PART

1

PREPRODUCTION

1

PREPRODUCTION

Whether you are a producer, director or editor working on a multicamera project, the first place to start is in preproduction.

> *The edit process starts in preproduction. We'll talk an editor through what I'm planning to do, what angles I've got, and how many nights I'm shooting.*
>
> **Hamish Hamilton, director***

Preproduction is the foundation of a multicam shoot—it's when many decisions that will directly affect postproduction editing are made. Furthermore, knowledge is power: the more a multicam editor knows about each production phase, the more influence that editor will have when talking to producers and directors about the edit itself. Additionally, there are more opportunities for editors on the set than ever before—not only as a preproduction consultant but as an editor in the field, in the truck, and on the go—but only if you have a measurable knowledge base, an appreciation for your colleagues' roles, and a dedication to organized planning. Know what you want and plan for it. This is the preproduction mantra.

Preproduction planning is critical to a shoot's successful edit. A poorly planned shoot can wreak havoc on the editing phase, especially when multiple cameras are involved. You can waste hours hand-syncing shots, trying to make up for a missing timecode, sorting through cameras that don't roll concurrently, and so on. Multicam shoots are by nature more complex, and not just because there are more tapes in post! Every aspect of a multicam shoot is multiplied: disks, drive space, crew, gear—and it all needs to be organized at the outset. Savvy directors will consult their editors *ahead* of time, and ask technical questions about how to use timecode, the best method for tape numbering, which way to set up a project, and what types of codecs should be used in shooting or in formatting edits and deliverables. Smart directors will also ask about high-definition video formats, drive space requirements, and backup solutions. Why? Because they know

* Hamish Hamilton, director, Done and Dusted. Credits: Victoria's Secret Fashion Show, Academy Awards, Super Bowl Halftime Show and many concert films for great artists like Madonna and U2.

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that a well-planned shoot will save precious time and probably also money in postproduction. In other words, preproduction can make the difference between a project that goes smoothly and the gig from hell.

Organization

To prepare for multicam editing, you must have an understanding of the actual needs of a multicam shoot. As in any type of production, organization is key, but for multicam it is paramount—and not just for big jobs. All multicam jobs benefit from organization.

Organization is the key to creativity.

Mark Raudonis

Mark Raudonis is the vice president of postproduction at Bunim-Murray Productions, which effectively invented reality TV in the early 1990s when it came out with *The Real World* for MTV. Today, Bunim-Murray Productions, generates almost 4,000 hours of videotape per show each season. Some scenes may use up to 12 or more cameras, so without the proper preparation, a shoot can easily dissolve into chaos. And it's not just the shoot itself that can fall apart. Raudonis says, "The entire post process is at risk." If you're wasting time searching for footage," Raudonis says, "you're not being creative. Less time searching equals more time editing. More editing means being able to try several different options in a given time period. This is why organization is the key to creativity."

Tim Leavitt is an assistant editor on *The Apprentice*:

We had over 3,000 takes, so obviously you've got to keep that super organized to be able to find anything at any time, exactly when you or the editor needs it. So we create separate projects for each episode, and we give the editors the media they need for that episode.

The power of an organized workflow is a value that successful producers of all genres share. Meredith Lerner is a multiple Emmy Award–winning producer who has worked on productions ranging from the Olympics and *The Rachael Ray Show* to the HGTV show *Destination Design*. To make the entire process a smooth one, Meredith Lerner says it's vital to have a clear plan before you go on location or even pick up a camera:

So many things come up in the field, and when you're not prepared it can completely put you behind schedule. It can really cause problems once you're back in the edit room with your footage and you realize there aren't shots that you need. When you're organized, then everyone on the crew will know what you need to achieve.

Figure 1.1a Multiple ENG cameras used for U2 Concert EPK. (Courtesy Mark Haefeli Productions/www.mhp3.com.)

Figure 1.1b Preproduction meeting with director Mark Haefeli. (Courtesy Mark Haefeli Productions/ www.mhp3.com.)

Chris Halasz, workflow supervisor at Livecut in Vienna (www.livecut.at), specializes in unique multicamera workflows and software solutions. Halasz says, "It's best for me to get involved at the preproduction phase." If you're an editor and you're on your game, your knowledge of the technology involved and how it's changing can help everyone avoid nasty surprises in the editing suite.

The Editor's Role in Preproduction

Some of the important preproduction elements an editor should consider to maximize the cost-effectiveness of editing

Aerosmith: You Gotta Move
Multi-Cam Notes

Tape Naming

For loading the concert performance tapes, will use the standard MHP3 naming convention with the following suffix added for the multicam shows:

Ft. Lauderdale show suffix=
FTL100A for part one tapes
and FTL100B for part 2 tapes

Orlando show suffix=
ORL200A for part 1
And ORL200B for part 2

Example=
MHP3Name_ORL200B

Clip Naming

For clips, log individual songs in their entirety. Use handles big enough to include the last few notes of the previous song and next song. Do not skip anything. If there is a "rap" between songs, treat the rap like a song, logged individually with appropriate handles.

