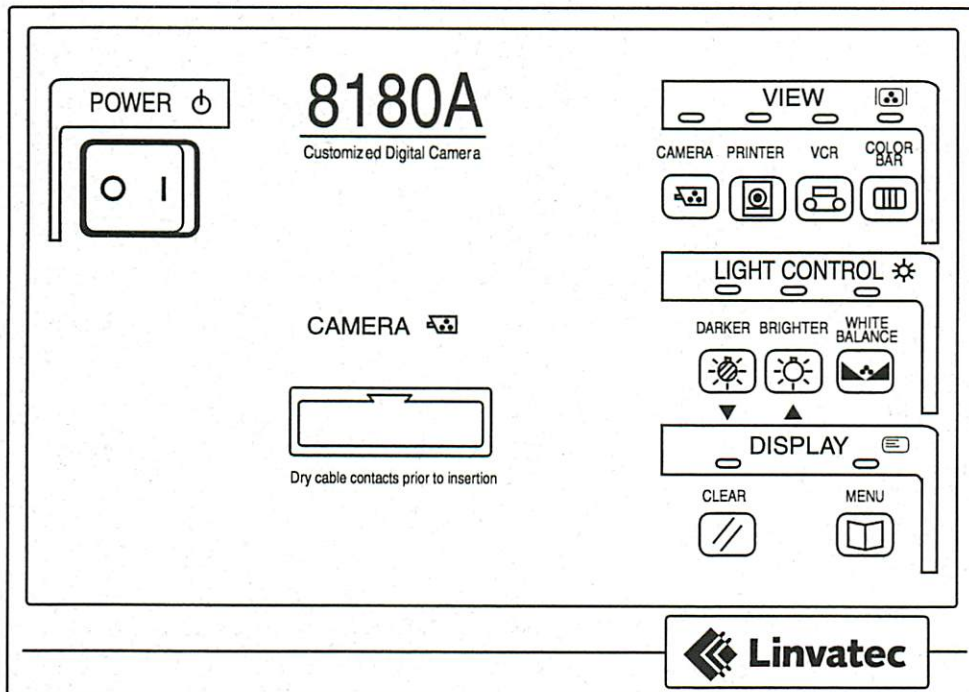
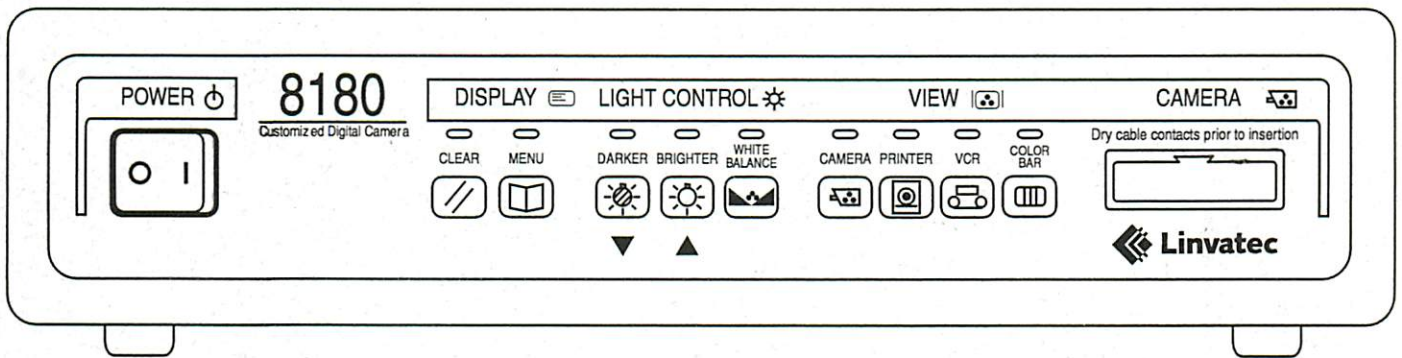


# OPERATING AND SERVICE MANUAL

## 8180 Customized Digital Camera PAL or NTSC Format



**Record the Model and Serial Numbers of the camera console and camera head and retain for future reference.**

**Camera Model No.** \_\_\_\_\_ **Serial No.** \_\_\_\_\_

**Camera Head Model No.** \_\_\_\_\_ **Serial No.** \_\_\_\_\_

# Important

8180 Customized  
Digital Camera



It is recommended that personnel study this manual before attempting to use, clean, service or adjust the Linvatec 8180 (NTSC/PAL format) Customized Digital Camera. The safe and effective use of the equipment is dependent, to a large extent, upon factors under the control of the operator and service personnel, and not entirely controllable by the design of the equipment. It is important that the instructions contained in this manual be understood and followed to enhance safety to the patient and to the operator.

This camera complies with IEC 601-1 International Standards as Type B, Class 1 equipment.

## Proprietary Information

This manual contains information that is deemed proprietary to Linvatec. The information contained herein, including all of the designs and related materials, is the property of Linvatec Corporation and/or its licensors. Linvatec and/or its licensors reserve all patent, copyright and other proprietary rights to this document, including all design, manufacturing and reproduction.

This document, and any related materials, is confidential and is protected by federal copyright laws and shall not be duplicated, transmitted, transcribed, stored in a retrieval system, or translated into any human or computer language in any form or by any means, electronic, mechanical, magnetic, manual or otherwise, or disclosed to third parties, in whole or in part, without the prior express written consent of Linvatec.

Linvatec reserves the right to revise this publication and to make changes from time to time in the contents hereof without obligation to notify any person of such revision or changes.

# Important

## 8180 Customized Digital Camera

### Warranty

The material and workmanship in the 8180 Customized Digital Camera and accessories manufactured for Linatec is guaranteed as stated below<sup>1</sup>.

#### **CAMERA CONSOLE**

The material and workmanship in every 8180 Camera manufactured for Linatec is guaranteed for **TWO YEARS** from the date of shipment to the original purchaser (excludes any repairs related to software upgrades).

#### **CAMERA HEAD**

The material and workmanship in every 8171/8171PAL and 8172/8172PAL Camera Head manufactured by/for Linatec is guaranteed for **ONE YEAR** from the date of shipment to the original purchaser.

#### **VIDEO ACCESSORY CABLE**

The material and workmanship in every 8199 and 8199C Video Accessory Cable manufactured by/for Linatec is guaranteed for **ONE YEAR** from the date of shipment to the original purchaser.

Any equipment that does not perform to its specifications during these time periods will be repaired or replaced, at the discretion of Linatec, without charge. Liability under this warranty is limited to the above conditions. Linatec is not obligated to warrant or furnish service for damage resulting from:

- a) attempts by personnel other than Linatec Representatives to install, repair, or service the product during its warranty period or;
- b) improper use, or from connecting the product to incompatible equipment or;
- c) modifications to the product by anyone other than Linatec Representatives.

Linatec reserves the right to make design changes at any time without notice or without incurring any obligation to incorporate these changes to products previously purchased.

**This warranty is expressly limited to the terms and conditions as stated above. There are no other implied or expressed warranties or guarantees.**

---

1. ACCESS agreement warranty periods vary according to contractual commitments.

### Customer Service

The Linatec 8180 Series Customized Digital Cameras are designed and manufactured in accordance with sound engineering practices and should provide continuous, reliable, trouble-free service. If it does not, and you are unable to locate the source of trouble, contact your Linatec Sales Representative or call our Customer Service Department giving all the information available concerning the situation.

Do not return the unit or accessories without authorization. If it becomes necessary to return the unit to our factory you must acquire authorization, then pack the unit carefully and return via air freight, prepaid.

#### Customer Service

If you need technical assistance regarding the use or application of this product or you encounter a problem that requires servicing or repair, contact Linatec Customer Service or your Linatec Sales Representative.

Report any events involving injuries or malfunctions to the Linatec Regulatory Compliance Department.

Returning products for any reason requires a Return Goods (R.G.) number that can be obtained by contacting Linatec Customer Service. Please provide the following information:

- Original Invoice Number
- Date of Purchase
- Reason for Return

#### Repairs

Products returned for repair must have an authorized Return Goods (R.G) number prominently displayed on the box and included on all paperwork. Refer to this number if making inquiries about the repair status. Please provide the following information when returning a product for repair:

- Catalog Number
- Serial/Lot Number - if applicable
- Original Invoice Number
- Date of Purchase
- Detailed description of the problem

**If you require a quote** - Notify Customer Service when requesting your R.G. number, or on the paperwork returned with the product indicate that a quote is required. If a quote is not requested the repair will be processed and your account billed accordingly - provided the repair is not covered under warranty.

**Minimum repair charge** - There is a minimum repair charge (except for products covered under warranty). This charge also applies to products returned for repair in which a problem cannot be verified.

Repairs are warranted for 90 days.

Whenever it is required to return your product for repairs, be sure to package it in a protective carton. We recommend that you save the original shipping container for this purpose. In-transit damage is not covered by the warranty, therefore, it is best to always insure shipments.

# **Important**

## **8180 Customized Digital Camera**

### **Returned Goods**

Products must be returned within 45 days of ship date. Returned products are subject to a restocking fee of fifteen percent (15%) of the purchase price (minimum charge \$25). Products returned as a result of errors attributable to Livatec are exempt.

Returns must have an authorized Return Goods (R.G.) number prominently displayed on the box and included on all paperwork.

Returns must be shipped prepaid freight, otherwise they will not be accepted. Products contaminated with biohazardous materials will be returned to the sender.

**Livatec**  
**11311 Concept Boulevard**  
**Largo, Florida 34643 USA**

### **Customer Service**

**800-237-0169**  
**813-399-5256 FAX**

### **International Customer Service**

**813-392-6464**  
**813-397-4540 FAX**

### **Livatec Regulatory Compliance**

**800-237-0169**

## **Certificate of Manufacturer**

This is to certify that the inspection, tests, and evaluations of the Livatec 8180 Series Camera is in compliance with the applicable requirements of the Standard for Medical Electrical Equipment (IEC 601-1, 2nd Edition and IEC 601-2-18, 1st Edition), UL544 and CSA601.1.

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Digital Camera

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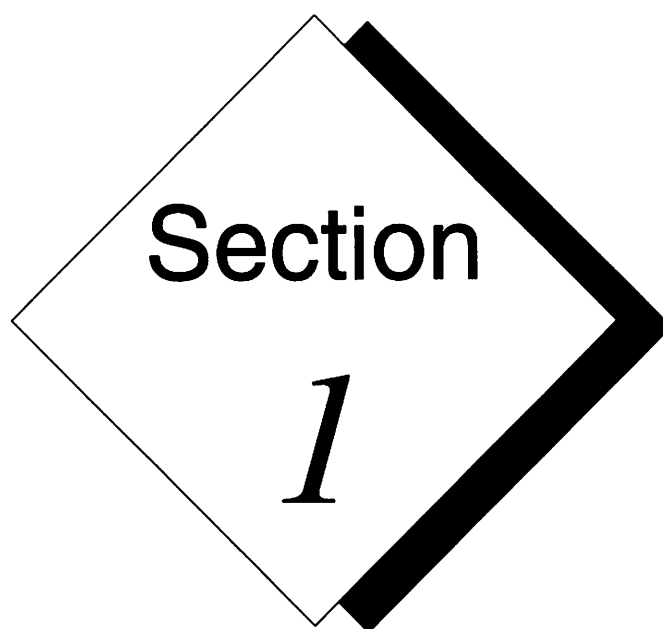
## Section 4

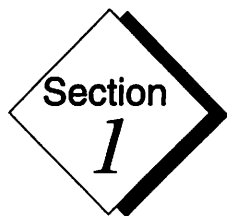
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# Introduction





## Description of Equipment

# Introduction

## 8180 Customized Digital Camera

The Linvatec 8180 Camera is designed for easy use and is durable in typical hospital applications. They are designed for use in the following applications

1. Endoscopic and General Surgery
2. Arthroscopy
3. Microsurgery
4. Applications utilizing lasers.

All uses of the camera should be carried out according to the instructions in this manual. When the camera is used according to the guidelines provided in this manual, it will provide many years of reliable and satisfactory performance.

The Linvatec 8180 Digital Camera consists of four models; 8180 - NTSC with no video enhancer; 8180C - NTSC with video enhancer; 8180A - PAL with no video enhancer; 8180AC - PAL with video enhancer. These cameras are fully digital and employ a state-of-the-art, color micro-camera and an exclusive coupler design to give one of the most sensitive and consistent video images with exact color enhancement available today. The camera head, coupler, cable, and connector are completely immersible in typical hospital disinfecting/sterilizing agents (see **"Cleaning and Disinfecting Information"** on page 3-1 before immersing the camera components in disinfecting/sterilizing liquids). The standard eyepiece coupler is designed to accept the eyecup of most of the endoscopes available today. The cartridge coupler will only accept the Linvatec cartridge scope to assure a "fog-free" optical system.

The camera contains a user programmable menu that allows the user to individually customize and save into memory several specific options and select them at any time during surgery.

The camera is equipped with video switching that can be controlled by the simple push of a button on the camera head. Therefore, the user does not have to switch the monitor to get the VCR image, printer image or camera image.

A communication channel exists between the camera and the 8430W/8430WE Xenon Light Source which gives them the ability to talk to one another.

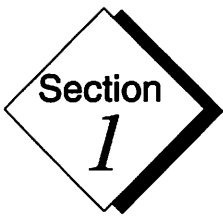
Throughout a surgical procedure the camera performs self-diagnostics internally and on all peripheral equipment for on-screen support.

Automatic white balance and sensitivity control circuits are included to enable the camera to be used under a wide variety of light source conditions.

A color bar test pattern signal for accurate color alignment of the monitor, printer and VCR.

The optional video enhancer gives the camera an added value of enhancing the image detail, contrast and background without distorting the image.

The camera's packaging and circuitry are designed to provide maximum immunity to the electromagnetic interference (EMI) typically found in electrosurgical environments.



# Introduction

8180 Customized  
Digital Camera

## Description of Manual

Section I — **Introduction**; Section II — **Operating the Equipment**; Section III — **Cleaning/Disinfecting/Sterilization**; and Section VII — **Appendix I — Error Messages** have been written for the user to provide information essential for the correct and safe operation of the camera.

Section IV — **Maintaining the Equipment**; Section V — **Theory of Operation & Schematics**; and Section VI — **Service Information**, were principally written for the hospital biomedical engineer or technician who will be involved in the routine maintenance and inspection of the unit. Included in these sections are technical specifications, circuit descriptions and procedures for performing incoming/periodic inspections, troubleshooting and cleaning and disinfecting.

Section VIII — **Glossary**, was written to define some unfamiliar terminologies for better understanding of how the camera system works, which may assist personnel in the use of the equipment.

If after reading this manual there are any questions regarding the unit, please call or write Linvatec's Customer Service Department or contact your local Linvatec Sales Representative.

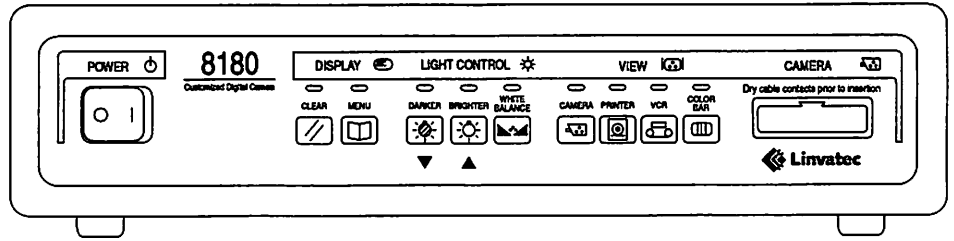
## Receiving Inspection

Upon receipt, carefully unpack the unit and assure that all items listed below are included in the box. Save **ALL** packaging materials; they may be needed to verify any claims of damage by the shipper.

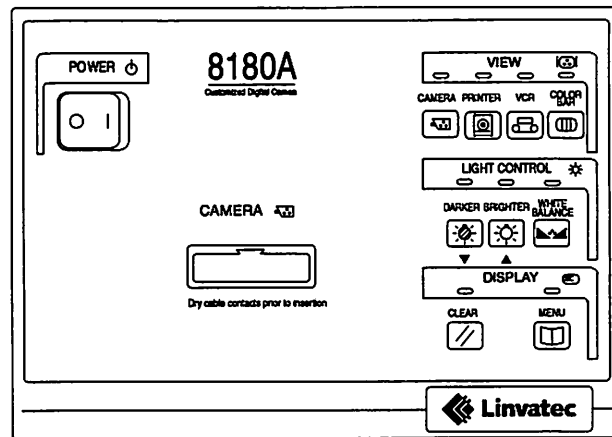
- Camera Console
  - 8180 - Low Profile (no video enhancer) or
  - 8180C - Low Profile with video enhancer or
  - 8180A - Modular (no video enhancer) or
  - 8180AC - Modular with video enhancer
- 1 - S-Video Cable
- 1 - BNC Cable
- Grip - O's (4 each, 8180/8180C only, Not Shown - used to increase slide resistance)
- Color Bar Chart Label (Not Shown)
- 8180 Quick Reference Guide
- 8180 Custom Setup Menu Cards
- 8180 Customized Digital Camera Operating and Service Manual

The power cord is packaged in a separate box.

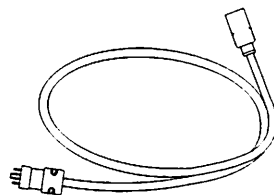
- C7104 Power Cord — 115VAC
- C7105 Power Cord — 230VAC



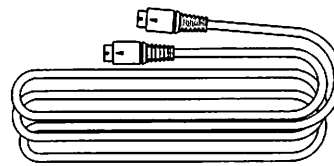
**8180/8180C Low Profile Digital Camera Console (PAL/NTSC)**



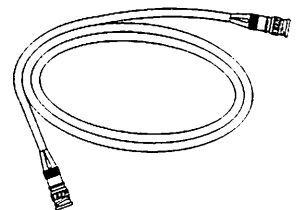
**8180A/8180AC Modular Digital Camera Console (PAL/NTSC)**



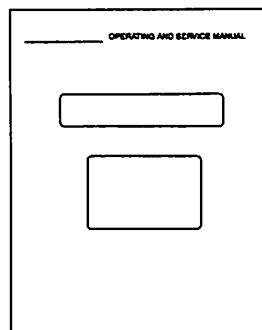
**AC Power Cord**



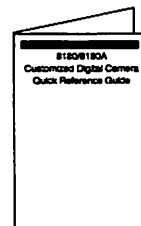
**"S" Video Cable**



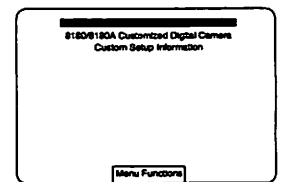
**BNC Cable**



**8180 Customized Digital Camera Operating/Service Manual**



**8180 Quick Reference Guide**

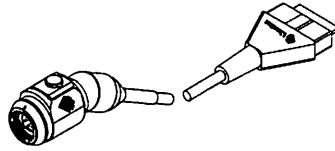


**8180 Custom Setup Menu Cards**

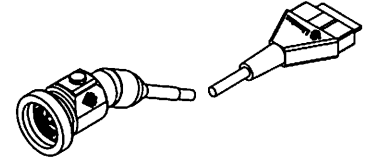
**Order Separately**

**Camera Heads and Cables must be ordered separately**

- Camera Head
  - V-mount - Cat. No. 8171/8171PAL OR
  - C-mount - Cat. No. 8172/8172PAL

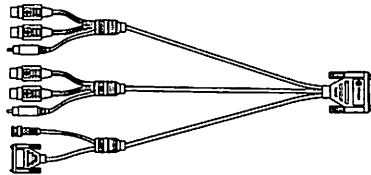


**8171/8171PAL "V" mount  
Camera Head**

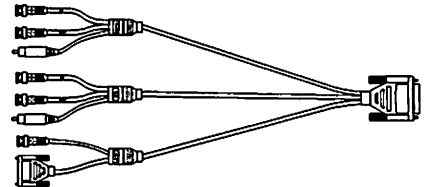


**8172/8172PAL "C" mount  
Camera Head**

- Video Accessory Cable
  - Cat. No. 8199 - S-Video (Y/C) OR
  - Cat. No. - 8199C - Video (Composite)

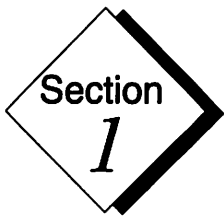


**S-Video Accessory  
Cable  
Cat. No. 8199**



**Composite Video Accessory  
Cable  
Cat. No. 8199C**





# Introduction

8180 Customized  
Digital Camera

## Chassis Inspection

Before shipment, this unit was inspected and found to be free of mechanical and electrical defects. Our equipment is shipped using custom packing materials; however, it is possible for mechanical damage to occur from shock and vibration during transit. Examine the unit for any damage that may have occurred. Carefully inspect all exterior components, surfaces and corners for signs of physical abuse.

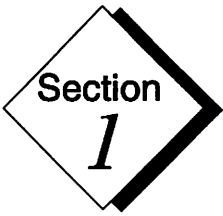
If signs of damage are observed, immediately file a claim with the transporting agency and notify your Linvatec Representative or Customer Service. Do not attempt to use the unit if any damage has occurred, and do not return the unit until the carrier has inspected it and you have received authorization, then pack the unit carefully and return via air freight, prepaid.

Any unit that has been dropped should be disassembled and checked internally by a qualified technician to verify that no components or hardware have been damaged.

## Mechanical Inspection

1. Inspect the power cable; video cables and camera cable. Verify the insulation is intact and that there are no sharp bends or kinks. Damaged cables should be replaced.
2. Inspect the camera connector and receptacle; assure pins are clean and unbroken.
3. Inspect the camera and coupler lenses; assure there are no chips or cracks.
4. Remove the cover and inspect the PCB for any signs of abuse. Verify that all connectors are securely mated.

Before installing the camera in the operating room, a “**Functional Test**” on page 4-1; “**Ground Bond Test**” on page 4-37, and “**Leakage Test**” on page 4-38 should be performed by a qualified technician.



# Introduction

8180 Customized  
Digital Camera

## Important Safety Instructions



**DANGER**

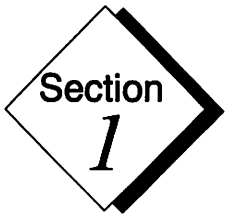


**CAUTION**



**CAUTION**

1. Read and follow all warning notices and instructions marked on the product or included in this manual.
2. Do not attempt to use the camera with incompatible equipment that is not authorized by Linvatec. Doing so will result in:
  - a) Jeopardizing the safety and integrity of the unit
  - b) Voiding of any warrant and/or service
  - c) Voiding of all certifications including, but not limited to:
    1. UL STD 2601-1
    2. IEC 601-1
    3. CAN/CSA C22.2 NO. 601.1
3. The 8180 Camera should only be operated by qualified personnel.
4. The performance of the camera may degrade if its components are exposed to severe heat. Do not use or store the camera console where it will be exposed to direct sunlight or to temperatures in excess of 104°F (40°C).
5. Do not use the camera in the presence of flammable anesthetics, gases, disinfecting agents, cleaning solutions, or any material susceptible to ignition due to electrical sparking.
6. Do not attempt to service this product yourself. Do not remove the cover. Removing the cover may expose you to dangerous high voltages or other risks. There are no user serviceable parts inside. Refer servicing to qualified service personnel.
7. Do not expose the camera console to rain or moisture, or operate in wet areas. Moisture can damage the camera unit and can also create the danger of electrical shock.
8. Equipment grounding is vital to insure safe operation. Plug the power cord into a properly earthed mains supply outlet whose voltage and frequency characteristics are compatible with those listed on the rear of the unit (i.e., receptacle marked "Hospital Only" or "Hospital Grade"). Do not use 2-prong plug adapters or 2-prong extension cords; such devices defeat the safety ground.
9. The system should be inspected for safe and proper operation by a qualified technician at least every six months.
10. Prior to each use, check that all cables are in good working condition; no cracked, split or broken cords.



---

# Introduction

8180 Customized  
Digital Camera

11. The camera cable and light guide should be handled with extra care to avoid unnecessary servicing. Do not stand on, hang, twist, kink or bend any of the cables, light guide or power cord or roll carts or tables over them.
12. Do not pull the camera cable, video accessory cable, light guide or power cable by the cord to remove them from the control unit or a wall outlet, hold the plug.
13. Do not mechanically shock or drop the camera head.
14. Unplug this product from the wall outlet before cleaning. At the completion of each use, thoroughly clean the unit and sterilize all accessories (see "Cleaning and Disinfecting Information" on page 3-1).

## Symbol Definitions



Power "OFF", disconnected from the mains



Power "ON", connected to the mains



Attention, consult accompanying documents



Type B equipment<sup>1</sup>



Caution - Presence of uninsulated High Voltage within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock.



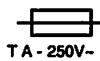
Alternating Current



Protective earth ground



ISO-Potential Ground



T A - 250V-

Warning - For continued protection against risk of fire, replace only with the same type and rating fuse.



Flammable Anesthetics - Risk of explosion if used in the presence of flammable anesthetics.

1. Equipment providing a particular degree of protection against electric shock particularly regarding:

- allowable Leakage Current
- reliability of the protective earth connection (if present)

Suitable for intentional external and internal application to the patient, excluding DIRECT CARDIAC APPLICATION.

## Controls and Indicators

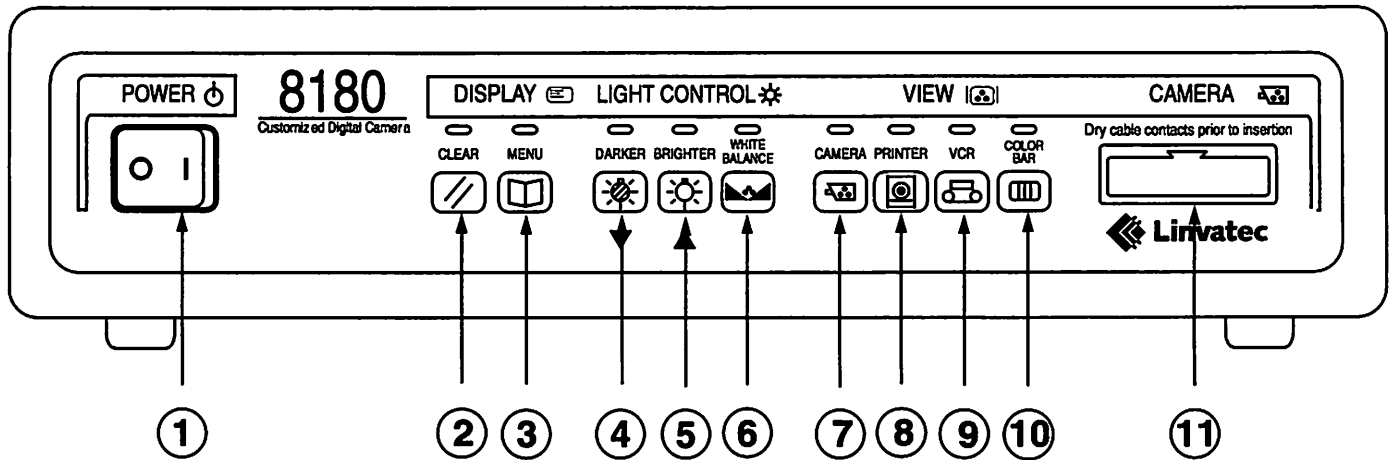
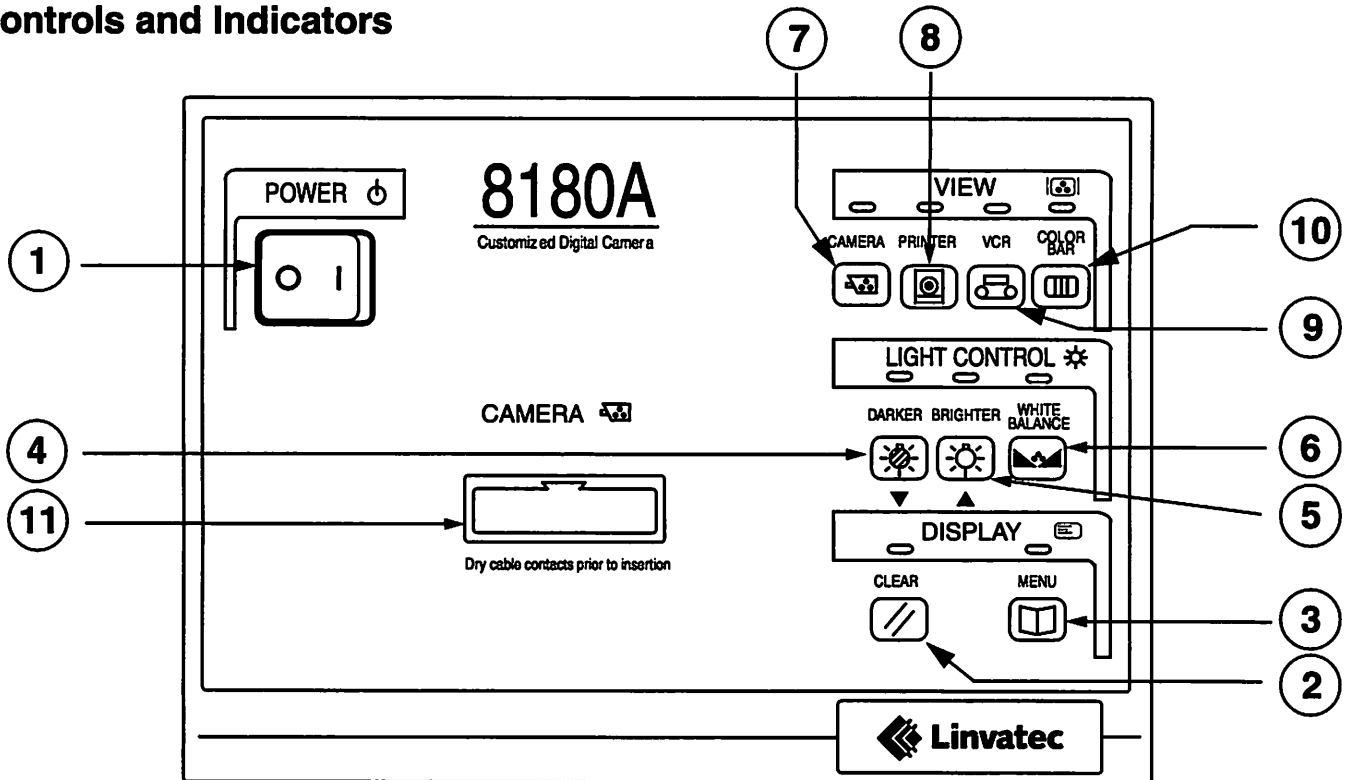


Figure 1-1  
8180/8180C Front Panel

1. **Standby Power Switch** - Lighted, green rocker-type ON/OFF switch. When pressed with the Mains Power switch (rear panel) ON, the switch illuminates and the camera is ready for operation. Turning this switch off while the Mains Power switch is on places the camera in stand-by mode.
2. **Display Clear Button** — Performs two functions.
  - (Clear) — Press this button to immediately remove diagnostic messages displayed on the screen.
  - (Menu Exit) — While in the Camera Menu Setup mode, press the **CLEAR** button to exit the Camera Menu Setup mode and return to normal operation.
3. **Display Menu Button** — Performs two functions.
  - (Menu Access) — Press this button to access the Camera Menu Setup mode.
  - (Menu Advance) — In the Camera Menu Setup mode, press the **MENU** button to advance to the next screen. The "Menu" LED is illuminated while the menu is activated. The **CLEAR** button must be pressed to exit the Camera Menu Setup mode.
4. **Light Control Darker Button** — Performs three functions.
  - (Darker) — Press to decrease the brightness level of the displayed image.
  - (Cursor Down) — While in Menu mode, press to scroll down to the next menu selection.
  - (Cursor Left) — While in a Menu "Set Level" mode, press to move the level marker left.
5. **Light Control Brighter Button** — Performs three functions.
  - (Brighter) — Press to increase the brightness level of the displayed image.
  - (Cursor Up) — While in a Menu mode, press to move the cursor up to the next menu selection.
  - (Cursor Right) — While in a Menu "Set Level" mode, press to move the level marker left.
6. **Light Control White Balance Button** — Press to initiate the camera white balance process. White balancing tunes the camera to the color temperature of the light source.

