CRT RECORDING CAMERAS

TEKTRONIX®

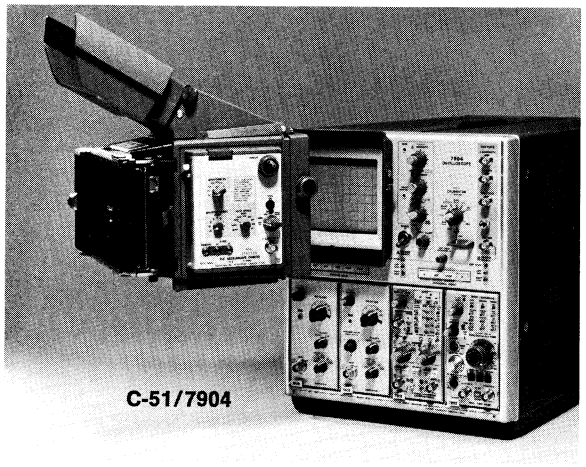
committed to technical excellence

TEKTRONIX CAMERAS

14 models to fit all applications

Laboratory Oscilloscope Cameras

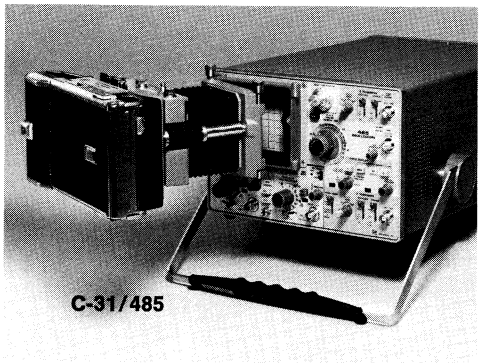
From the high-speed C-51 to the general-purpose C-53, the four all-electrical C-50-Series Cameras provide unequaled versatility and performance with range-finder focusing, exposure photometer, and electronically-controlled shutter.



C-51/7904

The economical general-purpose C-59 fulfills the majority of trace-recording requirements for a wide variety of TEKTRONIX oscilloscopes and display units.

C-59/520



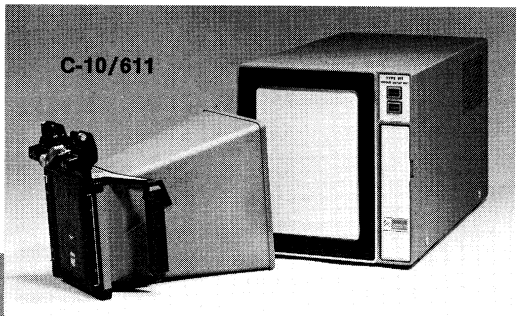
C-31/485

Portable Oscilloscope Cameras

The high-speed C-31 and two additional C-30-Series Cameras cover the full range of performance requirements for the TEKTRONIX 400-Series Portable Oscilloscopes.

11-Inch Display Monitor Camera

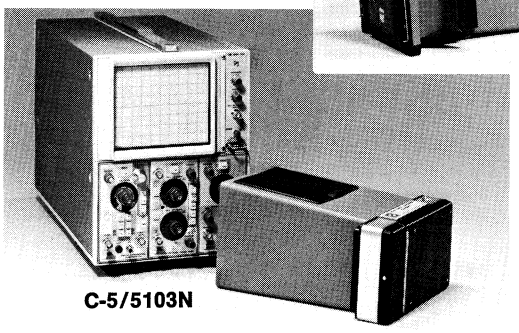
The C-10 Camera is designed specifically for TEKTRONIX Information Display Products which have an 11-inch CRT. This hand-held camera conveniently provides full-screen, 4 x 5-inch photos in seconds.



C-10/611

Low-Cost Camera

The C-5 is recommended primarily for the large-screen TEKTRONIX 5100-Series Oscilloscopes. This lowest-priced camera also fits any TEKTRONIX 7000-Series Oscilloscope, and is especially easy to use.



C-5/5103N

CONTENTS

CHOOSING A TEKTRONIX CAMERA

Just as no single oscilloscope can make every measurement, no single camera can meet every possible mechanical, electrical, and optical requirement. The specialized family of TEKTRONIX Cameras complements the broad line of TEKTRONIX Oscilloscopes to meet a wide range of trace-recording needs.

Which combination to choose?

The next three pages can help you. In them, we define the major characteristics of an oscilloscope camera, and how they relate to your needs. We've also summarized these camera characteristics in a check list, along with some other important factors to consider when choosing a camera system.

Specification data for the cameras is presented in convenient chart form throughout the booklet. First, a master chart classifies all the TEKTRONIX Cameras by Primary Use, and allows easy comparison of their major benefits. The pages following contain similar detailed charts for each camera series or family.

To complement these charts, the Oscilloscope/Camera/Adapter Guide on page 19 lists all the TEKTRONIX Oscilloscopes and the camera recommended for each of them. This Guide also lists eighteen Camera Adapters, and the many camera/oscilloscope combinations they allow.

CAMERA SELECTION CHECK LIST

The check list here briefly notes important things to consider when choosing a camera system. Following the list, each point is elaborated.

CAMERA MOUNTING AND USE—Is the camera mechanically and optically compatible? Specific camera types are designed for use primarily with a particular series of oscilloscopes or display units. By means of optional adapters, most cameras can be mounted on a wide variety of instruments, but they must of course be optically compatible to produce useful photos.

LENS SPEED—Does it match the task? For photographing a stored or recurrent stable CRT display, a slow or medium-speed lens is suitable and economical. For recording a high-speed, single-sweep trace you may need the fastest lens available.

FIELD OF VIEW—Cameras are available for the CRT displays that range in size from 6 x 8 cm to 16 x 21 cm. Does the camera have sufficient field of view to fully record the entire display on the size film of your choice?

LENS MAGNIFICATION—Will the lens produce the size photo image you want? Magnification of the lens also affects the field of view and writing speed.

FILM BACKS—Is it desirable to interchange different types of film backs to allow use of different film types, picture sizes, and emulsion speeds? Except for the C-5 and C-10, all TEKTRONIX Cameras have interchangeable film backs.

MULTIPLE IMAGES—Is it desirable to record more than one CRT display on a single photo? The C-12 and C-27 Cameras have rotatable, indexed sliding backs that allow recording multiple images on one photo.

FILMS—Films for CRT trace recording come in sheet, pack, and roll form. They vary in size, speed, contrast, spectral response, resolution, and cost. Some provide a positive print, and some provide a transparency; one Polaroid 4 x 5-inch film type provides both. Will the film backs available for the camera accomodate the type film you want to use?

FILM FOGGING—Will it be needed as a technique to increase writing speed? The Writing Speed Enhancer is an optional accessory that provides controlled film fogging, and is available for eight TEKTRONIX Cameras.

VIEWING—Is it important to be able to view the display while photographing it? Most TEKTRONIX Cameras allow this, but some compact cameras don't have a viewing port.

SHUTTER TRIGGERING—Must the shutter be operable by remote electrical control, or is manual operation of a mechanical shutter adequate? The all-electric C-50-Series Cameras need only a switch closure to ground for triggering; the optional Electric Shutter system for the C-12, C-27, and C-30-Series Cameras requires an insulated switch closure.

GRATICULE ILLUMINATION—Is it desirable to photograph the CRT graticule along with the trace? The graticules of some non-storage oscilloscopes and display units are not illuminated. Only the C-5 Camera with its built-in flash lamps can backlight and photograph the graticule of an oscilloscope that does not have graticule illumination.

CAMERA POWER—Four of the C-50-Series Cameras are electrically operated from +15 volts. Can your oscilloscope provide power, or will a Battery Pack be needed?

VIEWING

Most TEKTRONIX Cameras are hinge-mounted, and may be swung aside to allow a wide-angle view of the CRT display. Except for the C-30 Series, most cameras also have a viewing port to allow observing the CRT with the camera latched in place.

The light-weight, hook-mounted C-5, with a hinged door on top for angular viewing, can easily be slipped off the CRT bezel for full viewing. The C-27 and C-50-Series Cameras have an off-axis viewing hood that accommodates eyeglasses for a comfortable binocular view of the CRT display without interference from ambient light.

By means of mirrors, the C-12 viewing tunnel provides a straight-on view of the CRT to minimize parallax errors when photographing an external graticule. The optional Projected Graticule accessory for the C-12 provides parallax-free changeable graticules of any design.

FILMS

The three types of backs used on TEKTRONIX Cameras accommodate most all the films that are useful for CRT trace recording. These include sheet films, roll films, and several Polaroid Land films.

The most widely-used film is Polaroid Type 107. It is supplied in an 8-exposure pack and develops outside the film back in 15 seconds to produce a positive print with an image area of 7.3 x 9.5 cm. It has an ASA equivalent speed of 3,000 with 22-28 line-pairs/mm resolution. The equivalent in roll form is Type 47.

Polaroid 3,000-speed Pack Film and Roll Film are most suitable for recording stable CRT displays, and single-sweep traces of up to medium speeds. With controlled fogging provided by a Writing Speed Enhancer, the writing speed of both these films can be increased approximately three times to equal that of Polaroid Type 410 10,000-speed Roll Film. Type 410 film is especially suited for recording extremely fast single-sweep traces; its writing speed can be increased approximately two times with the Writing Speed Enhancer which is described on page 18.

Polaroid Roll Film Backs also accept Polaroid Type 46-L which provides a positive transparency suitable for use in slide projectors; it has an ASA equivalent speed of 800, with an image area of 6.2 x 8.3 cm, and 32-35 line-pairs/mm resolution.

Three of Polaroid's 4 x 5-inch films are also useful for CRT-display recording. The large image area of these films, 3½ x 4½ inches (8.9 x 11.4 cm), allows full-scale photography of 8 x 10-cm displays with the C-52 and C-58 Cameras which have unity-magnification lenses; an optional unity-magnification lens is also available for the C-12 and C-27 Cameras. The extra-wide-angle lens in the C-58 can fully expose the entire image area of these films with no vignetting.

Polaroid Type 52 4 x 5-inch Film has a wide tonal range and provides extremely good rendition of the CRT-display grey scale on a positive print. This characteristic is especially desirable when photographing brightness-modulated CRT displays such as those of scanning electron microscopes. Type 52 Film has an ASA equivalent speed of 400, and 22-28 line-pairs resolution.

Polaroid Type 55/PN 4 x 5-inch Film provides a medium-contrast print with 14-17 line-pairs/mm resolution, and a fine-grain negative with 150-165 line-pairs/mm resolution; it has an ASA equivalent speed of 50.

Polaroid Type 57 4 x 5-inch 3,000-speed film provides a medium contrast positive print with 22-28 line-pairs/mm resolution. Like Polaroid 3,000-speed Pack Film and Roll Film, Type 57 is very suitable for photographing stable CRT displays, and single-sweep traces of up to medium speeds.

Polaroid films are convenient and easy to use. They offer the advantages of development in seconds to a finished dry print with broad spectral response, good resolution, and high sensitivity. Polascope Type 410 is the fastest film available for use with oscilloscope cameras.

Conventional sheet films, and 70 mm and 120-size roll films can be used with the 4 x 5-inch and 2¼ x 3¼-inch Graflok Backs and the proper holder or adapter. A few of the many types of holders for these films are shown on page 15.

Conventional films provide a negative transparency from which unlimited contact prints or enlargement prints can be made. One twenty, 220, and 70 mm roll films offer high frame capacity with fast manual or automatic advance for photographing a large number of displays in rapid sequence.

Conventional films manufactured by Agfa, Ansco, DuPont, Eastman Kodak, Gavaert, and Ilford are available in several types and forms at ASA speeds from 64 to 1250. A detailed list of film types and their characteristics can be obtained from their respective manufacturers.

The ASA film-speed rating signifies the exposure requirements for general pictorial photography where the light has a very wide color spectrum. Since CRT phosphors emit light over a narrow spectrum, the ASA speed cannot be used to accurately predict the exposure requirements for oscilloscope trace photography, especially when recording fast, dim single-sweep traces.

LENSES

TEKTRONIX camera lenses differ mainly in speed, magnification, and field of view.

SPEED—The f-number of a lens inversely signifies its aperture size and speed. For example, the aperture of an f/1.4 lens is twice that of an f/2.8 lens of the same magnification and gathers four times more light. For recording a stored or stable recurrent CRT display, a lens as slow as the f/16 type in the C-5 Camera is adequate. On the other hand, to record a fast, dim, single-sweep trace, you may need a lens as fast as the f/1.2 types in the C-31 and C-51 Cameras.

The following table lists the approximate relative light-gathering power of most TEKTRONIX camera lenses; the data is based on actual light transmission measurements.

Camera	Lens	Magnification	Relative Lens Speed
C-5	f/16	0.68	0.02
C-12†	f/1.9	0.85	0.65
	f/1.4	1.0	1.0
	f/1.3	0.5	1.7
C-27	f/1.9	0.85	1.0
	f/1.4	1.0	1.5
	f/1.3	0.5	2.6
C-30A	f/1.9	0.7	1.0
C-30A Opt 1	f/1.9	0.8	1.0
C-31	f/1.2	0.5	3.4
C-32	f/1.5	1.0	1.5
C-50	f/1.9	0.7	1.2
C-51	f/1.2	0.5	3.6
C-52	f/1.4	1.0	1.5
C-53	f/1.9	0.85	1.0
C-58	f/2.8	1.0	0.4
C-59	f/2.8	0.67	0.65

†The C-12 beam-splitter mirror transmits 65% of the CRT light to the lens, and reflects 35% through the viewing tunnel.

FIELD OF VIEW—The description for each TEKTRONIX camera includes a statement of its field of view; this signifies how large a CRT display the camera can fully record. It is determined by the combined effects of the magnification and angular field of view of the lens, any field limiting apertures in the camera adapter or film holder, and the image area of the film.

MAGNIFICATION—Modern optical technology has made possible wide-aperture, wide-angle, flat-field lenses with short focal length for more compact cameras. To realize their inherent low distortion, high resolution, and uniform focus, these fixed focal length lenses must be used at their design center magnification.

Operating such lenses at a different magnification tends to compromise their important performance characteristics. For this reason, most TEKTRONIX cameras are designed for use at one lens magnification. Even the five interchangeable lenses for the C-12 and C-27 Cameras have fixed magnification. One exception is the C-30A Camera which has a magnification range of 0.7 to 1.5 to accommodate several portable oscilloscopes that have displays ranging in size from 3.8 x 6.3 cm to 8 x 10 cm. The rated magnification of a lens signifies its image-to-object ratio. $M = \frac{\text{Image}}{\text{Object}}$ or Image = M x Object.

For maximum resolution, the lens should produce the largest complete image possible within the image area of the film. The film most widely used for oscilloscope trace recording is Polaroid Type 107 Pack Film which has an image area of 73 x 95 mm.

The sixteen types of lenses used in TEKTRONIX cameras represent six fixed magnifications ranging from 0.5 to 1.0.

In most cases, the magnification is selected to provide the largest possible complete image of a particular display. In the case of some 0.5 magnification lenses, it is to achieve high writing speed by concentrating the trace light in a smaller area on the film.

