on UNLK, or the interface will be locked again.

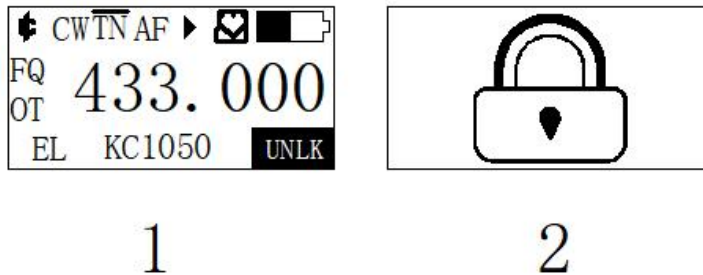


Figure 9

4.3.5. Tone Squelch Settings

Press and hold the NEXT key while powering on the device to enter the configuration screen. Select D/TCS and press ENTER. The EN setting enables or disables tone squelch and can be toggled by pressing ENTER. The MOD setting selects digital-coded squelch or analog tone squelch (DCS for digital and TCS for analog). The configuration screen has no exit option; power off and restart the device to exit.

In DCS mode, the DCS code and polarity inversion can be configured. Move the cursor to CD to set the DCS code. Select the digit to be set, press

ENTER, change it to the required value, and then move the cursor to the next digit. After completing the code setting, press NEXT to set polarity inversion (normally set to OFF), and press ENTER to toggle the setting.

In TCS mode, FQ indicates the tone squelch frequency and is set in the same manner as the DCS code. After setting the frequency, press NEXT to select the initial phase. The supported phase settings are 0, 120, 180, and 240 degrees (normally set to 0). After completing the settings, move the cursor to EXIT and press ENTER. Power off and restart the device for the settings to take effect.

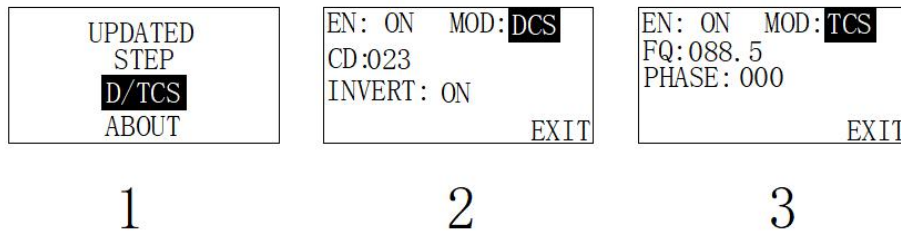


Figure 10

4.3.6. Viewing Device Information and Restoring Factory Settings

Press and hold the NEXT key while powering on the device to enter the configuration screen. Select ABOUT and press ENTER to view the device information. In the ABOUT screen, move the cursor to REST and

press ENTER to restore the factory settings.



Figure 11

4.3.7. Frequency Step and Wide/Narrow Band Settings

Press and hold the NEXT key while powering on the device to enter the configuration screen. Select STEP and press ENTER. Use PREV and NEXT to switch the frequency step setting. The available frequency steps are 12.5 kHz and 25 kHz. After selecting the required STEP setting, press ENTER to exit. The setting takes effect after the device is restarted. NOTE: When the 12.5 kHz step is selected, the occupied bandwidth of the transmitted FM signal becomes narrower.

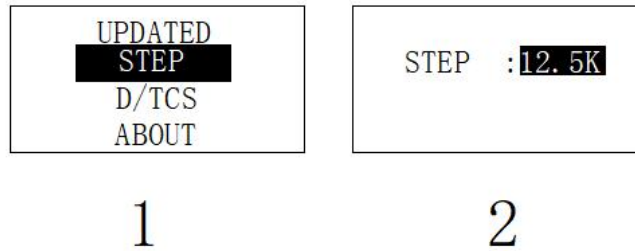


Figure 12

4.3.8. Intermittent Transmission

Press and hold the NEXT key while powering on the device to enter the configuration screen. Scroll down to TX MODE and press ENTER to open the setting.

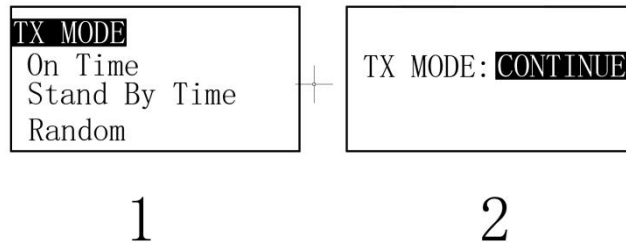


Figure 13

CONTINUE: Normal mode. The beacon transmits according to the settings on the main screen.

FITFUL: Intermittent mode. The beacon alternates between transmitting and remaining silent according to the configured pattern.