Grouped Source Monitor

Cam 1	Cam 2	Cam 3
Cam 4	Cam 5	Cam 6
Cam 7	Cam 8	Line Cut

Figure 1.2 Tape numbering system used for Aerosmith's *You Gotta Move*.

are *type of show, equipment testing, prelabeling and numbering media,* and the *formation of a timecode plan.*

On Different Types of Shows

Concerts are different from reality shows and reality shows are different from sitcoms. A dramatic or comedic production like a sitcom is organized so you can stop, back up, and try a second, third, or fourth take. The director has blocked it all out and knows exactly where everyone needs to be, down to a specific line of dialogue and which camera will be on that actor at any given time. You're still on the high wire, but you're performing over a net. Reality shows, however, are part run-and-gun and part studio. And concerts tend to run the gamut from scripted to more fluid, in a sense directed by the music. When dealing with a live show, which can be an unpredictable circus from start to finish,

you don't get a second shot. You need to be thinking about how to cover all of your bases from square one.

Preproduction for remote truck shows needs to be even more detailed. Eric Duke, owner of All Mobile Video, asks all the questions one would expect from the nation's best remote TV truck company: "How many cameras and tape machines do we need? Do we have sufficient crew?" And once he has the answers to those questions, he asks, "How do we cost out the job based on our requirements? How many days will it take? What format (high definition [HD] or standard definition [SD])? Will it require additional formats, too—ones we don't typically use, like a DVCPro HD?"

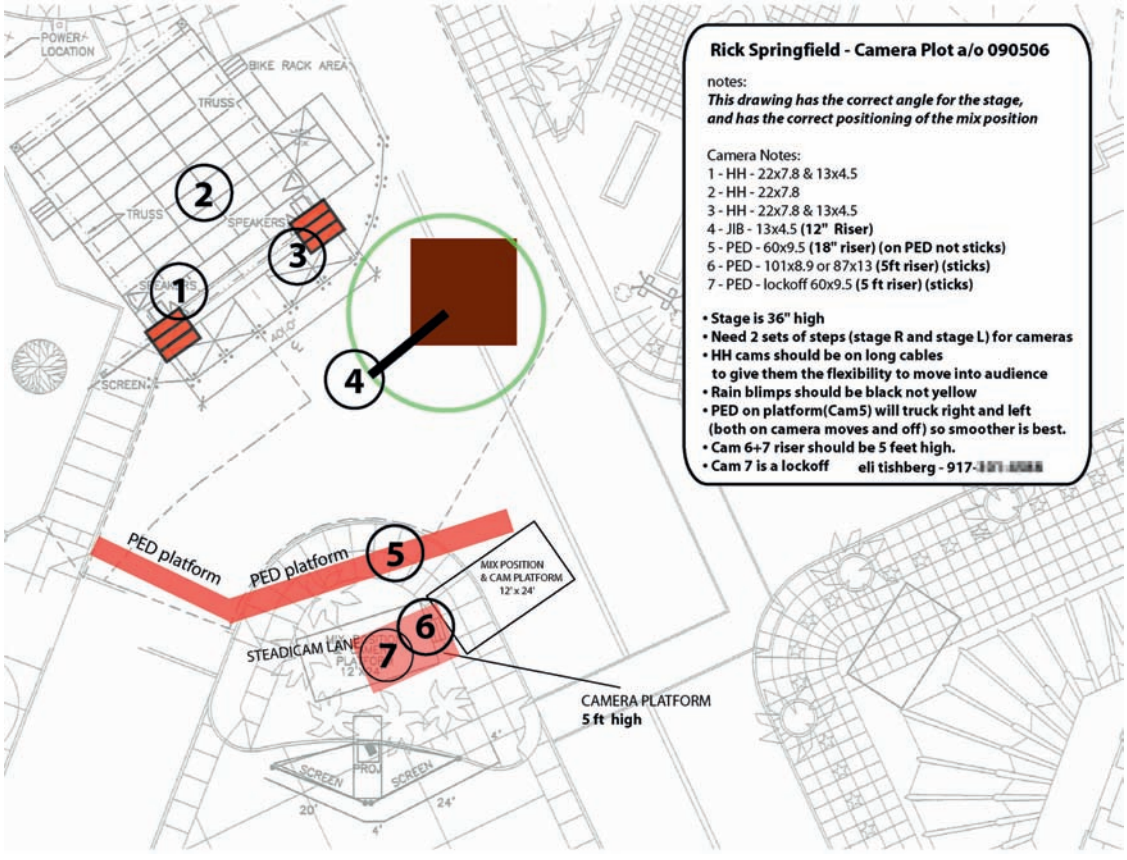


Figure 1.3a **Location camera plot**. Rick Springfield in concert. (Courtesy Eli Tischberg.)

