NOTE: For a technical description, please refer to Technical Guide VTG82052 HR-D540 PAL.

TABLE OF CONTENTS

1. The Instructions shown pertain specifiecally to the Model HR-D540EG. For detailed descriptions, be sure to consult the Instruction booklets of the other Models.
2. The following table lists the differing points between Models (suffixed HR-D540E and HR-D540EG) in this series.

Item		Model	HR-D540EG	HR-D540E
TV TUNER	Channel coverage	VHF	47 to 111 MHz	← *1)
			111 to 300 MHz	← *1)
			No	302 to 470 MHz
		UHF	470 to 862 MHz	← *1)
TIMER	Memory back-up time		Minimum 3 min	60 min
	VPS		Built-in	Option (VU-V110E)
TELETEXT	VPV		Option (VU-V120E) *2)	Option (VU-V100E) *3)
	VPT (with TOP) *4)		Option (VU-V140E) *2)	Option (VU-V150E) *3)

Notes: *1) ← *The same as model at left.*
*2) *VU-V120E/VU-V140E without VPS*
*3) *VU-V100E/VU-V150E with VPS*
*4) *TOP: TOP of page*

I

INSTRUCTIONS

Thank you for purchasing the JVC HR-D540EK Video Cassette Recorder. Before use, read this instruction booklet carefully for obtaining the best results from your new unit.
Diagrams are on the reverse side of this page. Fold it out and keep it opened so that you can refer to the diagrams when you are reading this booklet.

SOME DO'S AND DON'TS ON THE SAFE USE OF EQUIPMENT

This equipment has been designed and manufactured to meet international safety standards but, like any electrical equipment, care must be taken if you are to obtain the best results and safety is to be assured.

DO read the operating instructions before you attempt to use the equipment.

DO ensure that all electrical connections (including the mains plug, extension leads and interconnections between pieces of equipment) are properly made and in accordance with the manufacturer's instructions. Switch off and withdraw the mains plug when making or changing connections.

DO consult your dealer if you are ever in doubt about the installation, operation or safety of your equipment.

DO be careful with glass panels or doors on equipment.

DON'T continue to operate the equipment if you are in any doubt about it working normally, or if it is damaged in any way — switch off, withdraw the mains plug and consult your dealer.

DON'T remove any fixed cover as this may expose dangerous voltages.

DON'T leave equipment switched on when it is unattended unless it is specifically stated that it is designed for unattended operation or has a standby mode. Switch off using the switch on the equipment and make sure that your family knows how to do this. Special arrangements may need to be made for infirm or handicapped people.

DON'T use equipment such as personal stereos or radios so that you are distracted from the requirements of road safety. It is illegal to watch television whilst driving.

DON'T listen to headphones at high volume, as such use can permanently damage your hearing.

DON'T obstruct the ventilation of the equipment, for example with curtains or soft furnishings. Overheating will cause damage and shorten the life of the equipment.

DON'T use makeshift stands and NEVER fix legs with wood screws — to ensure complete safety always fit the manufacturer's approved stand or legs with the fixings provided according to the instructions.

DON'T allow electrical equipment to be exposed to rain or moisture.

ABOVE ALL
— NEVER let anyone especially children push anything into holes, slots or any other opening in the case — this could result in a fatal electrical shock;

— NEVER guess or take chances with electrical equipment of any kind — it is better to be safe than sorry!

SAFETY PRECAUTIONS

The rating plate and the safety caution are on the rear of the unit.

WARNING — DANGEROUS VOLTAGE INSIDE
WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS UNIT TO RAIN OR MOISTURE.

IMPORTANT (In the United Kingdom)
Mains Supply (240 V~, 50 Hz only)

IMPORTANT

Do not make any connection to the Larger Terminal coded E or Green. The wires in the mains lead are coloured in accordance with the following code:

Blue to N (Neutral) or Black
Brown to L (Live) or Red
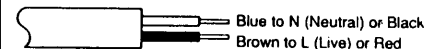
If these colours do not correspond with the terminal identifications of your plug, connect as follows:
Blue wire to terminal coded N (Neutral) or coloured Black.
Brown wire to terminal coded L (Live) or coloured Red.
If in doubt — consult a competent electrician.

CAUTION
● When you are not using the recorder for a long period of time, it is recommended that you disconnect the power cord from the AC outlet.
● Dangerous voltage inside. Refer internal servicing to qualified service personnel. To prevent electric shock or fire hazard, remove the power cord from the AC outlet prior to connecting or disconnecting any signal lead or aerial.

Omkopplaren OPERATE på denna apparat är sekundärt kopplad och skiljer inte apparaten från nätet i läge OPERATE OFF.

The OPERATE button does not completely shut off mains power from the unit, but switches operating current on and off.

BEMAERK: I stilling OFF er apparatet stadig forbundet med lysnettet Hvis det ønskes fuldstændig afbrudt skai netledningen trækkes ud.

The unit is produced to comply with Directives 76/889/EEC, 82/499/EEC, 87/308/EEC and Standard IEC Publ. 65.

WARNING
Pre-recorded tapes, records or discs should not be re-recorded without the consent of the owners of copyright in the sound recording and in any copyright musical or literary work embodied in that recording as this constitutes an infringement of copyright.

● Only cassettes marked "VHS" can be used with this video recorder.
● HQ VHS is compatible with existing VHS equipment.

PRECAUTIONS

VIDEO RECORDER

Handling and storage
- Avoid using the recorder under the following conditions:
  - extremely hot, cold or humid places,
  - dusty places,
  - near appliances generating strong magnetic fields,
  - places subject to vibrations, and
  - poorly ventilated places.
- Be careful of moisture condensation.
- Avoid using the recorder immediately after moving from a cold place to a warm place. The water vapour in warm air will condense on the still-cold video head drum and tape guides and may cause damage to the tape and the recorder.
- Handle the recorder carefully
  - Do not block the ventilation openings.
  - Do not place anything heavy on the recorder.
  - Do not place anything which might spill and cause trouble on the top cover of the recorder.
  - Use in horizontal (flat) position only.
- In case of transportation,
  - Avoid violent shocks to the recorder during packing and transportation.
  - Before packing, be sure to remove the cassette from the recorder.

Moisture condensation
- If you pour a cold liquid into a glass, water vapour in the air will condense on the surface of the glass. This is called moisture condensation.
- Moisture condensation on the head drum, one of the most crucial parts of the video recorder, will cause damage to the tape.
- Moisture condensation is apt to occur under the following conditions:
  - when the recorder is moved from a cold place to a warm place, and
  - under extremely humid conditions.
- In conditions where moisture condensation may occur, keep the power cord plugged in an AC outlet and the power switched on; this will help prevent condensation from occurring. When condensation has occurred, it will not evaporate quickly once the power is switched on. Wait a few hours for the recorder to become dry.

VIDEO CASSETTES
- Avoid exposing the cassettes to direct sunlight. Keep them away from heaters.
- Avoid extreme humidity, violent vibrations or shocks, strong magnetic fields (near a motor, transformer or magnet) and dusty places.
- Place the cassettes in cassette cases and position vertically.

REMOTE CONTROL UNIT
- Avoid violent shocks, especially take care not to drop the unit.
- Take care not to allow liquid to spill into the unit.
- Do not place heavy objects on the unit.
- Avoid leaving the unit in places subject to direct sunlight or extremely high temperatures.

CONTENTS

FEATURES

MAIN FEATURES, ADVANTAGES AND BENEFITS

Feature	Advantage	Benefit
Quick-Response Full-Loading Mechanism	■ Quick response: 1.3 seconds from Stop to Play or Record. ■ Increased Rewind/Fast-Forward speed.	■ Immediate, no-frustration operation of VCR. ■ Faster Rewind/Fast-Forward saves time.
Digital Tracking	Microcomputer-controlled tracking system maintains constant optimal video tracking.	Best possible picture performance, even for rental videos, is always assured.
Intelligent Blank Search System	Microcomputer-controlled system automatically seeks out the unrecorded portion on a tape (absence of control pulses) and automatically displays tape's remaining time.	■ Makes additional recording onto partially recorded tapes more simple and convenient. ■ Allows more efficient use of tapes.
Automatic Repeat Playback (possible up to 5 times)	■ Full Repeat: repeated playback of whole tape. ■ Index Repeat: repeated playback of segment located between two index codes.	You can repeatedly view favourite scenes with ease.
VPT Compatibility	Simply by connecting one of JVC's optional teletext adapter (VU-V140E), you add many extra features to the VCR; teletext viewing, simplified timer programming, and much more.	■ Complete access to many valuable teletext services. ■ Viewing, recording, and timer-recording of closed-subtitle broadcasts; ideal for hearing-impaired viewers. ■ Compatibility with Fastext system for simplified colour-coded page access. ■ Convenient, easy-to-understand on-screen timer programming.

OTHER KEY FEATURES

Realtime Go-To — Locates a point a specified time away from the beginning of the tape.

Realtime Search — Locates a point a specified time away from the current position.

Index Search — Automatic location of up to 99 index coded programmes. You can mark/erase index codes.

Intro Search — Plays back the beginning of each indexed programme for about 5 seconds in fast-motion.

Skip Search — Skips unwanted tape segments 1/2 to 2 minutes in length.

Duet Editing — Allows simultaneous control of two JVC VCRs by one remote control when editing.

Flexible timer functions — Timer programming flexibility thanks to 1-year/8-event timer, 24-hour instant timer, and "off" timer.

LCD-programmable, TV/VCR unified remote control — The remote's 4 independent programme memories make anytime anywhere programming possible for later transfer to the VCR's timer.

Quartz clock — Ensures accurate timekeeping/timer recording even in areas where power fluctuations occur.

Instant "summer time" adjustment — One-button adjustment of VCR's clock to and from daylight saving time.

Child Lock system — Temporarily disables VCR's controls to deter unwanted operation.

Display OFF function — Can switch off FDP to eliminate bothersome light and reduce chances of theft.

Preroll-capable PAUSE remote control terminal — For superior quality edits when used in an editing suite.
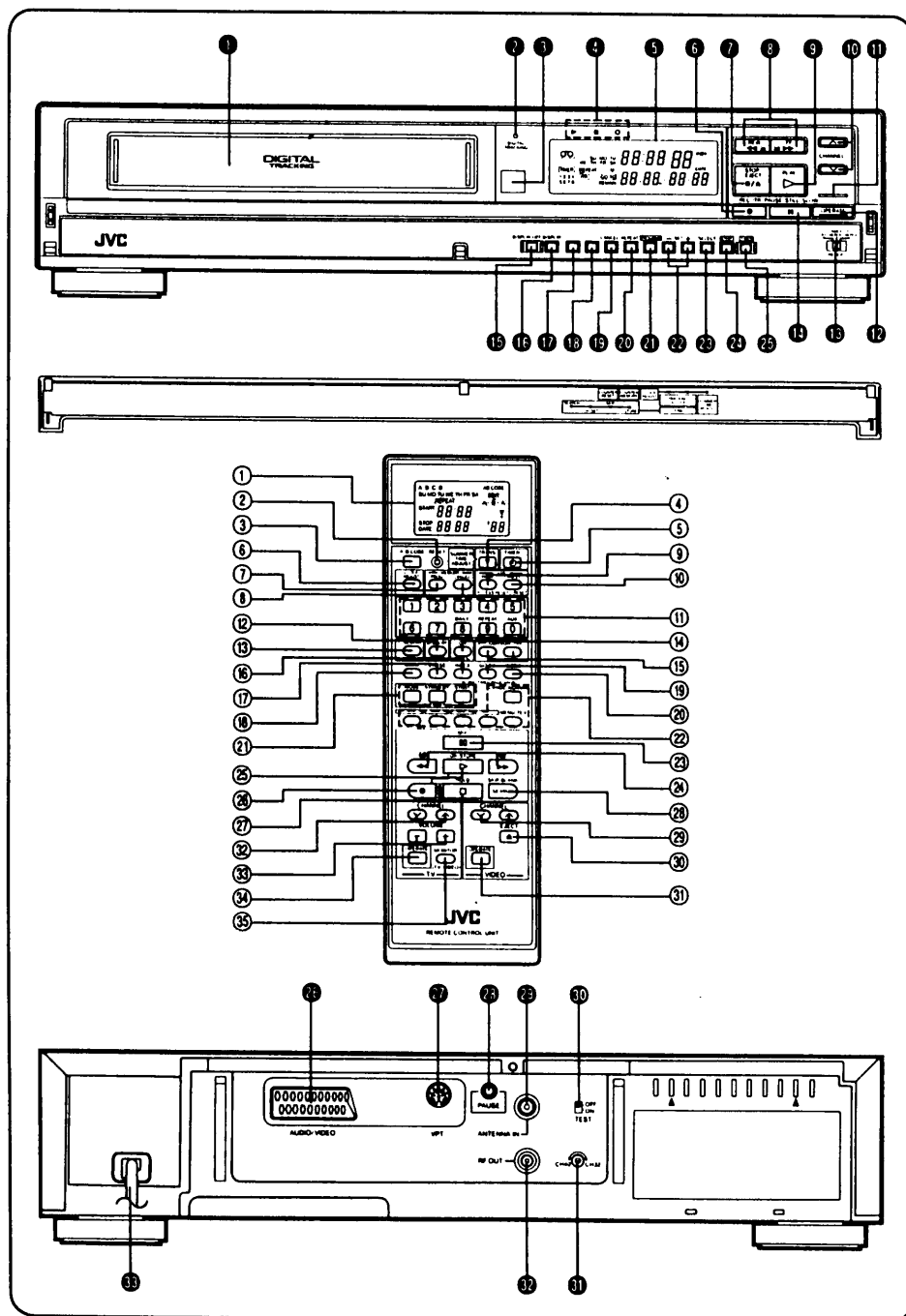
Front panel

❶ Cassette loading slot
Insert a VHS cassette. The door will close and the "cassette loaded" indicator will appear on the FDP (fluorescent display panel).

❷ DIGITAL TRACKING indicator
Lights in the Digital Tracking mode.
Blinks while adjusting.

❸ Infrared beam receiving window

❹ Mode Indicators
▷ : Play mode
▷ � : Still/Slow-Motion mode
▷ ○ : Record mode
▷ � ○ : Record-Pause mode

❺ Fluorescent Display Panel (FDP)

"Cassette loaded" indicator — Switchable display
  • Channel position
  • Index number
  • AUX indicator (AU)
  • Child lock indicator
Timer programming aids
Switchable display
  • Clock
  • Timer start time

Counter memory indicator   Switchable display
  • Timer stop time
  • Instant timer recording time
  • Real channel
  • Realtime tape counter
  • Remaining tape time
  • Go-To "time" entry
  • Date

❻ REC/ITR button
• Press once to start recording.
• Press twice to engage the Instant Timer Recording mode.
• Also use to set the required recording time in the 24-Hour Instant Timer Set mode.

❼ STOP/EJECT button
• Press while in the Stop mode to eject the cassette.
• Press while in other modes to stop the tape.

❽ REW/FF/Shuttle Search buttons
• Press while in the Stop mode to rewind or fast-forward the tape.
• Press while in the Play mode for Shuttle Search in the reverse or forward direction.
• Press while in the Record-Pause mode to engage the Retake mode. (See page 18.)

❾ PLAY button
• Press to play back a tape.
• Press to cancel the Pause/Still/Slow or Shuttle Search mode. (See page 16.)
• Press to start recording from the Record-Pause mode.

❿ CHANNEL buttons
Press either button to scan to a desired channel.

⓫ OPERATE indicator
⓬ OPERATE button
Press to apply operating power to the recorder. Loading a cassette also turns the power on.

⓭ REPEAT switch
FULL REPEAT: To play back the entire tape repeatedly.
INDEX REPEAT: To play back a segment between two adjacent index codes. (See page 15.)
OFF: No repeat playback.

⓮ PAUSE/STILL/SLOW button
• Press while in the Record mode to stop the tape temporarily to avoid recording of unwanted material.
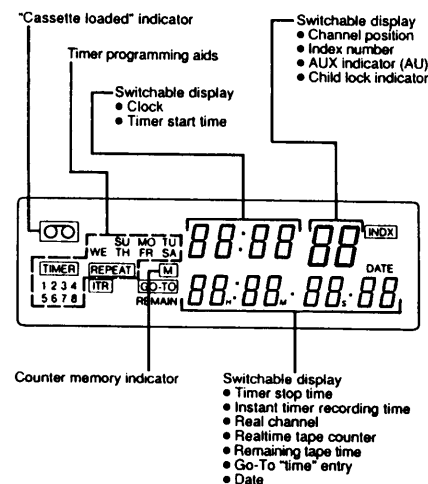• Press while in the Play mode to view a still picture.
• The still picture can be advanced each time this button is pressed.
• Keep this button pressed for more than 2 seconds to obtain slow-motion playback.
• Press again to view a still picture.

⓯ DISPLAY OFF button
Press to make all indications on the FDP disappear; only "—:—" will remain on the display.
Press again to make the clock display reappear. (See page 9.)

⓰ DISPLAY button
Press to switch the display among the realtime tape counter, remaining tape time and date. Also press to change the display from the Timer Set mode to the Clock mode.

⓱ SEARCH button
Press to initiate real channel automatic scan tuning. (See page 12.)

⓲ CH.SET button
Press to engage the Real Channel mode.

⓳ CANCEL/COUNTER RESET/SKIP button
This is a triple-function button.
• as a CANCEL button — press to cancel the programmed data in the Timer Set mode.
• as a COUNTER RESET button — press to reset the realtime counter reading to "0ʜ 00ᴍ 00s".
• as a SKIP button — press to skip unnecessary channels in the Real Channel mode.

⓴ REPEAT/COUNTER MEMORY/STORE button
This is a triple-function button.
• as a REPEAT button — press to enter the repeat command in the Timer Set mode.
• as a COUNTER MEMORY button — press to engage the Counter Memory mode.
• as a STORE button — press to store the tuned-in channel in the Real Channel mode.

㉑ PROGRAM/CLOCK ADJUST button
Press to change the recorder's mode in the following order: Clock mode, Timer Set mode, Clock Set mode, then return to the Clock mode.

● **SET/TRACKING/V. LOCK/FINE buttons (–/+)**
These are quadruple-function buttons.
- **as SET buttons** — press to set the correct data in the Clock Set or Timer Set mode.
- **as TRACKING buttons** — press both to cancel the automatic Digital Tracking mode, then press either for manual tracking control. (See page 14.)
- **as V. LOCK buttons** — press either to reduce vertical vibrations, if observed in the Still mode.
- **as FINE tuning buttons** — press to shift the frequency in either direction to fine-tune in a specific station in the Real Channel mode.

● **SELECT/SUMMER TIME ADJUST button**
This is a dual-function button.
- **as a SELECT button** — press to select the item to be set in the Clock Set, Real Channel or Timer Set mode.
- **as a SUMMER TIME ADJUST button** — press and quickly release to advance the clock by one hour, hold it pressed for 2 seconds to set the clock back by one hour. (See page 9.)

● **START button**
Press to engage the 24-Hour Instant Timer Set mode. (See page 19.)

● **TIMER button**
Press to engage the Timer Standby mode.

Rear Panel

● **AUDIO/VIDEO socket**
A 21-pin standardised audio/video input/output socket for AV connection to a TV or a 2nd video recorder. The input from this socket can be recorded in the AUX mode engaged by obtaining "AU" in the channel display.

● **VPT connector**
Connect the VPT adapter for decoding teletext programmes and for teletext timer programming.

● **PAUSE terminal**
When using the HR-D540EK as the source player, connect to the PAUSE OUT terminal of a second VCR (if so-equipped) for synchronized preroll operation. This terminal can also be used for editing from a JVC VideoMovie camera/recorder using the Master Edit Control system.

● **Aerial input connector (ANTENNA IN)**
Connect an aerial to this connector.

● **TEST signal switch**
Set to ON when tuning your TV receiver for the video channel. A test signal in the form of two vertical white bars will be available.

● **RF converter frequency adjustment screw (CH40–CH32)**
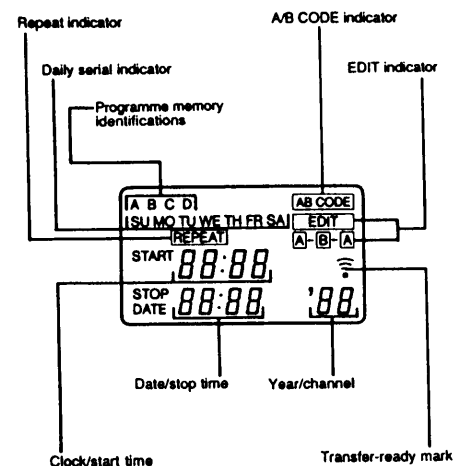(See page 8.)

● **RF OUT connector**
Connect to the aerial terminal of a TV receiver through the aerial cable (provided).

● **Power cord**

Remote Control Unit

① **LCD (Liquid Crystal Display) panel**
Refer to this panel when programming the remote control's built-in timer memory.

Repeat indicator

A/B CODE indicator

Daily serial indicator

EDIT indicator

Programme memory identifications

START

STOP DATE

Date/stop time   Year/channel

Clock/start time   Transfer-ready mark

② **RESET button**
Insert a pointed object into the hole to press the initialize button inside, when required. The memory for the LCD display will be cleared.
Normally do not touch this button.

③ **A/B CODE button**
When using two JVC video decks, press to switch this remote control from the "A" mode to "B" mode, or vice versa, depending on the deck to be controlled. (See pages 7 and 26.)

④ **TRANS/SUMMER TIME ADJUST button**
This is a dual-function button.
- **as a TRANS button** — press to transfer the data held in the remote control's timer memory to the recorder.
- **as a SUMMER TIME ADJUST button** — press to adjust the remote control's clock to the summer time setting. (See page 10.)

⑤ **TIMER button**
Functions same as ●.

⑥ **CLOCK ADJUST button**
Press to adjust the clock of the remote control.

⑦ **MEMORY PROG. button**
Press to programme the remote control's timer memory.

⑧ **MEMORY CANCEL button**
Press to cancel the programmed data in the remote control's timer memory.

⑨ **VTR PROG. button**
Press to engage the recorder's Timer Set mode.

⑩ **VTR CANCEL/C. RESET button**
This is a dual-function button.
- **as a VTR CANCEL button** — press to cancel the programmed data held in the recorder's timer memory in the Timer Set mode.
- **as a C. RESET button** — press to reset the realtime counter reading to "0H 00M 00s".

⑪ **Multi-purpose numeric keys**
Clock setting:	See page 10.
Channel selection:	See page 11.
Timer Programming:	See page 21.
Realtime Go-To and Search functions:	See page 23.
Index Search:	See page 24.
External Source recording:	See page 25.

⑫ **DISPLAY button**
Press to switch the display among the realtime tape counter, remaining tape time and date.
Also press to change the display from the Timer Set mode to the Clock mode.

⑬ **C. MEMORY button**
Functions same as ● as a COUNTER MEMORY button.

⑭ **CH button**
Functions same as ●.

⑮ **CURSOR (← / →) buttons**
When setting the timer, use these buttons to move the cursor to the position for data entry.

⑯ **INDEX button**
Press to engage the Index Search mode. (See page 24.)

⑰ **ERASE button**
Press during playback to erase an index code. (See page 24.)

⑱ **MARK button**
Press during playback or recording to put an index code onto the tape. (See page 24.)

⑲ **GO-TO button**
Press to engage the Realtime Go-To mode. (See page 23.)

⑳ **INTRO button**
Press to engage the Intro Search mode. (See page 24.)

㉑ **DUET EDITING MODE, STAND-BY and START buttons**
Duet Editing controls for simultaneous control of two JVC decks in editing. (See page 26.)

㉒ **Teletext buttons**
For teletext operation. (See page 30.)

㉓ **◼◼ (Pause/Still) button**

㉔ **◀◀ / ▶▶ (Rewind)(Fast-Forward)(Shuttle Search) buttons**

㉕ **▷ (Play) button**

㉖ **● (Record) button**
Press together with the ▷ button ㉕ to start recording.

㉗ **▢ (Stop) button**

㉘ **SKIP/BLANK SEARCH button**
- Press in the Stop mode to engage the Blank Search mode. The tape will automatically stop at the beginning of a non-recorded section. (See page 18.)
- Press while in the Play mode to zip through unwanted tape segments. (See page 15.)

㉙ **CHANNEL buttons (∨ / ∧)**
Function same as ●.

㉚ **EJECT button**
Press while in the Stop mode to eject the cassette.

㉛ **OPERATE button**
Press to turn the recorder power ON or OFF.
Keep this button pressed for 2 seconds when turning the power off to engage the Child Lock mode. (See page 22.)

TV Operation buttons (designated JVC TV models only)

㉜ **CHANNEL buttons (∨ / ∧)**
Press to select a desired channel on the TV receiver.

㉝ **VOLUME buttons (– / +)**
Press to decrease or increase the TV's sound volume.

㉞ **OPERATE button**
Press to turn the TV power on or off.

㉟ **MONITOR (TV/VIDEO) button**
Press to select the TV's operating mode.
TV: For viewing broadcast programmes or tape programmes via RF OUT connection.
VIDEO: For viewing programmes via the AV connection.

> **Note:**
> When the optional VPT adapter is connected, four coloured keys and several buttons have additional teletext functions, as indicated by their additional labels.

Remote Control Unit

A/B code switching

When you own two JVC video decks, this remote control can operate both decks separately; they do not respond simultaneously to the remote control's signal, if they are set to respond to different codes. Initially this recorder is set in the "A" mode.

To change the mode, carefully follow the instructions below:

(1) Unplug the power cord of the recorder from the AC outlet.
(2) Press the A/B CODE select button to engage the "B" mode; "B CODE" will appear on the LCD.
(3) Plug the power cord of the recorder into the AC outlet.
(4) Turn on the power of the recorder using the remote control's VIDEO OPERATE button.

The recorder "memorizes" this B code and will respond only to the B code signals. Set the other deck to respond to the A code signals in the same procedure.

Note:

Do not operate other remote controls after you have plugged the recorder into the AC outlet and before you press the VIDEO OPERATE button of this remote control.

