

# AATON CAMERAS

LTR 16 mm camera  
Instruction Manual  
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# The Lens

## Adapting to Aäton

The lens holder of the Aäton camera is mounted directly onto the central chassis which carries the aperture plate. The flange focal distance of the Aäton is thus very stable and precise : 40 mm. The absolute accuracy of this tolerance is the most important factor contributing to image sharpness -- a strong point in the Aäton. Don't impair this feature with a poorly aligned lens or a mount which isn't perfectly clean.

When selecting a lens, or having it modified with an adaptor (Arri-, Eclair-, Nikon- to Aäton), be sure to obtain a flange focal distance of  $40 \text{ mm} \pm 5 \text{ microns}$ .

(A theoretical explanation of flange focal distance, as well as instructions for measurement, are contained in the technician's maintenance manual).

It is highly recommended to leave Aäton adaptors on lenses already fitted with other mounts (Arri, Nikon, etc.) ; even better is to remove the 'foreign' mount, and have an original Aäton lens mount fitted onto the neutral lens (e.g. Angenieux 9.5 - 57 mm or 10 - 150 mm, using parts numbered 101867 and 40733 (9.5 - 57), and 101867 and 40731 (10 - 150)).

Given the volume inside the camera body of a C-mount lens, this type of mount is incompatible with exposuremeter fitted Aätons -- the photocells are placed in the C-mount area. For use on an exposuremeter fitted camera, a C-mount lens should have the mount removed and replaced with an original Aäton mount.

## Installation on the Camera

Turn the locking ring counter-clockwise as far as it can go, leaving room to insert the lens mount into the lens holder, with the three protruding lugs on the lens mount (or adaptor) corresponding to the slots in the locking ring. Tighten the locking ring by turning it clockwise. The lens is now in position.



*lens fitted with adaptor*

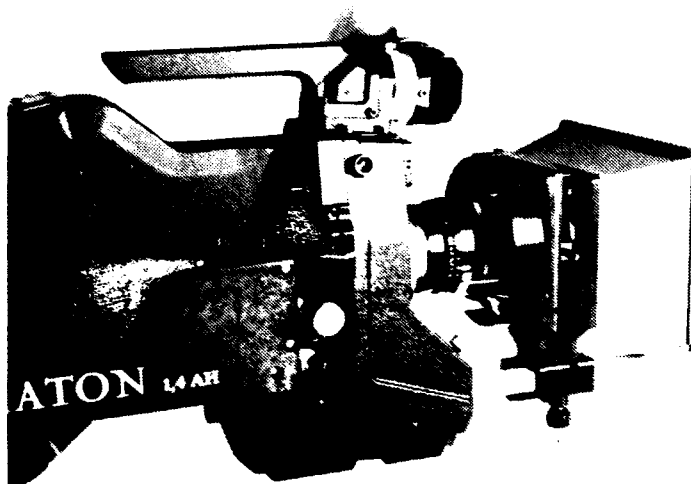


*adaptor*

## Matte box

The Aäton LTR can be equipped with a lightweight rigid matte box : it has two 3" x 3" filter holders and one rotating mount. It fits on long handgrip rod, and accepts fixed focus and zoom lenses with front lenses up to 77 mm in diameter.

There is also a studio type bellows matte box available : this one has a bridge plate with two support rods and two 4"x 4" filter holders.

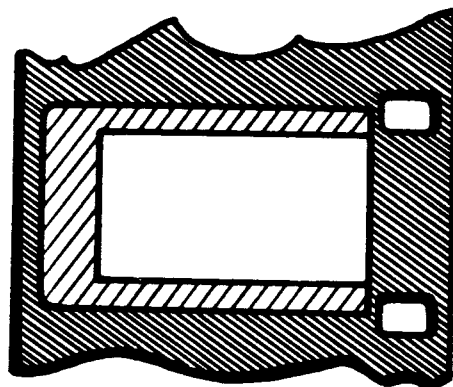


## Super 16

The very high film steadiness and definition of the Aäton LTR camera make it an ideal choice for 35 mm blow up work. And to make the most of 16, the largest possible surface of the film has to be exploited -- this is where Super 16 comes in, using the otherwise unused sound track area on the unperforated side of the film. This gives a 47 % increase over standard 16 mm cropped to 1.66 ratio.