Wizard ENTERTAINMENT

JOURNEY – WIZARD PRODUCTION SCHEDULE

Saturday 3/14

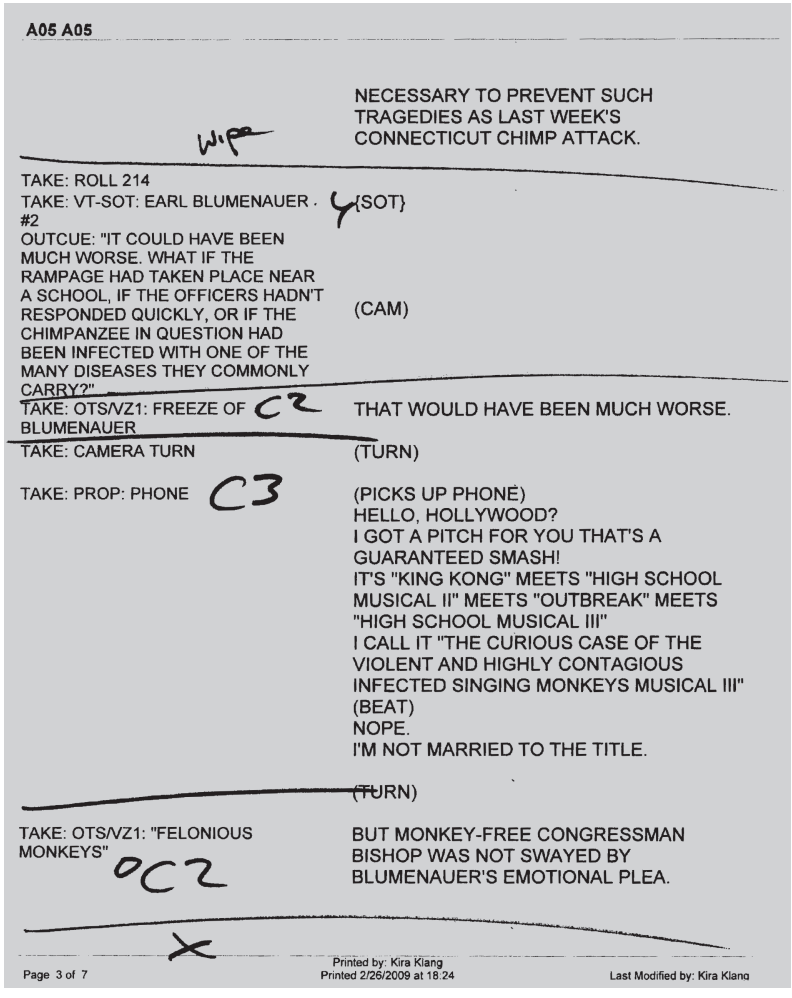
10:3O AM	Lobby Call: Barnett, Waxman, Noles
11:00 AM	RSVP HD Crew and Cameras arrive
1:00 PM	Lobby Call: Hilmer, S Gibby, Barton, P Gibby, Lisa Goodwin, Tishberg, Mollner, Ravitz, Quinn
2:30 PM	ALL RSVP CREW (23) on site
3:00 PM	Full Crew Meeting/Full Rehearsal
4:00	Lobby Call Blair/Goodwin
6:00 PM	Gates Open
8:00 PM	Show call
8:30 PM	JOURNEY CONCERT
10:00 AM	Strike Pack
1:00 AM	Cargo Pickup

Figure 1.3b Schedule for shoot day. Journey in Manila. (Courtesy Wizard Entertainment/ Dan Barnett.)

Hamish Hamilton brings his editors on early in the preproduction phase:

Organization, preparation, and careful thought are all cornerstones and the absolute key to the success of multicamera directing, no question. It is of massive, massive, massive importance. I think it's a combination of many, many things, like surrounding yourself with people who know their craft and are organized.

Figure 1.3c Hamish Hamilton conducting a camera briefing in Washington, DC. (Courtesy www.doneanddusted.com.)



A05 A05

NECESSARY TO PREVENT SUCH TRAGEDIES AS LAST WEEK'S CONNECTICUT CHIMP ATTACK.

TAKE: ROLL 214
TAKE: VT-SOT: EARL BLUMENAUER #2
OUTCUE: "IT COULD HAVE BEEN MUCH WORSE. WHAT IF THE RAMPAGE HAD TAKEN PLACE NEAR A SCHOOL, IF THE OFFICERS HADN'T RESPONDED QUICKLY, OR IF THE CHIMPANZEE IN QUESTION HAD BEEN INFECTED WITH ONE OF THE MANY DISEASES THEY COMMONLY CARRY?"

{SOT}

(CAM)

TAKE: OTS/VZ1: FREEZE OF BLUMENAUER

THAT WOULD HAVE BEEN MUCH WORSE.

