

**THE**  

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**INDEPENDENT**  

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**PRODUCER'S GUIDE**  

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**TO SUPER 8**

*FOR BEGINNING,*

*ADVANCED AND*

*PROFESSIONAL*

*PRICE \$5.00*

*FILMMAKERS*

**: 1 9 8 6**

*USING THE SUPER 8*

*FORMAT*

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## Windsor Total Video

565 Fifth Avenue, New York, N.Y. 10017  
Phone (212) 725-8080

### INTER-OFFICE MEMORANDUM

TO Bob Marmioli

FROM Bert Goodman

SUBJECT PROFESSIONAL SUPER 8/8mm  
TAPE TRANSFERS

As you know, our new super 8/8mm telecine system is now on line. The system is truly unique and should be of great interest to film professionals. I'd like you to prepare an ad describing its capabilities.

The ad should emphasize that the system uses a precision telecine projector and a full broadcast three tube Plumbicon camera with 600 line resolution. The system is continuously variable from 7 to 40 frames per second and will do magnetic sound from film edge. Using the Lexicon time compression unit we can lengthen or shorten a program 15% without changing the pitch of the program's sound. Don't forget to mention we can also do color correction.

And see if we can fit in the fact that we do super 8/8mm transfers for NBC and ABC for network airing. To my knowledge our system produces the highest quality super 8 and 8mm film to tape transfers in the industry.

Let's try to get something into the trade publications as soon as possible.

Thanks.

*Bert G.*

*Bert -  
You've written the ad!  
What more can we say?  
Bob*

# The Year at a Glance



*Jerry Kramer & Associates filming introduction to H.B.O. Howie Mandel Special*

It is anyone's guess what we will see done in Super 8 in 1986. If the last year is any indication of things to come, we may see the first successful feature, a top-ten rock video, or an academy award shot in Super 8. After struggling for fifteen years to gain recognition among media professionals, Super 8 appears to have finally won acceptance in 1985.

## AN ACADEMY AWARD NOMINATION

"In the Name of the People", a guerilla's eye view of fighting in El Salvador shot in Super 8 during 1981 and 1982, was an Academy Award nominee for best feature documentary of 1984. Producer/Director, Frank Christopher shot his feature documentary in Super 8 because he needed a highly portable production package capable of broadcast quality images.

"I'm used to shooting 16mm or videotape, mostly 16mm negative. But that was out of the question," Christopher said. "The border region of El Salvador is

very arid, poor, high in altitude and just having the hair on your head is almost too much to carry. ...I just could not see lugging 20 hours of film, as well as batteries and equipment needed to support this."

An architectural project shot in Super 8, and transferred to one-inch tape on a Rank-Cintel flying spot scanner, drew Christopher's attention to the small format. "They had remarkable results from Super 8 to one-inch videotape. I was convinced that Super 8 would make a good vehicle if we took care in the exposure and used tripods as much as possible for steadiness."

Christopher approached CBS with the idea of an original production in Super 8. This is something the network seldom does, but Christopher found a piece of information that provided a powerful lever. "We talked to some people who knew that Dan Rather had used Super 8 in Afghanistan. ...The fact that they had used Super 8 before was important. Then they went for it." The final release of Christopher's film was in 16mm and

videotape. (The above is excerpted from "The Filming of In the Name of the People" by David Wiener, American Cinematographer, October, 1985)

## A TELEVISION FEATURE

"Just the Two of Us", a feature length film for commercial broadcasting was shot in Super 8. The producers wanted to make a high quality film for release on television, but didn't have the financial resources for a conventional film production. After exploring video production options, Co-producer and Lighting Director Lon Caracappa suggested professional double system Super 8 production.

After performing a trial production of a rock video for Donny Thayer in Super 8, Caracappa was confident of the results he could get shooting Super 8 and transferring directly to one-inch video tape. The decision to shoot in Super 8 was made not only for financial reasons, but because "we felt we could get a higher quality image shooting K40 and transferring to tape than shooting in any tape format," Camera Assistant Vilma Gregoropoulos said.

The producers put together a professional crew from people who knew each other through commercial production work in the Boston area. The crew had access to equipment, including HMI's, dollies, and cranes, at no cost through their affiliation with a major grip and lighting equipment rental house in Boston. Super8 Sound outfitted the production with a crystal sync Nizo 6080 which, with a few customized accessories, was ready to shoot a feature.

The producers decided to shoot weekends because as Gregoropoulos said: "our main supplier of equipment could only lend us free equipment on the weekends. The weekend schedule also gave us our biggest asset: the availability of a full crew of professionals."

To avoid the considerable expense of workprinting, and since the film would be eventually transferred to videotape, the producers decided to rough edit in 3/4 inch videotape. With a Super 8 projector modified for film-to-tape transfer by Super8 Sound, they transferred their ten hours of dailies to video tape. "This gave us a relatively high quality working copy," said Gregoropoulos. The producers then edited "Just the Two of Us" on a simple 3/4 inch editing system, consisting of two decks and a controller

(without time-code) at the audio visual department of a museum. Based on this rough cut, the producers plan to transfer only that footage they need to one-inch videotape for final editing.

"Trying to shoot such a low budget movie requires many dedicated people and a very motivated producer." But, "the final analysis comes," Gregoropoulos says, "not with how much energy is spent, but with the quality of the final product." "In looking at 'Just the Two of Us' on video," Gregoropoulos concludes, "we see a high quality picture with sharp images and rich colors and the high standard of production values that feature work has. For us, Super 8 worked." (The above is excerpted from "Realities of Low Budget Production" by Vilma Gregoropoulos, American Cinematographer, January, 1986)

### **SUPER 8 BLOWN UP TO 35**

"The Ghost of Greenstone", a fantasy/adventure aimed at a general theatre audience, was shot in Super 8 and blown up to 35mm. It concerns the quest of six young adventurers trying to earn \$1,000 by spending a night in a reputed haunted mansion.

The idea of shooting his feature in Super 8 occurred to producer/director Tim Collare after reading an article about a South American feature which was blown up from Super 8 by Michael Hinton at Interformat Lab in San Francisco. "We considered the prospects and worked with Hinton on a test blow-up," Collare said. "We screened our one-minute print at a local theater. Our reactions ranged from surprise to mild shock. The technique worked and we determined it could be applied to our situation." "Of course there was increased grain," Collare added, "but not to the point of distraction. The audience accepted the story they watched on the screen without knowledge of the original film format."

Collare went on to shoot his entire feature project in Super 8 with the help of local TV people and students from a local school's Career Center TV class. The dailies were transferred to videotape for rough editing, the original loosely conformed, and then blown up to 35mm film and transferred to video cassette for distribution. (The above is excerpted from "The Ghosts of Greenstone: Super 8 to 35" by Tim

Collare, American Cinematographer, July 1985)

### **AN AEROSMITH ROCK VIDEO**

In 1985, Jerry Kramer & Associates, a major Hollywood producer, produced a rock video in Super 8 and 35mm film for the rock band Aerosmith. Jerry Kramer & Associates shot Super 8 because it fit the concept of the video: a couple of kids sneak a Super 8 camera and a recorder into an Aerosmith concert to bootleg some concert footage. Because they thought it would contrast with the 35mm film used to shoot the establishing shots of the kids filming, the producers decided to shoot Super 8 to represent the kids' perspective through the camera lens.

Jerry Kramer & Associates shot the concert footage in Boston's Orpheum Theater with three crystal controlled Nizo 6080s rented from Super8 Sound. Because the Super8 Sound crystal sync sound system uses the industry standard crystal technology the Nizo cameras were completely compatible with the 35mm equipment used in the production as well.

After transferring both the Super 8 and 35mm film to videotape on a Rank Cintel flying spot scanner, the producers were surprised with the results. "The Super 8 looked as good as the 35mm," Kramer said. In fact, it looked so good

that they used Super 8 for all the concert footage. The Aerosmith rock video is now running successfully on MTV and other rock video networks.

### **LOCAL COMMUNITY CABLE ACCESS**

Though it appears Super 8 has finally won acceptance among professional media producers, Super 8 is not only the professional. When first introduced to the consumer market place, Super 8 was heralded as the democratic film medium. Its low cost put media production within reach of most anyone. Since then, Super 8 has proven to be an effective video production format for local cable access programming - making media channels accessible to more and more people.

If 1985 was any indication, the prospects for Super 8 in 1986 look great. Professional media producers have finally begun to realize the potential Super 8 as an extremely portable production format capable of broadcast quality images. Independents are using Super 8 as a low-budget alternative video production format, while an explosion in the number of communities with cable access stations has provided a new expanding market for Super 8 as a low-budget media production format.



**Director of Photography, Paul Goldsmith on Howie Mandel Special**



# Beginning Single System Filmmaking

by Guy Holt

This system is for those who are making their first Super 8 film. Beginning Single System filmmaking is simple and direct. It is intended for those who need to translate their ideas into film with the least expense and with a minimum of craftwork. Designed to give you the best picture for your money, this system is limited in its ability to manipulate sound. The sound track will consist of unmanipulated sounds, recorded directly from the scene at the same time as the images (single system).

The limitations of single system sound do not mean, however, that your film cannot be interesting. After all, the most important aspect of filmmaking is visual literacy; and the simple system we will describe here is a more than adequate one with which to raise one's visual consciousness.

A new producer must learn the difference between "shooting" and "looking" — that creative filmmaking involves the mind as well as the eye. Shooting implies an attitude that there is a reality out there, and that to point the camera in the general direction of the highest action will somehow "capture" it on film. Nothing could be further from the truth. Unless one strains to "see" what is going on in a scene, that reality will never be visible on the screen.

In translating that vision to the screen, questions arise as to when and where to look in order to convey its meaning. For example, in an interaction

between two or more people, when should one look at the principle action? When should one look at the responses of the others involved in the interaction? Or when should one look at both? Such questions arise constantly when it comes to expressing your intent as a filmmaker; and greatly removes quality camera work from the passive act of just letting the camera run.

To be sure, you can learn to "see" and think in visual terms with any system; and the simple, relatively inexpensive equipment described here is more than sufficient to enable you to begin to express yourself in audio-visual terms.

## SINGLE SYSTEM EQUIPMENT

### Camera

You will need a very simple Super 8 low light (called "XL") sound camera; with a short telephoto lens, so that you will seldom have an out of focus picture. For ease of operation, a totally automatic exposure system is a must.

A good single system camera is the Elmo Traveler. The Traveler has a fast f/1.2 lens that enables it to film in low light where other cameras would fail. It has a short 10.5-26.5mm telephoto lens, with "Focus-Free" facility, so that you will seldom have an out of focus picture. The Traveler's exposure system is completely automatic and slow to react to light changes, so that exposure changes will seem natural. The Traveler's sound

recording system is also totally automatic and reacts to sound level changes in a most natural manner. On top of all this, the Elmo Traveler is constructed of sturdy metal for dependability even under abusive conditions.

Another good camera, though silent, is the Bauer C500 XLM. The C500 XLM is for those beginning filmmakers who would exchange sound recording capability for a more expansive visual vocabulary. The Bauer's 8.5mm to 40mm zoom lens gives you a greater choice of focal points, or ways of framing your subject. The Bauer C500 XLM has an automatic fade feature, that will fade out one scene and then slowly fade in another, enabling you to make symbolic transitions in time and space. Another effective dramatic feature of the C500 XLM is its automatic slow motion capability. Slow motion can be used to make a sequence funny, absorbing, or even tragic.

The Bauer C500 XLM also has all the necessary ingredients for animation — single frame capability, remote release, and macro-capability. The Bauer's macro lens has the added capability of selecting the macro range directly from any focal length, allowing you to determine the desired enlargement ratio yourself — a real plus for clay animation. Finally, the Bauer C500 XLM features a manual over-ride of the automatic exposure system, which will enable you to begin to creatively explore the art of film exposure.

### Film Viewer

You will need a viewer on which to review your processed film and make your editing decisions. We suggest a motor-driven viewer like the Hahnel Motomatic. The Motomatic features a bidirectional transport, with variable speeds from about 5 f.p.s. to 40 f.p.s., with automatic take-up, plus manual operation. The Motomatic's optical glass prism blends frame into frame without flicker or blackout for a steady, continuous picture. Finally, the Motomatic can take an accessory for sound that will enable you to monitor your sound track while editing.

### Film Splicer

The splicer is one of the single most important pieces of equipment for successful Super 8 filmmaking, so don't skimp when it comes to purchasing a splicer. We highly recommend the Wurker Stereo Tape Splicer and 2-frame Wurker

## Splice Tabs.

A Wurker splice is made by securing two separate pieces of tape flush on both the emulsion and base sides of the film. The tape splice only covers two frames, so there is minimal degradation of the image at the splice point; the tape does not wrap around the film, nor cover the main or balance sound stripes, so splices do not jump in the projector, or cause drop-out of the sound at the splice on either soundtrack. Sound may be recorded on either the main or balance stripes across the splice as well.

