BlueSleuth-Lite

BLE Tag Detector User Manual 1.7

Table Contents

Introduction

BlueSleuth-Lite is a pocket-sized detector for hidden BLE personal tags and many other nearby BLE devices including wireless earbuds, smartphones, smartwatches, tablets and all kinds of wireless IoT (Internet of Things) devices. BlueSleuth-Lite is primarily designed to detect hidden BLE personal trackers and tags including but not limited to Apple AirTag, Samsung Galaxy SmartTag, Tile Trackers, Chipolo, Eufy and PebbleBee. There are many BLE tags with new ones announced regularly. If you need to detect a BLE tag not mentioned in this user manual, please contact support so that we can test and include new BLE tags in future firmware updates.

About Bluetooth and BLE

Bluetooth is a wireless technology standard for exchanging data over short distances (using short-wavelength UHF radio waves in the 2.4 GHz ISM band) from fixed and mobile devices, and building personal area networks (PANs). The Bluetooth protocol is active in over tens of billions of devices worldwide. Bluetooth technology, combined with a lower cost of entry, has enabled business cases for applications that were previously unthinkable.

BLE devices follow the Bluetooth standard. They manage their power by automatically powering up and down while remaining connected to the reader infrastructure (smart connectivity). Compared to previous versions, BLE enables 250% faster and more reliable over-the-air data transmission and 10x more packet capacity. The job of BLE is to drive the 'Internet of Things' (IoT), namely the thousands of smart, web connected devices – from fridges to toothbrushes – that are expected to enter our lives over the next decade.

Operation

BlueSleuth-Lite is controlled by a single toggle side button which is essentially a 3-way switch; toggle left, toggle right and push in the toggle to choose the selection highlighted on screen. Hold in the toggle switch to power up the unit and hold it in for a few seconds to fully power down unit. Toggle left or right to navigate through screens and menus. Push in the toggle button to select the highlighted item on each screen.

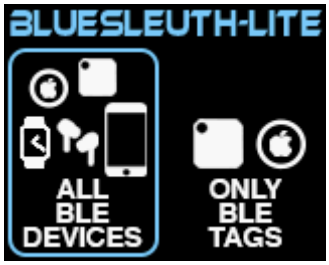
Unpacking Your Unit

BlueSleuth-Lite ships complete with the (1) BlueSleuth-Lite unit, (1) USB Mini cable, (1) Qi wireless charging pad with USB Micro cable. The user manual is in digital format on www.bvsystems.com. Scan the QR code on the shipping box to go directly to the product page containing user manual, quick start guide and tutorial videos.

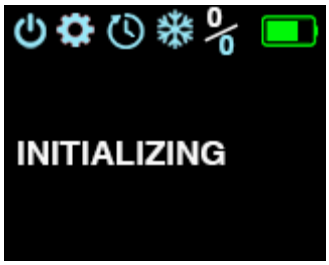
USB/Charging

BlueSleuth-Lite contains a USB Mini connector for both firmware updates and charging. BlueSleuth-Lite also charges via the included Qi (industry de facto standard providing 5-15 watts of power to small personal electronics) wireless charging pad. The unit charges fastest using wireless charging pad but both methods will easily charge unit from empty to full overnight. When charging wirelessly, the LED atop unit will turn red until fully charged. When charging using the USB Mini port, the LED atop unit will turn green until fully charged. Be sure to charge unit completely before updating firmware and follow instructions to download latest firmware from the support section at www.bvsystems.com. If you are experiencing technical issues with your BlueSleuth-Lite, contact support@bvsystems.com for further instructions and possible firmware updates as well.

Choosing Your BLE Target(s)



Press the toggle button to power up your BlueSleuth-Lite. The first screen shown offers users a choice to scan all BLE devices (including BLE tags) or only BLE tags. Be aware that some environments can contain dozens or even hundreds of BLE devices which can make sorting and scanning difficult. If you are only interested in searching for hidden BLE personal trackers, choose ONLY BLE TAGS. However, if you do choose ALL BLE DEVICES, BLE tags will still be prioritized at the top of the list even if they are not the strongest signals.

