Zartek

TWO-WAY RADIO

**UHF HANDHELD
FM TRANSCEIVER**

ZA-720

USER'S MANUAL

- Extra Long Range
- Ultra Thin & Durable
  - Li-ion Battery
- Desktop Charger
- Loud Clear Audio
  - 16 Channels

Zartek

MIC

ZA-720

Thank you for purchasing the Zartek ZA-720 Portable Two Way Radio. This radio is easy to use and gives you reliable and clear communication. The ZA-720 UHF transceiver operates at 0.5W on both license-free bands namely 464 MHz consisting of 5 frequencies and 446MHz consisting of 8 frequencies. This transceiver is also approved by ICASA to operate on licensed bands from 400 – 470MHz on 2W of transmitting power.

Please read this manual carefully before using the radio. The information presented here will ensure that you get maximum performance and functionality from the radio. There are also important battery and charging maintenance procedures.

High strength materials and quality components have been used in the manufacture of this two-way radio to give many years of product use. It is designed for every day general use both indoors and outdoors. The ZA-720 radio is slim and lightweight for easy handling yet still durable and easy to operate.

WARRANTY

There is a 12 month factory warranty on the unit. Warranty does not cover speakers, battery or accessories. The product must be used for the intended purpose and not subject to willful or accidental damage. If the product has been tampered with in any way, the warranty shall be considered null and void.

SAFETY INFORMATION

- Study this manual carefully to understand your transceiver well.
- For safety reasons, it is important that the user is aware of and understands the potential hazards common to using any transceiver.
- To clean the radio, wipe with a soft cloth dampened with water. Never use solvents or cleaners on the radio, they can harm the body and leak inside, causing permanent damage.
- Your radio is not splash proof or waterproof. If the radio gets wet, turn it OFF and remove battery immediately. Dry the battery compartment to minimize potential water damage. Leave cover off battery compartment and do not use until completely dry.
- Handle the radio with care and never hold the radio by the antenna. Do not drop or impact the radio as it contains sensitive electronics.
- Do not operate the transceiver or replace/charge the battery in an explosive environment (dust, gas, fumes etc).
- Do not transmit without the correct antenna connected fully or the radio could get damaged.
- Switch the transceiver off whilst filling gas or when parked at a petrol station.
- Do not open or modify the transceiver in any way.
- Refer to a qualified technician for any service or repairs.
- Do not expose the transceiver to long periods of direct sunlight, extreme hot environments or surfaces.
- Do not place the transceiver in excessively dusty, humid, wet and/or unstable areas.

- Please turn off the radio when you are close to a blast area or detonator zone.
- Do not use any radio which has a damaged antenna. It may cause a minor burn when the damaged antenna touches your skin.
- To avoid the problems caused by EMI and EMC, turn off your radio where notices "Please turn off your radios" are posted, such as hospitals.
- Turn off your radio before boarding an aircraft. Any use of the radio must be in accordance with airline regulations or flight crew's instructions.
- If a vehicle is fitted with an air bag, do not place the antenna of the radio within the air bag expand area.
- When the portable radio is transmitting, hold the radio in a vertical position and speak into the Microphone.
- If you carry a radio on your body, please keep the antenna away from your body by at least 2.5cm when transmitting.

PROGRAMMING NOTICE!

This transceiver has been factory programmed and can be used immediately once purchased. All 16 channels have been activated with channels in the license free bands as per the table below and on the back of the box. There are 2 bands, PMR 446MHz band with 8 frequencies (1-8) and the 464MHz band with 5 frequencies (1a-5a). Select the same channel on any ZA-720 radio to communicate.

Compatibility:

The ZA-720 is factory programmed to be directly compatible with all 16 channels on the TX-8, channels 1 to 12 on the ZA-748, ZA-725 and ZA-758 and the first 8 channels on the ZA-708 if they are set to factory programming. You will need to reprogram your ZA-720 radio when there are other channels to be set. Both the frequency (1-8 or 1a-5a) and CTCSS sub tones (1-38) / DCS tone must be the same on all radios for full intercommunication. Should there be interference on a specific channel, select a different channel. Note that Channel 9, 10 & 11 are set on the open frequency without a sub tone and channels 13 to 16 have been set with a tone 20 for more privacy. A sub tone is used to privatise conversations when using the same frequency.

