



# VIDEO MACHINE

## User Magazine

Powerful Desktop Video Production on the Video Machine

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### When Will We Ever Learn?

At the end of May, Wendy and I took a vacation which was the first non work- or family-related holiday for as long as we can remember. Normally we would have stowed the Supercam, the 450, tripods, battery backs, chargers, and a couple of cases of tape in the back of the Jeep, and set off without a second thought. This time we were flying to Calgary, then renting a car for a week in the Canadian Rockies. Thinking about the pile of equipment, we said to ourselves - "what the heck—this is a vacation." So we packed the Minolta 35mm camera with its 35-200 mm lens, and a couple of 6-packs of film instead. After all if Ansel Adams could do it without video - why can't we?

#### Bad decision!

Not even Ansel Adams could approach the capabilities that we videographers possess to record the sounds, motions, and scope of Nature. Even with my fisheye lens (which I didn't bring) I would not have been able to record the breathtaking torrents of water cascading almost 200 feet down a slender crevasse carved in the rock at Maligne Canyon - swirling and wearing potholes, pausing, then descending to the valley floor below. Although I managed to capture an avalanche in a single 35mm frame, how could I convey the thunderous sound followed by the awesome view of hundreds of tons of snow crashing from the mountainside onto the Athabasca Glacier spread out below? How to record the tall pines swaying as the wind whispered through their lofty boughs, with unseen birds singing their haunting evening songs? How to capture the tinkling

sound caused by the ebb and flow of the frozen lakes as they began to thaw, throwing up tiny mountains of jewels of ice crystals glistening in the afternoon sun? Even Wendy's former university teacher with his admonitions of "no pans" would have succumbed to the panoramas of the snow-clad giants towering above their glacier-scarred landscapes.

We returned with several hundred beautiful photographs, not quite up to Ansel's standards. But the lost opportunities will have to wait until we can return to the Rockies.

Will we ever learn?

Tony Cooper  
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### FAST POPULAR AT NAB AND COMDEX SHOWS

The success of FAST Electronic U.S., Inc.'s back-to-back NAB '95 and Spring COMDEX exhibition shows was tantamount to having a hit record on the charts or a book on the *New York Times* best sellers list. When you're hot—you're hot! Record attendance, product announcements, strategic partnering, positive press and months of preparation combined to make both shows the best ever.

#### Show Partnering

Invitations to partner with leading video and hard drive manufactures validated FAST's emergence as key player in digital video. IBM, Micropolis and Conner Peripherals all requested FAST nonlinear editing bays in their booth to showcase their latest A/V hard drives. Panasonic and Sanyo Industrial had OEM turnkey versions of Video Machine Lite on display and Pinnacle's Alladin was demonstrated for the first time interfaced with Video Machine Digital Player/Recorder (DP/R). A leading industry publication, *Digital Video Magazine*, invited FAST to demonstrate the DP/R in their booth as part of a nonlinear video showcase. All told, FAST setup a record 17 complete systems at NAB.

#### Dressing For Success

FAST dressed the part, sporting a new booth with a futuristic, high-tech energetic look. "The look and feel of the booth was designed to be open and inviting" says Karin Candussio, manager of marketing for FAST Electronic U.S., Inc. "We also wanted it to project the vitality, and innovation of FAST's culture as a whole, which we clearly achieved based on the overwhelming positive feedback."

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## New Demo a Show Stopper

At NAB, FAST was ideally situated in a multimedia hotbed between several nonlinear companies. A new video demo, edited by FAST U.S.'s own Paul Oakley, premiered on the nine-monitor video wall. The beat-thumping music video, starring basketball superstar Michael Jordan (courtesy of the NBA)—stopped passersby dead in their tracks! Former Avid editor, now FAST evangelist, Joe Mustacchi, completed the slam-dunk with a dynamic theater presentation that kept everyone glued to their seats.

## Video and Studio QUADS are Hot

Representatives from major television, cable and post production facilities saw demonstrations of the new fully configured U.S. versions of DP/R turnkey solutions, Video QUAD and Studio QUAD. The National Hockey Association (NHL), and New England Cable and News were so impressed—they purchased Studio QUADS right off the show floor.

More than 70 media representatives crowded into FAST's NAB press conference for a bite to eat and to hear the latest "scoop" from company founder and CEO, Matthias Zahn. They weren't disappointed as Matthias outlined publicly for the first time, news that FAST is creating an American Holding Company with headquarters based in the U.S. subsidiary's Foster City location. This should commence about mid-June.

## The Perfect Cap at COMDEX

COMDEX continued the string of excitement with the unveiling of the next generation of Movie line products. Movie Machine II and FPS 60 created a stir and provided the perfect cap to the back-to-back shows with MM II winning *BYTE Magazine's* Best of COMDEX Finalist Award for Best Multimedia Hardware.

*By Bob Hatton  
Manager Public Relations  
FAST Electronic U.S., Inc.*

# NEW PROGRAM ESTABLISHED FOR VIDEO MACHINE MACINTOSH OWNERS

The migration of the Apple's Macintosh computer to PCI bus architecture is a watershed development in the computer industry. Though issues remain, PCI will provide a bridge and welcome standard that will benefit users, and vendors alike. Apple expects to ship PCI Mac products as early as June 1995, signaling a new era away from the current Nubus platform. As a result, FAST Electronic is redeploying development efforts in favor of PC-based PCI digital video products. It is envisioned that these products will be compatible—with software drivers—on Macintosh or PC based computers.

Though FAST will no longer develop products for Macintosh Nubus computers, the current Video Machine Mac (VM Mac) linear video editor will continue to be supported with software fixes, unlimited free technical assistance and, hardware and warranty repairs. In addition, a program has been established whereby VM Mac owners wishing to take advantage of FAST's hybrid nonlinear Digital Player/Recorder, will be given special consideration to exchange Video Machine Mac for Video Machine PC hardware.

## VM MAC EXCHANGE PROGRAM

Effective June 1, 1995 through September 31, 1995, FAST Electronic U.S. Inc. will exchange Video Machine Macintosh Nubus boards for Video Machine PC boards under the following terms and conditions:

**Option:** Exchange for VM PC with Digital Player/Recorder

Video Machine Macintosh may be traded straight across for Video Machine PC when accompanied by an order and full payment for a Digital Player/Recorder. For exchange, the order must be accompanied by hardware, instruction manuals and a certified check payable to FAST Electronic U.S., Inc. The customer is responsible for one-way shipping handling and insurance charges. The exchange price is \$7,502 for California residents (includes 7.25% California Sales Tax), and \$6,995 outside California. FAST will then send a new Video Machine and Dual Channel Digital Player/Recorder via the same shipping instructions.

**Eligibility:** Offer open to original owners of Video Machine Mac purchased through a FAST authorized dealer in U.S. or Canada prior to June 1, 1995. Proof of purchase is required. All exchanges are being handled directly through FAST Electronic, 393 Vintage Park Dr., Foster City, CA 94404. This offer is not valid with any other discounts and is subject to product availability. Terms and conditions are solely at the discretion of FAST Electronic U.S., Inc. and may change at anytime

## PC HARDWARE CONFIGURATION

Assistance with PC hardware recommendation, installation and configuration is available through FAST Technical Support at (415) 345-3400, as well as on CompuServe (GOFAST). To find out more on the exchange program, contact FAST at 415-345-3400.

## TONY'S TIPS

I don't like using the macro option on my camera lens for transferring photographs to videotape. Consequently I have to struggle with the camera atop a 5 foot copy stand, so as to give appropriate zoom and focus control.

While browsing in the local office-supply store for a white-board to hang on the wall for keeping notes while editing, I came across one made of steel with a white porcelain finish. This seemed more durable than the usual plastic ones. After using it for a while and hanging notes on it with small magnets, a light suddenly flashed on in my brain. Why not hang pictures on it with magnets, instead of struggling with the copy stand?

This has proved to be remarkably successful. With proper lighting, the board can be used to set white balance, and now that the camera can be mounted in its normal horizontal position, it can easily pan and tilt to add motion to the photographs.

# Reflections in the FAST Lane

by Richard Pearlman CIS 74073,2534

**R**eflection—contemplating what outstanding effects are possible with the ability to mirror an image on the screen. Since FAST doesn't offer a simple way to reverse or flip a video image, here's the work-around. Please have your DP/R ready, as this is not a direct tape operation.

Here's what we are going to do. We will create a graphic for every frame, flipping the graphic image (or mirroring the image). Then we will take the graphics, and using the DPR, create a new animation clip. Then combine the original clip with the mirrored clip (from the graphics) using the clip editor, to show one half the screen with the original clip, and one half the screen with the mirrored clip. Both vertical and horizontal mirroring can be done.