CAUTION:
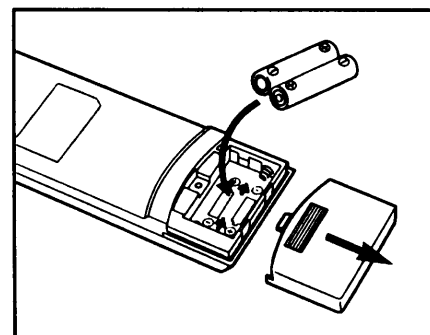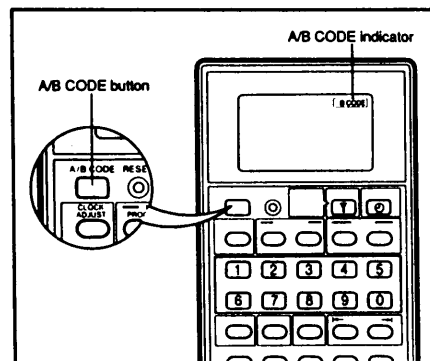
Some televisions may malfunction in response to this remote control when used in the "B" mode. If this should happen, switch the mode back to "A".

Operating distance for remote control unit
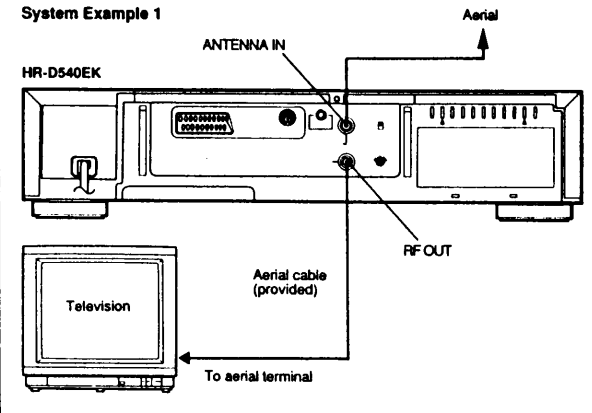● The maximum operating distance is about 8 m.

Installing the batteries
● Insert two "R6"-size batteries (provided) into the battery compartment on the rear of the remote control unit, observing correct polarity.

A/B CODE button A/B CODE indicator

CONNECTIONS

System Example 1

HR-D540EK

ANTENNA IN   Aerial

RF OUT

Aerial cable (provided)

Television

To aerial terminal

System Example 2

HR-D540EK

ANTENNA IN   Aerial

AUDIO/VIDEO

RF OUT

Audio/Video cable

Television

To AUDIO/VIDEO terminal

Aerial cable (provided)

To aerial terminal

AERIAL AND RF CONNECTION

1. Remove the aerial cable from the television and reconnect it to the recorder's ANTENNA IN connector. The recorder is then ready to record off-air programmes.
2. Connect the recorder's RF OUT connector to the television's aerial terminal using the provided aerial cable. The television is then ready to receive broadcast programmes. When you are not using the recorder, the TV signals are fed to the television via this terminal.

● If your television is equipped with the aerial terminal only, you view tape programmes also via this terminal. In this case, set the television to UHF channel 36 (or a UHF channel adjusted as the video channel). See "VIDEO CHANNEL SETTING" below.
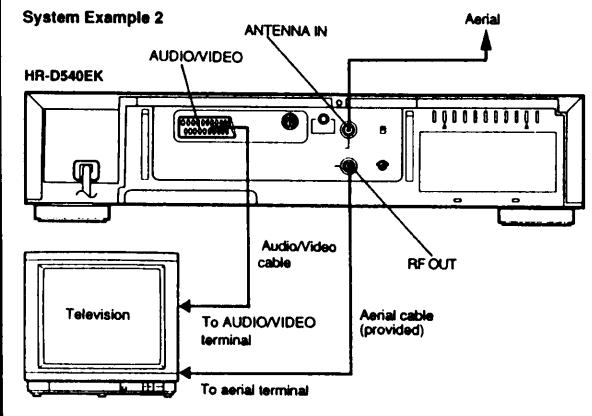
AV CONNECTION

● If your television is equipped with a 21-pin SCART connector, connect the recorder's AUDIO/VIDEO socket to the television's SCART connector.
● To view tape programmes via this connector, set the television to the AV mode.

Note:
For switching the television's input mode, refer to the instruction manual of your television.

VIDEO CHANNEL SETTING

■ Press the OPERATE button ● to turn the power on. Turn on the TV receiver.
■ Set the TEST switch ● to ON.
■ Adjust your TV receiver in the vicinity of UHF channel 36 until you bring in the two white signal bars on the screen as illustrated. This is your VIDEO CHANNEL.
■ Reset the TEST switch to OFF.

Notes:
● If some interference noise is seen on the screen because of broadcasts on neighbouring channels or if your preset broadcasts should be affected in picture quality, it is necessary to shift the RF converter output frequency from that of channel 36. Consult your JVC dealer for making this adjustment.
● Video channel setting is also possible using a prerecorded VHS video cassette. Play back the tape and tune the TV receiver to obtain clear pictures and sound while monitoring the playback picture on the TV screen.
● If your TV receiver is not provided with an AFC circuit, perform fine tuning of the TV receiver when you are actually viewing video cassettes.

Setting the built-in clock

Plug the recorder into an AC outlet. The display shows a blinking 0:00.
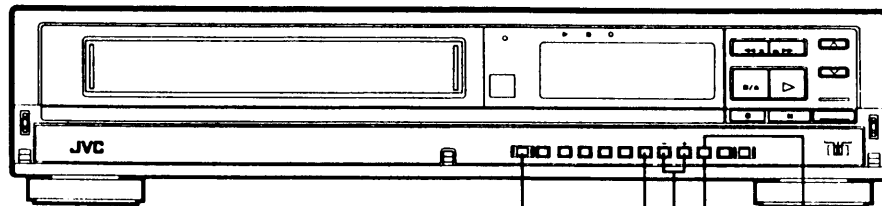
1 Press the CLOCK ADJUST button until the display shows the Clock Set mode with the hour indication blinking.

2 Set the hour and minute in that order by using the SELECT and SET buttons alternately.
● The blinking position is ready for entry.
● Press SET until the correct indication appears in each position.

3 Set the day, month and year in the same way.
● In year setting, set only the last two digits of the year.

4 Press CLOCK ADJUST.
● Press it at the exact instant of the time signal, and the clock will be set accurately to the present time.
● The day-of-the-week indication will be displayed automatically.

Hour digits ——— Minute digits

Day   Day Month Year
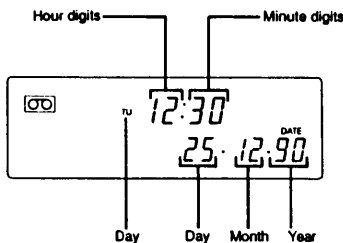
Notes:
● Clock setting is not possible in the timer recording standby mode. First check to see that the TIMER indicator on the FDP is not lit.
● Enter the data within 10 seconds after pressing the CLOCK ADJUST button.

SUMMER TIME ADJUST

This convenient feature is for quickly making the annual clock adjustment to the "summer time" (daylight saving time) setting, and back to regular time later.

1. Simply press and quickly release the SUMMER TIME ADJUST button in the Clock Set mode to set the clock forward by one hour.
2. Later in the year, to switch back to regular time, simply hold the SUMMER TIME ADJUST button pressed for 2 seconds to set the clock back by an hour.


DISPLAY OFF

Press the DISPLAY OFF button to make all indications on the FDP disappear when they are not required; the display will show "–:–". Press again to make the clock display reappear.


Power failure indicator

The blinking 0:00 (initial condition of the display) is also a power failure indicator, showing that there has been a power failure in excess of 3 minutes. Readjusting the time restores the normal condition of the clock display.

## Setting the LCD clock of the remote control unit

The LCD clock is independent of the recorder's clock.
The recorder's clock can be adjusted from the remote control unit if its transfer function is used.
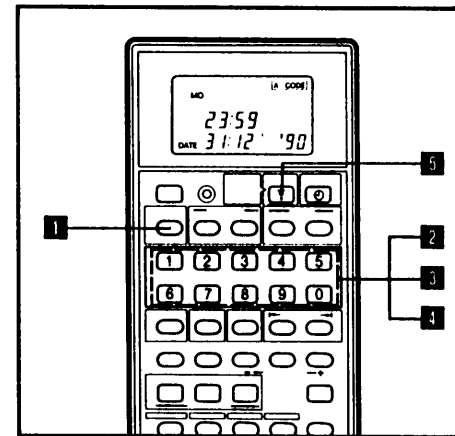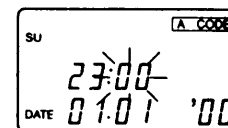

Insert two "R6"-size batteries (provided) into the remote control. The LCD shows the following with "0:00" blinking.
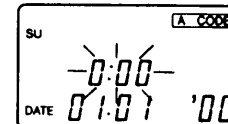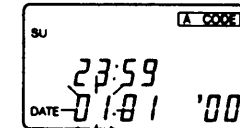

**1** Press the CLOCK ADJUST button.
● The hour indication will blink.
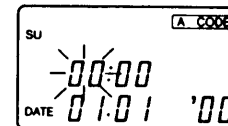
2 Press the numeric key corresponding to the current hour, then the minute indication will blink.
● Always key in two digits.
For a one-digit number, key in "0" first.

3 Key in the digits corresponding to the current minute, then the day position of the DATE indication will blink.

4 Key in the digits for the day, month and year in succession.
● In year setting, set only the last two digits of the year.
● After setting the year, the transfer-ready mark will appear and blink.

Transfer-ready mark
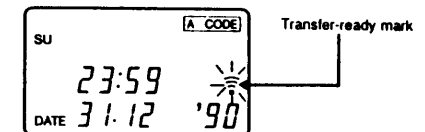
5 Press the TRANS button at the exact instant of the time signal.
● The day-of-the-week indication will be displayed automatically.
● The clock of the remote control will be set accurately to the second and, at the same time the set data will be transferred to the clock of the recorder.
● When it is not necessary to transfer the clock data to the recorder, press the CLOCK ADJUST button instead of the TRANS button to set the remote control's clock.
● If the transfer-ready mark disappears before transmission, press the CLOCK ADJUST button to make it reappear, then press the TRANS button while the transfer-ready mark is blinking; otherwise, the TRANS button will function as a summer time adjust button.
● If the clock has already been set, the transfer-ready mark starts blinking when the CLOCK ADJUST button is pressed.
● To transfer the data to the recorder's clock, simply press the TRANS button.
● To readjust the clock, press the CLOCK ADJUST button and then press either CURSOR ⊢— / —⊣ button so that the position which requires correction blinks.

SUMMER TIME ADJUST

For quickly making the annual clock adjustment to the "summer time" (daylight saving time) setting, and back to regular time later, use the SUMMER TIME ADJUST button ④.

1. Simply press and quickly release the SUMMER TIME ADJUST button in the Clock mode to set the clock forward by one hour.
2. Later in the year, to switch back to regular time, simply hold the SUMMER TIME ADJUST button pressed for more than 2 seconds to set the clock back by an hour.

Note:
● For summer time adjustment, make sure that the transfer-ready mark is not on the LCD.

This recorder incorporates an advanced frequency synthesized tuner which is pretuned to 49 UHF channels. Channel indication is given in two different ways: real channel numbers and channel position numbers. Real channel number indication is available by pressing the CH. SET button ⓔ or CH button ⓗ, or during search by pressing the SEARCH button ⓘ, while channel position number indication is always available in the channel display.

1. For example in the London area (Crystal palace transmitter) it is convenient to select a channel position number 1 to 4 for BBC1, BBC2, ITV and CH4. The real channel numbers for these transmissions are BBC1 (26), BBC2 (33), ITV (23) and CH4 (30).
   In the display example shown alongside therefore, channel position 1 for BBC1 would be turned to a real channel number of 26.

Stored channels

1. A total of 49 channels are receivable. Of them, up to 48 can be stored for easy channel selection. Prior to shipment, some channels are stored.
● It is possible to store more channels or skip some channels if there are no broadcasts on those channels in your area. It is possible to change the stored channels to correspond to your preferred channel allocation. Skipped channels can be restored whenever necessary.
● Channel memories are permanent; the programmed channel allocation will not be erased even if the recorder is unplugged from the AC outlet.
● Whilst channel memories are permanent they may be changed to suit the area of use.

Channel selection

To select a channel for recording, normally use the CHANNEL buttons ⓔ, ⓐ or 10 numeric keys ⓘ. You can choose any channel from among the stored ones by calling up the corresponding channel position.

● When using the 10 numeric keys, pay attention to the following. The number entered first will be shifted to the tens place and channels 10 to 48 can be set. An invalid number larger than 48 will be rejected.

● Use the "∨" button to scan to a channel in the direction of decreasing numbers; the "∧" button, in the direction of increasing numbers.
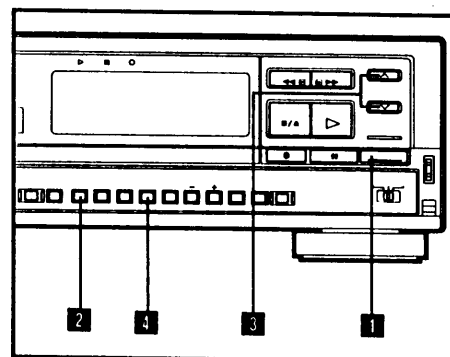
Channel position number display

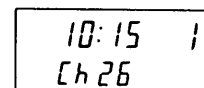Real channel number display
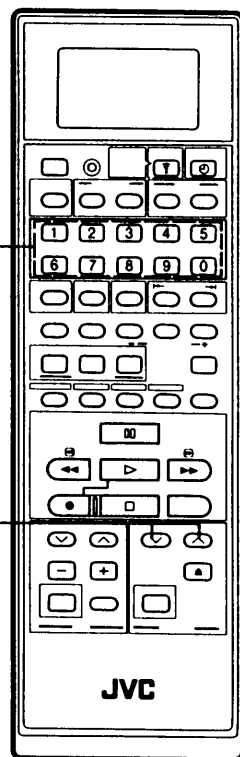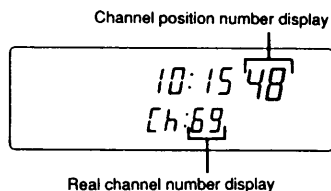
Storing channels

Switch on the TV receiver.
● Set the TV receiver to your video channel or to the AV mode (depending on the connection).


A. Automatic Setting

⬛ Turn the power on.
● The display will change from the Date mode to the Counter mode.
⬛ Press the SEARCH button.
● The display will change to the Real Channel mode and automatic scanning will take place.
● Reverse search will be engaged if the SEARCH button is kept depressed.

UHF channel 26 is stored for channel position 1.

● When a broadcast is detected, scanning stops automatically and the displayed channel position number will blink.
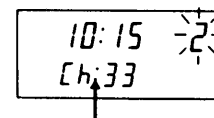
"Colon" will appear to indicate that this real channel is not stored for the indicated channel position.

⬛ Select a channel position into which you wish to store that station by using the CHANNEL buttons while the channel position number is blinking.
⬛ After confirming the real channel number and channel position number, press the STORE button.
● The Channel position number stops blinking.
● "Colon" will disappear and the selected station has been stored.

B. Manual Setting from remote control unit

(1) Press the CH button ⓗ.
● The display will change to the Real Channel mode.
(2) Press CH until the real channel number starts blinking.
● Blinking will stop in 10 seconds.
(3) Enter the number of a real channel to be preset.
● The channel position number will start blinking.
(4) Select a channel position into which the selected real channel is to be stored, using the 10-digit keypad.
● Depress the numeric key for the second digit continuously until blinking stops. This enables the entered number to be stored.
● The display will return to the clock mode by simply keying in the channel number to be viewed.

● **Fine Tuning**
For fine tuning, press the SELECT button ● in step 3 (both in automatic and manual setting) and use the FINE "+" or "−" button ●; "+" to fine-tune in the direction of increasing frequencies, and "−" to fine-tune in the direction of decreasing frequencies.
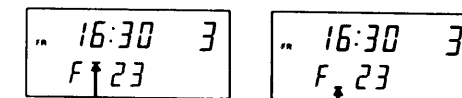
Upper or lower "−" sign indicates the operating tuning frequency is above or below the standard broadcast frequency.
Center "−" sign will appear when it corresponds to the standard.

Skipping the stored channels

1. Call up the channel position number that you wish to skip by using the CHANNEL buttons or 10 numeric keys.
2. Press the CH.SET button ●.
3. Press the SKIP button ●.
● "Colon" will appear to indicate that the displayed real channel is not stored.
● The skipped channel number will not appear on the channel display during up/down scan tuning.

Note:

If no command is given after each step of the setting operation, the Real Channel mode will be automatically cancelled in 10 seconds.
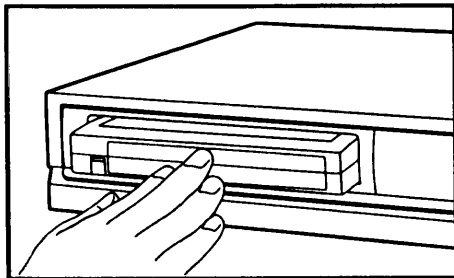
Motorized Loading System
* The cassette can be loaded even when the power has not been turned on. Inserting a cassette into the loading slot turns the power on automatically.
* The cassette can be unloaded even when the power has been turned off. If a cassette is inside, pressing the EJECT button turns the power on automatically and, after ejection of the cassette, shuts it off automatically.

Auto-Play System
* Inserting a cassette, with its safety tab removed, turns the recorder on and playback of the cassette begins automatically.

LOADING
Insert a cassette as illustrated with its labelled side facing you.
* With a cassette inserted, the" OO " indicator appears on the FDP.
* The counter resets automatically when a cassette is inserted.

UNLOADING
Press the STOP/EJECT button ● in the Stop mode.

Caution
* If unloading of a cassette is not possible, check to see whether the TIMER indicator is lit. If so, press the TIMER button so the TIMER indicator extinguishes.
* Do not attempt to pull out the cassette once automatic loading has started.

WARNING
* Do not insert fingers or any foreign object beyond the door flap of the cassette loading slot, as this could lead to injury or damage to the mechanism. Show special caution with children.

Notes:
* Be sure to insert the cassette firmly into the slot; otherwise it will be automatically ejected.
* The automatic loading mechanism will operate only when the cassette is inserted correctly.

## USABLE CASSETTES AND THEIR RECORDING TIME
Both regular VHS and S-VHS cassettes can be used with this video recorder for recording. However, only regular VHS recordings can be made and played back on this video recorder. S-VHS recordings can neither be made nor played back on this video recorder.

| Type of Cassette	Recording/Playback Time
E-30	30 minutes
E-60	1 hour
E-90	1 hour, 30 minutes
E-120	2 hours
E-180	3 hours
E-240	4 hours

ACCIDENTAL ERASURE PREVENTION
* Video cassettes are equipped with a safety tab to prevent accidental erasure. When the tab is removed, recording cannot be per-formed. If you wish to record on a cassette whose tab has already been removed, use adhesive tape to block the hole.

VHS Cassette
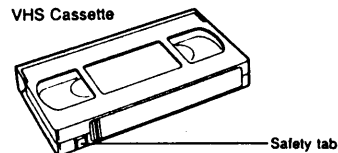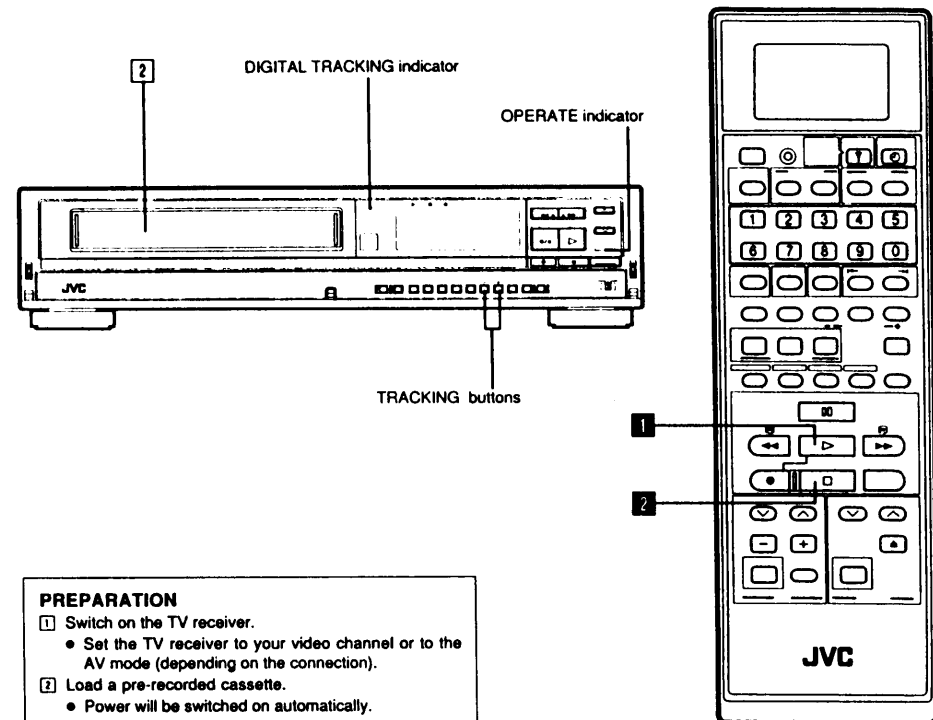
Safety tab

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DIGITAL TRACKING indicator

OPERATE indicator

TRACKING buttons

JVC

PREPARATION
1. Switch on the TV receiver.
   * Set the TV receiver to your video channel or to the AV mode (depending on the connection).
2. Load a pre-recorded cassette.
   * Power will be switched on automatically.
   * When a cassette with its safety tab removed is loaded, playback starts automatically.

DIGITAL TRACKING SYSTEM
This recorder incorporates a digital tracking system for automatic tracking adjustment. In most cases you do not have to adjust the tracking.
* When you start playback after inserting a tape, the digital tracking system automatically adjusts the tape path relative to the heads to obtain the best possible pictures.
* This automatic tracking adjustment also takes place when the playback output level reduces below a certain level.
* The DIGITAL TRACKING indicator blinks while the system is searching for optimum tracking, and remains lit as long as the automatic tracking mode continues.

If automatic tracking fails, and some noise bars are visible on the screen, use the manual tracking mode.
* Press both TRACKING buttons simultaneously to cancel the automatic mode, then press either button to move noise bars out of the screen.
* To return to the automatic mode, press both buttons simultaneously.

OPERATING PROCEDURE
1. Press the ▷ button.
2. Press the □ button at the end of the programme.

Notes:
* For various convenience facilities and special-effects features available during playback, see the next two pages.
* The tape-end auto-rewind mechanism functions in the Play, Fast Forward and Forward Search modes.

-14-

SKIP SEARCH

During playback, press the SKIP SEARCH button from 1 to 4 times to skip through 30-sec. to 2-min. sections of tape. Playback resumes automatically. Press the ▷ button to cancel the Skip Search mode midway.

MEMORY PLAY

If you want to watch the tape from its beginning after rewinding, you do not have to wait for completion of rewind to press the ▷ button.

* Press the ◀◀ button and then ▷ button within 2 seconds. Playback will start automatically at the beginning of the tape. (Check to see that the counter memory indicator [M] is off).
  If you want to watch the tape from the counter reading of "0H 00M 00S", press the C. MEMORY button to obtain [M]. Then, press the ◀◀ (or ▶▶) button and then ▷.
* While the tape is being rewound, the Play (▷) indicator is blinking. To cancel the Memory Play mode and go to another mode, press the corresponding button (□, ▷, ▶▶ , ◀◀).

More Next-Function Memory Features

If you are going to eject the cassette, or turn the power off after rewinding the tape, press the EJECT or OPERATE button within 2 seconds after pressing the ◀◀ button.
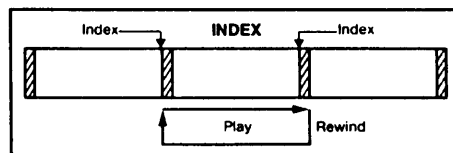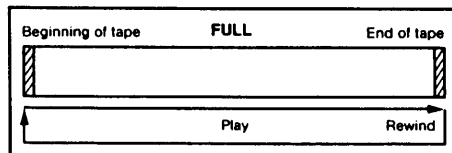
> **Note:**
> * For various tape access methods that can be used in different applications, refer to pages 23 and 24.
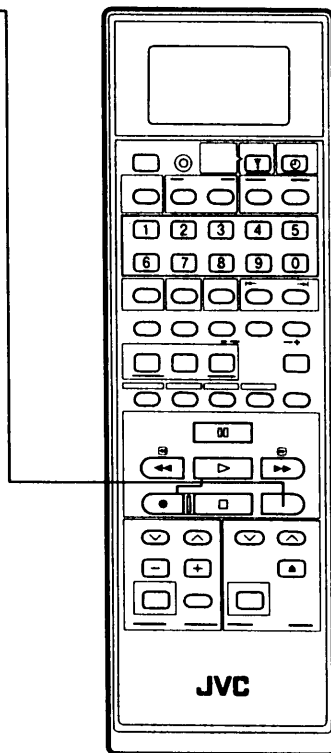
REPEAT PLAYBACK — FULL REPEAT OR INDEX REPEAT

This function allows you to set the video recorder for repeated playback (5 times) of the entire tape ("FULL REPEAT") or repeated playback (5 times) of a segment of the tape from one index mark to the next ("INDEX REPEAT").

Beginning of tape	FULL	End of tape
	Play	Rewind

Index	INDEX	Index
	Play	Rewind

■ Set the REPEAT switch ● as required.

■ With the switch in the INDEX REPEAT position, you can designate the segment using the Index Search mode or Index Mark function. (See page 24).

Note:

After repeat playback, be sure to reset the REPEAT switch to "OFF".

JVC

STILL PLAYBACK, FRAME ADVANCE AND SLOW MOTION

00 button

* To view a still picture, press this button in the Play mode.
* To advance the picture frame by frame, press this button again.
* To obtain slow-motion playback, keep this button pressed for more than 2 seconds.
* To return to the Still mode, press this button again.
* To return to normal playback, press the ▷ button.
* When the Still mode continues for longer than about 5 minutes, the Stop mode will be entered automatically.

HIGH-SPEED REVERSE SEARCH

◀◀ button

* To rewind the tape, press this button in the Stop mode.
* To shuttle search the tape in the reverse direction, press this button in the Play mode.
* The shuttling speed is about 9 times normal.
* Press the ▷ button to return to normal playback.
* For briefer scanning, keep the ◀◀ button pressed for more than 2 seconds; when you release the button, the Search mode will be cancelled.

HIGH-SPEED FORWARD SEARCH

▶▶ button

* To fast forward the tape, press this button in the Stop mode.
* To shuttle search the tape in the forward direction, press this button in the Play mode.
* The shuttling speed is about 9 times normal.
* Press the ▷ button to return to normal playback.
* For briefer scanning, keep the button pressed for more than 2 seconds; when you release the ▶▶ button, the Search mode will be cancelled.

