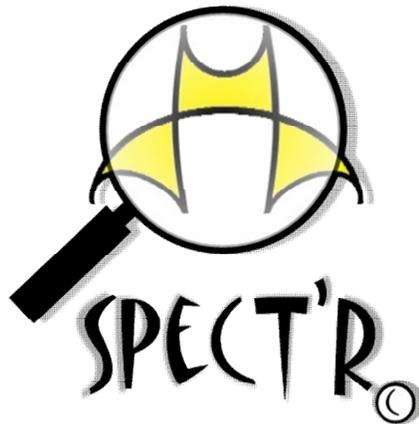


# **SPECT'R**

**Spectral Analysis, digital Tuning and Recording Software**

**Version 2.0**  
**Product description and features**



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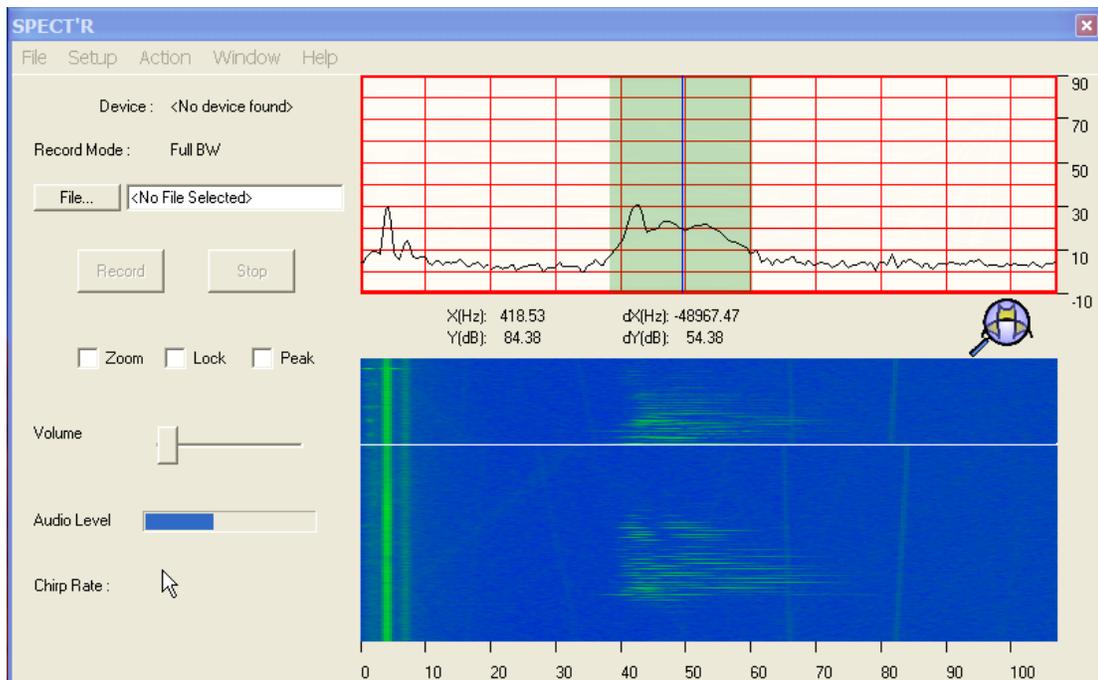
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## 1.0 Product Description

The SPECT'R software performs spectral analysis, digital tuning, and hard-disk recording. It is designed for field collection and it is capable of operating up to four ultrasonic receivers from a single laptop. SPECT'R can also be used as standalone playback processor to playback and reprocess or analyze recorded data.

SPECT'R features a versatile spectrum analyzer. The analyzer operates over the receiver bandwidth and is designed to allow the operator to quickly visualize the surrounding acoustic environment. It is mouse operated, and performs both frequency and signal pressure level measurements. The analyzer generates two spectral displays, a 2D SPL versus frequency plot and a 3D time versus SPL versus frequency raster.

