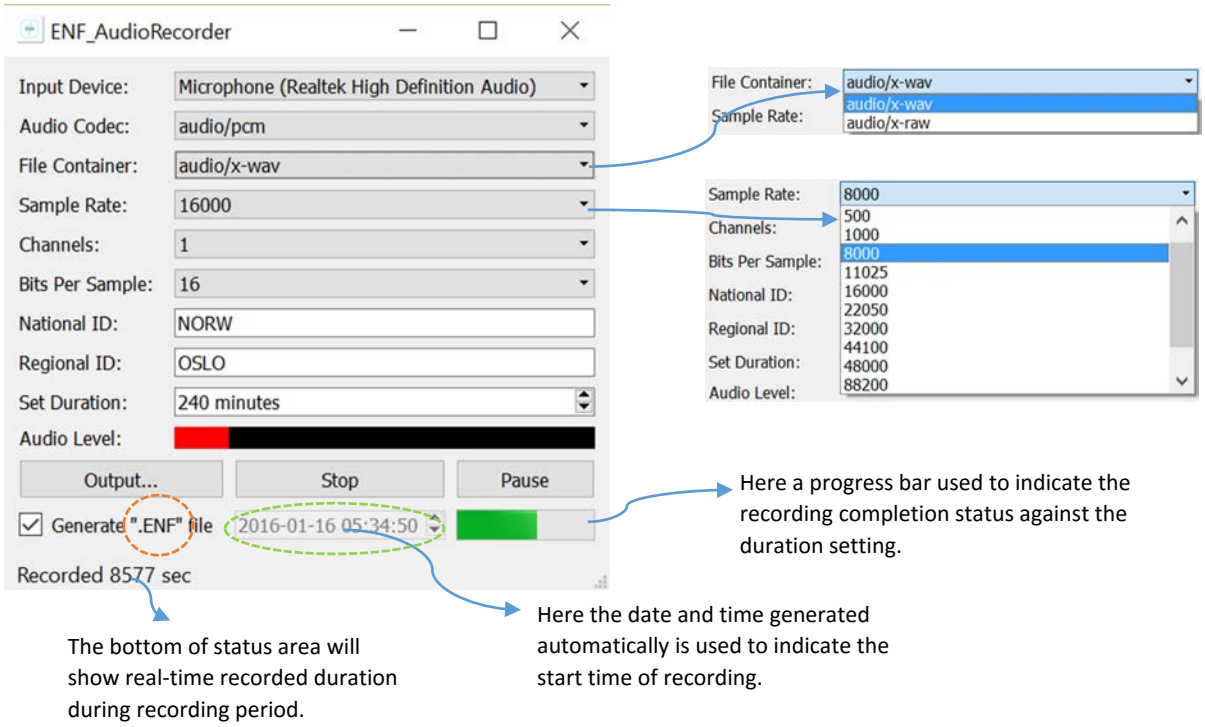
❖ ENF Recorder – User's Guide

ENF Audio Recorder is a handy tool for collecting the variation in frequency in the electric network via the audio card with an AC adapter with the correct voltage. It can assist in forensic research for determining the time of the recording. ENF Audio Recorder is developed in C++ programming language with Open Source Qt creator 5 and the first version only can be run on Windows systems.

- Before start recording, User should set suitable parameters. The setting process is illustrated as below.
  1. Check the input device is ready, and shown on the UI.
  2. Audio Codec: audio/pcm (fixed)
  3. Choose "File Container:" - audio/x-wav OR audio/x-raw
  4. Set "Sample Rate: " – select one from a drop down list
  5. Channels: 1 as default for ENF wave.
  6. Bits Per Sample: 16, (fixed)
  7. Enter National ID and Regional ID up to 4 chars, indicates the location of the record.
  8. Set record duration, the recorder will auto stop when reach the duration. If the setting is 0, it means the recorder won't auto stop until the Stop button is pressed manually.
  9. Click Output button to set the output file name. The suffix will be auto generated after start record according to the choice of "File Container". E.g if output file is named "test", and the File Container sets "audio/x-wav", the output file should be saved as "test.wav", while with "audio/x-raw" setting, the output file should be "test.raw".
  10. Generate ".ENF" file option is used to auto produce one enf audio format file with an additional suffix of ".enf" at the end of output file. E.g, if the output file is "test.wav", the ENF file should be generated with the name of "test.wav.enf". Please refer to the ENF format specification.
- After finish proper settings above, then click Start button to start recording. Ref to below figures.



