maxon
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SPARTAN

User Manual

TS-2116/TS-2416

Welcome

Thank you for your purchase. We are confident that the function and quality will bring you stable, reliable, and clear communication. Please read this manual before operating the radio.

- Ergonomic & Light Design
- 16 Channels
- LED Indicator Light
- Voice Prompts
- VOX
- 2 Watts Power

TS-2116/TS-2416

- Scan
- CTCSS/DCS
- Programmable Key
- Auto Battery Save
- Wired Cloning
- PC Programming

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Safety Information

Please read the following safety guidelines. Nonobservance of these guidelines may cause danger or violation of law.

Don't transmit with antenna detached from the radio or don't damage or change antenna type. Strong electronic waves are emitted from the radio and damages or changes to the antenna may effect the performance of the radio, and it may cause the radio to be defective and not covered under warranty.

Don't use other manufacturers' accessories. Unknown or unauthorized accessories may cause the radio to be defective and void the warranty.

Don't disassemble the radio. Disassembly of the radio may cause a serious defect or malfunction and void the warranty.

Avoid an excessive shock to the radio.
Don't place the radio where the direct sunlight or high temperature occurs.
Avoid a damage to the battery pack by sharp object or an excessive shock.

Turn off the radio before boarding on an airplane.
Don't use the radio in the hospital without any pre-approval.
Don't use the radio at the place of where computer of other electronic devices are being used.

- Please keep the radio at least 1 inch away from the human body.
- Don't give any damage to antenna.
- When using earphone, please reduce the volume to a low level. If not, unexpected high sound may have harmful effect to your ear.
- Don't touch the conductive metal of the battery radio with wet hands. It may cause damage on your hands.
- Please be careful when putting the battery in a pocket or a bag.

- FCC RF EXPOSURE COMPLIANCE REQUIREMENTS FOR OCCUPATIONAL USE ONLY

The Federal Communications Commission (FCC), with its action in General Docket 93-62, November 7, 1997, has adopted a safety standard for human exposure to Radio Frequency (RF) electromagnetic energy emitted by FCC regulated equipment. Proper operation of this radio will result in user exposure far below the Occupational Safety and Health Act (OSHA) and Federal Communications Commission limits.

- DO NOT transmit for more than 50% of total radio use time (50% duty cycle). Transmitting more than 50% of the time can cause FCC RF exposure compliance requirements to be exceeded.
- This radio is NOT approved for use by the general population in an uncontrolled environment. This radio is restricted to occupational use, work related operations only where radio operator must have the knowledge to control the user's exposure conditions for satisfying the higher exposure limit allowed for occupational use.
- When transmitting, hold the radio in a vertical position with its microphone 1 inch (2.5cm) away from your mouth.
- The radio is transmitting when the red LED on the front of the radio is illuminated. You can cause the radio to transmit by pressing the PTT bar on the radio.
- These are required operating configurations for meeting FCC RF exposure compliance. Failure to observe these restrictions mean violation.

FCC Notice

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.

Product Inspection

Thanks for choosing the Maxon TS-2000 Series radio. Before use, please check that the following contents are included:

Items


Radio TS-2116 or TS-2416
Qty: 1

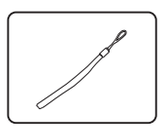

Antenna
Qty: 1


Li-Ion battery
Qty: 1


Charger
Qty: 1


Wall Adapter
Qty: 1


Belt Clip with screws
Qty: 1


Lanyard Strap
Qty: 1

User Manual
Qty: 1

For any damage or lost contents, please contact your Authorized Maxon Dealer.

Note: For antenna identification, the frequency is marked on the color circle at the bottom of the antenna.

Getting Started

Charging the Battery

Please charge the battery as follows:

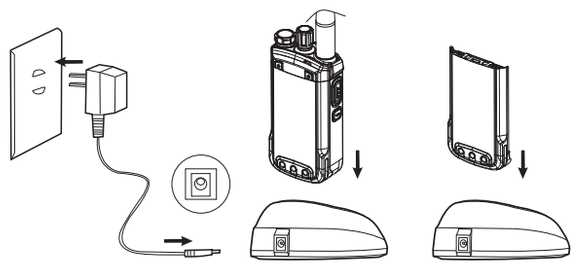
1.Turn off the radio for optimum charging.

