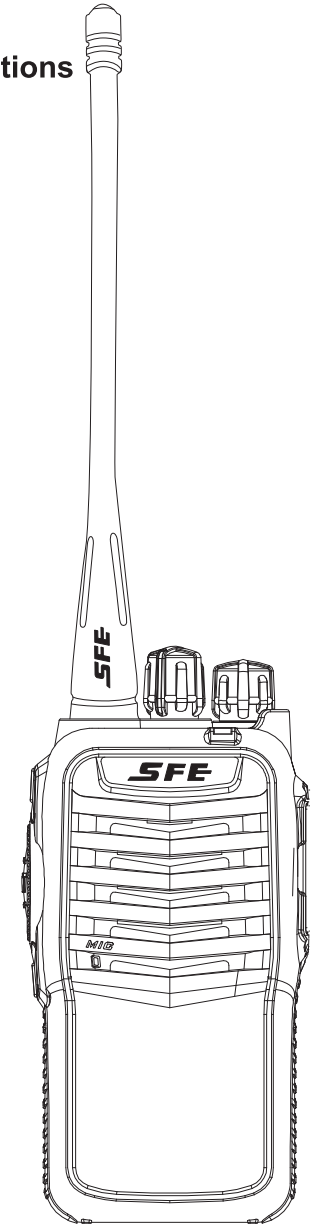




—Rugged-reliable Two-way Communications



Quanzhou SFE Electronic Technology Co.,Ltd

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Digital Portable Radio

USER MANUAL

Introduction

Thank you for purchasing this SFE two-way radio, a truly versatile, professional and durable radio that will provide reliable, high quality communication, even under harsh and demanding conditions. Before operation and to obtain the best performance, please read this manual carefully to become familiar with the radio's features and uses.



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Safety Information

Please read the following information carefully to become familiar with your new SFE two-way radio:

- ◆ Do not attempt to repair, disassemble or re-assemble the radio. Repair should only be carried out by a qualified Radio Engineer.
- ◆ In order to avoid electromagnetic interference, please turn off the radio in any areas where radio transmissions are not permitted e.g. Hospitals, Aircraft, etc.
- ◆ Do not place a radio in any area over, or in the deployment area of an Air Bag within a vehicle.
- ◆ Never operate the radio in potentially flammable and explosive atmospheres.
- ◆ Never replace or charge batteries in potentially flammable and explosive atmospheres.
- ◆ Do not operate the radio if its antenna is damaged.
- ◆ Do not expose the radio to long periods of direct sunlight, for example on the dashboard of a vehicle or close to heating appliances.
- ◆ When using your radio, try to keep it vertical and at a distance of 5~10cm from your mouth.
- ◆ Keep a distance of at least 2.5cm between the antenna and your head and body when transmitting.

Supplied Accessories

Please open the box carefully and check that the following items are included. If you find any items are missing or have been damaged during shipment, please contact your SFE dealer immediately.

Equipment and Accessories Supplied:

ITEM	QUANTITY
Two-way Radio Body	x1
Li-Ion Battery	x1
AC Adaptor	x1
Intelligent Charger Pod	x1
Antenna	x1
Wrist Strap	x1
Belt Clip	x1
User Manual	x1

Caution

In order to avoid damage to the battery, only use the charger provided. The supplied charger is an 'intelligent' charger and has automatic and over-protect functions built in. Do not short-circuit the battery pack or dispose of in fire. The optimal charging temperature is between 10°C and 35°C. When charging in temperatures below 10°C there may be a leakage of electrolyte which will damage the battery. If charging above 35°C, battery performance will be reduced.

Battery Charging

Connect the AC adaptor to the charger. The red LED will light up. Place the battery or the radio with battery attached into the charger (check that the battery is properly in place). The red light will begin to flash - indicating that charging is in progress. The LED will turn green when the battery is fully charged. (see illustration 1)

