



*Where there's smoke, there's*  
**Fire***Optic*

# ***FTC 200***

## **Operator's Manual**

**Read this manual carefully**  
**before using the camera.**

# **ATTENTION**

**Read this manual carefully before using the camera.  
Failure to do so may result in serious injury or death.**

**DANGER** This product is intended to help trained professionals to “see” in conditions of smoke, darkness, water sprays and steam. It is to be used in addition to standard practices that are already being used in these conditions, and is not intended to replace them. The operator is especially cautioned against relying on the camera in order to take risks that he would not ordinarily take. While the camera can resist some exposure to direct flames or flash over, it is not designed for any prolonged exposure to same.

**DANGER** The straps and shoulder harness are intended for light-duty non-critical use. **DO NOT USE ANY STRAP OR HARNESS** to lift any loads, carry any person, for use either as a safety device or any application where a failure may result in bodily injury or property damage. Periodically inspect and replace as necessary.

**WARNING** While the camera is designed specifically for use by professional firefighters, the housing and the internal circuitry is not designed to withstand prolonged exposure to direct flame or flash over conditions. Do not operate in explosive or flammable atmospheres. Serious personal injury or death can result if equipment is improperly operated. To be serviced by qualified personnel only.

**CAUTION** The battery box should only be removed from the camera in a dry, non-explosive atmosphere. Dry camera off prior to removing and installing battery box.

**CAUTION** Do not immerse the charging rack into water or subject to high humidity or moisture. Do not short the charging pins together.

**CAUTION** Do not allow battery terminals to come in contact with moisture. Wipe surface down immediately if wet.

**CAUTION** Do not disassemble the camera (other than removing the battery box) for any reason. There are no user-serviceable parts inside. Disassembling the camera will ruin the watertight seals, may cause damage to the camera, and will void the warranty.

**CAUTION** Do not store the camera where temperatures will be higher than 150°F, or lower than -20°F. Do not store the camera in direct sunlight.

**CAUTION** The camera is not intended for underwater operation, and should never be submersed intentionally.

**CAUTION** All statements, technical information and recommendations related to this product are based on information believed to be reliable, but the manufacturer cannot and does not guarantee their accuracy. Before utilizing this product, user must determine its suitability for its intended use.

# Contents

- 1. Receiving and Unpacking.....4
  - 1.1 Receiving.....4
  - 1.2 Unpacking .....4
  - 1.3 Parts Checklist .....4
- 2. Using the Camera .....4
  - 2.1 Infrared Light.....4
  - 2.2 Turning the Camera On.....5
  - 2.3 Display .....5
    - 2.3.1 Date and Time.....5
    - 2.3.2 Improving the Displayed Image .....6
    - 2.3.3 Battery-Charge / Power Indicator .....6
    - 2.3.4 OVERHEATED Warning Light.....6
    - 2.3.5 Using the Camera to Read Temperatures (optional feature).....6
  - Table 1 .....7
  - 2.4 Using the Side Straps and Shoulder Strap.....7
- 3. Using the Camera while Fire Fighting .....8
  - Similar to the posture assumed during standing, the camera easily accommodates the user when kneeling or during a “duck-walk” stance.....10
- 4. Care and Maintenance .....13
  - 4.1 Periodic Inspection.....13
  - 4.2 Battery Charging .....13
  - 4.3 Cleaning.....14
- 5. Technical Support and Repair Service .....15
- 6. Important Notes.....15
- Appendix A – Accessories (Check Factory for Availability) .....16
- Appendix B - Spare/Replacement Parts.....17
- Appendix C - Specifications .....18
- LIMITED ONE YEAR WARRANTY .....21



## 1. Receiving and Unpacking

### 1.1 Receiving

Upon receipt of the camera, check the shipping container for any damage that may have occurred during shipment. Immediately report any damage to the freight carrier who delivered the camera, and also immediately notify us.

### 1.2 Unpacking

Carefully remove the top layers of foam to expose the camera. Save all the original packing material for future storage or returning for service, if necessary.

### 1.3 Parts Checklist

The following parts are standard with your camera. If anything is missing or damaged, please contact us.

- Camera with attached battery box with one battery (unless you ordered the two battery option)
- Shoulder Harness
- Charging Rack with spare fuse and mounting template
- AC to DC Power Pack with 10' AC Line Cord
- 12 Volt Vehicle Power Cord
- Warranty Card
- Operator's Manual
- Lens Cleaning Towelettes

## 2. Using the Camera

### 2.1 Infrared Light

All objects give off or reflect light. If they didn't, we would not be able to see them. Some of this light is visible to the human eye, and some is not. Infrared light is not visible to the human eye. Even at night when it is "pitch black", and we can't see objects with our eyes, the objects are still giving off infrared light. Conditions such as heavy smoke, water sprays, and steam make it very difficult or impossible for us to see objects in the visible light range. Infrared light is not affected by these conditions.

