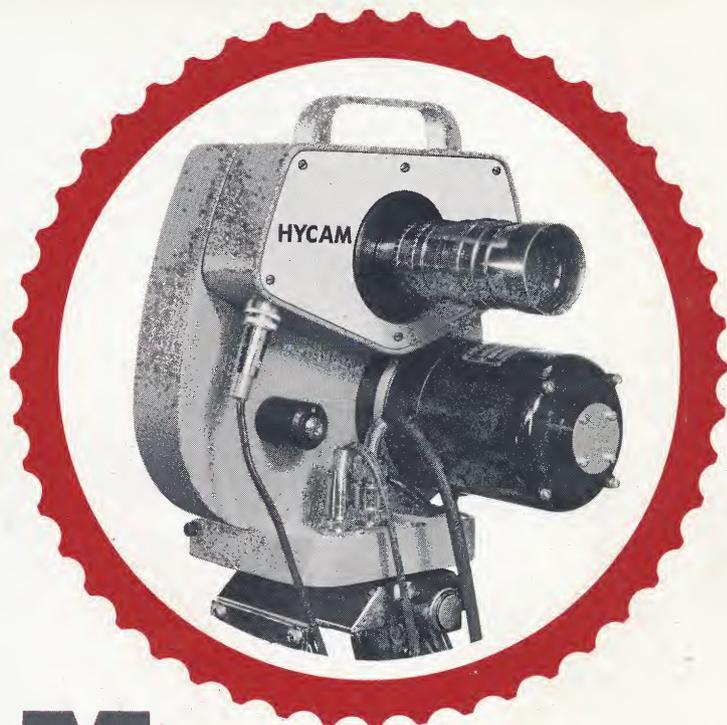


Red Lake Labs



HYCAM

16-mm high-speed motion-picture camera

Pictures of previously unimagined quality and steadiness are produced in the Hycam Model K1001 at framing rates ranging from 10 to 8,500 pps.

Every feature, every accessory, every auxiliary developed and made useful in the field of high-speed cinematography is available to the Hycam owner at a price substantially less than elsewhere. And no other camera includes the full total of these features.

Basically, Hycam excellence and versatility stem from a totally new design. Hycam engineers, working from career-long experience in the photo-instrumentation field, went back to fundamentals and produced in the Hycam series a design of such straightforward simplicity as to solve a series of basic technical problems and reduce costs of production drastically, both at once.

The heart of the Hycam is a single shaft carrying the film-transport sprocket, the rotating-prism optical-compensating device, and the segmented shutter. Eliminating all gearing with its troublesome backlash and limiting the number of critical bearings to two, this advanced design concept not only produced the industry's steadiest picture and the industry's least expensive camera, but also opened the way for a myriad of simple approaches to other special features and capabilities.

These include:

- *Interchangeable prisms for 1/2-frame 16-mm or true 8-mm (with 20 to 17,000 pictures per second)*
- *Flat film gate for uniform resolution*
- *Interchangeable shutters permitting exposures as short as 1.17 microsec with full 16-mm frame height*
- *Usability of any c-mount lenses*
- *Availability of aperture-mask fiducial markers for putting crosshairs on film*
- *One timing light standard, second auxiliary timing light can be added*
- *Event-synchronizer and end-of-film cutoff switches standard*
- *Convertibility of basic mechanism between 100-foot, 400-foot, and 2000-foot cameras*
- *General mechanical simplicity, which permits maintenance or parts changing with simple standard tools*
- *Availability of auxiliary units for cine-oscillography, streak photography, and electronic flash synchronization*

more 

HYCAM FEATURES

INTERCHANGEABLE SHUTTERS

Standard gives exposure ratio of 1/2.5 (at 1,000 pps, shutter speed is 1/2500 sec.). Other sizes available down to 1/100 for a 1.17 microsec exposure at 8,500 pps without reduction in frame height.

TIMING LIGHT

Circuitry and external connections. Single light puts marks on one edge of film. Auxiliary kit adds second timing light for opposite side of film.

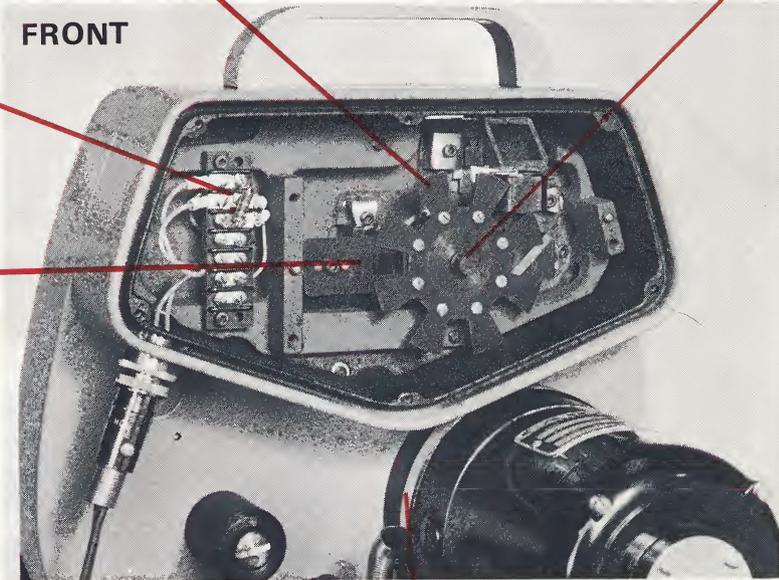
CROSSHAIRS

Can be added right here on the aperture mask.

C-MOUNT LENSES

Use of inexpensive and readily available c-mount lenses of any focal length adds to Hycam versatility.