1. Define a clip and digitize it.
2. Pull down the reel menu, having selected DP/R, and choose Split Clip to Images.
3. You'll see a Grab Video Frames As... window. Break the digitized clip into graphics

files, one frame per graphic file. The more complex your picture, the larger the graphic files. File size is approximately 1Mb per graphic, even with compression. Try using the VM output to avoid interpretation on recombining (it's faster), but the various tif, pcx, etc. formats all seem to produce acceptable final images. Be sure to ask VM to do the mirroring at this point: you'll see the V-Flip and H-Flip options. You will generate a new graphics reel.

4. The only reason you would want the picons (thumbnails) generated is to see pretty pictures. Otherwise the picons are grey and the process is faster.
5. Tagging which graphics files are to be recombined allows you to create lapsed time effects by tagging selected intervals (every tenth file for instance). Up to 3X can be done via the 300% Variable Speed function in the Clip Editor, but if you only want one frame per minute, then it's time lapse time; later you can use the variable speed to speed up

to 1 frame every three minutes.

6. Be careful of your disk space as filling a disk up can have bad consequences. We end up doing 5 second segments as we only have 300 available megs on our computer disk. I'm thinking about another gig just for animations and mirroring.
7. In your newly created graphics reel pull down the digital menu and choose Build Single Frame Animation. Choose compression ratio.
8. If an animation reel is not already created the process creates one. Then use the new animation as a regular clip.
9. Use DVE cropping to split the screen vertically (if that's the way you flipped the video image when splitting clips to images). Use the reversed clip as full screen in the background and the original cropped to the desired size in the foreground. Use 2X or 3X speeds (or your time lapse) for real impact. With this little secret and your imagination, you'll have the power to create wild MTV-style mirror and time-lapse effects.

## Faster Photo Montages

by Brian Santee CIS 74077,1253

**H**ere is a very quick way to produce photo montages—no need to scan, import, and crop the images. I capture all the images directly to the hard drive by double clicking on any graphic, clicking on the camera - frame grab - and grabbing the image.

Set the camera up on a tripod angled down, and place the photos on a similarly angled piece of corkboard, with 2 garage or construction flood lights (available from any hardware store) angled at 45° to prevent reflections. Don't forget to white balance as these lights tend to be a bit 'hot'. Connect a video cable directly from the camera video-out to one of the VM inputs.

It is really fast - click the VM capture camera icon, name the photo "001pic" (start with 001 rather than just 1, due to the way characters in file names are sorted), hit enter, change the photo—and REPEAT.

*TIP*—save the images in jpeg format to reduce the file size. I can get around 30 photos in 1 meg of disk space with no noticeable loss in quality, instead of the usual half meg or more per photo.

After capturing all the images, find a song to go with the photos. First, get the exact length of the song and calculate how long each photo must be displayed (including title). Then open a new graphics reel, name it for the song, and under tools, set the default length of the clips to the calculated length. In VM ver 2.0, if you can arrange that this length is at least 5 seconds, then VM will not pause between each clip to load the next one—a real time-saver. Select *load graphics*, click and drag all of the saved images into the new graphics group.

*Set the default transition to a dissolve, place the title, choose "auto assemble all graphics", press record, and walk away.*

When the graphics on the timeline have been recorded, it's time to add the audio. Simply disable the V1, V2, and F/X tracks in the timeline. Now, when you record the audio insert, the audio will not stop for the video transitions. Turn off the video and hi-fi channels so as to do an audio insert

by disabling V1 and A2 on the AG-1970, leaving only the A1 on for linear audio inserts.

If your CD player is installed in your computer, open another window and execute the CD player program. Cue up the song and pause. Hit record on the VM and when the audio cut comes in, press the play button on the CD player software, or on the player itself. In VM ver 2.0 there is the "live player" feature which will allow you to cue up your audio source. The song will automatically cut or fade out at the out-point on the timeline. You're done. If you miss the in-point—you can try, try, again without worry.

You can also do this in sections for multiple songs, photo groups, growing up, friends, wedding, etc. and match a title, set of photos, and a song.

*Brian has been involved with computers for the last 13 years with extensive programming on mainframes. He has used VM for about 2 years in his own production company, Visions and Voices. He is also a VM dealer.*

# Betacam SP Editing on a Budget

By Don Landis

## SAVE OVER TWO TON OF BUCKS WITH VM AND UVW-1200s (\$4540 savings)

Sony's recent UVW series addition to their line of Betacam SP editing decks has made Betacam SP quality affordable for all those who have budgets for 3/4 Umatic SP. I recently made this upgrade to the UVW-1800 Betacam SP editor and have found it not lacking any features or quality I need when used with the FAST VM. The UVW-1800 is a basic Betacam SP recorder that has frame accurate edit capabilities when connected to a capable edit controller such as the FAST VM.

For a player, Sony recommends only the UVW-1600 because of its RS-422 control protocol. This would seem reasonable since most edit controllers use RS-422. The UVW-1200 only has RS-232 control and is not thought of as a capable source player in an edit environment by Sony representatives. Thanks to a special driver developed by FAST and a tip from my dealer, STS Electronics, in Fort Lauderdale, FL, I was able to save over \$4500 by using these UV-1200s as source players vs the UVW-1600s as recommended by Sony.

Being the skeptic that I am, I managed to get a UVW-1600 and a UVW-1200 to do my own in-house test. I performed video quality tests as well as edit control tests. My wallet smiled when I discovered there was absolutely no difference in video and audio quality between the 1600 and the 1200. The control of each was identical and a 100 A/X roll edits test proved that the speed of the RS-232 was the same as the RS-422 deck for on-line project completion time. There also was no difference between the response time of the 1600 vs the 1200 when using the FAST Jog Shuttle Controller.

Are there any differences other than price? I only found two that have little significance for me. The most obvious difference is the lack of audio VU meters on the front panel of the UVW-1200. At first, I kind of missed them but figured if this becomes an issue I might build some outboard VU meters for each deck. The second difference is less obvious. The

UVW-1200 lacks any external control for its built in TBC. In actual practice, I have yet to need this feature, as all my source tapes to date from my beta SP clients have been of excellent quality, not requiring any TBC correction. I wish I could say the same for my 3/4 Umatic and SVHS clients. If you feel a need for this feature then you might spring the extra \$2270 for at least one UVW-1600 in your A/B roll setup so you can make TBC adjustments from a source player.

When you access the UVW-1200 or UVW-1400 device driver panel in VM Studio you will observe that there are ballistics settings for both the 1400 and the 1200. The UVW-1400 is a record capable deck but in itself it is NOT capable of functioning as an edit recorder. Do NOT make the mistake of buying one of these 1400s in hopes of getting a cheaper UVW-1800. It will not work! I see no purpose for the UVW-1400 in an edit suite so stick with the 1200 only. Remember this UVW-1400 can not work as an edit recorder, not even with the DP/R.

Cabling for the UVW-1200 is simple. Obtain a 25 pin male to female null modem cable from any computer supply store. Your timecode is located on the Betacam special timecode track as LTC and is transported to the VM via this RS-232 cable, so no extra timecode cables are required. In the device setup, there are only two options, *playstart shift* and *playdelay*. The defaults of 0 and 2 respectively worked frame accurately from the start for both of my players.

**TIP:** Need a way to do component Betacam SP editing without a YUV option card? Although the savings in just one

### UVW-1200/1600 FEATURE COMPARISON

	UVW-1200	UVW-1600
<b>Control</b>	<b>RS-232</b>	<b>RS-422</b>
Control S	Yes	Yes
<b>Output RGB</b>	<b>Yes</b>	<b>No</b>
Output YUV	Yes	Yes
Output Y/C	Yes	Yes
Output Composite	Yes	Yes
Output Monitor w CG	Yes	Yes
Inputs Video-Audio	N/A	N/A
<b>TBC external control*</b>	<b>No</b>	<b>Yes</b>
TBC of signal out	Yes	Yes
<b>VU meters</b>	<b>No</b>	<b>Yes</b>
TC reader-LTC	Yes	Yes
<b>TC output via BNC</b>	<b>No</b>	<b>Yes</b>
TC output via RS port	Yes	Yes
Video/audio specs	Same	Same
Machine control performance by VM**	Same	Same

\* The UVW-1200 refers to a Time Base Stabilizer rather than a Time Base Corrector. Per the Sony rep the Stabilizer only corrects the Sync portion while the Corrector with the optional UVR-60 can adjust the setup levels of the video as well. Without the optional UVR-60 both function identically.

\*\* As evaluated in a rigorous editing test by the author.

purchase of a UVW-1200 alone will buy the YUV option card, if bucks are tight, you can hook up a set of cables from the Betacam SP component outputs of the UVW-1200 to the component input of the UVW-1800 and use the FAST VM for edit control only, in a cuts only environment. I find this method especially useful when making working dubs from camera originals and eliminating the garbage footage shooters sometimes acquire.

