


# 40-hour Continuous Recorder

## Instruction Manual




**SR40TCN-A**

Technical Support is available from 8 a.m - 6 p.m CST by calling 800-444-6278 (inside the U.S.) or 972-353-6857 (outside the U.S.).



**WARNING**

RISK OF ELECTRIC SHOCK  
DO NOT OPEN



**WARNING:** TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

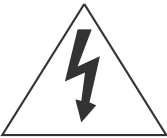


**AVERTISSEMENT**

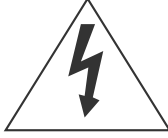
DANGER D'ÉLECTROCUTION  
NE PAS OUVRIR




**AVERTISSEMENT:** POUR ÉLIMINER TOUT RISQUE D'ÉLECTRO-CUTION, NE PAS OUVRIR LE COUVERCLE (OU LA PARTIE ARRIÈRE). AUCUNE PIECE RÉPARABLE PAR L'UTILISATEUR NE SE TROUVE À L'INTÉRIEUR. POUR TOUTE INTERVENTION D'ENTRETIEN OU DE RÉPARATION SE CONFIER AUX TECHNICIENS QUALIFIÉS.




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



La flèche symbolisant l'éclair dans un triangle équilatéral a pour objet de tirer l'attention de l'utilisateur sur le fait, qu'il y a des “tensions dangereuses” non-isolées à l'intérieur de l'enceinte du produit qui peuvent être suffisamment importantes pour conduire au risque d'électrocution.



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



Le point d'exclamation au sein d'un triangle équilatéral a pour objet de tirer l'attention de l'utilisateur sur le fait qu'il y a des instructions de mise en service et d'entretien (de réparation) dans les fiches descriptives de l'appareil qui doivent obligatoirement être respectées.

**WARNING:**  
TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

**CAUTION:**  
TO PREVENT ELECTRIC SHOCK DO NOT USE THIS (POLARIZED) PLUG WITH AN EXTENSION CORD, RECEPTACLE OR OTHER OUTLET UNLESS THE BLADES CAN BE FULLY INSERTED TO PREVENT BLADE EXPOSURE.

**AVERTISSEMENT:**  
AFIN D'ÉVITER TOUT RISQUE D'INCENDIE OU D'ÉLECTROCUTION, NE PAS EXPOSER CET APPAREIL À LA PLUIE NI À L'HUMIDITÉ.

**ATTENTION:**  
POUR PRÉVENIR LES CHOCS ÉLECTRIQUES NE PAS UTILISER CETTE FICHE POLARISÉE AVEC UN PROLONGATEUR, UNE PRISE DE COURANT OU UNE AUTRE SORTIE DE COURANT, SAUF SI LES LAMES PEUVENT ÊTRE INSÉRÉES À FOND SANS EN LAISSER AUCUNE PARTIE À DÉCOUVERT.

# Important Safeguards

Please read all these instructions carefully regarding your VCR before you begin operating it. Follow all warnings and instructions marked on the VCR.

## 1 Read Instructions

All the safety and operating instructions should be read before the product is operated.

## 2 Retain Instructions

The safety and operating instructions should be retained for future reference.

## 3 Heed Warnings

All warnings on the product and in the operating instructions should be adhered to.

## 4 Follow Instructions

All operating and use instructions should be followed.

## 5 Cleaning

Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.

## 6 Attachments

Do not use attachments not recommended by the product manufacturer as they may cause hazards.

## 7 Water and Moisture

Do not use this product near water — for example, near a bath tub, wash bowl, kitchen sink, laundry tub, in a wet basement, or near a swimming pool, and the like.

## 8 Accessories

Do not place this product on an unstable cart, stand, tripod, bracket, or table. The product may fall, causing serious injury to a child or adult, and serious damage to the product. Use only with a cart, stand, tripod, bracket, or table recommended by the manufacturer, or sold with the product. Any mounting of the product should follow the manufacturer's instructions, and should use a mounting accessory recommended by the manufacturer.

- 9 A product and cart combination should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the product and cart combination to overturn.



## 10 Ventilation

Slots and openings in the cabinet are provided for ventilation and to ensure reliable operation of the product and to protect it from overheating, and these openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, sofa, rug, or other similar surface. This product should not be placed in a built-in installation such as a bookcase or rack unless proper ventilation is provided or the manufacturer's instructions have been adhered to.

## 11 Power Sources

This product should be operated only from the type of power source indicated on the marking label. If you are not sure of the type of power supply to your home, consult your product dealer or local power company. For products intended to operate from battery power, or other sources, refer to the operating instructions.

## 12 Grounding or Polarization

This video product is equipped with a 3-wire grounding-type plug, a plug having a third (grounding) pin. This plug will only fit into a grounding-type power outlet. This is safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the grounding-type plug.

## 13 Power-Cord Protection

Power-supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the product.

## 14 Lightning

For added protection for this product during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the wall outlet and disconnect the antenna or cable system. This will prevent damage to the product due to lightning and power-line surges.

## 15 Overloading

Do not overload wall outlets, extension cords, or integral convenience receptacles as this can result in fire risk or electric shock.

## 16 Object and Liquid Entry

Never push objects of any kind into this product through openings as they may touch dangerous voltage points or short-out parts that could result in a fire or electric shock. Never spill liquid of any kind on the product.

## 17 Servicing

Do not attempt to service this product yourself as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.

## 18 Damage Requiring Service

Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:

- When the power-supply cord or plug is damaged.
- If liquid has been spilled, or objects have fallen into the product.
- If the product has been exposed to rain or water.
- If the product does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions as an improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the product to its normal operation.
- If the product has been dropped or damaged in any way.
- When the product exhibits a distinct change in performance — this indicates a need for service.

# Important Safeguards

## 19 Replacement Parts

When replacement parts are required, be sure the service technician has used replacement parts specified by the manufacturer or have the same characteristics as the original part. Unauthorized substitutions may result in fire, electric shock or other hazards.

## 20 Safety Check

Upon completion of any service or repairs to this product, ask the service technician to perform safety checks to determine that the product is in proper operating condition.

## 21 Heat

The product should be situated away from heat sources such as radiators, heat registers, stoves, or other products (including amplifiers) that produce heat.

### INFORMATION

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

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

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

### INFORMATION

This Class B digital apparatus complies with Canadian ICES-003.

### INFORMATION

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

# Caution and Care

## CONDENSATION IS THE ENEMY OF VIDEO RECORDERS

### ■ WHAT IS CONDENSATION?

1. When a very cold drink is poured into a glass, the water droplets which form on the outer surface of the glass are an example of condensation.
2. If the VCR is exposed to a rapid increase in temperature (such as warming a cold room or transporting it from a cold location to a warm one) condensation may form on the tape transport mechanism inside the VCR. By heating the inside of the VCR, it can dry up the moisture and prevent damage to the VCR or video tape from condensation. To do this, plug the VCR in and switch the VCR POWER to ON. Leave the VCR on for at least two hours before using it for recording or playback.

### ■ CONDENSATION IS LIKELY TO OCCUR WHEN:

1. The VCR is moved inside from outdoors or from a cold room to a warm one.
2. A cold room is heated quickly.
3. Humidity is high.

#### Note

- Avoid using the VCR where cold air (e.g., from an air conditioner) will blow directly on it.

**Never place anything containing water on top of the VCR (e.g., vases, cups, etc.)**

**Heavy object (e.g., TV) should never be placed on the VCR**

### NEVER TOUCH OR INSERT ANY OBJECT INSIDE THE VCR

Touching the inside of the cabinet or inserting foreign objects of any kind not only creates a safety hazard but can also cause extensive damage.

### PROTECT THE POWER CORD

Damage to the power cord may cause fire or shock hazard. When unplugged, hold by the plug only and pull out carefully.

### UNPLUG THE POWER CORD DURING A LONG ABSENCE

Turn off the power and unplug the power cord during a long absence.

### MAINTAIN GOOD VENTILATION

Do not obstruct the ventilation holes on the VCR. For maximum ventilation, place the unit on a hard level surface only, and ensure it is not covered during use.

### WHEN NOT IN USE

When you finish operating the VCR, always unload the cassette and turn OFF the VCR POWER.

### CABINET CARE

Never use petroleum-based cleaners. Clean with a soft cloth moistened with soap and water and wipe dry. PVC cables or leads should not be left in contact with the cabinet surface for long periods.

### INSTALLATION LOCATION

For excellent performance and lasting reliability, install in a location that is:

1. Well ventilated, out of direct sunlight and away from direct heat.
2. A solid, vibration-free surface.
3. Free from high humidity, excessive dust and away from magnetic fields.

#### Note

Never move the VCR without first removing the tape.

### CARE OF THE VIDEO CASSETTE TAPES

- Avoid vibration or shock.
- Do not place near a strong magnetic field (e.g., a motor, transformer or magnet).
- Never place or store in direct sunlight.
- Avoid dusty places.
- Place the cassette in its case and store vertically.
- Never store tape in high humidity.



#### WARNING:

The included power cord is used for 120 V, 60 Hz.  
Never connect any outlet or power supply having a different voltage or frequency.

# Features

This unit records in 3 modes and supports both T-120 and T-160 tapes. With a T-160 the Recording Hour modes supported are 8 (EP), 24 Hours Real Time (RT), and 40-Hour continuous mode.

Audio recording

High resolution and image quality

Remote operation by RS-485 controller

Automatic head cleaning

Easy menu setting on-screen

Easy cueing with alarm recording

All button lock

Protection against power failure

Variety of search functions

## Recording options for varied needs

- Daily/weekly/holiday timer recording
- Alarm recording
- Series recording
- Remote recording
- Repeat recording

## Special playback features

- Still picture
- Speed search using shuttle ring
- Frame-by-frame and field-by-field playback using jog dial

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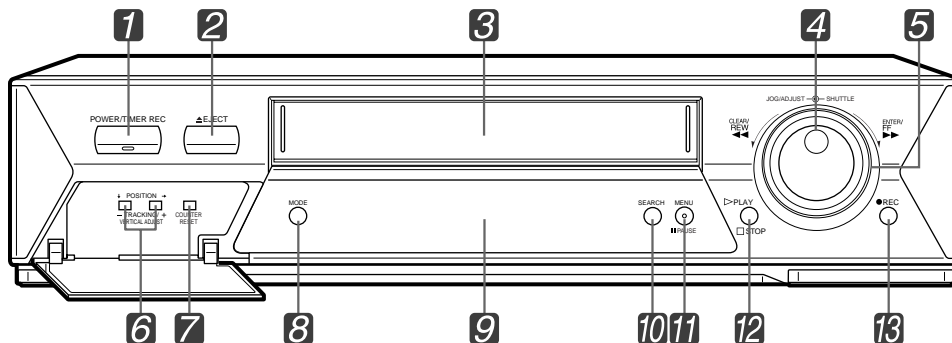
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**Accessories**

- 1 User's manual
- 1 Power cord
- 1 VCR cable
- 2 BNC-RCA adapters
- 1 Warranty card

# Controls and Functions

## Front View



### 1 POWER/TIMER REC button

Press to turn the VCR on or off.

If you have programmed your VCR to record, press to turn off the VCR and press again to stand by for the timer recording.

### 2 EJECT button

Press to remove the cassette.

### 3 Cassette Loading Slot

Cassette is inserted in this slot for loading.

### 4 JOG dial

Use to forward/reverse a tape frame-by-frame (field-by-field) or to set the menus.

### 5 SHUTTLE ring

When the VCR is in stop mode, turn to the right to forward a tape or to the left to rewind.

Also, use for special effects playback or to set the menus.

### 6 POSITION buttons

- When the day and present time display is shown on screen, press to move it right forward or bottom forward. During an alarm recording or if a warning display is shown on screen, the day and present time display cannot be moved.

#### TRACKING buttons

- If noise occurs on screen during playback, frame advance or slow-motion playback, press to adjust the tracking.

#### VERTICAL ADJUST buttons

- If screen images are blurred vertically during a still picture, press to reduce/eliminate the picture vibration.

### 7 COUNTER RESET button

Press to reset the counter to "00000".

### 8 MODE button

Press to select the recording or playback speed.

### 9 Fluorescent Display

See the next page for details.

### 10 SEARCH button

Press to display the <SEARCH FUNCTION> menu.

During recording or when the VCR is turned off, press this button for more than 10 seconds to lock/unlock all buttons.

### 11 MENU/PAUSE button

When the VCR is in stop mode, press to display the <MAIN MENU>.

When pressed during recording or playback, tape movement stops temporarily. Press again to continue the recording or playback.

### 12 PLAY/STOP button

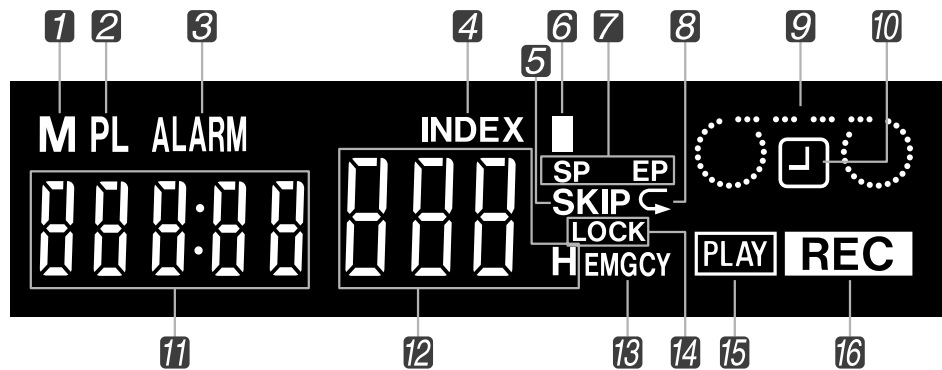
Press to playback a previously recorded tape or to discontinue all tape-related functions.

### 13 REC button

Press to begin recording.

# Controls and Functions

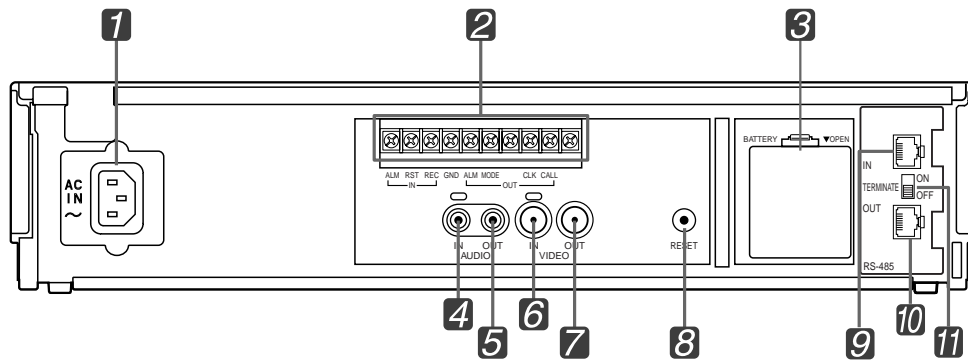
## Fluorescent Display



- 1 M (Counter Memory Stop) indicator**  
Illuminates during the counter memory stop.
- 2 PL (Power Loss) indicator**  
Illuminates when the VCR is turned on after a power failure occurs during recording.
- 3 ALARM (Alarm Recording) indicator**  
Flashes during alarm recording and stays on when the alarm recording is finished.
- 4 INDEX (Index Search) indicator**  
Flashes when recording an index signal and illuminates during the index number setup and the index search. (Index number is shown on the Recording and Playback Mode display.)
- 5 SKIP (Skip Search) indicator**  
Illuminates during the skip search.
- 6 ■ (Daylight Savings Time) indicator**  
Illuminates when "DAYLIGHT SAVINGS" is set to "ON."
- 7 SP, EP (Tape Speed) indicator**  
Indicates the tape speed.  
SP is standard play; EP is extended play.
- 8 ↺ (Repeat) indicator**  
Illuminates when "TAPE END" in "FIRST TIME SET UP" menu is set to "REPEAT" or "ALARM•PROT."
- 9 ○○○○ (Cassette Status) indicator**  
Illuminates when a tape is inserted. The light advances, stops, or flashes corresponding to the movement of the tape.
- 10 □ (Timer Recording) indicator**  
Illuminates when the VCR is in stand-by for timer recording or during timer recording.
- 11 Counter/Clock display**  
While the VCR is turned on, indicates the relative position on the tape. (The Counter stops counting where no recording is made on the tape.) When it is off, (when set) the clock (24-hour format) is shown.
- 12 Recording and Playback Mode/Index Number display**  
Displays the number corresponding to a selected recording or playback mode. Also, displays the index number during the index number setup and the index search.
- 13 EMGCY (Emergency Recording) indicator**  
Illuminates when "EMERGENCY REC" in "RECORDING SET UP" menu is set to "ON."
- 14 LOCK (Lock) indicator**  
Illuminates when the lock feature is in use.
- 15 PLAY (Playback) indicator**  
Illuminates during playback.
- 16 REC (Recording) indicator**  
Illuminates during recording.



