

# **USER MANUAL**

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ZAXCOM.COM

## **VRX1**

VHF IFB Receiver

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## Knowing your VRX1



### Overview

The Zaxcom VRX1 is a portable belt-worn analog VHF IFB audio receiver built to monitor audio and cue talent in the film, television, and broadcast industries. Simply connect an earpiece or headphones to the 3.5mm output for clean, reliable audio performance.

VRX1 utilizes an innovative direct conversion design that is capable of tuning into and decoding 10 analog broadcast channels in the VHF 192-217 MHz frequency range.

Among its core features is an intuitive voice prompt system, voting, frame specific audio delay, an adaptive squelch, headphone equalization, and multiple power options all in a rugged, easy to use device.

### Technology

As an analog VHF receiver with frequency modulation (FM), VRX1 features an innovative direct conversion design to receive audio. Zaxcom has refined this technology to reduce all forms of RF interference while extending battery life.

### Connectivity

VRX1 operates in the VHF 192-217 MHz frequency range and is pre-programmed with 10 standard channels for quick setup. The preset channels are: 216.025, 216.075, 216.175, 216.275, 216.425, 216.525, 216.725, 216.825, 216.925, and 216.975.

Users can select one of the 10 channels using the front two push buttons, both of which are programmable. When enabled, a voice prompt system allows for users to select channels as well. Pre-programmed channels can be reconfigured through the optional Zaxcom GUI Bridge (ZGB).

- VRX1 is also available in the 76-86 MHz frequency range as a special order.

### Compatibility

VRX1 is compatible with analog VHF FM Comtek transmitters operating on 192-217 MHz. This allows you to mix and match VRX1 with other Comtek IFB receivers connected to the same transmitter. Future compatibility with other manufacturers will be determined.

Current transmitter compatibility:

- Comtek BST 75-216
- Comtek BST 25-216
- Comtek M-216

## Operation, Voice Prompts & Voting

The front A/B and \* buttons control settings and can be programmed to limit control or be completely disabled.

Voice prompts can be enabled to announce the current channel selection, battery life, and other key settings through headphones. Think of voice prompts as convenient read out of the menu and settings.

Voice prompts can also adjust key settings, like selecting from the 3 preset modes, changing channels, adjusting audio delay, enable voting, controlling volume, and powering off the unit. The voice prompt system provides a seamless interaction with a user without the need to look down at the device. If desired, it can be disabled.

Voting allows VRX1 to automatically connect to the strongest transmitter signal when more than one transmitter is in operation. Voting can be enabled or disabled in the settings.

## Audio Delay & Squelch

When an audio delay is required, VRX1 has audio delay settings that can be customized from 1 to 15 frames. An adaptive squelch algorithm intelligently minimizes noise when a transmitter signal is absent.

## Camera Audio

Connecting VRX1 through its 3.5mm balanced mono output to a camera creates a single audio channel for reference monitoring.

## Power

VRX1 can be powered through 2x AA alkaline, NiMH, or lithium batteries.

- 2x Alkaline batteries up to 9 hours
- 2x NiMH AA batteries up to 13 hours
- 2x Lithium AA batteries up to 17 hours

The USB-C port located on top of the unit also provides power when connected to a power source. Additionally, you can also charge rechargeable NiMH batteries without removing them by connecting a USB-C power source.

## VRX1 Accessories

Zaxcom offers an optional VRX Dual Charger that can charge two VRX1 receivers. To use the VRX Dual Charger, power down VRX1 and insert into the slot. A flashing blue LED will indicate charging. A solid green LED will indicate a completed charge.

- Included in the VRX Dual Charger box:
- 1x VRX Dual Charger
- 1x USB-C cable
- 1x Power Plug

An optional EV Clip is available for quick attachment.

## Zaxcom GUI Bridge (ZGB)

The optional Zaxcom GUI Bridge (ZGB) combines hardware and software, giving complete control over VRX1 settings through an easy-to-use interface. Connect a ZGB to a VRX1 through USB-C to program advanced settings and manage a large inventory quickly.



