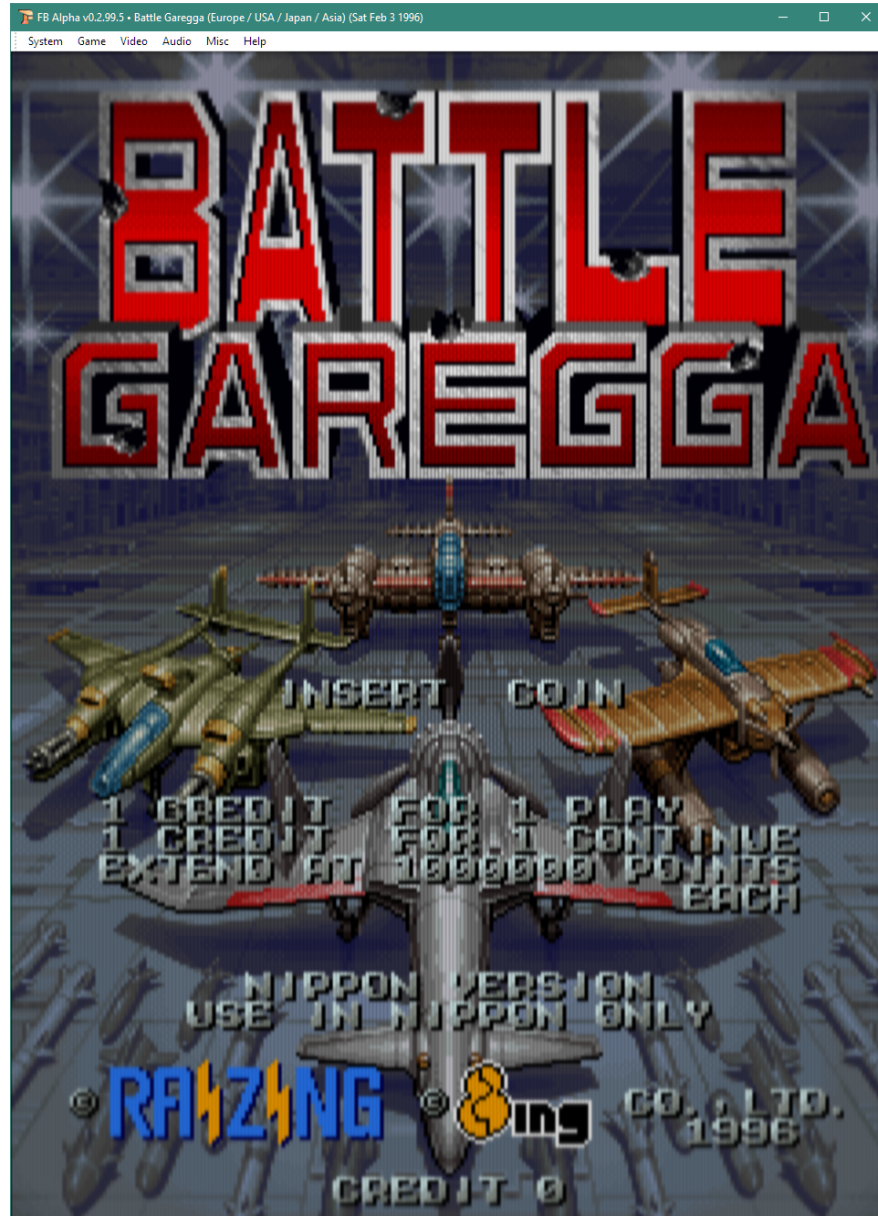# FB Alpha

jan_klaassen's mega super double extra special version

Preliminary documentation

This documentation is preliminary and incomplete. With each test release, sections may be updated, expanded, or added.

Conventions

This documentation is written with the default keyboard shortcuts and user interface language in mind, so read through it and familiarise yourself with the concepts before customising FB Alpha's user interface.

Whenever text is *formatted like this*, it is a literal that either appears in FB Alpha's user interface, or that you can type. Sub-menus or options are separated with a » glyph, so that the option to show this documentation is shown as *Help » View documentation*.

