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1 Overview

Echo Meter Touch app with an Echo Meter Touch Ultrasonic Module allows you to listen to, record, and identify bats with your Android phone or tablet. The Echo Meter Touch offers exclusive features and unprecedented ease-of-use for a handheld bat detector.

Echo Meter Touch Ultrasonic Modules are available from www.wildlifeacoustics.com/products/echo-meter-touch

This guide is available for printing at:

www.wildlifeacoustics.com/support/documentation

1.1 Echo Meter Touch Ultrasonic Modules

Echo Meter Touch 2

Echo Meter Touch 2 (\$179) is intended for nature enthusiasts and batting hobbyists.



Echo Meter Touch 2 Pro

The Echo Meter Touch 2 Pro (\$349) is designed for bat professionals and features a higher quality microphone, adjustable gain, and higher sample rate.



1.2 App Features

Listen to bat echolocations in real time

Echo Meter Touch translates bat echolocations into frequencies that are audible to humans using two technologies.

Wildlife Acoustics' patented Real Time Expansion (RTE) allows you to listen to bats in real time with unparalleled fidelity. RTE maintains the timing and tonality of the original echolocations.

Heterodyne (HET) listening is also available, for those accustomed to that way of hearing bats. Manual and automatic tuning is available.

[View the echolocations on a spectrogram](#)

A real-time spectrogram shows the frequencies and timing of the echolocations. Scroll back in time and zoom in on previous "bat passes."

[See most likely bat species in real time](#)

The Auto ID feature analyzes the echolocation calls and shows the two most likely bat species matches in real time. In North America, a portrait of each bat taken by renowned bat expert Merlin Tuttle will be shown as well. This is the same technology used in our professional Kaleidoscope Pro Bat Auto Identification software. Currently, the app can identify 38 species in North America, 31 in Europe, 63 in the neotropics and 20 in South Africa. For more information on Kaleidoscope and a full list of species, visit our website.

AUTO-ID FINE PRINT: Because bats vary their echolocation calls in response to a wide variety of needs, no automated call identification can achieve 100% accuracy in species identification. Nevertheless, in the hands of well-trained experts, bat detector recordings can be used to identify many species, providing invaluable discoveries. The Echo Meter Touch allows high quality recording suitable for analysis by experts. The built-in Auto-ID feature also suggests the two most likely bat species for each recording, for the enjoyment of enthusiasts hoping to learn more about bats. These automated identifications, though largely accurate, should not be relied on as a basis for scientific research. Auto-ID is intended for use in analyzing recordings of single bats in free flight in low clutter environments. Recordings of roost emergence, multiple or captive bats,

bats in high clutter environments, or bat social calls are not suitable for Auto-ID. In addition, the Auto-ID feature does not include every possible bat for each of the covered regions. Therefore, if a bat that is not included is recorded, it will be identified by the app as a species with a similar echolocation call type. In North America, there are seven species included in the species list that do not have classifiers. They are included so as to allow the user to learn about every species that occur in their state.

Record to WAV files

Use triggered recording to automatically save bat passes to full spectrum WAV files for analysis on a computer or to view on your Android device. Or use manual record mode to control start and stop of recording. View the recording spectrogram and add voice or text notes. Listen to the recording using RTE, HET, or traditional Time Expansion Playback (playback at fractional speed to make the ultrasound audible).

See your path and recording locations

View your path, including recording locations in satellite or road map view. View identified species codes directly on the map. Go to the recording's spectrogram from the map view. Transfer to your computer to view in Google Earth. Your Android device must have GPS capability or you must use a Bluetooth GPS receiver for this functionality.

NOTE: This feature requires an Android device with a GPS capability or a Bluetooth GPS receiver.

Transfer recordings to your computer

The Echo Meter Touch can transfer full spectrum WAV recordings to your computer over a wireless network or through a USB cable. Using Wi-Fi, the app bundles the recordings in a .zip folder and allows download by entering a URL in any web browser.

Share recordings via email or MMS messaging

You can share recordings via email or MMS messaging and import and open files that have been shared with you.

1.3 Contact Us or Review the App

Please contact us with any suggestions, issues, questions, or comments. We are always looking for ways to improve the app for you. Tap **Contact Us** on the Information page of the app to send your feedback.

If you like the app, please let others know by selecting **Review this App** from the Information page.

2 Using Echo Meter Touch

This section describes how to use the Echo Meter Touch app to monitor bats.

NOTE: The display examples in this guide were composed on an iPhone in portrait orientation. There may be minor difference on an Android device. You can also view the app in landscape mode. On tablet sized devices, there are minor differences in layout due to the larger display size.

2.1 App Permissions

The first time the Echo Meter Touch 2 app is run on an Android device, the Android OS will ask for specific permissions. You can allow or not allow any of these.

- Storage permission allows the app to save recordings. Microphone permission allows you to leave voice notes for recordings.

- Location permission allows the app to track the recording path and tag each recording with the GPS coordinates.
- Phone permission allows the app to elegantly handle incoming or outgoing phone calls in Live Mode. The phone permission will only be asked on devices with cellular call capabilities.

2.2 Connecting the Ultrasonic Module

The Echo Meter Touch Ultrasonic Modules sense ultrasonic signals, digitize the signal, and transmit the ultrasonic data to the Android phone or tablet.

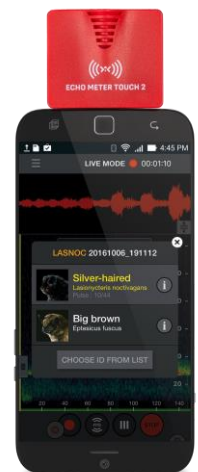
Plug an Ultrasonic Module into the micro-USB or USB-C port of your Android device and you can immediately start listening to, recording, and identifying bats.

NOTE: Ultrasonic Modules manufactured through 2021 have a micro-USB connector. Ultrasonic Modules manufactured after 2021 have a USB-C connector. Either type of connector on the Ultrasonic Module can be used with either type of port on the Android device. A USB-C to micro-USB, or micro-USB to USB-C adapter can be used. Any adapter must conform to the OTG (On the Go) Android specification.

1. Plug the Ultrasonic Module into the micro-USB or USB-C port of your Android device.
2. The Android device asks you to open the Echo Meter Touch app if it is not already open.

NOTE: Some models of Android device and OS version will ask for permission to record via USB every time the Echo Meter Touch 2 Ultrasonic Module is attached.

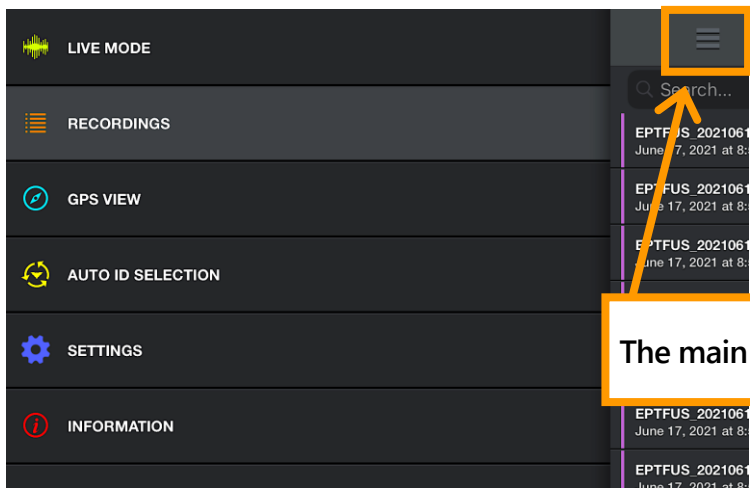
3. Press the START button to begin streaming the ultrasonic data.



NOTE: The module should be pointed in the general direction of the bats which requires the Android device to be turned upside down as shown above.