## Controls and Indicators



**Figure 1-2  
8180A/8180AC Front Panel**

**7. View Camera Button** — Press to view the video image directly from the camera. The camera LED illuminates while operating in the “Camera” mode.

**8. View Printer Button** — Performs two functions.

**(Printer)** — Press this button to view the video image through the printer. The printer LED illuminates while operating in the “Printer” mode.

**(Enter Cable Configuration Format Menu)** — Press the **MENU** button to access the Camera Menu Setup mode, then press the **PRINTER** button to enter the Cable Configuration Format mode to select either S-VIDEO or VIDEO format. Press the **CLEAR** button to exit the menu. Preset to S-VIDEO format at factory.

**9. View VCR Button** — Performs two functions.

**VCR** — Press this button to view the video image through the VCR. VCR status is displayed such as; VCR Stop, VCR Record with tape speed, Record icon (square) displayed when taping, and the camera image. The VCR LED illuminates while operating in the “VCR” mode.

**(Enter Video Enhancer Split Screen - only units with optional video enhancer board installed, 8180C and 8180AC)** — Press the **MENU** button to enter the Camera Menu Setup mode. Press the **VCR** button to enter the Video Enhancer Split Screen mode. This gives the user the opportunity to activate the split screen or normal screen display. In split screen, the unprocessed image is displayed on the left and the processed (enhanced) image is displayed simultaneously on the right. Press the **CLEAR** button to exit the menu.

**10. View Color Bar Button** — Performs two functions.

**(Color Bars)** — Press to turn on the color bar test pattern. Press any “View” button - Camera, Printer, VCR - for color adjustment of the specific peripheral device attached. Press again to turn the color bar test pattern off. Color bars are available on all video outputs.

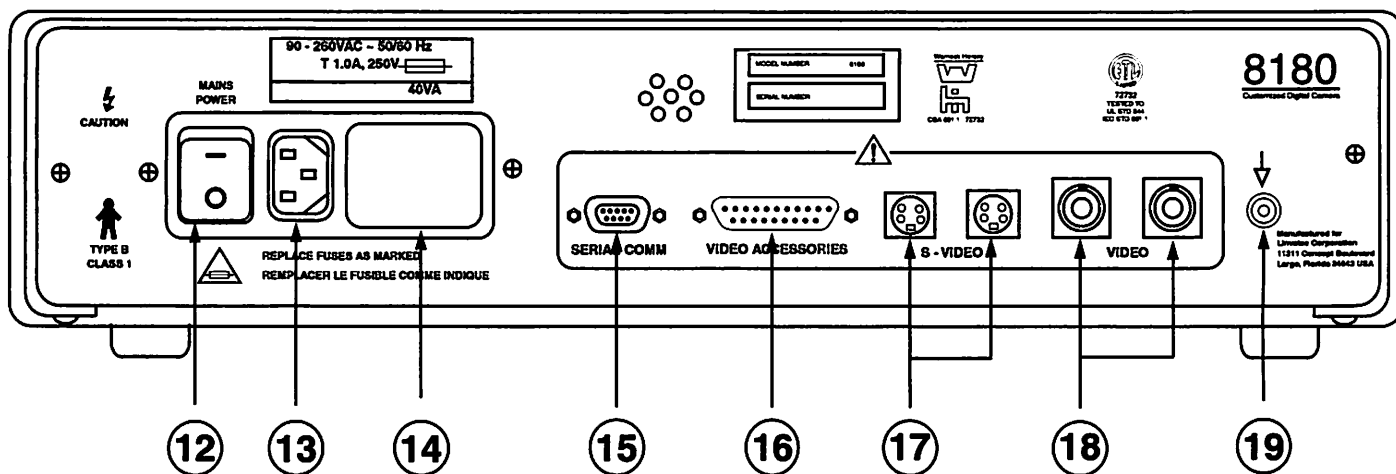
**(Enter Video Format)** — Press the **MENU** button to access the Camera Menu Setup mode. Then press the **COLOR BAR** button to enter the Video Format mode to select either PAL or NTSC format. Press the **CLEAR** button to exit the menu. Preset to NTSC format at factory.

# Section 1

# Introduction

## 8180 Customized Digital Camera

### Controls and Indicators



**Figure 1-3**  
**8180/8180C Rear Panel**

11. **Camera Receptacle** — Connect the camera head cable connector here. The cable connector will only insert one way; with the Linvatec logo facing up.  
  
**NOTE: Always dry connector completely before inserting into camera receptacle.**
12. **Mains Power Switch** — Controls the main power to activate the camera.
13. **Power Cord Receptacle/Line Filter** — Used to supply AC power to the camera. Accepts the power cable supplied with the camera. Also, line filtering integration helps to filter out unwanted noise and voltage spikes associated with the input voltage.
14. **Fuse (F1) Module** — Equipped with a T1.0A, 250V (slow blow) fuse. To replace a fuse reference "Fuse Replacement" on page 4-39.
15. **Serial COMM Receptacle** — A 9-pin, D-sub receptacle to allow for communications with future Linvatec equipment.
16. **Video Accessories Receptacle** — A 25-pin, D-sub receptacle used to easily connect the Video Accessory Cable (Cat. No. 8199 - S-VIDEO format or Cat. No. 8199C - Composite VIDEO format). The Video Accessory Cable contains all the necessary cables in one assembly to eliminate confusion in the connection of all the individual cable hook-ups.
17. **S-Video Connectors** — Used for the output of an S-Video signal to compatible equipment.
18. **Composite Video Connectors** — BNC connectors used for the output of a composite video signal to compatible equipment.
19. **ISO-Potential Equalization Connector** — A ground connector used to bring all individual chassis grounds to a common ground.

Section  
**1**

# Introduction

## 8180 Customized Digital Camera

### Controls and Indicators

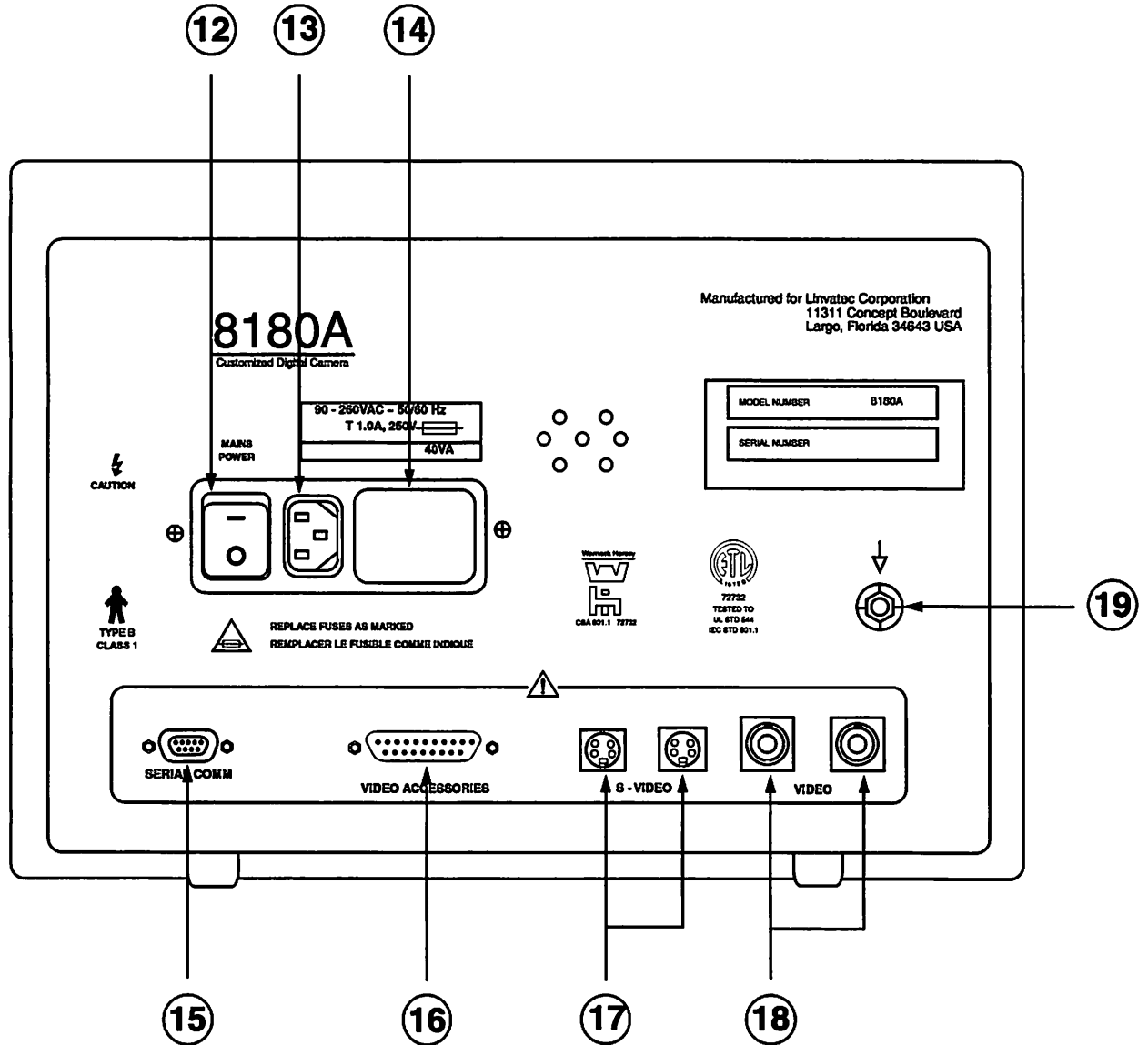


Figure 1-4  
8180A/8180AC Rear Panel

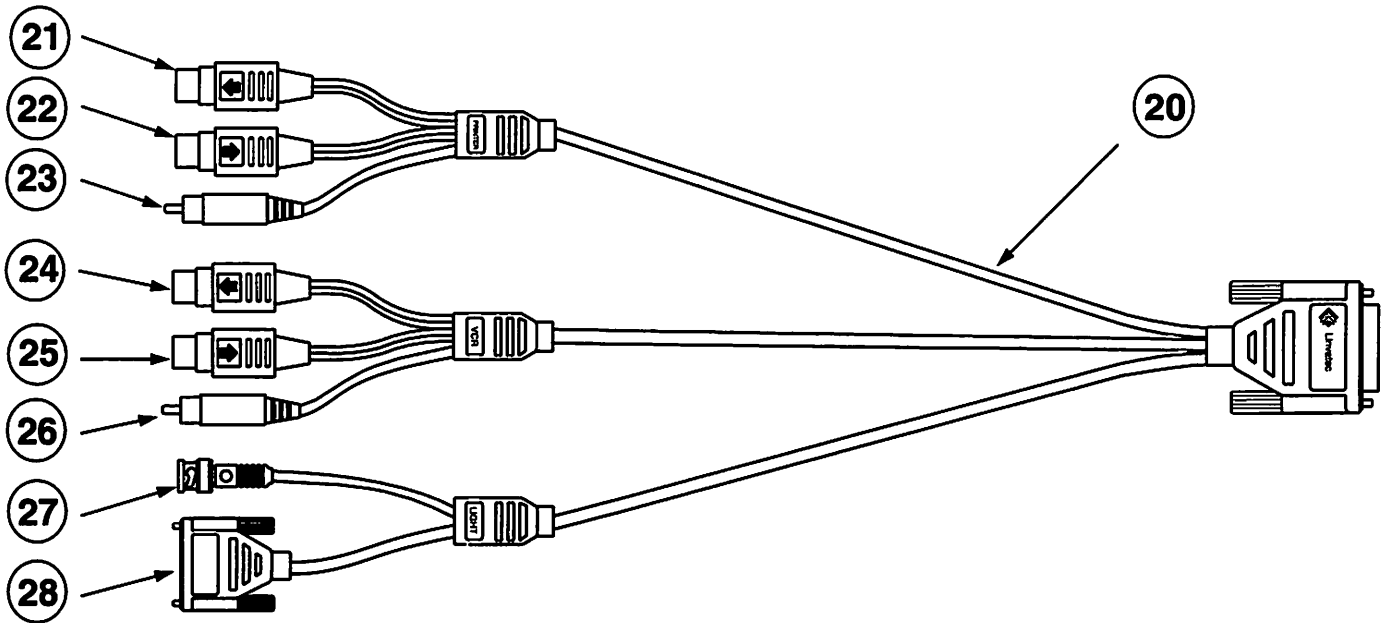


Section  
1

# Introduction

8180 Customized  
Digital Camera

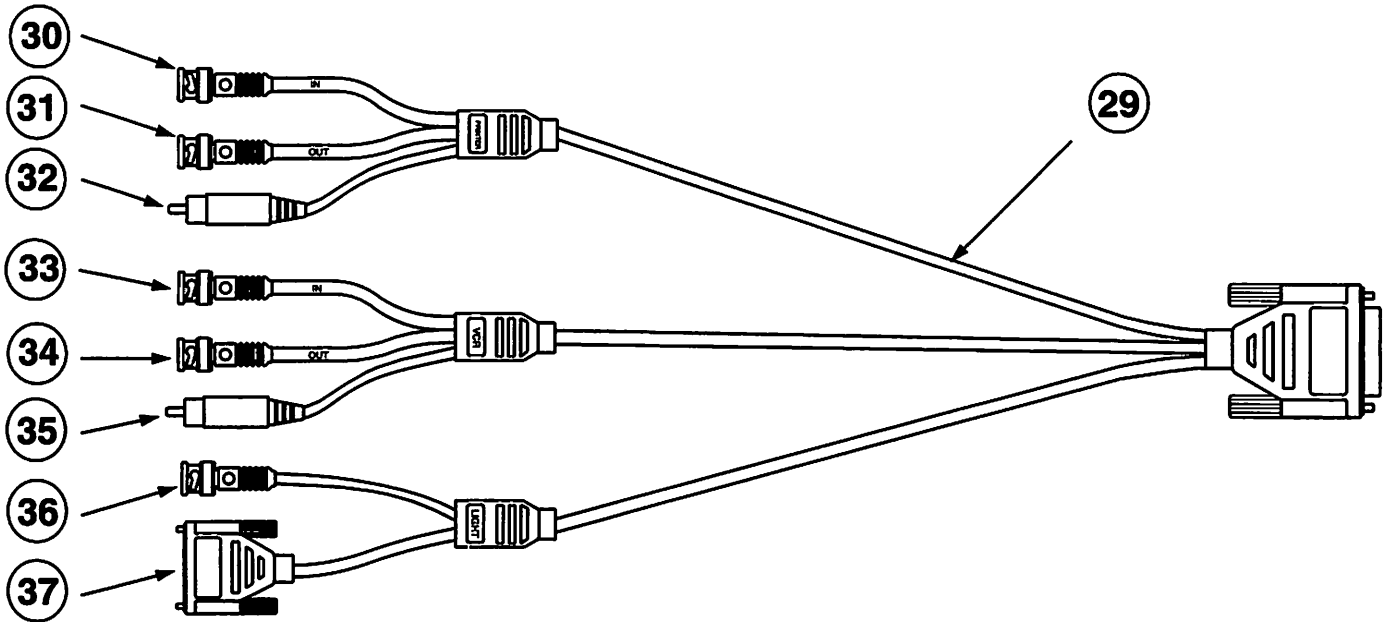
## 8199 S-Video Cable



**Figure 1-5**  
**8199 S-Video Accessory Cable**

- 20. **8199 S-Video Accessory Cable** — A reliable cable designed for quick and easy hook-up of the camera with other peripheral devices. Consists of a 25 pin D-sub male plug which easily connects to the 25 pin D-sub female receptacle on the camera. The opposite end consists of several "S", BNC, RCA and D-sub connectors with molded indicators to show which connector to connect to each peripheral device.
- 21. **Printer S-Video IN Cable** — An "S" connector used to connect between the camera and the printer's S-Video input connector for video processing between the camera and the printer.
- 22. **Printer S-Video OUT Cable** — An "S" connector used to connect between the camera and the printer's S-Video output connector for video processing between the camera and the printer.
- 23. **Printer Remote Cable** — An RCA connector used to connect between the camera and the remote connector on the printer. (Some printers may require an RCA female-to-female adapter).
- 24. **VCR S-Video IN Cable** — An "S" connector used to connect between the camera and the VCR's S-Video input connector for video processing between the camera and the VCR.
- 25. **VCR S-Video OUT Cable** — An "S" connector used to connect between the camera and the VCR's S-Video output connector for video processing between the camera and the VCR.
- 26. **VCR Remote Cable** — An RCA connector used to connect between the camera and the remote connector on the VCR to use the camera head button for remote VCR operation.
- 27. **Light Source Video Cable** — A BNC connector used to connect between the camera and light source video connector for video processing.
- 28. **Light Source Communication Cable** — A 9 pin, D-sub connector used to connect between the camera and the 8430W/8430WE Light Source COMM connector for communication and diagnostics between the two units.

## 8199C Video Cable



**Figure 1-6**  
**8199C Composite Video Accessory Cable**

29. **8199C Composite Video Accessory Cable** — A reliable cable designed for quick and easy camera hook-up with other peripheral devices. Consists of a 25 pin D-sub plug which connects to the 25 pin D-sub receptacle on the camera. The opposite end consists of several BNC, RCA and D-sub connectors with molded indicators to show which connector to connect to each peripheral device.
30. **Printer IN Cable** — A BNC connector used to connect between the camera and the printer's Video input connector for video processing between the camera and the printer.
31. **Printer OUT Cable** — A BNC connector used to connect between the camera and the printer's Video output connector for video processing between the camera and the printer.
32. **Printer Remote Cable** — An RCA connector used to connect between the camera and the remote connector on the printer. (Some printers may require an RCA female-to-female adapter).
33. **VCR Video IN Cable** — A BNC connector used to connect between the camera and the VCR's Video input connector for video processing between the camera and the VCR.
34. **VCR Video OUT Cable** — A BNC connector used to connect between the camera and the VCR's Video output connector for video processing between the camera and the VCR.
35. **VCR Remote Cable** — An RCA connector used to connect between the camera and the remote connector on the VCR to use the camera head button for remote VCR operation.
36. **Light Source Video Cable** — A BNC connector used to connect between the camera and light source video connector for video processing.
37. **Light Source Communication Cable** — A 9 pin, D-sub connector used to connect between the camera and the 8430W/8430WE Light Source COMM connector for communication and diagnostics between the two units.

Section  
**1**

# Introduction

## Camera Head Switch Operation

The camera head switch (Figure 1-7) is a remote control device that actuates the VCR - start or stop recording, and the printer - storing an image (if a VCR and/or printer are being used). The Remote Configuration Menu (see "Camera Menu Setup" on page 2-14) provides the capability of programming how the head switch functions. It can be programmed to activate the VCR, the Printer, or both. To use the head switch on the camera, take one of the following two actions:

When the head switch is programmed in the Custom Setup Menu to remotely control a VCR and printer, the head switch will function as follows:

**Press:** Press the head switch for less than 0.6 seconds to activate the VCR. A short audio tone will be heard signifying that the action is complete. This will cause the VCR to start recording. Press again to stop recording.

**Press and Hold:** Press and hold the head switch for greater than 0.6 seconds to activate the printer and store the current camera image being displayed on the monitor into printer memory. An audio tone will be heard signifying that an image has been stored. This image will stay on the screen until the head switch is released.

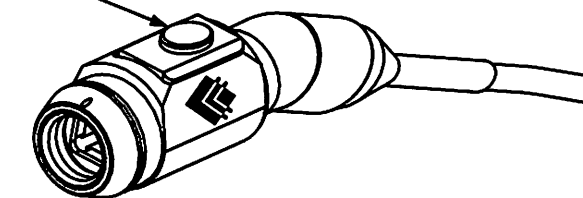
Otherwise, if the camera head switch is programmed for an individual item, such as printer only, all that is required is a single press of the head switch, regardless of the time



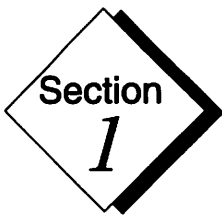
**NOTE**

If using a Linvatec 8128/8128A (NTSC) Printer the "MEMORY/INPUT", "MEMORY/LIVE" button, respectively, must be set to MEMORY to keep the stored image on the monitor screen. If the Linvatec 8128/8128A Printer is set to the FIELD mode (set with the FRAME/FIELD A/B button) and AUTO PRINT mode, the stored image(s) will automatically print whenever all segments in Field A have been filled. While the images are printing, the printer will automatically switch to Field B in the event more images are needed. However, while in Field B, the capabilities of pressing and holding the camera head switch to continuously display the image on the monitor is no longer enabled.

Head Switch



**Figure 1-7**  
**Camera Head Switch**



# Introduction

## 8180 Customized Digital Camera

### Camera Features

The 8180 Camera contains easy to use software, internal diagnostics, custom camera menu setups and a simple hook-up design for easy installation.

**Digital Camera** — The 8180 Camera contains a compact, high quality, state-of-the-art digital color camera that gives clear, high quality, precise color images in light as low as 1.2 foot-candles at F1.4 (3.5 lux). Its features consist of a 1/2 inch Interline Transfer HyperHAD CCD pick-up device, horizontal resolution of 470 lines, and a signal-to-noise ratio of 48dB.

**Communication Channel** — The 8180 Camera is equipped with a communication channel that gives them the ability to communicate with the 8430W/8430WE Xenon Light Source to display diagnostics and menu selections.

**Internal Diagnostics** — Throughout a surgical procedure, several important parameters are continuously checked on the camera as well as all attached peripheral equipment to help provide reliable operation of the camera.

**Custom Setup Menu** — A series of menus that allow the user to custom program a set of desired parameters and quickly recall them.

**Video Switching** — All video signals in the 8180 Camera are controlled by the front panel buttons. This enables the user to access the camera, VCR, or printer image and color bars without having to switch controls on the monitor.

**Camera Head Design** — The camera head of the 8180 Camera is small and compact, and incorporates an angled cable design for easier handling. The camera head is available in "V" mount or "C" mount and NTSC or PAL format.

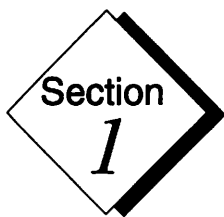
**Simplified Hook-up** — The 8180 Camera was designed for hassle-free hook-up of a complete video system. With all of the cables encased in one cable assembly, it easily connects to the back of the camera with a 25 pin D-sub connector. The operator only has to connect the appropriate cable to the correct equipment. Two options available: S and Composite Video.

**Color Bar Test Signal Generator** — This signal is useful for setting adjustments on the color video monitor as well as the VCR and printer.

**White Balance** — Tunes the camera to the color temperature of the light source for a high quality image.

**Auto Shutter Control** — This feature is extremely helpful for those using light sources that do not operate with an automatic shutter to adjust the amount of light output. With this function ON it enables automatic internal adjustment of light output, from within the camera, for the highest quality picture available. It is recommended to use the camera auto shutter even if the light source in use is equipped with its own auto shutter circuitry.

**Video Enhancer (Optional)** — The optional video enhancer gives the camera an added value of enhancing the image detail, contrast and background without distorting the image.



# Introduction

8180 Customized  
Digital Camera

## Switch Functionality

### Video Switches:

**Camera** — Press this button to view the image directly through the camera. The Camera LED will illuminate when Camera mode is activated

**Printer** — Press to access "Printer" view. In "Printer" mode the printer's video output image displays. Printer LED illuminates when Printer mode is activated

In the Camera Menu Setup mode, press the **PRINTER** button to access the Cable Configuration Format menu to select S-VIDEO or VIDEO format. To exit the Camera Menu Setup mode, press the **CLEAR** button. Factory preset to S-Video.

**VCR** — Press to access the "VCR" view. The VCR screen displays on the monitor. If currently recording a live image, the live image displays on the monitor along with a small, gray shaded square indicating the VCR is recording (while using most Linvatec VCRs). If replaying a previously recorded image, the recorded image displays on the monitor. The VCR LED illuminates in VCR mode.

(8180C/8180AC only) In Camera Menu Setup mode, press to access the Video Enhancer Split Screen mode. In split screen mode, monitor displays two images; the original unenhanced image and enhanced image. Press the **CLEAR** button to exit the Camera Menu Setup mode. Preset to Split Screen OFF at the factory.

**Color Bars** — Press to access the color bar test pattern. Color bars will display on the monitor for color adjustment. Press the desired button — Camera, Printer, VCR — for the device you wish to adjust. Press the **COLOR BAR** button again to turn the color bar test pattern off. Color Bar LED illuminates in Color Bar mode.

In the Camera Menu Setup mode, press the **COLOR BAR** button to access the Video Format mode to select either PAL or NTSC format. To exit the Camera Menu Setup mode, press the **CLEAR** button. Factory preset to NTSC.

**Head Switch** — Press to store an image in the printer or to toggle the VCR from record to stop while in the "Camera" mode.

### Setup Switches:

**Darker Button** — Press to decrease the brightness level of the displayed image.

Within the Camera Menu Setup mode, pressing the **DARKER** button moves the cursor down to the next menu selection. Also moves the level marker left.

**Brighter Button** — Press to increase the brightness level of the displayed image.

Within the Camera Menu Setup mode, pressing the **BRIGHTER** button moves the cursor up to the next menu selection. Also moves the level marker right.

**White Balance** — Press this button to tune the camera to the color temperature of the light source for a high quality image.

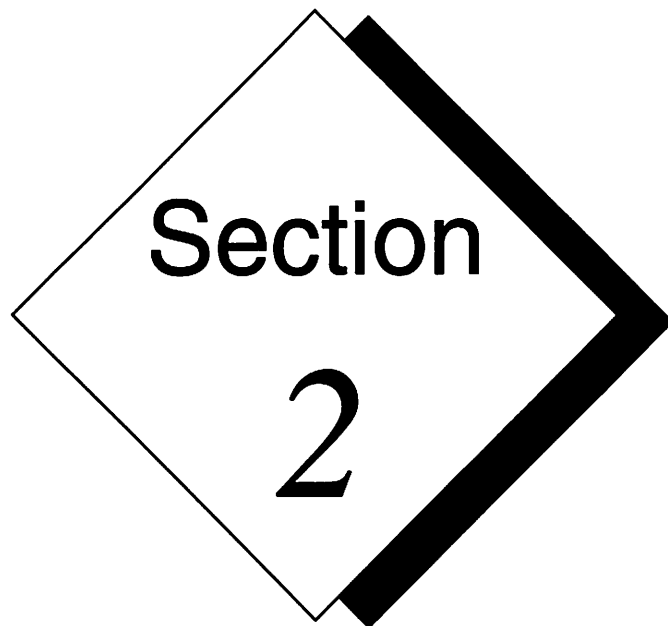
**Menu** — Press this button to access the Camera Menu Setup mode.

In the Camera Menu Setup mode press to continue on to the next menu.

**Clear** — Press this button to instantly remove any diagnostic messages that may appear on the screen.

In the Camera Menu Setup mode, press to exit the Camera Menu Setup mode.

# Operating the Equipment



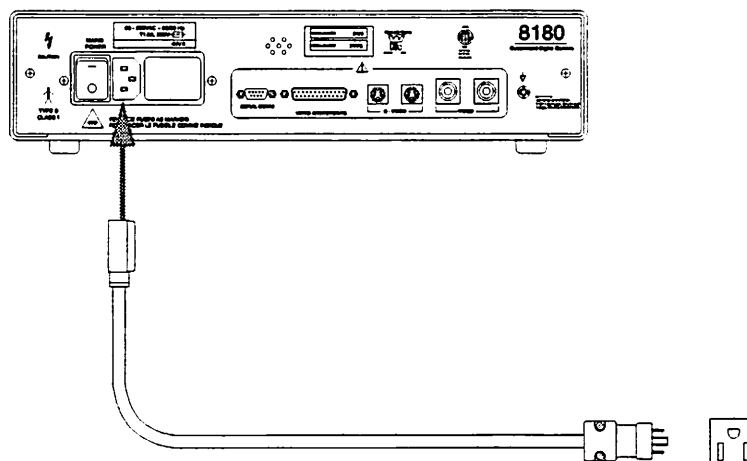
Section  
2

Installation

# Operating the Equipment

8180 Customized  
Digital Camera

1. Connect one end of the mains power cable to the rear of the camera console and the other end to a properly grounded outlet (see figure 2-1). To achieve reliable grounding, connect only to a properly earthed mains supply outlet (i.e., receptacle marked "Hospital Grade" or "Hospital Only").



**Figure 2-1**  
**Connecting Power Cord**

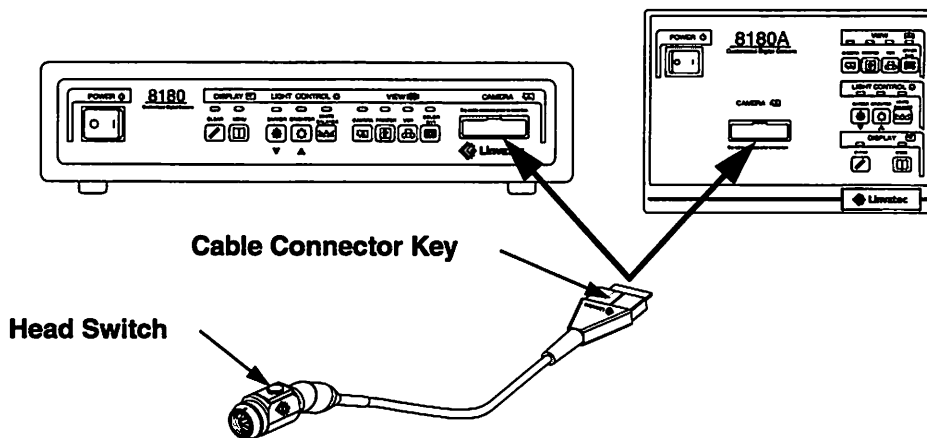
2. Connect the camera head cable connector to the camera console unit by positioning the cable connector with the insert key and Linvatec logo facing up (the keying on the connector only allows the connector to be inserted in one orientation). Push the connector into the camera console's mating receptacle (without any twisting) as far as it will go. Reference figure 2-2. (Cable connector must be clean and dry!).



**NOTE**

If the cable connector is not inserted completely, the following message will be displayed when the camera and monitor are powered on:

**"CONNECT CAMERA HEAD"**  
**"DRY CABLE CONTACTS PRIOR TO INSERTION"**



**Figure 2-2**  
**Connecting the Camera Cable to the Camera Receptacle**

3. Connect an S-Video cable from the S-Video connector on the rear of the camera to the S-Video IN (Y-C input) connector on the monitor (reference figure 2-3, system hook-up):



**NOTE**

Set monitor termination to 75Ω.

Figures 2-3 and 2-4 show a sample system connection of the 8180A/8180AC and 8180/8180C Cameras (respectively) to a 8430W/8430WE Xenon Light Source, Monitor, VCR and Printer. Other manufacturer's equipment may be in use which may require different connections than described. Also, communications and diagnostics will not be accomplished with other light sources as described with the 8430W/8430WE Xenon Light Source.

For use with any standard light source, an "S" VCR and an "S" compatible printer (reference figure 2-3):

1. Insert the 25-pin male D-sub connector, with the Linvatec logo facing up, into the "VIDEO ACCESSORIES" receptacle on the back of the camera console.

**From the major cable labeled "LIGHT":**

- Connect the BNC cable to the Video-IN (BNC) connector on any standard light source.
- If using a Linvatec 8430W/8430WE Xenon Light Source, connect the 9-pin female D-sub connector to the 9 pin male D-sub COMM receptacle on the light source rear panel.