2.Plug the AC connector of the adaptor into an AC (110V) outlet.

3.Insert the battery or radio equipped with battery into the charger.

• Red LED indicates battery is charging. Green LED indicates charging is complete.

• The battery requires full charge before initial use.

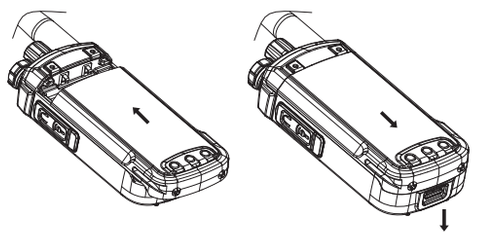


Attaching & Removing

Attaching & Removing the Battery

1. For attaching, slide the battery up from the bottom until it locks securely into place. (figure 1)

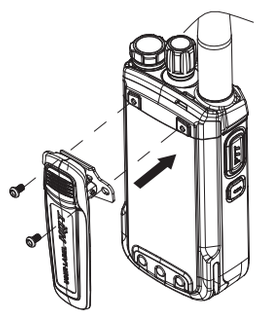
2. Before removing, make sure the radio is turned off. For removal, push the battery lock and slide the battery downwards. (figure 2)



(figure 1) (figure 2)

Attaching & Removing the Belt Clip

To attach the belt clip, secure the belt clip with the 2 screws provided (Phillips head screwdriver required). To remove, reverse the screws and the belt clip can be removed (figure 3). Note: the belt clip does not need to be removed to remove the battery.

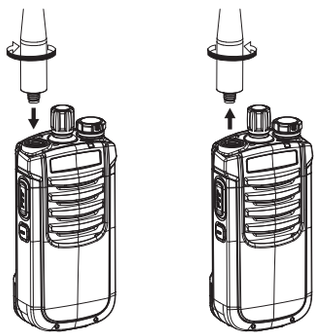


(figure 3)

Attaching & Removing the Antenna

1. To attach, insert the antenna into the connector on the top of the radio by holding the antenna at its base and rotate the antenna clockwise to fasten it. (figure 4) **IMPORTANT: Do not over tighten antenna as it will cause damage to the radio.**

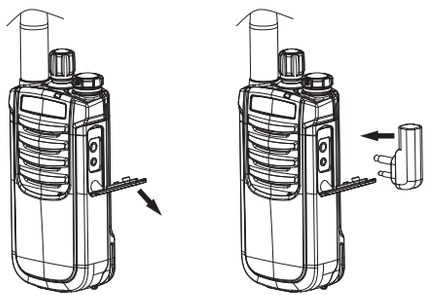
2. To remove, hold the antenna at its base and rotate the antenna counter clockwise until you can remove it. (figure 5)



(figure 4) (figure 5)

