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1 Overview

Echo Meter Touch allows you to listen to, record, and identify bats with your Apple iPad or iPhone. The Echo Meter Touch app offers exclusive features and unprecedented ease-of-use for a handheld bat detector.

This guide is available online for printing at:

www.wildlifeacoustics.com/support/documentation

NOTE: This companion app will not function without the required Echo Meter Touch Ultrasonic Module, available from www.wildlifeacoustics.com/products/echo-meter-touch.

1.1 App Features

Listen to bat echolocations in real time.

Echo Meter Touch translates bat echolocations into frequencies that are audible to humans. Using Wildlife Acoustics patented Real Time Expansion (RTE); you can listen to bats in real time with unparalleled fidelity.

RTE maintains the timing and tonality of the original echolocations; it's the closest thing to having *bat ears*!

View the echolocations on a spectrogram.

A real-time spectrogram shows detail never before seen on a handheld device. Understand the frequencies and timing of the echolocations. Scroll back in time and zoom in on previous bat passes.

Record bat passes to .wav files.

Activate triggered recording mode to automatically save bat passes to full spectrum .wav files for analysis on a computer or to view on your iPad or iPhone. View the recording spectrogram and add voice or text notes. Listen to the recording using RTE or traditional Time Expansion Playback (playback at fractional speed to make the ultrasound audible).

See your track with locations where bats were detected.

View your entire track, including recording locations in satellite or roadmap view. View species code directly on the map for any bats that have been auto-identified. Go directly to a spectrogram for a recording from the map view. The location of the recording is saved as metadata in the .wav file.

NOTE: This feature requires an iPad or iPhone with a GPS capability or a Bluetooth GPS receiver.

Identify species of bat automatically.

Accurately identify bat species in seconds. The *Auto-ID* feature allows for the automatic identification of bats to species based on their echolocations. This is the same technology used in our professional Kaleidoscope Pro Bat Auto-Identification software. Currently, most North American and UK bat species are covered with more regions to be added in time. For more information on Kaleidoscope and a full list of species, see [the Kaleidoscope page](#) on our website.

NOTE: Auto-ID is intended for use in analyzing recordings of single bats in free flight in low clutter environments. On average, more than half of such recordings will result in a classification with 80% accuracy. Recordings of roost emergence, multiple bats, captive bats or bats in high clutter environments are not suitable for auto-id and results may not be accurate.

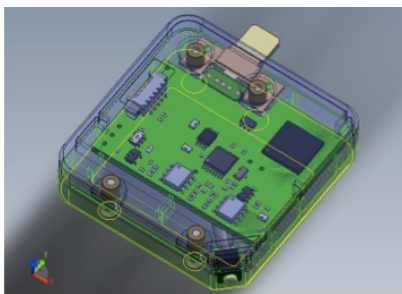
Transfer recordings to your computer via Wi-Fi or through iTunes.

The Echo Meter Touch can transfer full spectrum .wav recordings to your computer over a wireless network or cabled through the iTunes store. Using Wi-Fi, Echo Meter Touch bundles the recordings in a compressed .zip folder and allows downloads by entering a URL in a web browser. Combined with the *Auto-ID* feature, you can identify the species of the bat in the recording and export it with the recording.

1.2 The Ultrasonic Module



The Echo Meter Touch Ultrasonic Module senses ultrasonic signals up to 125 kHz with an ultrasonic microphone, digitizes the signal, and transmits the ultrasonic data to the iPad or iPhone.



Plug the Ultrasonic Module into the Lightning connector of your iOS device and you can immediately start monitoring, recording, and analyzing bat echolocations.

2 Using Echo Meter Touch

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

All screenshots were composed on iPhone in portrait orientation. You can also view screens in landscape mode. The differences are noted in this guide.

NOTE: iPad users may notice minor differences in layout to take advantage of the larger screen.