To cover this larger field (the diagonal is 14.5 as opposed to 12.7 mm), good lenses with higher coverage should be selected -- fixed focus distagons, or the Cooke Varo-Kinetal 10.4 - 52 zoom lens, specially designed for Super 16, for example.

More and more laboratories are equipped to handle Super 16. One very experienced laboratory providing reliable results is Du Art in New York. Numerous laboratories in Sweden have experience in Super 16 too; a great many of Sweden's feature films originate in Super 16 shot with Aäton cameras.



▨ added Super 16 area  
(1:1.66 aspect ratio)

→ Have you read the American Cinematographer articles on Super 16?

March, September and October '83; April '84

You can, at a glance determine whether the lens holder is set up for standard 16 or Super 16:

If the lever is on the battery side of the camera, and moved upwards to fix the lens into place, then it is Super 16.

If the lens lock-in lever is on the motor side of the camera, and is moved downwards to tighten the lens into position, then the lens is centered for Standard 16.

To transform a camera set up for Super 16 to standard 16, the following operations must be carried out :

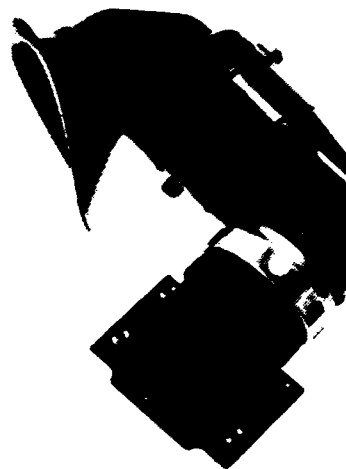
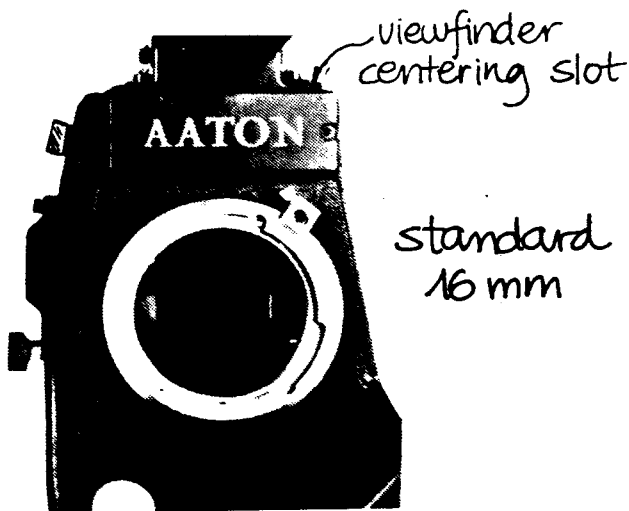
- the viewing screen must be shifted 1 mm;
- the viewfinder centering slot has to be put into position (see pic.). Like the lens lock-in lever, if it is on the battery side of the camera, centering is for Super 16; on the motor side, Standard 16.
- the lens port mount has to be set in relation to the aperture plate.

Conversion from Super 16 to standard 16 mm and vice versa is a workshop operation, and takes about thirty minutes.

## Viewing

### Viewfinder

The interchangeable viewfinder is a completely independent part of the camera and has a bayonet attached eyepiece; the entire viewfinder moves to allow shoulder/eye adjustment of the camera, and the eyepiece rotates over 360°. Automatic upright image.



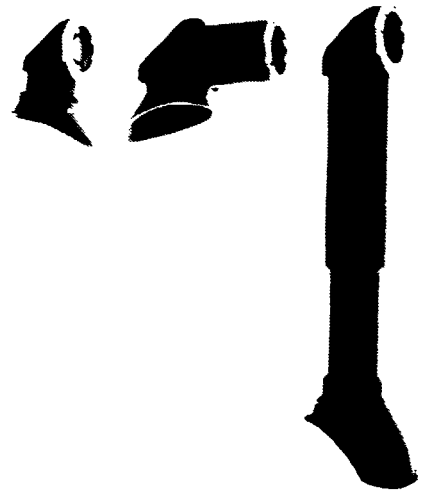
single position viewfinder

The interchangeable eyepiece for use on bayonet equipped viewfinders exists in three executions : left eye, right eye, and 20 cm long for tripod use.