Light and heat are related. Hot objects give off heat, but they also give off light, only it can't be seen because it is in the infrared range. The camera can "see" the infrared light that objects give off and display it, making the objects visible.

When an infrared camera is pointed at a hot object, it senses the heat in the form of infrared light. All objects, including humans, give off heat in the form of infrared light. Because of this, the cameras allow you to see people even through smoke, water, steam, or darkness.

Infrared light will not pass through translucent glass, plastic windows, or walls. The camera will not see people on the far side of glass, plastic, or a wall, but the camera will detect that a floor, wall, or ceiling is hot, thereby suggesting that a fire or hot gas is on the opposite side. In addition, infrared light will not pass through clothing, but the camera will detect clothed individuals due to infrared light coming from clothing and exposed skin.

Color only applies to visible light. Since infrared is not visible, it has no color in the normal sense. The camera senses the infrared light and provides a display in which objects that are hot appear whiter (or lighter in color) than their surroundings. Objects that are cold appear black, or darker in color than their surroundings. For example: A cup of hot coffee (160°F) placed in front of a snow bank (32°F) would appear white while the snow would appear black. The same cup of coffee, when placed in front of a roaring fireplace (450°F) would appear black, while the fire appeared white.

Although infrared cameras are available with “color” displays, the colors are not “true”, as they are with ordinary cameras. These “false” colors, representing differences in temperature, can be confusing as compared to the simpler black and white or grayscale image, with whiter objects being hotter. For this reason we do not recommend using a color display.

At the heart of the camera is a 320 x 240 resolution microbolometer thermal imaging sensor. This advanced product of Silicon Valley technology is sensitive to infrared light and is what makes it possible for the camera to see in the dark and in other adverse conditions encountered while fighting fires. It is this same device that is used in advanced military targeting and tracking systems. Its high resolution makes the display sharp and aids in object identification.

## 2.2 Turning the Camera On

The batteries have been charged at the factory, but do discharge over time. Before using the camera for the first time, it is recommended that the batteries be fully recharged. Refer to Section 4.2 for instructions on battery charging.

To turn the camera on, push the red button located at the right below the display. It will take about 30 seconds for the camera to begin normal operation. Pushing the button again turns the camera off.

## 2.3 Display

The display will be blank for the first 20 seconds after turning the camera on, after which a picture will begin to appear. The picture will be recognizable after about 30 seconds. It may take as long as two minutes for the image to fully stabilize. If the image is not clear, or is grainy, please refer to Section 2.3.2.

If the Temperature Display option has been included, there will be crosshairs in the middle of the display. At the top of the display is the temperature reading at the crosshairs.

### 2.3.1 Date and Time

The date and time are shown on the display whenever the transmitter option has been included. The date is shown in the lower left corner of the display, and the time in the lower right. The date is shown in month/day/year format, with numbers representing each. For example: October 9<sup>th</sup>, 1998 is 10/09/98. The time is shown in hours:minutes:seconds format. The hours are shown in 12-hour time format (not “military”), without a distinction between AM/PM. Both the date and time are stored in the camera’s memory and are not affected when the batteries are removed. The camera is Y2K compliant.

### 2.3.2 Improving the Displayed Image

Occasionally it may be necessary to “clear-up” the displayed image. To do this, momentarily push the Image Clear™ button on the left side of the panel below the display. The camera will automatically recalibrate to provide the best possible picture of the scene being viewed. During this recalibration period, the display will blank momentarily. This recalibration will last as long as the camera is turned on, and may be repeated as necessary.

If the image is grainy or not clear after two minutes of operation, a permanent recalibration will be necessary. To do this, push and hold down the Image Clear™ button until a message appears at the top of the display (approximately 10 seconds) indicating that a recalibration is being performed. When the message appears, release the button. The recalibration will take approximately 20 seconds. This recalibration will be stored in memory and not lost when the camera is turned off. This recalibration may be performed whenever necessary.

### 2.3.3 Battery-Charge / Power Indicator

A battery charge indicator is located below the display. Full charge is indicated when all eight LEDs (Light Emitting Diodes) are lit. As the amount of charge remaining decreases, the LEDs will go off. The rate at which the LEDs turn off is non-linear. Seven of the eight LEDs may turn off within the first ten to twenty minutes of camera operation. The remaining LED should remain lit for up to 1 hour for a single battery and up to 3 hours when a dual battery box is used. After the last LED goes off, there is still more power remaining. The final low-power warning is a “PWR LOW” flashing message that appears on the display at the bottom. When this occurs, the camera should be turned off and the batteries recharged or the battery box changed. The camera should not be turned on when the batteries are discharged to this level. We **emphatically** recommend that the camera be turned off in non-critical situations before the low-power message appears. Taking this step will help preserve the batteries for use in critical situations. We also **emphatically** recommend that the camera’s batteries be fully charged before each use. See Section 4.2 for battery charging instructions.

