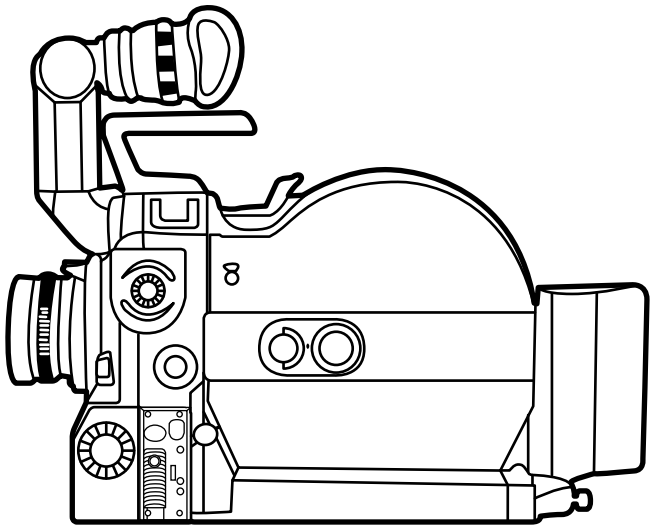
ARRI™ 16SR BOOK

A Guide to the 16SR-1 and 16SR-2 System



THE 10 COMMANDMENTS OF CAMERA CARE

The Arriflex 16SR Is one of the easiest cameras to use and maintain now available. With these 10 simple rules kept in mind, any professional can take out an SR for the first time and successfully work with it. The 16SR Book Illustrates and explains the principles behind these 10 rules, and makes the job of working the 16SR that much easier.

1. DON'T OIL, SPRAY. LUBRICATE or NOSE GREASE anything - not the aperture, not the film rolls, not the lens or lens mount ... because the camera runs totally dry.

2. **DON'T slam magazines on camera ... because mag gears can dent and you might put an extra perf in the film.**

3. **DON'T wiggle the On-Board Battery ... because it can crack inside. Slide the battery straight up or down.**

4. DON'T blast air into the mirror area ... because you could blow the light meter pin away.

5. DON'T pull up on film guide rollers in the mag ... because this isn't an ARRI S.

6. DON'T exceed tripod mounting hole depth ... because there are electronic parts inside the base.

7. DON'T clean the eyepiece without using lens fluid first... because the coating is soft and will scratch,

8. DON'T force anything ... because everything fits logically.

9. DON'T carry camera by eyepiece, lens or mag ... because handgrip or handle is safer.

10. DON'T take anything apart yet ... BECAUSE you should read these instructions first.

CAMERA PREP

PROCEDURES

You have probably worked with a 16SR before. But, for the purposes of a quick review, let US assume that you have spent the last twenty years on an anthropological expedition to the remotest corner of the earth. You have just returned, and are staring down at two cases labeled “Arriflex 16SR”.

When working on this or any camera, find a well-lit work surface. Lay out a soft, no-slip pad. A white terry bath towel borrowed from a hotel bathroom will do very nicely. It provides a soft cushion to protect the equipment from nicks and scratches, and prevents tools and parts from rolling around.

Wait! Do NOT take anything apart.

The ARRI 16SR is basically maintenance free. You will spend most of your time cleaning and checking. If a repair must be done, it should usually be at an authorized ARRI service facility. Once taken apart, the camera flange focal depth must be recalibrated.

Although the 16SR is highly complex, it is modular in construction. Repairs can be made quickly - faster, in fact, than on previous ARRI cameras.

- Do NOT force anything. Everything FINGER TIGHTENS that should be tightened. Use common sense.
- Do NOT use over or undersized screwdrivers. You will burr the screw heads, and make things more difficult. Use only the right tools. Tools for the 16SR are METRIC.
- NEVER use a Q-TIP on any cameras. Q-Tips contain lint. Make your own swabs out of orangewood sticks (available at drugstores) with lens tissue wrapped around the end. In a pinch, wrap the lens tissue over the shaft of a Q-Tip to contain the lint. Tapehead cleaning swabs, made of lint-free foam work very well.

NEVER use ACETONE. It will remove point and enamel. The strongest solvent you will need on the camera is lens fluid or denatured alcohol.

Do NOT grease or OIL the camera. It runs dry.

Now, take the camera out of its case, Do NOT pick it up by the eyepiece or lens. Use the handgrip, carrying handle or camera body.

MOUNTING THE CAMERA

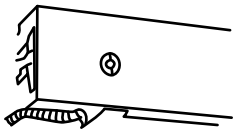
Let’s say you’re in a rental house or at a production company checking out the equipment for a shoot.

Note how everything is packed, so you can put it back that way.

Because the 16SR has a unique flat base, it is very simple to examine it on a table top. Use the towel or soft pad.

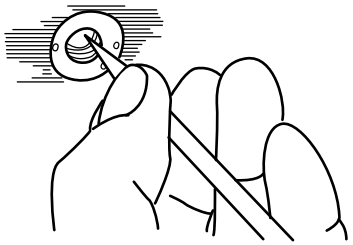
Some assistants prefer to set the camera up on a tripod for check-out.

1. The 16SR has one mounting hole in Its base: tapped 3/8”-16 (3/8” diameter, 16 threads to the Inch.)



It is helpful to carry with you several 3/8” - 16 bolts for mounting or emergency purposes. Also, get spacing washers with 3/8” holes.

CAUTION! The tripod mounting hole is shallow. it you screw a bolt in too deep, it will go through a printed circuit board.

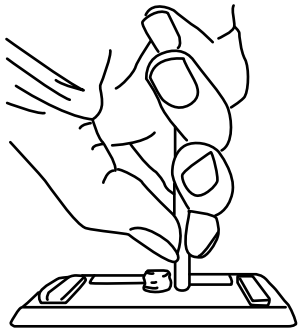


2. CHECK DEPTH FIRST. Insert a plastic skewer, toothpick, or match into the hole, Note how far it goes in.

3. Now, compare the skewer or toothpick depth with the tripod bolt.

New model 16SR mounting holes are 7/16” (11 mm) deep.

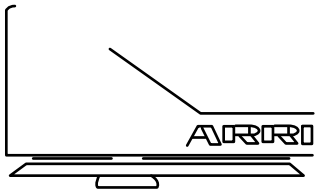
Older model 16SR mounting holes are 7/32” (7mm) deep.



4. When mounting the camera on a tripod, or when attaching a baseplate or quick-release plate, you often wind up with a metal-to-metal contact. The camera may twist right or left.

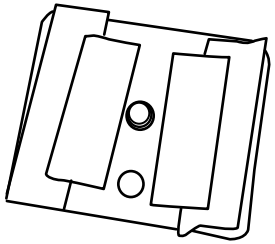
For a tighter fit, put two pieces of gaffers or camera tape on either side of the tripod mounting bolt.

The soft tape will compress, and provide better grip.



5. Put the tape on the accessory plate, tripod head, teleprompter plate, etc. NOT DIRECTLY ON THE CAMERA BASE.

The camera base can heat up, and as the paint on the camera base is soft, it may peel off as you remove the tape. Messy business.



CAMERA CHECK-OUT AND ASSEMBLY

Before any job, you should run down this check list. While you're assembling the camera, check all the things that could possibly be wrong. You should assume the worst, trust no one, and do it yourself. Murphy's Law lurks everywhere.

A. REMOVE MAGAZINE

B. CHECK CAMERA SPEED and PILOTONE OUTPUT

C. CHECK GEL FILTER SLOT (on older SR's)

D. MOUNT ON-BOARD BATTERY

E. CHECK CAMERA SWITCHES

F. MOUNT HANDGRIP

G. CHECK INCHING KNOB

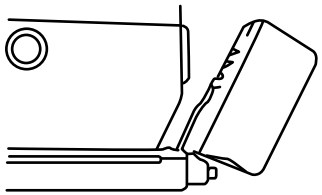
H. REPLACE MAGAZINE or APERTURE COVER

I. CHECK FOR SCRATCHES

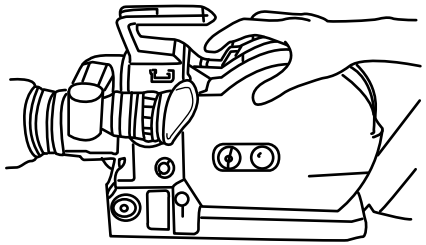
K. MOUNT LENSES

A. Remove Magazine

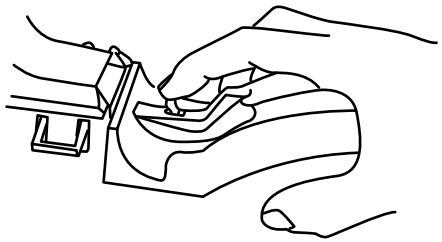
1. If the on-board battery is attached, swing it back. It is held to the magazine with a magnet.



2. Grasp the magazine with one hand.



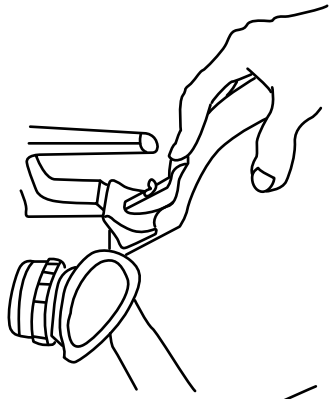
3. Hold camera body or camera handle with other hand.



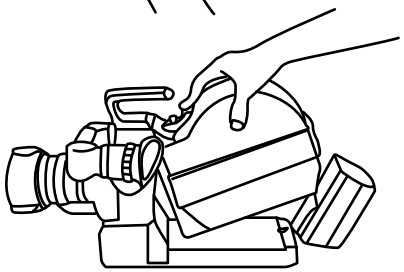
4. With your index finger, flip the safety lock back to the "OPEN" position.

5. Depress the release lever. Push it all the way down.

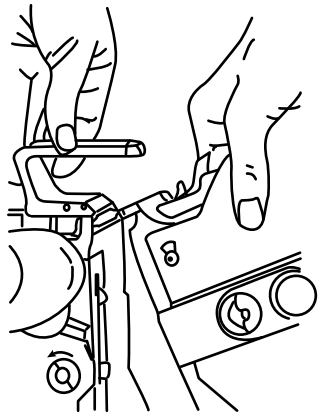
Lift up on the magazine. Pivoting from the top, the bottom will open out.



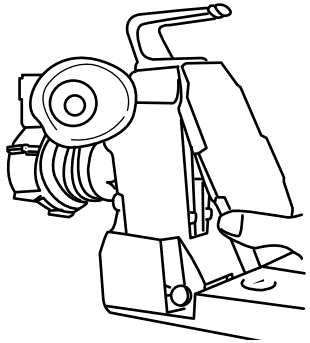
6. Raise the rear end of the mag until your index finger is almost touching the rubbertip of the camera handle. At this point. the quick-change.