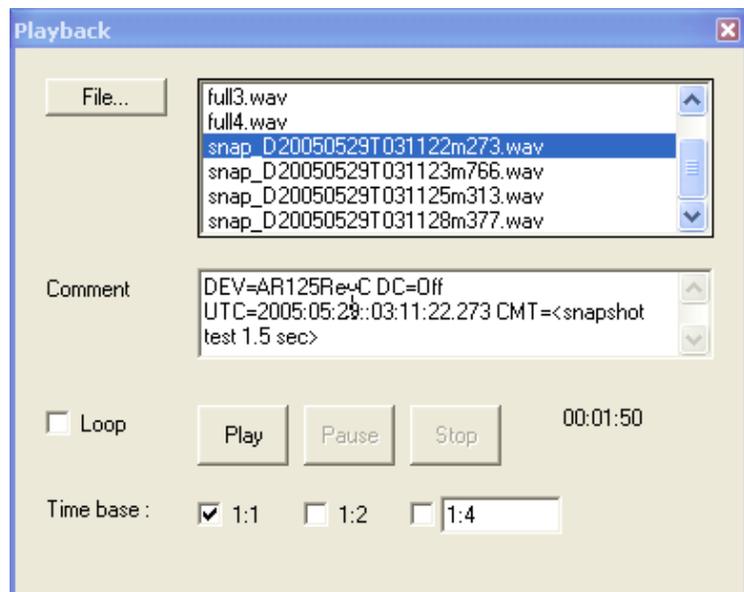
The screen capture below shows the main window which includes a control panel along with the spectrum analyzer displays.



SPECT'R also features a high performance digital tuner that translates high frequency ultrasonic signals down to the human audio range. The tuner uses true heterodyning and advanced Digital Signal Processing (DSP) to produce a high quality audio signal which can be piped through a windows compatible sound port, for live monitoring, and simultaneously recorded for future playback.

Several recording modes are supported, audio, full-bandwidth, and AutoSnap. The first two recording modes, audio and full-bandwidth, employ continuous recording directly to the hard disk. This allows an operator to record highly dynamic events such as roost emergences without the risk of missing anything. In audio mode, the output from the digital tuner (44.1Ksps) is recorded, while in full bandwidth mode, the entire bandwidth of the ultrasonic receiver (>200Ksps) is recorded. The third mode, AutoSnap is an automated, non-attended record mode. AutoSnap employs an energy detector to trigger short duration snapshot recordings. These snapshots are recorded only when bat vocalizations are detected. All recordings are stored using industry standard 16-bit .wav file format. The files are compatible with the SonoBat<sub>tm</sub> ([www.sonobat.com](http://www.sonobat.com)) analysis software.

Finally, SPECT'R includes a variable-rate playback feature, supporting all recording modes. The playback rate is operator selectable which allows a operator to employ a combination of time-stretching and digital heterodyning to obtain an optimum translation of ultrasonic acoustics into the audio range.

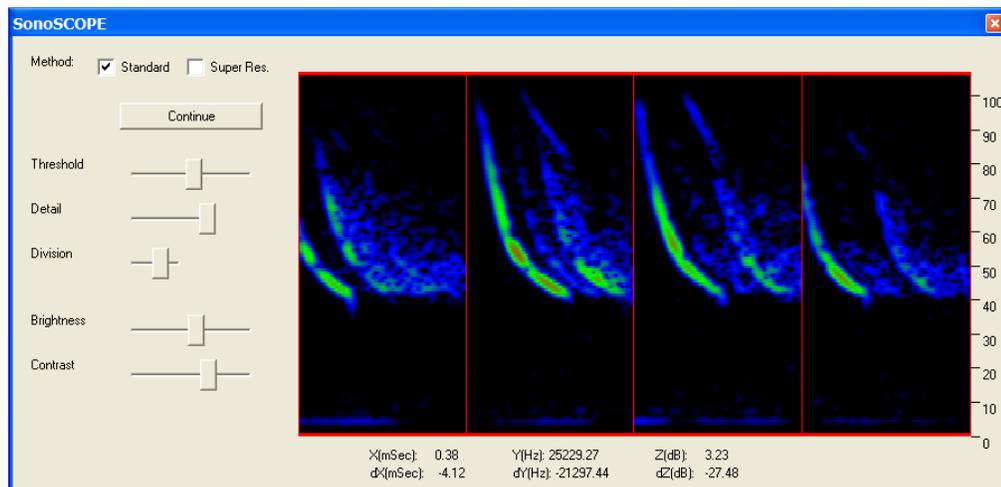


## 2.0 New Features and Enhancements

SPECT'R Version 2.0 offers several significant features and enhancements. First, version 2.0 includes a sonographic analyzer, **SonoSCOPE**, that is optimized for live collection and bat identification. Second, version 2.0 adds a new triggered snapshot recording mode called **AutoSnap**. Third, version 2.0 supports multiple receivers. One laptop can run up to four receivers. Finally, as of version 2.1.4, SPECT'R incorporates a significant new feature, a digital compensation filter. This filter can be employed to flatten out the frequency response of the AR125 ultrasonic receiver to create a nearly ideal recording

