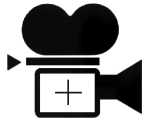

CEI Color Six

NTSC and PAL

Operator's Manual

Preliminary Edition, October, 1999

CEI Color Six Operator's Manual

Contents

Introduction

Description

The CEI Color Six is a digitally-controlled, self-contained video assist camera that can be adapted for use with most popular film cameras. In most instances, the available dedicated optical components will reduce the size and overall cost of the system while providing excellent optical performance.

The video image is developed on a CCD (charge-coupled device) that provides high light sensitivity and low noise levels. Picture size, centering and rotation are mechanically adjustable: all other important aspects of the video image may (at the operator's discretion) be adjusted either automatically or manually using a few controls on the exterior of the camera.

Features

The advanced design of the Color Six includes a number of features not found on other dedicated systems:

- A backlit LCD monitor
- Film footage counter
- SMPTE time code display
- Integral, infinitely adjustable frame lines with storage for 8 user-defined presets
- On-screen help messages
- On-screen battery voltage monitor

- On-screen film camera frame rate
- Electronic shutter
- 24 single-frame storage locations
- Live video, stored image or mixed output
- White flag insertion option
- S-video or YUV output (when used with remote)
- 2:1 Electronic zoom
- Normal (4:3) or anamorphic video aspect ratios
- 16 or 35 mm film formats
- 2 video outputs (one without message display or framelines)
- Operating hours counter

The following standard features of the CEI Color V have been retained:

- Manual or automatic operation of gain, white balance, and video frame rate
- Normal or inverted video output
- Adjustments for image rotation, size and centering
- Wide range of operating voltages
- Color or monochrome outputs

Warranty

The CEI Color Six comes with a one-year warranty on parts and labor. Misapplication, operation outside of specified limits, or physical abuse may void the warranty.

All CCD cameras can develop degradation of individual pixels, resulting in small “spots” in the picture. All Color Six cameras are carefully screened during manufacture to eliminate sensors that contain bad pixels. Should pixel degradation occur, CEI will, at its option, repair or replace any camera that develops spots within 30 days after the camera is shipped from the factory. Beyond that date, cameras will be repaired at the customer’s expense. During the warranty period, the repair or replacement of the camera due to bad pixels is at the discretion of CEI engineering.

The high level of integration makes the CEI Color Six both reliable and compact, but also limits the degree of service possible in the field. Special equipment and training are essential for effective service. It is highly recommended that service be performed only by the CEI Service Department. CEI will gladly provide technical support to help you diagnose a problem in the field, and possibly offer a compromise operating mode to get you through the current shoot. Should a return to the factory be indicated, CEI will do everything possible to expedite the repair.

Whether or not there is a problem, we invite you to call and ask our staff to answer operating questions or concerns that come up in the field. We will do everything possible to help you get the best from your CEI Color Six Video Assist Camera.

Installation

The CEI Color Six works with a constantly growing list of film cameras. For many film cameras, a CEI Universal Optical System is used with the appropriate mounting

hardware for the specific film camera. The Universal Optical System incorporates a “zoom” lens, which makes moving the Color Six from camera to camera simple, economical and convenient.

In some cases, such as with the Arriflex SR-3, a different set of interface optics unique to the film camera must be used. The Appendix to this manual contains the basic directions for attaching the Color Six to various film cameras.

Before attempting setup, find your film camera model in the Appendix for specific setup instructions. Make sure you have the necessary optical adapter for the film camera.

Setup

Mounting

See the Appendix: Verify that your film camera is among those listed, and follow the mounting instructions. Mounting and adjustment of the CEI Color Six will be easy, if the instructions are followed carefully. The only tools required are a 1/16-inch and a 3/32-inch hex driver.

Many variations of the mounting interfaces may be encountered in the field, even among the listed cameras. If this manual does not cover that with which you are working, or if your film camera is not listed, call CEI Technology for additional information.

The optical interface to the Color Six uses a clamp mount. A threaded insert (included with the video camera) will convert the Color Six for use with the common C-mount threaded

accessories, but the back focal distance is unique: This must be considered if the use of a “normal” C-mount lens is attempted. Similarly, the CEI Custom Universal Optical System may not perform as expected if installed in any other standard C-mount camera.

Power

Power in to the Color Six can be carried on either of two 3-pin Fischer connectors. Pin assignments for these connectors are:

1 Ground and power return

2 Positive supply voltage

3 Shutter pulse from film camera

The Color Six will operate on any “clean” DC voltage from 10 to 32 VDC. Within this range, the maximum power consumption of the camera system will be 5.5 Watts with the LCD monitor off, 7.5 W with the monitor on, and 8.5 W with the monitor on HIGH brightness.

The 3-pin connector not used for power in may be used to supply power to a low-power accessory, such as a pistol grip.

> **Caution**–Although the camera may operate briefly with an input somewhat greater than 32 volts, prolonged operation is likely to result in permanent damage.

> **Caution**–Never connect both of the 3-pin connectors to separate power sources at the same time.

The green LED above the POWER switch will blink if the input voltage falls below 10 volts. The LED is driven through the microprocessor, and a 2-3 second delay will be observed after the POWER switch is turned on until the LED initially illuminates.

The Color Six is internally protected against polarity reversals: Nonetheless, every effort should be made to ensure that battery polarity is correct before connecting the camera.

> **Caution**—Connection to an AC source will certainly damage (and may very well destroy) the camera.