TAKE: CAMERA TURN

(TURN)

TAKE: PROP: PHONE

(PICKS UP PHONE)
HELLO, HOLLYWOOD?
I GOT A PITCH FOR YOU THAT'S A GUARANTEED SMASH!
IT'S "KING KONG" MEETS "HIGH SCHOOL MUSICAL II" MEETS "OUTBREAK" MEETS "HIGH SCHOOL MUSICAL III"
I CALL IT "THE CURIOUS CASE OF THE VIOLENT AND HIGHLY CONTAGIOUS INFECTED SINGING MONKEYS MUSICAL III"
(BEAT)
NOPE.
I'M NOT MARRIED TO THE TITLE.

(TURN)

TAKE: OTS/VZ1: "FELONIOUS MONKEYS"

BUT MONKEY-FREE CONGRESSMAN BISHOP WAS NOT SWAYED BY BLUMENAUER'S EMOTIONAL PLEA.

Page 3 of 7 Printed by: Kira Klang Printed 2/26/2009 at 18:24 Last Modified by: Kira Klang

Figure 1.4 Director's script from *The Daily Show* with Jon Stewart. (Courtesy Chuck O'Neil/Comedy Central.)

Oliver Peters, an independent film and video editor-colorist, and owner of Oliver Peters Post Production Services, LLC, almost always finds himself involved in the preproduction phase. Sometimes plays the role of assistant director or coordinator on set by helping to sort through camera setups, tape numbering, and isolated camera (ISO) coordination for timecode and labeling.

Figure 1.5 Oliver Peters.

Peters says there are different ways to approach it:

It depends on the nature of the production. The industry used to be one of big trucks, big studios, and big post facilities, and that's become a lot more streamlined these days with ad hoc editing facilities and ad hoc productions out of fly packs. So I think in those kind of cases, editors are more involved in the front end, just because producers, hopefully … ask before they start shooting.

Tip

Use a production assistant (PA) or an assistant cameraperson to take timecode notes in the field. These notes will be valuable when you log and capture your media in the post process.

On Prelabeling and Numbering Media and Establishing a Clear Timecode Plan

With multicam shoots, keeping your media straight and getting timecode sync right in the field with a timecode generator or lock-it box (or the old-style slate method) means massive savings at the editing phase. It will save you days or even weeks of trying to get organized after the fact and even more days or weeks of trying to sync everything by hand. It makes sense to rent or buy the proper equipment for the shoot (like a lock-it box or timecode generator) to save the money in post. The same goes for planning the edit for postproduction: learn about proper storage and hard drives with the adequate speeds for multicam playback, or you'll have a frustrating editorial experience because of choppy or stagnated playback of your clips. (See chapter 8: Hardware, Bandwidth and Speed).

Fix It Before Post (for a Change)

Increasingly, multiple cameras start and stop at different times on location, and this causes many sync problems and tape capturing issues that might be avoidable. Dealing with tapeless formats makes a strong case for having postproduction meetings up front because of the massive amount of media generated.

For instance, if you are shooting an event, using time-of-day timecode with continuous recording during the event, all of your cameras will be in sync to themselves via timecode, and they will capture seamlessly. However, if you are shooting ENG-style B-Roll scenes with the camera turning on and off in a B-roll fashion, use record run timecode. Time-of-day timecode will be nightmarish for capturing B-Roll footage and syncing. Lack of preroll will confuse the decks with time-of-day timecode as the timecode breaks every time the camera stops.

But even with editors' input on the front end, decisions may be made that require a lot of fixing in post. And with tapeless cameras like RED, XDCAM, and P2, post will be even more complicated. Reconciling different time bases, like frame rates,

standards, and formats, will eat into time that could otherwise be spent improving the production's quality.

Tip

Plan backward from deliverable master requirements.

Acquisition Formats

Indeed, there are arguably too many choices for shooting formats. But the choices become clearer when you hone in on your budget, your genre, your editorial preferences, and what deliverables you'll need. If you work backward from the final product, then you'll know which brand of camera to choose and which format performs best for your workflow.

John Walker is a longtime producer at New York City's Thirteen/WNET, the flagship PBS station. With Mitch Owgang, he co-produces many nationally syndicated programs including the Emmy Award–winning *Great Performances*.

"I don't decide what formant to shoot," Mitch Owgang says. "PBS would like us to shoot every one of our shows in HD 5.1 surround sound if we can, so we try to. *Great Performances* has been shooting most of its shows in HDCAM for the last three or four years."

Let's look at the most common shooting formats being used in HD and SD multicamera productions.

Generally, for remote and studio broadcast television, videotape is used more than tapeless systems because of its proven reliability, cost-effectiveness, and archivability. ENG-style types of multicamera production such as reality are refining tapeless methods.

Most directors are shooting HD with either the Sony HDCAM and HDCAM SR with 4:4:4 color space and RGB RAW or the Panasonic DVCPro HD VARI Cam. Sony's HDCAM decks and the F-900 camera format is ubiquitous in the market.