JVC
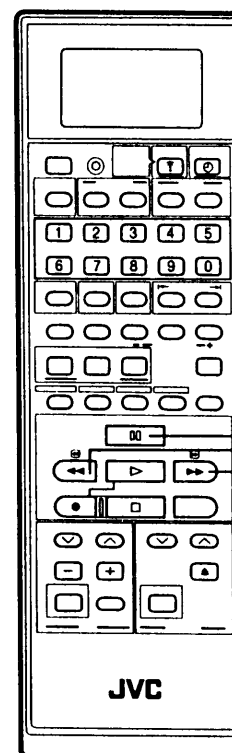
Notes:

* With some televisions, the still picture may be unstable. If vertical vibration of the picture is observed, attempt to correct it by pressing the V.LOCK buttons.
* If noise bars are visible in the Still, Slow, or Frame-by-Frame mode, attempt to correct it in the manual tracking mode as described on page 14.
* No audio is available during any special-effects playback mode.
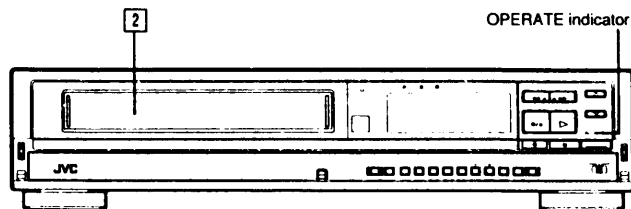
OPERATE indicator

PREPARATION

1 Switch on the TV receiver.
- Set the TV receiver to your video channel , or to the AV mode (depending on the connection).

2 Load a cassette (with safety tab in place). Power will be switched on automatically.

OPERATING PROCEDURE

1 Select the channel you wish to record with the CHANNEL ∨ / ∧ buttons.

2 Press the ● and ▷ buttons simultaneously to start recording. "INDX" will appear on the FDP and blink to show that an index code is being recorded.
(When using the video recorder's front panel control buttons, press REC/ITR once to start recording.)
- If there is part of the programme you do not want to record, press the ⎵ button. A white horizontal bar will appear on the screen, which reduces in size in 4 steps as time elapses. When the last quarter starts blinking and disappears, the Stop mode will be entered automatically. The pause duration is possible for about 5 minutes:
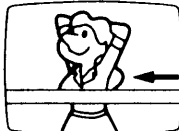- To continue recording from the Pause mode, press the ▷ button while the white bar is on-screen.

3 Press the ☐ button at the end of the programme.

PAUSE MODE INDICATOR

RECORDING ONE TV PROGRAMME WHILE WATCHING ANOTHER

A programme not being viewed can be recorded while you enjoy viewing another programme.
This permits the recorded programme to be played back later at your convenience.

The key points to remember are:
- Select the channel you wish to record with the recorder's channel selector.
- Select the channel you wish to view with the TV receiver's channel selector.

Notes:
- If the REC/ITR button is pressed more than once, the Instant Timer Recording mode will be entered (see page 19). To return to ordinary recording, repeatedly press the REC/ITR button until the ITR indicator on the FDP extinguishes.
- When recording is restarted from the Record-Pause mode, assemble recording is performed so that the playback picture will not distort at the edit point. A few frames recorded before the pause may be erased due to overlap of the new recording. This is not due to any defect of the unit.

- If the ● button cannot be engaged, check to see if the cassette safety tab has been removed. (See page 13).
- When the end of the tape is reached during recording, the tape is automatically rewound to the beginning and stops.
- The built-in tuner's automatic channel lock mechanism prevents the selected channel from being altered during recording. Therefore, if you wish to change the channel during recording, first engage the Record-Pause mode and then select a different channel.
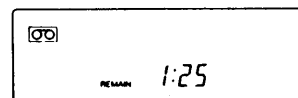
REMAINING TAPE TIME INDICATION

The tape counter can be switched to display the remaining tape time.
- Press the DISPLAY button to obtain the REMAIN tape time indication in hours and minutes on the FDP.

Note:
- The indicated remaining time is approximate.

REMAIN 1:25

ELAPSED RECORDING TIME INDICATION

When you need to know the exact time of a recording, press the C. RESET button before starting recording or playback. The counter will be reset to "0H 00M 00S" and show the exact elapsed time as the tape runs.

1.23. 45.
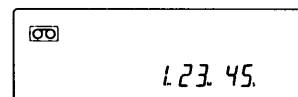
BLANK SEARCH

When you want to record a new programme on a partially recorded tape, use this function to automatically locate the end of a recorded section. Even when a fully recorded tape is used for re-recording new material, this system can be used to detect the end of the newly-recorded material.
- Insert a cassette and press the SKIP/BLANK SEARCH button.
- If a recorded signal is present, the recorder automatically enters the Fast Forward mode with the "GO-TO" indicator blinking, and stops automatically at the exact end of that recorded section.
- If the SKIP/BLANK SEARCH button is pressed where no signal is recorded, the recorder automatically enters the Rewind mode, searches for the end of the preceding recorded segment, and stops.
- When the SKIP/BLANK SEARCH button is pressed, the tape counter is automatically switched to the REMAIN mode and shows the remaining tape time in hours and minutes. To switch back to the realtime counter mode, press the DISPLAY button.

Video tape

Recorded | Blank

Fast-Forward ➡ ⬛ ⬅ Rewind
Stops at the end of recorded signal
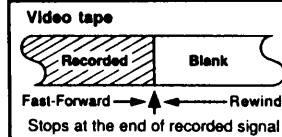
RETAKE FUNCTION

While in the Record-Pause mode, pressing the ►► or ◄◄ button initiates normal-speed search in the corresponding direction. Releasing the button engages the Record-Pause mode. If you have recorded unnecessary material because of having engaged the Record-Pause mode too late, use this function to return to the position where you want the next recording to start. Then, simply press the ▷ button when you want to re-start recording.

PAUSE

REW
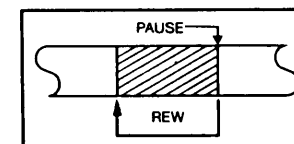
Note:
- Rainbow noise may occur in the rewound and re-recorded section.

24-HOUR TIMER

The 24-Hour Timer Recording feature allows unattended automatic starting and stopping of the recording of a single programme which starts within a 24-hour period.

Preparation

1. Insert a cassette with its safety tab in place. The recorder turns on automatically.
2. Select the channel you wish to record from.

Setting the timer
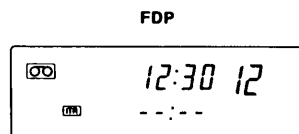
■ Press the START button ⊕ to engage the 24-Hour Instant Timer Set mode. The following appears on the FDP with the current time.

FDP

● Each pressing delays the START time by 30 minutes
● For a more precise time setting, use the SELECT and SET buttons.
■ After reaching the desired START time, press the REC/ITR button the required number of times to set the desired length of recording time.
● For a more precise time setting, use the SELECT and SET buttons.

■ After confirming the START time and recording length, press the OPERATE button.
● "ITR" remains on the FDP and the 24-Hour Instant Timer Standby mode will automatically engaged.
● If the programme has not been correctly preset, the "ITR" indicator will blink for about 10 seconds when the OPERATE button is pressed. Recheck the programmed data.

Notes:
● At each step of the timer setting procedure, if no data is entered within 10 seconds, the 24-Hour Timer Set mode is cancelled, and the current time is displayed.
● To cancel the 24-Hour Timer Set mode, press the CANCEL button once or twice depending on the setting status.
● 24-Hour Timer Recording has priority over other timer programme settings; therefore, no other programmes, set for timer recording, will be recorded until 24-Hour Timer Recording has been executed.

OFF-TIMER

● Start recording as described on page 17.
After you start recording, the recorder can be set to stop automatically after a certain period of time. Use this facility for starting a recording before you go to bed or leave home.

■ Press the REC/ITR button while recording (or twice if in the Stop mode).
● The following indication will appear on the FDP, to show that the recorder is recording in the Instant Timer Recording mode and power will switch off after 30 minutes.

FDP
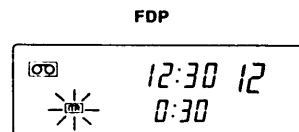
■ Each time the REC/ITR button is pressed, recording time increases by 30 minutes to a maximum of 4 hours. If the REC/ITR button is pressed again, the Normal Recording mode will be entered.
● For a more precise time setting, use the SELECT and SET buttons to set to the exact time required (possible up to 4 hours and 59 minutes).

Notes:
● While recording is in progress, the displayed time counts down; when 0:00 is reached, the Record mode is released after 10 seconds and the power is switched off.
● If you want to stop recording after having started recording in the Instant Timer Record mode, press the STOP/EJECT button.
● If instant timer recording is engaged while the unit is in the Pause mode, the timer will count down normally, but recording will not begin until the PLAY button is pressed.
● When the Instant Timer Record-Pause mode continues for longer than 5 minutes, the mode is released and power is switched off.
● If you want to check the elapsed time (Realtime Counter reading) on the FDP while performing Instant Timer Recording, press the DISPLAY button to obtain the desired indication. After about 5 seconds, the indicator will return to the ITR mode and the remaining time indication will reappear automatically.


 First of all, load a cassette (with safety tab in place); power will be switched on automatically.

Two ways to perform timer programming

A. Local programming: Programme the timer using the recorder's controls while referring to the recorder's FDP.

B. Independent remote programming: Programme the remote control's memory using the remote control's keys while referring to its own LCD and then transfer the data to the recorder anytime at your convenience.

Timer indicator
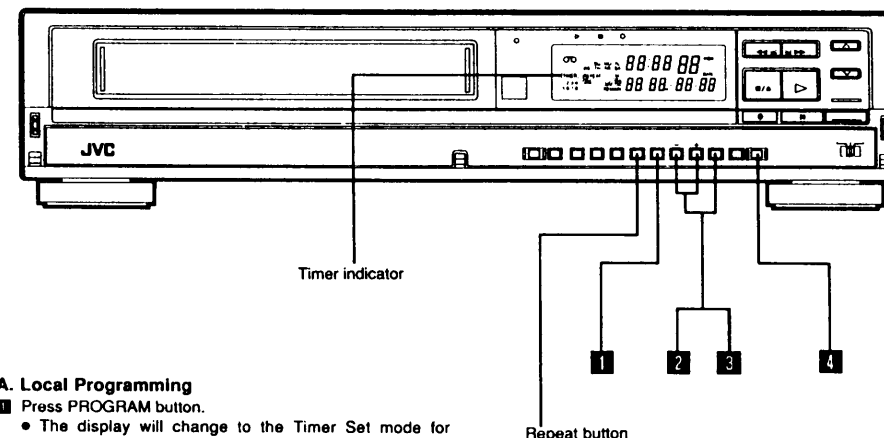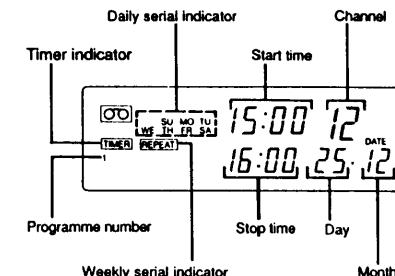
A. Local Programming

■ Press PROGRAM button.
● The display will change to the Timer Set mode for programme number "1". To advance to programme number 2 – 8, press either SET button a required number of times.
■ Set the start time by using the SELECT button and the SET buttons.
● Select the item to be set with the SELECT button; the selected item will blink.
● Set the desired data with the SET –/+ buttons.
● To record a weekly serial, press the REPEAT button once.
● To record a daily serial starting on a certain day, press REPEAT twice.
■ Set the stop time, date and channel in succession in the same way as for setting the start time.
● To record a daily serial starting on the day of setting, there is no need to enter any date figure; simply advance to the next item.
● For programming the timer to record an external source, while the channel position is blinking, press SET –/+ until the "AU" indicator appears in the channel display section of the FDP.

Repeat button

■ After making sure that the cassette is loaded, press the TIMER button.
● The Timer Recording Standby mode will be engaged with the TIMER indicator and the preset programme number(s) illuminated and the power turned off.
● With no cassette loaded, the TIMER and "cassette loaded" indicators will continue blinking.
● A cassette whose safety tab has been removed will be ejected automatically.
● If a preset programme contains errors, the programme number will not illuminate. Recheck the programmed data.

B. Independent Remote Programming

- The remote control incorporates 4 programme memories (A, B, C and D).
- The programmed data is held in memory even after it has been transferred to the recorder.

— CURSOR keys
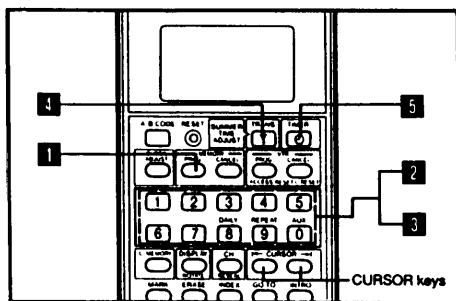
1 Press the MEMORY PROG. button.
- The LCD will be activated for programme memory "A".
- To advance to programmes B to D, press again.

2 Enter the date using the numeric keys.
- Invalid numbers will be rejected.
- To record a daily serial starting on the day of setting, press the CURSOR key "→" without entering any date figure.
- To record a daily serial starting on a certain day, press [8] and enter the date.
- To record a weekly serial, press [9] and enter the date.
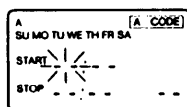
For daily serial setting
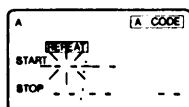
For weekly serial setting

3 Enter the start time, stop time and channel in succession.
- To key in a one-digit number of hours or minutes, first press [0]. Then press the relevant numeric key.
- For programming the timer to record an external source, press the numeric key "0" while the channel is blinking; "AU" will appear on the LCD. When transferred in step **4**, "AU" will appear in the channel display section on the FDP.
- After the channel has been entered, the transfer-ready mark will appear and blink.

— Transfer-ready mark

---

4 Direct the remote control to the recorder's Remote Sensor window and press the TRANS button.
- The programmed data will be loaded in one of the recorder's memories (1—8), the vacant one of the smallest programme number.
- If all programme memories are full, the recorder's clock will blink and transmission will not take place.
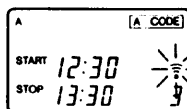- Call up the programme(s) to be cancelled by pressing the VTR PROG. button, then press the VTR CANCEL button to cancel it. Data transfer can now be made by pressing TRANS again.

5 Press the TIMER button.
- Check to see that the TIMER indicator appears on the FDP.

How to use the CURSOR keys (← / →)

- If you press a wrong key and the blinking position has advanced, press ← to return to the previous position for correction.
- Once all data have been programmed, you can reach any position for correction using ← or → . The blinking position is ready for re-entry.
- Pressing the MEMORY PROG. button on the remote control, engages the LCD in the transfer-ready mode in which the transfer-ready mark is blinking and data correction is not possible. For correction of data, press either cursor key to move to the position which requires correction.

Setting the date, start and stop times, and channel

- It is not possible to set the date, start and stop times unless the date and clock have previously been set.
- Enter the data while the digits are blinking.
- The stop time can be set within 24 hours of the start time.
- Non-applicable numbers (such as January 32, February 30 for dates, 24 or larger for hours, 60 or larger for minutes and 49 or larger for channels) will be rejected when keyed in.

Cancelling the preset data

- The preset programmes can be cancelled. First disengage the Timer Standby mode and engage the Timer Set mode for the programme number you wish to cancel and then press the CANCEL button ● or the VTR CANCEL button. Or for the remote control's memory, press the MEMORY CANCEL button.
- An executed programme is automatically cleared.

Checking the programmed data

- Checking can be performed anytime, even after the TIMER button has already been engaged. To do this, press the PROGRAM button ● while in the Timer Standby mode. The programme number will blink on the FDP and you can check each programme by advancing programme numbers with the SET buttons ●. If re-programming is required, disengage the Timer Standby mode and use the regular programming method. Pressing the PROGRAM button and/or SET buttons engages the FDP in the check mode in which no position blinks and data correction is not possible. For correction of data, press the SELECT button ● and move the cursor to a position which requires correction.

Timer recording operation

- When the preset start time is reached, recording starts.
- After timer recording, the power is switched off. If the end of the tape is reached during timer recording, the cassette is automatically ejected and then the power is switched off.

The Child Lock function is for preventing accidental operation by young children, or other unwanted operation, such as playing back or recording over an important cassette you may have left inserted in the recorder. By engaging the Child Lock mode, the operation buttons on the recorder become ineffective, unless the remote control is used.

To engage the Child Lock mode
- Press the remote control's OPERATE button ㉛ to turn the recorder power off and keep this button pressed for about 2 seconds after the power LED indicator has gone off.
- The Child Lock indicator (-) will appear in the channel display section on the FDP to show that the recorder is now in the Child Lock mode.

To disengage the Child Lock mode
- When the remote control's OPERATE button is pressed to turn the recorder power on, this disengages the Child Lock mode. The recorder will turn on and the corresponding display will appear with the channel number appearing where the child lock indicator appeared before.
- Pressing the TIMER button during timer recording also disengages the Child Lock mode.

Notes:
- While in the Child Lock mode, the recorder can receive timer programmed data from the remote control.
- Timer recording is possible also, even while in the Child Lock mode. After timer recording has been performed, the Child Lock mode remains in effect.
- Even after automatic cassette ejection at tape end, following timer recording, the Child Lock mode remains in effect.
- It is possible to insert a cassette while in the Child Lock mode. After inserting a cassette, the Child Lock mode remains in effect.
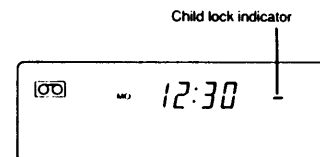
Child lock indicator

CONVENIENT TAPE ACCESS FUNCTION

REALTIME TAPE COUNTER
Unlike usual tape counters which show tape locations in numbers, this realtime tape counter shows tape time precisely in hours, minutes and seconds in all modes. The counter resets automatically when a cassette is inserted.

REALTIME SEARCH
To locate any point on the tape a specified time away from the current position in either direction.

The beginning of the tape

− 0.00.00 +

REALTIME GO-TO
To locate any point on the tape a specified time away from the beginning of the tape.

The beginning of the tape

0.00.00

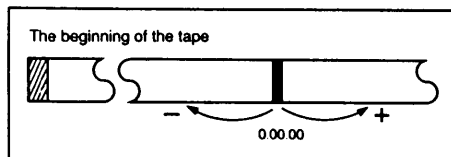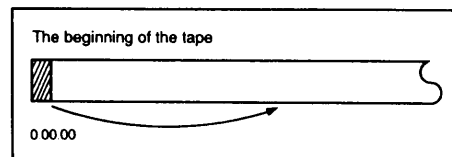**1** Press the remote control's GO-TO button while in the Play, Still or Stop mode.
- The FDP will show "GO-TO −H —M —S" if the recorder did not detect the leader tape when the cassette was loaded; it will show the current tape counter reading if the leader tape has been detected.
- "GO-TO 0H 02M 34S" (for example) will appear if the recorder has already detected the leader tape, to show the current tape counter reading in terms of realtime from the tape's beginning.

2 Press either CURSOR (⊢— / —⊣) button or either CHANNEL (∨/∧) button to specify the direction.

3 Specify the time to the point to be located, by using the numeric keys.
- Always key in a full number.

4 Press the ▷ or □ button (▯ button, if either the Play or Still mode is already engaged).
- Depending on the situation, search will take place in either the Shuttle Search mode or in the Fast Forward or Rewind mode. After the specified point is reached, playback starts automatically, the tape stops automatically or enters the Still mode, depending on the command.

The procedure is the same as for the Realtime Search except step **4**. Specifying the direction is not necessary.

Notes:
- Each step in the operation procedure must be followed by the next within 60 seconds, otherwise the Go-To or Search mode will be cancelled.
- Use of the other control buttons while in the Go-To or Search mode cancels that mode.
- If the specified time exceeds the tape length, the tape fast forwards to the end and then rewinds to the beginning and stops or enters the Play mode.

COUNTER MEMORY FUNCTION
1 Press the C. RESET button at a point which you may wish to locate later.
- The counter will read "0H 00M 00S".

2 Press the C. MEMORY button. Ⓜ will appear on the FDP.

3 Press the ◄◄ (or ►►) button when you need to return to the designated point.
- The tape will rewind (or fast forward) and stop at about "0H 00M 00S" automatically.
- The Counter Memory function can also be used in conjunction with the Memory Play function (page 15).

INDEX SEARCH
The Index Search function gives you automatic access to the beginning of individual recordings on the cassette tape. An index code is automatically placed on the tape's control track each time a recording is begun. You can access any one of up to 99 of these indexed segments in either the forward or reverse direction.
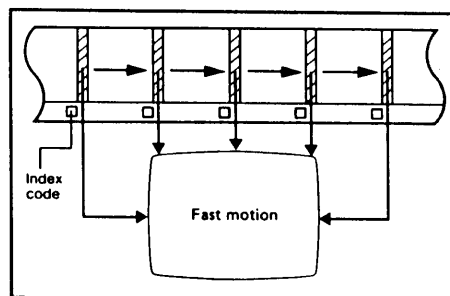

Index code

Normal playback
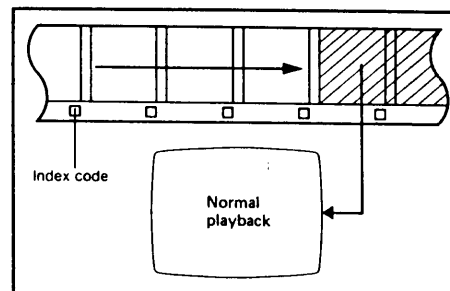
1 Press the INDEX button while in the Play or Stop mode.
- The channel display of the FDP will change to the Index Search mode and "INDX" will light.

2 Specify the index number (1 — 99) using the numeric keys within 10 seconds.
- The specified number will appear on the FDP.

3 Press either the ◄◄ or ►► button.
- The tape will move and the index numbers count down to 0, where normal playback will start.
- If the INDEX button was pressed in the Play mode, the screen shows search pictures; if the button was pressed in the Stop mode, the index codes are detected in the Rewind or Fast-Forward mode.

Notes:
- To cancel the Index Search mode before completion, press the ▷ or □ button.
- If the end of the tape is reached while still in the Index Search mode, the mode is cancelled and the tape rewound.

INTRO SEARCH

Index code

Fast motion

MANUAL INDEX MARK/ERASE
Index codes are automatically placed at the beginning of recordings which are started from the Stop or Timer Standby mode. You can use the MARK button to add extra codes, and the ERASE button to erase codes. In neither case is there any effect on the audio or video recordings on the tape.

Erase
In the Play or Still mode, press ERASE button to erase the next index code. The tape is automatically fast-forwarded and when an index code is detected, it will be erased automatically. "INDX" on the FDP remains lit during the searching process and blinks during the erasing process.

Mark
In the Play or Record mode, press MARK button once to put an index code onto the tape. "INDX" appears on the FDP and blinks during the marking process.

Notes:
- Index codes cannot be added or erased on a tape with its safety tab removed.
- The Erase mode is cancelled either after one index code has been erased or the Play mode is cancelled.

The Intro Search function lets you visually check the contents of each recording by playing back in fast motion a short segment of a programme each time an index code is detected.

1 Press the INTRO button while in the Play or Stop mode.
- The INDX indicator on the FDP will light.

2 Press the ◄◄ or ►► button within 2 seconds.
- The Intro Search will start in the corresponding direction.
- Each time an index code is detected, the corresponding part is played back at the search speed (9 times normal) for about 5 seconds.

3 When you find the section you want to view, simply press the ▷ button.
- Normal playback will start.

By connecting an external video source (such as a 2nd video recorder, VideoMovie camera-recorder, etc.) to the AUDIO/VIDEO socket, tape-to-tape transfer is possible.
- For connection of these units an appropriate cable is necessary.

Connection

1. Connect the AUDIO/VIDEO socket to the appropriate audio/video output of the 2nd video recorder.
2. Connect a TV receiver to the recorder to monitor the picture while recording.

Operation

■ Turn the power on for all connected equipment.
■ Tune the TV receiver to your video channel.
■ Load a cassette with its safety tab in place.
■ Press either CHANNEL button ●or the numeric key 0/AUX ⑪ to obtain "AU" in the channel display section on the FDP.
■ Press the REC/ITR button ●and the PAUSE/STILL/SLOW button ● to put the recorder in the Record-Pause mode.
■ Play back a tape on the source equipment to determine the segment to be recorded.
■ Press the PLAY button ● to start recording.
■ To stop recording temporarily, press the PAUSE/STILL/SLOW button.
■ To end recording, press the STOP/EJECT button ●.

Note:
- For the operation of the source equipment, refer to the instruction manual of the relevant machine.

Playback deck

To AUDIO/VIDEO

TV receiver

To AUDIO/VIDEO socket

Recording deck
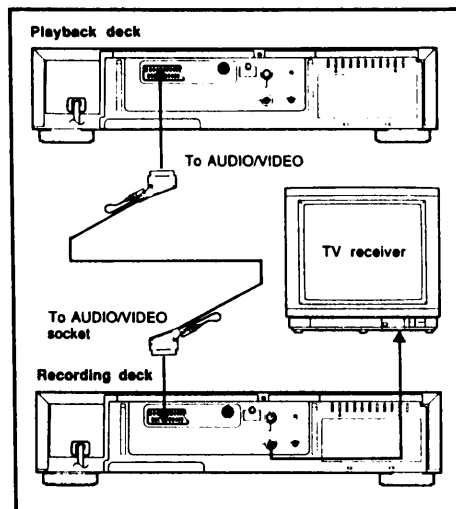
EDITING TO ANOTHER VIDEO RECORDER

This video recorder can also be used as the source player when editing tapes. This video recorder's remote PAUSE terminal is designed to accept a preroll command when used as a source player with a video deck which is preroll-capable and equipped with a Pause Control Output terminal. This combination makes possible synchronized preroll editing for high-quality editing results.

EDITING FROM A VIDEOMOVIE

- Connect the VideoMovie's AV OUT connector to the video recorder's AUDIO/VIDEO socket.
- Connect the mini-plug of the AV output cable to the remote PAUSE terminal of the video recorder.
- When the recorder is connected to a VideoMovie which incorporates a Master Edit Control system, you can control the recorder with the VideoMovie's controls for making edits free of transition-point gaps and distortion. Refer to the VideoMovie's instruction manual for detailed operating procedures for editing.
- With this connection, you can also use the VideoMovie as a video camera for direct recording onto the recorder's tape. Put the recorder in the Record-Pause mode and operate the VideoMovie's start/stop trigger to start and pause recording. (For direct recording with a separate video camera, a camera adapter is necessary.)

