Tools for Asset Repair by PEV

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Images2TGA

Revision 1.2 to suit Images2TGA Version 1.15

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This tutorial was originally written for John King's Trainz Resources News Letter.

Introduction

Trainz uses a render engine called Auran Jet to display and move objects within the simulator. Auran Jet supports a suite of proprietory file formats that define 3d objects, surfaces, animations, sounds and so on.

Any 3d object or surface can be modelled as a series of triangular facets, on to which surface colouring (textures) are added. All of this information is gathered together in a "mesh". The mesh contains all of the 3d geometrical data needed to define the shape of the object as well as the texture specifications to select surface colouring, and the texture mapping details to correctly place the texture images on to the various portions of the surfaces.

The progressive mesh was the same as the indexed mesh but with the addition of data that could simplify the mesh for distant viewing. (lower the Level Of Detail). Auran later chose to use multiple 'im' meshes instead of a single 'pm' for their LOD method.

The Indexed Mesh contains references to 'textures' for surface colouring. A 'texture' is a special form of image file with in-built features to achieve LOD and to control rendering within the game. The latest versions (TS2009 onwards) use DXT compression to reduce texture file size. DXT compressed images are now directly supported by most video cards.

Reskinning

Many users of Trainz wish to make their own versions of rolling stock or scenery based on existing assets in the game. This can be done by recolouring the existing assets; a process called 'reskinning'

To reskin an asset the textures need to be edited. The Auran texture format cannot be opened with normal imaging programs like Photo Shop, Paint Shop Pro, or the Gimp. Hence I decided to provide an intermediate conversion to a format that could be readily edited. I chose the TGA format because it supports an in-built Alpha channel for transparency. Initially I provided a program called Texture2TGA that just performed the conversion. Now I supply Images2TGA that has many more features.

I don't propose to write about reskinning. Sufficient to say that many tutorials are available so I will just say that the Images2TGA tool can assist in this process.

Repairing Downloaded Assets

TS2009, TS2010 and TS12 only support DXT compressed textures which are made by conversion from image files when assets are committed into the game by the Content Manager program. If you wish to download or import an asset from an earlier version and it has texture files in the Auran binary *.texture format, you will find that Content Manager will not import them. To succeed the textures must be converted to TGAs. I recommend using my Images2TGA to convert to TGA files and generate the required *.texture.txt files.

What Can Images2TGA Do?

1. Display images. The program can open any image type used in Trainz and display the image and alpha image (if present) Trainz supports .texture, .TGA, .JPG, and .BMP image files. All of these can be opened. All images can be viewed full size. Transparent sections can be viewed against a selectable coloured background.

2. Convert to other formats. Once opened an image can be saved back to .TGA, .JPG or .BMP formats. There is no need to save to .texture files as these are created when assets are committed into the game. When texture images are saved to TGA format the appropriate *.texture.txt file is generated automatically.

3. Add or remove Alpha channels.

4. Open the image or alpha image in you favourite image editor.

5. Merge an external image as an alpha channel.

6. Make bump and normal maps.

Using Images2TGA

Installation

If you don't have this program, please download its installer program (PEVImages2TGA_setup.exe) from my PEVSoft Download page.

http://www.members.optusnet.com.au/~villaump/pevsoft.htm

Run the installer and the program will be loaded on to the Program Files area of your C: drive, along with a desktop icon and an entry in the PEVSoft folder of your All Programs menu.

Setup

Before attempting any conversions you should connect Images2TGA to your favourite image editor (Photo Shop, Paint Shop Pro, Gimp or what ever.)

To set up editing, open the Images2TGA program and click on the 'Setup/Editor' in the main menu. You will be prompted to locate your favourite image editor. An open file dialog will appear allowing you to browse to your editor program. Click on it to select and save its location for future use.

"Setup/OpenWith" creates the 'OpenWith' macros for Content Manager for TS2009, TS2010 and TS12. This allows you to run Images2TGA directly from the Content Manager.

If you have installed Trainz TS2009, TS2010 and/or TS12 in the default folders then this process is completely automatic.

If the "OpenWith" installer cannot find a Trainz installation it will present a folder search dialogue window and ask you to locate the installation. If you don't have that version installed press the "cancel" button. Otherwise locate the Trainz application folder.

