695 QUARTERLY

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695 QUARTERLY

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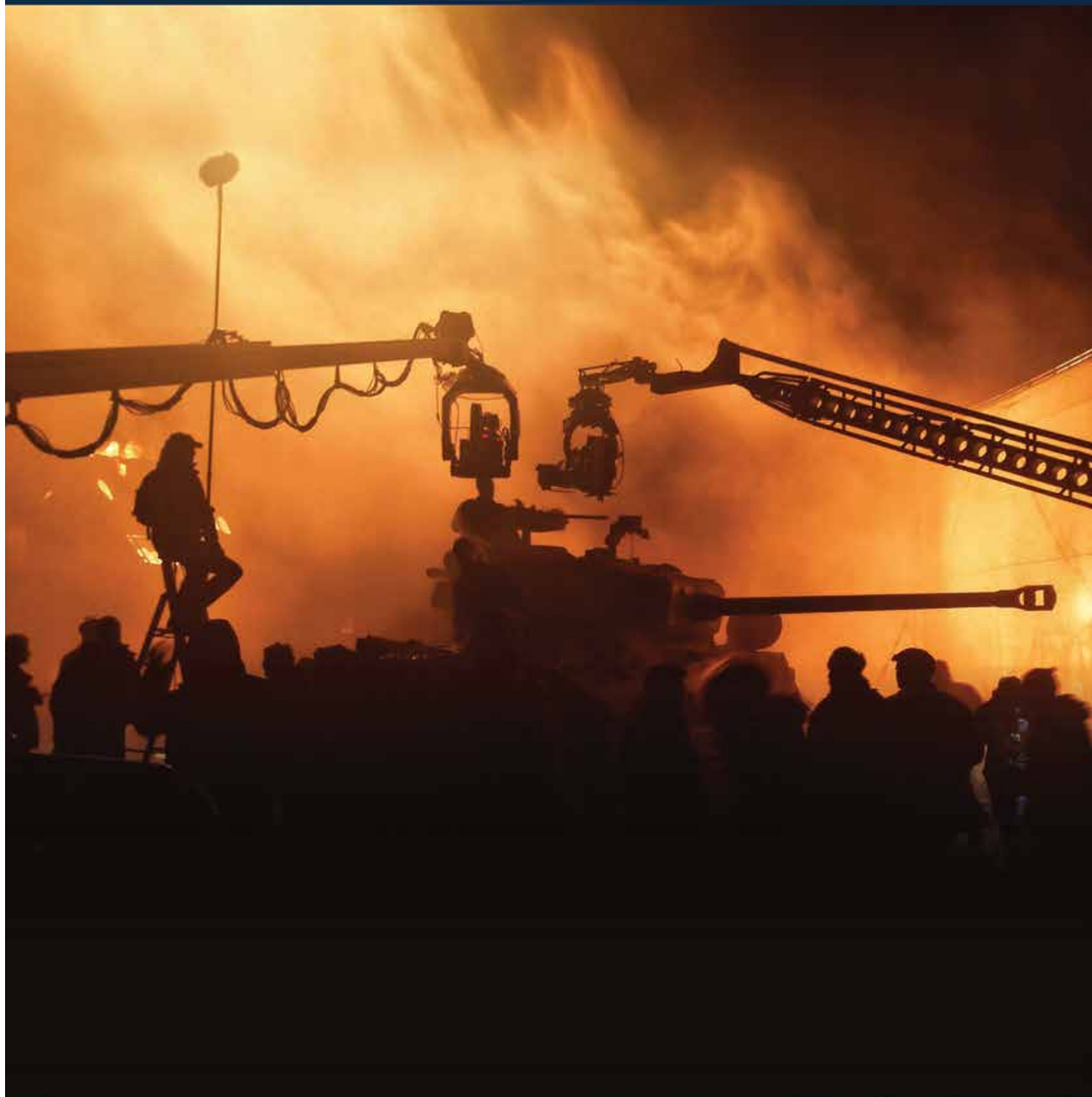

695 QUARTERLY

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Cover: *Fury*. (Photo: Taylor Tulip-Close)

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From the Editors

Ingenuity and Enthusiasm

The accomplishments of the Local 695 members featured in this issue span fifty years, from Jimmie Songer's work perfecting video assist in the late '60s to Lisa Piñero's efforts to make World War II communications gear functional for *Fury*. There's a remarkable consistency in these efforts. In every case, success was the result of a focused determination and attention to detail. Jimmie Songer introduced new materials to viewfinder optics to gain sufficient light for his design and worked with electronic circuits so miniaturized that he needed a microscope just to follow the traces. Lisa Piñero brought in a consultant to assist in rebuilding and repurposing antique tank communications.

If there is any new development, it is the growing complexity of the process. As Mark Agostino relates, accomplishing Clint Eastwood's goal of live-recording the *Jersey Boys* musicians required deploying microphones in several adjacent rooms to capture audio simultaneously from both on-screen and off-screen musicians.

We applaud the commitment and ingenuity of all these 695 engineers practicing the craft at the highest levels of skill and professionalism.

Fraternally yours,
Richard Lightstone, Eric Pierce and David Waelder

Our Contributors

Mark Agostino

Mark Agostino began his career as a studio recording engineer. After four years missing the light of day, he was in dire need of a change of scenery (literally). Along came an opportunity to join Local 695. He snatched it up and has been specializing in multi-track music playback and live recording for the last 18 years.

Richard Lightstone, CAS

Richard began his career in Canada and it continues in Los Angeles. He served as President of the Cinema Audio Society and is also a co-editor of the *695 Quarterly*.

Lisa Piñero, CAS

Lisa Piñero, CAS, a production sound mixer for more than 25 years, has credits including documentaries, television and feature films. Her recent work includes projects with directors Oren Moverman, John Hillcoat, Nicole Holofcener and the three most recent films of David Ayer including the current release *Fury*.

David Waelder

David has recorded sound for films for several decades and has been an editor of the *695 Quarterly* since its inception five years ago.

Photos courtesy of the respective contributors

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

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From the Interim Business Agent

AB 1839

On September 18, 2014, Gov. Jerry Brown and members of the California film community gathered in front of the TCL Chinese Theatre to sign Assembly Bill 1839 into law. As a result, IATSE Local 695 members can now expect substantially more job opportunities at home, here in Hollywood. State Assembly member and co-author of the bill, Mike Gatto, announced: "Today, with the stroke of a pen, California is doing something significant to bring good jobs back to our state."

The state of California will now support the film and television industry to the tune of $1.6 billion in tax incentives over the next five years.

This was not something that just happened overnight; this victory was years in the making and put the IATSE on the map in Sacramento. There were countless people working behind the scenes, meeting one-on-one with key players and walking the halls of the State House. We, the members of the IATSE, now have standing in Sacramento.

I have been fortunate to speak with many of our elected leaders up and down the state and the message you sent with your letters and participation in the rallies in Burbank, San Francisco and Sacramento was impressive. It went a long way to show that the IATSE will not be pushed aside when our jobs are threatened.

On Sunday, October 26, we held a celebratory rally at Calamigos Ranch in Malibu, where many political leaders came to thank you for standing up and bringing this bill home. "Production and production jobs aren't running away from California, they're being lured away … but that stops today," proclaimed Los Angeles Mayor Eric Garcetti.

There are way too many people to thank for the countless hours of work fighting for this much-needed tax incentive. I'm proud to report to you that Local 695, its leadership and members were right there on the front line leading the charge.

So now I say, "Let's get back to work."

Scott Bernard
Interim Business Agent

Scott Bernard introducing Los Angeles County Federation of Labor leader Maria Elena Durazo at the victory rally at Calamigos Ranch

"WHAT A FANTASTIC, FUN RIDE- FROM START TO FINISH! IT'S BETTER THAN THE FIRST FILM – AND I LOVED THAT TERRIFIC MOVIE! IT'LL MAKE YOU WISH WE ALL COULD RIDE DRAGONS – FOR REAL! THE BEST ANIMATED FILM RELEASED THIS YEAR!"

BILL ZWECKER
CHICAGO SUN-TIMES

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Supervising Sound Designer | RANDY THOM
Re-Recording Mixers | RANDY THOM
SHAWN MURPHY | BRANDON PROCTOR

BEST SOUND EDITING
Supervising Sound Editors | RANDY THOM | MICHAEL SILVERS

DREAMWORKS
HOW TO TRAIN YOUR DRAGON 2

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DREAMWORKS

AES Convention

The Audio Engineering Society Convention (AES), held in Los Angeles for the first time in 12 years, drew record attendance. The event attracted more than 15,000 attendees to seminars, workshops and exhibits from 300-plus sponsors.

The Convention had workshops featuring Production Sound recording with Local 695 members fully involved in the presentations. **Jim Tanenbaum** and **Mark Ulano** discussed the requirements for making quality recordings in the "Superstars of Production Sound Recording" seminar. Subsequently, Sound Mixer **Jay Patterson** and Boom Operator **Peggy Names** came in for a Master Class on techniques and equipment used by the Production Sound Crew.

The AES will return to Los Angeles for a first-ever Conference on Audio in Hollywood on March 6-8, 2015.

IATSE Officer Institute

International President Matthew Loeb addressing the attendees.

In October, IA officers from dozens of locals across the country attended the week-long IATSE Officer Institute at Local 80 in Burbank. Representing Local 695, Interim Business Representative **Scott Bernard** and Education Director **Laurence Abrams** attended presentations on Labor History, Labor Law, Organizing, Collective Bargaining, Union Finances, Contract Administration, Grievance Handling and more. International President **Matthew Loeb** and **Michael Miller**, International Vice President and Department Director of Motion Picture & TV Production, were on hand as well as the trainers and labor experts who helped design this unique program. President Loeb announced plans to continue conducting the IATSE Officer Institute over the next few years with the goal of advancing the effectiveness as well as the activism of the entire network of IA locals and their memberships across the US and Canada.