HR-D540EK

To AUDIO/VIDEO socket

To remote PAUSE terminal

A/V output cable (provided with VideoMovie)
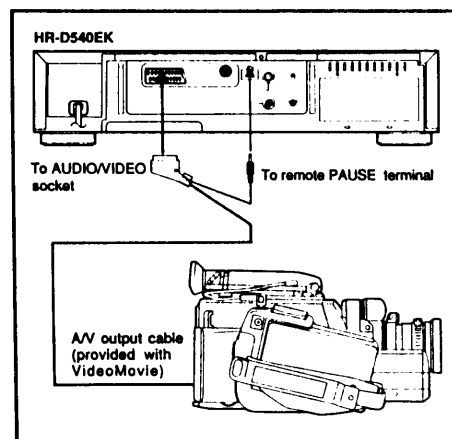
Designed specifically to simplify editing operations, the Duet Editing function delivers separate commands to two recorders simultaneously via a single remote control, taking advantage of the A/B code system. (JVC dedicated models only)

Preparations
- Connect two recorders as described in "RECORDING FROM AN EXTERNAL SOURCE" on the previous page.
- Set one recorder to respond to A code signals, the other, to respond to B code signals. (See page 7.)
- Place the two recorders side by side.

Notes:
- JVC video recorders with infrared remote control units which are not equipped with an A/B code select switch are designed to receive A code signals. Therefore, Duet Editing is possible with JVC decks if the HR-D540EK is set to respond to B code signals.
- It is not possible to perform Duet Editing unless the remote control's clock has been previously set.

Source Player (Recorder A)

Video/Audio Signals

B Recorder (Recorder B)

TV receiver
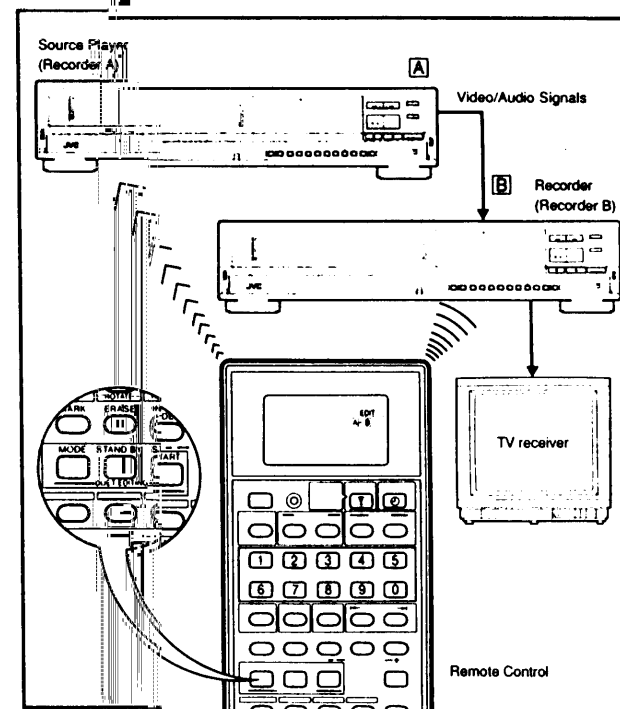
Remote Control

OPERATION

Remote Control	Recorder A (Source player)	Recorder B (Recorder)
	Load a recorded tape.	Load a blank tape.
1. Press MODE. "EDIT A → B " appears on LCD.		
2. Press STAND-BY.	Enters STILL mode.	Enters RECORD-PAUSE mode.
3. Search for an edit-in point on the source tape. Press 00 .	Functions as commanded. (In this state, only recorder A responds to the remote control's commands.)	Remains in RECORD-PAUSE mode.
4. Press START.	Enters PLAY mode.	Enters RECORD mode.
5. Press 00 .	Enters STILL mode.	Enters RECORD-PAUSE mode.
6. Repeat steps 3, 4 and 5 to continue editing.		

Notes:
- You can use Recorder B (the recorder set to respond to B code signals) as a source player and Recorder A as a recorder. In this case, press the A/B CODE button after step 1 to obtain "EDIT B → A" indication.
- To cancel the Duet Edit mode and return to normal remote control functions, press the MODE button so that the EDIT indication disappears.
- When the START button is pressed, the recorder takes a few seconds before actual editing starts due to the automatic backspace editing system. At the same time the START button is pressed, the player starts playback from the specified edit-in point. Therefore, it is recommended that you specify a point slightly before the intended edit-in point in step 3 for more accurate editing. This also ensures that the picture of the resulting edit will be more stable.

IN CASE OF DIFFICULTY

What may initially appear to be trouble is not always a real problem. Make sure first ...

POWER AND TAPE TRANSPORT PROBLEMS

Symptoms	Check points
No power is applied to the recorder.	● Is the power cord disconnected? — Connect it.
Clock is functioning properly, but the recorder cannot be powered.	● Is the TIMER indicator lit on the FDP? — Press TIMER to disengage the Timer Recording Standby mode.
Tape does not run during recording.	● Is the PAUSE/STILL/SLOW button engaged? — Press the PLAY button.
Tape stops in the Rewind or Fast-Forward mode.	● Is the COUNTER MEMORY switch set so that "M" appears on the FDP? — Press to make "M" disappear.
Tape will not rewind or fast forward.	● Is the tape already fully rewound or fast forwarded? — Check the cassette.

RECORDING PROBLEMS

Symptoms	Check points
Recording cannot be started.	● Is a cassette loaded? ● Is the safety tab on the cassette removed? — Reseal the slot with cellophane tape.
Camera recording is not possible.	● Are the camera and the camera adapter correctly connected? ● Is the power switch of the camera adapter set to ON? ● Does the channel display indicate "AU"? — Press "0/AUX".
Timer recording is not possible.	● Have you set the clock correctly and programmed the timer correctly? — Check once again. ● Is the TIMER indicator lit on the FDP? — Press TIMER.

PLAYBACK PROBLEMS

Symptoms	Check points
Playback picture does not appear while the tape is running	● Is the TV receiver's channel selector set to the correct video channel? — Set it to the RF converter channel. (See page 8.) ● If you are using AV connection, is the television engaged in the AV mode? — Operate the television's mode.
Playback is repeated.	● Is the REPEAT switch set to either "FULL REPEAT" or "INDEX REPEAT"? — Set it to "OFF".
Noise appears during playback.	● Is the automatic tracking mode engaged? — Engage the manual tracking mode. (See page 14.)
Playback picture is blurred or interrupted while TV broadcasts are clear.	● Video heads may be dirty. — Head cleaning is necessary. Consult your JVC dealer.

OTHERS

Symptoms	Check points
Whistling or howling is heard from TV.	● Move camera or microphone away from TV or reduce TV sound volume.
Some channels are skipped over when selecting a channel.	● Those channels are preset to be skipped over. If you need them, restore them. (See page 12.)
Channel cannot be switched.	● Is recording in progress? — Press PAUSE/STILL/SLOW, select a desired channel and press PLAY .
The recorder cannot be operated with the remote control.	● Batteries are discharged. — Replace with new one. ● Is the A/B CODE indicator showing the proper code for the recorder being operated? — Press the A/B CODE button to switch the remote control to the correct setting.
Index Search does not function properly.	● Adjacent index codes may be too close to each other. — Erase some index codes and mark new ones, if necessary, with sufficient distance between two index codes.

This recorder contains microcomputers. External electronic noise or interference could cause malfunctioning. In such cases, switch the power off and unplug the power cord. Then plug it in again and switch on. Take out the cassette. After checking the cassette, operate the unit as usual.

HEAD CLEANING

● Picture playback may become blurred or interrupted while the TV programme received is clear. This does not mean that the recorded programme has been erased.
● Dirt accumulated on the video heads after long periods of use causes such problems. We recommend the use of the cleaning cassette, model number TCL-2U.

For head cleaning, consult the nearest JVC dealer.

GENERAL

Power requirement	: AC 240 V~, 50/60 Hz
Power consumption	: 27 W
Temperature	: 5°C to 40°C (Operating)
	: –20°C to 60°C (Storage)
Operating position	: Horizontal only
Dimensions (WxHxD)	: 435 x 94 x 322 mm
Weight	: 5.3 kg
Format	: VHS PAL standard
Tape width	: 12.65 mm
Tape speed	: 23.39 mm/sec
Maximum recording time	: 240 min. with E-240 video cassette

VIDEO

Signal system	: PAL colour and CCIR monochrome signals, 625 lines/50 fields
Recording system	: Rotary, slant azimuth two-head helical scan system
Input	: 0.5 to 2.0 Vp-p, 75 ohms, unbalanced
Output	: 1.0 Vp-p, 75 ohms, unbalanced
Signal-to-noise ratio	: 43 dB (Rohde & Schwarz noise meter)
Horizontal resolution	: 250 lines

AUDIO

Recording system	: Longitudinal track
Input	: –3.8 dBs, (CENELEC standard), more than 50 k-ohms, unbalanced
Output	: –3.8 dBs, (CENELEC standard), less than 1 k-ohm, unbalanced (100 k-ohms, load)
Frequency range	: 70 Hz to 10,000 Hz

TUNER

Tuning system	: Frequency synthesized tuner
TV channel storage capacity	: 48 positions (+ AUX position "AU")
Channel coverage	: UHF channels 21 — 69 (470 — 862 MHz)
Aerial output	: UHF channel 36 (adjustable 32 — 40)

TIMER

Clock reference	: Quartz-crystal
Programme capacity	: 1-year/8-programme timer

ACCESSORIES

Provided accessories	: Aerial cable, Infrared remote control unit, "R6" battery x 2,
Optional accessory	: VPT adapter VU-V140E

E & O. E. design and specifications subject to change without notice.

Teletext services are becoming popular and a vast number of teletext pages are now available for a variety of information. This recorder is ready to take advantage of these services, not only for simple viewing but also for programming the recorder's built-in timer in an extremely easy way. All you need to do is connect the optional VPT adapter to the rear of the recorder. Then the recorder's remote control exhibits its full capability with all the dual or triple-function control keys working as intended.

TELETEXT
- View broadcast teletext pages.
- Several page access modes are available for quick and convenient viewing.
- Programme the timer using TV schedule pages.

PROGRAM
- Check the timer recording data on the colour display.
- Programme the timer manually with 10-key input.

MENU
1. – – – – TELETEXT
2. – – – – PROGRAM
3. – – – – PAGE SET
4. – – – – INITIAL SET

PAGE SET
- Preset teletext pages so that you can quickly access your favourite or frequently-referred-to pages.
- Four pages can be preset for each of the keys, 0 to 9, totalling 40 pages.

INITIAL SET

LANGUAGE
- Select one of four languages (English, German, Italian or Swedish) for on-screen messages (no effect on teletext pages).

CLOCK ADJUST
- Set the VCR's clock manually with 10-key input.
- Automatic clock setting by reading time information from teletext pages.

SECTION 1
DISASSEMBLY AND MECHANISM ADJUSTMENTS

1.1 DISASSEMBLY

1.1.1 Top cover

1. Refer to Fig. 1-1-1 and set for the EJECT (Stop) mode and disconnect VCR from AC power.
2. Take out 4 screws Ⓐ and 1 screw Ⓑ. To remove the top cover, slide it in the direction of the arrow and lift it away.

Fig. 1-1-1

1.1.2 Front panel assembly

1. Remove the top cover.
2. Carefully disengage 3 tabsⒸof the front panel assembly from the upper side of the chassis.
3. Refer to Fig. 1-1-2 and pull the front panel assembly forward you to disengage 3 tabs Ⓓ of the front panel assembly from the bottom side of the chassis, then remove the front panel assembly.

Fig. 1-1-2

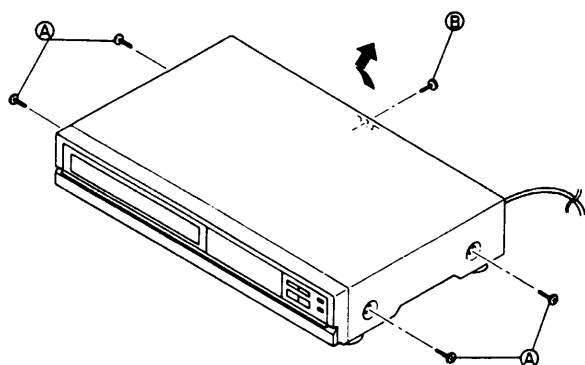### 1.1.3 Bottom cover

1. Remove the top cover.
2. Refer to Fig. 1-1-3 and take out 4 screws Ⓔ and 2 screws Ⓕ from the bottom of the chassis.
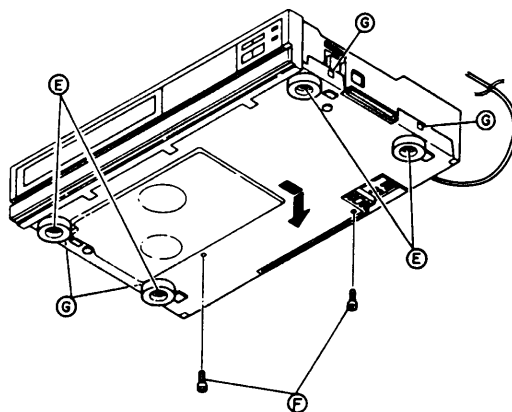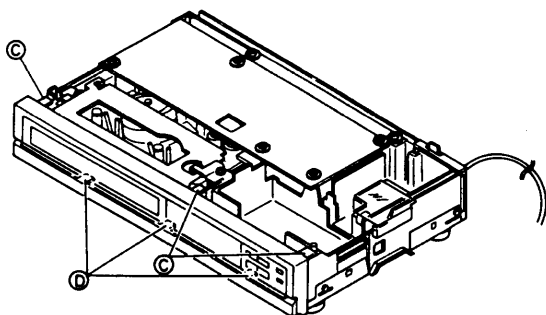3. Disengage the bottom cover from 4 claws Ⓖ on the bottom of the chassis.

Fig. 1-1-3

1.1.4 Main board assembly

1. Remove the top cover.
2. Refer to Fig. 1-1-4 and take out 5 screws Ⓗ and 1 screw Ⓘ from main board assembly.
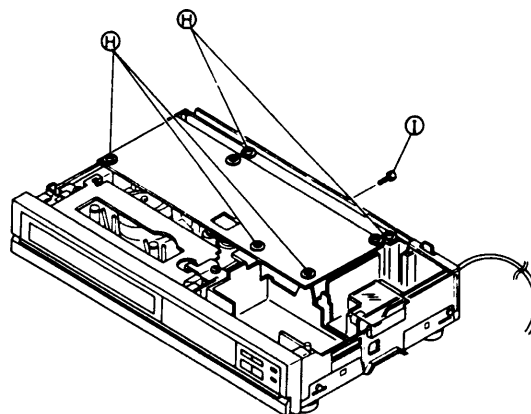

Fig. 1-1-4

1.1.5 Cassette housing

1. Remove the top cover and main board assembly.
2. Refer to Figs. 1-1-5 and 1-1-6.
   Take out 4 screws (J) that secure the cassette housing.
   Disengage 3 tabs (K) of the front panel and pull the front panel forward where it does not interfere with removing the cassette housing.
   Remove the cassette housing in the upward direction.
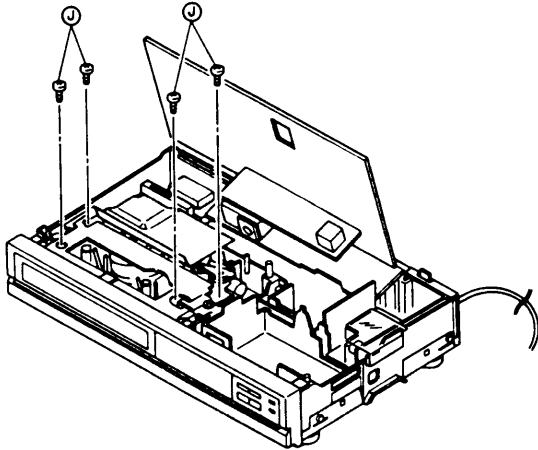
Fig. 1-1-5
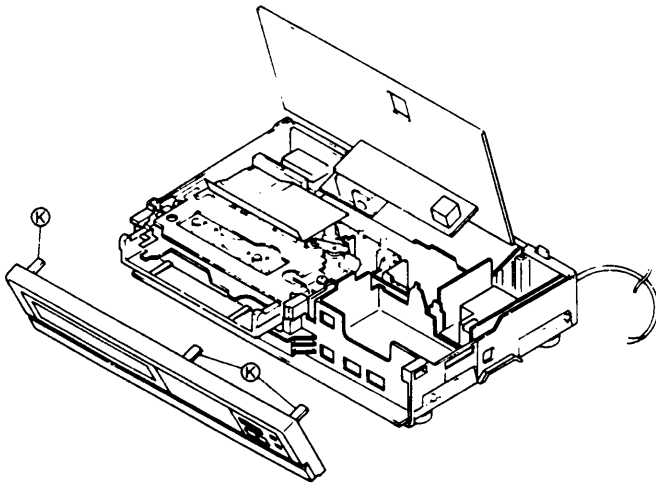
Fig. 1-1-6

1.1.6 Cassette housing installation

1. On the main deck, observe the positional relationships of the parts indicated in Fig. 1-1-7.
   If necessary, turn the loading motor by hand to obtain these positions.
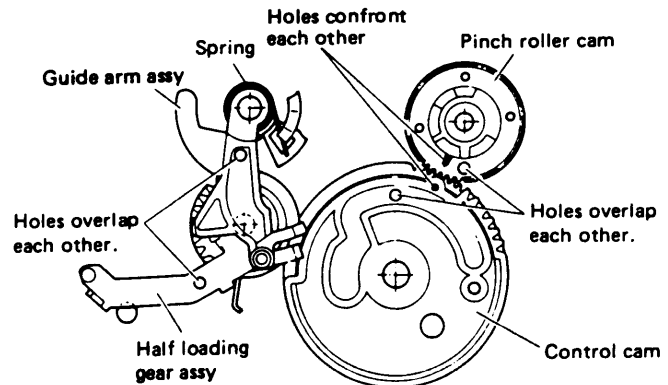
Fig. 1-1-7

2. Refer to Fig. 1-1-8 and confirm that the clutch is engaged.
   If necessary, press the lever indicated by the arrow to where the clutch is locked.
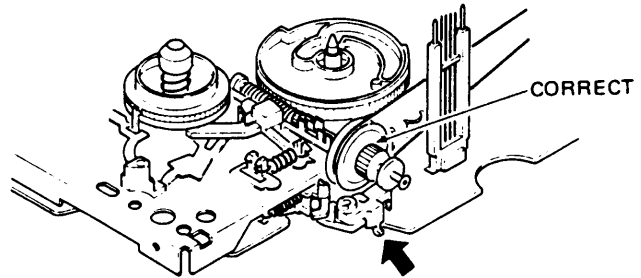
Fig. 1-1-8

3. Check that the cassette housing is in the eject state (internal holder of the cassette housing is locked in raised position).
   Set the cassette housing into place and secure with 4 screws.
4. Install the front panel as shown in Fig. 1-1-9 and re-engage the tabs. Supply power and use a spare cassette to check for normal loading and eject operations.
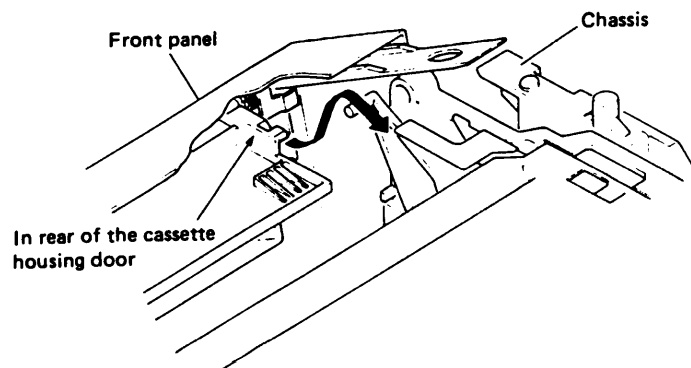
Fig. 1-1-9

5. Disconnect VCR from power, then reinstall the main board assembly and top cover.

1.1.7 Cassette housing door

1. Remove the top cover and front panel assembly.
2. Take out one screw Ⓛ of the front panel assembly.
3. Refer to Fig. 1-1-10 and use care regarding the torsion spring, then pull out the left end of the cassette housing door to move it.

In rear of the front panel
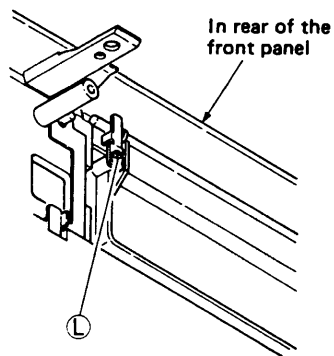
Fig. 1-1-10

1.1.8 Main-deck

1. Remove the top cover, front panel assembly and main board assembly.
2. Refer to Fig. 1-1-11 and take out 3 screws Ⓜ from the main-deck assembly.
3. Remove the main-deck assembly in the upward direction and disconnect a connector of CN601 from the Main board, connectors of CN1, CN2 from the Pre/Rec board, connectors of CN1, CN2 from the A/C head board, a connector of CN1 from the Loading MDA board and a connector of CN1 from the Drum MDA board.
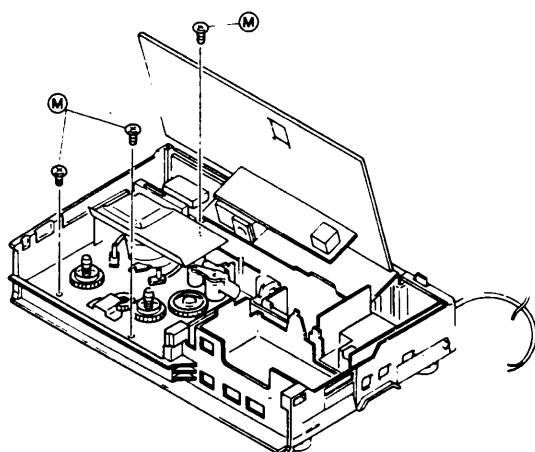
Fig. 1-1-11

1.2 MECHANISM ADJUSTMENTS

1.2.1 Precautions

1. Disconnect VCR from AC power before soldering.
2. Avoid imparting stress to wires when disengaging connectors.
3. Determine and correct the cause of difficulty before proceeding to adjustments. Do not disturb settings unnecessarily.
4. Use care not to damage tabs, claws, etc. during repairs.
5. Install the cassette housing assembly only when the mechanism is in the Eject or Stop mode position. In the Eject mode, the internal holder of the housing is fully raised. This is fully lowered in the Stop mode.
6. When installing the front panel assembly, be sure to engage the housing door with the door lever of the cassette housing assembly. If this is omitted, the door will not open at Eject and the cassette cannot be removed.

1.2.2 Check without cassette housing

Mechanism operations can be observed easily by removing the cassette housing assembly. Note the following.

1. Disable the photo transistor sensor (END SENSOR) on the main-deck by applying an opaque cover.
2. Connect pins 2 and 3 of Main board connector CN601.
3. Select the desired modes with the operation buttons. However, notice that without tape, setting for the reverse direction modes produces the Stop mode after a few seconds due to absence of the reel sensor output.

1.2.3 Manually removing cassette tape

In event of electrical system failure that prevents the tape from being unloaded, the tape can be removed manually by the following procedure. Refer to Figs. 1-3-1, 1-3-2 and 1-3-3.

1. Disconnect power cord from AC outlet.
2. Turn the loading motor by hand so that the control cam rotates clockwise. This retracts the pole base assembly to the unloading position.
3. Continue turning to where the guide arm and half loading gear assemblies shift to beneath the cassette.
4. Turn the clutch assembly (capstan motot) at the rear of the deck to absorb slack tape within the cassette.
5. Again turn the loading motor in the same direction to raise the cassette and remove it.

1.2.4 Test equipment

The following special tools and fixtures are required for mechanism adjustment.