Information that is not essential, but may add useful context or details is shown like this.

Emulation

The games you can load into FB Alpha weren't created to run on a PC. They were created to run on dedicated systems hidden inside arcade cabinets, or for games consoles or home computers that you could plug into a TV.

FB Alpha emulates the behaviour of these systems from the viewpoint of the software that was designed to run on them. The software was burned onto memory chips (or sometimes written to magnetic tape or floppy disks), and it, along with graphics and sound data has been extracted, allowing you to load them into FB Alpha. Given their origin, of these files are usually to as ROMs.

Selecting options and navigating through the application

FB Alpha's user interfaces uses standard Windows controls and conventions, so it should feel familiar to anyone who has used Windows. The escape key is special: it can always be used to back out of a dialog box and cancel any changes. The escape key can also be used to back out of fullscreen mode or active menus, and you cannot assign it to any other function.

Keyboard navigation

All dialogs and menus can be accessed with just the keyboard. Use the Left-Alt key to access the main menu, use the cursor keys to move between menus or items, and enter to select the item. When a dialog box is displayed, the main menu is unavailable. Use tab and shift+tab to switch between the controls in the dialog boxes, and use the menu key to access any right-click context menus. *Cancel* or pressing escape exits the dialog without accepting changes while *OK* or pressing enter confirms the changes.

Menu shortcuts

You can configure shortcuts for the menu command to your liking. To do so, select *Misc » Edit keyboard shortcuts*. All options except *Quit/Alt+F4* are configurable. Simply double-click the item to change the shortcut keys.

If you call up this dialog while a game is running, an additional option becomes available: in addition to the shortcuts keys, you can bind buttons (or other controls) on your game controller. These are referred to as aliases and assigning them works much like assigning a shortcut (double-click a command, below the alias header), except that you cannot use button or key combinations, not even with Shift, Alt or Ctrl. You can cancel assignment of a shortcut or alias by pressing the escape key.

The *Edit keyboard shortcuts* dialog box normally only shows the options that already have a keyboard shortcut assigned to them. So how do you assign a shortcut to an option that doesn't yet have one? Uncheck *Hide commands without shortcuts* to show all available options.

Pausing

The emulation does not stop when you use the menu or when a dialog box is displayed, except for in some special cases such as when starting a new input recording. If you don't like this behaviour, enable *Misc » Advanced settings » Auto pause*. This will temporarily pause the emulation whenever a menu or dialog becomes active, or when FB Alpha's main window becomes inactive.

You can also pause the emulation whenever you want to. Select *System » Pause game*, by default mapped to the pause key, to do so.

Finding and loading games

You can load a game in FB Alpha by selecting *System » Load game*. When you do so, a dialog will appear in which you can select the game you want to load. Before you can load a game however, you need to tell FB Alpha where to find the games. To do so, click the *Directories* button. You can set the directories that FB Alpha searches for the games in the dialog, as well as the location of various support files. In this version of FB Alpha, the ROM directories are searched recursively. Whenever you add or remove games, need to tell FB Alpha to update its list of available games. To do so, click the *Enumerate* button.

By right-clicking on a game's title in the game list, you can access a context menu with more functions and information.

Preview images

FB Alpha will display a preview image of the game if one is present. The images are scaled and displayed at the correct aspect ratio, so a few may appear smaller than others. You can double-click the image image to enlarge it (this option is also in the game list's context menu). See Preview images, below for more information.

Selecting a game

You select the game from the list of available games. To the left of the game list, below the preview image, are some controls to filter the game list. Starting at the bottom, there are some check-boxes that control global filters. Above that, radio buttons that control the sorting order. Above that, combo boxes that control more specific filtering and allow for searching. For each of the combo boxes, you can either click them and select a value from the drop-down list, or type a search text. The values you can select are presets (the text you see is a label, not the actual search pattern).

Neo Geo MVS is special. It is cartridge based system, and depending on the exact hardware, a cabinet could hold up to 6 cartridges. So, when you select *Neo Geo MVS system* from the game list, you get a new dialog that allows you to select up to 6 games. When the emulation is started, a toolbar appears to the right of the main menu. That's where the external credit counter and the marquee that shows the active game a Neo Geo cabinet appear (the marquee is emulated using the preview images for each of the games).