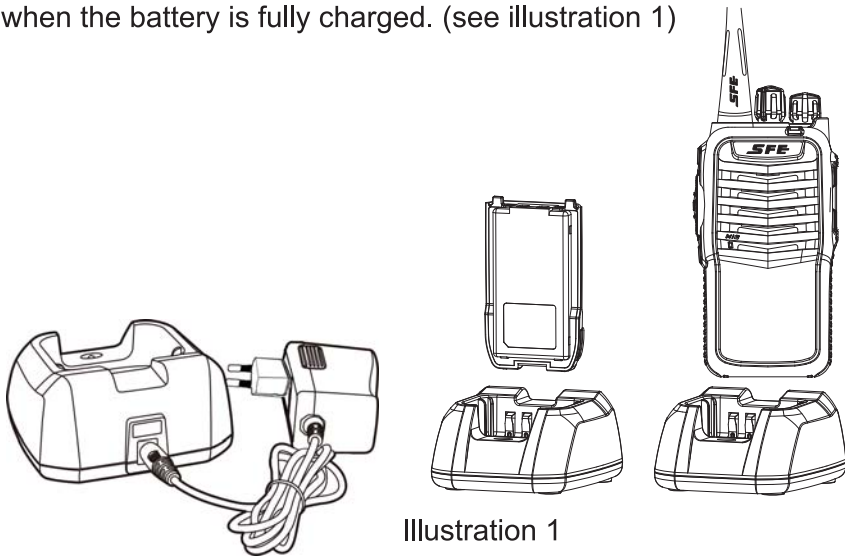


Illustration 1

Installing and Removing the Battery Pack

Place the rechargeable battery pack onto the back of the radio, it will only fit in one way. Snap the battery release clip until it clicks. Be sure the battery pack fits tightly against the body of the radio.

(See illustration 2)

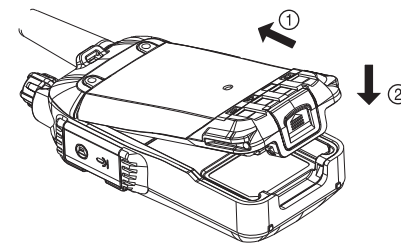


Illustration 2

To remove the battery pack, snap the battery release clip out and remove the battery pack from the body of the radio. (See illustration 3)

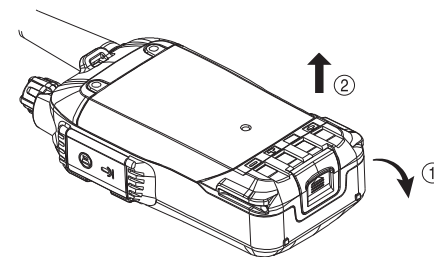


Illustration 3

Accessories Installation

Installing/Removing the Antenna

Screw the antenna into the connector on the top of the transceiver by holding the antenna at its base and turning it clockwise until secure.

(See illustration 4)

To remove the antenna, hold the antenna at its base and turning it counter-clockwise until it be released. (See illustration 5)

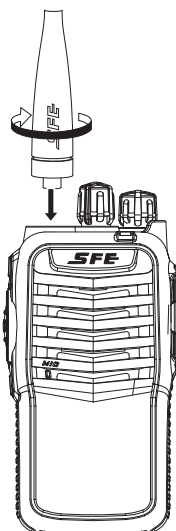


Illustration 4

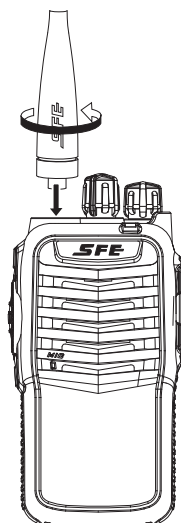


Illustration 5

Accessories Installation

Installing the Earpiece

First release the Speak/microphone cover then insert the speaker/microphone plugs into the SP/MIC jacks.

(See illustration 6)

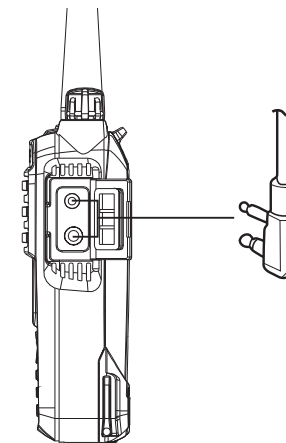


Illustration 6

Installing/Removing the Belt Clip

Attach the belt clip using the two supplied screws. (See illustration 7)

To remove the beltclip, release the screws on the belt clip.

