695 QUARTERLY

I.A.T.S.E. Local 695
5439 Cahuenga Blvd.
North Hollywood, CA 91601

695 QUARTERLY

THE OFFICIAL PUBLICATION OF IATSE LOCAL 695

695 QUARTERLY

Volume 4 Issue 3

Table of Contents

Features

Departments

Cover: Evolution of recording media, photo by David Waelder.

From the Editors

Summer has many meanings and attached memories. We can nostalgically look back to our time as young kids and remember summer as a time of freedom, no homework, camp, swimming, friends and long days.

Today, it might represent a return to another season of your episodic or the start of a new show that was picked up after the pilot. To others it could mean lots of traveling far from Los Angeles on a feature film that is on location not because of its unique look, but because that state has a terrific tax incentive.

Welcome to the summer of 2012 and the "new normal" of production that Local 695 members work in.

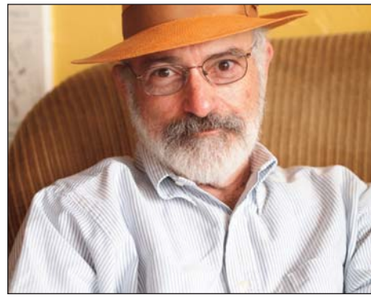
That's why the *695 Quarterly* is THE place to get a sound view of our craft. Steve Nelson continues his journey on *The River* and Jim Tanenbaum delves deeper into "The Cable Connection," while Scott D. Smith looks at the new world of "Digital Asset Management."

We are thankful to our contributors and want to read more from you, the heart and soul of Local 695.

In the meantime, enjoy your summer filled with family and friends.

Fraternally,
Eric Pierce, David Waelder and
Richard Lightstone

From the President



Thank you for participating…

During director Stanley Donan's acceptance remarks for his career achievement Oscar, he maintained that the key to his success as a director was showing up ready to work. This ethic also relates to our effectiveness as an organization.

We, along with *all* the other West Coast locals, have ratified this new contract with large pluralities of the voting members.

Some of us spoke strongly for rejection of this contract, some for its ratification. It seems to me that both sides were asking for a real movement toward solidarity amongst the larger body of membership.

These efforts to persuade fellow members to come together are the greater value, more than the pros and cons of this immediate contract. Whatever your position, I thank the voting members for engaging in the process and urge and invite those of you who sat this one out to reconsider for the next time. Your opinion only is heard if you return your ballot.

And speaking of effort and participation, issue number 14 of this publication is on deck and heartfelt gratitude goes out to all our stalwart contributors. Special mention is due Scott Smith, Jim Tanenbaum, Steve Nelson, Benn Betts and Laurence Abrams, who have each contributed more than one article.

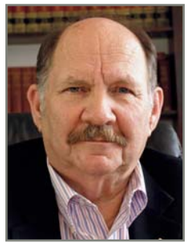
I invite you to join your colleagues with articles of your own creation. This is your quarterly and you are encouraged to appear in these pages.

Fraternally,
Mark Ulano
President, IATSE Local 695

From the Business Representative

In Perspective:

Long Production Hours



Our industry has shown a commitment to workplace safety and has implemented a variety of programs that work together effectively to promote safe working conditions. But with a history of working very long hours on the set and sometimes getting very short turnarounds, sleep deprivation on production is still a matter that needs serious attention.

Statistics don't lie. Research has shown that sleep deprivation can have some of the same hazardous effects as being drunk. Drivers are especially vulnerable to these risks. After being awake for 18 to 20 hours, most drivers will perform worse in driving tests than those who have exceeded the legal limit for drunk driving.

Long workdays and shortened sleep cycles affect coordination, reaction time and judgment and pose serious risks that can lead to reduced productivity, poor concentration, accidents, increased risk for a variety of chronic illnesses ... all of which can ultimately result in sickness, injuries, increased benefit expenses—even death.

If you are working long hours and getting short rest periods, we want to know about it. The information you share will be very helpful in our continuing discussions with industry representatives. To share your experiences, please visit **http://www.695.com/html/longhours.php**.

Be safe.

James A. Osburn, CAS
Business Representative
Executive Director

695 QUARTERLY

I.A.T.S.E. Local 695
Production Sound Technicians,
Television Engineers,
Video Assist Technicians and
Studio Projectionists
Certified & Chartered September 15, 1930
A California Nonprofit Labor Corporation
Incorporated July 31, 1951, State of California
Affiliated with the A.F.L.-C.I.O.,
California State Federation of Labor,
and L.A. Central Labor Council

5439 Cahuenga Blvd.
North Hollywood, CA 91601
(818) 985-9204 (323) 877-1052
(818) 760-4681 fax
local695@695.com
www.695.com

BUSINESS REPRESENTATIVE
James Osburn

PRESIDENT
Mark Ulano

VICE PRESIDENT
Jay Patterson

SECRETARY-TREASURER
Susan Moore-Chong

RECORDING SECRETARY
Elizabeth Alvarez

SERGEANT-AT-ARMS
Dean Striepeke

EXECUTIVE BOARD
Laurence B. Abrams
Scott Bernard
Courtney Goodin
Richard Lightstone
Andy Rovins
Jeff Wexler

BOARD OF TRUSTEES
Peggy Names
Eric Pierce

***695 QUARTERLY* CO-EDITORS**
Richard Lightstone
Eric Pierce
David Waelder

695 Quarterly
Inquiries or suggestions
mag@695.com

PUBLISHER
IngleDodd Publishing

ADVERTISING DIRECTOR
Dan Dodd
(310) 207-4410 ext. 236
Advertising@IngleDodd.com

NEWS & ANNOUNCEMENTS

Contract Negotiations

The issue of contract negotiations dominated the 2nd Quarter Membership Meeting on June 9, 2012. International VP Thom Davis was on hand, along with Business Representative Jim Osburn, to explain the details and the progress of negotiations. It was a lively discussion.

In the final vote tally on July 3, the contract was ratified. Local 695 members approved the new contract by almost a two-to-one margin.

Steve Klinghoffer asks about the new contract at the 2nd Quarter Membership Meeting.

Robert Sharman discusses the new contract.

Mark Patt Clark discuses the new contract.

www.695.com

Kriky & Seth's 2012 BBQ

Now in its sixth season, the Kriky and Seth BBQ has become something of a tradition, a gateway to summer. Each year, Michael (Kriky) Krikorian and Seth Gilbert host a BBQ and generously invite anyone involved in production sound in the Southern California area. They alternate hosting duties; this year it was Kriky's turn. About 100 people came, socialized and enjoyed pulled pork, ribs and other BBQ specialties. Many goodies supplied by Coffey Sound/Trew Audio, Location Sound Corp., NeoPac, Solar On Set and Wilcox Sound were raffled. There were also abundant supplies of "Accept No Subs" T-shirts from Lectrosonics.

To be on their mailing list, send an email to **soundbbq@kriky.com** or visit the Kriky & Seth's Sound Department BBQ on Facebook.

Kriky in the BBQ line

Glenn Berkovitz

We have a winner!

Kriky and Beau Baker

Kriky and Seth raffling off prizes

In Memoriam

SUMNER J. KAUFMAN
Projectionist
Oct. 4, 1919 – July 29, 2012

GLENN S. STUART
Projectionist
June 13, 1954 – July 14, 2012

by LAURENCE B. ABRAMS

You can pretty much say goodbye to film

because from this point forward, it's all about video.

You can pretty much say goodbye to film because from this point forward, it's all about video. That includes production and post-production and distribution, as well. After more than a dozen years of hi-def development, last year represented something of a tipping point ... the year that digital projection finally took the lead over film on theater screens around the world. For more than 80 years, 35mm film was the industry's primary theatrical projection format but in 2011, nearly 64,000 screens worldwide ... more than 51 perent of all screens ... were projecting digital films. And the rate of transition is certainly not slowing down. To the contrary, the use of conventional film prints by major studios may cease altogether both in the United States and in major markets worldwide sometime before the end of next year. As film manufacturers like Kodak and processing labs like Technicolor and Deluxe shut down or drastically scale back their facilities, we see clear evidence of the same sort of transition from film to video taking place on production, as well.

Director Christopher Nolan and his admirable commitment to continue shooting on celluloid notwithstanding, it's safe to say that the vast majority of our work has already gone to video. In retrospect, shooting on film seems so much more simple, more stable, more reliable and certainly easier to work with but the reasons for switching to video are not insignificant ... and there will be no turning back.

The film-to-video transition is driven by a rapidly changing technological environment, with new products reaching the market at a stunning pace and with new workflows in use on almost every production. During this year's Basic Contract negotiations with the AMPTP, some of the producers' representatives seemed to suggest the belief that all this "new video stuff" made it so much easier to shoot and somehow required fewer people to do it. Really? What this REALLY means for us ... the sound technicians, the video engineers, the broadcast technicians and the projectionists who actually do the work ... is that today's theatrical and broadcast productions are far more complex and far more technically demanding and far more challenging than anything we've experienced in the history of our industry.

But we love challenges and in many cases, members of Local 695 are some of the people advancing these new technologies, designing and developing the equipment, advising the manufacturers and developing creative and innovative on-set workflows.

What this all adds up to is an increasingly important need to develop new education and training resources for the membership of Local 695. With that in mind, we've developed a variety of programs, including a partnership with **THX** and **Dolby Labs** to offer our members a series of comprehensive **Color Science/ Color Management** classes. Local 695 Video Assist, Engineers and Projectionists have attended seven full days of intensive color science training so far and we expect to offer more of these classes in the future as just one component of our on-going data management training.

Also for Video Assist, Engineers and Projectionists, we have continued with our four-day **Final Cut Pro** training this summer but this time, we've expanded the program by including an additional **four-day Final Cut Pro Level 2 plus After Effects** training.

For Production Sound crews, we've developed **Local 695 Pro Tools PT-101** training that now qualifies as **Avid Certified Training** and we'll soon be expanding the program to include **PT-110**, as well. Each of these Avid-certified classes is concluded with an Avid-approved assessment test and once both units are completed, members are awarded qualification as an **Avid Certified Operator.**

The two-day **EVS** training we conducted in the spring offered training to members in the use of EVS systems to capture and distribute digital video and audio over networked servers. Local 695 members are currently using EVS on sports programming, awards shows, talk shows and some dramatic production.

Our **Cable Clinics**, now in their third year, are conducted on a recurring basis by Local 695's "Master Cable Builder" James Eric. These hands-on classes are limited to just four members, providing a great opportunity to receive highly personalized training in the essential skills of cable building and repair for sound and video.