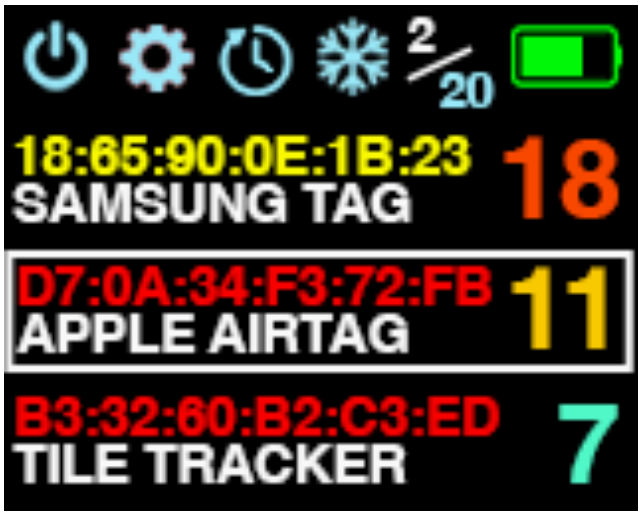


After choosing either ALL BLE DEVICES or ONLY BLE TAGS, the screen will display INITIALIZING for a few moments before entering the Main Scanning List screen.

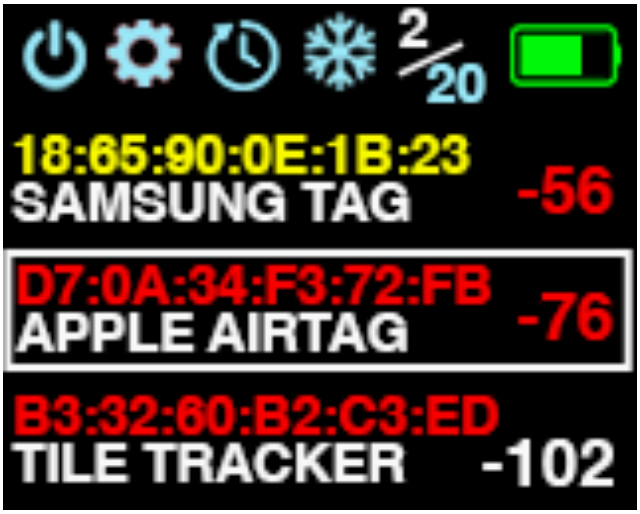
Main Scanning List

From this Main Scanning List, users can access every device and option the BlueSleuth-Lite has to offer. Use the toggle button to navigate. When an item is highlighted (with a white box around it) push in the toggle button to select that item. Scroll up and down the entire list by toggling either left or right on the button. When you reach the bottom of the list, the white selector box will jump back to the top. Hold the toggle in either the left or right position to engage continuous scrolling.

Basic Mode



Pro Mode



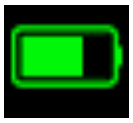
POWER - Press toggle button to turn BlueSleuth-Lite ON. Hold in toggle button for a few seconds to turn the unit back OFF

SETTINGS - Choose this icon to enter the SETTINGS menu to see firmware, serial number and choose threshold trigger settings, alert settings, user mode (Basic or Pro) and to choose between all BLE devices and just BLE tags.

PERSISTENCE - Choose between 10, 15 or 30 seconds minimum that devices stay on screen. This makes it easier to track multiple device detections even as the scan list changes frequently. This does not affect the rate or speed of scanning signal strengths.

FREEZE - Choose this to freeze all current measurements on or off screen. You may scroll to see full list and take notes while in this mode. Snowflake icon will turn grey in this mode so be sure to turn it back off in order to see live scanning of devices again.

DEVICE COUNT - Top left number indicates highlighted device ranking (according to signal strength) in scan list. Lower right number indicates total number of devices currently in scan list. Maximum number of devices that can populate the list at once is limited to 20.



