FlashMandel

Dino Papararo Alvino

COLLABORATORS

	TITLE : FlashMandel		
ACTION	*NAME*	*DATE*	*SIGNATURE*
WRITTEN BY	Dino Papararo Alvino	April 13, 2022	

REVISION HISTORY

NUMBER	DATE	DESCRIPTION	NAME

Contents

Chapter 1

FlashMandel

1.1 FlashMandel Guide

FlashMandel 1.5 Copyright 1996-1999 Dino Papararo

A new program for Mandelbrot's set .

Installation How to install

Requirements Minimun requirements

YAFG Yet Another Fractal Generator

Interface Program's interface

Features Major features

History History and old versions

Future To do...

Author Yes I'm...

Greetings ... Hi everybody !

Copyright Necessary informations

PowerPC version should be released by Steffen Haeuser, but date isn't fixed because he's very busy due to other PPC porting too.

If you are a programmer and interested for a recompile to support PPC please contact me .

1.2 Installation

To install the program, simply move the drawer "FlashMandel" into desired directory.

However FlashMandel does not need assignments, changes to user-startup or not standard libraries.

I suggest you to rename the closest to your configuration version in "FlashMandel" and cancel other binaries.

1.3 Mandelbrot's informations

Benoit Mandelbrot is the fractal's inventor. In 1975 he coined this word to refer to auto-similar and fragmented forms, characteristics common to all fractals.

Mandelbrot's set is a fractal generated by mathematic formula $Z = Z^2+C$.

This function is iterated many times into complex field (you get a complex number initially equal to zero, square it and add a costant, then you restart procedure); "many times" correspond to the "iterations" that you can set in many fractal's programs.

The result of this iteration can converge to a number or go to infinite. In the case that it goes to infinite, we assign a corresponding color to the speed of the divergence in the complex field.

This is the Mandelbrot's puppet.

1.4   System's requirements

FlashMandel does not need a lot of resources.

It works on any Amiga with at least 512 KB, with any processor, from 68000 to 68060 and any chip-set .

From version 0.870 to latest, is needed at least Kickstart 3.0.

If there are Graphic's boards , they are supported by Screen Database and ToolTypes.

However I suggest you to get at least 6 MB ram, OS 3.1, 68030/68882 50 MHz, and a graphic board.

1.5   Yet Another Fractal Generator

Why another fractal's generator

For joke, (this is the first binding program by author), but also because does not exist something like it which is full based on Amiga OS and doesn't make, to gain more speed, dirty tricks.

At this time the binary is less than 70 KB, while other programs are much more; moreover the others do not manage well RTG, Overscan, Multitasking or they writes directly into Chip ram or somewhere...

Obviously there can be BUGs !

For the features read the node Features .

1.6   Program's interface

FlashMandel is system friendly, and it respects the Style Guide, so all gadgets, menus and requesters are easy.

These are the supported ToolTypes:

SCREENWIDTH : initial screen's width between 640 and 16368 pixel (default=640).

SCREENHEIGHT: initial screen's height between 480 and 16384 pixel (default=480).

SCREENPLANES: initial screen's depth between 3 and 8 bitplanes (default=8).

SCREENMODE : initial hexadecimal display mode OCS,ECS,AGA,RTG (default=40d20001 CGX 640x480x8).

REALMIN : initial left real limit between -8 and +8 (default=-2.2).

REALMAX : initial right real limit between -8 and +8 (default=+0.8).

IMAGMIN : initial bottom imag limit between -8 and +8 (default=-1.125).

IMAGMAX : initial top imag limit between -8 and +8 (default=+1.125).

FONTNAME : initial screen font (default=courier.font).

FONTSIZE : initial font size (default=13).

STARTPRI : initial program priority (default=-3).

At the start, if you haven't modified ToolTypes, Mandelbrot's set is rendered between (-2.2,-1.125i) and (+0.8,+1.125i) limits, with a 640 x 480 for MC 68000-30 and 1024 x 768 for MC 68040-60 screen at maximun colors supported (256 for AGA/RTG , 16 with ECS/OCS).

At the end, the about requester will be displayed.

On the screen's title bar there are the following parameters:

Real current coord for real axis.

Imag current coord for imag axis.

These two parameters will continually change moving the mouse pointer.

W:H is the ratio between screen's dimensions.

R:I is the ratio between fractal's dimensions.

For a real representation these two parameters MUST be equal !