We are also continuing to offer our **Fisher Microphone Boom Training: One-on-One Intensive**, a unique training opportunity not available anywhere else. In addition to microphone boom operators and utility sound technicians, we strongly encourage Production Sound Mixers to enroll in this training, as well. In some cases, where video cameras are rolling for exceptionally long shooting takes, the Fisher boom can prove to be an excellent solution and this is why all Production Sound crews should be trained in their safe operation.

And we continue to provide our members with access to more than 1,000 self-paced software tutorials through **VTC**, covering a huge selection of programs, including **Adobe Premiere, Sony Vegas, Apple Final Cut Pro, Adobe After Effects, Adobe Photo Shop, Avid Pro Tools, Sound Forge, Adobe Audition, Adobe Soundbooth, Abelton Live, FL Studio, Apple Logic Studio, Steinberg Cubase, Filemaker Pro, Macromedia Director, Flash, Dreamweaver, Wordpress, Drupal, Joomla!, Wikis, PHP, Javascript** and many hundreds more.

All of the above training is free to Local 695 members (although in some cases, you may need to satisfy certain qualifications established by Contract Services.) In addition, more training is available at significantly reduced cost (via two-thirds reimbursements from Contract Services) at **Studio Arts** and the **IDEAS Workshop** and at **RED Digital Cinema, Barco, EVS, Video Symphony** and more.

How can you learn more about these important training opportunities? Thought you'd never ask. All classes are listed on the Announcements page and the Education & Training page of our website at **www.695.com** and are also announced in emails sent to the membership. Most of you have been getting these emails periodically but if you haven't, you need to first be sure that you're registered on the website. If not, it's quick and easy to do. If you're already registered, log in and check your profile to verify that we've got your correct email address. If all else fails, be sure to check the junk filters on your computer and if necessary, "white list" our address ... **info@695.com** ... to assure that you're receiving all of our emails.

As always, if you have any questions or suggestions about training or about the website, don't hesitate to contact us at **edu@695.**

Up The River
Part 2: Hawai'ian Style

by Steve Nelson, CAS

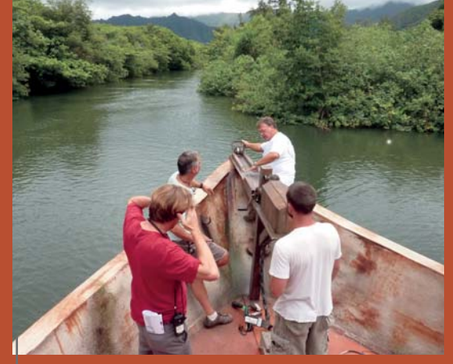
The common wisdom tells us that Puerto Rico is a great place to shoot a pilot but not the series. It's too far, the weather is dicey with a hurricane season, not enough infrastructure, language issues, too exotic, in our case, the landscape required too much expensive CGI to give it the right Amazonian look, all the usual complaints that make me wonder why so much production has left Los Angeles. So when we got our midseason pickup order, no one was surprised that we would take the show to Oahu, despite the very generous 40% incentive offered by Puerto Rico to stay.

There are some favorable reasons to go west: only five hours direct flight from Los Angeles, relative lack of hurricanes, more English, miles not kilometers, better sushi and cycling, more infrastructure including a recently built actual soundstage and enclosed water tank (which the network wants to tie up), a better jungly look and more varied, easily accessible, locations. In Puerto Rico, however, we had an actual navigable river—once we hauled the boat, at high tide during the full moon, over the sand bar at the river's mouth—while it is well known that there are no rivers in Hawai'i, at least on Oahu. Hawai'i's incentive is only 15%–20%. The unvoiced thought was that our show is a supernatural thriller kind of like that other show whose name we tried to avoid mentioning that shot for six seasons on Oahu, and since no one could think of a similarly successful show coming out of Puerto Rico ... aloha! (I prefer Puerto Rican rum, but I guess that's not enough reason to stay.)

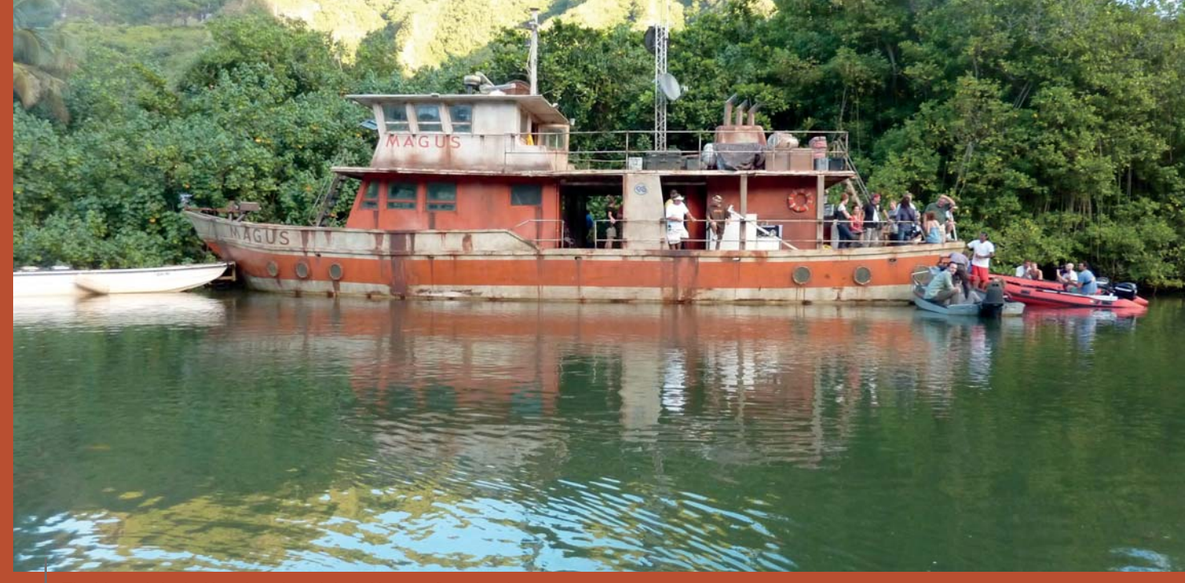
Opposite page, top: Scary things do happen at night. Ghost ship approaching. Far left: This is truly a magical place. Lunchtime at Kualoa Ranch. Center: The Magus parked, featuring the back of Jon Mumper's head. Left: On stage at Hawai'i Film Studio. They keep it dark and cold.

Operator Todd Campbell, marine guy, actors Joe Anderson & Eloise Mumford, actor/operator Scott Michel Foster. When the show is called *The River*, there will be boats!

Upper deck on the Magus.
I've worked in worse places!



First day on The Magus: (L-R) 1st AD Dave Hallinan, DP John Leonetti, key grip Dan Reilly, production designer Chase Harlan.



The Magus: It looks like a boat but it's built like a surfboard with a set on top.

IF WE'D KNOWN THEN WHAT WE KNOW NOW *or* THE SAME ONLY DIFFERENT

As a seven-episode midseason replacement, we'll start a bit later than the rest of the network season, late in August and go for about three months on Oahu.

There weren't many returning to continue the voyage up river: Our DP, John Leonetti, and his key grip, key makeup, accountant, producers and line producer, execs, our Puerto Rican 2nd 2nd AD (long story), our director, Jaume Collet-Serra (for the first episode), and me. Knox White was not available to make the Hawai'ian scene so I enlisted my old friend, Tom Hartig, to join me. I've traveled and worked in many faraway places with Tom and there are few better companions, and no better boom operator and set runner, so I was excited to have him back. On the recommendation of Richard Lightstone, I contacted local sound utility Jon Mumper, who, since he wasn't working on the other show going at that time, *Hawaii Five-O*, was happy to join us. Jon was the only member of the sound department to survive all six seasons of *Lost* and, like so many of the crew there, his career and skill set was forged in that crucible. He came through it fine and was a solid asset to my crew. He is amazingly stoic about things; I guess after six years of that show—so many stories!—everything else seems easy. We also had local John Reynolds on hand for our second units.

This was not my first visit to Hawai'i but my first time working there. I had resisted the calls to work on *Lost*, now would be my time. P.R. was a fun place to work; though always exotic it was not always easy. There has been so much filmmaking for so many years in our 50th state that it felt very normal to be there. Normal, but not to be taken for granted; there were so many locations where the natural beauty was absolutely stunning. Even when you're stuck in the usual horrible traffic jam, there's something nice to look at, at least a rainbow or something.

We would not be staying in a hotel this time; that was not an option. Rather, we would be given a housing allowance, a rented car and *per diems* and invited to find our own place to live. Negotiating with landlords can be a little tricky considering all the uncertainty of production work. Tom and I decided that we would pool our resources to get a house together. With the help of our production staff we found one in Kailua, the nice beachside town where President Obama stays, on the windward side about midway between the stage near Diamond Head in Honolulu and the Kahana Valley where our "river" was located. The out-of-town crew was mostly split between Honolulu/Waikiki and our side of the island. A word of advice to anyone who is driving there: watch and obey the speed limits on Oahu. They change suddenly and arbitrarily and there are many cops in unmarked cars lurking about. And on the advice of our teamsters, peel off the rental company bar-code ID sticker and put on a local bumper sticker so as not to look totally like a tourist and invite break-ins.

Our friends in Post-Production and our bosses were quite happy with the work we'd done on the pilot, so I decided to keep the same basic approach and try to fine-tune it and to anticipate some of the challenges a new season and location might bring.

On the pilot, Production had been willing to cover a week or so of rental for my over-the-shoulder rig but for the longer run, the network was unwilling to subsidize additional equipment I thought necessary to achieve the results they liked in the pilot. The network, in this case ABC, picks a number that someone believes is appropriate for sound equipment rental with little regard for actual job requirements. Then you must provide competitive bids to justify the number they gave you. As "employee vendors" we are in a special category; it seems that the networks would rather pay more to an outside, approved, vendor than to us. There are exceptions, but it is becoming more challenging to provide adequate technical support at these rates.

Nevertheless, we all love a good excuse to buy new equipment, especially if we know it will be necessary for a job and good to have for the future. So when it came time to gear up for the Hawai'i shoot, I found a great deal on a slightly used Zaxcom Fusion 10, which is basically a Deva 5.8 without the DVD burner. The Nomad was not yet available, and while it makes some tremendous advances in a very small package, I definitely needed all eight knobs that the Fusion sports, so it was a good choice for the job.

