695 QUARTERLY

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

Prsrt Std
U.S. Postage
Paid
Santa Ana, CA
Permit No. 450

695 QUARTERLY

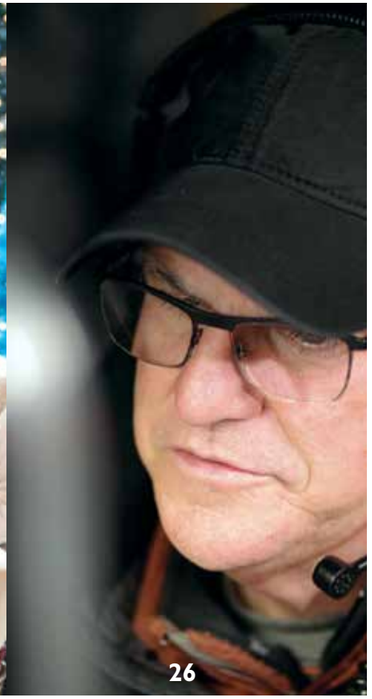
FALL 2013
VOLUME 5 ISSUE 4

THE OFFICIAL PUBLICATION OF IATSE LOCAL 695

695 QUARTERLY

Table of Contents

Volume 5 Issue 4



Features

Cover: Macbook Pro running Pro Tools v.11

Departments

From the Editors

For this issue, we focus our attention on just one of the sixteen different categories that comprise Local 695. We have four articles from members who specialize in music for cinema and TV, and they provide us with their perspectives on doing playback, pre-records and live recording.

Phillip Palmer tells us about the challenges of *Glee*, where he often handles up to six musical numbers per episode.

Nashville has an equally ambitious agenda and Anna Wilborn tells us how Joe Foglia handles those tasks with grace and wit.

Gary Raymond addresses the technical requirements of file formats for playback and Joseph Magee shares the lessons he's learned over several decades of working with music in both production and post production.

Playback and live-record have their own lingo and some equipment may be unfamiliar even to working professionals. We've included a glossary of specialized terms at the end of each article for the benefit of our non-technical readers and members working outside these particular disciplines.

We think you'll find good reading, and we are pleased to shine a light on a creative field that deserves more attention.

Fraternally yours,
David Waelder, Eric Pierce and Richard Lightstone

From the President

Dear Fellow Members,

This has been a hard year for many of our members as the business continues to morph into more and more unrecognizable forms. I say to those most affected by these stormy waters: keep heart and positive in spirit. Take this time to double down on the new knowledge needed to stay at the top of your craft. Take this time to become more fully informed about the obligation of service your union holds for you and how to best access this resource for your particular situation. When you act with knowledge, you leverage the strengths of professional union representation.

Read the Local's Constitution and By-Laws and the contracts under which we work, all available on our official website. Know what you're paying for and what your rights are. Don't be timid about the relationship with your union. Define the issues that matter to you and engage. Join committees and express your real-life experience in the development of policy. Your representatives can best focus resources when they have regular input; the institution draws its strength from the participation of its members.

Exercise your right to vote in this election. Make yourself heard.

This holiday season is a time for reflection and strategy and this is where we should be placing our creative energies.

I wish you and your families well and safe holidays to all.

Warmest regards and Fraternally,

Mark Ulano
President
IATSE Local 695

Our Contributors

Joseph Magee, CAS

Joseph Magee's twenty-plus years of work in music record and playback encompasses both production and post-production work. He has completed work on more than eighty features and won two Golden Reel Awards and a Grammy nomination.

Phillip W. Palmer, CAS

Phillip Palmer has worked in production sound for twenty-five years, mixing for the last fourteen. He currently lives and works in Los Angeles as the Production Sound Mixer on *Glee* for FOX Television.

Gary Raymond

Gary Raymond has provided Music Playback on more than eighty-five films and TV shows and has an Emmy Certificate for Best Sound for *Scrubs* and *Castle* and Emmy nominations for *Dexter*. Recent projects include *Love and Mercy* (the Brian Wilson/Beach Boys film), *The Originals* and *Get On Up* (the James Brown bio picture).

Scott Smith, CAS

A forty-year veteran of the music and film business, Mr. Smith has handled the sound recording duties on over forty feature films and TV productions. He is a two-time Oscar nominee and the recipient of the CAS Award and BAFTA Award for Best Sound for *The Fugitive*. Mr. Smith is principal owner of Chicago Audio Works, which provides production sound and related post services for film and TV productions nationwide.

Anna Wilborn

Anna began her career in Post till bitten by the production bug in 2005. A native Los Angeleno, USC alum and second-generation Local 695 member, Anna's production credits include *Scrubs*, *Castle*, *The Change-Up* and, currently, *Nashville*.

Phillip W. Palmer photo by Mark Edward Harris, *Emmy* magazine. All other photos courtesy of the respective contributors.

We need your help to get our message to the state legislators…

Keep our work in California

Local 695 has joined the other West Coast IA locals to form the Entertainment Union Coalition (EUC), whose mission is to "achieve a competitive California Entertainment Incentive that will return, restore and retain good-paying entertainment jobs to California." We will engage professionals, legislators, local government leaders and the unions to level the playing field and offer competitive production tax incentives in California. We need volunteers to move this forward and make it happen. **WILL YOU HELP? Contact us now at … info@695.com**

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
Edward L. Moskowitz
Peggy Names
Eric Pierce

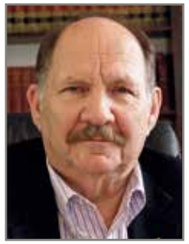
***695 QUARTERLY* CO-EDITORS**
Richard Lightstone
Eric Pierce
David Waelder

695 Quarterly
Inquiries or suggestions
mag@695.com

PUBLISHER
IngleDodd Media

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

From the Business Representative



In Perspective:

Exploitation and Manufacturing

Anytime someone uses your technical expertise to make money, you are being exploited. When the process is not accompanied by proper compensation, you are being badly exploited. All too often our future is predetermined when the exploiter and his messengers pursue the path of least resistance.

J.P. Rangaswami, chief scientist of Salesforce.com and Trustee of the Web Science Trust, recently published in *Scientific American* under the title "Manufacturing, Hollywood-Style," that "in the not too distant future, the business of making things will require the skills, temperament and workflow of a good film crew." Mr. Rangaswami went on to say, "The film industry knows about iteration. It knows about scripts, recipes and specifications." He added that "All of us will be able to bring back the original meaning of manufacture as we make things that feed us, keep us healthy, repair us and entertain us."

Mr. Rangaswami's assertions serve to define the contribution our members make to our industry when they bring their technical expertise to a production. When some employers demand work at state minimum hourly wages to ensure themselves a profit we do not share in, they clearly exploit us. Our skills, craft and technical expertise are an essential contribution to the success of the production product; something for you to think about.

Please send me your thoughts on this perspective at jimo@695.com

James A. Osburn, CAS
Business Representative
Executive Director

NEWS & ANNOUNCEMENTS

IATSE Local 695 Bannering Effort

"Bannering" is a labor organizing effort that is implemented to inform the public, as well as businesses and organizations that support a recalcitrant employer, of its resistance to hold good-faith negotiations with labor.