If not, is NECESSARY to go into the Coordinates Requester ShortCut Amiga C and select the Ratio button, then recalculate the picture with the new values.

There are four menus, with shortcuts obviously:

Project

Options

Calculate

Video

Holding down the left mouse button over fractal's picture, will appear a rectangle corresponding to the new coords for a Zoom or Preview.

Meantime rendering, with the Tab key you can jump current rectangle ; hitting the Esc key or using the Stop ShortCut Amiga X, you'll stop the rendering.

1.7 Menu Project

There are seven choices, About, Load Picture, Save Picture, Load Palette, Save Palette, Print e Quit.

About it's the same requester which appears at the start, it gives you infos about Author and his workgroup.

Shortcut: Amiga A

Load Picture loads a previously saved IFF picture, setting parameters automatically like those at the save time.

Shortcut: Amiga L

Save Picture saves current picture in IFF format, with a special Chunk where to store fractal's coords and other parameters (iterations, mapping, etc...). Clicking such icon from Workbench, the picture will be shown by MultiView, which must be into the Path. Be careful to not overwrite an existing file because there is not a verify function.

Shortcut: Amiga S

Load Palette loads an IFF palette, from a single file or from any IFF picture: Be careful to colors, because FlashMandel uses them from highest, contrarily to other programs... in this case you can invert palette from Palette requester .

Shortcut: Amiga K

Save Palette saves current palette in IFF format, useful for any graphic application.

Shortcut: Amiga J

Print performs a hard copy of the screen, it will print screen just like it is (settings are based on system preferences), the title bar, if it's present, is not printed.

Shortcut: Amiga D

Quit closes the program.

Shortcut: Amiga Q

1.8 Menu Options

There are six choices: Title, Limits, Iterations, Priority, Color mapping, Precision.

Title is a submenu which has a boolean flag that means if to show or not the title bar (Shortcut: Amiga O); if the title bar is ghosted, you can zoom even in the higher part of the screen, but holding down the right mouse button the menu will always be there.

This submenu has also the Last time (Shortcut: Amiga T) choice, which shows on the title bar the elapsed time for the last rendering and the speed in Pixels per Seconds, obviously if during rendering you stop it, time and speed will be inesacts.

It's useful to notice that the speed rendering is not proportional to the screen dimensions, for its rendering method, the so-called 'Divide et Impera'.

With other programs, rendering in 800x600 needs four times than one in 400x300, while instead with FlashMandel you have always to reduce it.

Limits shows a window with some numeric gadgets and permit to insert by hand new values for coords.

Four Button Gadget Accept Ratio Reset Cancel are left to accept and apply changes, adjust coord's aspect ratio to the screen dimensions, to come back to the original values and to close the window without any change.

The Other button, instead, holds only one of two complex dimensions for a successful next ratio adjustment; default is fractal's real coords.

Shortcut: Amiga C

Iteration is a submenu where to set iterations , with preset values or a numeric requester. You are warned about color mapping set, best iterations number MUST be greater than screen's colors otherwise you'll not be able to use all colors. This parameter interferes a lot with the final result and the rendering time !

Max iterations are equal to 2^15 -> 32768.

Shortcut: Amiga I to store a not preset iteration number.

Priority is a submenu for task priority. Choices are between -5 and +5 to not interfere with normal OS activity.

Shortcut: Amiga <n> to set the priority at +<n>, where <n> is a numeric value between 0 and 5.

Amiga Shift <n> to set the priority at -<n>, where <n> is a numeric value between 0 and 5.

NOTE: for negative priorities keys are, in sequence from -1 to -5, <!> <"> <#> <$> <%>

Color mapping is a submenu to set the color mapping .

Repeated After the highest, the next color will'be the lowest and so on.

Spread Colors are never repeated, but choosen linearly between minimum and maximun iteration.

Precision to choose the Calculating mode between Integer and IEEE: the first is really fast, but has less precision, the second uses the normal library's functions and/or the numeric coprocessor.

1.9 Menu Calculate

There are five choices: Preview, ReCalculate, UnDo, Zoom, Stop.

Preview opens a window four times smaller than screen for a faster rendering.

Shortcut: Amiga W

ReCalculate rewrites fractal with a new set of parameters.

Shortcut: Amiga R

UnDo comes back to the previous coords.

Shortcut: Amiga U

Zoom renders fractal within the new rectangle coords.

Shortcut: Amiga Z

Stop stops rendering.