### 2.3.4 OVERHEATED Warning Light

The camera has an internal temperature sensor. If the internal temperature is above 158°F (70°C), a red LED warning light will be on. The warning light is located below the bottom right corner of the display next to the thermometer icon. If the warning light comes on, the camera’s performance may be affected and the product itself may be compromised. We **emphatically** recommend immediately cooling the camera by removing it from the hot environment or by spraying it with water for a few seconds. This will lower the internal temperature, cause the warning light to go off, prevent damage to the electronics, and allow proper operation to resume.

### 2.3.5 Using the Camera to Read Temperatures (optional feature)

Any object that gives off heat also gives off light (see Section 2.1 “Infrared Light”). Because of this, it is also possible to use the camera to sense the temperature of an object. The cross hairs in the center of the display identify the point used for reading temperature. The temperature being read at the cross hairs is displayed at the top of the display. To measure the temperature of something, place a spot on the object in the cross hairs and look to the displayed reading. Note: the maximum temperature displayed is approximately 220°F. The cross hairs will disappear if they are fixed on an object whose temperature is above approximately 220°F. This automatic shutdown prevents

unnecessary and distracting temperatures from being read and displayed. This feature of the CRITICAL IMAGING exclusive Life Sensor Software™ allows the operator to search for bodies based upon their temperature.

The Life Sensor Software™ also features fully automatic contrast control that requires no operator adjustments and provides greatly improved sensitivity. Whatever is being viewed in the center one-ninth of the display, or “sweet spot”, controls the contrast. This feature allows the operator to view bodies, even those next to flames, without requiring the operator to position the camera so that the flames are “out of the picture”. In other words, the Life Sensor Software™ allows the camera to locate persons who may be near flames without the occurrence of “white-outs” or “black-out borders” on the display caused by viewing open flames.

**ATTENTION:** Not all objects give off heat and light uniformly. Two objects may be at exactly the same temperature, but giving off different amounts of heat and light. This is due to their composition, color, texture, and polish. In general, dark-colored nonmetallic objects with rough surfaces give off more heat and light (even though it may not be visible) than do light-colored, highly polished metallic objects. For this reason, the temperature reading taken from a dark, nonmetallic object with a “rough” surface is more accurate than one taken from a bright metallic object with a highly polished surface. Consequently, the operator has to consider the object being viewed to judge the accuracy of a temperature reading. Fortunately, temperature readings of human bodies are very accurate. Listed in Table 1 are common building materials and a rating of the accuracy of the temperature readings they produce.

**Table 1**  
**Temperature Accuracy vs. Building Material**

Building Material	Temperature Accuracy
Brick	Very good
Concrete	Very good
Cinder block	Very good
Wood	Very good
Wallpaper	Very good
Plaster & sheet-rock	Very good
Plumbing (black pipe)	Very good
Plumbing (PVC)	Good
Plumbing (copper)	Fair
Plumbing (galvanized pipe)	Poor
Plumbing (chrome plated)	Poor
Ductwork (galvanized)	Poor
Aluminum siding	Fair
Window glass and mirrors	Poor
Electric conduit	Fair

#### 2.4 Using the Side Straps and Shoulder Strap

The straps attached to either side of the camera may be used for both carrying and holding the

camera. The straps are mounted to the camera's housing with swivels, and are adjustable to fit different hand and glove sizes. Additionally, there is a shoulder strap that allows for hands-free carrying of the camera. The shoulder strap attaches to the D-ring on the side strap with a single spring-loaded snap link. The shoulder strap also features a bi-directional quick-release "hook & loop" fastening system that allows the operator to free himself or herself from the camera, should it become entangled.

**DANGER** The side straps and shoulder strap are intended for light-duty non-critical use. **DO NOT USE ANY STRAP** to lift any loads, carry any person, for use either as a safety device or any application where a failure may result in bodily injury or property damage. Periodically inspect and replace as necessary.

### 3. Using the Camera while Fire Fighting

If the picture in the display appears blurred or foggy, it may be because of lens fogging. A "rule of thumb" for this is: If the operator's visor is foggy, there's a good chance the camera's lens is too. Fogging may be removed from the lens by spraying with water or wiping lightly.

Do not attempt to use the camera to see through glass and most plastic windows. Even though visible light will pass through these materials, infrared light will not. If you see an image in a window, it will most likely be a reflection from something else. Also, because glass is highly reflective, it is hard to get an accurate temperature indication due to reflections from other heat sources, such as flames. This is also true for highly polished metal surfaces. We recommend that temperature readings from these sources be disregarded. See Section 2.1 for more information on infrared light.

The camera works very well for finding people because of its exclusive Life Sensor Software™. This feature automatically adjusts the picture to prevent annoying "white-outs" from occurring. This means that the operator can continue viewing and searching for people, even near things of much higher temperature, without having to make any manual adjustments or waiting for the picture to recover from "white-outs". With the optional temperature display feature, it is also possible to search for people based upon their body temperature. The camera will continuously read and display **pinpoint** temperatures (up to approximately 220°F), in addition to the automatic picture adjustment, regardless of the temperature of the surrounding area. See Section 2.3.5 for more information on reading temperatures.

