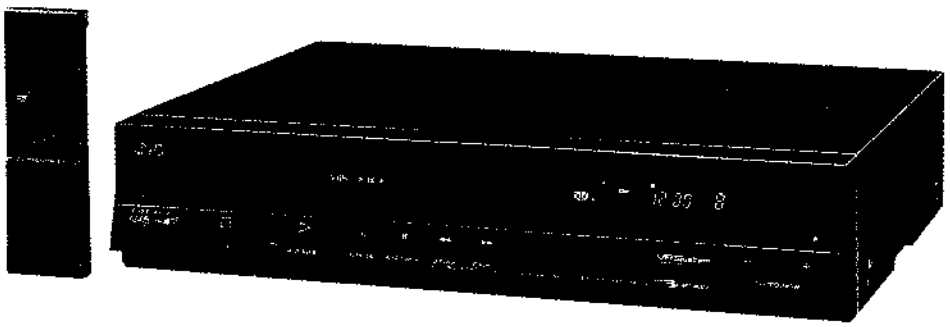
JVC

SERVICE MANUAL

VIDEO CASSETTE RECORDER VHS

HR-D300E/EG



HQ

VPSystem VIDEO PROGRAM

INDEX VHS-INDEX-SUCHLAUF

HYPERBAND OST EMPFANG

SPECIFICATIONS

Format	: VHS PAL standard
Recording system	: Rotary, two-head helical scan system with a slant double-azimuth combination video head
Video signal system	: PAL colour and CCIR monochrome signals, 625 lines
Tape width	: 12.65 mm
Playing time	: 240 min. with E-240 video cassette
Temperature	
Operating	: 5°C to 40°C
Storage	: -20°C to 60°C
Channel coverage	: VHF 47 – 89 MHz, 104 – 300 MHz, 302 – 470 MHz
	UHF 470 – 862 MHz
Aerial output	: UHF channels 32 – 40 (adjustable)
Power consumption	: 28 watts
Power requirement	: 220 V∿, 50/60 Hz
Video	
Input	: 0.5 to 2.0 Vp-p, 75 ohms, unbalanced
Output	: 1.0 Vp-p, 75 ohms, unbalanced
Signal-to-noise ratio	: 43 dB (Rohde & Schwarz noise meter)
Horizontal resolution	: 250 lines
Audio	
Input	: -3.8 dBs (CENELEC standard), more than 10 k-ohms, unbalanced
Output level	: -3.8 dBs (CENELEC standard), high impedance load
Output impedance	: Less than 1 k-ohm, unbalanced
Signal-to-noise ratio	: More than 40 dB
Frequency range	: 70 Hz to 10,000 Hz
Timer	: 14-day/4-programme timer
Dimensions	: 435 mm(W) x 95 mm(H) x 341 mm(D)
Weight	: 6.5 kg
Provided accessories	: Aerial cable, Infrared remote control unit, "R6" battery x 2

Design and specifications subject to change without notice.

No. 82033
October 1987

NOTE: For a technical description, please refer to Technical Guide VTG82003 HR-D210 PAL.

TABLE OF CONTENTS

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

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

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

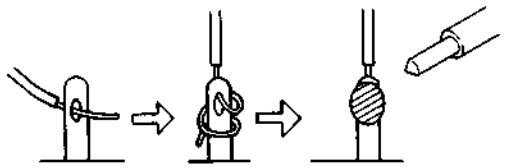


Fig. 1

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

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

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

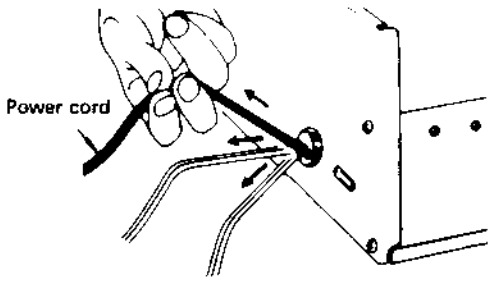


Fig. 2

9. Also check areas surrounding repaired locations.

10. 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.

11. 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).

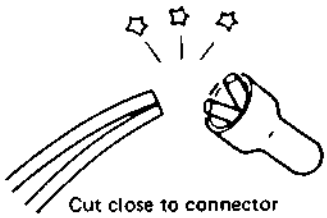


Fig. 3

(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.

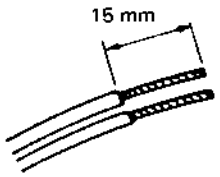


Fig. 4

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

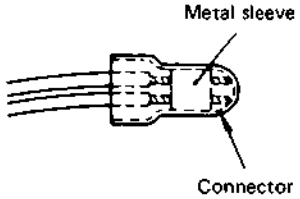


Fig. 5

(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.

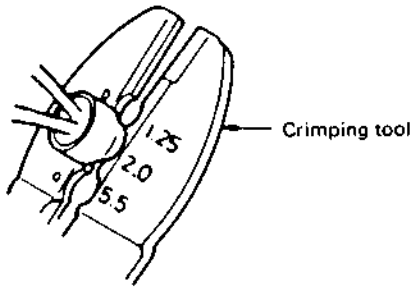


Fig. 6

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

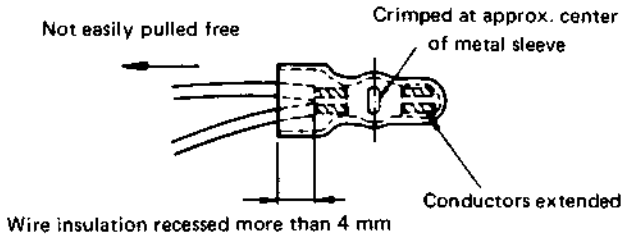


Fig. 7

● 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 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 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 below.

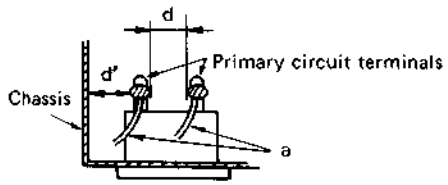


Fig. 8

4. Leakage current test
Confirm specified or lower leakage current between B (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 B (earth ground, power cord plug prongs) and exposed accessible parts. Use an AC voltmeter to measure across both terminals of load Z. See figure and following table.

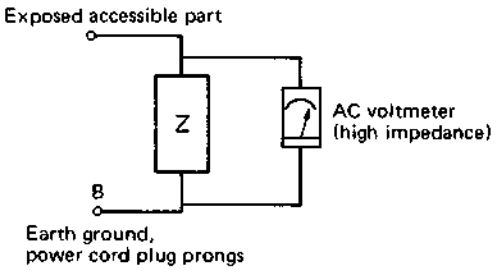


Fig. 9

AC Line Voltage	Region	Insulation Resistance	Dielectric Strength	Clearance Distance (d), (d')
100 V	Japan	≧ 1 MΩ/500 V DC	1 kV 1 minute	≧ 3 mm
110 to 130 V	USA & Canada	—	900 V 1 minute	≧ 3.2 mm
*110 to 130 V 200 to 240 V	Europe Australia	≧ 10 MΩ/500 V DC	4 kV 1 minute	≧ 6 mm (d) ≧ 8 mm (d') (a: Power cord)

*Class II model only.

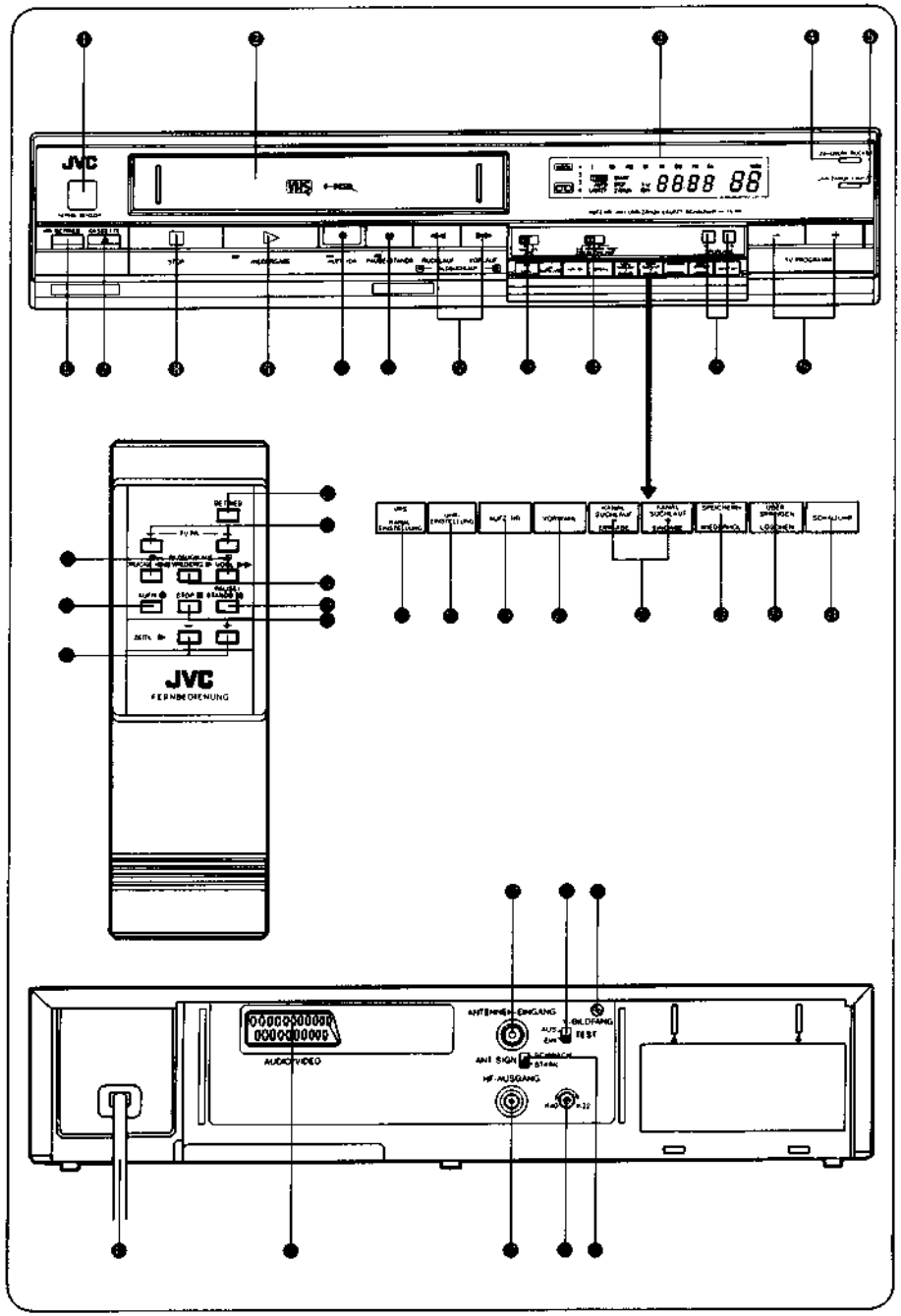
Table 1 Ratings for selected areas

AC Line Voltage	Region	Load Z	Leakage Current (i)	Earth Ground (b) to:
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 ratings for selected areas

Note: This table is unofficial and for reference only. Be sure to confirm the precise values for your particular country and locality.

Thank you for purchasing the JVC HR-D300EG Video Cassette Recorder. Before use, read this instruction booklet carefully for obtaining the best results from your new unit.
Diagrams are on the reverse side of this page. Fold it out and keep it opened so that you can refer to the diagrams when you are reading this booklet.



CONTENTS

SAFETY PRECAUTIONS

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

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

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

IMPORTANT

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

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.
Note
We recommend that you should disconnect the AC cord from the outlet.

FOR YOUR SAFETY (in Australia)
Install any external aerial to AS 1417.1

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.

This unit is produced to comply with Directive 82/499/EEC.

CAUTION

- Disconnect the mains plug from the supply socket when not in use.
- When you are not using the HR-D300EG 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.

VHS PAL HQ

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

Printed in Japan

FEATURES

High-quality pictures

- **HQ (High Quality) System technologies** with a Detail Enhancer, and 20 % higher white clip level.
- **Double-Azimuth 3-head (DA-3) system** for noiseless stills and frame advance.
- **Variable-speed slow motion** at 1/6, 1/12, 1/18, 1/24 and 1/30 normal speed.

Advanced tape access features

- **VHS Index Search System** facilitates location of the beginning of each recording by automatically marking an index code on the control track of the tape; index codes can be detected in the Shuttle Search mode. This system is based on the newly standardised CTL coding system for VHS.
- Counter search for returning to a designated point on a tape.

Convenient automatic functions

- **Auto play function:** insert a cassette (with safety tab removed), and playback will start automatically.
- **Next-function memory** allows a command to be entered immediately after pressing RÜCKLAUF (or VORLAUF), with the second command "remembered" and performed automatically after the tape rewinds to its beginning or fast-forwards to the counter reading of "0000".
  - Memory play: for automatic start of playback.
  - Memory eject: to eject the cassette after rewind, without waiting for completion of rewind.
  - Memory timer standby: to engage the timer recording standby mode after rewind.
  - Memory power-off: to turn the power off after rewind.
- Automatic backspace editing.
- Auto-power-on convenience.
- Power-off ejection.
- Automatic rewind at the end of tape.

Other value features

- **Voltage synthesized wide-band cable tuner** with 48-channel preset capacity; can receive VHF, UHF and cable channels including those of hyper band.
- **Compatible with VPS (Video Programme System)** with built-in VPS decoder.
- **14-Day/4-event programmable timer.**
- **Overlapped programme warning:** programme numbers on the FDP blink when the preset time spans of the programmes overlap.
- **Timer programme review** to show the preset programme contents in the order of execution.
- **Infrared remote control.**
- **On-screen record-pause mode display** with elapsed time indicated by shrinking white bar.
- Electronic tracking controls.
- Instant timer recording function using the record button.
- **Shuttle Search with latch function:** with the Shuttle Search button locked or held depressed, offers high-speed playback at 9 times normal speed in either direction.
- Comprehensive fluorescent display.
- Elapsed recording time indicator.

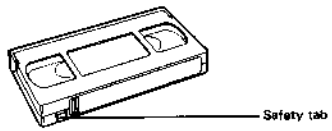
PRECAUTIONS

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.

Video cassettes

- This recorder employs VHS-type cassettes only.
  E-240 for 4 hours, E-180 for 3 hours, E-120 for 2 hours, E-90 for 1 hour and 30 minutes, E-60 for 1 hour and E-30 for 30 minutes of recording.
- 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.



- 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.

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 BETRIEB switch set to ON; this would 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.

Operation

- When a cassette is loaded, the power is switched on automatically.
- The cassette can be unloaded even when the power is off. Pressing the KASSETTE button turns the power on and, after ejection of the cassette, shuts it off automatically in this case.
- As long as the SCHALTUHR button is engaged with the TIMER indicator lit, the BETRIEB and KASSETTE buttons have no effect and unloading of a cassette is not possible. If a cassette has not yet been inserted, simply insert a cassette; the power will be switched on to load the cassette properly and, after completion of automatic loading, the Timer Recording Standby mode will be engaged with power off.

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.

WARNING

1. This recorder can also receive colour television signals in East Germany (DDR) for recording and playback.
2. Recordings made of DDR television signals produce monochrome pictures if played back on another video recorder of PAL or SECAM standard.
3. SECAM prerecorded cassettes or recordings made with a SECAM video recorder produce monochrome pictures when played back with this recorder.
4. This recorder cannot be used in France. Use a SECAM recorder to record French SECAM signals.

CONTROLS, INDICATORS AND CONNECTORS

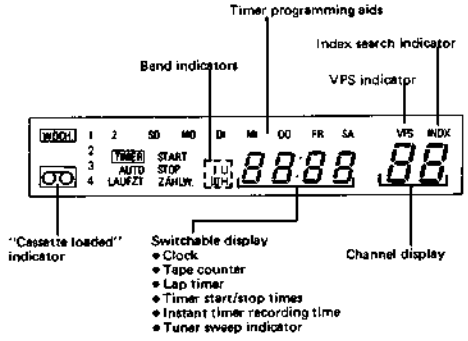
Refer to the diagrams on the front foldout page.

Front Panel

❶ Infrared beam receiving window (FERNB. SENSOR)

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

❸ Fluorescent display panel
Fully explained in relevant sections.



❹ Counter reset button (ZÄHLWERK-RÜCKST.)
Press to reset the counter reading or lap time to "0000" or "0:00" respectively.

❺ Clock/Counter/Lap button (UHR/ZÄHLW./LAUFZT.)
Press to switch the display among clock, tape counter (ZÄHLW.) and lap time (LAUFZT.). Also used to change the display from the timer programming mode to the clock mode.

❻ 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.

❼ Cassette eject button (KASSETTE)

❽ STOP button
Press to stop the tape.

❾ Play button (WIEDERGABE) with LED indicator
Press to play back the tape or cancel the Pause/Still and Search modes.

❿ Record/Instant timer record button (AUFN. DA) with LED indicator
Press once to start recording. Pressing it again engages the Instant Timer Recording mode. See page 23.

⓫ Pause/Still button (PAUSE/STANDB.) with LED indicator
Press to stop the tape temporarily to avoid recording of unwanted material or to view a still picture. The still picture can be advanced step by step or continuously.

⓬ Rewind and Fast-Forward (Shuttle Search) buttons (RÜCKLAUF and VORLAUF) (BILDSUCHLAUF)
Press while in the Stop mode to rewind or fast-forward the tape; press while in the Play mode to view the speeded-up picture for programme search. See pages 22 and 24.

⓭ AFC switch
Normally set to EIN.

⓮ Tape memory switch (ZIELSUCHLAUF)
ZÄHLWERK: The tape will stop automatically at the counter reading of about "0000" in the Rewind or Fast Forward mode. See page 24.
INDEX: The index code marked at the beginning of each recording will be detected in the Shuttle Search mode for automatic start of playback. See page 24.
AUS: Set to AUS if you are not going to use either of the two functions.

⓯ Tracking -/+ buttons (SPURLAGE)
Press either button to minimise noise bars, if observed, during playback.

⓰ TV programme -/+ buttons (TV-PROGRAMM)
Press either button to select a desired channel.

⓱ VPS/Channel set button (VPS/KANALEINSTELLUNG)
A dual-function switch. Serves as a VPS command enter button in timer programming (see page 26). Normally functions to engage or disengage the tuner preset mode (see page 21).

⓲ Clock adjust button (UHREINSTELLUNG)
Press to adjust the clock.

⓳ Programme button (AUFZ. NR.)
Press to programme the timer.

⓴ Select button (VORWAHL)
Press to select the band in tuner presetting; press to select the item to be set in clock setting or timer programming.

㉑ Channel search/Set -/+ buttons (KANAL SUCHLAUF/EINGABE)
Press to search for broadcast programmes in tuner presetting; press to set to the correct data in clock setting or timer programming.

㉒ Store/Repeat button (SPEICHERN/WIEDERHOL.)
Press to store the tuned-in channel in tuner presetting; press to enter the repeat command in timer programming.

㉓ Skip/Cancel button (ÜBERSPRINGEN/LÖSCHEN)
Press to skip unnecessary channels in tuner presetting; press to cancel the preset programme in timer programming.

㉔ Timer button (SCHALTUHR)
Press to engage the timer recording standby mode.

Remote Control Unit

❶ Operate button (BETRIEB)
Press to turn the recorder power on or off.

❷ TV PR. -/+ buttons
Press either button to select a desired channel.

❸ Play button (WIEDERG.)

❹ Pause/Still button (PAUSE/STANDB.)

❺ STOP button

❻ Rewind and Fast-Forward (Shuttle Search) buttons (RÜCKL. and VORL.) (BILDSUCHLAUF)

❼ Record button (AUFNAHME)
Press together with the WIEDERG. button to start recording.

❽ SLOW -/+ buttons (ZEITL.)
Press in the Play or Still mode to engage the Slow-Motion mode. To increase the speed, press "+" button, to decrease the speed, press "–" button. (See page 22.)

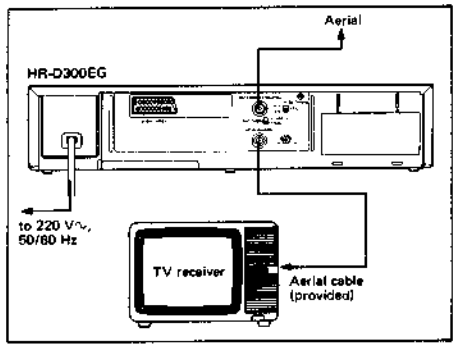
Operating distance for remote control unit
- The maximum operating distance is about 8 m.

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

Rear Panel

- **Aerial input connector (ANTENNEN-EINGANG)**
  Connect an aerial to this connector.
- **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.
- **Vertical lock adjustment screw (V-BILDFANG)**
  When operating in the Still mode, adjust this screw to eliminate any vertical vibration of the picture. (For any inquiry about this adjustment, contact a JVC dealer.)
- **AUDIO/VIDEO socket**
  A 21-pin standardised audio/video input/output socket for the connection to a TV or a 2nd video recorder equipped with the same type of socket. The input from this socket can be recorded in the AUX mode engaged by obtaining "AU" in the channel display.
- **RF output connector (HF-AUSGANG)**
  Connect to the aerial terminal of a TV receiver through the aerial cable (provided).
- **RF converter frequency adjustment screw**
- **Attenuator switch (ANT. SIGN.)**
  Set to SCHWACH to receive broadcasts from distant stations. Set to STARK to receive broadcasts of high field strength.
- **Power cord**

CONNECTIONS



1. Remove the aerial cable from the TV receiver 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 TV receiver's aerial terminal using the provided aerial cable. The TV receiver is then ready to receive broadcast programmes as well as accommodate video cassette playback.

VIDEO CHANNEL SETTING

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

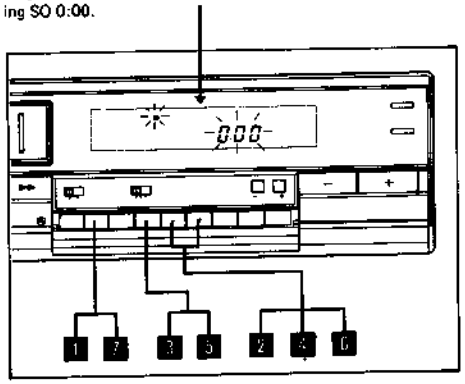
- Reset the TEST switch to AUS.

Notes:

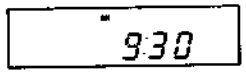
- If some interference noise is seen on the screen because of broadcasts on neighbouring channels or if your preset broadcasts should be affected in picture quality, it is necessary to shift the RF converter output frequency from that of channel 36. Consult your JVC dealer for making this adjustment.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

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



- Press UHREINSTELLUNG ●. The indicated day will blink.
- Press EINGABE ● until the correct day indication appears.
- Press VORWAHL ●. The indicated hour digits will blink.
- Press EINGABE until the correct hour indication appears.
- Press VORWAHL. The indicated minute digits will blink.
- Press EINGABE until the correct minute indication appears.
- Press UHREINSTELLUNG at the exact instant of the time signal and clock will be set accurately to the present time.



Power failure indicator
The blinking SO 0:00 (initial condition of the display) is also a power failure indicator, showing that there has been a power failure exceeding 10 seconds. Re-adjusting the time restores the normal condition of the clock display.

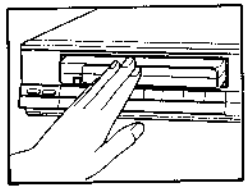
Note:

- 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.

LOADING AND UNLOADING A CASSETTE

Loading

Insert a cassette as illustrated. Be sure to insert it firmly into the slot; otherwise, it will be automatically ejected.



- The automatic loading mechanism will operate only when the cassette is inserted correctly.
- With a cassette inserted, the "cassette loaded" indicator will appear on the FDP.

AUTO POWER-ON AND AUTO PLAY SYSTEM

- The cassette can be loaded even when the power has not been turned on. Inserting a cassette into the loading slot turns the power on automatically.
- Inserting a cassette, with its safety tab removed, turns the recorder on and playback of the cassette begins automatically.

POWER-OFF EJECT SYSTEM

- The cassette can be unloaded even after the power has been turned off. Pressing the KASSETTE button turns the power on automatically and, after ejection of the cassette, shuts it off automatically.

Unloading

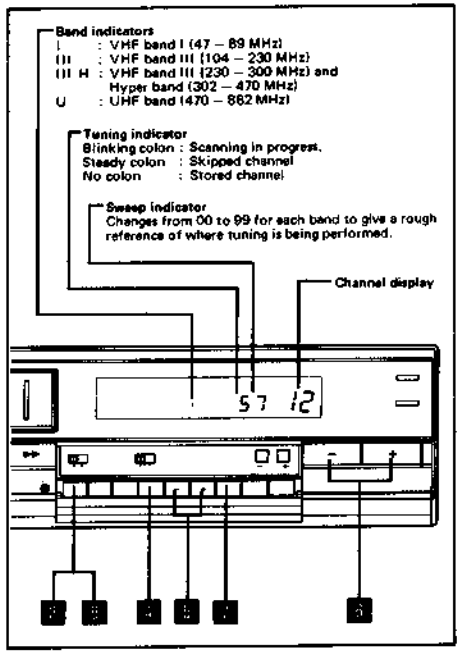
Press the KASSETTE button ⏏

CAUTION

- If unloading of the cassette is not possible, check to see whether the TIMER indicator is lit. If so, press the SCHALTUHR button so the TIMER indicator extinguishes.
- Do not attempt to pull out the cassette once automatic loading has started.
- Do not insert fingers or any foreign object beyond the door of the cassette loading slot, as this could lead to injury or damage to the mechanism. Show special caution with children.

OPERATING THE BUILT-IN TUNER

The HR-D300EG incorporates a voltage synthesized tuner with 48-channel preset capacity. Only channels stored can be called up with the TV-PROGRAMM buttons in modes other than Channel Set. In the Channel Set mode, all channel numbers including skipped ones are successively displayed so that they can be stored or skipped.



Available channels in each band

Band indicator	Frequency	Channels
I	VHF band I (47 – 89 MHz)	E2 – E4 (Common European channels) S1 – S3 (Belgium) X, Y, Z (Switzerland)
III	VHF band III (104 – 230 MHz)	M1 – M10, 80 – 89 (Belgium) S1 – S10 (West Germany, Switzerland) E5 – E12 (Common European channels)
III H	VHF band III (230 – 300 MHz) Hyper band (302 – 470 MHz)	U1 – U10, 90 – 99 (Belgium) S11 – S41 (West Germany, Switzerland)
U	UHF band (470 – 862 MHz)	E21 – E69 (Common European channels)

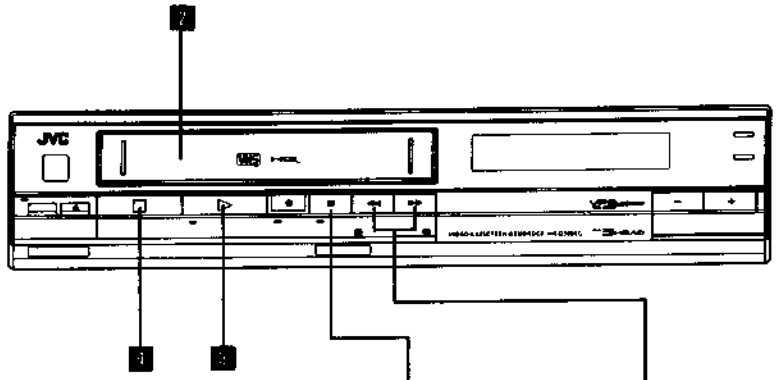
Storing channels

- Turn on the TV receiver and adjust it to your video channel.
- Turn on the recorder.
- Press KANALEINSTELLUNG ●.
- Press VORWAHL ● until the correct band indication appears.
- Press KANAL SUCHLAUF ● until the desired broadcast signal is detected; use either the "–" or "+" button depending on the direction of search.
  - The tuning indicator "colon" will blink and the sweep indicator will count down or up.
- Press TV-PROGRAMM ● to select the channel to be stored.
- Press SPEICHERN ●. The "colon" will disappear.
  - Repeat steps 4 through 7 for all necessary channels.
- Press KANALEINSTELLUNG to disengage the Channel Set mode.

Skipping channels

1. Press TV-PROGRAMM to select the channel to be skipped.
2. Press KANALEINSTELLUNG.
   - The band indicator and the sweep indicator corresponding to the broadcast stored in that channel will appear.
3. Press ÜBERSPRINGEN ●. The steady "colon" will appear.
4. Press KANALEINSTELLUNG to disengage the Channel Set mode.

PLAYING BACK A VIDEO CASSETTE



- Turn the TV receiver on and adjust it to your video channel.
- Load a pre-recorded cassette.
  - Power will be switched on automatically.
  - When the cassette loaded has no safety tab, playback will start automatically.
- Press WIEDERGABE ●.
- Press STOP ● at the end of the programme.
  - The tape will be rewound automatically when its end is reached and the recorder will enter the Stop mode.

SHUTTLE SEARCH

Shuttle Search allows high-speed playback at 9 times normal speed in either direction.

1. Press either RÜCKLAUF or VORLAUF BILDSUCHLAUF ● during playback.
2. To cancel the Search mode, press WIEDERGABE.
   - For briefer scanning, keep the BILDSUCHLAUF button pressed for more than 2 seconds; when you release the button, the Search mode will be cancelled.

STILL PICTURE

1. Press PAUSE/STANDB. ● during playback.
2. To advance the still picture, press PAUSE/STANDB. a number of times.
   - Keeping this button pressed continuously advances the picture to give a slow-motion effect.
3. To cancel the Still mode, press WIEDERGABE.

Notes:

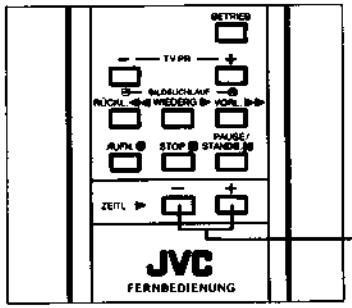
- When the Still mode continues for longer than about 5 minutes, the Stop mode will be entered automatically.
- With some televisions, the still picture may be unstable. This is not due to any defect of the unit.

Tracking Adjustment

Noise bars may appear on the screen if you play back a tape which was recorded using another recorder. For correction, press either SPURLAGE control ●. Tracking will be reset to the preset standard each time the cassette is ejected.

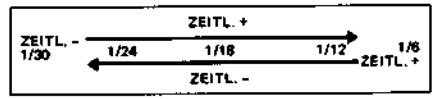
Note:

Only SP (Standard Play) recordings can be played back.



SLOW-MOTION PLAYBACK

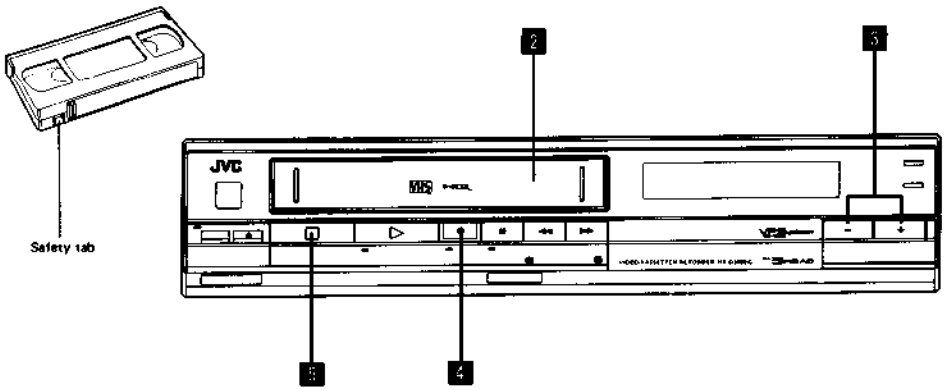
- Press the "–" button while in the Play or Still mode; slow-motion playback at 1/30 normal speed will start.
- Press the "+" button while in the Play or Still mode; slow-motion playback at 1/6 normal speed will start.
- Each time the "–" button is pressed, the tape speed becomes slower.
- Each time the "+" button is pressed, the tape speed becomes faster.



Note:

- With some video cassettes, the TV picture may distort during slow-motion playback. This is not due to any defect of the unit.

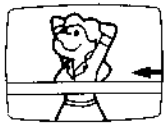
RECORDING TV PROGRAMMES



■ Turn the TV receiver on and adjust it to your video channel.
■ Load a cassette (with safety tab in place).
- Power will be switched on automatically.

■ Press either TV-PROGRAMM ● to select the channel you wish to record.
■ Press AUFN./DA ● to start recording.
- Be careful to press AUFN./DA only once, or Instant Timer Recording will begin.
- Press AUFN. and WIEDERGABE simultaneously when using the remote control unit.
- If there is part of the programme you don't want to record, press PAUSE/STANDB. ●. A white horizontal bar will appear on the screen, which reduces in size in 4 steps as time elapses. When the last quarter starts blinking and disappears, the Stop mode will be entered automatically. The pause duration is possible for about 5 minutes.

Pause mode indicator



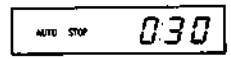
- To continue recording from the Pause mode, press WIEDERGABE ● while the white bar is on-screen.

■ Press STOP ● at the end of the programme.
- When the end of the tape is reached during recording, the tape is automatically rewound and stops.

Notes:
- If you want to start recording from the Play mode, first engage the Record-Pause mode by pressing PAUSE/STANDB., and then AUFN./DA. Then press WIEDERGABE.
- When recording is restarted from the Pause mode, a few frames recorded before are erased due to overlap of the new recording. This is not due to any defect of the unit.
- The selected channel cannot be altered during recording. If you wish to change the channel, first engage the Pause mode and then select a different channel.

INSTANT TIMER RECORDING

If you wish for recording to stop automatically after a certain period of time, use this Instant Timer Recording mode.

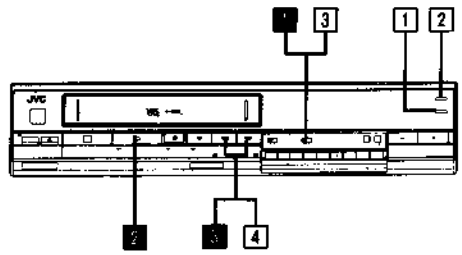


1. Press AUFN./DA during recording (or twice if in the Stop mode).
   - The FDP shows "AUTO STOP 0:30", showing that recording will automatically stop and power will switch off after 30 minutes.
2. Adjust the switch-off time, if necessary.
   - Press AUFN./DA to increase it in 30-minute increments (possible up to 4 hours).
   - Use VORWAHL and EINGABE to set to a more precise time when required (possible up to 4 hours 59 minutes). After setting the time, press VORWAHL so that all digits stop blinking.

RECORDING ONE PROGRAMME WHILE WATCHING ANOTHER

A programme not being viewed can be recorded while you enjoy another programme.
- Select the channel you wish to record with the recorder's TV-PROGRAMM buttons.
- Select the channel you wish to view with the TV receiver's channel selector.

INDEX SEARCH AND COUNTER SEARCH



VHS Index Search System

When you start recording from the Stop, or Timer Standby mode, an index code is marked on the tape. These index codes can be detected in the Shuttle Search mode.

■ Set ZIELSUCHLAUF ● to INDEX.
■ Press WIEDERGABE ● to start playback.
■ Press RÜCKLAUF or VORLAUF BILDSUCHLAUF ● depending on the direction of search.
- While the tape is being scanned, "INDX" will be displayed on the FDP.

■ When the first index code is detected, normal playback resumes automatically. To search for the next index code, press the same button once again.

Counter Search

The counter reading of "0000" can be located automatically.

[1] Press UHR/ZÄHLW./LAUFZT. ● to obtain the Counter mode.
[2] Press ZÄHLWERK-RÜCKST. ● during playback or recording at a point which you wish to locate later.
[3] Set ZIELSUCHLAUF to ZÄHLWERK.
[4] Press RÜCKLAUF or VORLAUF when you need to return to the designated point.
- The tape will stop automatically at about "0000".
- When used in conjunction with the Memory Play function, this offers more convenience. See below.

ELAPSED RECORDING TIME INDICATOR

The tape counter is switchable to the elapsed recording time indicator.

1. Press UHR/ZÄHLW./LAUFZT. to obtain the Lap mode.
   - The lap time is counted up to 9 hours 59 minutes.
2. To reset the lap time to "0 :00", press ZÄHLWERK-RÜCKST.

Notes:
- Unless the ZÄHLWERK-RÜCKST. button is pressed in the Lap mode, the count is maintained even after the power is switched off (as long as the unit remains plugged in to an AC outlet).
- When the Lap mode is engaged during playback, counting does not take place, even though the current count is displayed.

NEXT-FUNCTION MEMORY

Memory Play function

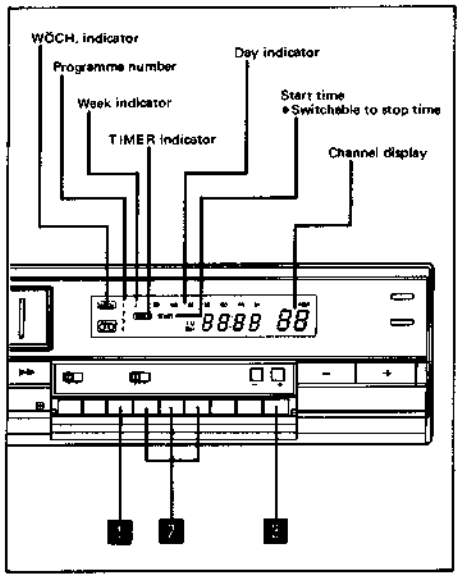
- If you want to watch the tape from its beginning after rewinding, press RÜCKLAUF and then WIEDERGABE within 2 seconds. Playback will start automatically at the beginning of the tape. (The ZIELSUCHLAUF switch must be in the AUS position.)
- If you want to watch the tape from the counter reading of "0000", set ZIELSUCHLAUF to ZÄHLWERK, press RÜCKLAUF (or VORLAUF) and then WIEDERGABE within 2 seconds.

Memory Eject/Power-Off/Timer Standby

If you are going to eject the cassette, turn the power off or engage the Timer Standby mode after rewinding the tape, you do not have to wait for completion of rewind to press the corresponding button.
- To eject the cassette after rewind, press RÜCKLAUF and then KASSETTE within 2 seconds.
- To turn the power off after rewind, press RÜCKLAUF and then BETRIEB within 2 seconds.
- To engage the Timer Standby mode after rewind, press RÜCKLAUF and then SCHALTUHR within 2 seconds.

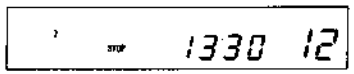
AUTOMATIC TIMER RECORDING

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



■ Press AUFZ. NR. ●.
- The display will change to the Timer Set mode for programme number "1". To advance to programme number 2, 3 or 4, press AUFZ. NR.

■ Set the day, start time, channel and stop time in succession by using the VORWAHL and EINGABE buttons ● ● alternately.
- Select the item to be set with the VORWAHL button; the selected item will blink.
- Set the desired data with the EINGABE buttons.



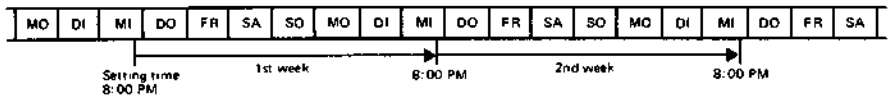
Setting the day
- With the EINGABE "+" button, the day indication advances from "SO" (first Sunday) to "SA" (first Saturday), then "2. SO" (second Sunday) to "2. SA" (second Saturday) and then the all-days indication with "WÖCH." for daily serial recording.
- For weekly serial recording, press the WIEDERHOL. button any time in the Timer Set mode.
- The "WÖCH." entry can be cancelled by pressing the WIEDERHOL. button.

Setting the start and stop times
- It is not possible to set the start and stop times unless the clock has previously been set.
- Enter the data while the digits are blinking.
- The stop time can be set within 24 hours from the start time.

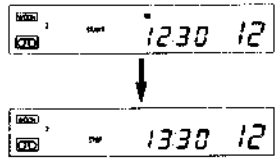
Cancelling the preset data
- The preset programmes can be cancelled. First engage the Timer Set mode for the programme number you wish to cancel and then press the LÖSCHEN ● button.

■ After making sure that the cassette is loaded, press SCHALTUHR ●.
- 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, that programme number will not be illuminated. Recheck the programmed data.
- If illuminated programme numbers are blinking, the time spans of those programmes overlap. Recheck their programmed data.

Note:
- The 1st week refers to the seven-day period from the present day and the 2nd week, to the following seven-day period (not weeks on the calendar). These two weeks are counted from the time of setting.



Reviewing the programmed data
- Press the AUFZ. NR. button in the Timer Standby mode; the programmed data of the earliest-to-start programme will be shown for 6 seconds (3 seconds for START and 3 seconds for STOP) and then those of subsequent programmes, if any, in the same manner.

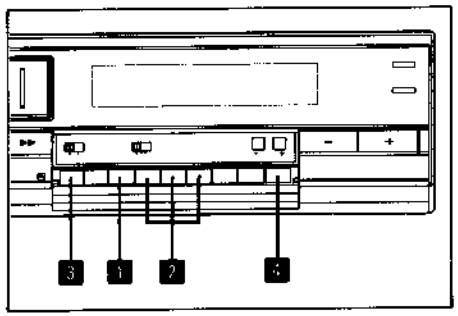


- If you wish to change the programmed data, engage the Timer Set mode (first press the SCHALTUHR button to disengage the Timer Standby mode and then press the AUFZ. NR. button) and call up the corresponding programme number for reprogramming.

Timer recording operation
- When the preset start time is reached, recording starts.
- After timer recording, the power is switched off. If the tape end is reached during timer recording, the cassette is automatically ejected and the power is switched off.
- After all preset programmes have been executed, the Timer Standby mode is cancelled.

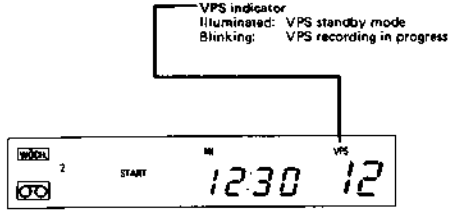
VPS RECORDING

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.



■ Press AUFZ. NR. ●.
■ Set the day, start time, stop time and channel in the same way as for timer programming.
■ Press VPS ●.
- All timer data will be converted to VPS codes and stored in memory.

■ Press SCHALTUHR ●.
- If the preset start time is between 4:00 and 23:59, the recorder will enter the VPS standby mode at 0:00 on the preset day and remain engaged until 4:00 on the following day, if the intended programme has not yet been broadcast.
- If the preset start time is between 0:00 and 3:59, the recorder will enter the VPS standby mode at 20:00 on the previous day.
- 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.



Notes:
- If no VPS code is detected from that station or a system status code which cancels VPS recording is detected, ordinary timer recording will be engaged.
- Operation at the end of VPS recording is the same as with ordinary timer recording.

RECORDING FROM AN EXTERNAL SOURCE

By connecting an external video source (such as a VideoMovie camera-recorder, 2nd video recorder, video camera, etc.) to the AUDIO/VIDEO socket, recording and/or editing are possible.