1. Alignment tape : MH-2
   Stairstep signal is employed for interchangeability checks and adjustments.
2. Torque gauge : PUJ48075-2
   Measures tape take-up torque.
3. Back tension cassette gauge : PUJ48076-2
   Measures tape tension at the supply side.
4. A/C head positioning tool : PUJ47351-2
   Shifts the head base for adjusting the control head position.
5. Roller driver : PTU94002
   Turns the guide roller for adjusting FM linearity.
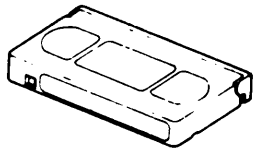
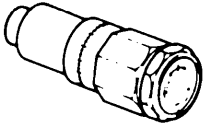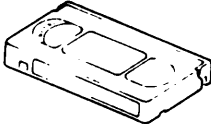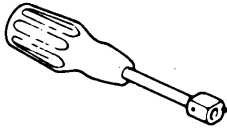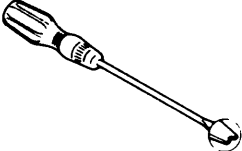| Alignment tapes 1	Torque gauge 2	Back tension cassette gauge 3	A/C head positioning tool 4	Roller driver 5

Fig. 1-2-4 Test equipment

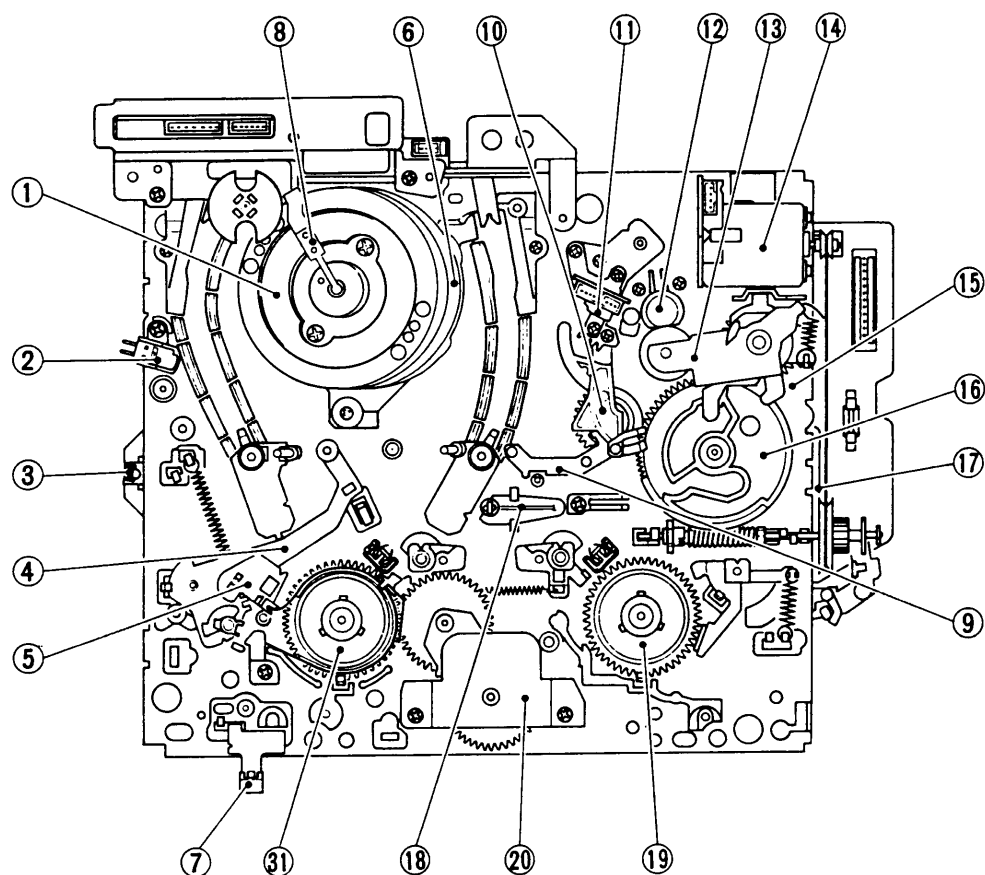## 1.3 MAIN MECHANISM PARTS
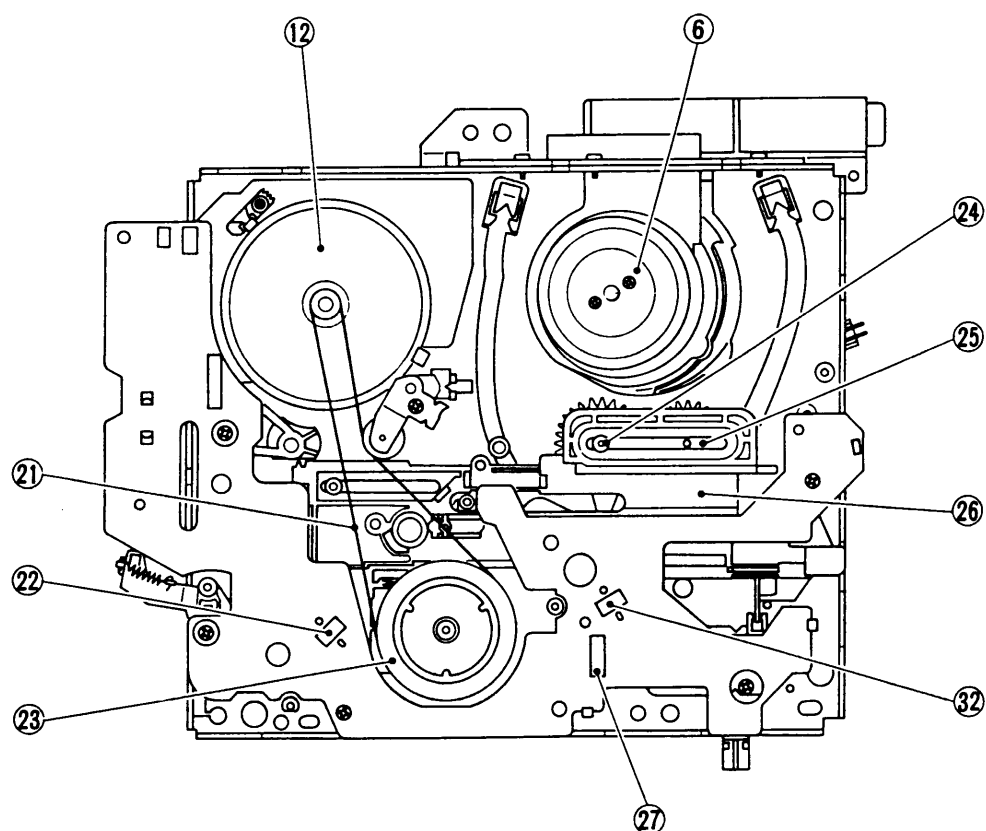

Fig. 1-3-1 Top view of main-deck

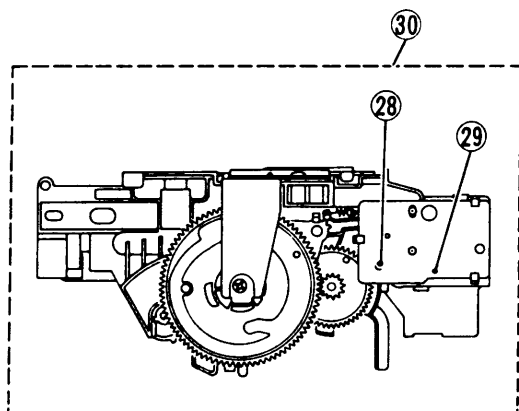**Fig. 1-3-2** Bottom view of main-deck

Fig. 1-3-3 Side view of cassette housing

A. Cleaning

Periodic cleaning of the tape transport system is desirable, but ordinarily not feasible in practice. Therefore, perform cleaning when a set is brought in for repairs or maintenance. Contamination of the video heads, tape guides and brushes can detract from playback picture quality and in extreme cases, even damage the tape. For cleaning, use a fine-mesh cotton cloth (about the texture of a white dress-shirt) moistened in alcohol.

- To clean the video heads, press the moistened cloth gently against the upper drum with fingertip and turn the drum by hand.
- Do not use a vertical stroke, as this may damage the heads.

B. Lubrication

Oil and grease do not normally require periodic replenshing. Apply only when replacing lubricated parts (also clean and replace lubrication of mating parts if soiled).

For parts and points to apply oil and grease, refer to the exploded views of the mechanism assembly.

Before oiling, clean with alcohol.
Apply one or two drops of oil. Avoid excess oil.

1. Table 1-1 indicates the oil and grease used in this set. Use these or recommended locally available equivalents.

Category	Part No.
Oil	COSMO-HV56
Grease	KANTO-G-31KAV

Table 1-1

2. Grease is not required for a replacement cassette housing assembly, as this has been applied at the factory.

Note: *Stir grease that has been stored for an extended period.*

C. Main mechanical parts

See Figs. 1-3-1, 1-3-2 and 1-3-3.

No.	Symbol	Parts Name	See Section
1	M32A	Upper drum assy	
2	M44	Full erase head	
3	51Q1	End sensor	
4	M41	Tension arm assy	1.5.4
5	M42	Tension band assy	1.5.4
6	M32C	Lower drum motor assy	1.5.2
7	M461	REC safety switch (S2)	
8	M32D	Brush assy	
9	M449	Half loading gear assy	1.5.5
10	M447	Guide arm assy	1.5.5
11	M48	A/C head	1.5.3
12	M422	Capstan motor	
13	M442	Pinch roller arm assy	
14	M434	Loading motor assy	
15	M446	Pinch roller cam	1.5.5
16	M438	Control cam	1.5.5
17	M437	Loading belt	
18	M460	LED holder (D1)	
19	M430	Reel disk (take-up)	
20	M424	Idler gear unit	
21	M429	Timing belt	
22	51PHS1	Take up reel sensor (PS1)	
23	M426	Clutch unit	1.5.6
24	M433	Take up loading arm assy	1.5.7
25	M432	Supply loading arm assy	1.5.7
26	M439	Plate assy	1.5.7
27	M462	Slide switch (S3)	
28	56PHS3	Cassette sensor (PHS3)	
29	56Q2	Start sensor (Q2)	
30	M36	Cassette housing assy	
31	M470	Reel disk (supply)	
32	51PHS2	Supply reel sensor (PS2)	

- Symbol interpretation example

1.4 INSPECTION AND MAINTENANCE

This product employs rotary and moving parts which wear out in the course of usage. Periodic inspection, cleaning, lubrication and maintenance are therefore important for ensuring maximum performance. Worn parts must also be replaced at when required.

1.4.1 Suggested servicing schedule for main components

The following table indicates the suggested period for such service measures as cleaning, lubrication and replacement. In practice, the indicated periods will vary widely according to environmental and usage conditions. However, the indicated components should be inspected when a set is brought for service and the maintenance work performed if necessary.

Also note that rubber parts may deform in time, even if the set is not used.

System	No.	Parts Name	Symbol No.	Periodic servicing schedule (operation hours)								
				250	500	750	1000	1250	1500	1750	2000	Overhaul
Tape Transport	1	Upper drum	M32A	★	★	☆	○	○	○	○	○	●
	11	A/C head	M48	★	★	★	○	○	○	○	○	●
	13	Pinch roller	M442	★	★	★	○	○	○	○	○	●
	2	Full erase head	M44	★	★	★	○	○	○	○	○	●
	4	Tension arm	M41									●
	6	Lower drum	M32C				○	○	○	○	○	●
	12	Capstan (shaft)	M422	★	★	★	★	★	★	★	★	●
	9	Half loading gear	M449									●
	10	Guide arm	M447									●
Drive	12	Capstan motor	M422				○	○	○	○	○	●
	17	Loading Belt	M437				○	○	○	○	○	●
	21	Reel Belt	M424				○	○	○	○	○	●
	19	Take-up reel disk	M430				○	○	○	○	○	●
	31	Supply reel disk	M470				○	○	○	○	○	●
	23	Clutch assy	M426								○	●
	14	Loading motor	M434				○	○	○	○	○	●
		Worm clutch assy	M436								△	●
	26	Plate assy	M439								△	●
Others	5	Tension band	M42				○				○	●
	8	Brush	M32D				○				○	●

★ : Cleaning
☆ : Cleaning (or Replacement if necessary)
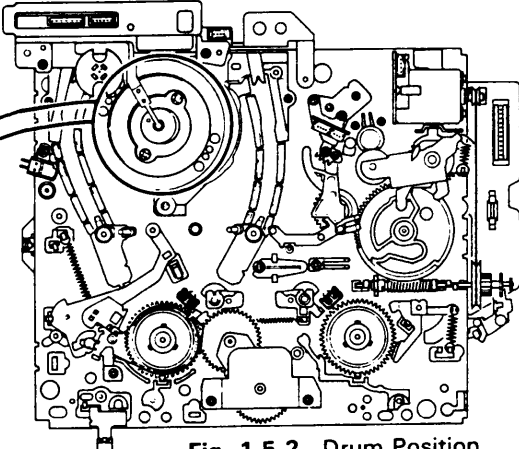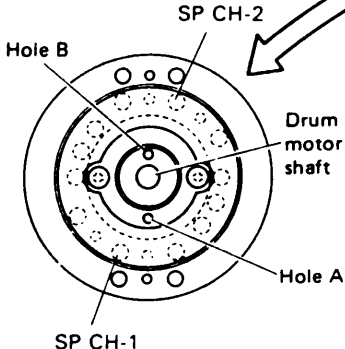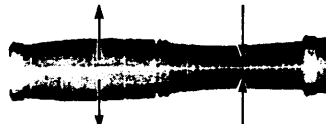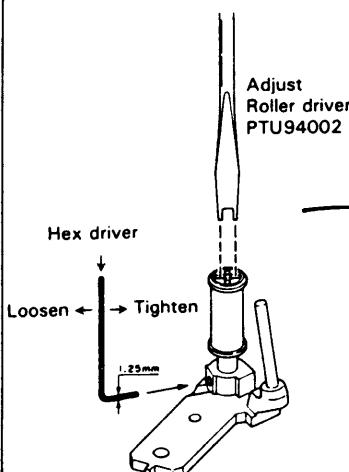△ : Lubrication
No: Refer to Main mechanical parts
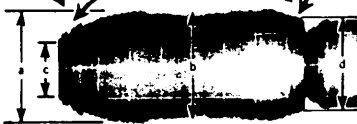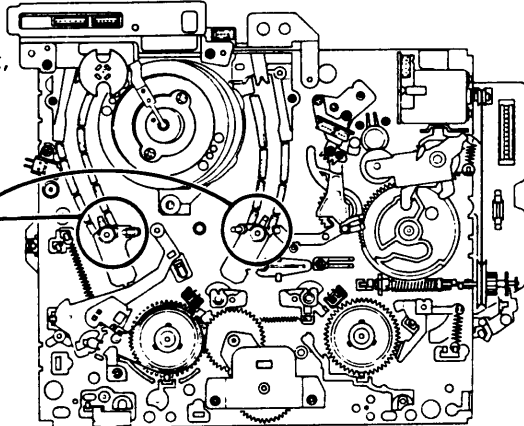
▲ : Lubrication (or Replacement if necessary)
● : Replacement
○ : Inspection or Replacement if necessary
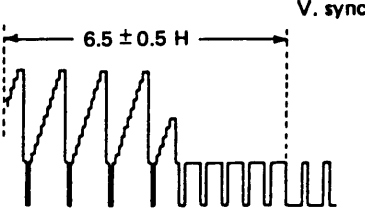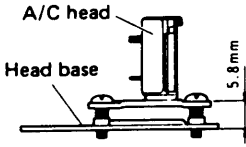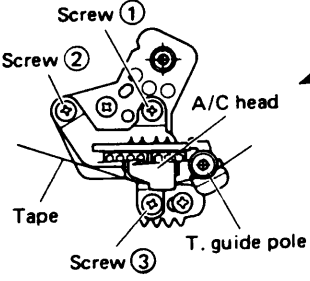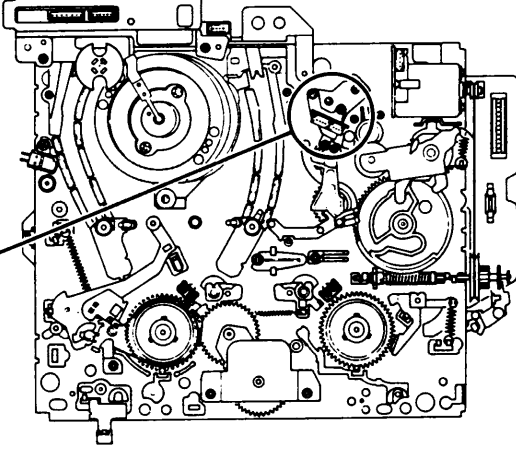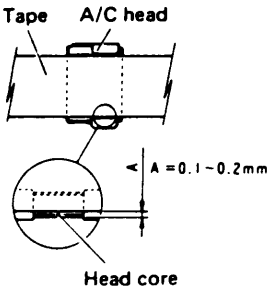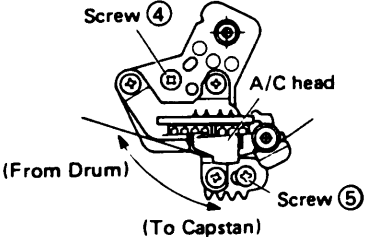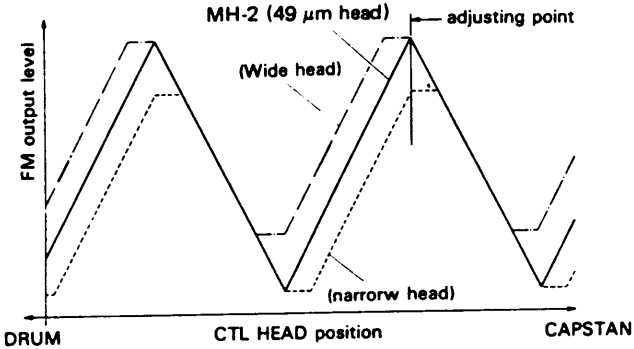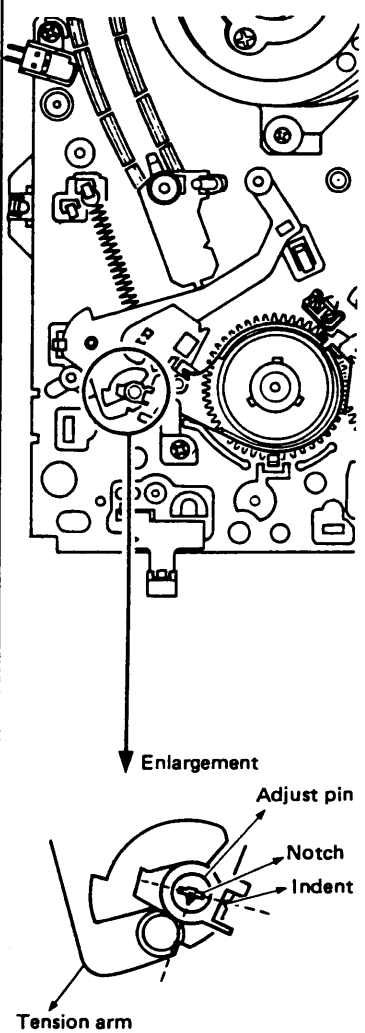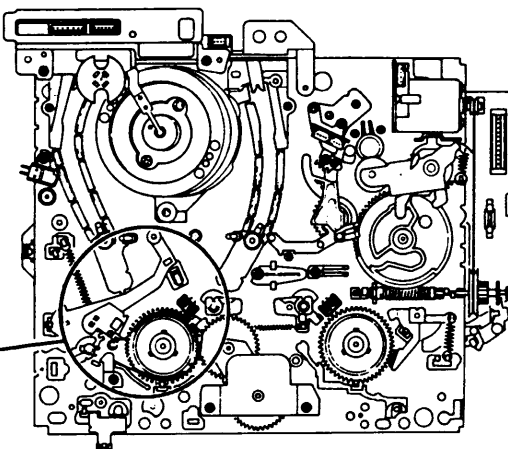
Table 1-4-1 Approximate maintenance schedule
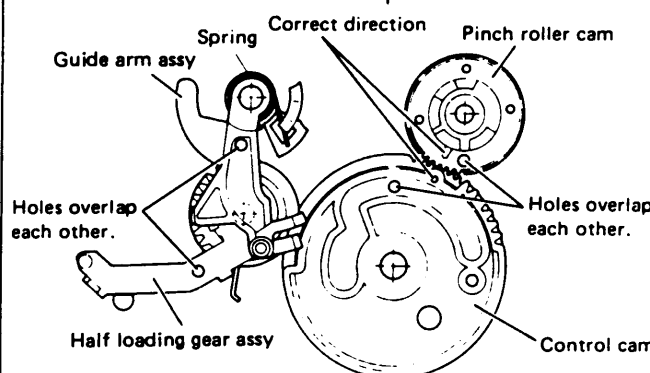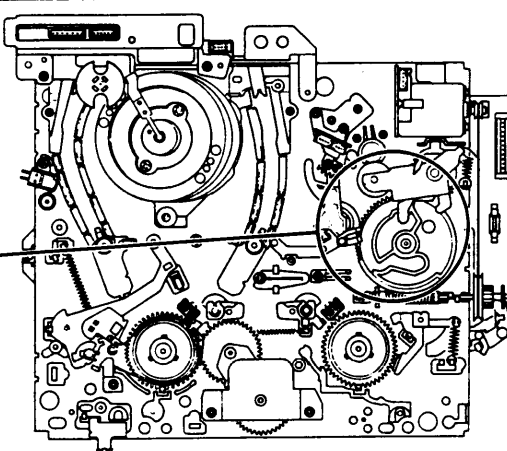
1.5 MAIN PARTS REMOVAL AND REPLACEMENT

No.	Item	Checkpoints	Adjustment and Checks
1	Upper drum assembly •Symptoms: FM signal absent, intermittent or weak on one channel; large difference in channel output levels •Cause: Worn or damaged video heads, poor response, etc. **Fig. 1-5-1** **DRUM TOP VIEW**	 **Fig. 1-5-2** Drum Position Mounting direction See Fig. 1-5-1. (Symptom: no picture)	After replacing, observe that upper drum hole A is opposite the motor axis from lower drum hole B.
		Axis wobble See Fig. 1-5-2. (Symptom: jitter, poor FM linearity) PB FM: Main board TP206 FF: Main board TP411	Record and playback in SP mode. Confirm absence of large difference between channels. (Fig. 1-5-3) **Fig. 1-5-3** Axis wobble
	 Fig. 1-5-4 S.T. Pole base	FM linearity check See Fig. 1-5-5. (Symptom: vertical sync absent, picture noise) PB FM: Main board TP206 FF: Main board TP411 **Fig. 1-5-5** FM linearity $\frac{b}{a} \geqq 0.7, \frac{c}{a} \geqq 0.65, \frac{d}{a} \geqq 0.65$	 **Fig. 1-5-6** S.T. Pole base position 1) Play stairstep signal of the MH-2 Alignment Tape. Confirm absence of obvious FM waveform loss and that operating the Tracking yields the optimum point. 2) Refer to Fig. 1-5-4, adjust for loss at the left edge (drum entry) of the FM waveform by turning the guide roller of the supply pole base. Similarly, adjust for loss at the right edge (drum exit) by turning the guide roller of the take-up pole base. Note: *If FM loss occurs on both channels and cannot be corrected by adjusting the guide rollers, the lower drum needs replacement.*

No.	Item	Checkpoints	Adjustment and Checks
	PB switching point •Symptom: switching noise at picture bottom.	VIDEO OUT V. sync ← 6.5 ±0.5 H → Fig. 1-5-7 PB Switching Point	1) Connect an oscilloscope to VIDEO OUT. 2) Set the MH-2 alignment tape into the cassette housing. Play back the stairstep segment of MH-2 alignment tape. 3) Trigger the oscilloscope externally (–slope) with the signal from TP411 (DRUM FF) of the main board. 4) Adjust R420 to position the trigger point 6.5 H ±0.5 H from V. sync as shown in Fig. 1-5-7.
2	Lower drum assembly •Symptoms: Poor FM linearity, noisy rotation, jitter •Cause: Lead and bearing wear	Check FM linearity and switching point.	See above upper drum assembly items.
		Check control head phase (X value) Symptom: tracking error PB FM: Main board TP206 FF: Main board TP411	1) Play stairstep signals of MH-2 Alignment Tape. Engage the Tracking Preset mode by pressing the + and – buttons simultaneously in the onscreen mode. Confirm that the same maximum FM waveform level is obtained as when the tracking is adjusted manually. 2) Refer to the A/C head adjustments.
3	A/C head Fig. 1-5-8 Temporary height Fig. 1-5-9 Inclination/Azimuth/ Height adj.	 Fig. 1-5-10 A/C HEAD position	
		Temporarily set height as indicated in Fig. 1-5-8.	Set the height as indicated in Fig. 1-5-8 to facilitate tape transport checks and adjustments.
		Tilt (forward inclination) See Fig. 1-5-9. (Symptom: audio level varies greatly.)	1) Run tape, turn screw ① counterclockwise to where slight curling of the tape occurs at the lower flange of the take-up guide roller. 2) Then slowly turn the screw clockwise to where the curling ceases.
		Azimuth See Fig. 1-5-9. (Symptoms: audio low level or noisy) Audio output: Main board AUDIO OUT	1) Play stairstep signal (with audio 6 kHz) of the MH-2 Alignment Tape. Observe audio output signal with oscilloscope. 2) Turn screw ② and adjust for maximum audio output level.

1-9

No.	Item	Checkpoints	Adjustment and Checks
	Tape A/C head A = 0.1～0.2mm Head core **Fig. 1-5-11** Height Adj	Height See Figs. 1-5-9 and 1-5-11. (Symptom: low audio and control signal levels)	1) Run tape and observe the control head area. 2) Turn screws ①, ② and ③ by small and equal amounts until 0.1 to 0.2 mm of the head core bottom can be seen. **Note:** *If difficult to observe, play stairstep signal of MH-2 Alignment Tape and adjust for maximum audio output and control pulse level.*
		FM linearity	Refer to upper drum assembly items. If adjustment is major, again check the azimuth.
		Control head phase See Fig. 1-5-12 PB FM: Main board TP206 FF: Main board TP411 Screw ④ A/C head (From Drum) Screw ⑤ (To Capstan) **Fig. 1-5-12** CTL head phase	1) Play stairstep signal of MH-2 Alignment Tape and observe the FM waveform. Set for Tracking Preset by pressing the + and − buttons simultaneously in the onscreen mode. 2) Loosen screws ④ and⑤. Set the A/C head positioning tool on screw ④, with the stud inserted into the nearby oblong hole. 3) Turn the tool first to position the A/C head fully toward the capstan. Then gradually return it toward the drum and stop at the position of maximum FM waveform output level as shown in Fig. 1-5-13. 4) Tighten screw ⑤ . Remove the tool and tighten screw ④.

MH-2 (49 μm head) adjusting point

(Wide head)

FM output level

(narrorw head)

DRUM CTL HEAD position CAPSTAN

Fig. 1-5-13 CTL head phase

Note: *Trigger the oscilloscope externally signal from TP411 (DRUM FF). Use (+) trigger for MH-2 alignment tape.*

No.	Item	Checkpoints	Adjustment and Checks
4	Tension arm assembly Tension band assembly **Fig. 1-5-14** Tension arm assy	Tension pole position See Fig. 1-5-14. (Symptom: poor FM waveform response)	 **Fig. 1-5-15** Tension arm position 1) Check that the cassette housing is in the eject state (internal holder of the cassette housing is locked in raised position). 2) Turn the eccentric adjust pin to align the notch of the pin with the tension arm indent as shown in Fig. 1-5-14.
		Back tension (Symptom: skew)	1) When the tension pole position is correctly adjusted, the back tension will assume the correct value. 2) Use the Back Tension Cassette Gauge and set for the playback mode. Confirm reading of 35 to 48. 3) Changing the tension pole position in order to vary the back tension will cause adverse effects elsewhere.

No.	Item	Checkpoints	Adjustment and Checks
5	Pinch roller cam Control cam Half loading gear assembly Guide arm assembly Fig. 1-5-16 Control/Pinch roller cam		Set mechanism to Eject mode (internal holder of the cassette housing is locked in raised) position. Fig. 1-5-17 Control cam position
		Important: Do not remove or disturb parts other than those mentioned. See Fig. 1-5-16.	1) When installing the pinch roller cam, overlap the largest hole of the gear portion with the hole of the deck. 2) Set the control cam on the deck with the hole of the groove overlapped with the hole of the deck. Observe that the small hole of the control cam and the ridge of the pinch roller cam are aligned. (If the control cam does not fit readily, shift the rear plate assembly within the range of play.) 3) Install the half loading gear assembly with the hole overlapped with the hole of the deck. Secure with E-ring. 4) Install the guide assembly over the spring and with the hole overlapping that of the deck. Engage the spring correctly.
		Cassette housing assembly	Install the cassette housing assembly with the mechanism in the Eject mode. Also observe that the inner holder of the housing is raised and locked.
6	Clutch assembly	Take-up torque (Symptom: inadequate take-up torque)	1) Remove cassette housing and set for playback mode (see Section 1.2). 2) Set torque gauge on the take-up reel disk. Gradually relax your grip on the gauge and read the needle indication at the point the gauge begins to rotate with the disk. Confirm indication of 60 to 100.