An optional programming cable is available to program different PMR 446MHz and 464MHz channels and sub tones on the ZA-720 Software is available for free download from www.zartek.co.za. The programming cable is connected to the radio to the USB port on a PC. Other settings such as Squelch level, VOX or reassigning the side key for different functions can also be programmed. Licence free use of this transceiver limits the frequencies to the 446MHz and 464MHz bands and the power is restricted to 500mW. If an ICASA license is granted for use of other frequencies (400-470 MHz) and power (2W), special software is available from a registered two-way radio dealer. The supplier and manufacturer take no responsibility if a user operates the transceiver not in accordance with ICASA regulation.

Please refer to the sections in this manual for instructions on programming and the functions available.

BATTERY INFORMATION

Initial Use

New batteries are not charged fully in the factory. Please charge the battery for 3 hours at least before first use. This initial charge pre-conditions the battery for full capacity. Failure to charge fully may shorten the life span of the battery. Recharge the battery immediately once it goes flat as it could get damaged if left very flat for long periods. The maximum battery capacity and performance is achieved after three full charge-discharge cycles.

Battery Pack

Please only use a battery which is approved by the manufacturer. Unauthorized batteries may cause failure of protection circuitry and result in bodily injury and property damage.

Safety Information

1) Do not throw the battery into fire!

2) The battery should be recycled and disposed of correctly.

3) Never attempt to disassemble the battery pack.

4) Only charge the battery, when the ambient temperature is between 5°C~ 40°C.

5) Please turn off the radio when the battery is charging. Using the radio during charging will affect the normal charging of the battery pack and will lengthen the charge time.

6) During charging, do not plug in/pull out the power supply or the battery frequently, it would affect battery charging.

7) Do not charge when the battery or radio is wet. Please dry it with a soft cloth before charging.

8) Do not use the charger, cable or battery if it is damaged, cracked or frayed in any way.

9) The battery life is over when the operating time is obviously shorter than normal even if it's fully and correctly charged. Please then replace with a new battery.

To Prolong Battery Life

1) Battery performance will degrade when the current temperature is below 0°C. A spare battery may be necessary in cold weather. Please keep the cold batteries, as these batteries will work under room temperature.

2) If the battery contact is dusty, it may influence its normal use or normal charge.

Battery Storage

1) Fully charge a battery before storing for a long time, to avoid battery damage caused by over-discharge.

2) Recharge the Li-Ion battery after 6 months as the battery will lose small amounts of charge even when not in use. This regular maintenance will avoid the battery capacity reducing which is caused by over-discharging.

3) When storing your battery, keep it in a cool and dry place under room temperature.

CONTENTS

STANDARD ACCESSORIES

Carefully unpack the transceiver.

We recommend that you identify the items listed below before discarding the packing material. If any items are missing or have been damaged during shipment, contact the supplier immediately. For optional accessories, please visit our website www.zartek.co.za.

Item List

Item	Quantity
Handheld UHF FM Transceiver	1
Detachable Antenna	1
Desktop Mains Charger	1
Li-ion Battery Pack 1600mAH	1
Belt Clip	1
Users Manual	1

RADIO OVERVIEW

Detachable Antenna

Channel Selector CH 1~16

ON/OFF Volume

Communication/ Direct Charging Indicator

Speaker

Microphone

High Impact Casing

Durable PTT Button

MONITOR Button

External Headset/ Programming Jack (Double pin)