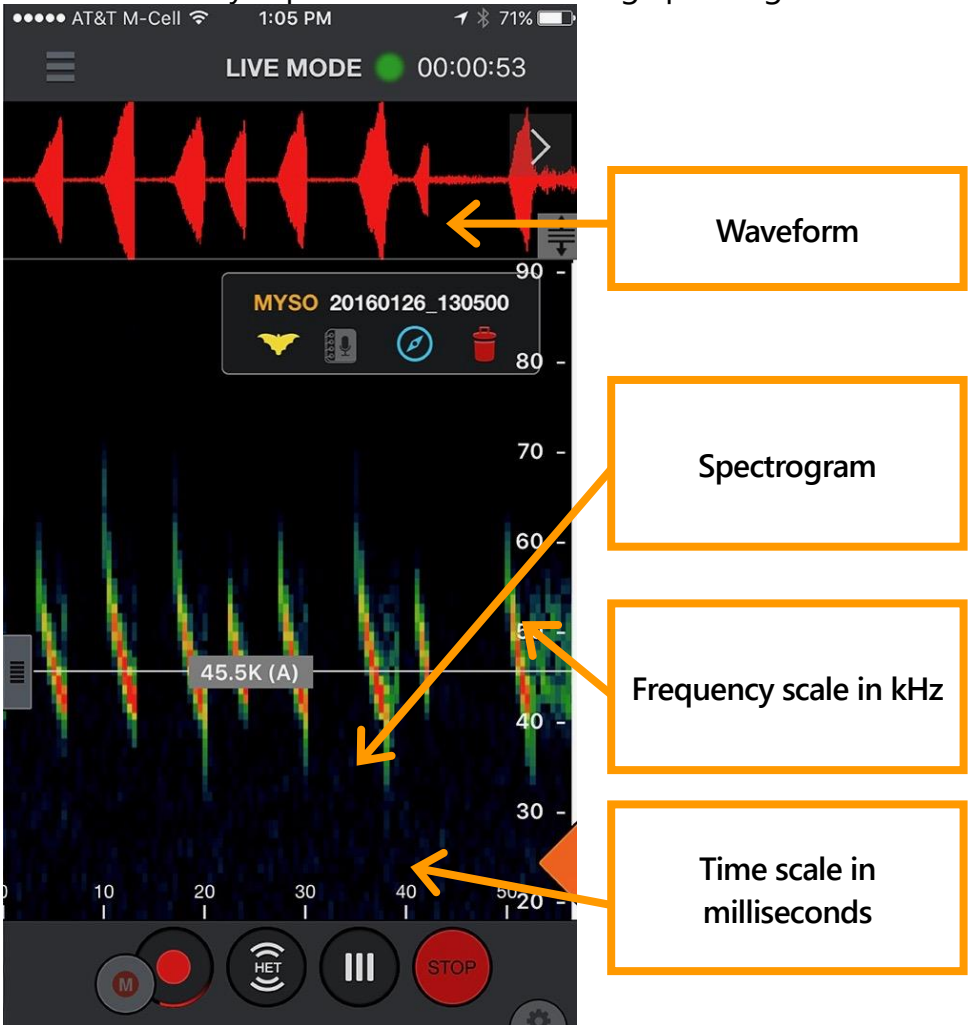
2.3 Navigating the app

To navigate through the app, press the main menu symbol. You can go to other sections of the app while still hearing and recording bats. You can even continue to monitor and record bats in the background while using other apps.



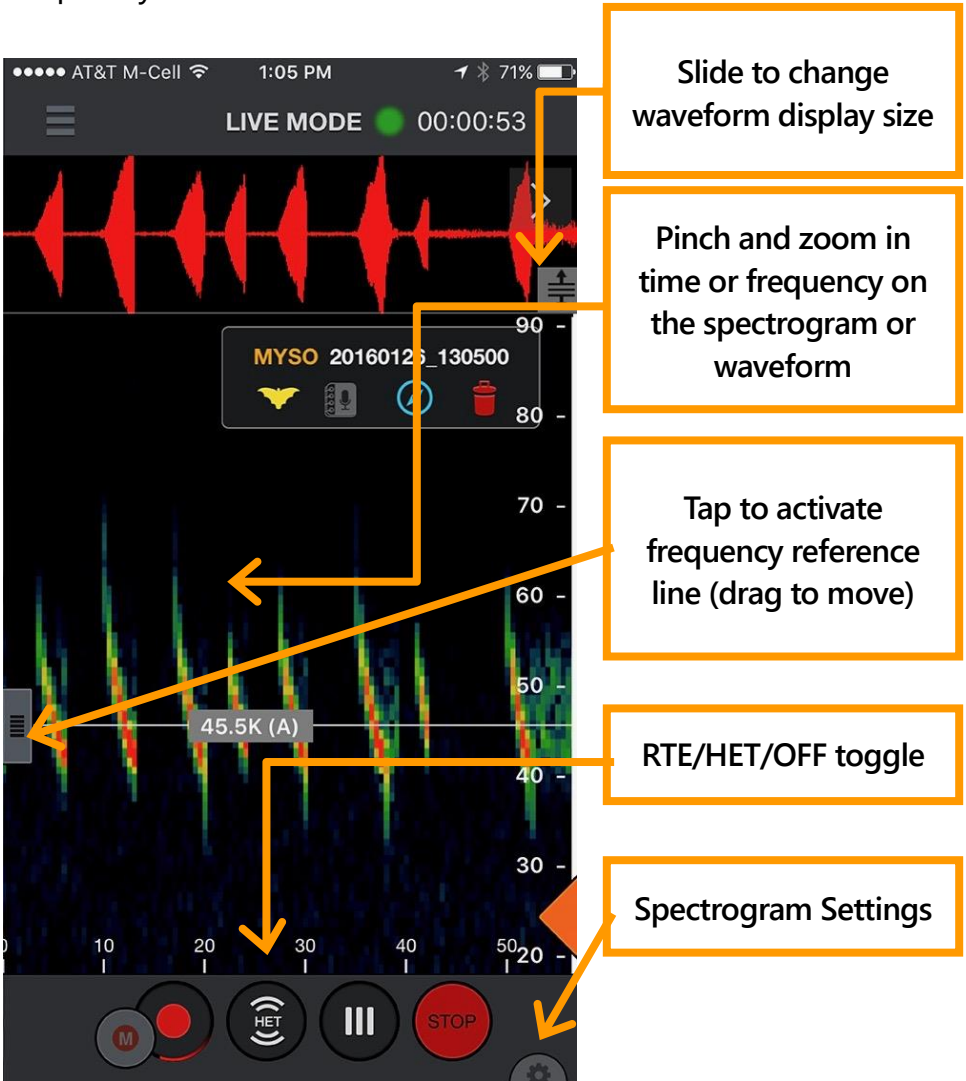
2.4 Monitoring in Live Mode

In **LIVE MODE**, ultrasonic data is streamed to your Android device. The frequency and duration of the bat echolocation calls are visually represented in a scrolling spectrogram.



In **LIVE MODE** you can scroll back and zoom into portions of the scrolling spectrogram. After scrolling back in time, a "Return to real-time" button appears at the top right of the screen; press to jump forward to real-time. You can scroll back in time through up to 10 minutes of history. The app will intelligently reduce the history if the Android device is nearly

full. A frequency reference line allows viewing a specific frequency.

