# Pegase

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**COLLABORATORS**

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| | *TITLE* :<br><br>Pegase | | |
| *ACTION* | *NAME* | *DATE* | *SIGNATURE* |
| WRITTEN BY | Didier Levet | August 9, 2022 | |

**REVISION HISTORY**

| NUMBER | DATE | DESCRIPTION | NAME |
|---|---|---|---|
| | | | |

# Contents

# Chapter 1

# Pegase

## 1.1  Pegase

```
                              Pegase : mPEG Audio Stream Encoder
                    ==================================

                         (c) 1998-2000, Didier Levet


    As my native language is french,  and  not  english,  this  documentation
might  be unreadable for most of you because of some mistakes. Do forgive me
for that.



===============================================================================


                              DISCLAIMER

    NO WARRANTY, IMPLICIT OR EXPLICIT, WILL BE DUE BECAUSE OF THE USE  OF
    THIS  PROGRAMM. ANY  DAMAGES,  DIRECT  OR  INDIRECT,  CAUSED  BY THE
    INSTALLATION  OR USE OF THIS PROGRAM WILL NOT  BE  IMPUTABLE  TO  THE
    AUTHOR.  YOU,  WHEN INSTALLING THIS SOFTWARE, ASSUME THE LIABILITY OF
    ALL RISKS TIED TO THE INSTALLATION OR USE OF THIS PROGRAM.


===============================================================================


    Pegase  is  an  MPEG  audio  encoder,  optimized  for  680x0/PPC  familly
processors It needs OS 2.0 or above to run. The PPC version requires WarpOS.

    Due to the
                patents
                 that cover mp3 encoding,  Pegase  will  never  support
Layer 3. However, the layer 2 algorithm gives really good results in a short
time, making Pegase usefull for anyone. At least, I hope so.



                Presentation

                Distribution
```

```
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                    How to use

                    Future

                    Problems

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                    Thanks
                        Pegase is EMail-ware.
```

## 1.2  Presentation

```
                        PRESENTATION
                        ------------
```

Although it is based upon the original  version  of  Musicin  (ISO/MPEG),
only  the principle on which things work is identical. The whole source code
has been rewritten, with the Amiga spirit in mind, in  order  to  provide  a
fast encoder without sacrifying the quality.

The first motivation comes from a simple finding : Musicin PPC appears to
be  slow compared to the CPU power, so slow that I was convinced that it was
a quick port which misuse this processor.
Then, I wanted to show what a foolish 68060 is able to do,  demonstrating
that  a  PPC  might  be  useless when it is not used as it should be. I must
admit that the result goes far away than what I expected.

MPEG files produced with Pegase are better than the ones created with the
Amiga version of Musicin. But Pegase is a lot faster : Encoding of a  stereo
AIFF  file,  44.1  KHz,  160  kbits/s,  requires roughly two times the sound
duration (68060/50). A 68040/40 is able to encode  the  same  file  at  five
times the sound duration.

Pegase is able to encode IFF-AIFF, IFF-MAUD  and  RIFF-WAV  files.  These
files  can  be  mono  or  stereo. RAW  format, and CDDA (CD Audio) are also
supported. The samples must be 16 bits wide, and the sample  frequency  must
be close to 32 KHz, 44.1 KHz or 48 KHz.

You can create MPEG files using the Layer I  or  the Layer II algorithms.
Stereo songs can be encoded using the joint-stereo mode.

## 1.3  Distribution

```
                        DISTRIBUTION
                        ------------
```

No restrictions apply.


## 1.4  Installation

<pre>
                        INSTALLATION
                        ------------
</pre>

    There is no need for an Installer script, and installation by hand is not
that difficult. Simply copy Pegase where you want, that's all.

    The default language is english (or something similar to :-)  ).  When  a
translation  is  available  for  your country, you can also copy the catalog
file to your LOCALE: directory, as usual.


## 1.5  How to use

<pre>
                              HOW TO USE
                        ----------
</pre>

    Pegase could be run from Shell as well as from Workbench. In both  cases,
it  examines  its  icon  in  order  to alter the default settings. Then, CLI
parameters are taken into account and override these settings.

    You can stop Pegase by pressing "CTRL-C" or  "CTRL-D".  The  former  only
stops  the  file  being  processed.  If  there are some files waiting in the
queue, Pegase starts to encode the next one. The latter, on the other  side,
stops  the  whole  process. Remaining files are ignored, and partial encoded
files are never deleted.


    Pegase only supports one psycho-acoustical analyzer, which is refered to
as "psycho #2" in Musicin.


Starting from a Shell :
----------------------

    Pegase sticks to the standard rules of Shell commands. Options are given
on the command line.

    As usual, "Pegase ?" causes  the  Shell  to  display  the  command  line
pattern.  If you answer this pattern with another question mark, then Pegase
shows its extended help :

    Usage :

                FROM
                Input sound files or directories to encode.