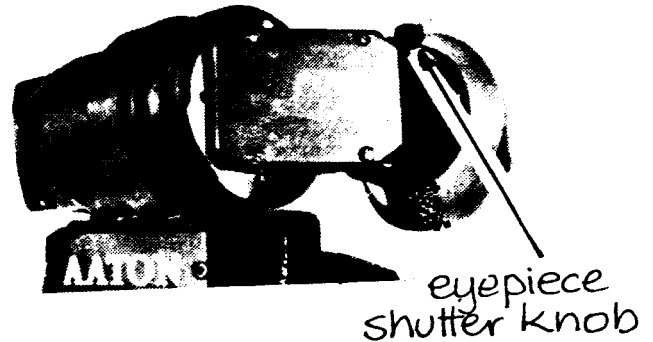
The eyepiece shutter is actuated with a small knob above the rubber eyecup.

For manual upright image adjustment, a perfectly horizontal image can be obtained as follows : open both eyes, and fix them upon a vertical line (e.g. a window); align the two images by sliding the knob right of the eyepiece. The setting will be correct, whatever the initial position of the camera. In order to eliminate errors due to perspective, make this adjustment using a prime lens with a 50 mm focal length. The correct position is fixed into place by tightening the same knob.

An adjustment made by a given cameraman may not suit another, given that no two persons' left and right eyes are aligned in exactly the same way.

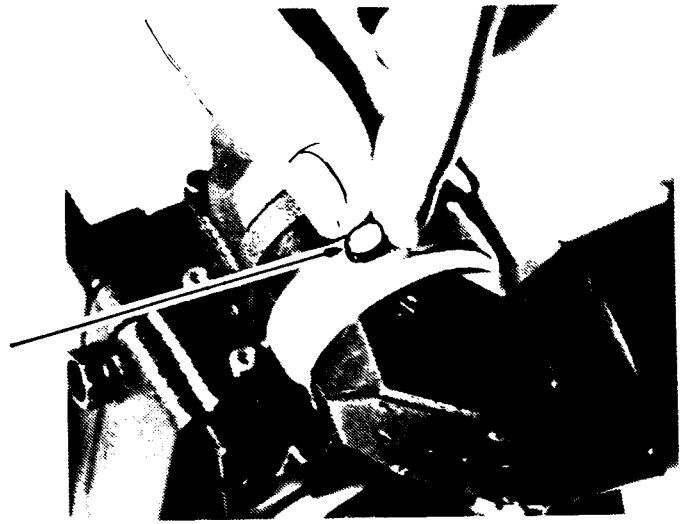


right, left, long eyepieces



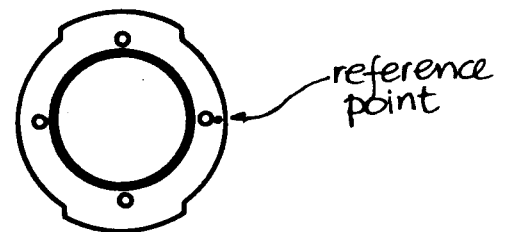
The dioptric setting is adjusted by turning the diopter ring on the viewfinder (see pic.) ; it can be set to  $\pm 5$  diopter, and is locked into position with the knurled screw fitted into it.