Shortcut: Amiga X, same result holding down ESC key.

1.10 Menu Video

There are four choices: Cycle, Palette, Screen mode, Font settings.

Cycle is a submenu with three options:

Forward starts the color cycling forward (Shortcut: Amiga >).

Backward starts the color cycling backward (Shortcut: Amiga <).

Delay sets delay between color cycling (0..100) (Shortcut: Amiga -).

Palette Opens Palette requester to manage colors.

Screen mode to select new screen resolutions.

Font settings to change screen's fonts, useful for higher resolutions. Gui will change automatically with new fonts. Maximun font size is 24 pixel and are supported proportional fonts.

1.11 Boolean Flag

A boolean flag has two states, on/off, zero/one; in this case shows or not the screen title.

1.12 Button Gadget

Un Button Gadget is a Gadget (interface selectable element) which can be pressed to execute any function.

(I didn't believe there were people who don't know it...)

1.13 Palette Requester

Palette Requester is a window where to modify, copy, spread, etc. the colors.

This window has many gadgets. The first is a rectangle with all modifiable colors, selecting one you can modify every cromatic component. Colors are ordered from left to right and from up to down; first color is in the top-left corner, last instead is in the bottom-right corner. First 4 colors should be unchanged, because are used for the interface look, however you can change them, but pay attention... you are warned!

Copy gadget copies the selected color into another. Select color to copy and press the Copy gadget, than select destination position and click on gadget Paste.

Paste gadget clones in current position the previously copied color.

Spread gadget merges colors between current color and next selected.

Invert gadget invert the palette. Is useful to test high palette's pens without zooming in and to import palettes of other Mandelbrot's pictures. FlashMandel for speed reasons uses colors in a different manner from other programs, the pen 255 is the first to be used, the pen 254 the second and so on...

UnDo gadget can delete only last operation.

The three scroller gadgets modify color's components red (R), green (G) and blue (B) of current color.

I suggest you to modify the single color's components with the keys 'e'-'t' for red, 'f'-'h' for green, 'v'-'n' for blue. The keys are 'case sensitive' and if used with shift/caps lock you will add/sub 10 units.

Three gadgets Accept, Reset e Cancel downwards can accept the new changes, reset to original colors and reject any change.

Warning: in EXTRAHALFBRITE modes only firsts 32 colors are showed, others are ghosted and have same colors than firsts, only with half intensity.

1.14   Color Cycling

The Color Cycling is a special function to animate the picture, moving palette color sequence.

In a Color Bar with a sequence of colors, if we copy the first in the second and so on, we'll have an animation effect.

The Mandelbrot's set generated has next related property: for all near functions divergences are set same colors, therefore the palette rotation, in this case, generate a special effect.

1.15   Color Mapping

There are two types of Color Mapping.

Spread is the default giving all fractal's points a specified color not assigned later.

Repeated is a function to assign for every iteration number a specified color of palette. If the colors are all assigned, then they will be repeated from the first and so on.

Is strongly recommended that the iterations be always higher than colors, otherwise you will have a cromatic loss.

1.16   Program features

Flashmandel is system friendly, with full respect of OS and Multitasking, uses only standard library functions, and SHOULD not be Enforcer or Mungwall Hit.

It has been tested with an Amiga 1200 standard + Omega 1200, Amiga 4000 + 060/PPC60 + CV64 + kick 3.1, Amiga 2000 + GVP G-Force 030/882 + CV643D + kick 3.1, and Amiga 3000 + PicassoIV.

Uses every screen mode of Screen Database, with support for all graphic boards.

Uses Fixed Point 32 bits math to improve performances on Amiga without FPU.

In FPU version rendering is speeded up with a direct access to the FPU registers.

Uses the Divide et Impera recursively method to gain time for Mandelbrot's set rendering.

Uses ToolTypes.

Sources are spreaded to learn as example and to improve/continue developing program.

1.17   FlashMandel Future

I'd like to add at least the following features:

1) PowerPC support for REALTIME rendering ! (If you have one, call me...)

2) Locale.library support for menus and errors.

Please send me any comment, suggest, bug, by normal mail or E-Mail DinoP@IName.Com.

1.18 FlashMandel History

FlashMandel 1.5

Fixed bug in Palette requester after palette inversion and picked a color.

Icon tooltypes changes with Picasso96 screenmodes compatible.

040/060 version now opens a screen in 800x600 no more in 1024x768.

