eclair

NPR OPERATING MANUAL

4/1/70

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CHAPTER I

INTRODUCTION TO THE NPR

Some General Features:

The initials NPR stand for Noiseless Portable Reflex. With the Angenieux 12-120mm zoom lens and 400 feet of film in its magazine, the NPR weighs just over 20 pounds. It is as easy to carry as a briefcase and equally easy to shoulder-rest, (hand-hold), since most of its weight is over your shoulder. Its accurate and versatile reflex viewfinder gives your eye an image about half a stop brighter than most cameras. It has a constant-speed motor with a built-in sync pulse generator, a rotating two-lens turret, and registration-pin movement. Its 400 foot magazine can be changed in five seconds and it runs in silence without a blimp. Camera body, motor, viewfinder, magazine, and lens are separate units. Any of them can readily be removed for cleaning, travel, maintenance or repair.

Reason for Silent Running:

Since the motor and the shutter are on the same drive shaft, no gears are needed between them. With most cameras, the motor and movement are the source of noise. With the NPR, the loudest sound is film passing over the sprocket wheels inside the magazine.

Movement Steadiness:

The registration pin limits vertical movement to less than one thousandth of the height of the 16mm frame. No steadier movement is available in 16mm.

Importance of Getting to Know the Camera:

You are probably aware that the NPR differs radically from older motion picture cameras, both in conception and in detail. It is extremely important that the operator be familiar with these new characteristics. If you have not used an NPR before, we strongly suggest that you get to know the camera - read this manual care-

fully and shoot some test footage before you use your NPR on an important assignment. And before you get into the manual's detailed instructions, here, briefly, are eleven important points to bear in mind when handling your NPR.

CAUTION

1. Use only 12 volt Nichel-Cadmium batteries with the constant speed motor.

2. Use only Cannon plugs, properly wired, and take care to use correct polarity. Reversed polarity can cause serious damage.

3. Do not use "power supplies."

4. Never touch the shutter mirror. If it needs cleaning, use an air syringe, or have it cleaned by an expert repairman.

5. When cleaning the aperture, ensure that the shutter is out of the way. You should be able to see right through.

6. When cleaning the gate area, pay particular attention to the side pressure plates in the film channel.

7. Remove the lens as seldom as possible. When replacing it, make sure the mount is dust free and use the minimum force necessary to seat it.

8. The magazine's take-up side lid must be in position before you divide the loop.

9. Each time you place or replace a magazine on the camera, check and divide the loop.

10. If you hear an unusual noise coming from the magazine, remove it and check the loop. Familiarize yourself with the sound of the two built-in noisemakers.

11. On most tripod heads, the NPR is top-heavy. The head must, therefore, be locked tightly. If your head does not lock rigidly, either stay with the camera or take it off the tripod.

CHAPTER II

THE VIEWFINDER

To fit the viewfinder onto the camera body:

1. Remove the protector caps from the finder and from the housing (8).

2. Push the camera end of the finder into the mount on the body with the slot facing upwards.

3. Screw the coupling ring (8) tight.

Viewfinder Features:

1. The viewfinder rotates in a plane parallel to the camera body. Use the viewfinder position lock (9) to loosen and tighten the rotating action. When the finder is rotated out of the "normal" horizontal position, the image is seen to rotate too. Notice, however, that the rectangular black aperture outline rotates with the image. Thus what is parallel to the sides of the outline is always vertical, and what is parallel to the top and bottom of the outline is always horizontal. There is therefore no need to rotate your head. Keep it in the most comfortable position and concentrate on seeing the image in relation to the outline. You will soon cease to be conscious of the image rotation.

1A. There is a new "Dove Prism" eyepiece available for the NPR, in which the image always appears level. This is a special order accessory.

2. The eyepiece also rotates in a plane at right angles to the camera body. For use with the left or right eye, the finder can be swiveled so that it is nearer to or further from the camera body when the finder is horizontal. The rubber eyecup (13) also swivels. Use the eyepiece locking screw (10) to loosen and tighten the swiveling action.

3. The eyepiece shutter (12) opens automatically with a slight forward pressure from the operator's eye, and closes when this pressure is released. It can be locked open by pushing firmly on the eyepiece cup. To release it, push gently sideways on the rubber eyecup (13) with your hand or head.

4. The eyepiece has diopter adjustment. To set it for your eye, remove the taking lens and focus the eyepiece on the groundglass aperture outline by turning the marked ring just in front of the rubber eyepiece cup. Then lock it with the dioptrics lock (11). It is wise to check this setting occasionally when doing critical work since it may then be necessary to compensate for eye fatigue.

5. The area within the black rectangle marked on the groundglass is the area covered by the full film aperture. What you see outside this rectangle will not be recorded on the film.

6. A groundglass marked with TV safe action area and center crosshairs is available as a special order.

7. Special purpose mattes may be ordered from your NPR dealer and inserted beneath the groundglass. Take care not to damage the groundglass or mirror.

CAUTION

Never use mattes made of gelatin, film or other materials with shiny surfaces. These will cause reflections onto the film.

CHAPTER III

THE LENS TURRET AND LENS MOUNTS

To revolve the turret:

1. Unlock the turret (6) by twisting turret lock (32) counter clockwise in the direction marked on the lock with an arrow and the letter D.

2. Pull out and revolve the turret 180 degrees, preferably counter-clockwise.

3. Then push the turret back into its housing and lock it by turning the turret lock in the direction marked by the letter S.

CAUTION

Be sure that the turret is fully seated before locking it.

Lens Turret Options:

The standard two lens turret (CIRCE) comprises one Eclair Camerette mount (CA-1, large diameter), and one "C" mount. As a special order, these turrets are also available: turret with two Camerette mounts, (CIRCA), and turret with two "C" mounts (CIRCC).

The Camerette mount is by far the best mount for all lenses because it provides sturdy support and accurate seating. This mount is essential for heavy, wide angle and zoom lenses.

As a special order the "TARRI" mount is availaboe in place of the CA-I mount.

Mounting the Lens:

"C" mount: screw the lens into the socket.

Camerette mount: Make sure that the split flange on the lens is at the top. Slide the lens carefully into the socket and twist it gently clockwise. Do not use force. The Camerette mount is extremely precise; it should be treated like any

precision instrument. Be sure that the socket and the lens are clean and dust-free.

Lens Mount Adapters:

Various adapters are available, but they should be used only as a last resort. They are available, for example, to use Arriflex mounted lenses with either the NPR's "C" mount or its Camerette mount.

CAUTION

Adapters are by their nature a source of inaccuracy and trouble, particularly when used with wide angle lenses and with zoom lenses.

Support for Extra Long Lenses:

A support rod is available for use either with a matte box or with unusually long or heavy lenses. To use it: Fit the rod into the rod socket (5) and tighten it with the screw beneath it. Then attach the adjustable support to the rod and the lens above it, locking it with the two knobs provided, so that there is tension between lens and rod.

Matte Box (CIPAR):

A bellows type matte box is available, to be mounted on the support rod. It has two filter stages, one of which can be rotated, for 2" x 2" thin glass or gelatin filters.

Matte Box (ROPAR):

A bellows type studio matte box for 3" x 3" filters; two stages, one rotating, one pass-through.

Matte Box (CIBOG):

Light weight single stage matte box for 3" x 3" filter, with moveable flags.

CHAPTER IV

LENSES

The Angenieux Zooms: 9.5 to 95mm, 12 to 120mm, 12 to 24mm

These lenses have been chosen as standard equipment for the NPR because they almost equal the resolution of any single focal length lens while offering, of course, far more versatility, and being "fast" enough for most uses. The Camerette mount is as much a precision instrument as the rest of it, since extremely accurate seating is necessary for holding focus through the zoom. In mounting it on the camera body, force should be avoided, and care should be taken to see that both lens and lens mount are clean and dust-free.

When packing the camera for travel, the lens should be removed; otherwise it is good practice to keep it on the camera body, removing it as seldom as possible. The Angenieux features a geared rotating zoom handle. To engage the gears, pull out on the handle mount; to disengage them, push in. F stops are marked on the barrel in white, T stops in red.

Other Lenses:

Many other well-known lens manufacturers offer their product in the Camerette mount. And, of couse, the "C" mount is widely used throughout the industry. Lenses wider, longer or faster than the Angenieux zoom may be mounted in either mount as desired. If you wish to put a heavy lens on the "C" mount we suggest you use the support rod that mounts in the socket (5).