The IATSE has mobilized local unions across multiple states to encourage the PAC-12 Network to negotiate a contract for our Sports Broadcasting Bargaining Unit. Members of Local 695 are now participating in a "Bannering" effort to encourage the PAC-12 Network to keep its broken promise to meet with the IATSE to implement a contract guaranteeing wages, working conditions and health and pension benefits.

Joe McGill, Andy Rovins and D.J. Ritchie representing Local 695 at USC. (Photo: International Rep Ron Garcia)

2nd Annual Mixers Out Socializing

For the second annual MOS (Mixers Out Socializing) gathering, organizer Michael Miramontes worked deliberately to make a lower key event. It was again held at the Gordon Biersch Brewery Restaurant in Burbank on October 6. Rich Topham of Pro Sound and Gene Martin of Audio Department covered the cost of food and drink. There was no raffle, and only a few goodies to pass out, so the attendees had an opportunity to connect with one another without competing with a public address system. About 40 people attended and enjoyed the event.

Third Quarter Membership Meeting

Vice President Jay Patterson and Recording Secretary Elizabeth Alvarez had the pleasurable task, at the Quarterly Membership Meeting held September 28, of recognizing continuous service by four members. Projectionist Alan Black qualified for his Permanent Membership Gold Card, a privilege available to retired members at age 75. Projectionist Eliot L. Yaffe and Production Sound Technician Peggy Waggoner Names each received thirty-five-year pins for their continuous service. Peggy Names was the first woman to join Local 695 in production audio and continues to serve as Trustee. Projectionist Matthew Powell received his twenty-five-year pin from Jay Patterson. At that meeting, Jay and Elizabeth and the membership also welcomed new member Devona L. Williams, a Y7A Utility Sound Technician.

New member Devona Williams

Jay presenting Gold Card to Alan Black

Jay presenting 25-year pin to Matthew Powell

Elizabeth Alvarez and Peggy Names with her 35-year pin

Jay awarding 35-year pin to Eliot Yaffe

In Memoriam

OZZIE SIMON
Boom Operator
June 3, 1931 – Aug. 13, 2013

LEE STROSNIDER
Production Sound Mixer
March 28, 1931 – Nov. 29, 2013

65TH EMMY WINNERS

OUTSTANDING SOUND MIXING FOR COMEDY OR DRAMA SERIES (ONE HOUR)

Boardwalk Empire
"The Milkmaid's Lot" HBO
Frank Stettner CAS, Tom Fleischman CAS, George A. Lara
Production Sound Team: Larry Provost, Sam Perry, Toussaint Kotright, Egor Panchenko, Tim Elder, Michelle Mader

OUTSTANDING SOUND MIXING FOR A MINISERIES OR A MOVIE

Behind the Candelabra HBO
Dennis Towns, Larry Blake, Thomas Vicari
Production Sound Team: **Javier M. Hernandez, Gerard Vernice, Mark Agostino**

OUTSTANDING SOUND MIXING FOR COMEDY OR DRAMA SERIES (HALF-HOUR) AND ANIMATION

Nurse Jackie
"Teachable Moments" Showtime
Jan McLaughlin CAS, Peter Waggoner
Production Sound Team: Brendan O'Brien, Joe Savastano

OUTSTANDING SOUND MIXING FOR VARIETY SERIES OR SPECIAL

The 55th Annual Grammy Awards CBS
Thomas Holmes, Mikael Stewart, John Harris, **Eric Schilling, Ron Reaves, Eric Johnston, Pablo Munguia, Tom Pesa, Michael Parker, Bob La Masney**
Production Sound Team: **Paul Sandweiss, Michael Abbott, Rick Bramlette, Jeff Peterson, Phil Ramone, Barry Warrick, Andres Arango,** Hank Neuberger, **Billy McCarge,** Dave Rickmears, **JP Velasco, Steven Anderson, Craig Rovello, Bill Kappelman, Pete San Filipo, Ric Teller, Damon Andres, Eddie McKarge, Paul Chapman, Dennis Mays, Bruce Arledge, Kirk Donovan,** Dave Bellamy, Grant Greene, **John Arenas, Matt Compisi, Jim Fay, Thomas Ryden, Hugh Healy,** Joel Singer, Charles Campbell, Anthony Catalano, Mike Babbitt

OUTSTANDING SOUND MIXING FOR NONFICTION PROGRAMMING

History of the Eagles Showtime
Tom Fleischman CAS, Bret Johnson, Richard Davis, Elliot Scheiner, Mike Harlow
Production Sound Team: Alan Barker, Tyler Wood

Names in **bold** are Local 695 members

From My Perspective: Music Playback and Live-Record

by Joseph Magee, CAS

Joseph Magee in the studio.

As a Local 695 professional, we hear a lot of crazy things at work and no, I'm not talking about that sick old generator staring at you fifty feet from set.

Have you ever heard one of these gems?

- Your Producer says, "I have a friend who knows Pro Tools and should do playback," the Music Supervisor says, "Right on man."
- Your Producer appointed to watch over the musical scenes in the film wants it all recorded live, with no tempo glue for editorial. He says, "That's the only way to have a real performance, no click ever, live pre-records and live on the day. Our Editor will make it all work in Post."
- The Director has a relative with an amazing home studio (in his garage) for pre-record. "The tracks will rock for sure. They will prep everything."
- The UPM tells you, his faithful Sound Mixer, that music playback needs to happen the next day without a hitch; we don't have a track yet. "Also, we don't have a budget for a music playback person so you guys figure it out. Remember, you have a whole trailer full of gear I'm paying for."
- The Music Supervisor has an MP3 they will email you sometime soon; it's all good.
- And last, but not least, the Film Editor wants you to get playback timecode on the slates because that's how he used to do it when he was doing music videos.

Oh brother!

I've been privileged to work on production music for feature films for more than two decades now. Before coming into the world of on-camera musical performances, I recorded classical and jazz records and broadcasts, worked as an orchestral scoring mixer for features and mixed front-of-house live sound for large venues including the Hollywood Bowl. Over the years, I've developed a keen sense of the procedures that facilitate a smooth production and the elements that enhance an artist's ability to give a great performance. My projects have given me the chance to work in feature film pre-production, pre-record, production and post with many acclaimed music producers, composers, musicians and recording artists all facilitating the filmmakers' vision. I do believe I have a unique perspective that starts from the very beginning and extends to the bitter end in final Post.

Although every project is slightly different, each usually starts with the music team, Director and Producers visualizing how the scene will play and then planning so that all the elements are in place on the shoot day. This is essentially the same as with any other scene in a feature film, except that a music performance has the complexity of managing creative work in three separate periods of work: the initial music composition/rehearsal/pre-record, the on-set performance to camera and through to creation of the scene in post. However, different than the rest of the feature film, these three distinctive periods are tied to the element of synchronous performance locked to the established timeline of the music track. This makes the music scene full of its own technical and artistic challenges.