# VRX1 Interface



- 1. Programmable A/B Key
- 2. Programmable \* Key
- 3. Charging Bay contacts
- 4. Battery Compartment
- 5. 1/8" Headphone Jack

- 6. USB Charging/Data Port
- 7. Power Switch
- 8. Signal/Power/Status LED
- 9. Volume Knob

## VRX1 Interface Continued

- **Power Switch:** Pressing the **A/B** and **\*** keys simultaneously within 3 seconds of powering up will activate the voice menu.
- **A/B (Up Arrow):** Programmable button to select a channel, adjust audio delay, and enable voice prompt.
- **\* Key:** Programmable button to select a channel, adjust audio delay, and enable voice prompt.
- **VRX1 LED Behavior:** Displays the current status.
  - Slow Blinking Green: Receiving signal from transmitter on selected channel.
  - Slow Blinking Purple: Not receiving signal from transmitter on selected channel.
  - Solid White: Programming Menu Mode.
  - Slow Blinking Red: Low battery (cell voltage less than 0.9V) – this means ~30 minutes are left.
  - Fast Blinking Red: Low battery (cell voltage less than 0.8V) – this means ~10 minutes are left.
  - Flashing Blue: Charging.
  - Solid Green: Charging complete.
  - Solid Red: Indicates a charging fault and that the charging process has been aborted. This generally indicates that non-rechargeable batteries are in the unit (cell voltage greater than 1.5V).

## Batteries & Charging

VRX1 is designed to support alkaline, rechargeable Ni-MH, and lithium batteries. Two AA batteries are needed to power the unit.

Ni-MH rechargeable batteries can be recharged without removing them from the device through USB-C. Before charging, VRX1 must be turned off. When in a charging state, an LED will blink blue. When charging is complete, the LED will change to solid green. In the event of a charging fault, the LED will turn solid red. VRX1 will also confirm a low battery and charging status with an audible voice prompt on the headphone output.

An optional VRX Dual Charger can charge two VRX1 receivers. To use the VRX Dual Charger power down VRX1 and insert into the slot. A flashing blue LED will indicate charging. A solid green LED will indicate a completed charge.

- **Note: The default battery setting is set to NiMH. If you use alkaline or lithium you can adjust this setting only using the Zaxcom GUI Bridge. If you don't adjust this setting, you might receive an incorrect low battery warning.**
- **Note: For proper performance, be sure to insert two of the same type of battery in the device. Do not attempt to charge a disposable battery. In addition, recharging fully charged batteries in the charger will shorten the overall battery life.**

## VRX1 Receiver Antennas

VRX1 uses the attached headphone cable as a receiver antenna.

## Recommended Channel Spacing

To ensure the best performance when using multiple analog transmitters, it is recommended practice to set any physically adjacent analog transmitters at frequencies at least 300kHz from each other. Channel spacing of less than 100kHz will result in poor RF performance. If using multiple brands of receivers, please observe both these guidelines and the transmitter manufacturer's channel spacing recommendation.

# Programming VRX1 via Zaxcom GUI Bridge (ZGB)

## What is the Zaxcom GUI Bridge (ZGB)?

The Zaxcom GUI Bridge (ZGB) is an all-in-one networking interface that provides set up and control of Zaxcom compatible devices.

## Connecting VRX1 to ZGB

ZGB is designed to be plug-and-play with all software built-in. Connecting a VRX1 to a ZGB is accomplished through the USB-C port on the VRX1:

- **Note: A USB-C male to USB-A male cable is required.**
1. **Power:** Plug the ZGB into the included power supply or a compatible USB-C power supply. Be sure VRX1 has batteries installed and is powered off.
  2. **Connect:** Using a USB-C male to USB-A male cable connect the ZGB and VRX1.
  3. **Operating:** If operating the ZGB directly, plug a mouse and keyboard into the USB-A ports, and a compatible monitor into the HDMI output.
    - **Note: If ZGB is powered on without a keyboard connected, an on-screen keyboard will appear on selected fields.**
  4. **Power Up:** Turn on the ZGB by pressing the power key. Green and red LEDs will blink on boot up and then slowly beat red while on.
  5. **Network:** To operate via LAN or external WAN connect ZGB to a network via its RJ45 port. Any computer connected to that network can access ZGB with an internet browser. Alternately, to access ZGB via its built-in WAN, the factory default password settings are:
    - SSID: Zax
    - PASSWORD: zaxcom2023
  6. **Web Browser:** Upon successful connection direct the web browser on the smartphone, tablet, or computer to **http://zaxcom.local** to access the remote software.