Video output

Two video outputs on the rear of the camera deliver NTSC video to an external monitor or recording device. The “A” connector is clean video only; the “B” connector will contain the selected digital display used for monitoring or adjusting the camera and the help messages that can be accessed from each menu. This signal also drives the built-in LCD display.

The optional remote control has the same two video signals, plus a luminance and a chrominance output. When the remote is used, S-video or YUV video can also be taken from the connectors thereon.

The Color Six should be connected to external equipment via coaxial cables, and terminated in 75 ohms at the destination. Equipment may be daisy-chained as long as the last (and only the last) equipment in the chain is terminated.

All of the video outputs are 1 volt peak-to-peak when terminated in 75 ohms.

SMPTE Time Code Input

If provided by the film camera, the Color Six will add SMPTE time code and user bits at lines 16 and 18 of the output video. It can also be displayed on the built-in LCD monitor and the “B” video output. The time code signal must be provided to the Color Six as a standard 0 to +5 volt signal.

Shutter Pulse Input

In order to provide flicker-free operation, the Color Six requires that the shutter pulse from the camera be provided at pin 3 of either of the 3-pin Fischer connectors. Cables for this purpose are available from CEI. When the Color Six speed is set to AUTO, the camera defaults to 30 fps in the absence of a shutter pulse, e.g., when the camera is stopped. The shutter pulse must be a positive-going 0 to +5 volt signal.

Setup Adjustments

Camera setup may be considered as having two components: External adjustments, which are largely mechanical in nature, and Internal adjustments, which are performed using the Multipurpose Control. These are described separately in this section, in the approximate order in which they would likely be made.

External Adjustments

> **Note**–All of the following adjustments should be made with abundant light entering the film camera and the taking lens removed or defocused. Adjustments should be made with respect to the markings on the ground glass, not to the scene in front of the camera.

Picture Rotation

Access to the rotating ring is gained through .1-inch wide slot in the headpiece of the Color Six (see figure 1). A short 1/16-inch hex driver with a knurled end (normally stored in the camera head) is inserted into the holes on the rotating ring, which may then be turned through a range of about 350°.

> **Caution**–Do not rotate the ring beyond its normal range, i.e. beyond the last hole in the ring.

Consult CEI Technology if the adjustment range is inadequate for your particular application.

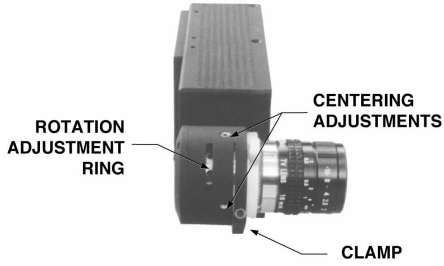

Figure 1: Adjustments on camera head.

Picture Centering

Image centering is adjusted using the same tool as for rotation. Two hex head set screws in the headpiece (see figure 1) can be turned in or out to change the location of the CCD imaging device to center the optical image.

Because of film camera differences, the adjustment axes may not be truly horizontal or vertical in all mounting configurations.

Focus

The CEI Custom Universal Optical System is focused by rotating the lens barrel. To adjust focus,

1. Locate the control ring closest to the video camera on the lens barrel.
2. Loosen the set screw to free the small plastic handle on the control ring. While viewing the image on a high-quality monitor, rotate the ring to make the focus as sharp as possible.
3. Tighten the set screw gently.

Note–Field curvature may be observed when attempting to focus the center and edges of the image simultaneously. This can be minimized by closing the iris slightly, which will improve the depth of focus.

Picture Size

The image size adjustment control for the CEI Custom Universal Optical System is located on the lens barrel. To adjust picture size,

1. Locate the control ring closest to the film camera on the lens barrel.
2. Loosen the locking set screw to free the small handle on the control ring.
3. Rotate the ring slowly, observing the change in image size.
4. Periodically refocus the image to determine if the image size is correct.
5. When size and focus are both correct, gently tighten the set screws.

Note–The Color Six has the capability of zooming the image about 2:1 electronically, in addition to the lens size adjustment, so the image size can be mechanically set a bit smaller and electronically zoomed to the exact size necessary in a later step.

Iris Adjustment

The manual iris adjustment is the center control on the lens. The iris must be set properly in order for the wide range automatic gain in the Color Six to accommodate the greatest range of contrast and brightness. To set the iris,

1. Open the iris as far as possible without causing flare in the picture. Flare will appear as a halo or glare surrounding bright objects.
2. Adjust the iris control to give the system as much light as possible without discernable glare. This will assure the least video noise in the output.

If the output video shows appreciable noise, verify that the iris is properly adjusted.

Internal (Electronic) Adjustments

When the Color Six video assist camera is operated in the AUTO mode, all electronic adjustments are set either to default values or automatically adjusted for normal video with average lighting. No menus or messages (beyond the startup screen) will appear on the LCD monitor or in the “B” video output. This may be the desired mode of operation in most cases, but the operator can customize all the important adjustments should it seem necessary or desirable. In many respects, the utility of the Color Six is greatly enhanced in MANUAL operation.

All electronic adjustments are made using the single multi-purpose control shown in Figure 2.