In Memoriam

HARRY C. HOWARD
Video Engineer
July 21, 1940 – August 6, 2014

The rally in South Weddington Park with the NBC/ Universal tower in the background

Local 695 members Jay Patterson and Brian Cahill picketing at the offices of NBC and Bravo

Shahs of Sunset

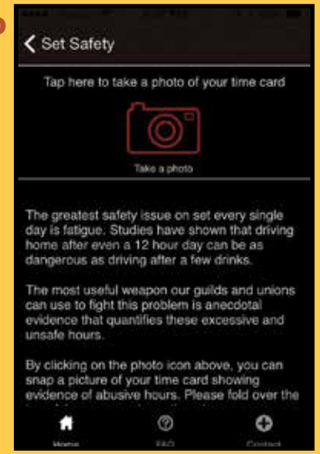
When 16 editors and assistant editors at *Shahs of Sunset* walked off the job at Berne, LLC, a subsidiary of Ryan Seacrest Productions, they thought that it would be a simple matter to settle with the show. They didn't have a serious grievance and were primarily seeking health benefits and contributions to a retirement plan. They walked out on September 10, only a month away from the announced season premiere on October 13. In a statement to *Deadline Hollywood*, Ryan Seacrest Productions indicated a willingness to meet but never responded to any overtures from union organizers. Bravo, the network carrying the show, dismissed the striking editors. Normally, an employer is enjoined from dismissing unionizing workers but Bravo asserted that the editors had never been their employees.

With no one from production willing to negotiate, things settled down to a long slog. The striking and dismissed editors maintained a picket line at the Bravo offices at the NBC/Universal building on Wilshire Boulevard for four weeks. They also displayed an informational banner and large, inflatable rat at the New York headquarters at 30 Rockefeller Plaza, alerted Bravo advertisers of the job action and held a rally in South Weddington Park in the shadow of the Universal and NBC black tower.

After four weeks of resistance, Ryan Seacrest Productions entered negotiations with the IATSE. They came to an agreement and, on October 10, the *Shahs of Sunset* crew voted unanimously to ratify a contract covering production as well as post-production work.

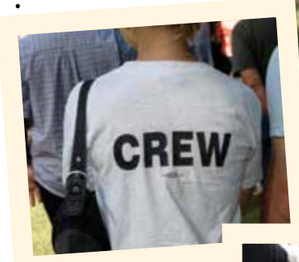
Safety App

A safety app to facilitate set safety and reporting dangerous conditions is now available as a free download for both Android and Apple phones. The Pledge to Sarah organization developed the application and detailed information is available from pledgetosarah.org



The app features a list of safety hotlines, a complete list of CSATF safety bulletins and the text of the twenty-one most relevant bulletins including working with firearms, animals, stunts, fog, process trailers and other commonly encountered situations. The app also has well thought out features to facilitate anonymous reporting. Each safety hotline number is accompanied by two "call" buttons, one just to dial the number and another to make the call with Caller ID blocked. There is also a function to take a picture of a time sheet and email the image to a Friends of Sarah Jones clearinghouse that will forward only the essential information to unions and protect the identity of the sender. Armed with the documentary evidence this function supplies, rather than just anecdotal accounts, representatives can more effectively address the issue in negotiations.

The Pledge to Sarah organization developed the application and detailed information is available from pledgetosarah.org



(Photo: Patrushkha Mierzwa)

66TH EMMY WINNERS

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

House of Cards "Chapter 14" Netflix
Lorenzo Millan, Nathan Nance, Scott R. Lewis
Production Sound Team: **Randy Pease**, **Chris Jones**, John Gooch, Brian Jordan, Steve Saada

OUTSTANDING SOUND MIXING FOR A MINISERIES OR A MOVIE

Treme "Sunset on Louisianne" HBO
Bruce Litecky CAS, Andy Kris, Blake Leyh
Production Sound Team: Matt Armstron, Robert Bigelow, Eric Heigel, Kyle Lamy, Jim Rongakis

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

Nurse Jackie
"The Lady With the Lamp" Showtime
Jan McLaughlin CAS, Peter Waggoner
Production Sound Team: Brendan O'Brien, Joe Savastano, Antonio Arroyo

OUTSTANDING SOUND MIXING FOR VARIETY SERIES OR SPECIAL

The 56th Annual Grammy Awards CBS
Tom Holmes, Eric Johnston, John Harris, **Eric Schilling, Mikael Stewart, Ron Reaves, Tom Pesa, Michael Parker, Pablo Munguia,** Josh Morton, **Bob La Masney**
Production Sound Team: **Michael Abbott, Steven Anderson, Damon Andres, Andres Arango, John Arenas, Bruce Arledge,** David Bellamy, William Bellamy, **Rick Bramlette, Robert Brogden, Paul Chapman, Steve Chavez,** Fred Coury, **Pete Dahlstrom,** Corey Dodd, **Kirk Donovan, Mike Faustino,** Max Feldman, Brian T. Flanzbaum, **Andrew Fletcher,** Grant Greene, **Kristian Harper, Hugh Healy,** Stacey Hempel, **Bill Kappelman,** Ray Lindsey, Mark Linett, Billy McKarge, Eddie McKarge, **Bob Milligan, Jeff Peterson,** Greg Price, **Craig Rovello, Peter San Filipo,** Joel Singer, James Spezialy, Ric Teller, **Phil Valdivia, J.P. Velasco, Barry Warrick,** Robert Wartinbee, **Joe Watson**

OUTSTANDING SOUND MIXING FOR NONFICTION PROGRAMMING

American Masters
"Jimi Hendrix: Hear My Train a Comin'" PBS
Eddie Kramer, Steve Crook

Names in **bold** are Local 695 members

Review of: Sound Devices 970

by Richard Lightstone, CAS

Evolution/Revolution: *How we got to now*

When I began mixing some forty-four years ago, we shot on film with one camera. A second camera only came out during big stunt work scenes. I mixed on a mono Nagra; recording to ¼ audiotape and the production track I delivered to editorial was THE only track of dialog.

Production changed in the '90s when two cameras were used for every setup. This usually meant simultaneous wide and close shots. Suddenly, we were using more wireless microphones and there was a need to have both mix and iso tracks of each wire in use.

There were several professional two-track audio tape-based recorders available then: the Nagra and Stellavox. DAT recorders from Fostex, Stellavox (the Stelladat) and HHB soon supplanted the analog machines and some enterprising Production Mixers embraced the technology of the music industry and started to use the newer eight-track recorders, either the Tascam DA-88 or the Alesis XT-8.

When Zaxcom, led by Glenn Sanders and Howard Stark, introduced the first portable four-channel hard-disc recorder in 1996, it revolutionized location recording. Sound Devices brought out their version of a nonlinear recorder in 2003 and we've rapidly come to the present where eight channels is the minimum. Some shows now expect to have individual tracks available for everyone in the cast and even eight tracks may not be enough.

I use a Yamaha 01V96 console (since 2004) and have always wanted to be able to record up to sixteen tracks if and when required. Previously I could achieve that only with a kluge of eight AES and eight analog outputs. But the new Sound Devices 970, an audio-only version of the PIX 260i, offers capabilities that greatly simplify high-track-count recording.

Features

The 970 is a half rack, 2U device capable of recording up to sixty-four tracks to multiple drives. There are two front-panel drive bays and two eSata drives accessible from the rear panel. The drives may be configured for simultaneous or sequential recording as needed.

970 front panel

Eight line-level inputs permit connecting devices directly but full use of high track capabilities comes with connection to a mixer that can supply Ethernet-based Dante or either optical, or coaxial MADI

Phrase list manager

SOUND REPORT INFO	
1. Project	V2.10
2. Producer	Ignatius J. Reilly
3. Director	Alan Smithee
4. Job	Release Candidate
5. Date	<System Date>
6. Location	Reedsburg, WI, USA
7. Sound Mixer	Mike Raphone
8. Phone	+1(608)524-0625
9. E-Mail	mike_raphone@sounddevices.c...
10. Client	Sound Devices, llc
11. Boom Op	Jane Doe
12. Prod.Co	Deming Productions

Sound report

970 back panel

connections. The 970 will also accept eight tracks of AES via a DB-25 connection.

Dual power inputs through standard 4-pin XLRs provide operational redundancy. In the event of a failure of both sources, proprietary PowerSafe™ circuitry provides ten seconds of reserve and an orderly shutdown.

Sound Devices continues to use the rock-steady Ambient Recording Lockit timecode technology offering sufficient accuracy and stability for use as a master clock.

A large five-inch screen provides visual metering up to sixty-four tracks and fast, intuitive menu control. Many of the same button actions on the SD 788T are duplicated here on the front face of the 970.

For example, pressing the STOP + FF buttons increments the Scene or Slate. Pressing STOP + RW buttons allows you to delete false start takes. A window asks you to confirm the action, YES or NO, before proceeding.

Similar dedicated keystrokes give access to the Metadata screen where scene number, takes, notes and other functions may be rapidly edited. Commonly used phrases may be selected and edited from a list manager.

By pressing AUDIO + FILES or pressing Ctrl + P on an attached USB keyboard will create a CSV file Sound Report on the current folder for all applicable drives.

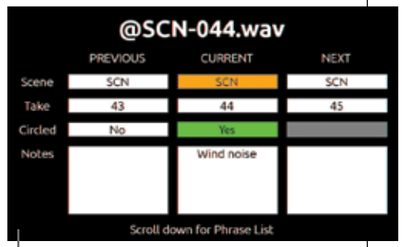
The real clincher to me was the ability to use the Audinate Dante network of up to sixty-four tracks!

Yes, far more than I might need, but I always believe in future proofing my investment.