## Rear View



### Warning:

The included power cord is used for 120 V, 60 Hz.  
 Never connect to any outlet or power supply having a different voltage or frequency.  
 Ensure the power cord is not plugged into the AC outlet before connecting to any rear terminals.

### 1 AC power socket

This socket connects to the power cord. Insert the cord firmly.

### 2 Input terminals

#### ALM IN

Use for alarm recording. The alarm sensor is connected here.

#### RST IN

Use to stop alarm recording.

- When "ALARM REC DURATION" in "RECORDING SET UP" menu is set to "MAN1," the alarm recording stops when a signal is input to this terminal. The alarm reset switch is connected here.
- When set to other than "MAN1," it can be used to adjust the VCR's clock.

#### REC IN

Use to start/stop recording or for series recording.

#### GND

When a lead connected to other terminals requires a ground, connect the ground lead here.

### Output terminals

#### ALM OUT

Use to indicate an alarm recording to an external alarm.

#### MODE OUT

Use to indicate the VCR's mode of operation.

- When "MODE OUT" in "REAR TERMINAL" menu is set to "CLOCK ADJ.," the clock of all connected VCRs can be adjusted. (☞ page 26)

#### CLK OUT

Use to control an external camera switcher.

#### CALL OUT

Use to indicate when a tape reaches its end during recording or if there has been a problem during recording.

### 3 Battery Box

Battery is stored here.

#### Note

- This VCR contains a special battery. Consult your dealer to replace it.

### 4 AUDIO IN connector

Audio input connector (RCA pin).

### 5 AUDIO OUT connector

Audio output connector (RCA pin).

### 6 VIDEO IN connector

Input connector for video signal (BNC connector). Connect cameras here.

### 7 VIDEO OUT connector

Output connector for video signal (BNC connector). Connect a monitor here.

### 8 RESET button

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### 9 RS-485 IN terminal (RJ-45 connector)

Input terminal to connect with a RS-485 controller.

### 10 RS-485 OUT terminal (RJ-45 connector)

Output terminal to connect with other time lapse VCR with RS-485 interface.

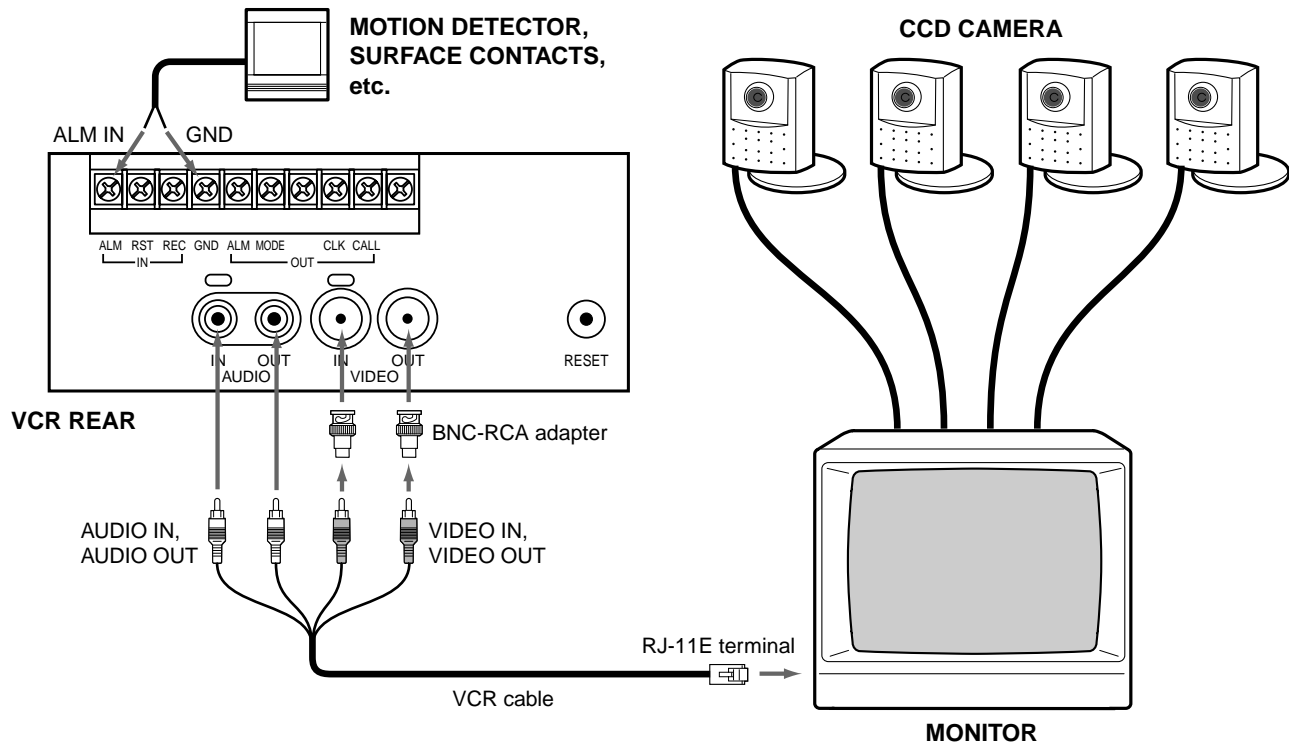
### 11 TERMINATE switch

Use to setup the termination (only when using the RS-485 terminal).

ON : use to turn on the termination.  
 OFF : use to turn off the termination.

For the rating of each connector at the rear panel of VCR, ☞ page 34.

# Connecting with CCD Camera, Monitor, and Sensor



## Note

- Monitor to be connected
  - Connecting with some monitors may cause picture vibration and/or picture distortion at the top or bottom of the image at still picture or normal playback.
  - A television for domestic use may easily cause the picture vibration and distortion.
- CCD camera to be connected
  - Do not connect color and black-and-white cameras together.

## Language Selection

The menu which appears on screen offers three languages: English (ENGLISH), Spanish (ESPAÑOL), or French (FRANÇAIS). This menu appears by pressing the **MENU** button when the VCR is turned on for the first time after the purchase or when the **RESET** button is pressed during use.

1. Press the **MENU** button.
  - The menu appears as shown to the right.
2. Turn the **JOG** dial to select the desired language.
3. Turn the **SHUTTLE** ring to the right.
  - **<MAIN MENU>** appears on screen in the selected language.
4. Press the **MENU** button to exit.

▷ ENGLISH  
FRANÇAIS  
ESPAÑOL

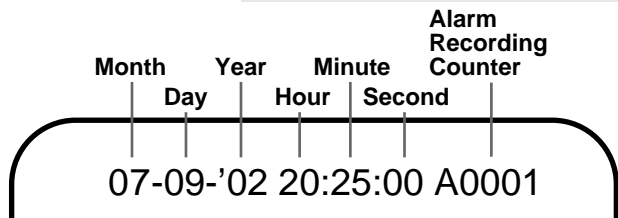
Use JOG to select,  
and ENTER .

## Note

- After first time setup and selecting the language to be used, the only way to go back and access the main menu in the three languages is to PRESS the **RESET** button found on the back panel. The **RESET** button can be accessed with a small pointed object. Once the **RESET** button is pressed, repeat steps 1 to 4 above.

# Setting the Clock

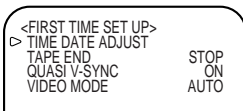
Accurately set the day and present time before timer programming.



- '02 indicates year 2002.
- The clock is shown in 24-hour format.
- Alarm recording counter is shown during alarm recording only.

Example : Setting the day and present time to 8:25 p.m., 9 July, 2002.

- Press the **MENU** button.
  - **<MAIN MENU>** appears.
- Turn the **JOG** dial to select **CLOCK/FIRST TIME SET UP** and turn the **SHUTTLE** ring to the right.
  - **<FIRST TIME SET UP>** menu appears.
- Turn the **JOG** dial to select **TIME DATE ADJUST** and turn the **SHUTTLE** ring to the right.
  - **<TIME DATE ADJUST>** menu appears.
- Turn the **JOG** dial to set **DAYLIGHT SAVINGS** and turn the **SHUTTLE** ring to the right.
  - When set to **ON**, the clock moves forward one hour.
  - When set to **AUTO**, the clock moves forward one hour from the 1st Sunday of April (at 2 a.m.) to the last Sunday of October (at 3 a.m.).
  - When set to **ON** or **AUTO** and the clock is put forward one hour, the Daylight Savings Time symbol (☀) is shown next to the hour digit of **TIME** on screen and the Daylight Savings Time indicator (■) illuminates on the fluorescent display.
- Turn the **JOG** dial to show "07" for **MONTH** and turn the **SHUTTLE** ring to the right.
- Set **DAY**, **YEAR**, **TIME** (hour digits, ten-minute digit, and one-minute digit) in a similar fashion.
- Turn the **JOG** dial while the one-minute digit of **TIME** is flashing.
  - The setting is now complete.
  - **<FIRST TIME SET UP>** menu appears.
- Press the **MENU** button.
  - The day and present time display appears on screen.



## Info.

- To move the displayed position of the day and present time display on screen, press the **POSITION** button (→) or (↓). (→) moves the display towards right-forward direction and (↓) towards a downward direction.

## Note

- When the **DAYLIGHT SAVINGS** is set to **AUTO**, the programmed recordings starting or finishing in the daylight saving time changeover period may not be recorded correctly.
- The daylight saving time may vary from the one above depending on your region or the year. In this case, set **DAYLIGHT SAVINGS** to **ON** or **OFF** manually.

## Setting the current time to exact second

Set the clock as described above, but set minute digits to one or two minutes ahead of the reference time being used. When the reference time reaches 00 seconds of the minute you have set, turn the **SHUTTLE** ring to the right. The VCR's clock now corresponds to the reference time to the nearest second.

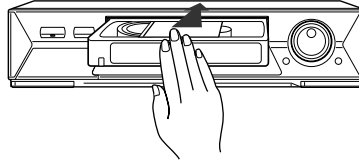
# Loading/Unloading a Tape

Tapes can be loaded into your VCR as long as the VCR is plugged into an AC outlet. Even if the VCR is turned off, loading a tape will automatically cause it to turn on. Use only video cassette tapes marked **VHS**.

- It is recommended to use T-120 or T-160 tapes. Do not use tapes longer than T-160.

## Loading

1. Insert the tape into the cassette slot by holding it so that the long narrow edge with the contents label faces towards you.

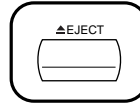


- The Cassette Status indicator illuminates on the fluorescent display when the tape is inserted.



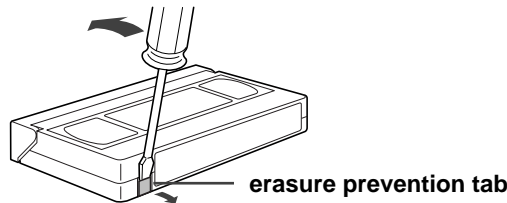
## Unloading

1. Press the **EJECT** button on the front panel of the VCR.
2. Remove the tape.



## Preventing accidental erasure

Tapes come with an erasure prevention tab which, when removed, prevents the tape's contents from being erased or recorded over. If the tape you insert into the VCR has the erasure prevention tab removed, your VCR will automatically eject it if you attempt to record on it.

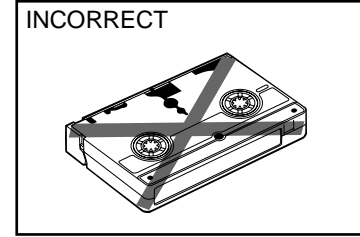


## Recommended number of tape uses

It is recommended that the cassette tape is replaced with a new one depending on the recording time mode and type of tape used.

Recording time mode	Number of tape uses	
	T-120	T-160
8H	50	45
L24H	35	30
L40H	20	10

## Note



- Your VCR has a protection circuit which will eject the tape if it is loaded improperly. If the VCR ejects the tape, remove it completely and check that the long narrow edge with the contents label is facing towards you, and the clear plastic window that shows the video tape is facing upwards. Wait a few seconds, and try inserting the tape again.
- You cannot insert a tape when the VCR is locked.

## Info.

- The VCR automatically turns on when the tape is loaded, **AUTO POWER ON**.
- The VCR automatically plays back the tape on which the erasure prevention tab has been removed, **AUTO PLAY**.
- The VCR will eject a tape even if the power to the VCR is turned off (as long as the VCR is plugged into an AC outlet), **POWER OFF EJECT**.

## Note

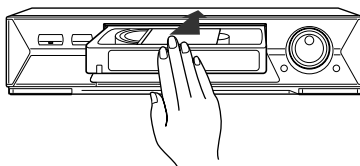
- When ejecting the tape during recording, press the **STOP** button once to stop recording, and then press the **EJECT** button to unload the tape.
- You cannot eject a tape when the VCR is locked.

## Note

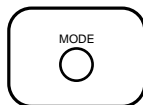
- We recommend that you take any broken or torn tapes to a professional for repair. The adhesives on many common types of tape could damage the head of your VCR.

# Manual Recording

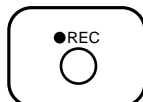
1. Turn on the VCR and peripheral devices.
2. Load a tape with an erasure prevention tab intact.



3. Press the **MODE** button to select the desired recording mode.
  - The recording mode shown on the fluorescent display is based on using a T-160 tape for recording.
  - ⇒ Refer to Recording/playback time below for the actual recording/playback time when T-120 or T-160 tape is used.



4. Press the **REC** button to begin recording.



5. Press the **PLAY/STOP** button to stop recording.



## Recording/playback time

	T-120	T-160
<b>(2H)</b>	(2h)	(2h 40min)
<b>8H</b>	6h	8h
<b>L24H</b>	18h	24h
<b>L40H</b>	30h	40h

( ) is for playback only.

## Audio recording

The 2H (playback only), 8H modes, and the modes with the letter "L" (L24H and L40H) are for audio recording and playback on the linear track.

### Note

- If the tape you insert in your VCR has the erasure prevention tab removed, your VCR will automatically eject it if you attempt to record on it.
- The **REC** button will not function unless a tape is in stop or pause mode.
- A tape recorded by this VCR may not be played back correctly by another VCR.

### Info.

- Press the **PAUSE** button to momentarily stop recording. Press it again to resume recording. To protect the tape, the pause mode is automatically cancelled after about five minutes.



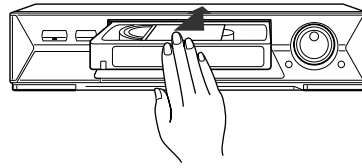
- For the VCR's movement when the tape reaches its end during recording, go to page 29.

### Note

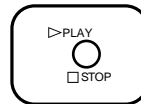
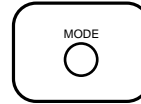
- Audio will not be recorded if a camera with a built-in microphone or other peripherals for audio are not connected.
- The longer the recording mode is set, the worse the sound quality gets. In L40H mode, the sound quality is of the degree that the speaking voice can be heard.

# Playback

1. Turn on the VCR and peripheral devices.
2. Load a pre-recorded tape.



3. Press the **MODE** button to select the desired playback mode.
  - If noise occurs during playback, adjust the tracking, page 17.
4. Press the **PLAY/STOP** button to start playback.
  - If noise occurs during playback, adjust the tracking, page 17.
5. Press the **PLAY/STOP** button again to stop playback.



## When the tape reaches its end during playback/fast forwarding

VCR's function varies by the setting of TAPE END in the FIRST TIME SET UP menu.

VCR's function TAPE END setting	Playback	Fast Forward
<b>STOP or REWIND</b>	Stop	Stop
<b>REPEAT or ALARM•PROT</b>	VCR automatically rewinds to the beginning of the tape and stops.	Stop

### Rewinding a tape

While the tape is stopped, turn the **SHUTTLE** ring to the left.

To stop rewinding, press the **PLAY/STOP** button on the front panel.

### Fast-forwarding a tape

While the tape is stopped, turn the **SHUTTLE** ring to the right.