The Wurker splicer cuts the film ends on the far side of the frameline and makes the splice under tension so that there will be no flash of light at the splice line when projected. Finally, Wurker splices can be undone and remade to include another scene without damaging the film — an absolute must for clean work. To be sure, for successful filmmaking, the Wurker Splicer is as important a piece of Super 8 equipment as your camera.

## Projector

You should consider a 1-track sound record and playback projector like the Elmo Traveler Projector. The Traveler utilizes a bright EFP 12V-100W halogen lamp with cold mirror; it is also complemented by an f1.4 15-25mm zoom lens; and its sound recording capability enables you to add narration or music to your film.

## PRODUCTION TIPS

### Filmmaking

Before shooting, adjust the viewfinder diopter of your camera to your eyesight or your pictures may come back out of focus (consult your camera manual for details). It is a good idea to put a Sky 1-A filter over your camera lens to protect it from scratches — the filter is considerably less expensive than replacing a scratched lens.

Constant camera maintenance is necessary. When filming, bring along some lens cleaning tissue and a child's soft toothbrush. Brush across the camera film gate before inserting each film cartridge. It can be very discouraging to see beautiful scenes ruined because a piece of debris that lodged in the film gate, scratched the entire roll of film.

With Super 8 cameras, you are not able to hear sound from a microphone through an earphone unless you have a sound cartridge in the camera and the camera trigger partially depressed.

Therefore, we suggest you carry a dummy sound cartridge to use to test for camera and obtrusive ambient noise in a given location. To make a dummy cartridge simply pull the unexposed film out of a sound cartridge. Save the film to use as leader.

Always edit on a clean surface and wash your hands thoroughly before handling film. Splice leader (black or white) at the beginning and end of reels so as not to damage the first or last few frames. Use Bonum self-threading reels to make spooling of film during editing and projecting easy. Mark your cuts with a china marker sharpened to a fine point; and mark boxes and reels with an indelible ink sharpie. If you are using a tape splicer, roll air bubbles out of your splice with a Wurker Splice Roller.

When you have completed editing, clean your film with film cleaner and store it on a plastic reel in a reel box. Again we recommend Bonum reels — they are made of durable plastic and come with a climatic storage container which keeps film elastic. The cases neatly stack together for functional as well as attractive storage of your finished film. Finally, before projecting your film, replace the Kodak white leader with black leader to spare your audience the glare of projected white leader.

## Shooting

In Single System Filmmaking, your sound track consists of unmanipulated sounds, recorded directly onto the film's magnetic sound strip at the same time as the image. Maintaining lip synchronous sound does not present a problem since it is recorded directly onto the film in a frame for frame correspondence with the picture. However, the sync sound accompanying any given frame of pictures is found 18 frames (one second or less) ahead of the picture. This separation can pose problems when you splice film together; but, because it is only 18 frames, for the most part, it is not a serious impediment to creative filmmaking.

Nevertheless, it makes sense to tailor your shooting style accordingly. Plan your shots so that they go together with as little editing as possible. Shoot longer takes than you might otherwise, and do not divide a scene into many separate shots or angles. If you begin and end each shot when no one is speaking (or at least when nothing crucial is being said), when you splice shots together you will not lose

important sections of the sound track. Of course, if there are scenes for which you will not use the synchronous sound, you can take more liberties with short shots and quick cuts.

## System I Recommended Reading

*The Book of Movie Photography:* An encyclopedia of movie photography, written by David Cheshire.

*Filmmaker's Guide to Super 8:* Written by Super 8 Filmmaker for Super 8 filmmakers

*Super 8 in the Video Age:* A single system production manual for the beginner to advanced filmmaker, written by Brods & Treadway.

*How to Shoot a Movie & Video Story: The Technique of Pictorial Continuity,* by Gaskill & Englander.

All of the above titles, and many more are available through Super 8 Sound's Booklist.

## TECHNICAL SPECIFICATIONS

### SYSTEM I CAMERAS

#### Elmo Traveler (Camera)

LENS: f/1.2, 10.5-26.5mm Zoom with "Focusfree" facility with one speed power zoom.

VIEWFINDER: Single lens reflex. Zone focusing. Indications of f/stops, Over/Under exposure, Recording & No/End-of-film.

METERING: Full automatic control.

FILM SPEEDS: 18 f.p.s.

SOUND SYSTEM: Automatic Level Control (AL) Electromagnetically controlled pinch roller drive system.

FILTER SIZE: 49mm.

OTHER FEATURES: Remote control socket and external power socket. Microphone and monitor inputs.

#### Bauer C500 XLM

LENS: Bauer Macro Neovaron f/1.4, 8.5-40mm motorized zoom.

VIEWFINDER: Single Lens Reflex with split image rangefinder. Viewfinder indicators for exposure under-exposure, film transport, film-end, battery.

METERING: Fully automatic TTL (through the lens) exposure control with manual over-ride.

FILM SPEEDS: Single Frame, 18 f.p.s., and automatic slow motion of 40 f.p.s.

SOUND SYSTEM: Silent.

SPECIAL EFFECTS: Automatic fade-out and fade-in. Slow motion of 40 f.p.s.

FILTER SIZE: 49mm.

OTHER FEATURES: Remote control jack. Flash jack.

### Chinon 60RXL

LENS: f/1.2, 7-42mm (6 to 1) power zoom lens with macro that focuses closer than 1 inch.

VIEWFINDER: Split Image Single Lens Reflex. Indicators for sound and picture, aperture setting, under and over exposure warnings, film transport, and recording signal.

METERING: Automatic Aperture Control. 1 Backlight Control. Exposure Compensation Control.

FILM SPEEDS: 18 f.p.s. only.

SPECIAL EFFECTS: Automatic Picture/Sound Lap dissolve at the push of a button.

SOUND SYSTEM: Fully Automatic Level Control (ALC) with Limiter.

FILTER SIZE: 52mm.

OTHER FEATURES: Dual LED electronic control panel which checks the condition of the batteries and the position of the built-in daylight filter. Uni-directional telescoping boom microphone.

### Chinon 30RXL

LENS: f/1.2, 7-21mm (3 to 1) power zoom lens.

VIEWFINDER: Single Lens Reflex with recording signal, film transport signal, film end signal, under exposure warning, and aperture visible in viewfinder.

METERING: TTL automatic exposure control with built-in type "A" filter. Exposure compensation provision, back light control.

FILM SPEEDS: 18 f.p.s. only.

SPECIAL EFFECTS: 72 frame automatic picture/sound lap dissolve with sound or silent cartridge.

SOUND SYSTEM: Built-in sound recording amplifier, provision for cordless microphone, built-in monitor and microphone jack.

FILTER SIZE: 46 mm.

OTHER FEATURES: "Auto-Magic" monitor panel for battery condition and type "A" filter position.

### Chinon 20PXL

LENS: f/1.3 11-22mm (2 to 1) power zoom lens.

VIEWFINDER: Single Lens Reflex with recording signal, film transport signal, film end signal, under/over exposure warning, and aperture visible in viewfinder.

METERING: TTL Automatic exposure control with built-in type "A" filter and back light control.

FILM SPEEDS: 18 f.p.s. only

SOUND SYSTEM: Built-in sound recording amplifier, provision for cordless microphone, built-in monitor and microphone jack, mic mixing capabilities.

FILTER SIZE: 43 mm.

### Chinon 133PXL (Animation)

LENS: f/1.3 8.5-25.5mm fixed focus power zoom lens.

VIEWFINDER: Single Lens Reflex with film transport signal, film end signal, and under exposure warning.

METERING: TTL Automatic Exposure Control with built-in type "A" filter and backlight control.

FILM SPEEDS: 1 and 18 f.p.s.

FILTER SIZE: 46 mm.

### Chinon 132PXL

Same as the Chinon 133PXL but with a f/1.3, 11-22mm lens.

## SYSTEM I EDITOR/VIEWERS

### Hahnel Supermatic

FORMAT: Super 8.

SCREEN SIZE: 5" x 3 1/2" recessed color corrected fresnel screen.

MAGNIFICATION: 22.5 times.

REEL CAPACITY: 600'.

LENS: Non flicker 16 face optical glass prism. No blackouts between frames at any speed.

LAMP: 6V 10W.

OTHER FEATURES: Accessories available include a sound monitor with built-in speaker and volume control, film cleaner, or frame counter.

### Hahnel Motomatic

FORMAT: Super 8

SCREEN SIZE: 5" x 3 1/2" color corrected fresnel screen.

MAGNIFICATION: 22.5 times.

REEL CAPACITY: 600'.

LENS: Non-Flicker 16-face optical glass prism. No blackouts between frames at any projection speed.

LAMP: 6V 10W.

OTHER FEATURES: Bidirectional motorized variable speed transport, also manual operation. Accessories available include a sound monitor with built-in speaker and volume control, frame counter, and film cleaner.

### Wurker Splicer

PEACE OF MIND: Broken splices are a thing of the past.

PRECISION: No flashes or drop-outs; no variation in quality.

DURABILITY: Long life tape does not stretch.

TRANSPARENCY: Practically invisible; roller smooths out bubbles.

SILENCE: No clicks, no wraparound to cause jumps in the projector.

VERSATILITY: Duo-play splices avoid both sound stripes to allow stereo recording over the splice.

EDITING FACILITY: No lost frames, even with re-splicing.

CLEANLINESS: No mess, no scraping, no fragments.

PROJECTION SPEEDS: 18 and 24 f.p.s. forward and reverse projection.

LENS: Chinon f/1.3, 15.5-30mm zoom lens.

REEL CAPACITY: 600'.

LAMP: 12V 100W EFP.

SOUND SYSTEM: 1-Track Magnetic Record and Playback, with automatic record level limiter.

Microphone and Auxiliary mixing capability. Sound-on-Sound recording.

OTHER FEATURES: Automatic film loading. MIC and AUX Input Terminals. EXT SP and MONITOR/AUX Output Terminals. Built-in speaker.

## SYSTEM I PROJECTORS

### Elmo Traveler Projector

FORMAT: Super 8 Sound/Silent film.

PROJECTION SPEED: 18 and 24 f.p.s., forward and reverse.

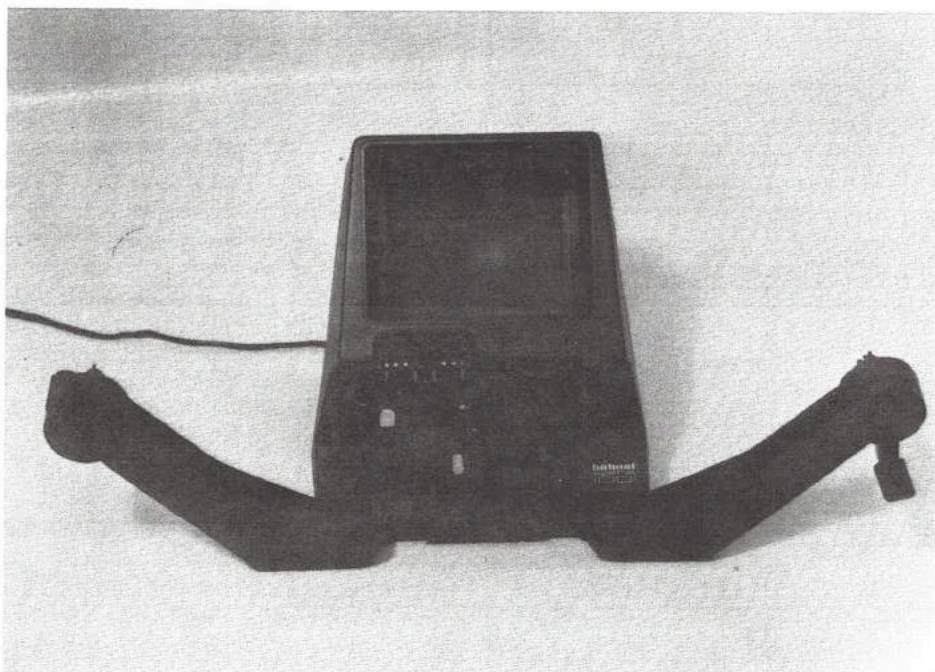
REEL CAPACITY: 600'.

LAMP: 12V-100W EFP.

LENS: Accepts any Elmo Lens (see price list for details)

SOUND SYSTEM: 1-Track magnetic playback, and recording with automatic level limiter.

