Mandelmania

COLLABORATORS			
	TITLE : Mandelmania		
ACTION	*NAME*	*DATE*	*SIGNATURE*
WRITTEN BY		October 2, 2022	

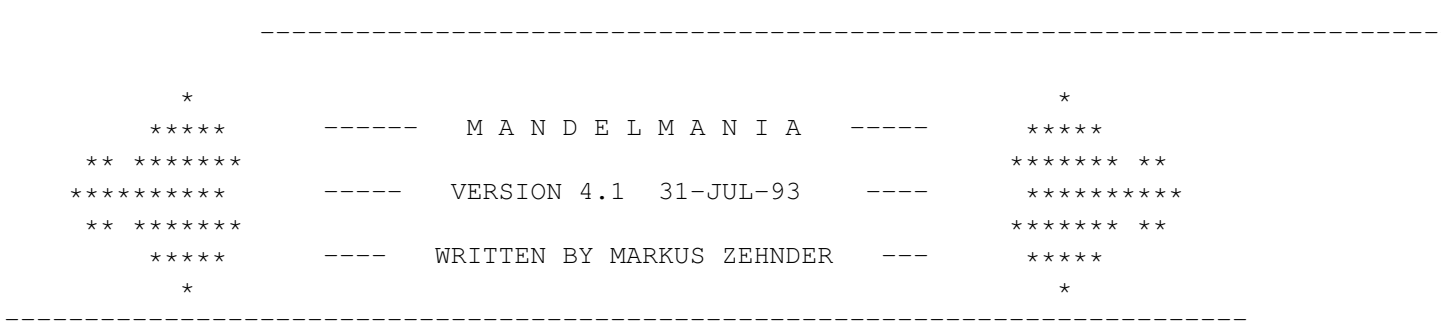
REVISION HISTORY			
NUMBER	DATE	DESCRIPTION	NAME

Contents

Chapter 1

Mandelmania

1.1 Mandelmania Help



Overview

Starting Mandelmania

Keystrokes

Fractal Types

Menus

ARexx Interface

Animations

Technical Information

Credits

1.2 Mandelmania/Overview

1.3 Mandelmania/Overview/Author

Mandelmania was written by

Markus Zehnder
Inwilerriedstrasse 47
CH-6340 Baar
Switzerland

E-Mail: zehnder@amiga.physik.unizh.ch

Bug reports, criticism, suggestions, comments etc. are always welcome
(in English or German)

1.4 Mandelmania/Overview/Copyright

Some people asked me to have an update service. If you want the next version of Mandelmania, send me at least 5 or 10 (or what it is worth to you) Dollars or Swiss francs. Don't forget to write me the version you currently use.

1.5 Mandelmania/Overview/Disclaimer

1.6 Mandelmania/Overview/History

```
Mandelmania 4.1:
- Several bugs fixed
- Anims using 8 bitplanes should now work
- Colorcycling in own task and with AGA mode support
- Colorincrement in colorcycling can now be changed for faster scrolling
  (especially useful for colorcycling with 256 colors)

Mandelmania 4.0:
- Filerequesters go to Mandelmania screen
- Better colorcycling; now a interrupt server is used
- Better colormap handling (up to 256 colors should be possible)
- Bug fixed for 68000-mode. User could select FPU --> GURU.
- New About Window
- Error in Screenmode-requester fixed.
- Several bugs in palette requester found.
- Different Filerequester
- Palette can be saved and loaded
- Preferences can be saved and loaded
- Form file for ARexx output files. This feature allows more user inter-
  vention in the automatical ARexx file generation
- More choices in the iterations menuitem. Some people didn't find out that
  they can enter every iteration value using the Enter Range menuitem.
- New ZoomHandling (object before action)
- New Titlebar handling (several options possible)
- Buffermode for storing iterations of a Mandelbrot Set
- Fully font associative, font can be selected by a fontrequester.
- Saving pictures as brushes
- Lyapunovia algorithm implemented
- Paths for several directories (pictures, anims, palettes etc.) can now
  be edited and saved.
- internal 24-bit palette
- save requester flag
- bug fixed for 68000-mode. After loading Prefs saved on a 68020 machine,
  Mandelmania crashed running on a 68000 machine.
- CPM (Continous Potentional Method) implemented (two- and
  threedimensional)
- Full AGA support
- Only two tooltypes: PALETTE, SETTINGS

Mandelmania 3.0:
 - complete rewritten version
 - faster calculation routines
 - FPU calculation routines added
 - several OS2.0 features supported
 - ARexx Port included
 - animation support

Mandelmania 2.1:
 - bug fixed in Julia set for 68000 mode

Mandelmania 2.0:
 - color cycling, proportional zooming and cursor key scrolling added.

Mandelmania 1.2:
```

```
 - color requester added
 - special Turbo version included

Mandelmania 1.1:
 - file requester added

Mandelmania 1.0:
 - first release
```