When using Zaxcom recorders in a bag, you want to avoid using their very noisy onboard slate mike. Robert Kennedy, former Coffey Sound specialist, helped with a clever solution that works really well with the Fusion and Deva and requires no modifications. Using the Disk Mix and Output matrices, it is easy to route an external headset mike to slate, public Comteks and also to IFB for a private line to my crew. This requires only a custom cable using the "Camera" connector on the Deva. Although I had to give up one mike input, this is much more versatile than on the pilot when I had only the Comtek for everybody, and it avoids using the bulky 25-pin output connector and snake.

I also acquired a Venue Field and loaded it with the appropriate VRT modules and a larger Petrol bag that fit better than the smaller one I'd had in Puerto Rico. For Hawai'i, I got a couple of dipole antennas instead of the sharkfins, thinking that would still increase my gain and not take up so much space. Also, I discovered that Petrol uses these little clips to attach all those pouches to the bag; I got the matching clips from Petrol, screwed them to the dipole mounting hardware and I could easily mount (and unmount) the antennas right to the bag. Ultimate range was not quite as good as the log periodics, but the lack of directionality is helpful, especially when talent is moving in three dimensions all around and I'm not sure exactly where they might be.

Since the Fusion lacks a DVD burner, I thought this would be a good opportunity to begin to wean myself off DVD-RAMs and move toward other media. At this point, the network still wanted archivable media. (I don't blame them; it is to my way of thinking a significant leap of faith to hand over your day's work on a tiny piece of media that will come back blank, having been downloaded to a drive. As our work evolves, this will be an ongoing discussion, but for now it seems to be someone else's problem.) The compromise was that when I worked off the cart I would deliver, as usual, two DVDs, one multi-track and one single-mix track, and when I was in mobile mode, I would deliver a multi-track Compact flashcard. Since the picture and sound transfer was happening back at the production office, the media turnaround was pretty quick. Certainly digesting all the picture data was the main concern. (On the pilot, I just finished as of this writing, I used no DVDs at all. I delivered to DIT the two flashcards and within minutes he'd downloaded them onto the drive with picture and off they went for syncing.) Although I've always admired the robust nature and flexibility of our DVD-RAM disks, these C/F cards are fast, flexible, and in the long run, very cost efficient.

NEVER THE SAME RIVER TWICE

In Puerto Rico, the boat playing the part of the hero boat, the Magus (think poor man's Calypso), was a real watercraft, artfully aged. But that was another ocean. We also had something more

Tom & Steve, together again on distant location.

Tom Hartig at sea.

A different view of Honolulu, featuring the mixer cart with Aviom.

like an actual river there and we could steam for quite a while before turning around. On Oahu, our main river location was in the beautiful Kahana Valley, up the windward coast, which features not a river, but the Kahana Stream. It comes down from the wet mountains and runs shortly to the sea, suitable mostly for kayakers and stand-up paddlers. Though not very deep, this stream is prone to flooding during the rainy season and there is a low bridge under the road at its mouth. The valley is incredibly lush with suitably tropical foliage and gorgeous mountains rising dramatically. The solution of how to get the Magus in here was to build our own and assemble it on site. Hawai'i is the birthplace of surfboards, so that technology was adopted. The construction crew shaped blocks of Styrofoam and covered them with fiberglass—just like a surfboard. They built a steel superstructure on top and constructed our floating set, which bore a striking resemblance to the original. The whole thing, about 60 feet long, with a main and upper deck, only drew about 18 inches of water, but it lacked power, a rudder and keel. It also had no head and no smoking section (much to the distress of Jaume Collet-Serra, our director). Nevertheless, fully loaded with cast, crew and equipment, we could push or pull this rig in a similar fashion as in Puerto Rico, about a quarter mile up and down our beautiful river before we ran out of room. (You can easily see it on Google Earth.)

There were some advantages to working on our floating set (not really a boat). It was more spacious and easier to work on than the original; it had less sharp metal pieces to bark your shins on and wider passage along the gunwales. The first time it rained we discovered it was not really watertight but that was quickly remedied. With less metal, it was more transparent to RF. It was the lack of steering that gave me the most grief. Lacking rudder and keel to help keep it on course, plus a less than symmetrical hull, it tended to move like a pig on ice when pushed, that is, anywhere but where you wanted, and often aground. The remedy? A pair of Zodiacs on either side of the bow keeping us on course. This was not a happy solution for sound; those little outboards are noisy and the operators were not too clued in to the dialog being more concerned with keeping things moving forward and out of the weeds. In addition, the main powerboat pushing us was not the same gentle giant that we had back east, and the generator it carried was also louder, giving us more noise to bury in the final mix. So began the ongoing negotiations with Marine and Electric: changing the positions of the Zodiacs, building housings for the generator (worked great until it overheated), swapping generators. Constant vigilance was required to keep things to a manageable roar, as were fingers on faders to keep it out of open mikes. Next season, if there is one, I will demand a steerable floating set!

I brought along one of those cute Backstage Mini-Magliners, thinking that it might be nice to have a platform when on the Magus or when four-wheeling through the bush. We did bring it on board and it was helpful, but as we were constantly moving around the boat, it seemed that there were always too many people aboard and not enough space so it was in the way. In prep there had been talk about a Sound Gator for getting to difficult locations. In that case, we would have tied the Mini down and used the Gator as a mobile unit, but as it turned out they were, for the most part, very gentle with our locations. We shot a lot in what we called "parking lot jungles": park the truck, roll the gear a little ways, and there you are. If you worked on *Lost*, you would be familiar with many of these places. We did use the Mini for some of these locations, particularly because it was easy to just grab the bag, leave the cart and go. Next time, I'd like to try the Zaxcom Mix-8 with the Fusion. That way, if I am able to find a comfortable place to sit and work, I'll get the ease of working with faders instead of knobs and if I have to run, just unplug it and go. Plus, I think it'll be great for insert car work.

Sooner or later in our line of work, you are going to encounter a situation where, one way or another, your actors are going to get wet. If your show takes place in a boat—on a river—in the tropics—the odds go way up. This is rarely not a problem for us. There are many ways to get actors wet but probably only two main categories: submersion (or, I suppose, immersion) and water from above, i.e., rain. Both are special sources of pain for us. Let's take the case of rain, the sort generally provided by our special effects brothers. How does the rain get up into those towers? By using a very noisy pump. So if you are able to keep your boom mike dry and free of raindrop impact noise (Remote Audio's Rainman is a very nice upgrade from the old hog's hair special), then chances are you'll be fighting SFX noise and the ambient sound of "rain," but you might be lucky enough to get a nice clean close-up. If you've been paying attention (see last issue, Part 1), you're aware that this is probably not an option for us on *The River*. We're pretty much left with Plan A: Wire 'em all.

The climactic scene of one episode involved a rainstorm of biblical proportion, at night, on the boat. The saving grace was that the boat would be docked. As the weather gods would have it, rain was forecast for that Friday night. Another opportunity to show off the beauty of the Aviom system as I stayed in the dry comfort of our truck (with my wife and daughter who were visiting), while we rain-bagged the RF Cart and put it at the water's edge near the Magus.

The scene involved much physical action and much water and cameras in all the usual places—handheld and mounted. Thanks to Tom we were well stocked with industrial-strength condoms, which keep the transmitters dry under most circumstances, but given the expected deluge, we decided to take it to the next level of water resistance and rented some Lectrosonics MMs. (The new Lectro WM looks like a great new alternative for a water-resistant transmitter.) Choice of lavalieres in this wet situation is important, though in my opinion not as important as one might think. The Sanken COS-11 is perhaps more water resistant than advertised. I had learned this on the pilot, where an actor (no names on location!) accidentally put one in the water during an unexpected dunking in an improvised scene. It made quite a sound when it hit and was apparently inert, but after carefully drying it and leaving it be awhile, it actually came back to us. (Sanken now has the COS-11D for moisture and reducing digital interference.) Nevertheless, the COS-11 is not my first choice for getting wet; that honor would go to the Countryman lavs. Their Classic Omni (like a smaller Tram) is good for water work, as is the B-6, which most of us carry, though probably without the right screw-in connector for the MM. Another choice, the Lectrosonics M-150 or 152, the lav that Lectro used to include with the purchase of a transmitter, is surprisingly good in the wet and if it goes down, it won't feel like such a loss.

After this dissertation on which lavalieres to use in the rain, I will share this: If you must have the mike hidden under their clothes, it doesn't much matter which lavaliere you deploy in a scene where the actors get really wet. Once the wardrobe becomes saturated, although the waterproof mike will be safe, it will not deliver natural sounding audio. As the clothing approaches saturation the material becomes less acoustically transparent and, though it might not sound "underwater," the frequency response is far from flat. You might get lucky with take one, or if the actors start each take with dry clothes, you'll get another chance. Some might not get as wet as others, so perhaps you can pick up dialog on another actor's mike, or maybe it's possible to sneak in a plant mike. With a tiny lav like the B-6 it might be possible to hide it in plain sight, out from under the wardrobe, especially at night, but then, of course, it is susceptible to wind noise and the possibility of taking a direct hit from a raindrop. In this case, the action was meant to be wild and chaotic in the dark with a *King Lear* storm blowing, which actually gave us some latitude. With a combination of "all of the above" and some good luck we managed to get what we needed. So much of what we do requires multiple options, quick reactions and improvisational skills. On top of all that, layering in more wind and rain fx in the mix can help cover a multitude of sins.

During our relatively short season—seven episodes, eight days per—we had some fun telling scary stories. We got to hit some classic horror tropes: jealous ghosts, animated dolls, mysterious and unfriendly natives, zombies, demonic possession and the series finale, an exorcism. There was also the plot development of some secret quasi-governmental organization that was behind all the mystery as Dr. Cole searched for the source of the magic in this beautiful but threatening place where the laws of nature have no sway. We used all kinds of special effects: rain, wind, fog (not easy on a river on the windward side of the island), water tank and more, and quite the arsenal of visual effects. As always, the mission of the sound department, producing appropriate and useable tracks, is complicated by all this trickery. In the case of *The River*, we really had to step it up because of the multitude of cameras. We got to do a little recording session, luckily on stage, for playback on the moving boat. It featured guitar, accordion and a vocal duet. We also provided playback of scary creature sfx and eerie music for actor motivation, nothing too complicated but rendered more challenging considering the location and the cameras. As was the case on the pilot, our work was made easier with the help of a very talented and supportive crew and production staff and a wonderful cast who themselves had to go through some pretty rigorous paces. Also, we were working in some of the most beautiful places ever!

Mudmen! (and stunt coordinator Mike Vendrell)

Biker Steve and bay.