With the introduction of new formats, including tapeless, come new requests for various machines on the truck—like XDCAM HD. But it's impossible to have every format on every truck. Each client's editorial process is usually what drives the format requests.

Richard Wirth (who in addition to winning an Emmy for his work as technical director [TD] on *The Rachael Ray Show* also served as TD on the movie *Tootsie*) says that *The Rachael Ray Show* is currently shot in a 4×3 format Digital BetaCam (29.97) for the live-to-tape show, recorded in multiple formats, and ISOd on Digi-beta—though he hopes to take the show to HD next season (2010). The show is recorded in 29.97, but its crew also works with mixed formats. "Our field pieces are 24P," Wirth says. "It's 23.98 and gets pulled down to 29.97 and has a film look to it. But it's not letter-boxed. It's still 4×3. What we're trying to do is give our field pieces a little bit of a different feel, more cinemagraphic or cinema verite … rather than standard, live-looking television."

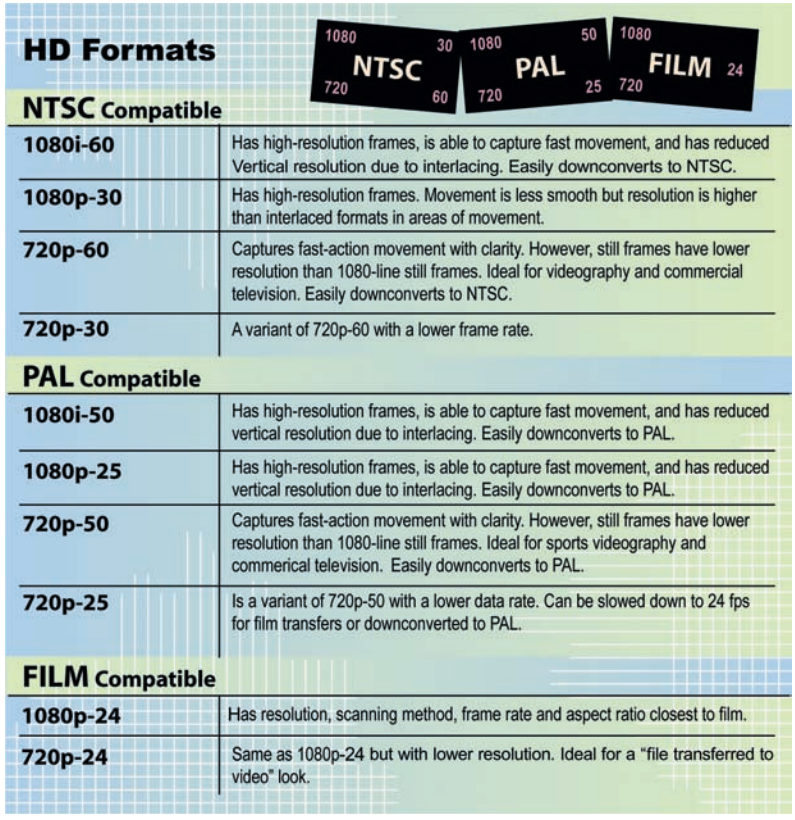


Figure 1.6 HD format chart.

DV Formats

Digital Format	Maker	Color sample ratio	Compression ratio	Recorded bit rate
DV (25)	multiple manufacturers	4:1:1 4:2:0 (PAL)	5:1	25 Mbps
DVCAM	Sony	4:1:1 4:2:0 (PAL)	5:1	25 Mbps
DVCPRO (D-7)	Panasonic	4:1:1 (NTSC and PAL)	5:1	25 Mbps
DVCPRO 50	Panasonic	4:2:2	3.3:1	50 Mbps
DVCPRO HD	Panasonic	4:2:2	6.7:1	100 Mbps

Figure 1.7 DV format chart.

Match Everything

Match is the key word. Match cameras to each other, use only one media format, and pick a matching editing codec. By the time you get to post, you'll be glad you did. It's all about maintaining consistency.

This is the *ideal* situation. The *reality*, however, is often that you end up with mixed formats. Then the question becomes how and why to convert, to unify the footage. In cases like these, there needs to be a budget for conversions, and time must be added to the post-schedule, too. Arranging for footage to be transferred or compressed is going to take some time, either in your edit suite or when you're waiting for the post vendor's work to be completed. The whole schedule could be held up if you're waiting on footage that needs to be grouped with footage that doesn't need to be converted.

Noteworthy

Sony Vegas allows mixed formats and codecs in the same multiclip; however, most nonlinear editing systems will not work in multicam mode with mixed codecs.

Aspect Ratios

Then there's the question of frame size: 4×3 SD? Or 16×9 HD? Anamorphic? Letterbox? Pillar box? Both? Some smaller markets still don't accept tapes with mixed aspect ratios. They claim it confuses their audiences. Increasingly, however, people are understanding it and developing ways to adapt.