- For connection of these units, an appropriate cable is necessary.
- For connection of a video camera, a camera adapter is also necessary. Consult a JVC dealer.

1. Turn the power on for all connected equipment.
2. Adjust the TV receiver to your video channel.
3. Load a cassette.
4. Press either TV-PROGRAMM button ● to obtain "AU" in the channel display.
5. Operate the source equipment properly.
6. Press AUFN./DA ●.
7. To stop recording temporarily, press PAUSE/STANDB. ●.
8. To end recording, press STOP ■.

Note:

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

IN CASE OF DIFFICULTY

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

Symptoms	Check points
No power is applied to the recorder.	• Is the power cord disconnected? Connect it.
Playback picture does not appear while the tape is running.	• Is the TV receiver's channel selector set to the correct video channel? Set to the RF converter channel.
Tape does not run in the Record mode.	• Is the PAUSE/STADB. button pressed? Press WIEDERGABE to release.
AUFN./DA button cannot be engaged.	• Is the cassette improperly loaded? Load it properly. • Is the safety tab broken? Reseal the slot.
Tape stops in the Rewind or Fast Forward mode.	• Is the ZIELSUCHLAUF switch set to ZÄHLWERK? Set to AUS.
Tape will not rewind.	• Is the tape already rewound to the end?
Noisy playback picture.	• Adjust with the SPURLAGE controls.
Pressing PAUSE/STANDB. during playback brings a still picture (in a frame-by-frame manner) with noise bars.	• Noise bars can be eliminated by pressing the PAUSE/STANDB. button a few more times.

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 check the functions.

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.

1.1.3 Disassembly (external covers)

1. Top cover
1) Take out five screws from the right, left and rear sides of the set.
2) Tilt up the rear end of the top cover, then remove the top cover.

2. Bottom cover
1) Take out five screws from the bottom side of the set.
2) Set free the bottom cover from six claws of the chassis in order to remove the bottom cover.

3. Front panel assembly
1) Remove the top cover.
2) Bend three upper hooks of the front panel assembly upward in order to disengage them from their chassis retainers.
3) Disengage three lower hooks of the front panel assembly from their chassis retainers in order to remove the front panel assembly from the chassis.

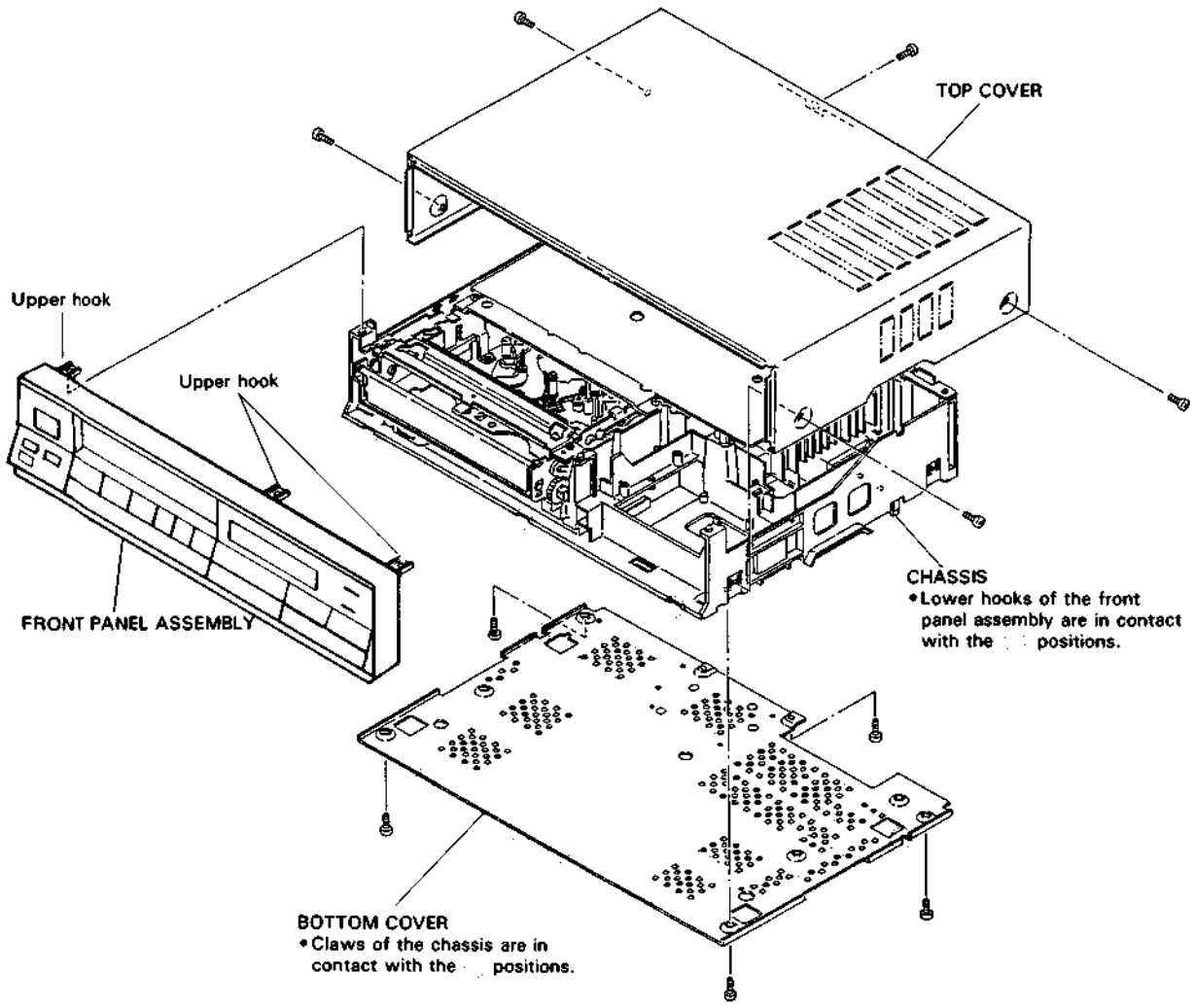


Fig. 1-1-1 Removal of external covers

SECTION 1
MECHANISM ADJUSTMENT

1.1 GENERAL

1.1.1 Precautions

IMPORTANT:

1. Disconnect unit from power before removing or soldering components.
2. When removing a fastener (screw, washer, etc.), be careful not to drop it into the mechanism. If a fastener should be dropped, be sure to retrieve it.
3. The tape transport mechanism has been precisely adjusted at the factory and ordinarily does not require readjustment.
4. When removing a part, be very careful not to damage or displace other parts. (Be especially careful with the tape guides and rotary video head drum.)
5. For service procedures that call for operation of the set when the cassette housing is separated from the main-deck, perform as below.

1) Set a sheet of insulated material on the right of the chassis.
2) Remove the cassette housing from the main-deck and place it on the insulated sheet, but do not disconnect the connector from the MAIN PWB.
3) Insert a cassette into the cassette housing. The housing mechanism functions to retract the cassette.
4) Disable the photo transistor sensor (END SENSOR) on the main-deck by applying an opaque cover.
5) The desired modes can be obtained by using the operation switches.

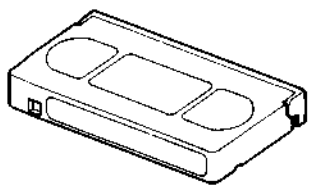
1.1.2 Required test equipment, fixturés and tools

For proper mechanical adjustment, the following test equipment, fixtures and tools are strongly recommended. Without them, a long trial-and-error period would be necessary, resulting in possible damage. In addition, general-purpose tools are required.

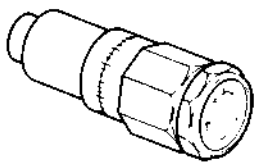
1. Test equipment required:

Color television or monitor
Oscilloscope: Wide-band, dual trace, triggered, delayed sweep
Recording tape
Alignment tapes
Signal generator : PAL color bars, stairstep

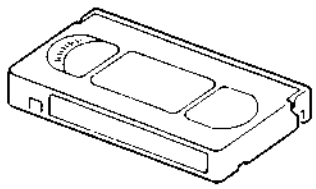
JVC alignment tape MH-2



Torque gauge assembly PUJ48075-2
(Torquemeter : 600ATG
Torquemeterhead : PUJ48016-2)



Back tension cassette gauge PUJ48076-2



A/CTL head position tool PUJ47351-2

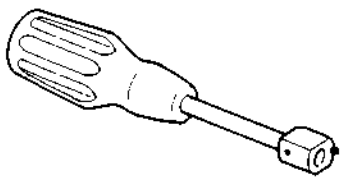


Table 1-1-1 Fixtures and tools

1.1.4 Layout of main parts

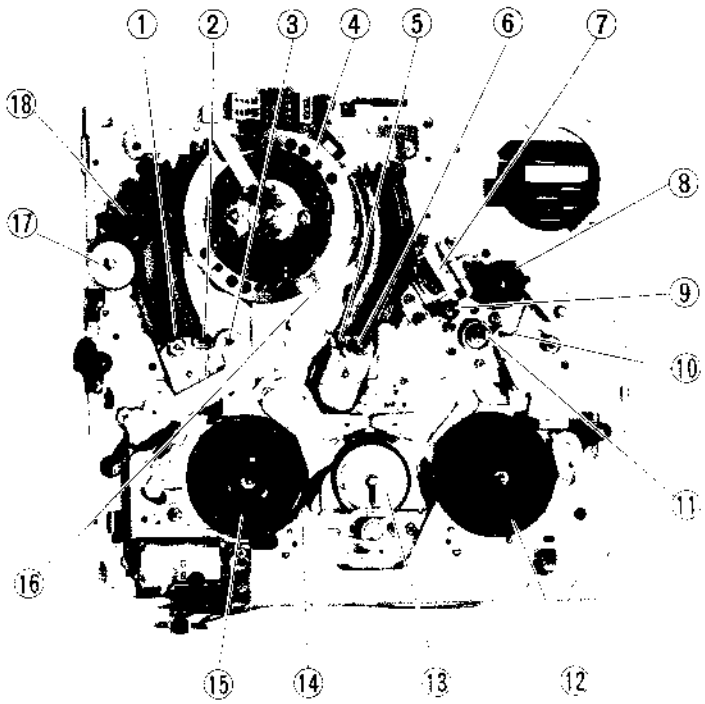


Fig. 1-1-2 Top view of main deck

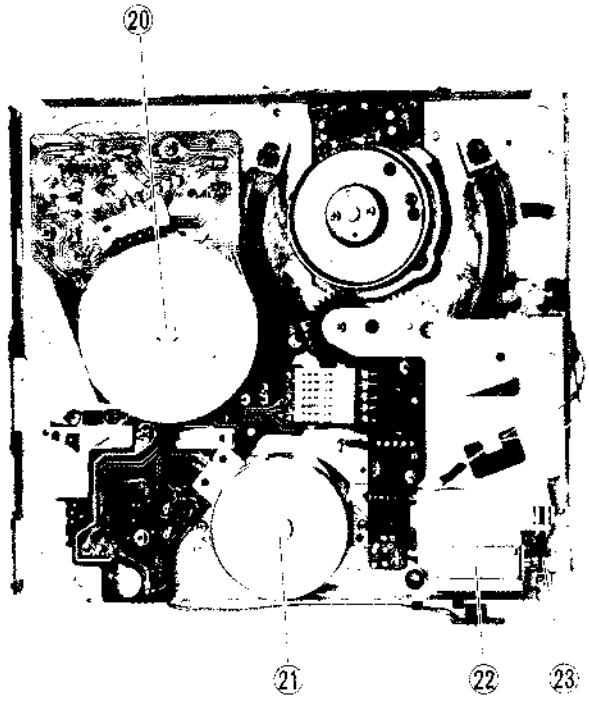


Fig. 1-1-3 Bottom view of main deck

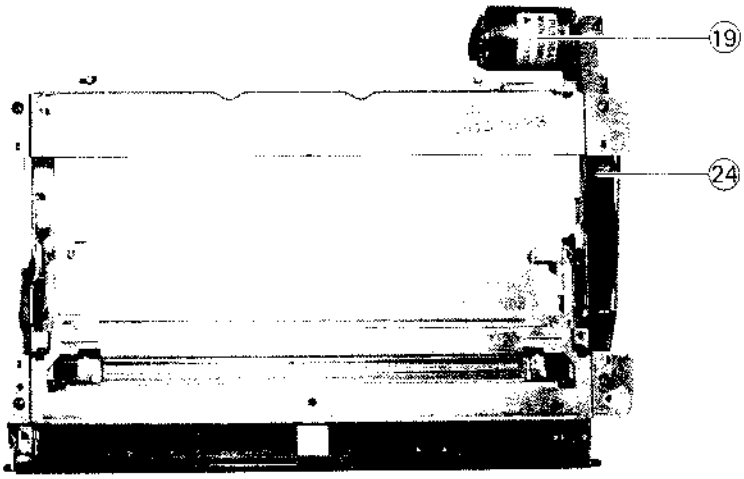


Fig. 1-1-4 Cassette housing

1. Supply guide roller
2. Supply slant pole
3. Tension pole
4. Upper drum
5. Take-up slant pole
6. Take-up guide roller
7. A/C head
8. Pinch roller
9. Take-up guide pole
10. Guide arm
11. Capstan
12. Take-up reel disk
13. Reel idler
14. Tension band
15. Supply reel disk
16. Lower drum
17. Impedance roller
18. Full erase head
19. Cassette motor
20. Capstan motor
21. Reel motor
22. Mode motor
23. Mode belt
24. Cassette belt

1.2 MAIN ASSEMBLY REPLACEMENT

1.2.1 Upper drum assembly

Notes: When handling and installing the upper drum assembly, avoid directly touching the head tips on the upper drum assembly.
For cleaning the head tips, push and hold a lint-free cloth or chamois dampened with alcohol to the upper drum assembly by the fingers, then turn the upper drum assembly clockwise. Do not clean the upper drum assembly with a vertical stroke.

1. Removal
1) Take out a screw and remove the brush assembly from the drum assembly.
2) Unsolder all soldered portions on the DRUM PWB. Remove excess solder, then remove the DRUM PWB from the upper drum assembly.
Note: Soldered portion can be easily removed by removing solder with sucker or wick.
3) Take out two screws and remove the upper drum assembly upwards.

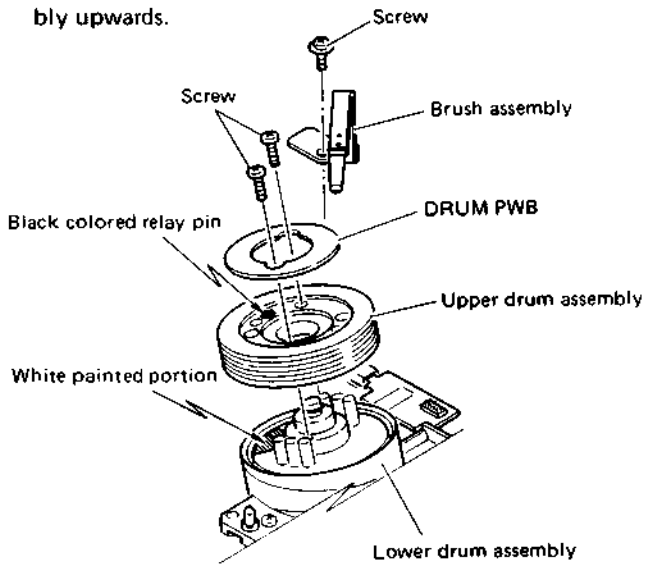


Fig. 1-2-1 Upper drum assembly

2. Installation
1) Install a new upper drum assembly so that the black-colored relay pin of the upper drum assembly overlies the white painted portion of the lower drum assembly, as shown in Fig. 1-2-1.
2) Tighten two screws in a balanced manner.
3) Set the DRUM PWB on the upper drum assembly, then resolder it.
4) Clean the drum unit (particularly clean the upper drum assembly).
5) Mount the brush assembly on the original position, then tighten a screw to fix the brush assembly.

3. Confirmation and adjustment
1) Perform the interchangeability confirmation. Refer to section 1.6.
2) Perform the PB switching point adjustment of the Servo (MAIN PWB) circuit. Refer to section 2.2.1.

1.2.2 A/C head (Audio/control head)

1. Removal
1) Disconnect connectors from the A/C HEAD PWB.
2) Take out two screws, then remove the A/C head and the head base together.
3) Unsolder and separate the A/C HEAD PWB from the A/C head.
4) Take out a screw and remove the shield cap from the A/C head.
5) Take out three screws and separate the A/C head from the head base. Use care regarding springs. Do not lose them.

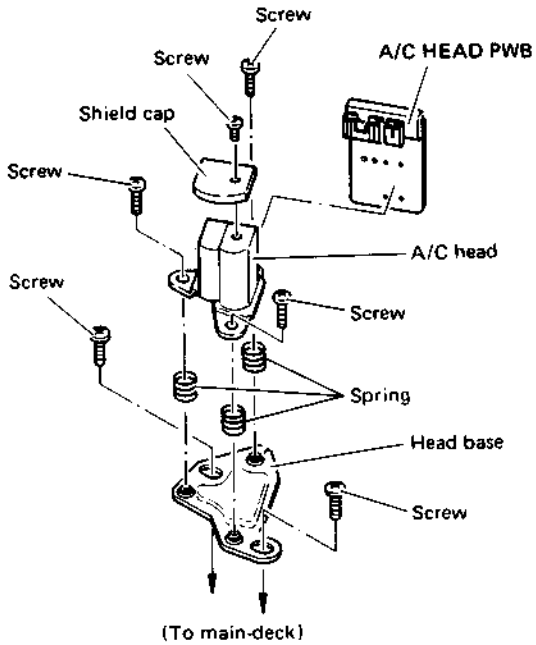


Fig. 1-2-2 A/C head

2. Installation
1) Mount a new A/C head and other peripheral parts on the main-deck by reversing the removal procedure.
2) Before installing the A/C head on the main-deck, perform rough-adjustment of A/C head height as shown in Fig. 1-2-3.

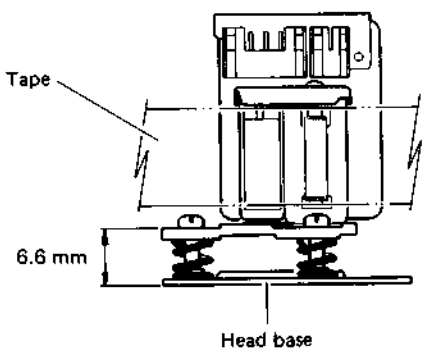


Fig. 1-2-3 A/C head height

3. Confirmation and adjustment
1) Use a recording tape and confirm correct tape transport operation, then perform interchangeability adjustment. Refer to sections 1.5 and 1.6.
2) Perform overall confirmation of the Audio circuit. Refer to section 2.4.

1.2.3 Tension band assembly

1. Removal

1) Take out a screw, then pry the A portion of the tension band assembly upwards to separate it from the tension arm assembly.

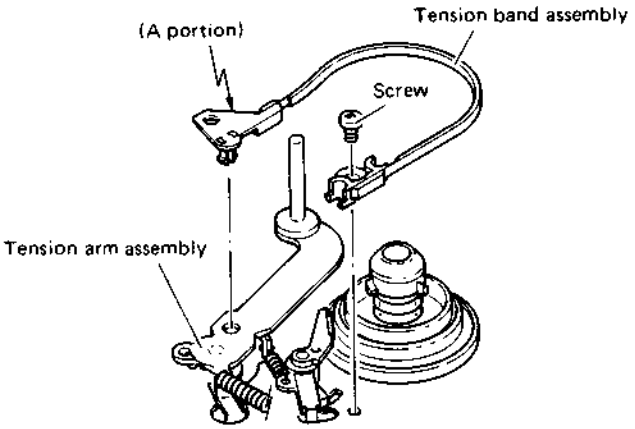


Fig. 1-2-4 Tension band assembly

2. Installation

1) Install a new tension band assembly by reversing the removal procedure.

3. Confirmation and adjustment

1) Perform tension pole position adjustment. Refer to section 1.4.1.

1.3 ASSEMBLY PROCEDURE OF MECHANISM

The mechanism of this model is mostly engaged to the mechanism control circuit, through the mode select switch. Therefore, the relation between the mode select switch and the control arm decides all mechanical movement of the mechanical parts such as levers, gears, rollers and so on. If these parts are not properly positioned, the unit will be unloaded or compulsorily stopped. This will result in damage of mechanical or electrical parts.

1.3.1 Loading arm assembly

Loading arm assembly consists of loading gear, torsion spring and loading arm.

1. Set up the loading arm assembly correctly as shown in Fig. 1-3-1.

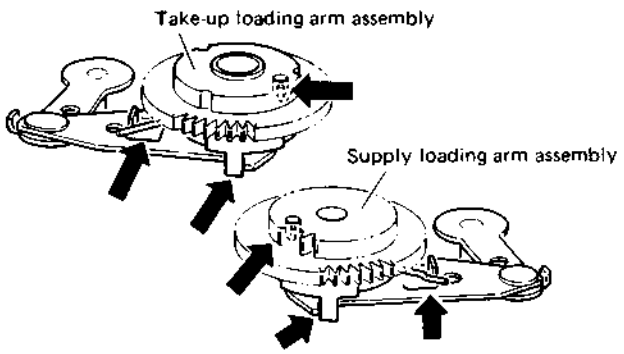


Fig. 1-3-1 Loading arm assembly (1)

2. Install the take-up loading arm assembly and the supply loading arm assembly so that the holes on the loading gears face each other, as shown in Fig. 1-3-2. Do not move the loading arm assemblies from this position for the next step.

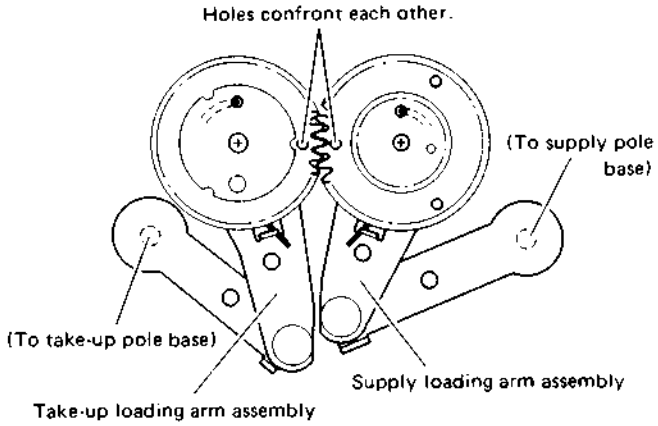


Fig. 1-3-2 Loading arm assembly (2)

1.3.2 Control cam

1. Set the arm gear assembly on the cam bracket assembly so that the hole of the arm gear assembly overlaps the hole of the cam bracket assembly.
2. Install the control cam on the cam bracket assembly so that the hole of the control cam overlaps the hole which is indicated in the step 1), as shown in Fig. 1-3-3. Do not turn the control cam from this position for the next step.

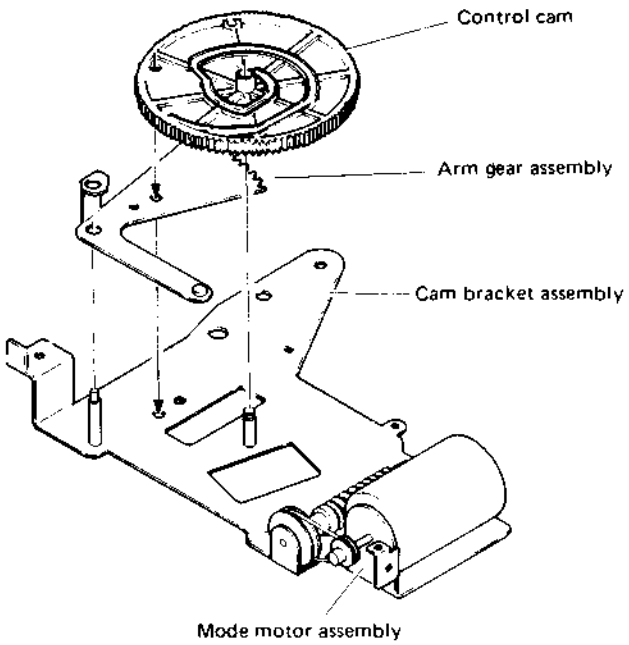


Fig. 1-3-3 Control cam

1.3.3 Cam bracket assembly

1. Push and hold the plate assembly so that the hole of the plate assembly overlaps the hole of the main-deck, as shown in Fig. 1-3-4.
2. Then mount the cam bracket assembly.

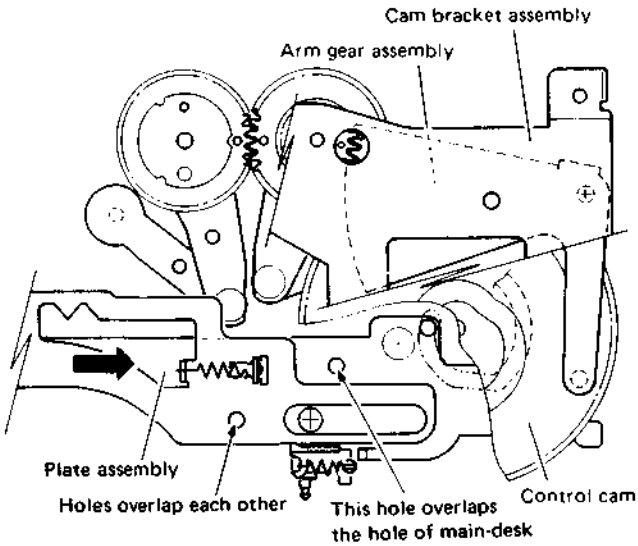


Fig. 1-3-4 Cam bracket assembly

Note: In order to overlap the holes turn the control cam fully counter clockwise by turning the mode motor with a finger.

1.3.4 Mode select switch

1. When the hole of the plate assembly overlaps the hole of main-desk, refer to Fig.1-3-4, confirm that the V-cut of the slider section just overlaps the V-cut of the outer section of the mode select switch.
2. If a difference of more than 0.5 mm is noticed, adjust the mode select switch to the correct position, after unsoldering and loosening the screw.

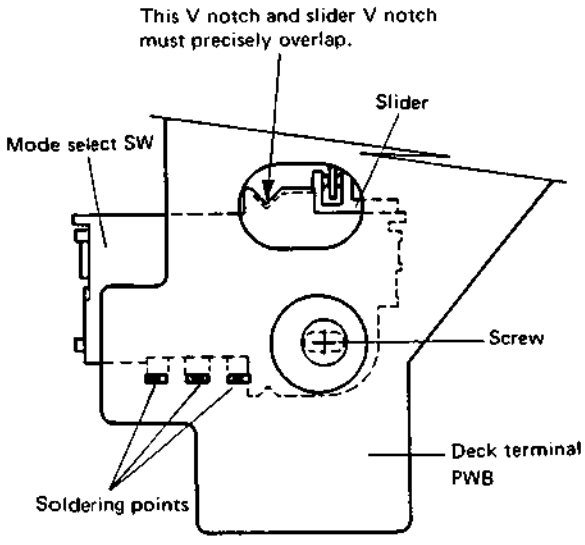


Fig. 1-3-5 Mode select switch

1.4 CONFIRMATION AND ADJUSTMENT

1.4.1 Tension pole position adjustment

1. Without loading a tape, set for the Play mode.
2. Loosen screw a little bit, then adjust the tension band holder so that the distance, shown in Fig. 1-4-1, becomes zero (0 mm).
3. Tighten screw to fix the tension band holder.

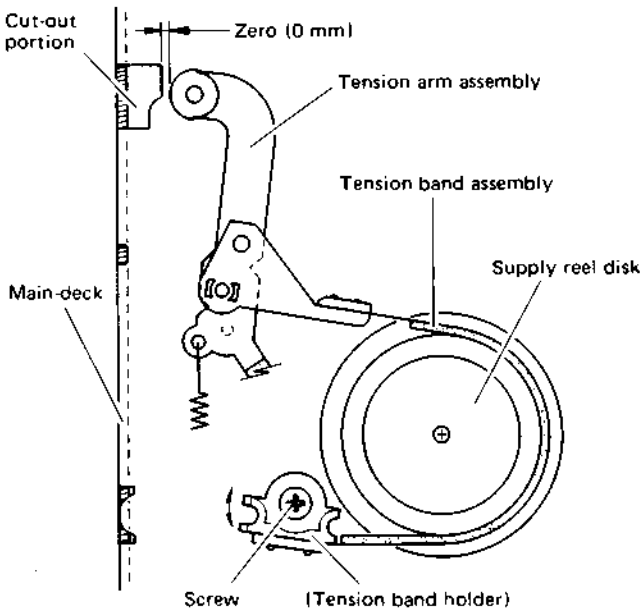


Fig. 1-4-1 Tension pole position

Note: By this adjustment, back tension is within normal specification, in spite of parts tolerances.

4. Use the back tension cassette gauge and set for the Play mode.
5. Confirm that the indication is between 25 – 75.

1.4.2 Take-up torque confirmation

1. Set the Play mode without the cassette housing assembly.
2. Set the torque gauge on the take-up reel disk.
3. The torque gauge consists of upper and lower sections connected by a spring mechanism. Relax the grip on the torque gauge so that the indicator needle and scale rotate at equal speed, then read the indication. The correct value is between 45 – 155.
4. If necessary, replace the take-up and supply clutches.

1.5 TAPE TRANSPORT SYSTEM CONFIRMATION AND ADJUSTMENT

Once adjusted to the complete condition, readjustment of the tape transport system is not necessary, except when the parts that compose the tape transport system are replaced due to troubles by long usage or unexpected accidents.

1.5.1 Tape transport system adjustment

1. Guide roller
   To get the FM envelope into ideal shape for interchangeability, the height adjustment of the guide roller is needed.
   Before turning the guide roller, slightly loosen the setscrew located under the guide roller. For loosening the setscrew, use the hex key (1.25 mm).
   Note: Loosen the setscrew enough to allow the guide roller to be turned. If excessively loose, tape motion may turn the guide roller inadvertently.

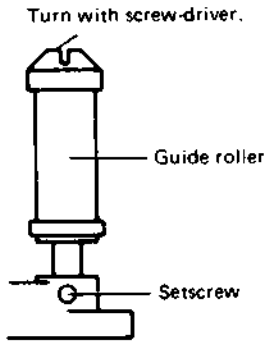


Fig. 1-5-1 Guide roller

2. Impedance roller
   Normally, do not adjust the height of the impedance roller. Only when the defects of tape travel are noted at the impedance roller, after complete adjustment for interchangeability, adjust the height of impedance roller to obtain smooth tape travel. For adjustment of impedance roller height, use the nut-driver (5.5 mm).
   Note: Do not lower the impedance roller excessively to avoid the defects of tape travel. Tape must be along the lower flange located under the impedance roller.

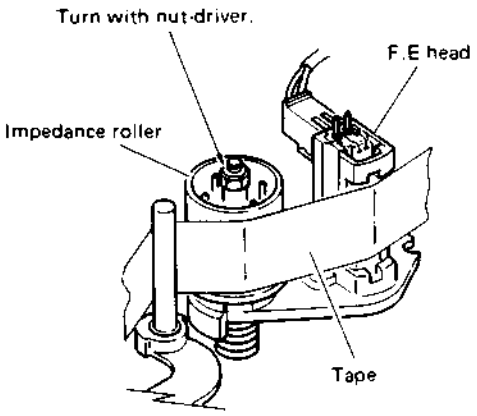


Fig. 1-5-2 Impedance roller

3. A/C head (audio/control head)
   When defects of tape travel are noted at the take-up guide pole, adjust the inclination of A/C head to obtain smooth tape travel.

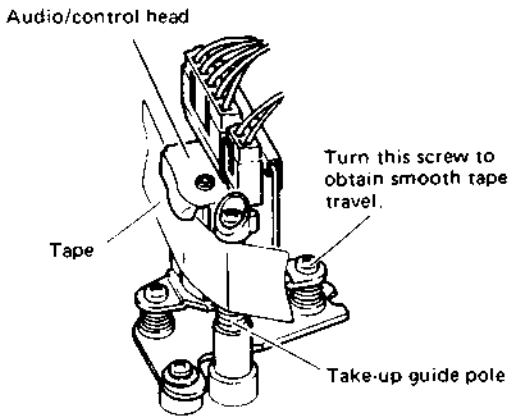


Fig. 1-5-3 A/C head

1.6 INTERCHANGEABILITY CONFIRMATION AND ADJUSTMENT

Before using an alignment tape, use a recording tape and confirm correct tape transport operation.
For the FM envelope output, connect an oscilloscope to TP106 of the MAIN PWB. For audio output, connect to the AUDIO OUT terminal, and trigger the oscilloscope externally with the signal from TP411 of the MAIN PWB. Use only the stairstep segment of the alignment tape, do not use another segment for interchangeability.

1.6.1 FM envelope confirmation and adjustment

1. Push the TRACKING +/– buttons to obtain the maximum FM envelope output corresponding to (a) level in Fig. 1-6-1. Observe the FM envelope, read the maximum level (a) and the minimum levels (b), (c) and (d). Confirm that:

$$\frac{b}{a} \geqq 0.7\ ,\ \frac{c}{a} \geqq 0.5 \text{ and } \frac{d}{a} \geqq 0.5$$

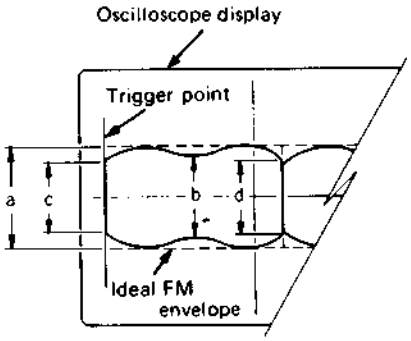


Fig. 1-6-1 FM envelope

2. If defects are noted, following adjustments are required.
1) Observe the oscilloscope display and push the TRACKING +/– buttons to vary the FM output from maximum to minimum.
2) If the variation is not parallel at the rising portion (drum entrance) of the FM envelope, turn the supply guide roller so that the rising portion of the envelope becomes nearly flat, as shown in Fig. 1-6-2.

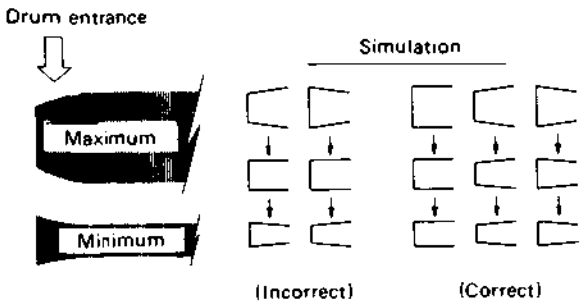


Fig. 1-6-2 Drum entrance

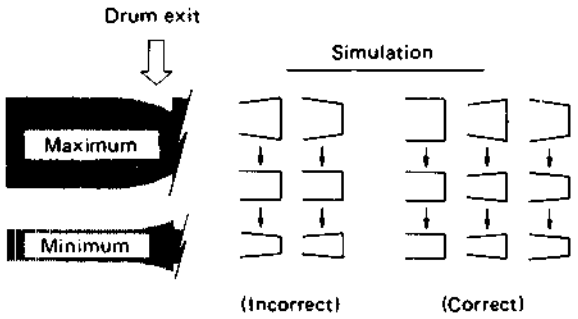


Fig. 1-6-3 Drum exit

3) In the same manner as for the rising portion, turn the take-up guide roller to adjust the falling portion (drum exit) of the FM envelope. See Fig. 1-6-3.
4) In addition to observing the envelope, confirm absence of tape curling or wrinkling at the impedance roller and take-up guide pole. If it occurs at the impedance roller, adjust the impedance roller height. If it occurs at the take-up guide pole, adjust the A/C head inclination.
5) Vary the FM envelope output level and perform fine adjustments of the guide rollers.

1.6.2 A/C head height and azimuth adjustments

Incorrect A/C head height can impair audio signal-to-noise ratio when playing back a pre-recorded tape.

1. For A/C head inclination, adjust screw (A) so that small tape wrinkles are not produced at the take-up guide pole. Turn screw (A) clockwise so that the tape wrinkles are apparent with the lower flange of the take-up guide pole, then turn screw (A) counter-clockwise so that the wrinkles smooth out.
2. Adjust azimuth with screw (B).
   Turn screw (B) to obtain maximum audio output.
3. For A/C head height, turn screws (A), (B) and (C) in succession by small and equal increments at a time and adjust for maximum audio output level.

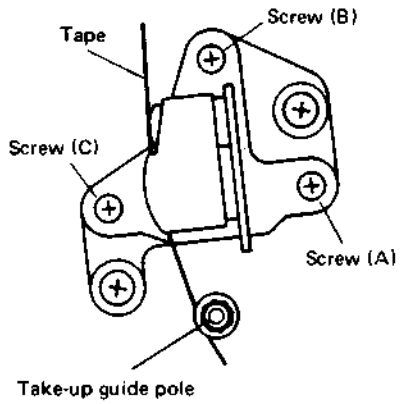


Fig. 1-6-4 A/C head

1.6.3 Control head phase adjustment

1. Set Tracking to Pre-Set Position by pushing both + button and – button at the same time.
2. Loosen screws (D) and (E) a little bit, then cover screw (D) with the A/CTL head position tool and set the pin of the tool into the hole next to screw (D).
3. Turn the tool counter-clockwise to shift the A/C head fully in the direction of the capstan, and then gradually turn the tool clockwise and observe the FM envelope output.
4. Set the A/C head at the point of the first output peak.

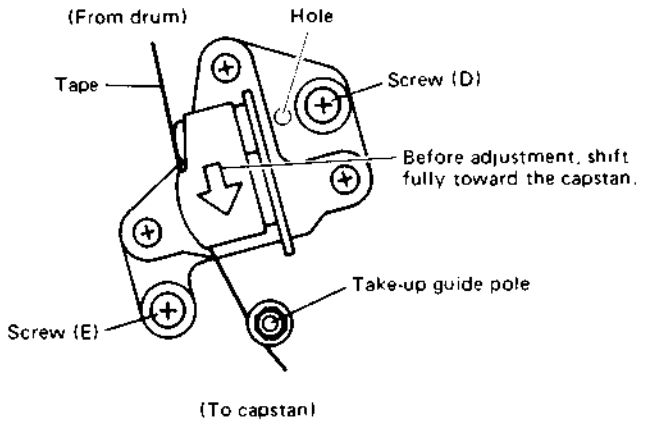


Fig. 1-6-5 Control head phase

1.6.4 Setscrew tightening

1. After confirming absence of tape wrinkling and other transport irregularities, tighten the setscrews located under the guide rollers while in the Stop mode.
   Note: Since the guide rollers are easily moved, use care when tightening.
2. Again perform the FM envelope confirmation.

1.6.5 Final confirmation

1. Supply a video signal and perform recording, then play back.
   Confirm that the FM envelope satisfies the specifications during playback of alignment tape MH-2.
2. Perform the PB switching point adjustment of the Servo circuit. Refer to section 2.2.1.
3. Perform the audio PB level adjustment of the Audio circuit. Refer to section 2.4.2.
4. Perform overall confirmation of the Video circuit. Refer to section 2.3.

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. Colour 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 colour bar, stairstep
9. Recording tape
10. Alignment tape: (MH-2)

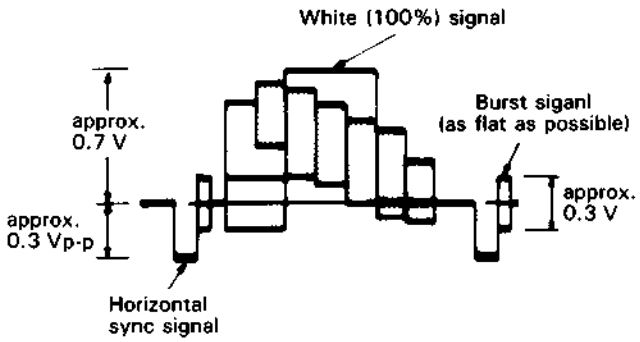


Fig. 2-1-1 Colour bar signal of pattern generator

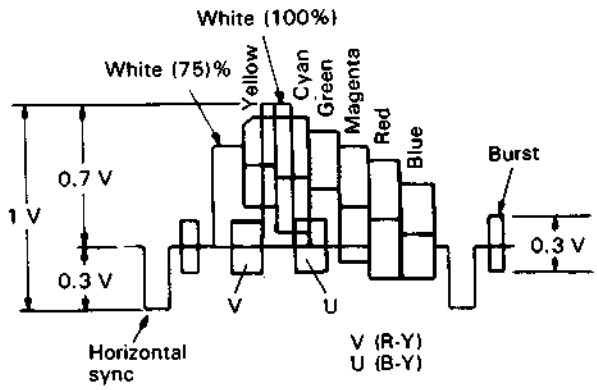


Fig. 2-1-2 Colour bar signal waveform

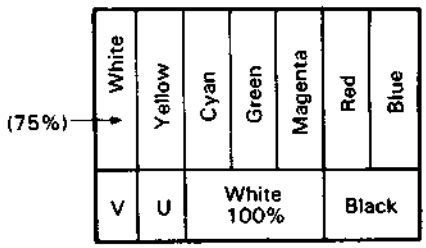


Fig. 2-1-3 Colour bar pattern

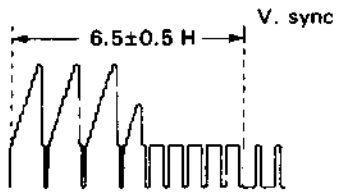
2.1.2 Check and adjustment steps

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 bar	Colour bar signal as video input.
• Stairstep	Stairstep signal as video input.
• 1 kHz	Supply a 1 kHz sinewave as audio input signal.
• MH-2 Colour bar	Play colour bar segment of MH-2 alignment tape.
• MH-2 Stairstep	Play stairstep segment of MH-2 alignment tape.
• MH-2 1 kHz	Play 1 kHz audio signal segment of MH-2 alignment tape.
• MH-2 RF sweep	Play RF sweep segment of MH-2 alignment tape.
• E-E	Power on and machine in Stop mode.
• REC	Recording mode
• PB	Playback mode
• REC then (another mode)	Use blank tape, record, then play back in the mode specified.
• SEARCH	Search (FWDS and REVS) playback mode.
• SLOW	Slow motion playback mode.
• STILL	Play back then Pause.
• A DUB	Audio dubbing mode.
Description	This column provides an explanation of the step, notes, adjustment values.

