BADGER WERX

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Badger 100

Complies with DMR Digital Protocol
Digital and Analog Programmable
VOX Function

Time-Division Multiple Access (TDMA) Digital Technology
Digital Mode • Single Call • Group Call • All Call • Voice Prompt
Channel Scanning • Priority Scanning • Emergency Alarm • DTMF
High/Low Power Selectable • Talk Around • 32 Channels
Programmable Multi-Function Keys

DMR
DIGITAL TWO-WAY RADIO

USER'S MANUAL

Patented: 201430207600.6

BADGER WERX

Introduction

Thank you for buying this Badger 100 two-way radio. The goal of the Badger 100 is to provide cost-effective communication equipment for a variety of business sites.

This product uses professional, commercial, and amateur frequencies. You are responsible for adhering to your local regulations on frequency allocation and usage.

Please read this manual carefully in order to know how to properly operate the radio prior to use.

Welcome to your Badger 100 two-way radio!

www.badgerwerx.com

Main Features

- High/Low Power Selective
- Voice Prompt
- Monitor
- 32 Channels
- Low Power Alarm
- SQL
- VOX
- Wide/Narrow Bandwidth Programmable
- Lone Work
- Channel Scanning/Priority Scanning
- End-Tone Elimination
- Emergency Alarm
- Programmable Multifunction Keys
- TOT
- Voice Encryption
- Talk Around

Digital And Analog Functionality

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User's Manual

Unpacking and Checking Equipment

Charging the Battery

Using the Battery

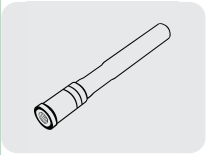
www.badgerwerx.com

Unpacking and Checking Equipment

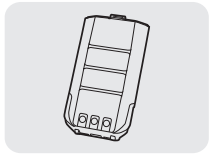
Welcome to your Badger 100 radio! Before use, we suggest you:

- Check the box and check for signs of damage.
- Open the box carefully and verify the following items are in the box. If any items were lost or damaged during shipping, please contact your Badger Werx dealer immediately.

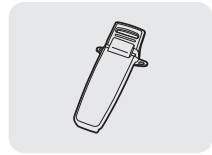
Parts List



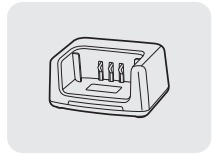
Antenna (1)



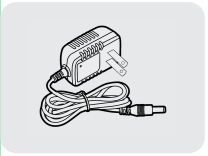
Li-ion battery (1)



Belt Clip (1)



Charger (1)*



Charger Adapter (1)*

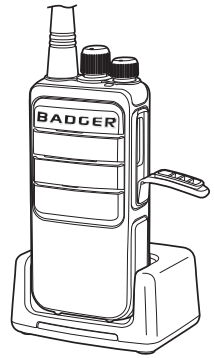
User's Manual (1)

*If Ordered Kit

Charging the Battery

Please use the battery charger provided by Badger Werx to charge the battery and follow these steps:

- Insert DC jack of the supplied power adapter into DC jack on the back of the charger.
- Insert power adapter into AC outlet, the green indicator will illuminate when the charger is properly connected.
- Insert the battery or radio with battery attached into the charger.
  A solid red indicator means the battery is charging normally.
  A flashing red indicator means the battery has over-discharged from non-use or extended storage. Normal charging has resumed when the red indicator remains solid.
  A solid green indicator means the battery is fully charged.
- Please remove battery or radio when fully charged.



Using the Battery

The battery is not fully charged at the factory, please charge before initial use.
After purchase or extended storage (more than two months), the battery will not charge to its full capacity on the initial charge cycle. After two or three charge/discharge cycles, the battery will charge to its full capacity.

Notice: After fully charging the battery, remove from the charger. Do not charge it again until after use or extended storage (more than two months). Over-charging the battery can damage the battery and/or shorten the battery life.

Note:

- The battery must be charged between 40˚F to 104˚F. It can not be fully charged outside of this temperature range. Please prepare a spare battery for extended cool weather use. The depleted batteries may be charged once they are within the stated temperature range.
- Keep the battery contacts clean to ensure proper charging and use.
- Please turn off the radio before charging.
- Do not charge the battery if the battery or radio is wet.
- Please replace the battery if it no longer charges to full capacity.