1.7 Mandelmania/Overview/Features

```
Mandelmania is a fast Fractal calculation program.
The main features are:

 - 2.5 times faster than MandFXP
 - Needs Kickstart 2.1 (V38+ of asl.library)
 - On-line help using amigaguide.library
 - Supports all Amiga graphic modes, incl. AGA modes and autoscroll screens
 - Loading and saving using IFF format. Picture parameters are stored in a
   special chunk
 - Entering new parameters using either the keyboard or the mouse (different
   zoom modes)
 - Supported Fractal types:
      Mandelbrot Set LSM
      Julia Set LSM
      Mandelbrot Set CPM (two- and threedimensional)
      Julia Set CPM (two- and threedimensional)
      Lyapunov Space
 - The graphic output window can be sized as you like
 - Colormap can be changed by a comfortable colorrequester
 - Built in colorcycling
 - ARexx interface
 - Creating animations automatically via ARexx scriptfile
 - Easy scrolling by pressing the cursor keys
```

1.8 Mandelmania/Overview/Known Bugs

```
Unfortunately, Mandelmania 4.1 has still some bugs. I wanted to release
this version before I'm on holidays for three months.

- Lyapunov only implemented in low precision (use FPU mode for high
  precision)
- Save as PPM doesn't work
- Special CPM and Lyapunov parameters can't be interpolated in animations
- Only full screen are saved for animations (not brushes)
- Buffer isn't valid anymore after scrolling
- Help produces two enforcer hits. This hits are produced in the amigaguide-
  library call "OpenAmigaGuide" (can change in newer amigaguide.libraries).
```

1.9 Mandelmania/Keystrokes

```
                Cursor keys :
                 Scrolling
                Help key    :
                 Help
                Del key     : Remove rubberband or Julia constant mark


Numpad
------

'0'          : Redraw (or recalculate if needed)
'1'-'9'      :
                    Scrolling
                   '+'          : Zoom in
'-'          : Zoom out
```

1.10 Mandelmania/Keystrokes/Scrolling

```
Pictures can be scrolled easily by pressing the cursor keys. All bitmaps will
then be moved 2 pixels in the selected direction and only two rows and/or
columns have to be calculated.
Only twodimensional pictures can be scrolled.
```

1.11 Mandelmania/Starting Mandelmania

```
                You should start Mandelmania from Workbench because of the
                 tooltypes
                defined in the Mandelmania.info file.
```

1.12 Mandelmania/Starting Mandelmania/Workbench/Tooltypes

```
                The following tooltypes are available:


                 SETTINGS

                 PALETTE
```

1.13 Mandelmania/Starting Mandelmania/Workbench/Tooltypes/SETTINGS

```
This tooltype defines your standard Mandelmania settings file.
```

1.14 Mandelmania/Starting Mandelmania/Workbench/Tooltypes/PALETTE

This tooltype defines your standard Mandelmania palette file.

1.15 Mandelmania/Fractal Types

Mandelmania can calculate several different fractal types.