BATTERY - This icon indicates remaining battery power. Highlight and choose this button icon to see more information on the battery status and procedures for recalibrating battery if performance of battery is in question.

DEVICE SELECTED (basic mode) - Toggle to the BLE device or tag of interest. Each device or tag displays the MAC address, identity of tag or device (if identifiable by manufacturer) and the strength of that device's signal on numerical scale. The scale runs from 1-20 where 1 is the lowest strength and 20 is the highest strength. The number also changes color which correlates to the same color index also used in the Single Device Scan screen.

Push in the toggle button to enter into the Single Device Scan screen for more information on the highlighted device or tag. The Basic mode is shown here. Choose Pro mode in the user settings at any time for true numerical dBm RSSI measurement display.

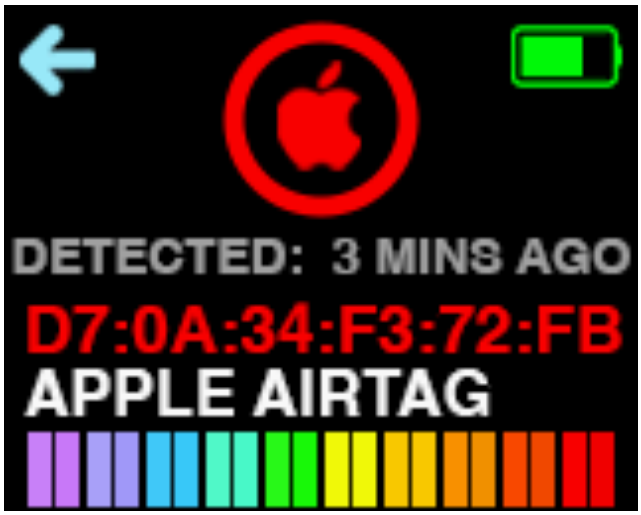
DEVICE SELECTED (pro mode) – The number to the right is in dBm. The lower the number is, the stronger the signal strength.

In both basic and pro modes, all BLE devices that break the user-defined threshold will blink in red and be listed in order from strongest signal strength (top of list) to weakest (bottom of list). In this list screen, all devices are scanned every 5 seconds. Due to MAC spoofing and manufacturers' settings, some BLE devices and tags will shift frequently up and down the list and sometimes disappear altogether and some will take a little longer to be detected than others. MAC addresses associated with BLE tags are color-coded according to confidence that these devices are still nearby and active: blue MACs are detections with no confidence (yet), yellow MACs have some degree of confidence and red MACs indicate that the device or tag is definitely nearby and active. Other BLE devices such as smartwatches and smartphones (non-tags) only appear in blue.

Single Device Scan

Once you have discovered the device or tag of interest in the main scanning list, you can select it to enter the Single Device Scan screen. This screen not only visually focuses on a single device but also scans just that device faster than the previous screen at once every 2 seconds. This screen identifies the BLE device or tag by manufacturer, the time that has elapsed since it was first detected, the MAC address and the signal strength. There are far too many BLE devices available to identify with new ones arriving all the time so BlueSleuth-Lite visually identifies the most widely used BLE tags, but as new tags come to market, they will be included with future BlueSleuth-Lite updates. Users with specific needs or security applications should contact BVS sales and support direct for help. The duration of detection is a simple timer that starts incrementing the moment that the BLE device or tag is first detected. The only time this detection timer will reset is when the unit is powered off. This detection timer is useful for determining patterns and durations of device activity, but it does not provide real time BLE device status. It only serves as an indicator for initial detection. For real time detection of active BLE devices or tags, you must return to the Main Scanning List. Below the detection timer is the MAC address of the single device being detected. For BLE surveys, it is important to write down this MAC address because devices will constantly shuffle order in the Main Scanning List screen as their relative signal strength changes.

