Audio Recorder – A SDR# plug-in

original by Vasili (TSSDR) – Modified/Updated plug-in and documentation by **thewraith2008 – March 2023**

SDR# side panel for Audio Recorder (light and dark theme)

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Description

The *Audio Recorder* plug-in allows automatic recording of SDR#'s filtered audio output.

The file and folder location naming can be defined using rules that utilise the *Frequency Manager* (STD/FreqMan) database.

Features

- Can record continuously or only record the activity.
- Recording can be triggered by squelch and mute states.
- Record to one file or multiple files.
- Don't record the inactivity between activity.
- Can continue to record for X time after squelch/mute closed.
- Create new file if frequency changed.
- Custom naming of files and folders.
- Display current duration and file size.
- Display total file count, duration and size of all files.
- Record in mono or stereo.
- Re-sample mono formats output to different sample-rates.
- Automatically delete files that are under a defined duration.
- Maximum file size is 2 GB or you can select a new (smaller) maximum size to use.
- When maximum is reached, a new file will be created and recording will continue.
- Check available HDD space and stop recording if < 10Mb HDD space remains.

Installation

Copy the file '*SDRSharp.AudioRecorder.dll*' to your SDR# folder
Copy the file '*SDRSharp.PluginsCom.dll*' to your SDR# folder

Update the file '*Plugins.xml*' (using notepad) with the following line (if it has not been done):
- Tip: Add the line under the "Wave Recorder" entry

```
<add key="AudioRecorder" value="SDRSharp.AudioRecorder.AudioRecorderPlugin,SDRSharp.AudioRecorder" />
```

Installation for SDR# above v1800:
Copy the file '*SDRSharp.AudioRecorder.dll*' to your SDR# **Plugins** folder
Copy the file '*SDRSharp.PluginsCom.dll*' to your SDR# **Plugins** folder

There is no need to edit the file '*Plugins.xml*'

Usage

Select plug-in options to use for recording.
Start SDR# playing.
Click “Record”. *

* This will occur automatically if the option “**Auto-start recording**” is enabled.

NOTE: The position of SDR# volume does not affect the recorded audio level.

SDR# side panel controls

Write: (label)
Shows the current recording duration and file size.
- This is cleared on clicking “Record” or creation of new file.

Totals: (label)
Shows the session total file count, duration and size of all files recorded.
- This is cleared on clicking “Stop” or if stop playing radio in SDR#.

Dropped buffers (label) and usage bar
Shows number of dropped buffers that has occurred.
- Should remain at zero for good recordings.
- The bar shows amount of buffer used while recording.
  It will vary but should not get to high.

Record status (label)
This only shows while recording (to the right of the “Configure” button)
- Shows state of recording: “Create new file”, “Record”, “Record x.x” and “Pause”
- Double clicking this label will show debug information. (see below)

Folder select (button)
Selects the base folder location where to save the recorded audio WAV files too.
- Default is the SDR# folder.
- Selected folder shows in tool-tip
- This is the base folder where the WAVs will be saved too.
  e.g. If you set the folder to **C:\WAVs,** when recording, a daily folder will be create which will have the recorded WAV file(s) in it using the rules for file/folder naming.
  e.g. file/folder name: C:\WAVs\2018_08_12\grp\freq_name\00-00-00 name x MHz.wav

NOTE: ~~If using more than one *AudioRecorder* (in 2 or more SDR# instances), then make sure this base folder is different or else there will be an issue with the temporary file if more the one *AudioRecorder* tries to record at same time~~. **This should be OK now** (see here)

NOTE: UNC paths are not supported

Open folder (button)
Open base folder location where WAVs are saved too.
- Selected folder shows in tool-tip

Configure (button)
Opens window with plug-in options for recording.
- see below: File or Recording options.

Continued...

Record/Stop (button)
Starts or stops recording.
Will check available HDD space and stop recording if < 10Mb HDD space remains.

NOTE: The last recording (file) will not be finalised (made available) until:

- "Stop" is pressed. (Plug-in "Stop" or SDR# Play/Stop for radio.
- Or if time has expired on option "Waiting time to create a new file, second" if enabled.

Debug Information (label)
While recording only:

- Double click the "Create new file", "Record", "Record x.x" or "Pause" label to toggle.
- Shows sample-rate and audio level of recording.
  Plug-in uses a different scaling value for each mode, this roughly shows recording audio level for each mode to determine if values used are OK. (or need to be changed)

Configuration Window – File options

(WAV) Sample format (drop-box)
Select to recording format to use - Stereo or mono and bits per sample

- 8 Bit PCM Stereo
- 16 Bit PCM Stereo
- 32 Bit IEEE Float Stereo – Direct copy of SDR# audio stream and is best (at cost of file size)
- 8 Bit PCM Mono
- 16 Bit PCM Mono

This option can affect the quality of the audio.

Samplerate (drop-box)
Only available if a **mono** *Sample format* is selected above
Selects if output audio is re-sampled to another sample-rate

- no re-sampling
- 8 kHz
- 16 kHz
- 32 kHz
- 48 kHz

Create a new file if the file size > MB (UpDown-box)
Disabled: Normally, a new file will be created if file is greater than 2 Gb.
Enable: A new file is create when the recording file reaches the set value. [3 – 2048]

Delete file if the file size < second (UpDown-box)
If the final recorded file is less than the set value, then it will be deleted. [0.0 - 3600.0]

Rules for creating file path/names (text-box)
Use the available keywords to to define the naming of the folder path and file name for recordings.

OK/ "X" (button)
Clicking "OK" accepts changes made and exits configuration window.
Clicking "X" will not store changes made in the configuration window.