USB Charging Port

Detachable Belt Clip

Desktop Charge Contacts

Desktop Charge Contacts
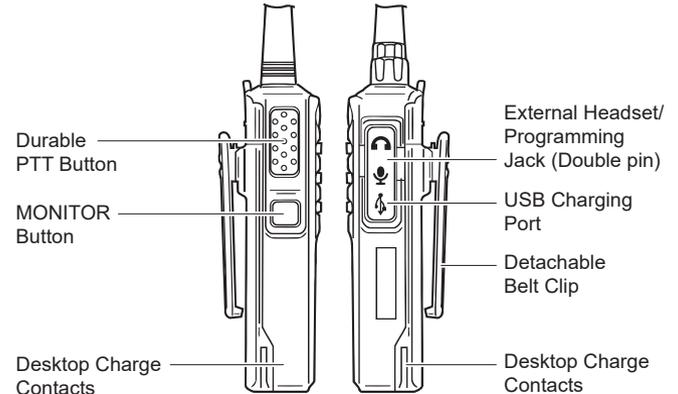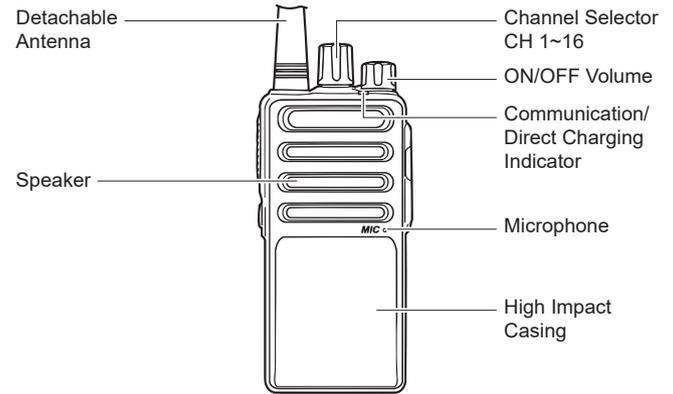
GETTING STARTED

Install & Remove the Battery

Insert the battery pack so that the two bottom protrusions fit into the holes and then close the battery so the battery clip clicks closed.

To remove the battery, lift up the clip at the top back of the radio to release the battery.

Install & Remove the Antenna

Connect the rubber antenna to the top antenna socket by inserting the plug and turning in a clockwise direction. Make sure that the antenna is fully connected until tight.

> **NOTE:** *That the radio requires the antenna to function. Do not transmit without an antenna connected as this could damage the radio.*

Install & Remove the headset / programming cable

Open the side headset speaker / MIC / USB port cover and then plug in the accessory firmly into the side jack.

If you want to remove the accessory, unplug it gently and close the cover.

Charging the Battery

- When the battery capacity runs low, the radio will announce "Please change the battery".
- **There are 2 ways to recharge the radio:**

  Using desktop cradle: Plug the cable from mains adaptor into the back of the desktop cradle and then insert the radio in the cradle. Light on the cradle will show RED when charging and GREEN when full.

  Direct plug in: Plug in the cable for the mains adaptor into the side micro USB charge socket. Light on the radio will show RED when charging and NO Light when full.

Only use the supplied charging adaptors to recharge the radio and battery.

> **NOTE:** *That the battery can be recharged separately from the radio using the desktop charger.*

CHARGE TIME is approximately 3 hours from flat to full.

OPERATING TIME is approximately 25 hours with a fully charged battery if used typically on a 5:5:90 duty cycle on 0.5W power.

> **NOTE:**
>
> 1. *Make sure the radio is switched off during charging or the charging time will be longer and number of possible battery charge cycles reduced.*
>
> 2. *Li-ion batteries do not have memory so they can be recharged at any time. There are a limited number of charge cycles that the battery can handle, typically 500-700 times. To get the maximum use of the battery, only recharge when getting flat. If an almost full battery is recharged, the charging cycles are not optimized.*

BASIC OPERATION

Power ON/OFF

Turn the Power Knob clockwise to switch on the radio; you will hear an On sound and a voice message will indicate the current channel number. Turn counter-clockwise to switch off the radio.

Adjust the Volume

Hold in the side "Monitor" or "Squelch Off" button to listen the background noise, then turn the On/Off knob to increase or decrease the volume.

Select a Channel

Turn the Channel Selector Knob clockwise to change the channels from 1 to 16. Your radio will report the channel number.

Refer to the factory channel settings when linking your radio to other radios as it may be necessary to reprogram or adjust the frequency / sub tone to match.

Transmit

Keep pressing down the PTT key and speak directly into the microphone hole (MIC). Hold the radio about 2.5cm to 5cm from your mouth. The radio should be held so that the antenna is vertical. Speak slowly loud and clear into the radio for a good signal to be received.

Receive

Release the PTT key to receive a call and adjust the volume if needed.

Monitor

The squelch circuit in the transceiver mutes the speaker automatically, when no signals are present so you will not hear background noise. Hold in the side button to Monitor a frequency by deactivating the squelch. This is useful when you want to adjust the volume level, or when you need to hear a weak signal.