CHAPTER V

THE SHUTTER

Viewing When Camera is Not Running:

When the camera is switched off, it will occasionally stop with the shutter open, so that the mirror is not in position to reflect the lens image to your eye. To advance the shutter so that you can see through the viewfinder, proceed as follows:

1. Turn the shutter control lever (3) to "Reflex" (marked on the camera body).

2. Wind the shutter inching knob (4) downwards until a full image is seen in the viewfinder.

3. Return the shutter control lever to "Motor." If this last step is omitted the camera will emit a sharp whining noise when next operated, and will not run at speed. In this event, flip the lever to "Motor," whereupon the camera will run correctly.

CAUTION

Do not allow anything to touch the surface of the mirror.

To Adjust the Shutter Opening:

The shutter may be set at any opening from 5° to 180°. The normal setting is 180°. To change it, proceed as follows:

1. Turn the lens turret (6) until it is horizontal, and push it in slightly.

2. Turn the shutter control lever (3) to "Reflex." Wind the shutter inching knob (4) until the shutter's leading edge appears in the aperture.

3. Turn the shutter control lever to "Shutter Adjustment" (reglage obdurateur) and hold it in this position.

4. Push in and turn the variable shutter control (34) until the desired shutter opening is obtained. The engraved number nearest the mirror's leading edge shows the effective shutter opening in degrees. (See Figure J).

5. Turn the shutter control lever back to "Motor." (Moteur).

CHAPTER VI

DRIVE MOTORS

General Features of the Constant Speed Motor (CIMUS):

Standard equipment on the NPR is the CIMUS (36), a governor controlled 12 volt DC battery operated motor generating a 60 cycle sync pulse. (For more on the sync pulse system see Chapter VIII).

Its extensive use of transistors and solid state circuitry make it compact and lightweight but also vulnerable to electrical abuse (see caution below). It runs at one speed, 24 frames per second and a running light (14) on the motor indicates when the camera is running at this speed.

Detailed Features of the CIMUS Motor:

The power input socket (1) is matched to the four-pin cannon plug of the power cable. The motor switch (2) is just above it. A built-in sync pulse generator feeds the sync pulse through the power cable to the battery, where a three-pin output socket is matched to the sync cable leading to the tape recorder.

A built-in governor maintains speed within limits of 0.2%. Its accuracy makes a tachometer unnecessary. When the running light (14) is glowing, even faintly, it indicates that film speed is within the 0.2% tolerance. If it does not glow, synchronization cannot be guaranteed. Since the brilliance of the running light is proportional to the power delivery of the battery, it may also be used as a check on the battery's charge.

The governor limits film speed to within 0.2% of the motor's set speed. However, there may be slight differences between the set speed of individual CIMUS motors. Any such difference is unimportant and imperceptible, provided the tape recorder being used records the sync pulse generated by that motor. With any constant speed motor, the sync pulse must be recorded by the tape recorder to ensure synchronization.

The symbol HZ on the motor stands for Hertz, which is the European designation for cycles in AC current. 60Hz, therefore, means 60 cycle, AC current. On the DC powered CIMUS motor, it refers to the sync pulse current put out by the builtin sync pulse generator, when the motor is running at its set speed of 24 frames per second. Film makers working abroad may find NPR motors set to 25 frames per second (the standard speed for European television) and generating sync pulses of 50Hz or 100Hz.

TRANSISTORIZED MOTORS

CAUTION

Transistors and associated electronic circuitry can be irreparably damaged by polarity reversal, incorrect voltage and wrong wave forms. Watch these four points carefully.

1. Never use a battery or power cord whose polarity can be accidentally reversed.

2. Always check the polarity of current supplied to the motor. On the four pin Cannon supplied with the CIMUS DC motor, Pin #1 is negative, pin #4 is positive; pins #2 and #3 are for the sync pulse.

3. Check battery voltage carefully. For the CIMUS motor it should be a nominal 12 volts. With the CIBAT/CIBCO/UNIBAT battery there is no danger of overloading. (True voltage up to 14 volts is acceptable. This may be the case when the battery is newly charged). If more than 14 volts are fed to the motor, particularly in hot weather, serious damage will result and the motor will run way off speed. In extremely cold weather, up to 15 volts may be used if necessary.

4. Do not use 'power supplies' (rectifying devices that supply DC current from AC current). Their true output voltage is very hard to determine, and varies tremendously according to the load. With the NPR, output voltage would have to be measured with a load of the camera running with film in the magazine.

A 'power supply' output measuring 16 volts unloaded may drop to 8 volts loaded, in which case the camera will not run at speed. And despite a voltmeter reading of 12 volts, fluctuations in the output current may reach peaks as high as 35 volts. If you must use 'power supplies' we strongly recommend extensive testing. And you do so at your own risk.

Detailed Features of the CICLO Motor.

To the features of the CIMUS motor have been added an electronic system that makes the CICLO motor activate the clapper light inside the camera body.

This is accomplished by a transistorized delay circuit that feeds a short 12 volts DC pulse to the related circuits. The pulse duration is about 1/3 of one second.

The NPR Variable Speed Motor: VACIR

This motor has a speed range of 10 to 40 frames per second in two ranges; 10 to 25 fps on 8 volts DC and 20 to 40 fps on 12 volts DC. To run it in the low speed range requires adjustment of the battery. See appendix "G" for a diagram of the battery wiring. A tachometer and a high/low range switch are mounted on this motor's left side.

The Crystal Controlled Motor:

This DC motor gives perfect "cordless" synchronization when used with a recorder equipped with a matching crystal sync pulse unit. The fact that this is a DC motor is a great improvement over the earlier "sync" motor/crystal power pack system. This unit will also allow operation in sync with any AC powered equipment, other sync pulse producing cameras and as a play-back unit.

This motor features the latest solid state speed control, operated from a quartz crystal oscillator through an electronic frequency discriminator. This provides the most accurate speed control for battery operated cameras in the industry.

The electronic control box mounted in one unit with the battery, makes a light weight and compact portable power pack.

The crystal controlled motor is available, on order, either for 24 fps or 25 fps, with reference to 50Hz or 60Hz.

The NPR Synchronous Motors.

3 types of synchronous motors are available to operate the NPR camera:

1. Standard Synchronous Motor. This light weight 110 Volt AC motor, operates the camera at 24 fps, on a 60 cycle line frequency.

   On special order this motor can be equipped to furnish clapper, bloop tone and sync pulse, for either Nagra or another type of recorder. A red pilot light, shows when the camera is running. A two position switch enables the operator to run the camera on short bursts or long filming periods.

2. Heavy duty Synchronous Motor. This 110 Volt AC, single phase motor has reserve power for long runs such as 1200 foot magazines, and cold weather. The motor is a polarized Hysteresis type. It is equipped with an incorporated control unit, to deliver sync pulse voltage, 12 volts DC clapper impulse and bloop tone for the recorder.

3. Three Phase AC Motor. This is a 220 Volt AC, 60 cycle 3 phase motor. It is available on special order. Also available is a Phasing Box for operating this motor on single phase current at either 110 or 220 volts.

CHAPTER VII

THE BATTERY AND CHARGER

CIBAT and CIBCO Battery:

This is a 4AH 12 volt, Nickel Cadmium battery, with a four pin Cannon output socket for connection to the camera, and a three pin Cannon output socket for relaying the sync pulse to a tape recorder. There is no built-in charger. (See CIBRE, separate charger).

The battery also has an indicator showing the degree of charge.

The contents are sealed, so that the battery may be shipped by air. It comes in either leather or metal case.

The non corrosive Nickel Cadmium battery cells are sealed and need very little maintenance care.

The output voltage is quite flat along the discharge period so the operation of the camera motor is steady and reliable.

The battery capacity is 4AH which at normal temperatures will drive the camera for about 4000 feet of film.

UNIBAT Battery Pack.

This power pack is a 4AH 12 volt Nickel Cadmium battery, incorporating a transformer type charger with silicon rectifiers, for use on 110 volts AC.

The Battery has a control panel with a four position switch for the following functions:

1. Operates non bloop CIMUS motors with sync pulse only.
2. Operates clapper CICLO and CIBLO motors, relays sync pulse only.
3. Operates CIBLO motors, relays both bloop tone and sync pulse.
4. Operates variable speed, VACIR, motors on high and low speed range.

