Before operating this product, please read the instructions carefully and save this manual for future use.
## WARNING:

- **TO REDUCE THE RISK OF FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE.**
- **TO REDUCE THE RISK OF FIRE OR SHOCK HAZARD, KEEP THIS EQUIPMENT AWAY FROM ALL LIQUIDS. USE AND STORE ONLY IN LOCATIONS WHICH ARE NOT EXPOSED TO THE RISK OF DRIPPING OR SPLASHING LIQUIDS, AND DO NOT PLACE ANY LIQUID CONTAINERS ON TOP OF THE EQUIPMENT.**

## CAUTION:

- **CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK DO NOT OPEN.** 
  NO USER-SERVICEABLE PARTS INSIDE.
  REFER TO SERVICING TO QUALIFIED SERVICE PERSONNEL. 

The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated “dangerous voltage” within the product’s enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

## Camera-Recorder

The rating plate is on the underside of the viewfinder.

## AC Adapter

The rating plate is on the underside of the AC Adapter.

Disconnect the AC mains plug from the AC mains socket when not in use.

## WARNING:

Always keep memory cards or accessories (coin battery, microphone holder screws, microphone holder adapter, ferrite cores, INPUT terminal cover) out of the reach of babies and small children.

## CAUTION:

- **EXCESSIVE SOUND PRESSURE FROM EARPHONES AND HEADPHONES CAN CAUSE HEARING LOSS.**

## CAUTION:

- **DO NOT LEAVE THE UNIT IN DIRECT CONTACT WITH THE SKIN FOR LONG PERIODS OF TIME WHEN IN USE. LOW TEMPERATURE BURN INJURIES MAY BE SUFFERED IF THE HIGH TEMPERATURE PARTS OF THIS UNIT ARE IN DIRECT CONTACT WITH THE SKIN FOR LONG PERIODS OF TIME. WHEN USING THE EQUIPMENT FOR LONG PERIODS OF TIME, MAKE USE OF THE TRIPOD.**

## FOR Battery Pack

- Replace only with same or specified type.
- Do not disassemble or dispose of in fire.
- Do not store in temperatures over 60°C (140°F).
- Do not leave the battery in an automobile exposed to direct sunlight for a long period of time with doors and windows closed.
- Use specified charger.

## FOR Battery of Remote Controller

- Replace battery with part No. CR2025 only.
- Do not recharge the battery.
- Do not disassemble or dispose of in fire.
- Do not store in temperatures over 60°C (140°F).

## CAUTION:

- **DO NOT LIFT THE UNIT BY ITS HANDLE WHILE THE TRIPOD IS ATTACHED. WHEN THE TRIPOD IS ATTACHED, ITS WEIGHT WILL ALSO AFFECT THE UNIT’S HANDLE, POSSIBLY CAUSING THE HANDLE TO BREAK AND HURTING THE USER. TO CARRY THE UNIT WHILE THE TRIPOD IS ATTACHED, TAKE HOLD OF THE TRIPOD.**

## CAUTION:

- **THE MAINS PLUG OF THE POWER SUPPLY CORD SHALL REMAIN READILY OPERABLE. THE AC RECEPTACLE (MAINS SOCKET OUTLET) SHALL BE INSTALLED NEAR THE EQUIPMENT AND SHALL BE EASILY ACCESSIBLE. TO COMPLETELY DISCONNECT THIS EQUIPMENT FROM THE AC MAINS, DISCONNECT THE POWER CORD PLUG FROM THE AC RECEPTACLE.**
FCC NOTICE (USA)

Declaration of Conformity

Model Number: AG-HPX170P
Trade Name: PANASONIC
Responsible Party: Panasonic Corporation of North America One Panasonic Way, Secaucus, NJ 07094
Support contact: Panasonic Broadcast & Television Systems Company 1-800-524-1448

This device complies with Part 15 of FCC Rules.

Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

To assure continued compliance, follow the attached installation instructions and do not make any unauthorized modifications.

CAUTION:

This equipment 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 communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or 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 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.

The user may find the booklet “Something About Interference” available from FCC local regional offices helpful.

FCC Warning:
To assure continued FCC emission limit compliance, follow the attached installation instructions and the user must use only shielded interface cables when connecting to host computer or peripheral devices. Also, any unauthorized changes or modifications to this equipment could void the user's authority to operate this device.

NOTIFICATION (Canada)

This class B digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

IMPORTANT

"Unauthorized recording of copyrighted television programs, video tapes and other materials may infringe the right of copyright owners and be contrary to copyright laws."

A lithium ion/polymer battery that is recyclable powers the product you have purchased. Please call 1-800-8-BATTERY for information on how to recycle this battery.

For USA-California Only

This product contains a CR Coin Cell Lithium Battery which contains Perchlorate Material – special handling may apply.
See www.dtsc.ca.gov/hazardouswaste/perchlorate.
IMPORTANT SAFETY INSTRUCTIONS

1) Read these instructions.
2) Keep these instructions.
3) Heed all warnings.
4) Follow all instructions.
5) Do not use this apparatus near water.
6) Clean only with dry cloth.
7) Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8) Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9) Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10) Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11) Only use attachments/accessories specified by the manufacturer.
12) Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
13) Unplug this apparatus during lightning storms or when unused for long periods of time.
14) Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

Recommendation for Use of Genuine Panasonic Battery Pack (Rechargeable Battery)

Thank you for using a Panasonic product.

It has been our policy to recommend that the genuine Panasonic battery pack be used for any Panasonic product that uses a battery pack, including digital cameras. It has, however, been found that imitation battery packs that look very similar to the genuine Panasonic battery pack are marketed in some markets.

Some of these imitation battery packs are not equipped with any protective devices that meet given quality standards for permitting use at high power outputs and for long hours. **If any of these battery packs of inferior quality is used, it could lead to an accident or failure involving firing or explosion.**

To ensure that our products are used in utmost safety, we once again remind you that we recommend the use of a genuine Panasonic battery pack for any Panasonic product that is to use a battery pack. The genuine Panasonic battery packs are sold under our stringent quality control.

Please be advised that we are not liable for any accident or failure occurring as a result of use of an imitation battery pack.

We appreciate your kind understanding and cooperation in this regard.
Software information for this product

1. Customer advisory: This product includes software licensed under the GNU General Public License (GPL) and GNU Lesser General Public License (LGPL); customers have the right to download, modify, and redistribute source code for this software. Descriptions of the GPL and LGPL are stored on the installation CD included with this camera-recorder. See the folder named ‘LDOC. (The description is the original (written in English).) To download the relevant source code, visit https://eww.pavc.panasonic.co.jp/pro-av/

Please note that we cannot answer any questions you may have about the content, etc. of any source code you may obtain from the above Web site.

2. This product includes software licensed under the MIT License. A description of the MIT is stored on the installation CD included with this camera-recorder. See the folder named ‘LDOC. (The description is the original (written in English).)

- LEICA is a trademark of Leica Microsystems IRGmbH.
- DICOMAR is a trademark of Leica Camera AG.
- SD logo is a trademark.

All other explanations, company names, and product names are the registered trademarks of the respective companies.

---

P2HD 5 Year Warranty Repair Program

Thank you for purchasing this Panasonic P2HD device. Register as a user for this device to receive a special service warranty up to five years of free warranty repairs.

Customers who register as users on the website will receive an extended warranty repair valid for up to five years.

<table>
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<tr>
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<th>3rd year</th>
<th>4th year</th>
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<tr>
<td>P2HD device²</td>
<td>Basic warranty³</td>
<td>Extended warranty repair⁴</td>
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</table>

*1: Please note that this extended warranty is not available in some countries/regions see web site below for details. *2: Not all models eligible for extended warranty coverage. *3: The basic warranty period may vary depending on the country/region see enclosed warranty for warranty coverage. *4: Not all repair work is covered by this extended warranty see enclosed warranty card for warranty coverage. *5: The maximum warranty period may be adjusted depending on the number of hours the device has been used.

Purchase P2 product
Register online within 1 month
“Registration Notice” e-mail sent
Make sure to save the “Registration Notice” e-mail during the warranty period.

Free 5 years of Warranty Repairs

Details about user registration and the extended warranty: http://panasonic.biz/sav/pass_e

Please note, this is a site that is not maintained by Panasonic Canada Inc. The Panasonic Canada Inc. privacy policy does not apply and is not applicable in relation to any information submitted. This link is provided to you for convenience.
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Outline of operations

This unit is compatible with P2 (Professional Plug-in) cards. The P2 card has a large capacity with a high transfer rate, and allows you sophisticated movie-making on this handy camera, including HD (High Definition) recording and smooth editing/dubbing.

1 P2 mode shooting and playback (Pages 25 and 63)

P2 card

You can use the following features:
- HD (High Definition) recording
- Multi format recording
- Variable frame rates
  - Slow & quick motion recording
- Maximum 4 channel uncompressed digital audio recording
- DV recording (480i)

For details on how to handle recorded data, see page 121

2 PC mode (Page 81)

Computer

The data (file) is transferred for nonlinear editing on your computer or other unit.

3 1394 host mode (Page 83)

External hard disk

The unit directly controls the external hard disk drive, and transfers the data (file) to it.
Precaution for use

Always take some trial shots before actual shooting.
- When shooting important events (such as weddings), always take some trial shots and check that the sound and images have been recorded properly before actual shooting.

Be sure to check and set the calendar and time zone.
- These settings affect the control and playback sequence of the recorded contents. Before making a recording, set and check the calendar and time zone. (Page 24)

Panasonic makes no guarantees for your recordings.
- Please understand that Panasonic makes no guarantees for your recordings in cases where images and/or sound were not recorded as you intended due to problems with the camera-recorder.

Respect copyrights
- Copyright laws forbid the use of video and audio material you have recorded for any purpose other than your own personal enjoyment. Remember that restrictions apply to the shooting of certain material even if it is intended for private use.

Caution regarding laser beams
- The CCD may be damaged if it is subjected to light from a laser beam.
  When using the camera-recorder in locations where laser irradiation equipment is used, be careful not to allow the laser beam to shine directly on the lens.

Notes when connecting a 1394 cable
- Windows:
  Before connecting, turn off the main unit power, and check the shape and orientation of the terminal.
- Macintosh:
  After turning on the power of the Apple Macintosh computer, check the shape and orientation of the terminal, and then connect the cable.
  (Pages 77, 78)

Media that can be used in this unit
The following media can be used in this unit. For details, refer to the respective pages.
- P2 card (Pages 25, 121)
- SD/SDHC memory cards (Pages 29, 122)

Mounting the camera-recorder on a tripod
The tripod mounting hole is 5.5 mm deep. Do not force the tripod screw beyond this depth. You can damage the camera-recorder if you use any screw other than 1/4-20UNC.

Attach the tripod to the tripod hole.

For other usage notes, see page 116.
Accessories

<table>
<thead>
<tr>
<th>Battery *1</th>
<th>AC Adapter</th>
<th>AC power supply cord/DC cord</th>
<th>Wireless remote control and battery (CR2025)</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Battery" /></td>
<td><img src="image2.png" alt="AC Adapter" /></td>
<td><img src="image3.png" alt="AC power supply cord/DC cord" /></td>
<td><img src="image4.png" alt="Wireless remote control" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Eye cup</th>
<th>Microphone holder</th>
<th>Screws for microphone holder 6-mm screws (2)</th>
<th>Microphone holder adapter</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image5.png" alt="Eye cup" /></td>
<td><img src="image6.png" alt="Microphone holder" /></td>
<td><img src="image7.png" alt="Screws for microphone holder" /></td>
<td><img src="image8.png" alt="Microphone holder adapter" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Shoulder belt</th>
<th>Component video cable</th>
<th>PIN-BNC conversion plugs (3)</th>
<th>30-mm ferrite core (2)*2 35-mm ferrite core (2)*2</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image9.png" alt="Shoulder belt" /></td>
<td><img src="image10.png" alt="Component video cable" /></td>
<td><img src="image11.png" alt="PIN-BNC conversion plugs" /></td>
<td><img src="image12.png" alt="30-mm ferrite core" /> <img src="image13.png" alt="35-mm ferrite core" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CD-ROM</th>
<th>The following accessories are attached to the camera-recorder.</th>
<th>Lens hood</th>
<th>INPUT terminal cover (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image14.png" alt="CD-ROM" /></td>
<td><img src="image15.png" alt="The following accessories are attached to the camera-recorder." /></td>
<td><img src="image16.png" alt="Lens hood" /></td>
<td><img src="image17.png" alt="INPUT terminal cover" /></td>
</tr>
</tbody>
</table>

*1 For part numbers for the battery, see “Optional units”, (see below)
*2 When using a 1394 cable (sold separately) or a USB cable (sold separately), attach ferrite cores to the both ends of the cable. (Page 77)

Optional units

- **XLR microphone**
  AG-MC200G
- **Battery**
  CGA-D54 (5400 mAh: equivalent to accessory battery)

About this manual

**Note concerning illustrations in these instructions**

- Illustrations (camera-recorder, menu screens, etc.) in these operating instructions differ slightly from the actual camera-recorder.