FRONT



INTERCHANGEABILITY

100-foot unit shown here. Optical head is quickly interchanged between 100-, 400-, and 2,000-ft film transports. (See illustration at top of opposite page.)

SINGLE UNIVERSAL MOTOR

Handles entire speed range from 10 to 8,500 pps, depending on voltage input. For low frame rates, d-c is used. At higher rates, either a-c or d-c can be used.

FULLY GUARANTEED

90-day guarantee: If, for any reason, you are not completely satisfied with any Red Lake product within 90 days, you may return it for full credit. *One-year guarantee* covers any defect in workmanship or material.

Red Lake Labs, Inc.

PHOTO INSTRUMENTATION EQUIPMENT

Products the User Likes

LE SHAFT

s segmented shutter, film sprocket, and ro-
prism. This is the heart of the Hycam
nism.



Release of three screws permits rapid removal of optical head from film transport



FLAT FILM GATE

Pictures look like intermittent frames.

SMOOTH-START CLUTCH

Centrifugal clutch brings film to speed without expensive voltage-control devices.

FILM COMPARTMENT

Minimizes film chips at end of run.

SPEED CURVES. See chart, page 4

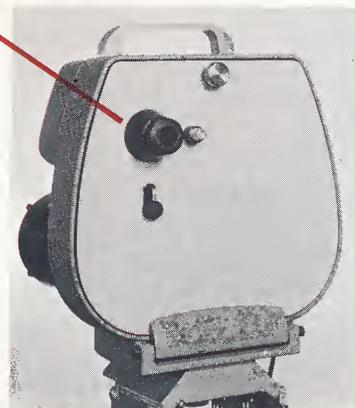
VIEWING AND FOCUSING

Done by a direct through-the-lens viewer and focuser directly on the film. Darkslide and external shutter positioner provided.

EVENT SYNCHRONIZER

iggers the event at pre-set point in film. Sec-
nd switch interrupts motor power at end of
m.

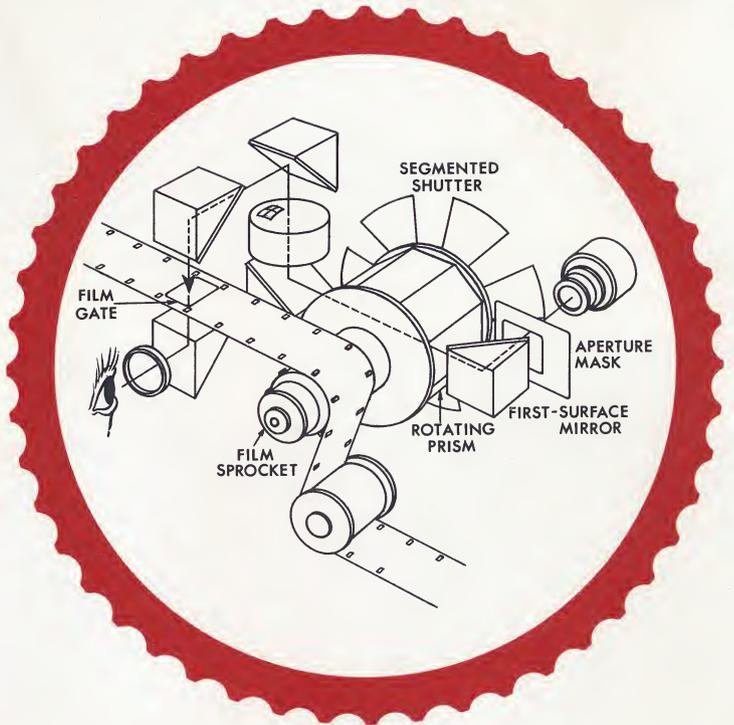
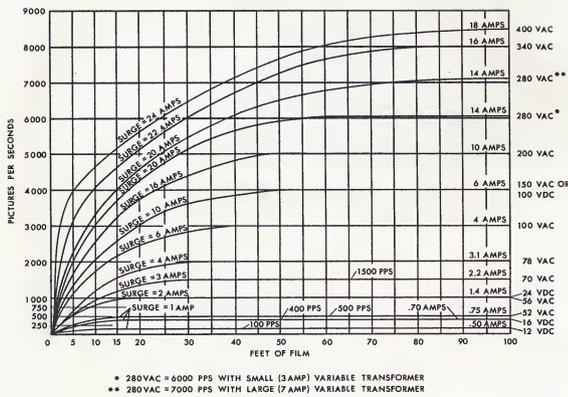
PATENT APPLIED FOR



Corwin Drive • Santa Clara, California

739-1698 (408)

SPEED CURVES



Hycam

specifications

OPTICAL HEAD

(interchangeable with 100-, 400-, and 2,000-ft models)

Prism-Sprocket-Shutter Assembly:

(interchangeable in field)

- Prism, 8-sided (standard)
10 to 8,500 pps—16-mm full frame
- Prism, 16-sided (accessory)
20 to 17,000 pps—1/2-frame
16-mm or true 8-mm
- Sprocket, 8-frame type, is used with both prisms
- Shutter, 1/2.5 (standard)
1/5, 1/10, 1/20, 1/50, 1/100 (accessories)

Viewing and Focusing:

Direct through-the-lens viewer and focuser

Lenses:

C-mount lenses of any focal length available (accessories)

Fiducial Marker:

Crosshairs on accessory aperture mask

Timing Lights:

One NE2J lamp for marking one side of film (standard) — second light to be added on opposite side of film (accessory)

Film Gates:

Flat, spring-loaded to accommodate various film thicknesses. Easily removable

FILM TRANSPORT

Film Capacity:

- Model K1001 16-mm by 100 ft
- Model K1004 16-mm by 400 ft
- Model K10020 16-mm by 2,000 ft

Drive System:

Single universal motor (fused) and smooth-start centrifugal clutch handle speed range 100 to 8,500 pps. Accessory gear train covers range 10 to 300 pps

Spool Ejectors:

Fingertip controls ease the removal of film spools

Event Synchronizer:

Electrical co-ordination between starting of camera and starting of event

Cutoff Switch:

Terminates motor power at end of film, automatically

Film-Supply Spindle:

Adjustable tension

Tripod Mounting:

- 1 hole—1/4"-20 thread (steel insert)
- 3 holes—3/8"-16 thread

Specifications subject to change without notice.