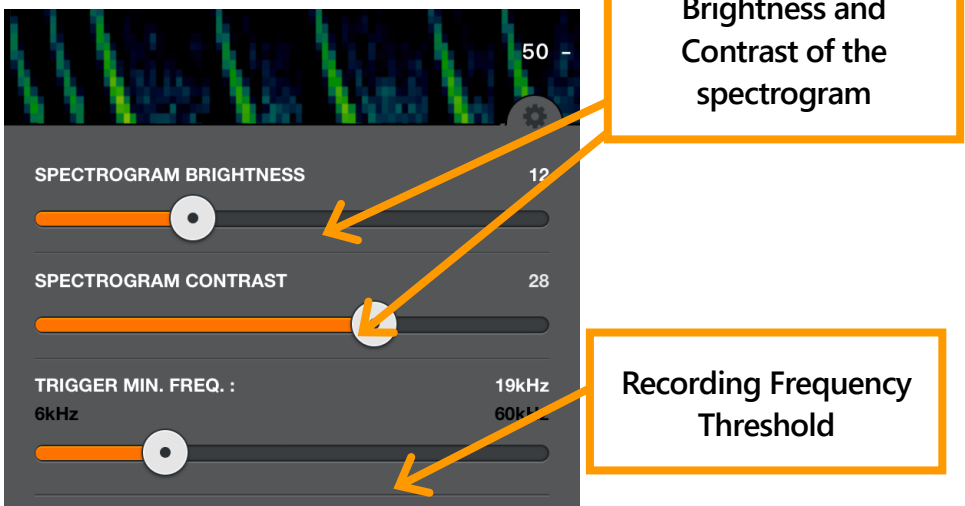


You can listen to bats using Wildlife Acoustics patented Real Time Expansion (RTE) or Heterodyne (HET). RTE translates the ultrasonic sounds to a range that is audible to humans by taking tiny snippets of the sound and slowing it down. Since there is quite a bit of space in between bat echolocation calls relative to the length of the call, the space in between is used to play back the slowed down call. When in HET mode, double tap the grey frequency reference control to go into

auto-het mode. This will constantly tune to the frequency with the most energy above the Trigger Minimum Frequency setting (see below) or a minimum of 10 kHz for EMT1 and EMT2 Pro or 16 kHz for EMT2. Just drag the grey slider on the left side to manually tune.

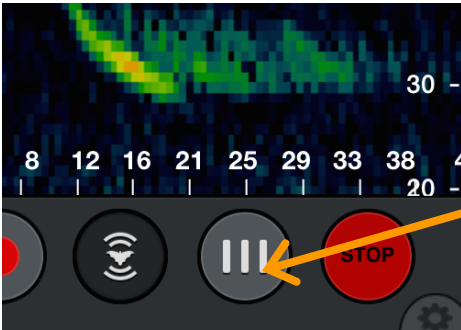
A bandpass filter is implemented based on the zoom level of the frequency axis in all listening modes. If you zoom in frequency, you will only hear the frequencies visible on the screen. If there is a quite a bit of low frequency noise, or the recorder is picking up its own output, you can zoom such that the noise is not seen on the screen and filter for a cleaner sound. You can also filter out the higher frequency noise of the EMT2 if you do not have very high frequency bats. Auto-HET will only tune to frequencies visible on the spectrogram based on zoom level.

Tap the **Settings** icon to open the spectrogram settings panel. Here you can adjust the brightness and contrast of the spectrogram as well as adjust the minimum frequency to trigger a recording. In portrait orientation, it appears as shown; in landscape orientation it appears at the top right of the screen.



In Compressed mode, the Echo Meter Touch only shows spectrograms containing ultrasonic signals. The spectrogram

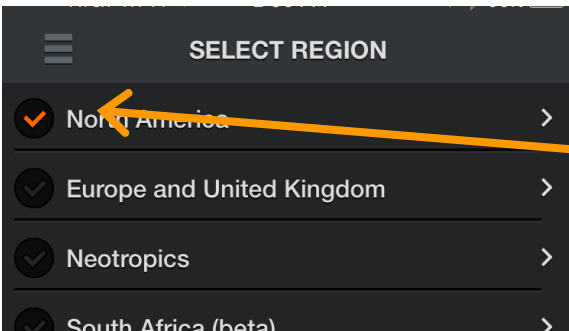
does not scroll unless there is a signal such as bat echolocations. In Expanded mode, the spectrogram scrolls in real time. Use this mode to examine the timing between previous bat echolocations. Because the signals scroll too quickly, this mode is not recommended for monitoring. Tap the **STOP** button to stop streaming data and put the Ultrasonic Module into a low-power state. Press **START** to resume.



Toggle between Compressed and Expanded Mode (Expanded shown)

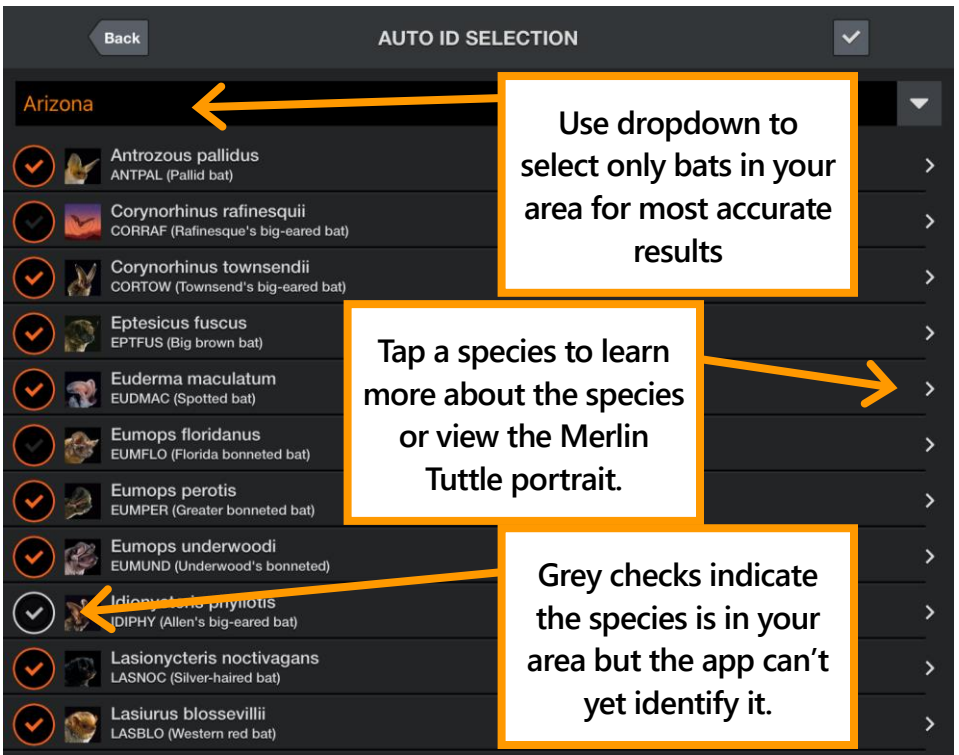
2.5 Configuring Auto-ID

Enter Auto ID mode to view a list of available regions. Current regions are North America, Europe and United Kingdom, and Neotropics. There is also a South African region that is in beta. Check a region to select all bats in that region. Tap a region to learn more about the species and to select only bats in your area.



Select region

A dropdown menu allows you to easily select only bats in your North American state or Canadian province.



After you select the bats to identify, you can automatically identify them in **LIVE MODE**.

2.6 Recording in Live Mode

There are two methods of initiating a recording; using triggers and manually. Using triggered recording, a recording is triggered only when bat activity is detected and is ended when there is no activity or 15 seconds have elapsed, whichever comes first. As long as recording is turned on, the device records automatically when bats are present, even when the app is running in the background. There is also a small manual record button which you can use to initiate a recording. This can be used on its own or while triggered recording is activated if the trigger misses something. When you press the manual button, a recording starts 5 seconds back in time and continues until you hit the button again or 15 total minutes is reached. The NOISE filter will not act on

manual recordings and Auto-ID will only run in real time if the length is under 60 seconds.

During triggered recording, the Trigger Minimum Frequency, in the Spectrogram **Settings panel**, should be set as high as possible but lower than any expected bat echolocation. For North America and the UK, 12 kHz works well. Lower frequency signals will not initiate a recording. The Threshold can be set between 6 kHz and 60 kHz.

During recording, animation appears around the **Record** button. A white outline forms around the recording on the spectrogram when a recording is in process. In addition, a glowing red orb appears on all title bars in the app when recording is activated and glows green when a recording is triggered. The duration of the current recording is shown to the right of the orb. Using triggered recording, the duration of the current session is shown and using manual recording, the duration of the current recording is shown. At the conclusion of the recording, a label shows the filename. Tap appropriate icon in the label to:

- Identify the species of bat automatically, or override the species tag.
- Append voice or text notes to that recording.
- Navigate to the recording location in GPS view.
- Delete the recording.