❖ ENF File Format Introduction

The ENF Audio File Format is a tailored file format for storing and classifying ENF (Electric Network Frequency) audio data. The raw ENF audio data in ".ENF" files is uncompressed pulse-code modulation (PCM). The Header structure of an ENF file is illustrated as blow Figure.5, and an UML class diagram illustrates in Figure 6.

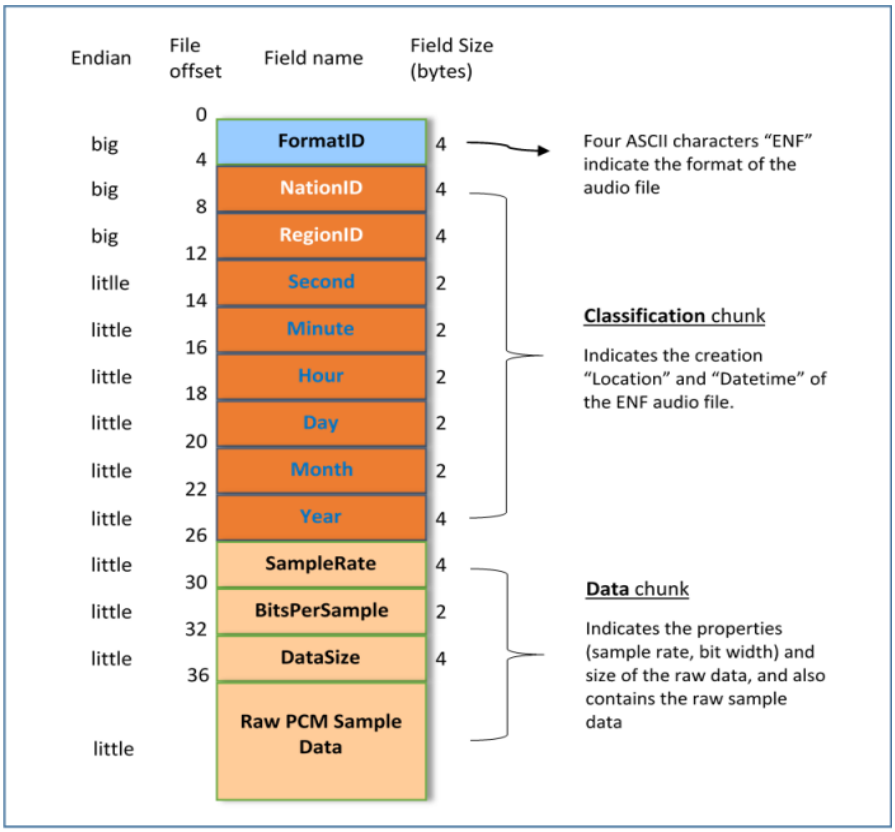


Figure 5. The "ENF" Audio File Format

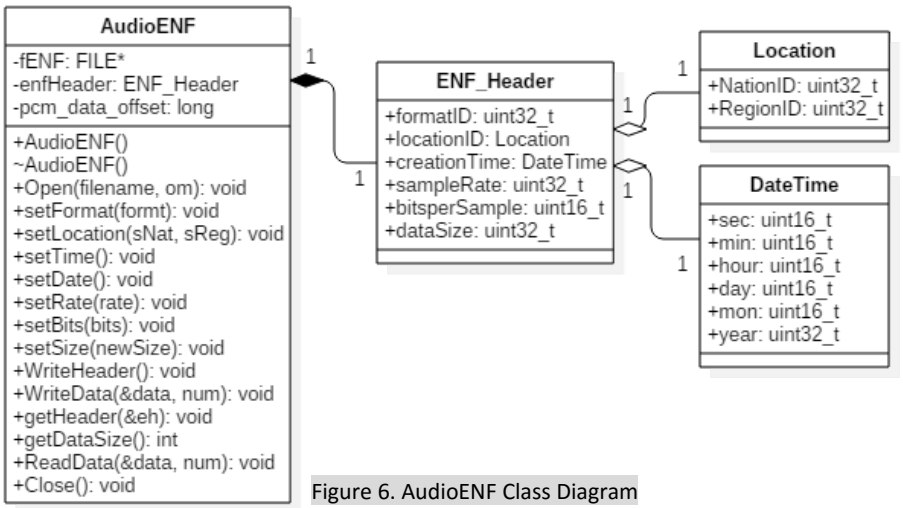
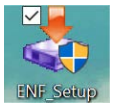