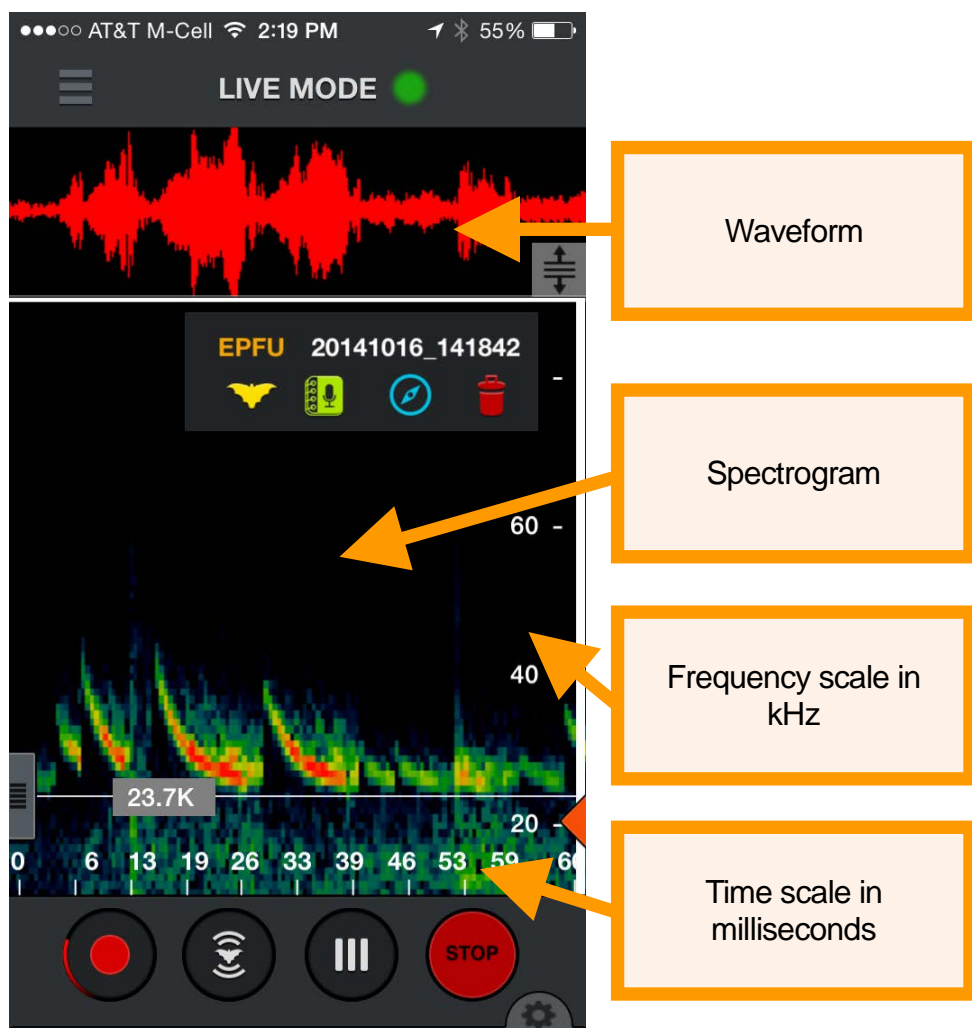
2.1 How to Attach the Ultrasonic Module

1. Plug the Ultrasonic Module into the Lightning connector of your iOS device.
2. The iOS device asks you to open the Echo Meter Touch app if it is not already open.
3. Press the **START** button to begin streaming the ultrasonic data.

NOTE: Insert the module in either direction. The microphone is mounted at a 45-degree angle to allow monitoring bats in portrait and landscape orientation.

2.2 Monitoring in Live Mode

In **LIVE MODE**, ultrasonic data is streamed to your iPhone or iPad. 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, double tap anywhere on the spectrogram or waveform to return to the present. You can scroll back in time through up to 10 minutes of history. The app will intelligently reduce the history if the iOS device is nearly full. A frequency reference line allows viewing a specific frequency.

The screenshot shows the app interface in LIVE MODE. At the top, the status bar shows AT&T M-Cell, signal strength, time (2:19 PM), location services, Bluetooth, and 55% battery. The app header includes a menu icon, the text 'LIVE MODE' with a green indicator light, and a vertical slider to adjust waveform display size. Below the header is a red waveform. A central control bar contains the text 'EPFU 2014 016_141842', a bat icon, a microphone icon, a compass icon, and a trash can icon. The main display is a spectrogram with a horizontal frequency reference line at 23.7K. The x-axis is labeled with time markers from 0 to 60. The bottom control bar includes a red record button, a microphone icon, a pause button, a red stop button, and a settings gear icon. Six callout boxes with orange borders and arrows point to specific features: 'Slide to change waveform display size' points to the top slider; 'Pinch and zoom in time or frequency on the spectrogram or waveform' points to the spectrogram area; 'Tap to activate frequency reference line (drag to move)' points to the 23.7K line; 'Double-tap to return to real time' points to the spectrogram; 'RTE on and off' points to the microphone icon; and 'Settings' points to the gear icon.

Slide to change waveform display size

Pinch and zoom in time or frequency on the spectrogram or waveform

Tap to activate frequency reference line (drag to move)