Mandelbrot Set

Julia Set

Mandelbrot Set CPM

Julia Set CPM

Lyapunov Space

1.16 Mandelmania/Fractal Types/Mandelbrot Set

```
Formula
-------

z[n+1] = z$^2$[n]+c

  z[] and c are complex numbers

  z[0] = 0
  c    = complex coordinate of pixel

The recursiv formula is calculated until either |z|$^2$>8 or
n>maxiter (maximal number of iterations)


Parameters
----------

You can enter the following parameters for Mandelbrot Sets.

The first four parameters define the Mandelbrot Set range being displayed.

x min = Real part of the pixelcoordinates on the left edge of the screen
x max = Real part of the pixelcoordinates on the right edge of the screen
y min = Imaginary part of the pixelcoordinates on the top edge of the
        screen
y max = Imaginary part of the pixelcoordinates on the bottom edge of the
        screen

iterations = Maximal number of iterations being calculated.
```

```
color divide = number of successive iterations having the same color.
```

1.17 Mandelmania/Fractal Types/Julia Set

```
Formula
-------

z[n+1] = z$^2$[n]+c

  z[] and c are complex numbers

  z[0] = complex coordinate of pixel
  c    = complex constant (the same for the whole picture)

The recursiv formula is calculated until either |z|$^2$>8 or
n>maxiter (maximal number of iterations)


Parameters
----------

You can enter the following parameters for Julia Sets.

The first four parameters define the Julia Set range being displayed.

x min = Real part of the pixelcoordinates on the left edge of the screen
x max = Real part of the pixelcoordinates on the right edge of the screen
y min = Imaginary part of the pixelcoordinates on the top edge of the
        screen
y max = Imaginary part of the pixelcoordinates on the bottom edge of the
        screen

x const = Real part of the Julia constant
y const = Imaginary part of the Julia constant

iterations = Maximal number of iterations being calculated.

color divide = number of successive iterations having the same color.
```

1.18 Mandelmania/Fractal Types/Mandelbrot Set CPM

```
Formula
-------

z[n+1] = z$^2$[n]+c

  z[] and c are complex numbers

  z[0] = 0
  c    = complex coordinate of pixel

The recursiv formula is calculated until either |z[n]|$^2$>64 or
```

```
n>maxiter (maximal number of iterations)

Then, a continous potential of the point must be calculated. If
n>maxiter, then this potential is equal zero.
In the other case, the potential is calculated as follows:


            / log(|z$^2$[n]| \
p(z) = 0.5* | ----------- |
            |      n      |
            \     2       /


To vary the steepness of the graphic, linear and logarithmic scaling
are possible.

                       logscale
P(z) = linscale * p(z)



Parameters
----------

You can enter the following parameters for CPM Mandelbrot Sets.

The first four parameters define the Mandelbrot Set range being displayed.

x min = Real part of the pixelcoordinates on the left edge of the screen
x max = Real part of the pixelcoordinates on the right edge of the screen
y min = Imaginary part of the pixelcoordinates on the top edge of the
        screen
y max = Imaginary part of the pixelcoordinates on the bottom edge of the
        screen

iterations    = Maximal number of iterations being calculated.

log. scale    = logarithmic scale constant
color periods = number of color periods (used only in 2D view)
                (=how many times is the full palette between iteration 0
                  and the maximal iteration)

lin. scale    = linear scale constant (used only in 3D view)
plateau [%]   = level of the plateau (cut level)  (used only in 3D view)
angle         = In 3D view, the graphic can be rotated.
                angle = 0  -> front view
                angle = 90 -> top view
```

1.19 Mandelmania/Fractal Types/Julia Set CPM

```
Formula
-------

z[n+1] = z$^2$[n]+c
```

```
  z[] and c are complex numbers

  z[0] = complex coordinate of pixel
  c    = complex constant (the same for the whole picture)

The recursiv formula is calculated until either |z[n]|$^2$>64 or
n>maxiter (maximal number of iterations)

Then, a continous potential of the point must be calculated. If
n>maxiter, then this potential is equal zero.
In the other case, the potential is calculated as follows:


            / log(|z$^2$[n]| \
p(z) = 0.5* | ------------ |
            |      n       |
            \     2        /


To vary the steepness of the graphic, linear and logarithmic scaling
are possible.

                       logscale
P(z) = linscale * p(z)



Parameters
----------

You can enter the following parameters for CPM Julia Sets.

The first four parameters define the Julia Set range being displayed.

x min = Real part of the pixelcoordinates on the left edge of the screen
x max = Real part of the pixelcoordinates on the right edge of the screen
y min = Imaginary part of the pixelcoordinates on the top edge of the
        screen
y max = Imaginary part of the pixelcoordinates on the bottom edge of the
        screen

x const = Real part of the Julia constant
y const = Imaginary part of the Julia constant

iterations    = Maximal number of iterations being calculated.

log. scale    = logarithmic scale constant
color periods = number of color periods (used only in 2D view)
                (=how many times is the full palette between iteration 0
                  and the maximal iteration)

lin. scale    = linear scale constant (used only in 3D view)
plateau [%]   = level of the plateau (cut level)  (used only in 3D view)
angle         = In 3D view, the graphic can be rotated.
                angle = 0  -> front view
                angle = 90 -> top view
```

