SONY

DIGITAL CAMCORDER

DNW-7/7P
DNW-90/90P
DNW-90WS
DNW-90WSP
DNW-9WS/9WSP

BETACAM SX

Power HAD

OPERATION MANUAL English

1st Edition (Revised 5)

WARNING

To prevent fire or shock hazard, do not expose the unit to rain or moisture.

To avoid electrical shock, do not open the cabinet. Refer servicing to qualified personnel only.

AVERTISSEMENT

Afin d'éviter tout risque d'incendie ou d'électrocution, ne pas exposer cet appareil à la pluie ou à l'humidité.

Afin d'écarter tout risque d'électrocution, garder le coffret fermé. Ne confier l'entretien de l'appareil qu'à un personnel qualifié.

WARNUNG

Um Feuergefahr und die Gefahr eines elektrischen Schlages zu vermeiden, darf das Gerät weder Regen noch Feuchtigkeit ausgesetzt werden.

Um einen elektrischen Schlag zu vermeiden, darf das Gehäuse nicht geöffnet werden. Überlassen Sie Wartungsarbeiten stets nur qualifiziertem Fachpersonal.

For the customers in the USA

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of th e 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 or more of the following measures:

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

You are cautioned that any changes or modifications not expressly approved in this manual could void your authority to operate this equipment.

The shielded interface cable recommended in this manual must be used with this equipment in order to comply with the limits for a digital device pursuant to Subpart B of Part 15 of FCC Rules.

For the customers in the USA and Canada

RECYCLING NICKEL-CADMIUM BATTERIES

Ni-Cd

NICKEL-CADMIUM BATTERY.
MUST BE DISPOSED OF PROPERLY.

Nickel-Cadmium batteries are recyclable. You can help preserve our environment by returning your unwanted batteries to your nearest Sony Service Center or Factory Service Center for collection, recycling or proper disposal.
Note: In some areas the disposal of nickel-cadmium batteries in household or business trash may be prohibited.

For the Sony Service Center nearest you call 1-800-222-SONY (United States only)
For the Factory Service Center nearest you call 416-499-SONY (Canada only)

Caution: Do not handle damaged or leaking nickel-cadmium batteries.

For the customers in Europe

This product with the CE marking complies with the EMC Directive(89/336/EEC) issued by the Commission of the European Community.
Compliance with this directive implies conformity to the following European standards:

- EN55103-1: Electromagnetic Interference(Emission)
- EN55103-2: Electromagnetic Susceptibility(Immunity)

This product is intended for use in the following Electromagnetic Environment(s):
E1 (residential), E2 (commercial and light industrial), E3 (urban outdoors) and E4 (controlled EMC environment, ex. TV studio).

Pour les clients européens

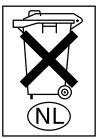
Ce produit portant la marque CE est conforme à la Directive sur la compatibilité électromagnétique (EMC) (89/336/CEE) émise par la Commission de la Communauté européenne.
La conformité à cette directive implique la conformité aux normes européennes suivantes:

- EN55103-1: Interférences électromagnétiques (émission)
- EN55103-2: Sensibilité électromagnétique (immunité)

Ce produit est prévu pour être utilisé dans les environnements électromagnétiques suivants:
E1 (résidentiel), E2 (commercial et industrie légère), E3 (urbain extérieur) et E4 (environnement EMC contrôlé, ex. studio de télévision).

Für Kunden in Europa
Dieses Produkt besitzt die CE-Kennzeichnung und erfüllt die EMV-Direktive (89/336/EEC) der EG-Kommission. Die Erfüllung dieser Direktive bedeutek Konformität für die folgenden Europäischen Normen:
• EN55103-1: Elektromagnetische Interferenz (Emission)
• EN55103-2: Elektromagnetische Empfindlichkeit (Immunität)
Dieses Produkt ist für den Einsatz unter folgenden elektromagnetischen Bedingungen ausgelegt:
E1 (Wohnbereich), E2 (kommerzieller und in beschränktem Maße industrieller Bereich), E3 (Stadtbereich im Freien) und E4 (kontrollierter EMV-Bereich, z.B. Fernsehstudio).

Voor de Klanten in Nederland
Gooi de batterij niet weg maar lever deze in als klein chemisch afval (KCA).



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1-1 Features

The DNW-7/7P series [1] Digital Camcorder combines a color video camera, which uses IT [2] type Power HAD [3] sensor CCDs [4], with a BETACAM SX series portable videocassette recorder. Its excellent image quality, sensitivity, portability, and dust- and water-proof construction make it ideal as a camcorder for ENG [5] and EFP [6] in the same way the earlier BVW-300A/300AP. The introduction of a new method of processing digital signals improves the image quality even further and makes the camcorder far easier to use.
The DNW-90/90P/90WS/90WSP uses FIT [7] type Power HAD sensor CCDs.
The DNW-90WS/90WSP designed on the basis of the DNW-90/90P employs a switchable CCD, allowing you to switch between the conventional aspect ratio of 4:3 and a wide screen aspect ratio of 16:9.
The DNW-9WS/9WSP is identical with the DNW-90WS/90WSP except that it uses IT type Power HAD sensor CCDs.

1) The DNW-7/90/90WS/9WS is for the NTSC broadcast system. The DNW-7P/9P/90WSP/9WSP is for the PAL broadcast system. The descriptions given in this manual apply to both models, any differences being clearly noted in the text.
2) IT: Interline Transfer
3) Power HAD: Power Hole-Accumulated Diode
"Power HAD" is a registered trademark of Sony Corporation.
4) CCD: Charge-Coupled Device
5) ENG: Electronic News Gathering
6) EFP: Electronic Field Production
7) FIT: Frame Interline Transfer

1-1-1 Camera Features

The features of the DNW-7/7P/90/90P/90WS/90WSP/9WS/9WSP series camera are described below.

- Power HAD sensor CCDs ensure high sensitivity and high image quality.
- Digital signal processing has improved picture quality, stability, and reliability.
- A setup menu enables you to control features such as status displays, messages, and markers; to select values or functions; and to operate a setup card.
- A setup card (not supplied) makes it easy to replicate the recorder setup data appropriate to the shooting conditions, and ensures uniform shooting [1)].
- Use of a built-in sophisticated electronic shutter, which has selectable modes, Clear Scan [2)], Extended Clear Scan (for DNW-90/90P/90WS/90WSP only) and Super Enhanced Vertical Definition, ensures shooting with little or no blurring.
- Selectable video gain ensures a noise-free image.
- A simple switch operation enables automatic adjustment of the black set, black balance, and white balance. Memory functions make it easy to replicate the settings appropriate for the lighting conditions.
- The ATW [3)] function automatically adjusts the white balance for the varying lighting conditions during shooting.
- The "TruEye" [4)] process is used to ensure naturally colored pictures even when shooting very bright subjects.
- The video gain can be boosted to 42dB instantly using the TURBO GAIN button.

1) The data saved in the setup card for the DNW-7/7P/90/90P/90WS/90WSP/9WS/9WSP is not interchangeable with the data saved in setup cards for other camcorders.
2) Clear Scan: "Clear Scan" is a trademark of Sony Corporation.
3) ATW: Auto Tracing White balance
4) "TruEye": TruEye is a trademark of Sony Corporation.

- The DynaLatitude[1)] function enables detailed adjustment of contrast control in each pixel in accordance with a histogram of luminance signal levels. Useful in shooting scenes which contain both dark and bright spots.
- A high-performance viewfinder is adjustable forward, backward and sideways, and has full auxiliary equipment.
- Character display functions on the viewfinder indicate switch settings, black and white balance adjustment, and warnings.
- Warning indicators and sound inform you of VTR faults, end of tape, low battery, etc.
- The camcorder is provided with a filter disk for adjusting the filter setting to the shooting conditions.
- Fine adjustment of the reference value for automatic iris control is provided.
- The iris of the lens automatically closes during automatic black balance adjustment and during operation of the built-in saw-tooth waveform generator.
- A built-in circuit produces a color bar signal for easy adjustment of the color monitor. An SNG bar signal is also provided for SNG [2)] uplink purposes.
- A super-cardioid directional microphone with an external power supply system is supplied. Other types of microphones can also be connected.
- By connecting the BVF-VC10W Color Viewfinder (not supplied), you can check both the camera image and a playback image in color.
- The RM-P9 Remote Control Unit (not supplied) controls some of the camera functions.
- By connecting the CA-701 Camera Adaptor (not supplied), you can record serial digital interface (SDI) signals.
- By connecting the CA-702 Camera Adaptor (not supplied), you can record external analog video signals or serial digital interface (SDI) signals.

1) “DynaLatitude”: “DynaLatitude” is a trademark of Sony Corporation.
2) SNG: Satellite News Gathering

1-1-2 VTR Features

The VTR features of this camcorder are described below.

- Using the Betacam SX format, it provides picture quality as good as or better than the Betacam SP format. It supports nonlinear editing and high-speed transfer, while offering digital audio capability.
- Use of low-cost Betacam SX tapes leads to lower running costs.
- The shooting date and time, camera ID, cassette number and other information can be recorded on the tape as shot data.
- It is possible to record recording start markers and good shot markers on the tape while shooting, and search automatically for required cuts when editing.
- It is possible to automatically rewind and review the last few seconds of the recording on the tape for a quick check immediately after shooting.
- No playback adaptor is needed to see the color playback image.
- The five times normal speed search function provides quick positioning of the tape.
- Both LTC [1)] and VITC [2)] recordings can be made, as can LTC playback.
- In addition to the two audio output channels, by using the CA-701 Camera Adaptor (not supplied), four audio channels can be input.
- By connecting the CA-701 Camera Adaptor (not supplied), you can output serial digital interface (SDI) signals.
- The built-in time code generator is synchronized with an external generator.
- A lithium battery is the back-up power supply for the time code generator enabling the time code to be held for about 5 years without charging the camcorder power supply.

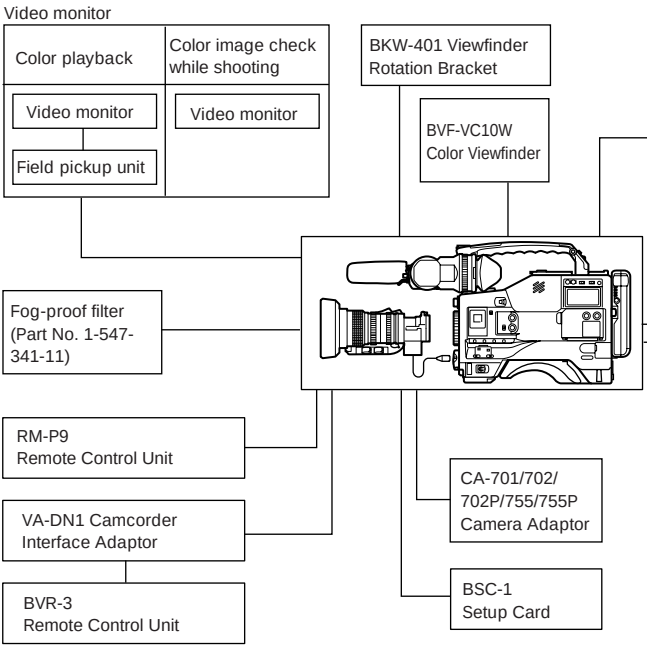
1) LTC: Longitudinal Time Code
2) VITC: Vertical Interval Time Code

- Optional long-life battery packs are available.
- Pressing the VTR START button on the camcorder or the VTR button on the lens ensures recording continuity from the very next frame.
- A slot-in UHF portable tuner (WRR-855A, not supplied) can be attached.
- By connecting the VA-DN1 Camcorder Interface Adaptor (not supplied) to the 6-pin REMOTE connector, you can control some of the VTR functions from a 9-pin remote control device.

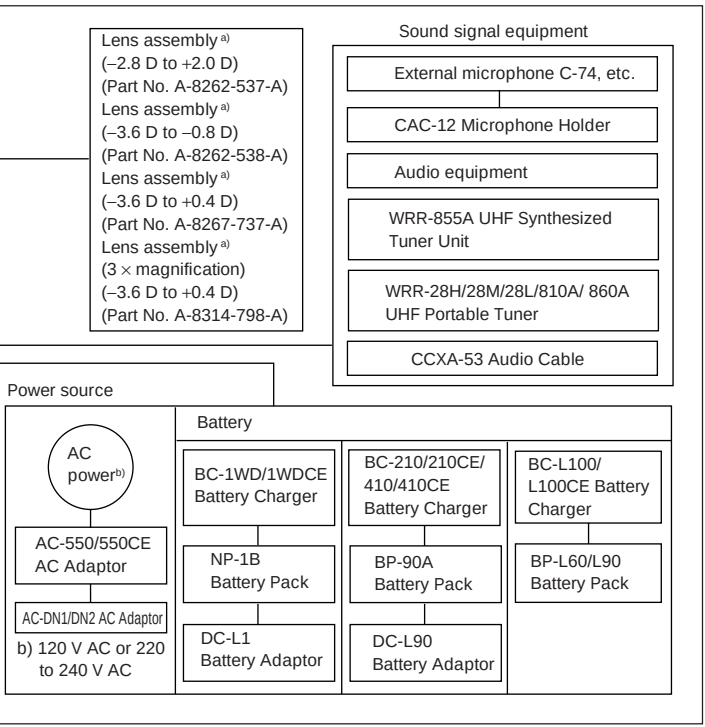
1-2 Example of System Configuration

The diagram below shows a typical configuration of the camcorder for ENG and EFP.

For more information about connections of the additional equipment and accessories, see Chapter 5, as well as the operation manuals for the connected equipment.



a) For more information, see “Viewfinder and related equipment” (page A-9).


Lens assembly a)
(–2.8 D to +2.0 D)
(Part No. A-8262-537-A)
Lens assembly a)
(–3.6 D to –0.8 D)
(Part No. A-8262-538-A)
Lens assembly a)
(–3.6 D to +0.4 D)
(Part No. A-8267-737-A)
Lens assembly a)
(3 × magnification)
(–3.6 D to +0.4 D)
(Part No. A-8314-798-A)
Sound signal equipment
External microphone C-74, etc.
CAC-12 Microphone Holder
Audio equipment
WRR-855A UHF Synthesized Tuner Unit
WRR-28H/28M/28L/810A/ 860A UHF Portable Tuner
CCXA-53 Audio Cable
Power source
AC power b)
AC-550/550CE AC Adaptor
AC-DN1/DN2 AC Adaptor
b) 120 V AC or 220 to 240 V AC
Battery
BC-1WD/1WDCE Battery Charger
NP-1B Battery Pack
DC-L1 Battery Adaptor
BC-210/210CE/ 410/410CE Battery Charger
BP-90A Battery Pack
DC-L90 Battery Adaptor
BC-L100/ L100CE Battery Charger
BP-L60/L90 Battery Pack

1-3 Precautions

1

Use and Storage

Do not subject the camcorder to severe shocks
The internal mechanism may be damaged or the body warped.

After use
Always turn off the power.

Before storing the camcorder for a long period
Remove the battery pack.

Use and storage locations
Store in a ventilated place. Avoid using or storing the camcorder in the following places.
- Places subject to temperature extremes
- Damp places
- Places subject to severe vibration
- Near strong magnetic fields
- In direct sunlight or close to heaters for extended periods

1-4 Using the CD-ROM Manual

The supplied CD-ROM includes Operation Manuals for the DNW-7/90/90WS/9WS series of Digital Camcorder (English, Japanese, French, and German versions).

1-4-1 CD-ROM System Requirements

The following are required to access the supplied CD-ROM disc.

- Computer: PC with MMX Pentium 166 MHz or faster CPU, or Macintosh computer with PowerPC CPU.
  - Installed memory: 32 MB or more
  - CD-ROM drive: × 8 or faster
- Monitor: Monitor supporting resolution of 800 × 600 or higher

When these requirements are not met, access to the CD-ROM disc may be slow, or not possible at all.

1-4-2 Preparations

The following software must be installed on your computer in order to use the operation manuals contained in the CD-ROM disc.

Notes

- If Microsoft Internet Explorer is not installed, it may be downloaded from the following URL:
  http://www.microsoft.com/ie
- If Netscape Navigator is not installed, it may be downloaded from the following URL:
  http://home.netscape.com/
- If Adobe Acrobat Reader is not installed, it may be downloaded from the following URL:
  http://www.adobe.com/products/acrobat/readstep.html

- Microsoft Internet Explorer Version 4.0 or higher, or Netscape Navigator Version 4.0 or higher
- Adobe Acrobat Reader Version 4.0 or higher

1-4-3 To Read the CD-ROM Manual

To read the operation manual contained in the CD-ROM disc, do the following.

1 Insert the CD-ROM disc in your CD drive.

A cover page appears automatically in your browser.
If it does not appear automatically in the browser, double click the index.htm file on the CD-ROM disc.

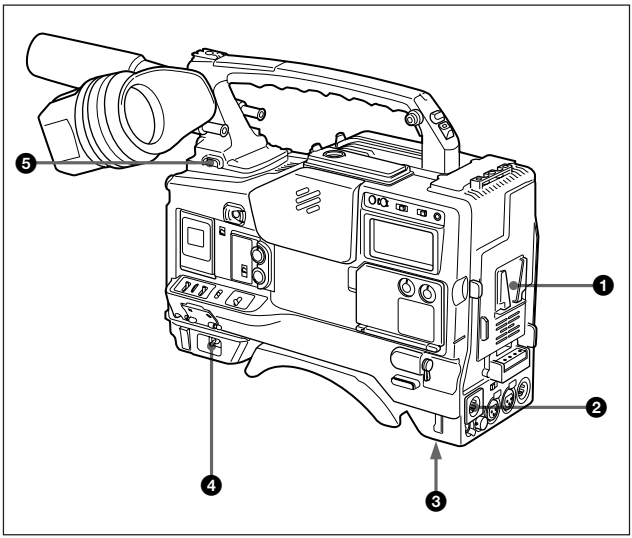
2 Select and click the operation manual that you want to read.

A PDF file of the operation manual opens.

Note

If you lose the CD-ROM disc or become unable to read its content, for example because of a hardware failure,
contact a Sony service representative. You can purchase a new CD-ROM disc to replace one that has been lost or damaged.

2-1 Power Supply



Power supply functions

❶ Battery attachment
Attach a BP-L60/L90 Battery Pack, a DC-L1 Battery Adaptor for loading an NP-1B Battery Pack, or a DC-L90 Battery Adaptor for loading a BP-90A Battery Pack.
Furthermore, by attaching an AC-DN1/DN2 AC Adaptor you can operate the camcorder from AC power.

❷ DC IN (external power input) connector (XLR type, 4-pin, male)
Connect an AC-550/550CE AC Adaptor with the DC output cable supplied with the adaptor.
To use an external battery, connect its DC output cable to the DC IN connector.

❸ BREAKER button

Excessive current in the internal circuitry, whatever the cause, will trip the internal circuit breaker, automatically cutting off the power. If the breaker trips, consult your Sony service personnel.

❹ POWER switch

This switch turns the main power supply on and off.

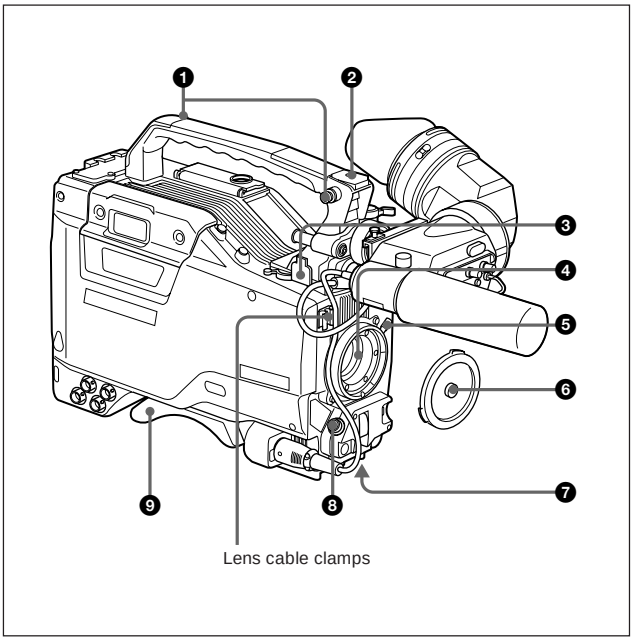
❺ LIGHT switch

This selects the way in which a video light connected to the LIGHT connector is switched on and off.

AUTO: When the video light switch is turned on, starting recording with the VTR turns on the light.

MANUAL: The video light switch controls the light, turning it on and off manually.

2-2 Accessory Attachments



Accessory attachments

❶ Shoulder strap posts
Attach the supplied shoulder strap to these posts.

❷ Light shoe
Attach a video light, etc. to this shoe.

❸ LIGHT connector
Connect the cable of a video light attached to the light shoe. The maximum power consumption allowable for the video light is 30 W.

❹ Lens mount
This is a special bayonet type lens mount.

❺ Lens locking lever
After inserting the lens in the lens mount, rotate the lens mount ring with this lever to lock the lens in position.

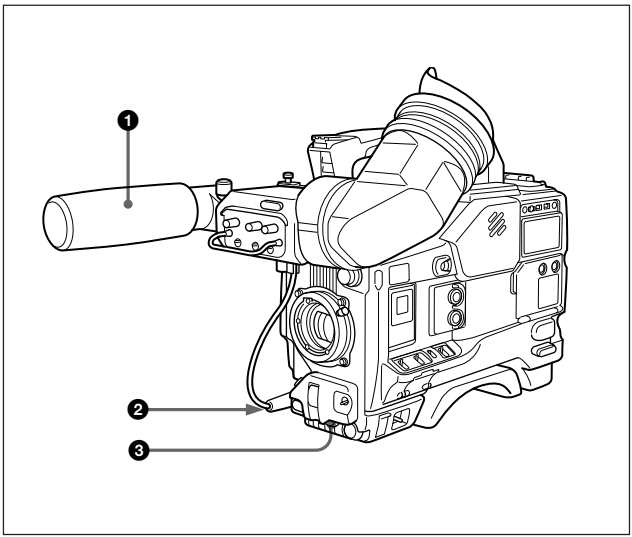
❻ Lens mount cap
Remove this cap by pushing up on the lens locking lever. For protection from dust, always insert this cap when no lens is mounted.

❼ Tripod mount
Fit the supplied tripod adaptor to mount the camcorder on a tripod.

❽ LENS connector (12-pin)
Fit the lens cable to this connector. Contact your Sony representative for more information about the lens you are using.

❾ Shoulder pad
You can move the shoulder pad forwards or backwards by loosening the two screws. Do this to ensure the best balance when shooting with the camcorder on your shoulder.

2-3 Audio Functions



Audio functions (1)

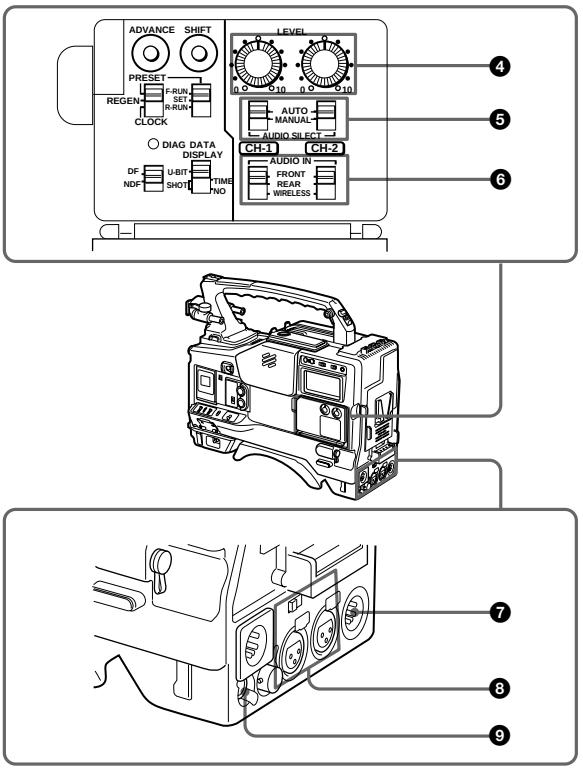
❶ Microphone
This is a super-cardioid directional microphone with an external power supply system. You can use it as an interview microphone by connecting it to an extension cable (not supplied).

❷ MIC IN (microphone input) connector (XLR type, 3-pin, female)
The supplied microphone connects to this connector. By using an extension cable (not supplied), you can connect a microphone other than the supplied one as long as it is provided with an external power supply system. The connector supplies power (+48 V) to the microphone.

❸ MIC (microphone) AUDIO LEVEL control

If one or both of the AUDIO IN switches are set to FRONT, you can adjust the recording level of the microphone.

When AUDIO is set to ON in the VF DISPLAY 2/2 page of the setup menu and the viewfinder DISPLAY switch is set to ON, adjust the channel-1 audio level, watching the indication in the viewfinder.



Audio functions (2)

❹ AUDIO LEVEL CH-1/CH-2 (audio channel 1 and channel 2 recording level) controls

These controls adjust the audio level of channels 1 and 2 when you set the AUDIO SELECT CH-1/CH-2 switches to MANUAL.

❺ AUDIO SELECT CH-1/CH-2 (audio channel-1 and channel-2 select) switches

These switches set the audio level adjustment for channels 1 and 2 to MANUAL or AUTO.

❻ AUDIO IN (audio input) switches

These switches select the audio input signals for audio channels 1 and 2. The input signal source is one of:

FRONT: The input signal source is the MIC IN connector.

REAR: The input signal source is the AUDIO IN CH-1/CH-2 connectors.

WIRELESS: The input signal source is a WRR-855A UHF Synthesized Tuner Unit (not supplied).

The audio input signals from the MIC IN connector and the wireless microphone are always recorded on audio channels 3 and 4, respectively, whether or not they are recorded on audio channels 1 and 2 in accordance with the setting of this switch.

For more infomration, refer to the Maintenance Manual.

❼ AUDIO OUT (audio output) connector (XLR type, 5-pin, male)

This connector outputs the stereo sound.

Using a CCXA-53 Audio Cable (not supplied), you can convert from a 5-pin connection to two 3-pin connections.

❽ AUDIO IN CH-1/CH-2 (audio channel 1 and channel 2 input) connectors (XLR type, 3-pin, female) and LINE/MIC/+48 V ON (line input/microphone input/external power supply +48 V on) selectors

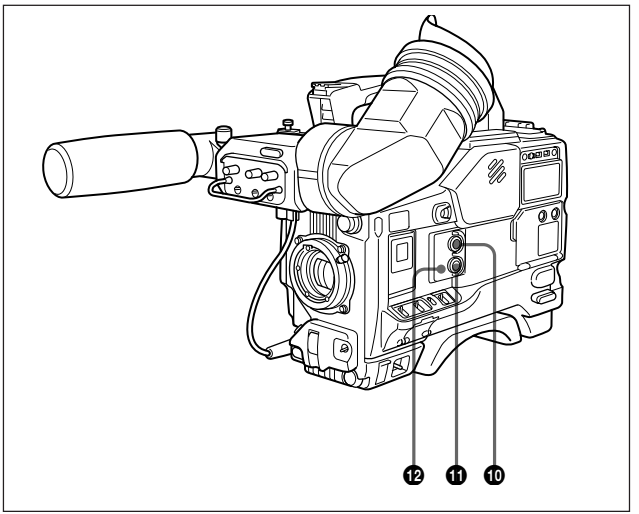
These are the audio input connectors for channels 1 and 2, to which you can connect a microphone or other audio sources.
The LINE/MIC/+48 V ON selectors select the audio input signal source connected to these connectors, as follows:
LINE: Line input audio equipment
MIC: A microphone with internal batteries
+48 V ON: A microphone with an external power supply system

❾ DC OUT (DC power output) connector

This connector supplies power for a WRR-28H/28M/28L/860A UHF Portable Tuner (not supplied).
Alternatively, it can supply power for a BVR-3 Remote Control Unit combined with a VA-DN1 Camcorder Interface Adaptor.

Note

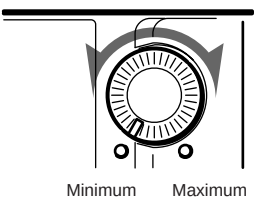
The type of UHF portable tuner which can be connected depends on the country where the camcorder is used.
For more information, consult your Sony representative.



Audio functions (3)

⓾ ALARM volume control

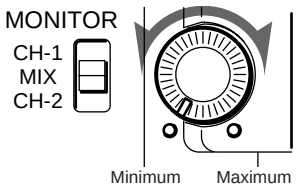
This control adjusts the speaker or earphone alarm volume. At the minimum position, no sound can be heard.



ALARM volume control

⓫ MONITOR volume control

This control adjusts the speaker or earphone sound volume, excluding the alarm sound. At the minimum position, no sound can be heard.



MONITOR volume control

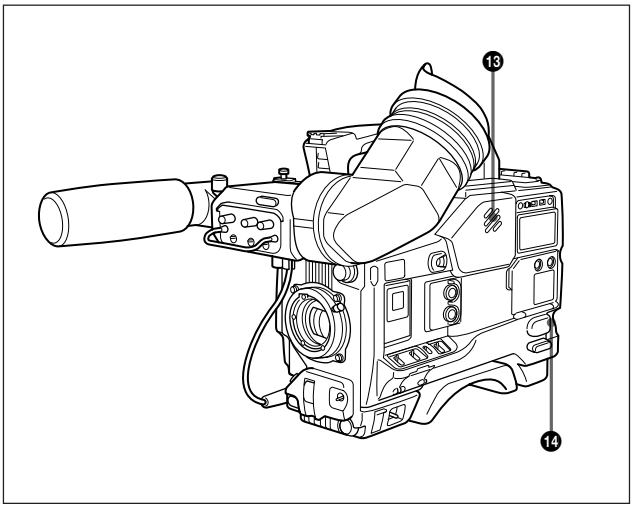
⓬ MONITOR (audio channels select) switch

This switch selects the audio output to the speaker or earphone.

CH-1: Audio channel 1

MIX: Mixed sound of channels 1 and 2

CH-2: Audio channel 2



Audio functions (4)

⓭ Built-in speaker

During recording, the speaker can be used for monitoring the E-E sound [1], and during playback for monitoring one or both audio channels. The speaker also sounds alarms to reinforce visual warnings.

If an earphone is plugged into the EARPHONE jack, the speaker sound is automatically cut off.

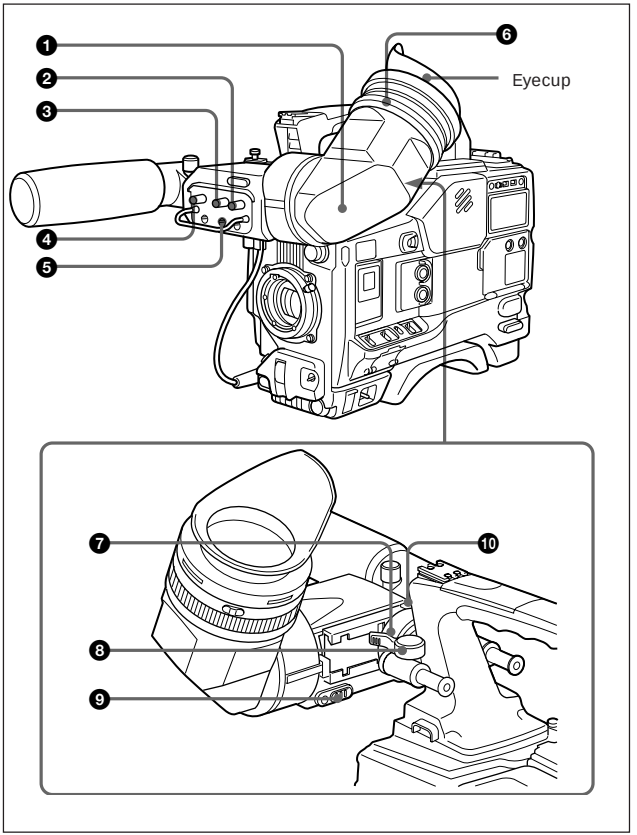
See Section 6-3 "Operation Warnings" (page 6-12) for information about alarms.

1) E-E sound (Electric to Electric sound)
The term E-E sound refers to an audio signal that has passed through the amplifier, but has not been recorded on the tape. In other words, you can directly monitor the recording input signal, as opposed to the simultaneous playback (output) signal.

⓮ EARPHONE jack

Plugging an earphone into the jack automatically cuts off the built-in speaker, and you hear the alarms about the camcorder's operation and status through the earphone.

2-4 Shooting and Recording/ Playback Functions



Shooting and recording/playback functions (1)

❶ Viewfinder

The viewfinder lets you view the camera image in black and white while shooting the picture and also see the playback picture from the VTR. It also displays various warnings and other information, a zebra pattern [1], safety zone marker [2], and center marker [3].

❷ BRIGHT (brightness) control

This control adjusts the picture brightness on the viewfinder screen. It has no effect on the camera output signal.

❸ CONTRAST control

This control adjusts the picture contrast on the viewfinder screen. It has no effect on the camera output signal.

❹ PEAKING control

This control adjusts the sharpness of the picture on the viewfinder screen to make focusing easier. It has no effect on the camera output signal.

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1) Zebra pattern
   The zebra pattern aids in manual iris adjustment by indicating areas of the picture where the video level is approximately 70% IRE (for the DNW-7/90/90WS/9WS) or 490 mV (for the DNW-7P/90P/90WSP/9WSP).
2) Safety zone marker
   The safety zone marker is a rectangle indicating the effective picture area which is equivalent to 80%, 90% (the factory setting) or 100% of the entire viewfinder screen area. A setup menu lets you change the effective picture area from 90% to 80% or 100%.
   For more information, see Section 4-8-4 “Setting the Marker Display” (page 4-61).
3) Center marker
   The center marker indicates the center of the picture with a crosshair.

❺ ZEBRA (zebra pattern) switch

This switch controls the zebra pattern on the viewfinder screen.
ON: The zebra pattern is displayed and stays.
OFF: No zebra pattern is displayed.
MOMENT: The zebra pattern is displayed and stays for a few seconds.
The zebra pattern display is factory set to indicate picture areas where the video level is approximately 70% IRE (for the DNW-7/90/90WS/9WS) or 490 mV (for the DNW-7P/90P/90WSP/9WSP).
It is possible to display an additional pattern, indicating areas of 100% IRE (for the DNW-7/90/90WS/9WS) and above, or 700 mV (for the DNW-7P/90P/90WSP/9WSP) and above.
The video levels to be indicated with these patterns can be changed.
For more information, refer to the Maintenance Manual.

❻ Diopter adjustment ring

Use this ring to adjust the viewfinder image for your vision.

❼ Viewfinder left-right positioning ring

Use this ring to move the viewfinder sideways.

❽ Viewfinder front-rear positioning lever

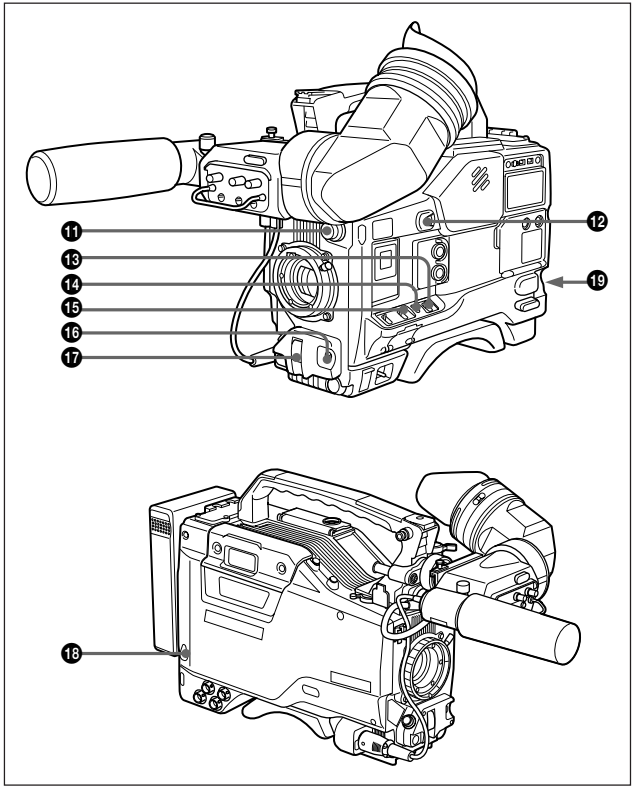
Use this lever to move the viewfinder forward or backward.