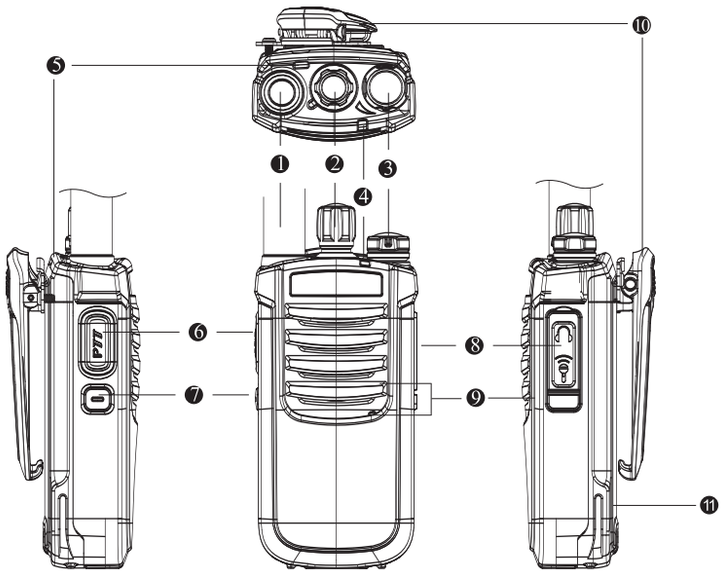
Attaching External Audio Accessories

Pull down the cover of earphone/microphone jack and insert the correct audio accessory into the jack. Please make sure that the proper audio accessory is being used and that it is properly seated in the jack. (figure 6)



(figure 6)

Radio Overview



❶ Antenna
Antenna with screwed connector is required for proper transmit and receive of radio.

❷ Channel Selector
Rotate clockwise or counter clockwise to select operating channel.

❸ Power Switch/Volume Control
Rotate the knob clockwise until a click sounds to turn on the radio. Keep turning clockwise to increase volume. Turn counter clockwise to decrease volume. Keep rotating counter clockwise until a click sounds to turn off radio.

❹ LED Indicator
LED glows red during transmitting; glows green during receiving; flashes red when battery power is insufficient; flashes green during scanning.

❺ Strap Hole
For use with lanyard strap.

❻ Push-To-Talk (PTT)
Press PTT key to transmit; release it to receive.

❼ Programmable Key
Default is battery check with short press and monitor function with long press.

❽ Audio Jack/Data Port
Connect the earphone/microphone or data cable.

❾ Speaker/Microphone

❿ Belt Clip

⓫ Li-Ion Battery

Basic Operation

1. Turn On/Off

Turn on the radio by rotating Power Switch/Volume Control knob clockwise until a click is sounded. Turn off the radio by rotating Power Switch/Volume Control knob counter clockwise until a click is sounded.

2. Adjust Volume

Rotate Power Switch/Volume Control knob to adjust volume when the radio is on.

Note: The volume can also be adjusted in accordance with background noise during monitoring.

3. Channel Selection

Rotate the channel knob to select operating channel from 1-16 or (15+Scan), according to the numbers and symbols on the bottom of channel selector knob or channel annunciation.

4. Make a Call

To make a call, press PTT key and speak into the microphone with a normal voice. Keep the radio/microphone area 2” (5 cm) away from your mouth.

5. Receive a Call

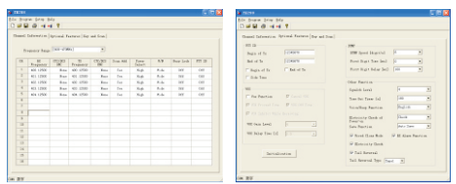
Calls can be received when PTT is released and the radio is in standby mode.

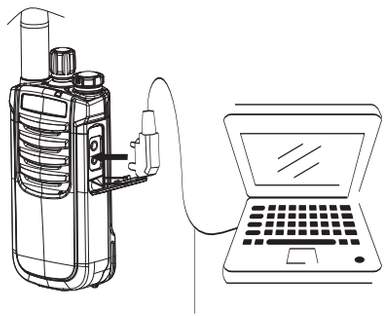
Advanced Operation

Certain functions can be made possible through programming software as programmed by an Authorized Maxon Dealer.

PC Programming

1. Turn off the radio and connect the programming cable between the radio and PC. (See figure 7)
2. For the setting of parameters and writing to the radio, please refer to the Help documents of the software.





Programming Cable (optional)

(figure 7)

Monitoring

1.The receiving status of the selected channel can be checked by a long press of the side button located below the PTT (programmable key). This allows the squelch to open on the radio so any received audio can be heard. Default Mode: Press and hold of the monitor button for up to 2 seconds to monitor the channel for activity.

2.When this function is on, the volume can be adjusted with the Volume Control.

Battery Power Check

1.The battery level/condition can be checked by a short press of the side button located below the PTT (programmable key). Default Mode: Press momentary and release. The radio will announce the power level as “high battery power”, “battery middle power”, “low battery power” or “please charge”.

