

EISFREI HERZOG ZWEI ROM EDITOR

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Requirements

Eisfrei runs on the Microsoft .NET Framework 1.1. If you have a newer version it *should* work but has not been specifically tested on it. If you have Windows XP or Vista then you likely have a compatible .NET Framework installed. If you need to install the .NET Framework it can be obtained from the Microsoft download center at:

<http://www.microsoft.com/downloads/details.aspx?familyid=262D25E3-F589-4842-8157-034D1E7CF3A3&displaylang=en>

It can also be installed through Windows Update.

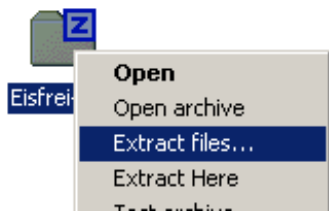
Eisfrei requires a copy of a Herzog Zwei binary ROM image. "**Herzog Zwei (UE) [!].bin**" as verified by GoodGen (<http://www.allgoodthings.us/>). Eisfrei has not been tested with any other ROM version.

Do not send requests for a copy of the ROM image.

For the record, I still own the Herzog Zwei cartridge I purchased over 15 years ago. I don't pretend to understand the legality of emulation and ROM images but I figure you should probably own a copy of the game if you're going play the ROM.

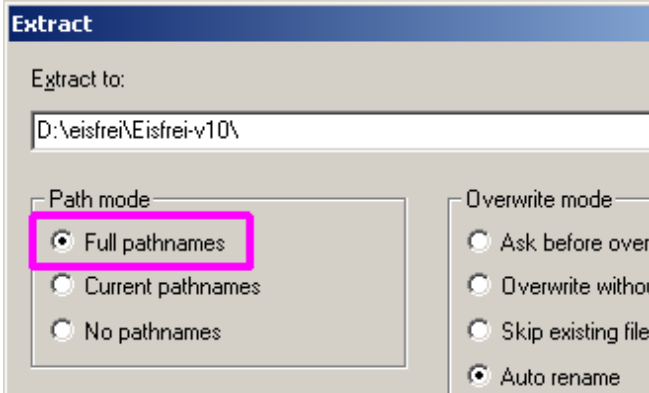
If Herzog Zwei is ever re-released for the Virtual Console (or another format) I would encourage you to purchase a legal copy, plus it would kick-\$&% if they ever released a version with a 2-player online mode.

Running

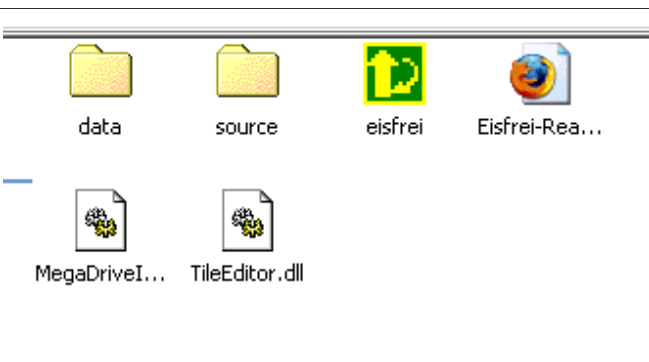


Eisfrei is packaged in a .zip file. Extract the .zip file.

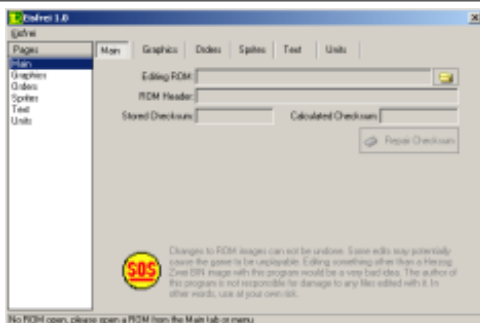
If you need a utility to extract .zip files, try 7-Zip (<http://www.7-zip.org/>) which is a free compression program.



Extract using full pathnames, this is usually the default setting.

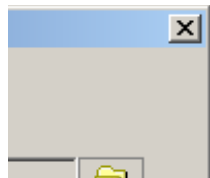


The extracted files should look remarkably like this. Double-click on eisfrei.exe to start Eisfrei.

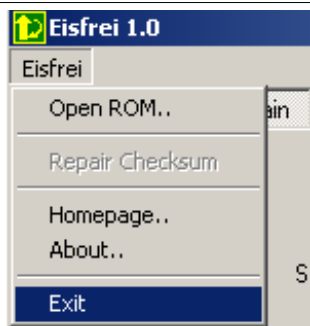


The main application window should load.

GUI Basics

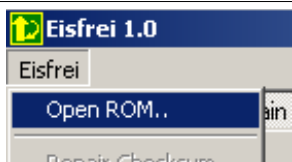


Eisfrei works like any other Windows application. You can move it around by clicking and dragging the title bar, close it by clicking the 'X' in the top corner, or minimize it with the line thingy. The Window can not be maximized or resized though.