(See illustration 8)

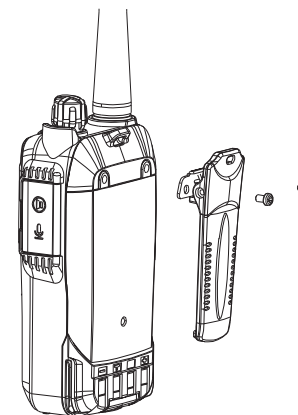


Illustration 7

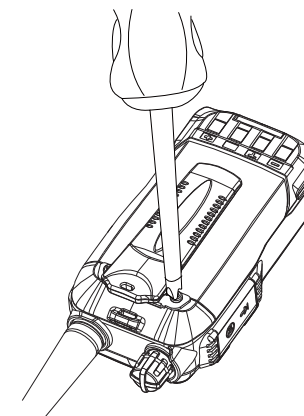
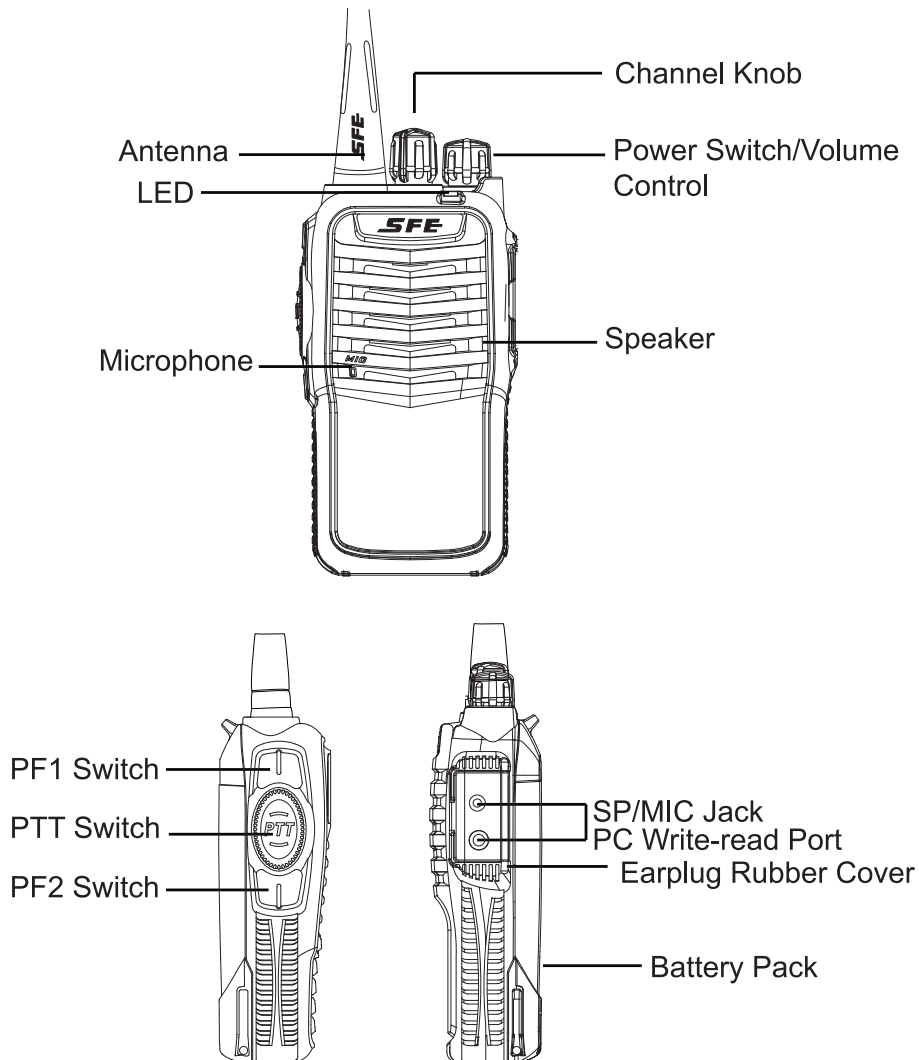


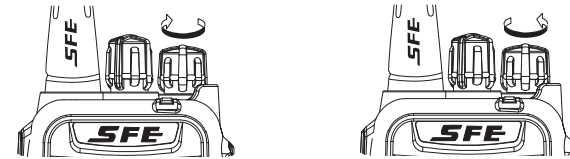
Illustration 8

■ Radio Diagram



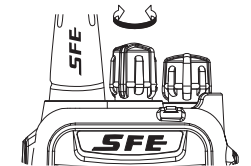
Power ON/OFF

Turn the On/Off/Volume knob clockwise to switch the radio ON. Turn the On/Off/Volume knob counter-clockwise to switch the radio OFF.