Note: Prices used in this article were obtained from the B&H catalog second edition, and may or may not reflect actual prices at the time of your purchase.

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# Custom DVEs the Easy Way

by Alan Fitch

One of VM Studio's most flexible features is its customizable Digital Video Effects. And if you've ever popped open the DVE Editor and taken a look around, you probably also know it can be one of the most difficult features to master.

But there is a way to create custom DVEs that are creative, original, and easy to put together using VM Studio's Link and Split functions. You will find these two options under the Edit menu, where they offer a handy way to disassemble existing DVEs and put them back together to easily create some very nice (and useful) effects. For instance:

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## THE DIP TO BLACK DVE

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Here's the picture: You've got twenty-three segments of two photo clips each that you want to do a quick fade to black between. Not a big deal when there are Fade to Black and Fade From Black DVEs already available, right? Just drop them on the timeline, right? Too much work! Try this instead:

1. Place the Fade to Black DVE on the V2 timeline. Double click on it to open the DVE editor, then change the Duration to 15 frames. Click on the DVE-Note icon (looks like a sheet of paper in the PC version of VM Studio) and change the name of this particular DVE to Dip to Black. Click on the save-to-disk icon to drop the changed DVE back on the timeline.
2. Place the Fade From Black DVE on the V1 timeline and slide its in-point up even with the out-point of the first DVE (don't overlap.) Double click on it to open the DVE editor, shorten the duration to 15 frames just as you did for the first one, and save it.
3. Last step: On the timeline Edit Track, click once on the numbered segment representing the first DVE, then, while holding down the <Shift> key, click on the following segment containing the second DVE. This highlights both segments. Then select "Edit" and "Link" from the top menu. Voila you now have a one second duration DVE that will do a quick fade to black and fade from black (the dip) all at

once. Drag it onto the Workbench so it doesn't disappear with the current movie. If you've started a new DVE group for your own DVEs, you can drag it from the Workbench into this Group. (Note: to use this DVE, place it at the end of the *out* going clip.)

Ready for a little more challenge? A number of the factory supplied DVEs are actually Linked DVEs themselves that can be split apart and tweaked, then reassembled to make a different DVE. Here's an example starting with one of the factory Cube DVEs (my thanks to Erik Lee Preminger for the idea on this one.)

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## THE ROLLING CUBE DVE

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1. Drag the "Cube HL to R" DVE onto the timeline.
2. Making sure the DVE is still highlighted, select "Edit" and "Split." The DVE will break into six separate DVE's, some slightly offset from each other.
3. Double click on the *top center* DVE. On the "Transition In" (left) side, click on the down arrow to copy the solid blue square from the top INPUT section to the bottom OUTPUT section. In the bottom "OUTPUT - Transition In" section, click once on the new blue square you just created (this will display the handles on the square.) Grab the bottom center handle and pull straight up, shrinking the square to an invisible (except for the handles) horizontal line at the *top* of the section's center window. Click on the "save to disk" icon to save the changed DVE.
4. Double click on the bottom center DVE. On the "Transition Out" (right) side this time, copy the blue square from the top INPUT section to the bottom OUTPUT section. Select the newly copied square in the bottom "OUTPUT - Transition Out" window and this time pull the center top handle *down*, squeezing the square to an invisible horizontal line at the bottom of the section's center window. Save the changed DVE.
5. Double click on the top left DVE. You will notice that where the individual icons dis-

played within the DVE Editor for the previous two showed as zooms or squeezes, the icon for this one shows as the "cube." Click on the DVE-Note icon and rename this DVE to "Rolling Cube" (or whatever you want to call it.) Change the Description as desired. Save the changed DVE.

6. We're almost done. On the Edit Track on the timeline, click once on the segment representing the first of the six split DVEs (this will probably be a pretty "thin" segment.) Then, while holding down the <Shift> key, click on the segment for the last of the six split DVEs. This should highlight the segments for *all* the individual DVEs to be combined. Then select "Edit" and "Link" to combine all six back into a single DVE. You now have a DVE that rolls the cube left to right, top to *bottom*, then left to right again
7. Drag the new DVE off the timeline onto the Workbench or into a new DVE group to save. (Note: When using this transition or the unmodified original, drop it on top of the INCOMING video clip, not the outgoing.) You can also change the speed/duration for the whole DVE by changing the durations for the individual DVE's while they're split apart. WARNING: You will need to slide them back together to close up space if you do this, so be careful you maintain the slight offsets between each pair so the transitions follow each other correctly.

Yes, it does seem a little like cheating. You've just created a couple of brand new special effects without knowing anything about the DVE Editor aside from how to change the Duration and DVE-Note Name. Who knows what you'll come up with when you start mixing and matching DVEs! (I'd like to hear about them, though!)

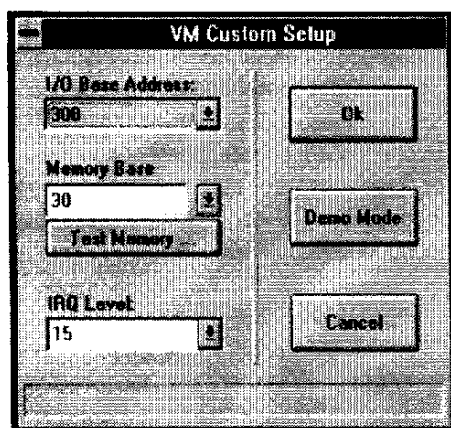
*Alan Fitch is an event videographer (specializing in weddings) and former technical writer based in Petaluma, California. He shoots with a JVC X-2 and edits using a Video Machine/Pentium combination along with Panasonic AG1960s and AG1970s. He has been a Fasternaut since November of 1994 and can be reached on Compuserve at 74435,1011 or via the Internet at WAFitch@aol.com.*

# Interrupts and Addresses

by Tony Cooper

If you have been very very good, and if you believe in the tooth fairy, then installing Video Machine and the DP/R can proceed extremely smoothly.

VM's automatic configuration module tries to search out all the possible conflicts between components installed in your computer, and if successful, you will be rewarded with a rotating globe and the sound of trumpets. For the rest of us - installation can be somewhat of a challenge.



What do we do when VM's *Custom Setup* dialog box appears? The default I/O Base Address is the same as that used by many accessory cards, the suggested Memory Base with its calculation formula of "2 times the total amount of RAM in the system - 2" hardly ever works, but as a consolation prize, the suggested IRQ level is usually OK.

In the following article I will explain what interrupts and addresses mean and where to look for conflicts. With a little care and understanding, VM will be up and running in, well, almost no time.

## INTERRUPTS

Interrupts are methods for "external" devices to signal the computer's CPU that they need to interrupt what the computer is doing at the moment, so it can process an important task. Quite often these external devices are relatively slow, such as printers, a mouse, or the keyboard. If the computer did not have a facility for these devices to signal that they require action, the

CPU would have to spend a lot of its time cycling through all these possible devices to interrogate them. For example, imagine if the computer had to spend time saying "Printer - have you finished printing that last character I sent you so that I can send you another?" "Mouse - did you send me a motion command?" "Did someone press a key on the keyboard?" "Hard disk - have you finished writing that last block of information I sent so I can send you the next one?" "Is anyone sending me data on the serial port?" Some of these actions are so important that the computer cannot afford to miss them. For example, if a modem receives a block of information, but the computer is busy sending data to the printer, then the modem's data will be lost forever. You can imagine that with all this going on, the computer would have little time to do anything else.

TABLE 1  
Standard PC Interrupt Assignments

Interrupt	Assignment
0 *	Timer
1 *	Keyboard
2 **	Prog Int Ctrl cascade to iRQ9
3 **	COM2 COM4
4 **	COM1 COM3
5	LPT2
6 *	Floppy disk
7	LPT1
8 *	Real time clock
9 **	Prog Int Ctrl cascade to iRQ2
10	Available for use
11	Available for use
12	Available for use
13 *	Math coprocessor
14 *	Hard disk
15	Available for use
*	Never use for anything else
**	Share these with care

This is where interrupts come in. You can think of an interrupt as a flag. When a character is received by a serial port from a modem for example, the serial port raises its flag and sets an internal busy signal saying that the serial port cannot receive any more data. When the CPU acknowledges the flag it stops whatever it was doing, executes a short program which accepts the character from the serial port and places it in a buffer in memory, lowers the serial port's flag, resets the busy indica-

tor, and resumes whatever it was doing when the interrupt occurred. If several devices raise their flags simultaneously, the CPU has a priority scheme by which it processes faster devices (for example, the hard disk) before slower ones (e.g. the keyboard).

## ADDRESSES

There are two types of addresses used by the computer—port addresses and memory addresses.

