12.WARRANTY AND AFTER-SALES SERVICE

(1) Please store your warranty paper in a safe location.

This product comes with a limited warranty. Confirm your date of purchase and warranty period, and store it in a safe location.

(2) The warranty period is valid for 12 months after date of purchase.

Check the No-charge Warranty Terms listed below and discuss details with your reseller. (Please contact your reseller for repairs not covered by the no-charge warranty or after the warranty period has expired.)

Warranty

Thank you very much for purchasing this product.
This warranty guarantees any repair for failures which occur in this product under normal use free of charge according to the prescriptions contained in this document.

<No-charge Warranty Terms>

1. In the event that any failure takes place in the unit under normal use according to the instructions contained in this user manual, please contact your reseller.
2. Under the following circumstances, servicing will be chargeable even within the warranty period:
   (1) If any failure or damage arises from improper use or modification to the unit;
   (2) If any failure or damage arises from the unit being dropped;
   (3) If any failure or damage arises from environmental pollution, disaster or natural disasters such as floods;
   (4) If any failure or damage arises from the use of an improper power supply;
   (5) If any failure or damage arises from using the unit as a commercial device (extended operation or when mounted to vehicles or water craft etc).

Customer notes

Name	
Address	
Phone	
Date of purchase	

Distributor
Scalar Corporation
Head office
2-10-5 Itabashi, Itabashi-ku, Tokyo 173-0004 Japan
Phone: +81-3-5248-6001 Fax: +81-3-5248-6110
http://www.scalar.co.jp

'0512000

IMPRESSIVE WORKS

USER'S MANUAL

DIGITAL MICROSCOPE

DG-3

- Please read this manual before using the product to ensure safety and means of use.
- After you have read this manual store it somewhere safe for future reference.
- The warranty for this product is printed on the back cover of this manual.

TABLE of CONTENTS

1. SAFETY PRECAUTIONS

Please ensure you have read these precautions before use.

- This manual includes warnings and cautionary notes to ensure safe use of this product. Please read the "Safety Precautions" so as to be able to use this product safely.
- Neither the manufacturer nor the reseller can be held liable for any damages including personal injury or coincidental damage arising from misuse or incorrect operation of this product.
- The purpose of these precautions is to ensure correct and safe use of this product and prevent personal injury or damages. The precautions are grouped into the following categories. Please observe these precautions as all of them are crucial to your safety.

This manual includes the following contents and indications.

WARNING: Indicates that serious personal injury or death may result if not followed.

CAUTION: Indicates that serious personal injury or property damage may result if not followed.

⚠ This symbol denotes **danger, warning** or **caution**.

⃠ This symbol denotes **prohibited actions**.

❗ This symbol denotes **mandatory actions** or i**nstructions**.

⚠ WARNING	**Failure to follow these precautions may result in serious injury or death.**
Disassembly prohibited **The unit may not be disassembled, modified or converted.**	● It is extremely hazardous to disassemble or modify the unit, the AC adapter or battery as they all contain high-voltage components. Failure to heed this warning may result in electric shock, fire or malfunction.
Usage prohibited **Cease use of the unit if any smoke, unusual odors or noise emerges from it, or it has been dropped or damaged.**	● Cease use of the unit, the AC adapter or battery if notice any smoke, unusual odors or noise emerging from it, or if you have dropped or damaged it. Failure to observe this may result in fire. If any of the above occurs please contact us.
Usage prohibited **Cease use of the unit if water or other liquid has found its way into it.**	● Remove the AC adapter and battery from the unit if water or other liquid has entered it. Failure to do so may result in short circuits or insulation failure which could cause electric shock or fire. Do not place containers containing liquids that may leak including vases, flower pots, cups, cosmetic bottles or medication anywhere near the unit.
Usage prohibited **Cease use of the unit if any pieces of metal or foreign objects have found their way into it.**	● Remove the AC adapter and battery from the unit if any pieces of metal or other foreign objects have found their way into it. Failure to do so may result in short circuits or insulation failure which could cause electric shock or fire.
Usage prohibited **Never use the unit if it is incorrectly plugged in.**	● Contact failure may result in overheating, electric shock or fire. Ensure the AC adapter is securely connected to the outlet.

Prohibited **Do not use the plug with any dust on it or allow it to be in close proximity to any metal object.**	• Dust or metal can conduct electricity and cause electric shock or fire. If dust has accumulated on the plug, remove the AC adapter from the power outlet and clean it.
Prohibited **Do not convert or apply excessive force to the cord.**	• Doing so may damage the cord, which could result in fire or electric shock. If the cord has been damaged, for example the conductor has become exposed, cease use of the unit and contact us.
Caution **Always use the specified power supply.**	• Always plug the AC adapter into a 100-120 VAC power supply. Plugging the adapter into any power supply other than that specified could result in electric shock, fire or malfunction.
Prohibited **Never touch the power plug or adapter with wet hands.**	• Failure to heed this warning could result in electric shock.
Prohibited **In thunder and lightning**	• Do not touch the cable or plug when there is thunder and lightning. Failure to heed this warning could result in electric shock.
Caution **When the unit is not in use**	• When the unit is not in use, remove the AC adapter from the power outlet. • When the unit is not in use, remove the battery.
Prohibited **Do not expose to sunlight or intense light.**	• Do not place the unit or lens where it will be exposed to direct sunlight, near intense lighting equipment, or where it will get hot. • The lens may focus the light and cause fire or malfunction. • Do not leave the unit near windows or inside automobiles. • Do not place anything flammable near the unit. • Do not point the camera at the sun.
Caution **Always hold the plug when connecting or disconnecting the cable.**	• Pulling the cable to disconnect it may damage the wire or plug which could result in short circuits, electric shock or fire. Always hold the plug when connecting or disconnecting the cable.
Electric shock **If you notice any damage to the power cord, please contact us.**	• It is extremely hazardous to use the power cord if its conductor is exposed or any wire is damaged. Doing so could cause fire or electric shock. If you notice any damage to the power cord, please contact us.

⚠ INSTALLATION AND MANAGEMENT

Failure to follow these precautions may result in personal injury or property damage.

Caution **Do not place the unit anywhere unstable.**	• The unit may fall or tip over, resulting in injury or damage.
Caution **Do not place anything on the unit.**	• Do not place anything on the unit as it could fall or tip over, resulting in injury or damage.
Caution **Do not place the unit where it will be exposed to humidity or dust.**	• Doing so could cause fire or malfunction.

Caution **Always turn the unit off and unplug the power plug from the power outlet when cleaning the unit.**	• When cleaning the unit, ensure the unit is turned off, unplug the power plug from the power outlet and remove the battery from the unit. Normally the unit should be wiped with a dry, soft piece of cloth. If it is excessively dirty, dampen a cloth with neutral detergent diluted with water, clean the unit with the cloth and then wipe it dry with a dry piece of cloth. • Do not use any substance such as thinner, benzene or alcohol.
Caution **Always turn the unit off during transportation.**	• When transporting the unit, ensure it is turned off, unplug the AC adapter from the power outlet and remove the battery from the unit. Ensure the unit is securely packed if there will be an extended amount of transportation time.
Caution **Always turn the unit off when replacing the lens or lamp.**	• Ensure the unit is turned off when replacing the lens or lamp.
Caution **Always use the specified replacement parts.**	• Ensure only optional components, consumables and replacement parts, such as the lens unit, lamp and camera cable which comply with our specifications are used.
Caution **Always use the unit within the specified temperature and humidity ranges.**	• Do not use the unit in conditions that fall outside the temperature rating. • Do not use the unit in conditions that exceed the humidity rating.

⚠ OPERATING PRECAUTIONS

These precautions particularly apply when taking close-ups of the human body.

Caution **Sanitizing the tip of the lens unit**	• Before each use, ensure the tip of the lens unit which comes in contact with the human body is wiped with a piece of cotton or gauze dampened with rubbing alcohol (ethyl alcohol).
Caution **Damage to the tip of the lens unit**	• Please contact us if you notice any damage, cracks or fogging on the tip of the lens unit. • Personal injury could result if you continue to use the lens unit in such a condition.
Caution **Dirty LCD monitor**	• Use an air dust cleaner to gently blow the dust from the LCD monitor. If you notice any fingerprints or other contamination on the screen, turn the unit off and then use a clean cotton swab or lens cleaning paper dampened with isopropyl alcohol to gently wipe the LCD monitor while ensuring that you do not damage it.
Caution **Dirty enclosure**	• Gently wipe the enclosure using a soft cloth dampened with diluted neutral detergent. Never use organic solvents such as thinner or toluene.
Prohibited **Do not insert into body orifices.**	• Do not insert into body orifices such as the eyes, nose or mouth.
Prohibited **Do not stare into the light-emitting parts**	• To protect your eyes, do not stare at the light emitted from the tip of the lens unit.
Caution **Take special measures to relieve eye and hand fatigue when using the unit over extended periods of time.**	• Ensure your posture is correct and that you rest occasionally when using the unit over extended periods of time or if you are in a posture that can strain your eyes or hands.