dioptric  
setting



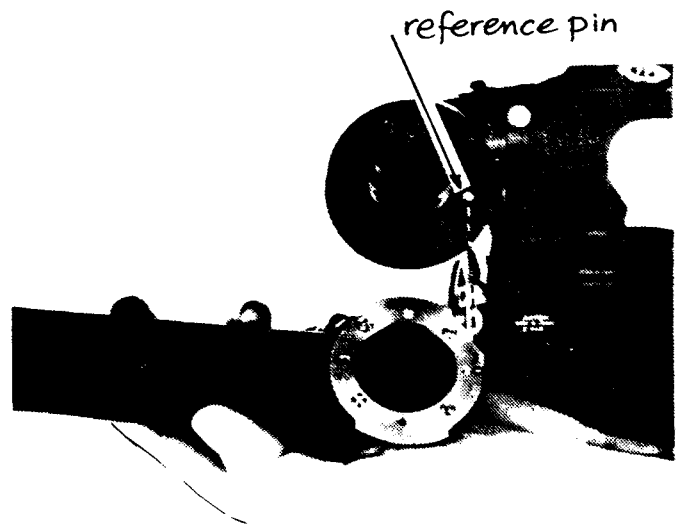
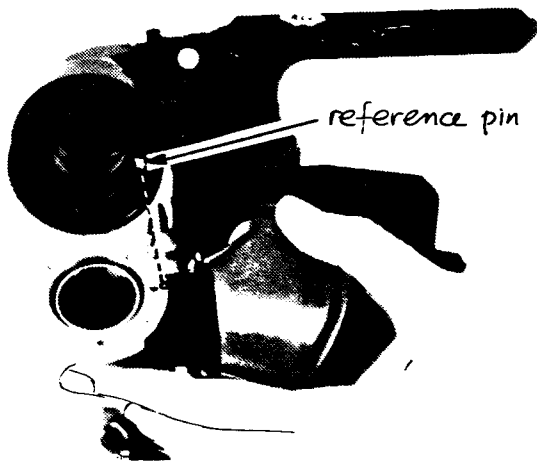
The eyepiece friction can be adjusted to individual preference as follows :

With an Allen wrench, loosen the locking screw (Hc 3 x 3) ; insert the Allen wrench into the opening at 90° away from the locking screw, and turn the friction ring until the desired friction is obtained. Then tighten the locking screw.



All three eyepieces are fitted with 4 openings allowing an "over-ride" of the automatic upright image in cases of unusual camera positions . Alongside one of the four holes there is a shallow bored reference point; when

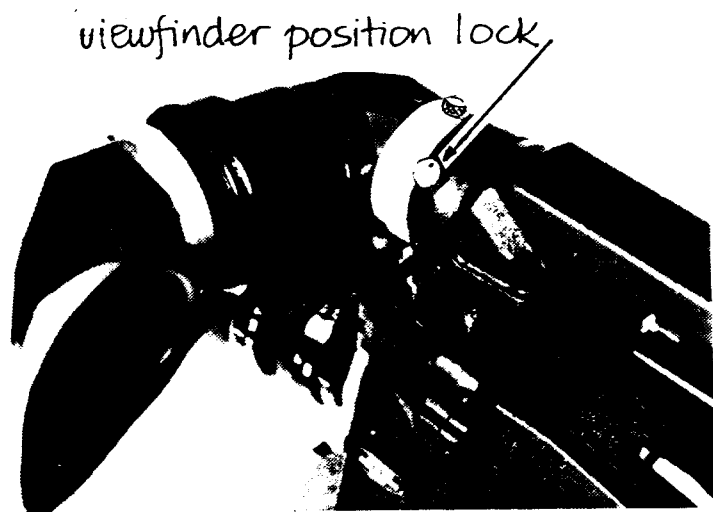
the eyepiece positioning pin is fitted into this reference position, the image will automatically fall into upright position. You will note that for the long eyepiece, this means attaching it to the viewfinder in just the opposite of normal tripod viewing position.



placing short and long eyepieces onto viewfinder

On adjustable viewfinders, the viewfinder angle relative to the camera body can be set:

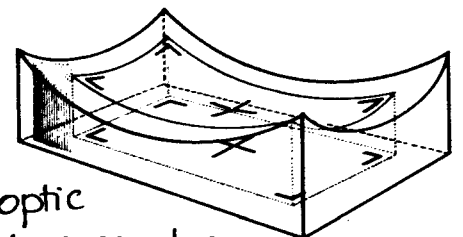
Loosen the position lock screw on the upper handgrip (see pic.); set the eyepiece up or down to the chosen level; then tighten the screw.