❾ Cameraman tally indicator

This indicator lights while the camcorder is operating.
Slide the window open when you shoot, keeping your eye away from the viewfinder.

❿ Viewfinder stopper

Pull this stopper up to detach the viewfinder from the camera.



Shooting and record/playback functions (2)

⓫ FILTER selector

This selector is a knob that selects the most appropriate filter to match the light source. Note that if the display mode is set to 3 when this selector is adjusted, the new setting will be indicated on the setting change/adjustment progress message display area of the viewfinder screen for about 3 seconds (e.g.: FILTER: 3).

The relationships between the selector settings and filter selections as well as examples of filters for different shooting conditions are given below.

Filter knob setting and filter

Filter knob setting	Filter
1	Straight through
2	5600K + 1/8 ND
3	5600 K
4	5600K + 1/64 ND

Examples of shooting conditions and appropriate filters

Shooting condition	Filter
Sunrise and sunset; inside studio	1 (straight through)
Clear skies	2 (5600K + 1/8 ND)
Cloudy or raining	3 (5600K)
Very bright conditions, such as on snow, at high altitudes, or at the seashore	4 (5600K + 1/64 ND)

⓬ TURBO GAIN button

When shooting under extremely poor lighting conditions, slide the cover of this button to the left and press the button once to boost the video gain to the value preset with the menu (factory setting: 36 dB). To stop boosting the gain, press the button once more or use the GAIN switch. When the RM-P9 Remote Control Unit is connected to the camcorder, you cannot use this button.

⓭ WHITE BAL (white balance memory) switch

This switch determines the source of white balance settings.

PRST (preset): Adjusts the color temperature corresponding to the position of the filter ring. Use the PRST setting when you have no time to adjust the white balance.

A or B: When the AUTO W/B BAL switch is pushed to WHT, the white balance is automatically adjusted according to the current position of the filter ring, and the adjusted value is stored in either memory A or memory B. (There are two memories for each filter, so a total of eight adjustments can be stored.) When the two-part FILTER selector is in the same position as at when the WHITE BAL switch was adjusted, the stored value is called from memory, and the camcorder automatically adjusts itself to that value.

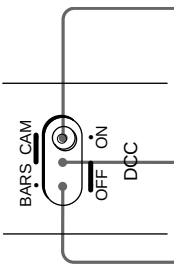
B (ATW): When this switch is set to B whereas, in the setup menu OPERATION MODE page, B CH is set to ATW[1], the ATW is activated.

You can use the AUTO W/B BAL switch even when the ATW is in use. Note that if the display mode is set to 3 when this switch is adjusted, the new setting will be indicated on the setting change/adjustment progress message display area of the viewfinder screen for about 3 seconds (e.g. WHITE = A CH).

1) ATW (Auto Tracing White balance)
The white balance of the picture being shot is ajusted automatically for the varying lighting conditions.

⓮ OUTPUT/DCC (output signal/dynamic contrast control) selector

This selector switches the video signal that is output to the VTR, viewfinder, and video monitor, between the color bar signal and the camera output. It also switches DCC [1] on and off when output from the camera is selected.



CAM, DCC ON
The video signal from the camera is output and the DCC circuit operates.

CAM, DCC OFF
The video signal from the camera is output and the DCC circuit does not operate.

BARS, DCC OFF
An SMPTE type or EBU type color bar signal is output and the DCC circuit does not operate. For example, use the setting for the following purposes.
- Adjusting the video monitor
- Recording the color bar signal

OUTPUT/DCC selector

1) DCC (Dynamic Contrast Control)
Against a very bright background with the iris opening adjusted to the subject, objects in the background will be lost in the glare. The DCC function will restore much of the lost detail and is particularly effective in the following cases.
- Shooting a subject against a bright sky
- Shooting a subject indoors, against a background through a window
- Any high contrast scenes

⓯ GAIN selector

This selector switches the gain of the video amplifier to match the lighting conditions during shooting. The gains corresponding to the L, M, and H settings are selected from the setup menu before use. The factory settings are L = 0 dB, M = 9 dB, and H = 18 dB.

Note that if the display mode is set to 3 when this selector is adjusted, the new setting will be indicated on the setting change/adjustment progress message display area of the viewfinder screen for about 3 seconds (e.g. GAIN: 12 dB).

For information about setting the gain values, see Section 4-9-1 "Setting the GAIN Selector Values" (page 4-74).

⓰ AUTO W/B BAL (automatic white/black balance adjustment) switch

This switch activates the adjustment functions of the white balance and black balance.

WHT: Automatic adjustment of the white balance. If the WHITE BAL switch is set to A or B, the white balance setting is stored in the corresponding memory. When the ATW setting is selected in the setup menu, the white balance setting adjusted with this switch is not stored in memory.

BLK: Automatic adjustment of the black set and the black balance. The setting is stored in a separate memory.

⓱ SHUTTER selector

Set this selector to ON to use the electronic shutter. Set it to SEL to switch the shutter speed or mode setting within the range that has been previously set from the setup menu.

Note that if the display mode is set to 2 or 3 when this selector is adjusted, the new setting will be indicated on the setting change/adjustment progress message display area of the viewfinder screen for about 3 seconds (e.g.:SS: 1/250 or :CLS: 60.6 Hz).

For more information about the shutter speed and mode settings, see Section 4-2 "Setting the Electronic Shutter" (page 4-11).

⓲ REMOTE (remote control) connector (6-pin)

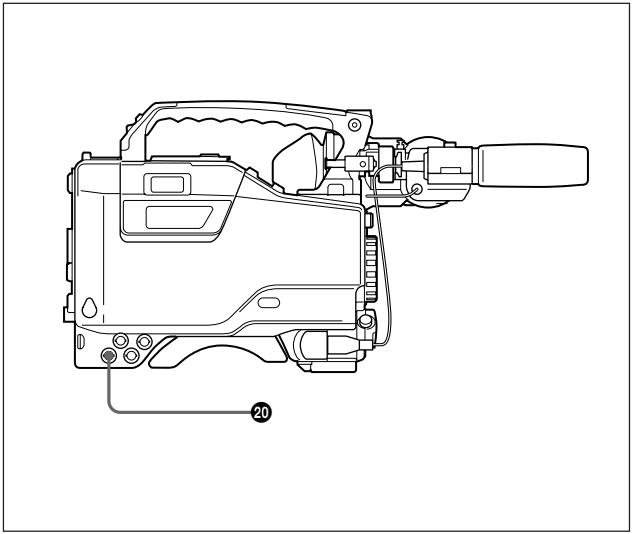
Connect the RM-P9 Remote Control Unit (not supplied) or VA-DN1 Camcorder Interface Adaptor (not supplied) to this connector.
By connecting a camcorder interface adaptor, you can control the VTR from a 9-pin remote control device.

Notes

- When the RM-P9 Remote Control Unit is connected, the setup menu is displayed on the monitor, regardless of the internal board setting.
- If the REMOTE and TEST OUT connectors are used at the same time, it may not be possible to generate video signals at standard levels.

⓳ VIDEO OUT (video output) connector (BNC type)

This connector outputs a composite signal (standard level, 75-ohm terminated) to the video monitor. If the video monitor is connected here, you can monitor the picture being shot by the camcorder as well as the picture recorded by the VTR. When synchronizing the time code of an external VTR with that of the camcorder, connect this connector to the video input connector of the external VTR.

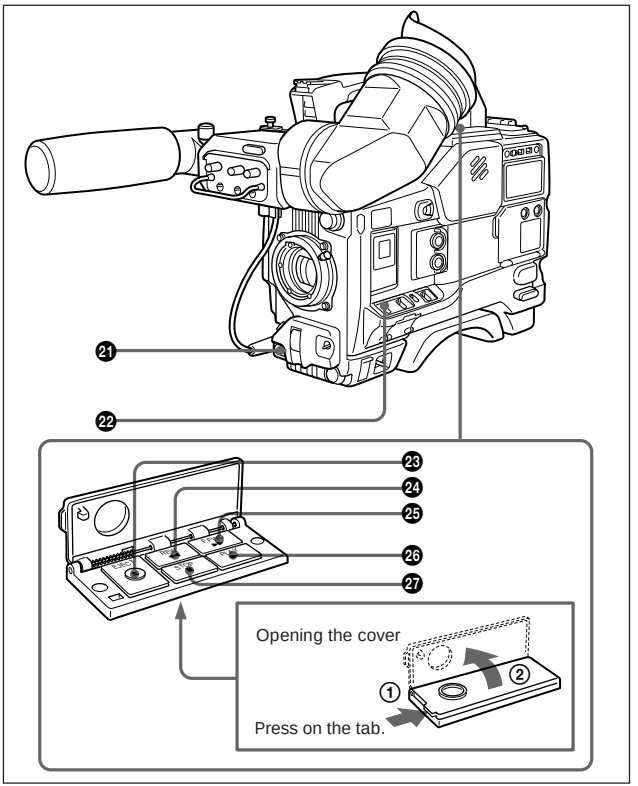


Shooting and playback/record functions (3)

⓴ TEST OUT (test output) connector (BNC type)

This connector outputs the video signal (standard level, 75-ohm terminated) for the video monitor. The output signal can be selected to be a composite, R, G, or B. The factory setting is composite, and the setting returns to composite whenever the power is switched on. Depending on the internal board and setup menu settings, the setup menu, the time code and the shot data can be displayed over the image on the monitor. As for the VIDEO OUT connector, you can use this connector for synchronizing the time code of an external VTR to the time code of the camcorder.

For information about the setting for test output, see Section 4-9-3 "Selecting the Test Output" (page 4-80).



Shooting and record/playback functions (4)

㉑ VTR START button

Press this button to start recording. Press it again to stop recording. The effect is exactly the same as that of the VTR button on the lens.

㉒ VTR SAVE/STBY (VTR power saving/standby) switch

This switch controls the VTR power mode during pauses in recording (REC PAUSE).

SAVE: Power saving mode. When you press the VTR START button, there is a short delay before recording starts, but power consumption is less than in standby mode, and battery life is extended. When the switch is set to SAVE, the VTR SAVE indicator in the viewfinder lights.

STBY: Standby mode. Recording starts as soon as you press the VTR START button.

See Section 4-7-1 "Layout of Indicators in the Viewfinder" (page 4-45).

㉓ EJECT (cassette eject) button

Press this button to eject or load a cassette.

㉔ REW (rewind) button and indicator

Press this button to rewind the tape. The indicator lights during rewinding.

㉕ F FWD (fast forward) button and indicator

Press this button to fast forward the tape. The indicator lights during fast forward.

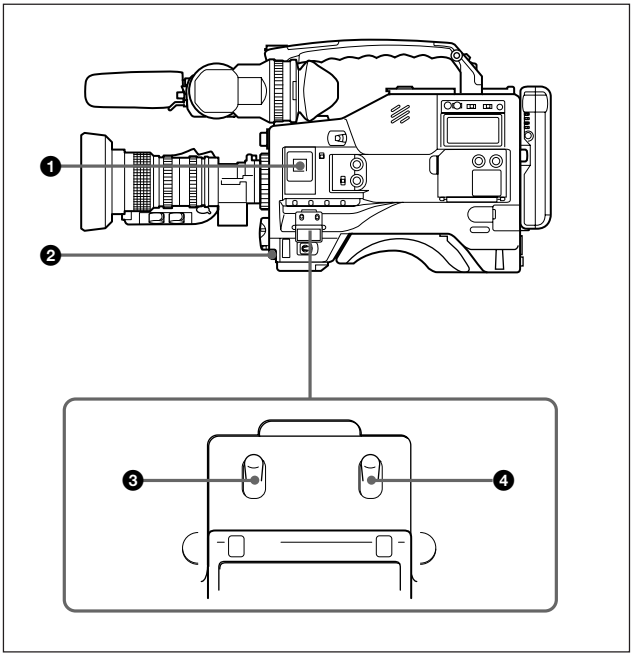
㉖ PLAY (playback) button and indicator

Press this button to view the recorded picture in the viewfinder or on a color video monitor. The indicator lights during playback. The 5 times normal speed search function is provided to make it far quicker to find a desired location of the tape. Press the REW button or F FWD button during playback to view the 5 times normal speed search picture.

㉗ STOP button

Press this button to stop the tape.

2-5 Setup Menu Operating Section



Setup menu operating section

❶ Setup card compartment

Open the cover and insert the BSC-1 Setup Card (not supplied) into the slot with the “SONY” logo facing you.

❷ Rotary encoder

When the cursor is aligned with the page title of a setup menu, pressing the rotary encoder changes to the page switching mode. When the cursor is other than on the page title, pressing the rotary encoder switches to the mode in which you can change the value of the current menu setting. To change the page or vary a setting value, turn the rotary encoder.

❸ MENU ON/OFF/PAGE (menu display/paging) switch

This switch is used to display the setup menu on the viewfinder screen or the test signal screen and to page through the menu items.

ON: Displays the setup menu on the viewfinder screen or the test signal screen, at the page which was on the screen when the previous menu access ended.(When the menu is first used, the first page is displayed.) To enable the MENU CANCEL/PRST/ITEM switch, select this position.

OFF: Removes the setup menu from the viewfinder screen or the test signal screen.

PAGE: Every time this switch is pushed down from the ON position, the next page of the setup menu is displayed.

❹ MENU CANCEL/PRST/ITEM (menu setting cancellation/menu presetting/item selection) switch

When the MENU ON/OFF/PAGE switch is set to ON, this switch is used to select an item on the setup menu or erase shot ID characters.

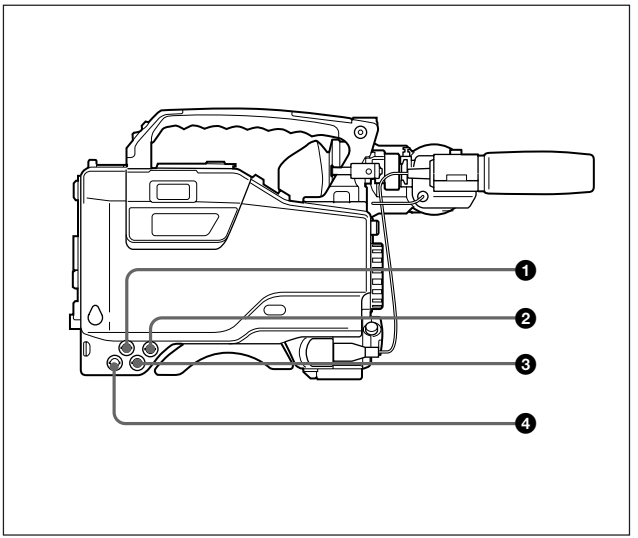
CANCEL/PRST: Pushing the switch up to this position allows you to cancel the previous settings, to reset the settings to their initial values, or to erase shot ID characters.

ITEM: Every time the switch is pushed down to this position, the cursor (arrow mark) in the page moves to the next item.

Note

Operation depends on the items displayed. Check the menu operation that corresponds to the current item for details.

2-6 Time Code System



Time code functions (1)

❶ GENLOCK IN (genlock input) connector (BNC type)

- This connector inputs a reference signal when the camera is to be genlocked, or when the time code is to be synchronized with external equipment.
- This connector also inputs a return video signal.

❷ TC IN (time code input) connector (BNC type)

To synchronize the time code with an external time code, connect the reference time code input here.

❸ TC OUT (time code output) connector (BNC type)
To synchronize the time code of an external VTR with that of the camcorder, connect this connector to the time code input lock connector of the external VTR.

❹ TEST OUT (output) connector (BNC type)
To synchronize the time code of an external VTR with that of the camcorder, set the test output signal to composite video and connect this connector to the video input connector of the external VTR.
For information about setting the test output, see page 2-23.

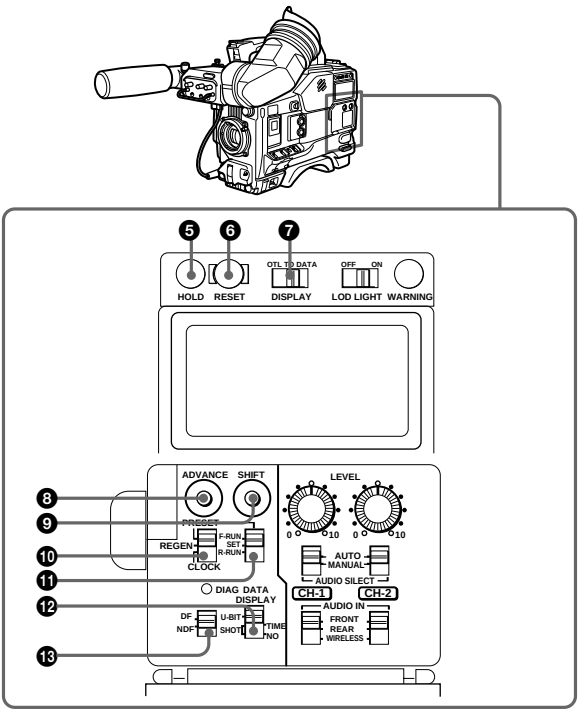


Illustration: DNW-7/90/90WS (for the NTSC broadcast system)

Time code functions (2)

❺ HOLD (display hold) button

Pressing this button instantly freezes the time data displayed in the counter display section. (The time code generator continues normal operation.) Pressing this button again releases the hold. One use of this feature is to determine the exact time of a particular shot.

See Section 2-8 "Warnings and Indications on the Display Panel" (page 2-37) for more information about the counter display.

❻ RESET (counter reset) button

This button resets the time data displayed on the counter display section to "00 : 00 : 00 : 00" and the user bit data to "00000000".

❼ DISPLAY switch

Depending on the settings of the F-RUN/SET/R-RUN switch and the REAL TIME switch, this switch selects data to display in the counter display section, as follows:

CTL: CTL

TC: Time code

DATA: The item selected by the DATA DISPLAY switch

For more information, see "Time code displays" (page 2-39).

❽ ADVANCE button

For setting the time code or user bits, each press of this button increments the flashing digit selected by the SHIFT button. Pressing this button while holding down the HOLD button decrements the flashing digit.

Hold down this button and press the SHIFT button to enter the VTR menu mode.

For details about the VTR menu, see Section 4-10, "VTR Menu Display in the Display Panel" (page 4-87).

❾ SHIFT button

For setting the time code or user bits, this button selects the digit to be changed. The selected digit flashes.

For more information, see Section 4-5-2 “Setting the Time Code” (page 4-27).

❿ PRESET/REGEN (regeneration)/CLOCK switch

This switch determines the source of time code values.

PRESET: Starts recording time code values on the tape from the currently set value. This enables the F-RUN/SET/R-RUN switch.

REGEN: Reads the existing time code on the tape, and sets the time code starting value accordingly. Thus, even when there is an indefinite break in recording, this setting ensures that time codes on the tape will be continuous. Regardless of the setting of the F-RUN/SET/R-RUN switch, the camcorder operates in R-RUN mode.

CLOCK: Makes the time code value coincide with the built-in clock. Regardless of the F-RUN/SET/R-RUN switch setting, the camcorder always operates in F-RUN mode.

⓫ F-RUN/SET/R-RUN (free run/set/recording run) switch

This switch selects the operating mode of the internal time code generator.

F-RUN: The time code advances regardless of whether the VTR is operating. Use this position for synchronizing the time code with an external time code.

SET: Set the switch to this position to set the time code or user bits.

R-RUN: The time code advances only during recording, making the time code on the tape continuous.

For more information, see Section 4-5-1 “Setting the User Bits” (page 4-25), and Section 4-5-2 “Setting the Time Code” (page 4-27).

⓬ DATA DISPLAY switch

U-BIT: Display the user bit value.

SHOT-TIME: Display the date and time from the shot data.

SHOT-NO.: Display the shot number from the shot data.

Using the VTR menu, it is possible to set the unit to display the real time in the LTC user bits, or to record shot data in the VITC user bits. For details, see Section 4-10, "VTR Menu Display in the Display Panel" (page 4-87).

⓭ DF/NDF (drop frame/non-drop frame) switch (DNW-7/90/90WS only)

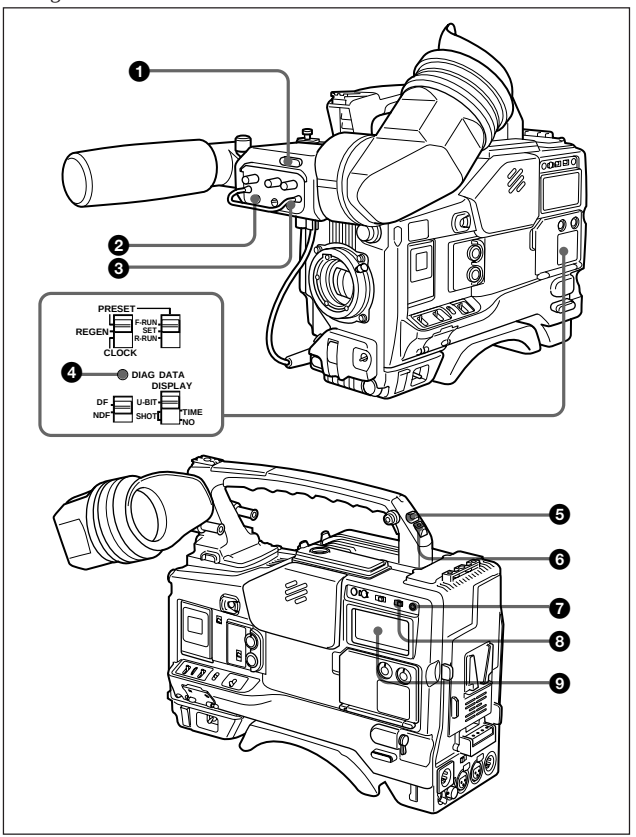
This switch selects whether the time code advances in drop frame mode or non-drop frame mode.

DF: Drop frame mode

NDF: Non-drop frame mode

2-7 Warnings and Indications

The camcorder gives visual information and warnings without your having to look in the viewfinder.



Warning and indication functions

❶ Tally indicator

Setting the TALLY switch to HIGH or LOW activates this indicator. The indicator lights during recording on the VTR. It also provides the same information as the REC indicator in the viewfinder: it comes on during recording and flashes to indicate a problem.

❷ DISPLAY switch

This switches the indications on the viewfinder screen on or off.
ON: The indications appear on the viewfinder screen.
OFF: The indications do not appear on the viewfinder screen.

❸ TALLY switch

This switch controls the tally indicator, setting its brightness (HIGH or LOW) or turning it off.

❹ DIAG (diagnosis) button

Pressing this button when the VTR is stopped switches the camcorder to the self-diagnosis mode. In the self-diagnosis mode, it is possible to carry out a display panel test, a VTR test, or a camera test, and to display the test result.
To exit from the self-diagnosis mode, press this button once more.
Refer to the Maintenance Manual for more information.

Caution

Do not press the DIAG button when a remote control unit is connected to the REMOTE connector (6-pin). Pressing the button with a remote control unit connected will disturb both the self-diagnostic and remote control functions. The only remedy for this disturbance is to disconnect the remote control unit and turn off the camcorder POWER switch.

❺ Back tally indicator

This indicator functions exactly the same way as the front tally indicator when the back tally switch is set to ON.

❻ Back tally switch

This switch turns the back tally indicator on and off.

❼ WARNING indicator

This indicator lights up or flashes when there is a fault in the VTR.

See Section 6-3 "Operation Warnings" (page 6-12) for more information about the relationships between the operation of the indicator and the meanings of the indications.

❽ LCD LIGHT switch

This switch turns the display panel illumination on and off.

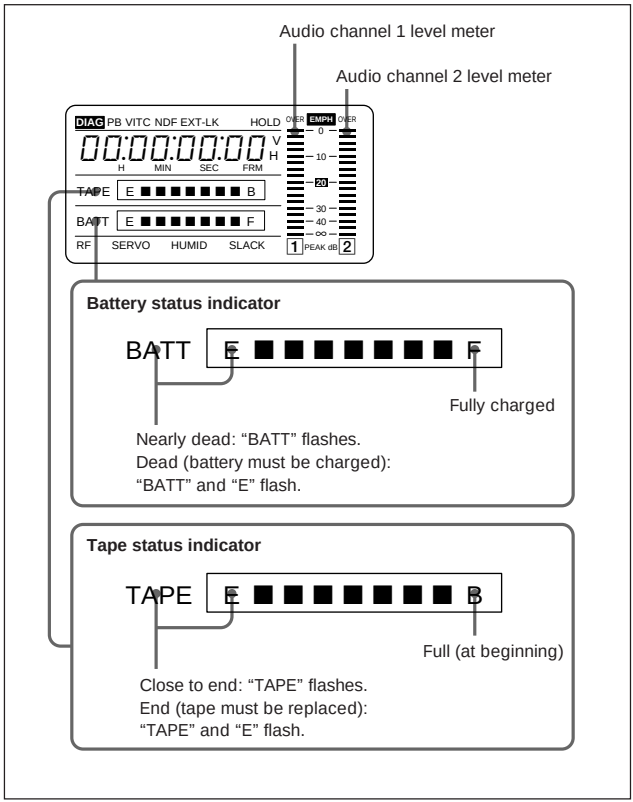
❾ Display panel

VTR error messages, battery status, tape status, audio level, time data, and so forth are displayed on this panel.

For more information, see Section 2-8 "Warnings and Indications on the Display Panel" (page 2-37).

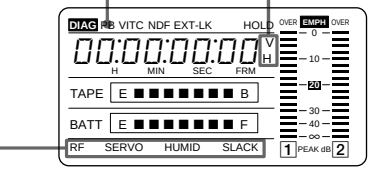
2-8 Warnings and Indications on the Display Panel

Tape status, battery status and level indicators



Tape status, battery status and level indicators

VTR operation and status indicators



Lights in the self-diagnostic mode (testing display panel, camera, and VTR).
For more information, see Section 6-3 "Operation Warnings" (page 6-12).

Lights during playback.

Warning indicators
RF: Lights if the recording heads are clogged.
SERVO: Lights if the servo motor fails.
HUMID: Lights if condensation is on the drum.
SLACK: Lights if the tape is not winding properly.
For more information, see Section 6-3 "Operation Warnings" (page 6-12).

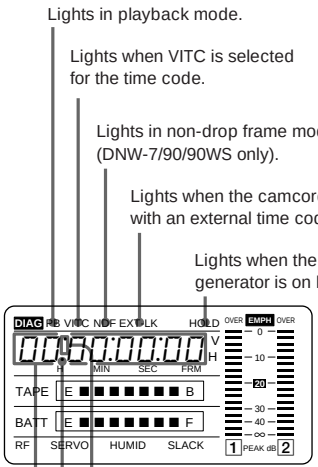
VTR operation and status indicators

Note

If the tape in the VTR is slacked, an error code appears in the display section of the display panel.

For more information, refer to the Maintenance Manual.

Time code displays



The table on the next page lists the details of the displayed items and switch settings.

Time code displays

Relationships between the DISPLAY switch and DATA DISPLAY switch settings and the time counter displays

Except during setting of the time code, the time counter display is determined by the positions of the DISPLAY switch and DATA DISPLAY switch.

For details of setting the time code menu operation, see Section 4-5-2, "Setting the Time Code" (page 4-27).

Switch settings relating to time code and displayed information

DISPLAY switch position	DATA DISPLAY switch position	Displayed information
CTL	Any position	CTL
TC	Any position	Time code
DATA	U-BIT	User bits
	SHOT-TIME	Date and time from shot data
	SHOT-NO.	Shot number from shot data

3-1 About Cassettes

This section describes the procedure for loading and unloading a cassette.

See "Specifications" (page A-1) for information about the cassettes you can use in the camcorder.

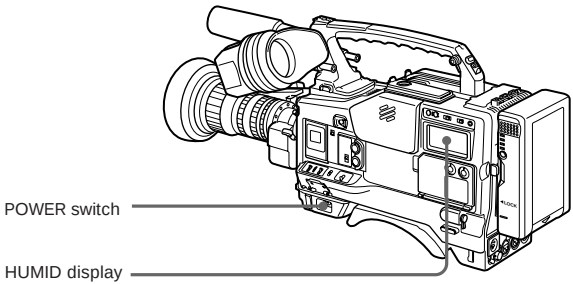
3-1-1 Loading and Unloading a Cassette

Loading a cassette

Note

If you insert a cassette which has been rewound on a rewinder with no beginning-of-tape detector into this unit, the "SLACK" indication may appear to indicate a tape take-up failure. If this happens, press the EJECT button to eject the cassette, then turn the take-up reel about three whole turns, and reinsert the cassette.

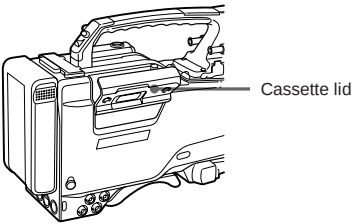
1 Turn on the POWER switch.



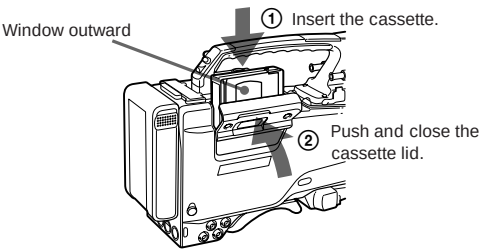
If the interior of the VTR section is damp, the HUMID indicator will light. If this happens, wait until the indicator goes off before going on to step **2**.

(Continued)

2 Press the EJECT button.
The cassette lid will open.

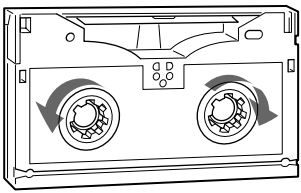


3 Check that there is no slack in the tape, then slide in the cassette until it clicks into position, and close the cassette lid completely by pressing near the engraved “PUSH”.



Checking the tape for slack

Pressing in the reels lightly, turn them gently with your fingers in the directions shown below. If the reels will not move, there is no slack.



Checking the tape for slack

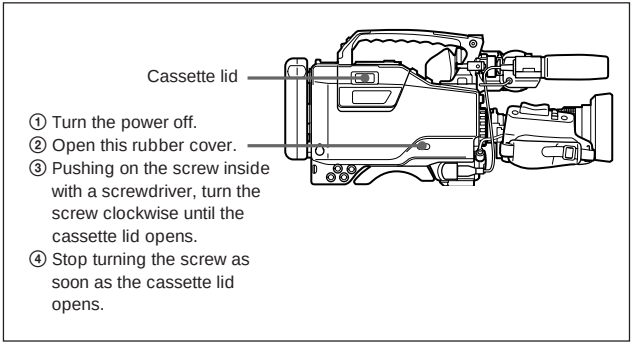
Unloading a cassette

With the power supply on, press the EJECT button to open the cassette lid, then take out the cassette. If you are not going to insert another cassette, close the cassette lid.

It is possible to take out the cassette and close the cassette lid unless the battery voltage drops below about 9 V.

Unloading a cassette manually

If the battery voltage drops below about 9V, take out the cassette manually as illustrated below.

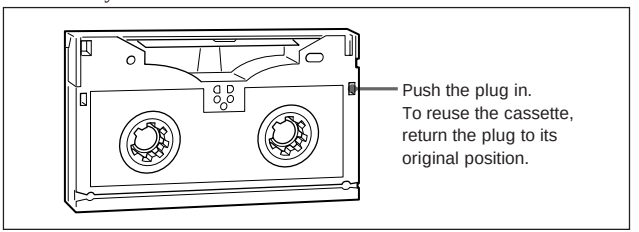


Unloading a cassette manually

You cannot lock the cassette lid after taking out the cassette, but turning on the power makes the cassette lid operable again.

3-1-2 Preventing Accidental Erasure

The following procedure prevents cassettes from being recorded inadvertently.



Preventing accidental erasure

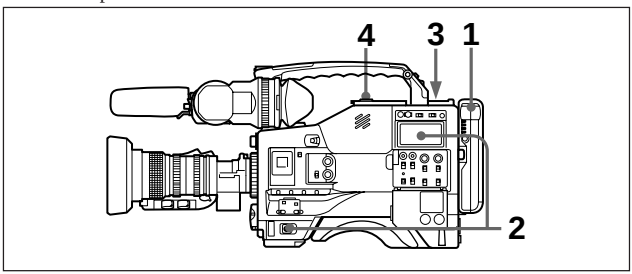
3-2 Recording

3-2-1 Basic Procedure

This section describes the basic procedure for shooting and recording. Before a shooting session, make the checks listed in Section 6-1 “Testing the Camcorder Before Shooting” (page 6-1) to ensure that the camcorder is functioning properly.

Turning on the camcorder and loading a cassette

Follow the procedure below.



Basic procedure for shooting : from power supply to cassette loading

1 Load a fully charged battery pack.

2 Set the POWER switch to ON. Check that the HUMID indicator does not appear and that the BATT indicator shows at least five segments. When using a BP-L60/L90 battery pack, check that the four LED indicator segments on the battery pack are lit.
- If the HUMID indicator appears, wait until it disappears.
- If the BATT indicator does not show at least five segments, replace the battery pack with a fully charged one.

3 Check that there are no obstructions near the cassette lid, then press the EJECT button to open the cassette lid.

(Continued)

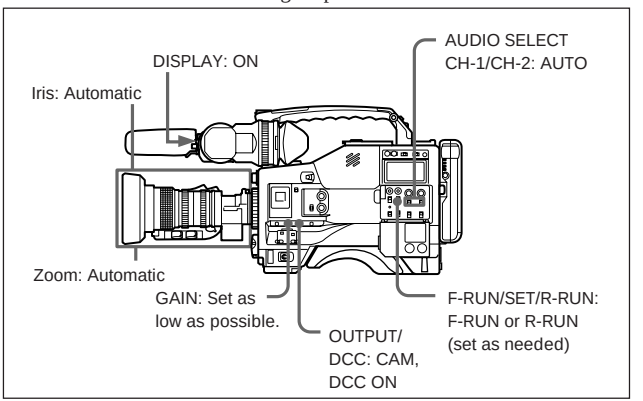
4 After checking the points below load the cassette, and close the cassette lid.

- The cassette is not write-protected.
- There is no slack in the tape.
- The leader tape is wound on the take-up reel.

3

Basic procedure for shooting : from adjusting the black balance and white balance to stopping recording

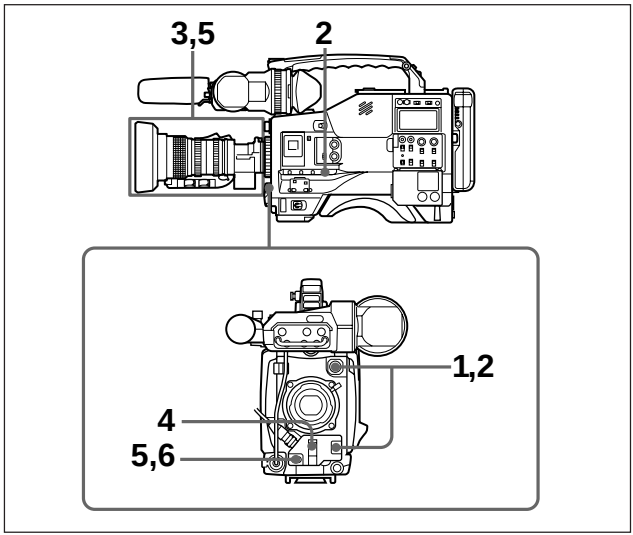
After turning on the power and loading a cassette, set the switches and selectors as shown below and begin operation.



Switch and selector settings before shooting

Shooting

Follow the procedure below.



