JVC

SERVICE MANUAL

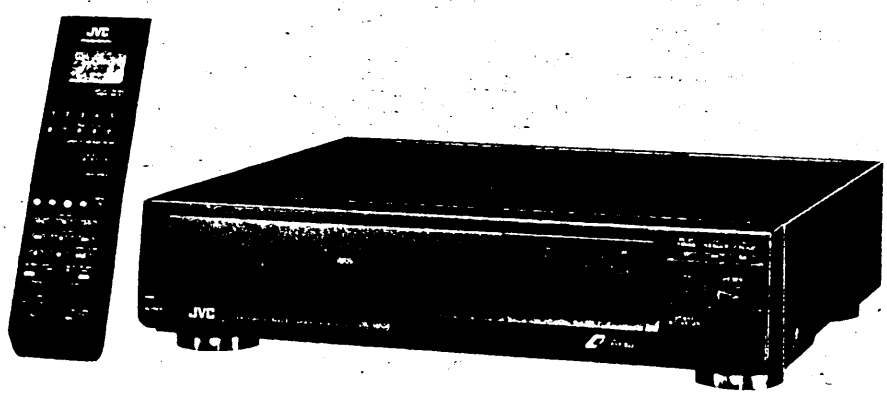
VIDEO CASSETTE RECORDER

HR-FC100E/EG

VHS/VHS-C COMPATIBLE

VHS PAL

VHSC PAL



SPECIFICATIONS *(The specifications shown pertain specifically to the model HR-FC100EG.)*

GENERAL

Power requirement	:	AC 220 V~, 50/60 Hz
Power consumption	:	30 W
Temperature	:	5°C to 40°C (Operating)
	:	–20°C to 60°C (Storage)
Operating position	:	Horizontal only
Dimensions (WxHxD)	:	435 x 108 x 382 mm
Weight	:	7.7 kg
Format	:	VHS PAL standard
Tape width	:	12.65 mm
Taped speed		
(SP)	:	23.39 mm/sec
(LP)	:	11.70 mm/sec
Maximum recording time with full-size cassette		
(SP)	:	240 min. with E-240 video cassette
(LP)	:	480 min. with E-240 video cassette
Maximum recording time with compact cassette		
(SP)	:	45 min. with EC-45 cassette
(LP)	:	90 min. with EC-45 cassette

VIDEO

Signal system	:	PAL colour and CCIR monochrome signals, 625 lines/50 fields
Recording system	:	Rotary, two-head helical scan system with a slant double-azimuth combination video head
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) with BILDSCHÄRFE control at centre position
Horizontal resolution	:	250 lines with BILDSCHÄRFE control at centre position

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	:	VHF 47 — 111 MHz 111 — 300 MHz UHF 470 — 862 MHz
Aerial output	:	UHF channel 36 (adjustable 32 — 40)

TIMER

Clock reference	:	Quartz-crystal
Programme capacity	:	1-year/8-programme timer
Memory back-up time	:	Minimum 3 min.

ACCESSORIES

Provided accessories	:	Aerial cable, Infrared remote control unit, "R6" battery x 2
Optional accessories	:	VPV adapter VU-V120E VPT adapter VU-V140E

No. 82196
September 1990

NOTE: For a technical description, please refer to Technical Guide VTG82061 HR-FC100.

TABLE OF CONTENTS

1. The Instructions shown pertain specifiecally to the Model HR-FC100EG. 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-FC100E and HR-FC100EG) in this series.

Item \ Model			HR-FC100EG	HR-FC100E
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

Important Safety Precautions

Prior to shipment from the factory, JVC products are strictly inspected to conform with the recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

● Precautions during Servicing

1. Locations requiring special caution are denoted by labels and inscriptions on the cabinet, chassis and certain parts of the product. When performing service, be sure to read and comply with these and other cautionary notices appearing in the operation and service manuals.

2. Parts identified by the ⚠ symbol and shaded (▨) parts are critical for safety.
   Replace only with specified part numbers.
   Note: Parts in this category also include those specified to comply with X-ray emission standards for products using cathode ray tubes and those specified for compliance with various regulations regarding spurious radiation emission.

3. Fuse replacement caution notice.
   Caution for continued protection against fire hazard.
   Replace only with same type and rated fuse(s) as specified.

4. Use specified internal wiring. Note especially:
   1) Wires covered with PVC tubing
   2) Double insulated wires
   3) High voltage leads

5. Use specified insulating materials for hazardous live parts. Note especially:
   1) Insulation Tape
   2) PVC tubing
   3) Spacers
   4) Insulation sheets for transistors
   5) Barrier

6. When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.) wrap ends of wires securely about the terminals before soldering.

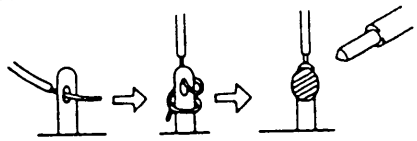


Fig. 1

7. Observe that wires do not contact heat producing parts (heatsinks, oxide metal film resistors, fusible resistors, etc.)

8. Check that replaced wires do not contact sharp edged or pointed parts.

9. When a power cord has been replaced, check that 10—15 kg of force in any direction will not loosen it.

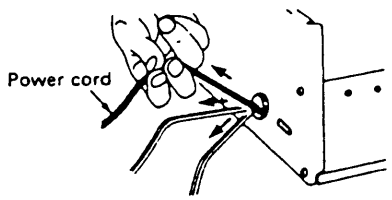


Fig. 2

10. Also check areas surrounding repaired locations.

11. Products using cathode ray tubes (CRTs)
    In regard to such products, the cathode ray tubes themselves, the high voltage circuits, and related circuits are specified for compliance with recognized codes pertaining to X-ray emission. Consequently, when servicing these products, replace the cathode ray tubes and other parts with only the specified parts. Under no circumstances attempt to modify these circuits. Unauthorized modification can increase the high voltage value and cause X-ray emission from the cathode ray tube.

12. Crimp type wire connector
    In such cases as when replacing the power transformer in sets where the connections between the power cord and power transformer primary lead wires are performed using crimp type connectors, if replacing the connectors is unavoidable, in order to prevent safety hazards, perform carefully and precisely according to the following steps.

    1) Connector part number : E03830-001
    2) Required tool : Connector crimping tool of the proper type which will not damage insulated parts.
    3) Replacement procedure
       (1) Remove the old connector by cutting the wires at a point close to the connector.
       Important : Do not reuse a connector (discard it).

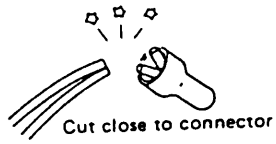


Fig. 3

(2) Strip about 15 mm of the insulation from the ends of the wires. If the wires are stranded, twist the strands to avoid frayed conductors.

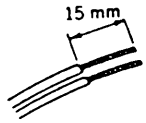


Fig. 4

(3) Align the lengths of the wires to be connected. Insert the wires fully into the connector.

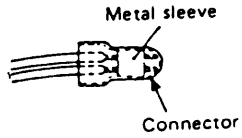


Fig. 5

(4) As shown in Fig. 6, use the crimping tool to crimp the metal sleeve at the center position. Be sure to crimp fully to the complete closure of the tool.

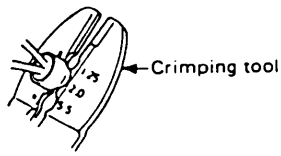


Fig. 6

(5) Check the four points noted in Fig. 7.

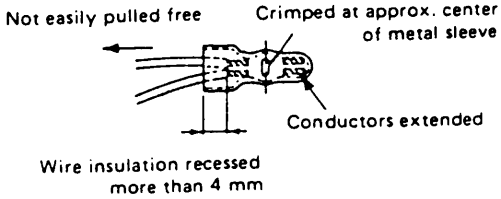


Fig. 7

● Safety Check after Servicing

Examine the area surrounding the repaired location for damage or deterioration. Observe that screws, parts and wires have been returned to original positions, Afterwards, perform the following tests and confirm the specified values in order to verify compliance with safety standards.

1. **Insulation resistance test**
   Confirm the specified insulation resistance or greater between power cord plug prongs and externally exposed parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table 1 below.

2. **Dielectric strength test**
   Confirm specified dielectric strength or greater between power cord plug prongs and exposed accessible parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table 1 below.

3. **Clearance distance**
   When replacing primary circuit components, confirm specified clearance distance (d), (d') between soldered terminals, and between terminals and surrounding metallic parts. See table 1 below.

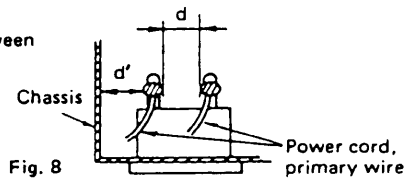


Fig. 8

4. **Leakage current test**
   Confirm specified or lower leakage current between earth ground/power cord plug prongs and externally exposed accessible parts (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.).
   Measuring Method: (Power ON)
   Insert load Z between earth ground/power cord plug prongs and externally exposed accessible parts. Use an AC voltmeter to measure across both terminals of load Z. See figure 9 and following table 2.

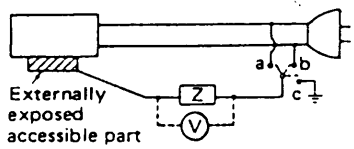


Fig. 9

5. **Grounding (Class I model only)**
   Confirm specified or lower grounding impedance between earth pin in AC inlet and externally exposed accessible parts (Video in, Video out, Audio in, Audio out or Fixing screw etc.).
   Measuring Method:
   Connect milli ohm meter between earth pin in AC inlet and exposed accessible parts. See figure 10 and grounding specifications.

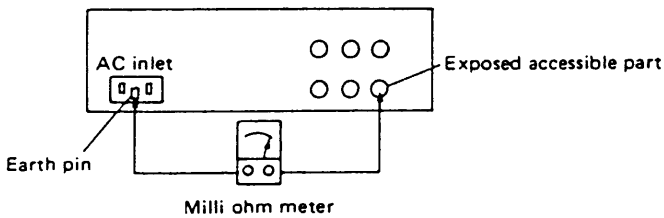


Fig. 10

Grounding Specifications

Region	Grounding Impedance (Z)
USA & Canada	Z ≦ 0.1 ohm
Europe & Australia	Z ≦ 0.5 ohm

AC Line Voltage	Region	Insulation Resistance (R)	Dielectric Strength	Clearance Distance (d), (d')
100 V	Japan	R ≧ 1 MΩ/500 V DC	AC 1 kV 1 minute	d, d' ≧ 3 mm
100 to 240 V			AC 1.5 kV 1 minute	d, d' ≧ 4 mm
110 to 130 V	USA & Canada	–	AC 900 V 1 minute	d, d' ≧ 3.2 mm
110 to 130 V 200 to 240 V	Europe & Australia	R ≧ 10 MΩ /500 V DC	AC 3 kV 1 minute (Class II) AC 1.5 kV 1 minute (Class I)	d ≧ 4 mm d' ≧ 8 mm (Power cord) d' ≧ 6 mm (Primary wire)

Table 1 Specifications for each region

AC Line Voltage	Region	Load Z	Leakage Current (i)	a, b, c
100 V	Japan	1 kΩ	i ≦ 1 mA rms	Exposed accessible parts
110 to 130 V	USA & Canada	0.15 μF, 1.5 kΩ	i ≦ 0.5 mA rms	Exposed accessible parts
110 to 130 V 220 to 240 V	Europe & Australia	2 kΩ	i ≦ 0.7 mA peak i ≦ 2 mA dc	Antenna earth terminals
		50 kΩ	i ≦ 0.7 mA peak i ≦ 2 mA dc	Other terminals

Table 2 Leakage current specifications for each region

Note: These tables are unofficial and for reference only. Be sure to confirm the precise values for your particular country and locality.

INSTRUCTIONS

SAFETY PRECAUTIONS

ENGLISH

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.

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

The BETRIEB 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 skal 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.

Video tapes recorded with this video recorder in the LP (Long Play) mode cannot be played back on a single-speed video recorder.

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.

WARNING

There are two different types of SECAM colour systems: SECAM-L, used in FRANCE (also called SECAM West), and SECAM-B, used in the GRD, e.g. (also called SECAM-East)

1. This recorder can also receive SECAM-B colour television signals for recording and playback.
2. Recordings made of SECAM-B television signals produce monochrome pictures if played back on a video recorder of SECAM-L standard, or do not produce normal colour pictures if played back on a PAL video recorder with SECAM-B system incorporated (even if the TV set is SECAM-compatible).
3. SECAM-L prerecorded cassettes or recordings made with a SECAM-L video recorder produce monochrome pictures when played back with this recorder.
4. This recorder cannot be used for the SECAM-L standard. Use a SECAM-L recorder to record SECAM-L signals.

IMPORTANT: It may be unlawful to record or play back copyrighted material without the consent of the copyright owner.

VHS VHSC PAL

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

Printed in Japan

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

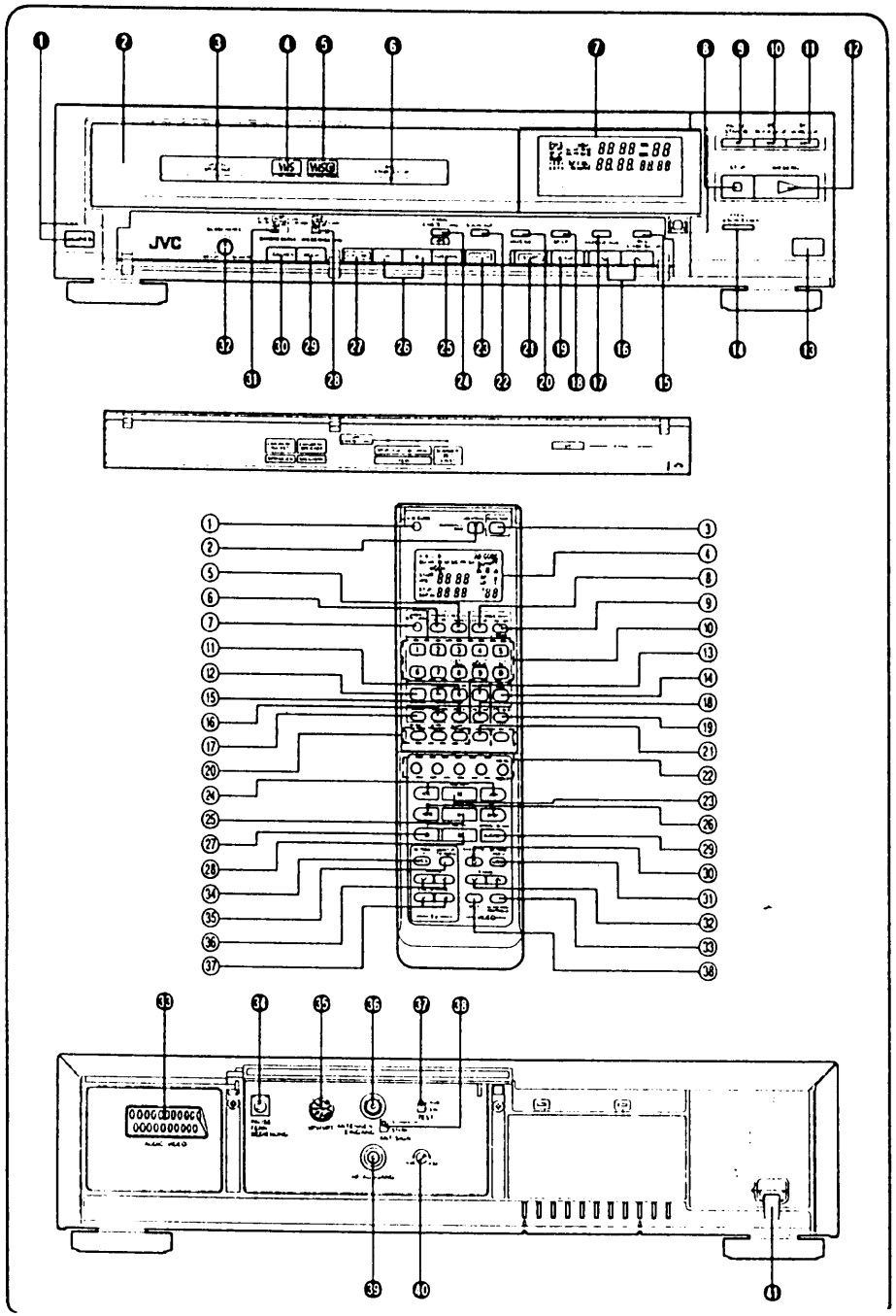
- Avoid exposing the cassettes to direct sunlight. Keep them away from heaters.
- Avoid extreme humidity, violent vibrations or shocks, strong magnetic fields (near a motor, transformer or magnet) and dusty places.
- Place the cassettes in cassette cases and position vertically.

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

ENGLISH



FEATURES

ENGLISH

MAIN FEATURES, ADVANTAGES AND BENEFITS

Feature	Advantage	Benefit
DA-4 (Double-Azimuth 4-Head) system	■ SP/LP twin-speed recording with a pair of exclusive video heads. ■ Noiseless stills, frame advance, variable slow and search in both directions are possible.	■ Up to 8 hours of recording on a single cassette (E-240). ■ Flexible special-effects playback in both SP and LP modes.
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.
Intelligent On-Screen Display System	On-screen display system for timer programming and mode check. You can select German, French, Italian or English for on-screen messages.	■ Easy-to-do, easy-to-see timer programming on the big, bright TV screen. ■ Dual-screen programming convenience in conjunction with remote's LCD.
Full-Size/Compact VHS compatible multi-loading mechanism	■ Directly accepts both full-size and compact VHS cassettes.	■ Selectively use either type of cassettes (VHS or VHS-C) based on application and preference. ■ Record individual TV programmes on a single compact VHS-C cassette with programme-matching tape length, for a quick-access, space-saving cassette library. ■ Play back a wide variety of available VHS software. ■ Play back compact Video Movie recordings.
Video Stabilizer	■ Corrects unstable pictures caused by irregular control pulses.	■ Ensures stable pictures even when playing back repeatedly dubbed tapes.

OTHER KEY FEATURES

Automatic Repeat Playback — Repeat playback of whole tape or segment between two index codes up to 5 times.
VPT Compatibility — Adds extra features such as teletext viewing and simplified timer programming simply by connecting one of JVC's optional teletext adapters (VU-V140E or VU-V150E).
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.
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 power remote control [illegible]

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

bothersome light and reduce chances of theft.

Preroll-capable pause remote control terminal

CONTROLS, INDICATORS AND CONNECTORS

Refer to diagrams on the front foldout page.

Front panel

❶ Operate button (BETRIEB)with LED indicator
Press to apply operating power to the recorder. The indicator will light. Loading a cassette also turns the power on.

❷ Cassette loading tray
Accepts fullsize VHS or compact VHS-C cassettes for recording or playback.

❸ Digital tracking indicator (DIGITAL SPURLAGE)
Lights in the Digital Tracking mode.
Blinks while adjusting.

❹ "VHS" indicator
Lights when a full-size VHS cassette is inserted, with the cassette mark also appearing on the display panel.

❺ "VHS-C" indicator
Lights when a compact VHS-C cassette is inserted, with the cassette mark also appearing on the display panel.

❻ VIDEO STABILIZER indicator
Lights when the VIDEO STABILIZER button ⓳ is pressed.

❼ Fluorescent Display Panel (FDP)
See page 47.

❽ Stop button (STOP)
Press while in other modes to stop the tape.

❾ Pause/Still button (PAUSE/STANDB.)
- 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.

❿ Rewind/Shuttle Search buttons (RÜCKLAUF)
- Press while in the Stop mode to rewind the tape.
- Press while in the Play mode for Shuttle Search in the reverse direction.
- Press while in the Record-Pause mode to engage the Retake mode. (See page 52.)

⓫ Fast-Forward/Shuttle Search buttons (VORLAUF)
- Press while in the Stop mode to fast-forward the tape.
- Press while in the Play mode for Shuttle Search in the forward direction.
- Press while in the Record-Pause mode to engage the Retake mode. (See page 52.)

⓬ Play button (WIEDERG.)
- Press to play back a tape.
- Press to cancel the Pause/Still or Shuttle Search mode. (See page 50.)
- Press to start recording from the Record-Pause mode.

⓭ Infrared beam receiving window

⓮ Open/close button (ÖFFNEN/SCHLIESSEN)
- Press to extend the cassette loading tray for cassette insertion or removal. Either a full-size or compact VHS cassette can be loaded.
- Press again to retract the cassette loading tray.

⓯ Video stabilizer button (BILDSTABILISATOR)
Corrects unstable pictures, such as crooked vertical lines or rolling pictures, caused by irregular control signals. This phenomenon can occur during playback of tapes recorded on camcorders operating in the LP mode. Normally leave this button to OFF. When pressed to ON, the VIDEO STABILIZER indicator ❻ lights. When the cassette is removed, the Video Stabilizer automatically resets to OFF.

⓰ TV programme buttons (KANAL)
Press either button to scan to a desired channel.

⓱ Display off button (ANZEIGE AUS)
To turn off the FDP.

⓲ SP/LP button
Press to select the recording speed (SP or LP).

⓳ Record/Instant Timer Record button (AUFN./DA)
- 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.

⓴ Display button (ANZEIGE)
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.

㉑ START button
Press to engage the 24-Hour Instant Timer Set mode. (See page 53.)

㉒ Search button (SUCHLAUF)
Press to initiate real channel automatic scan tuning. (See page 44.)

㉓ Timer button (SCHALTUHR)
Press to engage the Timer Standby mode.

㉔ Channel set button/VPS (KANAL/VPS)
This is a dual-function button.
- as a VPS button — press to enter the VPS command while in the Timer Set mode.
- as a KANAL button — press to engage the Real Channel mode.

㉕ Summer time adjust/Select button (SOMMERZEIT/AUSWAHL)
This is a dual-function button.
- as a SOMMERZEIT 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 41.)
- as a AUSWAHL button — press to select the item to be set in the Clock Set, Real Channel or Timer Set mode.

㉖ Vertical lock/Tracking/Set/Fine buttons (V-BILDFANG/SPURLAGE/EINSTELLEN/FEIN) (–/+)
These are quadruple-function buttons.
- as V-BILDFANG buttons — press either to reduce vertical vibrations, if observed in the Still mode.
- as SPURLAGE buttons — press both to cancel the automatic Digital Tracking mode, then press either for manual tracking control. (See page 48.)
- as EINSTELLEN buttons — press to set the correct data in the Clock Set or Timer Set mode.
- as FEIN tuning buttons — press to shift the frequency in either direction to fine-tune in a specific station in the Real Channel mode.

ENGLISH

㉗ Programme/Clock adjust button (AUFZ. NR./UHR EINSTELLUNG)
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.

㉘ Repeat switch (WIEDERHOLUNG)
KOMPL.: To play back the entire tape repeatedly.
INDEX: To play back a segment between two adjacent index codes. (See page 49.)
AUS: No repeat playback.

㉙ Repeat/Counter memory/Store button (WÖCH./ZÄHLWERK-SPEICHER/SPEICHERN)
This is a triple-function button.
- as a WÖCH. button — press to enter the repeat command in the Timer Set mode.
- as a ZÄHLWERK-SPEICHER button — press to engage the Counter Memory mode.
- as a SPEICHERN button — press to store the tuned-in channel in the Real Channel mode.

㉚ Cancel/Counter reset/Skip button (LÖSCHEN/ZÄHLWERK-RÜCKST./SPRINGEN)
This is a triple-function button.
- as a LÖSCHEN button — press to cancel the programmed data in the Timer Set mode.
- as a ZÄHLWERK-RÜCKST. button — press to reset the realtime counter reading to "0H 00M 00S".
- as a SPRINGEN button — press to skip unnecessary channels in the Real Channel mode.

㉛ Tape remain switch (BANDERESERVE)
For the remaining tape time indicator to give the correct information, it is necessary to set this switch correctly.
AUTO: Normally set to this position. With some types of cassettes, either a longer time is required to obtain their remaining time indication or their indication might be inaccurate. To avoid this when using tapes indicated at the other two positions, set to that respective position.
E-180/EC-30: Set to this position when using an E-180 or EC-30 cassette.
E-240/EC-45: Set to this position when using an E-240 or EC-45 cassette.

㉜ Picture sharpness control (BILDSCHÄRFE)
Turn this knob clockwise to make the picture sharper. Turn counterclockwise to give the picture a softer tone. Effective only for playback pictures. (No effect on recording.)

Rear Panel

㉝ 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.

㉞ Remote pause terminal (PAUSE FERNBEDIENUNG)
When using this recorder 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.

㉟ VPV/VPT connector
Connect the VPT (VPV) adapter for decoding teletext programmes and for teletext timer programming.

㊱ Aerial input connector (ANTENNEN-EINGANG)
Connect an aerial to this connector.

㊲ Attenuator switch (ANT. SIGN.)
Set to SCHWACH to receive broadcasts from distant stations. Set to STARK to receive broadcasts of high field strength.

㊳ TEST signal switch
Set to EIN when tuning your TV receiver for the video channel. A test signal in the form of two vertical white bars will be available.

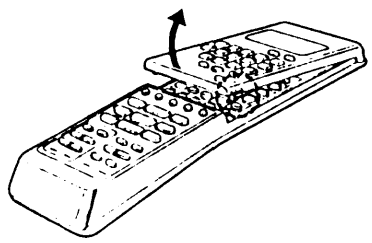
㊴ RF converter frequency adjustment screw (K40 – K32)
(See page 40.)

㊵ RF output connector (HF-AUSGANG)
Connect to the aerial terminal of a TV receiver through the aerial cable (provided).

㊶ Power cord

Remote Control Unit

Grasp the cover where the side tab is located and swing open the cover

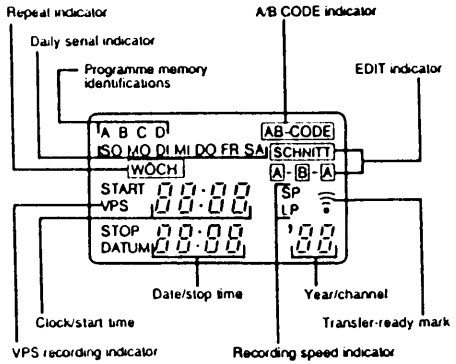


① **A/B-CODE button**
When using two JVC video decks, press to switch this remote control from the "A" mode to "B" mode, or vice versa, depending on the deck to be controlled. (See pages 39 and 60.)

② **Transfer/Summer time adjust button (ÜBERTRAG/SOMMERZEIT EINST.)**
This is a dual-function button.
- as a ÜBERTRAG button — press to transfer the data held in the remote control's timer memory to the recorder.
- as a SOMMERZEIT EINST. button — press to adjust the remote control's clock to the summer time setting. (See page 42.)

③ **Timer button (SCHALTUHR)**
Functions same as ㉘.

④ **LCD (Liquid Crystal Display) panel**
Refer to this panel when programming the remote control's built-in timer memory.



⑤ **Memory cancel button (SPEICHER LÖSCHEN)**
Press to cancel the programmed data in the remote control's timer memory.

⑥ **Memory programme button (SPEICHER AUFZ. NR.)**
Press to programme the remote control's timer memory.

⑦ **Clock adjust button (UHREINSTELLUNG)**
Press to adjust the clock of the remote control.

⑧ **Video programme button (VIDEO AUFZ. NR.)**
Press to engage the recorder's Timer Set mode.

⑨ **Video cancel/Counter reset button (VIDEO LÖSCHEN/Z.-RÜCKST.)**
This is a dual-function button.
- as a VIDEO LÖSCHEN button — press to cancel the programmed data held in the recorder's timer memory in the Timer Set mode.
- as a Z.-RÜCKST. button — press to reset the Realtime Counter reading to "0st 00m 00s".

⑩ **Multi-purpose numeric keys**

Clock setting:	See page 42.
Channel selection:	See page 43.
Timer Programming:	See page 55.
Realtime Go-To and Search functions:	See page 57.
Index Search:	See page 58.
External Source recording:	See page 59.

⑪ **Set (–/+)/Cursor (←/→) buttons (EINSTELLEN/CURSOR)**
These are dual-function buttons.
- as EINSTELLEN buttons — press to set the correct data in on-screen remote programming.
- as CURSOR buttons — press to move the cursor to the position for data entry when programming the remote control's timer memory.

⑫ **Select button (AUSWAHL)**
Press to select the item to be set in on-screen remote programming.

⑬ **Display button (ANZEIGE)**
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.

⑭ **VPS/Channel set button (VPS/KANAL)**
Functions same as ㉜.

⑮ **INDEX button**
Press to engage the Index Search mode. (See page 58.)

⑯ **Erase button (LÖSCHEN)**
Press during playback to erase an index code. (See page 58.)

⑰ **Mark button (MARKE)**
Press during playback or recording to put an index code onto the tape. (See page 58.)

⑱ **Go-To button (ZIELLAUF)**
Press to engage the Realtime Go-To mode. (See page 57.)

⑲ **Intro button (TITELBILD)**
Press to engage the Intro Search mode. (See page 58.)

⑳ **Duet editing mode, Stand-by and Start buttons (SCHNITT-BETRIEB, SCHNITT-BEREIT, SCHNITT-START)**
Duet Editing controls for simultaneous control of two JVC decks in editing. (See page 60.)

㉑ **Counter memory button (Z.-SPEICHER)**
Functions same as ⑨ as a Z.-SPEICHER. button.

㉒ **Teletext buttons**
For teletext operation. (See page 64.)

㉓ **II (Pause/Still) button**

㉔ **<</>> (Variable search) buttons**
Press either button to search for a specific segment of the programme at variable speeds. (For details, see page 50.)

㉕ **► (Play) button**

㉖ **◄◄/►► (Rewind)(Fast-Forward)(Shuttle Search) buttons**

㉗ **● (Record) button**
Press together with the ► button ㉕ to start recording.

㉘ **■ (Stop) button**

㉙ **Skip/Blank search button (SPRING/BLANK SUCHL.)**
- 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 52.)
- Press while in the Play mode to zip through unwanted tape segments. (See page 49.)

㉚ **Eject button (CASSETTE)**
Press while in the Stop mode to eject the cassette.

㉛ **Operate (video) button (BETRIEB (VIDEO))**
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 56.)

㉜ **TV programme buttons (KANAL ∨/∧)**
Function same as ⑫.

㉝ **On-screen button (BILDSCHIRM KONTROLLE)**
- Press to select the language for on-screen messages.
- Press to cancel instantly the on-screen display (See page 47.)

TV Operation buttons (designated TV models only)

㉞ **Operate (TV) button (BETRIEB (TV))**
Press to turn the TV power on or off.

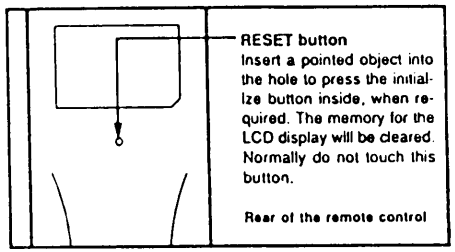
㉟ **MONITOR (TV/VIDEO) button**
Press to select the TV's operating mode.
TV: For viewing broadcast programmes or tape programmes via HF-AUSGANG connection.
VIDEO: For viewing programmes via the AV connection.

㊱ **Channel buttons (KANAL ∨/∧)**
Press to select a desired channel on the TV receiver.

㊲ **Volume buttons (LAUTSTÄRKE – / +)**
Press to decrease or increase the TV's sound volume.

㊳ **SP/LP button**
Functions same as ⑪.

Remote Control Unit's RESET button



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.

Rear of the remote control

Note:
When the optional VPT (VPV) adapter is connected, all buttons located on the cover of the upper portion of the remote control unit function for teletext operation when the cover is closed. Also four coloured keys and several buttons located on the lower portion of the remote control have additional teletext functions, as indicated by their additional labels.

ENGLISH

ENGLISH

Remote Control Unit

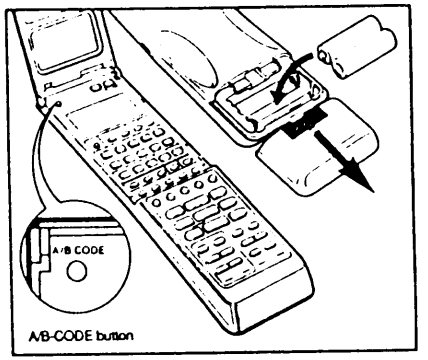
A/B code switching
When you own two JVC video decks, this remote control can operate both decks separately; they do not respond simultaneously to the remote control's signal, if they are set to respond to different codes. Initially this recorder is set in the "A" mode.
To change the mode, carefully follow 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 BETRIEB (VIDEO) 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 BETRIEB (VIDEO) 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".

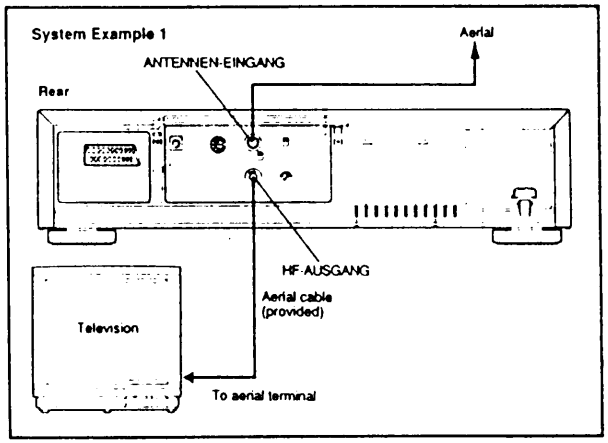


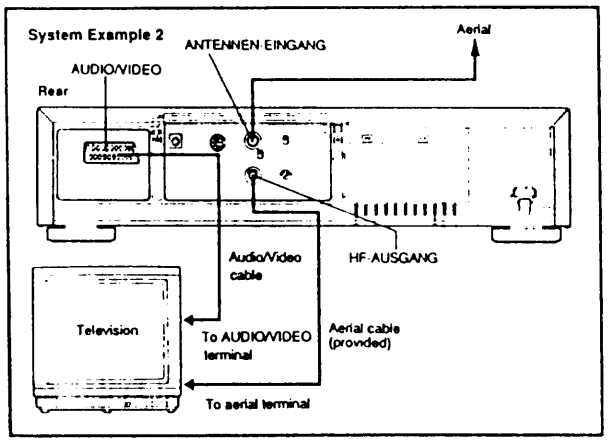
Operating distance for remote control unit
- The maximum operating distance is about 8 m.

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

CAUTION
- Do not install a combination of old and new batteries. (Never install a combination of an alkaline battery and a manganese battery.)

CONNECTIONS





AERIAL AND RF CONNECTION

1. Remove the aerial cable from the television and reconnect it to the recorder's ANTENNEN-EINGANG connector. The recorder is then ready to record off-air programmes.
2. Connect the recorder's HF-AUSGANG 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.

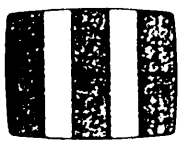
AV CONNECTION

- 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

1. Press the BETRIEB button ❶ to turn the power on. Turn on the TV receiver.
2. Set the TEST switch ❷ to EIN.
3. 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.
4. Reset the TEST switch to AUS.



Notes:

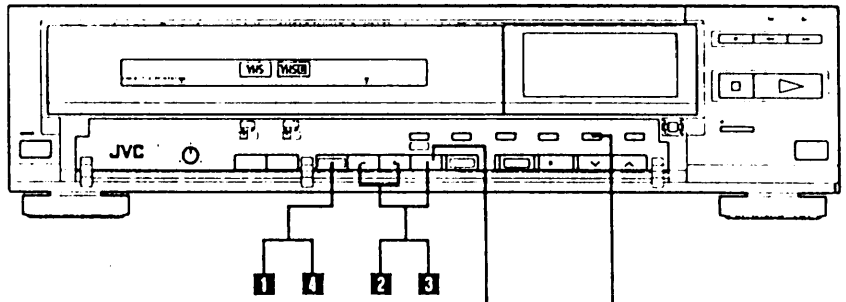
- If some interference noise is seen on the screen because of broadcasts on neighbouring channels or if your preset broadcasts should be affected in picture quality, it is necessary to shift the RF converter output frequency from that of channel 36. Consult your JVC dealer for making this adjustment.
- 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.

CLOCK SETTING

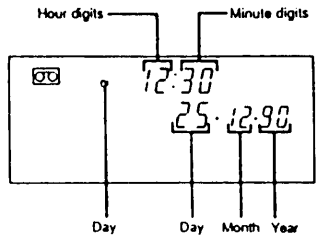
ENGLISH

Setting the built-in clock

Plug the recorder into an AC outlet. The display shows a blinking 0:00.



1. Press the UHR EINSTELLUNG 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 AUSWAHL and EINSTELLEN buttons alternately.
   - The blinking position is ready for entry.
   - Press EINSTELLEN 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 UHR EINSTELLUNG.
   - 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.



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 UHR EINSTELLUNG 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 SOMMERZEIT 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 SOMMERZEIT button pressed for 2 seconds to set the clock back by an hour.

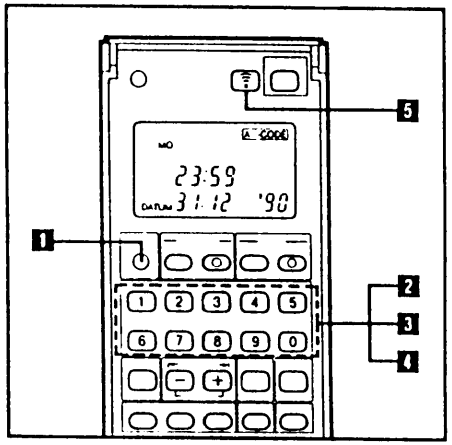
DISPLAY OFF

Press the ANZEIGE AUS 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.

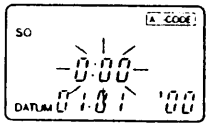
Power failure indicator
The blinking 0:00 (initial condition of the display) is also a power failure indicator, showing that there has been a power failure in excess of 3 minutes. Readjusting the time restores the normal condition of the clock display.

Setting the LCD clock of the remote control unit

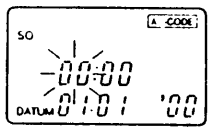
The LCD clock is independent of the recorder's clock.
The recorder's clock can be adjusted from the remote control unit if its transfer function is used.



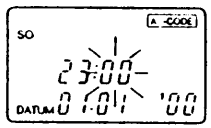
Insert two "R6"-size batteries (provided) into the remote control. The LCD shows the following with "0:00" blinking.



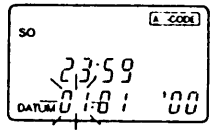
1 Press the UHREINSTELLUNG button.
- The hour indication will blink.



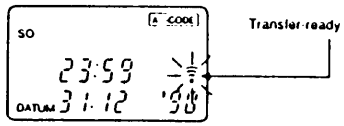
2 Press the numeric key corresponding to the current hour, then the minute indication will blink.
- Always key in two digits.
  For a one-digit number, key in "0" first.



3 Key in the digits corresponding to the current minute, then the day position of the DATUM 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.



5 Press the ÜBERTRAG 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 UHREINSTELLUNG button instead of the ÜBERTRAG button to set the remote control's clock.
- If the transfer-ready mark disappears before transmission, press the UHREINSTELLUNG button to make it reappear, then press the ÜBERTRAG button while the transfer-ready mark is blinking; otherwise, the ÜBERTRAG button will function as a summer time adjust button.
- If the clock has already been set, the transfer-ready mark starts blinking when the UHREINSTELLUNG button is pressed.
- To transfer the data to the recorder's clock, simply press the ÜBERTRAG button.
- To readjust the clock, press the UHREINSTELLUNG 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 SOMMERZEIT EINST. button ⑦.

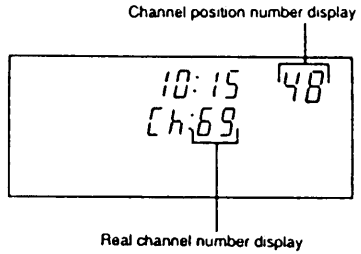
1. Simply press and quickly release the SOMMERZEIT EINST. button in the Clock mode to set the clock forward by one hour.
2. Later in the year, to switch back to regular time, simply hold the SOMMERZEIT EINST. button pressed for more than 2 seconds to set the clock back by an hour.

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

ENGLISH

OPERATING THE BUILT-IN TUNER

This recorder incorporates an advanced frequency synthesized tuner which is pretuned to 91 channels to cover VHF, UHF and CATV broadcasts. Channel indication is given in two different ways: real channel numbers and channel position numbers. Real channel number indication is available by pressing the VPS/KANAL button ⑱ or Ⓜ, or during search by pressing the SUCHLAUF button ⑱, while channel position number indication is always available in the channel display.



Correspondence between 91 pretuned TV stations and the recorder's real channel indications

DISPLAY	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
VHF	E2	E3	E4	E5	E6	E7	E8	E9	E10	E11 (H1)	E12 (H2)	A	B	C	D	E	F	G	H
DISPLAY	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
UHF	E21	E22	E23	E24	E25	E26	E27	E28	E29	E30	E31	E32	E33	E34	E35	E36	E37	E38	E39
DISPLAY	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58
UHF	E40	E41	E42	E43	E44	E45	E46	E47	E48	E49	E50	E51	E52	E53	E54	E55	E56	E57	E58
DISPLAY	59	60	61	62	63	64	65	66	67	68	69								
UHF	E59	E60	E61	E62	E63	E64	E65	E66	E67	E68	E69								
DISPLAY	75	76	77	78	79		81	82	83	84	85	86	87	88	89	90	91	92	93
CATV	X	Y	Z	—	—		S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13
DISPLAY	94	95	96	97	98	99	00												
CATV	S14	S15	S16	S17	S18	S19	S20												

Stored channels

A total of 91 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.

Channel selection

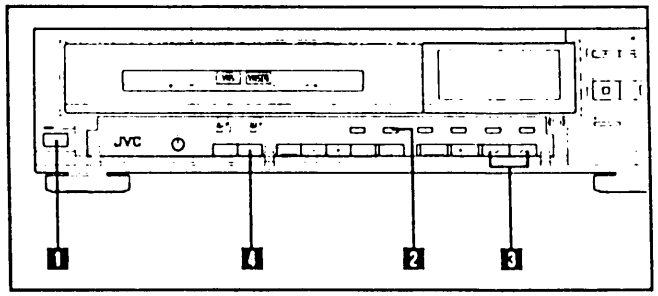
To select a channel for recording, normally use the KANAL buttons ⑱ (㉜ on the remote control) or 10 numeric keys ⑤. You can choose any channel from among the stored ones by calling up the corresponding channel position number.
- Use the "∨" button to scan to a channel in the direction of decreasing numbers; the "∧" button, in the direction of increasing numbers.
- An invalid number larger than 48 will be rejected.

If you want to select a channel other than those stored, engage the Real Channel mode and call up a channel, while referring to the real channel number display.
With recorder's controls:
- Simply press the SUCHLAUF button ⑱.

With remote control
- Press the VPS/KANAL button Ⓜ to engage the Real Channel mode and call up a channel by using the 10 numeric keys. For details, refer to the next page.

Storing channels

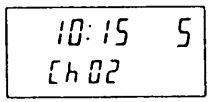
Switch on the TV receiver.
- Set the TV receiver to your video channel or to the AV mode (depending on the connection).



ENGLISH

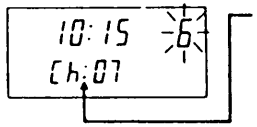
A. Automatic Setting

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



VHF channel 2 is stored for channel position 5.

- 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.

3. Select a channel position into which you wish to store that station by using the KANAL buttons while the channel position number is blinking.
4. After confirming the real channel number and channel position number, press the SPEICHERN 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 VPS/KANAL button Ⓜ.
   - The display will change to the Real Channel mode.

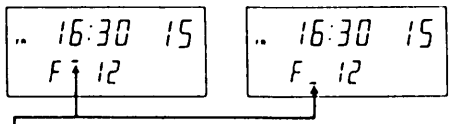
(2) Press VPS/KANAL until the real channel number starts blinking.
   - Blinking will stop in 10 seconds.