In Content Manager you will find that you now have an Open With option in the right click popup menu. Using this option Images2TGA will automatically search the opened asset folder and its sub folders for texture files to convert to TGAs. All textures in the asset should be converted and appropriate texture.txt files created.

I recommend, also, that you you make Images2TGA.exe the program that opens *.texture files when you double click them in Windows Explorer.

Opening a File.

The program can open Trainz Image files only. (.texture, .TGA, .BMP or .JPG)

To Open a File, start the program and click on the File menu. Click on Open and the open file dialogue box will be displayed. The file extensions are filtered so only the correct types are available.

Files can also be opened by double clicking in Windows Explorer. You must add the .texture file extension to the list

in Windows explorer and point it to this program before this will work.

The name of the Last File opened is also displayed. Click on that to re-open the file.

The Exit option closes the program.

Once the file is opened its image is displayed along with any alpha channel.
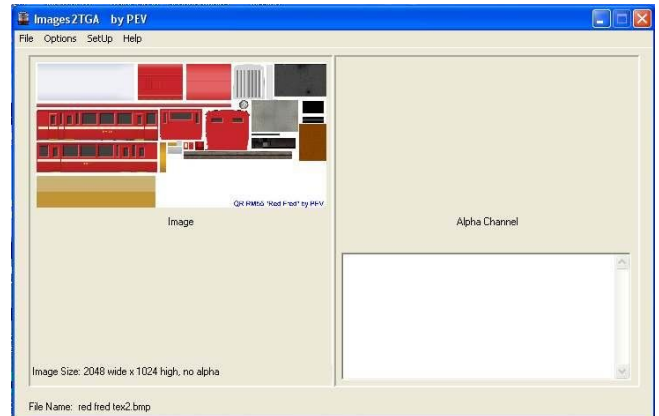
Full sized versions of the images can be viewed by right clicking on either image and selecting Display Actual Size from the pop-up menu.
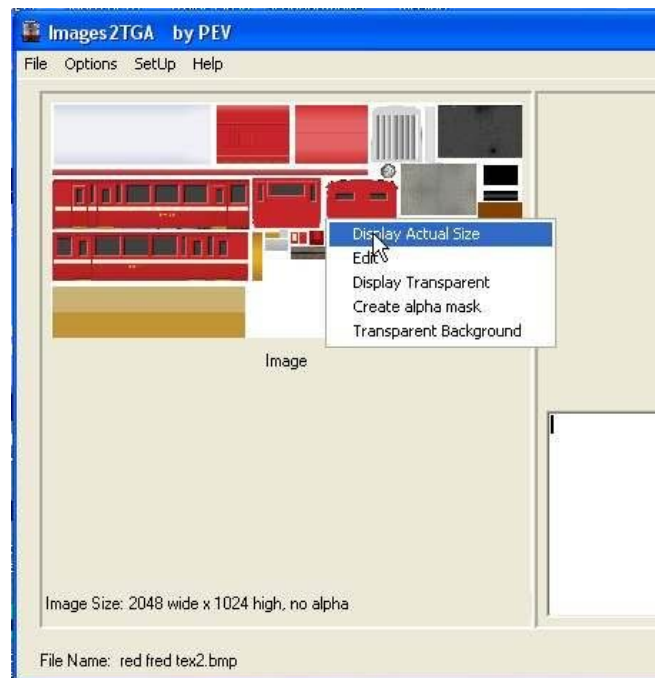
Transparency can be enabled to view masked or blended alpha images against the window background. To view transparent, right click on the main image and select Display Transparent from the pop-up menu.
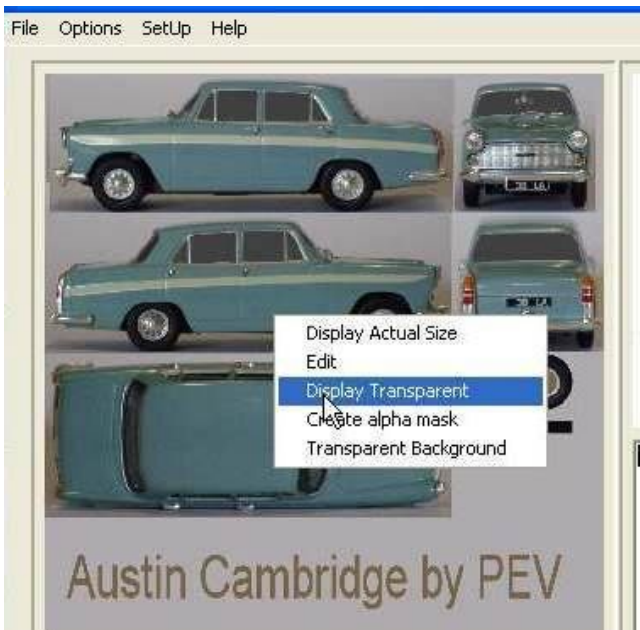
Note that the transparent portions of the image have a checker board pattern in the background colour. As below:

The background colour can be changed by right clicking on the main image and selecting Transparent Background. A colour selector will appear for you to choose a new colour.

Convert To TGA

The opened Image can be saved as a TGA, BMP or JPG file. If it has alpha data this will be lost if saved as BMP or JPG. Hence the program automatically offers to save as TGA when the image has been loaded from a texture.

To save an image, click on the File menu and then click on Save As. The Save File dialog will be displayed and you choose the file type to save, and enter a file name. Then click the save button to complete the save of the file.

When you save a *.texture to a TGA the program will automatically make the appropriate *.texture.txt file.

If you have lots of textures to convert to TGA's use the trawl facility included in this program..

Creating an Alpha Mask

A masked alpha channel can be added or substituted for an existing alpha image.

The mask is created by right clicking on the main image, and selecting Create Alpha Mask from pop-up menu.
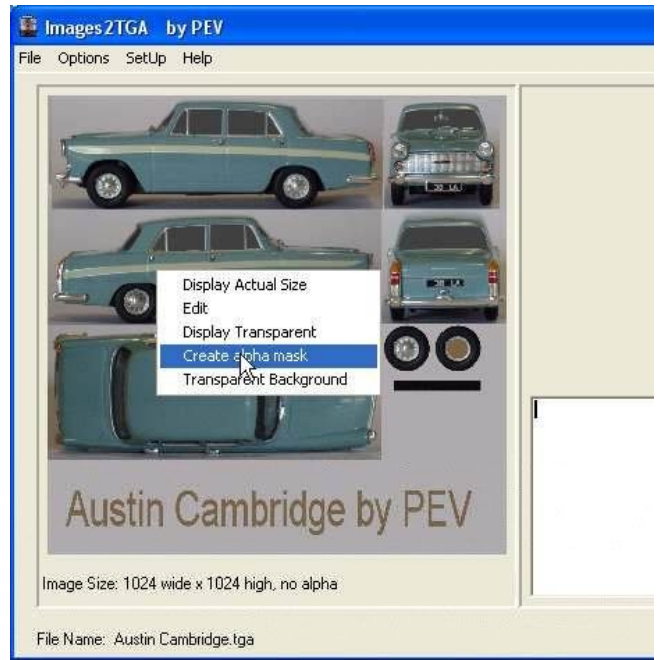
The tolerance input window will open and you can adjust the colour tolerance with the spin-edit box.


The tolerance is the value plus or minus that is selected from the RGB value (0-255) when you pick a colour (next step).. So if you enter 5, any value between plus 5 and minus 5 of the select colour value will be made transparent.. (Black on the alpha image).

When you have accepted the tolerance value, the colour picker is enabled. Notice that RGB values appear next to the cursor and change as you move the cursor over the main image.

(See first image on the next page)

Click on the colour that you want to be transparent and the new alpha mask will appear in the Alpha image panel, as below:
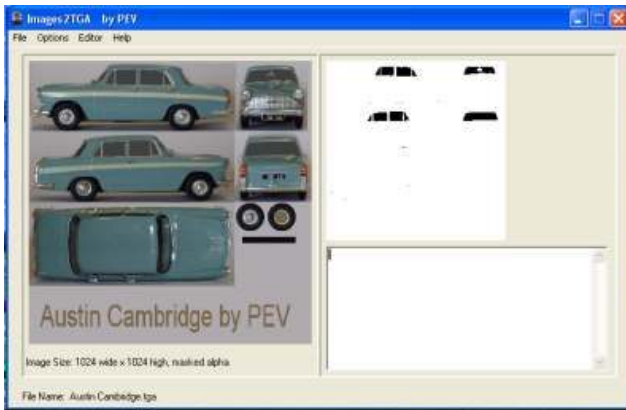
Adjust the tolerance and try again if you are not satisfied with the result.