**References**

- References are shown as (Page @).
Description of parts

Right side and rear side

1. POWER switch (Page 19)
2. START/STOP button (Page 25)
3. REC CHECK button (Page 25)
4. Zoom button (Page 30)
5. HANDLE ZOOM switch (Page 30)
6. Recording enable/disable switch (Page 40)
7. Handle zoom button (Page 30)
8. Handle START/STOP button (Page 25)
9. Built-in stereo microphone (Page 51)
10. Tally lamp (Front) (Page 19)
11. Remote control sensor (Front) (Page 18)
12. White balance sensor (Page 39)
13. INPUT 1/2 (audio input) switch (Page 51)
14. Zoom ring pin hole (Page 30)
15. P2 card access lamp (x 2) (Page 26)
16. Viewfinder (Page 20)
17. P2 card/SD memory card slot (cover) (Pages 25 and 29)
18. SCENE FILE dial (Page 53)
19. SLOT SEL button (Page 44)
20. Mode button (Page 25)
21. Remote control sensor (Rear) (Page 18)
22. Tally lamp (Rear) (Page 19)
23. Mode lamp (Page 25)
24. Power terminal (Page 16)
25. Battery release button (Page 16)
Description of parts (continued)

**Left side**

1. Focus ring (Page 35)
2. Zoom ring (Page 30)
   If you don’t need the zoom ring pin, fit it into the provided zoom ring pin hole (14 on page 11) so that you don’t loose it.
3. FOCUS ASSIST button (Page 36)
4. USER button (Page 42)
5. ZOOM switch (Page 30)
6. Built-in speaker (Page 75)
7. OPEN button (Page 21)
8. Diopter adjustment dial (Page 20)
9. FOCUS switch (Page 35)
10. PUSH AUTO button (Page 35)
11. AWB button (Page 38)
12. IRIS dial (Page 36)
13. ND FILTER switch (Page 37)
14. IRIS button (Page 36)
15. GAIN switch (Page 37)
16. WHITE BAL switch (Page 38)
17. FOCUS RING (FOCUS/IRIS) switch (Page 35)
18. DISP/MODE CHK button (Page 41)
19. AUTO/MANUAL switch (Page 25)
20. AUDIO LEVEL knobs (CH1, CH2) (Page 52)
21. LCD monitor (Page 21)
22. MENU button (Page 94)
23. THUMBNAIL button (Page 66)
24. Operation lever (Pages 63 and 94)
25. PAGE/AUDIO MON/VAR button (Pages 43 and 74)
26. CH1, CH2 SELECT switch (Page 51)
27. BARS button (Page 42)
28. SHUTTER, SPEED SELECT +/- button (Page 49)
29. INPUT1, 2 switch (MIC POWER +48 V) (Page 51)
30. COUNTER - RESET/TC SET button (Page 58)
31. LCD button (Page 23)
32. ZEBRA button (Page 40)
33. EVF DTL button (Page 21)
34. WFM button (Page 43)
35. OIS button (Page 42)
36. MCR REC button (Page 86)
   Functions when the ZEBRA button (32) and OIS button (35) are pressed at the same time.
Terminals and mounting parts

1 USB terminal (Mini-B) (Page 77)
2 Light shoe
3 Microphone shoe (Page 76)
4 P2 card slots (Page 25)
5 SD memory card slot (Page 29)
6 P2 card eject buttons (Page 28)
7 SDI OUT terminal (Page 80)
8 1394 terminal (Pages 77 and 78)
9 COMPONENT OUT terminal (Page 80)
10 CAM REMOTE jack*  
  FOCUS/IRIS (3.5 mm mini jack)  
  You can connect a remote control unit to control the FOCUS and IRIS (aperture).  
  ZOOM S/S (2.5 mm super mini jack)  
  You can connect a remote control unit to control zoom and start/stop of recording.
11 Headphone jack (3.5 mm stereo mini jack)  
  (Page 76)
12 Tripod hole (Page 9)
13 Security Lock opening  
  Use this opening to attach a security cable.  
  For details on how to attach the cable, see the Operating Instructions supplied with the cable.  
  The security lock and security cable are designed to prevent theft, but Panasonic will not accept any liability for damages resulting from theft.
14 INPUT 1/2 terminal (XLR, 3 pin) (Page 76)
15 AUDIO OUT CH1/CH2 terminals (Page 80)
16 VIDEO OUT terminal (Page 80)

* Do not connect any equipment except the remote controller to the CAM REMOTE jack.  
  Connecting any equipment other than the remote control may cause the image brightness to change and/or the images to appear out of focus.
**Remote control**

The following buttons are for functions that cannot be executed on the camera-recorder.

- PHOTO SHOT
- MULTI/P-IN-P
- STORE
- PB.ZOOM
- TITLE
- SELECT
- OFF/ON
- PB.ZOOM

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</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>DATE/TIME button</td>
<td>OSD button</td>
<td>COUNTER button</td>
<td>COUNTER RESET button</td>
<td>REC button</td>
<td>PLAY button</td>
<td>PAUSE button</td>
<td>STILL ADV button</td>
<td>STOP button</td>
</tr>
</tbody>
</table>

**Operation buttons**

- 6 PLAY button (►) (Pages 63 and 86)
- 7 ◄/REW button (◄) (Page 63)
- 8 PAUSE button (■) (Page 63)
- 9 STILL ADV button (◄, ►) (Page 18)
- 10 STOP button (■) (Page 63)
- 11 FF/► button (►►) (Page 63)

**Buttons for shooting and volume control**

- 12 START/STOP button (Page 25)
- 13 ZOOM/VOL buttons (Page 30)
- 14 VAR. SEARCH button (Page 74)
- 15 MENU button (Page 94)

Functions the same as the MENU button on the camera.

- [◄], [►], [▲], [▼] buttons
  Function the same as the Operation lever on the camera.
The battery

Charging

Before using the battery, fully charge it with the AC adapter.
Keep a spare battery with you.

1 Align the battery with the \( \equiv \) marking on the AC adapter, place it flat, and slide it in the direction shown below.
   • You cannot charge the battery if the DC cord is connected to the DC OUT connector, so disconnect it first.

2 Plug the AC cord into the power outlet.
   • The POWER lamp and CHARGE lamp on the AC adapter light, and charging begins.
   • If the CHARGE lamp does not light when attached, detach the battery and then attach it again.

3 Slide the battery and remove it.

Recording time of included battery

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Recharging time</th>
<th>Continuous recording time</th>
</tr>
</thead>
<tbody>
<tr>
<td>5400 mAh</td>
<td>Approx. 330 min.</td>
<td>Approx. 160 min.</td>
</tr>
</tbody>
</table>

- The times given above are approximate for when scenes are shot in the DVCPRO HD mode while not using the LCD monitor.
- The times apply when the ambient operating temperature is 68°F (20°C) and humidity is 60%. Charging may take longer at other temperatures and humidity levels.

• Keep metal objects (such as necklaces and hairpins) away from the battery. Shortcircuiting may occur across the terminals, causing the battery to heat up, and you may seriously burn yourself if you touch the battery in this state.

- The battery becomes hot while it is being used or charged. The camera-recorder itself also becomes hot during use.
- The recordable time reduces if you repeatedly start and stop recording.
- Discharge the battery before storing it. When storing it for an extended time, charge it at least once a year, use up its charge in the camerarecorder, and then store it again.
- If the battery is extremely hot or cold, the CHARGE lamp will blink several times before charging starts.
- If the CHARGE lamp continues to blink even when the battery temperature is normal, there may be something wrong with the battery or AC adapter. Contact your dealer.
- The battery takes longer to charge when it is warm.
- The AC adapter can interfere with radio reception so keep radios at least 1 meter away from it.
- The AC adapter may make some noise when you are using it, but this is normal.
- You cannot charge the battery when supplying power to the camera-recorder from the AC adapter.
- Operation of battery pack CGR-D16 (1600 mAh) (sold separately) is not guaranteed.
Installing and removing the power supply

Installing and removing the battery

**Installation**

1. Insert the battery until it clicks into place.

**Removal**

1. Set the POWER switch to OFF, and check that the mode lamp is off.
2. While pressing the battery release button, raise up the battery to remove it.
   - Support the battery with your hand to ensure that it will not fall.

Connecting and disconnecting the power cord

**Installation**

1. Connect the DC cord to the AC adapter.
2. Plug the AC power supply cord into the power outlet.
3. Slide the DC cord’s battery connector to the direction of the arrow until it clicks into place.

**Removal**

1. Set the POWER switch to OFF, and check that the mode lamp is off.
2. Slide the DC cord’s battery connector to the direction of the arrow while pressing the battery release button.
3. Disconnect the AC power supply cord from the power outlet.

**CAUTION:**
This apparatus can be operated at a voltage in the range of 110 – 240 V AC.
Voltages other than 120 V are not intended for U.S.A. and Canada.
Operation at a voltage other than 120 V AC may require the use of a different AC plug. Please contact either a local or foreign Panasonic authorized service center for assistance in selecting an alternate AC plug.
Adjusting the hand strap

Adjust the hand strap to suit your hand.

1. Open the cover and adjust the length.

2. Close the cover.
   • Make sure the cover is fully closed.

Attaching the shoulder strap

Attach the shoulder strap and use it as a precaution against dropping the camera.

Detaching and attaching the lens hood

Detaching the lens hood
• Turn the lens hood counterclockwise to detach it.

Attaching the lens hood
• Turn the lens hood clockwise until it clicks to secure it in position.
• Be sure to attach the lens hood cap to protect the lens when not in use.
## The remote control

### Insert the battery

1. Push the catch in the direction shown by arrow ① to remove the holder.

![Remote control with catch removed](image1)

2. Insert the battery with the “+” marked side facing up.

![Battery inserted](image2)

3. Return the holder to its original position.

![Holder returned](image3)

- When the battery (CR2025) has run out, replace it with a new one. (The battery lasts about one year, depending on the frequency of use.) If the remote control unit fails to work even when it is operated near the camera-recorder’s remote control sensor, the battery has run out.
- **Keep the battery out of the reach of children.**

### Remote control setup

When using two camera-recorders simultaneously, set this camera-recorder and the remote control to either “operation mode 1” or “operation mode 2” so the remote control does not operate the wrong camera-recorder by mistake.

#### Setting

- **Wireless remote control**
  
  Press the MCR operation buttons STOP (■) and STILL ADV (▶) at the same time to set the remote control unit for use in “operation mode 1”. Alternatively, press the STOP (■) and STILL ADV (◀) buttons at the same time to set the remote control unit for use in “operation mode 2”. When the battery in the remote control unit is replaced, the remote control unit is set for use in “operation mode 1”.

- **Camera**

  In the setup menus, OTHER FUNCTIONS screen, REMOTE, set to 1 or 2. (Page 110)

  If different settings are used for the camera-recorder and remote control unit, “REMOTE” lights in red on the viewfinder and LCD monitor.
Turn on/off the camera

While pressing the lock release, turn the POWER switch.

**Turn on the camera:**
The mode lamp (CAM) lights red (CAM mode) and the camera is now in the shooting standby mode.

**Turn off the camera:**
The mode lamp (CAM) goes out.

- **Power saving mode**
  When the camera is left idle in pause mode for about 5 minutes, it will behave as follows depending on what POWER SAVE settings have been made in the setting menu OTHER FUNCTIONS screen (Page 112).
  - **ON:** The camera-recorder turns off automatically.
  - **OFF:** The camera-recorder does not turn off automatically.

  See the setup menus, OTHER FUNCTIONS screen, POWER SAVE (Page 112) for details.

- **When the operation mode buttons flash in sequence starting with the top one and the power then goes off, it means that there is no charge left in the battery. Recharge the battery.**

Tally lamp

The tally lamp can be made to light up during shooting by selecting “ON” as the REC LAMP setting in the OTHER FUNCTIONS screen.

(Page 111)

When the camera-recorder is in any of the following states, the tally lamp blinks.

