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Mobile Editing - Right Here, Right Now!

By Neil Sadwelkar

Those in the business of making films are accustomed to thinking of shooting and editing as discrete activities separated in time. Shoot first edit later. So we've got used to thinking of editing as something needing large, non-portable equipment and a clean, cool environment. But with every thing getting smaller, faster, cheaper, can editing too be done on portable machines? Field editing? On location?



Editing on location with small, portable equipment is not a new thought. Someone somewhere in this hundred year history of cinema has to have thought of it. Yes it's even been done, but mostly in news and sports. But today it's possible for anyone, even on a modest budget. Portable computers - laptops - smaller, larger, faster hard disks, DV equipment, are all factors that make this possible and feasible. So let's dive in to the nitties and the gritties of field editing. First, the systems...



I'm only considering non-linear editing [NLEs] systems here. There are, of course, small tape-based systems; but they are not for everyone. Besides they are linear, so limited in editing flexibility.

For field editing, the basic requirements are...

1. A reasonably fast laptop. If it's a Mac, then a 15" PowerBook 1.25 or 1.33 GHz, or a 17" PowerBook of the same speeds. If PC, then a HP/Compaq or Dell or some such, offering at least a P4 running 1.6 GHz or above. And it has to have a FireWire port. Else you need to get a FireWire PC-card [PCMCIA card].
2. Lots of RAM. 1 GB should be good. A fast video card with lots of VRAM also.
3. External hard disks. Small portable FireWire hard disks are fine. Avoid USB hard disks even USB 2.0 and even avoid bus-powered FireWire hard disks. The reason for external hard disks is that most NLE software work better when the disk used for capture is not the same as the boot disk.
4. Software: On the Mac, it's Final Cut Pro or Final Cut Express. It could be Avid Xpress Pro too. On PCs, it could be Avid XPressDV or XPress Pro. For shoestring budgets Avid FreeDV may also work, but with limitations. Other contenders could be Adobe Premiere Pro, maybe Sony Vegas or Pinnacle Liquid Edition.

So, armed with this basic gear, let's look at other add-ons for specific tasks.

DV editing

If you shoot with a DV camera, then things are simple. Connect a FireWire cable from your camcorder to your laptop. This cable can be 15 feet or 4.5 meters max. If your laptop has FireWire800 ports, you can have up to 10 meter or about 30 feet cables. So you connect the FireWire cable, and set up your NLE software to capture 'on the fly'. You can even record on the camcorder as a backup.

DV takes up 1 GB space per 5 minutes. So a 120 GB hard disk should hold about 10 hrs of video. You can even capture at higher compressions like OfflineRT in Final Cut Pro or 15:1 in Avid XPress. This way you can capture 20-40 minutes per GB. Meaning, the same hard disk can hold 40-80 hrs of video footage. This way you can 'shoot' with your laptop so no time is lost in capturing after shooting. Where it isn't possible to capture on the fly while shooting, you can capture a few hours later when conditions permit. Of course, it won't be possible to edit as you shoot, but at least quick assemblies in a break or after shoot hours may help you visualize how the film is turning out. And if 120 GB isn't enough, you can chain another hard disk and another right up to 127 hard disks. Or you can get a larger hard disk. Even a 1 TB monster from LaCie that's portable. [1TB = 1024 GB, or 1 million MB]

Non-DV

If you shoot on Betacam or DigiBeta, things get slightly more involved. No laptop can capture analog video directly so you need a converter. One option is to connect the composite or S-video output of the Beta/DigiBeta recorder or camera to an analog-DV converter like the Canopus ADVC-100, Miglia Director's Cut, Dazzle, DAC-2 or some such. These little boxes take in analog signals, video and audio and convert them, to a DV signal. An NLE like Avid XPressDV or Final Cut Pro on your laptop can recognize these and capture it as DV. So you have your rushes in a compressed form ready to edit as soon as they are shot. Mind that we are converting Beta/DigiBeta to DV in this method, so it is essentially offline editing. And you need time code to be able to online this later.