No.	Item	Checkpoints	Adjustment and Checks
7	Take-up loading arm assembly Supply loading arm assembly Plate assembly		**Note:** • *Set mechanism to the Eject or Stop mode before removing these parts.* • *The flange of the plastic rivet securing the loading arm assembly and the pole base assembly can be damaged by attempting to remove it directly. Press the loading arm assembly firmly to prevent motion. Then use a narrow-shafted tool to press the rivet from the shaft end to remove it.*
		Mounting position alignment • Remove the tension arm assembly to facilitate operation. See Fig. 1-5-18.	1) Set the supply and take-up loading arm assemblies so that the holes of the gear portions are aligned, then secure to the pole base assemblies with rivets. 2) Shift the plate assembly and install with the holes of the upper and lower components overlapped.
		Slide switch See Fig. 1-5-18.	Be sure to engage the slide switch slider with the edge of the plate assembly.
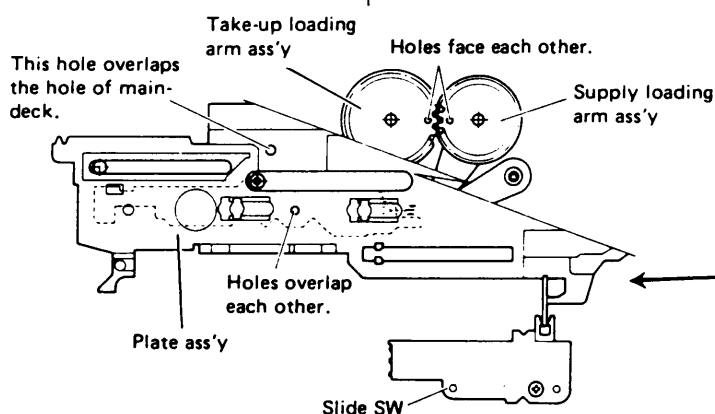
Fig. 1-5-18
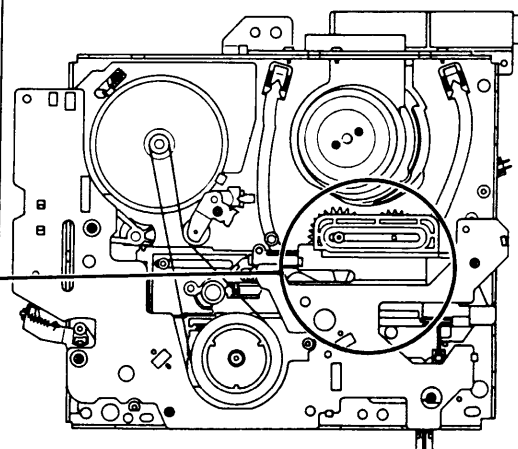
Fig. 1-5-19
T.S. Loading arm position

SECTION 2
ELECTRICAL ADJUSTMENTS

2.1 PREPARATION

Electrical adjustments are required after replacing circuit components and certain mechanical parts.

It is important to perform these adjustments only after all repairs and replacements have been completed. Also, do not attempt these adjustments unless the proper equipment is available.

2.1.1 Required test equipment

1. Color television or monitor
2. Oscilloscope: wide-band, dual-trace, triggered delayed sweep
3. Frequency counter
4. Audio oscillator
5. Audio voltmeter
6. Digital voltmeter
7. Signal generator: RF/IF sweep/marker
8. Signal generator: PAL color bar, stairstep, video sweeper
9. Signal generator: Audio multiplex TV signal generator
10. Recording tape
11. Alignment tape: MH-2
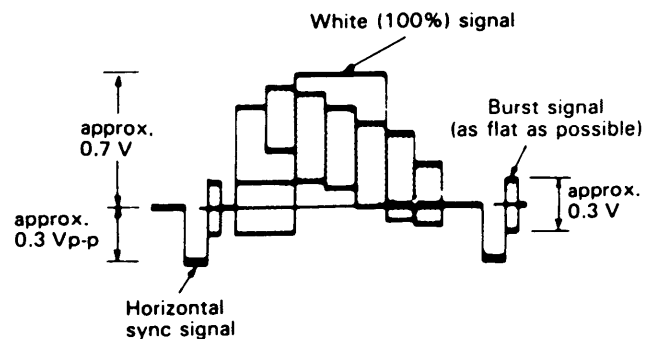
Fig. 2-1-1 Color bar signal of pattern generator
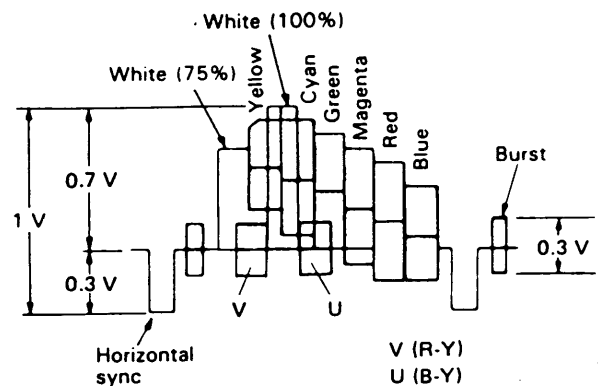
Fig. 2-1-2 Color bar signal waveform
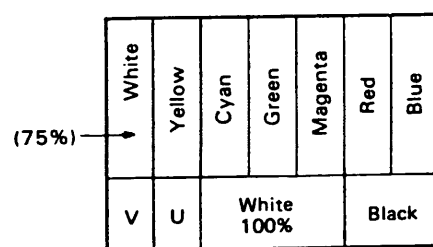
Fig. 2-1-3 Color bar pattern

2.1.2 Check and adjustment steps

The check and adjustment steps are provided in the following in the form of charts. For clarity, the nomenclature used in the charts is outlined below.

No.	Checks and adjustments are numbered in the recommended sequence in which they are to be performed.
Item	Name assigned to the particular check and adjustment step.
Check Point	Location to which measuring instrument (oscilloscope unless otherwise noted) is to be connected.
Adjustment Parts	Variable component (resistor, capacitor, etc.) to be adjusted in this step. Dash (−) indicates check only.
Signal & Mode	• Input signal required to perform adjustment. Dash (−) indicates that special signal is not required. • Equipment operating mode at time of check or adjustment.
Color bars	Color bars signal as video input.
Stairstep	Stairstep signal as video input.
1 kHz	1 kHz sinewave as audio input signal.
MH-2 color bars	Color bars segment of MH-2 alignment tape.
MH-2 stairstep	Stairstep segment of MH-2 alignment tape.
MH-2 1 kHz	1 kHz audio signal segment of MH-2 alignment tape.
MH-2 RF sweep	RF sweep segment of MH-2 alignment tape.
E-E	Power on and machine in Stop mode.
REC	Recording mode
PB	Playback mode
SEARCH	Search (FWDS and REVS) playback mode
SLOW	Slow motion playback mode
STILL	Pause during playback mode
SP mode	SP recording speed
Description	This column provides an explanation of the step, notes and adjustment values, and reference to waveforms where applicable.

2.2 SWITCHING REGULATOR CIRCUIT

Note: *Unless otherwise specified, all test points and adjustments are located on the SWITCHING REGULATOR board.*

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
1	5 V DC output voltage	TP1	R37 (5 V DC)	•REC •SOURCE SEL: TUNER	1) Connect a digital voltmeter between TP1 and TP-GND. 2) Record in the TUNER mode, adjust R37 for 5.3 ± 0.05 V.

2.3 TIMER CIRCUIT

Note: *Unless otherwise specified, all test points and adjustments are located on the TIMER board.*

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
1	Clock	IC1-16	C6 (clock)	•E-E	1) Connect a frequency counter between IC1-16 and GND. 2) Short TP1 to GND, then short the leads of electrolytic capacitor C3 once in order to reset IC1. All FDP Segments and power LED are on. 3) Adjust C6 for 2048.000 ± 0.002 Hz (488.2808 to 488.2818 μs).

2.4 SERVO CIRCUIT

Note: *Unless otherwise specified, all test points and adjustments are located on the MAIN board.*

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
1	SP PB switching point	VIDEO OUT	R420	• PB • MH-2 (stairstep) • Trigger slope (−) • SP mode • AUTO TRACKING OFF	1) Connect an oscilloscope to VIDEO OUT. 2) Play back the stairstep segment of MH-2 alignment tape. 3) Trigger the oscilloscope externally (− slope) with the signal from TP411. 4) Adjust R420 to position the trigger point 6.5 ± 0.5H from V. sync.

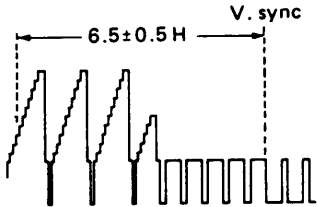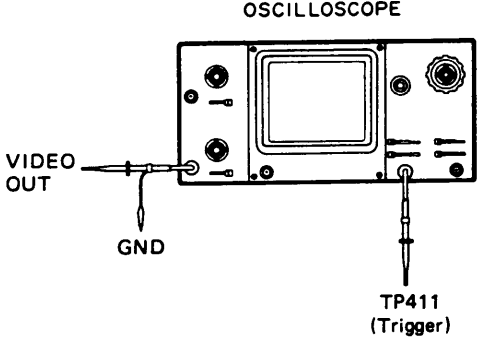| No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
2	SP slow tracking preset	Monitor-TV	Presetting unit (PTU 94008)	• SP mode • REC then PB (slow)	**Note:** *Set VCR to A mode by remote controller.* 1) Set recording video tape into the cassette housing. 2) Receive a color broadcast on a VHF-HI channel or supply a color bar signal to VIDEO IN. 3) Record a color broadcast or color bar signal in the SP mode. 4) Play back recorded signal in the FWD slow mode and set the tracking control of the FRONT panel to the center position by simultaneously pressing the (+) and (−) tracking buttons. 5) Observe the display on a monitor-TV and adjust for optimum noise condition (best tracking) by depressing "B (−)" or "C (+)" buttons of presetting unit as required. 6) Depress the STOP button on the FRONT panel. 7) Confirm that the bar noise is not visible on the monitor in the slow mode.

2.5 VIDEO CIRCUIT

Note: *Unless otherwise specified, all test points and adjustments are located on the MAIN board.*

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
1	REC color level and ch balance	L201-Ⓐ (VIDEO UNIT board)	R220 (SP Rec color level) (Main board)	• PB mode • MH-2 color bar • SP mode	1) Connect an oscilloscope to L201- Ⓐ (IC201-19) pin as shown in Fig. 2-5-1 and observe color signal level. 2) Set the MH-2 alignment tape into the cassette housing, play back the color bar segment of MH-2 alignment tape. 3) Set the tracking of the FRONT panel to the Auto tracking off position by simultaneously pressing the "+" and "−" tracking buttons. 4) Adjust by pressing the "+" and "−" tracking buttons of the Front panel for maximum level of the color waveform and make a note of the higher color level "A". 5) Press the STOP button on the FRONT panel and eject the MH-2 alignment tape.
				• REC then PB • MH-2 color level • Auto tracking : OFF • SP mode	6) Set recording video cassette into the cassette housing. Supply a color bar signal to VIDEO IN. 7) Trigger the oscilloscope externally with the signal from TP411 (DRUM FF) of the Main board. Use (−) trigger for CH1 and (+) trigger for CH2. 8) Record a color bar signal in the SP mode. 9) Play back recorded color bar signal. Set the tracking of the FRONT panel to the Auto tracking off position by simultaneously pressing the "+" and "−" tracking buttons and confirm 85 ± 5% of the noted color level at IC201-19. If necessary, before recording, adjust R220 so that the higher level channel becomes 85 ± 5% of the noted level "A" during playback as shwon in Fig. 2-5-2. At this time, confirm that the channel level difference is within 3 dB. Note: *Repeat the above step (9) several times.*
2	YNR NC balance	TP21 (IC1-26) (VIDEO UNIT board)	R16 (NC BAL) (VIDEO UNIT board)	• E-E • INPUT SEL: AUX • Color bar • SP mode	1) Supply a color bar signal to VIDEO IN and connect an oscilloscope to TP21 (IC1-26 pin). 2) Adjust R16 for minimum DC step difference.

Fig. 2-5-1 Component view of VIDEO UNIT board

Fig. 2-5-2 REC color level

Fig. 2-5-3

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
3	SP PB Frequency	VIDEO OUT (TP201)	R226 (PB EQ) — .	• REC then PB . • Video sweep • Auto tracking off	1) Terminate VIDEO OUT with monitor - TV (75 Ω load), supply a video sweep signal without burst to VIDEO IN. 2) Set recording video cassette into the cassette housing. Record a video sweep signal without burst in the SP mode. 3) Connect an oscilloscope to VIDEO OUT. Play back recorded video sweep signal in the SP mode, set the tracking of the Front panel to the Auto tracking off position by simultaneously pressing the (+) and (−) tracking buttons. 4) Use the control of the oscilloscope to position the 100 kHz region at graduation 3 (0 dB) of the oscilloscope scale. 5) Adjust R226 to position the 2 MHz of channel-1 portion at 2.4 − 3.0 (−1 ± 1 dB) of the oscilloscope graduations as shown in Fig. 2-5-4. At this time, confirm that the channel difference is within 3 dB.
			R226	• REC then PB • TV broadcast • Auto tracking off	Alternate method 1) Set recording video cassette into the cassette housing, receive a colour broadcast on a VHF channel. 2) Record a colour broadcast that shows a good depiction of human facial contours. 3) Play back recorded colour broadcast, set the tracking of the Front panel to the Auto tracking off position by simultaneously pressing the (+) and (−) tracking buttons. 4) Adjust R226 to obtain distinct facial features on the monitor. Note: *R226 nearly at centre position.*
4	SECAM DET.	IC251-18 (VIDEO UNIT board)	LC251 (VIDEO UNIT board)	• E-E • SECAM color bar	1) Connect an oscilloscope to pin 18 of IC251. 2) Adjust LC251 so that A and B are related as follows: A : B = 3 : 4 = 0.84 Vp-p : 1.11 Vp-p Fig. 2-5-5

Fig. 2-5-4   PB frequency

3 scale ▮   100 kHz   1 MHz   2 MHz   2.4-3 scale   T : 2 ms/10 mV
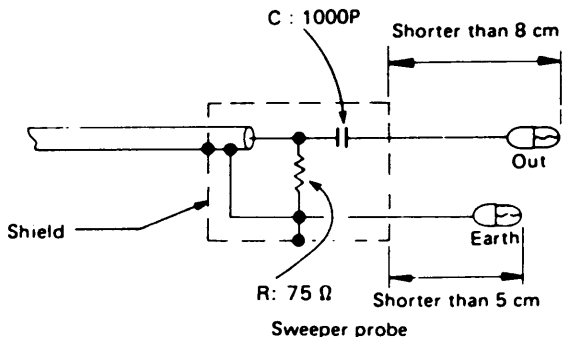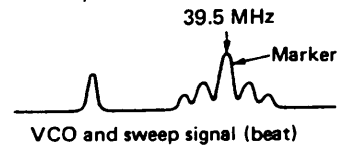
2.6 AUDIO CIRCUIT

Note: *Unless otherwise specified, all test points and adjustments are located on the MAIN board.*

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
1	Audio Bias Level	TP31 (+) TP32 (−)	R11	• SOURCE Select: AUX • SP mode • REC mode • No signal	1) Connect a millivoltmeter between TP31 and TP32. 2) Set for REC mode without incoming signal. 3) Adjust R11 for 1.9 mVrms.

2.7 TUNER/IF CIRCUIT

Note: *Unless otherwise specified, all test points and adjustments are located on the TUNER/IF board.*

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
	Equipment required: 1. Oscilloscope 2. IF sweep signal genrator with suitable markers (PIF, etc.) 3. Sweeper probe (sweep signal supply cable) as shown below.				

C : 1000P   Shorter than 8 cm
Out
Shield
Earth
R: 75 Ω   Shorter than 5 cm
Sweeper probe

Fig. 2-7-1

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
1	VCO	IC1-28	T2 (VCO) 39.5 MHz Marker VCO and sweep signal (beat) Fig. 2-7-2	• Sweep genrator out: 70 dBμ (39.5 MHz) • Tuner mode without antenna IN	1) Use a sweeper probe as shown in Fig. 2-7-1 and connect the sweep generator output to pin 1 of SAW 1. Adjust the sweep gain so that the waveform does not distort as observed with the oscilloscope. Connect the oscilloscope to pin 28 of IC1 (VIDEO DET OUT) and adjust T2 to align the waveform with the frequency marker as shown in Fig. 2-7-2.
				• TV broadcast • Tuner mode	**Alternate method:** 1) Receive a color broadcast on a VHF-HI channel. 2) Adjust T2 to obtain a fine picture on the monitor.

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
	● **Before the following adjustments:** 1. Connect a cable to ANT IN and terminate TV OUT at 75 Ω. 2. Set a TV channel signal generator as follows. Video : 65 dBμ/75 Ω, color bar 87.5% modulation Audio : 55 dBμ/75 Ω, 1 kHz ± 50 kHz deviation				
2	RF AGC	IF terminal of Front end	R21	● TV signal ● Tuner mode	1) Connect the oscilloscope to IF terminal of U/V Tuner (Front end). Adjust R21 for maximum level, then again adjust R21 for −5 dB again.
		MONITOR	R21	● TV broadcast ● Tuner mode	**Alternate method:** Note:*Adjust R21 (RF AGC) to correct for excess noise in the picture or when streaky cross interference occurs due to strong electrical fields.* 1) Adjust R21 to minimize noise or streaks on the TV screen. 2) Check for absence of abnormality on all channels.
3	Color Level	CN1-4 (VIDEO OUT) TUNER CTL board	R40	● TV signal ● Tuner mode ● Color bar	1) Receiving a color bar signal. Set the Y level for 100% reference signal and then adjust R40 for a magenta level of 48% at pin 4 of CN1.

B: magenta   A:B = 1:0.48

Fig. 2-7-3

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
				● TV broadcast ● Tuner mode	**Alternate method:** 1) Receive a color broadcast on a VHF-HI channel. 2) Adjust R40 so that the magenta level becomes 2/3% of the sync. level.
4	Sync det	Across C33	T5 (Sync det)	● TV broadcast ● Tuner mode	1) Receive a colour broadcast on a VHF-HI channel. Connect oscilloscope across C33. 2) Set the oscilloscope to DC mode Adjust T5 to obtain maximum level.

SECTION 3
CHARTS AND DIAGRAMS

3.1 CIRCUIT BOARD AND LOCATION

UPPER DRUM
BOARD (41)

CASSTTE HOUSING
BOARD ASSY (56)

PRE/REC
BOARD ASSY
(43)

A/C HEAD BOARD
ASSY (12)

LOADING MDA BOARD
ASSY (55)

MAIN BOARD ASSY
(03)

TUNER CTL
BOARD ASSY
< 08 >

IF BOARD ASSY
< 07 >

DECK TERMINAL BOARD
ASSY (51)

REGULATOR
BOARD ASSY
< 02 >

POWER CORD

SWITCHING REG
BOARD ASSY
< 01 >

TIMER/DISPLAY/SWITCH
BOARD ASSY (21)
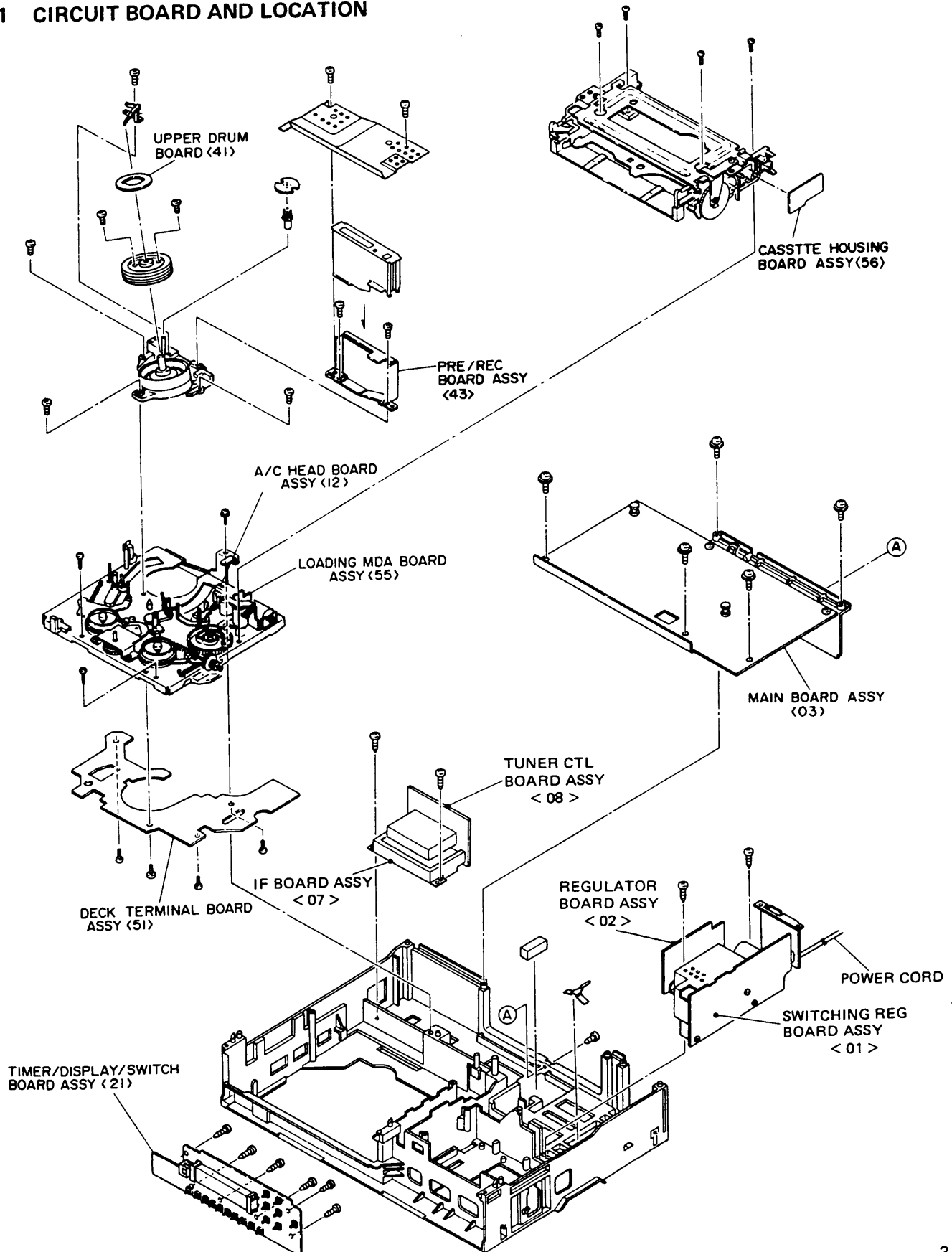
3.2 GENERAL INFORMATION

3.2.1 Connections

Note:
Unless otherwise specified, only signal input flow is indicated.
Connection arrows indicate only signal outputs.

 : Connectors

 : Board in connectors

 : Direct connections

 : Connected pattern in the board.

Abbreviations

V : Video	M : Mechacon
S : Servo	A : Audio

VS : Signal flow from video to servo.
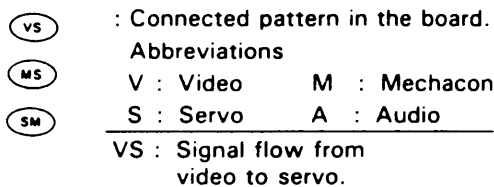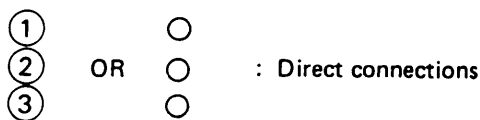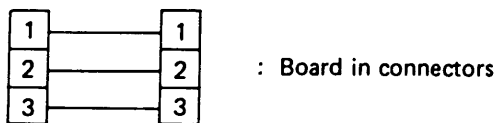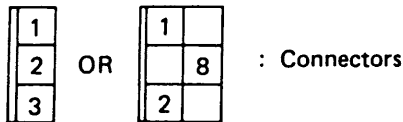
3.2.2 Disconnecting the flatwire

1. Pull the connector structure upward to release the clamp when removing or inserting the flat wire cable.

FPC WIRE
OR
PARALLEL WIRE
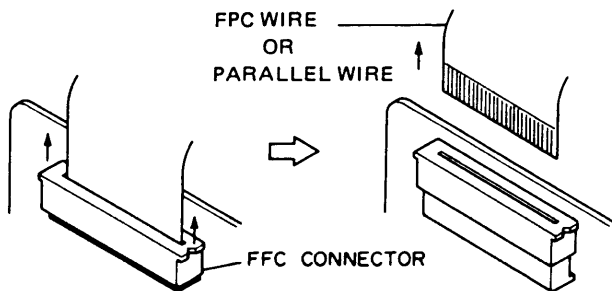
FFC CONNECTOR

2. Depress the connector structure downward to release the clamp when removing or inserting the flat wire cable, as indicated below.

PARALLEL WIRE

WIRE TRAP
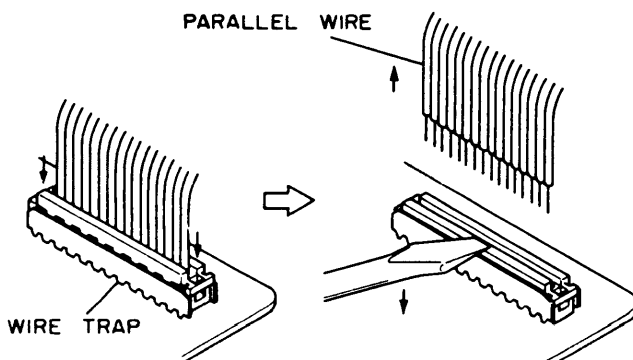
3.2.3 Indications

AUX : Active only at high.
$\overline{\text{AUX}}$: Active only at low.
$\underline{\overline{\text{AUX}}}$: Active only at middle.
$\overline{\text{AU}\overline{\text{X}}}$: Active only at open.