- When an operation initiated by the remote control unit has been received (8 blinks/sec.)
- When the remaining battery capacity runs out (4 blinks/sec.)
- When the available recording space on the P2 card or the battery power is low (1 blink/sec.)
- When removing the P2 card during access (4 blinks/sec.)
- When there is no recording space left on the P2 card (4 blinks/sec.)
Viewfinder

This camera has two viewfinders; one is a miniature LCD in the viewfinder and the other is a retractable 3.5-inch LCD. Use the viewfinder that best suits the application and shooting conditions.

- The brightness and hue may differ between the images appearing on the viewfinder and LCD monitor and those displayed on a TV monitor. To see how the final images will appear, check them on a TV monitor.
- Images are always displayed on the viewfinder.

Using the viewfinder

1 Set the POWER switch to ON and check that images appear in the viewfinder.
   • Keep the LCD monitor closed.

2 Adjust the viewfinder’s angle so that the screen is positioned where it is easiest to see.
   • You can move the view finder out to about 90 degrees perpendicular to the camera.

3 Adjust the diopter adjustment lever so that you can see the characters on the viewfinder screen clearly.

Fitting the eye cup

Attach the eye cup by aligning the projections on the eye cup holder and eye cup and fitting them together.

- Turning the eye cup after attaching it may cause the eye cup holder to come off. If the eyecup holder does come off, see “Cleaning the Viewfinder” (page 119) for details on how to refit it.

Do not point the eye piece at the sun or other strong light source.
- Light concentrated by the lens could damage internal components and poses a fire hazard.
Using the LCD

1 Set the POWER switch to ON.

2 Hold down the OPEN button to open the LCD monitor.
   - It can open out to 120 degrees. Do not try to open it further as this will damage the camera.

3 Position the LCD monitor where it is easiest to see.
   - The monitor can be rotated 180 degrees toward the lens and 90 degrees toward you.
   - Do not apply unnecessary force to the open LCD. This can damage the camera.

   • Ensure the LCD is fully closed.

Emphasizing outlines

Emphasizing the outlines of the images you see in the viewfinder or on the LCD makes it easier to focus. Emphasizing the outlines does not affect the images you shoot.

1 In CAM mode, press EVF DTL.
   “EVF DTL ON” appears on the screen for about 2 seconds.

Press EVF DTL again to return to the original display. “EVF DTL OFF” appears on the screen for about 2 seconds.
Viewfinder (continued)

Adjusting the screen display

1 Set the POWER switch to ON. (Page 19)

2 Press the MENU button.
   • For menu operation (Page 94)
   • You can also use the menu buttons on the remote control. (Page 14)

3 Viewfinder adjustments
   Select YES under EVF SET on the setting menu DISPLAY SETUP screen.

   LCD monitor adjustments
   Set YES under LCD SET on the setting menu DISPLAY SETUP screen.

   PUSH MENU TO RETURN

4 Push the Operation lever in the ▲ or ▼ direction to select the item.

5 Push the Operation lever in the ◀ or ▶ direction to make adjustment.

6 Press MENU three times to exit the menus.

   • You can return the settings for EVF SET and LCD SET to the factory settings by selecting the item and pressing COUNTER RESET (if it is possible to change the item at that time).
   • The viewfinder display can be in color or black and white. (See the setup menus, DISPLAY SETUP screen, EVF COLOR.) The resolution is the same for both of them.
### Adjusting the backlight

The steps below show how to set the brightness of the LCD monitor to one of three possible levels.

1. **Select LCD BL under LCD on the setting menu SW MODE screen.**
   This assigns LCD BL to the LCD button.

2. **Press the LCD button.**
   Each press of the button switches backlight brightness in the following order: NORMAL (standard) → LOW (dark) → HIGH (bright) → NORMAL.
   - These settings persist even when the camera-recorder is turned off.

### Flipping images vertically and horizontally

Use this function to flip an image vertically or horizontally to check the aspect ratio or composition on the LCD monitor.

This feature affects only the image in the viewfinder or on the LCD monitor, not the recorded image.

1. **Select LCD REV under LCD on the setting menu SW MODE screen.**
   This assigns LCD REV to the LCD button.

2. **Press the LCD button.**
   - This button toggles between normal and flipped image at each press.
   - No screens are displayed when the image is flipped.
   - The unit returns to normal image mode the next time it is powered up.

### Switching between overscan and underscan

Use this function to underscan or overscan the image shown in the viewfinder or on the LCD monitor.

1. **Select OVERSCAN under LCD on the setting menu SW MODE screen.**
   This assigns OVER SCAN to the LCD button.

2. **Press the LCD button.**
   - This button toggles between overscan and underscan at each press.
   - The unit returns to underscan mode the next time it is powered up.
   - In overscan mode, a frame appears on the screen.
Setting the calendar

The CLOCK SET value is recorded in the contents (clip), and affects the sequence of playback of the thumbnails. Before carrying out recording, be sure to check and set CLOCK SET and TIME ZONE. This shows you how to adjust the calendar to 5:20 PM on December 25, 2008.

1 Set the POWER switch to ON. (Page 19)

2 Press the MENU button.

3 Push the Operation lever in the ▲ or ▼ direction to set the time difference from Greenwich Mean Time under TIME ZONE on the setting menu OTHER FUNCTIONS screen. (Page 111)

4 In the setup menus, OTHER FUNCTIONS screen, CLOCK SET, select YES.

5 Push the Operation lever in the ◄ or ► direction to set YEAR to 2008.

6 Push the Operation lever in the ◄ direction to move to the MONTH setting.

7 Push the Operation lever in the ◄ or ► direction to set MONTH to DEC.

8 Set DAY, HOUR, and MIN using the method shown in steps 4 and 5.
   • This is a 24-hour clock.

9 Press MENU three times to exit the menus.

Choose a year between 2000 and 2030.
Basic shooting operations

Preparing to shoot

1 Set the POWER switch to ON. (Page 19)

2 Lift up the viewfinder, press the side of the card slot cover (①), and slide the cover (②) to open it.

3 Insert the P2 card securely in the card slot.

4 Push the P2 card eject button to the direction of the arrow, and close the card slot cover.
   • There are two card slots.
   • Be absolutely sure to close the card slot covers to keep the dust out.
   • Do not remove the P2 card while the P2 card access lamps are blinking orange. (Page 26)

Shooting in auto mode

1 Turn the POWER switch to ON. (Page 19)
   • Check that the mode lamp (CAM) is lighted red.

2 Switch the AUTO/MANUAL switch to AUTO to select auto mode.
   • “A” appears on the viewfinder and LCD screens.
   • The focus, gain, iris and white balance are adjusted automatically.

3 Press the START/STOP button (Red) on the POWER switch to start shooting.
   • Press again to return to the camera to the shooting standby mode.
   • Use the handle START/STOP button to make it easier to shoot from low angles.

Under the following circumstances, even if you press the STOP button it may take some time until the writing to the P2 card finishes. For this reason, the operation will not be acknowledged if you press the START button too soon.
   • Stopped after only a short recording time
   • Stopped immediately after the recording has moved to a second P2 card
Basic shooting operations (continued)

Checking photos taken (REC CHECK)
In the shooting pause mode, press the REC CHECK button.
This plays back about 2 seconds of the video and audio of the most recently recorded clip before returning to pause mode.
• Note that this REC CHECK portion will also be recorded to any equipment you have set up to make backup recordings.
• The REC CHECK function does not work in PC and MCR mode.

The HD recording (720P/60P) settings are already made in the default mode. (To view the current settings, see page 41.)

P2 card access lamps
CAM mode (MCR)
Lights green:
   Data can be saved onto the cards or loaded from them.
Blinks green (slow):
   No available space on card, card is write-protected
Lights orange:
   Slot that is the object of recording
Blinks orange:
   Data is now being accessed.
Blinks orange (fast):
   A card is now being recognized.
Both lamps blink orange:
   Ejection of card during access
Off:
   Cards have not been inserted or formatted.
   Insertion of incompatible card.

PC mode (USB DEVICE)
Blinks orange:
   Data is now being accessed.
Off:
   A status other than access underway.

PC mode (1394 DEVICE)
Blinks orange:
   Connected
Off:
   Not connected

Protecting against a possible erasure
Switch the write-protect switch of the P2 card to [PROTECT].

Formatting P2 cards
1 Set the POWER switch to ON. (Page 19)
2 Press the mode button and set it to MCR mode (the MCR lamp lights).
   • Thumbnails are displayed.
3 Press the MENU button.
   • For menu operation (Page 94)
   • Operation lever
   • MENU button
   • Mode button
   • Mode lamp

4 On the menu, select OPERATION and then FORMAT. (Page 68)
   • A screen such as the one shown below appears. Select the number of the slot into which you inserted the P2 card to be formatted. Select EXIT to cancel the formatting.
   • When you press the MENU button, the menu display disappears.

5 Select YES on the confirmation screen.
   • The selected P2 card is formatted.

---

**Recording times**

<table>
<thead>
<tr>
<th>Card model</th>
<th>Capacity</th>
<th>DVCPRO/DV 2-channel audio</th>
<th>DVCPRO50 4-channel audio</th>
<th>DVCPRO HD*1</th>
<th>DVCPRO HD 720P/24PN</th>
<th>DVCPRO HD 720P/30PN</th>
</tr>
</thead>
<tbody>
<tr>
<td>AJ-P2C004HG</td>
<td>4 GB</td>
<td>approx. 16 min.</td>
<td>approx. 8 min.</td>
<td>approx. 4 min.</td>
<td>approx. 10 min.</td>
<td>approx. 8 min.</td>
</tr>
<tr>
<td>AJ-P2C008HG</td>
<td>8 GB</td>
<td>approx. 32 min.</td>
<td>approx. 16 min.</td>
<td>approx. 8 min.</td>
<td>approx. 20 min.</td>
<td>approx. 16 min.</td>
</tr>
<tr>
<td>AJ-P2C016RG</td>
<td>16 GB</td>
<td>approx. 64 min.</td>
<td>approx. 32 min.</td>
<td>approx. 16 min.</td>
<td>approx. 40 min.</td>
<td>approx. 32 min.</td>
</tr>
<tr>
<td>AJ-P2C032RG</td>
<td>32 GB</td>
<td>approx. 128 min.</td>
<td>approx. 64 min.</td>
<td>approx. 32 min.</td>
<td>approx. 80 min.</td>
<td>approx. 64 min.</td>
</tr>
</tbody>
</table>

• The AJ-P2C002SG (2 GB) card cannot be used.
• The displayed available space includes the management area, and so the space available for recording is smaller than this.

**Concerning the division of clips recorded on P2 cards**
When using a P2 card of at least 8 GB in this camera, if the continuous recording time for a single session exceeds the time shown in the following table, recording will be automatically resumed as a different clip. When performing a thumbnail operation (display, delete, restore, copy, etc.) on clips using P2 cards, you can operate them as a single clip. When you are using non-linear editing software and a PC, for example, the clips are displayed individually.

<table>
<thead>
<tr>
<th>Recording Format</th>
<th>Recording times</th>
</tr>
</thead>
<tbody>
<tr>
<td>DVCPRO HD*1</td>
<td>approx. 5 min.</td>
</tr>
<tr>
<td>DVCPRO50</td>
<td>approx. 10 min.</td>
</tr>
<tr>
<td>DVCPRO/DV</td>
<td>approx. 20 min.</td>
</tr>
</tbody>
</table>

*1 The 720P/30PN and 720P/24PN formats are not included in the DVCPRO HD recording format.

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• When using any other types of cards, the driver installed in the camera-recorder may need to be updated. (Page 118)
• For the latest information not available in the Operating Instructions, visit the P2 Support Desk at the following Web sites.
  https://eww.pavc.panasonic.co.jp/pro-av/
Basic shooting operations (continued)

Remove the P2 card

1. Lift up the viewfinder, press the side of the card slot cover (①), and slide the cover (②) to open it.

2. Check that the P2 card access lamp is not blinking orange.

3. Raise the P2 card eject button and press it.

4. Remove the P2 card.

- During playback, a P2 card inserted into the empty slot will not be recognized and the P2 card access lamp will not light. When playback is completed, the P2 card recognition will begin.
- You can use ACCESS LED on the OTHER FUNCTIONS screen to set the P2 card access lamps so that they will always be off. In this case, either turn off the power or wait until enough time has passed after inserting the cards or stopping operation before ejecting the cards.
- If a P2 card is ejected while thumbnails are displayed, the thumbnail screen is released.

Cautions in using P2 cards

Before using a P2 card, be sure to format it with a P2 device.