2.This function is disabled/enabled through the programming software (default is on).

CTCSS/DCS

1.With this function, users can receive calls in corresponding channels only with the same CTCSS/DCS; without this function, users will receive calls from all corresponding channels using the same frequency.

2.This function is disabled/enabled through the programming software.

Busy Channel Lockout (BCL)

1. When BCL is activated, it prohibits transmitting on the channel if occupied by other users. This is indicated by an audio alarm when pressing the PTT.
2. When the channel becomes unoccupied, users can resume talk.
3. This function is disabled/enabled through the programming software (default is off).

DTMF Encode

1.This function is disabled/enabled through the programming software (default is off).

2.If enabled, users can send DTMF code at start or the end of transmission.

Voice Prompts

1.Channel Voice: the radio announces the channel information when you change the channel.

2.Low Power Prompt: the radio announces low battery information when the voltage reaches the minimum operating voltage.

3.Scan Operation Prompt: the radio announces the information when the channel sets to the designated scanning channel.

These prompts can be disabled/enabled through the programming software.

Time Out Timer (TOT)

1. The TOT function prevents extended periods of transmitting, which can cause possible damage to the circuitry of the radio.

2. If transmitting occurs longer than the set time, the radio will stop transmitting and an alarm will sound. Cease pressing the PTT. Press PTT again to resume transmitting.

3.Default is 180 seconds. The time duration can be changed through the programming software.

Squelch Levels

Default level is 4. Levels can be changed through the programming software, which ranges from 0-9. When you choose 0, the squelch is open allowing weak signals to be received. Higher numbers tighten the squelch reducing the noise and interference.

VOX

1.VOX can be enabled to transmit without pressing the PTT key allowing the voice signal to be transmitted through the microphone of the radio.

2.This function is disabled/enabled through the programming software (default is off).

Scan

1.This function is disabled/enabled through the programming software (default is off).

2. When the scan function is enabled, channel 16 becomes the scan channel. The LED flashes green and the radio will scan those channels assigned to scan. If a signal is received, the radio will cease scanning and stop on that channel for the duration of the call.

Low Power Alert

1.When the battery power becomes low during transmitting, receiving, or standby mode, the LED will flash red and the radio will announce “battery low”. You must charge the current battery or replace with a fully charged battery.

Battery Saving

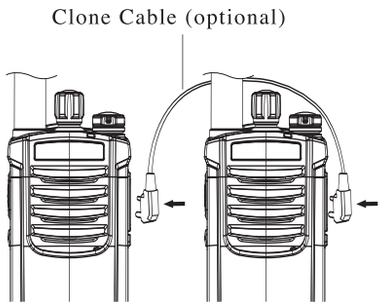
1.If there is no signal or operation after 5 seconds, the battery saving function will occur automatically; when signal is received or transmitted, the radio will switch to normal power mode.

2.Multiple battery save functions can be done through the programming software (default is on).

Wired Clone

Cloning procedure

1. Connect the source radio to the target radio with a cloning cable.
2. Set the source radio on the 8th channel, and press its MONI button to turn it on, its LED glows red after 3 seconds.
3. Press its MONI button again, the LED on the source radio flashes red and the LED on the target radio flashes yellow.
4. The cloning is complete when the LED on the source radio stops flashing and the yellow LED on the target radio goes out.
5. Change to another target radio and connect it with the source radio.
6. Press the MONI button on the source radio again to continue cloning. It is cloning when the red LED and yellow LED on the source radio flash at the same time.