(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 AUSWAHL button ⑱ in step 3 (both in automatic and manual setting) and use the FEIN "+" or "–" button ⑲; "+" 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 KANAL buttons ⑪ or 10 numeric keys ⑩.
2. Press the VPS/KANAL button ⑫.
3. Press the SPRINGEN button ⑭.
   - "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.
   - To restore the skipped channel, press the SPEICHERN button after step 3.

Note:
If no command is given after each step of the setting operation, the Real Channel mode will be automatically cancelled in 10 seconds.

LOADING AND UNLOADING A CASSETTE

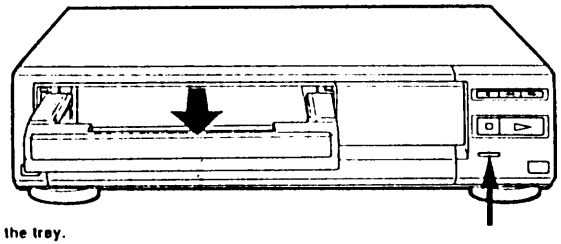
FULL-SIZE VS. COMPACT

- With the HR-FC100EG, both VHS and VHS-C cassettes can be loaded with equal ease for recording or playback.
- The type of loaded cassette is indicated by the respective indicator (VHS or VHS-C) on the front of the cassette loading tray.

LOADING

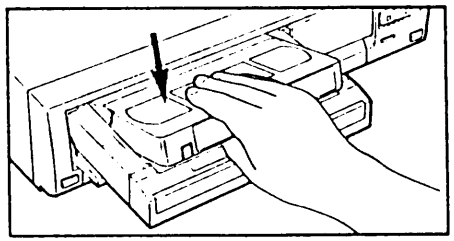
ENGLISH

1. **Press the ÖFFNEN/SCHLIESSEN button.**
   - The power will turn on and the cassette loading tray will glide out automatically.

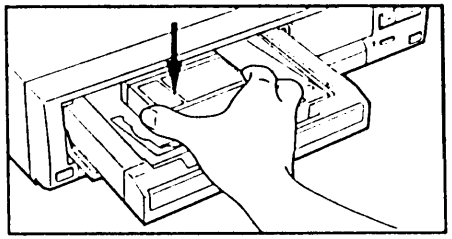


2. **Place a cassette on the tray.**

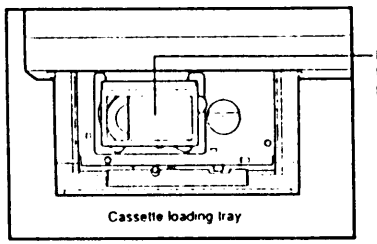
Full-size VHS cassette: Place with window-side up.



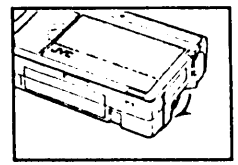
Compact VHS-C cassette: Place in the compact cassette receptacle with window-side up.



NOTE FOR COMPACT CASSETTE LOADING



Place the compact cassette so that it squarely fits in the compact cassette receptacle.



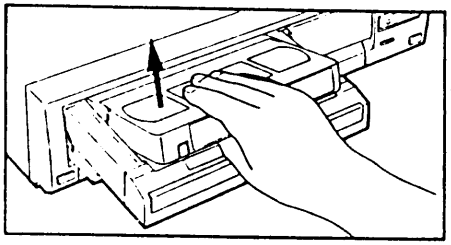
Make certain before loading the cassette that the tape is not slack. If there is any slack, turn the gear on the cassette in the direction of the arrow to take up slack.

3. **Press the ÖFFNEN/SCHLIESSEN button.**
   - The cassette loading tray will retract, and the ⊙⊙ indicator will appear on the display panel.
   - With cassettes whose safety tab has been removed, playback will start automatically.
   - The automatic loading mechanism will operate only when the cassette is inserted correctly. Observe the arrow printed on the cassette.

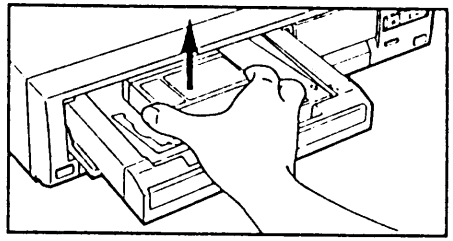
UNLOADING

1. **Press the ÖFFNEN/SCHLIESSEN button.**
   - the cassette loading tray will glide out. The ⌨ indicator will blink until the tray stops.
2. **Remove the cassette.**

Full-size VHS cassette



Compact VHS-C cassette



3. **Press the ÖFFNEN/SCHLIESSEN button.**
   - The cassette loading tray will retract.

Note:

- The cassette can be unloaded even when the power has been turned off. If a cassette is inside, pressing the ÖFFNEN/SCHLIESSEN button turns the power on automatically and extends the tray. Then remove the cassette and press the BETRIEB button; the tray will retract and power will shut off automatically.

CAUTION:

- Do not leave the cassette loading tray extended
- Do not place anything other than specified cassettes on the cassette loading tray.
- Do not place anything in the path of the cassette loading tray.
- Do not attempt to interrupt the movement of the cassette loading tray.
- With compact cassettes, the very beginning of the tape may not be played back. When recording on a VideoMovie, it is recommended that you start recording after running the tape forward a bit.

WARNING

- Take care that one's fingers do not become caught between the tray and the cabinet, as this could lead to injury or damage to the mechanism. Show special caution with children.

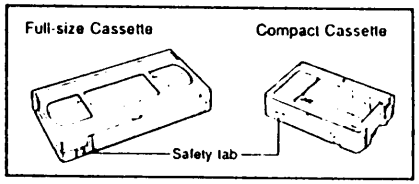
USABLE CASSETTES AND THEIR RECORDING TIME

Both VHS and VHS-C cassettes can be used with this video recorder. (S-VHS and S-VHS-C cassettes can also be used. However, only regular VHS recordings can be made and played back on this video recorder. Super VHS recordings can neither be made nor played back on this video recorder.)

	Type of Cassette	Recording/Playback Time	
		SP (Standard Play)	LP (Long Play)
FULL-SIZE	E-30	30 minutes	1 hour
	E-60	1 hour	2 hours
	E-90	1 hour, 30 minutes	3 hours
	E-120	2 hours	4 hours
	E-180	3 hours	6 hours
	E-240	4 hours	8 hours
COMPACT	EC-30	30 minutes	1 hour

ACCIDENTAL ERASURE PREVENTION

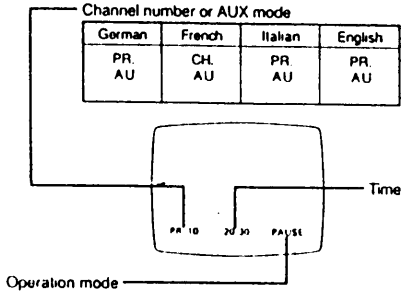
- Video cassettes are equipped with a safety tab to prevent accidental erasure. When the tab is removed, recording cannot be performed. If you wish to record on a cassette whose tab has already been removed, use adhesive tape to block the hole.



ENGLISH

ON-SCREEN MODE DISPLAY

Four-language on-screen display is available for timer programming (see page 54) and mode check. To select the language, press the remote control's BILDSCHIRM KONTROLLE button for longer than 2 seconds while a mode check display is on the screen. The screen will display "DEUTSCH", "FRANCAIS" and "ITALIANO" and "ENGLISH" in that order where the operation mode is otherwise displayed. Simply release the BILDSCHIRM KONTROLLE button at the language you want.



	German	French	Italian	English
• Play mode	LAUF	LECT	RIPRO	PLAY
• Record mode	AUFN	ENR	REG	REC
• Fast forward mode	VL	AV	AVANZ	FF
• Rewind mode	RL	RET	RIAVV	REW
• Pause mode	PAUSE	PAUSE	PAUSA	PAUSE

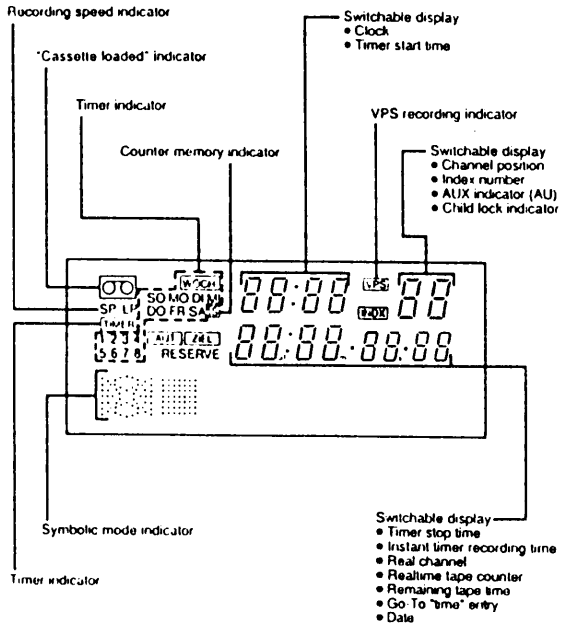
Automatic Indication

- Channel number is displayed each time a different channel (or AUX mode) is selected.
- Time is displayed whenever the channel or operation mode is displayed.
- Mode is displayed for 5 seconds each time the operation mode is changed to Record, Play, Fast Forward or Rewind from any other mode. The PAUSE indication remains on for as long as the Record-Pause mode is engaged.

Manual recall

- For checking of the channel, time, or mode, press the BILDSCHIRM KONTROLLE button. The corresponding indication will be available on the screen for 5 seconds

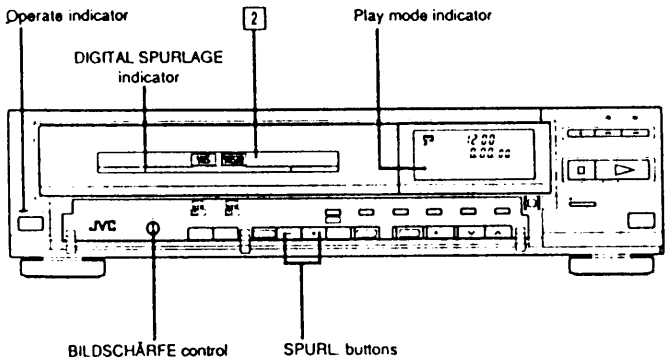
DISPLAY PANEL INDICATORS

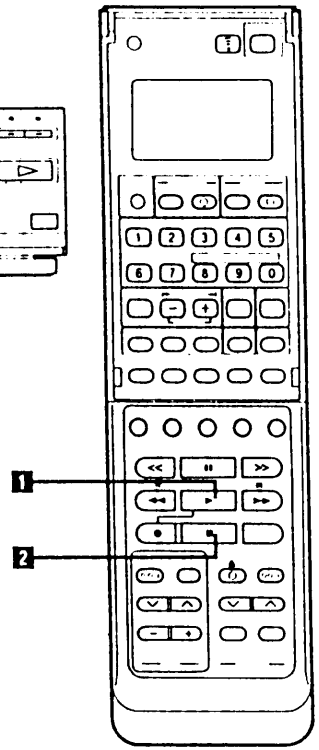


Symbolic mode indicators

PLAY:	
FF:	
REW:	
FF VARIABLE SHUTTLE SEARCH:	
REW VARIABLE SHUTTLE SEARCH:	
STILL: FORWARD SLOW:	
STILL: REVERSE SLOW:	
RECORD:	
RECORD PAUSE:	

PLAYING BACK A VIDEO CASSETTE





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.
- 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 SPURLAGE 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 SPURLAGE 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:

- If you press the ► button without loading a cassette, the cassette loading tray will glide out automatically. Load a pre-recorded cassette.
- The SP/LP button may be in either position. The SP or LP mode recording is automatically detected and played back at the correct speed.
- 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.
- If unstable pictures occur, refer to BILDSTABILISATOR button ⑮ on page 36.

PICTURE SHARPNESS ADJUSTMENT

Images on the screen can be adjusted to a preferred softer or sharper definition by turning the BILDSCHÄRFE control in the corresponding direction.

ENGLISH

CONVENIENT FACILITIES RELATED TO PLAYBACK

SKIP SEARCH

During playback, press the SPRING./BLANK SUCHL. 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.

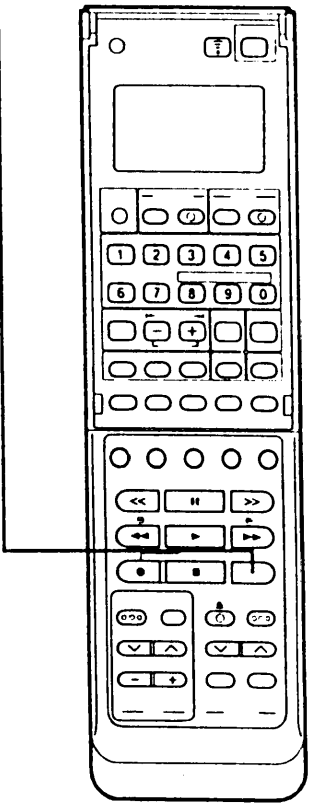
- Press the ◄◄ button and then ► button within 2 seconds. Playback will start automatically at the beginning of the tape. (Check to see that the counter memory indicator [S] is off).
  If you want to watch the tape from the counter reading of "0St 00M 00S", press the ZÄHLWERK-SPEICHER button to obtain [S]. Then, press the ◄◄ (or ►►) button and the ►.
- 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 CASSETTE or BETRIEB (VIDEO) button within 2 seconds after pressing the ◄◄ button.

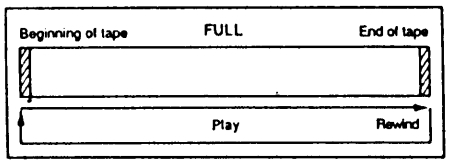
Note:

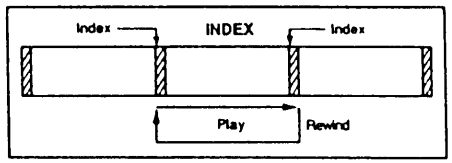
- For various tape access methods that can be used in different applications, refer to pages 57 and 58.



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 ("KOMPL.") or repeated playback (5 times) of a segment of the tape from one index mark to the next ("INDEX").





1 Set the WIEDERHOLUNG switch ⑰ as required.
2 With the switch in the INDEX position, you can designate the segment using the Index Search mode or Index Mark function. (See page 58).

Note:

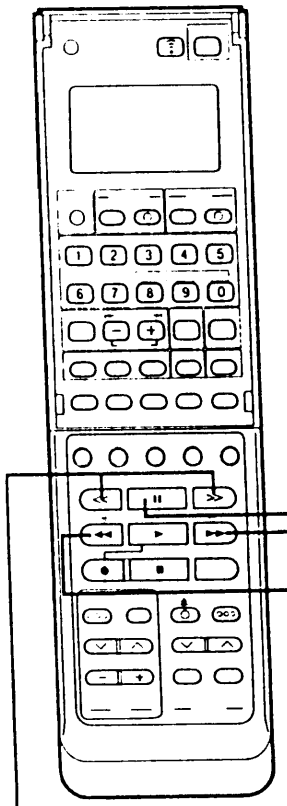
After repeat playback, be sure to reset the WIEDERHOLUNG switch to "AUS".

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-BILDFANG buttons.
- If noise bars are visible in the Special-Effects Playback mode, attempt to correct it in the manual tracking mode as
- No audio is available during any special-effects playback mode.

assemble recording is
picture will not dist
recorded before the pa
the new recording. Thi

SPECIAL-EFFECTS PLAYBACK



STILL PLAYBACK AND FRAME ADVANCE

II 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 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 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.

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.

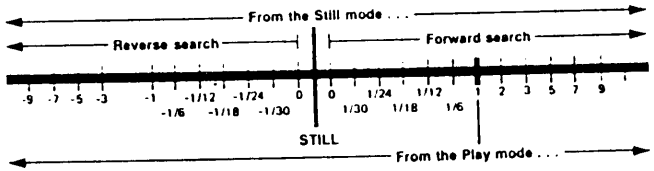
VARIABLE-SPEED SEARCH AND SLOW MOTION

Variable search buttons (<</>>)

The variable search buttons control both the direction and speed of tape search, making possible fast- and slow-motion playback in either forward or reverse direction from either the Still or Play mode.

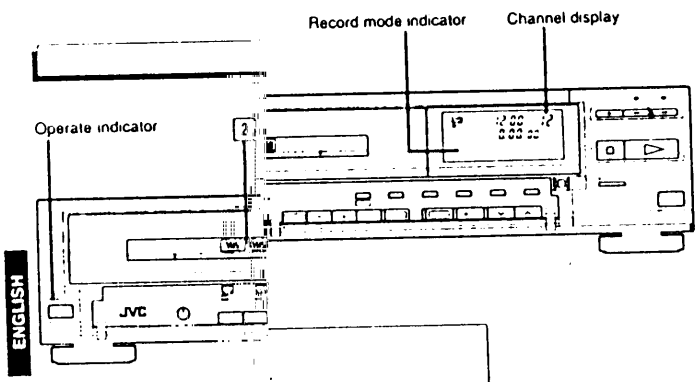
Operation tips:

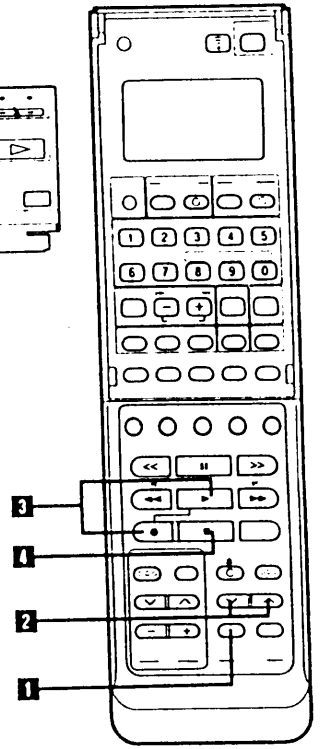
- To increase speed while in the forward direction, press >> repeatedly; to decrease, press << repeatedly. The direction reverses after leaving the Still mode.
- To increase speed while in the reverse direction, press << repeatedly; to decrease, press >> repeatedly. The direction reverses after leaving the Still mode.
- To return to normal playback, press the Play button.



ENGLISH

RECORDING TV PROGRAMMES





your video channel , or to the
n the connection).
ety tab in place).

PREPARATION

[1] Switch on the TV receiver
- Set the TV receiver to AV mode (depending

[2] Load a cassette (with sa

E
(SP or LP).
0 cassette, or 45 minutes with an

0 cassette, or 90 minutes with an

OPERATING PROCEDU

1 Select the recording spe wish to record with the KANAL
SP: 4 hours with an E-24 EC-45 cassette.
LP: 8 hours with an E-24 EC-45 cassette.
ttons simultaneously to start
ear on the FDP and blink to show
g recorded.

2 Select the channel yo recorder's front panel control ∨/∧ buttons. once to start recording.)

3 Press the ● and ► b end of the programme.
recording. "INDX" will ap
that an index code is be
(When using the vide
buttons, press AUFN./D

4 Press the ■ button at th

RECORDING ONE T PROGRAMME WHILE WATCHING ANOTHER

A programme not being awed can be recorded while you enjoy viewing another prog amme.
This permits the recorded rogramme 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.

is pressed more than once, the ode will be entered (see page 53).
ecording, repeatedly press the the AUT indicator on the FDP

Notes:

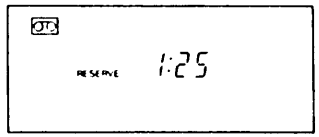
- If the AUFN./DA butto ramme you do not want to record, Instant Timer Recording elease the Pause mode. Press the To return to ordinary AUFN./DA button un ted from the Record-Pause mode, extinguishes. performed so that the playback
- If there is part of the pr at the edit point. A few frames press the II button. To e may be erased due to overlap of ► button. s not due to any defect of the unit.
- When recording is resta
- When the Record-Pause mode continues for longer than about 5 minutes, the Stop mode will be entered automatically.
- If the ● button cannot be engaged, check to see if the cassette safety tab has been removed. (See page 46).
- 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.

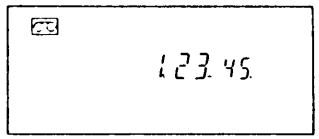
- Press the ANZEIGE button to obtain the remain (RESERVE) tape time indication in hours and minutes on the FDP.

Notes:
- For accurate indication, be sure the BANDERESERVE switch is set correctly. (See page 37).
- During recording, the remaining tape length is calculated in reference to the recording mode selected by the SP/LP button; during playback, it is calculated in reference to the recorded mode of the tape being played back (SP or LP).
- The indicated remaining time is approximate.



ELAPSED RECORDING TIME INDICATION

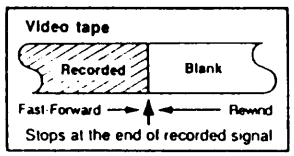
When you need to know the exact time of a recording, press the Z -RÜCKST. button before starting recording or playback. The counter will be reset to "0St 00M 00S" and show the exact elapsed time as the tape runs.

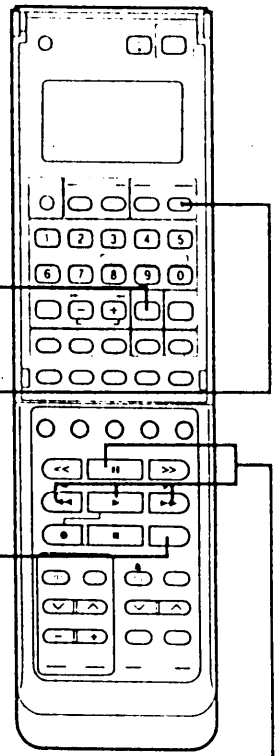


BLANK SEARCH

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.

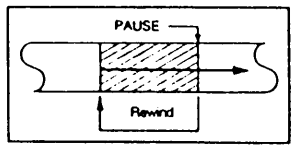
- Insert a cassette and press the SPRING./BLANK SUCHL. button.
- If a recorded signal is present, the recorder automatically enters the Fast Forward mode, and stops automatically around the end of that recorded section. Before starting recording, play back the tape to determine where to start a new recording.
- If the SPRING./BLANK SUCHL. 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 SPRING./BLANK SUCHL. button is pressed, the tape counter is automatically switched to the RESERVE mode and shows the remaining tape time in hours and minutes. To switch back to the realtime counter mode, press the ANZEIGE button.





RETAKE FUNCTION

While in the Record-Pause mode, pressing the ►► or ◄◄ button initiates normal-speed search in the corre-sponding 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.



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

ENGLISH

24-HOUR TIMER

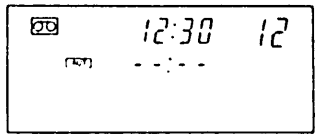
The 24-Hour Timer Recording feature allows unattended automatic starting and stopping of the recording of a single programme which starts within a 24-hour period.

Preparation
1. Load a cassette with its safety tab in place. The recorder turns on automatically.
2. Select the channel you wish to record from.
3. Select the recording speed "SP" or "LP" by pressing the SP/LP button.

Setting the timer

1 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 AUSWAHL and EINSTELLEN buttons.

2 After reaching the desired START time, press the AUFN./DA button the required number of times to set the desired length of recording time.
- For a more precise time setting, use the AUSWAHL and EINSTELLEN buttons.

3 After confirming the START time and recording length, press the BETRIEB button.
- "AUT" remains on the FDP and the 24-Hour Instant Timer Standby mode will automatically engaged.
- If the programme has not been correctly preset, the "AUT" indicator will blink for about 10 seconds when the BETRIEB 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 LÖSCHEN 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.

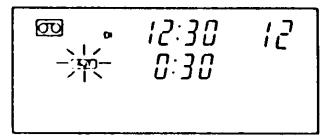
OFF-TIMER

- Start recording as described on page 51.

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.

1 Press the AUFN./DA 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



2 Each time the AUFN./DA button is pressed, recording time increases by 30 minutes to a maximum of 4 hours. If the AUFN./DA button is pressed again, the Normal Recording mode will be entered.
- For a more precise time setting, use the AUSWAHL and EINSTELLEN buttons to set to the exact time required (possible up to 8 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/CASSETTE 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 WIEDERG. 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 ANZEIGE button to obtain the desired indication. After about 5 seconds, the indicator will return to the AUT mode and the remaining time indication will reappear automatically.

AUTOMATIC TIMER RECORDING

First of all, load a cassette (with safety tab in place).

Three ways to perform timer programming

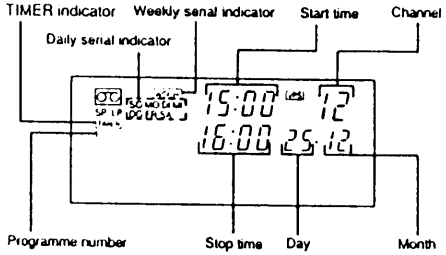
A. **Local programming:** Programme the timer using the recorder's controls while referring to the recorder's FDP.

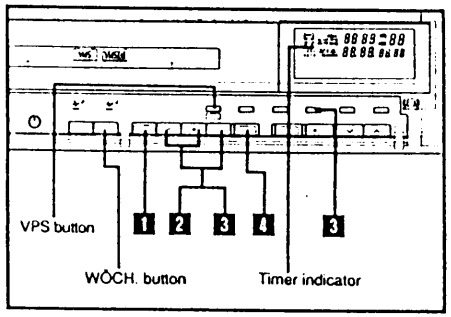
B. **On-screen remote programming:** Programme the timer using the remote control's keys while referring to the on-screen display.

C. **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.

A. Local Programming

1 Press AUFZ. NR. button.
- The display will change to the Timer Set mode for programme number "1". To advance to programme numbers 2 — 8, press either EINSTELLEN button a required number of times.
- By pressing the remote control's BILDSCHIRM KONTROLLE button while the FDP is in the Timer Set mode, the on-screen display is also available.

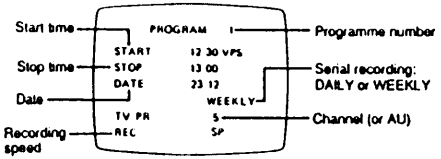


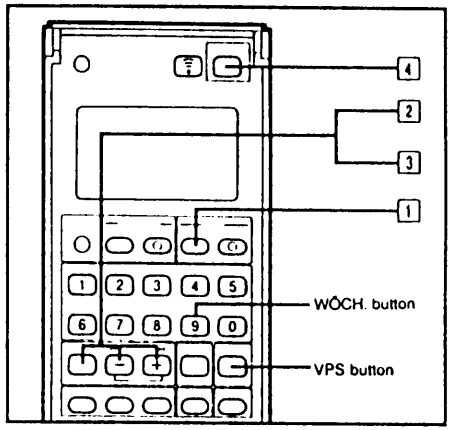


2 3 Set the start time by using the AUSWAHL button and the EINSTELLEN buttons.
- Select the item to be set with the AUSWAHL button; the selected item will blink.
- Set the desired data with the EINSTELLEN –/+ buttons.
- To record a weekly serial, press the WÖCH. button once.
- To record a daily serial starting on a certain day, press WÖCH. twice.

B. On-Screen Remote Programming

1 Press the VIDEO AUFZ. NR. button.
- The TV screen will change to the Timer Set mode for programme number "1" in one of the selected languages. (For language selection, see page 39.) To advance to programme numbers 2 – 8, press either EINSTELLEN button a required number of times.





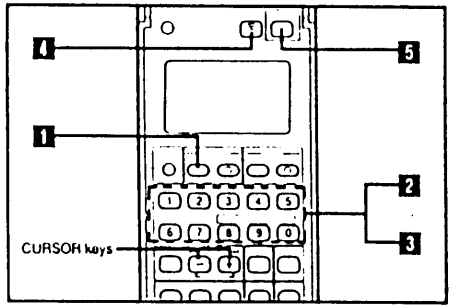
3 4 Set the stop time, date and channel in succession in the same way as for setting the start time.
- To record a daily serial starting on the day of setting, there is no need to enter any date figure; simply advance to the next item.
- When not using the VPS recording system, before setting the channel, press the VPS button to make "VPS" disappear.
- For programming the timer to record an external source, while the channel position is blinking, press EINSTELLEN –/+ until the "AU" indicator appears in the channel display section.
- Select the recording speed (SP or LP).
  SP: 4 hours with an E-240 cassette, or 45 minutes with an EC-45 cassette.
  LP: 8 hours with an E-240 cassette, or 90 minutes with an EC-45 cassette.

5 6 After making sure that the cassette is loaded, press the SCHALTUHR 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.

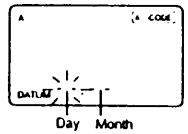
ENGLISH

C. Independent Remote Programming

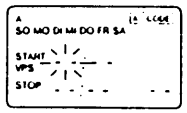
- The remote control incorporates 4 programme memories (A, B, C and D).
- The programmed data is held in memory even after it has been transferred to the recorder.



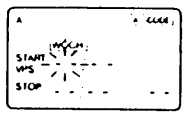
1 Press the SPEICHER AUFZ. NR. button.
- The LCD will be activated for programme memory "A".
- To advance to programmes B to D, press again.



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 1 and enter the date.
- To record a weekly serial, press 9 and enter the date.

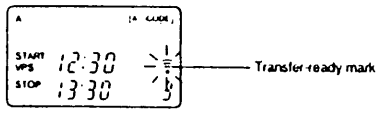


For daily serial setting



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.
- When not using the VPS recording system, before setting the channel, press the VPS button to make "VPS" disappear.
- 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.



- Select the recording speed (SP or LP)
  SP: 4 hours with an E-240 cassette, or 45 minutes with an EC-45 cassette.
  LP: 8 hours with an E-240 cassette, or 90 minutes with an EC-45 cassette.

4 Direct the remote control to the recorder's Remote Sensor window and press the ÜBERTRAG 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 VIDEO AUFZ. NR. button, then press the VIDEO LÖSCHEN button to cancel it. Data transfer can now be made by pressing ÜBERTRAG again.

5 Press the SCHALTUHR 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 SPEICHER AUFZ. NR. 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 LÖSCHEN button ⓒ or the VIDEO LÖSCHEN button. Or for the remote control's memory, press the SPEICHER LÖSCHEN button.
- An executed programme is automatically cleared.

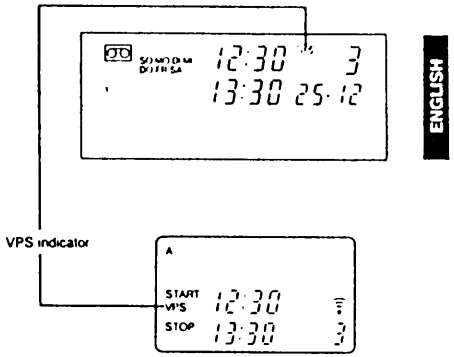
Checking the programmed data
- Checking can be performed anytime, even after the SCHALTUHR button has already been engaged. To do this, press the AUFZ. NR. button ⓐ while in the Timer Standby mode. The programme number will blink on the FDP and you can check each programme by advancing programme numbers with the EINSTELLEN buttons ⓑ. If re-programming is required, disengage the Timer Standby mode and use the regular programming method. Pressing the AUFZ. NR. button and/or EINSTELLEN 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 AUSWAHL 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 and there are programmes not yet executed, the power is switched off with the TIMER and ⊙⊙ indicator blinking.

VPS RECORDING

In the VPS (Video Programme System) system, TV stations transmit different VPS codes for different TV programmes, which control the starting and stopping of the video recorder and have precedence over times preset in the timer for accurate recording of a particular programme from start to finish.

1. Press the AUFZ. NR. button ⑰ (or the VIDEO AUFZ. NR. button ⑪) or, for the remote control's memory, the SPEICHER AUFZ. NR. button ⑥.
2. Set the date, start time, stop time, channel and recording speed in the same way as for timer programming.
3. Press the VPS/KANAL button ⑫ or ⑭.
   - All timer data will be converted to VPS codes and stored in memory.
4. Press the SCHALTUHR button ⑱ or ③.
   - The recorder will enter the VPS Standby mode at 20:00 on the day previous to the preset day and remain engaged until 3:59 on the following day, if the intended programme has not yet been broadcast.
   - When a VPS code corresponding to the intended TV programme is detected during the VPS Standby mode, recording will start. When the VPS code changes to another, recording will stop.
   - When an interruption code is detected during VPS recording, the VPS standby mode is engaged and recording restarts when the regular VPS code is restored.



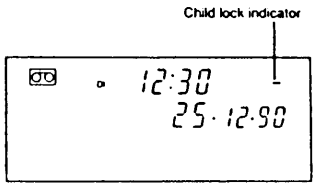
Note:
- Operation at the end of VPS recording is the same as with ordinary timer recording.

CHILD LOCK FUNCTION

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 BETRIEB (VIDEO) button ㉑ 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 BETRIEB (VIDEO) 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 SCHALTUHR 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.

ENGLISH

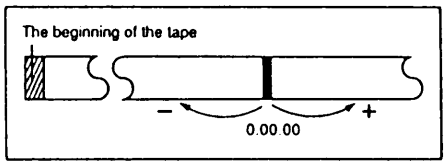
CONVENIENT TAPE ACCESS FUNCTION

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

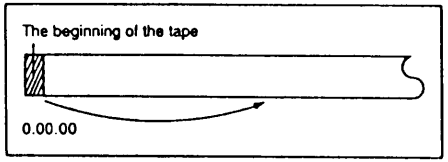
To locate any point on the tape a specified time away from the current position in either direction.



1. Press the remote control's ZIELLAUF button while in the Play, Still or Stop mode.
   - The FDP will show "ZIEL –Sı —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.
   - "ZIEL 0Sı 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 KANAL (∨/∧) 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 (II 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.

REALTIME GO-TO

To locate any point on the tape a specified time away from the beginning of the tape.



The procedure is the same as for the Realtime Search except step 2. Specifying the direction is not necessary.

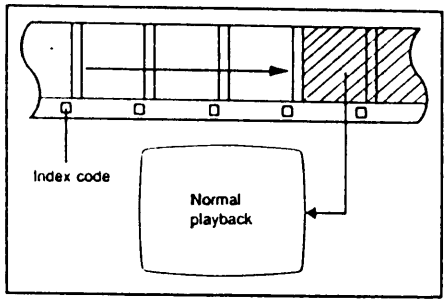
Notes:
- Each step in the operation procedure must be followed by the next within 60 seconds, otherwise the Go-To or Search mode will be cancelled.
- Use of the other control buttons while in the Go-To or Search mode cancels that mode.
- If the specified time exceeds the tape length, the tape fast forwards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

COUNTER MEMORY FUNCTION

1. Press the ZÄHLWERK-RÜCKST. button at a point which you may wish to locate later.
   - The counter will read "0Sı 00M 00S".
2. Press the ZÄHLWERK-SPEICHER button. [S] 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 "0Sı 00M 00S" automatically.
   - The Counter Memory function can also be used in conjunction with the Memory Play function (page 49).

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.



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.

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 MARKE button to add extra codes, and the LÖSCHEN 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 LÖSCHEN 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.

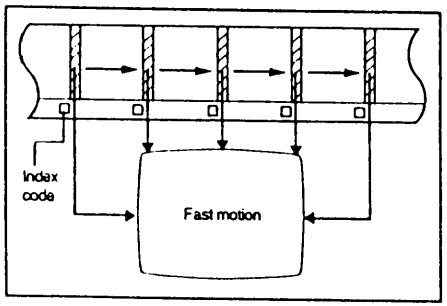
Mark

In the Play or Record mode, press MARKE 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.
- Changing the index codes in the vicinity of switching points between SP and LP recordings will distort the pictures.

INTRO SEARCH



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 TITELBILD 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.

ENGLISH

RECORDING FROM AN EXTERNAL SOURCE

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

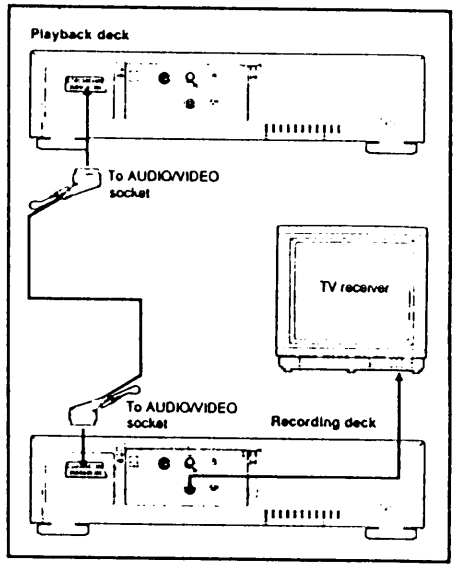
1. Connect the AUDIO/VIDEO socket to the appropriate audio/video output of the 2nd video recorder.
2. Connect a TV receiver to the recorder to monitor the picture while recording.

Operation

1. Turn the power on for all connected equipment.
2. Tune the TV receiver to your video channel.
3. Load a cassette with its safety tab in place.
4. Press either KANAL button ⓫ or the numeric key 0/AV ⓰ to obtain "AU" in the channel display section on the FDP.
5. Press the AUFN./DA button ⓭ and the PAUSE/STANDB. button ❸ to put the recorder in the Record-Pause mode.
6. Play back a tape on the source equipment to determine the segment to be recorded.
7. Press the WIEDERG. button ⓮ to start recording.
8. To stop recording temporarily, press the PAUSE/STANDB. button.
9. To end recording, press the STOP/CASSETTE button ❹.

Note:

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

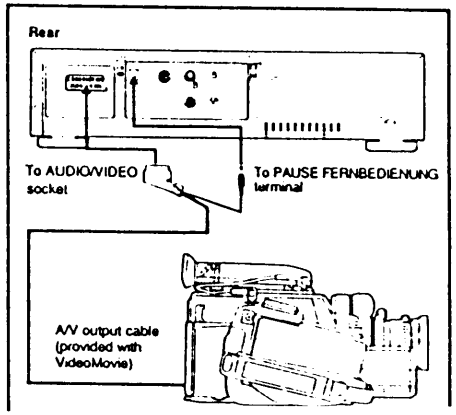


EDITING TO ANOTHER VIDEO RECORDER

This video recorder can also be used as the source player when editing tapes. This video recorder's PAUSE FERNBEDIENUNG 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.)



DUET EDITING

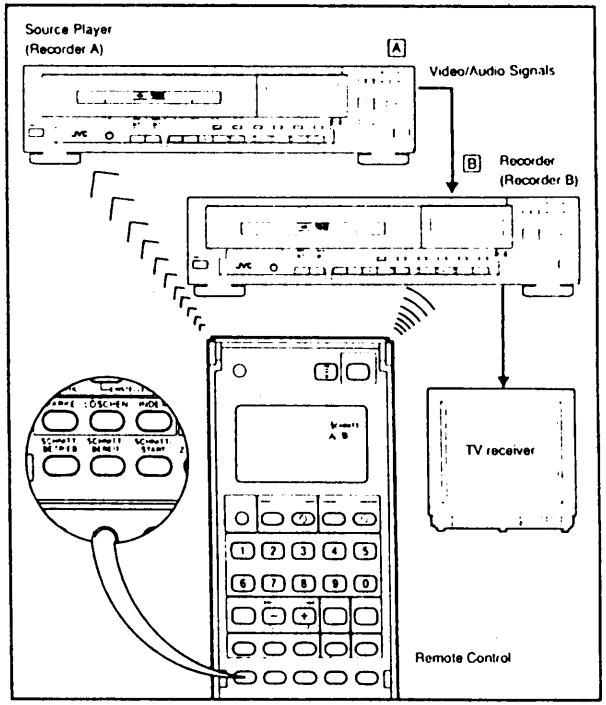
Designed specifically to simplify editing operations, the Duet Editing function delivers separate commands to two recorders simultaneously via a single remote control, taking advantage of the A/B code system. (JVC dedicated models only)

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 39.)
- 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-FC100EG 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.



OPERATION

Remote Control	Recorder A (Source player)	Recorder B (Recorder)
	Load a recorded tape.	Load a blank tape.
1. Press SCHNITT-BETRIEB "SCHNITT A → B" appears on LCD.		
2. Press SCHNITT-BEREIT.	Enters STILL mode.	Enters RECORD-PAUSE mode.
3. Search for an edit-in point on the source tape. Press II.	Functions as commanded. (In this state, only recorder A responds to the remote control's commands.)	Remains in RECORD-PAUSE mode.
4. Press SCHNITT-START.	Enters PLAY mode.	Enters RECORD mode.
5. Press II.	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 "SCHNITT B → A" indication.
- To cancel the Duet Edit mode and return to normal remote control functions, press the SCHNITT-BETRIEB button so that the SCHNITT 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.

ENGLISH

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 SCHALTUHR to disengage the Timer Recording Standby mode.
Tape does not run during recording.	• Is the PAUSE/STANDB. button engaged? — Press the WIEDERG. button.
Tape stops in the Rewind or Fast-Forward mode.	• Is the Z.-SPEICHER switch set so that "S" appears on the FDP? — Press to make "S" 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/AV".
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 the SCHALTUHR button.

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 40.) • If you are using AV connection, is the television engaged in the AV mode? — Operate the television's mode.
Playback is repeated.	• Is the WIEDERHOLUNG switch set to either "KOMPL." or "INDEX"? — Set it to "AUS".
Noise appears during playback.	• Is the automatic tracking mode engaged? — Engage the manual tracking mode. (See page 48.)
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

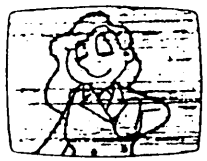
Symptoms	Check points
Whistling or howling is heard from TV.	• Move camera or microphone away from TV or reduce TV sound volume.
Some channels are skipped over when selecting a channel.	• Those channels are preset to be skipped over. If you need them, restore them. (See page 44.)
Channel cannot be switched.	• Is recording in progress? — Press PAUSE/STANDB., select a desired channel and press WIEDERG.
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. In this case, head cleaning requiring highly technical care is necessary.

For head cleaning, consult the nearest JVC dealer.



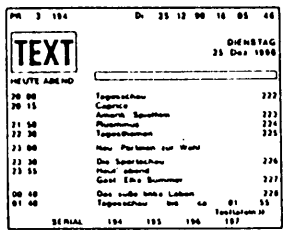
ENGLISH

TELETEXT COMPATIBILITY

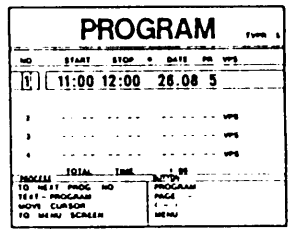
Teletext services are becoming popular and a vast number of teletext pages are now available for a variety of information. This recorder is ready to take advantage of these services, not only for simple viewing but also for programming the recorder's built-in timer in an extremely easy way. All you need to do is connect the optional VPT or VPV 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. The following information shows examples of using the optional VPT adapter.

ENGLISH

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
5. - - - - VPT WITH TOP

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.

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

VPT WITH TOP
- TOP automatic teletext timer programming.
  - "5. - - - - VPT WITH TOP" appears only when the VCR's tuner is tuned to a station which is transmitting TOP broadcasts.

SECTION 1
DISASSEMBLY AND MECHANISM ADJUSTMENTS

1.1 DISASSEMBLY

1.1.1 Top cover

1. Refer to Fig. 1-1-1. Set for the Eject (Stop) mode and disconnect from AC power.
2. Take out 4 screws Ⓐ and remove the top cover in the rearward direction.

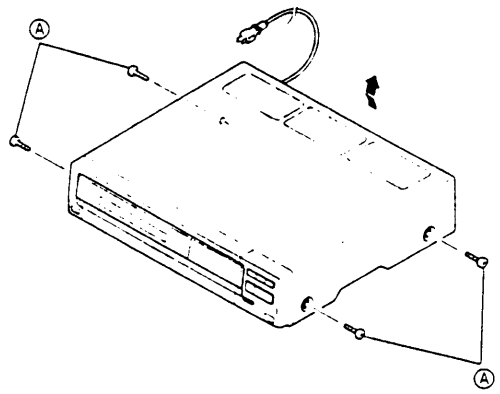


Fig. 1-1-1 Top cover

1.1.2 Front panel assembly

1. Remove the top cover.
2. Refer to Fig. 1-1-2. Take out 5 screws Ⓑ.
3. Remove the bracket.
4. Carefully raise the front panel assembly and disengage 3 upper tabs Ⓒ.
5. Rotate the panel in the forward direction to disengage 3 tabs Ⓓ.