Battery Type

Please use the Badger Werx supplied charger(s) and batteries. Using non-approved batteries or chargers may result in fire, personal injury and/or damage to property.

Battery Safety Tips

- Do Not Dissasemble
- Do Not Dispose Of In Fire
- Do Not Charge In Hazardous Locations
- Do Not Short-Circuit Terminals

Battery Storage

- A fully charged battery can be stored safely for up to two months.
- For extended storage, charge/discharge battery to 40% capacity and check every two months, recharging to 40% capacity as needed.
- Fully charge the battery before using after extended storage.
- Store in a cool, dry place between 40˚F and 80˚F for best results.

Installing and Uninstalling Accessories

Getting Acquainted

www.badgerwerx.com

Installing and Uninstalling Accessories

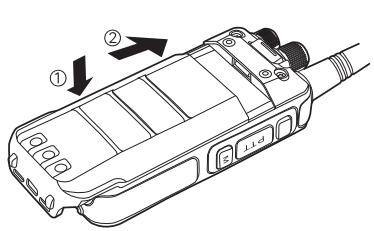
Installing / Removing the Battery

Installation

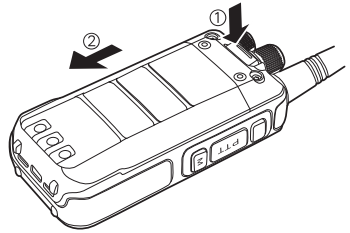
• Place the battery onto the back of the radio and slide upwards until you hear it click and lock into place.

Removal

• Be sure radio is turned off. Press the lock button and slide the battery down.



(Installing the battery)



(Removing the battery)

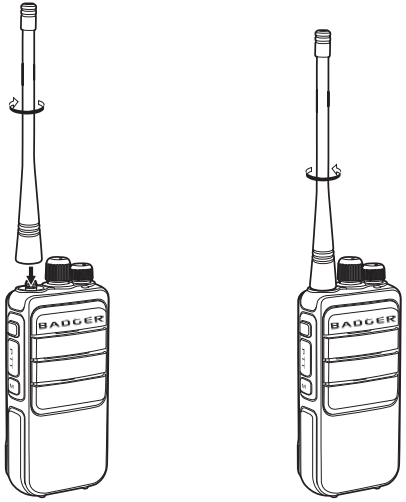
Installing / Removing the Antenna

Installation

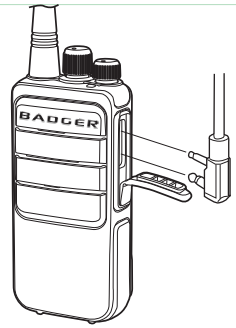
- Screw the antenna into the connector on the top of the radio by holding the antenna at its base and turning it clockwise until secure.

Removal

- Hold the antenna at its base and turn it counter-clockwise until removed.



Speaker Mic / Programming Jack

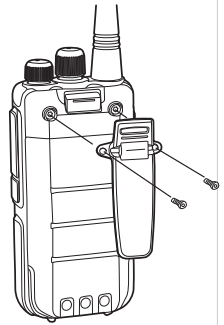


Open speaker mic cover, align jacks and insert into radio (speaker mic sold seperately)

You can use computer programming software to configure the radio (consult with your dealer for programming software)