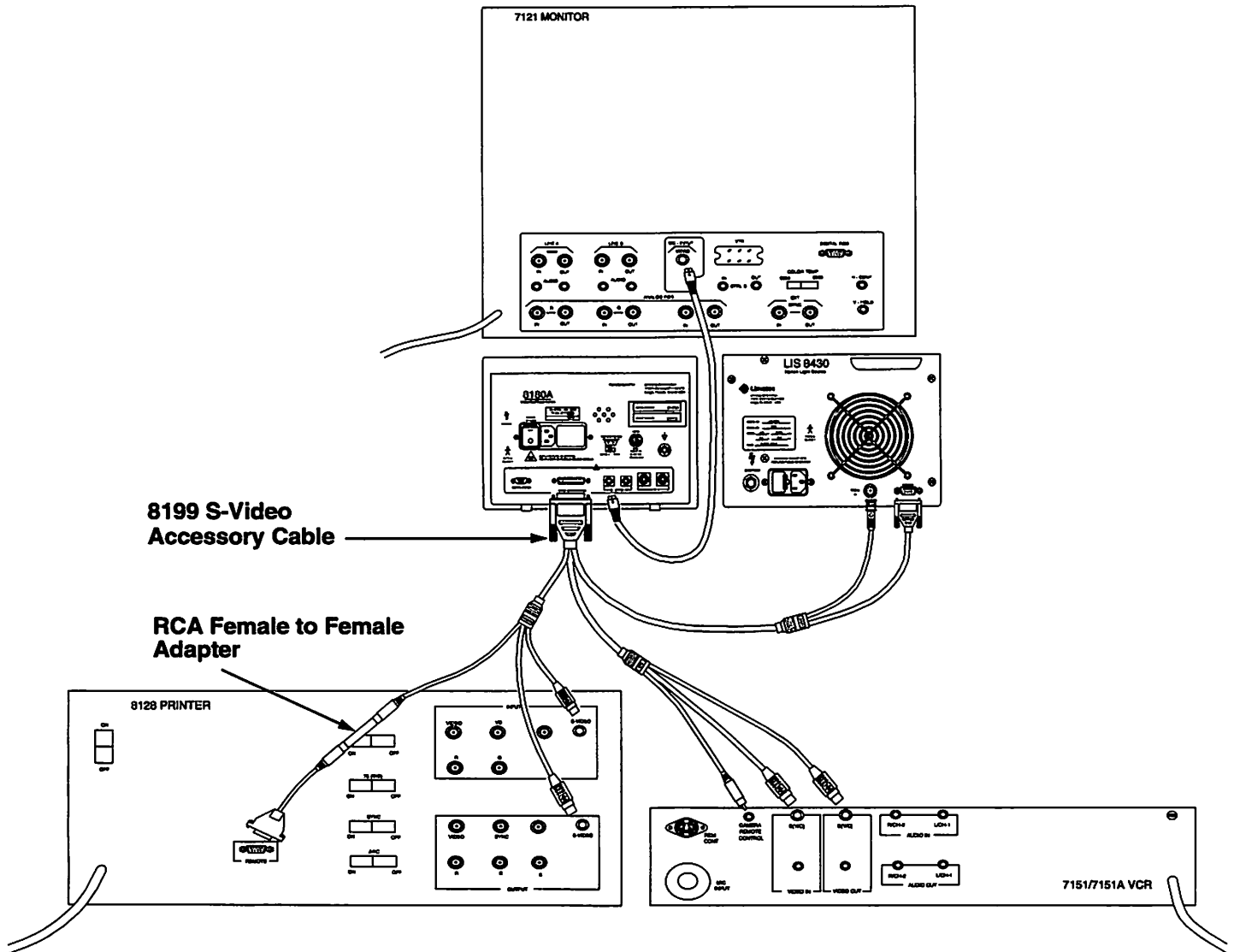
**S-Video Accessory  
Cable Connection  
(8199)**



Section  
2



# Operating the Equipment

## 8180 Customized Digital Camera





**Figure 2-3**  
**System Hook-up of the 8180A/8180AC Camera with the 8199 Video Accessory Cable**

**From the major cable labeled "VCR":**

- Connect the "S" connector (labeled  ) to the S-Video IN connector on the VCR.
- Connect the "S" connector (labeled  ) to the S-Video OUT connector on the VCR.
- Connect the RCA (remote) connector to the camera remote control receptacle on the VCR.

**From the major cable labeled "PRINTER":**

- Connect the "S" connector (labeled  ) to the S-Video IN connector on the printer.
- Connect the "S" connector (labeled  ) to the S-Video OUT connector on the printer.
- If using the Linvatec 8128/8128A High Resolution Video Printer, connect the RCA (remote) male connector from the camera's video accessory cable to the RCA female-to-female adapter (included with the printer).
- The other end of the RCA female-to-female adapter will attach to the RCA male connector on the remote cable included with the Linvatec 8128 /8128A Printer.
- The remote cable will then attach to the 9 pin D-sub receptacle on the rear of the printer.
- Additional outputs are available on the camera's rear panel. Two "S" format (labeled S-Video) and two "Composite" format (labeled "Video"). Attach an appropriate cable from the accessory to the appropriate connector on the rear of the camera.

**Composite Video  
Accessory Cable  
Connection (8199C)**

For use with non-standard light sources and non-"S" accessories or extra video accessories (reference figure 2-4):

1. Insert the 25-pin male D-sub connector, with the Linvatec logo facing up, into the "VIDEO ACCESSORIES" receptacle on the back of the camera console.
2. Connect a BNC video cable from the Video connector on the rear of the camera to the Video IN connector on the monitor.

Section  
2

# Operating the Equipment

8180 Customized  
Digital Camera

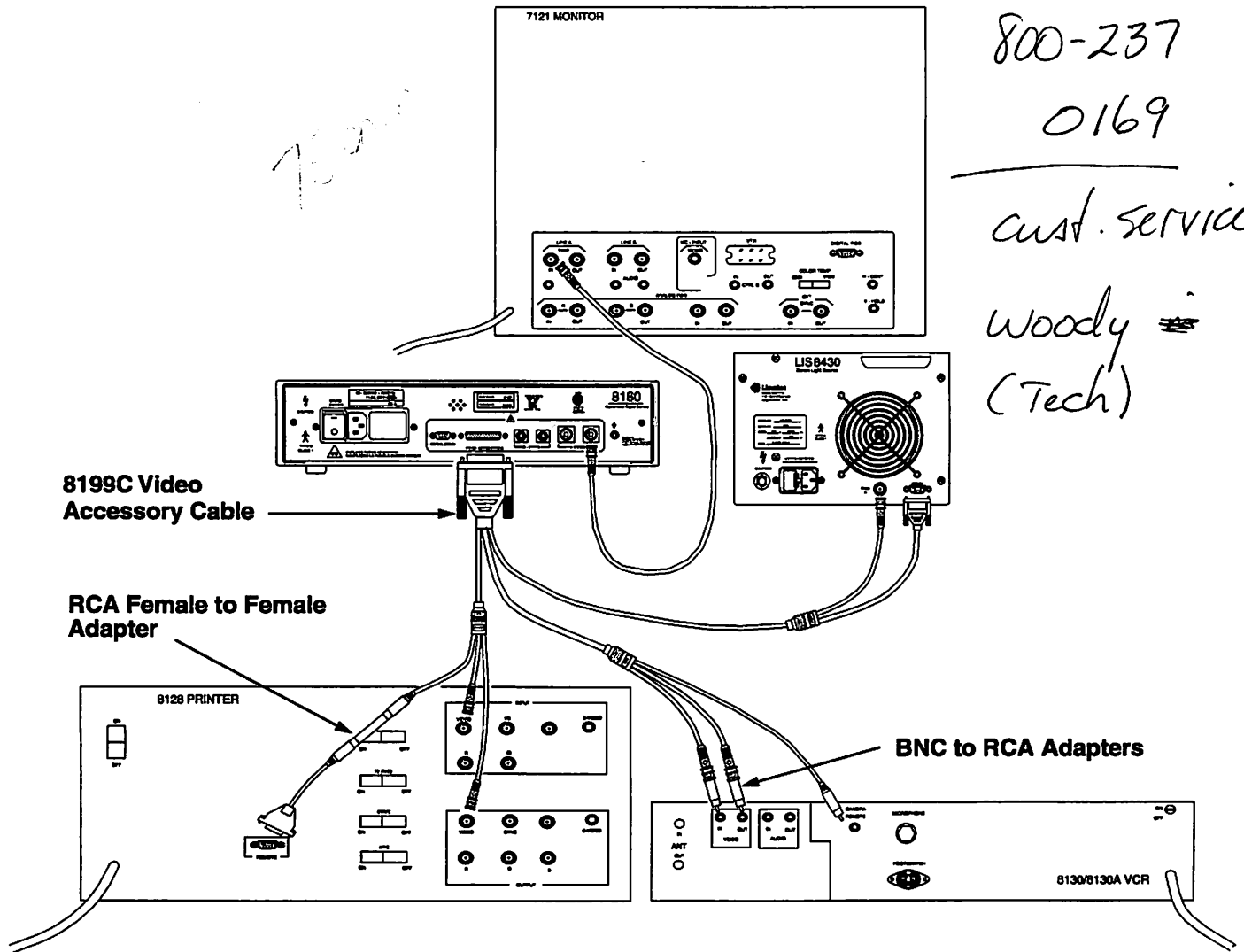


Figure 2-4  
System Hook-up of the 8180/8180C Camera with the 8199C Video Accessory Cable

**From the major cable labeled "LIGHT":**

- Connect the BNC cable to the Video-IN (BNC) connector on any standard light source.
- If using a Linvatec 8430W/8430WE Xenon Light Source, connect the 9-pin female D-sub connector to the 9 pin male D-sub COMM receptacle on the light source rear panel.

**From the major cable labeled "VCR":**

- Connect the BNC connector (labeled OUT) to the Video IN connector on the VCR using a BNC to RCA adapter.
- Connect the BNC connector (labeled IN) to the Video OUT connector on the VCR using a BNC to RCA adapter.
- Connect the RCA (remote) connector to the camera remote control receptacle on the VCR.

**From the major cable labeled "PRINTER":**

- Connect the BNC connector (labeled IN) to the Video IN BNC connector on the printer.
- Connect the BNC connector (labeled OUT) to the Video OUT BNC connector on the printer.
- If using the Linvatec 8128/8128A High Resolution Video Printer, connect the RCA (remote) male connector from the camera's video accessory cable to the RCA female-to-female adapter (included with the printer).
- The other end of the RCA female-to-female adapter will attach to the RCA male connector on the remote cable included with the Linvatec 8128 /8128A Printer.
- The remote cable will then attach to the 9 pin D-sub receptacle on the rear of the printer.
- Additional outputs are available on the camera's rear panel. Two "S" format (labeled S-Video) and two "composite" format (labeled "Video"). Attach an appropriate cable from the camera to the appropriate connector on the accessory.

Section  
2

# Operating the Equipment

8180 Customized  
Digital Camera

## Installation of Scope to Coupler



**CAUTION**



**NOTE**

Before mounting a lens or coupler to the camera head, check the following items:

- The mating "C" or "V" mount threads are clean, dry and undamaged.
- The endoscopic coupler should have a sealing ring at the base of the threads.
- Spotless camera, coupler, and scope lenses. Clean with a lint-free cloth or cotton swabs and alcohol to remove any smudges or dirt.
- Inspect camera, coupler, and scope lenses to assure there are no scratches, chips or other damage.
- Check scope shafts for dents which cause misalignment.

**Do not look into the light guide while it is plugged into the light source. Permanent eye injury may result.**

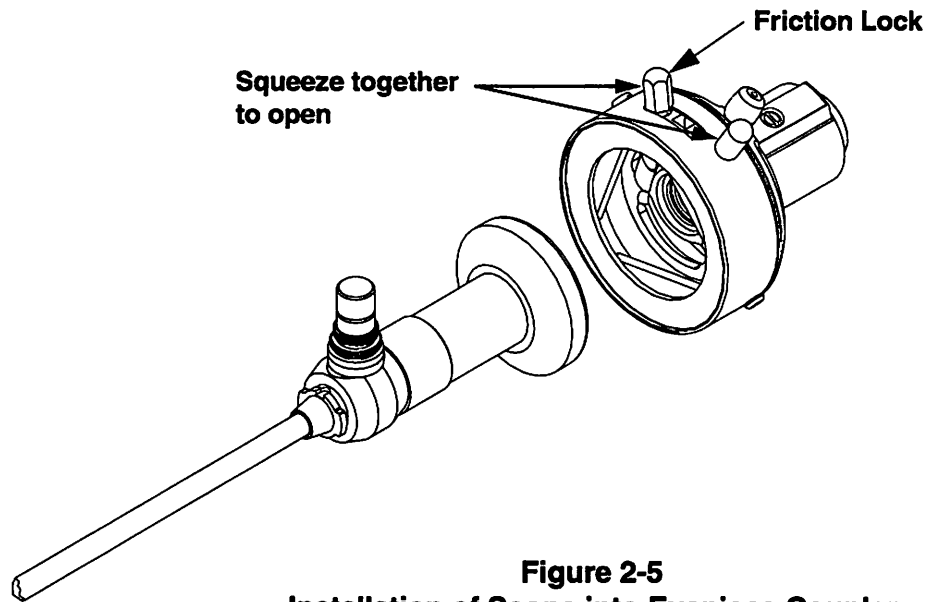
- Inspect the light guide to ensure adequate light is being emitted. Hold one end of the light guide to room light and look at the other end. If more than 30% of the fiber optic cables are darkened, replace the light guide.
- Residual buildup of sterilizing and disinfecting solutions cause blurry and streaked images on lenses, or can bake on to the lenses and fiber optic cable post causing a yellow filtering effect on the image. Check distal and proximal lenses and the fiber optic post and remove buildup with an alcohol prep or cotton swab dipped in alcohol.

**Couplers and scopes are not included with the 8180 Camera. Contact your Linvatec Sales Representative.**

1. Thread coupler clockwise onto the camera head until it seats firmly, but **DO NOT OVERTIGHTEN**.
2. Install a scope in the coupler.

**If using a Linvatec standard eyepiece coupler (Reference figure 2-5):**

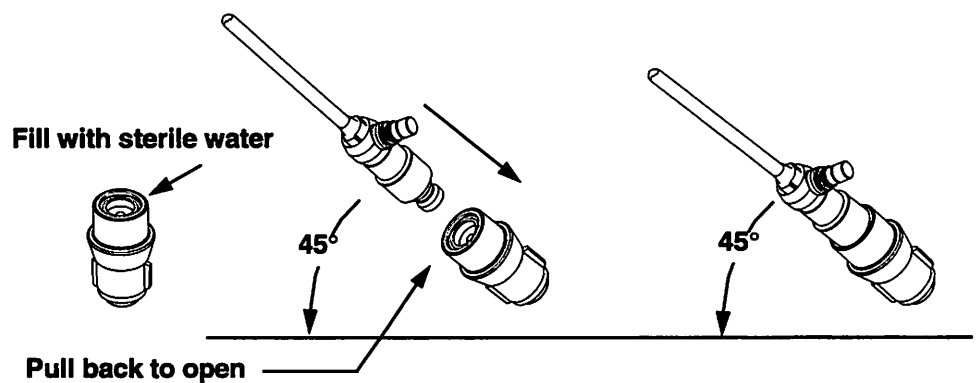
- Loosen the friction lock by turning fully counterclockwise.
- Squeeze the retaining levers together, insert the scope eyecup, then release the levers.
- Secure the scope in the coupler by turning the friction lock clockwise.



**Figure 2-5**  
**Installation of Scope into Eyepiece Coupler**

**If using a Linvatec cartridge coupler and cartridge scope (Reference figure 2-6):**

- Hold the coupler in an upright position and fill the Linvatec cartridge coupler with sterile water.
  - Pull back on the coupler and snap the cartridge scope into place at a 45° angle.
3. Attach a light guide to the light source and the endoscope.



**Figure 2-6**  
**Installation of Scope into Cartridge Coupler**

Section  
2

Operating  
Instructions

# Operating the Equipment

8180 Customized  
Digital Camera

1. Turn the power ON to all peripheral equipment attached to the camera. Allow the light source to warm up for approximately five (5) minutes.
2. Press the Standby switch on the front of the camera to the ON position. On the rear of the camera press the Mains Power switch to the ON position.

A self-test of the system will be initiated and will take several seconds to complete. If there is an internal malfunction or if the system is not hooked up completely, the internal diagnostics will display an error message on the monitor screen. (Reference Appendix I, Section 7 for information on error messages). Once diagnostics are complete, the following message will display indicating successful start-up:

**LINVATEC CUSTOMIZED  
DIGITAL CAMERA  
SOFTWARE REV LEVEL X**



**NOTE**

The camera is equipped with a Camera Menu Setup mode to set up or change specific operating parameters for individual users. Refer to the "Camera Menu Setup" on page 2-14 to select a preset factory setup, custom setup or to program user specific settings.

If selecting a custom setup, review the settings before proceeding.

3. Focus the scope for a clear, crisp image.

At this point, check that all equipment is color tuned to the users requirements.

1. Press the **COLOR BAR** button. The color bar LED illuminates and the color bar test pattern displays.
2. Press the specific button for the equipment that you want to color match. **CAMERA** button to color adjust the monitor screen; **PRINTER** button to color adjust the printer; or **VCR** button to color adjust the VCR.

Use the monitor color and hue controls to match the monitor color bar image with the Linvatec color bar chart provided.

Use the printer color adjustment controls, not the monitor controls, to adjust the printer's color output.

3. When you have finished color correcting the equipment, press the **COLOR BAR** button to exit the color bar test pattern.

Monitor Color  
Tuning



## White Balance



Different light sources have differing proportions of the primary colors of red, green and blue. Color temperature is used to describe the color contents of a light source. For example, a halogen light source, which has a higher concentration of red light, has a lower color temperature. Whereas, a xenon light source, which has a relatively higher proportion of blue light, has a higher color temperature. White balancing is a procedure to adjust these differing color temperatures.

The various components of the video endoscopic system can all affect the color temperature of the light being transmitted to the surgical site. It is important to first assemble the entire video endoscopic system; camera; coupler; endoscope; light guide and light source before attempting to white balance the camera.

1. White balance the camera, described below, using a stack of 4x4 white gauze
2. There are two methods for white balancing, "Manual" and "Automatic". The "Small Scope and Large Scope Presets" are set to automatic and cannot be changed. Custom Setups 1 thru 6 can be set to either one (reference "Custom Setup" on page 2-22 for more information).

### MANUAL WHITE BALANCE

- Enter the Camera Menu mode by pressing the **MENU** button. Select a Custom Setup and then advance to the Manual White Balance menu. Use the **BRIGHTER ▲** button (moves level marker right) or the **DARKER ▼** button (moves level marker left) to adjust the color balance to more blue or more red. This will be the new white balance setting.
- Press the **CLEAR** button to exit the Custom Camera Menu program.

### AUTOMATIC WHITE BALANCE

- Enter into the Camera Menu mode by pressing the **MENU** button. Select a Custom Setup and then advance to the Manual White Balance menu. Use the **BRIGHTER ▲** button (moves level marker right) to adjust the level marker to the "X". With "X" selected the Manual White Balance is defeated and Automatic White Balance is enabled.
  - Press the **CLEAR** button to exit the Custom Camera Menu program.
3. Set the light source to the "Manual" position (if not currently set) and the Brightness control to the middle position.
  4. Hold the tip of the scope approximately one inch away from the stack of white gauze.
  5. Adjust the light source intensity to a uniform level over the entire image on the monitor (no glaring) so that the picture is of nominal brightness to the user.



6. Hold the scope tip very steady and press the Light Control **WHITE BALANCE** button on the camera console. The monitor will display "WHITE BALANCING" during white balance.
  - a. If there is not enough light from the light source the monitor will display: "INADEQUATE ILLUMINATION". Increase the brightness level of the light source and repeat steps 4 and 6.
  - b. If there is too much light from the light source the monitor will display: "EXCESS ILLUMINATION". Decrease the brightness level of the light source and repeat steps 4 and 6.
  - c. If white balance fails for reasons other than inadequate or excessive illumination, the monitor will display "WHITE BALANCE FAILED". Perform the white balance procedure again.
  - d. When white balancing is achieved correctly the monitor will display: "WHITE BALANCE COMPLETE".

**At power up, the white balance default is as last set before power down.**

If a VCR and/or printer are being used, assure units are hooked up correctly and the camera head switch is operating satisfactorily (reference figures 2-3 and 2-4 System Hook-up of the 8180 Cameras with the 8199/8199C Video Accessory Cable - respectively).

1. Set the unit to the camera viewing mode by pressing the **CAMERA** button. The "Camera" LED will illuminate.
2. Aim the scope towards an object and focus for a clear picture. A live image will currently be displayed on the monitor screen.

**For best results, set the light source brightness to a MID level when the camera's Auto Shutter is ON. Reference your light source documentation on how to achieve this setting.**

**Certain functions of VCR's and printers are unique. Your VCR or printer may not display the same, or any symbols as described in this manual. Reference your VCR/printer documentation on how to use or adjust.**

Accessing the printer may be done in one of two ways; either by pressing the front panel **PRINTER** button or through the head switch (reference figure 2-2 for the location of the head switch). Perform the following steps:

**Printer operating setup is accomplished with the printer controls, not the camera. Reference the printer manual for setup and operating procedures.**

**PAL users reference the "PAL Remote" on page 4-7**

1. Press the **PRINTER** button to access the printer mode. The "Printer" LED will illuminate. When "Printer" is selected, the monitor displays the printer's video output image. To store an image or make a print, use the printer front panel buttons or camera head switch. (See next step for instructions to store an image with the head switch). To exit printer view, press the **CAMERA** button.



**NOTE**

**Camera Image Viewing**



**NOTES**

**Printer Operation**



**NOTES**





**NOTES**

2. While viewing the camera image from the "Camera" mode, the printer may be accessed with the head switch without leaving the camera image. In Camera mode, press and hold the head switch. The image is stored in the printer memory and also appears on the monitor until the head switch is released.

If using a Linatec 8128/8128A Printer the "MEMORY/INPUT", "MEMORY/LIVE" button must be set to MEMORY to keep the stored image on the monitor screen.

If the Linatec 8128/8128A Printer is set to the FIELD mode (set with the FRAME/FIELD A/B button) and AUTO PRINT mode, the stored image(s) will automatically print whenever all segments in Field A have been filled. While the images are printing, the printer will automatically switch to Field B in the event more images are needed. However, while in Field B, the capabilities of pressing and holding the camera head switch to continuously display the image on the monitor is no longer enabled.

**VCR Operation**



Accessing the VCR may be done in one of two ways; either by pressing the VCR button or through the head switch (reference figure 2-2 for the location of the head switch). Perform the following steps:



**NOTES**

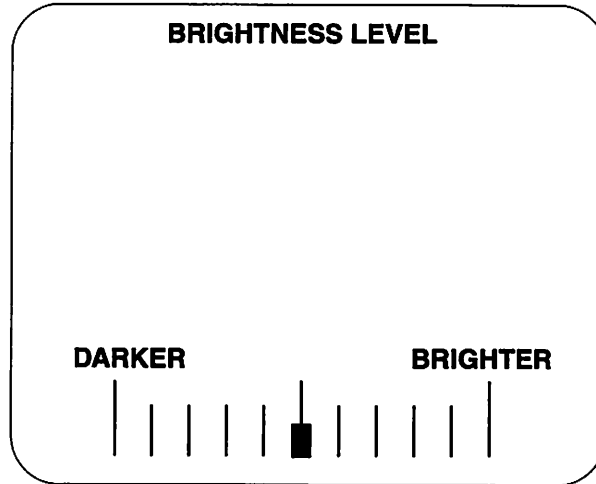
VCR setup is accomplished from the controls on the VCR, not from the camera. Reference the VCR manual for setup and operating procedures.

PAL users reference the "PAL Remote" on page 4-7.

1. Press the VCR button to access the VCR mode. The "VCR" LED illuminates. In the "VCR" mode the image being recorded will be viewed, or a previously recorded image can be viewed (depending upon which mode the operator sets the VCR). To exit to the camera view, press the **CAMERA** button.
2. While viewing from "Camera" mode, the VCR may be accessed to start or stop recording through the head switch without leaving the camera image.
  - a. To start recording while in "Camera" mode, press the head switch for less than 0.6 seconds (Only if VCR+PRINTER is selected in the "Remote Configuration" menu. Otherwise, if only VCR is selected, pressing the head switch for any duration of time will start/stop recording). The VCR will start recording and its status will appear on the monitor indicating it is recording. The status will disappear after approximately five (5) seconds and a gray shaded square will appear on the screen indicating that the VCR is in the record mode (only if using a Linatec VCR).
  - b. To stop recording press the head switch again for less than 0.6 seconds (Only if VCR+PRINTER is selected in the "Remote Configuration" menu. Otherwise, if only VCR is selected, pressing the head switch for any duration of time will start/stop recording). The VCR will stop recording and its status will appear on the monitor for approximately five (5) seconds showing that it has stopped recording. The gray shaded square will also disappear.

## Darker/Brighter Operation

Once the preferred View has been selected and the camera has been white balanced, use the **DARKER/BRIGHTER** buttons to adjust the image to the viewers preference. When either of the buttons is pressed the following "Brightness Level" menu will display on the screen:



This adjustment is a real time adjustment. You will notice the brightness changes as you adjust the level.

1. Press the **BRIGHTER** button (moves level marker right) to increase the brightness.
2. Press the **DARKER** button (moves level marker left) to decrease the brightness.

Once the desired brightness has been set the menu will automatically disappear.

The camera auto shutter allows for automatic internal adjustment of light output for the highest quality image intensity overall. Auto shutter can be set to either ON or OFF (in a Custom Setup only) through the Camera Menu Setup (Reference "Camera Menu Setup" on page 2-14).

**Small Scope and Large Scope presets are factory set to ON and cannot be changed.**

- Setting the auto shutter to ON eliminates having to continuously adjust the light source brightness control. (The light source is automatically set to the Manual mode by the internal firmware of the camera when the camera is set to auto shutter ON).
- Setting the auto shutter to OFF requires the operator to adjust the light output through the light source. (The light source is automatically set to the Auto mode by the internal firmware of the camera when the camera is set to auto shutter OFF).

**If the light source auto shutter is set to Auto in conjunction with the camera auto shutter being ON, strobing may occur. Set the light source to the Manual mode if this should occur.**



## Auto Shutter Operation



**NOTE**



**NOTE**

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2

# Operating the Equipment

8180 Customized  
Digital Camera

## Camera Menu Setup



The camera may be programmed through the Camera Menu to specific settings. There are several custom setups available to choose from as well as two (2) factory setups.

Once in the Camera Menu, the following buttons are used for specific purposes:

**DARKER Button** — Within any menu, pressing the **DARKER** button moves the cursor ( \* ) down. Within any Set Level menu, moves the level marker ( ■ ) left.

**BRIGHTER Button** — Within any menu, pressing the **BRIGHTER** button moves the cursor ( \* ) up. Within any Set Level menu, moves the level marker ( ■ ) right.

**MENU Button** — Press the **MENU** button to advance to the next menu.

**CLEAR Button** — Press the **CLEAR** button to exit out of the Camera Menu Setup mode.

## Factory Defaults

The initial factory settings are:

- Video Format — NTSC
- Cable Configuration — S-Video
- Select Setup Menu — Small Scope Preset
- All Custom Setups — Set to Small Scope Preset
- Video Enhancer Menu (8180C/8180AC only)
  - Video Enhancer — ON
  - Factory Preset — ON

## Small Scope Preset Settings

The SMALL SCOPE PRESET selection consists of the following settings:

- Auto Shutter Select — ON
- View Wake-up — PRINTER
- Picture Size Select — CIRCLE VIEW
- Remote Configuration — VCR + PRINTER
- Brightness Level — MID Range
- Manual White Balance — "X" Auto setting (Manual white balance defeated)
- Audio Level — MID Range

## Large Scope Preset Settings

The LARGE SCOPE PRESET selection consists of the following settings:

- Auto Shutter Select — ON
- View Wake-up — PRINTER
- Picture Size Select — FULL SCREEN VIEW
- Remote Configuration — VCR + PRINTER
- Brightness Level — MID Range
- Manual White Balance — "X" Auto setting (Manual white balance defeated)
- Audio Level — MID Range

Section  
2

# Operating the Equipment

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## Video Format Menu



### NOTE

Before using the camera confirm that the correct video format has been set; either PAL or NTSC format. If the correct format is not set the image display incorrectly. Reference “**Troubleshooting**” on page 4-40 for a description and corrective action of the problem.

**The video format is preset to NTSC at the factory, but if needed, it may be changed by doing the following:**

1. Press the **MENU** button to enter the Camera Menu Setup mode. The Menu LED illuminates and stays on as long as you are in the Menu mode.

The “**MENU INSTRUCTIONS**” menu will display.

**MENU INSTRUCTIONS**

- ◆ **BRIGHTER BUTTON:**  
MOVES CURSOR (\*) UP  
MOVES LEVEL (▬) RIGHT
- ◆ **DARKER BUTTON:**  
MOVES CURSOR (\*) DOWN  
MOVES LEVEL (▬) LEFT
- ◆ **MENU BUTTON:**  
SELECTS NEXT MENU
- ◆ **CLEAR BUTTON:**  
EXITS MENU MODE

2. Press the **COLOR BAR** button to access the Video Format menu. The following menu will display showing the current video format:

**SELECT  
VIDEO FORMAT**

(\*) NTSC  
( ) PAL

**MENU OR CLEAR TO EXIT**

3. Press the **DARKER** or **BRIGHTER** button to select the desired format.
4. Press the **MENU** or **CLEAR** button to exit the Camera Menu Setup mode.

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2

# Operating the Equipment

8180 Customized  
Digital Camera

## Cable Configuration Format Menu



### NOTE

Before using the camera confirm that the correct cable configuration format has been set; either S-Video or Video format. If the correct format is not set, certain functions will not perform correctly. (Confirm that the monitor is set to match the format of the camera). Reference “**Troubleshooting**” on page 4-40 for a description and corrective action of the problem.

**The cable configuration format is preset to S-Video at the factory, but if needed, it may be changed by doing the following:**

1. Press the **MENU** button to enter into the Camera Menu Setup mode. The Menu LED illuminates and stays on as long as you are in the Menu mode.

The “**MENU INSTRUCTIONS**” menu will display.

**MENU INSTRUCTIONS**

- ◆ **BRIGHTER BUTTON:**  
MOVES CURSOR (\*) UP  
MOVES LEVEL (■) RIGHT
- ◆ **DARKER BUTTON:**  
MOVES CURSOR (\*) DOWN  
MOVES LEVEL (■) LEFT
- ◆ **MENU BUTTON:**  
SELECTS NEXT MENU
- ◆ **CLEAR BUTTON:**  
EXITS MENU MODE

2. Press the **PRINTER** button to access the Cable Configuration Format menu. The following menu will display showing the current cable configuration.

**SELECT  
CABLE CONFIGURATION**

(\*) S-VIDEO  
( ) VIDEO

**MENU OR CLEAR TO EXIT**

3. Press the **DARKER** or **BRIGHTER** button to select the desired format.
4. Press the **MENU** or **CLEAR** button to exit out of the Camera Menu Setup mode.

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2

# Operating the Equipment

8180 Customized  
Digital Camera

## Selecting a Setup

1. To select a specific setup, press the **MENU** button to enter into the Camera Menu Setup mode. The “**MENU INSTRUCTIONS**” menu will display.

**MENU INSTRUCTIONS**

- ◆ **BRIGHTER BUTTON:**  
MOVES CURSOR (\*) UP  
MOVES LEVEL (■) RIGHT
- ◆ **DARKER BUTTON:**  
MOVES CURSOR (\*) DOWN  
MOVES LEVEL (■) LEFT
- ◆ **MENU BUTTON:**  
SELECTS NEXT MENU
- ◆ **CLEAR BUTTON:**  
EXITS MENU MODE

2. Press the **MENU** button again and the “**MAIN MENU**” menu will display:

**MAIN MENU  
SELECT SETUP**

- (\*) **SMALL SCOPE PRESET**
- ( ) **LARGE SCOPE PRESET**
- ( ) **CUSTOM SETUP - 1**
- ( ) **CUSTOM SETUP - 2**
- ( ) **CUSTOM SETUP - 3**
- ( ) **CUSTOM SETUP - 4**
- ( ) **CUSTOM SETUP - 5**
- ( ) **CUSTOM SETUP - 6**

**MENU-NEXT      CLEAR-EXIT**



### NOTE

**While in the Camera Menu Setup mode some function buttons perform more than one function. The primary function of these buttons is disabled.**

3. To select a factory setup (**SMALL SCOPE PRESET** or **LARGE SCOPE PRESET**) or a custom setup, move the cursor to the desired position (use the **DARKER** button to move **DOWN** or the **BRIGHTER** button to move **UP**). Press the **CLEAR** button to accept it and exit the Camera Menu mode.

The camera will now wake-up and operate in the programmed settings of the selected setup.