Double-tap to return to real time

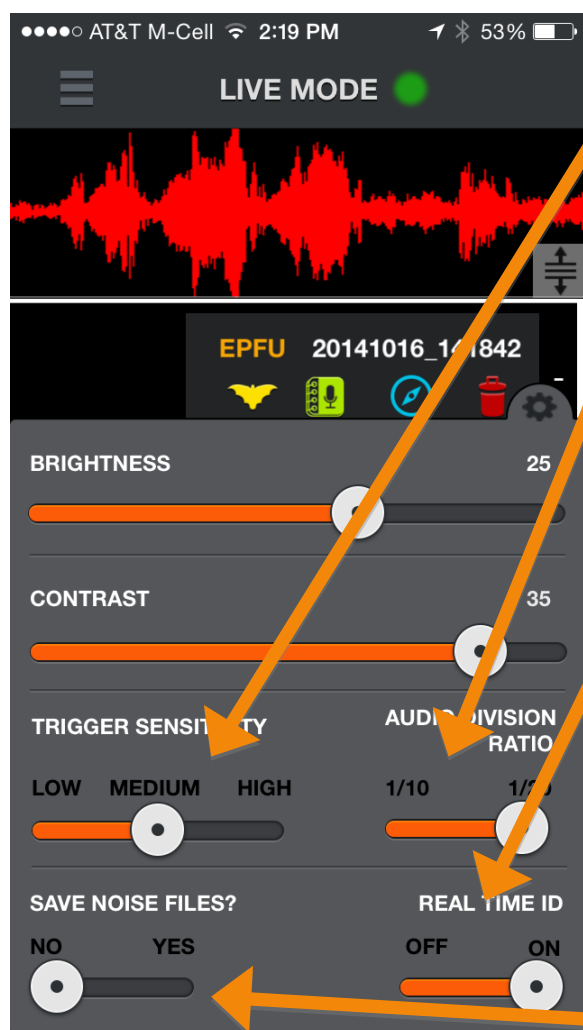
RTE on and off

Settings

You can also listen to bats using Wildlife Acoustics patented Real Time Expansion (RTE). 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.

Tap  **Settings** to adjust the brightness and contrast of the spectrogram as well as recording settings. In portrait orientation it appears as shown; in landscape orientation it appears at the top right of the screen. You can also adjust the **AUDIO DIVISION RATIO** here.



Adjusts the recording trigger sensitivity level.

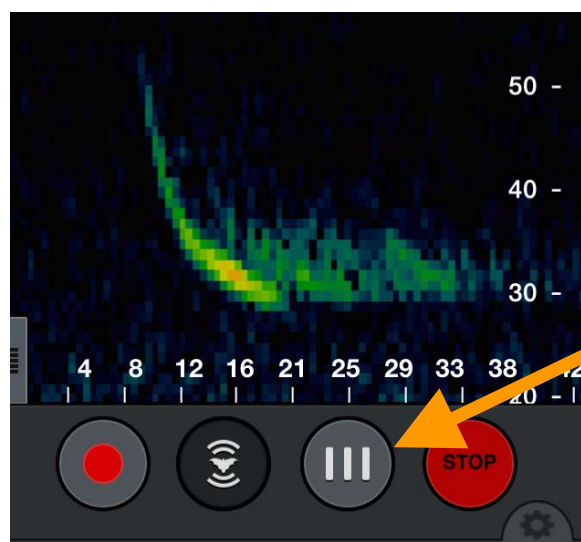
Adjusts how the RTE sounds: 1/10 is higher pitch and 1/20 is lower.

Turns on and off the ability to automatically ID bats after they are recorded.

Allows automatically deleting noise files that do not appear to contain bats

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.

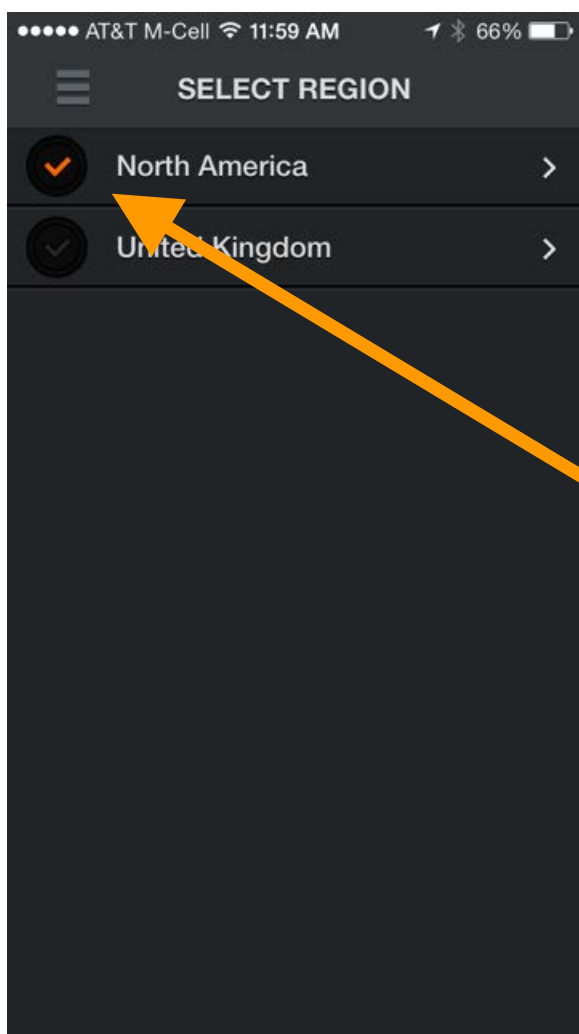
Tap the **STOP** button to stop streaming data and put the Ultrasonic Module into a low-power state. Press **START** to resume.