A meter on the panel of this pack will read either battery voltage or sync pulse being fed to the recorder.

The battery pack is connected to the camera by a four conductor coiled cable that stretches from 3 to 7 feet long.

The CIBLO Battery Pack.

This battery pack features 10 Nickel Cadmium cells with an incorporated charger, silicon rectifier type, which takes the power from 110 volts AC lines through a transformer.

A voltmeter on the battery pack panel shows battery voltage as well as AC sync pulse.

This pack is specially designed for the new system CIBLO motors, thus it has only one output socket to operate the camera.

Its capacity, 4AH enables the pack, when fully charged, to run the camera for about 4000 feet of film.

The CIBRE Battery Charger.

This separate charge is for the CIBAT and CIBCO batteries - operates on either 110v, 127v, 220v or 240v, 50 or 60Hz AC current.

Switch in position "C" charges at 18 hour rate for a full charge. Position "E" is for an unlimited maintenance trickle charge. "E" position will not build up charge.

CHAPTER VIII

THE SYNC PULSE AND CRYSTAL CONTROL

Features of the sync pulse system:

Whereas filming sync sound with synchronous motors requires that the camera and recorder run at precisely the same speed, the sync pulse system allows them to run independently, and corrects for deviations from sync when the track is being transferred to sprocketed tape.

These corrections are made possible by a 60 cycle AC pulse generated in the camera's motor and transmitted via the battery and sync cable to the recorder, where it is recorded in such a way that it is inaudible on normal playback. If the camera runs at exactly 24 frames per second the pulse will be exactly 60 cycles per second. If the camera runs a little over or under speed the pulse signal will be a little over or under 60 cycles, always in exact proportion.

When the track is transferred to sprocketed tape the sync pulse on the quarter-inch tape is compared with the 60 cycle current of the mains. If the pulse is found to be slower than the mains, the transfer system will correct for it either by speeding up the quarter-inch type or by slowing the sprocketed tape during re-recording. If the sync pulse is fast, the opposite correction is made.

This procedure also corrects speed deviations in the quarter-inch tape recorder, since the recorder's deviations can only have increased or diminished the variation from synchronous operation of the two machines. The sync pulse read at the transfer represents the sum of the errors of both camera and recorder.

The principle is that if the track is out of sync it is corrected by playing back the tape at a speed different from the recording speed. If track quality is not to suffer, the speed difference and the deviation from sync must be very slight. The system works because the motors of the NPR and of the Nagra and Perfectone recorders are so accurately controlled that deviations are, in practice, very small indeed.

CHAPTER IX

THE AUTOMATIC CLAPPER

An automatic clapper is standard equipment on the NPR. While there are various modifications of it for different applications, the basic tool is a small light, mounted in the camera body, that establishes sync between film and tape by fogging the film at the head of the roll and putting a simultaneous signal on the tape via the sync pulse cable.

Standard Automatic Clapper Operation: (CICLO)

The clapper light goes on automatically for the first 300 milliseconds after the camera is switched on. While this light is on, the sync pulse signal is not transmitted to the recorder. When the light goes out, the sync pulse begins transmission. (See Appendices A and B).

Establishing Sync with the Standard Automatic Clapper:

The clapper light completely fogs about four frames and then dies out gradually during the next four. Sync is established by lining up the beginning of the sync pulse on the tape with the first frame following the last completely fogged frame.

Bloop Modification for Nagra users: (CIBLO)

In this form, the clapper activates the Nagra recorder's oscillator while the light is on. This puts a 1000 cycle bloop tone on the tape that is audible in playback. Sync is established by lining up the last completely fogged frame with the end of the bloop tone.

From April 1968, a new CIBLO motor improvement has been made to eliminate the pigtail for bloop tone connections.

The modified motor has a three prong female connector on its right side from where the sync pulse and bloop tone is taken to the recorder. (For schematic, see Appendix C).

The sync pulse voltage, normally 1.5 volt, has been dropped to 1.0 volt for Nagra recorders.

Motors so modified are marked on the side "Nagra Bloop, Sync 1 volt."

If NPR package #2 has been ordered, the motor delivered has been already modified to this new system.

On request an early type CIBLO motor can be modified for the new clapper and bloop system.

The bloop modification can be used with recorders other than the Nagra by using an accessory oscillator, available on special order.

The sync pulse voltage, can also be adjusted for any other type of recorder requirements.

Modification for Manual End Clapping.

Where it is inconvenient to head clap, the cameraman may operate the clapper/bloop system manually by pressing a button the the motor housing. A switch on the motor may select either, automatic or manual operation. This modification is available on special order.

CHAPTER X

FEATURES OF THE MAGAZINE

The coaxial magazine's right side (Figure B) holds and feeds the unexposed rawstock; the left side (Figure C) takes up the exposed film. Film is threaded and the loop formed inside the magazine when it is loaded, before shooting starts. Changing magazines is thus a simple matter of snapping off the old one and snapping on the new.

The pressure plate (visible behind the film in Figure E) is on the front of the magazine; when you remove the magazine, the gate area on the camera body is easily visible and accessible for cleaning.

On each magazine lid (27) there are film reminder discs (28) to help you keep a record of the emulsion or subject matter inside. Footage counters are on top - just under the carrying handle when the magazine is mounted on the camera body. (See Figure H). The magazine lock, too, is just under the carrying handle.

Loads from 100 to 400 feet may be used, either on cores (rouleaux) or in daylight loading spools (bobines metal). Double or single perforation film may be loaded.

The pressure plate cover provided protects the plate from damage, and should be used whenever the magazine is off the camera body.

Since June 1968 new magazines have a two part "gap" type pressure plate to prevent problems with soft, tacky films such as EK "EF" film. This new type pressure plate can be installed on some older magazines. Please inquire if you need this.

CHAPTER XI

LOADING THE MAGAZINE

To Load the Magazine:

1. Place it on its side with the feed side up (Figure B).

2. Pull the magazine lid lock (26) to the left. Slide the button downwards and simultaneously lift the magazine lid (27) by the lip on its edge.

3. Raise the footage counter arm (16) toward the magazine's top until it locks in the up position.

4. If the film is on a core, place it firmly on the feed spindle (15) against the core load flange (25). This must be done in the dark, of course.

5. If the film is in a daylight loading spool, the core load flange must first be removed by pulling and raising the magazine spindle lock (Figure G) and lifting the flange out of the magazine. The spindle lock must then be lowered and centered again. If this is not done, the flange or spool will not be firmly held on the spindle, which will cause noise when the camera is run.

6. Film may be used with emulsion wound inside or outside, but it must be loaded so that the emulsion faces up toward the top of the magazine, (where the footage counters are) as it leaves the roll. Single perforation film (B wind) must have the perforations up towards you as you load.

7. Pull up the small knob to open the feed sprocket guide (17).

8. Pass the film under the film guide roller, (following, if you could see it in the dark, the engraved arrow), and engage the perforations of the first inch or so of film with the teeth of the feed sprocket wheel (18). Hold the sprocket wheel still with your right thumb and pull the film back gently with your left hand to check that the perforations and teeth have engaged.

9. Close the feed sprocket guide (17) so that the film is held.

10. Replace the magazine lid (27) and push in the magazine lid lock (26). The footage counter arm will fall automatically into its working position.

11. Switch on the darkroom light or remove the magazine from the changing bag. Turn the magazine over so that its take-up side is up (Figure C).

12. Remove the take-up side magazine lid as in 2. above.

13. Rotate the take-up spindle (24) counter-clockwise, as marked by the engraved arrow, until about four inches of film have emerged into the magazine.

14. Open the upper take-up sprocket guide (21) and engage the film on the sprocket's teeth so that the film roughly follows the engraved loop path. Then close the sprocket guide.

15. Again rotate the take-up spindle (24) counterclockwise. At the same time, press in on the pressure plate (Figure E). Continue this action until about 30 inches of film have emerged from above the pressure plate.

16. Make sure that no slack film has accumulated inside the closed portion of the magazine between the sprocket wheel and the pressure plate by pulling the film gently until you see the sprocket wheel begins to turn.