Section  
2

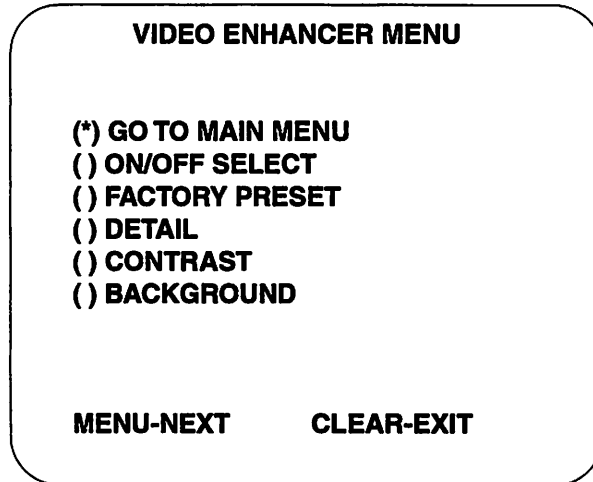
# Operating the Equipment

8180 Customized  
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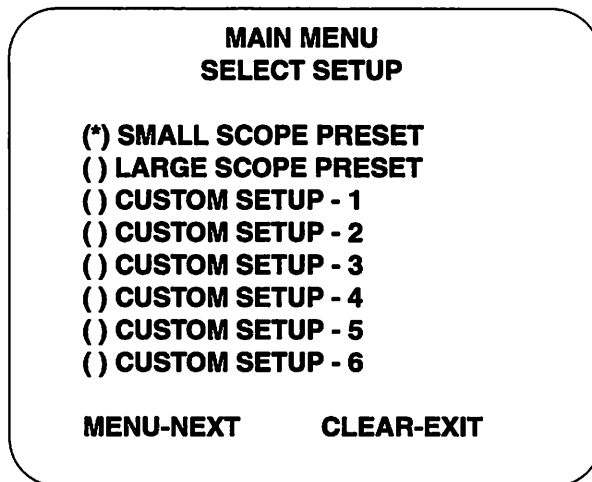


**NOTE**

**OPTIONAL.** If a Video Enhancer PCB is installed (Model 8180C/8180AC) the following "VIDEO ENHANCER MENU" menu will display after the "MENU INSTRUCTIONS" menu shown above when the MENU button is pressed (Reference "Video Enhancer Menu Selections" on page 2-30 for information on video enhancer menu selections and functionality):



4. To access the "MAIN MENU" menu from the "VIDEO ENHANCER MENU", move the cursor to the "GO TO MAIN MENU" option (use the **DARKER** button to move DOWN or the **BRIGHTER** button to move UP). Press the **MENU** button. The "MAIN MENU" menu will display and the desired selection can be made:





## Individual Options Selections

1. To initiate or change a specific setup only, enter into the Camera Menu Setup mode by pressing the **MENU** button.

The "MENU INSTRUCTIONS" menu will display.

### MENU INSTRUCTIONS

- ◆ **BRIGHTER BUTTON:**  
MOVES CURSOR (\*) UP  
MOVES LEVEL (▣) RIGHT
- ◆ **DARKER BUTTON:**  
MOVES CURSOR (\*) DOWN  
MOVES LEVEL (▣) LEFT
- ◆ **MENU BUTTON:**  
SELECTS NEXT MENU
- ◆ **CLEAR BUTTON:**  
EXITS MENU MODE

2. Press the **MENU** button again and the "MAIN MENU" menu will display.

### MAIN MENU SELECT SETUP

- (\*) **SMALL SCOPE PRESET**
- ( ) **LARGE SCOPE PRESET**
- ( ) **CUSTOM SETUP - 1**
- ( ) **CUSTOM SETUP - 2**
- ( ) **CUSTOM SETUP - 3**
- ( ) **CUSTOM SETUP - 4**
- ( ) **CUSTOM SETUP - 5**
- ( ) **CUSTOM SETUP - 6**

MENU-NEXT      CLEAR-EXIT



### NOTE

While in the Camera Menu Setup mode some function buttons perform more than one function. The primary function of these buttons is disabled.

The "SMALL SCOPE PRESET" and "LARGE SCOPE PRESET" are factory presets and cannot be changed.

3. To select a custom setup, move the cursor to the desired position (use the **DARKER** button to move DOWN or the **BRIGHTER** button to move UP). Press the **MENU** button to advance to the "CUSTOM SETUP - X" menu to customize this setup.



**NOTE**

**OPTIONAL.** If a Video Enhancer PCB is installed (Model 8180C/8180AC) the following "VIDEO ENHANCER MENU" menu will display after the "MENU INSTRUCTIONS" menu shown above when the MENU button is pressed (Reference "Video Enhancer Menu Selections" on page 2-30 for information on video enhancer menu selections and functionality):

**VIDEO ENHANCER MENU**

- (\*) GO TO MAIN MENU
- ( ) ON/OFF SELECT
- ( ) FACTORY PRESET
- ( ) DETAIL
- ( ) CONTRAST
- ( ) BACKGROUND

MENU-NEXT      CLEAR-EXIT

1. To access the "MAIN MENU" menu, move the cursor to the "GO TO MAIN MENU" option (use the **DARKER** button to move DOWN or the **BRIGHTER** button to move UP). Press the **MENU** button. The "MAIN MENU" menu will display and the desired custom setup selection can be made:

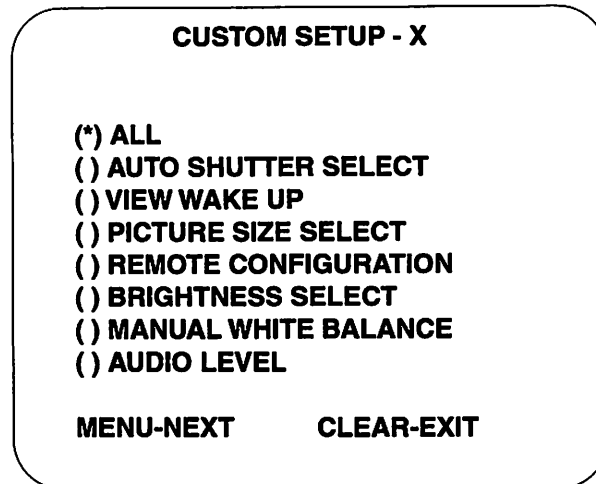
**MAIN MENU  
SELECT SETUP**

- (\*) SMALL SCOPE PRESET
- ( ) LARGE SCOPE PRESET
- ( ) CUSTOM SETUP - 1
- ( ) CUSTOM SETUP - 2
- ( ) CUSTOM SETUP - 3
- ( ) CUSTOM SETUP - 4
- ( ) CUSTOM SETUP - 5
- ( ) CUSTOM SETUP - 6

MENU-NEXT      CLEAR-EXIT

## CUSTOM SETUP - X Menu

1. The "CUSTOM SETUP - X" menu will appear (the "X" designator will change to the specific Custom Setup selected, e.g. CUSTOM SETUP - 1):



2. Select the desired option, such as "AUDIO LEVEL", by moving the cursor to that position. Press the **MENU** button and the specific menu displays.
3. Make the specific selection or setting and press the **MENU** or **CLEAR** button.
  - Pressing the **CLEAR** button exits the user completely out of the Camera Menu Setup mode.
  - When options are selected individually, pressing the **MENU** button will return the user to this menu window.

At this point, another option may be selected or you may press the **CLEAR** button to exit completely out of the Camera Menu Setup mode.

## Custom Setup

1. To enter into the Camera Menu Setup mode, press the **MENU** button. The Menu LED illuminates and stays on as long as you are in the Menu mode.

Upon entering the Menu mode the "MENU INSTRUCTIONS" menu displays.

**MENU INSTRUCTIONS**

- ◆ **BRIGHTER BUTTON:**  
MOVES CURSOR (\*) UP  
MOVES LEVEL (▣) RIGHT
- ◆ **DARKER BUTTON:**  
MOVES CURSOR (\*) DOWN  
MOVES LEVEL (▣) LEFT
- ◆ **MENU BUTTON:**  
SELECTS NEXT MENU
- ◆ **CLEAR BUTTON:**  
EXITS MENU MODE

2. Press the **MENU** button again. The "MAIN MENU" menu displays. The "MAIN MENU" menu allows the user to select current operating parameters and set them to memory in the camera.

**MAIN MENU  
SELECT SETUP**

- (\*) **SMALL SCOPE PRESET**
- ( ) **LARGE SCOPE PRESET**
- ( ) **CUSTOM SETUP - 1**
- ( ) **CUSTOM SETUP - 2**
- ( ) **CUSTOM SETUP - 3**
- ( ) **CUSTOM SETUP - 4**
- ( ) **CUSTOM SETUP - 5**
- ( ) **CUSTOM SETUP - 6**

**MENU-NEXT      CLEAR-EXIT**



### NOTE

While in the Camera Menu Setup mode some function buttons perform more than one function. The primary function of these buttons is disabled.

The "SMALL SCOPE PRESET" and "LARGE SCOPE PRESET" are factory presets and cannot be changed.

3. To select a custom setup, move the cursor to the desired position (use the **DARKER** button to move DOWN or the **BRIGHTER** button to move UP). Press the **MENU** button to advance to the "CUSTOM SETUP - X" menu for customizing this setup.

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**NOTE**

**OPTIONAL.** If a Video Enhancer PCB is installed (Model 8180C/8180AC) the following "VIDEO ENHANCER MENU" menu will display after the "MENU INSTRUCTIONS" menu shown above when the MENU button is pressed (Reference "Video Enhancer Menu Selections" on page 2-30 for information on video enhancer menu selections and functionality):

**VIDEO ENHANCER MENU**

- (\*) GO TO MAIN MENU
- ( ) ON/OFF SELECT
- ( ) FACTORY PRESET
- ( ) DETAIL
- ( ) CONTRAST
- ( ) BACKGROUND

MENU-NEXT      CLEAR-EXIT

1. To access the "MAIN MENU" menu, move the cursor to the "GO TO MAIN MENU" option (use the **DARKER** button to move DOWN or the **BRIGHTER** button to move UP). Press the **MENU** button. The "MAIN MENU" menu will display and the desired custom setup selection can be made:

**MAIN MENU  
SELECT SETUP**

- (\*) SMALL SCOPE PRESET
- ( ) LARGE SCOPE PRESET
- ( ) CUSTOM SETUP - 1
- ( ) CUSTOM SETUP - 2
- ( ) CUSTOM SETUP - 3
- ( ) CUSTOM SETUP - 4
- ( ) CUSTOM SETUP - 5
- ( ) CUSTOM SETUP - 6

MENU-NEXT      CLEAR-EXIT

## CUSTOM SETUP - X Menu

1. The "**CUSTOM SETUP - X**" menu will appear (the "X" designator will change to the specific Custom Setup selected, e.g. CUSTOM SETUP - 1).

The "**CUSTOM SETUP**" menu allows the user to establish a personal configuration of desired camera conditions:

**CUSTOM SETUP - X**

(\*) ALL  
( ) AUTO SHUTTER SELECT  
( ) VIEW WAKE UP  
( ) PICTURE SIZE SELECT  
( ) REMOTE CONFIGURATION  
( ) BRIGHTNESS LEVEL  
( ) MANUAL WHITE BALANCE  
( ) AUDIO LEVEL

MENU-NEXT      CLEAR-EXIT

2. Selecting "**ALL**" prompts the user to program or adjust the entire list of conditions and will automatically sequence the user through several more menus. To program or adjust only one condition, simply scroll to the desired topic and press the **MENU** button to select it.

Selecting a specific option, such as "**AUDIO LEVEL**", displays a menu specific to that function.

### SELECTING "ALL":

1. Move the cursor to "**ALL**" and press the **MENU** button. The camera will sequence through several more menus, one at a time. The next menu is "**AUTO SHUTTER SELECT**". This menu allows the user to turn Auto Shutter ON or OFF. It is recommended to have the camera auto shutter ON and the light source "Mode" button set to MANUAL.

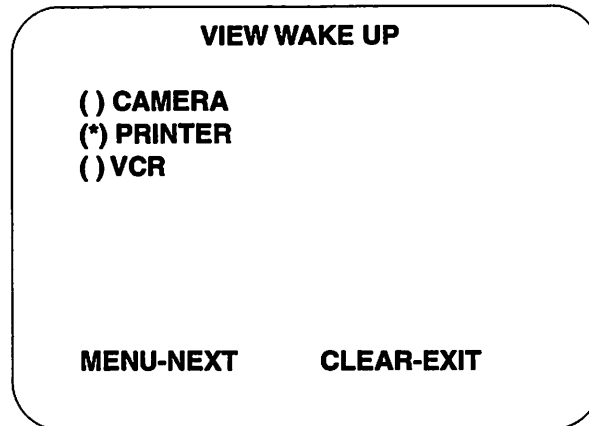
**AUTO SHUTTER SELECT**

(\*) ON  
( ) OFF

MENU-NEXT      CLEAR-EXIT

2. Select either ON or OFF.
  - Setting auto shutter to ON eliminates having to continuously adjust the light source brightness control. (Light source is automatically set to the Manual mode through the camera when camera auto shutter is ON).
  - Selecting OFF causes the camera to rely on the light source to control the light output. (Light source is automatically set to the Auto mode through the camera when camera auto shutter is OFF).
3. Press the **CLEAR** button to accept your selection and exit the Camera Menu mode OR

Press the **MENU** button to accept your selection and continue on to the next menu "**VIEW WAKE UP**". This menu allows the user to select the view that the camera will power up to and project on the monitor.



1. Select either CAMERA, PRINTER or VCR.
  - Selecting CAMERA will cause the camera to wake up in the camera image mode when the camera is turned on. The video image is routed directly from the camera to the monitor screen.
  - Selecting PRINTER will cause the camera to wake up in the printer mode when the camera is turned on. The video image is routed through the printer to the monitor screen.
  - Selecting VCR will cause the camera to wake up in the VCR mode when the camera is turned on. The video image is routed through the VCR to the monitor screen.
2. Press the **CLEAR** button to accept your selection and exit the Camera Menu mode OR

Press the **MENU** button to accept your selection and continue on to the next menu "**PICTURE SIZE SELECT**".

**PICTURE SIZE SELECT**

(\*) **CIRCLE VIEW**  
( ) **FULL SCREEN VIEW**

**MENU-NEXT      CLEAR-EXIT**

This menu enables the user to select the portion of the screen that affects the auto shutter function. The **CIRCLE VIEW** ignores the edges of the picture when calculating what the shutter level should be and how the auto shutter should function. This view is recommended when using a 27mm coupler.

The **FULL SCREEN VIEW** takes information from the entire screen to determine the auto shutter level. This view is recommended when using a 35mm coupler.

1. Select either **CIRCLE VIEW** or **FULL SCREEN VIEW** depending upon user preferences.
2. Press the **CLEAR** button to accept your selection and exit the Camera Menu mode OR

Press the **MENU** button to accept your selection and continue on to the next menu "**REMOTE CONFIGURATION**". This menu allows the user to program the camera head remote control switch.

**REMOTE CONFIGURATION**

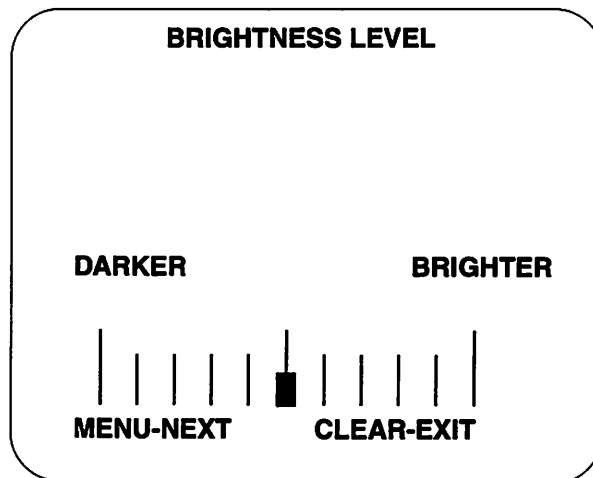
(\*) **VCR + PRINTER**  
( ) **PRINTER**  
( ) **VCR**

**MENU-NEXT      CLEAR-EXIT**



1. Select either VCR + PRINTER, PRINTER or VCR.
  - Selecting VCR + PRINTER allows the user to activate the VCR and printer with the camera head switch.
  - Selecting PRINTER allows the user to activate **ONLY** the printer with the camera head switch.
  - Selecting VCR allows the user to activate **ONLY** the VCR with the camera head switch.
2. Press the **CLEAR** button to accept your selection and exit the Camera Menu mode OR

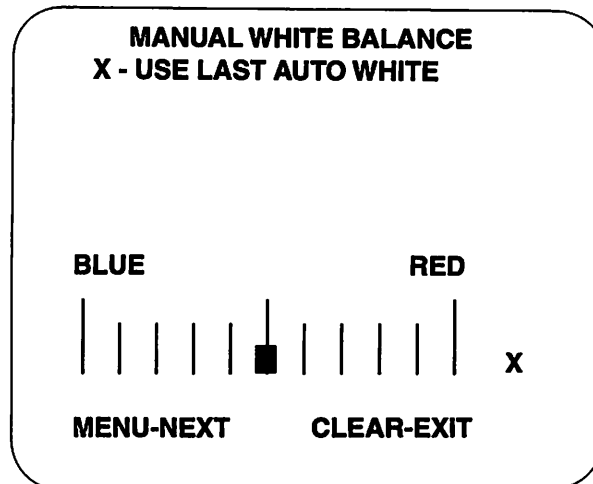
Press the **MENU** button to accept your selection and continue to the next menu, "**BRIGHTNESS LEVEL**". This menu allows the user to preset the desired brightness level.



This adjustment is a real time adjustment. You will notice the brightness change as you adjust the level.

1. Press the **BRIGHTER** button (moves the level marker right) to increase the brightness level of the displayed image.
2. Press the **DARKER** button (moves the level marker left) to decrease the brightness level of the displayed image.
3. Press the **CLEAR** button to accept your selection and exit the Camera Menu mode OR

Press the **MENU** button to accept your selection and continue on to the next menu "**MANUAL WHITE BALANCE**". This menu allows the user to set the level of red or blue in the image.



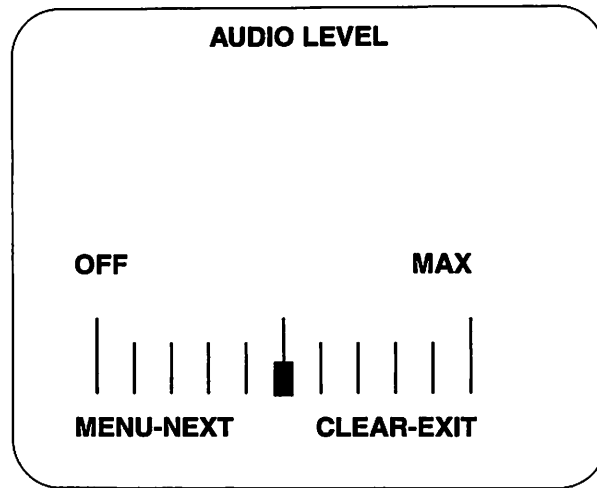
1. Press the **BRIGHTER** button (moves the level marker right) to adjust the color balance of the image being displayed to more red or to the "X" position.
2. Press the **DARKER** button (moves the level marker left) to adjust the color balance of the image being displayed to more blue.

This adjustment is a real time adjustment. You will notice the color change as you adjust the level.

- Adjusting the level marker anywhere in the blue to red level will establish the new white balance setting.
  - Adjust the level marker to the "X" level (the "X" will flash when activated). Activating this function defeats manual white balance and uses the last auto white balance settings when white balanced from the front panel (Reference "**White Balance**" on page 2-10 for more information).
3. Press the **CLEAR** button to accept your selection and exit the Camera Menu mode OR

Press the **MENU** button to accept your selection and continue on to the next menu "**AUDIO LEVEL**". This menu allows the user to adjust the volume.

## Operating the Equipment



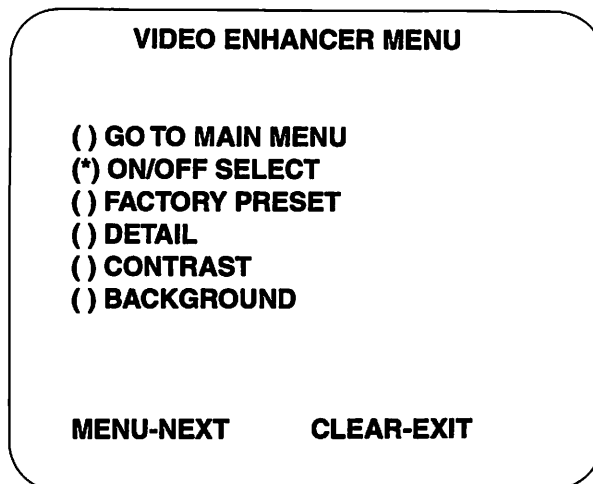
This adjustment is a real time adjustment. You will notice the volume change as you adjust the level.

1. Press the **BRIGHTER** button (moves level marker right) to increase the volume.
2. Press the **DARKER** button (moves level marker left) to decrease or turn off the volume.
3. Press the **CLEAR** button to accept your selection and exit the Camera Menu mode OR

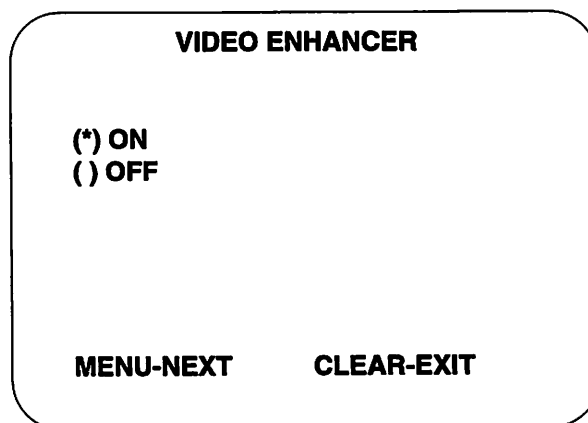
Press the **MENU** button to accept your selection and return to the "**CUSTOM SETUP**" menu.

## Video Enhancer Menu Selections (Model 8180C/8180AC)

1. The "VIDEO ENHANCER MENU" allows the user to adjust the video enhancer functions. Each adjustment must be selected individually.



2. To turn the video enhancer on or off move the cursor to the "ON/OFF SELECT" option (use the **DARKER** button to move DOWN or the **BRIGHTER** button to move UP). Press the **MENU** button. The "VIDEO ENHANCER" sub-menu will display.



- Setting the video enhancer to ON activates the video enhancer and the displayed image is enhanced.
  - Setting the video enhancer to OFF deactivates the video enhancer and the displayed image is not enhanced.
3. Press the **CLEAR** button to accept your selection and exit the Camera Menu mode OR

Press the **MENU** button to accept your selection and return to the "VIDEO ENHANCER MENU".

## VIDEO ENHANCER MENU

- GO TO MAIN MENU
- ON/OFF SELECT
- FACTORY PRESET
- DETAIL
- CONTRAST
- BACKGROUND

MENU-NEXT

CLEAR-EXIT

4. To activate video enhancer factory presets, move the cursor to the **FACTORY PRESET** option. Press the **MENU** button. The **"PRESET"** sub-menu displays.

## PRESET

- ON
- OFF

MENU-NEXT

CLEAR-EXIT

- Setting preset to ON configures the video control settings to predefined factory settings. With **PRESET ON**, **DETAIL**, **CONTRAST** and **BACKGROUND** options are not displayed in the **"VIDEO ENHANCER MENU"** as shown in the following menu.

## VIDEO ENHANCER MENU

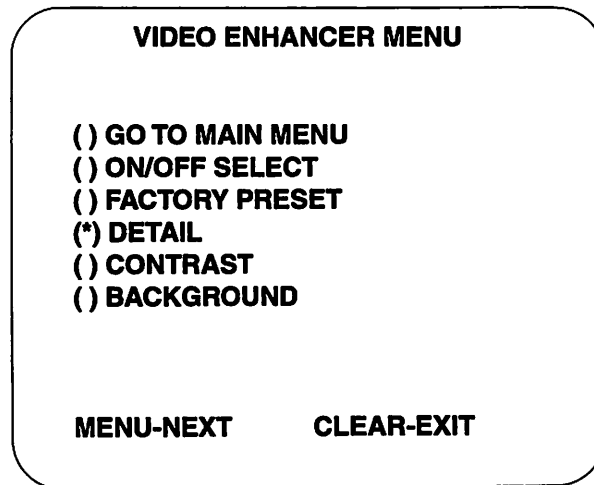
- GO TO MAIN MENU
- ON/OFF SELECT
- FACTORY PRESET

MENU-NEXT

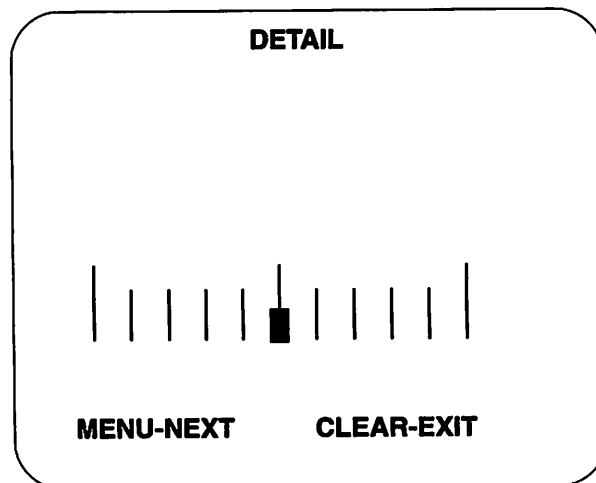
CLEAR-EXIT

- Setting preset to OFF deactivates the factory presets. The user should now, if desired, adjust "Detail", "Contrast" and "Background" for the desired image.

Press the **MENU** button to accept your selection. The unit returns to the "VIDEO ENHANCER MENU".

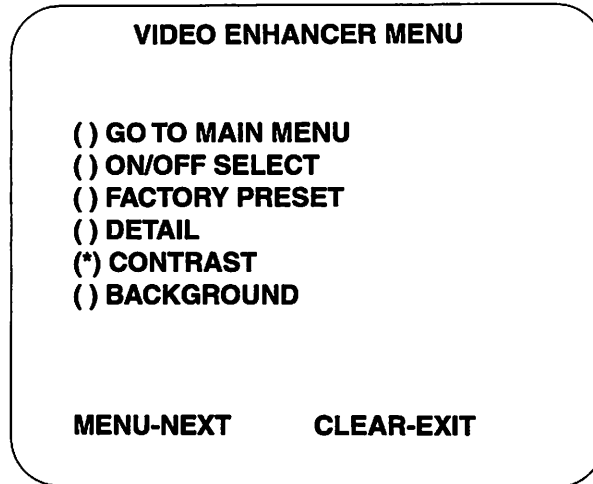


5. To adjust the enhanced image detail move the cursor to "DETAIL". Press the **MENU** button. The "DETAIL" sub-menu displays. Detail allows the user to adjust the maximum "size" of image details to be enhanced. When set to **MAX**, only the finest details present in the image are enhanced. When set to **MIN**, details as large as 10% of the total display are enhanced.

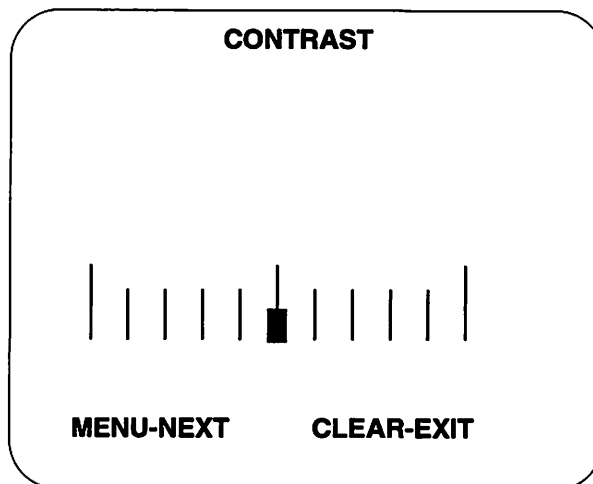


- Press the **BRIGHTER** button (moves level marker right) to enhance finer details.
- Press the **DARKER** button (moves level marker left) to enhance larger details.
- Press the **CLEAR** button to accept your selection and exit the Camera Menu mode OR

Press the **MENU** button to accept your selection. The unit returns to the "VIDEO ENHANCER MENU".

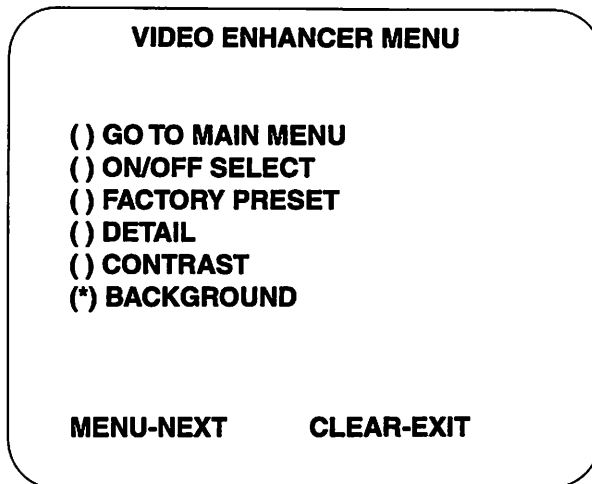


6. To adjust the enhanced image contrast move the cursor to **CONTRAST** and press the **MENU** button. The "**CONTRAST**" sub-menu displays. Contrast controls the amount of gain (or amplification) to be applied to the details of the image. Setting **CONTRAST** to **MAX** applies the maximum amount of gain. Setting **CONTRAST** to **MIN** decreases gain to a minimum.

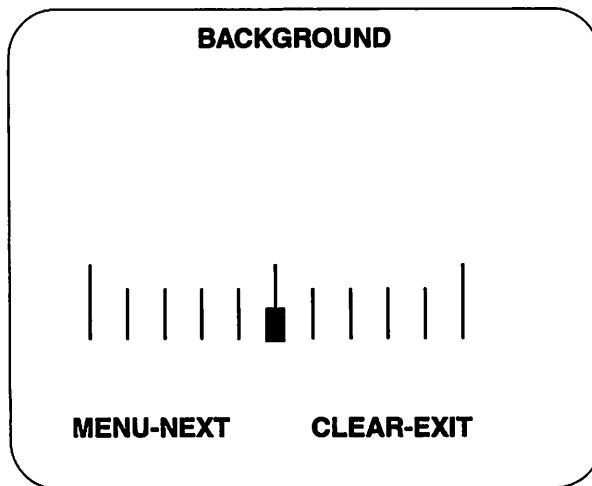


- Press the **BRIGHTER** button (moves level marker right) to increase gain.
- Press the **DARKER** button (moves level marker left) to decrease gain.
- Press the **CLEAR** button to accept your selection and exit the Camera Menu mode OR

Press the **MENU** button to accept your selection. The unit returns to the "VIDEO ENHANCER MENU".



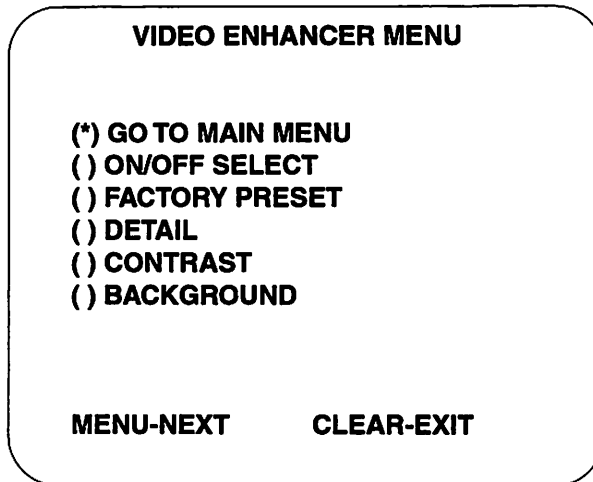
7. To adjust the enhanced image background move the cursor to **BACKGROUND** and press the **MENU** button. The **"BACKGROUND"** sub-menu displays. **BACKGROUND** adjusts the overall large scale variations in image background intensity. Setting **BACKGROUND** to **MAX** applies maximum reduction to these variations. Setting **BACKGROUND** to **MIN** retains the original image content.