Combined with a Dante card for the Yamaha, one Cat 5E cable gives me 16 x 16 I/O to the 970. I simultaneously record to both an SSD and CF card, which are mounted via the Sound Devices PIX-CADDY and PIX-CADDY CF respectively.

The 970 also features an embedded Web-based control panel, PIXNET, for machine transport and setup control over Ethernet-based networks, as well as file transfer over the data network with SMB.

File metadata editing of scene name, take name, notes, track names and reel folders can be done across all drives during, before and after recording.



Metadata screen

The 970 may also be controlled through an RS-422 port and GPIO (General Purpose Input/Output).

Use in the Field

I picked up my 970 in early April and, after installing it on my newly reconfigured cart, I had about two weeks of "sea trials" before beginning production on a television series in May. Having never used a PIX or Audinate Dante, I wanted to be comfortable with it well before I was on any set. This included familiarizing myself with the operation of the 970 and the routing of the Dante network.

The Dante Controller on a PC or Mac is the master for all the I/O to all the devices on the network.

The series shot for five months and the 970 worked flawlessly every day. I powered it on about a half an hour before call and shut it down at wrap. That added up to at least twelve hours a day of constant use.

My I/O setup was built around the Dante network. As I mentioned previously, I added the Dante MY16-AUD card to my Yamaha 01V.

I run the Dante Controller from a Mac Mini on my cart. The Controller routes the I/O from the Yamaha to the 970 (and any other Dante device on the network). PIXNET also runs from the Mac.

Each day I would create a new "Reel #" or folder. The 970 offers "Custom" (default) or "Daily." Choosing "Custom" allows the Reel to be edited with any alphanumeric value. "Daily" will automatically generate a value derived from the System Date. i.e., YYMMDD.

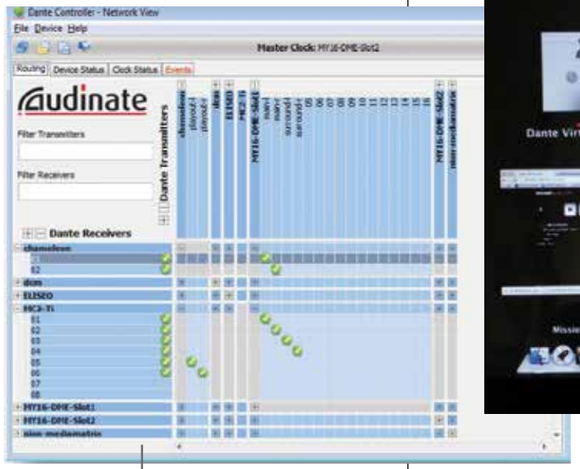
Aside from our most important responsibility of mixing great tracks, we have the added duties of accurate metadata and arming and disarming of tracks. These operations are available both directly on the 970 and via PIXNET.

PIXNET

Pressing the AUDIO button on the PIX and rotating the Control Knob allows me to scroll to a track. Pushing the Knob highlights my selection, for example, arm a track. Scrolling further I can edit the Track Name. These features are duplicated by an attached keyboard as well as on PIXNET.

PIX-Caddy

I use a wireless Logitech keyboard and have the Logitech USB key inserted in the keyboard slot.



Dante routing screen

Mac screen showing the Dante Controller, Virtual Sound card, PIXNET & Boom Recorder

Richard Lightstone's sound cart

Conclusion

The most important part of any new HD recorder is how it sounds; the answer to that is the 970 sounds great, like all of the Sound Devices recorders. Sound Devices is known for rigorously testing their products before introducing them for sale in the marketplace. They are also fast to respond and fix any software bugs reported by users and owners. This is a personal testimonial; they have my back.

The 970 is definitely a fixed installation recorder, not a bag-type machine, as it has no on-board mixing capabilities. However, its small footprint will easily fit any cart configuration.

With over five months of daily use, I can safely say I really enjoy the 970. It is reliable, well designed with an easily accessible menu and does the job it was designed for.

Armed channels & wireless keyboard

Images of Richard Lightstone and his cart are courtesy of Richard Lightstone. Images of the 970 recorder are courtesy of Sound Devices.

Remembering Walt Martin

Walt Martin at the Iceberg Lagoon, in Iceland while shooting *Flags of Our Fathers*. (Photo: Jonathan Fuh)

In his long and varied career as a Production Sound Mixer, Walt was proudest of the fifteen pictures he did with Clint Eastwood starting with *True Crime* in 1999. He was Oscar-nominated for *Flags of Our Fathers* and recorded sound for Best Picture winner *Million Dollar Baby* and Best Picture nominees *Letters From Iwo Jima* and *Mystic River*. He was a longtime member of the Eastwood team and is affectionately remembered.

Clint Eastwood (in a phone interview): We completed American Sniper, *everybody went home, and then we got the news after a couple weeks that Walt had passed away. It's like losing a member of the family. Walt was a terrific guy and the easiest person I've ever worked with in my life. He brought no antagonism or clumsiness to the work; he was just always ready.*

He was an interesting guy to shoot with because, you know, most crew members, you see 'em periodically, but you could go three or four days and not ever see Walt. He had a way of finding a spot for himself where he's out of everybody's way. I sometimes shoot quietly [especially] when working with children or active people who aren't experienced. I would just wave and the boom operator would whisper, "They're shooting." I never heard him and it worked really great. Of all the people I've ever worked with, he was the most unobtrusive, still getting the job done and in fine fashion.

I'll miss him on the next project. It'll be like a missing link, missing part of the chain, because he was that good and that reliable.

Recent members of his team contribute memories:

GAIL CARROLL-COE

I had the good fortune of doing eight movies for Clint Eastwood with Walt Martin and a few other projects in addition. He began his career by shooting documentaries with his father who was a missionary. I think everyone knows of his accomplishments, but thought I would share some personal things. We traveled quite a bit together for some of the projects. In each location, he made sure he experienced every location to its fullest. The last project took us to Morocco, albeit being difficult, he made the most of it. Walt loved traveling with his wife Elena and his daughter Claudia. He took along his mother-in-law and sister-in-law as well on some trips and made sure everyone had a great time. He loved gardening and sharing his fruit from his trees with others. He loved the Beatles and every Sunday spent some time listening to a program that played their music. Lastly, he loved recording sound.

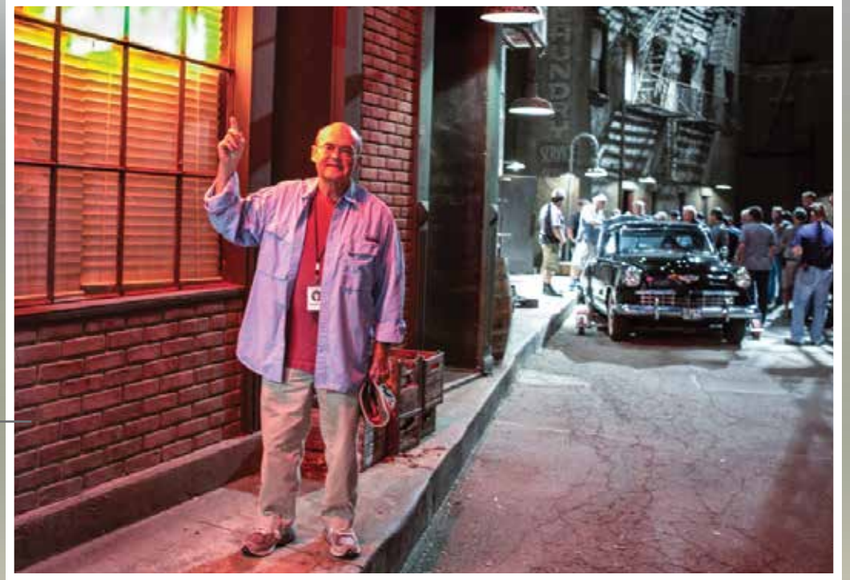
JONATHAN FUH

Working with Walt was a highlight in my career. He was quiet, unassuming and professional. He loved his family and was loyal to his friends. His wife Elena likes elephants. I remember, on his day off, while on locations, he was looking for elephant motif souvenirs to bring back for her. He will truly be missed by those of us who were fortunate to have worked with him

RANDY JOHNSON

I came to know Walt late in both his career and mine. I was familiar with his large body of work and awards so, when he called to ask me about filling out his sound team on *Jersey Boys* along with Gail Carroll-Coe, I jumped at the chance to work with him and, of course, with the man, the icon, Clint Eastwood. Working with Walt was a pleasure every day. He had a big heart and was a gentle soul. His sharp sense of humor made the days go by quickly. He was never afraid to laugh at himself and I think the crews sensed that and held him in high regard as a bit of a father figure.

His work on *Jersey Boys* was multi-layered and thorough. With the help of Mark Agostino and Tim Boot, the task of capturing the live performances went very smoothly. As difficult and challenging as *Jersey Boys* was, it was still a local shoot and a stage show. Mr. Eastwood's next project, *American Sniper*, demanded much more physical effort from Walt, but he embraced the adventure wholeheartedly. He had to climb on vehicles tethered to the top of Humvee's but I think he was proud of his ability to do whatever was needed to capture the performances. Very sadly, it was his last adventure but one he was very proud of. His talent and humility are his great legacy. I will miss Mr. Walter B. Martin.



Walt Martin on the set of *Jersey Boys*. (Photo: Keith Bernstein)

Recording Production Sound for FURY

by Lisa Piñero, CAS

Boom Operator Ben Greaves on *Fury*'s main gun near the "A" camera. The film was shot in 35mm anamorphic film. (Photo: Giles Keyte, courtesy of Columbia Pictures)

Mixer Lisa Piñero, CAS, Ben Greaves and Second Unit Sound Mixer Tarn Willers enjoy a tea break. (Photo: Giles Keyte, courtesy of Columbia Pictures)

In June 2013, I was called to do a series of reshoots for *Sabotage*, the David Ayer–directed film that I'd worked on the previous fall. While shooting, I learned that Dave's next film, *Fury*, was gearing up to shoot in England. I wanted in.