Basic Mode



Pro Mode

It is important to note that the Single Device Scan screen only alerts users to activity for the device shown and no other devices. That means that if another device or tag is detected while in this screen, you will not see nor get an alert to that new device. This screen also behaves a little like a Geiger counter. As you near closer to the device being scanned, the signal strength generally increases as well as the vibrations (if you have them turned on in Alert Settings). In Basic Mode, the signal strength is indicated by a scale of 1-20 colored bars. These bars correlate

to the 1-20 numerical scale on the previous Main Scanning List screen as well as the colors. All 20 bars are shown here indicating a very strong signal from a nearby Apple AirTag. In the Pro Mode, the RSSI dBm number will decrease as the signal strength gets stronger with the scale from -20 dBm (strongest signal strength) to -120 dBm (weakest signal strength). For instance, if the signal strength is between -20 dBm and -40 dBm, the device or tag being scanned is most likely very close (~1 to ~6 feet away) to the unit. However, there are no hard and fast rules for distance as it correlates to signal strength as every BLE device manufacturer transmits at different signal strengths and various RF environments can introduce unexpected reflections and interference.

Detecting AirTags and Other Bluetooth Tracking Devices

When testing for the presence of Apple AirTags or similar Bluetooth tracking devices, it is important to understand how they communicate and why they may not always appear on a Bluetooth detection tool such as BlueSleuth-Pro or BlueSleuth-Lite.

An AirTag primarily relies on Bluetooth Low Energy (BLE) to broadcast short advertising packets. These packets are what scanning tools or unpaired devices can detect. However, once an AirTag has been paired to an iPhone, that phone establishes a secure BLE connection with the tag. While this connection is active, the AirTag no longer behaves like an “unknown” tag broadcasting to its surroundings. Instead, it enters a connected state and primarily communicates with its owner’s iPhone using encrypted BLE packets. Because of this, third-party tools like BlueSleuth-Pro or BlueSleuth-Lite will not detect the AirTag when the paired iPhone is nearby, since the tag is no longer advertising openly.

In addition to BLE, newer iPhones equipped with the U1 Ultra-Wideband (UWB) chip use UWB signals for precision ranging when the phone is close to the AirTag. If the owner’s phone is very close to the tag, UWB may replace or reduce the need for BLE advertising. This further decreases the likelihood of the AirTag being visible in a BlueSleuth-Pro or BlueSleuth-Lite scan.

For these reasons, when attempting to test or detect an AirTag using BlueSleuth-Pro or BlueSleuth-Lite, it is critical to isolate the tag from its paired phone. A good practice is to place the iPhone (or any phone that the AirTag is registered to) into Airplane Mode and to physically move it a sufficient distance away from the area being scanned (at least 20 feet away). It is also important to manually turn off Bluetooth, since Airplane Mode by itself does not disable Bluetooth, and the phone will continue to transmit and receive BLE signals if it is left on. In contrast, Airplane Mode will automatically disable the Ultra-Wideband (UWB) radio. By ensuring both Airplane Mode is active and Bluetooth is turned off, you prevent any direct BLE connections or UWB ranging from taking place. This in turn forces the AirTag to resume periodic BLE advertising. Once the AirTag is no longer “busy” communicating with its owner device, it will once again appear as an unrecognized BLE signal, which is what BlueSleuth-Pro or BlueSleuth-Lite is designed to detect.

In summary, BlueSleuth-Pro and BlueSleuth-Lite are optimized to identify tags that are unknown or hidden, not tags that are actively paired and communicating with their owner device. Therefore, when testing for AirTags or other tracking tags, always ensure that the paired phone is disabled (via Airplane Mode) and kept at a good distance away. This ensures that the AirTag is in its advertising state and can be properly detected during a scan.

Operator Procedure: Testing for AirTags Paired to Your Phone

• Identify the Owner Device

• Determine which iPhone (or other mobile phone) the AirTag is paired with.

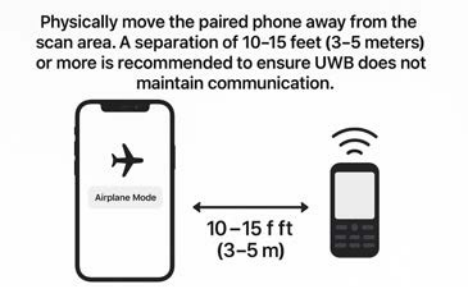
• Disable Communication

• Place the paired phone into Airplane Mode to stop all BLE and UWB connections. (And shut off Bluetooth in addition)

Create Separation

• Physically move the paired phone away from the scan area.