                TO
                Output file name, or destination directory.

```
                     LAYER
                     Layer number (1 or 2). Default = 2.

                     FREQ
                     Sampling frequency (Hz). Default = 44100.

                     BITRATE
                     Total bitrate (kbits/s). Default = 160.

                     MONO
                     Mono encoding.

                     JSTEREO
                     Joint stereo encoding.

                     COPYRIGHT
                     Mark as copyright.

                     ORIGINAL
                     Mark as original.

                     CRC
                     Add error protection.

                     PRIORITY
                     Change Pegase's priority.

                     VERBOSE
                     Verbose output.

                     MOTOROLA
                     Motorola byte order/PIPE switch.

                     INTEL
                     Motorola byte order/PIPE switch.

                     DELETE
                     Delete source file after completion.

    Don't bother about the stack size. Pegase will be happy with a standard 4
kb stack.


Starting from Workbench :
-------------------------

    The default settings, as said above, can be changed using the icon's tool
types :


                     TO
                     Output file name, or destination directory.

                     PATTERN
                     File requester's pattern.
```

```
                    LAYER
                    Layer number.

                    FREQ
                    Sampling frequency.

                    BITRATE
                    Total bitrate.

                    MONO
                    Mono encoding.

                    JSTEREO
                    Joint stereo encoding.

                    COPYRIGHT
                    Mark as copyright.

                    ORIGINAL
                    Mark as original.

                    PRIORITY
                    Change Pegase's priority.

                    CRC
                    Add error protection.

                    DELETE
                    Delete source file after completion.
```

   There's also some tool types that allow you to set the  default  settings
of the file requester :

```
                    FR_SOURCE
                    Default directory.

                    FR_XPOS
                    Default X position.

                    FR_YPOS
                    Default Y position.

                    FR_WIDTH
                    Default width.

                    FR_HEIGHT
                    Default height.
```

   The console settings can be changed with an environment variable named
"PEGASE_WBCONSOLE". Use the "SetEnv" command to create it, and don't forget
to copy it to "ENVARC:" to make it permanent when you are done.

## 1.6  File Requester

File requester

   If you start Pegase from the Workbench by clicking on its icon,  or  when
you  don't  provide  source files on the command line, Pegase pops up a file
requester. You can select multiple files at once, but they  must  reside  in
the same directory.

## 1.7  FROM

                FROM : Source(s).

   Specify one or more file  and/or  directory  names.  When  no  source  is
specified,  Pegase open a file requester where you can pick up several files
at once (multi-selection).

   When one entry, at least, is a  directory,  Pegase  analyzes  all  files
inside  this directory, and selects the ones that can be assumed to be audio
files. This automatic selection is helpful, but it is too simple to be  very
accurate.  For instance, any unknown file might be assumed to be a RAW audio
file. Don't expect anything useful if you encode such a file ! ;-)

   Pegase only handles these file formats :

- AIFF : Mono/stereo, 16 bits, uncompressed.
- MAUD : Mono/stereo, 16 bits, uncompressed.
- WAV  : Mono/stereo, 16 bits, uncompressed.
- CDDA : Always stereo, 16 bits, 44.1 KHz.  The byte order  (Intel/Motorola)
          is determined automatically by some magic.
- RAW  : Mono, 16 bits  (might be the default format  for  any  unknown  file
          type). Motorola byte order is expected for the samples.

   The sampling frequency used by  the  coder  comes  from  the  audio  file
header's  if  it  is available there (AIFF, MAUD and WAV). CDDA files always
use 44.1 KHz sampling rate (starting from Pegase  1.85,  you can  select the
sampling rate with the 'FREQ' keyword).

   Note that only 16 bits sample files are supported. Sample frequency  must
be  close  to those allowed by the encoder algorithm (32 KHz, 44.1 KHz or 48
KHz, +/- 4%).

NB : The byte order determination is based upon a statistical method  so  it
can give wrong results in some case.
See also

                MOTOROLA/INTEL
                  .

## 1.8  TO

TO : Destination.

   This define the output file name, or the directory where to  save  output
files.  When  no  destination is given, ouput files are saved along with the
input files. If a filename extension already exists,  it's  replaced  by  an
".mp?" like extension.

   You are not allowed to define an explicit output file name when there are
multiple  sources. Otherwise, Pegase will go back to its default setting and
save output files in the source's directory.

   When the destination is a directory, Pegase saves all output files there,
after  having  replaced  any  existing extension with ".mp?". This extension
depends on the layer number (".mp1" for layer 1, or ".mp2" for layer 2).
   The original filename extension is not  replaced  if  it  starts  with  a
decimal digit.