To stop fast-forwarding, press the **PLAY/STOP** button on the front panel.

### Audio playback and picture quality

Playback mode	2H/8H	L24H	L40H
<b>Audio playback</b>	Very good	Good	Good
<b>Picture Quality</b>	Very good	Good	Good

### Info.

- The VCR automatically plays back the tape on which the erasure prevention tab has been removed, **AUTO PLAY**.

### Note

- Playback mode  
When the MODE button is pressed, the playback mode is switched in the order of 8H → L24H → L40H → 8H ... (for a tape recorded in 8H, L24H or L40H mode).
  - A tape recorded in SP mode using an other VCR can only be played back in 2H mode.
- Picture jitter or noise may occur when the tape is played back in L24H or L40H mode even if the tape was recorded in its respective mode.
- When a pre-recorded tape is used for recording, the colored noise may appear on the beginning of the playback picture.
- There is normal sound playback only when a tape recorded in 8H, L24H, or L40H mode is played back in its respective mode.



- To find a picture you wish to view, go to page 18.
- For TAPE END setting, go to page 29.

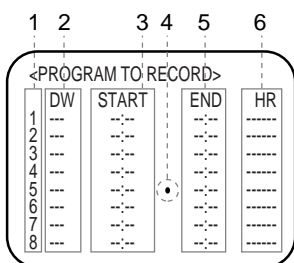
### Note

- The fast-forward/rewind time of a T-160 tape is approximately 120 seconds; however, the time varies by the type of tape you use.

# Recording Techniques

## Timer Recording

Accurately preset the day and present time before timer programming. (👉 page 5)



- 1) Program number  
Up to eight programs can be set.
- 2) Day of the week display
  - Display **HLD** to apply HOLIDAY SET UP setting. Display **SPL** to apply SPECIAL DW setting. (👉 next page)
  - Display **DAY** to record at the programmed time everyday.
- 3) Recording start-time
- 4) Next day indicator (•)  
Recording continues to the following day.
- 5) Recording end-time
- 6) Recording mode
  - Timer recording will not be performed when set to **SKIP**.

Example: Setting number 2 to L40H mode timer recording from 12:00 to 15:00 every Tuesday.

1. Press **MENU** button.
  - <MAIN MENU> appears.
2. Turn the **JOG** dial to select **TIMER PROGRAM** and turn the **SHUTTLE** ring to the right.
  - <TIMER PROGRAM> menu appears.
3. When the cursor (▷) is next to **PROGRAM TO RECORD**, turn the **SHUTTLE** ring to the right.
  - <PROGRAM TO RECORD> menu appears.
4. Turn the **JOG** dial to select the program number and turn the **SHUTTLE** ring to the right to select.
5. In the **DW** column, turn the **JOG** dial to select the Day of the Week. Turn the **SHUTTLE** ring to the right to select.
6. In the **START** column, turn the **JOG** dial to select the *hour* digits of the start time. Turn the **SHUTTLE** ring to the right when done.
  - ⇒ Set the *10-minute* digit and *1-minute* digit in a similar fashion.
7. In the **END** column, turn the **JOG** dial to select the *hour* digits of the end time. Turn the **SHUTTLE** ring to the right when done.
  - ⇒ Set the *10-minute* digit and *1-minute* digit in a similar fashion.
8. In the **HR** column, turn the **JOG** dial to select the RECORDING mode.
9. Turn **SHUTTLE** to the right when done. (Cursor flashing will stop.)
  - If the program has not been set completely, the **DW** column will continue to flash.
  - ⇒ Repeat steps 4 to 9 to set two or more programs at once.
10. Press **MENU** button.
  - The day and present time display appears on screen.
11. Press **TIMER REC** button twice.
  - The VCR is turned off and the Timer Recording indicator (◻) illuminates on the fluorescent display.
  - ⇒ When **TIMER REC** button is pressed during the programmed period, the VCR starts recording immediately.

```
<MAIN MENU>
▷ DISPLAY
  TIMER PROGRAM
  RECORDING SET UP
  REAR TERMINAL
  MAINTENANCE
  CLOCK/FIRST TIME SET UP
```

```
<TIMER PROGRAM>
▷ PROGRAM TO RECORD
  HOLIDAY SET UP
  SPECIAL DW          MON-SAT
```

```
<PROGRAM TO RECORD>
▷ DW  START  END  HR
▷ DAY 08:00 20:00 L24EP
  1 ---  ---  ---  ---
  2 ---  ---  ---  ---
  3 ---  ---  ---  ---
```

```
<PROGRAM TO RECORD>
▷ DW  START  END  HR
▷ DAY 08:00 20:00 L24EP
  1 ---  ---  ---  ---
  2 ---  ---  ---  ---
  3 ---  ---  ---  ---
```

```
<PROGRAM TO RECORD>
▷ DW  START  END  HR
▷ DAY 08:00 20:00 L24EP
▷ TUE ---  ---  ---  ---
  3 ---  ---  ---  ---
```

```
<PROGRAM TO RECORD>
▷ DW  START  END  HR
▷ DAY 08:00 20:00 L24EP
▷ TUE 12:00 15:00 L40EP
  3 ---  ---  ---  ---
```

```
<PROGRAM TO RECORD>
▷ DW  START  END  HR
▷ DAY 08:00 20:00 L24EP
▷ TUE 12:00 15:00 L40EP
  3 ---  ---  ---  ---
```

```
<PROGRAM TO RECORD>
▷ DW  START  END  HR
▷ DAY 08:00 20:00 L24EP
▷ TUE 12:00 15:00 L40EP
  3 ---  ---  ---  ---
```

```
<PROGRAM TO RECORD>
▷ DW  START  END  HR
▷ DAY 08:00 20:00 L24EP
▷ TUE 12:00 15:00 L40EP
  3 ---  ---  ---  ---
```

### Info.

- Time is displayed in 24-hour format.

### Info.

When the Timer Recording indicator (◻) starts flashing:

- a) A tape is not inserted.
- b) A tape without erasure prevention tab is inserted.

– Remedy -

1. Press the **TIMER REC** button to turn off the Timer Recording indicator (◻).
2. In case of this:
  - a) Insert a tape.
  - b) Insert a tape with erasure prevention tab intact.
3. Press the **TIMER REC** button twice to turn on the Timer Recording indicator.

### Info.

- **To erase a program:**  
Select the program number you wish to erase, turn the **SHUTTLE** ring to the right (**DW** column flashes), and then turn the **SHUTTLE** ring to the left.

### Note

- If the VCR's clock has not been set, the VCR will not be in timer recording stand-by mode even though the **TIMER REC** button is pressed.

# Recording Techniques

## Holiday set up

Up to 20 days per year can be set for Holiday for when the timer recording will be performed, or if HR in PROGRAM TO RECORD menu is set to SKIP, the timer recording will not be performed during the programmed period.

1. Display the <TIMER PROGRAM> menu.
2. Turn the **JOG** dial to select **HOLIDAY SET UP** and turn the **SHUTTLE** ring to the right.
  - <HOLIDAY SET UP> menu appears.
3. Turn the **JOG** dial to move the cursor (▷) and turn the **SHUTTLE** ring to the right.
  - Each time the **JOG** dial is turned, the cursor moves towards right-forward direction.
4. Turn the **JOG** dial to select the month you want, and turn the **SHUTTLE** ring to the right.
5. Turn the **JOG** dial to select the day you want, and turn the **SHUTTLE** ring to the right.
  - ⇒ Repeat steps 3 to 5 to set two or more days at once.
6. Press the **MENU** button.
  - The day and present time display appears on screen.

```
<HOLIDAY SET UP>
▷ 01/01 01/15 02/11 03/22
  04/29 05/03 05/04 05/05
  07/20 09/15 09/23 10/10
  11/03 11/23 12/23 --/--
  --/-- --/-- --/-- --/--
  MONTH/DAY
```

### Info.

- To erase the pre-set month and day, turn the **SHUTTLE** ring to the left while the month item is flashing.

## Special day of the week

Set the recording period by specifying the start and end day of the week for timer recording.

1. Display the <TIMER PROGRAM> menu.
2. Turn the **JOG** dial to select **SPECIAL DW** and turn the **SHUTTLE** ring to the right.
3. Turn the **JOG** dial to set the start and end day of the week, and turn the **SHUTTLE** ring to the right.
4. Press the **MENU** button.
  - The day and present time display appears on screen.

```
<TIMER PROGRAM>
PROGRAM TO RECORD
HOLIDAY SET UP
▷SPECIAL DW MON-SAT
```

### Note

- Start day of the week and end day of the week cannot be identical.

## When the recording periods of two or more programs are overlapped

The VCR always gives priority to the higher-numbered program.

### Info.

- To make sure that the HOLIDAY SET UP setting is applied correctly, set a timer program with **HLD** in **DW** column to the higher-numbered program.

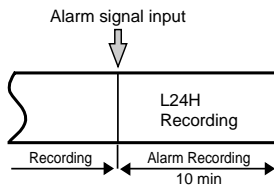


## Alarm Recording

If an alarm occurs, the VCR switches to alarm recording.

Example)

When ALARM REC MODE is set to L24H and ALARM REC DURATION is 10 min.



1. Press the **MENU** button.

- **<MAIN MENU>** appears.

```
<MAIN MENU>
> DISPLAY
  TIMER PROGRAM
  RECORDING SET UP
  REAR TERMINAL
  MAINTENANCE
  CLOCK/FIRST TIME SET UP
```

2. Turn the **JOG** dial to select **RECORDING SET UP** and turn the **SHUTTLE** ring to the right.

- **<RECORDING SET UP>** menu appears.

```
<RECORDING SET UP>
> ALARM REC MODE      8H
  ALARM REC DURATION  1M
  EMERGENCY REC       OFF
```

3. When the cursor (▷) is next to **ALARM REC MODE**, turn the **SHUTTLE** ring to the right.

```
<RECORDING SET UP>
> ALARM REC MODE      L24H
  ALARM REC DURATION  1M
  EMERGENCY REC       OFF
```

4. Turn the **JOG** dial to set the alarm recording mode you want and turn the **SHUTTLE** ring to the right.

```
<RECORDING SET UP>
> ALARM REC MODE      L24H
  ALARM REC DURATION  1M
  EMERGENCY REC       OFF
```

5. Turn the **JOG** dial to select **ALARM REC DURATION** and turn the **SHUTTLE** ring to the right.

```
<RECORDING SET UP>
> ALARM REC MODE      L24H
  ALARM REC DURATION  1M
  EMERGENCY REC       OFF
```

6. Turn the **JOG** dial to set the alarm recording duration you want and turn the **SHUTTLE** ring to the right.

- When set to **MAN 1**, alarm recording continues until RST IN terminal is grounded.
- When set to **MAN 2**, alarm recording continues while ALM IN terminal is grounded.

```
<RECORDING SET UP>
> ALARM REC MODE      L24H
  ALARM REC DURATION  10M
  EMERGENCY REC       OFF
```

7. Press the **MENU** button.

- The day and present time display appears on screen.

## Emergency Recording

The VCR automatically starts an alarm recording when an alarm signal is input even if the VCR is in stop mode, turned off, or in stand-by mode for timer recording.

1. After step 6 above, turn the **JOG** dial to select **EMERGENCY REC** and turn the **SHUTTLE** ring to the right.

2. Turn the **JOG** dial to select **ON** and turn the **SHUTTLE** ring to the right.

- The Emergency Recording indicator (EMGCY) illuminates on the fluorescent display.

```
<RECORDING SET UP>
> ALARM REC MODE      L24H
  ALARM REC DURATION  10M
  EMERGENCY REC       ON
```

## Display during alarm recording

- During the alarm recording, the alarm recording counter will automatically be displayed on-screen if DISPLAY MODE (☞ page 28) is set to 1, 2, or 3.
- The Alarm Recording indicator (ALARM) on the fluorescent display flashes during alarm recording and stays on when the alarm recording is finished.
- The alarm recording counter shows up to 9999 alarm recordings, then it is reset to 0000 and continues counting.
- When initializing the alarm recording list, the alarm recording counter will also be reset.

Alarm recording counter

```
01-01-'02 09:30:00 A0001
```



- For alarm recording connection, go to page 25.

## Info.

- The index signal is automatically recorded when an alarm recording begins. (The Index indicator (**INDEX**) flashes on the fluorescent display.)
- Even if an alarm recording is proceeding, the new alarm recording starts when the next alarm signal is input. (While an index signal is being recorded and then the next alarm signal is input, the second signal may not be detected during skip or index search.)
- An alarm recording continues until its end during timer recording, even if the timer recording end-time is reached.
- An alarm recording will be cancelled if the tape reaches its end.
- If the interval between two alarm recording start-times is too short, the skip or index search may not function correctly. (☞ For the minimum interval between two alarm recording start-times, go to page 18.)

## Note

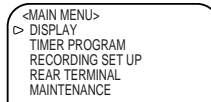
- After an emergency recording, the VCR automatically returns to its original state.

# Recording Techniques

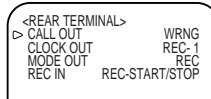
## Series Recording 1

Series recording is possible if two or more of these units are connected. When the first VCR's tape reaches its end or an error occurs on VCR, the second VCR automatically begins recording.

1. Press the **MENU** button.
  - **<MAIN MENU>** appears.

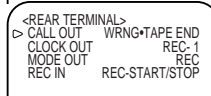
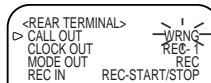


2. Turn the **JOG** dial to select **REAR TERMINAL** and turn the **SHUTTLE** ring to the right.
  - **<REAR TERMINAL>** menu appears.



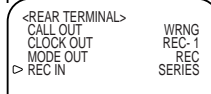
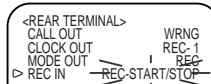
Step 3 and 4 on 1st VCR only:

3. When the cursor (**>**) is next to **CALL OUT**, turn the **SHUTTLE** ring to the right.
4. Turn the **JOG** dial to select **WRNG•TAPE END** and turn the **SHUTTLE** ring to the right.



Step 5 and 6 on 2nd VCR only:

5. Turn the **JOG** dial to select **REC IN** and turn the **SHUTTLE** ring to the right.
6. Turn the **JOG** dial to select **SERIES** and turn the **SHUTTLE** ring to the right.
7. Press the **MENU** button.
  - The day and present time display appears on screen.

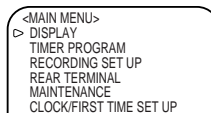


## Series Recording 2

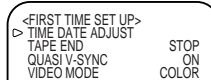
*Series Recording 2* provides a function: when the first VCR's tape reaches its end, the second VCR automatically begins recording. When the tape in second VCR finishes, the first VCR starts recording again. (The two VCRs keep recording one after another.) Set both the first and second VCRs as in the steps below.

1. Repeat steps 1 to 6 of **Series Recording 1**.
  - ⇒ Steps 3 to 6 must be set to both 1st and 2nd VCRs.

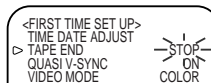
2. Turn the **SHUTTLE** ring to the left.
  - **<MAIN MENU>** appears.



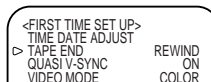
3. Turn the **JOG** dial to select **CLOCK/FIRST TIME SET UP** and turn the **SHUTTLE** ring to the right.
  - **<FIRST TIME SET UP>** menu appears.



4. Turn the **JOG** dial to select **TAPE END** and turn the **SHUTTLE** ring to the right.



5. Turn the **JOG** dial to select **REWIND** and turn the **SHUTTLE** ring to the right.



6. Press the **MENU** button.
  - The day and present time display appears on screen.



- For series recording connection, go to page 25.

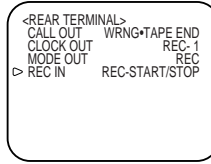
### Note

- Timer or emergency recording function cannot be used with series recording at the same time.

## Remote Recording

This function permits you to control the start/end of recording from a remote place. The VCR starts recording while the REC IN terminal is grounded.

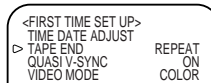
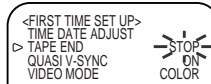
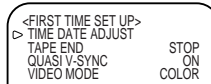
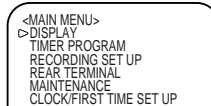
1. Display **<REAR TERMINAL>** menu.
2. Set **REC IN** to **REC-START/STOP**.
3. Press the **MENU** button.
  - The day and present time display appears on screen.