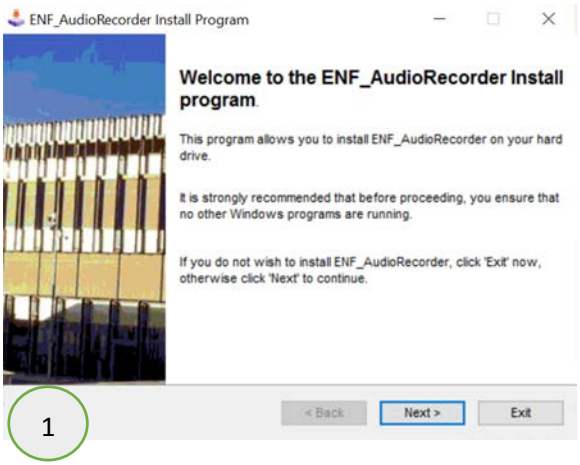
Figure 6. AudioENF Class Diagram

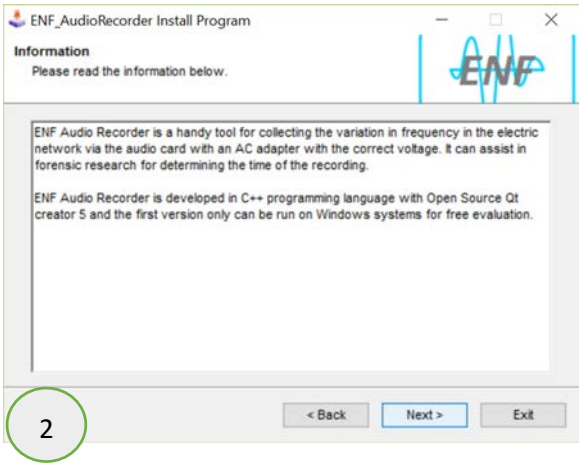
❖ Installation Instructions:

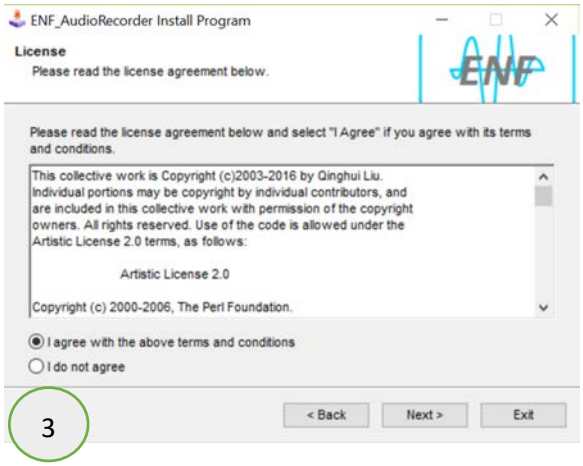
1. For Windows 7, 8, and 10 – double left click on the ENF_Setup.exe file that you downloaded from the internet to your desktop.

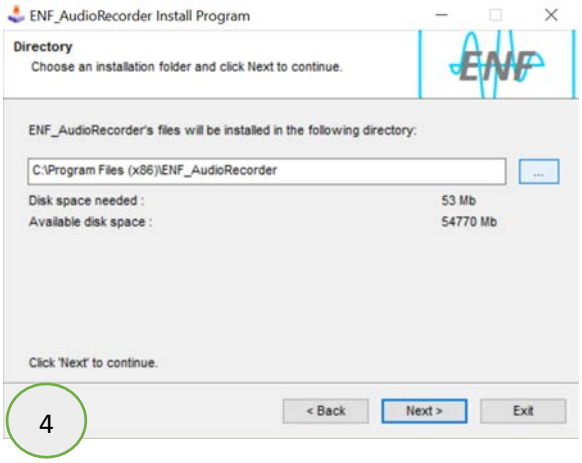


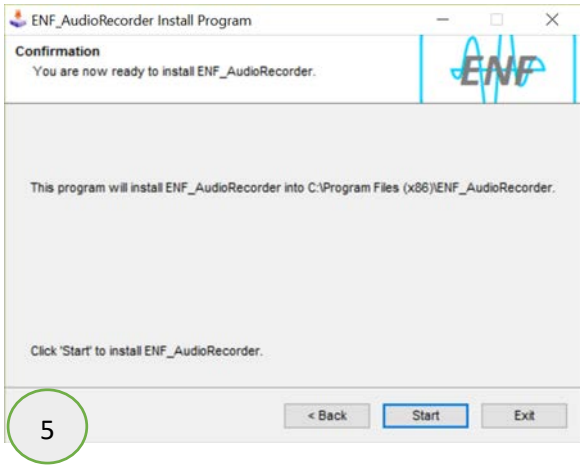
2. The following screens will appear as below, then follow the guide to click Next> button.