It is a good idea to ask these questions up front. Once you know your deliverables, you can work backward from there. In other words, know your market and your deliverables. This may mean mastering in 16×9 and doing a downconvert for certain markets if they don't accept the 16×9 image.

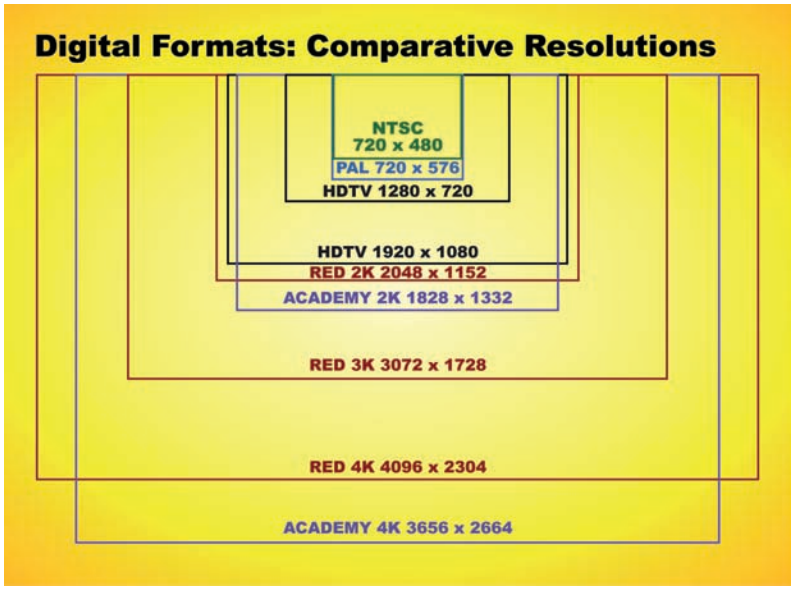


Figure 1.8a Comparatives aspect ratio chart.

Video Frame Sizes

Format	Bytes per Frame	or
NTSC DV25 (compressed)	120,000	117.2 KB
PAL DV25	144,000	140.6 KB
NTSC DV50	240,000	234.4 KB
PAL DV50	288,000	281.2 KB
SD 720x486 8-bit	699,840	683.0 KB
SD 720x486 10-bit	933,120	911.3 KB
SD 720x576 8-bit	829,440	810.0 KB
SD 720x576 10-bit	1,105,920	1.05 MB*
HD 1280x720 8-bit	1,843,200	1.76 MB*
HD 1280x720 10-bit	2,488,320	2.37 MB
DVCProHD 720p-60	240,000	234.4 KB
HD 1920x1080 8-bit	4,147,200	3.96 MB
HD 1920x1080 10-bit	5,529,600	5.27 MB*
DVCProHD 1080i-50	576,000	562.5 KB
DVCProHD 1080i-60	480,000	468.8 KB
HD 1920x1080 10-bit RGB	8,294,400	7.91 MB*
2K 2048x1556 10-bit RGB	12,747,000	12.45 MB*

* denotes a frame size that is an integer multiple of 4 KB.

Figure 1.8b Video frame sizes by format.

Compressed HD Formats

Format	Maker	Color sample ratio	Bit depth	Recorded bit rate
D-5 HD	Panasonic	4:2:2	8-bit 10-bit	235 Mbps
D-6	Philips, Toshiba	4:2:2	10-bit	1.2 Gbps
HDCAM	Sony	3:1:1	8-bit (internal) 10-bit (in/out)	143 Mbps
HDCAM SR	Sony	4:2:2 4:4:4	10-bit log 10-bit linear	440 Mbps (SQ) 800 Mbps (HQ)
DVCPRO HD	Panasonic	4:2:2	8-bit	100 Mbps
XDCAM HD	Sony	4:2:2	8-bit	35 Mbps (LP) 25 Mbps (SP) 18 Mbps (HQ)
HDV	Sony, JVC, Canon	4:2:0	8-bit	19 Mbps (720) 25 Mbps (1080)
RGB Video • 1080p-30 • 720p-60	n/a (computer graphics)	4:4:4	8-bit per color channel	1.39 Gbps 1.24 Gbps

Figure 1.9 Comparison of compressed HD formats for acquisition.

Frame Rates

With HD becoming the broadcast deliverable for all television stations, a whole new family of formats has come barreling out of technology's gates. Always avoid mixing frame rates with any project—especially multicamera projects. Most editing software can't handle it.

Tapeless

Although most productions are still on tape for archival and reliability reasons, it's difficult for producers to resist the lure of new tapeless formats. Tapeless systems are used in

multicam from lower budget, run-and-gun–type shoots to high-end, reality shows, features, or commercial work. Inexpensive cameras like Panasonic HVX-200 mean working with the P2 cards for doing capture, and that has migrated to a format that Panasonic has come out with called AVC Intra and AVCHD. AVC-Intra is a compression format that may be recorded on P2 cards. Sony has its version of this, which is called XDCAM, a family of camcorders, some of which (EX) use solid-state SxS cards or an optical format, which is being recorded on BluRay disks, called Sony XDCAM HD; it is different from the EX, which uses the cards. Although XDCAM uses a blue-laser disk, it is not Blu-ray.