The virtues of Hawai'i are well known to anyone who has traveled there; most of us go for vacation, but there are many far worse places to be shipped off to work. One hears so many stories about the challenges of a location and the specter of *Lost* looms large there ("Do you remember the season it rained for 40 days straight?") but we were fortunate with the weather, late summer to Thanksgiving, and it wasn't quite the mudfest I had feared. To be sure, we had rain, but as in Puerto Rico, the locals know how to deal with it and you'll be covered almost before the first raindrop lands. Heat and humidity are always a problem in the tropics and shooting on the windward side meant that we had some wind as well. Okay, and when I was on my bicycle, sometimes it felt like I was riding though a carwash, hot, then rain, then wind, and always sweat. Of course, I was commuting on a bicycle along the beach, over some mountains, through some towns on one of the world's great destinations. Really, who can complain? You're in Hawai'i, and I'm happy to say that it hasn't been ruined for me as a vacation destination.

The circumstances of working on a distant island are similar to other faraway locations only sometimes more so. There are limitations: you can't just send a driver to the rental house to get what you need, so you make do with what you can find there—or plan ahead. For us, there is only one suitable sound truck on the island and it was already in use by *Hawaii Five-O*. We got by with a (slightly) modified cube truck. Well, actually two, as the lift gate on the first was deemed unsafe. Then the supposedly safer gate on its successor broke while in use. Somehow no one was injured and the gear escaped unscathed and the gate was repaired. Which brings me to a major difference between shooting in Hawai'i and Los Angeles. Just before leaving I had completed the latest required Safety Passport classes. I arrived ready to implement all the good new rules and guidelines I'd learned only to find that not only were they not required there, but even normal safety guidelines are ignored, if not scoffed, by the locals. Is it really such an imposition, for example, to keep the fire lane on stage clear of obstructions? I am told that this is a concern at many of the newly popular production centers out of Los Angeles. I would like to see all union crews and signatory productions held to the same safety standards.

As I write it has been determined that despite all our best efforts we will not be returning for another voyage up *The River*. I guess we'll never find "the source." We had our fans but alas, not enough to make the network cut. My wife is particularly disappointed as she was looking forward to spending her teaching sabbatical in our house in Kailua.

Doing this show was quite an adventure, both in terms of location and the challenging nature of the work. Admittedly, it was a bit surprising at this point in my career to strap on all this gear and go running around like an ENG or reality show guy. It wasn't that we in Sound were doing anything especially innovative, just more of it than would be considered normal in the context of a one-hour network episodic show. (Not quite like *American History X* where Tom and I had to "invent" wireless boom to compensate for the antics of director/camera operator Tony Kaye. Seems pretty basic these days, but with the non-diversity VHF RF of yesteryear it was pretty challenging!) Of course, when you consider the up-to-14 cameras we used on *The River*, the whole notion of "normal" is left far behind. (We might have shot a million feet of film on *AHX*, but it was all one camera.) Once you get your head around it and commit to this crazy way of working, you just keep moving forward. It wasn't full-on every day; the reality TV mode was often interrupted by the old normal, which meant working off the cart, albeit with more lenses than seems right. And now that I have this studio-in-a-bag set up, it is amazing how appropriate it is for other gigs.

I'm happy to say that the unorthodox working style resulted in tracks that were a component of what I think is the best sounding television show I've ever done. The supernatural themes provided a broad canvas for our very creative cousins in post, Paula Fairfield, supervising sound editor, and Dan Hiland and Gary Rogers on the board at Warner Bros., plus a very suspenseful score by the great Graeme Revell made for a very effective sonic environment. Our dialog editor, Jill Purdy, was very happy with the tracks we provided and used only the bare minimum of ADR.

Thanks to all for the challenging and fun adventure and the excellent opportunity for growth in my craft! *Adíos* and *aloha!*

by Jim Tanenbaum, CAS

The Cable Connection Part 2

WESTERN UNION IS OUT OF THE TELEGRAM BUSINESS, BUT YOU CAN STILL SEND A CABLE

As mentioned earlier, there are two basic cable types: balanced and unbalanced. But there are many variations on these two themes.

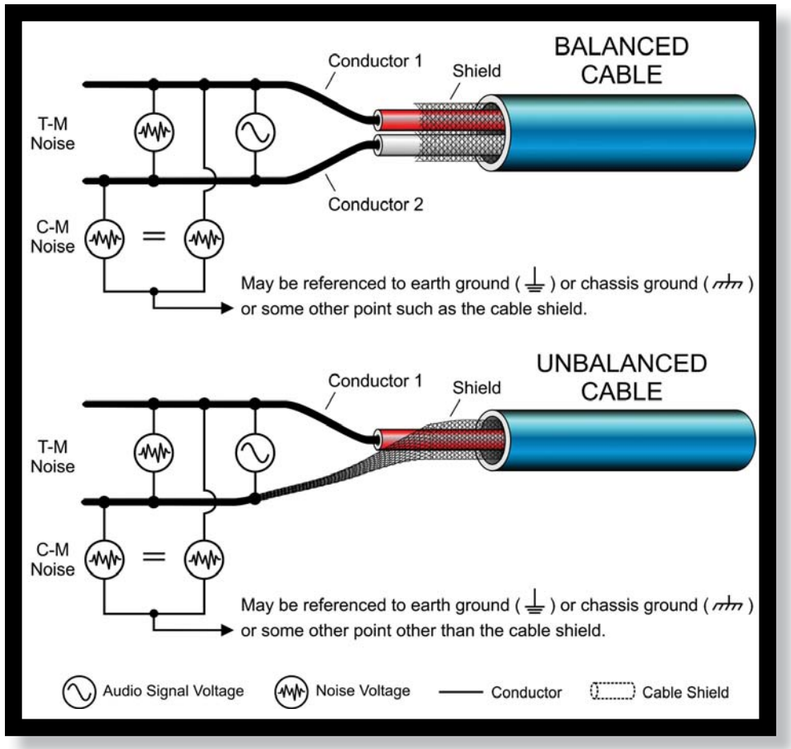


Diagram by Laurence B. Abrams

BALANCED

Balanced cables, which can be used for either balanced mike-level or line-level signals (or unbalanced mike or line signals, for that matter), consist of two (or three) insulated conductors surrounded by a metallic shield and an outer jacket of rubber or plastic. They do not have a standard impedance, but are usually close to 110 Ω. The inner conductors are composed of many thin individual wires twisted around each other for flexibility. The outer shield is available in various configurations, two of the most common are *twisted* and *braided*.

Twisted shields have many thin wires wrapped spirally around the insulated inner conductors. While this arrangement is more flexible than braiding, with repeated flexing the shield wires tend to separate, creating gaps for interference to enter and/or the inner conductors to bulge out. Their initial 95% coverage can fall to 70% or less. One attempt to overcome this is to have two layers of spiral wrapping, in opposite directions. Still, separations manage to occur, with the same problems as the single-wound shields. To further enhance their flexibility, most twisted shield cables have thin outer jackets of PVC plastic. While more supple, PVC-jacketed cables are also more easily damaged by abrasion, cutting or crushing. And they get really stiff in cold weather.

Braided shields have many thin wires woven (in an alternately over-and-under pattern) into a tube that encloses the inner conductors. This type of construction is durable, but somewhat less flexible than a twisted shield. The effective coverage ranges from about 85% to 95%. With repeated use, the individual shield wires will break, eventually causing increased susceptibility to interference and static when the cable is moved, particularly when phantom power is present. The Belden Company offers a line of mike cables that have a more open braid for flexibility, and then underneath, a layer of cloth impregnated with a conductive carbon compound to provide almost 100% shielding. The only drawback is that the black goo sticks to the shield and makes it difficult to solder. Finally, many braided shield cables are offered with rubber jackets that do not get as stiff when cold. IMPORTANT: Natural rubber quickly cracks when exposed to oil or smog—be sure to buy synthetic rubber (e.g. EPDM, Neoprene, Hypalon) jacketed cables.

A third type of shielding involves a wrapping of aluminum foil or aluminized plastic film, with one or more bare ground wires running alongside to provide a means of connecting to it. This type of cable is limited to permanent installations, as it is not very flexible, and sharp or repeated bends in the same area can cause the aluminum shield material to tear.

As mentioned above, some balanced cables have a third inner conductor. This will be discussed later.

A special class of balanced cable has recently been introduced for digital signals: *Unshielded Twisted Pair* (UTP) cables (such as CAT-5 and the newer CAT-5e) that consist of four twisted pairs of conductors twisted around each other and covered in a plastic jacket, without an overall shield, because digital signals can tolerate much more interference. For really difficult EMI (Electro-Magnetic Interference) environments, shielded twisted pair (STP) cable is available. The insulation thickness and spacing of the conductors is rigidly controlled, and these cables have an impedance of 100 Ω ±15%. Each of the four pairs has a different twist pitch to minimize crosstalk. They are nowhere as flexible as some of the cables described above and are chiefly intended for fixed installations. Nevertheless, many mixers use them in production for digital audio, timecode, and even video for their monitors. IMPORTANT: If you are working with an existing installation, or cables with pre-attached RJ-45 connectors, be aware that there are two different color-coding "standards": T568A and T568B. They differ by interchanging the plug pin positions of the green and orange wires, and the white-w/green-stripe and white-w/orange-stripe ones. Since the conductors at the cable ends are connected to the plug contacts one-for-one, either type of cable may be used with either type of jack—the confusion arises if you try to wire a CAT-5 cable directly into a circuit board and use the wrong color-code chart for the plug pin connections at the free end of the cable.

UNBALANCED

Unbalanced mike cables consist of a single insulated inner conductor surrounded by a metallic shield. These cables do not have a standard impedance, but can range from about 50 to 250 Ω. Shielding may be spiral or braided, and jackets plastic or rubber.

A second type of unbalanced cable is *coax* (coaxial). Like the mike cable, it has a single center conductor surround by a metallic shield. Unlike the mike cable, however, the physical dimensions and insulation composition are rigidly controlled, in order to maintain a constant impedance along its entire length. This is necessary because coax is used for very high-frequency signals, and a change in impedance can cause a loss of power by reflecting some of it back down the cable. Even with a constant impedance, the high-frequency signals are attenuated significantly as they travel, so in addition to an impedance specification, coax is rated for signal loss, in dB/100ft at various frequencies. Coax cable is identified as belonging to various groups or "Types," primarily by impedance and Outside Diameter (O.D.). Within a given Type, there are cables with stranded or solid center conductors, foam or solid dielectric (the plastic insulation surrounding the inner conductor), and braided or foil shielding. The first term in each of the preceding three pairs represents the more flexible construction.