17. Press in on the pressure plate and slip the film's end into the aperture below the pressure plate.

18. Open the lower take-up sprocket guide (22). Pull the film through between the sprocket guide and the sprocket, leaving a loop of twelve or thirteen frames (roughly the width of two fingers) outside the magazine.

19. Close the lower take-up sprocket guide (22).

20. As the film leaves the sprocket wheel it must follow the engraved arrow, passing over the film guide roller (23) and then down so that it winds counterclockwise onto the take-up spindle (24), and takes up emulsion out.

21. Wind the film onto the take-up core or spool so that it will just fit onto the spindle (24) without much slack. If a daylight loading spool is used, the core load flange (25) must be removed as in 5. above.

22. Make sure the core is firmly pushed onto the spindle.

23. Replace the magazine lid, sliding or scooping the narrow end in first, so that the film guide opening pin (20) is is pushed into working position. Push in the magazine lid lock (26).

24. Pull out firmly on the loop outside the magazine to be sure that all slack is out. Check its size - twelve or

thirteen frames.

Dividing the Loop:

This should be done when loading the magazine and should be done again each time a magazine is mounted on the camera body. Loop measurement and division are not very critical and may be done quickly when you have become familiar with them.

1. Check the loop's size - twelve or thirteen frames.

2. Divide it equally into two loops (see Figure E).

3. Slip the top loop into the gap above the pressure plate, and then bottom loop into the gap below. Any inaccuracy in this division should favor a slightly larger lower loop.

CHAPTER XII

MOUNTING AND REMOVING THE MAGAZINE

To Mount the Magazine on the Camera Body:

1. Check that the camera is not running.

2. Check that the loop is the right size and evenly divided.

3. Engage the triangular projections at the bottom of the magazine's front with the notches in the camera body below the gate plate (see Figure F).

4. Tilt the magazine forward until it locks itself in position. Pull on the magazine to check that it is secured and see that the magazine release button (30) is out nearly flush with camera body.

5. Push on the extra magazine lock (under the carrying handle, see Figure H) to the left.

To Remove the Magazine from the Camera Body:

1. Push the extra magazine lock to the right.

2. Holding the magazine with one hand, press the magazine release button (30).

3. Lift the magazine clear of the camera body.

CHAPTER XIII

STARTING THE CAMERA

1. Check that current polarity and voltage are correct. (See Chapter VI).

2. Push the four-pin Cannon plug on the battery power cable into the camera's power input socket (1).

3. Check that the shutter control lever (3) is at "Motor." (If the camera is started while the shutter control lever is at "Reflex," it will make a whining noise and run off speed. If this happens, flip the lever to "Motor" and continue shooting).

4. Press the motor switch button (2). The lock just above the button may be used to keep the camera running.

CAUTION

Never allow the shutter control lever (3) to shift from "Motor" position to either "Reflex" or "Shutter adjustment" while the camera is running.

CHAPTER XIV

BUILT-IN NOISEMAKERS: LOOP GUARD AND DRIVE CLUTCH

Operation of the Loop Guard:

The magazine contains a device that makes a distinct noise if the loop should be lost for any reason, such as improper loading, dirt in the gate or shifting of the loop during handling of the magazine while it is off the camera body. If you hear this noise while filming, proceed as follows:

1. Stop the camera and remove the magazine.

2. Check the loop (see Chapter XI). Film will probably be found to be coming entirely from the top. Redivide the loop, replace the magazine and continue shooting.

3. If noise and lost loop persist, check the magazine in a changing bag for evidence of a jam or torn sprocket hole.

4. Check these three points:

   (a) cleanliness of the film channel (on camera body)
   (b) free movement of the side pressure plate (beside the film channel);
   (c) free movement of the rear pressure plate (on the magazine).

Testing the Loop Guard:

To check that the loop guard is working and to familiarize yourself with its sound, proceed as follows:

1. Load a magazine with film in the usual way - but without making a loop in front of the pressure plate.

2. Mount the magazine on the body and run the motor.

You should hear a loud clattering noise. If you don't hear it, check that there is, in fact, no loop. If there is none, return the magazine to your NPR dealer for adjustment.

Operation of the Drive Clutch:

The magazine also contains a noise making clutch in the drive shaft. If a jam should occur, this clutch automatically disengages the drive shaft, protecting the film and the mechanism. In addition, the noise it makes warns you that something is wrong. If you hear the noise while filming, stop the camera and check the magazine's load inside a changing bag.

Testing the Drive Clutch:

To check that the drive clutch is working and to familiarize yourself with its sound, proceed as follows:

1. Mount a magazine on the camera with its take-up side lid off.

2. Run the motor, and press with your thumb on the take-up sprocket wheel.

You will hear a loud clattering noise, similar to that made by the loop guard.

CAUTION

Do not attempt these noisemaker tests on magazines with serial numbers beginning with the letters A, B, C, D, E or F.

CHAPTER XV

CLEANING AND MAINTENANCE

Cleaning the Gate Area:

With the magazine removed from the camera body, the film channel, aperture and side and rear pressure plates are easily accessible for cleaning. Clean the aperture plate and aperture with a clean chamois. Occasionally the chamois may be moistened with a very small quantity of pure alcohol. Rub in the direction of the grain, and be very careful not to damage the claw and registration pin. The rear pressure plate may be cleaned in the same way.

Take particular care to remove emulsion deposits along the side pressure plates, especially in humid weather and especially with color film. A wooden tooth pick or manicurist's orangewood stick is a useful tool for removing emulsion deposits. Never use anything made of metal.

Both the spring-loaded side pressure plate (right of the film channel) and the rear pressure plate on the magazine must move freely without sticking. If they don't, return the camera to your NPR dealer for adjustment.

CAUTION

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1. When cleaning the aperture, make sure that you can see right through - that the shutter is invisible. If you touch the shutter, even from the rear, it may be damaged.

2. Do not touch the shutter mirror. If an air syringe will not clean it adequately, take it to an NPR dealer.

3. Cleaning brushes are a menace. They are usually dirty and they shed hairs. If a brush hair gets into the claw slot it will jam the movement. If a hair gets into the aperture, it will probably appear on the projection screen.

Cleaning the Magazine:

Sprocket wheels and guides may be cleaned with a lint-free cloth moistened with a small quantity of alcohol. The interior generally is best blown clean with an air jet.

CAUTION

1. Do not attempt to lubricate any moving parts of the camera. All gears and bearings are permanently lubricated.

2. Optical elements are best cleaned with an air syringe. Rubbing, even with lens tissue, can scratch their surfaces.

Like all professional cinematographic equipment, the NPR should be given an occasional overhaul in your dealer's service department. Preventive maintenance can save time, trouble and money.

CHAPTER XVI

SHOULDER-RESTING

It's not how much the camera weighs but how the weight is distributed that determines steadiness. Every other 16mm camera requires the cameraman to support its weight in front of him with both arms. There's no hand permanently free to follow focus, change the aperture or zoom. And muscle fatigue causes camera shake.

Most of the NPR's weight is over your shoulder (see Figure K). Since the feed and take-up rolls are side by side at the back of the magazine, balance doesn't change as the film goes through. The motor nestles into your shoulder like a rifle butt, only higher. While your elbow rests against your side, you keep the camera in position with one hand.

The most effective stance is to lean back slightly from the waist like a pregnant woman, swivelling and bending from the waist to follow action. This puts the camera's weight directly over your shoulder, and allows you to relax, using your right arm merely to ease the camera back, not to support its weight.

The NPR with Angenieux zoom lens and 400 feet of film weighs just over 20 pounds. At first the operator tends to be afraid of dropping it, which causes tension, muscle fatigue and camera shake. With a little practice, however, one learns to relax and to let gravity do most of the work.

Another useful position is to hold the camera at your waist like a gangster's machine gun, rotating the viewfinder to its vertical position for viewing.

CHAPTER XVII

SILENT RUNNING

NPR Noise Level Compared with Blimped Mitchell 16:

Engineers at the Eclair Studios in Paris ran a comparative running noise test using an NPR and a Mitchell 16. The Mitchell camera inside its metal blimp, (a total of 83 pounds), is hard to beat for silence, and the NPR didn't beat it. Using a microphone at one meter from the film plane and with film running in both cameras, the noise levels recorded were as follows:

Mitchell 16 (inside blimp):	26 decibels above ambient noise.
NPR (no blimp, of course):	29.5 decibels above ambient noise.