Once connected, the control screen can be accessed from the ZGB main menu by clicking on the VRX icon or by selecting it from the menu in the upper left-hand corner of the screen. The ZGB menu allows the user to program individual VRX1 units.



## ZGB Read & Write Settings

The current saved settings of an individually connected VRX1 can be uploaded into the ZGB for editing by selecting **Read VRX**. When **Read VRX** is selected, the device's name will be displayed, and all its parameters will be shown in blue. Any changes or new settings will toggle to green as they are selected. When **Write VRX** is selected, the desired settings will be flashed to the connected VRX1. Presets can be saved and recalled by selecting **Presets**.

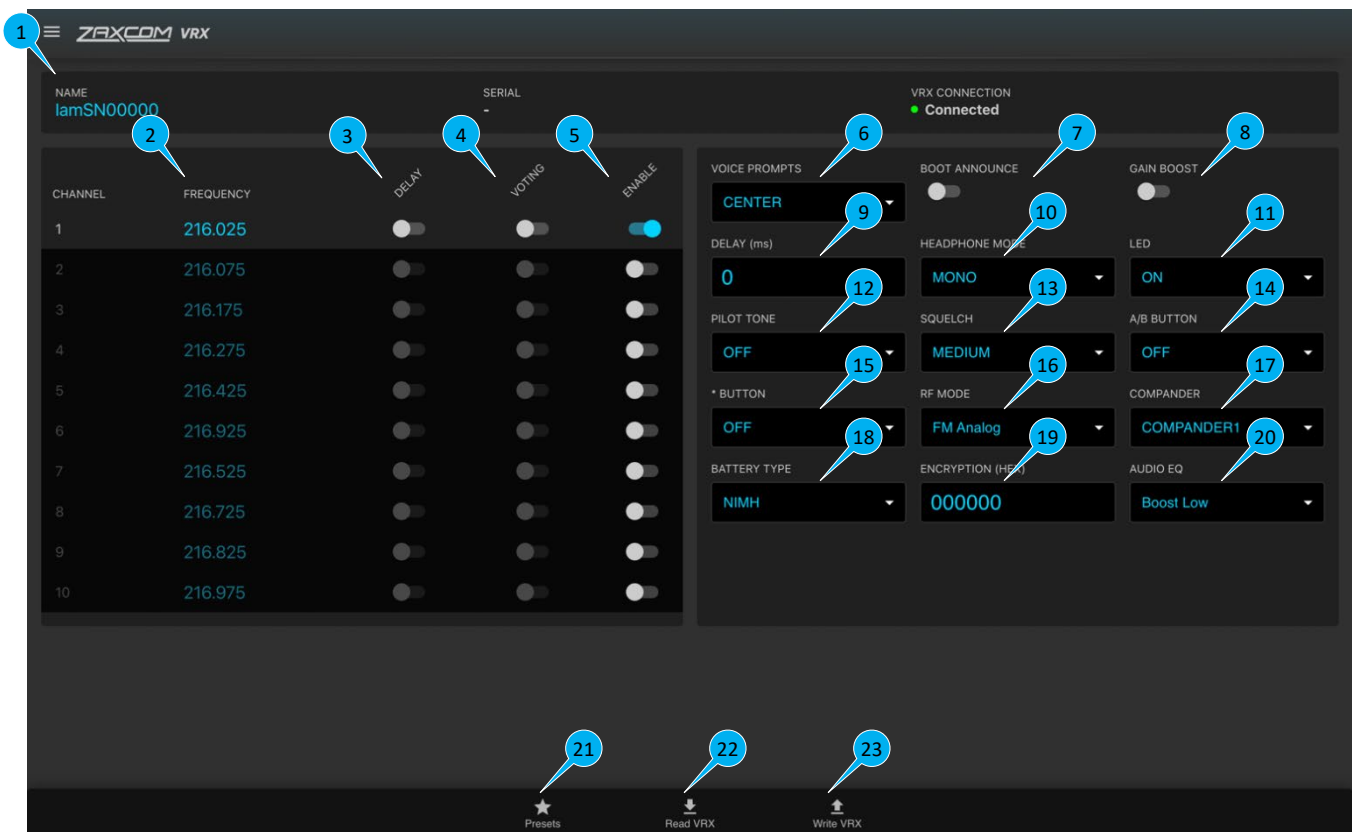
When the control screen is initially selected, it defaults to ALL\_DEVICES in the transmitter name. When ALL\_DEVICES is selected, the desired setup can be selected and written globally to any connected VRX1 units. This is especially helpful when handling many VRX1 units or working in batches.