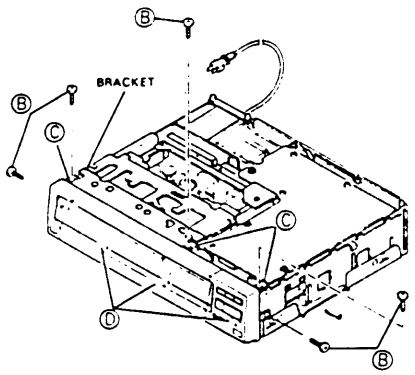


Fig. 1-1-2 Front panel assembly

1.1.3 Bottom cover

1. Refer to Fig. 1-1-3. Take out 4 screws Ⓔ and 7 screws Ⓕ.
2. Disengage 4 tabs Ⓖ and remove the bottom cover.

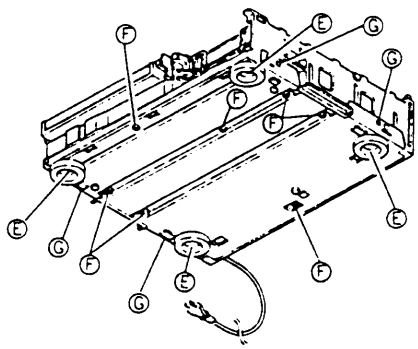


Fig. 1-1-3 Bottom cover

1.1.4 Main board assembly

1. Remove the top cover.
2. Refer to Fig. 1-1-4. Take out 6 screws Ⓗ and (from the rear) 2 screws Ⓘ.
3. Raise the Main board to remove it.

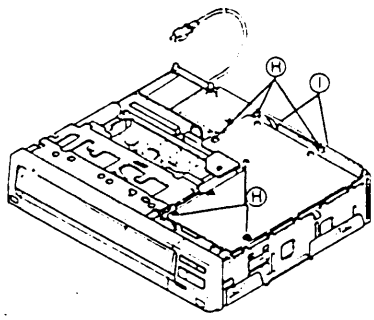


Fig. 1-1-4 Main board assembly

1.1.5 Cassette housing assembly

1. Remove the top cover and front panel.
2. Refer to Fig 1-1-5. Raise the Main board and stand it on the right edge as shown in Fig. 1-1-5.
3. Take out 5 screws Ⓙ.
4. Carefully shift the cassette housing toward the drum, then raise it to remove.

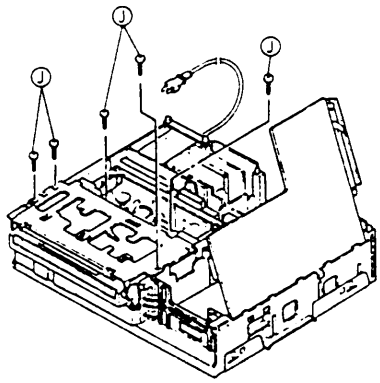


Fig. 1-1-5 Cassette housing assembly

1.1.6 Main deck

1. Remove the top cover, front panel, Main board and cassette housing.
2. Refer to Fig. 1-1-6 and take out 3 screws Ⓚ.
3. Raise the main deck, disengage the connectors and remove the deck.

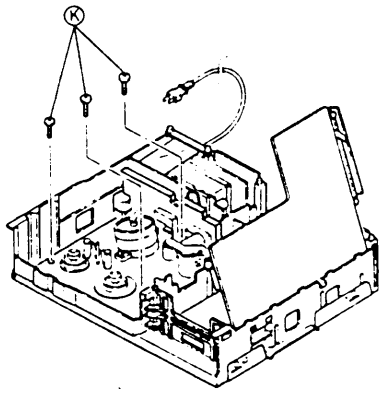


Fig. 1-1-6 Main deck

1.2 MECHANISM REPAIRS AND ADJUSTMENTS

1.2.1 Precautions

1) Be sure to disconnect from power before soldering.
2) Use care not to apply force to wires when disengaging connectors.
3) Repair any fault before proceeding to adjustment.
4) Set the mechanism to the Eject or Stop mode configuration when installing the cassette housing.

1.2.2 Mechanism operation check

The mechanism operation in each mode can be observed by removing the cassette housing.

1) Remove the cassette housing (but leave it connected to the deck terminal board) and insert tape in to the.
2) Cover the end sensor of the main deck with black tape to shield it from infrared light.
3) Select desired modes with operation buttons. If tape is not used, the mechanism stops after a few seconds when set for the rewind direction due to absence of the reel sensor output.

1.2.3 Manual cassette removal

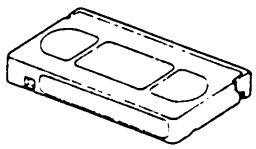
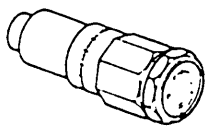
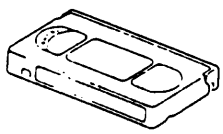
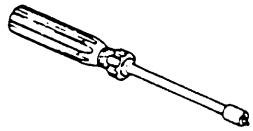
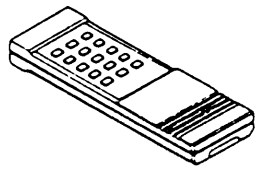
In event of electrical system failure while tape is loaded, the cassette can be removed manually according to the following steps. Refer to Figs. 1-3-1, 1-3-2, 1-3-3 and 1-3-4.

1) Disconnect from AC power.
2) Remove the top and bottom covers, and disengage the Video board (open outward as indicated in Disassembly).
3) Turn the drive assembly pulley by hand in the unloading direction to where the pole base assembly is positioned below the cassette tape.
4) Continue turning the pulley to where the half loading arm assembly and guide arm gear assembly are positioned below the cassette tape.
5) From the bottom of the deck, turn the capstan motor to where the tape is returned to the cassette.
6) Turn the pulley of the cassette housing loading motor assembly to raise the housing, then remove the cassette.

1.2.4 Tools and fixtures

The following tools and fixtures are required for mechanical adjustments.

1) Alignment tape: MH-2 and MH-2L
   Stairstep signal used for interchangeability checks and adjustment.
2) Torque gauge: PUJ 48075-2
   For measuring tape take-up torque.
3) Back tension cassette gauge: PUJ 48076-2
   For measuring supply side tape tension.
4) Taper nut driver: PUJ 50637
   Shifts the head base for adjusting the control head position.
5) Hex wrench: 2.0 mm
   Turning guide roller during FM linearity adjustment.
6) Presetting unit: PTU94008
   Use for LP auto tracking preset adjustment.

1. Alignment tape	2. Torque gauge	3. Back tension cassette gauge	4. Taper nut driver	5. Presetting unit
				

1.3 MAIN MECHANISM PARTS

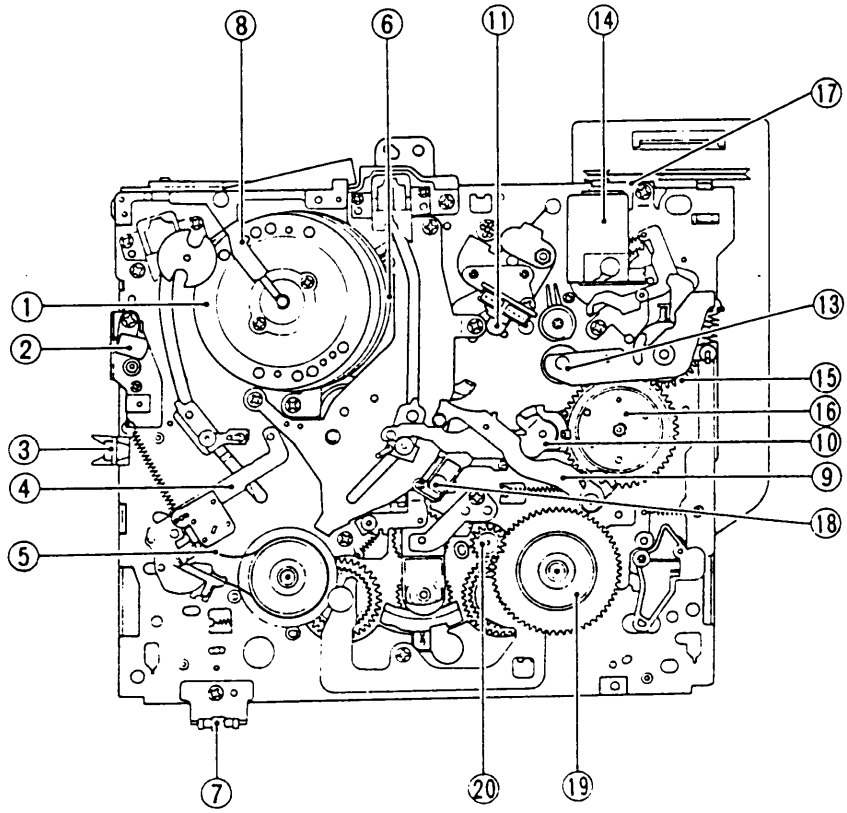


Fig. 1-3-1 Top view of main-deck

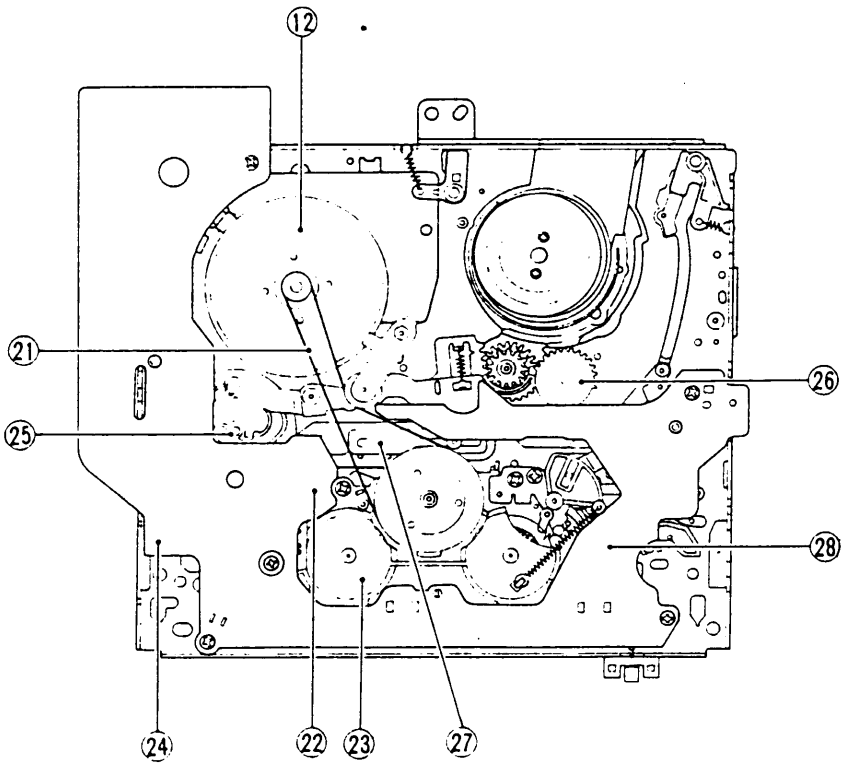


Fig. 1-3-2 Bottom view of main-deck

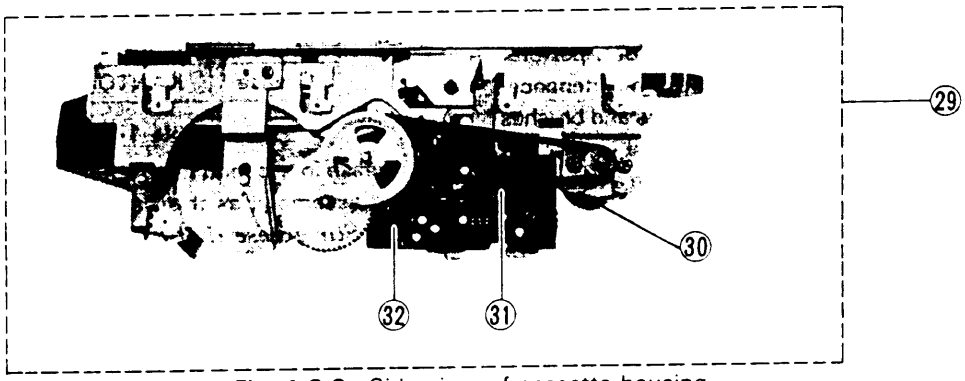
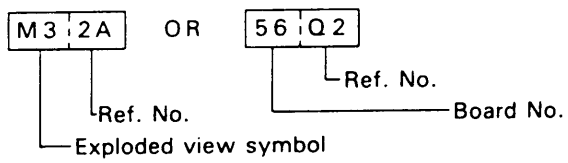


Fig. 1-3-3 Side view of cassette housing

No.	Parts No./Symbol	Parts Name
1	PDM2002B-2/M3-2A	Upper drum assy
2	PU61207/M4-8	Full erase head
3	PU60625/51-Q1	End sensor
4	PQ44096A-2/M4-1	Tension arm assy
5	PQ33075A-4/M4-82A	Tension band assy
6	PDM2138T/M3-2C	Lower drum motor assy
7	PQ44301A-1/M4-68	Rec switch assy
8	PDM4237A-2/M3-2D	Brush assy
9	PQ44139A/M4-27	Guide arm gear assy
10	PQ44134A-2/M4-25	Half loading gear arm assy
11	PQ44374A/M4-15	A/C head arm assy
12	PU61003-1-2/M4-59	Capstan motor
13	PQ44130A/M4-22	Pinch roller arm assy
14	PQ44300B/M4-20A	Mode motor assy
15	PQ33163/M4-21	Pinch roller cam
16	PQ44250A/M4-24	Half loading gear assy
17	PQM3003-25/M4-20C	Belt (Mode motor)

No.	Parts No./Symbol	Parts Name
18	PQ44302A-6/M4-70	LED holder assy
19	PU61156/M4-47	Take-up reel disk
20	PU61170-1-1/M4-54	Gear assy
21	PU61171/M4-63	Timing belt
22	PU61206/M4-50F	Reel sensor (Take up)
23	PU61250-1-2/M4-50	Gear unit assy
24	PU61172/M4-66	Slide switch
25	PQ33035/M4-37	Control cam
26	PQ44161A-2/M4-41	Loading gear assy (Supply)
27	PQ10902A-8/M4-33	Control plate assy
28	PU61206/M4-50F	Reel sensor (Supply)
29	PUS29464B/M6-1	Cassette housing assy
30	PQ44300B/M6-24	Mode motor assy (Cassette housing assy)
31	PQM30003-26/M6-18	Belt (Cassette housing)
32	PU60629/56-PS1	Cassette sensor

- Symbol interpretation exampale



1.4 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.

1.5 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 1-5-1 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 1-5-1

2. Grease in 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.***

1.6 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.

1.6.1 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	Parts Name	Symbol No.	Periodic servicing schedule (operation hours)							
			250	500	750	1000	1250	1500	1750	2000	Overall
Tape Transport	Upper drum assy	M3-2A	★	★	☆	○	○	○	○	○	●
	A/C head	M4-15A	★	★	★	○	○	○	○	○	●
	Pinch roller arm assy	M4-22	★	★	★	○	○	○	○	○	●
	Full erase head	M4-8	★	★	★	○	○	○	○	○	●
	Tension arm assy	M4-1									●
	Lower drum motor assy	M3-2C				○	○	○	○	○	●
	Capstan (shaft)	M4-59	★	★	★	★	★	★	★	★	●
	Half loading gear arm assy	M4-25									●
	Guide arm gear assy	M4-27									●
Drive	Capstan motor	M4-59				○	○	○	○	○	●
	Loading Belt	M4-20C				○	○	○	○	○	●
	Timing belt	M4-63				○	○	○	○	○	●
	Take-up reel disk	M4-47				○	○	○	○	○	●
	Supply reel disk	M4-46				○	○	○	○	○	●
	Mode motor	M4-20A				○	○	○	○	○	●
	Gear unit assy	M4-50								○	●
	Control plate assy	M4-33								○	●
Others	Tension band	M4-83				○				○	●
	Brush	M3-2D				○				○	●

★ : 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 1-6-1 Approximate maintenance schedule

1.7 MAIN PARTS REPLACEMENT

No.	Item	Reference	Adjustment and Checks
1	Upper drum assembly • Reasons: Video head wear, damage, faulty characteristics • Symptoms: One FM signal channel output weak or absent, low output level, large level difference between channels		
		Ref.: Note Fig. 1-7-2 mounting direction (no picture if incorrect)	After replacing the upper drum, confirm that hole A of the upper drum is opposite the motor shaft from hole B of the lower drum.
		Centering check See Fig. 1-7-3 If incorrect: Jitter, poor FM linearity PB FM: Main board TP206 FF: Main board TP411	Record and playback in the LP mode. Observe the FM waveform and confirm absence of the condition indicated in Fig. 1-7-3.

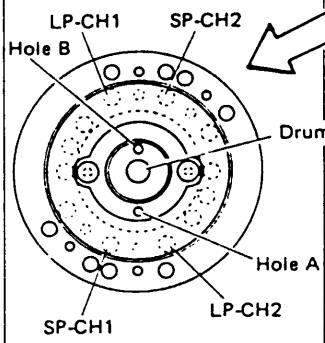


Fig. 1-7-2 Drum

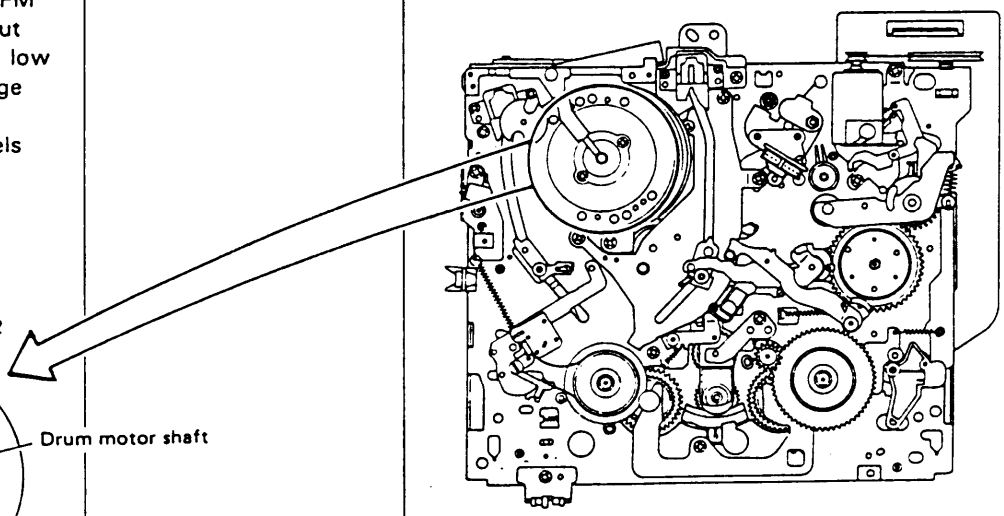


Fig. 1-7-1 Drum position

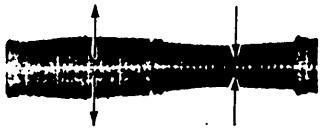


Fig. 1-7-3 Centering

No.	Item	Reference	Adjustment and Check
		Ref: FM linearity check See Fig. 1-7-3 If incorrect: vertical instability, picture noise PB FM: Main board TP206 FF: Main board TP411	

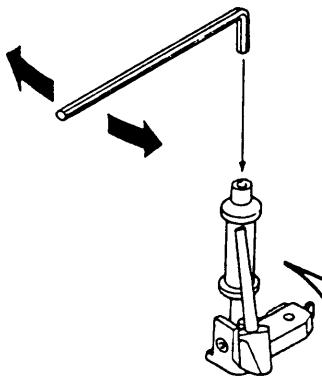


Fig. 1-7-4 Supply and take-up pole base

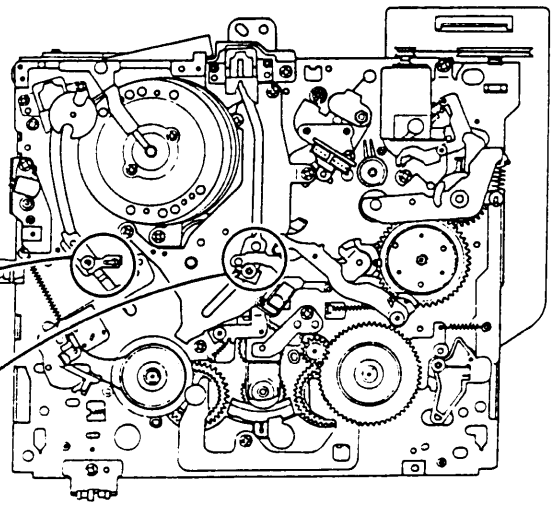


Fig. 1-7-6 Pole base positions

Fig. 1-7-5 FM linearity

$\frac{b}{a} \geqq 0.7, \frac{c}{a} \geqq 0.65, \frac{d}{a} \geqq 0.65$

1) Play the stairstep signal of the MH-2 Alignment tape. Confirm absence of strong differences in the FM waveform and that optimum tracking is obtained by tracking operation.
2) Refer to Fig. 1-7-4. FM signal reduction at the left (drum intake) is corrected by turning the guide roller of the supply pole base. To correct for reduction at the right side of the waveform (drum exit), turn the guide roller of the supply pole base.

Notes: • *If the reduction cannot be corrected with the guide rollers, the lower drum needs replacement. However, in this case, confirm that both FM waveform channels indicate the same tendency.*
• *Simultaneously pressing both the tracking buttons (+ and -) during playback produces the preset state.*

Playback switching point Effects: Switching noise at bottom of picture	Ref: Video out or Main board TP210	1) Connect the set to AC power and press the Power button. 2) Connect oscilloscope to Video Out or Main board TP210. 3) Play stairstep signal of the MH-2 Alignment tape. 4) Trigger the oscilloscope externally with the signal from Main board TP411 (Drum FF). 5) Set the trigger slope to minus and adjust R420 to position the switching point 6.5 plus or minus 0.5 H from V sync.

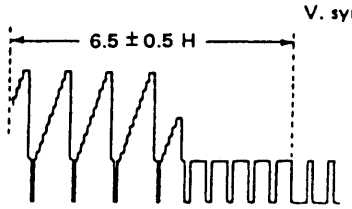


Fig. 1-7-7

No.	Item	Reference	Adjustment and Checks
2	Lower drum assembly (Drum assembly is complete unit) • Effects: FM linearity cannot be adjusted; rotation noisy; jitter • Cause: worn lead and bearings	Ref: Check FM linearity and switching point	Check according to Upper drum assembly items.
		Ref: Check control head position (Effect: tracking error) PB FM: Main board TP 206 FF: Main board TP411	1) Play the stairstep signal of the MH-2/MH-2L Alignment tape. Simultaneously press both tracking buttons (+ and −) for the preset state. Confirm the FM waveform level is the same as the maximum level obtained by manual tracking adjustment. 2) If adjustment is necessary, see A/C head adjustment steps.
3	A/C head		

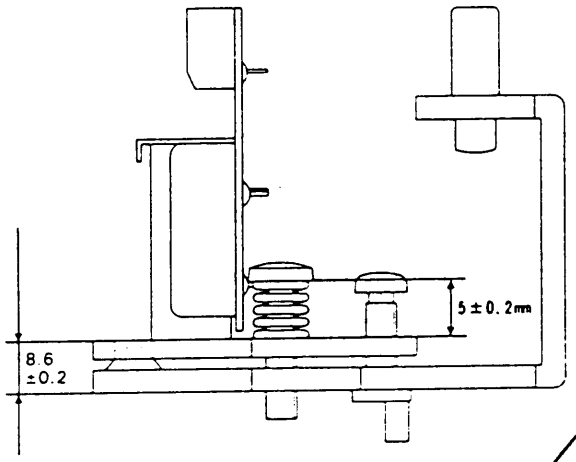


Fig. 1-7-9 Temporary height setting

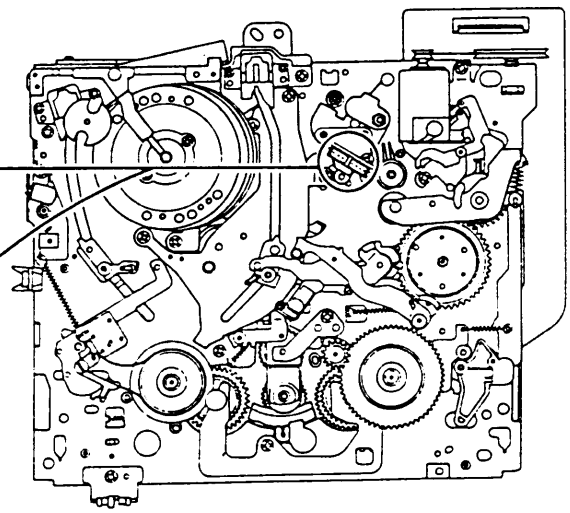


Fig. 1-7-8 A/C head position

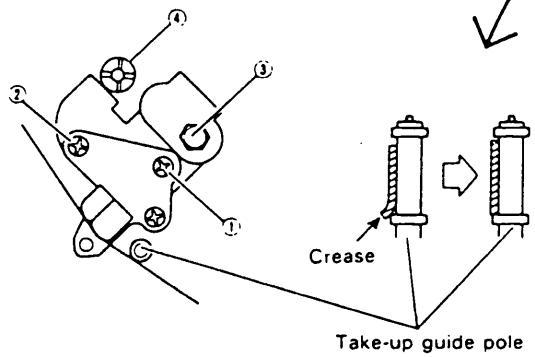
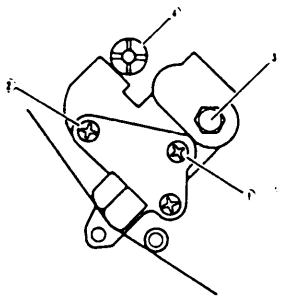


Fig. 1-7-10 Tilt, azimuth, height

	Ref: Check temporary height setting (Fig. 1-7-9)	At the time of installation, set the A/C head to the temporary height. This is to both avoid damage to the tape and simplify the adjustment. Confirm the spacing between the A/C head and head base indicated in Fig. 1-7-9.

No.	Item	Reference	Adjustment and Check
	 Fig. 1-7-11	Ref: Tilt adjustment (Fig. 1-7-10) (Effect: large audio level fluctuation)	1) Play tape and turn screw ① counter-clockwise until slight curling occurs at the lower flange of the take-up guide pole. 2) Slowly turn screw ① clockwise and stop at the point curling disappears.
		Ref: Azimuth adjustment (Fig. 1-7-10) Effect: Audio level low and noisy) Audio output: Main board Audio Out	Note: *Set the front panel audio output selector for normal audio output.* 1) Play stairstep signal (audio 6 kHz signal) of the MH-2 Alignment tape and observe the audio output waveform. 2) Adjust screw ② for maximum audio output level.
		Ref: Height adjustment (Figs. 1-7-10 and 1-7-11) (Effects: low audio level and control signal outputs)	1) Connect a dual trace oscilloscope to Main board TP401 and Audio Out. Set for the Alternate mode. 2) Play stairstep signal of the MH-2 Alignment tape. Adjust hex (7 mm) screw ③ for maximum audio output and control pulse level.
		Ref: Check FM linearity	Note: *After large adjustment, also again check the azimuth.* Refer to upper drum assembly items.

cks

ess both + and –

H-2 Alignment tape

o shift the A/C head

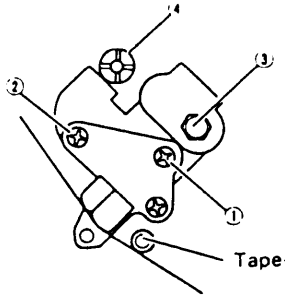
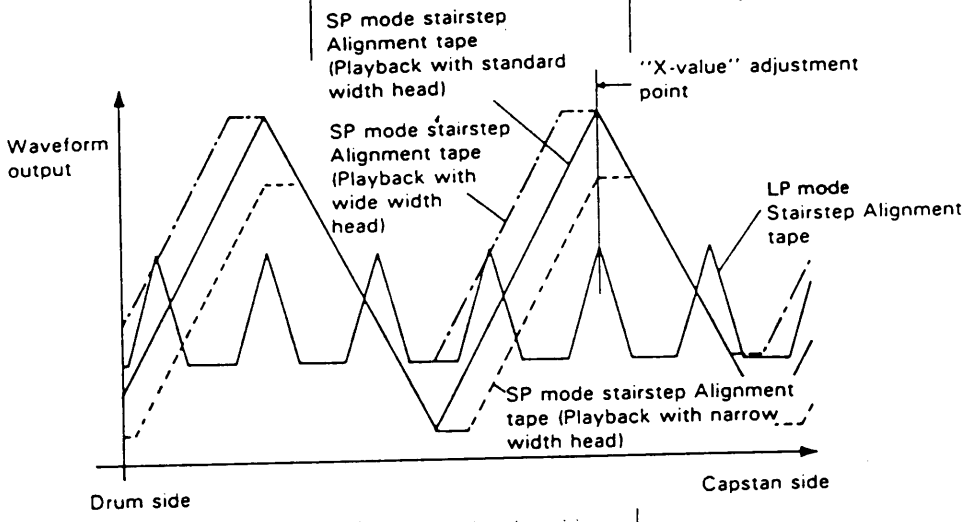
unter-clockwise to
rm output level, as

he MH-2L Alignment

evel as indicated in

he taper nut and set
om that point.

downward pressure
base. Shift the A/C
tan by hand when

No.	Item	Reference	Adjustment and Che
	 Fig. 1-7-12	Ref: Control head phase (Fig. 1-7-12) PB FM: Main board TP 206 FF: Main board TP411	Note: *Set for tracking preset (pre buttons during playback).* 1) Play the stairstep signal of the MI and observe the FM waveform. 2) Turn the taper nut ④ clockwise.t fully toward the capstan. 3) Gradually turn the taper nut co obtain the maximum FM wavefo indicated in Fig. 1-7-13. 4) Next play the stairstep signal of th tape and set for tracking preset. 5) Check for maximum FM output l Fig. 1-7-13. 6) If not maximum, carefully turn th to the nearest maximum level fr Note: *As the taper nut is tightened, is applied to the A/C head head base toward the caps tightening the taper nut.*
	 Fig. 1-7-13 Control head position		

or-TV (75 ohms) and

H-2L Alignment tape.
ng LED flashes, then

08) and press button
gital tracking LED

	Ref: LP auto tracking	1) Connect Video Out to a monito connect oscilloscope to PB FM 2) Play the stairstep signal of the M 3) Observe the A/V digital trackin lights steadily. 4) Use the Presetter Unit (PTU940 "D". Observe the A/V di extinguishes. 5) Again press button D. The LP interchangeability adjust mode is entered. Observe the LED flashes, then extinguishes. Note: *If the MH-2L Alignment tape is automatically ejected, repeat the Control head phase adjustment.*

No.	Item	Reference	Adjustment and Check
4	Tension arm and tension band		

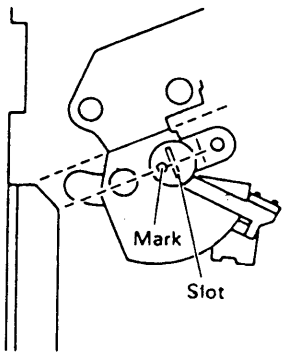


Fig. 1-7-15

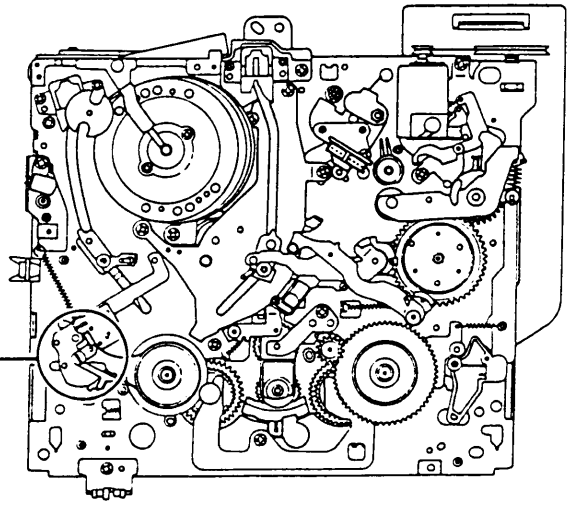


Fig. 1-7-14

	Ref: Tension pole position adjustment (Fig. 1-7-15) (Effect: Poor FM waveform rise)	Note: *The adjust pin is eccentric.* 1) Set for the eject mode and remove the cassette housing. 2) Align the adjust pin as indicated in Fig. 1-7-15.
	Ref: Back tension check (Effect: skew)	Notes: • *If the tension pole position is correctly adjusted, the back tension will be within ratings.* • *Avoid adjusting the back tension by shifting the tension pole, as this will cause other adverse effects.* 1) Use the back tension cassette gauge and set for the playback mode. Confirm left indication of between 29 and 42. Confirm right indication of between 60 and 100.

No.	Item	Reference	Adjustment and Checks
5	Pinch roller cam Control cam Half loading gear assembly Guide arm assembly		Note: *Before removing these parts, set the mechanism for the eject mode and remove the cassette housing.*

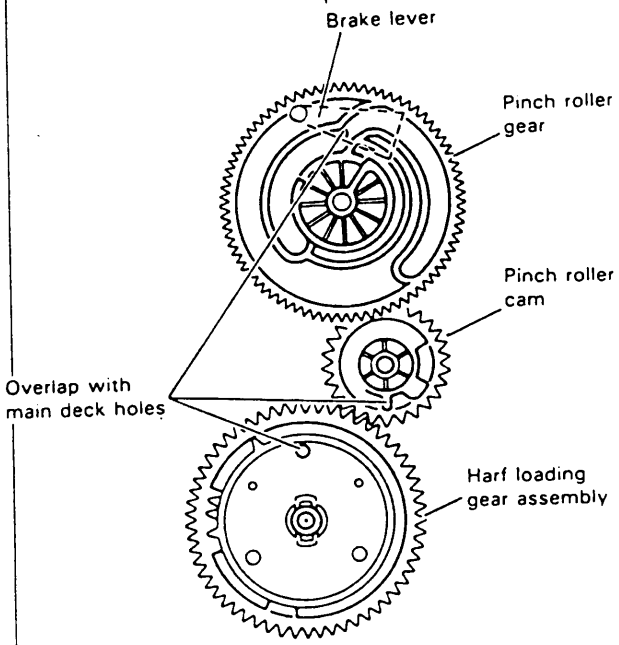


Fig. 1-7-17

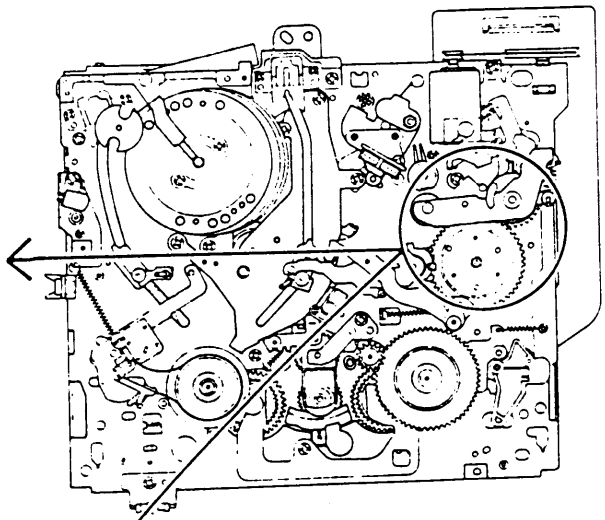


Fig. 1-7-16

	Ref: Position alignment	Note: *If the half loading gear cannot be installed easily, shift the rear control plate assembly within the range allowed by mechanical play.* 1) Overlap the hole farthest from the half loading gear center with the hole of the main deck. 2) While these are overlapped, set the pinch roller cam with its small hole overlapped with the main deck hole. Insert jewellers screwdriver or similar objects to prevent the holes from shifting. 3) Set the brake level and pinch roller gear with the hole overlapped with the hole of the main deck. 4) Check that all positioning holes are aligned with their corresponding main deck holes and install the drive assembly.
	Note: *Unless otherwise indicated, do not move parts from the mounted positions.* See Fig. 1-7-17.	
	Ref: Half loading cam assembly (Fig. 1-7-18)	1) First install the half loading gear assembly Ⓐ, then the guide arm assembly Ⓑ. 2) Confirm these are positioned as indicated in Fig. 1-7-18.

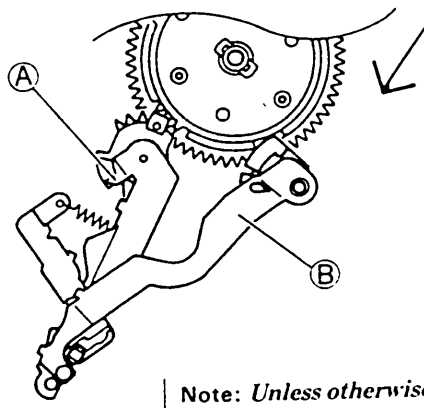


Fig. 1-7-18

No.	Item	Reference	Adjustment and Check
6	Take-up loading arm assembly Supply loading arm assembly Plate assembly	Ref: Position alignment **Note:** ***Temporarily disengage the spring of the tension arm assembly to allow easier operation.*** See Figs. 1-7-19 to 1-7-23	1) Set the supply loading gear assembly and take-up loading assembly with the gear holes facing each other (Fig. 1-7-22). Shift the guide lever toward the right (supply and take-up pole bases in forwardmost positions). 2) Set the control plate with the stud at the center of the oblong hole. Engage the tension arm level with the control plate tab. 3) With the tension arm lever installed, slide toward the left to overlap the control plate hole with the leftmost hole of the main deck. 4) Shift the capstan brake and install the control cam with its hole overlapped with the hole of the main deck. 5) With the supply and take-up pole bases at the forward-most positions, install the arm gear with the alignment mark facing the gear section alignment mark (Fig. 1-7-20). 6) Install the gear unit. Use care since the spring adjacent to the gear unit take-up reel sensor contacts the reel disk. 7) Engage the white slider of the slide switch with the end of the plate and secure with screw (Fig. 1-7-21).

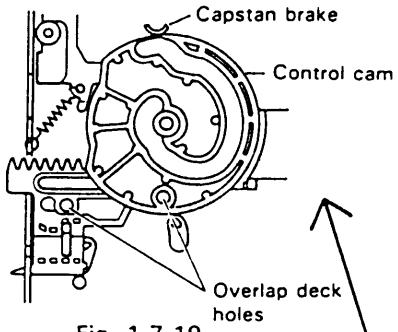


Fig. 1-7-19

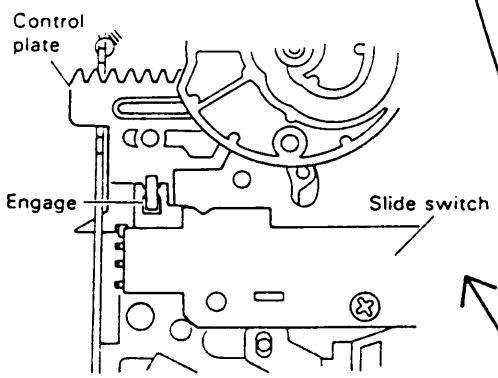


Fig. 1-7-21

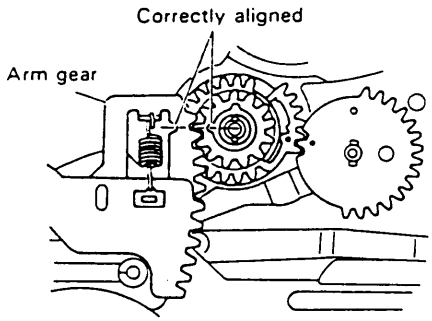


Fig. 1-7-20

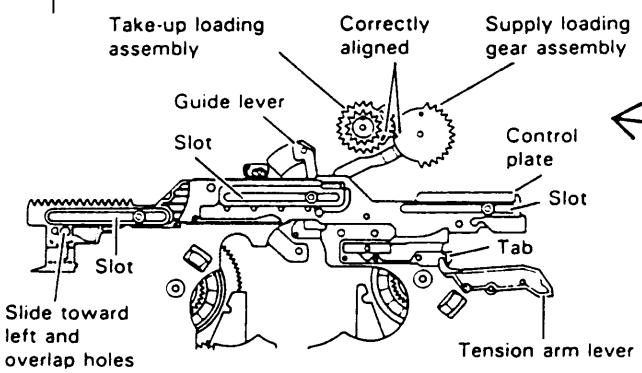


Fig. 1-7-22

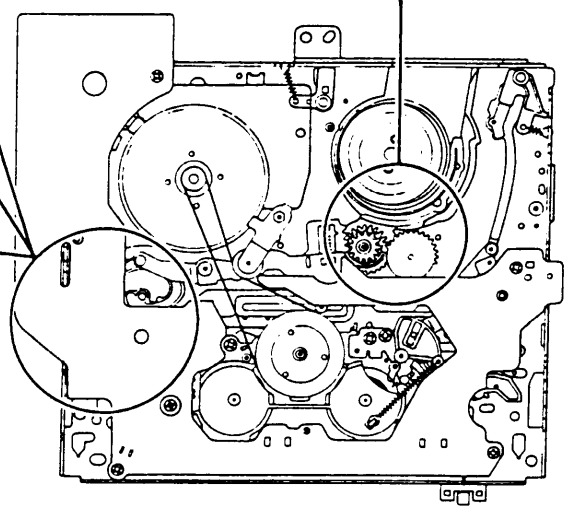


Fig. 1-7-23

1.8 CASSETTE HOUSING DISASSEMBLY AND REASSEMBLY

1.8.1 Disassembly

Refer to the flowchart of Fig. 1-8-1 to disassemble the cassette housing.

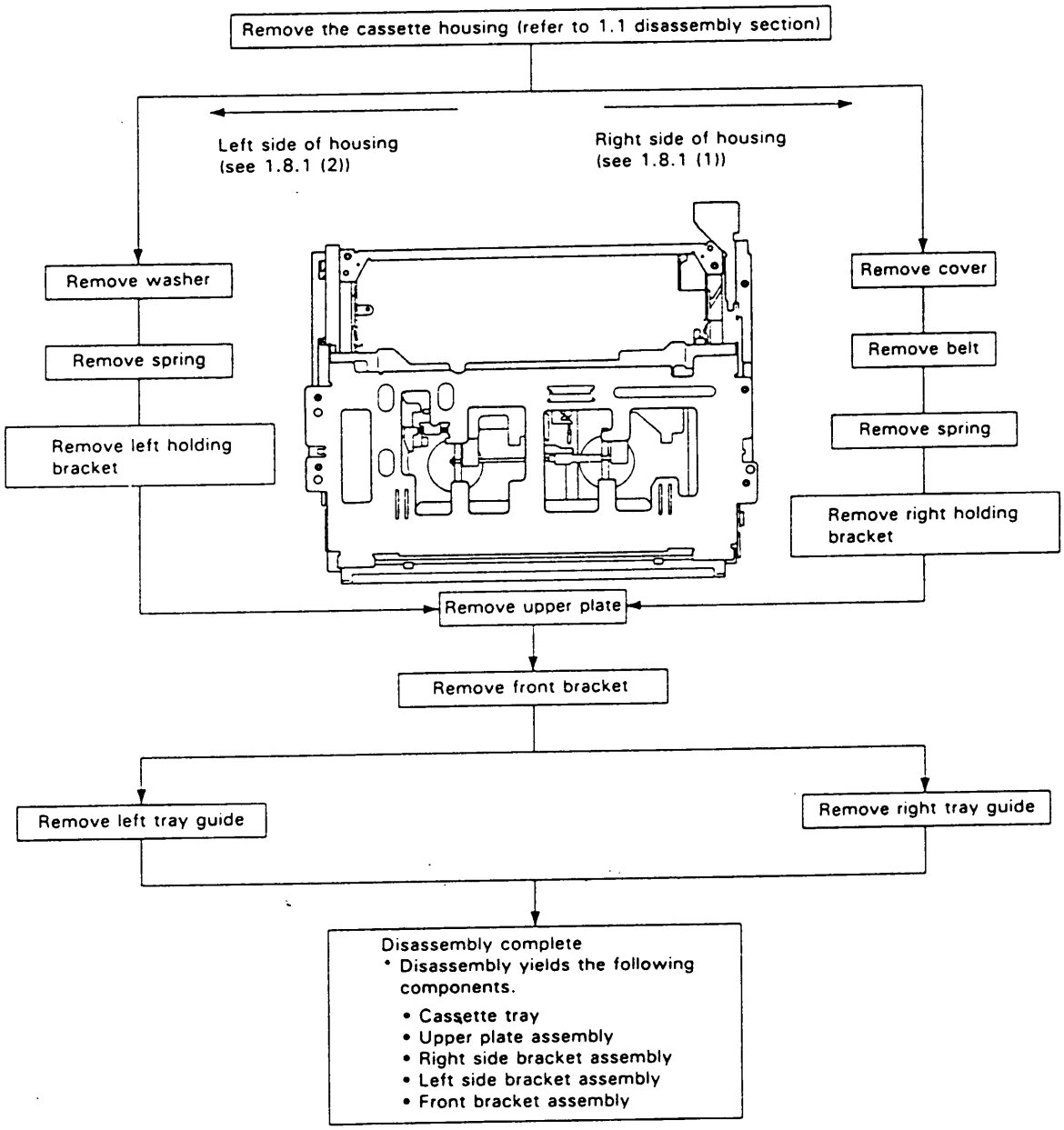


Fig. 1-8-1 Disassembly flowchart

1.8.1(1) Right side disassembly

1) Take out screw (A) and remove the cover.
2) Remove the belt.
3) Disengage the spring from point (B).
4) Take out screw (C) and remove the right holding bracket in the downward direction.