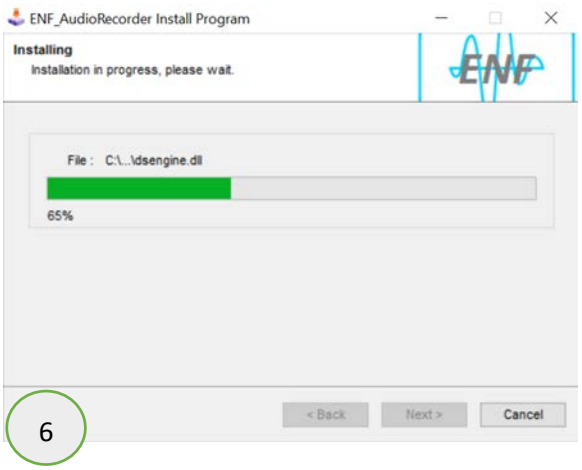


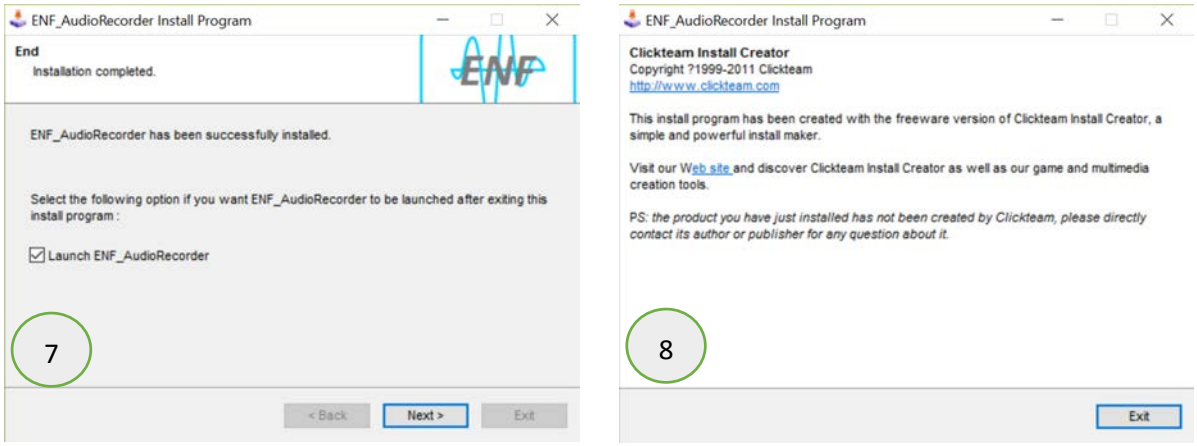












3. You may change the default directory “C:\Program Files (x86)\ENF_AudioRecorder” by clicking on the “…” button and selecting the desired folder. Click on the Next> button.
4. If anything is incorrect, you may click on the <Back button and make the desired corrections otherwise click on the Start button.
5. The Progress screen will appear. When it has finished copying files then click on Next> button.
6. The Installation complete screen will appear. If you want launch the app after exiting, just select the option “Launch ENF_AudioRecorder”, then click on Next> button.
7. Click on Exit button on the last screen.
8. To launch ENF_AudioRecorder click ENF Recorder icon on the desktop.
9. The default GUI will appear as blow Figure 7.

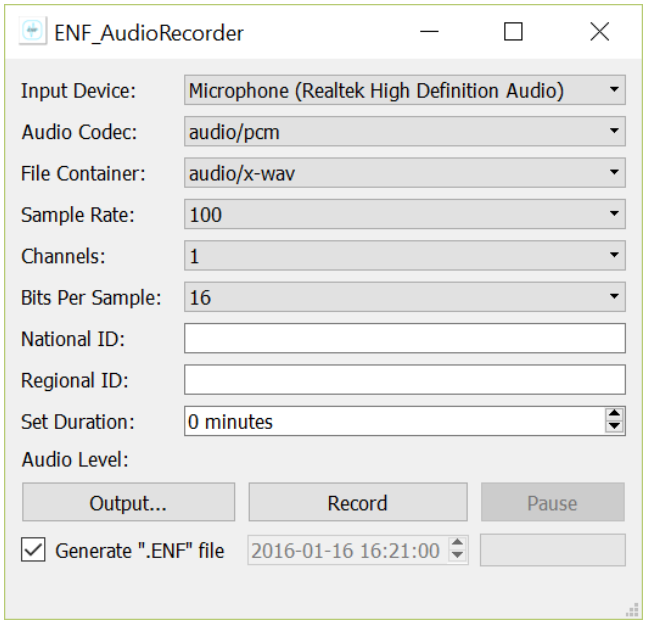


Figure 7. ENF Recorder start GUI on Win10 with (1920x1084) display