

## Installation instructions for xkl on macOS

### Prerequisites

The installation of xkl on macOS requires the following software packages to be installed on macOS:

- Xcode Command Line Tools
  - Update/install them by opening a Terminal and typing `xcode-select --install`
- Xquartz (<http://www.xquartz.org>): download the installer and follow the instructions
- Homebrew (<https://brew.sh/>): copy the command given on their webpage and paste it in a Terminal window; follow the instructions provided in the Terminal window at the end of the execution of the installation command
- Using homebrew, from a Terminal:
  - `openmotif` (command: `brew install openmotif`)
  - `x11` (command: `brew install xquartz --cask`)
  - `sox` (command: `brew install sox`)

### Installation procedure

- Download the code archive from the github repository at <https://github.com/lucadn/xkl/>
- Unzip the source code archive, go into its `src/` subfolder, and copy the folder `xkl_macOs/` in the desired folder, such as `/Applications`. This will create a `/Applications/xkl_macOs` folder
- Open a new Terminal window and move to `/Applications/xkl_macOs` with the command:  
`cd /Applications/xkl_macOs`
- Execute the following commands:  
`make clean`  
`make`
- The executable, named `xkl-3.2`, will be placed in `/Applications/xkl_macOs/xkl`, and can be opened by issuing the commands  
`cd /Applications/xkl_macOs/xkl`  
`./xkl-3.2`  
but it is preferable to open it by directly providing an input `.wav` file (see *Notes and caveats* for the reason) by typing (e.g. for the file `heavens.wav`, available in the `WAVEFORMS` subfolder)  
`./xkl-3.2 ../WAVEFORMS/heavens.wav`

### Notes and caveats

- The above procedure has been tested under macOS 12 (Monterey), macOS 11 (Big Sur) macOS 10.15 (Catalina) and macOS 10.14 (Mojave): it may or may not work on previous macOS versions.
- `.wav` files generated by most acquisition programs (e.g. Audacity) adopt MS headers, while xkl requires Klatt headers. MS `.wav` files can be converted by using the `ms2kl` program, that is generated during the compilation in the `/Applications/xkl_macOs/utls` folder. Just copy the MS `.wav` file (e.g. `test.wav`) in the `utls` folder, and in a Terminal type the commands  
`cd /Applications/xkl_macOs/utls`  
`./ms2kl test.wav`  
that will generate in the same folder a new `.wav` file named `test_kl.wav` that can be opened with xkl.
- If the application does not start from Terminal, returning the error message “`ERROR trying to open DISPLAY (null)`”, open the Terminal shell configuration file (`~/.bash_profile` or

~/*.zprofile* depending on the macOS version) and comment the line “**export DISPLAY=:0**”. Then open a new Terminal window and try again.

- Some of the windows are hidden at random when *xkl* is opened without providing an input file, and when it happens windows stay hidden even when a file is opened. However, the issue does not seem to appear when an input file is provided at launch.
- The play function uses the *sox* tool and two scripts in the *utils* subfolder. This is transparent to the user, provided that the internal folder structure under *xkl\_macOs* is not changed, and the application is launched in a Terminal or x11 shell from directory */Applications/xkl\_macOs/xkl*.
- The record function also uses the *sox* tool and two scripts in the *utils* subfolder. When a recording is started, the user is required to provide a file name that is used to save the recorded waveform in the *xkl* folder using the Microsoft (MS) .wav format. A version of the waveform is also saved in the Klatt format with the same name extended with the suffix *\_kl*, and automatically opened in *xkl*.

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