• A separation of 10–15 feet (3–5 meters) or more is recommended to ensure UWB does not maintain communication.



Prepare the Detection Tool

• Launch BlueSleuth-Pro or BlueSleuth-Lite

• Ensure the tool is set to scan for unknown or hidden BLE devices.

Perform the Scan

• Begin scanning the area where the AirTag may be located.

• The tag should now appear as an unrecognized BLE signal, since it is no longer linked to its paired phone.

Verify Detection

• Repeat the scan from different positions in the area to confirm results.

• If the AirTag does not appear, double-check that the paired phone is fully disabled and sufficiently distant.

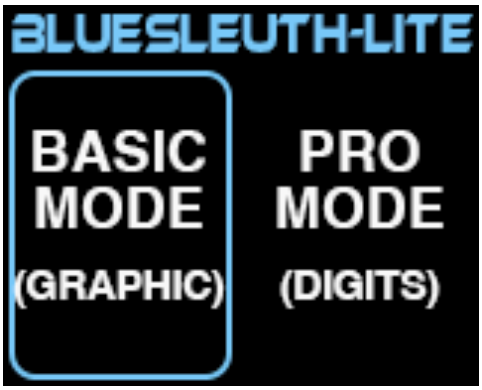
Tips for Locating Hidden Tags

It is important to move slowly and methodically when in the Single Device Scan mode. As signal strength increases the unit will vibrate and beep with more frequency if those alert settings are turned on. You will notice that the unit visually refreshes its scan about once every 6 seconds in both Main List Scan and 2 seconds in the Single Device Scan screens respectively. However, the unit's vibration and audible alerts only correlate with signal strength in the Single Device Scan screen. It is important to use these alerts as an indicator while continuing to move slowly during active scans to avoid sudden jumps in signal strength.

Once you have mastered locating a BLE tag you hid yourself, try locating one that someone else hid for you. Please remember that using an AirTag or any tracking device to monitor someone's location without their consent is illegal and a breach of privacy. It is crucial to respect others' privacy and use such devices responsibly and ethically.

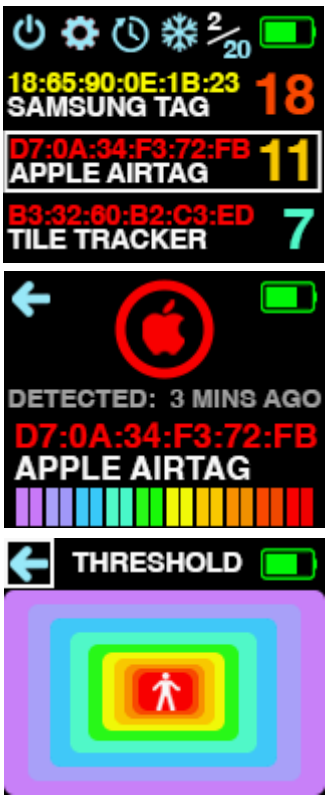
Vehicles are often tracked and offer good hiding spaces if you want to practice searching. Here are a few tips:
Under the seats: Tags are small and easy to conceal, making this a common hiding spot.
Glove compartment: Easily accessible but also enclosed make it a popular hiding space.
Trunk: Popular choice for hiding tags because it offers additional hidden spaces such as under the spare tire.
Door storage pockets: Convenient space to hide small item especially if the pocket is already full of items.
Between seat cushions: The seam between bottom and back cushions fits any BLE tag nicely.
Cup holders: Sometimes the best hiding place is right in front of you or at least under your coffee cup.
Center console: Contains many compartments to hide many small items.
Floor mat: Only takes a moment to place BLE tag under a mat and takes the same time to find one there too.
Outside vehicle: Too many possibilities to mention all of them but popular ones include inside gas cap, inside wheel well, under front/rear bumpers, behind license plate, inside front grill area, etc.