7. Pull the magazine straight back.



8. If there is an aperture cover instead of a magazine, the cover pivots from the top and snaps in or out at the bottom.

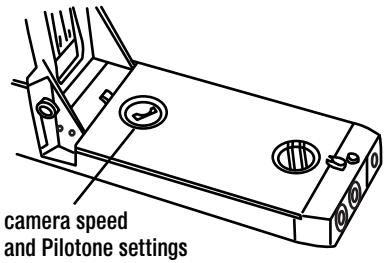


B. Check Camera Speed and Pilotone Output

1. CHECK CAMERA SPEED. Look on top of the base, through the plexi disc at the front of the electronics base cover.

2. CHECK PILOTONE OUTPUT. Same place.

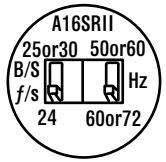
   For shooting in the USA, settings should be at 24 fps and 60Hz.



While the 24-25 fps switch does indeed change camera speed, the 50-60Hz switch only controls Pilotone sync pulse output. When a tape recorder is attached to the 16SR with an umbilical sync cord, the recorder gets its sync pulse from the camera. USA standard is 60Hz, while European standard is 50Hz. Since we usually use crystal control both in camera and recorder (no umbilical cord), the 50-60Hz setting will have no effect on camera operation other than to serve as a reminder.

1. To change the speed or Pilotone settings, unscrew the plexi disc with a large coin. Don't use a screwdriver.

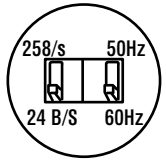
2. The newest SR cameras are equipped to shoot at 30fps for direct transfer to video. The switches look like this:

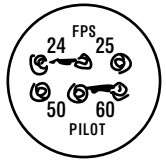


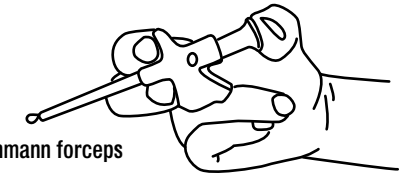
Important - it you intend to shoot at 30 fps, listen to the pitch of the camera while It's running. If it sounds similar to the camera when running at 24 fps, the internal control circuitry has been bridged back to 25 fps. It should be reset in the repair shop to 30 fps.

3. Most 16SR cameras have slide switches. Put a pin point in the hole on tip of the switch to slide it.

   Older model cameras have wire contact bridges. They can be removed and replugged across the appropriate two posts. Use a Hirschmann forceps, available from ARRI, or electronic stores.

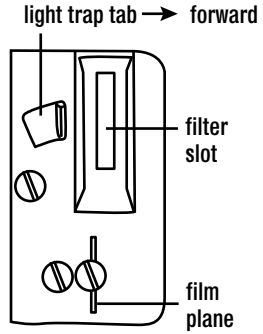





Hirschmann forceps

C. Check Gel Filter Slot

Older model cameras have gel filter slots. Newer ones do not, for reasons that will soon become apparent.



1. If your camera has a gel filter slot, be ABSOLUTELY certain that no one has left a gel inside.

2. The LIGHT TRAP should be closed – small tab all the way forward.

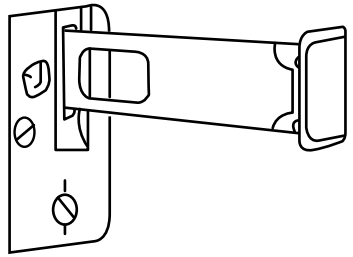
3. The vertical line below the filter slot shows the film plane.

   Note how close the filter slot is to the film plane. Dirt, dust or fingerprints may show up on the film itself. And since a behind-the-lens gel will shift flange-to-film focus back by 1/3 the thickness of the gel, you theoretically would haw to use a clear get when none would normally be needed to maintain consistency. You also would have had to shift your camera's depth to compensate for the 1/3 back-focus difference.

4. When you check the camera aperture later on, you have a second chance to notice whether a gel has been left inside the filter slot.

5. If you must use a gel, you will first have to find a gel holder, which has also been discontinued.

   The two pieces of spring steel separate at the gel holder's handle. Open it. Insert the gel. Snap shut. Cut off excess with an X-Acto knife. Open light trap. Push holder in slot all the way.



If there is any dirt or dust on the gel, brush it off with a camel's hair lens brush, or use an air syringe. Avoid Dust-Off, as it will leave a chemical residue. It finger prints or moisture get on the gel, you'll have to use another one. Use cotton editing gloves when handling the gels.

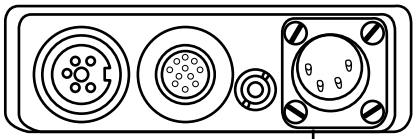
D. Mount On-Board Battery

1. Check battery voltage

Beginning 1984, ARRI 16SR-2 cameras are equipped with a green LED battery checker. The LED glows when the camera is switched to the "ready' or "on" position, and the voltage is between 9.5 and 12 volts. Below 9.5 volts. the LED goes out, and the battery should be changed. The green battery checker will also light up when you press the test button.

In addition, the single camera running light has been replaced by two red running lights on either side of the base, which makes it easier for the soundman, assistant and others to know when the camera is on.

The ARRI 16SR uses an on-board battery, which frees you from cables and battery belts. Each on-board battery will run about five 400' magazines at room temperature. (Six mags on more recent models.)

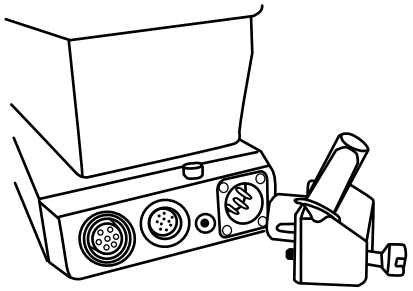


4 pin cannon
XLR receptacle

Heavier on-board packs are available. You can shoot more film per unit, but you have to carry more weight around.

Cine 60 modifies 16SR batteries to run about 10 mags.

G&M Power Products makes their own on-board units to run about 15 mags.

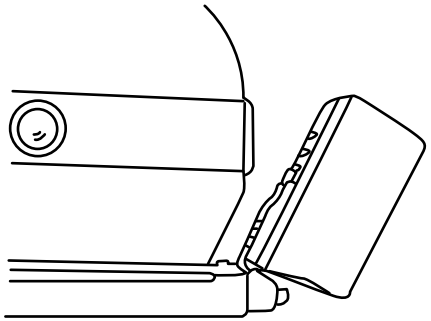


2. Attach the battery adapter to the four pin Cannon XLR receptacle at the back of the camera. Finger tighten the slotted screw. It will loosen in time, with use, so check it occasionally.

3. Slide battery onto the square plug. Slide straight up or down. NEVER wiggle battery from side to side. You'll crack the socket.

Sometimes this plug gets tight. Lubricate with an electrical contact restorer such as Miller-Stephenson Contact Re-Nu or CRC 2-26, Ordinary lubricants will gum up the electrical connection, so do NOT use WD-40 or CRC 5-56 here.

4. Later, when you attach a magazine, the battery pivots against the mag. and is held in place with a magnet. DO NOT SLAM the battery against the magazine. While it does give off a satisfying and efficient sound, you might break the battery's plastic case.

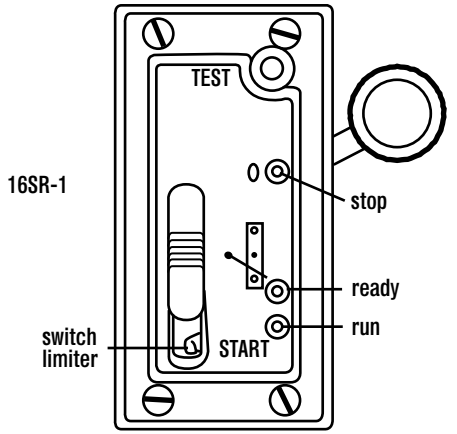


E. Check Camera Switches

The MAIN CAMERA SWITCH is on the forward left (viewfinder) side. In the UP Position, the camera Is OFF. In the MIDDLE position, the camera Is READY and the light-metering circuit is on; auto-iris lenses are stopped down to their preset aperture. In the DOWN position, the camera runs.

But before turning the camera on, get in the habit of pushing the red TEST BUTTON for a few seconds. The motor will make a low groaning sound (which is normal.) Whenever you put a magazine on the camera, push the TEST button. It will gently engage the pull-down claw into the film sprockets. If you turn the camera on at regular speed without running the TEST button (or manually inching) you risk damaging a perf.

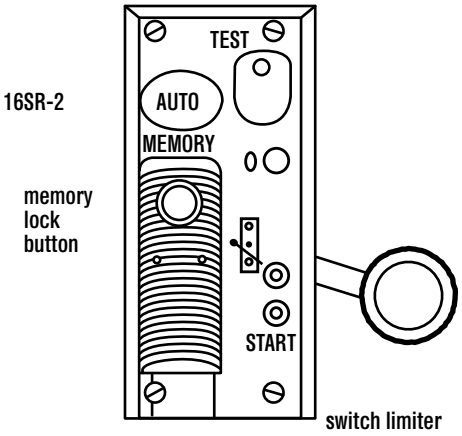
Now, switch the camera ON. It will run at crystal speed. If you have a strobe or crystal checker you can check speed now.



• 16SR-1

The Plastic Slide Cover on older models can be pushed up to reveal a metal tab which can be moved up or down with a skewer or pen, In the down position, all switch functions are normal. However, it you switch the camera to READY, and then slide the metal tab up, you will not be able to switch the camera to OFF. This device is sometimes used in fast-paced, documentary shooting when you want rapid starts and stops with the hand-grip trigger (coming up in the next section).

Remember-turn the camera OFF at the end of the day.The READY position will drain a battery.



• 16SR-2

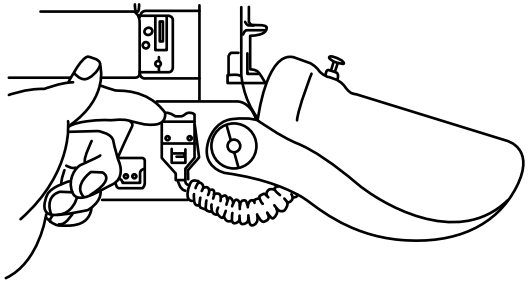
New model cameras don't have a plastic slide cover. The Switch Limiter is located below the main switch, and can be moved with your fingernail - back is normal, forward is limiting.

16SR-2 cameras equipped with Auto Servo Exposure have a Memory Lock. You switch the camera to READY. The exposure-control servo-motor stops the lens down to the correct aperture. If you are panning a scene with highlights and shadows, and don't want the lens to automatically open and close in the middle of the shot, you push the red Memory Lock button in and slide the whole plastic strip down. To release the Memory Lock, you either turn the camera OFF, or slide the plastic strip up while the camera is running. You can also engage the Memory directly while the camera, is ON and running.

F. Mount Handgrip

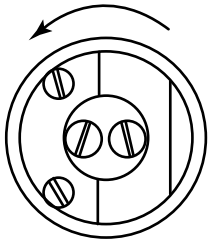
Attach the handgrip to the right side. Some grips have a steel knurled spacer ring which can be rotated to bevel the grip away from or towards the camera body. Tighten the grip. Plug in the four-prong electrical connection, and secure the wire bale. To remove the bale, use your fingernail.

