TEKTRONIX®

C-28 CAMERA WITH Options

INSTRUCTION MANUAL

Tektronix, Inc.
P.O. Box 500
Beaverton, Oregon 97077

Serial Number _____

070-2428-00

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WARRANTY

This Tektronix instrument is warranted against defective materials and workmanship for one year. Any questions with respect to the warranty should be taken up with your Tektronix Field Engineer or representative.

All requests for repairs and replacement parts should be directed to the Tektronix Field Office or representative in your area. This will assure you the fastest possible service. Please include the instrument type number or part number and serial number with all requests for parts or service.

Products of Tektronix, Inc. and its subsidiaries are covered by U.S. and foreign patents and/or pending patents.

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WARNING

The following servicing instructions are for use by qualified personnel only. To avoid personal injury, do not perform any servicing other than that contained in operating instructions unless you are qualified to do so.

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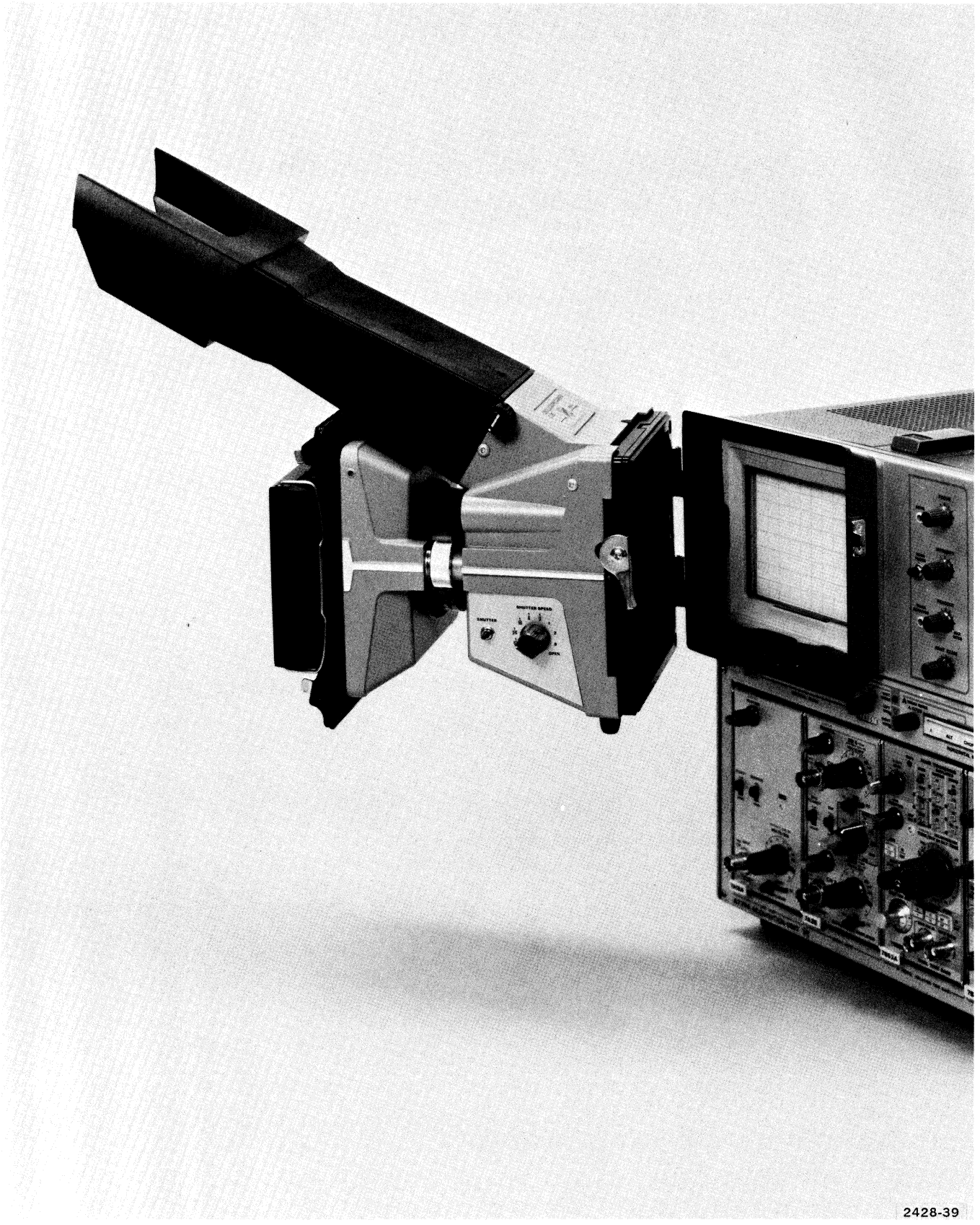


The C-28 Camera.

GENERAL INFORMATION

The C-28 is a versatile recording camera. It features a variable aperture and multiple speed electronic shutter, with input jacks for remote shutter control and X synchronous output. A field changeable ring spacer and lens assembly provides for object-to-image ratios (magnification factor) of 1:0.67 or 1:0.85[1]. With these ratios, photographs on instruments with either an 8 X 10 or 10 X 12 centimeter display cover the entire usable area of the Polaroid[2] back film surface.

The C-28 camera back is a Polaroid type pack film back. The camera contains a viewing door with a tunnel-hood accessory, to observe the instrument display without camera removal. The camera interfaces with standard mounting adapter options for use on various models of oscilloscopes and monitors. TABLE 1-1 lists instrument-adapter relationships for the camera.

TABLE 1-1

Relationship of Instrument to Adapter for the C-28

Instrument	Adapter
577, 601, 602, 603, 604, 605, 606, 607, 608, 5100 Series 5403/D40, 5440, 5444, 7000 Series	016-0249-03
502, 502A, 503, 504, 530 Series, 540 Series, 550 Series	016-0225-03
561A, 561B, 564A, 564B	016-0224-00

SPECIFICATIONS

The specifications in TABLE 1-2 apply over an ambient temperature range of 0° to +50°C (+32° to 122°F). The minimum time to allow temperature stablization of the camera is five minutes.

TABLE 1-2

Specifications

Characteristics	Performance Requirement
OPTICAL	
Relative Aperture	Variable *f*/2.8 to *f*/16 within 5%.
Focal Length	56 mm nominal.
Object-to-Image Ratio (Magnification Factor)	Standard: 1:0.67 and 1:0.85. Option 4: 1:0.8. Option 5: 1:0.9. Option 6: 1:1 (unity). All within 5% on focused camera.
Geometric Distortion	±0.2% at 1:0.85 magnification.

[1] Magnification ratios of 1:0.8, 1:0.9 and 1:1 (unity) are available as options.

[2] Polaroid is a registered trademark of the Polariod Corporation.

TABLE 1-2 (cont)

Characteristics	Performance Requirement
ELECTRICAL	
Shutter Speed	1/50, 1/25, 1/10, 1/5, 1/2, 1 second and 2 seconds within 20%. B (bulb) and lens OPEN position are also provided.
Remote Shutter Input	
Input	Compatible with TTL.
Maximum Input (dc or peak transient)	−1 to + 10 volts.
Input Requirement for Activation	
TTL	Transition from $\geq$+2.5 V dc to $\leq$+0.9 V dc in 10 μs or less and remaining for at least 50 μs. B (bulb) requires a continuous low for the duration that the shutter remains open.
Resistance	Transition from $\geq$7.5 kΩ to $\leq$1 kΩ in 10 μs or less and remaining for at least 50 μs.
Input Isolation Between Remote Shutter Input and Shutter Pushbutton Input	At least 100 kΩ.
Minimum Time Interval Between Shutter Activations	At least 500 ms.
Maximum X Sync Contact Rating	28 volts at 750 mA.
POWER REQUIREMENTS	
Voltage Input	+15 V dc ±0.5 V.
Current Drain	Less than 750 mA.
Power Consumption	Not more than 12 watts.
ENVIRONMENTAL	
Temperature	
Operating	0° to +50°C (+32° to +122°F) at 95% humidity. Shutter is excluded above 75% humidity.
Nonoperating	−40°C to +55°C (−40°F to +131°F).
Altitude	
Operating	To 4500 meters (15,000 ft). Operating temperature decreased 1°C (1.8°F) per 300 meters (1000 ft) above 1500 meters (5000 ft).
Nonoperating	To 15,000 meters (50,000 ft).

TABLE 1-2 (cont)

Characteristics	Performance Requirement
ENVIRONMENTAL (cont)	
Vibration (Mounted on oscilloscope)	15 minutes along each of the three major axes at a total displacement of 0.38 millimeters (0.015 inch) peak to peak, frequency varied from 10 to 55 to 10 Hz in 15 minute sweep for each axis. Dwelled for 10 minutes at 33 Hz on each axis.
Shock	50 g's, 1/2 sine, 11 ms duration, three shocks in each direction in each axis for a total of 18 shocks.
PHYSICAL	
Length, Width, and Height	See Dimensional Drawing (Figure 1-1).
Weight (with pack film back, 016-0249-03 mounting adapter, viewing tunnel and hood)	3.8 kilograms (8.5 lbs). May weigh up to 8.78 kilograms (19.5 lbs) with some types of roll film backs.

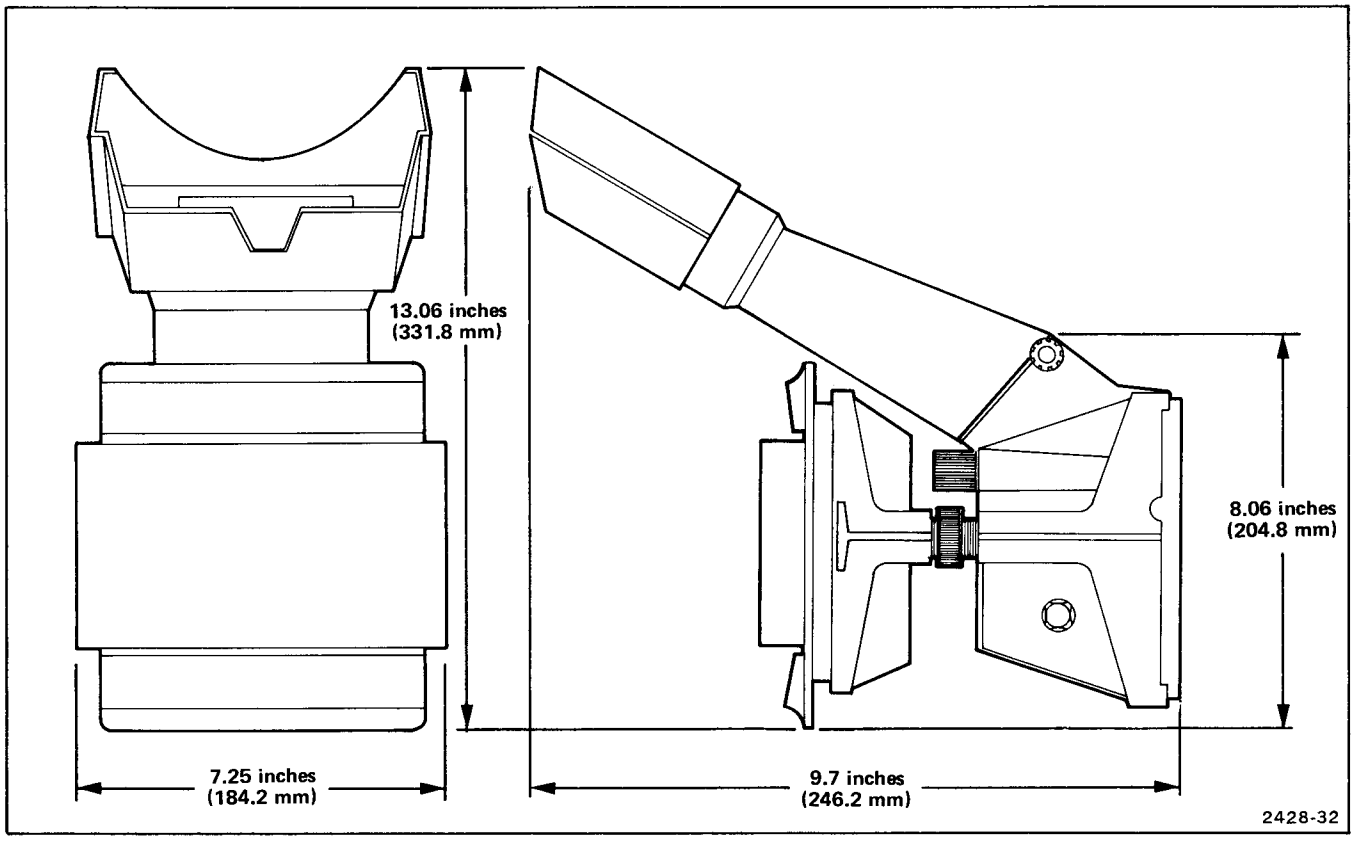


Figure 1-1. C-28 dimensional drawing.

OPERATING INSTRUCTIONS

FUNCTIONS OF CONTROLS AND INDICATORS (FIGURE 2-1)

(1) **Aperture Control.** Selects the size of the lens opening in variable *f*/ stops from *f*/2.8 to *f*/16.

(2) **SHUTTER.** Actuates the camera shutter when pushed.

(3) **SHUTTER SPEED.** Controls the time period that the shutter is open to admit light for exposing the film. The selectable speeds are 1/50, 1/25, 1/10, 1/5, 1/2, 1 and 2 seconds; B (bulb); and OPEN.

When OPEN is selected, the shutter opens and remains open until another SHUTTER SPEED position is selected.

In B (bulb) position, the shutter is pushed to hold the shutter open, and released to close it.

A FOCUS LIGHT OPTION position is available as Option 1. This position turns the focus lights on for camera focus alignment.

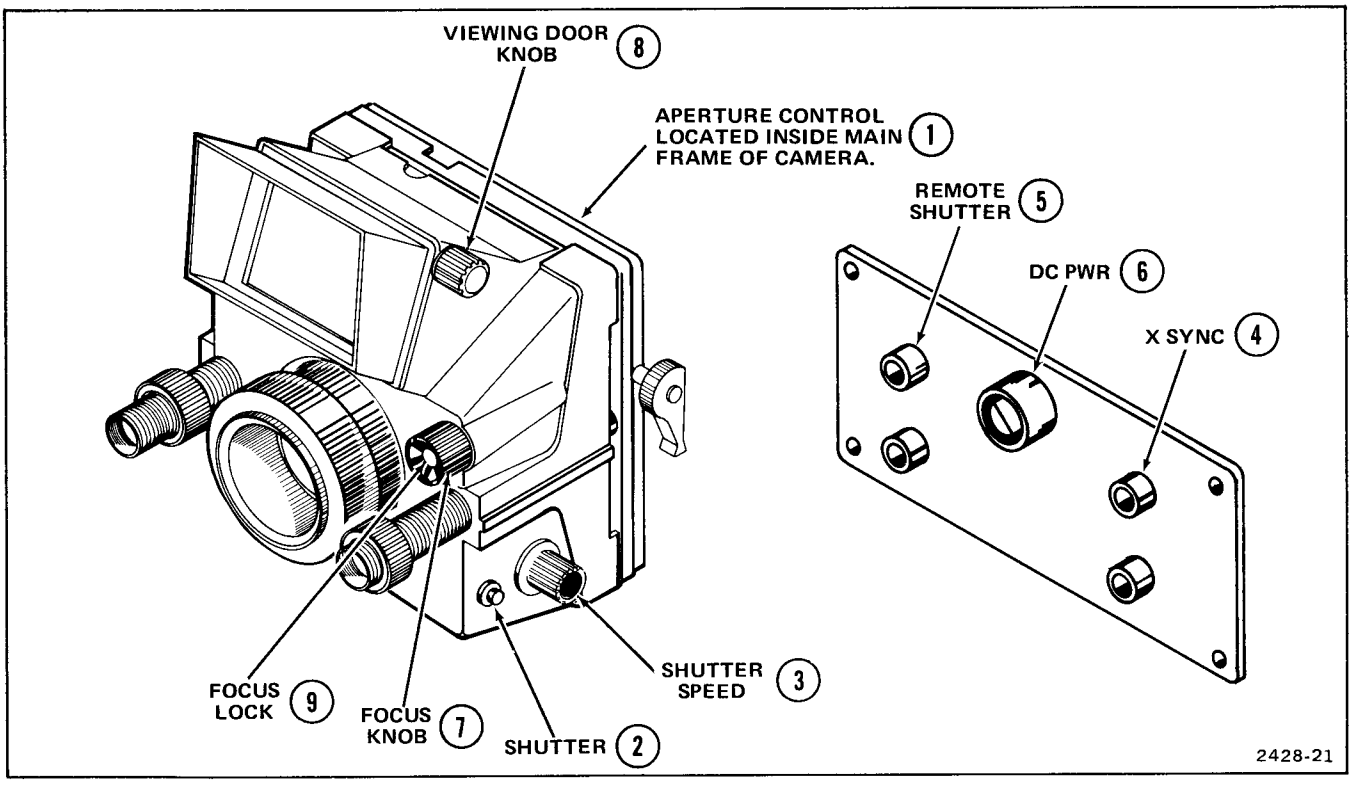


Figure 2-1. C-28 camera controls.

(4) **X SYNC Output.** Two banana jacks on 0.75-inch centers used to slave external equipment to the camera's shutter operation. This output represents a switch closure during the time that the shutter is open. These jacks are paralleled with the X Sync output contacts in the DC PWR connector. The red jack is the active connection and the black jack is connected to the chassis or signal ground, (see X Sync Output information for switch contact limitations).

(5) **REMOTE SHUTTER Input.** Two banana jacks on 0.75-inch centers used to remotely control the shutter. This input requires a switch closure or TTL LO input for operation. These jacks are paralleled with the Remote Shutter Control input contacts in the DC PWR connector. The red jack is the active connection and the black jack is connected to the chassis or signal ground.

(6) **DC PWR.** A 6-contact connector which provides a single-connector, single-cable connection for the following:

a. External Voltage Supply Input.
b. Remote Shutter Control Input.
c. X Synchronization Output.
d. Chassis or Signal Ground.
e. Protective Ground (connected to two pins).

(7) **Focus Knob.** Adjusts the distance from front of the camera lens to the display being photographed, for focus alignment.

(8) **Viewing Door Knob.** Opens (and closes) the viewing door to view the display to be photographed.

(9) **Focus Lock.** Screwdriver control to lock the Focus Knob to a particular focus adjustment.

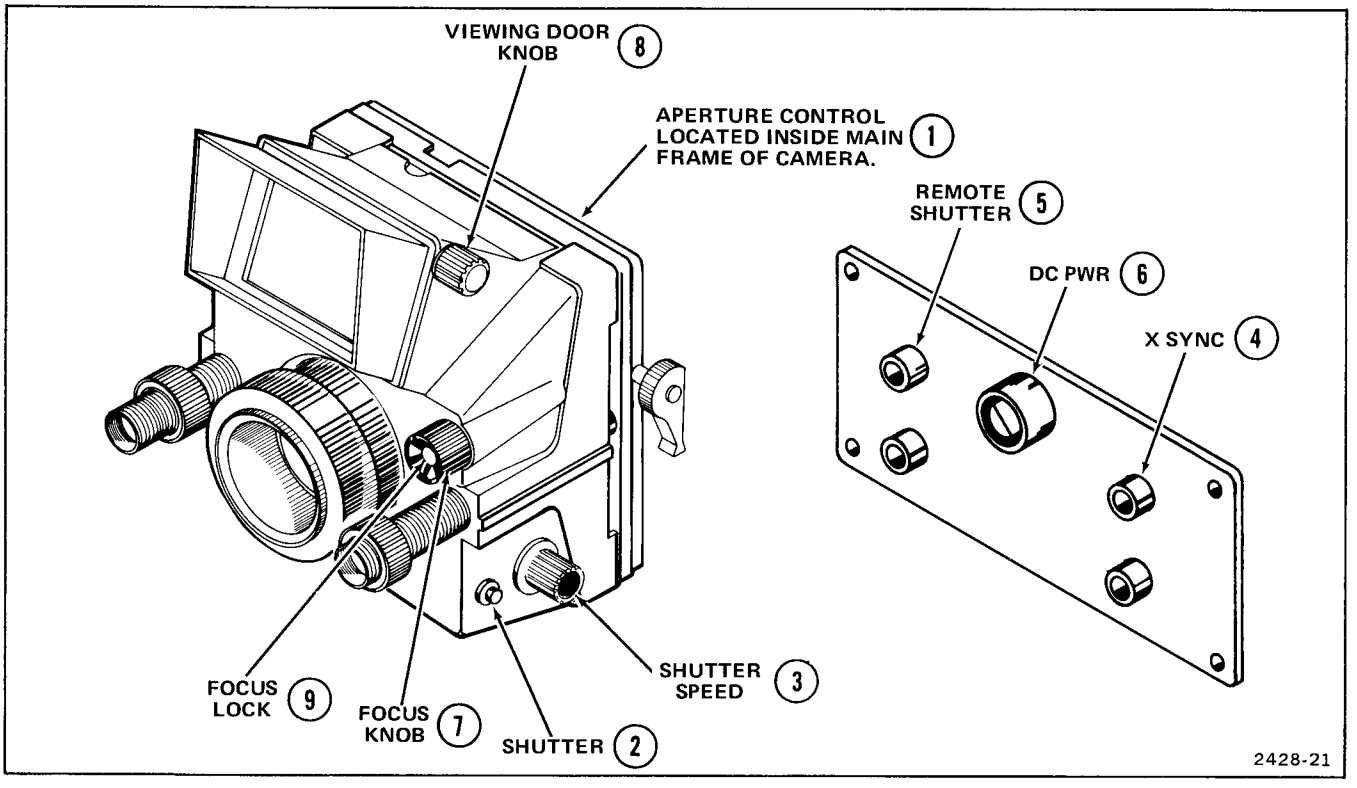


Figure 2-1. C-28 camera controls (cont).

