Video Script

SM4
Audio Settings

Welcome to Wildlife Acoustics.

Now that we've seen a general overview of the physical enclosure of the Song Meter SM4 recorder, let's get inside the box. The SM4 has sophisticated programming features. We'll start out by exploring the Audio settings.

From the Main menu scroll down to Settings and press the Enter button. The first item in the Settings menu is Audio. Press the right arrow button to access the Audio settings.

We'll start at the top where you can select individual channel parameters. The SM4 ships with two built-in microphones, as well as external microphone connections. You can specify Stereo, Right channel only, or Left channel only for recording.

To save a setting press the right arrow button or the Enter button.

Left Gain and Right Gain provide boost or attenuation for each microphone. The default setting of 16 dB assumes the built-in microphones are being used and this is a good starting point for most bioacoustic recordings. If the recorder is deployed near sound sources that are extremely loud you might find that you need to turn the gain down so the mic inputs are not overloaded and the recording files don't have clipping distortion. If the sound source is unusually quiet you can increase the gain. These are the only typical circumstances where you should have to adjust the gain with the built-in microphones. For most environments if the sound source is quiet it will still be picked up with the default gain setting

After the Gain settings are Preamp settings for the left and right channels. The preamps provide optimal input level for the built-in microphones when doing bioacoustics recording. The preamps do not apply to external microphones. For normal operation with the built-in mics leave the preamp settings at 26 dB for best audio quality. You can turn the preamps off in combination with lowered gain settings if you are recording extremely loud signals.

Next, we have Left Filter and Right Filter settings. The high pass filter allows higher frequency audio to pass through, and filters lower frequency sound to be less prominent. There are three options for each channel. Off does not filter any lower frequencies and allows recording of signals all the way down to the lower limits of the microphone, which is typically only a few Hz. The other choices are 220 Hz or 1000 Hz which will limit recordings to primarily signals existing above those frequencies.

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The reason you might want to apply high pass filters is that most birds vocalize above 220Hz. Therefore the high pass filter will cut out some wind and human sounds that exist in the lower frequency spectrum. if the species you'd like to record vocalizes in a higher range, you can cut out even more low frequency noise by setting the filter to 1000Hz. The default is Off, but 220Hz is often the most useful setting for general recording of birds.

Next on the list is the Sample Rate. Sample Rate describes how many times the analog audio waveform is digitally sampled per second as it is recorded. The Sample Rate must be at least double the highest frequency signal that you want to record. So for example if you're recording birds, almost all bird vocalizations are below 12 kHz in frequency. This is why the default sample rate of the SM4 is set to 24 kHz. A Sample Rate of 24 kHz will record audio signals up to 12 kHz in frequency. If you do know that you want to record very high frequency signals you can set the Sample Rate all the way up to 96 kHz. If you are using the built-in microphones they will sense signals up to around 30kHz.

A higher Sample Rate requires more data storage and therefore SD memory card space will be used up more rapidly. So if you want to record only lower frequency sounds such as owls, and you'd like to record for as long as possible, you could set the sample rate to a lower value and therefore use less SD memory card space.

Next in the Audio menu is Max Length. This determines the maximum length of each recording file. For example if the recording schedule is set to record continuously, you may not want to create recordings that are 24 hours in duration. You can set a maximum length for each recording segment. The default maximum recording file length is one hour but you could lower this down all the way to one minute. Then if your schedule is configured to record for longer than this Max Length, the recordings will be split into segments of the length you have specified.

There is also a limit to the actual file size that can be stored on the memory card. File size cannot exceed 2GB. Therefore if continuous recording is done and the file size is going to exceed 2GB, it will automatically be split at the 2 GB limit. For example, at a 24 kHz sample rate and recording in stereo, the 2 GB limit will be reached in about 6.2 hours.

The last item in the Audio menu is Compression. The SM4 can record in a data-compressed format which will result in smaller recording files and therefore use less SD memory card space. There is a trade-off in that a higher amount of Compression will create a smaller file but at the expense of data loss. Typically a setting of 8 or 6 will not compromise most recordings.

In the next video we'll complete the items under the Settings menu.

Thank you for watching.