With the camera switch at READY, you can turn the camera ON and OFF with the switch on the handgrip.

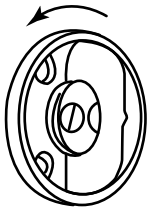


G. Check Inching Knob

To manually advance the mirror shutter, for checking the gate, turn the inching knob in the direction of the arrow (counterclockwise.)



For a good grip, you pull the inching knob handle 90 degrees away from the camera with your fingernail. When you push it back flat, note that IT ONLY RETURNS ONE WAY. If you force the tab the wrong way, it will break.



Older cameras did not have a handle. You pushed hard against a flat nylon disc, or used a coin in the slot of the disc.

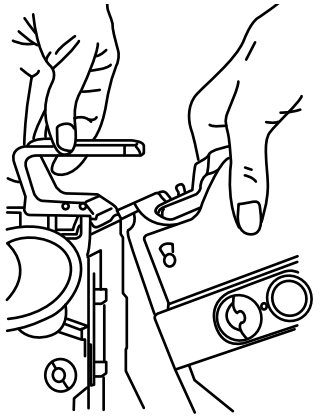
H. Replace Magazine or Aperture Cover

Never leave the camera open for more than a few minutes without the aperture cover or magazine in place. Dust will surely fly in. Sometimes insects will get inside. We once shut down an entire production for hours while trying to extract a curious critter.

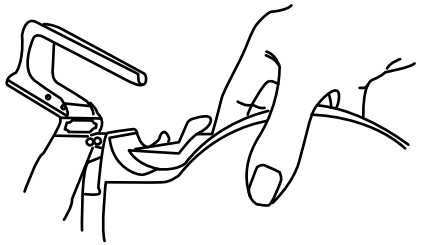
To attach the MAGAZINE:

1. Make sure film loop is centered, and held in place by the four side guide hooks.

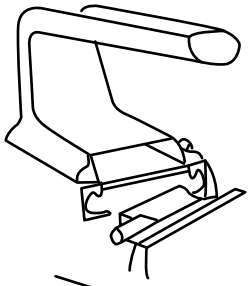
Grab the mag with one hand. Hold the camera with the other hand.



2. Angle the magazine about 30 degrees above the base.



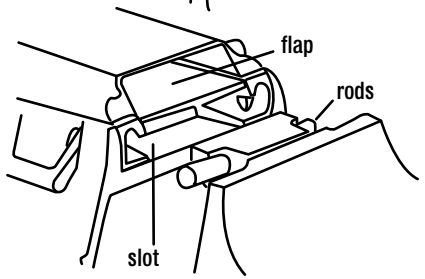
3. The release lever need not be pressed when you're at the proper angle. It will be at the same height as the handle on top of the camera.



4. Slide the rods of the magazine into the slot of the camera. The flap, which goes up as the mag goes in, will snap down when properly inserted, If you don't hear a click, wiggle gently, and pivot the mag up and down until you hear the click.

5. Then pivot the mag down gently until it locks in place.

DO NOT SLAM THE MAGAZINE. You will burr the magazine gears.



6. Slide the mag SAFETY LOCK to the LOCK position.

7. Press the TEST button. It engages the pull-down claw into a sprocket hole. With film loaded, you will hear the sprocket click in with a definitive and satisfying click. Keep the TEST button on until you hear that click. Sometimes It takes a few cycles to engage. Although the camera will run without first running the TEST button, you could damage a perf. Remember - If you slam the magazine onto the body, you could punch an extra, unwanted perf in the film. So, gently attach mag to camera.

IMPORTANT:

If your magazines are black, they are for the regular speed cameras (up to 75 fps).

If the magazines are grey and black, and marked HIGHSPEED, they are for the Highspeed Cameras (up to 150 fps.)

You should not interchange them.

DON'T USE REGULAR MAGAZINES ON HIGHSPEED CAMERAS. Your film might be out of focus. This is because regular magazines have a spring-loaded pressure plate. At high speed, the film can cause the pressure plate to breathe, and focus is lost.

NOTE: 16HSR Highspeed magazines should not be used on regular 16SR cameras. There is danger of unsharpness because the Highspeed magazine uses a different kind of pressure plate.

I. Check for Scratches

When checking out a camera, run a scratch test on each of the mags before the job.

You can use loaded magazines or test film.

Run about four feet of film with the take-up side magazine door open. Inspect the film with a magnifying glass. There should be no visible scratches or abrasions.

The area between the sprockets may show marks. This is normal.

If you do find scratches, check all obvious sources: gate, pressure pad, loop size, etc.

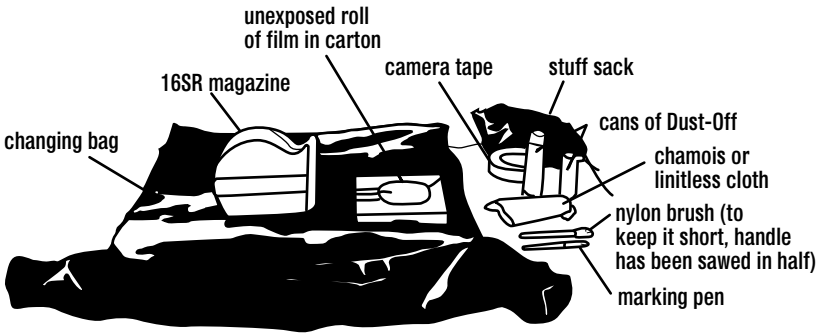
If no evidence at this point, you will have to remove magazine sprocket cover.

MAGAZINES

You have finished the major check-out of the camera. But, before you leave for the job, read through the rest of this manual in order to be familiar with the few remaining elements conspiring towards your downfall as an assistant.

LOADING MAGAZINES

The ARRI 16SR magazines are among the fastest and easiest to load of any camera. It takes about three minutes in and out of the changing bag. While the procedures are extremely simple, I have gone into great detail on the subject of loading to save you time on the job, make things simple and routine, and to insure foolproof and silent running.



An excellent changing bag for the 16SR is the Ross "5x7" Light Proof Changing Bag, measuring 30"x32" and made by Ross Photo Supply of Los Angeles, CA. It holds one mag at a time, with film, and folds up neatly into a compact stuff sack available at most camping stores. The sack keeps the changing bag clean.

Pick a comfortable place to work. On location use the tailgate of a station wagon or back of a van. Be sure your work space is clean. Wipe it free of dirt and dust, or unfold a Space Blanket under the changing bag.

Shake out the bag first. Turn it inside out. Brush off lint. Check for arm hairs that may have stuck to the fabric. This obsession with a clean bag will save much aggravation later on. The cause of most gate hairs (dirt or dust in the camera aperture) is a dirty changing bag.

The 16mm frame is very small, and gate hairs very large in comparison. Cleanliness now will save reshooting later. And, now that most 16mm films are being shot with negative, any dirt or dust on the film will look like snow, and is horrible to look at. So, mag and bag scrupulously clean.

When you are loading and unloading film in the changing bag, play it safe, out of direct sunlight. How do you check if the bag has pin-holes? Put it over your head and check for light leaks. What do you do if you forgot the bag? Use the bathroom - they usually don't have windows. Seal door with black tape. You can improvise with a jacket, or with the trunk of a car. Seal the edges with tape. And don't take the keys into the trunk with you - give them to the person who is going to close the trunk on you, if you trust him. You should have enough air for three minutes!

OPENING, CLOSING, AND CARE OF MAGAZINES

1. To open either side, push the red safety button all the way in. Old model mags don't have the safety button.

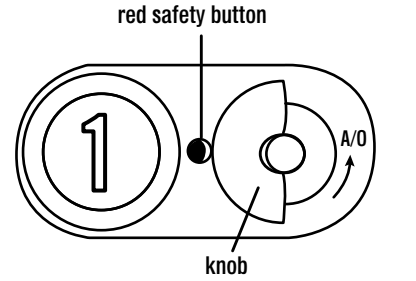
2. Grasp the knob. Rotate in direction of arrow to the "Auf/Open" position (counterclockwise). Do not force. If there is any resistance, red button is not in far enough.

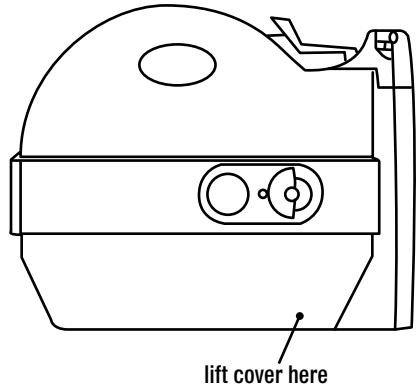
3. Right door swings open by pulling on right side. (Left door-left side).

4. DO NOT HOLD THE MAGAZINE BY ITS HINGED COVER. The hinges are delicate.

5. DO NOT SLAM MAG COVER SHUT

6. DO NOT CLOSE MAG COVER WITH KNOB IN THE LOCKED POSITION. You could bend or break the brittle locking tabs.





CLEANING EMPTY MAGS

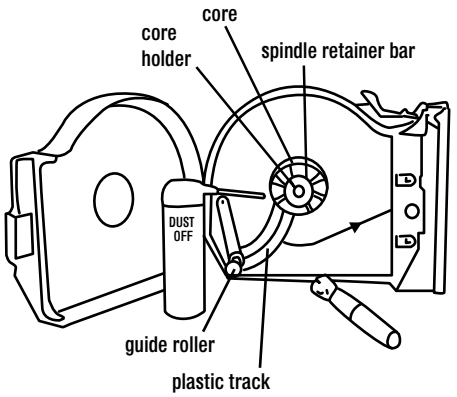
Do your cleaning away from the changing bag so the dirt doesn't settle there.

1. The insides of your magazines should be even cleaner than the inside of your changing bag.

   You will find that dust and slivers of film settle on the somewhat sticky insides of the mag after every roll. So, clean thoroughly every time.

   Use Nylon Brush to get rid of gritty dust.

   Follow with blasts of Dust-Off.



2. Swing away the footage counter guide roller. Don't lift up on it. You'll break the plastic track.

3. If there's a core in the feed side take it off now to save time in the bag. DO NOT WIGGLE THE CORE FROM SIDE TO SIDE - you'll bend the feed spindle. PULL STRAIGHT UP AND OUT.

4. Some core holders are stiff. If so, release spindle retainer, pull off core and core holder, separate the two outside the mag, and put the core holder back on. Remember to reattach spindle retainer.

SPINDLE RETAINERS, OLD AND NEW DESIGNS

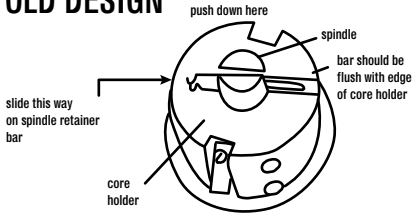
Time out for a brief word about the spindle retainer. There are three types.