Recordings with no bat detected are automatically tagged as "NOISE" and automatically deleted. You can choose to not auto-delete NOISE files in the **Advanced Settings** screen. Using triggered recording, each time you press the Record button a session is started. The session is concluded when you toggle recording off. Each session is given a distinctive color bar in the recording List and as a path in GPS View. An option in the **Advanced Settings** screen organizes sessions into nightly sessions (noon to noon) regardless of the number

of times recording is stopped and started. Each nightly session exports in its own folder with its own KML file. Using manual recording, the app automatically uses nightly session mode for those recordings so as to avoid making a folder for every recording.

The recording timer at the top of the screen starts at the beginning of triggered recording session. Or at the beginning of a manual recording. If a manual recording is made during a triggered recording session, then after the manual recording is over, the timer returns to the elapsed time for the triggered session rather than restarting.

The top two bat's scientific and common names appear in the Auto-ID pop-up, which is shown for 10 seconds after identification. This is not intended to ID two species of bats that might appear simultaneously in a recording, though it might in some circumstances. It is intended to give more information in order to help you make the best ID possible and also to allow you to see common confusions so you can learn the ID's limitations. You can also get a sense of the accuracy ID from the pulse count. This shows the number of echolocation pulses that match the top bat and the number of total pulses. More matching pulses can indicate a stronger match. You can select the runner-up species on the Auto-ID pop-up to immediately tag the recording with that bat instead of the front-runner. Click on the "i" icon to learn more about that species. If you know that both species are incorrect, select "CHOOSE ID FROM LIST" to label the recording with any other selected species of bat or enter your own six letter species code. The Auto-ID pop-up also shows the ratio of echolocation calls of the top bat to the total detected calls. This helps give a sense of confidence in the identification.

You can also run ID on one or all recordings from the recording list or while viewing spectrograms from the icon in

the recording label. Each recording takes a second or two to identify. If Real Time ID is set on, the app will not be able to trigger for a couple seconds following a recording while ID takes place. The species code or NoID is assigned as a prefix to the recording name. You can rerun Auto-ID if you should choose to select different bat species to ID. In addition, from the recording you can choose another label from your selected bat species by pressing the yellow bat in the recording label.

The screenshot shows the app's interface in LIVE MODE. At the top, the status bar displays 'Carrier', signal strength, time '1:53 PM', location, Bluetooth, and 100% battery. Below the status bar, the text 'LIVE MODE' is followed by a red dot and a timer '00:01:10'. The main display area features a red waveform representing the audio recording. Below the waveform, a semi-transparent panel displays the recording ID 'LASNOC 20161006_191112'. Two species options are listed: 'Silver-haired' (*Lasiurus blossevillensis*) and 'Big brown' (*Eptesicus fuscus*). Each option includes a small bat image and an information icon. A 'CHOOSE ID FROM LIST' button is positioned below the species list. At the bottom, a control bar contains several icons: a red dot, a circular icon with a signal symbol, a pause icon, and a 'STOP' button. A scale at the bottom of the recording area ranges from 20 to 140. Annotations with orange arrows point to various elements: the timer, the recording waveform, the 'Silver-haired' species name, the 'Big brown' species name, the 'CHOOSE ID FROM LIST' button, the red dot in the control bar, and the 'STOP' button.

Auto-ID pop-up

Pulse count

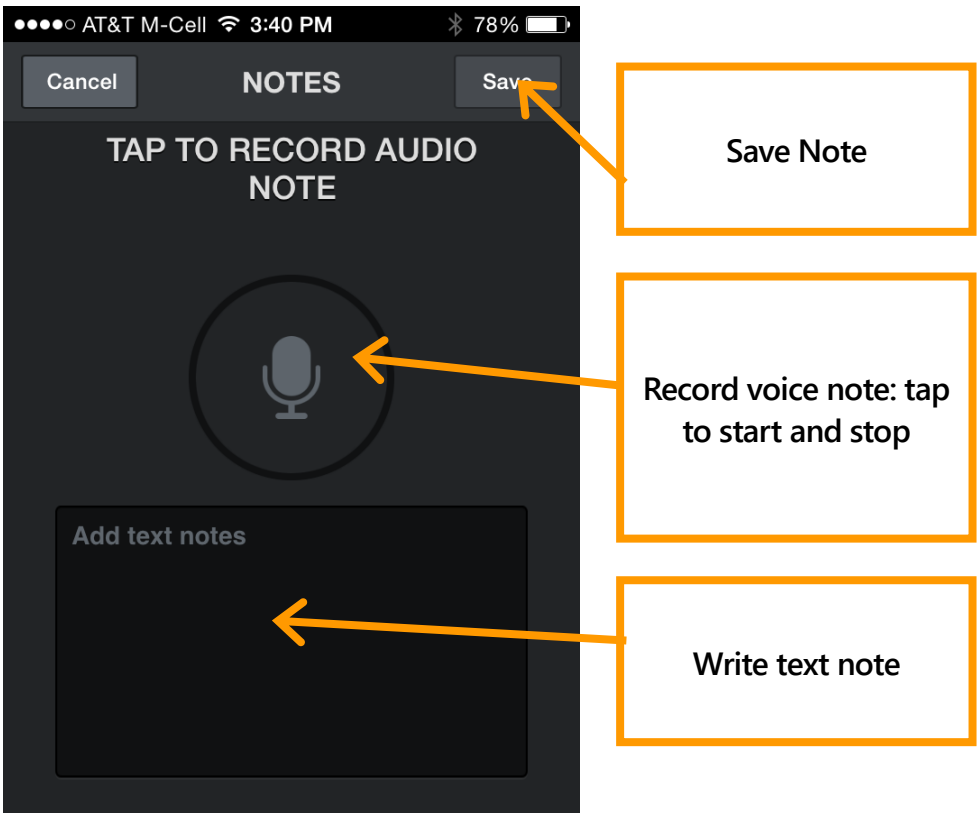
Click to label recording with alternate bat

Learn more about bat species

Label recording with another species of bat

Triggered recording and/or manual recording

Tap the recording label icon to open the **NOTES** page. Voice and text notes are saved as metadata in the recording so they can be transferred with the recording to a computer.

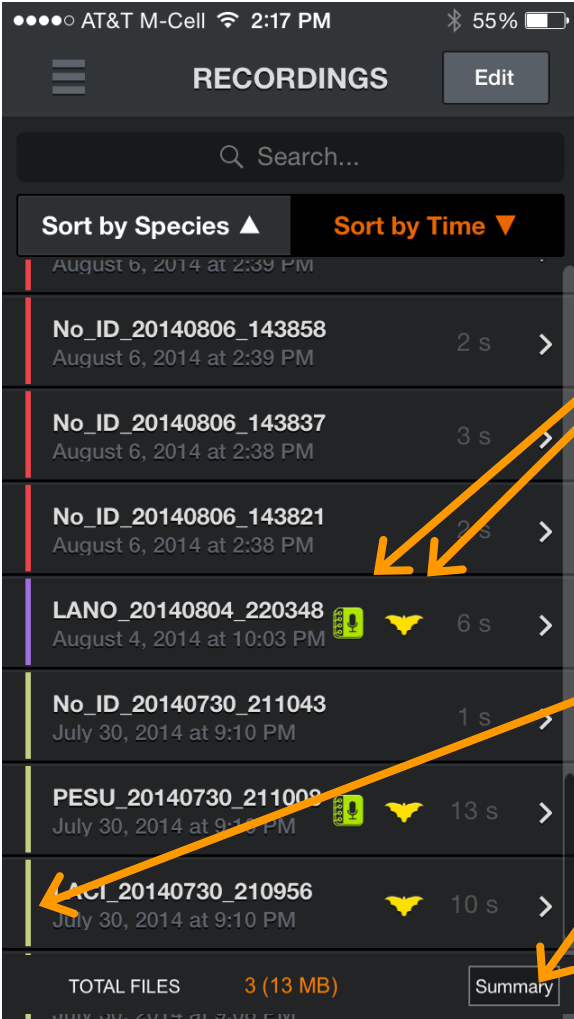


2.7 The Recording List

Here you can see a list of all of your recordings. The list can be sorted by Time or Species. The latter is useful to sort by species for identified recordings or to sort out noise or NoID recordings. **Tapping again will reverse the sort order.** Tap on a recording in the list to view the spectrogram or leave notes. If you are monitoring and recording in the background you will be advised that you are leaving Live Mode.