Since the blimped Mitchell is probably the industry's standard for silent studio operation, we are proud to have come so close to it without a blimp.

For recording in exceptionally difficult conditions, (a very quiet subject in a very quiet, very small, very live room, for example), a Barney is available for the NPR.

Difficulties in Making Objective Noise Tests:

If the camera cannot be heard during shooting it is, if not silent, certainly inaudible. But most amateur "test" involve hearing the camera run, and then deciding subjectively whether its noise level is satisfactory. The camera's apparent noise level is affected by the following factors: Ambient noise level and frequencies, proximity, angle and texture of reflecting surfaces in the area, how live the room is, position of the camera in relation to the listener or microphone, freshness of the film stock - and many more. Objective tests are therefore extremely difficult.

Practical Tests of Silent Running:

What noise the NPR does make is caused by film passing over the sprocket wheels in the magazine, and is reflected out from the sides of the camera. Any camera noise getting into the scene is probably, therefore, bounced in from close reflecting surfaces beside the magazine. Placing a microphone close to the magazine's side will do it, too; but since the subject being recorded is generally in front of the camera, this would be an unrealistic "test." Here are some practical test points:

1. Record someone speaking, and set the recorder's level for his voice.

2. Place the speaker in front of the camera as though filming him.

3. Use the same microphone and microphone placement as during filming.

4. Directional and lavalier microphones give the best results, of course.

5. Switch the camera on and off silently while the speaker is talking.

6. Have someone ignorant of its purpose listen to the recording.

7. Smell the filmstock; if the "fresh" perfume is gone, the stock is shrunk. Shrunken film will clatter in the camera.

HINTS AND SUGGESTIONS

For NPR Eclair and Nagra Recorder Users:

Electric Noises

Noise on the audio portion of the tape, may be due to an imperfect ground or shield connection. When this occurs check:

a) On cameras with sync pulse only, check for continuity on sync pulse cable, between battery and recorder, look for loose plugs, damaged connection pins, recorder input plug. Check for continuity on power cable from camera to battery.

b) On cameras with sync pulse and bloop tone, check for open sync cable shield. Check for continuity according to Appendix F schematic. If using pigtail, insert this on camera side of battery power cable. If using UNIBAT battery, check for right position of function switch on top of battery panel.

c) In all cases check for good shielding on recorder microphone cable and good ground connection to same. Experience has shown that most of the NPR electric interferences on sound recording are due to an open microphone cable shield.

When testing the camera with recorder and without a microphone connected, turn the recorder all the way down. Otherwise, with an open microphone input, all noise will be heard on the tape even though no microphone is connected.

Loss of Clapper and Bloop Tone:

The following cases may occur:

a) If clapper light works, but there is no bloop, with CIBLO motors, check sync cable or replace it for a known good one.

Check cable connections and continuity accordingly with schematic at Appendix F.

b) If neither clapper or bloop is working, check the fuse which is mounted on top of motor electronic borad, close to running light. To locate it, remove the 2 screws holding electronic board metal cover, on upper side of the motor and remove this cover. The fuse

Should be replaced with one of the same size, pigtail type, 1 amp. capacity.

Check the sync cable for posible short between pins # 2 and 3 at the Cannon plug.

Test the camera with the sync cable unplugged. If defect persists, it means there is a short circuit in the camera or motor wiring and should be sent to Eclair for service.

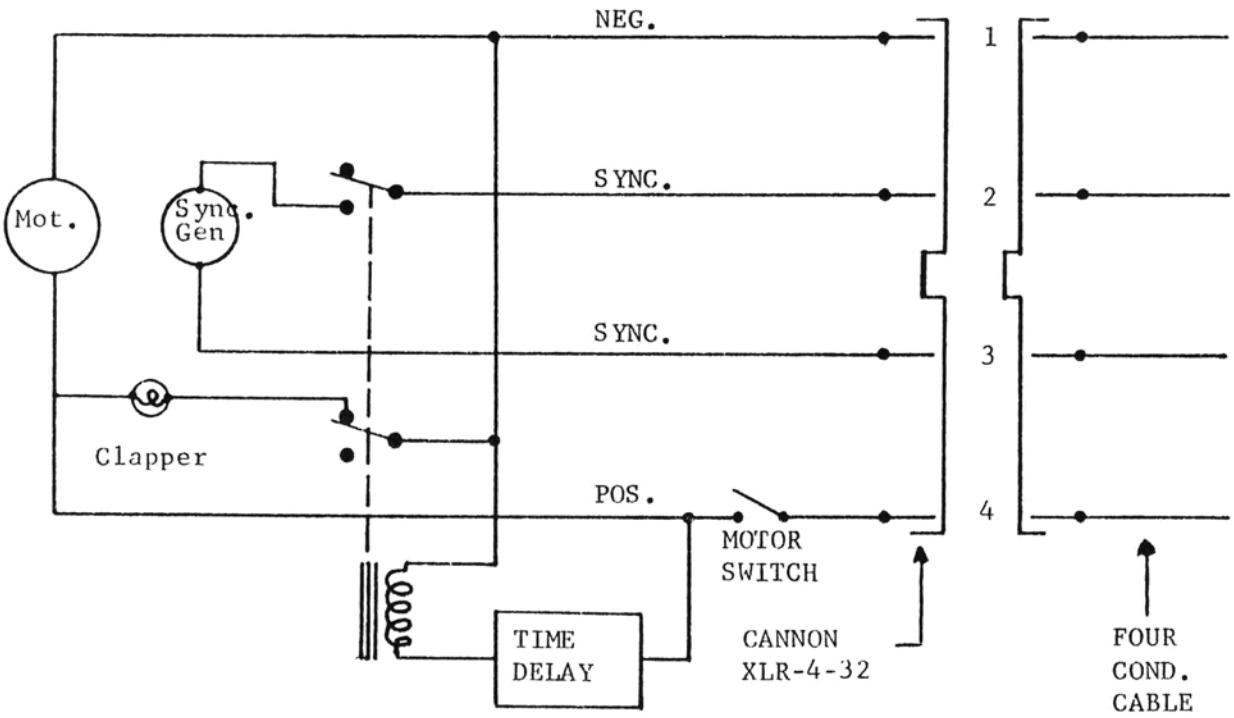
c) If clapper light, and bloop tone come on when filming, it may be due to an electronic delay unit problem.

A dis-activation of this unit in most cases is due to a low battery. The electronic clapper control goes off when the battery voltage is lower than 11.5 volts, even though camera motor may be running at normal speed.

When operating the camera, check battery voltage once in a while. Never run a camera with a battery lower than 12 volts.

APPENDIX A:

AUTOMATIC CLAPPER, STANDARD EQUIPMENT,
CICLO MOTOR SCHEMATIC

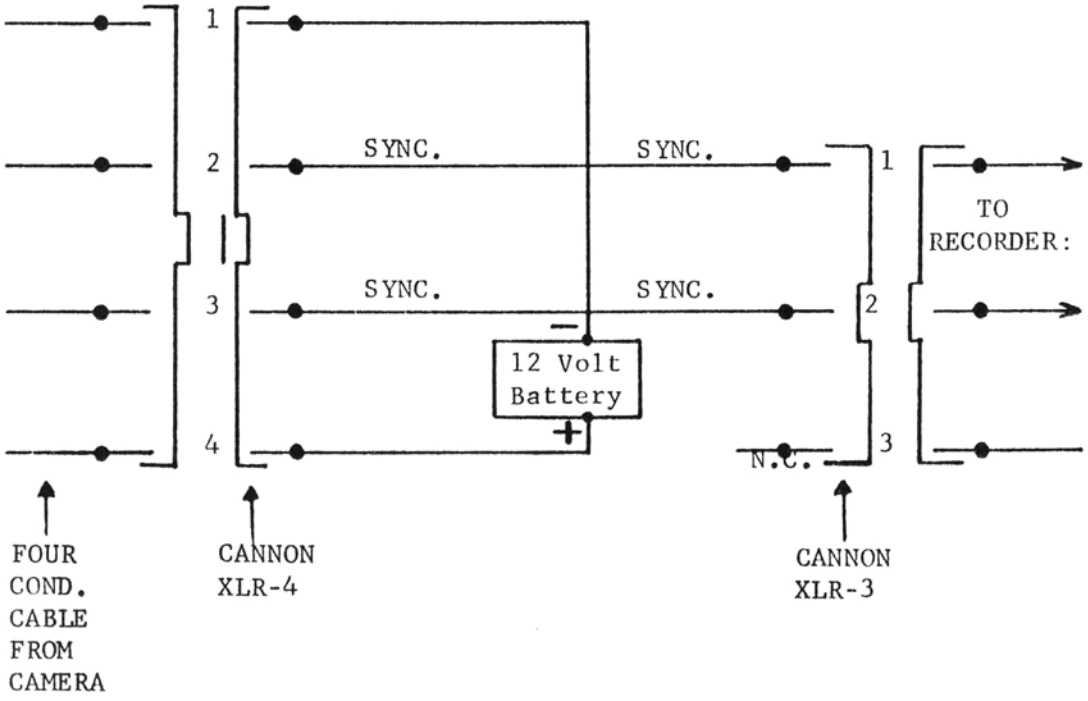


In this configuration, clapper light goes on automatically for first 300 milliseconds when camera is started. While light is on, sync pulse does not go to recorder. When light goes out, sync pulse goes to recorder. There is no audible tone on audio portion of tape.