CAMERA OPERATION

REMOTE SHUTTER INPUT AND X SYNC OUTPUT SIGNAL INFORMATION

Remote Shutter Input

The shutter can be operated through the REMOTE SHUTTER input jacks, or their equivalent connections in the DC PWR connector. The activating input can be any of the following signals, provided there is at least 500 milliseconds between occurrences:

1. A switch closure.

2. A TTL logic LO transition from a ⩾+2.5 volt signal level to a ⩽+0.9 volt signal level. The tranistion must occur in 10 microseconds or less and last for at least 50 microseconds.

3. A resistive change from a ⩾7.5 kilohm value to a ⩽1 kilohm value. This value change must occur in 10 microseconds or less and last for at least 50 microseconds.

X Sync Output

The X SYNC output is a switch contact closure type output. The contacts are rated at +28 V dc, 750 mA. Switching voltages or currents beyond these ratings will damage the contacts.

EXTERNAL POWER AND SIGNAL CONNECTIONS (FIGURE 2-2)

The camera requires a +15 volt dc, 750 mA external voltage input for proper operation of the electronic shutter. A mating connector with a pigtail is provided with the camera to facilitate this connection. The positive power supply voltage is connected to pin 6, and the power supply common to pin 4.

Pins 2 and 5 of the DC PWR connector are intended to be used solely and specifically for protective (safety-earth) ground connections. Any signal or circuit common routed through the connector should be via pin 4.

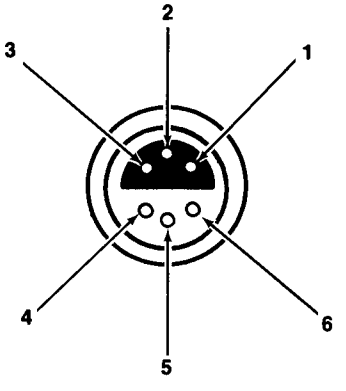
USING THE VIEWING TUNNEL-HOOD

The C-28 is equipped with a Viewing Tunnel-Hood which allows a binocular view of the crt display while excluding ambient light. The Viewing Tunnel-Hood is constructed of flexible rubber, and is easily mounted to the camera viewing door.

NOTE

The Viewing Door should be closed when not viewing a display. If the door is not properly secured, a reflection through the open door may appear on the photograph.

NOTE: SHELL IS CONNECTED TO CAMERA FRAME GROUND.



PIN	USE
1	REMOTE SHUTTER INPUT (ACTIVE LEAD)
2	CAMERA FRAME GROUND (MUST BE CONNECTED TO POWER SOURCE PROTECTIVE GROUND)
3	X SYNC OUTPUT (ACTIVE LEAD)
4	POWER AND CONTROL COMMON (CONNECTED TO CAMERA FRAME GROUND)
5	CAMERA FRAME GROUND (MUST BE CONNECTED TO POWER SOURCE PROTECTIVE GROUND)
6	+15 V DC INPUT

2428-18

Figure 2-2. Dc power connector.

ROTATING SLIDE ADAPTER

The rotating slide adapter interfaces the camera to the camera back. Instructions for mounting the rotating slide adapter and camera back are shown in Figures 2-3 and 2-4. The adapter can be mounted to the camera in a 90, 180, or 270-degree position. Normally it is inserted in the horizontal (90°) position for a right-hand pull of the pack film tabs. Rotating the adapter 180° allows for a left-hand pull.

NOTE

A dark slide is provided to protect the film from indirect light exposure. This slide should be inserted into the camera back whenever the back is removed from the camera. Remove the dark slide during actual picture taking.

INSTALLING CAMERA BACKS

The C-28 pack film camera back mounts directly to the rotating slide adapter assembly. Figure 2-4 describes the procedures for installing the camera back on the adapter.

MOUNTING THE CAMERA

Because of the number of different camera mounting adapters that may be used with the C-28 camera, instructions for installing specific adapters are not provided. Generally, most adapters fit into a top bezel notch and secure with a bottom bezel clamp, or mount with four screws or cap nuts onto existing instrument bezel hardware (see Figure 2-5). Table 1-1 list instrument-adapter relationships for the camera.

CAUTION

Ensure that the adapter is securely fastened to the instrument before mounting the camera to the adapter.

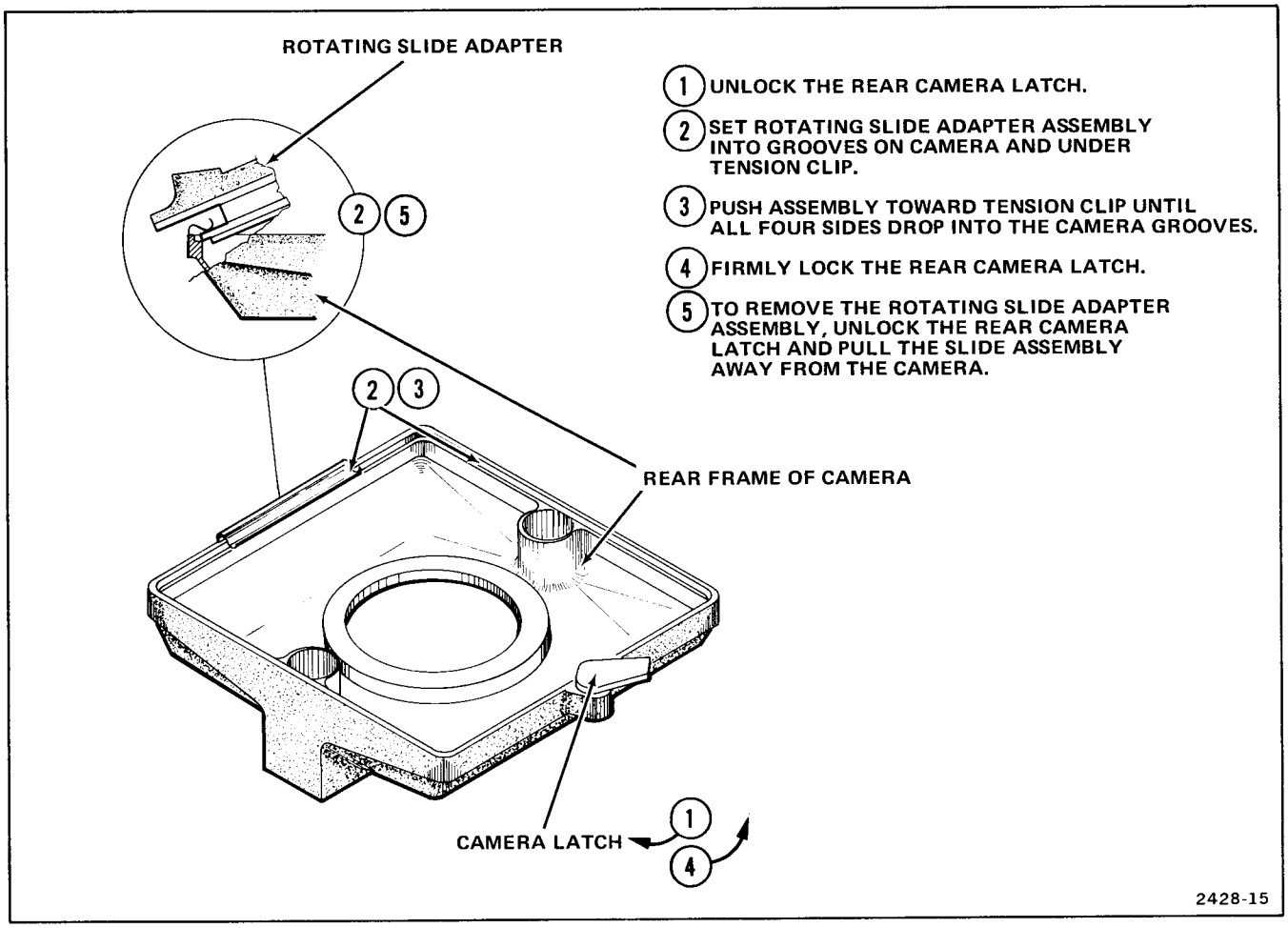


Figure 2-3. Installing the rotating slide adapter.

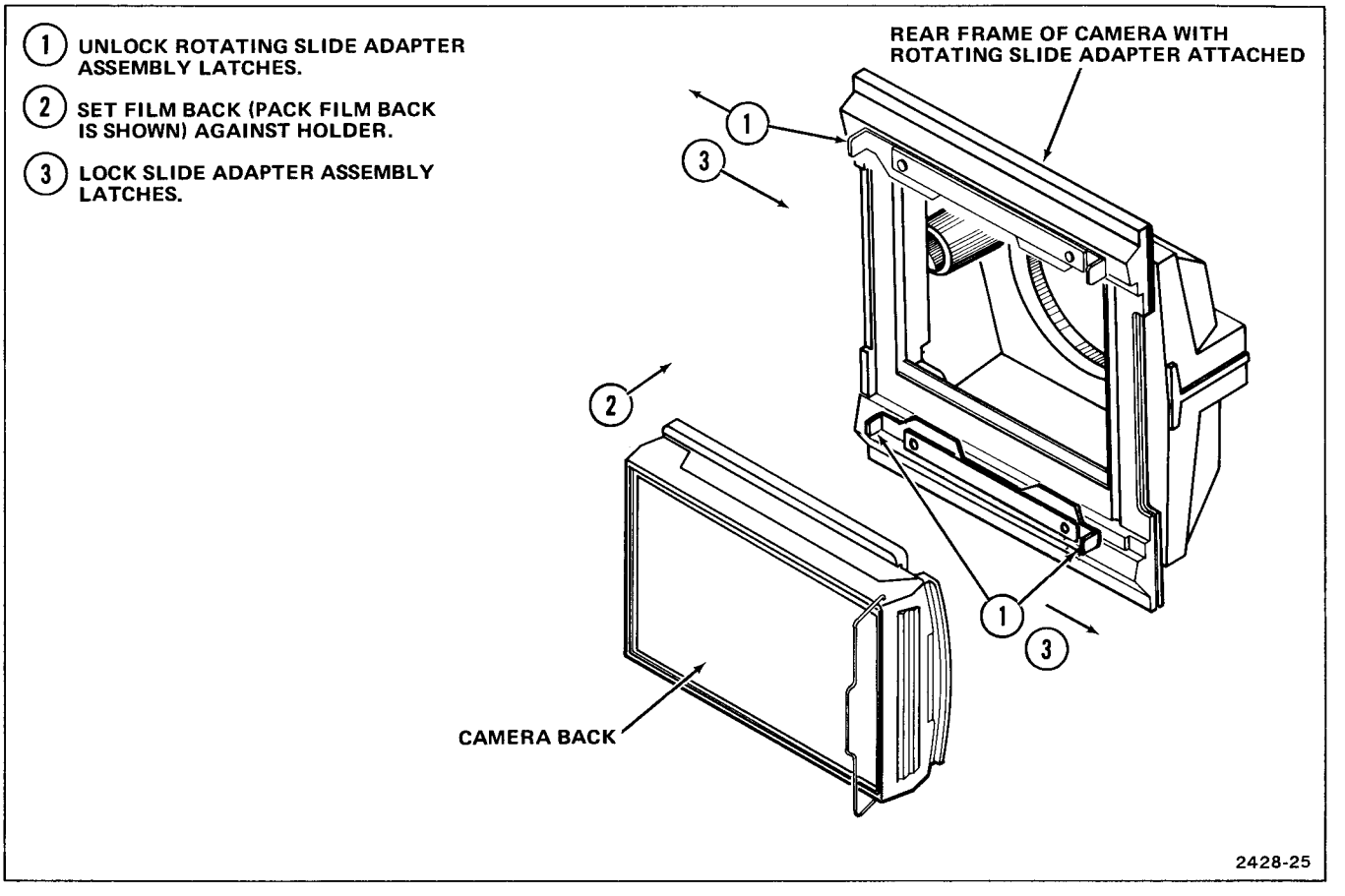


Figure 2-4. Installing the pack film camera back.

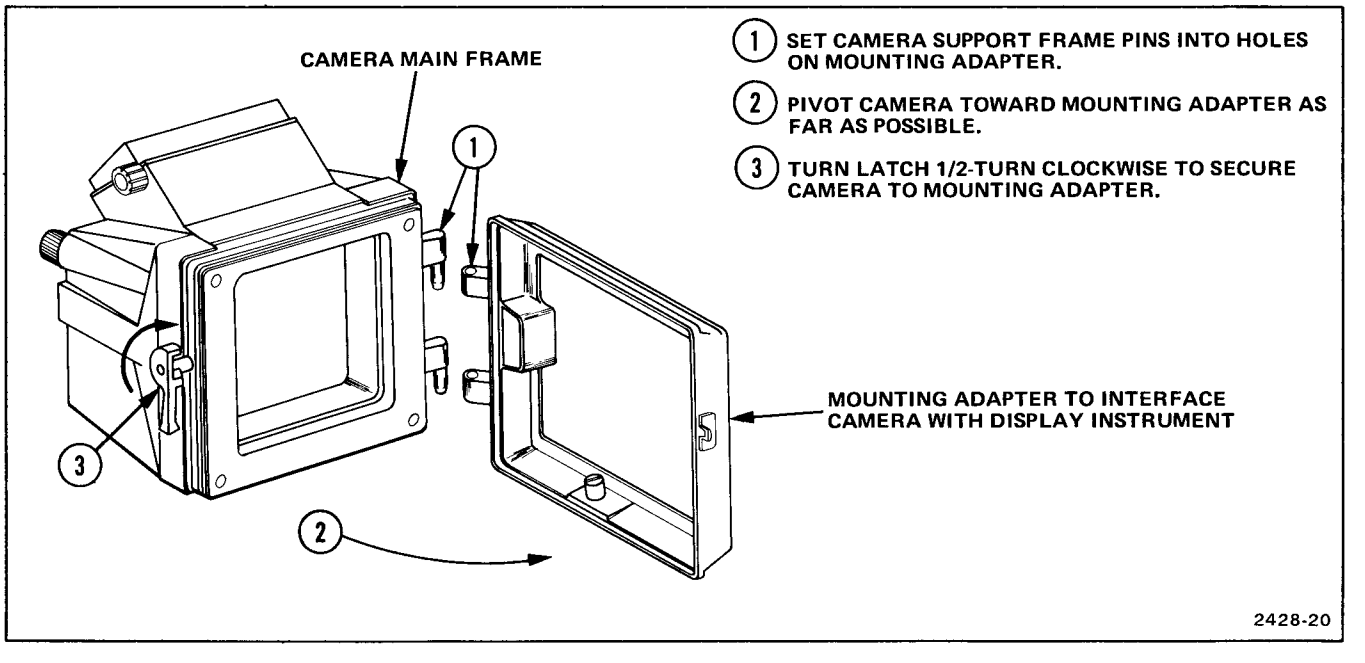


Figure 2-5. Mounting the camera to an adapter.

OBJECT-TO-IMAGE RATIO (MAGNIFICATION FACTOR)

Standard Object-to-Image Ratio Lens

CAUTION

The ratio can be changed with the camera mounted on the instrument. When the rear camera frame is removed, the lens assembly is completely loose. Careless handling could cause the lens assembly to fall free and be damaged. It is suggested that the camera be removed from the instrument for lens removal.

The object-to-image ratio is determined by the position of the movable "B" spacer ring in relation to the "A" lens assembly (Figure 2-7). Use the following procedures to change the magnification factor:

1. If there is film in the camera, install the dark slide in the camera back.

2. Lift the camera off the mounting adapter. Set the camera face down on a flat surface (Figure 2-6).

3. Unscrew the draw nuts holding the main and rear camera frames together. (Refer to Figure 2-6.)

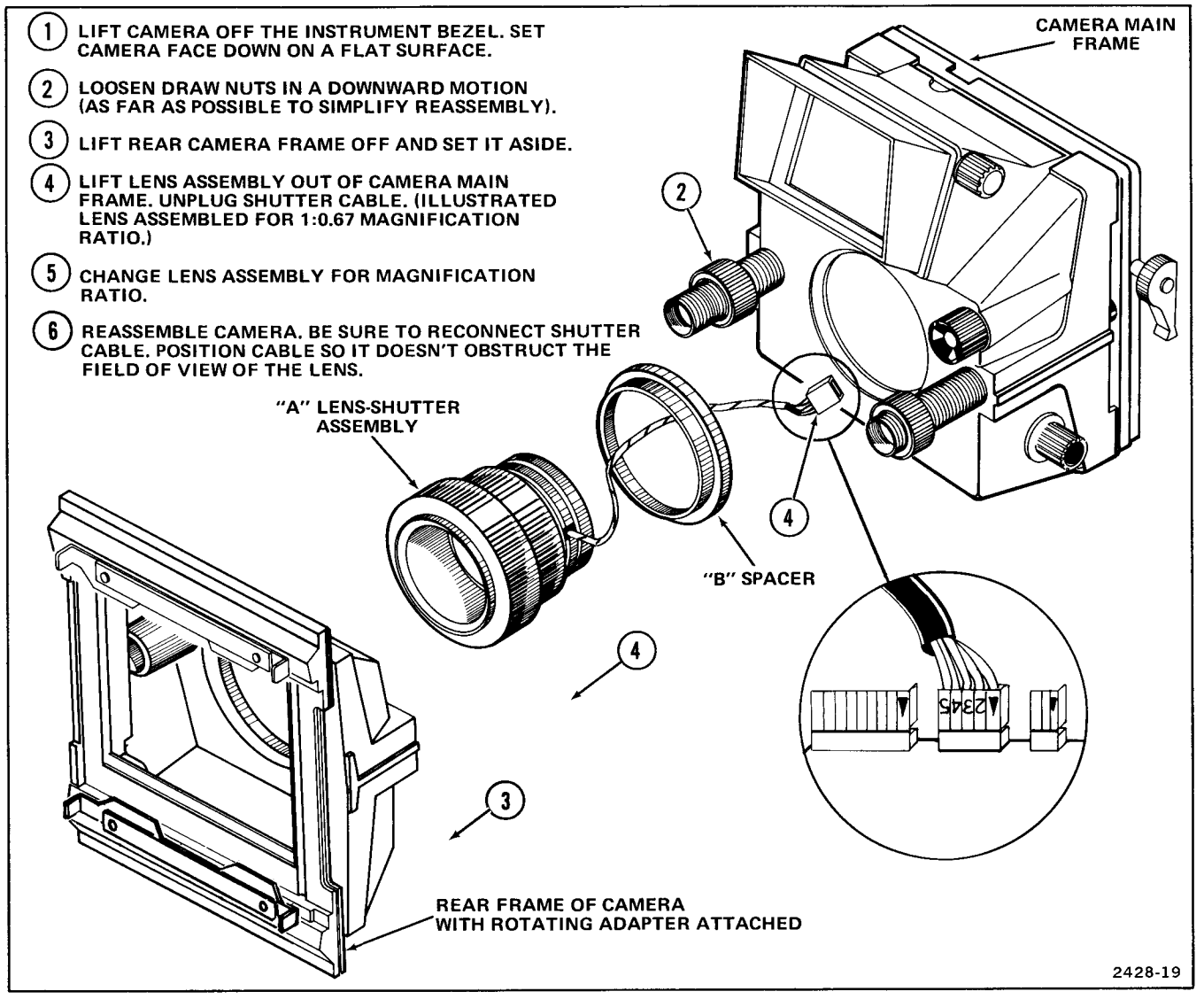


Figure 2-6. Removing the lens-shutter assembly.

4. Lift off the rear camera frame and set it aside.

5. Lift the lens-shutter assembly out of the camera main frame. Unplug the 5-pin harmonica connector from the circuit board to facilitate total lens removal.

6. The lens assembly consists of a stationary lens and movable spacer ring. The positioning of the spacer ring determines the object-to-image ratio of the camera. When the "B" spacer ring is interfaced in back of the stationary lens (marked "A"), the ratio is 1:0.67 (A+B). When the "B" spacer ring is positioned in front of lens "A", the object-to-image ratio is 1:0.85 (B+A). (See Figure 2-7).

NOTE

It is possible to position the spacer ring "B" backwards on the lens assembly. If this should occur, the camera would have the same magnification factor, however the camera would be out of focus.

7. After positioning the spacer ring, assemble the camera by reversing the disassembly procedures.

8. Before using the camera, verify the camera focus. (Focus procedures are described in the following section).

Optional Object-to-Image Ratio

Object-to-image ratio options are permanent fixed assemblies without spacer rings. Procedures for installing fixed assemblies are identical to those for changing standard assemblies described in the preceeding section (See Figure 2-6).