I love working with Dave; his unconventional shooting style and focused vision on *End of Watch* and *Sabotage*, the two films on which I'd previously collaborated with him, forced us to find creative ways to capture the dialog along with real-time sync tracks of actual environmental sounds.

But *Fury* was going to be different. This was a passion project for Dave; he had written a story that had attracted a fantastic cast, including Brad Pitt, Shia LaBeouf, Logan Lerman, Jon Bernthal, Michael Peña, Jason Isaacs and Scott Eastwood. It was set in the battlefields of World War II, in Germany near the end of the war, and would be shot on 35mm anamorphic film by Roman Vasyanov, the Director of Photography I had enjoyed working with on *End of Watch*. Dody Dorn was onboard to edit and Andrew Menzies, whose work I had admired on other films, would be the Production Designer.

For this film, Dave planned a much more conventional visual style. Although the idea of a conventional visual style may imply a comfort zone of a familiar process and "old school" sound recording techniques, this is never the case on a David Ayer project. Dave challenges everyone involved in his films to push the limits of their craft. He strives for a sense of reality in his work that forces us to re-think our assumptions about the filmmaking process.

Once I knew I was headed to England, priority one became finding a crew that could handle the job and that was able to work in the UK. I immediately thought of Ben Greaves, who I had enjoyed working with earlier in the year and who I knew had the demeanor and skills to get the job done properly. Ben currently works and resides in Los Angeles, but he has a UK passport, a flat in London and the contacts to pull together a good local crew for the show. Ben came aboard as my Boom Operator and we brought on local London Production Sound Mixer Tarn Willers to handle the sound utility position and act as our Second Unit Sound Mixer. We also brought on Tim Surrey to work as our fourth, along with Sound Utility Frank Barlow, who came in frequently as our top dailies hire.

At the end of August 2013, I set off for a month of prep at Pinewood Studios. Packed in my bags were manuals and notebooks filled with photos and diagrams of actual World War II tanks and tank crew field gear, including communications systems, along with actual pieces of US surplus Sherman tank communications gear, including plug-in BC-606 comm boxes, throat microphones and helmet headphone wiring. Forty-five cases of sound gear were shipped and on the way to Pinewood Studios, and a new sound cart, designed with our shooting environment in mind, was being built for me by Malcolm Davies in Manchester, UK.

Lisa Piñero testing actor communications on interior *Fury* set. (Photo: Ben Greaves)

Lisa Piñero inside the cramped quarters of the *Fury* interior set.

Boom Operator Ben Greaves in the daily muck. (Photo: Lisa Piñero)

Ben Greaves and Tarn Willers discuss the shot. (Photo: Giles Keyte, courtesy of Columbia Pictures)

Early in prep it was determined that we would have essentially three shooting scenarios involving tanks:

1) Exterior Tank Action, in which tank commanders would perform scenes with each other and need to speak/hear one another on one channel (tank-to-tank), while tank drivers (specialist/stunt drivers) would have to be on their own channel with our tank coordinator in order to hear commands and cues. In these situations, we would record our cast only through production microphones. We would wire all cast members and use either helmet or body-mounted microphones (DPA-4061 or DPA-4071).

2) Exterior Process Vehicle, in which our cast was riding in or on a custom-designed tracking "process vehicle." This vehicle was essentially a highly detailed, life-size fiberglass model of our Sherman tank Fury, attached to the base and suspension of a heavy-duty military tracking vehicle. It featured a large steel platform apron, suitable for mounting up to two Chapman hydrascope cranes, lots of camera, lighting, and grip gear, and necessary crew. In this case, as above, we would wire all cast, and the tank coordinator would be in direct communication with the process vehicle's driver seated at the front of the vehicle.

3) Interior Tank, in which our cast played out scenes inside a gimbal-mounted interior tank set. Here, we would wire all the cast and either boom or plant microphones for production dialog. We would also find a way to record the cast through the microphones of a modified vintage tank communications system.

In our first discussions regarding this project, David Ayer indicated to me that, in addition to our production microphones, he wanted to try to record dialog tracks through the vintage microphones used in the original Sherman tank communications systems. Many World War II Sherman tank crews used a SCR-508 turret bustle-mounted radio/interphone system that allowed the five-person tank crew to communicate with each other (interphone) as well as allowed the tank commander to communicate via the FM radio set with other tank commanders and military personnel outside the tank. The tank crews had communications components, including their headphones and microphones, integrated into their military-issue apparel. The headphones were wired into the tanker's helmet and connected to a push-to-talk switchbox and a throat microphone that was then connected to a communications box at each man's station in the tank. The tank commander uses the same style helmet; however, his microphone is a push-to-talk handheld microphone. Dave asked me to look into options for recording our cast's battle scene dialog through these microphones, using either vintage radios in our tanks or through modifications that would leave the outward appearance of the vintage gear intact.

Before leaving Los Angeles, I had acquired several sets of T-30 throat mikes. T-30s are essentially two small carbon microphone elements encased in rubber that are attached to an elastic strap and worn snugly around the neck. The capsules should be positioned on either side of the Adam's apple. The microphone was designed to pick up sound vibrations through contact at the throat; this was more effective than relying on sound waves transmitted through the air in the extremely high noise environment of a tank's interior. I needed to hear what these microphones sounded like; however, sadly, the mikes produced a very low-level and noisy signal. After more research, I learned that, over time, the carbon powder in these old surplus microphones solidifies into a solid mass, which does not allow the carbon granules to vibrate as they should with sound pressure in order to change the electrical resistance between the elements' plates enough to significantly modulate the signal. These old microphones weren't going to work without some modification.

There were other complications with the surplus vintage gear as well. The connectors used in these systems were specific to military systems and in some cases very rare and difficult to locate. Also, some elements were considered expendable in the day and not field repairable, which made them difficult to modify. We investigated the possibilities of using the actual radio systems in the tanks, but were dissuaded by our period tank mechanics, who recounted stories illustrating the extremely unreliable performance of these old tube radios. We needed a clever, resourceful engineer who understood the filmmaking process and was interested in tackling this project. I called Production Mixer Chris Munro for ideas, and he immediately assured me that he had the man for the job: James McBride.

Jim is royalty in the sound recording world, yet he is such a humble man you would never know it by meeting him. He was a valued studio engineer and an important technical contributor at the legendary Olympic Studios in London during its heyday. Jim designed and built the facility's Studio One recording console. Many of the most important acts of the '60s and '70s, including the Beatles, the Rolling Stones, Pink Floyd and Led Zeppelin, recorded their most famous records through the consoles at Olympic. (http://www.soundonsound.com/sos/aug12/articles/keith-grant.htm)

Jim has become Chris Munro's go-to man for designing and building custom sound equipment for specific applications. One of Jim's recent projects was finding a way to build a radio mike transmitter directly into a space helmet for the film *Gravity*. (Editor: See *Gravity* and *Captain Phillips* by Chris Munro, CAS, *695 Quarterly*, Spring 2014)

"There will be mud" battalion headquarters, Day Two. (Photo: Lisa Piñero)

Jim came aboard *Fury*, and after numerous meetings with all departments involved, we had a plan for our interior set vintage microphone recording scenario. Jim would modify enough existing vintage elements from the cast costumes, props and set dressing to give us a signal path from the vintage microphones (T-30 throat mikes and T-17 handheld mike) used by the actors to the inputs on my recorders. He would also modify the interior tank plug-in comm boxes (BC-606) to accept a return signal from my cart, so that each cast member could hear the mix-minus feed I was sending them via wireless monitoring from my cart. The actors would only have to plug in to what was now modified and practical set dressing in order to be recorded through their vintage microphones and hear each other (minus themselves) through their vintage helmet headphones.

In order to make this happen, Jim and his assistant had to meticulously modify equipment that was manufactured to be expendable and certainly not accessible for modification. In the case of the T-30

throat mikes, Jim carefully sawed through the very small Bakelite connector material and internal contacts in order to replace the old and unusable cable. Then, he glued it all back together so it was impossible to see that they were different from the unmodified pieces. He used a similar surgical technique on the flexible rubber piece that contains the carbon throat elements and replaced those with new elements that, while not high fidelity, replicated the sound of the originals when they were new. He sourced and found all matter of parts, including new cable for our cast PTT switch boxes that looked exactly like the original; a new SM-58-like capsule to fit inside the T-17 microphone that our tank commander would use; and small headphone speakers that could be glued to the sawed-off back of the visible part of our vintage headphones, so that they would look original but work as practical for our cast. The list goes on and on. I asked him for miracles, and Jim delivered them time after time.

Jim also worked on the exterior tank communication with the wireless company hired by the production company. Wireless Works had been hired to work out a duplex radio system for all the exterior tank operations. They were responsible for three huge areas: the communications between the tank coordinator and the tank drivers, the communications between our cast of tank commanders during exterior maneuvers, and all RF coordination on our sets. Jim worked with the Wireless Works onsite technician to help them integrate their duplex equipment into modified vintage equipment that the cast was using. Jim's ingenuity and tireless work made it possible to incorporate vintage communication equipment into the production process on this show.

I should also mention the invaluable assist provided to us by Rob Lihani, who also happened to be the EPK Producer hired by Sony Pictures to document the making of *Fury*. Rob is ex-military and an expert in World War II militaria. He utilized his many contacts in the world of military surplus dealers and collectors in order to help us acquire authentic pieces of unused military surplus parts and equipment when no one else could find them.