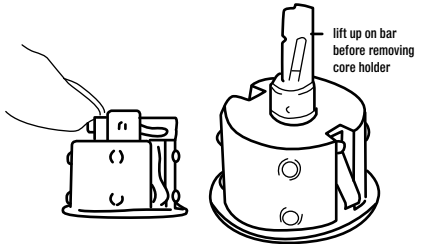
A. Older ARRI mags didn't have one. You simply pushed the core holder onto the spindle, and it usually stayed in place by pressure. Vibration, though, could shake it loose. The improved second version featured a piece of metal that might cut your finger if you're not careful. Also, if not fully locked, the spindle retainer bar could dig into the mag cover and score the metal and paint. Even more recent mags solved this with a cut-out in the cover, but a loose bar will still make noise and rattle around. Have the Arriflex, Service Dept. enlarge the cut-out on older mags if not large enough.

B. The newest version of the retainer is the best. Its made of two, easy-to-grab bars that move in a scissor-like manner. Simply pull both bars up, and lift the core holder up. To replace, push the core holder back down on the shaft, and simply push the two bars down.

MAKE SURE THE SPINDLE RETAINER BAR IS TIGHTLY LOCKED.

OLD DESIGN





1. Push down hard on the core holder itself. You'll be pushing it down against a spring. Don't push down on the film - it will "cone" and make noise.

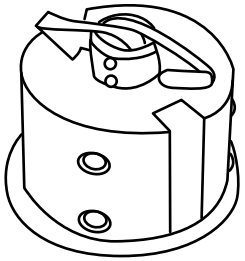
2. While the core holder is all the way down, slide the retaining bar all the way in against the spindle. Push hard. Your finger will hurt.

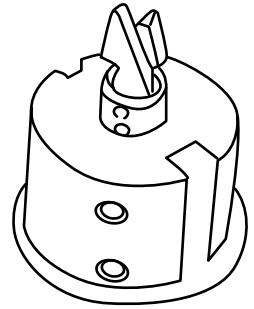
3. Remember the spindle? It is attached to the mag with 3 small press-fit rivets. Wiggling the core back and forth to remove it will ultimately loosen it. Pull cores straight off.

   It's best to unlock retaining bar, and pull both the core and core holder off the spindle, and then separate the two out of the mag.

4. Remove core holders when using daylight spools.

   The ARRI 16SR accepts up to 400' on cores, up to 200' on daylight spools.



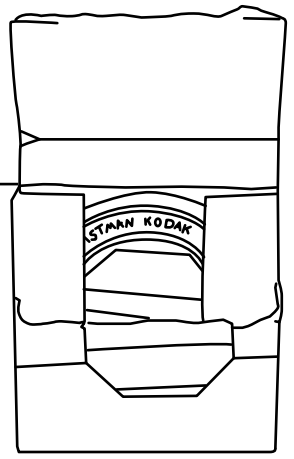


PREPARING FILM FOR LOADING

It's a good idea to leave cans of unexposed film inside their cardboard containers until ready to use. The cardboard helps absorb shocks and humidity insulates, and above all, is absolute proof that the roll is indeed UNEXPOSED

Save the cardboard for storing exposed cans of film, and again, to absorb shocks.

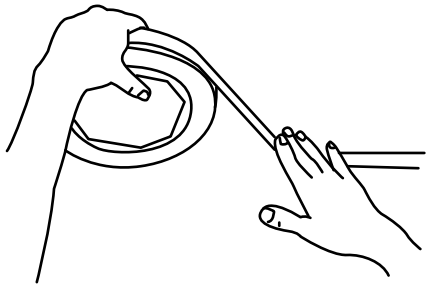
For quick identification of exposed (vs. unexposed), tear cardboard top of here.



The remaining cardboard pouch will be used later on.

It's a lot safer than having unprotected cans of valuable exposed film rolling around loose in your stock case.

Unwind manufacturer's can tape onto a smooth surface - desk top or equipment case, car window or wall - NOT on a carpet, clothing or priceless painting. Just make sure the tape will come up easily, without pulling up other things. You will need this identification tape again.



LOADING AN EMPTY MAG

1. Into the changing bag: UNEXPOSED FILM CAN (STILL CLOSED!!), and MAGAZINE (closed. feed size up).

2. Zip up both zippers of bag.

3. Hands into sleeves of bag, in over your elbows.

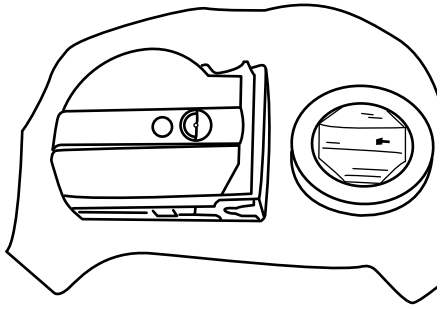
4. DOUBLE CHECK: ZIPPERS SHUT

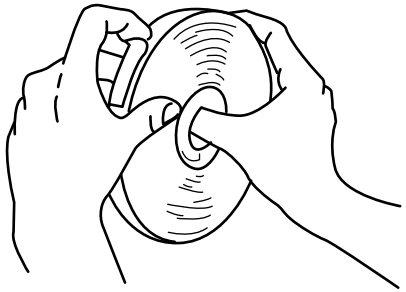
5. Open FEED door of mag. Push in Safety Button (old mags don't have them). Turn lock knob counterclockwise.

6. Open film can. Without turning film over, remove it from black bag with your right hand. Stick your thumb through core hole.

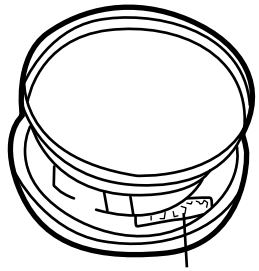
7. With fingernail of left hand, peel tape off end of film roll - top to bottom (counterclockwise). The way Kodak packs the film, the whole piece of tape should come off (until they change their system.)

8. **IT IS CRITICAL TO GET ALL THE TAPE OFF THE END OF THE ROLL - FAILURE TO DO IT WILL CAUSE MAG JAMS. Check - run your finger over the end.**



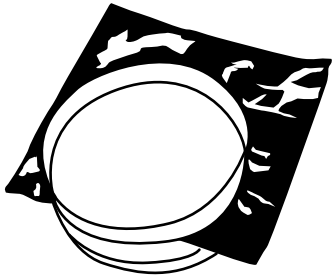


9. Put the tape on the OUTSIDE of the now empty can. You will look at it later when you open the bag to check that it's all in one piece. It the tape is ripped, you MUST account for every piece, like a surgeon counting sponges after an operation.



put tape on outside of can

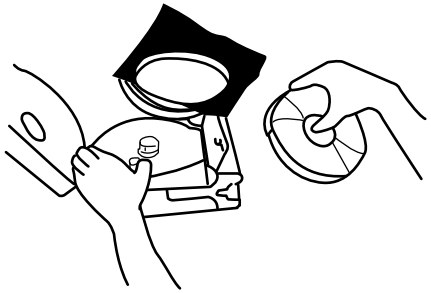
10. By the way, when taking the lid off the film can, put it under the can with open end facing down. This way, lid can't nestle into can and is easier to separate later on.



11. You have the roll of unexposed film in your right hand. We'll assume it's a 400' roll on core.

12. With your left hand, slide the guide roller arm (footage counter arm) all the way down and to the left until it clicks. DON'T LIFT UP ON IT (it's not an ARRI S).

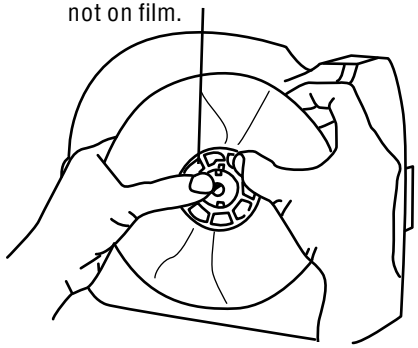
13. Hold the film roll over the center of the magazine. Locate the core holder with your thumb, which is sticking through the center of the core.



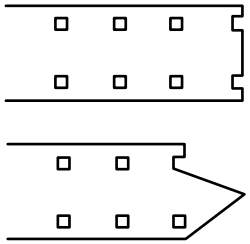
14. With your left hand, push the Core down on the core holder as far as it will go. DO NOT PUSH DOWN HARD ON THE FILM ITSELF-JUST PUSH DOWN ON THE CORE. Otherwise. the film will cone and make noise.

15. Next, push the head of the film into the magazine feed slot. Some people feed the film into the slot before putting the roll of film onto the core holder. It's harder and takes longer that way.

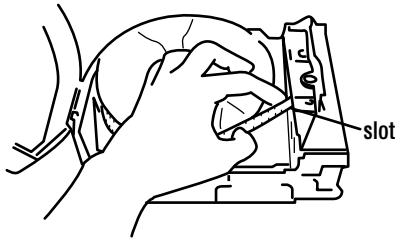
push down on core, not on film.



16. Hold the magazine drive gear with right index finger.

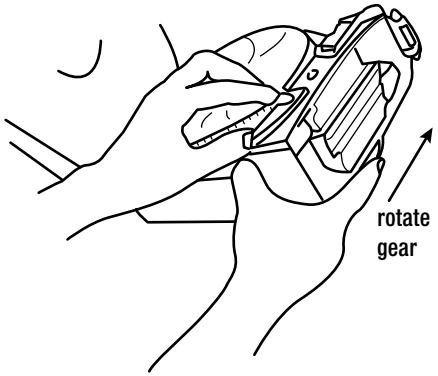


17. If the film has been cut straight across the sprocket holes, it will enter the slot easily. Unfortunately, Kodak usually supplies film with an arrow notched at the head of the roll. So, you'll have to wiggle the end around a bit to get it in.



18. Easiest way to get the film in the slot: locate end of film and rotate roll so the end is facing the feed slot. Use your left index finger and thumb to guide it into the slot. Start near the bottom of the mag, and push the film end up along the edge until it pops into the slot,

19. As film pops into slot, push gently until you feel the resistance of the internal sprocket gear.



20. Very gently advance the mag drive gear with your right index finger, in the direction of the arrow - just a slight amount until you feel pressure on the film.

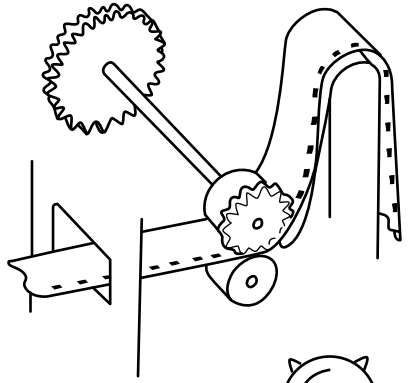
21. Then, pull back gently on the film with your left fingers until you feel a sprocket hole snap in place internally over a sprocket gear tooth.