How a production approaches the pre-record sessions influences the success of the whole venture. A good pre-record session should take place with awareness of how the scene is to be shot and

Photos courtesy of Joseph Magee

Joseph Magee mixing

the pace of the performance should mesh with the demands of dancing, screen action and other visual elements. Ideally, the same singers who appear on camera should record their own performances for playback (PB) tracks. It's more natural for actors to match their own performances rather than a hired studio singer. The transition from dialog to music to dialog is more believable if the voice is the same throughout. And, if done well, the pre-record functions as a first rehearsal for the scene. It should be executed long enough in advance so that the musical performance can "season" in the actor's brain for at least a few days.

The ideal scenario is to execute pre-records that will make it to final dub. During my many features with Disney, this also proved to be financially prudent. Yes, the tracks will be sweetened, edited, fixed to picture and **stem** mixed in the film's final theater presentation. But the musical, artistic content will be set and adhered to, creating the exact intention of the musical moment, the storyline and the actors' performances.

A synth track mock-up will not achieve this; it may get you through the day but that's about it. The mock-up has a very good chance of not feeling the same, or sounding anywhere as good as the final track. The hastily assembled temporary track does a poor job of conveying the emotions of the scene for cast and crew—a sure recipe for a lifeless performance. Even if the track exactly matches every beat and every note, music is a "feel" thing and if the performers don't feel it, the audience in the theater likely won't either. The substitution of better music in Post might improve the scene technically but won't do anything to breathe life into the unmotivated performances during production. I've found this to be a common theme—time spent in preparation makes filming go better and lessens the need to spend time in Post fixing mistakes.

A well-prepared playback should have vocals that are dry and relatively free of compression or processing. Vocal FX should be available as separate stems and mixed to the environment on the day. A believable music scene requires natural bridges between dialog and music. The performer can best deliver these transitions when every syllable from the recording can be easily heard in the playback.

Pro Tools is the industry standard software/hardware for feature films. The sound FX, dialog and music teams all use Pro Tools. It is the standard for the dubbing stages as well. So it saves a lot of time if Pro Tools is also the software of choice for on-set music playback. The technical sound platform software for communication from beginning to end of a production process should be a standardized. When someone chooses to use different software, it just creates conversion issues. Fortunately, Pro Tools is easily accessible on many levels and with many types of hardware. The one exception to this standard is often the music score composer's personal studio, but this can be worked out by conversion to Pro Tools before the score leaves to see the outside world.

The Pro Tools session that goes to set for music playback should have the music locked to a bars/beat grid. This will enable very quick edits if you are called upon to create magic while a 1st AD waits, not so patiently. The grid is easily achieved in advance, not so quickly on set at the last minute. I also believe in using your prep time to print a click and thump track, beginning to end. Even though your grid is functioning and your click is a plug-in firing off the grid, it is easier to show and cut a visual region when folks are at the rig trying to work out cues. We are lucky today that most choreographers and music folks all have a common ground in Pro Tools and are able to use the visual aide of the screen to communicate with each other. I also have my memory locations already set for song structure before anyone steps to my screen to talk cues. Another detail most often missed for the prep of the sessions is that PB timecode should advance to a new hour for each different song. This will help Editorial in the long run.

I believe that a music-intensive show should not rely on PB timecode on an audio track. An Avid Sync HD I/O should be used on films with music-intensive scenes. This device should be synchronous to a video sync reference. Good news is there are a few ways of setting up this requirement, which now makes the on-set hardware compliment much lighter.

In many situations live-music-record is very important. Combinations of music playback and **live-record** performances, if executed properly, are often worth their weight in gold in Editorial. Even a few words of live-record cut into the pre-record in Post enables the audience to believe the musical performance in the final cut.

On the other hand, a show built from all live-record can be a disaster in Post. Folks giving their accounts of "all live-record" shows don't always tell the whole story. Often these shows require extensive editing and pitch work to correct meandering tempos and modulating keys. I have worked on a long list of projects with well-meaning Directors who have gone down this road from the excitement during production to frustration in Post.

If you do have to go "all live" during production, you'll need to provide the performers some sort of mapped tempo either using a click track through **earwigs** or a **thumper** or both. If the singing is *a cappella*, you'll also need to play a pitch reference at the right moments. Even so, some key modulation and tempo variations are likely to occur.

Modern earwigs are very useful although limited by volume and low fidelity. I started doing this on-set work back in the days, first with earwig inductance loops taped into the set, and then with neck loops. So I am comfortable explaining the current limitations to talent and creating an environment that helps the devices do their jobs. For example, when transitioning from speaker playback to earwigs and back to speakers, I like to leave the thumper running at a very low level the entire time. The pulse helps provide the "rhythmic glue" to tie the separate moments into one seamless feeling. A thumper quietly pulsing away also helps to keep the full range speaker volume level lower throughout the day.

Active eighteen-inch subwoofers today are very affordable and do a great job. The source of the thump is also very easily tuned on-set in Pro Tools. The sample used for the thump can be highly tuned prior to arriving to set. I have used the same sample for thump for many years.

With the current state of the art in active loudspeaker design, I think everyone should take advantage of better fidelity playback on set. A speaker system with higher than average Total Harmonic Distortion (THD) and poor crossover points is fatiguing to the cast and crew. When music plays on set and sounds great, the day goes by more smoothly. It's easier for performers to follow lyrics that are clearly articulated and better fidelity helps them "feel" the music and translate that energy to the performance. New, high-quality designs are affordable and durable. Passive speakers with amp racks on set and drive racks with crossovers and EQs are basically a thing of the past. I worked through those days and am happy not to use that gear anymore. If a production requires very high sound pressure level (SPL) playback or on-set monitor mixing becomes critical, I then recommend employing a professional touring company to join the team.

The Playback Engineer should try to coordinate his efforts with both Editorial and the Production Mixer. A conversation with each before the assignment starts can sort out issues and make the process smoother. This is the best time to bring up the issue of playback timecode. Having both time-of-day (TOD) code and playback code married, available in burn-in windows for Editorial is the best way to load and edit synchronous music playback scenes. When loaded correctly, endless hours of sliding sync or making on-the-fly corrections will be completely avoided for the editorial team.

This production workflow is easily accomplished. For the Production Mixer, it's only necessary to print the PB timecode on one analog track on your multi-track and the mono music playback reference on another track. Your multi-track is already synchronous with your TOD code.

The media management company contracted for dailies and editorial workflow can then easily meet the need for PB code in a second window, if requested. On a show where Editorial is taking your tracks directly, they can create the second code window on their own. Either way, it will save numerous days of questionable sync work.

The relationship between the Avid assistant and the Playback Engineer is vital to maintaining sync in the music scenes. The initial conversation between Playback and the Assistant Editor responsible for loading each day's work into the Avid will set the tone between departments.

The Playback Engineer should provide to Editorial a master playback 48 kHz, 24-bit stereo interleaved file for each musical piece performed. The file should be created from the exact playback session and have the positional timecode reference identical to the day's playback work. This file with the correct timestamp will enable the correct loading of all of the takes with music playback timecode. Sent at day's end, the file labeled PB Edit Master, should go directly to the Avid assistant editor; I deliver this file via **Aspera**, with explanations regarding the use of the playback in the scene.