1.20 Mandelmania/Fractal Types/Lyapunov Space

```
Formula
-------

x[n+1] = r*x[n]*(1-x[n])

  x[] and r are real numbers

  r is either the x-coordinate or the y-coordinate of the current pixel
  and can change every iteration.
  The user can define this sequence by typing an 'A' for the x-coordinate
  and a 'B' for the y-coordinate. For example, the sequence "AB" would
  mean that r changes between x- and y-coordinate after every iteration.

This recursive formula needs a certain time to settle (if the function
is converging).

The Lyapunov exponent is calculated by:

L(x) = Average(log2(abs(r-2*r*x[n=1..maxiter])))

All exponents between the minimal Lypunov exponent and 0 are displayed.


Parameters
----------

You can enter the following parameters for Lyapunov Spaces.

The first four parameters define the graphics range being displayed.

x min = x-coordinates of the pixels on the left edge of the screen
x max = x-coordinates of the pixels on the right edge of the screen
y min = y-coordinates of the pixels on the top edge of the screen
y max = y-coordinates of the pixels on the bottom edge of the screen

lyaexpmin  = minimal Lyapunov exponent being displayed
sequence   = Lyapunov sequence (sequence of 'A's and 'B's)

settle     = Number of iterations for settling
iterations = Number of iterations for Lyapunov exponent calculation
             This value should be higher than the number of colors
             of the current screen.
```

1.21 Mandelmania/Menus

```
                  Project Menu:

                Open

                Save As

                Titlebar
```

```
About

Help

Quit
 Calculation Menu:

Buffer Mode

Reset Range

Enter Range

Zoom In

Zoom Out

Zoom Mode

Type

CPM Type

Iterations

Machine

Precision

Recalculate
  Settings Menu:

Default Screen

Screen Mode

Windowsize

Palette

Open Font

Paths

Load Palette

Save Palette

Save Palette As

Load Settings

Save Settings

Save Settings As
   Cycling Menu:
```

```
                Delay

                Increment
                     Forwards
      Backwards

                Off
                  ARexx Menu:

                Select Form

                New

                Append

                Interpolate

                Close

                Execute
```

1.22 Mandelmania/Menus/Open

```
Loads a fractal image.  You can select the file using a standard asl-
filerequester.  The file must include a MAND chunk to be loaded
successfully.
```

1.23 Mandelmania/Menus/Save As

```
                Saves a fractal image.  You can save the picture as a picture,  ↩
                   brush or as a
ppm file.  Additional to the standard ILBM chunks, some  special chunks
link SpecialChunk} is saved containing the constants representing the saved
picture.  If the current fractal type is either CPM or Lyapunov, additional
to the MAND chunk, a 'CPM1' or 'LYA1' chunk is saved containing the extra
parameters.


Options
-------

Picture: The whole screen is saved, even if the fractal window size is
         smaller than the screen size.

Brush:   The size of the saved picture is the same as the window size.
         You can change the window size using
                 Windowsize
                .

PPM:     --> NOT YET IMPLEMENTED <---
         Save picture as a PPM P6 file. This is a 24 bit standard which
```

can converted by a lot of image conversion programs (e.g. WASP, HamLabPlus)

1.24 Mandelmania/Menus/Titlebar

Specifies the function of the titlebar.

Off: No Titlebar is displayed.

No Coordinates: Titlebar is displayed, but no coordinates.

Window Coordinates: The window coordinates (x,y) of the mouse pointer are displayed in the titlebar.

Complex Coordinates: The complex fractal coordinates of the mouse pointer are displayed in the titlebar.

1.25 Mandelmania/Menus/About

An about window appears containing information about the current version and free memory.

