ListenTech-Note

LA-365 Lithium-Ion Battery Best Practices

Overview:

Lithium-ion batteries have many beneficial qualities: An extensive shelf life, high capacity with low internal resistance, a low self-discharge rate, and reasonably short charge times. These qualities make them ideal for use in our devices. This document is intended to provide pertinent information to the best practices for the operational usage, charging, and storage of the Listen Technologies lithium-ion (type NP60) rechargeable batteries. While the battery itself carries a one-year warranty, the average lifespan of a battery is from 2 - 4 years depending upon the environment and use of the devices.

The below images are of devices that make use of NP60 type Lithium-ion batteries.

ListenTALK Transceiver

Lithium-Ion Battery

iDSP Receiver

Relevant Terms:

- Discharge – An electric discharge is the release and transmission of electricity.
- Depth of Discharge – Indicates the percentage that a battery has been discharged relative to overall capacity of the battery.
- Charging Cycle – The process of charging a battery and discharging it. One charging cycle equals one full recharge and one full discharge.
- Self-Discharge – A phenomenon in batteries in which internal chemical reactions reduce the stored charge of the battery without any connection to an external circuit or connection between the battery electrodes.
- Battery Capacity- The measure of charge stored by the battery.

Best Practices for Use and Charging

- Charge often. It's best to charge in between uses and avoid deep depth of discharge when possible. Avoiding unnecessary full discharges between each charge cycle will reduce stress that the battery experiences. For example, if the regular operation of your device is for a user to attend a 1-hour tour, it is best to charge the devices between each tour. If the device is used for multiple tours before charging, the wear on the battery will be greater.
- Do not use, store, or charge lithium-ion batteries in areas of extreme temperatures. If possible, place charging docks or cords in an environmentally controlled area. Devices should be used and charged between temperatures of *-10 ºC (14 ºF)* to *40 ºC (104 ºF)* and within *0-95%* relative humidity, *non-condensing*.
- It is best to turn off a device that uses the LA-365 during the charge cycle. The default settings of our devices will automatically power down when charging begins.
- It's appropriate to store the units in the charging dock or connected to the charging cable. Even after they have finished charging, the units may be stored on their charger.

Best Practices for Long Term Storage Practices:

If a device is expected to go unused for a period longer than a month then it can be beneficial to consider some of the below storage methods.

- Remove battery from the device to prevent the device from discharging the battery during storage.
- Store batteries at *40-60%* of their capacity. Do not store lithium-ion batteries at a low or empty charge. A battery will self-discharge very small percentages of its stored power over time. If it does not have any stored power, it is possible the unit's internal voltage may not recover after recharge. Safely recycle a lithium-ion battery if it does not recover normally after storage.
- Store devices and batteries in a cool, dry place where the battery will not freeze. Ideal storage temperature is from *0°C (+32 °F)* to *25 °C (+77 °F).* Lower temperatures will have a lower loss of power due to self-discharge over time.
- Check any stored batteries approximately every six months and restore to *40-60%.*
- After you remove the devices from storage, allow a unit to charge for at least 15 minutes, even if the battery does not appear to be charging. Completely discharged batteries may need some time to begin the recharging process.

Lithium-Ion Battery Aging:

After your devices have been in use for some time, you may need to consider battery replacements. There are many symptoms of aging you can watch for. You may have witnessed signs of aging in your personal devices such as your smart phone which is likely to also utilize lithium-ion technology. Similar signs of aging will be present with our devices.

Signs of Aging Batteries:

- The batteries may take a longer period of time to finish charging.
- The batteries may produce more heat than they previously did.
- The fully charged battery may not last as long as it once did.
- A battery may appear swollen.

These are all normal symptoms of battery aging due to the chemical changes inside the battery. We recommend ***replacing aged batteries. Typical lifetime of well-maintained batteries is 2-4 years.***

You can find even more information at the below third-party source.
https://batteryuniversity.com/learn/article/how_to_prolong_lithium_based_batteries

Should you have any further questions or concerns, please contact Listen Technologies' technical services team at 1-800-330-0891 or support@listentech.com for further assistance.