RG-8 Type is 50 Ω, low loss (≈ 3 dB/100ft @ 450 MHz), and about 3/8-inch O.D.
RG-6 Type is 75 Ω, low loss (≈ 4 dB/100ft @ 400 MHz), and about 3/8-inch O.D.
RG-58 Type is 50 Ω, medium loss (≈ 7 dB/100ft @ 450 MHz), and about 1/4-inch O.D.
RG-59 Type is 75 Ω, medium loss (≈ 7 dB/100ft @ 400 MHz), and about 1/4-inch O.D.
RG-174 Type is 50 Ω, high loss (≈ 15 dB/100ft @ 450 MHz), and about 1/8-inch O.D.

RG-58 is sometimes used to extend radio mike receiver antennas, but its loss is often more than the inverse-square loss of the radio signal traveling the same distance through the air. For this application, RG-8 would be a better choice if more than five to 10 feet is needed.

IMPORTANT: There are subtypes: RG-58A/U Type is slightly different than RG-58 Type, and RG-8x is considerably different from RG-8. Read the manufacturer's data sheets carefully for the particular cables you are considering.

EVERY CABLE HAS TWO ENDS

To use a cable, it must be terminated with some kind of connector. (Unless it's soldered directly to a circuit board.)

BALANCED
The most commonly encountered (balanced) microphone connectors are 3-pin XLR (originally a model designation in the Cannon Brand, but now used generically). These connectors have a metal shell and three insulated contacts. The "standard" wiring is:

Pin 1 = Shield
Pin 2 = + Audio (a.k.a. Hi, In-phase)
Pin 3 = – Audio (a.k.a. Lo, Out-phase)
Shell = Ground (most models offer a way to connect the plug shell to Pin 1, with the exception of the old Cannon XLRs. If you use these, solder a length of bare busbar wire to Pin 1 and run it out the back, between the rubber strain relief and the U-clamp.)

This standard is based on Pin 2 of the microphone going positive with respect to Pin 3 when pressure on the front of the mike is increasing. A further standardization is that outputs are on male (having solid pin contacts) connectors (called "plugs" when on a cable) and inputs are on female (having hollow receptacle contacts) connectors (called "sockets" when mounted on a panel).

Murphy's Law ensures that things are not so simple. In the 1960s, the first Nagra recorders used male mike-input connectors, necessitating the use of mike cables with female connectors on both ends. (Extension cables were female-male.) Some European equipment manufacturers followed suit, with male in and female out. Other Euro devices have female inputs and male outputs. There also are places in the eastern U.S. (and elsewhere) where the functions of Pins 2 and 3 are reversed, so check carefully when using equipment not your own. (There also are pin-swapping issues with normal and "red dot" T-power microphones, but that is beyond the scope of this article.)

More recently, the Switchcraft Company brought out the "TA" line of miniature connectors, originally intended to follow the U.S. standard practice of male out and female in. But the panel-mounted female TA connectors were so much larger than the male ones that radio mike manufacturers were forced to use male TAs for their microphone inputs, and put the females on the mike cable. **WARNING:** Since some brands also use male panel connectors for receiver outputs, the possibility exists for accidently plugging in an electret lavaliere microphone to a line-level output and destroying the mike.

UNBALANCED

Unbalanced microphones normally use ¼-inch mono phone plugs (*TS*, or *Tip and Sleeve*). They often are high impedance, and are not usually encountered in professional work, although you may have the occasion to tie into them when they are used as props, or if you have to make a field recording of a local small-town musical group or public speaker. There is no industry-wide standard, and some of the microphones may be quite high impedance. Impedance-matching transformers are available, and may include a housing with a ¼-inch phone jack in and an XLR male plug out.

Unbalanced line-level signals may also use ¼-inch mono phone plugs, or the smaller and flimsier phono (RCA) plugs. (There are some high-quality semi-pro phono plugs, but even they become unreliable after repeated insertions.) The RETMA (consumer) line-level standard is -10 dB at 47 KΩ, but many manufacturers ignore it. You can make up simple wired adapters to interconnect unbalanced and balanced devices, but using a balun transformer (see below) will allow longer runs of cable and block common-mode interference.

IMPORTANT: Studio patch panels use a plug that resembles a standard ¼-inch stereo phone plug (*TRS*, or *Tip, Ring, and Sleeve*), but there are dimensional differences (particularly at the tip), and you can damage a patch panel if you attempt to plug a standard TS or TRS into it. You may also get an intermittent connection. It's a good idea to make up (or buy) several adapters so you will be able to tie in to a patch panel if the need arises. A good configuration is a TRS patch plug with its send circuit wired to a female XLR and the return circuit wired to a male XLR.

While on the subject of different types of ¼-inch plugs, if you need to patch into an aircraft pilot's headset, their ¼-plugs are much shorter (about ¾ inch) and have two ring contacts (*TRRS* or *Tip, Ring, Ring, and Sleeve*). You will have to make or rent/buy an adapter in advance.

The wiring is:

Tip = + Mike
Ring 1 = + Headphones (mono)
Ring 2 = - Mike
Sleeve = - Headphones

Another dimensional problem involves 1/8-inch (3.5 mm) phone plugs. The mono plug is slightly larger in diameter than the stereo plug, especially the tip portion. Depending on the particular manufacturer, a mono plug may not enter a stereo jack, of if it does, it may bend the contacts so a stereo plug will no longer work properly. (The jacks on Comtek receivers are designed to accept either type.) The smaller 3/32-inch (2.5 mm) plugs do not seem to have this incompatibility. Both these sizes of stereo plugs are used with some cell phone headsets, and some of them use a double-ring plug. Again, you will need an appropriate adapter to patch in.

Coaxial cables are usually terminated with BNC (Bayonet-style) connectors. **IMPORTANT:** Because of the relationship between size and impedance, BNC connectors for 50 Ω and 75 Ω cables are slightly different in dimension. Using connectors with one impedance on a cable with a different impedance cannot only cause signal reflections from the impedance mismatch, but also can be damaged when a 50 Ω connector is mated with a 75 Ω one. For limited space applications such as radio mikes, SMA and even smaller SSMA threaded-style connectors are used. **IMPORTANT:** Radio mikes use "normal" SMA connectors, with a male pin in the cable-mounted connector (the one with the threaded collet). The more common SMA connectors used on computer Wi-Fi equipment are "reverse," with the cable-mounted connector having a female receptacle for the male pin in the panel-mounted connector. Therefore, you cannot use a Wi-Fi SMA cable to extend a radio mike antenna.

TRANSFORMERS (NOT THE MOVIE)

Transformers have many uses, but here we are concerned with only four of them: changing impedance, converting between balanced and unbalanced circuits, blocking some kinds of noise, and splitting signals. A particular transformer may be designed to perform one, two, three, or all four of these functions.

A basic *transformer* consists of two coils of insulated wire wound around the same (usually iron alloy) core. Laminated iron sheets are used for low (e.g. audio) frequency cores; powdered iron alloy (ferrite) for medium to high frequencies. Air cores (wound on a plastic bobbin if the wire is not stiff enough to keep its shape) are used for even higher (radio) frequencies. If both coils have the same number of turns, a signal fed into one coil (the *primary*) will appear at the terminals of the other coil (the *secondary*) relatively unchanged. The second signal will, however, be electrically isolated from the original circuit. This removes most C-M noise.

An *isolation transformer* is usually 1:1, and will have an additional layer of non-magnetic metallic shielding over the secondary winding to block capacitive coupling of the electrical field produced by the noise on the primary winding. The entire transformer may be mounted in a shielded enclosure, with input and output connectors. In this case, the shell of the input connector must be electrically isolated from the shell of the output connector to block transmission of the C-M noise by this route, because XLR (and many other type) connectors often have their metal shells connected to the cable shielding, and thus ground loop current could bypass the electrical isolation of the transformer by flowing through its metal housing.

A transformer designed to change impedance will have a differing number of turns on the primary and secondary. The formula is: $\sqrt{Z_P/Z_S} = N_P/N_S$ (*N* is the number of turns, and the subscripts *P* and *S* denote the Primary and Secondary windings.) e.g. To change 600 Ω to 150 Ω, an impedance ratio of 4:1, the square root of 4 is 2, so the primary will have to have twice as many turns as the secondary. (The actual number of turns required is determined by the impedance, frequency, core characteristics, power level, and other factors, again beyond the scope of this article.) NOTE: The *turns-ratio* is always defined as primary (input) turns divided by secondary (output) turns.

A *balun* (BALanced-UNbalanced) transformer is used to convert a balanced circuit to an unbalanced one, or vice versa. At the same time, it can also change impedance if required. A typical application is connecting a 75-Ω coax (unbalanced) to a 100-Ω CAT-5 twisted pair (balanced). It may also provide the functions of isolation and blocking C-M noise. Changing a circuit from unbalanced to balanced will not remove T-M noise that is already there, but may prevent more from entering. **IMPORTANT:** Always put the balun as close as possible to the unbalanced source, so the cable run is made in balanced format.

A simple balun will have the two ends of one winding connected to the two conductors of the balanced circuit, and the two ends of the other winding connected to the center conductor and shield of the unbalanced circuit. The shield of the balanced circuit may or may not be connected to the case of the balun and/or the shield of the unbalanced circuit. An even simpler balun has only a single winding, with a center tap. The balanced circuit is connected to the two ends of the winding and the unbalanced circuit has the shield connected to a center tap of the winding and the inner conductor also connected to one of the winding ends. Obviously, this type of balun does not provide any isolation or blocking of C-M interference, and is mainly used in antenna circuits.

A *splitter transformer* has a single primary winding and two identical 1:1 secondaries. Since a splitter transformer is a passive device, each output will be -3 dB down from the input. Similar to those of isolation transformers, the two outputs will be electrically isolated from the input and from each other, but only if the transformer's XLR connector shells are insulated from its case. Many commercial units do not have this feature, but it is possible to remove the connectors, enlarge the hole if it contacts the protruding back part of the connector, place an insulating plastic film between the back of the mounting flange of the connector and the splitter case, and reattach it with plastic screws. **NOTE:** Many splitters have a "ground-lift" switch, but this breaks only the connection between Pins 1 of their input and output connectors. Unless you have cables with the connector shells floating, or insulate the splitter connectors as just described, the ground-lift switch will be ineffective.

WARNING: If you use a simple Y-cable instead of a transformer to split an audio signal to feed two other devices (e.g. a recorder and a Comtek transmitter), there will be no isolation, so signals from one can get into the other (RF in this case), and the audio may be completely corrupted.

All types of transformers have certain parameters that must match their intended application. Only the ones relevant to this article are discussed here.