The optional temperature display feature can also be used to detect if a warm body (person, pet, etc.) was recently present in a bed or chair, or similar setting where direct contact existed. If the camera is pointed at a bed where a person was laying recently, the temperature reading will be noticeably higher than the surroundings, assuming the surroundings are still relatively cool. Additionally, there will be a "body-shaped" outline on the bed that is whiter than the rest of the bed. This type of "signature" may linger for as long as 15 minutes after the person (or pet) has left. Areas such as under beds and in closets may be scanned for "hot spots" or **temperature differences** that indicate that a person may be there or was there. It is important to note that **temperature differences** are the clues the operator should be looking for in a search operation. See Section 2.3.5 for more on temperature reading.

The camera can also be used to detect fires or hot gases behind walls or under floors. Areas that have fires (smoldering or active) or hot gases behind them will cause a localized hot spot that can be detected by the optional temperature reading feature of the camera. Here again, it is the **difference**

**in temperature** from a nearby area that is the clue. For example, if the operator enters a room and scans all four walls and gets the following temperature readings: 90°, 95°, 93° and 150°; they'll know that something is "going on" behind the wall that scanned at 150°. It's important that ceilings and floors also be scanned. A hot ceiling or floor could be a warning that the ceiling or floor may collapse soon. When scanning a standard residential wall that has flames or hot gases in it, it is sometimes possible to "see" the studs in the wall as **dark** areas, as compared to the **whiter** "hot spots" between the studs where the flames or gases are. Similarly, it may be possible to detect differences in temperature between the spaces and studs, much like using a carpenter's "stud finder".

**NOTICE:** The camera can be used to detect heat from fire or hot gases located behind walls or ceilings, or under floors. However, the camera cannot see through walls, ceilings, or floors and therefore will not "see" persons on the other side of such obstructions. See Section 2.1, "Infrared Light."

The camera can also be used to detect electrical "hot spots", such as overheating ballasts in fluorescent light fixtures. Frequently, electrical devices that are overheating give off a distinct odor whose source is difficult to pinpoint. By scanning fixtures, circuit breaker boxes, and other electrical devices, it may be possible to detect the source of the heat and odor and prevent a fire before it starts. As before, it is not the actual temperature of a device that is the clue that something is wrong, but rather a comparison to similar devices that indicates which one is faulty.

## Ergonomic Design

This is the only camera available today that is truly suited for any attack posture utilized by firefighters. Perhaps the most notable feature missing from the camera is a pistol grip. The variety of attack postures required for effective camera use can be quickly and easily accomplished as shown in the following pictures.

### Standing Posture

The camera utilizes an angled screen to enable the view the image while keeping the camera below eye level. The 27½-degree tilt allows the upper arm to remain and close to the body and maintain a forward view of without holding the unit up close to the face with the extended. Prolonged extension of the upper arm results in excessive user fatigue, no matter how light the



firefighter to level. The downward the scene upper arm results in camera.



Kneeling

Similar to the posture assumed during standing, the camera easily accommodates the user when kneeling or during a “duck-walk” stance.

## Crawling

When crawling is required, the unit directly onto its side and crawling aid. In this posture, the of the camera allows the user to their weight directly from the through the elbow, into the palm and onto the camera. The image upright relative to the user, and viewing angle LCD screen allows keep his head in a downward



user can roll use it as a low profile transfer shoulder, of the hand, stays the wide the user to position.

## Fully Prone

In extreme situations, a fully prone posture can be accomplished as shown below. The flat bottom of the camera allows it to be self-supporting and can be pushed and shoved along the floor. The angled screen allows the user to view the display without having to tilt the head uncomfortably and without interference with the air tank of the SCBA.



## Overhead Viewing

By rotating the camera upside down, the user position the camera overhead for viewing into or into other overhead access points prior to angled LCD screen allows the maximum height without requiring the user to place his level of the camera.



Stairs



can  
loft spaces  
entry. The  
viewing  
head at the

Descending

When going down stairs, the user can directly visualize his feet by holding the camera upside down. This allows for safe decent of stairs and is an invaluable aid for avoiding congestion and hazards often found in residential stairways. The angled LCD screen allows the user to accomplish this without having to tilt the head downward and avoids interference with the SCBA mask being forced into the chest.



## 4. Care and Maintenance

### 4.1 Periodic Inspection

It is recommended that you visually inspect the camera's exterior after each use to detect possible damage, especially if the camera has been dropped, struck, or exposed to direct flame or flash-over conditions. Do not disassemble the camera (other than removing the battery box) to perform this inspection. Some damage may seem insignificant, such as a dent in the housing, and not appear to affect operation. However, a dent may cause a failure of the water-resistant seal, which could then allow water to get inside the camera, causing significant damage. That is why it's important that any damage to the camera be reported to CRITICAL IMAGING's Customer Services Representative for a determination of whether the camera should be returned for evaluation and possible corrective action. Please refer to Section 5 for contacting our Customer Services Representative.

