

SOX

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| COLLABORATORS |
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Chapter 1

SOX

1.1 SOX(1)

Welcome to Amiga SOX, the Sound Exchange.

NAME
SYNOPSIS
DESCRIPTION
OPTIONS
FILE TYPES
EFFECTS
BUGS
NOTICES
AMIGA INFO

1.2 name

NAME
sox - SOund eXchange - universal sound sample translator

1.3 synopsis

SYNOPSIS
sox infile outfile
sox infile outfile [effect [effect options ...]]
sox infile -e effect [effect options ...]
sox [general options] [format options] ifile [format
options] ofile [effect [effect options ...]]

General options: [-V] [-v volume]
Format options: [-t filetype] [-r rate] [-s/-u/-U/-A]
[-b/-w/-l/-f/-d/-D] [-c channels] [-x]

Effects:
copy
rate
avg

```

stat
echo  delay volume [ delay volume ... ]
vibro speed [ depth ]
lowp  center
band  [ -n ] center [ width ]
highp center
reverse

```

1.4 description

DESCRIPTION

Sox translates sound files from one format to another, possibly doing a sound effect.

1.5 options

OPTIONS

The option syntax is a little grotty, but in essence:

```

sox file.au file.voc

```

translates a sound sample in SUN Sparc .AU format into a SoundBlaster .VOC file, while

```

sox -v 0.5 file.au -rate 12000 file.voc rate

```

does the same format translation but also lowers the amplitude by 1/2 and changes the sampling rate from 8000 hertz to 12000 hertz via the rate sound effect loop.

File type options:

| | |
|-------------------|-----------------------------|
| -t <string> | File type specification |
| -r <integer> | Sampling rate specification |
| -s/-u/-U/-A | Sample type (style) spec |
| -b/-w/-l/-f/-d/-D | Sample size spec |
| -x | Word order flag |
| -c <integer> | Number of channels |

General options:

| | |
|------------|--------------------------------------|
| -e | Effect flag |
| -v <float> | Volume change |
| -V | Verbose processing notification flag |

The input and output files may be standard input and output. This is specified by '-'. The -t type option must be given in this case, else sox will not know the format of the given file. The -t, -r, -s/-u/-U/-A, -b/-w/-l/-f/-d/-D and -x options refer to the input data when given before the input file name. After, they refer to the output data.

If you don't give an output file name, sox will just read the input file. This is useful for validating structured file formats; the stat effect may also be used via the -e option.

1.6 -t

`-t filetype`
gives the type of the sound sample file.

1.7 -r

`-r rate` Give sample rate in Hertz of file.

1.8 suua

`-s/-u/-U/-A`
The sample data is signed linear (2's complement), unsigned linear, U-law (logarithmic), or A-law (logarithmic). U-law and A-law are the U.S. and international standards for logarithmic telephone sound compression.

1.9 bwlfd

`-b/-w/-l/-f/-d/-D`
The sample data is in bytes, 16-bit words, 32-bit longwords, 32-bit floats, 64-bit double floats, or 80-bit IEEE floats. Floats and double floats are in native machine format.

1.10 -x

`-x`
The sample data is in XINU format; that is, it comes from a machine with the opposite word order than yours and must be swapped according to the word-size given above. Only 16-bit and 32-bit integer data may be swapped. Machine-format floating-point data is not portable. IEEE floats are a fixed, portable format. ???

1.11 -c

`-c channels`
The number of sound channels in the data file. This may be 1, 2, or 4; for mono, stereo, or quad sound data.

1.12 -e

-e after the input file allows you to avoid giving an output file and just name an effect. This is only useful with the stat effect.

1.13 -v

-v volume Change amplitude (floating point); less than 1.0 decreases, greater than 1.0 increases. Note: we perceive volume logarithmically, not linearly. Note: see the stat effect.

1.14 -_v

-V Print a description of processing phases. Useful for figuring out exactly how sox is mangling your sound samples.