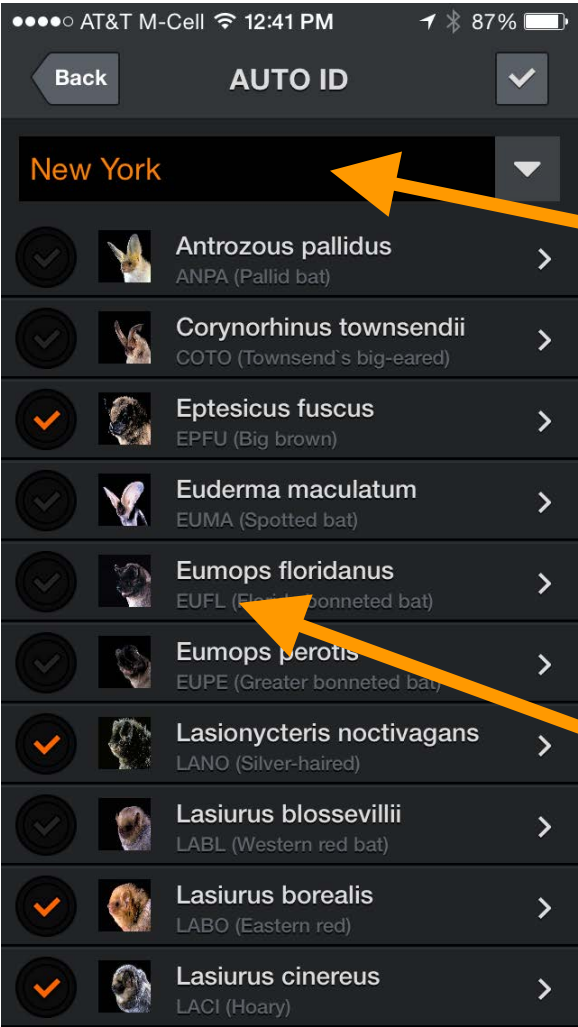
Toggle between
Compressed and
Expanded Mode
(Expanded shown)

2.3 Configuring Auto-ID

Enter Auto ID mode to view a list of available regions. Current regions are North America and the United Kingdom (more regions are planned). 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.




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



Use dropdown to select only bats in your area for most accurate results

Tap a species to learn more about the species and its behavior

After you select the bats to identify, you can automatically identify them in **LIVE MODE**, by turning on Real Time ID in  **Settings**. The bat's scientific and common names will display in a pop-up for several seconds after identification. Press anywhere on the screen to dismiss or press **Learn More** to learn more about the identified bat species. 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 D is set on, the app will not be able to trigger for a couple seconds following a recording while D takes place. The species code or *No_ID* 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.

2.4 Recording in Live Mode

The Echo Meter Touch app can record bat activity to standard .wav audio files sampled at 256 kHz. A recording is triggered only when bat activity is detected and is ended when there is no activity or 15 seconds have elapsed, whichever come 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.

The app has a limit of 5000 recordings and recordings will need to be transferred or deleted to activate recordings once that limit has been reached.

Set the Recording Frequency Threshold on the spectrogram 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.

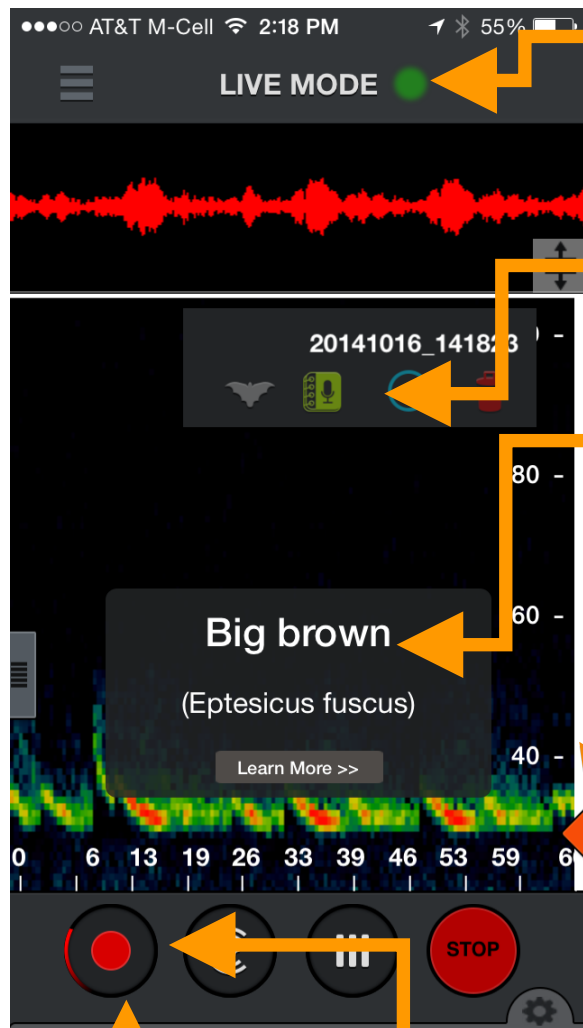
In  **Settings**, set the desired trigger sensitivity. High is extremely sensitive and maximizes detection, but will also trigger off other noises resulting in NOISE files. Low will only trigger on stronger signals that are likely to be able to be identified. Medium is somewhere in between the two extremes.