- Do not eject the P2 card or turn the power off under the following circumstances, since doing so may cause a malfunction in the card:
  1) While the orange P2 card access lamp is blinking after the card is inserted (and until it stops blinking).
  2) During recording, during the recording finish process, or while the access lamp is blinking.
- If a P2 card is ejected during formatting or while its data is being accessed, "TURN POWER OFF" appears in the viewfinder, and a warning is indicated by the tally lamp. If this happens, turn the power off and back on again.
- When a card is ejected during formatting:
  Format the card again.
- When a card is ejected while its data is being accessed:
  The clips may be thrown out of order.
  (Page 57) Check the clips and repair them.
  (For details on repairing clips, see page 68.)
- Immediately after pre-recording, a P2 card inserted into an empty slot will not be immediately recognized.
Using SD/SDHC memory cards

You can use SD and SDHC memory cards (the term “SD memory card” is used for both hereafter) to save and load SCENE files and USER files, and to upload clip meta data. (Page 55)

Installing and removing the SD memory card

Installation

1. Lift up the viewfinder, press the side of the card slot cover (①), and slide the cover (②) to open it.

2. Insert the card while making sure it is oriented in the proper direction.

3. Close the card slot cover.

Removal

1. Open the card slot cover, and check that the access lamp is not lit.

2. Press the card further into the unit, grasp the card, and then remove.

3. Close the card slot cover.

Formatting SD memory card

1. Set the POWER switch to ON. (Page 19)

2. Press the mode button and set it to MCR mode (the MCR lamp lights).

3. Press the MENU button.

4. On the menu, select OPERATION, FORMAT and then SD CARD. (Page 68)

5. Select YES on the confirmation screen.

- The selected SD memory card is formatted.

- You can also format from the SD CARD FORMAT option on the CARD FUNCTIONS screen. (Page 110)

- With SDHC cards, 32 KB of capacity will have been used.

Cautions in using SD memory cards

- SD memory cards used with the AG-HPX170P should conform to SD or SDHC standards. Be sure to format cards using the AG-HPX170P. SD memory cards with the following capacity can be used for the AG-HPX170P.

SD (from 8 MB to 2 GB):

<table>
<thead>
<tr>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 MB</td>
</tr>
<tr>
<td>16 MB</td>
</tr>
<tr>
<td>32 MB</td>
</tr>
<tr>
<td>64 MB</td>
</tr>
<tr>
<td>128 MB</td>
</tr>
<tr>
<td>256 MB</td>
</tr>
<tr>
<td>512 MB</td>
</tr>
<tr>
<td>1 GB</td>
</tr>
<tr>
<td>2 GB</td>
</tr>
</tbody>
</table>

SDHC (4 GB to 16 GB):

<table>
<thead>
<tr>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 GB</td>
</tr>
<tr>
<td>8 GB</td>
</tr>
<tr>
<td>16 GB</td>
</tr>
</tbody>
</table>

For the latest information not available in the Operating Instructions, visit the P2 Support Desk at the following Web sites.

https://eww.pavc.panasonic.co.jp/pro-av/

- SD memory cards must not be used or stored in an environment where they may be Exposed to high temperatures/humidities; Exposed to water droplets; or Electrically charged.

- Be sure always close the cover when using an SD memory card.

- See also “Checkpoints for using memory cards” on page 122.
Using the zoom function

This camera has a 13 x optical zoom function. Zoom with the zoom button or the zoom ring.

Zoom button
Set the ZOOM switch to SERVO so that you can use the motor-driven zoom.
- T : Zoom in
- W : Zoom out
Gently press the zoom button on the grip to zoom slowly, firmly press to zoom faster.
You can change the zoom speed on the handle zoom button by selecting one of three speeds with the HANDLE ZOOM switch.
Set the HANDLE ZOOM switch speeds by going to the setup menus, SW MODE screen HANDLE ZOOM (Page 101).

HANDLE ZOOM switch

Zoom ring
Set the ZOOM switch to MANUAL so that you can use the zoom ring.
- You cannot use the zoom ring if the ZOOM switch is set to SERVO. Trying to use it could damage the camera.

Digital zoom function
Assign the D.ZOOM function to any of the USER 1 – 3 buttons to enable use of the digital zoom. (Page 42)
Each press of the USER button to which D.ZOOM is assigned switches the zoom ratio in the following order: OFF (x1) → x2 → x5 → x10 → OFF (x1).
- The viewfinder and the LCD monitor indicate the zoom ratio when a setting other than OFF (x1) is selected.
- Digital zoom is available only in the 1080i/60i format.
- Digital zoom is not available when OFF is selected under DRS (Page 99) on the setting menu SCENE FILE screen.
- While using the zoom function, the slow shutter is disabled. While using the slow shutter, you cannot use the digital zoom function.
- Digital zoom cannot be changed during recording.

On the remote control
Press ZOOM/VOL to zoom with the motor drive.
- Zoom speed is fixed at medium.

Digital zoom function
Assign the D.ZOOM function to any of the USER 1 – 3 buttons to enable use of the digital zoom. (Page 42)
Each press of the USER button to which D.ZOOM is assigned switches the zoom ratio in the following order: OFF (x1) → x2 → x5 → x10 → OFF (x1).
- The viewfinder and the LCD monitor indicate the zoom ratio when a setting other than OFF (x1) is selected.
- Digital zoom is available only in the 1080i/60i format.
- Digital zoom is not available when OFF is selected under DRS (Page 99) on the setting menu SCENE FILE screen.
- While using the zoom function, the slow shutter is disabled. While using the slow shutter, you cannot use the digital zoom function.
- Digital zoom cannot be changed during recording.
Variable frame rates (VFR)

By taking full advantage of the special characteristics of P2 cards, this unit provides frame skipping (undercranking) recording and highspeed (overcranking) recording, which are actually movie techniques, without the use of a frame rate converter. (Either the 30PN or 24PN mode must be set for this.)

Since the camera-recorder records only the effective frames (native recording), recording is possible for between 2 times and 2.5 times as long compared with recording in the 24P, 30P or 60P mode (standard recording).

As with Panasonic's Varicam model (AJ-HDC27 series), this unit also provides a recording format that allows frame rate conversion using nonlinear editing. (Either the 30P or 24P mode must be set for this.)

24PN mode:
The camera-recorder shoots in the 24 fps native mode. The video signals delivering images at a rate of 24 fps are recorded in 24 frames. The signals are recorded only in the effective frames so recording is possible for 2.5 times as long.

- Before VFR shooting, you must set the recording frame rate and recording format ahead of time.
- You cannot change the frame rates while recording.
- VFR shooting is possible only in progressive-shooting mode with 720 vertical lines.

You can select any of 20 recording frame rates ranging from 12 frames per second (fps) to 60 fps. The list of formats that allow recording by the camera-recorder (Page 123)

There may be slight discrepancies between the recording frame rate displayed and the frame rate at which the images are actually recorded. Refer to the table below.

| Indicated recording frame rate | 60  | 54  | 48  | 44  | 40  | 36  | 34  | 32  | 30  | 28  | 27  | 26  | 25  | 24  | 22  | 21  | 20  | 18  | 15  | 12  |
|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
### Native recording

1. Using the REC FORMAT function (Page 104) on the RECORDING SETUP screen, select 720P/30PN or 720P/24PN as the recording format.

2. Select the appropriate scene file using the SCENE FILE dial.
   If necessary, before doing this, perform the camera settings from the setting menu, and register the scene file. (Page 53)

3. Using the OPERATION TYPE function (Page 98) on the SCENE FILE screen, select FILM CAM, and set the desired recording frame rate using the FRAME RATE function (Page 98).

4. Press the START/STOP button to start or stop native recording in VFR mode.
   - No signals are output from the 1394 terminal during recording or recording standby in the native mode.
   - Sound is not recorded. However, sound will be recorded when the same frame rate is used for both recording and playback.
   - When a recorded clip lasting a long time is to be played back and imported using a nonlinear editing system that supports Varicams, the UB MODE option on the RECORDING SETUP screen must be set to FRM.RATE.
   - If the effective frame information is to be carried over when recording onto this camcorder from a nonlinear editing system that supports Varicams, the 1394 UB REGEN option on the RECORDING SETUP screen must be set to ON.
   - After editing, materials are output from the nonlinear editing system in 1080i/24P or 720P/60P (24P over 60P) format.

### Standard recording

1. Using the REC FORMAT function (Page 104) on the RECORDING SETUP screen, select 720P/60P, 720P/30P or 720P/24P as the recording format.

2. Select the appropriate scene file using the SCENE FILE dial.
   If necessary, before doing this, perform the camera settings from the setting menu, and register the scene file. (Page 53)

3. Using the OPERATION TYPE function (Page 98) on the SCENE FILE screen, select FILM CAM, and set the desired recording frame rate using the FRAME RATE function (Page 98).
   When 720P/30P or 720P/24P has been selected as the recording format, the following displays appear depending on the setting which has been selected for the FRAME RATE item on the SCENE FILE screen.
   1) PULL DOWN information displayed in PROPERTY-CLIP PROPERTY-VIDEO
      With the default setting: 2:2 or 2:3
      With any other settings: other
   2) Format information in the bottom left of the screen when thumbnails are displayed
      With the default setting: 720P/30P or 720P/24P
      With any other settings: 720P/60P
      (The “default” setting is 30FRAME if the frame rate of the recording format is 30P or 24FRAME if it is 24P.)

4. Press the START/STOP button to start or stop standard recording in VFR mode.
   - Sound is recorded.
   - In the case of a nonlinear editing system that supports Varicams equipped with an effective frame extraction function, you can upload even undercrank or overcrank shooting materials as is. (The UB MODE option on the RECORDING SETUP screen must be set to FRM.RATE.)
   - After editing, materials are output from the nonlinear editing system in 1080i/24P or 720P/60P (24P over 60P) format.
   - The 24P format is used for 2:3 pull-down recording; the 30P format is used for 2:2 pulldown recording.
Using variable frame rates (VFR)

### Standard speed shooting for movie production

When making movies to show on a screen, a frame rate of 24 fps (frames per second), which is the same as for films, is the norm (1x speed). If you use the settings below, the same kind of playback as with screenings can be obtained. By using the 720P progressive mode and cine-like gamma, high-quality film-like images can be achieved.

<table>
<thead>
<tr>
<th>Recording format (REC FORMAT)</th>
<th>Recording frame rate (FRAME RATE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>720P/24P (2:3 pull-down)</td>
<td>24 fps*</td>
</tr>
<tr>
<td>720P/24PN (native recording)</td>
<td></td>
</tr>
</tbody>
</table>

### Standard speed shooting for making commercials and dramas

When producing commercials and dramas to be shown on a TV screen, as in the case of HDTV/SDTV and other broadcasts, a frame rate of 30 fps (frames per second) is the norm (1x speed). If you use the settings below, the same kind of playback as when the programs are broadcast can be obtained. Commercials and music clips will be recorded with a high film-like picture quality while the number of frames is also ideally suited to TV broadcasts.

<table>
<thead>
<tr>
<th>Recording format (REC FORMAT)</th>
<th>Recording frame rate (FRAME RATE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>720P/30P (2:2 pull-down)</td>
<td>30 fps*</td>
</tr>
<tr>
<td>720P/30PN (native recording)</td>
<td></td>
</tr>
</tbody>
</table>

### Undercrank shooting

This way of shooting provides quick motion effects used to present such scenes as the movement of clouds, someone standing among crowd of people, and moves made by martial artists. If, for instance, you have shot scenes using the 24P recording format for specifying the playback frames, you can double the speed of the quick motion effects by setting the VFR recording frame rate to 12 fps.

<table>
<thead>
<tr>
<th>Recording format (REC FORMAT)</th>
<th>Recording frame rate (FRAME RATE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>720P/24P, 720P/24PN</td>
<td>Set to 22 fps or lower.*</td>
</tr>
<tr>
<td>720P/30P, 720P/30PN</td>
<td>Set to 28 fps or lower.*</td>
</tr>
</tbody>
</table>

*In the case of the 720P/24P and 720P/30P formats, the quick motion effect can be obtained by using a nonlinear editing system to process what has been recorded.

### Overcrank shooting

This way of shooting provides slow motion effects used to show car chases as well as action scenes, climax scenes and other dramatic presentations. If, for instance, you have shot scenes using the 30P recording format for specifying the playback frames, you can obtain slow motion effects with the speed halved by setting the recording frame rate to 60 fps. Images in the 720P progressive format will create smoothly flowing slow motion sequences with a high picture quality.

<table>
<thead>
<tr>
<th>Recording format (REC FORMAT)</th>
<th>Recording frame rate (FRAME RATE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>720P/24P, 720P/24PN</td>
<td>Set to 25 fps or higher.*</td>
</tr>
<tr>
<td>720P/30P, 720P/30PN</td>
<td>Set to 32 fps or higher.*</td>
</tr>
</tbody>
</table>

*In the case of the 720P/24P and 720P/30P formats, the slow motion effect can be obtained by using a nonlinear editing system to process what has been recorded.

