

Tutorial



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Beyond Digital



VM-STUDIO has two layers that you can use for real-time video transitions. This is the basic principle behind the Video Machine hybrid editing system.

The VM-STUDIO PLUS 3.0 RENDERING ENGINE software greatly enhances your creative possibilities. Some of the functions are calculated and performed directly by VM-STUDIO PLUS 3.0 (e.g. rendering, multi-layering and optimizing), while others (plug-in effects and filters) work with the software of other manufacturers and, thus, require the CPU. The following sections provide background information on these features.


Overview

Rendering Functions

The rendering functions create a new clip in the RENDER GROUP of the PROJECT MANAGER. This clip consists of data copied from various sources and the rendered areas of a selected range of the TIMELINE or of the entire movie. You can use this clip for multi-layering or copy it to another media, etc.

A new digital file, visible to the user, is created during rendering which is saved in the RENDER GROUP. This file occupies space on the drive you specified on the hard disk.




 *Rendering functions are primarily used for multi-layering, i.e. when you need more than two video levels for a scene or an entire movie. The two video tracks result in a new digital file.*

Optimize Function

The OPTIMIZE function creates rendered clips required to play back the movie continuously. These clips are not visible to the user and are only created for those ranges of the TIMELINE which cannot be played back continuously.

Whenever you make a change to a movie, the temporary optimized files are automatically deleted and have to be processed again. **You can also delete optimized files directly in VM-STUDIO PLUS 3.0 with the DELETE functions to make room on your hard disk.**


 *Use the OPTIMIZE function if your movie cannot be played back continuously, i.e. if it interrupts at one or more edit. Digital files designed for "Continuous Play" cannot be edited and are automatically deleted whenever you make a change to the movie.*

Plug-In Filters and Effects

Plug-ins are visual effects that must always be rendered in order to be played (unlike Video Machine effects). During rendering, a hidden data file is created. This file is only required for playing the given clip(s). Plug-ins also let you preview each individual frame.

While filter plug-ins are applied directly to a clip, effect plug-ins are positioned directly on the FX TRACK (just like VM-STUDIO transitions).

When calculating a plug-in with the RENDERING functions, a hidden file is created in a RENDER GROUP which can be used for further processing (multi-layering, etc.).

 *Plug-in filters and effects must always be calculated before a movie can be played. This is done using the computer's CPU and requires quite a bit of time. Alternatively, you can preview frame by frame.*

The Rendering Engine

Rendering with VM-STUDIO PLUS 3.0 means that all transitions involving tracks V1 and V2 are mixed in the Video Machine framestores and stored by the D-DPR as a new file. In practical terms: All dissolves, wipes, slides, etc. (i.e. all transitions with a duration of more than one frame, not including hard cuts, of course, are calculated for rendering and stored by the D-DPR in a new data file on the hard disk. This naturally includes chrominance and luminance key effects, titles and graphics on images whose load times or processing would take too long to play back the movie continuously.

In such cases, a new clip is produced from the original two or more clips and the transition(s).

VM-STUDIO PLUS 3.0 only renders those areas which require rendering. Areas which involve only one video track are simply recopied as a digital file. This applies to both rendering as well as to the optimize functions.

The following example should shed some light on the matter:

- Three clips, A, B, and C, are arranged in an A/B distribution on the TIMELINE. Let's assume you wish to render this area and make it into a clip. It does not matter whether or not this sequence can be played continuously on the TIMELINE. We will address this problem later (→ Page 61, "Optimize").

Let's say you wish to place a title on an image in this



sequence. Since both video tracks are occupied, use the multi-layering functions of VM-STUDIO PLUS 3.0.

- Your TIMELINE might look something like this:

There is a transition effect from clip A to clip B and a hard cut between clip B and clip C.



- A single clip is rendered from this sequence which will also be saved as a DPR file on the DPR hard disks.
- Select the area to be rendered by marking the edits on the EDT TRACK. You do not have to mark anything if you wish the entire movie to be rendered.
- Use either the RENDER SELECTED RANGE function (→ Page 52, "Render Selected Range") or RENDER MOVIE (→ Page 52, "Render Movie") function.

