

Mediaware Review

Creating Digital Video with VideoSpigot

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General Information: VideoSpigot™, SuperMac Technology, 485 Potrero Avenue, Synnyvale, California 94086 • Phone: 408-245-2202 • Fax: 408-735-7250. System Requirements: • Any Macintosh computer with an available Nubus slot • A colour monitor with 8-bit or greater graphics card • 4 MB of RAM memory (although 8 or more is recommended) • At least 40MB hard disk drive (although larger drives are recommended) • System 6.0.7 or later system software • 32-Bit QuickDraw™, version 1.2 or later • QuickTime™, version 1.0 or later

VideoSpigot System. Description

Multimedia developers face the challenge of converting analog video and audio segments into digital files so that they can be incorporated into multimedia instructional programs. VideoSpigot is a hardware and software system for the Macintosh which does precisely half of the work—the video half. The hardware component of the system is the VideoSpigot Nubus Digital-Video Frame Grabber. The software components of the system are the QuickTime™ system software extension, the VideoSpigot System Extension, and ScreenPlay, an application that records video as QuickTime movies.

Frame Grabber

The VideoSpigot Nubus Digital Video Frame Grabber is a piece of hardware for capturing video; it is a circuit board which plugs into any available Macintosh nubus slot. When in place, it exposes an RCA plug for connecting the Macintosh to external video sources, such as videodisc and videocassette players, and camcorders. The Frame Grabber can successfully deal with video recorded in either NTSC or PAL formats.¹ It is capable of receiving analog video input from any of these sources and digitizing the signals. It is not capable of video output—transmitting video to an external monitor or receiver.

QuickTime Extension

The QuickTime Extension is an invisible program which is stored in your system folder. It is a standard protocol for managing time-based information, so in multimedia terms, it synchronizes video and sound, and allows them to be played back together on the Macintosh. The QuickTime Extension must be loaded into the system in order to use motion/audio data, but once it is loaded, it operates in the background, so the user can forget about it.

One particularly nice feature of the QuickTime protocol is that it has been adopted as the standard approach to handling multimedia data on the Macintosh platform. It is used in many newer versions of programs, including PowerPoint, Persuasion, MacroMind Director, Authorware Professional, and of course, HyperCard. QuickTime uses a new transparent data type, called dynamic data, which means motion and sound can be treated just like other data types such as text and graphics. Dynamic data (QuickTime movies) can be cut, pasted, copied, saved, and moved from one application to another. For those readers who care about such things, QuickTime is a media integration architecture which acts as a transparent interpreter between applications, codecs (compression/decompression managers), and other applications and equipment. For most users, QuickTime can be ignored, as it invisibly integrates video, audio, animation and devices.

VideoSpigot System Extension

The VideoSpigot System Extension automatically compresses QuickTime movies to save space when saving them on a hard drive, and decompresses them for playback. More on compression/decompression will be mentioned later. This extension is also placed in your system folder, and like the QuickTime extension, it performs invisibly in the background.

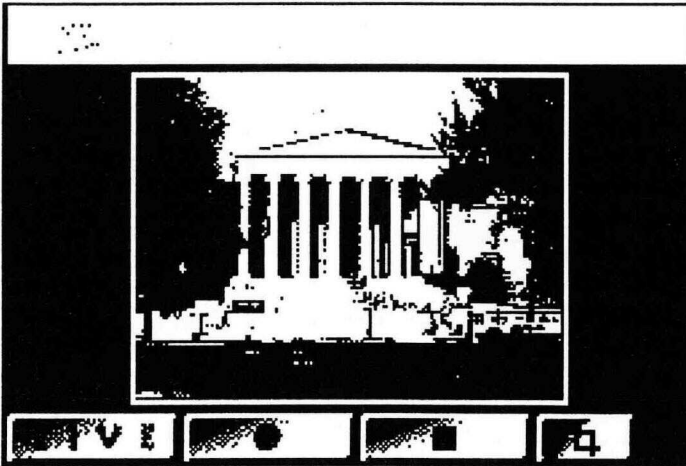
ScreenPlay

ScreenPlay is the program you receive with the VideoSpigot which allows you to produce and play QuickTime movies. When ScreenPlay is started, any video source which is playing through the video input appears in a window. For example, if you were playing a videocassette, and connected the "video-out" of the VCR to the "video-input" jack on the VideoSpigot, the motion video image would appear in the ScreenPlay Record window (see Figure 1).

