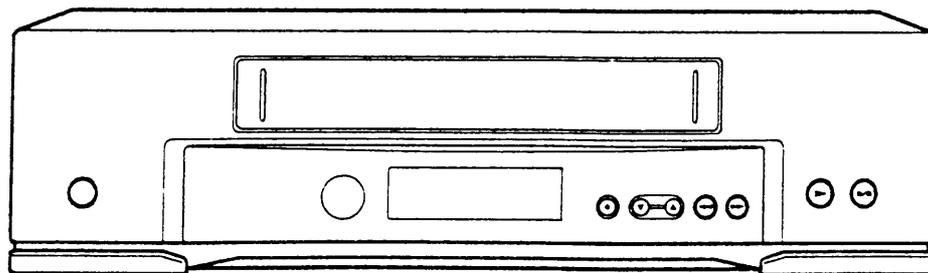


TENSAI

VHS
PAL

MODEL **TVR-202**

Video Cassette Recorder



SERVICE MANUAL

ELECTRICAL ADJUSTMENT

1. PLAYBACK SWITCHING POINT ADJUSTMENT

- Mode** : PLAY
- Test Signal** : TPS-13(S) or 13S
- Check Point** : FIP
- Adjustment Point** : CH UP/DOWN (▲/▼) KEY
- Adjustment** :
- (1) Solder a 30cm long piece of lead to the PG-TP at the back of the Main PCB (Figure 1 below) and wind it round the back. (Take care not to short circuit nearby components.)
 - (2) Playback the test tape and allow the automatic ATR to finish.
 - (3) Connect the lead attached in step (1) to the Tuner (ETA01) earth line. (Make sure that the lead can not come loose.)
 - (4) Adjust the display for FIP (H701) with the CH UP/DOWN (▲/▼) keys until it is as shown in Figure 2 Display B below.
 - (5) Remove the lead.

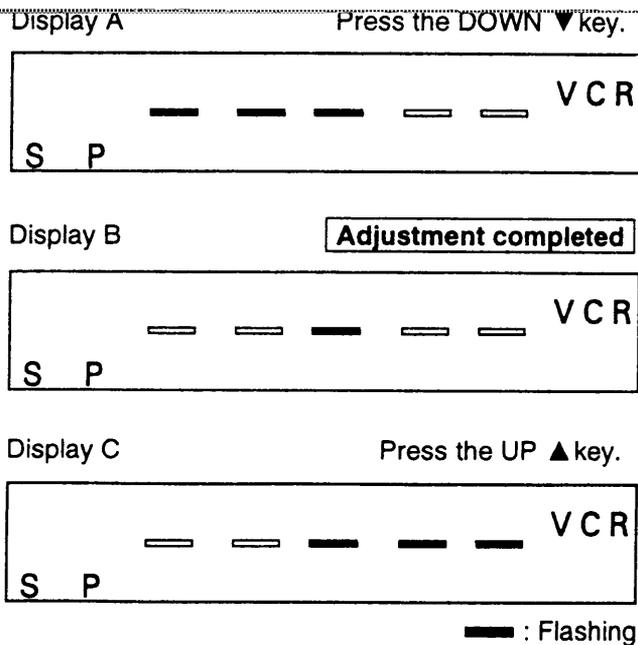


Figure 2

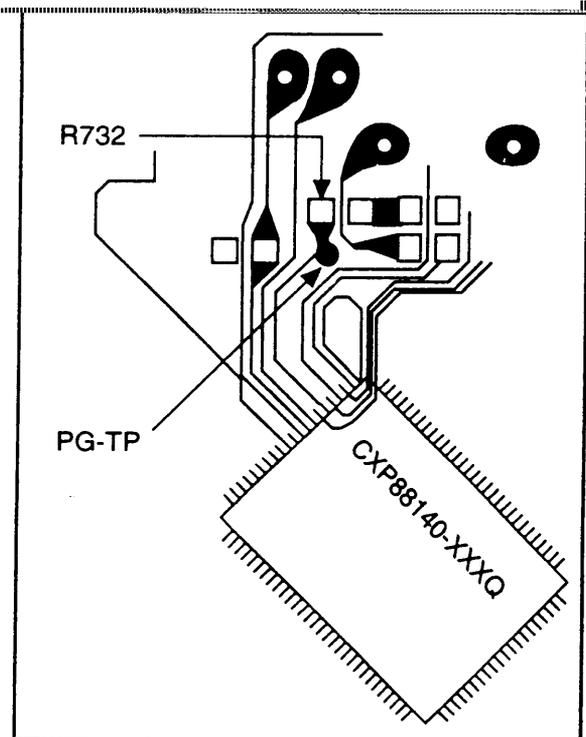


Figure 1

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INTRODUCTION

This manual provides service information for our VHS Video Cassette Recorder. It describes the principles and adjustments of mechanical and electrical operation for this model.

Service procedures given herein cover only field maintenance services. Adjustments which require high-level instruments, jigs, and techniques are excluded since they should be performed at the factory.

Due to design modifications, the servicing procedures and data given in this manual are subject to possible change without prior notice.

IMPORTANT SAFETY PRECAUTION

Prior to shipment from the factory, our 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. Parts identified by the Δ symbol are critical for safety. Replace only with parts number specified.
2. In addition to safety, other parts and assemblies are specified for conformance with such regulations as those applying to spurious radiation. These must also be replaced only with specified replacements. Examples: RF converters, RF cables, noise blocking capacitors, noise blocking filters, etc.
3. Use specified internal wiring. Note especially:
 - Wires covered with PVC tubing
 - Double insulated wires
 - High voltage leads
4. Use specified insulating materials for hazardous live parts. Note especially:
 - Insulation tape
 - PVC tubing
 - Spacers
 - Insulation sheets for transistors
5. When replacing AC primary side components (transformers, power cords, etc.), wrap ends of wires securely on the terminals before soldering.
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 force (maximum applied force should be 20-30 lbs.) in any direction will not loosen it.
9. Also check areas surrounding repaired locations.
10. Use care that foreign objects (screws, solder droplets, etc.) do not remain inside of unit.

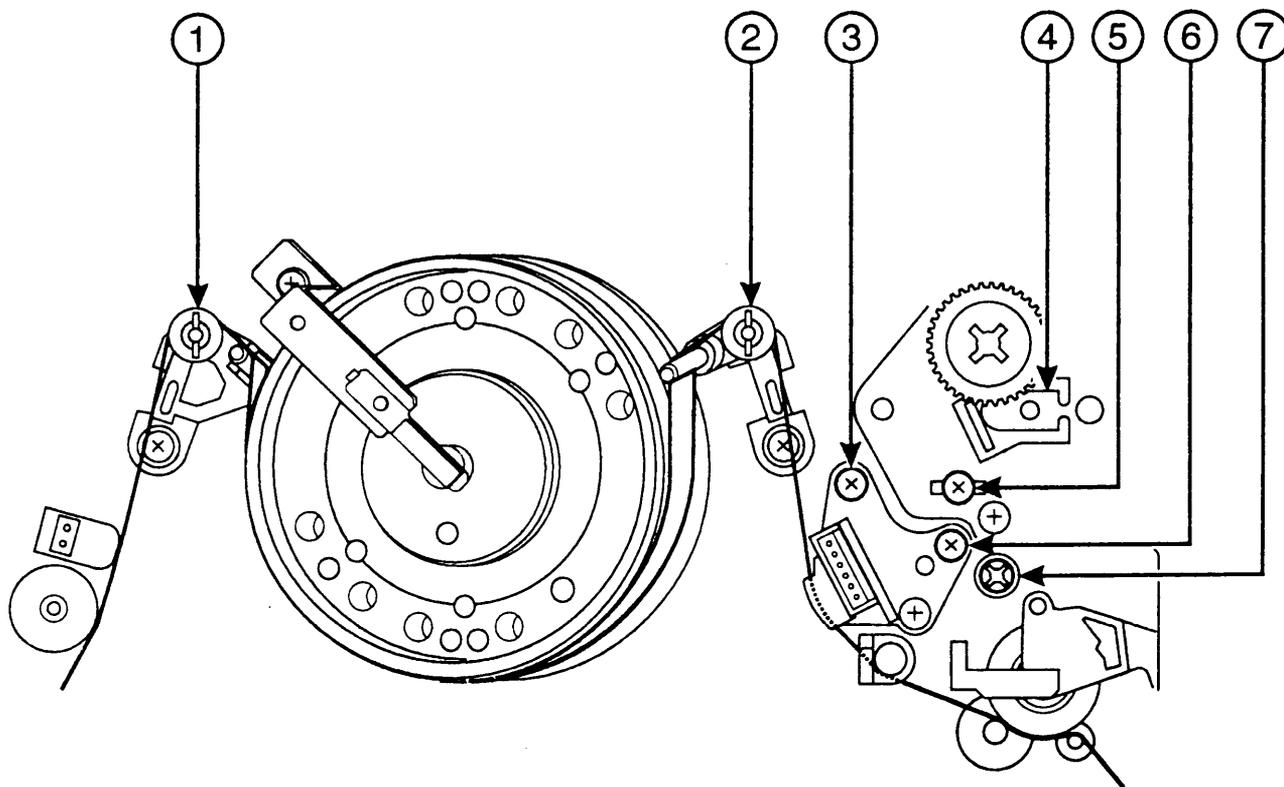
SAFETY CHECK AFTER SERVICING

1. **Insulation resistance test**
Confirm specified insulation resistance or greater between power cord plug prongs and externally exposed parts of the set (RF terminals, video and output terminals, etc.).
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 output terminals, etc.).
3. **Clearance distance**
When replacing primary circuit components, confirm specified clearance distance.

MECHANICAL ADJUSTMENT

DECK ADJUSTMENT POINTS

- ① FM Waveform (Envelope) entrance adjustment screw
- ② FM Waveform (Envelope) exit adjustment screw
- ③ Audio Azimuth adjustment screw
- ④ Control Head phase (X-value) adjustment point
- ⑤ Audio/CTL Head height adjustment screw
- ⑥ A/C Head tilt adjustment screw
- ⑦ RG Post height adjustment screw



MECHANICAL ADJUSTMENT

1. MECHANISM CONTROL

The mechanism includes its own mode as well as the operation mode of the VCR as shown in the chart below. This mode serves an important function in working to protect the tape by passing through the VCR when the mode is switched over.

The movement of the mechanism mode is performed by the control signal of the loading motor's rotary control circuit. With this control, the operation mode position is detected by the Mode switch (4-bit code data output), Cassette In switch, tape top sensor and the tape end sensor which detects all modes of the mechanism.

1-1. MODE SW

The composition of the 4 terminals, COM DATA 1, 2, 3, 4, are treated as a 4 bit signal.

POSITION NO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
POSITION NAME	EJECT		REW		ES	LOAD		REW		FF		STOP		PLAY		FSLOW		CT		RSLOW		FUNCTION	
SWITCH ON/OFF TIMING	M1 SW	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	M2 SW	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	M3 SW	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

ON OF THE MECHANISM

Mechanism

ected via the drive from the

the capstan motor starts and on the main unit to break the light capstan FG pulse and the Tape cassette to be pulled into the VCR.

insertion operation insertion Switch that is linked to cassette is inserted.

Switch is not included ism.

cassette ejection operation by the shutter on the shutter Tape Top Sensor. The light insertion/ejection is restored ejected.

Mechanism

mechanism that is loaded d to the mode switch. The 4-bit position code output s used.

cassette and wound on the

cassette. (tape unloading)

ch mechanism can operate.

on Mechanism

y the action of the capstan,

1-2-4. Motor

(A) Capstan Motor

The drives the capstan axle directly and also drives the reel that has been loaded on the belt. This motor is also used to drive the cassette loading mechanism.

(B) Tape Loading Motor

In addition to cassette loading/unloading, this motor also switched between the various operating modes (PLAY, FF/REW etc.)

(C) Cylinder Motor

Connected to the rotating head drum and drives the rotating head.

1-2-5. Safety Tab Sensor/Actuator

This actuator detects the tab that operates the REC SAFETY switch.

Note: This mechanism does not include the switch.

1-2-6. Mode Sensor Switch

This detects the 4-bit code before each position and is connected to the tape loading mechanism.