## ZGB Compatibility

The software portion of the Zaxcom GUI Bridge is compatible with any Raspberry Pi 4 device. The software can be downloaded at: <https://zaxcom.com/support/downloads/>

- **Note:** ZGB software can be loaded onto any Raspberry Pi 4 device when programing VRX1 or RX-8D devices. Control of URX, TRX, or ZMT units still requires Zaxcom branded ZGB hardware.

## ZGB Interface



1. **Name/Serial Number:** Displays the name and serial number of the unit. The name can be edited by clicking on this field. The serial number cannot be edited. In this way, multiple units can be catalogued and managed.
2. **Frequency:** Each individual VRX1 holds up to ten frequencies in its memory, marked as channels. These channels can be enabled or disabled in each individual unit, and, when enabled, are selected by using the



programmable **A/B** and **\*** buttons. This allows an individual VRX1 unit to tune in to up to ten different transmitting sources. The preset channels are 216.025, 216.075, 216.175, 216.275, 216.425, 216.525, 216.725, 216.825, 216.925, and 216.975. (Note: Recalling Factory Defaults will reset the frequencies if they have been modified. Refer to **Programming the VRX1 Manually** for instructions.)

3. **Delay:** Applies the programmed delay value to the audio received at that channel up to 400 milliseconds.
4. **Voting:** Selecting channels for voting will enable the VRX1 to automatically tune to the strongest received frequency from the list of enabled frequency channels. The minimum channel spacing for voting in Analog mode is 100KHz. If the **A/B** or **\*** Button is set to **CHANNEL**, pressing that button will still cycle between enabled frequencies.
5. **Enable:** Enables the VRX1 to tune to the desired channel, selectable with either the **A/B** or **\*** buttons as programmed. Enables will reset when factory defaults are selected.
6. **Voice Prompts:** Activates/Deactivates internal voice prompts on the VRX1 unit and can assign them to the left, right, or center channels of the headphones output. Some basic voice prompts, such as a low battery indication, or a bootup announcement will still be enabled.
7. **Boot Announce:** Activates/Deactivates the bootup announcements on the selected VRX1. Holding the **\*** key on bootup will announce the current firmware version and the settings for the currently selected channel.
8. **Gain Boost:** Activates +10db gain on the headphone output of VRX1. (Note: With Gain set to +10, and headphone knob turned up all the way, the audio output may distort.)
9. **Delay Value:** This value determines the amount of delay applied in milliseconds for channels in which delay is enabled. For reference, at 30fps, 33ms=1 video frame. With the delay set to zero, the overall system latency in analog mode is 4.7ms.
10. **Headphone Mode:** Toggles mono/stereo headphone output. In analog mode, the audio output defaults to mono.
11. **LED:** Activates/deactivates the external LED on VRX1.
12. **Pilot Tone:** Enables/Disables Pilot Tone on VRX1. This feature is currently disabled in Analog Mode.
13. **Squelch:** The Squelch setting controls the degree to which VRX1 reduces unwanted noise from RF interference. It's adjustable as a Low / Medium / High setting.
14. **A/B Button:** Programs the behavior of the **A/B** key on the VRX1.
  - **CHANNEL:** **A/B** key will cycle through enabled channels as it is pressed.
  - **DELAY:** **A/B** key will enable/disable delay on the current channel.
  - **ANNOUNCE:** **A/B** key will prompt VRX1 to announce the current channel selection.
  - Hold down the **A/B** button on boot up, then press **\*** repeatedly to open the factory default menu.
  - Holding **A/B** while holding down **\*** will enter the channel selection menu.
15. **\* Button:** Programs the behavior of the key on VRX1.
  - **CHANNEL:** **\*** key will cycle through enabled channels as it is pressed.
  - **DELAY:** **\*** key will enable/disable delay on the current channel.