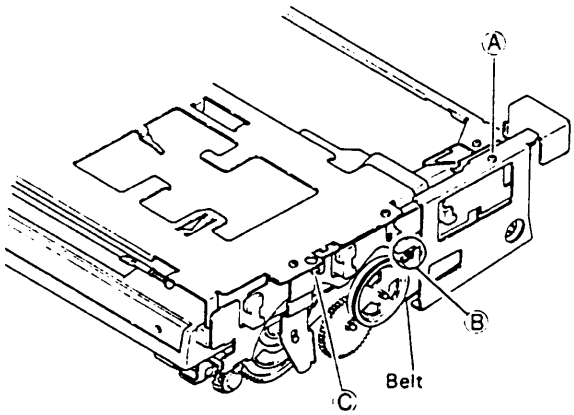


Fig. 1-8-2

1.8.1(2) Left side disassembly

1) Remove washer (D).
2) Disengage the spring from point (E).
3) Take out screw (F) and shift the left holding bracket obliquely to remove it.

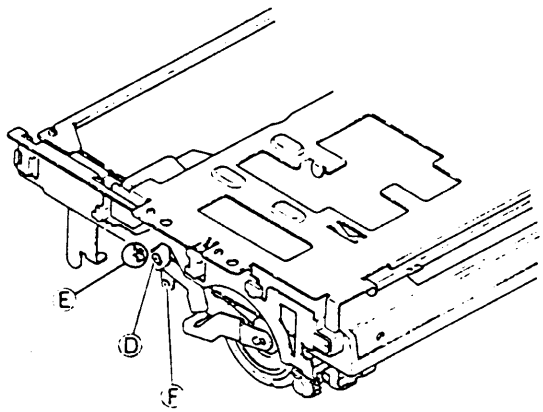


Fig. 1-8-3

1.8.1(3) Upper plate assembly

1) Take out screw (G).
2) Shift the hooks of the right (H) and left (I) holding levers and remove the upper plate assembly.

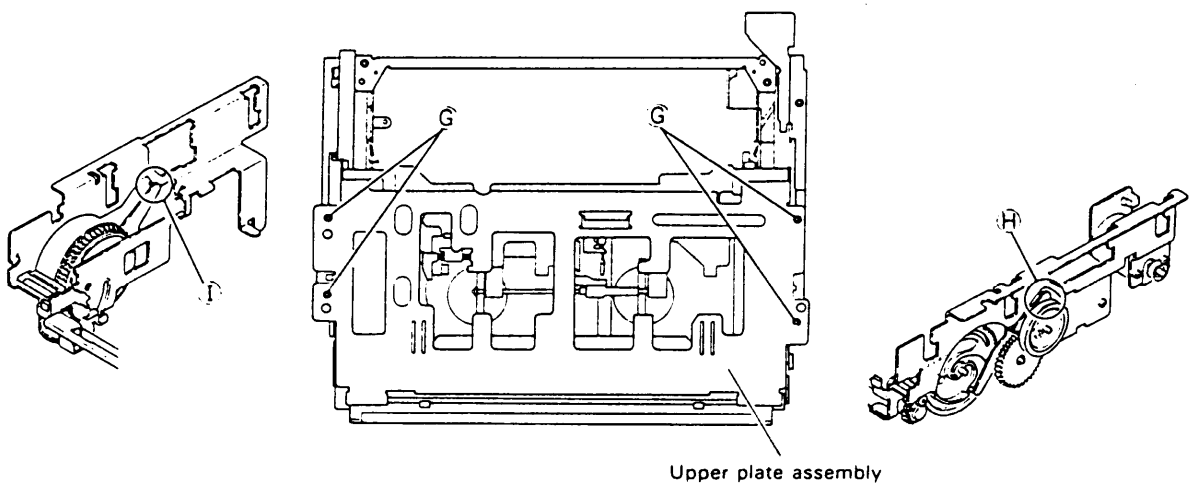


Fig. 1-8-4

1.8.1(4) Front and side bracket assemblies

1) Turn the left and right pinion gears to extend the cassette tray.
2) Take out screws (J) and remove the front bracket assembly.
3) Remove the side bracket assemblies.
4) Remove the tray guides from the side bracket assemblies.

Note: *Use care not to damage the flat wire when removing the right tray guide.*

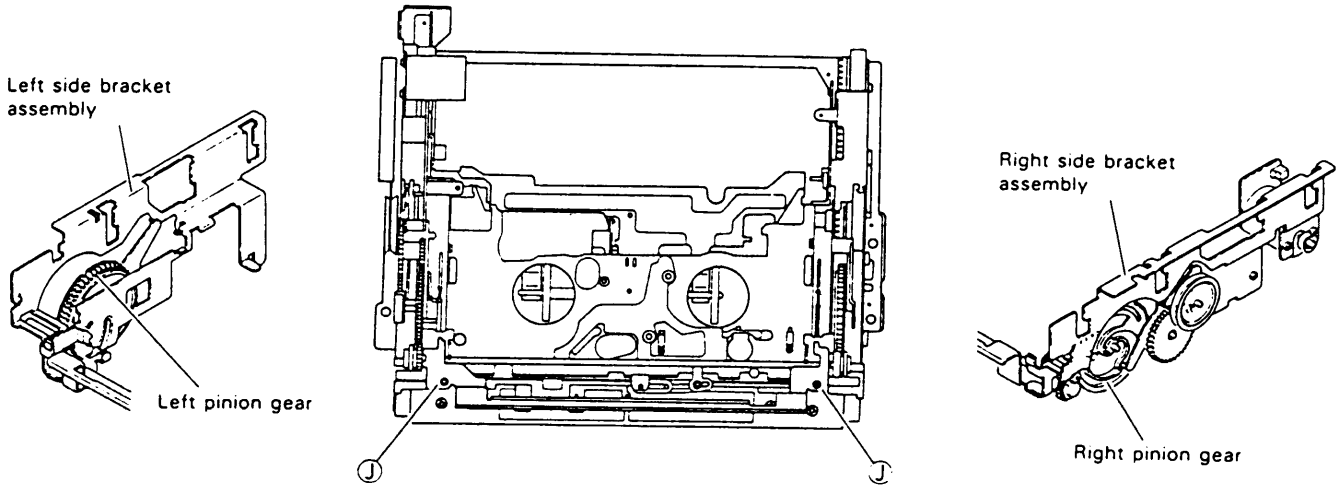


Fig. 1-8-5

1.8.2 Other parts

1.8.2(1) Cassette housing pulley and cassette housing gear

1) Remove the belt.
2) Spread the snap fit tab and remove the pulley from the shaft.
3) Spread the snap fit tab and remove the gear from the shaft.

Notes • *Use care not to damage the snap fit tabs (do not spread excessively).*
• *The cassette housing gear is engaged with the pinion gear. Turn the pinion gear to a position that allows removing the cassette housing gear.*

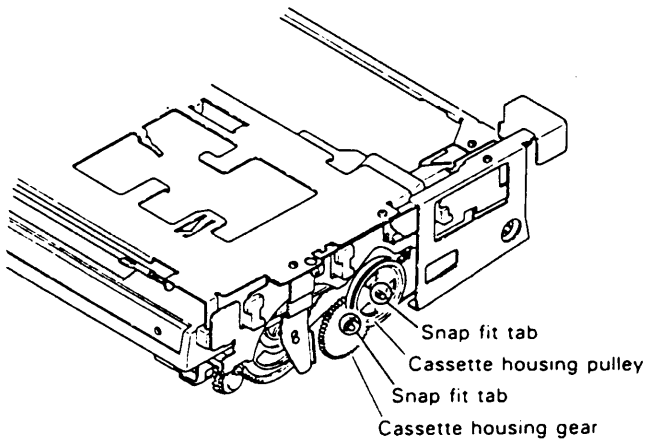


Fig. 1-8-6

1.8.2(2) Cassette housing board assembly and motor

1) Disconnect the flat wire from cassette housing board CN2.
2) Take out screws (K) and remove the cap from Q1. Remove the cassette housing board assembly.
3) Take out screws (L) and remove the cassette housing motor.

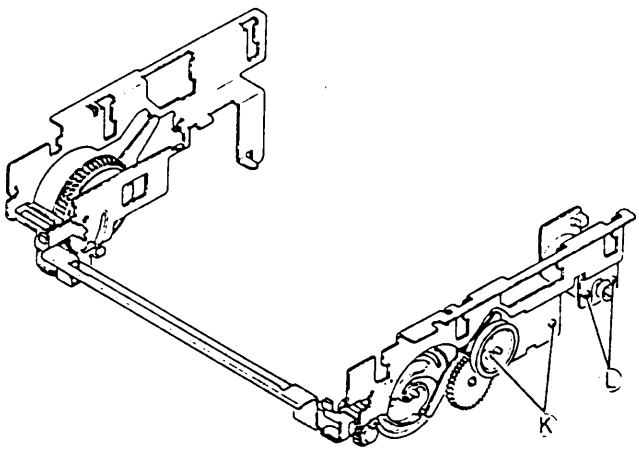


Fig. 1-8-7

1.8.3 Reassembly

Reassemble the parts according to the flowchart of Fig. 1-8-8.

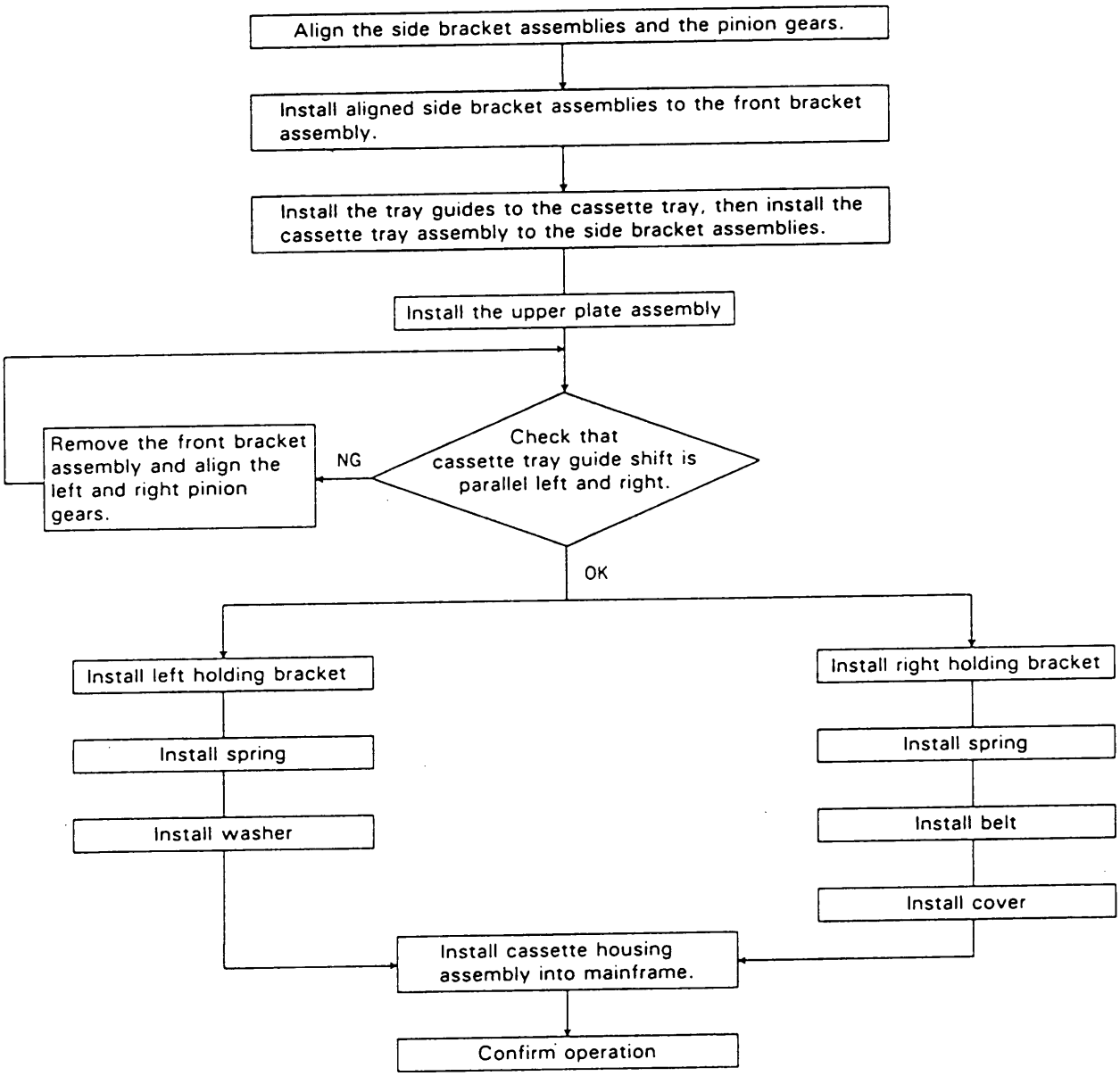


Fig. 1-8-8 Reassembly flowchart

1.8.3(1) Side and front bracket assemblies

1) Turn the pinion gear of the right side bracket so that the holding lever stud is positioned fully toward the pinion gear shaft (see Fig. 1-8-9).

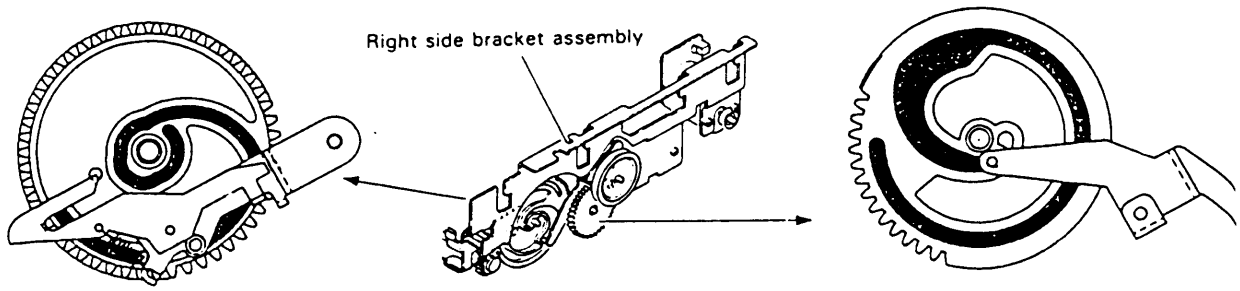


Fig. 1-8-9

2) Turn the pinion gear of the left side bracket so that the holding lever stud is positioned fully toward the pinion gear shaft (see Fig. 1-8-10).

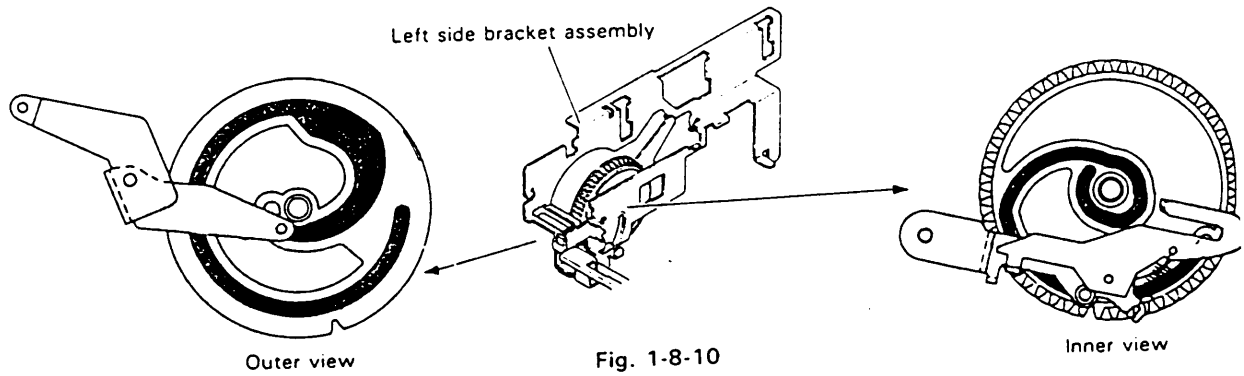


Fig. 1-8-10

3) Secure the aligned side bracket assemblies to the front bracket assembly with screws (A).

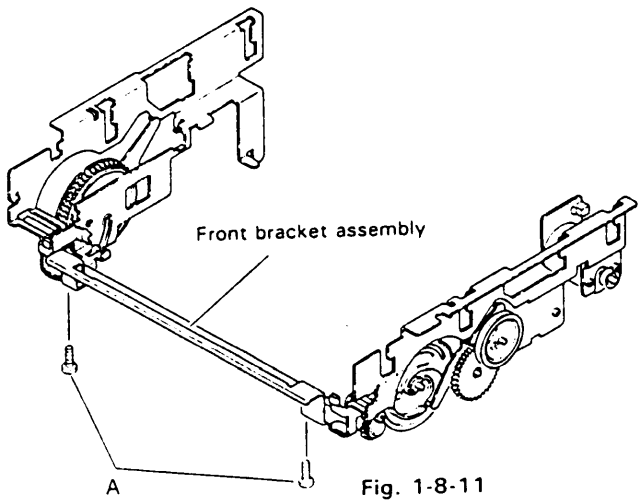


Fig. 1-8-11

4) After assembling, turn the front bracket shaft and confirm alignment of the pinion gear positioning holes.

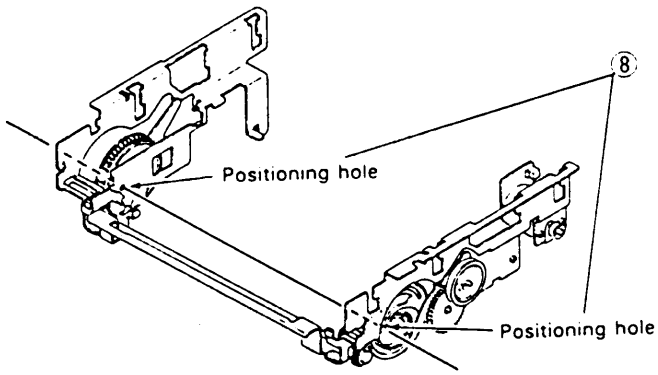


Fig. 1-8-12

1.8.3(2) **Side bracket and cassette tray assemblies**

1) Align the positioning holes of the left and right pinion gears. Insert screws etc. to hold them in position.

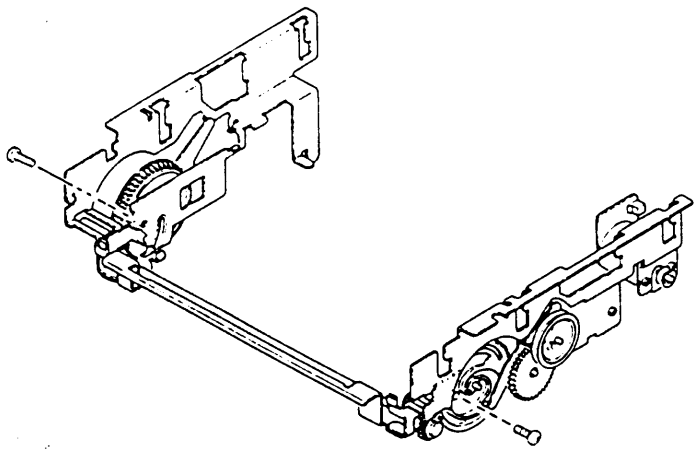


Fig. 1-8-13

2) Align holes Ⓒ of the tray guides with holes Ⓑ of the cassette tray assembly and install the tray guides.

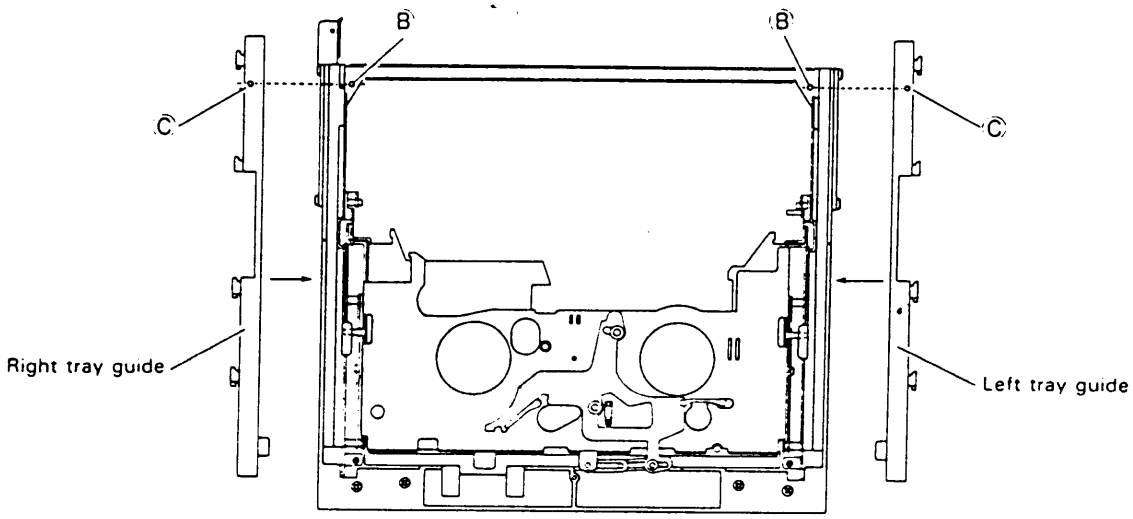


Fig. 1-8-14

3) Install the cassette tray (with tray guides) to the side brackets (with secured pinion gears).

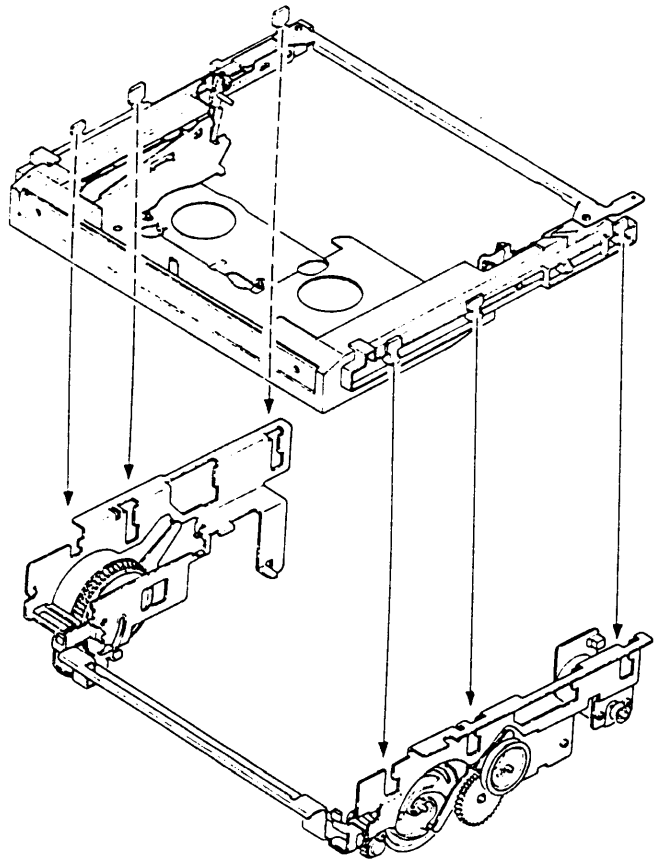


Fig. 1-8-15

1.8.3(3) Upper plate assembly

1) Engage left and right holding levers Ⓕ and Ⓖ with slots Ⓗ. Secure only the left holding lever with the washer.
2) Install the upper plate assembly with 4 screws Ⓔ.
3) Engage spring (Fig. 1-8-2 Ⓑ, 1-8-3 Ⓔ).
4) Turn the pinion gears and observe smooth extension and retraction of the cassette tray. Also confirm that shift is parallel left and right.

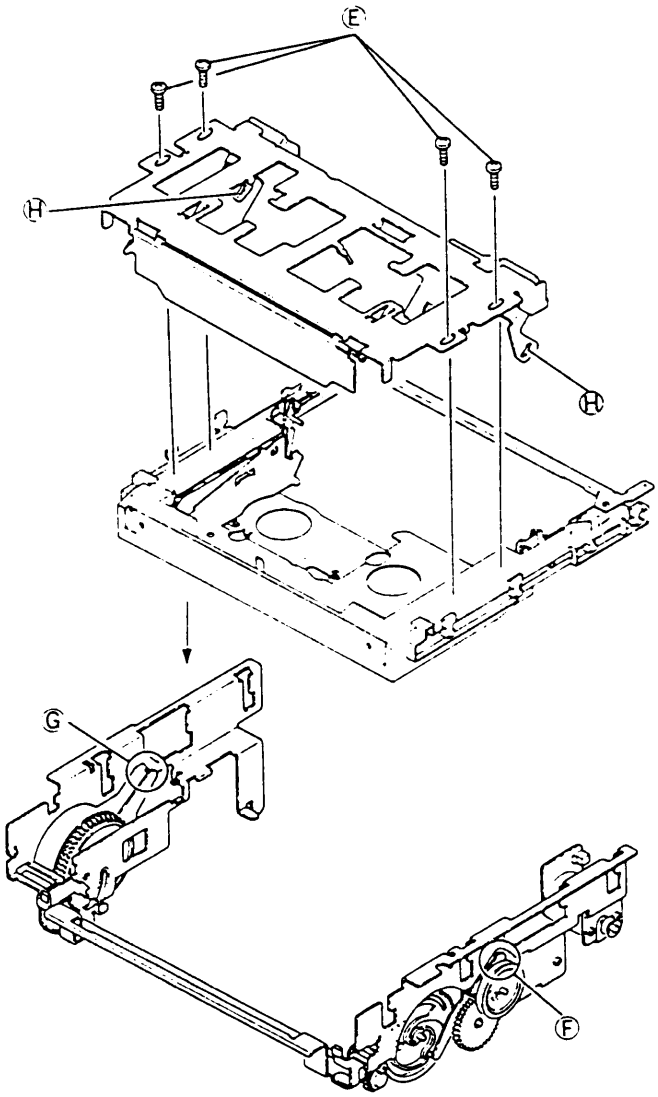


Fig. 1-8-16

Note: • *If faulty operation of the cassette tray is noticed, it is likely the pinion gears are not properly aligned. Check the alignment as follows.*

1. *Take out screws (J) and remove the front bracket assembly.*
2. *Turn the left and right pinion gears in the loading direction to where they stop (cassette holder lowered position).*
3. *In this state, install the front bracket and confirm proper operation.*

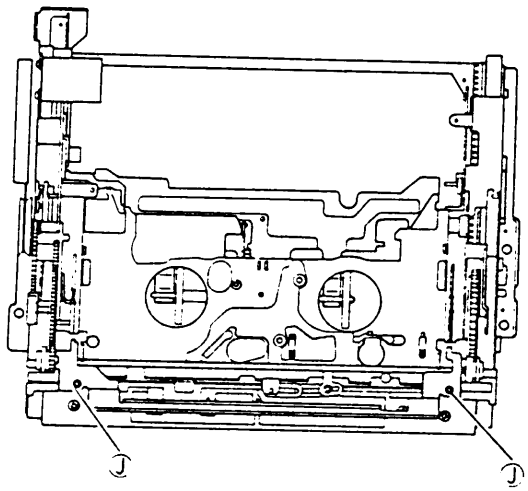


Fig. 1-8-17

1.8.4 Other parts

Reassemble other parts by reversing the disassembly steps.

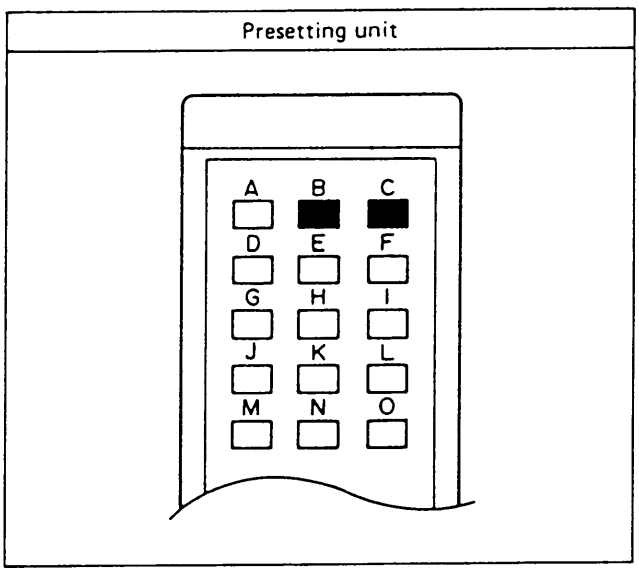
SECTION 2
ELECTRICAL ADJUSTMENTS

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
12. Presetting unit (PTU94008)



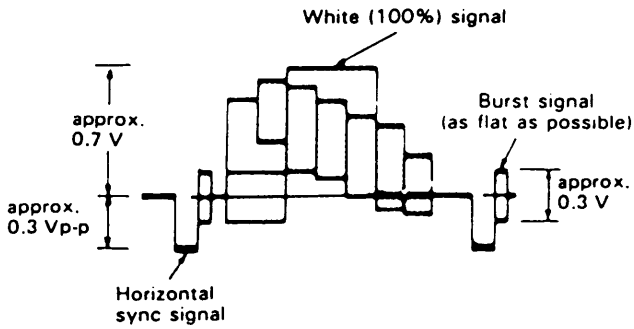


Fig. 2-1-1 Color bar signal of pattern generator

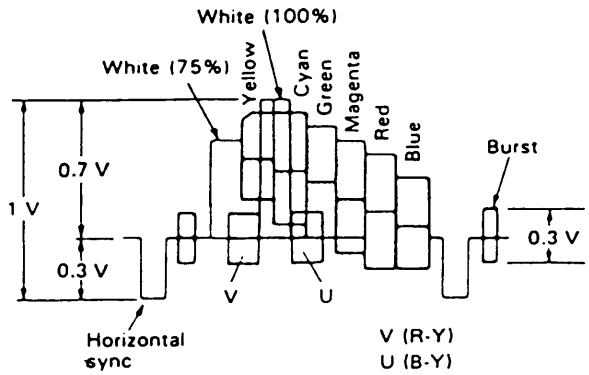


Fig. 2-1-2 Color bar signal waveform

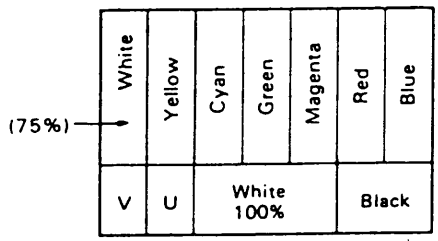


Fig. 2-1-3 Color bar pattern

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.
Colour bars	Colour bars signal as video input.
Stairstep	Stairstep signal as video input.
1 kHz	1 kHz sinewave as audio input signal.
MH-2 colour bars	Colour 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.
MH-2L colour bars	Colour bars segment of MH-2L alignment tape.
MH-2L stairstep	Stairstep segment of MH-2L alignment tape.
MH-2L RF sweep	RF sweep segment of MH-2L 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
LP mode	LP recording speed.
Description	This column provides an explanation of the step, notes and adjustment values.

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	CN2-2	R49 (SWD 5 V)	• REC • Tuner mode • SP mode	1) Insert recording video cassette to the cassetle housing and set for the REC mode. 2) Connect a digital voltmeter to CN2-2 and GND. 3) Adjust R49 for 5.275 ± 0.025 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	Note: *For below adjustments use 1 : 1 probe with input capacitance less than 100 pF.* 1) Connect a frequency counter between IC1-16 and GND. 2) Short TP1 to GND, then short the leads of 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 (TP210)	R420 (SP PB SW POINT)	• PB • MH-2 (stairstep) • Trigger slope (–) • SP mode • AUTO TRACKING OFF	1) Connect an oscilloscope to VIDEO OUT (TP210). 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 at ± 0.5H from V. sync.
2	SP slow tracking preset	Monitor-TV	Presetting unit (PTU 94008)	• SP mode • REC then PB (Slow ±1/6)	**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 and REV 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.
3	LP slow tracking preset	Monitor-VT	Presetting unit	• LP mode • REC then PB (Slow PB)	**Note:** *Set VCR to A mode by remote controller.* 1) In the same manner as the above SP slow mode

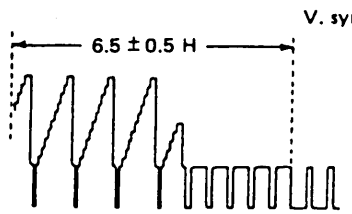
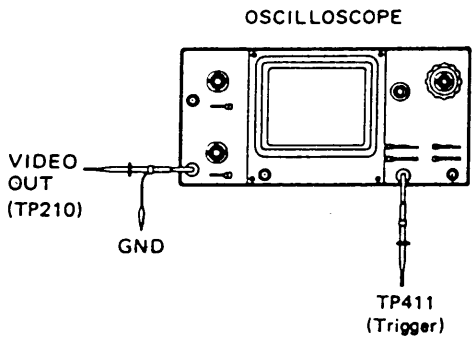


Fig. 2-4-1 PB Switching Point



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)	• PB mode • MH-2 color bar • SP mode • AUTO tracking : OFF	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 • Color bar signal • 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	LP REC Colour Level and Balance	L201-Ⓐ (VIDEO UNIT board)	R311 (LP REC COLOR)	•PB mode •MH-2L colour bar •REC then PB •Colour bar •LP mode •Auto reacking : OFF	1) Short between TP404 and GND. 2) In the same manner as above (2.5.1), adjust R311 so that the higher level channel becomes 85 ± 5% of the noted level during play back. At this time, confirm that the channel difference is within 3 dB.

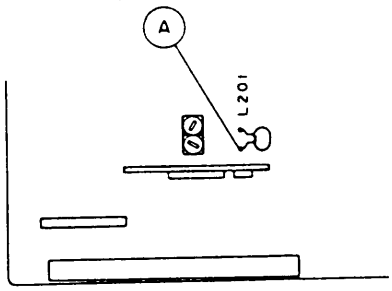


Fig. 2-5-1 Component view of VIDEO UNIT board

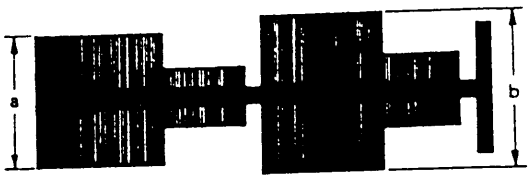
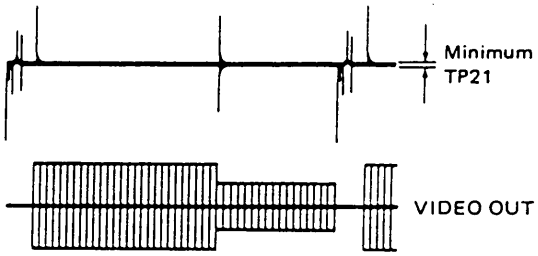
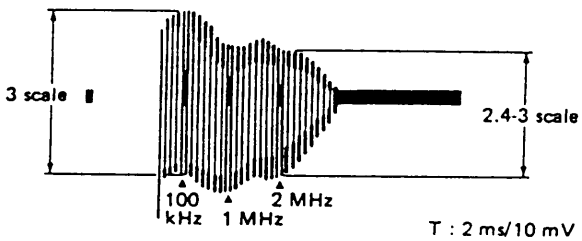


Fig. 2-5-2 REC color level

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
3	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. 2-5-3	
4	SP PB Frequency	VIDEO OUT (TP201)	R226 (SP FREQ RESPONSE)	• 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.
				 Fig. 2-5-4 PB frequency	
			R226 (SP FREQ RESPONSE)	• 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.*

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
5	LP PB Frequency & CH Balance	VIDEO OUT	R313 (LP FREQ RESPONSE)	• REC then PB • Video sweep • LP mode • AUTO TRACKING OFF	1) Terminate VIDEO OUT at 75 Ω. Connect a video sweep generator to VIDEO IN. 2) Record and play back a video sweep signal in the SP mode. Use the control of the oscilloscope to position the 100 kHz region at graduation 3 (0 dB) of the oscilloscope scale. 3) Adjust R313 to position the 2 MHz of CH1 portion at 1.5 – 1.9 (–5 ± 1 dB) of the oscilloscope graduations as shown in Fig. 2-3-4. 4) Confirm that the channel difference is within 2 dB.
					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 R313 to obtain distinct facial features on the monitor.
				• REC then PB • TV broadcast • LP mode	
6	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

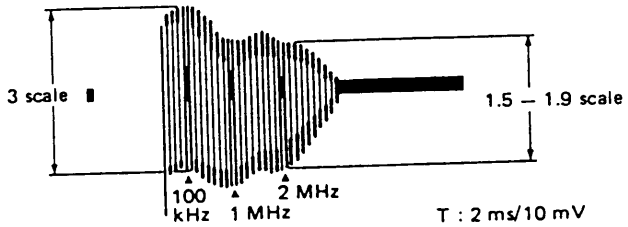


Fig. 2-5-5 PB frequency

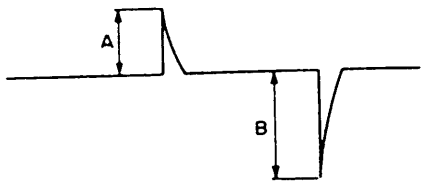


Fig 2-5-6

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 (AUDIO BIAS)	• SOURCE Select: AUX • SP mode • REC mode • No signal	1) Connect a millivoltmeter between TP31 and TP 2) Set for REC mode without incoming signal. 3) Adjust R11 for 2.2 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.				

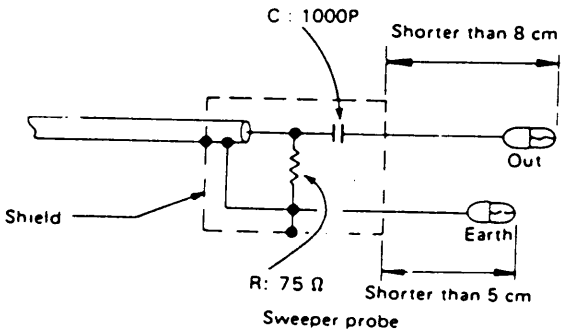


Fig. 2-7-1

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
1	VCO	IC1-28	T2 (VCO)	• Sweep genrator out: 70 dBμ (38.9 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.

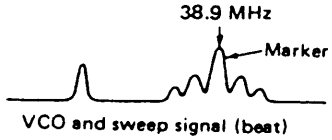
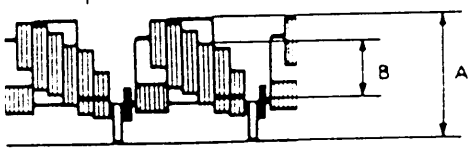


Fig. 2-7-2

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 (RF AGC)	• 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 −8 dB again.
		MONITOR	R21 (RF AGC)	• 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 (COLOR LEVEL)	• 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.
				• 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.



B: magenta A:B = 1:0.48

Fig. 2-7-3

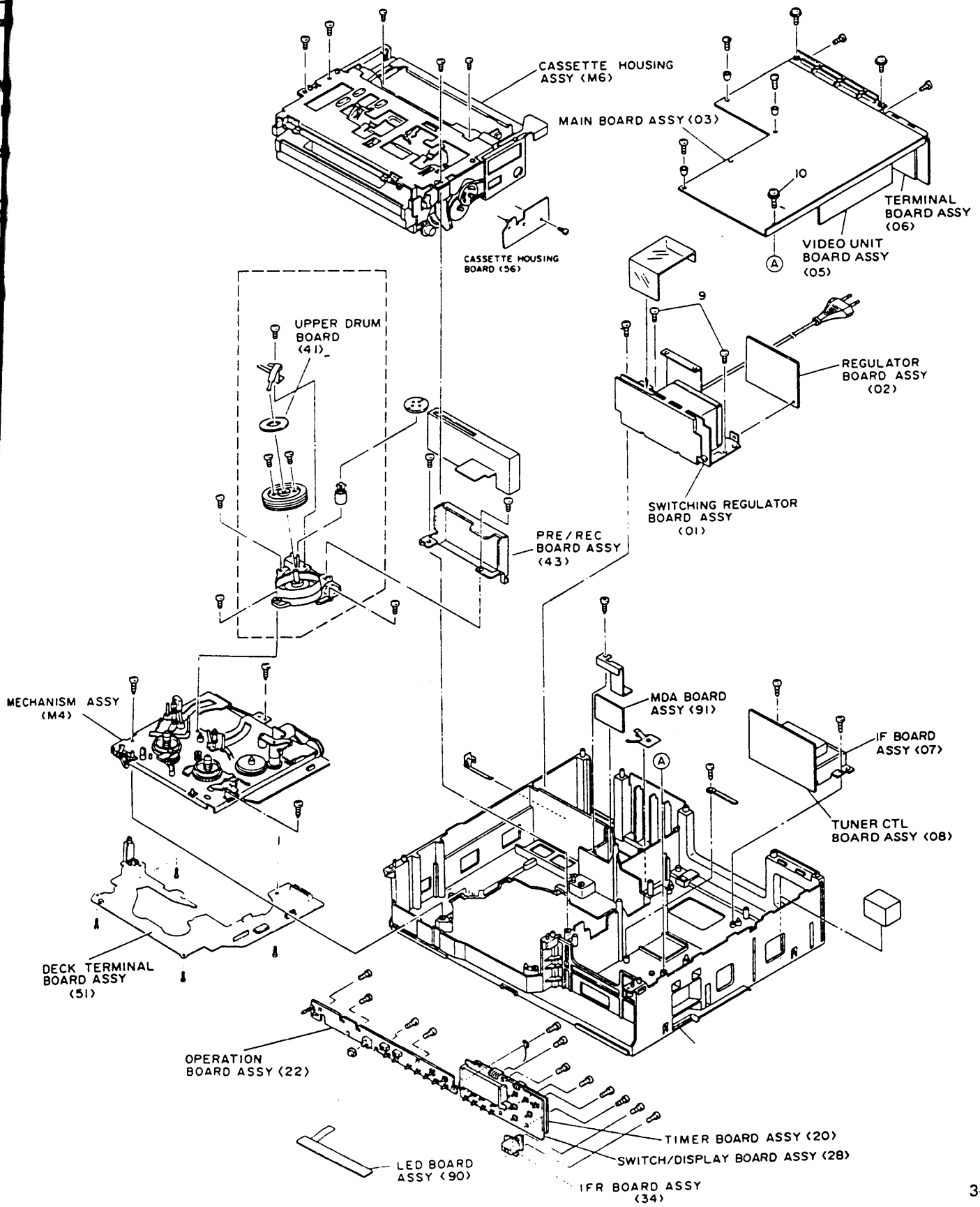
2.8 ON SCREEN CIRCUIT

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	Character Position	TP901	C905 (CHAR-ACTER POSITION)	• E-E	Note: *For below adjustments use 1 : 1 probe w input capacitance less than 100 pF.* 1. Connect a frequency counter to TP901 and GN Short IC901-3 pin to GND and short IC901-30 to IC901-32 pin (SWD 5 V). 2. Adjust C905 for 7.30 ± 0.05 MHz without vi signal.
2	Back ground Color	TP902	C916 (BACK G. COLOR)	• E-E	1. Connect a frequency counter to TP902 and GN 2. Adjust C916 for 17.73447 ± 0.00030 MHz.