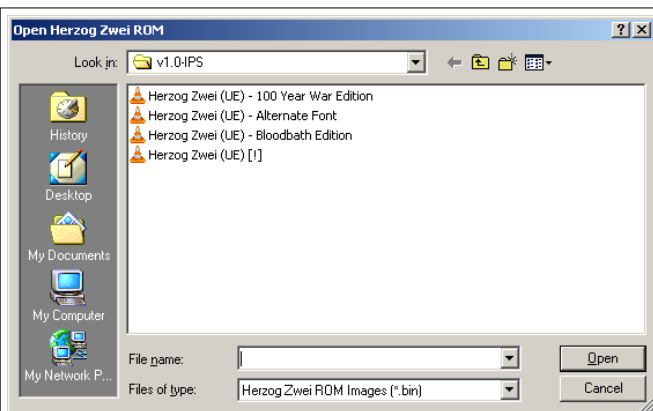
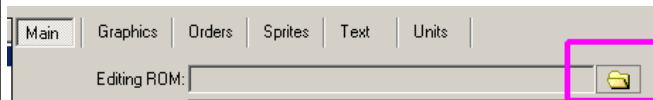


You can also exit from the menu by selecting **Eisfrei->Exit**.

From this menu you can also launch your default browser to the Eisfrei homepage by selecting **Eisfrei->Homepage...** The latest version of this document can be found there.

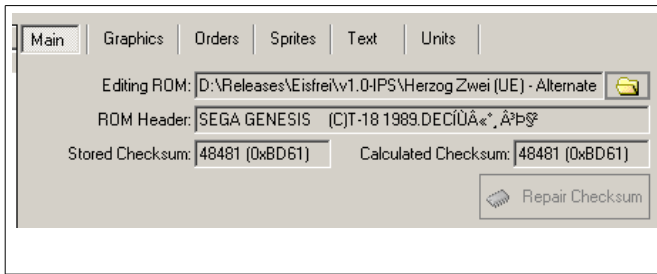


The first thing you'll want to do is open a ROM image. Select **Open ROM..** from the Eisfrei menu or click the folder icon on the **Main** tab.



A standard Windows Open dialog will load. Select the ROM image you want to edit.

It's probably a good idea to work off a backup copy because there's no "undo" feature in Eisfrei.

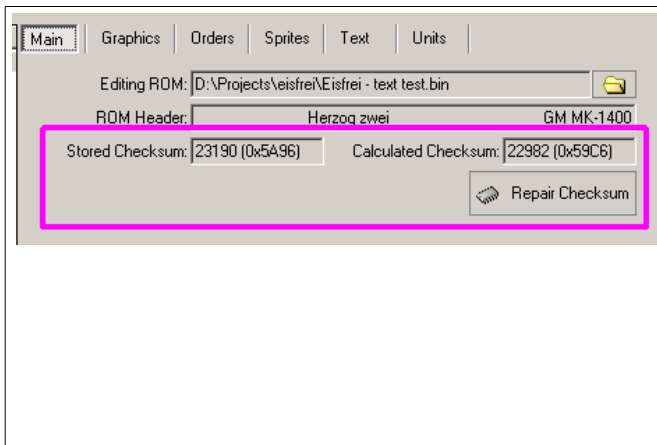


If everything went well, the **Main** tab should now be updated with the file path you selected and ROM header.

The ROM Header should be "SEGA GENESIS (C)T-18 1989.DECÍÙÂ«°, Â³b§² Herzog zwei GM MK-1400" (select the text in the field with the mouse and drag to scroll). If your ROM header is different, chances are it's not a supported image. Editing anything other than a supported image may produce wacky results. Please see the [Requirements](#) section.

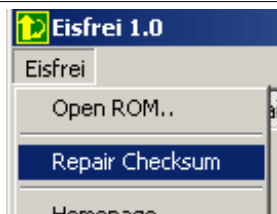
ROM Checksum

Sega Genesis games contain a checksum which is used by the console (or emulator) to ensure the integrity of the game. After editing a ROM image the checksum will need to be repaired.



The **Stored Checksum** field shows the value in the current ROM header. This is what the console (or emulator) is expecting

The **Calculated Checksum** is the actual checksum of the ROM. If these values do not match then the **Repair Checksum** button will be enabled. Click this button to repair the stored checksum.

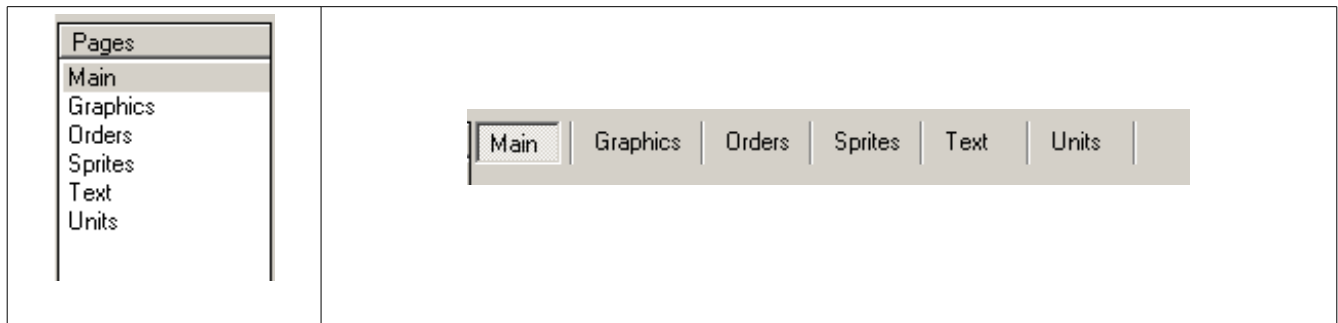


The **Repair Checksum** menu item can also be used at any time. It does the same thing as the Repair Checksum button and can be used from any tab.