Communication Range

Range will depend on the type of terrain that you are communicating across. The ZA-720 uses the UHF (Ultra High Frequency) band and will be subject to similar obstacle interference as cellular phones. The radio works indoors as well as outdoors. Typical rough estimate ranges for different terrains are:

- Indoors or Shopping centre 300m-1200m,
- Building 5-30 stories,
- City centre & dense bush 500m-2km,
- Residential & over water 2-6km,
- Farmland 3-7km,
- Top of mountain or building (line-of-sight) 10-30km.

When you press the PTT talk button a signal is transmitted and the signal floods the area in all sideway directions. The signal travels in 3 different ways:

1) Penetration: The signal can go through materials such as wood, plastic, cement and fabric. The denser the material or more built up the environment the weaker the signal will become. The signal cannot go through solid metal or very large solid land structures such as a hill or mountain. Metal acts like a shield and that is why the performance from the inside of a vehicle will be less than from outside.

2) Reflection: The signal cannot go through metal or very large structures such as a hill or mountain, but it can bounce off (like a mirror), go around and reflect in other directions as well. This happens at the speed of light.

3) Line-of-sight: Line-of-sight is when there are no obstructions in the path between the communicating parties. The higher up you go the further you can see, so the larger the line-of-sight distances will be. Generally you can talk to wherever you can see, which is why the coverage in a valley is much less than the coverage from on top of a hill.

Ensure that there is nothing blocking the antenna. The less metal in close proximity (0-2m) the better the range. There may be external interference from electrical equipment (power lines or factories) or natural causes (moisture in the air or storms) that may vary depending on the location and the weather.

PROGRAMMING (OPTIONAL)

A programming cable is needed to program different channels or functions on the ZA-720. The programming cable links the radio to USB port on a PC or laptop.

USB installation

USB cable driver software for your computer operating system is available for free downloading from www.zartek.co.za or from the cable manufacturer website Prolific (driver for PL2303 USB-Serial cable). Install the correct software and plug-in the cable to the PC. The computer should locate the cable and configure it automatically. You can check that the cable is working by locating it in DEVICE MANGER > PORTS > PROLIFIC USB – SERIAL COMM PORT

Software installation

Programming software for the ZA-720 is available for free download from www.zartek.co.za. Install the software on to a PC by following the installation steps. Once installation is finished, an icon called "ZA-720 User PC Software" will appear on the screen.

Connect the USB cable to the PC and plug-in the twin connector into the speaker/microphone jack on the side of the radio. Ensure that there is a charged battery connected to the radio and switch the radio on. Start the program and a window will appear. The software may automatically find the correct port of the programming cable. Check the Settings > Communication Port to select the correct COM port.

Reading data

Click on the "READ" icon and press "OK" to begin reading the data from the radio. Once loaded, the data can be edited to the appropriate channels and settings and then saved or printed for future reference. See below for instructions on each function.

Writing data

After channel and optional feature data is entered, click the "WRITE" icon to program the radio. Press "OK" to begin writing the data to the radio. Once finished, switch the radio off and unplug the cable from the radio. Additional radios can be programmed by plugging in the cable to the radio, switching it on and following the "WRITE" procedure.

To change settings select Edit > Channel Info or > Optional Features

Licence-free bands

The Frequency column refers to the frequencies that can be selected on the radio. The 8 frequencies in the 446MHz band are represented by the 8 channel numbers, 1-8, in the table. These channels correspond to the channels on other 446MHz license free radios. The 5 frequencies in the 464MHz band are represented by the 5 channel numbers, 1a - 5a, in the second table. These channels correspond to the channels on other 464MHz license free radios.