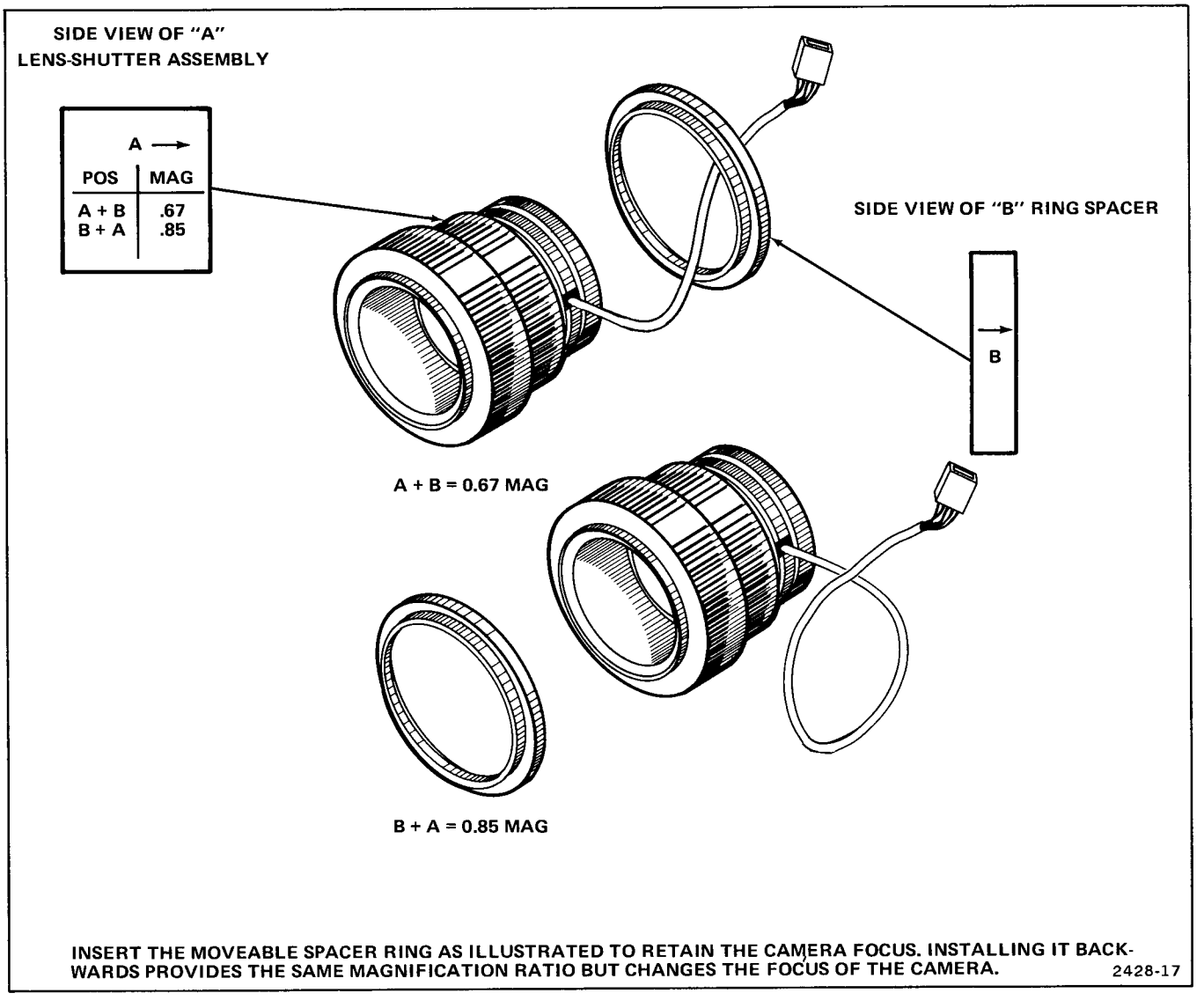


Figure 2-7. Changing the object-to-image ratio.

FOCUSING

The camera can be focused using a self-contained focus light system (Option 1), the focusing screen in the Graflok back (Option 2), or with a focus plate mounted in the pack film camera back, which is a standard accessory.

Self-contained Focus System (Option 1)

The following procedures describe the method of camera focus using the self-contained focus system (Option 1). The camera should be mounted on an instrument with its intensity and graticule illumination turned off. The user will view focus adjustments through the Viewing Door.

Set SHUTTER SPEED to FOCUS LIGHT OPTION. The dark crt display will show two beams of light. With the Focus Knob, adjust the camera so that the two light beams vertically impose each other as illustrated in Figure 2-8.

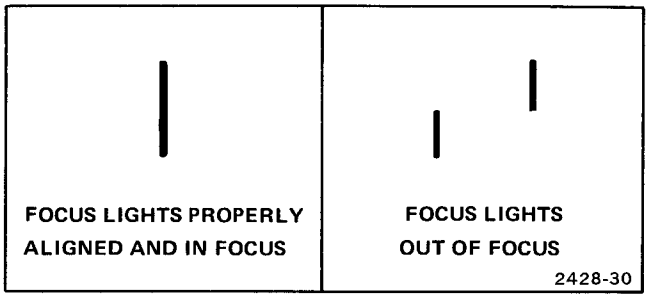


Figure 2-8. Camera focus using the self-contained focus light.

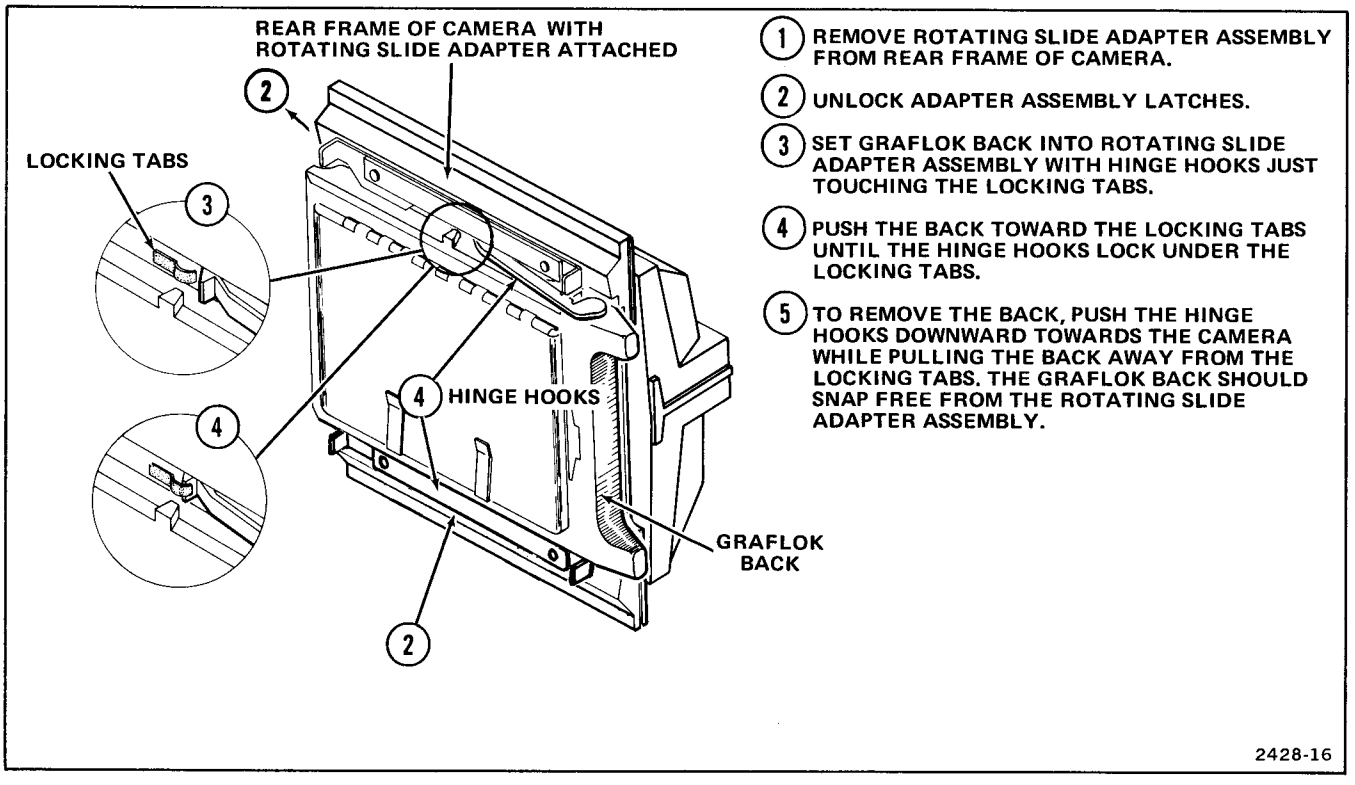


Figure 2-9. Installing the Graflok back.

Focusing With a Graflok Back

The following procedures assume that the Graflok Back is mounted to a properly adjusted display instrument (Figure 2-9); the Lens Aperture is set for maximum opening (*f*/2.8); SHUTTER SPEED indicator is in the OPEN position; and the Release Button is pushed to open the Viewing Hood, to observe the display image on the ground glass screen of the Graflok Back (Figure 2-10).

Using the Focus Knob, adjust the camera to produce a sharply focused presentation on the ground glass screen.

Focus Plate Focusing

The following procedures describe how to focus the camera using the focus plate. It is assumed that the camera is without film, and mounted on a properly adjusted display instrument.

To focus the camera, open the camera back and insert the focus plate where the film pack is normally placed. (See Figure 2-11.) Ensure that the frosted side of the plate is facing towards the instrument. Set the lens for maximum aperture opening (*f*/2.8). With the lens open, you should observe a display on the bi-prism of the focus plate. Adjust the presentation using the Focus Knob until the trace is aligned with itself. Refer to Figure 2-11 for an example of a in-focus display.

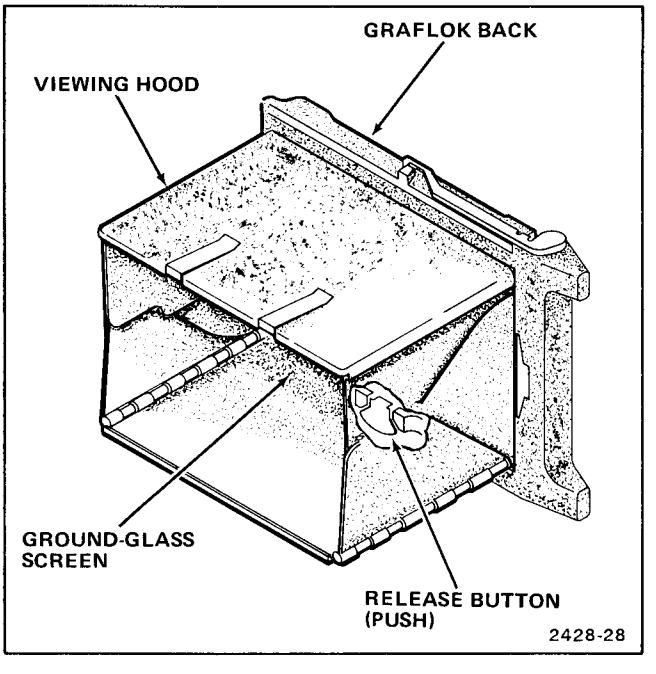


Figure 2-10. Viewing hood attached to the Graflok back.

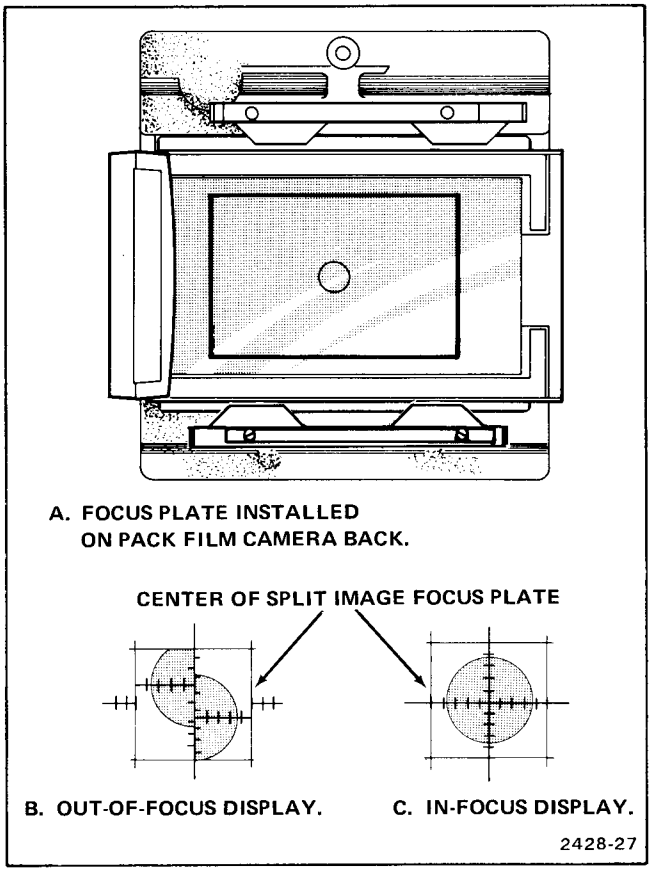


Figure 2-11. Using the focus plate in the pack film back.

FILM PACK CAMERA BACK

The following procedures described the proper method to load the film pack, advance and develop the film, and to protect the film prints.

Loading the Film Pack (Figure 2-12)

1. To open the camera back, swing the door latch away from the camera back and open the film door.
2. To remove an empty film container, lift up on the film pack tab and pull to the right.

NOTE

For the camera to operate properly, the processing rollers in the film back must be clean. Check these rollers each time film is inserted. Instructions for removal of the rollers are inside the film door. If the instructions are missing, refer to the Maintenance Section of this manual.

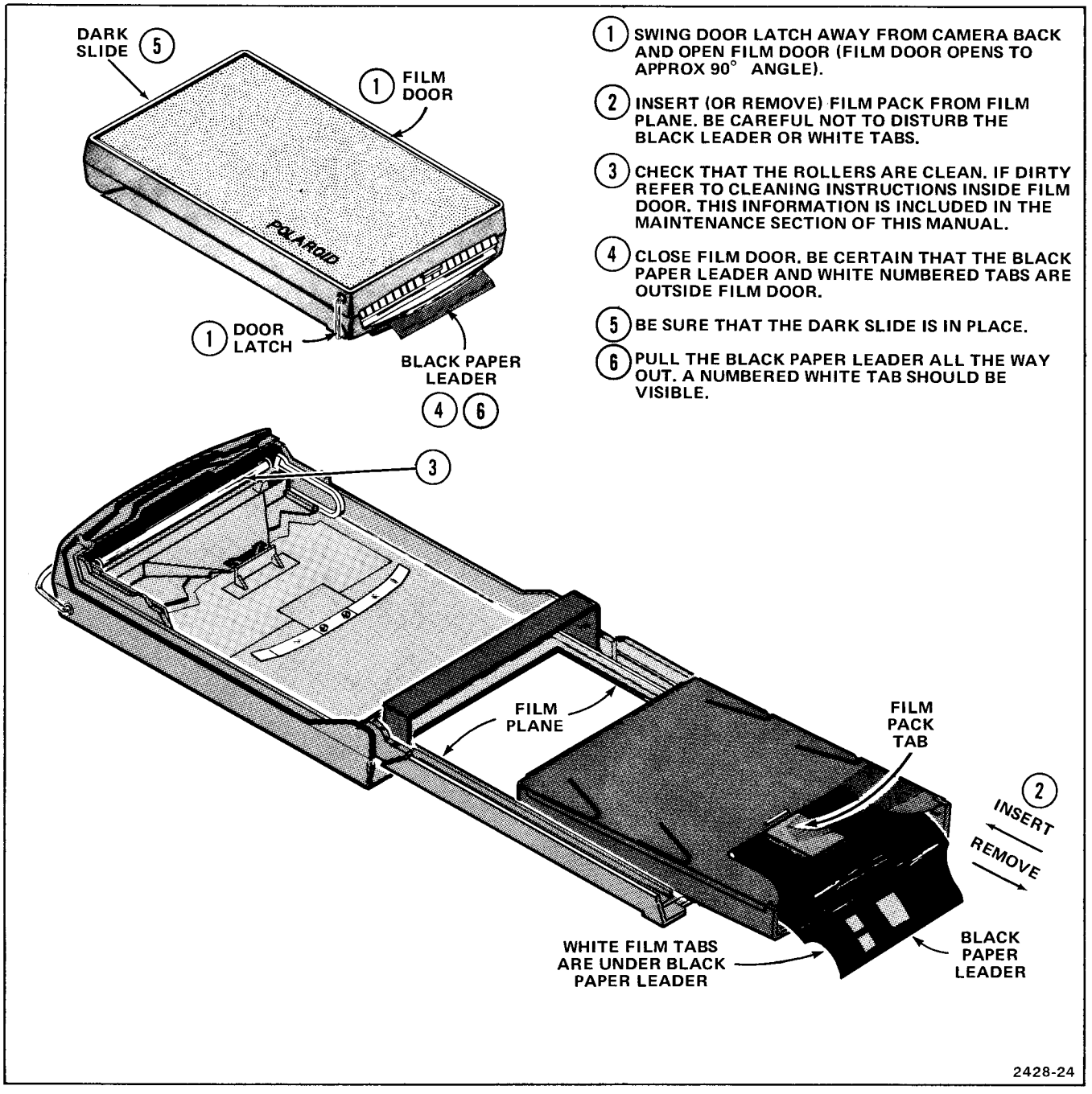


Figure 2-12. Loading pack film.

3. Open the film box and carefully remove the foil wrapped film pack. Retain the instruction sheet and print coater. Remove the film from the foil. Be sure to handle the film by the edges only.

4. Insert the film pack into the film plane. Then push the film pack to the left and down to the film plane until it snaps into place. Be sure that the black paper leader is hanging over the right end of the camera back, and that the white film tabs are not caught between the film pack and film plane.

5. Close the film door and hold it closed. Then swing the door latch into place until it snaps into the locked position.

6. With the camera back attached to the camera, pull the black paper leader all the way out. This will expose a white tab. The camera is now ready for the first picture. As pictures are taken, the number of the negative ready for exposure is indicated by a number on the white tab.

NOTE

Only a white tab should be showing when a picture is taken. If a yellow tab is showing, pull it out and develop the film to determine if the picture is good.

Advancing and Developing the Film

Procedures for developing the picture film are identified in Figure 2-13. If a yellow tab doesn't appear when the white tab is pulled, open the film back and carefully remove the yellow tab that failed to pop out. Discard the yellow tab. Remember, a camera back that contains film should be opened in a darkened condition.

CAUTION

Many developing solutions contain a caustic substance which may cause chemical burns. If you accidentally get the solution on your skin, wipe it off immediately and wash the area thoroughly as soon as possible. Be extremely careful to keep the solution away from the eyes and mouth.

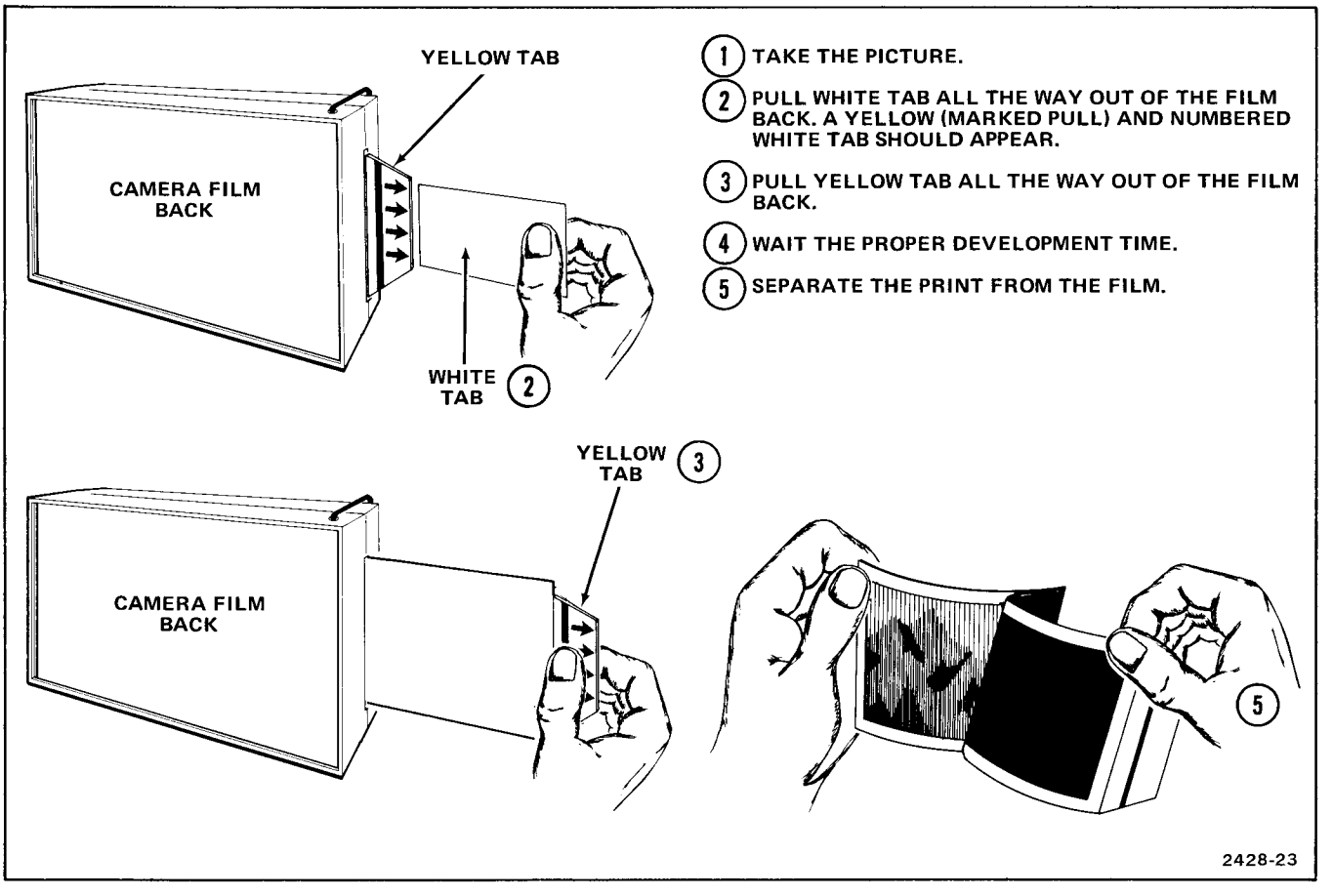


Figure 2-13. Developing pack film.