It's a good idea to repair the checksum before testing a game that has been edited.

Navigation

Eisfrei contains several pages that edit specific parts of the Herzog Zwei ROM image. Pages can be changed from the **Pages** list on the side of the UI or by clicking the headings in the tabstrip along the top.



The pages available are:

- Main – View the path of the ROM being edited, view the ROM header, view & regenerate the checksum.
- Graphics – Edit various static images in the game.
- Orders – Edit the name and cost of orders that can be assigned to units.
- Sprites – Edit sprites, easily the crudest piece of this application.
- Text – Edit game text.
- Units – Edit the name, cost, and orders for units.

Text

Current Value	Category	Address	Max Length
As a result of a long war the old	Ludwig victory dialog	343430	38
government returned to power.	Ludwig victory dialog	343470	38
LUDWIG lost the battle,killed	Wahrsager victory di...	343510	38
himself and was buried with due	Wahrsager victory di...	343550	38

To edit a text entry either double-click on the text or select the text and hit the Enter key. Simply type the new value in.

- Only letters, numbers, and punctuation are allowed.
- The Max Length for a string is fixed to avoid overflow issues (i.e. overwriting another string, writing a string over game code).
- Click on any of the columns to sort by that column.

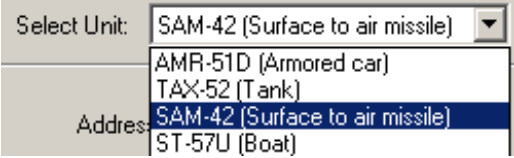
Orders


<p>Select Order: <input type="text" value="AF-001A (Patrol)"/> <input type="button" value="v"/></p> <p>Address: <input type="text" value="AT-101 (Go to nearest enemy base)"/> <input type="text" value="DF-F02A (Defend, attack enemies on sight)"/> Name: <input type="text" value="AT-101H (Invade nearest enemy base)"/> Cost: <input type="text" value="PW-SS10 (Supply)"/></p>	<p>Select the Order to edit with the Select Order drop-down list. The values in this list do not change if you edit the name.</p>
--	--

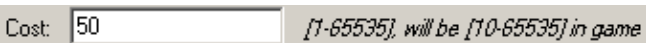
<p>Name: <input type="text" value="AF-001A"/> <i>[A-Z][0-9][-] only</i></p>	<p>The name as it appears in the game can be edited in the Name field. Only letters, numbers, and '-' are allowed. The maximum length is 10.</p>
---	---

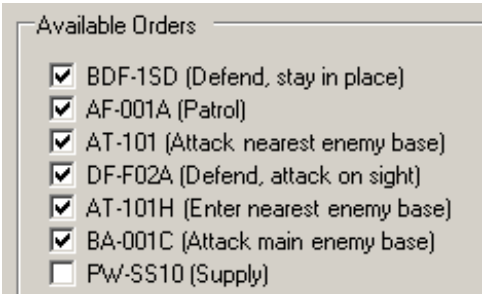
<p>Cost: <input type="text" value="50"/> <i>[1-65535], will be [10-655350] in game</i></p>	<p>The Cost field is how much it costs to purchase the order. In the game, a zero is added to this value. So a value of "50" will really be "500" when the game is played. This means "10" is effectively the lowest an item can cost. As with all unsigned 16-bit integers, the highest possible value is 65535.</p>
--	--

Units

	Select the Unit to edit with the Select Unit drop-down list. The values in this list do not change if you edit the name.
---	---

	The name as it appears in the game can be edited in the Name field. Only letters, numbers, and '-' are allowed. The maximum length is 8.
---	---

	The Cost field is how much it costs to purchase the unit. In the game, a zero is added to this value. So a value of "50" will really be "500" when the game is played. This means "10" is effectively the lowest an item can cost. As with all unsigned 16-bit integers, the highest possible value is 65535.
---	--

	The Available Orders panel contains the list of orders that can be assigned to a unit. Check to allow an order to be assigned to a unit, uncheck to disallow. This changes what you see in the buy menu in the game. Only the orders that are checked will appear. If you edit the names of orders they will not be updated here.
---	--

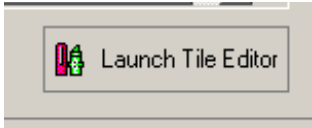
Some notes about editing the orders available to a unit:

- Some combinations don't do anything, the unit will just sit there.
- How this affects the computer AI in 1-player mode has not been tested. It's quite possible the game, or AI opponent, will freeze with specific changes.
- Removing all orders for a unit probably crashes the game, haven't tried.