## Repeat Recording

With this function, when the tape reaches its end during recording, the VCR rewinds the tape and starts recording again.

1. Press the **MENU** button.
  - **<MAIN MENU>** appears.
2. Turn the **JOG** dial to select **CLOCK/FIRST TIME SET UP** and turn the **SHUTTLE** ring to the right.
  - **<FIRST TIME SET UP>** menu appears.
3. Turn the **JOG** dial to select **TAPE END** and turn the **SHUTTLE** ring to the right.
4. Turn the **JOG** dial to select **REPEAT** or **ALARM•PROT** and turn the **SHUTTLE** ring to the right.
  - ⇒ Refer to the table below for REPEAT and ALARM•PROT.
  - ⇒ Repeat indicator (↺) illuminates on the fluorescent display.
5. Press the **MENU** button.
  - The day and present time display appears on screen.



## When the tape reaches its end during recording

The following functions are automatically engaged when the tape ends during recording.

TAPE END setting	When there are alarm recordings on tape	When there is NO alarm recording on tape
<b>ALARM•PROT</b>	The tape stops.(*)	The tape is rewound automatically to the beginning and then recording is resumed.
<b>STOP</b>	The tape stops.	
<b>REWIND</b>	The tape is rewound automatically to the beginning (except in timer recording) and then stops.	
<b>REPEAT</b>	The tape is rewound automatically to the beginning and then recording is resumed (also recording over existing alarms).	

\* To repeat recording on the same tape again, eject the tape and reinsert.



- For remote recording connection, go to page 25.

### Note

- An index signal will not be recorded during remote recording.
- Series or timer recording function cannot be used with remote recording at the same time.

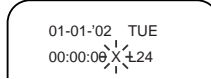
# Additional Features

## Memory Backup in Case of Power Failure

This VCR includes a built-in backup memory, so the preset day and present time will remain in memory even if there is a power failure. However, if the power cord is disconnected for a long period of time (2-3 months), the present time may not be accurate. In this case, set the clock again.

## After a Power Failure

If a power failure occurs during manual, timer, or alarm recording, the VCR will return to the recording mode when the power comes back on. The Power Failure symbol (X) will be displayed for about 1 minute on screen and the Power Loss indicator (PL) will illuminate on the fluorescent display when the power comes back on. If a power failure occurs while the VCR's power is on, the VCR will turn on by itself when the power comes back on.

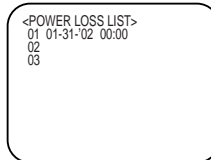


## Displaying/Clearing the Power Loss List

### ■ Displaying the power loss list

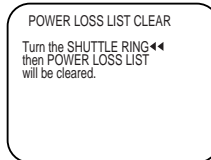
The power failure start time is logged in the VCR's Power Loss List. To view the list, please follow the steps listed below.

1. Press the **MENU** button.
  - **<MAIN MENU>** appears.
2. Turn the **JOG** dial to select **MAINTENANCE** and turn the **SHUTTLE** ring to the right.
  - **<MAINTENANCE>** menu appears.
3. Turn the **JOG** dial to select **POWER LOSS LIST** and turn the **SHUTTLE** ring to the right.
  - **<POWER LOSS LIST>** appears.
4. Press the **MENU** button.
  - The day and present time appears on screen.



### ■ Clearing the power loss list

1. Select **POWER LOSS LIST CLEAR** in **<MAINTENANCE>** menu and turn the **SHUTTLE** ring to the right.
2. Turn the **SHUTTLE** ring to the left to clear the list.
  - **<MAINTENANCE>** menu appears.
  - ⇒ To exit the menu without clearing the list, press the **MENU** button.
3. Press the **MENU** button.
  - Once the list is cleared, the Power Loss indicator (PL) will go off.

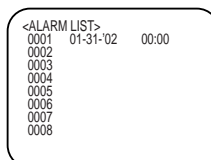


## Displaying/Clearing the Alarm List

### ■ Displaying the alarm list

The alarm recording start time/date are logged in the VCR's Alarm List. To view the list, please follow the steps listed below.

1. Press the **MENU** button.
  - **<MAIN MENU>** appears.
2. Turn the **JOG** dial to select **MAINTENANCE** and turn the **SHUTTLE** ring to the right.
  - **<MAINTENANCE>** menu appears.
3. Turn the **JOG** dial to select **ALARM LIST** and turn the **SHUTTLE** ring to the right.
  - **<ALARM LIST>** appears.
4. Press the **MENU** button.
  - The day and present time appears on screen.



## Info.

- The battery is fully charged if the VCR's power cord is plugged into an AC outlet for 40 or more hours per week.
- If the battery is fully charged, even if the power cord is not plugged in, the following settings will remain in memory for up to 31 days:
  - The day and present time display
  - Alarm list
  - Power loss list
  - Number of tape uses
  - Counter display
  - Recording/Playback mode

## Note

- When **ALARM REC DURATION** of the **RECORDING SET UP** menu is set to **MAN1** or **MAN2** and a power failure occurs during the alarm recording, the VCR may not return to the alarm recording mode when the power comes back on.

## Note

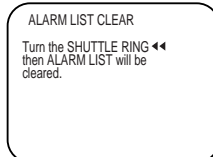
- Up to three power failure start times will be displayed. If more than three failures have occurred, the first start time and the last two start times will be displayed on the list.

## Note

- Maximum of 9,999 alarm recording start times will be counted.
- Up to eight alarm recording start times will be displayed. If more than eight alarm recordings have occurred, the first start time and the last seven start times will be displayed on the list.

## ■ Clearing the alarm list

1. Select **ALARM LIST CLEAR** in **<MAINTENANCE>** menu and turn the **SHUTTLE** ring to the right.
2. Turn the **SHUTTLE** ring to the left to clear the list.
  - **<MAINTENANCE>** menu appears.
  - ⇒ To exit the menu without clearing the list, press the **MENU** button.
3. Press the **MENU** button.
  - Once the list is cleared, the Alarm Recording indicator (**ALARM**) on the fluorescent display will go off.

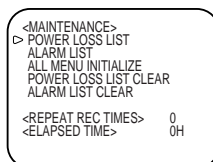


## Number of Tape Uses and Elapsed Time of VCR

**REPEAT REC TIMES** Indicates how many times a tape has been recorded over since it was first inserted.

**ELAPSED TIME** Indicates the total time the VCR has been used for recording or playback.

1. Press the **MENU** button.
  - **<MAIN MENU>** appears.
2. Turn the **JOG** dial to select **MAINTENANCE** and turn the **SHUTTLE** ring to the right.
  - **<REPEAT REC TIMES>** and **<ELAPSED TIME>** are shown at the bottom of the **<MAINTENANCE>** menu.
3. Press the **MENU** button.
  - The day and present time display appears on screen.



### Note

- **<REPEAT REC TIMES>** is:
  - counted when the tape ends during recording (except when **TAPE END** of **FIRST TIME SET UP** menu is set to **STOP**)
  - memorized even if the VCR is turned off
  - reset when a tape is inserted
  - shown up to 200 times. **OVER** is shown if the number exceeds 200 times.
- **<ELAPSED TIME>** is shown up to 89,999 hours.

## Lock Function

When the **SEARCH** button is pressed for more than 10 seconds, all buttons on the front panel of VCR are locked and kept in the current condition. The Lock indicator (**LOCK**) illuminates on the fluorescent display when the VCR is locked. To release the lock, press the **SEARCH** button for more than 10 seconds again. This function is only valid when the VCR is turned off or recording.

# Special Effects Playback

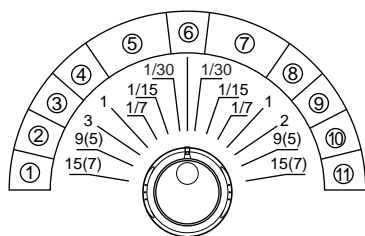
The following convenient functions are available. Audio output is muted during special effects playback.

## Still picture

1. Press **PAUSE** button during playback.
  - Press **PAUSE** button again to resume the playback.

## Shuttle ring

By turning the SHUTTLE ring during still picture, you can obtain a variety of playback speeds as shown below.



( ) indicates the playback speed of the recorded tape in 2H mode.

- 1 Reverse high speed search
- 2 Reverse speed search
- 3 Reverse fast playback (x3)
- 4 Reverse playback
- 5 Reverse slow
- 6 Still
- 7 Slow playback
- 8 Normal playback
- 9 Fast playback (x2)
- 10 Forward speed search
- 11 Forward high speed search

1. Turn **SHUTTLE** to the right or left during still picture.
  - The playback speed varies by the angle of **SHUTTLE** ring.
  - When **SHUTTLE** ring is released, it comes back to the center position and the playback picture stays at still.

## Shuttle hold

When the SHUTTLE ring is released, the playback speed can be fixed to one selected.

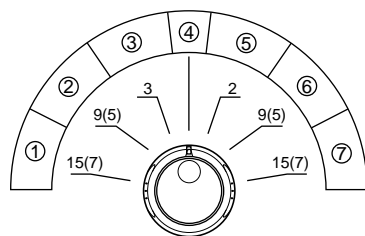
1. Turn **SHUTTLE** to the right or left to obtain a desired playback speed, then press **PAUSE** button.
2. Release **SHUTTLE**.

## ■ Cancelling the shuttle hold playback

1. Press **PAUSE** button once to go back to the still picture and press once again to return to the playback.

## Direct shuttle ring

By turning the SHUTTLE ring during playback, you can obtain some of special effects playback as shown below.



( ) indicates the playback speed of the recorded tape in 2H mode.

- 1 Reverse high speed search
- 2 Reverse speed search
- 3 Reverse fast playback (x3)
- 4 Normal playback
- 5 Fast playback (x2)
- 6 Forward speed search
- 7 Forward high speed search

## Frame or field playback

1. To forward frames or fields one by one, turn the **JOG** dial during still picture.
  - Turn to the right to forward.
  - Turn to the left to reverse.

To forward frames or fields continuously, keep turning the **JOG** dial during still picture.

- Keep turning to the right to forward frames (fields) continuously.
- Keep turning to the left to reverse frames (fields) continuously.

To stop frame or field playback, release the **JOG** dial.

- The playback picture stays at still.

## Note

- Noise bars may appear on the picture while switching between forward and reverse frame or field playback.

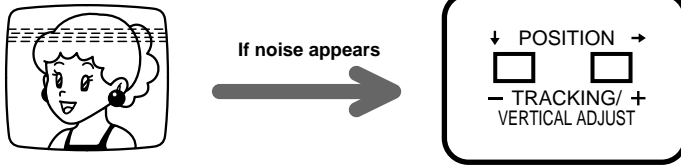
# Adjustment during Playback

## Tracking Adjustment

If noise appears in the picture during playback, reverse/slow playback, fast playback, reverse playback, frame or field playback, you can reduce or eliminate it by adjusting the tracking.

### ■ How to adjust during playback

1. Press **TRACKING** button (+) or (-) to achieve the best picture.



### ■ How to adjust during reverse/forward slow playback, fast playback, reverse playback, frame or field playback

1. During still picture, turn **SHUTTLE** to obtain the respective playback mode.  
⇒ If noise appears in frame or field playback, set to slow playback.
2. While turning **SHUTTLE**, press **PAUSE** button.
  - The playback picture is fixed at the selected speed.
3. Release **SHUTTLE**.
4. Press **TRACKING** button (+) or (-) to achieve the best picture.

### ■ Initializing the tracking

The tracking will be reset to its initial setting by pressing both **TRACKING** buttons (+) and (-) together during playback.

## Vertical Adjustment (picture vibration at the top and bottom)

The picture vibration during still picture, fast playback, or playback at L24H or L40H mode can be reduced or eliminated by the following steps.

### ■ How to adjust

1. Press **PAUSE** button during playback.
2. Press **VERTICAL ADJUST** button (+) or (-) to reduce or eliminate the picture vibration.



### ■ Initializing the vertical adjustment

The vertical adjustment will be reset to its initial setting by pressing both **VERTICAL ADJUST** buttons (+) and (-) together during still picture, fast playback, or playback at L24H or L40H mode.

### Note

- Adjust the tracking at each playback mode or the type of playback (fast playback, reverse playback, etc.), since the method of tracking adjustment varies.
- Although the tracking is adjusted during reverse playback or reverse slow playback, the noise may remain on screen.
- When a picture recorded in 8H mode is played back in L24H or L40H mode, noise may appear on screen after the adjustment.
- The noise bars will move continuously when a **TRACKING** button is depressed.

### Note

- Horizontal vibration cannot be corrected with **VERTICAL ADJUST** buttons.
- **VERTICAL ADJUST** buttons will not work, when QUASI V-SYNC of FIRST TIME SET UP menu is set to OFF.
- The picture vibration during still picture or frame or field playback may not be adjusted with **VERTICAL ADJUST** buttons.

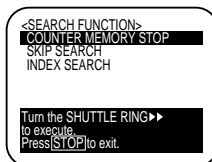
# Searching Techniques

The various search functions help you find pictures you wish to view.

## Counter Memory Stop

Rewinds a tape till the counter on the fluorescent display reaches "00000" and stops.

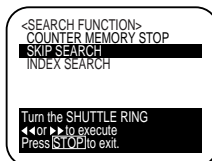
- Press the **SEARCH** button once.
  - <SEARCH FUNCTION>** menu appears and **COUNTER MEMORY STOP** is highlighted.
  - The Counter Memory Stop indicator (**M**) illuminates on the fluorescent display.
- Turn the **SHUTTLE** ring to the right.
  - The VCR starts rewinding the tape.
  - ⇒ To quit while rewinding, press the **STOP** button.
  - ⇒ To exit the **<SEARCH FUNCTION>** menu without rewinding, press the **STOP** button.



## Skip Search

During fast forwarding or rewinding, the VCR plays back a tape (at 2H or 8H mode) for about four seconds where an index signal is recorded. This process is repeated until the end or beginning of the tape is reached.

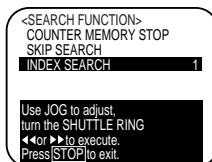
- Press the **SEARCH** button until **SKIP SEARCH** is highlighted.
  - The Skip Search indicator (**SKIP**) illuminates on the fluorescent display.
- Turn the **SHUTTLE** ring to the right or left to start the search.
  - Turning the **SHUTTLE** ring to the right proceeds the search in the forward direction.
  - Turning the **SHUTTLE** ring to the left proceeds the search in the reverse direction.
  - ⇒ To quit while searching, press the **STOP** button.
  - ⇒ To exit the **<SEARCH FUNCTION>** menu without searching, press the **STOP** button.
- When you find a picture you wish to view, press the **PLAY** button.



## Index Search

During fast forwarding or rewinding, the VCR will search for an index signal you have selected. When the index signal is found, the VCR will play back in still picture.

- Press the **SEARCH** button until **INDEX SEARCH** is highlighted.
  - The Index Search indicator (**INDEX**) illuminates on the fluorescent display.
- Turn the **JOG** dial to select an index number (between 1 and 255) you wish to find.
  - ⇒ To exit the **<SEARCH FUNCTION>** menu without searching, press the **STOP** button.
- Turn the **SHUTTLE** ring to the right or left to start the search.
  - Turning the **SHUTTLE** ring to the right proceeds the search in the forward direction.
  - Turning the **SHUTTLE** ring to the left proceeds the search in the reverse direction.
  - The index number shown on the fluorescent display will decrease one by one as each index signal goes by.
  - ⇒ To quit while searching, press the **STOP** button.



### Note

- When the counter on the fluorescent display indicates "00000," **COUNTER MEMORY STOP** in the **SEARCH FUNCTION** menu cannot be selected.

### Info.

- Skip search or index search may not function if the interval between two alarm recording start-times is too short. The table below indicates the minimum interval between two alarm recording start-times for the skip or index search to work correctly.

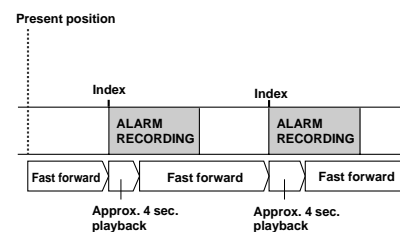
Alarm recording mode	Minimum interval between two alarm recording start-times
8H	approx. 15 sec.
L24H	approx. 2 min.
L40H	approx. 2 min.

### Note

- Audio output is muted during the skip search.