2.2 SERVO CIRCUIT

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

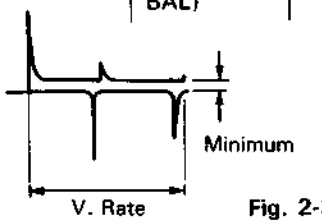
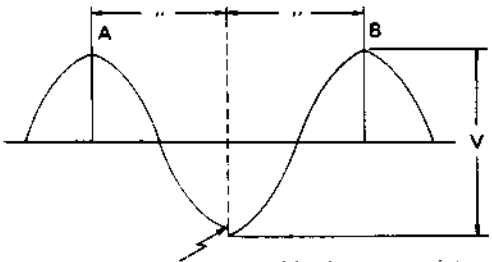
No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
1	PB Switching Point	TP110 (VIDEO OUT)	R430 (PB SW POINT)	• PB • MH-2 Stairstep • Trigger slope (–)	1. Connect an oscilloscope to TP110. 2. Play back the stairstep segment of MH-2 alignment tape. 3. Trigger the oscilloscope externally (– slope) with the signal from TP411 (DRUM FF). 4. Adjust R430 to position the trigger point 6.5 ±0.5 H from V. sync.  **Fig. 2-2-1**
Note: Before this adjustment "Control head phase adjustment" must be completed. Refer to Section 1.6.3.					
2	V. Pulse Position	MONITOR	R434 (V-LOCK)	• REC then STILL • Colour bar	1. Record a colour bar signal, then play back. 2. In the Still mode, observe the monitor and adjust R434 (rear panel) for the minimum vertical jitter.
3	SLOW Tracking	MONITOR	FINE SLOW board R25 (SLOW TRACK)	• REC then SLOW • Colour bar	1. Record a colour bar signal, then play back. 2. In the Slow mode, observe the monitor and adjust R25 to obtain the fine picture.

2.3 VIDEO CIRCUIT

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

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
1	VXO	TP209 (VXO)	R207 (VXO)	• PB • MH-2 Colour bar	1. Connect a frequency counter to TP209. 2. Play back the colour bar segment of MH-2 alignment tape. 3. Adjust R207 for 4.433619 MHz ± 50 Hz.
2	REC Color Level	TP207 (PB COL)	R214 (REC COL LEV)	• Colour bar • REC then PB	1. Play back the colour bar signal of the MH-2 Alignment tape. 2. Connect an oscilloscope to TP207 and measure the colour play-back level. Make a note of this as level "a". (Tracking control: maximum level) 3. Use a spare tape to record and play back a colour bar signal. Make a note of this play-back level as level "b". (Tracking control: reset) 4. So that the ratio of b/a becomes 0.85±0.05, adjust R214 during recording. 5. Confirm that the channel difference is within ±3 dB.

Fig. 2-3-1

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
3	Noise cancel balance	TP121 (NC BAL)	R112 (YNR NC BAL)	• Colour bar • REC then PB	1. Record, then play back a colour bar signal and connect an oscilloscope to TP121. 2. As indicated in the figure, adjust R112 for minimum DC step difference.
		 Fig. 2-3-2			
4	SECAM DET	TP251 (S DET ADJ)	L251 (1/2 fH TUNING)	• SECAM colour bar • E-E	1. Connect an oscilloscoape to TP251. 2. Adjust L251 so that the transition step becomes centered between "A" and "B" as shown in Fig. 2-3-3.
					 Set this point to center position between points "A" and "B". V = more than 5.5 Vp-p in REC V = 6.0±0.5 Vp-p in PB **Fig. 2-3-3**
		TP214 (SECAM DET)	R257 (SECAM DET. ADJ)	• SECAM colour bar • REC then PB	3. Connect an oscilloscope to TP214. 4. Record, then play back a SECAM colour bar signal. 5. Adjust R257 for 6.0 ±0.5 Vp-p.
5	PB Frequency Response	MONITOR	R127 (PB FREQ RESPONSE)	• REC then PB • TV Broadcast	1. Record, then play back a colour broadcast that shows a good depiction of human facial contours. 2. Adjust R127 to obtain distinct facial features on the monitor.

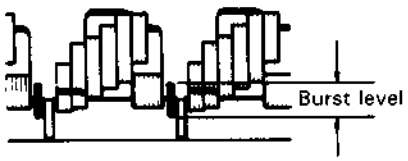
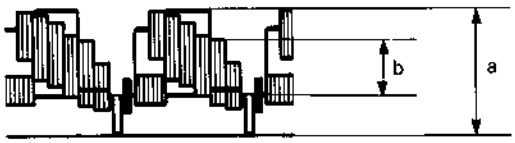
2.4 AUDIO CIRCUIT

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

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
1	Audio Bias Level	TP31, TP32 (BIAS LEVEL)	R41 (BIAS ADJ)	• REC	1. Connect a digital voltmeter between TP31 and TP32. 2. Set for REC mode without a signal. 3. Adjust R41 for 3.5 mV ± 0.2 mVrms.
2	Audio PB Level	AUDIO OUT	R33 (PB LEVEL)	• REC then PB	1. Connect an oscilloscope to AUDIO OUT. 2. Supply an audio signal (−8 dBs/1 kHz) to AUDIO IN and record together with a VIDEO signal, then play back. 3. Adjust R5 so that the audio output level during playback becomes −6 ± 1.0 dBs.

2.5 TUNER/IF CIRCUIT

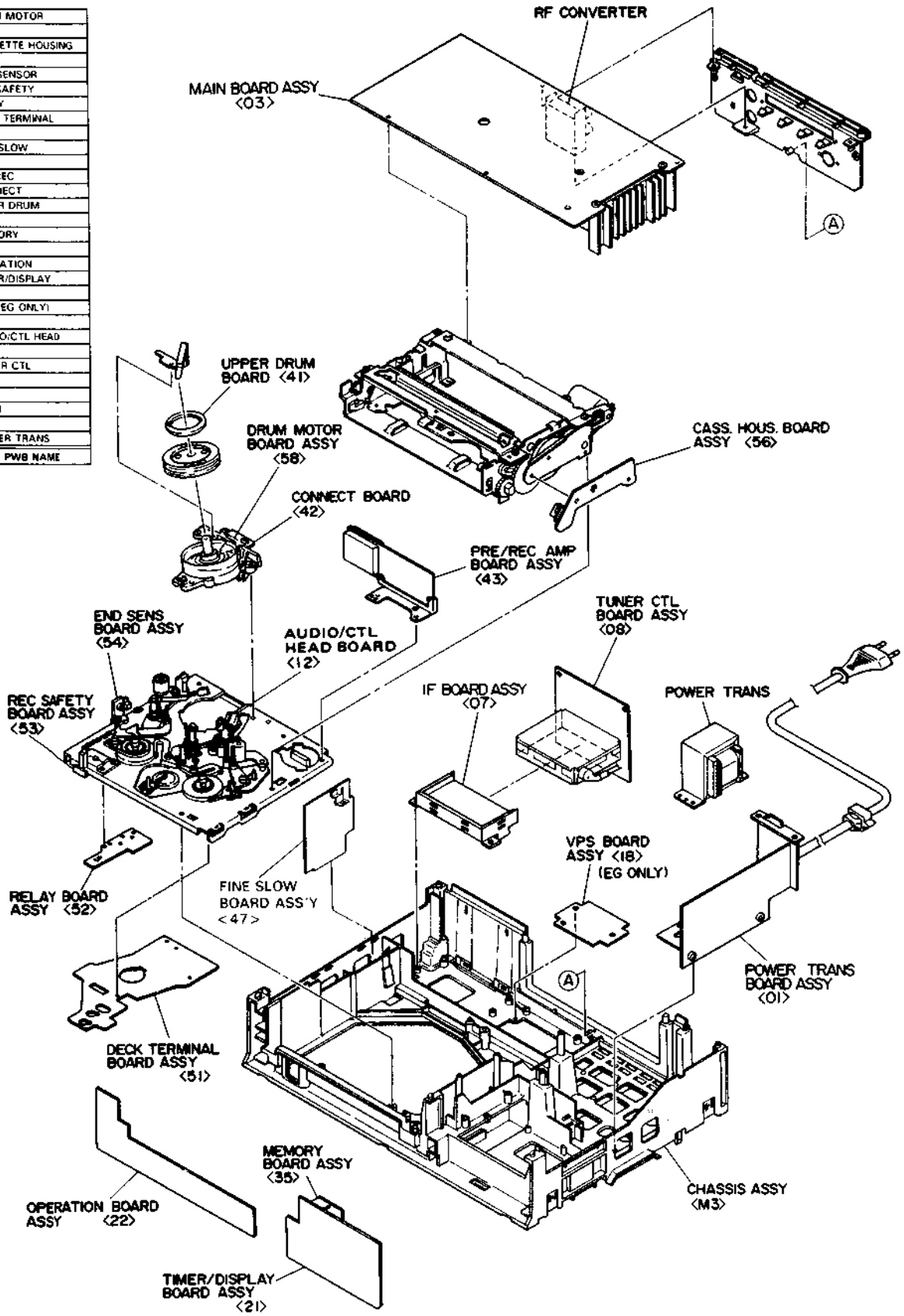
Note: Unless otherwise specified, all test points and adjustment parts are located on the IF board.

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
1	VCO	MONITOR	T1 (LLD)	• TV broadcast • Tuner mode	1. Receive a colour broadcast. 2. Adjust T1 to obtain a fine picture on the monitor.
2	AFC	MAIN board TP110 (VIDEO OUT)	T2 (AFC)	• TV broadcast • Tuner mode	1. Receive a colour broadcast. 2. With AFC SW to OFF, perform fine tuning. Then, precisely read the burst level of IC1-18. Make a note of the burst level. 3. When AFC SW is ON, adjust T2 (AFC) so that the burst level of IC1-18 becomes equal to the noted level as shown in Fig. 2-5-1.  **Fig. 2-5-1**
3	Color Level	MAIN board TP110 (VIDEO OUT)	R43 (COL LEV)	• TV broadcast • Tuner mode	1. Supply a colour bar signal from a TV channel signal generator and select the channel corresponding to the generator. 2. With AFC SW ON, adjust R43 to produce signal waveform as shown in Fig. 2-5-2. Alternate method 1. Receive a colour broadcast. 2. With AFC SW ON, adjust R43 so that the burst level becomes 2/3 of the sync level.  Y level = 1 Magneta level = 0.48 a : b = 1 : 0.48 **Fig. 2-5-2**
4	RF AGC	MONITOR	R18 (AGC)	• TV broadcast • Tuner mode	**Note:** Adjust R18 (RF AGC) to correct for excess noise in the picture or when streaky cross interference occurs due to strong electrical fields. 1. Adjust R18 to minimize noise or steaks on the TV screen. 2. Check for absence of abnormality on all channels.

SECTION 3
CHARTS AND DIAGRAMS

3.1 CIRCUIT BOARD LOCATIONS

NO.	PWB NAME
58	DRUM MOTOR
56	CASSETTE HOUSING
54	END SENSOR
53	REC SAFETY
52	RELAY
51	DECK TERMINAL
47	FINE SLOW
43	PRE/REC
42	CONNECT
41	UPPER DRUM
35	MEMORY
22	OPERATION
21	TIMER/DISPLAY
18	VPS (EG ONLY)
12	AUDIO/CTL HEAD
08	TUNER CTL
07	IF
03	MAIN
01	POWER TRANS



3.2 GENERAL INFORMATIONS

3.2.1 Connections

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

: Connector

: Direct connection

: Board in connector

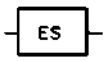
: Connected pattern in the board.
Abbreviations R : Regulator
V : Video M : Mechacon
S : Servo A : Audio

VS : Signal flow from video to servo.

3.2.2 Indications

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

: Active only at low for electronic switch.



: Active only at high for electronic switch.


: Low pass filter.

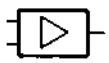

: High pass filter.


: Band pass filter.

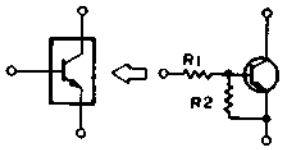

: Limiter.

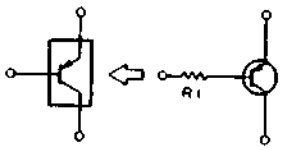

: Detector


: Amplifier.


: Mixer stage.

3.2.3 Digital transistor





DTA114T
T mark only

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.

3.2.4 Siganl flow in the schematic


Recording signal path
Playback signal path
REC/PB signal path

3.2.5 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.

3.3 ABBREVIATIONS USED IN THE SCHEMATIC DIAGRAM

A	AC	: Alternating Current
	ACC	: Automatic Color Control
	ACCEL	: Acceleration
	A/CTL	: Audio/Control
	ADC	: Analog to Digital Converter
	ADD	: Adder
	ADRS	: Address
	ADJ	: Adjustment
	A DUB	: Audio Dubbing
	AE	: Audio Erase
	AEF	: Automatic Editing Function
	AFC	: Automatic Frequency Control
	AFT	: Automatic Fine Tuning
	AGC	: Automatic Gain Control
	AH	: Audio Head
	AL	: After Loading
	ALC	: Automatic Light Compensation Automatic Level Control
	AM	: Amplitude Modulation
	AMP	: Amplifier
	ANT	: Antenna
	APC	: Automatic Pedestal Control Automatic Phase Control
	APL	: Average Picture Level
	A/S/M	: Audio/Servo/Mechacon
	ASS'Y	: Assembly
	ATT	: Attenuator
	AUD	: Audio
	AUTO	: Automatic
	AUX	: Auxiliary
B	B	: Base
	BAL	: Balance
	BATT	: Battery
	BFP	: Burst Flag Pulse
	BIT	: Binary Digit
	BLK	: Black, Blanking
	BLU	: Blue
	BILING	: Bilingual
	BPF	: Bandpass Filter
	BRK	: Brake
	BRN	: Brown
	BT	: Band Tuning
	BUFF	: Buffer
	BW or B/W	: Black and White
C	C	: Capacitance, Collector, Color
	CAP	: Capstan, Capacitor
	CAR	: Carrier
	CARR	: Carrier
	CASS	: Cassette
	CCD	: Charge Coupled Device
	CCT	: Circuit
	CD	: Count Down
	CE	: Chip Enable
	CF	: Ceramic Filter
	CH	: Channel
	CHG	: Charge
	CHROMA	: Chrominance
	CLK	: Clock
	CLR	: Clear
	CMD	: Command
	CNT	: Count, Counter
	COL	: Color
	COM	: Common
	COMB	: Combination Comb Filter
	COMP	: Comparator Composite Compensation
	CONN	: Connector
	CONV	: Converter
	CP	: Circuit Protector Clamp Pulse
	CPC	: Capstan Phase Control
	CTL	: Control
D	D	: Drum, Digital, Diode, Drain
	DAC	: Digital to Analog Converter
	dB	: Decibel
	DC	: Direct Current
	DEC	: Decoder
	DEMOD	: Demodulator
	DEMUX	: Demultiplexer
	DET	: Detector
	DEV	: Deviation
	DIF	: Differential
	DISCR	: Discriminator
	DL	: Delay Line
	DOC	: Dropout Compensator
	DOD	: Drop Out Detector
	DPC	: Drum Phase Control
E	E	: Edit, Emitter
	E-E	: Electric to Electric
	EF	: Emitter-Follower
	EMP	: Emphasis
	EN	: Enable
	ENC	: Encoder
	ENV	: Envelope
	EP	: Extended Play
	EQ	: Equalizer
	ES	: Electronic Switch
	ESNS	: End Sensor
	EXP	: Expander
	EXT	: External
F	F	: Farad, Fuse
	F ADV	: Frame Advance
	FDP	: Fluorescent Display Panel
	FE	: Full Erase
	FET	: Field Effect Transistor
	FF	: Fast Forward Flipflop
	FG	: Frequency Generator
	FM	: Frequency Modulation
	FMA	: FM Audio
	FR	: Full Recording, Frame, Fusible Resistor
	FREQ	: Frequency
	F-V CONV	: Frequency to Voltage Converter
	FWD	: Forward
	FWD S	: Forward Search
G	G	: Green, Gate, Grid
	GEN	: Generator
	GND	: Ground
	GRN	: Green
	GRY	: Gray
H	H	: High, Henry, Hour
	HG	: Hall Generator
	HPF	: Highpass Filter
	Hz	: Herz
I	IC	: Integrated Circuit
	ID	: Identification (Pulse)
	IF	: Intermediate Frequency
	IFR	: Infrared
	IFT	: Intermediate Frequency Transformer
	IND	: Indicator
	INH	: Inhibit
	INS	: Insert
	INT	: Internal, Interrupt
	INV	: Inverter
	I/O	: Input/Output
	IR	: Infrared
L	L	: Low, Left
	LIM	: Limiter
	LIN	: Linearity
	LOAD	: Loading (Cassette)
	LP	: Long Play
	LPF	: Lowpass Filter

M	M	: Motor, Mega
	MAX	: Maximum
	MDA	: Motor Drive Amplifier
	MECHACON	: Mechanism Control
	MIC	: Microphone
	MIN	: Minimum
	MIX	: Mixer, Mixing
	MMV	: Monostable Multivibrator
	MOD	: Modulation, Modulator
	MODEM	: Modulator-Demodulator
	MON	: Monitor
	MPX	: Multiplexer, Multiplex
	MS	: Mode Select
N	NAND	: Not-And
	NC	: Not Connected, Normally Closed
	NFB	: Negative Feedback
	NLN	: Non-Linear
	NO	: Normally Open
	NOR	: Normal, Not-Or
	NR	: Noise Reduction
O	OP	: Operation
	OPAMP	: Operational Amplifier
	ORN	: Orange
	OSC	: Oscillator
P	PB	: Playback
	PC	: Photocoupler, Pulse Counter
	PCM	: Pulse Code Modulation
	PG	: Pulse Generator
	PGM	: Program
	PI	: Photo Interrupter
	PIF	: Picture Intermediate Frequency
	PLA	: Programmable Logic Array
	PLL	: Phase Locked Loop
	POS	: Position
	p-p	: Peak-to-Peak
	PREAMP	: Preamplifier
	P/S	: Pause/Still
	PSC	: Pulse Swallowing Control
	PU	: Pickup
	PUT	: Programmable Unijunction Transistor
	PWM	: Pulse Width Modulation
	PWR	: Power
Q	Q	: Quality Factor
R	R	: Red, Right
	RA	: Resistor Array
	RAE	: Random Access Enable
	RAM	: Random Access Memory
	REC	: Recording
	REF	: Reference
	REG	: Regulated, Regulator
	REM	: Remote
	REMOCON	: Remote Control (Unit)
	REV	: Reverse
	REV S	: Reverse Search
	REW	: Rewind
	R/P	: Record/Playback
	RPT	: Repeat
	RST	: Reset
	RT	: Rotary Transformer
	RUN	: Running
	RY	: Relay
S	SAW	: Sawtooth, Surface Acoustic Wave
	SC	: Subcarrier, Simulcast
	SCH	: Search
	SEL	: Select, Selector
	SENS	: Sensor
	SEP	: Separator
	SF	: Source Follower
	SFF	: Short Fast Forward
	SIF	: Sound Intermediate Frequency
	SHARP	: Sharpness
	SN	: Signal to Noise Ratio
	SOL	: Solenoid
	SP	: Standard Play
	SREV	: Search Reverse
	SREW	: Short Rewind
	S/S	: Slow/Still
	SSG	: Sync Signal Generator
	SSNS	: Start Sensor
	STD	: Strobe Data, Standard
	SUP	: Supply
	SW	: Switch
	SWD	: Switched
	SYNC	: Synchronization
T	TF	: Thermal Fuse
	TIM	: Timing
	TK	: Tracking
	TNR	: Tuner
	TP	: Test Point
	TPZD	: Trapezoid
	TR	: Transistor, Trimmer
	TRANS	: Transformer
	TU	: Take-up
U	UL	: Unloading
	UNREG	: Unregulated
	UNSW	: Unswitched
V	V	: Vertical, Volt
	VCO	: Voltage Controlled Oscillator
	VD	: Vertical Drive
	VIF	: Video Intermediate Frequency
	VLT	: Violet
	VR	: Variable Resistor
	VS	: Video and Sync
	V/T	: Video/Television
	V/U	: VHF/UHF
	VXO	: Variable Crystal Oscillator
W	W	: Watt
	W & D	: White and Dark
	WHT	: White
X	XTAL	: Crystal
Y	Y	: Luminance
	YEL	: Yellow

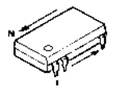
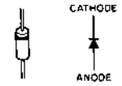
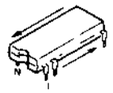
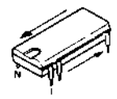
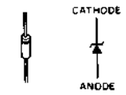
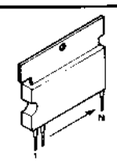
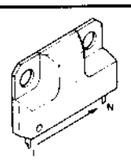
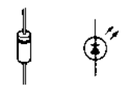
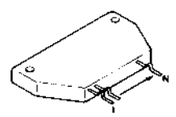
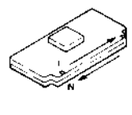
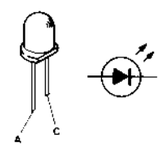
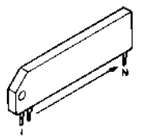
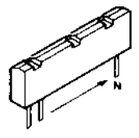
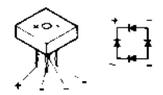
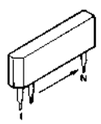
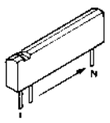
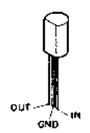
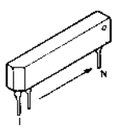
3.4 MAIN TYPES OF ACTIVE AND PACKAGE CIRCUITS

INTEGRATED CIRCUIT		
	NAME	L
B	BA10358	2B
	BA6222	3A
	BA6259N	5B
	BA7007	6B
	BA7751ALS	5A
	BU2767S	2B
	BU4066B	2B
H	HA118019NT	2B
	HD49703NT	2A
	HD49712NT	1A
I	IC-PST523H-2	7A
L	LA7910	7B
M	MN1220	2A
	MSM6967RS	8A
	M50965-645SP	2B
	M51496P	2B
	M5278L05	7A
	M5278L56	7A
	M54647L	3B
P	PB20166C	4B
	PU22046A	4B
S	STK5481	4A
T	TA7374P	6A
U	UPD75208CW-097	2A

TRANSISTOR		
	NAME	L
D	DTA114ES	3C
	DTA124ES	3C
	DTC124ES	3C
	DTC114YS	3C
	DTC144EF	1D
	DTC144ES	3C
	DTC144WS	3C
2SA	2SA1309	3C
	2SA720	2C
	2SA933	3C
2SB	2SB641	1D
	2SB810	3C
2SC	2SC1740	3C
	2SC2021	1D
	2SC2636	1D
	2SC3311	3C
	2SC3327	3C
	2SC3399	3C
	2SC3401	3C
	2SC536	3C
2SD	2SD1450	3C
	2SD637	1D

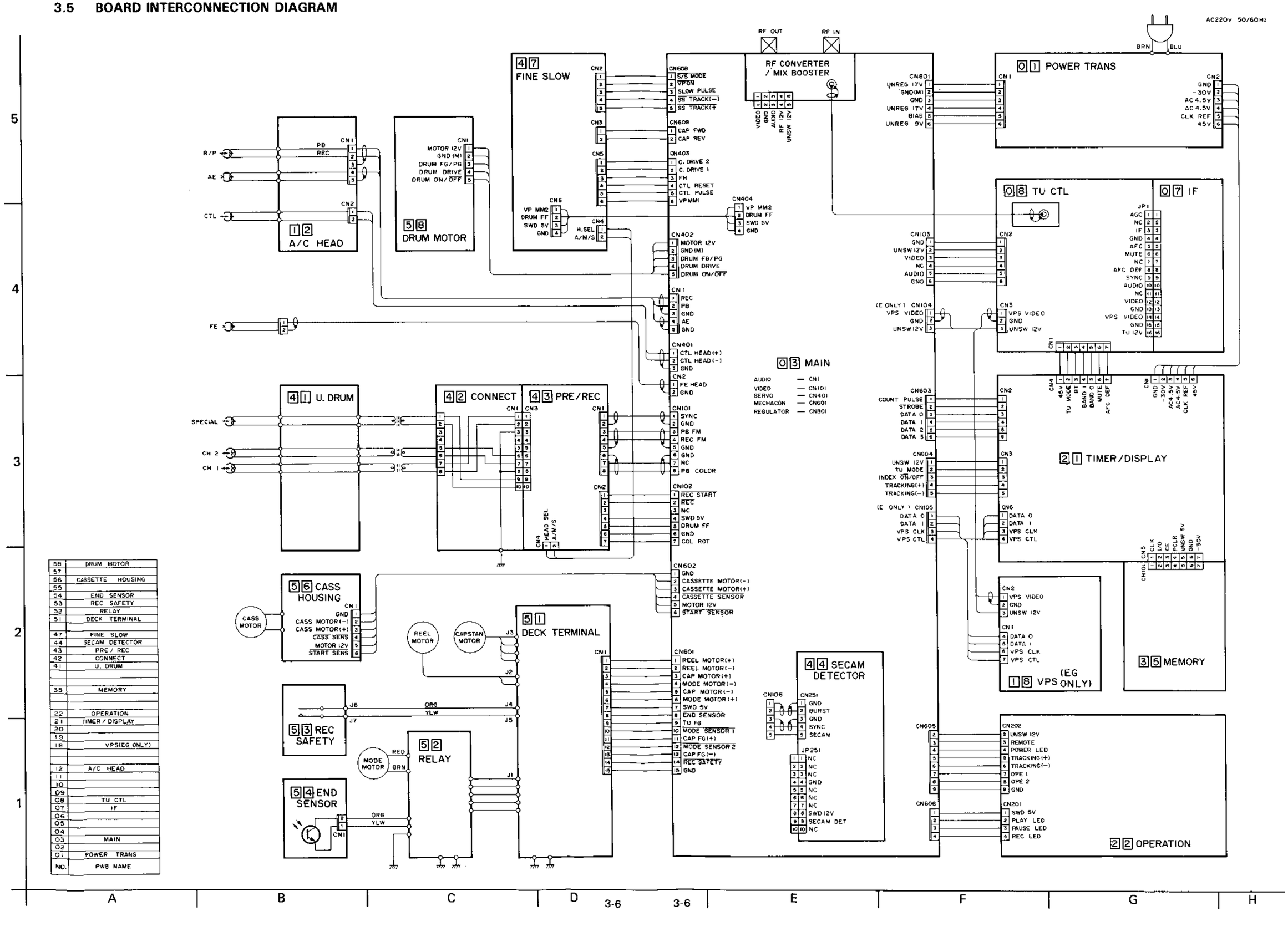
DIODE		
	NAME	L
H	HZS4.3EB2	2E
	HZS7.5EB2	2E
	HZT33-02	2E
	HZ30-2	2E
L	LTZ-MR15	3E
M	MA165	1E
	MA27	1E
	MTZ11B	2E
	MTZ15B	2E
	MTZ5.1	2E
R	RD10ES-T1B2	2E
	RD9.1ESB2	2E
S	SLR-34MC3F	4E
	SLR-34VC3F	4E
	S4VB10-F2	5E
	1SS132	1E
	1SS133	1E
	1SS292	1E
	11E2	1E

Note: FOR INSTANCE, BA10358 →
2B: SEE COLUMN 2, LINE B

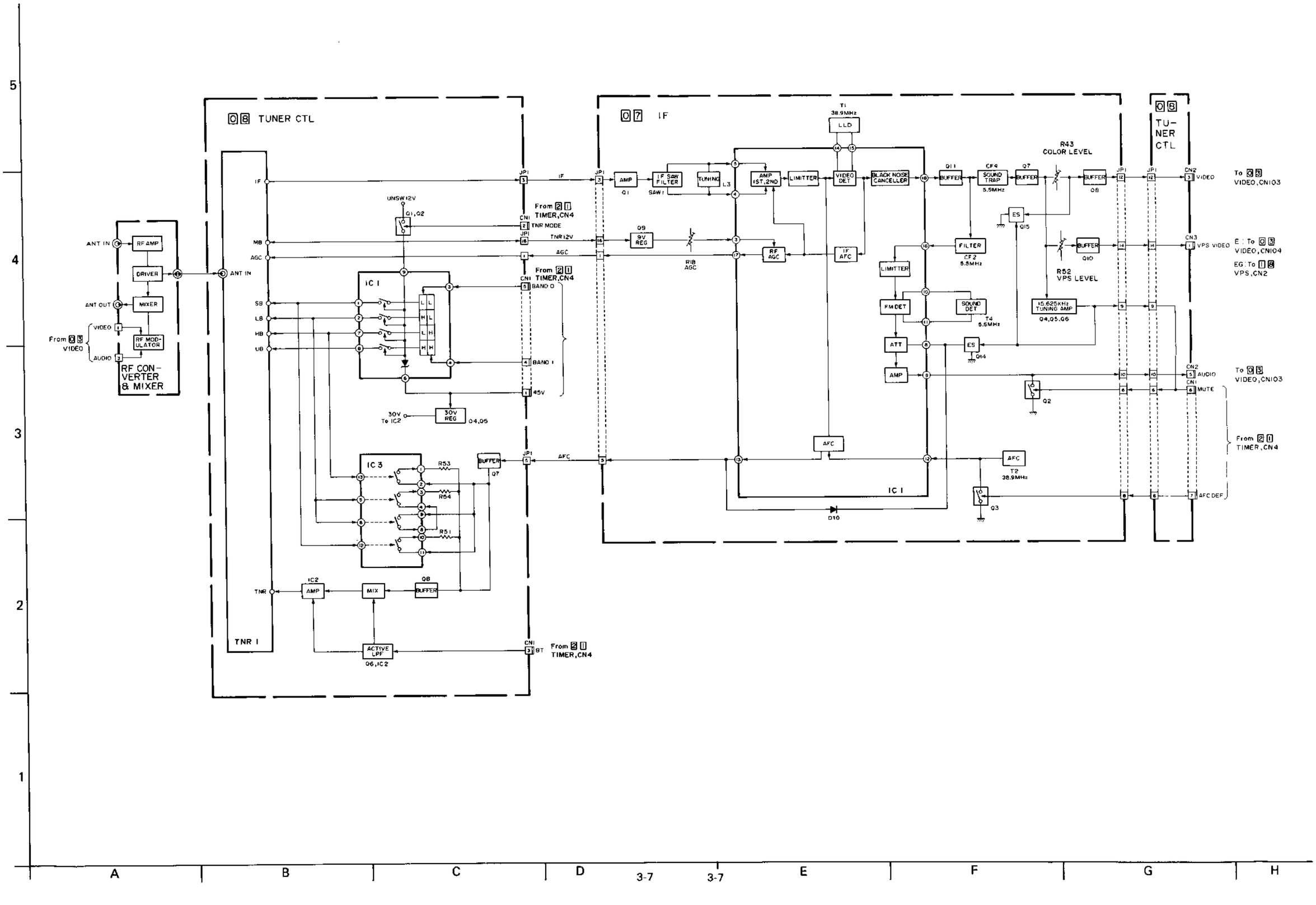
	Integrated Circuit		Transistor		Diode
	A	B	C	D	E
1					
2					
3					
4					
5					
6					
7					
8					
9					