NOTE

Development time for the type 107 film is approximately 15 to 20 seconds at a ambient temperature of 70°F or above. A slightly longer development time generally provides greater print contrast. Shorter development time will decrease print contrast, but may improve photographed details not otherwise visible.

Coating the Print

Prints that require coating should be coated as soon as possible after separating them from the negative. Use six to eight overlapping strokes to apply the print coater along the entire length of the print, including edges, borders, and corners.

PHOTOGRAPHIC TECHNIQUES

Film Selection

The following table (TABLE 2-1) of Polariod film types gives an outline of the available emulsion sizes. The film recommended, or films having the same characteristics, may be used.

TABLE 2-1

Available Film Types for the C-28 Camera

Film Type	ASA	Approximate Emulsion Size
Polariod Type 105	75	2.85 x 3.75 inches
Polariod Type 107	3000	2.85 x 3.75 inches
Polariod Type 107A (coaterless)	3000	2.85 x 3.75 inches

SHUTTER SPEED and Aperture Control Settings

The Aperture Control determines the amount of light exposure to the film. The camera has indicators for aperture openings of f/2.8, 4, 5.6, 8, 11, and 16 (refer to Figure 2-14).

The C-28 has available shutter speeds of 1/50, 1/25, 1/10, 1/5, 1/2, 1 and 2 seconds, B (bulb) and OPEN. Selection of the shutter speed determines the length of time that the aperture is opened to expose light to film.

Experimenting with the camera using various aperture openings and shutter speeds will define the best settings for normal display picture taking.

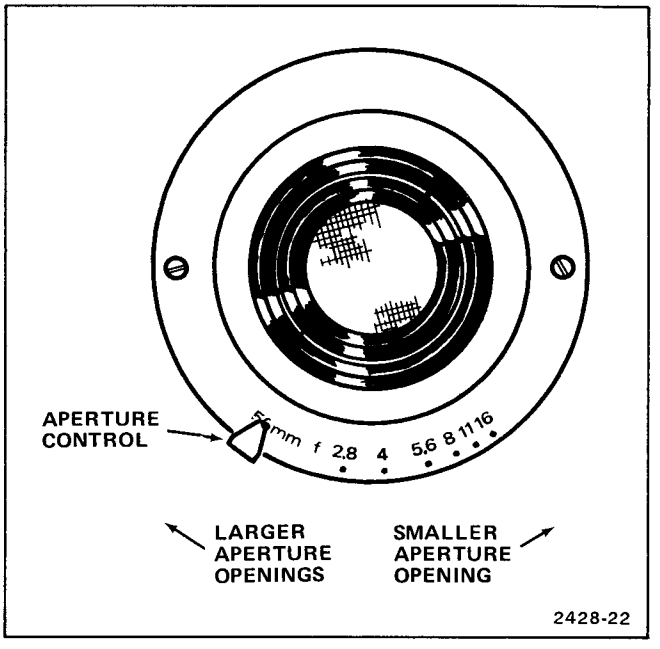


Figure 2-14. Aperture control.

Photographing a Continuous Tone (Gray Scale) Display

Photographing a continuous tone (gray scale) display requires a technique different from that used for trace recording. In trace recording, it is necessary to record two levels of intensity—white for trace and graticule, black or gray for the background. In gray scale photography, it is important to record a whole range of tones that may be only slightly different from one another.

A common problem when taking photographs of a continuous tone display is that the print develops with a loss of detail in the dark and light areas. A contributing factor relates to the difference between the human eye and film print reproduction. The eye is extremely sensitive with a wide dynamic range that accommodates (within one scene) brightness intensity ranges approaching 1000:1. Polaroid Type 107 or 667 film have a usable range of approximately 15:1.

There is quality gray scale tonal rendition when the film print renders information in both the darkest and lightest area of display presentation. Crt photography allows adjustment of camera shutter speed, aperture opening and instrument contrast to produce an acceptable photograph. Adjusting the instrument so that the display appears low in contrast, or "washed out" will merge the brightness (light intenisty) of the display for better film reproduction. This adjustment compresses the display brightness within the recordable range of the film. Once this is set, adjust the camera shutter and aperture control to obtain details in the darkest areas of interest. Generally, this process will require experimentation to produce satisfactory results.

Picture Troubles

Various picture troubles and corrective steps are discussed in the following sections.

No Image on Picture

1. Use higher instrument intensity settings.
2. Readjust the SHUTTER SPEED setting.
3. Set the Aperture Control to a smaller number.
4. Remove dark slide from the camera back.
5. Use a film with a higher ASA rating.

Light Streaks on Picture

1. Light leaks between shutter and camera back. See your local Tektronix Representative about repair.
2. Faulty light seal between camera and instrument.
3. Dirty rollers in camera back.
4. Film exposed to light during loading.

Fogging on Picture

1. Graticule illumination control set too high.
2. Bad film.
3. Film exposed to light during loading.
4. Viewing Door opened allowing reflected light.

THEORY OF OPERATION

This section of the manual contains a description of the circuitry used in the electronic shutter. The circuit is described using the diagram located on a foldout page at the rear of the manual.

INTRODUCTION

The C-28 electronic shutter is contained on one printed circuit board. Control circuitry for the shutter provides multiple shutter speeds along with OPEN and BULB capabilities. Also, a FOCUS LIGHT OPTION position is provided to turn on an optional self-contrained focus light system. Pressing the SHUTTER push button, or providing ground closure logic at the REMOTE SHUTTER Input jacks, actuates the shutter.

CIRCUIT DESCRIPTION

Quiescently, the voltage divider, R17 and R18, establishes a dc voltage level of approximately four to five volts at the collector of Q10. Resistor, R16 ensures that the base (and also the emitter) of Q10 will be near the same dc level. Ground-closure logic at the REMOTE SHUTTER input bias Q10 into heavy conduction pulling the collector to about zero volts. CR12 provides reverse breakdown protection for the emitter-base junction of Q10. Diode, CR10 limits the negative excursion of the emitter of Q10 to approximately −0.7 volts.

At quiescence, Q20 is biased into saturation which causes Q25 to be biased off. When Q10 is biased into saturation by a REMOTE SHUTTER signal, or when SHUTTER push button S10 is pressed, Q20 turns off and Q25 becomes biased into saturation. The resultant negative-going excursion at the collector of Q25 couples through C25 to trigger IC U30.

U30 is a monostable multivibrator whose output at pin 3 remains LO until a trigger is received at pin 2. Upon receipt of the trigger, pin 3 goes HI and remains HI for a period of time determined by the R and C combination (R30 through R39 and C30) connected to pins 6 and 7. If the trigger input of U30 (pin 2) is held LO, the output at pin 3 remains HI until the trigger input goes HI again.

Q40 is a Darlington transistor that drives the electronic shutter. A HI from pin 3 of U35 biases Q40 into saturation which energizes the shutter. C40 and C41, which are charged to +15 volts, provide the high initial-surge energy necessary to activate the shutter. Once activated, +15 volts through R42 provides the lower long-term holding energy to maintain the shutter in an activated state until Q40 turns off. Q40 turns off when pin 3 of U35 goes LO. CR40 provides reverse-breakdown-voltage protection for the collector of Q40.

When the FOCUS LIGHT OPTION position of S30 is selected, +15 volts is applied to DS6 and DS7, the focus lights, turning them on. The +15 volts is also applied to U30 through R8, which causes a fast pulse that slightly reduces the energy on C40 and C41, but doesn't activate the shutter. Without R8, it is possible for the shutter to open and stay open putting an unnecessary load on the power supply.

MAINTENANCE

GENERAL CARE OF THE CAMERA SYSTEM

The C-28 Camera is designed to provide long, trouble-free service if given the same care as other precision optical devices. Care should be taken in handling the various mechanisms to assure that they are not damaged.

CLEANING

Exterior

Exterior surfaces should be washed with a solution of mild soap or detergent and water. To prevent soaking the electronic circuitry with water, be sure to wring out the sponge or washcloth before using.

Interior

Interior surfaces may be cleaned by dusting with a dry, lint-free cloth or brush.

Lens

Lens surfaces may be dusted with a soft, camel-hair brush. Fingerprints and smudges should be lightly wiped off with a high-quality lens tissue. Be careful not to scratch the lens surfaces. Also keep them free of oil and grease.

Pack Film Camera Back Rollers

The pack film back has two stainless steel rollers inside at one end. These rollers are used when processing exposed film and in time may collect film developing solution. They should be checked each time a film pack is inserted, and cleaned as necessary.

Instructions for removing the rollers are found inside the camera back door. If these instructions are missing or worn, the rollers can be removed by lifting the rear of the roller assembly up and out of the camera back. To replace the assembly, set the rollers down into the camera back. Then gently push the rear of the roller assembly down into the camera back until the small plastic retaining latch on the roller assembly catches and holds the rollers in place.

Wipe the rollers clean with a slightly dampened sponge or lint free cloth. Do not scrape the rollers with any metal or other device that may scar them.

STORING THE CAMERA

To prevent chemical or corrosion damage when storing the camera for long periods of time, clean the processing rollers and remove any film. Also, to keep dust from accumulating in or on the camera, it should be covered or stored in a relative dust free area.

CORRECTIVE MAINTENANCE

TEKTRONIX FIELD SERVICE

Tektronix, Inc. maintains repair and recalibration facilities at its local Field Service Centers and the Factory Service Center. For further information or assistance contact your local Tektronix Field Office, or representative.

OBTAINING REPLACEMENT PARTS

Standard Parts

All electrical and mechanical part replacements can be obtained through your local Tektronix Field Office or representative. However, many of the standard electronic components can be obtained locally in less time than is required to order them from Tektronix, Inc. Before purchasing or ordering replacement parts, check the parts list for value, tolerance, rating, and description.

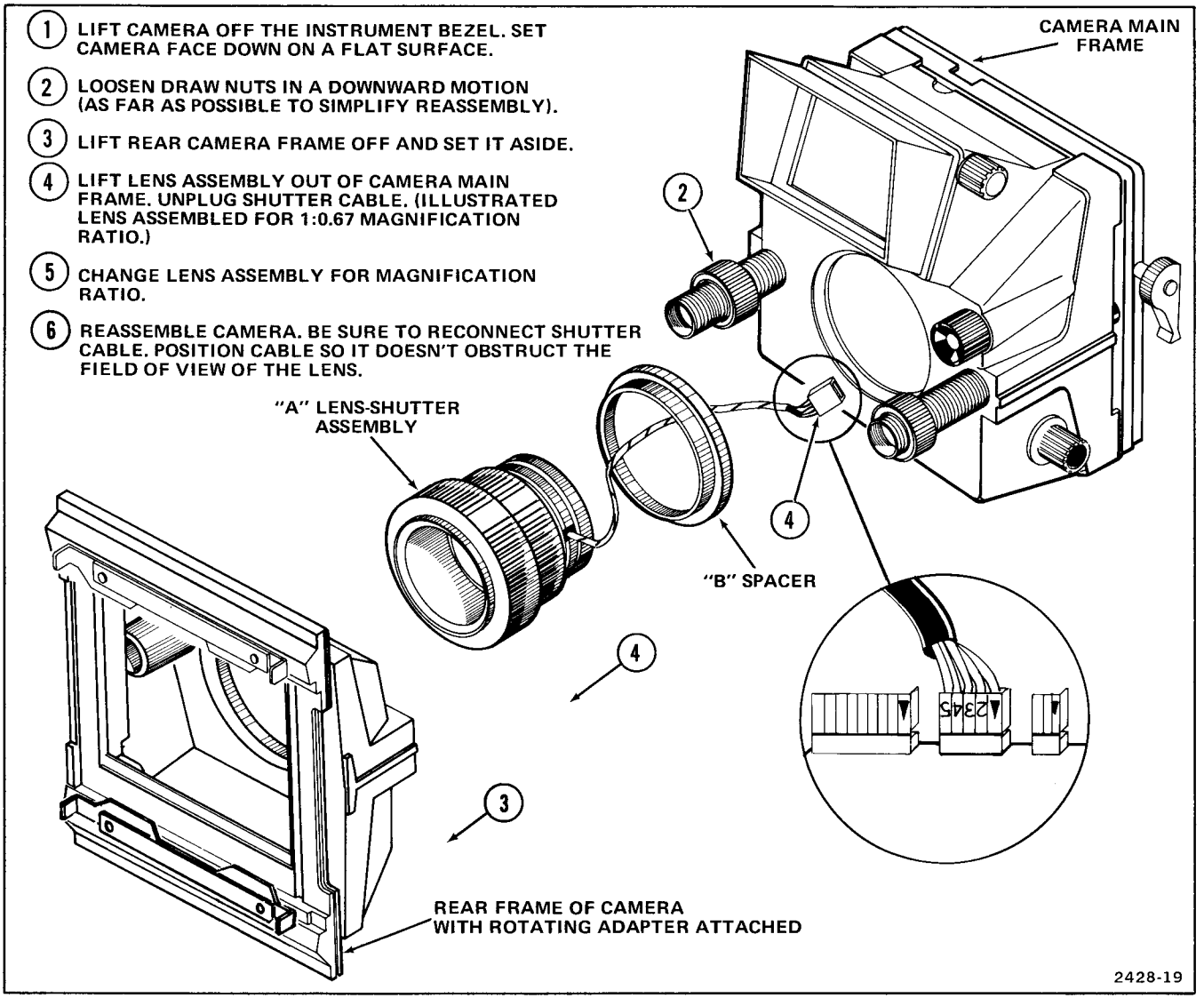


Figure 4-1. Removing the lens assembly.

Special Parts

In addition to the standard electronic components, some special components are used. These components are manufactured or selected by Tektronix, Inc. to meet specific performance requirements, or are manufactured for Tektronix, Inc. in accordance with our specifications. These special components are indicated in the parts list by the Tektronix, Inc. manufacturer code (80009) listed in the Mfg. Code column. Most of the mechanical parts used in this instrument, except miscellaneous hardware, have been manufactured by Tektronix, Inc. Order all special parts directly from your local Tektronix Field Office or representative.

Ordering Parts

When ordering replacement parts from Tektronix, Inc., it is imperative that all of the following information be included in the order to ensure receiving the proper parts.

1. Instrument type (include mod or option numbers).
2. Instrument serial number.
3. The complete description line from the parts list (Circuit No., Tektronix Part No., Serial/Model No., etc).

REPACKAGING FOR SHIPMENT

If the camera system is to be shipped to a Tektronix Service Center for service or repair, attach a tag showing: owner (with address) and the name of an individual at your firm that can be contacted, complete instrument serial number and a description of the service required.

Save and reuse the package in which your instrument was shipped. If the original packaging is unfit for use or not available, repackage the instrument as follows:

Surround the instrument with polyethylene sheeting to protect the finish of the instrument. Obtain a carton of corrugated cardboard of the correct carton strength and having inside dimensions of no less than six inches more than the instrument dimensions. Cushion the instrument by tightly packing three inches of dunnage or urethane foam between carton and instrument, on all sides. Seal carton with shipping tape or industrial stapler.

The carton test strength for your instrument is 200 pounds.

COMPONENT REMOVAL AND REPLACEMENT

When removing, replacing, disassembling or reassembling components, refer to the Exploded View drawing located in the Replaceable Mechanical Parts section of the manual. Mechanical disassembly requires a No. 2 Phillips-head screwdriver and a Spanner wrench.

Camera Sections

To remove and replace the camera sections, refer to Figure 4-1.

Lens-Shutter Assembly

CAUTION

When the rear camera frame is removed, the lens-shutter assembly is completely loose. Careless handling could cause the assembly to fall free and be damaged.

To remove and replace the lens-shutter assembly, see Figure 4-1.

NOTE

When installing the shutter cable, ensure that it is positioned so it doesn't obstruct the field of view of the lens.

Optical Lens

To remove and replace the optical lens, see Figure 4-2. Note that these procedures also apply for removing and replacing optional optical lens assemblies.

CAUTION

Optical lens are tightened in place with hand pressure only. Lens removal or replacement should not require application of pressure tools. Although the front lens holding ring has notches for a spanner wrench, because of the critical positioning of the lens, DO NOT remove the ring or lens.

Shutter Assembly

CAUTION

DO NOT attempt to disassemble the shutter assembly. If the shutter is inoperative, return the complete assembly to Tektronix for repair.

Electronic Shutter Circuit Board

To remove and replace the electronic shutter circuit board, refer to Figure 4-3.

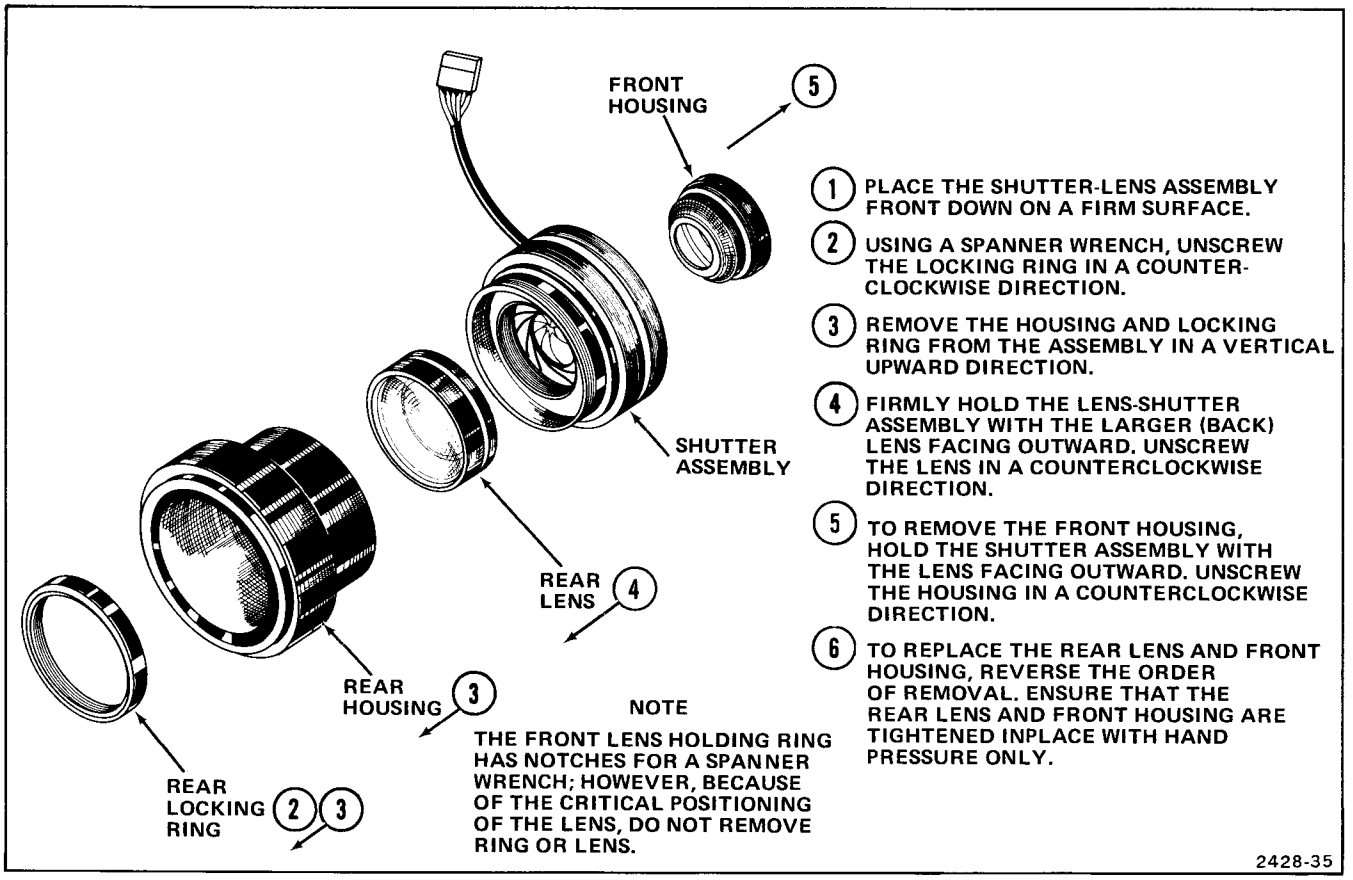


Figure 4-2. Removing the optical lens.