- Press the **BRIGHTER** button (moves level marker right) to apply the maximum reduction to the overall large scale variations of the image.
- Press the **DARKER** button (moves level marker left) to reduce the overall large scale variations of the image.
- Press the **CLEAR** button to accept your selection and exit the Camera Menu mode OR

Press the **MENU** button to accept your selection. The unit returns to the **"VIDEO ENHANCER MENU"**.





Select "Go to Main Menu". Press the **MENU** button to advance to the "**MAIN MENU**" OR

Press the **CLEAR** button to accept your selection and exit the Camera Menu mode.

## Video Enhancer Split Screen Menu



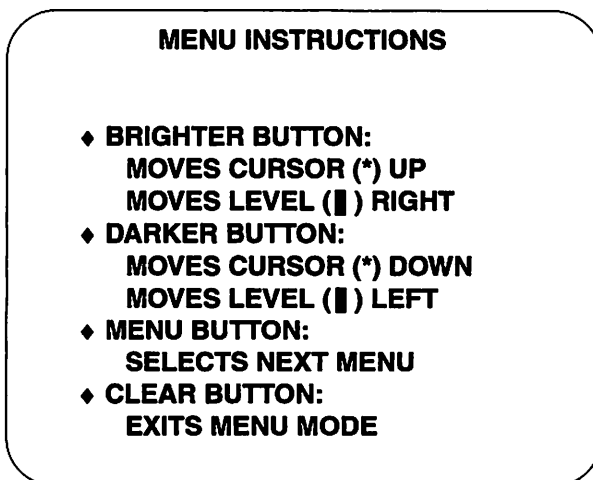
**NOTE**

This menu is only accessible if using the model 8180C or 8180AC Camera. This feature is for demonstration only. The monitor screen vertically splits in half and allows the user to view both the original (left side) and enhanced image (right side) simultaneously.

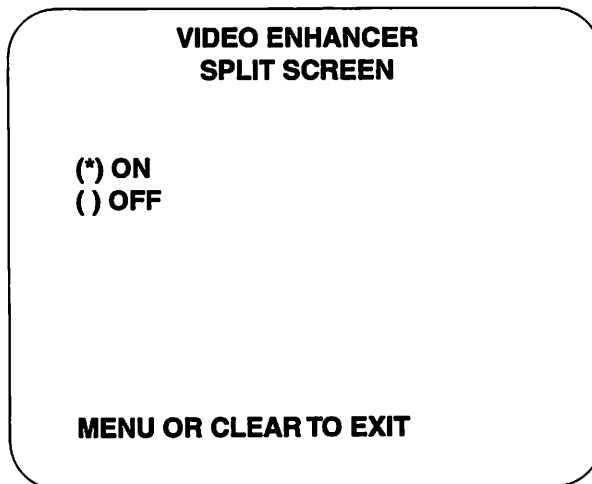
**The video enhancer split-screen format is factory preset to OFF. To turn ON:**

1. Press the **MENU** button to enter into the Camera Menu Setup mode. The Menu LED illuminates and stays on as long as you are in the Menu mode.

The "**MENU INSTRUCTIONS**" menu will display.



2. Press the **VCR** button to display the "VIDEO ENHANCER SPLIT SCREEN" menu:



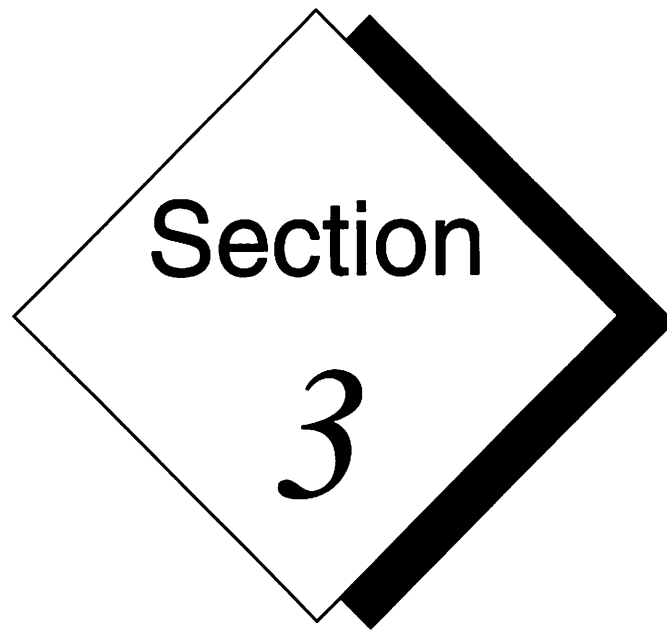
3. Press the **DARKER** or **BRIGHTER** button to make a selection.
4. Press the **MENU** or **CLEAR** button to exit out of the Camera Menu Setup mode.

When the camera is turned off, the current mode settings are retained and will be resumed when the camera is again turned on. To shut the camera off:

1. Press the Standby switch on the front of the camera to the OFF position. The light in the switch will go out.
2. Turn off all other equipment connected to the camera.

## Shutting the Camera OFF

# **Cleaning/Disinfecting/ Sterilization**



Section  
3

# Cleaning/Disinfecting/Sterilization

8180 Customized  
Digital Camera

## Cleaning and Disinfecting Information

### Cleaning

This section of the manual contains information for personnel to clean the camera and its accessories.

The cleaning and disinfecting of the camera console and camera head are vital for maintaining and prolonging their use.

By inspecting the camera head before starting any cleaning and disinfecting procedure, the operator may prevent unnecessary damage and service charges. If the camera head is dented or cracked, or if the cable or connector jacket are cut, DO NOT soak the camera head. Instead, call your Sales Representative.

The camera console should be wiped with a damp, soft cloth containing a mild detergent (equipment should be turned off and unplugged).

Do not separate the camera head and coupler for cleaning. Clean as one unit using a soft cloth and detergent. Rinse with distilled or sterilized water.

Clean the lenses using 70% alcohol saturated sterile cotton swabs to remove spots, residue and streaks. Dry with a cotton swab or other non-abrasive material.

Clean the paddleboard connector receptacle by using 70% alcohol saturated cotton swabs to remove residue. Dry receptacle thoroughly.

### Disinfecting



**WARNING**

The camera head may be disinfected before surgical procedures or a surgical drape may be used. If disinfection is chosen, the operator must follow the instructions below to avoid unnecessary damage.

**Do not autoclave the camera head. Damage will occur and the warranty will be voided.**

### Glutaraldehyde Solution

The camera head is designed to be soaked in glutaraldehyde (Cidex™) solutions. Follow the manufacturer's instructions for correct use. Distilled or sterilized water MUST be used for rinsing and wiping the cable and camera head surfaces. Dry the paddleboard connector prior to inserting into the camera console.

### EtO Sterilization

The camera head may also be sterilized using ethylene oxide sterilization (EtO). The temperature of the EtO MUST not exceed the specified maximum temperature of 140°F (60°C). Follow the manufacturer's instructions for correct use.

### Peracetic Acid (Steris™)

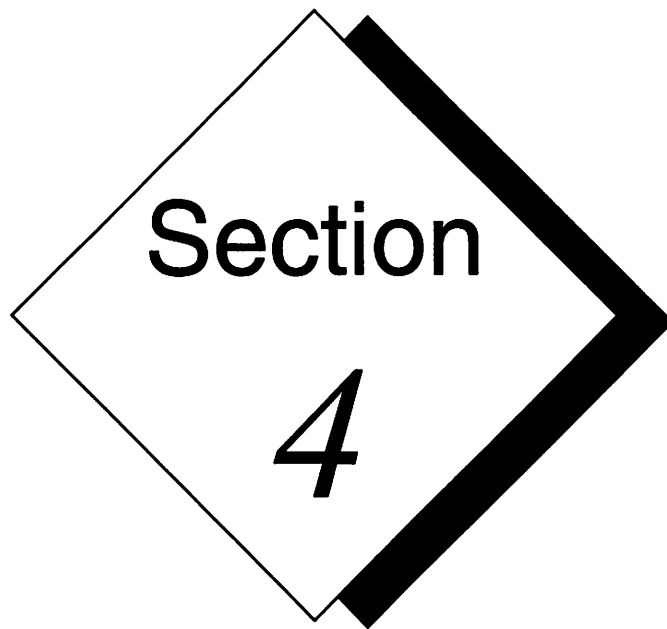
The camera head and coupler may be sterilized with Peracetic Acid (Steris™) according to the manufacturer's instructions.

### Soaking

The camera cable must be removed from the console for soaking. Grasp the paddleboard connector and pull straight back without twisting. Do not pull the cable.

If a coupler or beamsplitter are used, that device should be firmly attached to the front of the camera head. Submerge the camera head, cable, and paddleboard connector for the specified time in the sterilizing agent. After soaking, thoroughly rinse the items with sterile water. Shake any excess fluid from the components. Towel dry the components thoroughly. Dry the lens area with a cotton swab or other non-abrasive material. Thoroughly dry the paddleboard connector.

# Maintaining the Equipment



Section  
4

# Maintaining the Equipment

8180 Customized  
Digital Camera

## Functional Test

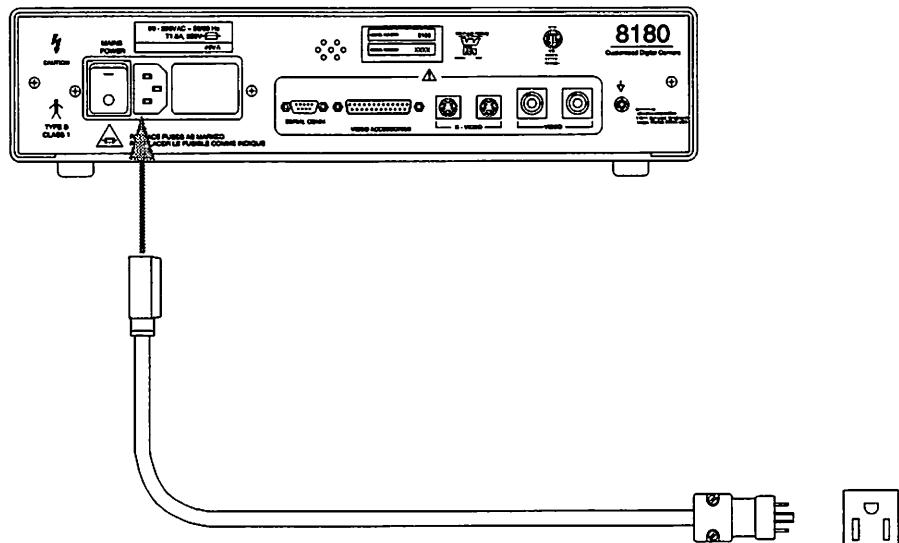
The purpose of the functional test is to determine that the unit is functioning properly before putting it into use.

### Equipment required:

Camera Console with power cord  
Camera Head  
White Gauze (for white balancing)  
Monitor  
Light Source  
Light Guide  
Camera Coupler  
Endoscope

### Procedure:

1. Connect one end of the mains power cable to the rear of the camera console and the other end to a properly grounded outlet (see figure 4-1). To achieve reliable grounding, connect only to a properly earthed mains supply outlet (i.e., receptacle marked "Hospital Grade" or "Hospital Only").



**Figure 4-1**  
**Connecting Power Cord**

2. Connect the camera head cable connector to the camera console unit by positioning the cable connector with the insert key and Linvatec logo facing up (the keying on the connector only allows the connector to be inserted in one orientation). Push the connector into the camera console's mating receptacle (without any twisting) as far as it will go. Reference figure 4-2. (Cable connector must be clean and dry!).

Section  
4

# Maintaining the Equipment

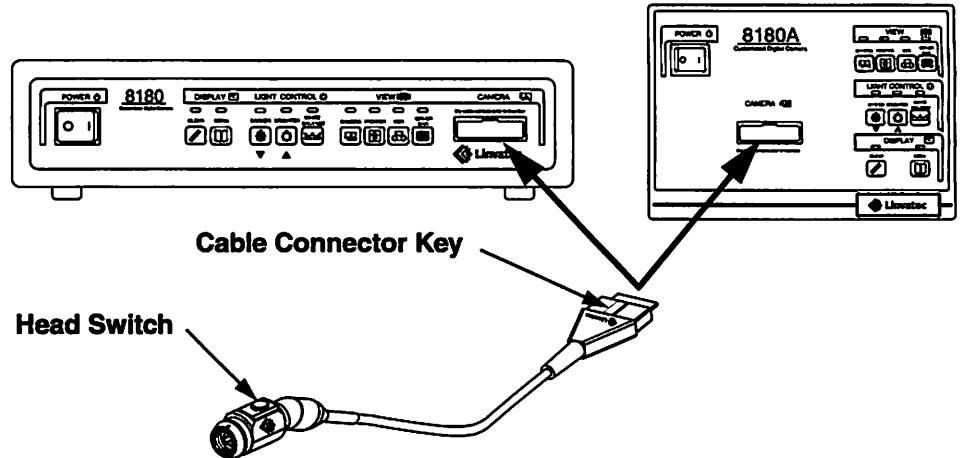
## 8180 Customized Digital Camera



**NOTE**

If the cable connector is not inserted completely, the following messages will be displayed when the camera and monitor are powered on:

**“CONNECT CAMERA HEAD”.**  
**“DRY CABLE CONTACTS PRIOR TO INSERTION”**



**Figure 4-2**  
**Connecting the Camera Cable to the Camera Receptacle**

3. Connect an S-Video cable from the S-Video connector on the rear of the camera to the S-Video IN (Y-C input) connector on the monitor (reference Figure 4-3, System Hook-up). Set monitor termination to 75Ω.



**NOTE**

Figures 4-3 and 4-4 show a sample system connection of the 8180A/8180AC and 8180/8180C Cameras (respectively) to an 8430W/8430WE Xenon Light Source, Monitor, VCR and Printer. Other manufacturer's equipment may be in use which may require different connections than described. Also, communications and diagnostics will not be accomplished with other light sources as described with the 8430W/8430WE Xenon Light Source.

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4

# Maintaining the Equipment

8180 Customized  
Digital Camera

## S-Video Accessory Cable Connection (8199)



For use with any standard light source, an "S" VCR and an "S" compatible printer (reference figure 4-3):

1. Insert the 25-pin male D-sub connector, with the Linvatec logo facing up, into the "VIDEO ACCESSORIES" receptacle on the back of the camera console.



### From the major cable labeled "LIGHT":

- Connect the BNC cable to the Video-IN (BNC) connector on any standard light source.
- If using a Linvatec 8430W/8430WE Xenon Light Source, connect the 9-pin female D-sub connector to the 9 pin male D-sub COMM receptacle on the light source rear panel.

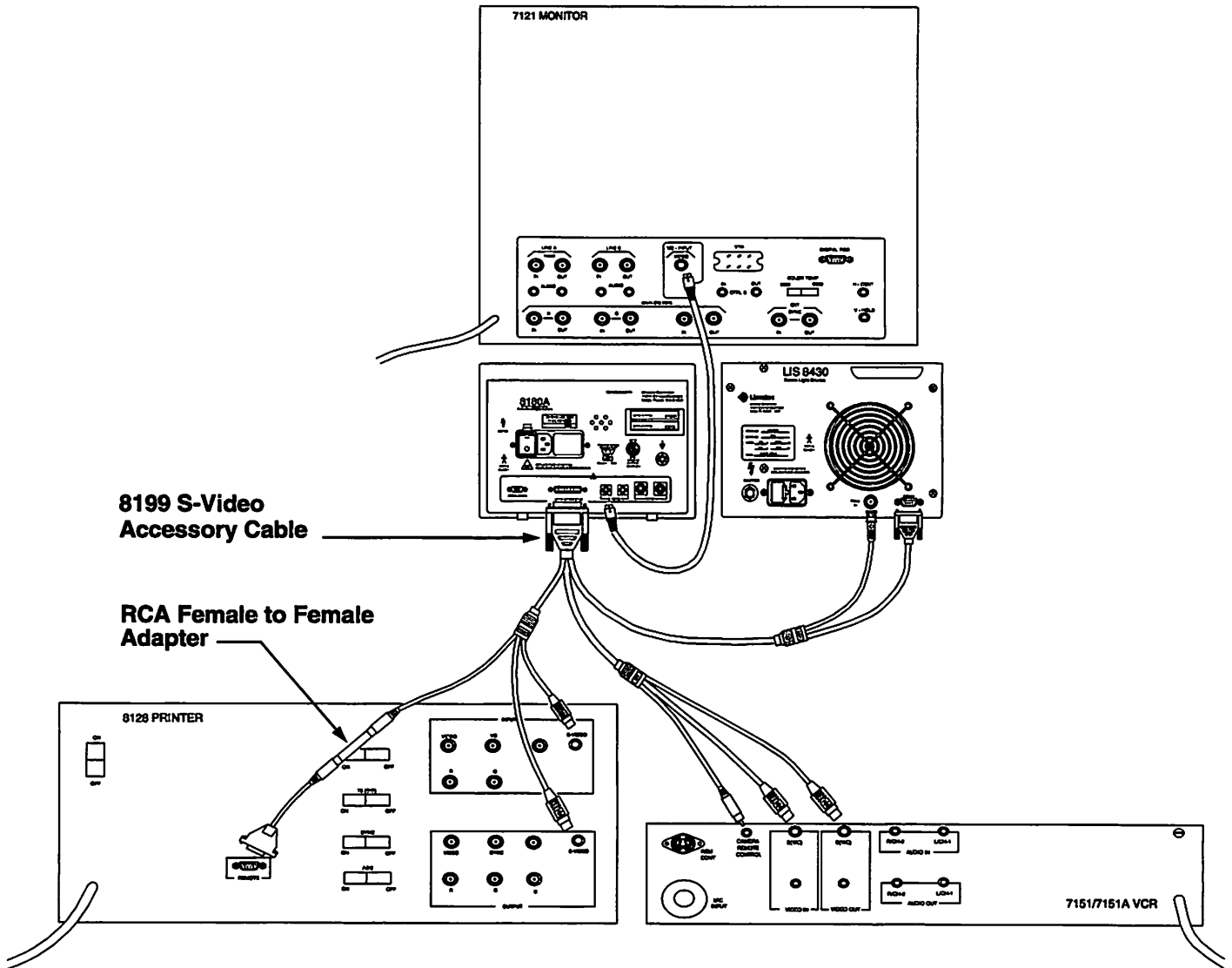
### From the major cable labeled "VCR":

- Connect the "S" connector (labeled ) to the S-Video IN connector on the VCR.
- Connect the "S" connector (labeled ) to the S-Video OUT connector on the VCR.
- Connect the RCA (remote) connector to the camera remote control receptacle on the VCR.

### From the major cable labeled "PRINTER":

- Connect the "S" connector (labeled ) to the S-Video IN connector on the printer.
- Connect the "S" connector (labeled ) to the S-Video OUT connector on the printer.
- If using the Linvatec 8128/8128A High Resolution Video Printer, connect the RCA (remote) male connector from the camera's video accessory cable to the RCA female-to-female adapter (included with the printer).
- The other end of the RCA female-to-female adapter will attach to the RCA male connector on the remote cable included with the Linvatec 8128 /8128A Printer.
- The remote cable will then attach to the 9 pin D-sub receptacle on the rear of the printer.
- Additional outputs are available on the camera's rear panel. Two "S" format (labeled S-Video) and two "Composite" format (labeled "Video"). Attach an appropriate cable from the accessory to the appropriate connector on the rear of the camera.





**Figure 4-3**  
**System Hook-up of the 8180A/8180AC Camera with the 8199 Video Accessory Cable**

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4

# Maintaining the Equipment

8180 Customized  
Digital Camera

## Composite Video Accessory Cable Connection (8199C)

For use with non-standard light sources and non-"S" accessories or extra video accessories (reference figure 4-4):

1. Insert the 25-pin male D-sub connector, with the Linvatec logo facing up, into the "VIDEO ACCESSORIES" receptacle on the back of the camera console.
2. Connect a BNC video cable from the Video connector on the rear of the camera to the Video IN connector on the monitor.

### From the major cable labeled "LIGHT":

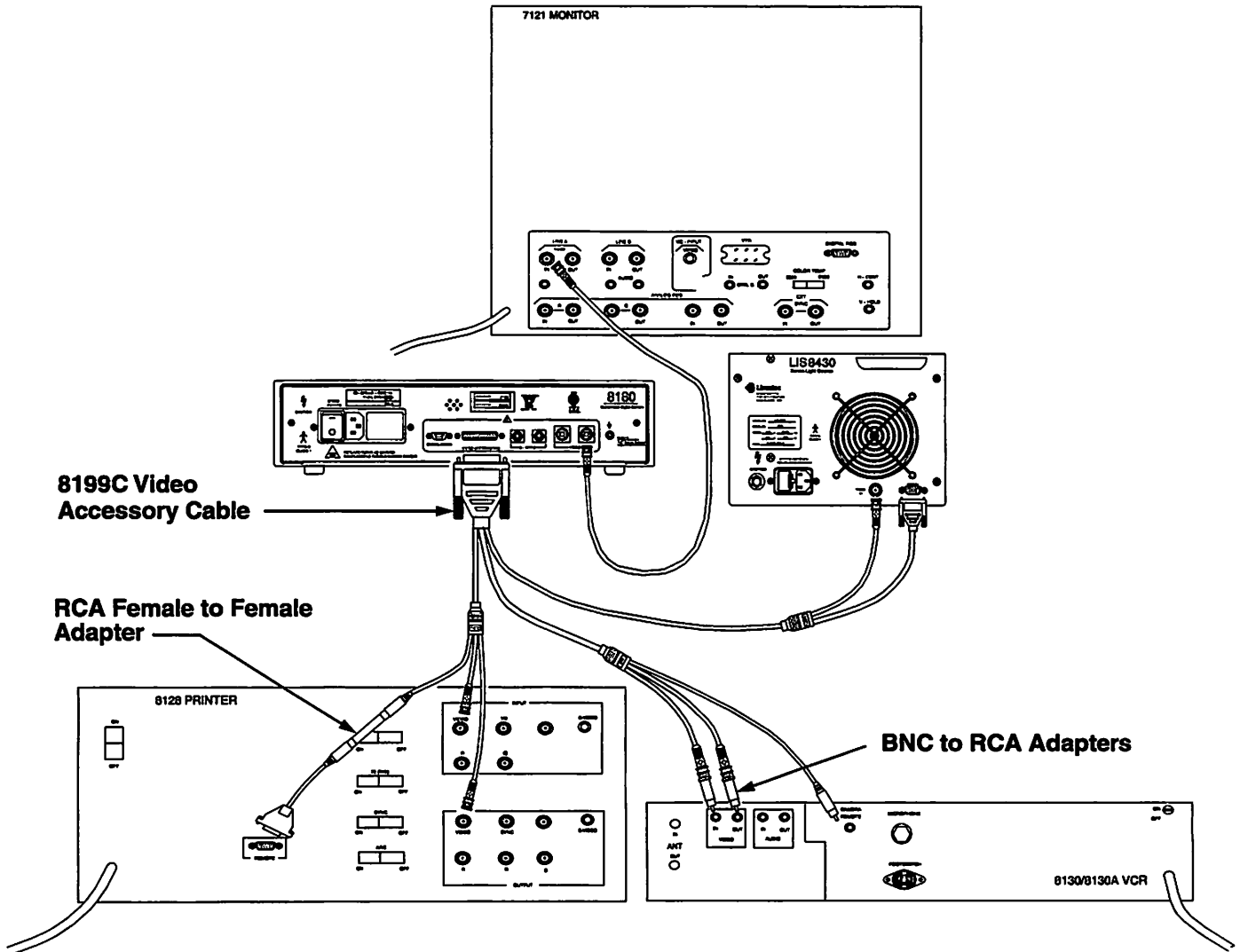
- Connect the BNC cable to the Video-IN (BNC) connector on any standard light source.
- If using a Linvatec 8430W/8430WE Xenon Light Source, connect the 9-pin female D-sub connector to the 9 pin male D-sub COMM receptacle on the light source rear panel.

### From the major cable labeled "VCR":

- Connect the BNC connector (labeled OUT) to the Video IN connector on the VCR using a BNC to RCA adapter.
- Connect the BNC connector (labeled IN) to the Video OUT connector on the VCR using a BNC to RCA adapter.
- Connect the RCA (remote) connector to the camera remote control receptacle on the VCR.

### From the major cable labeled "PRINTER":

- Connect the BNC connector (labeled IN) to the Video IN BNC connector on the printer.
- Connect the BNC connector (labeled OUT) to the Video OUT BNC connector on the printer.
- If using the Linvatec 8128/8128A Printer, connect the RCA (remote) male connector from the camera's video accessory cable to the RCA female-to-female adapter (included with the printer).
- The other end of the RCA female-to-female adapter attaches to the RCA male connector on the remote cable included with the Printer.
- The remote cable will then attach to the 9 pin D-sub receptacle on the rear of the printer.
- Additional outputs are available on the camera's rear panel; Two "S" format (labeled S-Video) and two "Composite" format (labeled "Video"). Attach an appropriate cable from the camera to the appropriate connector on the accessory.



**Figure 4-4**  
**System Hook-up of the 8180/8180C Camera with the 8199C Video Accessory Cable**

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4

# Maintaining the Equipment

8180 Customized  
Digital Camera

## PAL Remote Control Interface

This information refers to the camera remote control interface for remote operation of printers and VCR's on 8180 PAL formatted Cameras (See figure 4-5).

With the numerous VCR's and printers available it is unlikely the camera's remote capabilities are compatible with each brand of VCR and printer. Following is a description of electronic interface and timing information.

Pressing the head switch starts a timer that determines which peripheral device is selected. Press for less than 0.6 seconds; VCR remote control is activated and VCR video input is selected. VCR video displays for three (3) seconds, then returns to the previous video input. The VCR toggles between record and stop with each successive press of the head switch.

Press the head switch longer than 0.6 seconds. Printer remote control is activated and printer video input is selected. Printer video displays. Releasing the switch, printer remote control activates and a one second timer starts. The printer stores and prints an image (exact response of the printer depends on printer setup). After one second the previous video input is restored.

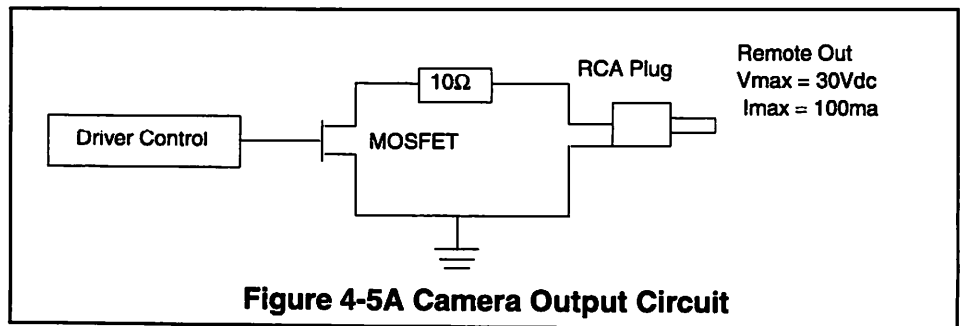


Figure 4-5A Camera Output Circuit

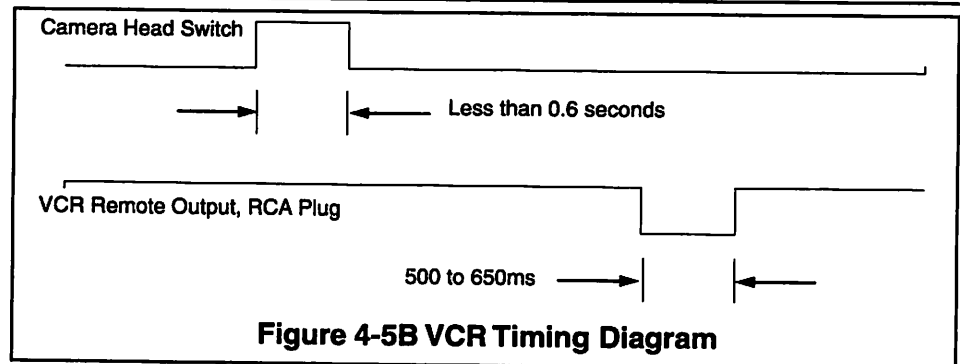


Figure 4-5B VCR Timing Diagram

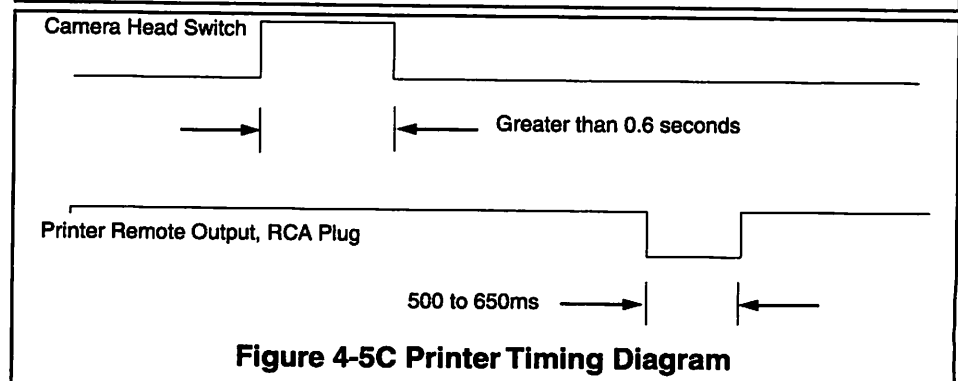


Figure 4-5C Printer Timing Diagram

Section  
4

# Maintaining the Equipment

8180 Customized  
Digital Camera

## Installation of Scope to Coupler



### CAUTION



### NOTE

Before mounting a lens or coupler to the camera head, check the following items:

- The mating "C" or "V" mount threads are clean, dry and undamaged.
- The endoscopic coupler should have a sealing ring at the base of the threads.
- Spotless camera, coupler, and scope lenses. Clean with a lint-free cloth or cotton swabs and alcohol to remove any smudges or dirt.
- Inspect camera, coupler, and scope lenses to assure there are no scratches, chips or other damage.
- Check scope shafts for dents which cause misalignment.

**Do not look into the light guide while it is plugged into the light source. Permanent eye injury may result.**

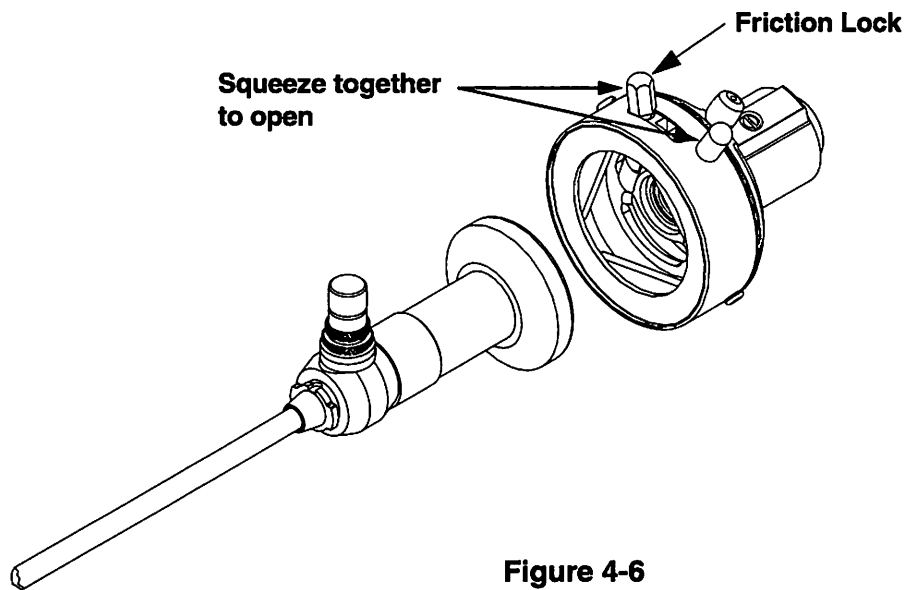
- Inspect the light guide to ensure adequate light is being emitted. Hold one end of the light guide to room light and look at the other end. If more than 30% of the fiber optic cables are darkened, replace the light guide.