SECTION 3
CHARTS AND DIAGRAMS

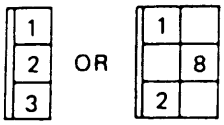
3.1 CIRCUIT BOARD AND LOCATION



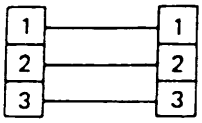
3.2 GENERAL INFORMATION

3.2.1 Connections

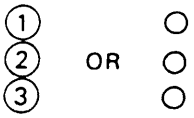
Note:
Unless otherwise specified, only signal input flow is indicated.
Connection arrows indicate only signal outputs.



: Connectors



: Board in connectors



: Direct connections

VS : Connected pattern in the board.

Abbreviations

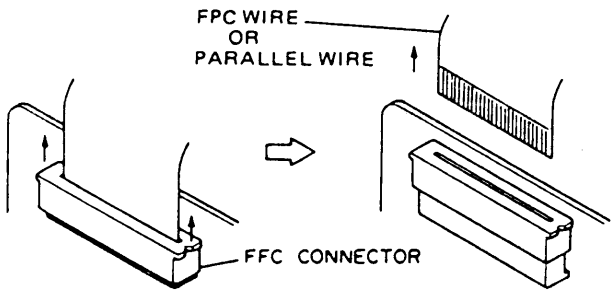
V : Video M : Mechacon

S : Servo A : Audio

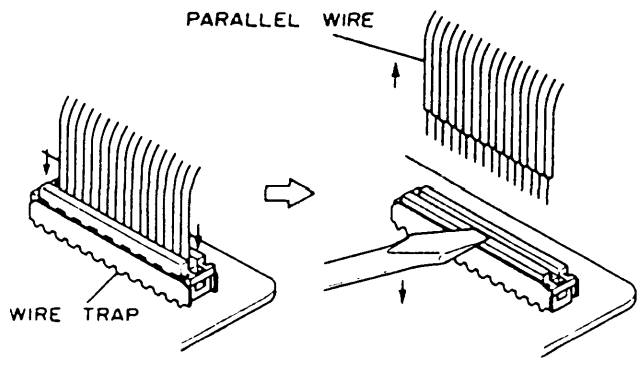
VS : Signal flow from video to servo.

3.2.2 Disconnecting the flatwire

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

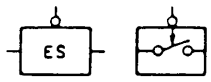


2. Depress the connector structure downward to release the clamp when removing or inserting the flat wire cable, as indicated below.



3.2.3 Indications

AUX : Active only at high.
$\overline{AUX}$: Active only at low.
$\overline{A}U\overline{X}$: Active only at middle.
$\overline{A}UX$: 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

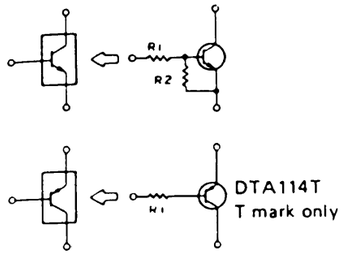
Recording signal path

Playback signal path

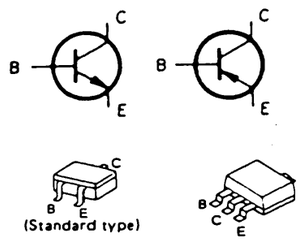
REC/PB signal path

2.6 Semiconductors

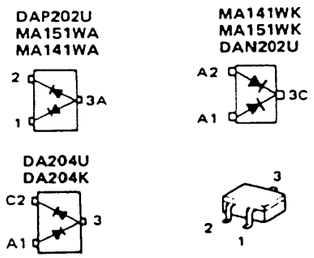
Digital transistor



Chip transistor



Chip diode



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.

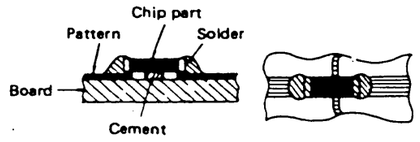


Fig. 3-2-1 Soldering condition-1

- Transistors, diodes, etc.

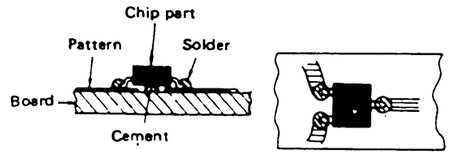


Fig. 3-2-2 Soldering condition-2

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.

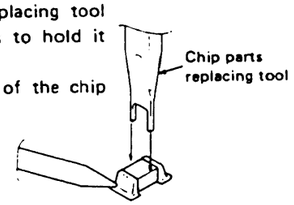


Fig. 3-2-3 R/C removal-1

3) Remove the chip parts by twisting and sliding it.

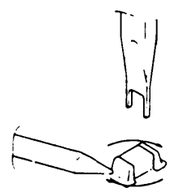


Fig. 3-2-4 R/C removal-2

3. How to remove transistors, diode.

1) Unsolder at the one-lead side of the chip parts.

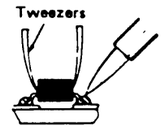


Fig. 3-2-5 Tr/Diode removal-1

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.

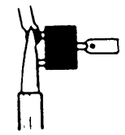


Fig. 3-2-7 Tr/Diode removal-3

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.

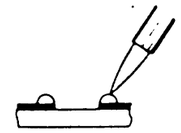


Fig. 3-2-8 Soldering-1

2) Holding down the chip parts with the chip parts replacing tool, solder it with a soldering iron.

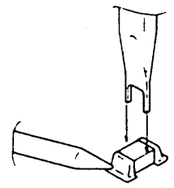
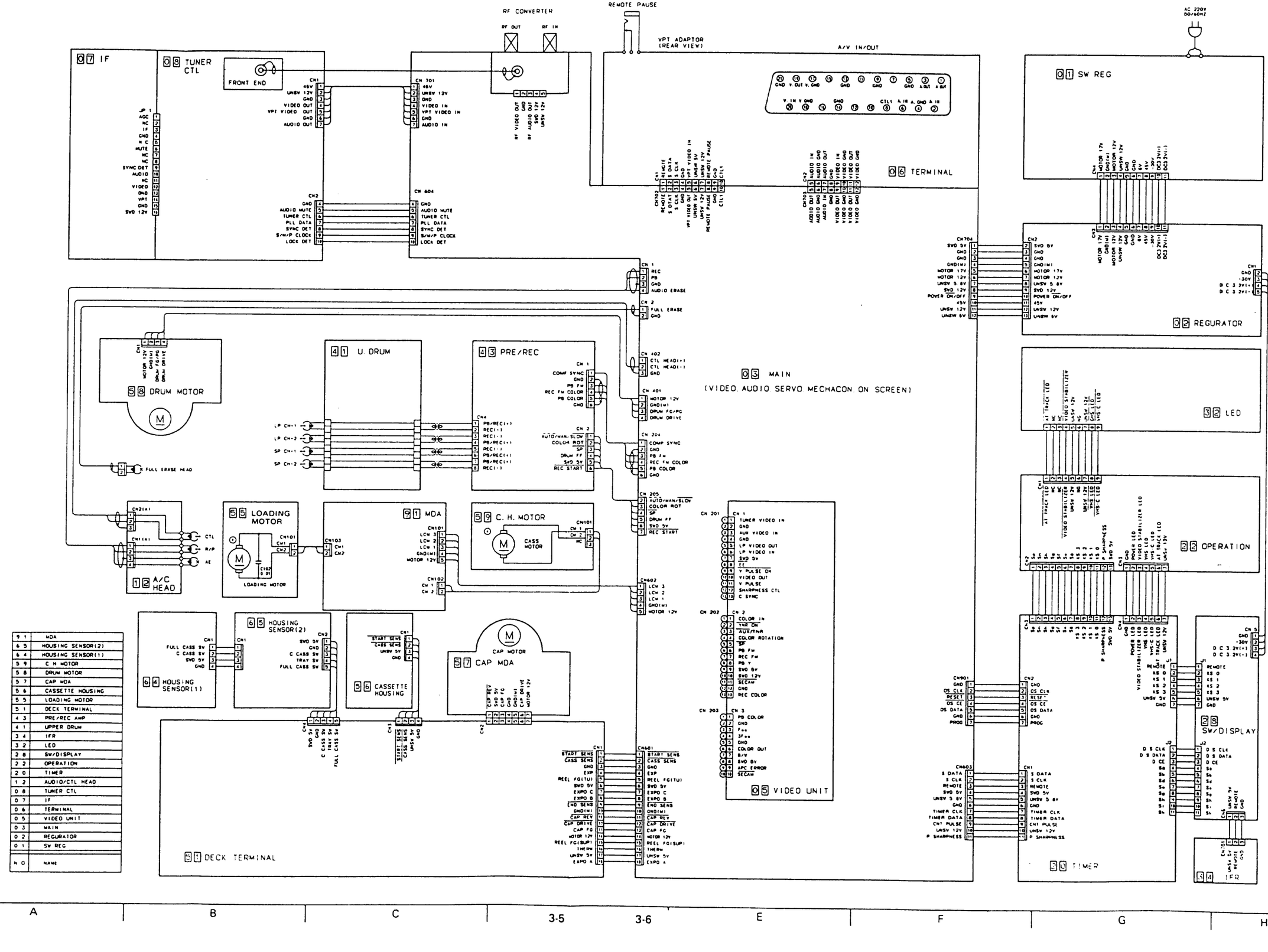


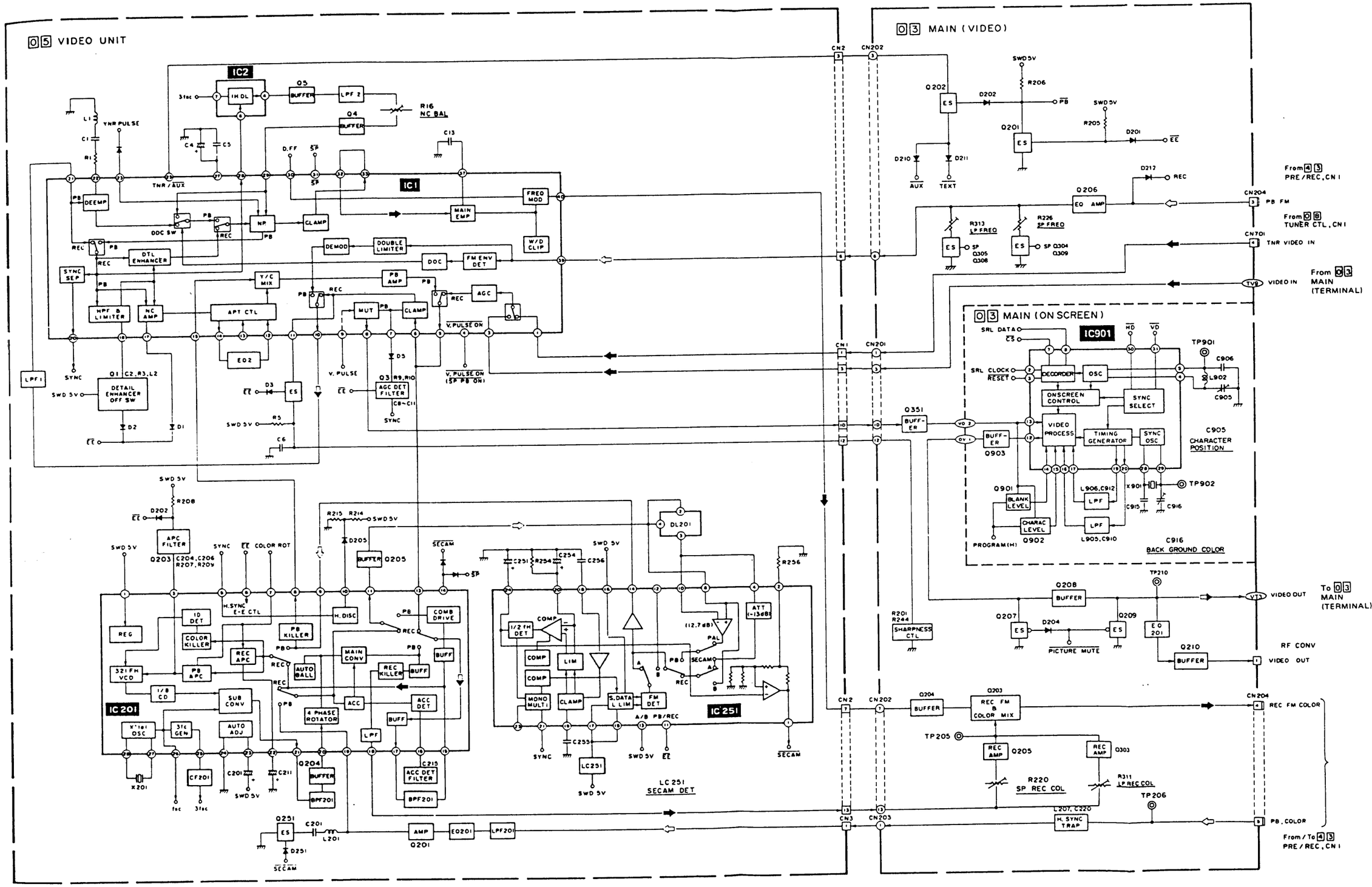
Fig. 3-2-9 Soldering-2

3.3 BOARD INTERCONNECTORS



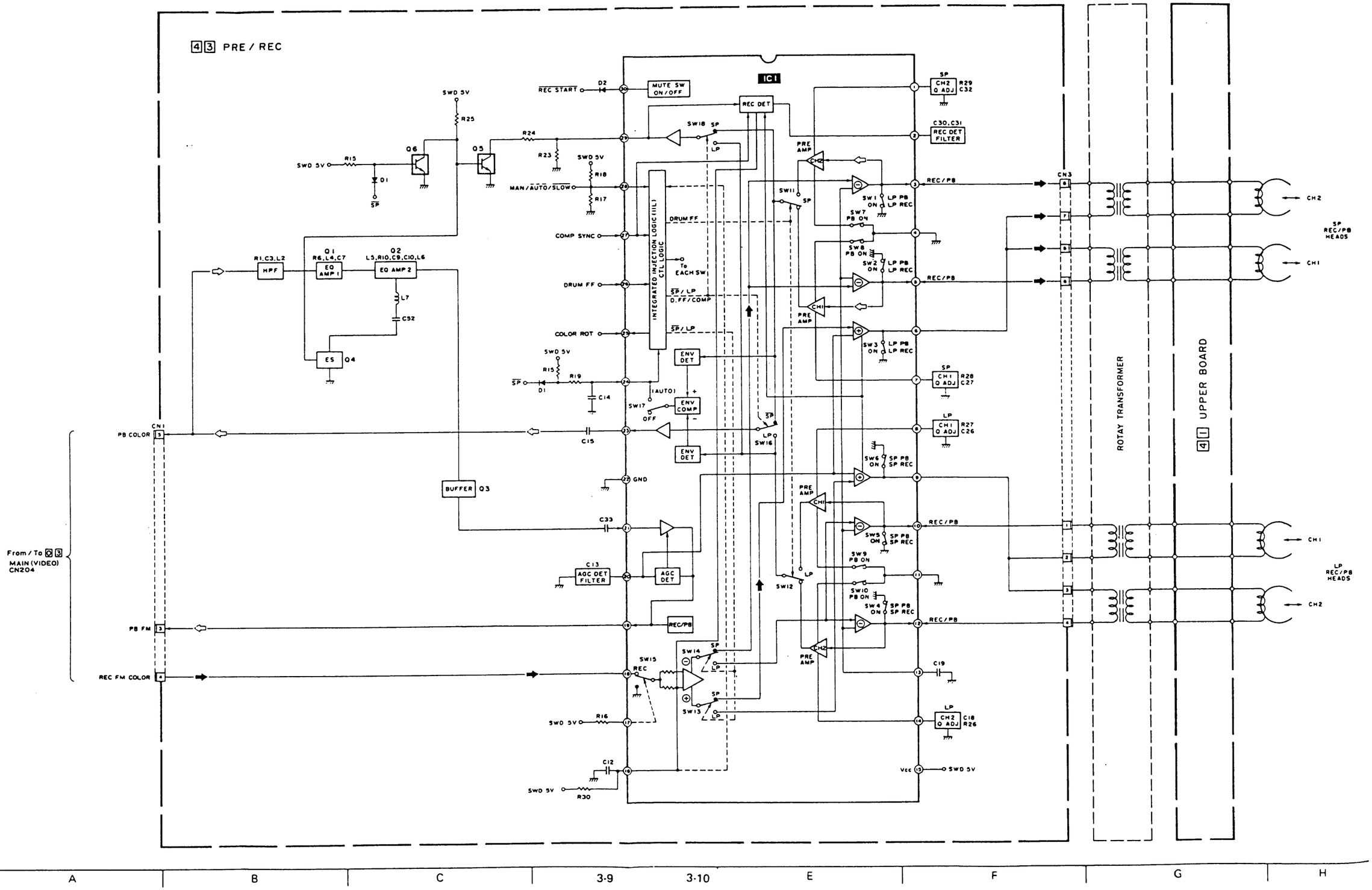
NO	NAME
91	MDA
65	HOUSING SENSOR(2)
64	HOUSING SENSOR(1)
59	C.H. MOTOR
58	DRUM MOTOR
57	CAP MDA
56	CASSETTE HOUSING
55	LOADING MOTOR
51	DECK TERMINAL
43	PRE/REC AMP
41	UPPER DRUM
34	IFR
32	LED
28	SW/DISPLAY
22	OPERATION
20	TIMER
12	AUDIO/CTL HEAD
08	TUNER CTL
07	IF
06	TERMINAL
05	VIDEO UNIT
03	MAIN
02	REGURATOR
01	SW REG