During triggered 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. At the conclusion of the recording, a label shows the filename. Tap appropriate icon in the label to:

- Identify the species of bat automatically.
- 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". These recordings can then be easily sorted for review or deletion. In addition, you can choose to not save NOISE files in

 **Settings.**



Recording orb

Recording label

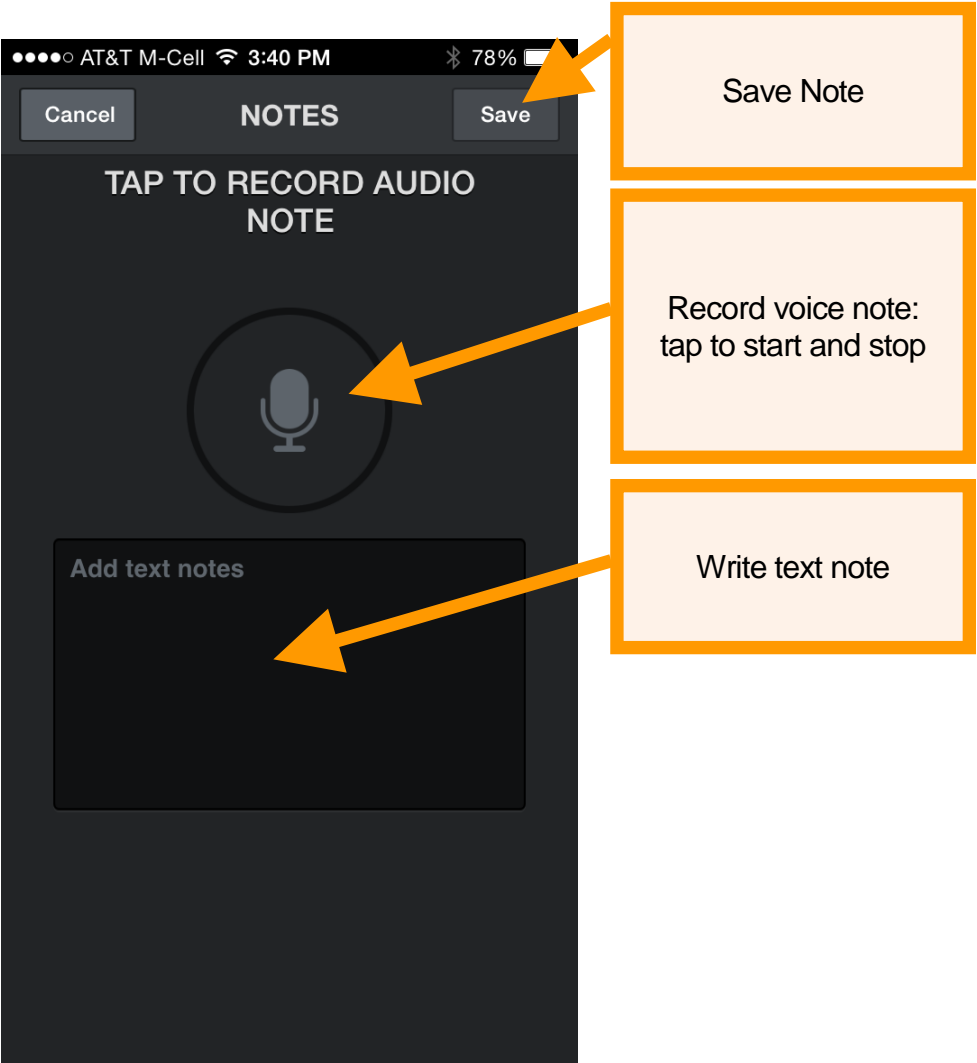
Auto-ID pop-up

Recording Frequency
Threshold

Toggles Recording on
and off

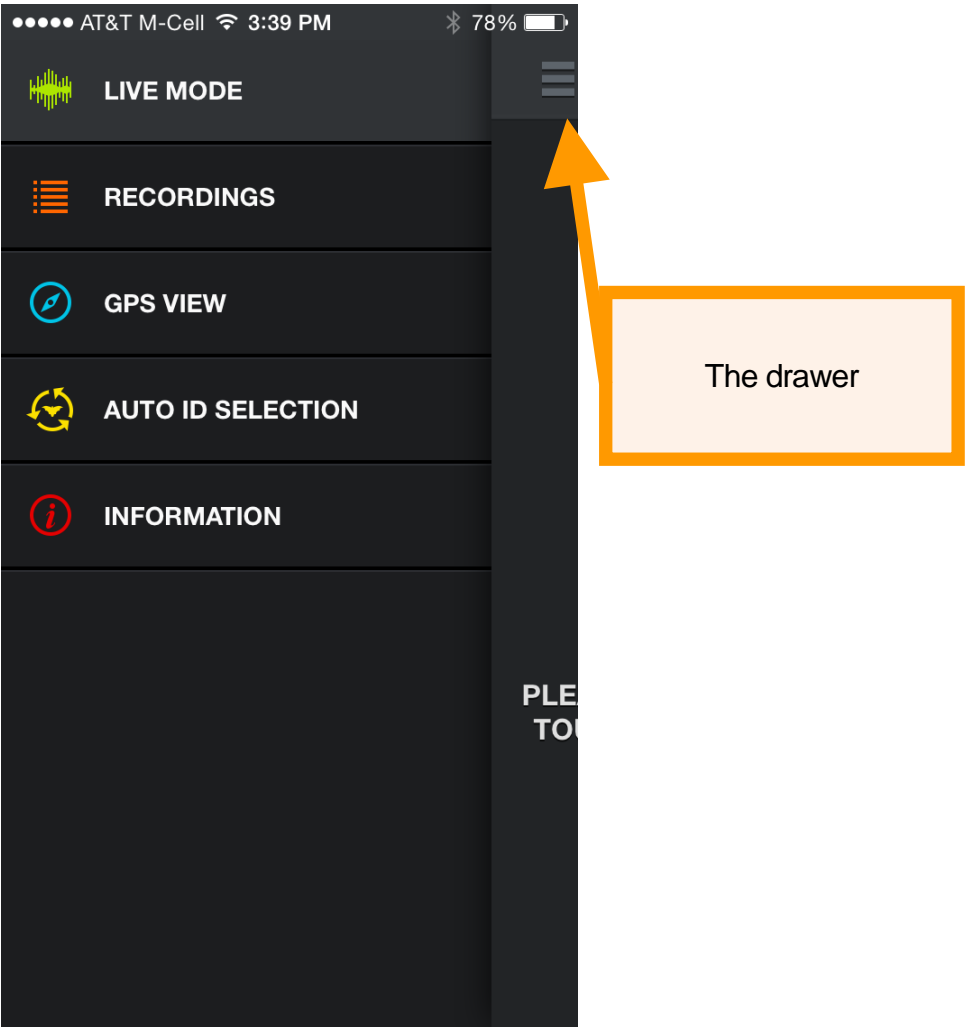
Trigger animation

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.