OPERATING PRECAUTIONS

- Image files generated by this unit are not EXIF-compatible. Please note that these files may not be recognized as image files by some EXIF-compatible devices such as photo printers.
- The unit and CF memory card may heat up depending on the lens unit used and/or ambient environment. While this poses no problem in terms of operation, please be careful of these hot components.
- TFT color LCD panels are inherently prone to occasional black pixels (pixels that do not light up) or bright pixels (pixels that stay lit up). Please note that this is not a malfunction.
- Once focus has been achieved, you may see red and blue flickering on the unit's LCD monitor or external monitor. This is due to CCD specifications and not a result of the unit malfunctioning. Please also note that this flickering will not appear on recorded images.
- Do not use the unit in highly humid conditions such as in a bathroom. Using the unit over extended periods of time in such conditions may result in rusting or adversely affect the characteristics and lifetime of the components.
- Do not subject the unit or lens unit to strong vibrations or shocks during transportation or storage as it may cause the unit to malfunction.
- Image files acquired using this unit may be lost if the unit malfunctions. Ensure to back up the images that you intend to save on your PC.
- Displaying the same image on the screen over extended periods of time may result in image burn-in, a faint shadow of that image being imprinted on the LCD.
- Never attach or remove the CF memory card while recording. Doing so may result in damage to your image files or the unit malfunctioning.
- Do not record when the "low battery" lamp is on. Doing so may cause the image to fail to be recorded or result in damage to your recorded images.
- Turning on the unit immediately after turning it off may result in malfunction. Always wait a few seconds before turning on the unit after turning it off.

Caution

IN THE EVENT OF A UNIT FAILURE OR MALFUNCTION

- **In the event of a unit failure or malfunction, turn off the unit and contact us. Continuing to use the unit under such conditions may increase the extent of damage or lead to an unexpected accident.**

2.OVERVIEW

■ This unit is a touch-and-view high-resolution digital microscope that allows users to take crisp enlarged images simply by pressing the tip of the lens unit against the subject.

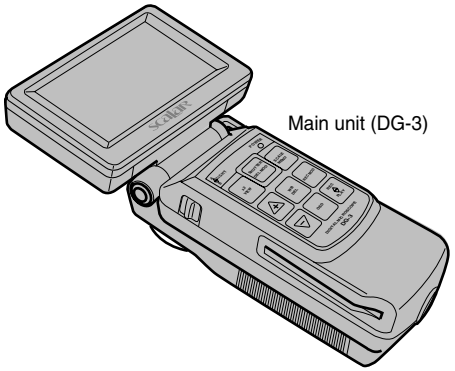
■ The unit is equipped with a 3.5" LCD monitor and rechargeable lithium-ion battery, making it highly portable and adaptable to a wide variety of applications including outdoor use.

■ The unit employs a bayonet type lens mount that allows users to switch between a broad range of lens units with different magnifications and light sources.

■ Image quality and brightness can be set manually, allowing customizable use.

■ Acquired images can be stored on a CF memory card, allowing users to access the images on a variety of external devices that include PCs and printers.

* The following lists the components that are included in the special hard shell case. Ensure you have all the components before using the unit.



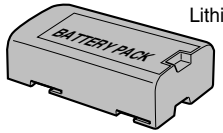
Main unit (DG-3)

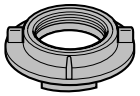
User's Manual

Video output cable

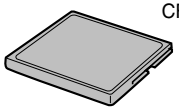
C-mount cap
Lithium-ion battery

Lithium-ion Battery

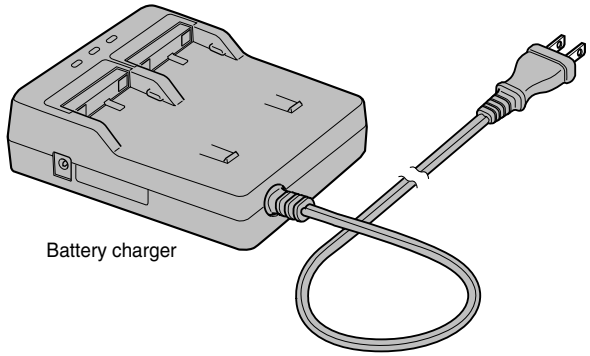




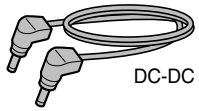
C-mount adapter



CF memory card



Battery charger



DC-DC cable

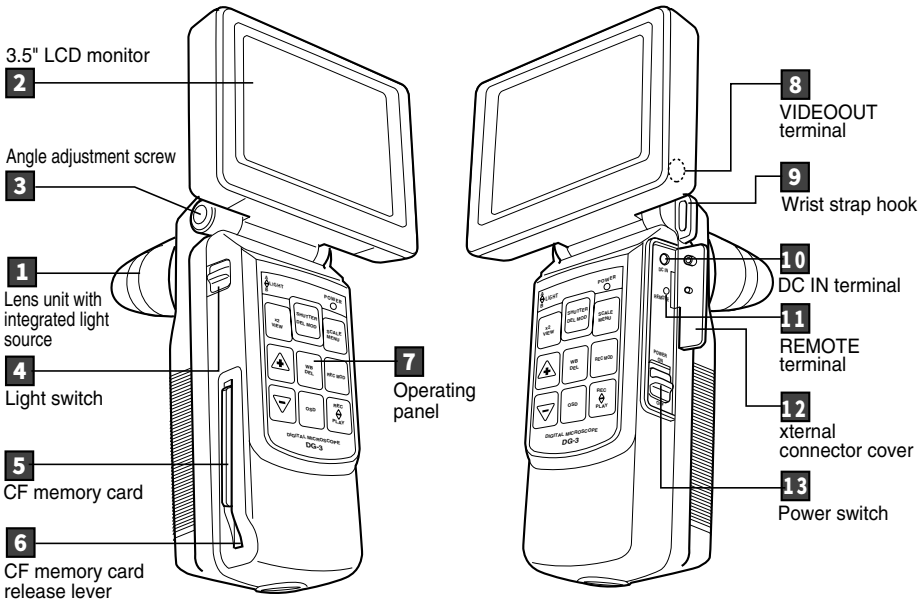
Options

- Various lens units with integrated light sources
- Remote shutter switch

Special hard shell case

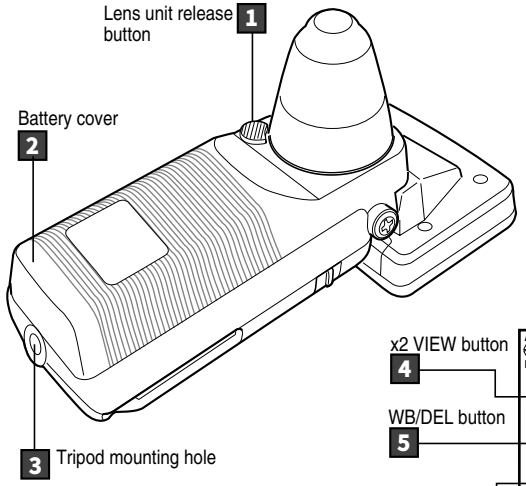
4.NAMES AND FUNCTION OF THE DIFFERENTS PARTS

MAIN UNIT

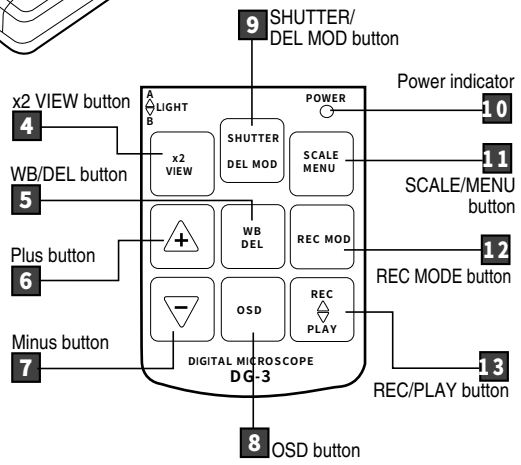


	NAME	DESCRIPTION
1	**Lens unit with integrated light source (optional)**	A variety of multi-functional replacement lenses (with light-source switching function) are also available.
2	**3.5" LCD monitor**	Used to view the image seen through the lens.
3	**Angle adjustment screw**	Used to adjust the angle of the LCD monitor for easier viewing.
4	**Light switch**	Used to switch the light source inside the lens on and off (only lenses with an integrated light source).
5	**CF memory card**	Used to record images.
6	**CF memory card release lever**	Press this lever to remove the CF memory card.
7	**Operating panel**	Used to perform various operations.
8	**VIDEOOUT terminal**	Used to output images to an external monitor.
9	**Wrist strap hook**	A wrist strap can be attached to this hook.
10	**DC IN terminal**	Used to connect the unit to an external power supply.
11	**REMOTE terminal**	An external switch can be connected to this terminal to allow operating the shutter with the remote switch.
12	**External connector cover**	Close this cover to protect the external terminals.
13	**Power switch**	Used to turn the unit on and off.