Using the Multipurpose Control

This one control has two components on the same knob:

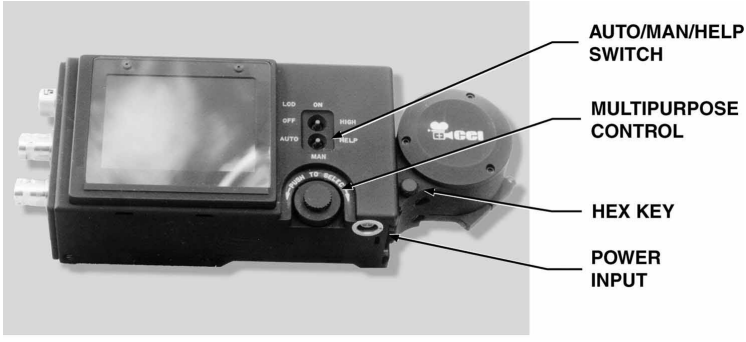

Figure 2: Side view of Color Six

1. A push-button switch, which is used to enter and exit display and adjustment modes, and to step from higher to lower levels on the various menus, and
2. A detented shaft-angle encoder that is used to step through menus, scroll through long messages, and to underline or adjust the operating parameters of any user adjustable function.

The push-button switch responds to two stimuli: A brief press and release (a *click*), and a press and hold of about a half-second. A click is used to either select or deselect an underlined function, or to step from a higher to a lower menu level. The press and hold is used to move from a lower to a higher menu level.

The effect of turning the encoder depends on where you are in the menu hierarchy. Starting from the higher level menus, such as the one that follows the opening screen, turning the multipurpose control scrolls through the other high level menus. When you locate the one you want, click the control to select it: If a lower level menu is available, it will be displayed. In either case, the first possible selection in the menu will be underlined: Clicking the control will select the parameter and the underline will change from a static dotted line to an animated one, in which the dots alternate from white to black. When the animated line is displayed, the underlined parameter may be changed by rotating the control. Pressing and holding the control will return the higher level menu: Clicking the control will return the underline to its static state, and the parameter will be deselected. Rotating the control clockwise at this point will move the underline to the next parameter on the menu, if there is one. If not, it will stop at the last possible selection. Turning the control counterclockwise will underline each parameter on the menu in reverse order until the first choice is underlined: Turning it one notch further will cause the message display to disappear until the control is either rotated clockwise one notch or clicked again. Either action will display the same menu.

It may seem complicated, but a little practice with the multipurpose control will make you confident and comfortable with its use .

Saving Custom Settings

All of the manual settings are automatically stored in non-volatile RAM for future use, even if camera power is turned off or disconnected, so you can switch between MANUAL and AUTO modes without losing them. Should your shooting conditions change radically, you can reset them all at the next to the last menu, SET ALL TO DEFAULT, and start over.

Operation

Power Switch

The power switch is located on the back panel (see figure 3). A green LED above the switch will illuminate two or three seconds after the switch is set to ON, indicating that the internal power supplies have stabilized. The LED will blink on and off if the input power drops below 10 volts.

If the LED fails to illuminate, check the input voltage and polarity (see *Power*, page 5).

LCD Monitor

When turned on, the built-in LCD monitor displays the “B” video signal. The backlight has two brightness settings, selectable by the LCD OFF/ON/HIGH switch. Brightness, contrast, color depth and tint of this display are electronically adjustable using the multipurpose control (see page 12).

Note–Because of its small size, use of the LCD monitor is not recommended when making critical adjustments, e.g., focus. A high quality monitor, connected to either the “A” or “B” video outputs, will ensure more accurate set-ups.

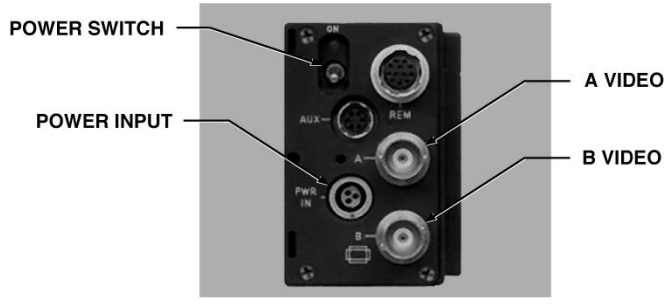

Figure 3: Color Six connector panel

Message Display

When the Color Six is first turned on a startup screen will appear briefly, on which is displayed the operating software version and directions for halting the scrolling message or exiting the startup screen. If the camera is powered up in the AUTO mode, the message

CAMERA IS IN AUTO MODE

appears as the last line in the display, instead of the scrolling message. The multipurpose control is inoperative in the AUTO mode.

When the Color Six is in MANUAL operation, the opening screen lasts about 20 seconds or until the multipurpose control is clicked. It is replaced by the first menu, which shows camera information: the film footage counter, the units for the counter, the film size, the camera frame rate and the input voltage. The purpose and use of each menu will be described in the following section of this manual.

Menus and Adjustments

The values set into adjustable parameters will be visible even when that parameter is being operated automatically, but will be grayed out unless it is the active value. Inactive values may be adjusted, but the effects will not be visible until the appropriate mode (e.g., Manual) is selected and the value of the parameter changes to full brightness.

When the AUTO/MAN/HELP switch is momentarily set to the HELP position, a help message will appear regarding the underlined function

Camera Information Menu

The first menu displayed when the camera is powered up shows information pertinent to the film camera:

1. Film Counter: The “R→” and the four digits that follow it comprise the Film Counter. Briefly pressing and releasing the multipurpose control will place a steady underline under the first two digits: Turning the control will move the

underline. Clicking again will animate the underline, and then turning the control will change the underlined value. Clicking yet again will set the selected value and exit the adjustment mode, so the underline will again become inanimate.