Then, of course, are the higher-end products like Panavision Genesis and Thomson Viper or Red, which use the RED flash cards. The data on these cards needs to be immediately transferred onto a disk drive or these cards need to be imported into the software for Final Cut Pro, Adobe Premiere, or Avid.

When working with tapeless files in multicam, the workflow is easily adapted in post. However, when it comes to preparing and organizing the media, tapeless becomes a much bigger job on set and before the edit session. For one thing, there is a massive number of data files that get captured and usually backed up twice.

Alexis Van Hurkman is a writer, director, and colorist based in New York City. He has authored many books including the *Encyclopedia of Color Correction* and many technical articles including "RED Final Cut Studio 2 Whitepaper." According to Van Hurkman:

You don't want to change the name of the source media (as it is acquired in the original hierarchy of files and folders in the field). Typically, all you ever want to do with tapeless source media is archive it somewhere safe and leave it alone. Because you don't want to inadvertently ruin your ability to reconform, because you renamed something inappropriately or you changed a reel number in appropriately or whatever.

Noteworthy

In the tapeless workflow, it is not a good idea to rename the file, because if your NLE crashes and you have to go back to the camera files, you'll have no cross reference to the name the camera has assigned the file.

Universal Unique ID Numbers (UUID)

You can change the name of the clips in your browser, no problem, because the Universal Unique ID (UUID) number is what's used to draw the correspondence. So while you're logging or after you've ingested, you can freely change the name of the clip and you're still going to be able to reconform that source because of the internal UUID number (see Chapter 2: Tapeless Clip Nomenclature).

Bob Zelin is a systems integrator, which means he builds television facilities and postproduction systems. He is known

Noteworthy

There are *many* more tapeless systems than those mentioned here, but here are a few of the most popular:

Panasonic P2
Sony XDCam and EX
RED R3D

worldwide as a technical guru and consultant and can be found in online forums and as a leader on the CreativeCow.com:

What you're doing is taking the individual cameras, no different than you would be taking the individual tapes from a multicamera shoot, and you would now import all of that footage. You're doing this one at a time. There's no miracle where everything just comes in instantly all at once.

Archivable Deliverables

If you shoot on tape, you have a built-in archive. When you shoot in tapeless formats, on P2 or RED cameras, for example, you need to take extra steps to protect and archive your media reliably. XDCAM uses a Blu-ray DVD in a case and is treated more like tape and it's actually archivable.

On insured production shoots, you may have to get what's called a completion bond. A completion bond may require you to have some archived format at the end of shooting every day. In a tapeless environment, you have a P2, Red, Infinity-type situation where you're not recording anything to tape and all you're handling is data files. Then you have to deal with archiving them on set and making sure there are backups and backups of the backups. One approved method uses linear tape open (LTO) tape and is a tried-and-tested archival system that is also used globally by banks and the financial industry.

Figure 1.10 Tape backup system for the Mac. (Courtesy HP.)

LTO4 is the newest flavor of LTO, and its benefits are considerable:

- A single $50 LTO4 tape can store 800 GB of uncompressed video—that's 26 whopping hours of 720/24p video from a Panasonic P2 camera, 38 hours of 1080/24p footage from a Sony EX3, or nearly 8 hours of 4 K footage from a RED camera.
- An LTO4 tape lasts about 30 years in normal storage conditions (i.e., don't leave it in your trunk indefinitely).
- Some LTO4 drives can read/write data up to 120 Mbps—that is, much faster than reading/writing to a conventional SATA hard drive—so incremental backups go in a hurry.

Gary Adcock, president of Studio 37 out of Chicago and a designer of high-end rigs for multicam and tapeless formats like RED, suggests that "as long as all the cameras are shooting the same format, it can actually expedite the post process, and you can expect to have a more consistent postprocess with all of that media, all of that data, all of those camera tapes, all the same type."

Looking Ahead Toward Postproduction

To save even more time in post, the PBS *Great Performances** team holds multiple meetings even before the show itself. They discuss set lists and rundowns, whether the performance in question is a variety show or just a straight concert. It's all laid out. What the scores are to the director, the rundown is to the editor. Every anticipated event is detailed in the rundown, which is also useful for audio and video in preproduction, as well as during production and post to preserve continuity. Great Performances, Coordinating Producer, Cara Cosentino says:

Depending on what turnaround is like, you have to figure out just how long you have in the edit room to complete the show. And the less time you have in post, the more time you better prepare in preproduction, which means probably more rehearsals, and more scripting, and more camera conferences.