I've found that it takes a complete team effort to pull off a complicated PB, live-record, earwig, thumper day on set. Technology has gotten more complicated and offers more production possibilities, but increases workload. Personally, my favorite shows are a team effort with playback integrated into the sound crew. Coordination of cable runs, speaker and thumper placement, music edits and session maintenance, music cues with the 1st AD and earwigs to talent is all very doable when executed by the whole team.

In my experience, the most effective way to operate PB is to coordinate with all the departments responsible for the creative process, before stepping onto set. The Playback Engineer can act as a bridge between Production and Post Production on the music scenes, assisting workflow and maintaining accountability. From my perspective, an effective Playback Engineer is always prepared before coming to set each day. Wise colleagues in Production and Post should bring him aboard early enough to make those preparations.

Glossary for highlighted words

Stem A mix of multiple audio sources. Example: A blend of music and effects, without dialog. The use of a stem allows complex source material to be treated as a single unit in the final mix or as a temporary part of the process of editing and recording audio.

Live-Recording The process of recording a musical performance on set rather than having the players mime to the playback of a studio session. Sometimes a live-recording will be used to generate a playback master that is immediately put into service to shoot alternate angles and close-ups.

Earwig A miniature monitor designed to fit within the ear canal like a hearing aid.

Thumper A playback system to reproduce the beat of music as a series of low-frequency thumps. The tones are typically about 40 Hz so they may easily be removed from a track without harm to recorded vocals. A special thumper speaker system optimized for low-frequency reproduction is used to play the track. The thumps permit performers to follow the beat of the music without musical playback that might interfere with dialog recording. Originally invented by Hal and Alan Landaker for Warner Bros. Studios. (See *695 Quarterly*, Volume 2, Issue 1, Winter 2010)

Aspera A company making software to facilitate transfers of large data files.

File Formats for Music Playback

by Gary Raymond

I was asked to discuss optimum file formats for Music Playback (PB). This is an important topic that continues to evolve. Traditionally, the media and file parameters have mirrored the Production Sound Mixer's formats.

When I started in the '90s, most Mixers were using Nagras. As a result, the spare Nagra ended up being the logical (convenient) machine to also use for playback. As a result, tape speed was typically the same as the Mixer's. There were definite limitations to the two-track format. When I worked on *For the Boys* in 1990, we had several large master shots that Mark Rydell, the Director, decided he wanted to shoot from scene beginning to end. Unfortunately, no one told Editorial as they had prepped all the reel-to-reel tapes as separate beginning, middle and end segments. To make matters worse, they didn't know what combination would be desired so we had tapes with Orchestra-L, Bette Midler Vocal-R; Orch. & Bette-L, Jack Sheldon Trumpet-R, Orch. without Vocal-L, Jack-R and about a half dozen other permutations. I remember the Editor bringing down this big box of about 50 seven-inch reels and us sorting through them. Then Mark announced he wanted to do the master shot all the way through. Duke Marsh, who was doing the playback with me, grabbed a second Nagra and we loaded the first part of the desired mix of the song on Nagra 1, the middle of the same song on Nagra 2, and stood by holding the pinch roller ready to let it fly on Playback. As Nagra 1 was playing, we had to start Nagra 2 at the correct spot and then, while it was playing, reload Nagra 1 with the end of the desired mix. I remember Mark Rydell came up to us after our successful playback day and said he wouldn't do that job if someone held a gun to his head.

Keith Wester, who I worked with on *Never Been Kissed*, told me he started as a Playback Operator and, in those days, it was off a record. He'd find the groove (literally), mark it with a piece of white chalk and hope the needle didn't bounce when he dropped it.

In the late '90s, there was a flirtation with DAT (introduced by Sony in 1987). This was limited to the DAT formats. The DAT was more convenient in some ways than the Nagra (you could auto cue to preset markers) but it still suffered similar problems

Photos courtesy of Gary Raymond

of any tape-based system. One was that the position coding information would actually get worn off with 20–30 repeated rewinds. Another unique disadvantage of the DAT relative to the Nagra was the fact that it couldn't be edited the way reel-to-reel tape could be (with razor blade in hand). All editing had to be done "off line" and retransferred.

For this reason, in 1993 I switched to Pro Tools, a nonlinear computer-based system. If we had been using Pro Tools in 1990 when we did *For the Boys*, we could have loaded all the various playback combinations into one session and been happy clams. Pro Tools (computer-based recording, editing & playback) was vastly superior to tape systems as far as "function" (ability to manipulate the audio), although not necessarily "performance" (sound quality). It took a while for the computers to catch up with the sound quality of a Nagra; however, for playback applications, the tradeoff between function and (audio) performance was decidedly biased toward function. This is why the computer-based system (Pro Tools or similar) has become the *de facto* standard.

There have been many shows I've worked on where I had to do on-the-fly things that would have been impossible with an analog or digital tape-based system. This includes pitch shifting; I transposed the playback songs on the Britney Spears movie *Crossroads* the first day on set when it was determined the songs had been recorded in the wrong key.

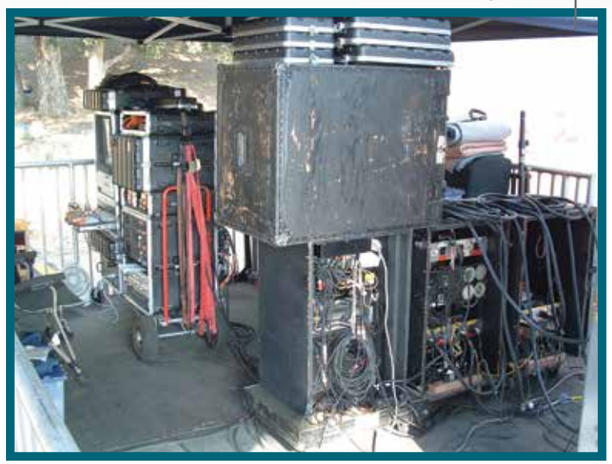
On *House*, I used Pro Tools to provide PB for a slow-motion scene. This was a helicopter crash scene with dialog that the Director wanted to play in slow motion but not pitch shifted. The scene was shot in real time at twenty-four frames per second and then I did some tests at various frame rates to see how fast the actors could lip sync to their playback. Interestingly, it's a function of the complexity of the particular spoken words. In this case, forty-four frames per second was the fastest the actors could sync convincingly. So, camera matched that frame rate and we shot the playback version of the scene. In post, everything was slowed down to normal twenty-four frames so, when viewed, it looked like the actors were talking in slow motion but with their voices' normal pitch (something that would have been impossible with tape).

On *Drag Me to Hell*, a séance scene required reverse playback of the actors' live lines. These effects could not have normally been done on set with a tape-based system.

Gary Raymond at console

Squeezing the Nagra pinch roller—the original "Hold the Roll"

PB rig for *Monk*



Gary working on the "Rock Star" Front Of House PB rig

Pro Tools screen

This brings us to the key issue, which is often either:

1) The PB material is not prepared for what is eventually desired on the set or,
2) more frequently, a live-record is used as the playback master.

In both these cases, the frequency sampling rate and bit depth must be decided.

When performing a live-record (as I did on *Almost Famous, Rock Star, 8 Mile*, or *The Hangover*), I usually match the Production Mixer's settings. This is important if timecode will be used. That's pretty straight ahead as it's a "closed information loop system" between the Mixer and me.