ACCESSORIES

Oscillo Attachment

Adapter for putting Pentax-type lens in camera door for super-impositioning of oscilloscope trace over framing image.



Streak Attachment

Auxiliary lower gate gives slit at film plane — adjustable 0 to 3/16 in. Writing rates up to 0.06 mm per μ sec. Uses oscillo attachment and lens system.

Electronic Flash

Magnetic pickup provides circuitry for synchronizing electronic flash with full-open shutter.

Slow-Speed Transmission

Gear train for speed reduction to 10 pps.



Tripod

Sturdy unit produced for Red Lake by Quick-Set. Has worm-gear elevator, geared spring loaded 90-degree tilt head, and positive locks in all positions. 13 lb.

Timing-Light Generator

Solid-state source unit for timing pulses to neon lamp in Hycam. Provides 10, 100, or 1,000 pulses per second. Inexpensive, battery or 115-v powered, 4 lb.



Exposure Meter

Ideal unit for high-speed photography is the Honeywell Spot Meter. Has an angle of acceptance of only three degrees. Reads directly in camera settings.



Lens Auxiliaries

Extension tubes designed in various lengths for c-mount lenses. Also lens adapters for using special-mount lenses on Hycam.

SPEED-CONTROL EQUIPMENT

D-C Power Supply

Full-wave 6-amp solid-state rectifier unit with 115-v 50/60 cps input, 0 to 110-v d-c output. Varies framing rate of standard Hycam over range 100 to 4,000 pps; with Slow-Speed Transmission, 10 to 300 pps.



Variable Autotransformer

Operating from 115-v 50/60-cps power gives 0 to 280-v a-c output to control standard Hycam from 500 to 6,000 pps; with Slow-Speed Transmission, 50 to 500. For higher frame rates, larger capacity autotransformers are required.

TOTAL WEIGHTS

- Model K1001 (100-ft capacity) 13 lb
- Model K1004 (400-ft capacity) 28 lb
- Model K10020 (2,000-ft capacity) 52 lb

Red Lake Labs



Model K1004E

HYCAM (400-ft)

16-mm high-speed motion-picture camera

Features include:

- All the basic advantages of the Hycam concept (See Red Lake Form HY-164)

plus

- 400-ft film capacity
- Special adapters to minimize film chipping with 100-ft and 200-ft film spools

- Integral electronic control (scr), which gives film speeds flat to within 1 per cent (See curves, page 2)
- Multiple run capability up to 3000 pictures per second
- External film-footage indicator to facilitate multiple runs
- Optical heads interchangeable between 100-ft. and 400-ft Hycam models

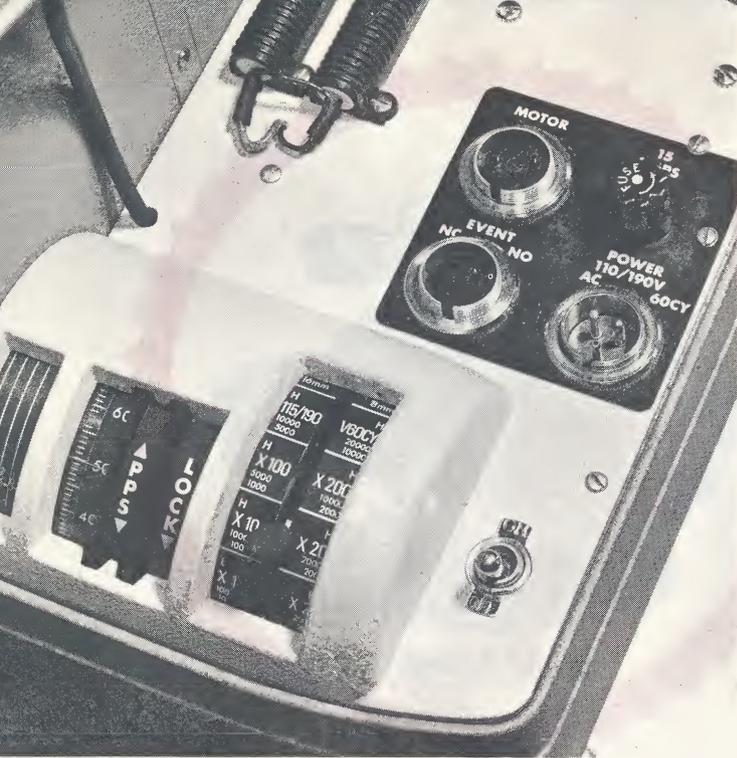
With the introduction of the 400-ft Hycam Camera, Red Lake Labs has not only added tremendous mechanical flexibility to the Hycam line, but has also provided electronic speed regulation to 1 per cent. This facilitates data reduction.