Navigating the game list

When the *Load game* dialog box appears, it will highlight the game that was selected previously. You can navigate through the list using the scrollbar or with the keyboard, using the cursor keys, the page down/up keys, or the home/end keys. You can also also press any letter key to jump to the first game whose title starts with that letter.

The symbols that may be displayed left of the game's name have the following meanings:

★ This game is a favourite.
☆ This game has a clone that is a favourite.
❌ One or more essential ROMs are missing. This game is unavailable.
⊗ One or more none-essential ROMs are missing. This game is available, but may not work if you change some of its settings.
⊗ If this symbol appears in black, this game isn't emulated properly. It will not run.
🏷 This game has one or more tags.

Favourites

You can also mark any game as a favourite. Favourites are always at the top of the game list, but beware that they are subject to filtering (see below) just as other games are. You can mark a game as a favourite by right-clicking the game's title in the game list, and selecting the *Make favourite* option.

Searching and filtering the game list

Searching the game list

The full game list can be quite large, however. When you want to focus on a particular group of games, there are the options to the left of the game list mentioned above.

The top combo box filters by hardware platform. the middle one by publisher, and the bottom one by the game name (short as well as full) and the comments. You can use all three combo boxes in combination, however the presets from the bottom combo box will reset both others to their defaults.

The search text, in any of the combo boxes, is not case-sensitive and does not have to match the beginning of the name— searching for *Contra* will find both *Contra* and *Super Contra*. Behind the scenes, FB Alpha uses regular expressions[1] to perform the filtering. That means you can use *19(4[1234]|xx)* as the search text to find all games in the 1942 series.

Filtering the game list by tags or genre

Below the sorting options is a combo box for the tag search. As with the global filters, you can select a value from the drop-down list. Here, the list contains the most frequently used tags. The tag search can search for multiple tags in two modes:

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1   See *https://en.wikipedia.org/wiki/Regular_expression* for background, and *https://www.regular-expressions.info/tutorial.html* for more practical information.

1.   Any one tag can match: separate tags in the search drop-down with a space.

2.   All tags must match: separate tags in the search drop-down with a plus sign.

You can assign a genre or a tag to a game by right-clicking the game's title in the game list. The menu has *Assign tag* and *Assign genre* options.

Savestates & input recordings

You can save your progress in a game at any time you wish. Since this is not built into the games themselves, FB Alpha saves the complete state of the emulated machine: the contents of its memory, the exact state of its hardware, inputs, outputs, everything. You can load such a savestate later and continue as if no time has passed at all—because, to the emulated game, it hasn't.

You can also record and play back your joystick movements, button presses, etc. FB Alpha can play back these input recordings as if you were playing the game, and because there is literally nothing else that can change from the emulated game's point of view, the gameplay will enfold exactly as it did when you recorded it. You can combine input recordings with savestates as well, to start playback or recording at any point you wish.

You can't load savestates or input recordings created with earlier versions of FB Alpha directly into this version, but if you select one FB Alpha can convert it for you. When that happens, a new version replaces the old one. The old file is backed up in the *backup* directory inside your FB Alpha directory.

Whenever you overwrite an existing savestate or input recording, a backup is created there as well.

Savestates

To create a savestate, select *System » Save state*. You can change the file name of your savestate in the dialog that appears, as well as enter your name and a comment, if you want to.

When you load a savestate, the game it was made with is automatically loaded before the savestate is applied. To load a savestate, select *System » Load state*. You can select a savestate from the *File* drop-down. To load a savestate that is located elsewhere on you hard-drive, select *Browse*. Once you have selected a savestate, some information about it is shown in the dialog. There are also some options that apply when you have selected an input recording that has a savestate embedded within it.

Savestate slots

When you don't wish to be interrupted by a dialog box each time you create a savestate, you can use the state slot options, from the *System » State slots* sub-menu. These options operate on eight savestate 'slots' for each game. All of these commands have keyboard shortcuts and require no additional input. Use these when you are playing a game and want to avoid being sent back, or having to re-play a difficult stretch of the game. These savestates also load faster than regular savesates do.