To get in time code, you can connect a RS-422 cable from laptop to the Beta/Digibeta deck like the BVW-50P or any other with an RS-422 port. A camcorder won't do. Here too, you roll the deck and let the NLE capture 'on the fly'. Alternately, if you don't want to mess with RS-422 or you use a camcorder, you can capture analog with a timecode burn, and change the timecode to the burn-in TC that you see. This works too and you can get accurate EDLs.

If you already have a DV or Digital8 camcorder and your model has 'analog conversion with pass-through' then you don't need an analog to DV converter. Your camcorder will do. Examples of such camcorders are nearly all Sony miniDV and Digital8 camcorders, many Canon miniDV camcorders, and nearly no JVC, Panasonic, Hitachi, camcorders.

So you need laptop, NLE software, FireWire hard disk, analog-DV converter or a camcorder that can do it, RS-422 cable/converter.

Uncompressed video on a laptop

Now we're getting really ambitious here! Capturing and editing with 1:1 uncompressed video on a portable machine is really a frontier area at the moment. It's possible, but takes some doing. But supposing you just had to, here's what things would look like.

The laptop would be as above. Software could be Avid Xpress Pro or Final Cut Pro. If you use Avid Xpress Pro, you need a break-out box called Mojo, also made by Avid. This has composite, S-video and component video inputs and connects to your laptop [PC or Mac] via FireWire. Mojo and Xpress Pro allow you to work with up to 8-bit uncompressed video.

For Final Cut Pro you would use a break-out box called IO made by AJA. This comes in two flavours. One has SDI in out, and digital audio in out. The other, component, S-video and composite. Both have unbalanced audio. There's even one model with digital and analog in outs.

While both IO and Mojo provide you with connectivity and the ability to capture analog or digital video uncompressed, there is the small matter of where to store it. Uncompressed video takes up upto 72 GB per hour of footage and needs disks that can sustain nearly 20 MB/sec speeds. And, you can't use FireWire hard disks because both Mojo and IO use up all available FireWire bandwidth.

So one solution is to get a FireWire800 PCMCIA card and an external FireWire800 hard disk. These disks have been shown to be capable of long uncompressed captures. You can even stripe two of them and get a faster array. This solution works for Final Cut Pro on a PowerBook, but I'm not sure if it does work with Mojo. Besides, Mojo doesn't have SDI or digital audio in/out and supports upto 8-bit only. A 500 GB LaCie FireWire 800 hard disk can store up to about 6 hours uncompressed. And of course you can add more [up to 127 of them]

Field HD editing

OK this one is really far out. Really really far out! At the present time, true HD editing on portable machines is not possible. Portable machines simply don't have the horsepower to pipe

all that data. Portable hard disks too are not ready. And there is no HD interface that can connect via FireWire. But if you still had to do HD editing in the field, you could use the 'down-convert' output of most HD decks to receive a 'normal' SD signal. These can be routed to the laptop via analog to DV converters. Time code is also as described in video editing. Essentially offline editing.

Film editing

Editing features in the field is a proposition that would appeal only to someone who is on a long schedule far away from home and would like to be able to at least rough cut what's being shot so that they know if something isn't working while they're still there. Especially for large action scenes with ridiculous logistics. Right! So how?

One issue is that there is no way to capture film into your NLE until it is processed and telecined. So one way of going about it is to connect an analog to DV converter or camcorder to the 'video assist' output of the film camera. You get a rather sad picture this way, but you can see people clearly. Sound can be fed in to the converter/camcorder by the recordist's line out. This way you get a rough picture and good sound and can cut a scene right there and then or soon after, end of the day perhaps. The NLE equipment used would be the same as outlined in 'analog video' upstairs.

Film rushes are huge. 500 rolls of film are not uncommon. To store that much rush at DV resolution would need nearly 500 GB space. But you get disks that large. Yes, there's even a portable FireWire 1 TB hard disk. Further, while still at location, one could have telecine rushes and logs couriered to location in a few days. These can then be captured and conformed to the 'assist edit'. Cumbersome, but works. If you use live sound and want to be able to capture it digitally, there are USB interfaces that have AES/EBU in and out and S/PDIF as well.