MAIN UNIT (back side)



OPERATING SIDE



	NAME	DESCRIPTION
1	**Lens unit release button**	Press this button in to remove the lens unit.
2	**Battery cover**	Covers the rechargeable lithium-ion battery.
3	**Tripod mounting insert**	A tripod or similar support can be attached to this insert when using the unit in a stationary setting.
4	**x2 VIEW button**	Used to enlarge the image you are checking to twice the magnification.
5	**WB/DEL button**	Used to adjust the white balance or for deleting.
6	**Plus button**	Used to adjust brightness or moving on to the next process.
7	**Minus button**	Used to adjust brightness or moving back to the previous process.
8	**OSD button**	Used to display or erase the recorded image displayed, the number of images or text.
9	**SHUTTER/DEL MOD button**	Used to operate the shutter or to delete a recorded image.
10	**Power indicator**	Lights up when the unit is turned on.
11	**SCALE/MENU button**	Used to display the lens magnification of the image being recorded or to enter MENU mode.
12	**REC MODE button**	Used to select image recording mode.
13	**REC/PLAY button**	Used to select operating mode.

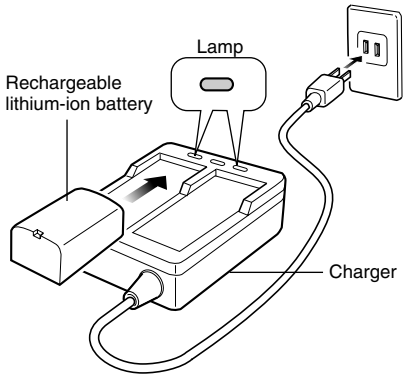
5. BEFORE USING THE UNIT

5-1. Charging the Rechargeable Lithium-ion Battery

1.Plug the charger's power cable into a power outlet.
2.Place the rechargeable lithium-ion battery horizontally onto the charger and press it all the way to the back. Charging will then automatically begin.

Caution Charging will be complete in about 100 minutes. The green lamp on the charger will flash while charging is in progress and stay lit up when charging has completed.

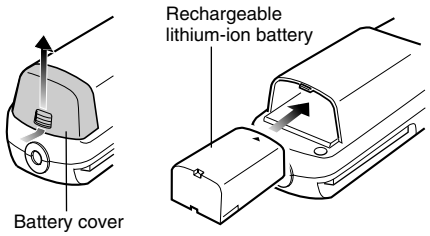
Note: The battery will not charge if the DC-DC cable is connected to the charger.



5-2. Inserting the Rechargeable Lithium-ion Battery

1.Remove the battery cover from the unit.
2.Insert the rechargeable lithium-ion battery into the unit with the terminals facing inward.
3.Press the battery in as far as it will go to attach it.

* To remove the battery cover, slide it in the direction of the arrow while pressing the area.



5-3. Power Switch

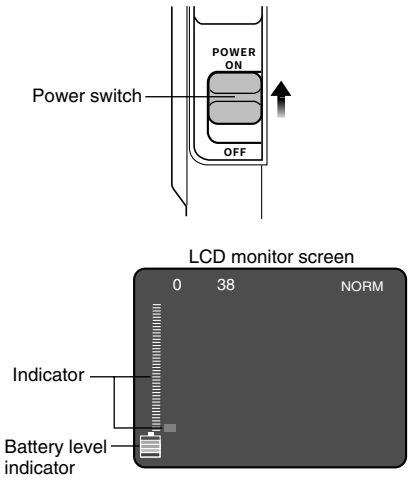
1.Toggle the unit's power switch to the on position to turn the unit on and the microscope will be ready for use.

* After turning on the unit a battery level indicator will appear in the lower left area of the LCD monitor which shows you the current status of the battery. When using battery power the indicator will display the battery level in stages of 1 to 5. Please note that it will not appear when running the unit with the AC adapter.

2.The power indicator on the unit will light up.

Caution This indicator will light up red when battery power is low, indicating that it is time to recharge the battery.

3.Toggle the unit's power switch to the off position to turn the unit off.



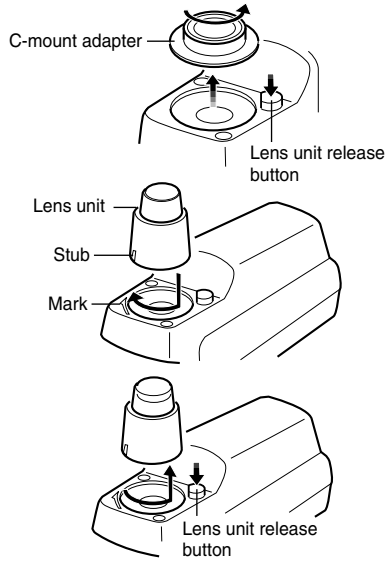
5-4. Attaching the Lens Unit

Caution Always ensure the unit is turned off when removing or attaching the lens unit.
1.Remove the C-mount adapter by rotating it counterclockwise while pressing the lens unit release button.
2.Align the stub on the lens unit with the "Lock" indication mark on the unit, and while pressing the lens unit in, turn it clockwise until you hear it click.

CAUTION

To remove the lens unit:

●Always ensure to turn the lens unit counterclockwise while pressing in the lens unit release button and then lift the lens unit when it stops.
* Never turn the lens unit without pressing the lens unit release button. Doing so may damage the button and/or lens unit.



5-5. Using the C-Mount Adapter

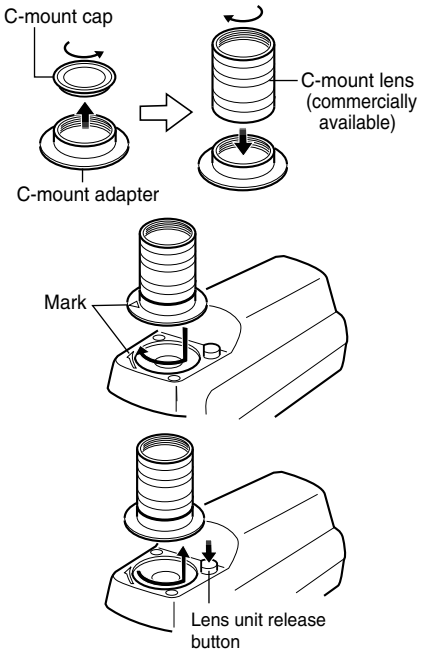
* The included C-mount adapter can be used to attach commercially available C-mount lenses.
1.Remove the C-mount cap from the C-mount adapter by turning it counterclockwise.
2.Attach a C-mount lens to the C-mount adapter by turning it clockwise.
3.Align the triangular mark on the C-mount adapter with the start of the mark on the unit, and while pressing the C-mount lens unit in, turn it clockwise until you hear it click.

CAUTION

To remove the C-mount lens unit:

●Always ensure to turn the C-mount lens unit counterclockwise while pressing in the lens unit release button and then lift the lens unit when it stops.
* Do not apply excessive force when removing the C-mount lens unit. Doing so may damage the otch on the unit.

* The C-mount adapter can be used to attach the DG-3 to endoscopes, microscopes and telescopes. Please contact us or your reseller for details.



5-6. Inserting CF Memory Card

Caution Always ensure the unit is turned off when removing or inserting CF memory cards.

1. If you turn the unit on without a CF memory card inserted the word "CARD" will flash in red on the screen.
2. Insert CF memory cards into the unit with the LCD monitor facing up.

Caution Orient the card so that the memory capacity inscription is facing up.

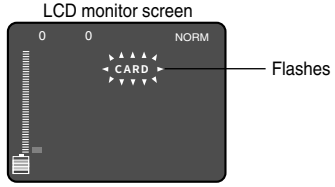
3. Insertion is complete when you feel the card hit the end.

* After inserting a CF memory card the release lever will stick out. Carefully fold it out of the way.