• **Default Channel Programming**

Channel	Frequency	Tone	Channel	Frequency	Tone
1	1	10	9	1	OFF
2	2	10	10	2	OFF
3	3	10	11	3	OFF
4	4	10	12	1a	15
5	5	10	13	2a	20
6	6	10	14	3a	20
7	7	10	15	4a	20
8	8	10	16	5a	20

446 MHz Band	
Channel	(MHz)
1	446.00625
2	446.01875
3	446.03125
4	446.04375
5	446.05625
6	446.06875
7	446.08125
8	446.09375

464 MHz Band	
Channel	(MHz)
1a	463.975
2a	464.125
3a	464.175
4a	464.325
5a	464.375

CTCSS standard tones 1-38					
Code#	(Hz)	Code #	(Hz)	Code #	(Hz)
1	67.0	14	107.2	27	167.9
2	71.9	15	110.9	28	173.8
3	74.4	16	114.8	29	179.9
4	77.0	17	118.8	30	186.2
5	79.7	18	123.0	31	192.8
6	82.5	19	127.3	32	203.5
7	85.4	20	131.8	33	210.7
8	88.5	21	136.5	34	218.1
9	91.5	22	141.3	35	225.7
10	94.8	23	146.2	36	233.6
11	97.4	24	151.4	37	241.8
12	100.0	25	156.7	38	250.3
13	103.5	26	162.2		

Sub-tones

The Tone column shows the sub tone assigned for each frequency. There are 50 QT (CTCSS quiet tones) and 210 DQT (digital quiet tones that can be selected. These tones are used to privatize conversations and reduce interference from other users on the same frequency. A CTCSS/QT/DQT tone is a sub-audible tone which allows you to ignore (not hear) calls from other parties who are using the same channel. When you receive a signal that has a tone different from the one set up in your transceiver, you will not hear the signal but only the LED will show frequency activity. Likewise, signals that you transmit will only be heard by parties whose CTCSS/QT/DQT tone matches the tone set up in your transceiver.

There are 38 CTCSS standard tones (1-38) plus 12 extra QT tones. The 38 tones are common on other 446 & 464MHz radios such as the Zartek Pro8 or Pro5. If the tone is left "OFF", the frequency is left "open" to receive communication from any tone, but your transmitter will not be decoded by a radio with a tone.

OPTIONAL FEATURES

Battery Save Function

The Battery Save function decreases the amount of power used when a signal is not being received and no operations are being performed (no keys are being pressed, and no switches are being turned). While the channel is not busy and no operation is performed for 10 seconds, Battery Save turns ON. When a signal is received or an operation is performed, Battery Save turns OFF.

• Factory programmed on Save ON.

Squelch

The squelch level is used to adjust the threshold at which signals will open the audio channel. A low level will allow weaker signals to be audible, although with more background noise. However, if weak signals are annoying, the level can be adjusted higher to open the channel only when stronger signals are received.

You can set up the squelch level from 0 to 9. The higher the squelch level, the less noisy is the signal as only stronger signal are accepted. The lower the squelch level the noisier the signal is, as weak signals are also allowed. As the communication range or obstructions between radios increase, the weaker the signal becomes. It is advised to use a lower squelch level to get further communication range.

• Factory programmed on Squelch level 3.

Time-out Timer

The purpose of the Time-out Timer is to prevent any person jamming up a channel for a long time whilst transmitting. If the time that you continuously transmit exceeds the set Time-out time, the transceiver will stop transmitting and a tone "beep" will sound. To stop the tone, release the PTT switch. You can press the PTT switch again to resume transmitting.

NOTE: you can set up the time level: 15s, 30s, 60s, 90s …… 600s.

• Factory programmed on TOT 300s.

VOX (Voice-operated Transmission)

The ZA-720 has a multi-level sensitivity built-in VOX function. You can enjoy talking and listening without pressing PTT key as transmit is automatically activated by sound. This turns your radio into hands-free "walk & talk" when used with a headset. Voice activation is used to operate the radio in hands-free mode or as a noise / baby monitor. The radio will begin transmitting when a noise or voice is heard. There are many headset options (see optional accessories below) which can be used in VOX mode allowing for full hands-free communication.

NOTE: That VOX can be activated in software and manually.

Manual VOX ON/OFF: First set the channel from CH 1 – 5, then switch off the radio. Now Hold in the PTT & Monitor Buttons together and switch radio On whilst holding them in and then release. The radio will announce VOX ON. Repeat the process to toggle VOX OFF.

VOX level

The sensitivity level of the microphone can be adjusted to allow different volumes of sounds to make the radio begin and remain transmitting. There are 1 - 5 levels with 1 being the highest and most sensitive to lower volumes of sound. If the radio is used in a very noisy environment it is recommended to use a low sensitivity level to avoid the radio transmitting unnecessarily. At low sensitivity level it will be required to speak loudly into the microphone to activate the radio. At high sensitivity, a soft voice is all that is required which enable the radio to be placed at a further distance from the noise source (typically 30cm max).