Tap the **Edit** button at the top right to delete recordings, transfer recordings to your computer via Wi-Fi, share recordings or identify the bat species in the recordings. Press a box to individually 'check it' in the list. You can select

multiple recordings from the list by checking the box of any recording, then pressing and holding the checkbox of any recording above or below. This will check all boxes in between.



Icons indicate recordings with voice or text notes and recordings with an identified species

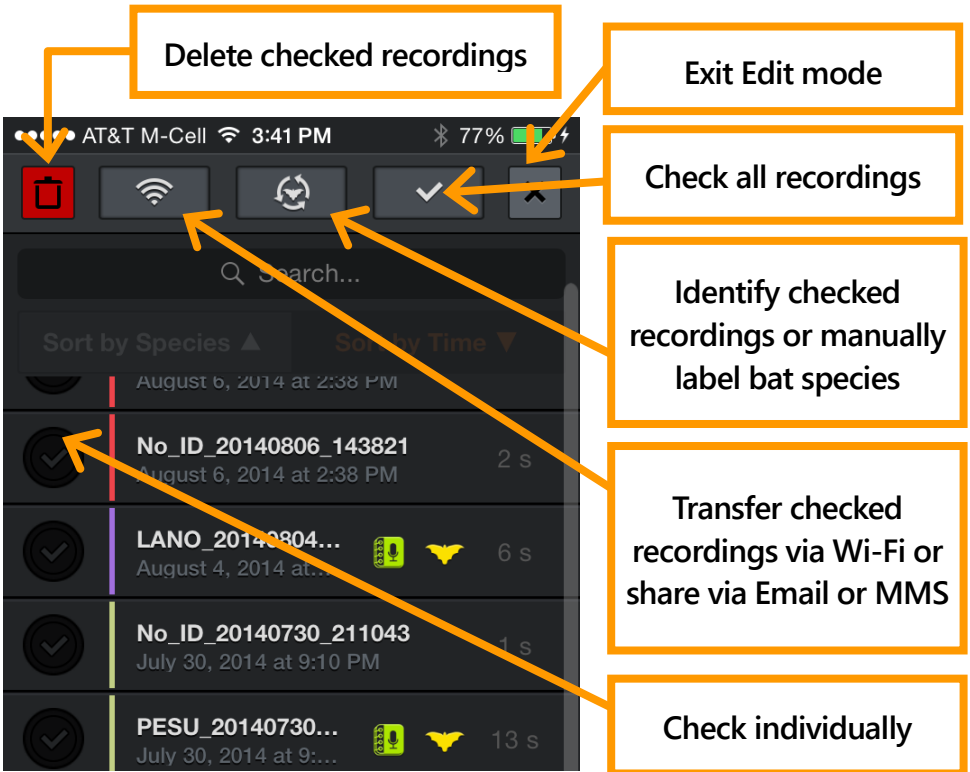
Colored recording session identifier

Show summary pop-up

Press the Summary button to show a pop up screen with the number of recordings with each identified species, NoIDs, and the NOISE files. This will summarize all recordings if none are checked, or a subset if only some have been selected with the checkboxes.

Use the search bar to search for species IDs or to search the text of any text notes you have added.

In addition to running ID or manually labeling recordings, the Auto-ID button will also give the option to remove all IDs from the checked recording. This will remove the ID meta data as well as the filename prefix.



The app has a limit of 10,000 recordings and recordings will need to be transferred or deleted to activate recordings once that limit has been reached.

2.8 Viewing Spectrograms of Recordings

Tap a recording from the Recordings list or from GPS view to view the spectrogram of the recording, leave a voice or text note, identify the bat, and listen to the recording. You can listen using RTE, (HET), or Time Expansion (TE) playback. Use TE to play the recording at a slow speed that renders ultrasound into audible sound. In compressed view, you will only hear visible signals during playback, not the space in between echolocations. For HET and RTE, the playback occurs

on all samples as though expanded view is selected, whether in compressed or expanded view. This lets you hear exactly how the bat would have sounded in live mode. As in Live Mode, heterodyne can be tuned automatically or manually. Press the up or down buttons to go to the next or previous recording in the recording list. The order of the recordings will match the sorting chosen in the list. Colored vertical bars at the beginning of each recording show the corresponding recording session and match the color shown in the recording list as well as the path in GPS view.

You can filter the audio for better fidelity as in Live Mode by zooming to only the frequencies of interest.

Spectrograph settings are available as in **LIVE MODE**.



Recording label - write/edit notes, run ID, delete file or go to map view

Scroll and Zoom spectrogram or waveform as in Live Mode

Choose RTE, HET, or TE

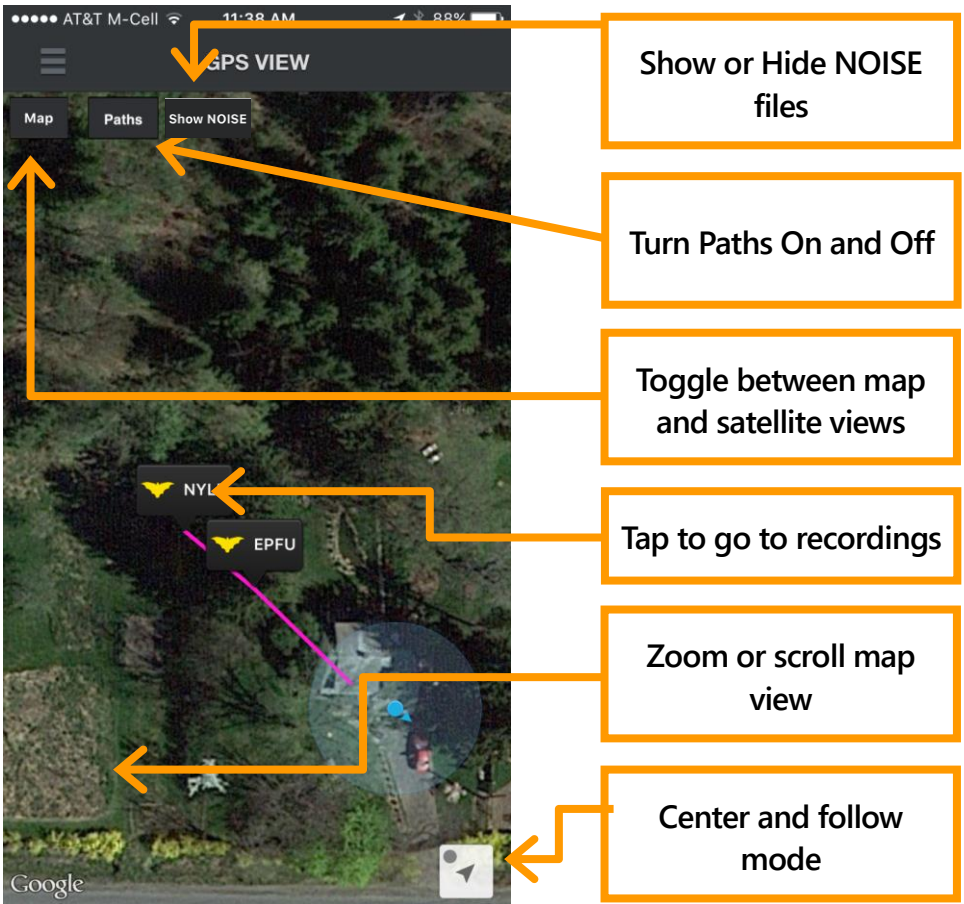
Playback

Go to next or previous recording in the list

2.9 GPS View

In **GPS VIEW**, you can see the locations of recordings and species ID and the track of your recording session on a map. Each recording session is shown with a different path color. NOISE files and path lines can be shown or hidden.. A KML file is generated and stored with the session recordings in the session folder. If any recording from a recording session is transferred via Wi-Fi, a KML file will be included in the session folder with all recording's waypoints shown. You can also download the files through iTunes as described in this User Guide. KML files can be opened directly

in Google Earth to show the recording locations, species IDs and recording path



The **zoom to current location** triangle in the lower right of the GPS view zooms to your current location and scrolls the map as you move. The blue dot indicates it is in auto-scroll mode. If you scroll away from your location, the dot turns gray and auto-scroll turns off.