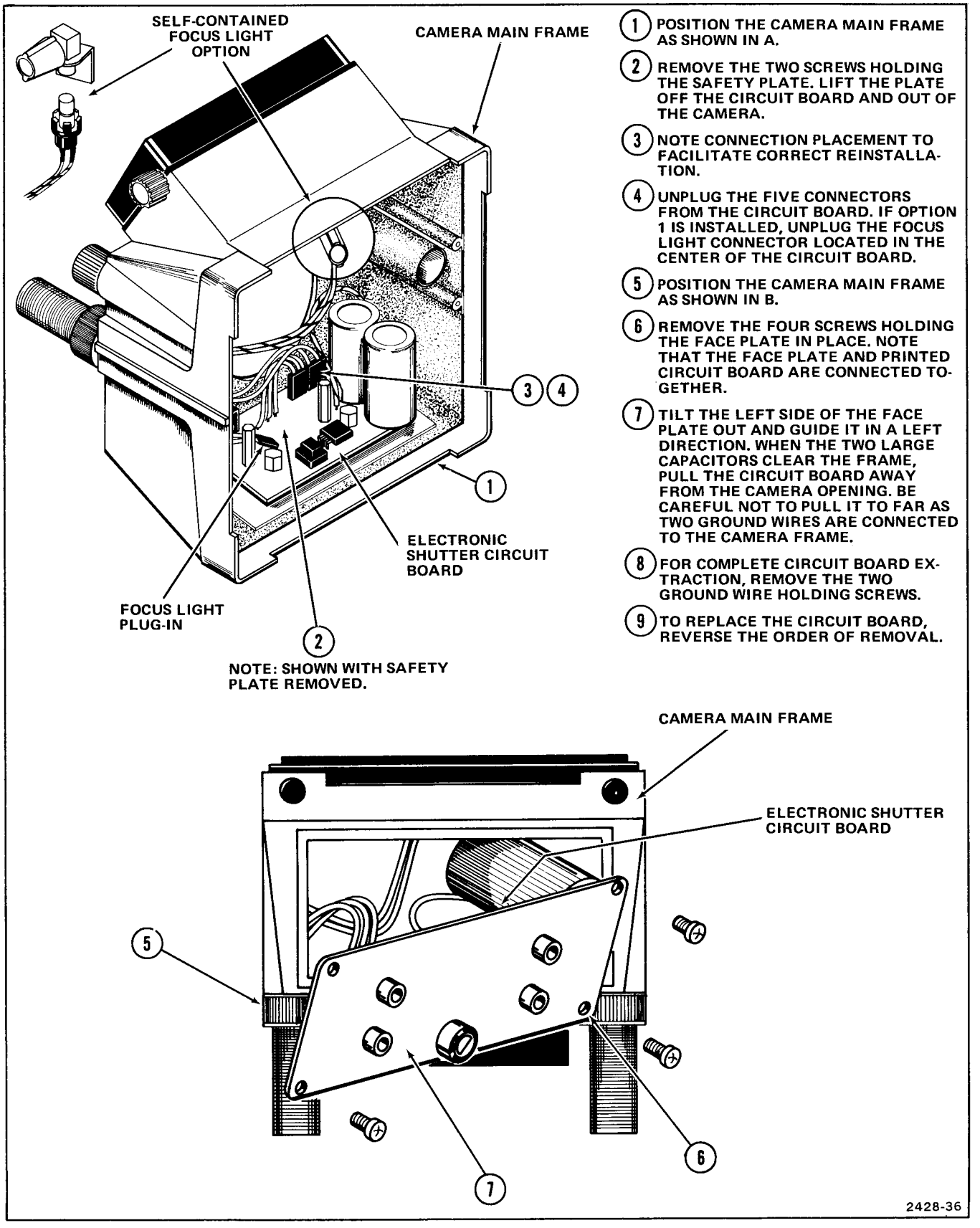


Figure 4-3. Removing the electronic shutter circuit board.

Focus Lamp Removal

CAUTION

Removing the self-contained focus light assembly will cause the camera to be out of focus. Lamp replacement can be accomplished without assembly removal.

To remove and replace the focus lamp, refer to Figure 4-4.

TROUBLESHOOTING

Troubleshooting Aids

Troubleshooting Chart. Figure 7-2 (located on a foldout page at the rear of the manual) is a guide for locating a defective circuit or part. If only a defective circuit is located, the trouble may be further pinpointed with voltage and waveform measurements located with the schematic.

Schematic Diagram. A complete circuit diagram is contained on a foldout page at the rear of the manual.

Troubleshooting Equipment

The following equipment should be sufficient for troubleshooting:

1. Multimeter

   Description: 20,000 ohms per volts; dc voltage range to at least 16 V; resistance range at least five megohms.

   Example: Triplett Model 630 NA or Simpson Model 262.

2. General Purpose Storage Oscilloscope

   Example: Tektronix T912 or 214.

CIRCUIT ADJUSTMENTS

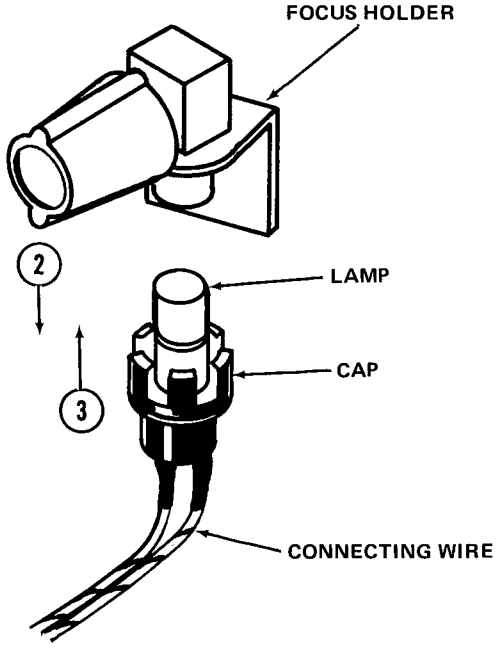
Adjusting the Self-contained Focus System

Focus lights are factory set and secured in place. It shouldn't be necessary to make other than fine focus adjustment for optimum picture reproduction. If the camera cannot be focused using the focus lights, use an alternate focus method (Focus Plate or Graflok Camera Back with Focusing Hood). If it can be focused with the alternate method, adjust the focus lights as follows:

1. Mount the camera on an instrument.

CAUTION

When the rear camera frame is removed, the lens-shutter assembly is completely loose. Careless handling could cause the assembly to fall free and be damaged.



(1) THE FOCUS LAMP HOLDERS ARE MOUNTED BELOW THE VIEWING DOOR OF THE CAMERA MAIN FRAME AS SHOWN IN FIGURE 4-3.

(2) REMOVE THE FOCUS LAMP CAP FROM THE HOLDER BY PULLING IT OFF IN A DIRECTION AWAY FROM THE LAMP HOLDER.

(3) REMOVE THE LAMP BY PULLING IT STRAIGHT OUT FROM THE CAP.

(4) TO REPLACE THE FOCUS LAMP, REVERSE THE ORDER OF THE REMOVAL INSTRUCTIONS.

2428-34

Figure 4-4. Removing the focus lamp.

2. Remove the rear camera frame. The lens-shutter assembly is now loose. Focus adjustments require a dark display. This may be accomplished by holding the lens assembly in position to prevent light leak, or removing the lens-shutter assembly and relocating the camera-instrument to a dark area.

3. Refer to Figure 4-5 for adjustment procedures.

Internal Adjustment of the 1/50 Second Shutter Speed

NOTE

The 1/50 Second Shutter Speed adjustment is calibrated and set at Tektronix, and should not require additional adjustment. Situations in which readjustment may be necessary include: circuit board repair, accidental adjustment of R38, or change of shutter assembly.

Adjustment requires the following basic measuring and set-up devices.

1. General purpose oscilloscope with 5 mV/div vertical deflection and 5 ms/div time base (Tektronix T900 Series.

2. Connecting 50 ohm cable and BNC adapter.

3. Constant intensity light source (perferably dc actuated).

4. Photometer Probe (Tektronix J6501), or phototransistor measuring device.

Figure 4-6 describes the basic set-up and adjustment procedures.

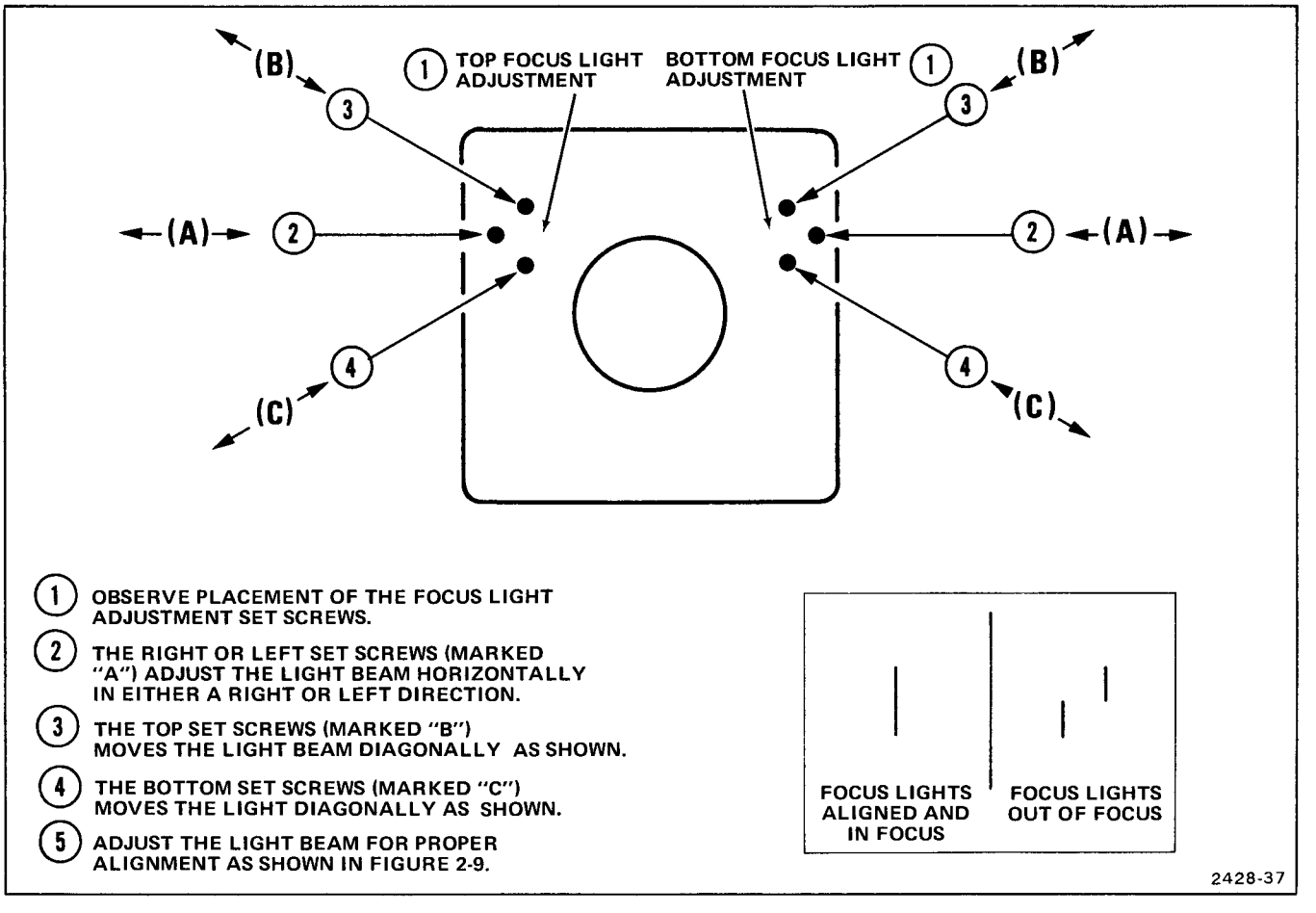


Figure 4-5. Adjusting the self-contained focus system.

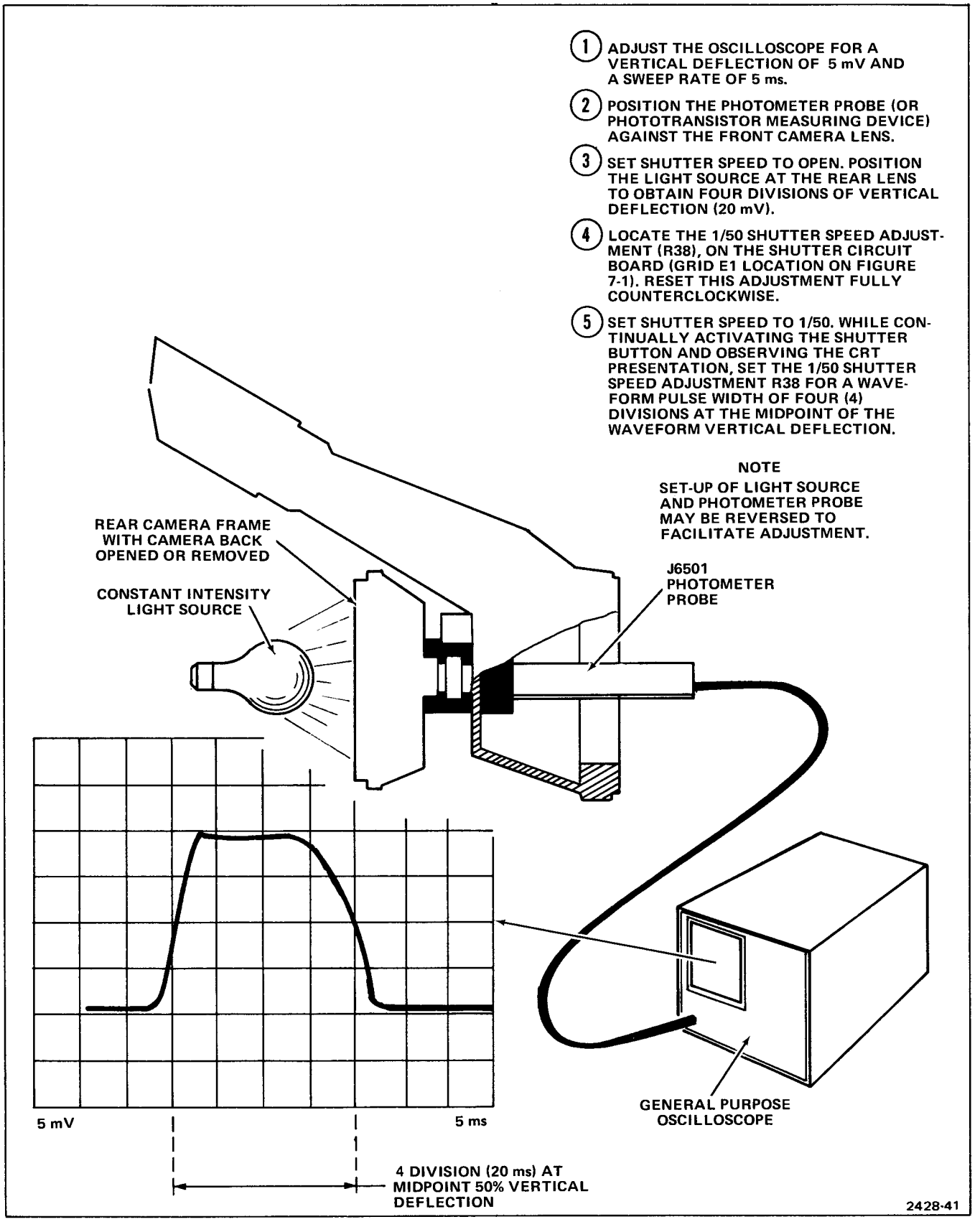


Figure 4-6. Adjusting the 1/50 second shutter speed.

INSTRUMENT OPTIONS

The C-28 Camera may be equipped with any of the following options. The options and a brief description of each is given below. TABLE 5-1 lists the location of option information within the manual.

OPTION 1

Provides the standard C-28 Camera with a self-contained focus system.

OPTION 2

Provides the standard C-28 Camera with a Graflok Camera Back and Focusing Hood.

OPTION 3

Provides the standard C-28 Camera without a Polaroid type pack film camera back.

OPTION 4

Provides the standard C-28 Camera with a fixed 1:0.8 object-to-image ratio lens.

OPTION 5

Provides the standard C-28 Camera with a fixed 1:0.9 object-to-image ratio lens.

OPTION 6

Provides the standard C-28 Camera with a fixed 1:1 (unity) object-to-image ratio lens.

OPTION 8

Provides the standard C-28 Camera with a mounting adapter for Tektronix Type 600-Series Display Monitors, the 577 Curve Tracer, and many 5000- and 7000-Series Oscilloscopes. Further details on use of adapters are contained in the Tektronix Products Catalog.

TABLE 5-1

Option Information Locator

Instrument Option	Manual Section	Location of Information
Option 1 Provides the standard C-28 Camera with a self-contained focus system	2 Operating Instructions	Self-contained Focus System Describes the procedures for camera focus using the self-contained focus light.
	4 Maintenance	Focus Lamp Removal Describes how to remove a focus lamp.
	5 Instrument Options	Instrument Options Introductory page includes a brief description of Option 1.
	8 Replaceable Mechanical Parts	Mechanical Parts Lists and Exploded Viewing Drawing Parts for Option 1 are footnoted in the mechanical parts list and on the exploded view drawing.
Option 2 Provides the standard C-28 Camera with a Graflok Camera Back and Focusing Hood	2 Operating Instructions	Focusing with Graflok Back Describes how to focus the camera using the Graflok back and focusing hood.
	5 Instrument Options	Instrument Options Introductory page includes a brief description of Option 2.
Option 3 Provides the standard C-28 Camera without a Polaroid type pack film camera back	NA	NA
Option 4 Provides the standard C-28 Camera with a fixed 1:0.8 object-to-image ratio lens	1 General Information	Description States that the 1:0.8 object-to-image ratio lens is available as an optional item.
	2 Operating Instructions	Optional Object-to-Image Ratio Describes procedures for changing the object-to-image ratio lens assembly.
	4 Maintenance	Optical Lens Removal Describes the procedures for removal of optical lens.
	5 Instrument Options	Instrument Options Introductory page includes a brief description of Option 4.

TABLE 5-1 (cont)

Instrument Option	Manual Section	Location of Information
Option 5 Provides the standard C-28 Camera with a fixed 1:0.9 object-to-image ratio lens	1 General Information	Description States that the 1:0.9 object-to-image ratio lens is available as optional item.
	2 Operating Instructions	Optional Object-to-Image Ratio Describes procedures for changing the object-to-image ratio lens assembly.
	4 Maintenance	Optical Lens Removal Describes the procedures for removing optical lens.
	5 Instruction Options	Instrument Options Introductory page includes a brief description of Option 5.
Option 6 Provides the standard C-28 Camera with a fixed 1:1 (unity) object-to-image ratio lens.	1 General Information	Description States that the 1:1 (unity) object-to-image ratio lens is available as an optional item.
	2 Operating Instructions	Optional Object-to-Image Ratio Describes procedures for changing the object-to-image ratio lens assembly.
	4 Maintenance	Optical Lens Removal Describes the procedures for removing optical lens.
	5 Instruction Options	Instrument Options Introductory page includes a brief description of Option 6.
Option 8 Provides the standard C-28 Camera with a mounting adapter for Tektronix 600-Series Display Monitors, the 577 Curve Tracer, and many 5000- and 7000-Series Oscilloscopes	1 General Information	Description TABLE 1-1 contains information concerning instrument-to-adapter relationships.
	2 Operating Instructions	Mounting the Adapter Describes the procedures to mount the adapter to the camera.

Information on any subsequent options may be found in the CHANGE INFORMATION section in the back of this manual.

REPLACEABLE ELECTRICAL PARTS

PARTS ORDERING INFORMATION

Replacement parts are available from or through your local Tektronix, Inc. Field Office or representative.

Changes to Tektronix instruments are sometimes made to accommodate improved components as they become available, and to give you the benefit of the latest circuit improvements developed in our engineering department. It is therefore important, when ordering parts, to include the following information in your order: Part number, instrument type or number, serial number, and modification number if applicable.

If a part you have ordered has been replaced with a new or improved part, your local Tektronix, Inc. Field Office or representative will contact you concerning any change in part number.

Change information, if any, is located at the rear of this manual.

SPECIAL NOTES AND SYMBOLS

X000	Part first added at this serial number
00X	Part removed after this serial number

ITEM NAME

In the Parts List, an Item Name is separated from the description by a colon (:). Because of space limitations, an Item Name may sometimes appear as incomplete. For further Item Name identification, the U.S. Federal Cataloging Handbook H6-1 can be utilized where possible.