Graphics

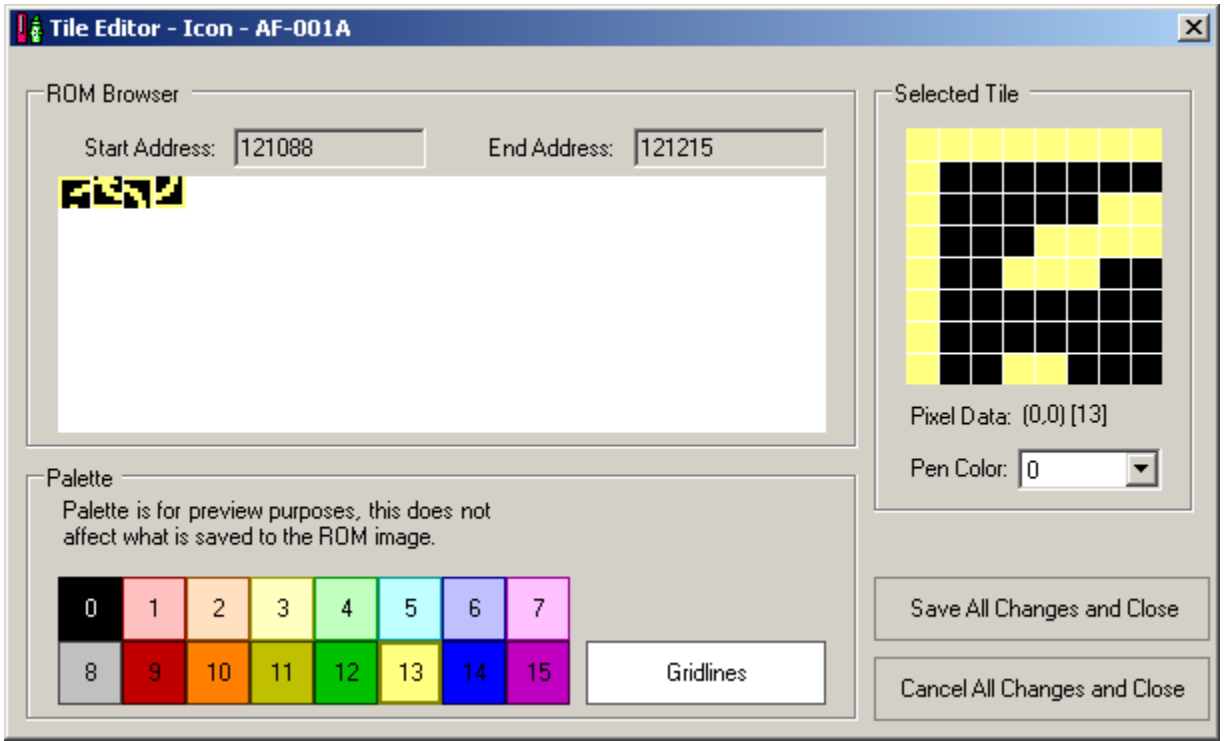
Main	Graphics	Orders	Sprites	Text	Units
Description	Start Address	End Address			
Font - Game menu	131296	133599			
Icon - BDF-12D	120960	121087			
Icon - AF-001A	121088	121215			
Icon - AT-101	121216	121343			

Select the item to edit.



Click the **Launch Tile Editor** to edit the selected item.

Tile Editor

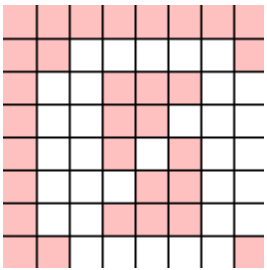


The screenshot shows the 'Tile Editor - Icon - AF-001A' window. It features a 'ROM Browser' section with 'Start Address: 121088' and 'End Address: 121215'. Below this is a preview of the selected tile. To the right, the 'Selected Tile' section shows an 8x8 grid with a yellow and black pattern. Below the grid, it displays 'Pixel Data: (0,0) [13]' and a 'Pen Color: 0' dropdown menu. At the bottom, there is a 'Palette' section with 16 color swatches numbered 0 to 15, a 'Gridlines' checkbox, and two buttons: 'Save All Changes and Close' and 'Cancel All Changes and Close'.

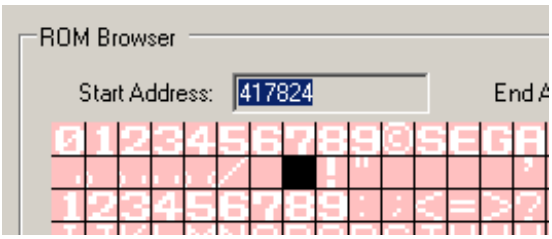
First, a brief explanation of how tiles are stored in the ROM image.. tiles are basically 8x8 bitmaps stored across 32 bytes. Each byte contains the palette entry for two pixels. The palette entry is a number between 0 and 16 (0x0-0xF) where 0 indicates blank pixel. The palette entry doesn't correspond to a specific color, but a color index in the currently loaded palette. For example, the same

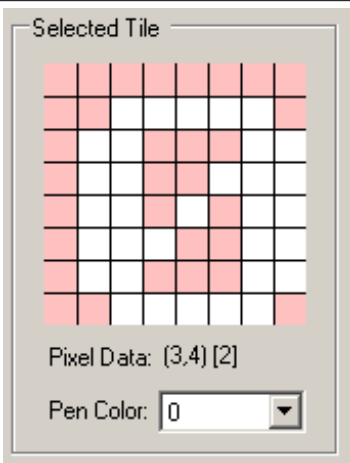
font tiles are used in the blue/gray and green/tan color schemes but different palettes are in memory.