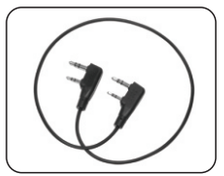
Optional Accessories

Optional Accessories are available according to your requirements, including:


Antennas


Programming Cable


Audio Accessories


Clone Cable


Gang Charger


Carrying Cases

Trouble Shooting

Problem	Solution
No Power	• The battery power may be insufficient. Please charge current battery or change to a fully charged battery.
The battery power consumes quickly after charge.	• The battery life is finished; a new battery would be required.
Can not communicate with other members.	• Please check if your frequency and CTCSS/DCS are the same with other members in your group. • Possibility of being too far away from other members. Please check if you are within communication range.
Voices of non-group members are heard on the channel.	• Please change CTCSS/DCS, and change those of your members also.
No sound or very low sound are received by partner when transmitting.	• Please check if the volume is turned to its highest level. • Be sure to speak directly into the microphone on the radio.
No reception on the channel.	• You may be too far away from other members and cannot receive. Please check if you are within communication range and try again.

Care and Maintenance

These recommendations can help you use the radio effectively and years of continued use.

- Keep the radio dry. Rain, moisture or other liquid may cause damage to the radio.
- Do not throw, hit or vibrate the radio. This may cause damage to the inner IC or other elements and void the warranty.
- Do not hold the radio by the antenna or external audio accessories.
- Please use the original or standard antenna. Unapproved antenna or modifications of accessories may cause damage to the radio.
- Cover the earphone/microphone pad when not using the radio for a long time.
- Use a mild detergent (not corrosive chemicals) and cloth to clean the casing.

Note:
All recommendations above also refer to the battery, charger and accessories.

Warranty Statement

Maxon America, Inc. offers to the original end user:

One (1) Year Limited Warranty on Maxon Spartan Series Radios (separate warranty period on accessories).

One (1) Year Limited Warranty on Accessories (includes, but not limited to, batteries, antennas, belt clips, chargers, audio accessories, nylon cases, leather cases, etc.) and TBM Series Bluetooth kits.

Maxon warrants each new radio product manufactured or supplied by it to be free from defects in material and workmanship under normal use and service for the time period stated, provided that the user has complied with the requirements stated herein. The warranty period begins on the date of purchase from an Authorized Maxon Dealer. This warranty is not assignable or transferable. This warranty is void if the product serial number is altered, defaced or removed. Maxon is not responsible for any equipment that is attached to or used in conjunction with our products.

During the warranty period, if the product fails to function under normal use, because of manufacturing defects or workmanship, it should be returned to the Authorized Maxon Dealer from which it was purchased. The Authorized Maxon Dealer will repair the product or return the product for repair to Maxon or its Authorized Repair Depot. The user is responsible for the removal of the product from a vehicle or any equipment attached to it, or other site of its use; transportation of the product to the Authorized Maxon Dealer; for the return of the repaired or replacement product to the site of its use and for the reinstallation of the product.

Maxon shall have no obligation to make repairs or replacement of product which results from normal wear and tear, or is necessitated by catastrophe, fault, or negligence of the user, improper or unauthorized alterations or repairs to the product, incorrect wiring, use for which it was not designed or by causes external to the product. Maxon's sole obligation shall be to replace or repair the product covered by the warranty. Replacement is done at Maxon's discretion and may consist of a similar or higher featured product. Repair may include the replacement of parts with functionally equivalent new or reconditioned parts. All replaced parts and accessories are warranted for the balance of the original time period. All parts and accessories that are replaced become the property of Maxon America Inc.

THE EXPRESS WARRANTIES CONTAINED HEREIN ARE IN LIEU OF ALL OTHER WARRANTIES, EITHER EXPRESSED OR IMPLIED OR STATUTORY, INCLUDING, WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

FOR ANY PRODUCT THAT DOES NOT COMPLY WITH THE WARRANTY SPECIFIED, THE SOLE REMEDY WILL BE REPAIR OR REPLACEMENT. IN NO EVENT WILL MAXON BE LIABLE FOR ANY DAMAGES, INCLUDING ANY SPECIAL, INCIDENTAL, INDIRECT OR CONSEQUENTIAL DAMAGES, OR THE LOSS OF PROFIT, REVENUE OR DATA ARISING OUT OF THE USE OF OR THE INABILITY TO USE THE PRODUCT.