When it came to production dialog, we knew that we would be dependent on wireless microphones whenever the tanks or process vehicle was moving. The tanks are **LOUD** and cast members might be in any number of positions while the tank was moving, so it was important to test various wireless mike positions before we started shooting. Tarn Willers and I spent several days at the tank training grounds testing a variety of lavalier microphones and mike positions on subjects as we placed them in different positions on the running tanks and the tank process vehicle. **We tested a number of microphones in various positions, including several in the cast tanker helmets.**

Prepping for a take of the crossroads scene with Boom Operator Ben Greaves on a ladder and Camera Operator Des Whelan on the controls. (Photo: Taylor Tulip-Close)

The results:

1. **The tanks were *really loud*.**
2. **The tank process vehicle was *even louder* than the tanks, and dialog recorded on it would in all likelihood have to be replaced.**
3. **The DPA-4061 sounded best when used in the helmet flap position and the DPA-4071 sounded best when mounted to a chest position.**

I came onto the project fully understanding that tanks are loud and that a group of many tanks are louder still. The fact that the "process tank vehicle" was much louder than an actual tank was somewhat disheartening. I discussed this with Dave, and although he knew it was a challenge, he felt very strongly that a towed process vehicle would not move like a tank and was even more problematic than having to ADR some dialog scenes shot on the current tracking process vehicle.

Given our challenge, we started to look for the best alternative solution that would give us the best results.

Opposite page: The cart was built by Malcolm Davies in the UK. It was then strapped onto the back platform of our 4x4 Chevy Cheyenne insert vehicle known as "The American Car." (Photo: Lisa Piñero)

Our costume technician, Mark Wyndham, worked with Ben to modify the hero cast helmets for permanent placement of a DPA-4061 in each. The microphone was fitted into the helmet's leather lining and exposed through a hole that was punched through for the purpose. Ben had our textile specialists dye Rycote Overcovers to match the helmets, and in the end, it was difficult to see where the mike was located, unless you were looking for it. Richmond Film Services modified these microphones with screw-on extension cables, so that the helmets could be removed easily without de-rigging the microphone cable and transmitter from the actor. Alternate mike placements were worked out on all our regular cast members' costumes.

Meanwhile, Tarn and I worked on fitting out the cart that Malcolm Davies built for me. The cart was based on a frame made of small diameter speed rail, with shelving and accessories designed and manufactured by Malcolm in his shop. Malcolm builds many carts of this style for the BBC and other production mixers in the UK and Europe. It was Ben Greaves who urged me to investigate this style of cart based on his experiences shooting in the wet and mud of the English countryside, where weight and unwieldiness cost valuable time. The cart was fitted with my gear, including a Sonosax SX-ST, Deva 16 recorder, a Denecke GR-2 Master Clock, two Lectrosonics WBL Venue Racks with a total of 12 VRT modules, a Marshall dual HD monitor rack and a Sennheiser EW-300 stereo transmitter, all powered by a Remote Audio Meon LiFE. My follow/support cart is a Backstage Equipment cart fitted out with a top shelf and an SKB case filled with foamed out rack drawers that hold microphones, transmitters and other sensitive pieces of gear. Our sound trailer was provided by English film production transportation provider Translux, and Ben worked with them to fit it out properly for our sound equipment. It was stocked with expendables, snacks, and, most importantly, a teakettle—that essential piece of equipment in British culture. For transporting our gear at location, the production company built us a small covered trailer with a ramp for our follow cart and gear along with a Gator to pull it with.

As shooting began, we received huge support from our 1st AD, Toby Hefferman, regarding a standalone mobile shooting platform for sound and video. We were given a 4x4 insert car vehicle with a driver. A "room" was built on the rear platform of the truck using a speed rail frame covered with a fitted weatherproof cover. An antenna rack was attached up high over the rear rollup cloth door and a Honda generator was rigged to the front of the truck. Voila! We were a powered off-road sound & video follow vehicle, with a wall of director's monitors hung along one side. This setup allowed us to track with moving tanks over any surface and to be instantly ready to record as soon as our truck landed for static shots. The "sparks" (that's British for "electricians") wired a box next to our onboard generator, giving us the ability to kill it and receive quiet power from their blimped generator when we weren't tracking with tanks. For shots when the tanks weren't moving, Ben had our guys run cable out for boom and ambient microphone positions. There was a lot of shouting and gunfire, and good ol' copper gave us the best signal-to-noise ratio along with more dynamic range than that available using radio mike transmitters. I developed a huge amount of respect for our crew as they unflinchingly ran hundreds of feet of microphone cable through deep, flinty, clay mud day after long, wet and cold day.

But we still had to solve the challenge of the extremely high noise environment of the working tanks. In the end, after a number of false starts at other solutions, we hired a truck designed for location dailies screening. We had construction soundproof it further and Dody Dorn, our Editor, found ADR Mixer Jon Olive, who would bring a portable ADR setup and would do all the prepping required for the necessary ADR sessions. Once the sessions were prepped, our ADs would schedule cast members into our ADR unit for Jon Olive to record. One of our Boom Operators was always on hand to mic the ADR sessions. We used exactly the microphones and mike placement we used in the shot; we added a boom microphone and encouraged our cast members to take the positions they were in during their on camera performances. Using this method, we were able to get clean dialog for most of those scenes aboard the tracking process vehicle.

It was also extremely important to Dave for us to document the sounds of the many extremely rare, vintage World War II vehicles that we would be using in the production. The British Tank Museum's German Tiger I tank was a particularly important subject. The last surviving operational Tiger I, we had this tank at our base camp for only a few days and its use was severely restricted to a certain amount of running time, all of which David Ayer wanted to use on camera. We needed to bring in someone who was familiar with the workings of vintage military vehicles and was skilled in sound effects recording. That man was Eilam Hoffman, who has traveled the world seeking out and recording effects. He has an impressive reel of multi-track sound effects recordings that includes many of the rarest military vehicles in the world. Eilam and his assistant scheduled several sessions at our Bovingdon Field base camp and the British Tank Museum in Dorset, and they were on set to record the Tiger tank on the day we shot it, so he could get Dave the sound of the tank's tracks as they ground through the actual muddy field surface we were shooting on. His recordings of this Tiger are the only known multi-track recordings of a working original equipment Tiger tank. Eilam was a pleasure to work with, and yet another one of the dedicated film sound professionals I had the honor of working with in the UK.

Fury was an amazing experience and adventure. I am incredibly fortunate to have had the opportunity to meet and work with such a talented group of filmmakers on such a remarkable project.

Jersey Boys MUSIC

by Mark Agostino

When Production Sound Mixer Walt Martin called me to do playback on *Jersey Boys*, he and I assumed it was going to be just that, playback. Why would we think otherwise? This was how it had been done for decades. Well, we didn't know it yet, but we were totally wrong.

There were weeks of emails and phone calls with the producers and Walt, and rumor after rumor about how we were going to shoot the musical scenes of the film. Finally, we had an answer. Clint Eastwood wanted to record everything live on set—all of the instruments and all of the vocals. He didn't want to do pre-records. He wanted to get on set and actually shoot the guys performing in the moment. It sounded challenging. With my background in studio and live recording, I welcomed the challenge. Well, this challenge was going to be monstrous. It would be the most exciting and technically complex production work of my career.

It would have been less complicated if the actors sang and played their own instruments. If that were the case, we would simply set up some microphones for the vocals and drum kit, plug in a few direct boxes for the guitars and keyboard, put together a monitor mix so everyone could hear each other and start recording some takes. Unfortunately, the actors were only singers, not musicians, and one of them was neither. This was getting more complex. We were going to need off-camera musicians to play the instruments, bass, guitar, keyboard and drums, that the actors couldn't play themselves. Most of the time we had an on-camera drummer and this added an additional challenge since we needed to mic the entire kit and none of the microphones could be visible. Let's just say, it was rarely the same thing twice. Many times we were informed which musicians were being used the-morning-of. Fun!

After a few meetings with the Producers, Walt and the 1st AD, David M. Bernstein, determined that we were going to need three things:

First, in order to give Post-Production the most flexibility, we needed to individually rig microphones for all of the instruments and vocals and record them to discreet tracks.

Second, after the performances were shot from the front, and, to allow the actors to save their voices, we needed the ability to quickly play

Twenty-piece big band performance of "Can't Take My Eyes Off You" (Photo: Keith Bernstein, courtesy of Warner Bros.)

back a good sounding mix of any of the previously recorded takes once the cameras had turned around to shoot the audience. The faster this could happen, the better. I had heard stories about the efficiency and speed of Clint's shoots, and was told by the producers and 1st AD that he moved fast. They weren't kidding!

Third, since we were going to have off-camera performers and on-camera performers, everybody needed to be able to hear themselves and each other. We would need a headphone mix for the off-camera performers and a separate foldback monitor mix for the on-camera performers.

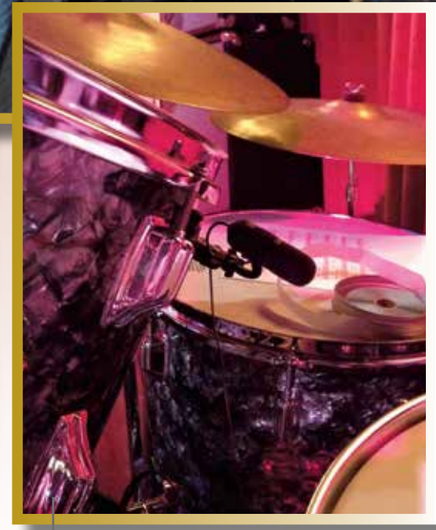
One of the major obstacles doing a live recording is controlling the amount of unavoidable leakage from the foldback monitors into the stage microphones. This would have to be minimized as much as possible. I made sure the producers were totally aware of this from the start. They completely understood and were prepared to replace things in Post if need be.