### 4.2 Battery Charging

A Battery Box that contains one or two batteries powers the camera. The inclusion of the second battery will more than double the operating time. The Battery Box may be recharged without being removed from the camera by placing the camera in the Charging Rack with power applied. The rack may be powered directly from 12VDC vehicle power or from 12VDC from the included power pack which is AC powered. There are three LEDs on the charging rack that show the charging status. The "POWER" LED lights up to show there is power to the charging rack. Please see Section 5 if this LED is not lit. When both the "CHARGING" and "POWER" LEDs are lit, battery charging is taking place. The camera should not be removed from the rack before charging is complete. While doing so will not damage the camera or batteries, it will result in an incomplete charge. When the battery is fully charged, both the "POWER" and "READY" LEDs will be lit, indicating the camera is ready for use. The electrical contacts used for charging are located on the right side of the camera, and make contact with mating contacts in the charging rack. The camera may be left on charge continuously, if desired. The built-in charging circuit prevents both overcharging and discharging. Both sets of contacts should be cleaned occasionally to insure proper charging. To clean the contacts, rub them gently with a clean pencil eraser.

To remove the camera from the Charging Rack, hold the camera strap securely while pushing the charging rack latch away from the camera. Then swing the top of the camera away from and out of the rack. To load the camera into the rack, first angle the bottom of the camera into the rack so that the hole on the bottom right side of the camera engages the mating pin in the rack. Then push the top of the camera into the rack until the latch snaps firmly into place. Always hold the camera strap securely whenever removing or replacing the camera.

To remove the battery box from the camera, simply turn the knurled thumbscrew counterclockwise and lift up on the bottom end of the box to pivot it away from the alignment pin that holds the top of the battery box in place. The contacts on the battery may now be cleaned without removing the cover from the battery box. To clean the contacts, rub them gently with a clean pencil eraser. Do not remove the cover from the battery box unless replacing the battery. To replace the battery box on the camera, first engage the hole in the top of the battery box with the alignment pin in the camera's chassis, then push down on the thumbscrew side of the battery box and turn the thumbscrew clockwise to secure the battery box to the camera.

**Note:** We recommend replacing the battery once a year to insure reliable operation.

**Note:** Whenever replacing the battery, a new battery box cover should be installed to prevent water from leaking into the battery box and the camera, avoiding possible damage. We recommend replacing the cover as this will replace both the cover gasket and the outside gasket, which are adhered to the cover and not easily replaced in the field.

A template is included for mounting the charging rack to a convenient flat surface. It may be mounted horizontally or vertically. If mounted vertically, the top of the camera should be facing up. Customer supplied mounting hardware must be used based upon individual mounting requirements.

**CAUTION** The battery box should only be removed from the camera in a dry, non-explosive atmosphere. Dry camera off prior to removing and installing battery box.

**CAUTION** Do not allow battery terminals to come in contact with moisture. Wipe surface down immediately if wet.

**CAUTION** Do not immerse the charging rack into water or subject to high humidity or moisture.

**CAUTION** The two pins on the charging rack supply 12 Volts (DC) of electricity. Do not short them together.

#### 4.3 Cleaning

The camera's housing is made of aircraft grade aluminum, with a special nickel coating that reflects heat and improves durability. Although the camera is rated for submersion in water to a depth of 3', submersion is not recommended for cleaning. In most cases, a damp cloth will do a good job. If necessary, mild detergents or nonabrasive cleansers may be used to clean the metal parts of the camera. We recommend using only the included Lens Cleaning Towelettes to clean the lens and display window of the camera, whenever possible. Other materials may damage the lens or window and adversely affect the high quality picture of the camera. Even though many minor lens scratches and defects will affect the picture only slightly, we recommend careful cleaning and handling to maximize product life and picture quality. A Lens Protection Kit is available as an option when the camera is purchased, and as an accessory for addition after purchase. The protective window is easily installed and goes in front of the camera's lens, does not affect the picture and helps to protect the camera's high-quality lens, at a fraction of the cost of a new lens. See APPENDIX B for details on optional accessories. The protection window should also be cleaned using only the Lens Cleaning Towelettes. The two electrical contacts located on the right side of the camera are used for charging the camera and should be cleaned occasionally to insure proper charging. To clean the contacts, rub them gently with a clean pencil eraser. The contacts on the battery in the battery box should also be cleaned to insure proper charging and operation. Use a clean pencil eraser for this also. See Section 4.2 for instructions on removing/replacing the battery box. When cleaning the side straps and shoulder harness: (1) do not use chlorine bleach or detergents containing chlorine, (2) machine wash in warm water (not greater than 130°F) using regular detergent, and tumble dry, (3) do not dry clean.