OTHER FEATURES: Automatic Film Loading. Reverse Projection. MIC and AUX Input Terminals, EXT SP and MONITOR/AUX Output Terminals. Built-in 5" dynamic speaker. Cast in metal for exceptional durability. Accessible film transport system for quick, easy cleaning.



Hahnel Super 8 Editor



by Guy Holt

Advanced Single System Filmmaking will enable you to translate your ideas into a technically polished film. It offers many creative possibilities to the filmmaker who has an interest in making good films at a reasonable cost. In fact, the potential of Advanced Single System Filmmaking is limited only by the level of commitment of the individual who takes it up.

## ADVANCED SINGLE SYSTEM EQUIPMENT

### Cameras

Most of our effort at Super 8 Sound is devoted to understanding the properties of Super 8 cameras as they relate to effective media production. Our years of experience in dealing with film producers and camera manufacturers have taught us a lot about what features apply best in production, rather than merely sound good in the showroom.

We have described below those features we have determined to be the most valuable both in terms of practical application and creative potential.

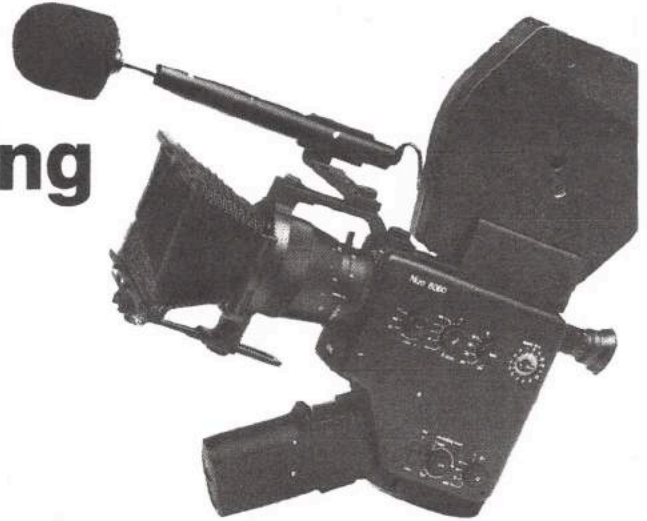
### Manual Aperture Control

Nearly all Super 8 cameras now have built-in light meters. They measure the amount of light in a scene and automatically set the aperture in the camera to give the correct exposure. Advanced single system cameras give you the added control of manually overriding the automatic meter to ensure proper exposure in difficult light, and to enable you to begin to explore the artistry of film exposure.

Proper exposure requires manual control of the camera's aperture because any one scene contains such a wide range of brightness that an automatic meter can be easily misled. Most in-camera meters work either by metering the whole frame-area and calculating the overall exposure (the "averaging method"), or by metering the central portion of the frame (the "center-weighted" method), assuming that this will represent the most important part of the picture. But where meter readings for a scene vary, as greatly as f2.8 for one part to f22 for another, both averaging and center weighted automatic meters may not expose the film properly.

In fact, automatic meters will be misled if there is a large bright area or a

# Advanced Single System Filmmaking



large dark area in its field-of-view. For instance, if you frame your subject in a doorway or shoot from under an arch, the meter will open the aperture in order to render the dark areas as mid-gray, when in fact they should be dark. A proper exposure in such situations requires a fine manual adjustment of the aperture.

Cameras with manual override or "exposure lock" allow you to make such adjustments and avoid over-exposing the film. You simply set the camera up for the shot in the normal way, zoom in close to your subject and either set the lens aperture manually or "lock" the meter to the setting indicated. Then zoom back out, to frame, and start filming.

Similar problems arise if you shoot into light. The automatic meter will tend to expose for the bright sky behind your subject rather than for their face: the result will be an under-exposed subject. You can correct for this by using either the camera's "backlight control" or manual override to open up the aperture one stop whenever light is shining towards the camera. When you have enough film to spare, it is even a good idea to "bracket" the exposure by shooting the scene at different aperture settings. To be sure, manual aperture control enables a trained eye to properly expose scenes that would fool an automatic meter. It can also be used to manipulate exposure creatively.

Once you have got sufficient light onto the film to record an image, manual control of the camera's aperture enables

you to vary the exposure to create certain effects. For instance, a pure silhouette, with its total absence of modeling or relief, can be used to create strong abstract images.

Sometimes referred to as "contrejour," shooting into the light will produce such a backlit effect. If you want to retain some detail in the shadow areas facing the camera, but still want to catch the high contrast glitter of the highlights or the sun streaming over your subject's shoulder, take a reflected light reading but use the camera's back light control. If you want to shoot in pure silhouette, meter the reflected light directly.

### The Zoom Lens

Advanced single system cameras give you the versatility of zoom lenses. The great advantage to zoom lenses is that they give you a wide range of focal lengths in one lens, thus eliminating the need for interchangeable fixed focal length prime lenses.

With a zoom lens, focal lengths may be changed during a shot (zooming) or between shots. Changing focal lengths between shots is like changing from one fixed focal length prime lens to another, but it takes less time with a zoom. Framing can also be easily changed, without moving the camera, thus saving a great deal of time when the camera is on a tripod.

Your choice of focal length will have a considerable effect on the "feel" of your shot. Altering the focal length of a zoom lens will vary the depth-of-field and the angle-of-view, but not the perspective. Hence, short focal lengths (wide-angle shots), exaggerate depth, and long focal lengths (telephoto shots) compress distances. Herein lies the creative potential of zoom lenses.

Wide angle shots combined with short subject-to-camera distances, give a "deep focus" effect and a certain ruthless clarity. The camera is unmistakably part of the scene, and the degree of impact and realism which this produces makes the use of wide angles common in documentary work. Close-up wide angle shots of the human face, however, tend to be unflattering.

Since long focal lengths compress distances, telephoto shots tend to produce more flattering close-ups. Combined with long subject-to-camera distances, telephoto shots give a "shallow focus" effect. The camera becomes a remote observer and produces detached, lyrical images.

Because the feel of a "deep focus" shot is so different from that of a "shallow fall" shot, the two can only be juxtaposed with difficulty. So you must decide on the atmosphere from the start and stick to it throughout.

The great advantage to zoom lenses is not only that they enable you to change angle-of-view between shots, but they also enable you to alter the angle-of-view during the shot — in other words, to produce zooms on film.

Most zooms are motorized and can be operated at the touch of a button. However, perhaps because of this, there is a tendency for beginners to zoom in and out too often. Zooms are essentially two dimensional — that is, unlike a dolly shot, they do not alter perspective. Therefore, they should be used sparingly, and only for particular effects.

In zooming, the entire image is magnified equally and the viewer is brought closer to the filmed subject without a change in perspective. Whereas, in a dolly shot, the camera moves in toward the subject and the perspective changes; that is, objects pass by the side of the frame, suggesting to the viewer that he is physically moving into the scene. The moving camera, hence, creates a feeling of depth in space; whereas the zoom flattens space and calls attention to the act of filming

itself. For this reason you should only zoom when you cannot move the camera itself — with the reservation that a steady tripod-zoom is better than a wobbly, handheld dollying shot.

There are times, however, when a zoom is the ideal effect; for instance, a "zoom-in" can be used to focus attention on a particular detail in a scene. A "zoom-in" is a narrowing of vision and of concentration. Unlike a simple cut from, say, a mid shot to a close-up, a "zoom-in" maintains an absolutely clear geography and forces the audience's attention onto the close-up. If you intend to use a "zoom-in," always focus at extreme telephoto first, and, if possible, use a tripod to avoid camera-shake.

A "zoom-out" is not a process of concentration, but of revelation. As the angle-of-view widens, more elements come into the shot and the surroundings or setting of the initial close-up are revealed. As you zoom out, a succession of new objects will continually enter the frame; it is vital, therefore, that the shot should become more interesting as it progresses. Try to preview the framing of the final wide angle before starting the shot, since it is more important than the initial close-up. There is usually no need to pre-focus for the end of the shot because depth of field increases.

Finally, a zoom combined with a pan will give an illusion of a tracking shot. The sideways motion of the pan tends to disguise the change of focal length of the zoom, creating the effect of a tracking shot. It is a difficult camera move to perform well, so where possible try to rehearse the shot. Use a tripod, focus up first, and keep both the pan and the zoom slow.

### Automatic Level Control

In any sound recording the incoming signal must be matched to the capacity of the magnetic oxide tape surface receiving it. Too little signal, and the sound becomes degraded by the hissy noise inherent in the magnetic oxide tape; too much signal, and the magnetic oxide tape becomes overloaded, resulting in a distorted, fuzzy sound, especially noticeable on high notes.

Most Super 8 cameras now feature automatic record level, known as "automatic level control." This feature automatically boosts or diminishes the signal to approximate an optimum recording level, and works well in conditions of

steady ambient sound. However, automatic level control does not handle sudden volume changes well. Say you are recording someone in a kitchen. While the person speaks, the level is set appropriately, but when he stops, the automatic level control responds to the quiet by boosting the level, thereby bringing the sound of, say, the refrigerator to full prominence.

Automatic level control also has a slow recovery time; so if a sudden, loud sound occurs while someone is speaking, the recording level will drop, reducing the level of the speech, and return to normal some moments later. For these reasons it is advantageous to be able to set the level manually.

Advanced single system cameras allow you to monitor the signal, and manually set the recording level. Some cameras allow you to monitor the signal with a peak level LED meter, while others have a calibrated VU meter. Peak level LED meters are better than VU meters for signal monitoring because they are more accurate.

When setting the recording level with a VU meter, the needle should remain solidly in the middle of the white area, and just nudge the red section when the loudest noise is recorded. When the needle enters the red section of the scale the recording is overloaded. With cameras that allow you to monitor the signal by means of a peak level LED indicator in the viewfinder, set the level so that the red diode lights infrequently, if at all.

Despite its problems, automatic level control is good for situations where you do not have time to set levels manually. Under such circumstances it will give good, consistent sound recordings and leave you with more time to think about the shooting. But for the most part, automatic level control cannot out-perform a competent recordist who sets the level manually.

### Special Effects

Advanced single system cameras offer you such in-camera effects as fades, dissolves, superimposition, slow and fast motion, time lapse and macro-cinematography.

A fade is an in-camera trick whereby the image either disappears to leave a black screen or slowly appears out of nothing. On single system sound cameras, picture fades are linked to a corresponding fade of the sound, and so

are especially useful in bridging discontinuous filming with sound-on-film. Fades are also an ideal way of showing the passage of time and the transition from one scene to another.

A dissolve is a double exposure in which one image melts into another. It is produced by filming a fade-in on the same segment of the film as a fade-out. To produce a dissolve, the camera backwinds the film before exposing it a second time.

Superimposition is a double-exposure effect where one image appears on top of another. It can be used for titling by superimposing white lettering on a black background over a scene; or, with a matte box and special effects mattes, it can be used for a wide variety of trick effects. When filming each shot designed for superimposition, remember that the exposure of that stretch of film will be cumulative. If both backgrounds are to be visible in the final mixed shot, the exposure of each should be reduced by at least one stop to avoid over-exposure.

Slow motion is produced by filming with the camera at a faster running speed than the eventual projection speed. This is called overcranking and the amount you over-crank depends on the subject and effect you are after. A fifty per cent increase in frame-rate will produce good effects when used to slow down very fast action like a car crash. But for more exaggerated slow motion you should film at 54 fps.

It is important to remember when doing slow motion cinematography that any change in the frame-rate effects exposure. For example, filming at 36 fps exposes the film to half as much light as filming at 18 fps, so the aperture has to be opened up to compensate for the shorter exposure time. Your camera will do this automatically, but you must remember that slow motion cinematography requires more light and so you cannot always film where you otherwise could.

Fast motion is produced by filming with the camera at a slower running speed than the eventual projection speed. It is called undercranking. Slight undercranking effectively speeds up action sequences like chases and fights, but undercranking by more than ten per cent results in unrealistically fast movement.

Because each frame receives a longer exposure, undercranking can also be used to film in situations that would otherwise be too dark. However, you must

choose a subject that is suited to the technique, since any movement will be speeded up. You should always use a tripod when undercranking, and remember that any movement of the camera — such as panning or tracking — will look much faster on projection.

Time-lapse cinematography enables you to see events which normally happen so slowly that they cannot be seen by the naked eye — the classic example being a flower bud opening. In this technique one frame of film is exposed at regular intervals using a single-frame release mechanism. The single frame can be exposed manually, with a cable release and stop watch (a very time-consuming task), or automatically with an intervalometer. This is a form of clock which operates the single-frame release at a pre-determined interval.