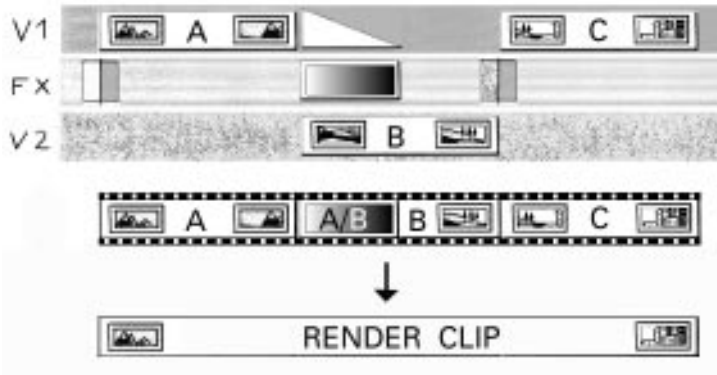
- The file generated from the sequence or movie will look something like this:

Clip A was copied as a file in the new render file until the beginning of the dissolve transition. This resulted in no generation loss since the file was simply copied in digital form to the hard disk and not decompressed or compressed. The dissolve between clip A and clip B was decompressed and mixed by Video Machine hardware and attached to the new DPR render file as a sequence.

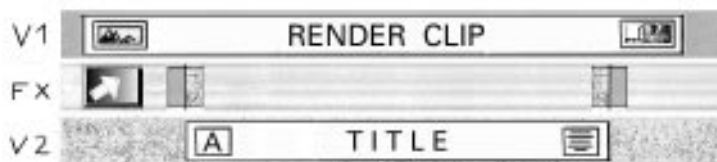
From the end of the transition on, clip B was only copied in digital form. The same holds true for clip C.

- This means that only the transition which involved both video channels had to be rendered. All other parts of the clip are merely digital copies of the originals.

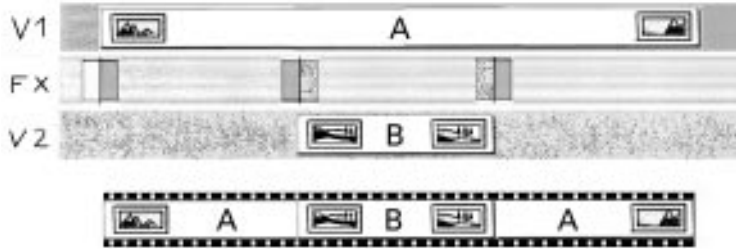
The following schematic drawing shows the results as a film strip clip. In this sequence, the files referred to make up the contents of the new Render file.



- An new render file was created which perfectly reflects the TIMELINE sequence, but only occupies one video track. This file is saved in the PROJECT MANAGER in the RENDER GROUP you created and specified (→ Page 58, "Render Groups"). From there you can position it on the empty TIMELINE of a new movie or in a free space of an existing movie (let's assume you saved the original state as a movie and deleted it from the TIMELINE). As the following diagram shows, you can position an alpha channel title (or a keyed title) on track V2 and cut directly to it.



- In this case three video layers result. However, you only notice these layers at the time of the dissolve: two superimposed live images appear in the video with a title in the foreground (this title can even crawl or roll across the screen).
- The following illustration shows a further example for the rendering process. Clip A is interrupted by an insert from clip B, but continues to run on V1. This is typically used for master scenes and close ups.



- In this case, the rendered clip only contains the data of clip A which is used until the cut to clip B and which is visible after the system returns to clip A after the cut. This rendered file does not exhibit any generation loss since the data only has to be copied.

For example, let's say you have ten consecutive hard cuts which you want to combine to create a clip. Mark the area on the TIMELINE with the ten clips and activate the RENDER function. VM-STUDIO PLUS 3.0 merges the digital data of the ten clips and creates a new DPR file. The quality of the image is not effected in the process.


 *There are many other examples of how the multi-layering functions of VM-STUDIO PLUS 3.0 can be used, but we wanted to keep things simple. We suggest you play around with the software to discover other possibilities for yourself.*

Image Quality

Digital generation loss?