2. By repeating the above procedure, you can set all four digits of the film counter, set the units display to FT (feet) or MT (meters) and the film size to 16 or 35 mm. Note that changing the units of the film counter does not automatically convert the amount of remaining film.
3. Turning the control one notch counterclockwise from its initial position will underline the "R→": At this point, a single click will reset all four digits of the film counter to zero.
4. You cannot change the FPS readout—this will count the film camera frame rate when the camera is running (provided the shutter pulse has been connected to the Color Six).
5. Similarly, the battery voltage is a measurement of the DC voltage supplied to the Color Six , and will change only as the supplied voltage does.

Camera Setup Menu

The next menu offers quite a few options, as follows:

Speed

This is the video frame rate output from the color Six . The options are

1. AUTO: In Automatic, the Color Six video frame rate will synchronize to the shutter pulse and track the camera,

providing flicker-free operation. In the absence of a shutter pulse (e.g., when the camera stops running) the Color Six defaults to 30 fps.

2. FLKR: In Flicker, the Color Six runs at the NTSC standard 30 frames per second. This will produce at least some degree of flicker in the scene through the taking lens of a running film camera.
3. MAN: In Manual, the operator has the option of adjusting the video frame rate from 1 to 99.99 in increments of .01 fps.

Color/Monochrome

The next option on this menu selects either COLOR or BLK&WT video for all outputs.

Gain

The operator can select between AGC (Automatic Gain Control) or MAN (manual). In the latter case, the number immediately following MAN in the display can be changed by the usual means. Note that the numbers displayed for this and other gain parameters are relative indications only, and do not reflect the actual system, channel or function gain.

Electronic Shutter

The electronic shutter can either be ON or OFF at the operator’s choice. In the ON position, scenes with action will show less motion blurring when viewed in slow motion or frame by frame. The downside is less sensitivity at low light levels.

White Balance

1. AUTO: Automatic white balance balances the video output based on a reading taken from the whitest portion of a scene. One of the other options may be preferred if the scene contains no white, or if the camera is slowly panned across such a scene.
2. INDR: Indoor balances the camera for a scene illuminated by incandescent lighting.
3. OTDR: Outdoor balances the camera for sunlight.
4. MAN: In Manual, the operator can set the gains of the Red (RD) and Blue (BL) channels, using the multifunction control, to achieve the desired balance. As with Gain, the numbers shown are relative indications only.

Electronic Zoom

The image size of the video output can be adjusted using the ZOOM feature. As with Gain, the numbers are only relative. The overall zoom range is about 2:1.

Aspect Ratio

When using a normal lens, the ASP 4/3 option will produce a normal video image on all outputs. The MORPHIC option compensates for an anamorphic taking lens on the film camera.

Image Reversal

The last item on this menu allows the selection of NORMAL (right-reading) or REVERS (top-to-bottom inverted) video output.

Frame Lines Setup Menu

The next menu allows the operator to select either from one of eight sets of previously saved frame lines, to customize one or all of them to his own liking, or to select none of the above.

Frame Lines

Each set of frame lines contains an “A” and a “B” frame, either one or both of which may be displayed (A+B). A fourth selection (#) displays a fixed grid in lieu of the rectangular frame lines.

Shading

The area outside of the frame, or outside of both frames if A+B is selected, is usually darker than the area within the frames. The degree of shading is adjusted in the usual manner using the SHAD function.

Page

Preset frame lines are stored as “pages,” and may be previewed and displayed by selecting pages 1 through 7. An eighth option, #, will display a nonadjustable grid. Pages 1 through 7 can be adjusted to the operator’s needs, and will be saved in non-volatile RAM when a different page is selected.

Adjustment

Three parameters of the frame lines can be changed using the ADJUST function:

1. The position of any edge of any frame,

2. The size of any frame, and
3. The position (centering) of any frame.

Adjustment is as follows:

1. With frame lines set to either A, B, or A+B, turn the multi-function control to underline the word after ADJUST.
2. Click to animate the underline, then turn the control to display either EDGE, CENT, or SIZE, depending on which you want to change. Click again to select the parameter.
3. Turn the control counterclockwise to underline ADJUST, then click it once more: The message display will disappear, and the frame lines will be shown with one, two or four edges as dashed lines. Turning the control will move the dashed lines to other edges: Clicking will animate the dashed lines, at which point turning the control will adjust the animated line or lines in the frame.
4. Clicking again will set the new setting in the active page. Turn the control to move to the next line or lines you want to change, or press and hold the control to return to the Frame Lines menu.

Style

The frame lines can be displayed on the LCD monitor and in the “B” video output as either dashed (ZEBRA) or solid lines. The selection is made using the multipurpose control in the usual manner.

Background

The shading behind the digitally-generated messages can be selected as either BLACK, DARK, DIM or LIGHT by

underlining the word following BKG on this menu. Click to animate the underline, turn to change the background, and click again to set the shading you want.

Intensity

The brightness of the frame lines and the letters in the message display can be adjusted with the LN function and the TEXT function, respectively, using the multipurpose control.

LCD Monitor Setup Menu

The next menu, LCD MONITOR SETUP, allows you to adjust the monitor brightness, contrast, color intensity and tint using the multipurpose control in the usual manner. The range of adjustment is from 0 to 63, and the default is 32 for each. As with gain, the numbers are relative indications only. These adjustments are for the LCD monitor only, and do not affect any of the output video signals.