Sync is established by lining up beginning of sync pulse tape with first frame following last completely fogged frame. Clapper light <u>completely</u> fogs about four frames and then dies out during next four frames.

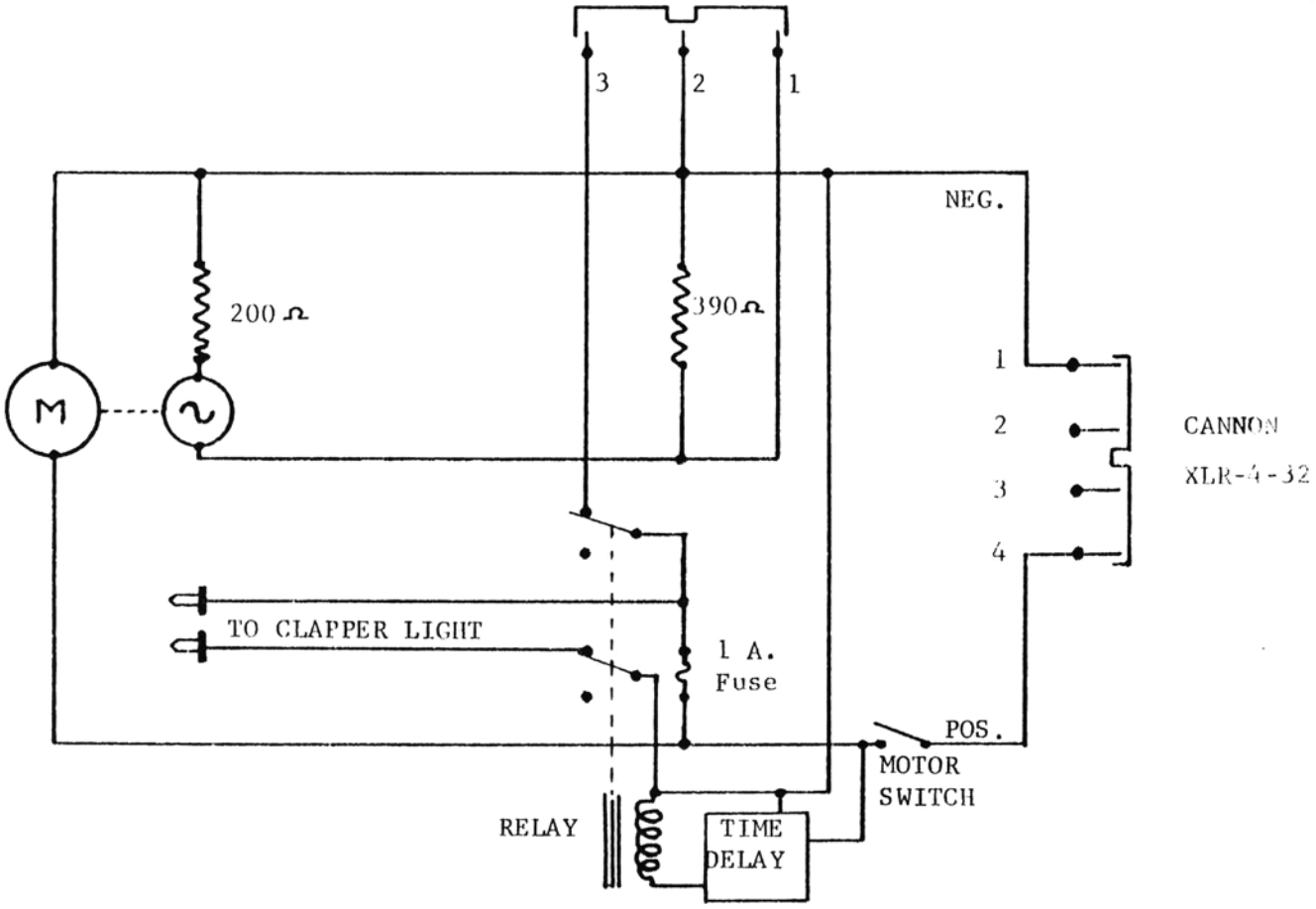
APPENDIX B:

STANDARD EQUIPMENT, BATTERY SCHEMATIC



APPENDIX C:

AUTOMATIC CLAPPER AND BLOOP
CIBLO MOTOR DIAGRAM

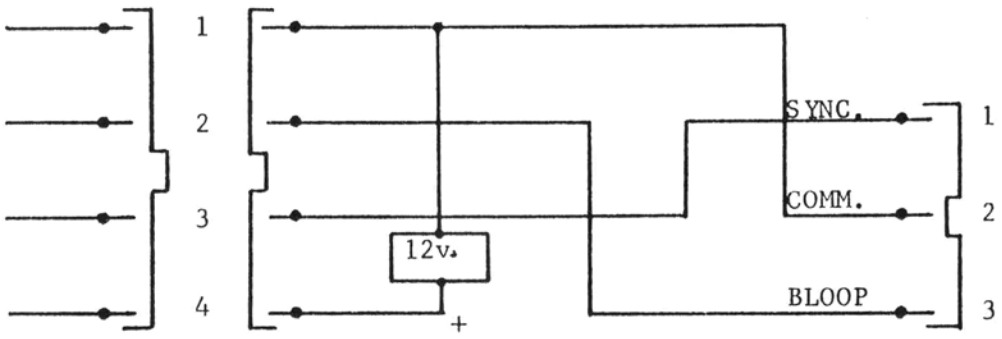


In this configuration, time delay relay activates clapper light in the camera and oscillator at recorder for bloop tone.

Sync is established by lining up last completely fogged frame with end of bloop tone.

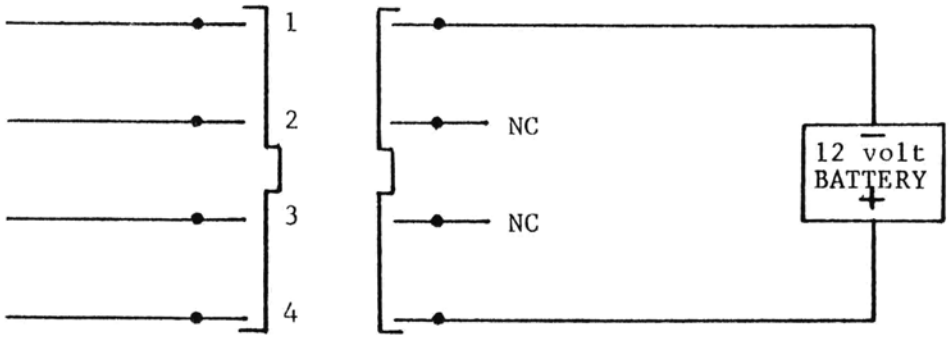
APPENDIX D:

BATTERY SCHEMATIC
BLOOP (CIBLO) MOTORS (Prior to April 1968)



APPENDIX E.