When doing time-lapse cinematography it is important that you set the camera up on a steady tripod, and not touch it during filming as even the slightest movement will be visible as a jolt in the final shot. Since the camera will be switched on for the entire filming period, check the batteries periodically between frame exposures. If they do fail, replace them as gently as possible between shots.

System II cameras feature a "macro" setting on their zoom lenses which allow you to do macrocinematography. Macrocinematography is a method of filming extreme close-ups to produce a magnified image of a subject. When doing macrocinematography it is important to keep in mind that at large magnifications the depth of field is very shallow, so you must use the smallest aperture possible, focus very carefully, and set up your camera on a tripod with a cable release to minimize vibration.

The movement of a swaying flower or an insect scurrying up a branch will appear unrealistically fast in macrocinematography. To correct this either steady the subject or overcrank the film by about fifty percent.

### **ADVANCED SINGLE SYSTEM SOUND RECORDING**

Most single system film productions would benefit by a portable non-sync tape recorder. Used with a high quality uni-directional condenser microphone, a tape recorder will greatly improve the fidelity of your sound, give you practical alternatives in recording, and give you more creative options for your film's

sound track.

A non-sync tape recorder will enable you to collect wild sound for a variety of studio effects. For instance, wild sound on tape and a projector with sound recording capability will enable you to create audio effects such as ambient sound introductions without accompanying picture, as well as sound transpositions or segues between scenes. You can mix wild sound with single system sync sound for a fuller, more textured sound; or you can record music or voice-over narration tracks to mix with your sync sound, fading and cross-fading between the tracks for the desired balance.

A portable tape recorder will also give you practical alternatives when recording. For instance, if you are recording in a space with loud ambient noise, say a train station, a portable recorder will allow you to use a highly directional microphone to record sync dialogue onto the film and, at the same time, ambient sound onto tape. The ambient sound can later be mixed with the camera original sync sound to achieve a realistic balance.

Such effects will give your film a fuller, more textured soundtrack. All you need is your original film, a projector with sound recording and mixing capabilities (see *Advanced Single System Sound Editing* for details), and sound on tape.

A portable recorder can also be used to record sync sound using a system called "echo sync." To record sync sound, either a common microphone is used for both the recorder and camera, or separate microphones are used for the recorder and camera. The sound is transferred from the tape to the stripe using the single system sound as a sync reference (see Brodsky & Treadway's discussion of Echo Sync in their book *Super 8 in the Video Age* for details).

Sony makes a very good portable cassette recorder — the Walkman Pro. The Walkman Pro features Dolby B & C noise reduction and automatic gain control, as well as manual gain control and record level meters. The Dolby encoding and decoding circuitry enables location tapes to be encoded for Dolby noise reduction, so that successive generations of sound can also remain encoded, up to the stage of mixing onto the film's sound stripe. In the transfer to the sound stripe the sound is decoded, thereby effectively eliminating the accumulated tape hiss of the successive generations of recording.

Fostex makes a good inexpensive

four-track cassette recorder, the X-15, which is ideal for low budget productions — it can double as a location recorder and mini sound studio. The X-15's light weight, easy portability, and Dolby noise reduction makes it a good location recorder; while its multi-track capability enables the mixing of several tracks of wild sound with single system sync sound in post production (see *Advanced Single System Sound Editing* for details).

## ADVANCED SINGLE SYSTEM PICTURE EDITING

Charlie Chaplin said of filmmaking: "the real work was thinking, just thinking." This is particularly true of single system (sound-on-film) picture editing.

When editing with sound on film, the separation between sound and picture can pose problems. The sync sound accompanying any given frame of picture is found 18 frames ahead of the picture. When two shots are spliced together, the sound accompanying the first 18 frames of the second shot comes from the magnetic stripe at the tail of the first shot. It is not possible to make a cut in which both sound and picture change simultaneously at the cut (the way in which most double system cuts appear). Furthermore, if the editor trims a shot to start at the moment a sync-sound event is beginning in the picture, for instance a door opening, the first 18 frames of sound for that event will be cut out. For cuts to be made for a specific dramatic effect, and not merely out of necessity, these problems posed by sound on film have to be circumvented.

In single system production, as with any visual medium, it makes sense to tailor your shooting style to the medium. With sound on film you don't always have the luxury to wait until you reach the editing stage to decide how you want your film to look. Tight editing of dialogue between two people shot in individual close ups, for instance, will require planning in advance, before you even put film in your camera. To be sure, with meticulous preplanning and careful scripting, many of the editing problems posed by the 18 frame gap can be easily circumvented and can even be used for dramatic effect.

If you begin and end each shot when no one is speaking (or at least when nothing crucial is being said), when you splice shots together you will not lose important sections of the sound track. You

will, however, end up with a one second pause between the end of the one actor's line and the start of the other actor's line, if, say, you are splicing together a dialogue sequence between two actors shot in individual close-ups. This is acceptable for the most part, but at times it can destroy dramatic effect.

One simple way to circumvent this problem is to use the 18 frame gap between single system sound and picture for dramatic effect. That is, use it to show the reaction of the person being spoken to and not just the person speaking. Used effectively, this device will give your audience insight into the characters, as well as clues on how to react to what is being said. Reaction shots provide an interesting counterpoint to spoken dialogue and provide a sense of dynamic flow in a conversation.

The 18 frame gap allows you to easily cut away from an actor speaking to a reaction shot of another actor before he begins to speak. Simply cut the first shot at the end of the sound — 18 frames before the first actor's lips stop moving. The end of his line will carry over the splice and be heard during the first instant that the second actor is on the screen. When shooting such a sequence it is important for the second actor to hold the appropriate facial expression, say alarm or surprise, for at least a second before he begins to speak.

If you require even tighter editing of dialogue — say, to cut away from one actor speaking to a reaction shot of another listening and then back to the first speaking — you will have to cut picture independently of sound. You must plan to shoot like this: shoot the first actor's entire line, then shoot the reaction of the second actor, while the first repeats his line into the microphone off camera. With these two shots, which have the same dialogue, you shouldn't have much trouble finding a place to cut from the first actor speaking to the second's reaction, and then back to the first without losing a word.

If for a specific reason you require a camera angle change during an actor's line, shoot the first angle and have the actor go through all the action — getting up out of a chair, for instance. After you've changed your camera angle, have the actor repeat the same action, as well as the part of his line with which you want to begin the second shot. In the end, you will have two pieces of film with overlapping action and sound, and you shouldn't have much trouble finding a place to cut

where both can be matched.

Such techniques enable you to cut for dramatic effect. They are the grammar and tropes of film language, and are invaluable in the communication of your ideas to your audience.

Though clearly single system editing problems can be easily circumvented in scripted filmmaking, documentary filmmakers may still feel frustrated by the lack of creative camera work they are allowed with sound on film. That is, the 18 frame gap still makes tight editing of picture and sound difficult in situations where the action can not be repeated for the benefit of the camera. The secret of being able to match creative camera work with single system sound in documentary filmmaking is a common microphone for both the camera and a portable non-sync cassette recorder.

Suppose you want to film an event from different camera angles, for variety in visuals, that can not be repeated for the benefit of your film. While you can cover your camera angle changes with cutaways filmed at a later time, your cutaways will have different background sounds. To maintain sound continuity throughout, shoot like this: use a common microphone for both your camera and a portable cassette recorder. Connect the microphone to the recorder. Then connect the Line Out of the recorder into the camera Aux or Line Input and set the camera's controls accordingly (you will have to use an impedance matching cable to get a good connection in a Super 8 camera with a mic input). As you shoot your first angle, start recording on the cassette. When you want to change angles, stop the camera but let the recorder continue to run. Repeat this procedure until your shooting is complete.

Visually you'll have a start-stop picture, but you will also have a continuous audio track, recorded at the same time, through the same microphone, with the same characteristic sound, on the cassette. Now you simply record this continuous background sound from the cassette onto the cutaway sequences (using a projector with recording capability) making sure to overlap the picture synchronous sound on the cutaway sequences. Where the two overlap you will have the same audio on both the live action and the cutaway and shouldn't have much trouble finding a place to cut where both can be matched.

This technique will also allow you to cutaway from interviews, to illustrate what

is being said: or cutaway from public speakers to reaction shots of the audience. Using a common microphone, you have a full audio track, as well as sync visuals when you need them. In the end, your cutaways will have that smooth, professional appearance, as if they were filmed at the same time as the live action; and your film will look and sound as if it were produced double system, using two sync cameras.

Granted, single system sound doesn't allow you the flexibility of double system editing, but you don't have the cost either. Editing single system allows many creative possibilities to the filmmaker who has an interest in making good films at a reasonable cost.

### ADVANCED SINGLE SYSTEM SOUND MIXING

Contrary to popular belief, single system sound presents the filmmaker with many possibilities in the mixing of his film's soundtrack. Granted, sound-on-film does not allow you the same creative control as double system sound; but, with the techniques described below, you will be able to create a textured, multi-layered soundtrack for your film.

For instance, Advanced Single System techniques will enable you to eliminate or reduce the level of unwanted noise in a sequence. You can introduce new sounds, such as music, sound effects, or voice-over narration. And you can make sound fades and cross-fades to other sounds. All these effects are accomplished with only your original film, a projector with sound recording and mixing capability, and a portable cassette recorder.

In single system sound mixing, the projector plays an integral role in the creation of the soundtrack. With such features as Sound-on-Sound recording, dual-track recording, and stereo recording, Super 8 projectors are mini-sound studios capable of mixing multiple sound tracks.

Mixing is the process by which dialogue, music, sound effects, and voice-over narration are combined for a durable balance. The simplest mix available in Super 8 is Sound-on-Sound recording. A feature found on many projectors, Sound-on-Sound enables you to add sound from other sources over what you already recorded in camera, keeping or suppressing as much of the

original sound as you want. With sound recorded independently on a tape recorder, you can build multiple tracks right on your projector; fading and cross-fading these tracks to create segues (sound dissolves).

Technically, Sound-on-Sound recording is not mixing. What it actually does is partially erase the previous track in favor of the new track being laid down on the stripe. You do not then have the control you would have with a separate mixer and manual volume controls, and are not able to filter out unwanted noise — all requirements for good mixing. You must, also, be careful not to damp down the previously recorded track to such a degree as to render it muddy and unacceptable.

Another problem is that if you miscalculate a level, you could easily erase too much of the first recording, forcing you to start all over — which could be unfortunate if your first recording happened to be the camera original sound. With Sound-on-Sound, a duplicate "safe" copy of your original track and a lot of practice is the only way to insure against the heartbreak of lost or botched sound.

For most purposes, however, Sound-on-Sound will deliver an acceptable mix of two tracks. It is particularly useful when you want to fade and cross-fade tracks. And if you shot some parts of your film without sound with the idea of adding to them later, Sound-on-Sound will enable you to go in and out of the record mode easily and quietly, making it possible to transfer sound from tape onto a section in the middle of your film. You can watch the picture during the transfer, which helps to correctly position sound dissolves over picture transitions and to keep the correct sound perspective.

A better alternative to Sound-on-Sound recording, is a projector which records on the film's balance stripe. Dual-track projectors enable you to add a second track without interfering with your camera original sound. You can leave your single system sync recording alone and add additional sound from tape onto the balance stripe instead. If you don't like the way the two tracks sound together, it's easy to erase the balance stripe track and start over again, until you get the balance you want. Unlike with the Sound-on-Sound feature, you never jeopardize your camera original sync sound.

A projector with stereo recording and playback capability will give you even

greater control in mixing multiple sound tracks. Stereo capability makes it possible to mix tape recordings, or other sound sources with existing sound tracks, a clear track, or both at once in stereo. A cable connecting the output of one channel to the input of the other, enables you to bounce camera original sync sound to the balance stripe, and mix in music, sound effects, and voice-over narration in the transfer back to the main stripe. If your sound requires signal processing, a graphic equalizer, limiter, compressor, etc. can be used in line, as well as a dbx or Dolby noise reduction unit to reduce the tape hiss of re-recording. To play back true stereophonic sound, you can use the main stripe as track I and the balance stripe as track II. Entirely separate recordings can be placed on each track, and they can be played back together or individually using two separate sets of level and tone controls.

This much flexibility brings almost unlimited control over your soundtrack without the need for much additional gear. With a multi-track tape recorder, like the Fostex X-15, and a graphic equalizer, a stereo projector becomes the nucleus of a sophisticated sound studio — making it possible to create a rich, textured multi-track mix.

A good stereo projector for such applications is the Bauer T430 Servo. A stereo projector, the Bauer T430 Servo is capable of synchronous track-to-track sound transfers, features a 30 w amplifier output (2 x 15 w for stereo), and manual and automatic recording level control — important features for good sound mixing.