* You can select any of 20 recording frame rates ranging from 12 frames per second (fps) to 60 fps. (Page 98)
Shooting in 1080i/480i progressive mode

Selecting 1080i/30P, 1080i/24P, 1080i/24PA, 480i/30P, 480i/24P or 480i/24PA in the REC FORMAT option (Page 104) of the setting menu RECORDING SETUP screen enables shooting in progressive mode.

30P mode:
Shoot 30 frames a second in the progressive mode.
For output and recording, the 30-frame-per-second signal is converted to 60-field-per-second interlace.
This mode gives you high quality images.

<table>
<thead>
<tr>
<th>30P</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
</tr>
</thead>
<tbody>
<tr>
<td>60i</td>
<td>A</td>
<td>a</td>
<td>b</td>
<td>C</td>
<td>a</td>
<td>c</td>
<td>D</td>
<td>a</td>
<td>e</td>
<td>f</td>
</tr>
</tbody>
</table>

24P mode:
Shoot 24 frames a second in the progressive mode.
For output and recording, the 24-frame-per-second signal is converted to 60-field-per-second interlace using the widely used “2:3” ratio.
This gives you images similar to a movie shot with film.

<table>
<thead>
<tr>
<th>24P</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>60i</td>
<td>A</td>
<td>a</td>
<td>b</td>
<td>C</td>
<td>a</td>
<td>c</td>
<td>D</td>
<td>a</td>
</tr>
</tbody>
</table>

24P advanced mode:
Shoot 24 frames a second in the progressive mode.
For output and recording, the 24-frame-per-second signal is converted to 60-field-per-second interlace using “advanced” conversion.

<table>
<thead>
<tr>
<th>24PA</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>60i</td>
<td>A</td>
<td>a</td>
<td>b</td>
<td>C</td>
<td>a</td>
<td>c</td>
<td>D</td>
<td>a</td>
</tr>
</tbody>
</table>

With the “2:3” method, frames [BoCe], [CoDe], [FoGe], and [GoHe] shown in the illustration would be extended over different frames which can cause a drop in picture quality.

With the 24P advanced method, however, frames [BoCe] and [FoGe] are cut out, leading to a reduction in image quality loss.

If you also use a system compatible with the advanced method, editing will also yield better quality images than those shot in the normal 24P mode.

- If you are not going to do your editing on such a system, use the normal 24P method for shooting.

Note the following when shooting in progressive mode.

- You cannot have a gain of 18dB.
- Set the shutter speed to 1/50 (OFF) or 1/60 for best results.
- There may be a slight delay to the start of recording when you use the 24P or 24P advanced modes because 5 frames are recorded at a time.
Shoot in manual mode

Set the unit to manual mode when manually adjusting the focus, iris, gain, and white balance.

**Switching to manual mode**

Slide the AUTO/MANUAL switch to MANUAL to switch to the manual mode. (A on the viewfinder and LCD go out).

![AUTO/MANUAL switch]

**Manual focusing**

Focus ring  FOCUS switch

PUSH AUTO button  AUTO/MANUAL switch  FOCUS/IRIS switch

1 Use the AUTO/MANUAL switch to switch to manual mode.

2 Use the FOCUS switch to choose how to control focusing.
   A (AUTO):
   Auto focus mode
   M (MANUAL):
   Manual focus mode
   Turn the focus ring by hand.

∞:
   The camera first focuses on infinity, then it switches to manual focus.
   The FOCUS switch automatically moves back to M (MANUAL) after you move it to ∞.

3 Use the FOCUS RING (FOCUS/IRIS) switch to change the function assigned to the focus ring.
   FOCUS: Adjusts focus.
   IRIS: Adjusts iris (aperture).

   • When setting the FOCUS switch to M, also set the FOCUS RING (FOCUS/IRIS) switch to FOCUS.

Temporarily switching to auto focus

Even if you have switched FOCUS to M (MANUAL), the camera will focus automatically while you press down PUSH AUTO.

Switching to manual focus assist mode

To change from the manual focus mode to the manual focus assist mode, set MF ASSIST to ON on the setting menu SW MODE screen.

• You can make coarse adjustments to the focus in manual focus assist mode by turning the focus ring about half the amount you would turn it in manual focus mode.

• Fine adjustment is made automatically after you operated the focus ring.

• If the focus differs considerably from the manually set focus, the focus may not be set correctly.

• Automatic adjustment is not performed until you operate the focus ring for the next time.

• Auto focus may not work properly if there is flickering.
   Select a shutter speed suited to the ambient light. (Page 49)

• If the auto focus mode is set with any format except 60i and 60P, controlling the focus will take slightly longer than in the normal focus mode.

• If you have set ON for the AF item on the setting menu AUTO SW screen, auto focusing will occur regardless of the position of the FOCUS switch when the auto mode has been established. (Page 104)

• During macro shooting “AF”, “MF” or “MA” will be displayed in a frame on the screen.
Shooting in manual mode (continued)

Using focus assist

Pressing the FOCUS ASSIST button magnifies the center portion of the image or brings up a frequency distribution graph at the top right of the image to assist during manual focusing. You can use the FOCUS ASSIST setting on the SW MODE screen to change the viewfinder and LCD monitor displays that appear when the FOCUS ASSIST button is pressed. (Page 103)

FOCUS ASSIST button

EXPANDED:
Doubles the size of the center of the image.

GRAPH:
Displays a frequency distribution graph at the top right in the viewfinder and LCD monitor. Turn the focus ring on the lens to place the graph further to the right.

Out of focus

The white area moves to the right as the image comes into focus.

BOTH:
Magnifies the center portion of the image and displays the frequency distribution graph.

• The image on the LCD monitor may differ slightly from the image in the viewfinder when the FOCUS ASSIST button is used in EXPANDED mode.
• The EXPANDED mode is available during 1080i and 720P HD mode recording and standby, but does not work in external input mode.
• In the 480i SD format, only the GRAPH display is available. When set to the EXPANDED mode, the focus assist function does not work. Even when the BOTH mode is set, only the GRAPH display is available.
• The FOCUS ASSIST button does not work when the digital zoom function is used.

To return to the previous screen, press the FOCUS ASSIST button again.

Iris adjustments

1 If the camera is in auto mode, use the AUTO/MANUAL switch to switch to manual mode. (Page 35)

2 Press the IRIS button to switch how to adjust the aperture of lens.
   AUTO IRIS: Adjust the iris automatically.
   MANUAL IRIS: Adjust the iris manually.

3 Turn the IRIS dial to adjust the aperture of lens when in the manual iris mode.
   In the auto iris mode, the lens iris can be corrected using this dial.

Set the direction of the IRIS DIAL and aperture control in the setup menus, SW MODE screen, IRIS DIAL. (Page 101)
If you have set ON under A.IRIS on the setting menu AUTO SW screen, auto iris will be forcibly selected when auto mode has been established. (Page 103)
• Setting the FOCUS RING (FOCUS/IRIS) switch to IRIS allows you to set aperture using the focus ring on the lens. Note that since the focus ring now does not control focus adjustment, set the FOCUS switch to A (AUTO) focus control. (Page 35)

This unit’s iris F number when it is open is F1.6 at full WIDE and F3.0 at full TELEPHOTO.
The iris display in the viewfinder or on the LCD when the iris is open is OPEN at full WIDE and F2.8 or OPEN at full TELEPHOTO.
**Adjusting the gain**

When the display is dark, increase the gain to brighten the display.

1. **If the camera is in auto mode, use the AUTO/MANUAL switch to switch to manual mode. (Page 35)**

2. **Switch the gain with the GAIN switch.**
   - **L:** Set here under normal conditions. (0 dB)
   - **M:** Increase the gain of the image amplifier. (The default value is 6 dB.)
   - **H:** Increase the gain of the image amplifier. (The default value is 12 dB.)

You can change the M and H gain values using the MID GAIN and HIGH GAIN items on the setting menu SW MODE screen. (Page 101)

In auto mode, auto gain is available regardless of the GAIN switch setting when a setting other than OFF is selected under AGC on the setting menu AUTO SW screen. (Page 104)

When the recording frame rate is less than 22 fps and when a slow shutter speed (1/15) has been set, the gain is fixed at 0 dB regardless of the GAIN switch setting. (Pages 31 and 49)

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**Light intensity adjustments**

Use the ND FILTER Switch to change the ND Filter used (filter to change light intensity).

- **OFF:** ND filter is not used.
- **1/4:** Cuts light intensity by up to about 1/4.
- **1/16:** Cuts light intensity by up to about 1/16.
- **1/64:** Cuts light intensity by up to about 1/64.

**ND FILTER switch**
Shooting in manual mode (continued)

Adjusting the white balance

In order to reproduce the white accurately, adjust the ratio between the three RGB primary colors. If the white balance is not adjusted properly, not only will the white be reproduced poorly but the color tones of the entire screen will also be downgraded. When you are shooting in manual mode, readjust the white balance whenever lighting conditions change.

You can save adjustments and reselect them by setting the WHITE BAL switch to A or B. You can also use the preset values. Use the settings to suit the shooting conditions.

5 Press the AWB button.
   • Adjustment takes a few seconds.
     (The following messages appear on the screen.)
     Message during adjustment
     AWB Ach ACTIVE
     Message after adjustment
     AWB Ach OK

An error message appears on the screen when white balance adjustment is not possible.

Message when adjustment cannot be done

AWB Ach NG

• White balance cannot be adjusted if the Auto Tracking White (ATW) function is working.
  If you have set ON under ATW (Auto Tracking White) on the setting menu AUTO SW screen, ATW will be selected when auto mode has been established regardless of the WHITE BAL switch position. (Page 104)

Make the necessary adjustments if one of the following error messages appears, then try adjusting the white balance again.

<table>
<thead>
<tr>
<th>Error messages</th>
<th>Adjustments</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOW LIGHT</td>
<td>Increase light or increase the gain.</td>
</tr>
<tr>
<td>LEVEL OVER</td>
<td>Reduce light or decrease the gain.</td>
</tr>
</tbody>
</table>

4 If the messages repeatedly appear even after trying a number of times, consult your dealer.

White balance adjustments

1 If the camera is in auto mode, use the AUTO/MANUAL switch to switch to manual mode. (Page 35)

2 Set the shutter speed. (Page 49)

3 Place a white pattern in a location with the same lighting conditions and light source as the subject, then zoom in and fill the whole screen with white.
   Something white (a white cloth or wall) near the subject can be used instead.
   • Do not include bright spotlights in your shot.

4 Set the WHITE BAL switch to A or B (whichever one you want to save the adjustment in).
Using presets

Use this feature when you have no time to make white balance adjustments.

1 If the camera is in auto mode, use the AUTO/MANUAL switch to switch to manual mode (A on the viewfinder and LCD goes out).

2 Set the WHITE BAL switch to PRST. The current white balance value appears.
   • White balance values 3200 K and 5600 K are preset in the PRST position.
   Guide to the preset values
     P3.2K (3200 K): halogen light
     P5.6K (5600 K): outdoors

3 Press the AWB button. White balance switches between 3200 K and 5600 K.

Black balance adjustments

In order to reproduce the black accurately, adjust the zero level of all three RGB primary colors. If the black balance is not adjusted properly, not only will the black be reproduced poorly but the color tones of the entire screen will also be downgraded.

It is not normally necessary to adjust the black balance. Adjust it when:
• You use the camera for the first time.
• You use the camera after not using it for a long time.
• The ambient temperature changes greatly.
• You switch to the normal (OFF) shutter speed or to slow shutter.
• You switch between the progressive and normal (60i) modes.

Press the AWB button to automatically adjust the white balance.
Press and hold the AWB button to adjust the black balance.
• As the white balance is adjusted first when you press the AWB button, make the necessary preparations for this.

• You cannot adjust the black balance while you are shooting.

Message during adjustment
ABB ACTIVE

Message after adjustment
ABB END

• Hold down the AWB button to adjust the black balance (available also when the ATW function is used).

Auto Tracking White (ATW)

You can allocate the ATW feature to one of the positions on the WHITE BAL switch (A, B, or PRST). Allocate it by going to the setup menus, SW MODE screen, ATW. (Page 101)

The ATW feature is set to work in the auto mode at the time of shipping. (Page 104)

If you use the ATW feature whenever you are shooting, the camera automatically adjusts the white balance as you shoot.

• The ATW feature automatically determines the current shooting environment and adjusts the white balance accordingly. Depending on the environment, there may be some error in the adjustment.

Use the procedure described on the preceding page whenever you need more precise white balance.