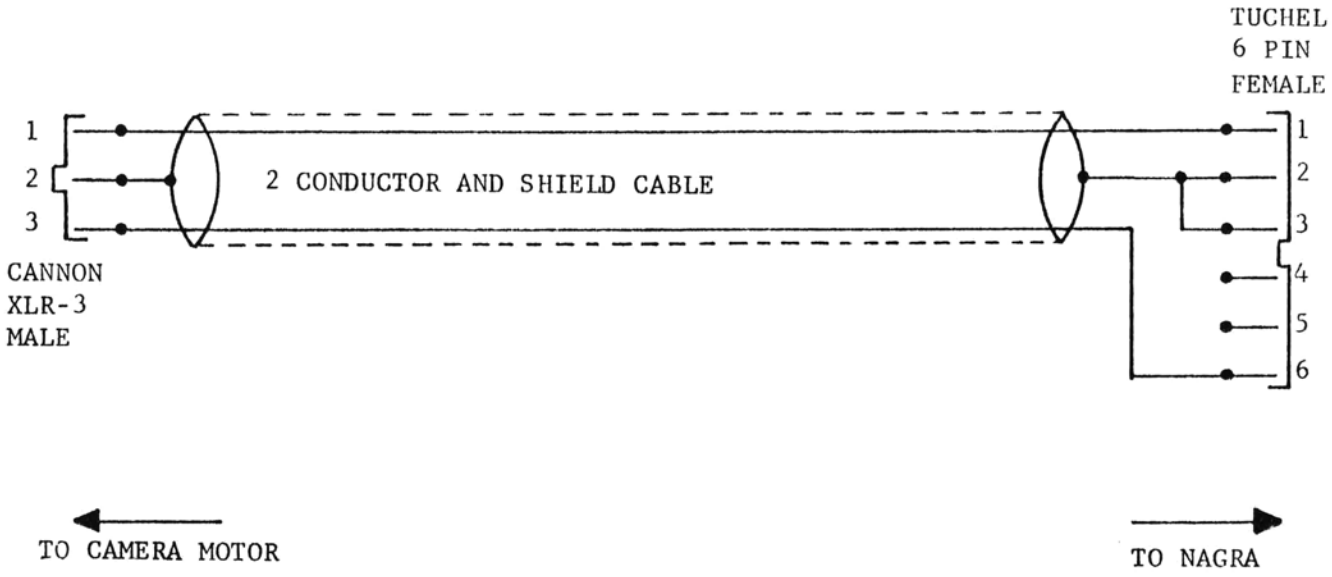
NEW CIBLO SYSTEM, BATTERY SCHEMATIC



With this system the sync pulse and bloop tone are no longer taken from the battery case.

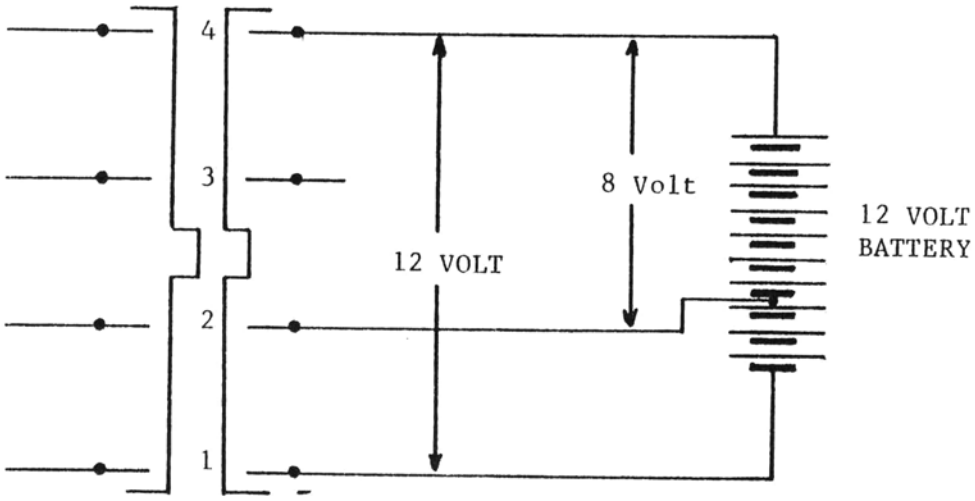
APPENDIX F:

WIRING FOR NAGRA SYNC CORD WITH BLOOP



APPENDIX G:

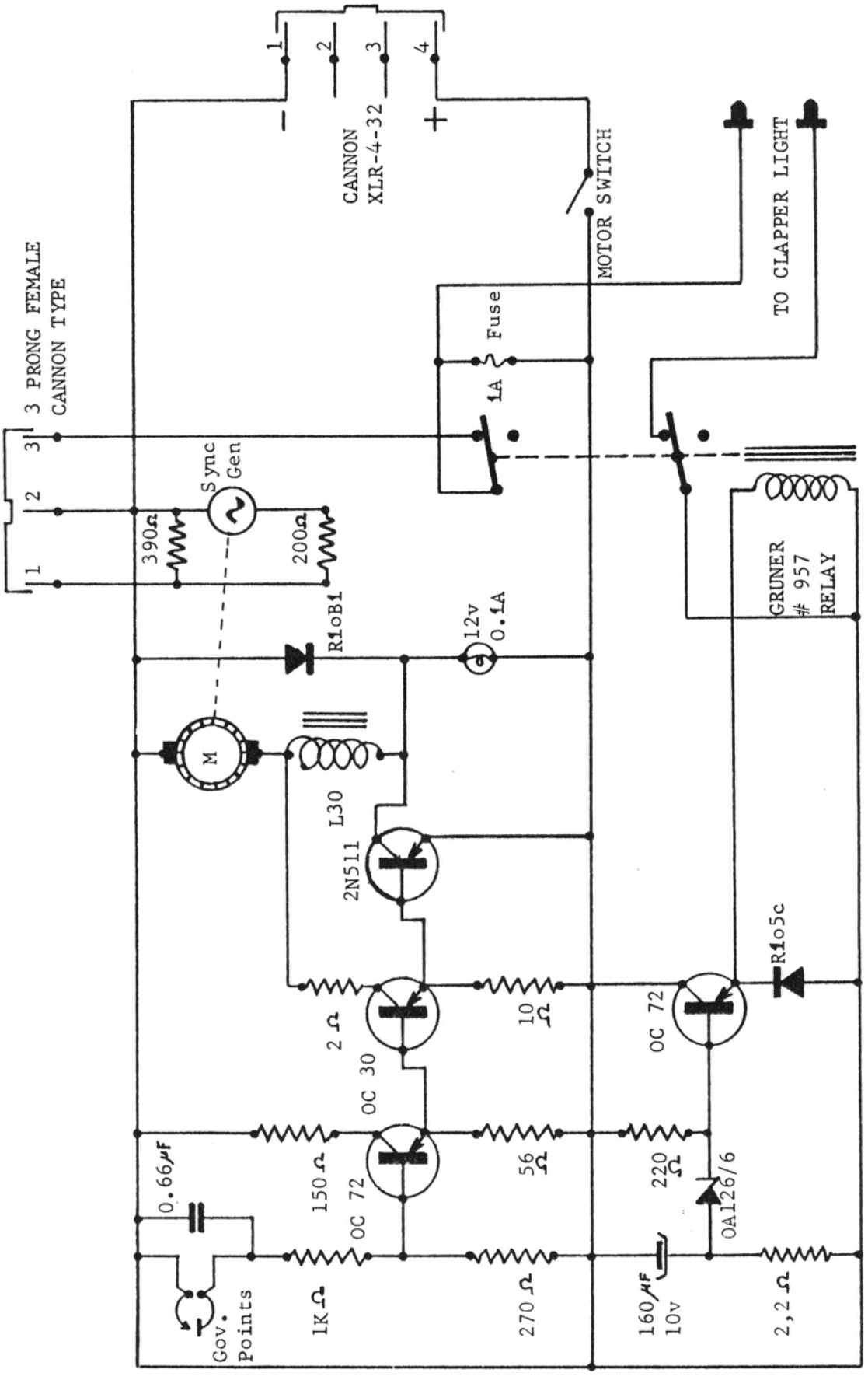
VARIABLE SPEED (VACIR) MOTOR, BATTERY SCHEMATIC



This arrangement can be made from a normal battery connecting a lead between minus 8 battery terminal to pin #3 of the XLR-4-31 plug.

You must be sure to mark the modified batter because it should not be used with CIBLO motors purchased prior to April 1968. This battery will not affect CIBLO motors purchased after April 1968.