Hycam flexibility now permits the user mechanically to switch optical heads from 100-ft to 400-ft film-transport units with the simple release of three screws. To attain electronic speed regulation, the 100-ft head requires installation of the speed sensor. With the newly developed built-in electronic speed control, the speed curves are flat after acceleration. (See curves, page 2) This control regulates up to picture rates of 5000 (10,000 with $\frac{1}{2}$ -frame or 8-mm head). Above this, an external autotransformer is used.

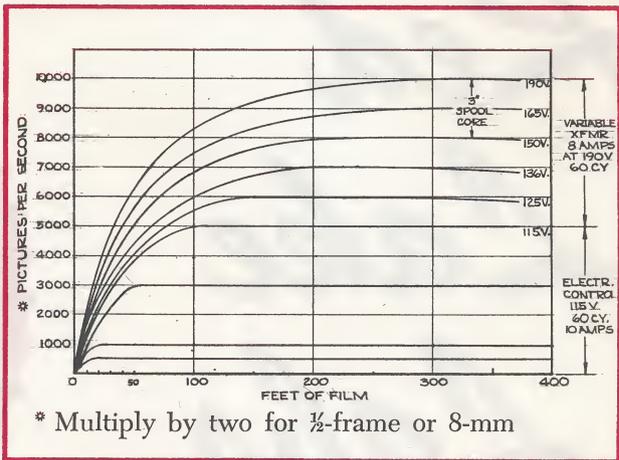
Aside from film capacity, the inclusion of the film-footage indicator, and the built-in electronic speed control, the new 400-ft Hycam transport unit contains all the remarkable features of the earlier 100-ft Hycam Camera: such as,

- A single motor for the entire speed range 10 to 20,000 pps
- A smooth-start centrifugal clutch that does away with the need for expensive heavy external voltage-control devices.
- Fingertip film-spool ejectors
- A film compartment designed to minimize film chipping at the end of a run
- For the 400-ft model, adapters are available to permit the running of 100-ft and 200-ft film reels

more 



SPEED CURVES (MODEL K1004E)



Speed-control and operating console built into Hycam base permits continuously variable fingertip control within 1 per cent of framing rates up to 5000 pps. Lock is provided to insure stability of setting during camera run

HYCAM MODEL K1004E (Continued)

- An event synchronizer and end-of-film cutoff switch built in
- Direct through-the-lens viewing and focusing facilities with dark slide and external shutter positioner.

The famous Hycam optical head* has

- Interchangeable rotating prisms to give 1/2-frame 16-mm or true 8-mm pictures
- A flat film gate for uniform resolution
- Interchangeable shutters permitting exposures as short as 1 microsec with full- or 1/2-frame 16-mm, or 0.5 microsec with 8-mm
- Convenient mounting for all C-mount lenses
- The ability to install special aperture masks for fiducial markers
- Double timing lights
- A single shaft carrying the segmented shutter, the film sprocket, and the rotating prism. This eliminates gearing with its backlash problems

* (for Details see Red Lake Form HY-164)

ORDERING INFORMATION

- Model K1004E** Hycam High-Speed Motion-Picture Camera, 16-mm x 400-ft, with electronic speed control, with framing rate variable from 100 to 10,000 pps
- Model K10S4E** Hycam High-Speed Motion-Picture Camera, 16-mm x 400-ft, with electronic speed control, with low-speed transmission to give framing rates variable, 10 to 10,000 pps
- Model K1004AE** Hycam High-Speed Motion-Picture Camera, 16-mm x 400-ft, with electronic speed control, with 16-sided prism for 1/2-frame 16-mm or true 8-mm at framing rates variable 200 to 20,000 pps
- Model K10S4AE** Hycam High-Speed Motion-Picture Camera, 16-mm x 400-ft, with electronic speed control, with 16-sided prism for 1/2-frame 16-mm or true 8-mm with low-speed transmission to give framing rates variable from 20 to 20,000 pps

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Red Lake Labs

PHOTO INSTRUMENTATION EQUIPMENT

Products the User Likes

High-Speed Photography

PROBLEMS OF MOTION ARE EASILY ANALYZED WITH HIGH-SPEED CAMERAS



Above, a Hycam sequence. Framing rates range from 5 to 44,000 pictures per second.

Stretching time

In the study of rapid motion, photo-optical means have long been used to stretch the time base. This technique has made it possible to slow down action so it can be studied in detail.

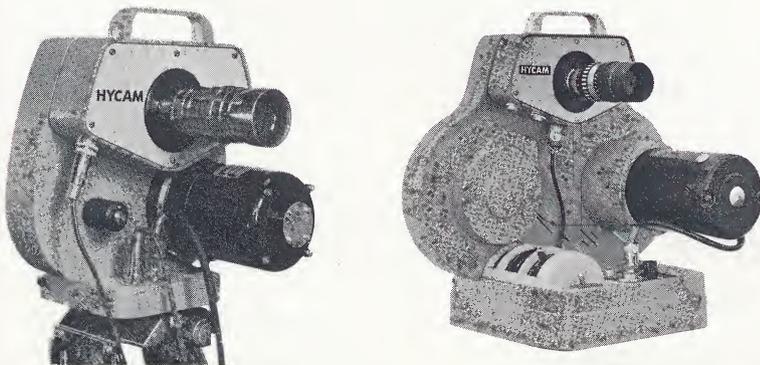
An early trick in the motion-picture field was the slow-motion sequence, produced by speeding the camera up so that projection at normal speeds permitted newsreel viewers to appreciate the fine points of sporting events like diving, football, golf, etc.

In 1932, this speed range was substantially extended by the introduction of the rotating-prism type camera. In this development, the film moves through the

camera continuously and the image is transferred to the film by the action of a rotary optical element.