Do not block the white balance sensor when using the ATW feature. ATW will not work if you do.
Shooting techniques for different targets

### Low-angle shooting
Set the Recording enable/disable switch to ON and use the START/STOP button on the handle to make it easier to shoot from low angles.
- Set the Recording enable/disable switch to OFF to prevent inadvertent use of the START/STOP button on the handle when this function is not needed.

---

### Zebra pattern
Press the ZEBRA button in CAM mode to show the zebra pattern or marker on the screen so you can check the brightness of the subject.
Parts that may be whitened out through overexposure are shown as a zebra pattern.
- Very bright
- Reflecting parts
You can remove most overexposed parts by adjusting the iris and shutter speed in the manual mode to remove the areas with zebra patterns. The display changes as follows each time you press the ZEBRA button.

![Zebra pattern diagram](image)

In the setup menus, DISPLAY SETUP screen, ZEBRA DETECT 1 and ZEBRA DETECT 2, set the brightness for the zebra patterns. (Page 108) The zebra pattern you have set appears as a percentage on the display for about 2 seconds.

### Marker
If you press the ZEBRA button again while the zebra pattern is being displayed, a marker appears in the center of the display (if you have set the setup menu, DISPLAY SETUP, MARKER to ON). The brightness of the areas near the screen center can be checked as a percentage (0% to 99%). “99%↑” appears if the percentage is over 99.

![Marker diagram](image)

The normal display reappears if you press the ZEBRA button again.

---

### Self-portrait shooting
Images in the LCD when it is turned 180 degrees for self-portrait shooting may appear unusual. You can make them appear better by reversing left and right. Go to the setup menus, DISPLAY SETUP screen, SELF SHOOT, and select MIRROR. Shooting in mirror mode has no effect on what you actually shoot and record.
Checking and displaying shooting status

When you hold down the DISP/MODE CHK button during recording standby or recording, all the information including the setting status of the shooting functions and a list of functions allocated to the USER buttons, will be displayed. When you release the button, the normal display will be restored.

When you push the DISP/MODE CHK button during recording standby or recording, all the information will be unshown. When you press the button again, the normal display will be restored. The information is retained even if you turn off the unit’s power or switch to another operation mode.

To display property of the selected clip in MCR mode, press the DISP/MODE CH button in the thumbnail screen. Press the button again to return to the thumbnail screen.

Changing the image size

When recording in 480i mode, you can change the size (aspect ratio) of the images that you record. Select the aspect ratio in the setup menus, CAMERA SETUP screen, ASPECT CONV. (Page 100)
- For menu operation (Page 94)

SIDE CROP:
Recorded in the regular 4:3 aspect ratio.
The left and right edges of the image are cut.

LETTER BOX:
Recorded in the 16:9 aspect ratio.
Black bands are recorded at the top and bottom of the image.

SQUEEZE:
The recorded images are squeezed horizontally so that they are shown as 16:9 images on a compatible wide-screen television.
If you have selected SQUEEZE, “SQU” appears on the screen.

To change the aspect ratio display of the viewfinder and LCD
Select the aspect ratio in the setup menus, DISPLAY SETUP screen, DISPLAY ASPECT. (Page 109)
## Optical Image Stabilizer

Use the Optical Image Stabilizer (OIS) to reduce the effects of camera shake when shooting by hand.

Press the OIS button to turn the function on and off. (✓) appears on the screen when this function is on. Turn the function off when using a tripod for more natural images.

- This function will not be as effective when the vibration is severe or when tracking a moving subject.

## Using the USER buttons

You can allocate one of sixteen features to each of the three USER buttons. Use these buttons to change shooting settings quickly or add effects to the images you are shooting. The following features are allocated to the buttons at the time of shipping.

- USER1: WHITEFADE
- USER2: BACKLIGHT
- USER3: TEXT MEMO

For details, see the setup menus, SW MODE screen, USER1 to 3. (Page 102)

If you press a USER button to which one of the following functions has been allocated and then turn off the power, that button will revert to the previous setting:

- SPOTLIGHT, BACKLIGHT, ATW, ATW LOCK, GAIN:18 dB, D.ZOOM

## Adding effects to images

Press the USER button you have allocated to the BLACKFADE or WHITEFADE feature to add fading effects to your images. The button’s function is forcibly canceled during playback or REC CHECK and also when thumbnails are displayed.

**BLACKFADE:**
Press and hold to fade out to black. Audio also fades out. Fade-in starts when the button is released.

**WHITEFADE:**
Press and hold to fade out to white. Audio also fades out. Fade-in starts when the button is released.

## Backlight compensation

Press the USER button you have allocated to the BACKLIGHT feature when shooting subjects lit from the back. BACK appears on the screen. Backlight compensation adjusts the iris so the subject doesn’t come out dark.

Press the same USER button to turn the feature off.

## Color bars

Press the BARS button in CAM mode to output a color bar screen to a television or monitor so you can adjust them.

Press the button again to turn the feature off.

A 1 kHz test tone is output in the color bar screen when ON is selected under TEST TONE on the setting menu AV IN/OUT SETUP screen.

- The color bar can be recorded together with a 1 kHz test tone.
**Waveform monitor function**

Press the WFM button in CAM mode to display a waveform of the image on the LCD monitor. Pressing the WFM button once again closes the waveform display.

- WFM (Page 103) on the setting menu SW MODE screen allows you to switch between the waveform and vector display.
- The viewfinder does not show the waveform display.
- The waveform does not appear when the focus assist function is used.
- The waveform display cannot be recorded.

**Adjusting the volume while shooting**

![Adjusting the volume](image)

If you are monitoring the sound through headphones while shooting, you can adjust the volume with the PAGE/AUDIO MON/VAR button.

- To adjust the recording level (Page 52)

**Backup recording**

If you have connected equipment to the 1394 terminal (pages 77 and 78), you can make automatic backup recordings of whatever you are shooting.

- In the setup menus, OTHER FUNCTIONS screen, 1394 CONTROL and 1394 CMD SEL, select how to control the equipment you have connected. (Page 110)

---

**Note the following when backup recording.**

- Menu settings are retained even if you turn the power off. So if you use the camera-recorder with the settings for backup recording still in effect, images on media in any unit that connected may be overwritten. After backup recording, check the menu item settings before you operate the camera-recorder.
- If you use another AG-HPX170P as the external unit for backup recording, select “OFF” for 1394 CONTROL on the external unit and set it to MCR mode.
- Backup recording may not work properly if you connect two or more external units.
- Use a 1394 cable of 4.5 m or less for connection.
- Set the external unit up to receive 1394 signals before backup recording.
- You can have a media in the external unit start recording automatically when the media in this unit is almost finished. Set 1394 CONTROL on the setting menu OTHER FUNCTIONS screen (Page 110) to “CHAIN”.
- Note that images are recorded even when you perform a rec check.
- You cannot perform backup recording when the unit is set up for native recording.
- Backup recording does not work in three of the special recording modes: Interval recording, One-shot recording and Loop recording (Pages 46 – 48)
- Backup recording does not work during direct shooting (Page 66) in MCR mode.
### Shooting techniques for different targets (continued)

<table>
<thead>
<tr>
<th><strong>2-slot continuous recording</strong></th>
<th><strong>Text memo recording</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>If you insert two P2 cards into the two card slots, this function allows you to record continuously on the two cards. You can also record continuously on three or more cards by replacing one card while data is being recorded on the other. (Hot swap recording) However, depending on when the P2 card is inserted into an empty slot (immediately after pre-recording, or before or after continuous recording spanning two slots), there may be a delay in recognizing the P2 card. We recommend inserting the P2 card while there is at least one minute remaining on the card that is recording. The SLOT SEL button offers a one-touch mechanism to select the slot whose card will be recorded. • You cannot change slots while recording so do this during recording standby. • Does not support hot swap playback.</td>
<td></td>
</tr>
<tr>
<td>This function adds text memos at the video points on the clip now being recorded or played back. When you press the USER button to which the TEXT MEMO function has been allocated, the text memo will be recorded at that point. (Page 42) On the thumbnail screen you can select only those clips where text memos have been added, and then either display those clips or play them back. You can record up to a hundred text memos per clip. You will need the latest updated version of P2 Viewer to edit the text memos. (Page 121) • You cannot record text memos during interval recording or one-shot recording. • INVALID appears when you cannot record text memos.</td>
<td></td>
</tr>
</tbody>
</table>

### Shot mark function

The marks attached to the thumbnails of clips are called shot marks. On the thumbnail screen monitor you can select only those clips with a shot mark and display them or play them back. During recording, when you press the USER button to which the SHOT MARK function has been allocated, MARK ON appears in the LCD monitor or the viewfinder, and a shot mark is set for the thumbnail of the clip being recorded. If you press the button again, the shot mark is released. You can also set or release the shot marks by performing the thumbnail operations for clips. (Page 66) However, note that you cannot set or release shot marks during playback. • INVALID appears when you cannot set or release shot marks. • When the video data of a single shoot using hot swap recording is made up of multiple clips, you cannot set or release shot marks unless all the P2 cards that make up the video data are inserted into the slots. • You cannot set or release shot marks during loop recording. |

### Time stamp function

Use the time stamp function to record date and time of shooting on the video. Select ON under TIME STAMP on the setting menu RECORDING SETUP screen. “R” prefixes the date and time display in the viewfinder and the LCD monitor when the time stamp function is on. • “R” is not recorded on the video. • The size and location of the date and time characters will vary with the recording format. • The data recorded depends on the DATE/TIME setting on the setting menu DISPLAY SETUP screen. No data is recorded when OFF is selected. • Superimposed characters are output only during 1394 output.
LAST CLIP DELETE function

Assign LAST CLIP to any of the USER 1 – 3 buttons to enable a convenient way to delete the last recorded clip.
Pressing the USER button to which LAST CLIP was assigned displays a YES/NO confirmation dialog on the screen.
Select YES, and the last recorded clip is deleted and “LAST CLIP DELETE OK” is displayed.
Select NO to cancel clip deletion.
• Clips cannot be deleted when a switch has been made to the MCR or PC mode or the recording format has been changed after completing a recording. Then it will not be possible to delete the clip by turning the power off and turning it back on.
• This button cannot be used to delete clips when a P2 card (one of two inserted cards) has been removed and reinserted after recording, nor can it be used to delete clips on a write-protected P2 card.
• In hot swap recording, the clip delete function is not available unless all the P2 cards containing data shot in one recording operation are inserted.
• The YES/NO confirmation dialog does not appear when the clip delete function is not available.
Using the special recording functions

Making the settings in the RECORDING SETUP screen (Page 104) enables special recording functions such as **Pre-recording, Interval Recording, One Shot Recording, and Loop Recording**.

**These special recording functions can be used only when the settings below are established.**
- **OPERATION TYPE item (page 98):** VIDEO CAM
- **Recording format:** 1080i/60i, 720P/60P, 480i/60i, 1080i/30P, 720P/30P or 480i/30P

### Pre-recording (PRE REC)

This function is used to record pictures and sound starting at a fixed time (approx. 3 seconds for HD recording or approx. 7 seconds for 480i recording) before the time when the actual recording has been set to start.

1. Check that the settings given above have been established for the OPERATION TYPE item and recording format.
2. Select ON under PRERECC MODE. (Page 104)
   - For menu operations (Page 94)
3. Press the START/STOP button. Pre-recording starts.
   - In the following cases, the pre-recording function will be canceled, and recording will be initiated from the respective operation points.
     - When 1394 input recording is initiated
     - When the unit is transferred from the playback mode to the recording mode
     - When interval recording is initiated
     - When one-shot recording is initiated
     - When loop recording is initiated
   - Immediately after switching from the MCR mode to CAM mode, immediately after turning on the camera-recorder's power or immediately after changing the PRE-REC option setting, it may not be possible to record the images and sound before the time mentioned on the previous page has elapsed even if the recording has been started straight away.

### Interval recording (INTERVAL REC)

With this function, the unit continuously records frames (1/30 sec.) one at a time with an interval. The interval can be set with INTERVAL TIME item.