APPENDIX H: NEW CIBLO MOTOR SCHEMATIC



ECLAIR NPR

EXPOSURE TIME

DEGREE OF SHUTTER OPENING	FRAMES PER SECOND				
	8	16	24 Sync Sound Speed	32	40
180°	1/16	1/32	1/48	1/64	1/80
170°	1/17	1/34	1/52	1/68	1/84
160°	1/18	1/36	1/54	1/73	1/91
150°	1/19	1/38	1/58	1/77	1/95
140°	1/21	1/42	1/62	1/83	1/104
130°	1/22	1/45	1/67	1/89	1/111
120°	1/24	1/49	1/72	1/97	1/124
110°	1/26	1/53	1/79	1/105	1/132
100°	1/29	1/59	1/87	1/118	1/145
90°	1/32	1/64	1/96	1/128	1/161
80°	1/36	1/73	1/112	1/147	1/182
70°	1/42	1/83	1/125	1/166	1/209
60°	1/48	1/98	1/147	1/196	1/242
50°	1/58	1/117	1/175	1/232	1/290
45°	1/64	1/128	1/192	1/256	1/320
40°	1/72	1/145	1/221	1/288	1/364
35°	1/83	1/166	1/250	1/332	1/415
25°	1/115	1/230	1/345	1/460	1/575
15°	1/192	1/384	1/576	1/768	1/960
10°	1/288	1/576	1/864	1/1152	1/1440
5°	1/576	1/1152	1/1728	1/2304	1/2880
2.5°	1/1152	1/2300	1/3450	1/4600	1/5750

GENERAL FORMULA: $T = \frac{A}{360 \times C}$

T = Exposure time in seconds
A = Shutter opening in degrees
C = Frames per second

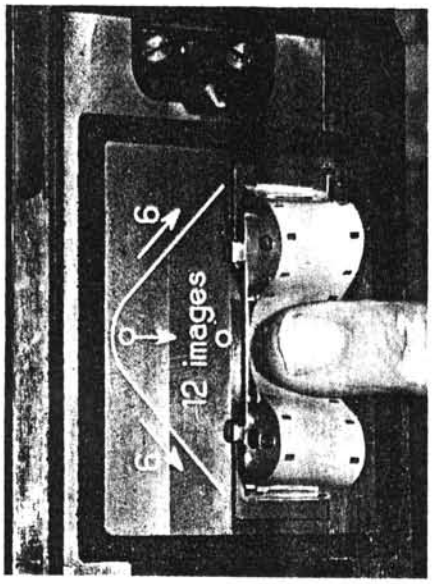


FIG. E dividing the loop

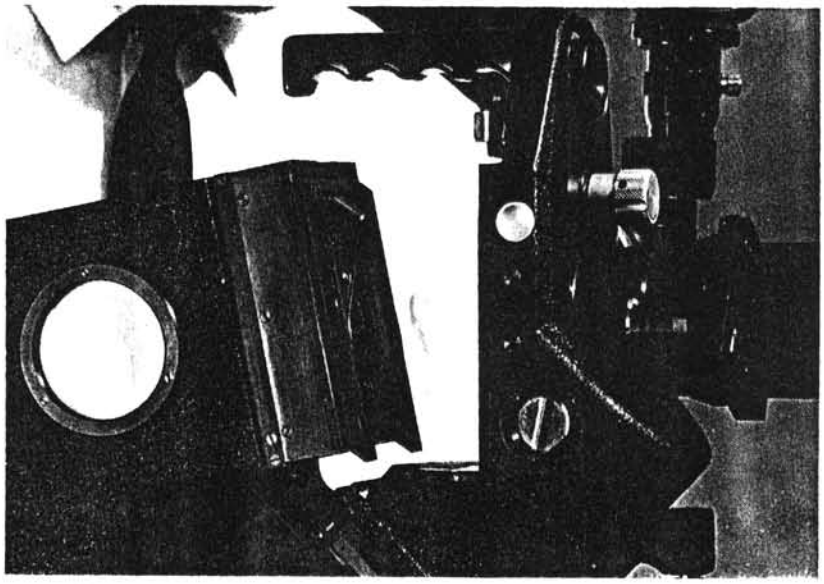


FIG. F mounting magazine on camera body

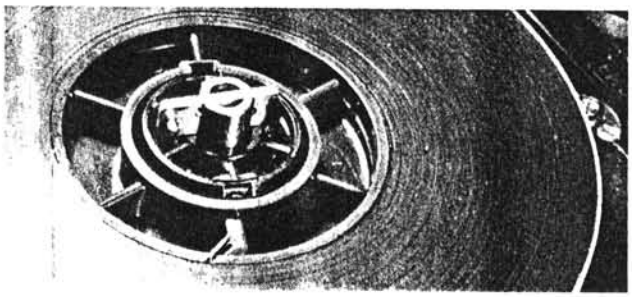


FIG. G magazine spindle lock

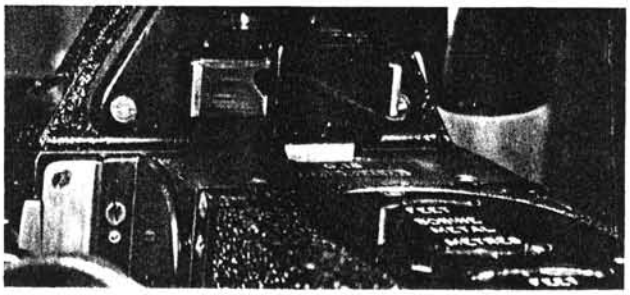


FIG. H magazine lock and footage counters

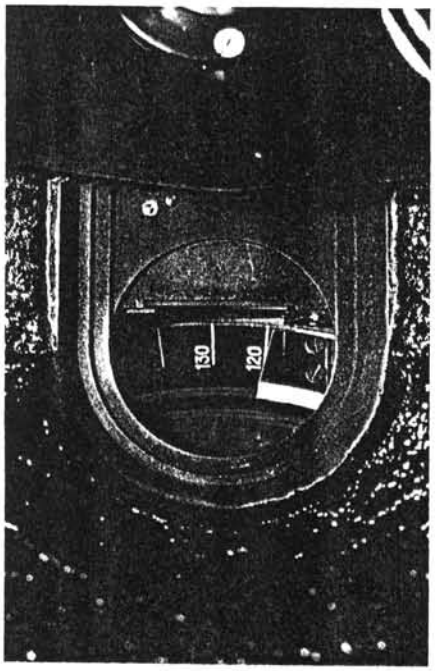


FIG. J shutter opening in degrees

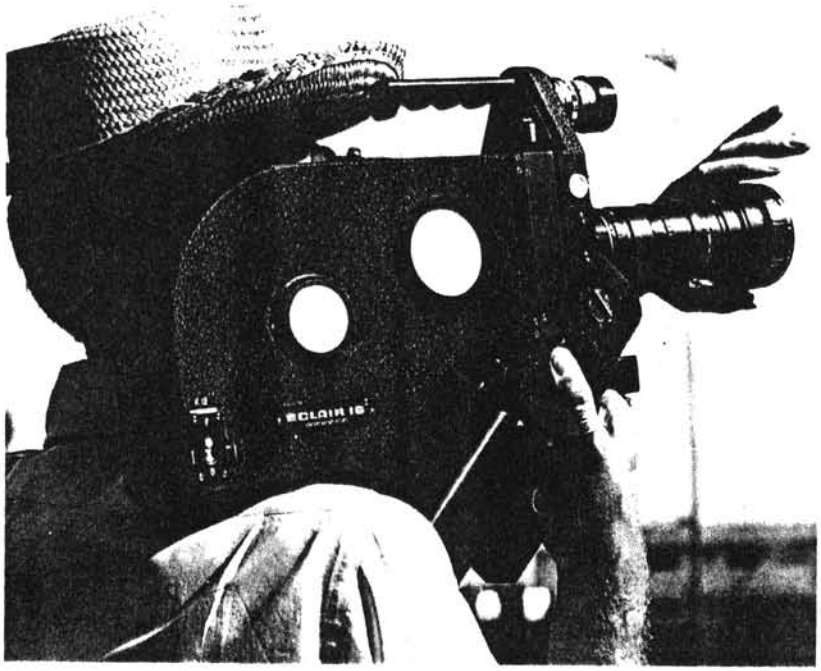


FIG. K shoulder-rest position for hand-held shooting