Basic procedure for shooting: from adjusting the black balance and white balance to stopping recording

1 Push the AUTO W/B BAL switch to BLK to adjust the black balance.

2 Select the filter to match the lighting conditions, and adjust the white balance.

(Continued)

When the black balance and white balance settings are already in memory:
Set the WHITE BAL switch to A or B.

When the white balance setting is not in memory and you do not have enough time to adjust the white balance:
Set the WHITE BAL switch to the PRST position. The white balance is automatically set to 3200 K when the FILTER knob is in position 1, and to 5600 K in other positions.

For more information, see Section 4-1-2 "Adjusting the White Balance" (page 4-5).

3 Aim the camera at the object, and adjust the focus and zoom.

4 If necessary, set the electronic shutter for an appropriate mode and speed.

For more information, see Section 4-2 "Setting the Electronic Shutter" (page 4-11).

5 To start recording, press the VTR START button or the VTR button on the lens.

During recording, the REC indicator in the viewfinder goes on. Perform zooming and focus control, if necessary.

6 To stop recording, press the VTR START button or the VTR button on the lens again.

The REC indicator goes off.

Cassette control buttons

During recording, the cassette control buttons (EJECT, REW, F FWD, PLAY, STOP) have no effect.

3-2-2 Continuous Recording

If the camcorder is in the recording pause mode, simply pressing the VTR START button on the camcorder or the VTR button on the lens continues recording at exactly the next frame.
In other cases, you first need to position the tape at an appropriate point to prevent the recording continuity from being lost.

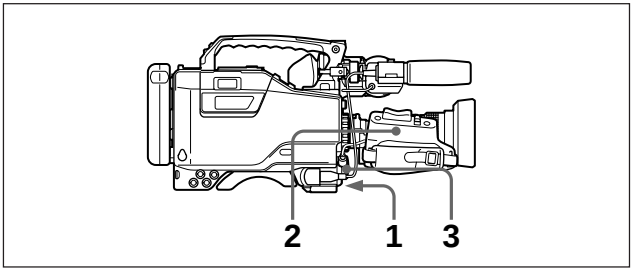
When the camcorder is in the recording pause mode

Pressing the VTR START button on the camcorder or the VTR button on the lens positions the tape at the appropriate point automatically.
However, the time taken before recording starts depends on the setting of the VTR SAVE/STBY switch.

- If the VTR SAVE/STBY switch is in the SAVE position, it takes about 4 seconds before recording starts.
- If the VTR SAVE/STBY switch is in the STBY position, recording starts immediately. However, just after the switch position is changed from SAVE to STBY, it takes about 4 seconds before recording starts.

If you turn off the power during a recording pause

Follow the procedure below to continue recording.



Continuous recording after turning off the power during a recording pause

1 Turn on the power again.

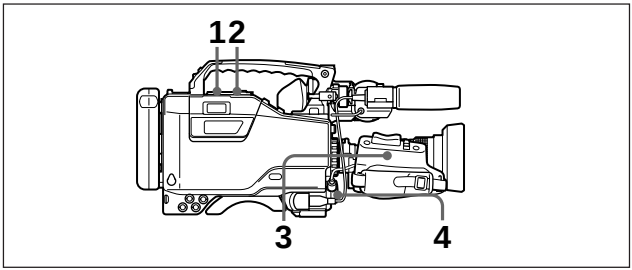
2 Press the RET button on the lens. (Make sure that CAM RET. is set to OFF on the FUNCTION 2/2 page of the setup menu.
For more information, see Section 4-9-2 "Selecting the Functions" (page 4-76).)

The camcorder positions the tape at the appropriate point. Note, however, that this function works only for continuously recorded material or consecutively joined segments totaling at least 4 seconds in length.

3 Press the VTR START button on the camcorder or the VTR button on the lens to start recording.

Continuous recording in other cases

After rewinding or fast forward, after removing the cassette, or on a tape that has been partially recorded, you can obtain a continuous recording by following the procedure below.



Continuous recording after rewinding or fast forward, after removing the cassette, or on a tape that has been partly recorded

1 Looking in the viewfinder, press the PLAY button to start playback.

2 Press the STOP button at the desired point to begin recording. To continue from the end of recording already on the tape, press the STOP button immediately after the end of the previous recording (within 0.5 seconds).

3 Press the RET button on the lens. (Make sure that CAM RET. is set to OFF on the FUNCTION 2/2 page of the setup menu. *For more information, see Section 4-9-2 "Selecting the Functions" (page 4-76).*)

The tape will rewind and will be positioned at the desired point to continue recording in about 7 seconds.

4 Press the VTR START button on the camcorder or the VTR button on the lens to start recording.

3-2-3 Recording Good Shot Markers

It is possible to record a good shot marker on tape by pressing the RET button on the lens during recording.
Press the RET button once to record shot marker 1. On the viewfinder screen, "●" and the time code of the marked point are displayed for about 3 seconds. Press the RET button twice successively to record shot marker 2. On the viewfinder screen, "✕" and the time code of the marked point are displayed for about 3 seconds.
Recording shot markers 1 and 2 for scenes containing important image and sound enables quick access to the marked points, for efficient editing. For shot marker operations, refer to the manual for your VTR.
A setting in the VTR menu determines whether or not good shot markers are recorded. (Factory settings allow recording of both shot markers 1 and 2.)

For details, see Section 4-10, "VTR Menu Display in the Display Panel" (page 4-87).

3-2-4 Recording a Recording Start Marker

It is possible to record a recording start marker at the beginning of recording.
Using recording start markers enables quick access to the marked points, for efficient editing. For recording start marker operations, refer to the manual for your VTR.
A setting in the VTR menu determines whether or not recording start markers are recorded. (Factory settings allow automatic recording of recording start markers.)

For details, see Section 4-10, "VTR Menu Display in the Display Panel" (page 4-87).

3-3 Checking the Recording — Playback

By pressing the PLAY button, you can review any length of the recording in the viewfinder in black and white. There are two other ways to review the recording.

- **Recording review:** You can see the last 2 seconds of the recording in the viewfinder in black and white.
- **Color playback:** You can see the recording in color on a color video monitor without the need for any external adaptor.

You can also view the picture by pressing the REW button or F FWD button during playback.

See Section 2-3 "Audio Functions" (page 2-5), for information about the switches and controls used to select the audio output signal and to adjust the audio level.

3-3-1 Checking the Last Two Seconds of the Recording — Recording Review

If you press the RET button on the lens while recording is paused, the last two seconds of the tape is automatically rewound, and that segment is played back on the viewfinder screen. Use this function to check whether recording went smoothly. If you hold the RET button down longer, at most 10 seconds of the tape is rewound and played back. After playback, the camcorder is ready to start recording again.

Set CAM RET. to OFF on the FUNCTION 2/2 page of the setup menu when inputting a return video signal to the GENLOCK IN connector.

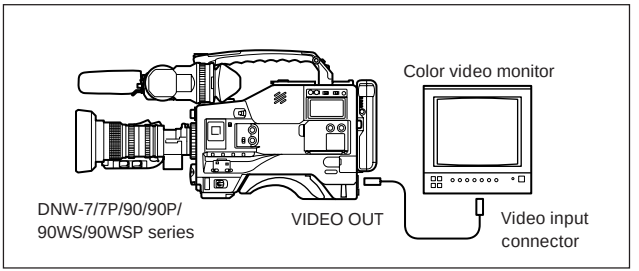
For information about setting the CAM RET. function, see Section 4-9-2 "Selecting the Functions" (page 4-76).

Note

The recording review function only works if the recording you have made is at least 2 seconds long.

3-3-2 Checking the Recording on the Color Video Monitor — Playback in Color

Connect a color video monitor to the VIDEO OUT connector of the camcorder, and press the PLAY button.



Color playback

4-1 Adjusting the Black Balance and the White Balance

Conditions may require that both the black balance and the white balance be adjusted.

The black balance will require adjustment in the following cases.
- When the camcorder is first used
- When the camcorder has not been used for a long time
- When the camcorder is used under conditions in which the surrounding temperature has changed greatly
- When the GAIN selector values have been changed

It is not usually necessary to adjust the black balance when using the camcorder after it has been briefly off.

Always readjust the white balance when the lighting conditions change.

If the black balance or white balance adjustment is started when the display mode is set to 2 or 3, messages that report on the adjustment progress and results are displayed on the viewfinder screen. Change the display mode to 1 to suppress these messages.

For information about setting the display mode, see Section 4-8-3 "Display Mode and Setting Change and Adjustment Progress Messages" (page 4-58).

Note

The black balance and white balance cannot be adjusted while the setup menu is displayed on the viewfinder screen. Always set the MENU ON/OFF/PAGE switch to OFF before starting these adjustments.

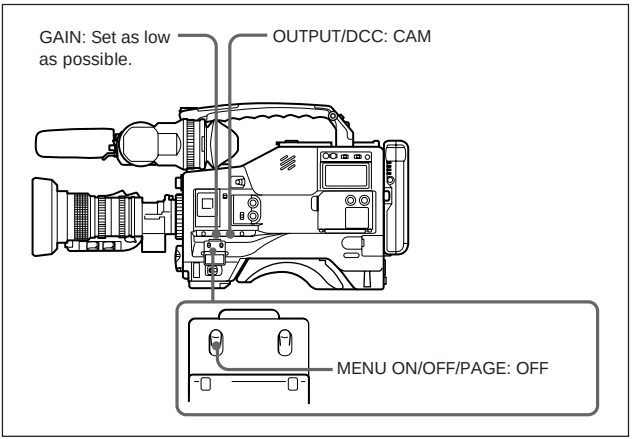
4-1-1 Adjusting the Black Balance

In automatic black balance mode, the black balance is adjusted after the black set is adjusted.
Manual black balance adjustment can be selected from the setup menu.
Refer to the Maintenance Manual for information about manual black balance adjustment.

4

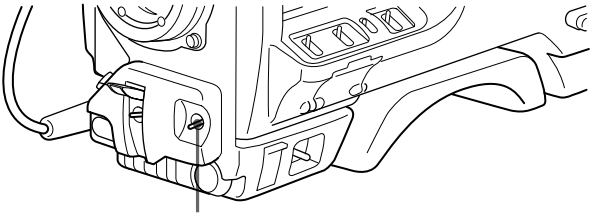
Follow the procedure below to adjust the black balance.

1 Set the switches as follows:



If you change the setting of the GAIN selector, a message reporting the set position appears in the setting change and adjustment progress message display area of the viewfinder screen for about 3 seconds (in display mode 3).

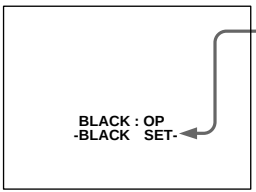
2 Push the AUTO W/B BAL switch to BLK, and release the switch.



AUTO W/B BAL switch

The switch returns to the center position, and the adjustment is completed.

During adjustment, the following messages are displayed on the viewfinder screen (in display mode 2 or 3).



The messages change in the following sequence : -BLACK SET- → -BLACK BAL- [1] → -CHECK-

Message during adjustment

(Continued)

1) If the existing black balance adjustment is satisfactory, the message "BLACK BAL" may not appear, that is, the automatic black balance adjustment may be omitted to save time.

The black balance adjustment ends in a few seconds with the message “BLACK : OK,” and the adjustment setting is automatically stored in memory.

Notes

- During the black balance adjustment, the iris is automatically closed.
- During the black balance adjustment, the gain selection circuit is automatically activated so you may see flickering on the viewfinder screen, but this is not a fault.

4

If automatic black balance adjustment cannot be made

If the black balance adjustment cannot be completed normally, an error message will appear for about 3 seconds on the viewfinder screen (in display mode 2 or 3).
Possible messages are listed on the next page.

Black balance adjustment error messages

Error message	Meaning
BLACK : NG IRIS NOT CLOSED	The lens iris did not close; adjustment was impossible.
BLACK : NG R (or G or B) : TIME LIMIT	Adjustment could not be completed within the standard number of attempts.
BLACK : NG R (or G or B) : OVERFLOW	The difference between the reference value and the current value is so great that it exceeds the range. Adjustment was impossible.

If any of the above error messages is displayed, retry the black balance adjustment. If the error message occurs again, an internal check is necessary.

Refer to the Maintenance Manual for information about this internal check.

Note

The black balance cannot be adjusted while the setup menu is displayed on the viewfinder screen. Always set the MENU ON/OFF/PAGE switch to OFF before starting these adjustments.

Black balance memory

Values stored in memory are held until the black balance is next adjusted.

If a memory error occurs

If the error message ": STORED DATA : NG" flashes on the viewfinder screen when the camcorder is turned on, the black balance memory content has been lost.

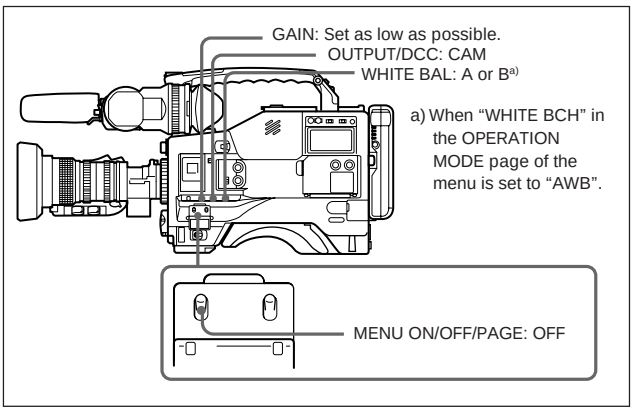
Adjust the black balance again. Contact your Sony representative if this message continues to appear even after the black balance has been adjusted again.

For more information, refer to the Maintenance Manual.

4-1-2 Adjusting the White Balance

Follow the procedure below to automatically adjust the white balance.

1 Set the switches as follows:



(Continued)

If the setting of the GAIN selector or WHITE BAL switch is changed, a message reporting the set position appears for about 3 seconds in the setting change and adjustment progress message display area of the viewfinder screen (in display mode 3).

2 Adjust the FILTER selector to suit the lighting conditions.

The relationships between the various selector settings and filter selections are listed in the tables below.

Filter selector setting and filter

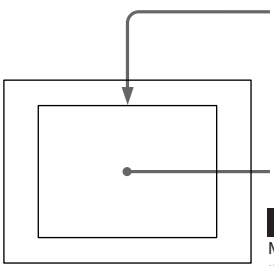
Filter selector setting	Filter
1	3200K
2	5600K + 1/8 ND
3	5600K
4	5600K + 1/64 ND

For examples of FILTER selector settings, see the description of the FILTER selector in Section 2-4 “Shooting and Recording/Playback Functions” (page 2-14).

If the setting of the FILTER selector is changed, a message reporting the setting appears for about 3 seconds in the setting change and adjustment progress message display area of the viewfinder screen (in display mode 3).

3 Place a white test card under the same lighting conditions as the subject to be shot, and zoom up to it. Alternatively, any white object such as a cloth or a wall could be used.

The absolute minimum white area is as follows:



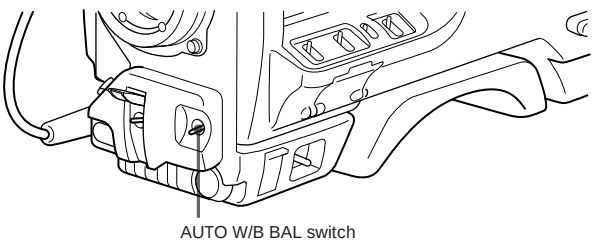
Note

Make sure there are no bright spots in the rectangle.

4 Adjust the lens iris.

If the lens is manually adjusted, adjust it as appropriate. If the lens has an automatic iris, set the automatic/manual switch on the lens to automatic.

5 Push the AUTO W/B BAL switch to WHT, and release the switch.

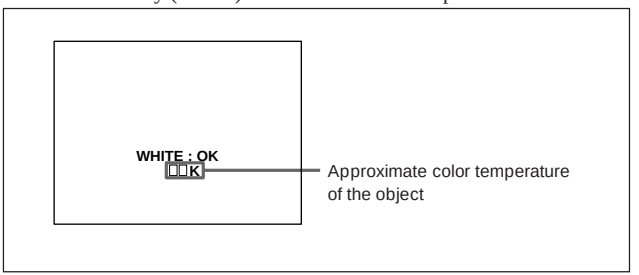


(Continued)

The switch returns to the center position, and the adjustment is completed.

During adjustment, the message “WHITE : OP” is displayed on the viewfinder screen (in display mode 2 or 3).

The white balance adjustment ends in a second with the message “WHITE : OK”, and the adjustment setting is automatically stored in the memory (A or B) that was selected in step **1**.



Note

If the camera has a zoom lens with an automatic iris, the iris may hunt [1] during the adjustment. To prevent this, adjust the iris gain knob (marked with IG, IS, or S) on the lens.

For more information, refer to the lens operation manual.

1) Hunting
Repeated brightening and darkening of an image, resulting from repeated responses to automatic iris control.

If automatic white balance adjustment cannot be made

If the white balance adjustment cannot be completed normally, an error message will appear for about 3 seconds on the viewfinder screen (in display mode 2 or 3).
Possible messages are listed below.

White balance adjustment error messages

Error message	Meaning
WHITE : NG LOW LEVEL	The white video level is too low. Either make the lighting brighter or increase the gain.
WHITE : NG COLOR TEMP. HIGH	The color temperature is too high. Select a suitable filter setting.
WHITE : NG COLOR TEMP. LOW	The color temperature is too low. Select a suitable filter setting.
WHITE : NG TIME LIMIT	Adjustment could not be completed within the standard number of attempts.
WHITE : NG POOR WHITE AREA	The white area could not be checked.
WHITE : NG LEVEL TOO HIGH	The white video level is too high. Either narrow the lens iris opening or change the ND filter.

If any of the above error messages is displayed, retry the white balance adjustment. If the error message occurs again, an internal check is necessary.

Refer to the Maintenance Manual for information about this internal check.

Note

The white balance cannot be adjusted while the setup menu is displayed on the viewfinder screen. Always set the MENU ON/OFF/PAGE switch to OFF before starting these adjustments.

If you have no time to adjust the white balance

Set the WHITE BAL switch to PRST. The white balance is automatically set to 3200 K when the FILTER selector is in position 1, and to 5600 K in other positions.

White balance memory

Values stored in memory are held until the white balance is next adjusted.

There are two sets of white balance memories, A and B, and adjustments for each of the filters can be automatically stored in the memory corresponding to the setting (A or B) of the WHITE BAL switch. The camcorder has four built-in filters, so a total of eight (4×2) adjustments can be stored. The number of memories allocated each A and B can be limited to one each by setting FILTER INH. to ON on the FUNCTION 2/2 page of the setup menu. In this case, the memory contents are not linked to the filters.

When the WHITE BAL switch is set to B whereas, in the setup menu OPERATION MODE page, “B CH” is set to ATW, the ATW function is activated to automatically adjust the white balance of the picture being shot for varying lighting conditions.

If a memory error occurs

If the error message “: STORED DATA : NG” flashes on the viewfinder screen when the camcorder is turned on, the white balance memory content has been lost.

Adjust the black balance and the white balance again. Contact your Sony representative if this message continues to appear even after the black balance and the white balance have been adjusted again.

For more information, refer to the Maintenance Manual.

4-2 Setting the Electronic Shutter

This section describes the shutter modes that can be used with the electronic shutter of the camcorder, and describes the procedure for selecting the shutter speed and mode.

4-2-1 Shutter Modes

The shutter modes that can be used with the electronic shutter and the shutter speeds that can be selected are listed below.

Selectable shutter modes and speeds

Mode	Shutter speed	Application
Standard	DNW-7/90/90WS/9WS: 1/100, 1/125,1/250, 1/500, 1/1000, or 1/2000 sec.	For shooting fast-moving subjects with little blurring.
	DNW-7P/90P/90WSP/9WSP: 1/60, 1/125, 1/250, 1/500, 1/1000, or 1/2000 sec.	
CLS (Clear Scan)	DNW-7: 263 speeds in the range of 60.0 Hz to 10156 Hz DNW-90/90WS/9WS: 260 speeds in the range of 60.1 Hz to 7000Hz	For shooting subjects such as monitor screens with vertical scanning frequencies of over 60 Hz (DNW-7/90/90WS/9WS) or over 50 Hz (DNW-7P/90P/90WSP/9WSP), to obtain images with no horizontal bands of noise.
	DNW-7P: 312 speeds in the range of 50.0 Hz to 10101 Hz DNW-90P/90WSP/9WSP: 310 speeds in the range of 50.2 Hz to 9000 Hz	

(Continued)

Mode	Shutter speed	Application
ECS (Extended Clear Scan) (For DNW-90/ 90P/90WS/ 90WSP only)	DNW-90/90WS: 248 speeds in the range of 30.4 Hz to 58.3 Hz DNW-90P/90WSP: 295 speeds in the range of 25.4 Hz to 48.7 Hz	For shooting subjects such as monitor screens with vertical scanning frequencies of up to 60 Hz (DNW-90/90WS) or up to 50 Hz (DNW-90P/90WSP), to obtain images with no horizontal bands of noise.
EVS (Enhanced Vertical Definition)	DNW-7/90/90WS/9WS: 1/ 60 sec. (automatic setting) DNW-7P/90P/90WSP/ 9WSP: 1/50 sec. (automatic setting)	Improved vertical resolution. In the case of the DNW-7/7P/9WS/ 9WSP, the sensitivity of the CCD is reduced to half.

4

Notes

- Whatever the operating mode of the electronic shutter, the sensitivity of the CCD decreases with increasing shutter speed.
- When the automatic iris is used, the iris opens wider and wider as the shutter speed increases, thus reducing the depth of field.
- Under artificial light, particularly fluorescent or mercury lamps, the light intensity may appear to be constant, but the strengths of each of the R, G and B colors are actually changing in synchronization with the frequency of the power supply (“flicker”). Using an electronic shutter under such lighting could make the flicker even worse. Color flicker is particularly likely to happen when the power supply is 60 Hz (with the DNW-7/90/90WS/9WS) or 50 Hz (with the DNW-7P/90P/90WSP/ 9WSP). However, if the power frequency is 50 Hz (DNW-7/90/90WS/ 9WS) or 60 Hz (DNW-7P/90P/90WSP/9WSP), setting the shutter speed to 1/100 or 1/60 can reduce this flicker.
- When a bright object is shot in EVS mode or ECS mode (DNW-90/ 90P/90WS/90WSP only) in such a manner that it fills the screen, the upper edge of the picture may have poor quality because of an inherent characteristic of CCD. Before using EVS mode, check the shooting conditions.

• When using the electronic shutter, set FIELD/FRAME to FLD (field accumulation mode) on the FUNCTION 2/2 page of the setup menu.

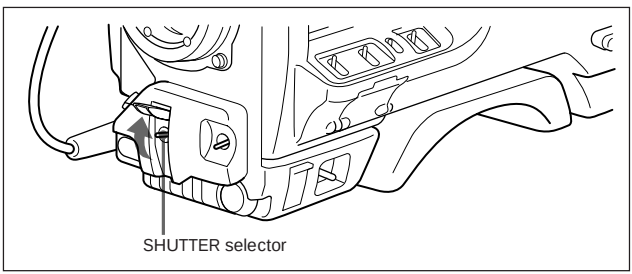
4-2-2 Selecting the Shutter Mode and Speed

Use the SHUTTER selector to select a shutter mode or a standard-mode shutter speed. To set the shutter speed in CLS/ECS mode, with the SHUTTER switch set to ON and the CLS/ECS mode selected, turn the rotary encoder.
You can use the SHUTTER SPEED page of the setup menu to narrow the range of choice in advance, or to select in advance whether you use CLS, ECS or EVS mode.

Setting the shutter mode and standard-mode shutter speed

1 Follow the procedure described in “Changing the display mode” (page 4-60) to set the display mode to 2 or 3 from the VF DISPLAY page of the setup menu.

2 Open the SHUTTER selector cover, then push the SHUTTER selector from ON to SEL.



(Continued)

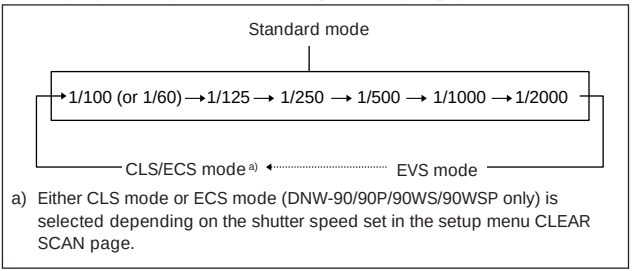
The current shutter setting appears for about 3 seconds in the setting change and adjustment progress message display area of the viewfinder screen.
E.g.: SS : 1/250 or : CLS : 60.6 Hz

3 Before the message from step **2** disappears, push the SHUTTER selector to SEL again and repeat until the desired mode or speed appears.

4

Pushing the SHUTTER selector to SEL repeatedly allows you to cycle through the settings of mode and speed preselected on the SHUTTER SPEED page of the setup menu.
Note that all modes and all standard-mode speeds listed in the table on page 4-12 are preselected using the SHUTTER SPEED page of the setup menu.

For more information about the SHUTTER SPEED page, see "Changing the range of choice of shutter mode and speed settings" (page 4-17).



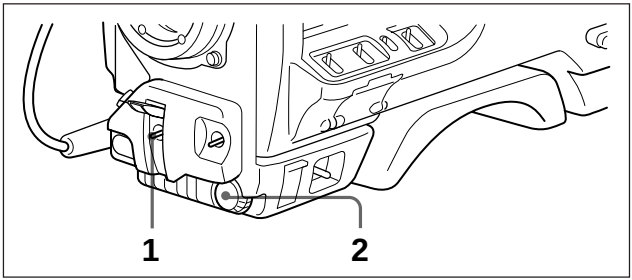
a) Either CLS mode or ECS mode (DNW-90/90P/90WS/90WSP only) is selected depending on the shutter speed set in the setup menu CLEAR SCAN page.

Selectable settings of shutter mode and speed (factory setting)

Once a shutter speed is selected, it is maintained until the next shutter speed setting operation.
When the message "STORED DATA:NG" appears, the shutter speed returns to 1/100 s (DNW-7/90/90WS/9WS) or 1/60 s (DNW-7P/90P/90WSP/9WSP).

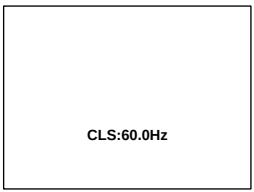
Setting the shutter speed in CLS mode

Follow the procedure below.



Setting the shutter speed in CLS mode

1 Set the shutter speed mode to CLS.



The value indicated differs between camcorder models.

CLEAR SCAN page (factory settings)

(Continued)

2 Turn the rotary encoder counterclockwise as seen from the front of the camera to increase the value, or clockwise to decrease the value, until the desired frequency appears.

The frequency ranges as follows.

DNW-7:	60.0 Hz to 10156 Hz in 263 steps
DNW-90/90WS:	60.1 Hz to 7000 Hz in 260 steps, and 30.4 Hz to 58.3 Hz in 248 steps
DNW-9WS:	60.1 Hz to 7000 Hz in 260 steps
DNW-7P:	50.0 Hz to 10101 Hz in 312 steps
DNW-90P/90WSP:	50.2 Hz to 9000 Hz in 310 steps, and 25.4 Hz to 48.7 Hz in 295 steps
DNW-9WSP:	50.2 Hz to 9000 Hz in 310 steps

Pressing the MENU CANCEL/PRST/ITEM switch toward the CANCEL/PRST position returns the setting to the default value, 60.0 Hz (DNW-7)/60.1 Hz (DNW-90/90WS/9WS) or 50.0 Hz (DNW-7P)/50.2 Hz (DNW-90P/90WSP/9WSP).

When the RM-P9 Remote Control Unit is connected

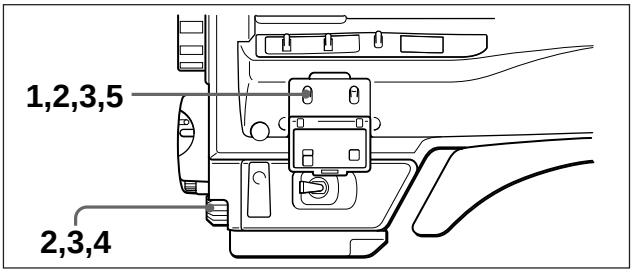
You can set the shutter speed using the UP/DOWN switch of the RM-P9. In this case, however, the setting does not appear on the viewfinder screen.

Changing the range of choice of shutter mode and speed settings

You can reduce the time required to select the shutter mode and speed by narrowing the choice of settings in advance. This can be done by using the SHUTTER SPEED page of the setup menu.
Follow the procedure below.

Note

The SHUTTER SPEED page cannot be accessed when a remote control unit is connected to the camcorder.



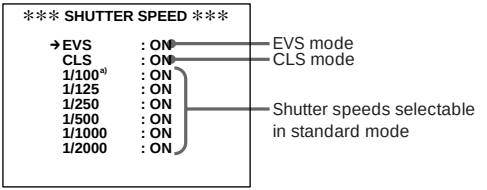
Changing the range of choice of shutter mode and speed settings

1 Set the MENU ON/OFF/PAGE switch to ON.

The page that was on the screen when the last menu operation ended appears on the viewfinder screen. (When this menu is first used, the lowest-numbered page of the currently selected pages for configuring the menu appears.)

2 Push the MENU ON/OFF/PAGE switch repeatedly to PAGE until the FUNCTION 2/2 page shown on the next page appears (or use the rotary encoder).

(Continued)



a) 1/100 for DNW-7/90/90WS/9WS or 1/60 for DNW-7P/90P/90WSP/9WSP

SHUTTER SPEED page (factory settings)

3 Push the MENU CANCEL/PRST/ITEM switch repeatedly to ITEM until the cursor reaches the mode or shutter speed you want (or use the rotary encoder).

4 To use the selected mode or speed (the “ON” setting), turn the rotary encoder counterclockwise as seen from the front of the camera. In order not to use it (the “OFF” setting), turn the rotary encoder clockwise.

Note that pushing the MENU CANCEL/PRST/ITEM switch to CANCEL/PRST has no effect on the SHUTTER SPEED page.

To select another mode or speed, return to step **3**.

5 To end the menu operation, set the MENU ON/OFF/PAGE switch to OFF.

The setup menu disappears from the viewfinder screen and the display indicating the current status of the camcorder appears along the top and bottom of the viewfinder.

4-3 Changing the Reference Value for Automatic Iris Adjustment

The reference value for automatic iris adjustment can be changed to enable the shooting of clear pictures of back-lit subjects, or to obtain special effects. The reference value for the lens iris can be set within the following range with respect to the standard value as defined by an F number.

- 0.5: about 0.5 stop further open
- 0.25: about 0.25 stop further open
- –0.25: about 0.25 stop further closed
- –0.5: about 0.5 stop further closed

To change the reference value, set A. IRIS OVERRIDE to ON (factory setting is OFF) on the FUNCTION 2/2 page of the setup menu.

The reference value is normally set to the standard value. Even if the reference value is changed, it reverts to the standard value every time the power is turned on.

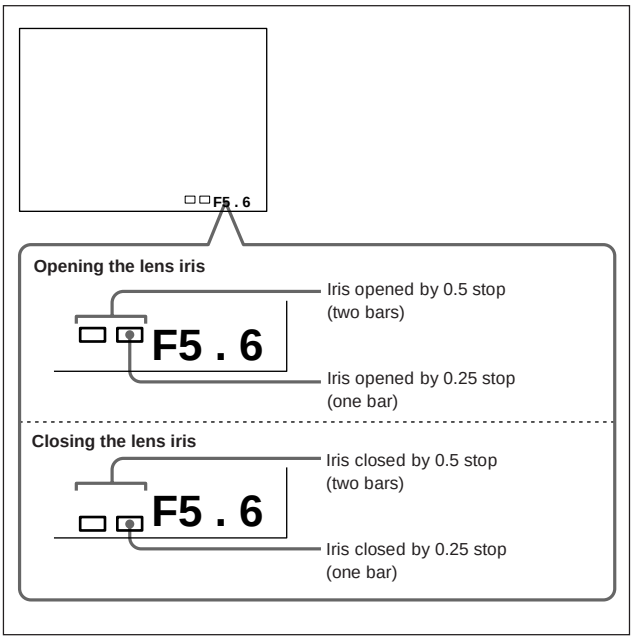
Opening or closing the lens iris

1 Set the MENU ON/OFF/PAGE switch to OFF to close the menu.

2
- To open the iris by 0.25 stop: turn the rotary encoder counterclockwise as seen from the front of the camera.
  One bar appears in the upper part to the left of the F number in the iris indication.
- To open the iris by 0.5 stop: turn the rotary encoder further counterclockwise as seen from the front of the camera.
  Two bars appear in the upper part to the left of the F number in the iris indication.

(Continued)

- To close the iris by 0.25 stop: turn the rotary encoder clockwise as seen from the front of the camera.
  One bar appears in the lower part to the left of the F number in the iris indication.
- To close the iris by 0.5 stop: turn the rotary encoder further clockwise as seen from the front of the camera.
  Two bars appear in the lower part to the left of the F number in the iris indication.



Opening or closing the lens iris

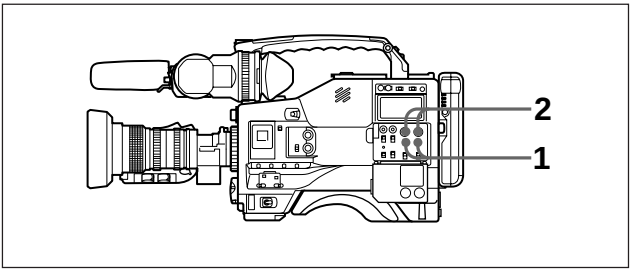
When the RM-P9 Remote Control Unit is connected

The IRIS control knob of the RM-P9 can be used for lens iris setting. The bar display (☐) will not appear, however.

4-4 Adjusting the Audio Level

If you set the AUDIO SELECT CH-1/CH-2 switches to AUTO, the input levels for the corresponding channels are adjusted automatically.

Follow the procedure below to manually adjust the level for both audio channels.



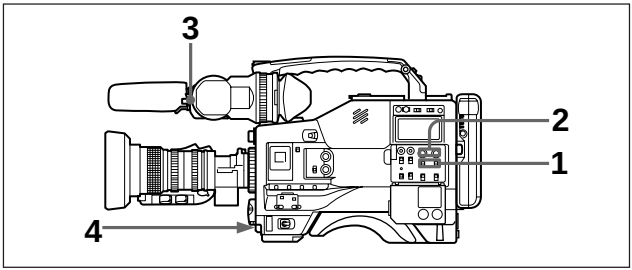
Audio level manual adjustment

1 Set the AUDIO SELECT CH-1/CH-2 switches to MANUAL.

2 Adjust the AUDIO LEVEL CH-1/CH-2 controls so that at the maximum sound level the level meter indicates –20 dB.

Adjusting the audio level of the microphone

You can adjust the audio level input from the microphone for channels 1 and 2 by using the MIC AUDIO LEVEL control on the front of the camcorder.



Microphone audio level adjustment

1 Set either or both AUDIO IN switches to FRONT as follows:
- When using the front microphone input for both channels 1 and 2: Set both AUDIO IN switches to FRONT.
- When using the front microphone input for either channel 1 or 2: Set the AUDIO IN switch for the desired channel to FRONT.

2 Set the AUDIO SELECT switch(es) for the desired channel(s) to MANUAL.

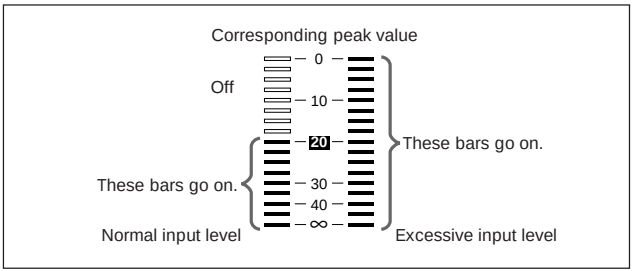
3 Set the DISPLAY switch at the viewfinder to ON.

The audio level indication of the channel 1 will appear in the viewfinder.