PHOTOGRAPHIC WRITING SPEED

Photographic writing speed signifies the ability of a particular oscilloscope/camera system to provide a useful photographic record of a fast single-sweep trace. It is stated as an oscilloscope performance characteristic and is expressed in cm/μs or cm/ns. It is designed to answer the question, "What is the speed of the fastest single-sweep trace the system can record?"

All statements of writing speed must specify the measurement conditions, including the CRT phosphor and film used, and the definition of a readable trace image.

Several methods for measuring writing speed are discussed in the book "Oscilloscope Camera Concepts," a TEKTRONIX publication, part number 062-1460-00.

GLOSSARY OF CAMERA AND PHOTOGRAPHIC TERMS

ASA FILM-SPEED INDEX—The method of specifying film speed for general photography in the United States. Since the ASA index is based on the response of film to sunlight and tungsten light, it cannot be used directly as an accurate exposure guide for the narrow color spectrum emitted by CRT phosphors, especially for recording fast single-sweep traces where exposures fall at the threshold sensitivity of the film.

CAMERA ADAPTER—Attaches to an oscilloscope so that a camera can be mounted on it. Adapters are needed for all TEKTRONIX Cameras except the C-5 and C-10.

CRT BEZEL—The front-panel frame around the CRT; it may be a removable graticule cover or a flanged frame which is integral to the instrument.

EXPOSURE VALUE—For every product of film speed (ASA) times luminance (footlamberts), there is a product of lens opening $(\text{f-number})^2$ times inverse shutter speed (I/t) that will produce a picture. The exposure value, E_v is 2 log (f-number) — log t. When luminance and film speed are fixed, the inverse shutter speed and the f-number can be varied inversely, keeping their product constant, or keeping the sum of their logs, E_v, constant.

FIELD OF VIEW—The effective field of view of an oscilloscope camera may be defined as the maximum-size CRT display that the camera can record. It is determined by the combined effects of the magnification and angular field of view of the lens, and field-limiting apertures in the camera adapter, camera body or film holder, and the image area of the film.

FILM FOGGING—A technique of increasing writing speed by deliberately fogging the film to enhance the undeveloped trace image.

FILM IMAGE AREA—The actual area of the film which can produce an image. The image area of conventional sheet films, and roll films that don't have sprocket holes, is as large as the film. Polaroid prints are masked to produce a border; for example, Type 107 Pack Film is designated as 3¼ x 4¼-inch film; its actual image area is 7.3 x 9.5 cm or 2⅞ x 3¾ inches.

LENS MAGNIFICATION—A number M which signifies the image-to-object ratio of a lens system. $M = \frac{\text{Image size}}{\text{Object size}}$ or image size = M x Object size.

LIGHT-GATHERING POWER—The illumination in an image plane that a lens can produce from an object, relative to the brightness or luminance of the object. It is sometimes referred to as "lens speed."

VIGNETTING—The loss of the periphery of the image due to restriction of off-axis light rays by the lens-mounting barrels or edges of the glass elements. In a positive print, it usually appears as darker areas of the image at the corners of the photo. It contributes to the angular limits of the field-of-view of the lens.

More information is available in TEKTRONIX publication, "Oscilloscope Camera Concepts."

REFERENCE INFORMATION

As shown in the chart below, each TEKTRONIX Camera is offered for use primarily with a particular series of oscilloscopes or display units for optimum system performance at a commensurate price.

Most TEKTRONIX Cameras can also be used effectively with many instruments other than those they were primarily designed for. The Oscilloscope/Camera/Adapter Guide on page 19 shows the many additional combinations possible.

CAMERA SUMMARY

CAMERA	PAGE	PRIMARY USE	PERFORMANCE FEATURES	LENS				SHUTTER	FILM BACKS		with back ordinarily used
				MAXIMUM RELATIVE APERTURE	MAG	RELATIVE SPEED*	FIELD OF VIEW (with 3¼ x 4¼-inch Polaroid Film except where noted)		ORDINARILY USED	OPTIONAL AND INTERCHANGEABLE	
C-5	11	5100 Series Oscilloscopes and TELEQUIPMENT D-83	Low price; easy to use	f/16	0.68	0.02	10.2 x 12.7 cm/ 4 x 5 inches	MECHANICAL	Polaroid[1] Pack	None	Pack
C-10	11	611 11-inch Display Unit and some computer Display Terminals	Provides Polaroid 4 x 5-inch print of full CRT display	f/8	0.5	0.08	17.8 x 22.8 cm/ 7 x 9 inches (with Polaroid 4 x 5-inch film)		4 x 5 Graflok[2]	None	Graflok
C-12	12	500 Series oscilloscopes with external graticules up to 8 x 10 cm	Straight-on binocular viewing. Optional Projected Graticule. Movable film backs. Four optional lenses.	f/1.9 (standard lens)	0.85	0.65†	8 x 10 cm/ 3.15 x 3.93 inches	MECHANICAL (Standard)	Polaroid Pack Film	Polaroid Roll Film and 4 x 5-inch Graflok	Pack
C-27	12	500 Series oscilloscopes with internal graticules up to 10 x 10 cm	Selectable orientation of off-axis binocular viewing. Movable film backs. Four optional lenses.	f/1.9 (standard lens)	0.85	1.0	10 x 10 cm/ 3.93 x 3.93 inches (with Polaroid 4 x 5-inch film)				
C-30A	16	400 SERIES PORTABLE OSCILLOSCOPES	General-purpose with variable mag lens.	f/1.9	0.7 to 1.5	1.0[5]	8 x 10 cm/ 3.15 x 3.93 inches at 0.85 MAG setting[3]	ELECTRIC (Optional)	Polaroid Pack	Polaroid Roll and 2¼ x 3¼-inch Graflok	Pack
C-30A Opt 1	16		General Purpose; Full Coverage of 8 x 10-cm CRT display	f/1.9	0.8	1.0	8 x 10 cm (no vignetting)		Polaroid Pack		Pack
C-31	16		Fast writing speed with 0.5 mag lens.	f/1.2	0.5	3.4	8 x 9 cm/ 3.15 x 3.5 inches		Polaroid Roll	Polaroid Pack and 2¼ x 3¼-inch Graflok	Roll
C-32	16		Full-size image with medium writing speed.	f/1.4	1.0	1.5	7 x 9 cm/ 2.75 x 3.5 inches at 1.0 MAG setting		Polaroid Pack	Polaroid Roll and 2¼ x 3¼-inch Graflok	Pack
C-50	5	7000 SERIES OSCILLOSCOPES with 8 x 10 cm CRT's	General-purpose with 0.7 mag lens.	f/1.9	0.7	1.2	10.2 x 12.7 cm/ 4 x 5 inches[4]	ELECTRIC	Polaroid Pack	Polaroid Roll and 4 x 5-inch Graflok	Pack
C-51	5		Fastest writing speed with 0.5 mag lens.	f/1.2	0.5	3.6	8 x 10 cm/ 3.15 x 3.93 inches		Polaroid Roll	Polaroid Pack and 4 x 5-inch Graflok	Roll
C-52	5		Full-size image with medium writing speed.	f/1.4	1.0	1.5	8 x 10 cm/ 3.15 x 3.93 inches (with Polaroid 4 x 5-inch film)		4 x 5-inch Graflok	Polaroid Pack and Roll Film	Graflok
C-53	5		General-purpose with 0.85 mag lens.	f/1.9	0.85	1.0	8 x 10 cm/ 3.15 x 3.93 inches		Polaroid Pack	Polaroid Roll and 4 x 5-inch Graflok	Pack
C-58	5		Full-size image of largest field at lowest price.	f/2.8	1.0	0.4	8.9 x 11.4 cm/ 3½ x 4½ inches (with Polaroid 4 x 5-inch film)	MECHANICAL	4 x 5-inch Graflok	Polaroid Pack and Roll Film	Graflok
C-59	5	5400 Series; 7000 Series Oscilloscopes with 6½-inch CRT's; TELEQUIPMENT D-83	General-purpose at low price.	f/2.8	0.67	0.65	10.2 x 12.7 cm/ 4 x 5 inches		Polaroid Pack	Polaroid Roll and 4 x 5-inch Graflok	Pack

[1] Registered Trademark Polaroid Corporation

[2] Registered Trademark Graflex, Inc.

[3] Possible corner vignetting with some instruments

[4] Slight corner vignetting

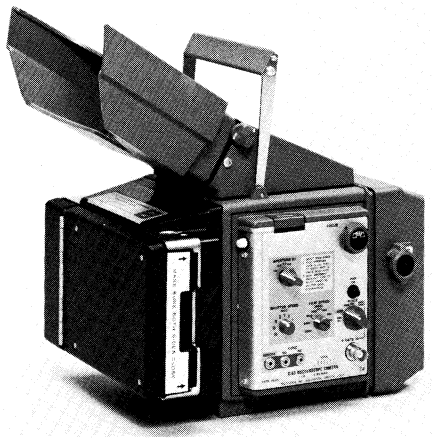
[5] At 0.7 MAG setting

* Relative light gathering power

† Beam-splitter mirror transmits 65% of CRT light to the lens and 35% to the viewing tunnel

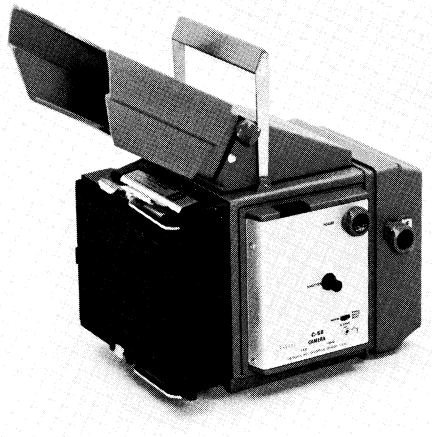
COMMON C-50 SERIES FEATURES

- COMPACT, LIGHTWEIGHT
- INTERCHANGEABLE FILM BACKS
- LIFT-OFF MOUNTING, SWING-AWAY HINGING



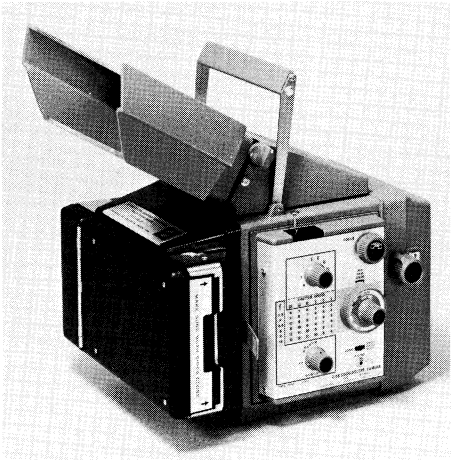
C-50, C-51, C-52, and C-53

- ELECTRONIC-CONTROLLED SHUTTER
- PHOTOMETER EXPOSURE AID
- RANGE-FINDER FOCUSING
- AUTOMATIC SINGLE-SWEEP CONTROL



C-58

- LOW COST
- UNITY-MAGNIFICATION LENS
- WIDE FIELD OF VIEW WITH NO VIGNETTING



C-59

- PHOTOMETER EXPOSURE AID
- RANGE-FINDER FOCUSING
- INTERNAL BATTERY POWER

Three distinct versions comprise the C-50-Series Cameras: (1) The C-50, C-51, C-52, and C-53, all with photometer exposure aid and electronic-controlled shutter; (2) the low-cost C-59 with photometer exposure aid and mechanical shutter; and (3) the C-58 with mechanical shutter and wide-angle unity-magnification lens.

The six C-50-Series Cameras are designed for use with all TEKTRONIX 7000-Series Oscilloscopes. They can also be adapted to most TEKTRONIX 500-Series Oscilloscopes and 600-Series Display Units. Please refer to the Oscilloscope/Camera/Adapter Guide on page 19.

All the C-50-Series Cameras can be ordered with a Polaroid[1] Pack-Film or Roll-Film Back, or Graflok[2] 4 x 5-inch Back. All three backs can easily be removed and interchanged without fogging the film, and without need to refocus the camera.

See next five pages for details and waveform photographs.

See page 10 for Accessories and Ordering information.

SUMMARY COMPARISON OF MAJOR CHARACTERISTICS

CAMERA	C-50	C-51	C-52	C-53	C-58	C-59
PERFORMANCE FEATURES	General purpose for CRT's up to 6½ inches; Medium writing speed, electric shutter	Fastest writing speed 0.5 mag lens; electric shutter	Full--size image; Medium writing speed; electric shutter	General purpose for 7000 Series with 8 x 10-cm CRT's**, electric shutter; medium writing speed	Full-size image of largest field at lowest price. Slow writing speed	General purpose at lowest price. For CRT's up to 6½ inches; slow writing speed
LENS	f/1.9	f/1.2	f/1.4	f/1.9	f/2.8	f/2.8
MAGNIFICATION	0.7	0.5	1.0	0.85	1.0	0.67
RELATIVE LENS SPEED*	1.2	3.6	1.5	1.0	0.4	0.65
FIELD OF VIEW	10.2 x 12.7 cm with 3¼ x 4¼-inch film[3]	8 x 10 cm with 3¼ x 4¼-inch film	8 x10 cm with Polaroid 4 x 5-inch film	8 x 10 cm with 3¼ x 4¼-inch film	8.9 x 11.4 cm with Polaroid 4 x 5-inch film	10.2 x 12.7 cm with 3¼ x 4¼-inch film
SHUTTER	Electrically actuated, 4 to 1/60 second, plus Bulb and Time				Mechanically actuated 1 to 1/100 sec, Bulb and Time	Mechanically actuated 1 to 1/50 sec, Bulb and Time
FILM BACKS	These cameras may be ordered with a Polaroid Pack Back which accepts 3,000-speed film, a Polaroid Roll Back which accepts 3,000- and 10,000-speed film, or a 4 x 5-inch Graflok Back which accepts a Polaroid 4 x 5-inch Film Holder and 4 x 5-inch sheet-film holder. See ORDERING INFORMATION on page 10, and ACCESSORIES on page 15.					
(With Film Back Ordinarily Used)	(Pack Back)	(Roll Back)	(Graflok Back)	(Pack Back)	(Graflok Back)	(Pack Back)

DIMENSIONS AND WEIGHTS WITH FILM BACK ORDINARILY USED

	C-50-P		C-51-R		C-52-G		C-53-P		C-58-G		C-59-P	
	in	cm	in	cm	in	cm	in	cm	in	cm	in	cm
Height	11.5	29.2	11.5	29.2	11.5	29.2	11.5	29.2	11.5	29.2	11.5	29.2
Width	7.5	19.1	9.8	24.8	7.5	19.1	7.5	19.1	7.7	19.3	7.7	19.3
Length	10.8	27.3	10.8	27.3	10.8	27.3	10.8	27.3	10.8	27.3	10.8	27.3
Weight (Approx)	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg
Net	7.5	3.4	9.5	4.3	8.0	3.6	7.5	3.4	6.0	2.7	7.0	3.2
Domestic Shipping	12.0	5.4	15.0	6.8	15.0	6.8	12.0	5.4	10.0	4.5	11.0	5.0
Export-Packed	24.0	10.9	27.0	12.2	27.0	12.2	24.0	10.9	22.0	9.9	23.0	10.4

*Relative light-gathering power. (See Camera Reference Information for comparison of all Tektronix Cameras.)