22. NEVER FORCE THE FILM. If you do, you'll tear the sprocket holes and deposit emulsion inside the tracks.

23. If you're having trouble, maybe the film is curling inward. Try bending it out slightly to give it a straighter path to foliow.

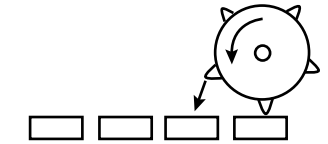
HERE'S WHAT IS GOING ON INSIDE:

The film finds its own path.



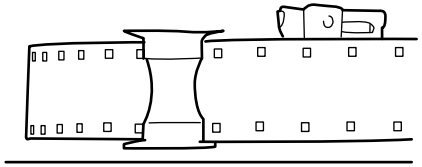
A. If the film has been cut straight across the sprocket holes, the end of film pushes against the sprocket roller gear as you push It in. Sprocket gear engages naturally in next sprocket hole.

B. But, film doesn't usually come that way. The head of the film roll is either notched or cut midway between the sprockets. In this case, the end of the film pushes the sprocket roller, and the next sprocket gear does not engage in a sprocket hole, but rather the film itself. So, you then have to pull the film back a little bit until the sprocket hole pops in place.



push film in, the slowly pull back to engage sprocket.

25. Be sure spindle lock retainer is tight over core holder, as described earlier.



26. **Now, disengage footage counter guide-roller by sliding it gently toward roll of film**

27. With your finger, make sure both lips of the footage counter roller ride evenly over top and bottom edges of film.

28. If not, pull up or push down on the whole roll of film - very gently, by grabbing around the circumference and moving it until the roller pops into position. DO NOT MOVE ROLLER - MOVE FILM.

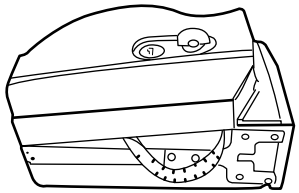
29. DOUBLE CHECK: IS FOOTAGE COUNTER GUIDE-ROLLER IN PLACE?

This is the most common mistake made when loading.

30. Take out slack in film by advancing magazine main drive gear, or winding feed roll back clockwise.

31. Check that magazine lock knob is all the way open (counterclockwise).

32. Gently shut magazine feed door. Be careful not to catch any slack film that may be hanging out.



33. DON'T slam the door shut it's delicate.

    DON'T close With the Mag lock knob in the lock position - you might bend the brittle metal tabs, or break them off.

34. Once closed, run your fingers around the edges of the mag to be sure you haven't caught the changing bag or black film stock bag inside.

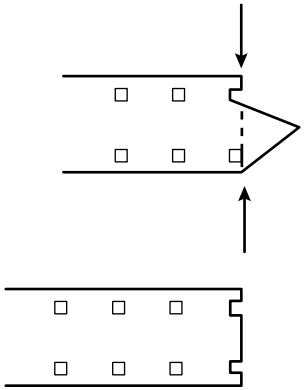
35. Lock the mag. Turn lock knob clockwise until it clicks.

36. DOUBLE CHECK-try to pull mag open by pulling the cover on all corners. Mag is now shut.

37. Think again: mag shut, locked, no film left in bag.

38. Open changing bag, remove mag.

39. If head of film roll is notched, or otherwise less than perfect, cut across the sprocket holes with the scissors of your Swiss Army knife.

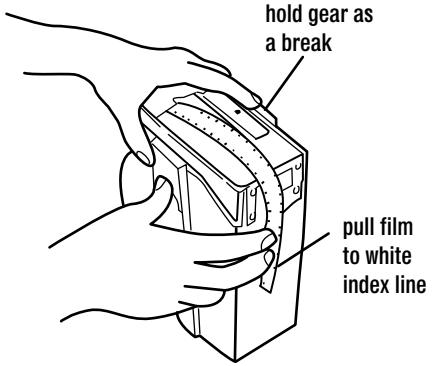


40. It's a particularly good idea when you're rushed, because it may save you time in the long run, not having to jiggle film in and out.

41. When cutting off the notch, make sure you dispose of this small piece of film in a place where it will not interfere with any equipment. Small chips always wind up in the places where they do the most harm.

42. Stand the mag up on its hinges, throat up, drive gear away from you.

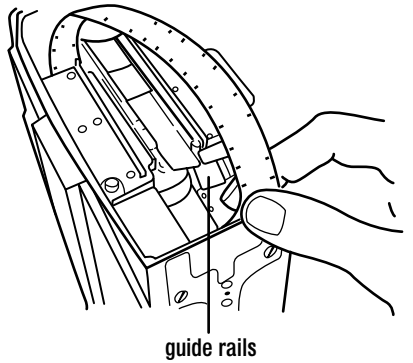
43. Pull film out of the throat with your right hand, while using your left index finger on the drive gear as a brake.



44. Continue pulling across the throat and along bottom of mag to the white index line. The film comes out on a slight diagonal. Don't try to straighten it out along the shiny film channel guide rail.

45. If you didn't cut the film head across the sprocket holes, you measure the film to the first set of sprocket holes over the index line,

46. Now, hold on light to the drive gear with your left index finger to keep the loop size from slipping.



47. With your right index finger and thumb, press the film end down onto the smooth guide rails and into the slot

48. The drive gear will rotate as the film enters - same principle as when loading the feed side. When the film sprockets engage, rotate the drive gear in the direction of the arrow about five revolutions.

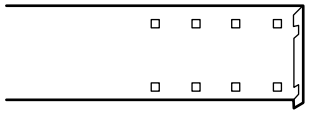
49. As before, don't force the film in. If you have trouble, be patient. Delicately feel with the film, hold drive gear, gently pull the film back until a sprocket hole Is engaged.

50. If the loop has become too large, you can turn the, mag drive gear in reverse (opposite direction of arrow). Just remember that the feed spindle will not take-up the slack, and the film will just accumulate loosely in the feed chamber.

51. Open the TAKE-UP side of the magazine. Clean it out with Dust-Off and a brush.

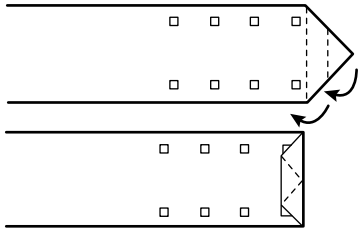
52. Lay the mag down, take-up side up. Pull back guide roller.

53. Pull about 2 feet of film through. You can pull on the film directly, without turning the mag drive gear.



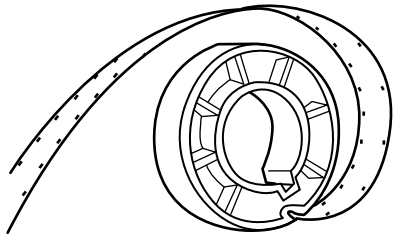
54. Fold the film end over once.

    Make the fold even, and smooth it out with your fingernails.

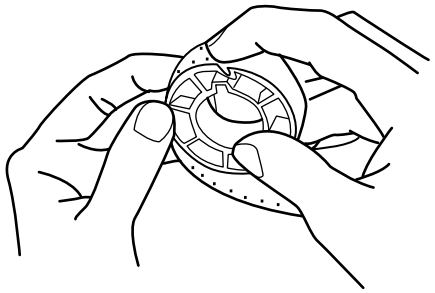


55. If you are in a hurry, and the end is notched, fold over twice.

56. Insert folded end of film into slot of core, as shown.

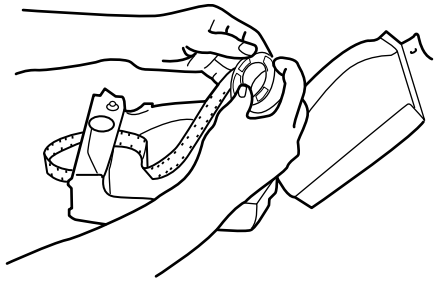


57. Smooth the fold with your ifingernail. Any bump will make noise as the guide roller passes over during operation. Be sure film and folded ends do not protrude out of the core slot.



    Wind about five turns around core to be certain film is secure. Index finger and thumb of left hand should guide film evenly on core, while right hand rotates core.

    Take-up will then be even smooth and quiet.



    This is done with core out of the magazine. (See pages 44 to 45 for more on cores.)

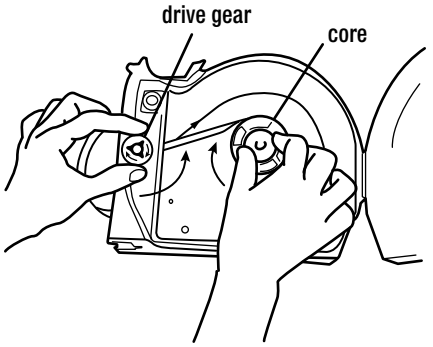
58. Slide core over core holder. Push on core.

    Engage guide arm roller by sliding it into place.

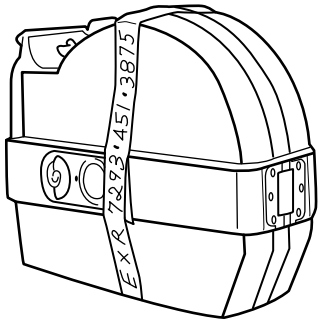
    Hold drive gear with left hand, and core with right. Gently turn the two away from each other to take out any slack. Don't force.

    Now, rotate drive gear with roller in place to be sure that take-up is even.

    Close the mag cover, and lock. Test by trying to open it by the cover.



59. Check the footage counter. If you don't see the white pointer, you forgot to engage the feed guide roller arm. Back into the bag!

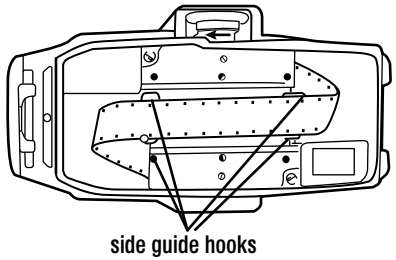


60. Mag cover is closed. Wind film identification tape around the mag to prevent accidental opening and to remind you about emulsion in use.

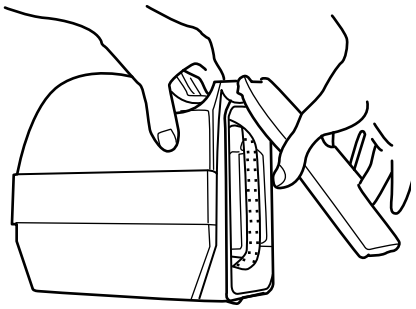
61. Run mag gear in direction of arrow for 3 or 4 revolutions to feed film and make sure it runs smoothly.

62. Center the loop. Position film under the 4 side guide hooks.

    You don't have to count frames - just do it by eye.