(Continued)

4 Turn the MIC AUDIO LEVEL control on the front of the camcorder to adjust the audio level while seeing the audio level indication.

- When the incoming audio level is normal, the nine bars from the bottom are on.
- The second bar from the top may turn on occasionally, but do not allow the top bar to go on. If it goes on, the audio level is too high.



4-5 Setting the Time Data

4-5-1 Setting the User Bits

By setting the user bits (up to hexadecimal 8 digits), you can record user information such as the date, time, or scene number on the time code track.

Follow the procedure below to set the user bits.

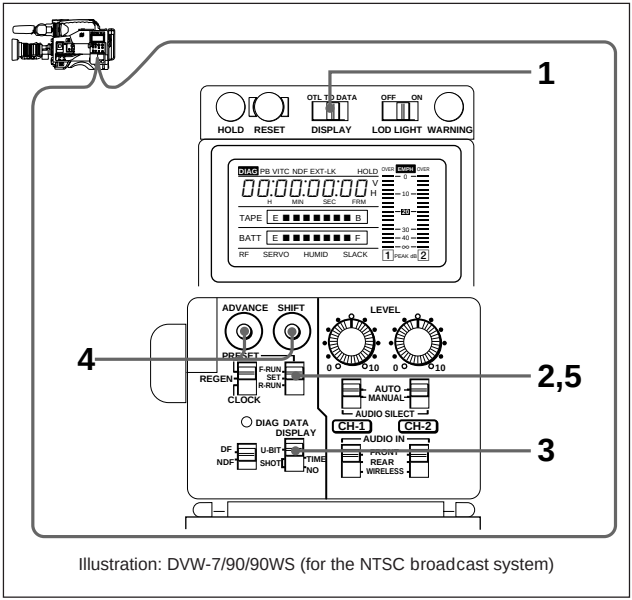


Illustration: DVW-7/90/90WS (for the NTSC broadcast system)

Setting the user bits

1 Set the DISPLAY switch of the camcorder to DATA.

2 Set the F-RUN/SET/R-RUN switch to SET.

(Continued)

3 Set the DATA DISPLAY switch to U-BIT.

4 Set the user bits, using the SHIFT and ADVANCE buttons.

SHIFT: Selects a digit to set. Each time you press it, the flashing column moves one to the right.
Pressing this button while holding down the HOLD button moves the flashing digit one to the left.

ADVANCE: Increments the value of the flashing digit.
Pressing this button while holding down the HOLD button decrements the flashing digit.

Hexadecimal digits A to F are displayed as follows:

Hexadecimal	A	B	C	D	E	F
Display						

5 Set the F-RUN/SET/R-RUN switch to F-RUN or R-RUN.

The specified user bits will be recorded in the LTC and VITC.

Storing the user bits in memory

The user bits setting (apart from the real time) is stored in memory when the power is turned off.

4-5-2 Setting the Time Code

The time code setting range is from 00 : 00 : 00 : 00 to 23 : 59 : 59 : 29 (hour : minute : second : frame) for the DNW-7/90/90WS/9WS, or to 23 : 59 : 59 : 24 for the DNW-7P/90P/90WSP/9WSP.
Follow the procedure below to set the time code.

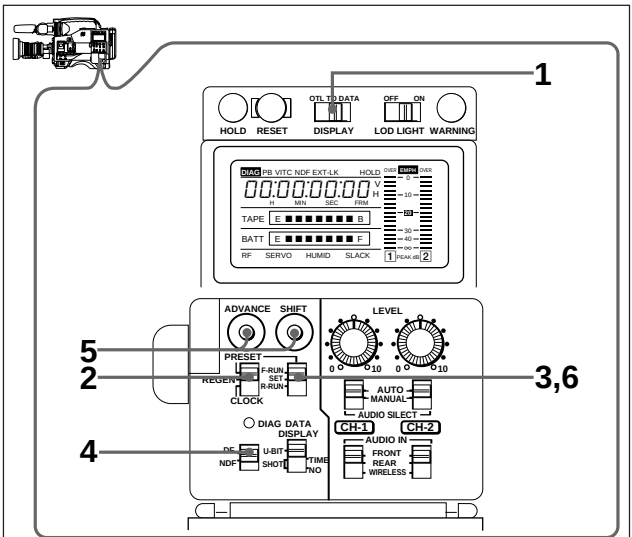


Illustration: DNW-7/90/90WS/9WS (for the NTSC broadcast system)

Setting the time code

1 Set the DISPLAY switch of the camcorder to TC.

2 Set the PRESET/REGEN/CLOCK switch to PRESET.

3 Set the F-RUN/SET/R-RUN switch to SET.

(Continued)

4 If you are using the DNW-7/90/90WS/9WS, set the DF/NDF switch.
DF: Drop frame mode
NDF: Non-drop frame mode

5 Using the SHIFT and ADVANCE buttons, set the time code.
SHIFT: Selects a digit to set. Each time you press it, the flashing column moves to the right one digit.
Pressing this button while holding down the HOLD button moves the flashing digit one to the left.
ADVANCE: Increments the flashing digit.
Pressing this button while holding down the HOLD button decrements the flashing digit.

6 Set the F-RUN/SET/R-RUN switch to F-RUN or R-RUN.
F-RUN: Free run - The time code advances constantly.
R-RUN: Record run - The time code stops except during recording.

Making the time code continuous

When the F-RUN/SET/R-RUN switch is set to R-RUN, recording a number of scenes on the tape normally produces continuous time codes. If, however, you take the cassette out at some point, the time code will no longer be continuous.
To make the time code continuous, follow the procedure below.

1 Set the PRESET/REGEN/CLOCK switch to REGEN.

2 Use the tape transport buttons to play back.

3 Watching the playback, find the point of the previous recording on the tape from which you wish to continue recording, and press the STOP button.

4 Press the RET button on the lens.

This reads the previous recording, and synchronizes the internal time code generator, thus allowing the new time code recorded to follow on consecutively.

4-5-3 Saving the Real Time in the Time Code

Setting the PRESET/REGEN/CLOCK switch to CLOCK saves the real time in the time code.

When it is necessary to set the real time, use the VTR menu.

For more information about the VTR menu, see Section 4-10 "VTR Menu Display in the Display Panel" (page 4-87).

4-5-4 Synchronizing the Time Code

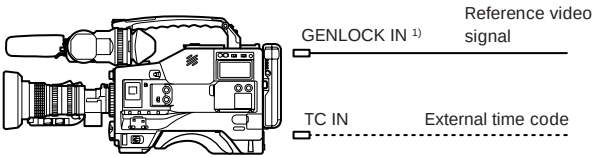
You can synchronize the internal time code generator of this camcorder with an external generator for the regeneration of an external time code. You can also synchronize the time code generators of external VTRs with the internal generator of this camcorder.

Connections for time code synchronization

Connect both the reference video signal and the external time code as illustrated below.

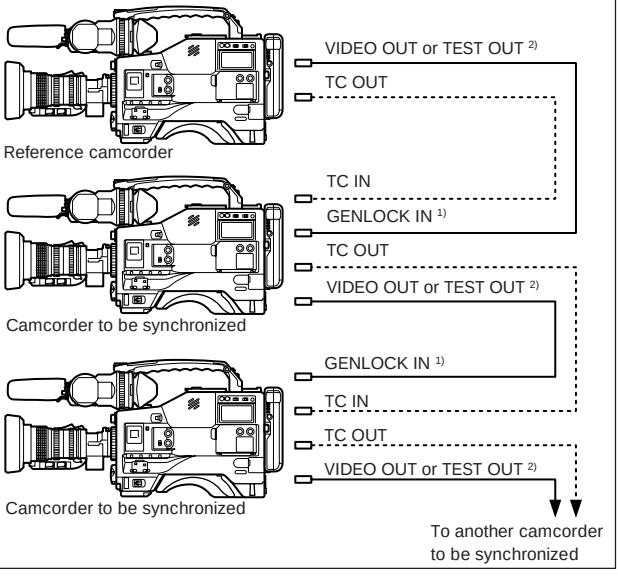
4

Example 1: Synchronizing with an external time code



1) Set GENLOCK to ON from the FUNCTION 2/2 page of the setup menu. *For information about this setting, see Section 4-9-2 "Selecting the Functions" (page 4-76).*

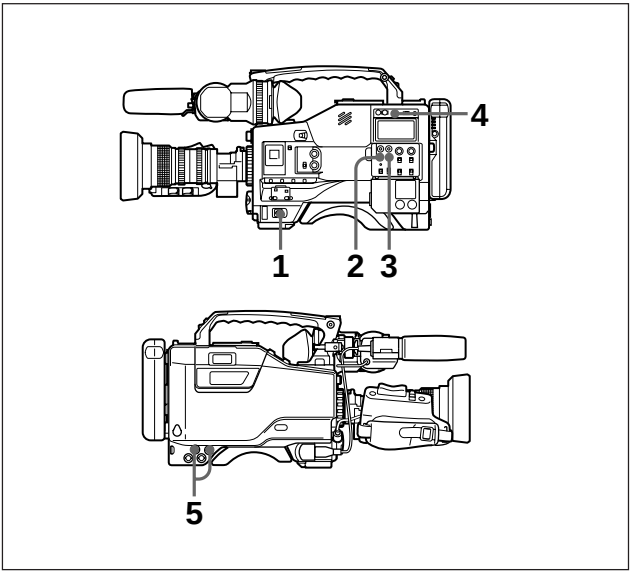
Example 2: Interconnecting a number of camcorders for time code synchronization



1) Set GENLOCK to ON from the FUNCTION 2/2 page of the setup menu. *For information about this setting, see Section 4-9-2 "Selecting the Functions" (page 4-76).*
2) Output a composite video signal from the TEST OUT connector. In the FUNCTION 1/2 page of the setup menu, set TEST OUT to ENC. *For more information, see Section 4-9-3 "Selecting the Test Output" (page 4-80).*

Procedure for time code synchronization

Follow the procedure below to synchronize the time code.



Synchronizing the time code

1 Turn on the POWER switch.

2 Set the PRESET/REGEN/CLOCK switch to PRESET.

3 Set the F-RUN/SET/R-RUN switch to F-RUN.

4 Set the DISPLAY switch of the camcorder to TC.

5 Supply the time code to the TC IN connector and reference video signals that comply with the SMPTE (DNW-7/90/90WS/9WS) or EBU (DNW-7P/90P/90WSP/9WSP) time code standard and are in the proper phase relationship to the GENLOCK IN connector (set GENLOCK to ON with the FUNCTION 2/2 page).

This operation synchronizes the internal time code generator with the external time code. After about 10 seconds, you can disconnect the external time code without losing the synchronization. However, the synchronization will be disrupted if you connect or disconnect the time code during recording.

Note

When you finish the above procedure, the time code is immediately synchronized with the external time code and the counter display will show the value of the external time code. However, wait for a few seconds until the sync generator stabilizes before recording.

User bits settings during time code synchronization

When the time code is synchronized, only the time data is synchronized with the external time code value. Therefore, the user bits can have their own settings for each camcorder.
You can also synchronize the user bits with external user bit data.
For more information, refer to the Maintenance Manual.

Releasing the time code synchronization

First disconnect the external time code, then set the F-RUN/SET/R-RUN switch to R-RUN.

Changing the power supply from the battery pack to an external power supply during time code synchronization

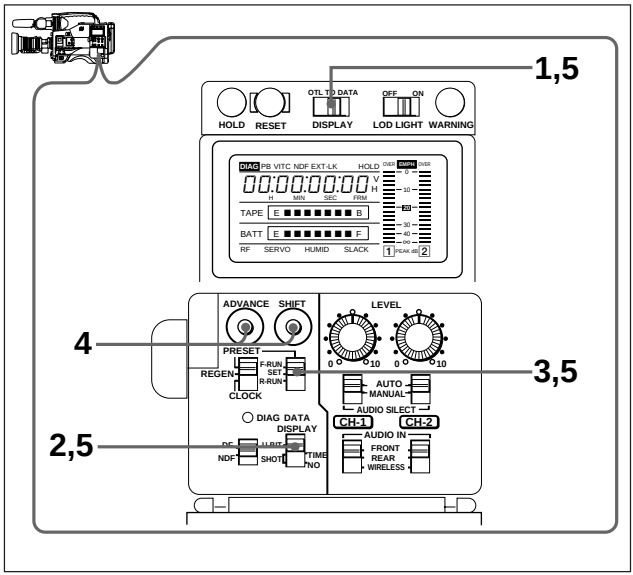
To maintain a continuous power supply, connect the external power supply to the DC IN connector before removing the battery pack. You may lose time code synchronization if you remove the battery pack first.

Camera synchronization during time code synchronization

During time code synchronization, the camera is genlocked to the reference video signal input from the GENLOCK IN connector.

4-5-5 Setting Cassette Numbers and Shot Numbers

Follow the procedure below to set a cassette number or shot number.



Setting a cassette number or shot number

1 Set the DISPLAY switch to DATA.

2 Set the DATA DISPLAY switch to SHOT-NO.

A cassette number (left-hand 3 digits) and a shot number (right-hand 3 digits) appear in the display panel.

(Continued)

3 Set the F-RUN/SET/R-RUN switch to SET.

The rightmost digit of the shot number starts flashing.

4 Using the SHIFT and ADVANCE buttons, set the cassette number or shot number (up to 999).

SHIFT: Selects a digit to set. Each time you press this button, the flashing digit moves one to the left.
Pressing this button while holding down the HOLD button moves the flashing digit one to the right.

ADVANCE: Increments the value of the flashing digit.
Pressing this button while holding down the HOLD button decrements the value of the flashing digit.

To reset the cassette number or shot number to 001

Select any digit of the cassette number or shot number, making it flash, then press the RESET button.

5 Return the DISPLAY, DATA DISPLAY and F-RUN/SET/R-RUN switches to the original positions.

4-6 Setup Menu Display on the Viewfinder Screen

If the MENU ON/OFF/PAGE switch is set to ON, the setup menu is displayed on the viewfinder screen.
Use this setup menu to select settings and also to select which items are displayed on the viewfinder screen as well as how they are displayed.

4-6-1 Setup Menu Configuration

The setup menu is displayed as individual pages. The pages that make up the setup menu and brief details of the function of each page are listed in the table below.
You can change the configuration of the setup menu to suit your requirements. At the factory, the pages marked with the a) in the table are available.

Pages and functions of the setup menu

Page number	Page name	Function	Reference
1 a)	MARKER 1/2	Sets markers (center marker and safety zone marker).	Section 4-8-4 “Setting the Marker Display”
2	MARKER 2/2	Sets markers (box cursor).	Maintenance Manual
3 a)	VF DISPLAY 1/2	Selects the viewfinder screen display, the extender display, and the zoom position display.	Section 4-8-2 “Selecting the Display Items”
4a)	VF DISPLAY 2/2	Viewfinder screen display selections (filter, white balance memory, and gain)	Section 4-8-2 “Selecting the Display Items”

a) At the factory, the setup menu consists of these pages.

(Continued)

Pages and functions of the setup menu (continued)

Page number	Page name	Function	Reference
5 a)	MASTER GAIN	Sets the GAIN selector value.	Section 4-9-1 “Setting the GAIN Selector Values”
6 a)	SHOT ID	Sets the shot data ID.	Section 4-8-6 “Setting the Shot ID”
7a)	SHOT DATA DISP.	Selects the shot data display.	Section 4-8-5 “Recording Superimposed Shot Data in Color Bars”
8	SHUTTER SPEED	Sets the shutter speed and mode.	Section 4-2 “Setting the Electronic Shutter”
9	‘!’ LED	Sets the operation of the ⓘ indicator.	Section 4-7-2 “Setting the ⓘ Indicator”
10 a)	SETUP CARD	Accesses the setup card.	Section 4-11 “Using the Setup Card”
11	FUNCTION 1/2	Selects functions to use.	Maintenance Manual
12	FUNCTION 2/2	Selects functions to use (continued).	Section 4-9-2 “Selecting the Functions”
13	ZEBRA	Selects viewfinder function.	Maintenance Manual
14	WIDE SCREEN (DNW-90WS/ 90WSP/9WS/ 9WSP only)	Selects the aspect ratio.	Section 4-9-4 “Selecting the Aspect Ratio”
15 - 23	LEVEL 1 to 9	Adjust levels.	Maintenance Manual

Pages 24 to 40 are part of the engineer-oriented menu.

a) At the factory, the setup menu consists of these pages.

Note

When the camcorder is connected to a remote control unit and is being controlled remotely, the SHUTTER SPEED and several pages of the engineer-oriented menu (MEASUREMENT and DATA RESET pages) are not displayed. There are also some pages which are displayed but which you cannot use to change settings.

For information about the function of each page, refer to the relevant sections in this manual or the Maintenance Manual.

When changing the setup menu

You can configure the setup menu to display only the pages you need. To select pages, use the MENU SELECT page of the engineer-oriented menu. When using the engineer-oriented menu, switch the camcorder to engineer mode. Power off the camcorder, then hold down the rotary encoder and turn the power on again.
To revert to the user mode, turn the camcorder off and then on.

Engineer mode and user mode differ in the following ways.

Engineer mode: All the pages in the setup menu can be used. Data set with the menu is written to non-volatile memory and can be stored semi-permanently.

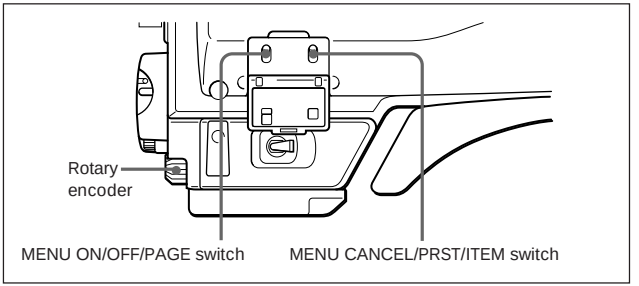
User mode: Only the pages selected in the engineer-mode MENU SELECT page can be used. Data set with the menu is written to non-volatile memory and can be stored semi-permanently.

After making settings and adjustments in engineer mode, configure the setup menu with the pages you use frequently so that you can access them quickly.

Refer to the Maintenance Manual for information about the MENU SELECT page.

4-6-2 Basic Use of the Setup Menu

Use the MENU ON/OFF/PAGE switch, the MENU CANCEL/PRST/ITEM switch, and the rotary encoder to manipulate the setup menu.



Controls for use of the setup menu

Follow the procedure below to use the setup menu.

1 Display the setup menu.

2 Select a page.

3 Select an item.

4 Change the setting of that item, or turn the function or display of that item on or off.

5 End the setup menu operation.

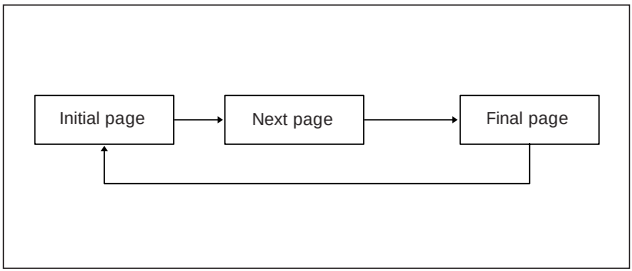
Displaying the setup menu

Set the MENU ON/OFF/PAGE switch to ON to display the setup menu. The status display along the top and bottom disappears from the viewfinder screen, and the page that was on the screen when the last menu operation ended appears.

When this menu is first used, the lowest-numbered page of the currently selected pages for menu configuration appears. This also occurs if you set the MENU ON/OFF/PAGE switch to ON while holding the MENU CANCEL/PRST/ITEM switch at CANCEL.

Paging through the menu

Push the MENU ON/OFF/PAGE switch from ON to PAGE. Every time you push this switch to PAGE, the next page of the menu is displayed.



Paging through the menu

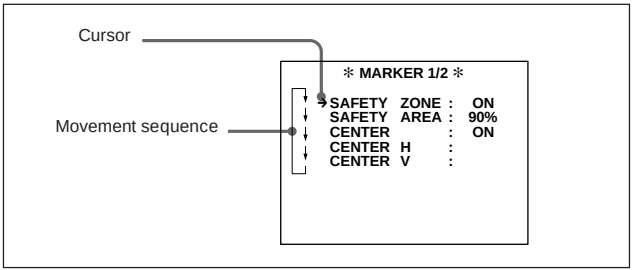
While a question mark appears at the left of the page title, you can use the rotary encoder as follows to switch pages.

Turning the rotary encoder counterclockwise as seen from the front of the camera: advances to the next menu page.

Turning the rotary encoder clockwise as seen from the front of the camera: returns to the previous menu page.

Selecting an item

Push the MENU CANCEL/PRST/ITEM switch to ITEM.
Every time you push this switch to ITEM, the cursor (arrow), which indicates the selected item, moves to the next item.



Cursor movement sequence

You can also use the rotary encoder as follows to switch items.
While a question mark appears at the left of the page title, if you press the rotary encoder, the question mark disappears, and the cursor appears. Next turn the rotary encoder.

Turning the rotary encoder counterclockwise as seen from the front of the camera: moves the cursor up continuously.

Turning the rotary encoder clockwise as seen from the front of the camera: moves the cursor down continuously.

If you move the cursor to the left of the page title, and press the rotary encoder, a question mark reappears at the left of the page title, and once again you can use the rotary encoder to change pages.

Changing the setting of ON/OFF selection of a selected item

Check that the cursor is by the desired item, then press the rotary encoder. A question mark appears at the left of the setting value. Next carry out one of the following operations.

To increase a setting value

Turn the rotary encoder counterclockwise as seen from the front of the camera.

To decrease a setting value

Turn the rotary encoder clockwise as seen from the front of the camera.

To toggle a setting on or off

To select the “ON” setting, turn the rotary encoder counterclockwise as seen from the front of the camera, and to select the “OFF” setting, turn the rotary encoder clockwise.

Canceling the settings and resetting to the initial settings

You can cancel the settings and reset them to their initial values (those set at the factory, or in engineer mode) by pushing the MENU CANCEL/PRST/ITEM switch to CANCEL/PRST.

When the MENU CANCEL/PRST/ITEM switch is pushed to CANCEL/PRST, the message “CANCEL?” appears below the page name. To cancel the previous settings, push the switch to CANCEL/PRST again. To reset the settings to their initial values, push the switch to CANCEL/PRST a third time. The message “PRESET?” appears below the page name. To reset to the initial settings, push the switch to CANCEL/PRST once more.

The action of the CANCEL/PRST function differs for some setting items. Some items are only affected by PRST; check the setting procedure for each item for more information.

To confirm a setting

Press the rotary encoder once more. The question mark at the left of the setting value disappears, and you can again use the rotary encoder to select items.

Closing the menu

Return the MENU ON/OFF/PAGE switch to OFF.
The setup menu disappears from the viewfinder screen, and displays showing the current status of the camcorder appear along the top and bottom of the viewfinder screen.

When you close the switch cover

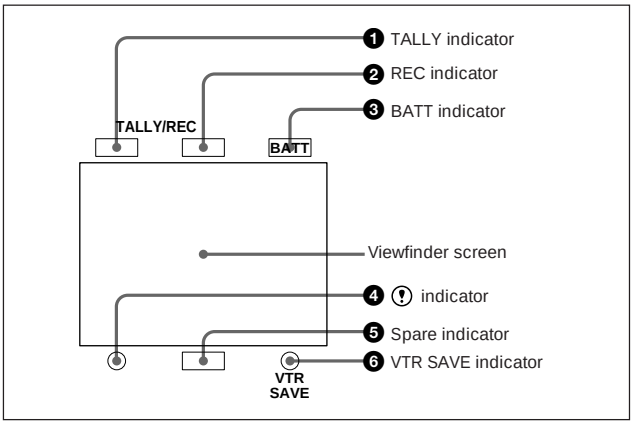
When the cover for the MENU ON/OFF/PAGE and MENU CANCEL/PRST/ITEM switches is closed, the MENU ON/OFF/PAGE switch turns off automatically.

4-7 Indicators in the Viewfinder

The indicators of the status of the camcorder and the results of adjustments are arranged along the top and bottom edges of the viewfinder screen.

4-7-1 Layout of Indicators in the Viewfinder

The indicators in the viewfinder are arranged as illustrated below.



Indicators in the viewfinder

❶ TALLY indicator

This lights when a green tally control signal is received from the camera control unit.

❷ REC (recording) indicator

This indicator lights in red during recording. It also warns by flashing.

For more information, see Section 6-3 "Operating Warnings" (page 6-12).

❸ BATT (battery) indicator

This indicator starts to flash when the voltage of the battery connected to the camcorder has fallen. This indicator stays on for a few minutes when the battery is dead.

To prevent any interruption in operation, change the battery as soon as it gets low.

For more information, see Section 5-1-4 "Avoiding Breaks in Operation Due to Dead Batteries" (page 5-7).

❹ (!) (operation status warning) indicator

This indicator lights when the camcorder is used under one or more of the following conditions and if the corresponding items have been set to ON in the '!' LED page of the setup menu.

- The gain is set to anything but 0 dB.
- The SHUTTER selector is ON.
- The WHITE BAL switch is at PRST.
- ATW is being used.
- The lens extender is in use.
- The FILTER selector is set to anything but 1.
- The reference value of the automatic iris adjustment is anything but the standard value.

See Section 4-7-2 "Setting the (!) Indicator" (page 4-47) for more information about selecting the items that will cause the (!) indicator to operate.

❺ Spare indicator

This is a spare indicator. A setup menu operation makes it possible to use this as a REC TALLY indicator.

For more information about the use of this spare indicator, refer to the Maintenance Manual.

❻ VTR SAVE indicator

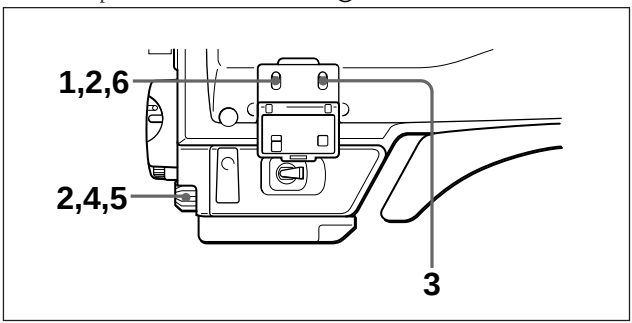
This indicator lights when the VTR SAVE/STBY switch is set to SAVE. This indicator goes off during recording.

4-7-2 Setting the ⓘ Indicator

Select the items to be indicated by the ⓘ indicator from the '!' LED page of the setup menu. Note that at the factory the '!' page is not set for display. To access the '!' LED page, either set the camcorder to engineer mode, or select the '!' LED page from the MENU SELECT page before use.

See Section 4-6-1 "Setup Menu Configuration" (page 4-37) for more information about the engineer mode and selecting the display page.

Follow the procedure below to set the ⓘ indicator.



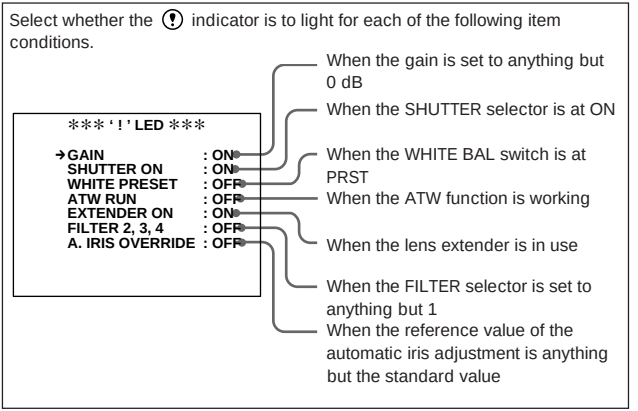
Setting the ⓘ indicator

1 Set the MENU ON/OFF/PAGE switch to ON.

The display for setting the status disappears from the viewfinder screen, and the page that was on the screen when the last menu operation ended appears.
(When this menu is first used, the lowest-numbered page of the currently selected pages for configuring the menu appears.)

(Continued)

2 Push the MENU ON/OFF/PAGE switch repeatedly to PAGE until the '!' LED page shown below appears (or use the rotary encoder).



'!' LED page (factory settings)

3 Push the MENU CANCEL/PRST/ITEM switch repeatedly to ITEM until the cursor reaches the desired item (or use the rotary encoder).

4 Turn the rotary encoder to select whether the ⓘ indicator should light with respect to the selected item (the “ON” setting), or not light (the “OFF” setting).

For the “ON” setting: Press the rotary encoder, and when a question mark appears to the left of the “ON/OFF” indication, turn the rotary encoder counterclockwise as seen from the front of the camera. The “ON/OFF” indication switches to “ON”.

For the “OFF” setting: Press the rotary encoder, and when a question mark appears to the left of the “ON/OFF” indication, turn the rotary encoder clockwise as seen from the front of the camera. The “ON/OFF” indication switches to “OFF”.

To turn the setting of another item ON or OFF, repeat steps **3** and **4**.

5 Press the rotary encoder to make the question mark to the left of the “ON/OFF” indication disappear.

6 To end the menu operation, return the MENU ON/OFF/PAGE switch to OFF.

The setup menu disappears from the viewfinder screen and the displays indicating the current status of the camcorder appear along the top and bottom of the viewfinder.

4-8 Status Display on the Viewfinder Screen

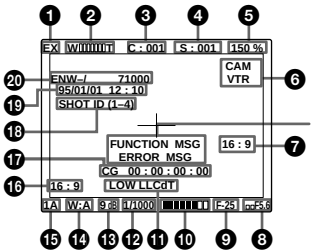
The viewfinder screen displays not only the video picture but also characters and messages indicating the camcorder settings and operating status, a center marker, a safety zone marker, etc.
When the MENU ON/OFF/PAGE switch is set to OFF, and the viewfinder DISPLAY switch is set to ON, the items for which an “ON” setting was made in the VF DISPLAY page of the setup menu or with related switches are displayed at the top and bottom of the screen. The messages that give details of the settings and adjustment progress and results can also be made to appear for about 3 seconds while settings are being changed, during adjustment, and after adjustment.

For information about the display item selection, see Section 4-8-2 “Selecting the Display Items” (page 4-55); for information about setting change and adjustment progress messages, see Section 4-8-3 “Display Mode and Setting Change and Adjustment Progress Messages” (page 4-58); and for information about marker display, see Section 4-8-4 “Setting the Marker Display” (page 4-61).

When the setup menu is displayed using the MENU ON/OFF/PAGE switch, no superimposed information on the camera settings (e.g. white balance) appears on the viewfinder screen.

4-8-1 Layout of the Status Display on the Viewfinder Screen

All items that can be displayed on the viewfinder screen are shown below.



Setting change and adjustment progress message display area *(For more information, see Section 4-8-3 "Display Mode and Setting Change and Adjustment Progress Messages (page 4-58).)*

❸, ❹, ⓲, ⓳ and ⓴ appear only when color bars are displayed.

Status display on the viewfinder screen

❶ Extender indicator

This indicator appears when a lens extender is used.

❷ Zoom position indicator [1)]

This indicator indicates the approximate position of the variator [2)] of the zoom lens, between wide angle (W) and telephoto (T).

❸ Cassette number indicator

This shows the cassette number.

---

1) Zoom position indicator
This indicator appears only when you use a lens that has a zoom position display function.

2) Variator
A group of lenses that are moved to adjust the focal length.

❹ Shot number indicator
This shows the shot number.

❺ Battery state indicator
When an Anton Bauer Intelligent Battery System is used, this shows the remaining battery capacity numerically.

❻ Self-diagnosis indicator
When a fault has been detected in the camcorder, the indication “xxx?” appears. For example, when a fault is detected in the camera, the indication “CAM?” appears.

❼ 16:9 mode recording indicator (DNW-90WS/90WSP only)
This indicates recording in the 16:9 mode. This indicator is recorded together with the color bars.

❽ Iris setting indicator [1)]
This shows the iris setting (the f-stop) of the lens.

❾ Remaining tape indicator
This shows the remaining tape recording time (in minutes) of the VTR.

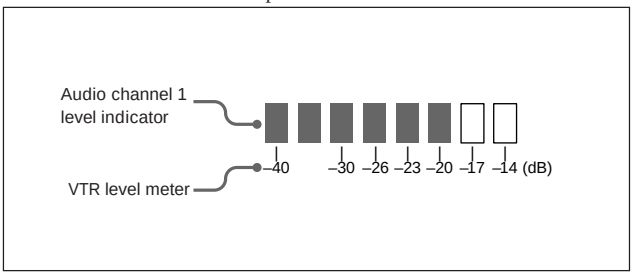
Example of remaining tape indicator

Display	Tape time remaining
F-15	Full to 15 minutes
15-10	15 to 10 minutes
10-5	10 to 5 minutes
5-0	5 to 2 minutes
5-0 (flashing)	Less than 2 minutes

1) Iris setting indicator
This indicator appears only when you use a lens that has an iris opening display function.

⓾ Audio level indicator

This indicator indicates the level of the audio channel 1. This indicator roughly corresponds to the peak indication of the level meter of the internal VTR of a sine wave input as follows:



Audio level indicator

For information about turning the audio level indicator on and off, see Section 4-4 "Adjusting the Audio Level" (page 4-22).

⓫ Subject illumination indicator

This appears, depending on the setting, to indicate that the subject illumination is inadequate.

⓬ Shutter speed and mode indicator

This indicator indicates the shutter speed and mode settings.

1/100 (DNW-7/90/90WS/9WS) or 1/60 (DNW-7P/90P/90WSP/9WSP), 1/125, 1/250, 1/500, 1/1000, 1/2000: Shutter speed (in seconds) in standard mode.

CLS: CLS mode

ECS: ECS mode (DNW-90/90P/90WS/90WSP only)

EVS: EVS mode

⓭ Gain indicator
This indicator indicates the gain (in dB) of the video amplifier, as set by the GAIN selector.

⓮ White balance memory indicator
This indicator indicates the currently selected white balance automatic adjustment memory.
A: The WHITE BAL switch is set to A.
B: The WHITE BAL switch is set to B.
P: The WHITE BAL switch is set to PRST.
M: The WHITE BAL switch of the RM-P9 Remote Control Unit is set to MANUAL.
T: ATW is being used.

⓯ Filter indicator
This indicator indicates the currently selected filter types.

⓰ 16:9 mode indicator (DNW-90WS/90WSP/9WS/9WSP only)
This indicates the 16:9 mode.

⓱ Time code indicator
This indicates the time code, user bits or other information selected by the DISPLAY switch and DATA DISPLAY switch settings.
For more information, see the section "Relationships between the DISPLAY switch and DATA DISPLAY switch settings and the time counter displays" (page 2-40).

⓲ ID number indicator
This indicates the ID number selected from ID1 to ID4. This indicator is recorded together with the color bars.

⓳ Date and time indicator
This shows the date and time of recording. This indicator is recorded together with the color bars.

⑳ Model name and serial number indicator
This displays the model name and serial number of the camcorder. This indicator is recorded together with the color bars.

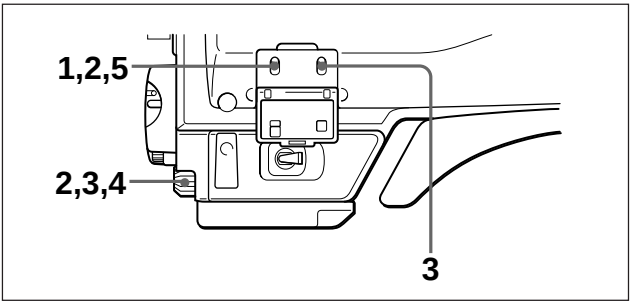
4-8-2 Selecting the Display Items

To select the items to be displayed on the viewfinder screen from the VF DISPLAY page, turn on or off the indication next to each item. Selection of the following items can be turned on or off on the VF DISPLAY 1/2 and 2/2 pages.

- Display mode *(For more information, see Section 4-8-3 "Display Mode and Setting Change and Adjustment Progress Messages" (page 4-58).)*
- Extender indicator
- Zoom position indicator
- Filter indicator
- White balance memory indicator
- Gain indicator
- Shutter speed and mode indicator
- Remaining tape indicator
- Iris opening indicator

Selecting the display items

Follow the procedure below to select the items to be displayed on the viewfinder screen.