### Info.

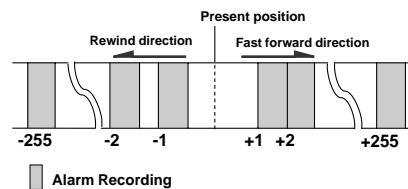
Skip search mechanism



### Info.

How to count index number

- Index number is the count from the present position. The index number of one alarm recording before the present position is "-1." One after is "+1."
- ±255 alarm recordings are counted at the maximum.



### Note

- The index signal may be difficult to locate in some recording conditions.



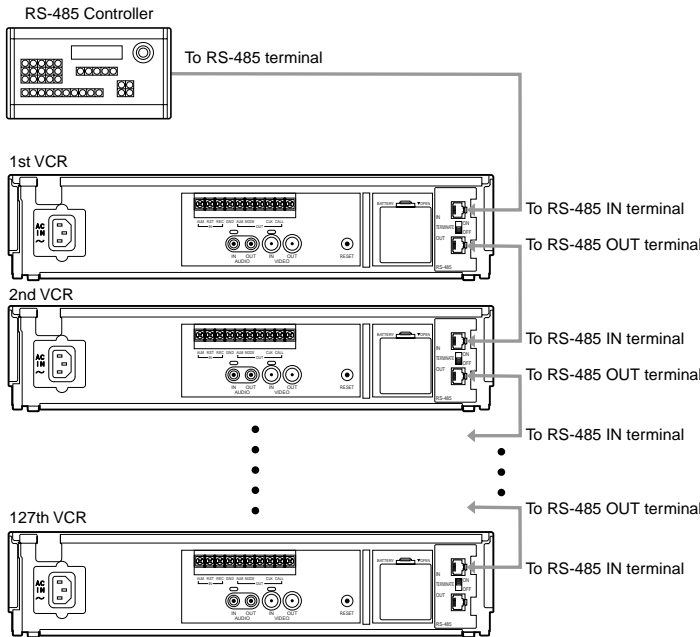
# Using RS-485 Interface

## Configuring the Time Lapse VCR

### Important notice:

- Before connecting the hardware, unplug the power cord of the VCR from the wall outlet, and turn the RS-485 controller power off.

### ■ Connecting the VCRs to a RS-485 controller



1. Connect the cable to the RS-485 terminal of the RS-485 controller.
2. Connect the other end of cable to RS-485 IN terminal on the VCR.
3. Connect the other end of the cable to RS-485 OUT terminal of the 1st VCR and the other end of cable to RS-485 IN terminal on the 2nd VCR.
4. Continue this process until the last (up to 127) VCR is connected.

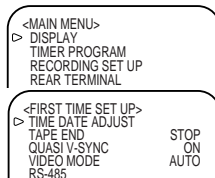
### Note

- RS-485 remote control is through a RJ-45 connector on the rear panel. RS-485 remote connection requires two wires. One wire connects to the RS-485 RXA and the other connects to the RS-485 RXB. Connect RXS and RXB externally, or set the TERMINATE switch to ON. If more than two units are connected, connect only one VCR with RXS and RXB externally, or set the TERMINATE switch to ON.
- Twist the wires together to help eliminate noise from the signal.

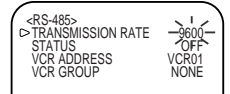
### RS-485 Setting

Set the RS-485 interface board setting by using the on screen menu of the VCR.

1. Press **MENU** button.
  - **<MAIN MENU>** appears.
2. Turn **JOG** to select **CLOCK/FIRST TIME SET UP** and turn **SHUTTLE** to the right.
  - **<FIRST TIME SET UP>** menu appears.



3. Turn **JOG** to select **RS-485** and turn **SHUTTLE** to the right.
  - **<RS-485>** menu appears.



4. Change the parameter value by turning **JOG** to the left or right and turn **SHUTTLE** to the right to store the new value.



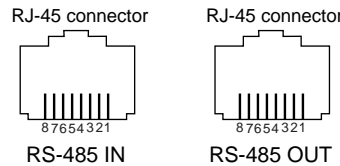
5. Repeat step 4 until all of the items are set.
  - **<FIRST TIME SET UP>** menu appears after setting VCR GROUP.
6. Press **MENU** button.
  - The day and present time display appears on screen.

### Note

- Set TRANSMISSION RATE to the same value as the controlling RS-485 controller.
- When VCRs have a unique VCR ADDRESS (from VCR01 to VCR127), VCRs can be controlled remotely via a RS-485 controller.
- When the group number (from 01 to 15) is set, the multiple VCRs set to the same number will be controlled at the same time.

### Connecting to a RS-485 Controller

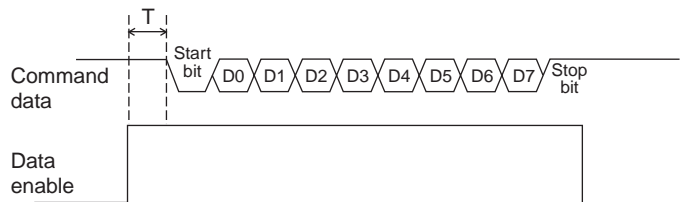
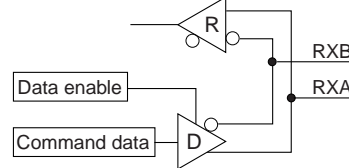
#### ■ Physical protocol of RS-485



No.	Pin Assignment
1	NO CONNECTION
2	NO CONNECTION
3	RXS
4	RXB (Data -)
5	NO CONNECTION
6	RXA (Data +)
7	NO CONNECTION
8	NO CONNECTION

#### ■ Data format

Synchronization Asynchronous  
 Transmission rate 1200/2400/4600/9600/19200 bps  
 Start bit length 1bit  
 Stop bit length 1bit  
 Data length 8bit  
 Parity bit Nil



### Note

- When the RS-485 controller sends the command to the VCR, enable the RS-485 driver of the controller to send the data before sending Start bit (before T=1bit or more).

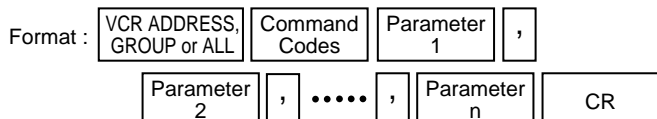
# Using RS-485 Interface

## Commands from RS-485 Controller

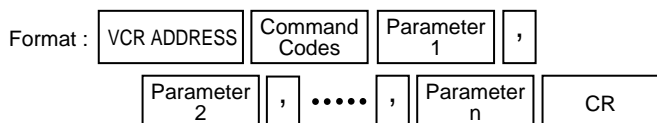
The commands sent from the RS-485 controller to the VCR and responses produced by the VCR are detailed in this section.

- Input the "VCR ADDRESS (eg. VCR01)" that you want to control and ", (comma)" before inputting the command code.
- When you want to control all the VCRs set to the same group number, input "GROUP (eg. GRP01)" that you want to control and ", (comma)" before inputting the command codes.
- When you want to control all connected VCRs, input "ALL" and ", (comma)" before inputting the command codes.

Command : Commands set to the VCR.



Status : Response codes from the VCR to outside.



- \* **CR** indicates carriage return code (0DH).

Example 1:

Fast forward the tape in the VCR of the ID number VCR02.

Sending commands from the RS-485 controller	Status or error code from the VCR to RS-485 controller	Meanings
VCR02, FF <b>CR</b>		Command for fast forwarding (VCR02)
	VCR02, RC <b>CR</b> *2	Command received (VCR02) *2
	VCR02, EX <b>CR</b> *2	Command carried out (VCR02) *2

- \* **CR** indicates carriage return code (0DH).
- \*2 Status or error code will be sent from the VCR when STATUS in the RS-485 menu is set to ON.

Example 2:

When the VCRs from VCR28 to VCR34 are set to GROUP03, and switch on the all VCR of the GROUP number 03.

Sending commands from the RS-485 controller	Status or error code from the VCR to RS-485 controller	Meanings
GRP03,PW1 <b>CR</b>		Power ON command

- \* **CR** indicates carriage return code (0DH).
- \* When the commands are sent for the group of VCRs, status or error code will not be sent from the VCRs.

Example 3:

Set the clock of the all VCR connected to 12:27.

Sending commands from the RS-485 controller	Status or error code from the RS-485 controller	Meanings
ALL,SC12,27 <b>CR</b>		Command for setting all VCRs' clock at 12:27

- \* **CR** indicates carriage return code (0DH).
- \* When the commands are send for ALL VCRs, status or error code will not be sent from the VCR.

## Commands and Responses

- **[CR]** indicates carriage return code (0DH).
- \* indicates one character or number. (eg. \*\*\* indicates three characters or numbers.)
- \*1: the command available for "ALL" VCRs or the "GROUP" of the VCRs. (All commands are available for controlling the specified VCR ADDRESS.)
- \*2: the command for which the VCR sends the status even when the STATUS in RS-485 menu is set to OFF.

NO.	Commands	*1	*2	Functions	Status after normal execution	Explanation of status
1	PW[CR]	O	–	Power ON/OFF	RC[CR] EX[CR]	Command received and carried out
2	PW0[CR]	O	–	Power OFF	↑	↑
3	PW1[CR]	O	–	Power ON	↑	↑
4	EJ[CR]	O	–	Eject	↑	↑
5	SP[CR]	O	–	Stop	↑	↑
6	PB[CR]	O	–	Playback	↑	↑
7	RP[CR]	O	–	Reverse playback	↑	↑
8	FF[CR]	O	–	Fast forward	↑	↑
9	RW[CR]	O	–	Rewind	↑	↑
10	RC[CR]	O	–	Recording	↑	↑
11	CM[CR]	O	–	Counter memory stop	↑	↑
12	PU[CR]	O	–	Pause ON/OFF	↑	↑
13	PU0[CR]	O	–	Pause OFF	↑	↑
14	PU1[CR]	O	–	Pause ON	↑	↑
15	FA[CR]	O	–	Frame advance (when still)	↑	↑
16	RA[CR]	O	–	Reverse frame advance (when still)	↑	↑
17	LK[CR]	O	–	Lock OFF	↑	↑
18	LK0[CR]	O	–	Lock ON	↑	↑
19	SF[CR]	O	–	Skip search (forward)	↑	↑
20	SR[CR]	O	–	Skip search (reverse)	↑	↑
21	IF***[CR]	O	–	Index search (forward) (***=001-255)	↑	↑
22	IR***[CR]	O	–	Index search (reverse) (***=001-255)	↑	↑
23	IN[CR]	–	O	Enquiry about current index No. (during index search)	RC[CR] ID***[CR]	Index No. is***=001-255
24	TR[CR]	O	–	Timer recording ON/OFF	RC[CR] EX[CR]	Command received and carried out
25	TR0[CR]	O	–	Timer recording OFF	↑	↑
26	TR1[CR]	O	–	Timer recording ON	↑	↑
27	TP[CR]	–	O	Enquiry about current executing timer program No.	RC[CR] TN*[CR]	Timer program N* is =1-8 (Note)ER08, when not timer recording
28	SS[CR]	–	O	Enquiry about current VCR status	RC[CR] ST00[CR] RC[CR] ST01[CR] RC[CR] ST02[CR] RC[CR] ST03[CR] RC[CR] ST04[CR] RC[CR] ST05[CR] RC[CR] ST06[CR] RC[CR] ST07[CR] RC[CR] ST08[CR] RC[CR] ST09[CR] RC[CR] ST10[CR] RC[CR] ST11[CR] RC[CR] ST12[CR] RC[CR] ST13[CR] RC[CR] ST14[CR] RC[CR] ST15[CR] RC[CR] ST16[CR] RC[CR] ST17[CR] RC[CR] ST18[CR] RC[CR] ST19[CR] RC[CR] ST20[CR] RC[CR] ST21[CR] RC[CR] ST22[CR] RC[CR] ST23[CR] RC[CR] ST30[CR] RC[CR] ST33[CR] RC[CR] ST34[CR]	Power off, cassette in Power off, cassette out Power on, cassette in Power on, cassette out Fast forward underway Rewind underway Recording underway Recording pause underway Playback underway Reverse playback underway Forward speed search underway Reverse speed search underway Still underway Counter memory stop underway Skip search (fast forward) underway Skip search (rewind) underway Playback during skip search Index search (fast forward) underway Index search (rewind) underway Rewind during repeat recording Alarm recording underway Timer recording underway Standby for timer recording Timer recording error underway Alarm recording Index writing underway Frame advance underway Reverse frame advance underway
29	LO*[CR]	O	–	Lock ON/OFF *:0=OFF, 1=ON	RC[CR] EX[CR]	Command received and carried out
30	LM[CR]	–	O	Enquiry about current lock status and lock mode	RC[CR] LM*[CR]	*: 0=Lock off, 1=Lock on
31	CR[CR]	O	–	Counter reset	RC[CR] EX[CR]	Command received and carried out
32	CT[CR]	–	O	Enquiry about current counter display value	RC[CR] CT *****[CR]	*****=00000-99999

## Using RS-485 Interface

NO.	Commands	*1	*2	Functions	Status after normal execution	Explanation of status
33	MC*** CR	O	-	Switch over REC/PLAY mode to ***= 006, L18, L30	RC <sub>CR</sub> EX <sub>CR</sub>	Command received and carried out
34	MD CR	-	O	Enquiry about current REC/PLAY mode	RC <sub>CR</sub> MD*** <sup>(1)</sup> CR	*** <sup>(1)</sup> : (same as item 34)
35	DP CR	O	-	Change menu to the next layer	RC <sub>CR</sub> EX <sub>CR</sub>	Command received and carried out
36	DP*** CR	O	-	Switch screen page to ***: 000=present time display 100=MAIN MENU 110=DISPLAY menu 120=SEARCH FUNCTION menu 130=TIMER PROGRAM menu 131=PROGRAM TO RECORD menu 132=HOLIDAY SET UP menu 140=RECORDING SET UP menu 150=REAR TERMINAL menu 160=MAINTENANCE menu 161=POWER LOSS LIST 162=ALARM LIST 163=ALL MENU INITIALZE 164=POWER LOSS LIST CLEAR 165=ALARM LIST CLEAR 170=FIRST TIME SET UP menu 171=TIME DATE ADJUST menu 172=RS-485 menu	↑	↑
37	PI CR	-	O	Enquiry about current screen page	RC <sub>CR</sub> ON*** <sup>(1)</sup> * <sup>(2)</sup> CR	*** <sup>(1)</sup> : (same as item 37), 050=LANGUAGE SELECT * <sup>(2)</sup> : 0=Setting completed, 1=Setting underway
38	SD** <sup>(1)</sup> , ** <sup>(2)</sup> , ** <sup>(3)</sup> CR	O	-	Current date setting ** <sup>(1)</sup> :Month, ** <sup>(2)</sup> :Day, ** <sup>(3)</sup> :Year	RC <sub>CR</sub> EX <sub>CR</sub>	Command received and carried out
39	DT CR	-	O	Enquiry about current date	RC <sub>CR</sub> TD** <sup>(1)</sup> , ** <sup>(2)</sup> , ** <sup>(3)</sup> , * <sup>(4)</sup> CR	** <sup>(1)</sup> , - ** <sup>(3)</sup> : (same as item 39) * <sup>(4)</sup> : Day of the week 0=SUN, 1=MON, 2=TUE, 3=WED, 4=THU, 5=FRI, 6=SAT
40	SC** <sup>(1)</sup> , ** <sup>(2)</sup> CR	O	-	Current time setting ** <sup>(1)</sup> :Hour, ** <sup>(2)</sup> :Minute	RC <sub>CR</sub> EX <sub>CR</sub>	Command received and carried out
41	TM CR	-	O	Enquiry about current time	RC <sub>CR</sub> TI** <sup>(1)</sup> , ** <sup>(2)</sup> , ** <sup>(3)</sup> CR	** <sup>(1)</sup> :Hour, ** <sup>(2)</sup> :Minute, ** <sup>(3)</sup> :Second
42	TD CR	-	O	Enquiry about power failure symbol	RC <sub>CR</sub> MK* CR	*: 0=Not Displayed, 1=Displayed
43	PS** <sup>(1)</sup> , ** <sup>(2)</sup> CR	O	-	Time and date display position ** <sup>(1)</sup> :Horizontal =01-30 (mode 1, size large) =01-52 (mode 1, size small) =01-39 (mode 2,3 size large) =01-62 (mode 2,3 size small) ** <sup>(2)</sup> :Vertical =01-37 (mode 1, size large or small) =01-35 (mode 2,3 size large or small)	RC <sub>CR</sub> EX <sub>CR</sub>	Command received and carried out
44	LC CR	-	O	Enquiry about time and date display position	RC <sub>CR</sub> LT** <sup>(1)</sup> , ** <sup>(2)</sup> CR	** <sup>(1)</sup> , ** <sup>(2)</sup> : (same as item 44)
45	DP131 <sub>CR</sub> PG* <sup>(1)</sup> , * <sup>(2)</sup> , ** <sup>(3)</sup> , ** <sup>(4)</sup> , ** <sup>(5)</sup> , ** <sup>(6)</sup> , ** <sup>(7)</sup> , * <sup>(8)</sup> CR DP <sub>CR</sub>	O	-	Timer program setting * <sup>(1)</sup> Program No.=1-8 * <sup>(2)</sup> :Day of the week (0=SUN, 1=MON, 2=TUE, 3=WED, 4=THU, 5=FRI, 6=SAT, 7=DAY, 8=SPL, 9=HLD) ** <sup>(3)</sup> :Rec. starting hour=00-23 ** <sup>(4)</sup> :Rec. starting minute=00-59 ** <sup>(5)</sup> :Rec. ending hour=00-23 ** <sup>(6)</sup> :Rec. ending minute=00-59 ** <sup>(7)</sup> :Rec. time mode= 006, L18, L30, SKP	RC <sub>CR</sub> EX <sub>CR</sub>	Command received and carried out (Note) An error (ER08) will occur if an attempt is made to program a timer program number that has already been set. Clear the timer program contents with the "CA*" command and then retry.
46	PM* CR	-	O	Enquiry about setting contents of timer program No. (*=1-8)	RC <sub>CR</sub> MP* <sup>(1)</sup> , * <sup>(2)</sup> , ** <sup>(3)</sup> , ** <sup>(4)</sup> , ** <sup>(5)</sup> , ** <sup>(6)</sup> , ** <sup>(7)</sup> , * <sup>(8)</sup> CR	* <sup>(1)</sup> , - * <sup>(8)</sup> (=same as item 46)
47	DP131 <sub>CR</sub> CA* DP <sub>CR</sub>	O	-	Clear contents of timer program No. (*=1-8)	RC <sub>CR</sub> EX <sub>CR</sub>	Command received and carried out
48	DW* <sup>(1)</sup> , * <sup>(2)</sup> CR	O	-	Setting the special day of the week * <sup>(1)</sup> :Start day of the week (0-6) * <sup>(2)</sup> :End day of the week (0-6) 0=SUN, 1=MON, 2=TUE, 3=WED, 4=THU, 5=FRI, 6=SAT	↑ (Cannot accept this command when* <sup>(1)</sup> and* <sup>(2)</sup> are the same number)	↑