When using straight PB tracks or files prepared by someone else, I also will usually consult with the Production Mixer and match rates.

However, even when you ask, you don't always get what you requested.

The evolution of current Music Playback is that half the time I get music tracks from the Director's Assistant off their iPhone five minutes before they want to roll. This is often the case even when I ask for a better format a few days in advance. They may provide me something in advance, but often it's not what they ultimately want to use on set.

We are seeing a revolution in technological information acquisition that is being driven by computer media and smart cell-phone capabilities. The ability to send information on a personal smartphone is conditioning the population to expect any bit of information to be instantly produced. The misperception is that all information is equally available. To a person who does not have to create information but simply download commercially available product, there is a lack of appreciation of the technical creative process. As a result, creative decisions that used to be decided weeks or days in advance are now made "on the fly" to suit the creative process.

The good side is that this has allowed more spontaneous creativity on the part of the Director. The bad side is that there is an expectation that anything can be ready on the spur of the moment. So, in this sense, with regard to prepared material provided by others, we have de-evolved to the point where probably half the playback-only projects I work on now are iPhone downloads. The first thing to suffer is audio quality, of course.

When prepping a film, television or commercial, I still ask for WAV or AIFF files when possible and an audio CD backup. A good conversation with the Editor (if there is one at that point in the film) can also be valuable.

If timecode will be used, I will match the desired rate which, of course, is dictated by camera format and, if no TC, the Mixer's preference. With the aforementioned "iPhone" transfers, I'll convert them to the preferred formats.

In **live-record** situations, the same pretty much applies. Obviously, the higher the sampling rate and bit depth, the better the sonic quality. However, conversion transfers with digital must be considered because converting from one sampling rate to another, whether up or down, degrades the sound quality. For that reason, I'll normally record at the highest sampling rate that I think will be ultimately used. Getting the highest quality sound verses the convenience of various formats will continue to be an issue.

I'm expecting the next stage of this evolution to be direct brain scan downloads off the call sheet.

Happy Playback.

Glossary for highlighted word
Live-Recording The process of recording a musical performance on set rather than having the players mime to the playback of a studio session. Sometimes a live-recording will be used to generate a playback master that is immediately put into service to shoot alternate angles and close-ups.

The Road to 600

The Evolution of Playback on *Glee*

by Phillip W. Palmer, CAS

"Don't Stop Believing" number. From left to right: Chris Colfer, Lea Michele, Amber Riley, Cory Monteith and Jenna Ushkowitz. (Photo: Courtesy of FOX)

From left to right: Phillip W. Palmer, CAS, Patrick Martens, Jeff Zimmerman, Mitchell Gebhard. (Photo: Adam Rose)

Pilot and Run of Show

When I got the call asking if I was interested in mixing a pilot for Ryan Murphy and Fox Television, the Producer asked an interesting question. He asked how comfortable I was doing a musical pilot, and whether I could manage the production side of things for a group of Producers who, while experienced, had never done this type of project before. Looking back now, almost five years to date, I had no idea what I was in for.

The pilot had elements of several processes: live-record, live-record to playback, playback only and combinations of all three. What we learned from the pilot, and how our company and cast operated, set the tone and process for a long journey. Soon after we started work on the pilot, we knew we were in for something special. Since October 2008, we have produced close to one hundred episodes and nearly six hundred musical numbers.

The music production and playback for the pilot was a completely different situation than the run of show. The music had mostly been prerecorded earlier, giving us time to figure things out and adjust our production process accordingly. For the run of show, music production has been a race against the schedule.

Glee still remains bound by the network episodic schedule, which we attempt to hold to eight days per episode. When the script is released, the music team goes to work immediately arranging and composing anywhere from five to as many as eleven musical numbers per episode. The temp versions are sent back and forth to our Executive Producers for notes and preliminary approval. Then the cast members are brought in to record their specific vocal tracks. The completed music mix is then sent back to our Producers. Upon final approval, the music goes to David Klotz, our Music Editor, for preparation of playback on set. The Pro Tools sessions he builds are specific to our purpose, which include timecode as an audio track, **click**, **thumper**, music mix, any specific and special music **stems**, vocal and vocal effects, and background vocal and vocal effects tracks. The playback session track count will frequently be upward of twenty-five or more stems.

The "Halo/Sunshine" number from Season 1. From left: Jenna Ushkowitz, Heather Morris, Lea Michele, Amber Riley, Naya Rivera and Dianna Agron. (Photo: Courtesy of FOX)

Phil Palmer's sound cart. (Photo: Phillip Palmer)

The Choir room. (Photo: Courtesy of FOX)

Live-Records vs. Playback

The advantages of live-records are obvious on camera. The drama of the moment and the nuances of the performer yield an authenticity that is often undeniable. What we learned on *Glee* is that this works for us only sometimes. We discovered early on that repeated live performances, especially when sung "all out" take after take, have a detrimental effect on the performance as time went on. Essentially, after ten or more takes, the moment was lost, as well as the performer's ability to continue to work through the day and into the next on a TV production schedule. We had to decide which songs needed to have this live performance effect, and plan our production accordingly.

In the pilot, all the Glee Club student auditions were recorded live on set including the piano, with the exception of "On My Own," performed by Lea Michele. Her audition intercut with her singing the same song in several locations, and was prerecorded for playback and lip sync on set. The shower scene with Cory Monteith singing, "I Can't Fight This Feeling" *a cappella,* was recorded live as well. Our vocal coach gave Cory a pitch and then we ran a thump track for tempo. The thump track is essentially a 40 Hz click track played at a low level through an eighteen-inch subwoofer. The 40 Hz thump can be removed later in Post by the use of a notch filter, leaving the vocal recording unaffected. The artist can feel and maintain a tempo and Editorial can easily cut back and forth between takes of live recording. The remainder of musical performances in the pilot were prerecorded and played back for lip sync.

Pro Tools

While there are many Digital Audio Workstations available to the Production Sound Mixer today, we use Pro Tools for several reasons, foremost among them being that the music production team uses Pro Tools for their recording process and we can easily modify their sessions for our use. We have found that the use of Pro Tools on the set has been an invaluable tool to our playback workflow. We can easily manipulate any session to match what we are currently filming and, if need be, send that same session back to the Music Editor so he can prep it accordingly for Editorial. We can easily do things such as change level and volume to match camera angles, or make music edits at the request of the Director. The Music Editor can then load our session files to see what we've done on set.

There has been an evolution to our playback Pro Tools sessions since the pilot. In the beginning we simply had a mix, essentially the Producers' approved demo, with a click track added. As the seasons have progressed, we have added regular stems to our sessions that we find very useful. Our Music Editor adds a thump stem, which matches the click track, so we can assign a separate output for the thumper. We can do it on the fly, or program it in the automation to dump the music at any point and go to a thump to record dialog during the song. We also add a timecode stem as an audio track, which comes in very handy when creating any off-speed versions of the song. The timecode will always stay locked at any speed if it is an audio track and part of the session. We have the music stems combined as a mix, unless there is a specific stem that needs to be split out, such as a piano track. The vocal stems are all separated by lead vocal and effects. If there are six lead parts in a song, there will be six stems and six effects stems. We have the background vocals combined, but sometimes it's difficult to distinguish the background vocals in the overall mix. Having the ability to boost the background vocal stem by 4 dB to 6 dB during playback helps our cast follow their cues. When the sessions are completed and sent to us, there are frequently dozens of stems to manipulate.