- **ANNOUNCE:** \* key will prompt the VRX1 to announce the current channel selection.
- Holding down the \* key on bootup will announce the receiver's firmware and current selected channel settings.

- 16. RF Mode:** Toggles between FM analog and digital modes. FM is the only mode available.
- 17. Compander:** Toggles adjustment of the compander settings for the receiver unit. Currently, **Compander 1** is the default and is compatible with Comtek transmitters on companded channels. Turning the compander off will make VRX1 compatible with uncompanded channels but will result in degraded audio quality.
- 18. Battery Type:** Adjusts the battery metering for NIMH, alkaline, or lithium batteries.
- 19. Encryption:** Sets receiver encryption for digital reception mode. This function is not available in FM analog mode.
- 20. Bass Boost:** Toggles a low-frequency boost for frequencies below 320Hz on the VRX1 unit. Choices are: Normal, +3dB, +6dB.
- 21. Presets:** Loads saved preset settings for VRX1.
- 22. Read VRX:** Uploads the current settings while connected to a Zaxcom GUI Bridge.
- 23. Write VRX:** Writes selected settings while connected to a Zaxcom GUI Bridge.

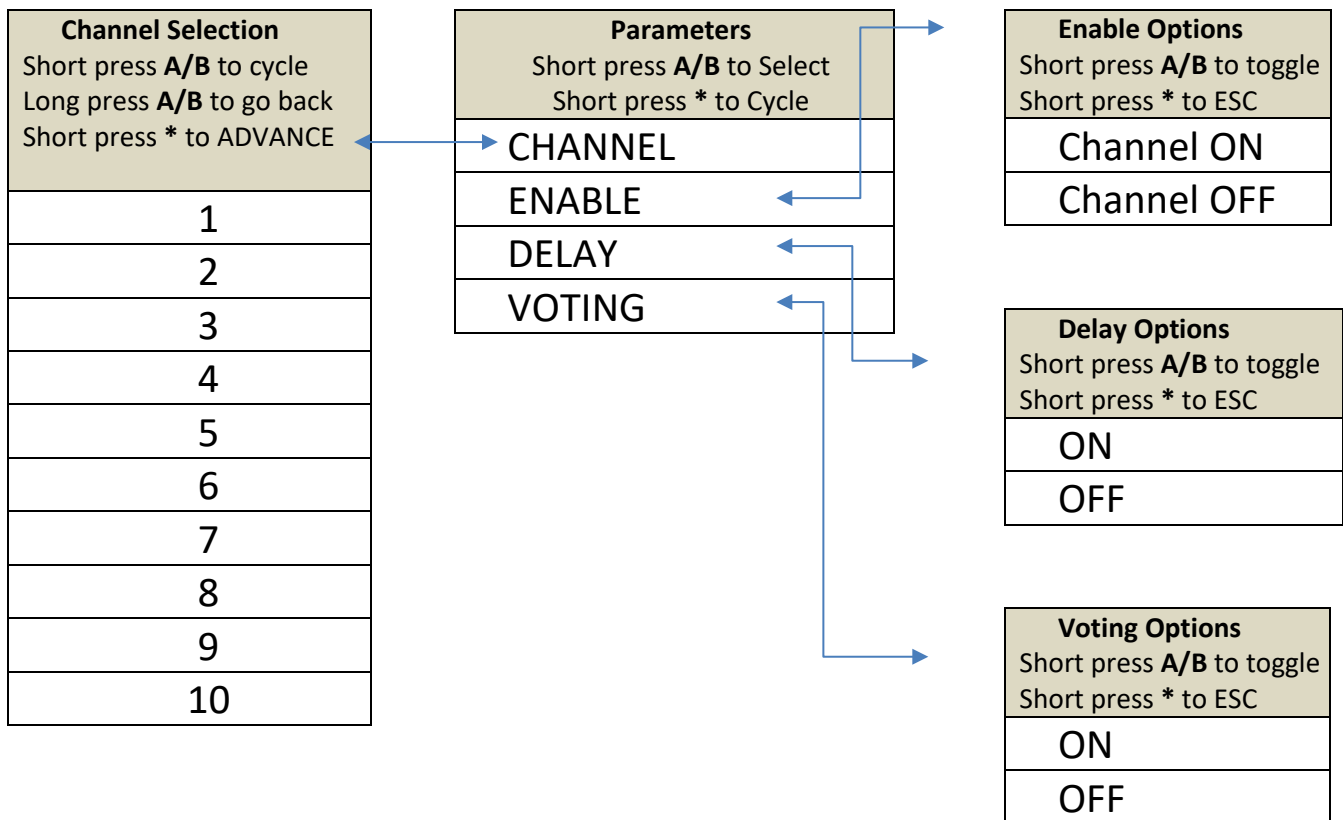
# Programming VRX1 Manually

## Access menu settings without a Zaxcom GUI Bridge (ZGB)

1. Power on the device. Within a few seconds of powering on, depress both the **A/B** and \* buttons simultaneously. A LED will turn white and you will hear a voice prompt for channel selection.