1.15 file types

FILE TYPES

Sox needs to know the formats of the input and output files. File formats which have headers are checked, if that header doesn't seem right, the program exits with an appropriate message. Currently, the raw (no header), IRCAM Sound Files, Sound Blaster, SPARC .AU (w/header), Mac HCOM, PC/DOS .SOU, Sndtool, and Sounder, NeXT .SND, Windows 3.1 RIFF/WAV, Turtle Beach .SMP, and Apple/SGI AIFF and 8SVX formats are supported.

| | |
|-------------------------|--|
| .aiff | AIFF files used on Apple IIc/IIgs, SGI, and Mac. |
| .au | SUN Microsystems AU files. |
| .hcom | Macintosh HCOM files. |
| .raw | Raw files (no header). |
| .ub, .sb, .uw, .sw, .ul | Various shorthands for raw types. |
| .sf | IRCAM Sound Files. |
| .voc | Sound Blaster VOC files. |
| .auto | ``Meta-type'' for auto-type-detect. |
| .smp | Turtle Beach SampleVision files. |
| .wav | Windows 3.1 .WAV RIFF files. |

1.16 .aiff

`.aiff` AIFF files used on Apple IIc/IIgs and SGI. Note: the AIFF format supports only one SSND chunk. It does not support multiple sound chunks, or the 8SVX musical instrument description format. AIFF files are multimedia archives and can have multiple audio and picture chunks. You may need a separate archiver to work with them.

1.17 `.au`

`.au` SUN Microsystems AU files. There are apparently many types of `.au` files; DEC has invented its own with a different magic number and word order. The `.au` handler can read these files but will not write them. Some `.au` files have valid AU headers and some do not. The latter are probably original SUN u-law 8000 hz samples. These can be dealt with using the `.ul` format (see below).

1.18 `.hcom`

`.hcom` Macintosh HCOM files. These are (apparently) Mac FSSD files with some variant of Huffman compression. The Macintosh has wacky file formats and this format handler apparently doesn't handle all the ones it should. Mac users will need your usual arsenal of file converters to deal with an HCOM file under Unix or DOS.

1.19 `.raw`

`.raw` Raw files (no header).
The sample rate, size (byte, word, etc), and style (signed, unsigned, etc.) of the sample file must be given. The number of channels defaults to 1.

1.20 `.ub`

`.ub, .sb, .uw, .sw, .ul`
These are several suffices which serve as a shorthand for raw files with a given size and style. Thus, `ub`, `sb`, `uw`, `sw`, and `ul` correspond to "unsigned byte", "signed byte", "unsigned word", "signed word", and "ulaw" (byte). The sample rate defaults to 8000 hz if not explicitly set, and the number of channels (as always) defaults to 1. There are lots of Sparc samples floating around in

u-law format with no header and fixed at a sample rate of 8000 hz. (Certain sound management software cheerfully ignores the headers.) Similarly, most Mac sound files are in unsigned byte format with a sample rate of 11025 or 22050 hz.

1.21 .sf

`.sf` IRCAM Sound Files.
SoundFiles are used by academic music software such as the CSound package, and the MixView sound sample editor.

1.22 .voc

`.voc` Sound Blaster VOC files.
VOC files are multi-part and contain silence parts, looping, and different sample rates for different chunks. On input, the silence parts are filled out, loops are rejected, and sample data with a new sample rate is rejected. Silence with a different sample rate is generated appropriately. On output, silence is not detected, nor are impossible sample rates.

1.23 .auto

`.auto` This is a ``meta-type``: specifying this type for an input file triggers some code that tries to guess the real type by looking for magic words in the header. If the type can't be guessed, the program exits with an error message. The input must be a plain file, not a pipe. This type can't be used for output files.