Unit Operation

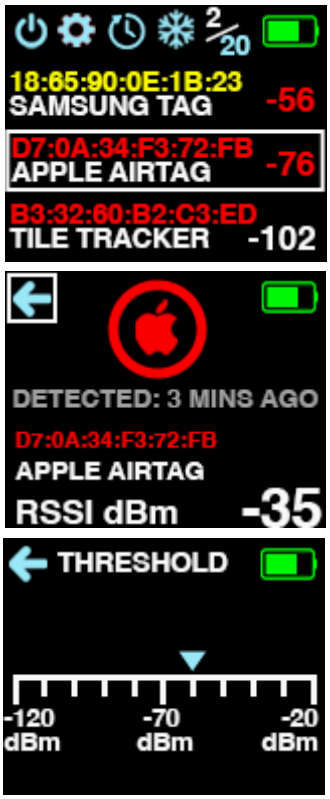


When you first power up your BlueSleuth-Lite, you will see a startup screen prompting a choice between Basic Mode and Pro Mode. These choices can be changed at any time in the main options menu. Basic Mode is designed for users that are more comfortable with consumer electronics. The signal strength and threshold settings are displayed graphically. Pro Mode offers numerical settings for more granular control over the device's alerts and signal strength measurements and recommended for users providing security. Functionally, there is no difference between the Basic and Pro Modes. Visually, the two modes offer a different way for users to search for and view device scans.

Basic Mode



Pro Mode



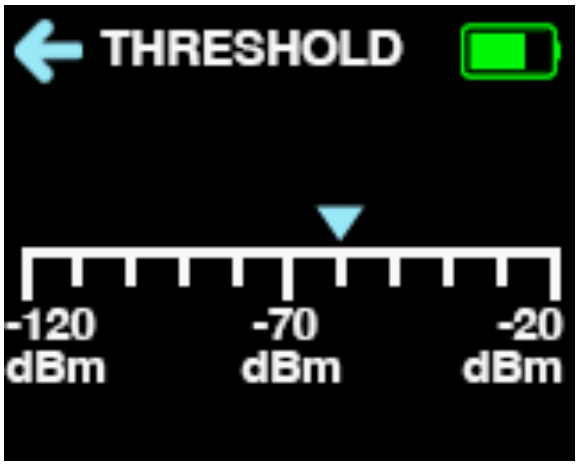
Main Options Menu

Choose the gear icon to enter the Main Options Menu at any time. From this menu, users can adjust their threshold, set alerts, switch user mode and switch the scan mode from only BLE tags to all BLE devices. This screen also displays the unit's current firmware and serial number. Be sure to reference this serial number if you intend to contact support regarding any operational issues.

Adjust Threshold

BlueSleuth-Lite scans all nearby BLE devices and tags but is most useful to users when they receive alerts about a specific nearby BLE device or tag. These alerts can only trigger if the threshold is set properly. Threshold settings do not affect the scan radius, they only affect the amount of alerts the user receives. Regardless of threshold, you will still see the same amount of BLE devices and tags listed in the Main Scanning List screen. If you set the threshold too low (higher sensitivity), you might receive too many alerts from nearby BLE devices or tags. If you set the threshold too high (low sensitivity), you might not receive any alerts from a nearby BLE tag. Before you set out to find hidden BLE tags, be sure test these various settings using a tag of your own to get familiar with the behavior of BlueSleuth-Lite's threshold settings in various environments.

In Basic Mode, threshold settings are depicted using 10 color-coded rectangles surrounding the user while holding or wearing the BlueSleuth-Lite unit. The smallest rectangle is red and indicates the personal space around the user which is about 5 feet in every direction. This setting is useful for detection of BLE devices and tags that might be contained in a bag the user is carrying or a coat pocket they are wearing. The medium-sized rectangle is blue and indicates a larger radius (~ 15 feet in every direction) of detection surrounding the user. This setting is useful for detection of BLE devices and trackers in a single room or a vehicle for instance. The largest rectangle is purple and indicates the maximum range (about 50 feet in every direction) of detection for BlueSleuth-Lite. This setting is most useful for detection of BLE tags and devices in a home or office building. Toggle the switch to the left to increase the ring size and to the right to decrease the ring size. Push in the toggle button to highlight the back arrow to exit back to the previous screen.