ScreenPlay has four buttons which appear beneath the Record window. They allow the user to play "live" video, crop the video image, record video, and stop live video or recording. Another additional command is activated by clicking on any image appearing in the "live" video window and dragging it off the screen. This, in effect, creates a still image which can be saved as a PICT file.

Three pull-down menus also appear at the top of the screen — File, Edit and Spigot. The File and Edit menus contain the usual variety of Macintosh commands, but the file menu also contains a "Compression..." command line which allows the user to select the method of compression used when recording

Figure 1.
ScreenPlay "Record" Window.



a movie or still image. The methods include Video, Photo—JPEG, Animation, Graphics, Component Video, Compact Video, and None. With the compression method selected, the user chooses the number of colours (the video settings have no options or few), and adjusts the quality of the image with a slider bar (see Figure 2). The Spigot menu allows several adjustments to the video and still images. The colour and hue of live video can be adjusted with one set of controls (see Figure 3). A second set of controls labelled Preferences allows the user to record audio with the video (through a separate input), set the limit of the number of frames-per-second for motion segments, select the size of a still image, and whether it is captured from a still video source (see Figure 4). The number of frames-per-second is particularly important, as it will largely determine how choppy or smooth the recorded movie will appear when you play it.

Each of these settings also influences the amount of compression performed on the file, and therefore the size of a file. Theoretically, if hard disk space is at a premium, it is important for the user to select the lowest acceptable levels of quality available (i.e. lower quality compression, fewer frames per second). Figure 5 presents comparison data I generated on my own system (Macintosh Ilci, 8MB) recording the same 15-second segment at high, medium and low quality compression settings and at 20 fps, 15 fps, and 10 fps.

It is apparent from these data that adjusting frames per second has a much more dramatic effect on file size than does the quality of compression setting. In fact, at 10 frames-per-second, the file sizes are marginally larger at low quality compression settings than at high quality compression settings. This

Figure 2.
ScreenPlay "Compression..." Window.

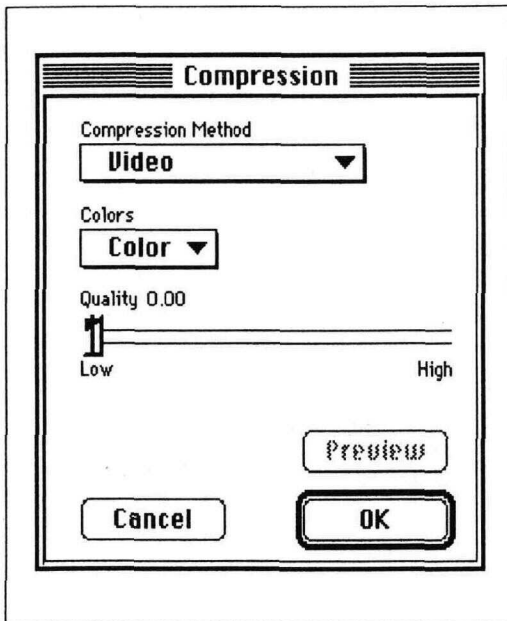


Figure 3.
ScreenPlay "Colour" Window.

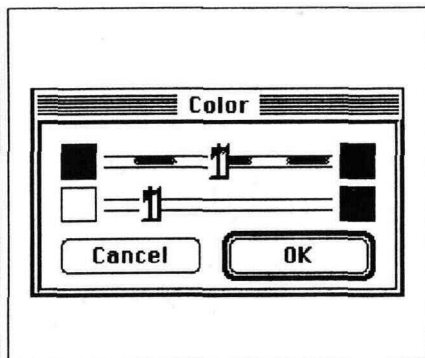


Figure 4.
ScreenPlay "Preferences" Window.