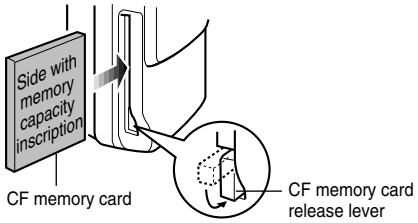
To remove the card:

1. Fold out the CF memory card release lever and press it in.
2. The CF memory card will slightly eject so grip it with your fingers and pull it out.

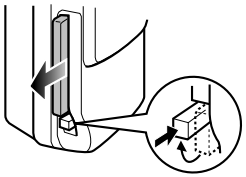
Note: Be careful when pressing the release lever as pressing it too hard may forcibly eject the card.



Inserting the card:



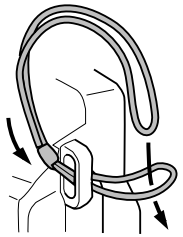
Removing the card:



5-7. Attaching a Wrist Strap

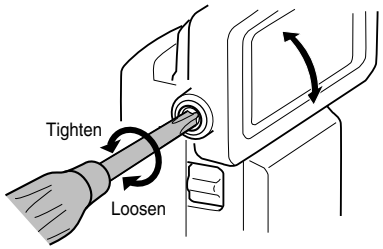
● Commercially available camera wrist straps can be attached to the unit's hand strap hook and passed over your hand. This then reduces the chances of dropping the unit while taking images or when carrying it around.

Note: Never use cell phone straps as they may break.



5-8. Adjusting the LCD Monitor's Angle

● If you are not comfortable with the LCD monitor angle setting use a commercially available screwdriver to adjust the LCD monitor angle adjustment screw.



6-1. Selecting Operating Mode

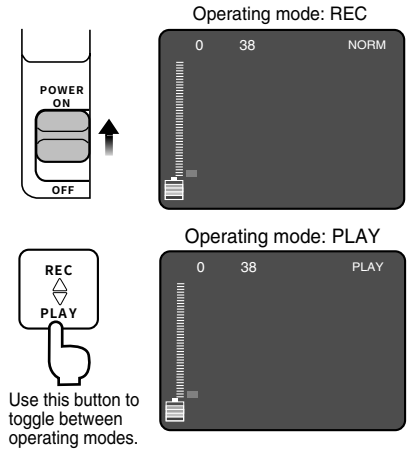
* See section 9-1 "Screen Configuration" on page 23 for the location of the onscreen displays.

The DG-3 can be used in the following two operating modes: **REC mode** for taking images and **PLAY mode** for checking images.

■**REC mode:** Used to check the image of a subject, adjusting focus or recording.

■**PLAY mode:** Used to check images or deleting recorded images.

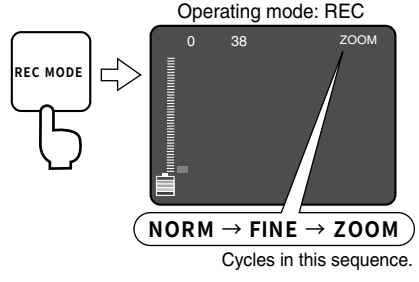
● When you turn on the unit it will enter REC mode.
● REC and PLAY modes can be toggled using the **REC/PLAY** button on the operating panel.
● The word "**PLAY**" will display on the monitor when in PLAY mode.



6-2. Selecting Image Recording Mode

● Set operating mode to REC, and then press the **REC MODE** button on the operating panel to select desired recording mode.
● "**NORM**" and "**FINE**" denote the quality of the image to be recorded.
Use "**FINE**" to record high resolution images.
Use "**NORM**" to conserve the memory of a CF memory card.

Caution Image quality is varied by altering the compression rate of a JPG file. (Higher resolution images use more memory.)
"**ZOOM**" can be used to record the area around the center of an image displayed in **NORM** mode at twice the magnification.



■ **FINE mode (high resolution):** 1792 x 1184 pixels, JPEG compression rate: approx. 1/8, memory requirement: about 900 KB

■ **NORM mode (standard resolution):** 1792 x 1184 pixels, JPEG compression rate: approx. 1/13, memory requirement: about 500 KB

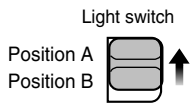
■ **ZOOM mode (high resolution):** 896 x 592 pixels, JPEG compression rate: approx. 1/8, memory requirement: about 500 KB

6-3. Light Switch

● The light switch can be toggled between the two positions "**A**" and "**B**."

(Only available if a normal lens unit with integrated light source is used.)

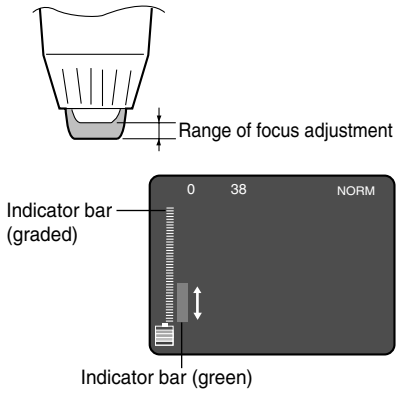
■ **Switch positions**
Position A: Lamp lights up (in the lens).
Position B: Lamp goes off.



6-4. Taking Images

- When you turn on the unit it will enter REC mode.
- To aid in focusing the unit is equipped with the focus indicator.

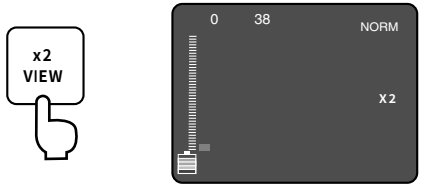
1. Press the lens unit against the subject that you wish to focus upon.
2. As the focus increases the green bar displayed on the LCD monitor will extend upwards and as the focus decreases the bar will shrink downwards.
3. Adjust the vertical position of the unit so that the green bar is at its longest.



Caution Rather than using the focus indicator the monitor on the unit or an external monitor connected via the video output cable can be used to adjust the unit's position to achieve the best focus.

If you have difficulty checking focus sharpness:

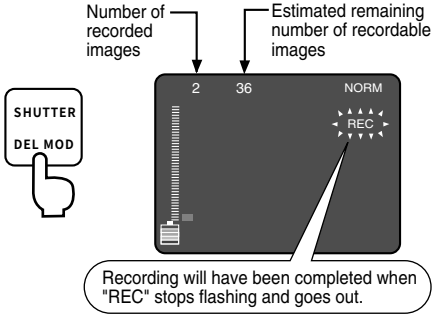
1. Press the **x2 VIEW** button and the area around the center of the image can be viewed at twice the magnification.
2. This function only displays images on the LCD monitor at twice the magnification but recording will be performed at the magnification of the recording mode selected. This makes it easier to achieve a sharp focus.
3. If you want to return the image on the LCD monitor to regular size, press the **x2 VIEW** button again.



Caution The feature for magnifying the image on the LCD monitor is only available in **NORM** and **FINE** modes. It is not available in **ZOOM** mode.

If the preview function is set to "Off" (initial setting):

1. The unit can be set to preview images before they are saved to the flash memory card. However, if one desires to turn this function off, the unit will not perform preview checks for any images taken. And therefore when you press the **SHUTTER/DEL MOD** button on the operating panel the word "**REC**" will flash in red on the LCD monitor and image recording will begin.
2. Recording will have been completed when "**REC**" stops flashing and goes out.

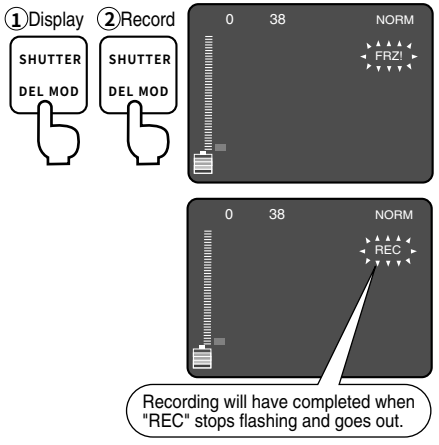


Caution You will see the number of recorded images in the upper left area and the estimated remaining number of recordable images possible at the upper center area of the LCD monitor. (Please note that the estimated remaining number of recordable images is approximate.)

Caution Ensure that the unit is securely held when pressing the **SHUTTER/DEL MOD** button, otherwise, the image may be blurred. In order to take clear, crisp images, cradle the unit in both hands, keep your elbows close to your body, relax your shoulders and then gently press the **SHUTTER/DEL MOD** button. If you find it difficult to acquire clear images, we recommend attaching the unit to one of the stands available for the unit made by Scalar Corporation or a commercially available tripod and using the optional external shutter switch.