Added overwrite control on save.

Added other example palettes.

Optimized integer rendering routine for pipelines 040+.

FlashMandel 1.4

Fixed palette bug when decreasing and later increasing screen depth, colors no more are lost.

Added fade effects between screen changes.

Added new ToolType STARTPRI.

Added new picture Fractal_6.iff.

Added new Palette_09.256 & Palette_09.32.

Reworked source to easy support PowerPC.

Small code fixes and improvements.

FlashMandel 1.3

Major SpeeeedUp improvements.

No more required mathieeedoubbas.library V39+ (never released by AI) for IEEE ver.

Fixed bug with fontnames longer than 10 chars.

Fixed bug in Palette requester using Undo as first operation.

Added pic Fractal5.iff and rewritten Palette_07 & Palette_08.

FlashMandel 1.2

Fixed Enforcer hit in palette requester.

Now gui is font sensitive.

Added new ToolTypes FONTNAME & FONTSIZE.

FlashMandel 1.1

Fixed bug in Palette requester with ExtraHalfBrite's screens.

Changed SCREENPLANES ToolType in SCREENDEPTH.

Restyled Limits Requester.

New icons for Standard & NewIcon mode.

Now source is STRICT ANSI compatible.

Small code fixes and improvements.

Deleted some pictures from archive to minimize space and Up/Download time.

FlashMandel 1.0

Added rendering speed in pixel/sec from menu Options->Title->Last Time.

Extended palette requester with new invert function and reworked color's control by keys.

Now will only appear screens between 16/256 colors, 3/8 bitplanes.

Gained a little speed in rendering.

Modified docs, now in english too.

Added new 256 colors Palette.

Added new 256 colors Picture.

Reworked startup code.

FlashMandel 0.870

Implemented ToolTypes.

Implemented Font requester.

Implemented Ratio button in Coordinates requester.

Changed start coords.

Changed title bar.

Fixed minimum screen resolution to 640x480.

Rewritten documentation.

Deleted installation's script.

Added 256 colors palettes and pictures.

Corrected some potential bugs on RTG systems.

FlashMandel 0.810

Corrected screen's depth bug.

Corrected bug in cycle function to manage the EHB.

Added controls by keys for R,G,B components of palette requester.

Added 256 colors palettes and reduced 32 colors palettes.

Added pictures.

Small code changes.

Recompiled with SAS C 6.58.

Updated docs.

Installation's script reworked.

FlashMandel 0.700

Added Load and Save for pics and palettes.

Recoded screen opening..

Many little bugs corrected.

FlashMandel 0.100

Added Color's cycle .

Added Palette Requester .

Deleted functions for a particular CPU and made dedicated versions for All processors .

Reworked rendering method for continous probability to avoid recalculating the same points.

Added color's mapping .

Added installation's script .

Corrected bugs for binaries and docs.

FlashMandel 0.099

First released version.

1.19   How reach the author

Postal address (if you have a lot of patience):

Dino Papararo

Via Manzoni 184

80123 Napoli

Italy

E-Mail address:

DinoP@IName.Com

Coder of FlashMandel.

1.20   Precious cooperator

E-Mail address:

E-Mail: PucciC@Cli.Di.UniPi.It

Has written the first docs version in AmigaGuide, old and not more included installation's script and has worked in first beta testing and in small code routine (eg. color cycling).

1.21   For informations about Fixed Point math

Lelio della Pietra

Has explained the Fixed Point base operations like mul,add...

1.22   Great Beta Tester

Sergio Tassi

Has heavily tested the program on a A-1200 NF, has created palettes and GUI look.

1.23   For the RTG debug

Giuseppe Staffelli

Has tested the early versions under CyberGraphix.

1.24   For docs supervision

Paolo Alvino

Has corrected both italian and english Amigaguide docs and tested program with his A-3000 + Picasso IV.

1.25 Author another fractal generator program

Robert Brandner

Austria

Has written another fractal generator program FFEX, FlashMandel can be considered as the continuation of it. FFEX was written in Modula II in 1991.

Obviously FlashMandel is the evolution of the original project, which today is to consider completely obsolete and bad coded... (Dino Papararo)

1.26 Mandel-92 authors

Tobias Ferber and Martin Giese

Have written a Mandelbrot's set exploration program Mandel-92 with a Fixed Point assembly 68000 function of type 4+28, from which the author has developed a personal calculating routine more efficient.