ABBREVIATIONS

ACTR	ACTUATOR	PLSTC	PLASTIC
ASSY	ASSEMBLY	QTZ	QUARTZ
CAP	CAPACITOR	RECP	RECEPTACLE
CER	CERAMIC	RES	RESISTOR
CKT	CIRCUIT	RF	RADIO FREQUENCY
COMP	COMPOSITION	SEL	SELECTED
CONN	CONNECTOR	SEMICOND	SEMICONDUCTOR
ELCTLT	ELECTROLYTIC	SENS	SENSITIVE
ELEC	ELECTRICAL	VAR	VARIABLE
INCAND	INCANDESCENT	WW	WIREWOUND
LED	LIGHT EMITTING DIODE	XFMR	TRANSFORMER
NONWIR	NON WIREWOUND	XTAL	CRYSTAL

CROSS INDEX—MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip
0000A	LEMO USA	2015 2ND STREET	BERKLEY, CA 94710
01121	ALLEN-BRADLEY COMPANY	1201 2ND STREET SOUTH	MILWAUKEE, WI 53204
07910	TELEDYNE SEMICONDUCTOR	12515 CHADRON AVE.	HAWTHORNE, CA 90250
08806	GENERAL ELECTRIC CO., MINIATURE LAMP PRODUCTS DEPARTMENT	NELA PARK	CLEVELAND, OH 44112
09353	C AND K COMPONENTS, INC.	103 MORSE STREET	WATERTOWN, MA 02172
14752	ELECTRO CUBE INC.	1710 S. DEL MAR AVE.	SAN GABRIEL, CA 91776
18324	SIGNETICS CORP.	811 E. ARQUES	SUNNYVALE, CA 94086
34114	OAK INDUSTRIES, INC.	S MAIN STREET	CRYSTAL LAKE, IL 60014
56289	SPRAGUE ELECTRIC CO.		NORTH ADAMS, MA 01247
71400	BUSSMAN MFG., DIVISION OF MCGRAW-EDISON CO.	2536 W. UNIVERSITY ST.	ST. LOUIS, MO 63107
72982	ERIE TECHNOLOGICAL PRODUCTS, INC.	644 W. 12TH ST.	ERIE, PA 16512
73138	BECKMAN INSTRUMENTS, INC., HELIPOT DIV.	2500 HARBOR BLVD.	FULLERTON, CA 92634
75042	TRW ELECTRONIC COMPONENTS, IRC FIXED RESISTORS, PHILADELPHIA DIVISION	401 N. BROAD ST.	PHILADELPHIA, PA 19108
80009	TEKTRONIX, INC.	P O BOX 500	BEAVERTON, OR 97077
90201	MALLORY CAPACITOR CO., DIV. OF P. R. MALLORY AND CO., INC.	3029 E WASHINGTON STREET P O BOX 372	INDIANAPOLIS, IN 46206
91637	DALE ELECTRONICS, INC.	P. O. BOX 609	COLUMBUS, NE 68601

Ckt No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
A1	670-5224-00			CIRCUIT BD ASSY:ELECTRONIC SHUTTER	80009	670-5224-00
C1	290-0574-00			CAP.,FXD,ELCTLT:47UF,10%,20V	90201	TDC476K020CL
C19	283-0204-00			CAP.,FXD,CER DI:0.01UF,20%,50V	72982	8121N075Z5U0103M
C25	283-0204-00			CAP.,FXD,CER DI:0.01UF,20%,50V	72982	8121N075Z5U0103M
C26	290-0267-00			CAP.,FXD,ELCTLT:1UF,20%,35V	56289	162D105X0035CD2
C30	285-1051-00			CAP.,FXD,PLSTC:1UF,1%,200V	14752	230B1C105F
C32	283-0204-00			CAP.,FXD,CER DI:0.01UF,20%,50V	72982	8121N075Z5U0103M
C34	283-0024-00			CAP.,FXD,CER DI:0.1UF,+80-20%,30V	72982	8131N039Z5U-104Z
C40	290-0802-00			CAP.,FXD,ELCTLT:4700UF,+75-10%,16V	56289	D76401
C41	290-0802-00			CAP.,FXD,ELCTLT:4700UF,+75-10%,16V	56289	D76401
CR10	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	07910	1N4152
CR12	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	07910	1N4152
CR20	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	07910	1N4152
CR21	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	07910	1N4152
CR22	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	07910	1N4152
CR23	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	07910	1N4152
CR40	152-0066-00			SEMICOND DEVICE:SILICON,400V,750MA	80009	152-0066-00
DS6	150-0097-01			LAMP,INCAND:6.3V,0.2A,#7381,FROSTED	08806	7381F
DS7	150-0097-01			LAMP,INCAND:6.3V,0.2A,#7381,FROSTED	08806	7381F
F1	159-0114-00			FUSE,CARTRIDGE:1A,125A,0.05 SEC. AXIAL	71400	GFA1
J1	136-0138-00			JACK,TIP:BANANA STYLE,W/BLACK CAP	80009	136-0138-00
J2	136-0139-00			JACK,TIP:BANANA STYLE,W/RED CAP	80009	136-0139-00
J3	131-1471-00			CONN,RCPT,ELEC:	0000A	RA1306
Q10	151-0190-00			TRANSISTOR:SILICON,NPN	80009	151-0190-00
Q20	151-0190-00			TRANSISTOR:SILICON,NPN	80009	151-0190-00
Q25	151-0190-00			TRANSISTOR:SILICON,NPN	80009	151-0190-00
Q40	151-0190-00			TRANSISTOR:SILICON,NPN	80009	151-0190-00
R1	308-0793-00			RES.,FXD,WW:0.51 OHM,5%,0.50W,1W	75042	BW20-R5100J
R8	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
R10	315-0470-00			RES.,FXD,CMPSN:47 OHM,5%,0.25W	01121	CB4705
R12	315-0104-00			RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
R14	315-0333-00			RES.,FXD,CMPSN:33K OHM,5%,0.25W	01121	CB3335
R16	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
R17	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
R18	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
R19	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
R21	315-0332-00			RES.,FXD,CMPSN:3.3K OHM,5%,0.25W	01121	CB3325
R23	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
R25	315-0473-00			RES.,FXD,CMPSN:47K OHM,5%,0.25W	01121	CB4735
R26	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
R27	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
R30	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
R31	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
R32	321-0507-00			RES.,FXD,FILM:1.87M OHM,1%,0.125W	91637	HFF1813G18703F
R33	321-0807-00			RES.,FXD,FILM:900K OHM,1%,0.125W	91637	HFF1104F90002F
R34	321-0448-00			RES.,FXD,FILM:453K OHM,1%,0.125W	91637	MFF1816G45302F
R35	321-0410-00			RES.,FXD,FILM:182K OHM,1%,0.125W	91637	MFF1816G18202F
R36	321-0378-00			RES.,FXD,FILM:84.5K OHM,1%,0.125W	91637	MFF1816G84501F
R37	321-0333-00			RES.,FXD,FILM:28.7K OHM,1%,0.125W	91637	MFF1816G28701F
R38	311-1558-00			RES.,VAR,NONWIR:20K OHM,20%,0.50W	73138	91A R20K

Ckt No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
R39	321-0260-00			RES.,FXD,FILM:4.99K OHM,1%,0.125W	91637	MFF1816G49900F
R40	315-0471-00			RES.,FXD,CMPSN:470 OHM,5%,0.25W	01121	CB4715
R42	308-0634-00			RES.,FXD,WW:12.5 OHM,1%,5W	91637	HL605Z812R50F
S10	260-1285-00			SWITCH,PUSH:SPDT,1A,115AC,MOM	09353	P8121
S30	260-1904-00			SWITCH,ROTARY:SHUTTER TIME	34114	OBD
U30	156-0402-00			MICROCIRCUIT,DI:TIMER	18324	NE555V
U35	156-0285-00			MICROCIRCUIT,LI:VOLTAGE REGULATOR,12V,1A	80009	156-0285-00

DIAGRAMS AND CIRCUIT BOARD ILLUSTRATIONS

Symbols and Reference Designators

Electrical components shown on the diagrams are in the following units unless noted otherwise:

Capacitors = Values one or greater are in picofarads (pF). Values less than one are in microfarads (μF).

Resistors = Ohms (Ω).

Graphic symbols and class designation letters are based on ANSI Standard Y32.2-1975.

Logic symbology is based on ANSI Y32.14-1973 in terms of positive logic. Logic symbols depict the logic function performed and may differ from the manufacturer's data.

Abbreviations are based on ANSI Y1.1-1972.

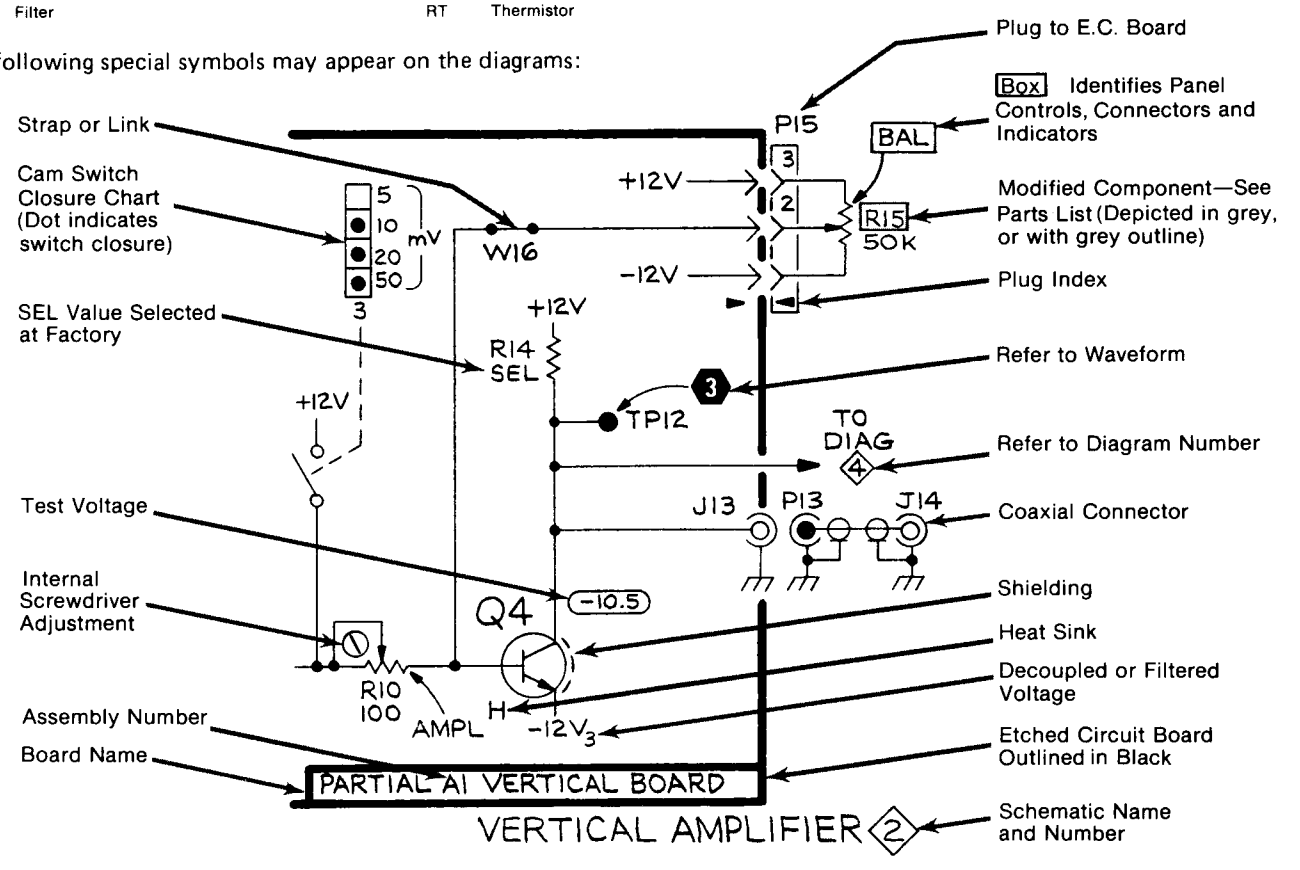
Other ANSI standards that are used in the preparation of diagrams by Tektronix, Inc. are:

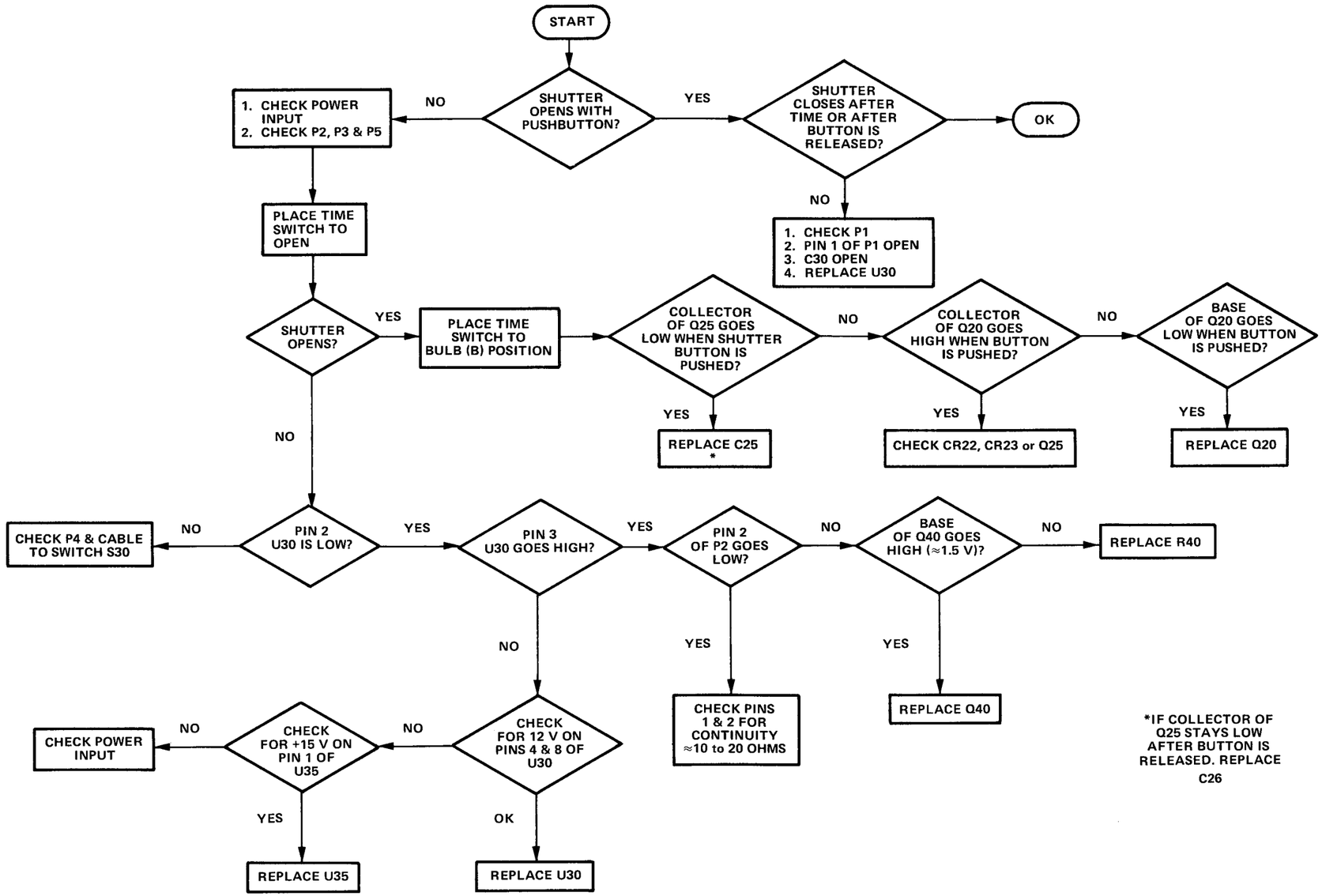
Y14.15, 1966	Drafting Practices.
Y14.2, 1973	Line Conventions and Lettering.
Y10.5, 1968	Letter Symbols for Quantities Used in Electrical Science and Electrical Engineering.

The following prefix letters are used as reference designators to identify components or assemblies on the diagrams.

A	Assembly, separable or repairable (circuit board, etc)	H	Heat dissipating device (heat sink, heat radiator, etc)	S	Switch or contactor
AT	Attenuator, fixed or variable	HR	Heater	T	Transformer
B	Motor	HY	Hybrid circuit	TC	Thermocouple
BT	Battery	J	Connector, stationary portion	TP	Test point
C	Capacitor, fixed or variable	K	Relay	U	Assembly, inseparable or non-repairable (integrated circuit, etc.)
CB	Circuit breaker	L	Inductor, fixed or variable	V	Electron tube
CR	Diode, signal or rectifier	M	Meter	VR	Voltage regulator (zener diode, etc.)
DL	Delay line	P	Connector, movable portion	W	Wirestrap or cable
DS	Indicating device (lamp)	Q	Transistor or silicon-controlled rectifier	Y	Crystal
E	Spark Gap, Ferrite bead	R	Resistor, fixed or variable	Z	Phase shifter
F	Fuse	RT	Thermistor		
FL	Filter				

The following special symbols may appear on the diagrams:





2428-33

FIGURE 7-2. TROUBLESHOOTING CHART.

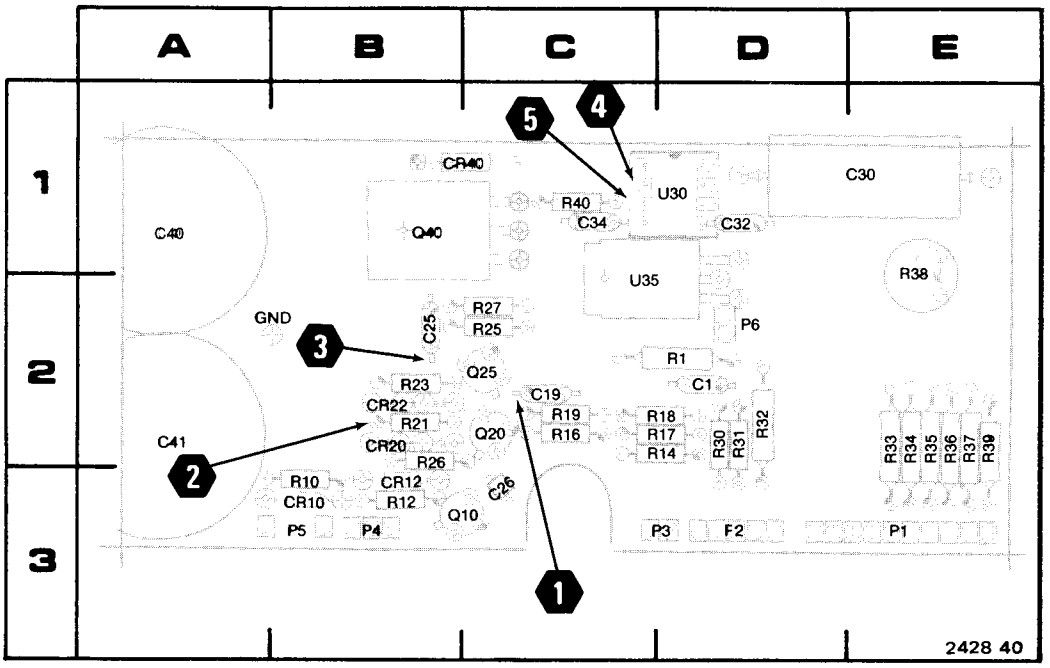


FIGURE 7-1. ELECTRONIC SHUTTER CIRCUIT BOARD.

CKT NO	GRID LOC	CKT NO	GRID LOC
C1	2D	R1	2D
C19	2C	R10	3B
C25	2B	R12	3B
C26	3C	R14	2D
C30	1E	R16	2C
C32	1D	R17	2D
C34	1C	R18	2D
C40	1A	R19	2C
C41	2A	R21	2B
		R23	2B
CR10	3B	R25	2C
CR12	3B	R26	2B
CR20	2B	R27	2C
CR22	2B	R30	2D
CR40	1C	R31	2D
		R32	2D
P1	3E	R33	2E
P2	3D	R34	2E
P3	3D	R35	2E
P4	3B	R36	2E
P5	3B	R37	2E
P6	2D	R38	1E
		R39	2E
Q10	3C	R40	1C
Q20	2C		
Q25	2C	U30	1D
Q40	1B	U35	2C

VOLTAGE AND WAVEFORM CONDITIONS

Common Measurement Conditions

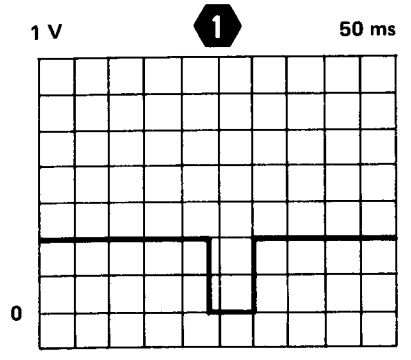
1. All measurement are between the observed test point and ground.