1-2-7. Take-up/Supply Reel Sensor Photoelectric Cell

A luminous diode and phototransistor at the fixed position for the cell comprise the reel sensor. (Pulse rate=8pulses/rotation)

Note: This mechanism does not include the luminous diode or the phototransistor.

1-2-8. Tape Start/End Sensor Photoelectric Cell

A luminous diode and phototransistor at the fixed position for the cell comprise the start/end sensor. (Pulse rate=8pulses/rotation)

Note: This mechanism does not include the luminous diode or the phototransistor.

1-2. CONFIGURATION TN6500 VCR ME

1-2-1. Cassette Drive M

The cassette is loaded and ejected by the capstan motor.

(A) Detection of cassette insertion

When an cassette is inserted, simultaneously causes the shutter beam of the Tape Top Sensor. This Top Sensor change cause the cassette insertion.

(B) Detection of completed cassette insertion

This is detected by the Cassette In switch. The actuator activated when a cassette is inserted.

Note: The Cassette Insertion switch is not included with the deck mechanism.

(C) Detection of completed cassette ejection

As above, this is detected by detecting the change in the Tape Top Sensor beam that is broken by cassette insertion when the cassette has been ejected.

1-2-2. Tape Loading Mechanism

Tape loading mechanism is the mechanism that is linked with the tape loading motor. The following actions occur when the tape is loaded from the mode detection switch is activated.

(A) The tape is pulled out of the capstan cylinder. (tape loading)

(B) The tape is returned to the capstan cylinder.

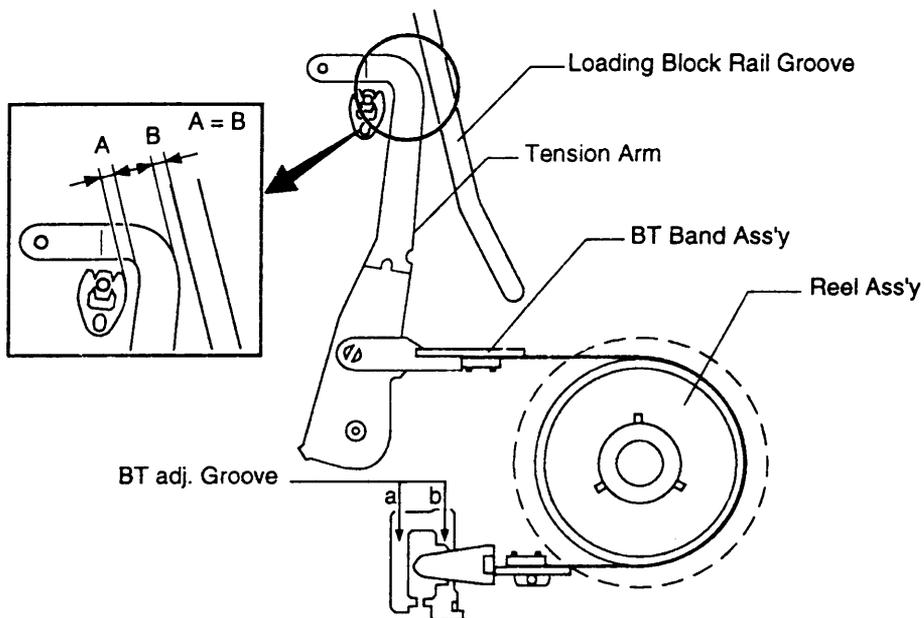
(C) Function are switched so that each mode is performed.

1-2-3. Tape Transport Mechanism

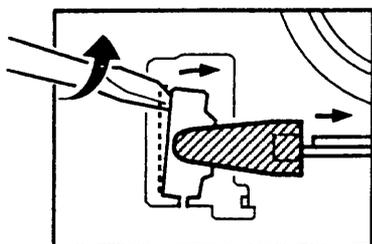
The tape is fed through the VCR by the pinch roller and reel drive.

2. ADJUSTMENT OF BT TORQUE IN PLAY MODE (ADJUSTMENT OF THE TENSION ARM POSITON)

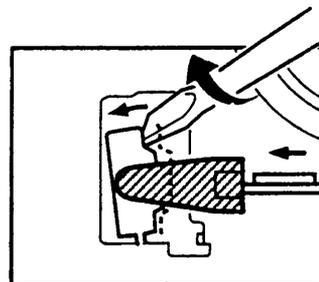
1. Remove the FL Ass'y.
2. Rotate the loading pulley with your finger until PLAY mode is reached.
3. Insert a standard screwdriver into the BT adjustment groove (a or b) of the main chassis.
Twist the screwdriver left and right to adjust gap(A) and gap(B) so that they are the same.



- To reduce the gap (BT torque reduction), insert into adjustment groove "a" and twist counter-clockwise as shown in the figure below.



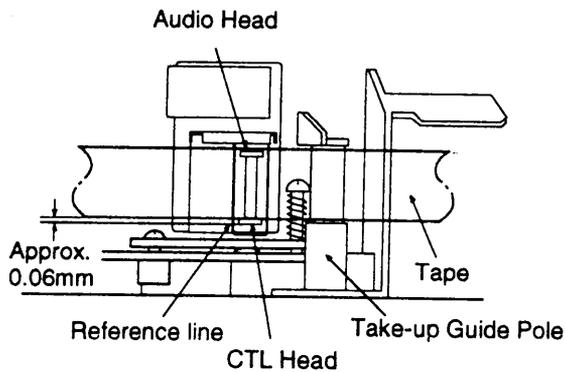
- To increase the gap (BT torque increase), insert into adjustment groove "b" and twist clockwise as shown in the figure below.



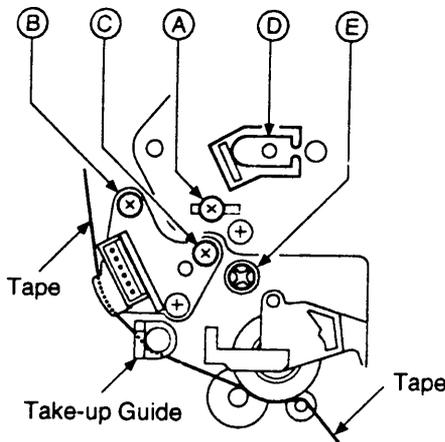
CAUTION: Do not twist at too much of an angle. Doing so will have adverse effects on other areas as well.

3. AUDIO/CTL HEAD

3-1. TAPE TRANSPORT ADJUSTMENT



Audio/CTL Head Adjustment



1. Using an ordinary cassette tape, set to PLAY mode.
2. Turn screw ③ and adjust for smooth transport at the take-up guide.

3-2. AUDIO/CTL HEAD HEIGHT AND AZIMUTH ADJUSTMENT

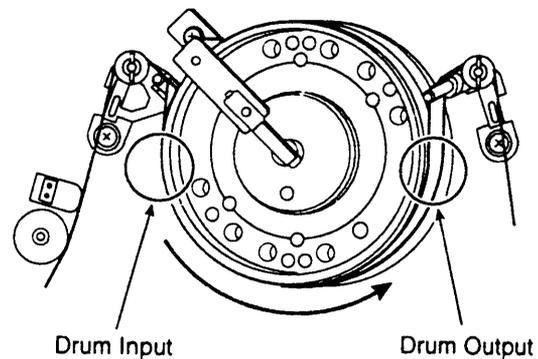
1. Connect the noise meter to the audio output.
2. Play the test tape (1 KHz color bar signal), turn nut ① back and forth a little at a time to set maximum audio output level.
3. Play the test tape, (8 KHz stair step signal), turn screw ② back and forth a little at a time to adjust the azimuth so that the audio output level will reach a maximum.
4. Play the test tape (1 KHz color bar signal), and make sure that there is no significant change in the audio output level. If a large change remains, turn screw ③ back and forth a little at a time to adjust so that the level change will reach a minimum.
5. When all adjustment is finished, lock up screw ④.

4. TAPE TRANSPORT SYSTEM CHECKS AND ADJUSTMENT

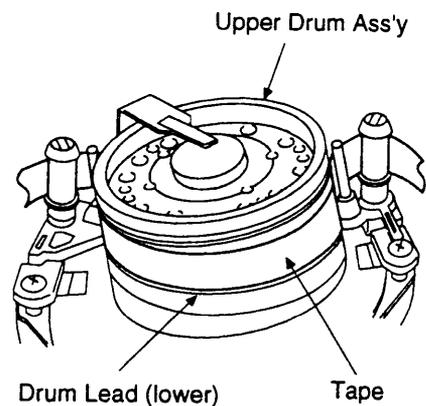
The tape transport system has been precisely aligned at the factory and normally does not require readjustment. The following steps are therefore necessary only in cases of frequent use or when replacing parts which have an effect on the tape transport system.

4-1. TAPE TRANSPORT CHECK

1. Using an ordinary cassette tape, switch back and forth between PLAY and STOP modes several times.
2. During PLAY mode, observe the input and output portions of the tape (A and B in the figure below) of the head drum lead. Confirm that the tape slips neither upward nor downward with respect to the lead as shown in Figure "Drum Lead Check-1".



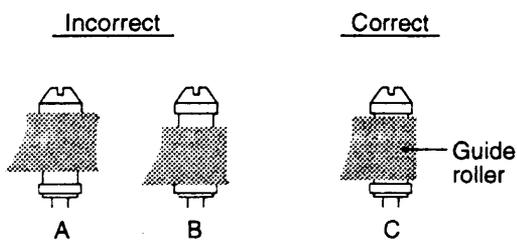
Tape Transport Check



Drum Lead Check-1

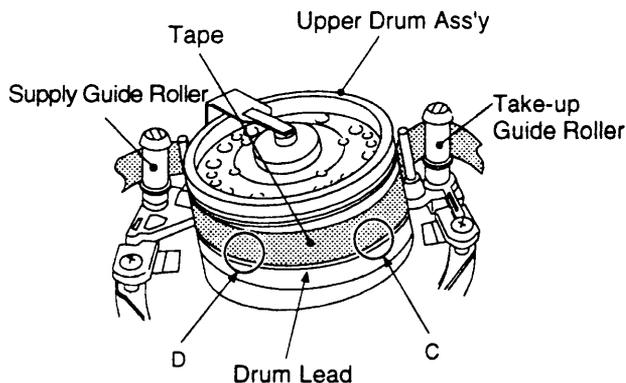
NOTES:

1. If the tape slips upward; sound is produced by contact between the tip of rotating heads and the edge of the tape.
2. If the tape slips downward; the tape curls or wrinkles (or makes noise) at its connection with the lead face of the drum lead.
3. During loading, play, and unloading of the cassette tape, observe the tape at the supply guide roller, and take-up guide roller.
4. Make sure that there are no curls or wrinkles as shown in the figure below.



Guide Roller

5. Observe the tape as it wraps around the drum during PLAY and separates from the drum during STOP.
6. As shown in the figure below, make sure that there is no damage to C and D and that there is no contact noise between the head tips and tape edge.

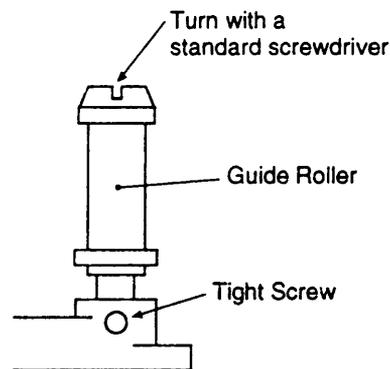


Drum Lead Check-2

7. If a defect is detected during check, perform the following procedure for adjusting Guide Roller height.

4-2. GUIDE ROLLER HEIGHT ADJUSTMENT

1. Slightly loosen the tight-screw of the supply and take-up guide rollers as shown in the figure below.
2. Using an ordinary cassette tape, set to PLAY mode.
3. With a standard screwdriver, slightly turn the supply guide roller (no more than 180° at a time), and adjust so that at the drum input portion, the tape travels smoothly along the drum lead without slipping upwards or downwards.
4. Similarly, adjust the take-up roller for the drum output.