Advanced users might be more comfortable setting thresholds in the Pro Mode because it offers a more familiar scale for fine tuning a search effort. This scale (in dBm) runs from -120 dBm to -20 dBm. Toggle left to increase the sensitivity and amount of threshold trigger alerts and toggle right to decrease sensitivity and the amount of threshold trigger alerts.

Set Alerts

This screen allows users to set the alerts that are triggered when the threshold is broken by any BLE device or tag. Use the toggle button to scroll and select to make the desired change.

Vibration alerts are useful when BlueSleuth-Lite is being held or resting inside a pocket. The vibration is barely audible but can be felt so that the user does not need to visually engage with the unit all the time.

Audio alerts are in the form of a simple beep. The sound is loud enough to be heard from a distance in any quiet space. Both vibration and beeps are synchronized and when in the Single Device Scan screen, correlate to the signal strength of the device being scanned. Vibration and audible alerts that trigger with more frequency indicate a stronger signal strength which generally indicates that the BLE device or tag is closer compared with less frequency of alerts.

Power save shuts off the display but continues scanning if the user does not interact with the unit for at least 4 minutes. This can extend BlueSleuth-Lite runtime substantially when used for constant scanning that doesn't require user interactivity. Turning off all alerts can save battery life as well, but users can expect a full 8 hour day of battery life even with everything turned on. After you have turned on Power Save, return back to the Main Scanning List screen in order to fully engage this mode and do not touch the toggle button unless you need to change a setting or view the screen again.

Persistence Settings

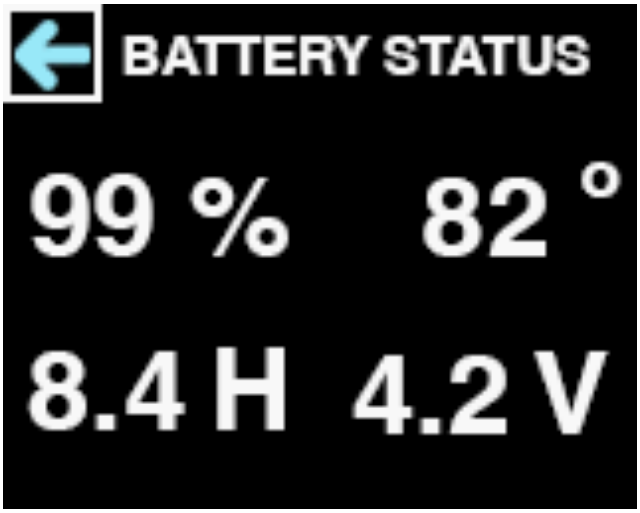
BlueSleuth-Lite is capable of detecting many BLE devices and tags simultaneously but since the Main Scanning List can only display 3 devices on screen simultaneously, it can sometimes make it difficult to identify specific ones, especially if they broadcast intermittently. Setting the Persistence (small clock-like icon atop the Main Scanning List screen) to a longer duration setting will help to identify some of the more elusive BLE devices and tags. There is no single 'correct' setting for everyone or every environment so there are 3 persistence durations for users to choose. The general rule is the more BLE devices being displayed, the longer the persistence duration should be set. Remember that there are generally fewer BLE tags around us and they will always be displayed at the top of the list so this persistence feature might be better utilized for analyzing BLE devices found nearly everywhere. Persistence does not change the rate or speed at which BLE devices and tags are scanned. It merely changes the rate at which they are removed from the list once they are no longer detected.