**The C-53 lens records the largest practical image of an 8 x 10 cm CRT display on Polaroid 3¼ x 4¼-inch film.

[1] Registered Trademark Polaroid Corporation [2] Registered Trademark Graflex, Inc. [3] Slight corner vignetting

C-50, C-51, C-52, and C-53 CAMERAS

These electrically-powered cameras offer more convenience and flexibility of operation than any other trace-recording camera. The controls are grouped on one panel for convenient operation. With new-design, short-focal-length lenses, these compact cameras are less than eleven inches long.

COMMON FEATURES

Mode Switch—Turns on camera power and selects four modes of operation: Normal, Time, Bulb, and Single Sweep.

Focus—When the spring-loaded FOCUS control knob is pushed in, two vertical bars of light are projected onto the CRT screen. By turning the FOCUS control, the camera body can be moved in and out until the light bars coincide, which indicates that the camera is focused on the CRT screen. When the FOCUS control is released, the lamps extinguish and the camera is locked in focus. (See inside back cover for photos.)

Photometer Exposure Aid—The photometer exposure-aid operates similarly to exposure-value meters in conventional cameras. Mechanical analogues of film speed, phosphor type, shutter speed, and CRT-trace brightness are set by panel controls into a gear train which properly relates these factors. The operator can quickly and easily set the shutter controls for the exposure-value that will provide properly exposed photos of recurrent CRT displays over a wide range of trace brightness.

In procedure, the FILM SPEED knob is first set to match the ASA index of the film being used. Normally, the SHUTTER-SPEED selector is slaved to the APERTURE (f) control. Depressing the APERTURE control disengages it from the shutter, and it can be turned without affecting the shutter speed.

Depressing the APERTURE control knob also turns on the photometer light, which appears in the viewing tunnel as a small spot of light on the CRT screen. By turning the APERTURE control, the brightness of the photometer spot can be adjusted to match the brightness of the CRT trace. This sets the shutter speed and lens aperture to the correct exposure-value for a properly exposed photo.

When the spring-loaded APERTURE control knob is released, the SHUTTER-SPEED control is again slaved to the APERTURE control. If the APERTURE (f) control setting is changed, the SHUTTER SPEED automatically tracks with it to maintain the same exposure-value and the same film exposure.

Four selectable filters allow matching the color of the photometer spot to P1, P2, P11, and P31 phosphors. The filters are mounted on a thumbwheel which is interlocked with the exposure-photometer gear train.

Shutter—The electrically-controlled shutter can be triggered locally with a push button, or remotely with a switch closure to ground. In the SINGLE SWEEP mode, the camera provides an automatic single-sweep sequence when used with a TEKTRONIX 7000-Series Oscilloscope. When the shutter is triggered open, the camera arms the oscilloscope sweep. The shutter stays open until the sweep occurs, then closes five seconds after the sweep ends.

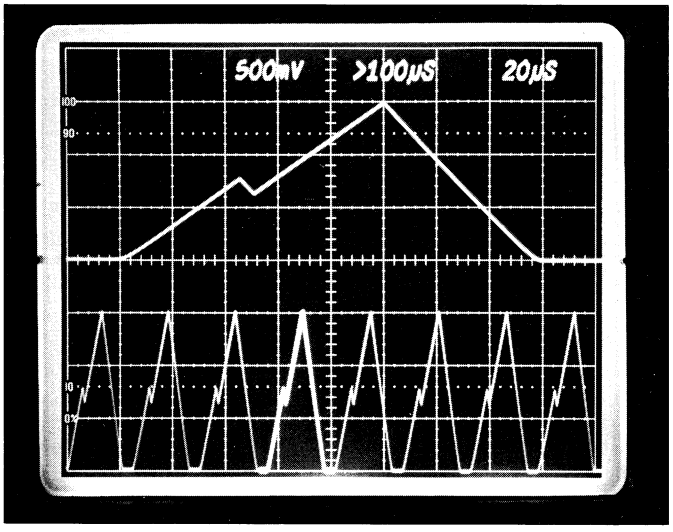
Camera Power and Sweep Reset—A 3-pin connector on the bezel of the TEKTRONIX 7000-Series Oscilloscopes provides +15 V power to the camera, and a sweep-reset signal (in single-sweep mode only) back to the oscilloscope. An optional Battery Pack allows use of these cameras with other oscilloscopes.

See page 10 for Ordering information.

C-50, C-51, C-52, and C-53 LENS SYSTEMS

The following four photos show each camera's field of view and lens magnification.

C-50 GENERAL-PURPOSE CAMERA



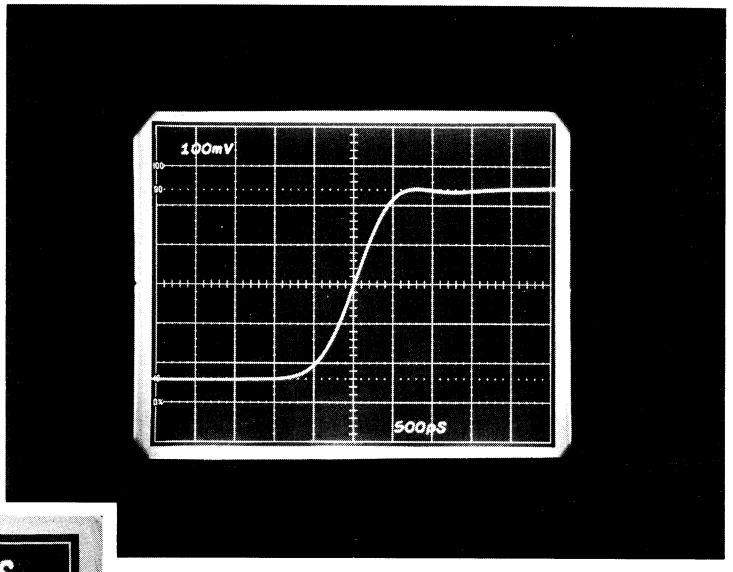
(Actual image area of Polaroid Type 107 Film)

7704A with 8 x 10-cm CRT

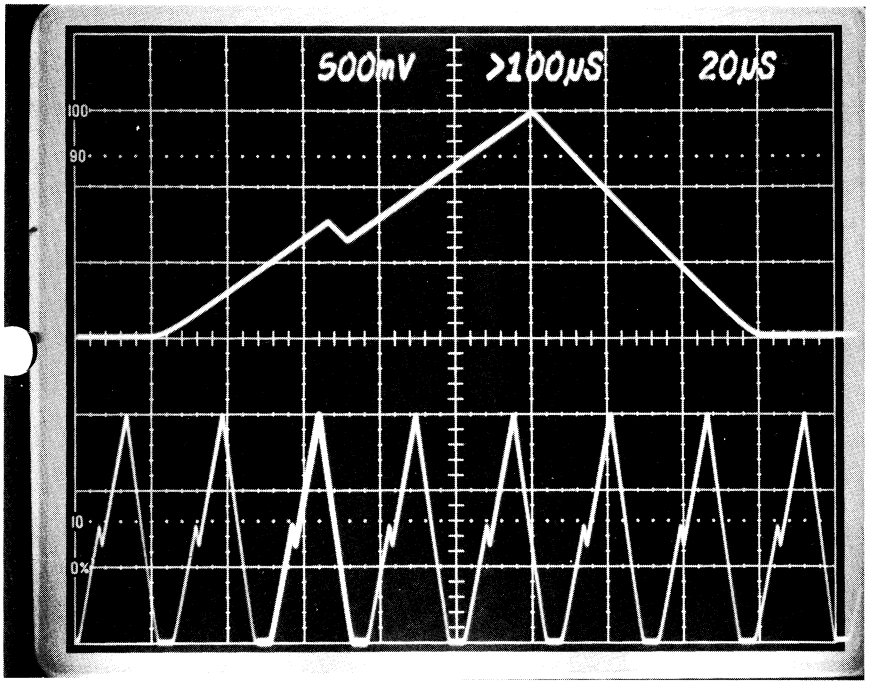
The C-50 can also record the 9.76 x 12.2-cm CRT display of the 5403, 7403 and 7603 on Polaroid 3¼ x 4¼-inch film. The C-50 Camera's f/1.9, 0.7 lens has a relative light-gathering power of 1.2.

C-51 CAMERA
MAXIMUM WRITING SPEED
7904 with 8 x 10-cm CRT

The C-51 Camera provides the fastest writing speed of all the C-50-Series Cameras, and is recommended for use with all TEKTRONIX 500- and 7000-Series Oscilloscopes where maximum single-sweep writing speed is desired. Its f/1.2, 0.5 magnification lens has a light-gathering power of 3.6.



(Actual image area of Polaroid Type 107 Pack Film)



(Actual image area of Polaroid[1] Type 57 4 x 5-inch Film)

C-52 CAMERA
FULL-SIZE IMAGE
MEDIUM WRITING SPEED
7704A with 8 x 10-cm CRT

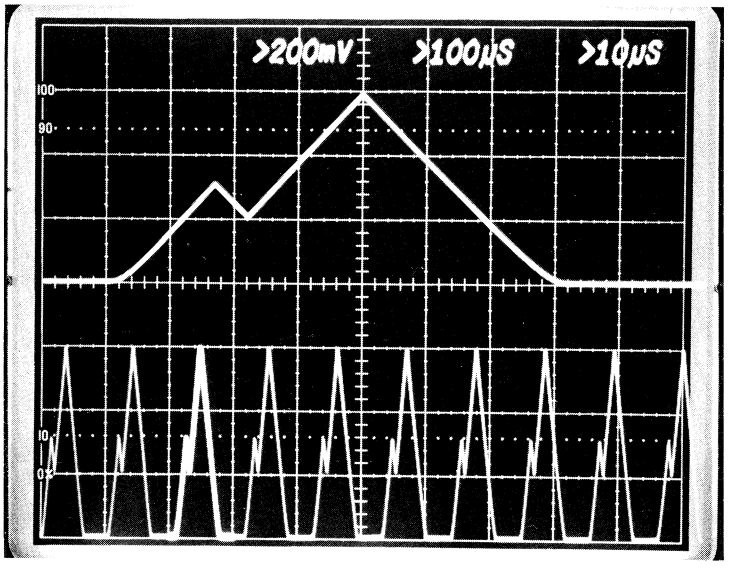
The C-52 Camera, using a Graflok[2] Back, provides a full-size image with sufficient writing speed for most medium-speed single-sweep applications. Its f/1.4, unity-magnification lens has a light-gathering power of 1.5.

Polaroid Pack Film and Roll Film Backs can be used with the C-52 but the 3¼ x 4¼-inch films used with these backs limit the camera's field of view to their actual image area, which is 7.3 x 9.5 cm.

C-53 CAMERA
GENERAL PURPOSE
7704A with 8 x 10-cm CRT

The C-53 f/1.9 lens, which has a relative light-gathering power of 1.0, provides adequate writing speed for most general-purpose applications. The 0.85-magnification lens provides the largest practical image of an 8 x 10-cm CRT display that will fall within the 7.3 x 9.5-cm image area of Polaroid 3¼ x 4¼-inch film.

The C-58 and C-59 Cameras are described on the next two pages.



(Actual image area of Polaroid Type 107 Pack Film)

[1]Registered Trademark Polaroid Corporation
[2]Registered Trademark Graflex, Inc.

C-58 CAMERA
FULL-SIZE IMAGE

The C-58 Camera features an extra-wide-angle f/2.8 unity-magnification lens which can fully record all the image area of 4 x 5-inch film with no vignetting. Its simplified design with mechanically actuated shutter provides easy operation and low cost.

The C-58 is an ideal camera for general purpose oscilloscope photography where full-size photos are desired but without the need for fast writing speed. It is also well suited for providing vignette-free photos of brightness-modulated CRT displays such as those of scanning electron microscopes, ultrasonic scanners, and IR thermogram instruments.

Shutter—The mechanical shutter is actuated by a plunger on the control panel. It has six selectable speeds from 1 to 1/50 second, with Time and Bulb modes.

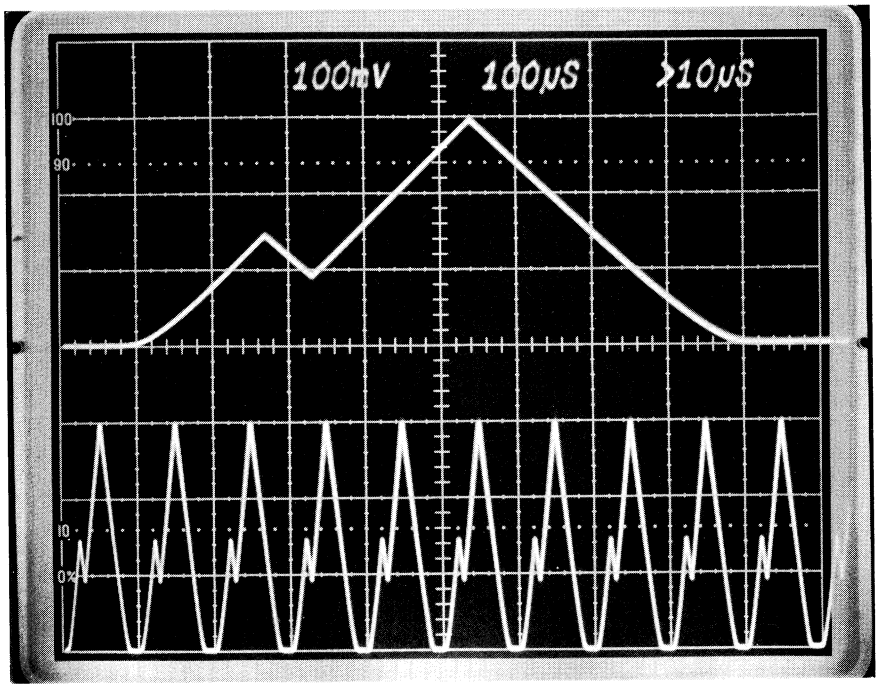
Aperture—The aperture is continuously adjustable from f/2.8 to f/16. The aperture and shutter speed controls are readily accessible through the wide opening at the front of the camera.

Focus Control—The spring-loaded knob is pushed in and turned to focus the camera while observing the CRT display on the Graflok Back focusing screen, or a focus plate if a Polaroid Film Back is used. When the knob is released, the camera is locked in focus.

X-Sync Switch—A normally-open switch in the shutter closes when the shutter is operated fully open. One contact of this switch is grounded, and the other is connected to the X-SYNC switch on the control panel. When this panel switch is in NORM position, connection can be made to the mini-phone jack (just below the switch) for controlling test circuitry in conjunction with the camera shutter operation.

When the X-SYNC switch is in the SINGLE-SWEEP-RESET position, the shutter switch is connected via an adapter/bezel connector to the sweep-reset line of a 7000-Series Oscilloscope. When the camera shutter opens, the shutter switch arms the oscilloscope sweep when it is in Single-Sweep Mode.

See page 10 for Ordering Information.