2.10 Settings Screen

The Setting screen is accessible from the Main menu.

Audio Division Ratio

Adjusts how the RTE sounds in **Live Mode** and how RTE and TE sound on a previously made recording. 1/10 is higher pitch and 1/20 is lower.

Values: 1/10, 1/20

Default: 1/20

Nightly Sessions Mode

Set to **ON** to organize sessions into nightly sessions (noon to noon) regardless of the number of times recording is stopped and started. Each nightly session exports in its own folder with its own KML file.

Using manual recording, the app automatically uses nightly session mode for those recordings so as to avoid making a folder for every recording.

Values: ON, OFF

Default: OFF

Save Noise Files?

Recordings with no bats detected are automatically tagged as "NOISE". You can choose whether to save these files or automatically delete them.

Values: ON, OFF

Default: OFF

Real-Time Auto ID

If **ON**, Auto-ID will run immediately after concluding a recording and the Auto-ID pop-up will be displayed.

Values: ON, OFF

Default: ON

Real-Time Auto ID Sensitivity

Adjusts how conservative the ID results will be. On **SENSITIVE**, more bats will be identified even if the algorithm is less confident of the result. On **ACCURATE**, only bats in

which the algorithm is very confident will be shown.

BALANCED is in between.

Values: SENSITIVE, BALANCED, ACCURATE

Default: SENSITIVE

Trigger Sensitivity

Adjusts the recording trigger sensitivity level. High is extremely sensitive and maximizes detection, but will also trigger from other noises resulting in NOISE files. Low will only trigger on stronger signals that are likely to be able to be identified. Medium is somewhere in between the two extremes. The trigger only applies to signals that are higher in frequency than the **Trigger Minimum Frequency** setting in the **Spectrogram Settings** panel.

Values: LOW, MEDIUM, HIGH

Default: MEDIUM

Trigger Window

The recording continues for this amount of time after the last signal that satisfies the trigger. (The recording is also truncated when it reaches the maximum recording duration set by **Max Trigger Length**.) Set the trigger window setting long enough to avoid a recording that ends after one echolocation call. For example, if bat echolocation calls occur every 0.5 seconds and trigger window is 0.1 seconds, you would get a new trigger with every single echolocation call.

NOTE: Some standards describe a specific recording trigger window as a bat pass.

Values: 1 to 15 seconds in 1-second increments

Default: 3 seconds

Max Trigger Length

You can specify the maximum length (time duration) of recordings to comply with file size restrictions of your analysis

software or to fulfill a specific recording protocol or definition of a bat pass.

Values: 1 second to 60 seconds in 1-second increments

Default: 15 seconds

Gain (Echo Meter Touch 2 Pro only)

The Echo Meter Touch 2 Pro has configurable gain. The HIGH setting roughly corresponds to the gain on the Echo Meter Touch 1 and the SM4BAT FS set to the default 12dB level. This can be useful for recording very distant or quiet bats.

MEDIUM corresponds to the gain on the Echo Meter Touch or the 0dB gain setting on the SM4BAT FS and is a good setting for general recording. The LOW setting is 12 dB lower than MEDIUM and is useful for recording hand released bats or any other situation where the bats are close or loud.

Values: LOW, MEDIUM, HIGH

Default: MEDIUM

Sample Rate (Echo Meter Touch 2 Pro only)

The sample rate on the Echo Meter Touch 2 Pro can be set to 256k or 384k. 256k will record up to 128kHz which is sufficient for all North American and European bats. 384k will record up to 192kHz but will use proportionately more storage for recordings.

Values: 256k, 384k

Default: 256k

Select Storage

Selects the storage location for the recordings. If your Android device accepts an SD card, you may choose to store recordings to that card.

Values: Internal, SD Card

Default: Internal

NOTE: For Android versions 8 and 9, after the storage location has been changed from internal to SD card, the next time the

Live Mode screen is opened a pop-up message will appear to choose the root directory to grant write access. The choices are "Cancel" or "Open". Select "Open" to be taken to a folder selection screen. There, press "Select", which by default is the root directory of the SD card. This process is only required once after changing the location under Android 8 or 9. This process is not required under Android 10 or later.

Advanced Settings

Clean Recording Database

This button will make sure that each recording in the list still points to a recording file on your device. Sometimes recordings can end up in this list with no associated file if the user deletes files in the file system of the device or through iTunes. Cleaning this up when the app is "initializing" on start up just takes too long so this is a way to clean house when needed without start-up delays.

Restore Defaults

Press the **Restore Defaults** button to restore the following to defaults: zoom level, spectrogram settings and advanced settings. It also unselects all bats on the AUTO-ID SELECTION screen.

Update Module Firmware

Firmware should only be updated as directed by Wildlife Acoustics support to address issues with some models of Android devices.

3 Recordings

This section describes the format of the recordings, how to transfer them to or from a computer, and how to share them with others.

3.1 Filenames for Recordings

Recordings use the following naming convention:

ID_YYYYMMDD_HHMMSSWAV

ID

The first three letters of the species and the first three letters of the genus for recordings that have been identified, NoID if Echo Meter Touch was unable to identify the recording or NOISE if the no bats are detected in the recording.

YYYYMMDD_HHMMSS

The full timestamp including the year, month, day, hour, minute, and second when the recording started.

3.2 Metadata Included in Recordings

Metadata is stored in the recording file in the standard GUANO format as well as Wildlife Acoustics' proprietary format. For more information on the format, visit www.wildlifeacoustics.com/SCHEMA/GUANO.html. Metadata is visible in Wildlife Acoustics Kaleidoscope free spectrogram viewer software and can be tabulated in spreadsheet form using Kaleidoscope's converter function. Kaleidoscope software has the ability to add further metadata relating to analysis of the recording. The following are some of the metadata stored in each recording:

Device Model: Displays the type of **Echo Meter Touch**.
Module Serial Number

App Version

Timestamp

GPS Coordinates: The location and elevation of the Echo Meter Touch when the recording started.

Voice and Text Notes

Species ID: Stores the Auto-ID species, if run, as well as any manual ID added by the user.

Settings: Including Gain, Sample Rate, Max Trigger Length, Trigger Window, Trigger Sensitivity, and Trigger Minimum Frequency.

3.3 Sharing Recordings via Email or Text Message

Recordings can be shared via Email or MMS text.

1. Tap the **Edit** button at the top right to make the edit bat appear.
2. Select one or more recordings (up to 20MB total).
3. Tap the **Share** button and select **Email** or **MMS**. A message composition window opens.

NOTE: Android devices apply a maximum size limit to MMS attachments. This can vary between .3MB and 1MB. Recordings larger than the maximum size limit cannot be shared via MMS messaging.

Shared recordings can be imported into the app.

1. Press and hold the recording attachment in the email or text message.
2. Select the **Echo Meter Touch** app. The recording is imported into the app.

All imported files must have been recorded using Echo Meter Touch app (as opposed to another bat recorder) and will be stored in a session folder called **Imported Files**. Imported files have a white session color in the recording list.

3.4 Backing Up Recordings

It is advised to back up your Android device since all your recordings can be lost if the your Android device is lost or damaged. There are many third-party apps to allow backing up data on your device. Recordings will **not** be backed up through the Google data back up under "backup & reset" in the Android settings.