Adjusting Guide Roller Height

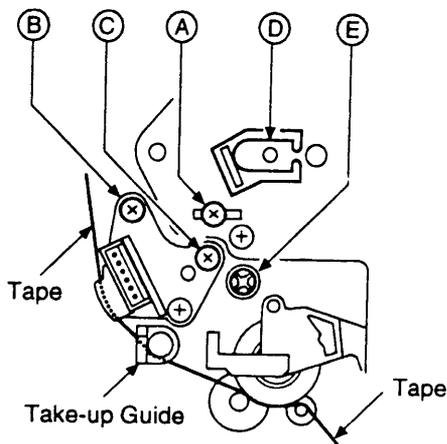
NOTES:

1. Loosen the tight-screw only enough to allow the guide rollers to be rotated. Loosening it anymore than that may rotate the roller inadvertently as a result of tape motion.
2. Rotate the roller carefully to avoid damage to the tape.
3. When the adjustment is completed, tighten the screw and set by locking up the screw.

4-3. TAPE TRANSPORT CHECK AT THE TAKE-UP GUIDE

In general, no adjustment will be necessary for the take-up guide. However, adjustments or checks will be necessary when replacing the Audio/CTL Head or parts affecting the tape transport system after a long period of operation.

1. Using an ordinary cassette tape, set to PLAY mode.
2. Turn Audio/CTL Head screw ④ as shown in the figure below and adjust for smooth transport at the take-up guide as shown in Figure "Guide Roller" on page MA-5.



Take Up Guide Roller

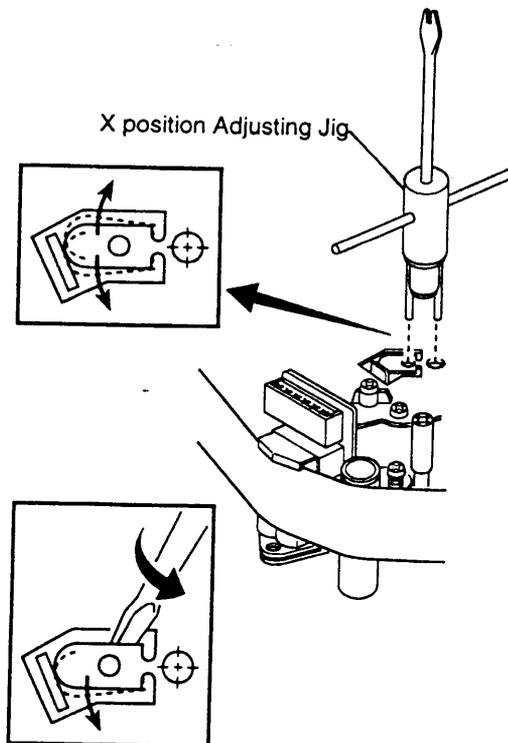
5. INTERCHANGEABILITY ADJUSTMENT

Before using the test tape, make sure that the tape transport is normal using an ordinary cassette tape. Also, make sure that the switching point (Refer to EA) is adjusted. If they are not, do the following checks after adjusting.

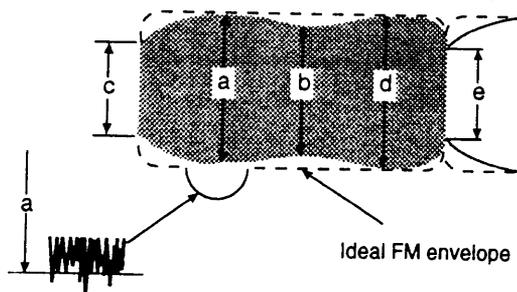
5-1. PRELIMINARY CHECKS

1. FM Envelope Waveform Check

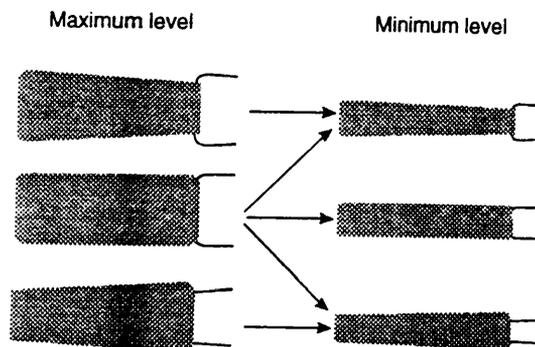
1. Connect the CH-1 oscilloscope to TP of PB ENV and CH-2 to TP of CTL. At this time, trigger the oscilloscope externally with the signal (RF Switching Pulse) from TP of RFS.
2. Play the test tape (Stairstep).
3. Use the Channel ∇/\blacktriangle buttons to tune the tracking to center position. Adjust point ④ (X value adjustment point: test point reference P.MA-1) so that the FM envelope output at TP of PB ENV reaches a maximum.



4. Using the Channel ∇/\blacktriangle buttons. Perform the following 3 steps (5-7) by moving the TP of CTL waveform in both positive (+) and negative (-) directions in 3 ms increments.
5. Refer to the figure below. Read the level of portion (a) of the waveform. If the waveform is serrated at point (a), adjust the level so that the serrations are as smooth as possible (refer to the second figure).



FM Waveform (Maximum Output)



Normal Waveform Examples

6. As shown in the equation below, read the FM waveform value at point (b) and make sure that:

$$\frac{b}{a} \geq 0.75 \text{ or } 20 \log \frac{b}{a} \geq -2.5 \text{ dB}$$

7. Read the values at points (c) and (d) [drum input and output] and make sure that:

$$\frac{c}{a} \geq 0.75 \text{ and } \frac{d}{a} \geq 0.75 \text{ or}$$

$$20 \log \frac{c}{a} = -2.5 \text{ dB and}$$

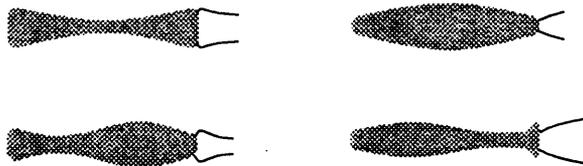
$$20 \log \frac{e}{a} = -2.5 \text{ dB}$$

NOTES:

1. Read the minimum levels for (b), (c), and (d).
2. If above checks yield normal results, proceed to page MA-8 section "ADJUSTMENT".
3. If defects are noted, perform the following FM envelope waveform adjustment.

2. FM ENVELOPE WAVEFORM ADJUSTMENT

1. As in the previous section, observe the FM waveform and press the CHANNEL ▼/▲ buttons. Waveform alterations must be nearly parallel to each other as shown in Figure "Normal Waveform Examples" on page MA-7.
2. If the waveform changes as shown in the figure below, adjustment is necessary.



Abnormal Waveform Example

5-2. ADJUSTMENT

1. Connect the TP of PB ENV to the oscilloscope CH-1. At this time, trigger the oscilloscope externally with the signal (RF Switching Pulse) from TP of RFS.
2. Play the test tape (Stairstep).

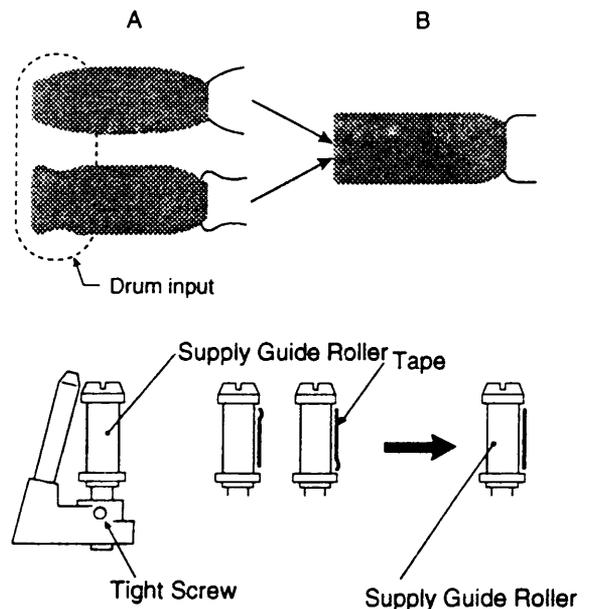
1. DRUM INPUT ADJUSTMENT

1. Observe the FM envelope output wave at the TP of PB ENV with the oscilloscope and press the CHANNEL ▼/▲ buttons in both positive (+) and negative (-) directions.
2. A of the following figure shows incorrect waveforms. With a standard screwdriver, adjust the transport guide roller to flatten the peak of the FM envelope waveform as shown in B.

NOTES:

1. If the guide roller rotates freely, tighten the screw slightly.
2. Be sure to adjust the guide roller only by small increments at a time to avoid damaging the test tape.

In addition to observing the waveform, make sure that there is no slipping of the tape or curling at the drum lead.

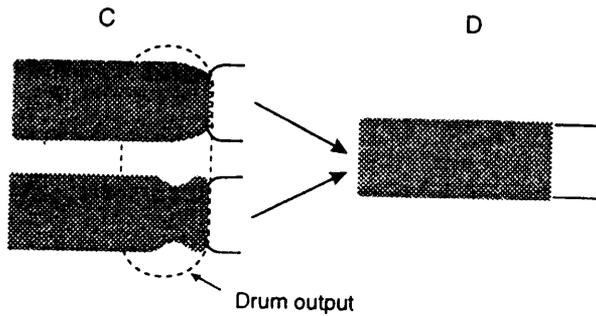


Drum Input Adjustment

MECHANICAL ADJUSTMENT

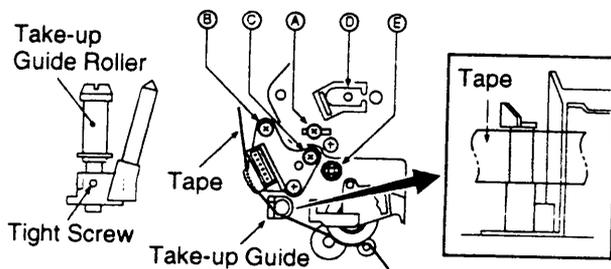
2. DRUM OUTPUT ADJUSTMENT

1. Adjust the take-up guide roller so that the FM envelope output flattens as shown in D of the figure below.



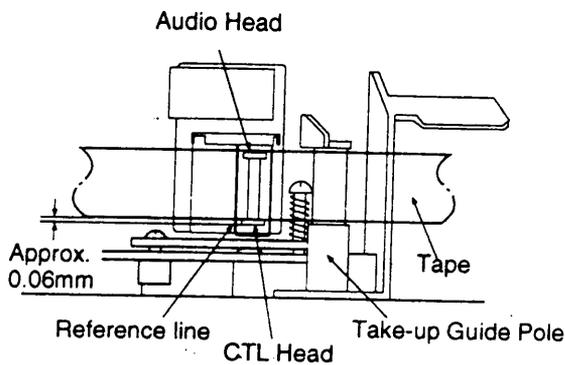
Drum Output Adjustment

2. If the tape separates from the guide or wrinkling occurs at the take-up guide, adjust by turning screw © of the Audio/CTL Head as shown in the figure below.



Take-up Guide

3. As shown in the figure below, adjust screws © and © and nut ① to align the Audio/CTL Head height with the tape.



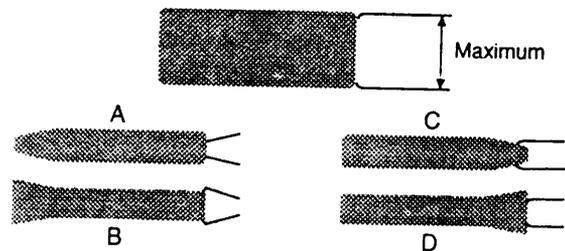
Audio/CTL Head Height

NOTES:

1. Fine adjustments are not required at this time. It is sufficient if the tape is engaged with the guide and that the servo operates properly (control signal picked up).
2. If the tape separates from the take-up guide or wrinkling occurs, screw © must have been excessively tightened with respect to screw ① and screw ②, which is causing the Audio/CTL Head to incline forward or backward. Use care in adjusting screws ② and ©, and screw ① evenly and observe that wrinkles are not produced at the take-up guide.

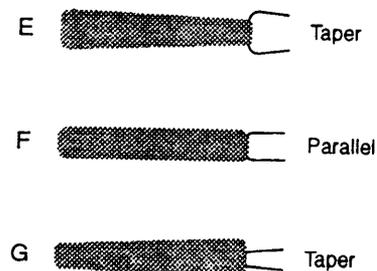
5-3. INTERCHANGEABILITY ADJUSTMENT

1. Observe the FM envelope output waveform at the oscilloscope and press to adjust the CHANNEL ▼ / ▲ buttons in both positive(+) and negative(-) directions.