Note that this process makes a masked alpha channel. Masked alpha channels have only two values, black and white or 0 and 255, in the colour data. If there is any pixel with a value other than 0 or 255 the alpha channel is considered blended.

For TS2009, you must be very careful to ensure that you have only black or white in your alpha images. Any intermediate values will hinder performance and in some cases will not work in TS2009 native mode.

Editing the Main Image or Alpha Image

The image and alpha channel can both be opened for editing in an image editor such as Gimp or Paint Shop Pro.

If you have connected Images2TGA to your editor as explained in the SetUp section above, you can open your editor from Images2TGA.

To edit the main image, right click on the image to bring up the pop-up menu.
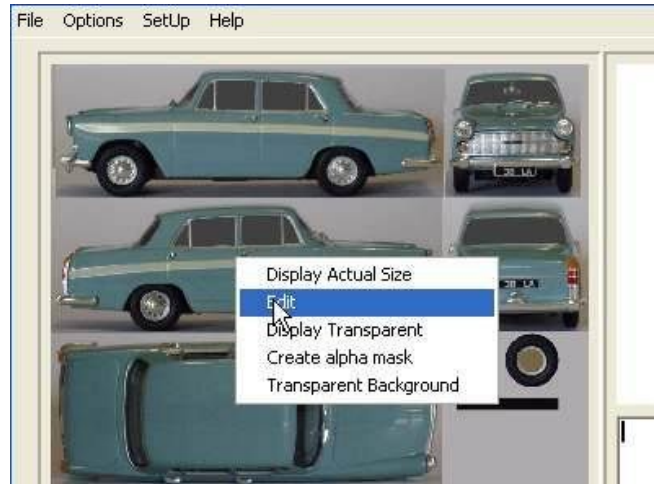
Select Edit and your editor will open with the image in it ready to edit.

Similarly to edit the alpha image, right click on the alpha image and so on.

When ever you save the image file in your editor the file will be updated in the Texture Viewer.

Note: In your image editor, do NOT save as a different file name, just press the save button.. If you save to a different file name, the connection to the Images2TGA will be lost, and it will not reload the saved image.

Also, do not change the size of the image.. It will not merge with the other channel if you change the size.

Trawling

Images2TGA can be used to trawl (or search) for images to convert.   Before attempting to trawl, the type of images to convert to TGAs must be set.

From the **Options** menu select the image type or types that you would like to convert to TGAs.

The **Convert Textures** option enables conversion of Trainz Binary textures (.texture files) to TGAs.

The Convert Textures option is set by default when the program is run for the first time after installation.

The **Convert JPGs** option enables conversion of JPEG images to TGAs.

The **Convert BMPs** option enables conversion of BITMAP images to TGAs

If none of the above options is set the progam will display a message and do no conversions.

Trawling must be launched from the command line (typically from the batch file in the 'Open With' menu of Content Manager 2 or 3), as detailed in the SetUp section above, and as shown in the image of Content Manager below.

If you click on "**Images2TGA.bat**" in the **Open With** menu of Content Manager 2 or 3 the program will convert whatever textures or images it finds to TGAs with texture.txt files.