With all of this in mind, I devised a plan that basically (and luckily) held true to form throughout the shoot.

We were going to need two multitrack recording systems on set at all times. The first would be specifically used for recording the bands. The second (which I was going to operate) would record, on up to no more than eight tracks, submixes of the band from the first system and, at the same time, all of the vocal microphones. This would allow me, with a more consolidated session, to switch from recording mode

Performance of "Can't Take My Eyes Off You" at the Dorothy Chandler Pavilion in downtown L.A. (Photo by Keith Bernstein, courtesy of Warner Bros.)

Cristina Meyer adjusting the off-camera drum isolation onstage at Warner Ranch. (Photo: Tim Boot)



A DPA-4099 (with Rycote Windsock) attached to the rack tom for recording the on-camera snare drum

to playback mode, do a quick mix and be ready for playback as soon as the cameras had turned around to shoot the audience. On top of that, since I then had all of the musical elements at my disposal, I could route whatever was needed to either the headphone or on-stage monitoring systems.

I soon realized that this project was going to be a huge technical undertaking. It was going to require live recording, sound reinforcement, music mixing and music playback. I could do all of these things myself, but there was no way that I could do all of these things *by myself* at the same time.

For the first time in my 18-year career in music playback, I needed a crew. With the immediate and full support of the producers, I began my search.

I needed someone to run the first recording system and focus specifically on mic'ing and recording all the instruments, someone who had studio and live music recording experience, someone who would take control and make decisions without me having to hold their hand. (I was going to have a huge amount of work myself.) I needed someone who knew how to do it all low profile. Those people who wanted to bring in a recording studio in a semi-truck just wouldn't do; this person had to have a small footprint and be mobile. Looking for someone with the rare compliment of skills this job would require, two people came immediately to mind, but neither of them were in the industry anymore. I gave it a shot anyway. To my delight, one of them was all in. Tim Boot became my first crew member and he would turn out to be phenomenal, as I had expected.

Next, we needed someone to primarily assist Tim with mic'ing all of the instruments each and every day, making sure the off-camera musicians had all the elements they needed for their headphone mixes, handing out earwigs, and other less-than-glamorous tasks. We needed someone to hold it all together, someone to keep us out of trouble. Along came Cristina Meyer. She too was phenomenal and truly invaluable to both Tim and me throughout the shoot. In fact, on Day One, even though Tim and I had only been working with her for a few hours, she was doing such an incredible job that we convinced her to ditch a scheduled gig so she could stay with us for the entire *Jersey Boys* shoot. What a relief!

Now that we had a team, I was excited to get to it. It was definitely the largest sound/music department I had ever worked in. On the regular music days, the combined department consisted of six people (three sound personnel and three music personnel). However, we had eight sound/music people working together on the really complex music days

There were a few days I specifically recall from the shoot because of their complexity or it was a completely new experience or the amount of work we did in one day was greater than what I had done in an entire week on other shows. Let me tell you about a couple of them.

Day One: For some reason, I always remember the first day of a show. I remember this first day in particular because I got to meet Clint as we were setting up. (That was cool. He was cool.)

The location was a bar. There were four singers and a drummer on a very small stage. In an adjacent room, Tim and I had our systems set up. Tim used Boom Recorder on a Mac Mini and I used a Pro Tools HD Native Thunderbolt system on my Macbook Pro. Beside us were the guitar, bass and keyboard players. All of these off-camera instruments went through direct boxes. This gave us very clean recordings and created no extraneous sound on stage (above the foldback mix) to interfere with the acoustic recording.

To mic the drums, Tim used this wonderful set of miniature DPA microphones. He and Cristina developed a fantastic system of attaching the microphones to the rims (or sometimes the shells) of the drums and to the cymbal stands away from camera so they wouldn't be seen.

For off-camera monitoring, we set up a small mixer near the off-camera musicians so that they could adjust their own headphone mix. The outputs of their direct boxes were split. One output went to Tim's console to be recorded and the other output fed the headphone mixer. Since Tim was feeding me submixes of all of the instruments, I then routed whatever instruments were on stage (in this case the drums) to additional channels on the headphone mixer so the off-camera players could also hear the on-stage musicians.

The vocal microphones were another challenge. Since the time period of this film ranged from the '50s into the '90s, Props was going to have some pretty old microphones for several of the performances.

Recording/playback setup for the big band performance at the Dorothy Chandler Pavilion. Foreground: Tim Boot's Yamaha DM2000 console with 24 additional external microphone inputs recording to Boom Recorder and Pro Tools via Dante. (Photo: Tim Boot)

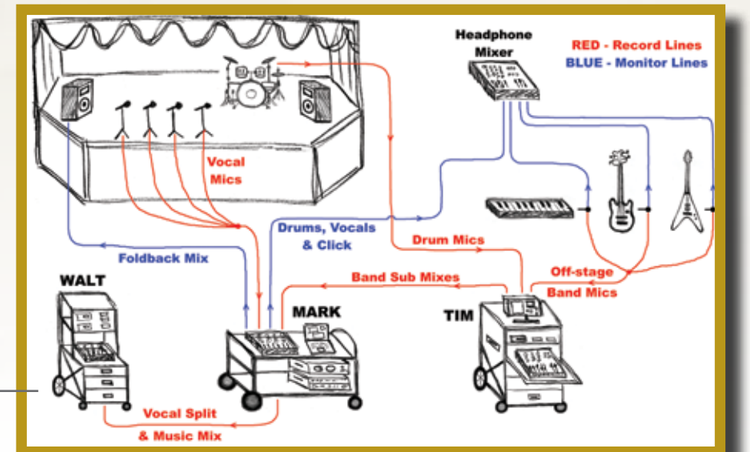
Typical recording/playback setup used on the majority of the shoot. Left to right: Tim Boot's cart, Mark Agostino's cart, Walt Martin's cart. (Photo: Tim Boot)

Walt and I went through as many microphones as we could before we started shooting. Luckily, many of them worked well and sounded pretty damn good for being so old. There were a few, however, that were completely unusable for recording purposes. In these cases, Gail Carroll-Coe and Randy Johnson of the Sound Department did a fabulous job of attaching lavalier microphones to the faces of the old microphones, with great results. Then, since we did playback when the cameras went on stage to shoot the audience, the lavaliers would not be needed anymore and we removed them.

All of the vocal microphones were split at my cart. One set of outputs went to Walt for recording and I recorded a second set. I also sent a mix of the vocal microphones to an additional channel on the off-camera headphone mixer so those guys could hear the vocalists.

Finally, I hid a few speakers on stage so the performers there could hear their vocals and, most importantly, the off-camera instruments. That tied it all together.

As you can imagine, we had a pretty extensive setup each day. I initially asked for three hours and wasn't sure even that would be enough. We weren't just setting up a simple multitrack live recording, we were setting up a dual system multitrack recording session linked between two different rooms with a headphone monitoring system in one and a completely independent foldback system in the other. We just made it on Day One. Of course, we became more and more proficient with our setup as the show progressed. I think we may have cut the setup time down to an hour by the middle of the shoot. We had the process dialed in.



Jersey Boys music setup sketch, drawing by Mark Agostino

The most important thing was that the actors could hear everything they needed to hear in order to give their best performances. We had to provide whatever they needed to feel comfortable on stage.

Eventually, our setup was complete, and we did our first shot of the show. It was the songs "Apple of My Eye" and "I Can't Give You Anything but Love." We were all pleased that it went well and I must say, I was certainly a little relieved.

As we went along, there were, of course, minor adjustments/additions to the initial system design. The musicians that were hired were absolute professionals, but the first few performances were recorded completely free-time. No click (metronome) was used. Clint made it clear in the beginning that there was to be no click track. We weren't even allowed to say the "c" word on set. The drummer was amazing. He truly kept as solid a tempo as anyone could. However, in order to help in the editing process, the produc-

Under mic'ing an on-camera crash cymbal with a DPA-4061 attached to the stand with Butyl. (Photo: Tim Boot)

On set at the Orpheum Theater in downtown Los Angeles. (Photo by Keith Bernstein, courtesy of Warner Bros.)

ers wanted to be sure that the tempo did not slip between takes. As a result, we began sending a click to an earwig for the drummer. It was also fed to the off-camera musicians to keep everyone in time. The only problem that arose here was the drummer's inability to hear the click through the tiny earwig. As anyone who's ever used earwigs knows, they are best for hearing cues when the rest of the environment is relatively quiet. With the noise created by the drummer actually playing and the foldback speakers putting out a decent amount of level, it was understandably rather difficult to hear the click through the little earwig. Many times we had to give him one for each ear. This wasn't a problem because there was hardly ever a close-up of the drummer.

As I've already said, it was rarely the same thing twice. Musicians were constantly being added to the ensemble the-morning-of just prior to shooting. Sometimes they were off-camera, other times they were to be on-camera. We learned to expect and be prepared for anything, and being prepared simply meant being prepared to change.

There were certainly many other notable days on the shoot. A few of them occurred during what the 1st AD called Hell Week. Ha! That was an understatement.

During this week there were going to be three absolutely crazy days. Two of those days, each at a different location, would have multiple performance areas, and one day would have a single performance at each of two different locations. Yup, one day we were going to have performances at two different locations. WHAT? It takes us close to three hours to put together our basic setup. How are we going to have time to break that down, pack up, move everything, load into the next location, and set it all back up again? Not only that, this particular day was to begin at one location with our basic four-piece band/four-vocalist setup for "My Boyfriend's Back" and "Walk Like a Man." Then, we had a company move to a location where we were going to shoot a twenty-piece big band performance of "Can't Take My Eyes Off You." Were we going to have another three hours to set up at the second location? I thought, we are going to need a bit more than three hours for THAT setup. We would later be informed that, in addition to the twenty-piece big band, there would be a separate three-piece off-camera band at the same time. YIKES!! That day was going to be huge.