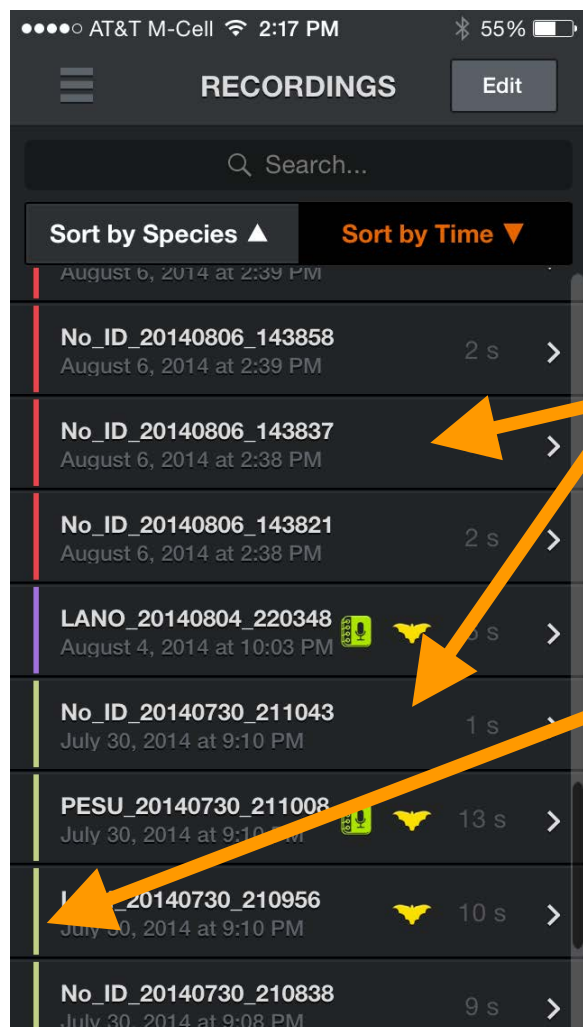
2.5 Navigating the app

To navigate through the app, press the drawer 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 navigating to other apps.



2.6 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 NO_ID 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.



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

Colored recording session identifier

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

Delete checked recordings

Exit Edit mode

Check all recordings

Identify checked recordings

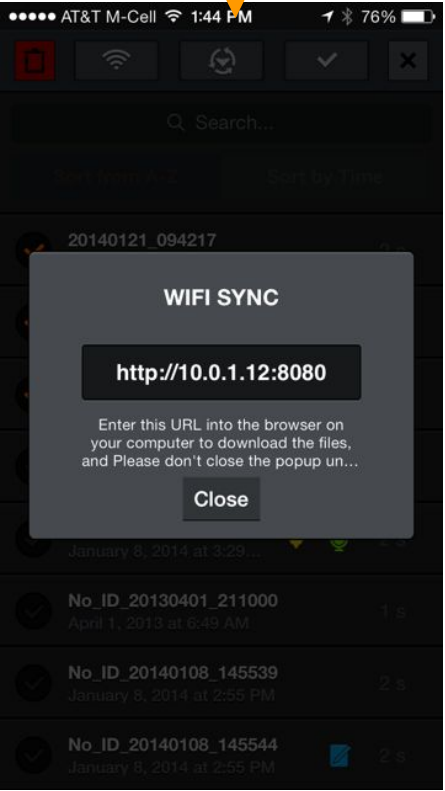
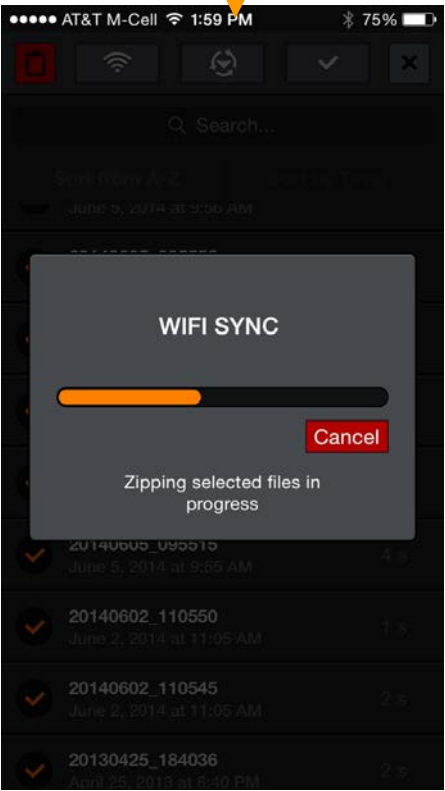
Transfer checked recordings via Wi-Fi