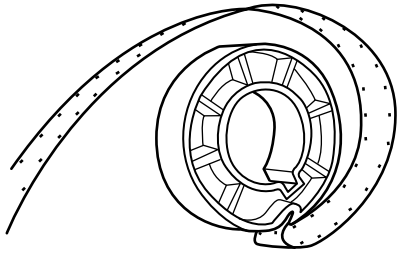


63. Attach the loop protector.



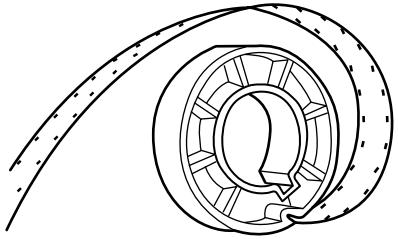
CORE SLOTS, CORES AND COLLAPSIBLE CORES

You will hear a variety of opinions on which way the film retaining slot on the core should face.



The safest, most foolproof direction is in the direction of rotation:

But the film buckles slightly, causing the guide roller to bump and make noise.



Therefore, because of the cut-out in the construction of the core, it is recommended that the slot face the film this way:

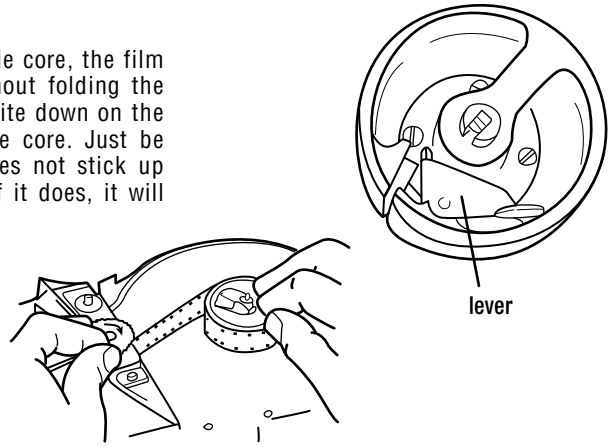
You will also hear different opinions on whether to fold or not to hold the film end.

The safest method is to fold the end straight, making sure that the edges do not buckle out from the sides of the core slot.

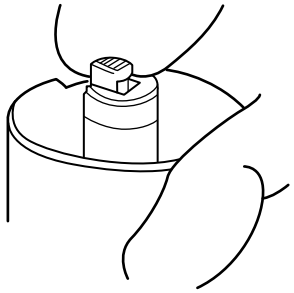
Not folding over the end is asking for trouble - if the film goes slack, you might lose take-up.

The ARRI factory recommends using tape on the end. DON'T. You could gum up a lab processing machine, or even your camera, assuming the worst.Many ARRI cameras are fitted with collapsible cores. They are handy because you don't have to remember about extra plastic cores or worry about shortends. However, their disadvantages outnumber the advantages, as discussed on page 49.

If you are using the collapsible core, the film is inserted into the slot without folding the end. The lever is pushed to bite down on the film end while expanding the core. Just be certain that the film end does not stick up above the collapsible core. If it does, it will make noise.



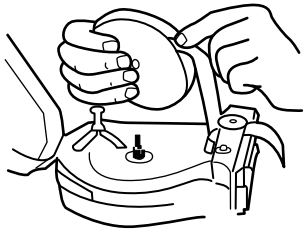
If you are using daylight spools (only up to 200'), remove the core holder on the take-up side by pressing the button in the center of the shaft.



Do not lose the core adapter.

NASA uses slightly cut down 400' daylight spools in the SRs they use on the Space Shuttles. You must cut off 1/16 of an inch from the outside diameter of the 400' spool for them to fit.

Engage the film in the slot of the daylight spool, wind a few turns clockwise, and put the spool on the shaft. Tighten up the slack lay turning spool and mag drive gear in opposite directions.

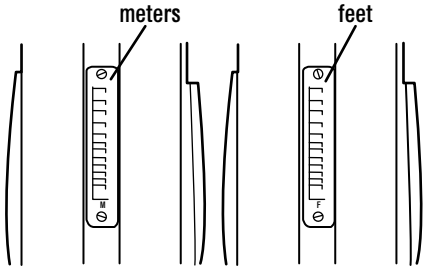


Keep the guide roller arm latched and away from the spool.

Use "film exposed" footage counter.

FOOTAGE COUNTERS

The 16SR has two footage counters. There are several variations of them in use, calibrated in meters, feet, and a combination of the two

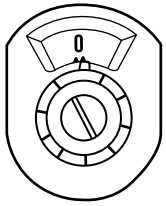


1. Film Remaining (Magazine, top back)

   Numbers refer to footage remaining in the feed side.

2. Film exposed (Magazine, upper left side)

   When using daylight spools, set the wheel to "0" as the regular footage counter is deactivated when you lock the footage counter guide roller out of the way.



   This counter reads footage exposure

   It will work with both daylight spools and cores. Just reset it to "0" with every fresh roll.

LOADING AN EXPOSED MAG

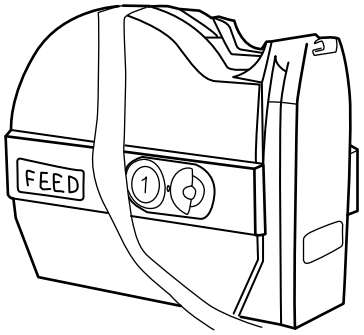
The cameraman has just handed you a magazine which has been fully exposed -all 400 feet have been shot. The footage counter reads "0." There is no film visible. He tells you not to hurry, but as soon as you're out of the bag, he needs you to pull focus. Obviously, you should hurry as much as is safely possible.

RULE: Don't get into a panic situation. don't let yourself be rushed, But remember the entire crew can only go as fast as you go. Assistants who work often work fast, and without error.

1. Remove the loop protector.

2. Remove the camera identification tape. You can throw it away. There is no further use for it,

When the loop protector is on the right, you're looking at the feed side. Loop is also on the right. FEEDS RIGHT. It is helpful to put tapes marked FEED and TAKE-UP on the appropriate sides of the 16SR mag. It is not embarrassing-even the most experienced assistants mark them this way. In the heat of the moment, it is good to be reminded which side is which.

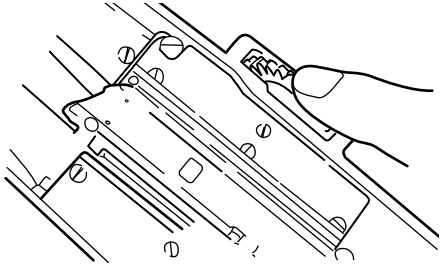


feeds right

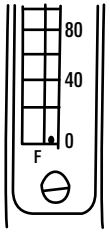
What you are about to do is open the feed side, so it can be cleaned and blown out in daylight. You should be getting into the habit, essential when working with negative stock, of cleaning out both sides of the mag after every roll.

Rather than unload the film in the bag, cleaning the totally empty mag in daylight, and going back into the bag to load the new roll, you will be taking advantage of the coaxial feature of the SR magazine.

3. Reconfirm that you know which side is which. Spin the mag drive gear. You will be able to feel the exposed roll of film spinning around on the same side. Remember - exposed film is on the same side as the drive gear. DO NOT OPEN THIS SIDE.

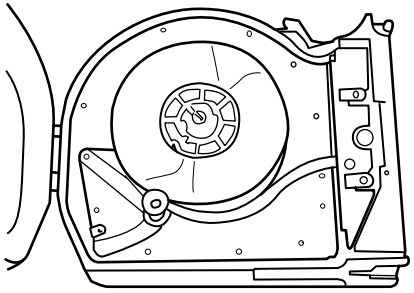


4. Check the footage counter one last time. It should read "0." If not, there is film inside the feed side. Check, and be sure.

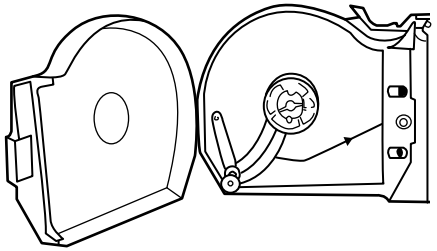


5. In daylight, open the FEED side.

   If for any reason you have fouled up at this stage, tell the cameraman immediately - better now, when things can still be reshot than a surprise in the screening room, Film exposed to light will have orange streaks, even if exposed for an instant. Clean out the FEED side with Dust-Off and a brush.



6. In the magazine throat, clean the chrome fixed gap, film channel and pressure pad with a well washed chamois cloth, or even better, no-lint "Selvyt."



7. Remove the old core left over from the expended roll of film. Save the core for use again later.

8. Take the ID tape off a can of unexposed stock.

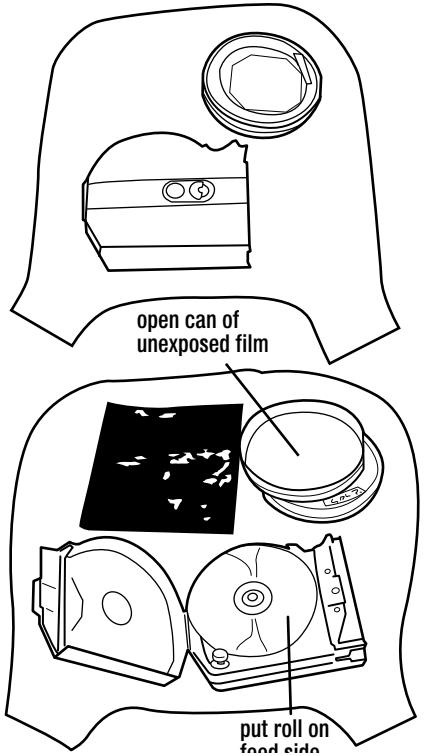
   Go into the bag with the can and the magazine FEED side up.

   Zip up both zippers of the bag.

   Put your hands into the bag as far as possible. The elastic cuffs should be above your elbows.

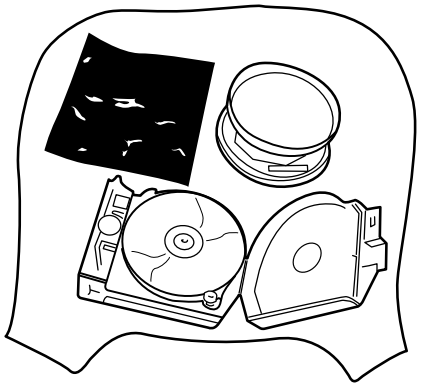
   Rotate the magazine drive gear away from you to be sure all the exposed film has cleared the sprocket rollers.

9. Open the film can. LOAD the FEED SIDE as we discussed earlier. Without turning film over, remove it from black bag. Peel off tape from head. Place core on FEED core holder. Push down on the core, not on the film itself. Engage the film end in the feed slot. Rotate the mag drive gear a few turns. Slide the footage counter guide roller in place. Close the FEED door. Lock it. Check it. Double check it.

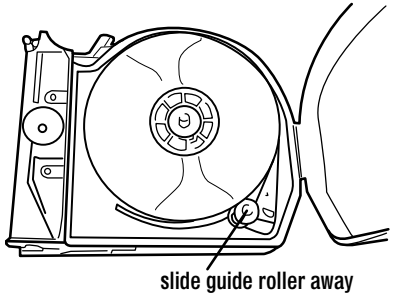


10. Turn the mag over, TAKE-UP side up.

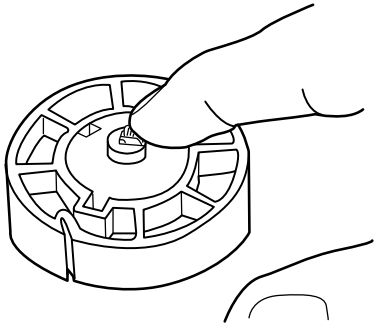
    Open the cover.