Minimum FM Output (Incorrect Examples)

2. If there are waveforms as shown in A or B in the above figure, adjust the supply guide roller height so that the waveform appears as shown by E, F, or G in the figure below. At this time, if the waveform fluctuates, adjust to the point of minimum fluctuation.



Minimum FM Output (Correct Examples)

3. If the FM waveform appears as shown by C or D in the above figure, adjust the take-up guide roller height to obtain a waveform such as shown in E, F, or G.

At this time, if the waveform fluctuates, adjust to the point of minimum fluctuation.

4. Vary the tracking control from maximum to minimum FM output.

Perform fine adjustment of supply and take-up guide rollers so that waveform variation appears as shown in E, F, or G.

5-4. AUDIO/CTL HEAD HEIGHT, AZIMUTH AND SLANT

Refer to 3-2 (MA-5) for details regarding audio/CTL head height and azimuth.

5-5. SETSCREW TIGHTENING

1. Check for maximum FM output waveform, maximum audio output, and be sure that there is no wrinkling on the tape or other transport irregularities. When finished, secure the guide rollers. (This must be performed in STOP mode.)
2. Because the guide rollers are easily moved, use care when securing.
3. After tightening the screws, perform the final interchangeability check.

5-6. FINAL INTERCHANGEABILITY CHECK

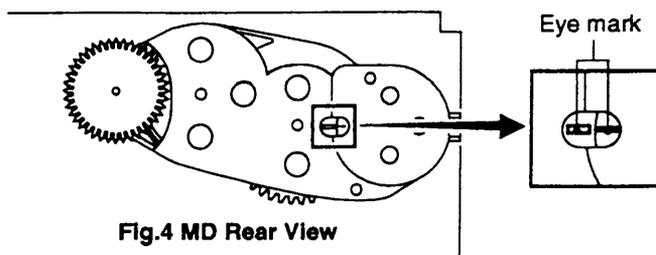
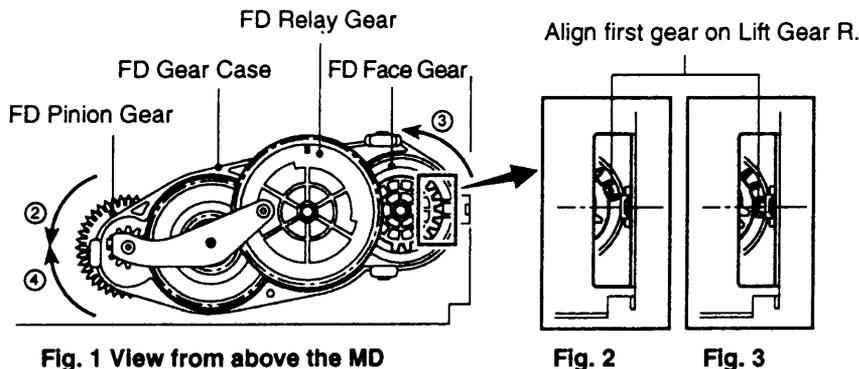
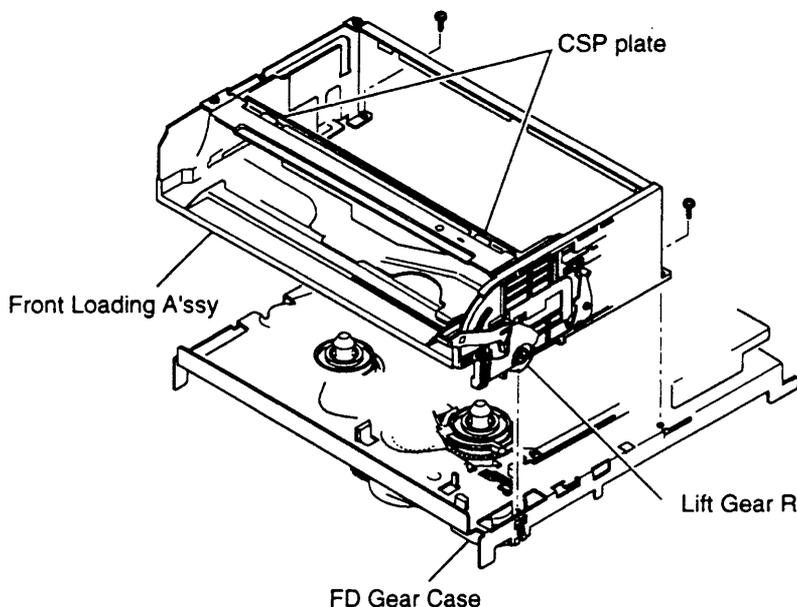
Perform preliminary checks referring to section "PRELIMINARY CHECKS" on page MA-6.

6. FRONT LOADING ASSEMBLY ATTACHMENT

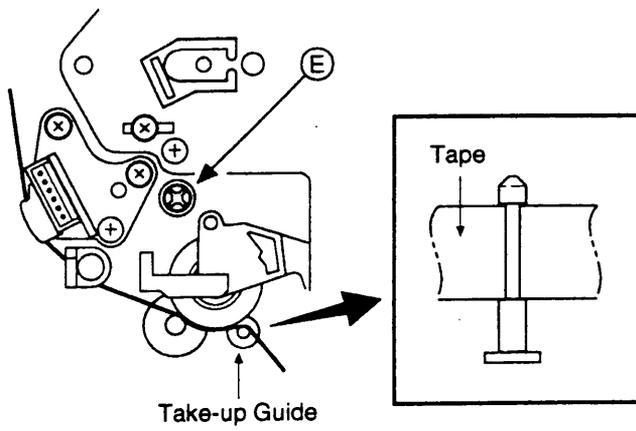
To attach the Front Loading Assembly, follow the procedures below.

- 1) Twist the loading motor with your finger until it is in EJECT mode.
- 2) Twist the FD Pinion Gear counterclockwise until it stops. (The FD Face Gear is loose.)
- 3) Twist the FD face Gear counterclockwise until it stops, then apply gentle pressure in the counterclockwise direction.
- 4) In the position at step 2) , rotate the FD Pinion Gear clockwise. After about 3 1/2 turns, the FD Pinion Gear should begin to interlock with the FD Relay Gear. Now twist the FD Pinion Gear until it stops. (The assembly should now resemble Fig. 2)
- 5) Twist the FD Pinion Gear about 1/3 of a turn counterclockwise so that the Lift Gear R attachment position is horizontal making attachment easier, as shown in Fig. 3. Also, the FD Relay Gear and FD Face Gear eye marks should be aligned when the MD is viewed from the back. (Fig. 4)
- 6) Attach the front assembly. Insert the first Lift Gear R between the first and second gear of the front assembly. (Fig. 3)

Note: Do not touch the CSP plate of the Front Loading Assembly. (Take care not to distort it.)



7. RG POST HEIGHT ADJUSTMENT



- 1) Use a blank tape and set the VCR to REV mode.
- 2) Twist screw E and adjust the RG Post height until the tape is aligned with the lower winding plunger.

PERIODIC MAINTENANCE

The following procedures are recommended for maintaining optimum performance and reliability of this video cassette recorder.

CLEANING

For cleaning, use a lint-free cloth or gauze dampened with alcohol.

TAPE TRANSPORT SYSTEM

1. The following components should be cleaned after every 500 hours of use.
 - Impedance Roller
 - Tension Post
 - Transport Slide Post
 - Supply Guide Roller
 - Take-up Slide Post
 - Take-up Guide Roller
 - Video Head & Drum System
 - Drum Ground
 - Drum Motor Shaft
 - Audio/CTL Head
 - Pinch Roller
 - Capstan
 - Reverse Guide Post
 - Full Erase Head
 - Tape Guide
 - F Post
2. Since the above parts come in direct contact with video tape, they tend to collect dust particles. If allowed to accumulate, dust may lead to damage to the video tape and above parts.
3. After cleaning with alcohol, allow the parts to dry thoroughly before using a cassette tape.

NOTE:

- When cleaning the two video heads on the upper drum, do not clean them with a vertical stroke.
- Use only a gentle back and forth motion in the direction of the tape path.

REEL DRIVE SYSTEM

1. The following components should be cleaned after every 1000 hours of use.

TOP

- Take-up Reel Table Ass'y
- Supply Reel Table Ass'y
- T Soft Brake Ass'y
- T Main Brake Ass'y
- S Main Brake Ass'y
- BT Band Ass'y

BOTTOM

- Capstan Motor Pulley
- Clutch Pulley
- Drive Belt
- C Brake

2. The above revolving parts are of rubber or come in direct contact with rubber parts. Dust on rubber accumulates and interferes with proper operation.
3. Avoid using excessive alcohol when cleaning rubber parts.

SERVICE SCHEDULE FOR MAIN COMPONENTS

The following table lists the parts which should receive periodic servicing at the recommended intervals.

59275

Name	Periodic Service Schedule (operating hours)					Part No.
	1000	2000	3000	4000	5000	
Cylinder Ass'y	○	●	○	●	○	62D806601601
Clutch Ass'y		●		●		62D806509302
Drive Belt		●		●		62D80650920
BT Band Ass'y		●		●		62D806508303
Soft Brake Ass'y		●		●		62D806510303
T Main Brake Ass'y		●		●		62D806510301
S Main Brake Ass'y		●		●		62D806510302
Pinch Roller Arm Ass'y		●		●		62D806506301
Audio/CTL Head			●			62D62041520
T Reel Ass'y			○			62D806505301
S Reel Ass'y			○			62D806505302
Capstan Motor Ass'y			○			62D60030360
Loading Motor Ass'y			○			62D806511303

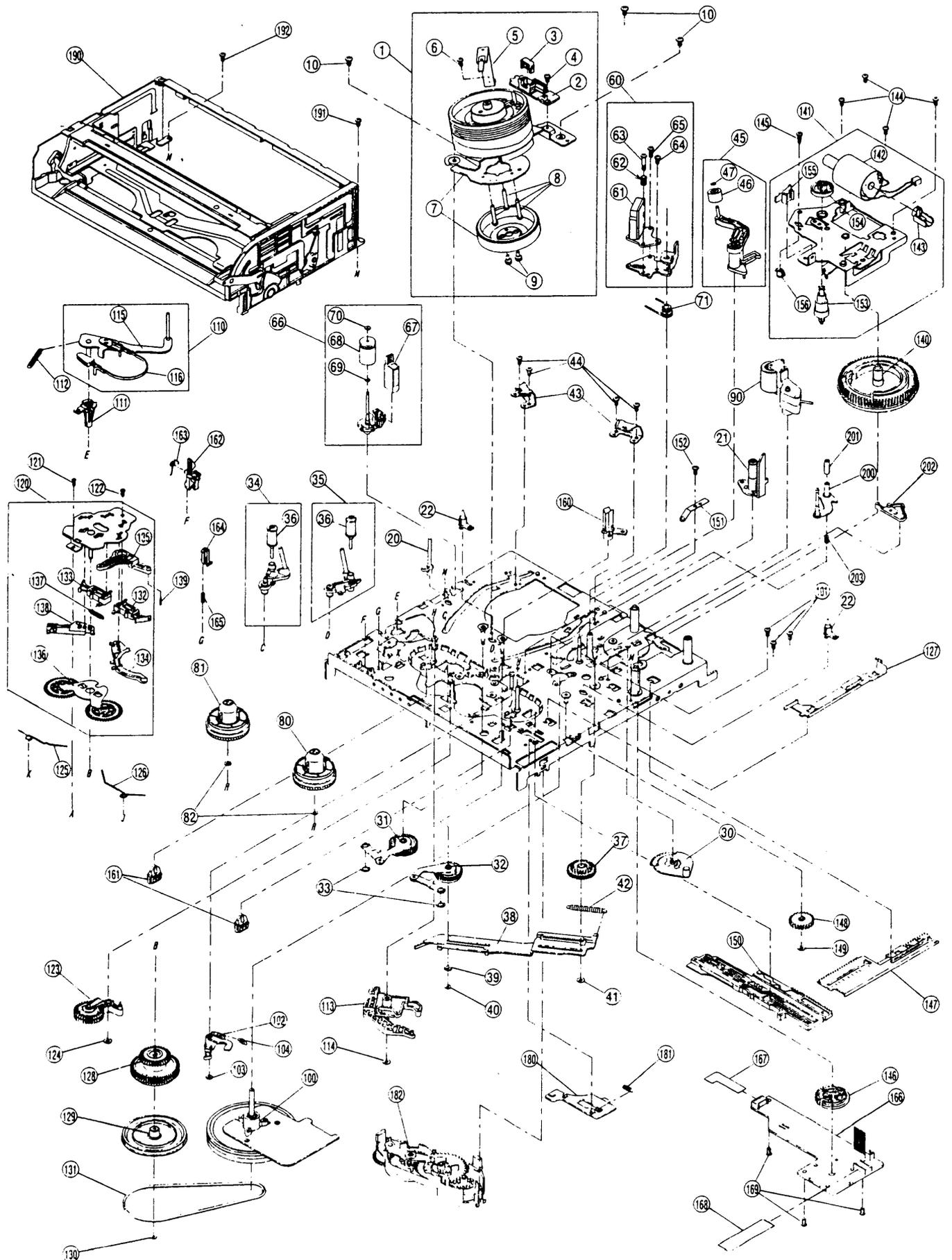
Standard Service Periods

- Check and replace if necessary
 ● Replace

NOTE:

Cleaning and replacement of the belts should be undertaken every 2 years even if the unit is not used frequently.