The quality of a digital image depends both on the compression rate used for digitizing and on the quality of the original image. As explained in the Digital Player/Recorder manual, images with noise are harder to digitize than high-quality images. You must use very low compression rates for images with noise just to maintain the quality of the original. Otherwise, you increase the noise in digital form.



With rendered transitions, Video Machine decompresses the clips, mixes them, recompresses them, and creates a new data file with the specified compression rate. Depending on the compression rate, you may notice digital generation loss. This is different than the loss that results from analog generations of video editing or from copying video tapes. You can keep digital

generation loss so low that it is not noticeable over 10-15 generations. This requires the following:

1. The material of the sequence to be rendered must be of high quality. That means the material must have been digitized at a very low compression rate.
2. You must also use a very low compression rate for rendering.

When rendering and applying multi-layers, remember to use as low a compression rate as possible.

The Optimize Engine

The optimize functions process areas of a movie that cannot be played back continuously. This includes sequences with extremely short clips (less than one second), alpha wipes in very short succession, and graphics and titles with loading and processing times which are too long for continuous playback. Optimizing generally does not require rendering. Thus, there is no generation loss. If possible, the clips are merely copied to the hard disks. New image files are created on the DPR drives in the process. They take up memory space, of course. These files are not visible to the user, but can be managed, i.e. deleted, with VM-STUDIO PLUS 3.0. (→ Page 65, "Delete ...").

Temporary files created during optimization take up space on DPR drives. Before using the OPTIMIZE command, make sure there is enough space on the connected hard disks.

For more information on this subject, see the section entitled "Optimization" (→ Page 61, "Optimize").

Once a movie has been optimized, sequences consisting of several clips can be played back continuously. However, if you edit the sequence after optimization (trim a clip, for example), you must reoptimize the entire movie. The temporary files are automatically deleted from the hard disks after the movie is edited.

This also explains why there is no Undo function which permits you to replay an optimized movie after making changes to it.



No Undo

Keep this in mind before making changes to a movie that has already been optimized. You can set up your system so that a dialog box appears before the optimized files are deleted. This box provides you with a last chance to cancel the change(s). For more information on this subject, see the tips on using the Optimizing functions (→ Page 61, "Optimize").

During optimization, only critical parts of new files are recopied and copied together. If your movie consists mostly of long sequences, you don't need optimization for the most part, since Video Machine can play it back continuously. However, VM-STUDIO PLUS 3.0 will optimize a sequence with extremely short cuts (one second or less) by creating new files with the merged clip data. The system automatically determines the structure and sequence of the new temporary VM-STUDIO PLUS 3.0 files depending on the given conditions; you do not have to specify any settings.

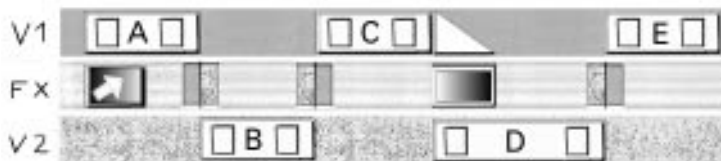
You can specify a certain duration for all objects on the TIMELINE. The OPTIMIZE functions of VM-STUDIO PLUS 3.0 orient themselves to these times. For more information on this subject, please see (→ Page 81, "Optimize Settings")

An optimized movie appears in the TIMELINE with a green background. This colored area immediately tells you that there are optimized files and that you can play the movie continuously.