1.27 FlashMandel workgroup

Author greets these people to have helped him during the project development:

Lelio della Pietra for Fixed Point explanations.

Claudio Pucci for early versions debugging, for first docs in AmigaGuide, old installation script not more supported and the little cpu-time method for color cycling.

Sergio Tassi for beta testing, palettes and gui-look.

Giuseppe Staffelli for RTG debug under CyberGraphicX.

Paolo Alvino for the rielaboration of this document.

Robert Brandner for an old Mandelbrot's set exploration program FFEX from which FlashMandel has developed.

Tobias Ferber e Martin Giese for the main Fixed Point assembly function from which the author has developed his own routine.

Last but not least following people have contibuted with criticisms and hints to debug and improve costantly of FlashMandel:

Vincenzo Iodice,Guillaume Ubbelohde,Jen Allen,Illya Rudkyn,Jarle Thorsen,Francis Labrie,

Carol Meilicke,Steffen Haeuser,Staffan Lindberg,Giorgio Signori,Thomas Lorenz.

TNX ! TNX ! TNX ! TNX ! TNX ! TNX ! TNX ! TNX ! TNX ! TNX ! TNX ! TNX ! TNX ! TNX ! TNX ! TNX ! TNX ! TNX !

1.28 CopyRight infos

FlashMandel is GiftWare, send anything to Author , if you like it.

USE FlashMandel AT YOUR OWN RISK, THERE IS NO WARRANTY OF FUNCTIONING. AUTHOR DOES NOT ASSUME ANY RESPONSABILITY.

The whole archive of FlashMandel or a part of it can't be used for money, anyway it is freely distributable in Public Domain, ShareWare or GiftWare software collections, on condition that they be under 30 US $ fee. Fred Fish, Aminet, AmyResource and EARCD are free to include this program in their collections.

1.29   Supported processors

Every Motorola® 68000 family processor is supported.

In this archive are released the versions for 68000, (68020+68881)+ and 68040+; you can simply delete the unnecessary versions and rename the suitable one for your system in "FlashMandel".

Are not released versions compiled for 68010, 68020, 68030+68881/2 and 68040 because there's not a remarkable improvement compared with the released versions.

040+ version is really compiled to generate code for 68060, compatible 100% with 68040.

1.30   I chipset supportati

Are supported all the original Amiga OCS, ECS e AGA chipsets. The program adapts himself to yours, allowing a maximum of 64 colors (in ExtraHalfBrite) on OCS and ECS, and screens up to 256 colors on AGA.

If you have a graphic board which adds owner screens to the Screen Database, the program will use them in any resolution (anyway with a 256 colors limitation, for the present).

1.31   Differences between Fixed Point Math and IEEE

FlashMandel uses two different kind of calculation which have their respective advantages and disadvantages:

Fixed Point is a mathematics dividing the integer part of a number from the decimal one always in the same number of bits (in this case 1 bit for the sign, 3 bits for the integer and 28 bits for the fixed comma). The employed functions use a 32 bits precision (a LongWord) and are very fast, but they have the disadvantage of losing precision in the decimal part quickly (they are indeed more precise than "1 / 2 ^ 27", due to the errors in the approximations). The Fixed Point function is an evolution of Mandel-92 one, a fractal calculation program written by Tobias Ferber and Martin Giese , strongly optimized by author .

Having only three bit of precision for the integers, which can represent numbers between -8 and +8, it's not possible to draw the fractal beyond this numerical interval.

IEEE is the standard mathematics used by the huge majority of the processors, it is slow because uses the mobile comma, but it has more precision; if it's present, the mathematic coprocessor is utilized, besides with the purposely compiled versions, also with the IEEE system library which automatically recognizes it.

1.32   Continuità Probabilistica

FlashMandel utilizes the properties of Mandelbrot's set known as Probabilistic Continuity that is to say:

Given a rectangle on the complex plane containing Mandelbrot's set , if all the points on the rectangle outline have the same escape speed, in that case is "very probable" that the inner area has the same escape speed too.

The program traces the borders of the rectangle to draw and, if they have the same color, fills the area with this one, otherwise it divides the rectangle in two parts and starts again on the two drawn rectangles repeatedly, with a strategy called divide et impera.

An explanation of the word probabilistic is given if you let the program trace the complex plane area with the coordinates (-8,-8i) (8,8i), which it fills with a uniform color: it's not a program bug, it made only a probability error...