## Viewing Screen

The viewing screen system in the Aaton LTR is of a special **patented design**. It consists of a concave fiber optic base, with a lens flush against it. This accounts for the extreme brightness and crispness of the image in the viewfinder.

The viewing area outside the frame is the largest offered by professional 16 mm cameras today.



fiber optic viewing screen base

## Mirror

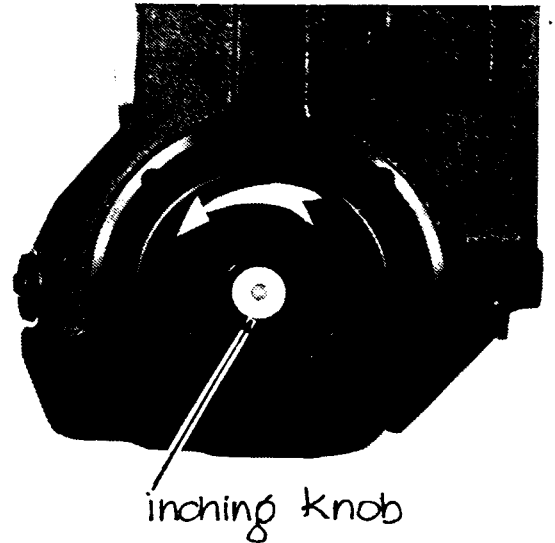
The rotating mirror is very wide, maximising high speed shutter action; it opens at  $180^\circ$  for 50 cycle HMI lighting at 25 fps, and 60 cycle HMI lighting at 24 fps.

The mirror stops automatically in viewing position; it can be moved manually for gate inspection by actuating the inching knob on the motor. If the mirror has been inched out of viewing position, it is advisable to inch it back to viewing position before starting the motor up again; this avoids undue effort on the mirror gears. Always inch counter-clockwise (see pic.)

Cleaning: see p.25.

### Exposuremeter

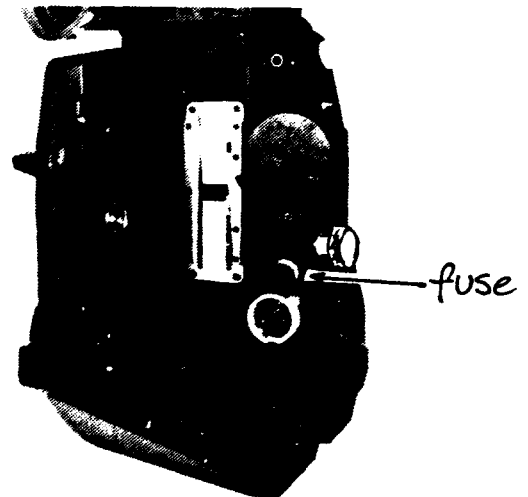
See Option L, p. 17.



## Power

The current consumption of the camera with a 12 volt (nominal) power supply is from .9 to 3.2 amps (at  $+45^\circ$  and  $-20^\circ$  C respectively). The voltage tolerance is from 10 to 16 V.

In case of power overload or polarity reversal (for example crossed wires when running the camera from an automobile battery) there is a fuse protection (Jahnichen 272005 - 5 amperes) on the PBX battery holder (see pic.).



## Batteries

The small clip-on Aäton battery (12 V 1.4 Ah, selected cells) drives an average of 5 magazines in normal weather conditions. In cold weather, it is advisable to keep the battery in a warm place (above 10°C -- a shirt or jacket pocket, for example) using the 54LL cable connected to the standard Cannon XLR 4.11 connector on the battery holder. (For further cold weather notes, see p. 27).

If the camera is not going to be used for a long period of time, it is advisable to remove the battery. After two weeks on board the camera, the battery would be discharged.