The files processed are listed in the text box below the alpha image as the conversions progress. The program keeps a log (named Trawl_Log.txt) of files found and shows the actions taken on each file. The log is accessed from the File menu and clicking on View Log. The log file accumulates data every time trawl is started. The Log should be deleted after large trawl conversions. A delete option is included in the File Menu.
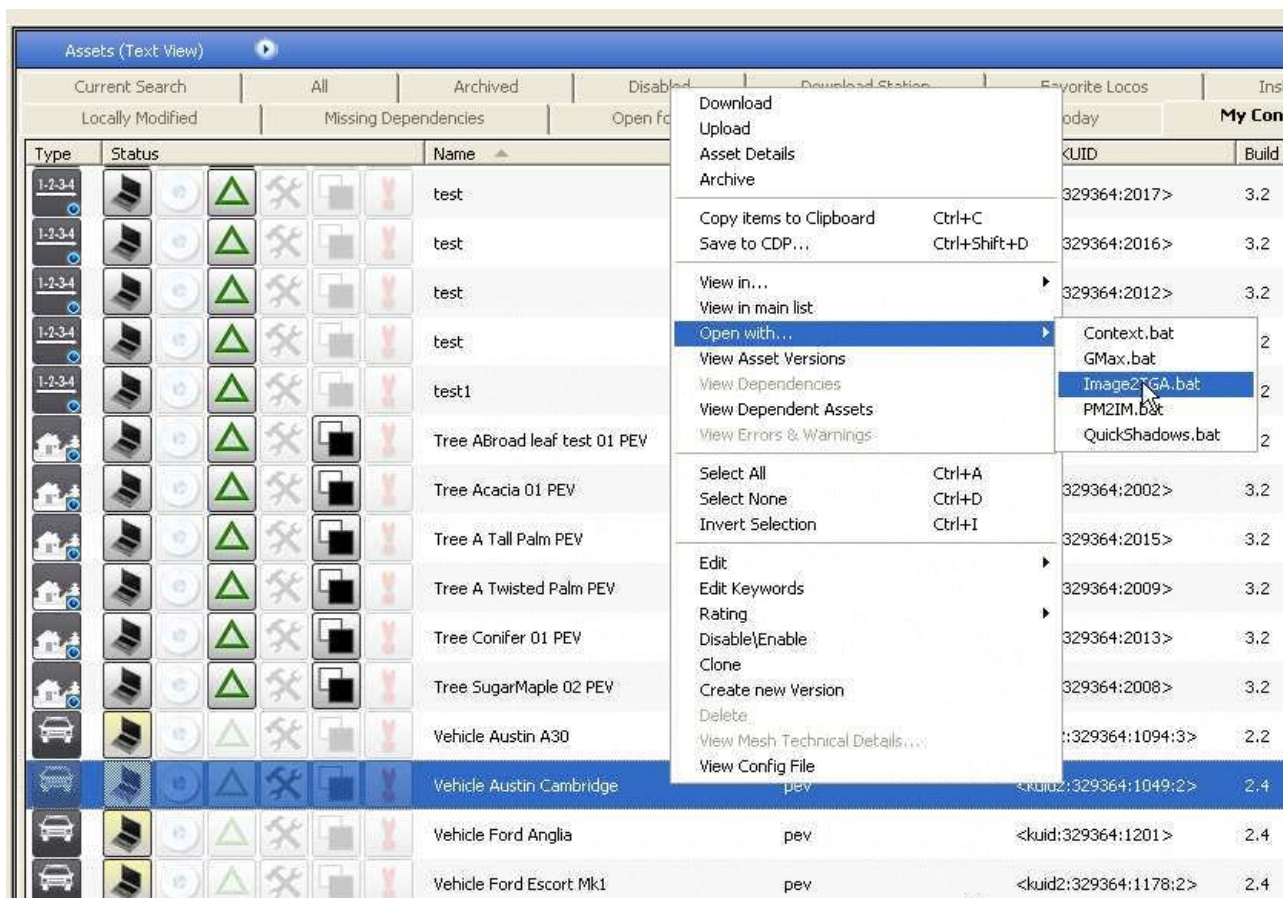
Merging a Separate Alpha Image

If there are two images that are used by the texture.txt file to make a composite transparent image, the two images can be merged into a single TGA image with an alpha channel for transparency.

Open the primary image defined by the 'Primary=' line in the texture.txt file.
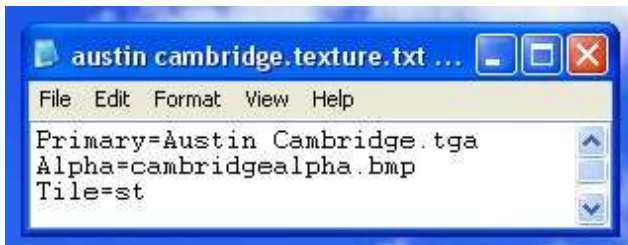
Use the Images2TGA File menu, and "Open" to choose the file.