(Actual image area of Polaroid Type 57 4 x 5-inch Film)

C-58 CAMERA
FULL-SIZE IMAGE

7704A with 8 x 10-cm CRT

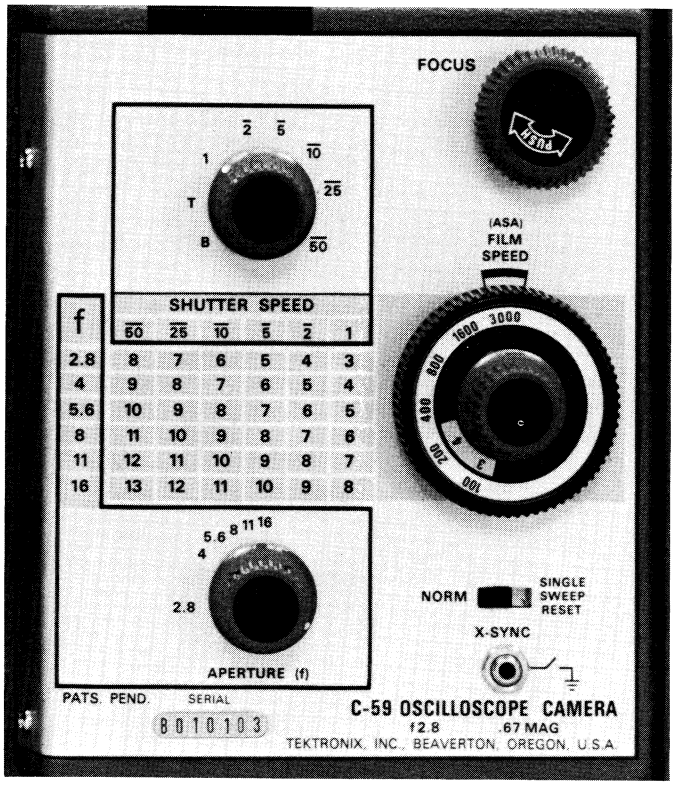
The C-58 Camera, using a 4 x 5-inch Graflok Back provides a full-size image without vignetting on 4 x 5-inch film. Its f/2.8, unity-magnification lens has a relative light-gathering power of 0.4. Polaroid[1] Pack Film and Roll Film Backs can also be used with the C-58. However, the 3¼ x 4¼-inch films for these backs limit the camera's field-of-view to their actual image which is 7.3 x 9.5 cm.

[1]Registered Trademark Polaroid Corporation.

C-59 CAMERA
LOW COST — GENERAL PURPOSE

The C-59 is a general-purpose camera which is suitable for most photographic needs. It is designed primarily for use with TEKTRONIX 7000-Series Oscilloscopes that have 6½-inch CRT's, but also fits directly onto all other 7000-Series Oscilloscopes with its standard adapter. The C-59 can also be used with any other oscilloscope that accommodates a TEKTRONIX C-27 Adapter; see Oscilloscope/Camera/Adapter Guide on page 19 for oscilloscope compatibility.

The C-59 features range-finder-focusing, and a photometer exposure-aid that allows the operator to quickly and easily set the camera controls for properly exposed photos of recurrent CRT displays over a wide range of trace brightness. Its f/2.8 lens is limited, however, to the single-trace recording of medium-speed traces. The optional WRITING SPEED ENHANCER described on page 18 can effectively increase the C-59's writing speed by a factor of at least two.



FEATURES

Focus—When the spring-loaded FOCUS control knob is pushed in, two vertical bars of light are projected onto the CRT screen. By turning the FOCUS control, the camera body can be moved in and out until the light bars coincide, which indicates that the camera is focused on the CRT screen. When the FOCUS control is released, the lamps extinguish and the camera is locked in focus.

Photometer Exposure Aid—The FILM SPEED control is set to match the ASA index of the film being used. Depressing the PHOTOMETER switch on the left side of the camera turns on the photometer light which appears in the viewing tunnel as a small spot of light on the CRT screen. By turning the knob concentric with the FILM SPEED control, the photometer spot brightness can be adjusted to match the CRT trace brightness. The number appearing in the dial window of the photometer brightness control is the EXPOSURE VALUE for the combination of film speed and CRT trace brightness. A chart on the control panel shows the combinations of SHUTTER SPEED and APERTURE (f) control settings that coordinate with this EXPOSURE VALUE number to produce a correctly exposed photo.

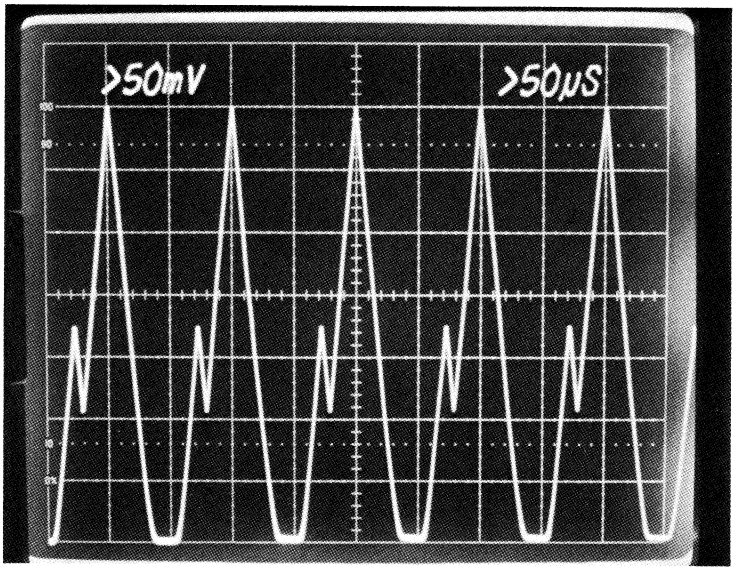
An absorption filter over the photometer lamp provides an approximate color match of the photometer light spot to P 31 phosphor. Optional filters may be ordered for P1, P2, and P11 phosphors.

X-Sync Switch—A normally-open switch in the shutter closes when the shutter is operated fully open. One contact of this switch is grounded, and the other is connected to the X-SYNC slide switch on the control panel. When this panel switch is in NORM position, connection can be made to the mini-phone jack (just below the switch) for controlling test circuitry in conjunction with the camera shutter operation. When this switch is in the SINGLE-SWEEP RESET position, the shutter switch is connected internally to the single-sweep reset line in the oscilloscope (7000-Series only).

Camera Power and Sweep Reset Connector—A three-pin connector on the CRT bezel of TEKTRONIX 7000-Series Oscilloscopes mates with a similar connector on the standard C-59 Adapter to provide +15 V power and ground connection to the camera. The third pin connects the camera shutter X-Sync SWITCH to the single-sweep-reset line in the oscilloscope. Internal batteries supply power for the photometer and focus lamps when the C-59 is used with an oscilloscope other than a 7000 Series. Whenever the C-59 is attached to a 7000-Series Oscilloscope, the camera automatically disconnects its internal batteries and selects +15 V power from the oscilloscope.

See page 10 for Ordering Information and Accessories.

C-59 CAMERA
LOW COST, GENERAL PURPOSE



(Actual image area of Polaroid Type 107 3¼ x 4¼-inch Film)

7603 with 6½-inch CRT

The C-59 Camera can record the entire display of 6½-inch CRT's on Polaroid 3¼ x 4¼-inch film. Its f/2.8, 0.67 magnification lens has a light-gathering power of 0.65.

ORDERING INFORMATION

All C-50-Series Cameras include a mounting adapter 016-0249-03 for TEKTRONIX 7000-Series Oscilloscopes. See Oscilloscope/Camera/Adapter Guide on page 19 for camera/oscilloscope compatibility data.

C-50

C-50-P CAMERA, Pack-Film Back
C-50-R CAMERA, Roll-Film Back
C-50-G CAMERA, 4 x 5 Graflok Back

C-51

C-51-P CAMERA, Pack-Film Back
C-51-R CAMERA, Roll-Film Back
C-51-G CAMERA, 4 x 5 Graflok Back

C-52

C-52-P CAMERA, Pack-Film Back
C-52-R CAMERA, Roll-Film Back
C-52-G CAMERA, 4 x 5 Graflok Back

C-53

C-53-P CAMERA, Pack-Film Back
C-53-R CAMERA, Roll-Film Back
C-53-G CAMERA, 4 x 5 Graflok Back

C-58

C-58-P CAMERA, Pack-Film Back
C-58-R CAMERA, Roll-Film Back
C-58-G CAMERA, 4 x 5 Graflok Back

C-59

C-59-P CAMERA, Pack-Film Back
C-59-R CAMERA, Roll-Film Back
C-59-G CAMERA, 4 x 5 Graflok Back

Eight AA alkaline cells are included with each C-59 Camera.

Included Accessories—For all camera modules: Focus plate for Polaroid Pack-Film Back (387-0893-02); focus plate for Polaroid Roll-Film Back (387-0893-01); (Graflok Back has an integral focusing screen).

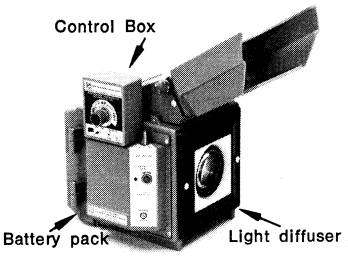
C-50 SERIES OPTIONAL ACCESSORIES

Camera Mounting Adapters—Available for most TEKTRONIX 500- and 7000-Series Oscilloscopes and 600-Series Display Units. See page 19 for camera/oscilloscope compatibility and adapter part numbers.

BATTERY PACK

Provides an auxiliary +15 V power source for the C-50, C-51, C-52, and C-53 when using them with oscilloscopes that don't provide camera power. The Battery Pack also allows the camera to be powered from a 7000-Series Oscilloscope or an external +15 V source. Net weight of pack, including 12 AA-Size alkaline batteries, is 1.2 pounds.
Order 016-0270-00

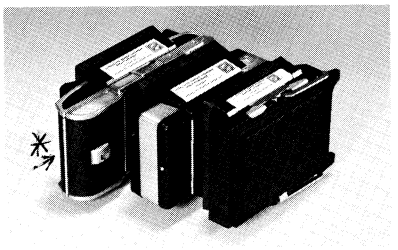
WRITING SPEED ENHANCER



Provides automatic controlled film-fogging to increase writing speed by ≈3 times for 3000 ASA film and ≈2 times for 10,000 ASA film. For C-50, C-51, C-53, and C-59 only; not for C-52 and C-58. Please refer to page 18 for details.

Writing Speed Enhancer for C-50 Camera,
Order 016-0278-00
Writing Speed Enhancer for C-51 Camera,
Order 016-0279-00
Writing Speed Enhancer for C-53 Camera
Order 016-0300-00
Writing Speed Enhancer for C-59 Camera,
Order 016-0290-00

FILM BACKS



Three optional film backs allow a wide choice of films and provide flexibility of performance. Dark slides included with Polaroid Backs allow interchanging of all three films backs without exposing the film. Each Polaroid Back also includes a split-image focusing plate to allow optional image-type focusing if desired; the Graflok Back has an integral focusing screen and light shield.

Polaroid[1] **Pack Film Back**—Accepts Polaroid 3¼ x 4¼-inch 3000-speed pack film. **Order 122-0926-00**

Polaroid Roll-Film Back—Accepts Polaroid 3¼ x 4¼-inch 3000- or 10,000-speed roll film. **Order 122-0929-00**

Graflok[2] **Back, 4 x 5**—Accepts Polaroid Land 4 x 5-inch film holder, standard cut-film holders, film-pack adapters, roll-film holders (see page 15). **Order 122-0931-01**

ADDITIONAL SPLIT-IMAGE FOCUSING PLATES

For Polaroid Pack Back, **Order 387-0893-02**

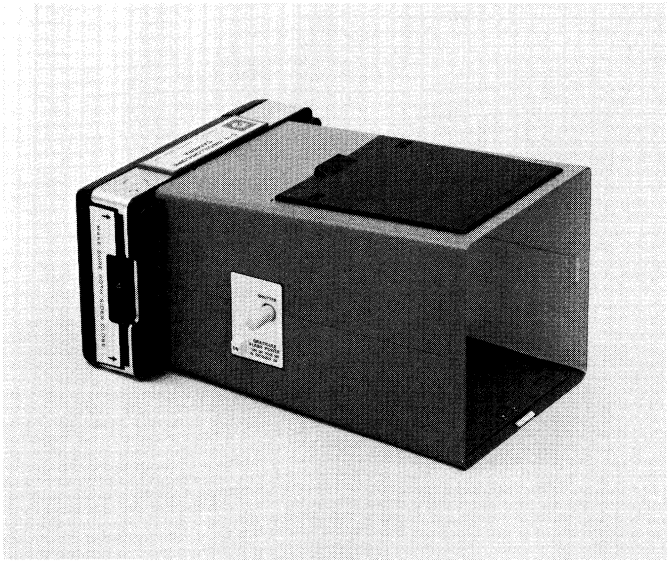
For Polaroid Roll Back, **Order 387-0893-01**

CARRYING CASE

Holds a complete C-50-Series Camera with extra film-backs and accessories. **Order 016-0177-00**

[1]Registered Trademark Polaroid Corporation
[2]Registered Trademark Graflex, Inc.

C-5 CAMERA



- **EASY TO USE**
- **FIXED FOCUS**
- **LIGHTWEIGHT**
- **LOW COST**

The C-5 Camera is recommended for photographing the 4 x 5-inch CRT display of TEKTRONIX 5100-Series Oscilloscopes and 603 and 604 Display Units. The camera hook-mounts directly onto these instruments without need for an adapter. The C-5 also mounts directly onto all 7000-Series Oscilloscopes, the 601 and 602 Display Units, the 528 TV Monitor, and the 577 Curve Tracer. No adapters are available for other instrument types.

The C-5 features a battery-powered, variable-intensity, pulsed graticule-illuminator for photographing 6½-inch size CRT screens that have non-illuminated graticules. A hinged door in the top of the camera housing provides a convenient view of the CRT.

The C-5's f/16 lens is relatively slow and should not be used where medium or higher single-shot writing speeds are required.

Lens—f/16 (fixed) with a magnification of 0.68. Provides a 2¾ x 2⅜-inch image of 4 x 5-inch CRT displays, and a 5.3 x 6.6-cm photo image of 8 x 10-cm CRT displays. Both on Polaroid Type 107 Pack Film.

Shutter—Mechanically actuated with speeds of 1/5, 1/10, and 1/25 second plus Bulb and Time.