Port addresses resemble the address of a house. This is a means whereby the CPU can locate and talk to the electronics which control specific events. For example, a single serial interface has 8 addresses assigned to it. Each address is often referred to as a *port*. Some of these ports represent one-way streets and are called *unidirectional*. For example there is an *input* port, which is used by the computer to send a stream of characters to the serial device, and there is an *output* port, used to send the data from the serial device to perhaps a modem. Other ports are *bidirectional*, such as the status ports which control the interrupt flags and busy indicators.

Memory space is where the real work is done in the computer. This space may be compared to a book in which every word is numbered. A program is a list of instructions which tells the CPU how to perform its tasks. This program resides in the computer's memory, in the initial chapters of the book. The computer starts executing the program at word number 1 in the book, then proceeds to word number 2, and so on.

The program can make a decision to alter the flow of instructions by telling the computer to branch away from the where it is currently executing, and execute the instructions in chapter 3 of the book, then branch back and resume executing from where it left off.

Similarly, data are stored in the later chapters of the book. The program knows, for example, which "word numbers" contain the ballistics data for the play and record decks attached to the Video Machine program. When you define a clip, the information is stored in memory, and the

**TABLE 2**  
Examples of I/O Address and Interrupt Assignments  
for Common Add-in Cards

Address	Interrupt	Assignment
100 - 140	3	Digiboard 8 port serial card
100	15	FAST Video Machine
140 - 17f		Opto-22 Pamux
180	10	Winjet printer interface
1f0 - 1f7	14	Fixed disk controller
200 - 20f		Game port
220	7	Sound Blaster & all other sound cards in Sound Blaster emulation mode
23c - 23f	5	Bus mouse port
240 - 25f	2	SMC Ethernet Elite
258		EMS control on older memory boards
278 - 27f	5	LPT2
280	None	HP Scanjet SCSI interface
2a0 - 2af		Tecmar base board
2e0 - 2ef		IBM 8514 interface (& ATI=8514/A)
2e0	2	SMC arcnet interface
2e8 - 2ef	3	COM4
2e8		Older video boards with S3 chipset
2f0 - 2f7		GPIB - PC III
2f8 - 2ff	3	COM2
300	15	VM default address
310		DP/R default address
320 - 33f	9	SMC Ethernet #3016 No RAM/ROM
328		Digichannel C/X
330 - 33f	2	Roland MPU
330 - 333	11	Adaptec SCSI controller
340 - 35f	5	GPIB PC III
350 - 35f	None	NEC-Trantor SCSI adapter CDXT003
378 - 37a	7	LPT1
388	11	Proaudio Spectrum 16 SCSI port
3b0 - 3df	(2/9)	All video cards
3f0 - 3f7	6	Floppy controller
3f8 - 3ff	4	COM1

VM program remembers which word numbers were used for these data.

### PUTTING IT ALL TOGETHER

Now that we have defined our terms, there are some rules that have to be obeyed.

**Rule 1: No two people can live at the same memory address.**

Imagine what would happen if the decks' ballistics data had the same address as the in- and out-points of a clip. When a clip is defined, it would evict the current resident at that address, but the program would think that the ballistics data still lived there.

So when VM does a preroll on the play deck, instead of rolling for 3 seconds, it would use 09:45:02:25, which would cause it to throw up its hands in despair, and probably cause a system crash! Worse still, if a clip was defined and saved at the same set of memory addresses that were being used by a segment of the VM program, it would destroy that piece of program and cause catastrophic events to occur, possibly even the erasing of all information on your hard disk!

It is the job of the person writing the program to ensure that these types of conflicts don't occur. However, the end user can sometimes cause unpredictable prob-

lems when assembling his computer. VM likes to use the memory area starting at D000 or E000 for itself. If you are using a memory manager such as EMM386 or QEMM and have enabled EMS memory support—you are in for some surprises. Both VM and the memory manager will write large amounts of information into the same area of memory, and as described above, this is a definite no-no. Other problems are not quite as obvious. For example, SCSI disk controller cards, and many network cards may have both RAM and ROM on-board. Although there are user-settable options which allow the alteration of the addresses of this on-board memory, the default settings are usually in the D000-DFFF memory address range.

**Rule 2: No two devices can have the same port address.**

Disobeying this rule does not always manifest itself as obviously as memory address conflicts. If two devices have been set to the same port address, each one may appear to work sometimes. Usually, the program which accesses one of these devices will simply lock up when access is attempted. If the device is never, or is rarely accessed, the program will probably work just fine—until the device is accessed—then strange things will occur. The problem with this type of conflict is that it is often difficult to reproduce the error condition to track down its source. This is because one often needs to duplicate the exact sequence of events, from the time the computer is turned on, to the time the problem occurs, in order to have it recur.

**Rule 3: Several devices may share the same interrupt — with care.**

The range of allowable port and memory addresses is large, so it is usually possible to locate an area to be used which will not cause a conflict. However, the PC has only 16 possible interrupt selections, and some of these are already dedicated to specific devices (see Table 1). Fortunately, it is possible to share the same interrupt value between several devices, provided care is exercised to ensure that the selected devices cannot both raise their interrupt flags at the same time.

We would not want to share the math coprocessor (FPU) interrupt with the mouse interrupt since the FPU is very busy most of the time and the CPU would not be able

to decide who had caused the interrupt. However, we can be pretty sure that we can control whether the printer is going to be used at the same time as a sound card playing music, so we could confidently let these two devices share the same interrupt. The definition of the PC has already allowed the two serial ports called COM1 and COM3 to share the same interrupt, and similarly for COM2 and COM4. This brings up a problem when you are installing both a mouse and a modem. Many PCs are set up so that the mouse will only plug into the COM1 port. If this is the case, and you also install a modem on COM3, then these share the same interrupt, and any motion of the mouse while the modem is receiving or sending data could result in lost modem data. Lost mouse data is not important since we simply move the mouse again to correct for the loss.

Table 1 summarizes the preassigned interrupts in the PC. IRQ2 and 9 are somewhat special in that they allow the first programmable interrupt controller (for the first 8 IRQs) to communicate with the second (for the second 8 IRQs). Consequently it is best not to use these 2 interrupts for anything with the exception of network cards. Most systems do not have a second printer, so IRQ5 is often the first interrupt to be selected for add-in cards. IRQ values of 5, 10, 11, 12 and 15 can usually be safely used. Note that the higher interrupt numbers have priority over the lower ones, so that if two devices both request an interrupt at the same time, the one with the higher number will be processed first.

### LOOKING FOR PROBLEMS

Below are some of the add-in accessory cards which commonly cause address conflicts. The sample addresses are those which are commonly used, but may vary for different manufacturers. In all cases, these addresses can be altered by setting switches or jumpers on the boards, or by running special installation software. Some examples of these default assignments are given in Tables 2 and 3.

**Sound Cards.** These are without a doubt, the most serious offenders in creating conflicts. Video Machine does not make any use of the sound card, except to create the opening and closing sounds when

TABLE 3  
Examples of Upper Memory  
Address Assignments

RAM/ROM Address	Assignment
C000 - C7FF	BIOS on all video cards
C800 - C9FF	Future Domain SCSI BIOS
C800 - CBFF	HP Scanjet SCSI ROM
C800 - CFFF	Older disk controller BIOS
D000 - D0FF	SMC ArcNet RAM
D000 - DFFF	VM (Alternate)
E000 - EFFF	VM
D100 -	SMC ArcNet ROM
D800 - DFFF	Digichannel C/X
D800 - DBFF	SMC Ethernet RAM
DC00 -	Adaptec SCSI BIOS
DC00 - DCFF	SMC Ethernet Elite

you enter and leave the program. For this reason, you are better off not having one installed in your system. This card typically includes I/O port addresses and interrupts peculiar to itself, as well as addresses and interrupts for Sound Blaster emulation, MPU-401 emulation, joystick and MIDI interface, as well as an SCSI or proprietary interface for a CDROM. Not only is there a chance of a conflict with other devices in the system, but the joystick port almost certainly coincides in address space with the game port which exists on your multi I/O card which also includes the parallel and serial port interfaces. Because of this conflict, neither of these joystick ports will operate reliably. The solution is to disable one of them. CDROM drives are best attached to your SCSI disk controller, or with the newer drives, to your IDE disk controller. The only draw back to this suggestion is that you will not have any sound capabilities for your CDROM—but then we don't play games on our VM computer, do we?

**SCSI disk controllers.** These cards have an I/O address, an interrupt, and memory space for the ROM bios. Typically, these cards come preaddressed at address 300 or 330, and IRQ 11. The bios is usually at DC00.