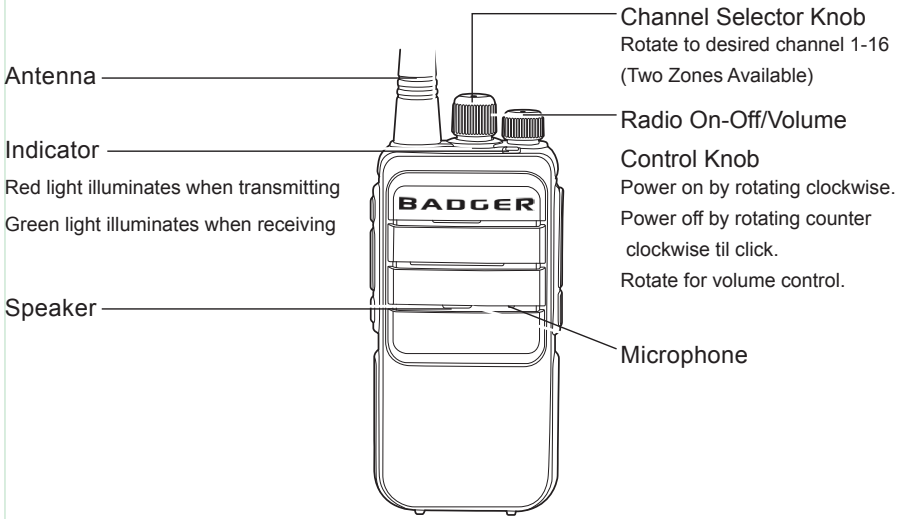
Note: If you enable VOX function, you will need to power-cycle the radio after programming it to activate VOX function.

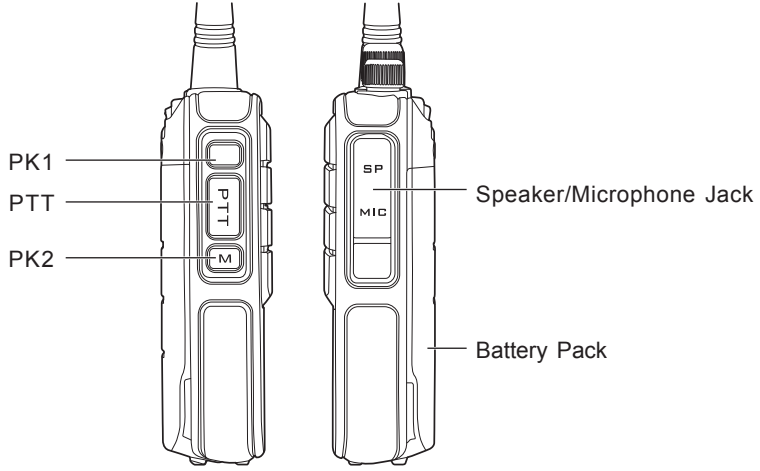
Installing the belt clip



If desired, attach the belt clip to the back of the radio with the supplied screws.

Getting Acquainted





PK1 & PK2 can be dual-programmed for the following functions using short/long press.

PK Options: 1. Unnasigned 2. Alerts On/Off 3. Emergency On 4. Emergency Off
5. High/Low Power 6. Monitor 7. OTA1 8. OTA2 9. OTA3 10. OTA4
11. OTA5 12. OTA6 13. Repeater / Talkaround 14. Scan On/Off
15. SQL 16. Voice Encryption On/Off 17. VOX On/Off 18. Zone Toggle
19. Battery Indicator 19. Lone Work On/Off

OTA = One Touch Access

Basic Operation and Functions

www.badgerwerx.com

Basic Operation

Power On/Off

Rotate the power/volume control knob clockwise to turn on radio power and counter-clockwise to turn it off.

Note: There will be no power-on indication beep if the alert tones are disabled.

If the radio will not power on, check the battery pack to ensure it is charged and properly installed.

If the radio will still not power on, please contact your Badger Werx dealer.

Volume Control

Rotate the power/volume control knob clockwise to increase the volume and counter-clockwise to decrease the volume. You can check the volume level by pressing the monitor key if programmed.

Note: Please refer to the programming software to program the PK1 & PK2 keys.

Channel Selection

Turn the channel selector knob to desired channel number (32 Channels).

Note: There are two zones with 16 channels in each zone on this radio.

Use the Zone Toggle key to switch zones if programmed.

TX

Press PTT and face microphone when talking. Hold the radio 1.5” to 2” away from your mouth and speak normally for best results.

RX

Release PTT to receive information. Adjust volume level for best voice quality.

Functions

LED Indicator

The LED indicator shows the radio’s status.

Red Light: The radio is transmitting.

Green Light: The radio is powering on, receiving a non-encrypted call or message, or detecting signal activity.

Alert Tones

Alert tones are for indicating radio status or recieving signal.