**Couplers and scopes are not included with the 8180 Camera. Contact your Linvatec Sales Representative.**

1. Thread coupler clockwise onto the camera head until it seats firmly, but **DO NOT OVERTIGHTEN**.
2. Install a scope in the coupler.

**If using a Linvatec standard eyepiece coupler (Reference figure 4-6):**

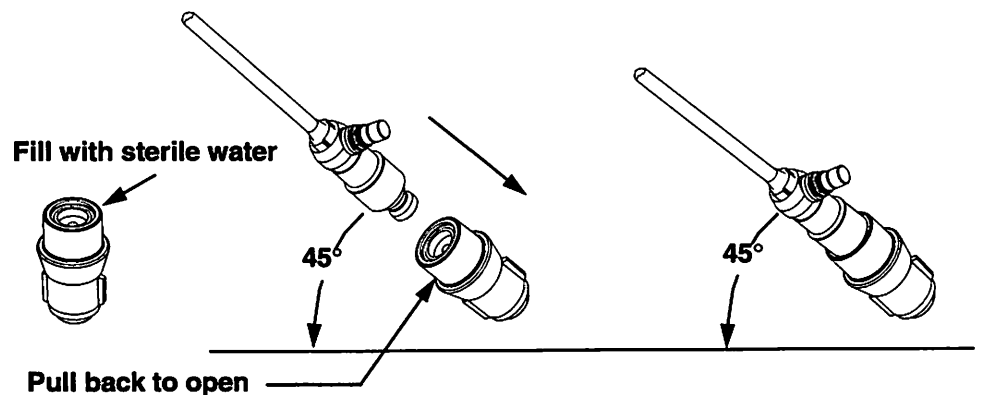
- Loosen the friction lock by turning fully counterclockwise.
- Squeeze the retaining levers together, insert the scope eyecup, then release the levers.
- Secure the scope in the coupler by turning the friction lock clockwise.



**Figure 4-6**  
**Installation of Scope into Eyepiece Coupler**

If using a Linvatec cartridge coupler and cartridge scope (Reference figure 4-7):

- Hold the coupler in an upright position and fill the Linvatec cartridge coupler with sterile water.
  - Pull back on the coupler and snap the cartridge scope into place at a 45° angle.
3. Attach a light guide to the light source and the endoscope.



**Figure 4-7**  
**Installation of Scope into Cartridge Coupler**

## Camera Operation

1. Turn the power ON to all peripheral equipment attached to the camera. Allow the light source to warm up for approximately five (5) minutes.
2. Press the Standby switch on the front of the camera to the ON position. On the rear of the camera press the Mains Power switch to the ON position.

A self-test of the system will be initiated and will take several seconds to complete. If there is an internal malfunction or if the system is not hooked up completely, the internal diagnostics will display an error message on the monitor screen. (Reference Appendix I, Section 7 for information on error messages). Once diagnostics are complete, the following message will display indicating successful start-up:

**LINVATEC CUSTOMIZED  
DIGITAL CAMERA  
SOFTWARE REV LEVEL X**



### NOTE

The camera is equipped with a Camera Menu Setup mode to set up or change specific operating parameters for individual users. Refer to the "Camera Menu Setup Mode Operation" on page 4-15).

## Monitor Color Tuning



3. Focus the scope for a clear, crisp image.
4. Press the **COLOR BAR** button to access the color bar test pattern. The color bar LED illuminates and the color bar test pattern should display.
  - a. Press the specific button for the equipment that you want to color match. **CAMERA** button to color adjust the monitor screen; **PRINTER** button to color adjust the printer; or **VCR** button to color adjust the VCR.
  - b. Use the monitor color and hue controls to match the monitor color bar image with the Linvatec color bar chart provided.
  - c. Use the printer color adjustment controls, not the monitor controls, to adjust the printer's color output.
5. When you have finished color correcting the equipment, press the **COLOR BAR** button to exit the color bar test pattern.

## White Balance



6. White balance the camera at this point using a stack of 4x4 white gauze.
7. There are two methods for white balancing, "Manual" and "Automatic". "Small Scope and Large Scope Presets" are set to automatic and cannot be changed. Custom Setups 1 thru 6 can be set to either one (reference the "Camera Menu Setup Mode Operation" on page 4-15 for more information).

## MANUAL WHITE BALANCE

- a. Enter the Camera Menu Setup mode by pressing the **MENU** button. Select a Custom Setup and then advance to the Manual White Balance menu (See “**INDIVIDUAL OPTIONS SELECTIONS**” on page 4-20 for more information).
- b. Use the **BRIGHTER ▲** button (moves level marker right) or the **DARKER ▼** button (moves level marker left) to adjust the color balance to more blue or more red. This will be the new white balance setting.
- c. Press the **CLEAR** button to exit the Custom Camera Menu program.

## AUTOMATIC WHITE BALANCE

- a. Enter the Camera Menu Setup mode by pressing the **MENU** button. Select a Custom Setup and then advance to the Manual White Balance menu.
  - b. Use the **BRIGHTER ▲** button (moves level marker right) to adjust the level marker to the “X”. With “X” selected the Manual White Balance is defeated and Automatic White Balance is enabled.
  - c. Press the **CLEAR** button to exit the Custom Camera Menu program.
8. Set the light source to the “Manual” position (if not currently set) and the Brightness control to the middle position.
  9. Hold the tip of the scope approximately one inch away from the stack of white gauze.
  10. Adjust the light source intensity to a uniform level over the entire image on the monitor (no glaring) so that the picture is of nominal brightness to the user.
  11. Hold the scope tip very steady and press the Light Control **WHITE BALANCE** button on the camera console. The monitor will display “**WHITE BALANCING**” during white balance.
    - If there is not enough light from the light source the monitor will display: “**INADEQUATE ILLUMINATION**”. Increase the brightness level of the light source and repeat steps 9 and 11.
    - If there is too much light from the light source the monitor will display: “**EXCESS ILLUMINATION**”. Decrease the brightness level of the light source and repeat steps 9 and 11.
    - If white balance fails for reasons other than inadequate or excessive illumination, the monitor will display “**WHITE BALANCE FAILED**”. Perform the white balance procedure again.
    - When white balancing is achieved correctly the monitor will display “**WHITE BALANCE COMPLETE**”.



### NOTE

**At power up, the white balance default is as last set before power down.**



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4

# Maintaining the Equipment

8180 Customized  
Digital Camera

## Camera Image Viewing



If a VCR and/or printer are being used, assure units are hooked up correctly and the camera head switch is operating satisfactorily (reference figures 4-3 and 4-4 System Hook-up of the 8180 Cameras with the 8199/8199C Video Accessory Cable).

1. Press the **CAMERA** button to access the camera mode. The "Camera" LED should illuminate.
2. Aim the scope towards an object and focus for a clear picture. A live image will currently be displayed on the monitor screen.



### NOTES

**For best results, set the light source brightness to a MID level when the camera's Auto Shutter is ON. Reference your light source documentation on how to achieve this setting.**

**Certain functions of VCR's and printers are unique. Your VCR or printer may not display the same or any symbols as described in this manual. Reference your VCR/printer documentation on how to use or adjust.**

## Printer Operation



Accessing the printer may be done in one of two ways; either by pressing the **PRINTER** button or through the head switch. Perform the following steps:

1. Press the **PRINTER** button to access the printer mode. The "Printer" LED should illuminate. When "Printer" is selected, the monitor displays the printer's video output image. To store an image or make a print, use the printer front panel buttons or the camera head switch. (See next step on how to store an image with the head switch). To exit printer view, press the **CAMERA** button.
2. In "Camera" mode, press and hold the head switch. The image is stored in printer memory and also appears on the monitor until the head switch is released.



### NOTES

**Printer operating setup is accomplished from the controls on the printer, not from the camera. Reference the printer manual for setup and operating procedures.**

**PAL users reference the "PAL Remote" on page 4-7**

**If using a Linatec 8128/8128A Printer, "MEMORY/INPUT", "MEMORY/LIVE" button must be set to MEMORY to keep the stored image on the screen.**

**If the Linatec 8128/8128A Printer is set to FIELD mode (set with the FRAME/ FIELD A/B button) and AUTO PRINT mode, the stored image(s) will automatically print whenever all segments in Field A have been filled. While images are printing, printer automatically switches to Field B in the event more images are needed. However, while in Field B, the capabilities of pressing and holding the camera head switch to continuously display the image on the monitor is no longer enabled.**

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# Maintaining the Equipment

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## VCR Operation



Accessing the VCR may be done in one of two ways; either by pressing the **VCR** button or through the head switch. Perform the following steps:

1. Press the **VCR** button to access VCR mode. The "VCR" LED will illuminate. When "VCR" is selected, the image being recorded will be viewed, or a previously recorded image can be viewed (depending upon which mode the operator sets the VCR). To exit the VCR view, press the **CAMERA** button.
2. In "Camera" mode, access to the VCR to start or stop recording may be accomplished through the head switch without leaving the camera image.
  - a. In the "Camera" mode press the head switch for less than 0.6 seconds to start recording (Only if VCR+PRINTER is selected in the "Remote Configuration" menu. Otherwise, if only VCR is selected, pressing the head switch for any duration of time will start/stop recording). The VCR will start recording and its status will appear on the monitor indicating that it is recording. The status will disappear after approximately five (5) seconds and a gray shaded square will appear on the screen indicating that the VCR is in the record mode (only if using a Linvatec VCR).
  - b. To stop recording, press the head switch again for less than 0.6 seconds (Only if VCR+PRINTER is selected in the "Remote Configuration" menu. Otherwise, if only VCR is selected, pressing the head switch for any duration of time will start/stop recording). The VCR will stop recording and its status will appear on the monitor for approximately five (5) seconds showing it has stopped recording. The gray square will also disappear.



### NOTES

**VCR setup is accomplished from the VCR controls, not from the camera. Reference the VCR manual for setup and operating procedures.**

**PAL users reference the "PAL Remote" on page 4-7**

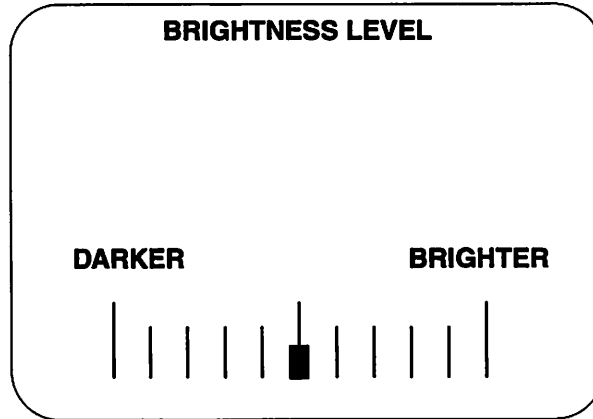
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# Maintaining the Equipment

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## Darker/Brighter Operation

Once the preferred View has been selected and the camera has been white balanced, press the **DARKER/BRIGHTER** button to verify the illumination of the image changes. When either button is pressed the following "**Brightness Level**" menu should display on the screen:



This adjustment is a real time adjustment. The brightness changes as the brightness level is adjusted.



1. Press the **BRIGHTER** button (moves level marker right) to increase brightness.



2. Press the **DARKER** button (moves level marker left) to decrease brightness.

After the desired brightness has been set the menu automatically disappears.

## Clear Operation

The "Clear" function is used to immediately remove any diagnostic message that may display on the monitor screen.



1. Pull the camera cable connector out of the front panel receptacle to get the following message displayed: "**CONNECT CAMERA HEAD**".
2. Press the **CLEAR** button and the message should instantly be removed.

## Auto Shutter Operation

1. The camera auto shutter allows for automatic internal adjustment of light output for the highest quality image intensity overall. Auto Shutter is set to either ON or OFF in the Camera Menu Setup mode. Test the functionality of the auto shutter and light source (if using a Linvatec 84310W/8430WE Light Source) by performing the following:

- a. Set the camera auto shutter to ON and verify that the light source wakes up in the Manual mode.
- b. Set the camera auto shutter to OFF and verify that the light source wakes up in the Auto mode.



## NOTES

**Settings for Auto Shutter Wake-up are achieved through the Camera Menu programming setups. See "Camera Menu Setup Mode Operation" below.**

**If the light source auto shutter is set to Auto in conjunction with the camera auto shutter being ON, strobing may occur. Set the light source to the Manual mode if this should occur.**

## Camera Menu Setup Mode Operation



Check the Camera Menu Setup mode to assure that the camera responds to level settings and wakes up in the mode that was programmed.

As you move through the different menus, set several different custom setups, save the settings and exit out. Turn the camera off and then on and verify that the camera wakes up in these modes with the specific level settings that you set.

Once in the Camera Menu, the following buttons are used for specific purposes:

**DARKER Button** — Within any menu, press the **DARKER** button to move the cursor ( \* ) down. Within any Set Level menu, moves the level marker left.

**BRIGHTER Button** — Within any menu, press the **BRIGHTER** button to move the cursor ( \* ) up. Within any Set Level menu, moves the level marker right.

**MENU Button** — Press the **MENU** button to advance to the next menu.

**CLEAR Button** — Press the **CLEAR** button to exit the Camera Menu Setup mode.

### Factory Defaults

The initial factory settings are:

- Video Format — NTSC
- Cable Configuration — S-Video
- Select Setup Menu — Small Scope Preset
- All Custom Setups — Set to Small Scope Preset
- Video Enhancer Menu (8180C/8180AC only)
  - Video Enhancer — ON
  - Factory Preset — ON

The **SMALL SCOPE PRESET** selection consists of the following settings:

- Auto Shutter Select — ON
- View Wake-up — PRINTER
- Picture Size Select — CIRCLE VIEW
- Remote Configuration — VCR + PRINTER
- Brightness Level — MID Range
- Manual White Balance — "X" Auto setting (Manual white balance defeated)
- Audio Level — MID Range

The **LARGE SCOPE PRESET** selection consists of the following settings:

- Auto Shutter Select — ON
- View Wake-up — PRINTER
- Picture Size Select — FULL SCREEN VIEW
- Remote Configuration — VCR + PRINTER
- Brightness Level — MID Range
- Manual White Balance — "X" Auto setting (Manual white balance defeated)
- Audio Level — MID Range

## VIDEO FORMAT MODE

1. Confirm that the correct video format is set, either PAL or NTSC format (preset to NTSC format at the factory, PAL format is for international only).
2. Press the **MENU** button to enter into the Camera Menu Setup mode. The "MENU INSTRUCTIONS" menu should display.

### MENU INSTRUCTIONS

- ◆ **BRIGHTER BUTTON:**  
MOVES CURSOR (\*) UP  
MOVES LEVEL (■) RIGHT
- ◆ **DARKER BUTTON:**  
MOVES CURSOR (\*) DOWN  
MOVES LEVEL (■) LEFT
- ◆ **MENU BUTTON:**  
SELECTS NEXT MENU
- ◆ **CLEAR BUTTON:**  
EXITS MENU MODE

3. Press the **COLOR BAR** button and the "VIDEO FORMAT" menu should display showing the current video format:

### SELECT VIDEO FORMAT

(\*) NTSC  
( ) PAL

MENU OR CLEAR TO EXIT

4. Press the **DARKER** or **BRIGHTER** button to select the desired format.
5. Press the **MENU** or **CLEAR** button to exit the Video Format menu.

## CABLE CONFIGURATION FORMAT MODE

1. Confirm that the correct cable configuration format has been set; either S-Video or Video format (this is preset to S-Video at the factory).
2. Press the **MENU** button to enter into the Camera Menu Setup mode. The "MENU INSTRUCTIONS" menu should display.

### MENU INSTRUCTIONS

- ◆ **BRIGHTER BUTTON:**  
MOVES CURSOR (\*) UP  
MOVES LEVEL (■) RIGHT
- ◆ **DARKER BUTTON:**  
MOVES CURSOR (\*) DOWN  
MOVES LEVEL (■) LEFT
- ◆ **MENU BUTTON:**  
SELECTS NEXT MENU
- ◆ **CLEAR BUTTON:**  
EXITS MENU MODE

3. Press the **PRINTER** button. The "CABLE CONFIGURATION" menu should display showing the current cable configuration.

### SELECT CABLE CONFIGURATION

(\*) S-VIDEO  
( ) VIDEO

MENU OR CLEAR TO EXIT

4. Press the **DARKER** or **BRIGHTER** button to select the desired format.
5. Press the **MENU** or **CLEAR** button to exit the Cable Configuration format menu.

## SELECTING A SETUP

1. Press the **MENU** button to enter into the Camera Menu Setup mode. The "MENU INSTRUCTIONS" menu should display.

**MENU INSTRUCTIONS**

- ◆ **BRIGHTER BUTTON:**  
MOVES CURSOR (\*) UP  
MOVES LEVEL (▮) RIGHT
- ◆ **DARKER BUTTON:**  
MOVES CURSOR (\*) DOWN  
MOVES LEVEL (▮) LEFT
- ◆ **MENU BUTTON:**  
SELECTS NEXT MENU
- ◆ **CLEAR BUTTON:**  
EXITS MENU MODE

2. Press the **MENU** button again to access the next menu. The "MAIN MENU" menu should display:

**MAIN MENU  
SELECT SETUP**

- (\*) **SMALL SCOPE PRESET**
- ( ) **LARGE SCOPE PRESET**
- ( ) **CUSTOM SETUP - 1**
- ( ) **CUSTOM SETUP - 2**
- ( ) **CUSTOM SETUP - 3**
- ( ) **CUSTOM SETUP - 4**
- ( ) **CUSTOM SETUP - 5**
- ( ) **CUSTOM SETUP - 6**

**MENU-NEXT      CLEAR-EXIT**



### NOTE

In the Camera Menu Setup mode some function buttons perform more than one function. The primary function of these buttons is disabled.

3. To select a factory setup (SMALL SCOPE PRESET or LARGE SCOPE PRESET) or a custom setup, move the cursor to the desired position using either the **DARKER** or **BRIGHTER** button and press the **CLEAR** button to accept it and exit the Camera Menu Setup mode.

The camera should now wake-up and operate in the programmed settings of the selected setup.

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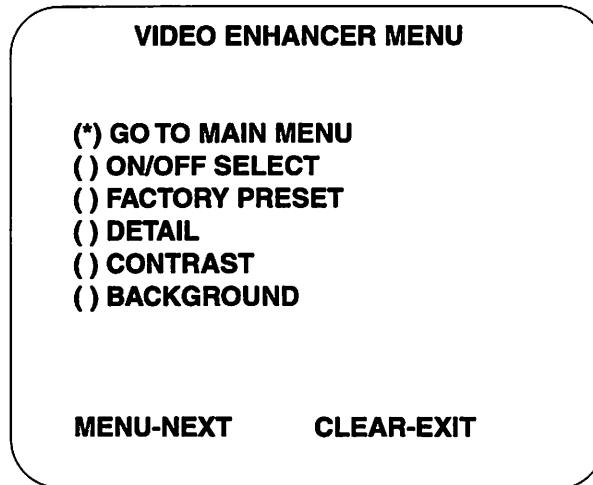
# Maintaining the Equipment

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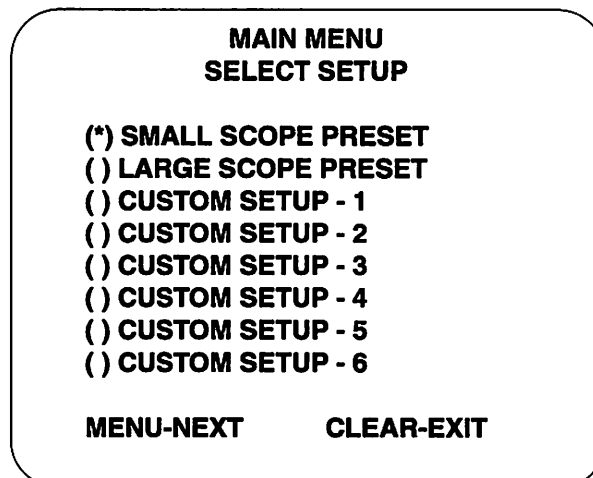


**NOTE**

**OPTIONAL.** If a video enhancer PCB is installed (Model 8180C/8180AC) the following "VIDEO ENHANCER MENU" menu will display after the "MENU INSTRUCTIONS" menu shown above when the MENU button is pressed (Reference "VIDEO ENHANCER MENU SELECTIONS (Model 8180C/8180AC)." on page 4-30 for information on video enhancer menu selections and functionality):



1. To access the "MAIN MENU" menu from the "VIDEO ENHANCER MENU", move the cursor to the "GO TO MAIN MENU" option (use the **DARKER** button to move DOWN or the **BRIGHTER** button to move UP). Press the **MENU** button. The "MAIN MENU" menu should display and the desired selection can be made:





## INDIVIDUAL OPTIONS SELECTIONS

1. Press the **MENU** button to enter into the Camera Menu Setup mode to setup or change a specific setup only. The "**MENU INSTRUCTIONS**" menu should display.

**MENU INSTRUCTIONS**

- ◆ **BRIGHTER BUTTON:**  
MOVES CURSOR (\*) UP  
MOVES LEVEL (▣) RIGHT
- ◆ **DARKER BUTTON:**  
MOVES CURSOR (\*) DOWN  
MOVES LEVEL (▣) LEFT
- ◆ **MENU BUTTON:**  
SELECTS NEXT MENU
- ◆ **CLEAR BUTTON:**  
EXITS MENU MODE

2. Press the **MENU** button again to access the next menu. The "**MAIN MENU**" menu should display.

**MAIN MENU  
SELECT SETUP**

- (\*) **SMALL SCOPE PRESET**
- ( ) **LARGE SCOPE PRESET**
- ( ) **CUSTOM SETUP - 1**
- ( ) **CUSTOM SETUP - 2**
- ( ) **CUSTOM SETUP - 3**
- ( ) **CUSTOM SETUP - 4**
- ( ) **CUSTOM SETUP - 5**
- ( ) **CUSTOM SETUP - 6**

**MENU-NEXT      CLEAR-EXIT**



### NOTE

While in the Camera Menu Setup mode some function buttons perform more than one function. The primary function of these buttons is disabled.

The "**SMALL SCOPE PRESET**" and "**LARGE SCOPE PRESET**" are factory presets and cannot be changed.

3. To select a custom setup, move the cursor to the desired position (using either the **DARKER** button - DOWN or the **BRIGHTER** button - UP). Press the **MENU** button to continue to the next menu for customizing this setup.

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**NOTE**

**OPTIONAL.** If a video enhancer PCB is installed (Model 8180C/8180AC) the following "VIDEO ENHANCER MENU" menu will display after the "MENU INSTRUCTIONS" menu shown above when the MENU button is pressed (Reference "VIDEO ENHANCER MENU SELECTIONS (Model 8180C/8180AC)." on page 4-30 for information on video enhancer menu selections and functionality):

**VIDEO ENHANCER MENU**

(\*) GO TO MAIN MENU  
( ) ON/OFF SELECT  
( ) FACTORY PRESET  
( ) DETAIL  
( ) CONTRAST  
( ) BACKGROUND

MENU-NEXT      CLEAR-EXIT

1. To access the "MAIN MENU" menu, move the cursor to the "GO TO MAIN MENU" option (use the **DARKER** button to move DOWN or the **BRIGHTER** button to move UP). Press the **MENU** button. The "MAIN MENU" menu should display and the desired custom setup selection can be made:

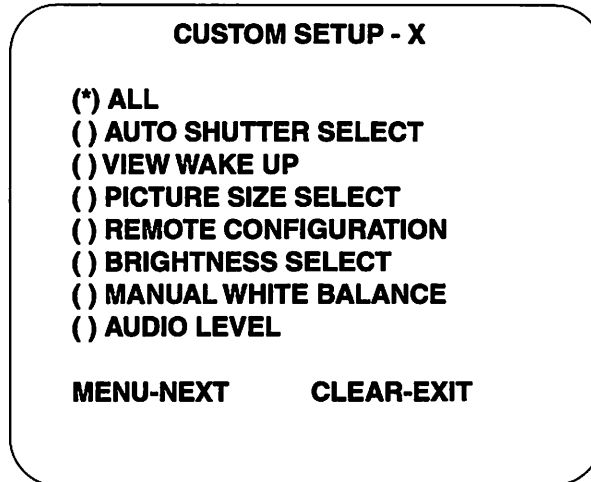
**MAIN MENU  
SELECT SETUP**

(\*) SMALL SCOPE PRESET  
( ) LARGE SCOPE PRESET  
( ) CUSTOM SETUP - 1  
( ) CUSTOM SETUP - 2  
( ) CUSTOM SETUP - 3  
( ) CUSTOM SETUP - 4  
( ) CUSTOM SETUP - 5  
( ) CUSTOM SETUP - 6

MENU-NEXT      CLEAR-EXIT

## CUSTOM SETUP - X Menu

The "CUSTOM SETUP - X" menu should appear (the "X" designator will change to the specific Custom Setup selected, e.g. CUSTOM SETUP - 1):

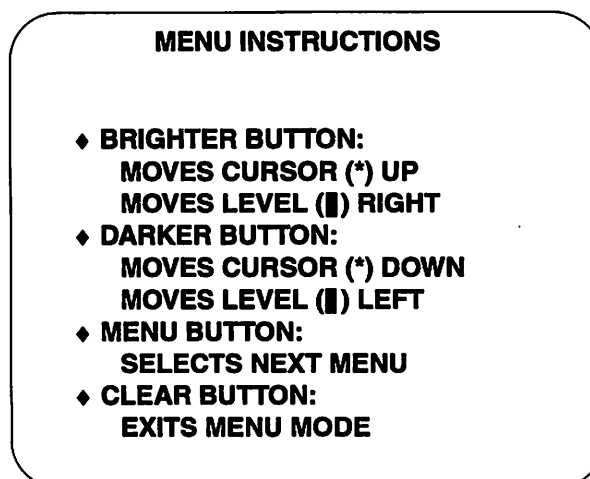


1. Select desired option, such as "AUDIO LEVEL" by moving the cursor to that position and pressing the **MENU** button. The specific menu should display.
2. Make the specific selection or setting and press the **MENU** or **CLEAR** button.
  - Pressing the **CLEAR** button exits the Camera Menu mode.
  - When options are selected individually, pressing the **MENU** button returns the user to the "Custom Setup" menu.

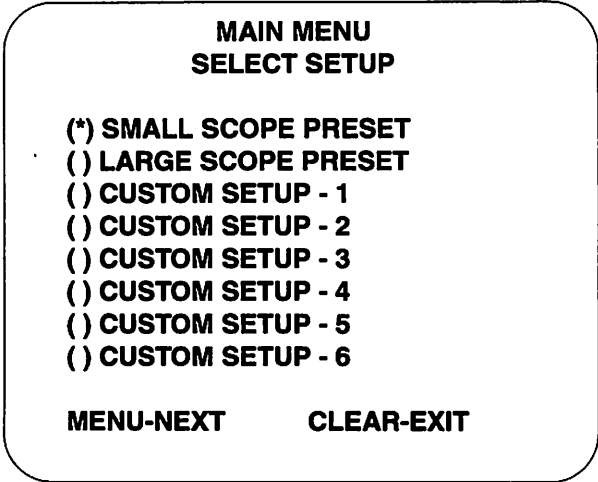
At this point, another option may be selected or you may press the **CLEAR** button to exit completely out of the Camera Menu Setup mode.

## CUSTOM SETUP

1. Press the **MENU** button to enter the Camera Menu Setup mode. The Menu LED should illuminate and stay on as long as you are in the Menu mode. The "MENU INSTRUCTIONS" menu should display.



2. Press the **MENU** button again. The **"MAIN MENU"** menu should display which allows you to select current operating parameters and set them to memory in the camera.



**NOTE**

While in the Camera Menu Setup mode some function buttons perform more than one function. The primary function of these buttons is disabled.

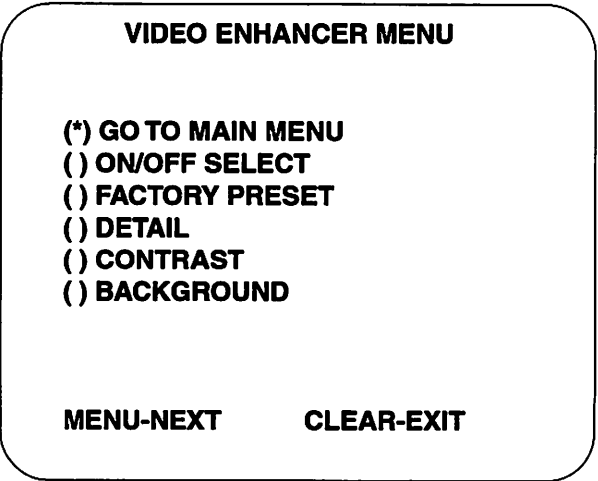
The **"SMALL SCOPE PRESET"** and **"LARGE SCOPE PRESET"** are factory presets and cannot be changed.

3. To select a custom setup, move the cursor to the desired position (using either the **DARKER** button to move DOWN, or the **BRIGHTER** button to move UP). Press the **MENU** button to continue to the **"CUSTOM SETUP - X"** menu for customizing this setup.



**NOTE**

**OPTIONAL.** If a video enhancer PCB is installed (Model 8180C/8180AC) the following **"VIDEO ENHANCER MENU"** menu will display after the **"MENU INSTRUCTIONS"** menu shown above when the **MENU** button is pressed (Reference **"VIDEO ENHANCER MENU SELECTIONS (Model 8180C/8180AC)."** on page 4-30 for information on video enhancer menu selections and functionality):



1. To access the "MAIN MENU" menu, move the cursor to the "GO TO MAIN MENU" option (use the **DARKER** button to move DOWN or the **BRIGHTER** button to move UP). Press the **MENU** button. The "MAIN MENU" menu should display and the desired custom setup selection can be made:

**MAIN MENU  
SELECT SETUP**

(\*) SMALL SCOPE PRESET  
( ) LARGE SCOPE PRESET  
( ) CUSTOM SETUP - 1  
( ) CUSTOM SETUP - 2  
( ) CUSTOM SETUP - 3  
( ) CUSTOM SETUP - 4  
( ) CUSTOM SETUP - 5  
( ) CUSTOM SETUP - 6

MENU-NEXT      CLEAR-EXIT

#### **CUSTOM SETUP - X Menu**

The "**CUSTOM SETUP - X**" menu should appear (the "X" designator will change to the specific Custom Setup selected, e.g. CUSTOM SETUP - 1). This menu allows the user to establish a personal configuration of desired camera conditions:

**CUSTOM SETUP - X**

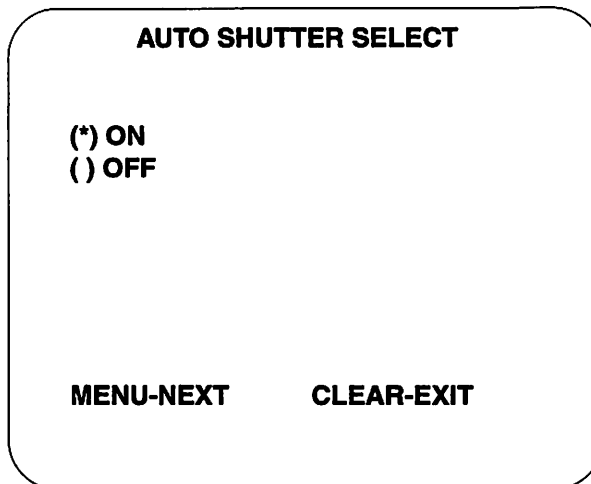
(\*) ALL  
( ) AUTO SHUTTER SELECT  
( ) VIEW WAKE UP  
( ) PICTURE SIZE SELECT  
( ) REMOTE CONFIGURATION  
( ) BRIGHTNESS LEVEL  
( ) MANUAL WHITE BALANCE  
( ) AUDIO LEVEL

MENU-NEXT      CLEAR-EXIT

1. Selecting "**ALL**" prompts the user to program or adjust the entire list of conditions and will automatically sequence through several more menus. To program or adjust only one condition, simply scroll to the desired topic and press the **MENU** button to select it.
2. Selecting a specific option, such as "AUDIO LEVEL" will display the menu specific to that function.