Appendix

Appendix I: Specification

Item	TS-2116/TS-2416
Frequency Range	136~174MHz/400~470MHz
Channel Number	16
Normal Voltage	DC 3.8V
Working Temperature	-25℃~55℃
Li-ion Battery	2000mAh
Antenna Impedance	50Ω
Output Power	2W/1W High/Low

Modulation Mode	8kΦF3E
Max. Frequency Deviation	≤±2.5kHz
Audio Distortion	≤5%
Frequency Stability	±2.5PPM
Receiving Sensitivity	0.2μV
Audio Power	700mW
Weight	170g
Dimension	105×54×30mm

Appendix II: Technical Terms

Name	Description
Standby	The radio is in receiving mode when no key is operated.
CTCSS / DCS	CTCSS/DCS is a tone attached to an audio signal. If the CTCSS or DCS tone of the transmitter matches that of the receiver, the speaker is unmuted and the audio will be heard. If they do not match, no audio will be heard.
Battery Save	If there is no signal being received or no operation being conducted for some time, the radio will enter into power saving mode. In this mode, the radio will stop working at regular intervals to save power.
TOT	The Time Out Timer (TOT) is used to prevent extended periods of transmitting. If an extended period of transmitting occurs, this can cause damage to the circuitry of the radio.
Squelch	This is to solve the problem of talk quality and noise. Squelch is to suppress the background noise and keep the radio quiet when no signal is received. It can mute the radio when no signal is received. Turn on the Squelch, and you will hear the sound from the speaker.

Squelch On	In the on condition, the radio is receiving all audio signals.
Monitor	This function enables you to hear all the calls even with unmatched CTCSS/ DCS.
Scan	Allows the radio to receive calls on multiple channels.
BCL	When this channel is in use by other users, your radio is prohibited to transmit on the channel to avoid interference.
VOX	VOX enables user to speak into the radio without pressing [PTT] key and the sound is transmitted.
Wired Clone	This is a way to clone parameters from one radio to another one.
Revert Channel	Revert channel refers to the current working channel when pressing [PTT] key during scan.

Appendix III: Frequency & Tone Chart TS-2116 (VHF)

Maxon TS Series				
Model TS-2116 VHF Radio				
	Transmit (TX)	Receive (RX)	CTCSS Tone	Bandwidth
Channel	Frequency	Frequency	TX and RX	W/N
1	151.6250	151.6250	67.0	N
2	151.9550	151.9550	67.0	N
3	152.8850	152.8850	67.0	N
4	152.9150	152.9150	67.0	N
5	151.7000	151.7000	67.0	N
6	151.7600	151.7600	67.0	N
7	152.9450	152.9450	67.0	N
8	151.8350	151.8350	67.0	N
9	151.8050	151.8050	67.0	N
10	151.5125	151.5125	67.0	N
11	151.6550	151.6550	67.0	N
12	151.6850	151.6850	67.0	N
13	151.7150	151.7150	67.0	N
14	151.7450	151.7450	67.0	N
15	151.7750	151.7750	67.0	N
16	151.8650	151.8650	67.0	N

Appendix IV: Frequency & Tone Chart TS-2416 (UHF)

Maxon TS Series				
Model TS-2416 UHF Radio				
	Transmit (TX)	Receive (RX)	CTCSS Tone	Bandwidth
Channel	Frequency	Frequency	TX and RX	W/N
1	464.5000	464.5000	67.0	N
2	464.5500	464.5500	67.0	N
3	467.7625	467.7625	67.0	N
4	467.8125	467.8125	67.0	N
5	467.8500	467.8500	67.0	N
6	467.8750	467.8750	67.0	N
7	467.9000	467.9000	67.0	N
8	467.9250	467.9250	67.0	N
9	461.0375	461.0375	67.0	N
10	461.0625	461.0625	67.0	N
11	461.0875	461.0875	67.0	N
12	461.1125	461.1125	67.0	N
13	461.1375	461.1375	67.0	N
14	461.1625	461.1625	67.0	N
15	461.1875	461.1875	67.0	N
16	461.2125	461.2125	67.0	N