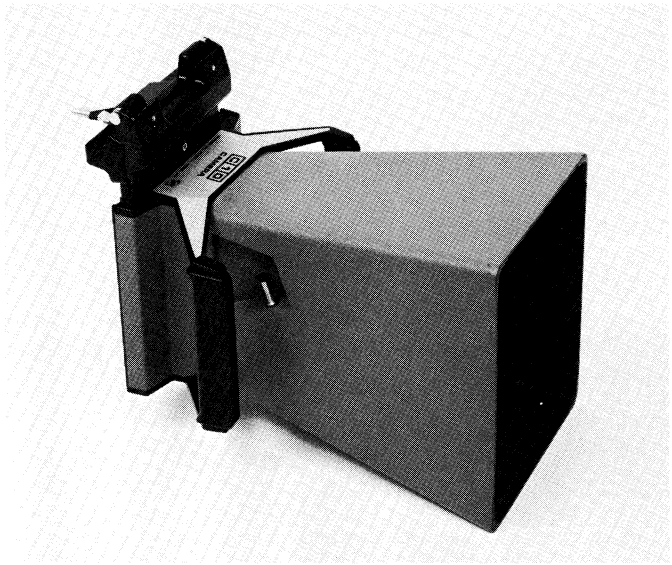
Film Back—Permanently attached Polaroid[1] Pack-Film Back accepts 3000-speed pack film which develops outside the camera in 15 seconds.

DIMENSIONS	inches	cm	WEIGHTS (approx)	lb	kg
HEIGHT	5.2	13.3	NET	2.9	1.3
WIDTH	7.5	19.1	DOMESTIC SHIPPING	5.0	2.3
LENGTH	10.0	25.4	EXPORT-PACKED	10.0	4.5

Order C-5 CAMERA

Includes—Two 9-V batteries (146-0017-00).

C-10 CAMERA



- **LIGHTWEIGHT**
- **FIXED FOCUS**

The C-10 is a fixed-focus, light-weight camera for use with TEKTRONIX Display Products that utilize the 611 Display Unit 11-inch CRT. These include the 611 Display Unit and the 4002A, 4010-1, 4012, and 4013 Computer Display Terminals.

The C-10 is hand held against the CRT for photographing the display.

Lens—f/8, 0.5 magnification. Records the entire 16.2 x 21-cm display of the 611 CRT on Polaroid 4 x 5-inch Film. The aperture is adjustable from f/8 to f/22.

Shutter—Mechanically actuated, with speeds selectable from 1 to 1/125 second, plus Bulb and Time.

Film Back—The C-10 is furnished with a Polaroid 4 x 5-inch Film Holder which attaches to a 4 x 5-inch Graflok[2] Back on the camera. The Graflok Back also accepts Graflok 4 x 5-inch Film Holders and Film-Pack Adapters. The Polaroid 4 x 5-inch Film Holder accepts Polaroid 4 x 5-inch film packets which develop outside the camera in 15 seconds.

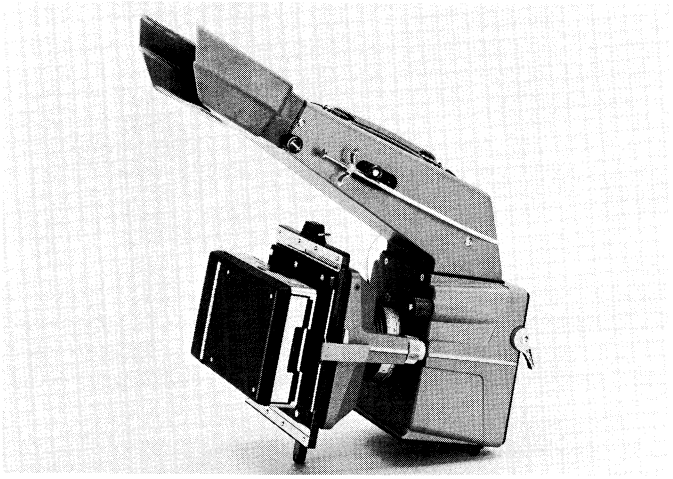
DIMENSIONS	inches	cm	WEIGHTS (approx)	lb	kg
HEIGHT	8.8	22.3	NET	5.5	2.5
WIDTH	10.4	26.4	DOMESTIC SHIPPING	8.0	3.6
LENGTH	13.8	34.9	EXPORT-PACKED	16.0	7.2

Order C-10 CAMERA

[1]Registered Trademark Polaroid Corporation.
[2]Registered Trademark Graflex, Inc.

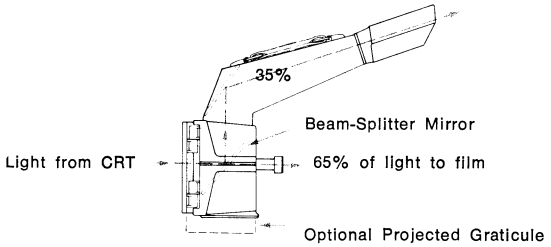
COMMON FEATURES

- LIFT-OFF MOUNTING, SWING-AWAY HINGING
- OPTIONAL INTERCHANGEABLE LENSES
- ROTATING AND SLIDING FILM BACKS
- OPTIONAL ELECTRIC SHUTTER



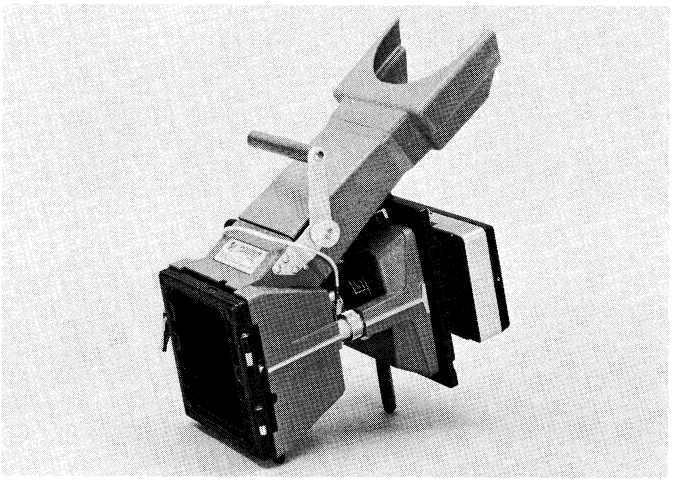
C-12 CAMERA

The C-12 is recommended for use with TEKTRONIX 500-Series Oscilloscopes that have external graticules up to 8 x 10 cm in size.



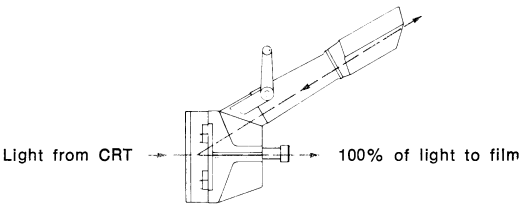
C-12 MAIN FRAME

The C-12 mirror system provides a straight-on view of the CRT, and minimizes parallax due to an external graticule. An optional Projected Graticule accessory provides changeable parallax-free graticules of various patterns; see page 14 .



C-27 CAMERA

The C-27 is recommended for use with TEKTRONIX 500-Series Oscilloscopes that have internal graticules up to 10 x 10 cm in size.



C-27 MAIN FRAME

The C-27 provides a direct view of the CRT, and maximum light transmission from CRT to film. Removable viewing tunnel and folding carrying handle allow rack-stacking the C-27 on 7-inch vertical centers. The frame can be rotated to place the viewing port at either side, or at the bottom.

SUMMARY COMPARISON OF MAJOR CHARACTERISTICS

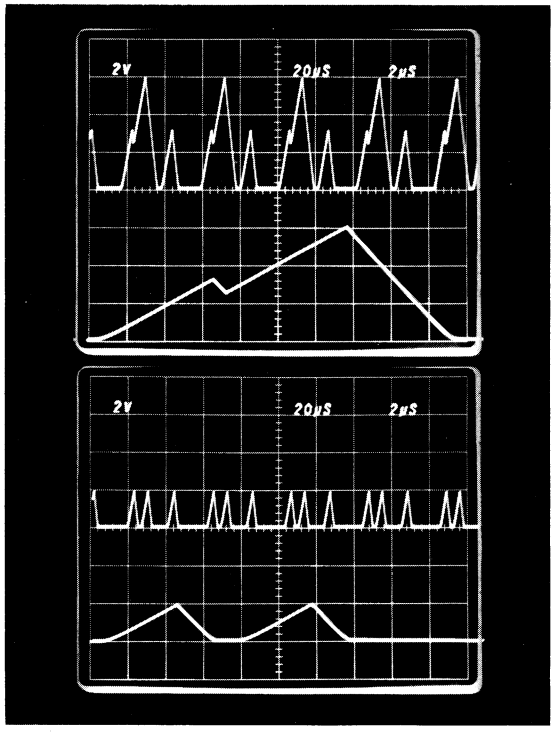
CAMERA	C-12	C-27
PERFORMANCE FEATURES	Straight-on binocular viewing via beam-splitting mirror. Optional Projected Graticule for zero parallax.	Off-axis binocular viewing. No mirrors; max light-transmission to film. Four viewing-tunnel positions. Removable viewing tunnel for compact stacking on rack-mounted oscilloscopes.
FIELD OF VIEW	Up to 8 x 10 cm depending on lens magnification and film size.	Up to 10 x 10 cm depending on lens magnification and film size.
STANDARD LENS	f/1.9 0.85 magnification. Four other interchangeable optional lenses are also available. (See next page and page 15.)	
RELATIVE† LENS SPEED	0.65 Light-dividing action of beam-splitter mirror taken into account.	1.0 (Reference)
STANDARD SHUTTER	Mechanically actuated; Speeds: 1 to 1/50 sec., plus Bulb and Time.	
OPTIONAL ELECTRIC SHUTTER	Speeds: 1 to 1/50 sec., plus Bulb and Time. Remote triggering with insulated switch closure. Power requirements: 115/230 V, 50 to 60 Hz. See page 15.	
FILM BACKS	Both cameras can be ordered with a Polaroid Pack-Film Back for 3,000-speed film, a Polaroid Roll Back for 3,000 and 10,000-speed film, or a 4 x 5-inch Graflok Back for Polaroid 4 x 5-inch Film Holder, and various sheet-film holders. See ORDERING INFORMATION on next page, and ACCESSORIES on page 15.	

	(With Pack Back)					(With Pack Back)			
DIMENSIONS	C-12		C-27		WEIGHTS	C-12		C-27	
	in	cm	in	cm		lb	kg	lb	kg
Height	15.4	39.1	17.2*	43.6	Net	12.3	5.5	10.5	4.7
Width	7.5	19.1	7.5	19.1	Domestic Shipping	16.0	7.2	14.0	6.3
Length	17.3	43.9	13.4*	34.1	Export-Packed	33.0	13.6	36.0	16.3

*Without viewing tunnel, the C-27 height is 8 inches, and length is 12 inches.

† Relative light-gathering power. For relative speed of optional lenses, see CUSTOM CAMERAS on next page. See Camera Reference Information for comparison with other TEKTRONIX Cameras.

FILM ECONOMY



(Actual image area of Polaroid 3¼x4¼-inch Film)

C-12 or C-27 with 0.5 Mag Lens 8 x 10 cm CRT

The C-12 and C-27 film backs can be oriented vertically or horizontally and through nine detent positions to allow multiple exposure on one photo. Two 0.5 magnification lenses are available for the C-12 and C-27 cameras: an f/1.9 lens for medium writing speed, and an f/1.3 lens for high writing speed.

ORDERING INFORMATION

Included Accessories—For C-12 and C-27: cable release (122-0586-02); split-image focus plate for Polaroid Pack-Film Back (387-0893-02); split-image focus plate for Polaroid Roll-Film Back (387-0893-01); (Graflok Back has an integral focusing screen).

All C-12 and C-27 cameras are sold without mounting adapters; see table on page 19 for oscilloscope compatibility and adapter part numbers.

MECHANICAL SHUTTER CAMERAS

(with f/1.9, 0.85 magnification lens)

C-12

C-12-P CAMERA, Pack-Film Back
C-12-R CAMERA, Roll-Film Back
C-12-G CAMERA, 4 x 5 Graflok Back

C-27

C-27-P CAMERA, Pack-Film Back
C-27-R CAMERA, Roll-Film Back
C-27-G CAMERA, 4 x 5 Graflok Back

OPTION 9 for C-12 and C-27 Cameras

Replaces mechanical shutter with electric shutter only. The SPEEDCOMPUTER power-supply control box and mounting bracket are not included. Control voltage must be supplied by customer. When ordering, include "OPTION 9" with regular camera order number.

ELECTRICALLY ACTUATED CAMERAS

(with f/1.9, 0.85 magnification lens and electrically controlled shutter)

Includes Electric Shutter and SPEEDCOMPUTER power-supply-control box and mounting bracket.

See Specification Chart on preceding page for details.

C-12

C-12-PE CAMERA, Pack-Film Back
C-12-RE CAMERA, Roll-Film Back
C-12-GE CAMERA, 4 x 5 Graflok Back

C-27

C-27-PE CAMERA, Pack-Film Back
C-27-RE CAMERA, Roll-Film Back
C-27-GE CAMERA, 4 x 5 Graflok Back

C-12 and C-27 CUSTOM CAMERA OPTIONS

All versions of the C-12 and C-27 Cameras can be ordered with any of the four optional lenses listed here. When ordering desired lens option, include OPTION NUMBER below with regular camera order number.

LENS TYPE & PURPOSE	RELATIVE SPEED†	OPTION NUMBER	
FILM ECONOMY—f/1.9, 0.7 magnification. Records two 6 x 10-cm, or three 4 x 10-cm on 3¼ x 4¼-inch film. Also records one 10 x 10-cm display on same size film with C-27 only.	0.78 with C-12 1.2 with C-27	Option 1	
MEDIUM WRITING SPEED—f/1.9, 0.5 magnification. Records two 8 x 10-cm CRT displays on 3¼ x 4¼-inch film.	0.9 with C-12 1.4 with C-27	Option 2	
FULL-SIZE IMAGE—f/1.4, 1.0 magnification. Records full-size image of 8 x 10-cm CRT display on 4 x 5-inch film with optional Graflok Back.	0.97 with C-12 1.5 with C-27	Option 3	
HIGH WRITING SPEED—f/1.3, 0.5 magnification. Records two 8 x 10-cm CRT displays on 3¼ x 4¼-inch film.	1.7 with C-12 2.6 with C-27	Option 4	

†Relative light-gathering power. Light loss through beam-splitting mirror taken into account for C-12. See Camera Reference Information.

CUSTOM C-12 and C-27 CAMERAS

The C-12 and C-27 cameras can be ordered with any of four optional lenses, with any of three types of film backs and with mechanical or electric shutter.

OPTIONAL ACCESSORIES

Camera Mounting Adapters—Available for most TEKTRONIX Oscilloscopes and some non-TEKTRONIX Oscilloscopes. See page 19 for oscilloscope compatibility.

C-12 Projected Graticule—Provides changeable parallax-free graticules with an area for write-in data. For details, see next page.

Writing Speed Enhancer—Provides automatic-controlled film-fogging to increase writing speed ≈3 times for 3000 ASA film and ≈2 times for 10,000 ASA film. The enhancer can be used with any of the five interchangeable lenses available for the C-12 and C-27, including the f/1.4—1.0 magnification lens. Refer to page 18 for details and ordering information.

Optional Film Backs—Polaroid Roll-Film and Pack-Film Backs, and two sizes of Graflok backs allow a wide choice of films and provide flexibility of performance. All three film backs can be interchanged without fogging the film. Several types of cut-film and roll-film holders are available for use with the Graflok backs. See page 15 for more information.