## 5. Technical Support and Repair Service

If you have any difficulty operating the camera, have any technical questions, or wish to make any comments, please contact our Customer Services Representative at the address below. If you need to return the camera for service, be sure to call for a Return Material Authorization (RMA) number prior to sending it.

Critical Imaging LLC  
2306 Bleecker Street  
Utica, NY 13501

Phone: 315-732-1544

Fax: 315-732-5931

e-mail: [gdicesare@criticalimaging.net](mailto:gdicesare@criticalimaging.net) or [sales@criticalimaging.net](mailto:sales@criticalimaging.net)

## 6. Important Notes

### Mounting Holes

Template Drawing, Part No: 1000286P1, Camera Charging Rack Assembly Template shows holes to be drilled in a 10" x 9" pattern (width x height). This applies if the cross braces that are attached to the shock mounts are used so the rack can be mounted from the front into a wall or panel.

**CAUTION** The Charging Rack Assembly must be mounted into the wall support structure. Do not mount in drywall, plaster, or other panels without reinforcement.

The cross braces can be eliminated if there is access to the rear of the panel, such that screws can be installed directly into the shock mounts. In this case, the holes should be in an 8" x 9" pattern (width x height).

## **Appendix A – Accessories (Check Factory for Availability)**

The following accessories are available for the camera. These items have been specifically designed or selected for use with the camera and are guaranteed to provide proper operation. Unapproved accessories should not be substituted for Critical Imaging approved accessories. Using unapproved accessories may damage the camera, compromise the camera's operation and reliability, and may void the warranty.

### **Battery Box Charger – ACC1000229**

This accessory makes it possible to charge extra battery boxes (not included) while they are not attached to the camera. The accessory comes with the 100-240VAC to 12VDC Power Supply for operation on AC power, 10 foot AC power cord, and a Vehicle Power Cord for operation on 12 volt vehicle power. With this accessory and extra battery boxes, extended operation is possible. The user must supply the mounting hardware to suit individual mounting requirements.

### **Battery Box with One Battery – ACC1000201**

### **Battery Box with Two Batteries – ACC1000202**

These extra battery boxes are compatible with the camera and the Battery Box Charger, making extended operation possible.

### **Grab-'n'-Go Charging Rack - P/N ACC1000187**

This accessory is an extra charging rack, complete with 100-240VAC to 12VDC power supply, 10 foot AC power cord, a Vehicle Power Cord for operation on 12-volt vehicle power, mounting template, and spare fuse. The user must supply the mounting hardware to suit individual mounting requirements.

### **Video Receiver - P/N ACC1000227**

The Video Receiver comes with a 120VAC to 12VDC power supply for AC operation, a Vehicle Power Cord for operation from 12-volt vehicle power, 7" whip antenna, and 6' cable to connect the receiver to a VCR or TV with a video input, or a monitor. The cable has BNC (1/8<sup>th</sup> turn twist-on) connector on one end to mate to the receiver, and an RCA (standard hi-fi plug-in) connector on the other end. An RCA to BNC adaptor is also included, thereby accommodating most installations. The Video Transmitter should be purchased as an option on the camera, but can be ordered as a user installable accessory, if needed. Contact the factory for further information on the transmitter accessory.

### **Lens Protection Kit - P/N ACC1000298**

This user installable accessory mounts inside the Lens Protection Ring to protect the camera's germanium lens from accidental impacts. The germanium window has no effect on picture quality. The kit includes an o-ring seal to prevent water from getting between the lens and protective window.

### **Carrying Case with Grab-'n'-Go Charging Rack - P/N ACC1000225**

### **Carrying Case with Charging Rack and Battery Box Charger - P/N ACC1000226**

These cases are impact, water, and corrosion resistant, and come with a pass-through power cord assembly which allows the Grab-'n'-Go Charging Rack and Battery Box Charger to be powered with the lid closed. The accessory comes with the 100-240VAC to 12VDC Power Supply for operation on AC power, 10 foot AC power cord, and a Vehicle Power Cord for operation on 12-volt vehicle power. The case also includes a lid organizer for storing the cords, straps, and other items.

## Appendix B - Spare/Replacement Parts

The following user-replaceable parts are available for the camera. These items have been specifically designed or selected for use with the camera and are guaranteed to provide proper operation. Unapproved parts should not be substituted for CRITICAL IMAGING approved parts. Using unapproved parts may damage the camera, compromise the camera's operation and reliability, and may void the warranty.

### **Shoulder Strap – SP1000217**

The shoulder strap allows for hands-free carrying of the camera. The shoulder strap attaches to a D-ring on one of the side straps with a single spring-loaded snap link. The shoulder strap features a bi-directional quick-release "hook & loop" fastening system that allows the operator to free themselves from the camera, should they become entangled.