Recordings are not stored as part of the app, they are stored in a separate folder on an SD card or internal memory, so deleting the app will not delete recordings. If you delete and reinstall the app, you will need to re-associate the recordings for them to be visible to the app:

1. Shut down the app.
2. Move recordings or folders into the Echo Meter > Import folder using the files app.
3. Launch the app to import them so they appear in the app

3.5 Transferring Recordings to a Computer

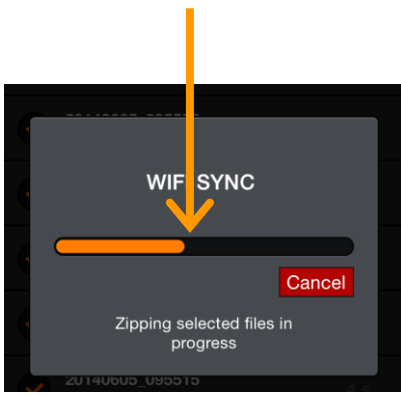
Recordings can be transferred to your computer via Wi-Fi or through a USB cable.

Using Wi-Fi

1. Tap the **Edit** button at the top right to show the edit bar.
2. Select one or more recordings.
3. Tap the **Share** button and select **Wi-Fi** to compress all the recordings into one or more transfer files (not to exceed 1GB).
4. A short URL with an IP address and port appears.
5. Type the address exactly as shown into any web browser on any computer on the same wireless network.
6. A page appears where you can download the recordings.

Preparing files

Ready to download



Using a USB cable on a Windows PC

Recordings can also be transferred to your computer using a USB cable (the charging cable that comes with the Android device).

1. Plug the Android device into the computer using the charging cable. It will appear in your Windows file manager window as a standard device.

Navigate to the recordings at path: Device name > Internal Storage > Documents > EchoMeter > Recordings

2. Copy any recordings or session folders onto your computer using drag and drop.
3. Select the recording sessions you want to transfer and press the Save to button to select a destination.

Using a USB cable on a Mac

Recordings can also be transferred to your computer using a USB cable (the charging cable that comes with the Android device).

1. Download and install the free third-part program called **Android File Transfer**.
2. Plug the Android device into the mac computer using the charging cable. The **Android File Transfer** program will automatically open whenever you connect an Android device to your Mac.
3. Navigate to and open the EchoMeter folder.

4. Copy any recordings or session folders onto your computer using drag and drop.

3.6 Importing Recordings

You can import recordings and/or session folders into the app from your computer or from an email or text. This is useful if you need to switch to a new Android device and want to transfer your recordings or you want to import recordings or sessions shared with you from a friend.

Using a USB cable to import from a computer

1. Connect your Android device to a Mac or Windows computer via USB cable.
2. Open the EMT app and go to the Settings screen.
3. Select either Internal or SD Card storage. This sets the recording destination and also sets the import destination.
4. Close the EMT app and connect the Android device to your computer using the USB cable charging cable.
 - On Windows, it will appear in the file manager window as a standard device.
 - On Mac, Download and install the free third-party program called Android File Transfer to access the files on you Android device.
5. Navigate to:
 - SD Card/Documents/EchoMeter/Import
 - Internal Storage/Documents/EchoMeter/Import
6. If the Import folder is missing you must create a new folder and name it "Import".
7. Copy all session folders and/or independent recordings that you wish to import into your EMT device into the Import folder.
 - You can also add Zipped session folders.
8. On the Android device, launch the Echo Meter Touch app.

- The app should see the files to import and ask for permission to import them.
 - The app will then ask to select the folder for import.
9. Select the folder which corresponds with the "Select Storage" setting.
- If set to Internal, select: "Internal/Storage/Documents/EchoMeter".
 - If set to SD card, select: "SD Card/Documents/EchoMeter".
10. After choosing, tap "use this folder", and all the files will now be imported into the app on your device and they can then be found in the recordings list. The recordings or sessions will then be deleted from the Import folder. Sessions will be shown with a unique color bar and the path will be imported into GPS view as well.

Importing from an email or text

1. Open the EMT app and go to the Settings screen.
2. Select either Internal or SD Card storage. This sets the recording destination and also sets the import destination.
3. Close the EMT app.
4. On the Android device, copy the recordings, sessions folders, or zipped session folder to the following folder that corresponds to the above storage setting:
 - SD Card/Documents/EchoMeter/Import
 - Internal Storage/Documents/EchoMeter/Import
5. If the Import folder is missing you must create a new folder and name it "Import".
6. Continue from Step 8 in the "Using a USB cable to import from a computer" section above.

3.7 Analysis Software

Use the free Kaleidoscope Viewer to create a spreadsheet file showing your recording's metadata and notes and view spectrograms of your bat recordings on a computer. Upgrade to Kaleidoscope Pro to add automatic classification of bats. You can also use third party bat analysis software for your Echo Meter Touch recordings.

4 Testing the Microphone Element

Use the available Ultrasonic Calibrator to test the microphone element on the Echo Meter Touch. Since ultrasound is beyond the range of human hearing, verifying performance requires special equipment. The Ultrasonic Calibrator helps you test both the microphone and the full recording system. The calibrator uses a 9V alkaline battery (included with the calibrator). When the battery is depleted, the calibrator can no longer provide a tone and its LED no longer illuminates. While the recorder may still emit sound at this point, it cannot be used as an accurate calibrator until the battery is replaced. The calibrator offers two modes of operation. Calibration mode is used to test the microphone at close range and Chirp mode is used to test the entire system at a greater distance.

4.1 Calibration Mode Microphone Testing

1. Remove the clear calibrator microphone adapter by sliding it off the calibrator from the bottom.
2. Turn the calibrator ON and set the toggle switch to CAL (calibration). The calibrator generates a 40 kHz inaudible tone.
3. If you are using the Pro version of the EMT 2, set the gain to Medium in the Advanced Settings of the app.
4. Enter Live Mode on the Echo Meter Touch. Make sure you are in expanded view or the spectrogram will adapt to the calibration tone and stop scrolling. Also turn the volume on your phone or tablet down so as to avoid acoustic feedback affecting the test.
5. Drag the slider to maximize the size of the red waveform panel at the top of the screen.
6. Point the acoustic horn of the Echo Meter Touch directly at the calibrator speaker.



7. Observe the waveform level on the screen. Move the Echo Meter Touch around until the waveform is maximized. There is variation in microphone sensitivity between units so you may see a larger waveform, but a microphone is good if the waveform takes up more than $\frac{1}{4}$ of the waveform panel.

4.2 Chirp Mode System Testing

To test the entire system, use the Ultrasonic Calibrator in Chirp mode to emit loud ultrasonic signals that can be picked up by the Echo Meter Touch from some distance. This can be used to verify all triggering and recording functions.

- Turn the calibrator ON and set the toggle switch to CHIRP. The calibrator emits a 100ms long tone at 40kHz (+/- 10Hz) every 500ms. The amplitude of the tone is 104dB SPL (+/- 3dB) at 10cm.
- Enter Live Mode on the Echo Meter Touch and place the calibrator within 20 meters to assure the signal can be received.
- With the calibrator chirping, you can test trigger settings and monitoring modes.

WARNING! Do not place the Ultrasonic Calibrator near your ears. In CHIRP mode, the calibrator emits a 40 kHz signal at over 100 dB SPL. Prolonged exposure to high intensity ultrasonic signals may cause permanent hearing loss at audible frequencies.