**Network interface cards.** These typically use addresses 280 or 300, IRQ 3 or 10 and ROM address D000 or DC00. The older ArcNet cards use address 2E0, IRQ 2 and address D000. Both these cards usually also include a small amount of RAM used to buffer data. This typically takes the

address space immediately following the ROM bios.

**Multi I/O cards.** These should not cause a conflict since they contain devices whose addresses have been predefined in the PC standard. However, adding a modem card or sound card can cause both address and interrupt conflicts.

**Expanded memory.** This is a scheme which allows programs to access memory addressed above 1 megabyte. It uses a 64K section of "upper" memory, usually at D000 or E000 as a "page frame". Both these areas of memory are prime candidates for conflicts, as pointed out above. Also, VM's memory mapping scheme seems to prefer to use these areas. Windows programs do not use expanded memory, so make sure you include the "NOEMS" parameter in your *config.sys* file on the device=emm386 line, or the "EMS:N" parameter on the device=qem386 line. You will also need to ensure that these memory areas have not been enabled for shadowing in the system BIOS setup. Bring up your system BIOS (at boot time) and go to the "Advanced Setup" selections. Set the entire memory range D000-EFFF to *shadow = disabled*. If you need expanded memory for games or other programs, it is best to create a multiple boot file with separate boot options for VM, with no EMS, and for other applications, with EMS.

As a final note—if VM won't even start when you first install it, you probably have another board with an address set to 300. If you can't change this, you will have to edit the *vm.ini* file in the windows directory: look for the line that says *IO\_BASE=768*, and change the value to 256. (*The vm.ini file uses decimal values: 768=300 hex, 256=100 hex.*)

### THE BEST VM SETUP

If you have to use VM's Custom Setup, and you have resolved all the above conflicts, then the configuration most likely to produce success is:

I/O Base Address	100
Memory Base	E000
IRQ Level	15

*When he is not editing the VMUM, and helping his wife Wendy with her videography, Tony is a computer consultant.*

# Michael Yeager, One Man Video Band

by Jim Stinson

*Oh, I am the cook and the captain bold  
and the crew of the Nancy Brig.  
And the bosun tight and the midship-mite  
and the crew of the captain's gig.*  
—W. S. Gilbert

The above verse reminds me of Mike Yeager, the power behind KnowledgePath Video in Seattle, producers of highly regarded videotapes on videomaking.

Mike is the instructional designer for these programs. He's also scriptwriter, producer, director, videographer, lighting director, sound engineer and editor.

Oh, and by the way, he's also host and narrator; and in his latest two-hour program, *Video Machine PC & Lite*, that means he's on screen as much as 90 percent of the time.

Does he pull off this juggling trick successfully? You bet! In the finished program Mike comes across with a relaxed and pleasant authority, as if he weren't simultaneously honchoing every aspect of the taping process—as if he had nothing else to do except demonstrate desktop video to you, personally.

Asked how he accomplishes this tour de force, Mike says, candidly, "trial and error"—not to mention ten years' experience directing over 75 stage productions and working on a number of videos. A full treatment of Michael Yeager's techniques for self-taping would require an article of its own, but here's a grab bag of his tricks that you can use to help your on-camera performance—even if you aren't sailing single-handed.

• **Camera.** He sets focus using a stand-in and/or a video test card, and makes sure he's got enough depth of field so that the camera doesn't require refocusing during a shot.

• **Lighting.** Mike lights with a soft key light, reflector fill, and a back light for separation. This simple system controls heat in the small shooting area, and reduces power needs as well.

• **Set.** In the *Video Machine* program, the action takes place at a desktop editing console set against a seamless paper backing. To obtain different angles without time-

consuming setup changes, the chair and console are on rollers. So instead of moving and resetting lights and camera to get a different angle, Mike simply rotates the set instead. Because the paper backing is featureless, the viewer is unaware of the shift.

• **Sound.** On camera, Mike wears an unobtrusive in-the-ear headphone connected to his camcorder so he can verify good sound quality as he narrates the program. He uses a hard-wired lavalier mike.

• **Directing.** To see what he's doing on-screen, Mike consults not one, but three video monitors. A studio monitor in under-scan mode shows the entire image. A 30-inch monitor allows him to verify fine details. And a four-inch Sony LCD monitor is mounted right on top of the lens so that Mike can see himself as he addresses the camera. He can't make out details, of course, but he can check that he's staying in frame and maintaining a good composition. (If you have a camera with an integral LCD screen, like the JVC model GR-SV3 or the Sharp VL-E42U, you can get the same effect by rotating the display screen until it's beside the lens and facing forward.)

And what about narration? Mike says his programs are fully scripted, mostly word-for-word. To read his scripts on camera, he uses a couple of ingenious techniques. First, he often mounts cue cards just below the camera lens, so that he can read a script directly.

But his niftiest trick has to be his adaptation of playback/lip-sync techniques for delivering complex narrative passages. For these, he prerecords the narration on an audio cassette. Then he connects the cassette player to the headphone in his ear.

With the video camera rolling, Mike then plays back the cassette audio to remind himself of his lines, while delivering those same lines to the video camera in a sort of duet with himself! Since the lavalier mike can't hear the cassette playback, the result sounds perfectly natural.

For relaxation, Michael Yeager probably juggles carving knives and blowtorches while reciting the MS-DOS manual from memory.

In Urdu.

But that, of course, is another story.

*Reprinted from Videomaker, May 1995.*

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## From the editor

With all the great production work we see from Mike, I asked him to describe his studio. Here is his reply.

"Regarding my system setup, it's not all that special: a Sony EVO-9720 as two player decks, a UVW-1800 as the record deck, a Sony PVM 1954Q monitor, VM with the pro-filter and the Studio Control box, a Truevision Vide/o Workbench (Windows waveform monitor/vectorscope), a Symetrix audio compressor/limiter/expander, Software Audio Workshop (windows audio editing system), Inscribe, and an ever growing list of graphics programs."

"By the time this article is printed I will have probably also acquired the Digital Player/Recorder and the YUV adapter."

Mike has prepared the following instructional videotapes, which may be ordered from KnowledgePath Video at (800) 537-3050.

- *Video Machine PC & Video Machine Lite: Editing, Effects & Graphics.* 2 hour video and 90 page reference guide.
- *Hi8 Video Production: Achieving Broadcast Quality.* 2 tape set - 165 minutes total
- *Canon's A-1, L-1, LX-100 & LX-200: Hi8 Camcorder Craft.* 2 tapes - 140 minutes
- *Sony's EVO-9700 & EVO-9720: Hi8 Desktop Editors.* 2 tapes - 145 minutes

As well as the above, Mike is working on the following upcoming titles:

- *Video Machine PC / Lite / Sanyo Edit Pro / Panasonic FastEdit: Advanced Editing Video.*
- *Video Machine PC: Digital Player / Recorder.*
- *Video Machine PC / Lite / Sanyo Edit Pro / Panasonic FastEdit: Advanced Effects Video.*
- *Windows Graphics for Video.*

# FAST Users Database

by William J. Myatt, CIS 75052,54

First a little background: Taylor Collins (CIS 72610,26) and myself wanted to provide some means for FAST users to get to know each other and what kind of similar problems each of us had during editing with VM. So we each came up with a way to do this, Taylor with his Mac, and I with the PC. Taylor put a message on Compuserve asking users that were interested in getting a database together, to forward to him a message giving the particulars about their equipment. This eventually turned into a database that Taylor maintained. Since his system was a Mac, a PC user could not read his data directly, and *vice versa*.

To give PC users access to Taylor's database, I wrote an application in dBase III, called FORUM.EXE. Taylor sent me an ASCII file of the first 40 users who had responded, and I entered it into a .DBF file that could be read by my application, and posted it on the forum. The latest version is FORUM1.ZIP that contains all of the required application zipped together. (A zip file is a compressed file containing multiple applications and must be un-zipped before you can use the applications within it.) It can be downloaded from Library number 6 in the FAST Forum.

FORUM.EXE is a database application that allows storing user data such as Name, Address, City, State, Zipcode, Company, Telephone Number, Compuserve Number, and Type of Video Equipment being used. The purpose of this application is to allow the user to collect and have reference data on other FAST VM-Studio Users that have editing equipment similar to yours or more advanced equipment and be able to answer a question or help with a problem.

Eight files make up the application:

FORUM.EXE	Executable Application
FORUM.DBF	Data Storage File
FOR_COND.DBF	Filter Data Storage
FOR_0001.LBL	1st Sample Label Format
FOR_0002.LBL	2nd Sample Label Format
FOR_0001.FRM	1st Sample Report Form
FOR_0002.FRM	2nd Sample Report Form
FOR_NAME.FRM	Report Alphabetized By Last Name

After the application is run, it will generate five alphabetized indexes for use by the filter or selection:

LNAME.NTX, for indexing by last name; COMPANY.NTX, for indexing by company name; TELE.NTX, for indexing by telephone number; ZIP.NTX, for indexing by zipcode; and CIS.NTX, for indexing by Compuserve number.