1.26 Mandelmania/Menus/Help

This command provides on-line help. You need "amigaguide.library" to use this feature.

You can use help:

1. Select "Help" from the menu.
2. Press the "Help" key:
   Same function as "Help" menu. Additional you can get help when windows are open which provide help (for example palette-windows or enter-range-windows).
3. Select a Menu, and instead of releasing the right mousebutton, you press the "Help" key. You get then help on the menu command you selected.

1.27 Mandelmania/Menus/Quit

Leaves the program after asking for confirmation.

1.28 Mandelmania/Menus/Buffer Mode

Turns buffer mode on and off.
(MUST be on for three-dimensional CPM fractal types)

To speed up several operations and to make 3D CPM fractal types possible, a data buffer for the values of each pixel is used. Several operations don't need a recalculation of the fractal values, for example changing the number of bitmaps, recalculation etc. After operations like this, the fractal isn't recalculated, only a lookup in the table is needed.

1.29 Mandelmania/Menus/Reset Range

The range parameters are reset. The default values are:

```
Mandelbrot Set:  xleft   = -2.5
                 xright  =  1.5
                 ybottom = -1.75
                 ytop    =  1.75

Julia Sets:      xleft   = -2
                 xright  =  2
                 ybottom = -2
                 ytop    =  2

Lyapunov Space:  xleft   = -3
                 xright  =  3
                 ybottom = -3
                 ytop    =  3
```

1.30 Mandelmania/Menus/Enter Range

This command lets you enter new coordinates and picture parameters ↩
. For
every fractal type, you have to enter different parameters.

Enter Mandelbrot

Enter Julia
Enter Mandelbrot CPM
Enter Julia CPM

Enter Lyapunov

1.31 Mandelmania/Menus/Zoom In

Zooms into an area. But you first have to select the zoom area (↩
before
choosing this command). This is done by selecting two points defining

the zoom area (see also
Zoom Mode
).

1.32 Mandelmania/Menus/Zoom Out

Zooms out of an area. But you first have to select the zoom area ↩
(before
choosing this command). This is done by selecting two points defining
the zoom area (see also
Zoom Mode
).

1.33 Mandelmania/Menus/Zoom Mode

For several operations (zoom, windowsize) you have to select a
"rubberband".

You can select two different ways, how to draw a "rubberband":

Corner-Corner: The first selected point (left mouse button pressed)
and the second selected point (left mouse button released)
are opposite corners of the "rubberband".

Center-Corner: The first selected point (left mouse button pressed) is the
center of the "rubberband" and the second selected point
(left mouse button released) is a corner.

You can also turn proportional mode on and off. If this mode is turned on
the x- and y-range are proportional to the window width and height.
Therefore the width and height of a pixel are equal in (complex) fractal
coordinates and the proportion of the resulting fractal will look
reasonable (this is especially useful for Zoom In and Zoom Out).

1.34 Mandelmania/Menus/Type

You can select different Fractal types:

Mandelbrot Set: The default mandelbrot set is drawn immediately.

Julia Set: Before you start this command, you have to select a
"Julia Constant". This is done by clicking in the set.
A cross will appear where the Julia Constant is set.
The Julia Set will then be calculated immediately.

Mandelbrot Set CPM: A window pops up which asks you for several parameters.
The picture will be calculated after choosing OK.

Julia Set CPM: A window pops up which asks you for several parameters. If you set a "Julia Constant" before executing this command, this constant is set as a default. The picture will be calculated after choosing OK.

Lyapunov Space: A window pops up which asks you for several parameters. The picture will be calculated after choosing OK.

1.35 Mandelmania/Menus/CPM Type

You can select either two- or threedimensional CPM mode. If choosing threedimensional mode, you must have the buffer mode turned on.

1.36 Mandelmania/Menus/Iterations

You can change the maximal number of iterations. You can choose from different values. You should increase this value if you zoom into the fractal image to see more details. If you select 'other' you can enter the maximal number of iterations in a requester.

1.37 Mandelmania/Menus/Machine

Defines the machinetype. You can choose either 68000, 68020/30/40 or FPU.

The subitems which aren't available on your computer are ghosted. If there is a 68040 in your system, the FPU mode is also selectable.