Transformer parameters:

1. Level: Mike or line. Mike-level transformers will overload and distort if used with line-level signals because the core will be completely saturated with magnetic flux lines well before the input signal reaches its maximum voltage. Line-level transformers can be used with mike-level signals, but the higher winding impedance might cause loss of high-frequency response when connected to certain types of output circuits.
2. Impedance: ranges from low (50Ω) to high (>10 KΩ). Impedance matching is more or less critical depending on the nature of the circuits involved.

Typical values are:

Input/Output Impedance, isolation: Mike-level = 150Ω/150Ω. Line-level = 600Ω/600Ω

Input/Output Impedance, impedance matching: Hi-Z Mike to Lo-Z Mike input = 6KΩ/150Ω

Input/Output Impedance, balun: Twisted-Pair to Video Coax = 100Ω/75Ω.

NOTE: The "impedance rating" of a transformer does not refer to the actual impedance of the windings inside the transformer itself, but rather the impedance of the input and output circuits it is designed to work with. The *input impedance* of a transformer will be the actual impedance of whatever the output winding is connected to, divided by the square of the turns-ratio. The *output impedance* is the input-circuit impedance (such as a 150Ω microphone) multiplied by the square of the same turns-ratio.

3. Power Handling: The higher the power, the larger the diameter of the coil wire and the larger the core cross section, in order to handle the larger magnetic flux.
4. Frequency Response: Transformers do not respond equally to all frequencies. To give good performance over a range of frequencies requires certain design parameters. The lower the frequency, the larger the core must be. The higher the frequency, the lower the winding inductance and distributed capacitance must be. These two factors oppose each other, so transformer design must of necessity involve trade-offs. The particular core material is also a function of frequency. Professional transformers easily are flat within ±0.5 dB from 20 Hz to 20 KHz.
5. Distortion: All transformers produce some amount of distortion, primarily because of core saturation, hysteresis, and signal phase shift. A "good" transformer will have 0.01% distortion, an "excellent" one will have 0.003% or less. Most audiences aren't aware of even 0.1% distortion in a movie soundtrack so this is usually not a problem.
6. Isolation: Electrically shielding the secondary winding from C-M noise on the primary is tricky because the alternating magnetic field will induce "eddy currents" in the metallic shield. Any design features that reduce this will decrease the efficiency of the shielding. However, most isolation transformers you will encounter provide adequate isolation.
7. Shielding: Overall electrical and magnetic shielding to protect the transformer from outside interference is somewhat easier, because that shield can be placed far enough from the core to avoid most of the external flux lines. IMPORTANT: Most inline transformers (e.g. isolation) are not magnetically shielded, so be careful where you place them. Avoid motors and power transformers. If magnetic interference is a problem, rotating the transformer 90 degrees to the magnetic field may reduce it sufficiently, if not, move it farther away.

IMPORTANT: Remember that a transformer is a passive device; it cannot give out more power than it receives. The input signal is characterized by voltage, current, and its circuit's impedance. You may chose any one of these to change at will, but then the others will automatically alter to compensate. e.g. You can raise the voltage of a 150-Ω mike-level signal a thousand times to that of line-level, but now the output impedance will be so high (150 Ω x $1{,}000^2$ = 150,000,000 Ω) that a 600-Ω line input would effectively short-circuit it. You could use a so-called *infinite-impedance device* to "see" the full higher voltage, but now the extra power comes from its amplifier, not the input signal.

SO HOW DOES THIS ALL WORK IN THE REEL WORLD?

Let's start with the XLR cables. I have most of mine 50 feet in length, with some 25-footers for shorter runs. Also, an assortment of 1-, 2-, 5-, and 10-footers. If a longer cable gets damaged in a single area, it can be cut there and turned into several shorter ones. When cables have been in use for some time, they will develop so many breaks in their shield wires that they become susceptible to picking up interference or creating static when they are moved. Discard them, even if the problem seems to be in just one or two spots—the rest of the cable will fail shortly thereafter. Whether or not to reuse their XLR connectors depends on how much wear and tear they have accumulated. One thing that can be done peremptorily to extend the life of cables is to periodically "circumcise" them, cutting off the connectors and about two inches of cable, and then reattaching

the connectors. Cables tend to fail at the flex point where they enter the connector much sooner than elsewhere. As soon as two or three of your cables have gone bad at their plugs, it's time to service the lot.

Actually soldering the cables to the plugs is a skill beyond the scope of this article, but Local 695 offers an excellent training class. One thing to keep in mind is that shrink-tubing does NOT make good strain reliefs, because when shrunk it is too stiff and simply transfers the stress point to the far end of the shrink-tubing. Use plain PVC tubing (available in many sizes from electronic supply stores) instead. It is much more flexible and will form a smooth curve to more evenly distribute the stress. I save the sections of the outer plastic jacket I strip off various cables while attaching plugs, and use them for strain reliefs on smaller diameter cables.

Jim Tanenbaum at his cable-free cart. Two sharkfins are aimed at the boom operator and the third is aimed to pick up video signal.

Some brands of microphone connectors offer a means of connecting to the metal shell and some do not. There is still a considerable controversy over whether to ground the connector shell (sometimes called *body*) or not, and if grounded, whether to ground the shell at only one end of the cable. There is no simple, always-correct answer.

Here are the possibilities (using 2-conductor cable with the balanced audio always connected to Pins 2 and 3 at both ends):

1. Shield connected to male and female Pin 1; male and female connector shells floating.
2. Shield connected to male and female Pin 1; male connector shell connected to Pin 1; female shell floating.
3. Shield connected to male and female Pin 1; female connector shell connected to Pin 1; male shell floating.
4. Shield connected to male and female Pin 1: both male and female connector shells connected to Pin 1.

If 3-conductor cable is used, there are three more possibilities:

5. Third wire connected to male and female Pin 1; shield connected to male connector shell; female connector shell floating.
6. Third wire connected to male and female Pin 1; shield connected to female connector shell; male connector shell floating.
7. Third wire connected to male and female Pin 1; shield connected to both male and female connector shells.

IMPORTANT: Some people advocate not connecting the shield (and/or the third inner conductor if present) to Pin 1 at both ends of the cable, but then differ among themselves as to whether the sole connection should be made at the male or female end. In the following discussion, I will assume the standard configuration in which a male plug will be connected to an input and a female to an output. To begin with, if the cable is to be used with phantom-powered mikes, there must be a current path between both Pin 1s, so any further discussion is moot. If phantom powering is never a consideration (**WARNING:** "never" is not a valid term in Hollywood), connecting the shield to the male's Pin 1 will usually provide the greatest protection from EMI (e.g. radio station) pickup; but it can also increase the amount of T-M noise which had previously been C-M. Connecting the shield to the female's Pin 1 will usually provide the greatest protection from continuing the transmission of C-M noise without converting it to T-M; but now increasing the susceptibility to EMI. I do not believe these purported "benefits" of breaking the Pin 1 interconnection outweigh the potential disadvantages, especially the lack of compatibility with phantom power, and in the production environment. But if you really, really must break the Pin 1 circuit, connect the shield to Pin 1 at the female (input) end.

What to do? Consult a Ouija board. Actually, you could do worse. Or you could make up cables in each of these configurations, and try them one-by-one.

Here's what I do: most of my cables are 2-conductor, and wired as per Number 4. I have made up several 3-conductor cables wired as per Number 5. On those occasions when I have encountered problems with the 2-conductor cable, the first thing I try is replacing the T-power microphone (e.g. a Sennheiser MKH406) with a phantom-power one (MKH40), or vice versa. This usually eliminates the trouble. **IMPORTANT:** Sennheiser's new aluminum-cased mikes have a problem that is often attributed to a bad cable: The case is grounded by a screw near the plug that tightens against a bare patch of aluminum. In about a year or so, the aluminum oxidizes and forms an insulating layer, destroying the integrity of this grounding function and ability of the case to intercept interference. Loosening and retightening the screw a couple of times restores the effectiveness of the connection.

On those occasions when swapping mikes didn't remedy the problem, I have substituted a 3-conductor cable. But in only two instances was there any improvement. Most of the situations occurred in proximity to AM radio broadcast towers (antennas), and the signal strength was simply so high that nothing could keep it out. One time it was possible to move the recorder very close to the mike, and connect it with a much shorter cable. Interestingly, grounding the sound cart's chassis to a nearby cold-water pipe made matters far worse. I haven't used a full digital system in this environment yet, so I don't know if it will be any more resistant.

NOTE: To help block AM radio or other high-frequency interference, inline 50 to 70 KHz low-pass filters are available that can be inserted next to the mixer's or recorder's mike input receptacle. Some sound mixers RF bypass the inner conductors with 0.01-0.02 µF capacitors inside the male XLR plug. You need a disc ceramic type (low internal inductance) and to keep the two leads as short and straight as possible. Adding a 1/10-watt 50-Ω resistor in series with the 0.01 µF capacitor will help match the cable impedance and reduce the amount of energy reflected back into the cable. Solder one capacitor-resistor combination between Pin 2 and Pin 1, and another between Pin 3 and Pin 1. If you can get "chip" capacitors and resistors (as used on SMT circuit boards), they have no leads at all, just tinned ends, and are even smaller. Using chip components will make it much easier to install the parts.

I have been able to conduct some experiments on stage with buzzes from H.M.I. lights, and found that both 2- and 3-conductor cables were almost equally affected. Crossing these power cables at right angles was of no help. Only separating the two cables with an apple box worked, but there is always the danger of having the mike cable pulled off the box to land back on the H.M.I. cable. It is better to re-route your audio cable to avoid crossing any electric cables if at all possible.

Another common problem occurs with outdoor cable runs. Electricity always takes the path of least resistance—literally. (However, some of the current will still flow through other paths that have higher resistance). For example, if lighting units are set on the bare ground, there may be a flow of leakage current through the soil between the lamp stands and the grounding point of the generator. Now, if you have a run of interconnected mike cables lying on the ground along this path, some of the AC current will leave the soil where one of the cable connectors is located and flow along the mike cable's shield until it leaves at the connector at the other end of the cable, closer to the generator. This is a case where having the connector shells floating would protect you, but it is easy enough to cover the connectors with gaffer's tape. (IMPORTANT: Be sure to leave a folded-over tab to make removal of the tape quick and easy.)

While damp ground can be dealt with by gaffer-taping the connectors, protecting them from actual liquid water requires more extreme measures. The best one is not to do it in the first place: if you know in advance that you will need a long cable run underwater, make up a single continuous length cable. (You can always make several shorter ones out of it afterward.) If only mud or dirt is the problem, Neutrix makes a line of heavy-duty mike connectors. The male has a stainless-steel barrel which resists deforming when stepped on or run over, and the female has an external rubber boot that mates with the open end of the male shell and also covers the latch button. This combination keeps out non-liquid contamination, and if you apply some silicone sealant inside the cable strain relief, will handle liquid splashes as well (as long as the sealing lip of the rubber boot is not damaged).