If the preview function is set to "On":

1. When you press the **SHUTTER/DEL MOD** button on the operating panel the image will be displayed and the word "**FRZ!**" will flash in green on the LCD monitor.
2. After viewing the displayed image press the **SHUTTER/DEL MOD** button one more time to record the image to the CF memory card. The word "**REC**" will flash in red on the LCD monitor, indicating that the image is being recorded.
3. Recording will have been completed when "**REC**" stops flashing and goes out.



Caution If you do not want to record the image taken, press the **WB/DEL** button. The image will then be deleted and the unit will revert to REC mode.

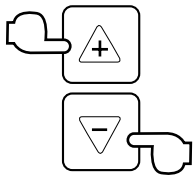
Caution If you want to turn the preview function off, see section 6-11 "Making Advanced Settings on the DG-3."

6-5. Adjusting Brightness

- To adjust the brightness of images to be taken, use the **Plus** or **Minus** button on the operating panel while viewing the monitor.

* When adjusting brightness in this way some jerky movements of the screen may occur. However this is normal in that brightness adjustment is made by changing the shutter speed.

* If the screen is too bright or too dark, the correct white balance may be difficult to achieve, making colors appear unnatural.



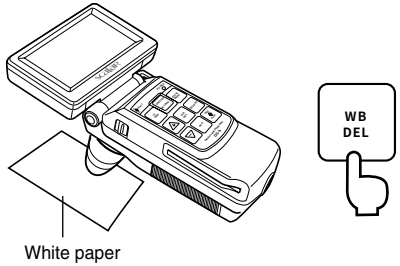
Caution If it is difficult to adjust brightness correctly using the **Plus** or **Minus** button on the operating panel, adjust the light, aperture and/or ND filter so as to achieve optimum brightness.

* In order to meet a wide range of applications the unit does not employ an optical filter.
Colors may appear unnatural when the unit is used outdoors in the presence of near infrared light or with very fine, distinct patterns.

6-6. Adjusting White Balance

- If it is difficult to achieve good color balance on the LCD screen, the white balance can be adjusted to correct the colors.

1. Switch the unit's operating mode to REC.
2. Place a non-reflective white sheet of paper in front of the lens unit and make adjustments so that white can be seen over the entire monitor screen.
3. White balance can be adjusted by pressing the **WB/DEL** button.

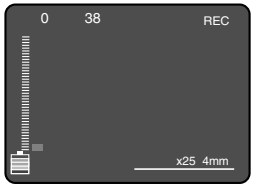


Caution In some cases better color reproduction can be achieved by using an object that is slightly grayer than pure white for white balancing adjustment.

6-7. Scale Display

- A scale can be inserted into the image to be taken using the lens unit.

1. Press the **SCALE/MENU** button while in REC mode and two numbers will appear in the lower right area of the monitor.
2. The number to the right denotes the lens magnification. Press the **SCALE/MENU** button until the displayed magnification matches that of the lens you are using.



Magnification cycles in the following sequence: x25 → x30 → x50 → x100 → x200 → x500 → x1000 → x25.

Caution When matching the number to the left with the magnification of the lens used, the number to the right indicates the length of the scale.

* If the length of the scale differs from the actual length, see section 6-11 "Making Advanced Settings on the DG-3."

Caution If the scale can be seen on the monitor it will also appear in the recorded image. If you want the scale to appear in the image take the image as is. If you do not want the scale to appear in the image, press the **SCALE/MENU** button to remove the scale display before recording the image.

6-8. OSD Button

- By pressing the **OSD** button on the unit's operating panel while in **REC** mode the recording mode or number of recorded images can be displayed. Pressing this button toggles between "**display**" and "**do not display**."

* OSD stands for On Screen Display.

Use this button to make the onscreen displays appear or disappear.

6-9. Checking Recorded Images

- Switch operating mode to **PLAY**.
- If there are any images recorded in a CF memory card, the last image recorded will appear on the LCD monitor along with its **image number** below the ons-creen display "**PLAY**."

Caution If there is no CF memory card inserted or the CF memory card contains no images, no image will appear on the monitor until an image has been taken by pressing the **REC/PLAY** button.

Caution If there are multiple images recorded on a CF memory card, pressing the **plus** and **minus** buttons scrolls through the images.

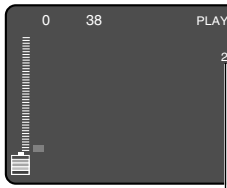
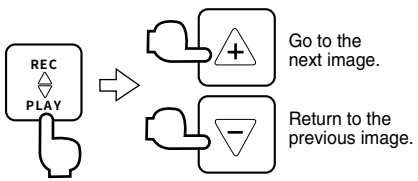


Image number



Go to the next image.

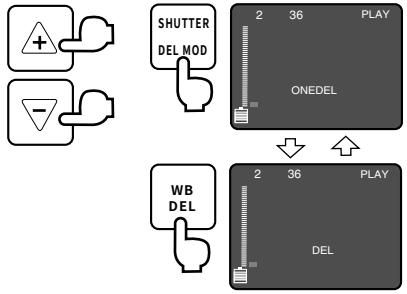
Return to the previous image.

6-10. Deleting Recorded Images

Note: Ensure caution is taken when deleting recorded images as a mistake may lead to all the images being lost or the CF memory card being reformatted.

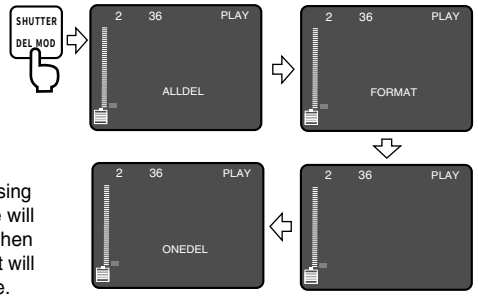
Deleting a single image recorded on a CF memory card

1. Insert the CF memory card, switch operating mode to PLAY and press the **plus** or **minus** button on the operating panel to display the image to be deleted.
2. Press the **SHUTTER/DEL MOD** button on the operating panel.
3. The word "**ONEDEL**" will appear near the bottom of the monitor.
4. At this point, pressing the **WB/DEL** button on the operating panel will change the word to "**DEL**."
5. Image deletion will have completed when "**ONEDEL**" appears again.



To cancel the deleting process:

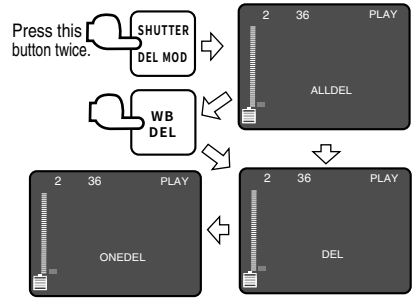
1. Press the **SHUTTER/DEL MOD** button on the operating panel before pressing the **WB/DEL** button.
2. Each time this button is pressed the options will sequence through "**ALLDEL**" → "**FORMAT**" → **no display** → "**ONEDEL**."
3. Select the "**no display**" option to exit deleting mode.



Caution If the **REC/PLAY** button is pressed before pressing the **WB/DEL** button, the unit's operating mode will change from **PLAY** to **REC**. Be extra careful when returning to **PLAY** mode again because the unit will still be in the previously selected **deleting** mode.

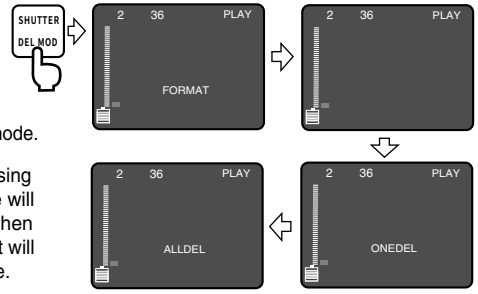
Deleting all images recorded on a CF memory card

1. Insert the CF memory card, switch operating mode to PLAY and press the **SHUTTER/DEL MOD** button on the operating panel twice.
2. The word "**ALLDEL**" will appear near the bottom of the monitor.
3. At this point, pressing the **WB/DEL** button on the operating panel will change the word to "**DEL**."
4. Image deletion will have completed when "**no display**" goes out.



To cancel the deleting process:

1. Press the **SHUTTER/DEL MOD** button on the operating panel before pressing the **WB/DEL** button.
2. Each time this button is pressed, the options will sequence through "**FORMAT**" → **no display** → "**ONEDEL**" → "**ALLDEL**."
3. Select the "**no display**" option to exit **deleting** mode.



Caution If the **REC/PLAY** button is pressed before pressing the **WB/DEL** button, the unit's operating mode will change from **PLAY** to **REC**. Be extra careful when returning to **PLAY** mode again because the unit will still be in the previously selected **deleting** mode.