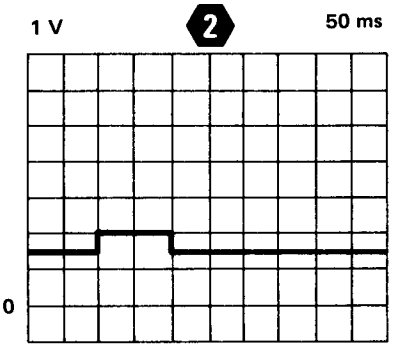
2. Test oscilloscope is dc coupled and internally triggered. Vertical deflection and sweep ranges are shown on the waveforms. The test oscilloscope should have a storage capability to provide optimum trace presentation.

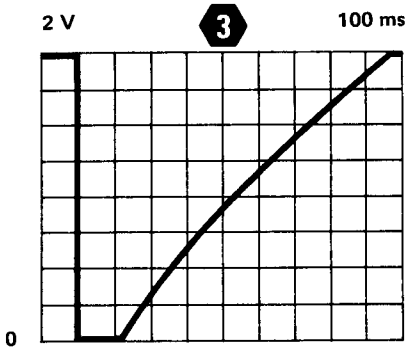
3. Push the SHUTTER button to activate the circuit and test waveforms.

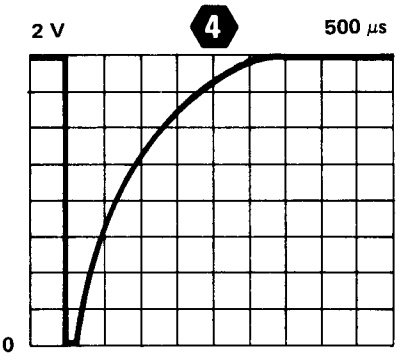
4. Pulse width on test points 1, 2, and 3 are dependent on the time period required for activating (push-release) of the SHUTTER button.

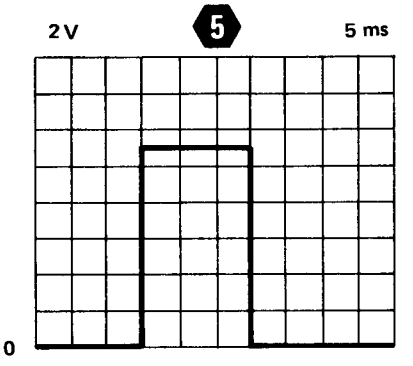
5. Voltage measurements may vary as much as 20%.

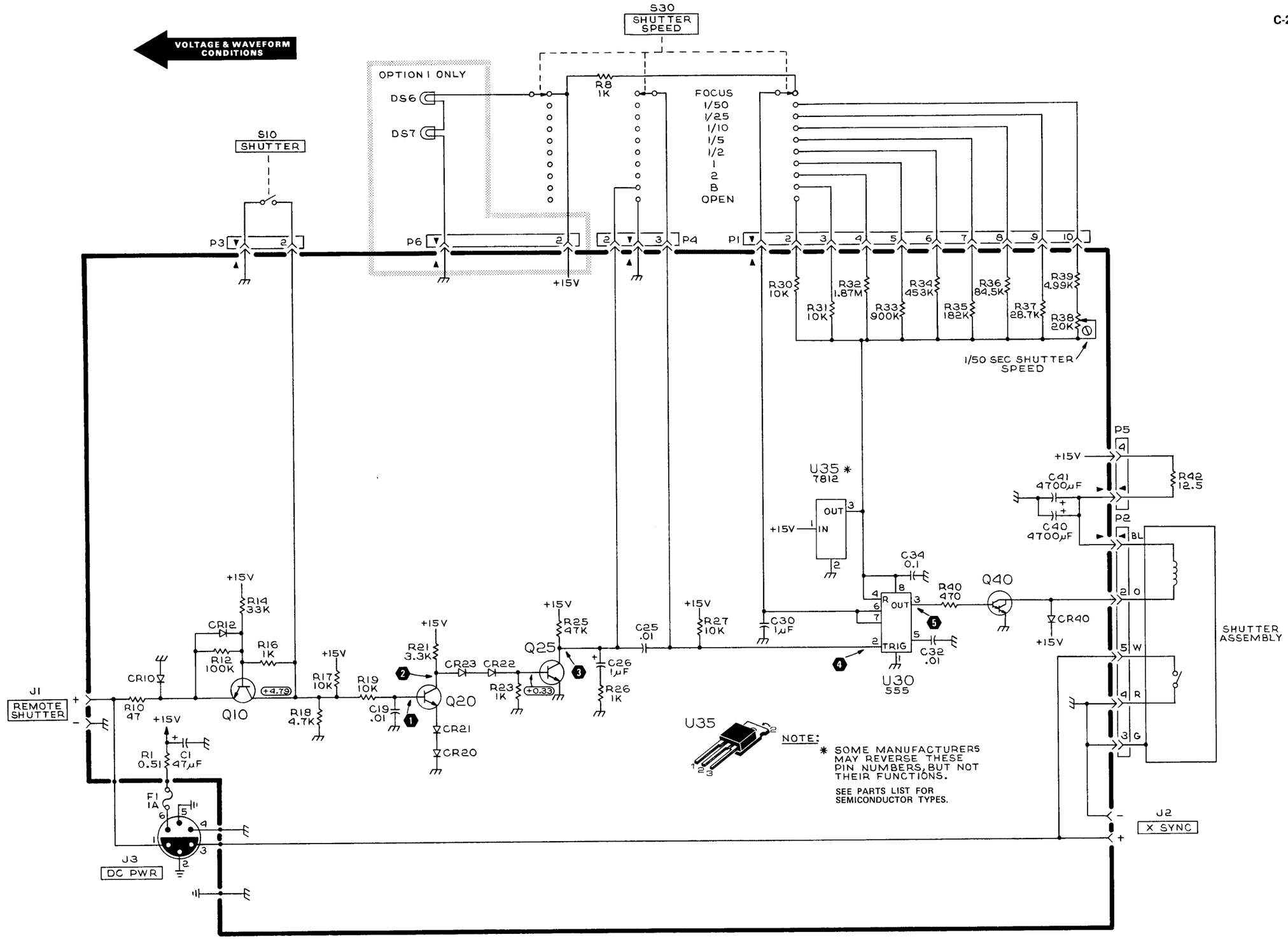











VOLTAGE & WAVEFORM CONDITIONS
S30 SHUTTER SPEED
OPTION 1 ONLY
DS6
DS7
R8 1K
FOCUS
1/50
1/25
1/10
1/5
1/2
1
2
B
OPEN
S10 SHUTTER
P3
P6
P4
P1
+15V
R30 10K
R31 10K
R32 1.87M
R33 900K
R34 453K
R35 182K
R36 84.5K
R37 28.7K
R38 20K
R39 4.99K
1/50 SEC SHUTTER SPEED
P5
+15V
C41 4700µF
C40 4700µF
R42 12.5
P2
BL
U35 * 7812
OUT
IN
C34 0.1
R40 470
Q40
CR40
C30 1µF
C32 .01
U30 555
TRIG
R
SHUTTER ASSEMBLY
5 W
4 R
3 G
2 O
J1 REMOTE SHUTTER
R10 47
CR10
CR12
R14 33K
R12 100K
R16 1K
Q10
+4.79
R17 10K
R18 4.7K
R19 10K
C19 .01
R21 3.3K
Q20
CR23
CR22
CR21
CR20
R23 1K
+0.33
Q25
R25 47K
C26 1µF
R26 1K
C25 .01
R27 10K
R1 0.51
C1 47µF
F1 1A
J3 DC PWR
J2 X SYNC
U35
NOTE:
* SOME MANUFACTURERS MAY REVERSE THESE PIN NUMBERS, BUT NOT THEIR FUNCTIONS.
SEE PARTS LIST FOR SEMICONDUCTOR TYPES.

REPLACEABLE MECHANICAL PARTS

PARTS ORDERING INFORMATION

Replacement parts are available from or through your local Tektronix, Inc. Field Office or representative.

Changes to Tektronix instruments are sometimes made to accommodate improved components as they become available, and to give you the benefit of the latest circuit improvements developed in our engineering department. It is therefore important, when ordering parts, to include the following information in your order: Part number, instrument type or number, serial number, and modification number if applicable.

If a part you have ordered has been replaced with a new or improved part, your local Tektronix, Inc. Field Office or representative will contact you concerning any change in part number.

Change information, if any, is located at the rear of this manual.

SPECIAL NOTES AND SYMBOLS

X000	Part first added at this serial number
00X	Part removed after this serial number

FIGURE AND INDEX NUMBERS

Items in this section are referenced by figure and index numbers to the illustrations.

INDENTATION SYSTEM

This mechanical parts list is indented to indicate item relationships. Following is an example of the indentation system used in the description column.

1 2 3 4 5 Name & Description

Assembly and/or Component
Attaching parts for Assembly and/or Component
\- - - * - - -
Detail Part of Assembly and/or Component
Attaching parts for Detail Part
\- - - * - - -
Parts of Detail Part
Attaching parts for Parts of Detail Part
\- - - * - - -

Attaching Parts always appear in the same indentation as the item it mounts, while the detail parts are indented to the right. Indented items are part of, and included with, the next higher indentation. The separation symbol - - - * - - - indicates the end of attaching parts.

Attaching parts must be purchased separately, unless otherwise specified.

ITEM NAME

In the Parts List, an Item Name is separated from the description by a colon (:). Because of space limitations, an Item Name may sometimes appear as incomplete. For further Item Name identification, the U.S. Federal Cataloging Handbook H6-1 can be utilized where possible.

ABBREVIATIONS

"	INCH
#	NUMBER SIZE
ACTR	ACTUATOR
ADPTR	ADAPTER
ALIGN	ALIGNMENT
AL	ALUMINUM
ASSEM	ASSEMBLED
ASSY	ASSEMBLY
ATTEN	ATTENUATOR
AWG	AMERICAN WIRE GAGE
BD	BOARD
BRKT	BRACKET
BRS	BRASS
BRZ	BRONZE
BSHG	BUSHING
CAB	CABINET
CAP	CAPACITOR
CER	CERAMIC
CHAS	CHASSIS
CKT	CIRCUIT
COMP	COMPOSITION
CONN	CONNECTOR
COV	COVER
CPLG	COUPLING
CRT	CATHODE RAY TUBE
DEG	DEGREE
DWR	DRAWER
ELCTRN	ELECTRON
ELEC	ELECTRICAL
ELCTLT	ELECTROLYTIC
ELEM	ELEMENT
EPL	ELECTRICAL PARTS LIST
EQPT	EQUIPMENT
EXT	EXTERNAL
FIL	FILLISTER HEAD
FLEX	FLEXIBLE
FLH	FLAT HEAD
FLTR	FILTER
FR	FRAME or FRONT
FSTNR	FASTENER
FT	FOOT
FXD	FIXED
GSKT	GASKET
HDL	HANDLE
HEX	HEXAGON
HEX HD	HEXAGONAL HEAD
HEX SOC	HEXAGONAL SOCKET
HLCPS	HELICAL COMPRESSION
HLEXT	HELICAL EXTENSION
HV	HIGH VOLTAGE
IC	INTEGRATED CIRCUIT
ID	INSIDE DIAMETER
IDENT	IDENTIFICATION
IMPLR	IMPELLER
IN	INCH
INCAND	INCANDESCENT
INSUL	INSULATOR
INTL	INTERNAL
LPHLDR	LAMPHOLDER
MACH	MACHINE
MECH	MECHANICAL
MTG	MOUNTING
NIP	NIPPLE
NON WIRE	NOT WIRE WOUND
OBD	ORDER BY DESCRIPTION
OD	OUTSIDE DIAMETER
OVH	OVAL HEAD
PH BRZ	PHOSPHOR BRONZE
PL	PLAIN or PLATE
PLSTC	PLASTIC
PN	PART NUMBER
PNH	PAN HEAD
PWR	POWER
RCPT	RECEPTACLE
RES	RESISTOR
RGD	RIGID
RLF	RELIEF
RTNR	RETAINER
SCH	SOCKET HEAD
SCOPE	OSCILLOSCOPE
SCR	SCREW
SE	SINGLE END
SECT	SECTION
SEMICOND	SEMICONDUCTOR
SHLD	SHIELD
SHLDR	SHOULDERED
SKT	SOCKET
SL	SLIDE
SLFLKG	SELF-LOCKING
SLVG	SLEEVING
SPR	SPRING
SQ	SQUARE
SST	STAINLESS STEEL
STL	STEEL
SW	SWITCH
T	TUBE
TERM	TERMINAL
THD	THREAD
THK	THICK
TNSN	TENSION
TPG	TAPPING
TRH	TRUSS HEAD
V	VOLTAGE
VAR	VARIABLE
W/	WITH
WSHR	WASHER
XFMR	TRANSFORMER
XSTR	TRANSISTOR

CROSS INDEX—MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip
000AH	STANDARD PRESSED STEEL CO., UNBRAKO DIV.	8535 DICE ROAD	SANTA FE SPRINGS, CA 90670
08261	SPECTRA-STRIP CORP.	7100 LAMPSON AVE.	GARDEN GROVE, CA 92642
11897	PLASTIGLIDE MFG. CORPORATION	P O BOX 867, 1757 STANFORD ST.	SANTA MONICA, CA 90406
18680	HIGHLAND MFG. CO., THE DIV. OF BUELL INDUSTRIES, INC.	1240 WOLCOTT STREET	WATERBURY, CT 06720
22526	BERG ELECTRONICS, INC.	YOUK EXPRESSWAY	NEW CUMBERLAND, PA 17070
29556	POLAROID CORPORATION	750 MAIN STREET	CAMBRIDGE, MA 02139
30181	ILEX OPTICAL COMPANY	690 PORTLAND AVENUE	ROCHESTER, NY 14621
46384	PENN ENGINEERING AND MFG. CORP.	P O BOX 311	DOYLESTOWN, PA 18901
71785	TRW, CINCH CONNECTORS	1501 MORSE AVENUE	ELK GROVE VILLAGE, IL 60007
73743	FISCHER SPECIAL MFG. CO.	446 MORGAN ST.	CINCINNATI, OH 45206
73803	TEXAS INSTRUMENTS, INC., METALLURGICAL MATERIALS DIV.	34 FOREST STREET	ATTLEBORO, MA 02703
74445	HOLO-KROME CO.	31 BROOK ST. WEST	HARTFORD, CT 06110
77250	PHEOLL MANUFACTURING CO., DIVISION OF ALLIED PRODUCTS CORP.	5700 W. ROOSEVELT RD.	CHICAGO, IL 60650
77969	RUBBERCRAFT CORP. OF CALIF., LTD.	1800 W. 220TH ST.	TORRANCE, CA 90507
78189	ILLINOIS TOOL WORKS, INC. SHAKEPROOF DIVISION	ST. CHARLES ROAD	ELGIN, IL 60120
79807	WROUGHT WASHER MFG. CO.	2100 S. O BAY ST.	MILWAUKEE, WI 53207
80009	TEKTRONIX, INC.	P O BOX 500	BEAVERTON, OR 97077
83385	CENTRAL SCREW CO.	2530 CRESCENT DR.	BROADVIEW, IL 60153
85471	BOYD, A. B., CO.	2527 GRANT AVENUE	SAN LEANDRO, CA 94579
89663	REESE, J. RAMSEY, INC.	71 MURRAY STREET	NEW YORK, NY 10007
96904	NATVAR CORP.	211 RANDOLPH AVE.	WOODBRIDGE, NJ 07095

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Qty	1 2 3 4 5	Name & Description	Mfr Code	Mfr Part Number
1-	426-1503-00			1		FRAME ASSY,CAMR:MAIN	80009	426-1503-00
-1	200-0572-00			1		. COVER,PROT,CAMR:FRONT,CLEAR BUTYRATE	80009	200-0572-00
	122-0716-00			1		. FRAME,SUPPORT:ROTATING	80009	122-0716-00
						(ATTACHING PARTS)		
-2	211-0584-00			4		. SCR,CAP,SOC HD:6-32 X 0.250 INCH LG,STL	74445	OBD
						- - - * - - -		
	----- -----			-		. . FRAME SUPPORT INCLUDES:		
-3	367-0020-00			1		. . LATCH,RIM:	80009	367-0020-00
						(ATTACHING PARTS)		
-4	212-0069-00			1		. . SCREW,MACHINE:8-32 X 0.312 INCH,TRH STL	77250	OBD
						- - - * - - -		
-5	355-0067-00			1		. . STUD,LATCH:5/16 BRS ROD,0.749 LONG	80009	355-0067-00
-6	214-0397-00			1		. . PIN,STR,HDLS:	80009	214-0397-00
-7	214-0398-00			1		. . PIN,STR,HDLS:	80009	214-0398-00
-8	426-0215-00			1		. . FRAME,SUPPORT:	80009	426-0215-00
	122-1011-00			1		. FRAME,SUPPORT:	80009	122-1011-00
						(ATTACHING PARTS)		
-9	210-0455-00			1		. NUT,PLAIN,HEX.:0.25-28 X 0.375 INCH,BRASS	73743	3089-402
						- - - * - - -		
-10	134-0072-00			3		. PLUG,LIGHT SEAL:0.625 OD X 0.25,D-SHAPE,BK	80009	134-0072-00
	----- -----			-		. . SUPPORT HOUSING INCLUDES:		
-11	129-0667-00			2		. . SPACER,POST:5.5 L,W/0.312-24 THD 1 END	80009	129-0667-00
						(ATTACHING PARTS FOR EACH)		
-12	211-0072-00			1		. . SCREW,CAP:0.312-24 X 0.750,BTN HD,STL	000AH	OBD
						- - - * - - -		
-13	426-0213-00			1		. . FRAME,SUPPORT:	80009	426-0213-00
	122-0718-00			1		. SHIELD,LT SEAL:	80009	122-0718-00
						(ATTACHING PARTS)		
-14	211-0105-00			8		. SCREW,MACHINE:4-40 X 0.188"100 DEG,FLH STL	83385	OBD
						- - - * - - -		
	----- -----			-		. . LIGHT SEAL ASSY INCLUDES:		
-15	252-0550-00			FT		. . TAFFETA:1.500 FT LONG	80009	252-0550-00
-16	214-0170-00			2		. . GASKET:	80009	214-0170-00
-17	214-0171-00			1		. . GASKET:	80009	214-0171-00
-18	337-0603-00			1		. . SHIELD,LT SEAL:	80009	337-0603-00
-19	252-0571-00			FT		. RUB.SPL SHAPED:CHANNEL,2.0 FT LONG	77969	1353
-20	337-2471-00			1		. SHIELD,ELEC:CIRCUIT BOARD	80009	337-2471-00
						(ATTACHING PARTS)		
-21	211-0083-00			2		. SCREW,MACHINE:4-40 X 0.250,PNH,STL,BK OXD	83385	OBD
						- - - * - - -		
	672-0715-00			1		. CKT BOARD ASSY:	80009	672-0715-00
						(ATTACHING PARTS)		
-22	211-0504-00			4		. SCREW,MACHINE:6-32 X 0.25 INCH,PNH STL	83385	OBD
						- - - * - - -		
	----- -----			-		. . CKT BOARD ASSY INCLUDES:		
-23	----- -----			1		. . CONN,RCPT,ELEC:(SEE J3 EPL)		
						(ATTACHING PARTS)		
-24	361-0887-00			1		. . SPACER,RING:0.2 L X 0.484ID,ALUMINUM	80009	361-0887-00
						- - - * - - -		
-25	----- -----			2		. . JACK,TIP:(SEE J1 EPL)		
	----- -----			2		. . JACK,TIP:(SEE J2 EPL)		
						(ATTACHING PARTS FOR EACH)		
-26	210-0465-00			1		. . NUT,PLAIN,HEX.:0.25-32 X 0.375 INCH BRS	73743	3095-402
-27	210-0940-00			1		. . WASHER,FLAT:0.25 ID X 0.375 INCH OD,STL	79807	OBD
-28	210-0895-00			1		. . WSHR,SHOULDERED:0.375 OD X 0.105 INCH THK	80009	210-0895-00
	210-0898-00			1		. . WSHR,SHOULDERED:0.375 OD X 0.105 " THK	80009	210-0898-00
-29	210-1261-00			1		. . WASHER,FLAT:0.325 ID X 0.05 THK,NYLON	11897	167-NN-Q627
						- - - * - - -		
-30	386-3806-00			1		. . PANEL,BOTTOM:ALUMINUM	80009	386-3806-00
-31	----- -----			1		. . CKT BOARD ASSY:(SEE A1 EPL)		
						(ATTACHING PARTS)		
-32	220-0816-00			4		. . NUT,PLAIN,CAP:0.25-32 X 0.375 HEX,AL	80009	220-0816-00
-33	210-0940-00			4		. . WASHER,FLAT:0.25 ID X 0.375 INCH OD,STL	79807	OBD
						- - - * - - -		