The Hycam contribution

Within the last two years, the world's most advanced rotating-prism type camera has appeared on the engineering scene and radically expanded the area of usefulness assigned to it. Going back to fundamentals, the engineers of Red Lake Laboratories Inc. used their career-long experience in high-speed photo instrumentation to refine and develop the essentially simple Hycam. In its present advanced form, Hycam exhibits the following three outstanding characteristics:



100-ft-film-capacity Hycam—weight 13 lb 400-ft-film-capacity Hycam—weight 30 lb

- Best picture quality by far ever produced with a rotating-prism camera (resolution—68 lines per millimeter vertically and horizontally)
- The greatest range of speeds ever available in the rotating-prism camera field (5 to 44,000 pictures per second)
- The lowest first cost, model for model, and the most economical operation, service, and maintenance.

more 

HIGH-SPEED PHOTOGRAPHY (continued)

Simplicity, ease of use, and versatility permit Hycam to be used in the laboratory by scientists, engineers, or photographers. Hycam is so designed that the following features can be added for special problems:

CINE-OSCILLOGRAPHY

In the study of mechanical equipment having electrical functions, it is often desirable to coordinate the two aspects in analysis. Replacement of the Hycam focusing eyepiece with an accessory lens permits superimposition of oscilloscope traces over the framing images on the film.

STREAK PHOTOGRAPHY

By replacement of the Hycam lower film gate, an

auxiliary attachment gives a slit at the film plane, adjustable from 0 to 3/16 of an inch. This permits streak photography at writing rates up to 0.08 millimeters per microsecond.

TIME-LAPSE PHOTOGRAPHY

Addition of a simple auxiliary device to Hycam permits successive exposures, individually initiated by electrical input signals at rates as low as desired. Used to speed up the action of imperceptible events.

SELF-PROJECTION

Auxiliary projection-lamp assembly converts Hycam into a projector capable of displaying any of the types of films taken by Hycam.



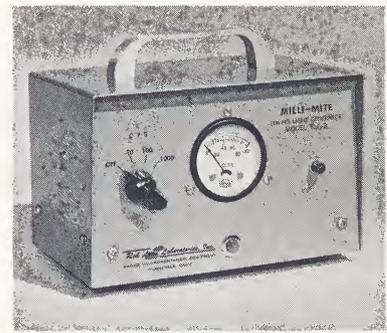
Oscillo Attachment

This shows the manner in which a Pentax-type lens is adapted to the camera door for cine-oscillography as described above. Weight 1 lb.



Tripods

Special tripods are available for low and high mounting of both Hycam cameras in the field. Weights 13 and 27 lb.



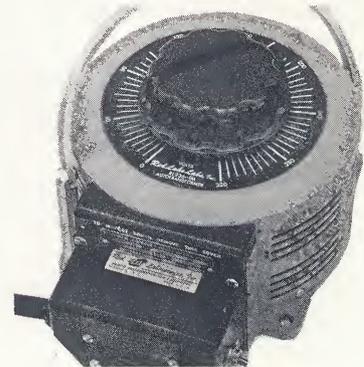
Timing Light Generator

Solid-state unit delivers timing pulses to neon lamp built into Hycam for putting time-base pips on the film. Operates from battery or 115-v a-c power. Weight 4 1/2 lb.



Exposure Meter

Red Lake recommends the Honeywell Pentax 1°/21° Exposure Meter, which has an angle of acceptance of only one degree and gives camera settings directly from light-level readings. Weight 18 ounces.



Power Supply

Variable autotransformer, 115-v a-c input, 0- to 320-v a-c output, controls both 100-ft and 400-ft Hycam models up to their top rated speeds. Weight 24 lb.



VISIT BOOTH 1024
Los Angeles Sports Arena
October 4-7, 1965

Red Lake Labs, Inc.

PHOTO INSTRUMENTATION EQUIPMENT

Products the User Likes

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(408) 739-1698

RED LAKE LABS., INC.
2971 Corvin Drive
SANTA CLARA, CALIFORNIA (95051)
(Area Code 408)739-1698