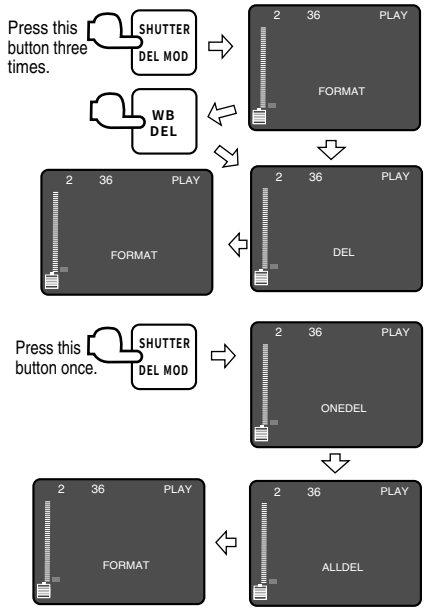
Formatting a CF memory card

1. Insert the CF memory card, switch operating mode to PLAY and press the **SHUTTER/DEL MOD** button on the operating panel three times.
2. The word "**FORMAT**" will appear near the bottom of the monitor.
3. At this point, pressing the **WB/DEL** button on the operating panel will change the word to "**DEL**."
4. Image deletion will have completed when "**FORMAT**" appears again.

To cancel the deleting process:

1. Press the **SHUTTER/DEL MOD** button on the operating panel before pressing the **WB/DEL** button.
2. Each time this button is pressed, the options will sequence through "**ONEDEL**" → "**ALLDEL**" → "**FORMAT**" → **no display**.
3. Select the "**no display**" option to exit deleting mode.

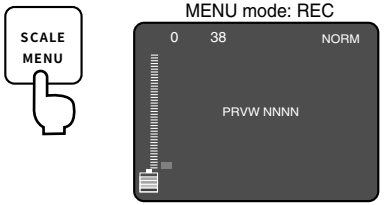
Caution If the **REC/PLAY** button is pressed before pressing the **WB/DEL** button, the unit's operating mode will change from **PLAY** to **REC**. Be extra careful when returning to **PLAY** mode again because the unit will still be in the previously selected **deleting** mode.



6-11. Making Advanced Settings on the DG-3

- The DG-3 has several more advanced settings that can be made in addition to switching operating and image recording modes.

1. Holding down the **SCALE/MENU** button enters **MENU** mode.



The following shows the controls that can be used once the configuration menu is open.

(1) WB/DEL button

WB DEL — Press this button to move to the next option.

(2) REC/MOD button

REC MOD — Press this button to return to the previous option.

(3) Plus and minus buttons

Press these buttons to increase or decrease a number or to toggle between on and off.

(4) SCALE/MENU button

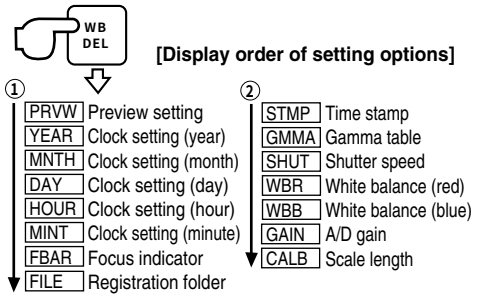
SCALE MENU — Press this button to confirm a setting or a changed value. To quit the configuration process, hold this button down. The saving process will complete and the unit will exit MENU mode when this setting option name disappears from the screen.

- Setting changes will not be saved unless this button is pressed.
- Always ensure this button has been pressed if you wish to retain your settings after the unit has been turned off.
- If multiple setting changes have been made pressing this button after having made all the changes will save all of the setting changes at once.

The following eleven setting options can be made:

Preview setting	Clock setting	Focus indicator	Registration folder	Time stamp	Gamma table
Shutter speed	White balance (red)	White balance (blue)	A/D gain	Scale length	

- Upon entering advanced settings, the word "**PRVW**" (preview setting) will appear at the center of the LCD monitor.
  At this point, pressing the **WB/DEL** button can switch between setting options.
- * The display order of the setting options is shown to the right. This order is the opposite of when the **REC/MODE** button is used.



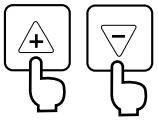
1. Preview setting (PRVW)

Choose whether to display the screen that allows you to decide whether to record an image to the CF memory card. The initial setting for this option is OFF (no preview).

- Select "**ON**" to show a preview.
- Select "**OFF**" to not show a preview.

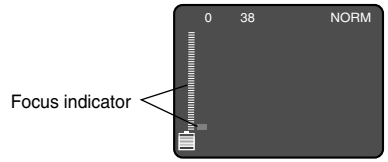
2. Clock settings (YEAR, MNTH, DAY, HOUR, MINT)

In clock settings the year, month, day, hour and minutes can be set. Initial settings will show the date and time set at the factory. Use the **plus** and **minus** buttons to change the settings.



3. Focus indicator (FBAR)

Choose whether to display the focus indicator on the LCD monitor. The initial setting has this option set to display the indicator.



4. Changing the registration folder of recorded images (FILE)

The DG-3 creates a specific folder within a CF memory card to record images. Use this option to select a name for the folder.The initial setting has this option set to DCIM. Select DSC to view images that have been recorded on a CF memory card with the DG-2, the previous version of this unit.

DCIM\DCIM\100_DG_2\AUT_0000.JPG
Image file numbers start at 0001.

DSC\DSC\SUBDSC\AUT_0000.JPG
Image file numbers start at 0001.

5. Time stamp (STMP)

Choose whether to insert into recorded images the date and time set in clock settings.

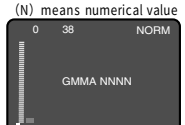
* In the DG-2, the previous version of this unit, this option was initially set to OFF and then switched to ON to achieve compatibility with the current version.
The initial setting for this option in the DG-3 is ON.

- Select "**ON**" to insert the date and time.
- Select "**OFF**" to not insert the date and time.

6. Changing gamma (γ) table setting (GMMA)

Gamma (γ) is the ratio of the variation between the screen's brightness and the video output signal. The closer this value is to 0.45, the truer the reproduced image will be. However, depending on the subject and the external monitor used, the optimum curve may result in an image that is too light or too dark. This option can be used to adjust gamma correction so that the image reproduced resembles what is actually seen.

(N) means numerical value



Normal gamma setting: 0.45
Gamma > 0.45: Darken an image.
Gamma < 0.45: Lighten an image.

In the DG-3, the **plus** button decreases the gamma value in the following sequence: 0.40 → 0.35 → 0.30 → 0.25. The **minus** button increases it up to 1.00.

7. Changing the shutter speed (SHUT)

The shutter speed can be changed from 1/45 of a second up to 4 seconds. The larger the value, the brighter the image will be and vice versa. Unlike brightness adjustment in REC mode, brightness will display as the current shutter speed value.

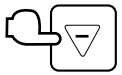
8. Changing white balance settings (WBR, WBB)

Change the red and blue balances when you set the white balance. Increasing the red and blue values using the **plus** button will increase their intensities while decreasing the values using the **minus** button will decrease their intensities.

* This option is effective in situations where it is difficult to change the white balance, such as when the unit is attached to a microscope.
* Initial settings for **WBR** (red) and **WBB** (blue) are 93 and 73 respectively.

"**WBR**": Used to change the red value.
"**WBB**": Used to change the blue value.

Use the plus button to increase intensity.



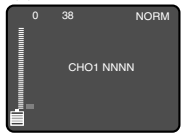
Use the minus button to decrease intensity.

9. Changing the A/D gain setting

When the method described in section 6-5 is used to adjust the brightness of an image, screen movement will be less smooth under overly bright settings as this method adjusts the shutter speed to control brightness. The A/D setting can be used to adjust brightness without the screen movement being jerky.

* When this feature is used an increase in small bright spots that resemble image noise may be noticeable. However this is normal in that this method amplifies the brightness of the video signal and consequently also amplifies the noise elements.

(N) means numerical value

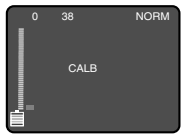


Normal A/D gain setting: 96
A/D gain > 96: Brighten an image.
A/D gain < 96: Darken an image.

In the DG-3, the **plus** button increases the A/D gain setting value up to 255 in increments of 4, for example 96 → 100 → 104, while the **minus** button decreases the value down to 000 in increments of 4, for example 96 → 92 → 88.

10. Adjusting the scale length (CALB)

Even if the magnification of the lens being used matches the scale display, the scale length may not match the actual dimensions due to variations in lens' specifications. In such cases, the scale length can be adjusted at will.