*\* for general remarks on battery chargers, see p. 29.*

## Battery Charger

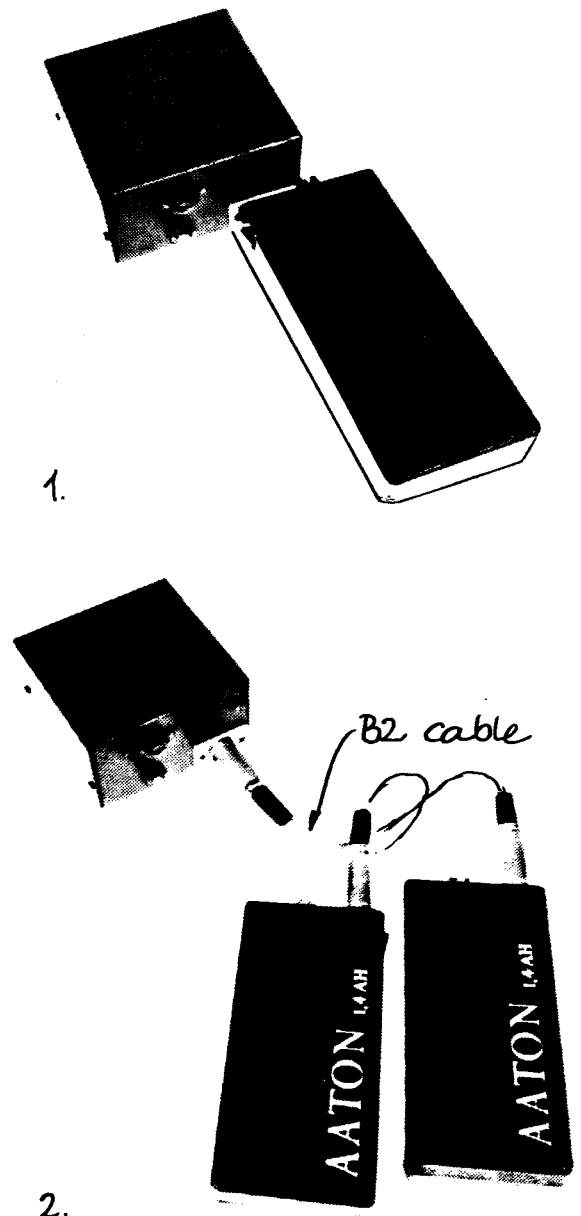
The T4 12 V 300m A battery charger shown here runs on either 110 or 220 V ; setting on knob on front of housing (yes, it's a tough one to turn!)

Then the charger is connected to mains and battery or batteries connected, either directly to the charger (1), or via B2 serial connection cable (2).

Full charge is obtained in 5 ½ hours. For each additional charge, the charger must be unplugged and reconnected to the mains.

If the mains current should for some reason be cut off , the charger will start a new 5 ½ hour charge when the power comes back on; Aäton batteries generally survive this treatment, though it is of course best to avoid it.

Fuse protection: mains 160 mA (T)  
battery 400 mA (T)



## PBX battery/video holder

The PBX universal battery/video holder contains from the top downwards :

- **red diode** : warning signals ; the same red diode function appears in the viewfinder (see p. ).
- **yellow diode** : lit to show when camera is running.
- **video camera holder** and cover for same : access via M3 hex screw (see option R, p.21).
- **Amphenol connector**, delivering electronic signals for remote on/off, TV sync, tachometry, etc...
- **standard XLR 4.42 connector** : pin attribution :
  - .1 : ground
  - .2
  - .3
  
  - .4 : + battery

- **Jaeger pin attribution** :
  - .1 : ground
  - .2 : TV sync
  - .3 : external signal from Atelen : 2400 Hz
  - 4 : + battery

The PBX is permanently fixed to the central chassis of the camera and should not need to be removed in normal maintenance.

There are two diodes on the PBX :

- red : warning signals ; the same red diode function appears in the viewfinder (see p.12)
- yellow : lit up when the camera is running.

The round opening on the PBX constitutes an accessory holder for VR 30 video camera (see option R, p. 21). During use without this accessory, this opening is plugged with a cover held into place using an M3 Allen screw.

## Speed Control

The motor is driven by electronic circuits housed in the camera base, which is interchangeable on location.