Configuration Window – Recorder options

Auto-start recording (check-box)

- When SDR# play is pressed, the audio recording system will be set to the ready state. Depending on options selected, actual recording may not begin until conditions met.
- This is the same as clicking “Record”

Write all in one file (check-box)
All activity will be recorded to one file, even if frequency changes.

NOTE: The file and folder naming will be based of what the first frequency was when activity started recording and will remain same regardless if frequency changes.

Exception to this is:

- When the current recording size becomes greater than 2 Gb, then additional files will be created for duration of recording.
- When the current recording size becomes greater than the value of “Create a new file if the file size > MB ”, then additional files will be created for duration of recording.

Enabling causes the follow options to be greyed out:

- “Waiting time to create a new file after”
- “Create a new file if the frequency is changed”

Don't write pause (check-box)
Enabled:

- When “Record” is pressed, plug-in only records when squelch (if enabled) or mute (if enabled) are opened.
- If the “Squelch” and “Mute” are disabled, then option works as if option is disabled.

Disabled:

- When “Record” is pressed, the plug-in will record all the time until stopped.

NOTE: This option with squelch will only work for NFM and AM (only modes which use squelch)

When disabled, the follow options are greyed out:

- “Continue recording after the squelch has been closed for”.
- “Squelch”.
- “Mute”.

Use 'squelch' and 'mute' to trigger recording (check-box)
see above “Don't write pause”

Continue recording after the squelch has been closed for X seconds (UpDown-box)
When enabled, will continue to record for the defined value of time after the squelch has closed.

- Range [0-100]
- Only when “Don't write pause” enabled

This may help if recordings stop to early or if you wish to create a larger gap between main activity.
Continued...

Waiting time to create a new file after X seconds (UpDown-box)
When enabled, if inactivity exceeds the set value, then the current recording (file) will be finalised and plug-in will be ready for a new recording to be created.
Range: [0-100]

Create a new file if the frequency is changed (check-box)
Only when option “Write all in one file” is disabled.

- When “Record” is pressed, but recording state is paused, if frequency is changed then current recorded file will be finalised and plug-in will be ready for a new recording to be created.

NOTE: If signal is active and if frequency is changed, then this new file is created anyway.
NOTE: When disabled, this new file is still created but:

- It will only be created when the new frequency becomes active.

This option almost seems redundant as it looks like it's the default behaviour in most cases.

Notes, bugs, limits or other things of possible interest

NOTE:
Not all aspects of this plug-in, whether it be it's usage, features, options, bugs, issues, problems or any other unforeseeable things maybe covered by this documentation.

Other sample-rates can be defined via the saved setting "`AudioRecorder.WriterOutputSampleRate`" but the default values should suffice for most cases [default = `"48 kHz,32 kHz,16 kHz,8 kHz"`]

Recording audio level can be changed from defaults by changing values in:

- Edit the key "`AudioRecorder.ScaleAudioMode`" in the file:
  "SDRSharp.exe.config" or "SDRSharp.config".
- Key value must be a ','delimited string with 8 elements ordered as:
  `NFM,WFM,AM,DSB,LSB,USB,CW,RAW`
- Each element must be in the ranges of `50000` to `500000`.
- Original plug-in value used was `59049`.
- Distortion is highly probable using some values.
- Different reception conditions can affect the audio levels so a happy medium must be found to suit all conditions when recording.
  This is the reason the a scaling value is now available for each mode.
- You can use the debug information to get rough idea of audio recording level.
  -6 dB is probably the highest level to aim for, any higher may result in clipping.

Any changes to the *Frequency Manager* database will require a recording session to be stopped/started for **Audio Recorder** to see any database changes.

SDR# latency value may affect start/stop of recordings.

- May start/stop recording earlier than expected.
- May start/stop recording later than expected.

If the same path/file name is to be created, it will appended with a number in brackets.

- e.g. "C:\xxx\yyy(#).wav"

Excessive dropped buffers may indicate possible CPU loading issues or HDD writing issues.

The temporary file used for recording now uses a appended string (hhmmss of SDR# start) to try and make it more unique. This may help if using more than one SDR# with the *AudioRecorder* plug-in at same time to avoid file conflicts. (as of v1.3.1.0)

UNC paths are not supported, but you can use a mapped network drive
The plug-in uses drive information which is not available when using UNC paths.

Theme matching does not 100% match all colours used by controls
BUG:
I've not tested this yet, but if you run out of HDD space the plug-in may crash SDR# resulting in the possible corruption of last record TMP file. At a minimum, the TMP file will not be correctly renamed.

This modified version and documentation by thewraith2008 started in 2019 (mainly in 2022)
see ***Changelog.txt*** for more details about changes and fixes.

Support forum here:
https://forums.radioreference.com/forums/software-defined-radio.193/

NOTE: Support is not guaranteed. Especially if the answers are contained in the documentation or on forum.

Special thanks to the creators of the following software:

SDRSharp (SDR#) by Youssef Touil

- https://airspy.com/
- The *Audio Recorder* plug-in utilises code from the SDR# plug-in API.
  As such, that code used by the plug-in is the property of Youssef Touil (Airspy).

Audio Recorder (this original SDR# Plug-in) by Vasili (TSSDR)

- http://rtl-sdr.ru
- Thanks Vasili for allowing me to update this plug-in.

Necessary Disclaimer:

- **This program is "as is"**
- **This program most probably contains errors, bugs or whatever and that it may crash itself, SDR#, the plug-ins, windows or your car. You accept that you use it at your own risk.**
- **I make no promises to update it or support it.**
- **I'm under no obligation to implement anything.**
- **The creator of SDR# has the right to change their code as they see fit. Because of this, this program/plugin can and probably will break.**
- **Not reading the read-me/set-up and usage documentation files may cause you issues.**