* Scale length setting can be individually made for each magnification and the setting will be retained after the unit has been turned off. The adjusted scale length can be initialized by turning the unit on while pressing both the **plus** and **minus** buttons. However be careful as this initialization process will apply to all other scale length settings that have been made.

Setting the scale:

Press the **SCALE/MENU** button to display the scale that corresponds to the lens in use.View a subject with a predetermined length while displaying the scale and align the subject with the scale display.For example, the scale length will be 500 μm (0.5 mm) at x200 magnification. So prepare plotting paper or a ruler that allows you to determine the dimension of 500 μm and overlap the scale using this reference on the monitor.If the scale length is shorter than the reference, use the **plus** button to increase the length. If the length is longer, use the **minus** button to decrease the length. When the scale length approximately matches the reference, hold down the **SCALE/MENU** button to confirm the scale setting change and exit MENU mode.

6-12. Retaining Settings Made

The DG-3 can retain all settings other than shutter speed, and include recording mode (NORM, FINE or ZOOM), white balance settings and configuration menu settings, even when the unit has been turned off. The next time the unit is turned on the unit will operate under the retained settings made.

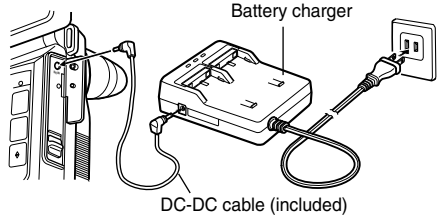
6-13. Initializing Settings

Use this feature when resetting the DG-3 to its factory settings.The unit can be initialized by turning it on while pressing both the **plus** and **minus** buttons. Please note that the clock settings remain unchanged after initialization.

7-1. DC IN Terminal

In addition to using the included rechargeable lithium-ion battery, power can also be supplied to the unit by co-necting it to an external power supply via the DC IN terminal located on the side of the unit.

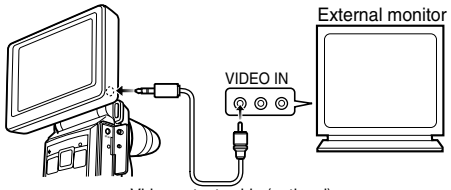
* The included battery charger can be used as an AC adapter by connecting it to the unit with the DC-DC cable.
* If any other AC adapter other than the included charger is intended being used or the unit is to be directly connected to an external power source, ensure that any such equipment meets the DG-3's power specifications and that an EIAJ Type-2 plug which complies with the specifications is used.



DC power jack and pin arrangement: EIAJ Type-2, center positive Power input: 6 VDC±5 %, 1 A or greater
Connector on the unit: EIAJ Type-2, center positive

7-2. VIDEOOUT Terminal

The unit can be connected to an external monitor via the VIDEOOUT terminal located on the side of the unit's LCD monitor.

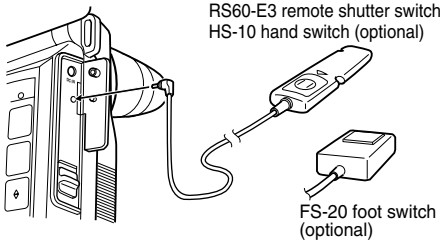


Connector on the external monitor: RCA pin jack
Connector on the unit: o3.5 mm mono mini jack

7-3. REMOTE Terminal

A single stereo plug can be plugged into the REMOTE terminal for simultaneous use of functions for operating the shutter with an external switch and flashing an external strobe light in synchronization with the shutter.

* When using only an external shutter switch a mono plug can be plugged into the unit's mini jack. However to utilize the strobe signal output feature a stereo plug must be used.
* Use a common ground for the external shutter switch and the strobe.



(φ2.5 mm mini plug ⟷ φ3.5 mm mini plug)
Commercially available products: SONY PC-262S (stereo)
PC-261M (mono)
Connector on the unit: φ2.5 mm stereo mini jack

● Shutter signal input

The shutter operates when the GND and shutter signal circuits are shorted. The unit's connector uses a pull up to 3.3 V (10 kΩ).

● Strobe signal input

As standard the mechanical shutter closes about 33 msec after the strobe signal is output, and the CCD element begins reading the exposed image. (The output time of the strobe signal is 4 msec.)

* The signal voltage of the strobe terminal is an open collector output so it will be GND when the shutter is operated. Set the strobe to a pull up to accommodate the signal.

*Please contact us or your reseller for details.

8. TROUBLESHOOTING

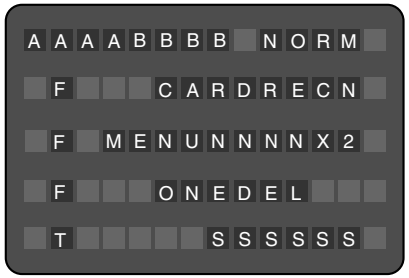
Please ensure you have checked the following before making repair inquiries.

Symptom	Points to check
The unit is completely unresponsive.	● Ensure that the rechargeable battery is correctly attached. If an external power supply is being used, ensure that the connector is connected correctly and that the input terminal is receiving the correct voltage. ● Ensure that the rechargeable battery has been fully charged and that it has not been left idle for a long period of time since last being charged. ● Ensure that the power switch has been toggled to ON.
The image on the LCD monitor or external monitor is unclear.	● Red or blue noise elements can be seen if dark areas are present in the image. ● Ensure that the lens unit is clean. If not, clean the lens unit. ● Ensure that the LCD monitor is clean. If not, clean the LCD monitor.
A shadow of the OSD display can be seen on the LCD monitor.	● On rare occasions a shadow of the OSD display may be seen. To remove this shadow, turn the OSD or power switch off and then back on.
Images cannot be recorded to the CF memory card or the unit does not recognize a CF memory card.	● Ensure that the CF memory card is fully inserted into its slot. ● Ensure that the CF memory card has been correctly initialized on a PC or other device. ● Use a PC or other device to check whether all the available space on the CF memory card has been used. ● The message "ERR" will be seen if recording was impossible because of insufficient space on the CF memory card. And in this case, the number of recorded images shown on the monitor will not increase, indicating that the image could not be recorded.
	● Some CF memory cards may not work or may be unstable in this unit. ● Some CF memory cards may not work or may be unstable in this unit even if exactly the same product as the one that did work well in the originally purchased unit. * Some products and product lots may not be compatible with this unit.
The color on the display monitor is considerably different.	● Ensure white balance adjustment was carried out before taking images. ● Ensure that reflective white paper and not non-white objects were used in making the white balance adjustment.
The image is too dark.	● Change the shutter speed to adjust brightness and then recheck again. ● If a lens unit with an integrated light source is being used, ensure that the light switch has been toggled to the correct position. ● Ensure that nothing is obstructing the front of the lens unit. ● Check that the light shining on the subject is not too bright.
The image is too bright.	● Change the shutter speed to adjust brightness and then recheck again. ● Check that the light shining on the subject is not too dark.