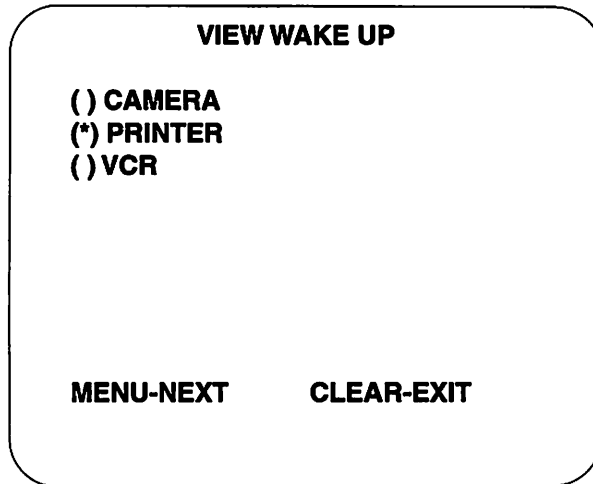
**SELECTING "ALL":**

1. Move the cursor to the "ALL" option and press the **MENU** button. The camera should sequence through several more menus, one at a time. The next menu should be "AUTO SHUTTER SELECT". This menu allows the user to turn Auto Shutter ON or OFF. It is recommended to have the camera auto shutter ON and the light source "Mode" set to MANUAL.



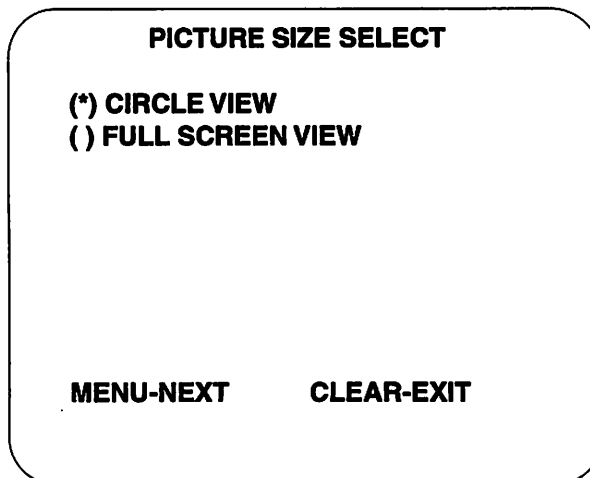
2. Select either ON or OFF.
  - Setting the auto shutter to ON eliminates having to continuously adjust the light source brightness control. (The light source should automatically set to the Manual mode by the internal firmware of the camera when the camera auto shutter is set to ON).
  - Selecting OFF should cause the camera to rely on the light source to control the light output. (The light source should automatically set to the Auto mode by the camera's internal firmware when the camera auto shutter is set to OFF).
3. Press the **CLEAR** button to accept your selection and exit the Camera Menu mode OR

Press the **MENU** button to accept your selection and continue on to the next menu "VIEW WAKE UP". This menu allows the user to select the view that the camera will power up to and project on the monitor.



1. Select either CAMERA, PRINTER or VCR.
  - Selecting CAMERA will cause the camera to wake up in the camera image mode when the camera is turned on. The video image is routed directly from the camera to the monitor screen.
  - Selecting PRINTER will cause the camera to wake up in the printer mode when the camera is turned on. The video image is routed through the printer to the monitor screen.
  - Selecting VCR will cause the camera to wake up in the VCR mode when the camera is turned on. The video image is routed through the VCR to the monitor screen.
2. Press the **CLEAR** button to accept your selection and exit the Camera Menu mode OR

Press the **MENU** button to accept your selection and continue on to the next menu "PICTURE SIZE SELECT".



This menu enables the user to select the portion of the screen that affects the auto shutter function. The **CIRCLE VIEW** ignores the edges of the picture when calculating what the shutter level should be and how the auto shutter should function. This view is recommended when using a 27mm coupler.

The **FULL SCREEN VIEW** takes information from the entire screen to determine the auto shutter level. This view is recommended when using a 35mm coupler.

1. Select either **CIRCLE VIEW** or **FULL SCREEN VIEW** depending upon user preference.
2. Press the **CLEAR** button to accept your selection and exit the Camera Menu mode OR

Press the **MENU** button to accept your selection and continue on to the next menu "**REMOTE CONFIGURATION**". This menu allows the user to program the camera head remote control switch:

**REMOTE CONFIGURATION**

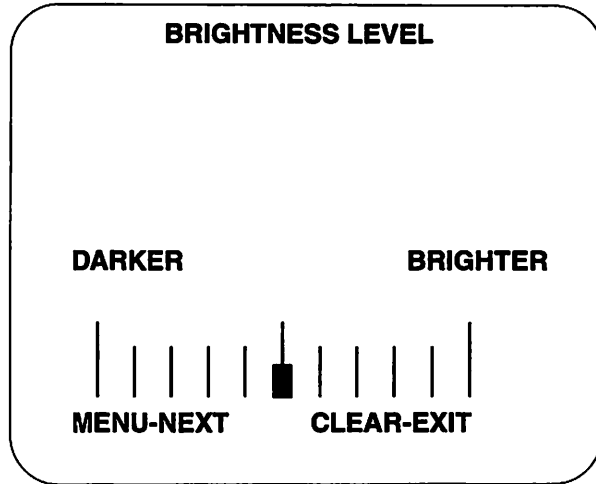
(\*) **VCR + PRINTER**  
( ) **PRINTER**  
( ) **VCR**

**MENU-NEXT**      **CLEAR-EXIT**

1. Select either **VCR + PRINTER**, **PRINTER** or **VCR**.
  - Selecting **VCR + PRINTER** will allow the user to activate the VCR and printer with the camera head switch.
  - Selecting **PRINTER** will allow the user to activate **ONLY** the printer with the camera head switch.
  - Selecting **VCR** will allow the user to activate **ONLY** the VCR with the camera head switch.
2. Press the **CLEAR** button to accept your selection and exit the Camera Menu mode OR

Press the **MENU** button to accept your selection and continue on to the next menu "**BRIGHTNESS LEVEL**". This menu allows the user to preset the desired brightness level.

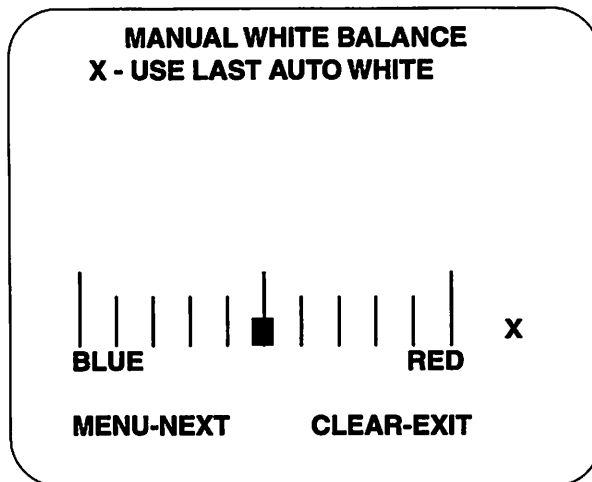




This adjustment is a real time adjustment. You will notice the brightness changes as you adjust the level.

1. Press the **BRIGHTER** button to increase the brightness level of the image being displayed.
2. Press the **DARKER** button to decrease the brightness level of the image being displayed.
3. Press the **CLEAR** button to accept your selection and exit the Camera Menu mode OR

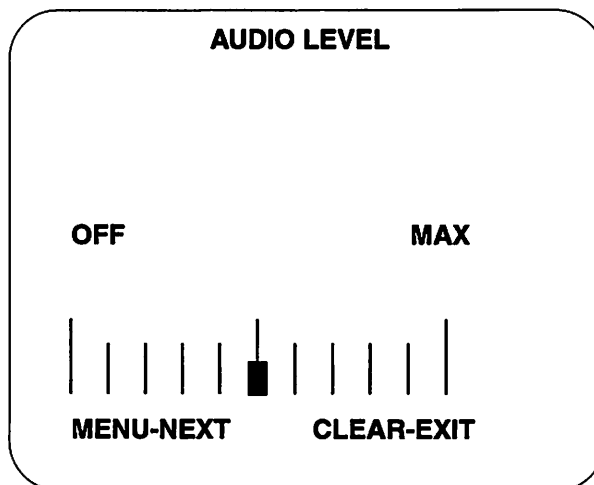
Press the **MENU** button to accept your selection and continue on to the next menu "**MANUAL WHITE BALANCE**". This menu allows the user to set the level of red or blue in the image.



This adjustment is a real time adjustment. You will notice the color changes as you adjust the level.

1. Press the **BRIGHTER** button (moves the level marker right) to adjust the color balance of the image being displayed to more red or to the "X" position.
2. Press the **DARKER** button (moves the level marker left) to adjust the color balance of the image being displayed to more blue.
  - Adjusting the level marker anywhere in the blue to red level will establish the new white balance setting.
  - Adjust the level marker to the "X" level (the "X" will flash when activated). Activating this function defeats the manual white balance and will use the last white balance settings when white balanced from the front panel (Reference "**White Balance**" on page 4-10 for more information on white balancing).
3. Press the **CLEAR** button to accept your selection and exit the Camera Menu mode OR

Press the **MENU** button to accept your selection and continue on to the next menu "**AUDIO LEVEL**". This menu allows the user to adjust the camera's volume.



This adjustment is a real time adjustment. You will notice the volume changes as you adjust the level.

1. Press the **BRIGHTER** button (moves level marker right) to increase the volume.
2. Press the **DARKER** button (moves level marker left) to decrease or turn off the volume.
3. Press the **CLEAR** button to accept your selection and exit the Camera Menu mode OR

Press the **MENU** button to accept your selection and return to the "**CUSTOM SETUP**" menu.

## VIDEO ENHANCER MENU SELECTIONS (Model 8180C/8180AC).

1. Press the **MENU** button to enter into the Camera Menu Setup mode. The "MENU INSTRUCTIONS" menu should display.

**MENU INSTRUCTIONS**

- ◆ **BRIGHTER BUTTON:**  
MOVES CURSOR (\*) UP  
MOVES LEVEL (▣) RIGHT
- ◆ **DARKER BUTTON:**  
MOVES CURSOR (\*) DOWN  
MOVES LEVEL (▣) LEFT
- ◆ **MENU BUTTON:**  
SELECTS NEXT MENU
- ◆ **CLEAR BUTTON:**  
EXITS MENU MODE

2. Press the **MENU** button. The "VIDEO ENHANCER MENU" should display. This menu allows the user to adjust the video enhancer functions. Each adjustment must be selected individually.

**VIDEO ENHANCER MENU**

- ( ) GO TO MAIN MENU
- (\*) ON/OFF SELECT
- ( ) FACTORY PRESET
- ( ) DETAIL
- ( ) CONTRAST
- ( ) BACKGROUND

**MENU-NEXT      CLEAR-EXIT**

3. To turn the video enhancer on or off move the cursor to the "ON/OFF SELECT" option (use the **DARKER** button to move DOWN or the **BRIGHTER** button to move UP). Press the **MENU** button. The "VIDEO ENHANCER" sub-menu should display.

# Maintaining the Equipment

## VIDEO ENHANCER

(\*) ON  
( ) OFF

MENU-NEXT

CLEAR-EXIT

- Setting the video enhancer to ON activates the video enhancer and the displayed image is enhanced.
  - Setting the video enhancer to OFF deactivates the video enhancer and the displayed image is not enhanced.
4. Press the **CLEAR** button to accept your selection and exit the Camera Menu mode OR

Press the **MENU** button to accept your selection and return to the “**VIDEO ENHANCER MENU**”.

## VIDEO ENHANCER MENU

( ) GO TO MAIN MENU  
( ) ON/OFF SELECT  
(\*) FACTORY PRESET  
( ) DETAIL  
( ) CONTRAST  
( ) BACKGROUND

MENU-NEXT

CLEAR-EXIT

5. To activate the video enhancer factory presets, move the cursor to the **FACTORY PRESET** option. The “**PRESET**” sub-menu should display.

**PRESET**

(\*) ON  
( ) OFF

MENU-NEXT      CLEAR-EXIT

- Setting the preset to ON configures the video control settings to predefined factory settings. When **PRESET** is ON, **DETAIL**, **CONTRAST** and **BACKGROUND** options are not displayed in the "**VIDEO ENHANCER MENU**" as shown in the following menu.

**VIDEO ENHANCER MENU**

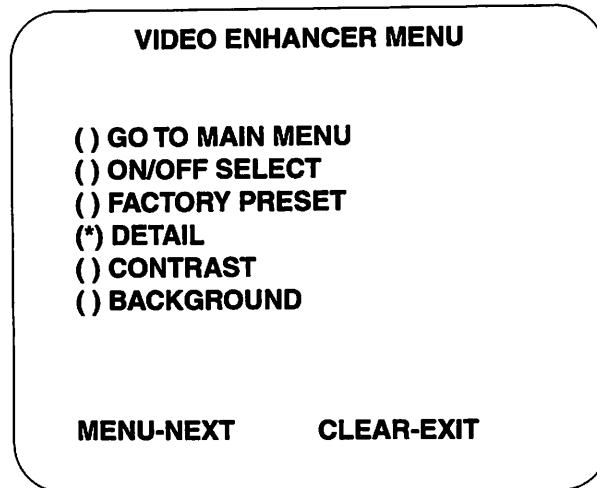
( ) GO TO MAIN MENU  
(\*) ON/OFF SELECT  
( ) FACTORY PRESET

MENU-NEXT      CLEAR-EXIT

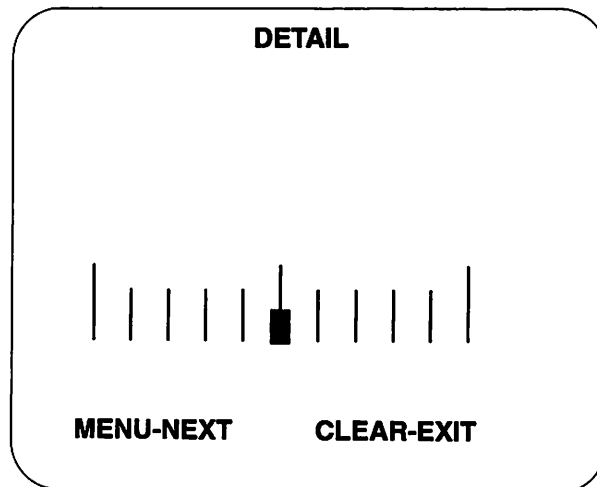
- Setting preset to OFF deactivates the factory presets. The user should now, if desired, adjust "Detail", "Contrast" and "Background" for the desired image.

Press the **MENU** button to accept your selection. The unit should return to the "**VIDEO ENHANCER MENU**".

# Maintaining the Equipment

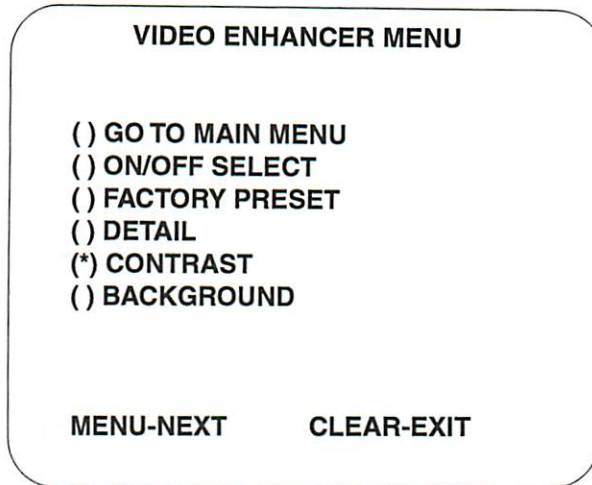


6. To adjust the enhanced image detail move the cursor to "DETAIL". Press the **MENU** button. The "**DETAIL**" sub-menu should display. Detail allows the user to adjust the maximum "size" of image details to be enhanced. With **DETAIL** set to **MAX**, only the finest details present in the image are enhanced. With **DETAIL** set to **MIN**, details as large as 10% of the total display are enhanced.

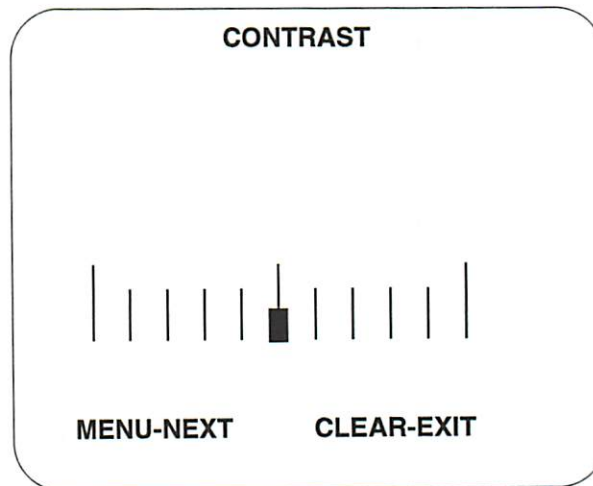


- Press the **BRIGHTER** button (moves level marker right) to enhance finer details.
- Press the **DARKER** button (moves level marker left) to enhance larger details.
- Press the **CLEAR** button to accept your selection and exit the Camera Menu mode OR

Press the **MENU** button to accept your selection. The unit should return to the "**VIDEO ENHANCER MENU**".



7. To adjust the enhanced image contrast move the cursor to **CONTRAST** and press the **MENU** button. The "**CONTRAST**" sub-menu should display. Contrast controls the amount of gain (or amplification) to be applied to the details of the image. Setting **CONTRAST** to **MAX** applies the maximum amount of gain. Setting **CONTRAST** to **MIN** decreases gain to a minimum.



- Press the **BRIGHTER** button (moves level marker right) to increase gain.
- Press the **DARKER** button (moves level marker left) to decrease gain.
- Press the **CLEAR** button to accept your selection and exit the Camera Menu mode OR

Press the **MENU** button to accept your selection. The unit should return to the "**VIDEO ENHANCER MENU**".

# Maintaining the Equipment

## VIDEO ENHANCER MENU

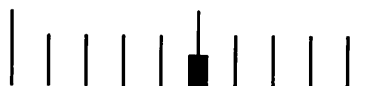
- ( ) GO TO MAIN MENU
- ( ) ON/OFF SELECT
- ( ) FACTORY PRESET
- ( ) DETAIL
- ( ) CONTRAST
- (\*) BACKGROUND

MENU-NEXT

CLEAR-EXIT

8. To adjust the enhanced image background move the cursor to **BACKGROUND** and press the **MENU** button. The "**BACKGROUND**" sub-menu should display. **BACKGROUND** adjusts the overall large-scale variations in image background intensity. Setting **BACKGROUND** to **MAX** applies maximum reduction to these variations. Setting **BACKGROUND** to **MIN** retains the original image content.

## BACKGROUND



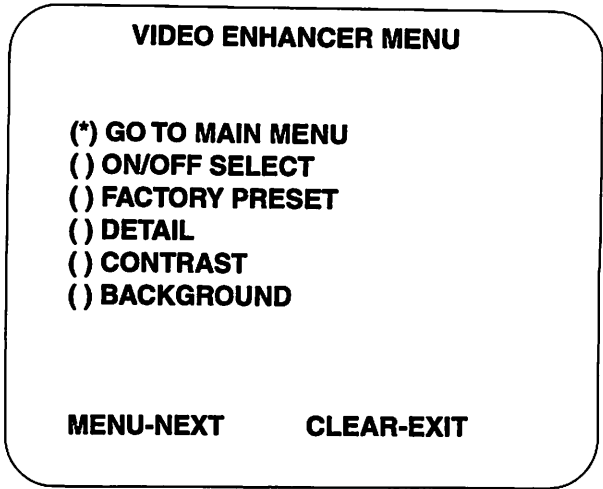
MENU-NEXT

CLEAR-EXIT

- Press the **BRIGHTER** button (moves level marker right) to apply the maximum reduction to the overall large scale variations of the image.
- Press the **DARKER** button (moves level marker left) to reduce the overall large-scale variations of the image.
- Press the **CLEAR** button to accept your selection and exit the Camera Menu mode OR

Press the **MENU** button to accept your selection. The unit should return to the "**VIDEO ENHANCER MENU**".





Select "Go to Main Menu". Press the **MENU** button to advance to the "**MAIN MENU**" OR

Press the **CLEAR** button to accept your selection and exit the Camera Menu mode.

This completes the Functional Test. Turn all the power switches off and remove the accessories.

### VIDEO ENHANCER SPLIT SCREEN MENU

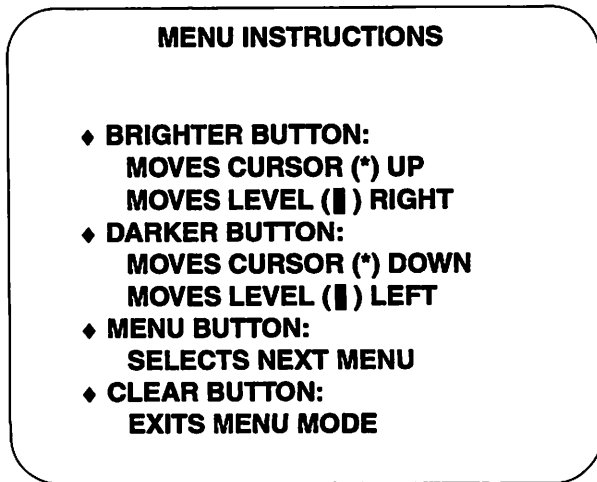
This menu is only accessible if using the model 8180C or 8180AC Camera. This feature is for demonstration purposes. The monitor screen vertically splits in half and allows the user to view both the original and enhanced images simultaneously.



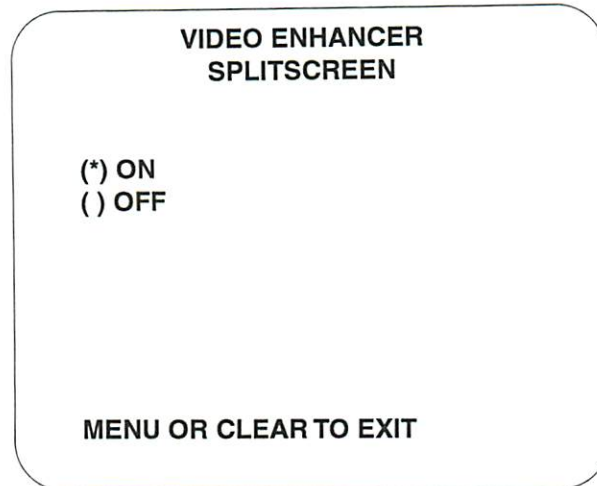
### NOTE

The video enhancer split-screen format is factory preset to OFF. To turn ON:

1. Press the **MENU** button to enter into the Camera Menu Setup mode. The "**MENU INSTRUCTIONS**" menu will display.



2. Press the **VCR** button to display the "VIDEO ENHANCER SPLITSCREEN" menu:



3. Press the **DARKER** or **BRIGHTER** button to make a selection.
4. Press the **MENU** or **CLEAR** button to exit out of the Camera Menu Setup mode.

## Ground Bond Test

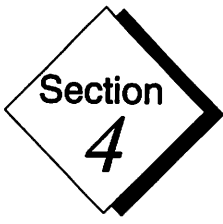
The purpose of this test is to check the continuity of the ground bond from the power plug to the chassis whenever any maintenance has been performed.

### Test Equipment Required:

Simpson Model 265 Multimeter or equivalent.

### Procedure:

1. Set the multimeter to the lowest ohms range. Connect the test leads to each other and zero the instrument.
2. With the camera unplugged from the AC power source, connect one test lead to chassis ground and the other test lead to the power cord ground pin. Measure the resistance value. The meter should measure less than 0.1 ohm.
3. If the reading obtained is greater than 0.1 ohm, the line cord or chassis wiring may be damaged. Do not place unit into service until the problem is resolved.



# Maintaining the Equipment

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## Leakage Test

The purpose of this test is to measure the amount of 50/60 cycle leakage from the transformer primary to the instrument circuitry. AC leakage from any exposed metal part to earth ground and from all exposed metal parts having a return to chassis must not exceed 100ua

### Test Equipment Required:

Bio-Tek Instrument, Model 501 or equivalent.

### Procedure:

1. Plug the power cord into the rear of the camera and into the test receptacle of the Bio-Tek instrument, and the Bio-Tek instrument into the operating voltage receptacle.
2. Turn the camera ON, allow to warm up for a minimum of two (2) minutes and measure the leakage current as follows:
  - 120VAC operation — 100µa maximum
  - 230VAC operation — 500µa maximum

Camera Power Switch	Ground Switch	Polarity Switch
ON	Closed	Normal
ON	Open	Normal
ON	Closed	Reversed
ON	Open	Reversed

3. Turn the camera and the test equipment off. Disconnect all test equipment.
4. If leakage exceeds these limits, the unit may have a faulty line cord or power transformer. Do not place the unit into service until the problem is resolved.

## Calibration

Calibration is not required on the unit as long as there are no modifications made to the PCB's. If a modification is made to any of the PCB's, the unit must be returned to Linvatec for calibration due to the complexity and the process in which it is calibrated. Calibration must not be attempted by anyone other than Linvatec.

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# Maintaining the Equipment

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## Fuse Replacement

In the event of a blown fuse, a new one can be replaced quickly and easily.

1. Ensure the power is OFF and the unit is unplugged. Insert a small screwdriver or other small instrument into the small rectangular opening of the fuse module door (reference figure 4-8).
2. Press the screwdriver blade against the fuse module door lever to open.

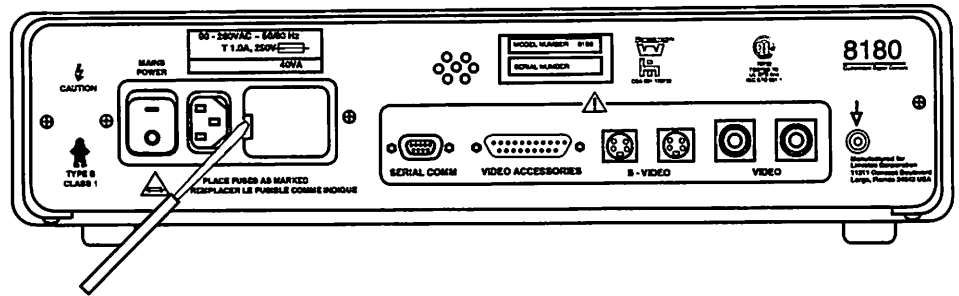


Figure 4-8  
Removal of the Fuse Module

3. Removed the fuse holder from the module. Remove the fuse(s) and replace with a new one. Replace only with the designated fuse as stated on the rear panel of the camera. Reference figure 4-9.
4. Replace the fuse holder and fuse module door and press to lock into place.

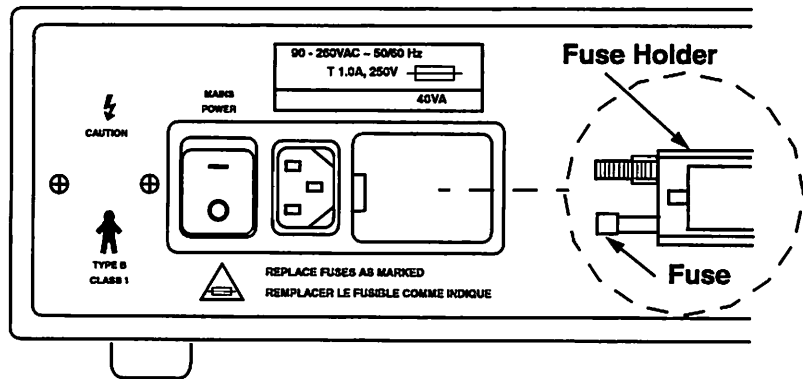


Figure 4-9  
Fuse Holder

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**Troubleshooting**

# Maintaining the Equipment

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Whenever service is performed on a unit, the "Ground Bond Test" on page 4-37 should be performed to assure continuity of the ground bond from the AC power plug to the chassis as well as the "Leakage Test" on page 4-38 to determine the amount of leakage.

Due to the design of the unit, it is not advisable to replace individual components on any printed circuit board (PCB). Replacement of discrete components requires calibrating the unit, which can only be done by the factory. If at any time it becomes necessary to perform repairs, replace the suspect PCB as ordered with a new one or return the suspect PCB to Linatec for repairs. Linatec is not liable for any injuries or damage that may occur if any repairs are made to the unit other than by a Linatec representative or service technician.



**CAUTION**

Dangerous potentials exist at several places within the camera. The cover should only be removed by a qualified technician when troubleshooting the unit. Do not touch exposed connections or components as severe electrical shock may occur. Disconnect power from the supply source prior to replacing any parts or cleaning.