The application is written to hold as many records as your hard drive will support and normally uses expanded memory in the DOS mode. So if you are running it in DOS, you must (if you don't already have) put the "RAM" specification in your *config.sys* file for DOS operation. Instructions for modifying your *config.sys* file are given in the documentation file which comes with the software. Instructions are also given for running the program from a DOS box under MS Windows.

FORUM.DBF presently contains 40 data records, which was e-mailed from Taylor Collins and is a good starter for users. From time to time I will upload a new version of the FORUM.DBF, which will contain the original plus additional data of new users. All you will need to do is delete the old .DBF version and substitute the new one in its place. However, if you have added your own entries, these might be lost. So use caution.

The first screen viewed upon running the FORUM.EXE application will be a Menu of Selections. You can choose options to add new member data; browse the database using selection filters to allow the location of only those members with, for example, Cam1=SONY; view, edit, or print selected records, print labels, and print a number of reports.

This application was developed with dBase III and then compiled using Clipper into the startup program "FORUM.EXE". Any version of dBase prior to dBase IV can be used to fabricate a new report or label format. It can also be used to modify a specific Report (.FRM) or Label (.LBL) for printout per your requirements. If you have a recommendation for improvements, please drop me a message on Compuserve.

William (Bill) Myatt *Advanced Class Amateur Radio Operator WA6YKH* --- ---  
---, --- --- *Commercial Pilot with Instrument Rating. Compuserve 75052,54*

## THE FAST FORUM ON COMPUSERVE

As of May 19, 1995, FAST has moved to its own Forum on CIS: it is no longer part of the Multimedia B Vendors Forum. To join the new Forum after logging onto Compuserve, type GO FAST, then type JOIN, and enter your name.

Instead of all the communications being lumped together as they were in the past, there now exist a number of subgroups into which members of the Forum are asked to place their messages. At present, the following groups and libraries exist:

- 1 General Information
- 2 Video Machine PC
- 3 Video Machine Mac
- 4 Movie Line Products
- 5 Screen Machine
- 6 VM User Groups
- 7 Deutsche Hotline
- 8 3rd Party and miscellaneous
- 9 Uploads
- 10 Cinetic
- 11 Classified section

Additional sections will be added to the Forum as appropriate.

When you "JOIN" the Forum, you are asked to enter the groups that you wish to monitor. You can select "all", or just groups 1,2, and 6, for example. These classifications make it much easier to browse the Forum for only those subjects of interest to you, without having to search through the total information base. For example, if you wanted to get help on using the DVE Editor on the PC, you would either browse, or ask your question, in section 2 (Video Machine PC); FORUM1.EXE will be found in Library number 6 (VM User Groups), while PKUNZIP, which is "shareware" will be found as part of the file PKWARE.EXE in Library number 8 (3rd Party).

To make the system work, you need to take care that you place your own messages into the appropriate groups, otherwise there is a good chance that they will neither be read nor responded to.

—T.C.

# Black Frames and Flashes

by Tony Cooper

Most of us have learned not to use *assemble mode* for anything except copying tapes. The biggest problem in using this mode for normal editing is the danger of losing the control track on the output tape at the end of an edit. Once lost, it is not possible to perform an insert edit at this point, although it is possible to assemble edit a clip to the end of the previous one, since assemble edit always lays down new control track. We know to use *insert mode* when performing edits, so why do we still end up with black frames and flashes of "old" video at the insert point of an edit, or even when laying down new video on a previously blacked tape?

The most usual reason is inaccuracy of positioning by the record deck, which occurs most frequently in consumer and prosumer decks. We might consider that a positioning accuracy of one to two frames is pretty good, but if the record operation starts as little as one frame too late, whatever was on the destination tape before the edit will poke its head through the one frame gap left at the beginning of the edit and the eye will perceive even this 1/30th second artifact.

The solution is twofold—deck calibration which should cure the problem most of the time, and adjustment of clip positions on the timeline for the occasional misfits.

Before proceeding, make sure that your record tapes are *always* preblacked and striped with VITC. Use VM's *first edit* option in the Output Setup section. Most consumer and prosumer decks do not contain timecode circuitry, so on the Device Setup options for these decks, under VITC, make sure the box is checked that says "use VM VITC if timecode board is missing".

Firstly, you need to calibrate the record deck. This will be the subject of a future article in VMUM—until then, you can use the procedure found in section 3.3 of

the Video Machine User Guide. Although a little vague, this procedure does work! The best approach is to keep good notes, and make some pretty big alterations to the parameters initially, in both directions, to get a feeling for what these parameters do. The main effect we are attempting to achieve is to ensure that the recorder does not start or stop too early or too late.

Now that you know what sort of accuracy to expect from your calibrated deck, what do you do if you still get occasional glitches? Simply start the edit a little earlier on the timeline. If the edit starts late, you see a black frame or a flash; if it starts one or two frames early, these frames will be lost from the previous clip, but this should not be a problem. Turn on the *info box* so you can see what you're doing, and turn off the *magnet*, otherwise it will prevent you from making tiny changes. Now drag the clip to the left on the timeline so it overlaps the previous clip by one or more frames. Remember to move the effect for the in-point

along with the clip. We've now opened a hole at the out-point of the clip. If this was the last clip on the timeline—then we don't care. But if we were inserting a clip into an existing movie, the easiest solution is to make the clip longer by the same amount that it was moved left. Alternatively, although not always appropriate, you could have dragged the clip, and all clips to its right, by selecting the *film style* option.

You can use the opposite of the above steps to compensate for an occasional black frame at the end of an insert edit. If you are using version 2.0 software, glitches at the out-point can be eliminated by selecting the *linear edit mode* in the General Player Setup. This option keeps the output channel of the VM open for 4 frames after a clip's endpoint, thus ensuring that video is available to the recorder if it keeps recording a bit longer than intended.

## POST STRIPING LTC USING VM

By Jawad A. Malik CIS 73777,141

I had a need to post-stripe LTC onto an already recorded video tape. Here are the steps I worked out:

1. From device control, disable any players.
2. Make sure LTC is checked on in the Output Setup window.
3. Open the edit panel.
4. Place the prerecorded tape in the recorder.
5. Rewind (using the edit panel controls) to beginning of tape.
6. If you wish, zero the counter using the panel controls.
7. Enter a mark-in point of about 00:00:10:00 (enough for preroll) on the recorder. Enter a mark out point of about 2 hours, or wherever the control track on the video tape ends.
8. Place a graphic on V1 and V2 (it can be the same graphic).
9. MAKE SURE YOU MARK FOR INSERT EDIT, ON AUDIO TRACK 2 ONLY!
10. Perform the edit.

This will write LTC to an audio track on a prerecorded tape, except for the first 10 seconds (where you should never put useful footage anyway!). On the JVC 822, you can hear the time code if you monitor Normal audio track 1, but don't worry, it's not being recorded on track 1.

I've only tested this on a JVC 822, and obviously this requires use of the VM SC-Box. I'm not sure if this would work on decks that have a separate track for LTC, but one could always experiment (e.g., try it with none of the edit buttons selected—not the assemble or insert edit buttons).

*From the editor*

Note that this procedure will not work with prosumer decks in which LTC is not supported in the VM-supplied device driver. For example, even though you may have made the Carlson Strand modification to your AG1960 to bring out the separate linear tracks, you cannot use LTC since the VM device driver is not expecting to see it.

# Ni /Cd Battery Memory

## . . . Fact or Fiction?

**N**i/Cd "memory" is probably the most widely misunderstood of all battery anomalies. A major source of the confusion surrounding "memory" stems from the fact that there are two totally separate phenomena that have been called "memory". One of these is the "true" memory phenomenon which virtually never exists in video applications. The other is actually a voltage drop problem that has become known as a "memory" problem based on its symptoms. It is this latter voltage drop pseudo "memory" that has been the long time subject of myth in the video industry.

### Nominal Battery Voltage

Before discussing the memory problem, we must first understand the capabilities of various battery packs. Most consumer and prosumer video cameras are designed to take 12 volt battery packs, while professional cameras are designed to take either 13 volt or 14 volt packs. In all cases, camcorders are designed to shut down when the battery voltage drops to about 11 volts. Herein lies the basis of the memory problem. In order for a battery pack to deliver its full rated capacity it should continue to provide power to the camcorder until it reaches its rated end of discharge (EOD) voltage. As can be seen from the following table, a camcorder operating on a typical 12 volt pack will shut down before the batteries have delivered their full charge. On the other hand, camcorders utilizing nominal 13 and 14 volt packs can fully utilize the capacity of their batteries.

