Document Number:	Document Title: **Krill Operational Guide**	Revision Level: **F**
Original Issue Date: 8/26/2022		Date Effective: 05/15/2025
Original Created By: M Harkins	Revised By: M Harkins	ECO:

1. Scope

This document outlines the operation for the Krill audio system.

2. Overview

The Krill audio system is a rechargeable battery powered Bluetooth Audio system. The unit is charged with USB-C PD power adapter with a minimum rating of 45W. PD blocks of lower rating will increase the charge time.

3. Device Name:

When first looking to connect to the device with your phone, you will see BRP Connect

4. User Interface:

The following is a description of how to operate the unit.
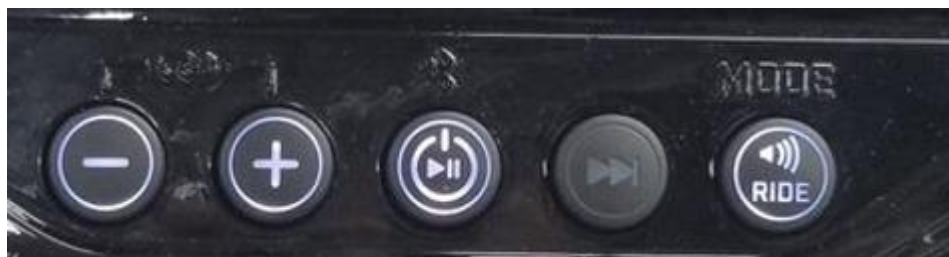
4.1. Turn On

Pressing and releasing the power button starts the "Power On LED" sequence. During the power on Sequence the unit will play its custom "Power On" sound. The speaker volume will be set to 30%

4.1.1. Power On LED Sequence

When the Power/Play/Pause button is first pressed in the off state, the "Power On LED" sequence starts with lighting the Play/Pause button, it stays lit for a half second then the Volume Up and Next buttons light up. They all stay lit for a half second then the Volume Down and Ride buttons light up. They all stay on for a half second then they all turn off.

4.1.2.   Welcome Audio Prompt

After the Turn On sequence is completed, there is a delay until the BT module has booted and is ready. All LEDs are off during this time. Upon receiving the BT Ready signal, the amplifier chip is programmed, then the Welcome audio indicator is played.

4.1.3.   Enter Pairing Mode

After completing the Welcome Audio Prompt, the unit then enters pairing mode unless it finds a previously paired device. If found, it will immediately connect to it and indicate Paused status.

4.2.   Pairing Mode

Upon completion of the Power On sequence and the BT Module is ready, the unit automatically enters Pairing Mode unless a previously paired device is found. If one is, it will automatically connect and enter the Paused state. If no connection is found within 10 minutes, the unit will automatically shut down. Also, if the connection is lost from a connected device, the unit will revert to pairing mode and will shut down after 10 minutes.

Additionally, pressing and holding the Power Button greater than 3 seconds initiates pairing mode. The unit will remain in pairing mode if the button is released before the 5 second point, at which time the unit will enter the shutdown sequence.

The pairing operation is only needed when connected to a phone and wishing to disconnect and enter Pairing mode.

4.2.1.   Pairing LED Indication

In Pairing mode all Button LEDs will blink at a rate of a half second on, half second off. This continues until either a connection is made, or registration times out.

4.3.   Play/Pause

After powering up and connecting to a device, the unit enters the Pause operational mode. Press and release the Play/Pause button to toggle the operation between Paused and streaming (Play). (See Charging and Fault sections for expected Play button LED color).

4.3.1.   Pause LED Indication

In Paused mode the Play button will continuously blink at a half second rate (0.25S On - 0.25S Off).

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4.3.2. Play LED Indication

In Play mode the Play button will be on solid.

4.4. Volume Up/Down

Pressing and releasing either the Volume Up or Volume Down buttons while actively streaming music from a connected phone, will adjust the output volume up or down. There are 16 steps from minimum volume and maximum volume. Pressing and holding an individual volume button will initiate an auto repeat indexing the volume level at a quarter second rate until either the minimum or maximum level is reached. There is no specific LED operation for this function. After reaching Min or Max volume any subsequent press to index beyond that point will execute the Min/Max volume audio prompt. These audio prompts are locked out when operating as the Primary concert mode device.

4.5. Next Button

The Next button will cause the unit to send a message to a connected phone to advance to the next Song. There is no specific LED operation for this function.

4.6. Mode Button (DSP Toggle)

On power up, the unit will initialize to the DSP setting what it was in previously upon shutdown. The DSP Toggle function will toggle between On Vehicle (Ride) and In Home DSP settings.

4.6.1. Mode Button Indication

The Mode button will be illuminated depending upon which DSP setting is selected. When the button is first pressed, all other buttons will turn off their illumination, and the "Mode" button will flash "On" and "Off" at a half second rate. The audio will be muted while the DSP amplifier is reprogrammed. Upon completion of the mode change, the Mode button will be either lit (Ride Mode), or off (Home Mode) depending upon which mode it is in. The other buttons will revert to their previous state. The toggle takes ~5-6 seconds to complete.

4.7. Concert Mode

Enter Concert Mode by pressing the Vol+ and Vol- simultaneously for ~ 0.5 seconds. If not currently in "Home" mode when Concert Mode is first started, the unit will automatically switch to it. After entering concert mode, each unit can toggle their individual DSP setting. **Note:** all units will have control of their own volume level in concert mode, except for when the Primary unit volume hits minimum (muted) all audio is muted.

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Primary Mode: For Concert Mode Primary operation, first have the unit that is to be the Primary unit powered up and connected to a phone. Press and release the Concert mode buttons to start the concert mode operation. The Volume Up and Down buttons will be illuminated, and the Play/Pause button will indicate its status.