### ADVANCED SINGLE SYSTEM RECOMMENDED READING

*The Book of Movie Photography: An encyclopedia of movie making, written by David Cheshire.*

*Filmmaker's Guide to Super 8: Written by Super 8 Filmmaker for Super 8 filmmakers.*  
*Super 8 in the Video Age: A single system production manual for the beginner to advanced filmmaker, written by Brodsky & Treadway.*

*How to Shoot a Movie & Video Story: The technique of pictorial continuity, written by Gaskill & Glander.*

*Technique of Film Editing: A standard text on the principles of continuity, timing, and*

the selection and juxtaposition of shots, written by Reiz & Miller.

*The Use of Microphones:* A handbook of microphones, their characteristics, and application in sound recording, written by Alex Nesbitt.

All of the above titles, and many more, are available through Super8 Sound's Booklist.

## TECHNICAL SPECIFICATIONS

### ADVANCED SINGLE SYSTEM RECORDERS

#### Sony Walkman Professional

Format: Portable tape recorder with two tape heads.

Tape: 1/8" cassette tape.

Track System: 1/8 track.

Tape Speed: 1 7/8 ips, with variable speed control.

Record Level Meter: LED Peak Level Indicators.

Limiter circuit for distortion-free recording

Noise Reduction System: Dolby B & C.

Wow & Flutter: 0.04% wrms (NAB).

Signal/Noise Ratio: Dolby NR off w/Metallic 58dB w/EHF or CD 56dB w/BHF or HFX 54dB

Dolby NR On Improved by 5 dB at 1 kHz, by 10 dB above 5 kHz

Frequency Response: Dolby NR Off w/Metallic 40-15 kHz

w/EHF or CD 40-15 kHz

w/BHF or HFX 40-15 kHz

Total Harmonic Distortion: 1.0% w/Metallic.

Mic Input: Sensitivity 0.25mV (-70dB) w/low impedance microphone (mini jack).

Power Supply: 6 V, 4-AA batteries. External power input jack 6 V DC.

Dimensions: 7.25 x 1.60 x 3.75 inches.

Weight: 1 lb, 7 oz.

#### Fostex X-15 Four Track Cassette Recorder

Format: Portable 4-track tape recorder with two tape heads and "simul-sync" capability.

Tape: cassette tape, C-60 or C-90, IEC Type II for use at high bias position (CrO<sub>2</sub>).

Track System: 1/8 track.

Tape Speed: 1 7/8 ips, with variable speed control.

Noise Reduction System: Dolby B.

Record Level Meter: LED Peak Level Indicator.

Mic Input Impedance (x2): 10k Ohms or less.

Line Input Impedance (x2): 20k Ohms

Line Output (Stereo): 10k Ohms or more.

Tape Output (x4): 10k Ohms or more.

Record Track: 4 track, one direction.

Record Channel: 4 with Dolby NR type B in encode mode, records up to 2 tracks at a time.

Playback Channel: 4 with Dolby NR type B in decode mode.

Frequency Response: 40 - 12.5 kHz.

Signal/Noise Ratio: 60 dB.

Dimensions: 3" x 11 1/2" x 7 3/4".

Weight: 4.6 lbs.

### ADVANCED SINGLE SYSTEM PROJECTORS

#### Bauer T430 Servo Stereo

Projection Speeds: 18 and 24 f.p.s., and reverse projection.

Film Types: Super 8 and Single 8.

Reel Capacity: 600 ft.

Projector Lamp: 100W.

Projection Lens: Bauer Neovaran f1.2, 15.5 - 28mm.

Record/Play: Mono, Duoplay, and Stereo record and playback.

Recording Control: Automatic and manual record level control. Sound mix control for multiple recording (fade control).

Output: 30w amplifier output (2 x 15w for stereo).

Other Features: Built-in 10w speakers. Start/Stop of tape via sound mix control. Electronic frame counter. Manual inching knob. Still frame projection at glow light.

#### Elmo ST-180E Dual Track

Projection Speeds: 18 and 24 f.p.s., and reverse projection.

Film Types: Super 8 sound and silent.

Reel Capacity: 600 ft.

Projection Lamp: 100W.

Projection Lens: will accept any Elmo lens (see price list for details).

Record/Play: Dual track record and playback. Dual track playback balance control.

Recording Control: Automatic level limiter.

Output: 5 W at 4 Ohms.

Other Features: MIC and AUX IN inputs, mixing is possible with use of Aux In and Mic terminal. Ext Sp: 4 Ohms. Moni/Aux Out jack. 5" dynamic speaker built-in.

#### Elmo GS1200 Stereo

Projector Speeds: 18 and 24 f.p.s., search speed of 6 f.p.s., forward and reverse projection with speed compensation provision.

Film Types: Super 8 sound and silent.

Reel Capacity: 1200 ft.

Projection Lamp: 24V - 200W ESC Halogen Lamp. High and Low Brightness Selector.

Projection Lens: will accept any Elmo lens (see price list for details).

Record/Play: Stereo record and playback, sound-on-sound and sound-with-sound mixing, track to track transfer, optical playback in mono.

Frequency Response: 50 - 13 kHz at 24 f.p.s.

Tone Control: Separate Bass and Treble Controls.

Recording Control: Manual and automatic, separate tone controls for each track. Automatic and manual recording level control for microphones and auxiliary inputs.

Pulse synchronization: Possible. While projecting with pulse synchronization, magnetic recording or reproduction is possible.

Monitor: Earphones, VU meters for both tracks.

Output: 15W at 8 Ohms.

Other Features: Fully automatic threading. Piano key controls. Four separate motors for main electronic governor, take-up, rewind, and cooling fan. Still picture projection. Remote Control Projection. High Speed Film Rewinding. Frame Counter. Aux In (x2) and Mic (x2) input terminals. Ext Sp (x2): 8 Ohms each, Aux Out (x2): 600 Ohms each, output terminals. Two 5" dynamic speakers built-in.

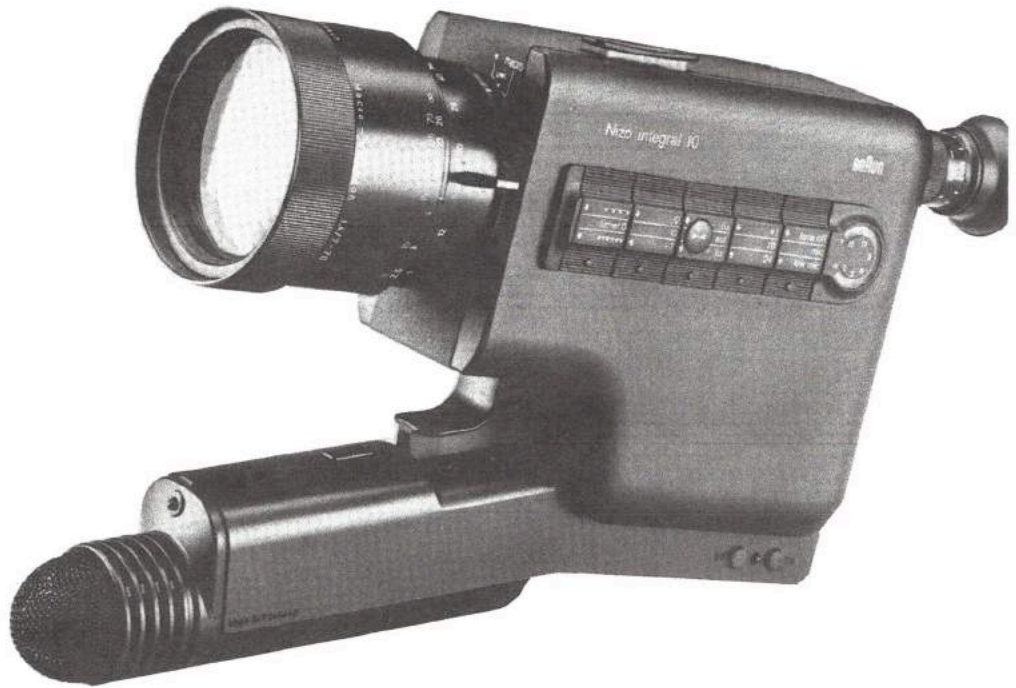
# NIZO INTEGRAL 10

So that you will never miss a scene, or ever make a mistake, the Nizo Integral 10 is engineered with automatic circuitry that greatly reduces the technical aspects of filming. There are none of the usual knobs, dials and buttons to confuse you. The Integral 10's sixteen separate functions are controlled by five unobtrusive sliding switches.

With these switches in their normal control position, you can shoot in day-light at 18 f.p.s., with automatic exposure and automatic record level. A quick glance shows if any switch has been moved up or down for time-lapse photography, indoor filming, backlight setting, single frame animation, filming at 24 f.p.s., mike attenuation, or phono input. For all its automation, the Integral 10 also features a manual exposure control which allows you to explore the artistry of film exposure.

The Integral 10 features an f/1.4, 7mm-70mm Schneider Macro Variogon lens, which can be focused quickly and accurately with its split image range-finder. The macro feature of this lens allows you to focus right up to its class and is wisely located at the wide-angle end of the zoom range. This means an ultra wide angle aspheric lens can be used; the one available for this camera opens your world up to 4mm (increasing the field of vision by a factor of three) without distortion. Ultra-wide aspherics not only let you film in cramped interiors, but also relieves the burden of focusing, and greatly minimizes the unsteadiness of hand-held shooting.

The Integral 10 is fitted with a telescoping directional microphone, a two stage automatic record level control and an integrated amplifier — facilities to make live sound recording easy.



Other practical features engineered with the filmmaker in mind are a rocker switch on top to power the zoom and a fade button. The trigger is squeezed down into the grip rather than back into the camera body. This simple, but important, innovation greatly reduces camera movement at the beginning and end of a shot — a built-in shoulder brace helps to steady handheld shots as well. The shoulder brace is adjustable for a custom fit and it folds away when not in use. Finally, the integral 10 is extremely quiet running for excellent sound recording.

## TECHNICAL SPECIFICATIONS

LENS: Schneider Macro-Variogon, f/1.4, 7-70mm w/ Macro & Power Zoom.

METERING: Automatic, with full Manual Override & +1 Backlight.

FILM SPEEDS: 18, 24 & Single Frame, Time Lapse Photography of one frame every 5 & 15 seconds.

SPECIAL EFFECTS: Fade In/Out

SOUND SYSTEM: Fully automatic with built in boom mike.

OTHER FEATURES: Built in shoulder support, remote release socket, and extremely quiet filming.

## ACCESSORIES

ULTRA WIDE LENS: This adapter lens will extend the wide focal length to 4mm, increasing the field of vision by a factor of 3.

TELEPHOTO EXTENDER: This will extend the telephoto to 105mm.

SOFT BLACK SHOULDER CASE: Custom fitted case with room for camera and three rolls of film and a few accessories.

MIKE EXTENSION SET: Will allow you to use the boom mike off the camera for optimum miking; will also allow you to connect other mikes to the Integral 10 or a line level source.

# NIZO 6080

The Nizo 6080 is the camera to translate your filming ideas into a technically perfect film. Capable of more special effects and trick photography than any other camera available, the 6080 is the ultimate in sound filming for the advanced Super 8 filmmaker.

Special effects like dissolves, fades, and double exposures are all executed at the touch of a button. A built-in micro-processor controls the rest. With a 200' film magazine, the 6080 is capable of unlimited rewinding and multiple-exposure over the entire length of the magazine. A Matte Box with special effects mattes will allow you to do such special effects as filming through a keyhole, binocular, or window, as well as split screen images and wipes. And to ensure proper double exposure, an exposure compensation control allows you to reprogram the 6080's light meter by fractions of a stop.

The 6080 also features variable film rates - from 54 f.p.s., to one frame every 15 seconds - for a host of effects, such as slow motion and time-lapse photography. These features, taken all together, make the 6080 capable of more special effects and trick photography than any other camera available.

For more straight forward shooting, the 6080 is engineered with "red dot" automatic circuitry that greatly reduces the technical aspects of filming. Set the camera's knobs and switches to the red dots, and you can shoot in daylight, at 18 f.p.s., with automatic exposure and sound level control. The 6080 also gives you both manual exposure and manual record level control, to allow you to explore the artistry of film exposure and sound recording.

The 6080 is fitted with a f/1.4, 7mm-80mm Schneider Macro Variogon lens. The macro feature of this lens allows you to focus right up to its glass, as well as use an ultra-wide aspheric lens.