To make many invisible processes more transparent during optimization, proceed as follows:



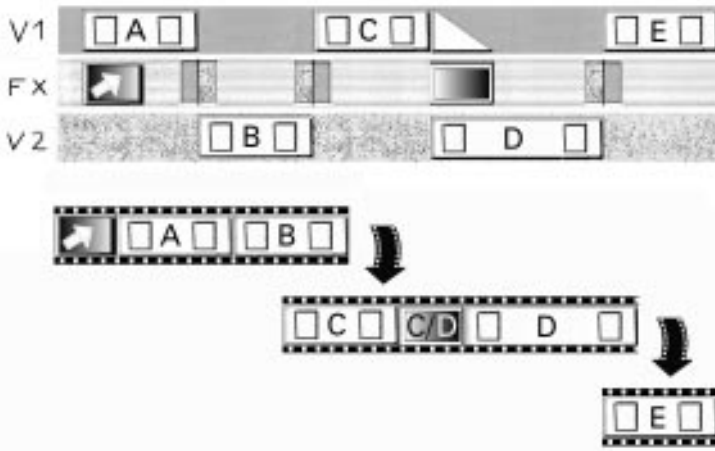
- Let's say your TIMELINE looks something like this: Five very short clips (all with a duration of 10-15 frames) are distributed among both tracks. Clip A has a fade-in transition. There is a short transition between clip C and clip D. All other transitions are hard cuts.



This film cannot be played continuously on some systems. There are two edits that the system has to cut to: the cut to clip C and the cut to clip E. As you know, Video Machine has two framestores and two SCSI controllers in order prepare in time

the necessary clip of an A/B distribution on the TIMELINE. This ensures continuous playback of clips A and B. However on V1 the time between clip A and clip C is too short to play clip C in time after clip A. For this reason, the system continues playing with a preroll. The same applies to the transition between clip C and clip E on V1. Here, VM-STUDIO has to play clip C until the end of the dissolve. This leaves it too little time for preparing clip E.

- In such a situation, the OPTIMIZE function permits continuous playback of the movie as follows:
Clip A and B remain unchanged and are not copied. Clip C and D are copied and the dissolve area is rendered. Clip E remains unchanged.



- To sum it up, in our example only clips C and D are copied to a new position and merged in a file to permit continuous play of the movie. Everything else can stay where it is. Based on this example you can surely imagine how complicated things can get with longer movies. Depending on how they are distributed, clips have to be merged, sometimes rendered and in many cases merely copied. You do not see any of this. The continuously playing movie which results can be directly captured on the recorder.

Filter and Effect Plug-Ins

Plug-ins are effects and filters from third-party manufacturers that only have to be calculated with the software.

Effect plug-ins can be used with the **TIMELINE**, just like Video Machine effects.

Filter plug-ins are applied directly to the digital clips both in the **PROJECT MANAGER** and on the **TIMELINE**.

Effect and filter plug-ins differ in terms of how they are processed by the computer. Unlike Video Machine effects, plug-ins cannot be played back in real-time. To view results, all plug-ins have to be calculated. This is not done with Video Machine hardware, but rather with your PC's microprocessor. This explains the long processing times.

Calculating a plug-in creates a new DPR file from the resulting image data. This file is not visible to the user. This means a lost digital generation, as when rendering normal A/B sequences.

You can apply as many filter plug-ins to a clip as you like. These filters are applied to each frame of the clip in the sequence you specified and written as a DPR file to your DPR drives. Even if you use more than one filter, you do not have to go through more than one digital generation. Filter processing uses one frame/field of the digital clip and filters it using the sequence in the selected filter list, without writing it back to a DPR file in the

Effects

Filters



Filter Plug-In

Effect Plug-In

process. This results in only one generation loss even in the case of longer filter calculations with several filtering levels.

Effect plug-ins calculate each frame of the two clips involved in a transition and write this effect as a temporary file to the DPR hard disks. The transition can be played after being calculated.

Plug-In Preview

All plug-ins can be previewed directly on the TIMELINE. During previewing, you can view each frame on the output monitor at any quality you like.



Plug-ins represent a significant expansion of Video Machine's capabilities and are an important addition to the VM-STUDIO effects. However, the long processing times required for online quality may be a reason not to use plug-ins during editing. Careful planning can reduce the time required. Be sure to use the highest quality possible when trimming and processing effects and filters in the preview. Let the computer render when you are not working on it. Use the RENDER ALL (→ Page 70, "Render All") or RENDER FILTER (→ Page 69, "Render Filter") functions, especially in combination with the "if necessary" parameters so that the entire movie is processed.