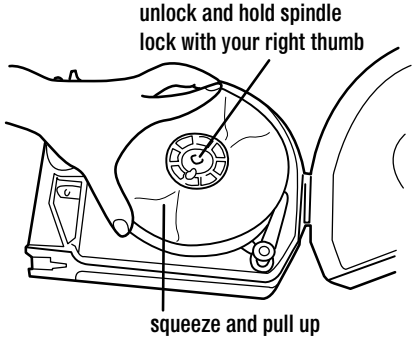
11. Slide the guide roller away to its open position. It will snap into place, and stay there. DO NOT LIFT UP ON IT.



12. With your right thumb, push the spindle lock away, and lift up on the exposed roll of film.

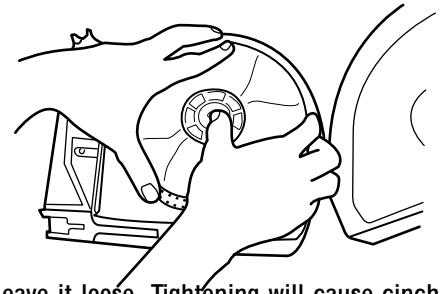


13. While holding spindle lock with your right thumb, lift the roll of film up with your left hand, Push in while lifting - this will prevent coning.



14. Since the core holder is still inside the core, and you don't want to send it to the lab, push it out from the core with the thumb of one hand, while holding the roll in both hands. Be careful, or you will push the core out as well.

    By holding the core itself back with the tips of your fingers, only the metal holder will come out-leaving everything else in place.



If the roll of film is loose, NEVER tighten it. Leave it loose. Tightening will cause cinch marks to appear on the negative.

15. If the take-up side has a collapsible core, leave it in the magazine.

    To remove the film, first pinch the small strip of film caught inside the core. With your other hand, release the chrome lever. The core will collapse. Release core lever. With one hand holding circumference of the film, and the other hand guiding center of roll, carefully pull up on roll. Immediately place a core inside empty hole to reduce lab handling.

    Problem: When you lifted the film up, the center coned out, Solution: Wind it back into the hole -a frustrating and tedious procedure. Whenever an assistant has turned pale, his hands in the bag, and his back drenched with sweat - he is without a doubt salvaging a collapsible core disaster,

    When the film gets to the lab it can still cinch because the film is loose on the core, or it can cinch because there is no core and the lab has put their "best men" on the job. Risky business.

16. Put the exposed roll of film inside the black paper or plastic bag, Fold all the edges and corners in and down, so the bag is a circle around the roll of film.

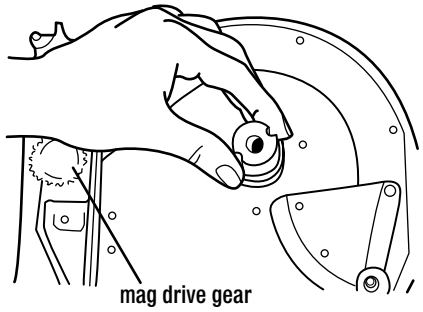
17. Put the bag in the can, folds down. Cover the can.

18. Put the core adapter back onto its spindle.

    This is easily done with your left hand.

    Hold the mag drive gear with the palm of your left hand, to prevent it from rotating.

    Slip the holder onto its spindle with your left thumb and index finger. You may have to jiggle it around until it finds its position. Then, it will just drop down and lock into place.



An immutable law of the film business: core holders sent inadvertently to the lab are lost forever.

Time to come out of the bag. DOUBLE CHECK - EXPOSED FILM CAN SHUT. FEED SIDE SHUT. Check again.

20. Pull your hands out. Tap the closed exposed can through the bag, to make sure it's closed.

    a. While pressing on the can through the bag to keep it shut
    b. Open the zippers. Take the can out.

21. Use camera tape to seal the can shut. Do NOT use the original can ID tape - it can be confusing.

    This way, it is virtually impossible to mix up exposed film with unexposed. Now, clean out the take-up side of the mag.

23. Put the plastic core on the holder, and finish threading up the magazine. Close and tape it up for safety.

25. This system of loading works well in cramped quarters when you have to load with the bag on your lap.

    When opening the bag, just be sure to hold the can of exposed film between your knees - protecting it from accidental opening.

    The other advantage of this loading method is that the unexposed film goes directly from the can to bag - and can't pick up dirt or hairs from the bag.

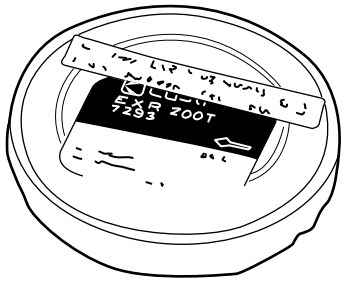
TAPING AND LABELING EXPOSED FILM

You can use either regular camera tape, or camera tape that has been printed up "WARNING: EXPOSED FILM - OPEN IN DARK ROOM ONLY." to seal the can shut.

Label the exposed cans as indicated above. Don't rely on the original can labels - the labs ignore them.

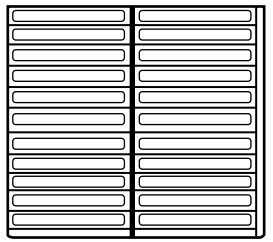
Stick to the information as shown, and in that particular order.

If you have pushed, or need special handling, use a separate label.



Note that for negative, with certain labs, pushing to ASA 400 involves pushing development not 2 stops but only 1, and then printing up 1 stop on the workprint. So ask, and double check with the cameraman.

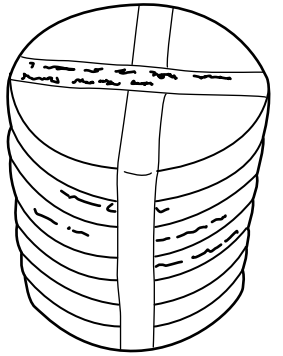
Store your exposed stock in a stock case. By putting exposed back into the cardboard boxes whose tops have been torn off, you not only protect the film, but also provide an organized way to store and identify.



When preparing film for delivery to the lab, discard the cardboard. Tape the cans together in sequence. Only tape film with the same processing requirements together. Tape rolls for Forced Processing or Special Handling separately.

Flip top and bottom cans so they face inward - so labels won't peel off.

Write instructions, number of rolls, and information on outer tape.



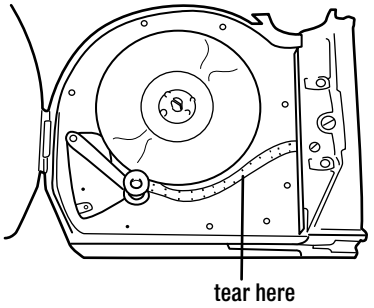
LOADING A MAG WITH A SHORT-END TO BE DISCARDED

If the magazine has some film leftover which is expendable (usually fewer than 100') open the feed door in daylight, swing the footage counter arm out of the way.

Cut the film off with your Swiss Army Knife, and tear it as indicated.

Lift the film off by applying equal pressure on both sides of the roll. Lift straight up. Do not wiggle from side to side, or you'll loosen the press fit rivets. If it's tight, you'll have to release the spindle lock and remove the core and coreholder.

Since you will need the core for the take-up side later on, push out and discard the film. Or, hold the core, and let the film spool off into a waste basket or garbage bag.



Speaking of garbage, it's very helplul to tape up a plastic garbage bag, large and heavy duty, inside the vehicle you're working out of or in the area where you're working. It speeds clean-up and makes things neater.

LOADING A MAG WHERE YOU MUST SAVE THE SHORT-END

If the feed side has a short-end which must be saved (usually over 100') you will go into the bag without first opening the feed side.

Into the bag go: magazine, can of unexposed film, empty 400' can with empty black bag.

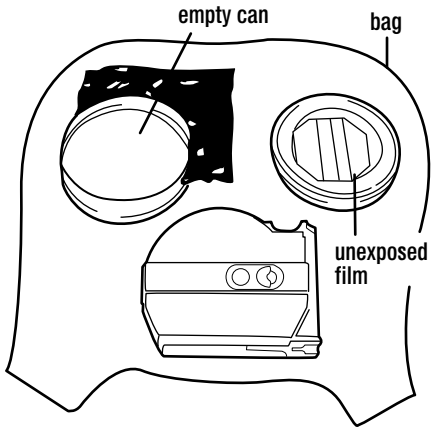
Unexposed film can on the right.

Empty can for shortend on the left.

Short-end comes out first. Open feed side door. Break off the film, push the guide roller out of the way, lift off the short-end and can it.

If you have time, after making sure both cans are shut, open the bag, remove and tape up short-end can, and clean out the feedside of the mag.

Otherwise, stick to the system of short-end cans on the left so you won't get confused.



Tape up the edge of the can containing the short-end with white camera tape, and identify it as "XXX" unexposed EMULSION #000 short-end, date, and your name.

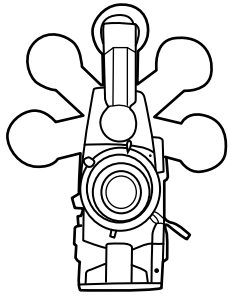
Then, proceed with loading as described earlier. Make sure a spare core is available for the TAKE-UP side.

VIEWFINDER

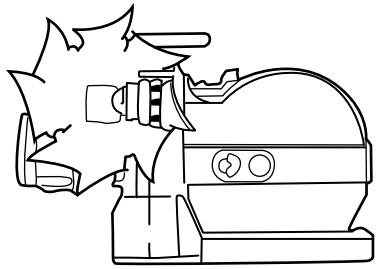
VIEWFINDER SYSTEM

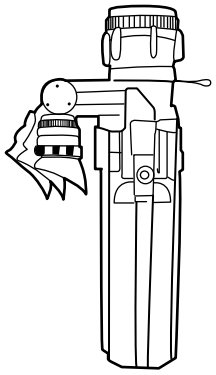
The swingover viewfinder system of the 16SR is symmetrical: It does not assume that all cameramen are right handed, right eyed and right shouldered.

It swings 190˚ to either side of the camera, so you can shoot from either side.



It rotates 360˚ parallel to the camera.