NOTE :

   By now, Pegase doesn't check if it  can  write  the  output  file  before
starting  the  encoding.  Also,  an  already  existing  destination  file is
overwritten, without any warning.


## 1.9  LAYER

LAYER : Layer number.

   By now, Pegase only supports layer level 1 and 2. Layer 2 gives the best
results, and, despite what you might think, it is faster than layer 1.

   The default setting is layer 2. Layer 3 is not supported.


## 1.10  FREQ

FREQ : Sample frequency.

   Pegase use the sample frequency specified  in  the  input  file  header's
(AIFF, MAUD or WAV), or select 44.1 KHz in case of a CDDA file encoding.

   Then, you only need to define this frequency for RAW format audio  files.
The sampling rate can also be defined when encoding CDDA files.  This  makes
no sense when encoding real CD Audio tracks, but this is usefull if you  use
a frontend that pass sample datas to Pegase through a PIPE.

   In all cases, the sample frequency must be close to 32 KHz, 44.1  KHz  or
48 KHz (+/− 4%).


## 1.11  BITRATE

```
BITRATE : Output bit rate (kbits/s).
```

   This value determines the size (and quality) of the  MPEG  file.  Several
values are allowed, for each layer.

   The default bitrate (160 kbits/s) gives near-CD  quality  in  most  cases
(44.1 KHz sampling rate). 48 KHz samples require a higher bitrate.

   You don't need to learn each of these values as the encoder  selects  one
that  is lowest when the specified value is not allowed. Thus, giving 200 as
bitrate causes Pegase to select 192 kbits/s.

   Known bitrates are (layer 1/layer 2) :

```
32, 64, 96, 128, 160, 192, 224, 256, 288, 320, 352, 384, 416 and 448.
32, 48, 56,  64,  80,  96, 112, 128, 160, 192, 224, 256, 320 and 384.
```

   Having the sample frequency and the number of channels, you  can  compute
the  MPEG  file  size.  In example, for a 35 Mb CDDA file, using 160 kbits/s
output bitrate, we have :

```
Source :
44100  x          16        x    2     = 1411200 bits/s
(freq)   (bits per sample)   (channel)

1411200 / 160000  = 8.82 (ratio)
         (bitrate)
```

35 x 1024$^2$ / 8.82 = 3.97 Mb = Output file size.

   The bitrate has no  noticeable  effect  on  the  encoding  speed.  Slower
bitrates give a slightly extra speed, but that's all.

## 1.12  MONO

```
MONO : RAW file format.
```

   As RAW files are assumed to be mono files, this option does  nothing  for
now.

## 1.13  JSTEREO

```
JSTEREO : Use Joint-Stereo mode.
```

   Input file(s) must be stereo. This  option  gives  some  liberty  to  the
encoder,  which  can  progressively  mix samples to mono on a subband basis.
Thus, the coder gets more bits to encode  the  samples,  which  improve  the
quality when you use a (too) low bitrate.

This mix is done dynamically, for each frame, whenever it  is  necessary.
The  number  of  mixed  subbands  varied  also from frame to frame, and some
frames can be encoded in full stereo mode.  Then,  your  decoder/player  can
forget to tell you that there are some j-stereo frames in the MPEG file.

## 1.14  COPYRIGHT

COPYRIGHT : Mark as copyright.

   This is an information telling that the audio stream is copyrighted.

## 1.15  ORIGINAL

ORIGINAL : Mark as original.

   This is an information telling that the audio stream is original.

## 1.16  CRC

CRC : Add error protection.

   Compute a checksum of each MPEG headers.

## 1.17  PRIORITY

PRIORITY : Change Pegase's priority.

   Priority values must be in the range [-128; 5].

## 1.18  VERBOSE

VERBOSE : Verbose output.

   Display global settings.

## 1.19  PATTERN

PATTERN : File requester pattern.

   Define the pattern used to display files in the file requester.

   Default setting : ~(#?.info)

## 1.20  CDDA byte order and PIPEs

```
MOTOROLA : Motorola byte order.
```

   This switch forces ALL input files to be handled as 16-bit  stereo files,
in which samples are recorded in Big Endian mode (Motorola).

```
INTEL : Intel byte order.
```

   This switch forces ALL input files to be handled as 16-bit  stereo files,
in which samples are recorded in Little Endian mode (Intel).

```
PIPE support :
```

   If you use one of the switches  mentionned  above,  Pegase  bypasses  its
automatic file type recognition in order to allow you to encode files from a
PIPE. The 'FREQ' keyword may be used to select the sampling rate.

## 1.21  DELETE

```
DELETE : Delete source file after completion.
```

   This switch tells Pegase to  delete  the  source  file  after it has been
successfully encoded.