### 2.1 SonoSCOPE

SonoSCOPE is a sonographic analyzer that is optimized for live processing and bat identification. It uses a synchronized triggering mechanism that maintains visual alignment on the display, allowing the operator to see events that actually occur faster than a blink of the eye. Below is a screen capture of the SonoSCOPE window. The window includes a dedicated control panel along with the sonographic display



## 2.2 AutoSnap

AutoSnap is a new automated, non-attended, recording mode that saves disk space by recording only short duration snapshots when triggered by actual bat vocalizations. It includes two methods to set the triggering threshold, manual and automatic. It also allows the operator to select one of six snapshot durations between one-tenth and five seconds.

To enhance operation and reduce the number of falsely triggered recordings due to extraneous sounds (like birds, frogs, and insects), AutoSnap includes both a sound pressure level trigger and a frequency selection filter. This allows the operator to select both the desired sound pressure level and the frequency range of vocalizations that can trigger a snapshot recording.

Record Setup

Snapshot Trigger Threshold:

Manual (Linked to SonoSCOPE)

Automatic : NF + (dB)

Trigger Filter Range (KHz):

Low:  High:

Snapshot Duration (seconds):

0.1  0.25  0.5

1.0  2.5  5

Time Expansion Factor:

1  4  10

Comment:

Status : Inactive

## ***2.3 Multiple Receiver Capability***

SPECT'R Version 2.0 now supports multiple receivers. This feature is designed to allow the operator to perform multiple sensor surveys. One laptop can operate up to four receivers allowing the operator to use multiple sensors and cover a wider area .

## ***2.4 SonoBat File Compatibility***

As of version 2.0, AutoSnap generates SonoBat compatible files. All SonoBat attributes including a comment field are supported and stored directly into the snapshot files as they are recorded. The files may be post processed by SonoBat without having to setup the importer correctly, which saves time and confusion.

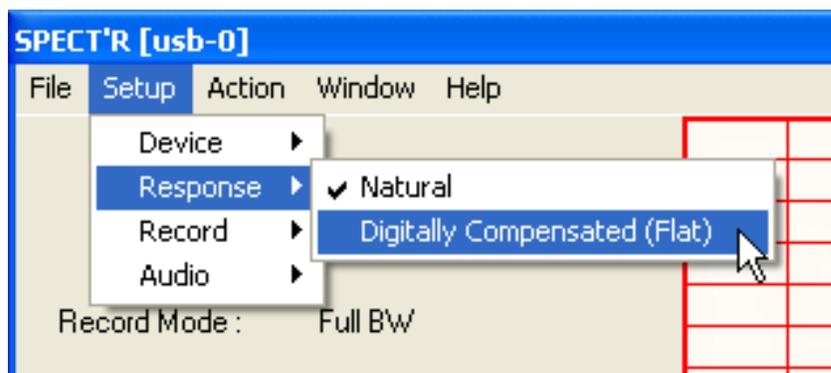
For more information on SonoBat, please visit [www.sonobat.com](http://www.sonobat.com).

## 2.5 Digital Compensation Filter

The ideal sensor for collecting and recording bat calls has a completely uniform response over the entire ultrasonic frequency range and, at the same time, it offers high sensitivity with little thermal noise. As you might imagine, real sensors don't quite meet these ideal requirements. However, there are methods to fix non-uniform response characteristics to effectively generate a nearly ideal recording. SPECT'R includes such a method.

As of version 2.1.4, SPECT'R incorporates a digital compensator. This compensator is designed to flatten out the response of an AR125 receiver such that the recording will have a nearly uniform response over the 10KHz to 120KHz frequency range. This is especially important for bat vocalization analysis. Also, digital compensation is highly recommended for users who are using SonoBat ([www.sonobat.com](http://www.sonobat.com)) to analyze AR125 recordings.

SPECT'R provides two response options, **Natural** and **Digitally Compensated**. If Natural response is selected, no compensation will be performed. If Digitally Compensated is selected, then the compensator will be used to flatten out the response. To select an option, click the appropriate option in the *Setup => Response* menu as shown below.



### ***3.0 Minimum System Requirements***

**1.0GHz Pentium M processor equivalent or higher**

**256Mbytes RAM**

**Windows 98SE/ME/2000/XP**

**Windows compatible sound port**

**One (1) USB 2.0 compatible port per receiver**