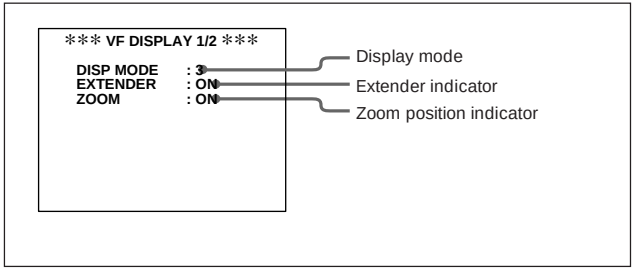


Selecting the display items

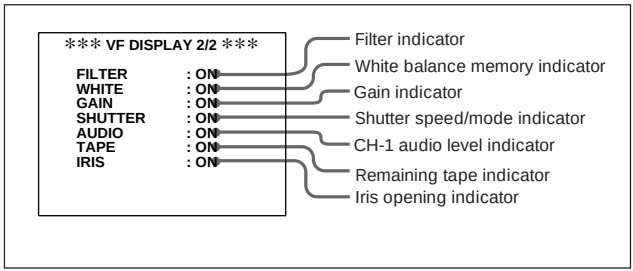
1 Set the MENU ON/OFF/PAGE switch to ON.

The page that was on the screen when the last menu operation ended appears on the viewfinder screen. (When this menu is first used, the lowest-numbered one of the currently selected pages appears).

2 Push the MENU ON/OFF/PAGE switch repeatedly to PAGE until the VF DISPLAY 1/2 or 2/2 page shown below appears (or use the rotary encoder).



VF DISPLAY 1/2 page (factory settings)



VF DISPLAY 2/2 page (factory settings)

3 Push the MENU CANCEL/PRST/ITEM switch repeatedly to ITEM until the cursor reaches the desired item (or use the rotary encoder).

4 Turn the rotary encoder to select whether the selected item should appear in the viewfinder display (the “ON” setting), or not appear (the “OFF” setting).

Note that pushing the MENU CANCEL/PRST/ITEM switch to CANCEL/PRST on this page has no effect.

(Continued)

To turn the setting of another item ON or OFF, repeat steps **3** and **4**.

5 To end the menu operation, return the MENU ON/OFF/PAGE switch to OFF.

The setup menu disappears from the viewfinder screen and the display indicating the current status of the camcorder appears along the top and bottom of the viewfinder screen (when the viewfinder DISPLAY switch is set to ON).

4-8-3 Display Mode and Setting Change and Adjustment Progress Messages

You can limit or suppress the messages that give details of setting changes and adjustment progress and results by setting a display mode. The conditions under which messages are displayed and their correspondence with the display mode are as follows:

Setting change and adjustment progress messages and display modes

Y: Message is displayed.
N: Message is not displayed.

Message display condition	Message	Display mode setting		
		1	2	3
When the filter selection has been changed	FILTER : n (where n = 1, 2, 3, 4)	N	N	Y
When the gain setting has been changed	GAIN : n (where n = –3dB, 0dB, 3dB, 6dB, 9dB, 12dB, 18dB, 24dB, 30dB, 36dB, 42dB,TURBO[a])	N	N	Y
When the setting of the WHITE BAL switch has been changed	WHITE : n (where n = A CH, B CH, PRST) or ATW : RUN	N	N	Y
When the OUTPUT/ DCC selector has been set to DCC ON or OFF	DCC : ON (or OFF)	N	Y	Y
When the shutter speed and mode setting has been changed [b]	: SS : 1/100 (DNW-7/90/ 90WS/9WS) or 1/60 (DNW-7P/90P/90WSP/9WSP) (or 1/125, 1/250, 1/500, 1/1000, 1/2000, CLS, ECS [c], EVS)	N	Y	Y
When the black or white balance has been adjusted	E.g. WHITE : OK *For more informarion, see Section 4-1 “Adjusting the Black Balance and the White Balance” (page 4-1).*	N	Y	Y

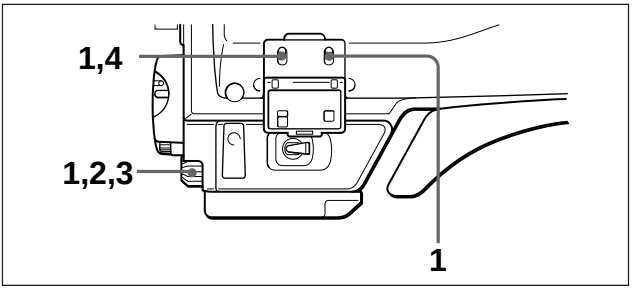
a) When the TURBO GAIN button is pressed, “TURBO” is displayed regardless of the GAIN setting.

b) This is also displayed for about 3 seconds when the SHUTTER selector is set to ON.

c) DNW-90/90P/90WS/90WSP only

Changing the display mode

The currently set display mode appears on the VF DISPLAY page of the setup menu. Follow the procedure below to change it.



Changing the display mode

1 Follow steps **1** to **3** in Section 4-8-2 “Selecting the Display Items” (page 4-55), until the VF DISPLAY 1/2 page of the setup menu is on the viewfinder screen and the cursor is at DISP MODE.

2 Press the rotary encoder so that a question mark appears to the left of the display mode indication, then turn the rotary encoder to change the display mode selection.

3 When the setting is completed, press the rotary encoder.

The question mark to the left of the display mode indication disappears.

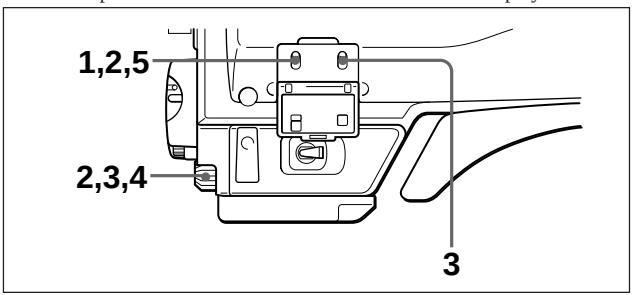
4 To end the menu operation, set the MENU ON/OFF/PAGE switch to OFF.

4-8-4 Setting the Marker Display

Use the MARKER 1/2 page of the setup menu to switch the display of the center and safety zone markers on or off and to select whether the area indicated by the safety zone marker is 80%, 90% or 100% of the screen area.

Setting the marker display

Follow the procedure below to set details of the marker display.



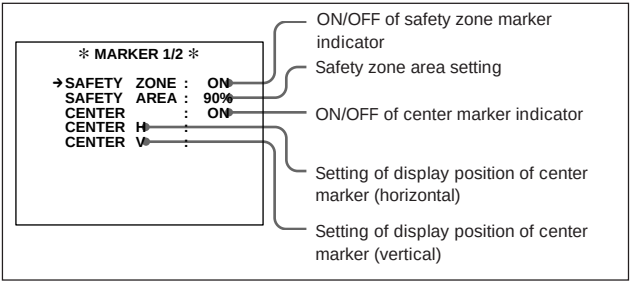
Setting the marker display

1 Set the MENU ON/OFF/PAGE switch to ON.

The page that was on the screen when the last menu operation ended appears on the viewfinder screen. (When this menu is first used, the lowest-numbered one of the currently selected pages appears.)

2 Push the MENU ON/OFF/PAGE switch repeatedly to PAGE until the MARKER 1/2 page shown on the next page appears (or use the rotary encoder).

(Continued)



MARKER 1/2 page (factory settings)

3 Push the MENU CANCEL/PRST/ITEM switch repeatedly to ITEM until the cursor reaches the desired item (or use the rotary encoder).

4 For each item, operate the rotary encoder as follows (directions indicated as seen from the front of the camera).

CENTER or SAFETY ZONE selections: For an "ON" display setting, turn the rotary encoder counterclockwise; for an "OFF" display setting, turn the rotary encoder clockwise.

SAFETY AREA selection: To set the safety zone to 100% of the screen area, turn the rotary encoder counterclockwise, and to set the safety zone to 80% of the screen area, turn the rotary encoder clockwise.

CENTER H selection: To move the center marker to the right in the viewfinder, turn the rotary encoder counterclockwise, and to move the center marker to the left in the viewfinder, turn the rotary encoder clockwise.

CENTER V selection: To move the center marker up in the viewfinder, turn the rotary encoder counterclockwise, and to move the center marker down in the viewfinder, turn the rotary encoder clockwise.

If any of the above selections is set to ON, the corresponding marker is displayed.

Note that the CANCEL and PRESET functions can also be used for the CENTER H and CENTER V selections.
If the MENU CANCEL/PRST/ITEM switch is pressed twice to CANCEL/PRST, all the previous settings are canceled. If the switch is pressed twice more to CANCEL/PRST, the settings are reset to their initial values.

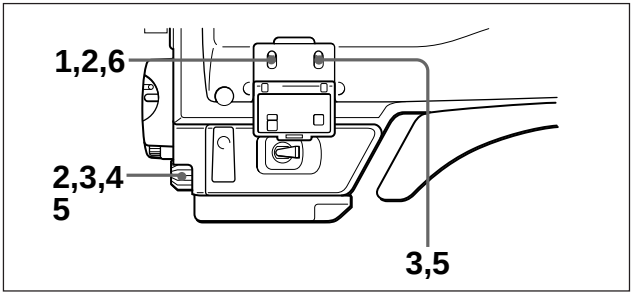
5 To end the menu operation, return the MENU ON/OFF/PAGE switch to OFF.

The setup menu disappears from the viewfinder screen and the displays indicating the current status of the camcorder appear along the top and bottom of the viewfinder.

4-8-5 Recording Superimposed Shot Data in Color Bars

In the setup menu SHOT DATA DISP page, you can select which shot data is recorded superimposed on the color bars. You can also select which of the shot IDs (1 to 4) set in the SHOT DATA page is recorded superimposed on the picture.

Use the following procedure.

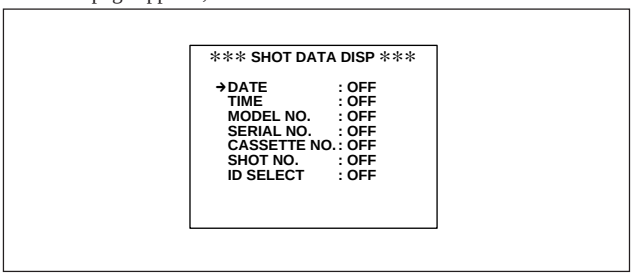


Selecting the shot data for superimposed recording

1 Set the MENU ON/OFF/PAGE switch to ON.

The last page accessed appears in the viewfinder display (initially the SHOT DATA page appears).

2 Press the MENU ON/OFF/PAGE switch repeatedly toward the PAGE position (or use the rotary encoder) until the SHOT DATA DISP page appears, as shown below.



3 Push the MENU CANCEL/PRST/ITEM switch repeatedly toward the ITEM position until the cursor is positioned to the left of the item you wish to set (or use the rotary encoder).

The items and their meanings are as follows:

DATE: date
TIME: time
MODEL NAME: model name
SERIAL NO.: serial number
CASSETTE NO.: cassette number
SHOT NO.: shot number
ID SELECT: shot ID set in SHOT DATA page

Next press the rotary encoder so that a question mark appears to the left of the selected item.

4 Turn the rotary encoder to select whether or not to record the selected item superimposed on the picture.

To carry out superimposed recording: turn the rotary encoder counterclockwise as seen from the front of the camera to select "ON".

Not to carry out superimposed recording: turn the rotary encoder clockwise as seen from the front of the camera to select "OFF".

In the ID SELECT item, in order not to carry out superimposed recording of any shot ID, select "OFF", and to carry out superimposed recording of a shot ID, select the shot ID number (1 to 4).

To set other items on or off, continue to step **5**. If all item settings are complete, skip to step **6** to end the process.

(Continued)

5 Press the MENU CANCEL/PRST/ITEM switch toward the ITEM position (or use the rotary encoder), to advance the cursor to the next position, then return to step **4** to make the next on/off setting.

6 To exit from the menu, return the MENU ON/OFF/PAGE switch to the OFF position.

The setup menu disappears from the viewfinder screen.

To carry out superimposed recording

To actually record the items selected for superimposed recording in the SHOT DATA DISP page, set the OUTPUT switch to BARS, DCC OFF. The items selected for superimposed recording appear in the viewfinder screen and are recorded superimposed on the picture.

4-8-6 Setting the Shot ID

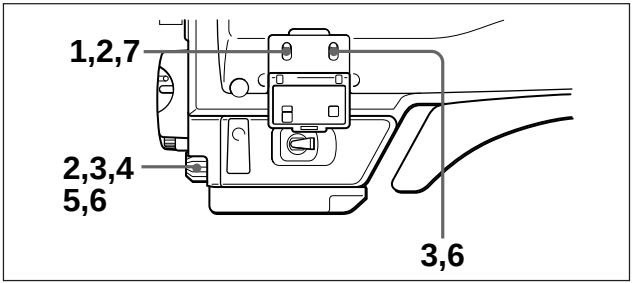
In the SHOT ID page of the setup menu, you can set a shot ID, of up to 12 alphanumeric characters, spaces, and symbols.
When the OUTPUT switch is set to BARS, DCC OFF, this shot ID is output with the color bar signal. The shot ID comprises ID1 to ID4, and the setting can be changed using the SHOT DATA DISP page of the setup menu.

Notes

- To display the shot ID, set the TEST OUT item in the FUNCTION 1/2 page of the setup menu to ENC, and make the signal output from the TEST OUT connector a composite signal.
  For information about the TEST OUT page, see Section 4-9-3 “Selecting the Test Output” (page 4-80).
- When the setup menu is displayed, the shot ID is not displayed even if the color bar signal is output.

Setting the shot ID

Follow the procedure below to set the shot ID.

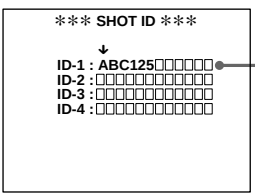


Setting the shot ID

1 Set the MENU ON/OFF/PAGE switch to ON.

The page that was on the screen when the last menu operation ended appears on the viewfinder screen. (When this menu is first used, the lowest-numbered page of the currently selected pages for configuring the menu appears).

2 Push the MENU ON/OFF/PAGE switch repeatedly to PAGE until the SHOT ID page shown below appears (or use the rotary encoder).



Shot ID
(Squares indicate spaces; they are displayed this way only on this menu page.)

(Continued)

3 Press the MENU CANCEL/PRST/ITEM switch repeatedly toward the ITEM position, until the ID (one of ID-1 to ID-4) you wish to set has the cursor to the left of it (or use the rotary encoder).

When you press the rotary encoder once more, a question mark appears by the selected ID, and a character position selection cursor (↓) also appears (the character setting mode).

4

4 Press the rotary encoder repeatedly until the character position cursor indicates the character you wish to set.

Each time you press the rotary encoder, the cursor moves one position to the right. If you press it when the cursor is at the right end, the cursor disappears, the camcorder exits from the character setting mode.

5 Turn the rotary encoder until the character you wish to set appears.

Turn the rotary encoder clockwise as seen from the front of the camera to cycle the character from the alphabet, through space (□), the symbols, and the digits, in that order. Turn the rotary encoder counterclockwise to cycle through the characters in the reverse direction.

It is also possible to enter a space when the character position cursor (↓) is in the required character position, by pressing the MENU CANCEL/PRST/ITEM switch toward the CANCEL/PRST position.

To set more characters, go to step **6**, and to end character setting go to step **7**.

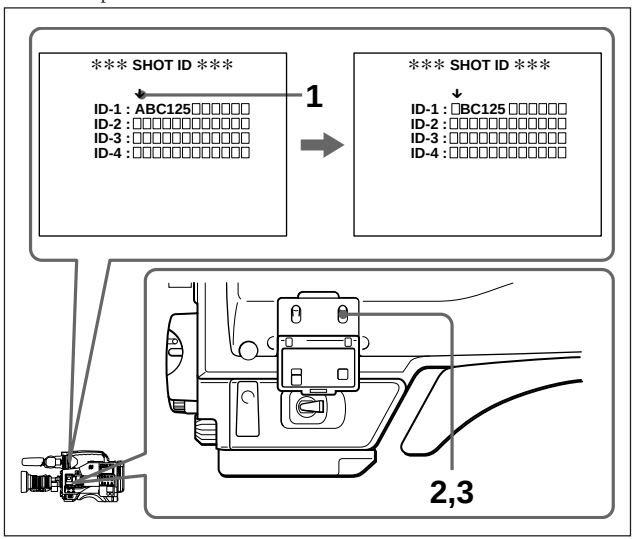
6 Press the rotary encoder to advance the character position cursor to the next position, then return to step **5** to set a character.

7 To end the menu operation, return the MENU ON/OFF/PAGE switch to OFF.

The setup menu disappears from the viewfinder screen and the displays indicating the current status of the camcorder appear along the top and bottom of the viewfinder.

Deleting a character

Follow the procedure below.



Deleting a character

1 Move the cursor (↓) to the position of the character to be deleted.

(Continued)

2 Press the MENU CANCEL/PRST/ITEM switch to CANCEL/PRST.

The character below the character position cursor disappears, and is replaced by a space (☐).

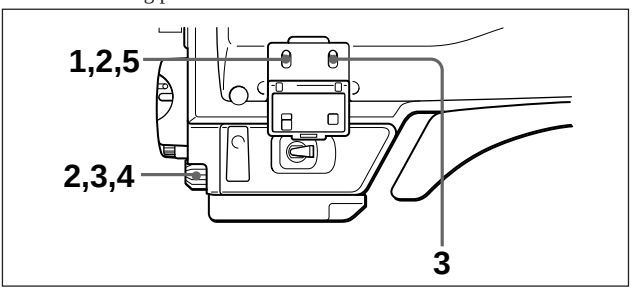
3 (1) To delete another character, press the rotary encoder repeatedly until the cursor is at the position of the character to be deleted.

(2) Return to step **2** to delete the character.

4

4-8-7 Displaying Time Code and Other Information

In the setup menu OPERATION MODE 2/2 page, you can select information to be displayed in the viewfinder and output from the TEST OUT connector.
Use the following procedure.

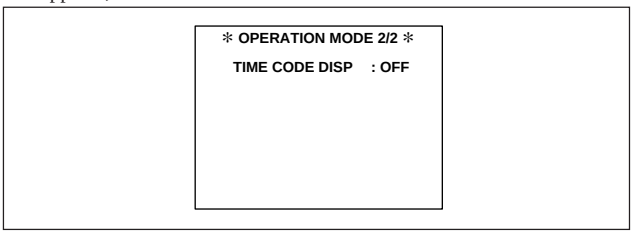


Settings to select whether or not to display or output time code and so forth

1 Set the MENU ON/OFF/PAGE switch to ON.

The last page accessed appears in the viewfinder display. When this menu is first used, the lowest-numbered on of the currently selected pages appears.

2 Press the MENU ON/OFF/PAGE switch toward the PAGE position (or use the rotary encoder) until the OPERATION MODE 2/2 page appears, as shown below.



3 Push the MENU CANCEL/PRST/ITEM switch toward the ITEM position.

Next press the rotary encoder, to display a question mark to the left of “TIME CODE DISP”.

4 Turn the rotary encoder to select whether or not to display or output the time code and other information.

To display or output the information: turn the rotary encoder counterclockwise as seen from the front of the camera to select one of the following settings.

- VF: display in the viewfinder.
- TEST: output from the TEST OUT connector.
- BOTH: display in the viewfinder and output from the TEST OUT connector.

(Continued)

To neither display nor output the information: turn the rotary encoder clockwise as seen from the front of the camera to select "OFF".

5 To exit from the menu, return the MENU ON/OFF/PAGE switch to OFF.

The set up menu disappears from the viewfinder screen and the displays indicating the current status of the camcorder appear along the top and bottom of the viewfinder screen.

Selecting information to display

Use the DISPLAY and DATA DISPLAY switches to select the information to display from the following.

- time code
- CTL
- user bits
- shot data date and time
- cassette number and shot number from shot data

For details, see the section "Time code displays" (page 2-39).

4-9 Adjustments and Settings From the Setup Menu

The camcorder provides a menu for adjustments and settings. The basic method of using this setup menu was described in Section 4-6-2 “Basic Use of the Setup Menu” (page 4-40). This section elaborates how to use the setup menu to carry out each adjustment and setting.
The adjustments and settings provided by the setup menu are listed below.

Adjustments and settings provided by the setup menu

Item	Page name	Reference
Setting of the GAIN selector values	MASTER GAIN	4-9-1 “Setting the GAIN Selector Values”
Selection of shutter mode and speed	SHUTTER SPEED	4-2 “Setting the Electronic Shutter”
Setting of shutter speed in CLS mode	CLEAR SCAN	4-2 “Setting the Electronic Shutter”
Manipulation of setup card	SETUP CARD	4-11 “Using the Setup Card”
Selection of required functions	FUNCTION 1/2	Maintenance Manual
	FUNCTION 2/2	4-9-2 “Selecting the Functions”
Level adjustment	LEVEL 1/9 to 9/9	Maintenance Manual

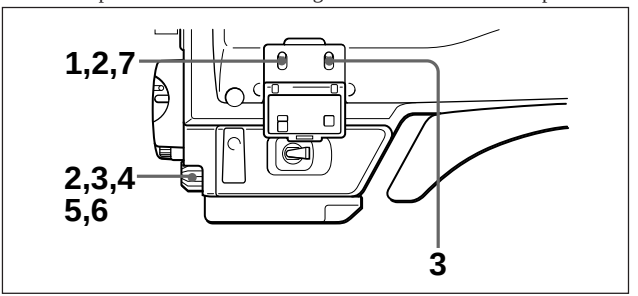
Refer to the Maintenance Manual for procedures of other adjustments and settings.

4-9-1 Setting the GAIN Selector Values

Before using the camcorder, use the MASTER GAIN page of the setup menu to set the gains corresponding to the L, M, and H positions of the GAIN selector and the TURBO GAIN switch, which switches the gain of the video amplifier.

Setting the GAIN selector values

Follow the procedure below to set a gain value for each switch position.

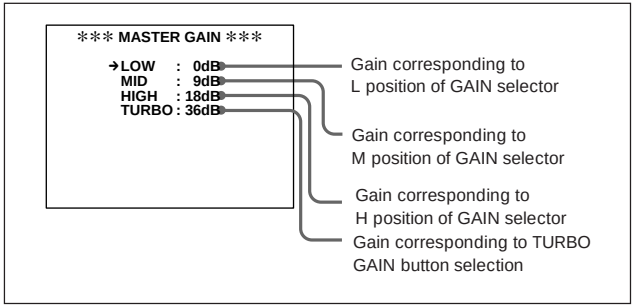


Setting the GAIN selector values

1 Set the MENU ON/OFF/PAGE switch to ON.

The page that was on the screen when the last menu operation ended appears on the viewfinder screen. (When this menu is first used, the lowest-numbered one of the currently selected pages appears.)

2 Push the MENU ON/OFF/PAGE switch repeatedly to PAGE until the MASTER GAIN page shown on the next page appears (or use the rotary encoder).



MASTER GAIN page (factory settings)

3 Push the MENU CANCEL/PRST/ITEM switch repeatedly to ITEM until the cursor reaches the desired position (LOW, MID, HIGH or TURBO) (or use the rotary encoder).

4 Press the rotary encoder, to display a question mark to the left of the display.

5 Turn the rotary encoder to display the gain value you wish to select.

Any of –3, 0, 3, 6, 9, 12, 18, 24, 30, 36,or 42 dB can be set for each of the L, M, and H positions, in any sequence.
For TURBO, any of –3, 0, 3, 6, ..., 30, 36 , 42 dB [1] can be selected.
Press the MENU CANCEL/PRST/ITEM switch to CANCEL/PRST to reset the gains to the factory set values (L = 0 dB, M = 9 dB, H = 18 dB, and TURBO = 36 dB).
To change the gain corresponding to another switch position, return to step **3**.

(Continued)

1) Video gain boosted from 30 dB to 36 or 42 dB by combining blocks of 2 or 4 adjacent pixels of the CCD.

If the settings of the GAIN selector values have been changed, the black set must also be adjusted.

For more information, refer to the Maintenance Manual.

6 Press the rotary encoder, so that the question mark disappears.

7 To end the menu operation, set the MENU ON/OFF/PAGE switch to OFF.

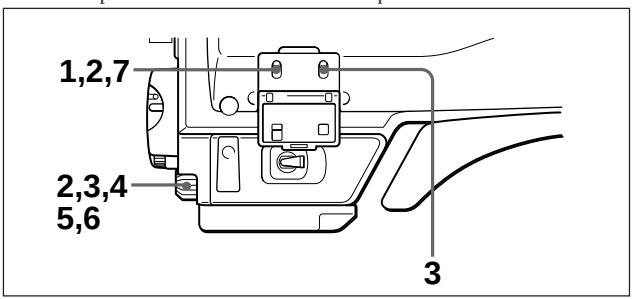
The setup menu disappears from the viewfinder screen and the displays indicating the current status of the camcorder appear along the top and bottom of the viewfinder.

4-9-2 Selecting the Functions

Use the FUNCTION 2/2 page of the setup menu to select the camcorder functions related to return video signal.

Selecting required functions

Follow the procedure below to select the required functions.

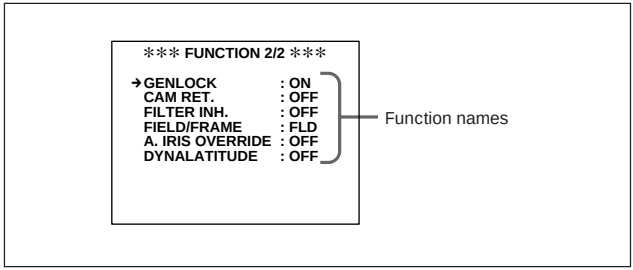


Selecting required functions

1 Set the MENU ON/OFF/PAGE switch to ON.

The page that was on the screen when the last menu operation ended appears on the viewfinder screen. (When this menu is first used, the lowest-numbered one of the currently selected pages appears.)

2 Push the MENU ON/OFF/PAGE switch repeatedly to PAGE until the FUNCTION 2/2 page shown below appears (or use the rotary encoder).



FUNCTION 2/2 page (factory settings)

3 Push the MENU CANCEL/PRST/ITEM switch repeatedly to ITEM until the cursor reaches the item whose setting you want to change (or use the rotary encoder).

4 Press the rotary encoder, to display a question mark to the left of the display.

5 Turn the rotary encoder to change the setting of the selected function.

(Continued)

GENLOCK: To use the signal input to the GENLOCK IN connector as a camera genlock signal or for an external time code lock (the "ON" setting), turn the rotary encoder counterclockwise as seen from the front of the camera, and in order not to use it (the "OFF" setting), turn the rotary encoder clockwise.

CAM RET.: To display the return video signal input to the GENLOCK IN connector on the viewfinder screen by using the RET button on the lens (the "ON" setting), turn the rotary encoder counterclockwise as seen from the front of the camera, and in order not to display it (the "OFF" setting), turn the rotary encoder clockwise.

FILTER INH.: To restrict the number of white balance memories to one each for A and B (the "ON" setting), turn the rotary encoder counterclockwise as seen from the front of the camera, and in order not to restrict the number in this way (the "OFF" setting), turn the rotary encoder clockwise.

FIELD/FRAME: Switches between field (FLD) and frame (FRM) for the method of charge accumulation of the CCD sensor.

For details of menu operation, refer to the Maintenance Manual.

A. IRIS OVERRIDE: To make fine adjustment of the reference value for automatic iris adjustment (the "ON" setting), turn the rotary encoder counterclockwise as seen from the front of the camera, and in order not to make fine adjustment (the "OFF" setting), turn the rotary encoder clockwise.

See section 4-3 "Changing the Reference Value for Automatic Iris Adjustment" (page 4-19) for more information about fine adjustment of the reference value of the automatic iris adjustment.

DYNALATITUDE: An image with extreme contrast, leading to white smudging in the background or black smudging in a subject, can be detected, and both white and black smudging corrected. Turning the rotary encoder counterclockwise as seen from the front of the camera switches in turn through the settings: OFF (no function), LOW (minimum correction), MID (medium correction), and HI (strong correction).

Notes

- When a remote control unit is connected to the camcorder, the settings of the FILTER INH. and the IRIS OVERRIDE cannot be changed from the remote control unit. These items appear on the menu, but the cursor skips them so that they cannot be selected.
- Pushing the MENU CANCEL/PRST/ITEM switch to CANCEL/PRST has no effect on the FUNCTION 2/2 page.

To change the setting of another function, return to step **3**.

6 Press the rotary encoder, so that the question mark disappears.

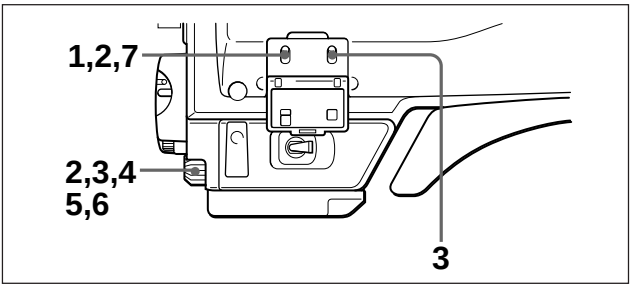
7 To end the menu operation, set the MENU ON/OFF/PAGE switch to OFF.

The setup menu disappears from the viewfinder screen and the displays indicating the current status of the camcorder appear along the top and bottom of the viewfinder.

4-9-3 Selecting the Test Output

Use the TEST OUT page of the setup menu to select the type of video signal to be output from the TEST OUT connector.

Follow the procedure below to select the test output signal.

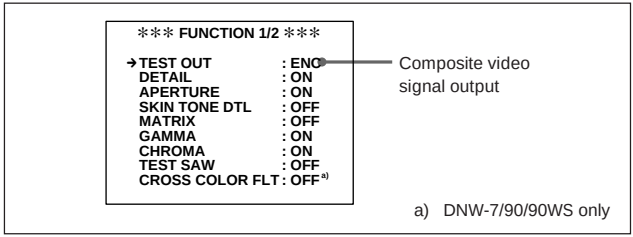


Selecting the test output

1 Set the MENU ON/OFF/PAGE switch to ON.

The page that was on the screen when the last menu operation ended appears on the viewfinder screen. (When this menu is first used, the lowest-numbered one of the currently selected pages appears.)

2 Push the MENU ON/OFF/PAGE switch repeatedly to PAGE until the FUNCTION 1/2 page shown on the next page appears (or use the rotary encoder).



FUNCTION 1/2 page (factory settings)

3 Push the MENU CANCEL/PRST/ITEM switch repeatedly to ITEM until the cursor reaches the desired output (or use the rotary encoder).
Note that the test output signal reverts to ENC (encoded) every time the camcorder is switched on.

4 Press the rotary encoder to display a question mark to the left of the display.

5 Turn the rotary encoder to select the desired output.

The R–G and B–G signal outputs can be selected only when R–G/B–G SEL on the OPERATION MODE page is set to ON.

Refer to the Maintenance Manual for information about the OPERATION MODE page.

6 Press the rotary encoder, so that the question mark disappears.

(Continued)

7 To end the menu operation, set the MENU ON/OFF/PAGE switch to OFF.

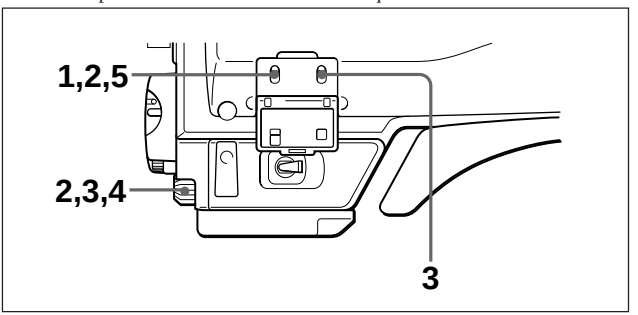
The setup menu disappears from the viewfinder screen and the displays indicating the current status of the camcorder appear along the top and bottom of the viewfinder screen.

4-9-4 Selecting the Aspect Ratio (DNW-90WS/ 90WSP/9WS/9WSP Only)

Use the WIDE SCREEN page of the setup menu to select the aspect ratio of the video output signal and other related items.

Selecting required functions

Follow the procedure below to select the required function.

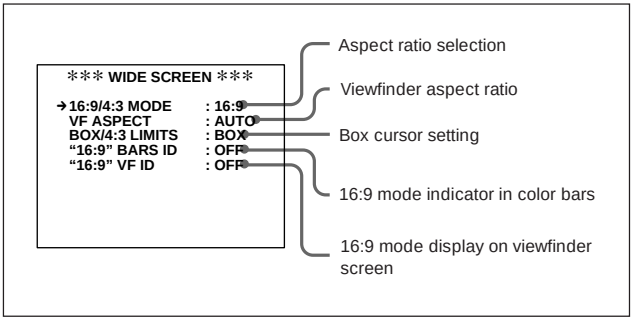


Selecting the aspect ratio

1 Set the MENU ON/OFF/PAGE switch to ON.

The page that was on the screen when the last menu operation ended appears on the viewfinder screen. (When this menu is first used, the lowest-numbered one of the currently selected pages appears.)

2 Push the MENU ON/OFF/PAGE switch repeatedly toward PAGE until the WIDE SCREEN page shown below appears (or use the rotary encoder).



WIDE SCREEN page (factory settings)

3 Push the MENU CANCEL/PRST/ITEM switch repeatedly toward ITEM until the cursor reaches the item whose setting you want to change (or use the rotary encoder).

(Continued)

4 Use the rotary encoder to change the setting of the selected item.

16:9/4:3 MODE: Turn the rotary encoder clockwise to select a 16:9 aspect ratio, or counterclockwise to select a 4:3 aspect ratio.

VF ASPECT: Turn the rotary encoder clockwise to change the aspect ratio of the viewfinder screen to that selected by 16:9/4:3 MODE (AUTO), or counterclockwise to fix the aspect ratio of the viewfinder screen at 4:3 (4:3) regardless of the 16:9/4:3 MODE setting.

To fix the aspect ratio at 16:9 (16:9A or 16:9B), turn the rotary encoder further counterclockwise.

When the 16:9/4:3 MODE is set to 4:3 with the VF ASPECT set to 16:9A or 16:9B, then the viewfinder shows the whole of the original 16:9 mode picture in the 16:9 mode frame.

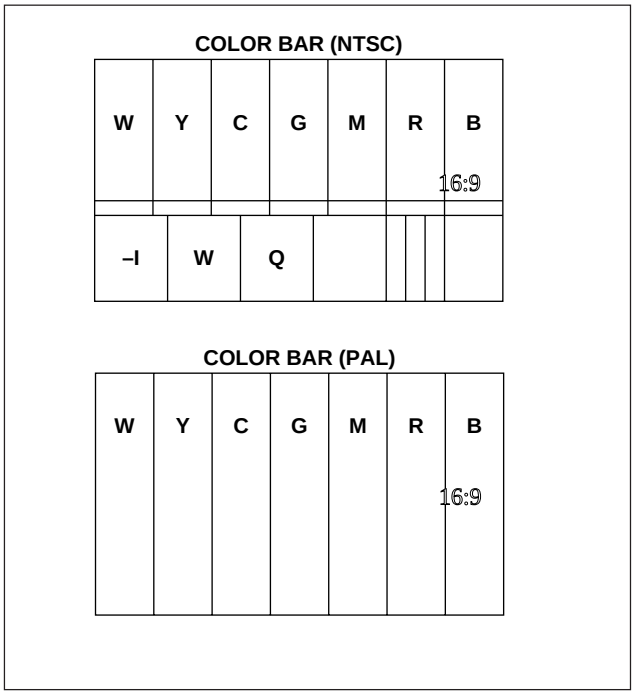
When the VF ASPECT is set to 16:9A, a marker indicating the 4:3 mode picture output area appears in the 16:9 mode frame.