Freeze Feature

Select the snowflake icon atop the Main Scanning List screen at any time to “freeze” the list in place. Once selected, this icon will turn grey to indicate it has been activated. You may now scan the entire list of detected BLE devices and tags to ensure you do not miss any. This feature is most useful for navigating long and active lists of all detected BLE devices and tags.

Do not forget to de-select this snowflake icon again to turn off the freeze mode once you have finished reviewing. The snowflake icon will turn back to blue and measurements will resume to a live display again.

Battery Status



Navigate to the green battery icon in the upper right corner of the Main Scanning List screen and select it to enter into this comprehensive battery status screen. In this screen, users can view the remaining battery capacity in percent, the temperature of the battery in degrees Fahrenheit, the approximate remaining runtime in hours or minutes, the current voltage of the battery. These metrics offer the user details for remaining runtime as well as diagnostics in case the battery has become defective or lost its capacity over time. Take note of these metrics and report them to BVS support if you are experiencing any issues with your BlueSleuth-Lite unit.

The only component of BlueSleuth-Lite that cannot last indefinitely is the internal battery so we have included the model used in this manual. After a few years of use, the internal Lipo battery may not charge fully so that users can replace this component themselves to restore operation to new. If you plan to change the battery yourself, be sure to contact BVS support in advance for the proper connectors and instructions.

Detectable BLE Tag List

This list changes (and new BLE tags introduced into the market) with more frequency than this user manual can be updated, so if you do not see your tag listed here, contact sales@bvsystems.com for the latest updates. If you need to detect a particular BLE tag not on the list, contact support@bvsystems.com and we can attempt an update to your unit's firmware to include that tag.

✔ Apple AirTag (registered and non-registered)

✔ Samsung Galaxy SmartTag (versions 1 and 2) (registered and non-registered)

✔ Eufy Security SmartTrack Link

✔ Tile (Slim, Mate, Pro, Sticker, Sport)

✔ AirCard

✔ Chipolo (generation 1 and 2)

✔ PebbleBee

✔ These lesser known tags simply identify as generic “Tag Detected”

Do you believe you are being stalked?

BlueSleuth-Lite offers users a method to quickly identify and locate hidden BLE tags that might be used to track their movements illegally, but this is only one step in a more complicated and potentially dangerous scenario. Even if you fail to locate a hidden BLE tag you suspect is tracking you, we urge you to take the following steps:

Contact the Police: If you feel that you are in immediate danger or being stalked, call your local law enforcement or emergency number (e.g., 911 in the United States) right away. Provide them with all the necessary information and details about the situation.

Talk to Friends and Family: Reach out to trusted friends and family members to inform them about what you are experiencing. They can provide emotional support and may help you come up with a safety plan.

Contact a Support Organization: Many countries have organizations that specialize in assisting victims of stalking or harassment. Look for local support organizations or helplines that can offer guidance and resources.

Seek Legal Advice: Consult with an attorney who specializes in stalking or harassment cases to understand your rights and options for legal protection.

Document Incidents: Keep a detailed record of all stalking incidents, including dates, times, locations, and descriptions of the events. This documentation may be useful for law enforcement and legal proceedings.

Secure Your Online Presence: Review your social media profiles and other online accounts to ensure your privacy settings are strong. Limit the information shared publicly.

Change Your Routine: If possible, consider altering your daily routine to reduce the chances of encounters with the stalker.

Inform Your Employer or School: If you are being stalked, it may be necessary to inform your employer or school authorities to ensure your safety in those environments.

Consider a Restraining Order: Depending on your jurisdiction and the severity of the situation, you may be able to obtain a restraining order or protection order against the stalker.

Speak to a Counselor or Therapist: Experiencing stalking can be traumatic. Speaking to a mental health professional can help you cope with the emotional impact and develop strategies for self-care.

Your safety is of the utmost importance, and it's crucial to take any signs of stalking seriously. Always trust your instincts, and don't hesitate to seek help from the appropriate authorities and support organizations.

Thank you for your purchase, we look forward to supporting you and your team.

Customer Support

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Phone: 732-548-3737
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www.bvsystems.com