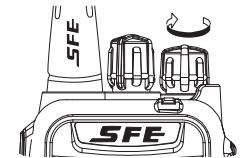
Channel Selection

Rotate the channel knob to select the required channel.



Volume Adjustment

Rotate the Volume knob to adjust the volume, clockwise to increase the volume and counter-clockwise to decrease it. If your dealer programmed Monitor onto 【PF1】 / 【PF2】 key, you can press Monitor key to hear background noise while adjusting the volume level.



Side Key Setting

The [PF1] and [PF2] can be re-assigned to any of the following functions by programming, and customers can select “short press” or “long press”(with long press duration 0.5-3s,default on 1s) as per your request.

Key Assignment

- None •Zone Up •Zone Down •Power Adjustment •Squelch OFF
- Monitor •Talk Around •Scan ON/OFF •VOX ON/OFF •Local Alarm
- Remote Alarm •Remote Monitor •Remote Stun •Remote Kill
- Remote Activation

Kindly note: [PF1] and [PF2] can have the same key assignments.

None: No functions

Zone Up: Switch between Zone 1 and Zone 2

Zone Down: Switch between Zone 1 and Zone2

Power Adjustment: Switch between HIGH/LOW power output.

Squelch OFF: In analog mode, squelch will be ON after press **【PF1】** or **【PF2】** , press again to exit. Kindly note: This function is invalid in digital mode.

Monitor: In analog mode, press pre-programmed monitor key to open signaling squelch so that audio conversation can be heard when the signal is weak.

Note: this function is invalid in digital mode.

Talk Around: Press this programmed key, the RX frequency will be used in place of the TX frequency when transmitting.

Note: After Talk Around function is activated, both receiving frequency and receiving signaling will be used in place of the transmitting frequency and signaling when transmitting.

Scan ON/OFF: Press the programmed Scan key to initiate radio scanning from the current channel, and scanning ascends through the channel numbers in scan list. The green/blue LED flashes when scanning proceeds, and solidly glows when a signal is received with signaling match on a channel. Press the scan key again to exit radio scanning. The scan status will not be memorized after the radio being restart.

Key Assignment

VOX ON/OFF: After inserted with earpiece, press the programmed VOX ON/OFF key to activate or disable VOX function.

Note: This function is invalid without being inserted with an earpiece.

Local Alarm: Press the programmed key to activate/disable local alarm function, radio will emit on-site alarm tone after activated, this function is helpful for emergency rescue.

Remote Alarm: Press the programmed key to activate remote alarm function in the pre-defined radio, once remote alarm function activated successfully the calling radio will receive acknowledgement message sent from the pre-defined radio. Note: This function is valid only in digital mode.

Remote Monitor: Press the programmed key to activate remote monitor function in the pre-defined radio, once remote monitor function activated successfully the calling radio will be able to monitor the conversation in the pre-defined radio. Note: This function is valid only in digital mode.

Remote Stun: Press the programmed key to remote stun the pre-defined radio by sending remote stun code. Only receiving is allowed for a stunned radio(Transmitting is prohibited).

Note: This function is valid only in digital mode.

Remote Kill: Press the programmed key to remote kill the pre-defined radio by sending remote kill code. Transmitting and receiving are prohibited for a killed radio, and can be revived only by PC software programming with revived code.

Note: This function is valid only in digital mode.

Remote Activation: Press the programmed key to remote revive the pre-defined radio having been stunned by sending remote revive code. Note: This function is valid only in digital mode.

Basic Setting

Radio ID

Each radio can be assigned with an ID number, which is useful and can be identified by other users to place an individual call/group call or to send text info etc. ID Range: 1-16776415.

Noted: This function is valid only in digital mode.

Language Selection

Users can select English or Chinese as display language and voice prompt language.

SQ (Squelch Level)

Squelch level can be programmed from level 0 to level 9, receiving sensitivity is the lowest when set in level 9.

Battery Save

If this function is programmed by your dealer, the transceiver will automatically switch to battery save mode when there is no receiving and no operation for more than 10 seconds. When the transceiver receives an incoming signal or is used to transmit, the battery save mode switch off automatically. Battery Save can be programmed ON/OFF by PC software programming.