Other preproduction questions that should be on the producers' minds include these: How much videotape stock should we buy? How much drive space or cards for tapeless cameras do we need? How are we going to track and back up our media? How many ISO decks can we afford? Should we roll on all cameras, or roll on a few and switch ISOs to a limited number of VTRs? How much loading and digitizing time is there going to be?

Testing Saves Money and Time

One half day of testing can save countless hours of problem solving on location and in the edit suite. Often your vendors will provide you with a no-cost setup at their facility to troubleshoot your rig. Certainly this is the case when renting cameras from a reliable rental house. If you're renting a 5- or 10-camera package, it will include the setup, space to calibrate all your tools, and instructions.

According to Gary Adcock:

It's imperative for the producers who think, "Oh, we need to save money because we really don't need the prep," to realize that one day of prep can save 10% of their postbudget. And if something goes wrong on the shoot that could have been avoided, then it can save a lot more than that.

You're going to try to sync hundreds of hours of footage in post. You cannot afford to have faulty timecode. If you have five cameras on a 3-hour shoot, that's 15 hours of content to sift through.

*Emmy Award winning Great Performances, (PBS) is one of the longest running performing arts anthologies on television,since 1972. The show is produced by WNET in New York City.

the DAILY show February 23rd – February 26th 2009

ACT 1		SHOW OPEN (Obama Charms At Fiscal Summit)		SHOW OPEN (Fox Misspells Criticizing Biden's Gaffe)
	HEADLINES (Oscar Recaps w/John Oliver (& Aasif) Stand-up)	HEADLINES (Obama Visits Canada)	HEADLINES (Obama Addresses Congress/Jindal's Response)	HEADLINES (Hillary Visits Asia)
	STUDIO BUMPER	STUDIO BUMPER	STUDIO BUMPER	STUDIO BUMPER
ACT 2	STUDIO BUMPER	STUDIO BUMPER	STUDIO BUMPER	STUDIO BUMPER
	OTHER NEWS (Republicans Oppose The Stimulus Bill)	OBAMA: GOD OR DEVIL (Jason not in studio) (Producer: Lindsay)	THIRD PARTY STAND-UP (Wyatt)	OTHER NEWS (Interstate Chimp Transport Bill)
	STUDIO BUMPER	STUDIO BUMPER	STUDIO BUMPER	STUDIO BUMPER
ACT 3	DAILY SHOW BUMPER	DAILY SHOW BUMPER	DAILY SHOW BUMPER	DAILY SHOW BUMPER
	JEFF BEZOS (CEO, Amazon.com)	RICKY GERVAIS ("Ricky Gervais: Out of England")	TOM SELLECK ("Jesse Stone: Thin Ice")	BRIAN WILLIAMS (NBC Nightly News)
	STUDIO BUMPER	STUDIO BUMPER	STUDIO BUMPER	STUDIO BUMPER
ACT 4	TEASE TOMORROW	JON/STEPHEN TOSS TEASE TOMORROW	TEASE TOMORROW	TEASE TOMORROW
	MOMENT OF ZEN (Hugh Jackman "seducing" Barbara Walters)	MOMENT OF ZEN (Anderson Cooper & Reporter)	MOMENT OF ZEN (MSNBC ragging on Jindal)	MOMENT OF ZEN
	CREDITS (Boby jindal)	CREDITS (Obama: God Or Devil)	CREDITS (Obama Meet & Greet)	CREDITS
PRE-TAPES AVAIL CORR			**6:45pm:** Tape Global Wraparounds	
	Jason, John Oliver, Samantha, Aasif & Wyatt	Jason, John Oliver, Samantha, Aasif & Wyatt	Jason, John Oliver, Samantha, Aasif & Wyatt	Jason, John Oliver, Samantha, Aasif & Wyatt

Figure 1.11 Rundown. (Courtesy Daily Show, Comedy Central.)

Figure 1.12 Setup day at Rental House. (Courtesy Liman Video Rental, www.lvrusa.com.)

Figure 1.13 Mark Schubin at the Early TV Museum. (Courtesy Mark Schubin.)

With a properly tested setup, you can produce footage that will sync up in minutes. But without it, you could be trapped in hand-sync hell for hours, even days on end. For just one day of prep, you've got to pay the Assistant Cameraperson (AC), the Director of Photography (DP), and maybe a Production Assistant (PA) to be there. That's not a big cost, especially if it's saving an entire day of color correction, or two or three days in an online session, or, in terms of concert footage, audio syncing.

Mark Schubin is a broadcast engineer and SMPTE fellow (Society of Motion Picture and Television Engineers). He is also Engineer in Charge (EIC) for the live global theatrical transmissions for the Metropolitan Opera's HD series: "The Met: Live in HD": says, "My job should be almost 100% preproduction. I'm only involved in the postproduction if we've done something wrong. There's a saying in my end of the business that if I'm working, you're in trouble."

Looking ahead to postproduction during preproduction is crucial. You must always be able to view your project in its entirety—from preproduction to deliverable masters—with an eye on the end result.