CONSUMER NET PRICE LIST

JANUARY 1, 1965

USE THESE MODEL NUMBERS & SPECIFICATIONS FOR ORDERING INFORMATION

- Model K2001 HYCAM, HIGH SPEED MOTION PICTURE CAMERA,
16mm x 100' capacity, 100 to 8500 pictures per second, complete
with event synchronizer, cut-off switch, 1/2.5 shutter, single
timing light assembly, takes "C" mount lenses of any focal
length, has sprocket, prism, and shutter on one shaft, with
power cord and connectors. Resolution: Center, 68 lines/mm
vertical and horizontal. Edges, 56 lines/mm vertical and
horizontal. Wt. 13 lbs. \$1295.00
- Model K20S1 HYCAM, HIGH SPEED MOTION PICTURE CAMERA,
16mm x 100' capacity, 10 to 8500 pictures per second, complete
with event synchronizer, cut-off switch, 1/2.5 shutter, single
timing light assembly, speed reducer, takes "C" mount lenses
of any focal length, has sprocket, prism and shutter on one
shaft, with power cord and connectors. Resolution: Center 68
lines/mm vertical and horizontal. Edges, 56 lines/mm vertical
and horizontal. Wt. 14 lbs. \$1145.00
- Model K2001A HYCAM, HIGH SPEED MOTION PICTURE CAMERA,
16mm x 100' capacity, 200 to 17,000 pictures per second, com-
plete with event synchronizer, cut-off switch, 1/2.5 shutter,
single timing light assembly, takes "C" mount lenses of any
focal length, has 16 sided prism, sprocket and shutter on one
shaft, with 2 aperture masks for obtaining 1/2 frame 16mm with
one mask and true 8mm with other mask, with power cord and
connectors. Resolution: Center, 68 lines/mm vertical and
horizontal. Edges, 56 lines/mm vertical and horizontal.
Wt. 13 lbs. \$1145.00
- Model K20S1A HYCAM, HIGH SPEED MOTION PICTURE CAMERA,
16mm x 100' capacity, 20 to 17,000 pictures per second, com-
plete with event synchronizer, cut-off switch, 1/2.5 shutter,
single timing light assembly, has speed reducer, takes "C"
mount lenses of any focal length, has 16 sided prism, sprocket,
and shutter on one shaft, with 2 aperture masks for obtaining
1/2 frame 16mm with one mask and true 8mm with other mask, with
power cord and connectors. Resolution: Center, 68 lines/mm
vertical and horizontal. Edges, 56 lines/mm vertical and
horizontal. Wt. 14 lbs. \$1595.00
- Model K2004E HYCAM, HIGH SPEED MOTION PICTURE CAMERA,
16mm x 400' capacity, 100 to 10,000 pictures per second, with
electronic (SCR) speed control for 1% frame rate regulation
after acceleration from 100 to 5000 pictures per second, com-
plete with event synchronizer, cut-off switch, 1/2.5 shutter,
double timing light assembly, film footage counter, with Y
cord for remote control, takes "C" mount lenses of any focal
length, has sprocket, prism, and shutter on one shaft, with
power cord and connectors. Resolution: Center, 68 lines/mm
vertical and horizontal. Edges, 56 lines/mm vertical and
horizontal. Wt. 30 lbs. \$2330.00

RED LAKE LABS., INC.

Model K20S4E HYCAM, HIGH SPEED MOTION PICTURE CAMERA,
16mm x 400' capacity, 10 to 10,000 pictures per second with
electronic (SCR) speed control for 1% frame rate regulation
after acceleration from 10 to 5000 pictures per second, com-
plete with event synchronizer, cut-off switch 1/2.5 shutter,
double timing light assembly, film footage counter with Y
cord for remote control, speed reducer, takes "C" mount lenses
of any focal length, has sprocket, prism and shutter on one
shaft, with power cord and connectors. Resolution: Center,
68 lines/mm vertical and horizontal. Edges, 56 lines/mm
vertical and horizontal. Wt. 32 lbs. \$2580.00

Model K2004AE HYCAM, HIGH SPEED MOTION PICTURE CAMERA,
16mm x 400' capacity, 200 to 20,000 pictures per second, with
electronic (SCR) speed control for 1% frame rate regulation
after acceleration from 200 to 10,000 pictures per second,
complete with event synchronizer, cut-off switch, 1/2.5 shutter,
double timing light assembly, film footage counter, with Y cord
for remote control, takes "C" mount lenses of any focal length,
has 16 sided prism, sprocket and shutter on one shaft, with 2
aperture masks for obtaining a 1/2 frame 16mm with one mask and
true 8mm with the other mask, with power cord and connectors.
Resolution: Center, 68 lines/mm vertical and horizontal.
Edges, 56 lines/mm vertical and horizontal. Wt. 30 lbs. \$2480.00

Model K20S4AE HYCAM, HIGH SPEED MOTION PICTURE CAMERA,
16mm x 400' capacity, 20 to 20,000 pictures per second with
electronic (SCR) speed control for 1% frame rate regulation
after acceleration from 20 to 10,000 pictures per second,
complete with event synchronizer, cut-off switch, 1/2.5
shutter, double timing light assembly, film footage counter,
with Y cord for remote control, speed reducer, takes "C" mount
lenses of any focal length, has 16 sided prism, sprocket, and
shutter on one shaft, with 2 aperture masks for obtaining a
1/2 frame 16mm with one mask, and true 8mm with other mask,
with power cord and connectors. Resolution: Center, 68 lines/mm
vertical and horizontal. Edges, 56 lines/mm vertical and
horizontal. Wt. 32 lbs. \$2730.00

FILM COMPARTMENT AND TRANSPORT SECTIONS

Model K20M1 HYCAM 100' FILM COMPARTMENT AND TRANSPORT SECTION,
complete 100' camera without optical head, with event
synchronizer, cut-off switch, power cord and connectors.
Accepts all optical heads. Wt. 10 lbs. \$575.00

Model K2SM1 HYCAM 100' FILM COMPARTMENT AND TRANSPORT SECTION,
complete 100' camera with speed reducer, without optical head,
with event synchronizer, cut-off switch, power cord and
connectors. Accepts all optical heads. Wt. 11 lbs. \$725.00

RED LAKE LABS., INC.

Model K20M4E HYCAM 400' FILM COMPARTMENT AND TRANSPORT SECTION, complete 400' camera, without optical head, has electronic (SCR) speed control for 1% frame rate regulation, with event synchronizer, cut-off switch, film footage counter, with Y cord for remote control. Accepts all optical heads. However, optical heads without the speed sensor must have speed sensor installed at factory to obtain regulation (charge for this is \$60.00). Wt. 27 lbs. \$1550.00

Model K2SM4E HYCAM 400' FILM COMPARTMENT AND TRANSPORT SECTION, complete 400' camera with speed reducer, without optical head, has electronic (SCR) speed control for 1% frame rate regulation, with event synchronizer, cut-off switch, film footage counter, with Y cord for remote control. Accepts all optical heads. However, optical heads without the speed sensor must have speed sensor installed at factory to obtain regulation (charge for this is \$60.00). Wt. 29 lbs. \$1800.00