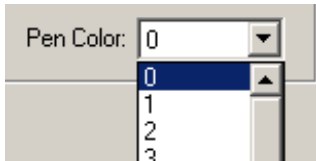
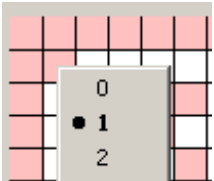
Here is how a zero character tile is stored:

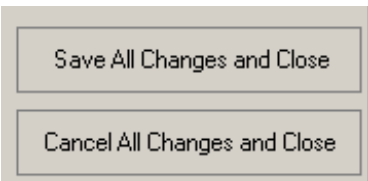
	<pre>22 22 22 22 22 11 11 12 21 12 22 11 21 12 21 11 21 12 12 11 21 11 22 11 21 12 22 11 22 11 11 12</pre>
---	--

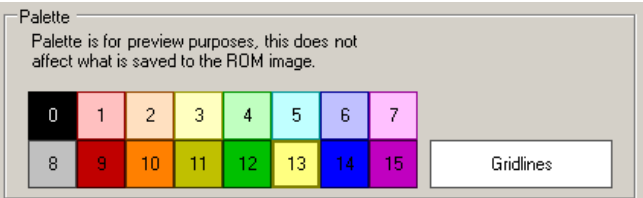
So when you edit a tile you're really changing palette entries for pixels. It's slightly important to understand how this works before being able to edit tiles effectively.

	<p>The Rom Browser section shows all the tiles in the current set. Click on a tile to edit it.</p>
--	---

	<p>The tile will open in the Selected Tile section. Left-click on a pixel to set it to the current pen color (palette entry). You can also hold down the left mouse button and drag across to fill multiple squares.</p>
---	---

	<p>Change the pen color (palette entry) with the Pen Color drop down..</p>
	<p>..or right-click on the selected tile.</p>

	<p>Click Save All Changes and Close to commit all changes back to the ROM image.</p> <p>Click Cancel All Changes and Close to cancel all changes. If you click this it cancels all changes made in this dialog.</p>
---	--

	<p>Click on the palette buttons to change the current color palette. This is for preview purposes and does not affect the data saved to the ROM.</p>
--	--

Sprites

I'll be the first to admit, editing sprites is a pain. It's also the feature I spent the least time on because making it elegant would take a while. So I had to make a decision:

- (a) Work on it for weeks before getting frustrated and scrapping the entire project
- (b) Force sprite editing to work with the existing tile editor

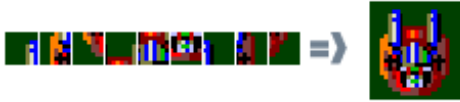
If/when I do a major update to Eisfrei I will find a way to make sprite editing much, much easier.

So here we go...

Sprites are broken up into sets of 16x16 tiles. In the tile editor, a 3x3 sprite will be comprised of nine tiles. They form into the sprite in the following order:

```

          1 4 7
1 2 3 4 5 6 7 8 9 => 2 5 8
                   3 6 9
    
```



So what are the dimensions of sprites?

Main	Graphics	Orders	Sprites	Text	Units
Description	Start Address	End Address			
Armored car	98304	99743	Large vehicles are 3x3.		
Tank	99744	101183			
SAM	101184	102623			
Boat	102624	104063			
Supply truck	104064	105503			
Cannon	105504	106943			

Main	Graphics	Orders	Sprites	Text	Units
Description	Start Address	End Address	The tank and boat turrets are separate 3x3 sprites.		
Tank turret	106944	108383			
Boat turret	108384	109823			

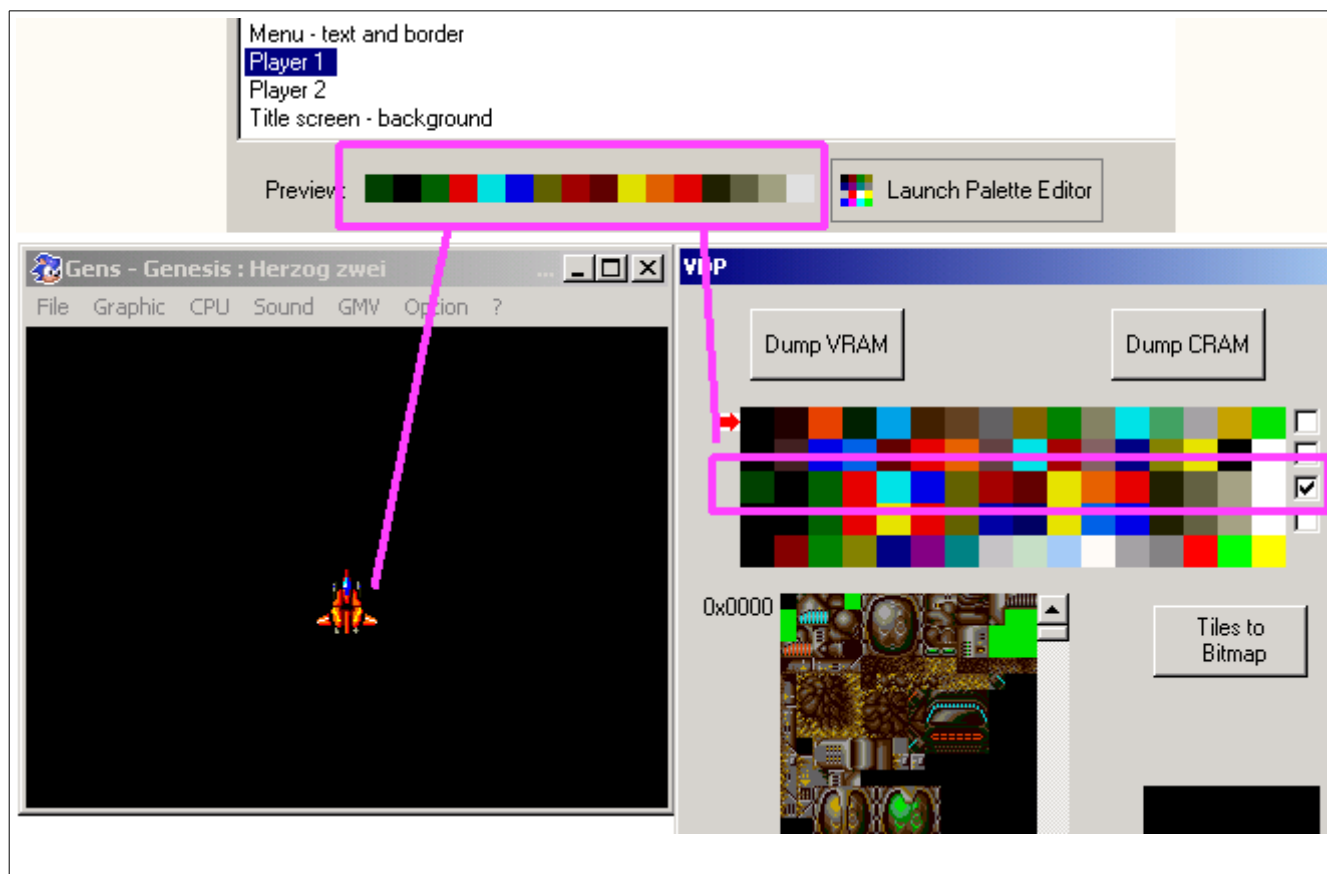
Description	Start Address	End Address	Infantry are 2x2 sprites. The motorcycle appears to use the infantry sprite with a wheel overlay like the turrets.		
Infantry	112032	117119			
Infantry death	117120	118655			