During transmission, it follows the settings on the main screen. During the silent period, it does not transmit.

4.3.8.1. Intermittent Transmission Time Setting

Set the transmission time and silent time in seconds (setting range: 1-999 s). The device repeats the following cycle according to the configured times: transmit-silent-transmit-silent.

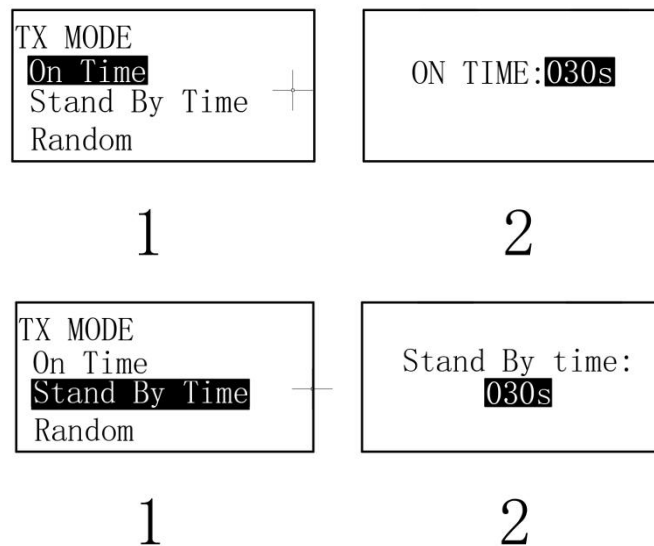


Figure 14

4.3.8.2. Intermittent Transmission Randomness Setting

To add randomness to intermittent transmission, enable the

intermittent transmission randomization function. This function has 10 levels with the following parameters:

OFF: Disabled; Level 1: 0.9-1.1; Level 2: 0.8-1.2; Level 3: 0.7-1.4; Level 4: 0.6-1.7; Level 5: 0.5-2.0; Level 6: 0.4-2.5; Level 7: 0.3-3.0; Level 8: 0.2-5; Level 9: 0.1-10. The beacon multiplies the configured transmission time and silent time by a random factor. The random factor is automatically selected from the range corresponding to the selected level. If the resulting time is shorter than 1s, it is set to 1s. If it is longer than 999s, it is set to 999s.

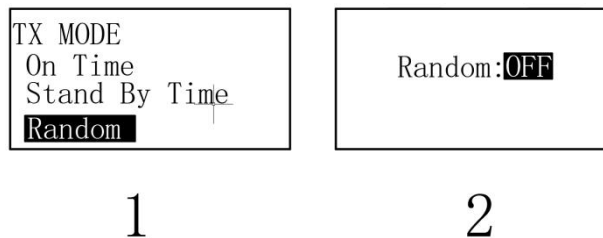


Figure 15

4.3.9. Random Power

The KC1050 can randomly vary its power level. Enable the random power function to make the transmit power vary randomly.

4.3.9.1. Enabling the Random Power Function

Press and hold the NEXT key while powering on the device to enter the system configuration screen. Scroll down to the TX Power Random menu. Press ENTER to open the setting, and change the parameter from OFF to ON.

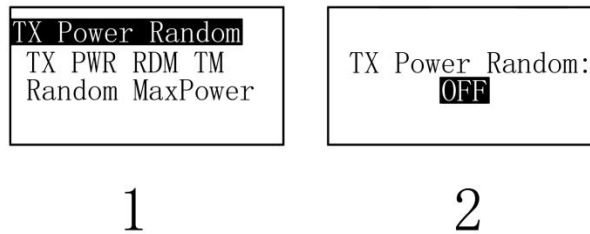


Figure 16

4.3.9.2. Setting the Random Power Switching Interval and Power Range

Continue scrolling down the menu and open TX PWR RDM TM. Set the random power switching interval within the range of 1-999 seconds. At each configured interval, the device adjusts the transmit power once. The power level is randomly selected from the available levels within the configured maximum power limit.

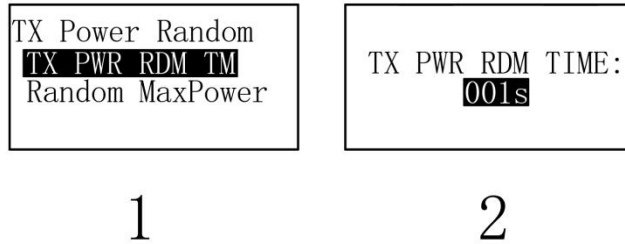


Figure 17

Set the maximum power limit in the Random MaxPower menu:

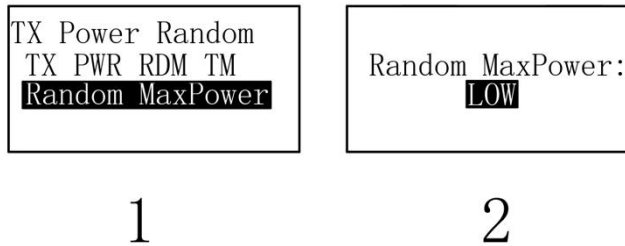


Figure 18

If this parameter is set to LOW, the device randomly switches between LOW and EL. If it is set to HIGH, the device randomly switches among EL, LOW, MID, and HIGH. If it is set to EL, the random power function does not take effect.