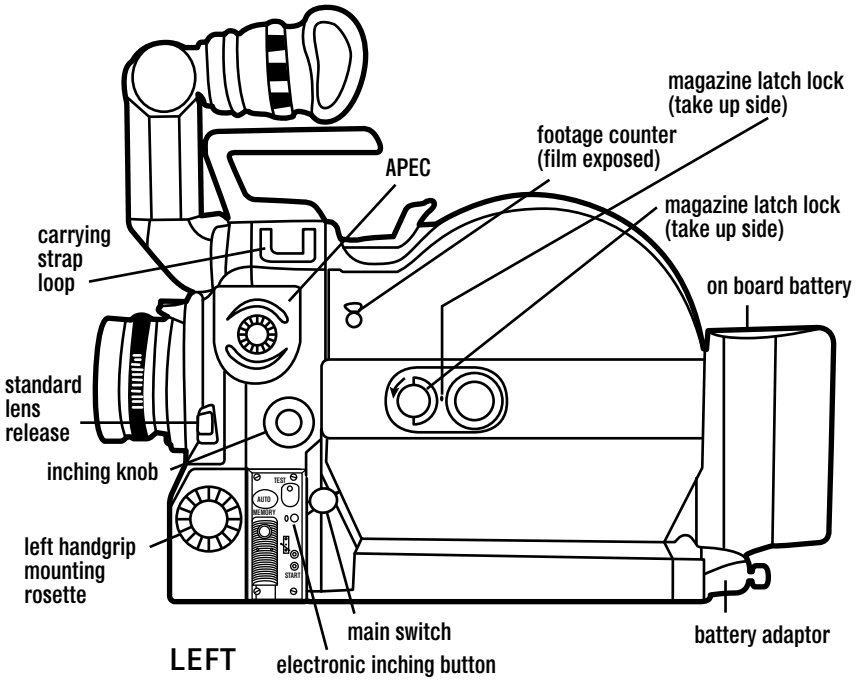


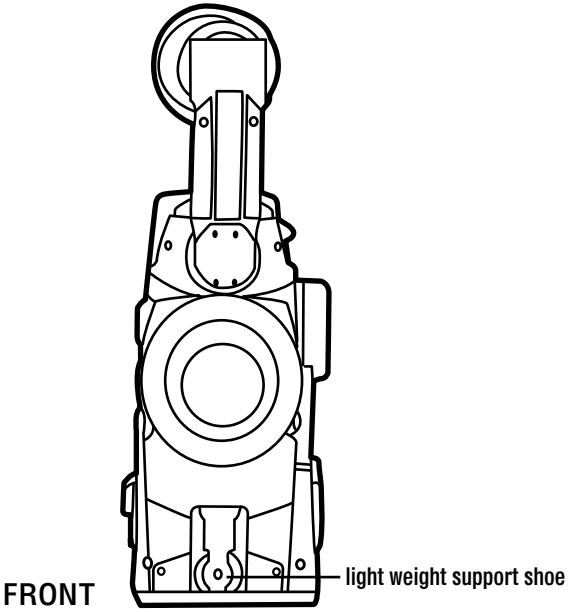
And it will go 25˚ out from the side of the camera.
The viewing system, combined with the fiber optic screen, provides an image with a speed value of f 1.2 for bright viewing.

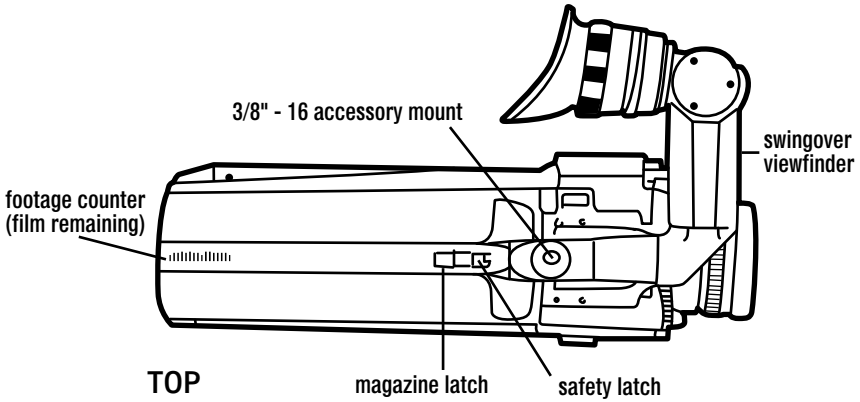
The mirror stops in the viewing position.

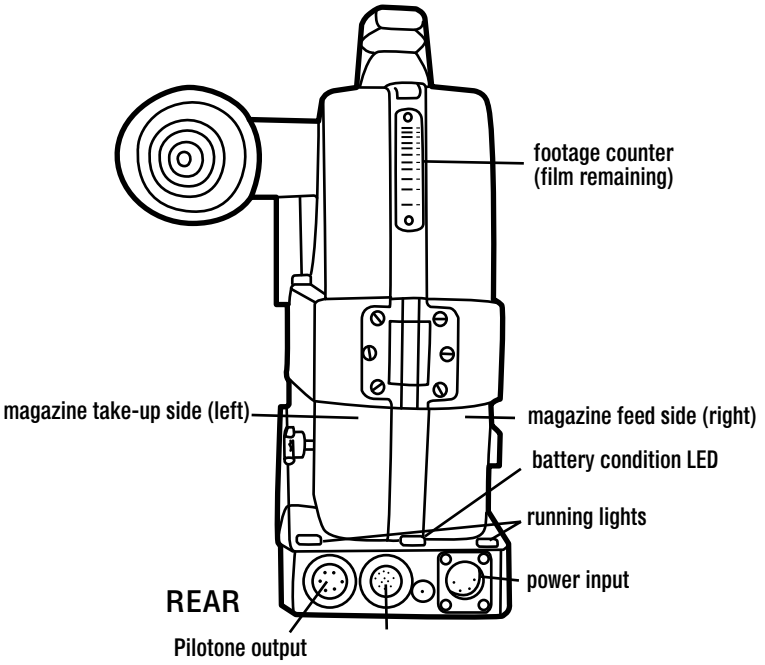
The image will always appear upright and correct left-to-right no matter where the finder is positioned.

16SR CAMERA ID PULL OUT SECTION

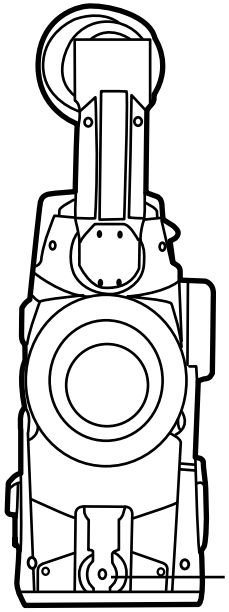






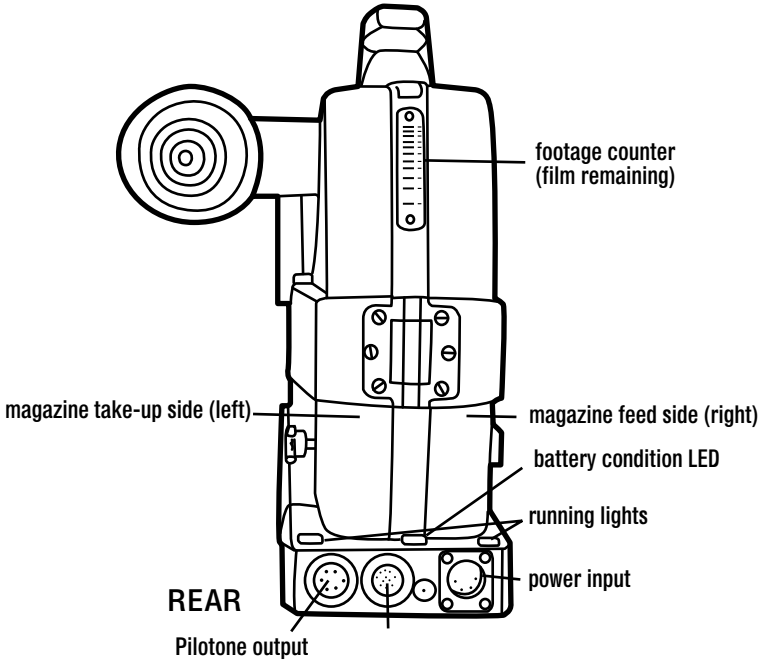


16SR CAMERA ID PULL OUT SECTION

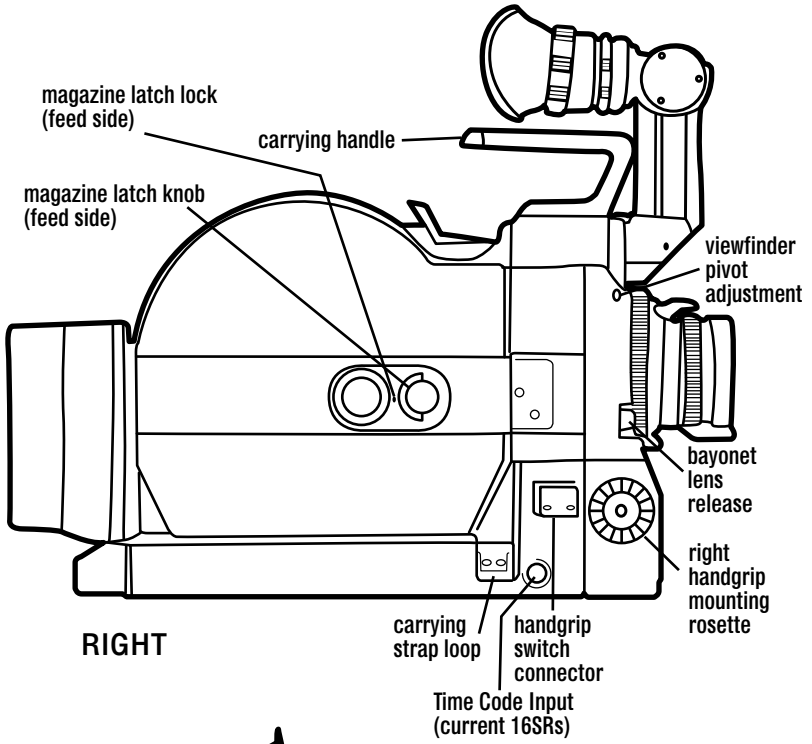


FRONT

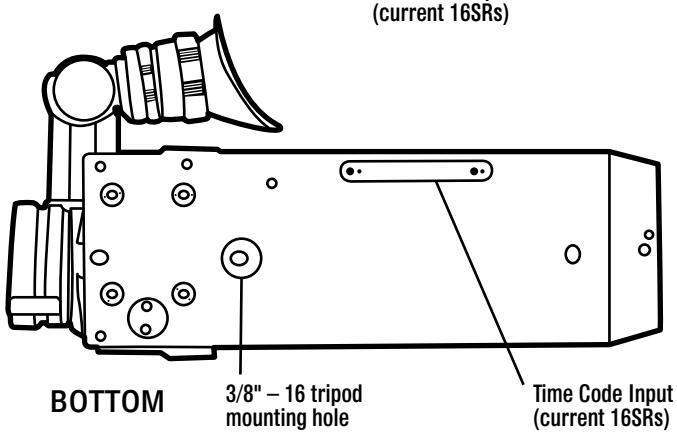
light weight support shoe



REAR



RIGHT



BOTTOM