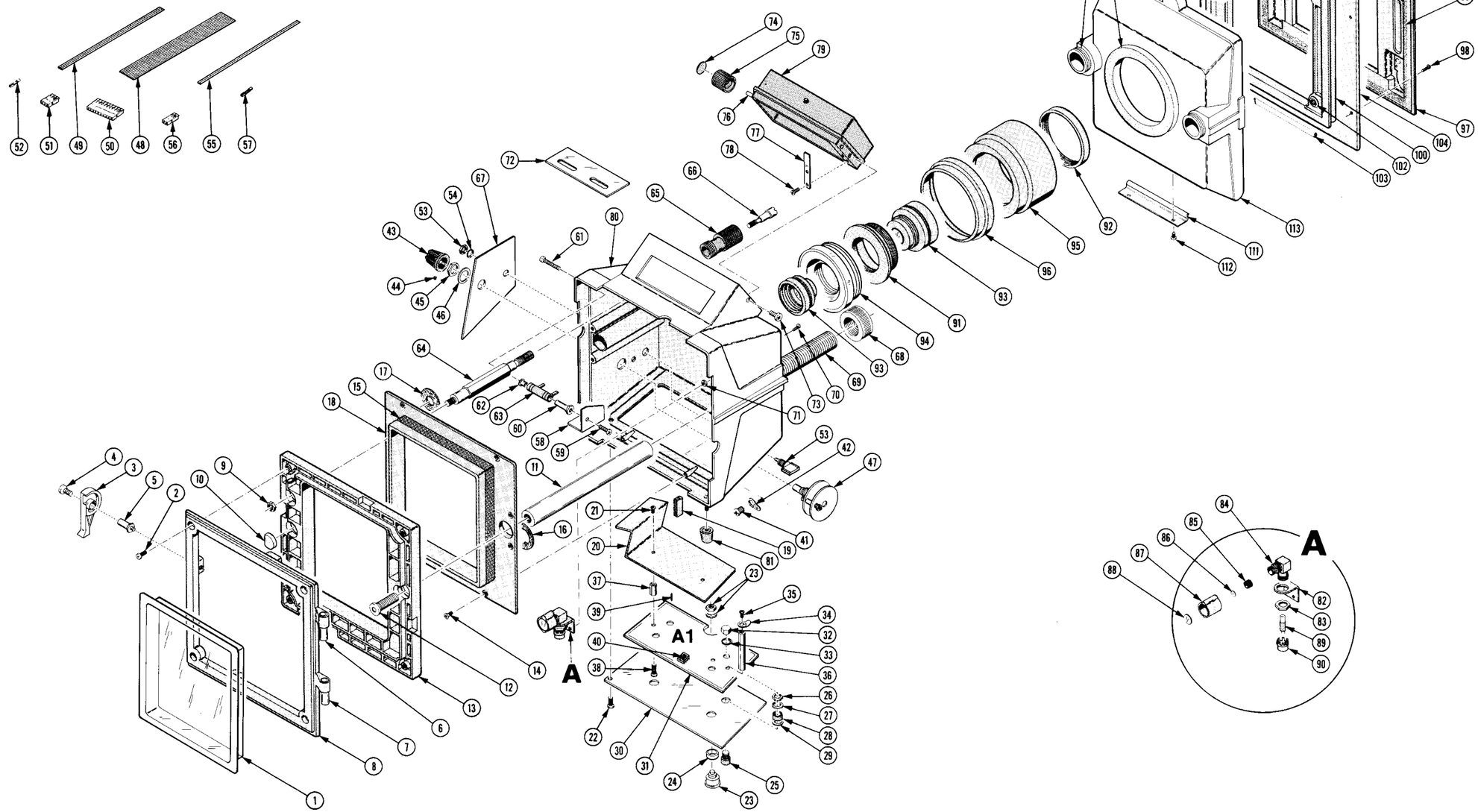
Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Qty	1 2 3 4 5	Name & Description	Mfr Code	Mfr Part Number
1-	----- -----			-		. . . CKT BOARD INCLUDES:		
-34	210-0201-00			1		. . . TERMINAL,LUG:SE #4	78189	2104-04-00-2520N
						(ATTACHING PARTS)		
-35	211-0008-00			1		. . . SCREW,MACHINE:4-40 X 0.25 INCH,PNH STL	83385	OBD
						- - - * - - -		
-36	129-0114-00			1		. . . POST,ELEC-MECH:0.25 INCH HEX,1.625 INCH L	80009	129-0114-00
						(ATTACHING PARTS)		
	211-0116-00			1		. . . SCR,ASSEM WSHR:4-40 X 0.312 INCH,PNH BRS	83385	OBD
						- - - * - - -		
-37	220-0449-00			2		. . . NUT,SLEEVE:4-40 X 0.188 X 0.50" LONG	80009	220-0449-00
						(ATTACHING PARTS FOR EACH)		
-38	211-0116-00			1		. . . SCR,ASSEM WSHR:4-40 X 0.312 INCH,PNH BRS	83385	OBD
						- - - * - - -		
-39	131-0608-00			24		. . . CONTACT,ELEC:0.365 L X 0.25 PH BRZ GOLD PL	22526	47357
-40	136-0514-00			1		. . . SOCKET,PLUG IN:MICROCIRCUIT,8 CONTACT	73803	C950802
	198-3832-00			1		. . WIRE SET,ELEC:	80009	198-3832-00
						(ATTACHING PARTS)		
-41	210-0504-00			2		. . NUT,PLAIN,HEX.:0-8 X 0.156 INCH,BRS	73743	3004-402
						- - - * - - -		
	----- -----			-		. . . WIRE KIT INCLUDES:		
-42	210-0202-00			2		. . . TERMINAL,LUG:SE #6	78189	2104-06-00-2520N
-43	366-1190-00			1		. KNOB:GRAY	80009	366-1190-00
-44	213-0153-00			2		. . SETSCREW:5-40 X 0.125 INCH,HEX SOC STL	74445	OBD
	262-1010-00			1		. SWITCH ASSY:	80009	262-1010-00
						(ATTACHING PARTS)		
-45	220-0495-00			1		. NUT,PLAIN,HEX.:0.375-32 X 0.438 INCH BRS	73743	OBD
-46	210-0840-00			1		. WASHER,FLAT:0.39 ID X 0.562 INCH OD,STL	89663	644R
						- - - * - - -		
	----- -----			-		. . SWITCH ASSY INCLUDES:		
-47	----- -----			1		. . SWITCH,ROTARY:(SEE S30 EPL)		
	198-3833-00			1		. . WIRE SET,ELEC:	80009	198-3833-00
-48	175-0833-00			FT		. . WIRE,ELECTRICAL:10 WIRE RIBBON,0.458 FT L	08261	OBD
-49	175-0826-01			FT		. . CABLE,SP,ELEC:26 AWG STRD,PVC JKT RBN	08261	OBD
-50	352-0168-00			1		. . CONN BODY,PL,EL:10 WIRE BLACK	80009	352-0168-00
-51	352-0161-00			1		. . CONN BODY,PL,EL:3 WIRE BLACK	80009	352-0161-00
-52	131-0707-00			13		. . CONNECTOR,TERM.:0.48" L,22-26AWG WIRE	22526	75691-005
	262-1009-00			1		. SWITCH ASSY:	80009	262-1009-00
-53	----- -----			1		. . SWITCH,PUSH:(SEE S10 EPL)		
						(ATTACHING PARTS)		
-54	210-0940-00			1		. . WASHER,FLAT:0.25 ID X 0.375 INCH OD,STL	79807	OBD
						- - - * - - -		
	----- -----			-		. . SWITCH ASSY INCLUDES:		
	198-3834-00			1		. . WIRE SET,ELEC:	80009	198-3834-00
-55	175-0825-00			FT		. . . WIRE,ELECTRICAL:2 WIRE RIBBON,0.354 FT L	08261	OBD
-56	352-0169-00			1		. . . CONN BODY,PL,EL:2 WIRE BLACK	80009	352-0169-00
-57	131-0707-00			2		. . . CONNECTOR,TERM.:0.48" L,22-26AWG WIRE	22526	75691-005
-58	337-2472-01			1		. SHIELD,ELEC:RESISTOR	80009	337-2472-01
						(ATTACHING PARTS)		
-59	211-0638-00			1		. SCREW,MACHINE:6-32 X 0.438 INCH,PHN	83385	OBD
						- - - * - - -		
-60	210-0478-00			1		. INSERT,SCR THD:0.66" L,W/HEX FLG ONE END	80009	210-0478-00
						(ATTACHING PARTS)		
-61	211-0514-00			1		. SCREW,MACHINE:6-32 X 0.750 INCH,PNH STL	83385	OBD
						- - - * - - -		
-62	210-0601-00			1		. EYELET,METALLIC:CAD PLATED	18680	A424
	644-0133-00			1		. POWER RES ASSY:	80009	644-0133-00
-63	----- -----			-		. . RES,FXD,WW:(SEE R42 EPL)		
	198-3835-00			1		. . WIRE SET,ELEC:	80009	198-3835-00
	175-0825-01			FT		. . . CABLE,SP,ELEC:0.958 FT LONG	08261	OBD
	352-0162-00			1		. . . CONN BODY,PL,EL:4 WIRE BLACK	80009	352-0162-00
	131-0707-00			2		. . . CONNECTOR,TERM.:0.48" L,22-26AWG WIRE	22526	75691-005

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Qty	1 2 3 4 5 Name & Description	Mfr Code	Mfr Part Number
1-64	384-0626-00			1	. EXTENSION,SHAFT:3.891" L X 0.375 HEX	80009	384-0626-00
					(ATTACHING PARTS)		
-65	366-0186-00			1	. KNOB:0.750 DIA X 1.375 HIGH	80009	366-0186-00
-66	214-0251-00			1	. LOCK,FOCUS:	80009	214-0251-00
					- - - * - - -		
-67	386-3805-01			1	. PANEL,SIDE:CONTROLLER	80009	386-3805-01
	122-1010-00			1	. FRAME,FRONT:	80009	122-1010-00
-68	210-0542-00			1	. NUT,PLAIN,ROUND:0.75-27,0.937-14 X 1.0625L	80009	210-0542-00
-69	166-0120-01			2	. . SPACER,SLEEVE:1.094" L X 0.18 ID,AL	80009	166-0120-01
-70	211-0118-00			6	. . SCREW,MACHINE:2-56 X 0.250 INCH,PNH STL	83385	OBD
					(ATTACHING PARTS)		
-71	210-0405-00			6	. . NUT,PLAIN,HEX.:2-56 X 0.188 INCH,BRS	73743	2X12157-402
					- - - * - - -		
-72	334-0877-02			1	. . PLATE,IDENT:MARKED C28	80009	334-0877-02
	122-1012-00			1	. OCCLUDER ASSY:	80009	122-1012-00
					(ATTACHING PARTS)		
-73	213-0104-00			2	. SCR,TPG,THD FOR:6-20 X 0.375 INCH,TRH STL	83385	OBD
					- - - * - - -		
	----- -----			-	. . OCCLUDER ASSY INCLUDES:		
-74	334-0819-00			1	. . PLATE,IDENT:	80009	334-0819-00
-75	366-0123-00			1	. . KNOB:	80009	366-0123-00
	213-0004-00			1	. . . SETSCREW:6-32 X 0.188 INCH,HEX.SOC STL	74445	OBD
-76	384-0625-00			1	. . RED,LIGHT SHLD:4.443" L X 0.156	80009	384-0625-00
-77	344-0042-00			1	. . CLIP,SPR TNSN:	80009	344-0042-00
					(ATTACHING PARTS)		
-78	213-0119-00			2	. . SCR,TPG,THD FOR:4-24 X 0.375 INCH,PNH STL	83385	OBD
					- - - * - - -		
-79	426-0216-01			1	. . FRAME,LT SHIELD:	80009	426-0216-01
-81	426-0211-02			1	. . FRAME,CAMERA:FRONT	80009	426-0211-02
	348-0187-00			2	. . . FOOT,CABINET:0.780 X 1.650 INCH LONG	80009	348-0187-00
	644-0134-00[1]			1	FOCUS LT ASSY:	80009	644-0134-00
	122-0969-00			2	. FOCUS LT ASSY:	80009	122-0969-00
-82	407-0688-00			2	. . BRACKET,LAMP:	80009	407-0688-00
					(ATTACHING PARTS)		
-83	210-0590-00			1	. . NUT,PLAIN,HEX.:0.375 X 0.438 INCH,STL	73743	2X28269-402
					- - - * - - -		
-84	352-0194-00			1	. . HLDR,LAMP-LENS:	80009	352-0194-00
					(ATTACHING PARTS)		
-85	122-0844-00			1	. . DIFFUSER,LIGHT:	80009	122-0844-00
-86	386-1632-00			1	. . PLATE,FOCUSING:	80009	386-1632-00
-87	352-0236-00			1	. . HOLDER,LENS:	80009	352-0236-00
-88	122-0845-00			1	. . LENS,FOCUSING:	80009	122-0845-00
					- - - * - - -		
-89	----- -----			2	. LAMP,INCAND:(SEE DS6 & DS7 EPL)		
	198-3847-00			1	. WIRE SET,ELEC:	80009	198-3847-00
	352-0169-00			1	. . CONN BODY,PL,EL:2 WIRE BLACK	80009	352-0169-00
	175-0825-01			FT	. . CABLE,SP,ELEC:1.250 FT LONG	08261	OBD
	131-0707-00			2	. . CONNECTOR,TERM.:0.48" L,22-26AWG WIRE	22526	75691-005
-90	136-0379-00			2	. . LAMPHOLDER:1 G-3 1/2 LAMP	80009	136-0379-00
	131-0856-00			4	. . CONTACT,ELEC:LIGHT	71785	413-17-14-114
	426-1498-01			1	MOUNT,LENS:1.525" L,W/SHUTTER	80009	426-1498-01
	122-0997-01			1	. LENS,CAMERA:F2.8,56MM,W/SHUTTER	80009	122-0997-01
-91	122-1006-00			1	. . ADAPTER,RING:	30181	20229
					(ATTACHING PARTS)		
-92	122-1007-00			1	. . RING,LOCKING:	30181	20228
					- - - * - - -		
-93	122-0997-00			1	. . LENS,CAMERA:F2.8,56MM	30181	B-21945-1
-94	122-0996-01			1	. . SHUTTER,PHOTO:W/CONNECTOR	80009	122-0996-01
	122-0996-00			1	. . . SHUTTER,PHOTO:W/6V SOLENOID 59WD	30181	A-21941-WD
	131-0707-00			5	. . . CONNECTOR,TERM.:0.48" L,22-26AWG WIRE	22526	75691-005
	352-0163-00			1	. . . CONN BODY,PL,EL:5 WIRE BLACK	80009	352-0163-00
-95	426-1498-00			1	. MOUNT,LENS:1.525 L,AL	80009	426-1498-00
	426-1499-01[2]			1	. MOUNT,LENS:1.765 L,AL,W/SHUTTER	80009	426-1499-01

[1]Option 1
[2]Option 4

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Qty	1 2 3 4 5	Name & Description	Mfr Code	Mfr Part Number
1-	426-1500-01[1]			1		. MOUNT,LENS:1.975 L,AL,W/SHUTTER	80009	426-1500-01
	426-1501-01[2]			1		. MOUNT,LENS:2.19 L,AL,W/SHUTTER	80009	426-1501-01
						(ATTACHING PARTS)		
-96	361-0894-00			1		. SPACER,RING:0.57 THK X 2.61 ID,AL	80009	361-0894-00
						- - - * - - -		
	122-1008-00			1		BACK,CAMERA:	80009	122-1008-00
-97	122-0511-02			1		. BACK,CAMERA:	80009	122-0511-02
						(ATTACHING PARTS)		
-98	211-0001-00			5		. SCREW,MACHINE:2-56 X 0.25 INCH,PNH STL	83385	OBD
						- - - * - - -		
-99	122-0764-00			FT		. GASKET,LT SHLD:CAMERA ADAPTER,2.458 FT LONG	80009	122-0764-00
-100	354-0298-01			1		. R MT,ROT SLIDE:	80009	354-0298-01
						(ATTACHING PARTS)		
-101	211-0559-00			4		. SCREW,MACHINE:6-32 X 0.375"100 DEG,FLH STL	83385	OBD
-102	210-0566-00			4		. NUT,PRESSMOUNT:6-32 X 0.39 OD,STL CD PL	46384	AS-682-2CC
						- - - * - - -		
-103	162-0008-00			FT		. INSUL SLVG ELEC:0.034 ID,VINYL BLK,1.885 FT L	96904	OBD
-104	122-1004-00			1		. PLATE,CAMR BACK:MOUNTING	80009	122-1004-00
	426-1447-01			1		FRAME,CAMERA:REAR,W/HARDWARE	80009	426-1447-01
						(ATTACHING PARTS)		
-105	358-0128-01			1		. BSHG,BRG LOCK:0.81 OD,1.75 L	80009	358-0128-01
						- - - * - - -		
-106	214-0163-00			1		. BACK,CAMERA:	80009	214-0163-00
						(ATTACHING PARTS)		
-107	212-0039-00			1		. SCREW,MACHINE:8-32 X 0.375 INCH,TRH STL	83385	OBD
-108	210-0044-00			2		. WSHR,SPR TNSN:0.23 ID X 0.375 OD STL	78189	3502-12-01-0531
-109	358-0108-00			1		. BUSHING,SLEEVE:	80009	358-0108-00
						- - - * - - -		
-110	337-2511-01			1		. SHIELD,LIGHT:BLACK,RUBBER	85471	OBD
-111	344-0039-00			1		. CLIP,ADAPTER:	80009	344-0039-00
						(ATTACHING PARTS)		
-112	211-0065-00			2		. SCREW,MACHINE:4-40 X 0.188 INCH,PNH STL	77250	OBD
						- - - * - - -		
-113	426-1447-00			1		. FRAME,CAMERA:REAR	80009	426-1447-00

[1]Option 5
[2]Option 6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A1

ACCESSORIES

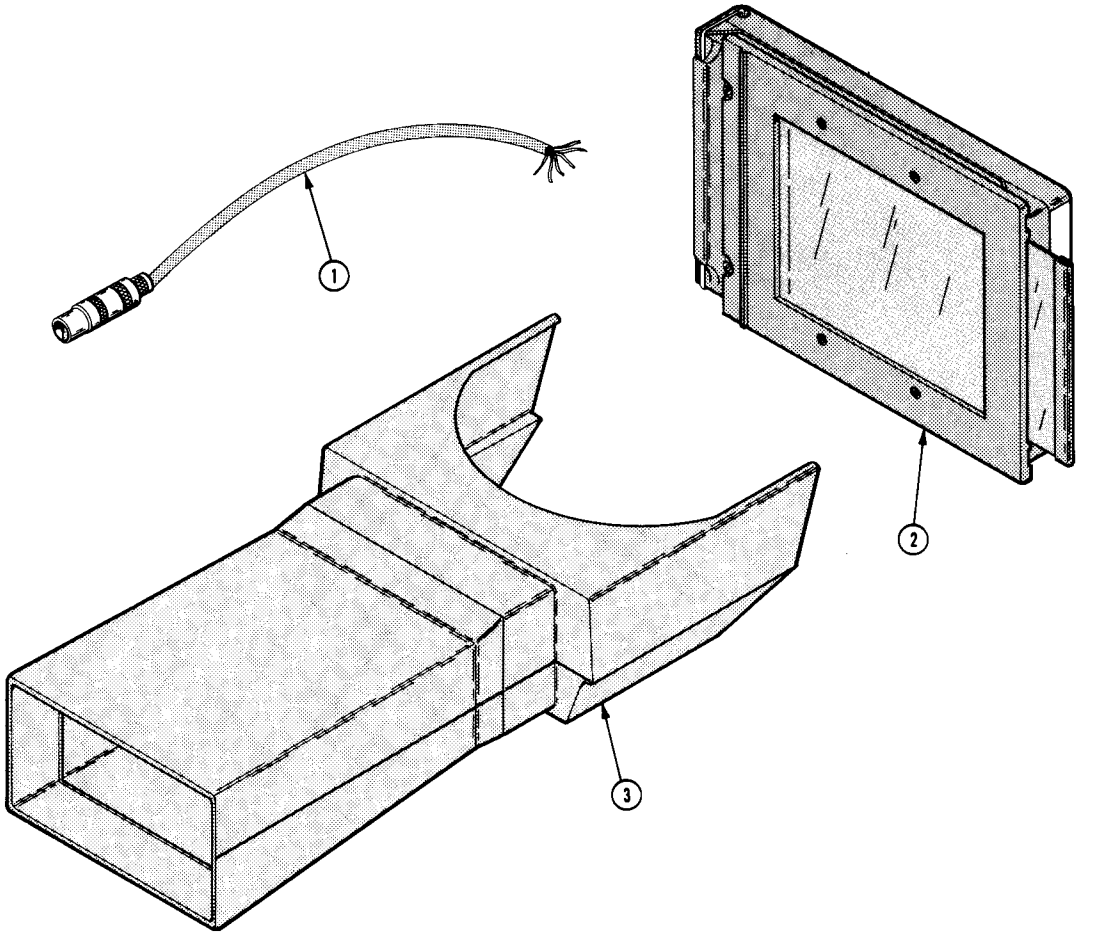

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Qty	1 2 3 4 5	Name & Description	Mfr Code	Mfr Part Number
-1	175-2133-00			1	.	CA ASSY,SP,ELEC:6,26 AWG,20.0" L	80009	175-2133-00
-2	352-0505-01			1	.	HLDR,PHOTO FILM:	29556	405
-3	122-0719-01			1	.	VISOR,CRT:BLACK	80009	122-0719-01
	070-2428-00			1	.	MANUAL,TECH:INSTRUCTION	80009	070-2428-00