When the VF ASPECT is set to 16:9B, the VF signal level outside the current safety zone area (100%, 90% or 80%) drops to a half regardless of whether the SAFETY ZONE setting is ON or OFF.

If you are using the BVF-VC10W Color Viewfinder with the picture output to the viewfinder in 4:3 mode, setting the VF ASPECT to 16:9A or 16:9B disables the viewfinder from showing the picture correctly.

BOX/4:3 LIMITS: Turn the rotary encoder clockwise to display the box cursor on the viewfinder screen (BOX), or counterclockwise to display a 4:3 mode area on the 16:9 mode viewfinder screen (4:3).

"16:9" BARS ID: Turn the rotary encoder counterclockwise to record a 16:9 mode indicator in color bars (ON), or clockwise not to record it in color bars (OFF).



"16:9" indicator on the color bar display

"16:9" VF ID: Turn the rotary encoder counterclockwise to keep a 16:9 mode indicator displayed on the the viewfinder screen when the 16:9 mode is selected (ON), or clockwise not to display the 16:9 mode indicator on the viewfinder screen (OFF).

(Continued)

Notes

- The BOX CURSOR setting on the MARKER 2/2 page cannot be changed in the following cases.
  - The BOX/4:3 LIMITS setting is 4:3.
  - The 16:9/4:3 MODE setting is 4:3 with the VF ASPECT set to 16:9.
- The LEVEL 1/9 page can be individually set for both 16:9 and 4:3 mode.

To change the setting of another function, return to step **3**.

5 To end the menu operation, set the MENU ON/OFF/PAGE switch to OFF.

The setup menu disappears from the viewfinder screen and the displays indicating the current status of the camcorder appear along the top and bottom of the viewfinder screen.

4-10 VTR Menu Display in the Display Panel

When the camcorder is stopped, hold down the ADVANCE button and press the SHIFT button for at least one second to display the VTR menu in the display panel.

Using the VTR menu, you can carry out with ease some of the system settings, including adjusting the internal clock, which are possible in the diagnosis mode.

4-10-1 Configuration and Functions of the VTR Menu

The VTR menu consists of seven submenus, identified by menu numbers, and numbers 3 to 6 of these each include a number of items.

VTR menu items and functions

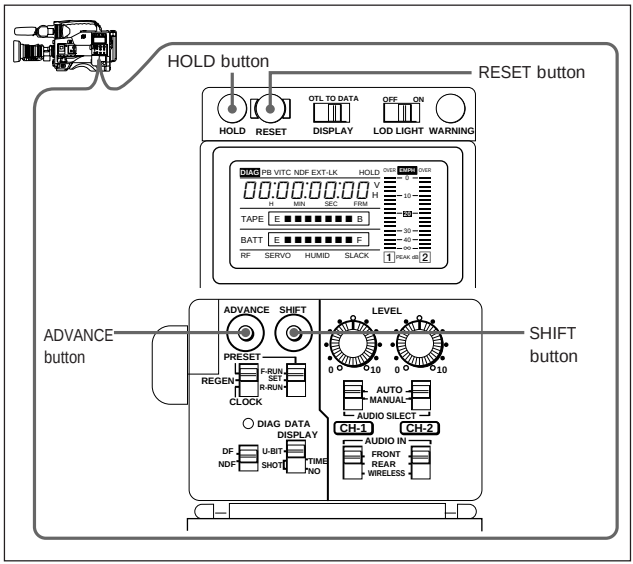
Menu number	Item	Function
1	TIME SET	Check and update the internal clock time.
2	DATE SET	Check and update the internal clock date.
3	REC START/ STOP TONE	Select whether to sound a tone on starting and stopping recording.
	AUTO SHOT NO. RESET	Select whether to automatically reset the shot number when a new cassette is loaded.
	SHOT TIME DISP SEL	Select how to display the shot date and time in the display panel.

(Continued)

4	LTC UBIT	Select the contents of the LTC user bits.
	LTC UBIT MARKER	Select which LTC user bit markers to record.
	REC START MARKER	Select whether to record recording start markers.
	SHOT MARKER 1 SHOT MARKER 2	Select whether to record shot markers 1. Select whether to record shot markers 2.
5	VITC UBIT	Select information to be recorded in the VITC user bits.
	SHOT DATA	Select the VITC UBIT DATA mode.
6	WATCH IC REVISE	Check and update the internal clock adjustment.

4-10-2 Using the VTR Menu

To access the VTR menu, hold down the ADVANCE button and press the SHIFT button for at least one second.
For operations within the VTR menu, use the SHIFT, ADVANCE, HOLD, and RESET buttons.
To exit the VTR menu, hold down the ADVANCE button and press the SHIFT button.



Buttons used in the VTR menu

Operations in the VTR menu relating to the internal clock

Menu numbers 1, 2 and 6 are for settings relating to the internal clock. The following summarizes the procedure in these menus.

1 Access the VTR menu.

2 For menu numbers 2 and 6, press the ADVANCE button to move to the required menu number.

3 Press the SHIFT button.

(Continued)

4 Change the internal clock setting as required.

5 Press the SHIFT button.

6 Exit the VTR menu.

For details of operation for menu numbers 1, 2, and 6, see the respective sections, "Changing the time setting of the internal clock" (page 94), "Changing the date setting of the internal clock" (page 4-96), and "Changing the internal clock adjustment" (page 4-100).

Operations in the VTR menu not relating to the internal clock

Menu numbers 3 to 5 each include a number of functions. Each setting is generally a binary choice (such as ON/OFF), but some settings have three choices.

The following summarizes the procedure in these menus.

1 Access the VTR menu.

2 Press the ADVANCE button to move to the required menu number.

3 Press the SHIFT button repeatedly until the setting you wish to change is flashing.

4 Press the ADVANCE button to change the setting.

5 Press the SHIFT button to advance to the last function in this submenu.

6 Press the SHIFT button once more.

7 Exit the VTR menu.

Menu item settings and indications in the display panel

TIME SET

Setting	Indication
Internal clock time	1:xx xx xx

DATE SET

Setting	Indication
Internal clock date	2:xx xx xx

REC START/STOP TONE

Setting	Indication
No tone on starting and stopping recording	3:0xx
Sound tone on starting and stopping recording	3:1xx

AUTO SHOT NO. RESET

Setting	Indication
Reset shot number when new cassette loaded	3:x0x
Do not reset shot number when new cassette loaded	3:x1x

(Continued)

SHOT TIME DISP SEL

Setting	Indication
Show shot time as “month-day:hour-minute”	3:xx0
Show shot time as “day-month:hour-minute”	3:xx1
Show shot time as “day:hour-minute-second”	3:xx2

LTC UBIT

Setting	Indication
Set LTC user bits to fixed user bit values	4:0xxxx
Set LTC user bits to real time	4:1xxxx
Record shot data in LTC user bits	4:2xxxx

LTC UBIT MARKER

Setting	Indication
LTC user bit marker recording determined by REC START MARKER and GOOD SHOT MARKER items	4:x0xxx
Both markers (REC START MARKER and GOOD SHOT MARKER) recorded in LTC user bits	4:x1xxx
No markers recorded in LTC user bits	4:x2xxx

REC START MARKER[1)]

Setting	Indication
Recording start marker recorded in user bits	4:x00xx
Recording start marker not recorded in user bits	4:x01xx

1) This switch is effective when the LTC UBIT MARKER setting is 0 (“SW”).

SHOT MARKER 1[2)]

Setting	Indication
Shot marker 1 recorded in user bits	4:x0x0x
Shot marker 1 not recorded in user bits	4:x0x1x

2) This switch is effective when the LTC UBIT MARKER setting is 0 (“SW”).

SHOT MARKER 2[3)]

Setting	Indication
Shot marker 2 recorded in user bits	4:x0xx0
Shot marker 2 not recorded in user bits	4:x0xx1

3) This switch is effective when the LTC UBIT MARKER setting is 0 (“SW”).

VITC UBIT

Setting	Indication
Set VITC user bits to fixed user bit values	5:0x
Set VITC user bits to real time	5:1x
Record shot data in VITC user bits	5:2x

(Continued)

SHOT DATA

Setting	Indication
Use standard mode for shot data	5:20
Use extended mode for shot data	5:21

WATCH IC REVISE

Setting	Indication
Adjustment for internal clock (frames/hour)	7:xxx

4-10-3 Example Operations in the VTR Menu

This section describes typical examples of setting operations carried out using the VTR menu.

Changing the time setting of the internal clock

1 Hold down the ADVANCE button and press the SHIFT button for at least one second.

This displays the VTR menu.

2 Press the SHIFT button.

The hours indication flashes.

3 Set the hours value.

To increase the value, press the ADVANCE button.
To decrease the value, hold down the HOLD button and press the ADVANCE button.

4 Press the SHIFT button.

The minutes indication flashes.

5 Set the minutes value.

To increase the value, press the ADVANCE button.
To decrease the value, hold down the HOLD button and press the ADVANCE button.

6 Press the RESET button to set the seconds value to 00.

If before you press the RESET button the seconds value is less than 30, the minutes value does not change. If before you press the RESET button the seconds value is 30 or more, the minutes value is incremented by 1 at the moment the seconds value changes to 00.

7 Press the SHIFT button.

The corrected time appears in the display.

8 Hold down the ADVANCE button and press the SHIFT button to exit the VTR menu.

Changing the date setting of the internal clock

1 Hold down the ADVANCE button and press the SHIFT button for at least one second.

This displays the VTR menu.

2 Press the ADVANCE button once.

This moves to DATE SET.

3 Press the SHIFT button.

The year indication flashes.

4 Set the year.

To increase the value, press the ADVANCE button.
To decrease the value, hold down the HOLD button and press the ADVANCE button.

5 Press the SHIFT button.

The month indication flashes.

6 Set the month.

To increase the value, press the ADVANCE button.
To decrease the value, hold down the HOLD button and press the ADVANCE button.

7 Press the SHIFT button.

The day indication flashes.

8 Set the day.

To increase the value, press the ADVANCE button.
To decrease the value, hold down the HOLD button and press the ADVANCE button.

9 Press the SHIFT button.

The corrected date appears in the display.

10 Hold down the ADVANCE button and press the SHIFT button to exit the VTR menu.

Sounding a tone on starting and stopping recording

1 Hold down the ADVANCE button and press the SHIFT button for at least one second.

This displays the VTR menu.

2 Press the ADVANCE button twice.

3 Press the SHIFT button.

The current setting of REC START/STOP TONE flashes.

4 Press the ADVANCE button until the displayed setting value is 1.

In the viewfinder, this appears as “ON”.

5 Press the SHIFT button three times.

This saves the new setting value.

(Continued)

6 Hold down the ADVANCE button and press the SHIFT button to exit the VTR menu.

If the new setting is not saved correctly
When you press the SHIFT button in step **5**, an indication "3:Ex xx" appears. Make the setting once more.

Recording all markers in the LTC user bits

1 Hold down the ADVANCE button and press the SHIFT button for at least one second.

This displays the VTR menu.

2 Press the ADVANCE button three times.

3 Press the SHIFT button twice.

The current setting of LTC UBIT MARKER flashes.

4 Press the ADVANCE button until the displayed setting value is 1.

5 Press the SHIFT button three times.

This saves the new setting value.

6 Hold down the ADVANCE button and press the SHIFT button to exit the VTR menu.

If the new setting is not saved correctly
When you press the SHIFT button in step **5**, an indication "4:Ex xx x" appears. Make the setting once more.

Recording shot data in the VITC user bits

1 Hold down the ADVANCE button and press the SHIFT button for at least one second.

This displays the VTR menu.

2 Press the ADVANCE button four times.

3 Press the SHIFT button.

The current setting of VITC UBIT flashes.

4 Press the ADVANCE button until the displayed setting value is 2.

5 Press the SHIFT button twice.

This saves the new setting value.

6 Hold down the ADVANCE button and press the SHIFT button to exit the VTR menu.

If the new setting is not saved correctly
When you press the SHIFT button in step **5**, an indication “5:Exx” appears. Make the setting once more.

Changing the internal clock adjustment

The rate of advancement of the internal clock while the camcorder is powered off can be adjusted as follows.

1 Hold down the ADVANCE button and press the SHIFT button for at least one second.

This displays the VTR menu.

2 Press the ADVANCE button six times.

3 Press the SHIFT button.

The current setting of the internal clock adjustment value flashes.

4 Set the adjustment value (number of frames/day).

To increase the value, press the ADVANCE button.
To decrease the value, hold down the HOLD button and press the ADVANCE button.

5 Press the SHIFT button.

This saves the new setting value.

6 Hold down the ADVANCE button and press the SHIFT button to exit the VTR menu.

If the new setting is not saved correctly

When you press the SHIFT button in step **5**, an indication "7:E x xx" appears. Make the setting once more.

4-11 Using the Setup Card

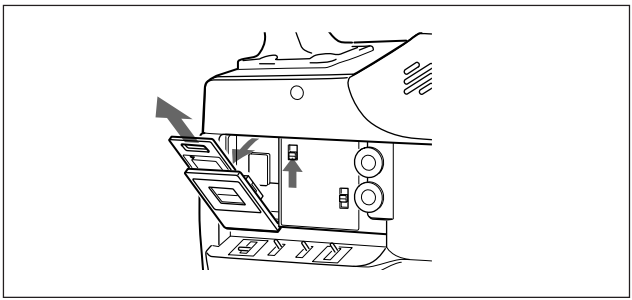
You can save the contents of the setup menu in the BSC-1 Setup Card (not supplied). This data enables rapid recreation of suitable setup conditions.

4-11-1 Handling the Setup Card

The setup card can be inserted or removed from the camcorder with the power turned on or off.

Removing the setup card

Push up on the tab on the right-hand side of the card insertion lid to open the lid.



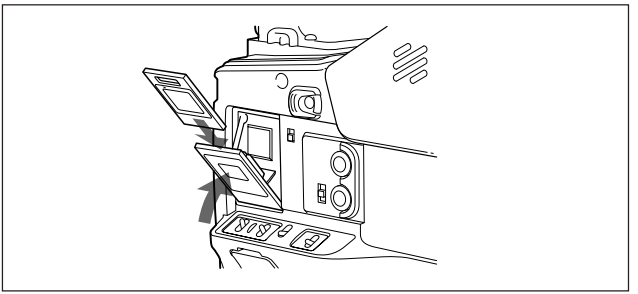
Removing the setup card

Note

Do not touch the pins on the card connector.

Inserting the setup card

Hold the setup card with the “SONY” logo facing you so you can read it, slide it into the insertion slot, then close the lid.



Inserting the setup card

Note

Make sure that you can read the “SONY” logo when you insert the card. If there is some resistance when you insert the card, the card might be turned around or upside down. Do not force the card into the slot. Check that the card is correctly oriented, then try inserting it again.

Note for using and storing the setup card

The following points apply to the use and storage of a setup card.

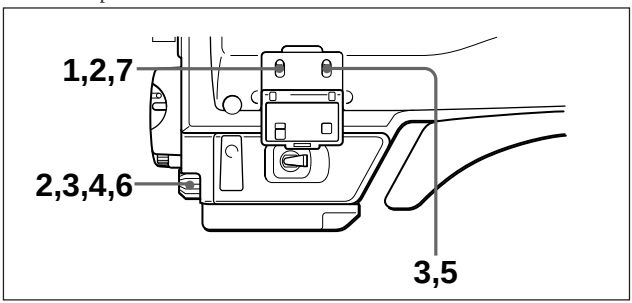
- Avoid high temperature and humidity.
- Make sure the card does not get dirty or wet.
- Avoid static electricity.
- Store the card by inserting it into the camcorder and closing the card insertion lid.

4-11-2 Using Data on the Setup Card

The operations of saving data to the setup card and reading the saved data from the setup card are done from the SETUP CARD page of the setup menu.

Writing data to the setup card

Follow the procedure below.



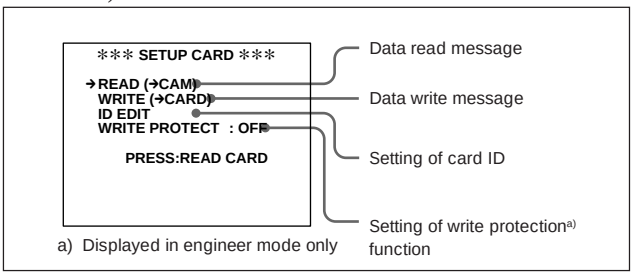
Writing data to the setup card

1 Set the MENU ON/OFF/PAGE switch to ON.

The page that was on the screen when the last menu operation ended appears on the viewfinder screen. (When this menu is first used, the lowest-numbered one of the currently selected pages appears.)

(Continued)

2 Push the MENU ON/OFF/PAGE switch repeatedly to PAGE until the SETUP CARD page shown below appears (or use the rotary encoder).



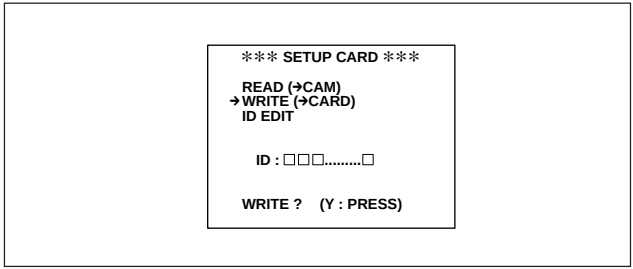
SETUP CARD page (factory settings)

If no card is inserted, the message “CARD NOT INSERTED!” appears. Close the menu and insert a card.

3 Push the MENU CANCEL/PRST/ITEM switch repeatedly to ITEM until the cursor reaches the WRITE (→ CARD) position (or use the rotary encoder).

4 Press the rotary encoder.

A message asking whether or not data and the card ID of the camera are to be written to the card appears.



4

5 • To end writing data, push the MENU CANCEL/PRST/ITEM switch to CANCEL/PRST.
• To continue the writing of data, go on to step **6**.

6 Press the rotary encoder.

The displayed card ID and the setting data stored in the camcorder are written to the card.
While the data is being written, the message “WRITING DATA!” is displayed.

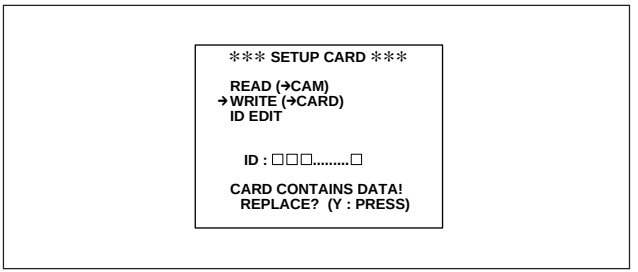
When the writing is completed, the message “WRITE : OK” appears.

7 To end the menu operation, set the MENU ON/OFF/PAGE switch to OFF.

The setup menu disappears from the viewfinder screen and the displays indicating the current status of the camcorder appear along the top and bottom of the viewfinder.

Updating the data

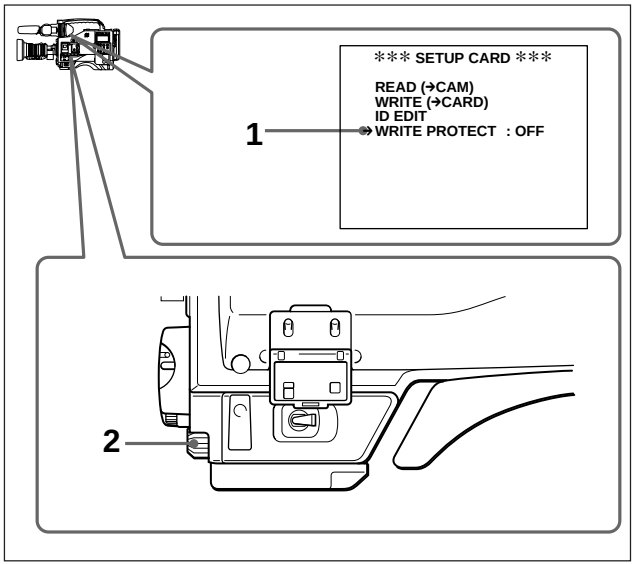
If data is already saved on the card, a message asking whether or not that data is to be updated is displayed in step **6** (page 4-105). The message is illustrated below.



To update the data, press the rotary encoder.

Protecting saved data

If you set the WRITE PROTECT setting to “ON” in engineer mode to protect data written to a setup card, then pressing the rotary encoder in step **6** of the foregoing procedure (page 4-105) does not carry out overwriting. Follow the procedure below (possible in engineer mode only).



Protecting saved data

1 Move the cursor to the WRITE PROTECT position.

(Continued)

2 • To enable the write-protection function (the “ON” setting), turn the rotary encoder counterclockwise as seen from the front of the camera.
• To disable the write-protection function (the “OFF” setting), turn the rotary encoder clockwise.

If data cannot be written

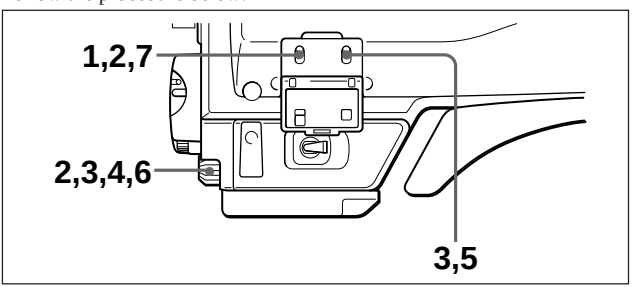
If when you press the rotary encoder in step **6** of the foregoing procedure (page 4-105) one of the following error messages appears, then the data was not written.

Data write error messages

Error message	Reason	Action
CARD NOT INSERTED!	No setup card is inserted.	Close the menu and insert or reinsert the card.
WRITE PROTECTED!	WRITE PROTECT is set to ON.	Set WRITE PROTECT to OFF.
WRITE ERROR! (flashing)	Circuit or card fault	Check the circuitry, or replace the card with a verified card.

Reading saved data from a card

Follow the procedure below.

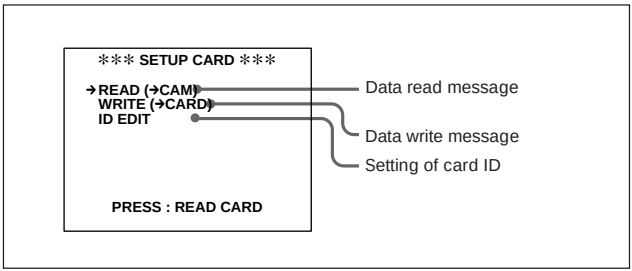


Reading saved data from a card

1 Set the MENU ON/OFF/PAGE switch to ON.

The page that was on the screen when the last menu operation ended appears on the viewfinder screen. (When this menu is first used, the lowest-numbered one of the currently selected pages appears.)

2 Push the MENU ON/OFF/PAGE switch repeatedly to PAGE until the SETUP CARD page shown below appears (or use the rotary encoder).



SETUP CARD page (factory settings)

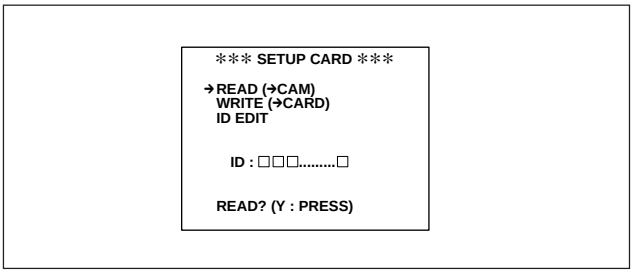
If no card is inserted, the message “CARD NOT INSERTED!” message appears. Close the menu and insert a card.

3 Push the MENU CANCEL/PRST/ITEM switch repeatedly to ITEM until the cursor reaches the READ (→ CAM) position (or use the rotary encoder).

4 Press the rotary encoder.

A message asking whether or not data and the card ID of the camera are to be read from the card appears.

(Continued)



4

5 • To end reading data, push the MENU CANCEL/PRST/ITEM switch to CANCEL/PRST.
• To continue the reading of data, go on to step **6**.

Notes

- The data and the card ID read from the card overwrite the data stored in the camcorder. Before going on to step **6**, re-check the card ID and decide whether it is necessary to read the data and card ID from the card.
- The card stores data for both user-mode settings and engineer-mode settings. Both sets of data are read and written together.
  For more information, refer to the Maintenance Manual.
- There is no setup card read-write compatibility between different models of digital camcorder. For example, a card written by the DNW-7 cannot be read by the DNW-90 or DNW-7P, and vice versa.

6 Press the rotary encoder once more.

While data is being read, the message “READING DATA!” is displayed.

When reading is completed, the message “READ : OK” appears.

7 To end the menu operation, set the MENU ON/OFF/PAGE switch to OFF.

The setup menu disappears from the viewfinder screen and the displays indicating the current status of the camcorder appear along the top and bottom of the viewfinder.

If data cannot be read

If when you press the rotary encoder in step **6** of the above procedure (page 4-110) one of the following error messages appears, then the data was not read.

Data read error messages

Error message	Reason	Action
CARD NOT INSERTED!	No setup card is inserted.	Close the menu and insert or reinsert the card.
READ ERROR! (flashing)	Circuit or card fault	Re-check, and consult a Sony representative.
CARD DATA NG! (flashing)	The card contains the data that cannot be read into this camcorder.	Do not try to read the data written for another camcorder.

Setting the card ID

When data is written to a setup card, it is useful to set an ID for the card to identify it.

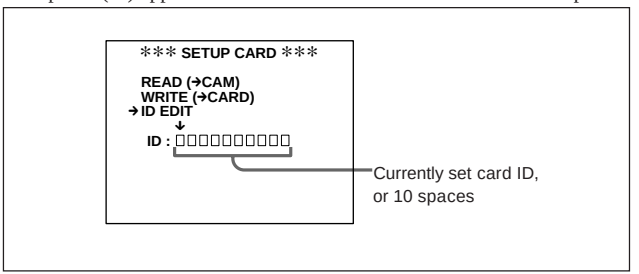
When data is saved to a card, a card ID is written to the card together with the data. When data is read from a card, the card ID is also read, and that ID overwrites the card ID associated with the data that was previously in the camcorder.

1 Move the cursor to ID EDIT on the SETUP CARD page.

(Continued)

2 Press the rotary encoder.

The currently set card ID appears. If no card ID is currently set, 10 spaces (□) appear. The cursor is at the left-most character or space.



3 Turn the rotary encoder clockwise as seen from the front of the camera until the character you wish to set appears.

The character display cycles from the alphabet, through the symbols, and the digits in that order. Turn the rotary encoder counterclockwise to cycle through the characters in the reverse direction.

4 Press the rotary encoder to advance the cursor to the next position.

When the settings are completed, press the rotary encoder repeatedly until the cursor reaches the rightmost position.
To set another character, return to step **3**.
When 10 characters are set, EDIT mode is exited automatically.

5 To change the card ID, press the MENU CANCEL/PRST/ITEM switch toward the CANCEL position.

If a correction is required after once pressing the rotary encoder, press the rotary encoder once again, to display the cursor above the card ID and enable correction (returning to the state in step **2**).

Notes

- Shot ID-1 is read and written always together with other data. Therefore, if shot ID-1 is written to a card after being set or modified through the SETUP CARD page for data stored in the camera, other data than shot ID-1 will also be written onto the card. Shot ID-2 to shot ID-4 are not recorded on the setup card.
- To set or modify only the card ID of data stored on a card, read the data from the card to the camcorder, set or modify the card ID, then write that data back to the card.

5-1 Power Supply

You need to power on the camcorder for the flange focal length adjustment, viewfinder focus and screen adjustment, etc., which are described later.
The following power supplies can be used with the camcorder.

- A BP-L60/L90 lithium-ion battery pack
- An NP-1B or a BP-90A Ni-Cd battery pack
- AC power using AC-550/550CE or AC-DN1

Alternatively, you can make combined use of internal and external batteries, by mounting one of the above batteries as an internal battery and connecting an external battery that can be a BP-90A contained in a DC-210 Battery Adaptor and connected to the DC IN connector of the camcorder.

5-1-1 Using a BP-L60/L90 Battery Pack

With a battery pack, the camcorder will operate continuously for the time listed in the table below.

Approximate continuous operating time with BP-L60/L90 Battery Pack

	DNW-7/7P	DNW-90/90P	DNW-90WS/90WSP/9WS/9WSP
BP-L60	120 minutes	110 minutes	105 minutes
BP-L90	180 minutes	165 minutes	160 minutes

Before use, charge the battery pack with a BC-L100/L100CE Battery Charger. It takes about 2.5 hours to charge one BP-L60, and about 3.5 hours to charge one BP-L90.

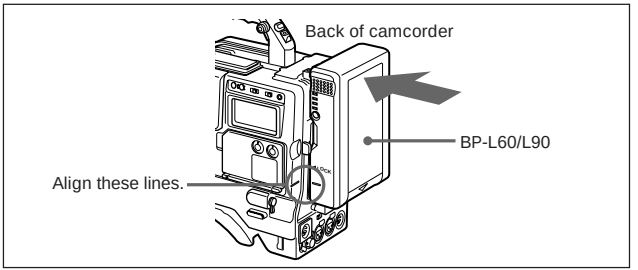
For more information, refer to the BC-L100/L100CE manual.

Note on using the battery pack

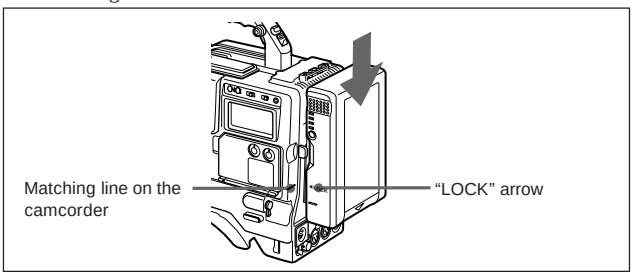
A warm battery pack may not be able to be fully recharged.

Attaching the battery pack

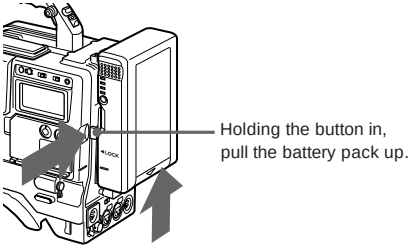
1 Press the battery pack against the back of the camcorder, aligning the side line of the battery pack with the line on the camcorder.



2 Slide the battery pack down until its “LOCK” arrow points at the matching line on the camcorder.



Detaching the battery pack



Detaching the battery pack

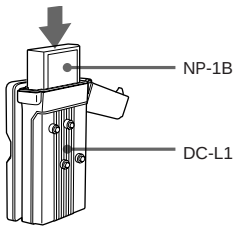
5-1-2 Using an NP-1B Battery Pack

The camcorder will operate continuously for about 40 minutes with an NP-1B Battery Pack. Use of this battery pack requires a DC-L1 Battery Adaptor (not supplied).
Before use, charge the battery pack with a BC-1WD/1WDCE Battery Charger for about 1 hour.

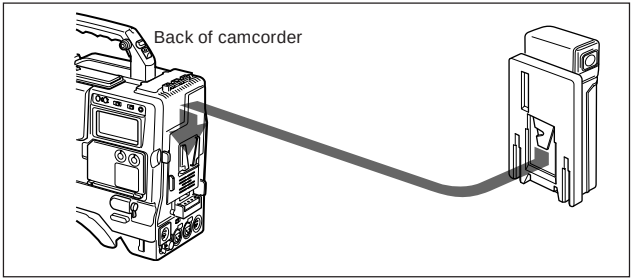
For more information, refer to the BC-1WD/1WDCE manual.

Attaching the battery pack

1 Slide an NP-1B Battery Pack into the DC-L1 Battery Adaptor.



2 Mount the DC-L1 Battery Adaptor on the back of the camcorder.



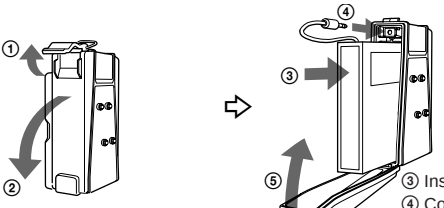
5-1-3 Using a BP-90A Battery Pack

The camcorder will operate for about 120 minutes (DNW-7/7P), 110 minutes (DNW-90/90P) or 105 minutes (DNW-90WS/90WSP) with a BP- 90A Battery Pack. Use of this battery pack requires a DC-L90 Battery Adaptor (not supplied).
Before use, charge the battery pack with a BC-210/210CE/410/410CE Battery Charger for about 2 hours.

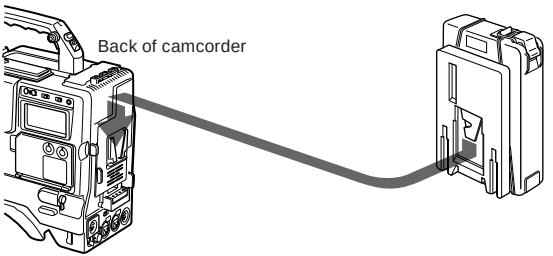
For more information, refer to the BC-210/210CE/410/410CE or BC-L100/ L100CE manual.

Attaching the battery pack

1 Fit a BP-90A Battery Pack in the DC-L90 Battery Adaptor.



2 Mount the DC-L90 Battery Adaptor on the back of the camcorder.



5-1-4 Avoiding Breaks in Operation Due to Dead Batteries

If you use both an internal battery pack and an external battery connected to the DC IN connector at the same time, you can avoid breaks in operation due to the dead batteries.

When the external battery begins to fail and an internal battery pack is also used

Remove the DC output cable of the external battery from the DC IN connector. The power source will switch to the internal battery pack.

When the external battery begins to fail and an internal battery pack is not used

First load the camcorder with a fully charged internal battery pack, then remove the DC output cable of the external battery from the DC IN connector. The power source will switch to the internal battery pack. To use an external battery again, connect a fully charged external battery to the DC IN connector before unloading the internal battery pack. The power source will switch to the external battery.

Continuous operation when operating with only an internal battery pack

First, connect a fully charged external battery to the DC IN connector, then change the internal battery.

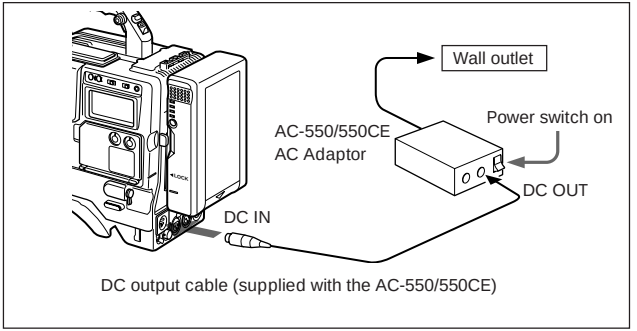
Notes

- Whenever an internal battery pack is loaded and an external battery is connected to the DC IN connector, the external battery is always used as the power source.
- There may be some noise on the video signal at the instant the power sources are switched.

5-1-5 Using an AC Adaptor

Using an AC-550/550CE AC Adaptor

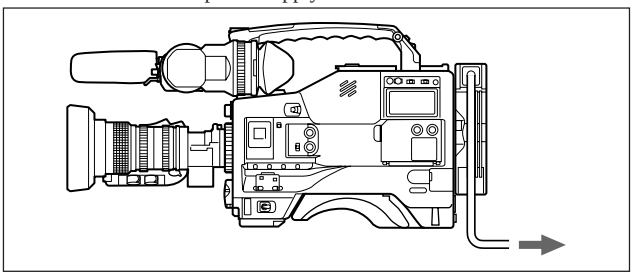
Connect the camcorder to the AC power supply as shown in the following figure, and turn the POWER switch of the AC-550/550CE on.



Using an AC Adaptor

Using an AC-DN1/DN2 AC Adaptor

Mount the AC-DN1/DN2 on the camcorder in the same way as a battery, then connect to the AC power supply.