1. Check that the settings given above have been established for the OPERATION TYPE item and recording format.
2. Select INTERVAL under REC FUNCTION. (Page 104)
   - For menu operations (Page 94)
3. Set the time INTERVAL TIME. (Page 104)
4. Press the START/STOP button. The unit starts INTERVAL REC operation.
   - To stop operation, push the Operation lever in the direction.
   - To release the function, either turn off the unit's power or select NORMAL under REC FUNCTION.
   - The following displays will appear on the left of the operation status display.
     - While recording is underway: I-REC lights up. In temporary standby: I-PAUSE lights up. While recording is stopped: The “I-” of I-PAUSE flashes.
     - However, if the duration selected in step 3 is less than 2 seconds, I-REC will flash while recording is underway in accordance with the set time.
   - The pre-recording function does not work.
   - No sound is recorded.
   - All data recorded while this mode is active will be contained in one file.
   - No guarantees are made for the 1394 output images.
• Operation is not possible even if only one of the inserted cards is DIR ENTRY NG CARD. (Page 91)
• After interval recording has started, a recordable P2 card cannot be used even if it is inserted into an empty slot.
• The slots for recording in this mode are indicated by the orange P2 card access lamps.
  The slots for recording P2 cards that are inserted after starting recording are indicated by the green P2 card access lamps.
• Text memos cannot be added.

One-shot recording (ONE-SHOT REC)

This function records a single shot at each unit of time which has been set.

1 Check that the settings given on page 46 have been established for the OPERATION TYPE item and recording format.

2 Select ONE SHOT under REC FUNCTION. (Page 104)
   • For menu operations (Page 94)

3 Set the recording time using ONE-SHOT TIME. (Page 104)

4 Press the START/STOP button.
Recording continues for the duration set in step 2 and then goes on standby.
To stop operation, push the Operation lever in the ♤ direction.
To release standby, either turn off the unit's power or select NORMAL under REC FUNCTION.
• The following displays will appear on the left of the operation status display.
  While recording is underway: I-REC lights up.
  In temporary standby: I-PAUSE lights up.
  While recording is stopped: The “I-” of I-PAUSE flashes.
• The pre-recording function does not work.
• No sound is recorded.
• All data recorded while this mode is active will be contained in one file.
• No guarantees are made for the 1394 output images.
• Operation is not possible even if only one of the inserted cards is DIR ENTRY NG CARD. (Page 91)

Loop recording (LOOP REC)

This function is used to record first on one card and then on the next when you have inserted two P2 cards into the card slots. If there is not enough free memory remaining on the second card, recording returns to the first card whose data will then be overwritten. When data is overwritten, the saved clips are deleted, and then the new clips are recorded in their place. (Clip deletion is performed approximately 30 seconds before the overwrite.)

1 Check that the settings given on page 46 have been established for the OPERATION TYPE item and recording format.

2 Select LOOP under REC FUNCTION. (Page 104)
   • For menu operations (Page 94)

3 Press the START/STOP button.
Recording starts.
To stop operation, press the START/STOP button.
To release the function, either turn off the unit's power or select NORMAL under REC FUNCTION.
• The following displays will appear on the left of the operation status display.
  While recording is underway: L-REC lights up.
  While recording is stopped: L-PAUSE lights up.
  Insufficient memory space: LACK L- flashes.
• Use two P2 cards each with a recording capacity of more than one minute. Recording stops when either card is ejected.

(Continued on the next page)
Using the special recording functions (continued)

- This function does not work during 1394 input recording.
- The pre-recording function does not work.
- Operation is not possible even if only one of the inserted cards is DIR ENTRY NG CARD. (Page 91)
- Stopping may take some time.
- The following operations are not acknowledged until the P2 card access lamps change from blinking to fully lit up.
- The slots for recording in this mode are indicated by the orange P2 card access lamps.
- Text memos cannot be added.
Adjusting the shutter speed

1 Press the SHUTTER button.
   Each time you press the SHUTTER button, the shutter speed switches between normal (OFF) and the speed you selected with the SPEED SELECT button.

2 After you have pressed the SHUTTER button, press SPEED SELECT to select the shutter speed.
   The shutter speed changes as follows each time you press SPEED SELECT + (The order is reversed for the SHUTTER SELECT - button.)
   - Remember that the faster the shutter speed, the lower the sensitivity.

   • If iris is set to auto, then it will open wider with higher shutter speeds and thereby reduce focal depth.
   • It will take longer to focus when the shutter speed has been reduced so it is recommended that the unit be secured to a tripod, etc. for use.

The current shutter speed appears on the viewfinder and LCD screens unless you have selected OFF in OTHER DISPLAY in the DISPLAY SETUP screen of the setup menus. It is not displayed if you have set the shutter speed to normal (OFF).

(Continued on the next page)

* Bold and underlines indicate formats that can be selected only when VIDEO COM is selected under OPERATION TYPE, and OFF is selected under DRS in the SCENE FILE screen of the setup menus.
Adjusting the shutter speed (continued)

With artificial lighting and especially fluorescent lights and mercury-vapor lamps, the luminance changes in synchronization with the power line frequency. When this frequency is 50 Hz, mutual interference will occur between the camcorder’s vertical sync frequency (approx. 60 Hz) and the lighting frequency (50 Hz). This means that the white balance may change periodically. Before shooting in areas with artificial lighting or adjusting the white balance, set the shutter speed as follows.

<table>
<thead>
<tr>
<th>Progressive mode</th>
<th>Shutter speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 Hz</td>
<td>60 Hz</td>
</tr>
<tr>
<td>OFF (60i)</td>
<td>1/100</td>
</tr>
<tr>
<td>30P</td>
<td>OFF (1/50)</td>
</tr>
<tr>
<td>24P/24PA/24PN</td>
<td>OFF (1/50)</td>
</tr>
</tbody>
</table>

- The gain is fixed at 0 dB with a shutter speed of 1/12 and 1/15.

### Synchro scan

Set the shutter speed of the synchro scan (used when shooting a television or computer monitor) in the setup menus, SCENE FILE screen, SYNCRO SCAN. (Page 98)

- Adjust the shutter speed to match the frequency of the television or computer monitor to minimize the horizontal noise that appears when shooting such subjects.
- By switching to progressive mode you can also shoot PAL system television screens.
- When the OPERATION TYPE option in the SCENE FILE screen (page 98) is set to FILM CAM, the shutter opening angle can be adjusted from 10° to 360° in 0.5° steps.

Example: When the recording frame rate is set to 24 fps and the exposure time is halved, \(1/24 \div 2 = 1/48 = 180° \times \frac{1}{12} \times \frac{1}{15}\)

In the default setting (180°), this becomes 1/2 of the exposure time. If it were 90°, it would be 1/4, and if it were 45°, it would be 1/8 of the exposure time.

(Shutter opening angle: This is equivalent to the shutter speed of a film camera, and a wider angle results in a longer exposure to light.)

- If the shutter speed is displayed in blue characters followed by (1/60), you cannot change the shutter speed in the blue characters while the current recording format is used. The speed is fixed at (1/60).

You can change the progressive mode in the setup menu with REC FORMAT in the RECORDING SETUP screen. (Page 104)
Switching Audio Input

During shooting, you can record up to four channels of sound. You can also switch the input sound to be recorded on each of the channels to the built-in microphones, external microphones or audio equipment connected to camera. (See table below)

<table>
<thead>
<tr>
<th>CH1*</th>
<th>CH2**</th>
<th>CH3</th>
<th>CH4</th>
</tr>
</thead>
<tbody>
<tr>
<td>INT(L): Built-in microphone L</td>
<td>INT(R): Built-in microphone R</td>
<td>INPUT1</td>
<td>INPUT2</td>
</tr>
<tr>
<td>INPUT1</td>
<td>INT(R): Built-in microphone R</td>
<td>INT(L): Built-in microphone L</td>
<td>INPUT2</td>
</tr>
<tr>
<td>INPUT2</td>
<td>INPUT2</td>
<td>INT(L): Built-in microphone L</td>
<td>INT(R): Built-in microphone R</td>
</tr>
</tbody>
</table>

* The input sound to be recorded onto CH1 can be switched using the CH1 SELECT switch.
** The input sound to be recorded onto CH2 can be switched using the CH2 SELECT switch.

Switch the CH1 SELECT switch to INT (L).
- Audio from the built-in microphone Lch is recorded to audio channel 1.

Switch the CH2 SELECT switch to INT (R).
- Audio from the built-in microphone Rch is recorded to audio channel 2.

Using another microphone and audio equipment

1 Connect an external microphone or audio equipment to the INPUT 1/2 (XLR 3-pin) terminal. (Page 76)

2 Use the INPUT 1/2 switch to switch the audio input.
   - **LINE:** (audio equipment is connected) Input level is 0 dBu.
   - **MIC:** (another microphone is connected) Input level is -50 dBu.
   - You can change the input level to -60 dBu in the setup menus, RECORDING SETUP screen MIC GAIN 1 and MIC GAIN 2 (Pages 104 and 105). Be aware that sensitivity will be higher if you choose -60 dBu so you will record more noise.

3 When using the phantom microphone, set the INPUT 1/2 (MIC POWER +48V) switch to ON.
   - **ON:** (When using the phantom microphone) +48V power supply to INPUT 1/2 terminal.
   - **OFF:** (When a phantom microphone is not connected) No power supply for INPUT 1/2 terminal.
   - The battery will discharge faster if you use a phantom microphone.
   - Set to OFF if you connect equipment not compatible with +48V. You can damage such equipment if you leave the setting at ON.

(Continued on the next page)
4 Use the CH1 SELECT switch to select the input signal to be recorded to audio channel 1.
   INT (L):
   Audio from the built-in microphone Lch is recorded to audio channel 1.
   INPUT 1:
   Audio from a device connected to INPUT 1 terminal is recorded to channel 1.
   INPUT 2:
   Audio from a device connected to INPUT 2 terminal is recorded to channel 1.

5 Use the CH2 SELECT switch to select the input signal to be recorded to audio channel 2.
   INT (R):
   Audio from the built-in microphone Rch is recorded to audio channel 2.
   INPUT 2:
   Audio from a device connected to INPUT 2 terminal is recorded to channel 2.

   • When inputting the microphone signal to channels 1 and 2, connect the microphone to INPUT 2 and switch both CH1 SELECT and CH2 SELECT to INPUT 2.

Adjusting the recording level

Use the AUDIO LEVEL knob to adjust the recording level of the built-in microphone or of audio signals input through the INPUT 1/2 (XLR 3-pin) terminal.

To adjust the volume of the sound for monitoring. (Page 43)

To adjust the recording level of the audio signals, turn the AUDIO LEVEL knob while referring to the audio level meter at the bottom left of the viewfinder and LCD monitor, regardless of the MIC ALC option setting (page 104) on the RECORDING SETUP screen of the setting menu.

-20 dB -12 dB 0 dB

• The CH1 and CH2 characters are highlighted (they will appear in black text) when INT MIC on the AV IN/OUT SETUP screen is set to OFF.

Check the recording level prior to shooting.

• The recording level is set higher than for Panasonic’s broadcast-use camera recorders (AJ series).
Using scene files

The settings according to the variety of shooting circumstances are stored in each position of scene file dial. When shooting, you can retrieve the necessary file instantly using scene file dial.

During recording, the OPERATION TYPE and FRAME RATE (Page 98) settings remain unchanged even when the scene file is changed. To change these settings, set the camcorder to recording standby state.

When the camcorder is shipped from the factory, the following files are stored.

**F1: SCENE**
File suitable for normal shooting.

**F2: SCENE FLUO.**
File suitable for shooting under fluorescent lights, i.e. indoors.

**F3: SCENE SPARK**
File suitable for shooting with fuller variations of resolution, coloring and contrast.

**F4: SCENE B-STR**
File for broadening the contrast of dark parts, such as when shooting sunsets.

**F5: SCENE CINE V**
File suitable for shooting movie-like scenes where the contrast is to be emphasized. (The recording format remains unchanged even when the scene file is changed. It must be set using the REC FORMAT option on the RECORDING SETUP screen. (Page 104))

**F6: SCENE CINE D**
File suitable for shooting movie-like scenes where the dynamic range is to be emphasized. (The recording format remains unchanged even when the scene file is changed. It must be set using the REC FORMAT option on the RECORDING SETUP screen. (Page 104))

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### Changing scene file settings

The setting value of the scene file can be changed. Also you can save the changed scene file to each position of the scene file dial.

**Example: Change the name of the scene file.**

1. Set the POWER switch to ON.
2. Turn the scene file dial, then select the scene file to be changed.
3. In the setup menus, select the SCENE FILE screen.
   - For menu operation (Page 94)
   - You can also use the menu buttons on the remote control. (Page 14)
4. Push the Operation lever in the ▲ or ▼ direction to select NAME EDIT.
5. Press the Operation lever (or push it in the ▶ direction), then push it in the ▼ direction to select YES and press it again.

(Continued on the next page)
Using scene files (continued)

6 When the screen shown below appears, use the Operation lever to enter a 6-character file name.
Set the same as user information. (Page 61)
• Characters that can be set
  Space, A to Z, 0 to 9, : ; < = > ? @ [ ] ^ - /.
When the filename has been set, you can erase all characters using the RESET button on the camera or the remote control.