### True Memory

The "true" memory was first observed by NASA while monitoring an orbiting satellite. Each day at precisely the same time, this satellite alternately passed from sunlight, where its NiCd batteries were solar charged, into darkness, where the

batteries were called upon to power the craft. After many cycles of this precise duration partial discharge/charge routine, the scientists found that the battery would refuse to deliver power beyond that point to which it had previously been repeti-

### Unavailable Capacity

The "memory" so often mentioned in the video industry is not really a loss of capacity nor does it result from repeated partial discharges. It is in reality a voltage depression phenomenon as shown in the

### BATTERY PACK RATINGS

Nominal voltage *	EOD voltage	Upper voltage
12.0 volts (10 cells)	10 volts	14 volts
13.2 volts (11 cells)	11 volts	15.5 volts
14.4 volts (12 cells)	12 volts	17 volts

\* One Nickel/Cadmium cell is rated at 1.20 volts

tively discharged. In other words, the battery "memorized" the point of partial discharges and then refused to give energy beyond that point if called upon to do so. This story has given rise to the myth that batteries should always be fully discharged before being charged in order to prevent the mysterious "memory" from robbing the remaining capacity.

This type of memory is extremely rare and almost never occurs in the video industry or any other industry for that matter. This rare memory phenomenon only results when the amount of the repetitive partial discharge is precisely identical each time, as occurred in the satellite. Relating this to video, a battery would, for example, have to be discharged for exactly 23.5 minutes at the exact same rate each day and then recharged each night for a week or more before this type of memory developed. Clearly nothing even close to this could ever happen. Batteries are frequently only partially discharged and then recharged, but never in the precise manner necessary for true memory to be developed.

graph. At the so-called "memory" depression point, the voltage of the battery will drop about 1.2 volts. Curve 'A' represents a 12 volt nominal battery on a typical camcorder. Note that at the "memory" point the battery voltage drops below the camera cutoff voltage and thus the camera will stop. It appears that the battery has no more capacity. However this is not true. As can be seen, the battery can still deliver full capacity to the specified end of discharge voltage at this lower voltage without a problem. The problem is the camcorder, which can not use this capacity (called "unavailable capacity"). This is why this type of "memory" became known as a "loss of capacity", because in this misapplication it does indeed result in a loss of capacity.

### Rogue Alloy

Curve 'B' represents the optimum "14.4 volt" nominal battery for professional camcorders. Note that the so-called "memory" point and associated voltage depression results in no loss of capacity. So this type of "memory" really is not a "loss of capac-

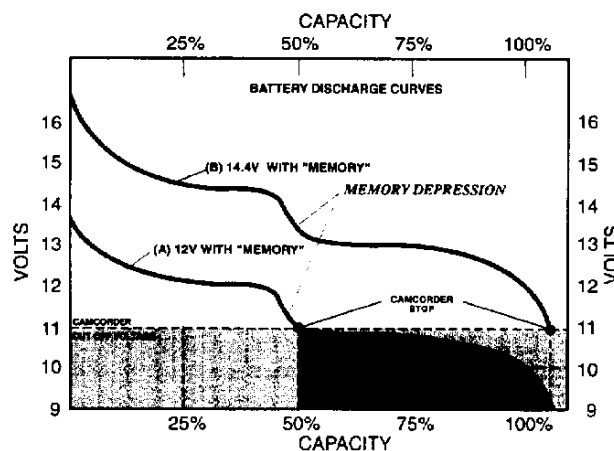
ity". This so-called "memory" problem may be traced to a secondary alloy of nickel and cadmium. Very simply, when a fully charged NiCd battery remains on a slow charger or many fast chargers, it is receiving a trickle charge which is designed to prevent self discharge. Unfortunately over a period of time, this conventional trickle charge gradually transforms the crystal structure of the nickel/cadmium into the secondary alloy. While normal NiCd has a nominal voltage of 1.2 volts per cell, this secondary or "rogue" alloy has a lower characteristic voltage of approximately 1.08 volts per cell.

Now consider a 10 cell VTR type video battery that has developed some of the rogue alloy. It is really two batteries in one: part of the battery is a 12 volt nominal NiCd and the rest is a 10.8 volt nominal secondary alloy. When this "dual battery" is placed on a camcorder, the power will always be drawn from the higher voltage section first and everything appears normal. Once all the normal high voltage NiCd has been discharged, power will begin to be drawn from the lower voltage alloy section of the battery. Of course at this point the voltage will fall to the characteristic voltage of the rogue alloy which is insufficient to keep the camcorder operating.

There appears to be a mysterious loss of capacity and the battery is returned to the charger. The question now is: "What is being recharged"? The answer is: not the rogue alloy part of the battery. Because the camcorder could not discharge the rogue alloy part of the battery, it is still fully charged and intact. Only the normal section of the battery is being recharged. Therefore the next day the battery will perform exactly as it did on the previous day. First, everything will appear normal and then all of a sudden the camcorder will mysteriously stop at the same point as before, as if it had memorized the point at which the capacity was lost. This is where the misnomer "memory" comes from. Likewise, this is where the myth of the discharger was born giving rise to the totally false notion that batteries should be discharged fully before being charged.

### To discharge or not to discharge

Now that the mysterious phenomenon of "memory" is understood, the principle of the discharger becomes apparent. Because the camcorder can not discharge the rogue alloy in a 12 volt nominal battery, it will remain there "forever". As a matter of fact, the situation actually gets worse as each subsequent trickle charging will create even more rogue alloy. In reality the rogue alloy is a perfectly legitimate battery. If the afflicted battery is connected to a device that can properly run down to the correct full discharge voltage of 10.0 volts, the battery will be *totally* discharged, rogue alloy and all. Now when it is recharged it



will be 100% normal NiCd and the missing capacity magically returns. Thus the creation of the "discharge-before-charge" myth is as follows:

1. A camcorder is powered with the wrong battery that has a full discharge voltage below the cutoff voltage of the camcorder.
2. When trickle charging begins to create the rogue alloy, the camcorder can not discharge it. Thus the rogue alloy remains intact and the battery appears to progressively lose capacity.
3. By placing the battery on a device that can discharge the rogue alloy, the battery becomes 100% normal alloy when recharged and the "lost capacity" miraculously returns.

Take another look at Curve 'B'. Note that when the correct battery with the proper voltage range for the camcorder is used, there is no "memory" problem. In essence the camcorder performs the func-

tion of the discharger by fully discharging and erasing the rogue alloy every time the battery is used. It should be clear that the "memory" problem and the associated "discharging-before-charging myth" are both the result of using a 12 volt nominal battery in applications calling for a 13.2 volt or a 14.4 volt nominal battery. Moreover, when using the proper voltage battery, discharging fully before charging is not only unnecessary, it is not recommended.

### Discharge before charge?

A light bulb or resistor must **never** be used as an unmonitored load to discharge a battery as this will take the battery down

to 0 volts. Fully discharging a battery may damage it irreparably and could cause a serious explosion. A video battery consists of ten or more cells in series. As a battery approaches the end of discharge, one cell will always reach total depletion before the others. Once this first cell reaches 0 volts, the remaining cells may still have some energy and will continue to deliver power to the load. This current passes through the depleted cell and will actually begin to charge the depleted cell

in the wrong direction, driving the cell into reverse polarity which will damage and weaken the cell. Once such a cell has been weakened in this manner, it becomes more vulnerable to reverse polarity on the next deep discharge thus beginning a vicious cycle that ends with total destruction of the battery or a hazardous explosion.

When applied to rechargeable batteries the expressions "full discharge" or "deep discharge" **never** mean a discharge to 0 volts but rather a discharge to the specified End of Discharge Voltage. Therefore a discharger must have an automatic cutoff set at the EODV of the battery or slightly below. When the battery voltage reaches this value, the load must be instantly disconnected from the battery to avoid damage and injury.

*This article has been prepared with the assistance of information found in the Anton Bauer "Video Battery Handbook". This handbook is available free of charge by calling (800) 541-1667*

# HOTKEYS Keyboard Controller for Video Machine and VM-Lite

HOTKEYS is a programmable, 124 key keyboard with 51 custom printed, color-coded keys containing 97 of the most important VM program functions. It works by assigning multiple keystrokes (macros) to a single key. The macros are stored in non-volatile memory on the keyboard itself. They don't take any of your valuable computer system resources, and they are saved even when you turn your computer off or move the keyboard from one computer to another.

HOTKEYS makes the task of learning VM Studio easier, and the job of editing with the Video Machine faster. New users will quickly feel at home in VM Studio because related functions are color-coded and logically grouped together. With HOTKEYS you can easily navigate through the VM Studio software to accomplish your editing task. It is like having all the menus open all the time without using any valuable screen space.

letter, number, punctuation, and system control keys have been left completely intact - no colors and no macros. As a result, you can feel confident about using HOTKEYS with your CG, word processor, spreadsheet and database without fear of "pushing the wrong button".