EXPLODED VIEW OF THE CASSETTE DECK MECHANISM



CASSETTE DECK MECHANISM 59275

Ref. No.	TN Part No.	ST Part No.	Description
1	8066-01-601	62D806601601	CYLINDER ASS'Y
2	8065-01-305	62D806501305	V OUT PWB ASS'Y
3	6807-02-43	62D68070243	FPC4 CONNECTOR (C)
4	9P12-26-064	62D9P1226064	TAMS SCREW (TAPPING)S 2.6X6
5	8065-01-501	62D806501501	DRUM EARTH ASS'Y
6	9P04-26-041	62D9P0426041	TAPPING SCREW 2.6X4
7	6003-03-61	62D60030361	MOTOR E20XL15
8	9P02-26-151	62D9P0226151	TAMS SCREW 2.6X15
9	8065-01-311	62D806501311	ROTOR SCREW B ASS'Y
10	9P04-30-051	62D9P0430051	TAPPING SCREW 3.0X5
20	8065-02-301	62D806502301	F POST METAL ASS'Y
21	8065-02-302	62D806502302	TAPE GUIDE ASS'Y
22	8063-02-23	62D80630223	CASSETTE GUIDE BOSS
30	8065-03-502	62D806503502	LOADING LEVER KASIME
31	8063-03-305	62D806303305	LOADING PLATE L ASS'Y
32	8065-03-305	62D806503305	LOADING PLATE R ASS'Y
33	9W06-50-110	62D9W0650110	HL WASHER(CUT)4.5X7X0.5
34	8065-03-303	62D806503303	L BLOCK L ASS'Y
35	8065-03-304	62D806503304	L BLOCK R ASS'Y
36	8063-03-09	62D80630309	ROLLER POST
37	8065-03-04	62D80650304	LOADING GEAR
38	8065-03-05	62D80650305	L GEAR PLATE
39	8065-03-11	62D80650311	L GEAR PLATE COLLOR
40	9W02-50-100	62D9W0250100	POLYSLIDER WASHER(C)2.1X5X0.5
41	9W02-50-110	62D9W0250110	POLYSLIDER WASHER(C)2.6X6X0.5
42	8065-03-10	62D80650310	L GEAR PLATE SPRING
43	8065-03-01	62D80650301	LD CATCHER
44	9P04-26-051	62D9P0426051	TAPPING SCREW 2.6X5
45	8065-03-306	62D806503306	HEAD CLEANING ASS'Y
46	8063-03-29	62D80630329	CLEANING ROLLER ASS'Y
47	9W02-30-050	62D9W0230050	POLYSLIDER WASHER(C) 1.6X3.8X0.3
48	9C17-20-233	62D9C1720233	CAMERA SCREW(FLAT TIP)2.0X2.3
60	8065-04-302	62D806504302	ACE HEAD BASE ASS'Y
61	6204-15-20	62D62041520	ACE HEAD HVMZA1220
62	8000-06-04	62D80000604	AZIMUTH SPRING
63	8000-06-26	62D80000626	AZIMUTH SPRING SCREW
64	9P09-30-061	62D9P0930061	SCREW (SHARP-POINTED) 3X6
65	9P01-26-072	62D9P0126072	SCREW 2.6X7
66	8065-04-301	62D806504301	FE HEAD BASE ASS'Y
67	6209-15-04	62D62091504	VTR1X2ERS11107
68	8063-04-306	62D806304306	IMPEDANCE ROLLER ASS'Y
69	9W02-30-050	62D9W0230050	POLYSLIDER WASHER(C) 1.6X3.8X0.3
70	9W06-30-040	62D9W0630040	HL WASHER(CUT) 1.55X4.5X0.3
71	8065-04-02	62D80650402	HEAD BASE SPRING
80	8065-05-301	62D806505301	T REEL ASS'Y
81	8065-05-302	62D806505302	S REEL ASS'Y

CASSETTE DECK MECHANISM 59275

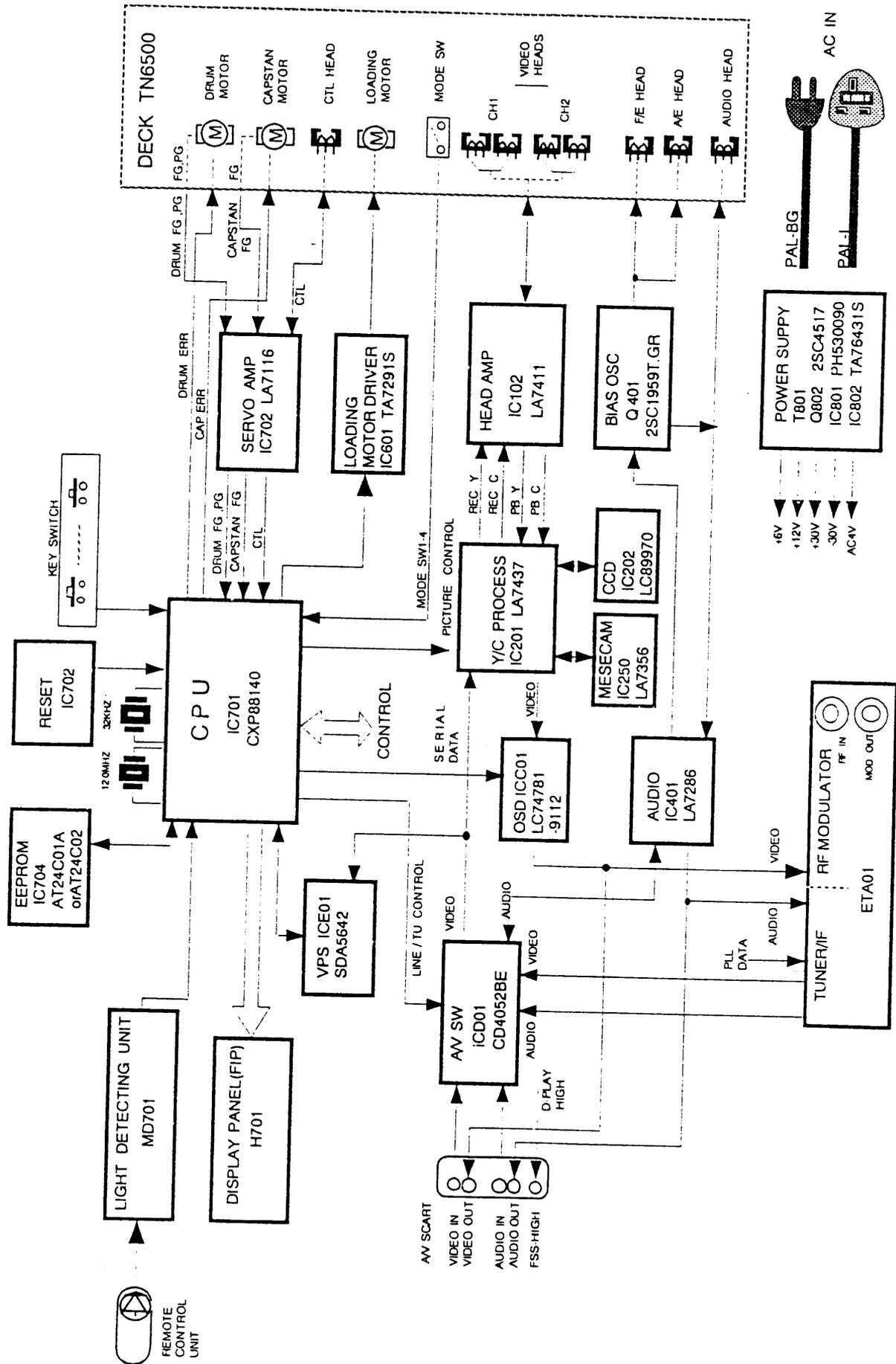
Ref. No.	TN Part No.	ST Part No.	Description
82	9W03-30-110	62D9W0330110	NYLON WASHER 2.5X5X0.3
90	8065-06-301	62D806506301	PINCH ROLLER ARM ASS'Y
100	6003-03-60	62D60030360	CAPSTAN MOTOR (F2QTB10)
101	9P07-26-061	62D9P0726061	TAPPING SCREW P 2.6X6
102	8065-07-301	62D806507301	C BRAKE ASS'Y
103	9W02-50-100	62D9W0250100	POLYSLIDER WASHER(C)2.1X5X0.5
104	8065-07-02	62D80650702	C BRAKE SPRING
110	8065-08-301	62D806508301	TENSION ARM ASS'Y
111	8063-08-04	62D80630804	BT ARM METAL
112	8065-08-02	62D80650802	BT SPRING
113	8065-08-06	62D80650806	BT LEVER
114	9W02-50-110	62D9W0250110	POLYSLIDER WASHER(C)2.6X6X0.5
115	8065-08-302	62D806508302	TENSION ARM SEMI ASS'Y
116	8065-08-303	62D806508303	BT BAND ASS'Y
120	8065-09-303	62D806509303	SUB PLATE ASS'Y
121	9C04-26-503	62D9C0426503	CAMERA SCREW(TAPPING)S 2.6X5
122	9P04-20-041	62D9P0420041	TAPPING SCREW 2.0X4
123	8065-09-304	62D806509304	RF CLUTCH ASS'Y
124	9W02-50-110	62D9W0250110	POLYSLIDER WASHER(C)2.6X6X0.5
125	8065-10-07	62D80651007	TS BRAKE SPRING
126	8065-10-09	62D80651009	SS BRAKE SPRING
127	8065-10-10	62D80651010	TS BRAKE LEVER
128	8065-09-302	62D806509302	CLUTCH ASS'Y
129	8065-09-301	62D806509301	CLUTCH PULLY ASS'Y
130	9W02-30-060	62D9W0230060	POLYSLIDER WASHER(C) 2.1X5X0.3
131	8065-09-20	62D80650920	DRIVE BELT
132	8065-10-301	62D806510301	T MAIN BRAKE ASS'Y
133	8065-10-302	62D806510302	S MAIN BRAKE ASS'Y
134	8065-10-303	62D806510303	T SOFT BRAKE ASS'Y
135	8065-11-13	62D80651113	REVERSE LEVER
136	8065-09-307	62D806509307	GEAR PLATE ASS'Y
137	8065-10-05	62D80651005	MAIN BRAKE SPRING
138	8065-10-08	62D80651008	S SOFT BRAKE ARM
139	8065-11-14	62D80651114	REVERSE LEVER PIN
140	8065-11-302	62D806511302	CAM GEAR ASS'Y
141	8065-11-301	62D806511301	CAM PLATE ASS'Y
142	8065-11-303	62D806511303	LOADING MOTOR ASS'Y
143	8065-11-11	62D80651111	MOTOR HOLDER
144	9P02-26-051	62D9P0226051	TAMS SCREW 2.6X5
145	9F22-26-081	62D9F2226081	ADJUST SCREW 2.6X8
146	8065-11-04	62D80651104	M GEAR
147	8065-11-305	62D806511305	M GEAR PLATE ASS'Y
148	8065-11-07	62D80651107	M RELAY GEAR
149	9W06-30-100	62D9W0630100	HLW(C) 2.6X6X0.3
150	8065-11-08	62D80651108	M SLIDE PLATE
151	8065-11-17	62D80651117	R LEVER SPRING PLATE