3-5

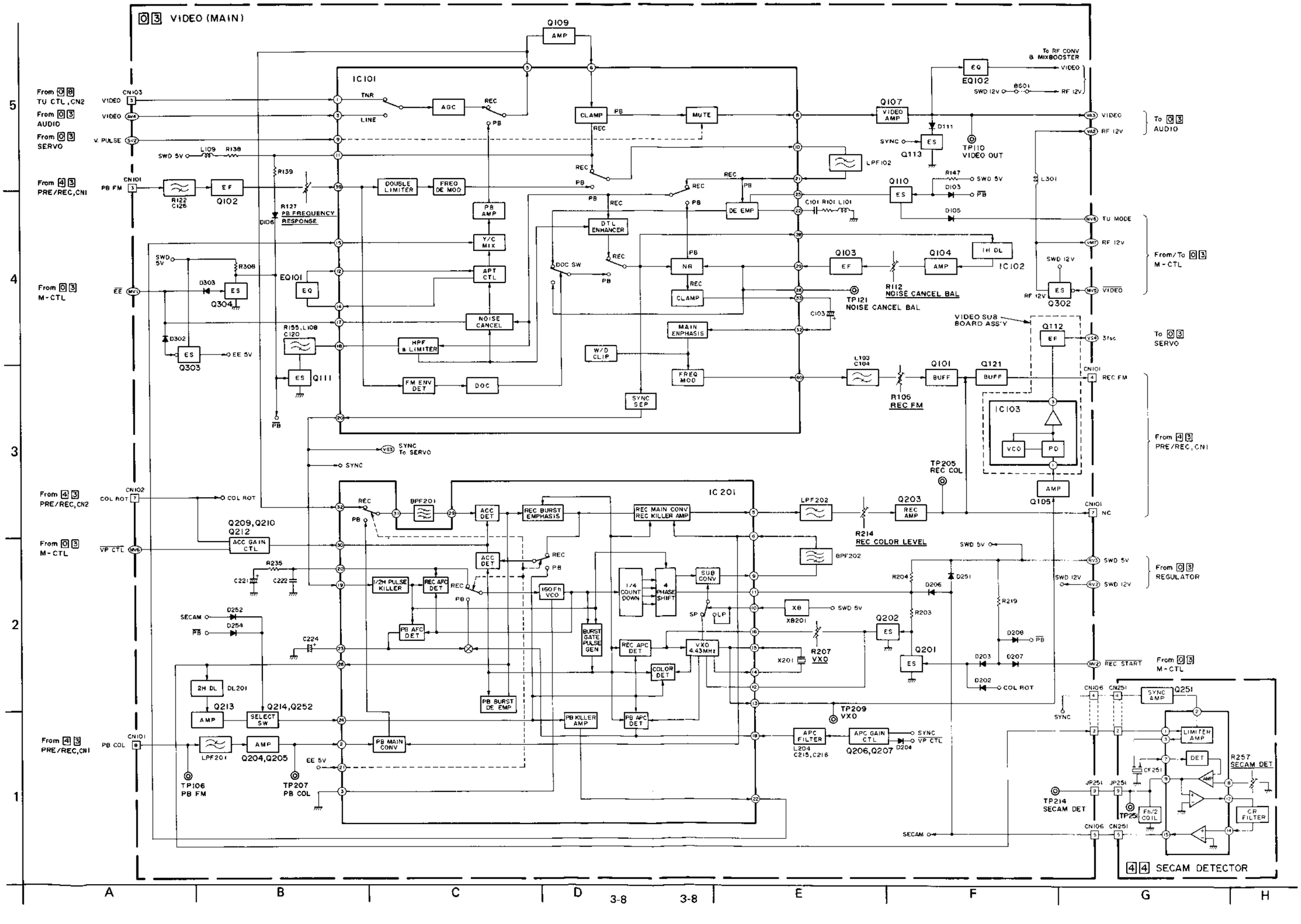
3.5 BOARD INTERCONNECTION DIAGRAM



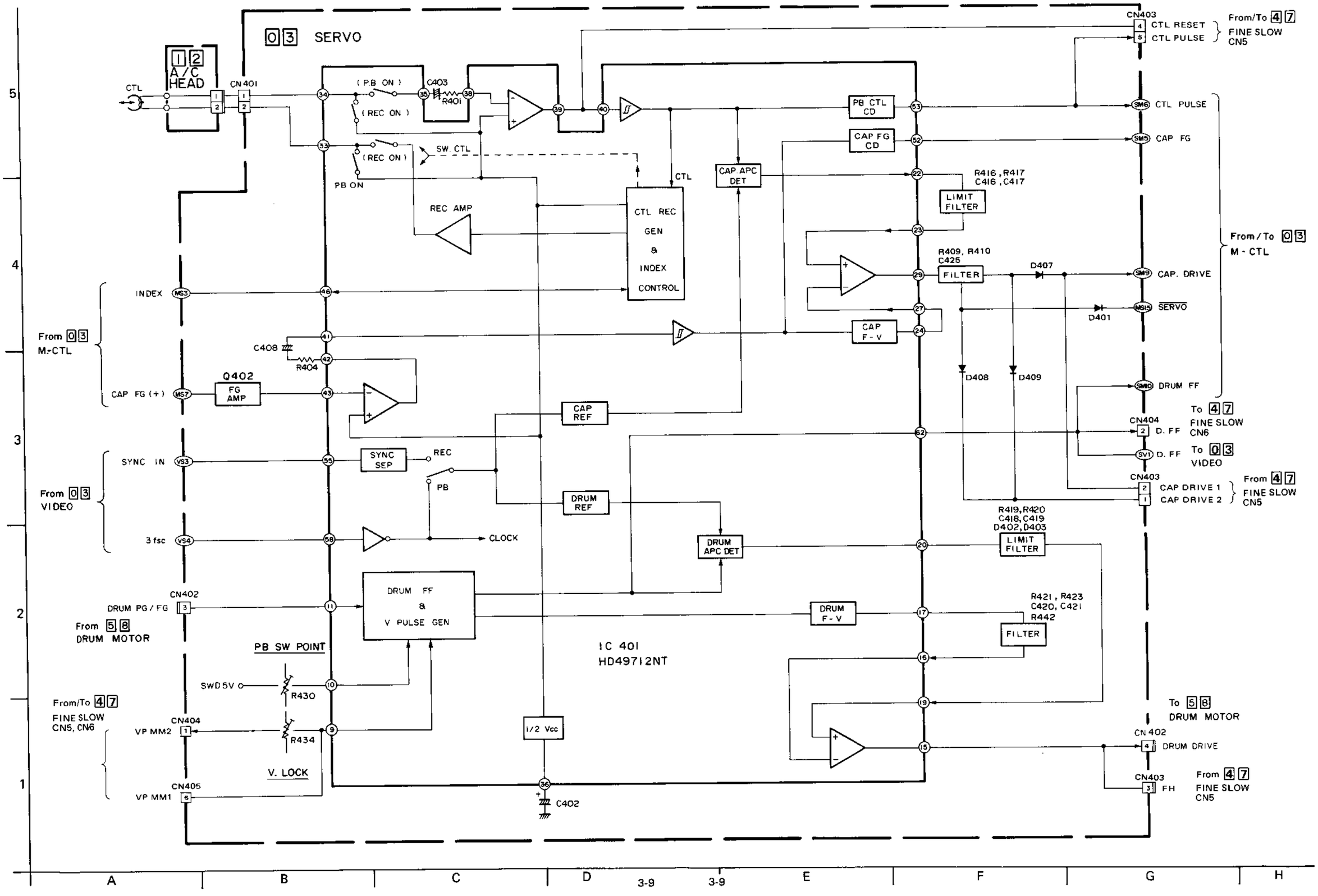
3.6 IF AND TUNER CTL BLOCK DIAGRAMS



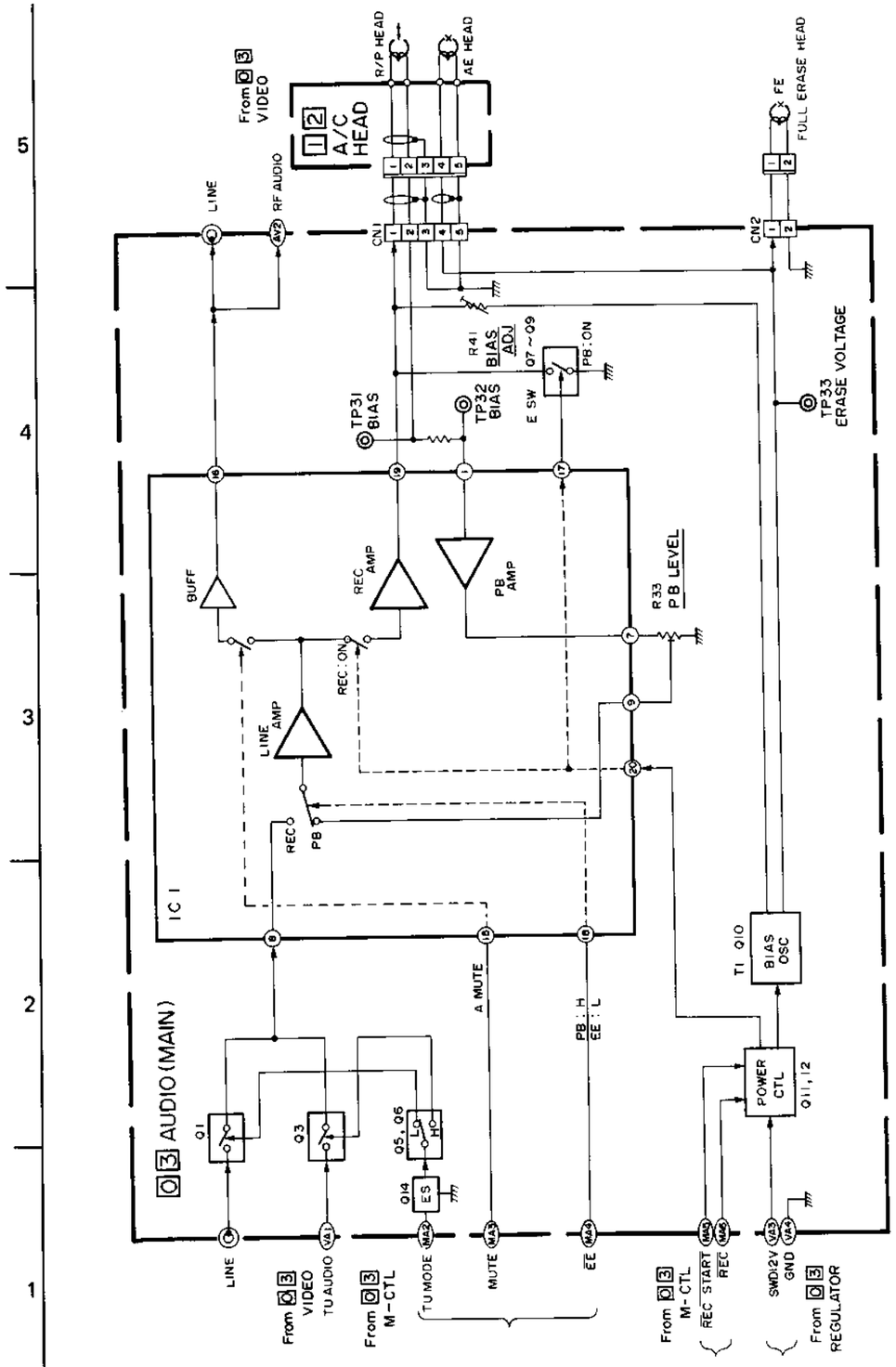
3.7 VIDEO BLOCK DIAGRAM



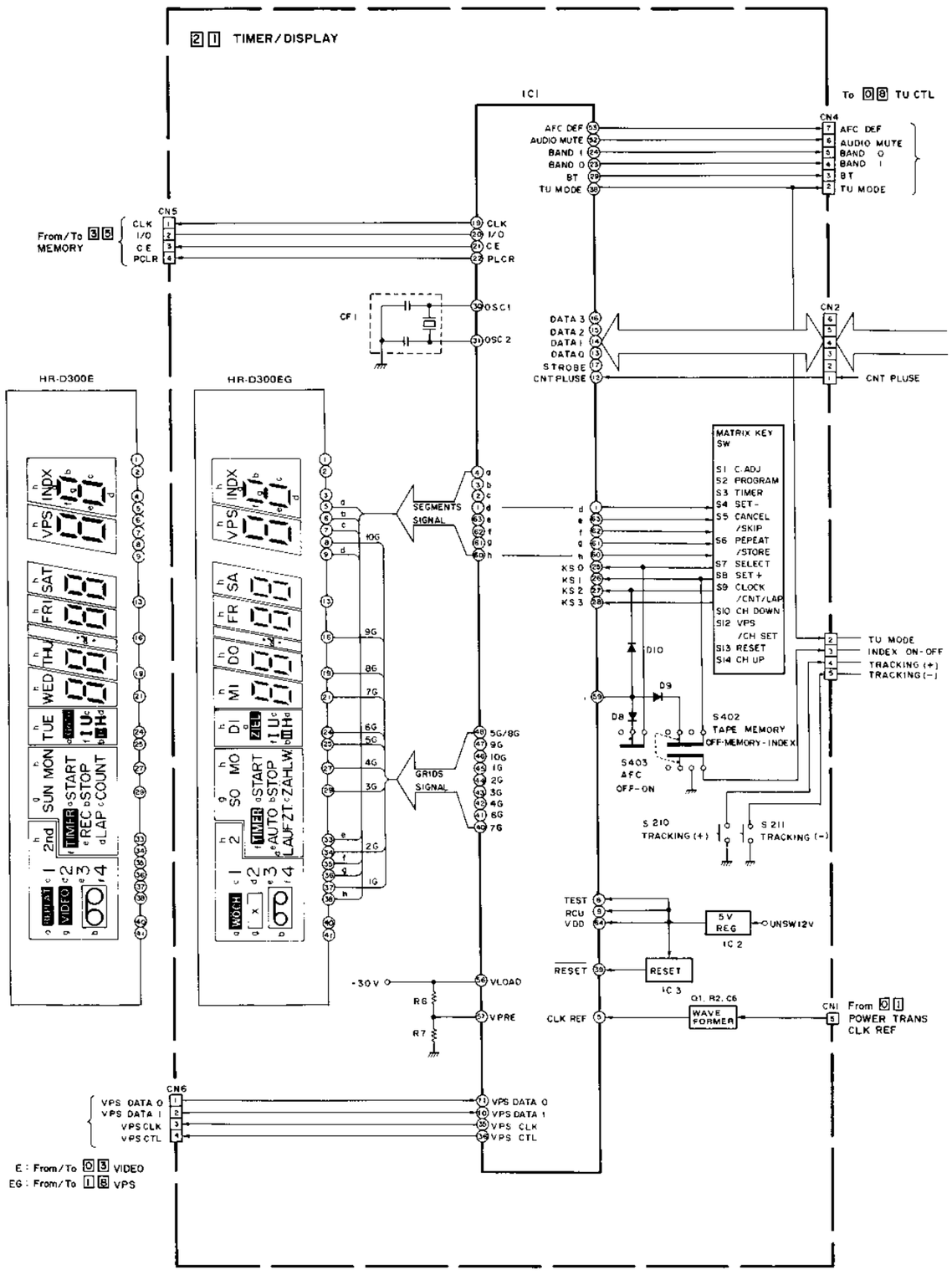
3.8 SERVO BLOCK DIAGRAM

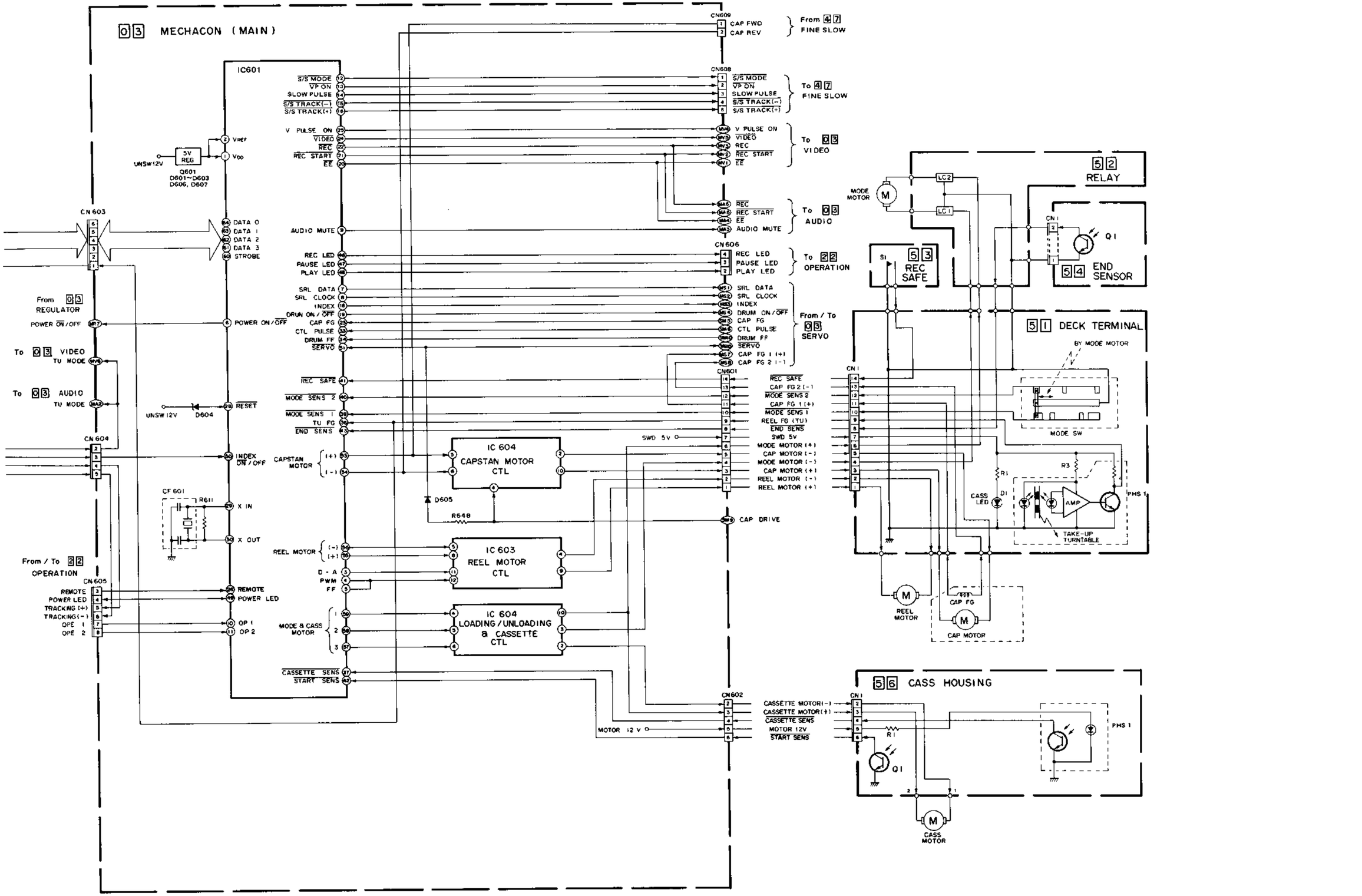


3.9 AUDIO BLOCK DIAGRAM

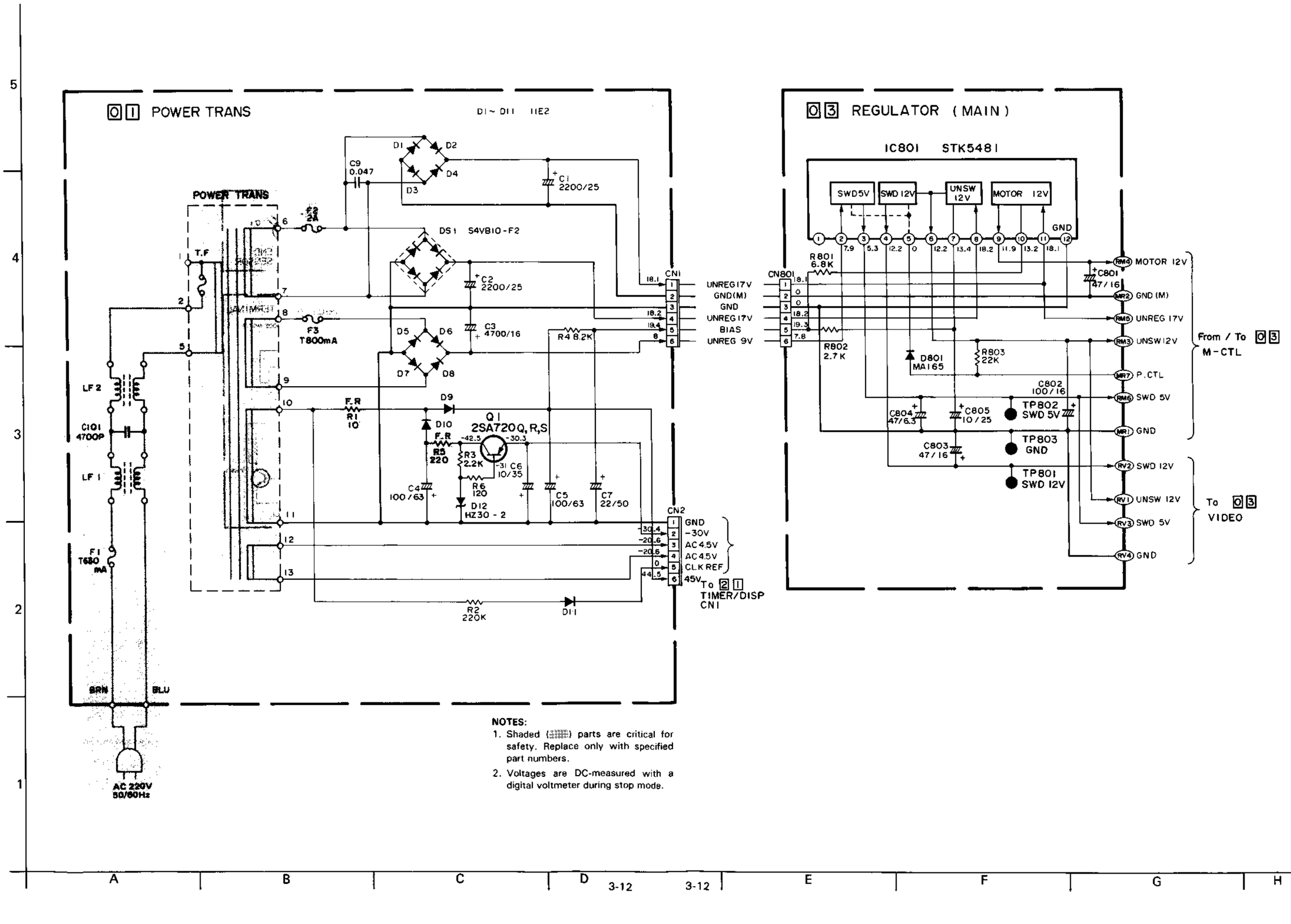


3.10 MECHANISM CONTROL AND TIMER/DISPLAY BLOCK DIAGRAMS




03 MECHACON (MAIN)
IC601
CN609
CAP FWD
CAP REV
From 47 FINE SLOW
CN608
S/S MODE
VP ON
SLOW PULSE
S/S TRACK(-)
S/S TRACK(+)
To 47 FINE SLOW
V PULSE ON
VIDEO
REC
REC START
EE
To 03 VIDEO
To 03 AUDIO
AUDIO MUTE
CN606
REC LED
PAUSE LED
PLAY LED
To 22 OPERATION
SRL DATA
SRL CLOCK
INDEX
DRUM ON / OFF
CAP FG
CTL PULSE
DRUM FF
SERVO
From / To 03 SERVO
CN601
REC SAFE
CAP FG 2 (-)
MODE SENS 2
CAP FG 1 (+)
MODE SENS 1
REEL FG (TU)
END SENS
SWD 5V
MODE MOTOR (+)
CAP MOTOR (-)
MODE MOTOR (-)
CAP MOTOR (+)
REEL MOTOR (-)
REEL MOTOR (+)
CAP DRIVE
CN602
CASSETTE MOTOR(-)
CASSETTE MOTOR(+)
CASSETTE SENS
MOTOR 12V
START SENS
MOTOR 12 V
5V REG
UNSW 12V
Q601
D601~D603
D606, D607
VREF
VDD
RESET
D604
CN603
DATA 0
DATA 1
DATA 2
DATA 3
STROBE
From 03 REGULATOR
POWER ON/OFF
To 03 VIDEO TU MODE
To 03 AUDIO TU MODE
CN604
INDEX ON / OFF
CF601
R611
X IN
X OUT
From / To 22 OPERATION
CN605
REMOTE
POWER LED
TRACKING (+)
TRACKING(-)
OPE 1
OPE 2
OP 1
OP 2
REC SAFE
MODE SENS 2
MODE SENS 1
TU FG
END SENS
CAPSTAN MOTOR
(+)
(-)
IC 604
CAPSTAN MOTOR CTL
D605
R648
REEL MOTOR
IC 603
REEL MOTOR CTL
D-A
PWM
FF
MODE & CASS MOTOR
IC 604
LOADING / UNLOADING & CASSETTE CTL
CASSETTE SENS
START SENS
MOTOR 12 V
52 RELAY
MODE MOTOR
LC2
LC1
53 REC SAFE
SI
CN1
Q1
54 END SENSOR
51 DECK TERMINAL
BY MODE MOTOR
MODE SW
R1
R3
CASS LED
D1
AMP
PHS 1
TAKE-UP TURNTABLE
REEL MOTOR
CAP FG
CAP MOTOR
56 CASS HOUSING
CASS MOTOR

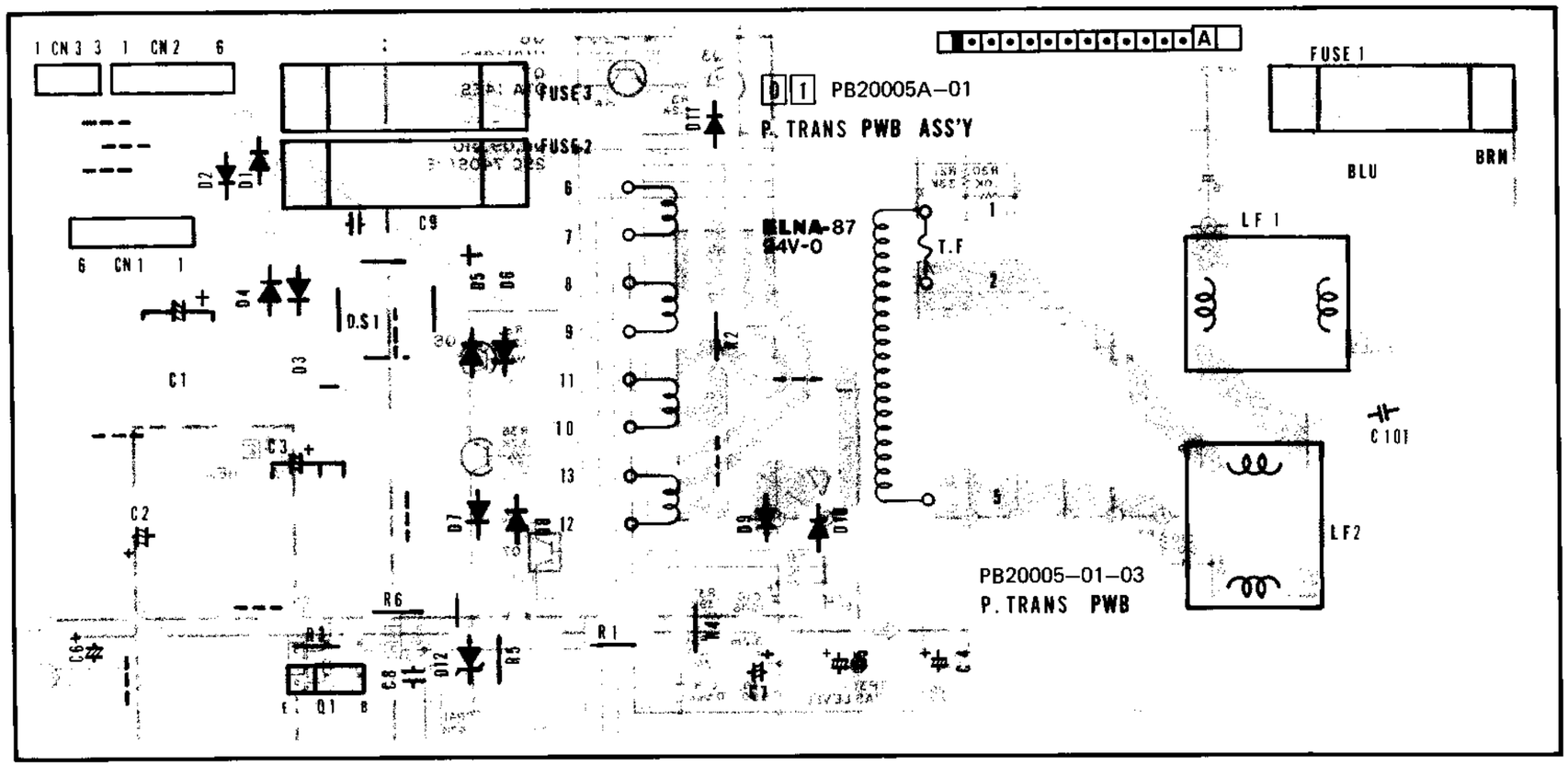
3.11 POWER TRANSFORMER AND REGULATOR SCHEMATIC DIAGRAMS



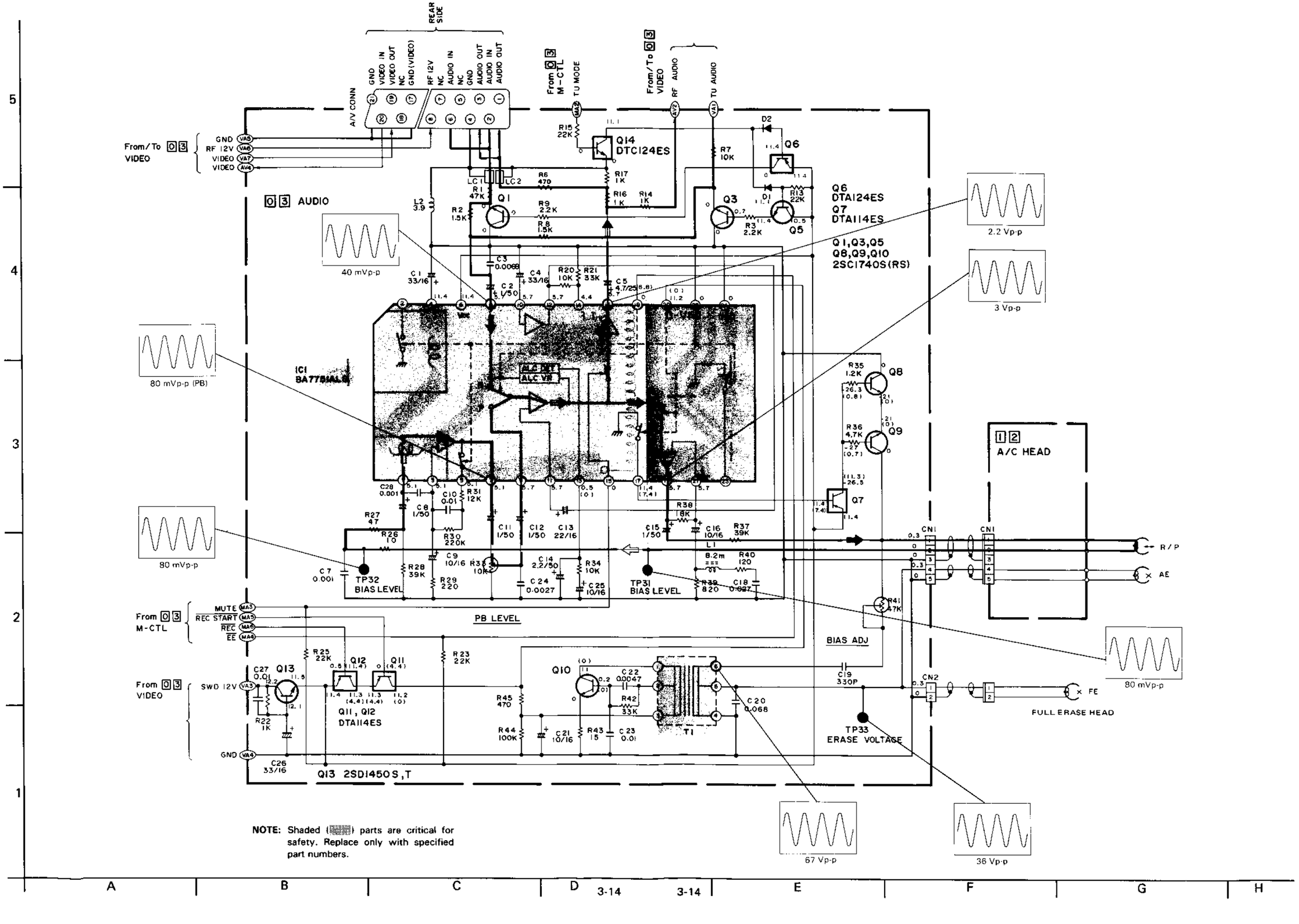
NOTES:

1. Shaded (▒▒) parts are critical for safety. Replace only with specified part numbers.
2. Voltages are DC-measured with a digital voltmeter during stop mode.

3.12 POWER TRANSFORMER CIRCUIT BOARD



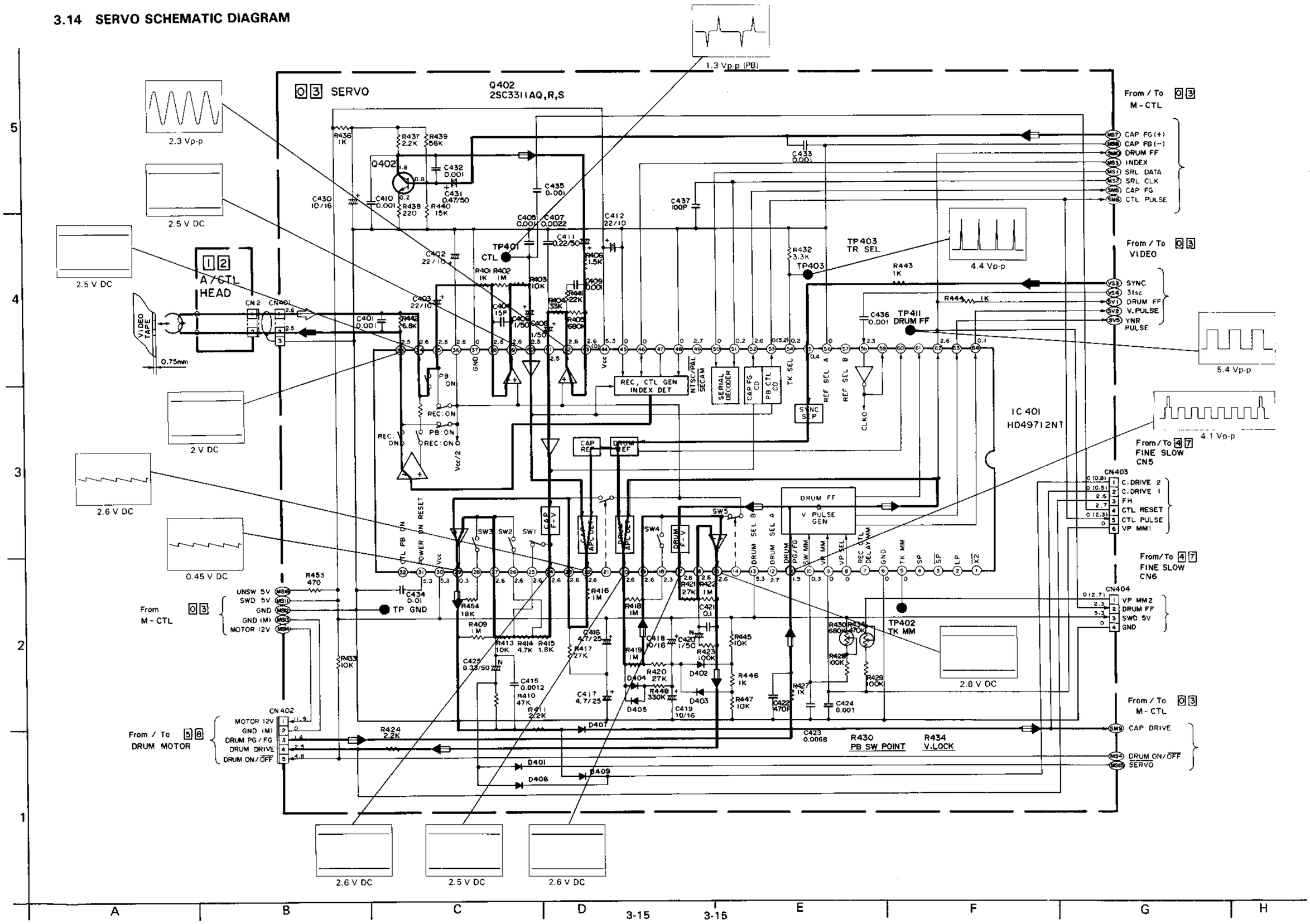
3.13 AUDIO SCHEMATIC DIAGRAM



NOTE: Shaded (▒▒▒) parts are critical for safety. Replace only with specified part numbers.

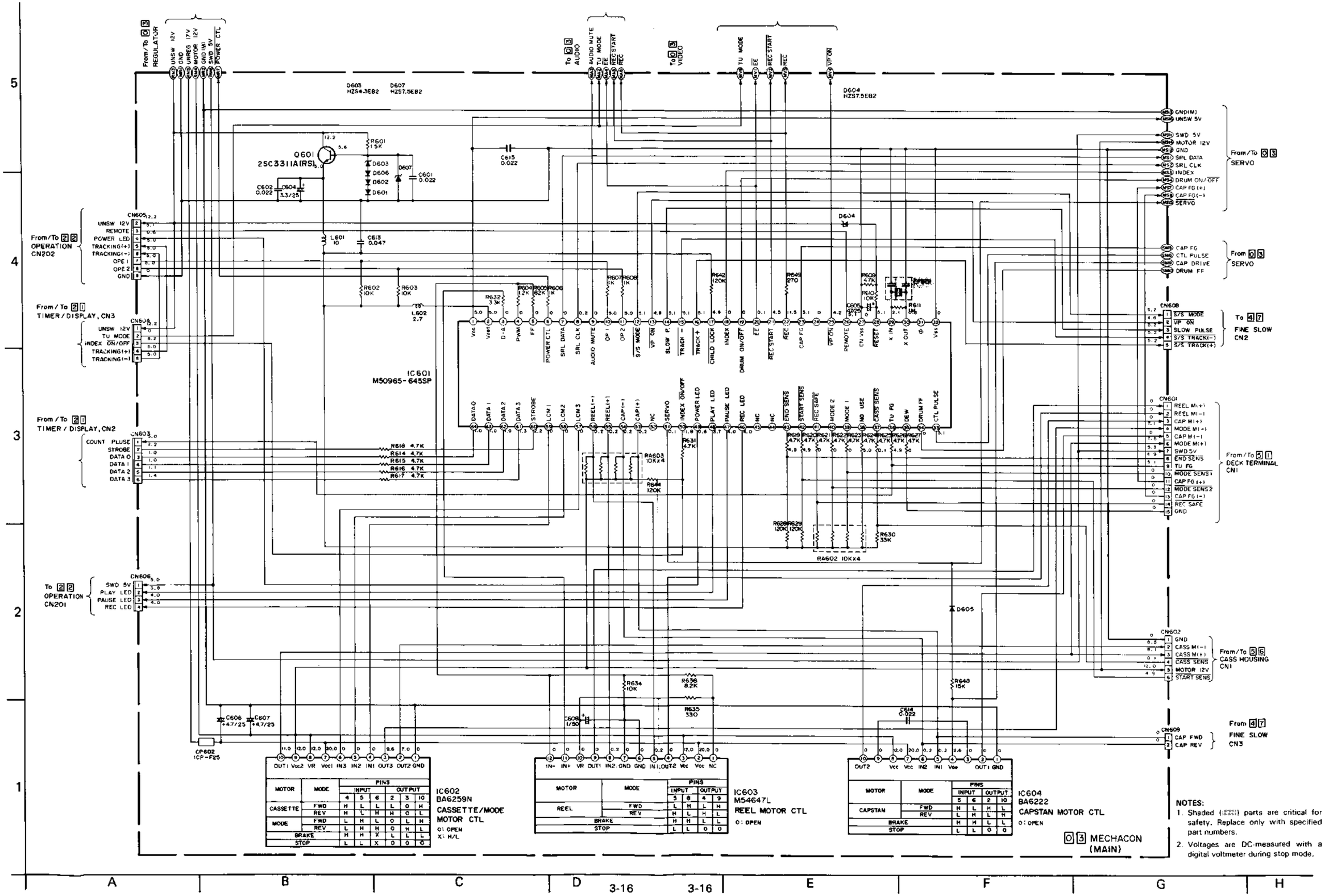
3-14

3.14 SERVO SCHEMATIC DIAGRAM



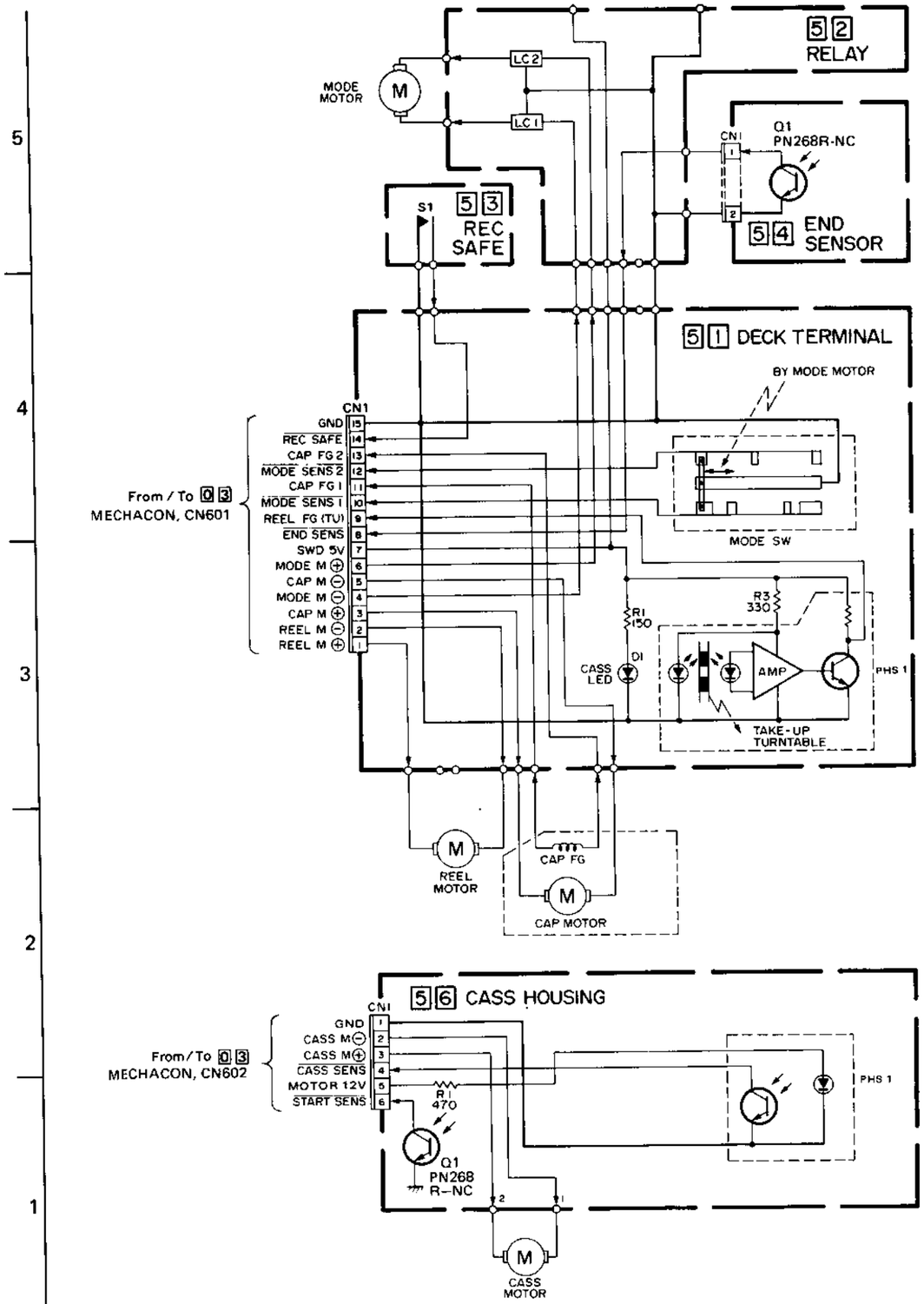
3-15 3-15

3.15 MECHANISM CONTROL SCHEMATIC DIAGRAM



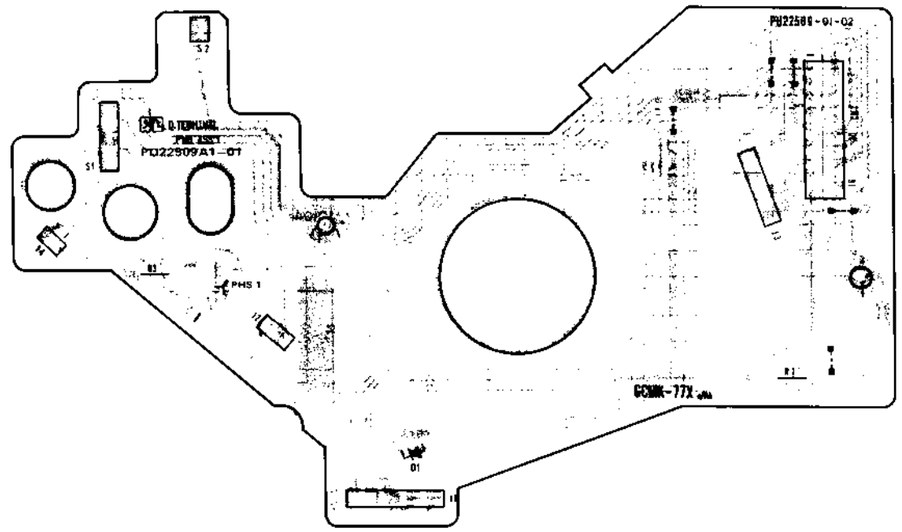
3-16

3.16 DECK TERMINAL SCHEMATIC DIAGRAMS

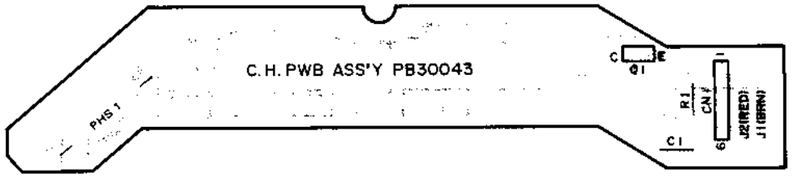


3.17 DECK TERMINAL CIRCUIT BOARDS

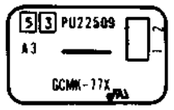
—DECK TERMINAL—



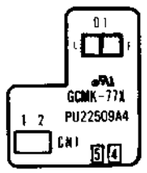
—CASSETTE HOUSING—



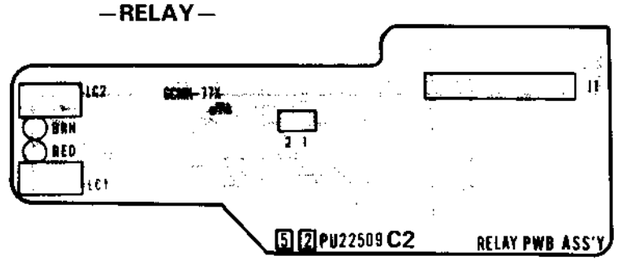
—REC SAFETY—



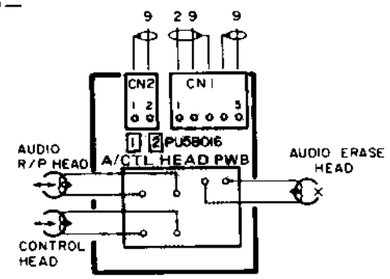
—END SENSOR—



—RELAY—

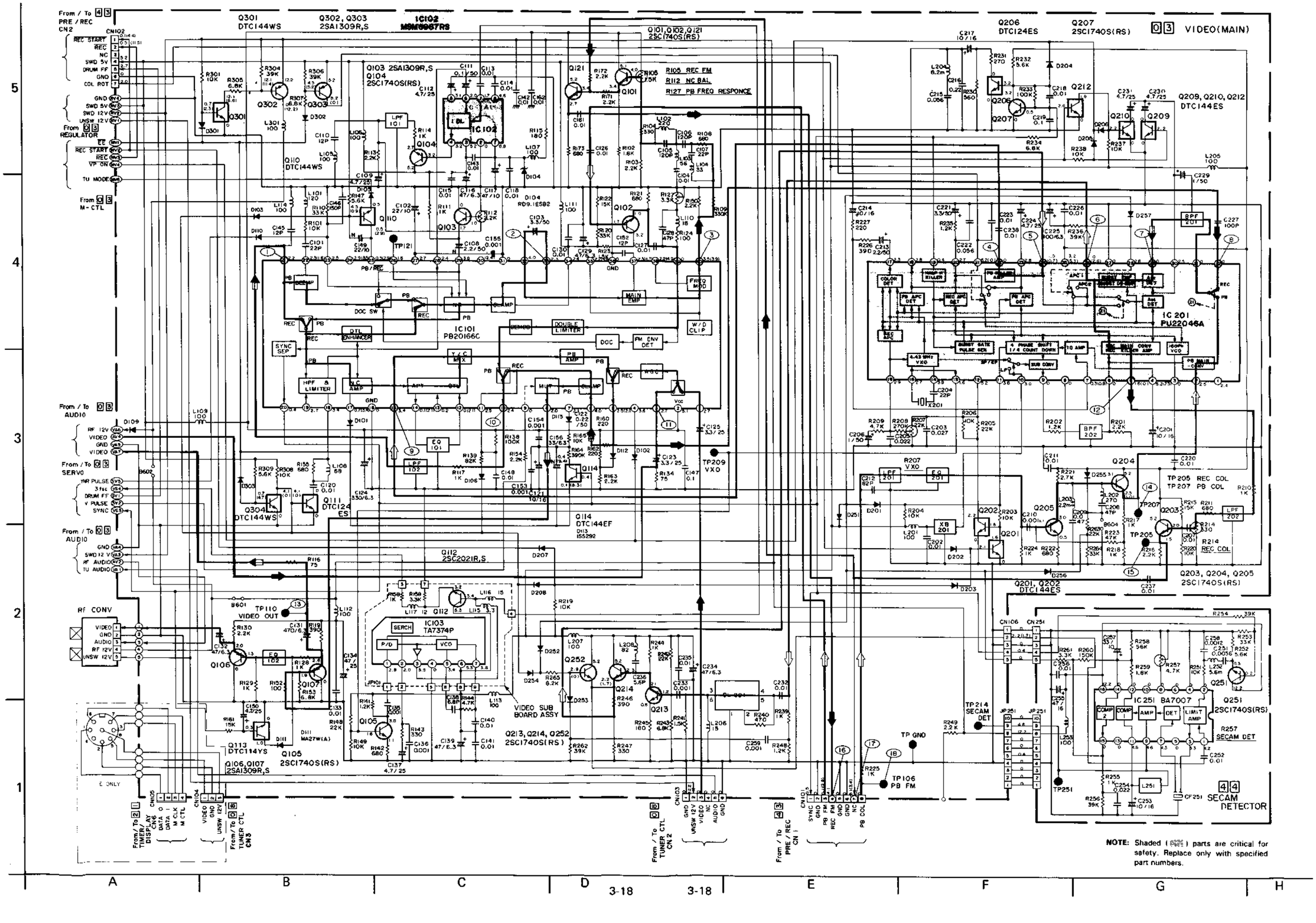


—AUDIO/CTL HEAD—



3-17

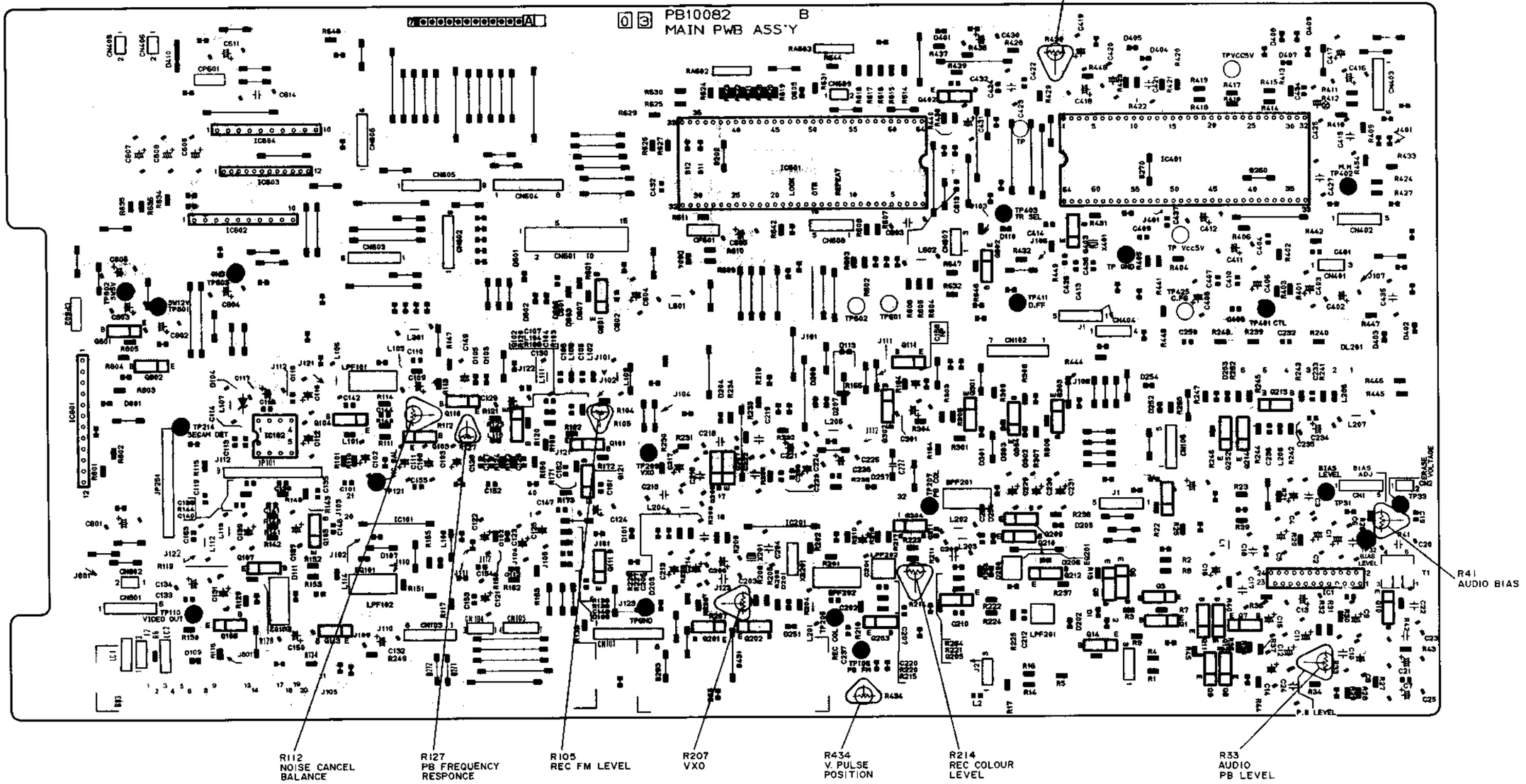
3.18 VIDEO SCHEMATIC DIAGRAM



NOTE: Shaded (▨) parts are critical for safety. Replace only with specified part numbers.