The NLE to use for this could be Avid XPress Pro with Mojo if you only want to edit the assist picture. If you need 24 fps editing of your real telecine rushes as well, then Final Cut Pro and Cinema Tools is the only way to go.

Really Big Time

If you want to be able to use PCI cards or SCSI hard disks there are even such things as PCI extenders. These external boxes connected to your laptop via the PCMCIA slot and have an external box that has two or more PCI slots and space for two or more hard disks. They need mains power. But using these, you can use a capture card like the Decklink or Kona or Aurora and SCSI drives striped into a RAID. This is a rather costly option and could be used if you simply have to have a cutting-edge editing studio in the field.

Does it really work?

Short answer, yes. Long answer as always, 'Depends ...!' One consideration in field editing is power. Laptops run off batteries, but they run between 3-5 hours before a recharge. You can get a car battery adapter for some laptops to edit in a car.

Hard disks need mains power. But most shoots have lights, so power is available. A make-up van that has mains power can also do. Analog to DV converters, IO, Mojo also need mains power. But camcorders can run off batteries for extended periods, so they can be a better option to an analog to DV converter. For the DIY types there may be a way to rig up an adapter that runs all these systems off a 12V 'dabba battery' that most equipment owners have. And they are quite cheap so if you plan on doing a lot of field editing you can even buy a set of two to run one and charge the other.

Also, remember that in extremely cold climates, rechargeable batteries run out faster, even twice as fast. And in extremely hot climates, laptops and hard disks may turn themselves off to protect themselves, or maybe they won't and get damaged. So think about the climate.

The software itself, Avid XPress or Final Cut Pro is quite stable as are the laptops themselves. But still, you need to carry all necessary software and updates. Downloading 80 MB OS updates and service packs are not an option in Rajasthan or Chhatisgarh. External FireWire hard disks are quite robust but need to have a stable surface. Don't plan on editing on a bumpy road. And hard disks run best when they are not completely full. So get hard disks of about twice the capacity you really need.

And in the field, problems can arise. And if you're on the field, you need to prepare yourself for how to tackle them. If you are within mobile range, you could identify a trouble-shooter who can help you on the phone. So before you venture out you need to make this guy or gal familiar with your system so he/she can be of help if needed remotely. You may even need to make a provision in your budget to fly him or her to your location, or in an extreme case, fly you and your gear back. It also helps to carry a spare of critical things like hard disks, batteries, maybe even a whole spare laptop. And of course, you need to put together your systems a good while and test it thoroughly to iron out any problems before you go out into the wilderness.

So field editing, on the location, in a car, make-up van or hotel room is a reality. Possible, even feasible. Whether to actually do it and how best to make use of it, is something that you need to think through carefully. If used correctly it can be a whole new way of movie-making. Imagine, just how different would film-making be if one could edit alongside a shoot, or very

nearly soon after - like same day? If one could have access to the scene preceding the one that's being shot or the one that follows? I can't say with certainty how and whether this would really help. What I can say for sure is that this is possible.

About Neil Sadwelkar



Neil Sadwelkar has little formal training, so he just about makes a living in the film & TV industry in India. His profession is a higher form of meditation through which one can deny hunger and sleep - it's called editing. In his spare time thinks hard and writes stuff like this piece above. And in whatever time is left over, he does his own accounts and chases clients for money. As you must have noticed by now, he is also shamelessly besotted with Macintosh machines and considers them as God-sent gifts to man kind!

He builds and tinkers with computers, so some people get conned into believing that he knows a lot about computers and editing software, so they even pay him as a consultant. Really! If you love what he's written you can drop him a line at neil@misenscene.net and tell him he's the greatest. He even has a web site dedicated to Final Cut Pro where you can take in more of his writings.

If you're a budding editor you can make him feel good by asking for advice. But if you're looking for work, don't bother because he doesn't have contacts. And if you really hate his writings, write to him and give him some work, so he has no time to write stuff like this. But don't make him chase you for money; else he'll go back to writing.