Other extremely well engineered features in the 6080 are a graduated LED

record level indicator in the viewfinder; a P.C. flash socket for cable sync (the 6080 can be modified for crystal sync as well); 200' film capacity for ten minutes of uninterrupted shooting and film savings of up to 25% on large productions; Nicad batteries that can be recharged in or outside the camera; and, finally, the 6080 features a long zoom lever and big focus ring for the fastest zoom-in, focus, re-frame, and film action of any camera available. The 6080 is also the quietest camera available — an important feature for quality sound recording.

## TECHNICAL SPECIFICATIONS

**LENS:** Schneider Macro Variogon, f/1.4, 7-80mm (11 to 1), 2 speed power zoom with manual over-ride.

**METERING:** Automatic aperture control, with manual over-ride, + step backlight control, overall exposure compensation.

**FILM SPEEDS:** 9, 16, 18, 24, 25, & 54 f.p.s. single frame, and time lapse photography of one frame every 2, 5, or 15 seconds.

**SPECIAL EFFECTS:** Automatic fade in/out over 45 & 90 frames. Automatic Lap Dissolves over 45 & 90 frames. Automatic 90 frame backwinding with 50' ctgs, and unlimited backwinding with 200' ctgs, for multiple-exposure.

**SOUND SYSTEM:** Fully automatic ALC with limiter. Fully manual level control with limiter. Graduated LED level indicator in the viewfinder.

**OTHER FEATURES:** Built in shoulder support. Extremely quiet filming. Sound shut off switch. Remote release contact.



## NIZO 6080 ACCESSORIES

**BOOM MIKE:** Telescopic uni-directional electret condenser microphone: mounts on camera, with accommodations for matte box or the 200' ctg., or can be hand-held with mike extension cable; will deliver exceptional sound, with slight bass roll off, powers from the camera and comes with wind-screen.

**MIKE EXTENSION CABLE:** Will allow you to use the boom microphone off the camera for optimum miking. You need this special cable because of the 3 pin Din connectors of the 6080 boom mike.

**XLR to DIN ADAPTER CABLE:** Will adapt any mike with an XLR plug to the 6080's 3 pin Din input. Any mike can be hard-wired for the 6080. If you would like to wire your own microphone, 3 pin Din plugs are readily available.

**HEADPHONE MONITORS:** Sennheiser high impedance professional headphones for high fidelity monitoring of the audio signal.



**MATTE BOX W/EFFECTS MATTES:** Same as the universal matte box, but with a custom mount for the 6080. Contains numerous mattes for effects like key holes, binoculars, center cuts, zig zags, window frames, etc.; a glass plate for tilting; moving bellows; vaseline and much more.

**ULTRA WIDE LENS:** This adapter lens will reduce the focal length of the 6080 lens to 4mm, increasing the field of vision by a factor of 3.

**TELEPHOTO EXTENDER:** Will increase the focal length of the 6080 lens from 80mm to 120mm.

**SOFT BLACK SHOULDER CASE:** Traveling case, with shoulder strap, for the 6080 with accommodations for a loaded 200' ctg.

**CUSTOM METAL CASE:** A custom designed metal case for the 6080, with a layered interior to accommodate all the 6080 accessories, as well as three 200' ctgs of film.

**ZOOM RING EXTENSION:** 1½" Extension lever for smoother manual zooming.

**NICAD BATTERY PACK (ACCUMULATOR):** The 6080 runs on six AA, 1.2 volt, Nicad batteries loaded into a pack for quick battery changes. A

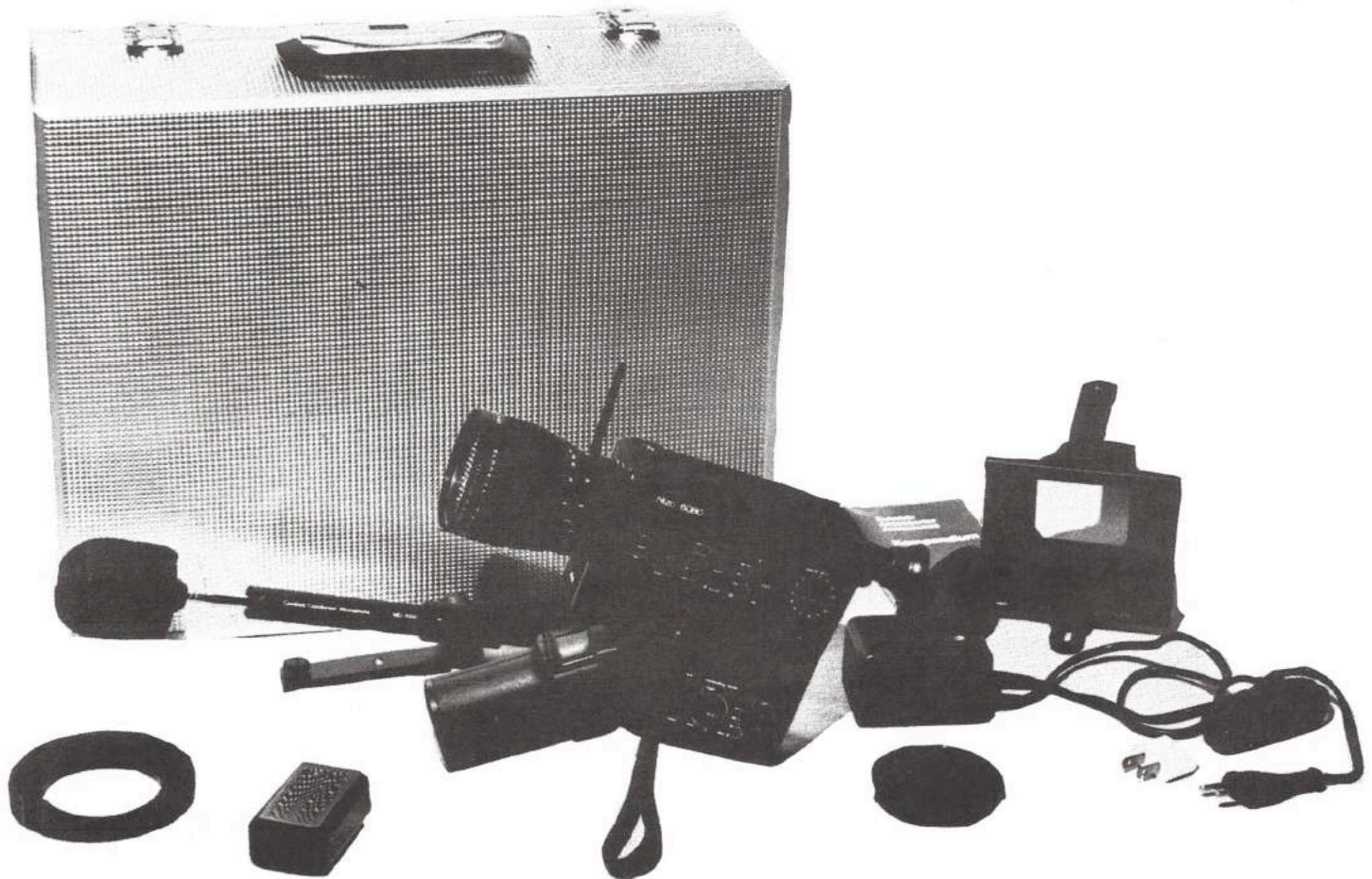
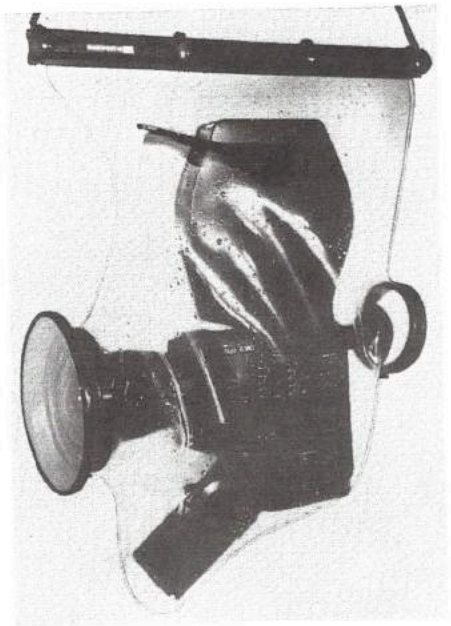
pack can be reloaded with fresh Nicad batteries, or you can use complete additional packs for quick battery changes. The 6080 will not run on standard AA batteries because they are 1.5 volts.

**BATTERY CHARGER:** Recharges the 6080 Nicad pack, inside or outside the camera.

**MARINE UNDERWATER HOUSING:** Extremely useful for protecting your camera while filming under adverse conditions, such as rain, snow, salt water, sand and mud. These housings are tested for underwater depths of up to 30' as well.

**SOUND BLIMP:** Custom sound blimp for the 6080. If you have never used the 6080, do not assume that you will need a blimp. Our experience has shown that under most conditions you will not need to blimp the 6080.

**OPERATING MANUAL:** We make the 6080 manual available so that you can know as much about the camera as possible before your purchase. If you buy the manual separately, please inform us at the time of the camera purchase and we will deduct it from the price of your purchase.



# The New Beaulieu 7008 Series Cameras



The introduction of the new Beaulieu 7008 cameras, the 7008S & 7008 PRO, firmly establish Super 8 as a professional production format. Similar in design to 16mm cameras, with such features as mirror shutters, ground glass focusing, interchangeable C-mount lens, and a crystal sync camera control, the new Beaulieu 7008 cameras further advance the professional production capability of the Super 8 format. In addition, Beaulieu has engineered into the new 7008 cameras a digital frame counter for the precise placement of multiple exposure effects.

## ANGÉNIEUX OPTICS

The new Beaulieu 7008 cameras come with an f1.4/6-90mm Angénieux lens, with multi-coating for excellent color rendition, and a unique macro focusing capability that enables you to focus down to two feet at any focal point in the lens's normal range (6mm to 90mm). The wide range of focal lengths in the Angénieux's 15:1 zoom ratio — the greatest of any Super 8 camera — is the equivalent of having a wide range of interchangeable fixed focal point prime lenses to choose from.

The 7008 cameras feature a variable

speed motorized zoom that will travel the 15:1 range in from 4 to 10 seconds, and a quick zoom button for dramatic zoom effects. Because it is almost impossible to get steady hand held shots beyond 40mm, the Angénieux engineers have built into this lens a manual lock to prevent it from accidentally zooming out past 40mm.

## INTERCHANGEABLE LENS

For filmmakers who require still greater telephoto or wide-angle capability, the 7008 cameras feature a C mount that offers the option of using a full complement of interchangeable fixed focal point prime lenses. For instance, you can use any 16mm C-mount prime lens for exceptionally sharp results; or, with adapter rings, you can use the 200mm telephoto lens of a 35mm still camera to get an incredible 1200mm effect with the 7008. Though the capabilities of the Angénieux are such that you would hardly ever have reason to use this interchangeable feature, the lens potential of the new Beaulieu 7008 cameras leave nothing to be desired.

The C-mount also makes the 7008 cameras ideal for scientific research. They can be mounted on microscopes, telescopes, or anywhere a 35mm SLR camera

can be mounted for research applications.

## DIGITAL FRAME COUNTER

The digital frame counter of the 7008 cameras counts frames, forward and backwards from 0000 to 9999, i.e. over a period of seven minutes at 24 fps. Such precise backwinding control enables you to do a number of lab effects in camera. Not only will you be able to place lap-dissolves precisely on a designated frame, but you will also be able to adapt the rhythm of the lap-dissolve to the particular sequence. Such control will also enable you to superimpose a title with a gradual fade-in at the right moment and for the required time, before fading out again.

The backwinding capability and digital frame counter of the 7008 cameras also give you the control required to create matte effects such as split screen images. By using a matte box and mattes to first limit the effective area of exposure to one part of the picture frame, and then backwinding the film to the exact beginning to expose the other part, the 7008 cameras enable you to film lab effects like split screen images in camera.

When doing such special effects, a 50-foot cartridge allows you to backwind the film for a full 10 seconds of double exposure. But to give you even greater creative control the 7008 cameras accept the 200' of cartridge which allows you to backwind over the entire length of the twelve minute cartridge.

## MIRROR SHUTTER

Designed more like 16mm cameras than Super 8 cameras, the Beaulieu 7008 cameras employ a mirror shutter. Set at a 45 degree angle with a guillotine action that allows all incoming light to go to the film when the shutter is opened, and to the viewfinder when it is closed, the mirror shutter of the 7008 cameras give them the professional capabilities of 16mm cameras. It enables you to see through the viewfinder the effect of the selected aperture on the depth of field in a particular scene. In executing fades the guillotine principle of the variable shutter enables you to hold the aperture while closing the shutter, as opposed to closing the aperture (the method by which fades are executed in most other Super 8 cameras). Shutter fades give a much better picture quality with fade-ins and fade-outs.