68000 and 68020/30/40 mode is fix point arithmetics. This is much faster then floating point arithmetics (except 68040) but the precision is lower.

1.38 Mandelmania/Menus/Precision

Defines the precision. This makes only sense in 68000 or 68020/30/40 mode.

When low precision is selected, 16 bit fix point arithmetics are used for calculation.

When high precision is selected, 32 bit fix point arithmetics are used for calculation.

When auto mode is on, Mandelmania chooses either low or high precision by itself.

1.39 Mandelmania/Menus/Recalculate

Recalculates the picture. If the buffer mode is on and the buffer contents are valid, this is just a redraw.

1.40 Mandelmania/Menus/Defaultscreen

Sets the screen to its default value. The default values are in the file Mandelmania.prefs or the file defined in the tooltype SETTINGS.

1.41 Mandelmania/Menus/Screen Mode

Opens a new screen. For this purpose a screen mode requester is opened where you can enter the new screen parameters. You can select the screentype in the listview gadget and the width, height and depth of the screen. If you specify width and hight greater than the maximal visible size, the screen will be autoscroll. You can also select the standard amiga overscan modes using the cycle gadget. If the width and height are smaller than the nominal screensize, they are automatically replaced by the nominal values.

1.42 Mandelmania/Menus/Windowsize

This command lets you size the graphic window. You have to draw a "rubberband" first. See also Zoom Mode.

1.43 Mandelmania/Menus/Palette

If you choose this function you will see a color requester. The currently selected color is on the left side of the palette gadget. You can select a color by clicking in the palette gadget on the color. Use the three slider gadgets to change the currently selected color. There are also certain functions to modify the colormap:

Spread : spread colors between the currently selected and the next selected
Copy : copy the currently selected color to the next selected
Exchange : exchange the currently selected color with the next selected

To cancel the operation, just press the right mouse button.

```
Undo     : undo the last operation
Ok       : accept the palette changes
Cancel   : change to the palette you had before
```

1.44 Mandelmania/Menus/Open Font

All Mandelmania requesters and windows are fully font-sensitive. To change the screen font you can use this command. The screen will then be closed and reopened, and a recalculation is executed unless you have the buffer mode turned on.

1.45 Mandelmania/Menus/Paths

Lets you change different default paths (for pictures, animations, ARexx scripts, palettes, preferences, form files and the ARexx IO window).

1.46 Mandelmania/Menus/Load Palette

Loads a new palette. This can be any file containing a CMAP chunk.
The filename can be selected by a file requester.

1.47 Mandelmania/Menus/Save Palette

Saves the current palette as the default palette "Mandelmania.palette".

1.48 Mandelmania/Menus/Save Palette As

Saves the current palette. The filename can be selected by a file requester.

1.49 Mandelmania/Menus/Load Settings

Loads a new settings. This can be any file containing a CMAP chunk.
The filename can be selected by a file requester.

1.50 Mandelmania/Menus/Save Settings

Saves the current settings as the default settings "Mandelmania.prefs".

1.51 Mandelmania/Menus/Save Settings As

Saves the current settings. The filename can be selected by a file requester.

1.52 Mandelmania/Menus/Delay

You can enter the cycling delay. The value you enter is the number of delays between two color-rotations. So you have the maximal speed if you enter 0. The colorcycling won't be started until you choose either

Forward

or

Backward

.

1.53 Mandelmania/Menus/Increment

You can enter the color increment. The higher the color increment, the higher the cycling speed. This feature is only useful, if the delay is 0 and the cycling speed is still too low (especially for 256 color screens).

1.54 Mandelmania/Menus/Forward

Starts the colorcycling. The colormap is cycled forwards.

1.55 Mandelmania/Menus/Backward

Starts the colorcycling. The colormap is cycled backwards.

1.56 Mandelmania/Menus/Off

Turns off colorcycling.

1.57 Mandelmania/Menus/Select Form

You can select a form file by a filerequester. A form file describes how ARexx files are created when selecting the commands

New

,

Append
,

Interpolate
and
Close
. The default form file is
"CreateAnims.form" which is used for creating animations.

1.58 Mandelmania/Menus/New

Creates new ARexx scriptfile and writes ARexx header (@HEAD part of the form file). Only one scriptfile can be opened at one time.