2. Short press the **A/B** key to cycle forward through available channels. You will hear an audio prompt through the headphone announcing the choices. Long press the **A/B** key to go to the previous channel.
3. Once a channel has been selected, short press the \* key to advance menu parameters for that channel.
  - Press A/B to select. Press the \* key to go back to the previous list of settings.
4. Once you are satisfied with your selections, wait three seconds, power the device off and then on.

If a VRX1 is left in this menu, it will default to normal operating mode after 30 seconds of inactivity.

### MENU STRUCTURE:



## VRX1 Presets

VRX1 comes preloaded with 3 different presets and are available to select when entering the factory preset mode. These are ideal for users who do not have a ZGB.

**PRESET #1:** Channel 1 only enabled, no selection buttons, no announcements, no delay, no voting, mono headphone, external LED ON, analog mode.

```
VoicePrompts = CENTER;
BootAnnounce = off;
DelayMs = 0;
HpMode = MONO;
LedMode = LED ON;
ChargeMode = CHARGE_FAST;
ABbutton = OFF;
StarButton = OFF;
RFmode = FM;
CompanderMode = COMPANDER1;
BatteryType = BATTERY_NIMH;
Encryption = OFF
BassBoost = Bass Boost +3dB (medium)
GainBoost = false;
ChannelCount = 10;
Current Channel = 1
Squelch = Medium
```

```
Channel[1] Freq = 216025 kHz; Enabled
Channel[2] Freq = 216075 kHz; Disabled
Channel[3] Freq = 216175 kHz; Disabled
Channel[4] Freq = 216275 kHz; Disabled
Channel[5] Freq = 216425 kHz; Disabled
Channel[6] Freq = 216925 kHz; Disabled
Channel[7] Freq = 216525 kHz; Disabled
Channel[8] Freq = 216725 kHz; Disabled
Channel[9] Freq = 216825 kHz; Disabled
Channel[10] Freq = 216975 kHz; Disabled
```