When the primary image is displayed in the left pane of the program window, click on File menu, then select Merge Alpha Image.
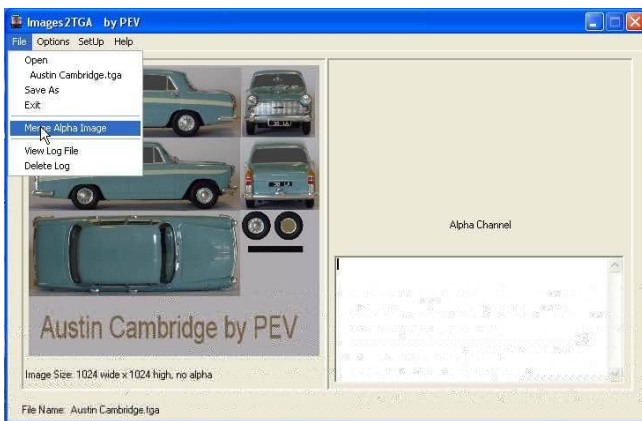
From the open file dialog choose the image nominated in the 'Alpha=' line of the texture.txt file; in this case cambridgealpha.bmp.

The new image should appear in the Alpha Image pane of the program window, and the file definition should change from No Alpha to Masked Alpha or Blended Alpha.
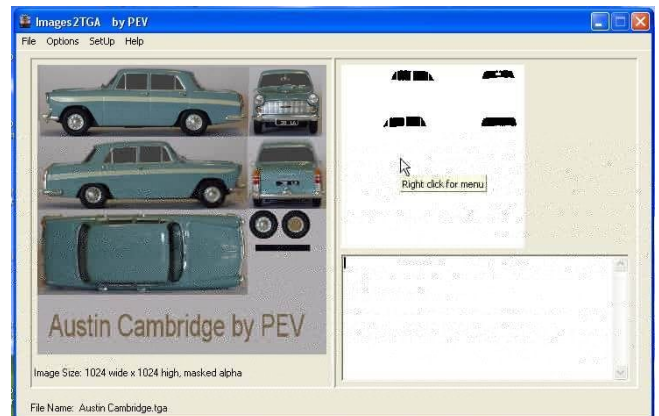

You can now save the image as a TGA.

If the primary image and the alpha image are different sizes the merge will fail and no alpha image will be loaded. The program will display a message about non matching image sizes.

Removing an Alpha Channel

To remove an alpha channel from a composite image, right click on the alpha image panel and select "Remove Alpha Channel" from the popup menu.
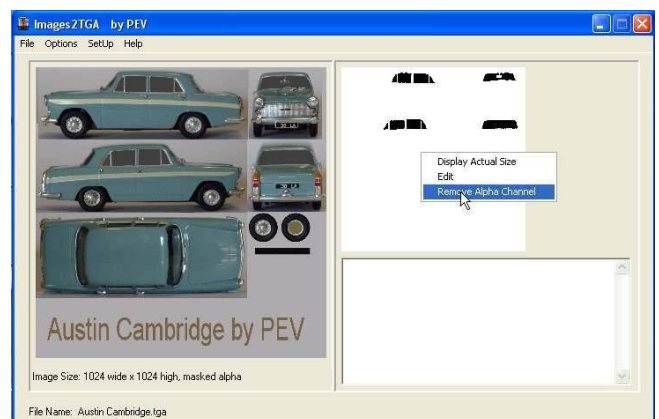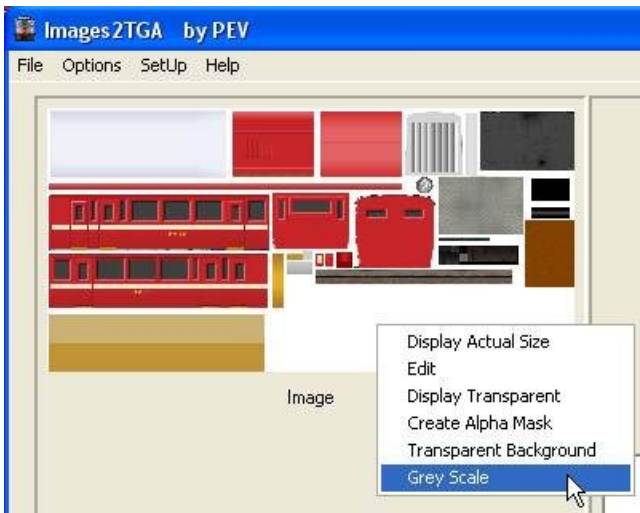