Check individually

Tap the **Wi-Fi Transfer** button to compress all the recordings into one transfer file. A short URL with an IP address and port appears. Type the address into any web browser on any computer on the same wireless network. A page appears where you can download the recordings.

Preparing files

Ready to download



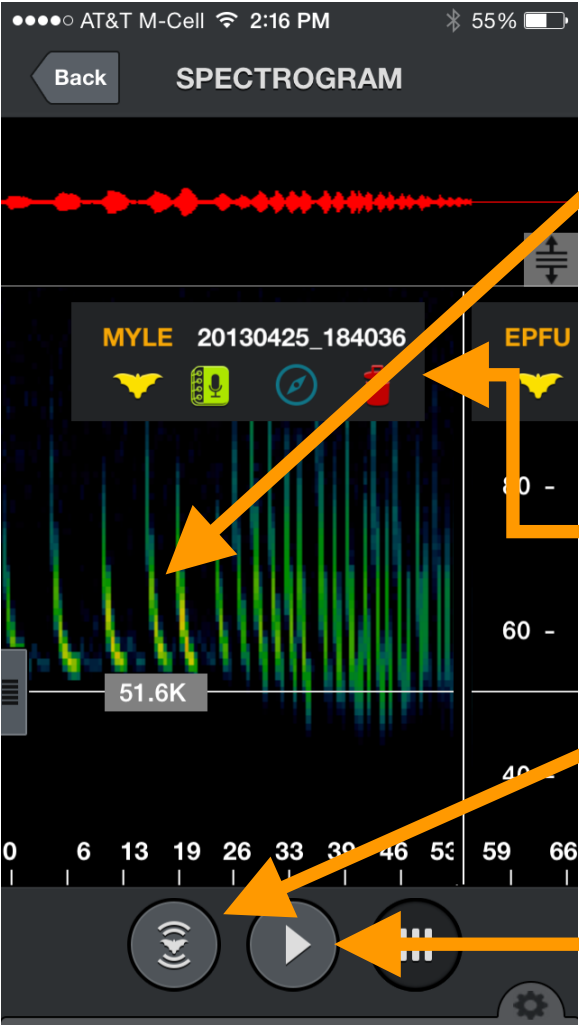
2.7 Transferring Recordings using iTunes

Recordings can also be transferred to your computer using iTunes software on a Mac or PC via a Lightning-to-USB cable (charging cable that comes with the iOS device).

1. Download and install Apple iTunes software on your computer.
2. Plug the iOS device into the computer using the charging cable.
3. Select the attached device in the device list.
4. Select the "Apps" tab and scroll down to the "File Sharing" section.
5. Select Echo Meter Touch app.
6. Select all the recording sessions you wish to transfer and press the "Save to" button to select a destination.

2.8 Viewing Spectrograms of Recordings

Tapping a recording from the Recordings list or from GPS view allows you 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 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.



Scroll and Zoom spectrogram or waveform as in Live Mode

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

Play using RTE

Play with Time Expansion

While viewing recordings you can scroll forward and backward in the spectrogram through all the recordings stored in the app. The recordings are presented as you scroll in the same sort order as the recording 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.

Playback includes all the recordings in the session.