1.24 .smp

`.smp` Turtle Beach SampleVision files.
SMP files are for use with the PC-DOS package SampleVision by Turtle Beach Softworks. This package is for communication to several MIDI samplers. All sample rates are supported by the package, although not all are supported by the samplers themselves. Currently loop points are ignored.

1.25 .wav

`.wav` Windows 3.1 .WAV RIFF files.
 These appear to be very similar to IFF files, but not the same. They are the native sound file format of Windows 3.1. Obviously, Windows 3.1 is of such incredible importance to the computer industry that it just had to have its own sound file format.

1.26 effects

EFFECTS

Only one effect from the palette may be applied to a sound sample. To do multiple effects you'll need to run sox in a pipeline.

| | |
|---|---------------------------------|
| <code>copy</code> | Copy input to output (default). |
| <code>rate</code> | Resample. |
| <code>avg</code> | Mix 4 channels to 2, or 2 to 1. |
| <code>stat</code> | Statistical check of input. |
| <code>echo [delay volume ...]</code> | Add echoing to a sound sample. |
| <code>vibro speed [depth]</code> | Add vibrato. |
| <code>lowp center</code> | Apply a low-pass filter. |
| <code>band [-n] center [width]</code> | Apply a band-pass filter. |
| <code>highp center</code> | Apply a high-pass filter. |
| <code>reverse</code> | Reverse a soundfile. |

Sox enforces certain effects. If the two files have different sampling rates, the requested effect must be one of `copy`, or `rate`. If the two files have different numbers of channels, the `avg` effect must be requested.

1.27 copy

`copy` Copy the input file to the output file. This is the default effect if both files have the same sampling rate, or the rates are "close".

1.28 rate

`rate` Translate input sampling rate to output sampling rate via linear interpolation to the Least Common Multiple of the two sampling rates. This is the default effect if the two

files have different sampling rates. This is fast but noisy.

1.29 avg

avg

Mix 4- or 2-channel sound file into 2- or 1-channel file by averaging the samples for different speakers.

1.30 stat

stat

Do a statistical check on the input file, and print results on the standard error file. stat may copy the file untouched from input to output, if you select an output file. The "Volume Adjustment:" field in the statistics gives you the argument to the `-v` number which will make the sample as loud as possible.

1.31 echo

echo [delay volume ...]

Add echoing to a sound sample. Each delay/volume pair gives the delay in seconds and the volume (relative to 1.0) of that echo. If the volumes add up to more than 1.0, the sound will melt down instead of fading away.

1.32 vibro

vibro speed [depth]

Add the world-famous Fender Vibro-Champ sound effect to a sound sample by using a sine wave as the volume knob. Speed gives the Hertz value of the wave. This must be under 30. Depth gives the amount the volume is cut into by the sine wave, ranging 0.0 to 1.0 and defaulting to 0.5.

1.33 lowp

`lowp center`

Apply a low-pass filter. The frequency response drops logarithmically with center frequency in the middle of the drop. The slope of the filter is quite gentle.

1.34 band

`band [-n] center [width]`

Apply a band-pass filter. The frequency response drops logarithmically around the center frequency. The width gives the slope of the drop. The frequencies at center + width and center - width will be half of their original amplitudes. Band defaults to a mode oriented to pitched signals, i.e. voice, singing, or instrumental music. The -n (for noise) option uses the alternate mode for un-pitched signals. Band introduces noise in the shape of the filter, i.e. peaking at the center frequency and settling around it.

1.35 highp

`highp center`

Apply a high-pass filter. See the lowp effect for more info.

1.36 reverse

`reverse`

Reverse the sample sequence in a soundfile, so that the sound plays "backwards".

1.37 bugs

BUGS

The syntax is horrific. It's very tempting to include a default system that allows an effect name as the program name and just pipes a sound sample from standard input to standard output, but the problem of inputting the sample rates makes this unworkable.

1.38 notices

NOTICES

The echoplex effect is Copyright (C) 1989 by Jef Poskanzer.

