

## Monitoring The Repeater

Are you curious about what hams talk about on the repeater, but don't have time to listen all day? Well there is a solution. The good news is that it is rather easy to implement. The hardware, assuming you have a radio and a computer, doesn't cost much, and the software is free. --READ ON--

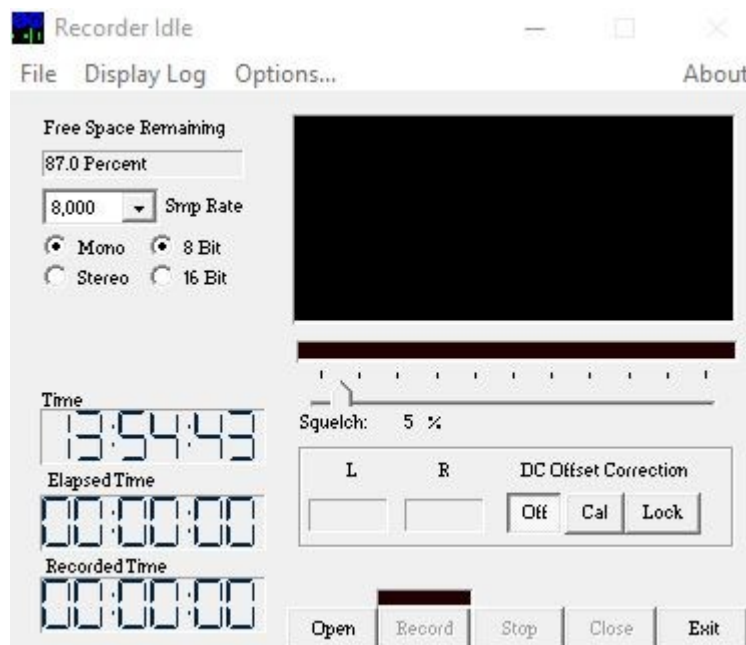
Let's start with the software. The one I am most familiar with is called "Scanner Recorder." I have installed this on a PC running Vista and another running Windows 10, so I am confident it will run on most windows machines. This is important to know because you may have an old Windows computer laying around that you might like to dedicate to this use. The computer you chose does not have to be powerful, and your learning curve will not be very steep either. The program is quite small and rather intuitive. I will give explicit instructions later, but basically you start the program, click on a button to **Open** a file to save your recording, give it a name, and then click on **Record**. After this, every time your radio picks up a transmission two events take place. First the date, time, length of transmission, and total recorded time is written to a log file, and second any sound received is recorded. At some point you will want to stop the recording to play back the audio you have collected. When you stop the recording, both the audio and log of events are saved. You will find the log handy. It will let you pinpoint the exact time of interest so you will not have to listen to everything if you choose not to. I should point out that only transmissions are recorded, not the dead space in-between. This means that in any 24 hour period you are only recording when the repeater is in use. That's it for the quick software overview.

Software is only half of what you will need. You will also need a cable to connect your radio to your computer. The kind of cable depends on the radio. For example, if you have a Boafeng, you will need a 3.5 mm to 2.5 mm mono patch cable. These are available on line at reasonable prices. I got one for less than \$3.00. One end goes in the radio, the other into the microphone socket on the computer. If you can't find the appropriate cable for your radio you will have to roll your own. This could involve some soldering. More on that later.

### The Software

You can download a copy of the Scanner Recorder 1.9 software from Softpedia. Google **Scanner Recorder Softpedia**. The download will arrive in a compressed zip file. Unzip this file in the usual way. Inside the unzipped file there is an installer named Scanner Recorder **setup.msi**. Click on this and the program will self install.

This is what the program looks like when you open it.



Lets go over its main features. In the upper left hand corner you will see the message **Free Space Remaining**. This is how much space you have left on your hard drive for recording. Directly below this is **SMP Rate**. This stands for sample rate. To convert analog sound from your radio to a digital file the software has to sample the audio. The more samples, the higher the quality the sound. The flip side is the more samples, the bigger the digital file becomes. There is a trade off. Initially use a sample rate of 8000. You can experiment later.

Directly under the sample rate are four radio buttons. Unless you are recording from a stereo radio, select **mono and eight bits**.

The next block of data relates to *times*. The first clock shows the current time in 24 hour format. The next clock shows the elapsed time since the program was started. Last is a record of the total recorded time.

At the bottom center there are five clickable buttons. Starting from the left the first is labeled **Open**. After clicking this button you will be prompted for a name that will be used to identify two files. The first is the digital *audio file*, and the second is its associated *text file*. The text file records the date, time, duration of the audio, and the running total time. I like to use the current date to name my files, but you are free to use any name, as long as it conforms to Windows naming conventions.

The next button is the **Record** button. Clicking on it starts the recording process. The cursor will immediately begin to move across the scope section of the display. Detected sounds will appear as waves on the scope, and any sound detected will be digitized and saved along with a log entry for the event.

The **Stop** button stops recording. You can stop then start the recording at a later time, without having to open a new pair of files. This is handy if you want to queue everything up before an event.

The **Close** button will close both the sound and log files, making them available for you to listen to, and read. At this time, you can either start another session by clicking on **Open**, or end the program by clicking on **Exit**.