3.4 VIDEO BLOCK DIAGRAM



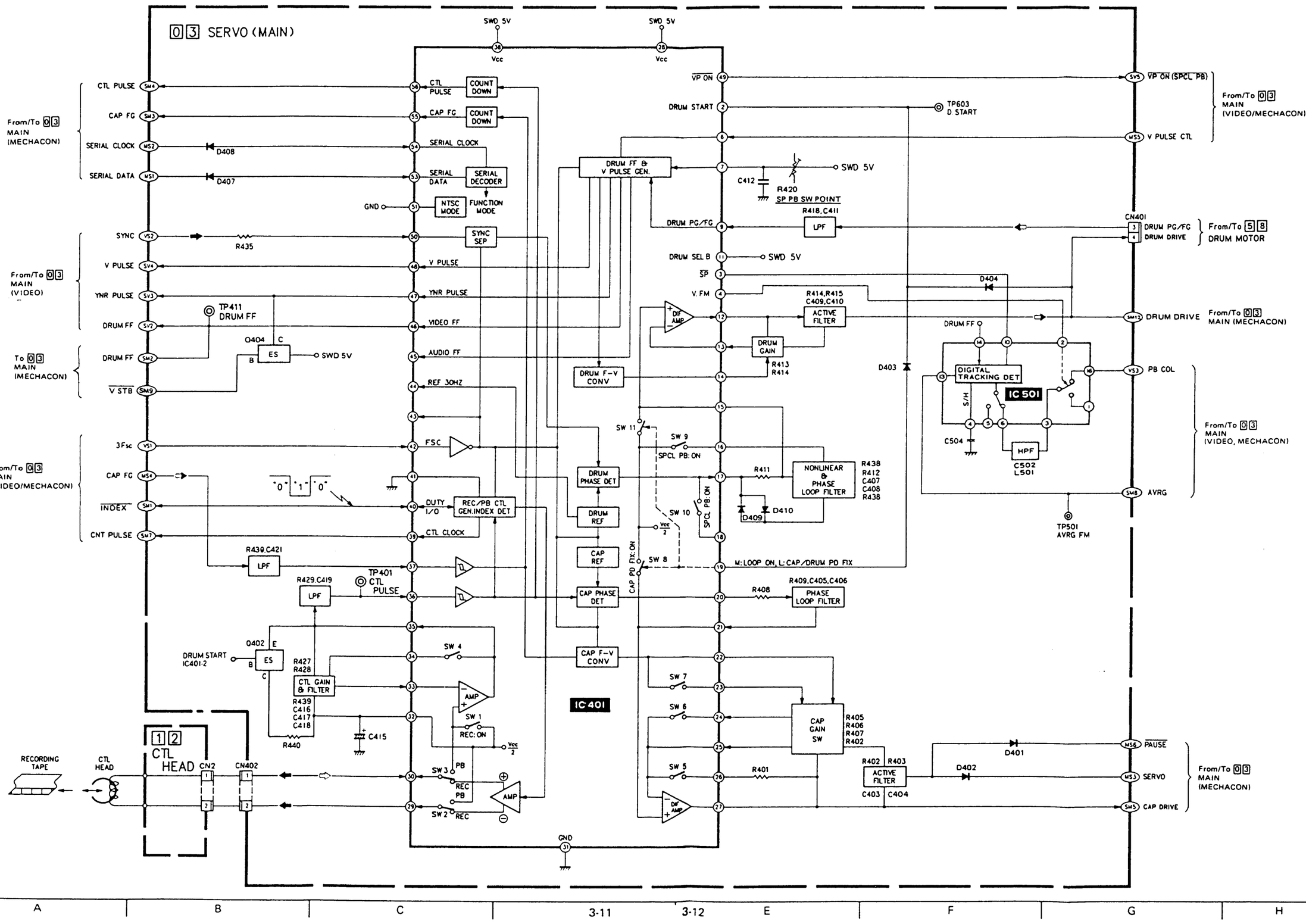
A B C 3-7 3-8 E F G H

3.5 PRE/REC BLOCK DIAGRAM

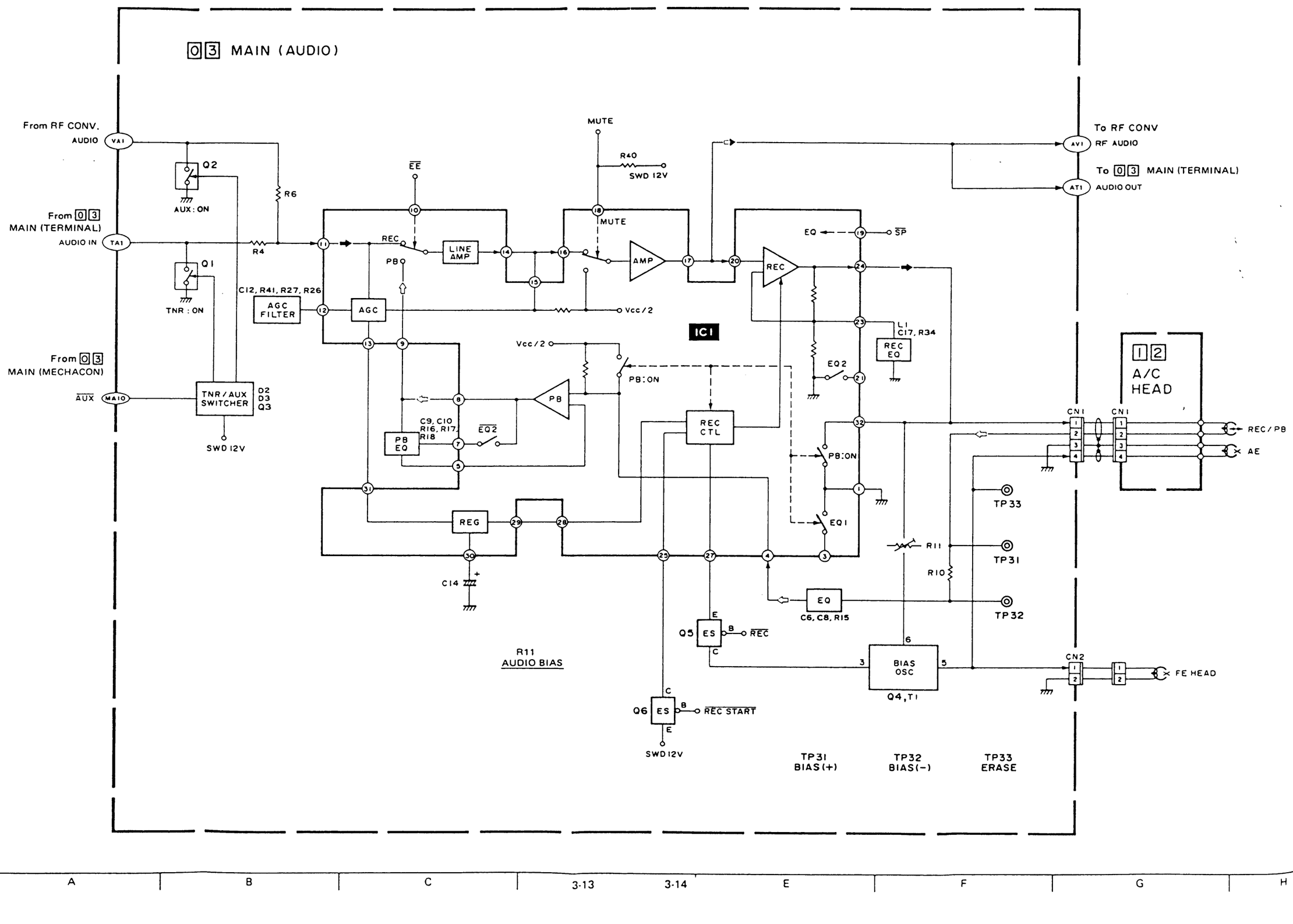


A B C 3-9 3-10 E F G H

3.6 SERVO BLOCK DIAGRAM

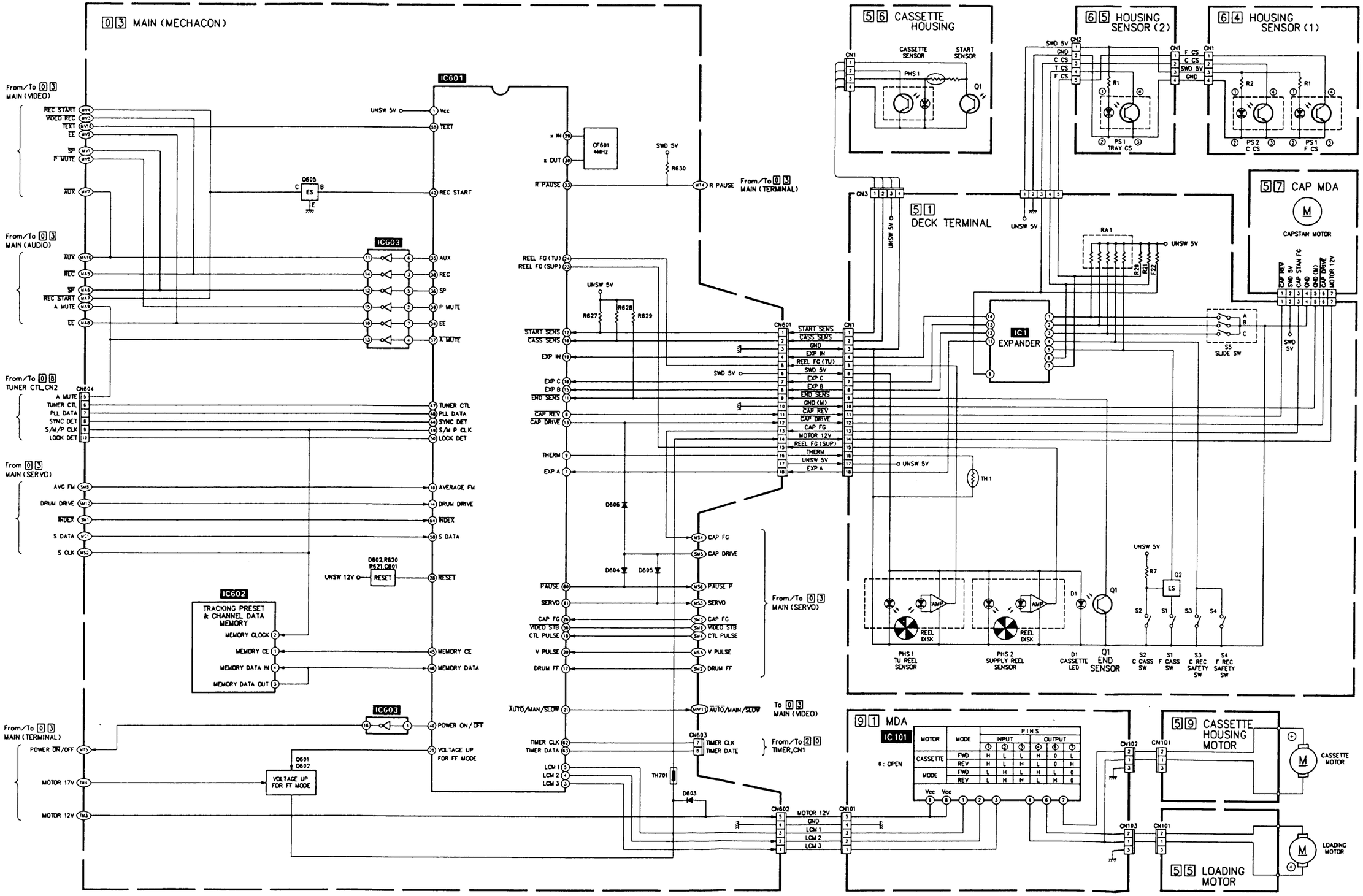


3.7 AUDIO BLOCK DIAGRAM



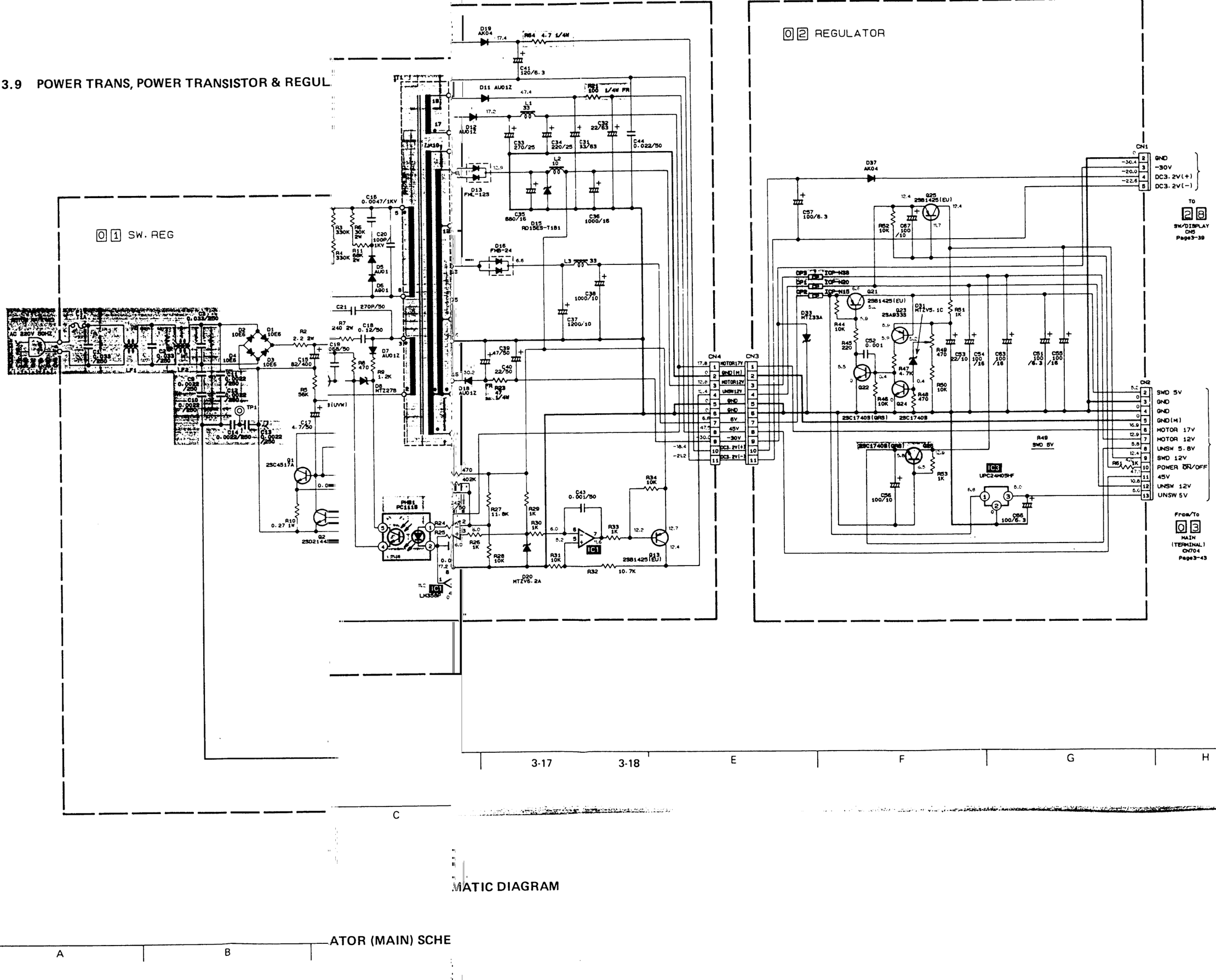
A B C 3-13 3-14 E F G H

3.8 SYSTEM CTL BLOCK DIAGRAM



3-15 3-16

3.9 POWER TRANS, POWER TRANSISTOR & REGUL

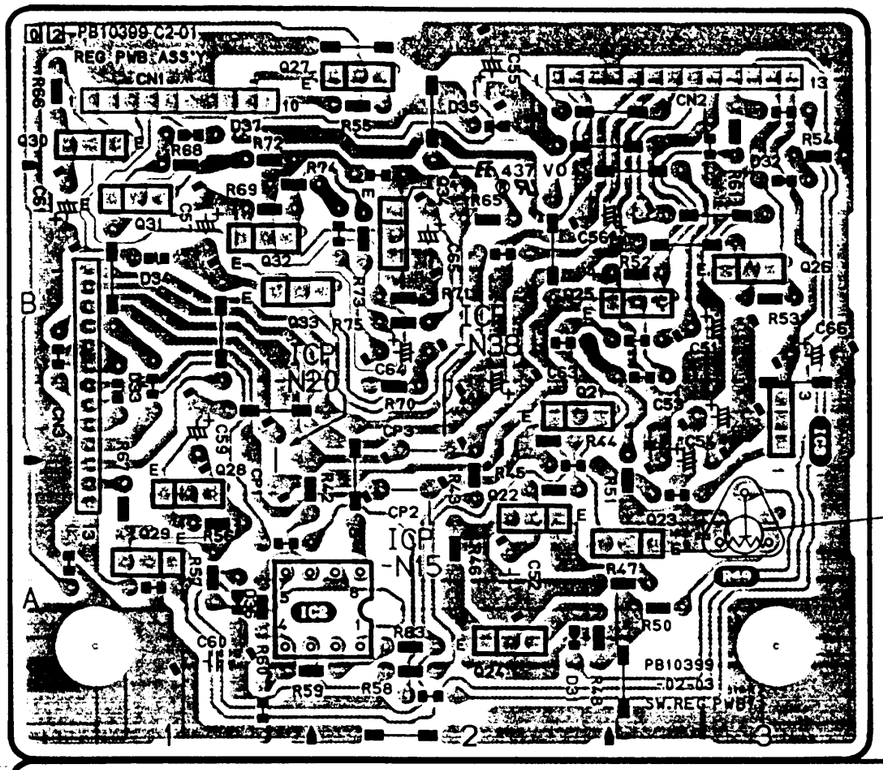


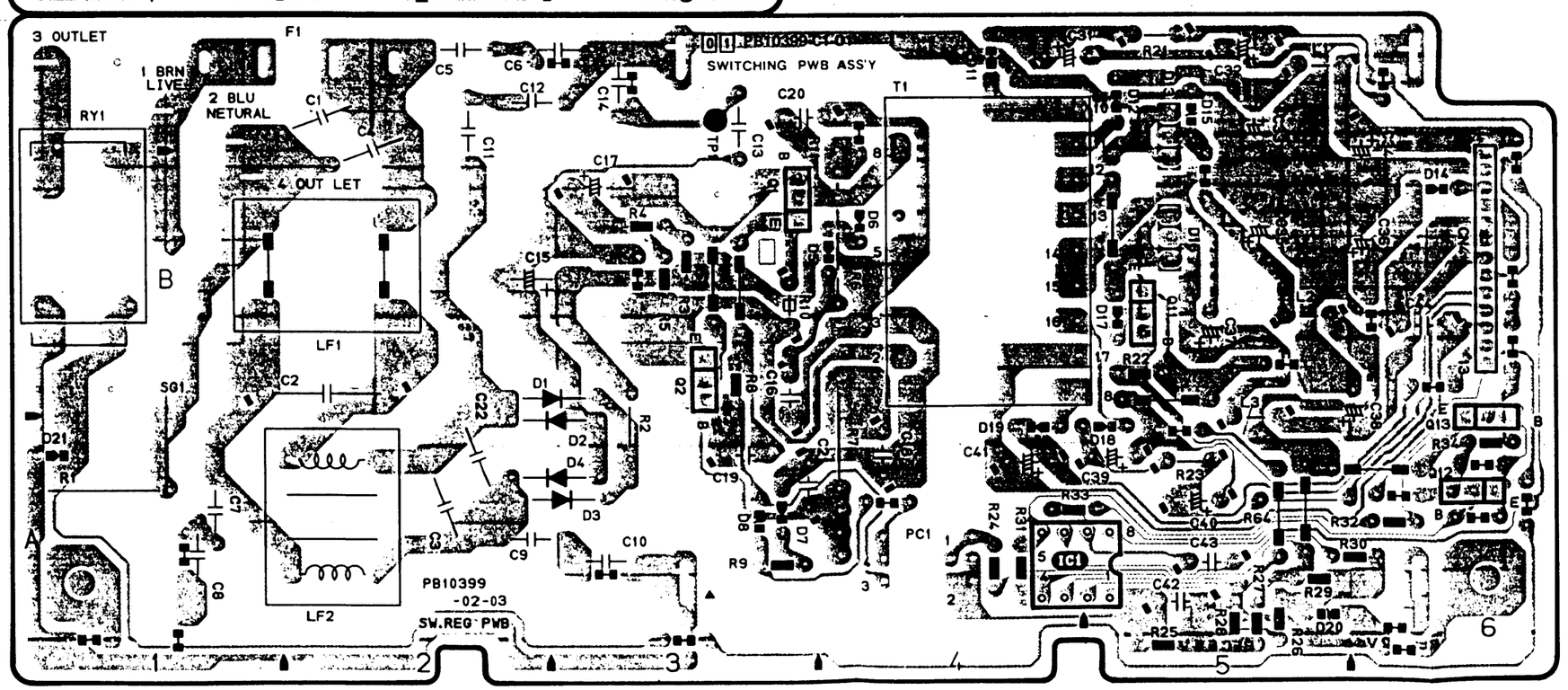
3-17 3-18

MATIC DIAGRAM

ATOR (MAIN) SCHE

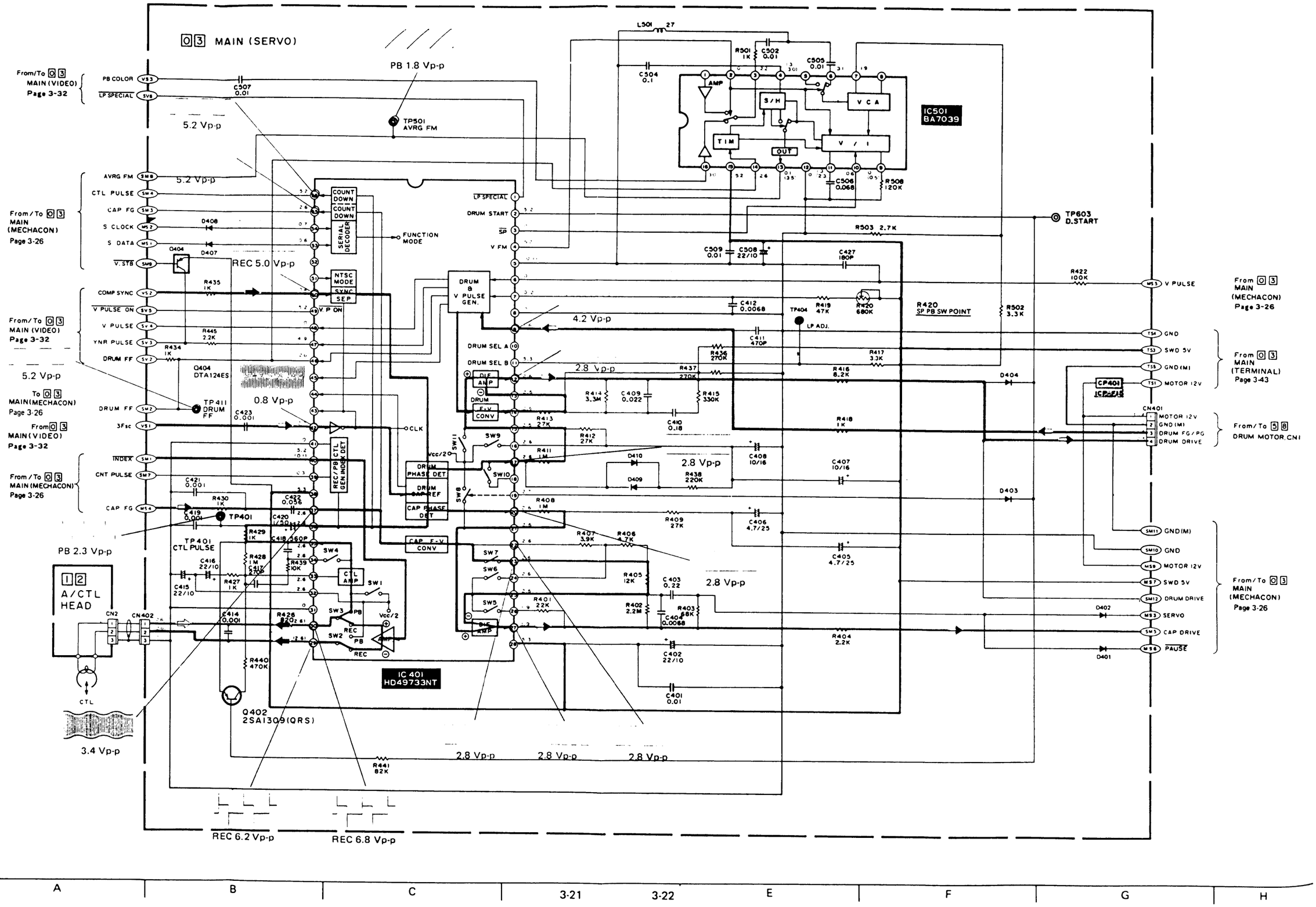
3.10 SWITCHING REGULATOR CIRCUIT BOARD



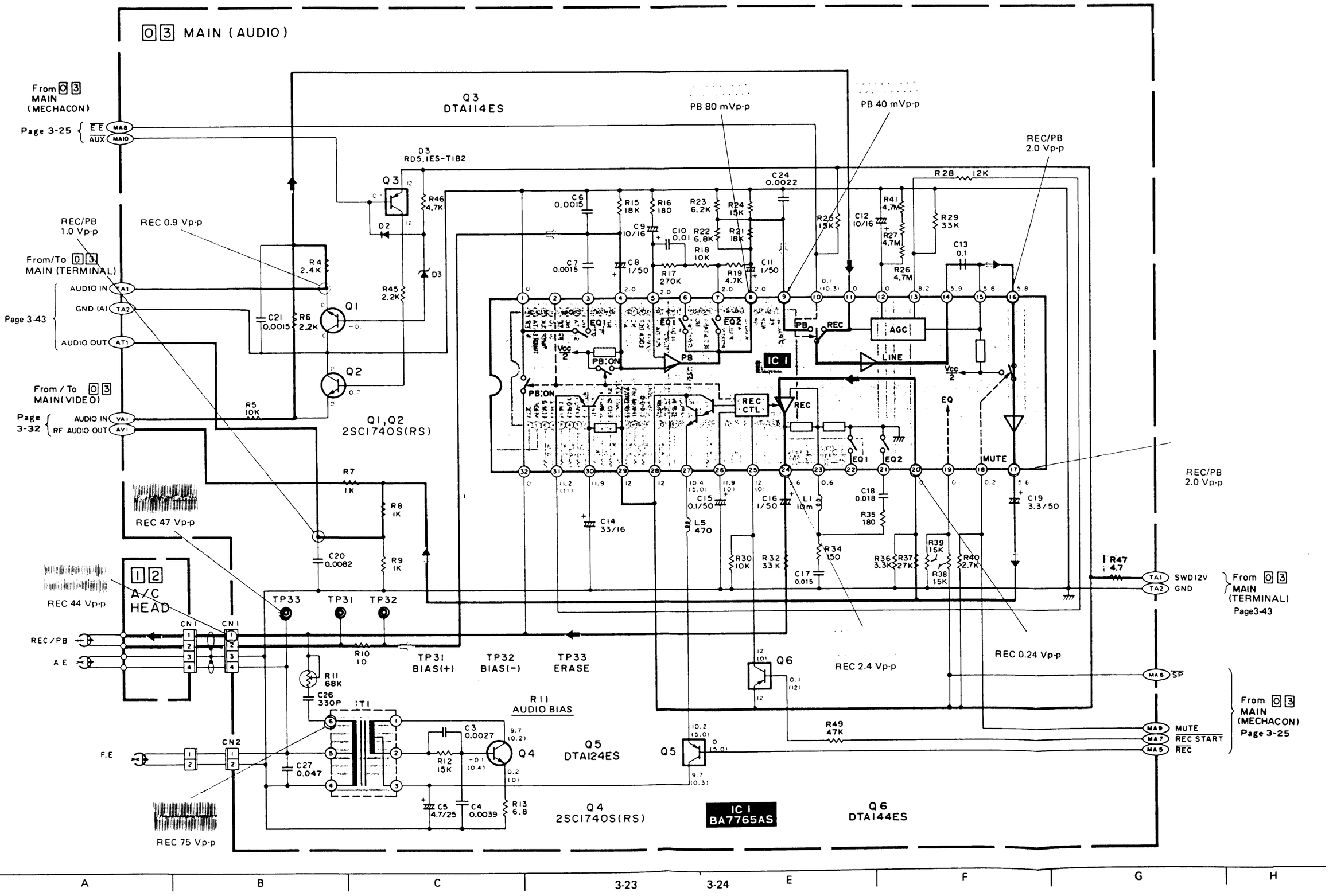


A | B | C | 3-19 | 3-20 | E | F | G | H

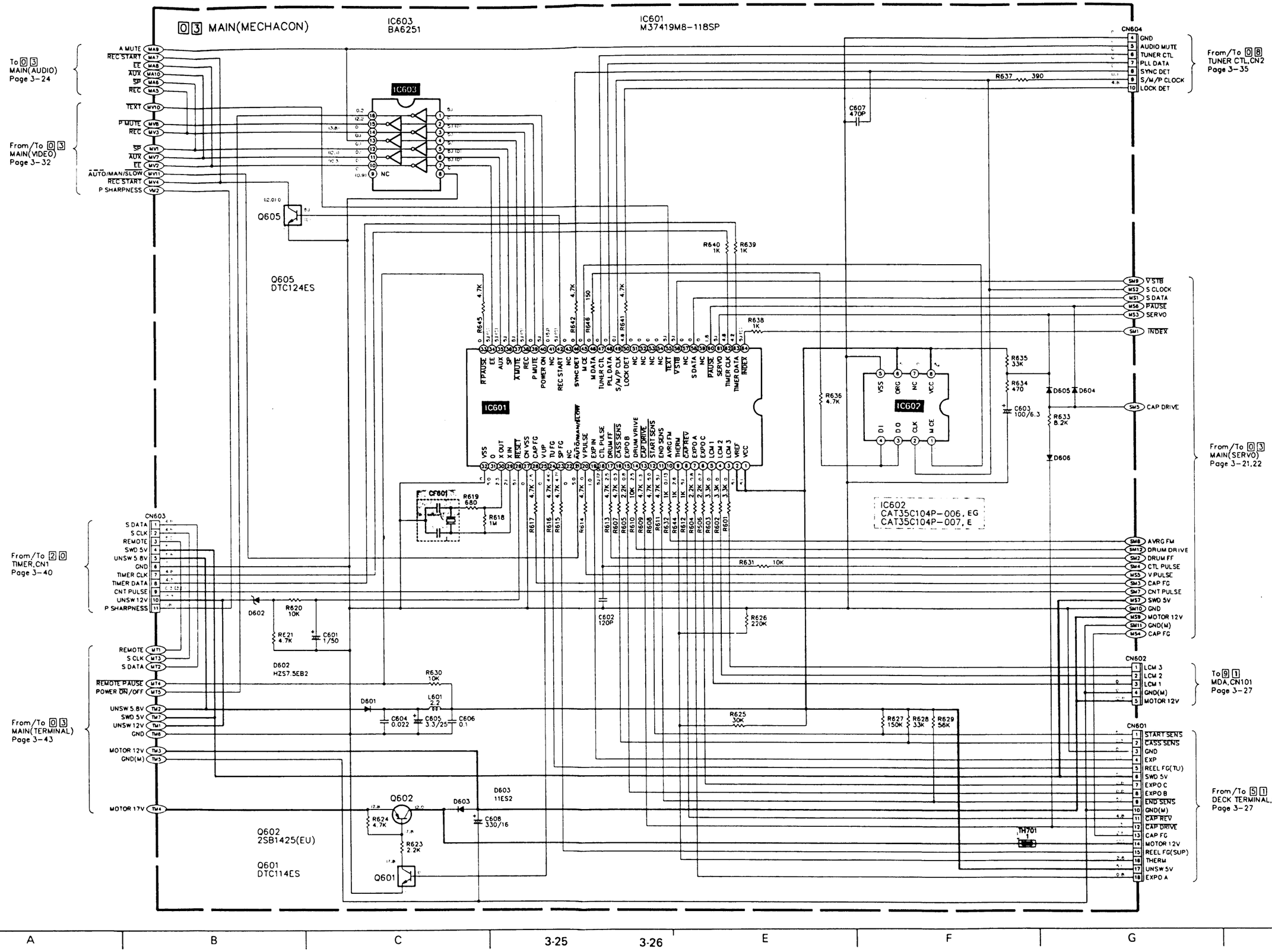
3.11 SERVO SCHEMATIC DIAGRAM



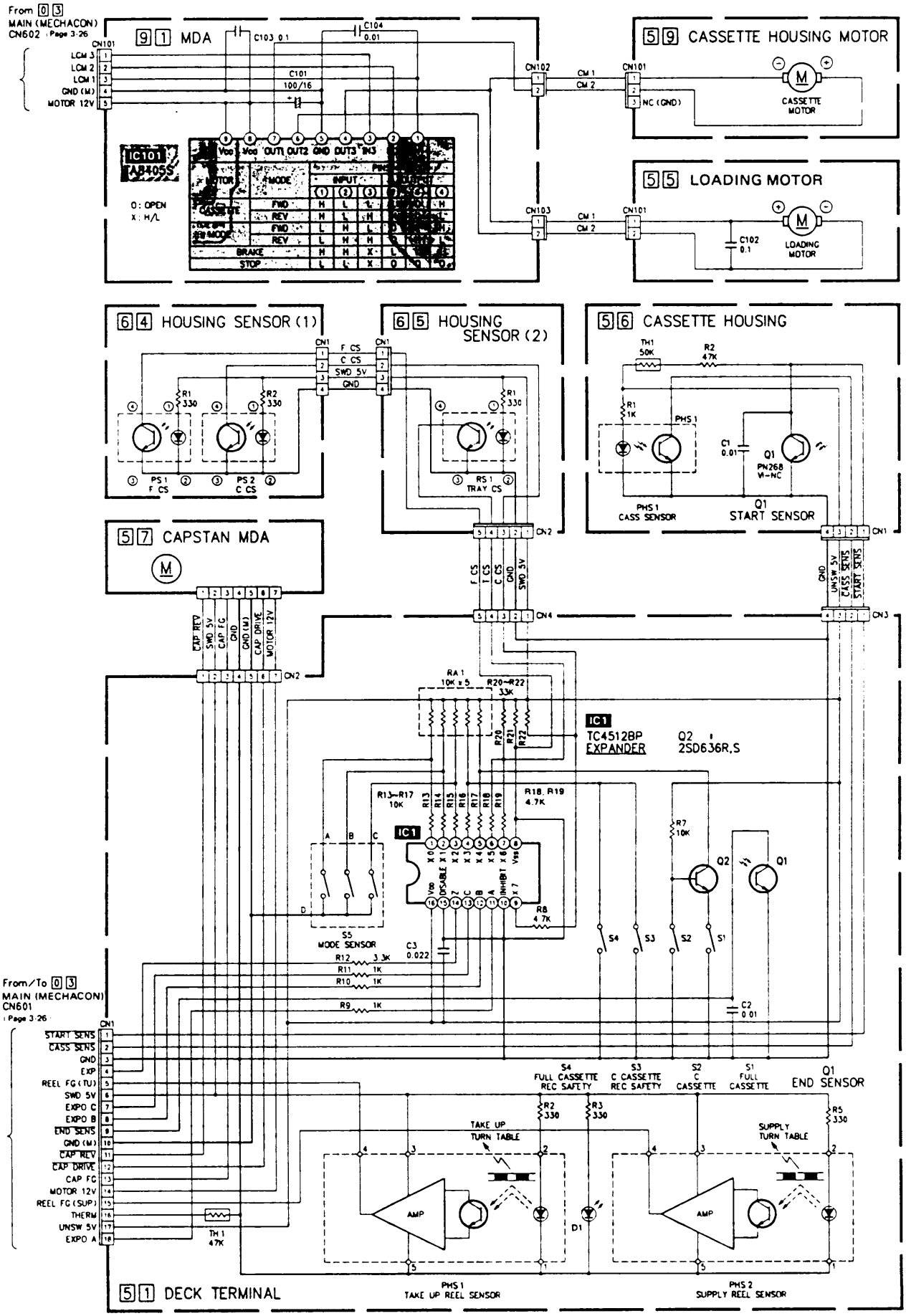
3.12 AUDIO SCHEMATIC DIAGRAM



3.13 SYSTEM CTL SCHEMATIC DIAGRAM

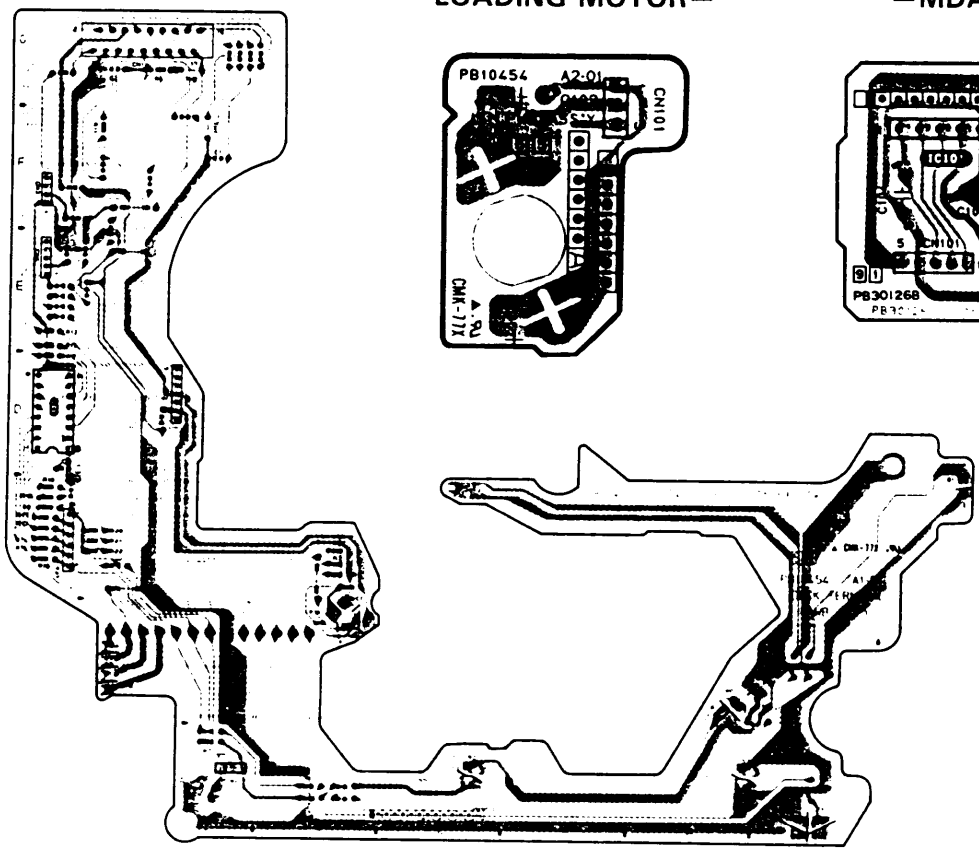


3.14 DECK TERMINAL, LOADING MOTOR, MDA, CASSETTE HOUSING MOTOR, CASSETTE HOUSING, CAPSTAN MDA, HOUSING SENSOR (1) & HOUSING SENSOR (2) SCHEMATIC DIAGRAMS



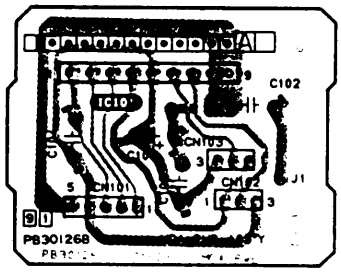
3.15 DECK TERMINAL, LOADING MOTOR, MDA, CASSTTE HOUSING MOTOR, CASSETTE HOUSING, A/CTL HEAD, HOUSING SENSOR (1) & HOUSING SENSOR (2) CIRCUIT BOARDS

—DECK TERMINAL—

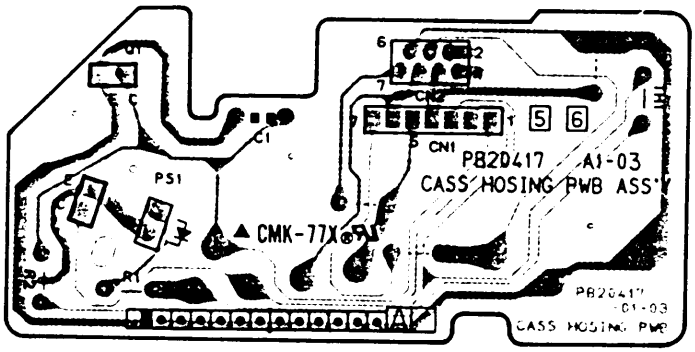


—LOADING MOTOR—

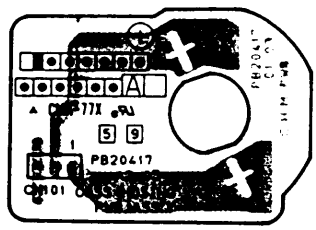
—MDA—



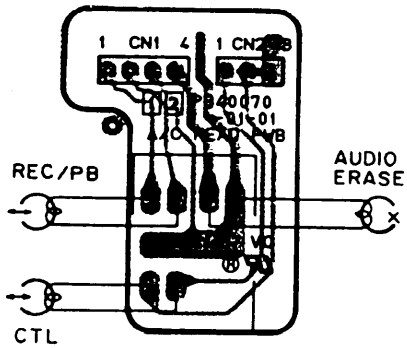
—CASSETTE HOUSING—



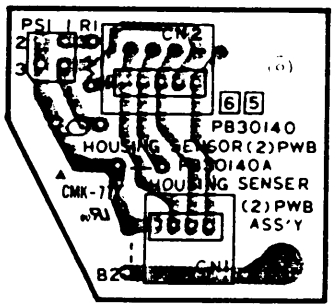
—CASSETTE HOUSING MOTOR—



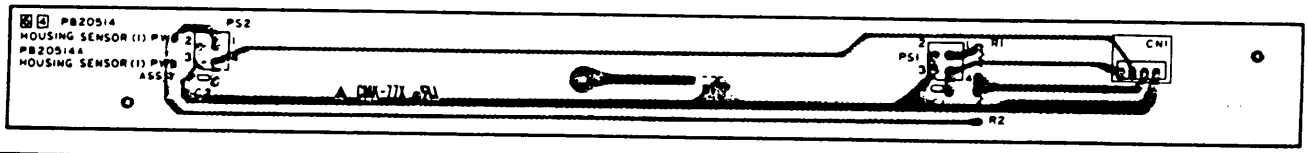
—A/CTL HEAD—



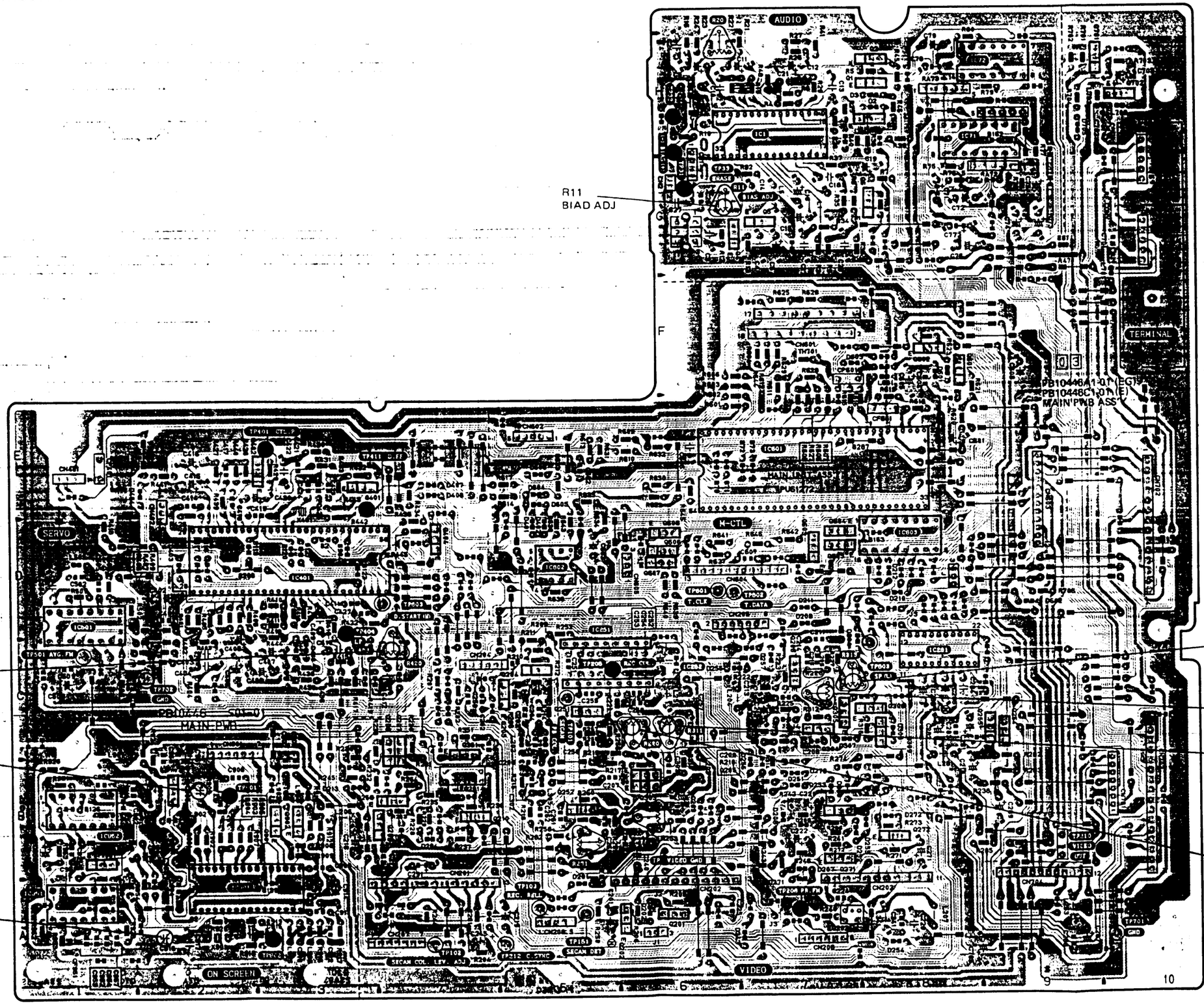
—HOUSING SENSOR (1)—



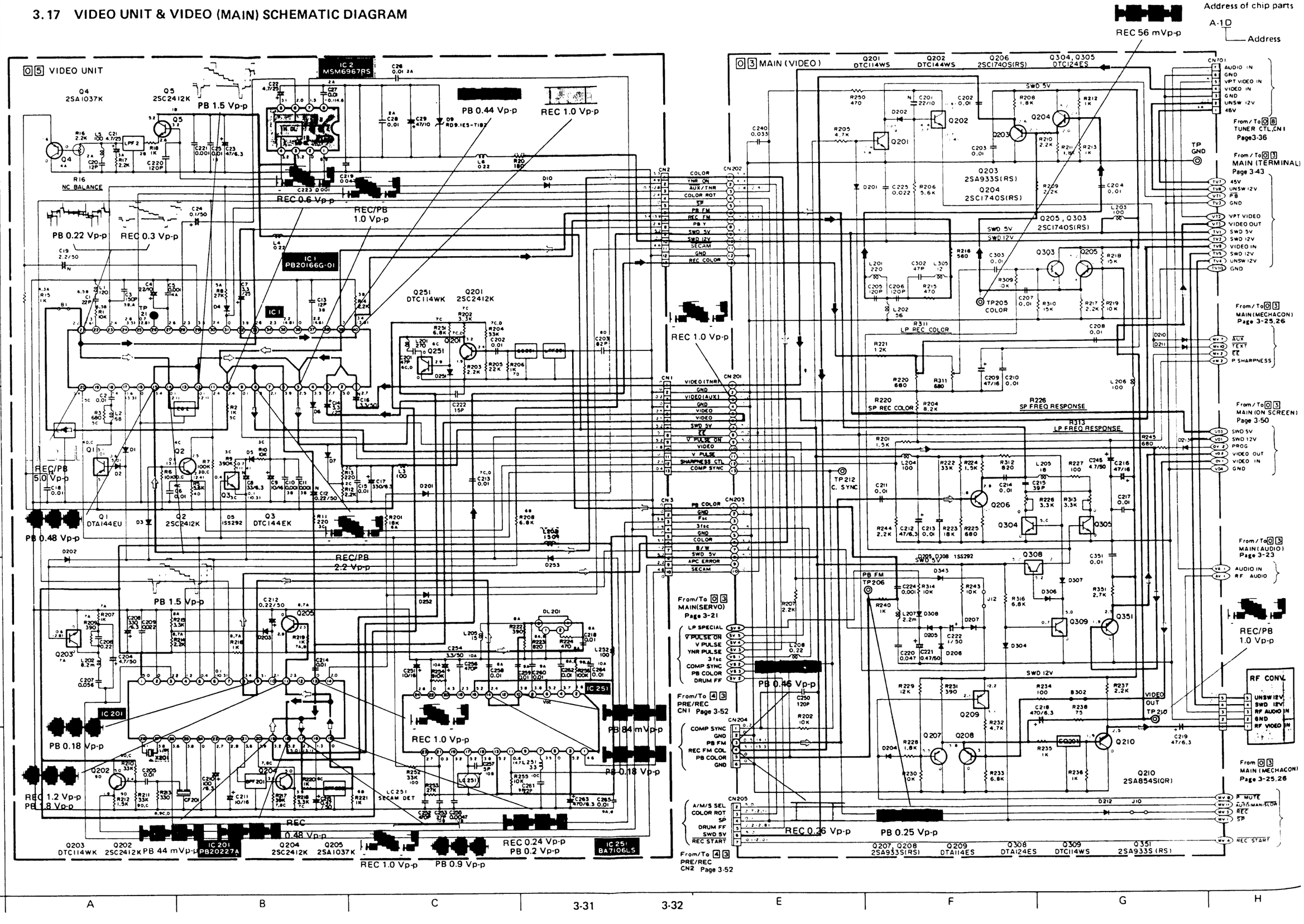
—HOUSING SENSOR (2)—



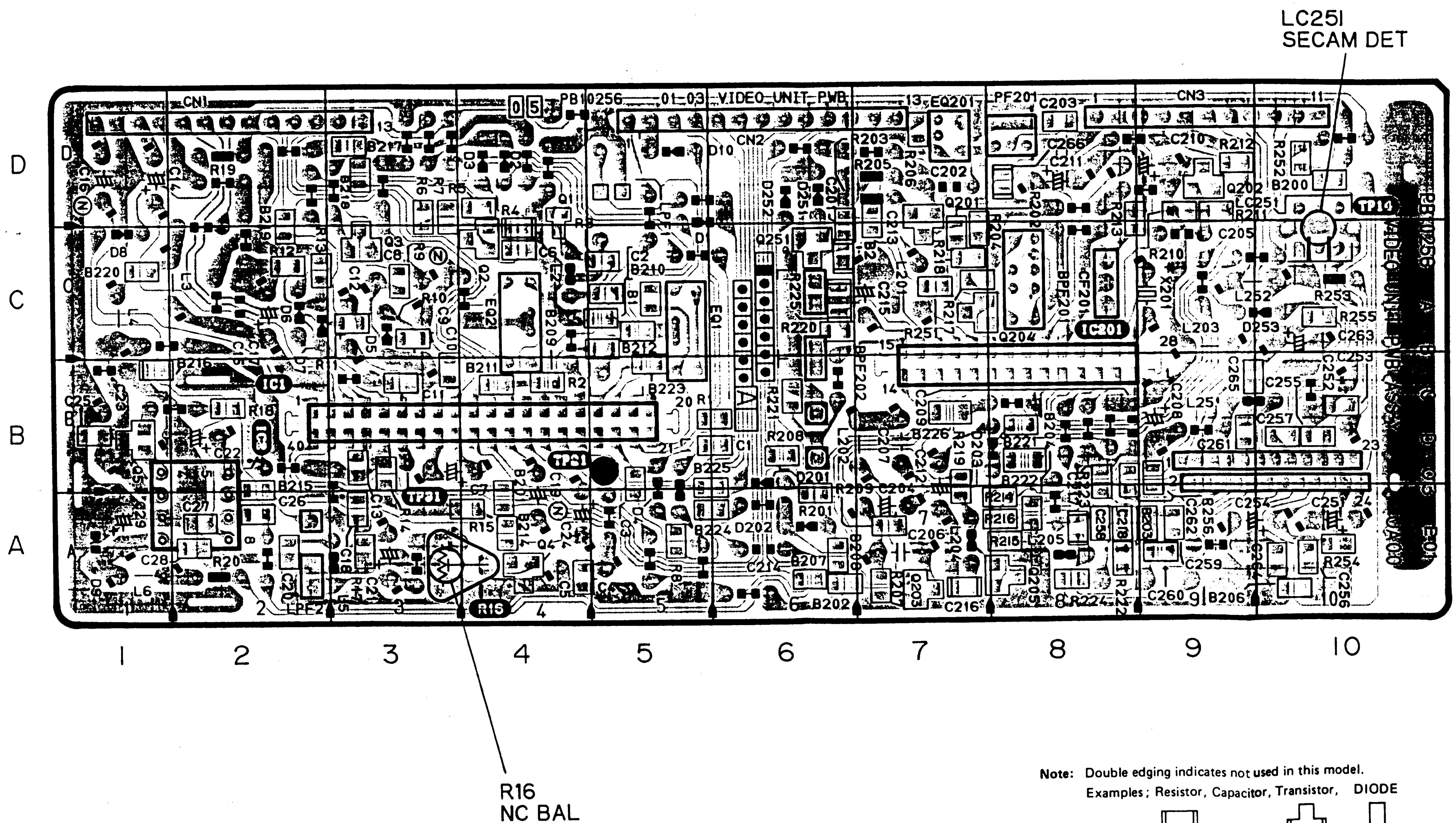
3.16 MAIN CIRCUIT BOARD



3.17 VIDEO UNIT & VIDEO (MAIN) SCHEMATIC DIAGRAM

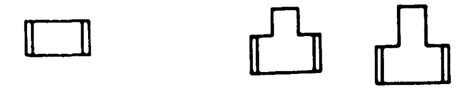


3.18 VIDEO UNIT CIRCUIT BOARD



Note: Double edging indicates not used in this model.

Examples; Resistor, Capacitor, Transistor, DIODE



3.19 IF & TNR CTL SCHEMATIC DIAGRAM

• Address of chip parts
1D
Address

NOTE: Voltages are DC-measured with a digital voltmeter during stop mode.

RF CONV & MIXER

Q2 2SD1863(QR) Q3 2SB810H,J Q4 DTC144ES

CN2
- 4 GND
- 5 A MUTE
- 6 TU CTL
- 7 PLL DATA
- 8 SYNC DET
- 9 S/M/P CLK
- 10 LOCK DET

From/To 05 MAIN (MECHACON) CN604 Page 3-25

CP1 IC5±5V

R8 15K R9 1.8K Q4 Q3 C16 10/16 R7 270 D4 1SS133 D3 RD5.6ES-T1B3 Q2 L5 10 C15 100/16 C7 0.001 C8 180P C5 0.001 C4 0.001 R3 15K C1 100/16 C2 2.2/50 R2 100K L1 0.22 L2 6.8 R32 10K L4 1 C14 33/16 D5 C23 10/50 D1 HZT33-02 C28 2.2/50 L9 5.6 C29 91P R36 56 D2 E-452-2 L7 2.7

JP1 (08)
- 6 SWD 12V
- 5 GND
- 4 VPT
- 3 GND
- 2 VIDEO
- 1 GND

JP1 (18)
- 18 AUDIO
- 17 SYNC DET
- 16 NC
- 15 NC
- 14 MUTE
- 13 NC
- 12 GND
- 11 IF
- 10 NC
- 9 AGC

CN1
- 1 45V
- 2 UNSW 12V
- 3 GND
- 4 VPT VIDEO OUT
- 5 VPT OUT
- 6 GND
- 7 AUDIO OUT

To 03 MAIN (VIDEO) CN701 Page 3-32

08 TUNER CTL

07 IF

Q4 2SA933S(S) Q13 DTC144ES Q15 2SK381(C) Q11 2SC1740(RS) Q9 2SD1450S,T

R86 2.2K R84 39K Q15 R100 1M R38 1.8K R87 2.2K Q4 R40 COLOR LEVEL R39 2.7K Q13 R88 10K Q9 R85 7.5K C29 47P R40 10K L5 22 R54 8.2K C33 0.47/50 R52 22K R110 68K C64 390P C63 0.001 R47 15K R102 2.2K R83 330 C56 33/16 Q7 R51 22K D6 DA204U C32 0.022 T5 SYNC 15.625 KHz C31 3.3/50 R53 10K Q6 Q5 R46 100K R45 470 R101 2.2K Q11 R50 470 R48 3.9K R49 10K R82 68

Q7 2SC1740(RS) Q6 FMS2 Q5 2SD1819A(RS)

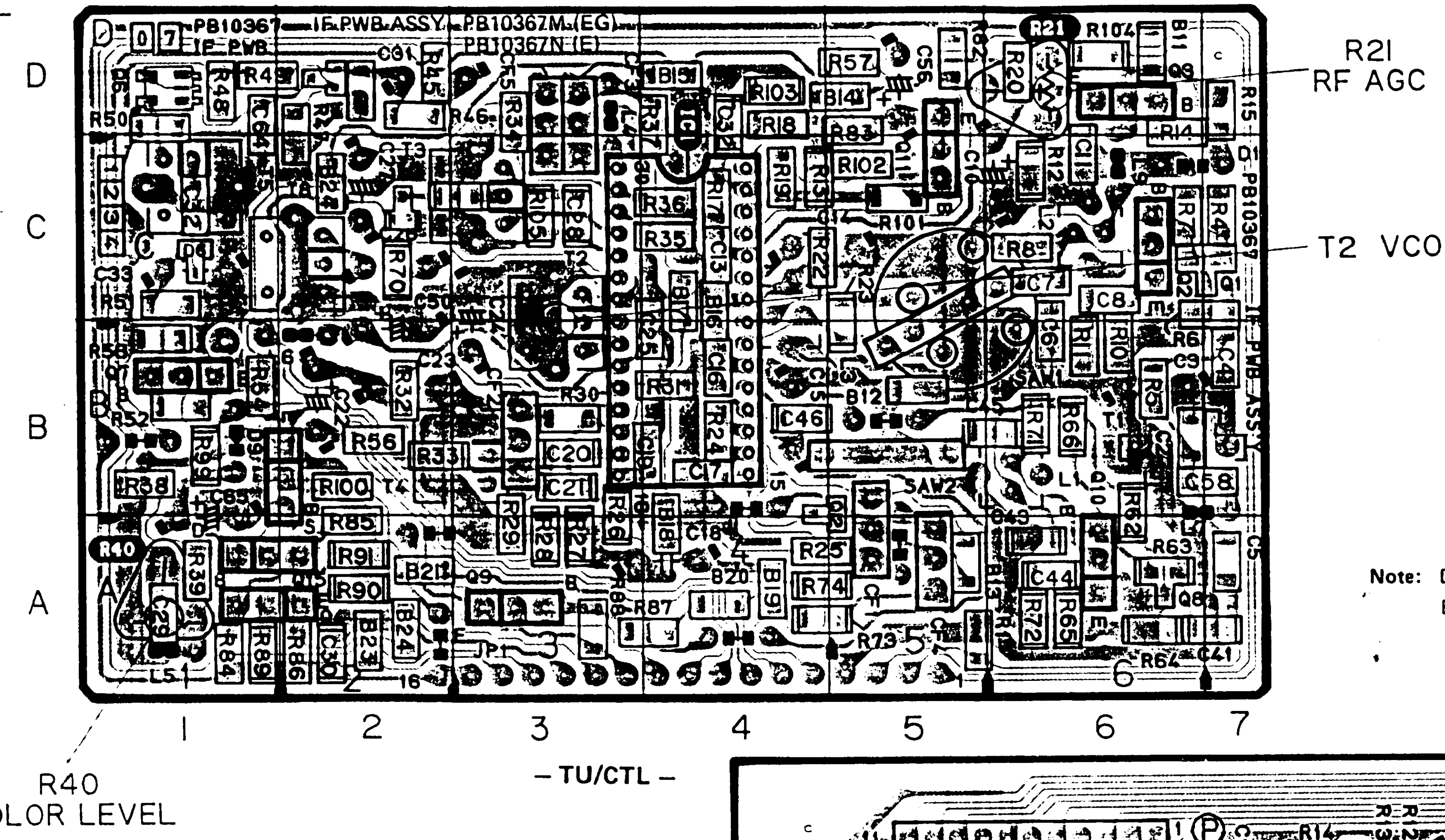
IC1 M51365SP

R25 470 CF1 5.5MHz C17 0.022 R24 820 C19 0.01 R56 2.2K C20 10P R29 680 Q12 R30 330 CF2 5.5MHz R31 3.3K LIM FM DE C15 33/16 C16 0.0022 R32 10K C23 0.022 C22 1/50 SIF DET L9 6.8 R5 150 R4 3.9K C24 1/50 C3 0.001 C58 10P C4 4.7P R8 680 L2 E 10 EG 082 C6 0.0022 T2 VCO 38.9MHz C2 3.9P T1 40.37 MHz R7 2.2K SAW 1 L3 1.5 VCD C25 0.0022 R1 75 C3 100P R6 2.7K Q1 Q2 C7 0.001 C8 0.001 R10 470 R11 100 L7 0.22 C14 0.47/25 IF AGC C27 0.47/50 PHASE DET C50 33/16 R22 820K R34 47 R36 560 C10 100/16 C11 0.01 D1 MTZ10D AFC C13 0.0022 R20 2.2K R21 4.7K R19 2.2K L6 6.8 R14 100 Q3 R21 RF AGC VIDEO DET R35 560 R15 270 R18 3.3K LOCK CTL EQ BNC R57 15K CF3 5.5MHz R17 5.6K CF5 6.5MHz L4 8.2 R37 120

Q1 2SA1532(C) Q2 2SC3354 Q3 2SC1317(RS) Q12 DTC144EU

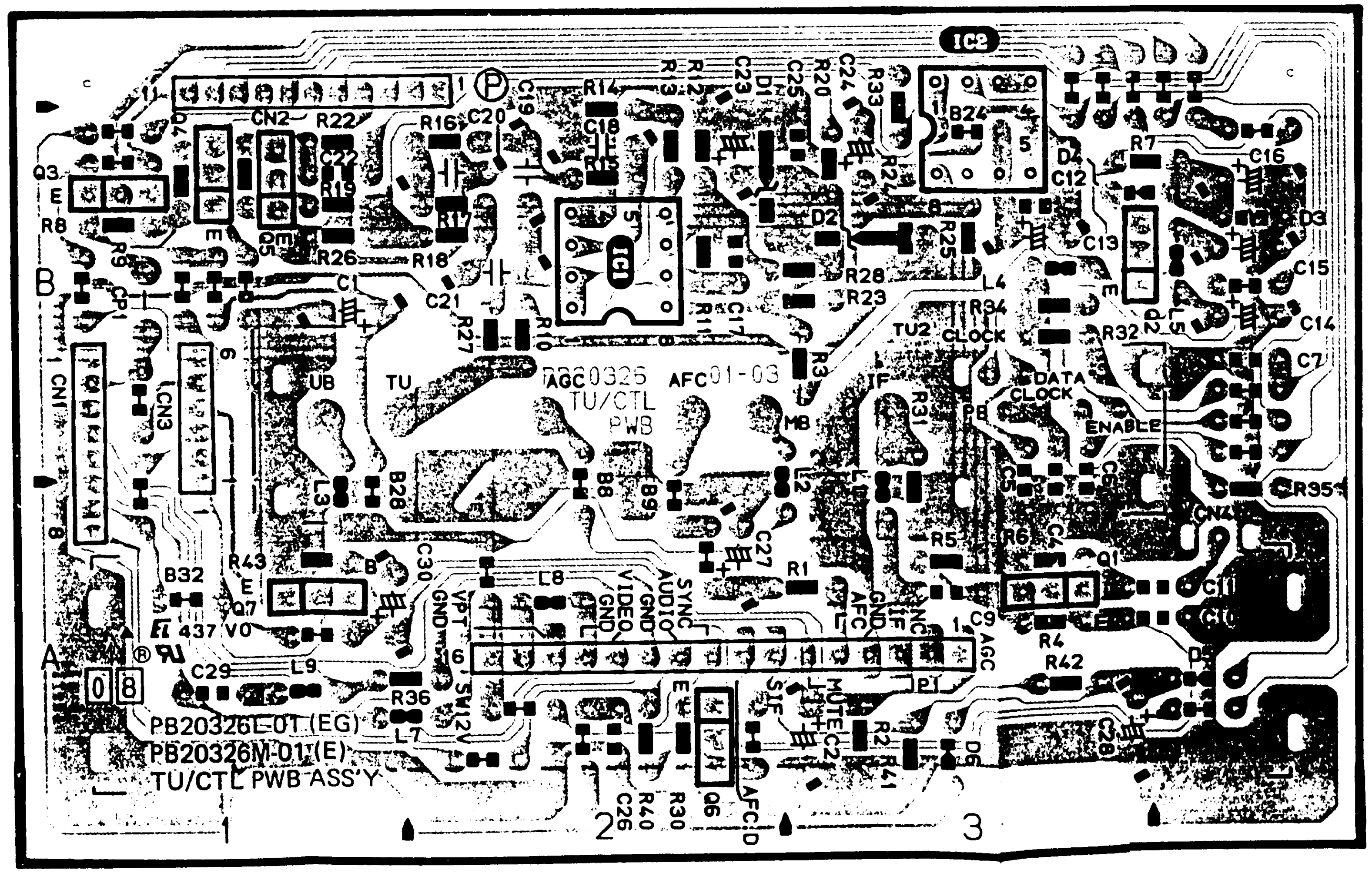
3.20 IF & TNR CTL CIRCUIT BOARD

– IF –



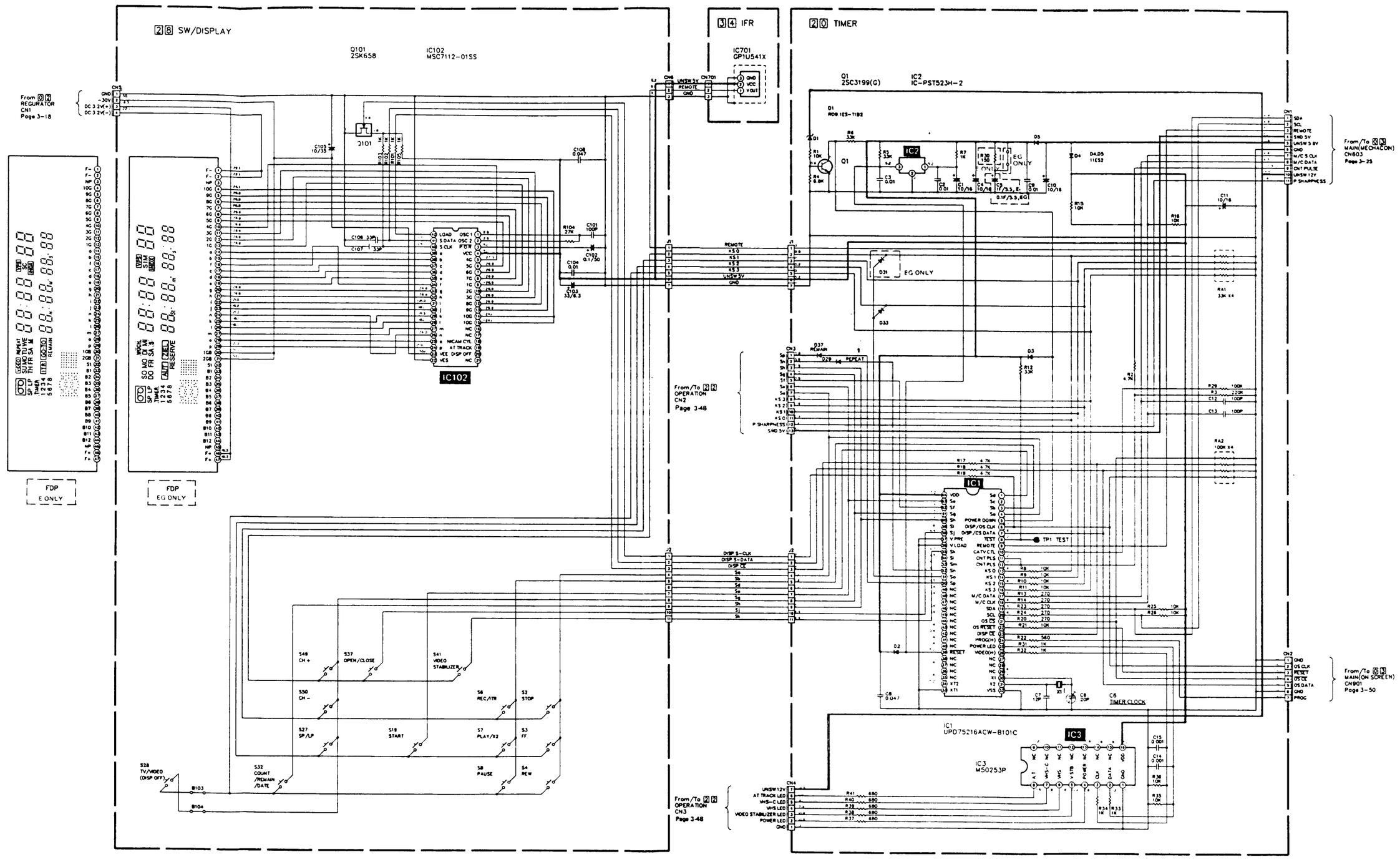
Note: Double edging indicates not used in this model.
Examples; Resistor, Capacitor, Transistor, DIODE

– TU/CTL –



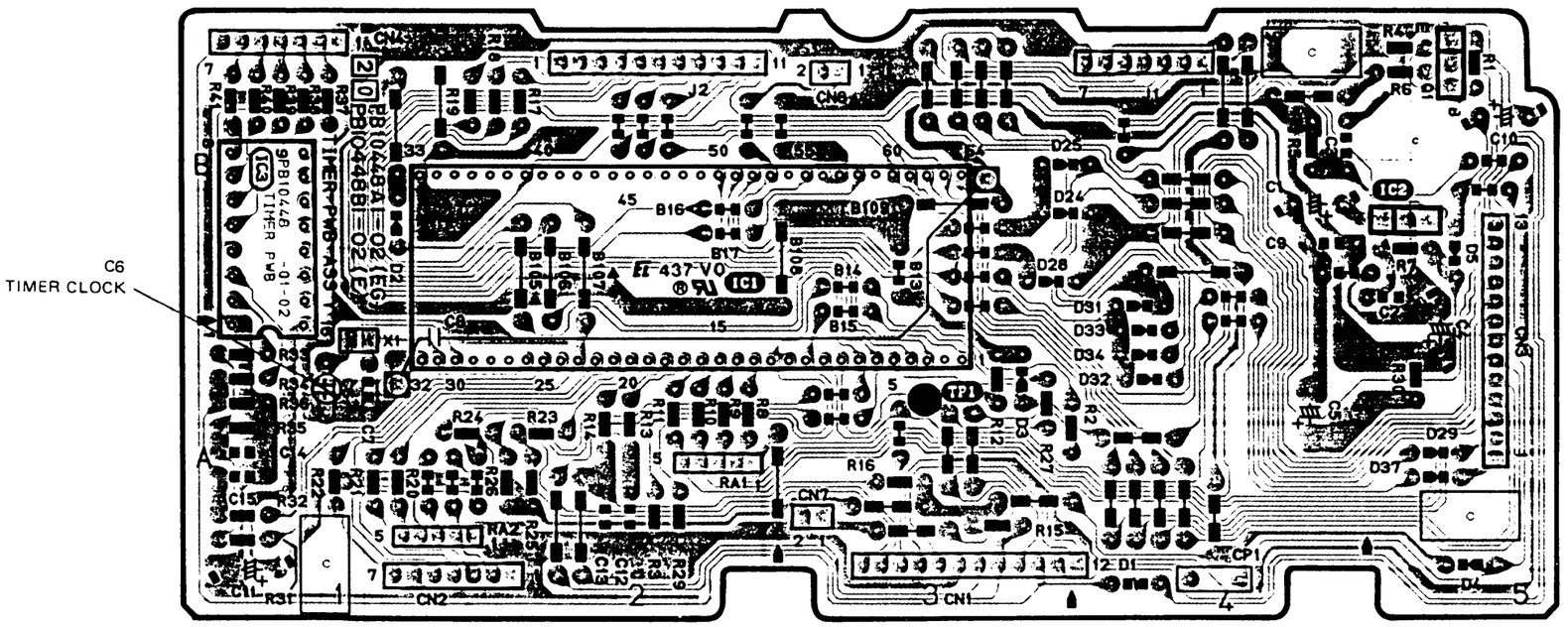
3.21 TIMER AND SWITCH/DISPLAY SCHEMATIC DIAGRAM

NOTE: Voltages are DC-measured with a digital voltmeter during stop mode.