Continuous tone: Sounds until user silences it.

Recurring tone: Programmed for desired duration and repetition. Automatic On/Stop/Repeat.

Repeating tone: Repeats until user silences it.

Single tone: Sounds once, duration set with programming software.

PTT

1. The PTT button enables the radio to transmit information to other radios.
   Press PTT to communicate, release to receive. Pressing PTT activates the microphone on the radio or speaker mic(if attached).
2. When the radio is not receiving communication, the PTT button can be used to initiate a new call. If programmed, the Talk Permit tone will sound, wait until tone ends before talking.

3. If programmed, the Free Channel Indication Tone will sound after the sending radio has ended their transmission and released their PTT button. This indicates the channel is clear and awaiting your response.
4. You can disable the Free Channel Indication with the programming software. You can disable all Alert Tones or make it user selectable with the programming software. (Alerts On/Off)

Receiving and Making A Call

Zone Selection

The Zone is a channel group. This radio supports 2 Zones with 16 channels in each Zone.

1. Press programmed Zone key.
2. You will hear two beeps when switching to Zone 2.
   You will hear one beep when switching to Zone 1.
   Choose the desired channel by rotating the Channel Selector Knob to corresponding channel, user ID or contact ID.

Receiving and Answering Calls

The radio is ready to transmit and receive communications once the channel number, user ID, or contact ID has been set by rotating the Channel Selector Knob. Calls can also be made by using pre-programmed One Touch Access Keys.

Calls:

Green LED illuminates when receiving.

Red LED illuminates when transmitting.

1. When line is clear, press PTT to answer.
2. Keep the radio 1-2 inches (2.5-5.0cm) away from mouth when speaking.
3. Wait to speak until after Talk Permit tone has ended (if programmed).
4. Release PTT when finished speaking to receive information.

Receiving and Answering Group Calls

The radio must be programmed as a group member to transmit and receive communications in group calls.

Group Calls:

Green LED illuminates when receiving.

Red LED illuminates when transmitting.

1. When line is clear, press PTT to answer.
2. Keep the radio 1-2 inches (2.5-5.0cm) away from mouth when speaking.
3. Wait to speak until after Talk Permit tone has sounded (if programmed).
4. Release PTT when finished speaking to receive information.
5. The group call automatically ends if there is no traffic within the specified timeframe.

Receiving and Answering a Private Call

Private Calling allows for private calls between radios with the same privacy settings. There are two steps.

First, detecting radio before calling; Second, ready to make a call.

The LED lights green for the chosen radio. You can only program this feature on the same type of radios.

First, detecting radio before calling; Second, ready to make a call.

The LED lights green for the chosen radio. You only can program this with the same type of radios.

Making a Private Call:

Press the programmed private call key on both radios that wish to initiate a private call.

Green LED illuminates when receiving.

Red LED illuminates when transmitting.

1. When line is clear, press PTT to answer.
2. Keep the radio 1-2 inches (2.5-5.0cm) away from mouth when speaking.
3. Wait to speak until after Talk Permit tone has sounded (if programmed).
4. Release PTT when finished speaking to receive information.
5. The private call automatically ends if there is no traffic within the specified timeframe and you will hear a short tone.

Programmed Key to Make Group /Private Call

This function enables users to easily make a private or group call to defined ID or contacts by short or long pressing the programmed key.

Receiving All Calls

All Call is for transmitting information such as “Special Notices” to all of the programmed channels.

When receiving:

1. The green LED will illuminate and the radio will sound a tone.
2. The private call automatically ends if there is no traffic within the specified timeframe.

Note: If you change to another channel while receiving an All Call, you will stop receiving the All Call. You can not use any programmed keys until the All Call is over.

Making All Call

Program the radio with this function to transmit information to all programmed channels.

1. Rotate Channel Select Knob to to desired channel.
2. Press PTT to transmit, the red LED will illuminate.
   Wait to speak until after Talk Permit tone has sounded (if programmed)
3. Keep the radio 1-2 inches (2.5-5.0cm) away from mouth when speaking.
4. Users on this channel can not respond.

Message

Send Preset Messages

You can preset up to 50 character messages.