Connection to an AC power supply using an AC-DN1/DN2 AC Adaptor

5-1-6 Using the Anton Bauer Ultralight System

By fitting the camcorder with the Anton Bauer Ultralight System, and setting the LIGHT switch to AUTO, you can switch the light on and off automatically as you start and stop VTR operation. (This system operates with lights powered by 12 V, with a maximum power consumption of 30 W.)

5-1-7 Using the Anton Bauer Intelligent Battery System

You can equip the camcorder with a special battery mount which the Anton Bauer Corporation has developed for its Intelligent Battery System and Ultralight System.
When the camcorder is used with an Anton Bauer Digital Magnum series battery, the remaining battery capacity is shown numerically in the viewfinder display.

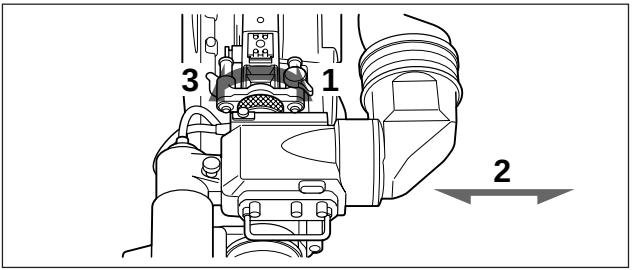
Contact your Sony representative for more information.

5-2 Adjusting the Viewfinder

For maximum viewing convenience, you can adjust the viewfinder position in the left-right and backward-forward directions.

5-2-1 Adjusting the Viewfinder Position

Adjusting the position to left or right



Adjusting the position to left or right

1 Loosen the viewfinder left-right positioning ring.

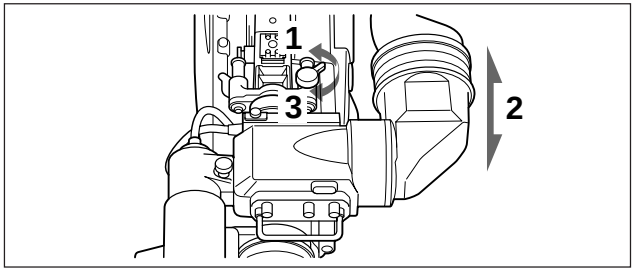
2 Slide the viewfinder to the most convenient position.

3 Tighten the viewfinder left-right positioning ring.

Storing the camcorder in the carrying case

Always store the camcorder with the viewfinder moved fully in the direction opposite to the barrel and the viewfinder left-right positioning ring tightened.

Adjusting the position backward or forward



Adjusting the position backward or forward

1 Loosen the viewfinder front-rear positioning lever.

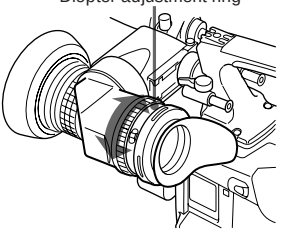
2 Slide the viewfinder longitudinally to the most convenient position.

3 Tighten the viewfinder front-rear positioning lever.

5-2-2 Adjusting the Viewfinder Focus and Screen

Adjusting the viewfinder focus

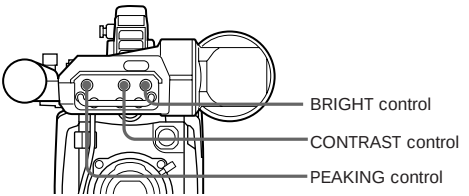
Turn the diopter adjustment ring until the viewfinder image is sharpest.



Adjusting the viewfinder focus

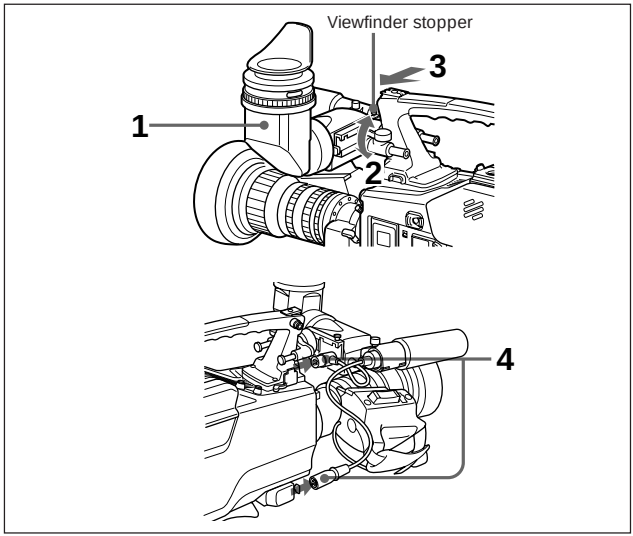
Adjusting the viewfinder screen

Adjust the brightness, contrast, and peaking of the viewfinder screen with the controls shown below.



Adjusting the viewfinder screen

5-2-3 Detaching the Viewfinder



Detaching the viewfinder

1 Point the viewfinder barrel up or down.

2 Loosen the viewfinder left-right positioning ring.

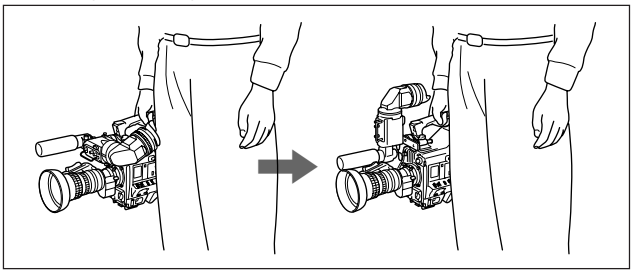
3 Holding the viewfinder stopper up, slide the viewfinder in the direction indicated by the arrow and detach it.

4 Remove the viewfinder cable and microphone cable from the clamps and disconnect them.

The viewfinder rotation bracket

By fitting a BKW-401 Viewfinder Rotation Bracket (not supplied), you can rotate the viewfinder out of the way so that your right leg does not hit the viewfinder while you are carrying the camcorder.

For more information, refer to the BKW-401 manual.

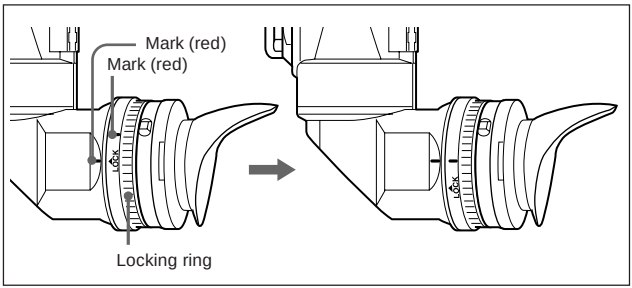


Using the BKW-401 Viewfinder Rotation Bracket

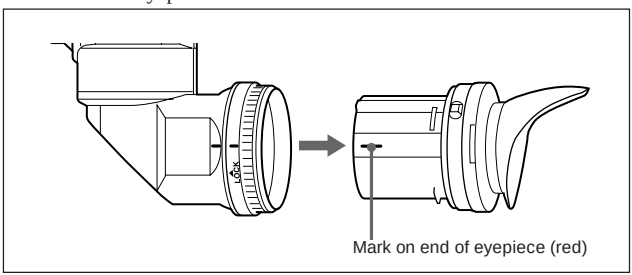
5-2-4 Detaching the Eyepiece

Removing the eyepiece gives a clearer view of the screen from further away. It is also easy to remove dust from the viewfinder screen and mirror when the eyepiece is detached.

1 Turn the eyepiece locking ring fully counterclockwise, to line up the red marks on the locking ring and the viewfinder barrel.



2 Detach the eyepiece.



Reattaching the eyepiece

1 Align the mark on the eyepiece locking ring with the one on the viewfinder barrel.

2 Align the mark on the eyepiece end (see step **2** in the illustration for eyepiece detachment) with those on the eyepiece locking ring and viewfinder barrel. Then insert the eyepiece into the viewfinder barrel.

3 Turn the eyepiece locking ring clockwise until its “LOCK” arrow points at the mark on the viewfinder barrel.

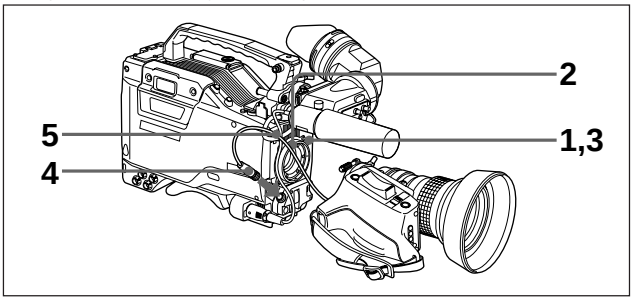
Note

When the eyecup is worn out, replace it with a new one (service part number 3-723-079-02).

5-3 Mounting the Lens

Follow the procedure below to mount the lens.

For information about using the lens, refer to the lens manual.



Mounting the lens

1 Push the lens locking lever up and remove the lens mount cap from the lens mount.

2 Align the center slot in the lens mount with the center pin on the lens, and insert the lens into the mount.

3 Holding the lens in place, push the lens locking lever down to mount the lens.

4 Connect the lens cable to the LENS connector.

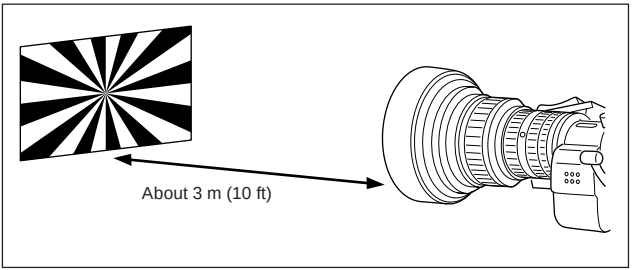
5 Secure the lens cable with the cable clamps.

5-4 Adjusting the Flange Focal Length

If the lens does not stay in focus properly as you zoom from telephoto to wide angle, adjust the flange focal length (the distance from the plane of the lens mounting flange to the imaging plane). Make this adjustment after mounting or changing the lens.

Adjusting the flange focal length

The positions of the controls for adjusting the flange focal length vary somewhat from lens to lens. Check the identification of the various controls in the lens manual.



Adjusting the flange focal length

1 Set the iris to manual.

2 Open the iris. Place the flange focal length adjustment chart about 3 m (10 ft) away from the camera, lit well enough to provide a satisfactory video output level.

3 Loosen the fixing screws on the Ff ring (flange focal length adjustment ring).

4 Use manual or power zoom to set the lens to telephoto.

5 Point the camera at the chart, and focus on it.

6 Set the zoom to wide angle.

7 Turn the Ff ring until the chart is in focus, being careful not to disturb the focus ring.

8 Repeat steps **4** to **7** until the chart stays in focus all the way from wide angle to telephoto.

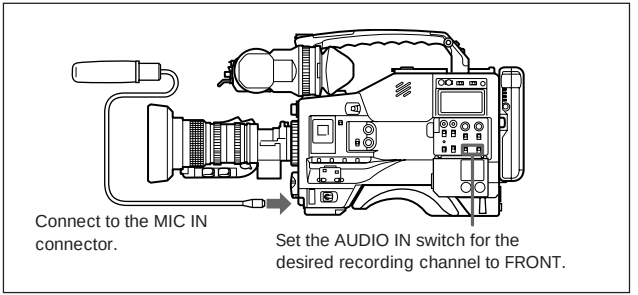
9 Tighten the Ff ring fixing screws.

5-5 Audio Input System

5-5-1 Using the Supplied Microphone

You can use the supplied microphone either detached from or attached to the camcorder.

Using the microphone detached from the camcorder



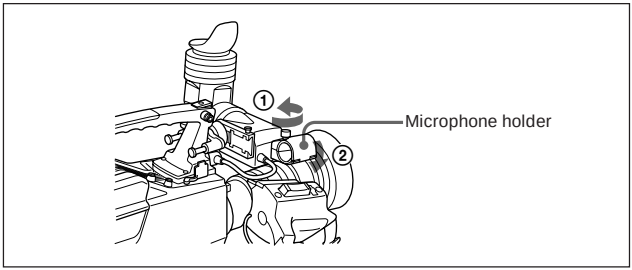
Using the microphone detached from the camcorder

Note

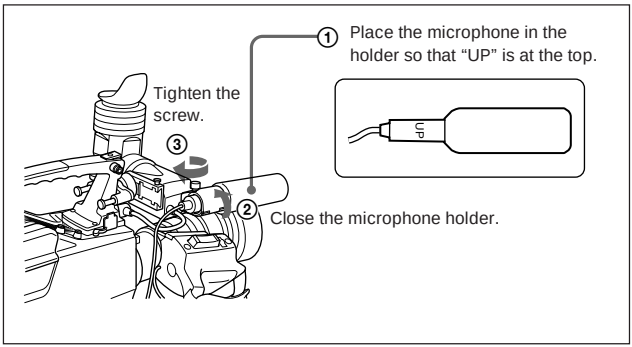
When using the supplied microphone with an extension cable, always use an external power supply type cable.

Using the microphone attached to the camcorder

1 Loosen the screw and open the microphone holder.

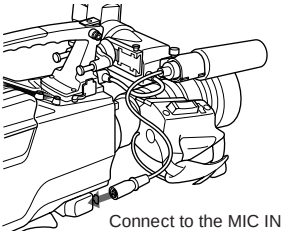


2 Place the microphone in the microphone holder.



(Continued)

3 Plug the microphone cable into the MIC IN connector, and set the AUDIO IN switch for the desired recording channel to FRONT.

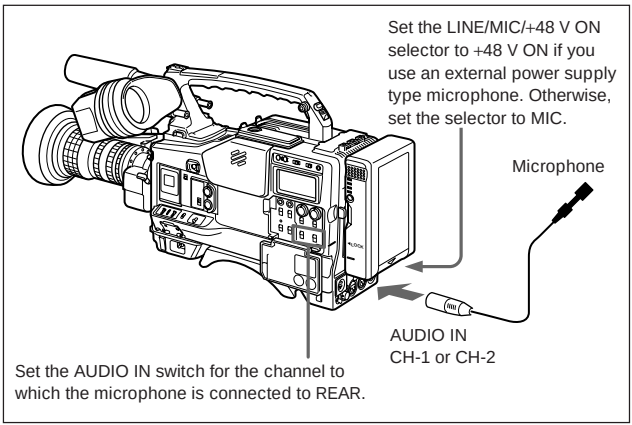


Connect to the MIC IN connector.

5-5-2 Using an External Microphone

You can connect up to two external microphones, using the AUDIO IN CH-1 and CH-2 connectors. When you use an external power supply type microphone, set the LINE/MIC/+48 V ON selector for the appropriate AUDIO IN connector to +48 V ON.
If a microphone you use is not the external power supply type, set the LINE/MIC/+48 V ON selector to MIC.

Using a detached external microphone



Using a detached external microphone

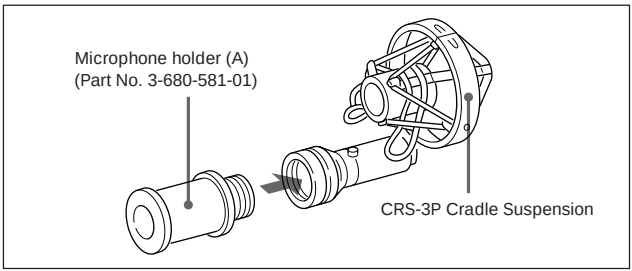
Using an external microphone attached to the camcorder

You can attach an external microphone to the camcorder by using a CAC-12 Microphone Holder (not supplied). Additionally, by using a CRS-3P Cradle Suspension (not supplied), you can reduce the mechanical vibration noise from the VTR, and can also attach a long microphone. Note, however, that use of the CRS-3P requires a microphone holder (A) (Part No. 3-680-581-01), which is not supplied with the CRS-3P.

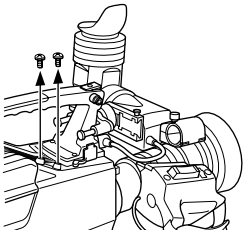
The procedure for attaching an external microphone using a CAC-12 and CRS-3P is shown below.

Refer to the microphone holder or cradle suspension manual for more information.

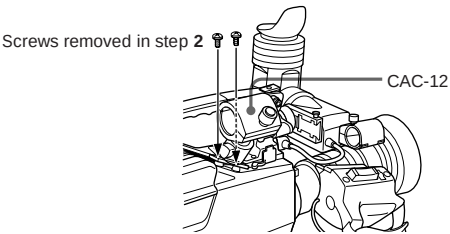
1 Assemble the CRS-3P Cradle Suspension and microphone holder (A) (Part No. 3-680-581-01).



2 Remove the external microphone holder attachment screws.

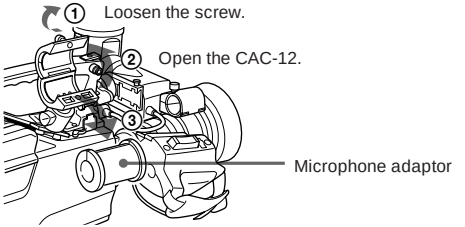


3 Attach the CAC-12 Microphone Holder.



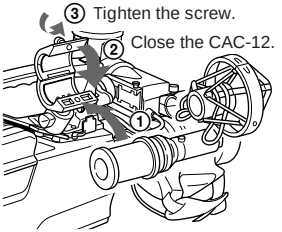
(Continued)

4 Open the CAC-12 and remove the microphone adaptor.

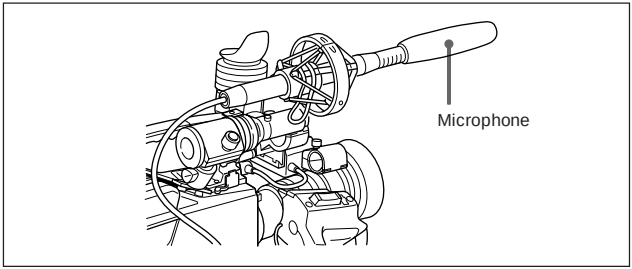


5

5 Mount the assembly from step **1** in the CAC-12.



6 Mount the microphone into the cradle suspension.



7 Connect the microphone cable to the AUDIO IN connector for channel 1 or 2. Set the corresponding AUDIO IN switch to REAR. Set the LINE/MIC/+48 V ON selector to +48 V ON or MIC in accordance with the type of the microphone power supply.

Notes

- You can only connect an external power supply type microphone to the MIC IN connector.
- If the microphone you connect to the AUDIO IN CH-1/CH-2 connector is of the external power supply type, set the appropriate LINE/MIC/+48 V ON selector to +48 V ON.
  Otherwise, set the selector to MIC.

5-5-3 Attaching a UHF Portable Tuner (for a UHF Wireless Microphone System)

To use a Sony UHF wireless microphone system, fit one of the following UHF portable tuners:

- WRR-855A UHF Synthesized Tuner Unit
- WRR-28M/810A/860A UHF Portable Tuner

For each of these UHF portable tuners, use the following attachment procedure. (For the WRR-28M/810A/860A UHF Portable Tuner, the WRR-28M is taken as an example.)

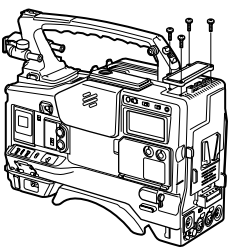
Refer to the UHF portable tuner manual for more information.

5

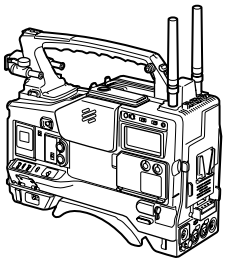
Fitting the WRR-855A

You can use the WRR-855A UHF Synthesized Tuner Unit simply by inserting it into the slot in the camcorder, and fastening the fixing screws.

1 Undo the four fixing screws holding the cover of the slot, and remove the cover.



2 Insert the WRR-855A, and fasten the four fixing screws.



Set the AUDIO IN switch to WIRELESS for the channel to be used.

For the operation of the WRR-855A, refer to the manual supplied with the WRR-855A.

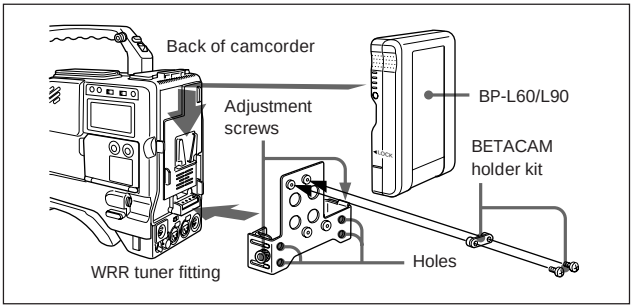
Fitting a WRR-28M (using a BP-L60/L90 Battery Pack)

1 (1) Attach the WRR tuner fitting (not supplied, service part number A-8278-057-A) to the back of the camcorder.
- ① Pass a screwdriver through the holes and tighten the screws.
- ② Loosen the adjustment screws.
- ③ Adjust the metal fitting position for a BP-L60/L90 Battery Pack to be attached, and tighten the adjustment screws to fix its position.
- ④ Attach the BETACAM holder kit supplied with the tuner to the WRR tuner fitting.

(Continued)

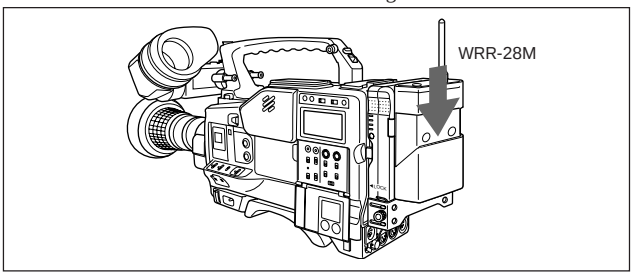
(2) Attach the battery pack.

For more information about attaching the BP-L60/L90 Battery Pack, see Section 5-1-1 "Using a BP-L60/L90 Battery Pack" (page 5-1).

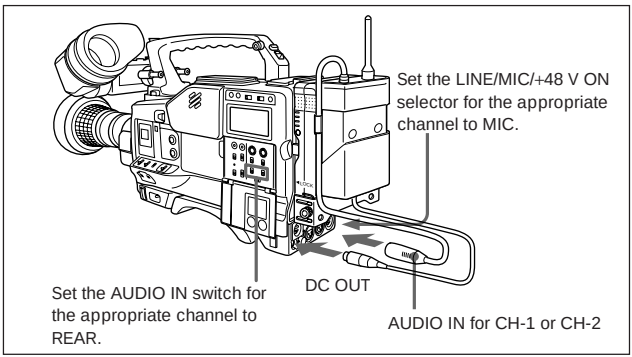


5

2 Mount the tuner on the WRR tuner fitting.



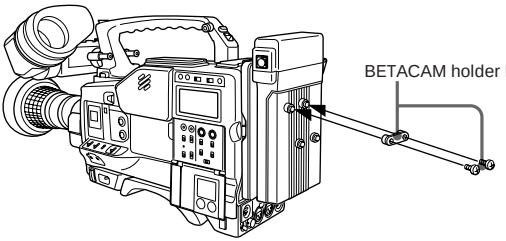
3 Connect the tuner power cord to the DC OUT connector of the camcorder, and the audio output cable to the AUDIO IN connector for channel 1 or 2.



Fitting a WRR-28M (using an NP-1B or BP-90A Battery Pack)

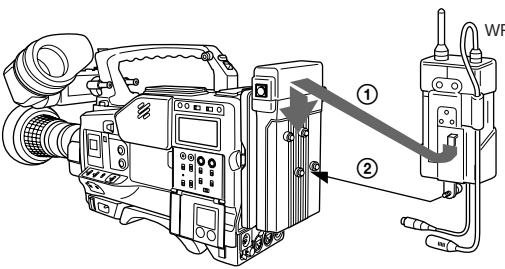
Before attempting the following attachment, make sure that an NP-1B Battery Pack is contained in the DC-L1 Battery Adaptor or that a BP-90A Battery Pack is contained in the DC-L90 Battery Adaptor.

1 Attach the BETACAM holder kit supplied with the tuner to the WRR tuner fitting.



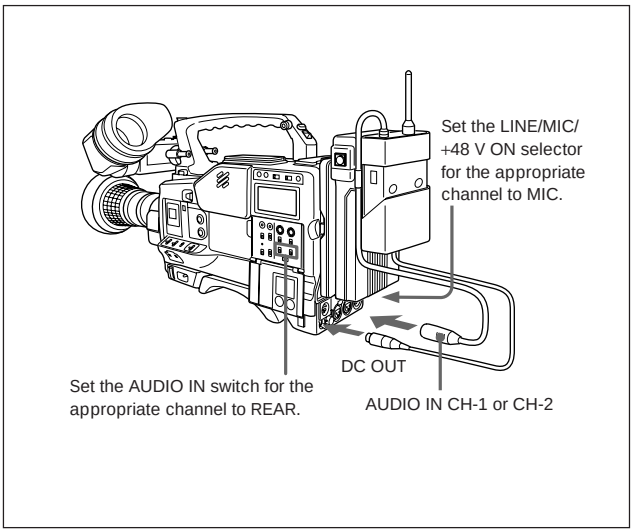
5

2 Mount the tuner on the battery adaptor.



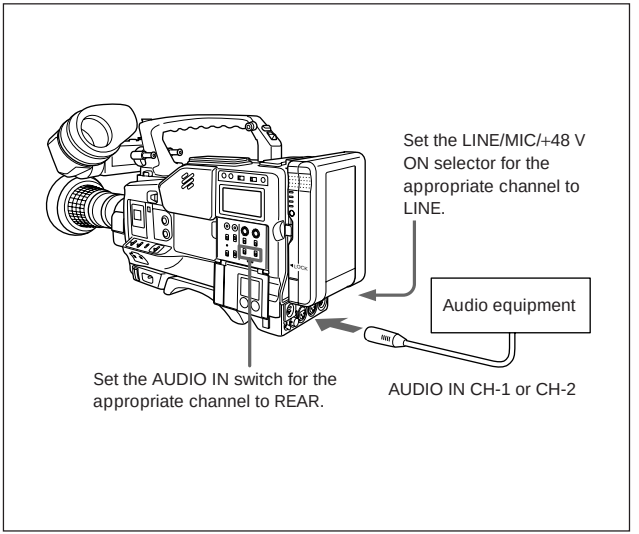
① Attach the hook to the bracket.
② Tighten the screw.

3 Connect the tuner power cord to the DC OUT connector of the camcorder, and the audio output cable to the AUDIO IN CH-1 or CH-2 connector.



5-5-4 Connecting Line Input Audio Equipment

Connect the audio output connector of the audio equipment that supplies the line input signal to the AUDIO IN CH-1 or CH-2 connector.

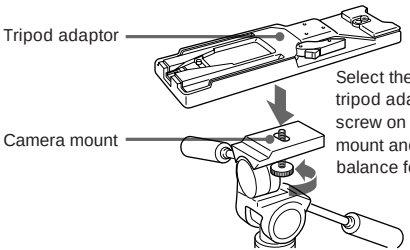


Line input connection

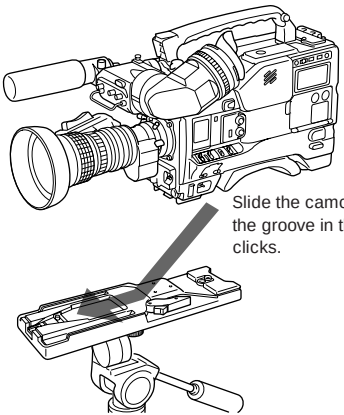
5-6 Tripod Mounting

You can easily mount and dismount the camcorder on a tripod by using the tripod adaptor (not supplied).

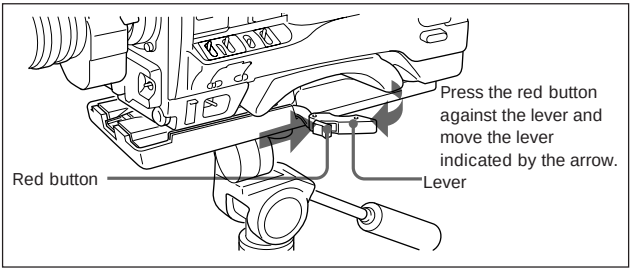
1 Attach the tripod adaptor to the tripod.



2 Mount the camcorder on the tripod adaptor.



Removing the camcorder from the tripod adaptor

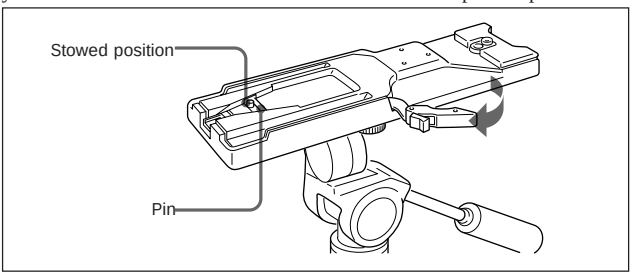


Removing the camcorder from the tripod adaptor

5

Note

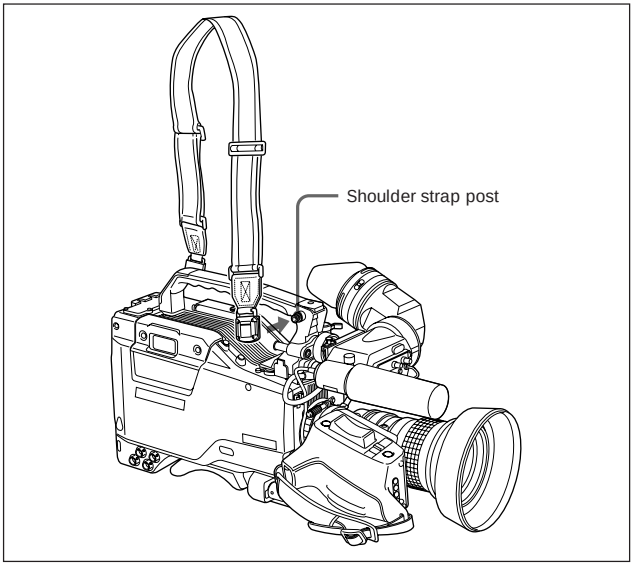
The tripod adaptor pin may remain in the engaged position even after the camcorder is removed. If this happens, press the red button against the lever a second time and move the lever as shown below until the pin returns to the stowed position. If the pin remains in the engaged position, you will not be able to mount the camcorder on the tripod adaptor.



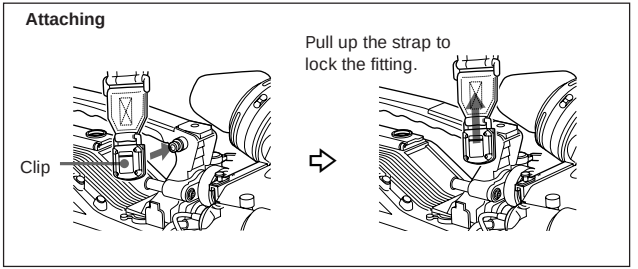
If the pin remains in the engaged position

5-7 Attaching the Shoulder Strap

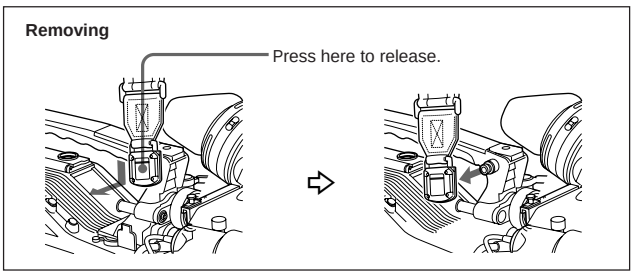
Attach the supplied shoulder strap as shown below.



Attaching the shoulder strap



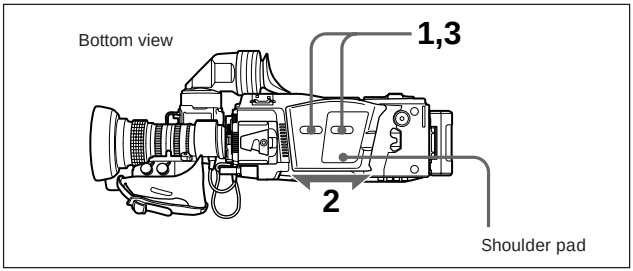
Attaching the shoulder strap



Removing the shoulder strap

5-8 Adjusting the Shoulder Pad Position

You can shift the shoulder pad from its center position backward or forward by up to 10 mm (3/8 inch). This adjustment helps you get the best balance for shooting with the camcorder on your shoulder.



Adjusting the shoulder pad position

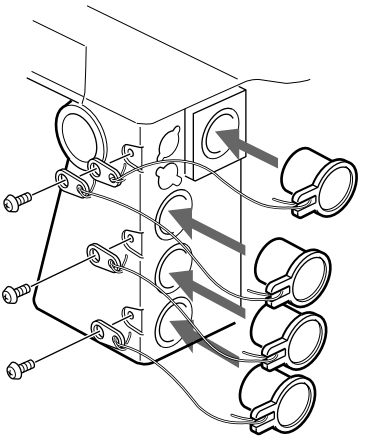
1 Loosen the two screws.

2 Slide the shoulder pad backward or forward until it is in the most convenient position.

3 Tighten the screws.

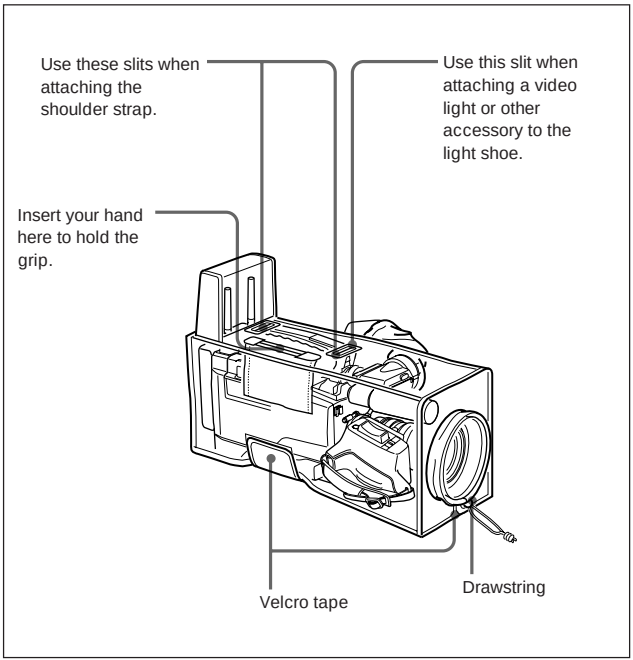
5-9 Using the XLR Caps

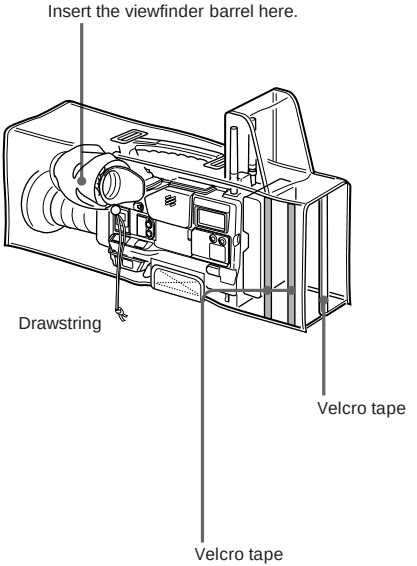
When the XLR-type connectors (DC IN, AUDIO OUT, AUDIO IN CH-1/CH-2) at the rear of the camcorder are not in use, you can use the supplied XLR caps for protection as shown below.



5-10 Putting On the Rain Cover

Attach the rain cover (not supplied), close the velcro tapes and fasten the drawstrings as illustrated.



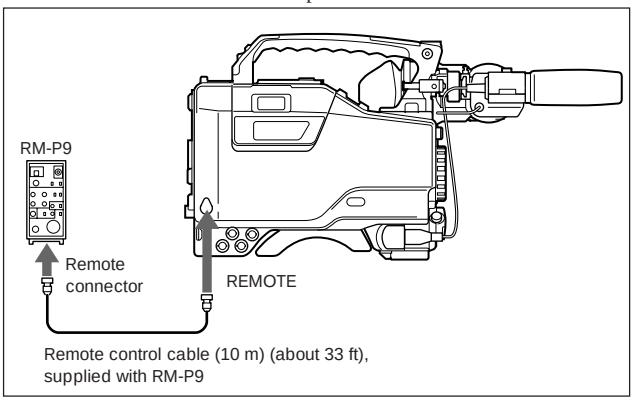

Insert the viewfinder barrel here.
Drawstring
Velcro tape
Velcro tape

5-11 Connecting the Remote Control Unit

Connecting the RM-P9 Remote Control Unit (not supplied) enables remote control of the principal camera functions.
Turning the POWER switch of the camcorder to ON when the RM-P9 is connected to the REMOTE connector, automatically puts the camcorder into remote control mode. If you disconnect the RM-P9, remote control mode is canceled.