Video Output Menu

This menu allows the selection of the following:

SMPTE VITC ON or OFF
WHITE FLAG ON or OFF
REMOTE VID SVID or YUV

With SMPTE set to ON, the time code and user bits (input to the Color Six through the 6-pin AUX connector) is inserted in the vertical interval at lines 16 and 18.

When WHITE FLAG is set to ON, a white pulse (used by some editing equipment) is inserted in the “back porch” of the video signal. It will not appear on a normal monitor.

REMOTE VID can be either of the two formats indicated, but is only available through the optional remote control. When SVID is selected, two of the four BNC connectors thereon carry the “A” and “B” video signals, and the other two carry the luma and chroma components of S-Video. When YUV is selected, these last two connectors carry the color difference signals (U and V) and the connector formerly used for “A” video carries the luma (Y) component. The “B” video connector remains unchanged.

Image Mix Menu

The NTSC Color Six has the capability of storing up to 24 single-frame images captured from the live video, and the PAL version can store 12. The storage and display of these images is controlled through this menu.

Mix

Three choices are available under IMAGE MIX:

1. LIVE is the normal live video taken by the Color Six .
2. When MEM is selected, the following two digits become brighter, and indicate the storage location of the image being viewed in the output. The storage location can be changed using the multipurpose control in the usual manner.
3. When MIX is selected, the output video alternates between stored and live video at about 15 Hz. The rate of alternation is independent of the camera frame rate.

Store

When the STORE function is underlined, a single click of the multipurpose control will capture the frame currently seen by the camera in the location selected. If the camera ”A” video is not visible in the monitors (as would be the case if MEM was selected under the MIX function), the frame will still be captured. The counter advances to the next location each time an image is captured: If an image is already stored at the indicated location, it will be overwritten by the next captured frame.

All stored images are erased when the camera is powered down.

Display Vertical Position Menu

The next menu has only one function, to allow the displayed menus and messages to be shifted closer to the top or bottom of the monitor display. The adjustment is made using the multipurpose control in the usual manner.

Time Code Menu

While not exactly a menu (since no selections are possible), the TIME CODE displayed in this view is that being supplied to the Color Six from the film camera through the 6-pin AUX connector.

User Bits Menu

Again, no adjustment is possible from this menu, but it may be used to view the User Bits that often accompany the Time Code.

Set All To Default Menu

When you just want to delete all the custom settings and start over from the factory defaults, this menu makes it easy. One click will display a cautionary message and the option to CANCEL or PROCEED. Turn the control to underline PROCEED and click it once again to complete the operation.

Run Demo Menu

A brief demonstration and explanation of the electronically adjustable camera parameters is available by clicking on the last high-level menu, RUN DEMO. The first screen shows the operating hours log of the Color Six : The program then steps through each menu in sequence, and activates and changes each possible parameter. Scrolling messages describe the functions where it can be helpful. The demo can be aborted at any time with a quick click or turn of the multipurpose control.

Specifications

Sensitivity

ASA rating approximately 1500 with typical camera interface, e.g. Arriflex 35-3, Arriflex door, AUTO frame rate, AUTO gain control.

Video Resolution

The resolution of both video outputs is 768 x 494 pixels.

Input Signal Requirements

The shutter pulse, SMPTE Time Code and User Bits from the film camera must be normal 5 volt logic pulses.

Output Signals

"A" Video (BNC): Clean live, stored or mixed NTSC video. No messages beyond opening menu.

"B" Video (BNC): Live, stored or mixed NTSC video with messages (in MAN operation) at operator's option.

Power Requirements

10 to 32 VDC clean (filtered) input. The CEI Color Six consumes 5.5 Watts with the LCD monitor OFF, 7.5 W with the LCD monitor ON, and 8.5 W with the LCD monitor at HIGH backlight level.

Physical Dimensions (without adapters)

6.3 x 2.6 x 1.6 inches (160 x 66 x 40 mm)

Weight (without adapters)

19 ounces (539 g)

External Connectors

[To be described.]

Appendix

General Information for All Film Camera Models

The CEI Universal Optical System provides the necessary size and back focus adjustments to accommodate many film cameras, such as the Arri 35-III, 535A, and BL. For other models, such as the SR-3, optical adapters supplied by Arri or Jurgens may be used.

When using an optical adapter provided by a manufacturer other than CEI, the proper focal distance may be provided through the use of an extender tube.

> **Caution**: Remove any extender tubes before installing the CEI Universal Optical System.

Universal Optical System

There are currently three generations of the CEI Universal Optical System in the field, designated STD, XR and XI. The type designation is found on the iris control ring with the serial number. If the lens either has no serial number or contains any serial number that does not include the letters XR or XI, then it is an STD. The differences between the generations are as follows:

- The XR is an improved version of the STD lens. The improvement is primarily in the field flatness, providing better resolutions in the corners of the picture.

- The XI is a still later generation with further improvement in field flatness, and the addition of an anchor mechanism to assist in securing the lens to the video camera.

Directions for mounting the XI with lens clamp are as follows:

1. Start with the 3/32-inch hex clamping screw loosened such that the clamp rotates freely around the lens.
2. Begin screwing the lens into the camera, then rotate the clamp to align the pin to the threaded hole in the face of the video camera.
3. Maintain this alignment while threading the lens the rest of the way into the video camera.
4. Tighten the 3/32-inch hex head screw to lock the lens and prevent further rotation.