Each slot holds a single savestate. You can overwrite it with the *System » State slots » Save state to active slot* option, and load it with the *System » State slots » Load state from active slot* option. You can also restore the slot to the previously saved savestate with the *System » State slots » Restore active slot* option, but take into account this cannot be undone and that there is no backup (you are in effect restoring a backup. Lastly there are options to switch to the next or previous slot.

Input recordings

To create an input recording, select *System » Record input*. You can change the file name of your input recording in the dialog that appears, as well as enter your name and a comment, if you want to.

You can start an input recording when no game is running. If you do that, the input recording is started right when the emulated machine starts. You can also start an input recording when a game is already running. In that case, FB Alpha will embed a savestate into the input recording and whenever it is played back, this embedded savestate is loaded first as the starting point.

When you load an input recording, the game it was made with is automatically loaded and any embedded savestates are applied before playback starts. To load an input recording, select *System » Replay input*. You can select an input recording from the *File* drop-down. To load an input recording that is located elsewhere on you hard-drive, select *Browse*. Once you have selected an input recording, some information about it is shown in the dialog.

When playing back an input recording, you can take control at any time and play the game from then on Select *System » Stop playback / recording* to do so. You can also switch straight back to record mode to re-record your control move-ments, overwriting what was in the recording from that point onwards. Select *System » Switch to record mode* to do so.

Creating savestates when recording or playing back input

When you create a savestate while you are also creating or playing back an input recording, it will contain some extra information that will allow you to start playback of the input recording, or re-record it, from the point where the savestate was created. When you re-record am input recording using such a savestate, that original input recording is overwritten, so be careful.

Display settings

Display properties

When FB Alpha is launched for the first time, it will auto-detect some display properties. With that and the default settings, you should not have to adjust any settings for your displays—systems with multiple displays are fully supported. In fullscreen mode, multiple displays are supported only when using the *Advanced* blitter.

There are some situations that do still require manually changing some settings:

1. You have multiple displays connected to your computer, and want to select which displays are used for full screen mode. You can select which displays are used with the *Video » Select full screen display* option. You can also select which audio output should be used in case the display has sound (e.g. a TV). Then, whenever that display is used, so is the audio output you selected with it.

2. You are using an older CRT display. You should manually set the display's aspect ratio, and select the display mode for full screen display. Note that you can only select the display mode when a game is running, that hori-zontally and vertically oriented games have separate display mode settings, and that the display modes listed in the dialog box will reflect the displays selected in the *Select fullscreen display* dialog.

To change the aspect ratio setting for your displays, use the *Video » Monitor Settings* sub-menu. As noted above, this is auto-detected and, for LCD displays, should be on the *Fixed resolution / Square pixels* setting. In case you have selected

an aspect ratio manually, use the *Video » Advanced Settings » Fullscreen resolution for CRT* sub-menu to select the display mode you wish to use. There is only a single aspect ratio setting that applies to all displays.

Gamma correction

The *Advanced* blitter uses your displays' gamma values. Use The *Video » Monitor properties » Set display gamma* option. If the checkbox at the top is checked, FB Alpha will will use the gamma value from whichever display profile you select. If you override that, the top slider should be set to your display's gamma. The small slider below it indicates how bright the area around the display is. It is normally at the centre position, which indicates a dimmed environment, but can be moved left to compensate for a brighter environment or right for a darker one. There is only a single gamma setting that applies to all displays.

Colour correction

The *Advanced* blitter can use your displays' colour information to display accurate colours. Use The *Video » Monitor properties » Display profile* sub-menu to select your display's colour profile. There is only a single setting that applies to all displays, however the *From profile* or *From EDID* options will automatically use the information from whichever display FB Alpha is using, at any time: the *From EDID* option gets the information from the display itself, while the *From profile* option reads the colour profile that is attached to the display. The profile that describes the displays used by the games is selected from the Game *» Colour profile* sub-menu (this is referred to as the *source profile*). The *Assume dim environment* setting tells FB Alpha to assume that the assumption of a dim viewing environment is encoded in the source gamma, as is specified in the analogue TV standards. This setting works in concert with the settings in the *Video » Monitor properties » Set display gamma* dialog.