There are two settings for the shutter

— normal and low light. The respective speeds are 1/72 and 1/40 second at 18 fps, and 1/96 and 1/60 second at 24 fps.

## SOUND SYSTEM

The 7008S features Beaulieu's patented "Hall Sensor System" — an electronic design that incorporates a captor and magnet to keep a perfect loop between the picture gate and the sound head. This innovation keeps "wow" down to an incredible and inaudible 0.3 percent. The frequency response is from 50 to 12,000 Hz at 24 fps with a signal to noise ratio of 60 dB. The quality of sound is then better than that of the average tape recorder or projector.

## DOUBLE SYSTEM SOUND

A flash/sync contact on the 7008S enables you to record double-system sound in lieu of, or along with, the built in sound system. Double system filmmaking is accomplished by using two pieces of equipment — a camera and a Super8 Sound Magnetic Fullcoat Recorder. In this sync set-up, called "cable sync", a cable connects the camera's flash/sync output to the sync input of the Super8 Sound Recorder, and the recorder maintains sync against the sync reference pulse generated by the camera's flash/sync contact.

Finally, the 7008S enables you to control the speed of action by shooting at 4, 9, 18, 25, 36, or 56 fps (sound film can only be shot at 18 or 24 fps). It will accept the Kodak 200' sound cartridge for twelve minutes of uninterrupted shooting. The 7008S also features single-frame capability and built in interval times that will expose 1 frame per second, 1 frame per 10 seconds, or 1 frame per 30 seconds. The 7008 will run on rechargeable nicad batteries or alkaline batteries, and can be remotely powered by a 9v battery pack.

## BEAULIEU 7008 PRO

For complete freedom and mobility in shooting double system, Beaulieu has built a crystal sync control into a professional model of the 7008, the 7008 PRO. Crystal sync, preferred by professionals for its added flexibility, requires a crystal motor control in the camera and a crystal oscillator in the recorder — but no cable to trip over or pull loose.

With crystal sync, the cameraman is free to shoot from the best vantage point

with no thought to the sound. The sound person can likewise pick the most desirable spot to record from, independent of the camera. There is no cable or other physical connection between the two. Great angles, tight miking, no umbilical cord, and yet it is all in exact lip-sync with the accuracy of a quartz watch. The new Beaulieu 7008 PRO further enhances the professionalism of double system Super 8.

The 7008 PRO has the same superlative features as the 7008S with the notable exception that it is a silent camera - it will accept sound cartridges so that you can shoot striped film and transfer your sound for single system projection without having to send your film off to a lab to be striped. The only other difference between the 7008S and the 7008 PRO is slow motion. The 7008S has speeds of 4, 9, 18, 24, 36, and 56 fps; the Pro gives you the additional option of shooting at an incredible 80 fps, instead of 56 fps.

## TECHNICAL SPECIFICATIONS

FORMAT: Super 8

LENS: Angénieux 6-90 1/1.4 macro zoom Interchangeable (fitted with Beaulieu mount)

DIAPHRAGM: Fully automatic settings provided by a servomotor. Automatism can be uncoupled for manual setting. Exposure check by LED in the viewfinder. Memory lock provided.

ZOOMING: Electric and manual. Zooming speed control. Instant start/stop.

FOCUSING AID: Automatic control rapidly sets the lens to minimum depth of field (maximum focal length with diaphragm to full aperture).

VIEWFINDER: Reflex. Fine grain focusing screen. Exposure, power and sound recording check by means of LEDs.

FILMING SPEEDS: 4, 9, 18, 24, 36 and 56 fps with silent cartridges. 18 and 24 fps with sound cartridges. Single frame filming capability. Time-lapse filming possible (3 speeds).

SHUTTER: 45° mirror-type. 2 settings: normal speeds and low light, allowing shutter speeds from 1/10 to 1/210 sec.

EXPOSURE METER: CdS cell. Center-weighted. TTL metering. Film speed range: ISO 12-400.

FRAME/CENTIMETER COUNTER: Digital additive-type counters. automatically set back when loading the camera. Manual set back available for frame counter.

CAMERA LOADING: Instant loading with sound or silent 15m/50ft or 60m/ft cartridges.

CAMERA RELEASE: Electromagnetic trigger. Remote control.

POWER SUPPLY: Six R6 type NiCad. 1.2V batteries with sintered electrodes. Possible supply from "Power Pack". External power supply possible (from a 12V battery). Power supply by switch.

FADES: Fade-ins/fade-outs: picture + sound. Lap dissolves: picture + sound.

INPUT SOCKETS: Microphone/(DIN) line (ø 3.5 jack). External power supply. Remote control. Charge.

OUTPUT SOCKETS: Flash synchronization. Earphone.

SOUND: Sound recording on pre-stripped film. Built-in amplifier. Picture/sound gap: 18 frames (standard). Sound modulation LED. Sound over-modulation LED.

DIMENSIONS: 310mm x 157mm x 90mm with Angénieux 6-90.

WEIGHT: Body only: 1.280 kg. Angénieux 6-90/1.4 zoom: 1.140 kg.

## AMPLIFIER SPECIFICATIONS

INPUTS: 3 sensitivities voltage:

- 1) 0.12 mV to 30 mV.Z. = 5 K;
- 2) 3 mV to 200 mV.Z. = 100 k;
- 3) 40 mV to 1.2 mV.Z. = 500 k.

BIAS: HF signal 60 KHz.

NOISE/SOUND RATIO: "Non attenuated": 60 dB.

DISTORTION: At maximum modulation; manual = 0.3%, auto = 0.4%

OUTPUT LEVEL: Maximum modulation.

## DIFFERENTIATING PRO SPECIFICATIONS

FILM SPEEDS: 4, 9, 18 24/25, 36 and 80 frames per second, with silent or sound cartridges. Selection 24-25 fps, via a control on the slide, at the back of the camera. Single-frame filming capability, at any speed. Time-lapse filming possible (3 speeds).

DOUBLE SYSTEM SOUND SYNC: By quartz (optional synchro quartz slide).

NO SINGLE SYSTEM SOUND CAPABILITIES

# Beginning Double System Filmmaking



by Guy Holt

Double system is the most flexible means of producing a motion picture. Most 16mm and all 35mm films are made in double system because of the creative freedom it allows. Available in Super 8, double system will give you the same versatility and control over the filmmaking process in Super 8 as in the larger formats.

Professional applications of Super 8 began with the introduction in 1973 of Super 8 magnetic fullcoat and the development by Super8 Sound of a versatile magnetic fullcoat recorder - the Super8 Sound Recorder. Now, with the introduction to the consumer hi-fi market of equipment — such as compact cassette recorders with Dolby noise reduction circuitry, four channel cassette tape recorders, mixers, and 10-band stereo equalizers, etc. — with professional capabilities, virtually every double system production and post-production sound film technique can be accomplished with today's sophisticated Super 8.

Still, Super 8 magnetic fullcoat is the keystone of sync double system production. Analogous to the magnetic film which for years has been the industry standard in 16mm and 35mm production, Super 8 magnetic fullcoat has the dimensions and sprocket holes of Super 8 film, and a magnetic oxide surface like that on

sound recording tape. Super 8 magnetic fullcoat allows Super 8 to be edited in exactly the same way 16mm and 35mm films have always been edited.

With picture and sound on separate strands of material that are both sprocketed, picture and sound are cut and spliced, frame for frame, on an editing bench or flatbed editing table, to maintain sync. The advantage to editing with sound on magnetic fullcoat is that it allows the sound and picture to be cut independently, and it is this creative freedom that is essential for developing film as a medium to its fullest.

Film sound is recorded on magnetic fullcoat with a Super8 Sound Recorder I, II, or Mag IV. Super8 Sound Recorders are multi-purpose machines able to synchronize the rate at which they transport magnetic fullcoat to that at which cameras and projectors transport film, thereby maintaining sync throughout production.

Many films made in double system are edited with several magnetic fullcoat tracks to accompany the picture. The use of multiple tracks allows music, narration and sound effects to be added to the original sync sound. After the editing is complete, a four-channel mix re-records the different soundtracks into a composite track to achieve a durable balance. This

composite track is then transferred back onto the edited film via a double system projector and a Super8 Sound Recorder.

When getting into double system production it is important to remember that double system, as its name implies, is a system of filmmaking that utilizes separate, but compatible, components. Like a puzzle, your picture will be incomplete until you fit these pieces together in an integrated process of filmmaking. But once the pieces fit, you will have the same creative freedom and control in Super 8 as do professional filmmakers in 16mm and 35mm film production, and at a fraction of the cost.

## DOUBLE SYSTEM PRODUCTION

Double System Production is a synchronous recording system in which the soundtrack is recorded outside the camera — that is, the magnetic recording medium and the film are entirely separate at the time of filming.

The advantage to double system production is that location sound is recorded directly onto easily edited magnetic fullcoat with a Super8 Sound Recorder. The better electronics and the wider track width, as well as the manual record level control and peak level indicator of the Super8 Sound Recorder enables you to record higher fidelity sound; while a high quality uni-directional condenser microphone, independent of the camera, enables you to mike for optimum sound recording without compromising camera angles. In all, double system production greatly improves the fidelity of location sound recording, as well as allowing for more creative options for a film's soundtrack.

The problem of double system production is syncing the sound on tape to the picture on film. Even the best cameras and recorders do not run exactly at speed, and only a slight fluctuation is enough to lose sync. Special technology is then required if in the end sound is to emanate from the screen in perfect sync with the picture.

Of the sync systems on the market today, the Super8 Sound Recorder is the most versatile. The Super8 Sound Recorder is a portable reel-to-reel recorder that records directly onto easily edited Super 8 magnetic fullcoat, and combines the function of location recorder, laboratory resolver, sound studio dubber, and transfer recorder. In fact, David Cheshire

in his "Book of Movie Photography" calls it "the very heart of double system sound."

As a location recorder, the Super8 Sound Recorder will record in sync with most Super 8 cameras, with no modification to the camera necessary. The only basic requirement is that the Super 8 camera (silent or single system sound) be equipped with a PC flash contact (most cameras are factory equipped with such a flash contact).

The PC flash contact, which was originally designed to permit electronic flash to be used in conjunction with time-lapse cinematography, here serves as a sync reference pulse generator. If instead of a flash, the Super8 Sound Recorder is cabled to the PC flash contact, this once-per-frame switch will produce a single on/off pulse for every frame of film. If the speed of the camera varies, so does the number of pulses produced. The digital pulses generated are an accurate reference of the camera's speed.

The Super8 Sound Recorder uses this sync reference to match its speed to that at which the film is exposed in the camera. It accomplishes this by producing its own pulses optically by a light-emitting diode shining through the perforations of the magnetic fullcoat. The phase difference between the internally produced pulses and the camera's pulses provide the basis for a moment-to-moment servo control of the rate of the magnetic fullcoat.

Such electronic servo-control of the recorder's speed insures that for each frame of film exposed in the camera exactly one sprocket hole of magnetic film passes the magnetic head of the Super8 Sound Recorder. Hence, there is produced for every frame of picture on film, a corresponding frame of sound on fullcoat. With equal lengths of fullcoat and film for each scene, picture and sound can then be locked in frame-for-frame correspondence, on an editing bench or table, to maintain sync during viewing and editing.

The Super8 Sound Recorder will also pace itself to the pilot-tone sync reference signal generated by some older Nizo and Beaulieu cameras. And for use with crystal-controlled cameras, without a connecting sync cable, it will sync to a built in crystal oscillator at 24 fps.

Location sound can alternatively be recorded onto cassette tape, with a crystal pilot-tone cassette recorder like

Super 8 Sound's LXR6. Recording location sound onto cassette recorder has its advantages (see Advanced Double System); but, it must still be transferred, in sync, to magnetic fullcoat for double system editing.

## DOUBLE SYSTEM EDITING

Double system editing refers to the editing of picture and sound on separate medium, with the sound recorded on sprocketed magnetic fullcoat.

There are a number of advantages to editing double system: one advantage is that with picture and sound on separate strands of material, they can be locked in frame-for-frame correspondence on an editing bench or table, thereby eliminating the 18 frame gap between a picture and its accompanying sound of single system, or sound-on-film production. Called "editing sync," this allows picture and sound to be cut independent of one another, so that they may be freely combined without losing important passages of dialogue or sync.

The creative freedom of double system editing lies in this ability to freely combine picture and sound. For instance, the only easy way to intercut between two actors engaged in dialogue, without losing bits of it when editing with sound-on-film, is to cut to each actor as they begin to speak. The end result, however, is a one second pause between the end of the first actor's line and the start of the second actor's line. This is acceptable for the most part, but at times it can destroy dramatic effect.