Playback Equipment and Installations

For the pilot, our playback gear on set was a simple Pro Tooks **Mbox** Mini audio interface and a MacBook. We made the most out of it, but quickly knew we had to improve on our rig to handle more complex playback situations. After the first season, we built a cart that had a dedicated Mac Mini, twenty-inch monitor, Pro Tools Mbox Pro audio interface, a backup Mbox Mini, **Command8** control surface, Mackie 1402, Comtek transmitter for earwigs, Sennheiser receivers for **VOG**, and video monitors. This rig stayed fairly unchanged until an overhaul this past summer for our fifth season.

The current playback cart has a new Mac Mini and monitor, **MOTU Traveler** audio interface, Lectrosonics Venue for VOG, **Black Magic** Smartvue Duo HD monitors, and the Mackie 1402 and Comtek base station from the older rig for audio distribution, **earwigs** and monitoring. Our mobile speaker complement consists of two JBL EON10 speakers for small sets and two Mackie SRM450 speakers for larger sets and exteriors. We built several lengths of custom speaker snakes so both power and signal can be run from the playback cart. Also included in the speaker arsenal is an eighteen-inch powered subwoofer for both thumper and low end when needed.

As we progressed through the first season we began to see the need for speaker installations in our main sets. Speaker placement became difficult as we battled with multiple camera angles, Steadicam 360's, set walls and crew. We found the only good place to put them was up in the air. The first set to get this dedicated installation was the McKinley High Choir Room. This set saw the most playback by far, and still does to this day. For the Choir Room we mounted four JBL EON10's surrounding the set. They are permanently hung and wired to a space just off set where we park the playback cart for 99% of the music on that stage. From that position we have "drive lines" to several places on the stage where we can drop a speaker and tie right in. This makes the music playback in the hallways very easy, as we are able to place speakers at either end of our long hallways without dragging cables through the set.

Season Two saw the construction of the McKinley High School Auditorium on stage. With this construction build, we installed six Mackie SRM450 speakers, two on each stage wing and a pair in the house, plus an eighteen-inch powered subwoofer for thumper. They are all wired, both power and audio, to a distribution amp and power control rack placed above the Stage Manager's desk on stage right. They exist as a functional part of the set decoration. Both the playback and the main cart are set up in the same spot each time we work this set, so all the cable runs, including power, audio, video and bell/light, are permanently run underneath the set.

The "Glease" number from Episode 310. Left to right: Darren Criss, Damian McGinty, Mark Salling, Cory Monteith and Harry Shum Jr. (Photo: Courtesy of FOX)

For Season Four, we built a new set for the storyline set in a New York dramatic arts school called NYADA. This new set is a dance rehearsal space, large and open, with high ceilings and giant windows that look out to Manhattan. We faced the same issues as with the McKinley Choir Room, and chose to suspend a pair of Mackie SRM450's from above the **greenbeds** aimed down through the fabric ceiling and into the set. As with all previous installations, they are prewired with both power and drive lines to one central spot for the playback station.

The most recent set construction has been a New York City diner, built for Season Five on the backlot of Paramount. This was an incredible undertaking for the construction department, both in scope and speed. They used an existing space in the backlot but expanded up to create a two-story, high ceiling, Broadway performance diner. For this installation, the speakers are incorporated into the set design and mounted on the set's west wall as part of the set decoration. We used a pair of the new QSC K10 speakers with the QSC yoke mounts for a permanent installation. We ran power and signal wires through the set walls to a drop point to facilitate connecting to the playback cart.

Speaker installations in the fly area.
(Photos by Phillip Palmer)

The Spotlight Diner built for Season 5.

Playback Process

Most of the music scenes on *Glee* happen within a normal scene of dialog. Occasionally we have a stand-alone music piece but, for the most part, we fold the music playback into the dialog as best we can. The playback volume is often so loud it is at rock concert level. As we go from dialog recording to music playback, the transition is often abrupt and becomes difficult for Editorial. Anything that may happen within the song is lost due to the high playback level. We attempt to bridge this transition between dialog and music with a blending element.

The key to making this work is recording the elements we see during the playback as wild sound so Editorial and Post Sound can add these tracks to play under the prerecorded music. Due to our very tight episodic television schedule, Editorial doesn't have the time to build the background noise and Foley for our multiple music scenes. To do this we make every attempt to do a **"Foley Pass"** of things like laughter, whistles, footsteps, hand claps, crowd applause, set pieces moving or falling, or anything that makes noise during the musical number. We record this wild track with the music playback at a very low volume. For the Editor, the Foley Pass becomes an important element in making the musical number feel real.

When we choose to record a performance live, we often prerecord the music stems and record the actor singing on set. The music is fed to the actor via earwig and we record the vocal as usual, with a boom microphone. We try, not always successfully, to leave the temp vocals in for the wide shots, and go into the live-record when we get into close-ups. In our experience, it saves the actor and the performance. I do my best to create a mix in the Comtek public **IFB** for the Director to get a feel for what we are recording. For the IFB feed, to the boom operators and set crew, I leave the playback track out or run it at a low volume. I split tracks one and two as a post-fader mix for Editorial, track one is the live microphone and track two is music. Everything is ISO-tracked pre-fader so it can be adjusted or rebuilt as needed.

Often we are tasked with strange and challenging playback situations. Midseason Three, we had a scene and musical number that took place at a swimming pool with synchronized swimmers. Having a beat to follow underwater is one thing, but having to do lip sync is another. Luckily, after some tests, we found the synchronized swim music equipment "Oceanears" worked very well for our needs. The swimmers and our cast were able to hear the playback feed from the underwater transducers. I was quite impressed by the clarity and the distance the music could travel underwater at nominal levels.

One script called for a musical number being sung from a golf cart while moving. That works well if it's traveling a short distance, but that wasn't the plan. They wanted to load down the golf cart with cameras and drive the entire length of the song, some two-plus minutes. We negotiated for an additional golf cart, placed a speaker with wireless receiver in the picture cart and transmitted from our "sound golf cart," which slowly became the "everyone else" golf cart. We essentially did two angles several times, first leading then following. The playback rig was somewhat simple, a MacBook Pro, MOTU Traveler, and a Lectro UH transmitter. The speaker on the cart was a battery-powered Sound Projections SMP1 fed from a Lectro UCR411. We had a good time with this one.

Certain musical performances call for special shots that require playback manipulation—specifically, off-speed filming for in-camera effect. Frequently, we speed up both camera and playback by as much as three times normal. When the image is played back at normal speed and the music is laid back in, the artist appears to be singing in sync while everything moves in slow motion. This is achieved by speeding up both the music stems and the timecode stems. We transmit the high-speed timecode to a slate and roll camera, then playback as you would in a music video. Post can then manually sync the music to the displayed timecode as it's locked in the session as an audio stem.