To Use the Appendix

Turn to the section that contains installation instructions for your film camera. Instructions for attachment to the following film cameras are included in this manual:

- Aaton 35
- Arriflex 35-3
- Arriflex 35BL
- Arriflex 435
- Arriflex 535A
- Arriflex 535B
- Arriflex SR-2

- Super 16 Converted SR-1 or SR-2
- Arriflex SR-3
- Super 16mm
- Moviecam Compact

Aaton 35

[Text & illustrations to be added]

Arriflex 35-3

Use with Arri Rotating and Arri/CSC Doors

The Color Six can interface with a variety of doors, including the Arri Rotating and Arri/CSC doors available from CEI. See the equipment list at the end of this manual to order the necessary hardware.

Use with Jurgens Universal

No installation is necessary on the Jurgens Universal door, as it comes equipped with a threaded flange that matches the Color Six thread adapter.

The following illustrations show the proper camera and door orientation. If you have a door other than the Arri Rotating, Arri/CSC or Jurgens Universal, please call CEI for orientation instructions.

Arriflex 35-3 Door Orientation

[Text & illustrations to be added]

Arriflex 35BL

All Arriflex 35BL models can use the CEI Universal Optical System, which comes provided with a lens holder and threaded ring. A CEI Color Six V-to-BL prism adapter is required, however.

To attach the Color Six to an Arriflex 35BL:

1. If attached, remove the clamp and threaded adapter from the front of the lens.
2. Insert the front barrel of the lens into the clamp end of the BL prism adapter.
3. Tighten the clamp.
4. Tighten the lens into the Color Six .
5. Mount the threaded end to the Arriflex BL.
6. Loosen the clamp again.
7. Loosen the 3/32 hex screws in the headpiece dovetail adjustment on the Color Six .
8. Orient the Color Six as shown below.
9. Tighten the clamp to hold the Color Six in place. Overtightening the clamp will result in interference with the size adjustment ring. Loosen the clamp enough to allow size adjustment, then retighten.
10. Tighten the headpiece dovetail adjustment.

If picture rotation is required, use the rotation ring near the front of the Color Six (see page 8).

Arriflex 435

Install the CEI/435 optics as follows:

1. Check that the camera locator screw and positionable C-mount lock screw are reasonably tight. For Super 35 models, thread the reducing optic into the rear of the tap lens. Do not use the blue spacer ring.
2. Screw the tap lens (C-mount threads) into the Color Six tightly, but do not overtighten.
3. Loosen the positionable C-mount lock using a 3/32-inch hex driver.
4. Loosen the 3/32 hex screws in the headpiece dovetail adjustment on the Color Six .
5. Rotate the entire tap lens clockwise until the 435 locating hole lines up directly forward in line with the body of the video camera. Some friction is normal.
6. Tighten the positionable C-mount lock.
7. Loosen the camera locator lock screw using the 3/32-inch hex driver.
8. Rotate the camera locator ring until the camera locator screw aligns with the #8-32 threaded hole on the face of the Color Six .
9. Using a ball-tip 3/32 hex driver, insert and tighten the camera locator screw.
10. Tighten the camera locator lock screw.

Next mount the Color Six to the 435:

1. Mate the locating key of the 435 to the locating hole on the face of the tap lens. Thread on and tighten the knurled mounting ring.
2. Tighten the headpiece dovetail adjustment.
3. Apply power to the Color Six : Viewing the LCD monitor, adjust image rotation and centering as described on pages 8-9.
4. Open the tap iris all the way.
5. With an evenly illuminated ground glass (preferably with no image), loosen the focus lock set screw using a 1/16-inch hex driver.
6. Rotate the focus adjustment ring to achieve the best overall focus on the ground glass markings.
7. Again using the 1/16-inch hex driver, gently tighten the focus lock screw.

Arriflex 535A

A 535A adapter, available from CEI, is necessary to install the Color Six on an Arriflex 535A system in place of the Arriflex VOM unit. Proceed as follows:

1. Loosen the 3/32 hex screws in the headpiece dovetail adjustment on the Color Six .
2. Position the Color Six adapter to align with the wedge shoe.
3. Tighten the 6mm screw in the plate to secure the Color Six adapter to the 535A.
4. On initial installation, attach the 535A adapter first, then add the Color Six .

5. Remove the threaded adapter from the CEI Universal Lens System, if installed, and insert the lens barrel into the clamp on the 535A adapter.
6. Rest the Color Six on the padded foot and tighten the clamp.
7. The clamping block position can be adjusted on the mounting plate. Adjust the clamping block position to best center the ground glass image prior to using the Color Six centering screws. This mechanical centering will help eliminate tilt of focus.
8. Tighten the headpiece dovetail adjustment.
9. Use the size, centering and rotation controls on the Color Six (see pages 8-9) to align it to the 535A optics.
10. Once the initial alignment is complete, the entire adapter (including the Color Six) can be removed from the 535A and reinstalled without realignment.
11. The Color Six can be powered from the 3-pin connector on the 535A or from the 11-pin Fischer, if one is present. In either case, the film camera does not provide a shutter pulse, so the Color Six cannot track the camera speed for flicker-free video.
12. The run/stop state of the film camera can be affected by switching the Color Six power on and off. Contact CEI for remedy suggestions.