For last-minute emergency waterproofing of a pair of mated connectors, "Rescue Tape" brand silicone self-fusing tape can be used (www.rescuetape.com). Start a spiral wrap around the cable, about six inches from a connector, pulling the tape until it is fully stretched (about three times its original length). Completely overlap the first turn, then be sure to overlap the remaining turns almost half the width (be careful to avoid bumps from creating a third layer). Wrap over the two connectors, being sure to maintain the almost 50% overlap. Continue wrapping six inches into the next cable. Finish with the last turn completely overlapping the previous one. Squeeze all the tape with your hands to ensure complete adhesion of the layers. If you've done this properly, the connection should be good for submersion under several feet of water, at least for a short time. WARNING: Test your technique in advance. Unfortunately, removing the fused mass afterward is difficult. Slice through it with a sharp blade, gradually going deeper with each pass, and being careful not to nick the cable jacket or connector shells.

Editor's Note: The next installment will take up issues of interconnecting equipment and optimal sound cart wiring.

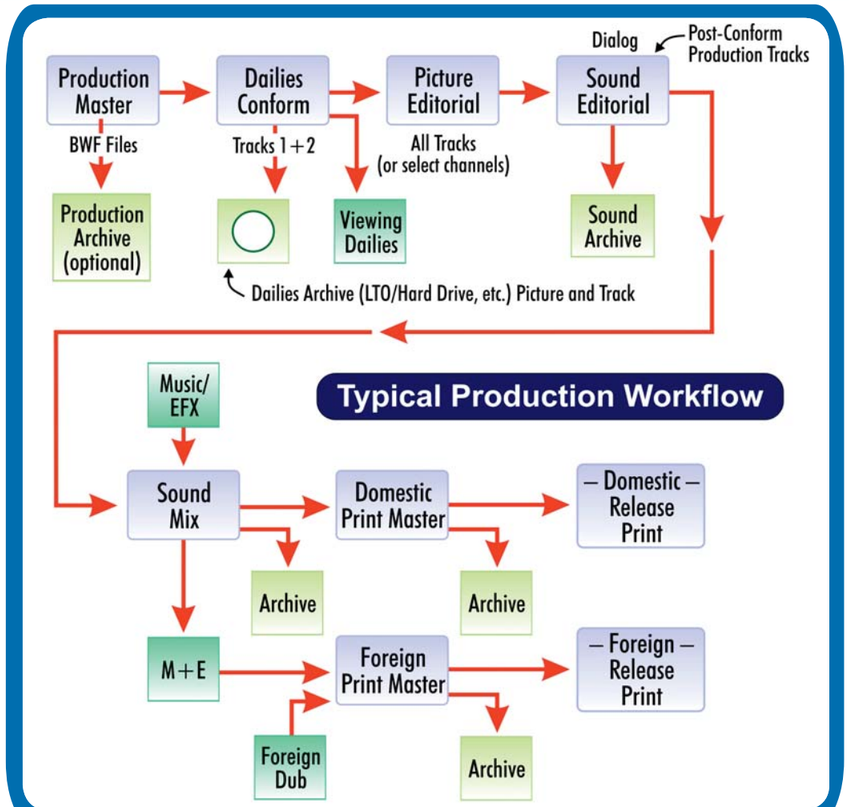
Protecting Your Ass**s

Digital File Management for Production Sound

by Scott D. Smith, CAS

Introduction

As a production mixer, sooner or later (if it hasn't happened already), you will receive a call that goes something like this: "Hello, this is Charlie (usually some overworked and underpaid editorial assistant) calling from the editorial room of Clueless Pictures. We are going through the sound elements for delivery to sound editorial for the show *Mission: Impossible XXXVII*, and it appears we are missing the iso tracks for shoot days number 200 to 225. We wanted to check to see if there is any possibility that you might have backup files for those days."



Workflow illustration by Laurence Abrams

A brief silence ensues while you try to remember exactly what show he is talking about, as it has now been about six months since production wrapped. You respond, "Geez, I don't know, I will have to check and see. That was some time ago—there might be a backup at the shop. Didn't they make backups of the dailies in editorial?" More silence, and Charlie replies, "Um, I guess not. I don't know—I was hired on after the fact. We only have what was delivered to us for ingest into the Avid. We were under the impression that backups were being made on set."

Welcome to the World of Digital Asset Management...

What the Hell Is Digital Asset Management—and Why Should I Care?

Virtually unheard of 15 years ago, Digital Asset Management (referred to as "DAM" in the trade), is the catch-all term used to describe the process relating to the storage, access, retrieval and migration of digital media files. While "Digital Management" systems have been in existence since the invention of IBM punch cards and magnetic data tape systems, the terminology related to Digital Asset Management systems typically involves files described as "Rich Data" or "Rich Media." These could include image files, video files, audio files, CAD files, animation and the like.

In the "bad old days" of analog sound recording (including that of film-based cinematography), the "assets" of a production typically consisted of sound elements recorded on magnetic tape or film and optical sound negatives, along with various picture elements (such as camera negatives, interpositives, internegatives, opticals, etc.).

Properly stored, these elements could last for many years, allowing for the restoration and "versioning" of films. They are, however, prone to degradation. Photographic elements in particular are notorious for issues related to color dye fading (with the exception of Technicolor IB), and the base materials used for both film and tape suffer from problems of shrinkage and warping. Further, triacetate base film and tape stocks suffer from problems related to "vinegar syndrome." There is also the well-known issue of "binder hydrolysis" (known as "sticky shed"), which can render a magnetic recording virtually unplayable unless treated.

These problems are not confined to just analog recordings either. All tape-based digital recordings (PCM, DAT, DASH, DTRS, etc.) suffer from similar issues. The only difference in the case of these formats is that problems in reproduction will render the recording completely unplayable; the digital converters simply mute when they encounter data past the threshold of error correction. Analog recordings, on the other hand, have a much better chance of being recovered (albeit degraded), even in situations where the carrier material is damaged.

For example, a 35mm magnetic recording could suffer issues related to base warp, incorrect head azimuth, and vinegar syndrome, but in the hands of an experienced sound archivist, will still provide a reasonable facsimile of the original recording. Conversely, a digital tape suffering from base damage can render it totally unplayable, with no chance recovering any part of the signal!

While file-based digital media avoids the pitfalls noted above, it is not without its problems. The most obvious of these is that if the physical carrier containing the data (hard drive, LTO tape, optical media) becomes damaged even slightly, it could result in the total loss of the program. Therefore, any successful digital-based archival strategy requires at least one backup of all the assets deemed to be important. This means that the storage requirements are virtually doubled, as is the storage cost. Further, rapid changes in media file formats and conversion technologies can quickly render both files and management systems obsolete, further adding to the overall costs pertaining to both migration and storage.

What Is a "Rich Media" File?

A "Rich Media" file is distinguished from more traditional digital files in that they typically are visual or audio data of some type, as opposed to files which are primarily text based (such as a Word document), or contain only binary code. While these file types are not mutually exclusive (for example, a Word file might have embedded images contained along with the text), Rich Media files are usually composed mostly of visual and/or audio elements, and are sometimes contained within a file "wrapper" or container. This "wrapper" might contain additional metadata or data that interfaces with a specific program used in conjunction with the file being addressed.

A prime example of a file wrapper is the MXF (Material eXchange Format) file standard, which allows for additional metadata (such as timecode) to be embedded along with video and audio data. While the video portion of the file could be encoded with any number of codecs, the wrapper itself is designed (at least in theory), to allow exchange among any systems which support the MXF file platform.

In a similar fashion, there also exist variations of some basic media file types (such a variations of audio WAV files), that can be played out without the need for a specific proprietary program, but may contain additional "chunks" of data within the file header. The BWF file format that is now used almost universally in audio recording for film and video is typical of this kind of "extended" file structure. Further, a file such as a PDF may contain embedded photos or Flash video, in additional to text elements. It is because of this blurring of distinctions between what might be construed a "Rich Media" file, as opposed to a basic "document" or text file, that has further muddied the context used to describe DAM systems.

In practical use, however, DAM systems are typically employed to manage large files encoded with visual or audio data, anything from a simple MP3 or Flash video, all the way up to full uncompressed hi-def video. So while there could be a variety of file formats and codecs contained within a DAM system, an overall integrating structure is still needed to manage the competing file types. This has given rise to some highly complex DAM systems, which in many instances are expensive proprietary solutions designed for large clients such as broadcast media outlets.

The Dalet News Suite, manufactured by Dalet Digital Media systems, is a typical example of a dedicated system. This system employs a unique "container"-based approach to handling news content that might be repurposed for various channel outlets, allowing a producer or editor to access raw footage, and re-edit it for subsequent distribution in different markets. Similar collaborative tools exist in the world of post-production, such as the Avid Unity MediaNetwork system.

While these systems may vary in the way they are designed to access and move data based on user needs, they share a common thread in that they rely on a standardized file structure (using either external descriptive data or embedded metadata), to handle the task of determining exactly what a file contains. Therefore, while a cursory look at the file names contained in a project folder may reveal just a useless array of arbitrary letters and numbers, the database tied to those files allows the system to provide the user with a wide array of pertinent data relating to that specific file. In the world of film or video, the data might include such things as scene and take number, timecode, shot description, the date it was shot, camera metadata

and comments from the director. There could also be additional data files such as lookup tables (or LUT's), which allows the look of a shot to be controlled during the final color-grading of the production.

For these systems to function as intended, it is crucial that the metadata coding, file-naming conventions and folder structures be followed without any variations. Without this, the system will be incapable to tying together the various descriptive data with the corresponding files. If this correlation is lost, then the system will be unable to manage the tracking and movement of data as it makes from program origination through distribution.

That's Great—My Head Hurts. What Does This Have to Do With Sound?

As film and video production has moved from an analog world to the realm of digital, the way of both image production and sound recording has changed radically. The tools used to manage workflow in the analog world are wholly unsuited to digital production. A typical example is how films are edited. No longer are there a bevy of assistant editors charged with tracking film elements using edge coding and a code book. Instead, all of this information is contained within a database linked to each of the individual audio and video files that make up a finished show. These may include raw picture files from set, associated production sound files, picture FX files, music files, title files, etc.