Main	Graphics	Orders	Sprites	Text	Units
Description	Start Address	End Address	The robot/plane editing is the worst. Each animation frame is a 4x4 sprite. Between walking, flying, and transforming there are 64 animations. Editing all the robot/plane sprites will take a looong time.		
Robot/Plane - 1	65536	66047			
Robot/Plane - 2	66048	66559			
Robot/Plane - 3	66560	67071			
Robot/Plane - 4	67072	67583			
Robot/Plane - 5	67584	68095			
Robot/Plane - 6	68096	68607			
Robot/Plane - 7	68608	69119			
Robot/Plane - 8	69120	69631			

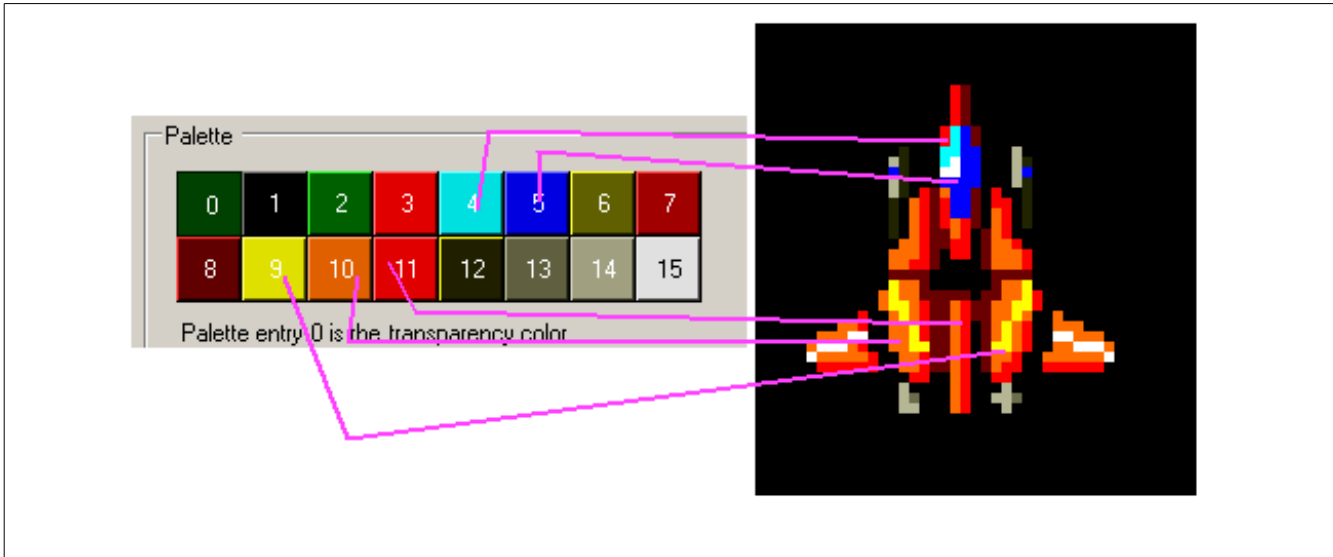
Palettes

Palette Basics

The way palettes are stored in a Genesis ROM is directly related to how they're held in memory at runtime. The Genesis VDP stores 4 palettes of 16 colors for a maximum of 64 distinct on-screen colors. In the Herzog Zwei ROM image, and presumably many others, there are blocks of data that store palettes. The palettes map up nicely with ones loaded in the VDP:



The difficult part is visualizing how the palette maps to what it's being applied to.