### **Side Strap and D Ring – SP1000044**

These straps attached to either side of the camera and may be used for carrying and holding the camera. The straps are mounted to the camera's housing with swivels and are adjustable to fit different hand and glove sizes.

### **Glare Shroud – SP1000415**

The shroud is used to eliminate glare when viewing the display, primarily for use outdoors. The shroud provided is long and can be easily cut to suit personal preferences.

### **Battery – SP0300129**

Standard Duracell DR11 camcorder batteries are used inside the battery boxes. These may be purchased locally. We recommend replacing the Battery Box Cover whenever batteries are replaced.

### **Battery Box Cover – SP1000326**

Whenever replacing the battery, a new battery box cover should be installed to prevent water from leaking into the battery box and the camera, avoiding possible damage. We recommend replacing the cover as this will replace both the cover gasket and the outside gasket, which are adhered to the cover and not easily replaced in the field.

### **Lens Protection Ring – SP1000040**

This is the ring that screws on the end of the housing around the lens. It is removable to allow addition of the Lens Protection window.

### **12VDC Vehicle Power Cord – SP1000314**

One end of this cord plugs into the Grab-'n'-Go Charging Rack, the Battery Box Charger, or Carrying Case and the other end plugs into a standard (12VDC, negative ground) vehicle accessory (cigarette lighter) receptacle. This cord provides DC power for charging the batteries. Professional installation is highly recommended when wiring directly to vehicle power for permanent installations. Insure that the center connector of the camera plug is positive (+), the outer connection is negative (-), and that a 5 AMP maximum fast-blow fuse is used.

### **Lens Cleaning Towelettes – SP1000226**

Box of 100 individually packaged pre-moistened lens cleaning Towelettes.

## Appendix C - Specifications

### Optical

Material	Anti-Reflective Coated Germanium
F/number	f/1.4
Focal Distance	>4 ft to <30 ft (>1.22 m to <9.14 m)
Lens Field of View (FOV)	50° diagonal 40° horizontal 30° vertical
Lens Transmission	7 to 14 microns
Lens Coating Durability	Adhesion per MIL-F-48616 para 3.4.2.1.1 Humidity per MIL-F-48616 para 3.4.2.1.2 Severe Abrasion per MIL-F-48616 para 3.4.2.3.1
Additional Lens Protection	via Optional Germanium Window

### Detector

Type	Microbolometer
Format	320 x 240 pixels
Pixel Pitch	51 microns
Spectral Response	7 to 14 microns
Dynamic Range	>60 dB
Minimum Resolvable Temperature	<150 mK (0.15°C) [ $<80$ mK (0.080°C) @ f/1.0]
Update (Frame) Rate	60 Hz
Detector Fill Factor	>60%

### Electronics

Data Resolution	12 bit
Contrast Control	Automatic via CRITICAL IMAGING Life Sensor Software
Anti-Whiteout Control	Automatic via CRITICAL IMAGING Life Sensor Software
Date/Time Readout	On-screen

### Viewing Screen

Type	TFT Active Matrix - Backlit
Measurement	4" Diagonal
Nominal View Angle	27 ½° from Optical Axis

### Temperature Display (optional)

Units	°F or °C – Factory Configured
Range	-20°F to 220°F (-29°C to 104°C)

**Power**

Camera Operating Voltage	5.0 to 7.0 VDC (6.0 VDC Nominal)
Battery Specification	Nickel Metal Hydride
Run Time	Up to 1.25 hour – single battery Up to 3 hours – dual batteries
Charging System	Truck/Wall Mounted Charging Rack
Recharge Time	< 2 hours – single battery < 4 hours – dual batteries
Charger Input Voltage	12 VDC
Connector	Coaxial 2.1mm x 5.5mm center positive
Charger Voltage Source	Cigarette lighter cord to 12 VDC vehicle power (Negative ground system) Power Pack operated from 110 to 240 VAC

**Interface**

Serial Communications	RS-232 @ 38.4 Kbps
External Video	RS-170 composite video
Transmitter Power	12 VDC Nominal (for optional transmitter)
Connector Type	DB-9 Male
Power Switch	SPDT Sealed Push Button Type
Image Clear Switch	SPST Sealed Momentary Push Button Type

**Transmitter** (optional, availability limited)

Channels	2 - Selectable via internal switch
Frequency	2458 MHz, 2474 MHz
Power Output	50 mW
Distance	600 yards, line-of-sight (less depending on building characteristics)

**Receiver** (optional, availability limited)

Receiver specifications are included for reference, as it is not an integral part of the camera.