Our saving grace was that we weren't shooting the day before. It was a holiday, and we were able to pre-rig the second location as much as possible. This meant setting up Tim's gigantic Yamaha DM 2000 console, plugging in and testing over 40 microphones (which then had to be disconnected because the set wasn't finished), and putting up some extra speakers and amps I luckily had that wouldn't be needed at the first location.

The plan was for Tim to immediately break down at the first location as soon as we entered playback mode and get any gear he needed over to the second location as fast as possible. I think we actually had Cristina transport a few of Tim's things over there during the first part of the day when they were no longer needed at the first location. Cristina would follow him and they would begin reconnecting the big band microphones, setting up the off-camera band microphones and headphone system, and preparing everything they could before the rest of the company arrived. I was left behind to do playback for our final shots of the audience.

As soon as we were finished at the first location, I packed up and moved my gear over to the next one as quickly as possible. Tim and Cristina were flying through the setup. I dove full on into connecting my system to Tim's, verifying signal flow from his console to mine, and making sure that the on-stage foldback system was happy. I happened to glance around and was amazed at how much gear we had at that location ... and on the show itself. I remember having to pull something out of my garage in the middle of the project and thinking to myself how empty it looked. By that time, I had brought in just about every piece of gear I owned, and we used every bit of it at one point or another.

We were moving right along. Tim was going to be recording 48 tracks, so I quickly filled up and surpassed my self-allotted eight-track band submix limit for playback. Happily, there was only one vocal microphone.

Once again, we had barely finished our setup when the 1st AD called for the first rehearsal. There was so much equipment, so many microphones, so many cable runs, electrons flowing and neurons firing. When I think about it sometimes, with all of the thousands of components and interconnections, I am amazed and relieved when it all just works.

We eventually started shooting and everything went as smoothly as on Day One. It was really exciting to be involved in such a grand production. I felt proud to have been chosen to be a part of it.

As it would happen though, I had been so busy that I didn't fully absorb the spectacular musical creation that had just taken place. Only after we had entirely finished the live recording segment of that location did it begin to sink in. It was time to go into playback mode and put together a nice mix for everyone to listen to while we did shots of the audience. I finally had a chance to breathe and something happened: I was now actually listening to the full mix of the performance. I wasn't zoning in and soloing individual microphones to make sure the signal was clean. I wasn't monitoring recording levels to be sure there weren't any overloads. I wasn't riding the vocal channel to be sure "Frankie's" vocal level was consistent for him in the foldback speakers. I was now listening to over 20 musicians playing as one with "Frankie Valli" singing his heart out, and it sounded incredible. I was only listening in mono through a four-inch monitor on my cart, but it truly sounded amazing. When we did the first playback on the big speakers, I literally got goose bumps. The dynamics of the band, the smoothness of "Frankie's" voice, the energy of all those involved was absolutely thrilling. All through my career there have been moments like this that have brought forth powerful and electrifying emotions I've never felt in any other line of work. To experience feelings like these on the job is my definition of success. As I had done so many times before, I thought to myself ... there is, without a doubt, nothing else I'd rather be doing.

That day was the most exhilarating and, at the same time, most technically challenging movie-making experience of my career. Tim and Cristina did an exceptional job and would continue to excel throughout the rest of the shoot. I couldn't have found a better team and can't thank them enough. It was an absolute pleasure working with Walt and his team. They were always willing to lend a hand if we needed it.

In the end, it really felt great to have accomplished all that we did. To my knowledge, what we had done had never been done before. I am so thankful to Walt Martin, the producers, and Clint Eastwood for allowing me to join them in such an extraordinary adventure. As I was packing up on the last day, the producer, Rob Lorenz, said to me, "Thanks, Mark. Thanks for making it work." That meant a lot.

Jimmie Songer and the Development of Video Assist

by David Waelder

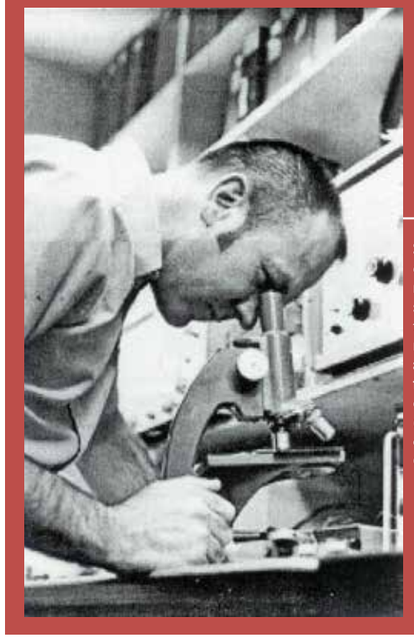
Video Village is a standard feature on the modern movie set. Producers, writers, clients and others can view the action clustered around a monitor far enough away from the set to stay out of trouble. Their segregation in the video ghetto allows camera people and others to go about their tasks without the distraction of people jockeying for position at the viewfinder. It also helps makeup and wardrobe personnel to see how their work appears on camera and it has become an essential tool for the director and continuity person. Even the sound crew benefits by having extension monitors to see the frame and position the boom microphone. All this is made possible by a video assist system perfected by Jimmie Songer, a Local 695 technician.

The advantages of using a video camera as an aid to directing movies were apparent from the very beginning. Several directors began to set up TV cameras adjacent to the film camera so they could see an approximate frame. This became a common practice particularly on commercials where the placement of the product is crucially important. To match the view and perspective, assistants would carefully adjust the aim and image size to closely approximate the view of the film camera.

Of course, that isn't really a video assist system. The image is useful for the simplest shots but not much help when the camera moves or the lens is adjusted. Every setup change or lens adjustment necessitates a recalibration of video camera position and exposure settings. To be a fully functional system, both the video and film cameras would have to view the scene through the same lens to avoid parallax errors and exposure sensitivities would have to track together. This presents a series of technical challenges.

It was a cowboy from East Texas with little formal education who took on the challenge and worked out all the engineering obstacles. Jimmie Songer grew up on a ranch in Burleston, south of Fort Worth, with a keen interest in how radio and television worked. He and his friend, Don Zuccaro, would purchase crystal radio kits, assemble them and string the antenna wire along his mother's clothesline.

As a teenager, he took a road trip that would set up the course of his life. He and his friends traveled north as far as Bloomington, Indiana, when funds began to run out. Looking for a job to replenish assets, he applied to the RCA plant on Rogers Street. Ordinarily, his lack of formal training would have been an impediment but RCA was just then



Some of the circuits were miniaturized to such a degree that it was necessary to use a microscope to follow the traces, circa 1971. (Photo: Courtesy of *American Cinematographer*)

experimenting with designs for color sets and there was no established technology to learn. By diagramming from memory the circuit design of a popular RCA model, he demonstrated familiarity with the major components and was hired on the spot to be a runner for the engineers developing the new color system.

His duties at RCA consisted largely of gathering components requested by the engineers and distributing them. Along the way, he asked questions about the function of each element and how it fit into the overall design. He stayed about a year, not long enough to see the model CTC4 they were developing go on sale. That didn't happen until a couple of years later in 1955. But, when he did move back to Texas, he had a pretty good understanding of how video, and color video in particular, worked.

Graduating from crystal radio sets, he and his friend, Don Zuccaro, made a mail-order purchase of plans for a black & white television. Components were not readily available at that time but Jimmie and Don were ingenious and purchased a war surplus radar set with A&B scopes and cannibalized it for parts. The task of hand-winding the tuning coil was simplified because Fort Worth had only one TV station so there was no need to tune anything other than Channel 5.

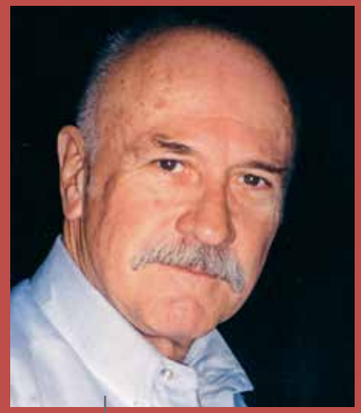
With skills honed from building his own set and working at the RCA plant in Indiana, Jimmie Songer quickly found work with appliance shops in the Fort Worth area that were beginning to sell television sets but had no one to set them up, connect antennas and service them when needed. This led to an offer, in 1953, to work setting up KMID, Channel 2, in the Midland Odessa area. After a few years with KMID, he worked awhile in the Odessa area and then returned to Fort Worth but he stayed only a year before setting out for Los Angeles in April 1963.

In Los Angeles, he worked at first for a TV repair shop in Burbank while he tinkered with his own experimental projects. Hearing that Dr. Richard Goldberg, the chief scientist at Technicolor, was looking for people with experience with color, he sought him out and secured a job calibrating the color printers. Dr. Goldberg was also developing a two-perforation pull-down camera for widescreen use. Songer became fascinated by the possibility of using that design at 48 fps to make alternate images, one atop the other, which might be used for 3D and built some experimental rigs to test the idea.

This work with Dr. Goldberg in the early '60s brought him to the attention of Gordon Sawyer at Samuel Goldwyn Studios. Sawyer wanted him to help with an ongoing project for Stan Freberg involving simultaneous video and film recording. Freberg was using side-by-side cameras to create video records of film commercials. The side-by-side positioning produced parallax errors but his commercials were mostly static. Generally, the results were good enough for timing and performance checks. But issues of accurately tracking motion would arise whenever the camera did move and Stan Freberg wanted a better system.