Secondary Mode: The secondary unit(s) must be powered up and operating in Pairing mode (All LEDs blinking). If the unit is connected to a phone, either go to the phone and disconnect the unit so it reverts to pairing operation or enter pairing mode on the unit. Once in this mode, initiate Concert mode as previously described.

While searching for a concert mode stream, the Volume Plus and Minus buttons will blink. Upon connection the Volume buttons will be on solid. The unit will connect to a broadcast stream in 5 to 10 seconds if available. The Play/Pause button will not be illuminated unless in Low Battery, Charging, or Muted state (See Secondary Mute Toggle). If the secondary unit does not find a concert mode stream in about 90 seconds, then the unit will time out and shut down.

4.7.1. Concert Mode LED Indication
Entering Concert mode will be shown by both the Vol- and Vol+ buttons initially blinking on-off-on at a half second then remaining on solid. This is the same whether Primary or Secondary concert mode operation is used. The primary will also have its Play button showing the current Play/Pause state (On Solid for Play/Blinking for Pause), while the Play button will be "Off" in the secondary mode except when muted, low battery condition, or charging.

4.7.2. Secondary Mute Toggle
A concert mode Secondary unit's sound can be toggled in and out of mute by pressing then releasing the power button. When entering the muted state, the power button will do a double blink pattern with the first blink indicating the mute status (White if muted, battery status if not muted), and the second blink indicating the battery status (Good, Low, Charging).

4.8. Charging Operation
Plugging in the charger will cause the hardware to enter the charging operation and will be indicated by the Blue LED indicator on the "On/Off/Play/Pause" button.

4.9. Charge Level Indication

The Play Pause button back light changes color depending upon the current level of the battery charge state. All normal Play button illumination patterns are the same, only the color will change. The LED indications are as follows:

1. Charging: Blue Solid.

2. Charge Complete: Solid White.

3. Battery Low/Fault: Red Solid

4. Critical Level/Protect   Red/Blue rapid blinking followed by shut down.

Note: When charging while the unit is operational, the Charge indication will blink in some modes (e.g., Paused, Pairing, etc.).

4.10. Turn Off

Press and hold the power button until the Power Down LED sequence starts (hold for more than 5 seconds).

4.10.1. Power OFF LED Sequence

The Power Off LED sequence starts with all button LEDs on for a half second. This is followed by the Volume Down and Ride buttons turning off. A half second later the Volume Up and Next buttons turn off. Lastly, the Power/Play/Pause button turns off.

4.10.2. Forced Shutdown

If a system error has occurred and the shutdown sequence doesn't start after 3 seconds, continue holding the button down for ~10-15 seconds will force the unit off. The Play/Pause button will show critical shutdown by rapid blinking between red and blue.

4.10.3. Charge Fault Indication

Upon detection of a charger fault condition (battery over temperature, under temperature, etc.) the unit will initiate the "Forced Shutdown" condition. While the charger cable remains plugged in, the unit will continue to indicate the fault condition by rapid blinking between red and blue.

4.11. Audible Prompts

The following are the audible prompts for the unit:

4.11.1.   Power On

Custom Sound #1: BRP Custom On sound.

4.11.2.   Power Off

Custom Sound #2: Four beeps in descending frequency (525 Hz, 410 Hz, 300 Hz, 200Hz).

4.11.3.   Maximum Volume

Double beep at ~800Hz. NOTE: this prompt is disabled while in Primary Concert Mode operation.

4.11.4.   Minimum Volume

Long beep at ~600Hz. . NOTE: this prompt is disabled while in Primary Concert Mode operation.

4.11.5.   Bluetooth Connected

Custom Standard Pairing Sound same as Spark

5.   Battery Level Reporting

The current battery charge level will be reported to the phone in 10% increments.

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Revision History

Rev	ECO	Description of Revision	Revised By	Date
A		Document Creation	M Harkins	08/26/2022
B		Updated for production release operation	M Harkins	05/10/2023
C		Updated for latest bug fixes	M Harkins	08/03/2023
D		Updated for code changes with larger microprocessor	M Harkins	11/20/2023
E		Updated for requested changes from BRP	M Harkins	07/31/2024
F		Updates for USB-C charging	M Harkins	05/15/2025

This device complies with Industry Canada licence-exempt RSS standard(s).
Operation is subject to the following two conditions: (1) This device may not cause interference, and (2) This device must accept any interference, including interference that may cause undesired operation of the device.
- French:
Le présentappareilestconforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L' exploitationestautorisée aux deux conditions suivantes:
(1) l'appareil ne doit pas produire de brouillage, et
(2) l'utilisateur de l'appareildoit accepter tout brouillageradioélectriquesubi, mêmesi le brouillageest susceptible d'encompromettre le fonctionnement.
The device has been evaluated to meet general RF exposure requirement.
The device can be used in portable exposure condition without restriction.
le dispositif a été évalué à satisfaire l'exigence générale de l'exposition aux rf.
l'appareil peut être utilisé dans des conditions d'exposition portatif sans restriction.

Warning
To assure continued compliance, any changes or modifications not expressly approved by the party.Responsible for compliance could void the user's authority to operate this equipment.

FCC Statement
This equipment complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and
(2) This device must accept any interference received, including interference that may cause undesired operation.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.
However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
-Reorient or relocate the receiving antenna.
-Increase the separation between the equipment and receiver.
-Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
-Consult the dealer or an experienced radio/TV technician for help.

FCC Radiation Exposure Statement:
The device has been evaluated to meet general RF exposure requirement.
The device can be used in the portable exposure condition without restriction.