**PRESET #2:** A/B selects, star off, 1&3 enabled, announcements on, delay off, no voting, mono, external led on, analog mode. Similar to Preset 1 except:

```
ABbutton = CHANNEL
StarButton = OFF
BootAnnounce = ON
Channel[1] Enabled
Channel[3] Enabled
```

## VRX1 Presets Continued

**PRESET #3:** A/B Selects, star Delay, 1&3 enabled, announcements on, delay toggled, no voting, mono, led on, analog mode. Similar to Preset 1 except:

ABbutton = CHANNEL  
StarButton = DELAY TOGGLE  
BootAnnounce = ON  
Delay = 90ms  
BassBoost = OFF  
Channel[1] Enabled  
Channel[3] Enabled

## Manually Restore Factory Default

To restore factory defaults, hold **A/B** key while powering on, and repeatedly hit the \* key immediately. Use the **A/B** key to choose from 3 default settings. After choosing a desired factory setting, wait three seconds and then power the VRX1 off.

## Confirm VRX1 Program Status

To confirm the current VRX1 program status and hear the firmware version, hold down the \* key on bootup for a voice prompt summary of the current channel selection status.

## Firmware Updates

VRX1 ships with the latest firmware version installed. As newer firmware becomes available, it can be downloaded from the Zaxcom website:

- <http://www.zaxcom.com/software-updates>

Newer versions of beta firmware may be found on the Zaxcom forums:

- <http://www.zaxcom.com/forums>

## Currently Installed VRX1 Firmware

To confirm the current installed VRX1 firmware, hold down the \* key on bootup for a voice prompt summary of the installed firmware version.

## Updating VRX1 Firmware

1. Connect VRX1 to a computer via USB-C
2. Press and hold the **A/B** and \* button within 3 seconds of powering on.
  - The VRX1 will now appear as a mountable drive on the computer
3. Open the VRX1 drive using your computer's file browser
  - Download the VRX1 firmware \*.UFZ file and copy it onto the card.
  - The unit will disconnect from the computer when done. Power cycle the unit afterward.
    - **Note: If the unit does not boot, there is a way to force it into a firmware update mode by shorting a pad on the battery board and ground with tweezers while powering on.**

## VRX1 Specifications

### **IFB Receiver**

Receiver type: Direct Conversion  
RF Frequency Range: 192-217 MHz (76-86 MHz optional)  
RF Sensitivity: .8uV for 20dB  
Modulation (in Analog Mode): FM  
Minimum Channel Spacing (in Analog mode): 100KHz  
RF Frequency Channels: 10  
Frequency steps (in Analog Mode): 25KHz  
Spurious RF rejection: Greater than 90dB  
Antenna: Headphone cable

### **Receiver Audio**

System Delay: 4mS to 400mS adjustable (minimum 4mS of overall receiver latency in Analog FM mode)  
Audio bandwidth: 16KHz  
Audio Signal to Noise Ratio: 97dB (signal full quieting)  
Analog FM Distortion: less than 1%  
Output Connector: 1/8" Stereo (3.5 mm)  
Minimum HP Impedance: 16 ohms  
Audio output level: 2.8V max driving 16 ohms  
Output type: Headphone or balanced differential

### **Physical**

Weight: 4oz (including NiMh batteries)  
Dimensions (H x W x D): 4.60"x2.46"x.640"  
External Power: via USB, 700 mA while charging  
Internal Power: NiMh batteries up to 13 hours (2450 mA hour battery)

## Product Support

Product Registration:	<a href="http://www.zaxcom.com/product-registration">http://www.zaxcom.com/product-registration</a>
Download Firmware:	<a href="http://www.zaxcom.com/software-updates">http://www.zaxcom.com/software-updates</a>
Download User Manuals:	<a href="http://www.zaxcom.com/instruction-manuals">http://www.zaxcom.com/instruction-manuals</a>
Submit Technical Questions:	<a href="http://www.zaxcom.com/submit-a-technical-question">http://www.zaxcom.com/submit-a-technical-question</a>
Repair Services:	<a href="http://www.zaxcom.com/repairs">http://www.zaxcom.com/repairs</a>
Zaxcom Forum:	<a href="http://www.zaxcom.com/forum">http://www.zaxcom.com/forum</a>



# Zaxcom Warranty Policy and Limitations

Zaxcom Inc. values your business and always attempts to provide you with the very best service.