1.59 Mandelmania/Menus/Append

Adds the @APPEND part of the form file to the ARexx file under ↩
construction.
By default this is a routine which adds the current image parameters to the ARexx script file. You must do this first before selecting
Interpolate
.

WARNING: The rangewidth (xright-xleft) or rangehight (ytop-ybottom) must be at least 1E-16. If the precision is higher a "Precision too high for animation!" error message is shown.

1.60 Mandelmania/Menus/Interpolate

Adds the @INTERPOLATE part of the form file to the ARexx file under construction. By default this is a routine which interpolates between the picture you appended before and the current picture. You are asked after the number of steps you want to interpolate. All picture parameters are interpolated (except type).

ATTENTION: In this version, Lyapunov and CPM parameters are not yet interpolated. This feature will be implemented in the next version.

1.61 Mandelmania/Menus/Close

Adds the @TAIL part of the form file to the ARexx file under construction and closes it.

1.62 Mandelmania/Menus/Execute

Executes a ARexx scriptfile. You must run RexxMast (located in the System
folder of the Workbench) before selecting this command.

1.63 Mandelmania/ARexx Interface

Mandelmania opens an ARexx port called 'rexx_mandelmania'. You can send
the following ARexx commands to that port:

defaultscreen

calculate

interpolate

openfractal

savefractal

openanim

saveanim

closeanim

screenmode

windowsize

machine

1.64 Mandelmania/ARexx Interface/defaultscreen

arguments : -
function : Set the screen to its default value.

1.65 Mandelmania/ARexx Interface/calculate

arguments : xleft xright ybottom ytop xconst yconst iterations type
function : Calculates Mandelbrot-Set with the specified parameters

If no arguments are specified, this command will recalculate the fractal image
using the last parameters.

1.66 Mandelmania/ARexx Interface/interpolate

```
arguments : nr steps xleft1 xright1 xbottom1 xtop1 xconst1 yconst1 iterations1
                     xleft2 xright2 xbottom2 xtop2 xconst2 yconst2 iterations2
                     type

function  : Calculates one picture. This function is used to calculate
            interpolated pictures, where the set has <steps> pictures and we
            are currently calculating the picture <nr> of the series. The other
            parameters are for the definition of the start and the destination
            picture.
```

1.67 Mandelmania/ARexx Interface/openfractal

```
argument  : filename
function  : Load a fractal image
```

1.68 Mandelmania/ARexx Interface/savefractal

```
argument  : filename
function  : The current fractal image will be saved under the specified
            filename.
```

1.69 Mandelmania/ARexx Interface/openanim

```
argument  : animationfilename
function  : Opends a new animationfile
```

1.70 Mandelmania/ARexx Interface/saveanim

```
argument  : -
function  : Appends the current picture to the open animationfile
```

1.71 Mandelmania/ARexx Interface/closeanim

```
argument  : -
function  : Closes the open animationfile
```

1.72 Mandelmania/ARexx Interface/screenmode

```
Argument  : DisplayID Width Height Depth

Function  : Opens a new screen using the specified screen parameters.
            The fractal image won't be calculated

Example   : screenmode '8000'x 704 240 3
```

1.73 Mandelmania/ARexx Interface/windowsize

```
argument  : leftedge topedge width height
function  : Sizes the graphicwindow to the specified values. The fractal image
            is not calculated!
```

1.74 Mandelmania/ARexx Interface/machine

```
argument  : machinetype
function  : Sets the machinetype to either 68000, 68020 or FPU
```

1.75 Mandelmania/Animations

To calculate an animation, you have to go through the following steps:

a) Start Mandelmania
b) Choose a form file (
Select Form
) (not absolutely necessary, because Mandelmania loads a default form file during startup).
b) Choose
New
from the ARexx menu and enter a new filename for the scriptfile. If you don't specify fileextension ('.rexx'), they will be appended automatically.
c) Now you must have a start picture. You can load one from disk or get one by zooming and scrolling through the fractal image.
If you found a suitable start picture, you must choose
Append
from the
ARexx menu.
d) Now you need a destination picture. You can get it similar to the start picture. If you got one, choose
Interpolate
from the ARexx menu. You are asked after the number of interpolations you want to calculate between the start and the destination.
e) If you want to continue your animation, you can select another fractal image and interpolate multiple times.

```
    The destination picture of the last interpolation is automatically the
    start picture of the new interpolation.
    If you want a cut you have to append the picture after the cut.
 f) Choose
                Close
                from the ARexx menu.
 g) You have created an ARexx scriptfile. Start it by choosing
                Execute
                   or type rx <rexxfilename> in a shell and the animation will be
    calculated.

If you want to interrupt the calculation, send a Ctrl-C to the scriptfile and
then you can abort the current calculation (using the menu).

This is the only possibility to have a controlled interruption.  All open
files will be closed and the animation is made loopable.
```

1.76 Mandelmania/Technical Information

```
               Mandelmania 3.0 was compiled using AztecC 5.2.  The very time- ↩
                  wasting
calculation routines are written in assembler.


                Special Chunks

                Precision
```

1.77 Mandelmania/Technical Information/Special Chunks

To store specific picture parameters, a special chunks are built in. The most important one called "MAND". The structure of this chunk is as follows:

```
struct MAND_Chunk {
  USHORT LeftEdge,TopEdge,Width,Height;  /* windowcoordinates */
  long double xleft,xright,ybottom,ytop; /* range */
  long double xconst,yconst;             /* Julia constant */
  ULONG Iterations;                      /* max number of Iterations */
  ULONG Type;                            /* Type, see below */
};
```

Remember that a 'long double' is 12 Bytes (=96 bits) long.

Mand_Chunk->Type can be one of the following:

```
#define TYPE_MANDELBROT 0
#define TYPE_JULIA 1
#define TYPE_MANDELBROT_CPM2D 2
#define TYPE_JULIA_CPM2D 3
```

```
#define TYPE_MANDELBROT_CPM3D 4
#define TYPE_JULIA_CPM3D 5
#define TYPE_LYAPUNOV 16


I also need special chunks for saving the parameters for Lyapunov and
CPM fractals:

struct CPM1_Chunk {
  double LogScale;
  double LinScale;
  USHORT ColorPeriods;
  USHORT PlateauLevel;
  USHORT SeaLevel;
  USHORT Angle1;
  USHORT Angle2;
};

struct LYA1_Chunk {
  LONG LyaExpMin;
  LONG Settle;
  UBYTE Sequence[];
};

As you can see, the length of the "LYA1" chunk is variable.

I looked for an "official" standard for special fractal chunks, but I
didn't found.  If there is a special chunk and you have further
information about it, please send it to me.
```

1.78 Mandelmania/Technical Information/Precision

```
                There are 3 different precisions in Mandelmania:
                 16-, 32-bit integer
                 and

                 FPU
                .  For calculating FPU, you need a mc68881, mc68882, mc68040 or  ↩
                   higher,
of course.
```

1.79 Mandelmania/Technical Information/Precision/Integer

```
                In integer mode, internal coordinate calculation are made 64-bit  ↩
                   wide (to
avoid some problems, for example instability of animations near the
precision limit).  The fractal calculation is done either in 16-bit or
32-bit.

Mandelmania switches automatically between 16- and 32-bit precision.
But it can be also forced to calculate either low- or high-precision
```

by choosing
Precision
from the menus.

1.80 Mandelmania/Technical Information/Precision/FPU

All FPU numbers are extended real numbers (64-bit mantissa, 15-bit exponent).
If the numbers are converted to or from ascii (e.g. 'Enter range', 'Append',
'Interpolate') only double real numbers are used (C-restriction).

If your calculation mode is 68020 (integer), Mandelmania switches to FPU
mode, if higher precision is necessary and FPU available (and switches
back to 68020 mode if not necessairy any more).

It is different if you select FPU mode explicitly. Then you will always
stay in FPU mode. That's why the 68020-subitem is still checked, if
Mandelmania switched to FPU mode automatically.

Maximal precision is reached when the difference between two neighbourpixels
is 5E-19.

1.81 Mandelmania/Credits

Special thanks to Christian Schneider, Andreas Baumgartner, Leo Zimmermann,
Thomas Meyer and Stephan Babotai for beta testing.
Thanks also to all the people sending me bug reports, suggestions etc.