Notes

- Always turn the POWER switch to OFF before connecting or disconnecting the remote control cable.
- When you turn off the camcorder power, the settings and adjustments made with the switches and controls of the RM-P9 are canceled. The settings and adjustments made with the setup menu are saved, but some of them are not written in the setup card.



Connecting the remote control unit

Notes on RM-P9 operation

For operation of the RM-P9, refer to the RM-P9 Operation and Maintenance Manual as well as the notes below.

- All the control knobs, switches, and indicators of the RM-P9 are operable.
- Set the MODE switch to 1.
- The A/B/MANUAL selector, WHITE BALANCE RED/BLUE control knobs, BLACK BALANCE RED/BLUE control knobs, and the SHUTTER selector operate the same way as in the BVP-90/90P.
- The setup menu operates from the RM-P9 side (although some of the pages and functions may not be valid).

  Viewing the menu: Connect a monitor to the MONITOR connector of the RM-P9 or the TEST OUT connector of the camcorder.

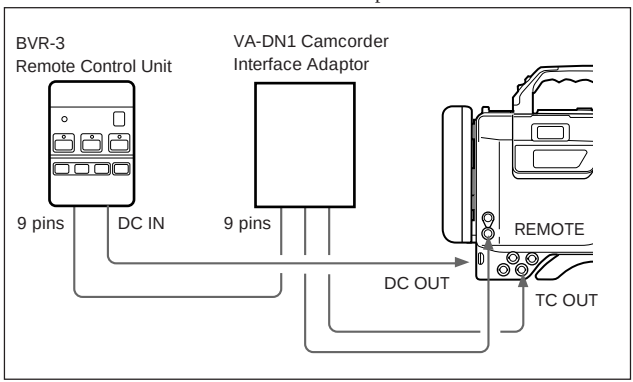
  Canceling the settings/resetting to the initial settings: It is possible to use the spare switch on the RM-P9 to cancel a setting (CANCEL) or reset it to its initial value (PRESET). Press the switch to the bottom position to cancel and the top position to reset to the initial value.

5

When the RM-P9 is connected to the camcorder, the automatic white balance and R/B GAIN painting data set with the RM-P9 are saved in a special memory within the camcorder. When the RM-P9 is disconnected, these settings revert to the values last set on the camcorder. If you set the SW2-4 switch on the RM-P9 to ON, the data set with the RM-P9 in the camcorder's memory are maintained as long as the camcorder is turned on.

5-12 Connecting a VA-DN1 Camcorder Interface Adaptor

By connecting a VA-DN1 Camcorder Interface Adaptor, you can control some of the functions of the VTR from a 9-pin remote control device.

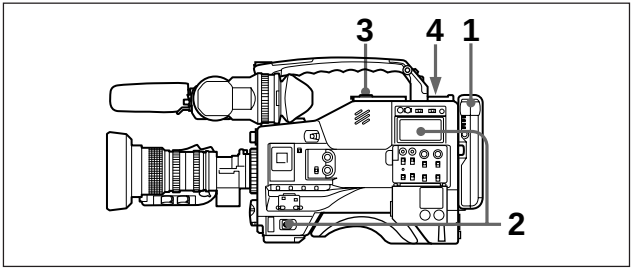


6-1 Testing the Camcorder Before Shooting

Check the functions of the camcorder before setting out for a shooting session, preferably by operating the camcorder together with a color video monitor.

6-1-1 Preparations for Testing

Follow the procedure below.



Preparations for testing

1 Load a fully charged battery pack.

2 Set the POWER switch to ON, and check that the HUMID indicator does not appear and that the BATT indicator shows at least five segments. When using a BP-L60/L90 Battery Pack, check that the four LED indicator segments on the battery pack are lit.
- If the HUMID indicator appears, wait until it disappears.
- If the BATT indicator does not show at least five segments, replace the battery pack with a fully charged one.

3 Check that there are no obstructions near the cassette lid, then press the EJECT button to open the cassette lid.

(Continued)

4 After checking the points below, load the cassette and close the cassette lid.
- The cassette is not write-protected.
- There is no slack in the tape.
- The leader tape is wound on the take-up reel.

Condensation

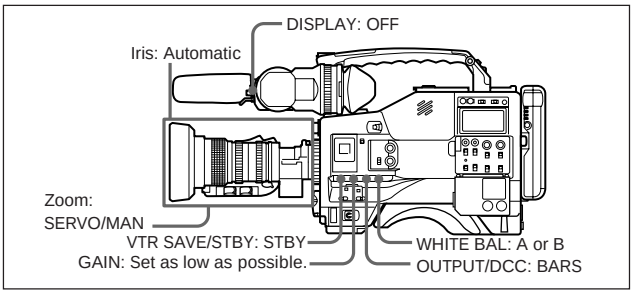
If you move the camcorder from a very cold place to a warm place, or use it in a damp location, condensation may form on the head drum. Then, if the camcorder is operated in this state, the tape may adhere to the drum, and cause a failure or even permanent damage. Do the following to prevent this from happening.

- When moving the camcorder from a cold place to a warm place, be sure no cassette is loaded in the camcorder.
- Whenever you turn on the power, check that the HUMID indicator does not appear. If it appears, wait until it disappears before loading a cassette.

For more information, see Section 3-1-1 "Loading and Unloading a Cassette" (page 3-1), and Section 6-3 "Operation Warnings" (page 6-12).

6-1-2 Testing the Camera

Set the switches and selectors as follows:



Switch and selector settings for testing

Testing the viewfinder

1 Adjust the position of the viewfinder.

2 Check that the color bars are displayed in the viewfinder, and adjust the BRIGHT, CONTRAST, and PEAKING controls to give the best color bar display.

3 (1) Set the MENU ON/OFF/PAGE switch to ON and check that the setup menu is displayed on the viewfinder screen.
(2) Push the MENU ON/OFF/PAGE switch to PAGE and check that the setup menu page changes to the next page.
(3) Push the MENU CANCEL/PRST/ITEM switch to ITEM and check that the cursor moves within the current page.
(4) Turn the rotary encoder and check that the setting value or ON/OFF indication of the item selected by the cursor changes.

4 After once setting the MENU ON/OFF/PAGE switch to OFF, set the OUTPUT/DCC selector to CAM, and change the FILTER selector position in the sequence of 1, 2 , 3, 4. Check that the FILTER indicator on the viewfinder screen displays the correct numbers.

5 Check each of the following operations, and make sure that the ⓘ indicator lights if the corresponding item has been turned on in the '!' LED page.
(1) Set the gain to anything but 0 dB by the GAIN selector and on the MASTER GAIN page of the setup menu.
(2) Set the SHUTTER selector to ON.
(3) Set the WHITE BAL switch to PRST.
(4) Use the lens extender.
(5) Set the two-part FILTER selector to anything but 1.
(6) Set the iris to automatic mode, and turn the rotary encoder to change the reference value to other than the standard value.

(Continued)

6 Push the SHUTTER selector from ON to SEL repeatedly, and check that the shutter setting changes on the viewfinder screen.

7 Pointing the camera at a suitable subject, focus the camera and check the picture on the viewfinder screen.

8 (1) Set both of the AUDIO IN switches to FRONT and the DISPLAY switch on the viewfinder to ON. Check that when sound is input to a microphone connected to the MIC IN connector on the front of the camcorder, the audio level indication appears on the viewfinder screen.
(2) Turn off the DISPLAY switch, and check that the audio level indication in the viewfinder disappears.

9 Check that setting the ZEBRA switch to ON and OFF makes the zebra pattern appear and disappear on the viewfinder screen.

Note

The current display status may inhibit one of the displays or operations mentioned in steps **3** to **6**. If this happens, switch the camcorder to engineer mode, set the DISPLAY MODE to 3 in the VF DISPLAY page of the setup menu, then set the desired items in the SHUTTER SPEED, '!' LED, and MENU SELECT pages.

Testing the iris and zoom functions

1 Set the zoom to automatic zoom mode and check that the power zoom operates correctly.

2 Set the zoom to manual zoom mode and check the zoom functions manually.

3 Set the iris to automatic adjustment mode and point the camera at objects of different brightness. Check that the automatic iris adjustment operates correctly.

4 Set the iris to manual adjustment mode and check that turning the iris ring adjusts the iris correctly.

5 Hold down the instant auto iris button on the lens and point the camera at objects of different brightness. Check that the iris ring turns as the automatic adjustment is made.

6 Set the iris back to automatic adjustment mode, and check the following points when the GAIN selector is moved from L to M to H.
- For objects of the same brightness, the iris is adjusted to correspond to the change in setting.
- The gain indicator on the viewfinder screen changes to correspond to the change in setting.

7 If an extender mechanism is incorporated in your lens, put it into the operative position and check the effect.

6-1-3 Testing the VTR

Perform tests ① to ⑥ consecutively in the given order.

① Testing the tape transport functions

1 Set the VTR SAVE/STBY switch to SAVE and check that the VTR SAVE indicator in the viewfinder goes on.

2 Set the VTR SAVE/STBY switch to STBY and check that the VTR SAVE indicator in the viewfinder goes off.

(Continued)

3 Set the F-RUN/SET/R-RUN switch to R-RUN.

4 Set the DISPLAY switch to CTL.

5 Press the VTR START button and check the following points.
- The tape reels are turning.
- The counter indication is changing.
- The REC indicator in the viewfinder is on.
- The RF and SERVO indicators on the display panel are off.

6 Press the VTR START button again, and check that the tape stops and that the REC indicator in the viewfinder goes off.

7 Repeat the checks of steps **5** and **6**, this time using the VTR button on the lens.

8 Press the RESET button, and check that the counter display goes to "00 : 00 : 00 : 00".

9 Turn on the LCD LIGHT switch, and check that the display panel is illuminated.

10 Hold down the REW button to rewind the tape for a while, then press the PLAY button. Check that the rewind and playback functions operate normally.

11 Press the STOP button and press the F FWD button. Check that the fast forward function operates normally.

② Testing the automatic audio level adjusting functions

1 Set the AUDIO SELECT CH-1/CH-2 switches to AUTO.

2 Set the AUDIO IN switches to FRONT.

3 Aim the microphone connected to the MIC IN connector at a suitable sound source. Check that the level indications for both channels correspond to the sound level.

③ Testing the manual audio level adjusting functions

1 Set the AUDIO IN switches to FRONT.

2 Set the AUDIO SELECT CH-1/CH-2 switches to MANUAL.

3 Adjust the MIC AUDIO LEVEL control on the front of the camcorder. Check that the level indications increase as the control is turned counterclockwise.

④ Testing the earphone and speaker

1 Turn the MONITOR control and check that the speaker volume changes accordingly.

2 Connect an earphone to the EARPHONE jack. Check that the speaker sound is cut off and that you can hear the sound from the microphone in the earphone.

3 Turn the MONITOR control and check that the earphone volume changes accordingly.

⑤ Testing external microphones

1 Set the LINE/MIC selectors to MIC.

2 Connect external microphones to the AUDIO IN CH-1/CH-2 connectors.

3 Set the AUDIO IN switches to REAR.

4 Aim the microphones at a sound source.

5 Check that the audio level meter in the display panel and the audio level indication in the viewfinder reflect the changing sound level.

Alternatively, with a single microphone, check each channel in turn.

⑥ Checking the functions of the user bits and time code

1 Set the user bits as required.

For more information, see Section 4-5-1 "Setting the User Bits" (page 4-25).

2 Set the time code.

For more information, see Section 4-5-2 "Setting the Time Code" (page 4-27).

3 Set the F-RUN/SET/R-RUN switch to R-RUN.

4 Press the VTR START button, and check that the tape starts and that the counter indication changes.

5 Press the VTR START button again, and check that the tape stops and that the counter indication also stops changing.

6 Set the F-RUN/SET/R-RUN switch to F-RUN, and check that the counter indication changes regardless of whether the tape is running.

7 By setting the DISPLAY switch to DATA, and set the DATA DISPLAY switch to U-BIT, you can check that the user bit value set is displayed.

6-2 Maintenance

6-2-1 Cleaning the Video Heads

To clean the video heads, always use a Sony BCT-5CLN Cleaning Cassette. Carefully follow the instructions given with the cleaning cassette, as incorrect or excessive use could damage the video heads.

6-2-2 Cleaning the Viewfinder

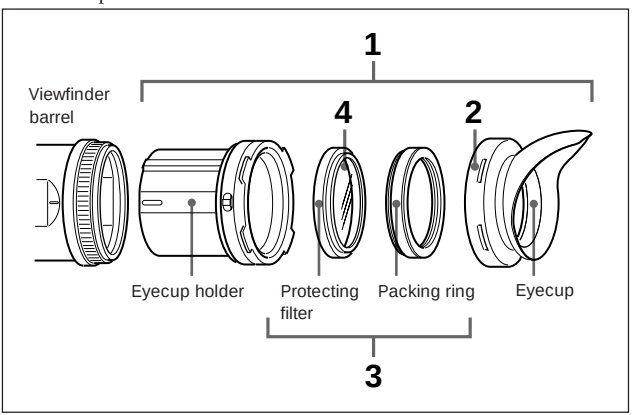
- Use a dust blower to clean the CRT screen and mirror inside the barrel.
- Clean the lens and protecting filter with a commercially available lens cleaner.

Caution

Never use organic solvents such as thinners.

Disassembling the eyepiece

Follow the procedure below.



Disassembling the eyepiece

1 Detach the eyepiece unit from the viewfinder.

For more information, see Section 5-2-4 "Detaching the Eyepiece" (page 5-15).

2 Remove the eyecup from the eyecup holder.

3 Remove the protecting filter together with the packing ring from inside the eyecup holder.

4 Detach the protecting filter from the packing ring.

Fog-proof filter

Depending on the temperature and humidity, the protecting filter may mist because of vapor or your breath. To ensure that the viewfinder is always clear, replace the protecting filter with a fog-proof filter (Part No. 1-547-341-11, not supplied).

Fitting the fog-proof filter

Detach the protecting filter from the packing ring, and replace it with the fog-proof filter.

Be sure to correctly assemble the fog-proof filter, the packing ring, and the eyecup so that the reassembled eyepiece is waterproof.

Note

When cleaning the fog-proof filter, wipe it very gently with a soft cloth to avoid impairing the anti-fogging coating.

6-3 Operation Warnings

When a problem occurs either at power on or during operation, warnings are given by the WARNING indicator and tally indicator, in the display panel, and in the viewfinder. The speaker and earphone also give audible warnings.

Operation warnings

Display panel		Indicators			Warning sound
Warning/ indication	Flashing/ continuous	: Continuous : 2 flashes/s. : 1 flash/s. : 4 flashes/s.			: 4 beeps/s. : 1 beep/s. : Continuous beep
		WARNING	REC/tally	BATT	
RF	Continuous a)				a)
SERVO	Continuous				
	Continuous				
HUMID	Continuous				a) b)
SLACK	Continuous				
TAPE c)	Flashing a)	a)			
TAPE and E	Continuous				
BATT	Flashing				a)
BATT and E	Flashing				
(No indication on the display panel)					

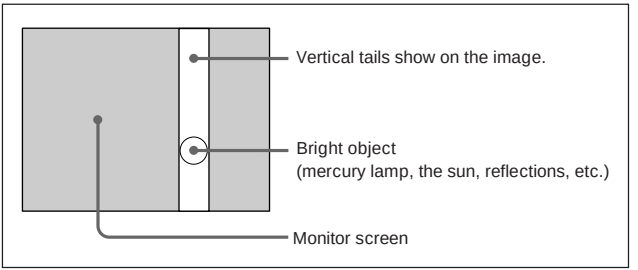
a) During recording b) During playback, fast forward, or rewind
c) Also "5-0" appears in the tape remaining displays.

Problem	VTR action	Corrective action
Video head gap clogged or problem in recording circuit.	After clogged head is detected, recording continues but is substandard.	Clean the heads. If recording is still substandard, turn off the power and consult your Sony representative.
Servo lock lost.	Recording continues but is substandard.	Turn off the power and consult your Sony representative. Note that this indication may be given momentarily when the tape starts moving, but this does not indicate a problem.
Interface error between system CPU and servo CPU.	VTR stops.	Turn off the power and consult your Sony representative.
Condensation on the head drum.	Recording continues but stops if the tape sticks to the head drum. Playback, fast forward, and rewind do not operate.	Stop the tape, and wait until the HUMID indicator disappears.
The tape cannot be wound properly.	VTR stops. An error code appears in the counter display section of the display panel. Look up the error code in the Maintenance Manual.	Remove the cassette by the method described in the Maintenance Manual or by pressing the EJECT button several times. Close the cassette lid without loading a cassette. Turn off the power and consult your Sony representative.
Near the end of tape.	Operation continues.	Be prepared to change the cassette.
End of tape.	Record, playback, and fast forward do not operate.	Change the cassette or rewind the tape.
Low battery.	Operation continues.	Change the battery.
Dead battery.	Operation stops.	Change the battery.
Interface error between system CPU and servo CPU.	Recording continues, but some operations such as review and cuing do not operate. If another problem also occurs, its indication is given priority.	Turn off the power and consult your Sony representative.

Notes on CCD Image Sensors

Vertical smear

Smear tends to be produced when an extremely bright object is being shot; it is more likely to occur with a faster electronic shutter speed.



Vertical smear

Aliasing

When patterns of stripes or lines are shot, they may appear jagged.

Specifications

Power voltage
12 $^{+5.0}_{-1.0}$ V DC

Power consumption
DNW-7/7P: 29 W
DNW-90/90P: 31 W
DNW-90WS/90WSP: 32 W
DNW-9WS/9WSP: 31.5 W
(with 12 V DC supply, when recording)

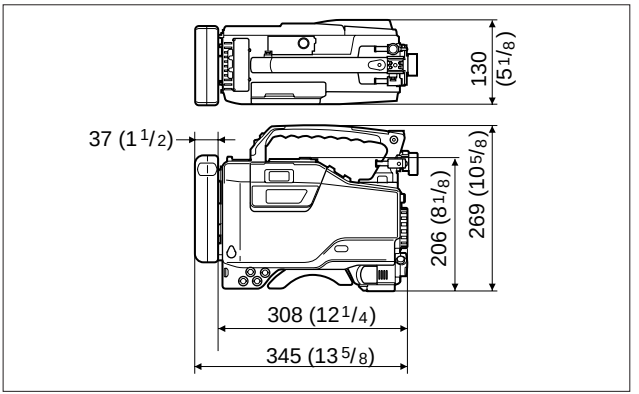
Operating temperature
0°C to 40°C (32°F to 104°F)

Operating humidity
25% to 85% (relative humidity)

Storage temperature
–20°C to +60°C (–4°F to +140°F)

Mass
Approx. 6 kg (13 lb 3 oz) (with lens, cassette and BP-L60 Battery Pack)

Dimensions



Dimensions in mm (inches)

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Video Camera Section

General

Imager

DNW-7/7P/9WS/9WSP: 2/3-inch interline-transfer type Power HAD CCD

DNW-90/90P/90WS/90WSP: 2/3-inch frame-interline-transfer type Power HAD CCD

Imager Configuration

RGB, 3 CCDs

Spectral system

F 1.4 prism system (with quartz filter)

Built-in filters

ND filter

1 : Straight through
2 : 5600K + 1/8 ND
3 : 5600K
4 : 5600K + 1/64 ND

Electronic shutter speed

1/100, 1/125, 1/250, 1/500, 1/1000, 1/2000 second (DNW-7/90/90WS/9WS)

- CLS mode: 60.0 Hz to 10156 Hz in 263 steps (DNW-7)
  60.1 Hz to 7000 Hz in 260 steps (DNW-90/90WS/9WS)
- ECS mode: 30.4 Hz to 58.3 Hz in 248 steps (DNW-90/90WS)
- EVS mode: 1/60 second (DNW-7/9WS)
- Super EVS mode: 1/60 second (DNW-90/90WS)

1/60, 1/125, 1/250, 1/500, 1/1000, 1/2000 second (DNW-7P/90P/90WSP/9WSP)

- CLS mode: 50.0 Hz to 10101 Hz in 312 steps (DNW-7P)
  50.2 Hz to 9000 Hz in 310 steps (DNW-90P/90WSP/9WSP)
- ECS mode: 25.4 Hz to 48.7 Hz in 295 steps (DNW-90P/90WSP)
- EVS mode: 1/50 second (DNW-7P/9WSP)
- Super EVS mode: 1/50 second (DNW-90P/90WSP)

Lens mount

Special bayonet type

Sensitivity

DNW-7/7P: 89.9% reflection chart, 2000 lx (F13 standard)
DNW-90/90P/90WS/90WSP/9WS/9WSP: 89.9% reflection chart, 2000 lx (F9 standard)

Minimum illumination

DNW-7/7P: 0.18 lx (at F 1.4, +42 dB gain)
DNW-90/90P/90WS/90WSP/9WS/9WSP: 0.35 lx (at F1.4, +42 dB gain)

S/N
DNW-7/90/90WS/9WS: 63 dB (Y typical)
DNW-7P/90P/90WSP/9WSP: 61 dB (Y typical)

Modulation (at center)
DNW-7/7P: 60%
DNW-90/90P: 70%
DNW-90WS/90WSP/9WS/9WSP (4:3 mode): 55%
DNW-90WS/90WSP/9WS/9WSP (16:9 mode): 70%

Registration
0.05% or better for entire screen area (excluding lens distortion)

Geometric distortion
None identified (excluding distortion due to lens)

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Smear
–130 dB (DNW-7/7P)/–140 dB (DNW-90/90P/90WS/90WSP)/–120 dB (DNW-9WS/9WSP) (Y typical)

Viewfinder

CRT
1 1/2-inch (DNW-7/7P/90/90P) or 2-inch (DNW-90WS/90WSP/9WS/9WSP) monochrome, quick start type

Horizontal resolution (at center)
DNW-7/7P/90/90P: 600 TV lines
DNW-90WS/90WSP/9WS/9WSP: 450 TV lines (16:9 mode)
600 TV lines (4:3 mode)

The DNW-90WS/90WSP/9WS/9WSP has a greater eyepiece magnification than the DNW-7/7P/90/90P.

VTR Section

General

Usable cassette tapes

1/2-inch BETACAM SX cassette tapes
BCT-12SX/22SX/32SX/60SX
BETACAM SP cassette tapes
BCT-30MA series
UVWT-30MA series

Tape speed

Approx. 59.575 mm/s

Record/playback time

60 minutes (using BCT-60SX)

Fast forward time

Approx. 5 minutes (using BCT-60SX)

Rewind time

Approx. 5 minutes (using BCT-60SX)

Continuous recording time

Approx. 120 minutes (using BP-L60)

Video (when playing back SR5-1 alignment tape)

Bandwidth	Luminance	0 to 4 MHz ± 0.5 dB
S/N	Luminance	53.5 dB min.
Y/C delay		15 ns max.

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Audio (when using standard playback machine)

Frequency response	20 Hz to 20 kHz $^{+0.5}_{-1.0}$dB
Dynamic range	85 dB min.
Distortion	0.08% max.
Crosstalk	70 dB max.
Wow and flutter	Below measurable level

Input/output connectors

Signal inputs

AUDIO IN CH-1/CH-2 (XLR, 3-pin, female)

–60 dBu [1]/+4 dBu for DVW-7/90/90WS/9WS, or –60 dBs [2]/+4 dBs for DNW-7P/90P/90WSP/9WSP

MIC IN (XLR, 3-pin, female)

–60 dBu for DNW-7/90/90WS/9WS, or –60 dBs for DNW-7P/90P/90WSP/9WSP, with an external power supply system (48 V DC, maximum current 3 mA)

GENLOCK IN (BNC type)

1.0 Vp-p, 75 ohms

TC IN (BNC type)

0.5 V to 18 Vp-p, 10 kilohms

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1) 0 dBu = 0.775 Vrms.
2) 0 dBs = 0.775 Vrms.

Signal outputs

VIDEO OUT (BNC type)
1.0 Vp-p, 75 ohms, unbalanced

TEST OUT (BNC type)
1.0 Vp-p, 75 ohms, unbalanced
(internally connected with REMOTE connector)

AUDIO OUT (XLR, 5-pin, male)
0 dBm

TC OUT (BNC type)
1.0 Vp-p, 75 ohms

EARPHONE (minijack)
8 ohms, –∞ to –18 dBu (or –18 dBs) variable

Others

DC IN (XLR, 4-pin, male)
11 to 17 V DC

DC OUT (4-pin)
11 to 17 V DC, maximum current 0.1 A

LENS (12-pin)

REMOTE (6-pin)

Supplied Accessories

Microphone (super cardioid directional, external power supply type) (1)
Shoulder strap (1)
XLR caps (5)
Operation Manual (1)
Maintenance Manual Part 1 [1] (1)

Recommended Additional Equipment

Power supply and related equipment

BP-L60/L90 Battery Pack
NP-1B Battery Pack
BP-90A Battery Pack
BC-L100/L100CE Battery Charger (for BP-L60/L90)
BC-1WD/1WDCE Battery Charger (for NP-1B)
BC-210/210CE Battery Charger (for BP-90A)
BC-410/410CE Battery Charger (for NP-1B, BP-90)
DC-L1 Battery Adaptor (to hold an NP-1B)
DC-L90 Battery Adaptor (to hold a BP-90A)
AC-550/550CE AC Adaptor
AC-DN1/DN2 AC Adaptor

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Setup card

BSC-1-Pack (Four BSC-1s with a setup card holder)

BETACAM SX cassette tapes

BCT-12SX/22SX/32SX/60SX

1) Maintenance Manual Part 1
This manual gives the information necessary for users to maintain the camcorder and its optional equipment.

BETACAM SP cassette tapes

BCT-30MA series
UVWT-30MA series

Viewfinder and related equipment

BVF-VC10W Color Viewfinder
Fog-proof filter (Part No. 1-547-341-11)
Lens assembly (farsighted) (–2.8 D to +2.0 D) (Part No. A-8262-537-A)
Lens assembly (low magnification) (–3.6 D to –0.8 D) (Part No. A-8262-538-A)
Lens assembly (standard magnification with special compensation for aberrations) (–3.6 D to +0.4 D) (Part No. A-8267-737-A)
Lens assembly (3 × magnification) (–3.6D to +4.0D) (Part No. A-8314-798-A)

Optical attachments

ND filter ($^1/_4$ ND) (Part No. 3-194-480-01)
ND filter ($^1/_{16}$ ND) (Part No. 3-194-481-01)
Cross filter (Part No. 3-174-682-01)
Mount ring (Part No. 3-186-442-01)

Consult your Sony representative for more infomation about these filters.

Equipment for remote control

RM-P9 Remote Control Unit
BVR-3 Remote Control Unit
VA-DN1 Camcorder Interface Adaptor

Audio equipment

C-74 microphone
ECM-MS5 stereo microphone
CAC-12 Microphone Holder
CRS-3P Cradle Suspension
WRR-855A UHF Synthesized Tuner Unit
WRR-28H/28M/28L/810A/860A UHF Portable Tuner
WRT-27 UHF Transmitter
BTA-27 UHF Portable Tuner Attachment Kit

Equipment for maintenance and easier handling

BCT-5CLN Cleaning Cassette
LC-777 Carrying Case
LC-304SFT Soft Carrying Case
Rain cover
WRR Tuner Fitting (service part number: A-8278-057-A)
VCT-14 Tripod Adaptor
Maintenance Manual Part 2 [1)]

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Design and specifications are subject to change without notice.

1) Maintenance Manual Part 2
This manual gives the additional information to fully maintain the comcorder. It contains details of adjustments that can be made, cirduit diagrams, etc.

Glossary

Aliasing
Distortion of the signal caused by overlap of the baseband signal and the lower sideband signal when the signal is demodulated.

ATW
Auto Tracing White balance. The white balance is automatically adjusted for the lighting conditions during shooting.

Bayonet mount
A type of lens mount. The lens can be inserted into the lens mount and quickly locked in place by simply rotating the lens locking ring.

Black balance adjustment
To balance the black levels of the R, G, and B channels of a video camera so that black has no color.

Black set
A reference level for black balance adjustment.

CCD
Charge-Coupled Device. A solid state imager used in most video cameras in place of a pickup tube. The device converts input light levels into electrical charges that are first stored and then output in the form of voltage variations.

Center marker
A cross which indicates the center of the image on the viewfinder screen.

Color bar signal
A test signal which can be displayed as vertical bars of different colors on a color video monitor. This signal is used to check chrominance functions of color television and video systems such as cameras and monitors.

Color temperature
The temperature in Kelvins (K) to represent the color of a light source, determined by heating a perfectly black body until its color matches that of the light source. Color temperature is higher when the color is bluish and lower when reddish.

Condensation
Moisture condensation on the VTR tape transport mechanism. Condensation on the head drum causes tape to stick to the drum, resulting in damage to tape and a malfunction of the VTR.

CRT
Cathode-Ray Tube. Video camera viewfinders are equipped with a CRT image display, so you can monitor what you are shooting.

CTL
Control signal in the form of regular pulses recorded along a longitudinal track on the video tape. By counting these pulses, it is possible to determine the number of frames, and hence the tape running time. Used mainly to adjust the tracking position of video heads, and to achieve time code continuity in continuous recording.

DCC
Dynamic Contrast Control. A video camera containing a DCC circuit can handle a wide dynamic range of luminance.

Diopter
A measure of lens power ; its unit is the reciprocal of 1 m (3.28 ft). A diopter lens is a simple supplementary lens placed over the main camera lens to alter its effective focal length.

Drop frame mode

SMPTE time code runs at 30 frames/second, while the NTSC color television system runs at about 29.97 frames/second. This means that a length of 1 hour as indicated by time code is longer than the actual clock time of 1 hour by 108 frames, or about 3.6 seconds. Drop frame mode adjusts the running of time code to eliminate this discrepancy by dropping two frames from the time code value at the beginning of each minute except every tenth minute. In contrast, non-drop frame mode does not adjust the discrepancy between time code value and actual time.

EBU

European Broadcasting Union. Established by broadcasting and related organizations in Europe.

E-E mode

Electric-to-Electric mode. When you operate a VTR in E-E mode, input video and/or audio signals pass through electric circuits only and then come out from the output connectors, without passing through electromagnetic conversion circuits such as recording heads. You can use E-E mode to directly check and monitor the input signals without recording them on tape.

EFP

Electronic Field Production. The use of electronic equipment such as portable video cameras, VTRs, and sound equipment for television production outside studios.

ENG

Electronic News Gathering. The use of electronic equipment such as portable video cameras, VTRs, and sound equipment for the production of daily news stories and short documentaries.

Ff
See Flange focal length.

FIT
Frame Interline Transfer. A type of CCD imager featuring substantially reduced vertical smear. *See also* CCD and Vertical smear.

Flange focal length
The distance from the plane of lens mounting flange to the image focal plane. Abbreviated to Ff.

Flare
Dark or colored flashes caused by signal overload through extreme light reflections of polished objects or very bright lights.

Flicker
Repeated change of brightness on the screen.

Genlock
Generator lock. To synchronize the pulse generator built into video equipment to an external reference (master) sync signal.

Geometric distortion
Any change in geometry or perspective of the reproduced image from the original.

Good shot markers
Signals recorded in LTC user bits by pressing the RET button on the lens during recording. When the recorded picture is later edited, good shot markers can be located quickly and easily.

HAD
Hole-Accumulated Diode. A CCD sensor structure designed to suppress certain types of noise inherent to CCDs. *See also* CCD.

Horizontal resolution
The capability of a video camera or a display unit to preserve detail in the horizontal direction. Usually expressed as the number of vertical lines which can be distinguished in the reproduced image of a test chart.

Hunting
Repeated brightening and darkening of an image resulting from repeated response to automatic iris control.

IRE scale
The scale to determine video signal amplitudes devised by the Institute of Radio Engineers (IRE), an American organization now called the Institute of Electrical and Electronic Engineers (IEEE).

IT
Interline Transfer. A type of CCD imager.

LTC
Longitudinal Time Code. A time code recorded along the tape in the forward direction of a tape run. A VTR cannot reproduce LTC when tape run stops to output a still picture. The output level of LTC is very low when tape runs slowly, so an LTC read error is likely to occur while the VTR is playing back in slow motion. *See also* Time code and VITC.

ND filter
Neutral Density filter. ND filters reduce the amount of incident light equally across the entire visible wavelength range without affecting color.

R/G mixing detail circuit
A circuit used to mix R and G signals to obtain a Y signal so that a sharp picture is reproduced.

Reference video signal
A video signal that contains a sync signal or sync and burst signals, used as a reference for synchronization of video equipment.

Sawtooth waveform
A form of signal resembling the teeth of a saw. A video signal having a sawtooth waveform is used to check linearity and other characteristics of video amplifiers.

Shot data
Data recorded, while shooting, in the color bars, the U-BIT data of the VITC, and so forth. Includes the model name, serial number, date, time, shot number, cassette number, and ID1 to ID4.

Shutter speed
The length of time for which the shutter stays open. The higher the shutter speed, the more clearly a moving object can be shot.

Smear
See Vertical smear.

SMPTE
Society of Motion Picture and Television Engineers, a professional association established in the U.S.A. mainly for the purpose of setting forth motion picture and television engineering standards.

S/N
Signal-to-Noise ratio. The relation of the strength of the desired signal to the accompanying electronic interference, the noise. If S/N is high, sounds are reproduced with less noise and pictures are reproduced clearly without snow.

Time code
A digitally encoded signal which is recorded on video tape to identify each frame of video by hour, minute, second and frame number. SMPTE time code is applied to NTSC system, and EBU time code to PAL and SECAM systems. There are two kinds of recorded signals : longitudinal time code (LTC) and vertical interval time code (VITC). *See also* LTC and VITC.

Time code synchronization
To synchronize the built-in time code generator of video equipment such as a VTR to an external time code.

Turbo gain
Video amplifier gain boosted from 30 dB to 36 or 42 dB by combining blocks of 2 or 4 adjacent pixels of the CCD.

User bits
A total of 32 bits are provided in the time code which the user can use to record such information as date, scene number, or reel number on video tape.

Vertical smear
A bright vertical line which appears on the screen when shooting a very bright object with a CCD camera. Also called smear.

Video gain
Amount of amplification for video signals, expressed in decibels (dB).

VITC
Vertical Interval Time Code. A time code recorded on video tape in two horizontal lines during each vertical blanking period of a video signal. Unlike LTC, VITC is recorded in the same tracks as the video information, so they can be read even while the tape is not moving. *See also* Time code and LTC.

White balance adjustment

In the light of a particular color temperature, to adjust the white levels of the R, G, and B channels of a color video camera so that any white object shot in that light is reproduced as a truly white image. *See also* Color temperature.

White shading

When shooting a white object, the upper and lower portions of the screen may appear magenta or green while the central portion appears white, depending on the performance of the camera lens. This is called white shading.

Zebra pattern

In a video camera, striped patterns which appear in the viewfinder screen to indicate areas of the image where the video level is higher than a certain value. If a zebra pattern appears on the skin when the object is a human being, that is a correct exposure.

Zoom

To gradually change the field of view of a camera lens from wide to narrow angle (zoom in) or narrow to wide angle (zoom out).

Index

C

D

E

F

G

S

T

U

V

W, X, Y

Z

Name

Office

Address

Phone

Sony Corporation
B & P Company

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DNW-7/7P
DNW-90/90P
DNW-90WS/90WSP
DNW-9WS/9WSP(SYM, 英)
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