9. CHARTS

9-1. Screen Configuration

nscreen display locations

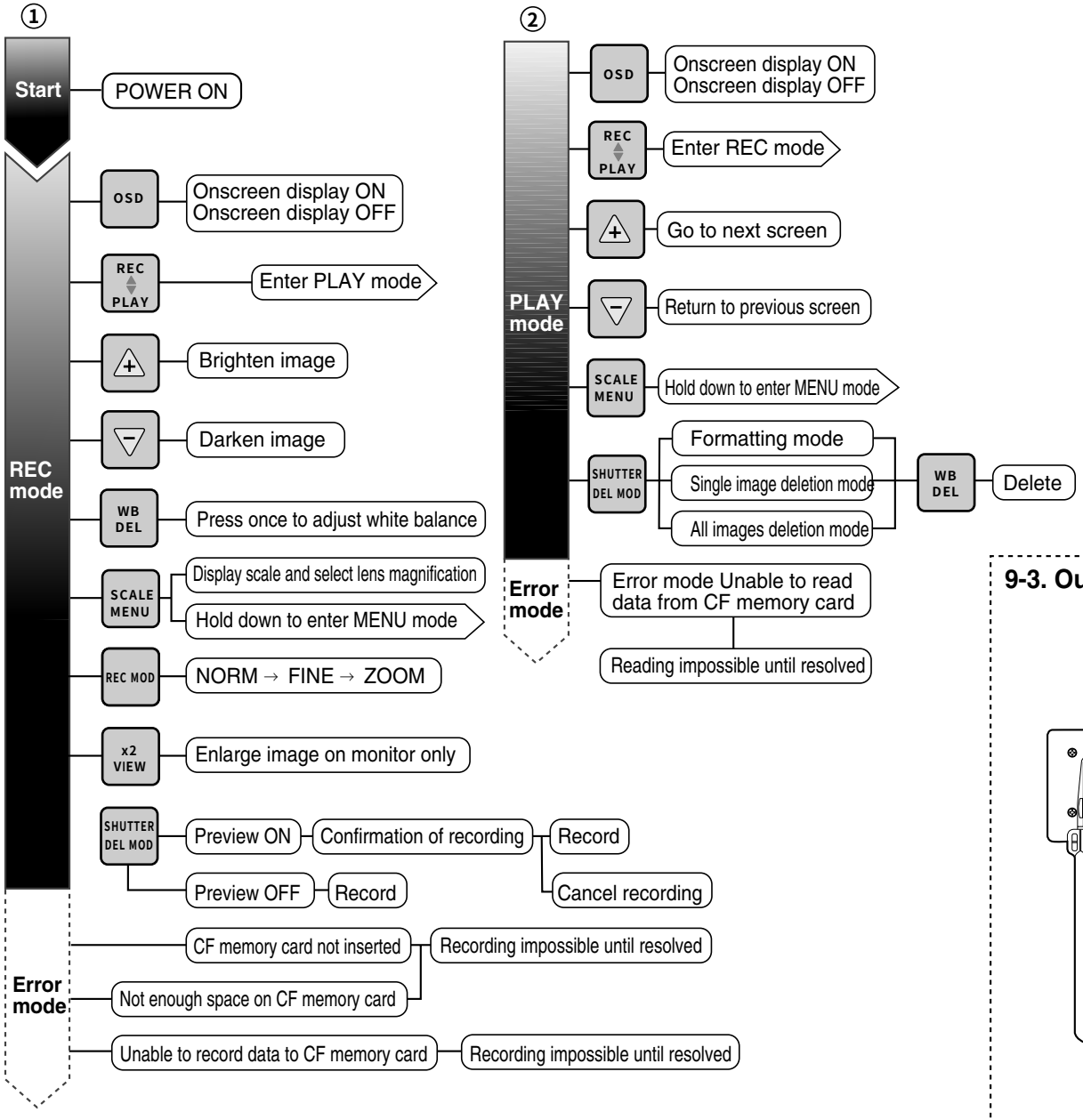


Location	Display	Operating mode	Description
AAAA	NNNN	REC & PLAY	Number of recorded images
BBBB	NNNN	REC & PLAY	Estimated remaining number of recordable images (guideline)
NORM	NORM	REC	Standard resolution (about 500 KB)
	FINE	REC	High resolution (about 900 KB)
	ZOOM	REC	Enlarged image (about 500 KB)
	PLAY	REC & PLAY	View mode
CARD			Error display
RECN			Record/view related display
	REC!	REC	Recording in progress
	FRZ!	REC	Display preview
	NNNN	PLAY	Viewed image No.
ONEDEL			Deletion related display
	ONEDEL	PLAY	Single image deletion mode
	ALLDEL	PLAY	All images deletion mode
	FORMAT	PLAY	Formatting mode
	DEL!	PLAY	Deleting in progress
FFF		REC	Focus indicator display
	FFF	REC	Focus indicator
X2		REC	2x display
	X2	REC	Displaying at x2 magnification
T			Battery
SSSSSS			Magnification, length and scale display
MENUNNNN			Menu display
	PRVW ON/OFF	REC	Preview setting
	YEAR NNNN	REC	Clock setting (year)
	MNTH NNNN	REC	Clock setting (month)
	DAY NNNN	REC	Clock setting (day)
	HOUR NNNN	REC	Clock setting (hour)
	MINT NNNN	REC	Clock setting (minute)
	FBAR ON/OFF	REC	Focus indicator
	FILE DCIM//DSC	REC	Registration folder location
	STMP ON/OFF	REC	Time stamp
	GMMA NNN	REC	Gamma table
	SHUT NNN	REC	Shutter speed
	WBR NNN	REC	White balance (red)
	WBB NNN	REC	White balance (blue)
	CH01 NNN	REC	A/D gain
	CALB NNN	REC	Scale length

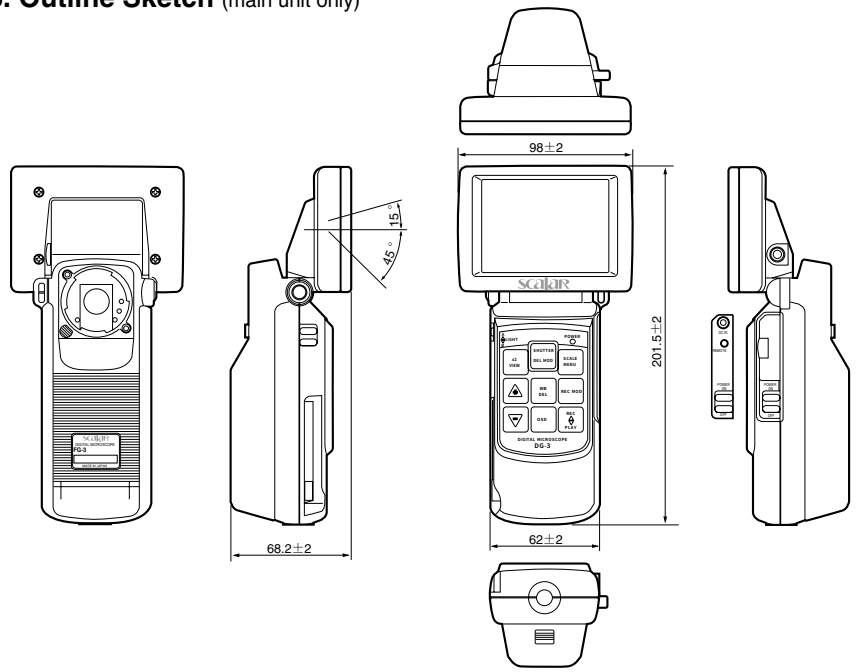
＊NNN,NNNNは数値が入ります。

CHARTS

9-2. Functional Hierarchy



9-3. Outline Sketch (main unit only)



10.SPECIFICATIONS

Imaging element	1/1.75" interlace scanning CCD
	(aspect ratio: 3:2, RGB primary color filter, square pixels)
Pixels	Total pixels: about 2.3 million pixels (1901 x 1212)
	Effective pixels: about 2.19 million pixels (1816 x 1208)
Mount	Scalar DG mount (Complies with C-mount when C-mount adapter used.)
Shutter speed	1/45 to 4 sec.
Recording medium	CF memory card
	● NORM mode: 1792 x 1184 pixels, about 500 KB
	● FINE mode: 1792 x 1184 pixels, about 900 KB
	● ZOOM mode: 896 x 592 pixels, about 500 KB
Monitor	3.5" 230 thousand pixel TFT LCD (dots: 960 x 234)
Video output	NTSC
VIDEO OUT/	ϕ3.5 mm mono mini jack (side of LCD monitor)
REMOTE terminal	ϕ2.5 mm stereo mini jack (also synchronizes external strobe light)
DC IN terminal	DC power jack (EIAJ Type-2, center positive)
Light switch	Switchable between lights A and B (when lens unit with integrated light source used)
Output voltage	5 V; Maximum output current: 250 mA
Input voltage	6.0 VDC ±5 %, 1 A; 6.0-7.2 V ±5 % during battery operation
Power consumption	About 6 W when only operating main unit
Battery operation time	1-1.5 hours of non-stop monitoring (varies depending on settings used) 1 hour of non-stop recording (varies depending on settings used)
Power indicator LED	Power on: Green LED lights up. Low battery power: Red LED lights up. Power off: Both LEDs go off.
Weight	About 370 g (main unit only) About 490 g (with battery and CF memory card)
Mounting hole	Tripod mounting hole
Operating environment	Temperature: 0-40 ˚C
Storage environment	Temperature: -10-55 ˚C
Operating and storage humidity	30-85 % (no condensation allowed)

* Specifications are subject to change without notice due to continuous product development and improvement.

11. FCCand VCCI

FCC • • • FCC CLASS B

Warning

This device has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio or television reception. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio and television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Warning

Changes or modifications not expressly approved by Scalar Corporation could void the user's authority to operate the equipment.

VCCI • • • Class 2 Information Technology Equipment

This equipment is in the Class B category (Information Technology Equipment to be used in a residential area or adjacent area thereto) and conforms to the standards set by the Voluntary Control Council for Interference by Information Technology Equipment aimed at preventing radio interference in such residential areas. When used near radios or TV receivers it may be a cause of radio interference. Read the instructions for correct handling. This equipment conforms to VCCI standards with the power cord and video output cable connected.