

# Digitising Discs

# JAZZED

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## GramoFile

One or two readers may have a record player or even a gramophone still lying around. There's certainly something nostalgic about playing sound media on such devices, but this doesn't make shellac or vinyl discs sound any better.



Gramofile 1.6  
Source text and Mandrake-RPM

Why not **digitise** your favourite pieces with the aid of a computer and thus get rid of a bit of the crackling? The *GramoFile*, which comes under the **GPL**, was written by Anne Bezemer for just this purpose.

### Before recording

Not much is necessary to install GramoFile:

- the GNU C compiler (*gcc*),
- **make** and
- the *ncurses* **library** with the associated **Header files**.

Now it is time to download the GramoFile **source text** archive from

<http://panic.et.tudelft.nl/~costar/gramofile/>; you will of course also find it on the cover CD. The following steps are necessary to convert the program:

```
tar xzf gramofile-1.6.tar.gz
cd gramofile-1.6
make
strip gramofile bplay gramo
chmod 755 gramofile bplay gramo
su (enter root password)
cp gramofile bplay gramo brec gramo /usr/local/bin
exit
```

The Mandrake-RPM archive (which can sometimes also be used for other distributions too) can be installed with the command

```
rpm -i gramofile-1.6-1mdk.i586.rpm
```

from the directory  
*/mnt/cdrom/LinuxUser/gramofile/*.

### Sound off

In an *xterm* or another terminal emulator, you should now enter the command *gramofile*. After briefly showing a start logo, the program should now greet us with the main menu (Figure 1). You can jump back and forth between the menu items using the cursor keys and the Tab key. *Return* selects a menu entry.

Before anything can be recorded with GramoFile, you should look at the mixer settings for the sound card and make sure there is enough disk space available for the recording. In any case, you will need just under 10MB per minute. When you select *1. Record audio to a sound file*, the program firstly wants to know the name of the new audio file. (Figure 2).

Recording will continue until you press *Return*. You can confidently record a whole side of a disc with several pieces of music as GramoFile has a very reliable function to find pauses (*Track location*). This is precisely the function we are going to use next.

### Hack it to pieces!

Now select, from the main menu, *3. Locate tracks*. After the obligatory file selection, there is some

**Digitising:** Converting a continuous analogue signal into a series of digital values. In computers, the analogue/digital converter on the sound card takes over this task.

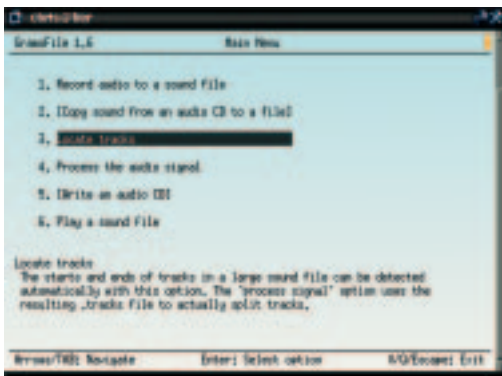
**GPL:** The GNU General Public Licence. A software licence allowing the program to be passed on, on condition that the source text always remains available. Equally permissible and expressly desired is the fact that you can make your own improvements to the software and republish it. Linux itself is also under the GPL.

**make:** Program for sequence control when converting source texts. The configuration file of *make* (the *Makefile*) contains, for example, information about dependencies between the individual program modules.

**Library:** Files containing a collection of useful C-functions for specific purposes. So there are such things as *libm*, which provides mathematical functions, or *libncurses*, which realises functions for terminal-dependent text outputs. Often libraries are used jointly by several programs (shared).

**Header Files:** In header files (also called *Include files*) there are lists of the functions available in a library together with parameters. The C-compiler needs this information when converting a program. In the most common distributions a header packet belonging to a library usually includes the add-on *dev* or *level* in its name.

**Source text:** The form of any software which can be read by humans. By converting (compiling) with a Compiler this is turned into an executable program.



[left] Figure 1: The main menu



[right] Figure 2: File select

configuration data (Figure 3). Reasonable defaults are found here. In the so-called RMS-("Root Mean Square")-file the weighted average values of a block (4410 values) are written. This information is required by GramoFile for most functions and should therefore be created in any case.

The procedure can take a while, then GramoFile proudly announces how many tracks it has found (Figure 4), and stores the locations found in a text file with the ending `.tracks`. You can find out the precise method of this function in the file `Tracksplit2.txt`.

At this point, the audio file has not yet been broken down. All that exists are the positions in the `.tracks` file, which you can, if necessary, also fine-tune with a text editor. The basic name of the `.tracks` file is the one entered in the file selection. Listing 1 shows an extract from a sample file.

### Smooth as silk

We can otherwise split the audio file into individual pieces in one pass thereby decracking it. GramoFile provides various filters to do this, which are hidden behind the menu item `4. Process the audio signal`. The function `Split tracks` should always be ticked (Figure 5), unless the recorded LP or single side consists of only one piece anyway.

On the left, you will find all the available filters. These are marked using the cursor keys and included in the selection on the right side by using `Return`. The pre-set `Conditional Median Filter II` is the best choice in most situations.

#### Listing 1: Extract from a `.tracks` file

```
Number of tracks=3

# Track 1 - blocks 8 to 2514 - length: 0:04:2
10.700
Track01start=0:00:00.800
Track01end=0:04:11.500

# Track 2 - blocks 2535 to 4187 - length: 0:02
2:45.300
Track02start=0:04:13.500
Track02end=0:06:58.800

# Track 3 - blocks 4212 to 6218 - length: 0:02
3:20.700
Track03start=0:07:01.200
Track03end=0:10:21.900
```

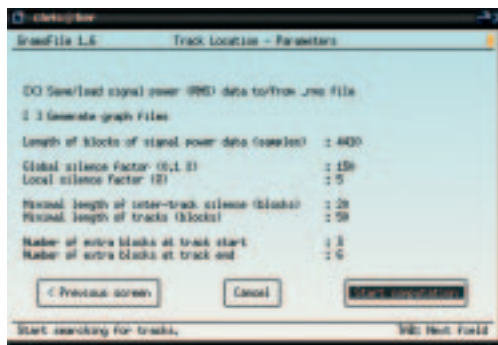


Figure 3: Find pauses with `Track location`

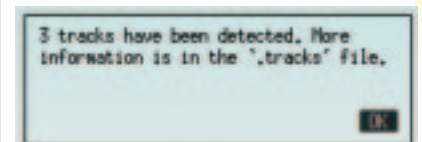
If you want to simply split the recording into individual parts instead, but leave the signal otherwise unaltered, select the filter `Copy Only`. There are also additional parameter settings for most filters, which you can reach by pressing `Return` on a filter that has already been selected. For those who like to experiment, there is a filter which – with adequate knowledge of C – you can program yourself (`Experimenting Filter`).

### Not yet implemented

In the main menu you will notice that the items `2. Copy sound from an audio CD to a file` and `5. Write an audio CD` have no function yet. But GramoFile would not be open source software, if an industrious developer was not going to look into this in the foreseeable future and integrate the tools `cdparanoia` and `cdrecord`. What started as a classwork project, does not have to end with Version 1.6...

#### How do I connect the record player to the computer?

*In most cases the output from the record player cannot be connected directly to the input of the sound card, because the output signal has to be equalised first. An equaliser-pre-amp or if necessary the line-out output of the amplifier to which the record player is connected, should be used here. It is best to use line-in as the input to the sound card.*



[top] Figure 4: Three items found



[bottom] Figure 5: Filters in GramoFile