Only ICC display profiles are supported. See https://www.windowscentral.com/how-configure-correct-color-profile-your-monitor-windows-10 for some more practical information, and http://color.org/ for technical information.

Video blitter selection

You should use the *Advanced (DirectX Graphics 9)* blitter. Use the *Enhanced (Direct3D 7)* blitter only if the advanced blitter doesn't work well on your system, or you specifically want the effects it can do that the advanced blitter can't. Use the *Legacy SoftFX (DirectDraw 7)* blitter only as a last resort, in case neither of the other blitters work.

The reason for preferring the *Advanced* blitter is not because of its scaling effects, nice though they are. It's because the underlying Windows technologies that the other blitters use are outdated and recent drivers have stopped offering full support for them, and/or they are not available for 64-bit applications.

Video blitter options & scanlines for the *Advanced* blitter

There are several filtering options for enlarging the image. The first two, a *point filter* and a *linear filter*, are there mainly for compatibility reasons, and should not be your first choice. The remaining options are discussed in some detail below.

Colour adjustments

FB Alpha can adjust the colours of the games. Similarly to a CRT TV or monitor, it allows you to adjust the hue and saturation.

Gamma correction

In order to match the image to your displays and viewing environment, FB Alpha applies a gamma correction. The correction needed for your displays is normally detected automatically, but can be overridden (see Display properties, above).

Colour correction

In order to match the colours shown on your display to the colours shown on the actual hardware's monitor, FB Alpha can apply a colour correction (also see Display properties, above). The options are found in the *Video » Monitor properties » Colour correction* sub-menu.

There are three colour correction modes available:

- Absolute colour correction: show the colours exactly according to the selected source profile
- Maintain neutral grey tones: show the colours according to the selected source profile, but adjust grey tones so that they are neutral with the display's colour temperature
- Maintain colour temperature: do not adjust the colours except for the effect of the colour temperature

> These colour correction modes are usually referred to as *absolute colorimetric*, *relative colorimetric*, and *saturation*, respectively.

The cubic filter

The cubic filter gives you control over the amounts of blurring and sharpening artefacts that are an unavoidable side effect of scaling an image. FB Alpha's cubic filter is an efficient implementation, running on your GPU, of the work by Don Mitchell and Arun Netravali[1].

The *Video » Blitter options » Cubic filter quality* sub-menu has the available options for the cubic filter. At the top are some presets: the first preset, *Lightly filtered*, gives a clean look where you can still see the pixels that make up the image. The five presets below that give a more blurred or sharpened look, with the middle preset providing a balance between sharpening and blurring. The three options below the presets yield dialog boxes allowing finer control.

The cubic filter also allows you to scale the image to any size with few aliasing artefacts, even when scanlines are enabled. However, when the option is disabled FB Alpha can create better looking and more realistic scanlines. You can also use a variety of scaling effects with the cubic filter, even in combination with scanlines if you want. They are located in the *Video » Blitter options » SoftFX algorithm* sub-menu.

> Sharpening works especially well with scanlines enabled, but with them disabled the *Balanced* or *Lightly filtered* options tend to work best.

> There also some advanced settings to tailor the filter's algorithm to your GPU for the best performance. They are in the *Video » Blitter options » Adcanced settings* sub-menu. The bottom three options in that list cannot be selected; they show some settings that are automatically adjusted.

The CRT simulation

The CRT simulation simulates the electron beam sweeping across the screen in a cathode ray tube[2], as used by the monitors in arcade machines. Therefore, it always shows scanlines. The width (and intensity) of the scanlines depends

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1   *Mitchell, Don P.; Netravali, Arun N. (August 1988). <u>Reconstruction filters in computer-graphics</u> (PDF). <u>ACM SIGGRAPH International Conference on Computer Graphics and Interactive Techniques</u>. 22. pp. 221–228. <u>doi:10.1145/54852.378514</u>. ISBN 0-89791-275-6.*
2   See <u>https://en.wikipedia.org/wiki/Cathode_ray_tube</u>.

on how sharply the electron beam is focused. As in a CRT, the focus is not consistent across the entire display—it is sharpest in the centre. The settings are in the *Video » Blitter options » CRT simulation* sub-menu.