3.19 MAIN, SECAM DETECTOR AND VIDEO SUB CIRCUIT BOARDS

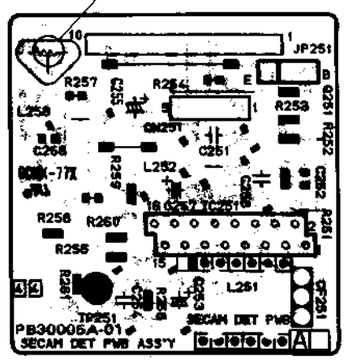
—MAIN—



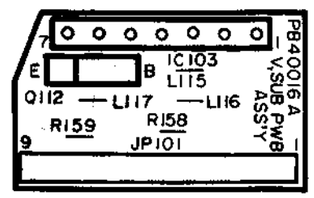
—Waveforms of VIDEO circuit—

1	2	3	4	5	6	7	8	9
IC101-21 REC 0.3 Vp-p	IC101-33 REC 1.3 Vp-p	IC101-40 REC 0.95 Vp-p	IC201-22 PB 0.55 Vp-p	IC201-24 REC 0.3 Vp-p	IC201-26 REC 1.0 Vp-p	IC201-29 REC 0.3 Vp-p	IC201-32 PB 0.68 Vp-p	IC101-15 PB 0.55 Vp-p
10	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**
IC101-10 REC 0.6 Vp-p	IC101-3 REC 0.8 Vp-p	IC201-5 REC 1.2 Vp-p	TP110 REC 2.0 Vp-p	TP207 PB 0.25 Vp-p	TP205 REC 50 mVp-p	CN101-4 REC 0.68 Vp-p	CN101-7 REC 50 mVp-p	TP106 PB 0.3 Vp-p

—SECAM DETECTOR—

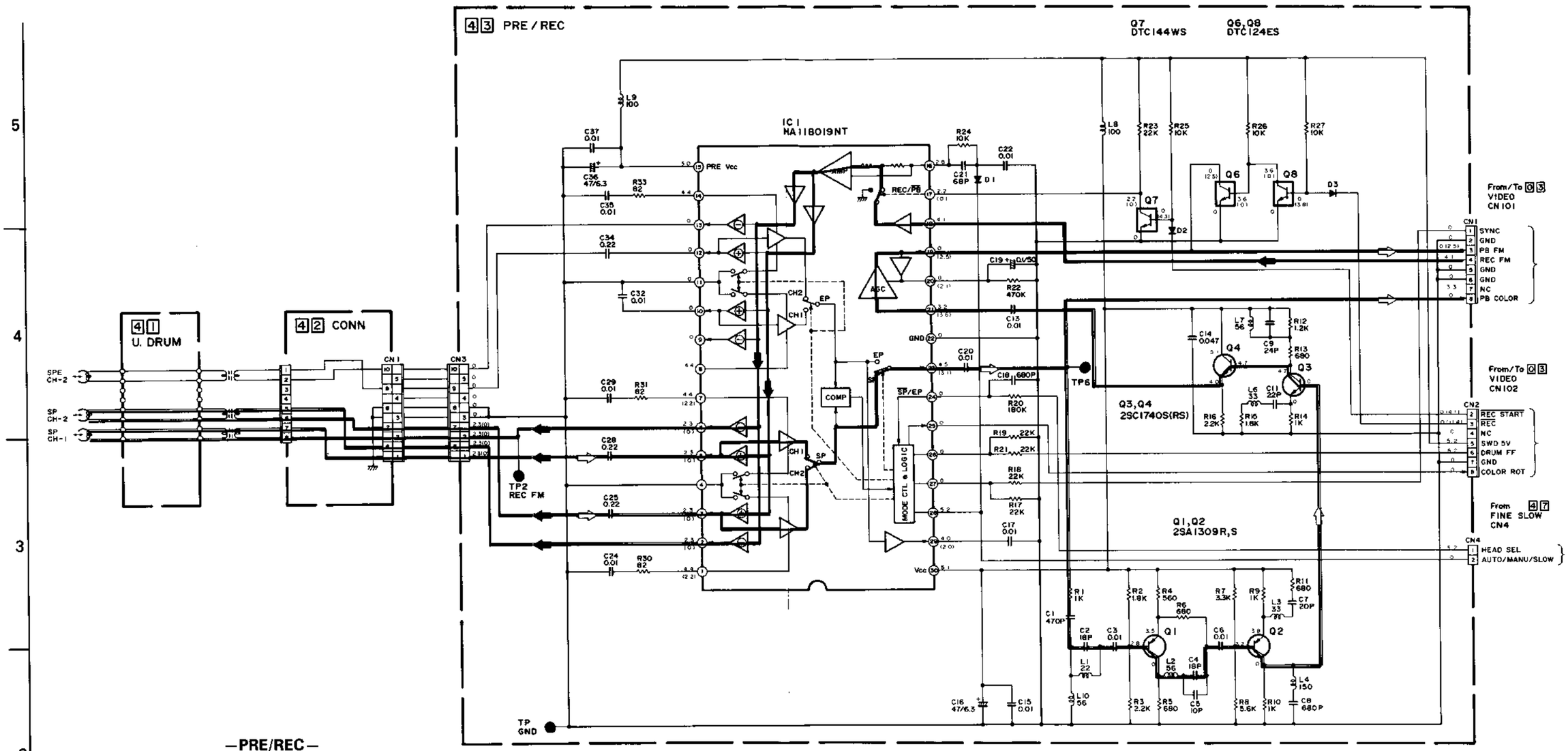


—VIDEO SUB—

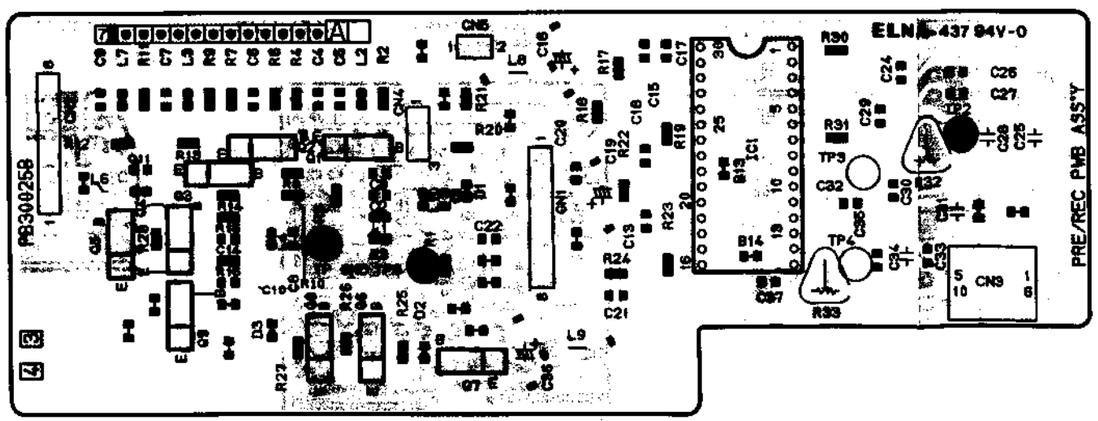


3-19

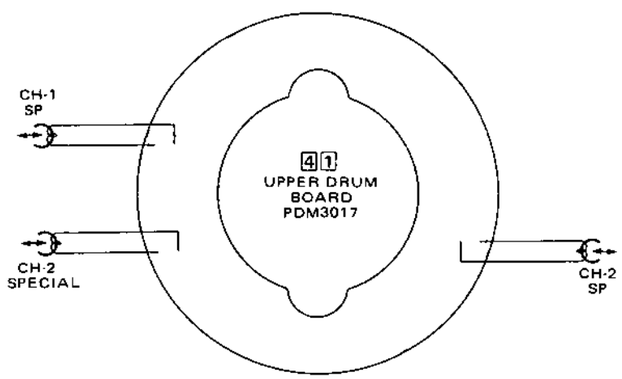
3.20 PRE/REC SCHEMATIC DIAGAM AND CIRCUIT BOARD



—PRE/REC—

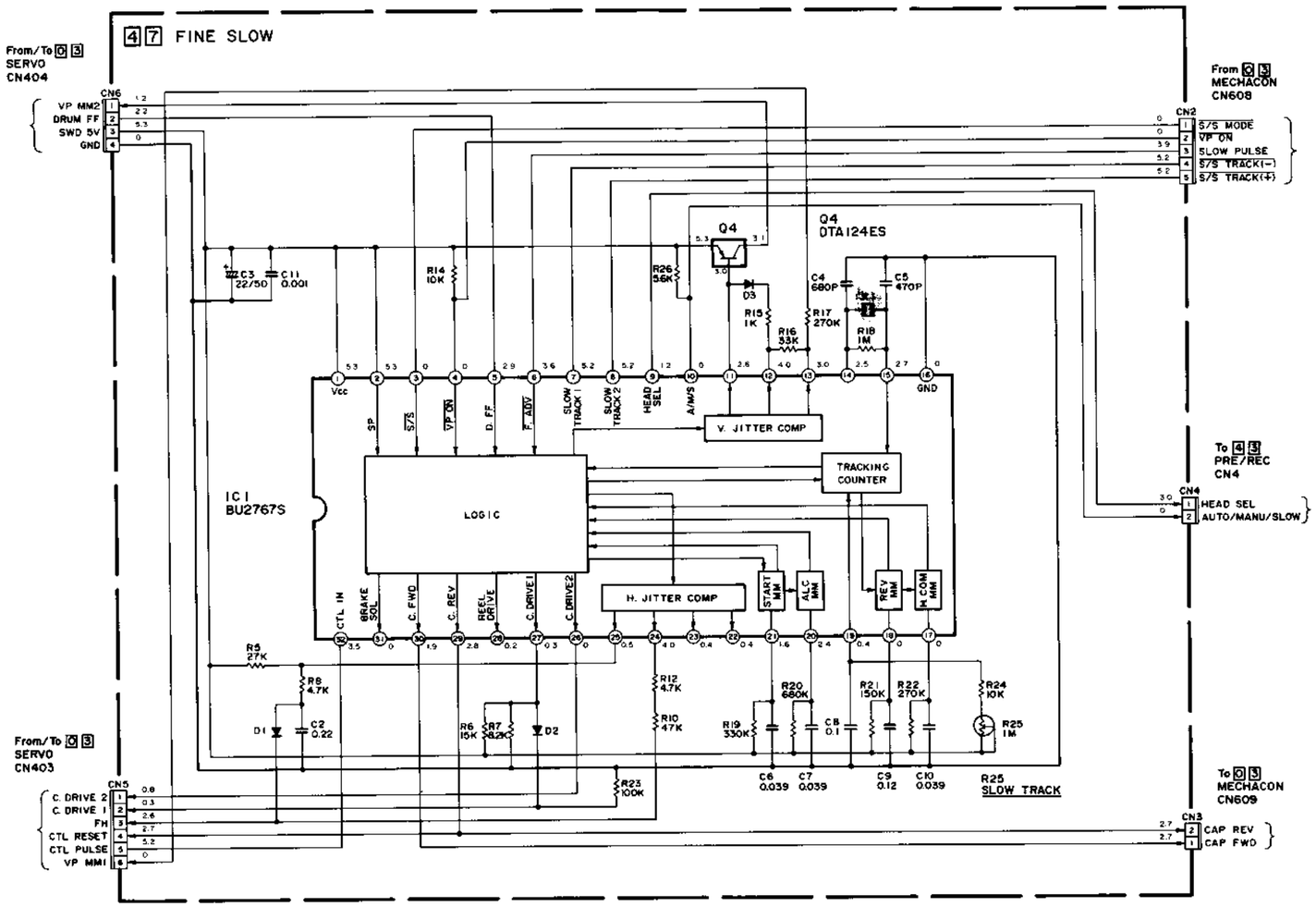


—UPPER DRUM—

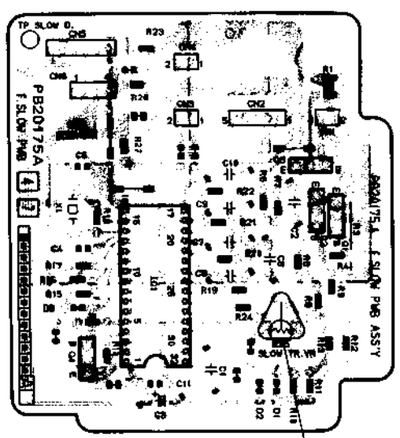


3-20

3.21 FINE SLOW SCHEMATIC DIAGRAM AND CIRCUIT BOARD



—CIRCUIT BOARD—

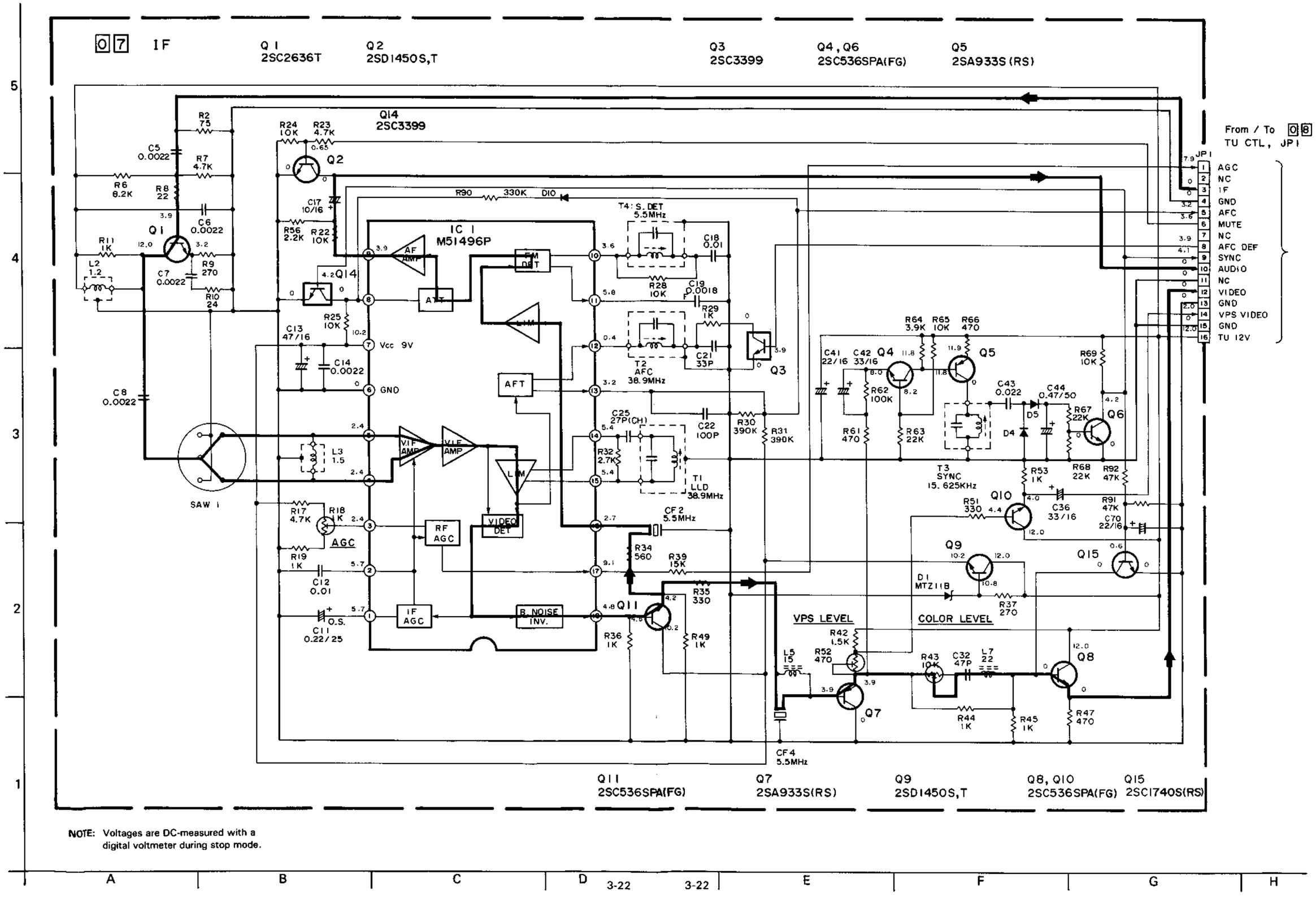


NOTES:

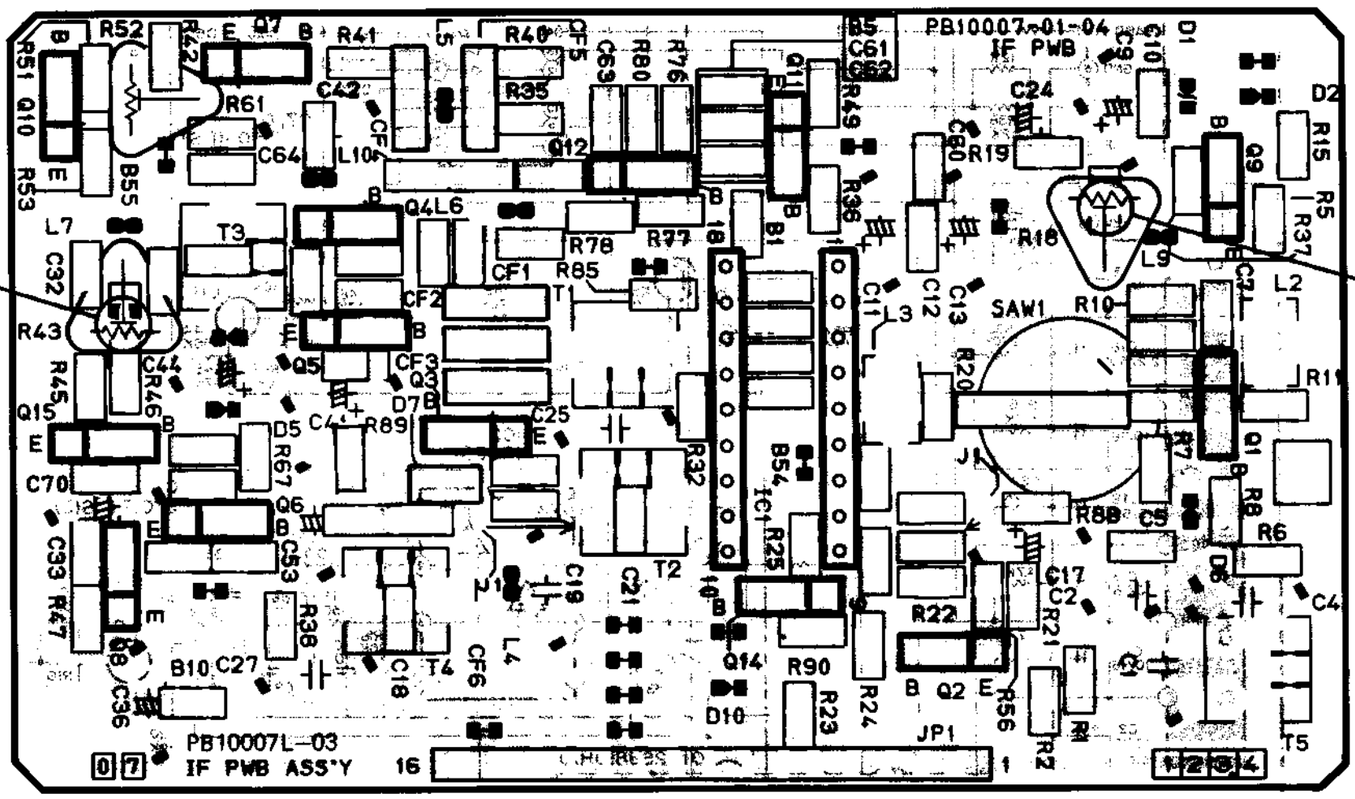
1. Shaded (▒▒) parts are critical for safety. Replace only with specified part numbers.
2. Voltages are DC-measured with a digital voltmeter during PB (SLOW) mode.

3-21

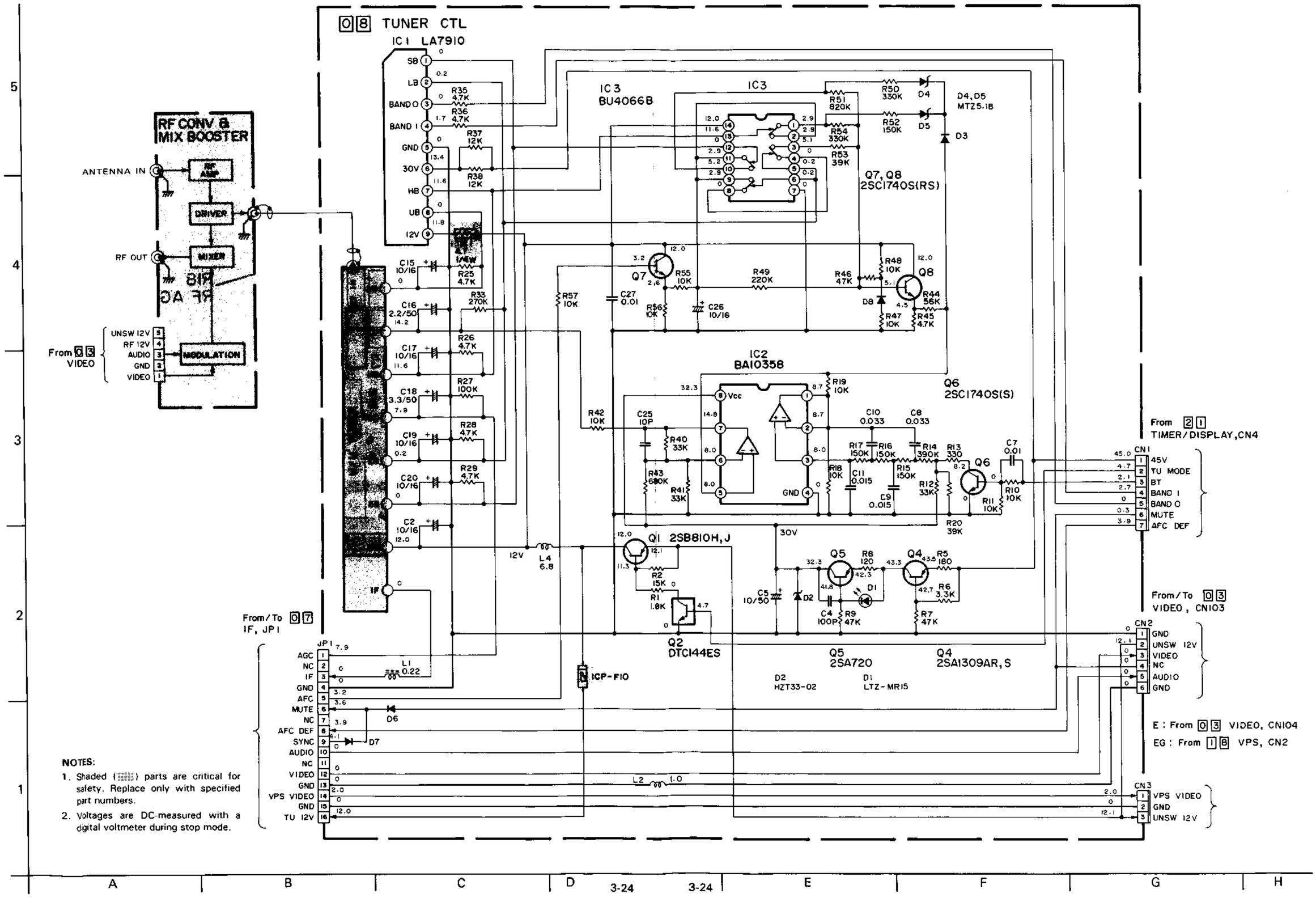
3.22 IF SCHEMATIC DIAGRAM



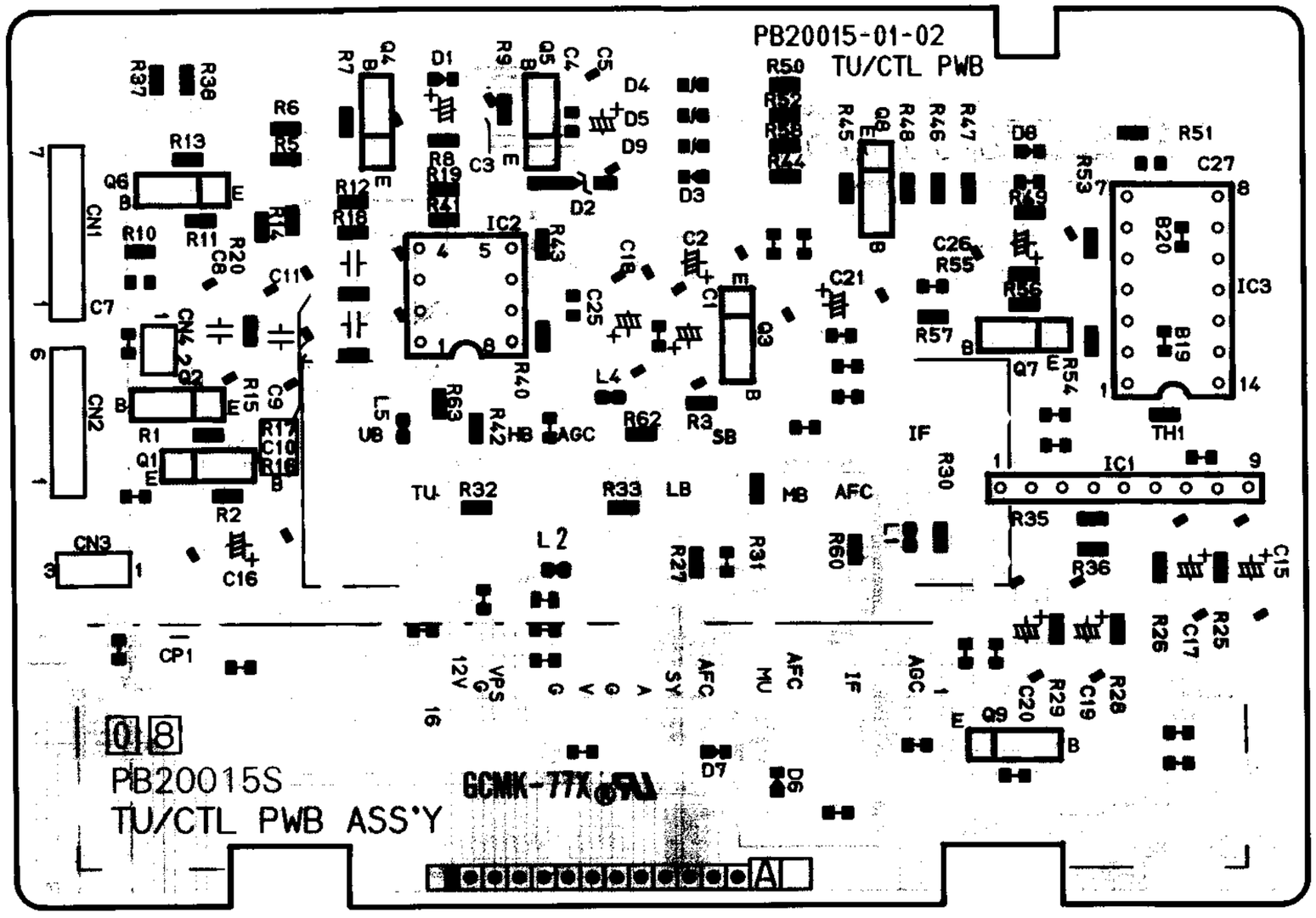
NOTE: Voltages are DC-measured with a digital voltmeter during stop mode.


R43
COLOR LEVEL
R18
RF AGC
PB10007L-03
IF PWB ASS'Y
PB10007L-01-04
IF PWB
SAW1
JP1

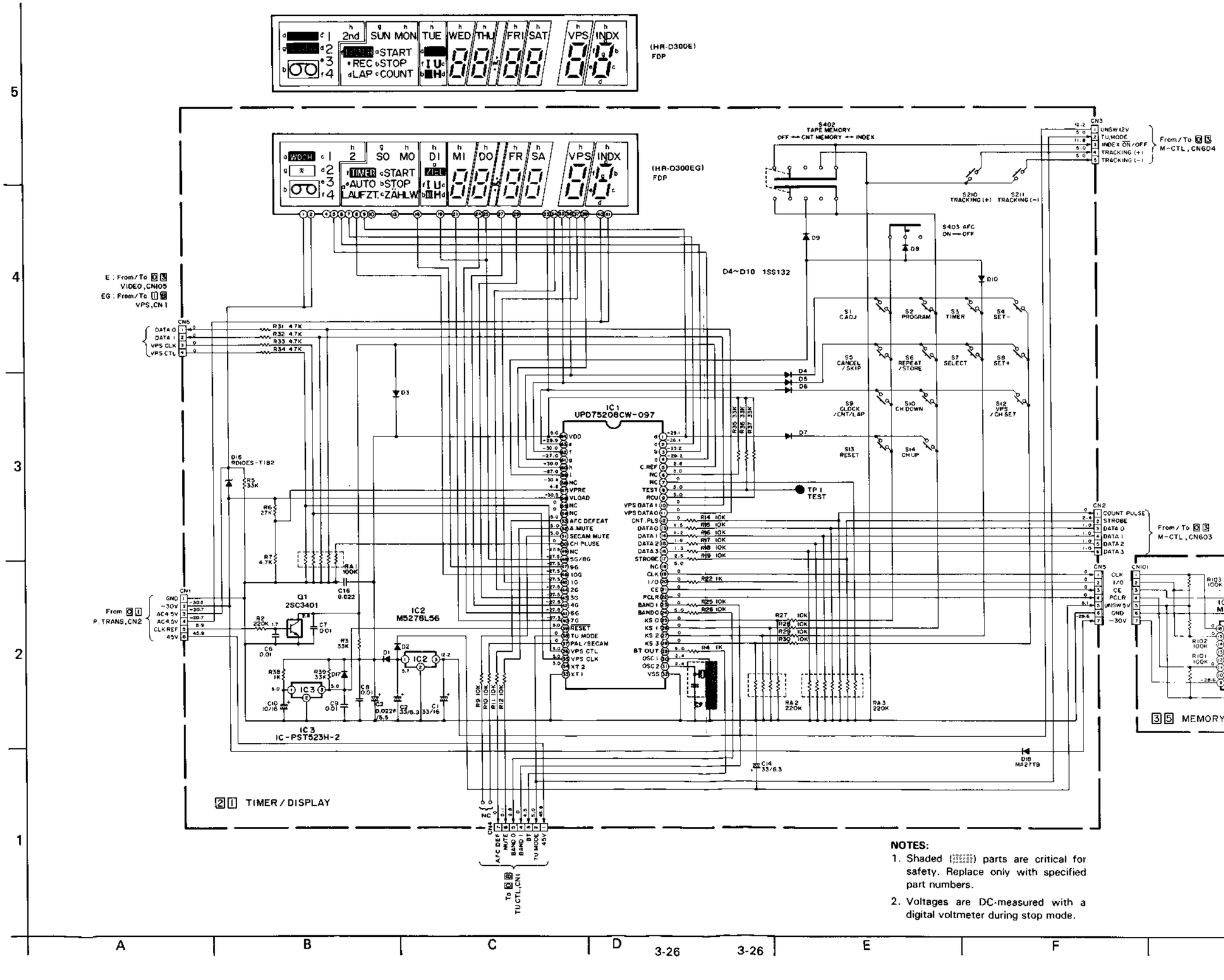
3.24 TUNER CTL SCHEMATIC DIAGRAM



3.25 TUNER CTL CIRCUIT BOARD



3.26 TIMER/DISPLAY AND MEMORY SCHEMATIC DIAGRAMS

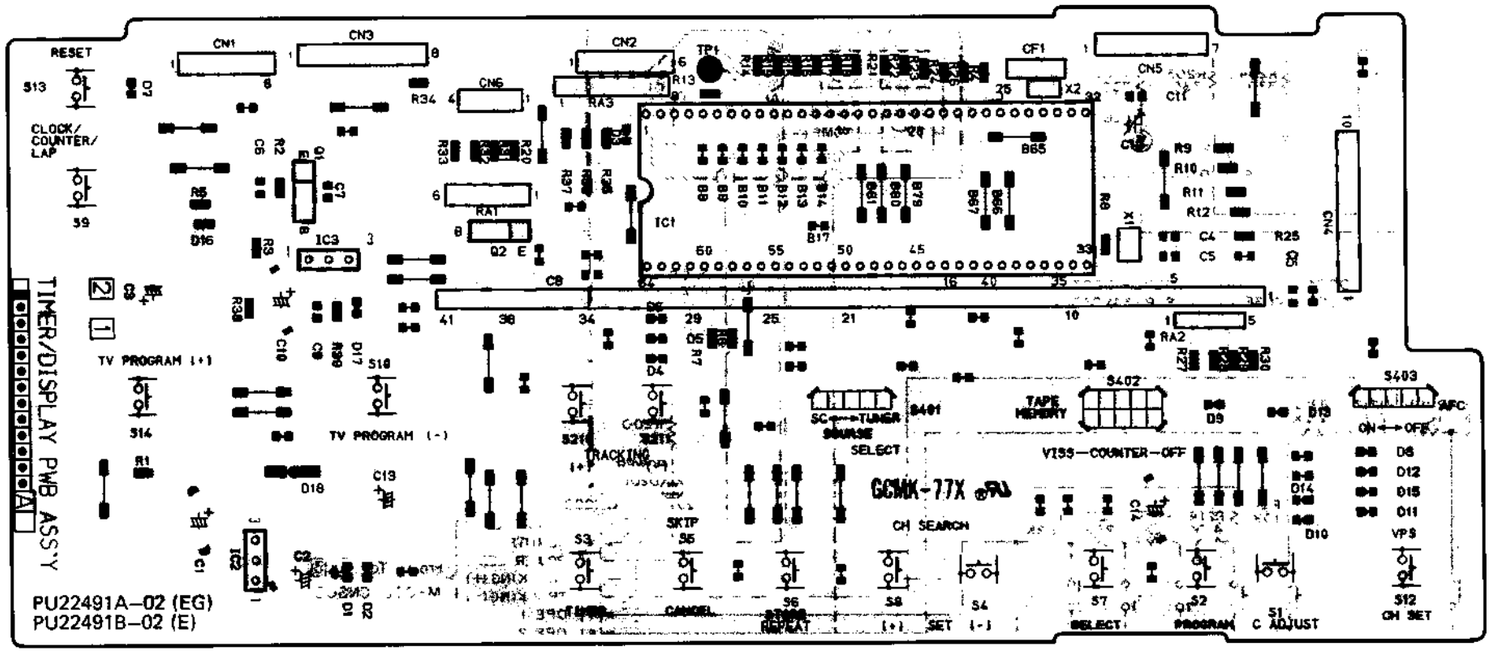


NOTES:

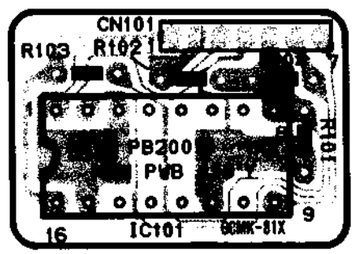
1. Shaded (▨) parts are critical for safety. Replace only with specified part numbers.
2. Voltages are DC-measured with a digital voltmeter during stop mode.

3.27 TIMER/DISPLAY AND MEMORY CIRCUIT BOARDS

—TIMER/DISPLAY—

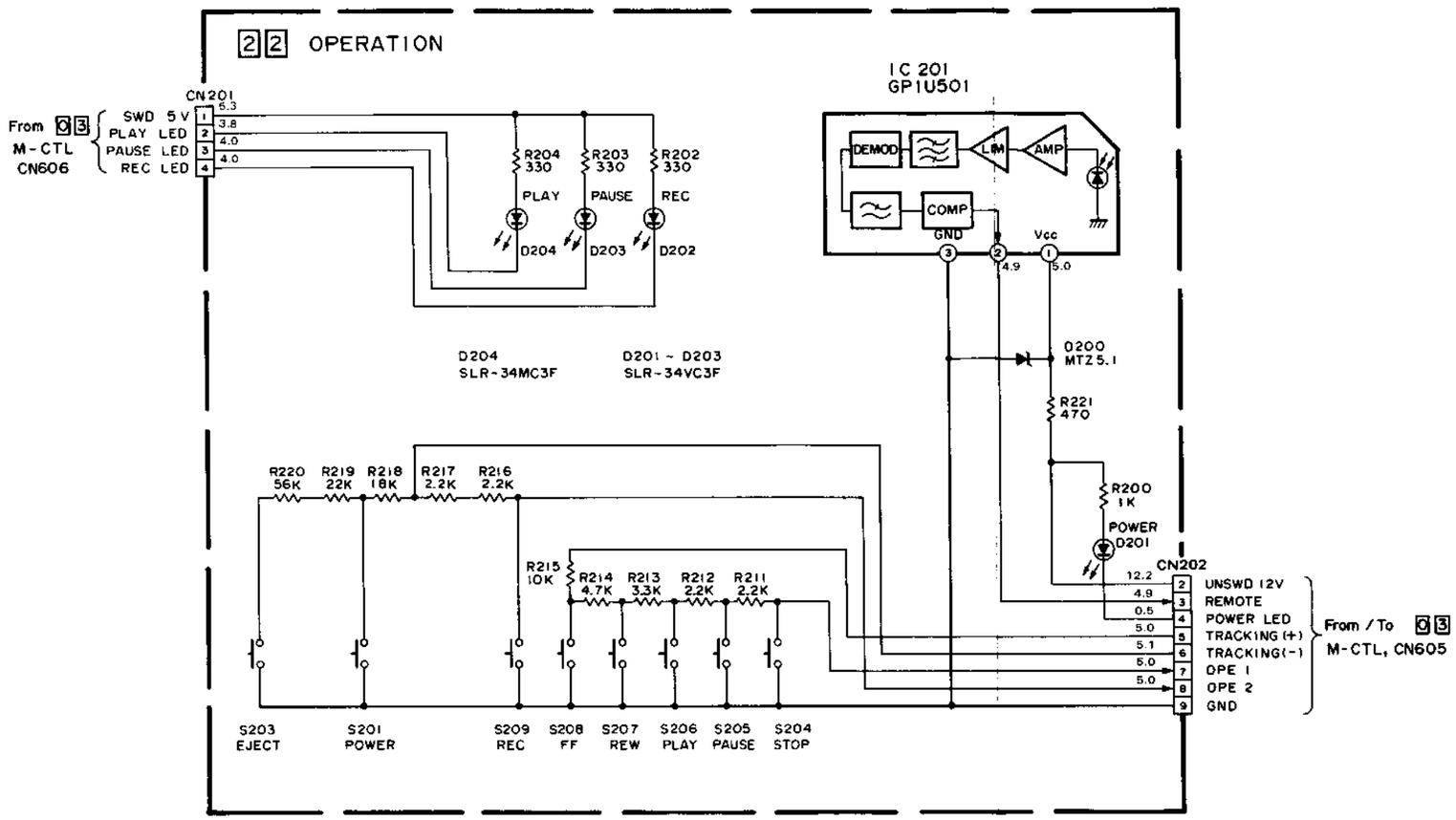


—MEMORY—

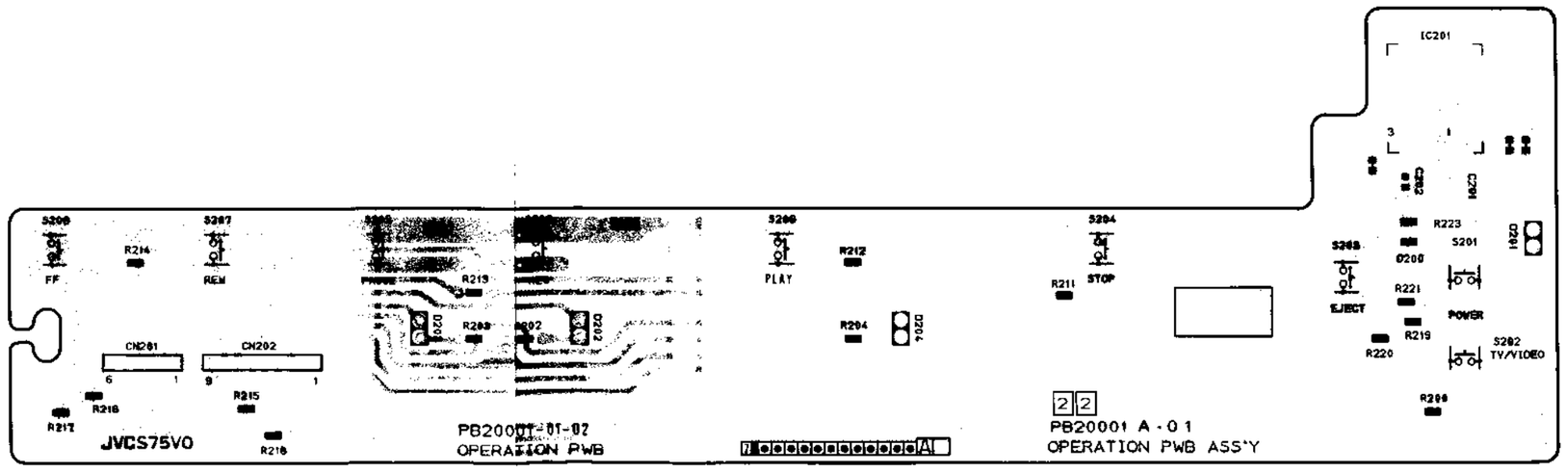


3-27

3.28 OPERATION SCHEMATIC DIAGRAM AND CIRCUIT BOARD

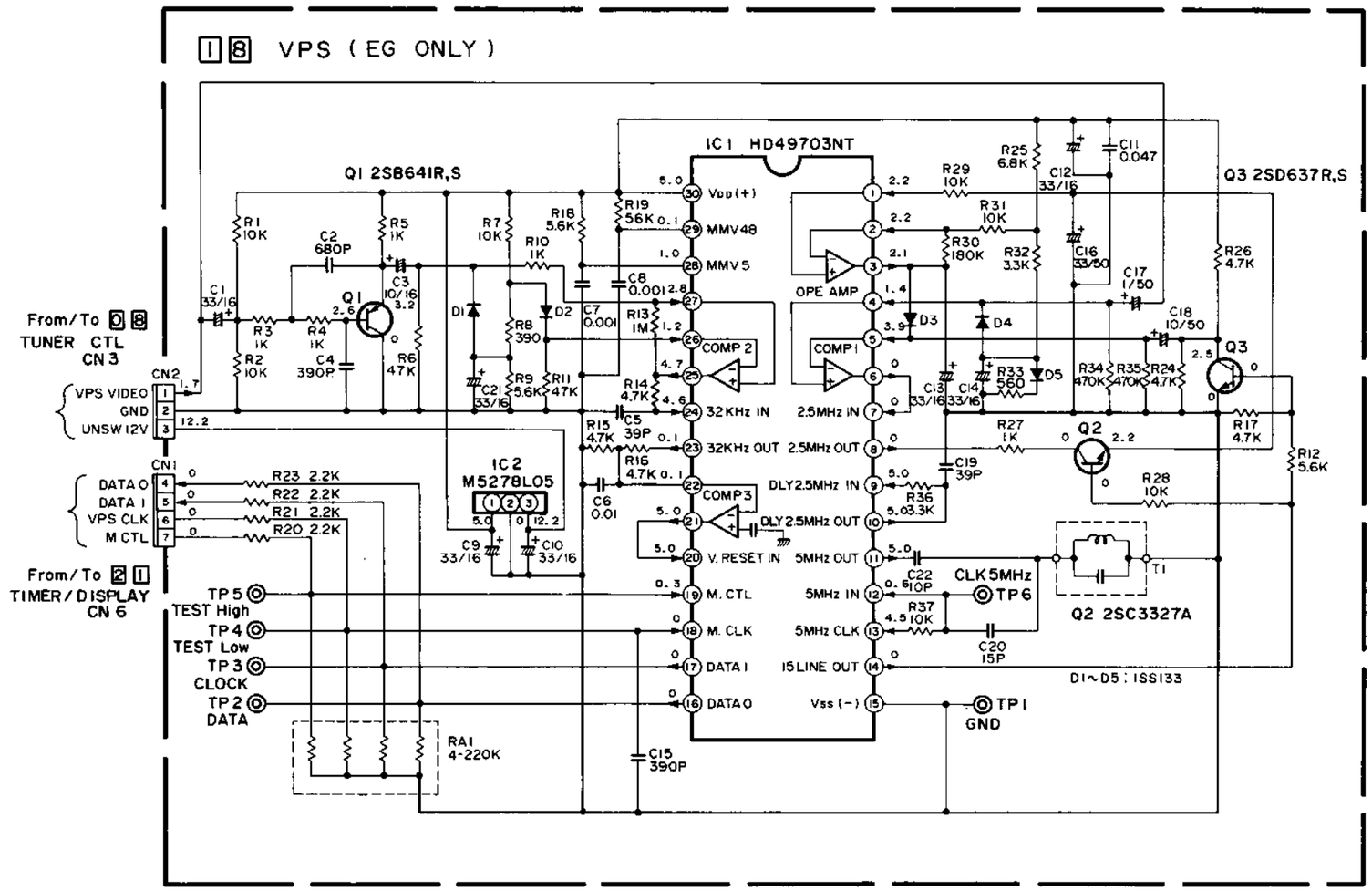


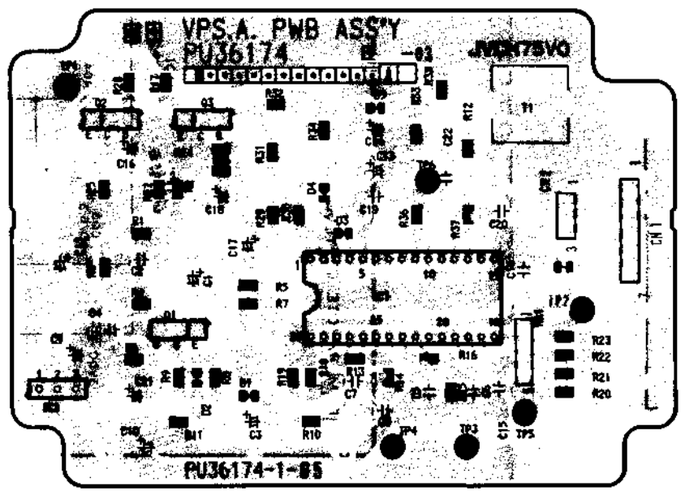
NOTE: Voltages are DC-measured with a digital voltmeter during stop mode.