## 1.22  Problems

```
                        PROBLEMS
                        --------
```

- Output files overwrite silently existing files.
- Pegase doesn't check if it can write to the destination file or directory.
  Thus,  encoding something from a CD requires that you define  explicitly a
  destination ("TO" option or Tooltype).
- Pegase doesn't check if there is enough room on the destination medium  to
  store the MPEG file. Anyway, this detection would prevent the usage of the
  RAM disk as a destination medium.
- RAW files are assumed to use the MOTOROLA byte order.

   As of today, MPEGA 3.4 (along with mpega.library) refuses  to  handle  any
file encoded using Layer 1. Despite that, these files  are  perfectly  MPEG-
compliant, and an older version of MPEGA (v3.3, Aminet Set 6d)  handle  them
just fine.

## 1.23  Future

```
                        FUTURE
                        ------
```

   "pegase.library" is on its way. It would combine an enhanced encoder and a
decoder in the same library, but I don't promise anything.
   I don't have any particular motivation to  achieve  this  project,  mainly
because I just do it for the fun. Believe it or not, I never  use  any  MPEG
audio related tools and this may explain a lot of things...


## 1.24  Support

                              SUPPORT
                              -------


   Support is available by sending an EMail to :

                          kakace@pacwan.fr

   Please, don't forget to prepend the subject with "[PEGASE]". This will
help me to set up a trigger for these mails.

   Pegase homepage is still up and running :

                   http://perso.pacwan.fr/kakace/pegase/


## 1.25  History

                              HISTORY
                              -------

 V1.8, Pegase 1.80 (31.8.2000) :
  - Final release.

 V1.8b, Pegase 1.81 (3.9.2000) :
  - The original filename extension is no longer replaced by ".mp?" if it
    begins with a decimal digit. Thus, an audio CD track named "track.2"
    will not overwrite "track.mp2" silently, created by a previous  track
    named "track.1", as this was the case before.

 V1.8d, Pegase 1.83 (9.9.2000) :
  - The output quality has been improved.

 V1.8e, Pegase 1.84 (11.9.2000) :
  - Bitstreams produced from 32/48 KHz sampled datas were wrong.

 V1.8f, Pegase 1.85 (13.9.2000) :
  - The psycho-acoustic analyzer has been polished.
  - The modified threshold table used for 32 KHz sampled datas was
    erroneously computed for 38 KHz sampled datas.
  - The 'FREQ' keyword may be used to select the sampling rate when encoding
    CDDA files (or samples sent through a PIPE).

 V1.8g, Pegase 1.86 (23.9.2000) :

    – Layer 1 SNR and Quantization tables have been fixed (long standing bug).
    – The absolute threshold tables have been changed again.
    – Little speedup due to a lower attenuation limit in the spreading
      function.
    – Little modification on the scale factors select information patterns
      (Layer 2) in order to better match the subband levels in some cases.


## 1.26  Thanks

```
                              THANKS
                              ------


    I don't forget those who encouraged me, or tested this "thing" :

Thierry Sillis
Johann Girard-Cheron
Eric Giguère
"Rafo"
Georges Goncalves (aka "spectrum analyzer" :)) )
The CdBS Software group.
"Crisot"


    I also thank the translators for the catalog files, and all those who
sent me an e-mail.


    Finally, many thanks to Thierry "Pumpkin" Schmitt who drew this beautiful
icon for me, and to Patrick Beerhorst for his help on Pegase homepage.
```


## 1.27  MP3 Royalties

```
This is an abstract of the licensing terms found on :
http://www.iis.fhg.de/amm/legal/index.html


2.2. MPEG LAYER-3 SOFTWARE ENCODERS

    While most of the distribution of MPEG Layer-3 software decoders is  free
of  charge,  for all MPEG Layer-3 encoders a license is needed and royalties
have to be paid. ~

2.2.1. Software Encoders not developed by Fraunhofer IIS  ~

    If you have developed your own software encoder or  acquired  a  software
encoder  from another developer than Fraunhofer IIS to run MPEG Layer-3, you
have to get a "patent-only" license from THOMSON multimedia;  the  following
royalties apply :

         1 -   1,000 encoders   US$ 25.00 per unit
     1,001 -   2,000 encoders ~ US$ 20.00 per unit
     2,001 -   3,000 encoders ~ US$ 15.00 per unit
     3,001 -  10,000 encoders ~ US$ 10.00 per unit
    10,001 - 100,000 encoders ~ US$  5.00 per unit
```

```
    > 100,000 encoders ~          US$ 2.50 per unit
```

    US$ 15,000 annual minimum, payable upon signature and each following year
in January, fully creditable against annual sales. ~

    The royalty does not include any on-going support  from  Fraunhofer  IIS.
This  agreement  does  NOT cover the right to sell MPEG Layer-3 encoded data
(e.g. in "pay-audio" and "broadcast" systems). These rights are  covered  by
the licenses described under 2.4. and 2.5.