After completing the settings, power off and restart the device to enter normal operating mode (main screen).

After the random power function is enabled, the power setting option

in the lower-left corner of the main screen no longer takes effect.

4.3.10. Firmware Update

When a firmware update is available, download the firmware package from the website to a PC. Connect the update cable and open the firmware package using XCOM. Set the baud rate to 115200 and select the correct serial port. Press and hold the NEXT key while powering on the device, select UPDATE, and press ENTER. Then click the Send File button in XCOM and wait for the update to complete. **Do not select the KC1050 UPDATE function unless an update is required and the update cable is properly connected; otherwise, the existing firmware may be lost.**

If the firmware update fails, power off the device and repeat the procedure above.

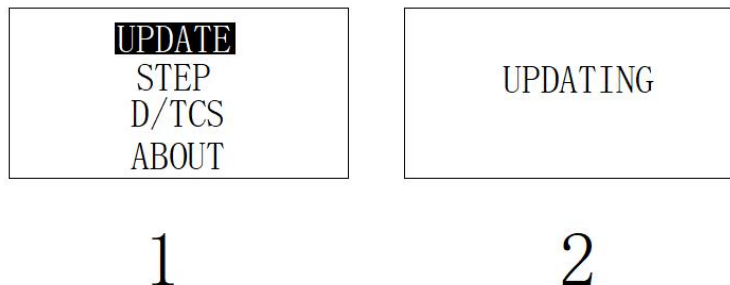


Figure 19

5. Technical Specifications

Frequency Range	VHF: 144-148 MHz / UHF: 430-440 MHz
Frequency Step	25/12.5 kHz
Occupied Bandwidth	16kHz
Maximum Frequency Deviation	4.5 kHz
Antenna Impedance	50 Ω
Operating Temperature ¹	-10 to 40°C (50°C permitted at low power)
Dimensions	58.3 × 86.5 × 36.7 mm
Output Power ²	0.01 W (extremely low) / 0.1 W (low) / 0.2 W (medium) / 0.4 W (high)
Spurious Emissions ³	Better than -60 dBc
Harmonics	Better than -60 dBc
Operating Voltage	7.2 V
Operating Current	≤500 mA
Charging Voltage	5 V (USB voltage)
Charging Current	1 A
Charging Time ⁴	Approximately 6 h
Operating Time ⁵	Approximately 6 h (high power) / approximately 10 h (low power)

Notes:

1. The spurious emission specification is not guaranteed when the temperature is below 0°C or above 40°C.
2. The detectable range of the beacon depends not only on the output power, but also closely on antenna performance. **The supplied antenna is intended primarily for the UHF band.** At low power, the detectable range in an open area can reach approximately 500 m. When the VHF band is used, high power may be required to achieve the same range. **When using the VHF band, a longer antenna is recommended.**
3. CW telegraphy is implemented by switching the RF signal on and off. No raised-cosine filter is used. At the switching instant, pulse spurious emissions not covered by this specification may occur.
4. **Charge the battery as early as possible and avoid waiting until it is fully depleted before charging.** If charging begins only after the battery is fully depleted, the device automatically uses a very low charging current to protect the battery. **Normal charging begins after approximately 30 minutes,** which extends the charging time and may delay use.
5. The operating time was measured at 25°C during continuous transmission. Temperature has a significant effect on battery capacity. When the temperature is below 0°C or above 40°C, the

operating time is reduced. When a straight key or paddle key is used for telegraphy, the device consumes less power while not transmitting, significantly extending the operating time. However, during automatic CW or audio-message transmission, the transmitter remains continuously powered, and the operating time does not change.

For extended operation, the device may be used while being charged from a USB power bank. Each 8000 mAh (29 Wh) extends the operating time by approximately one full operating period.

WARNING: Charging may present a fire or explosion hazard. Do not use the device while charging in vehicles or sensitive areas, and keep it away from flammable materials.

Product Certificate of Conformity		
Model	KC1050	Inspector
Version	0.1.1	
This product has been inspected, complies with the published technical specifications, and is approved for shipment.		