Time-out Timer (TOT)

The purpose of the Time-out-Timer is to prevent any caller from using a channel for an extended period and avoid any damage caused by long time transmission. Once a continuous transmission exceeds the preset time(programmable by dealer), the transceiver will automatically stop transmitting and emit a warning tone until the PTT is released.

Time-out Timer range: 30-600s, steps: 30s, default: 180s

VOX Function

VOX can be programmed ON/OFF by PC software programming or activated/disabled by pre-programmed key, VOX ON allow users to place a voice-activated hands-free call on the pre-programmed channels. Whenever microphone detect voice, the transceiver will automatically transmit and stop transmitting when voice disappear, or pre-programmed TOT time expires.

VOX Level Range: 0-9

VOX Delay Time: 1-4s

Alert Tone Settings

1. Power ON Tone: ON/OFF selective, transceiver will emit tone "Deng Deng Deng.." when switched ON/OFF;
2. Lower Battery Alert Tone: ON/OFF selective, transceiver will emit alert tone "Deng Di Deng .." if the power is lower than preset value, users should charge the battery or replace with a new battery in time, or the transceiver will stop transmitting if users continue using it.
3. Keypad Tone: ON/OFF selective.
4. Digital Calling Tone: ON/OFF selective, in digital mode transceiver will emit an alert tone "Deng" automatically once after PTT pressed, this is used to alert its in digital mode and also transmitting is ongoing.
5. Channel Voice Prompt Tone: ON/OFF selective.

Channel Information

1. Zone Name

Users can input new name for zone 1 and zone 2, the name can be programmed as number, symbol, English letter and Chinese character up to 9 digits.

Function and Operation

Users can press the corresponding button to add zone, delete zone and switch between zones.



2. Channel Name

Users can input new name for each channel, the name can be programmed as number, symbol, English letter and Chinese character up to 9 digits.



3. General Part

RX/TX Frequency: Users is able to input/change RX/TX frequency for each channel, and the frequency must be consistent with the frequency step rule and within frequency range.

Working Mode: Digital/analog mode is selective for each channel.

Output Power: High/Low power selective for each channel.

Transmitting Limit

Always Allow: Transmitting is always allowed.

Channel Free: Transmitting is allowed only when current channel is free.

CC(color code) Match: Transmitting is allowed only when color code of the incoming call is matched with the transceiver.

Bandwidth: 12.5KHz

Only RX: Only receiving is allowed for the current channel, transmitting is prohibited.

Function and Operation

4. Digital Part

RX CC(Receiving color code): Transceiver will receive incoming call when receiving color code matched, RX CC is 0-15 selective by PC softwareprogramming.

TX CC(Transmitting color code): TX CC is 0-15 selective by PC software programming.

TX Contact(Transmitting Contact)

There are maximum 128 transmitting contacts for users to select, each transmitting contact can be programmed as individual call, group call or all call.

Dual Capacity Direct Mode (DCDM)

Dual Capacity Direct Mode (DCDM) feature supports two simultaneous subscriber transmissions within a 12.5 kHz channel bandwidth for Direct Mode transmissions. The radios within the same group must use the same timeslot so that the group using timeslot 1 does not interfere with the group using timeslot. When a 12.5 kHz RF channel is configured for dual capacity direct mode, both timeslots are available for independent and simultaneous radio call conversations.

RX Group List: This option is to configurate receiving channel list to the current channel. When matched calling group ID from the list detected, the receiving transceiver will open the speaker to receive audio.

Noted: This function is valid only in digital mode.

Voice Encryption: This function allows user to program voice encryption code to the current channel, conversation is allowed between radios only when same encryption code are programmed.

Code range: OFF, 0 – 65535.

Function and Operation

Time Slot Selection: This function is used for dual capacity direct mode(DCDM) and working through repeater, each digital channel can be configure with time slot 1 or time slot 2.

5. Analog Part

RX Sub-tone Type/TX Sub-tone Type: None/CTCSS/DCS/Reverse DCS selective

Digital Contact (Valid only for digital channel)

Individual call/Group call/All call are available for selection, the transceiver supports maximum 128 digital contacts.

This allows user to add digital contacts and input Alias containing numbers, symbols, letters and Chinese characters up to 9 bits. Range of numbers: 1-16776415.

RX Group List (Valid only for digital channel)

This allows user to create/delete receiving group list by adding/deleting members(contacts), group list name can be changed to an Alias (up to 13 bits containing numbers, symbols, letters and Chinese characters). The transceiver supports maximum 32 receiving group lists and maximum 10 members to each group call list.