The Crew

Commitment and cooperation from the entire shooting company from the beginning has been the key to making this all work seamlessly (or what appears so). I can't imagine what this would be like if the crew didn't understand how challenging it is on a daily basis. It's difficult for each department in their own way, and we respect and strive to work together to make it happen. We have had three Directors of Photography for the run of show: Christopher Baffa, Michael Goi and Joaquin Sedillo. Each one of them has worked with us to get what we need to achieve our goals, both with sound recording and the music. It's a cooperative effort, as always, and I'm grateful for our working relationship. When our needs impact the way the show is shot, we have to have a plan and options. I can't stress how important it is to have multiple plans of operation.

My sound crew has undergone some changes since the pilot, but for the most part, has remained constant. Patrick Martens has been my Boom Operator for the entire run. Devendra Cleary was Utility Sound Technician and Playback Operator for the first two seasons, and then moved up to Playback only in Season Three. Mitchell Gebhard joined the crew as Utility full time in Season Three. After Season Three, Devendra moved on to mixing full time, and Jeff Zimmerman joined us as Playback Operator beginning Season Four. Without the unbelievable ability and flexibility of these people, I would be completely useless as their Sound Mixer. They show incredible professionalism on a daily basis and shine in their abilities to do the job. I provide the guidance, but they get the job done.

Top left: Phillip Palmer at his console.
Lower left: Jeff Zimmerman at his playback console.
(Photos by Adam Rose)

Glossary of highlighted words

Click Track A series of audio cues in time to a piece of music. Typically, the click track is generated in a *DAW* and used by musicians or dancers to keep time to the music.

Thumper A playback system to reproduce the beat of music as a series of low-frequency thumps. The tones are typically about 40 Hz so they may easily be removed from a track without harm to recorded vocals. A special thumper speaker system optimized for low-frequency reproduction is used to play the track. The thumps permit performers to follow the beat of the music without musical playback that might interfere with dialog recording. Originally invented by Hal and Alan Landaker for Warner Bros. Studios. (See *695 Quarterly*, Volume 2, Issue 1, Winter 2010)

Stem A mix of multiple audio sources. Example: A blend of music and effects, without dialog. The use of a stem allows complex source material to be treated as a single unit in the final mix or as a temporary part of the process of editing and recording audio.

Mbox An audio interface manufactured by Avid for use with its Pro Tools software.

Command8 A mixing panel *control surface* manufactured by Avid for use with their Pro Tools audio editing software.

VOG Voice of God. A portable public address system that allows a Director to address groups of performers and technicians with an authoritative voice.

MOTU Traveler The Traveler is an audio interface for connecting multiple microphones, and other audio inputs, to a computer. It is made by MOTU (Mark of the Unicorn), a manufacturer of hardware and software for computer recording

Black Magic A manufacturer of speakers, amplifiers and signal processing equipment.

Earwig A miniature monitor designed to fit within the ear canal like a hearing aid.

Greenbuds A series of catwalks above the sets in a studio.

Foley Pass An alternative to the studio process of Foley recording. The Foley Pass is recorded on-set at the time of principal photography. At the completion of the shot, the AD, at the request of the Mixer, calls for a Foley Pass and the performers go through all of the motions of the scene but without dialog and either without playback or with the music played very softly. This makes it possible to record all the natural sounds as an element separate from the music and speech. The Editor can use these sounds to add a natural background to the scene. It is an expedient alternative to the more elaborate process of the Foley stage but it also can preserve some of the immediacy of the scene.

IFB Interruptible Fold Back: A system for supplying audio as it is being recorded to artists and technicians. The signal path from the microphones is "interrupted" before going to the recorder and "folded back" so it may be heard by the people involved in the process of making or supervising the recording.

Jeff Zimmerman at his cart.
(Photo: Phillip Palmer)

WELCOME TO NASHVILLE

by Anna Wilborn

Boom Operator Scott Solan. (Photo: Anna Wilborn)

Mixer Joe Foglia at the sound cart.
(Photo: Anna Wilborn)

Scott Solan, Joe Foglia, CAS, Glen Trew, CAS and Anna Wilborn.
(Photo courtesy of Glen Trew)

When Joe Foglia rang me up to offer me a spot as the Utility Sound Tech on ABC's *Nashville*, I fell on the floor laughing. Move to Nashville? I had a new house, a new baby, a three-year-old and a husband who was neck deep besting a new VH1 show. I'd already heard the stories of ungodly hours, the daily multiple locations, the stake beds, the stairs, the tiny costumes, the non-soundstages, the lack of a great Thai restaurant … "I'm fine thanks," I chuckled to Joe, as I tossed my kid a toy. I got in my car and headed to Costco. Forty-five minutes later, I pulled in to the parking lot. It's a mile and a half away. Had to get some diapers at Target. That was another two-hour ordeal complete with honking and expletives (not from me of course!). Six weeks later, my whole house was packed up, boxes shipped, and I was bouncing my baby on my lap as my flight to Music City lifted up out of the smog.

It had been over two years since I'd worked with Joe and, thankfully, nothing had changed. Except the recorder. And the monitors. And the sound reports. And the media. And some of the microphones. And the timecode boxes. And the **IFBs**. And the follow cart. I soon realized the only thing recognizable was Joe's smile. Even the boom guy, Scott Solan, was different. He hails from an Irish, hockey-playing borough of Syracuse, NY, with a long list of credits, including the new *Star Trek* features, *Transformers: Dark of the Moon* and *Thor*. Scott is a thoughtful perfectionist. He forgets nothing and leaves no stone unturned in his drive for a quiet, locked-up location. Scott has the unique ability to up everyone's game, both within and beyond our department. Our very first scene up on starting the new season was indicative of the next ten months to come: 6 earwigs, music playback, live stage microphones, PA system, 4 wires, 50 extras and 3 RED cameras. I suddenly yearned for a forty-five-minute drive to Costco with a toddler and a teething baby. I pondered the validity of the lease agreement just signed by my new tenants back in Los Angeles. I suppose I could get a lawyer … Joe just smiled and shrugged, "Welcome to Nashville!"

Matt Andrews is at the helm of our music playback. He is the Chief Engineer at Sound Emporium in Nashville and a bona fide Grammy Award winner (I know 'cause I kinda stole it off his mantle one night when we were shooting down the street from his house). Matt's credits include Playback Tech on *Walk the Line* and 2nd Studio Engineer for the *O Brother, Where Art Thou?* soundtrack. Joe and Matt are a match made in heaven. Watching them together is like a Martin and Lewis film. There's nothing better than seeing the two of them behind the racks, heads down in a flurry of cables and connectors, trouble-shooting and finishing each other's sentences. They are the yin to each other's yang. Given that Joe spent his formative years at Criteria Recording Studios in Miami Beach, it's no surprise.