 : Active only at low for electronic switch.

 : Active only at high for electronic switch.

 : Low pass filter.

 : High pass filter.

 : Band pass filter.

 : Limiter.

 : Detector

 : Amplifier.

 : Mixer stage.
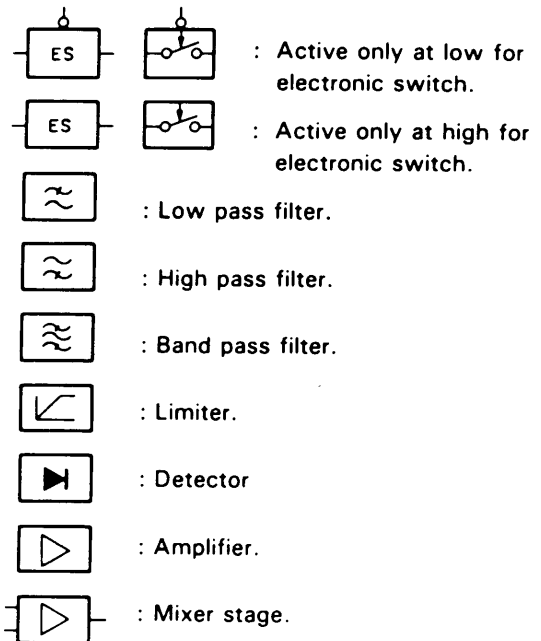
3.2.4 Schematic diagram values

Unless otherwise specified.
1. All resistance values are in ohms, 1/6 W, 1/8 W, (refer to parts list).
2. All capacitance values are in μF, (P; PF).
3. All inductance values are in μH, (m; mH).
4. All diodes are 1SS133 or MA165, (refer to parts list).
5. Voltages are DC-measured (reference to ground) with a digital voltmeter during recording (SP mode) and playback (SP mode) with alignment tape. Where voltages differ between recording and playback, the voltage during playback is shown in parentheses.
6. Waveforms (VIDEO System) are measured (reference to ground) with a color bar during recording (SP mode) and playback (SP mode) with alignment tape.
7. Waveforms (AUDIO System) are measured (reference to ground) with 1 kHz (– 8 dBs) during recording and playback with alignment tape (1 kHz).
8. Shaded ( ) parts are critical for safety. Replace only with specified parts numbers.

3.2.5 Signal flow in the schematic

 Recording signal path
 Playback signal path
 REC/PB signal path
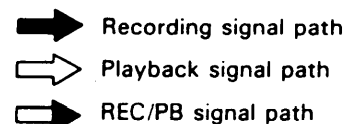
3.2.6 Semiconductors

1. Digital transistor

DTA114T
T mark only

2. Chip transistor

(Standard type)

3. Chip diode

DAP202U
MA151WA
MA141WA

MA141WK
MA151WK
DAN202U

DA204U
DA204K
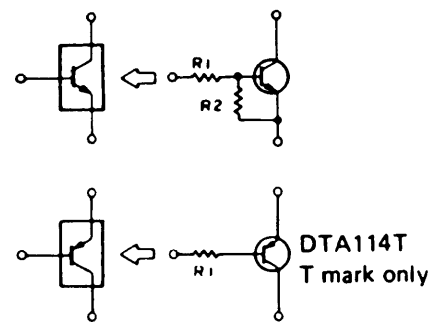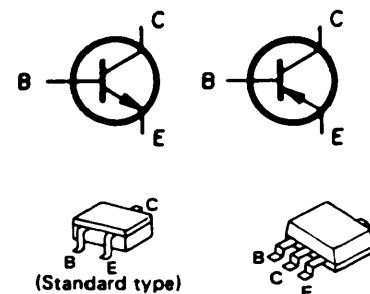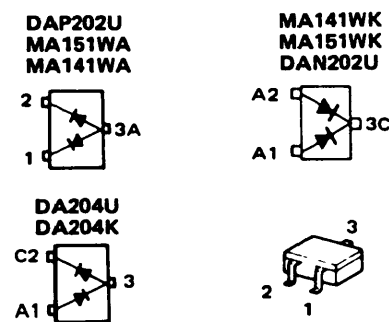
Note:

The digital transistor includes built in resistors.
It features small size and high reliability.
Both PNP and NPN types are available.

Uses:

Inverter, Interface, driver circuits.

3.2.7 Replacement of chip parts

For replacing chip parts, proceed it as follows.
Use a well insulated fine-tipped soldering iron (approx. 17 W, 130°C ~ 260°C in temp.).
In addition, it is recommended to use a soldering iron (55 W approx.) with solder absorber for convenience.

Caution: • Do not apply heat for more than 3 seconds.
• Do not rub electrodes.
• Do not reuse chips removed once. Discard them.
• Supplementary cementing is not required.

1. Soldered condition of chip parts

• Resistors, capacitors, etc.
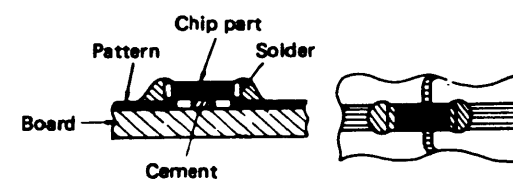
Fig. 3-2-1 Soldering condition-1

• Transistors, diodes, etc.
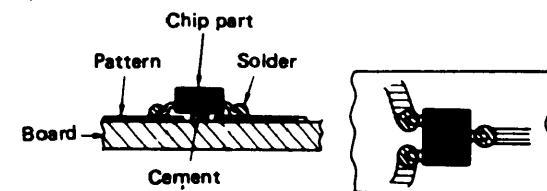
Fig. 3-2-2 Soldering condition-2

2. How to remove chip parts

• Resistors, capacitors, etc.

1) Set a chip parts replacing tool onto the chip parts to hold it down.
2) Unsolder at a side of the chip parts.
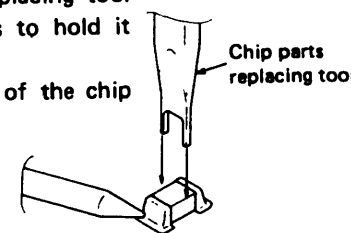
Fig. 3-2-3 R/C removal-1

3) Remove the chip parts by twisting and sliding it.
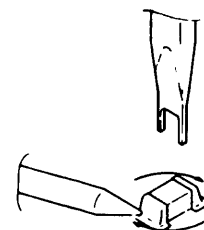
Fig. 3-2-4 R/C removal-2

---

3. How to remove transistors, diode.

1) Unsolder at the one-lead side of the chip parts.
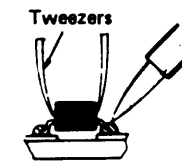
Fig. 3-2-5 Tr/Diode removal-1

2) Lift the unsoldered side upwards.

Fig. 3-2-6 Tr/Diode removal-2

3) Heat the other two leads simultaneously and remove the chip parts upwards.
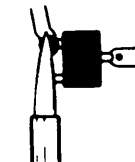
Fig. 3-2-7 Tr/Diode removal-3

4. Preheating and soldering

When setting new chip parts, especially capacitors, but except transistors, preheat them with hot air (150°C approx.) by use of a blower type of hair dryer for about 2 minutes just before soldering. For soldering, use a soldering iron of 30 watt approximately.

---

5. How to set and solder chip parts

1) Presolder the contact points of the circuit pattern to which the chip parts will be soldered.
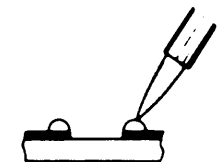
Fig. 3-2-8 Soldering-1

2) Holding down the chip parts with the chip parts replacing tool, solder it with a soldering iron.
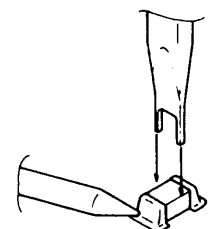
Fig. 3-2-9 Soldering-2

3.3 BOARD INTERCONNECTIONS

RF CONVERTER

REMOTE PAUSE

A/V IN OUT

RF OUT RF IN

VPT ADAPTOR
(REAR VIEW)

AC 240V

07 IF **08 TU CTL**

FRONT END

CN1
48V
UNSW 12V
GND
VIDEO OUT
VPT OUT
GND
AUDIO OUT

CN 701
48V
UNSW 12V
GND
VIDEO IN
VPT VIDEO IN
GND
TUR AUDIO IN

JP 1
AGC
NC
IF
GND
MUTE
NC
NC
SYNC
AUDIO
NC
VIDEO
GND
VPT
GND
SVD 12V

01 SW REG

CN 1
DC 3.4V(-)
DC 3.4V(+)
-30V
GND

CN2
GND
AUDIO MUTE
TUNER CTL
PLL DATA
SYNC DET
S/M/P CLOCK
LOCK DET

CN 604
GND
AUDIO MUTE
TUNER CTL
PLL DATA
SYNC DET
S/M/P CLOCK
LOCK DET

CN 2
FULL ERASE HEAD
GND

FULL ERASE HEAD

58 DRUM MOTOR

DRUM MOTOR

MOTOR 12V
GND(M)
DRUM FG/PG
DRUM DRIVE

CN1

CN 1
REC
PB
GND
AUDIO ERASE

AE
REC/PB
CTL

A/C HEAD 12

CN 402
CTL HEAD(+)
CTL HEAD(-)
GND

03 MAIN

CN 401
MOTOR 12V
GND(M)
DRUM FG/PG
DRUM DRIVE

41 U. DRUM **43 PRE/REC**

CN 1
COMP SYNC
GND
PB FM
REC FM COLOR
PB COLOR
GND

CN 204
COMP SYNC
GND
PB FM
REC FM COLOR
PB COLOR
GND

CH-1
CH-2

CN4
REC(-)
PB/REC(+)
REC(-)
PB/REC(+)

CN 2
DRUM FF
SVD 5V
REC START
REC

CN 205
DRUM FF
SVD 5V
REC START
REC

CN 201

CN 1
TUNER VIDEO IN
GND
AUX VIDEO IN
GND
LP VIDEO OUT
LP VIDEO IN
SVD 5V
EE
V. PULSE ON
VIDEO OUT
V. PULSE
SHARPNESS CTL
COMP SYNC

56 CASS. HOUSING **57 CAP MDA** **55 LOADING MDA**

CAP MOTOR

LOADING MDA

CN1

CN 602
MOTOR 12V
GND
GND(M)
LCM 2

CN 202 CN 2
COLOR IN
YNR ON
AUX/TMR
COLOR ROL
SP
PB FM
REC FM
PBSY
SVD 5V
SVD 12V
NC
GND
REC COLOR

CN 203 CN 3
PB COLOR
GND
Fee
3Fee
GND
COLOR OUT
B/W
SVD 5V
APC ERROR
NC

6 0	
5 9	
5 8	DRUM MOTOR
5 7	CAP MDA
5 6	CASSETTE HOUSING
5 5	LOADING MDA
5 4	
5 3	
5 2	
5 1	DECK TERMINAL
5 0	
4 3	PRE/REC AMP
4 1	UPPER DRUM
2 8	
2 7	
2 6	
2 5	
2 4	
2 3	
2 2	
2 1	TIMER/DISPLAY/SW
2 0	
1 9	
1 8	
1 7	
1 5	
1 4	
1 3	
1 2	AUDIO/CTL HEAD
1 1	
1 0	
0 9	
0 8	TUNER CTL
0 7	IF
0 6	
0 5	VIDEO UNIT
0 4	
0 3	MAIN
0 2	REGURATOR
0 1	SW.REG
N O	NAME

51 DECK TERMINAL

05 VIDEO UNIT

CN1
START SENS
CASS SENS
GND
MODE SENS2
REEL FG1(TU)
SVD 5V
REC SAFETY
MODE SENS1
END SENS
GND(M)
REV
CAP CTL(V)
CAP FG
MOTOR 12V/17V
REEL FG(SUP)
THERM
MODE SENS3

CN 601
START SENS
CASS SENS
GND
MODE SENS2
REEL FG1(J)
SVD 5V
REC SAFETY
MODE SENS1
END SENS
GND(M)
REV
CAP CTL(V)
CAP FG
MOTOR 12V/17V
REEL FG(S,P)
THERM
MODE SENS3

02 REGURATOR

CN601
48V
MOTOR 17V
MOTOR 12V
GND(M)
GND
GND
UNSW 12V
UNSW 5.8V
SVD 12V
POWER ON/OFF
SVD 5V
VPT 5V

CN4
48V
MOTOR 17V
MOTOR 12V
GND(M)
GND
GND
UNSW 12V
UNSW 5.8V
SVD 12V
POWER ON/OFF
SVD 5V
VPT 5V

21 TIMER/DISPLAY/SW

CN1
DC 3.4V(-)
DC 3.4V(+)
-30V
GND

CN603
S. DATA
S CLOCK
REMOTE
SVD 5V
UNSW 5.8V
GND
TIMER S-CLK
TIMER DATA
CTL CLOCK
UNSW 12V

CN2
S. DATA
S CLOCK
REMOTE
SVD 5V
UNSW 5.8V
GND
TIMER S-CLK
TIMER DATA
CTL CLOCK
UNSW 12V

3.4 VIDEO BLOCK DIAGRAM

3.6 SERVO BLOCK DIAGRAM

3.8 SYSTEM CTL BLOCK DIAGRAM

5V DC

3.11 SERVO SCHEMATIC DIAGRAM

0̲3̲ MAIN (SERVO)

IC 401 HD49733NT

IC501 BA7039

3.14 DECK TERMINAL, MODE MOTOR, CAPSTAN MDA, C. HOUSING SCHEMATIC DIAGRAM
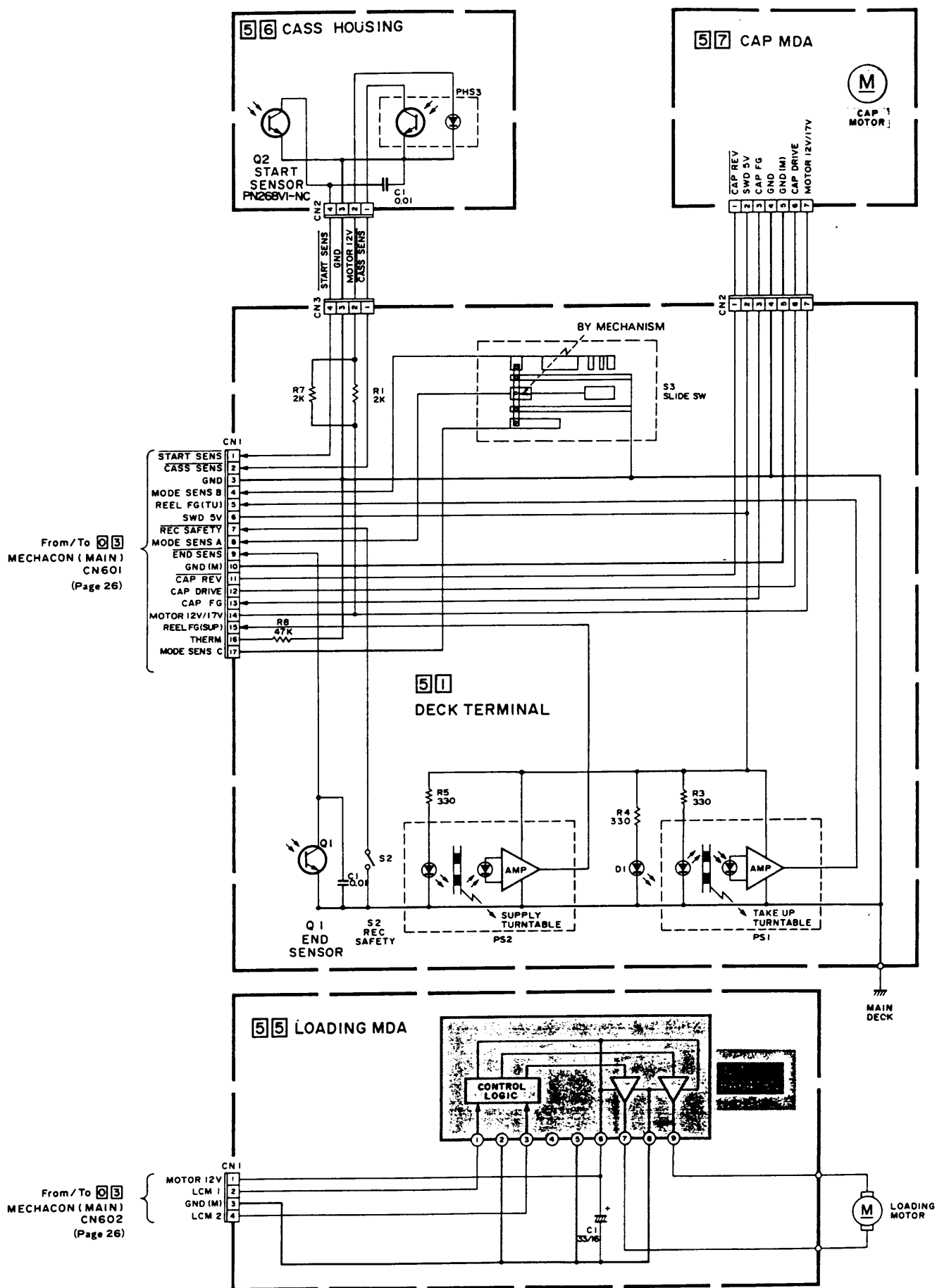
3.15 DECK TERMINAL, MODE MOTOR, C. HOUSING, A/C HEAD CIRCUIT BOARDS

– A/C HEAD –

PB40068   A
A/CTL HEAD PWB AS'Y

1   CN 1   7

1 2

A/CTL HEAD PWB

– DECK TERMINAL –

PB10320   A1-02   B1
DECK TERMINAL PWB ASS'Y

5 1

TAKE UP SENSOR

SUPLLY SENSOR

– MDA –

CN1

CN2

– CASSETTE HOUSING –

5 6   PB 40041 A-01

C. H PWB ASS'Y

CN 1

CN 2

PS 3

Q 2
E C

YEC YE-34VN

LC251
SECAM DET

R16
NC BAL

- IF -

R21
RF AGC

T2 VCO

R40
COLOR LEVEL

- TU/CTL -

2|1 TIMER / DISPLAY / SWITCH

CLOCK

PB10352
T/D/S PWB ASS'Y
A B C D E

S53 FF
R44
R43
R42
R5
R12
R7
PLAY S7
S4 REW
S2 STOP
/EJECT
C14
CN1
C18
R2
D6
R3
R10
D104 REC
R41
R11
R8 R9 R40
RA1
PAUSE/STILL
J1 D103 R102
R103
PLAY
D102
C6
X1
C7
R32
R33
AUTO TRACKING
D105
R105
B157
IC1
B212 B213 B214
C17
B211 B210
B162

S49
CANNEL
S50
CN3

B

Q2 J1
E B B
Q3
R37
R38 J2
J3

D101
POWER LED
R39
C4
S8 PAUSE/STILL
C3
IC2
D128
D132
D111
D112
D133 D131
D134
D126
D124 D125
S6 REC/OTR
D115 D116 D117

34   30
31
35
64 25   1   8 RA2   D2
20   15   10
D3
R30
R17
R14 R16
R13
R36
R31
R6
IC101
J2
R26 R25 R15
R11
J
C11
C15
C16
C5
C12

A

D129
S405

S401

2

3

S24 TIMER
S23 SELECT

S19 START
S25
SET
TRACKING
V-LOCK
FINE S26
4

S18 PROGRAM
C.ADJ
S22 REPEAT
MEMORY
STORE
S21 CANCEL
RESET
SKIP
5
S30 CH.SET
/VPS

D118
D139 D140
JVCD75V0
S29 SEARCH
S32
S30
COUNT REMAIN
6
S28 DISPLAY OFF

CN2
7
D4
D5
ON
CP1
C19
OFF
D1 R1
J3 R4
Q1
S403 AFC
3
D125
C13

FULL REPEAT   INDEX REPEAT   OFF   NZ   AUS

3.23 PRE/REC SCHEMATIC DIAGRAM

43 PRE/REC AMP

Q1
2SA1309R,S

Q2,Q3
2SC1740S(RS)

IC1
AN3380K

41
UPPER
DRUM

VIDEO
HEADS

CH-2

CH-1

REC 1.5 Vp-p

REC 1.5 Vp-p

REC 2.0 Vp-p

Q5
DTC144WS

PB 0.25 Vp-p

REC 0.26 Vp-p

PB 0.2 Vp-p

PB 0.46 Vp-p

CN2
DRUM FF
SWD 5V
REC START
REC

From/To 0 3
VIDEO (MAIN)
CN205
(Page 3-22)

CN1
GND
PB COLOR
REC FM COLOR
PB FM
GND
COMP SYNC

From/To 0 3
VIDEO (MAIN)
CN204
(Page 3-32)

Q4
2SC1740S(RS)

| A | B | C | 3-43 | 3-44 | E | F | G | H |

3.25 REMOTE CONTROL SCHEMATIC DIAGRAM

NOTES: 1. All parts shown in this schematic are critical for safety.
2. This schematic is only for reference.
Avoid replacing individual parts.
Replace the entire unit only.
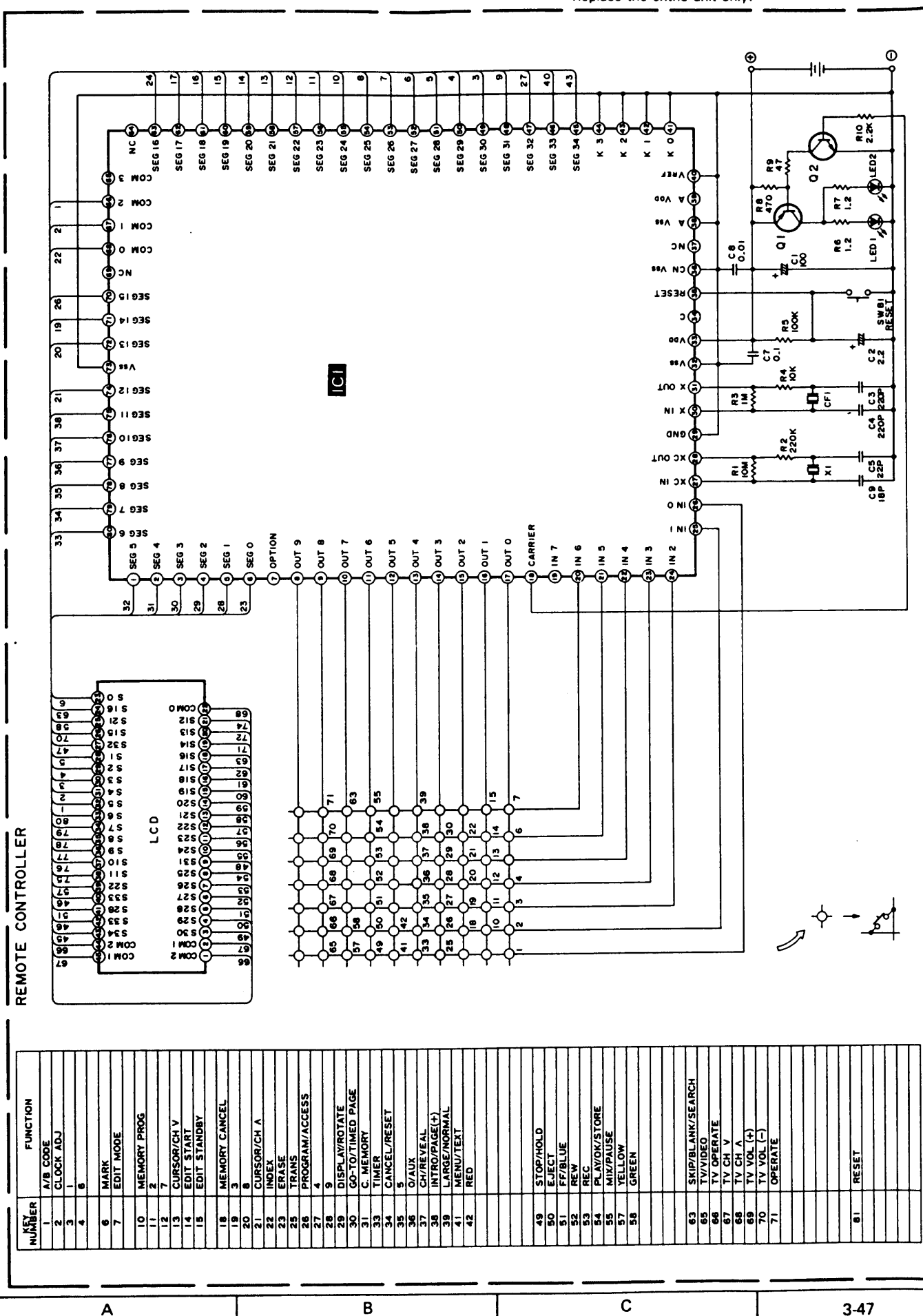
3.26 RF CONVERTER SCHEMATIC DIAGRAM

NOTES:
1. All parts shown in this schematic are critical for safety.
2. This schematic is only for reference.
Avoid replacing individual parts.
Replace the entire unit only.

KEY NUMBER	FUNCTION
1	A/B CODE
3	CLOCK ADJ
6	MARK
7	EDIT MODE
10	MEMORY PROG
11	2
13	CURSOR/CH ∨
14	EDIT START
15	EDIT STANDBY
18	MEMORY CANCEL
19	3
20	CURSOR/CH ∧
21	INDEX
23	ERASE
25	TRANS
26	PROGRAM/ACCESS
27	4
28	DISPLAY/ROTATE
29	GO-TO/TIMED PAGE
31	C. MEMORY
33	TIMER
34	CANCEL/RESET
35	5
36	O/AUX
37	CH/REVEAL
38	INTRO/PAGE(+)
39	LARGE/NORMAL
41	MENU/TEXT
42	RED
49	STOP/HOLD
50	EJECT
51	FF/BLUE
52	REW
53	REC
54	PLAY/OK/STORE
55	YELLOW
57	MIX/PAUSE
58	GREEN
63	SKIP/BLANK/SEARCH
65	TV/VIDEO
66	TV OPERATE
67	TV CH ∧
68	TV CH ∨
69	TV VOL (+)
70	TV VOL (−)
71	OPERATE
81	RESET

REMOTE CONTROLLER

LCD

IC1

Q1 2SC2480

Q51 - Q53 2SC3357

D51 1SS119

IC1 LA7054

SECTION 4
EXPLODED VIEWS AND PARTS LIST

SAFETY PRECAUTION

Parts identified by the △ symbol are critical for safety. Replace only with specified part numbers.