In addition to being transparent to other applications, HOTKEYS is completely customizable. Any of the VM keys can be tailored to your particular needs and preferences. For example, you may want to set the Clip Notes key to automatically position the cursor at the Scene or Take field instead of the default Name field; no problem. You can also create completely new functions for use in VM Studio and in your other software simply by pressing a few keys. Your customized configurations can be saved to disk and reloaded any time. Since each key on the keyboard can hold up to 4 different program macros, there is plenty of room for expansion. There is even an option for "Locking" your keyboard so that no accidental program changes can be made without you first "Unlocking" it.

With a list price of \$399, HOTKEYS is an attractive and affordable option for every Video Machine and VM-Lite System. HOTKEYS is current with VM Studio 2.0 and is easily upgradable. It is available now through your local FAST dealer or directly from the developer, Video SnapShots at (708) 213-2227. You can purchase it for \$250 until the end of August 1995 *if you mention this article!*



All of the major features of the Project Manager, Timeline, Clip Editor, and Trim Editor modules are available at the touch of a button. In addition, the Player Selection and Transport Control section allows you to instantly access, control, and switch between your players and your recorder without "mousing around". With HOTKEYS, it is easy to precisely set a forward or reverse shuttle speed and to use the single frame jog function. Keys dedicated to Help, Save, and Set-Up are also available. There are even keys dedicated to the operation of the Digital Player/Recorder option.

HOTKEYS is a "big stick" that "walks softly" with your other applications. Because HOTKEYS replaces your existing keyboard, it was designed to be completely transparent when using your other software. This is accomplished in 2 ways. First, you can easily toggle the functions programmed into your HOTKEYS keyboard on and off. There is a "Program LED" that lets you know if HOTKEYS is hot or not. Second, HOTKEYS differs from keyboard controllers used with other editing packages in that none of the keys in the main keyboard area has been altered in any way. All of the

## VM Studio 2.0 Commands On the HOTKEYS Keyboard Controller

### TIMELINE

#### File Menu Commands

Save, Open, New, Save As

#### Edit Menu Commands

Undo, Redo, History Mark, History

Delete Range, Toggle Range, Link, Split

#### View Menu Commands

Zoom-In, Zoom-Out, Goto Start, Goto End, Minimize All Tracks, Default Track Size, Show More Tracks, Show Less Tracks

#### Tools Menu Commands

T-Bar, Editing Panel, EDL, REC Control, Infobox, Switch Panel, Device Set-Up, Output Set-Up, Pattern Generator, General Preferences, Toggle Recorder <=> Player

#### Help Menu Commands

Help Contents, Search For Help

#### CLIP EDITOR

Mark-In, Mark-Out, Clip-In, Clip-Out, Use Clip, New Clip, Clip Notes

### PROJECT MANAGER

#### File Menu Commands

Save, Open, New, Save As

#### Group Menu Commands

New Reel Group, New Graphics Group, New Rack Group, New DVE Group

#### Project Menu Commands

Cascade, Tile, Arrange Icons, More Windows

#### Project Manager Pop-Up Menu Commands

New, Edit, Edit Group, Sort,

Autoassemble, Autoassemble Tagged, Autoassemble All, Delete Tagged, Tag, Untag, Tag All, Invert All Tags

#### DPR COMMANDS

DPR Settings, Switch To Player, Switch To DPR, DPR Reset

#### OTHER COMMANDS

Set Timeline Scale to 1 Second, Set Timeline Scale To 1 Minute, Activate Player 1, Activate AUX 1, Activate Player 2, Activate AUX 2, Mark, Mark Timeline Range

### DEVICE TRANSPORT CONTROLS

Rewind, Pause, Fast Forward, Shuttle Reverse, Shuttle Forward, Jog Reverse, Jog Forward, Play, Stop, Preview, GoTo

#### TRIM EDITOR

Previous Edit, Next Edit, Trim Outgoing Clip, Trim Incoming Clip, Trim Point Of Edit (Both Clips), Slip Outgoing Clip, Slip Incoming Clip, Frame Trim Left, 10 Frames Trim Left, Frame Trim Right, 10 Frames Trim Right

# VIDEO MACHINE USER GROUP NEWS

## ACTIVE USER GROUPS

Please let us know if your User Group is not listed, or if your information is inaccurate or incomplete. If you are looking to join a user group with no listing in your area, let us know and we will try to put you together with other users in your area.

### ARIZONA Tempe

Bert Cutler (602) 820-3696  
CIS 75262,1077

### CALIFORNIA

#### Los Angeles / Orange

Steve Wright (909) 941-0027  
3rd Thursday of each month

#### San Diego

Alicia Reed (619) 565-1101

#### San Francisco Bay Area

Bay Area Video Machine Users Group  
Tony Cooper (510) 820-1896  
CIS 75321,2756

### FLORIDA Pinellas Park

Russell Hoffacker (813) 579-9200  
FAX (813) 579-4204

### ILLINOIS Chicago

Jim Stofa (708) 961-2402  
CIS 76231,3601

### GEORGIA Norcross

Mark Allen (404) 564-3881  
FAX (404) 564-0221

### NEW YORK Westchester

Raphael Ferrer (212) 772-4877 day,  
(914) 238-5195 night.

### OKLAHOMA Tulsa

Brian Santee (918) 451-3643  
CIS 74077,1253. AOL :vmachine

### VIRGINIA Norfolk

Don Thompson (804) 496-9579 evenings

### WASHINGTON Issaquah

Michael Yeager (206) 527-3050  
CIS 72262,2456

## CANADA

### ALBERTA

Alberta VM User Group (AVUG)  
Lance White (403) 497-0824  
CIS 76364,554

### SOUTHERN ONTARIO

George Plhak (416) 504-3646

### VANCOUVER

Sean Jamieson (604) 669-5525 FAX  
(604) 669-6347

## MEXICO

### MEXICO CITY

Diane Garcia, Campeche #176, Colonia  
Roma, C.P. 06700, Mexico, D.F. Phone/  
FAX 653-7070

## The Bay Area Video Machine User Group Full-Day Workshop

On May 21, the members of the Bay Area Video Machine Users group met at G.E.S.I. in Berkeley CA, for a full day workshop on the use of the Video Machine.

Eight of our members with various skills, set up tables either with their own equipment, or using decks and computers provided by our hosts, G.E.S.I. A DP/R system was also loaned by FAST for the day.

Over 60 people attended the workshop, including Roland Augustin, President of FAST, US, and Reuben Hill, Kelly Michell, and James Fetterolf from FAST technical support.

Our "experts" were Tony Cooper - general computer hardware configuration; Soula Culva - Compuserve; Lee Hinton &



A group of BAVMUG members looks on attentively while Lee Hinton provides expert tuition on the use of Inscrubber CG with VM Studio



Tony Cooper (center) with Workshop hosts 'Mac' Mehafeff and Jack Pfeiffer

Mike Rand - Inscrubber; Tim Musselman - frame grabbing; Rob Nordvik - photo montages, wedding videography, and DVEs; Jack Pfeiffer - lighting for video; Erik Preminger - Photoshop; and Chris Wood - the DP/R. Tom Oelsner also showed off the Alladin system.

The workshop was free to members of

BAVMUG, and nonmembers could attend either for \$10, or by joining the group and paying the normal \$20 membership fee. Lunch and other refreshments were provided.

BAVMUG meets on the 3rd Thursday of each month in Berkeley, San Francisco, and Sunnyvale.



## **Second Annual FAST Video Competition**

### *Categories*

- ◆ *Short Form Show (less than 30 minutes)*
- ◆ *Long Form Show (more than 30 minutes)*
- ◆ *Best Music Video*
- ◆ *30 or 60 seconds commercial*
- ◆ *Best graphics / animation*
- ◆ *Best multimedia*
- ◆ *Best work by an under 18 year old*
- ◆ *An overall prize will also be awarded.*

*All entries should be in either VHS, SVHS, Hi8 or Betacam format.*

*Entries must be received at FAST no later than October 31, 1995.  
The judging and award ceremony will be in December 1995.*

*All registered users of FAST products will be mailed an invitation to participate in the Competition. This will include additional details, including up-to-date information on the closing date, and on the prizes to be awarded. All entrants will receive a complimentary T-shirt.*

Video Machine User Magazine is published bi-monthly by Tony Cooper for FAST Electronic. Every effort is made to ensure the accuracy of information published. However the editor and publisher can assume no responsibility for errors or omissions. Editorial submissions are welcome. Our mailing address is 451 Bolla Place, Alamo, CA 94507. We can be reached on CompuServe at 75321,2756