Each episode offers up four to five musical numbers with anywhere from one to a dozen performers. Matt's playback paraphernalia includes a Pro Tools 10 rig in a small, red, rolling rack, closely followed by Playback Utility Cassidi Spurlock, dragging The Biggest Pelican Case In The World. Seriously. If Nashville ever floods again, we can just

Scott booming the scene. (Photo: Anna Wilborn)

Matt Andrews with the new Soundcraft Si Compact 16 mixer. (Photo: Anna Wilborn)

Anna Wilborn wiring David Alford. (Photo: Erin Naifeh)

ditch the cables and all hop in. He runs the Pro Tools via a Quad-core Mac Mini with a **Focusrite Rednet 2** interface. He typically comes armed with twenty-four tracks of music all broken out in stereo pairs from vocals to cowbell. Matt is all about the **Dante** matrix system. Over the next few months, we plan to fully integrate Dante so both he and Joe can pull any track they choose out of a thin little Ethernet cable. It will also drastically cut down on the cabling which, in turn, will reduce the propensity to pick up hums and ground loops along the way, a typical nuisance of our large-scale music venue locations.

Six years ago, Joe looked at his shiny new eight-channel Sonosax mixer and thought, *what am I going to do with all these inputs?* Now he knows. Problem is the board is continually maxed out with all the live vocal microphones, booms, wires and music. An upgrade looms in the near future. For now, the new addition to the family is a Dante-compatible Soundcraft Si Expression digital mixer. It has fourteen faders with four layers for up to fifty-six tracks. "It's great," Matt says, "we just hit a button and the board instantly switches to a whole different mix." To it we input the Shure handheld wireless stage microphones and Matt's music and timecode tracks. It allows instant accessibility to all audio on Matt's playback rig as well as all live stage microphones. From there we feed customizable mixes to the **QSC** PA and the actors' **Ultimate Ears** custom molded in-ear monitors. Our actors sing aloud to their pre-records, and are then recorded by Joe. (Y'all following this? There will be a quiz at the end.) This gives our Music Editor, a more precise way to sync, rather than relying solely on timecode.

Joe's primary recorder is the Sound Devices Pix 260i. It is capable of up to thirty-two channels and is also Dante compatible. It carries a 250 gigabyte solid-state hard drive and a compact flash card which gets turned in for dailies. He backs up to a Sound Devices 788T which simultaneously mirrors to a one TB hard drive. We mostly use Sanken COS-11 wires with Lectrosonics SMV and SMQV transmitters, matched to a six-channel Lectrosonics Venue receiver. Schoeps CMIT shotguns are used with Cinela mounts, K-Tek boom poles and Lectrosonic HM plug-on transmitters. Scott and I use Shure P9RA receivers to listen to Joe's mix. The clarity is remarkable and the channels are mixable so we can have boom in one ear and wires in the other if we choose. These are the same receivers we use on our actors for their in-ear monitoring.

In the early days of Season One, the performance playback music was fed only to the actors via in-ears, Phonak earwigs, or small stage monitors. Famed music producer T-Bone Burnett noticed during a performance shoot that the audience wasn't getting as excited about the music as they could be. He wanted speakers blasting the crowd with music. Joe then contacted Ray Van Straten at the speaker company QSC in Costa Mesa, CA, about a possible relationship. A love affair was born. We now receive both practical and mock-up KW series speaker arrays to pump music to the crowd for a real concert look and feel.

Normally, being this far away from Los Angeles would spell the usual equipment and expendables headaches. Thankfully, in Nashville we have Trew Audio right in our backyard. When Joe arrived in town, he wheeled the carts right into the middle of the shop like a sound pit stop. Software updates, new cables, batteries, fluids, tires pumped up, and we were off and running. Rob Milner has been a big part of our crew and it goes something like this: "Hey Rob, I need a seven-foot cable to run from the Zaxcom wireless to a split XLR with a four-pin." An hour later, we send the drivers. Having them here has made the transition to the South seamless. Glen Trew was the Sound Mixer on the pilot and the first three episodes before Joe took over. He still comes in from wherever he is around the world (last time it was Amsterdam) to do our 2nd unit days. He's like a rock star around here. It takes him a half-hour to get from crafty to the cart with all the hugs and handshakes in his way.

Nashville has been the best thing to happen to my little world in quite some time. We're having a blast both on-set and off. Our hours are sane, the people are jaw-droppingly friendly and there's never a lack of fun things to do with festivals and concerts every weekend. I can say the road signs are more confusing than anything I've ever seen (even the locals admit that), but when people actually let you merge with a friendly wave and a smile, all is forgiven. The other day, my husband found himself stranded in the rain with a dead car battery and a flat tire, and yes, two very disgruntled kids in the back seat. Before he could find his AAA card, someone had pulled over, jumped the car, fixed his flat (with a plug!) and bid him a good day. Don't you have a pretty picture of that happening in Los Angeles? Gotta love this sweet Southern country livin'! Viva La Nashville!

Glossary of highlighted words

IFB Interruptible Fold Back: A system for supplying audio as it is being recorded to artists and technicians. The signal path from the microphones is "interrupted" before going to the recorder and "folded back" so it may be heard by the people involved in the process of making or supervising the recording.

Focusrite Rednet 2 The Rednet 2 system is the premium line of audio interfaces for network distribution over Ethernet cable manufactured by the Focusrite company.

Dante A system of hardware, software and network protocols for delivering digital audio through Ethernet cable.

QSC A manufacturer of speakers, amplifiers and signal processing equipment.

Ultimate Ears A manufacturer of speakers and custom-molded, in-ear monitors.

A Tribute to

Ray Dolby

by Scott Smith, CAS and David Waelder

To be an inventor, you have to be willing to live with a sense of uncertainty, to work in this darkness and grope towards an answer, to put up with anxiety about whether there is an answer.
–Ray Dolby

The Dolby name appears so often on films that it has become like Kleenex or Xerox, a generic for noise reduction. But the many innovations of Dolby Labs are largely the work of Ray Dolby, a man of prodigious ingenuity. He died of leukemia on September 12, 2013, at age eighty, at his home in San Francisco.

Born January 18, 1933, in Portland, Oregon, Mr. Dolby was hired straight out of high school by Alexander Poniatoff of Ampex Corporation. At the time, Mr. Dolby had volunteered as a projectionist for a talk that Mr. Poniatoff was giving. Impressed by his talents, Poniatoff invited the young Mr. Dolby to come to work with him at Ampex, where he contributed to the design of the first quad videotape recorders.

After completing studies in electrical engineering at Stanford and physics at the University of Cambridge, Ray Dolby invented a system of high-frequency compression and expansion that minimized recorded hiss. He formed Dolby Labs in 1965 to bring this noise reduction system, called Dolby A, to market. Mr. Dolby later turned his attention to the problems of sound recording for motion pictures, which still relied on decades-old technology. His endeavors would lead to the introduction of a surround sound system that could be duplicated using traditional optical soundtrack printing techniques. It replaced the expensive and cumbersome printing techniques previously used for big-budget films.

At Dolby Labs he is remembered as much for mentoring a new generation of scientist/engineers as for his particular innovations. He was a scientist who expanded creative horizons for artists.

His contributions are covered in greater detail in Scott Smith's series "When Sound Was Reel" in the Summer 2011 and Winter 2012 issues of *695 Quarterly*. There is also a very fine video tribute available on the Dolby website. These are available at:
http://695quarterly.com/3-3/3-3-when-sound-was-reel-7/
http://695quarterly.com/4-1/4-1-when-sound-was-reel-8/
http://www.dolby.com/us/en/about-us/who-we-are/leadership/ray-dolby.html