NOTE:
[M] indicates mechanical symbol number.

4.1 PACKING ASSEMBLY < M1 >

#△	REF No.	PART No.	PART NAME, DESCRIPTION
	6	PU59168-3	RF CABLE
	or	PU59167-3	RF CABLE
△	9	PU30425-1118	INSTRUCTIONS
	10	TCN-3379	TAPE CATALOG
	11	UM-3DJ2P	BATTERY
	12	PQM30023-8	POLY BAG
	13	PQM30023-5	POLY BAG
	14	BT-20060	WARRANTY CARD
	15	BT-20066A	E. DISTRI. LIST
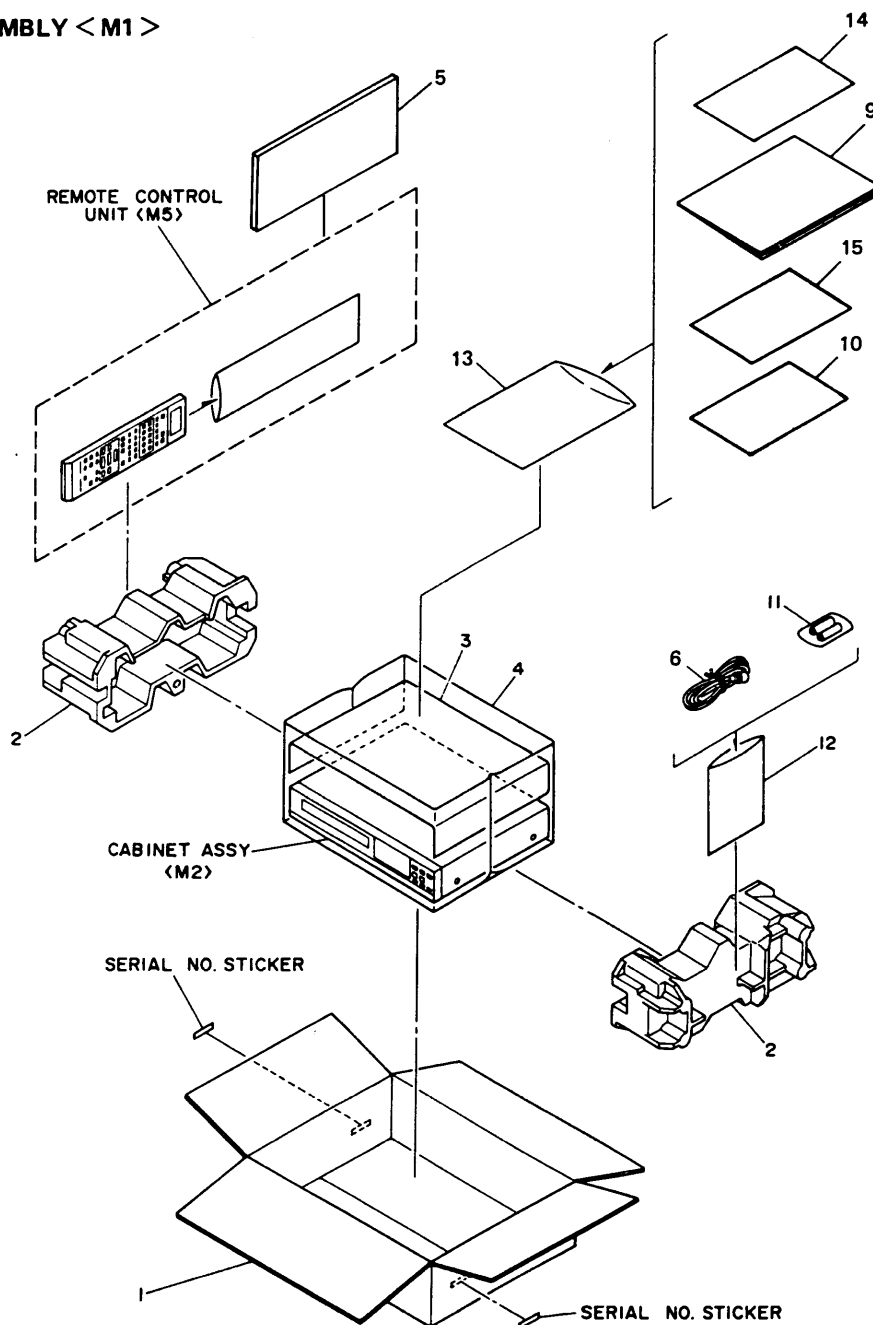
1. PACKING ASSEMBLY ⟨M1⟩

	REF No.	PART No.	PART NAME, DESCRIPTION
	1	PQ32790-153	PACKING CASE
	2	PQ33275A-1	CUSHION ASSY
	3	PQ41026-20	PROTECT SHEET
	4	PUP30320-26-12	POLY BAG
	5	PQ42987-6	SHEET

4.2 CABINET ASSEMBLY <M2>
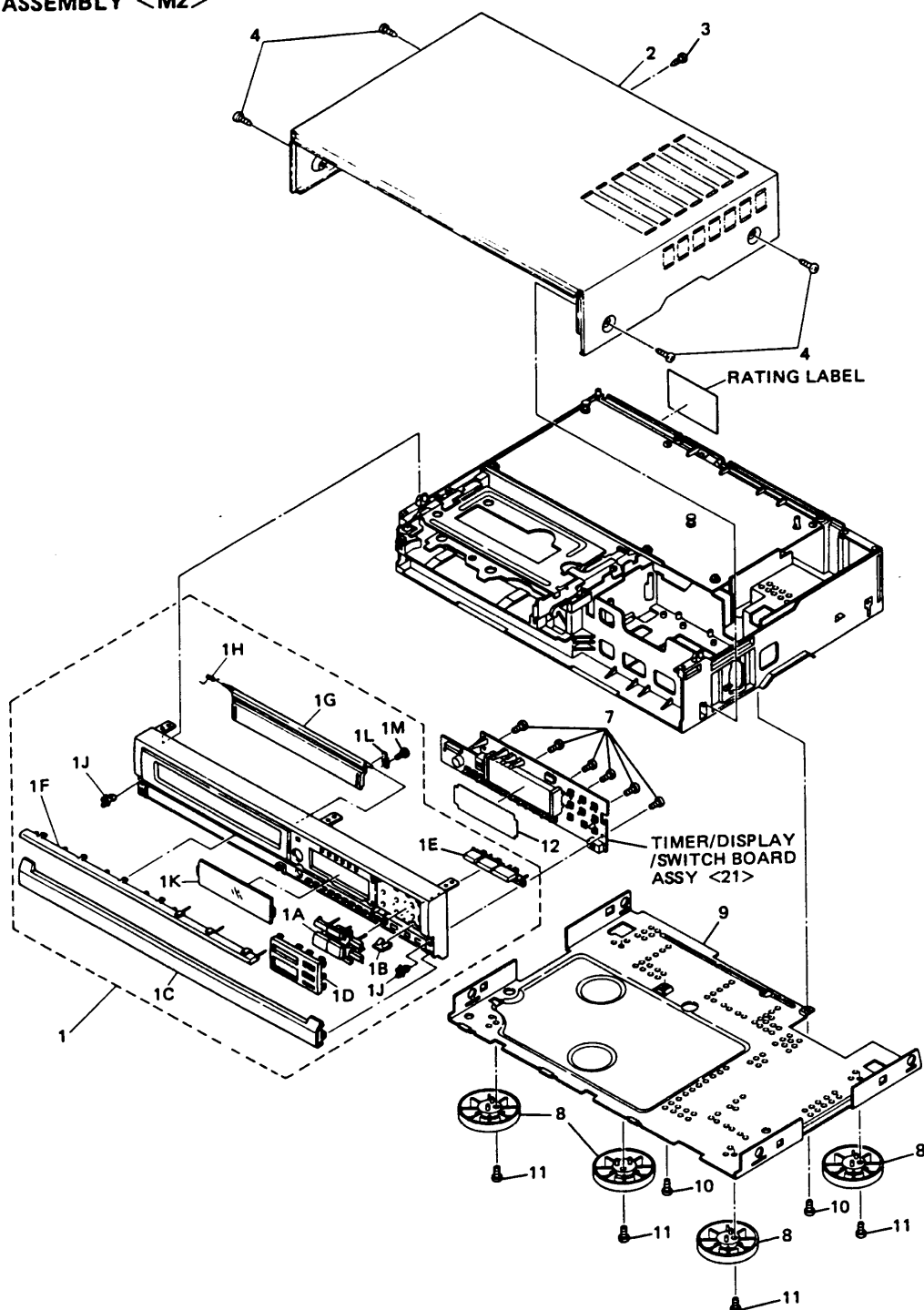
#⚠ REF No.	PART No.	PART NAME, DESCRIPTION
****:**		

2. CABINET ASSEMBLY ⟨M2⟩

1	PQ10889D-8	FRONT PANEL ASSEMBLY
1A	PQ32990-4	BUTTON (OP)
1B	PQ44062-1-2	INDICATOR
1C	PQ20892D-7	DOOR ASSY
1D	PQ32991-4	COVER (OP)
1E	PQ32993-4	HINGE (OP)
1F	PQ20888-1-1	COVER (1)
1G	PQ20890-4	CASSETTE HOUSING DOOR
1H	PQ43628-1-1	TORSION SPRING

#⚠ REF No.	PART No.	PART NAME, DESCRIPTION
1J	PU60109	CATCHER
1K	PQ32992-3-3	DISPLAY WINDOW
1L	PQ44389	BRACKET
1M	SDSF2005Z	SCREW
⚠ 2	PQ10602-12	TOP COVER
3	SDSF3010M	SCREW, FOR TOP
4	PQ43827	SPECIAL SCREW, X4, FOR TOP COVER
7	SDSF2608Z	SCREW, X6, FOR T/D/S PWB
8	PQ43456B-1	FOOT ASS'Y, X4
⚠ 9	PQ10712-1-3	BOTTOM COVER
10	SDSF3012Z	SCREW, X2, FOR BOTTOM COVER
11	SDSF3012Z	SCREW, X4, FOR FOOT
12	PQ43850-2-5	FILTER (FDP)

4.3 CHASSIS ASSEMBLY <M3>

BEWARE OF BOGUS PARTS

Parts that do not meet specifications may cause trouble in regard to safety and performance. We recommend that genuine JVC parts be used.

Labels in diagram:
- 2E, 2D, UPPER DRUM BOARD <41>, 2B, 2B, 2A, 2C, 2F, 17, 3, 3, 3, 19, 9, 8, PRE/REC AMP BOARD ASSY <43>, 20, 6, 7, 7, CASSETTE HOUSING BOARD <56>
- 5, 5, 4, 22, 5, MECHANISM ASSY <M4>
- 12, 15, 12, MAIN BOARD ASSY <03>
- 13, TUNER CTL BOARD ASSY <08>, 16, 10, 10, 23, 21, 14, 18, CHASSIS, A
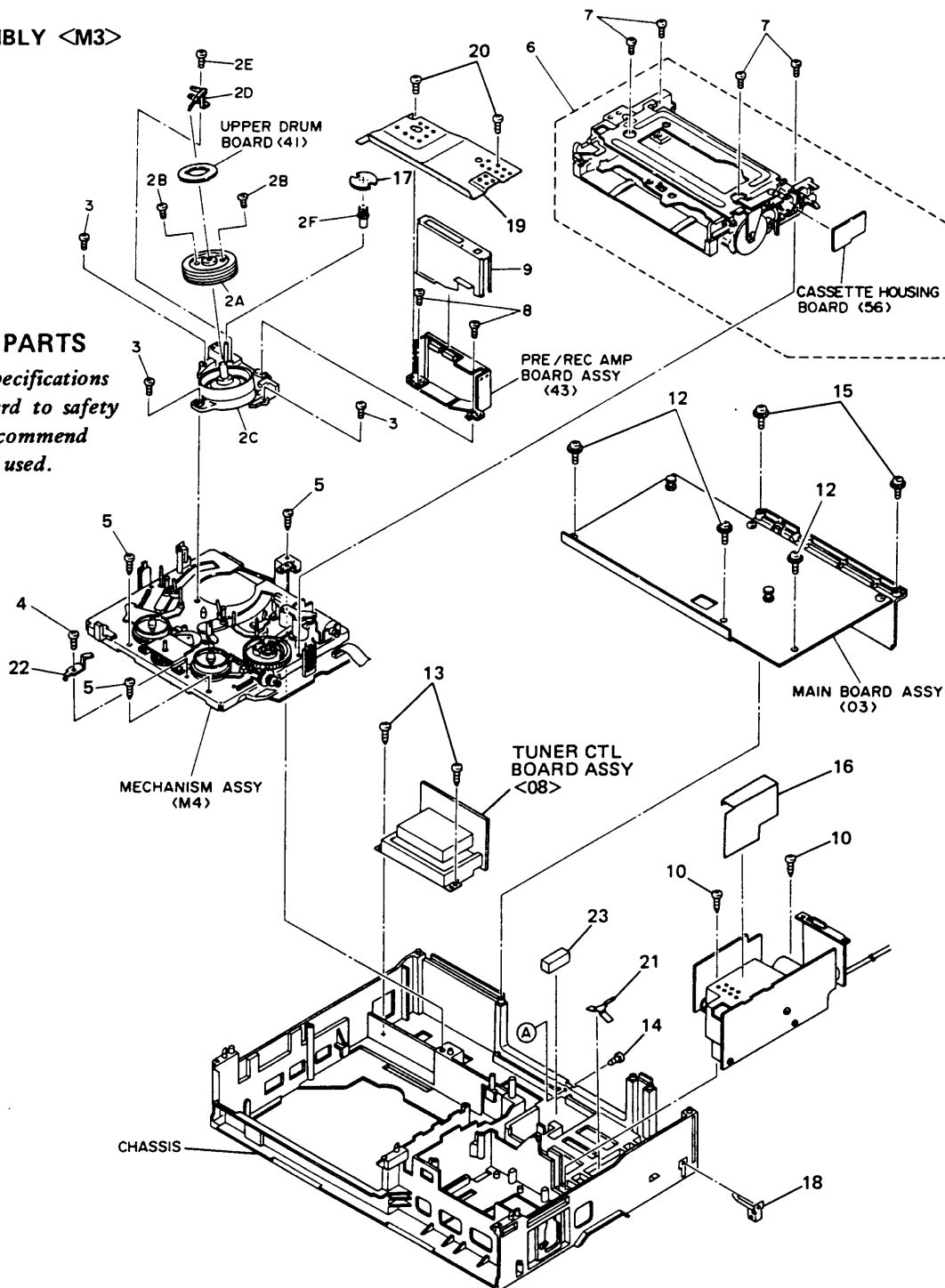
#△ REF No.	PART No.	PART NAME, DESCRIPTION
3. CHASSIS ASSEMBLY ⟨M3⟩		
2A	PDM2008B-5	UPPER DRUM ASSEMBLY
2B	PDM4165A	DRUM SCREW ASSEMBLY, X2
2C	PDM2138G	LOWER DRUM MOTOR ASSEMBLY
2D	PDM4229A-1	BRUSH ASSY
2E	SDSG2606Z	SCREW, FOR BRUSH ASSEMBLY
2F	PDM4226A	ROLLER ASSEMBLY
3	SPST2610Z	SCREW, X3, FOR DRUM
4	SPST2606Z	SCREW, FOR REEL BRACKET
or	SDST2606Z	SCREW, FOR REEL BRACKET
5	PQ43831	SPECIAL SCREW, X3, FOR MAIN DECK
6	PUS29183E	CASSETTE HOUSING ASSEMBLY
7	SDST2608Z	SCREW, X4, FOR CASSETTE HOUSING
8	SDSG2606Z	SCREW, X2, FOR PRE/REC

#△ REF No.	PART No.	PART NAME, DESCRIPTION
9	PQ32217-1-1	SHIELD CASE (2), FOR PRE/REC
10	PQ43831	SPECIAL SCREW, X2, FOR P. TRANS
12	GPSF2610Z	SCREW, X3, FOR MAIN BOARD
13	SDSF3008Z	SCREW, X2, FOR TUNER UNIT
14	SDSF3010M	SCREW, FOR TEARMINAL BOARD
15	GPSF2610Z	SCREW, X2, FOR TEARMINAL BOARD
△ 16	PQ44631	AC COVER
17	PQ44230	INERTIA PLATE
18	PQ44679	EARTH PLATE
19	PQ32387-1-4	DRUM SHIELD
20	SDST2608Z	SCREW, X2, FOR DRUM SHIELD
21	PQ43942	EARTH PLATE
22	PQ43941	R. BRACKET
23	PQM30029-127	SPACER, FOR CHASSIS

4-3

4.4 MECHANISM ASSEMBLY <M4>

AUDIO/CONTROL
HEAD BOARD <12>

LOADING MDA
BOARD ASSY
<55>

DECK TERMINAL
BOARD ASSY <51>
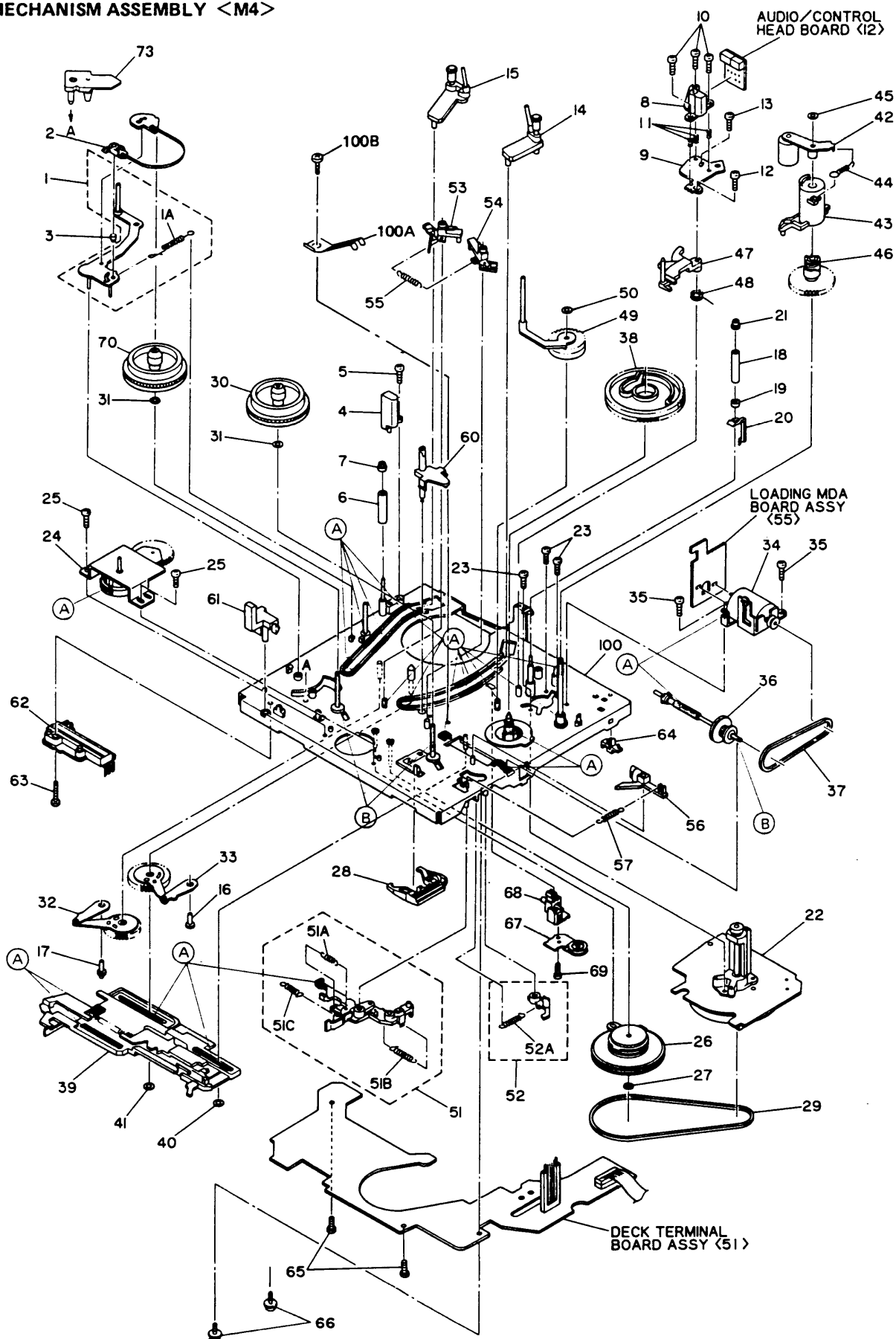
Category	Part number	MARK
Grease	KANTO-G-31KAV	Ⓐ
Oil	COSMO-HV56	Ⓑ

NOTE: The section marked in Ⓐ and Ⓑ
indicate lubrication and greasing areas.

** * ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** *

4. MECHANISM ASSEMBLY ⟨M4⟩

#△	REF No.	PART No.	PART NAME, DESCRIPTION
	1	PQ43497E	TENSION ARM ASSY
	1A	PQ43500	TENSION SPRING
	2	PQ43501B	TENSION BAND ASSY
	3	PQ43503-1-4	ADJUST PIN
	4	PU60616	FULL ERASE HEAD
	5	SDSF2614Z	SCREW
	6	PQ43505-1-1	ROLLER
	7	PQ43506	GUIDE POLE CAP
	8	PU60617	AUDIO/CONTROL HEAD
	9	PQ43509	HEAD BASE
	10	PQ43687A	SPECIAL SCREW, X3
	11	PQM30002-192	COMPRESSION SPRING, X3
	12	SPSP2606Z	SCREW
	13	SPSF2608M	SCREW
	14	PU61103-2	POLE BASE ASSY (TU)
	15	PU61151-2	POLE BASE ASSY (SUPPLY)
	16	PQ43524	STOPPER
	17	PQ43525	STOPPER 2
	18	PQ43526-1-3	TAPE GUIDE
	19	PQ43670-1-1	GUIDE FLANGE
	20	PQ43675	TAPE GUARD
	21	PQ43506	GUIDE POLE CAP
△	22	PU61003	CAPSTAN MOTOR
	23	SPSG2608Z	SCREW, X3
	24	PU61004-1-3	IDLER GEAR UNIT
	25	SPST2606Z	SCREW, X2
	26	PU61005-1-2	CLUTCH UNIT
	27	PQM30017-8	SLIT WASHER
	28	PQ43532A-1	CHANGE LEVER ASSY
	29	PU61006	TIMING BELT
	30	PU60858	REEL DISK (TAKE-UP)
	31	PQM30018-54	SPACER, X2
	32	PQ43537A	LOADING ARM ASSY (SUPLLY)
	33	PQ43542B	LOADING ARM ASSY (TAKE-UP)
	34	PQ43676B-5	MODE MOTOR ASSY
	or	PQ43676C	MODE MOTOR ASSY
	35	SPST2606Z	SCREW, X2
	36	PQ43548A-3	WORM CLUTCH ASSY
	37	PQM30003-23	BELT (LOADING)
	38	PQ20822-2-4	CONTROL CAM
	39	PQ44326A-1	PLATE ASSY
	40	PQM30017-12	SLIT WASHER
	41	PQM30017-8	SLIT WASHER
	42	PQ43921B	PINCH ROLLER ARM ASSY
	or	PQ43921D	PINCH ROLLER ASSY
	43	PQ32415	PINCH ROLLER PRESS LEVER
	44	PQM30001-233	TENSION SPRING
	45	PQM30017-12	SLIT WASHER
	46	PQ32416-2	PINCH ROLLER CAM
	47	PQ43567A-7	GUIDE ARM ASSY
	48	PQ43569-1-3	TORSION SPRING
	49	PQ43570A	HALF LOADING GEAR ASSY
	50	PQM30017-12	SLIT WASHER
	51	PQ43575A-5	C. LEVER ASSY
	51A	PQM30001-273	T. SPRING
	51B	PQM30001-237	TENSION SPRING
	51C	PQM30001-274	T. SPRING
	52	PQ43578A-2	HOOK ASSY
	52A	PQM30001-238	TENSION SPRING
	53	PQ43581A-6	MAIN BRAKE ASSY (SUPPLY)
	54	PQ43582A-1	MAIN BRAKE ASSY (TAKE-UP)
	55	PQM30001-251	TENSION SPRING
	56	PQ43583A	SUB BRAKE ASSY (TAKE-UP)
	57	PQM30001-252	TENSION SPRING
	60	PU60621-1-1	LED HOLDER (INCL. LED : D1)
	61	PU60624-1-4	REC SAFETY SWITCH (S2)
	62	PU60973	SLIDE SWITCH (S3)
	63	SDSF2614Z	SCREW
	64	PQ32516	PWB HOLDER
	65	SDST2616Z	SCREW, X2
	66	GPSF2608Z	SCREW, X2
	67	PQ43912A-3	PULLEY ARM ASSY
	68	PQ32882	PULLEY BASE
	69	SDSF2608Z	SCREW
	70	PU60859	REEL DISK (SUPPLY)
	73	PQ44246	TENSION BRACKET 3
	100	PQ20650E-18	MAIN DECK ASS'Y
	or	PQ20753D	MAIN DECK ASS'Y
	100A	PQ43849	EARTH PLATE
	100B	SPST2604Z	SCREW

4.5 REMOTE CONTROL ASSEMBLY <M5>

#⚠	REF No.	PART No.	PART NAME, DESCRIPTION

⁕⁕⁑ ⁕⁕⁕⁕⁕⁕⁕⁕⁕⁕⁕⁕⁕⁕⁕⁕⁕⁕⁕⁕⁕⁕⁕⁕⁕⁕⁕⁕⁕⁕⁕⁕⁕⁕⁕

5. REMOTE CONTROLLER <M5>

⚠	REF No.	PART No.	PART NAME, DESCRIPTION
⚠	31	PQ10884G	REMOTE CONTROLLER
	31A	PQ20861	COVER (FRONT)
	31B	PQ20862	COVER (REAR)
	31C	PQ32956	BATTERY CAP
	31D	PQ20863-5	BUTTON

#⚠	REF No.	PART No.	PART NAME, DESCRIPTION
	31E	PQ44010	PLATE (1)
	31F	PQ32922-6	PLATE (2)
	31G	PQ32957	WINDOW (IR)
	31H	PQ44008	TERMINAL (A)
	31J	PQ44023	TERMINAL (B)
	31K	PQ44024	TERMINAL (C)
	31L	PQ44009	LCD HOLDER
	31M	SSSF2010M	SCREW
	31N	SPSJ2006M	SCREW
	31R	QPGA012-03005	POLY BAG