1. Choose the desired contact to send a preset message.
2. The red LED will illuminate.
3. A double tone will sound if the message was succesfully sent. A single tone indicates the message was not succesfully sent.

Encryption

This function is only available for digital channels.

You can preset up to 16 4byte encrypted lines with the programming software.

Emergency Alarm

If programmed, use this key to send an emergency alarm.

Lone Work

When programmed, this function protects radio users working alone. When enabled the radio will alert the user at a specified interval. The user keys up to signal they are safe. If the user does not key up within the specified interval, the radio will transmit an emergency alarm.

Scan

Scan List

Create the scan list and allocate it to a channel. Scanning will search for any communications on the channels listed. It supports up to 250 lists with 16 members for each list.

Scan

The red LED illuminates when scanning.

There are two methods of scanning:

1) Main Channels (manual scanning):
   Scans all channels/contact groups in all scanning lists.
   When scanning, your radio starts from the last scanned channel/contact list or first scanning channel.
2) Automatically:
   Scanning starts from the last active channel.

Start And Stop Scan

1) Choose automatic scanning channel by pressing the programmed key or by rotating the Channel Selector Knob.
2) When scanning begins, the red LED illuminates and a high tone sounds.
   When scanning stops, the LED goes off and a low tone sounds.

Scanning with Priority Channels

When enabled, this function scans the priority channels first then cycles through the normal channels then starts over with the priority channels.

Answering Calls During Scanning:

Radio will stop on an active channel for the pre-programmed amount of time.

1. Within the set time, Press PTT to call, the red LED will illuminate.
2. Keep the radio 1-2 inches (2.5-5.0cm) away from mouth when speaking.
3. Wait to speak until after Talk Permit tone has sounded (if programmed).
4. Release PTT when finished speaking to receive information or restart scanning.

Settings

SQL

You can adjust the SQL to filter poor signals or channels with higher than normal background noise.

Normal: Default value.

High: Filters channels with high background noise, may also filter poor signals from long distance transmissions.

1) Press the programmed SQL key.

2) A high tone indicates high SQL; A low tone indicates normal SQL.

High/Low Power

High power(5W) enables long distance communication. Low power(1W) is for short distance communication.

1) Press the programmed High/Low Power key.

2) A high tone indicates low power mode; A low tone indicates high power mode.

Alerts On/Off

You can enable or disable radio alert tones.

1) Press the programmed Alerts On/Off key.

2) A high tone indicates alert tones are on; A low tone indicates alert tones are off.

VOX

This function enables your radio to make a voice activated call on the current channel.

When an accessory with VOX capability detects voice, the radio will transmit the information within the set timeframe.

Press PTT to disable the VOX function.

Use the following steps to re-start the VOX function:

Cycle the radio power, rotate the Channel Selector Knob to another channel, or use the following steps.

1) Press the programmed VOX On/Off key.

2) A high tone indicates VOX is on; A low tone indicates VOX is off.

Check Remaining Battery Capacity

Press programmed key to check the battery capacity by tones.

1) High Capacity Remaining: Three beeps

2) Mid Capacity Remaining: Two beeps

3) Low Capacity Remaining: One Beep

4) Very Low Capacity Remaining: Long Tone. Recharge or swap batteries immediately.

Specifications

Trouble Shooting Guide

Warranty Card

www.badgerwerx.com

Specifications

General Specifications

Frequency Range	VHF Version: 136-174MHz UHF Version: 400-480MHz
Channel	32 Channels: 2 Zones - 16 Channels per Zone
Channel Spacing	Digital: 12.5KHz Analog: 12.5KHz or 25KHz
Operating Voltage	7.5V
Battery Type	Li-ion
Operating Temperature	-30˚C to 60˚C
Storage Temperature	-40˚C to 85˚C (Extended Storage 0˚C to 30˚C)
Antenna Impedence	50Ω
Audio Output Power	⩽1000mW@16Ω
Battery Capacity	1700mAh or 2000mAh Standard Li-ion battery
Dimension (HxWxD)	128x61x38mm (Not Including Antenna)
Weight	258g