7 After you finish setting the filename, press the MENU button.

8 Push the Operation lever in the ▼ direction to select LOAD/SAVE/INIT.

9 Press the Operation lever, push it in the ▼ direction to select SAVE and press it again.

10 Press the Operation lever to select YES when the screen shown below appears.
(To return to the menu level above, press the MENU button.)

The message below appears, and the changes to the scene file are complete.

11 Press MENU twice to exit the menus.
• To return to a previously saved setting after a change in scene file settings, select LOAD in step 9 and do steps 10 and 11.
• To return the scene file settings to the factory settings, select INITIAL in step 9, then do steps 10 to 11.
Saving scene files and other settings on SD memory cards

You can save up to four scene file settings or other settings as files on an SD memory card, and you can also load them from the card.

- The data in all the scene files, F1 to F6, is rewritten.
- Insert the SD memory card into the unit.

(Page 29)

If you have saved a scene file

1. Set the unit’s POWER switch to ON.

2. Select SCENE FILE on the setting menu CARD FUNCTIONS screen, select YES and press the Operation lever. (or push it in the direction)
   For all other settings, select USER FILE.
   - For menu operations (Page 94)
   - You can also use the menu buttons on the remote control. (Page 14)

3. Push the Operation lever in the ◄ or ► direction to select a file number (1 to 4).

4. Push the Operation lever in the ▲ or ▼ direction to select WRITE and press it again.

   SCENE FILE (SD CARD)
   FILE SELECT  1
   READ  ▲
   WRITE  ▼ YES
   FILE 1  NO FILE
   FILE 2  NO FILE
   FILE 3  NO FILE
   FILE 4  NO FILE
   TITLE RELOAD ▲
   PUSH MENU TO RETURN

5. Push the Operation lever in the ◄ direction to display the screen below, then select YES and press the Operation lever again.
   - In the following example, TITLE 1 is the filename. (To change the filename, see page 56.)

   SCENE FILE (SD CARD)
   WRITE FILE 1 YES push TITLE
   NO TITLE EDIT
   TITLE 1
   ▼ YES push ◄
   SEL : push ◄
   PUSH MENU TO RETURN

The message shown below appears to indicate that the change in scene file settings has been completed.

NOW WRITING... WRITE OK

(Continued on the next page)
6 Press the MENU button four times to cancel the menu mode.

To load a file
1) Perform steps 1 to 3, select READ in step 4 and push the Operation lever.
   When reading is completed, READ OK appears.

To title a file
1) Perform steps 1 to 4.
2) Push the Operation lever in the ▲ or ▼ direction to select a character, then push it in the ► direction to move to the next character. (The next character can now be selected.)
   • You can input any of the following characters: Space, A to Z, 0 to 9, : ; < = > ? @ [ \ ] ^ _ - /
   • You can erase all characters using the RESET button on the camera or the remote control.

Camera or Remote control
3) When all characters have been entered, push the Operation lever in the ◄ direction at the left end (or in ► direction at the right end) of the characters. Then press the Operation lever.

To reload a file from an SD memory card
1) Perform steps 1 and 2.
2) Push the Operation lever in the ▲ or ▼ direction to move to TITLE RELOAD, display YES and press it again.
   The file reloads.

• If WRITE NG FORMAT ERROR appears, format the SD memory card. (Page 29)
• If WRITE NG WRITE PROTECT appears, release the protected status of the SD memory card.
• If WRITE NG CANNOT ACCESS appears, quit all other operations (such as playback) before proceeding.
• If WRITE NG ERROR appears, the SD memory card may be defective. Replace it.
Clip metadata

You can add the video and audio systems, name of the videographer, shooting location, text memos and other information to the video data you have recorded on the P2 card. This data is called the clip metadata. (Display method: Page 69)

There are two kinds of clip metadata: the data that is recorded automatically during shooting, and the data in the metadata upload file created on the SD memory card which is loaded in the unit. (Loading method: Page 72)

Creating the metadata upload file on the SD memory card
You will need the latest updated version of P2 Viewer. Download it from the URL address given below, and install it in the computer.
https://eww.pavc.panasonic.co.jp/pro-av/

What the clip metadata consists of

You can set the items underlined below by loading the metadata upload file on the SD memory card. All other items are set automatically during shooting.

GLOBAL CLIP ID:
This indicates the global clip ID that shows the shooting status of the clip.

USER CLIP NAME:
This indicates the name of the clip that the user has set.*1

VIDEO:
This indicates the recorded image’s FRAME RATE, PULL DOWN system and ASPECT RATIO.

AUDIO:
This indicates the recorded sound’s SAMPLING RATE (sampling frequency) and BITS PER SAMPLE (number of quantizing bits).

ACCESS:
This indicates the CREATOR (name of the person recording), CREATION DATE (recording date), LAST UPDATE DATE (date on which the data was last updated), and LAST UPDATE PERSON (the person who last updated the data).

DEVICE:
This indicates the MANUFACTURER (manufacturer of the equipment), SERIAL NO. (serial number of the equipment) and MODEL NAME (equipment model name).

SHOOT:
This indicates the SHOOTER (name of the videographer), START DATE (date and time at which shooting started), END DATE (date and time at which shooting ended) and LOCATION/ ALTITUDE/LONGITUDE/LATITUDE/SOURCE/ PLACE NAME (shooting location, altitude, longitude, latitude, information source, name of location).

SCENARIO:
This indicates the PROGRAM NAME, SCENE NO. and TAKE NO.

NEWS:
This indicates the REPORTER (name of the reporter), PURPOSE (purpose of data collection) and OBJECT (target of data collection).

MEMO: *2
This indicates the No. (memo No.), OFFSET (frame position from the beginning of the clip), PERSON (name of the person who recorded the text memo), and TEXT (contents of memo).

THUMBNAIL:
Indicates thumbnail image offset. It is used in editing thumbnails with the EXCH. THUMBNAIL function.

*1 If there is no information in the metadata upload file, the global clip ID serves as the USER CLIP NAME. The USER CLIP NAME recording method is selectable. Please refer to Appendix (page 124).

*2 When MEMO is to be input, you must input TEXT. You cannot input PERSON only.

• It may not be possible to load files which have been edited using a viewer other than the P2 Viewer. (In this case, UNKNOWN DATA will be displayed.)
• Only printable ASCII characters can be displayed by this unit.
• Due to the limitations imposed by this unit on the number of characters which can be displayed, not all the data can be displayed. (This does not mean that the data which is not displayed has been deleted.) Use a P2 viewer or other program to check all the data.
Using the Counter

Counter display
You can display a counter that indicates how much time has elapsed during shooting or playback.

1. Press the COUNTER button.
   Each time you press the button, the display changes as follows. (Page 87)
   0 : 00. 00 (CAM mode only)
   Counter value
   CLIP 0 : 00.00
   (When CLIP is selected for the REC COUNTER item on the DISPLAY SETUP screen)
   The value is automatically reset at start of shooting and the counter value appears during each shooting session.
   TC XX:XX:XX:XX
   Time code value (Display time code frame digits in 24 frames when 720/24PN is set, and in 30 frames when any other format is set.)
   tc XX:XX:XX:XX
   During recording and playback when FILM CAM has been set under OPERATION TYPE, the time code frame digits are converted into 24 frames for display. However, “tc” does not appear during recording when 720/24PN has been set under REC FORMAT, or during recording and playback when 720/30PN has been set. During playback when 720/24PN has been set, the time code frame digits are converted into 30 frames for display. (Pages 98 and 104)
   UB XX XX XX XX
   User information
   FR -- -
   Frame rate (30P/24P/24PA) and frame sequence in progressive mode shooting.
   No display:
   Data is not displayed.

Resetting the counter
Press the COUNTER RESET button while the counter is displayed.

1394TC preset mode
When shooting using a multi-camera, you can synchronously set the initial values of TC.
The camera used for synchronization is the MASTER and the camera being synchronized is the SLAVE.

1. Connect a second camera with a 1394 cable and turn both cameras on.
   • For connection (Page 78)

2. Put the MASTER camera in CAMERA mode and output a video signal from the 1394 terminal.
   • Set both cameras to the same recording format.

Do the remaining steps on the SLAVE camera.

3. Switch the SLAVE camera to MCR mode, set 1394TC REGEN on the RECORDING SETUP screen of the setup menu to OFF and then set the counter so that it shows the TCG display.
   • You cannot do this if you have selected REGEN.

4. In the setup menus, RECORDING SETUP screen, set 1394 IN PRESET to ON. (Page 106)
   • 1394TC appears on the screen.

5. Stop the media.

6. Press the COUNTER RESET/TC SET button.
The TCG value is preset with the TC value from the input 1394 signal.
   • “TC SET OK” is displayed for about 2 seconds in the center of the screen.

7. Reset the SLAVE camera to CAMERA mode.
Recharging the built-in battery

The camera’s internal battery saves the date and time. “/time” appears on the screen of the viewfinder or LCD when the internal battery is running low on charge. Do the following to recharge it. Reset the date and time when fully recharged.

1 Connect the AC adapter. (Page 16)
   • Leave the POWER switch at OFF.

2 Leave the camera-recorder like this for about 4 hours.
   • The internal battery charges during this time.
   • Recharge the battery regularly to ensure correct TC and menu operations.

If “/time” appears even after charging, it means that the internal battery must be replaced. Ask your dealer to do this.

Setting the time code

In the setup menus, RECORDING SETUP screen, set the following time code related items. (Page 105)
• TC MODE
• TCG
• TC PRESET
• 1394 TC REGEN (appears when in MCR mode)

In MCR mode and 1394 TC REGEN is ON, you cannot change the items shown above.

Specifying the time code (TC PRESET)

Set TC PRESET so you can record a value of your choice as the initial setting for the time code to be used at the start of recording.

1 Set the POWER switch to ON.

2 On the setting menu RECORDING SETUP screen, push the Operation lever in the ▲ or ▼ direction to move to TC PRESET and press it again.

3 Push the Operation lever in the ▼ direction to move to YES and press it again.

4 When the screen below appears, set the time code value.
   Push the Operation lever in the ▲ or ▼ direction to select a time code value.

(Continued on the next page)
Charging the built-in battery/Setting the time data (continued)

Push the Operation lever in the ▶ direction to move to the next digit, then push it in the ▲ or ▼ direction to select a value.

You can reset the time code to zero by pressing RESET on the camera or the remote control.

5 Press the MENU button when you have finished setting the time code.

6 Push the Operation lever in the ▲ direction to move to YES and press it again.

7 Press MENU twice to exit the menus.

With this unit, the time code value is adjusted in accordance with the format and frame rate. For this reason, bear in mind that making a change in the format or frame rate may result in discontinuity from the last time code value of the previous recording.

<table>
<thead>
<tr>
<th>Recording format</th>
<th>Frame rate</th>
<th>Time code adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1080i/24P 1080i/24PA</td>
<td>—</td>
<td>Adjustable in 5-frame increments</td>
</tr>
<tr>
<td>480i/24P 480i/24PA</td>
<td>—</td>
<td>Adjustable in 4-frame increments</td>
</tr>
<tr>
<td>720P/60P 720P/30P 720P/24P</td>
<td>24</td>
<td>—</td>
</tr>
<tr>
<td>720P/24PN</td>
<td>—</td>
<td>Adjustable in 4-frame increments</td>
</tr>
<tr>
<td>720P/30PN</td>
<td>—</td>
<td>Adjustable in 2-frame increments</td>
</tr>
</tbody>
</table>
Setting user information

Setting user information allows you to store 8-digit memo (information such as the date and time) in the hexagonal format on the sub code track area. User information is automatically saved in the memory and retained after you turn off the power.

1 Set the POWER switch to ON.

2 In the setup menus, RECORDING SETUP screen UB MODE, select USER.
   • For menu operation (Page 94)
   • You can also use the menu buttons on the remote control. (Page 14)
   Example: In the CAM mode

3 Push the Operation lever in the ▲ or ▼ direction to move to UB PRESET and press it again.

4 Push the Operation lever in the ▼ direction to move to YES and press it again.

5 Set the user information.
   Push the Operation lever in the ▲ or ▼ direction to select user information characters.
   • You can use numbers from 0 to 9 and letters from A to F.

You can reset the user information to nothing by pressing RESET on the camera or the remote control.

6 Press the MENU button when you have finished setting the user information.

(Continued on the next page)
Charging the built-in battery/Setting the time data (continued)

7 Push the Operation lever in the ▲ direction to move to YES and press it again.

8 Press MENU twice to exit the menus.