Send the commands no. 45 and 47 when the VCR is in STOP mode.

NO.	Commands	*1	*2	Functions	Status after normal execution	Explanation of status
49	DW? [CR]	-	O	Enquiry about setting of the special day of the week	RC [CR] DW* <sup>(1)</sup> , * <sup>(2)</sup> [CR]	* <sup>(1)</sup> : Start day (of the week) (0-6) * <sup>(2)</sup> : End day (of the week) (0-6) 0=SUN, 1=MON, 2=TUE, 3=WED, 4=THU, 5=FRI, 6=SAT
50	AM** [CR]	O	-	Alarm recording mode setting **=06, 18, 30	RC [CR] EX [CR]	Command received and carried out
51	AS1 [CR]	-	O	Enquire of alarm recording mode setting	RC [CR] AM ** [CR]	**=06, 18, 30
52	AD* [CR]	O	-	Alarm REC duration setting *:0=MAN1, 1=MAN2, 2=15S, 3=30S, 4=45S, 5=1M, 6=2M, 7=5M, 8=10M	RC [CR] EX [CR]	Command received and carried out
53	AS0 [CR]	-	O	Enquiry about alarm REC duration setting	RC [CR] AP * [CR]	*: (same as item 53)
54	EM [CR]	O	-	Emergency REC ON/OFF	RC [CR] EX [CR]	Command received and carried out
55	EM0 [CR]	O	-	Emergency REC OFF	↑	↑
56	EM1 [CR]	O	-	Emergency REC ON	↑	↑
57	AS2 [CR]	-	O	Enquiry about emergency REC setting	RC [CR] EG* [CR]	*:0=OFF, 1=ON
58	TE * [CR]	O	-	Tape end movement setting *: 0=STOP, 1=REWIND, 2=REPEAT, 3=ALARM*PROT (protect)	RC [CR] EX [CR]	Command received and carried out
59	FS0 [CR]	-	O	Enquiry about tape end movement set	RC [CR] TE* [CR]	*: (same as item 59)
60	DM* [CR]	O	-	Display mode setting *=1-4	RC [CR] EX [CR]	Command received and carried out
61	DM? [CR]	-	O	Enquiry about display mode setting	RC [CR] DM* [CR]	*=1-4
62	CH0 [CR]	O	-	Set date character display size "SMALL"	RC [CR] EX [CR]	Command received and carried out
63	CH1 [CR]	O	-	Set date character display size "LARGE"	↑	Command received and carried out
64	FS1 [CR]	-	O	Enquiry about date character display size	RC [CR] CZ* [CR]	*: 0=SMALL, 1=LARGE
65	CO* <sup>(1)</sup> , ** <sup>(2)</sup> [CR]	O	-	Clock out setting * <sup>(1)</sup> :0=REC, 1=T/L REC ** <sup>(2)</sup> :01, 02, 03, 04, 05, 10, 15, 20, 25, 30, 50, 60, 00(output by field)	RC [CR] EX [CR]	Command received and carried out
66	RO [CR]	-	O	Enquiry about clock out setting	RC [CR] CD* <sup>(1)</sup> , ** <sup>(2)</sup> [CR]	* <sup>(1)</sup> , ** <sup>(2)</sup> : (same as item 66)
67	MO* [CR]	O	-	Mode out setting *: 0=REC, 1=PLAY, 2=POWER, 3=TAPE IN, 5=CLOCK ADJ	RC [CR] EX [CR]	Command received and carried out
68	RM [CR]	-	O	Enquiry about MODE OUT setting	RC [CR] MR* [CR]	*: (same as item 68)
69	CU* [CR]	O	-	CALL OUT setting *:0=OFF, 1=ON Receive the command only when the signal at the CALL OUT terminal is switched to the active condition.	RC [CR] EX [CR]	Command received and carried out
70	CU? [CR]	-	O	Enquiry about CALL OUT setting	RC [CR] CU* [CR]	*: 0=OFF, 1=ON
71	BL* [CR]	O	-	Blue Back setting *: 0=OFF, 1=ON	RC [CR] EX [CR]	Command received and carried out
72	BL? [CR]	-	O	Enquiry about Blue Back setting	RC [CR] BL* [CR]	*: 0=OFF, 1=ON
73	ST* [CR]	O	-	Set menu item to flash *:0=OFF, 1=ON	RC [CR] EX [CR]	Command received and carried out
74	AN [CR]	-	O	Enquiry about current alarm REC. No.	RC [CR] AN***** [CR]	*****=0000-9999
75	AT* [CR]	-	O	Enquiry about alarm list *: 0=about the first alarm recording 1-7=about the last to seventh last alarm recording	RC [CR] AT** <sup>(1)</sup> , ** <sup>(2)</sup> , ** <sup>(3)</sup> , ** <sup>(4)</sup> , ** <sup>(5)</sup> [CR]	** <sup>(1)</sup> :Month, ** <sup>(2)</sup> :Day, ** <sup>(3)</sup> :Year, ** <sup>(4)</sup> :Hour, ** <sup>(5)</sup> :Minute
76	CA [CR]	O	-	Clearing alarm list	RC [CR] EX [CR]	Command received and carried out
77	PN [CR]	-	O	Enquiry about current power loss No.	RC [CR] PN** [CR]	**=00-99
78	PT* [CR]	-	O	Enquiry about power loss list *: 0=about the first power loss 1=about the second last power loss 2=about the last power loss	RC [CR] PT** <sup>(1)</sup> , ** <sup>(2)</sup> , ** <sup>(3)</sup> , ** <sup>(4)</sup> , ** <sup>(5)</sup> [CR]	** <sup>(1)</sup> :Month, ** <sup>(2)</sup> :Day, ** <sup>(3)</sup> :Year, ** <sup>(4)</sup> :Hour, ** <sup>(5)</sup> :Minute
79	PC [CR]	O	-	Clearing power loss list	RC [CR] EX [CR]	Command received and carried out
80	MI [CR]	O	-	Initializing the menu setting	↑	↑
81	HM? [CR]	-	O	Enquiry about the elapsed time	RC [CR] HM***** [CR]	*****=hour
82	WN [CR]	-	O	Enquiry about warning information	RC [CR] WN** [CR]	** : Warning No. 00=no malfunction, 01=tape end 03=video input missing 04=clogged head 05=reel rotation trouble 06=loading motor trouble 07=capstan motor trouble 08=drum motor trouble, 09=tape loose 10=switching power short, 11=cut tape

## Using RS-485 Interface

NO.	Commands	*1	*2	Functions	Status after normal execution	Explanation of status
83	CA0 <input type="checkbox"/>	O	-	Clearing the warning "ER05"	RC <input type="checkbox"/> EX <input type="checkbox"/>	Command received and carried out
84	RI * <input type="checkbox"/>	O	-	REC IN setting *: 0=SERIES, 1=REC-START/STOP	↑	↑
85	RI? <input type="checkbox"/>	-	O	Enquiry about REC IN setting	RC <input type="checkbox"/> RI * <input type="checkbox"/>	*: (same as item 93)
86	QV * <input type="checkbox"/>	O	-	QUASI-VSYNC setting * : 0=OFF, 1=ON	RC <input type="checkbox"/> EX <input type="checkbox"/>	Command received and carried out
87	QM <input type="checkbox"/>	-	O	Enquiry about QUASI-VSYNC setting	RC <input type="checkbox"/> QV * <input type="checkbox"/>	*: 0=OFF, 1=ON
88	CL * <input type="checkbox"/>	O	-	CALL OUT setting *: 0=WRNG, 1=WRNG•TAPE END	RC <input type="checkbox"/> EX <input type="checkbox"/>	Command received and carried out
89	RL <input type="checkbox"/>	-	O	Enquiry about CALL OUT setting	RC <input type="checkbox"/> CL * <input type="checkbox"/>	*: (same as item 97)
90	SM * <input type="checkbox"/>	O	-	DAYLIGHT SAVING setting *: 0=OFF, 1=ON, 2=AUTO	RC <input type="checkbox"/> EX <input type="checkbox"/>	Command received and carried out
91	SM? <input type="checkbox"/>	-	O	Enquiry about DAYLIGHT SAVINGS setting	RC <input type="checkbox"/> SM * <input type="checkbox"/>	*: 0=OFF, 1=ON, 2=AUTO OFF, 3=AUTO ON
92	RS? <input type="checkbox"/>	-	O	Enquiry about REPEAT REC TIMES	RC <input type="checkbox"/> RS *** <input type="checkbox"/> RC <input type="checkbox"/> RSOVER <input type="checkbox"/>	*** : 000-200 OVER (more than 201 times)
93	LP? <input type="checkbox"/>	-	O	Enquiry about tape remaining time	RC <input type="checkbox"/> LP * <sup>(1)</sup> , ** <sup>(2)</sup> <input type="checkbox"/>	* <sup>(1)</sup> :Hour, ** <sup>(2)</sup> :Minute
94	MQ * <input type="checkbox"/>	O	-	VIDEO MODE setting * : 0=COLOR, 1=B/W, 2=AUTO	RC <input type="checkbox"/> EX <input type="checkbox"/>	Command received and carried out
95	SB1 <input type="checkbox"/>	-	O	Enquiry about VIDEO MODE	RC <input type="checkbox"/> SQ * <input type="checkbox"/>	* : (same as item 108)
96	MM * <input type="checkbox"/>	O	-	Menu language selection * : 0=English, 1=French, 2=Spanish	RC <input type="checkbox"/> EX <input type="checkbox"/>	Command received and carried out
97	SB3 <input type="checkbox"/>	-	O	Enquiry about selected menu language	RC <input type="checkbox"/> SP * <input type="checkbox"/>	* : (same as item 110) 8=Language is not selected
98	HL * * <sup>(1)</sup> , * * <sup>(2)</sup> , * * <sup>(3)</sup> <input type="checkbox"/>	O	-	Holiday set up setting ** <sup>(1)</sup> :Position No. 01-20, ** <sup>(2)</sup> :Month, ** <sup>(3)</sup> :Day	RC <input type="checkbox"/> EX <input type="checkbox"/>	Command received and carried out
99	EH * * <input type="checkbox"/>	O	-	Clearing holiday set up setting * * : Position No. 01-20	↑	↑
100	HC * <input type="checkbox"/>	-	O	Enquiry about holiday set up setting on line 1 to 5 * : Line No. 1-5	RC <input type="checkbox"/> HC * * <sup>(1)</sup> , * * <sup>(2)</sup> , * * <sup>(1)</sup> , * * <sup>(2)</sup> , * * <sup>(1)</sup> , * * <sup>(2)</sup> , * * <sup>(1)</sup> , * * <sup>(2)</sup> <input type="checkbox"/>	* * <sup>(1)</sup> :Month, * * <sup>(2)</sup> :Day

### Error code

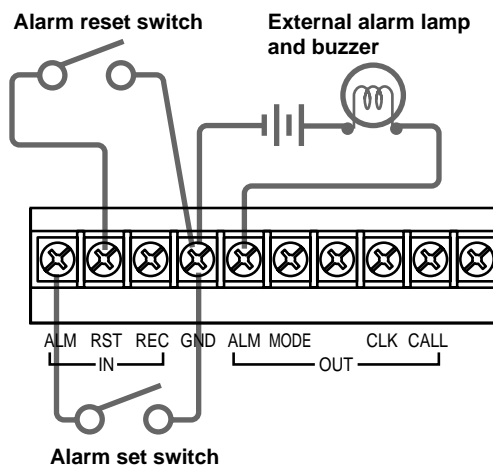
NO.	Errors	Meaning of error
1	ER00	No power supply
2	ER01	No cassette loaded
3	ER02	Broken tape tab (unable to record)
4	ER03	Beginning of the tape
5	ER04	Tape end
6	ER05	Problem with the tape, video input or VCR mechanism
7	ER06	Present time or timer program not yet set

NO.	Errors	Meaning of error
8	ER07	Alarm REC underway (Unable to change setting)
9	ER08	Unfeasible
10	ER10	Incorrect command
11	ER11	Incorrect parameter
12	ER12	Overflow of the VCR's command receive buffer
13	ER13	Data not received correctly

# Connections for Various Functions

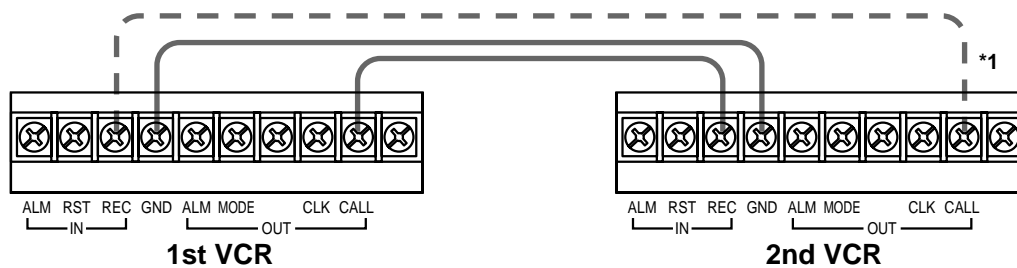
## Alarm Recording Connection

The alarm can be confirmed from a distance by connecting the ALM OUT terminal with an existing alarm system panel or other peripherals such as a buzzer. Connect the VCR and other peripherals as shown to the right. (☞ page 11 for the menu setting)



## Series Recording Connection

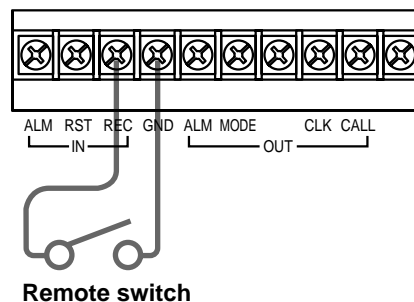
Connect VCRs to be used as shown below. (☞ page 12 for the menu setting)



\*1 : This connection is necessary in case of **Series Recording 2**.