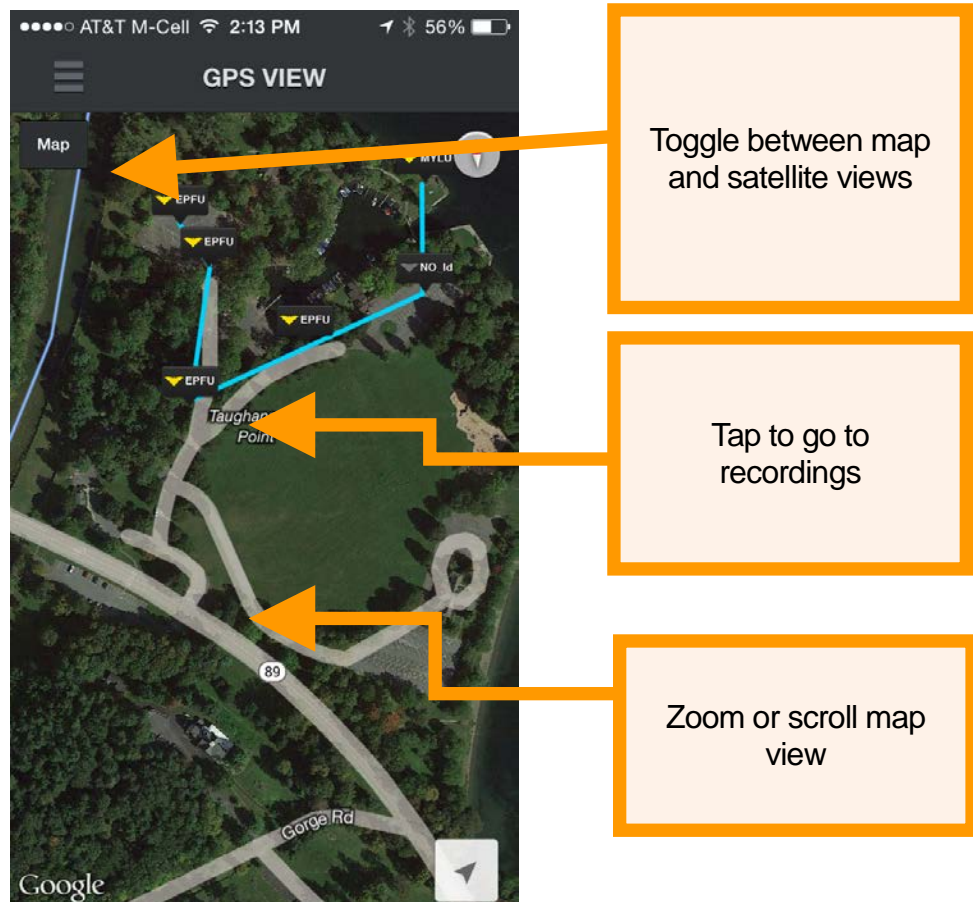
Spectrograph brightness and contrast can be set as in **LIVE MODE**. The **AUDIO DIVISION RATIO** setting affects both RTE and the playback speed of Time Expansion.

When viewing recordings, double tapping on the left or right of the screen will now jump position as follows: If you are in default time sorted mode, left double tap jumps to beginning of session and right double tap jumps to beginning of next session. If you have sorted backwards then it just works backwards. If you have sorted by species, then it will jump to beginning of first recording of a species or beginning of next species.

2.9 GPS View

In **GPS VIEW**, you can see the locations of recordings and species ID on map or satellite views. You can also see the track of your recording session. Each recording session is shown with a different path color. Each time you press the Record button a session is started. The session is concluded when you toggle recording off. One session can be made of many or zero recordings. NOISE files are not shown in GPS view.

A KML file is generated from the session path 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. 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 will turn grey and auto-scroll will turn off.

3 Recordings

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

3.1 Filenames for Recordings

Recordings use the following naming convention:

`ID_YYYYMMDD_HHMMSS.wav`

ID

The first two letters of the species and genus names for recordings that have been identified, *No_ID* 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 Tags for Recordings

Values for the attributes listed below are stored as metadata in your recordings.

Some of the metadata information is visible in the available Kaleidoscope software. Kaleidoscope software has the ability to add further metadata relating to analysis of the recording.

Device Name

The Name of the iOS device as set in Settings→General→About→Name.

Device Model

Displays **Echo Meter Touch** and the App version number.

Timestamp

The date and time when the recording started.

GPS Coordinates

The location of the Echo Meter Touch when the recording started.

Voice and Text Notes

Any voice or text notes that were added by a user.

3.3 Analysis Software

Purchase Kaleidoscope Viewer to 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 Specifications

4.1 Physical

Height: 1.81 inches (46 mm) Excluding the connector.
Width: 1.89 inches (48 mm)
Thickness: 0.476 inches (12.1 mm)
Weight: 1.1 ounces (31 g)
Material: Anodized Aluminum

4.2 Audio

- Recording format:** 16-bit WAV (sampled at 12 bits)
- Bandwidth:** 8 - 125 kHz (below 8 KHz: 12dB per octave attenuation)
- Sample Rate:** 256,000 samples per second

4.3 Microphone

- Type:** FG Electret
- Directionality:** Omnidirectional
- Environmental:** Weather resistant

4.4 Storage Requirements

How many recordings you can store on your iOS device depends on the capacity of your iPad or iPhone and how much memory is available. A 5.0-second recording uses 2.5 MB of storage. A 32

GB iPad with 28 GB of storage available, for example, would be able to save over 10,000 recordings.

4.5 Battery Life

iPad: Up to 13 hours

iPad mini: Up to 8 hours

iPhone: Up to 4 hours

NOTE: Running the GPS features can dramatically reduce battery life.

4.6 iOS Hardware Compatibility

The Echo Meter Touch app and Ultrasonic Module are compatible with the following iOS devices:

- iPad Air 2
- iPad Air
- iPad 4th Generation
- iPad mini 3
- iPad mini with Retina Display (iPad mini 2)
- iPhone 6 Plus
- iPhone 6
- iPhone 5s
- iPhone 5c
- iPhone 5

The Echo Meter Touch app and Ultrasonic Module are NOT compatible with the following devices:

- iPad 3rd Generation or earlier

-
- iPad mini (non-Retina Display models)
 - iPhone 4s or earlier
 - iPod Touch (all generations)
 - iPod Nano (all generations)

5 App Version History

See the app version history by navigating to the Echo Meter Touch app in the app store on your iOS device and scroll down to Version History.

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