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1.39 amiga info

AMIGA INFO

As compiled under SAS/C v6, SOX appears to work identically to the Unix version. Supplied in this archive are versions of SOX for 68000, 68020, 68881, and 68020+68881. All four versions contain AmigaDOS version strings to help identify which one you're using.

I received no notification of the release of patchlevels 10 and 11, so this was all on my own; I discovered the release myself and have made it Amiga-compilable. It seems to work. Because changes to the source were slightly more complex this time, I've supplied full source code. This source should still compile fine on any other platform, since my changes were only to the Amiga Makefile, files used only by the Amiga Makefile, or were enclosed inside preprocessor conditionals to filter out Amiga stuff on non-Amigas.

NOTE (see below): This .guide file is not totally accurate; except for these end comments, it is identical to the Amiga SOX 3.1 release. I am not very into SOX any more, so I'm not very into rewriting its documentation either. I will continue to port SOX, but I will likely drop the .guides in the future since it's not easy to convert from Unix-style manuals.

The SOX source code is maintained by Lance Norskog, with contributions from many others. Amiga ports (pl5, pl6) and modifications (pl7-9, 11) were performed by David Champion. My e-mail address is dgc3@midway.uchicago.edu; please send

any comments, bug reports, etc. to this address. If they are Amiga-only problems, I will handle it myself and supply necessary patches or recompiled binaries. If they are problems with SOX as a whole, I will forward the report(s) to the maintenance group.

The part of the README file that says that the Amiga port was "done against old versions of SOX" is not true. This release of Amiga SOX was made directly from the generic/Unix release 6, pl11 distribution.

Note that in order to use pipes with Amiga SOX, you must have a true piping shell such as Csh or WShell. The native PIPE: device is not okay. Matt Dillon's FIFO: will work, however.

This AmigaGuide file is not intended to be nice. For the most part, it's simply a HyperText-ization of the file 'sox.txt'. Also, it has not been updated to conform to the pl11 man page, since doing so is a pain and I'm not all that interested in this program anymore.

CHANGES since last version
MANIFEST

1.40 changes

With release 3.1, I decided to compile versions for the 68020 and 68000 instead of the '030 and '000. The performance ratio of an '020 to a '000 is better than the performance ratio of the '030 to an '020, and not much less than '030 to '000. Essentially, '030 users lose little by using an '020 binary, but '020 users gain much by not using the '000 version. This solution, then, maximizes the benefit distribution.

Changes from patchlevel 8 to patchlevel 9 include:

- new high-pass filter
- modified WAVE handler to accept RIFF's optional properties
- miscellaneous fixes elsewhere

Changes from pl 9 to pl 11 include:

- Sun ADPCM compress u-law support
- Other stuff. I haven't really looked.

1.41 manifest

Contained in this archive are the following:

bin/csh/*2*.sh Amiga Csh shell scripts for specific conversions.

bin/csh/soxaliases.sh Amiga Csh aliases for specific conversions.

bin/dos/*2* AmigaShell scripts for specific
 conversions.
bin/sox Sound Exchange, runs on any Amiga.
bin/sox020 Sound Exchange for 68020 machines.
bin/sox881 Sound Exchange for Amigas with 68881/68882
 floating-point processors.
bin/sox020881 Sound Exchange for 68020/6888[12] Amigas.

dist/* Standard multi-platform distribution plus
 Amiga fixes which are NOT yet in the
 distribution.

doc/CHEATS Original Unix CHEATS list.
doc/README Original Unix README.
doc/sox.guide AmigaGuide documentation.
doc/soxscripts.doc Information on the supplied shell scripts.
doc/sox.doc ASCII documentation.
doc/st.doc ASCII documentation for libst.
doc/TIPS Original Unix TIPS help file.
doc/TODO Original Unix TODO file.

Information specific to the Amiga version is contained at the end of
the AmigaGuide document 'sox.guide'.

--dgc, 28 Feb 1994