3-28

3.29 VPS SCHEMATIC DIAGRAM AND CIRCUIT BOARD (EG MODEL ONLY)



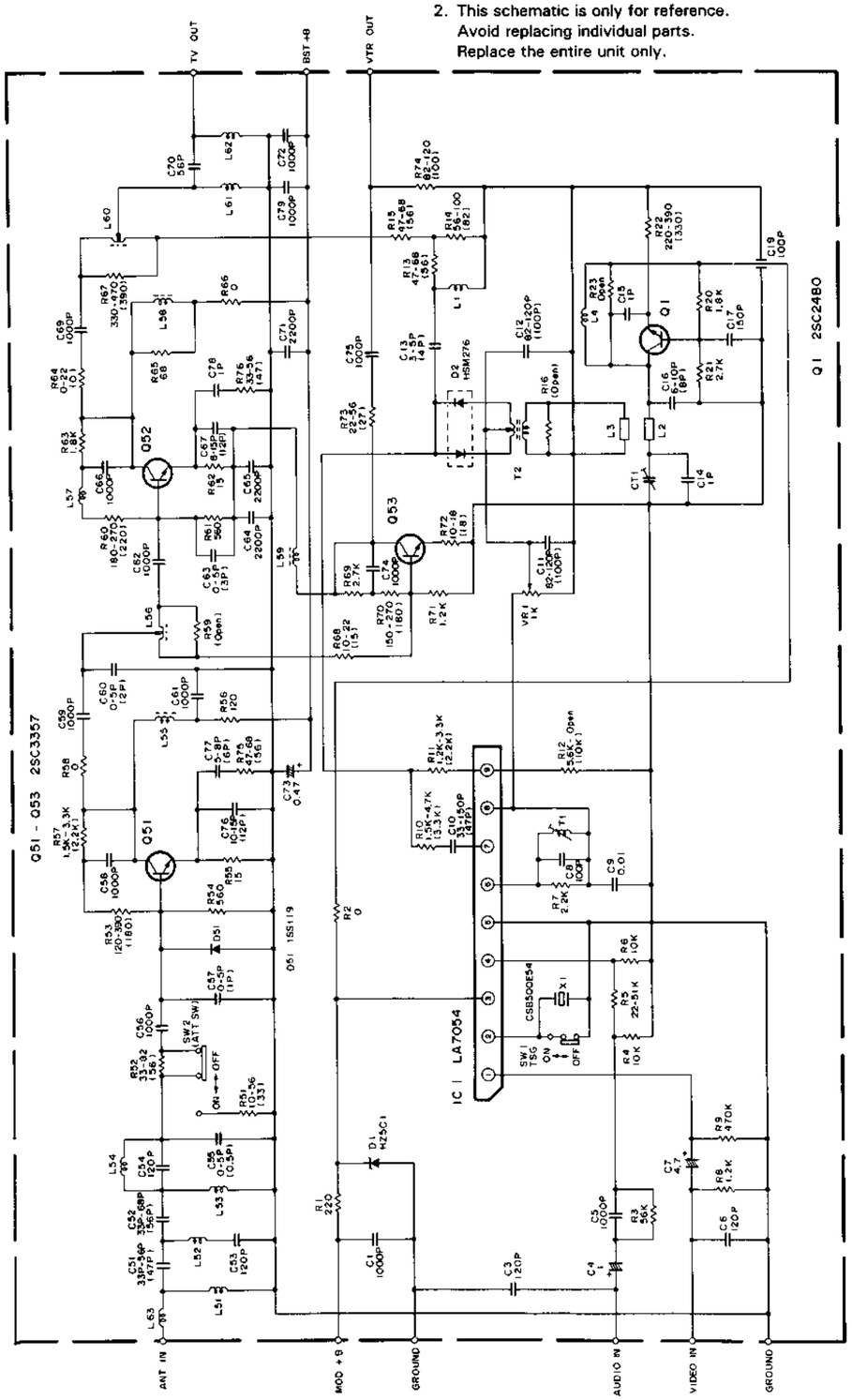


NOTE:
Voltages are DC-measured with a digital voltmeter during stop mode.

3-29

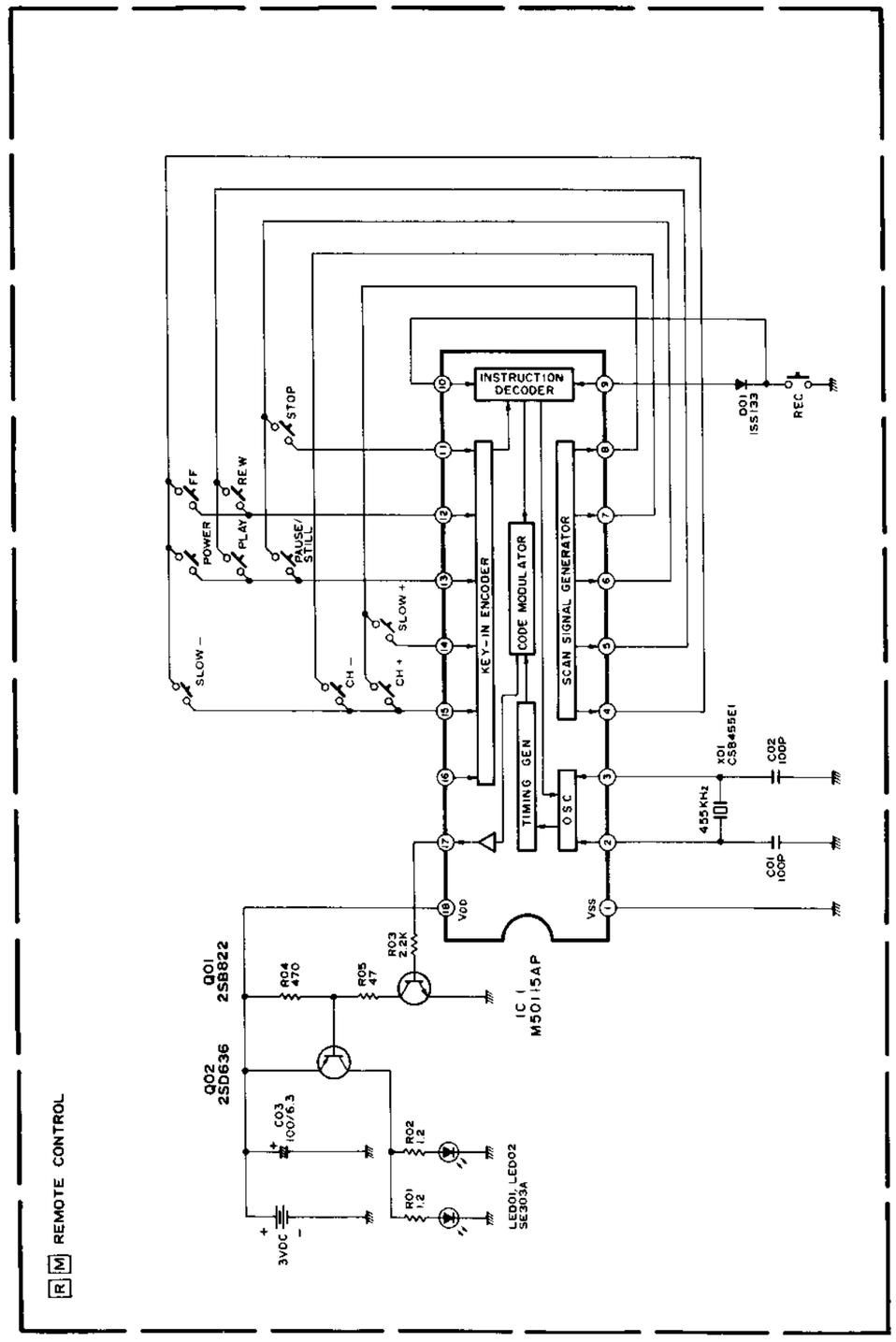
3.30 RF CONVERTER AND MIX BOOSTER SCHEMATIC DIAGRAM

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



3.31 REMOTE CONTROL SCHEMATIC DIAGRAM

NOTE: This schematic parts are critical for safety.
Replace only with specified part numbers.

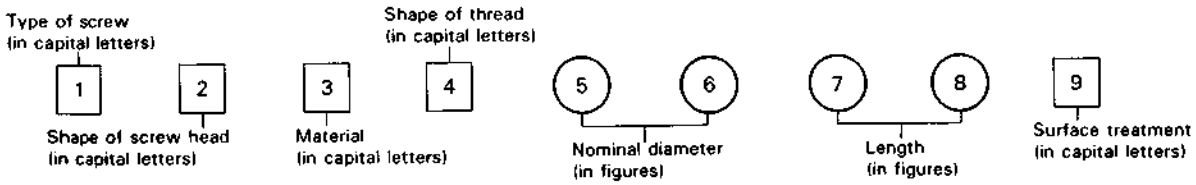


SECTION 4
EXPLODED VIEWS AND PARTS LIST

4.1 STANDARD PART NUMBER CODING

4.1.1 Screw coding

Standard screw part numbers are as follows.

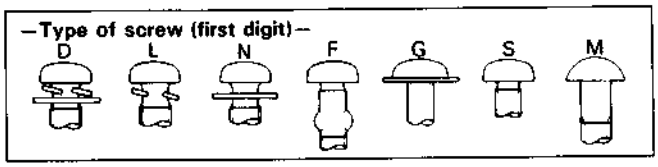


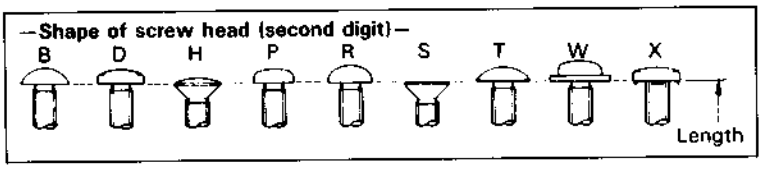
Type of screw (first digit)

- S Normal screws
- D Assembled machine screws (with plain and spring washers)
- L " (with spring washer)
- N " (with plain washer)
- F Feather screws
- G Washer head tapping screws
- M Wood screws

Shape of screw head (second digit)

- B Brazier head
- D Binding head
- H Oval countersunk head
- P Pan head
- R Round head
- S Flat head
- T Truss head
- W Washer head (machine screws)
- X Toothed head



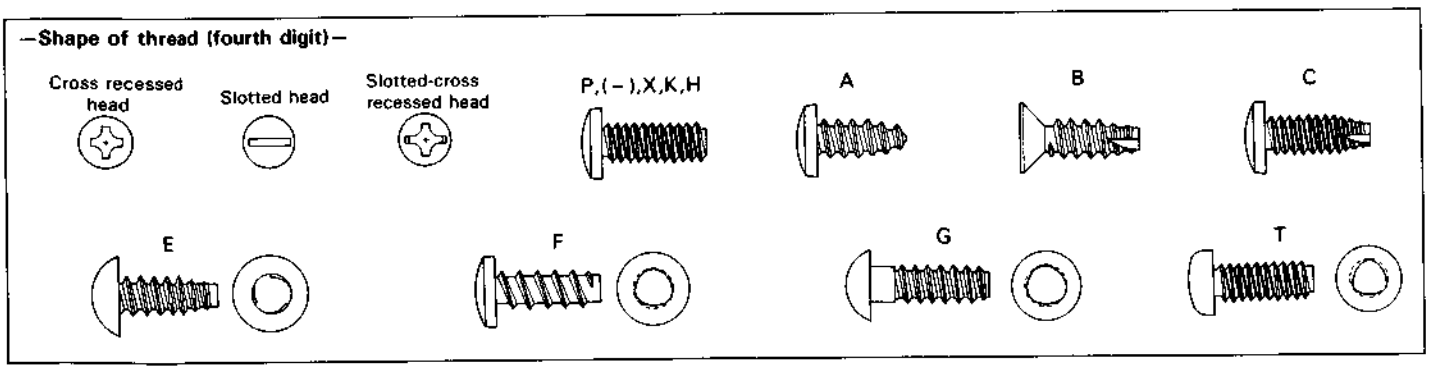


Material (third digit)

- S Steel
- E Stainless steel
- C Cast iron
- U Copper
- B Brass
- P Phosphor bronze
- N Nickel silver
- Y Cast brass
- A Aluminum
- Z Zinc alloy
- K Polycarbonate

Shape of thread (fourth digit)

- P Cross recessed head screws
- (–) Slotted head machine screws
- X Slotted-cross recessed head machine screws
- K Cross recessed head machine screws for precision equipment (type 1)
- H " (type 3)
- A Cross recessed head tapping screws (type 1)
- B " (type 2)
- C " (type 3)
- E Cross recessed head special tapping screws (brand : evertight)
- F " (brand : P-tight)
- T " (brand : taptight)
- G "



Nominal diameter (fifth and sixth digits)

The fifth and sixth digits indicate a nominal diameter or dimension. If the dimension exceeds 10 mm, three digits are used. The number indicates a nominal diameter or dimension, given in millimeters, multiplied by ten.

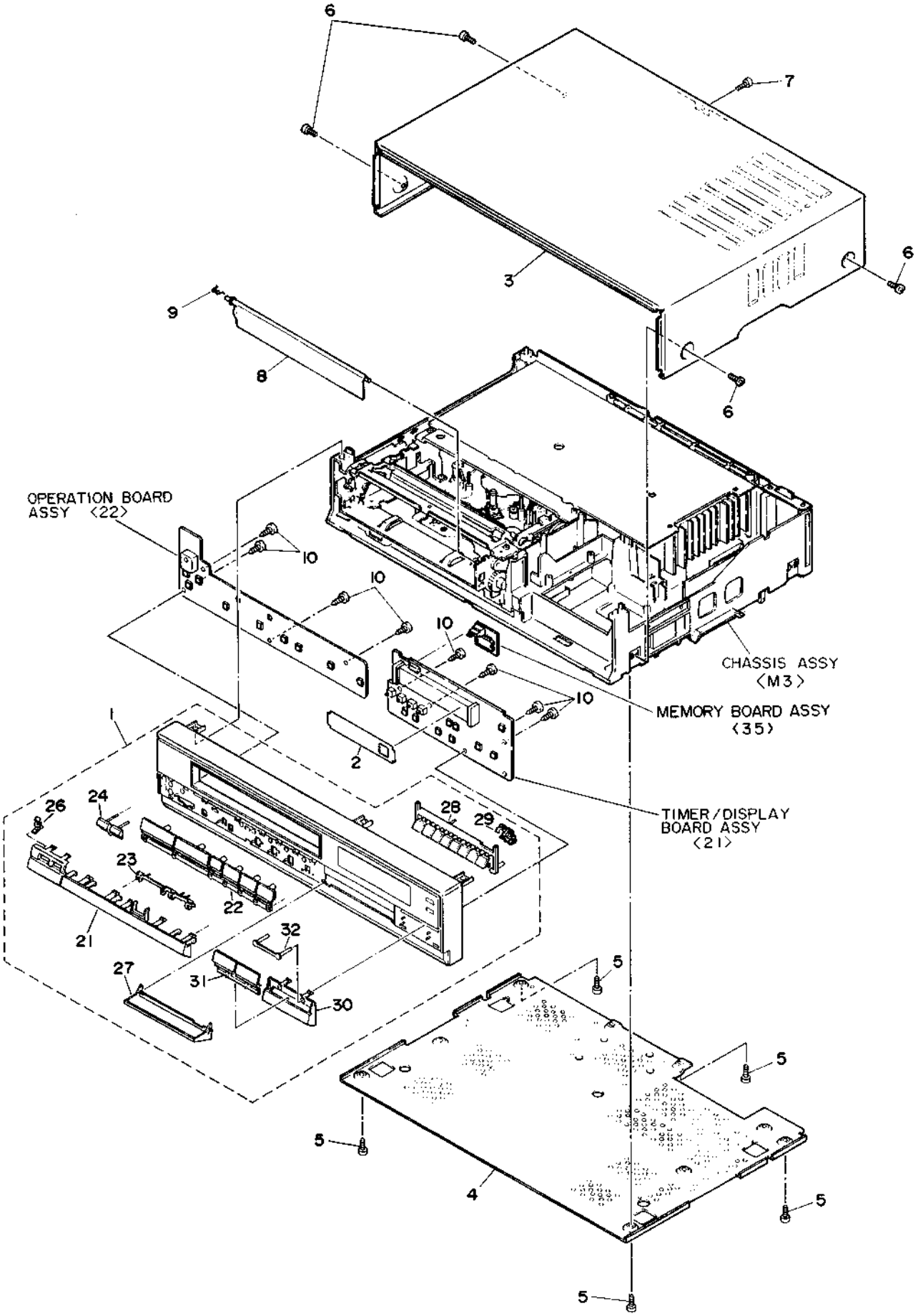
Length (seventh and eighth digits)

The seventh and eighth digits indicate length in millimeters. The preceding figure is zero when the dimension is smaller than 10 mm. For machine screws used in precision equipment whose length is given in units of 0.1 mm, the number indicates ten times the size of their length.

Surface treatment (ninth digit)

- Z Dichromate treatment after galvanizing (MFZn II-C)
- N Nickel plating (MFNiII, MFNiI)
- R Chromium plating (MBCrII, MBCrI)
- G Silver plating (SP4)
- B Black coating after plating
- F Blackening of iron (FB)
- M Blackening after galvanizing
- K Pickling of brass (PF2)
- P Phosphate treatment
- W Uni-chrome plating
- L Coated with transparent paint
- A Colored red after galvanizing (MFZnII-C)
- C Colored blue after galvanizing (MFZzII-C)
- T Colored green after galvanizing (MFZnII-C)
- V Colored purple after galvanizing (MFZnII-C)

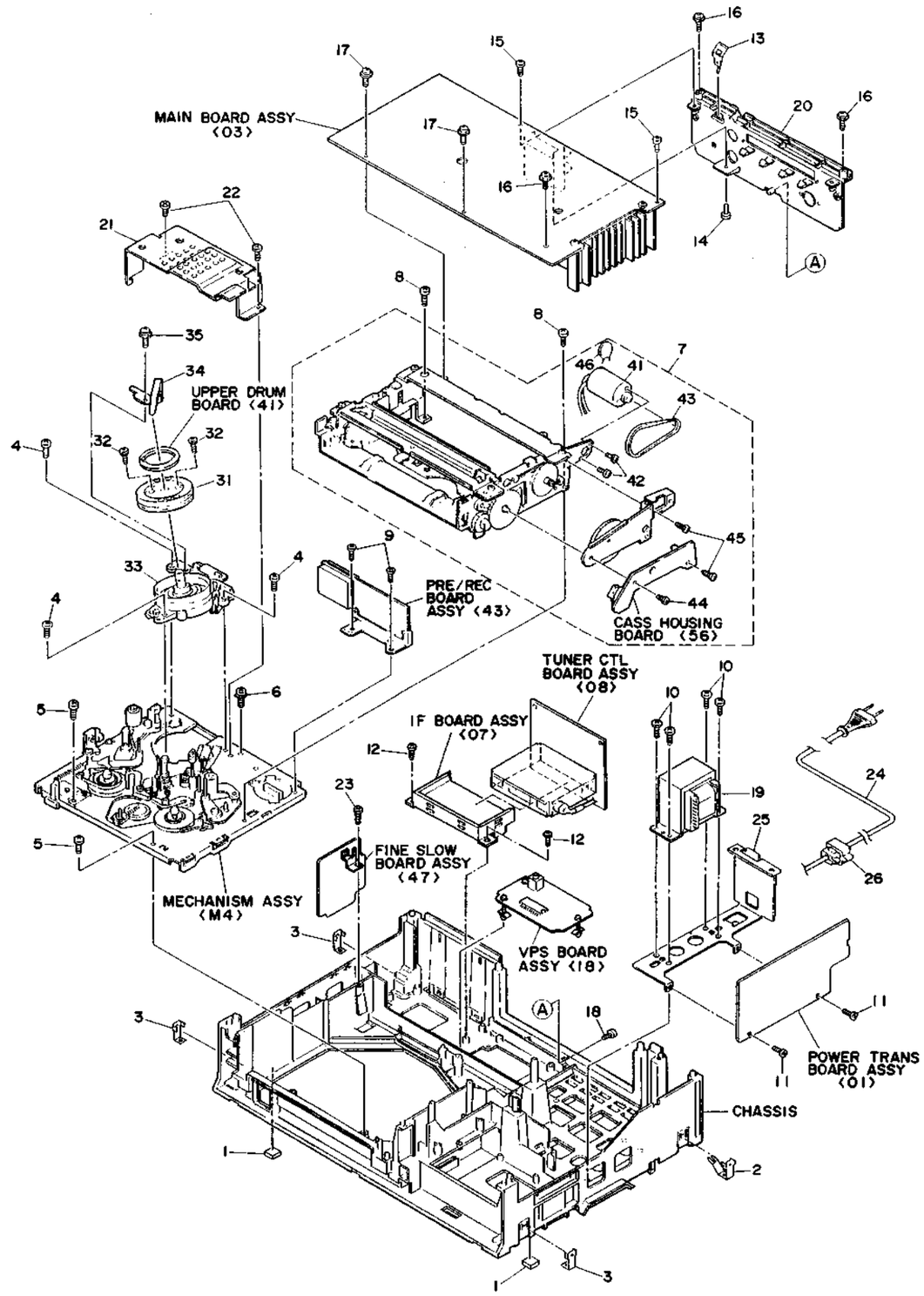
4.2 CABINET ASSEMBLY <M2>



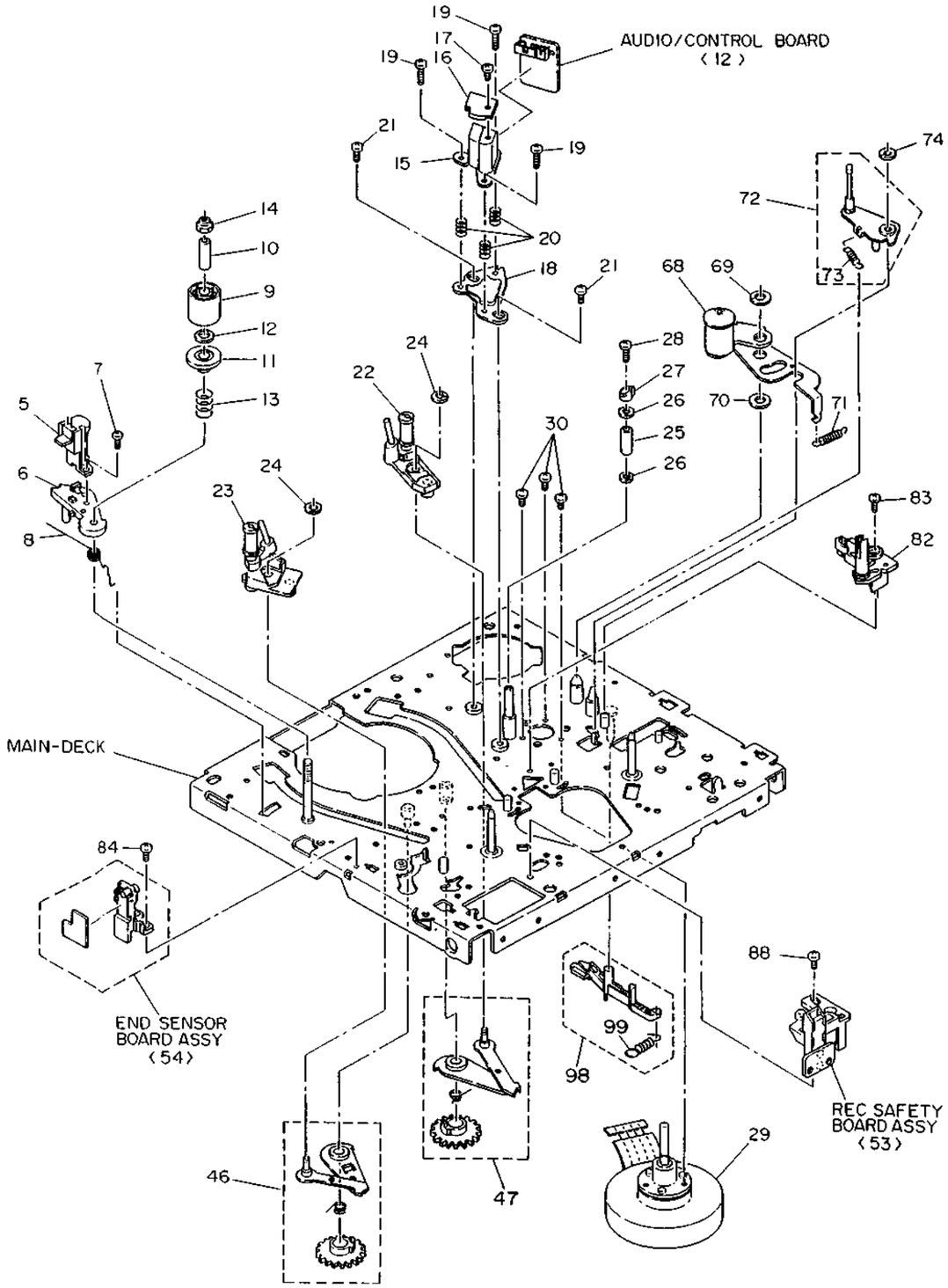
#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
			CABINET ASSEMBLY <M2>
	1	PQ10479P-7	FRONT PANEL ASSY,INCL.21-32, E
		PQ10479N-7	FRONT PANEL ASSY,INCL.21-32,EG
	2	PQ42382-2	SHEET
⚠	3	PQ10473-2-5	TOP COVER
⚠	4	PQ10472-1-2	BOTTOM COVER
	5	SDSF3008Z	TAPPING SCREW,X5
	6	SDSA4014M	TAPPING SCREW,X4
	7	SDSF3010M	TAPPING SCREW
	8	PQ31267-84	C.HOUSING DOOR
	9	PQ42410-1-1	TORSION SPRING
	10	SDSF2608Z	TAPPING SCREW,X8
	21	PQ20436-3	COVER(OPERATION), EG
		PQ20436-4	COVER(OPERATION), E
	22	PQ20294-3	OPERATION BUTTON
	23	PQ31227	OPERATION INDICATOR
	24	PQ31204-3	POWER BUTTON
	26	PQ42355	POWER INDICATOR
	27	PQ31228AG	DOOR ASSY, E
		PQ31228AE	DOOR ASSY, EG
	28	PQ31384-2	PROGRAM BUTTON, EG
		PQ31384-5	PROGRAM BUTTON, E
	29	PQ31206	COUNTER BUTTON
	30	PQ31702-3	COVER(CHANNEL), E
		PQ31702-2	COVER(CHANNEL), EG
	31	PQ31703	BUTTON(CHANNEL)
	32	PQ43015	PIN

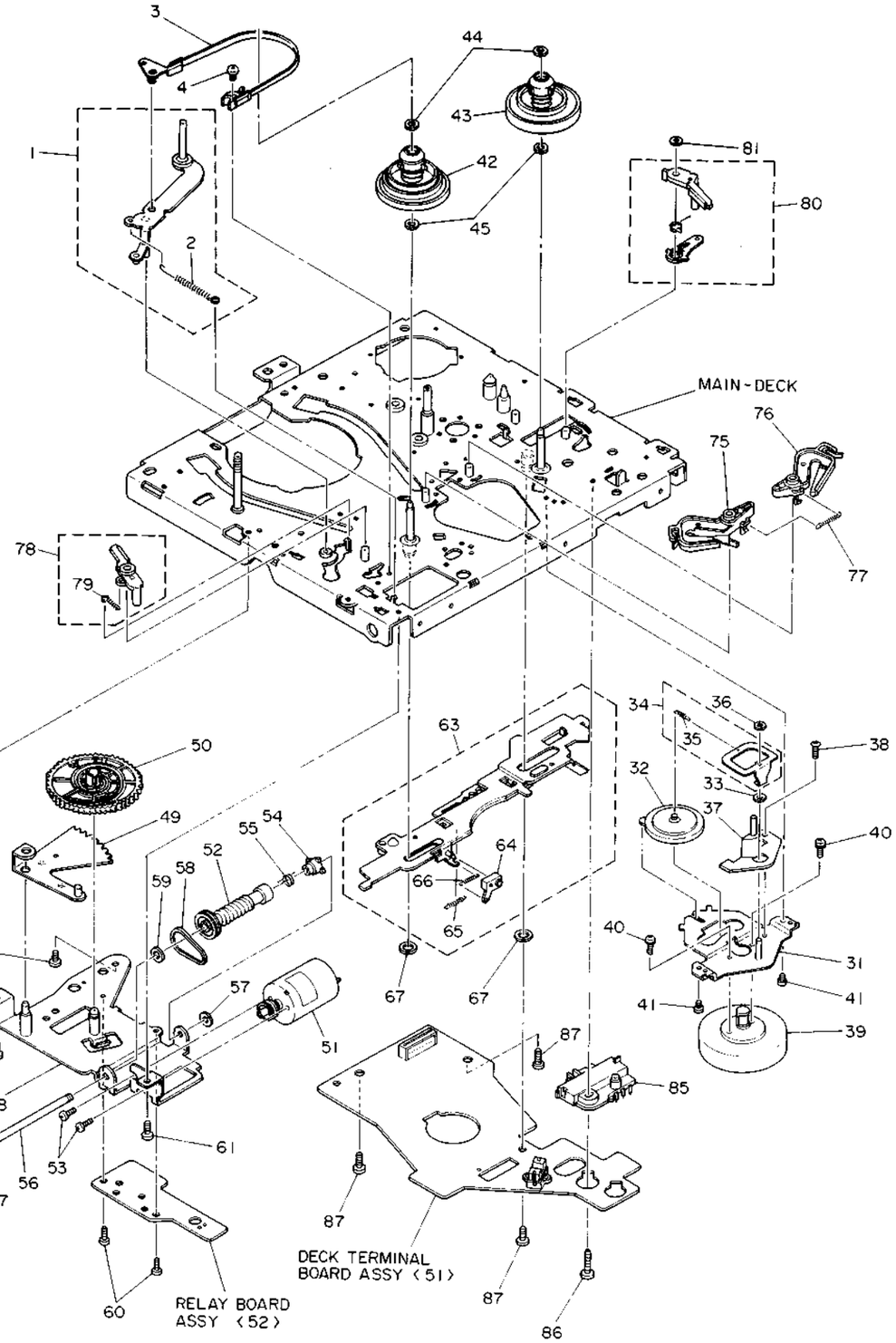
#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
			CHASSIS ASSEMBLY <M3>
	1	PQ43013	FOOT,X2
	2	PQ43023	EARTH PLATE
	3	PQ43011	EARTH PLATE,X3
	4	SDSP2608Z	SCREW,X3
	5	SDSA4014Z	TAPPING SCREW,X2
	6	PQ41396	SPECIAL SCREW
	7	PUS28277H	CASS.HOUSING ASSY,INCL.41-46
	8	SDST2605Z	TAPPING SCREW,X2
	9	SDST2605Z	TAPPING SCREW,X2
	10	SDSA4014Z	TAPPING SCREW,X4
	11	SDST3006Z	TAPPING SCREW,X2
	12	SDSF3008Z	TAPPING SCREW,X2
	13	PQ43012	EARTH PLATE
	14	SDST2605Z	TAPPING SCREW
	15	SDSA2608Z	TAPPING SCREW,X2
	16	GPSF2610Z	TAPPING SCREW,X3
	17	GPST2608Z	TAPPING SCREW,X2
	18	SDSF3010M	TAPPING SCREW
⚠	19	PU60178	POWER TRANSFORMER
⚠	20	PQ20438-3-2	TERMINAL BOARD, E
⚠		PQ20438-1-2	TERMINAL BOARD, EG
	21	PQ31171-2-7	DRUM SHIELD
	22	SDST2605Z	TAPPING SCREW,X2
	23	SDSF3008Z	TAPPING SCREW
⚠	24	QMP3980-200	POWER CORD
⚠	25	PQ31670	TRANS BRACKET
⚠	26	QHS3771-108	STRAIN RELIEF
	31	PDM2087A	UPPER DRUM ASSY
	32	PDM4001A	DRUM SCREW ASSY,X2
	33	PDM2053N-12	LOWER DRUM MOTOR ASSY
	34	PDM4015A-4	BRUSH ASSY
	35	DPSP2606Z	SCREW
⚠	41	PQ42385A	CASSETTE MOTOR ASSY
⚠	OR	PQ42385B	CASSETTE MOTOR ASSY
	42	SPSP2603Z	SCREW,X2
	43	PQM30003-19	BELT
	44	SPSP2604Z	SCREW
	45	SPST2605Z	TAPPING SCREW,X2
	46	DV710SR223M16	VARISTOR

4.3 CHASSIS ASSEMBLY <M3>



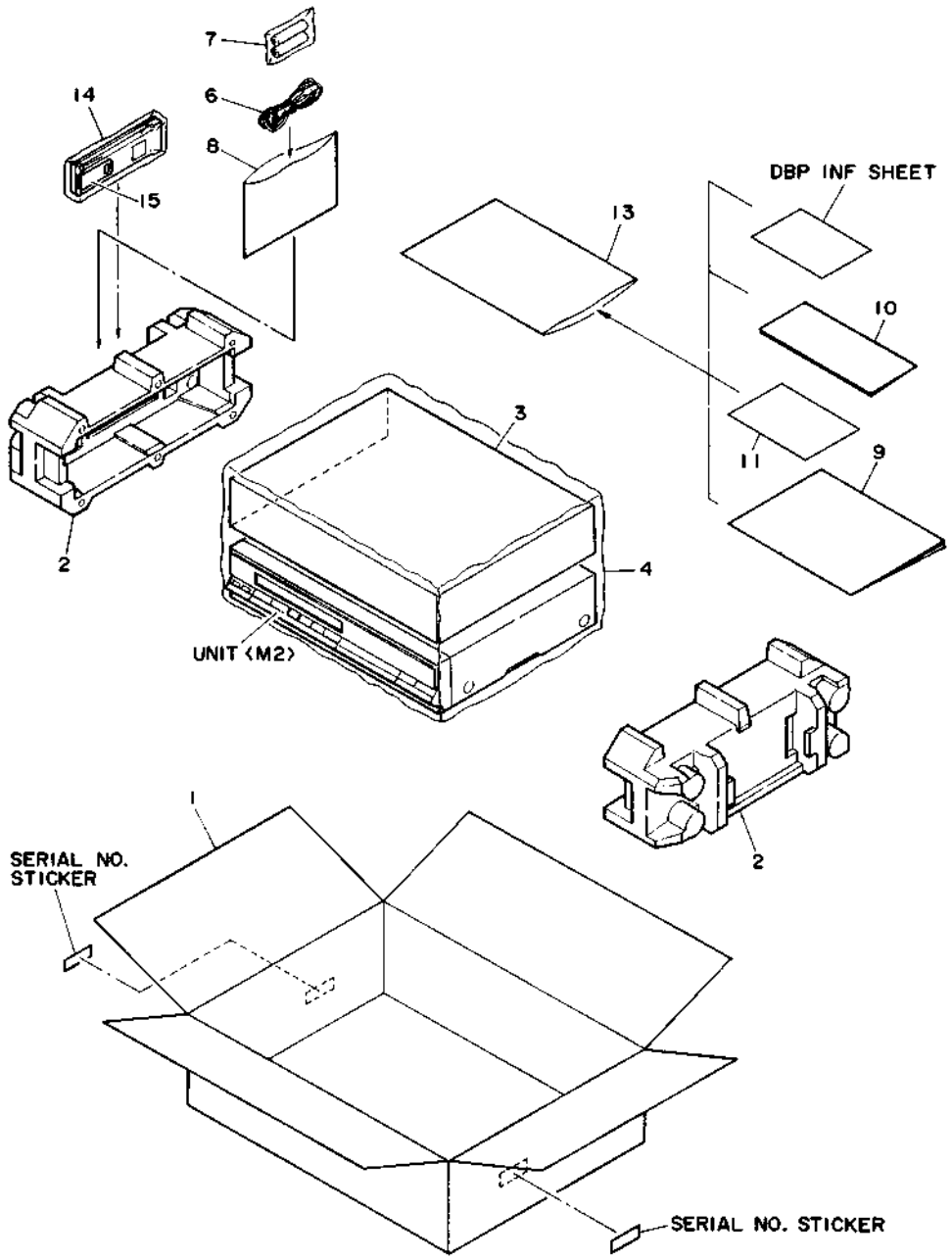
4.4 MECHANISM ASSEMBLY <M4>





#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
			**********
			**********
			* MECHANISM ASSEMBLY <M4> *
			**********
	1	PQ41944A-7	TENSION ARM ASSY,INCL.2
	2	PQ41952-3	SPRING
	3	PQ41948A	TENSION BAND ASSY
	4	SDST2606Z	TAPPING SCREW
	5	PU57641-2	FULL ERASE HEAD
	6	PQ31036	FULL ERASE HEAD BASE
	7	SPSG2606Z	TAPPING SCREW
	8	PQ41954-1-1	TORSION SPRING
	9	PQ41955	IMPEDANCE ROLLER
	10	PQ41956	COLLAR
	11	PQ41957	LOWER FLANGE
		OR PQ42958	LOWER FLANGE
	12	PQM30018-39	SPACER
		OR PQM30018-50	SPACER
	13	PQM30002-124	COMPRESSION SPRING
	14	PQ40353	NYLON NUT
	15	PU59253	AUDIO/CONTROL HEAD
	16	PU55535	SHIELD CAP
	17	HPSP2015N	SCREW
	18	PQ42984-2	HEAD BASE
	19	SPSP2608Z	SCREW,X3
	20	PU30080-49	SPRING,X3
	21	SDSP2606Z	SCREW,X2
	22	PQ41963A-2	POLE BASE ASSY(TU)
		OR PU59994	POLE BASE ASSY(TU)
		OR PQ43148A	POLE BASE ASSY(TU)
	23	PQ41969A-2	POLE BASE ASSY(SUP)
		OR PQ43147A	POLE BASE ASSY(SUP)
		OR PU59993	POLE BASE ASSY(SUP)
	24	PQM30017-5	SLIT WASHER,X2
	25	PU53629-2	TAPE GUIDE
	26	PQ40268-2	GUIDE FLANGE,X2
	27	PQ42999-2-1	GUIDE POLE CAP
	28	SDSP2006Z	SCREW
⚠	29	PU60201V	CAPSTAN MOTOR
	30	SPSP2605N	SCREW,X3
	31	PQ41974A-3	REEL MOTOR BRACKET ASSY
	32	PU58645-1-4	IDLER ARM
	33	Q03093-834	WASHER
	34	PQ41976A-1	SPRING ARM ASSY,INCL.35
	35	PQ42212-1-4	SPRING
	36	PQM30017-22	SLIT WASHER
	37	PQ41978	HOLDER
	38	SPST2606Z	TAPPING SCREW
⚠	39	PU58636W	REEL MOTOR
⚠		OR PU58636M	REEL MOTOR
	40	LPSP2604Z	SCREW,X2
	41	SPST2606Z	TAPPING SCREW,X2
	42	PU59250-1-2	REEL DISK(SUP)
	43	PU58638-1-2	REEL DISK(TU)
	44	PQM30017-5	SLIT WASHER,X2
	45	Q03093-828	WASHER,X2
	46	PQ41979A-4	LOADING ARM ASSY(SUP)
	47	PQ41985B	LOADING ARM ASSY(TU)
	48	PQ41992A-1	CAM BRACKET SUB ASSY
	49	PQ41994A-2	ARM GEAR ASSY
	50	PQ20577-2	CONTROL CAM
⚠	51	PQ41996B	MODE MOTOR ASSY
	52	PQ41998A	WORM ASSY
	53	LPSP2604Z	SCREW,X2
	54	PQ42001	WINDMILL
	55	PQ42002	CLUTCH SPRING
	56	PQ42003	WORM SHAFT
	57	PQM30017-5	SLIT WASHER,X2
	58	PQM30003-20	BELT
	59	PQM30018-22	SPACER
	60	SPST2606Z	TAPPING SCREW,X2
	61	SPST2606Z	TAPPING SCREW,X2
	62	SPSP2603Z	SCREW
	63	PQ42038D	PLATE ASSY,INCL.64-66
	64	PQ31044-1-2	LOCK LEVER
	65	PQM30001-191	TENSION SPRING
	66	PQM30001-211	TENSION SPRING
	67	PQM30017-28	SLIT WASHER,X2
	68	PQ42006B	PINCH ROLLER ARM ASSY
	69	PQM30017-28	SLIT WASHER
	70	Q03093-833	WASHER
	71	PQM30001-229	TENSION SPRING
	72	PQ42013B-4	GUIDE ARM ASSY,INCL.73
	73	PQ42029	SPRING
	74	PQM30017-6	SLIT WASHER
	75	PQ42019A-6	MAIN BRAKE ASSY(SUP)
	76	PQ42020B	MAIN BRAKE ASSY(TU)
	77	PQM30001-216	TENSION SPRING
	78	PQ42021A-3	SUB BRAKE ASSY(SUP),INCL.79
	79	PQ42023-1-2	TENSION SPRING
	80	PQ42037A-2	SUB BRAKE ASSY(TU)
	81	PQM30017-6	SLIT WASHER
	82	PU59925-1-1	LED HOLDER,INCL.LED
	83	SPST2606Z	TAPPING SCREW
	84	SPST2606Z	TAPPING SCREW
	85	PU60444	SLIDE ENCODER
	86	SDSP2610Z	SCREW
	87	SDSP2606Z	SCREW,X3
	88	SDST2606Z	TAPPING SCREW
	98	PQ43295A	MOTOR BRAKE ASSY,INCL.99
	99	PQ43296	SPRING

4.5 PACKING ASSEMBLY <M1>



#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
**********			
			**********
			* 1. PACKING ASSEMBLY <M1> *
			**********
	1	PQ31705-102	PACKING CASE, E
		PQ31705-100	PACKING CASE, EG
	2	PQ31706A-1	CUSHION ASSY
	3	PQ41026-8	PROTECT SHEET
	4	PQM30021-59-11	POLY BAG
⚠	6	PU59168-3	RF CABLE
⚠	OR	PU59167-3	RF CABLE
	7	UM-3DJ2P	BATTERY,X2
	8	QPGA020-02003	POLY BAG

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
⚠	9	PU30425-951	INSTRUCTIONS, E
⚠		PU30425-950	INSTRUCTIONS, EG
	10	TCN-3379	TAPE CATALOG
	11	BT-20069A	WARRANTY CARD, EG
	13	QPGA025-03505	POLY BAG
⚠	14	PQ10344BC	REMOTE CONTROLLER,INCL.15, EG
⚠		PQ10344BM-15	REMOTE CONTROLLER,INCL.15, E
	15	PQ31323	BATTERY CAP

SECTION 5
ELECTRICAL PARTS LIST

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

ABBREVIATIONS IN THIS LIST ARE AS FOLLOWS:

RESISTORS—All resistance values are in ohms (Ω), unless otherwise indicated.

k	: 1,000 (Kilo)
M	: 1,000,000 (Mega)
Chip R	: Chip Resistor
Chip VR	: Chip Variable Resistor
Comp. R	: Composition Resistor
CR	: Carbon Film Resistor
FR	: Fusible Resistor
MFR	: Metal Film Resistor
MPR	: Metal Plate Resistor
OMR	: Oxide Metal Film Resistor
PMR	: Precision Metal Film Resistor
UFR	: Unflammable Resistor
VR	: Variable Resistor (Potentiometer)
WR	: Wire Wound Resistor

CAPACITORS—All capacitance values are in μF, unless otherwise indicated.