## Remote Recording Connection

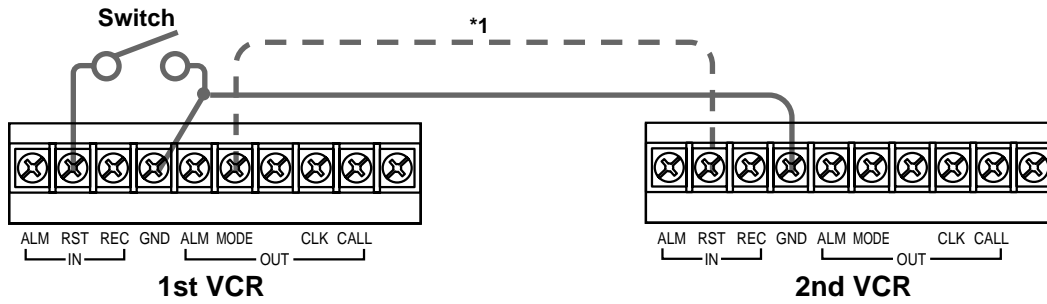
Connect the VCR with a remote switch as shown to the right. (☞ page 13 for the menu setting)



# Connections for Various Functions

## Connection for External Time Clock Adjustment

Connect VCRs as shown below.



\*1 : When connecting MODE OUT terminal of the first VCR with RST IN terminal of the second VCR, the on-screen clock of the second VCR can be adjusted to that of the first VCR.

## External time clock adjustment

The VCR's clock can be set to the nearest hour by connecting with an external clock. When two or more VCRs are connected, the clock can be set to the first VCR's clock simultaneously. Make the following settings on all VCRs that you wish to set the clock.

- 1 Press the **MENU** button.
  - **<MAIN MENU>** appears.
- 2 Set **ALARM REC DURATION** of **<RECORDING SET UP>** menu to other than **MAN1**.

```
<RECORDING SET UP>
▷ ALARM REC MODE      8H
  ALARM REC DURATION  1M
  EMERGENCY REC       OFF
```

Set step 3 to the first VCR only when setting the clock of more than two VCRs.

- 3 Set **MODE OUT** of **<REAR TERMINAL>** menu to **CLOCK ADJ**.
- 4 Press the **MENU** button.
  - The day and present time display appears on screen.

```
<REAR TERMINAL>
CALL OUT WRNG+TAPE END
CLOCK OUT REC-1
▷ MODE OUT  CLOCK ADJ
  REC IN    SERIES
```

### ■ How the external time clock adjustment works

When the RST IN terminal is grounded at the rear panel, the clock is automatically set to the nearest hour.

Example)

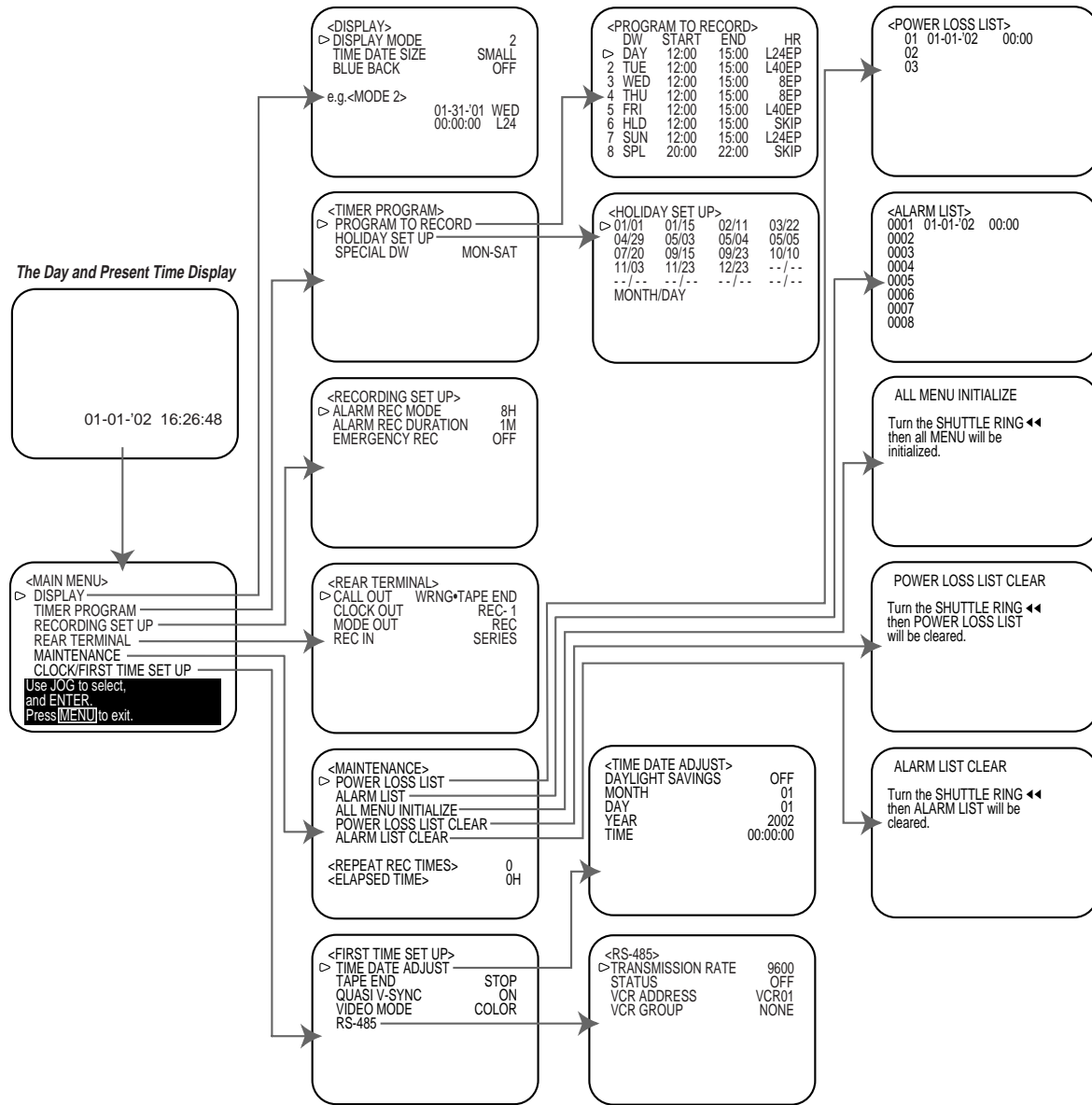
- When the display shows 11:29:59, the clock is adjusted to 11:00:00.
- When the display shows 11:30:00, the clock is adjusted to 12:00:00.

When more than two VCRs are connected and the clock of the first VCR is adjusted to the nearest hour, the additional VCRs will also be set to the nearest hour.



# Setting the Menus

## Menu Chart



Set the menus by the following steps.

1. Press **MENU** button.
  - **<MAIN MENU>** appears.
2. Turn the **JOG** dial to the left or right to select the desired item.
  - When turned to the right, the cursor moves downward.
  - When turned to the left, the cursor moves upward.
3. Turn the **SHUTTLE** ring to the right.
  - The desired item is selected and the menu appears.
4. Turn the **JOG** dial to the left or right to select item.
5. Turn the **SHUTTLE** ring to the right, then the setting item flashes.
6. Turn the **JOG** dial to the left or right to change the setting.
7. Turn the **SHUTTLE** ring to the right to set.
8. Press **MENU** button.
  - The day and present time display appears.

# Setting the Menus

## MAIN MENU

### DISPLAY

Sets the display format of the date and present time on screen.

### TIMER PROGRAM

Sets the timer recording.

### RECORDING SET UP

Sets the alarm recording mode, alarm recording duration, and emergency recording.

### REAR TERMINAL

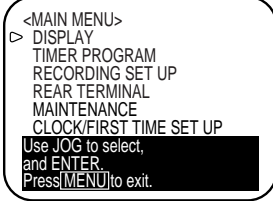
Sets the frequency division ratio of CLOCK OUT, output signal of CALL OUT terminal, MODE OUT terminal, etc.

### MAINTENANCE

Displays the power loss list, alarm list, etc. Also, initializes all menu settings and clears the power loss list and alarm list.

### CLOCK/FIRST TIME SET UP

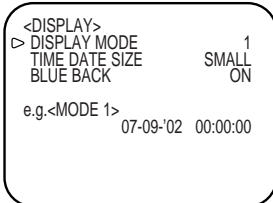
Sets the present time and the operation at the tape end, etc.



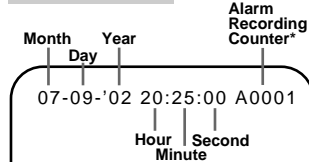
## DISPLAY

### Setting the display mode (DISPLAY MODE)

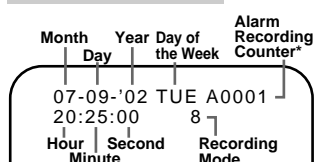
- Shows date and present time.
- Shows date, day of the week, present time, and recording mode.
- Displays nothing. In case of alarm recording, same as DISPLAY MODE 2.
- Displays nothing.



DISPLAY MODE 1



DISPLAY MODE 2 and 3



\* shown when DISPLAY MODE 1, 2, or 3 is selected.

### Setting the size of letters for date and present time display (TIME DATE SIZE)

**SMALL** The size of the letters become small.

**LARGE** The size of the letters become large.

### Setting the background color (BLUE BACK)

**ON** The blue colored screen overlays on the recorded picture when the menu is displayed on the monitor.

**OFF** The blue colored screen will be replaced by the recorded picture overlaid with the menu display.

- When the setting is OFF and the video signal is not input, the blue colored screen overlays on the recorded picture when the menu is displayed on the monitor.
- When the setting is ON and the video signal is not input, the background color will be in blue. In this case, the warning "NO SIGNAL" flashes on screen and "noSIG" flashes on the fluorescent display.

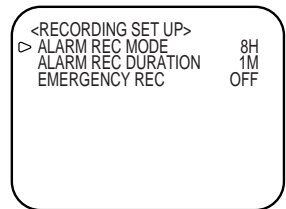
## TIMER PROGRAM

☞ page 9, Timer Recording.

## RECORDING SET UP

### Setting the alarm recording mode (ALARM REC MODE)

Sets the alarm recording time mode. When the JOG dial is turned, the display will be switched in the order of 8H → L24H → L40H → 8H → ...



### Setting the alarm recording duration (ALARM REC DURATION)

Sets the duration of the alarm recording period. When the JOG dial is turned, the display will be switched in the order of 1M (minute) → 2M → 5M → 10M → MAN1 → MAN2 → 15S (second) → 30S → 45S → 1M → ...

### Setting the emergency recording (EMERGENCY REC)

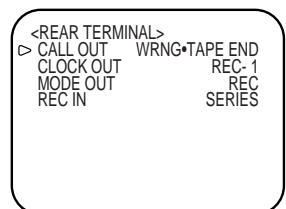
**ON** Starts alarm recording when the ALM IN terminal is grounded, while the VCR is recording, in stop mode, turned off or in stand-by mode for timer recording.

**OFF** Starts alarm recording when the ALM IN terminal is grounded during recording.

## REAR TERMINAL

### Setting the operation mode of the CALL OUT terminal (CALL OUT)

Sets the mode of call signal output from the CALL OUT terminal. If any abnormalities occur with the VCR during recording, the call signal is output from the CALL OUT terminal on the rear panel regardless of CALL OUT setting.



**WRNG•TAPE END** The VCR outputs a call signal when the tape reaches its end during recording or when a malfunction occurs during recording. The VCR's function when the tape ends depends on the setting of TAPE END in FIRST TIME SET UP menu (☞ next page).

**WRNG** The VCR outputs a call signal only when a malfunction occurs during recording.

## Setting the recording mode and frequency division ratio (CLOCK OUT)

Sets the recording mode and the frequency division ratio of clock pulse output from the CLOCK OUT terminal.

- Setting the recording mode during the clock pulse output

<b>REC</b>	When recording in any mode.
<b>T/L REC</b>	When recording in time-lapse mode (L24H, L40H).

- Setting the frequency division ratio of the clock pulse output

When the JOG dial is turned, the display will be switched in the order of 1 → 2 → 3 → 4 → 5 → 10 → 15 → 20 → 25 → 30 → 50 → 60 → F (field) → 1 → ...  
The numbers 1 to 60 indicate the number of frames at 8H recording mode and the number of fields at time lapse recording modes. (One frame consists of two fields.) When set to F (field), one field is selected.

## Setting the operation mode of the MODE OUT terminal (MODE OUT)

A mode signal is output under the following circumstances.

<b>REC</b>	During recording.
<b>PLAY</b>	During playback.
<b>POWER</b>	While the VCR is turned on.
<b>TAPE IN</b>	When a tape is inserted in the VCR.
<b>CLOCK ADJ</b>	When the clock indicates "00(min.):00(s)," the signal is output for 1 second only.

## Setting the operation mode of REC IN terminal (REC IN)

<b>SERIES</b>	Recording starts when the REC IN terminal is grounded.
<b>REC-START/STOP</b>	Recording continues while the REC IN terminal is grounded. If the signal is input for a short period, the VCR may not start recording.

## MAINTENANCE

### Displaying the power loss list (POWER LOSS LIST)

page 14

### Displaying the alarm list (ALARM LIST)

page 14

```
<MAINTENANCE>
▷ POWER LOSS LIST
  ALARM LIST
  ALL MENU INITIALIZE
  POWER LOSS LIST CLEAR
  ALARM LIST CLEAR

<REPEAT REC TIMES>  0
<ELAPSED TIME>      0 OH
```

### Initializing all menu settings (ALL MENU INITIALIZE)

All menus will be initialized except timer programs.

- Press the **MENU** button.
  - <MAIN MENU> appears.
- Turn the **JOG** dial to select **MAINTENANCE** and turn the **SHUTTLE** ring to the right.
  - <MAINTENANCE> menu appears.
- Turn the **JOG** dial to select **ALL MENU INITIALIZE** and turn the **SHUTTLE** ring to the right.
  - <ALL MENU INITIALIZE> menu appears.

```
ALL MENU INITIALIZE
Turn the SHUTTLE RING ◀◀
then all MENU will be
initialized.
```

- Turn the **SHUTTLE** ring to the left.
  - The setting of all menus (except TIMER PROGRAM) will return to its initial setting.
    - ⇒ To exit the menu without initializing all menus, press the **MENU** button.
- Press the **MENU** button.
  - The day and present time display appears on screen.

### Clearing the power loss list (POWER LOSS LIST CLEAR)

page 14

### Clearing the alarm list (ALARM LIST CLEAR)

page 15

### Displaying number of tape use (REPEAT REC TIMES)

page 15

### Displaying the elapsed time of VCR (ELAPSED TIME)

page 15

## FIRST TIME SET UP

### Setting the present time, date, and Daylight Saving Time settings (TIME DATE ADJUST)

page 5

```
<FIRST TIME SET UP>
▷ TIME DATE ADJUST
  TAPE END
  QUASI V-SYNC
  VIDEO MODE
  RS-485
                                STOP
                                ON
                                AUTO
```

### Setting operation of VCR when the tape reaches its end during recording or playback (TAPE END)

The VCR's function when the tape reaches its end during recording is as follows.

**STOP** The tape stops, the indication "End" appears on the fluorescent display, and "TAPE END" appears on screen. When CALL OUT is set to WRNG•TAPE END, a call signal is output from the CALL OUT terminal.

**REWIND** Rewinds the tape to the beginning and stops (except during timer recording). When CALL OUT is set to WRNG•TAPE END and a tape reaches its end, a call signal is output for two seconds from the CALL OUT terminal.

**REPEAT** Rewinds the tape to the beginning and resumes the recording. When CALL OUT is set to WRNG•TAPE END and a tape reaches its end, a call signal is output for two seconds from the CALL OUT terminal.

### ALARM•PROT (alarm protection)

If any alarm recordings are present on the tape and the tape stops, the indication "End" appears on the fluorescent display and "TAPE END" appears on screen. When CALL OUT is set to WRNG•TAPE END, a call signal is output from the CALL OUT terminal. If there is no alarm recording, the VCR rewinds the tape to the beginning and resumes the recording.

Go to page 8 for the VCR's function when the tape reaches its end during playback.