A confirmation box will be displayed.. select "Yes" to remove the alpha channel, or "No" to retain it.

Making a Normal Map

A normal map is derived from a grey-scale bump map, so firstly we load the main texture for an object into Images2TGA. Take, for example, the texture image for the RM55 rail motor:

See image on next page

The image is then converted to grey-scale using the right click menu and choosing "Grey Scale".

The resulting image can then be used as the start of a bump map where white features are protruding bumps and dark ones are inset hollows.
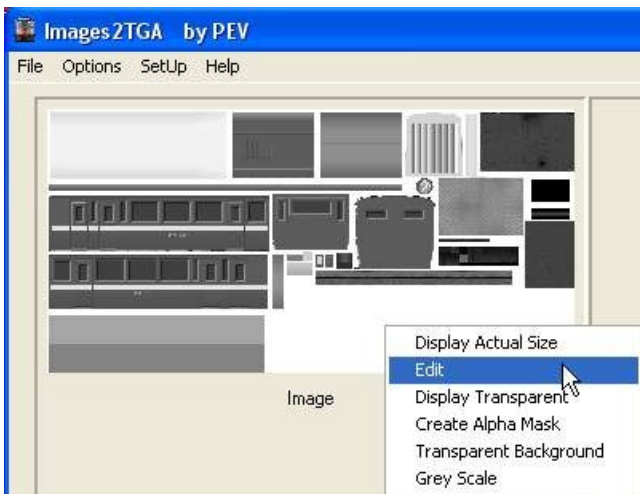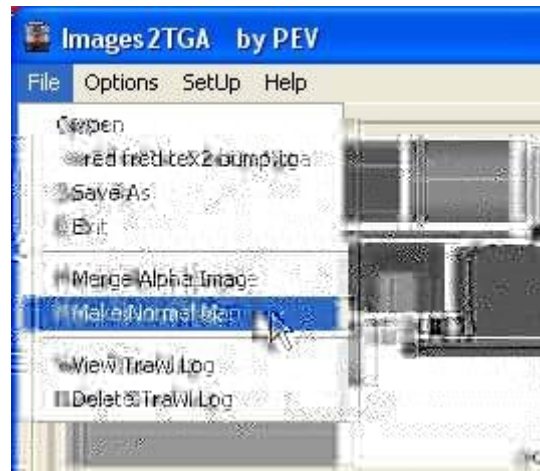

You can now open the image in your editor and alter it to give the desired bumpiness. Right click on the image and select "Edit" from the pop-up menu.

In the case the result was a follows:
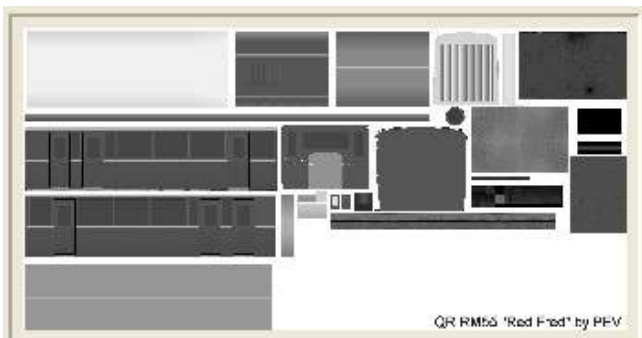
The grey scale bump map should now be saved for future use.

After saving, choose "Make Normal Map" from the "File" menu.

The result is the typical blue-mauve looking normal map.

Don't forget to save the normal map as a TGA with "normal" in the file name.

The normal maps produced by this utility are directly compatible with Trainz, so we only need the one additional entry in the texture.txt file:

NormalMapHint=normalmap