CASSETTE DECK MECHANISM 59275

Ref. No.	TN Part No.	ST Part No.	Description
152	9P04-26-051	62D9P0426051	TAMS SCREW 2.6X5
153	8065-11-03	62D80651103	CAM DRIVE GEAR
154	8065-11-10	62D80651110	WORM WHEEL
155	8065-11-15	62D80651115	OPEN ANGLE
156	8065-11-16	62D80651116	AH ADJUST NUT
160	8065-13-01	62D80651301	OPTICAL LEADER
161	8065-13-303	62D806513303	RS LEADER
162	8065-13-04	62D80651304	REC SWITCH LEVER
163	8065-13-05	62D80651305	REC LEVER SPRING
164	8065-13-06	62D80651306	IN SWITCH SLIDER
165	8065-13-07	62D80651307	IN SW SLIDER SPRING
166	8065-13-302	62D806513302	BASE PWB ASS'Y
167	8065-13-11	62D80651311	DM LEAD PWB
168	8065-13-12	62D80651312	CM LEAD PWB
169	9P04-26-051	62D9P0426051	TAPPING SCREW 2.6X5
180	8065-15-301	62D806515301	FD GEAR CASE ASS'Y
181	8065-15-09	62D80651509	FD SLIDE PLATE
182	8065-15-10	62D80651510	FD SLIDE PLATE SP
190	8065-16-301	62D806516301	FRONT LOADING ASS'Y
191	9B03-26-051	62D9B0326051	TAPPING SCREW(BIND) 2.6X5
192	9P04-26-051	62D9P0426051	TAPPING SCREW 2.6X5
200	8065-17-501	62D806517501	RG ARM KASIME
201	8065-17-03	62D80651703	RG ADJUST NUT
202	8065-17-04	62D80651704	RG LEVER
203	8065-17-05	62D80651705	RG ARM SPRING

DIAGRAM

1. BLOCK DIAGRAM



2. TERMINOLOGY REFERENCE

The following terms have been changed as a result of the use of a new CAD system.

Description	Ref. No.	CAD Code	
◆ IC	<u>IC101</u>	<u>LA3373, MT</u>	No Connection Description (LA3373) Circuit Ref. Number Head Name
◆ Transistor	<u>Q101</u>	<u>2SC2785T, E, F</u>	Rank No Connection Description (2SC2785) Circuit Ref. Number Head Name
◆ Diode	<u>D101</u>	<u>1S2835T</u>	No Connection Description (1S2835) Circuit Ref. Number Head Name
◆ Resistor	<u>R101</u>	<u>RC102F</u>	Tolerance F: ±1 % G: ±2 % J: ±5 % (No Mark) K: ±10% M: ±20% H: No Connection Resistance (10 x 10 ² = 1000 ohms) Carbon Resistor 1/6W Circuit Ref. Number Head Name
	<u>R102</u>	<u>RA1R1</u>	Resistance (1.1 ohm) Decimal Point Mark Chip Resistor 2125 Type 1/10W
◆ Capacitor (Chip)	<u>C101</u>	<u>CA200C</u>	Temperature Characteristic C: CH, CJ, CK U: UJ S: SL B: B D: D Capacitance (20 x 10 ⁰ = 20pF) Chip Capacitor 2125 Type Circuit Ref. Number Head Name
◆ Capacitor (Ceramic)	<u>C101</u>	<u>SL1R5H or S or Z</u>	No Connection Capacitance (1.5pF) Decimal Point Mark Characteristic (Ceramic SL)
◆ Capacitor (Electrolytic)	<u>C101</u>	<u>ES1/50H or F or Z</u>	No Connection Voltage Proof (50V) Capacitance (1µF) Electrolytic SSM Type
◆ Hybrid IC	IC102	HIC*.....	Code No. (3 - 8 Column → 11*.....0)
◆ CR Component	CR101	CR*.....	Code No. (3 - 8 Column → 11*.....0)
◆ In-Line Block	IB101	IB*.....	Code No. (3 - 8 Column → 11*.....0)
◆ Surge Absorber	D102	Z*.....	Code No. (3 - 8 Column → 13*.....0)
◆ LED	LD101	LED*.....	Code No. (3 - 8 Column → 14*.....0)
◆ LCD	H101	LCD*.....	Code No. (3 - 8 Column → 14*.....0)
◆ FIP	H102	FIP*.....	Code No. (3 - 8 Column → 14*.....0)
◆ Pilot Lamp	PL101	PL*.....	Code No. (3 - 8 Column → 14*.....0)
◆ Neon Bulb	NE101	NE*.....	Code No. (3 - 8 Column → 14*.....0)
◆ Trimmer Cap.	C102	CT*.....	Code No. (5 - 9 Column → 1591*.....)
◆ CFC Assy	C103	CFC*.....	Code No. (5 - 9 Column → 1501*.....)
◆ Coil	L101	L*.....	Code No. (3 - 8 Column → 17*.....0)
◆ Filter	F101	F*.....	Code No. (3 - 8 Column → 17*.....0)

Description	Type	Capacitance Limit	No Marked Tolerance
Chip	CK, CJ, CH, UJ CH, UJ CH, SL SL, B D	1PF - 5PF 6PF - 10PF 12PF - 470PF 680PF - 0.022μF 0.033μF - 0.1μF	C (±0.25PF) D (±0.5PF) J (±5%) K (±10%) M (±20%)
Ceramic	General B	1PF - 5PF 6PF - 10PF 12PF - 270PF 100PF - 680PF	C D J K
Semi-Conductor	SR BC	0.001μF - 0.068μF 0.1μF - 0.2μF	K Z (-20% - +80%)
Mylar (M)		0.001μF - 0.1μF	J
TF		0.1μF - 0.47μF	J
PS, NPS		470PF - 1000PF	G (±2%), J
ALSICON (AS)		0.1μF - 0.22μF	M
Tantalum (TA)		0.15μF - 10μF	M
Electrolytic	General	0.1μF - 220μF	M

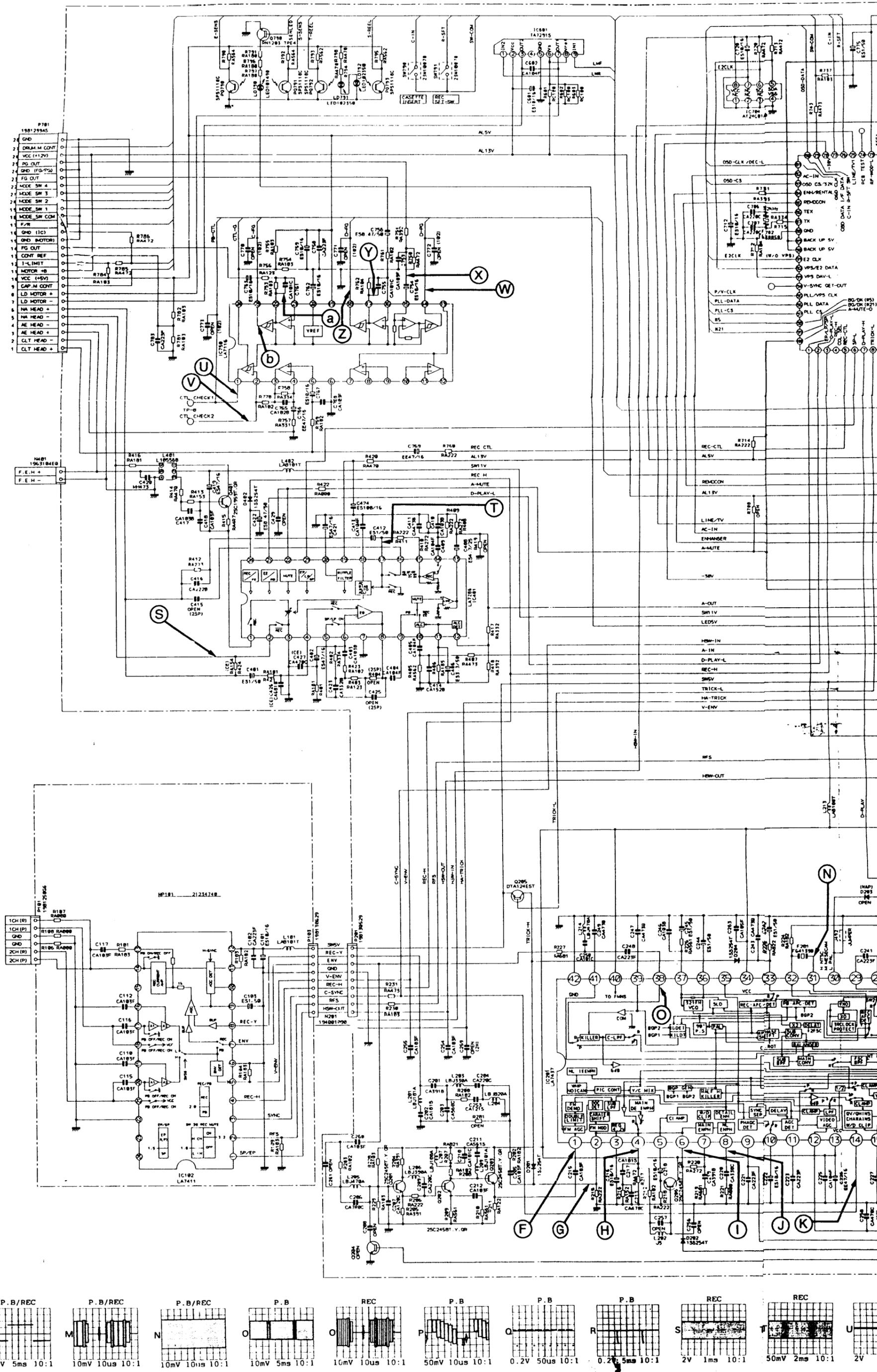
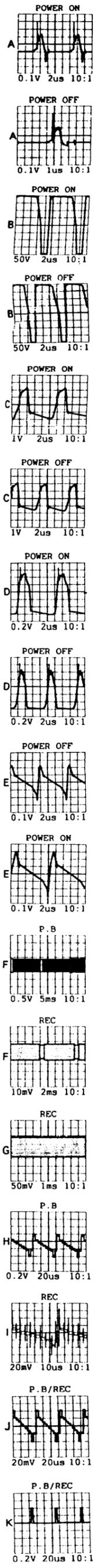
Head	Description	Head Name	Description
ET	Electrolytic Tuner	NE	Neon Bulb
MT	Manual Tuner	PL	Pilot Lamp
PT	Push Button Tuner	C*	Capacitor
K	Relay	R**	Resistor
MC	Microphone	L	Transformer
SP	Speaker	L	Coil, Inductor
IC	IC, Hybrid IC	F	Ceramic Filter, Crystal
IB	In-Line Block	W	Printed Circuit Board
CR	CR Component	BL	Block PC Ass'y
Q	Transistor	P	Connector Post
D	Diode, Surge Absorber	TP	Check Pin
LD	LED	AJ	Antenna Jack
H	LCD	SW	Switch
H	FIP	VR	Volume