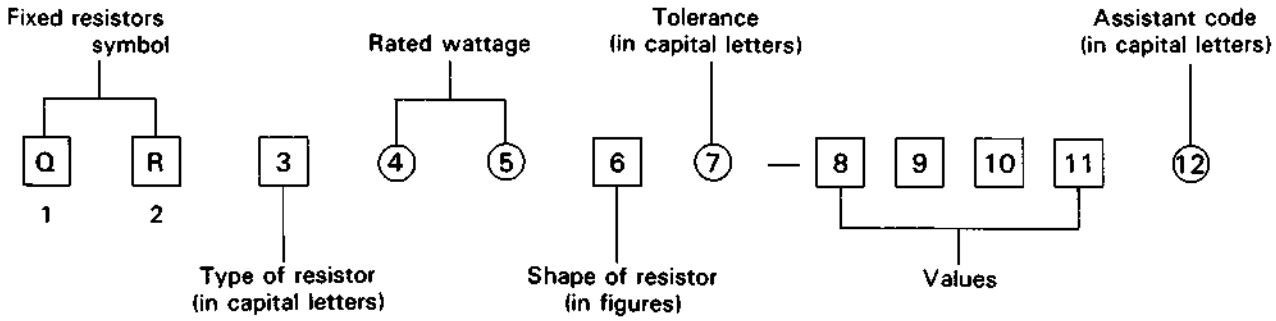
pF	: μμF (Pico farad)
C Cap	: Ceramic Capacitor
Chip Cap	: Chip Capacitor
Chip T Cap	: Chip Tantalum Capacitor
E Cap	: Electrolytic Capacitor
FM Cap	: Film Mica Capacitor
LL Cap	: Low Leak Current Electrolytic Capacitor
MM Cap	: Metalized Mylar Capacitor
MP Cap	: Metalized Paper Capacitor
MY Cap	: Mylar Capacitor
NP Cap	: Non-polar Capacitor
PC Cap	: Polycarbonate Capacitor
PP Cap	: Polypropylene Capacitor
PS Cap	: Polystyrol Capacitor
T Cap	: Tantalum Capacitor
TF Cap	: Thin Film Capacitor
TR Cap	: Trimmer Capacitor

NOTES:
- [M] indicates mechanical symbol number.
- [2 digits] indicates circuit board symbol number.
- "X " indicates quantity per set.

5.1 STANDARD PART NUMBER CODING

5.1.1 Fixed resistor coding

Fixed resistor part numbers are as follows.



Type of resistor (third digit)

C	Composition resistors
D	Carbon film resistors
F	Unflammable resistors
G	Oxide metal film resistors
H	Fusible resistors
M	Metal plate resistors
S	Metal glazed resistors
V	Precision metal film resistors
W	Wire wound resistors
X	Metal film resistors
Z	Special resistors

Rated wattage (fourth and fifth digits)

A0	1/10 W
18	1/8 W
16	1/6 W
14	1/4 W
12	1/2 W
01	1 W
02	2 W
03	3 W
04	4 W
05	5 W
06	6 W
07	7 W
75	7.5 W
08	8 W
10	10 W
15	15 W
A6	16 W
20	20 W
30	30 W

Tolerance (seventh digit)

F	±1 %
G	±2 %
J	±5 %
K	±10 %
M	±20 %

Assistant code (twelfth digit)

A	Small type
B	Small type
S	Small type
Y	Lead tapping
Z	Lead tapping

Values (eighth – tenth or eleventh digits)

examples:

R47		0.47 Ω
4R7		4.7 Ω
470	47×10^{0}	47 Ω
471	47×10^{1}	470 Ω
472	47×10^{2}	4.7 kΩ
473	47×10^{3}	47 kΩ
474	47×10^{4}	470 kΩ
475	47×10^{5}	4.7 MΩ

QRV resistance shown by four digits:

4640	464×10^{0}	464 Ω
4641	464×10^{1}	4.64 kΩ
4642	464×10^{2}	46.4 kΩ

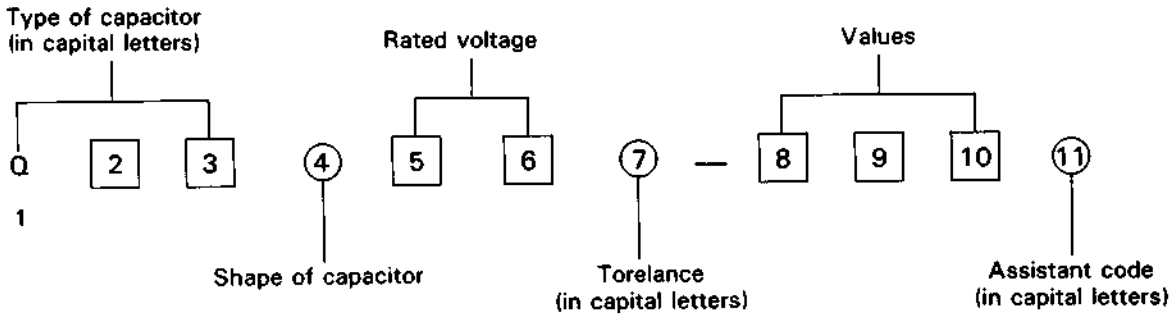
Shape of resistor (sixth digit)

Note: ■ indicates flame retardant resistor.

Shape of resistor \ Type of resistor	C	D	F	G	H	M	S	V	W	X
1										
2										
3										
4										
5									(L) type	
6										
7			Lug (B) type							
8			Lug (A) type				Chip			
9			Lug (C) type							

5.1.2 Fixed capacitor coding

Fixed capacitor part numbers are as follows.



Ceramic capacitors

Type of capacitor (first – third digits)		Shape of capacitor (fourth digit)				
Symbol	Characteristics	Mono-direction	Kink lead	Axial lead	Axial forming lead	Chip
QCC	Ceramic	1		4	5	
QCD	High capacitance					A
QCF	High capacitance	1,4	3			8,A
QCS	Temperature compensation	1	3	4	5	8,A
QCT	Temperature compensation	Special coding				8,A
QCV	Ceramic			1	3	
QCX	Ceramic			1	3	
QCY	High capacitance	1,4	3	6	7	8,A
QCZ	Special type	Special coding				
QCB	Ceramic			B	C	

Electrolytic capacitors

Type of capacitor (first – third digits)		Shape of capacitor (fourth digit)				
Symbol	Characteristics	Tubular	Mono-direction	Anti-stress	Forming	Snap-in
QEB	Low leakage		4	5	6	
QEC	Low leakage		4,8,A	9,B	6,C	
QEE	Tantalum (normal)		4	5	6	
	Tantalum (small)		8			
QEF	Chip tantalum	8 (chip type)				
QEG	Low impedance		4			
QEK	Miniature type		4	5	6	
QEL	Small type		4	5	6	7
QEM	Small type		4,A	5	6	
QEN	Non-polar	2	4	5	6	
QEP	Non-polar (small)		4,A	5,B	6,C	
QER	Miniature type		4	5	6	
QET	Small type	2	4,A	5,B	6,C	7
QEU	Small type		4	5	6	
QEV	Small type		4		6	7
QEW	Normal	2	4	5	6	7

Paper film capacitors

Type of capacitor (first – third digits)		Shape of capacitor (fourth digit)				
		Tubular	Normal		Flame retardant	
Symbol	Characteristics		Mono-direction	Kink lead	Mono-direction	Kink lead
QFA	Metalized polypropylene				7	
QFE	Metalized mylar				5	
QFF	Film mica		4			
QFG	Polypropylene film		4	8		
QFH	Metalized mylar	2	4	3	5,7	6
QFJ	Mylar (special)		4			
QFK	Metalized mylar (small)				5	
QFM	Mylar	2	4	3,7	5	6
QFN	Mylar (small)		4	3		
QFP	Polypropylene		4	3,8		
QFS	Polystyrole	2	4	3		
QFV	Thin film		4	8		
QFZ	Special type	Special coding				

Rated voltage (fifth and sixth digits)

Fifth digit \ Sixth digit	A	B	C	D	E	F	G	H	J	K	V	W	X
0						3.15	4.0		6.3				
1	10		16	20	25		40	50	63	80	35		
2	100	125	160	200	250	315	400	500	630		350	450	600
3	1000	1250		2000				5000					

Tolerance (seventh digit)

A	$^{+100}_{-10}$ %	M	± 20 %
F	± 1 %	N	± 30 %
G	± 2 %	P	$^{+100}_{-0}$ %
H	$^{+50}_{-10}$ %	R	$^{+30}_{-10}$ %
J	± 5 %	X	$^{+40}_{-20}$ %
K	± 10 %	Z	$^{+80}_{-20}$ %

Values (eighth – tenth digits)

Example : Values are in picofarads

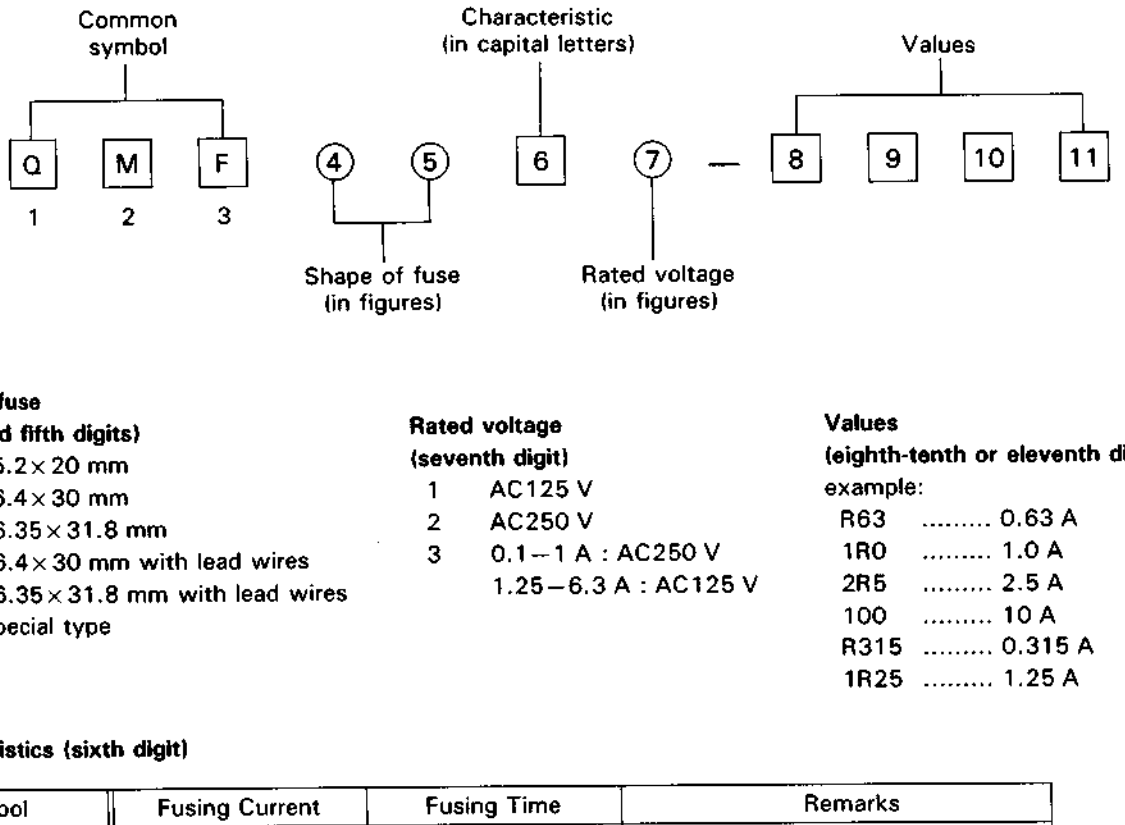
101 ..... 10×10^{1} pF ..... 100 pF
102 ..... 10×10^{2} pF ..... 1,000 pF (0.001 μF)
103 ..... 10×10^{3} pF ..... 10,000 pF (0.01 μF)
104 ..... 10×10^{4} pF ..... 100,000 pF (0.1 μF)
105 ..... 10×10^{5} pF ..... 1 μF
5R0 ..... 5.0 pF

Assistant code (eleventh digit)

G Small size
Z Lead tapping
Y Lead tapping

5.1.3 Fuse coding

Standard fuse part numbers are as follows.



Shape of fuse
(fourth and fifth digits)

51	ϕ5.2×20 mm
60	ϕ6.4×30 mm
61	ϕ6.35×31.8 mm
63	ϕ6.4×30 mm with lead wires
66	ϕ6.35×31.8 mm with lead wires
00	Special type

Rated voltage
(seventh digit)

1	AC125 V
2	AC250 V
3	0.1–1 A : AC250 V 1.25–6.3 A : AC125 V

Values
(eighth-tenth or eleventh digits)
example:

R63	..... 0.63 A
1R0	..... 1.0 A
2R5	..... 2.5 A
100	..... 10 A
R315	..... 0.315 A
1R25	..... 1.25 A

Characteristics (sixth digit)

Symbol	Fusing Current	Fusing Time	Remarks
A	210 %	Within 2 min.	Anti-rush type (for Europe)
	275 %	0.6 – 10 sec.	
	400 %	0.15 – 3 sec.	
	1000 %	0.02 – 0.3 sec.	
B	210 %	Within 30 min.	Regular fusible type (for SEMKO, Europe)
	275 %	0.05 – 2 sec.	
	400 %	0.01 – 0.3 sec.	
C	135 %	Within 1 hr.	Regular fusible type (for UL, Japan)
	200 %	Within 2 min.	
E	210 %	Within 2 min.	Anti-rush type (for Europe)
	275 %	0.6 – 10 sec.	
	400 %	0.15 – 3 sec.	
	1000 %	0.02 – 0.3 sec.	
J	135 %	Within 1 hr.	Anti-rush type
	200 %	Within 2 min.	
M	135 %	Within 1 hr.	Regular fusible type (for UL)
	200 %	Within 2 min.	
R	160 %	Within 1 hr.	Regular fusible type
	200 %	Within 2 min.	
S	160 %	Within 1 hr.	Anti-rush type
	200 %	Within 2 min.	
	700 % – 2000 %	Within 0.01 sec.	
U	135 %	Within 1 hr.	Anti-rush type (for UL)
	200 %	Within 2 min.	
	800 % – 2000 %	Within 0.01 sec.	

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
			********** POWER TRANSFORMER BOARD ASSY <01> **********
	PWBA	PB20005A-01	POWER TRANS BOARD ASSY
	Q1	2SA720	TRANSISTOR
	D1	11E2	DIODE
		OR 11ES2	DIODE
		OR 1SR35-200A	DIODE
		OR S5688G	DIODE
		OR ERA15-02	DIODE
	D2	11E2	DIODE
		OR 11ES2	DIODE
		OR 1SR35-200A	DIODE
		OR S5688G	DIODE
		OR ERA15-02	DIODE
	D3	11E2	DIODE
		OR 11ES2	DIODE
		OR 1SR35-200A	DIODE
		OR S5688G	DIODE
		OR ERA15-02	DIODE
	D4	11E2	DIODE
		OR 11ES2	DIODE
		OR 1SR35-200A	DIODE
		OR S5688G	DIODE
		OR ERA15-02	DIODE
	D5	11E2	DIODE
		OR 11ES2	DIODE
		OR 1SR35-200A	DIODE
		OR S5688G	DIODE
		OR ERA15-02	DIODE
	D6	11E2	DIODE
		OR 11ES2	DIODE
		OR 1SR35-200A	DIODE
		OR S5688G	DIODE
		OR ERA15-02	DIODE
	D7	11E2	DIODE
		OR 11ES2	DIODE
		OR 1SR35-200A	DIODE
		OR S5688G	DIODE
		OR ERA15-02	DIODE
	D8	11E2	DIODE
		OR 11ES2	DIODE
		OR 1SR35-200A	DIODE
		OR S5688G	DIODE
		OR ERA15-02	DIODE
	D9	11E2	DIODE
		OR 11ES2	DIODE
		OR 1SR35-200A	DIODE
		OR S5688G	DIODE
		OR ERA15-02	DIODE
	D10	11E2	DIODE
		OR 11ES2	DIODE
		OR 1SR35-200A	DIODE
		OR S5688G	DIODE
		OR ERA15-02	DIODE
	D11	11E2	DIODE
		OR 11ES2	DIODE
		OR 1SR35-200A	DIODE
		OR S5688G	DIODE
		OR ERA15-02	DIODE
	D12	HZ30-2	ZENER DIODE
	DS1	S4VB10-F2	BRIDGE DIODE
⚠	R1	QRZ0052-100	F RESISTOR
	R2	QRD181J-224	RESISTOR
	R3	QRD181J-222	RESISTOR
	R4	QRD181J-822	RESISTOR
⚠	R5	QRZ0052-221	F RESISTOR
	R6	QRD181J-121	RESISTOR
	C1	QETB1EM-228	E CAPACITOR
	C2	QETB1EM-228	E CAPACITOR
	C3	QETB1CM-478	E CAPACITOR
	C4	QETB1JM-107	E CAPACITOR
	C5	QETB1JM-107	E CAPACITOR
	C6	QETC1VM-106	E CAPACITOR
	C7	QETC1HM-226	E CAPACITOR
	C9	QFK52AK-473	M CAPACITOR
⚠	C101	QCZ9016-472P	CAPACITOR
⚠	H01	PU57505	FUSE CLIP,X6, FOR F1,F2,F3
⚠	LF1	PU60088	LINE FILTER
⚠	LF2	PU60089	LINE FILTER
⚠	TAB1	A74316	TAB,X2
	CN1	PU59555-6	CAP HOUSING
	CN2	PU59555-6	CAP HOUSING
⚠	F1	QMF51E2-R63	FUSE,DOES NOT INCLUDE.
⚠	F2	QMF51E2-2R0	FUSE, "
⚠	F3	QMF51E2-R80	FUSE, "
			********** MAIN BOARD ASSEMBLY <03>&<44> **********
	PWBA	PB10082B-01	MAIN BOARD ASSY, E
		PB10082A-01	MAIN BOARD ASSY, EG
⚠	RF1	PU59980S	RF CONVERTER/MIX BOOSTER
	RV1	PU52105	P RIVET,X2
	TB1	PU60192B	CONNECTOR BOARD, E
		PU60192A	CONNECTOR BOARD, EG
	WR1	PW30401-AB22T	COAXIAL CORD,RF CONV
		-AUDIO SECTION-	
⚠	IC1	BA7751ALS	IC
	Q1	2SC1740S(R$)	TRANSISTOR
	Q3	2SC1740S(RS)	TRANSISTOR
	Q5	2SC1740S(RS)	TRANSISTOR
	Q6	DTA124ES	TRANSISTOR
	Q7	DTA114ES	TRANSISTOR
	Q8	2SC1740S(RS)	TRANSISTOR
	Q9	2SC1740S(RS)	TRANSISTOR
	Q10	2SC1740S(RS)	TRANSISTOR
	Q11	DTA114ES	TRANSISTOR
	Q12	DTA114ES	TRANSISTOR
	Q13	2SD1450S,T	TRANSISTOR
	Q14	DTC124ES	TRANSISTOR
	D1	1SS133	DIODE
		OR MA165	DIODE
	D2	1SS133	DIODE
		OR MA165	DIODE

*⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	R1	QRD161J-473	RESISTOR
	R2	QRD161J-152	RESISTOR
	R3	QRD161J-222	RESISTOR
	R6	QRD161J-471	RESISTOR
	R7	QRD161J-103	RESISTOR
	R8	QRD161J-152	RESISTOR
	R9	QRD161J-222	RESISTOR
	R13	QRD161J-223	RESISTOR
	R14	QRD161J-102	RESISTOR
	R15	QRD161J-223	RESISTOR
	R16	QRD161J-102	RESISTOR
	R17	QRD161J-102	RESISTOR
	R20	QRD161J-103	RESISTOR
	R21	QRD161J-333	RESISTOR
	R22	QRD161J-102	RESISTOR
	R23	QRD161J-223	RESISTOR
	R25	QRD161J-223	RESISTOR
	R26	QRD161J-100	RESISTOR
	R27	QRD161J-470	RESISTOR
	R28	QRD161J-393	RESISTOR
	R29	QRD161J-221	RESISTOR
	R30	QRD161J-224	RESISTOR
	R31	QRD161J-123	RESISTOR
	R33	QVZ3518-103	V RESISTOR,PB LEVEL
	R34	QRD161J-103	RESISTOR
	R35	QRD161J-122	RESISTOR
	R36	QRD161J-472	RESISTOR
	R37	QRD161J-393	RESISTOR
	R38	QRD161J-183	RESISTOR
	R39	QRD161J-821	RESISTOR
	R40	QRD161J-121	RESISTOR
	R41	QVZ3518-473	V RESISTOR,BIAS ADJ
	R42	QRD161J-333	RESISTOR
	R43	QRD161J-150	RESISTOR
	R44	QRD161J-104	RESISTOR
	C1	QETB1CM-336	E CAPACITOR
	C2	QETC1HM-105	E CAPACITOR
	C3	QCC11EJ-682	CAPACITOR
	C4	QETC1CM-336	E CAPACITOR
	C5	QETC1EM-475	E CAPACITOR
	C7	QCBB1HJ-102	CAPACITOR
	C8	QEB51HM-105	E CAPACITOR
	C9	QETC1CM-106	E CAPACITOR
	C10	QCC11EJ-103	CAPACITOR
	C11	QETC1HM-105	E CAPACITOR
	C12	QETC1HM-105	E CAPACITOR
	C13	QETC1CM-226	E CAPACITOR
	C14	QETC1HM-225	E CAPACITOR
	C15	QETC1HM-105	E CAPACITOR
	C16	QETC1CM-106	E CAPACITOR
	C18	QFV71HJ-273	M CAPACITOR
	C19	QCBB1HJ-331	CAPACITOR
	C20	QFV71HJ-683	M CAPACITOR
	C21	QETC1CM-106	E CAPACITOR
	C22	QCC11EJ-472	CAPACITOR
	C23	QCC11EJ-103	CAPACITOR
	C24	QCC11EK-272	CAPACITOR
	C25	QETC1CM-106	E CAPACITOR
	C26	QETC1CM-336	E CAPACITOR
	C27	QCVB1CN-103	CAPACITOR
	C28	QCBB1HJ-102	CAPACITOR
	L1	PU58308-822J	COIL
	L2	PU59152-3R9K	PEAKING COIL
	L3(R45)	PU48530-471J	PEAKING COIL
	LC1	PU59736-271	N FILTER
		OR PU59885-271	N FILTER
	LC2	PU59736-271	N FILTER
		OR PU59885-271	N FILTER
⚠	T1	PU60017-2	OSC TRANS
	TP	PU57545	TEST PIN,X3

-LUMINANCE SECTION-

	IC101	PB20166C	Y MODULE BOARD ASSY
⚠	IC102	MSM6967RS	IC
	Q101	2SC1740S(RS)	TRANSISTOR
	Q102	2SC1740S(RS)	TRANSISTOR
	Q103	2SA1309R,S	TRANSISTOR
	Q104	2SC1740S(RS)	TRANSISTOR
	Q105	2SC1740S(RS)	TRANSISTOR
	Q106	2SA1309R,S	TRANSISTOR
	Q107	2SA1309R,S	TRANSISTOR
	Q110	DTC144WS	TRANSISTOR
	Q111	DTC124ES	TRANSISTOR
	Q113	DTC114YS	TRANSISTOR
	Q114	DTC144EF	TRANSISTOR
	Q121	2SC1740S(RS)	TRANSISTOR
	D101	1SS133	DIODE
		OR MA165	DIODE
	D102	1SS133	DIODE
		OR MA165	DIODE
	D103	1SS133	DIODE
		OR MA165	DIODE
	D104	RD9.1ESB2	ZENER DIODE
	D105	1SS133	DIODE
		OR MA165	DIODE
	D106	1SS133	DIODE
		OR MA165	DIODE
	D109	1SS133	DIODE
		OR MA165	DIODE
	D110	1SS133	DIODE
		OR MA165	DIODE
	D111	MA27W(A)	DIODE
	D112	1SS133	DIODE
		OR MA165	DIODE
	D113	1SS292	DIODE
	R101	QRD161J-103	RESISTOR
	R102	QRD161J-182	RESISTOR
	R103	QRD161J-222	RESISTOR
	R104	QRD161J-331	RESISTOR
	R105	QVZ3531-152	V RESISTOR,REC FM LEVEL
	R108	QRD161J-681	RESISTOR
	R109	QRD161J-331	RESISTOR
	R110	QRD161J-333	RESISTOR
	R111	QRD161J-102	RESISTOR
	R112	QVZ3518-222	V RESISTOR,NC BALANCE
	R113	QRD161J-222	RESISTOR
	R114	QRD161J-102	RESISTOR
	R115	QRD161J-181	RESISTOR
	R116	QRD161J-750	RESISTOR
	R117	QRD161J-102	RESISTOR
	R119	QRD121J-391	RESISTOR
	R120	QRD161J-333	RESISTOR
	R121	QRD161J-681	RESISTOR
	R122	QRD161J-153	RESISTOR
	R123	QRD161J-152	RESISTOR
	R124	QRD161J-101	RESISTOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	R127	QVZ3531-332	V RESISTOR,FREQ RESPONSE
	R128	QRD161J-102	RESISTOR
	R129	QRD161J-102	RESISTOR
	R130	QRD161J-222	RESISTOR
	R134	QRD161J-750	RESISTOR
	R138	QRD161J-104	RESISTOR
	R139	QRD161J-823	RESISTOR
	R141	QRD161J-122	RESISTOR
	R142	QRD161J-681	RESISTOR
	R143	QRD161J-331	RESISTOR
	R144	QRD161J-472	RESISTOR
	R147	QRD161J-562	RESISTOR
	R148	QRD161J-223	RESISTOR
	R149	QRD161J-103	RESISTOR
	R150	QRD161J-222	RESISTOR
	R152	QRD161J-101	RESISTOR
	R153	QRD161J-682	RESISTOR
	R154	QRD161J-222	RESISTOR
	R155	QRD161J-681	RESISTOR
	R160	QRD161J-221	RESISTOR
	R161	QRD161J-153	RESISTOR
	R162	QRD161J-221	RESISTOR
	R163	QRD161J-222	RESISTOR
	R164	QRD161J-394	RESISTOR
	R165	QRD161J-103	RESISTOR
	R171	QRD161J-222	RESISTOR
	R172	QRD161J-222	RESISTOR
	R173	QRD161J-681	RESISTOR
	C101	QCSB1HJ-220	CAPACITOR
	C102	QETC1AM-226	E CAPACITOR
	C103	QETC1HM-335	E CAPACITOR
	C104	QCVB1CN-103	CAPACITOR
	C105	QCBB1HJ-121	CAPACITOR
	C106	QCBB1HJ-121	CAPACITOR
	C107	QCSB1HJ-220	CAPACITOR
	C108	QEN61HM-225	NP E CAPACITOR
	C109	QETC1EM-475	E CAPACITOR
	C110	QCSB1HJ-120	CAPACITOR
	C111	QETC1HM-104	E CAPACITOR
	C112	QETC1EM-475	E CAPACITOR
	C113	QCVB1CN-103	CAPACITOR
	C114	QCVB1CN-103	CAPACITOR
	C115	QCVB1CN-103	CAPACITOR
	C116	QETC0JM-476	E CAPACITOR
	C117	QETC1AM-476	E CAPACITOR
	C118	QCVB1CN-103	CAPACITOR
	C120	QCVB1CN-103	CAPACITOR
	C121	QETC1CM-106	E CAPACITOR
	C122	QETC1HM-224	E CAPACITOR
	C123	QETC1EM-335	E CAPACITOR
	C124	QETC0JM-337	E CAPACITOR
	C125	QEN61EM-335	NP E CAPACITOR
	C126	QCVB1CN-103	CAPACITOR
	C127	QCVB1CN-103	CAPACITOR
	C128	QCSB1HJ-470	CAPACITOR
	C129	QETC0JM-476	E CAPACITOR
	C130	QCVB1CN-103	CAPACITOR
	C131	QETC0JM-477	E CAPACITOR
	C132	QETC0JM-476	E CAPACITOR
	C133	QCVB1CN-103	CAPACITOR
	C134	QETC1EM-476	E CAPACITOR
	C135	QCBB1HJ-102	CAPACITOR
	C136	QCBB1HJ-102	CAPACITOR
	C137	QETC1EM-475	E CAPACITOR
	C138	QCSB1HK-6R8	CAPACITOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	C139	QETC0JM-476	E CAPACITOR
	C140	QCVB1CN-103	CAPACITOR
	C141	QCVB1CN-103	CAPACITOR
	C142	QCVB1CN-103	CAPACITOR
	C143	QCF11HP-103	CAPACITOR
	C145	QCSB1HJ-120	CAPACITOR
	C146	QCBB1HJ-151	CAPACITOR
	C147	QCC11EK-104	CAPACITOR
	C148	QCVB1CN-103	CAPACITOR
	C149	QEN61AM-226	NP E CAPACITOR
	C150	QETC1EM-475	E CAPACITOR
	C152	QCSB1HJ-120	CAPACITOR
	C153	QCBB1HJ-102	CAPACITOR
	C154	QCBB1HJ-102	CAPACITOR
	C155	QCBB1HJ-102	CAPACITOR
	C156	QEN50JM-336	NP E CAPACITOR
	C161	QCVB1CN-103	CAPACITOR
	C162	QCVB1CN-103	CAPACITOR
	L101	PU59152-121J	PEAKING COIL
	L102	PU59152-221J	PEAKING COIL
	L103	PU59152-560J	PEAKING COIL
	L104	PU59152-330J	PEAKING COIL
	L105	PU59152-101J	PEAKING COIL
	L106	PU48530-101K	PEAKING COIL
	L107	PU48530-101K	PEAKING COIL
	L108	PU59152-680J	PEAKING COIL
	L109	PU48530-101K	PEAKING COIL
	L110	PU59152-180J	PEAKING COIL
	L111	PU48530-101K	PEAKING COIL
	L112	PU48530-101K	PEAKING COIL
	L113	PU48530-101K	PEAKING COIL
	L114	PU59152-101J	PEAKING COIL
	EQ101	PU60162	EQUALIZER
	EQ102	PU54838	EQUALIZER
	LPF101	PU60161	LOW PASS FILTER
	LPF102	PU58021-2	LOW PASS FILTER
	SLD101	PU60147	SHIELD CASE(1)
	SLD102	PU60148	SHIELD CASE(2)
	SLD103	PU60149	SHIELD CASE(3)
	TP	PU57545	TEST PIN,X4
	CN104	PU58844-3	CAP HOUSING, E
	CN105	PU58844-4	CAP HOUSING, E
			-VIDEO SUB BOARD SECTION-
	PWBA1	PB40016A	VIDEO SUB BOARD ASSY
	IC103	TA7374P	IC
	Q112	2SC2021R,S	TRANSISTOR
	R158	QRD162J-102	RESISTOR
	R159	QRD162J-332	RESISTOR
	L115	PU59152-3R3K	PEAKING COIL
	L116	PU59152-150J	PEAKING COIL
	L117	PU59152-120J	PEAKING COIL
	TML101	PU59935-09	TERMINAL,JP101
			-COLOR SECTION-
⚠	IC201	PU22046A	C.MODULE BOARD ASSY

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	Q201	DTC144ES	TRANSISTOR
	Q202	DTC144ES	TRANSISTOR
	Q203	2SC1740S(RS)	TRANSISTOR
	Q204	2SC1740S(RS)	TRANSISTOR
	Q205	2SC1740S(RS)	TRANSISTOR
	Q206	DTC124ES	TRANSISTOR
	Q207	2SC1740S(RS)	TRANSISTOR
	Q209	DTC144ES	TRANSISTOR
	Q210	DTC144ES	TRANSISTOR
	Q212	DTC144ES	TRANSISTOR
	Q213	2SC1740S(RS)	TRANSISTOR
	Q214	2SC1740S(RS)	TRANSISTOR
	Q252	2SC1740S(RS)	TRANSISTOR
	Q301	DTC144WS	TRANSISTOR
	Q302	2SA1309R,S	TRANSISTOR
	Q303	2SA1309R,S	TRANSISTOR
	Q304	DTC144WS	TRANSISTOR
	D201	1SS133	DIODE
	OR	MA165	DIODE
	D202	1SS133	DIODE
	OR	MA165	DIODE
	D203	1SS133	DIODE
	OR	MA165	DIODE
	D204	1SS133	DIODE
	OR	MA165	DIODE
	D205	1SS133	DIODE
	OR	MA165	DIODE
	D206	1SS133	DIODE
	OR	MA165	DIODE
	D207	1SS133	DIODE
	OR	MA165	DIODE
	D208	1SS133	DIODE
	OR	MA165	DIODE
	D251	1SS133	DIODE
	D252	1SS133	DIODE
	D253	1SS133	DIODE
	D254	1SS133	DIODE
	OR	MA165	DIODE
	D255	1SS133	DIODE
	D256	1SS133	DIODE
	D257	1SS133	DIODE
	D301	1SS133	DIODE
	OR	MA165	DIODE
	D302	1SS133	DIODE
	D303	1SS133	DIODE
	R201	QRD161J-222	RESISTOR
	R202	QRD161J-122	RESISTOR
	R203	QRD161J-103	RESISTOR
	R204	QRD161J-103	RESISTOR
	R205	QRD161J-223	RESISTOR
	R206	QRD161J-103	RESISTOR
	R207	QVZ3518-223	V RESISTOR,VXO
	R208	QRD161J-274	RESISTOR
	R209	QRD161J-472	RESISTOR
	R210	QRD161J-102	RESISTOR
	R211	QRD161J-681	RESISTOR
	R214	QVZ3518-331	V RESISTOR,REC COLOUR LEVEL
	R215	QRD161J-153	RESISTOR
	R216	QRD161J-222	RESISTOR
	R217	QRD161J-102	RESISTOR
	R218	QRD161J-102	RESISTOR
	R219	QRD161J-103	RESISTOR
	R220	QRD161J-103	RESISTOR
	R221	QRD161J-272	RESISTOR
	R222	QRD161J-681	RESISTOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	R223	QRD161J-473	RESISTOR
	R224	QRD161J-102	RESISTOR
	R225	QRD161J-102	RESISTOR
	R226	QRD161J-391	RESISTOR
	R227	QRD161J-221	RESISTOR
	R230	QRD161J-561	RESISTOR
	R231	QRD161J-271	RESISTOR
	R232	QRD162J-562	RESISTOR
	R233	QRD162J-104	RESISTOR
	R234	QRD161J-682	RESISTOR
	R235	QRD161J-122	RESISTOR
	R236	QRD161J-393	RESISTOR
	R237	QRD161J-103	RESISTOR
	R238	QRD161J-103	RESISTOR
	R239	QRD161J-102	RESISTOR
	R240	QRD161J-471	RESISTOR
	R241	QRD161J-152	RESISTOR
	R242	QRD161J-223	RESISTOR
	R243	QRD161J-682	RESISTOR
	R244	QRD161J-102	RESISTOR
	R245	QRD161J-181	RESISTOR
	R246	QRD161J-391	RESISTOR
	R247	QRD161J-331	RESISTOR
	R248	QRD161J-122	RESISTOR
	R249	QRD161J-222	RESISTOR
	R262	QRD161J-393	RESISTOR
	R263	QRD161J-223	RESISTOR
	R264	QRD161J-333	RESISTOR
	R265	QRD161J-822	RESISTOR
	R301	QRD161J-103	RESISTOR
	R304	QRD161J-393	RESISTOR
	R305	QRD161J-682	RESISTOR
	R306	QRD161J-393	RESISTOR
	R307	QRD161J-682	RESISTOR
	R308	QRD161J-103	RESISTOR
	R309	QRD161J-562	RESISTOR
	C201	QETC1CM-106	E CAPACITOR
	C202	QCVB1CN-103	CAPACITOR
	C203	QFN31HJ-273	M CAPACITOR
	C204	QCT25CH-220	CAPACITOR
	C205	QFN31HJ-223	M CAPACITOR
	C206	QETC1HM-105	E CAPACITOR
	C207	QCVB1CN-103	CAPACITOR
	C208	QCSB1HJ-470	CAPACITOR
	C209	QFN31HJ-473	M CAPACITOR
	C210	QCBB1HJ-102	CAPACITOR
	C211	QCVB1CN-103	CAPACITOR
	C212	QCBB1HJ-820	CAPACITOR
	C213	QETC1HM-225	E CAPACITOR
	C214	QETC1CM-106	E CAPACITOR
	C215	QFN31HJ-563	M CAPACITOR
	C216	QFN31HJ-224	M CAPACITOR
	C217	QETC1CM-106	E CAPACITOR
	C218	QFN31HJ-103	M CAPACITOR
	C219	QFN31HJ-104	M CAPACITOR
	C220	QCVB1CN-103	CAPACITOR
	C221	QETC1EM-335	E CAPACITOR
	C222	QFN31HJ-563	M CAPACITOR
	C223	QCVB1CN-103	CAPACITOR
	C224	QETC1EM-475	E CAPACITOR
	C225	QETC0JM-107	E CAPACITOR
	C226	QCVB1CN-103	CAPACITOR
	C227	QCBB1HJ-101	CAPACITOR
	C229	QETC1HM-105	E CAPACITOR
	C230	QETC1EM-475	E CAPACITOR
	C231	QETC1EM-475	E CAPACITOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	C232	QCVB1CN-103	CAPACITOR
	C233	QCBB1HJ-102	CAPACITOR
	C234	QETCOJM-476	E CAPACITOR
	C235	QCVB1CN-103	CAPACITOR
	C236	QCSB1HK-5R6	CAPACITOR
	C237	QCVB1CN-103	CAPACITOR
	C238	QCVB1CN-103	CAPACITOR
	C259	QCBB1HJ-102	CAPACITOR
	L201	PU48530-101K	PEAKING COIL
	L202	PU48530-271J	PEAKING COIL
	L203	PU48530-222J	PEAKING COIL
	L204	PU59153-822J	PEAKING COIL
	L205	PU59153-101K	INDUCTOR
	L206	PU59152-150J	PEAKING COIL
	L207	PU48530-101J	PEAKING COIL
	L208	PU59152-820J	PEAKING COIL
	L301	PU48530-101K	PEAKING COIL
	EQ201	PU53501-6	EQUALIZER
	LPF201	PU58705	LOW PASS FILTER
	LPF202	PU54988	LOW PASS FILTER
	BPF201	PU57072	BAND PASS FILTER
	BPF202	PU54410-2	BAND PASS FILTER
	DL201	PU58971-2	2H DELAY LINE
	OR	PU59413	2H DELAY LINE
⚠	XB201	PU58023	CRYSTAL BLOCK
⚠	OR	PU58126	CRYSTAL BLOCK
	X201	PU60307	CRYSTAL RESONATOR
	OR	PU59335	CRYSTAL RESONATOR
	OR	PU31449-4K	CRYSTAL RESONATOR
	TP	PU57545	TEST PIN,X3
	TP214	PU50766-2	TEST PIN
		-SECAM DET BOARD SECTION <44>-	
	PWBA2	PB30005A-01	SECAM DET. BOARD ASSY
	IC251	BA7007	IC
	Q251	2SC1740S(RS)	TRANSISTOR
	R251	QRD161J-103	RESISTOR
	R252	QRD161J-562	RESISTOR
	R253	QRD161J-333	RESISTOR
	R254	QRD161J-393	RESISTOR
	R255	QRD161J-102	RESISTOR
	R256	QRD161J-393	RESISTOR
	R257	QVZ3521-472	V RESISTOR,SECAM DET
	R258	QRD161J-563	RESISTOR
	R259	QRD161J-182	RESISTOR
	R260	QRD161J-154	RESISTOR
	R261	QRD161J-332	RESISTOR
	C251	QFN31HJ-562	M CAPACITOR
	C252	QCVB1CN-103	CAPACITOR
	C253	QETC1CM-106	E CAPACITOR
	C254	QFN31HJ-223	M CAPACITOR
	C255	QER61CM-476	E CAPACITOR
	C256	QCVB1CN-103	CAPACITOR
	C257	QETC1AM-336	E CAPACITOR
	C258	QFN31HJ-122	M CAPACITOR
	L251	PU49057	LC BLOCK