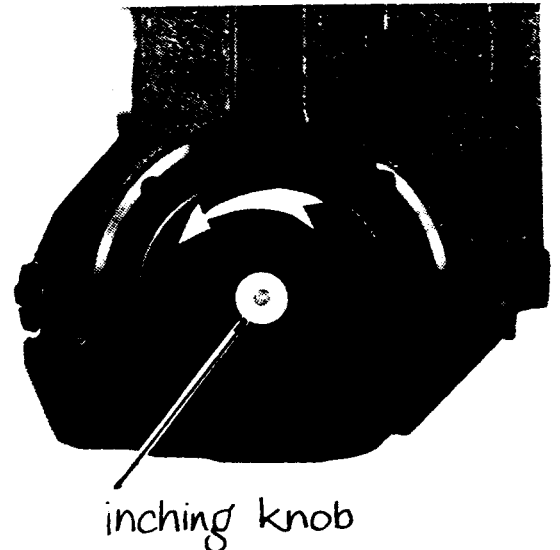
### Manual drive

The inching knob on the motor can be used to drive the camera manually for gate inspection. Push the thumb against the knob, and turn counter-clockwise. It is advisable to inch the mirror back to viewing position before starting the motor; however not doing so will not harm the motor.

### Start up

Actuate one of the two on/off switches: one on the front body housing, the other on the front handgrip. Both switches provide three positions:

- single shot/ test position
- off
- on



### Crystal speed

To avoid unfortunate mishaps, it is advisable to check the camera speed before using a camera for the first time. As well as the variable speeds (see below), the camera has two crystal speeds: 24 or 25 fps (precision:  $\pm 1/4$  frame over 10 minutes, i.e. 1 magazine).

To obtain crystal speed:

- Set the speed knob to the white dot located between 20 and 28 fps.
- Set the 24 / 25 fps switch to desired speed.

### Variable speed

Variable speeds of 6, 12, 16, 18, 20, 28 and 32 are obtained by adjusting the speed knob to the desired setting.

### Single shot

Single shot is obtained by putting the switch in the test position.

Maximum rate is 1 fps; exposure: 1/4 s

The Lemo plug on the front housing can be used for connection with an intervalometer.

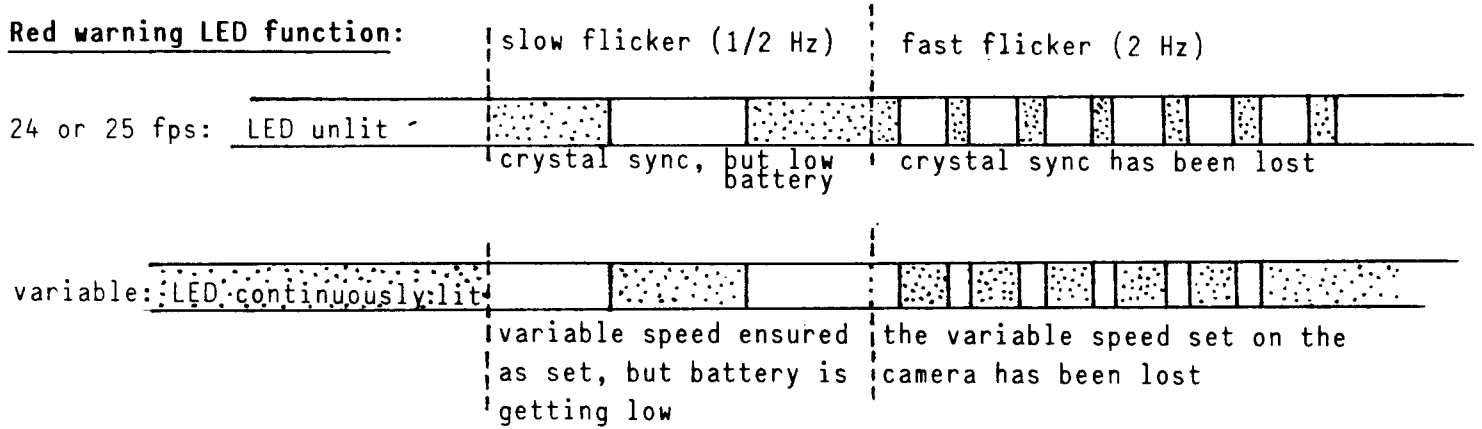
### Speed control diodes

When the camera is running, whatever the set speed, the external yellow diode is lit.