Scan List

This function allows user to create/delete scan list by adding/deleting channels to be monitored, scan list name can be changed to an Alias (up to 11 bits containing numbers, symbols, letters and Chinese characters). The transceiver supports maximum 8 scan lists and maximum 16 channels to each scan list.

Troubleshooting and Maintenance

Troubleshooting

Problem	Solution
The transceiver does not work when switched on.	The battery is low. Please recharge the battery pack and make sure the battery pack is properly fitted or insert a fresh battery, refit it if necessary. Swap the battery onto another radio to check if one is available.
The battery runs out in a short time.	The battery is no longer in good condition and needs to be replaced with a new one.
The radio can't communicate with other units in the same user group.	The radio is out of usable range, is not on the same channel, is not of the same model type, or the CTCSS/DCS/CC Code/Group ID settings and/or frequencies are incorrect and do not match. Please re-set it.
The radio receives unwanted transmissions from other radio users.	Change the channel of all the radios in the required group to a quiet channel, or change CTCSS/DCS/Time Slot of all the radio in the required group.

Maintenance and Cleaning

Do not carry the transceiver by the antenna or attached audio accessories. Always turn the transceiver OFF when attaching or detaching audio accessories. Clean the buttons, control knob and radio body with a dry cloth when it has been unused for a long time or becomes dirty.

Specifications

General	
Frequency range	EU 400-470MHz/USA 400-480MHz
Channel capacity	32CH
Channel Zone	2
Operating voltage	7.4V DC $\pm 10\%$
Battery capacity	Li-Ion battery 2000mAh 20hours according to 5-5-90
Operating temperature	-20°C to + 40°C
Frequency stability	$\pm 1\text{ppm}$ (-20°C to + 60°C)
Antenna impedance	50 Ω
Dimensions	53x31.5x108mm (exclude projection)
Weight	about 215g (including battery and antenna)
Transmitting	
RF power output	$\leq 5\text{W}$
4SK Modulation	7K60FXD for Data Only;7K60FXW for Data and Voice
Adjacent channel power	$\leq -60\text{dB}(\pm 12.5\text{KHz})$
Spurious RF sponderance	-36dBm $\leq 1\text{GHz}$ -30dBm $\geq 1\text{GHz}$
Frequency response	+1~ 3dB
Audio distortion	$\leq 3\%$
Vocoder	AMBE+2 TM
Receiving	
Frequency sensitivity	5% BER:0.25 μV
Audio distortion	$\leq 5\%$
Spurious restraint	$\geq -8\text{ dB}$
Adjacent-channel selectivity	65 / 60dB (25/12.5KHz)
Inter-modulation distortion	65 / 60dB (25/12.5KHz)
Frequency response	+1~3dB
Jam-up	$\geq 85\text{ dB}$

Sub-tone Table

50 Groups CTCSS

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

110 Groups DCS(N/I)

017	053	122	165	246	311	371	455	546	664
023	054	125	172	251	315	411	462	565	703
025	065	131	174	252	325	412	464	606	712
026	071	132	205	255	331	413	465	612	723
031	072	134	212	261	332	423	466	624	731
032	073	143	223	263	343	431	503	627	732
036	074	145	225	265	346	432	506	631	734
043	077	152	226	266	351	445	516	632	743
047	114	155	243	271	356	446	523	645	754
050	115	156	244	274	364	452	526	654	760
051	116	162	245	306	365	454	532	662	765

Only valid in analog mode

Warranty and Service

Quanzhou SFE Electronic Technology Co.,Ltd warrants against defects in material or workmanship, for a period of 18 months for radio body, and for a period of 6 months for batteries and accessories, from the date of original purchase. This warranty is limited to repair or replacement of defective parts only and is not valid if the equipment has been tampered with, misused or damaged.

This manual is applicable for SD780 Series.

Use this SD780 Digital Portable radio in the environment with temperature between 0-40°C, otherwise, it may damage your Digital portable radio. It can be operating under 2000m. Hereby, Quanzhou SFE Electronic technology Co.,Ltd. declare that the radio equipment type SD780 Digital portable radio is compliance with Directive 2014/53/EU.

For safe operating, the antenna for the product shall be least 25 mm away from your face and 0 mm from your body with belt clip.