5 Specifications

5.1 Physical

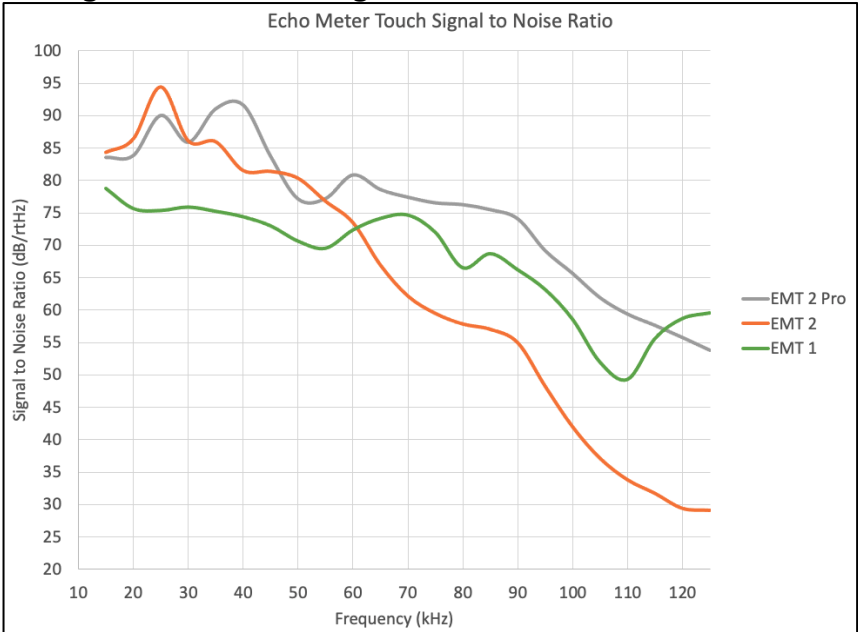
	Echo Meter Touch 2 and 2 Pro
Length w/o connector:	1.4 inches (35mm)
Width:	1.9 inches (48 mm)
Thickness:	.4-.6 inches(10-16mm)
Weight:	0.7 ounces (20g)
Material:	Polycarbonate/ABS
Environmental:	Weather resistant but avoid rain

5.2 Audio

	EMT 2	EMT 2 Pro
Recording Format:	16-bit WAV	16-bit WAV
Gain:	Fixed	3 settings
Sample Rate:	256kHz	256kHz/384kHz
Directionality:	Slightly Directional	Slightly Directional
Hi Pass Filter	None	2-pole at 8kHz

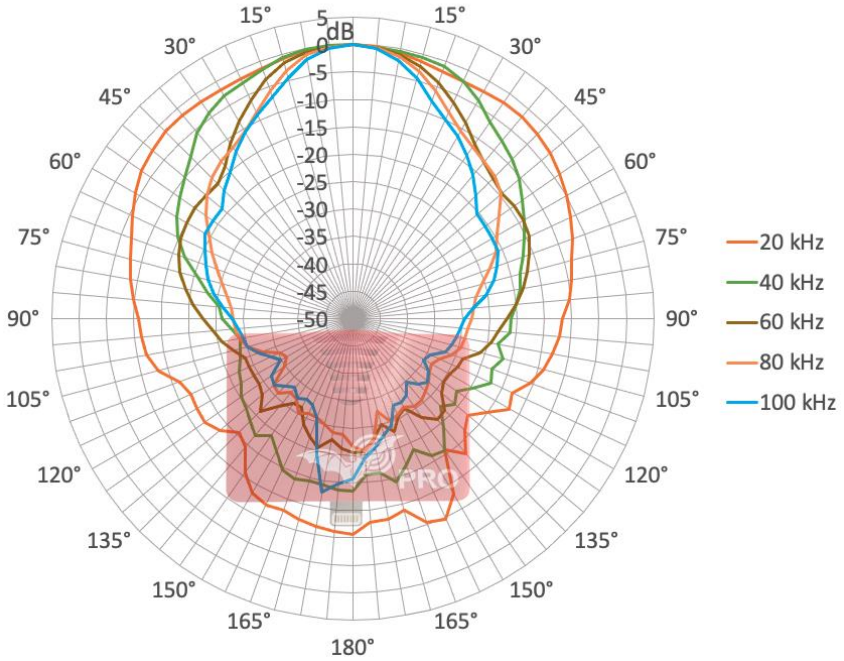
Maximum Recording Frequency: Half of the sample rate (up to 128 kHz for 256 kHz sample rate and up to 192 kHz for 384 kHz sample rate)

Signal to Noise Ratio: This is a measure of quality within the recording bandwidth. A higher value is better.

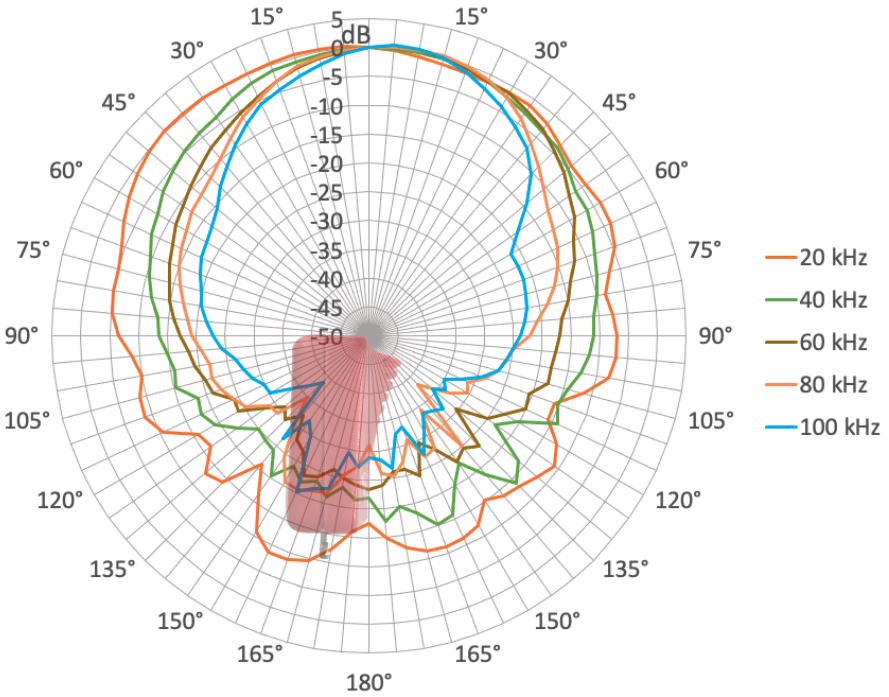


Directionality: The waveguide on the EMT 2 provides some directionality to reduce extraneous noise and echoes.

Echo Meter Touch 2 and Pro Directionality (Horizontal)



Echo Meter Touch 2 and Pro Directionality (Vertical)



5.3 Storage Requirements

How many recordings you can store on your Android device depends on the capacity of your device and how much memory is available. A 5.0-second recording uses 2.5 MB of storage. A 32 GB phone with 28 GB of storage available, for example, would be able to save over 10,000 recordings.

If you have an Android device that accepts an external SD card and have chosen that as your storage location on the Advanced Settings, screen, the following is the file path for the recordings on the card: Android--> data--> emtouch.wildlifeacoustics.com.echometer --> files--> EchoMeter--> Recordings

The app also needs at least 600mb of internal memory storage for sufficient buffering of Live Mode. The app will warn you if you have insufficient storage.

5.4 Module Firmware Updates

The firmware on the Echo Meter Touch module can be updated through the app to improve compatibility with current or future Android devices. If new firmware is available, a pop-up alert will be shown giving the option of updating or waiting. The update process takes under a minute. Do not remove the module during the process.

5.5 Android Device Compatibility

Echo Meter Touch 2 is designed to work with Android tablets and phones running Android version 8.0 or later and with at least 1GB of RAM. For a full list of compatible devices and more details on requirements visit:

www.wildlifeacoustics.com/devices.

The site will be updated with tablets and phones known to be compatible and incompatible. You can also find information on USB converters, extenders and cables.

Wildlife Acoustics, Echo Meter, and Kaleidoscope are registered with the U.S. Patent and Trademark Office. All other trademarks are the property of their respective owners.

The Echo Meter Touch is covered under the following patents:

US 8599647, 10612967, D813,835

GB 2480358, 2559838

Wildlife Acoustics, Inc.

3 Mill and Main Place, Suite 110

Maynard, MA 01754 USA

www.wildlifeacoustics.com

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