On some radios you may have to adjust the volume on your radio to insure that the input is not too high so as to cause clipping. This can only be done while the radio is receiving a signal. Adjust the volume control on your radio until audio signal fills the scope but does not exceed its upper and lower boundaries. If it does, your signal will be distorted.

**Squelch** adjustment is next. Clicking and dragging on the slider will cause a white band to increase or decrease, indicating the level needed to break squelch.

### **Listening To Your Recording**

After recording some audio, you will want to listen to it. Lets assume you have clicked on the **Close** button which in turn closed the two files that you had originally opened. Be sure to remember where you saved them. The audio file is in wave format, and can be opened with any audio player. The one that came with your computer should work fine. The second is a plain text file. This can be opened in a word processing program, or better yet a spreadsheet program. If you know the time of the transmission of interest you can look up its **Relative Time** in the text file. Guided by the **Relative Time** value you can move the slider to the same relative or cumulative time on your audio player and begin to listen. There is no need to listen to the entire recording unless you wish to.

The following is a portion of a typical log file. This happened to be started in the middle of a transmission on January 25<sup>th</sup> at 10:58 AM. The duration of the first recording was 52.9 seconds. A second transmission followed and lasted 64.4 seconds. Note that the column labeled **Relative Time** is keeping track of the total recorded time for later use.

1\_25\_19.LOG - Notepad

File	Edit	Format	View	Help
Date	Time	Duration	Relative Time	
2019/01/25,	10:58:53,	000052.9,	00:00:00	
2019/01/25,	10:59:45,	000064.4,	00:00:52	
2019/01/25,	11:00:50,	000051.1,	00:01:57	
2019/01/25,	11:01:43,	000007.5,	00:02:48	
2019/01/25,	11:01:50,	000001.5,	00:02:55	
2019/01/25,	11:01:52,	000007.1,	00:02:57	
2019/01/25,	11:03:14,	000001.5,	00:03:04	
2019/01/25,	11:03:15,	000007.1,	00:03:06	
2019/01/25,	11:33:28,	000001.5,	00:03:13	
2019/01/25,	11:33:29,	000006.4,	00:03:14	
2019/01/25,	11:42:43,	000001.5,	00:03:21	
2019/01/25,	11:42:45,	000001.1,	00:03:22	
2019/01/25,	11:43:29,	000001.5,	00:03:23	
2019/01/25,	11:43:31,	000007.2,	00:03:25	
2019/01/25,	12:06:49,	000001.5,	00:03:32	
2019/01/25,	12:06:51,	000007.0,	00:03:33	
2019/01/25,	12:07:41,	000001.5,	00:03:40	
2019/01/25,	12:07:42,	000001.1,	00:03:42	
2019/01/25,	12:07:44,	000001.5,	00:03:43	
2019/01/25,	12:07:46,	000001.1,	00:03:44	
2019/01/25,	12:07:49,	000001.5,	00:03:45	
2019/01/25,	12:07:51,	000001.1,	00:03:47	
2019/01/25,	12:16:51,	000001.5,	00:03:48	
2019/01/25,	12:16:53,	000007.2,	00:03:49	
2019/01/25,	12:22:17,	000001.5,	00:03:57	

Using a simple audio player is fine, but if you want more control, and information from your recordings you should install a very special player called “Audacity.” Audacity is also free, and does much much more than a simple audio player. Google “Audacity download” to get your copy. Installation is straightforward. Audacity is feature rich but you will only need a few of this programs features to make better sense of your audio files. These are **File open**, **Play**, and the **Magnifying tool**. **The Magnify tool** will allow you to examine the wave form in minute detail. Audacity is not for everyone, but it is a nice tool to have on your belt when you are working with audio files.

If you have monitored our repeater you will be familiar with the Morse Code identifier which is broadcast at regular intervals. This is what it looks like visually in Audacity.



### **The Hardware Solution When You Can't Find The Exact Cable**

I promised to address the case where you cannot find the perfect cable for your radio. There is a solution but it requires some soldering. Some radios have a unique audio jack intended for use with a headset. If this is the case you will have to roll your own patch cable. In my case I purchased an inexpensive earphone and mic that was intended for use with my radio. I cut the earpiece from one end of the cable, exposing the two wires needed to feed the computer's line or microphone input. The wires you will be dealing with at this stage are as fine as human hair. Soldering directly to a plug that will go into your computer is not practical. Some method of removing strain from the connection is needed. This was accomplished by attaching the cable to a small container in such a way as to remove any strain on the connections to a female 3.5 mm socket. A small knot in the cord beneath the plastic cap below was all it took. Once the connections were made I used a standard 3.5 mm to 3.5 mm mono patch cable to connect the radio to the computer. This is not the preferred solution, but sometimes it is the only solution. This picture will help. The plastic container is sitting in a small can filled with washers to weight it down.



So to wrap up, there is a freeware software program called “**Scanner Recorder**” that will allow you to record audio from your radio. This program only works with the Windows operating system. Mac and Linux users must find another solution. The hardware is minimal. You will need a cable to connect the audio out of your radio to line or mic in on your computer. You can listen to your recorded files with any audio player, or if you would like more control you can use **Audacity** to view your files. The log file for each session will help you pinpoint events if you know the approximate times they occurred.

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