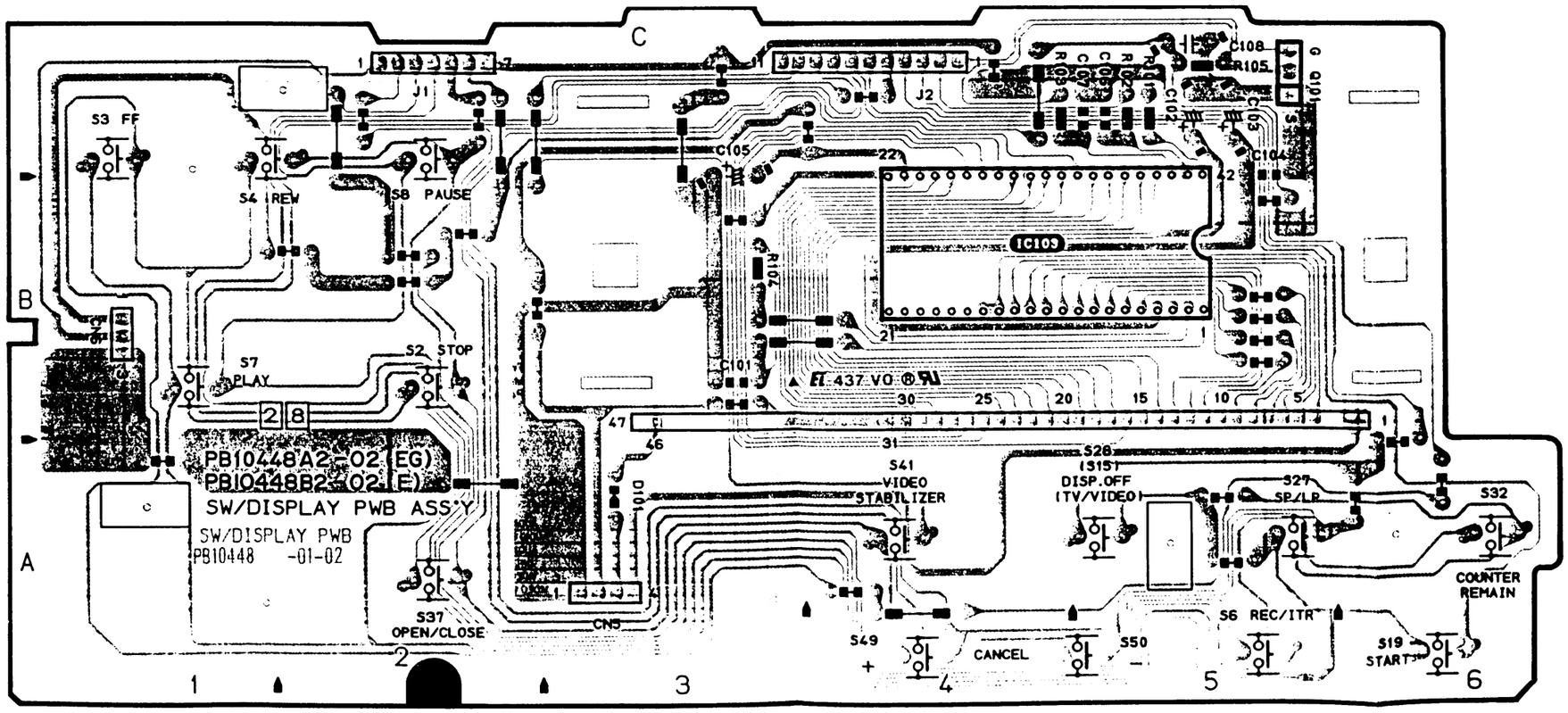


3.22 TIMER AND SWITCH/DISPLAY CIRCUIT BOARDS

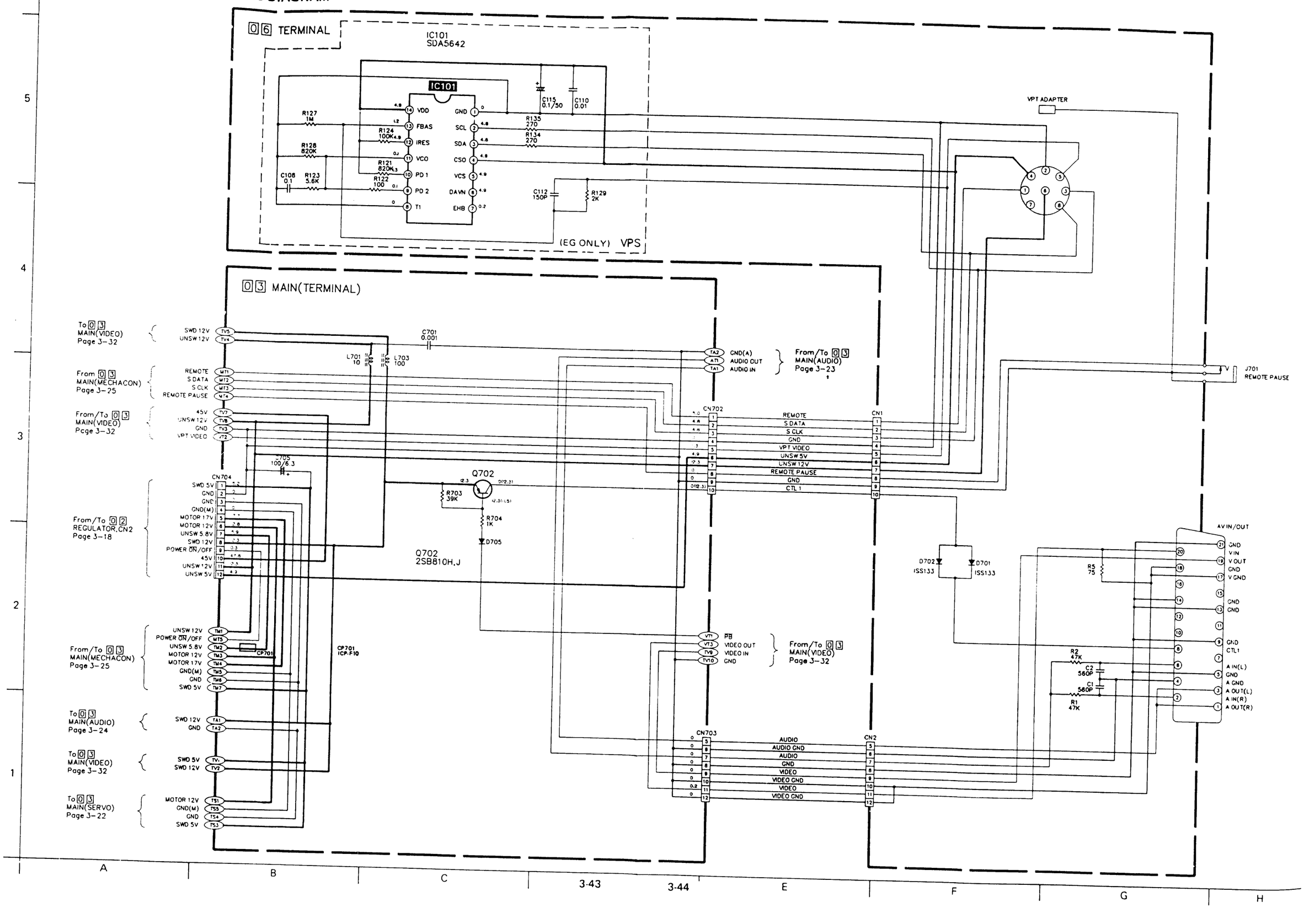
– TIMER –



– SWITCH/DISPLAY –

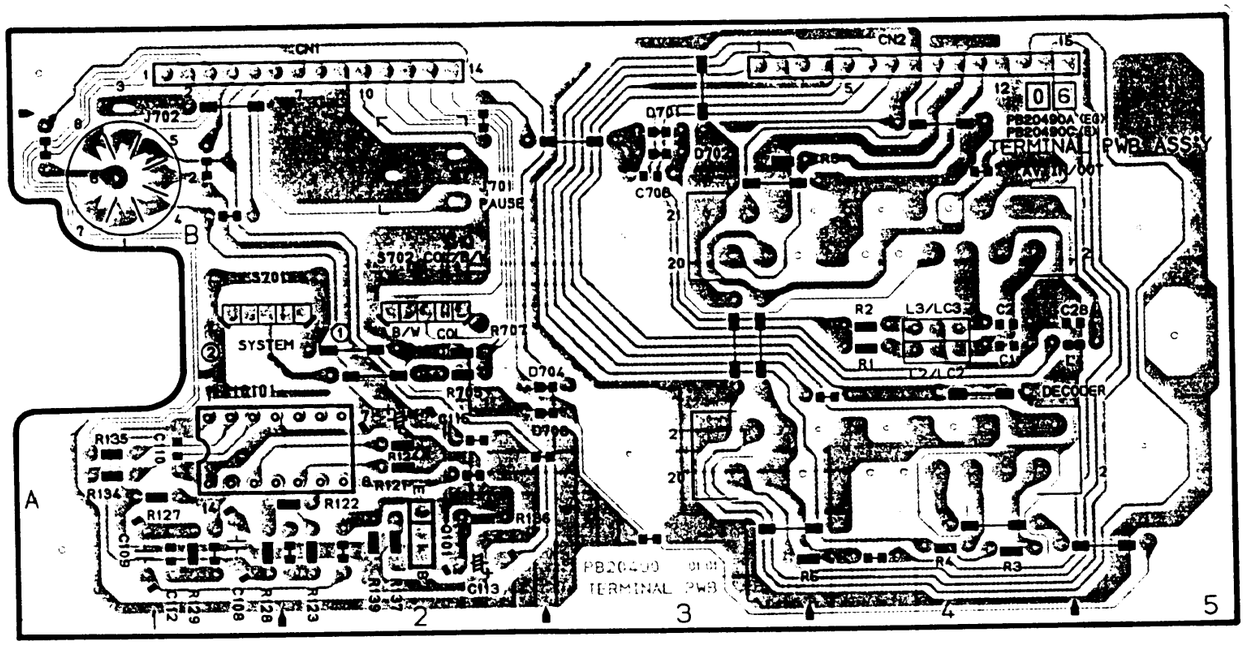


3.23 TERMINAL SCHEMATIC DIAGRAM

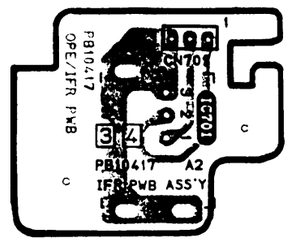


3.24 TERMINAL, LED, IFR AND OPERATION CIRCUIT BOARDS

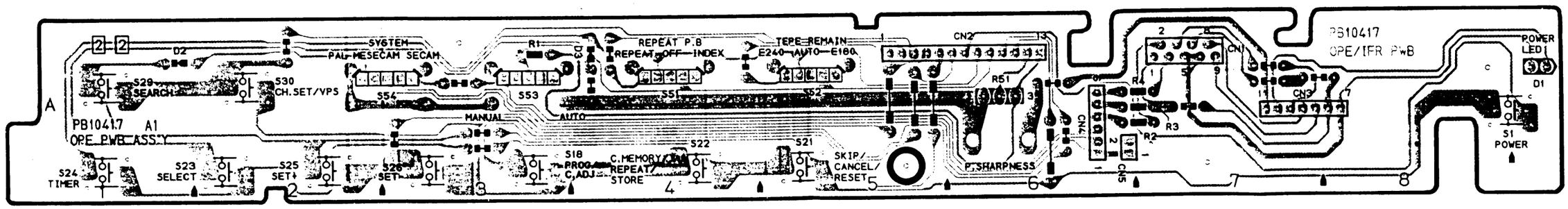
– TERMINAL –



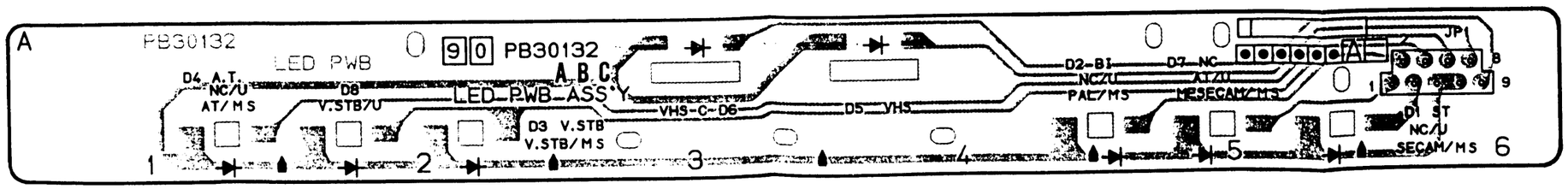
– IFR –



– OPERATION –

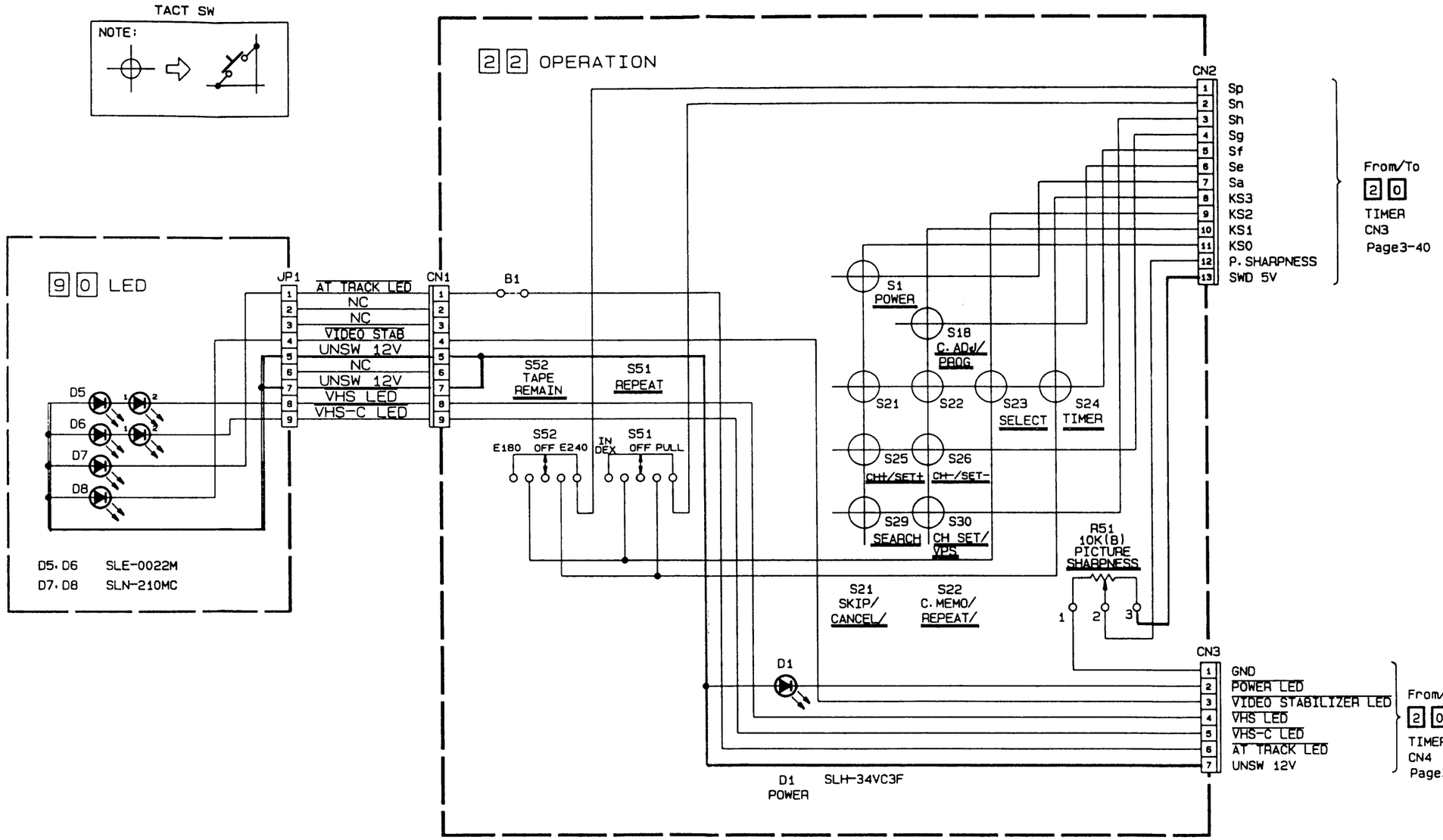


– LED –

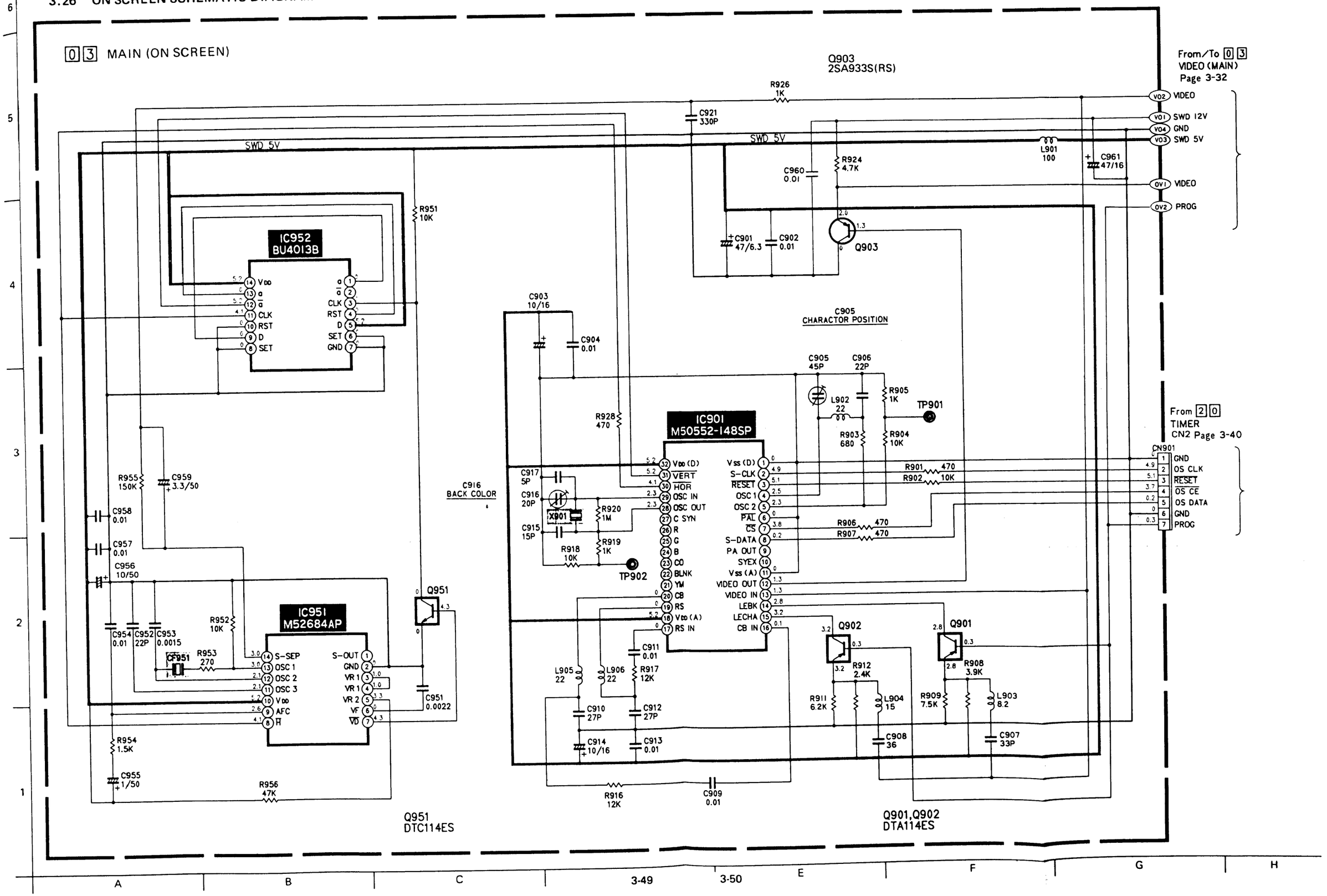


A | B | C | 3-45 | 3-46 | E | F | G | H

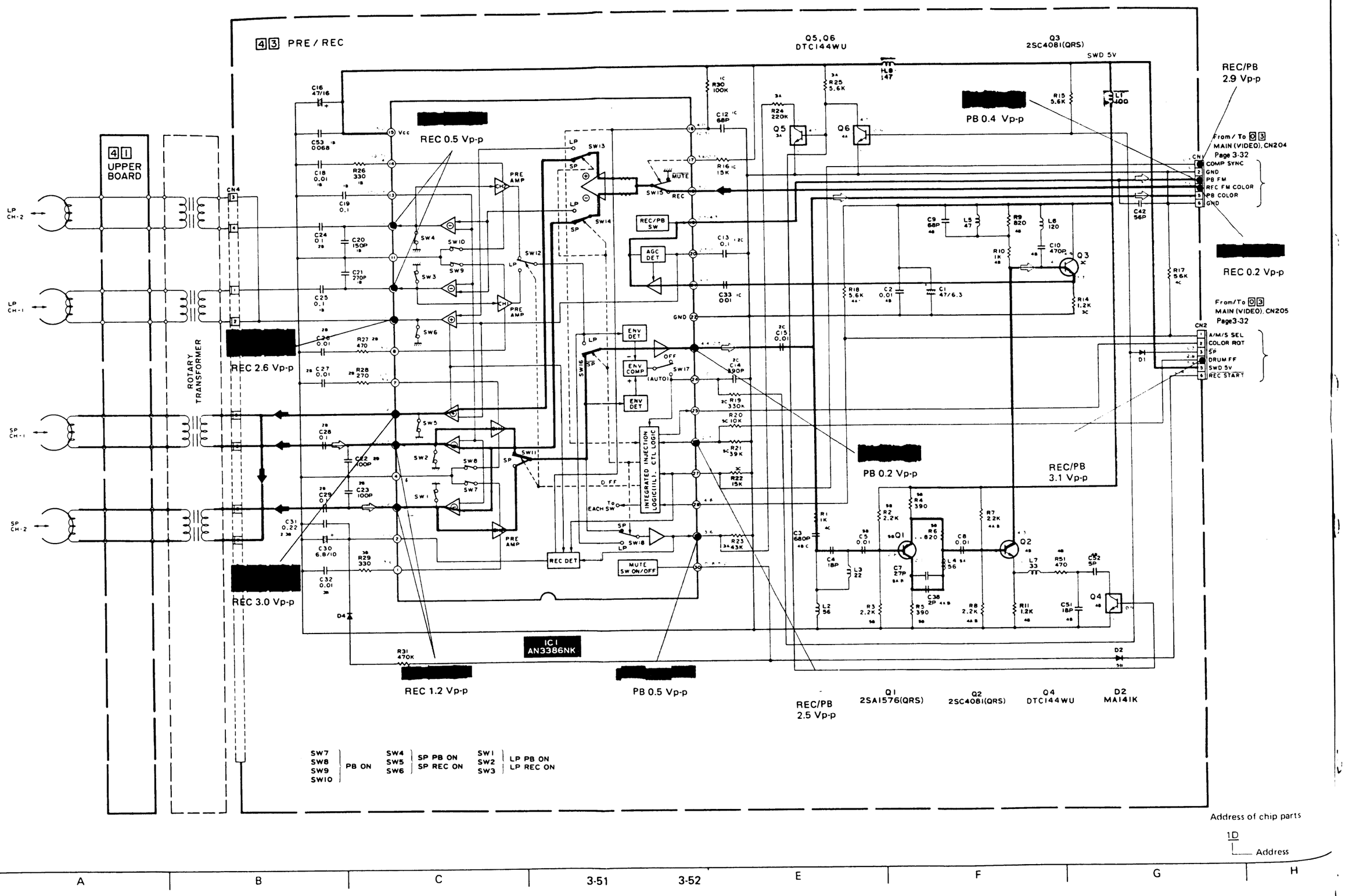
3.25 OPERATION, LED AND IFR SCHEMATIC DIAGRAMS



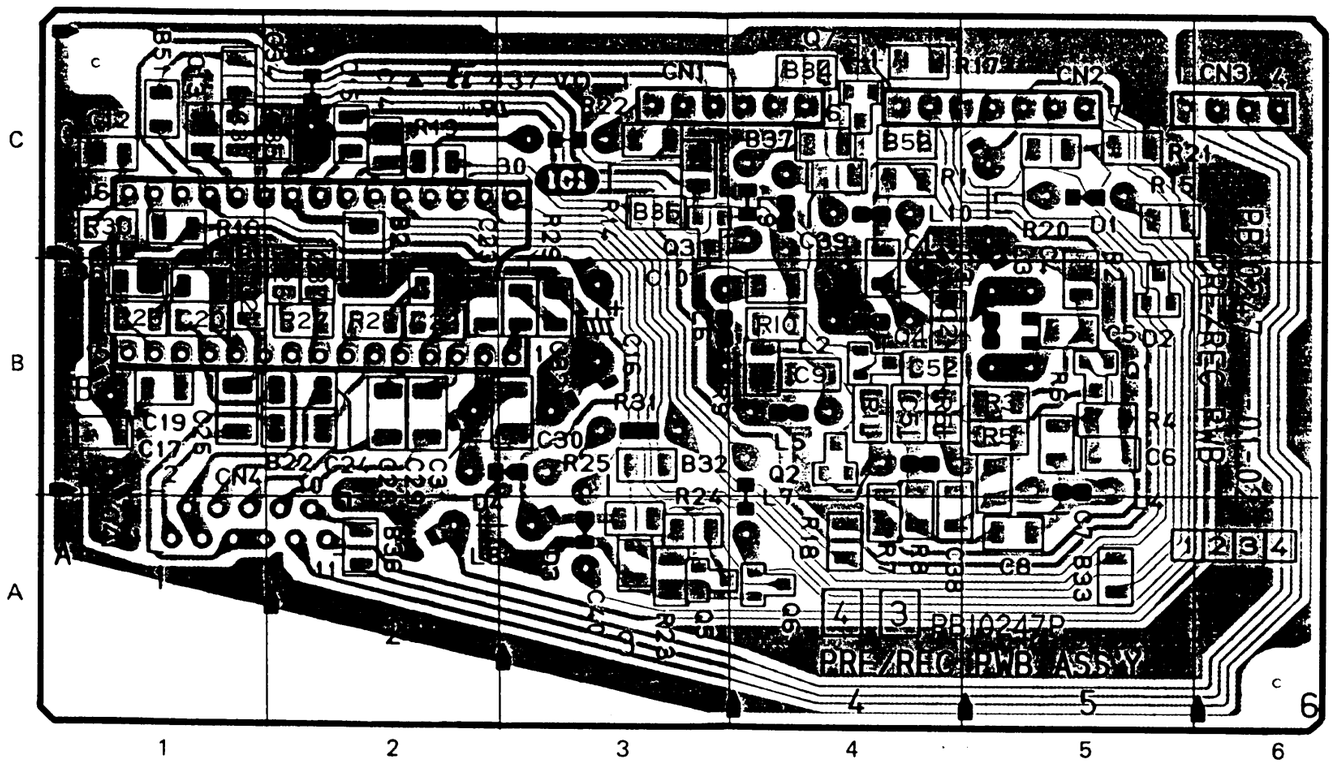
3.26 ON SCREEN SCHEMATIC DIAGRAM



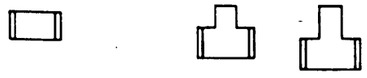
3.27 PRE/REC SCHEMATIC DIAGRAM



3.28 PRE/REC CIRCUIT BOARD

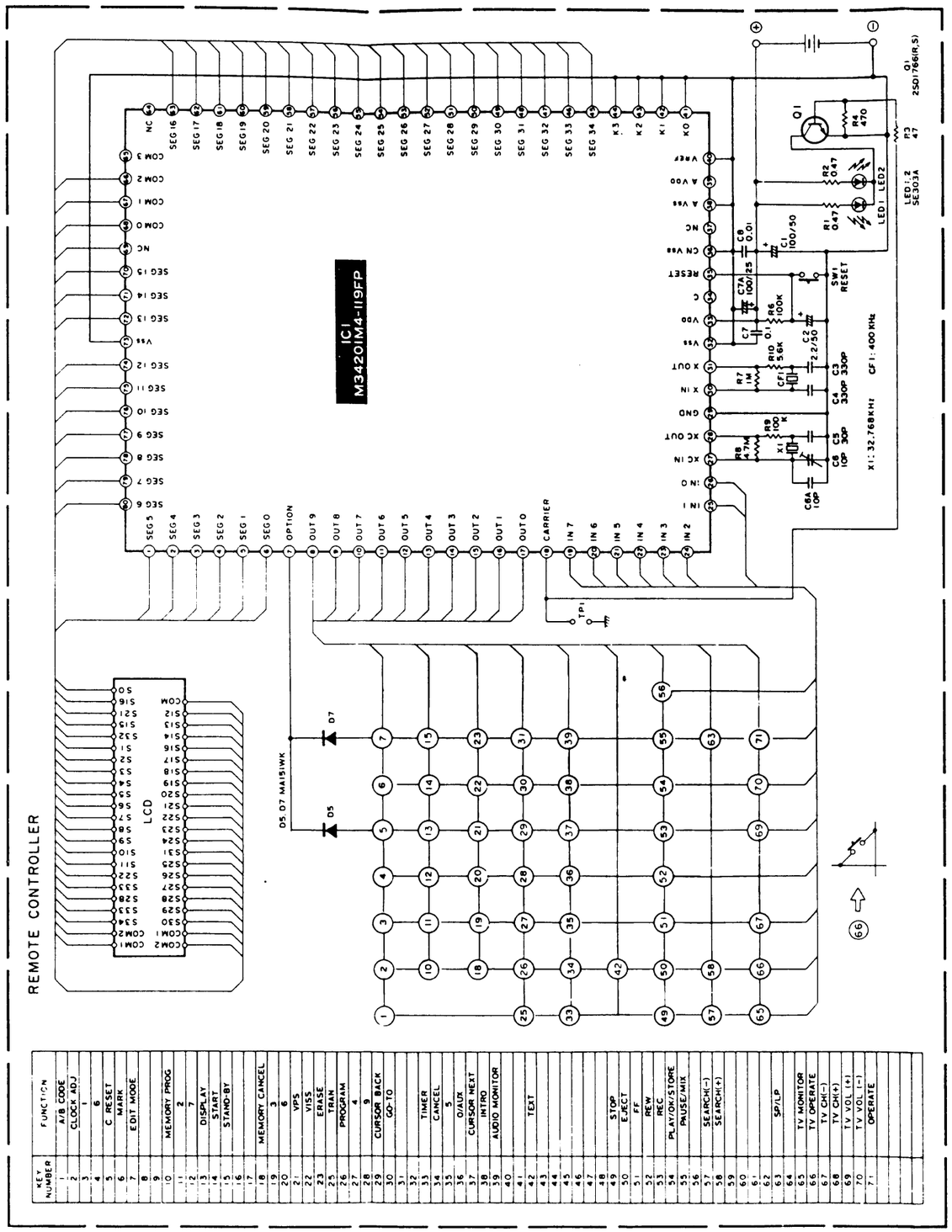


Note: Double edging indicates not used in this model.
Examples; Resistor, Capacitor, Transistor, DIODE



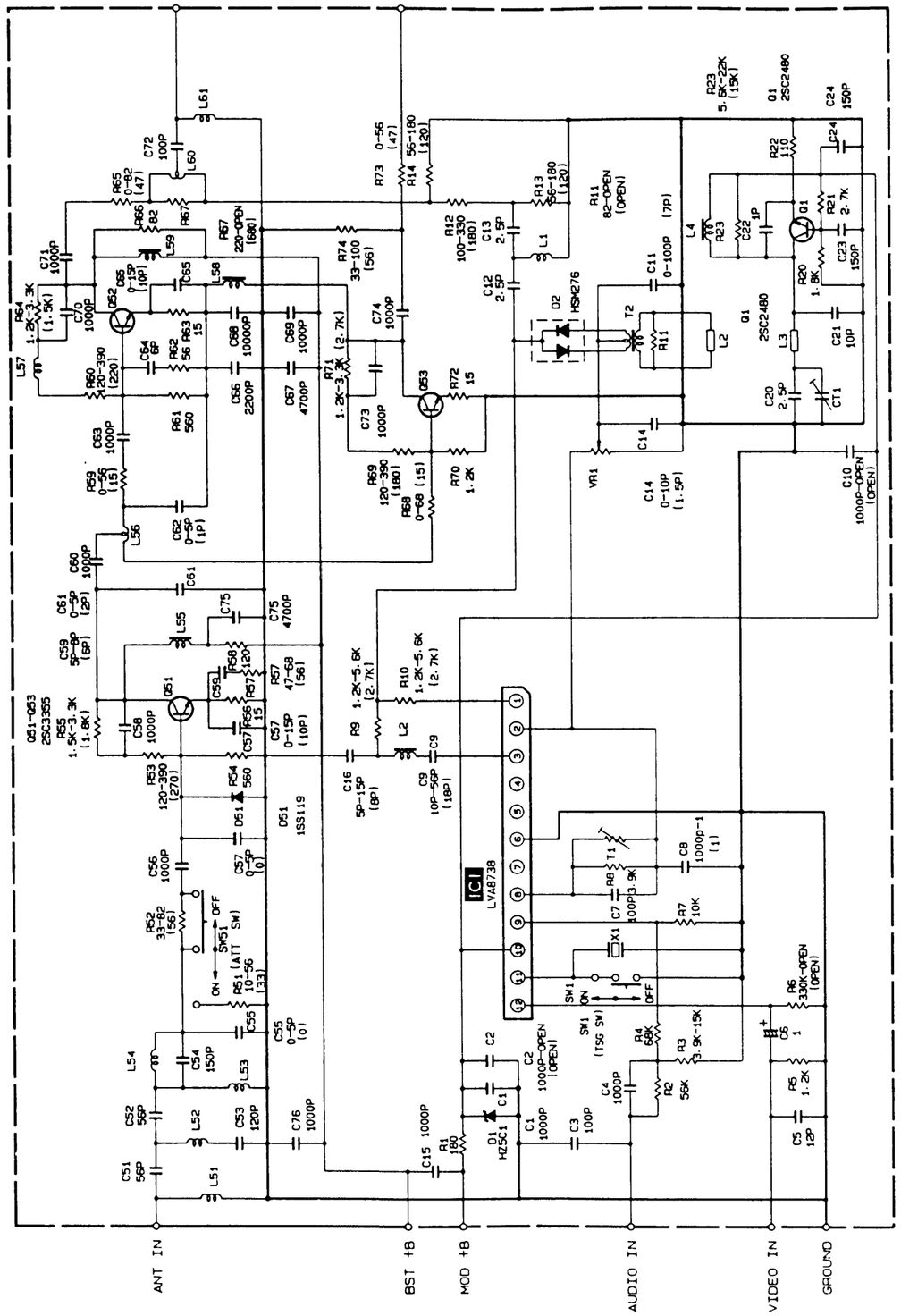
3.29 REMOTE CONTROL SCHEMATIC DIAGRAM

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 entrie unit only.



3.30 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.