OPTICAL HEADS

Model K20H HYCAM OPTICAL HEAD, 16mm full frame with 1/2.5 shutter, single timing light assembly, takes "C" mount lenses, has sprocket, prism, and shutter on one shaft. Fits all 100' film compartments and transport sections. Resolution: Center, 68 lines/mm vertical and horizontal. Edges, 56 lines/mm vertical and horizontal. \$720.00

Model K20HA HYCAM OPTICAL HEAD, 1/2 frame 16mm or 8mm with 1/2.5 shutter, single timing light assembly, takes "C" mount lenses, has 16 sided prism, sprocket, and shutter on one shaft, with two aperture masks for obtaining 1/2 frame 16mm with one mask and true 8mm with other mask. Fits all 100' film compartments and transport sections. Resolution: Center, 68 lines/mm vertical and horizontal. Edges, 56 lines/mm vertical and horizontal. \$870.00

Model K20HE HYCAM OPTICAL HEAD, with installed electronic speed sensor, 16mm full frame with 1/2.5 shutter, double timing light assembly, takes "C" mount lenses, has sprocket, prism, and shutter on one shaft. Fits all film compartments and transport section. Resolution: Center, 68 lines/mm vertical and horizontal. Edges, 56 lines/mm vertical & horizontal. \$805.00

Model K20HAE HYCAM OPTICAL HEAD, with installed electronic speed sensor, 1/2 frame 16mm or 8mm with 1/2.5 shutter, double timing light assembly, takes "C" mount lenses, has 16 sided prism, sprocket, and shutter on one shaft, with 2 aperture masks for obtaining 1/2 frame 16mm with one mask and true 8mm with other mask. Fits all film compartments and transport sections. Resolution: Center, 68 lines/mm vertical and horizontal. Edges, 56 lines/mm vertical and horizontal. \$955.00

RED LAKE LABS., INC.

PRISM/SHUTTER/SPROCKET KITS

K2P/S/S/8E	8 sided prism, sprocket, and shutter shaft assembly, with electronic speed sensor provision, including bearings and full frame 16mm aperture mask. Fits all optical heads.	\$300.00
K2P/S/S/16E	16 sided prism, sprocket, and shutter shaft assembly, with electronic speed sensor provision, including bearings and 3 masks. One for use in upper gate, one for obtaining 1/2 frame 16mm and one for obtaining true 8mm. Fits all optical heads.	\$450.00

SHUTTERS FOR FULL FRAME 16MM HYCAM

K2S-1/2.5	Shutter.....\$18.50	K2S-1/20	Shutter.....\$22.50
K2S-1/5	Shutter.....\$18.50	K2S-1/50	Shutter.....\$22.50
K2S-1/10	Shutter.....\$22.50	K2S-1/100	Shutter.....\$22.50

SHUTTERS FOR 1/2 FRAME 16MM & 8MM HYCAM

K2S8-1/2.5	Shutter.....\$24.50	K2S8-1/20	Shutter.....\$24.50
K2S8-1/5	Shutter.....\$24.50	K2S8-1/50	Shutter.....\$24.50
K2S8-1/10	Shutter.....\$24.50	*K2S8-1/100	Shutter.....\$24.50
		*(for use with 8mm only)	

TIMING LIGHT ASSEMBLIES AND GENERATORS

K2DTL	Extra timing light assembly installed in camera at time of manufacture.	\$25.00
K2TL	Parts for extra timing light assembly to be installed in the field by customer.	\$25.00
K2T	Labor and parts for installing extra timing light assembly at factory after manufacturing, plus transportation.	\$50.00
RLTLG-3	Milli-Mite timing light generator with 10, 100, 1000 cycles per second, complete with battery. Wt. 4 lbs.	\$210.00
RLTLG-3DC	Milli-Mite timing light generator with 10, 100, 1000 cycles per second, with D.C. power supply 110V AC in, with power cord. Wt. 5 lbs.	\$284.00
RLDC-2	DC Power Supply 110V AC in, fixed 40V DC out. Remove battery and use with Milli-Mite timing light generator, model TLG-3, with power cord. Wt. 2 $\frac{1}{2}$ lbs.	\$76.50
RLMMTLG-2	Micro Milli-Mite timing light generator, high G loads, 10, 100, 1000 cycles per second. Wt. 1 lb.	\$340.00

RED LAKE LABS., INC.
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NEW OPTICAL QUALITY

HYCAM 16MM HIGH SPEED MOTION PICTURE CAMERAS

ROTATING PRISM TYPE

The basic difference between the HYCAM design and all other rotating prism camera designs is that all gears have been removed from the optical system and the rotating prism and film sprocket have been placed on one shaft.

A further improvement has been made by adding a segmented disc shutter to this shaft. This technique eliminates gear backlash and bearing run out which improves the steadiness and the optical quality of the film. An 8 sided rotating prism is used in the full frame 16mm and a 16 sided rotating prism is used in the 1/2 frame 16mm or 8mm cameras. These greater number of sides minimize the angular rotation of the prism during a given exposure. This greatly enhances the picture quality because of its superior optical compensation over the standard 4 sided prism camera such as all other manufacturers use.

The current HYCAM cameras basically consist of two models, a 100' model and a 400' model.

HYCAM is so designed that the main optical parts are contained in a removable optical head which can be interchanged from model to model and from unit to unit. A speed sensor is installed in all 400' optical heads. If a 100' optical head is to be used with the 400' model, the speed sensor must be installed in it at the factory. The speed sensor does not interfere in any way with its operation when used with the 100' model. It costs \$60.00 to have the speed sensor installed in the 100' optical head.

Both standard models have a minimum frame rate of 100 frames per second.