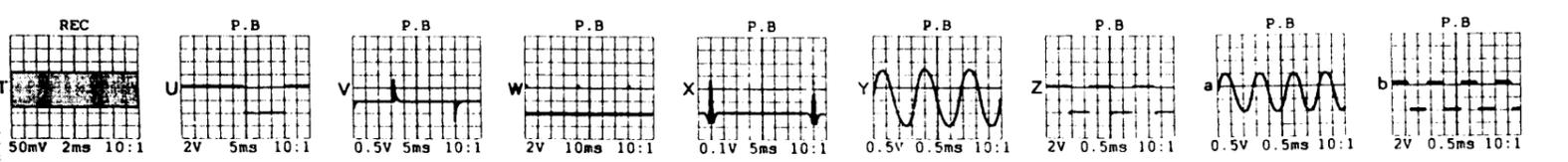
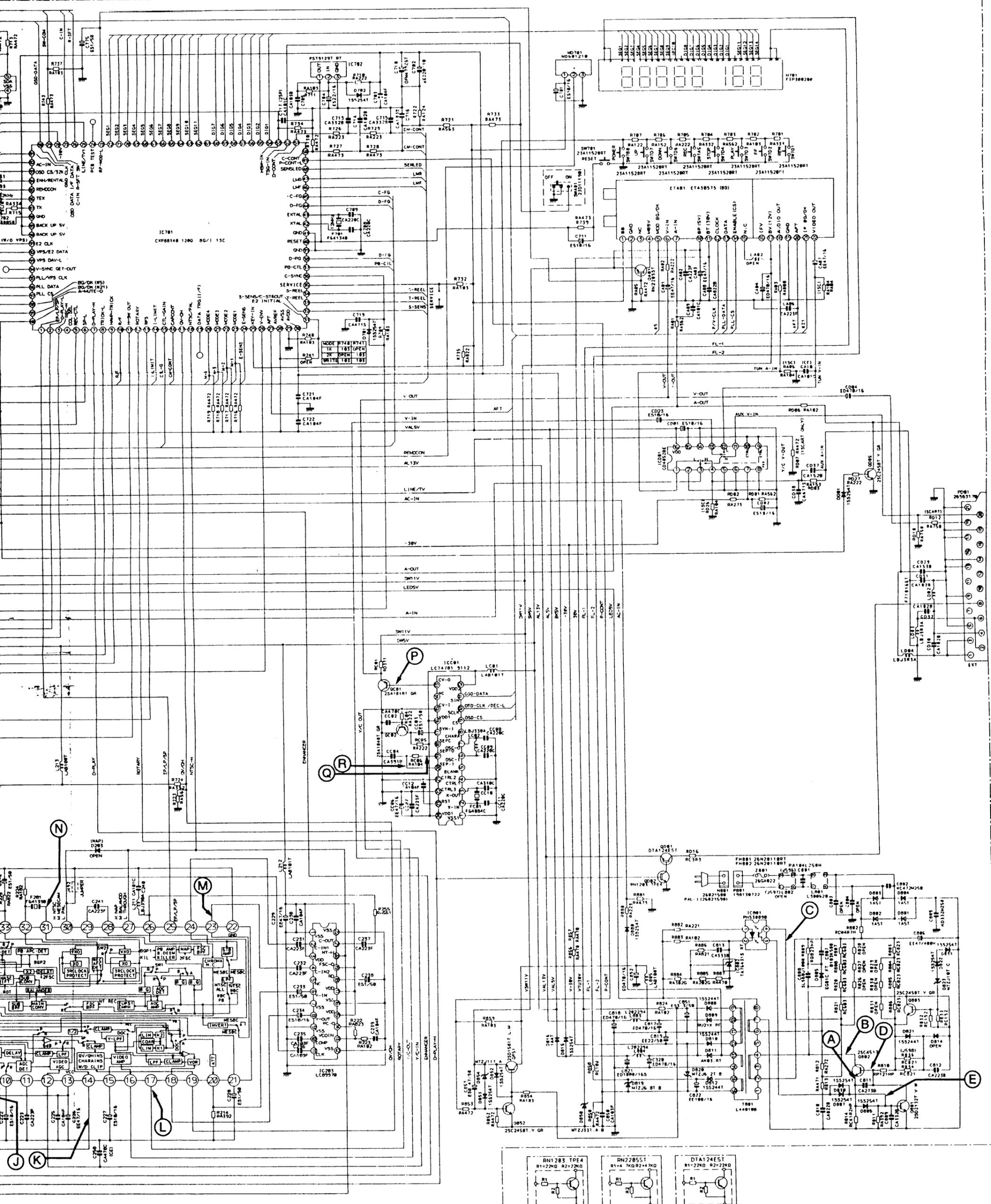
CAD Code	*Capacitor
CA****	Chip Capacitor 2125 Type
CB****	Chip Capacitor 3216 Type
SL****	Ceramic Capacitor SL Type
B****	Ceramic Capacitor B Type
F****	Ceramic Capacitor F Type
CH****	Ceramic Capacitor CH Type
LH****	Ceramic Capacitor LH Type
PH****	Ceramic Capacitor PH Type
RH****	Ceramic Capacitor RH Type
SH****	Ceramic Capacitor SH Type
TH****	Ceramic Capacitor TH Type
UJ****	Ceramic Capacitor UJ Type
SR****	Semi-Conductor Cap. SR Type
BC****	Semi-Conductor Cap. BC Type
M****	Mylar Capacitor
TF****	TF Capacitor
NP****	NPS Capacitor
AS**/**	ALSICON Capacitor
TA**/**	Tantalum Capacitor
ES**/**	Electrolytic Cap. SSM Type
ESL**/**	Electrolytic Cap. SSM-L Type
ESH**/**	Electrolytic Cap. SSM-H Type
ESB**/**	Electrolytic Cap. Bi-Polar
EG**/**	Electrolytic Cap. GSM Type
EE****	Electrolytic Cap. SEM Type

CAD Code	*Capacitor
EA**/**	Electrolytic Cap. Aibis Type
EL**/**	Electrolytic Cap. LSM Type
EH**/**	Electrolytic Cap. HPW Type
CT*****	Trimmer Capacitor

CAD Code	**Resistor
RA****	Chip Resistor 2125 Type
RB****	Chip Resistor 3216 Type
RC****	Carbon Resistor 1/6W S Type
RD****	Carbon Resistor 1/4W U Type
RU****	Carbon Resistor 1/6W U Type
RF****	Carbon Resistor 1/2W S Type
RK***/F	Metal Film Resistor 1/4W S ±1%
RL***/F	Metal Film Resistor 1/6W S ±1%
RP****	Metal Oxide Resistor 1W S Type
RQ****	Metal Oxide Resistor 2W S Type
RM****	Cement Resistor 5W S Type
RV**	Variable Resistor Vertical Type 6φ
RV***/A	Variable Resistor Vertical Metal 6φ
RV***/B	Variable Resistor Down Type 6φ
RV***/C	Variable Resistor Vertical 6φ 4 pin
PR****	Printed Resistor (on PC Board)

3. SCHEMATIC DIAGRAM

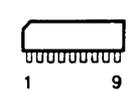


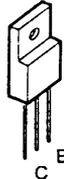


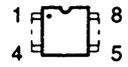
Service Manual
 Video Cassette Recorder
TVR-202 No. 289C2010

4. IC, TRANSISTOR LEAD IDENTIFICATION

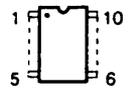
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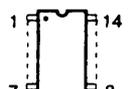
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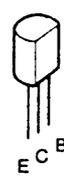
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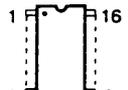
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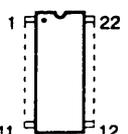
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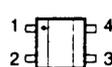
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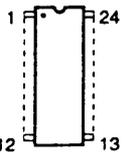
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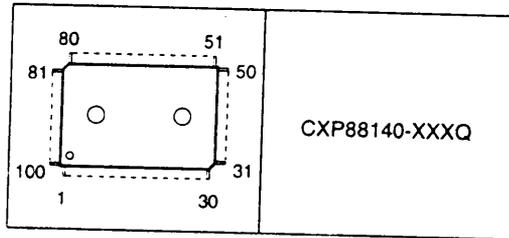
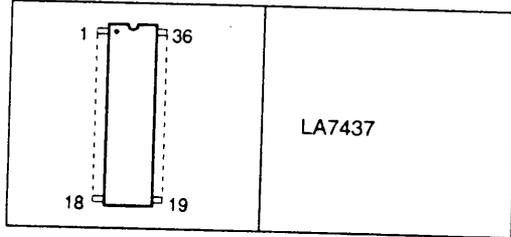
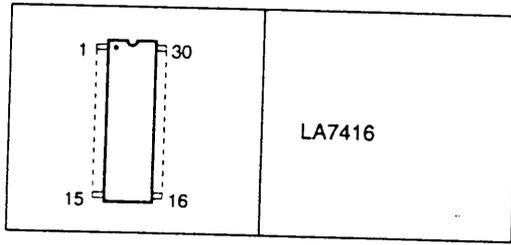
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	<p>PST9129T</p>
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	<p>LC89970</p>
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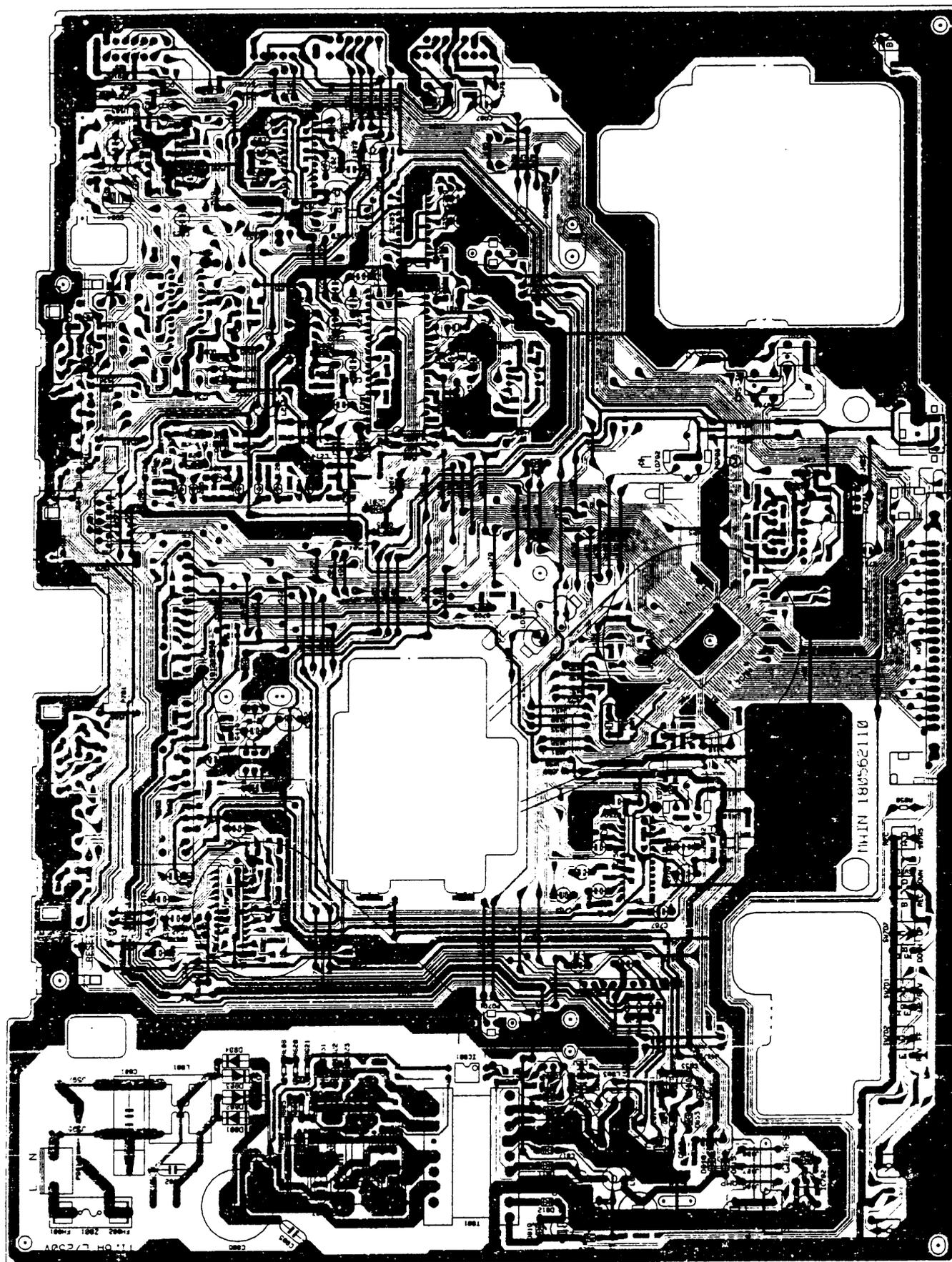
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	<p>LA7411 LA7156 LA7116 LA7286 LC74781.9112</p>
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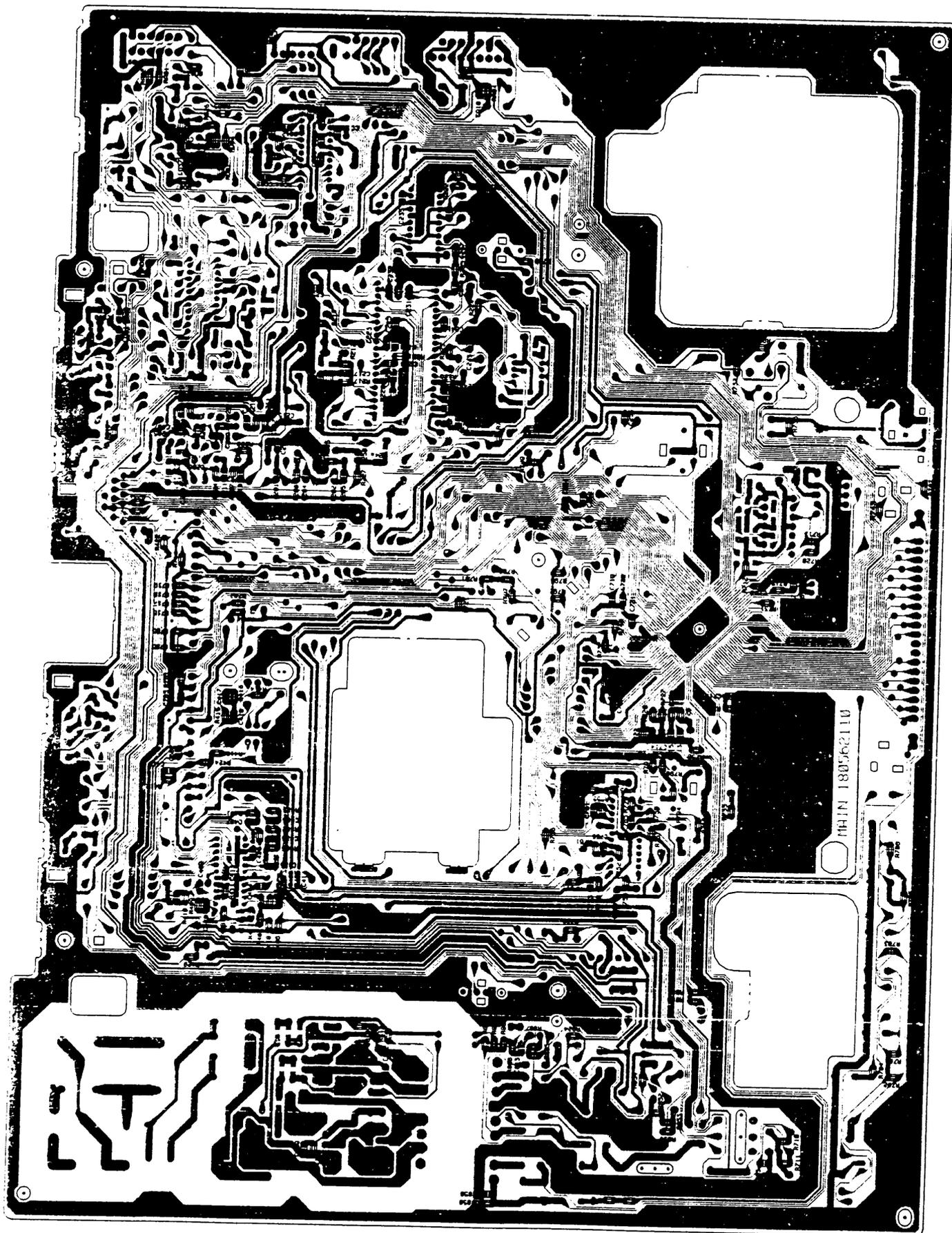