### Setting Quasi-V-sync on or off (QUASI V-SYNC)

**ON** Quasi-V-sync. signal is inserted to the video output signal in the special effects playback ( page 16) or normal playback in L24H or L40H mode.

**OFF** Quasi-V-sync. signal is not inserted.

#### Note

- Some multiplexers may require Quasi-V-sync to be OFF in order to work properly.

# Setting the Menus

## Setting the playback/recording color mode (VIDEO MODE)

**AUTO** The VCR automatically switches the circuits according to type of the input/playback video signal, color or black and white.

**COLOR** Select for recording or playback in color.

**B/W** Select for recording or playback in black and white.

---

## RS-485

### Setting the transmission rate (TRANSMISSION RATE)

When JOG is turned, the display will be switched in the order of 9600 (bps) → 19200 → 1200 → 2400 → 4600 → 9600 → ...

<RS-485>	
▷ TRANSMISSION RATE	9600
STATUS	OFF
VCR ADDRESS	VCR01
VCR GROUP	NONE

### Setting of status (STATUS)

**ON** : The status will be sent from the VCR when the command for the specified VCR ADDRESS is send.

**OFF** : The status will not be sent from the VCR when the command for the specified VCR ADDRESS is send.

For the commands which are specified in \*2 column of the Commands and Responses on page 21 to 24, the VCR sends the status even when STATUS is set to OFF.

### Setting the ID number of the VCR (VCR ADDRESS)

When JOG is turned, the display will be switched in the order of VCR01 → VCR02 → ..... → VCR126 → VCR127.

**Note**

- Assign a different VCR ADDRESS for each connected VCRs.

### Setting the group number of the VCR (VCR GROUP)

When JOG is turned, the display will be switched in the order of NONE → GRP01 → GRP02 → ..... → GRP14 → GRP15.

---

# Before Calling for Service

When you find any problem with this VCR, first check the following. If you still cannot solve the problem, stop using the VCR, unplug it from the AC outlet, and contact your dealer.

Symptom	Remedy
<b>Installation</b>	
No power supplied to VCR.	<ul style="list-style-type: none"> <li>• Has the power cord been disconnected from the AC outlet?</li> <li>• Is the Lock indicator (LOCK) illuminated? → Press the SEARCH button on the front panel for more than 10 seconds to unlock the VCR.</li> <li>• Is the Timer Recording indicator (⏏) illuminated? → Press the TIMER REC button on the front panel to cancel the timer recording.</li> </ul>
The VCR POWER is ON, but the unit does not operate.	<ul style="list-style-type: none"> <li>• Is the Lock indicator (LOCK) illuminated? → Press the SEARCH button on the front panel for more than 10 seconds to unlock the VCR.</li> <li>• Safety devices are in operation. → Press the RESET button on the back panel using a pointed instrument, and then turn the power on again.</li> </ul>
No picture displays on the MONITOR screen.	<ul style="list-style-type: none"> <li>• Is the monitor or the camera connected correctly? → Check the connection.</li> <li>• Is the connecting cable properly connected, or is the cable defective? → Check the connection and also check for the snapping of a wire in the cable.</li> </ul>
The picture is not clear on the monitor.	<ul style="list-style-type: none"> <li>• Is the camera focused? → See the user's manual for your camera and focus the camera correctly.</li> </ul>

## Function/operation

No operation when any tape operation button is pressed.	<ul style="list-style-type: none"> <li>• Is the Lock indicator (LOCK) illuminated? → Press the SEARCH button on the front panel for more than 10 seconds to unlock the VCR.</li> <li>• Is a cassette inserted?</li> </ul>
The present time is not correct even if using the VCR everyday.	→ Make sure the power cord is connected to the AC outlet for approximately 40 or more hours per week when using it everyday.
The power cord has been disconnected for less than 31 days, but the present time has been reset.	→ Make sure the power cord is connected to the AC outlet for approximately 40 or more hours per week when using it everyday. <ul style="list-style-type: none"> <li>• The reserved contents may be erased even within 31 days depending on the charging time of the power failure compensation circuit. → Set the present time setting again.</li> </ul>

## Recording

Recording does not work by pressing the REC button.	<ul style="list-style-type: none"> <li>• Is the Lock indicator (LOCK) illuminated? → Press the SEARCH button on the front panel for more than 10 seconds to unlock the VCR.</li> <li>• Has the cassette's erasure prevention tab been broken off? → Load the cassette with its erasure prevention tab intact.</li> <li>• Has the tape run out? → Rewind the tape or load a new tape.</li> </ul>
Recording cannot be stopped by pressing the STOP button.	<ul style="list-style-type: none"> <li>• Is the Lock indicator (LOCK) illuminated? → Press the SEARCH button on the front panel for more than 10 seconds to unlock the VCR.</li> <li>• Is the VCR in timer recording mode (Timer recording indicator (⏏) is illuminating)? → Press the TIMER REC button once.</li> </ul>
Repeat recording does not work.	<ul style="list-style-type: none"> <li>• Is the Repeat indicator (↺) illuminated? → Set TAPE END in the FIRST TIME SET UP menu to REPEAT or ALARM•PROT. When TAPE END in the FIRST TIME SET UP menu is set to ALARM•PROT, repeat recording does not work using a tape with an alarm recording. When a tape reaches its end during the emergency recording (recording started while the VCR is stopped or the VCR power is off), the VCR rewinds the tape and stops (recording does not start again) even though TAPE END in the FIRST TIME SET UP menu is set to REPEAT.</li> </ul>

## Before Calling for Service

Symptom	Remedy
---------	--------

### Recording (continued)

Timer recording does not operate.	<ul style="list-style-type: none"> <li>• Have the day and present time been set accurately? → Set the day and present time again.</li> <li>• Have the recording start-time, recording end-time, and the recording mode been set accurately? → Confirm the settings on the &lt;PROGRAM TO RECORD&gt; menu.</li> <li>• Is the TIMER REC indicator (⏻) illuminated? → If not, press the TIMER REC button on the front panel to stand by for the timer recording.</li> </ul>
Alarm recording does not work.	<ul style="list-style-type: none"> <li>• Is the external switch connected correctly? → Check the connection.</li> <li>• Is the Emergency Recording indicator (EMGCY) illuminated? → Set EMERGENCY REC in the RECORDING SET UP menu to ON.</li> </ul>

### Playback

Playback does not start by pressing the PLAY button.	<ul style="list-style-type: none"> <li>• Is the Lock indicator (LOCK) illuminated? → Press the SEARCH button on the front panel for more than 10 seconds to unlock the VCR.</li> <li>• Is a cassette inserted?</li> <li>• Has the tape run out?</li> </ul>
Noise bars in the picture during playback.	→ Adjust the tracking by pressing the TRACKING buttons on the front panel.
Playback speed is fast or slow.	→ Adjust the playback speed by pressing the MODE button on the front panel.
The picture vibrates at the top and bottom when in still picture mode.	→ Adjust the picture by pressing the VERTICAL ADJUST buttons on the front panel.
Clear camera pictures during recording, but during playback the picture is not clear.	<ul style="list-style-type: none"> <li>• The video heads may be clogged. → Eject the cassette, insert it again, and wait for more than 5 seconds. Repeat this step for 4 to 5 times. If this does not correct the problem, contact your dealer.</li> </ul>

# Warning Display

## Self-diagnostic function

This VCR uses a self-diagnostic function to detect an internal malfunction during recording. When a malfunction occurs in the VCR during recording, the indicator corresponding to each malfunction illuminates on the fluorescent display and/or on screen.

The type of malfunction corresponding to the indicator and countermeasures are given below.

Fluorescent display	Monitor	Cause	Remedy	To turn off the indicator
End	TAPE END	The tape ends during recording.	Rewind the tape or press the EJECT button.	Turn off the indicator on the fluorescent display and screen by pressing the EJECT button or rewinding the tape.
noSIG	NO SIGNAL	Lack of video signal input during recording.	Check for loose connections.	When a video signal is restored or the recording mode is cleared, the indicator on the fluorescent display and screen turns off.
(the display starts flashing)	CHECK	Tape/deck trouble during recording.	First, check the cassette. If there seems to be nothing wrong with the cassette, try the recording operation again. If the indicator "CHECK" is still displayed, replace the cassette with a new one and try the operation again. If this does not clear the indicator, unplug the power cord and contact your dealer.	

### ■ When the tape ends

When the tape reaches its end during recording, "End" illuminates on the fluorescent display and "TAPE END" illuminates on screen. The warning indicators will not illuminate if TAPE END in FIRST TIME SET UP menu is set to REPEAT, ALARM•PROT (when no alarm recording is made), or REWIND.

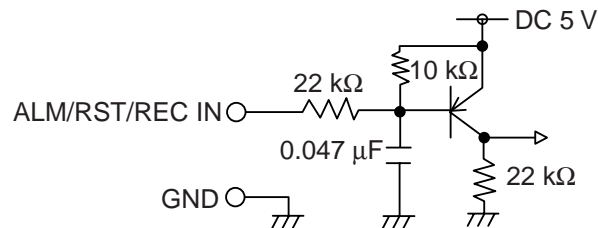
### ■ Lack of video signal input

The indicator "NO SIGNAL" appears on screen and "noSig" flashes on the fluorescent display when the VCR cannot get any video input signal during recording. The video input signal will not be obtained in case of any malfunction such as a broken video cable or when POWER to the camera is turned off.

# Control Input/Output Signals and Circuit

## ALM/RST/REC IN terminals (screw)

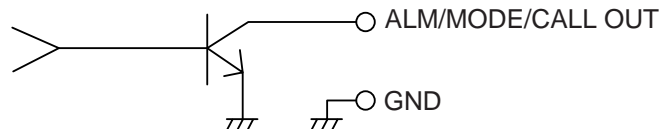
Active	When input terminals are short-circuited to GND or "L" level voltage (0 – + 1.6V) applied.
Time for active	0.1 sec. or over.
Non active	Open the input.



<Interface circuit inside the VCR>

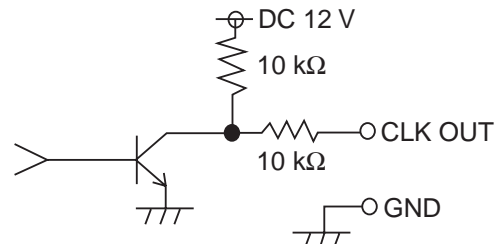
## ALM/MODE/CALL OUT terminals (screw)

Active	"L" level voltage (0 – + 0.4V) output; max. drive current 50 mA (+5V dc)/10 mA (+24V dc)
Non active	Open; max. voltage +24V dc



<Interface circuit inside the VCR>

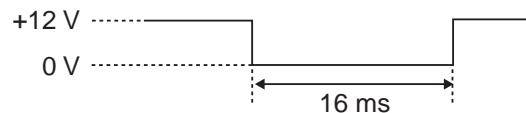
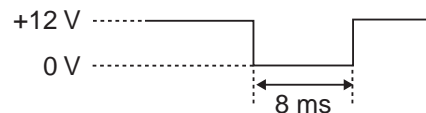
## CLK OUT terminals (screw)



<Interface circuit inside the VCR>

## CLK OUT signal

- When F is selected in CLOCK OUT of REAR TERMINAL menu (at 8H mode) or while recording in L24H or L40H mode.
- When REC-1 to REC-60 is selected in CLOCK OUT of REAR TERMINAL menu (at 8H mode).





# Maintenance Guide

[○: CLEANING      ●: CHECK & ADJUSTMENT      ⊙: REPLACEMENT      □: GREASING]

SPECIFICATION	EVERY 500 HOURS	EVERY 1,000 HOURS	EVERY 4,000 HOURS	EVERY 10,000 HOURS
VIDEO HEAD *1	○	⊙	⊙	⊙
BRUSH *1			⊙	
DRUM MOTOR *2				⊙
ASSY DRUM *3	○	○	○	⊙
FE HEAD	○	○	○	⊙
A/C HEAD UNIT	○	○	○	⊙
TAPE PATH POLES	○	○	○	○
CAPSTAN SHAFT	○	○	○	○
REEL DISK	○	○	⊙	○
CAPSTAN MOTOR			⊙	
PINCH ARM UNIT			⊙	
REEL BELT			⊙	
BCP UNIT			⊙	
BRAKE BELT (SP, TU)			⊙	
IDLER UNIT			⊙	
ASSY GEAR PULLY			⊙	
CLEANING ROLLER			⊙	
LOADING MOTOR ASSY				⊙
LOADING MECHANISM				□
SERVO CIRCUIT *4			●	
Interchangeability Adjustment of the Mechanism			●	

\*1 Included in the UPPER DRUM ASSY of the ASSY DRUM.

The exchange every 4,000 hrs is recommended only when over 24H mode is used.

\*2 Included in the ASSY DRUM.

\*3 Means the UPPER DRUM ASSY and LOWER DRUM ASSY, excluding the VIDEO HEAD.

\*4 Included in the PCB-MAIN.

Note : 1. Check tape running functions and performance, such as picture and sound, concerning each mode at inspection.

2. Disassembly for repair is required when the operating time exceeds approx. 10,000 hrs.

3. ⊙ : Replace with new part at 4,000 hrs or three years.

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# Specifications

## General

Power Source	100-230 V ac $\pm$ 10%, 50/60 Hz (The included power cord is used for 120 V, 60 Hz.)
Power Consumption	Approx. 18 Watts
Television System	CCIR standard 525 lines, 60 field NTSC
Color Signal	Low frequency conversion, sub-carrier phase shift recording
Tape Format	VHS 1/2" width high-density video cassette tape
Tape Speed and Recording Time	See below (*1)
Fast Forward/Rewind Time	Approx. 90 seconds with T-120 tape Approx. 120 seconds with T-160 tape
Operating Temperature	41 °F to 104 °F (5 °C to 40 °C)
Relative Humidity	Max. 80 %
Dimensions (JOG dial included)	16.7 W x 12.4 D x 3.7 H in. (425 W x 314 D x 95 H mm)
Weight	9 lbs (4.2 kg)
Heads-Video	4 rotary heads
Luminance Signal	Frequency modulation recording
Audio Track	1 track
Audio/Control	1 stationary head
Erase	1 full-track head
Motors	3 motors-drum/capstan direct drive system
Battery Backup	31 day

## Audio

Input	308 mV (rms), 50 k $\Omega$ , RCA plug
Output	388 mV (rms), 1 k $\Omega$ , RCA plug
Signal-to-Noise Ratio	Better than 43 dB
Frequency Response	70 Hz - 4 kHz (8H mode)

## Video

Input	1.0 V (p-p), 75 $\Omega$ , BNC plug
Output	1.0 V (p-p), 75 $\Omega$ , BNC plug
Signal-to-Noise Ratio	Better than 42 dB
Horizontal Resolution	More than 330 lines (black & white) More than 240 lines (color)

## Connectors

ALM Input	Screw terminal for starting alarm recording
RST Input	Screw terminal for finishing alarm recording or for adjusting on-screen clock
REC Input	Screw terminal for starting/finishing recording or for series recording
GND	Screw terminal for ground
ALM Output	Screw terminal for output while alarm recording is under way
CLK Output	Screw terminal to command camera switching
MODE Output	Screw terminal for indication of VCR selected mode
CALL Output	Screw terminal for external warning device or for series recording
RS-485 Interface	RJ-45 (female) connector

Weight and dimensions shown are approximate.  
Design and specifications are subject to change without notice.

(\*1)

Tape Speed and Recording Time (with T-160 cassette):

MODE	TIME (hour:minute)	TAPE SPEED (mm/s)	RECORDING INTERVAL (s/field)	NUMBER OF RECORDING FIELDS (fields/s)	TAPE DRIVE RECORDING	AUDIO	MPX field delay setting *1
<b>8H (EP)</b>	8:00	11.12	0.0167	60	Continuous	Yes	002
<b>L24H (EP)</b>	24:00	3.71	0.050	20	Continuous (Slow)	Yes	003
<b>L40H (EP)</b>	40:00	2.22	0.083	12	Continuous (Slow)	Yes	005

\*1 Case of using Dedicated Micro's MPX.

## Note

If the VCR is not working correctly or showing an unusual indication on the fluorescent display, press the **RESET** button on the back panel using a pointed instrument. When pressed, Date/Present time/ALARM LIST/POWER LOSS LIST/Counter display/Recording and Playback mode will be set to the default setting and the VCR turns off.

To restart the VCR, press the **POWER** button to turn on the VCR, and then set the day and present time.