Under general supervision from Gordon Sawyer, the team first addressed the issue by adjusting the position of the video camera. They attached a small Panasonic camera to the mount for an Obie light. This put the video lens exactly in line with the film camera lens and only a couple of inches above it. Left-right parallax was effectively eliminated and the vertical alignment could be adjusted to match the film camera with only minimal keystone effect. By affixing a mirror just above the lens mount at a 45-degree angle and mounting the video camera vertically to shoot into the mirror, they reduced vertical parallax to almost nothing. Jimmie Songer addressed the keystone problem by devising a circuit that slightly adjusted the horizontal scan, applying an opposite keystone effect to neutralize the optical effect that was a consequence of slightly tilting the video camera to match the film camera image. Most of the time, this system worked well but there were still limitations. The video system needed to be recalibrated with every lens change. Even with careful adjustment, use of a separate lens for the video meant that depth of field would be different so the video image would only approximate the film image. Blake Edwards knew Gordon Sawyer and approached the team to design a system suitable for movies with moving cameras and frequent lens changes.

The limitations could only be resolved if the video camera used the very same lens used by the film camera. Accomplishing that would



A recent picture of Jim Songer. (Photo: Courtesy of Mr. Songer)

require exact positioning of the video lens and adjusting sensitivity of the system both to obtain sufficient light for exposure and to track with the film exposure. Jimmie Songer set about developing a system that could be built into a Panavision Silent Reflex camera (PSR) that used a pellicle mirror to reflect the image to the viewfinder. They left the image path from the lens to the film completely untouched but introduced a second pellicle mirror to reflect the image from the ground glass to a video camera they built into the camera door. This one design change eliminated many of the limitations of previous systems in one stroke. Since the video used the film camera lens and picked up the exact image seen by the film and the camera operator, issues of parallax and matching depth of field were completely eliminated. There was no need to recalibrate the system with every lens change and the video camera was configured to use the same battery supply as the camera. The introduction of a second pellicle mirror did flip the image but Songer corrected this easily by reversing the wires on the deflection coil. But the issue of having sufficient light for the video image still remained.

In one way, a pellicle reflex system is ideal for video use. Unlike a mirror shutter, the pellicle system delivers an uninterrupted image to the viewfinder so there is no need to coordinate the 30-frame video system with a 24-frame film camera. While there would be more frames in a single second of video, the running times would match and that was all that was important. Furthermore, the video image would be free of the flicker seen in the viewfinder of a mirror shutter camera. However, the pellicle mirror used in the reflex path deflected only about one-third of the light to the viewfinder. That was no problem when filming outside in daylight but there was insufficient light when working interiors.

Jimmie Songer needed to make three refinements to the system to address the exposure issue. First, he replaced the vidicon tube that was normally fitted to the camera with a newly available saticon tube that was more sensitive and also provided 1,600 lines of resolution. That helped but wasn't enough. He then adjusted the optics so that the image, rather than being spread over the full sensitive area of the tube, was delivered only to the center portion. By concentrating on the image, he obtained more exposure and adjusting the horizontal and vertical gain allowed him to spread out the smaller image to fill the monitor. But, there are limits to how much can be gained by this approach. Even with a high-resolution saticon tube, the image will

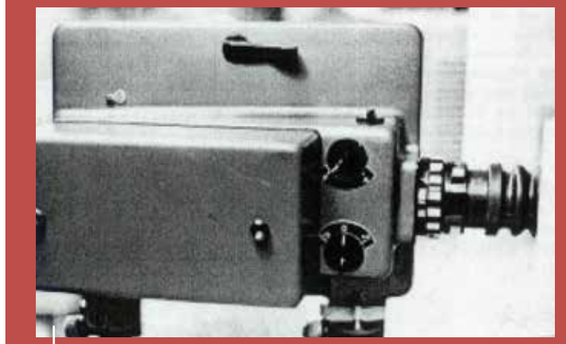
begin to degrade if magnified too far. There was still not enough light for an exposure but the video system had been pushed to its limits so Songer turned his attention to the film camera.

Recognizing that the ground glass itself absorbed a considerable amount of light, Songer contacted Panavision and asked them to fabricate a replacement imaging glass using fiber optic material. Although the potential of using optical fibers for light transmission had been recognized since the 19th century, the availability of sheets of tightly bundled fiber suitable for optics was a recent development in the 1960s. The fiber optic ground "glass" was the trick that made the system work, allowing the video camera function with the light diverted to the viewfinder.

Jimmie Songer and his assistant used the system, first called "instant replay" but now renamed "video assist" to avoid confusion with sports replay systems, on *The Party* in 1968 and then *Darling Lili* in 1970. It worked flawlessly, delivering the exact image of the main camera so Blake Edwards, the Director, could follow the action as it happened. It never held up production; to the contrary, Edwards said that it streamlined production because the certain knowledge of how the take looked freed him from making protection takes.

After *Darling Lili*, the key figures behind the project formed a company, Video West, to further develop the system. They met with rep-

The Ampex 660 was an early broadcast-quality video recorder. Jim Songer bought one of the first examples but modified it extensively for work in the video assist system.



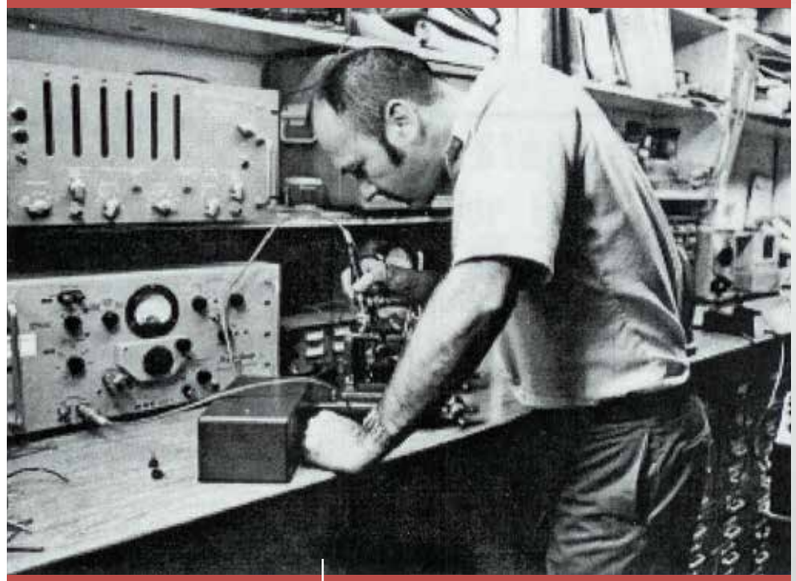
The first production examples had the video camera built into the door of a Panavision PSR camera.
(Photo: Courtesy of *American Cinematographer*)

resentatives of the ASC to draw up a series of specifications for video assist systems. Don Howard was brought in to interface the camera with the playback system and operate it in the field. Harry Flagle, the inventor of Quad-Split viewing technology and one of the Ampex engineers who worked on the development of the Model VR-660 portable two-inch recorder, joined the team soon after.

They next used the system on *Soldier Blue*, directed by Ralph Nelson, and then *Wild Rovers*, again with Blake Edwards. It proved so popular with producers that Songer and Don Howard, his assistant who was primarily responsible for operating and cuing the video recorder, scheduled projects months in advance and went from film to film. The work was so tightly booked that they sometimes had to ship the camera directly from one project to the next without a return to the shop.

Jimmie Songer joined Local 695, sponsored by Gordon Sawyer, shortly after *Darling Lili* and continued as a member until his membership was transferred to Local 776 in 1997. In the course of his career, he obtained seventeen US patents for a variety of innovations in high-definition TV and 3D video imaging.

In 2002, he received a Technical Achievement Award from the Academy for his work developing video assist. He lives today on a ranch near Fort Worth but continues to refine the video engineering work that has been his life.



Jim Songer at his workbench, circa 1971.
(Photo: Courtesy of *American Cinematographer*)

Glossary

Deflection coil – In a CRT (cathode ray tube), the beam of electrons is aimed by magnetic fields generated by coils of wire surrounding the tube. Adjusting the electrical energy sent to different coils directs the electron stream.

Obie light – A diffuse light mounted very near the camera lens, typically just above the matte box, to provide soft fill on faces in close-ups. Lucien Ballard, ASC developed the light to photograph Merle Oberon after her face was scarred in an auto accident.

Pellicle mirror – A semi-transparent mirror used in optical devices. A pellicle reflects a certain percentage of light and allows the remainder to pass through. In the Panavision PSR camera, a pellicle mirror deflected approximately 30% of light to the viewfinder and passed about 70% to the film plane.

Saticon tube – A saticon tube is a refinement of the vidicon tube design that adds particular chemicals to the photosensitive surface to stabilize the signal.

Vidicon tube – A vidicon is one of the early image capture devices made for television cameras. An image focused on a photoconductive surface produces a charge-density pattern that may be scanned and read by an electron beam.

Video Assist

A quote, attributed to Tacitus, claims that success has many fathers while defeat is an orphan. It's just so with the invention of video assist which is claimed by several people. Jerry Lewis is often cited as the inventor and he certainly incorporated simultaneous video recording in his filming practices very early. He began development work in 1956 and first used a video record and playback system during the filming of *The Bellboy* in 1960. He used the system to view and evaluate his own performance immediately after each take. But the system he used on *The Bellboy* was the simplest version; a video camera was lashed just above the main lens and would be adjusted to approximately match the view of the film camera lens with each setup. Later, Jerry Lewis also worked to develop a system that would use a pellicle mirror to view the image through the primary lens.

The assertion that Jerry Lewis "invented" video assist is overstated. The original patent for a video assist system dates to 1947 and subsequent patents in 1954 and 1955 added the refinements of merging optical systems to eliminate parallax and adding a second beamsplitter to permit simultaneous use of video and film viewfinders. The integrated video systems that came into general use in films were the work of many individuals each building on the accomplishments of predecessors. Jimmie Songer's contributions were many and essential as recognized in 2002 by the Academy of Motion Picture Arts and Sciences.