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	L252	PU59153-562J	PEAKING COIL
	L253	PU48530-101K	PEAKING COIL
	CF251	PU56983	CERAMIC FILTER
	TML251	PU60330-10	TERMINAL,JP251
	TP251	PU57545	TEST PIN
		-SERVO SECTION-	
	IC401	HD49712NT	IC
	OR	HD49712ANT	IC
	Q402	2SC3311A	TRANSISTOR
	D401	1SS133	DIODE
	OR	MA165	DIODE
	D402	1SS133	DIODE
	OR	MA165	DIODE
	D403	1SS133	DIODE
	OR	MA165	DIODE
	D404	1SS133	DIODE
	OR	MA165	DIODE
	D405	1SS133	DIODE
	OR	MA165	DIODE
	D407	1SS133	DIODE
	OR	MA165	DIODE
	D408	1SS133	DIODE
	OR	MA165	DIODE
	D409	1SS133	DIODE
	OR	MA165	DIODE
	R401	QRD161J-102	RESISTOR
	R402	QRD161J-105	RESISTOR
	R403	QRD161J-103	RESISTOR
	R404	QRD161J-333	RESISTOR
	R405	QRD161J-684	RESISTOR
	R406	QRD161J-152	RESISTOR
	R409	QRD161J-475	RESISTOR
	R410	QRD161J-473	RESISTOR
	R411	QRD161J-222	RESISTOR
	R413	QRD161J-103	RESISTOR
	R414	QRD161J-472	RESISTOR
	R415	QRD161J-182	RESISTOR
	R416	QRD161J-105	RESISTOR
	R417	QRD161J-273	RESISTOR
	R418	QRD161J-105	RESISTOR
	R419	QRD161J-105	RESISTOR
	R420	QRD161J-273	RESISTOR
	R421	QRD161J-273	RESISTOR
	R422	QRD161J-105	RESISTOR
	R423	QRD161J-104	RESISTOR
	R424	QRD161J-222	RESISTOR
	R427	QRD161J-102	RESISTOR
	R428	QRD161J-104	RESISTOR
	R429	QRD161J-104	RESISTOR
	R430	QVZ3518-684	V RESISTOR,PB SW POINT
	R432	QRD161J-332	RESISTOR
	R433	QRD161J-103	RESISTOR
	R434	QVZ3521-474	V RESISTOR,V PULSE POSITION
	R436	QRD161J-102	RESISTOR
	R437	QRD161J-222	RESISTOR
	R438	QRD161J-221	RESISTOR
	R439	QRD161J-563	RESISTOR
	R440	QRD161J-153	RESISTOR
	R441	QRD161J-223	RESISTOR
	R442	QRD161J-682	RESISTOR
	R443	QRD161J-102	RESISTOR
	R444	QRD161J-102	RESISTOR

*⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	R445	QRD161J-103	RESISTOR
	R446	QRD161J-102	RESISTOR
	R447	QRD161J-103	RESISTOR
	R448	QRD161J-334	RESISTOR
	R453	QRD161J-471	RESISTOR
	R454	QRD161J-183	RESISTOR
	C401	QCBB1HJ-102	CAPACITOR
	C402	QETC1AM-226	E CAPACITOR
	C403	QETC1AM-226	E CAPACITOR
	C404	QCSB1HJ-150	CAPACITOR
	C405	QCBB1HJ-102	CAPACITOR
	C406	QETC1HM-105	E CAPACITOR
	C407	QCXB1CN-222	CAPACITOR
	C408	QETC1HM-105	E CAPACITOR
	C409	QCBB1HJ-102	CAPACITOR
	C410	QCBB1HJ-102	CAPACITOR
	C411	QETC1HM-224	E CAPACITOR
	C412	QETC1AM-226	E CAPACITOR
	C415	QFN31HJ-122	M CAPACITOR
	OR	QCC31CK-122	CAPACITOR
	C416	QETC1EM-475	E CAPACITOR
	C417	QETC1EM-475	E CAPACITOR
	C418	QETC1CM-106	E CAPACITOR
	C419	QETC1CM-106	E CAPACITOR
	C420	QEN61HM-105	NP E CAPACITOR
	C421	QFV71HJ-104	M CAPACITOR
	C422	QCBB1HJ-471	CAPACITOR
	C423	QFN31HJ-682	M CAPACITOR
	C424	QCBB1HJ-102	CAPACITOR
	C425	QFV81HJ-334	TF CAPACITOR
	C430	QETC1CM-106	E CAPACITOR
	C431	QEK61HM-474	E CAPACITOR
	C432	QCBB1HJ-102	CAPACITOR
	C433	QCBB1HJ-102	CAPACITOR
	C434	QCVB1CN-103	CAPACITOR
	C435	QCBB1HJ-102	CAPACITOR
	C436	QCBB1HJ-102	CAPACITOR
	C437	QCBB1HJ-101	CAPACITOR
	TP	PU57545	TEST PIN,GND
	TP401	PU57545	TEST PIN
	TP402	PU57545	TEST PIN
	TP403	PU57545	TEST PIN
	TP411	PU57545	TEST PIN
	CN402	PU58844-5	CAP HOUSING
		-MECHACON SECTION-	
	IC601	M50965-645SP	IC
	OR	M50965E-323SP	IC
	IC602	BA6259N	IC
	IC603	M54647L	IC
	IC604	BA6222	IC
	Q601	2SC3311A(RS)	TRANSISTOR
	D601	MA165	DIODE
	OR	1SS133	DIODE
	D602	MA165	DIODE
	OR	1SS133	DIODE
	D603	HZS4.3EB2	ZENER DIODE
	D604	HZS7.5EB2	ZENER DIODE
	D605	MA165	DIODE
	OR	1SS133	DIODE
	D606	1SS133	DIODE
	OR	MA165	DIODE

*⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	D607	HZS7.5EB2	ZENER DIODE
	R601	QRD161J-152	RESISTOR
	R602	QRD161J-103	RESISTOR
	R603	QRD161J-103	RESISTOR
	R604	QRD161J-122	RESISTOR
	R605	QRD161J-823	RESISTOR
	R606	QRD161J-102	RESISTOR
	R607	QRD161J-102	RESISTOR
	R608	QRD161J-102	RESISTOR
	R609	QRD161J-472	RESISTOR
	R610	QRD161J-103	RESISTOR
	R611	QRD161J-105	RESISTOR
	R614	QRD161J-472	RESISTOR
	R615	QRD161J-472	RESISTOR
	R616	QRD161J-472	RESISTOR
	R617	QRD161J-472	RESISTOR
	R618	QRD161J-472	RESISTOR
	R619	QRD161J-472	RESISTOR
	R620	QRD161J-472	RESISTOR
	R621	QRD161J-472	RESISTOR
	R622	QRD161J-472	RESISTOR
	R623	QRD161J-472	RESISTOR
	R624	QRD161J-472	RESISTOR
	R625	QRD161J-472	RESISTOR
	R626	QRD161J-472	RESISTOR
	R627	QRD161J-472	RESISTOR
	R628	QRD161J-124	RESISTOR
	R629	QRD161J-124	RESISTOR
	R630	QRD161J-333	RESISTOR
	R631	QRD161J-472	RESISTOR
	R632	QRD161J-332	RESISTOR
	R634	QRD161J-103	RESISTOR
	R635	QRD161J-331	RESISTOR
	R636	QRD161J-822	RESISTOR
	R642	QRD161J-124	RESISTOR
	R644	QRD161J-124	RESISTOR
	R648	QRD161J-153	RESISTOR
	R649	QRD181J-271	RESISTOR
	RA602	QRB049J-103	RESISTOR ARRAY
	OR	QRB047J-103	RESISTOR ARRAY
	RA603	QRB049J-103	RESISTOR ARRAY
	OR	QRB047J-103	RESISTOR ARRAY
	C601	QCFB1EZ-223	CAPACITOR
	C602	QCFB1EZ-223	CAPACITOR
	C604	QETC1EM-335	E CAPACITOR
	C605	QETC1EM-475	E CAPACITOR
	C606	QETC1EM-475	E CAPACITOR
	C607	QETC1EM-475	E CAPACITOR
	C608	QETC1HM-105	E CAPACITOR
	C613	QCC11EK-473	CAPACITOR
	C614	QCF31HP-223	CAPACITOR
	C615	QCC11EK-223	CAPACITOR
	L601	PU59152-100J	PEAKING COIL
	L602	PU59152-2R7J	PEAKING COIL
⚠	CF601	PU60030	RESONATOR
⚠	OR	PU60125	RESONATOR
	HS601	PU60158	HEAT SINK
	SCW601	SBSE3006Z	TAPPING SCREW,X2
	SCW602	SBSE3008Z	TAPPING SCREW
	WR601	PW30112-N0AF6AF	PARALLEL WIRE,CN601

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	CN601	PU59934-15	WIRE HOLDER
	CN603	PU59555-6	CAP HOUSING
	CN604	PU59555-5	CAP HOUSING
	CN605	PU59555-8	CAP HOUSING
	CN606	PU58844-4	CAP HOUSING
⚠	CP602	ICP-F25	CIRCUIT PROTECTOR
		-REGULATOR SECTION-	
	IC801	STK5481	IC
	D801	MA165	DIODE
	OR	1SS133	DIODE
	R801	QRD161J-682	RESISTOR
	R802	QRD161J-272	RESISTOR
	R803	QRD161J-223	RESISTOR
	C801	QETC1CM-476	E CAPACITOR
	C802	QETC1CM-107	E CAPACITOR
	C803	QETC1CM-476	E CAPACITOR
	C804	QETC0JM-476	E CAPACITOR
	C805	QETC1EM-106	E CAPACITOR
⚠	HS801	PQ31691	HEAT SINK
	SCW801	SDSB3014Z	TAPPING SCREW,X2
	SCW802	SDSB3010Z	TAPPING SCREW,X2
	TP	PU5754S	TEST PIN,X3

****

****
* IF BOARD ASSEMBLY <07> *
****

	PWBA	PB10007L-03	IF BOARD ASSY
	IC1	M51496P	IC
	Q1	2SC2636T	TRANSISTOR
	Q2	2SD1450S,T	TRANSISTOR
	OR	2SD1468S(RSE)	TRANSISTOR
	Q3	2SC3399	TRANSISTOR
	OR	UN4213	TRANSISTOR
	OR	DTC144ES	TRANSISTOR
	Q4	2SC536SPA(FG)	TRANSISTOR
	OR	2SC1740S(RS)	TRANSISTOR
	OR	2SC3311A(RS)	TRANSISTOR
	Q5	2SA933S(RS)	TRANSISTOR
	OR	2SA1309AR,S	TRANSISTOR
	Q6	2SC536SPA(FG)	TRANSISTOR
	OR	2SC1740S(RS)	TRANSISTOR
	OR	2SC3311A(RS)	TRANSISTOR
	Q7	2SA933S(RS)	TRANSISTOR
	OR	2SA1309AR,S	TRANSISTOR
	Q8	2SC536SPA(FG)	TRANSISTOR
	OR	2SC1740S(RS)	TRANSISTOR
	OR	2SC3311A(RS)	TRANSISTOR
	Q9	2SD1450S,T	TRANSISTOR
	OR	2SD1468S(RSE)	TRANSISTOR
	Q10	2SC536SPA(FG)	TRANSISTOR
	OR	2SC1740S(RS)	TRANSISTOR
	OR	2SC3311A(RS)	TRANSISTOR
	Q11	2SC536SPA(FG)	TRANSISTOR
	OR	2SC1740S(RS)	TRANSISTOR
	OR	2SC3311A(RS)	TRANSISTOR
	Q14	2SC3399	TRANSISTOR
	OR	UN4213	TRANSISTOR
	OR	DTC144ES	TRANSISTOR
	Q15	2SC1740S(RS)	TRANSISTOR
	OR	2SC3311A(RS)	TRANSISTOR
	D1	MTZ11B	ZENER DIODE
	OR	RD11ES-T1B2	ZENER DIODE
	OR	UZ11BSB	ZENER DIODE
	D4	1SS133	DIODE
	D5	1SS133	DIODE
	D10	1SS133	DIODE
	R2	NRD718J-750NBU	RESISTOR
	R6	NRD718J-822NBU	RESISTOR
	R7	NRD718J-472NBU	RESISTOR
	R8	NRD718J-220NBU	RESISTOR
	R9	NRD718J-271NBU	RESISTOR
	R10	NRD718J-240NBU	RESISTOR
	R11	NRD718J-102NBU	RESISTOR
	R17	NRD718J-472NBU	RESISTOR
	R18	QVZ3518-102	V RESISTOR, RF AGC
	R19	NRD718J-102NBU	RESISTOR
	R22	NRD718J-103NBU	RESISTOR
	R23	NRD718J-472NBU	RESISTOR
	R24	NRD718J-103NBU	RESISTOR
	R25	NRD718J-103NBU	RESISTOR
	R28	NRD718J-103NBU	RESISTOR
	R29	NRD718J-102NBU	RESISTOR
	R30	NRD718J-394NBU	RESISTOR
	R31	NRD718J-334NBU	RESISTOR
	R32	NRD718J-272NBU	RESISTOR
	R34	NRD718J-561NBU	RESISTOR
	R35	NRD718J-331NBU	RESISTOR
	R36	NRD718J-102NBU	RESISTOR
	R37	NRD718J-271NBU	RESISTOR
	R39	NRD718J-153NBU	RESISTOR
	R42	NRD718J-152NBU	RESISTOR
	R43	QVZ3518-103	V RESISTOR, COLOR LEVEL
	R44	NRD718J-102NBU	RESISTOR
	R45	NRD718J-102NBU	RESISTOR
	R47	NRD718J-471NYU	RESISTOR
	R49	NRD718J-102NBU	RESISTOR
	R51	NRD718J-331NBU	RESISTOR
	R52	QVZ3518-471	V RESISTOR, Y LEVEL
	R53	NRD718J-102NBU	RESISTOR
	R56	NRD718J-222NBU	RESISTOR
	R61	NRD718J-471NBU	RESISTOR
	R62	NRD718J-104NYU	RESISTOR
	R63	NRD718J-223NBU	RESISTOR
	R64	NRD718J-392NBU	RESISTOR
	R65	NRD718J-103NBU	RESISTOR
	R66	NRD718J-471NBU	RESISTOR
	R67	NRD718J-223NBU	RESISTOR
	R68	NRD718J-223NBU	RESISTOR
	R69	NRD718J-103NYU	RESISTOR
	R90	NRD718J-274NBU	RESISTOR
	R91	NRD718J-473NYU	RESISTOR
	R92	NRD718J-473NYU	RESISTOR
	C5	NCX71CM-222NBR	CAPACITOR
	C6	NCX71CM-222NBR	CAPACITOR
	C7	NCX71CM-222NBR	CAPACITOR
	C8	NCX71CM-222NBR	CAPACITOR
	C11	PU57601-224MEZ	E CAPACITOR, 0.22/25
	C12	NCY71CM-103NBR	CAPACITOR
	C13	QEK61CM-476	E CAPACITOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	C14	NCX71CM-222NBR	CAPACITOR
	C17	QEK61CM-106	E CAPACITOR
	C18	NCY71CM-103NBR	CAPACITOR
	C19	QFL31HJ-182	CAPACITOR
	C21	NCS71HJ-330NBR	CAPACITOR
	C22	NCB71HK-101NBR	CAPACITOR
	C25	QCT25CH-270	CAPACITOR
	C32	NCS71HJ-470NBR	CAPACITOR
	C36	QEK61CM-336	E CAPACITOR
	C41	QEK61CM-226	E CAPACITOR
	C42	QEK61CM-336	E CAPACITOR
	C43	NCF71EZ-223NBR	CAPACITOR
	C44	QEK61HM-474	E CAPACITOR
	C70	QEK61CM-226	E CAPACITOR
	L2	PU60025-1R1	PEAKING COIL
	L3	PU60025-1R8	PEAKING COIL
	L5	PU59152-150J	PEAKING COIL
	L7	PU59152-220J	PEAKING COIL
	CF2	PU58558-2	CERAMIC FILTER
	CF4	PU32990-2	CERAMIC FILTER
	SAW1	PU35557-4	SAW FILTER
	T1	PU59982-2	IFT, LLD
	T2	PU59983-2	IFT, AFC
	T3	PU60046	IFT, SYNC
	T4	PU60176-2	IFT, S.DET
	TML1	PU59935-16	TERMINAL

****

****
* TUNER CTL BOARD ASSEMBLY <08>&<35> *
****

	PWBA	PB20015S	TUNER CTL BOARD ASSY, EG
		PB20015L-02	TUNER CTL BOARD ASSY, E

-TUNER CTL BOARD SECTION <08>-

	PWBA1	PB20015S1	TUNER CTL BOARD ASSY, EG
		PB20015L1-02	TUNER CTL BOARD ASSY, E
⚠	TNR1	PU36384-1-1	U/V TUNER, EG
⚠		PU36384	U/V TUNER, E
	IC1	LA7910	IC
	IC2	BA10358	IC
	OR	M5223P	IC
	IC3	BU4066B	IC
	OR	TC4066BP	IC
	Q1	2SB810H,J	TRANSISTOR
	Q2	DTC144ES	TRANSISTOR
	OR	UN4213TA	TRANSISTOR
	OR	2SC3399	TRANSISTOR
	Q4	2SA1309AR,S	TRANSISTOR
	Q5	2SA720	TRANSISTOR
	OR	2SB1278(QR)	TRANSISTOR
	Q6	2SC1740S(S)	TRANSISTOR
	OR	2SC3311A(S)	TRANSISTOR
	Q7	2SC1740S(RS)	TRANSISTOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	OR	2SC3311A(RS)	TRANSISTOR
	OR	2SC536SPA(FG)	TRANSISTOR
	Q8	2SC1740S(RS)	TRANSISTOR
	OR	2SC536SPA(FG)	TRANSISTOR
	OR	2SC3311A(RS)	TRANSISTOR
	D1	LTZ-MR15	LE DIODE
	D2	HZT33-02	ZENER DIODE
	D3	1SS133	DIODE
	D4	MTZ5.1B	ZENER DIODE
	OR	RD5.1ES-T1B2	ZENER DIODE
	D5	MTZ5.1B	ZENER DIODE
	OR	RD5.1ES-T1B2	ZENER DIODE
	D6	1SS133	DIODE
	D7	1SS133	DIODE
	D8	1SS133	DIODE
	R1	QRD161J-182	RESISTOR
	R2	QRD161J-153	RESISTOR
	R5	QRD161J-181	RESISTOR
	R6	QRD161J-332	RESISTOR
	R7	QRD161J-473	RESISTOR
	R8	QRD161J-121	RESISTOR
	R9	QRD161J-473	RESISTOR
	R10	QRD161J-103	RESISTOR
	R11	QRD161J-103	RESISTOR
	R12	QRD161J-333	RESISTOR
	R13	QRD161J-331	RESISTOR
	R14	QRD161J-394	RESISTOR
	R15	QRD161J-154	RESISTOR
	R16	QRD161J-154	RESISTOR
	R17	QRD161J-154	RESISTOR
	R18	QRD161J-103	RESISTOR
	R19	QRD161J-103	RESISTOR
	R20	QRD161J-393	RESISTOR
	R25	QRD161J-472	RESISTOR
	R26	QRD161J-472	RESISTOR
	R27	QRD161J-104	RESISTOR
	R28	QRD161J-472	RESISTOR
	R29	QRD161J-472	RESISTOR
	R33	QRD161J-274	RESISTOR
	R35	QRD161J-472	RESISTOR
	R36	QRD161J-472	RESISTOR
	R37	QRD161J-123	RESISTOR
	R38	QRD161J-123	RESISTOR
	R40	QRD161J-333	RESISTOR
	R41	QRD161J-333	RESISTOR
	R42	QRD161J-103	RESISTOR
	R43	QRD161J-684	RESISTOR
	R44	QRD161J-563	RESISTOR
	R45	QRD161J-472	RESISTOR
	R46	QRD161J-473	RESISTOR
	R47	QRD161J-103	RESISTOR
	R48	QRD161J-103	RESISTOR
	R49	QRD161J-224	RESISTOR
	R50	QRD161J-334	RESISTOR
	R51	QRD161J-824	RESISTOR
	R52	QRD161J-154	RESISTOR
	R53	QRD161J-393	RESISTOR
	R54	QRD161J-334	RESISTOR
	R55	QRD161J-103	RESISTOR
	R56	QRD161J-103	RESISTOR
	R57	QRD161J-103	RESISTOR
	C2	QETC1CM-106	E CAPACITOR
	C4	QCBB1HJ-101	CAPACITOR
	C5	QETC1HM-106	E CAPACITOR
	C7	QCVB1CM-103	CAPACITOR
	C8	QFV71HJ-333	M CAPACITOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	C9	QFV71HJ-153	M CAPACITOR
	C10	QFV71HJ-333	M CAPACITOR
	C11	QFV71HJ-153	M CAPACITOR
	C15	QETC1CM-106	E CAPACITOR
	C16	QETC1HM-225	E CAPACITOR
	C17	QETC1CM-106	E CAPACITOR
	C18	QETC1HM-335	E CAPACITOR
	C19	QETC1CM-106	E CAPACITOR
	C20	QETC1CM-106	E CAPACITOR
	C25	QCSB1HJ-100	CAPACITOR
	C26	QETC1CM-106	E CAPACITOR
	C27	QCVB1CM-103	CAPACITOR
	L1	PU59152-R22M	PEAKING COIL
	L2	PU59152-1R0K	PEAKING COIL
	L4	PU59152-6R8K	PEAKING COIL
⚠	TH1	PU52108-4R7K	POSITIVE THERMISTOR
⚠	OR	PU52108-4R7T	POSISTOR
⚠	OR	PU52108-4R7KT	POSISTOR
⚠	OR	PU52108-4R7	POSISTOR
	HD1	PU36416	HOLDER
	CN1	PU59555-7	CAP HOUSING
	CN2	PU59555-6	CAP HOUSING
	CN3	PU58844-3	CAP HOUSING
⚠	CP1	ICP-F10	CIRCUIT PROTECTOR
		-MEMORY BOARD SECTION <35>-	
	PWBA2	PB20015A2	MEMORY BOARD ASSY
	IC101	MN1220	IC
	R101	QRD161J-104	RESISTOR
	R102	QRD161J-104	RESISTOR
	R103	QRD161J-104	RESISTOR
	CN101	PU60168-7	CAP HOUSING

****

****
* AUDIO/CTL HEAD BOARD <12> *
****

	PWB1	PU58016	A/C HEAD BOARD
	CN1	PU54537-5B	CAP HOUSING
	CN2	PU54537-2	CAP HOUSING

****

****
* VPS BOARD ASSEMBLY..ONLY EG <18> *
****

	PWBA	PU36174B-03	VPS BOARD ASSY
	IC1	HD49703NT	IC
	IC2	M5278L05	IC
	Q1	2SB641R,S	TRANSISTOR
	Q2	2SC3327A	TRANSISTOR
	OR	2SC2878A	TRANSISTOR
	Q3	2SD637R,S	TRANSISTOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	D	1SS133	DIODE, X5,D1-D5
	R1	QRD161J-103	RESISTOR
	R2	QRD161J-103	RESISTOR
	R3	QRD161J-102	RESISTOR
	R4	QRD161J-102	RESISTOR
	R5	QRD161J-102	RESISTOR
	R6	QRD161J-473	RESISTOR
	R7	QRD161J-103	RESISTOR
	R8	QRD161J-391	RESISTOR
	R9	QRD161J-562	RESISTOR
	R10	QRD161J-102	RESISTOR
	R11	QRD161J-473	RESISTOR
	R12	QRD161J-562	RESISTOR
	R13	QRD161J-105	RESISTOR
	R14	QRD161J-472	RESISTOR
	R15	QRD161J-472	RESISTOR
	R16	QRD161J-472	RESISTOR
	R17	QRD161J-472	RESISTOR
	R18	QRD161J-562	RESISTOR
	R19	QRD161J-563	RESISTOR
	R20	QRD161J-222	RESISTOR
	R21	QRD161J-222	RESISTOR
	R22	QRD161J-222	RESISTOR
	R23	QRD161J-222	RESISTOR
	R24	QRD161J-472	RESISTOR
	R25	QRD161J-682	RESISTOR
	R26	QRD161J-472	RESISTOR
	R27	QRD161J-102	RESISTOR
	R28	QRD161J-103	RESISTOR
	R29	QRD161J-103	RESISTOR
	R30	QRD161J-184	RESISTOR
	R31	QRD161J-103	RESISTOR
	R32	QRD161J-332	RESISTOR
	R33	QRD161J-561	RESISTOR
	R34	QRD161J-474	RESISTOR
	R35	QRD161J-474	RESISTOR
	R36	QRD161J-332	RESISTOR
	R37	QRD161J-103	RESISTOR
	RA1	QRB049J-224C	RESISTOR ARRAY
	C1	QETC1CM-336	E CAPACITOR
	C2	QCS31HJ-681	CAPACITOR
	C3	QETC1CM-106	E CAPACITOR
	C4	QCS31HJ-391	CAPACITOR
	C5	QCT25CH-390	CAPACITOR
	C6	QFN31HJ-103	M CAPACITOR
	C7	QFN31HJ-102	M CAPACITOR
	C8	QFN31HJ-102	M CAPACITOR
	C9	QETC1CM-336	E CAPACITOR
	C10	QETC1CM-336	E CAPACITOR
	C11	QCF31HP-473	CAPACITOR
	C12	QETC1CM-336	E CAPACITOR
	C13	QETC1CM-336	E CAPACITOR
	C14	QETC1CM-336	E CAPACITOR
	C15	QCS31HJ-391	CAPACITOR
	C16	QETC1HM-335	E CAPACITOR
	C17	QETC1HM-105	E CAPACITOR
	C18	QETC1HM-106	E CAPACITOR
	C19	QCT25CH-390	CAPACITOR
	C20	QCT25CH-150	CERAMIC CAP
	C21	QETC1CM-336	E CAPACITOR
	C22	QCT25CH-100	CAPACITOR
	T1	PU58484	COIL
	SPC1	PU59210-003	W.LOKING SPACER,X3

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	TP	PU56008	TEST PIN,X6
	CN1	PU58844-4	CAP HOUSING
	CN2	PU58844-3	CAP HOUSING

TIMER/DISPLAY BOARD ASSEMBLY <21>

	PWBA	PU22491B-02	TIMER/DISPLAY BOARD ASSY, E
		PU22491A-02	TIMER/DISPLAY BOARD ASSY, EG
	IC1	UPD75208CW-097	IC
	OR	UPD75208CW-139	IC
	IC2	M5278L56	IC
	IC3	IC-PST523H-2	IC
	Q1	2SC3401	TRANSISTOR
	OR	DTC144WS	TRANSISTOR
	D1	1SS133	DIODE
	D2	1SS133	DIODE
	D3	1SS133	DIODE
	D4	1SS132	DIODE
	D5	1SS132	DIODE
	D6	1SS132	DIODE
	D7	1SS132	DIODE
	D8	1SS132	DIODE
	D9	1SS132	DIODE
	D10	1SS132	DIODE
	D16	RD10ES-T1B2	ZENER DIODE
	OR	UZ10BSB	ZENER DIODE
	D17	1SS133	DIODE
	D18	MA27TB	DIODE
	R2	QRD161J-224	RESISTOR
	R3	QRD161J-333	RESISTOR
	R4	QRD161J-102	RESISTOR
	R5	QRD161J-333	RESISTOR
	R6	QRD161J-273	RESISTOR
	R7	QRD161J-472	RESISTOR
	R9	QRD161J-103	RESISTOR
	R10	QRD161J-103	RESISTOR
	R11	QRD161J-103	RESISTOR
	R12	QRD161J-103	RESISTOR
	R14	QRD161J-103	RESISTOR
	R15	QRD161J-103	RESISTOR
	R16	QRD161J-103	RESISTOR
	R17	QRD161J-103	RESISTOR
	R18	QRD161J-103	RESISTOR
	R19	QRD161J-103	RESISTOR
	R22	QRD161J-102	RESISTOR
	R25	QRD161J-103	RESISTOR
	R26	QRD161J-103	RESISTOR
	R27	QRD161J-103	RESISTOR
	R28	QRD161J-103	RESISTOR
	R29	QRD161J-103	RESISTOR
	R30	QRD161J-103	RESISTOR
	R31	QRD161J-472	RESISTOR
	R32	QRD161J-472	RESISTOR
	R33	QRD161J-472	RESISTOR
	R34	QRD161J-472	RESISTOR
	R35	QRD161J-333	RESISTOR
	R36	QRD161J-333	RESISTOR
	R37	QRD161J-333	RESISTOR
	R38	QRD161J-102	RESISTOR
	R39	QRD161J-333	RESISTOR
	RA1	QRB057J-104	RESISTOR ARRAY
	RA2	QRB047J-224	RESISTOR ARRAY
	RA3	QRB077J-224	RESISTOR ARRAY
	C1	QER61CM-336	E CAPACITOR
	C2	QER60JM-336	E CAPACITOR
	C3	PU60177	E CAPACITOR, 0.022/5.5
	C6	QCVB1CN-103	CAPACITOR
	C7	QCVB1CN-103	CAPACITOR
	C8	QCVB1CN-103	CAPACITOR
	C9	QCVB1CN-103	CAPACITOR
	C10	QER61CM-106	E CAPACITOR
	C14	QER60JM-336	E CAPACITOR
	C16	QCC11EK-223	CAPACITOR
⚠	CF1	PU59545	RESONATOR
	S1	PU53598-2	TACT SWITCH,CLOCK ADJUST
	S2	PU53598-2	TACT SWITCH,PROGRAM
	S3	PU53598-2	TACT SWITCH,TIMER
	S4	PU53598-2	TACT SWITCH,SET(-)
	S5	PU53598-2	TACT SWITCH,CANCEL
	S6	PU53598-2	TACT SWITCH,REPEAT
	S7	PU53598-2	TACT SWITCH,SELECT
	S8	PU53598-2	TACT SWITCH,SET(+)
	S9	PU53598	TACT SWITCH,MODE
	S10	PU53598	TACT SWITCH,CHANNEL DOWN
	S12	PU53598-2	TACT SWITCH,CHANNEL SET
	S13	PU53598	TACT SWITCH,RESET
	S14	PU53598	TACT SWITCH,CHANNEL UP
	S210	PU53598-2	TACT SWITCH,TRACKING(+)
	S211	PU53598-2	TACT SWITCH,TRACKING(-)
	S402	PU58488-1-1	SLIDE SWITCH
	S403	PU58486-1-1	SLIDE SWITCH
	FDP1	PU59951-3	FLUORESCENT DISPLAY PANEL, EG
		PU59951-2	FLUORESCENT DISPLAY PANEL, E
	HD1	PQ31215-1-4	FDP HOLDER(R)
	HD2	PQ31163-1-4	FDP HOLDER(L)
	TP	PU56008	TEST PIN
	CN5	PU60169-7	HOUSING

OPERETION BOARD ASSEMBLY <22>

	PWBA	PB20001A-01	OPERATION BOARD ASSY
	IC201	GP1U501	IFR UNIT
	OR	SPS-403	IFR UNIT
	D200	MTZ5.1	ZENER DIODE
	D201	SLR-34VC3F	LE DIODE,POWER
	D202	SLR-34VC3F	LE DIODE,REC
	D203	SLR-34VC3F	LE DIODE,PAUSE
	D204	SLR-34MC3F	LE DIODE,PLAY

*⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	R200	QRD161J-102	RESISTOR
	R202	QRD161J-331	RESISTOR
	R203	QRD161J-331	RESISTOR
	R204	QRD161J-331	RESISTOR
	R211	QRD161J-222	RESISTOR
	R212	QRD161J-222	RESISTOR
	R213	QRD161J-332	RESISTOR
	R214	QRD161J-472	RESISTOR
	R215	QRD161J-103	RESISTOR
	R216	QRD161J-222	RESISTOR
	R217	QRD161J-222	RESISTOR
	R218	QRD161J-183	RESISTOR
	R219	QRD161J-223	RESISTOR
	R220	QRD161J-563	RESISTOR
	R221	QRD161J-471	RESISTOR
	S201	PU57550	TACT SWITCH,POWER
	S203	PU57550	TACT SWITCH,EJECT
	S204	PU57551	TACT SWITCH,STOP
	S205	PU57551	TACT SWITCH,PAUSE
	S206	PU57551	TACT SWITCH,PLAY
	S207	PU57551	TACT SWITCH,REW
	S208	PU57551	TACT SWITCH,FF
	S209	PU57551	TACT SWITCH,REC
	HD201	PQM30038-1-2	LED HOLDER
	HD202	PQM30038-1-2	LED HOLDER
	HD203	PQM30038-1-2	LED HOLDER
	HD204	PQM30038-1-2	LED HOLDER
			**********
			* UPPER DRUM BOARD <41> *
			**********
	PWB1	PDM3017	UPPER DRUM BOARD
			**********
			* PRE/REC AMP BOARD ASSEMBLY <43> *
			**********
	PWBA	PB30025B	PRE/REC BOARD ASSY
	IC1	HA118019NT	IC
	Q1	2SA1309R,S	TRANSISTOR
	Q2	2SA1309R,S	TRANSISTOR
	Q3	2SC1740S(RS)	TRANSISTOR
	Q4	2SC1740S(RS)	TRANSISTOR
	Q6	DTC124ES	TRANSISTOR
	Q7	DTC144WS	TRANSISTOR
	Q8	DTC124ES	TRANSISTOR
	D1	MA165	DIODE
	OR	1SS133	DIODE
	D2	MA165	DIODE
	OR	1SS133	DIODE
	D3	MA165	DIODE
	OR	1SS133	DIODE
	R1	QRD161J-102	RESISTOR
	R2	QRD161J-182	RESISTOR
	R3	QRD161J-222	RESISTOR
	R4	QRD161J-561	RESISTOR

*⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	R5	QRD161J-681	RESISTOR
	R6	QRD161J-681	RESISTOR
	R7	QRD161J-332	RESISTOR
	R8	QRD161J-562	RESISTOR
	R9	QRD161J-102	RESISTOR
	R10	QRD161J-102	RESISTOR
	R11	QRD161J-681	RESISTOR
	R12	QRD161J-122	RESISTOR
	R13	QRD161J-681	RESISTOR
	R14	QRD161J-102	RESISTOR
	R15	QRD161J-182	RESISTOR
	R16	QRD161J-222	RESISTOR
	R17	QRD161J-223	RESISTOR
	R18	QRD161J-223	RESISTOR
	R19	QRD161J-223	RESISTOR
	R20	QRD161J-184	RESISTOR
	R21	QRD161J-223	RESISTOR
	R22	QRD161J-474	RESISTOR
	R23	QRD161J-223	RESISTOR
	R24	QRD161J-103	RESISTOR
	R25	QRD162J-103	RESISTOR
	R26	QRD161J-103	RESISTOR
	R27	QRD161J-103	RESISTOR
	R30	QRD161J-820	RESISTOR
	R31	QRD161J-820	RESISTOR
	R33	QRD162J-820	RESISTOR
	C1	QCB81HJ-471	CAPACITOR
	C2	QCSB1HJ-180	CAPACITOR
	C3	QCVB1CN-103	CAPACITOR
	C4	QCSB1HJ-180	CAPACITOR
	C5	QCSB1HJ-100	CAPACITOR
	C6	QCVB1CN-103	CAPACITOR
	C7	QCSB1HJ-200	CAPACITOR
	C8	QCBB1HJ-681	CAPACITOR
	C9	QCSB1HJ-240	CAPACITOR
	C11	QCSB1HJ-220	CAPACITOR
	C13	QCVB1CN-103	CAPACITOR
	C14	QCC11EJ-473	CAPACITOR
	C15	QCVB1CN-103	CAPACITOR
	C16	QETC0JM-476	E CAPACITOR
	C17	QCVB1CN-103	CAPACITOR
	C18	QCBB1HJ-681	CAPACITOR
	C19	QETC1HM-104	E CAPACITOR
	C20	QCVB1CN-103	CAPACITOR
	C21	QCSB1HJ-680	CAPACITOR
	C22	QCVB1CN-103	CAPACITOR
	C24	QCVB1CN-103	CAPACITOR
	C25	QFZ0096-224	MM CAPACITOR
	C28	QFZ0096-224	MM CAPACITOR
	C29	QCVB1CN-103	CAPACITOR
	C32	QCVB1CN-103	CAPACITOR
	C34	QFZ0096-224	MM CAPACITOR
	C35	QCVB1CN-103	CAPACITOR
	C36	QETC0JM-476	E CAPACITOR
	C37	QCVB1CN-103	CAPACITOR
	L1	PU59152-220J	PEAKING COIL
	L2	PU59152-560J	PEAKING COIL
	L3	PU59152-330J	PEAKING COIL
	L4	PU59152-151J	PEAKING COIL
	L6	PU59152-330J	PEAKING COIL
	L7	PU59152-560J	PEAKING COIL
	L8	PU48530-101K	PEAKING COIL
	L9	PU48530-101K	PEAKING COIL
	L10	PU59152-560J	PEAKING COIL
	BKT1	PQ42955	PWB BRACKET

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	ETH1	PQ40433-2	EARTH LUG
	SCW1	DPSP2606Z	SCREW
	SCW2	DPSP2606Z	SCREW,X2
	SLD1	PQ43281	SHIELD CASE
	SLD2	PQ43282	SHIELD PLATE
	SLD3	PQ43283	SHIELD COVER
	SPC1	WBS2600Z	T.LOCK WASHER
	TP	PU57545	TEST PIN,X3
	CN1	PU58844-8	CAP HOUSING
	CN2	PU59555-7	CAP HOUSING
	CN3	PU56258-10	CAP HOUSING

****

FINE SLOW BOARD ASSEMBLY <47>

	PWBA	PB20175A	FINE SLOW BOARD ASSY
	IC1	BU2767S	IC
	Q4	DTA124ES	TRANSISTOR
	OR	UN4112	TRANSISTOR
	D1	1SS133	DIODE
	OR	MA165	DIODE
	D2	1SS133	DIODE
	OR	MA165	DIODE
	D3	1SS133	DIODE
	OR	MA165	DIODE
	R5	QRD161J-273	RESISTOR
	R6	QRD161J-153	RESISTOR
	R7	QRD161J-822	RESISTOR
	R8	QRD161J-472	RESISTOR
	R10	QRD161J-473	RESISTOR
	R12	QRD161J-472	RESISTOR
	R14	QRD161J-103	RESISTOR
	R15	QRD161J-102	RESISTOR
	R16	QRD161J-333	RESISTOR
	R17	QRD161J-274	RESISTOR
	R18	QRD161J-105	RESISTOR
	R19	QRD161J-334	RESISTOR
	R20	QRD161J-684	RESISTOR
	R21	QRD161J-154	RESISTOR
	R22	QRD161J-274	RESISTOR
	R23	QRD161J-104	RESISTOR
	R24	QRD161J-103	RESISTOR
	R25	QVZ3518-105	V RESISTOR,SLOW TRACKING
	R26	QRD161J-562	RESISTOR
	C2	QFN31HJ-224	M CAPACITOR
	C3	QET61HM-226	E CAPACITOR
	C4	QCBB1HJ-681	CAPACITOR
	C5	QCBB1HJ-471	CAPACITOR
	C6	QFN31HJ-393	M CAPACITOR
	C7	QFN31HJ-393	M CAPACITOR
	C8	QFN31HJ-104	M CAPACITOR
	C9	QFN31HJ-124	M CAPACITOR
	C10	QFN31HJ-393	M CAPACITOR
	C11	QCBB1HJ-102	CAPACITOR
⚠	X1	PU60215	RESONATOR
	BKT1	PQ43307	BRACKET
	RV1	PU56800	NYLON RIVET
	SPC1	PQM30017-29	SLIT WASHER
	CN2	PU59555-5	CAP HOUSING
	CN3	PU58844-2	CAP HOUSING
	CN4	PU58844-2R	CAP HOUSING
	CN5	PU59555-6	CAP HOUSING
	CN6	PU58844-4	CAP HOUSING

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

****

DECK TERMINAL BOARD ASSEMBLY <51>&<53>

	PWBA	PU22509C-01	DECK TERMINAL BOARD ASSY
		-DECK TERMINAL BOARD SECTION <51>-	
	PWBA1	**PU22509A1-01**	**DECK TERMINAL BOARD ASSY**
	R1	QRD181J-151	RESISTOR
	R3	QRD181J-331	RESISTOR
	PHS1	PU60271	PHOTO INTERRUPTER
	WR1	PW30110-26OD885	PARALLEL WIRE,CN1
	CN1	PU59933-15	WIRE TRAP
		-REC SAFETY BOARD SECTION <53>-	
	PWBA3	PU22509A3	REC SAFETY BOARD ASSY
	S1	PU53644-1-3	REC SAFETY SWITCH

****

RELAY BOARD ASSEMBLY <52>

	PWBA2	PU22509C2	RELAY BOARD ASSY
	LC1	PU59809-222T	N FILTER
	LC2	PU59809-222T	N FILTER
	WR2	PW30113-G0ABZ62	PARALLEL WIRE

****

END SENSOR BOARD ASSEMBLY <54>

	PWBA4	PU22509A4	END SENSOR BOARD ASSY
	Q1	PN268R-NC	PHOTO TRANSISTOR
	HD1	PQ31047	E.SENS.HOLDER
	CN1	PU59945-102	WIRE SOCKET

****

CASSETTE HOUSING BOARD <56>

	PWBA	PB30043	CASSETTE HOUSING BOARD
	Q1	PN268R-NC	PHOTO TRANSISTOR
	R1	QRD161J-471	RESISTOR
	PHS1	PU58879	PHOTO INTERRUPTER
	CN1	PU58844-106	CAP HOUSING

E. & O. E. No. 82033