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# Maintaining the Equipment

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Symptom	Possible Cause	Corrective Action
<p>No power, no switch illumination and no LED illumination when Mains Power and Stand-by switches are both on.</p>	<ul style="list-style-type: none"> <li>◆ Power cord is unplugged.</li> <li>◆ Suspect power cord.</li> <li>◆ Blown fuse.</li> <li>◆ Suspect Mains Power and/or Standby switch.</li> <li>◆ Suspect line filter.</li> <li>◆ Wiring harness from power supply assembly to AC power module is damaged, loose or disconnected.</li> <li>◆ Suspect power supply assembly.</li> </ul>	<ul style="list-style-type: none"> <li>◆ Plug the power cord into the rear of the unit and/or a properly grounded receptacle.</li> <li>◆ Replace power cord.</li> <li>◆ Turn the mains power off and unplug the power cord from the AC power supply. Remove the fuse and check the continuity. Replace with a new fuse. (Reference information on "Fuse Replacement" on page 4-39.</li> <li>◆ Measure for the appropriate voltage across the Mains Power switch. Unplug the unit from the AC power source and replace if at fault.</li> <li>◆ Measure for the appropriate voltage across the output line and neutral pins. Unplug the unit from the AC power source and replace if at fault.</li> <li>◆ Turn the mains power off and unplug the power cord from the AC power supply. Remove the wiring harness from the power supply assembly and the AC power module. Check the continuity of the wiring harness. Replace if faulty.</li> <li>◆ Ensure that the wiring harness from the power supply assembly to the AC power module is securely fastened.</li> <li>◆ Replace the power supply assembly.</li> </ul>

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# Maintaining the Equipment

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Digital Camera

Symptom	Possible Cause	Corrective Action
<p>No picture.</p>	<ul style="list-style-type: none"> <li>◆ Power cord is unplugged.</li> <li>◆ Both power switches are not on.</li> <li>◆ Video signal is not being properly transmitted to the monitor.</li> <li>◆ Monitor signal cable disconnected.</li> <li>◆ Video cables are damaged.</li> <li>◆ Camera head cable connector not inserted correctly or completely.</li> <li>◆ Monitor contrast or brightness extremely out of adjustment.</li> <li>◆ Suspect camera head and/or cable.</li> <li>◆ Suspect front panel <b>CAMERA</b> button.</li> </ul>	<ul style="list-style-type: none"> <li>◆ Plug the power cord into the rear of the unit and/or a properly grounded receptacle.</li> <li>◆ Turn the Mains Power and Standby switches to the ON position.</li> <li>◆ Video cables are routed incorrectly. Check system hook-up and reroute video cables. (Reference figure 4-3 or 4-4 for correct connections).</li> <li>◆ Check video monitor settings. Assure monitor is switched for appropriate video input (i.e. Y/C, line A, line B, etc.).</li> <li>◆ Connect cable correctly and securely.</li> <li>◆ Check all video cables for damage and replace as necessary.</li> <li>◆ Insert the camera head cable connector completely into the console receptacle on the front panel.</li> <li>◆ Adjust the contrast and brightness of the monitor.</li> <li>◆ Replace the camera head and cable with a working unit to rule out the camera head and/or cable. If this is the cause, return the camera head to Linvatec for repair.</li> <li>◆ Replace the Display PCB.</li> </ul>

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# Maintaining the Equipment

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Digital Camera

Symptom	Possible Cause	Corrective Action
Poor picture.	<ul style="list-style-type: none"> <li>◆ Monitor controls need adjustment.</li> <li>◆ Camera needs to be white balanced.</li> <li>◆ Video cables damaged.</li> <li>◆ Auto Shutter not functioning properly.</li> </ul>	<ul style="list-style-type: none"> <li>◆ Adjust the brightness, sharpness and/or contrast controls of the monitor.</li> <li>◆ Check the "Manual White Balance" menu within the Camera Menu Setup mode for correct settings. Adjust if needed and white balance camera (reference "Camera Menu Setup Mode Operation" on page 4-15).</li> <li>◆ Check all video cables for damage and replace as necessary.</li> <li>◆ Verify functionality of auto shutter.</li> </ul>
Dark or grainy picture.	<ul style="list-style-type: none"> <li>◆ Monitor settings incorrect.</li> <li>◆ Suspect optical train.</li> <li>◆ Insufficient light.</li> <li>◆ Video cables damaged.</li> <li>◆ Low light intensity output from the light source lamp module.</li> </ul>	<ul style="list-style-type: none"> <li>◆ Adjust the color or brightness adjustment on the monitor.</li> <li>◆ Check scope, coupler and fiber optic cables for damaged fibers, nicks, cuts and cidex buildup on ends.</li> <li>◆ Increase the intensity of light output on the light source.</li> <li>◆ Check all video cables for damage and replace as necessary.</li> <li>◆ Replace the light source lamp module.</li> </ul>
Blurry picture.	<ul style="list-style-type: none"> <li>◆ Out of focus.</li> <li>◆ Fingerprints on lenses.</li> <li>◆ Fogging.</li> <li>◆ Cartridge coupler dry.</li> </ul>	<ul style="list-style-type: none"> <li>◆ Adjust focus ring on coupler.</li> <li>◆ Clean lenses.</li> <li>◆ Inspect scope, coupler and camera head for chips or cracks. Clean.</li> <li>◆ Remove cartridge scope, fill coupler with sterile water and reinsert scope at a 45° angle (reference figure 4-7).</li> </ul>



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# Maintaining the Equipment

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Digital Camera

Symptom	Possible Cause	Corrective Action
No color or poor color.	<ul style="list-style-type: none"> <li>◆ Tint and color out of adjustment.</li> <li>◆ Video cables damaged.</li> <li>◆ Camera needs to be white balanced.</li> <li>◆ Wet or dirty camera head cable connector.</li> <li>◆ Monitor is not terminated correctly.</li> </ul>	<ul style="list-style-type: none"> <li>◆ Adjust monitor tint and color using the color bar test pattern and monitor tint and color controls in "Camera" mode.</li> <li>◆ Check all video cables for damage and replace as necessary.</li> <li>◆ Check the "Manual White Balance" menu within the Camera Menu Setup mode for correct settings. Adjust if needed and white balance camera (reference "<b>Camera Menu Setup Mode Operation</b>" on page 4-15).</li> <li>◆ Clean, rinse and thoroughly dry the camera head cable connector. (See "<b>Cleaning and Disinfecting Information</b>" on page 3-1).</li> <li>◆ Terminate monitor at 75 Ω.</li> </ul>
Intermittent picture.	<ul style="list-style-type: none"> <li>◆ Suspect camera head or cable.</li> <li>◆ Suspect video and/or power cables.</li> </ul>	<ul style="list-style-type: none"> <li>◆ Flex camera cable. If picture is intermittent, return to factory for repair or replacement.</li> <li>◆ Flex video and power cables. If picture is intermittent, inspect cables and replace as necessary.</li> </ul>
Blooming or flaring picture.	<ul style="list-style-type: none"> <li>◆ Too much light.</li> <li>◆ Connection to light source incorrect.</li> <li>◆ Power supply regulators.</li> </ul>	<ul style="list-style-type: none"> <li>◆ Set the brightness control on the light source to half brightness or best position for current situation</li> <li>◆ Adjust the camera's brightness level.</li> <li>◆ Confirm connection to the Video In connector on the light source.</li> <li>◆ Possible loss of DC regulation. Check and replace power supply regulators if faulty.</li> </ul>

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# Maintaining the Equipment

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Digital Camera

Symptom	Possible Cause	Corrective Action
Constant flashing or "strobing".	<ul style="list-style-type: none"> <li>◆ Too much light from the light source.</li> <li>◆ Auto shutter set on both the camera and the light source.</li> </ul>	<ul style="list-style-type: none"> <li>◆ Adjust light source intensity.</li> <li>◆ Set either the camera or light source to auto shutter on. If camera auto shutter is on, turn light source to Manual. If light source is set to "Auto", turn camera auto shutter off.</li> </ul>
VCR indicator does not display, but status does, when head switch is pressed to activate VCR.	<ul style="list-style-type: none"> <li>◆ Monitor and camera are set to different video formats.</li> </ul>	<ul style="list-style-type: none"> <li>◆ Set monitor and camera to the same video format; either S-Video or Video. The camera is set through the Cable Configuration menu (reference the "Camera Menu Setup Mode Operation" on page 4-15).</li> </ul>
Image display is extended beyond monitor screen.	<ul style="list-style-type: none"> <li>◆ Camera is connected for PAL video while the Video Format menu is set to NTSC video format.</li> </ul>	<ul style="list-style-type: none"> <li>◆ Set camera to PAL format in the Video Format menu within the Camera Menu mode (see "Camera Menu Setup Mode Operation" on page 4-15).</li> </ul>
Image is not displayed on the complete monitor screen.	<ul style="list-style-type: none"> <li>◆ Camera is connected for NTSC video while the Video Format menu is set to PAL video format.</li> </ul>	<ul style="list-style-type: none"> <li>◆ Set the camera to the NTSC format in the Video Format menu within the Camera Menu Setup mode (reference the "Camera Menu Setup Mode Operation" on page 4-15).</li> </ul>
No response from front panel buttons.	<ul style="list-style-type: none"> <li>◆ A front panel button is permanently engaged.</li> <li>◆ Ribbon cable from Display PCB is damaged, loose or disconnected.</li> </ul>	<ul style="list-style-type: none"> <li>◆ The following error message will display: "Camera Panel Switch Fail". This indicates that a front panel button is permanently engaged and the software has disabled the front panel buttons. Replace the display PCB.</li> <li>◆ Remove ribbon cable from Display PCB and Monoboard PCB. Check continuity of cable. Replace if faulty.</li> <li>◆ Ensure ribbon cable from Display PCB to Monoboard PCB is securely fastened.</li> </ul>

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# Maintaining the Equipment

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Symptom	Possible Cause	Corrective Action
Automatic white balance not functioning.	<ul style="list-style-type: none"> <li>◆ Manual white balance is incorrectly set in the Manual White Balance menu.</li> <li>◆ Suspect <b>WHITE BALANCE</b> button.</li> <li>◆ Ribbon cable from Display PCB is damaged, loose or disconnected.</li> </ul>	<ul style="list-style-type: none"> <li>◆ Check the "Manual White Balance" menu within the Camera Menu Setup mode for correct settings. Set the level marker to the "X" (see "<b>Camera Menu Setup Mode Operation</b>" on page 4-15).</li> <li>◆ Replace the Display PCB.</li> <li>◆ Remove ribbon cable from Display PCB and Monoboard PCB. Check continuity of cable. Replace if faulty.</li> <li>◆ Secure ribbon cable from Display PCB to Monoboard PCB.</li> </ul>
Messages will not clear when <b>CLEAR</b> button is pressed.	<ul style="list-style-type: none"> <li>◆ Suspect <b>CLEAR</b> button.</li> <li>◆ Ribbon cable from Display PCB is damaged, loose or disconnected.</li> </ul>	<ul style="list-style-type: none"> <li>◆ Replace the Display PCB.</li> <li>◆ Remove ribbon cable from Display PCB and Monoboard PCB. Check continuity of cable. Replace if faulty.</li> <li>◆ Secure ribbon cable from Display PCB to Monoboard PCB.</li> </ul>
Cannot access the "Menu" mode.	<ul style="list-style-type: none"> <li>◆ Suspect <b>MENU</b> button.</li> <li>◆ Ribbon cable from Display PCB is damaged, loose or disconnected.</li> </ul>	<ul style="list-style-type: none"> <li>◆ Replace the Display PCB.</li> <li>◆ Remove ribbon cable from Display PCB and Monoboard PCB. Check continuity of cable. Replace if faulty.</li> <li>◆ Secure ribbon cable from Display PCB to Monoboard PCB.</li> </ul>
No audio when buttons are pressed.	<ul style="list-style-type: none"> <li>◆ Audio level is set to OFF in the Audio Level menu.</li> <li>◆ Suspect speaker.</li> </ul>	<ul style="list-style-type: none"> <li>◆ Check the "Audio Level" menu within the Camera Menu Setup mode. Set the level marker to a level other than OFF. (Reference "<b>Camera Menu Setup Mode Operation</b>" on page 4-15).</li> <li>◆ Check speaker and replace if faulty.</li> </ul>

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# Maintaining the Equipment

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Digital Camera

Symptom	Possible Cause	Corrective Action
<p>Cannot record from camera head.</p>	<ul style="list-style-type: none"> <li>◆ VCR cables are not connected properly.</li> <li>◆ VCR power switches are not on.</li> <li>◆ Video cables damaged.</li> <li>◆ VCR setup is incorrect.</li> <li>◆ Remote configuration is set for printer only.</li> <li>◆ Head switch sticking.</li> <li>◆ Possible open condition in camera head and/or cable.</li> </ul>	<ul style="list-style-type: none"> <li>◆ Connect VCR cables correctly. Reference “<b>S-Video Accessory Cable Connection (8199)</b>” on page 4-3 or “<b>Composite Video Accessory Cable Connection (8199C)</b>” on page 4-5 for information on connecting cables. Also reference figures 4-3 or 4-4.</li> <li>◆ Turn on all power switches on VCR.</li> <li>◆ Check all video cables for damage and replace as necessary.</li> <li>◆ Check the VCR setup. Reference the manufacturer’s instruction guide.</li> <li>◆ Check the Remote Configuration menu within the Camera Menu Setup mode. Set your selection to either VCR+PRINTER or VCR and exit the menus.</li> <li>◆ Clean around head switch with cotton swab and alcohol. If this is not the cause and problem persists, return camera head to Linvatec for repair or replacement.</li> <li>◆ Replace camera head with a known working unit and test head switch by pressing for less than 0.6 seconds. Return camera head to Linvatec for repair.</li> </ul>

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# Maintaining the Equipment

8180 Customized  
Digital Camera

Symptom	Possible Cause	Corrective Action
<p>Cannot print from camera head.</p>	<ul style="list-style-type: none"> <li>◆ Printer cables are not connected properly.</li> <li>◆ Printer power switches are not on.</li> <li>◆ Video cables damaged.</li> <li>◆ Printer setup is incorrect.</li> <li>◆ Remote configuration is set for VCR only.</li> <li>◆ Head switch sticking.</li> <li>◆ Possible open condition in camera head and/or cable.</li> </ul>	<ul style="list-style-type: none"> <li>◆ Connect printer cables correctly. Reference "S-Video Accessory Cable Connection (8199)" on page 4-3 or "Composite Video Accessory Cable Connection (8199C)" on page 4-5 for information on connecting cables. Also reference figures 4-3 or 4-4.</li> <li>◆ Turn on all power switches on printer.</li> <li>◆ Check all video cables for damage and replace as necessary.</li> <li>◆ Check the printer setup. Reference the manufacturer's instruction guide.</li> <li>◆ Check the Remote Configuration menu within the Camera Menu Setup mode. Set your selection to either VCR+PRINTER or PRINTER and exit the menus.</li> <li>◆ Clean around head switch with cotton swab and alcohol. If this is not the cause and problem persists, return camera head to Linvatec for repair or replacement.</li> <li>◆ Replace camera head with a known working unit and test head switch by pressing for greater than 0.6 seconds. Return camera head to Linvatec for repair.</li> </ul>

After correcting the original service problem(s), perform the following safety checks before releasing the unit for use.

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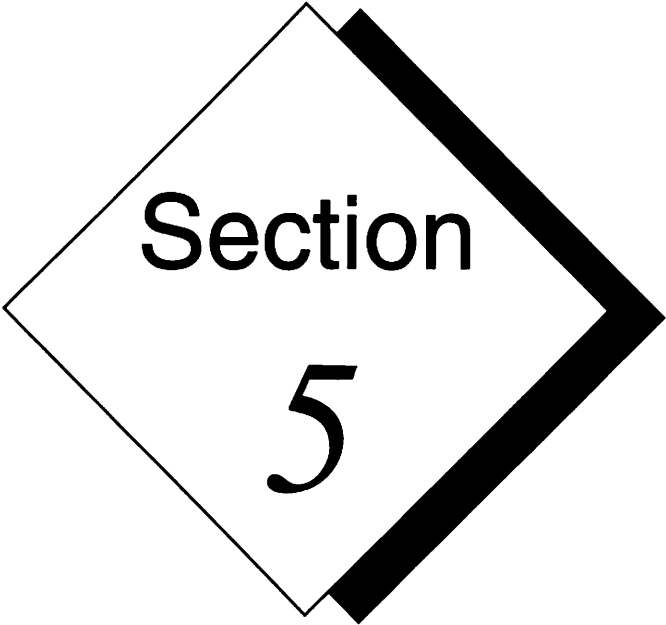
# Maintaining the Equipment

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Digital Camera

## Visual Inspection

1. Check the area(s) of repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.
2. Check the interboard wiring to ensure that no wires are pinched, contact high-wattage resistors or have melted insulation.
3. Check that all control knobs, shields, covers, ground straps, connectors and mounting hardware have been replaced. Assure also that all insulators have been replaced.
4. Look for parts which, though functioning, show obvious signs of degradation. Replace them.
5. Check the power cord for cracks and abrasions.
6. After any repairs or replacement of boards have been made, perform the "Ground Bond Test" on page 4-37 and the "Leakage Test" on page 4-38.
7. Replace the chassis cover by sliding the cover towards the front of the unit.
8. Secure the cover by replacing and tightening the four (4) screws and rubber feet to the bottom of the chassis.

# Service Information



Section  
5

# Service Information

8180 Customized  
Digital Camera

## Care and Handling of CMOS Logic

Most logic elements used in this instrument are fabricated using monolithic Complementary Metal Oxide/Silicone technology (CMOS). The N and P channel enhancement mode transistors used provide symmetrical circuits with output swings essentially equal to the supply voltage. This results in high noise immunity equal to approximately 45% of the supply voltage. This is the desired feature for instruments that must operate in a high noise environment.

No DC power other than that caused by leakage is consumed during static conditions. Thus, the devices run very cool which results in longer life and higher reliability. All of the inputs are protected against static discharge and latching conditions.

Although precautions have been taken in the design of the logic elements, it is still possible they may be damaged by electrostatic discharge during handling. Therefore, the following procedures should be adhered to when working with all CMOS logic elements:

1. Work on a grounded surface when handling any CMOS logic elements, identifiable by "4000", "74AC" or "74HC" series numbers. Grounded wrist straps should also be worn.
2. Do not insert devices into sockets or PC boards with the power ON.
3. When soldering on any CMOS board, use only antistatic type solder-suckers and grounded-tip soldering irons.
4. Avoid plastic, vinyl, and styrofoam in work area.

To obtain replacement parts or accessories for the Linvatec 8180 Video Camera, please contact your local Linvatec Sales/ Service Representative or contact:

### Linvatec

**Attn: Customer Service Dept.**  
11311 Concept Boulevard  
Largo, Florida 34643 USA

**Phone: 800-237-0169**  
**FAX: 813-399-5256**

### International Department

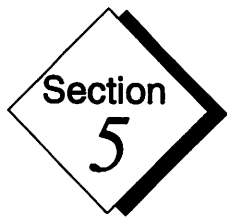
**Phone: 813-392-6464**  
**FAX: 813-397-4540**

When ordering spare parts or replacement parts, please supply the following information:

1. Instrument model/serial number.
2. Component description.
3. Quantity desired.
4. Linvatec part/catalog number.
5. Component reference designator (if applicable).

## Replacement Parts





## Accessories

# Service Information

## 8180 Customized Digital Camera

Description	Part Number
Female-to-Male RCA Adapter (used to connect remote cable from the 8180 Cameras to a non-"S" printer)	E52-120
Female-to-Female RCA Adapter	E52-152
BNC to RCA Adapter (used to connect a non-"S" VCR to the 8180 Cameras)	E52-076
"S" Extender ("S" to "S" Adapter) (used to connect the Linvatec 8126 Character Generator to the Linvatec 8128/8128A Printer)	8149-01
Modular Cart	8179
Light Source with no communications capabilities (no A4 COMM/Bit Board)	8430/8430E
Light Source with communications capabilities (A4 COMM/Bit Board installed)	8430W/8430WE
<b>BNC Video Cables</b>	
6 ft.	8175-06
10 ft.	8175-10
15 ft.	8175-15
20 ft.	8175-20
<b>S-Video Cables</b>	
6 ft.	8149-06
10 ft.	8149-10
15 ft.	8149-15
20 ft.	8149-20
Power Cord, 115V	C7104
Power Cord, 220V	C7105
Video Accessory Cable - S- Video Format	8199
Video Accessory Cable - Composite (NTSC) Video Format	8199C
"V" mount Camera Head	8171
"V" mount Camera Head - PAL	8171PAL
"C" mount Camera Head	8172
"C" mount Camera Head - PAL	8172PAL

## Technical Specifications

### I.E.C. Equipment Classification

Type B, Class 1

### Typical Operating Requirements

Input Voltage: 90 - 260 V~  
 Frequency: 50/60 Hz  
 Power Consumption: 40VA  
 Fuse: T 1.0A, 250V

### Line Frequency Leakage

Chassis to Ground: 120V~ < 100μA      220V~ < 500μA

### Video Output

2 - Composite (BNC) Connectors  
 2 - Y/C: 4 socket mini din (S-Video) Connectors  
 1 - D-sub 25 pin Receptacle  
 1 - D-sub 9 pin Receptacle

	Level	Impedance	
Composite Video	1.0 Vp-p	75 ohms	Sync Negative
Y	1.0 Vp-p	75 ohms	Sync Negative
C	.286 Vp-p	75 ohms (NTSC)	Sync Negative
C	.300 Vp-p	75 ohms (PAL)	Sync Negative

### Pick-up Device

1/2" Interline Transfer HyperHAD™ CCD Image Sensor

- 768(H) x 494(V) pixels. (NTSC)
- 752(H) x 582(V) pixels. (PAL)

### Horizontal Resolution

470 lines.

### Signal-to-Noise Ratio

48db

### Signal System

EIA Standards, NTSC Color System  
 CCIR Standards, PAL Color System

### Scanning System

2:1 interlace

- 525 lines, 30 frames/sec. (NTSC)
- 625 lines, 25 frames/sec. (PAL)

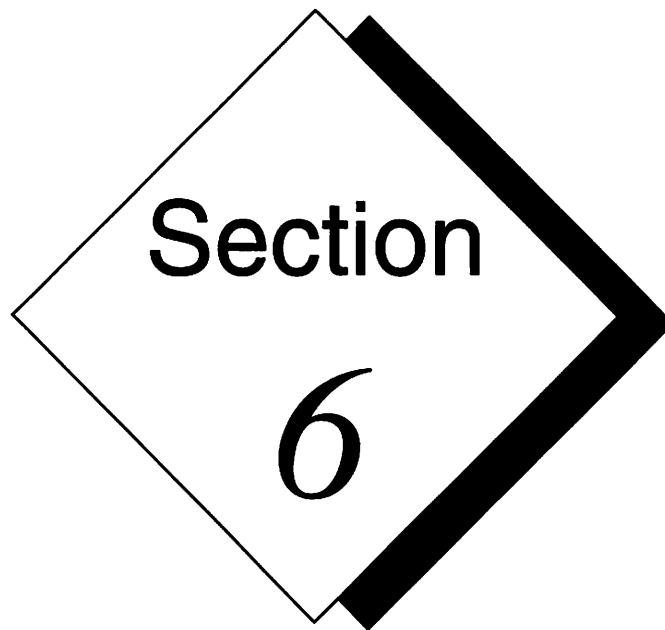
\* HyperHAD is a registered trademark of Sony Corporation

## Technical Specifications

(Continued)

<b>Scanning Frequency</b>	Horizontal - 15.734 KHz (NTSC)	15.625 KHz (PAL)
	Vertical - 59.94 KHz (NTSC)	50 KHz (PAL)
<b>Minimum Scene Illumination</b>	3.5 lux. at F1.4	
<b>Sensitivity</b>	2000 LUX at F4	
<b>Auto Shutter Speeds</b>	1/60 sec to 1/10,000 sec	
<b>Environmental</b>		
<b>Ambient Operating Temperature</b>	40°F to 104°F (4.5°C to 40°C)	
<b>Relative Humidity</b>	30% to 90% RH	
<b>Dimensions</b>		
	<b>8180/8180C</b>	<b>8180A/8180AC</b>
	17.0" (W) x 3.64" (H) x 13.5" (D)	10.0" (W) x 7.0" (H) x 15.5" (D)
	43.2cm (W) x 9.3cm (H) x 34.3cm (D)	25.4cm (W) x 17.5cm (H) x 39.4cm (D)
<b>Camera Cable</b>	10 ft. (3.35m)	
<b>Weight</b>		
<b>Camera Head with Cable</b>	V-mount Head: 7.1 oz. (3.2kg)	C-mount Head: 7.3 oz. (3.25kg)
<b>Camera Control Unit</b>	8180/8180C: 8.45 lbs. (3.80kg)	8180A/8180AC: 8.35 lbs. (3.76kg)

# Appendix I - Error Messages



This appendix describes error messages you may encounter while using the 8180 Camera. Perform the recommended actions before calling or returning the unit to Linvatec for service.

**Camera Diagnostic Fail:** Indicates a camera system failure. Power the camera OFF and then ON. The camera will initiate its self-test. If the **Camera Diagnostic Fail** message displays again, return to Linvatec for service.

**Camera Head Switch Fail:** Indicates the head switch is not functioning. Perform the following:

1. Power the camera OFF. Clean around the camera head switch area with 70% isopropyl alcohol and a cotton swab to assure there is no cleaning agent or dirt build up. Power the camera ON. Press the camera head switch to see if it is functioning properly. If not, return the camera head to Linvatec for service.

**Camera Panel Switch Fail:** Indicates one or more of the front panel buttons are permanently engaged. The firmware will disable all of the front panel buttons. Power the camera OFF and then ON. The camera will initiate its self-test. If the **Camera Panel Switch Fail** message displays again, return to Linvatec for service.

**Please Insert Dry Paddle:** Indicates the camera cable connector is either wet or is not inserted completely or correctly. Dry the camera cable connector thoroughly and insert completely into the camera receptacle with the LINVATEC logo side up.

**No Printer Input:** Indicates the camera does not recognize a printer. There are several possible causes:

1. No printer hooked up or it is hooked up incorrectly
2. The printer is not turned ON
3. The system did not go through its diagnostics correctly
4. Printer cable on the Video Accessory Cable is possibly at fault.

Perform the following:

1. Reference figures 4-3 and 4-4 System Hook-up of the 8180 Camera for information on how to connect the printer cable.
2. Turn the printer power switch to ON.
3. Power the camera OFF and then ON. The camera will initiate its self-test. If the **No Printer Input** message is displayed again, go to step 4.
4. Power the camera OFF. Unplug the cable from the rear of the printer (reference figures 4-3 and 4-4, System Hook-up of the 8180 Camera for identification and location of connector). Power the camera ON. The camera will initiate its self-test. If the **No Printer Input** message is no longer indicated, the printer cable on the Video Accessory Cable is possibly at fault.

**No VCR Input:** Indicates the camera does not recognize a VCR. There are several possible causes:

1. No VCR hooked up or it is hooked up incorrectly;
2. The VCR is not turned ON
3. The system did not go through its diagnostics correctly
4. VCR cable on the Video Accessory Cable is possibly at fault

Perform the following:

1. Reference figures 4-3 and 4-4 System Hook-up of the 8180 Camera for information on how to connect the VCR cable.
2. Turn the VCR power switch to ON.
3. Power the camera OFF and then ON. The camera will initiate its self-test. If the No VCR Input message is displayed again, go to step 4.
4. Power the camera OFF. Unplug the cable from the rear of the VCR (reference figures 4-3 and 4-4 for identification and location of connector). Power the camera ON. The camera will initiate its self-test. If the **No VCR Input** message is no longer indicated, the VCR cable on the Video Accessory Cable is possibly at fault.

## Light Source Error Messages

This section describes error messages which may be encountered while using the 8430W/8430WE Light Source in conjunction with the 8180 Camera.

**Light Source Test Fail:** Indicates a light source system failure (the light source may still be used, but will not have diagnostic communications with the 8180 Camera). Power the camera OFF, then ON. The camera will initiate its self-test. If the **Light Source Test Fail** message displays, return to Linvatec for service.

**Light Intensity Low:** Indicates that the intensity of the lamp is low and the lamp module (Cat. No. 8431) should be replaced as soon as possible.

**Light Source Lamp Fail:** Indicates the lamp has expired. Have the lamp module (Cat. No. 8431) replaced.

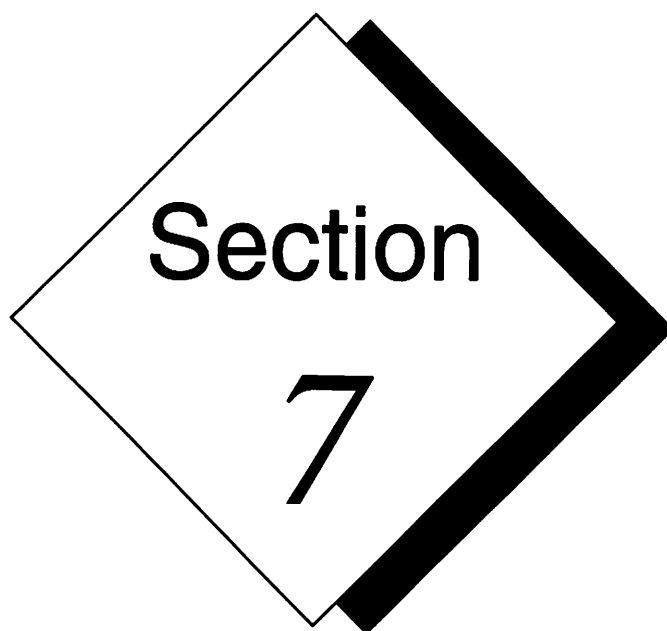
**Light Source Over Temp:** Indicates the light source is overheating. A possible cause may be a fan failure. Power the camera and light source OFF and let it cool down for approximately ten (10) minutes. Verify that all air vents are clear of obstructions. Power back ON and check for proper operation with no overheating error message. If error message displays again, return to Linvatec for service.

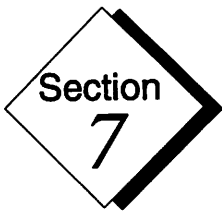
**Light Source Power Fail:** Indicates the internal power supply has failed. Return to Linvatec for service.

**L. S. Shutter Fail:** Indicates the automatic shutter has failed. Return to Linvatec.

**L. S. Panel Switch Fail:** Indicates a front panel switch is permanently engaged. The firmware will disable all the front panel switches and set the unit to its previous setting so that the unit may still be used to complete an operation. Power the system OFF, then ON. The camera will initiate its self-test. If the **L. S. Panel Switch Fail** message displays again, return to Linvatec for service.

# Glossary





# Glossary

**AC**

Alternating Current.

**A/D Converter**

The process of converting an analog signal into digital form.

**Auto Balance**

A system for detecting errors in color balance in the white and black areas of the picture and automatically adjusting the white and black levels of both the red and blue signals as needed for correction.

**Automatic White Balance**

An electronic circuit in the camera to control the color reproduction. This circuit automatically sets the white balance of the picture by controlling the level of the Red and Blue signals. White balance means that the camera will reproduce a white object in the picture as white.

Different light sources have different proportions of the primary colors - red, green and blue. Color temperature is a term used to describe the color contents of a light source. For example, a halogen light source which has a higher concentration of red light, has a lower color temperature. A xenon light source, which has a relatively higher proportion of blue light, has a higher color temperature. White balancing is a procedure to adjust for these differing color temperatures.

**Auto Shutter**

A function that electronically adjusts the amount of light absorbed at the individual pixel level. Therefore, the CCD replicates the function of an automatic light source internally.

**Beam Splitter**

A system of mirrors and lenses that splits the primary color image to an appropriate camera tube and adjacent eyepiece.

**Blooming**

The phenomenon of the TV picture expanding or distorting when a high intensity object is being viewed.

**BNC**

A coaxial bayonet connector found on all industrial and broadcast video components. Standard composite video and RGB connector.

**Brightness**

One of four video characteristics (brightness, contrast, hue, and chroma) that are changed externally by altering the density of the video signal. Brightness affects the luminance (black and white) signal by increasing or decreasing the intensity (voltage) of the scanning electron beam that creates the picture.

**C-Mount**

A standard lens mount for threaded camera lenses. One inch (1") in diameter (2.54cm) with 32 threads per inch.



**CCD**

Charge Coupled Device. A CCD is a solid state image sensor which is used in cameras to convert light energy into electrical current according to its brightness and color.

**Chroma (C)  
(Chrominance)**

A measure of the color level of a video signal. The quality of color which embraces both hue and saturation (intensity) of color. The name of the color information of a composite video signal. White, black and grays have no chroma.

**Color Bars**

The video signal that is a series of colored bars (white, black, primary and complimentary colors) and is used as a reference for brightness, contrast, color intensity, and correct color balance.

**Composite Video  
Signal**

The television signal that consists of the video signal (luminance (Y) and chrominance (C)), burst signal and synchronizing signal (horizontal and vertical). PAL is a composite video signal.

**Contrast**

The ratio between the dark and light portions of a television picture.

**Decibel (db)**

A standard measure of relative intensity or power. Used to express signal to noise ration and signal gain.

**F-stop**

A specific aperture opening on a camera. Amount of light reaching a focal plane.

**Footcandle**

A unit of illumination. Also called lumens per square foot.

**Field**

One half of a TV frame, composed of 262.5 scanning lines for NTSC and 312.5 scanning lines for PAL. There are 60 fields - NTSC (50 - PAL) per second for monochrome and color TV.

**Frame**

One complete TV picture. It consists of two fields and has a total of 525 (NTSC) and 625 (PAL) scanning lines at 30/25 frames respectively per second.

**High Z**

High impedance signal most frequently encountered on TV monitors to pass or "loop" a video signal through a monitor or video component without downstream signal loss.

**Hue**

Refers to the color or dominant wavelength in light. The term shade means a mixture of colors, while saturation refers to the dilution of a color with white. Thus pink is in fact red diluted with white. A "pure" color is said to have 100% saturation.

**Interlace Scanning**

A system of TV-picture scanning. Odd-numbered scanning lines, which make up an odd field, are interlaced with the even-numbered lines of an even field. The two interlaced fields constitute one frame. In effect, the number of transmitted pictures is doubled, thus reducing flicker.

**Luminance (Y)**

The brightness component of a video signal. While a monochrome signal contains only luminance information, a color signal contains an additional component (Chroma) which contains the hue and saturation information.

**LUX**

The ability to gather light or a measure of the sensitivity of a component to light.

**NTSC**

National Television Systems Committee which devised the present system of United States color television transmission.

**Oscillator**

An electronic circuit that switches back and forth between two states.

**PAL**

Phase Alternation by Line which consists of 25 frames, 50 fields 625 scanning lines and a 4.43 MHz subcarrier.

**Resolution**

The picture quality of detail, which depends on the number of picture elements to be played by on the TV screen and regularly measured by means of the monoscope test pattern.

**Vertical Resolution**

Refers to the number of horizontal black and white lines that can be resolved in the picture height.

**Horizontal Resolution**

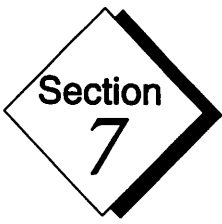
Refers to the black and white lines resolved in a dimension equal to the vertical height and may be limited by the video amplifier bandwidth. Ordinarily, the horizontal resolution shall be 400 lines or more and the vertical resolution 300 lines or more for a B/W TV set.

**RGB**

Red, Green and Blue, or chrominance signal. The three primary colors which, when combined in equal parts, make up white light.

**Saturation**

The intensity of the color. In color, the degree to which a color is undiluted with light or is pure. The vividness of a color, described by such terms as bright, deep, pastel, pale, etc. Saturation is directly related to the amplitude of the chrominance signal.



# Glossary

## Scanning

The process of moving the electron beam horizontally and slightly vertically to cover the picture tube screen in successive horizontal lines.

## "S" Video

A component video format which separates the luminance (Y) signal from the chrominance (C) signal to produce a sharper image by eliminating the "cross-talk" between the two signals.

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