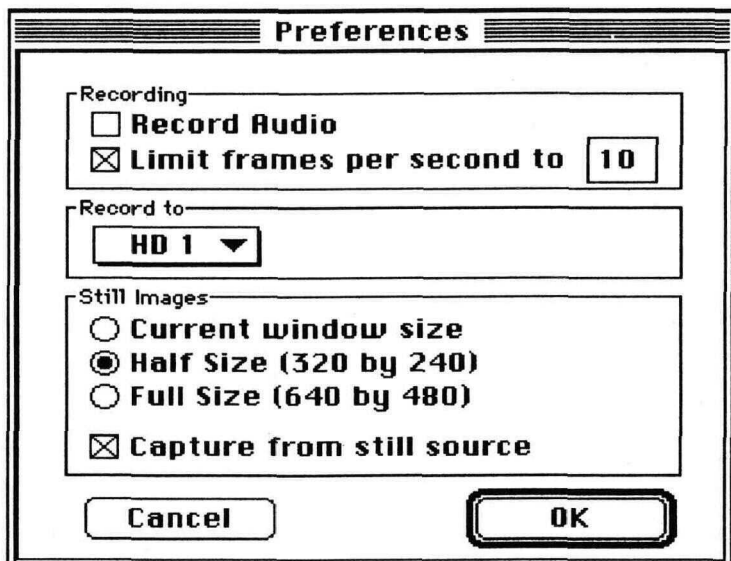
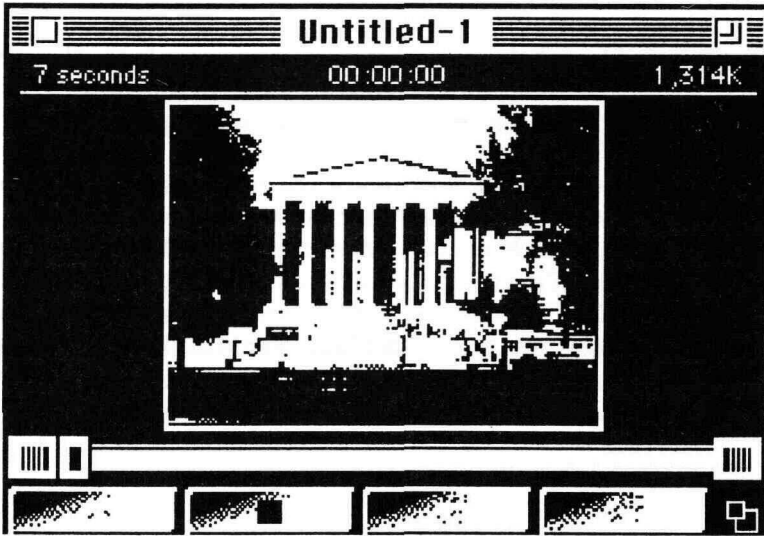


Figure 5.

File Sizes Resulting from Various Quality Settings for a 15 Second Motion Segment without Audio.



opposes logic, and I have no explanation for the results. It is possible that my reflexes were inconsistent in stopping the recording at 15 seconds, but I repeated the measures three times and obtained the same pattern of results each time. Regardless, at every speed the effect of the compression setting was small —almost negligible. These data argue for using the highest quality compression setting available, and making adjustments to the number of frames-per-second in order to conserve file space.

It is also important to know what type of system you are using for recording. The maximum frame rate for recording live video depends in the size of the image, the speed of the CPU, the speed of the hard disk drive and whether or not audio is being recorded. For example, the documentation for ScreenPlay reports that a Macintosh LC records 320 x 240 pixel frames at 8-10 frames-per-second (fps), and 160x 120 pixel frames at 12-15 fps. One method of improving a recording on a slower system is to record to RAM memory (Option-Record Button). Because recording to memory is faster and less variable than recording to hard drives, the movie is smoother, but each recording is limited to the amount of RAM available in the system.

Recording, Editing and Playing Video

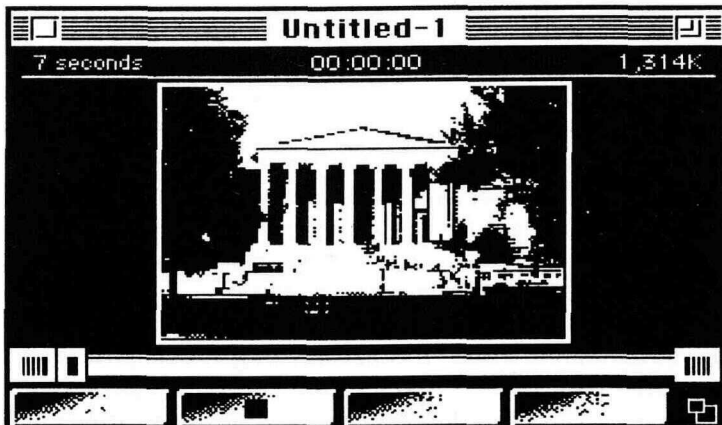
As with most Macintosh applications, ScreenPlay is highly intuitive and uses well-established conventions for carrying out routine operations such as

opening and saving files. The buttons in the Record Window mimic the controls of a VCR for the most part, so it is very likely that a new user would be able to record a segment without reference to the documentation. Of course the process doesn't stop there. Several specific operations must be carried out in order to crop images, record, edit, preview and save the exact video clip you want to create.