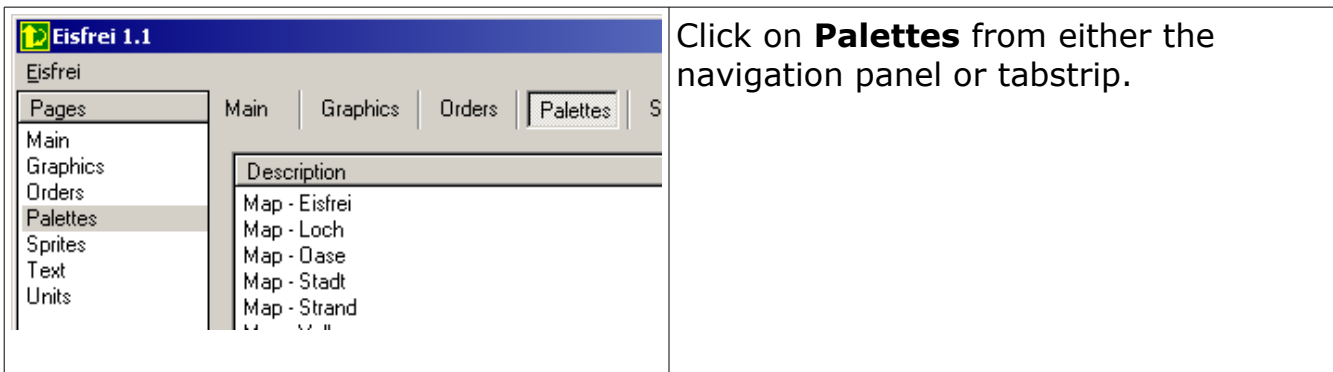


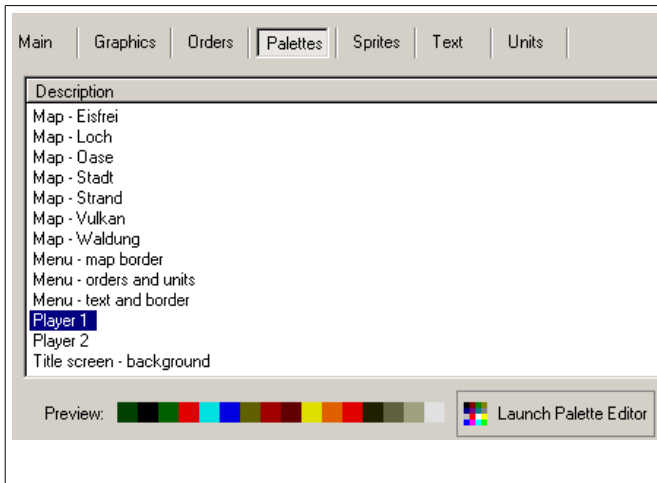
Given infinite time, energy, and knowhow I could add a preview feature. Don't hold your breath on it.

The palette entries have an R (red), G (green), and B (blue) value that's combined into one 16-bit number. The R, G, and B values can range from 0-7 so only 12-bits are actually used. It's just like how RGB colors work, only there are 8^3 (512) total combinations instead of 256^3 (16,777,216). Only colors in this 512 range can be used.

So, when you edit a palette you're really taking a block of 16 colors and adjusting the R, G, and B values.

Palette Editor





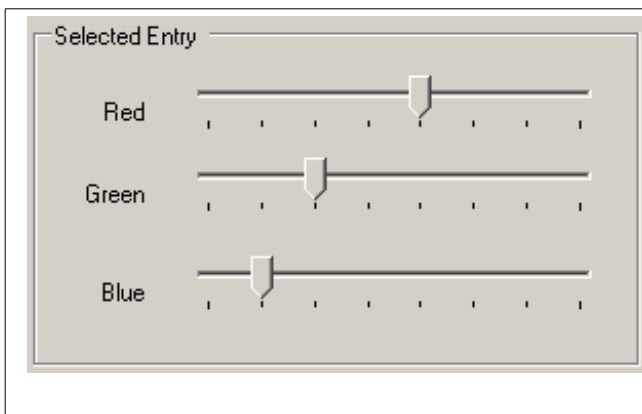
Click on the **Description** or **Address** column to sort.

Double-click on an entry, or click the **Launch Palette Editor** button, to start the palette editor.

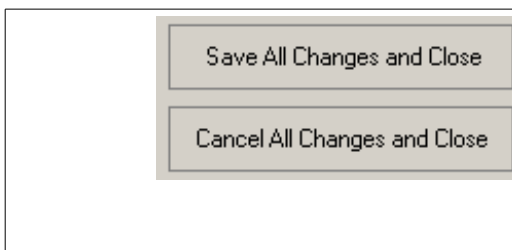
The preview is there to help with the identification process and because it looks neat.



In the palette editor, click on one of the colors in the **Palette** panel to edit it.



The sliders in the **Selected Entry** pane will update with the selected color. Use the sliders to modify the R, G, and B values for the color.



Click **Save All Changes and Close** to commit all changes back to the ROM image. Click **Cancel All Changes and Close** to cancel all changes. If you click cancel it cancels **all** changes made in this dialog.

Custom Development

The source code to Eisfrei is free as covered by the GNU General Public License version 2 (<http://www.gnu.org/licenses/>). This means (more or less) that you can modify and redistribute the code, or release other applications derived from the source as long as the source code is all available. Please read the full license for details.

The source code for Eisfrei was based on the **Aridia Phantasy Star III ROM editor**. Rather than re-write all the Aridia documentation, please visit the Aridia homepage (<http://www.huguesjohnson.com/aridia/>). The Aridia tutorial contains a fairly detailed section explaining how the project is structured and also offers tips for custom development. The Eisfrei project is not vastly different.