As with the cubic filter, the first options are presets. Below the presets is a *Custom settings* option that shows a dialog where you can adjust the corner and centre sharpness and beam shapes. Because LCD displays do not have high brightness and contrast, the effect is split into separate colour and brightness components. The brightness component is then blended in partially to make the image look good on an LCD screen. You can control this through the *Custom settings* option, using the bottom left slider in the dialog. Finally, there is a *contrast* control. This increases the brightness of bright colours a bit further and applies slight halo, giving the image greater contrast. Use the lower right slider to control it.

The CRT simulation cannot be used with the scaling effects in the *Video » Blitter options » SoftFX algorithm* sub-menu, but it can optionally scale the image to any size. Note that it is more prone to aliasing artefacts than the cubic filter + scanlines when used this way (higher resolutions give less artefacts).

The CRT simulation algorithm is optimised and sacrifices some authenticity for the sake of efficiency. Even so it still requires much more computing power from your GPU than does the cubic filter.

Fullscreen mode

When fullscreen mode is enabled, FB Alpha will switch to fullscreen mode whenever a game has been loaded successfully, and no dialog boxes are active. If you call up a dialog box while in fullscreen mode, it will temporarily switch to windowed mode.

Overlay

FB Alpha can display an overlay with some useful information. There are four options, which can be combined. You will will find them in the *Misc » Overlay* the sub-menu. Additionally, the size of the text and symbols used for the overlay can be changed; use the *Misc » Overlay » Set overlay size* option.

The first option, *Show mode indicators*, is enabled by default. It will show an icon when FB Alpha is paused, when playing over the internet, or when recording or playing back input. While playing back an input recording, it will also show a graph indicating how far along playback is. Each of the other three overlay components have alternate display options, which can be switched by holding Left-Alt while pressing the keyboard shortcut:

- *Show rendering speed:*   FPS only ⇔ emulation speed + FPS
- *Show frame counter:*   current frame ⇔ time
- *Show controls:*   controls for player 1 ⇔ controls for all players

The size of the overlay is the same for any game when using the *Advanced* and *Enhanced* blitters, depending on the display resolution. For the *Legacy SoftFX* blitter, it depends on the size of the underlying image instead. Usually, that means the text in the overlay will be larger when this blitter is selected.

Sound settings

In case your computer has more than one sound card, possibly including a TV or monitor, you can select which one to use. Select *Audio » Select sound playback device* to do so.

FB Alpha can also process the audio with DSP modules. You can Select a module to use in the *Audio » Select DSP module* to do so, and enable it by selecting *Audio » Enable DSP module*.

Bass enhancer

The bass enhancer is a simple module that boosts the bass. It has no controls.

VST hosting module

The VST hosting module can load external VST plugins. Although these plugins are usually created for professional audio processing applications, there are a variety of free plugins available that work with FB Alpha. For example, there are various equalisers that work well with FB Alpha.

By convention, VST plugins are all installed in the same directory. FB Alpha follows this convention. After you have installed one or more VST plugins and enabled the VST hosting module, select *Audio » DSP module options » Select plugin*. Click the *Browse* button on the dialog box, and select the directory where you installed the plugins. FB Alpha will enumerate the plugins, and after it has done so they will appear in the list. Select a plugon from the list to use it, and click *OK*.

In order to adjust the plugin's settings, select *Audio » DSP module options » Show plugin. Editor*. A window will appear with the plugin's user interface, allowing you to change its settings. These settings are automatically saved when you exit FB Alpha.

FB Alpha supports the 32bit VST2 plugin format only.

User interface translations

To do.

High scores

To do.

Game-specific configuration

Setting up controllers / mapping inputs

You can map the controls a game uses to your game controller by selecting the *Game » Map game inputs* menu item once you have loaded a game.

Creating input presets

You can create input presets to easily set the same inputs for multiple games. Simply configure the inputs the way you want, and click the 'save' button. A new preset will be created which will be then available from the preset drop-down box. In case you want to edit or change the preset, you can do so with a text editor. The presets located in config/presets, in your FB Alpha directory.