No limited warranty is provided by Zaxcom unless your VRX1 ("Product") was purchased from an authorized distributor or authorized reseller. Distributors may sell Product to resellers who then sell Product to end users. Please see below for warranty information or obtaining service. No warranty service is provided unless the Product is returned to Zaxcom Inc. or a Zaxcom dealer in the region where the Product was first shipped by Zaxcom.

## Warranty Policy

The Product carries a Standard Warranty Period of one (1) year.

**NOTE:** The warranty period commences from the date of delivery from the Zaxcom dealer or reseller to the end user.

There are no warranties which extend beyond the face of the Zaxcom limited warranty. Zaxcom disclaims all other warranties, express or implied, regarding the Product, including any implied warranties of merchantability, fitness for a particular purpose or non-infringement. In the United States, some laws do not allow the exclusion of the implied warranties.

## Troubleshooting & Repair Services

No Product should be returned to Zaxcom without first going through some basic troubleshooting steps with the dealer you purchased your gear from.

To return a product for repair service, go to the Zaxcom Repair Services page <http://www.zaxcom.com/repairs> and fill in your information; there is no need to call the factory for an RMA. Then send your item(s) securely packed (in the original packaging or a suitable substitute) to the address that was returned on the Repair Services page. Insure the package, as we cannot be held responsible for what the shipper does.

Zaxcom will return the warranty repaired item(s) via two-day delivery within the United States at their discretion. If overnight service is required, a FedEx or UPS account number must be provided to Zaxcom to cover the shipping charges.

\*Please note a great resource to troubleshoot your gear is the Zaxcom Forum: <http://www.zaxcom.com/forum>.

## Warranty Limitations

Zaxcom's limited warranty provides that, subject to the following limitations, each Product will be free from defects in material and workmanship and will conform to Zaxcom's specification for the particular Product.

### Limitation of Remedies

Your exclusive remedy for any defective Product is limited to the repair or replacement of the defective Product.

Zaxcom may elect which remedy or combination of remedies to provide in its sole discretion. Zaxcom shall have a reasonable time after determining that a defective Product exists to repair or replace a defective Product. Zaxcom's replacement Product under its limited warranty will be manufactured from new and serviceable used parts. Zaxcom's warranty applies to repaired or replaced Product for the balance of the applicable period of the original warranty or thirty days from the date of shipment of a repaired or replaced Product, whichever is longer.

### Limitation of Damages

Zaxcom's entire liability for any defective Product shall, in no event, exceed the purchase price for the defective Product. This limitation applies even if Zaxcom cannot or does not repair or replace any defective Product and your exclusive remedy fails of its essential purpose.

### No Consequential or Other Damages

Zaxcom has no liability for general, consequential, incidental or special damages. These include loss of recorded data, the cost of recovery of lost data, lost profits and the cost of the installation or removal of any Product, the installation of replacement Product, and any inspection, testing or redesign caused by any defect or by the repair or replacement of Product arising from a defect in any Product.

In the United States, some states do not allow exclusion or limitation of incidental or consequential damages, so the limitations above may not apply to you. This warranty gives you specific legal rights and you may also have other rights, which vary from state to state.

## Your Use of the Product

Zaxcom will have no liability for any Product returned if Zaxcom determines that:

- The Product was stolen.
- The asserted defect.
- Is not present.
- Cannot reasonably be fixed because of damage occurring when the Product is in the possession of someone other than Zaxcom, or
- Is attributable to misuse, improper installation, alteration, including removing or obliterating labels and opening or removing external covers (unless authorized to do so by Zaxcom or an authorized Service Center), accident or mishandling while in the possession of someone other than Zaxcom.
- The Product was not sold to you as new.

## Additional Limitations on Warranty

Zaxcom's warranty does not cover Product, which has been received improperly packaged, altered or physically abused.