Future Enhancements

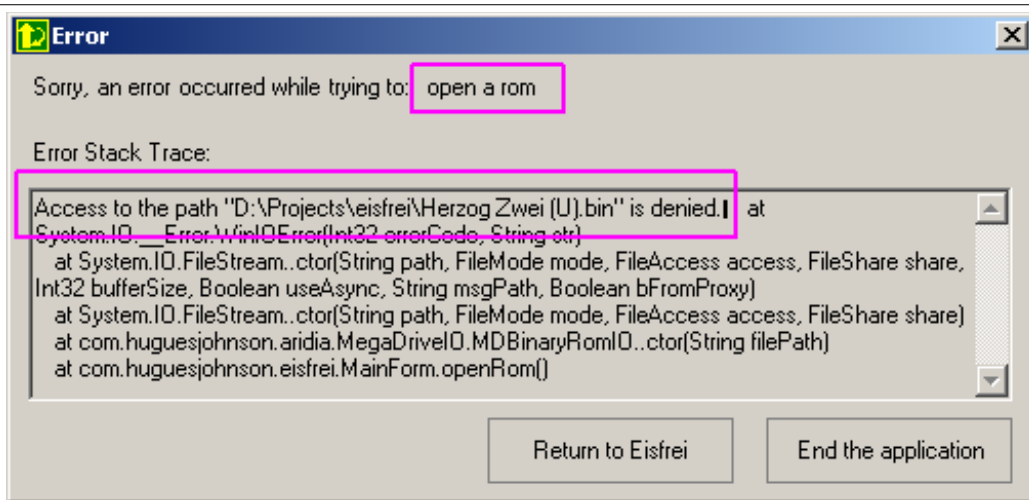
So if you're serious about developing updates for Eisfrei please contact me. Why? Because there are a few things I'd like to do myself. Maybe I've already done them by now, maybe I haven't started and would appreciate help.

Here's what I'd like to add in future releases:

- Make sprite editing easier by laying out sprites in their natural order and with a predefined palette
- More unit editing capabilities:
 - Maximum energy
 - Maximum damage
 - Maximum ammo
 - Time to build
- Edit maps
- Edit main menu fonts and borders
- Rate of money increase

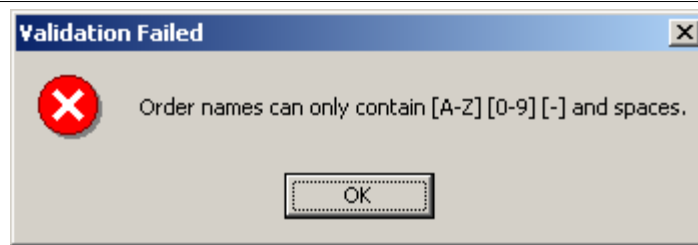
Troubleshooting

Here are some errors you may encounter and the resolution:



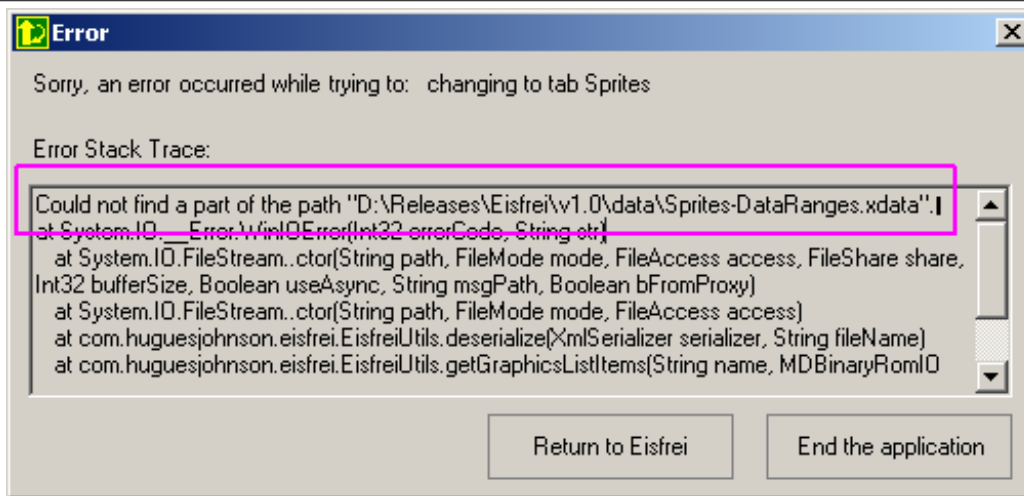
"Access to the path [...] is denied" when opening a ROM image.

The file is read-only. Change the attributes by right-clicking the file in Windows Explorer and try again.



"Validation Failed"

Seems pretty self-explanatory. All strings (text) have a maximum length that can not be exceeded. The font set of Herzog Zwei only supports alphanumeric characters and basic punctuation. Please try a valid value for the string being edited.



"Could not find a part of the path [...].xdata"

A required data file is missing. Eisfrei expects several **.xdata** files to be in subfolder called **data**. If the folder, or a required file, is missing this message may be displayed. This can happen if:

- The Eisfrei .zip file was not extracted with path information (see [Running](#))
- Eisfrei.exe was moved without moving the data folder.

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Version 1.2, November 2002

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