Setting up autofire

You can create autofire aliases for any button control (only 'fire' buttons, not start, reset, etc.) To do so, right-click a control, select *Create auto-fire alias* from the menu that appears, and assign a control. You can change the speed of the autofire by right-clicking on the auto-fire alias, since each one has its own speed. (The menu also contains an option to remove an alias.)

Display settings

Borders or unused screen edges

Some games (including most Neo Geo games) have some unused space at the edges of the screen. On the arcade machines, the monitor would be adjusted so that these edges would be off the screen. You can do the same in FB Alpha by selecting the *Game » Set visible area* menu option. There, you can set the number of pixels on the edges that should not be displayed (set this to 8 on the left and right for most Neo Geo games).

Colour profile

The colour profile that describes the displays used by the games is selected from the Game *» Colour profile* sub-menu (see Display properties, above).

Setting the emulated CPU speed

Some games suffer from slowdowns when a lot is happening on the screen. That's mostly because the CPU that powers the hardware the game is made for simply cannot do the calculations fast enough. Even though this the correct behaviour emulation-wise, FB Alpha allows you to 'overclock' the emulated CPU, giving it enough power to avoid any slowdown. To use this feature, select *Game » Adjust CPU speed* from the main menu.

ROM managers & dat files

FB Alpha can generate the dat files required by ROM managers. It uses Logiqx's generic XML-based format[1], which will work with most ROM managers. FB Alpha can export dat files for arcade games, related sets of consoles, or individual consoles. See the *Misc » Generate ROM management data* sub-menu for the available options.

Command line & front-ends

There is a basic command line interface; at the command prompt type *fba --help* to get a short overview of options. If you use Powershell instead of the regular command prompt, you may wish to use the included launcher. To do so, copy FB Alpha.com from the launcher directory to FB Alpha's main directory.

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1   There is no documentation beyond the XML DTD for this format. see *http://www.logiqx.com/Dats/datafile.dtd*.

When working with a front-end, first set up FB Alpha's video, etc. settings the way you want without using the front-end. Use the *--front-end* option for starting FB Alpha from within the front-end. This has the following effects:

- The splash screen is suppressed.
- Popup messages are suppressed; instead, the message is printed to stdout and, if it has encountered an error, FB Alpha exits.
- When no dialog box is active, the escape key exits FB Alpha.
- The main configuration file is not saved on exit.

File formats

This version of FB Alpha uses a new file format for savestates, input recordings, and other files. It will not directly load files saved from other, earlier versions. If you select an older savestate or input recording in the *Load state* or *Replay input* dialogs, you can convert the file to the new format (a backup is created first so the original file is never lost).

Configuration files are different from other FB Alpha versions; don't install this version in the same directory as another, or vice versa. Neo Geo memory card files are compatible however.
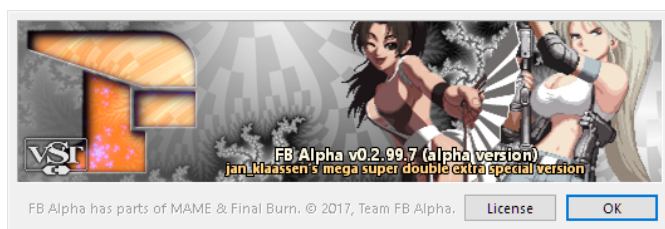
Appendices

Support files

Hiscore.dat

To do.

History.dat

To do.

Flyers

To do.

Preview images

To tell FB Alpha where to find the images to use, click the *Directories* button. FB Alpha will alternate between multiple images if they are present. You can double-click the image image to enlarge it (this option is also in the game list's context menu).

In order for FB Alpha to find the preview images, they must be png files and follow a specific naming convention; they should have the same name as the zip file containing a game's ROMs. If there are multiple images, they must have a sequence number in square brackets, so the 2nd preview image for *Art of Fighting 2* is named *aof2 [02].png*. You should use unprocessed screenshots, as the images are scaled to the correct size.

Translation templates

To do.

tag database

To do.