The product supplied by Li-ion battery and charged from approved travel Charger.



RF Exposure Information

WARNING! Read this information before using the radio. In August 1996 the Federal Communications Commission (FCC) of the United States with its action in Report and Order FCC 96-326 adopted an updated safety standard for human exposure to radio frequency electromagnetic energy emitted by FCC regulated transmitters.

Those guidelines are consistent with the safety standard previously set by both U.S. and international standards bodies. The design of the radio complies with the FCC guidelines and these international standards.

Never allow children to operate the radio without adult supervision and the knowledge of the following guidelines.

This device complies with Part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference.

For a transmitter that can only be operated with an FCC license, warnings concerning compliance with applicable licensing requirements and information concerning license application procedures.

Our radio generates RF electromagnetic energy during transmit mode.

This radio is designed for and classified as "Occupational Use Only", meaning it must be used only during the course of employment by individuals aware of the hazards, and the ways to minimize such hazards.

This radio is NOT intended for use by the "General Population" in an uncontrolled environment. This radio has been tested and complies with the FCC RF exposure limits for "Occupational Use Only". In addition, our radio complies with the following Standards and Guidelines with regard to RF energy and electromagnetic energy levels and evaluation of such levels for exposure to humans:

---IEEE Std. 1528:2013 and KDB447498, Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields.

---American National Standards Institute (C95.1-1992), IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.

---American National Standards Institute (C95.3-1992), IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields-RF and Microwave.

The information listed above provides the user with the information needed to make him or her aware of RF exposure, and what to do to assure that this radio operates with the FCC RF exposure limits of this radio.

RF Exposure Information

Electromagnetic Interference/Compatibility

During transmissions, Our radio generates RF energy that can possibly cause interference with other devices or systems. To avoid such interference, turn off the radio in areas where signs are posted to do so. DO NOT operate the transmitter in areas that are sensitive to electromagnetic radiation such as hospitals, aircraft, and blasting sites.

Occupational/Controlled Use

The radio transmitter is used in situations in which persons are exposed as consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure.

Attention:

This radio complies with IEEE and ICNIRP exposure limits for occupational/controlled RF exposure environment at operating duty factors of up to 50% and is authorized by the FCC for occupational use only. An appropriate warning label is affixed to all units. In order to comply with RF exposure requirements, a minimum distance of 2.5cm must be maintained when held-to-face, and body-worn operations are restricted to the approved original accessories (belt clip) a minimum distance of 0 mm. Do not use this device when antenna shows obvious damages.

This product is compliance to FCC RF Exposure requirements and refers to FCC website

<https://apps.fcc.gov/oetcf/eas/reports/GenericSearch.cfm> search for FCC ID: 2AYFQ-SD780 to gain further information include SAR Values.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

WARNING! It is up to the user to properly operate this radio transmitter to insure safe operation. Please adhere to the following:

Use only the supplied or an approved antenna(max gain 2.15dBi) Unauthorized antennas, modifications, or attachments could impair call quality, damage the radio, or result in violation of FCC regulations.

If a damaged antenna comes into contact with the skin, a minor burn may result. Please contact your local dealer for a replacement antenna.

RF Exposure Information

■ FCC Compliance Statements:

This device complies with part 15 of the FCC Rules.

Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

RF Exposure Information

■ Licensing Information

Use our radio in USA is subject to the rules & regulations of FCC. Changes or modifications not expressly approved by our may void the user authority granted by the FCC to operate this radio and should not be made. To comply with FCC requirements, transmitter adjustments should be made only by or under the supervision of a person certified as technically qualified to perform transmitter maintenance and repairs in the private land mobile and fixed services as certified by an organization representative of the user of those services. Replacement of any transmitter component (crystal, semiconductor, etc) not authorized by the FCC equipment authorization for this radio could violate FCC rules.

Note: Use of this radio outside the country where it was intended to be distributed is subject to government regulations and may be prohibited.

Important: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this device. Your radio is set up to transmit a regulated signal on an assigned frequency. It is against the law to alter or adjust the settings inside the radio to exceed those limitations. Any adjustments to your radio must be made by qualified technicians.

WARNING: MODIFICATION OF THIS DEVICE TO RECEIVE CELLULAR RADIOTELEPHONE SERVICE SIGNALS IS PROHIBITED UNDER FCC RULES AND FEDERAL LAW.