Transmitter

Output power	High: ⩽5W (HI) Low: ⩽1W (Low)
Frequency Stability	+-1.0PPM
Adjacent Channel Power	⩽-60dB
Free Time Slot Power	TDMA: ⩽57dBm
Hum and Noise	-40dB@12.5KHz
Spurious Radiation	Antenna: 9KHz-1GHz ⩽-36dBm 1GHz-12.75GHz ⩽-30dBm
FM Modulation Mode	12.5KHz: 11K0F3E
4FSK Digital Mode	12.5KHz(data only):7K60FXD 12.5KHz(data+voice): 7K60FXE
Modulation Maximum Deviation	2.5KHz@12.5KHz
Nonactive Slot Power	-57dBm
Digital Protocol	ETSI TS 102 361-1 -2 -3
Vocoder Type	AMBE+2TM
Audio Response	+1dB~-3dB
Modulation BER(Bit Error Rate)	⩽5%

Receiver	
Analog Sensitivity	0.35uV/-116dBm(20dB SINDA) 0.22uv/-120dBm(Type)
Digital Sensitivity	0.3uV/-117.4dBm (BER 5%) 0.22uv/-110dBm (BER 1%)
Co-channel Rejection	⩾-12dB
Adjacent Channel Selectivity	TIA603C:65dB ETSI:60dB
Spurious Response	TIA603C:75dB ETSI:70dB
Rated Audio Power	1W
Audio Response	=1dB~-3dB
Rated Audio Distortion	3%(Type)
Spurious Radiation	Antenna: 9KHz-1GHz ⩽-57dBm 1GHz-12.75GHz ⩽-47dBm

Note: Specifications may change without notice due to technical improvements. Thank you.

Trouble shooting guide

Troubles	Solution
No Power	● The battery has been depleted. Replace or recharge the battery. ● The battery is installed incorrectly. Remove it and install again.
The operating time is short, even when the battery is fully charged.	● Replace the battery.
Not able to communicate with other transceivers in the same group.	● Confirm the QT/DQT is the same. ● The distance is out of range.
Another group can be heard.	● Change the QT/DQT of your group.
Other radios do not receive the TX signals or received signals are quiet.	● The microphone may be damaged, send it to a local dealer to check. ● Turn the volume up by rotating the Volume Control Knob clockwise.
Only hear static noise.	● The distance is out of the radio's range. Turn on the radio in closer range and try again.

Badger Werx

Warranty card

Note:

1. This warranty card is only applicable for the two-way radio model and serial number listed above.
2. The warranty card is required for the end-user to qualify for warranty service on their two-way radio under the terms specified.
   Please keep this document in a safe place.
3. The warranty card must be completed by the dealer or it is invalid.

Maintenance record

Carry-in date			
Completion date			
Fault description			
Maintenance staff numbers			
Maintenance personnel No.			
Signature			

This warranty card to be kept by the end-user, no replacement if lost.

Customer Name :

Customer Address :

Customer Telephone :

Radio Model :

Serial number :

Purchase date :

Invoice No. :

Dealer : Stamp:

Dealer Address :

Dealer Contact :

Dealer Contact Telephone :

Thank you for buying Badger Werx two-way radios. We strive to provide you with stable, clear, and efficient wireless communication services.
For the best warranty service experience, please review the following information:

The warranty period begins on the date of purchase. If a product failure occurs during the warranty period (12 months on the radio and battery, 6 months on accessories), you must provide the product, original warranty card, and purchase invoice to an authorized repair center.

The following failures are not covered under warranty and would be subject to repair or replacement charges:

(1) Failure to supply original warranty card, or the card has been altered or is illegible.
(2) Damage caused by use that is outside of the intended use of the product.
(3) Damage caused by misuse, abuse, accidents, water, or negligence.
(4) Damage caused by improper testing, operation, maintenance, disassembly, or adjustments.
(5) Damage caused by unauthorized repairs or disassembly.
(6) Damage caused by excessive force.
(7) Wear and tear during normal use.

If in need of repairs, please return in-person or ship the following to a Badger Werx authorized repair center:
The product, original warranty card, and purchase invoice. Shipping costs are the responsibility of the end-user. Return shipping to the end-user is covered if the repair or replacement was covered under the product's warranty.