Just as all of these elements needed to be tracked in a master code book in the analog world, along with the editor's cutting copy of the script, the same provisions apply to the myriad files that constitute a final program in the digital realm. It is therefore of crucial importance that a consistent overall structure for handling these elements be adhered to. Without this, at best, files will be impossible to manage, and at worst, may not play at all, due to file incompatibilities.

With file formats and systems constantly evolving, what used to be a pretty straightforward task 15 years ago has now become a minefield, with any number of problems lurking to trip up the unwary. In the analog days, a production mixer could pretty much rest assured that a tape submitted to post would get handled properly (assuming that the log was marked clearly). Worst case, maybe the heads were out of azimuth, or perhaps the wrong track would get transferred. This would happen long before sound editorial was involved in the show.

Despite some areas of standardization for audio file formats (with BWF mono or poly files being the generally agreed-upon format for most production), there still exists a wide variety of standards for items pertaining to timecode, sample rates and bit depth. Further, there is not as yet a fully defined format for how metadata is encoded in the BWF file header. Nor is there any industry standardization regarding file-naming conventions.

Therefore, it is vitally important that an agreed-upon set of conventions be established prior to production, and be adhered to throughout the run of the show. This is especially important when multiple units are involved in production, as material from all units will still need to be ingested into a common platform for editorial. Typically, these specifications will be supplied by editorial. If a show is just starting, it is good policy to shoot a sync test with the cameras and recorders to be used during actual production, and have editorial verify that everything plays well together. At the very least, it is important to get the required information supplied in writing from post-production.

In addition to defining such issues as file format, timecode, sample rate, etc., it is of equal importance to determine exactly who will be responsible for the task of file backups. Despite the endless meetings and phone calls that usually precede a production, this seems to be one area that no one wants to deal with. With so many people involved in the handling of files from the set to post-production, the area of data backup (especially of audio files) seems to get lost in the shuffle. While there are a variety of ways to approach the issue, as a mixer, it is important to define exactly what is expected from you in relation to making file backups of daily production material.

Despite the fact that file-based recording for production sound has been around for at least 15 years now, it is worth noting that most studios still don't have a clear-cut policy as to how audio and video files are to be archived. In the days of analog production, no one would expect the mixer to maintain a set of backup tapes for a show. Yet somehow, due the perception surrounding file-based recording, the expectations have changed. While this makes absolutely no sense, frequently, certain assumptions are made by post-production in relation to production audio file backups. One of these assumptions has to do with backups.

Liability and Piracy—Why You Should Cover Your Ass**s

Despite the reams of documents that accompany the start of most productions (deal memos, non-disclosure agreements, safety policies, non-discrimination policies, auto mileage reimbursement, cell phone usage and hoards of other items the studio attorneys have dreamed up), there is seldom anything pertaining how production files are handled. While many productions prohibit the taking of personal photos on set, there is almost never any mention of what becomes of the files recorded by the sound department, which typically reside on one or more hard drives or removable media. Although it is understood that such recordings are the property of the production company, what exactly becomes of them is frequently ignored completely.

While this may be a non-issue in most production situations, there have been a few cases that might give one pause. Stories abound regarding instances where digital audio workstations have been rented from a supplier for the recording of a music artist, and subsequently returned with all the sessions files left intact! This allows anyone with access to the drives to simply copy the files and distribute them as they wish. This is essentially the equivalent of handing over the multitrack master session tapes. Occasionally, this oversight works in one's favor (such as the instance where Michael Jackson's recordings were found on a DAW hard drive after his death), but it can also become a major headache when the material ends up in the wrong hands.

Likewise, the failure to have a clear backup strategy in place can have equally heart-stopping consequences. There is no shortage of stories regarding hard drives containing crucial production elements being lost, damaged or stolen, resulting in days (or weeks) of work being lost. You do not want this happening on your watch.

Strategies to Help You Sleep Better

Despite the fact that many productions don't have a clear-cut approach to file management, this does not mean that you shouldn't take an active role in defining your responsibilities when it comes to the delivery and backup of production files. As everyone knows, when the manure hits the fan (and it will!), production will come looking for a fall guy. Don't be that guy.

If production has not provided clear guidelines for how files are to be managed, you need to take it upon yourself to define your role in terms of how files are to be stored and delivered. Despite the fact that this is not exactly part of the job description, it is necessary to protect yourself when things blow up. To not take an active role in outlining your responsibilities is to leave yourself open for liability, which is not a situation you want to be in.

So, what are the specific steps you need to take in this regard?

1. If production has not already outlined all the steps for file handling, prepare a basic memo that outlines what you intend to do. This should include what medium files are recorded on (IE: on hard drive, CF card, or both). How they are delivered on the day of production (IE: CF cards handed off to DIT, CF cards delivered off to camera, DVD-RAM disks, etc.). If a film break is done during the day, will files be appended to the same roll or will a new roll be started?
2. State how logs will be delivered (paper copy, file, or both).
3. Outline what steps (if any) you will take in regards to making file backups, i.e., if recording to hard drive, will you make a daily backup or weekly backup or none at all?
4. If you are expected to make incremental backups on a daily or weekly basis, make note of how much additional time you expect this to take, so that you don't start receiving questions from payroll about your timecard.
5. If files are being recording to hard drives (belonging to either yourself or a rental company), state what you intend to do at the end of production. If a production expects you to keep files after the end of shooting, clearly state what your liability is in this regard. You do not want to put yourself in the position of being liable in a case where production may come asking for backups, and you discover that you don't have the files they are asking for.

If you are renting equipment from an outside rental company, it should be clearly stated that all data will be wiped from the hard drives before the equipment is returned. This will cover you in a situation whereby something from a shoot may suddenly turn up on the Internet. Additionally, if you are expected to hold onto files after production, you need to state

Sound Element Table:

1. 3M 1/4" audio tape (on hub)
2. External hard drive
3. Quantegy 480 1/4" audio tape (7" reel)
4. FPC 16mm magnetic film
5. Audio Devices 35mm magnetic film (1000')
6. Western Digital pocket hard drive
7. San Disk CF card caddy
8. Maxell DVD-RAM disk
9. Zaxcom Deva hard drive
10. Maxell DAT tapes
11. Jaz drive & cartridge
12. 3M 200 1/4" audio tape (7" reel)

that you are doing this as a courtesy to production, but in no way are you liable for their safety or piracy. (This is SOP for labs and post-production houses.)

6. If you do keep files after production has wrapped, state for how long you will keep them. (In this regard, it is also a good policy to notify post-production of your intent to wipe drives before you do it). No matter what the strategy, do not load files on any computer or drive connected to the Internet! No matter what your level of protection from hacking, this will prevent you from becoming a casualty of data theft. Files should always be stored on a separate hard drive, preferably kept in a safe place.

   If you are operating under some kind of company structure (LLC, LLP or Corporation), you should submit these guidelines under the auspices of your company, so as to limit your personal liability. In no circumstances should you sign any document from production which holds you personally liable for the loss or piracy of media!

This memo should be delivered to the unit manager, the production supervisor, and editor. If delivering by email, make sure that they acknowledge receipt! (Personally, I prefer to make a printed copy and deliver it as well. This will save you in situations where somebody says, "I never got the memo.")

When delivering files to the production office, be sure to have the recipient sign to acknowledge delivery. This will provide a clear chain of custody in situations where something gets lost. If sending media by a courier or shipping company, it is important that you request a signature upon delivery.

This may seem like a lot of extra effort, but the digital landscape has completely changed the way we operate and allows scenarios that would seldom occur in the world of analog recording. (For example, a production company would never expect the mixer to maintain copies of 1/4" production tapes.)

Having said this, you will of course be a hero if you take it upon yourself to make file backups of your own accord, and receive the call from post-production looking for them six months later! In this regard, however, you do not want to accidentally open yourself to liability in cases where files may end up in the wrong hands.

Housekeeping

Despite the move to digital, it has not relieved us of the burden of paperwork (in some ways it has made it worse). We still need to submit a sound report, whether as a paper log or digital file. In addition, it is now expected that we include basic file metadata in the header of each take. This usually consists of scene number, take number and track name, along with any basic notes. Unfortunately, this arrangement doesn't always allow for easy changes after the fact.

While some recorders allow the metadata header to be edited after the fact, there are occasionally limitations as to exactly what fields can be changed. For example, in a quick scene change, you may accidentally forget to change the name of a track, so the file will bear the names from previous scenes. While tools such as BWF Widget allow the user to modify the metadata on external media after the fact, it does not change what is contained on the hard drive. Therefore, if you produce a file backup from the hard drive, it will contain the same errors, forcing you to make corrections on both the daily file media and the backup. Not how you want to be spending your weekend!

Further, in most current file-based recorders, metadata is stored as both a bext data chunk and an extended iXML header. If changes are to be made, they will usually need to be done separately for both. Therefore, it is always helpful to pay attention to the metadata that is recorded during shooting, so as to prevent the hassles of trying to correct it after the fact (easier said than done when it's hour 14 of a grueling production). Hopefully, new tools will be introduced soon which will allow for easier modification of file metadata after the fact. The delivery of logs is equally fraught with complications that we never had to deal with in the days of analog. If paper logs are delivered, they frequently get separated from the data files during post-production (or get delivered after the fact). This is especially the case when sound files are delivered from picture editorial to sound editorial, which may be done over network drives, with no physical delivery of media. All the careful notes you made for sound editorial are now stuffed away in a box somewhere.

To keep yourself from being a victim of this scenario, it is helpful to provide a digital log of some sort along with audio files (this could be in the form of a scan of a paper log, a PDF of a machine-generated log, an Excel file or text file). No matter what route you choose, having a log file kept with the media will always be appreciated by the folks in post. However, it is best to stay away from formats that are dependent on specific operating system platforms, as it is impossible to know in advance what systems might be employed down the line.

Further, as studios begin to archive productions on mass storage systems for repurposing of content, it will allow for the easy retrieval of the sound files along with their associated logs, without resorting to searching through paper logs.

Summary

As the digital landscape continues to evolve, it will become increasingly important to be cognizant of how the material recorded during production will be handled down the line. While practices put in place during the analog era generally remained the same for decades at a time, the same cannot be said for digital media. New technologies for both production and post-production can change almost overnight, with subsequent impact on how the scenario for production sound is played out. This is especially true when it comes to the physical media that data is being stored on, both during production, as well as subsequent archiving. Already, we have seen at least three major transitions for the physical delivery of sound files in the past 15 years (Jazz Drive, DVD-RAM, and CF cards), with more to come. It will be increasingly important for sound crews to be well versed as how data is recorded and delivered on various media, each of which has its own idiosyncrasies. As the production world becomes more "data-centric," our role in how sound is recorded and delivered will have a major impact on how accessible it will be for future generations.