Arriflex 535B

When used with an Arri 535B, the Color Six may be powered by connecting the 3-pin Fischer connector to one of the

convenience outlets on the base of the film camera using a special cable available from CEI.

To use the Color Six with the Arriflex 535B you may use either the Arri video elbow (available from Arriflex) or the CEI Universal Optical System with CEI/535B mounting hardware.

Using the Arri Video Elbow

A blue spacer ring, supplied by CEI, must be inserted into the Color Six before attaching it to the Arri video elbow.

1. Tighten the big black ring on the Arri optics elbow.
2. Loosen the 3/32 hex screws in the headpiece dovetail adjustment on the Color Six .
3. With the 5mm spacer (blue ring) in place, screw the elbow firmly into the Color Six .
4. Loosen the big black ring and rotate the elbow relative to the Color Six .
5. Connect the assembly to the 535B and tighten the black ring.
6. Tighten the headpiece dovetail adjustment.
7. Connect and apply power to the Color Six . Using a high-quality monitor, adjust the focus control on the Arri optics.
8. Center the picture using the three set screws above the black ring. The set screw nearest the front of the camera is the lock or tension adjustment: The other two set screws adjust picture position.

> Note: Some tension is necessary to make the system work.

9. Complete the centering and rotation adjustments using the controls on the Color Six as described on pages 8-9. Iris adjustments are made using the Arri optics.

Using the CEI/535B Interface

Use the 535B adapter with a CEI Universal Optical System containing the letters XR or XI in the serial number.

1. Start with no lens, the clamp screw secured, and the foot slid to the right, allowing it to clear the camera body.
2. Screw the assembly (using reasonable torque) clockwise into the 535B.
3. Loosen the 3/32 hex screws in the headpiece dovetail adjustment on the Color Six .
4. Slide the foot to the left as shown:
5. Loosen the clamp screw and rotate the clamp ring until the foot rests on the camera body.
6. Screw the lens into the video camera and insert the front of the lens into the clamp assembly until it seats.
7. Orient the camera as follows:

- XR—The back corner of the video camera should rest on the body of the 535B.
- XI—Position the Color Six as desired.

8. Tighten the clamp screw using a 3/32-inch hex driver.
9. Use the attaching screws to adjust the tension on the slide.
10. Tighten the headpiece dovetail adjustment.

Arriflex SR-2

The Arri standard T-bar cannot be used with the Color Six . Instead, a beam splitter system is used to connect the Color Six to the Arri SR-2. The beam splitter is a conversion of the standard viewing system, and is more compact and less expensive than the standard T-bar. A standard T-bar can also be converted for use with the Color Six .

Your standard viewer can be converted by CEI. Contact the factory for conversion turnaround times. Optics for this system are included in the conversion.

To attach the Color Six to the Arri SR-2, see the detailed illustrations that follow.

Once set up, the Color Six can be quickly removed from the Arri SR-2 and reinstalled without adjustment. Removed, the viewer system can be rotated for shipping in small containers.

It is possible to remove the entire splitter and restore the viewer to its original configuration. This is unnecessary, however, because with the improved optics, the splitter system is virtually as bright in the eyepiece as the unconverted system. Realignment is required if the splitter is removed and reinstalled.

Super 16 Converted SR-1 or SR-2

SR/CEI conversions sold since 1998 have provisions to accept a reducing optic for Super 16 coverage if installed on a Super 16 Converted SR.

> **Note**—Initial factory installation will most likely be required to minimize vignetting of the video.

Due to limitations of the SR's viewing system, which was not designed to include Super 16, some vignetting may persist and will worsen when the video optics iris is closed down.

Arriflex SR-3

Use of the Color Six with the Arriflex SR-3 requires a light splitter and video optics, available from Arriflex. The recommended splitter is the Arri Color 50/50 splitter. The black-and-white 80/20 splitter will also work, but video performance may be degraded.

The Arri optics system terminates in a C-mount thread that screws directly into the Color Six . See "CEI Retrofit of Arri SR-3 Elbow" (page 40) for improvements to the Arri system.

> **Note**: A 5mm spacer (blue ring), provided by CEI, must be installed in the Color Six *before* attaching the Arri optics.

Attach the Color Six to the Arri SR-3 as follows:

1. Tighten the big black ring on the Arri optics elbow.
2. With the 5mm spacer in place, screw the elbow firmly into the Color Six .
3. Loosen the big black ring and rotate the elbow relative to the Color Six .
4. Loosen the 3/32 hex screws in the headpiece dovetail adjustment on the Color Six .

5. Connect the assembly to the SR-3 (see illustration for mounting and positioning details). Tighten the black ring.
6. Tighten the headpiece dovetail adjustment.
7. Connect and apply power to the Color Six . Using a high-quality monitor, adjust the focus control on the Arri optics.
8. Center the picture using the three set screws above the black ring. The set screw nearest the front of the camera is the lock or tension adjustment: The other two set screws adjust picture position.

   Note: Some tension is necessary to make the system work.

9. Complete the centering and rotation adjustments using the controls on the Color Six as described on pages 8-9. Iris adjustments are made using the Arri optics.
10. When used with an Arri SR-3, the Color Six may be powered by connecting the 3-pin Fischer connector to one of the convenience outlets on the base of the film camera using a special cable available from CEI.

    Note—If powered from the 11-pin Fischer connector on the SR-3 12V adapter, no shutter pulse will be present, so the Color Six will not be able to track the camera speed and produce flicker-free video.