5. ELECTRICAL PARTS LOCATION

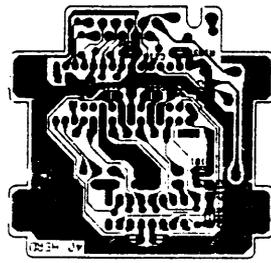
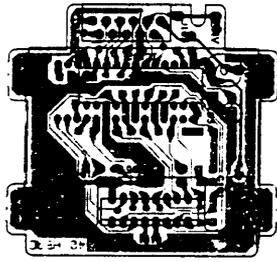
PC BOARD ASS'Y (MAIN)



PC BOARD ASS'Y (MAIN)



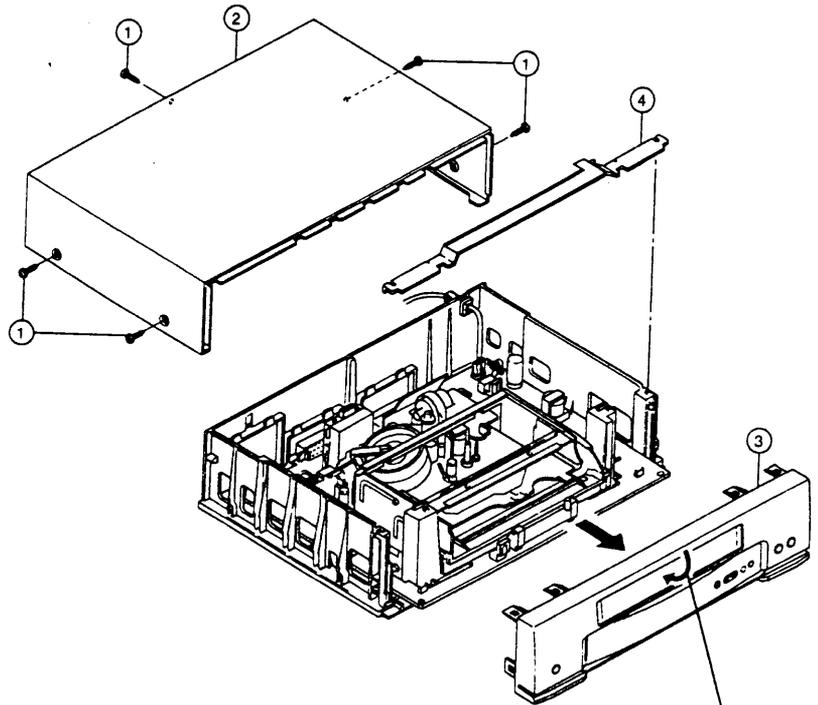
PC BOARD ASS'Y (HEAD)



6. REMOVAL OF THE DECK MECHANISM

6-1. REMOVING THE TOP COVER AND FP ASSY

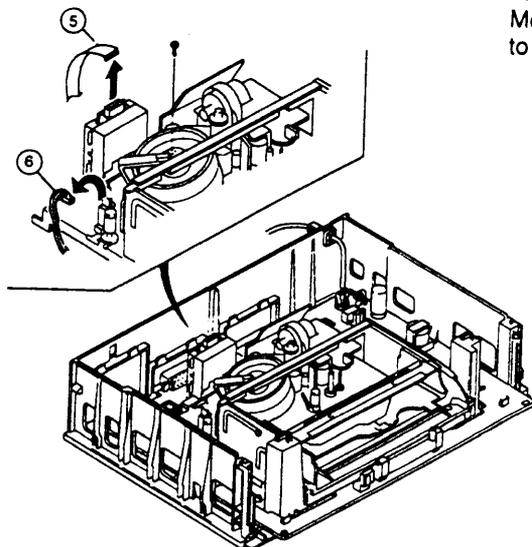
- ① Remove the four screws.
- ② Remove the Top Cover.
- ③ Remove the FP Assy, held in position by the eight prongs, the direction of arrow.
- ④ Remove the Bracket.



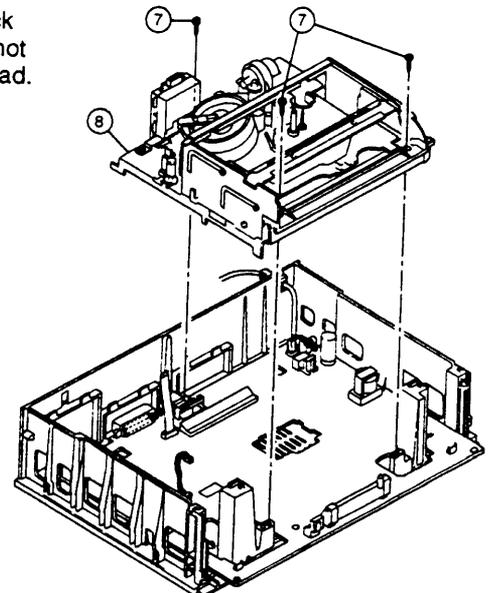
* Attach the Face Plate with the Dust Cover pushed open.

6-2. REMOVING THE DECK MECHANISM

- ⑤ Disconnect the Flexible Wire 9P from the Head Amp Unit.
- ⑥ Disconnect the Connector (N401) from the Deck Mechanism.
- ⑦ Remove three screws.
- ⑧ Remove the Deck Mechanism.



* When handling the Deck Mechanism, take care not to touch the cylinder head.

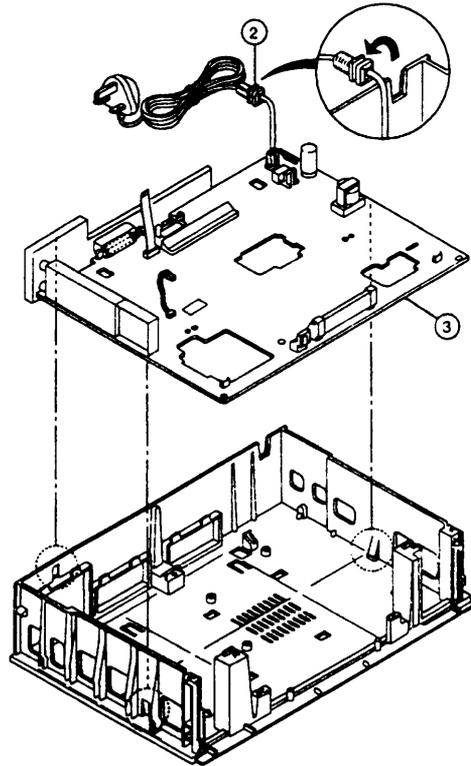
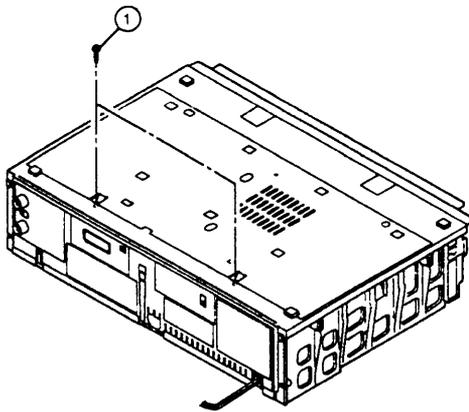


7. BRIEF SERVICE INSTRUCTION

7-1. REMOVING THE MAIN PCB

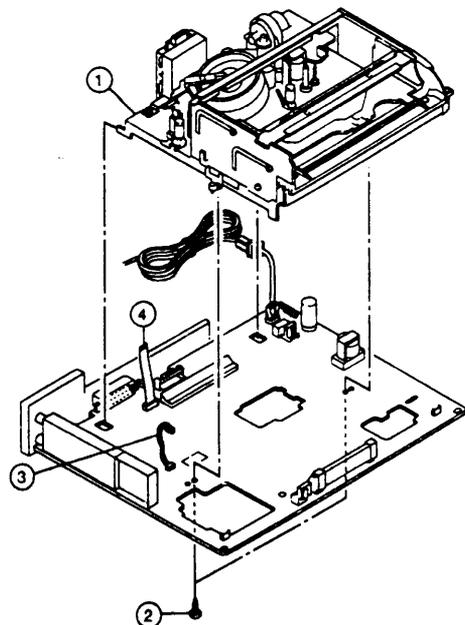
Remove the Deck Mechanism as described in steps 1-1 and 1-2 of 1. REMOVAL OF THE DECK MECHANISM.

- ① Remove the two screws.
- ② Disconnect the Power Cord from the chassis.
- ③ Remove the Main PCB from the three prongs on the chassis. (Do not hold the Tuner when removing the Main PCB.) Remove the Sub PCB, if one is attached, from the Main PCB.



7-2. INSTALLING THE DECK MECHANISM FOR BRIEF OPERATION

- ① Attach the Deck Mechanism to the Main PCB removed from the chassis.
- ② Fix the two spacers of the Deck Mechanism to the back of the Main PCB with screws.
- ③ Attach the (N401) Connector to the Deck Mechanism.
- ④ Attach the 9P Flexible Wire to the Head Amp Unit.



8. CABINET EXPLODED VIEW