By comparison, double system editing allows for much greater creative freedom. Editing double system it is possible to overlap one actor's line with a reaction shot of the other listening, and this can be extended into all or part of the reply. Such overlapping of dialogue generates a subtle narrative switching from character to character, which cannot be achieved with simple shot-for-shot editing. For example, you can manipulate not only shot length but also the pace and therefore relative importance accorded to each participant in the dialogue.

Cutaways, or the insertion of enriching visual details to a master shot without interrupting the sound continuity, are easily accomplished in double system editing as well. A cutaway may be simply a shot of something or somebody offscreen to which the main characters are referring.

Or it may be something at a distance — in either time or space. It may well be an image that is quite unrealistic, inserted as a metaphorical comment on the action or on one of the characters. Whatever its purpose, in double system editing, a cutaway is as easy to perform as replacing the same number of frames of one image with another in the picture roll.

## The Editing Bench

The Super8 Sound Editing Bench has become the standard for filmmakers who are working in double system Super 8. Their popularity is partly due to their low price (about 1/3 of a comparable horizontal editing table), but also because the editing benches provide many of the operating functions and convenience of horizontal editing.

Modeled after and fashioned of 16mm editing bench components, the basic bench consists of a viewer, sync block, rewinds, a sound reader and a "squawk box" or amplifier. It incorporates all the traditional editing techniques of 16mm filmmaking, yet overcomes many of the problems usually encountered in editing with a sync block and rewinds. For instance, differential rewind adapters allow Super 8 reels to fit on 16mm rewind shafts and eliminate the familiar problem of "reel banging" in order to take up slack caused by reels of different diameters on the same shaft. Because the adapters provide true differential action between the reels of sound and picture, they allow the editor to move either strand independently without having to spend time adjusting clamps and spacers.

Another well engineered feature is an unusual sliding magnetic sound head assembly which permits sync "tuning," over a range of 12 frames in either direction from a referenced point in line with the viewer, while running at sound speed. This simplifies finding sync in difficult passages, such as scenes with no clapmark.

The essential component of the editing bench is the sync block or synchronizer. It can have two, three, or four sprocketed wheels, called "gangs," into which the rolls of film and magnetic fullcoat are "locked" to maintain sync. One, two, or three sound heads (one for each fullcoat channel) enable the fullcoat tracks to be monitored (the gate of the viewer is in line with the sound heads). In this way, one roll of film may have up to three tracks of sound running in sync with

it—one dialogue track, one music track and one effects or commentary track, for example.

The first step to editing double system is to lock the picture in sync with its accompanying sound on the sync block.

### “Slating”

The initial syncing up of picture and sound is easy to do if there is some common start mark — that is, a distinct event that can be seen clearly in the picture and heard on the soundtrack — that enables you to establish the precise starting point of both elements. For example, the closing of a car door would suffice.

The usual method of establishing common start marks for each shot is to use a “slate.” This is a piece of board with a hinged section and a piece of slate on which information can be chalked. Information written on the slate includes the production company, name of film, director, camera person, scene and take numbers, sound take number, camera and sound roll numbers and date.

Before each shot, the camera is pointed at the slate (positioned in front of the intended action) and when the camera is running and the recorder is registering the sync pulse properly, someone calls out the shot number and “claps” the two sections of the slate together. When syncing up, this simple device identifies the shot in both sound and picture, and because you can not only hear but also see exactly when the clapper falls, you have an accurate sync reference point for each shot.

### Establishing Sync

Syncing-up is then accomplished by locking the picture and sound into the sync block where the clapperboard closed. With a wax pencil, the picture is marked with a boxed X, and the corresponding frame of sound is marked with three bars, III, using an indelible ink sharpie. The shot and take number are then written ahead of these marks for both picture and sound.

For convenience of continuous sync replay from one shot to the next, the spacing between successive shots is adjusted so that picture and sound follow in the same synchronization as that of the preceding shot. Where there is picture but no sound, this step consists of inserting spacer in the sound role; and,

likewise, where sound runs on after the picture, spacer is inserted in the picture role. Intervening silent shots and wildtrack sound can be cut out at this stage and wound onto separate rolls.

The synchronized film is assembled from left to right across the sync block, with the edited rolls growing on the reels on the right-hand rewind arm. When the syncing is complete, each roll should have one set of start marks at both the head and tail, along with proper labeling so that footage can be easily identified and put in sync when needed.

All of the good takes of sync material can now be viewed with sound in the sequence in which they were shot. While in this form the material is viewed, re-viewed for content, and the cutting style is decided upon.

### Rough Cutting

The actual editing begins by making a rough cut — that is ordering the shots in the sequence in which they are to appear. At this stage sync sound and picture are cut parallel, making a “straight” or editorial cut. Sound overlays (where the sound from one shot runs over the next) may be allowed, but the cut in picture is marked on the soundtrack.

Besides ordering the footage, rough cutting usually consists of trimming excess sound — typically, with sync sound footage, there is more sound than picture because the recorder is started before, and stopped after, the camera. The sound trims, called “out-takes,” are marked with an indelible ink sharpie and stored in chronological order on a separate reel in case they are required later for further sound overlays.

### Fine Cutting

At the fine cut, further sound and picture are cut away, and these out-takes are added to the out-take reel in chronological order as before. Before any complex non-parallel cut is made, it is assured that sync can easily be found again both before and after the region of the cut. This work is done on the left of the sync block so that the cut just completed has to pass through the sync block and can be checked for sync before it is wound onto the take-up reels on the right.

### Track Laying

To save time during the fine cut, many filmmakers edit picture, with sync sound, using only one channel for magnetic

fullcoat (two soundtracks require six splices instead of four, every time a section of footage is added). In this method of program assemblage, where there is no sync dialogue, either sync sound effects recorded at the time of filming are retained on the magnetic fullcoat track, or narration is laid in the gap.

When the picture editing is complete, to make the mix easier, this sync soundtrack is split into two or more strands, according to some simple rules and additional tracks are built up.

In double system Super 8, it is possible to mix sound from a number of different sources. A filmmaker editing with magnetic fullcoat can build a soundtrack from such varied sources as sync sound, wild sound, voice-over narration, music, sync sound effects, and wild sound effects; and combine these separate elements in a durable balance. Magnetic fullcoat tracks can be faded, cross-faded (called a “segue”), and balanced for a realistic sound perspective — creating a textured, three-dimensional sound on a composite track. But to take full advantage of the creative potential of double system editing requires careful planning and preparation for the mix.

In preparation for the mix, the constituent parts of the fine cut soundtrack — dialogue, sync effects, wild sounds, etc. — are separated onto different tracks; and additional sounds, such as music and commentary, are laid in.

Different types of sound are segregated, partly so that you can know what to expect from each track during the mix, but primarily so that the number of adjustments made during the mix are minimized. For example, if you lay tracks so that only one contains narration (which is usually recorded at a constant level and quality), you only have to set the level once for that track and then leave it alone.

The sound effects track is built from library effects, which are selected and transferred to magnetic fullcoat for this purpose, and wild tracks which were specially shot during filming. At this stage the music track may also be laid: where it is dominant it will already have been arranged for the picture cuts to be related to it, or alternatively for specially composed music to match the picture. Commentary that has been pre-recorded is also laid at this stage.

If you plan a sound dissolve from one scene to another, you must put them on separate tracks and overlap the head and

tail extensions of each scene (just like A & B rolling a picture dissolve — see Advanced Double System Filmmaking). This usually requires going back to the out-takes to find the extensions. In the mix, the outgoing scene is faded down, while the incoming scene is faded up — putting in extra overlap will allow you greater flexibility during the mix.

### Common Start Marks

After the soundtracks have been assembled in this manner, common start marks are established to aid in syncing up the soundtracks relative to one another on a multi-track recorder for mixing (see Photo Start below).

Common start marks are made by, first, splicing black leader to the head of the picture role, and then punching out (with a one eighth inch paper hole punch) frames one and two feet before the start of the film. With the picture and soundtracks locked in sync on the sync block, beep-tones (magnetic tape on which has been recorded a 1000 Hz tone) are adhered to the frames of the soundtracks corresponding to the punched out frames of the picture.

These common start marks will serve several purposes. They will be used to transfer the magnetic fullcoat tracks, in sync relative to one another, to a multi-track recorder for mixing. They will also indicate if the transfer of the magnetic fullcoat tracks to the multi-track was, in fact, successful and in sync relative to one another when they are heard in unison as one beep upon playback. Finally, when transferring the mixed composite track back to the film's magnetic edge strip, these same common start marks are also used to sync up the picture and sound.

At the end of the film a frame is punched out of the tail leader and beep-tones are adhered to the corresponding frames of the soundtracks. These sync marks, likewise, will indicate that all the tracks remained in sync during the mix if they beep when the punched out frame passes through the projector gate.

### MIXING

The basic approach to mixing multiple tracks of Super 8 magnetic fullcoat is to use a four-channel cassette tape recorder, like the Fostex X-15, in conjunction with a Super8 Sound Recorder and a multi-channel mixer.

Four channels will enable you to mix

up to three sync tracks (one channel carries a sync control track), or more with progressive mix-downs. Wild tracks — from wild recorders carrying loops of room-tone, wind effects, etc. — may be fed into the mixer at the same time as well.

### The Control Track

To mix multiple soundtracks on a multi-track recorder, a sync control track is recorded on one channel of the four-track recorder to ensure that sync is maintained throughout the mix. The control track consists of a "pilot-tone" (a 60 Hz sine wave) generated by the Super8 Sound Recorder and recorded parallel to the first sync soundtrack as it is transferred from the Super8 Sound Recorder to the four-track recorder.

This control track serves two purposes: first, it serves as an indication of the rate at which the first sync track was transferred to the four track recorder, so that during subsequent transfers sync can be maintained between magnetic fullcoat tracks. Second, the control track, typically recorded with the Super8 Sound Recorder operating in AC line sync, serves as a sync reference so that sync is maintained when the mixed sound is later transferred back to the picture.

At every stage of post production it is the Super8 Sound Recorder that, in fact, maintains sync — the control track only serves it as a sync reference. In the first case, the pilot-tone sync pulse, when played back to the Super8 Sound Recorder's speed-matching circuitry, enables the Super8 Sound Recorder to vary its speed to match any variations in the speed of the four track recorder playing back the sync sound. Thus, the same Super8 Sound Recorder that transferred the first magnetic fullcoat track can transfer a second magnetic fullcoat fullcoat track with additional sync sound, to a third track of the four track recorder, while maintaining sync with the first magnetic fullcoat track — all that is required is that the Super8 Sound Recorder (transferring the second magnetic fullcoat track), and the four-track recorder (playing back the first magnetic fullcoat track) be started together. This is accomplished using the common start marks established for each track, and a common start device called a PhotoStart.

### PhotoStart

The PhotoStart is a light and audio sensitive remote switch that can be

triggered by either the flash frame of the picture startmark or the 1000Hz beep tone of the soundtrack startmarks.

For transfers of magnetic fullcoat tracks in sync to a four track recorder, the PhotoStart will trigger the Super8 Sound Recorder to begin the transfer of a second fullcoat track when its audio sensing circuitry is activated by the first startmark of the soundtrack recorded previously and being played back on the four-track recorder. With the common start of the two soundtracks, the Super8 Sound Recorder maintains sync against the pilot-tone control track, as the four-track recorder records the second soundtrack in sync with the first.

Upon playback, the second beep-tones will indicate if the two soundtracks in fact started in sync. If they are heard in unison as one beep, the transfer was successful and the first and second soundtracks are in sync relative to one another. If they are heard as two distinct beeps the tracks are not in sync, and the startmark on the magnetic fullcoat in the Super8 Sound Recorder must be displaced to the right in order to compensate for the start-up of the Super8 Sound Recorder. Once you have established, by trial and error, the displacement required for a perfect sync transfer (usually no more than eight frames), it will not change and the third track can be transferred in sync with the first two.

In the second case above, after all the layed tracks have been transferred in sync to the four-track recorder, the Super8 Sound Recorder, likewise, maintains sync against the control track during the mix down.

### "Blind" Mixing

A "blind" mix (without picture) is accomplished by patching the soundtracks from the multi-track recorder through a multi-channel mixer and into the Super8 Sound Recorder's audio input. So that the Super8 Sound Recorder maintains sync during the mix, the control track from the four track recorder is plugged into the Super8 Sound Recorder's sync input.

Again, the Super8 Sound Recorder's speed matching circuitry enables it to vary its speed to match any variations in the playback speed of the four track recorder that could cause sync to be lost. That is, the Super8 Sound Recorder produces a corresponding frame of sound for every frame of picture on film,