X-Sync Cable—Coiled cable has standard ASA connector which mates to the flash sync connectors on the C-12 and C-27 camera shutters and SPEEDCOMPUTER. Other end of cable has miniature phone plug. Order 012-0364-01

Carrying Case—Holds one C-12 or C-27 Camera,
Order 016-0208-01

PROJECTED GRATICULE FOR C-12

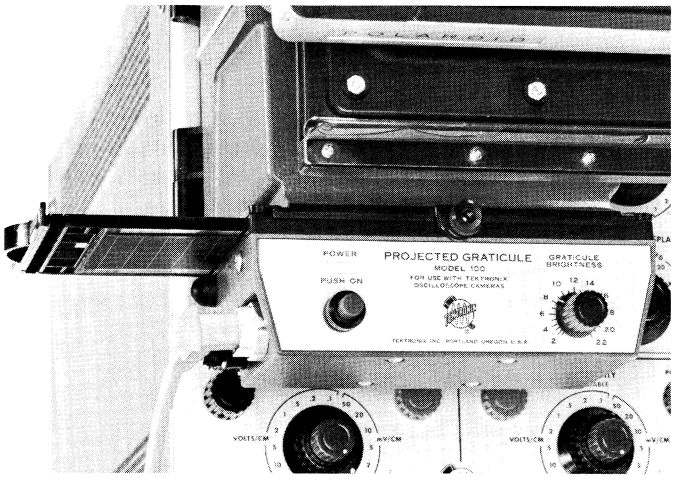
The Projected Graticule provides changeable parallax-free graticules of any pattern, and a means of recording write-in data on the photograph.

Parallax is the difference between the CRT-and-graticule display as seen in the C-12 viewing tunnel, and as seen through the lens when the oscilloscope has an external graticule. It occurs because (1) the external graticule is separated from the CRT phosphor plane by the optical thickness of the CRT face-plate, and (2) the operator's view of the display through the viewing tunnel is approximately 20 inches away, whereas the lens is much closer to the CRT. The difference in the two distances and in the angles-of-view over the display field produces a small amount of parallax between the viewed and photographed images.

The Projected Graticule utilizes the beam-splitter mirror in the C-12 to present a virtual image of a graticule at the object plane of the camera. When the camera is focused on the CRT trace, the graticule image lies in the same optical plane as the CRT phosphor screen. Accordingly, the camera photographs the graticule and the CRT display in exactly the same relationship as seen by the operator through the C-12 viewing tunnel.

Special graticules, reference waveforms, or any pattern that can be produced on a film transparency can be imposed on the CRT display.

The Projected Graticule provides an 8 x 10-cm image area, a portion of which can be used for write-in data.



The Graticule Film transparency is held in a slide holder which is easily slipped in and out of the Projected Graticule case, making possible rapid changes of graticules.

The slide assembly included with the Projected Graticule has a clear window. Additional slide assemblies are available in three colors so that the graticule image can match or contrast the CRT phosphor.

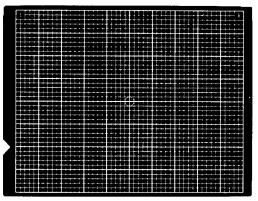
Operates on 90 to 130 V, or 180 to 260 V; 50 to 440 Hz.

Although the Projected Graticule case is small (it adds only 2¼ inches below the camera) clearance problems may occur with some plug-in unit/probe combinations. If in doubt about compatibility, please consult your Tektronix Field Engineer, Representative, or Distributor.

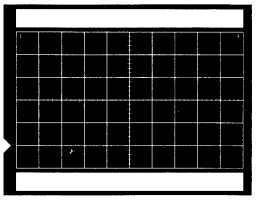
Included Accessories

Power cable (161-0015-01)

One clear-window graticule slide assembly (122-0659-00)
Two graticule films and one mask film as shown here:



8 x 10-cm graticule with full minor lines



6 x 10-cm graticule with short minor lines and write-in area

6 x 10-cm graticule mask to black out the write-in area when not used

PROJECTED GRATICULE for 115 volts.
Order 016-0204-00

PROJECTED GRATICULE for 230 volts.
Order 016-0234-00

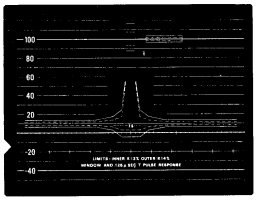
OPTIONAL ACCESSORIES

ADDITIONAL GRATICULE SLIDE ASSEMBLIES

Clear Window 122-0659-00	Green Window 122-0668-00
Blue Window 122-0667-00	Amber Window 122-0669-00

ADDITIONAL GRATICULES and MASKS

Shown below is one of seventeen additional graticule films and masks that are also available. Please consult your Tektronix Field Office, Representative, or Distributor for information on film patterns available.



MECHANICAL SHUTTER/LENS

Shutter speeds from 1 to 1/100 second, plus Bulb and Time.

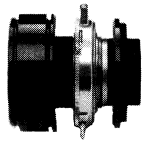
f/1.9—0.7 MAG lens, film economy.
Order 122-0547-00

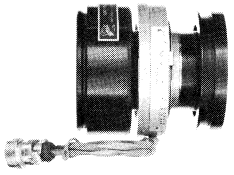
f/1.9—0.5 MAG lens, medium writing speed.
Order 122-0549-00

f/1.4—1.0 MAG lens, full-size image.
Order 122-0608-00

f/1.3—0.5 MAG lens, high writing speed.
Order 122-0662-00

f/1.9—0.85 MAG lens, general purpose.
Order 122-0692-00





ELECTRIC SHUTTER/LENS

Requires SPEEDCOMPUTER for operation. SPEEDCOMPUTER and electric shutter are included with all C-12-E and C-27-E Cameras.

f/1.9—0.7 MAG lens, film economy, electric shutter.
Order 122-0772-00

f/1.9—0.5 MAG lens, medium writing speed, electric shutter.
Order 122-0773-00

f/1.4—1.0 MAG lens, full-size image, electric shutter.
Order 122-0840-00

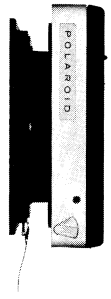
f/1.3—0.5 MAG lens, high writing speed, electric shutter.
Order 122-0769-00

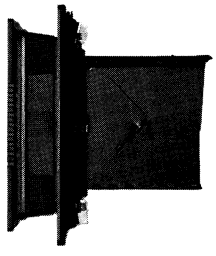
f/1.9—0.85 MAG lens, general purpose, electric shutter.
Order 122-0771-00

SPEEDCOMPUTER. **Order 122-0767-02**

Bracket for C-12, C-27. **Order 122-0713-00**

FILM BACKS





Polaroid Pack-Film Back—Accepts Polaroid 3¼ x 4¼-inch 3000-speed pack film. Split-image focusing plate included. **Order 122-0671-00**

Polaroid Roll-Film Back—Accepts Polaroid 3¼ x 4¼-inch 3000 and 10,000-speed roll film. Split-image focusing plate included. **Order 122-0603-00**

Additional split-image focusing plates
for Polaroid Pack Back, **Order 387-0893-02**

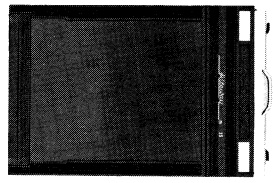
for Polaroid Roll Back, **Order 387-0893-01**

4 x 5-inch Graflok Back with Focusing Screen accepts standard cut-film holders, film-pack adapters, roll-film holders, Polaroid 4 x 5-inch Film Holder. **Order 122-0604-00**

2¼ x 3¼-inch Graflok Back with Focusing Screen accepts standard cut-film holders, film-pack adapters, 120 roll-film holders. **Order 016-0233-00**

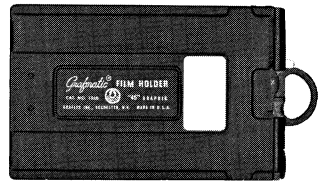
ACCESSORIES FOR GRAFLOK BACKS
(For C-12, C-27, C-30 Series and C-50 Series)

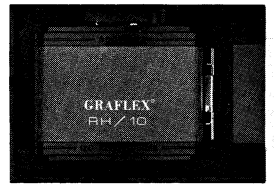
Shown here are a few of the film holders available for use with the Graflok Back to allow use of sheet film, roll film, film packs, and Polaroid 4 x 5-inch Film.



Graphic Cut-Film Holder—Darkroom load 2 sheets of cut film. (Two dark slides required). For 2¼ x 3¼-inch Graflok Backs. **Order 122-0699-00** (Dark slide, **Order 122-0701-00).** For 4 x 5-inch Backs, **Order 122-0700-00** (Dark Slide, **Order 122-0702-00).**

Graphic Film Pack Adapter—For daylight loading of 16-exposure film packs. For 2¼ x 3¼-inch Graflok Backs, **Order 122-0703-00.** For 4 x 5-inch Graflok Backs, **Order 122-0704-00.**





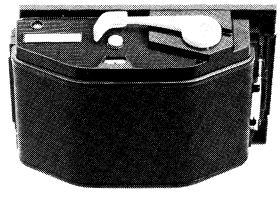
Grafmatic Film Magazine—Darkroom load of 6 sheets of cut film. For 4 x 5-inch Graflock Backs, **Order 122-0706-00.**

RH/8 120 Roll-Film Magazine—8 exposures, 2¼ x 3-1/16 inches, use with 0.7 MAG lens. For 2¼ x 3¼-inch Graflok Backs, **Order 122-0735-00**. For 4 x 5-inch Graflok Backs, **Order 122-0736-00.**

RH/10 120 Roll-Film Magazine—10 exposures, 2¼ x 2¾ inches, use with 0.5 MAG lens. For 2¼ x 3¼-inch Graflok Backs, **Order 122-0735-01.** For 4 x 5-inch Graflok Backs, **Order 122-0736-01.**

RH/12 120 Roll-Film Magazine—12 exposures, 2¼ x 2¼ inches, use with 0.5 MAG lens. For 2¼ x 3¼-inch Graflok Backs, **Order 122-0735-02.** For 4 x 5-inch Graflok Backs, **Order 122-0736-02.**

RH/20 220 Roll-Film Magazine—20 exposures, 2¼ x 2¾ inches, use with 0.5 MAG lens. For 2¼ x 3¼-inch Graflok Backs, **Order 122-0970-00.** For 4 x 5-inch Graflok Backs, **Order 122-0971-00.**

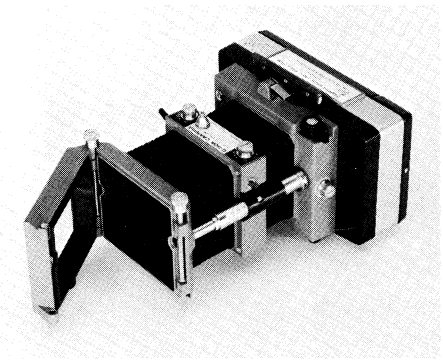


RH/50 70 mm Film Holder—50 exposures, 2¼x2¾ inches, use with 0.5 or 0.7 MAG lens, depending upon CRT display size. For 4x5-inch Graflok Backs, **Order 122-0967-00.**

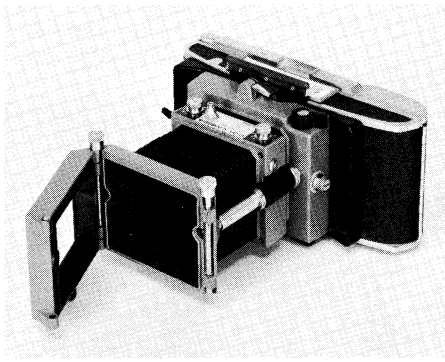
Polaroid Land #545 4 x 5 Film Holder—For Polaroid 4 x 5-inch single exposure Film Packets, **Order 016-0201-01.**

COMMON FEATURES

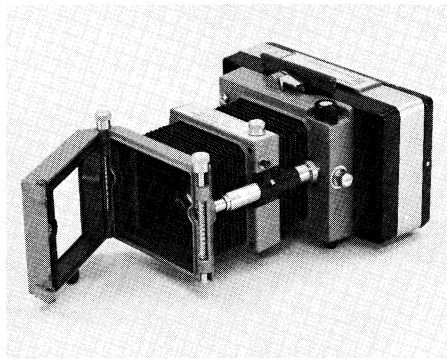
- COMPACT, LIGHTWEIGHT
- EASILY-ACCESSIBLE CONTROLS
- OPTIONAL ELECTRIC SHUTTER AND SPEEDCOMPUTER



C-30A



C-31



C-32

The C-30-Series Cameras are recommended primarily for the TEKTRONIX 400-Series Portable Oscilloscopes. They can also be used with many other TEKTRONIX Oscilloscopes and Display Units by means of adapters listed on page 19.

The standard C-30A, and the C-31 and C-32 are supplied with an 016-0306-00 Adapter which allows the camera to slide-mount directly onto the 422, 453A, 454A, and 485 Oscilloscopes and the 491 Spectrum Analyzer; all these instruments have an 8 x 10 division CRT display (0.8 cm/div).

The C-30A can also be ordered as an Option 1 Model which comes equipped with an 016-0301-00 Adapter Frame/Corrector Lens to allow its use on the 432, 434, 465, and 475 Oscilloscopes[1]. The Adapter Frame/Corrector Lens increases the C-30A's field-of-view so it can photograph the entire 8 x 10-cm CRT display of these oscilloscopes; the 434 CRT display is actually 7.8 x 9.8 cm but it also requires the Option 1 Model of the C-30A for full-screen coverage.

The C-30A Option 1 can also be used with any standard C-30 Series Camera Adapter by simply removing the Corrector Lens which is normally mounted over the front of the camera's lens. A standard C-30A Camera can also be converted to an Option 1 Model by means of an 016-0301-00 Adapter Frame/Corrector Lens as listed on page 19.

No Adapter Frame/Corrector Lens assemblies are available for allowing use of the C-31 and C-32 Cameras with the 432, 434, 465, and 475 Oscilloscopes.

All C-30-Series Cameras swing open left or right, and can be quickly detached from the adapter at the hinges. All cameras can be ordered with an integral Electric Shutter in place of the standard mechanical shutter; these "E" model cameras include a SPEEDCOMPUTER control box which supplies operating power to the electric shutter.