Super 16mm

In order to increase the viewing area of the system for Super 16mm, a second 2.75 mm red spacer, available from CEI, needs to be added between the Color Six and Arri optics.

SR-3 Support Bracket

An SR-3 support bracket, available from CEI, will hold the Color Six more securely to the SR-3. We strongly recommend the use of this device. To install the support bracket:

1. Remove the dovetail accessory mount from the right side of the SR-3.
2. Install the restrainer mounting plate under the dovetail using the longer screws provided by CEI. Make sure the mounting plate is installed with the protruding foot located at the upper left corner of the dovetail.
3. Install the Color Six following the instructions above. Securely tighten the C-mount and Arri friction lock (the big black ring), but do not overtighten.
   Since the Color Six has its own centering system, centering with the Arri friction lock need only be approximate. There is no need to force the Arri friction lock into a precisely centered position.
4. The Color Six should rest firmly against the foot protruding from the mounting plate.
5. Screw the padded retaining bolt into the foot until the outer knob pad contacts the Color Six . Do not overtighten this bolt. Only slight pressure with the Color Six is adequate: Any loosening or movement of the Arri system will be prevented by the padded foot on the mounting plate.

> **Caution**—If the mounting plate is removed from the SR-3, do not reattach the dovetail using the longer screws supplied with the SR-3 support bracket: they will damage the film camera.

CEI Retrofit of Arri SR-3 Elbow

With the CEI retrofit kit, the following common situations experienced with the Arri elbow can be avoided:

- Standard 16 video images are typically smaller than desired.
- Super 16 images are too large to fit on typical monitors.
- Physical mount is difficult to center and secure.

The kit replaces the back end of the Arri elbow. It uses a moveable optic for size adjustment in Super 16, and allows for the addition of spacers for size reduction in both Super 16 and standard 16.

To install the CEI retrofit kit,

1. Loosen the three set screws used for centering. These are located just inside the large black ring.
2. Unthread (turn CCW) the large black ring of the Arri elbow. Collect any shims, the C-mount rims and the crescent-shaped spring wire.
3. Remove the four Phillips screws and dismount the black metal flange from the gray painted body.
4. Mount the CEI retrofit with the four Phillips screws, with the clamp screw outboard. Tighten all four screws, then loosen the two outer ones (the ones with nonmetallic washers) 1/4 to 1/3 of a turn.

5. Install the optic labeled *CEI/SR3 S16* for Super 16, or remove it for standard 16.
6. Tighten the clamp screw on the retrofit using a 3/32-inch hex driver, then screw the elbow assembly securely into the face of the CEI Color Six .
7. Loosen the clamp screw: This allows pivoting of the Color Six to the desired position relative to the elbow.
8. Mount the elbow and Color Six camera assembly securely to the SR-3
9. Pivot the Color Six to the desired position. If using a CEI SR-3 support bracket, rest the color camera against the clear pad on the support bracket and screw the restraining bolt into the appropriate hole such that it lightly seats against the Color Six .
10. Tighten the clamp screw using a 3/32-inch hex driver.

Focus and iris functions will be as normal on the Arri elbow. Focus adjustments should be made with the iris fully open.

To adjust picture size, perform the following steps:

For Super 16

1. Locate the slot in the mount clamp near the face of the Color Six .
2. Using a 1/16-inch hex key (normally part of the Color Six), access the inner ring through the slot.
3. Change the picture size: Rotate the inner cell by inserting the hex key into one of the holes along the inner ring and turning it.
4. Refocus

For standard 16

There is no internal size adjustment for standard 16, but by installing thin shims between the Color Six and the elbow in Step 8 of the installation procedure, you can make incremental size reductions in both standard and Super 16.

Moviecam Compact

Most Compacts come from Moviecam with a CEI color video repackaged by Moviecam. There are, however, tow alternate methods of installing a Color IV, Color V or Color Six on the Compact. Both of these methods use a CEI Universal Optical System zoom lens, but they are substantially different and need to be studied carefully before installation.

Method one, which uses hardware no longer supplied by CEI, uses a special version of the Universal lens, which is easily identified by the gold colored iris control ring. This lens inserts into an adapter designed and supplied by CEI. Installation of the adapter is described below.

The currently supplied hardware is used in the second method, and mounts in a very similar manner, but both the adapter and the lens are different from those previously supplied, and the components are not interchangeable. It is most important that the lens and adapter components of the two methods not be mixed.

The adapters look similar in both methods, but the older component lacks the glass element used in the current adapter.

In the current method, the Universal lens used is the standard lens which CEI has been shipping since the Fall of 1997. These lenses are identified by the letters XI included in the serial number, e.g., XIG. The advantage of this method is that the same lens is used in many other movie camera interfaces.

To install either of the adapter systems,

1. Screw the Universal Lens into the CEI camera.
2. Mount the plate to the Compact using the two screws provided.
3. Insert the lens and CEI camera into the clamp. Allow the camera to rest on the plastic-coated foot, and tighten the lens clamp using a 3/32-inch hex driver.
4. Use the lens controls to adjust image size, iris, and focus: Use the color camera controls for image rotation and centering. Be sure the iris is fully open when focusing the lens.

Index

G

H

I

J

L

M

N

O

P

R

S

T

U

V

W

Y

Z

CEI Technology 880A Maude Avenue Mountain View, CA 94943 (650) 969-1910