Channels	2 - Selectable via external switch
Frequency	2458 MHz, 2474 MHz
Output	Composite video (for monitor/TV/VCR "video input")
Connector	BNC (2)
Receiver Input Voltage	12 VDC
Connector	Coaxial 2.1mm x 5.5mm center positive
Receiver Voltage Source	Cigarette lighter cord to 12 VDC vehicle power (Negative ground system) Power Pack operated from 120 VAC
Operating Temperature	-10°F to 122°F (-23°C to 50°C)

**Mechanical**

Chassis	Nickel Plated Aluminum
Dimensions	4.9" wide x 7.9" high x 7.9" deep (124mm x 201mm x 201mm)
Weight	5.6 lbs – no batteries 6.4 lbs – 1 battery 7.2 lbs – 2 batteries
Continuously Moving Parts	None
Chassis Reflectivity	>90%

**Environmental**

Waterproof	3 ft (0.91m) depth maximum
Humidity	0 to 100% RH
Internal Electronics	
Startup Temperature	-4°F to 140°F (-20°C to +60°C)
Drop Shock	3 axis - 3 ft (0.91m) high IAW MIL-STD-810
Transportation Vibration	IAW Commercial Handling/Shipping
EMI & RFI	Tested to FCC 47 CFR, Part 15, Sub-Part B

**Ergonomic**

Handles	Dual Adjustable Kevlar/Nomex Side Straps
Shoulder Harness	Adjustable and removable
Attachment Points	D-Ring on Side Strap

**Warranty**

Standard	1 year
----------	--------

**Note:** Specifications subject to change without notice.

## Appendix D - Warranty

### LIMITED ONE YEAR WARRANTY

CRITICAL IMAGING LLC (“MANUFACTURER”) WARRANTS THIS PRODUCT AGAINST DEFECTS IN MATERIAL AND WORKMANSHIP UNDER NORMAL USE, CARE AND SERVICE FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF PURCHASE BY BUYER PROVIDED BUYER RETURNS THE PRODUCT TO MANUFACTURER WITHIN SUCH PERIOD, TOGETHER WITH A DATED PROOF OF PURCHASE IN ACCORDANCE WITH FURTHER PROVISIONS OF THIS WARRANTY. THERE ARE NO WARRANTIES THAT EXTEND BEYOND THIS LIMITED TWO-YEAR WARRANTY. THIS LIMITED WARRANTY PROVIDES THAT, IF DEFECTIVE, THE PRODUCT WILL BE REPAIRED OR REPLACED AT MANUFACTURER’S OPTION, AT NO CHARGE TO BUYER. THIS WARRANTY DOES NOT COVER DEFECTS OR DAMAGE RESULTING FROM MISUSE, IMPROPER OPERATION, UNAUTHORIZED MODIFICATION, SATURATION OR CONTAMINATION BY LIQUID OR BATTERY, FAILURE OF BATTERY OR NORMAL WEAR AND TEAR. THIS LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WHICH WARRANTIES ARE EXPRESSLY DISCLAIMED. BUYER HEREBY WAIVES ALL OTHER WARRANTIES, GUARANTEES, CONDITIONS OR LIABILITIES, EXPRESS OR IMPLIED, ARISING BY LAW OR OTHERWISE, INCLUDING, WITHOUT LIMITATION, ANY CLAIM WITH RESPECT TO CONSEQUENTIAL OR INCIDENTAL DAMAGES. MANUFACTURER SHALL NOT BE LIABLE TO BUYER, USER OR ANY OTHER PERSON UNDER ANY LEGAL THEORY, INCLUDING BUT NOT LIMITED TO NEGLIGENCE OR STRICT LIABILITY, FOR ANY INJURY OR FOR ANY DIRECT OR CONSEQUENTIAL DAMAGES SUSTAINED OR INCURRED BY REASON OF THE USE OF THE PRODUCT. THIS LIMITED WARRANTY MAY NOT BE EXTENDED, ALTERED OR VARIED EXCEPT BY A WRITTEN INSTRUMENT SIGNED BY THE MANUFACTURER AND BUYER. THE TOTAL MONETARY LIABILITY OF THE MANUFACTURER TO THE BUYER OR ANY OTHER PERSON UNDER THIS LIMITED WARRANTY OR OTHERWISE SHALL NOT EXCEED BUYER’S PURCHASE PRICE OF THIS PRODUCT. IN THE EVENT AND TO THE EXTENT THAT ANY OF THE FOREGOING IS FOR ANY REASON HELD INEFFECTIVE THE REMAINDER OF THIS LIMITED WARRANTY SHALL REMAIN IN FULL FORCE AND EFFECT.

Manufacturer reserves the right to make future design changes to any of its products without thereby incurring any obligations to make changes to or replacements of this product.

Manufacturer neither makes nor authorizes any person to make on its behalf any other guarantee or warranty concerning its products.

To obtain service under this Limited Warranty call Critical Imaging LLC, Customer Services Department, 315-732-1544 to obtain a Return Material Authorization (RMA) number. If you cannot deliver the product in person:

- Pack it in its original shipping container (or equivalent)
- Put the RMA number on the address label
- Put the RMA number on the shipping carton
- Insure it (or assume the risk of loss/damage during shipment)
- Deliver the product freight pre-paid

**Manufacturer is not responsible for damage to inbound product.**