SUMMARY COMPARISON OF MAJOR CHARACTERISTICS

CAMERA	C-30A	C-30A OPTION 1	C-31	C-32
PERFORMANCE FEATURES	General Purpose with variable magnification for 422, 453A[1], 454A, 485 and 491	General Purpose for 432[1], 434, 465 and 475 Oscilloscopes	Fast Writing Speed with 0.5 Magnification for 422, 453A[1], 454A, and 485 Oscilloscopes	Full-Size image with Medium Writing Speed for 422, 453A[1], 454A, 485 and 491
LENS	f/1.9	f/1.9	f/1.2	f/1.4
MAGNIFICATION	1.5 to 0.7 in ten detent steps	0.8 only with corrector lens. (lens can be removed for normal C-30A MAG Range)	0.5 fixed	1.0 (detent steps also at 0.85, 0.9, 1.1 and 1.2 but with some distortion)
RELATIVE LENS SPEED*	1.0 at MAG setting of 0.7	1.0	3.4	1.5
FIELD OF VIEW	8 x 10 cm at MAG setting of 0.85. (Possible corner vignetting with some instruments)	8 x 10 cm	8 x 9 cm	7 x 9 cm at MAG setting of 1.0 (increases to 8 x 10 cm at MAG setting of 0.85 but with some distortion)
STANDARD SHUTTER	Mechanically actuated, 4 to 1/50 sec, plus Bulb and Time.			
OPTIONAL ELECTRIC SHUTTER	Speeds: 4 to 1/60 sec, plus Bulb and Time. Remote triggering with insulated switch closure. Power requirements: 115/230 v, 50 to 60 Hz. See next page for ordering information.			
FILM BACKS	All cameras can be ordered with a Polaroid[2] Pack Back for 3,000-speed film, a Polaroid Roll Back for 3,000- and 10,000-speed film, or a 2¼ x 3¼-inch Graflok[3] Back for sheet film holders, film pack adapters and 120 roll film holders such as listed on preceding page.			
(With Film Back Ordinarily Used)	(With Pack Back)	(With Pack Back)	(With Roll Back)	(With Pack Back)

DIMENSIONS AND WEIGHTS WITH FILM BACKS ORDINARILY USED

	C-30A-P		C-30A-P Option 1		C-31-R		C-32-P	
	Inches	cm	Inches	cm	Inches	cm	Inches	cm
Height	5.1	13.0	5.1	13.0	5.5	14.0	5.5	14.0
Width	7.5	19.1	7.5	19.1	9.1	23.1	7.5	19.1
Length	10.4	25.4	10.4	26.4	10.6	26.9	10.0	25.4
Weight (approx)	lb	kg	lb	kg	lb	kg	lb	kg
Net	4.8	2.2	5.0	2.3	6.8	3.1	5.0	2.3
Domestic Shipping	9.0	4.1	9.0	4.1	12.0	5.4	9.0	4.1
Export-Packed	14.0	6.4	14.2	6.4	17.0	7.7	14.0	6.4

*Relative light gathering power—(See Camera Reference Information for comparison of all TEKTRONIX cameras)

[1]The internal graticule in the 432, and 453A Models 1, 2, 3, and 4 is non-illuminated and thus is not photographable. The 434 graticule is also nonilluminated, but it will photograph when the CRT is in the stored mode.

[2]Registered Trademark, Polaroid Corporation.

[3]Registered Trademark, Graflex, Inc.

ORDERING INFORMATION

All C-30-Series Cameras except the C-30A Option 1 model include a Mounting Adapter 016-0306-00 for the 422, 453A, 454A, and 485 Oscilloscopes, and the 491. The C-30A Option 1 model includes an Adapter Frame/Corrector Lens for the 432, 434, 465, and 475 Oscilloscope.

MECHANICAL SHUTTER CAMERAS

C-30A

C-30A-P CAMERA, Pack-Film Back
C-30A-R CAMERA, Roll-Film Back
C-30A-G CAMERA, Graflok Back
Option 1, ADPT-FRAME CORR-LENS

C-31

C-31-P CAMERA, Pack-Film Back
C-31-R CAMERA, Roll-Film Back
C-31-G CAMERA, Graflok Back

C-32

C-32-P CAMERA, Pack-Film Back
C-32-R CAMERA, Roll-Film Back
C-32-G CAMERA, Graflok Back

ELECTRICALLY-ACTUATED CAMERAS

(Includes SPEEDCOMPUTER control box)

C-30A

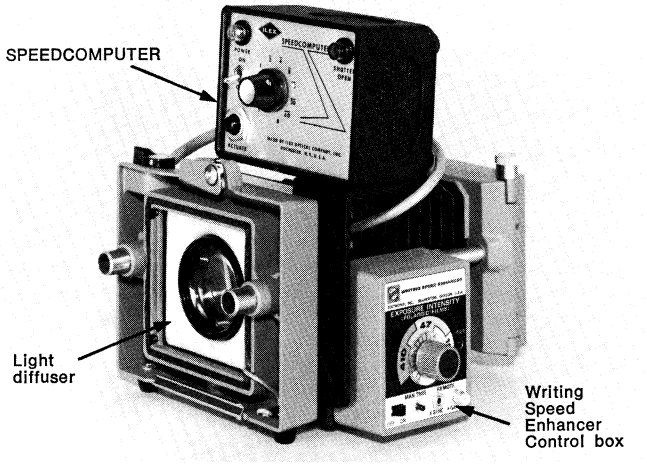
C-30A-PE CAMERA, Pack-Film Back
C-30A-RE CAMERA, Roll-Film Back
C-30A-GE CAMERA, Graflok Back
Option 1, ADPT-FRAME CORR-LENS

C-31

C-31-PE CAMERA, Pack-Film Back
C-31-RE CAMERA, Roll-Film Back
C-31-GE CAMERA, Graflok Back

C-32

C-32-PE CAMERA, Pack-Film Back
C-32-RE CAMERA, Roll-Film Back
C-32-GE CAMERA, Graflok Back



C-31-PE shown with Writing Speed Enhancer (film back removed) and SPEEDCOMPUTER which controls the electric shutter.

Included Accessories—For all camera models: Split-image focusing plate for Polaroid Pack-Film Back or Polaroid Roll-Film Back; (Graflok Back includes a focusing screen).

OPTIONAL ACCESSORIES

Camera Mounting Adapters—Available for most TEKTRONIX Oscilloscopes. See page 19 for camera/oscilloscope compatibility and adapter part numbers.

Writing Speed Enhancer—Provides automatic controlled film-fogging to increase writing speed ≈ 3 times for 3000 ASA film and ≈2 times for 10,000 ASA film. For C-30A and C-31 only. Please refer to page 18 for details.
Order 016-0284-00

Film Backs—Three optional film backs allow a wide choice of films and provide flexibility of performance. Dark slides are included with Polaroid backs to permit interchanging of all three film backs without exposing the film. Each Polaroid Back also includes a split-image focusing plate; the Graflok Back has an integral focus screen and light shield.

Polaroid Pack-Film Back—Accepts Polaroid 3¼ x 4¼-inch 3000-speed pack film, **Order 122-0752-00**

Polaroid Roll-Film Back—Accepts Polaroid 3¼ x 4¼-inch 10,000- or 3000-speed roll film, **Order 122-0754-00**

Graflok Back, 2¼ x 3¼-inch with focusing screen—Accepts standard cut-film holders, film-pack adapters, 120 roll film holders (See page 15). **Order 122-0755-00**

Additional Split-Image Focusing Plates

For Polaroid Pack Back, **Order 387-0893-02**
For Polaroid Roll Back, **Order 387-0893-01**

Carrying Case—Holds one C-30 Series Camera and all standard accessories including up to three film backs, extra adapters and film. The case is constructed of heavy-gage, high-impact plastic and has a vacuum-formed styrene liner. Dimensions are 7-3/16 x 13-3/16 x 15-3/16 inches.
Order 016-0126-00

X-Sync Cable—Coiled cable has standard ASA connector which mates to the flash sync connector on C-30-Series Cameras, C-12 and C-27 Cameras and SPEEDCOMPUTERS. Other end has miniature phone plug. **Order 012-0364-01**

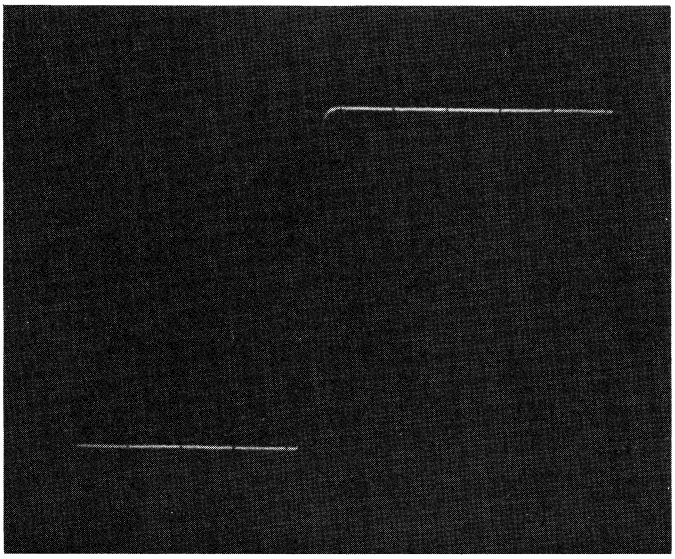
Writing Speed Enhancer

The TEKTRONIX Writing Speed Enhancer provides automatic, accurately-controlled fogging of the film to increase writing speed.

The writing speed of Polaroid Type 47 3,000-speed Roll Film and Type 107 3,000-speed Pack Film can be increased ≈3 times, while the writing speed of Polaroid Type 410 10,000-speed Roll Film can be increased ≈2 times.

The battery-powered unit is easy to install and easy to use. It is available for all TEKTRONIX cameras except the C-5, C-10, C-32, and C-52.

The Enhancer consists of a battery-powered control box which mounts on the camera, and four light-emitting diodes in a plastic light diffuser which fits around the camera's rear lens. When the Enhancer is triggered, the four diodes emit a half-second burst of low-level red light which is diffused directly onto the film to provide a uniform fog background.



This Polaroid Type 107 3,000-speed Pack Film was exposed to the single-trace display of a pulse waveform with a fast-rising leading edge too dim to produce a developable image.

The following table lists the approximate relative writing speed of three types of Polaroid Film and the gains that can be achieved with controlled fogging.

Polaroid Film Type	Relative Film Speed (approximate)		
	No Enhancement		
	With Front Illumination of Print for Viewing	With Back Illumination of Print for Viewing	With Fogging by Writing Speed Enhancer
107 (3,000 pack)	1.0 (Reference)	Print Base is Opaque	3.0
47 (3,000 roll)	1.0	1.2	3.0
410 (10,000 roll)	2.0	2.2 - 2.4	4.0

CHARACTERISTICS

Triggering—Manual push button, or automatic when connected to camera X-sync, or oscilloscope + gate.

Exposure Time—Approximately 0.5 seconds.

Repeatability—Within 5%.

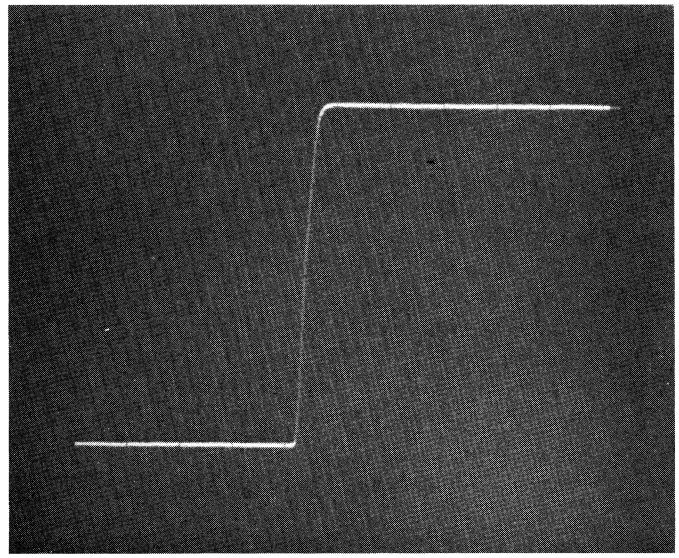
Illumination—Four light-emitting diodes in a specially designed diffuser.

Power—Two 9-V batteries; life expectancy approx 1 year.

The intensity of the light from the diodes is set by a control knob which has a dial showing ranges of adjustment for Polaroid Film Types 47, 107, and 410.

The Enhancer can be triggered in three ways: by a push button on the control box, remotely with a switch closure to ground (such as provided by the camera-shutter X-sync switch), or by the oscilloscope-sweep + gate. Thus, the film can be fogged before the sweep occurs, after the sweep occurs, or at the same time the sweep occurs. These techniques are respectively called prefogging, post fogging, and simultaneous fogging. Of these modes, simultaneous fogging provides the greatest gain in writing speed. Automatic simultaneous fogging is easily achieved by triggering the Enhancer with the oscilloscope-sweep + gate.

The following photos illustrate how the controlled fog exposure from a Writing Speed Enhancer can reinforce an extremely dim trace exposure to increase writing speed and still maintain good contrast.



Film from the same pack was exposed to the same single-trace waveform and simultaneously to light from a Writing Speed Enhancer. The Enhancer light supplied the additional photons needed at the weak development centers formed by the dim leading edge, to produce a visible image of the entire waveform.

Exposure Indicator—A light-emitting diode on panel (will not light if batteries are low).

Environment—Operating temperature range, 0°C to +50°C.

DIMENSIONS	In	cm	WEIGHTS (approx)	lb	kg
HEIGHT	3.0	7.6	NET	0.6	0.27
WIDTH	1.3	3.3	DOMESTIC SHIPPING	2.0	0.9
LENGTH	2.5	6.4	EXPORT-PACKED	2.0	0.9

Included Accessories—Cable for triggering from oscilloscope-sweep + gate; cable for triggering from camera-shutter X-sync switch; two 9-V batteries.