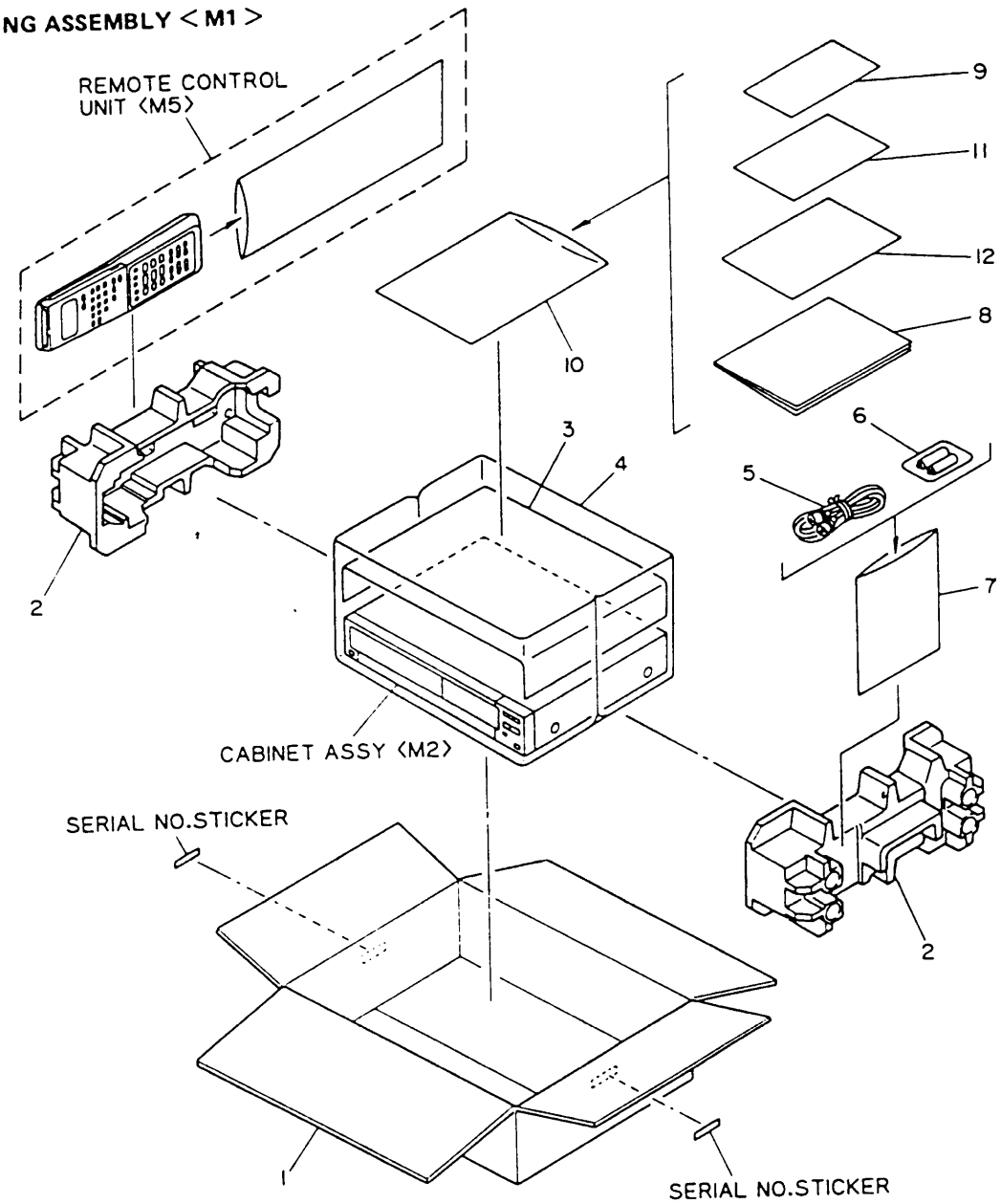


SECTION 4
EXPLODED VIEWS AND PARTS LIST

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>

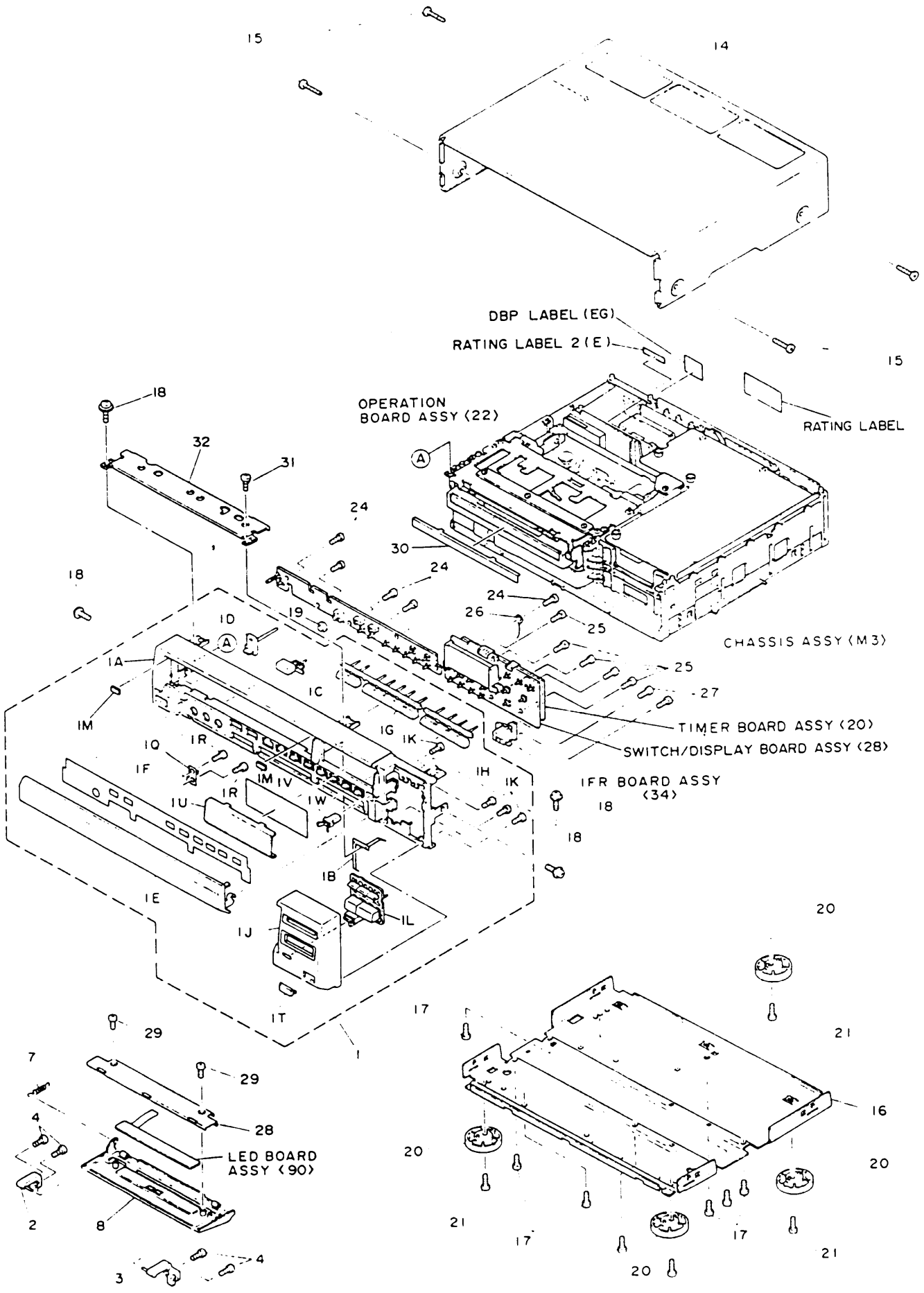


#△ REF No.	PART No.	PART NAME, DESCRIPTION
**********	**********	**********

PACKING ASSEMBLY <M1>

1	PQ33565-3	PACKING CASE, EG
1	PQ33565-4	PACKING CASE, E
2	PQ33447A	CUSHION ASSY
3	PQ41026-21	PROTECT SHEET
4	PQM30021-70	POLY BAG
5	PU59168-3	RF CABLE
	or PU59167-3	RF CABLE
6	UM-3DJ2P	BATTERY, X2
7	QPGA020-02005	POLY BAG
△ 8	PU30425-1168	INSTRUCTIONS, EG
△ 8	PU30425-1169	INSTRUCTIONS, E
9	TCN-3379	TAPE CATALOG
10	QPGA025-03505	POLY BAG
11	BT-20114	WARRANTY CARD, EG
△ 12	—	DBP INF SHEET, EG

4.2 CABINET ASSEMBLY < M2 >



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

CABINET ASSEMBLY <M2>

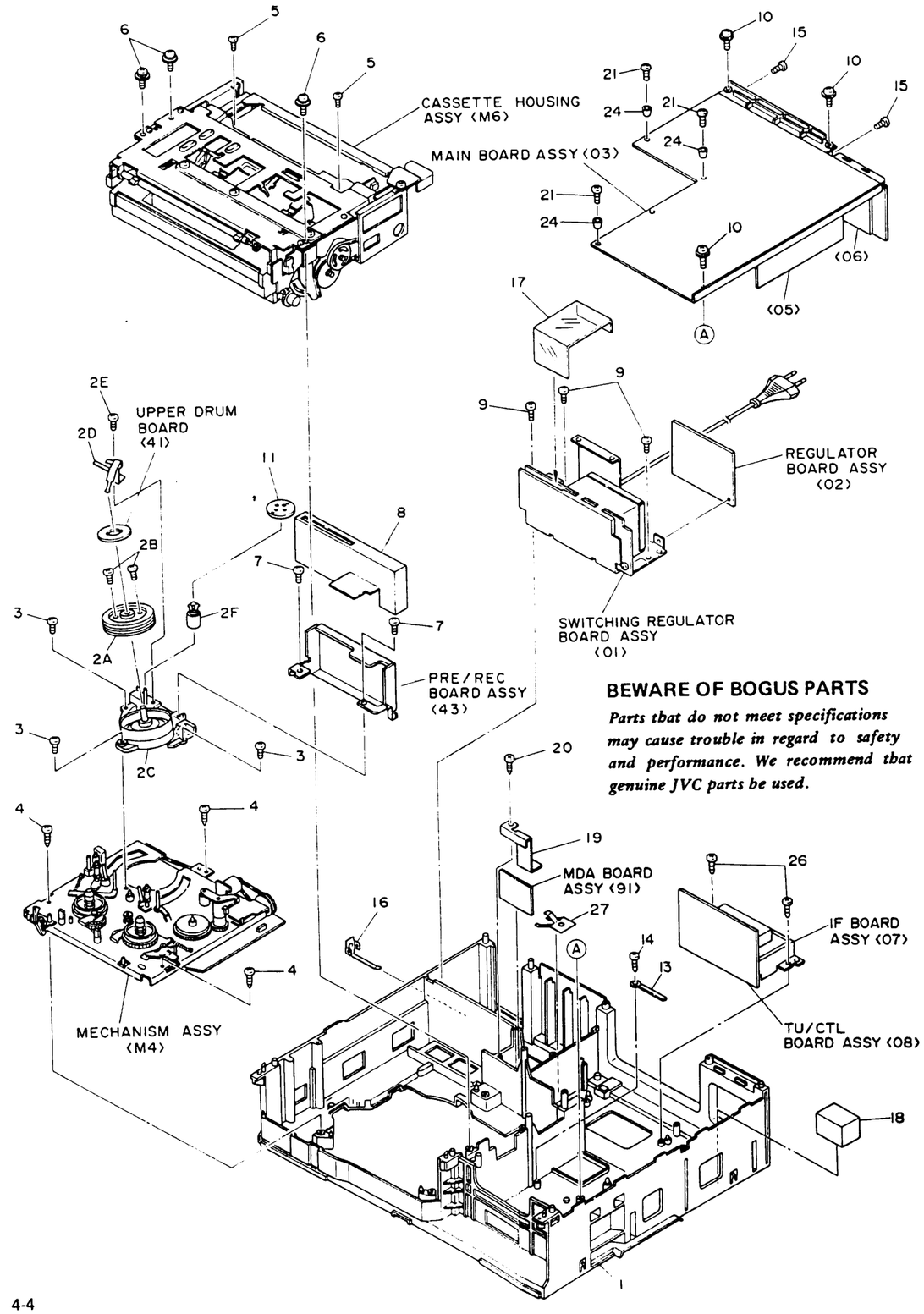
1	PQ10996D-5	FRONT PANEL ASSY, E
1	PQ10996C-5	FRONT PANEL ASSY, EG
△ 1A	PQ10997-3-2	FRONT PANEL
1B	PQ33449	EARTH PLATE
1C	PQ33423-4	BUTTON(POWER)
1C	PQ33423-3	BUTTON(POWER)
1D	PQ44666	INDICATOR
1E	PQ33344D	DOOR ASSY, E
1E	PQ33344C	DOOR ASSY, EG
1F	PQ21048-4	PLATE(PROG)
1F	PQ21048-3	PLATE(PROG)
1G	PQ33345-3	BUTTON(PROG.1)
1G	PQ33345-4	BUTTON(PROG.1)
1H	PQ33346-3	BUTTON(PROG.2)
1H	PQ33346-2	BUTTON(PROG.2)
1J	PQ21097-2	COVER
1J	PQ21097	COVER
1K	SDSF2608Z	SCREW, X4 FOR COVER
1L	PQ21094-1-1	BUTTON(OPE)
1M	PQM30029-154	SPACER, X2
1Q	PQ44669	BRACKET(SPRING)
1R	SDSF2606Z	SCREW, X2 FOR BRACKET(SPRING)
1T	PQ44668	WINDOW(IR)
1U	PQ33349	WINDOW
1V	PQ33442	SHEET(FRONT)
1W	PU60005	PUSH OPEN UNIT
2	PQ33445A	SHAFT(L) ASSY
3	PQ33444A	SHAFT(R) ASSY
4	SSSF2606M	SCREW, X4 FOR SHAFT(L)(R)
7	PQM30001-284	TENSION SPRING
8	PQ21056C	DOOR(LED) ASSY
8	PQ21056B	DOOR(LED) ASS'Y
△ 14	PQ10911-3	TOP COVER
15	PQ43827	SPECIAL SCREW,X4 FOR TOP COVER
△ 16	PQ10912-1-3	BOTTOM COVER
17	SDSF3008Z	SCREW,X7 FOR BOTTOM COVER
18	GPSF2610Z	SCREW, X4 FOR FRONT PANEL
19	PQ44257	KNOB(VOLUME)
20	PQ43749C	FOOT ASSY
21	SDSG3010Z	SCREW, X4 FOR FOOT ASSY
24	SDSF2608Z	SCREW, X5 FOR OPERATION BOARD
25	SDSF2608Z	SCREW, X5 FOR TIMER BOARD
26	PU49485-3	WIRE CLAMP
27	SDSF2608Z	SCREW, X2 FOR IFR BOARD
28	PQ33581A	COVER ASSY
29	SDSF2005M	SCREW, X2
△ 30	PQ33164-1-1	PLATE
31	SDSF2610Z	SCREW, FOR BRACKET
32	PQ33577-1-1	BRACKET

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

CHASSIS ASSEMBLY <M3>

△ 1	PQ10910-2-7	BOTTOM CHASSIS
2A	PDM2002B-2	UPPER DRUM ASSY
2B	PDM4165A	DRUM SCREW ASSEMBLY, X2
2C	PDM2138T	LOWER DRUM MOTOR ASSEMBLY
2D	PDM4237A-2	BRUSH ASSEMBLY
2E	SPSG2606Z	SCREW, FOR BRUSH ASSY
2F	PDM4234A	ROLLER ASSEMBLY
3	SDSP2608Z	SCREW,X3 FOR DRUM
4	PQ43831	SPECIAL SCREW,X3 FOR MAIN DECK
5	SPST2606Z	SCREW,X2 FOR CASSETTE HOUSING
6	GPSF2610Z	SCREW,X3 FOR CASSETTE HOUSING
7	SDSG2606Z	SCREW,X2 FOR PRE/REC BOARD
8	PQ21112	SHIELD CASE(2)
9	PQ43831	SPCL SCREW,X3 FOR SW REG BOARD
10	GPSF2610Z	SCREW,X3 FOR MAIN BOARD
11	PQ44230	INERTIA PLATE
13	PU49485-4	WIRE CLAMP
14	SDSF2608Z	SCREW
15	SDSF3010M	SCREW,X2 FOR TERMINAL BOARD
16	PQ43876	EARTH PLATE
△ 17	PQ32987	COVER(AC)
18	PQM30029-144	SPACER
19	PQ44803	BRACKET
20	SDSF2608Z	SCREW
21	SDSF2610Z	SCREW,X3 FOR MAIN BOARD
24	PQ44901-1-2	HOLDER,X3
26	SDSF3008Z	SCREW, X2 FOR TUNER, IF BOARD
27	PQ45052	EARTH PLATE, EG

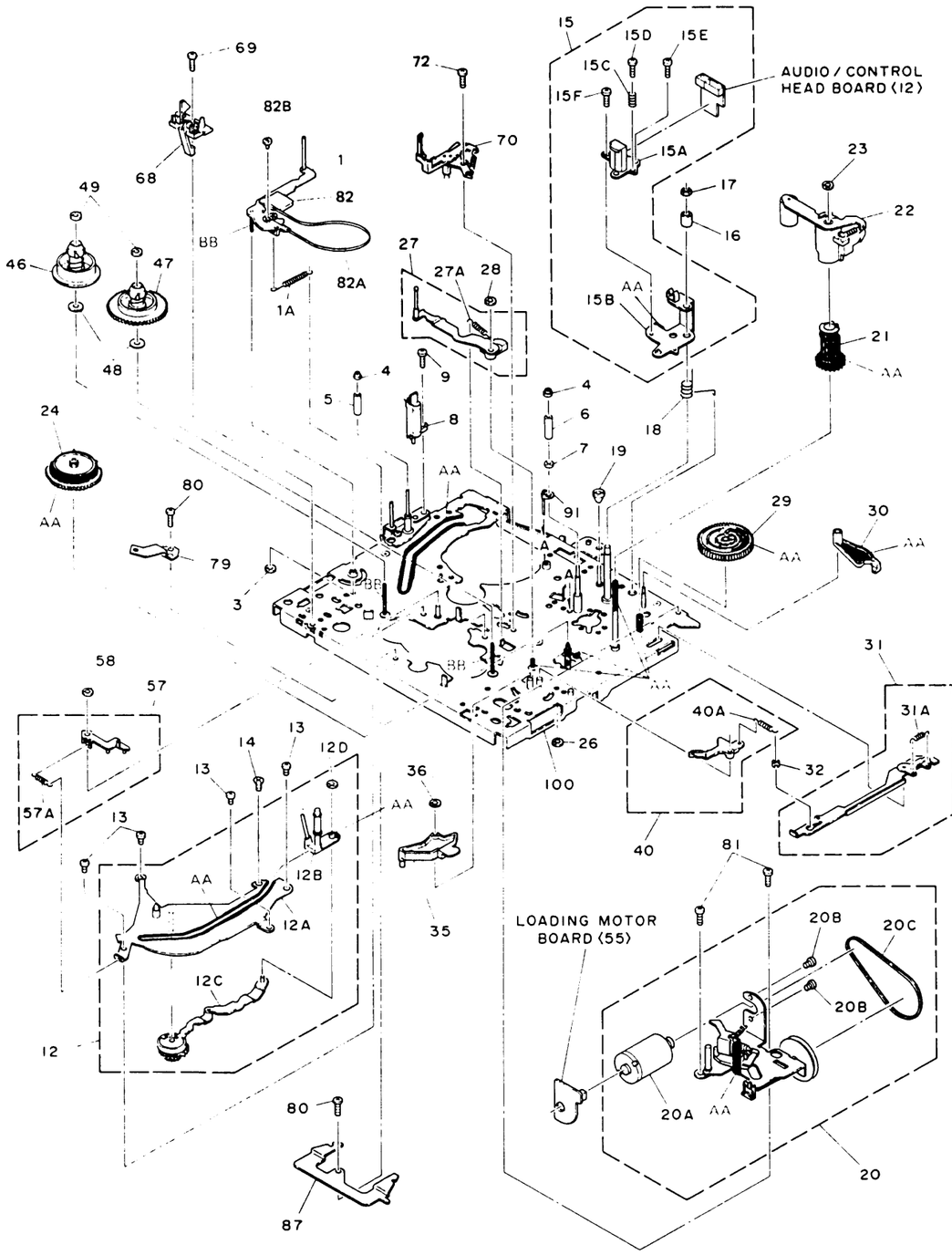
4.3 CHASSIS ASSEMBLY <M3>



BEWARE OF BOGUS PARTS

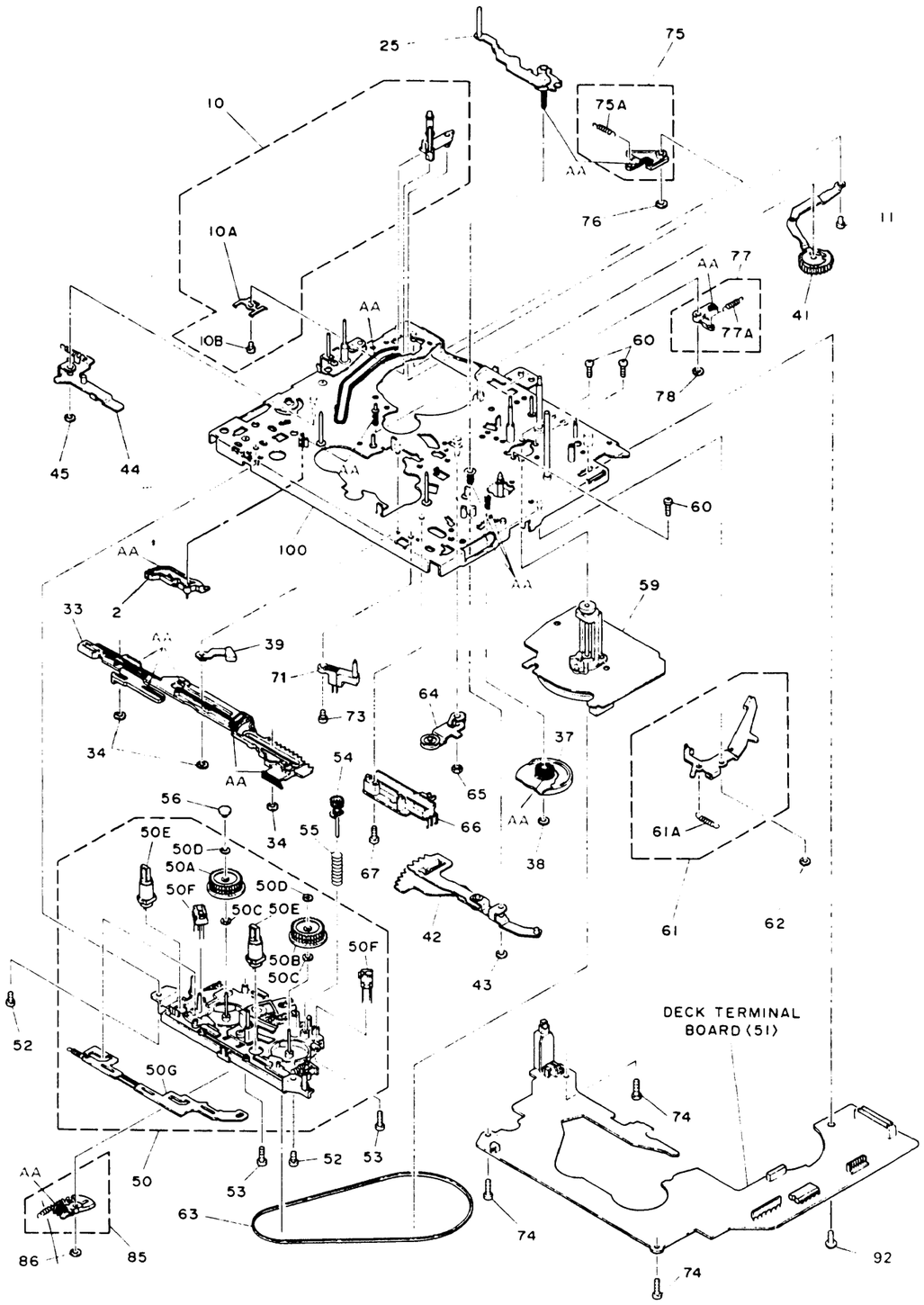
Parts that do not meet specifications may cause trouble in regard to safety and performance. We recommend that genuine JVC parts be used.

4.4 MECHANISM ASSEMBLY < M4 >



Category	Part number	MARK
Grease	KANTO-G-31KAV	AA
Oil	COSMO-HV56	BB

NOTE: The section marked in AA and BB indicate lubrication and greasing areas.

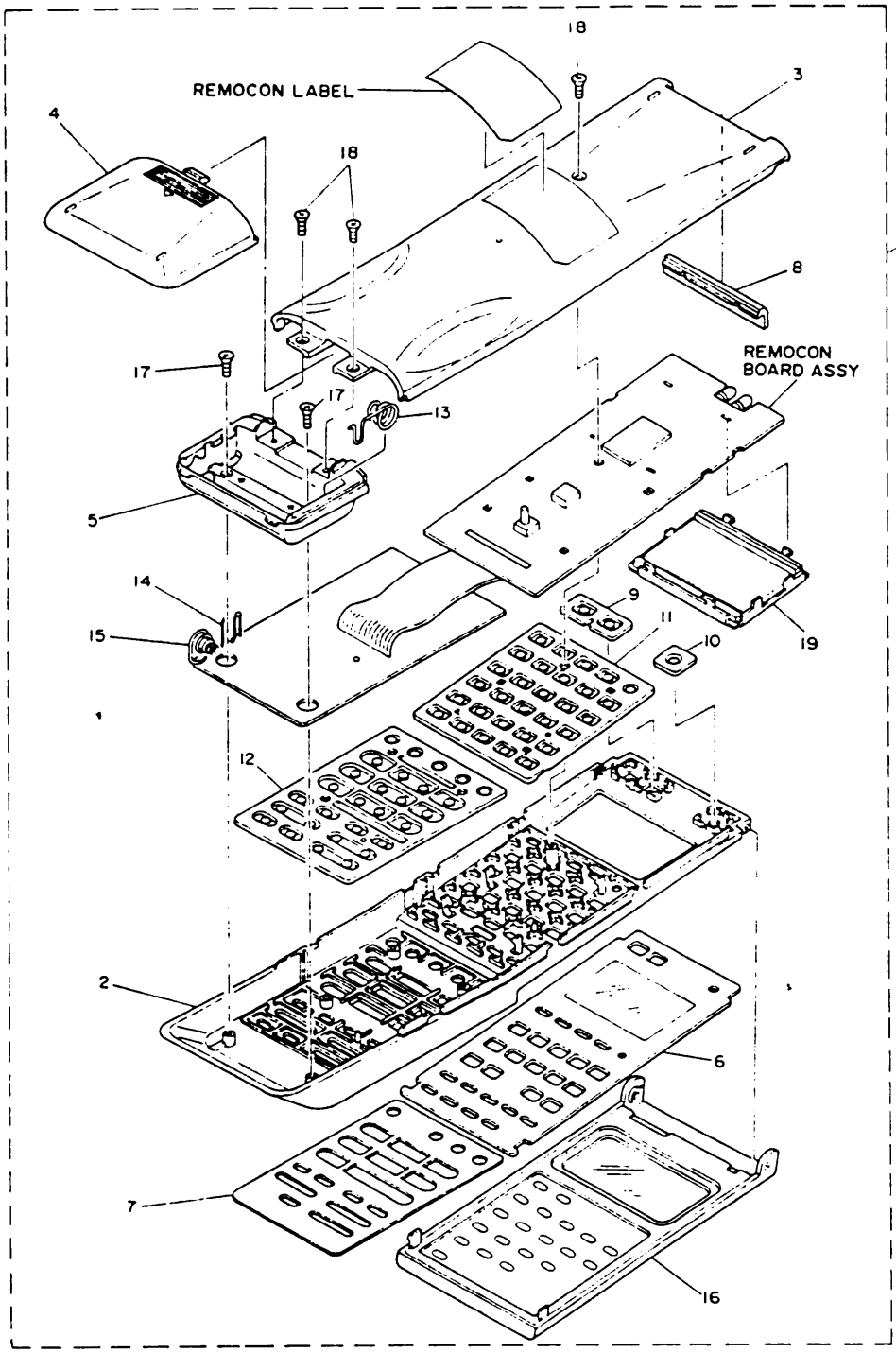


MECHANISM ASSEMBLY · M4

REF No.	PART No.	PART NAME, DESCRIPTION
1	PQ44096A-2	TENSION ARM ASSY
1A	PQ44100	TENSION SPRING
2	PQ44637A-1	TENSION ARM LEVER ASSY
3	PQM30017-7	SLIT WASHER
4	PQ43506	G.P.CAP,X2
5	PQ43505-1-1	ROLLER
6	PQ43526	TAPE GUIDE
7	PQ43670	GUIDE FLANGE
8	PU61207	FULL ERASE HEAD
9	SDST2608Z	SCREW
10	PQ44106A-4	P.BASE(S)ASS'Y
10A	PQ44116-1-1	SPRING PLATE
10B	SDSP2603Z	SCREW
11	PQ44117-1-1	STOPPER
12	PQ44373A	LOADING(T)ASS'Y
12A	PQ44094A	GUIDE RAIL ASSY
12B	PQ44114A-3	P.BASE(T)ASS'Y
12C	PQ44155A-2	L.GEAR(T)ASS'Y
12D	PQM30017-25	SLIT WASHER
13	SDSP2604M	SCREW,X4
14	SSSP2606Z	SCREW
15	PQ44374A	A/C H.ARM ASS'Y
15A	PU61208	AC HEAD
15B	PQ33027	HEAD ARM
15C	PQM30002-197	C.SPRING
15D	SDSP2612Z	SCREW
15E	PQ44621	SPECIAL SCREW
15F	PQ43687B	SPECIAL SCREW
16	PQ44541	SPACER
17	PQ44630	NYLON NUT
18	PQ44119	TORSION SPRING
19	PQ44120	TAPER NUT
20	PQ44375C	DRIVE ASSEMBLY
20A	PQ44300B	MODE MOTOR ASSY
20B	SPSP3003Z	SCREW,X2
20C	PQM30003-25	BELT
21	PQ33163	P.R.CAM
22	PQ44130A	PINCH ROLLER ARM ASSY
23	PQM30017-12	SLIT WASHER
24	PQ44250A	H.L.GEAR ASS'Y
25	PQ44134A-2	H.L.G.ARM ASS'Y
26	PQM30017-8	SLIT WASHER
27	PQ44139A	G.A.GEAR ASS'Y
27A	PQ44143	TENSION SPRING
28	PQM30017-5	SLIT WASHER
29	PQ20907	PINCH R.GEAR
30	PQ44144	BRAKE LEVER
31	PQ44145A	CONNECT P.ASS'Y
31A	PQM30001-242	TENSION SPRING
32	PQ44343	STOPPER
33	PQ10902A-8	C.PLATE ASS'Y
34	PQM30017-8	SLIT WASHER,X3
35	PQ44642A	C.LEVER ASSY
36	PQM30017-8	SLIT WASHER
37	PQ33035	CONTROL CAM
38	REE2000	ËRING
39	PQ33101	GUIDE LEVER
40	PQ44152A	S.BRAKE(T)ASSY
40A	PQM30001-255	TENSION SPRING

=△ REF No.	PART No.	PART NAME, DESCRIPTION
41	PQ44161A-2	L.GEAR(S)ASS'Y
42	PQ44165A-1	ARM GEAR ASSEMBLY
43	PQM30017-29	SLIT WASHER
44	PQ44309A-2	LEVER ARM ASS'Y
45	PQM30017-8	SLIT WASHER
46	PU61153	R.DISK(S) ASSY
47	PU61156	R.DISK(T) ASSY
48	PQM30018-54	SPACER,X2
49	PQM30017-5	SLIT WASHER,X2
50	PU61250-1-2	GEAR UNIT ASSY
50A	PU61157	C.GEAR UNIT(S)
50B	PU61158	C.GEAR UNIT(T)
50C	PQM30018-22	SPACER,X2
50D	PQM30017-7	SLIT WASHER,X2
50E	PU61174	CASSETTE SWITCH,X2
50F	PU61206	REEL SENSOR,X2
50G	PU61165	CANCEL LEVER
52	SDSP2605Z	SCREW,X2
53	SDST2614Z	SCREW,X2
54	PU61170-1-1	GEAR ASSY
55	PQM30002-198-12	COM.SPRING
56	PQ44104	CAPACITOR
57	PQ44358A-3	C.LEVER(2)ASS'Y
57A	PQM30001-270	TENSION SPRING
58	PQM30017-5	SLIT WASHER
△ 59	PU61003-1-2	CAPSTAN MOTOR
60	SPSG2608Z	SCREW, X3
61	PQ44286A	CAP.BRAKE ASS'Y
61A	PQM30001-268	TENSION SPRING
62	PQM30017-8	SLIT WASHER
63	PU61171	BELT
64	PQ44169A	PULLEY ARM ASSY
65	NNS3000ZS	NUT
66	PU61172	SLIDE SWITCH
67	SDST2614Z	SCREW
68	PQ44301A-1	REC.SW ASS'Y
69	SDST2606Z	SCREW
70	PQ44302A-6	LED HOLDER ASSY
71	PU61008	CASSETTE SW
72	SDST2606Z	SCREW
73	SDSP2605Z	SCREW
74	SDSP2606Z	SCREW, X3
75	PQ44557A	POLE BASE LEVER ASSY(S)
75A	PQM30001-260	TENSION SPRING
76	PQM30017-12	SLIT WASHER
77	PQ44556A	POLE BASE LEVER ASSY(T)
77A	PQM30001-275	TENSION SPRING
78	PQM30017-12	SLIT WASHER
79	PQ44575-1-1	IDLER BRACKET
80	SDSP2603Z	SCREW
81	SDSP2604M	SCREW,X3
82	PQ44903A	TENSION BAND BKT ASSY
82A	PQ33075A-4	TENSION BAND ASSY
82B	PQ44103	ADJUST PIN
85	PU61173	TAKE UP LEVER ASSEMBLY
86	PQM30017-8	SLIT WASHER
87	PQ44604-1-2	CLUTCH BRACKET
91	PQ44650	TAPE GUARD
92	DPSP2605Z	SCREW
100	PQ20905A-8	MAIN DECK ASS'Y

4.5 REMOTE CONTROL ASSEMBLY <M5>

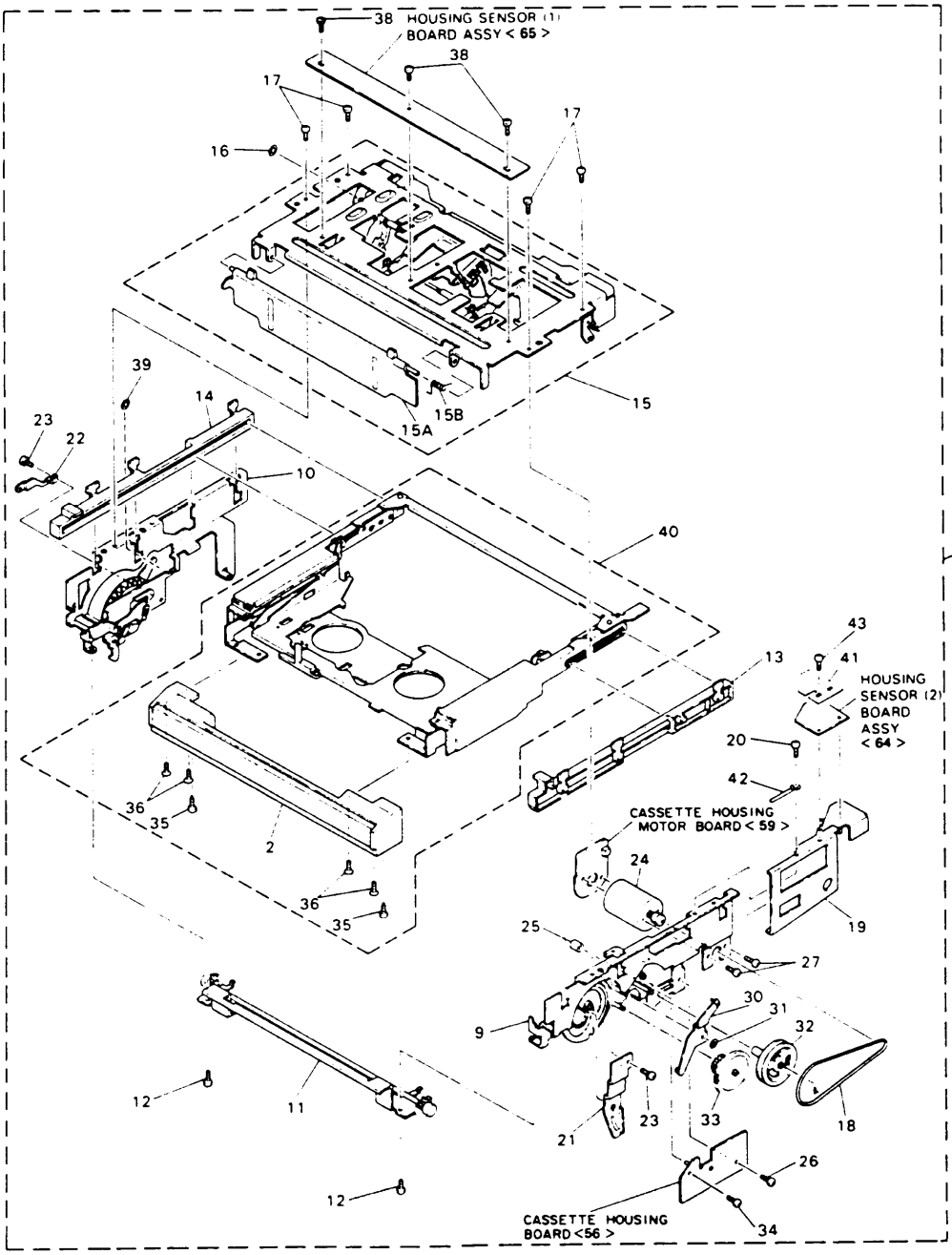


#△ REF No.	PART No.	PART NAME, DESCRIPTION
**********		

REMOTE CONTROL UNIT <M5>

△ 1	PQ10779BN	REMOTE CONTROLLER, E
△ 1	PQ10779BL	REMOTE CONTROLLER, EG
2	PQ20751	UPPER CASE
3	PQ20752	LOWER CASE
4	PQ32715	BATTERY CAP
5	PQ32758	BATTERY CASE
6	PQ32718-25	TOP PANEL (1), EG
6	PQ32718-27	TOP PANEL (1), E
7	PQ32719-49	TOP PANEL (2), EG
7	PQ32719-50	TOP PANEL (2), E
8	PQ43800	IR WINDOW
9	PQ32720	BUTTON(1)
10	PQ43802	BUTTON(2)
11	PQ32721-14	BUTTON(3)
12	PQ32722-25	BUTTON(4), E
12	PQ32722-29	BUTTON(4), EG
13	PQ43803	TERMINAL(A)
14	PQ43843	TERMINAL(B)
15	PQ43844	TERMINAL(C)
16	PQ32901L	DOOR ASSY, EG
16	PQ32901N	DOOR ASSY, E
17	SSSF2006M	SCREW, X2
18	SSSF2010M	SCREW, X3
19	PQ43845	HOLDER(LCD)

4.6 CASSETTE HOUSING ASSEMBLY <M6>



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

****

CASSETTE HOUSING ASSEMBLY <M6>

1	PUS29464B	CASSETTE HOUSING ASSY
2	PQ10914	TRAY(F)
9	PQ33039A	SIDE BRACKET (R) ASSY
10	PQ33043A	SIDE BRACKET (L) ASSY
11	PQ44385A	FRONT BRACKET ASSY
12	SPST2606Z	SCREW,X2
13	PQ33059	TRAY GUIDE(R)
14	PQ33060	TRAY GUIDE(L)
15	PQ20910A-3	TOP PLATE ASSY
15A	PQ33050	DOOR
15B	PQ44192	TORSION SPRING
16	PQM30017-23	SLIT WASHER
17	SPST2606Z	SCREW,X4
18	PQM30003-26	BELT
19	PQ33183	COVER
20	SPST2606Z	SCREW

#△ REF No.	PART No.	PART NAME, DESCRIPTION
21	PQ44409	HOLDING BRACKET(R)
22	PQ44408	HOLDING BRACKET(L)
23	SPST2606Z	SCREW,X2
24	PQ44300B	MODE MOTOR ASSY
25	PQ44181	CAPACITOR
26	SPST2606Z	SCREW
27	SPSP3003Z	SCREW,X2
30	PQ44175A	HLEVER (R) ASSY
31	PQM30017-22	SLIT WASHER
32	PQ44173	PULLEY(C.H)
33	PQ44174	GEAR(C.H)
34	SPST2605M	SCREW
35	SPSF2606Z	SCREW,X2
36	SSSP2604Z	SCREW,X4
38	SPST2606Z	SCREW, X3
39	PQM30017-22	SLIT WASHER
40	PUS29467B	OASSETTE TRAY ASSY
41	PQ45021	COVER
42	PU49485-4	WIRE CLAMP
43	SPST2606Z	SCREW

SECTION 6
TECHNICAL INFORMATIONS

6.1 CPU pin functions

6.1.1 Mechacon CPU pin function (IC601)

Pin No.	Symbol	I/O format	Label	IN/OUT	Contents
1	Vcc	–	Vcc	–	System power
2	VREF	–	VREF		AD, DA reference voltage
3	DA	Analog	LCM 3	O	CASS/MODE MOTOR DRIVE CONTROL
4	PWM	PWM	LCM 2		
5	Port 6 4	N-ch OPEN DRAIN	LCM 1		
6	3		EXPO C	O	Mechanism state detect data
7	2		EXPO A		
8	1		CAP REV	O	CAPSTAN REVESE MODE: L
9	0		THERM	I	TEMPERATURE COMPENSATION (CAPSTAN BRAKE TIMING CONTROL DURING SLOW)
10	AN 7	Analog	AVG FM	I	Auto tracking data
11	6		END SENS	I	End sensor (L: Trailer tape detect)
12	5		START SENS	I	START SENSOR (L: Leader tape detect)
13	4		CAP DRIVE	O	Capstan motor control/correction
14	Port 4 3	N-ch OPEN DRAIN	DRM DRIVE	O	Drum motor control/correction
15	2		EXPO B	O	MECHANISM STATE DETECT DATA
16	1		CASS SENS	I	CASSETTE SENSOR CASS IN/OUT DETECT)
17	0		DRUM FF	I	Drum motor speed detect and timing control
18	Port 3 7	N-ch OPEN DRAIN	CTL PULSE	I	Mode detect, blank tape detect, PB reference signal
19	6		EXP IN	I	MECHANISM STATE DETECT DATA INPUT
20	5		V PULSE	O	V pulse output (spec. PB, V stb: on)
21	4		A/M/S	O	Head select (AUTO: H, MUL: M, SLOW: L)
22	3		NC	–	Not connected
23	2		SP FG	I	Supply reel FG INPUT, reel rotation detect, tape remaining data
24	1		TU FG	I	Take-up reel FG INPUT, "
25	0		V UP	O	Drive voltage control (SPEED UP: H)
26	INT-1	–	CAP FG	I	Mode detect, tape remaining data
27	CN Vss		CN Vss		Ground (normally ground level)
28	RESET		RESET		Reset input (1 μs L), RESET AT CONNECT VCR TO AC
29	X IN		X IN	I	Main system clock (4 MHz)
30	X OUT		X OUT	O	
31	ø		–	–	Note connected
32	Vss		Vss		Ground
33	Port 5 7	with Input Latch	R REMOTE	O	REMOTE PAUSE CONTROL (PAUSE ON: L)
34	6		EE		EE MODE: H
35	5		AUX		INPUT SIGNAL SELECT (AUX MODE: H)
36	4		SP		SP MODE:H
37	3	High Impedance	A MUTE	O	AUDIO MUTE CONTROL (MUTE ON: L)
38	2		REC		REC ON: H
39	1		P MUTE		PICTURE MUTE CONTROL (MUTE ON: H)
40	0		POWER ON		POWER (ON/OFF) CONTROL (POWER ON: H)
41	Port 1 7	N-ch OPEN DRAIN	NC	–	Not connected
42	6		REC START	O	REC START: H
43	5		NC	–	Not connected
44	4		SYNC DET	I	SYNC DETECT (BLUE BACK CONTROL, TUNING DETECT)
45	3		M CE	O	MEMORY IC CHIP ENABLK
46	2		M DATA	I/O	MEMORY DATA (READ/WRITE) CONTROL
47	1		TU CTL	O	TUNER MODE (ON/OFF): H
48	0		PLL DATA	O	TUNING CONTROL DATA OUTPUT
49	Port 0 7	N-ch OPEN DRAIN	S/M/P CLK	O	CLOCK
50	6		LOCK DET	I	TUNING CHECK DATA INPUT
51	5		NC	–	Not connected
52	4		NC		
53	3		NC		
54	2		NC		
55	1		TEXT	O	TEXT MODE: L
56	0		V STB		VIDEO STABILIZER ON: L
57	Port 2 7	C MOS	NC	–	Not connected
58	6		S DATA	O	SERVO IC CONTROL DATA (16 bit Serial data)
59	5		NC	–	Not connected
60	4		PAUSE	O	CAPSTAN MOTOR CONTORL (SLOW and EDIT).
61	3		SERVO		CAPSTAN MOTOR CONTROL
62	2		T CLK	I	TM (timer)/S-CTL bus, clock, 16 bit serial data
63	1		T DATA	I/O	
64	0		INDEX	I/O	INDEX DATA DETECT (READ/WRITE CONTROL) ON: L

Table 6-1 IC601 pin function

2. IC1 pin function (Timer)

Pin No.	Symbol	Label	I/O	Contents
1	S3	Sd	O	KEY SCAN PULSE OUTPUT
2	S2	Sc	–	NC
3	S1	Sb	O	KEY SCAN PULSE OUTPUT
4	S0	Sa		
5	P00/INT4	POWER DOWN	I	POWER DOWN DETECT (P. DOWN END: L)
6	P01/SCK	DISP/OS CLK	O	CLOCK
7	P02/SD	DISP/OS DATA		DISPLAY CONTROL DATA (18 bit)/ON SCREEN DATA (8 bit) OUTPUT
8	P03/SI	TEST	I	TEST POINT
9	P10/INT0	REMOTE	I	16 bit REMOTE DATA INPUT (A/B CODE)
10	P11/INT1	CATV CTL		
11	P12/INT2	CNT PLS	I	COUNTER DATA (PB CONTROL PULSE) INPUT
12	P13/T10	CNT PLS		
13	P20	KS0	I	KEY SCAN DATA INPUT
14	P21	KS1		
15	P22	KS2		
16	P23/BUZ	KS3		
17	P30	M/C DATA	I/O	TM (TIMER/M-CTL CPU) BUS : 16 bit SERIAL DATA
18	P31	M/C CLK	I	: CLOCK
19	P32	SDA	I/O	VIDEO PROGRAMMING SYSTEM : I^2 C BUS
20	P33	SCL	O	: CLOCK
21	P60	OS CS	O	ON SCREEN CONTROL : CHIP SELECT
22	P61	OS RESET		: RESET
23	P62	DISP CE	O	DISPLAY CONTROL (CHIP ENABLE)
24	P63	PROG	O	BLUE BACK MODE: H
25	P40	LED DATA	O	LED CONTROL DATA (12 bit SERIAL) OUTPUT (To IC3)
26	P41	LED CLOCK		CLOCK
27	R42	NC	–	NC
28	P43	NC		
29	PP0	NC		
30	X1	X1	I	MAIN SYSTEM CLOCK
31	X2	X2	O	
32	Vss	Vss	–	GND
33	XT1	XT1	I	
34	XT2	NC	–	NC
35	P50	NC		
36	P51	NC		
37	P52	NC		
38	P53	NC		
39	RESET	RESET	I	RESET AT CONNECT VCR TO AC
40	T0	NC	–	NC
41	T1	NC		
42	T2	NC		
43	T3	NC		
44	T4	NC		
45	T5	NC		
46	T6	NC		
47	T7	NC		
48	T8	NC		
49	T9	NC		
50	T10/S15/PH3	Sp	O	KEY SCAN PULSE OUTPUT
51	T11/S14/PH2	So		
52	T12/S13/PH1	Sn		
53	T13/S12/PH0	Sm	–	NC
54	T14/S11	Sl		
55	T15/S10	Sk	O	KEY SCAN PULSE OUTPUT
56	VLOAD	VLOAD	I	FDP DRIVE
57	VPRE	VPRE		
58	S9	Sj	O	KEY SCAN PULSE OUTPUT
59	S8	Si	–	NC
60	S7	Sh	O	KEY SCAN PULSE OUTPUT
61	S6	Sg		
62	S6	Sg		
63	S4	Se		
64	VDD	VDD	–	For the SYSTEM CONTROL

Table 6-2 IC1 pin function