The external red diode and the red diode in the viewfinder have the following functions :

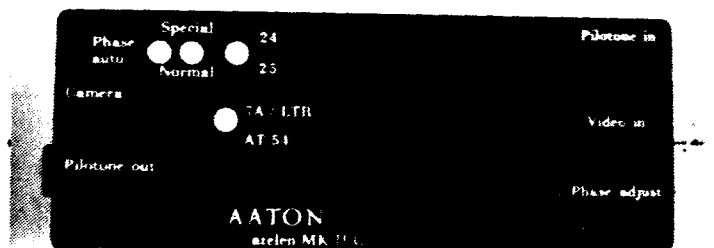
- lit: the camera is running at the set variable speed.

- out: the camera is running at the set crystal speed.
- slow flicker (1/2 Hz): the battery is low (below 10.5 V), but sync is not lost.
- fast flicker (2 Hz): the camera is not running at the set speed.



# Atelen

The Atelen accessory delivers an external master frequency derived from a video signal, or pilotone, to the camera. This allows automatic elimination of the TV bar, and of flicker generated by HMI lights. This accessory functions at 50 cycles only connection to camera on PBX (on XLR or Amphenol connectors)



7 x 18 cm.

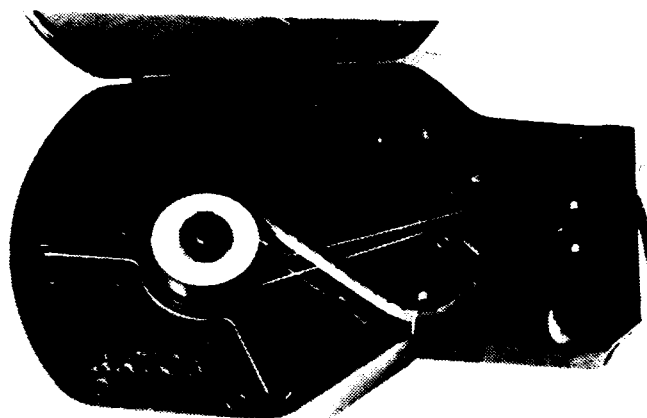
# Magazine

The coaxial magazine takes 120 m (400 ft) double or mono perforation 16 mm stock on 50 mm cores.

Before putting a magazine on the camera, it is always advisable to make sure the aperture plate is clean, and the lateral film pressure bar moves freely.

The magazine is extremely **easy to load**. Many Aäton users have discovered that they no longer need three magazines to allow their assistant to keep up with loading: two are enough.

Good news for those shooting in cold climes: threading is so simple that you can do it with gloves on!



## Feed

### Loading feed compartment

Block the footage counter by turning the indicator counter-clockwise.  
Unfasten lid lock by turning it downwards.  
Open lid (which is fixed onto the magazine for ease of handling in the changing bag).  
Squeeze the core-lock mechanism inwards with thumb and forefinger on either side.  
Place the roll of film over the core holder, and press on the center to lock the core into place.

Thread 10 cm of film into the left/right passage, and ensure that the film passes outside the idler roller.

Lock the lid, making sure the film is not caught in so doing.

Unblock the footage counter by turning it clockwise.

The indications correspond to film on a 50 mm core.

**For 30 m. daylight reels:**

- To remove the core holder, loosen screw 02.613.02 with knurled screw in place near left/right passage; use knurled screw to hold bobbin on spindle.

Lift the core holder; place the 30 m. reel on spindle.

When re-installing the core holder, tighten screw 02.613.02 with the knurled screw ; check that the head of the small screw (02.613.02) does not protrude.

The knurled screw can then be put back into place.

# Take-up

## Threading the take-up compartment

These steps do not have to be done in the changing bag

Open both pinch rollers by pressing the aluminium release buttons.

Pull through the film which appears in the left/right passage slot.

Introduce the end of the film into the upper film guide, passing below the first idler roller; it will appear outside the magazine nose.

Re-introduce the film into the lower film guide, and pull through about 15" of film.

Thread the film around the upper sprocket wheel, making sure the perforations engage with the sprockets.