ORDERING INFORMATION

WRITING SPEED ENHANCER for:

C-12 and C-27 Cameras, Order 016-0280-00

C-30A and C-31 Cameras, Order 016-0284-00

C-50 Camera, Order 016-0278-00

C-51 Camera, Order 016-0279-00

C-53 Camera, Order 016-0300-00

C-59 Camera, Order 016-0290-00

TYPE OSCILLOSCOPE	RECOMMENDED CAMERA	C-12 ADAPTER PART NUMBER	C-27 ADAPTER PART NUMBER	C-30 SERIES ADAPTER PART NUMBER	C-50 SERIES ADAPTER PART NUMBER[4]
422	C-30A			016-0306-00 (included with camera)	
432[1], 434[2]	C-30A Opt 1			016-0301-00 Adapter Frame/ Corrector Lens (included with camera)	
453A, 454A	C-30 Series			016-0306-00 (included with camera)	
465, 475	C-30A Opt 1			016-0301-00 Adapter Frame/ Corrector Lens (included with camera)	
485	C-30 Series			016-0306-00 (included with camera)	
491	C-30A				
502A	C-59				
503, 504	C-12 or C-27	016-0226-01	016-0225-03	016-0243-00	016-0225-03
519	C-51 or C-27-662		Integral with 519		Integral with 519
520A	C-59		016-0295-00		016-0295-00
521	C-59				
522	C-59				
528	C-59		016-0249-03	016-0248-00	016-0249-03
529	C-59	016-0217-00	016-0224-00	016-0244-00	016-0224-00
544, 545B	C-27 or C-12	P-12 - See.	016-0225-03		016-0225-03
546, 547	C-27 or C-12	016-0226-01		016-0243-00	
549	C-12			016-0243-00[5]	
556	C-27 or C-12			016-0243-00	
561B, 564B	C-27 or C-12	016-0217-00	016-0224-00	016-0244-00	016-0224-00
565	C-59	016-0226-01	016-0225-03	016-0243-00	016-0225-03
568	C-12 or C-27	016-0217-00	016-0224-00	016-0244-00	016-0224-00
575	C-12	016-0226-01	016-0225-03	016-0243-00	016-0225-03
576	C-12, C-27, C-50 or C-59	See Adapter Frame/Corrector Lens Systems at right			
577[6]	C-5 or C-59[2]	016-0263-00[6]	016-0249-03[6]	016-0248-00[6]	016-0249-03[6]
601, 602	C-30A	016-0263-00	016-0249-03	016-0248-00	016-0249-03 (included with camera)
603[6 7]	C-5 or C-59				
604[6 8]	C-5				
647A	C-27-662 or C-51		016-0223-00		016-0223-00
5030	C-12, C-27	See Adapter Frame/Corrector Lens Systems at right			
5031	C-50 or C-59				
5100 Series[6]	C-5	016-0263-00[2 6]	016-0249-03[2 6]	016-0248-00[2 6]	016-0249-03[2 6]
5403	C-5 or C-59 or C-50	016-0263-00[6]	016-0249-03[6]	016-0248-00[6]	016-0249-03[6]
7313	C-53	016-0263-00	016-0249-03	016-0248-00	016-0249-03 (included with camera)
7403N	C-59 or C-50	016-0299-00			
7503	C-53	016-0263-00			
7504	C-53				
7514	C-53				
7603	C-59 or C-50	016-0299-00			
7603N Opt 11	C-53				
7613	C-53 or C-58P	016-0263-00			
7623	C-53 or C-58P				
7704A	C-51				
R7903	C-51				
7904	C-51				
Tekequipment D83[6]	C-59 or C-5				
some Hewlett-Packard	call TEKTRONIX Field Office or Representative	016-0229-00	016-0228-00		016-0228-00
some Fairchild Dumont			016-0227-00		016-0227-00

CAMERA ADAPTER PART NUMBERS

016-0217-00	016-0243-00
016-0223-00	016-0244-00
016-0224-00	016-0248-00
016-0225-03	016-0249-03
016-0226-01	016-0263-00
016-0227-00	016-0295-00
016-0228-00	016-0299-00
016-0229-00	016-0301-00
016-0242-00	016-0306-00

C-30A OPTION 1 ADAPTER FRAME/CORRECTOR LENS

The C-30A Option 1 comes equipped with an 016-0301-00 Adapter Frame/ Corrector Lens to allow its use on the 432, 434, 465, and 475 Oscilloscopes. The camera's field of view is increased so it can photograph the entire 8 x 10-cm CRT display of these oscilloscopes.

ADAPTER FRAME/CORRECTOR LENS FOR C-12 or C-27 CAMERA

This adapter allows a C-12 or C-27 Camera to photograph displays and adjacent scale-factor readout on the 576 Curve Tracer, 5030, and 5031 Oscilloscopes. A corrector lens is included to compensate for the increased distance 2⅞ inches from CRT to film. Object-to-image ratio with a standard camera (0.85 MAG lens) is about 1:0.45. The adapter frame requires use of a standard camera adapter (016-0226-01 for C-12, or 016-0225-03 for C-27), not included.

Order 016-0264-01

ADAPTER FRAME/CORRECTOR LENS SYSTEMS for C-50 and C-59 CAMERAS

These adapter systems expand the field of view of the C-50 and C-59 Cameras so they can photograph the large-screen CRT and adjacent scale-factor display on the 576 Curve Tracer, and the 5030 and 5031 Oscilloscopes. To achieve the larger field of view, the Adapter Frame places the camera back from the CRT an additional 1⅜ inches. The corrector lens compensates for this added distance to the CRT screen, and reduces the lens-system magnification so it will fully record the CRT and readout display on Polaroid 3¼ x 4¼-inch film. Since the adapter frame places the camera 1⅜ inches back from the CRT screen, the Range-Finder-Focusing system of the C-50 and C-59 Cameras cannot be utilized to indicate when the camera is focused on the CRT screen. Instead, use a Graflok Back or a Focus Plate.

For C-50 Camera,
Order 016-0271-00

For C-59 Camera,
Order 016-0288-00

Focus plate for Polaroid Roll-Film Back,
Order 387-0893-01

Focus plate for Polaroid Pack-Film Back,
Order 387-0893-02

[1]Graticule is nonilluminated and will not photograph.

[2]Graticule is nonilluminated and will not photograph except when CRT is in the stored mode.

[3]Increases camera's field-of-view so that the full 8 x 10-cm CRT display area can be recorded.

[4]C-50, C-51, C-52, and C-53 Cameras require Battery Pack 016-0270-00 for power when not used with 7000-Series Oscilloscopes.

[5]C-30-Series Cameras can only be mounted and removed from the 549 by means of the camera hinges.

[6]Only the C-5 and C-59 Cameras can entirely record the 6½-inch CRT display without cropping.

[7]The C-59 is suitable for the standard-model Type 603 but it cannot photograph the nonilluminated graticule of the Option 1 Model.

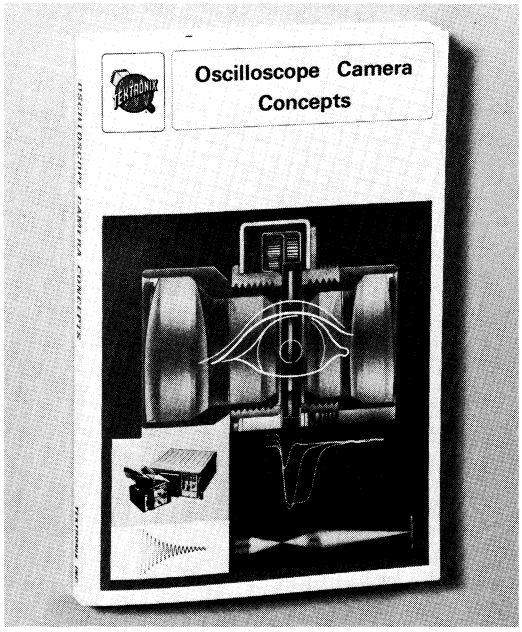
[8]The C-59 also mounts directly onto the Type 604 but it cannot photograph the nonilluminated graticule of the standard model.

ADAPTERS

TEKTRONIX Adapters for mounting Beattie Coleman, DuMont, and Hewlett-Packard cameras on TEKTRONIX Oscilloscopes. The outside diameter of the mounting ring is 5⅝ inches. Net weight of each adapter is approximately 1 pound.

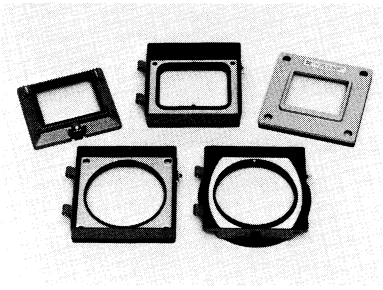
INSTRUMENT	CAMERA	ADAPTER		INSTRUMENT	CAMERA	ADAPTER	
540 & 550 Series, 502A, 503, 504, 565 and 575.	Beattie Coleman: Models K-5, K-5R, KD-5, Mark IIA, Mark II-911, 565A, & Polexa.	014-0018-00		647A	Beattie Coleman: All models listed at left.	014-0017-00	
561B, 564B, 567, and 568.	DuMont: Models 296, 298, 299, 302(B), 321A, 353, 450(A), & 453/454A Series. HP: Models 195A, 196(A), 197A, and 198A.	014-0016-00		529	DuMont: All models listed at left.	014-0031-00	
					HP: Model 196(A).		
				528, 601, 602, 603, 604, 5100 7000 Series and 5400 Series	Beattie Coleman: All models listed at left. DuMont: 450(A) and 453/453/A Series. HP: Models 195A and 197A.	014-0045-00	

Optional Features and Accessories for Extending Your Camera's Versatility



OSCILLOSCOPE CAMERA CONCEPTS

A comprehensive treatise on the technology of oscilloscope photography, written for the user of oscilloscope cameras. The book is generously illustrated and conceptually covers such subjects as: Radiation & Light, Recording Materials & Processes, Photographic Optics, Cathode-Ray Tubes, Cameras, and Features Of Oscilloscope Cameras. An extensive bibliography offers a subject guide to pertinent reference books and articles for further reading on each subject.

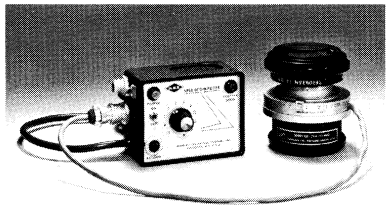


ADAPTERS

Many camera/oscilloscope combinations are available through the use of TEKTRONIX mounting adapters. The wide selection of adapters provides economy and convenience by allowing you to use a new camera on your present oscilloscope, or a new oscilloscope with your present camera.

ELECTRIC SHUTTER/SPEED COMPUTER

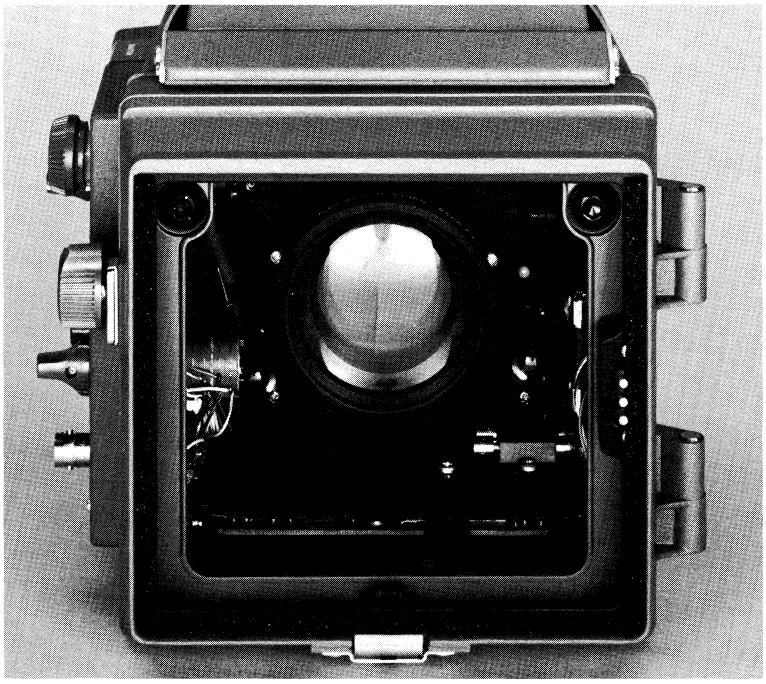
This feature is available as an option for the C-12, C-27, and C-30-Series Cameras. The standard mechanical shutter is replaced by an electronically-controlled shutter to provide improved timing accuracy and added operating convenience.



LENSES

Five interchangeable lenses for the C-12 and C-27 Cameras provide versatility to meet a wide range of trace-recording needs economically with one camera.

TEKTRONIX Cameras Offer the Ultimate in Performance, Reliability, and Convenience for Your Dollars

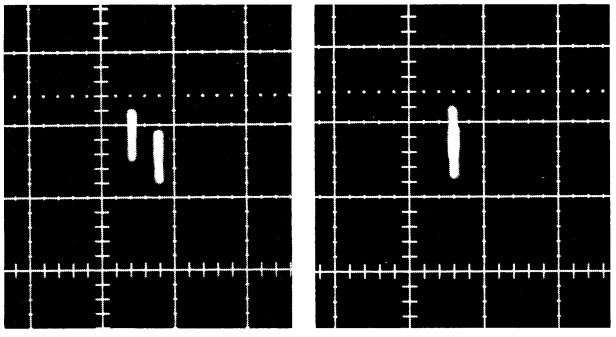


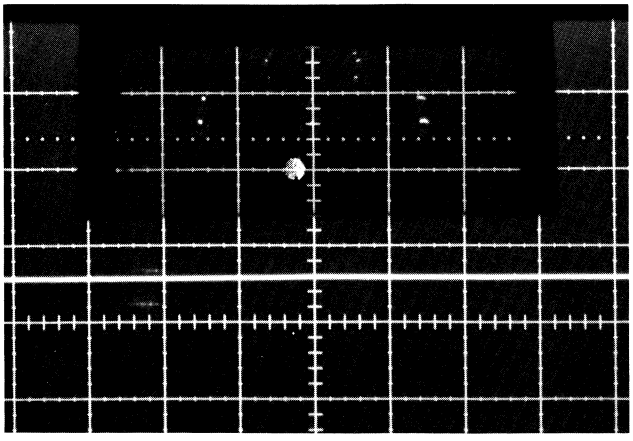
Tektronix, Inc. has been continually active in development of advanced oscilloscope/camera systems to provide the best in trace-recording technology. Ease of operation, fast photographic writing speed, and faithful reproduction at minimum cost have been some of the many objectives underlying the program. This effort has produced high-quality cameras of proven performance and reliability.

Pictured at left is an interior view of the C-51 Camera. Shown below are two of the many advanced-concept features of the C-50-Series Cameras.

RANGE-FINDER FOCUSING

A fast, easy means of focusing the camera without need to view the CRT image on a focus screen. When the FOCUS control knob is depressed, two bars of light are projected from triangulated sources onto the CRT screen. By turning the FOCUS knob, the light bars can be made to merge, thus bringing the camera into focus on the CRT screen.





PHOTOMETER EXPOSURE AID

The photometer exposure aid reduces time and expense in CRT trace recording by providing a simple, systematic means of setting the camera controls for correct exposure of the film. Adjusting a single control knob to match the brightness of the photometer spot to the CRT trace automatically interlocks the shutter speed and aperture (f) controls in proper exposure-value relationship.

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Tektronix Limited maintains a warehouse of United States-made instruments, accessories and parts on the Island of Guernsey to quickly support these distributors in filling customer orders. Technical support of customers and distributors is also available from this facility. In addition, Tektronix has manufacturing facilities within the European Economic Community and European Free Trade Association.

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103-105 Felton Mathew Avenue
Glen Innes
(P.O. Box 3097)
Auckland
Phone 587-039 & 587-037
Cable: KOSFY Auckland

PAKISTAN
Pak-land Corporation
Central Commercial Area
Iqbal Road
P.E.C.H. Society
Karachi 29
Phone 417315 & 418094
Cable: PAKLAND Pakistan

PERU
Importaciones y
Representaciones
Electronicas, S.A.
Franklin D. Roosevelt 105
Lima
Phone 27-2076
Cable: IREING, Lima

PHILIPPINES
Philippine Electronic
Industries, Inc.
2129 Pasong Tamo Street
(P.O. Box 498)
Makati Commercial Center
Makati, Rizal
Phone 80-72-41/42/43/44
Cable: PHILECTRON, Makati

SINGAPORE
Mechanical & Combustion
Engineering Co. Pty. Ltd.
No. 12 Jalan Kilang
Redhill Industrial Estate
(P.O. Box 46, Alexandra Post Office)
Singapore 3
Phone 647151
Cable: MECOMB

TAIWAN
Heighten Trading Co. Ltd.
(P.O. Box 1408)
Taipei
Republic of China
Phone 518324, 518372, 517517
Cable: HEIGHTEN Taipei

THAILAND
G. Simon Radio Co. Ltd.
30, Patpong Avenue, Surlwong
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Phone 30991-3
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