Both models can be reduced to ten frames per second by having a speed reducer added at the factory as an accessory. The speed reducer does not in any way interfere with the operation of the camera at the higher frame rates. The speed reducer can be changed from high to low range by merely shifting a lever.

Both models can be easily changed from a full frame 16mm to 1/2 frame 16mm or a true 8mm. Two methods can be used to change from the full frame 16mm to the 1/2 frame 16mm or 8mm:

1. Change the complete optical head. This requires about two minutes time and the 1/2 frame optical head costs \$955.00.
2. You can change the prism/shutter/sprocket shaft in the field. This requires thirty minutes time and the 16 sided prism/shutter/sprocket shaft assembly costs \$450.00. No special mechanical skills are necessary for this operation.

SPECIAL FEATURES

All models include the smooth start centrifugal clutch.

All models contain a built-in power cut-off switch.

All models include a built-in event synchronizer.

All models include a flat spring loaded film gate.

All models have interchangeable shutters making it possible to change the shutter speed without changing the frame rate. This can be done quickly in the field. The minimum shutter speed with the full frame 16mm or the 1/2 frame 16mm is one microsecond, as a .5 microsecond with the true 8mm.

The 1/2.5 shutter is supplied as standard with all model cameras. Shutters available for the full frame 16mm models are: 1/2.5, 1/5, 1/10, 1/20, 1/50, 1/100. Other sizes are available on special order down through the 1/100. All of the above sizes are available for the 1/2 16mm, excepting the 1/100. All of the above shutters are available for the 8mm, including the 1/100.

There is no reduction in frame height with the higher ratio shutters.

To determine the shutter speed at a given frame rate with a given ratio shutter, use this shutter speed formula: $SS = 1/\text{ratio} \times \text{FPS}$.

EXAMPLE

$$\frac{1}{2.5 \times 1000} = \frac{1}{2500} \text{ sec.}$$

(This is true for all models.)

NEW IMPROVED OPTICAL SYSTEM

The model K1 has been discontinued. The model K2 HYCAM will be available January 15, 1965. The major changes are as follows:

1. Right angle prisms have been substituted for all front surface mirrors.
2. The one field lens has been substituted for two field lenses.
3. The relay lens has been completely redesigned to transmit more light, give a higher resolution and a flatter field on the film.

The new internal optics are so superior to the old optics that superior objective lenses show an improved quality on the film over routine objective lenses.

C MOUNT LENSES ARE STILL USED

The maximum effective aperture is f/2.8. The transmission loss through the system is 1/2 stop. This requires a 1/2 stop wider lens setting than normal. All HYCAM models in the field can be modernized with the new optics for approximately \$200. The price on all K2 models has been increased by \$120 over the old K1 models, because of the higher cost of the new optics.

The optical resolution with a good objective lens with a plus X type film is as follows:

Center 68 lines/mm vertical and horizontal

Edges 56 lines/mm vertical and horizontal

We believe this resolution to be the highest of any of the rotating prism cameras on the market today. The frame rate has no effect on resolution. These numbers should be obtained at all speeds commensurate with good photographic practices.

POWER SUPPLIES NEEDED

DC is needed for all standard 100' models for frame rate below 1000 fps. DC can be used throughout the entire speed range. However, above 1000fps it is customary to use AC. We have available a 4 lb. DC rectifier that operates the 100' model from its minimum frame rate to 5000fps for the full frame 16, (10,000fps for the 1/2 frame 16 or 8mm). (Price, \$112.50) For the top frame rates on the 100' models, RL236-1M is recommended.

AC is used throughout the entire speed range for the 400' models. An electric speed control, built into the camera base, is used from the minimum frame rate to 5000 (or 10,000fps with the 1/2 frame 16 or 8mm). Speed setting dials are used. The film accelerates to the desired speed in a minimum length of time and the electronic control regulates the frame rate within one percent. Above the 5000fps (or 10,000fps), the electronic speed control is neutralized by a switch provided and our model RL236-1M is recommended. 195V AC results in 10,000fps (or 20,000fps for the 1/2 frame or 8mm version). (See speed curves.)

CURRENT MODELS AVAILABLE

<u>MODEL NO.</u>	<u>FRAME RATES</u>	<u>CAPACITY</u>	<u>PRICE</u>
K2001	100 to 8500fps	16mm x 100'	\$1295.00
K20S1	10 to 8500fps	16mm x 100'	\$1145.00
K2001A	200 to 17,000fps	1/2 frame 16mm or 8mm x 100'	\$1145.00
K20S1A	10 to 17,000fps	1/2 frame 16mm or 8mm x 100'	\$1595.00
K2004E	100 to 10,000fps	16mm x 400'	\$2330.00
K20S4E	10 to 10,000fps	16mm x 400'	\$2580.00
K2004AE	200 to 20,000fps	1/2 frame 16mm or 8mm x 400'	\$2480.00
K20S4AE	20 to 20,000fps	1/2 frame 16mm or 8mm x 400'	\$2730.00

SEE PRICE LISTS FOR ALL DETAIL PRICES

EXPLANATION OF MODEL NUMBERS

K2 denotes new optical quality.

1 denotes 100' capacity.

4 denotes 400' capacity.

S denotes speed reducer

E denotes electronic speed control
unit installed in base of camera.

A denotes 1/2 frame 16mm or 8mm.

ALL MODEL NUMBERS INDICATED ABOVE INCLUDE SPECIFICATIONS LISTED IN PRICE LIST
DATED JANUARY 1, 1965.

FULLY GUARANTEED

90-DAY GUARANTEE: If, for any reason,
you are not completely satisfied with
any Red Lake product within 90 days,
you may return it for full credit.

ONE-YEAR GUARANTEE: Covers any defect
in workmanship or material.