When "live" video is being recorded, counters appear in the Record Window which keep track of the elapsed time and the actual frame rate of the recording. Once the recording is completed, the recorded video appears in a new window called a "Movie Window" (see Figure 6). The Movie Window displays the recording you just completed, and allows you to edit clips from the segment. The complete segment, and any clips extracted from it can be saved as separate movie files. The top of the Movie window shows the total length of the segment, the position (in time) of the current image being shown, and the file size of the segment. Beneath the recorded image, the Movie Window displays a scrub bar, which can be used to mark the "in" and "out" points of clips to be extracted and saved from the original full segment.

Figure 6.

ScreenPlay "Movie" Window.



This review will not drag you through a complete procedure. There are many approaches and variations which might be taken with the same material, and these are amply described in the ScreenPlay documentation. Most procedures are so simple to use that you will be able to create and edit movies within a few minutes if you are already a seasoned Macintosh user.

But What About the Audio?

Even though the VideoSpigot hardware only records video, audio can be recorded at the same time if your Macintosh has built in audio capabilities or through an audio input board or MacRecorder system. I have used a MacRecorder successfully to add the audio tracks from the video or add my own audio to a recording.

The ScreenPlay program must be configured to record audio. This is accomplished by selecting Record Audio from the Preferences window under the Spigot pulldown menu.

CONCLUDING REMARKS AND OBSERVATIONS

The VideoSpigot documentation is beautifully laid out and easy to use. It is well-illustrated, and what impressed me the most was its economy. The entire operation of ScreenPlay is described in a few short pages—testament to both the simplicity and elegance of the program, and, I hope, the fine hand of an instructional developer in the creation of the print document. Still, the documentation is missing some key features I would have appreciated, such as comparison tables of various systems/quality settings configurations. The documentation is also missing a description of the compression methods one can select, so the user is left to experimentation to determine which of the compression methods might be best for any particular use. Of course, most users will be familiar with the Apple QuickTime documentation too, which contains brief, but very useful descriptions of these and other compression methods.

The ScreenPlay software is limited to recording segments of motion video, and clips or still images from the segments. If one wants to assemble a video production by combining clips, adding transition effects and mixing audio, then video editing software is required. At the time of this writing, VideoSpigot was being bundled with Adobe Premier, an easy-to-use and quite impressive video editing program. For many multimedia applications, one only needs to record or copy brief, intact sequences for insertion in an instructional program. For these applications, ScreenPlay is adequate. For anything more elaborate (and I suggest you will be unable to avoid the temptation) video editing software is necessary.

Word on the street has it that there are higher quality frame grabbers than the VideoSpigot on the market, and if price is any indication, this is probably true. I have had occasion to use only one other frame-grabber system (VideoVision), and I was unable to see a marked difference in quality, and I found its software to be a nightmare to use.

One personal observation: I dislike the choppy look of digital video. Digital video, at least the variety we are able to create on our desktops at the moment, is not very pleasing. The pixilated movement and out-of-synch audio makes me cringe. For high-quality video, videodisc is still unsurpassed in multimedia

productions. Still, digital video is improving rapidly, and the affordability, convenience and portability of creating digital images makes the pain of watching inferior motion images bearable. I suspect that with products such as VideoSpigot and ScreenPlay, we are witnessing the beginning of an important transition in the development of multimedia instruction. I only hope that the transition is brief, and we achieve higher levels of technical quality very soon.

¹ NTSC stands for "National Television Standards Committee," and it is the standard video format used in Canada, Central America, Japan, Korea, Mexico, western parts of South America, Taiwan, and the United States.

PAL stands for "Phase Alternate Line," the video format used in most of Africa, Australia, China, New Zealand, Scandinavia, eastern parts of South America, and most of Western Europe.