Scan

A scan function is useful when you want to find other people on similar frequencies or to monitor communication within your group. If an active channel is found the scan will stop and lock on to that channel. You can now transmit and receive on this frequency. When the signal is gone for 5 seconds, scanning will resume. LED flashes when scanning.

There are 2 ways to setup scanning:

1) Via Programming Software: Program CH 16 to be blank with no data. Select CH 16 to scan. The radio will begin scanning all the selected chan-

nels (1-15) and lock on to any activity.

2) Manual SCAN ON/OFF: First set the channel CH 16, then switch off the radio. Now Hold in the PTT & Monitor Buttons together and switch radio On whilst holding them in and then release. The radio will announce ON. Repeat the process to toggle Scan OFF.

Scan Add/Delete

In the Channel Info You can add a channel to the scan group or delete it from group.

Add choose Yes in the channel row under the Scan Add column to add the channel.

Del choose No in the channel row under the Scan Add column to remove the channel.

Low Battery Alert

When the battery capacity is getting low, the radio will alert you with a message "please charge the battery" every 5 seconds unless the radio is recharged.

Announce Voice Channel

As the channels are changed, a voice announces the specific channel. This is useful when using the radio at night.

Power Selection (only in dealer license version)

Maximum communication range is achieved when the transceiver is set to high power mode, whilst lower power settings will save battery life. The power can be set on low (500mW) or High (2W).

• Factory programmed on low 500mW

Programmable Side Key

You can program specific functions for the bottom - side key via software.

Local Alarm: A very loud continuous emergency siren is sounded.

Monitor: Hold in the side button to Monitor a frequency by deactivating the squelch. This is useful when you want to adjust the volume level, or when you need to hear a weak signal.

HEADSETS (use with PTT or VOX)

GE-252	Earphone speaker with in-line PTT microphone
GE-259	Lapel speaker microphone for vehicle & security use
GE-266	Acoustic eartube speaker with microphone for discrete communication
GE-273	Heavy Duty D-Cup high volume speaker with mic. & in-line PTT
GE-274	Heavy Duty D-cup high volume speaker with **boom** mic. & in-line PTT
GE-276	Throat Microphone with lapel & finger PTT for motorbike & high wind/noise

GE-203	Spare Battery (3.7V 1600mAH)
GE-254	PC Programming cable USB

TROUBLESHOOTING

Problem	Solution
No power.	• The battery pack may be dead. Recharge or replace the battery pack. • The battery pack may not be installed correctly. Remove the battery pack and install it again.
Battery power dies shortly after charging.	• The battery pack life is finished. Replace the battery pack with a new one.
Cannot talk to or hear other members in your group.	• Check that the Antenna is fitted correctly. • Make sure you are using the same frequency and QT/DQT as the other members in your group. • Other group members may be too far away. Make sure you are within range of the other transceivers.
Other voices (besides group members) are present on the channels.	• Change the QT/DQT. Be sure to change the tone on all transceivers in your group.
The transceiver continuously rings	• Channel programming is empty.

SPECIFICATION

General	
Frequency range	UHF 400-470MHz
Memory channels	16
Operation voltage	3.7V DC
Frequency stability	±2.5ppm
Operation temperature	-20°C~+50°C
Mode of operation	Simplex
Antenna impedance	50Ω
Transmitter	
RF Power	0.5W / 2W
Maximum deviation (W/N)	≤ 5KHz / ≤ 2.5KHz
Spurious emission	≤ 7.5μW
Adjacent channel power	≤ -65dB / ≤ -60dB
SNR (W/N)	≥ -45dB / ≥ -40dB
QT/DQT (W/N)	0.7±0.1KHz / 0.4±0.1KHz
Modulation sensitivity	8-12mV
Transmission current	≥ 1.2A
Receiver	
Sensitivity	-122dBm (12dB SINAD)
Audio power	0.4W (8R Load)
Audio distortion	≤ 10%.
Intermediation(W/N)	≥ 65dB / ≥ 60dB
Adjacent channel selectivity (W/N)	≥ 65dB / ≥ 60dB
Clutter suppression	≥ 65dB
Receiver current	≤ 380mA

NOTE: