

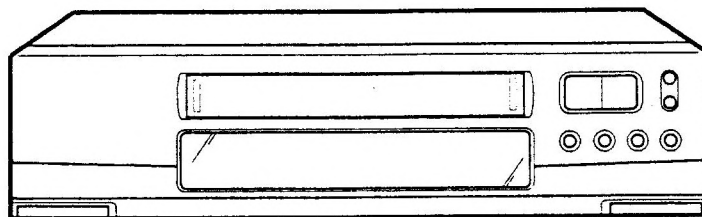
# Service Manual

## ORION

### VH-501

*VCR655A take*

VIDEO CASSETTE RECORDER



**VHS**  
PAL

## SPECIFICATIONS

<b>Power Source :</b>	AC230V/50Hz	<b>Audio Track :</b>	1 track
<b>Power Consumption :</b>	Approx. 23W	<b>Tape Format :</b>	12.65mm high density tape
<b>Operating Temperature :</b>	5°C to 40°C	<b>RF Output Channel :</b>	36 (± 4) channel
<b>Television System :</b>	CCIR : 625 lines,50 fields PAL-Farbsignal	<b>Tape Speed:</b>	23.39mm/s
<b>Video Recording System :</b>	2 rotary heads, helical scanning system Luminance : FM azimuth recording Color signal : Converted subcarrier phase shift recording	<b>F.FWD/REW Time :</b>	Approx. 2 minutes 30 seconds (with E-180 Cassette Tape)
<b>Heads:</b>	Video : 2 rotary heads Erase : 1 full track erase head Audio/Control : 1 stationary head	<b>Input Level :</b>	VIDEO : 1.0Vp-p, 75 ohm unbalanced AUDIO : 500mV, 50k ohm unbalanced
		<b>Output Level :</b>	VIDEO : 1.0Vp-p, 75 ohm unbalanced AUDIO : 500mV, 1k ohm unbalanced
		<b>Weight :</b>	4.0 Kg
		<b>Dimension :</b>	380(W) × 92(H) × 280(D) mm

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Design and specification are subject to change without notice.

## SERVICING NOTICES ON CHECKING

### 1. KEEP THE NOTICES

As for the places which need special attentions, they are indicated with the labels or seals on the cabinet, chassis and parts. Make sure to keep the indications and notices in the operation manual.

### 2. USE THE DESIGNATED PARTS

The parts in this equipment have the specific characters of incombustibility and withstand voltage for safety. Therefore, the part which is replaced should be used the part which has the same character.

Especially as to the important parts for safety which is indicated in the circuit diagram or the table of parts as a  $\Delta$  mark, the designated parts must be used.

### 3. PUT PARTS AND WIRES IN THE ORIGINAL POSITION AFTER ASSEMBLING OR WIRING

There are parts which use the insulation material such as a tube or tape for safety, or which are assembled in the condition that these do not contact with the printed board. The inside wiring is designed not to get closer to the pyrogenic parts and high voltage parts. Therefore, put these parts in the original positions.

### 4. PERFORM A SAFETY CHECK AFTER SERVICING

Confirm that the screws, parts and wiring which were removed in order to service are put in the original positions, or whether there are the portions which are deteriorated around the serviced places serviced or not. Check the insulation between the antenna terminal or external metal and the AC cord plug blades. And be sure the safety of that.

## HOW TO ORDER PARTS

Please include the following informations when you order parts. (Particularly the CHASSIS CODE.)

#### 1. MODEL NUMBER and CHASSIS CODE

You can find it in the back of your unit.

#### 2. PART NO. and DESCRIPTION

You can find it in your SERVICE MANUAL.

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# DISASSEMBLY INSTRUCTIONS

## 1. REMOVAL OF MECHANICAL PARTS AND P.C. BOARDS

### 1-1: TOP CABINET AND FRONT CABINET (Refer to Fig. 1-1)

1. Remove the 4 screws ①.
2. Remove the Top Cabinet in the direction of arrow (A).
3. Disconnect the following connector. (CP651 4 pins)
4. Unlock the 2 supports ②.
5. Remove the Front Cabinet in the direction of arrow (B).
6. Remove the 3 screws ③ and remove the Operation PCB.

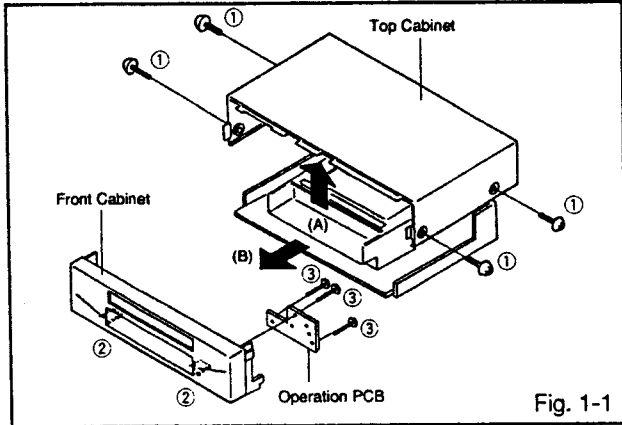


Fig. 1-1

### 1-2: LOCATION OF P.C. BOARDS (Refer to Fig. 1-2)

**CAUTION: BEFORE ATTEMPTING TO REMOVE OR REPAIR ANY PCB, UNPLUG THE POWER CORD FROM THE AC SOURCE.**

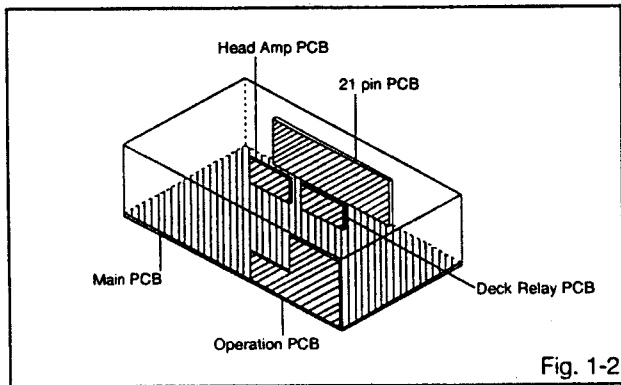


Fig. 1-2

### 1-3: BOTTOM CHASSIS (Refer to Fig. 1-3)

1. Unlock the 2 supports ①.
2. Remove the Bottom Chassis in the direction of arrow.

#### NOTE

AC Cord must be removed from the AC Jack before PCB and Deck Chassis can be removed.

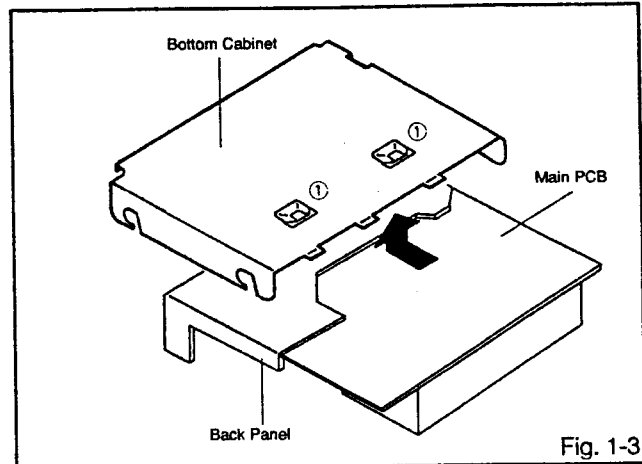


Fig. 1-3

### 1-4: FLAP (Refer to Fig. 1-4)

1. Open Flap to 90° and flex in direction of arrow (A), at the same time slide in direction of arrow (B).
2. Then lift in direction of arrow (C).

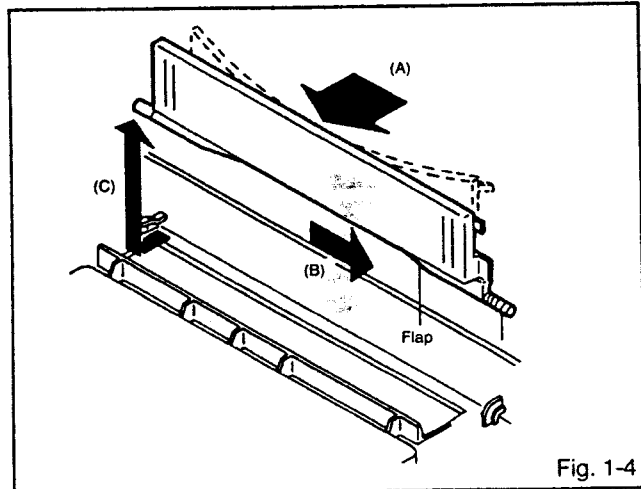


Fig. 1-4

### 1-5: MAIN PCB (Refer to Fig. 1-5)

1. Remove the 3 screws ①.
2. Disconnect the 2 connectors (CY1003 20 pins and CY4001 22 pins) and remove the Deck Chassis in the direction of arrow.

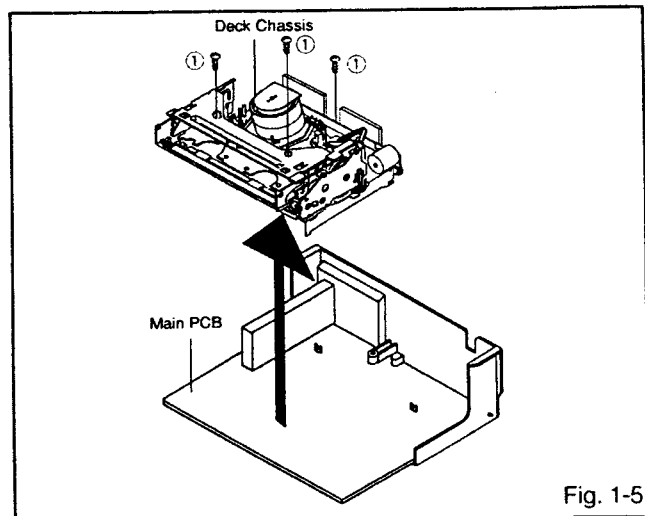
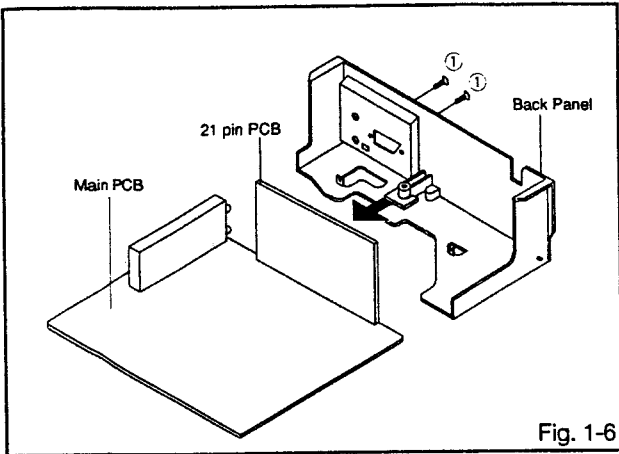


Fig. 1-5

# DISASSEMBLY INSTRUCTIONS

## 1-6: MAIN PCB AND BACK PANEL (Refer to Fig. 1-6)

1. Remove the 2 screws ①.
2. Remove the Main PCB in the direction of arrow.

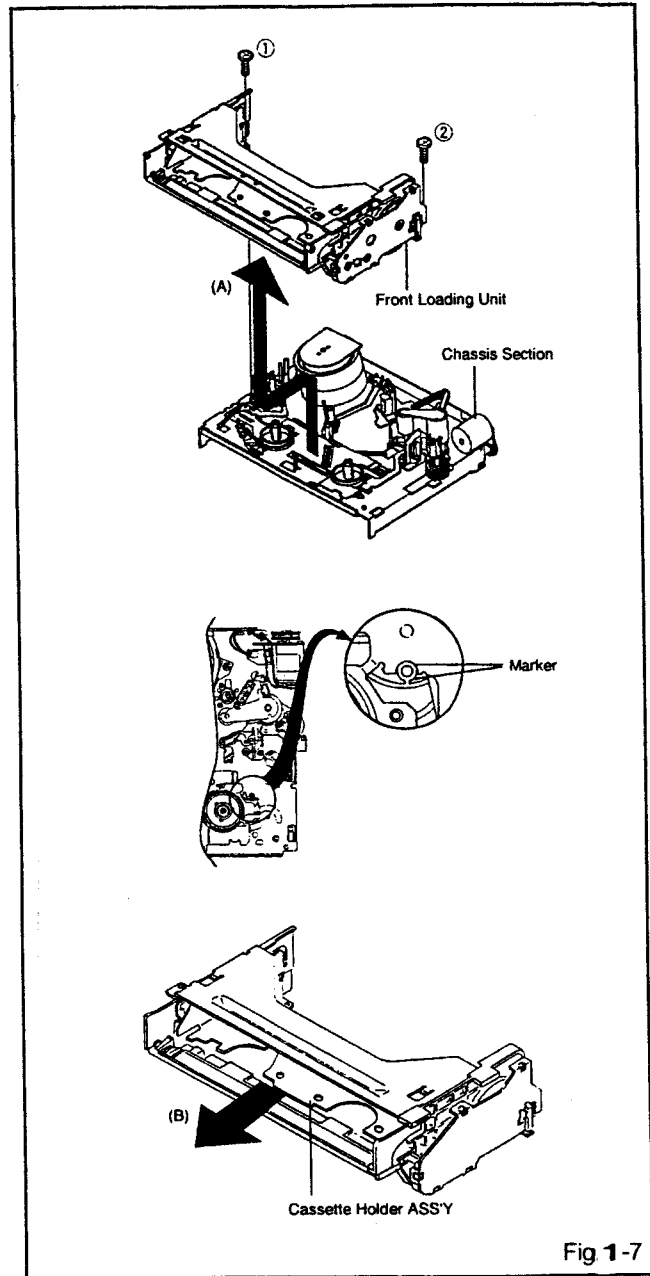


## 1-7: CHASSIS SECTION AND FRONT LOADING UNIT (Refer to Fig. 1-7)

1. Remove the screw ①.
2. Remove the screw ②.
3. Remove Front Loading in the direction of arrow (A).

### NOTE

When installing the Front Loading Unit, align the timing marks and pull the Cassette Holder ASS'Y in the direction of arrow (B).



# DISASSEMBLY INSTRUCTIONS

## 2. REMOVAL OF DECK PARTS

### 2-1: LINK GEAR (R) / CLUTCH GEAR (Refer to Fig. 2-1)

1. Unlock support ①.
2. Remove the BOT Sensor cover.
3. Unlock the 2 supports ② and remove the BOT Reflector.
4. Remove the Flap Lever Spring.
5. Unlock the 5 supports ③.
6. Remove the Side Bracket R2 and Spring Earth.
7. Remove the Flap Lever, Link Gear (R) and Cam Gear Ass'y.

#### NOTE

When installing the Cam Gear Ass'y and Rink Gear (R), align the timing Marks.

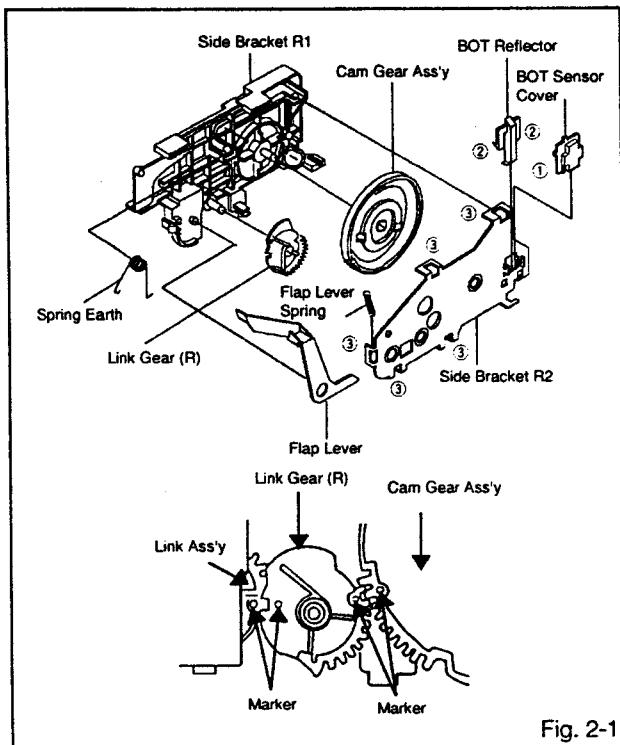


Fig. 2-1

### 2-2: TOP BRACKET / TAPE PIECE GUIDE (Refer to Fig. 2-2)

1. Unlock the 3 supports ① and remove the Tape Piece Guide.
2. Unlock the 2 supports ②.
3. Remove the Top Bracket with the Side Bracket L.

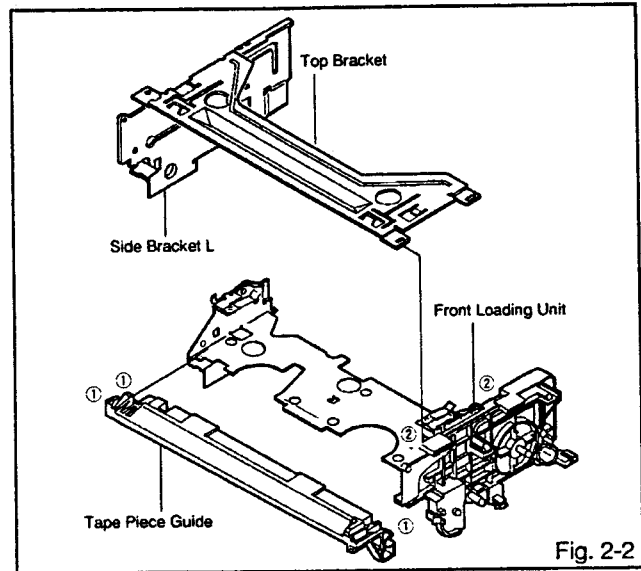


Fig. 2-2

### 2-3: SIDE BRACKET R1 / CAM GEAR (Refer to Fig. 2-3)

1. Remove the Side Bracket R1.
2. Unlock the support ①.
3. Remove the Joint Gear.
4. Remove the Removing.
5. Remove the Spring Locker R.

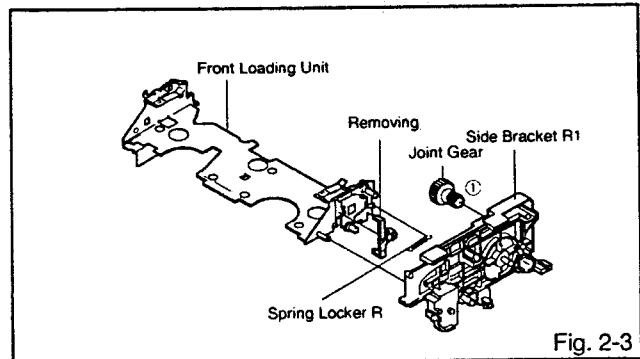
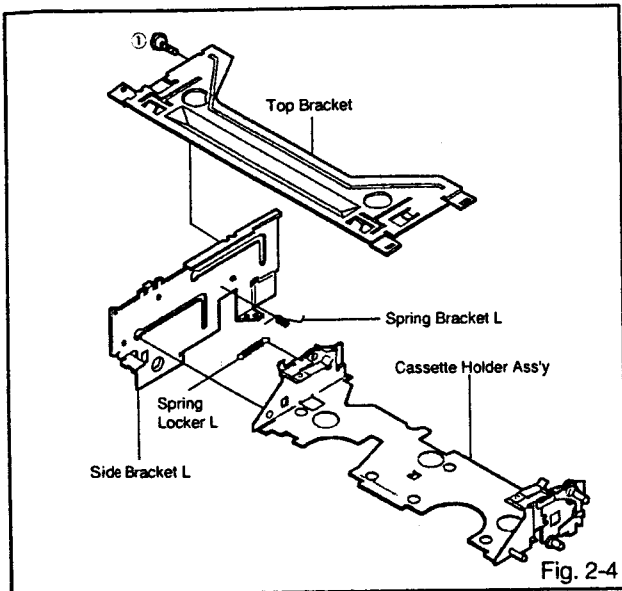


Fig. 2-3

### 2-4: SIDE BRACKET L (Refer to Fig. 2-4)

1. Remove the screw ①.
2. Remove the Side Bracket L.
3. Remove the Spring Locker L.
4. Remove the Spring Bracket L.

## DISASSEMBLY INSTRUCTIONS

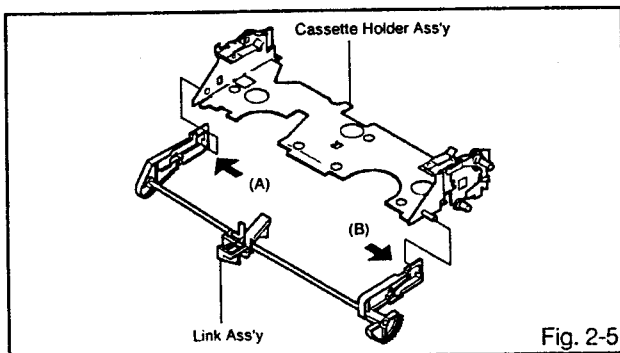


### 2-5: LINK ASS'Y (Refer to Fig. 2-5)

1. After removing in the direction (A) of Link Ass'y remove the Link Ass'y in the direction (B).

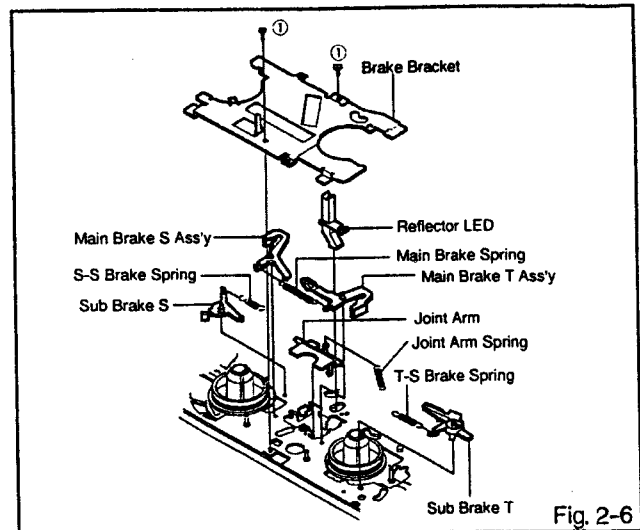
#### NOTE

Install the (B) first, then install the (A).



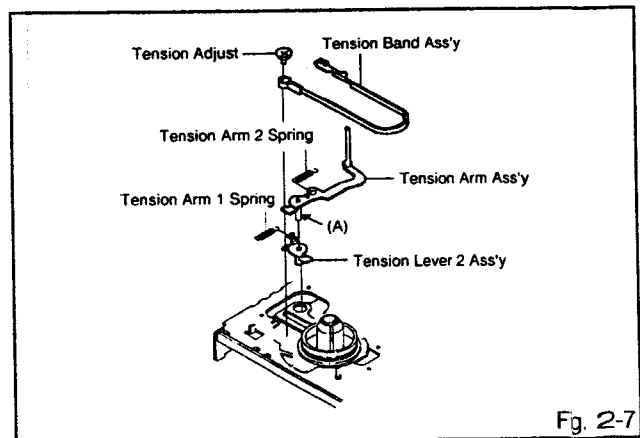
### 2-6: BRAKE BRACKET (Refer to Fig. 2-6)

1. Remove the Main Brake Spring, S-S Brake Spring, Joint Arm Spring and T-S Brake Spring.
2. Remove the 2 screws ①.
3. Remove the Brake Bracket.
4. Remove the Sub Brake S, Sub Brake T, Main Brake S ASS'Y and Main Brake T Ass'y.
5. Remove the Joint Arm.
6. Remove the Reflector LED.



### 2-7: TENSION BAND (Refer to Fig. 2-7)

1. Remove the Tension Arm Spring 1.
2. Remove the Tension Arm Spring 2.
3. Remove the Tension Adjust.
4. Remove the Tension Arm Ass'y.
5. Remove the Tension Band Ass'y.
6. Remove the Tension Lever 2 Ass'y.



#### NOTE

1. Install the Tension Band Ass'y without twisting it.
2. After oiling (Kyoudo oil slaidasu #150 the (A)).(Refer to Fig. 2-7)

### 2-8: REEL DISK (Refer to Fig. 2-8)

1. Remove the Reel Disk S Ass'y and Reel Disk T Ass'y.
2. Remove the 2 polyslider washers ①.



# DISASSEMBLY INSTRUCTIONS

## NOTES

1. Installation after Disassembly in section 2-7 1, 2 and 3.
2. The Height Adjustment washers ① are sometimes attached to the back of the Reel Disk.
3. Clean the Reel Disk Shaft and Put in height adjusting washers ①.
4. Be careful not to damage the Tension Band Ass'y at the time of removal and installation.
5. Be careful not to scratch the Reel Disk Shaft with the polyslider washer or the tool at the time of removal and installation.
6. After oiling (Kyoudo oil slaidasu #150 the Reel Disk Shaft, install the new Reel Disk S Ass'y and Reel Disk T Ass'y again.
7. After installation, adjust the height of the Reel Disk.  
(Refer to item 1-1 of MECHANICAL ADJUSTMENTS)
8. After installation, adjust and confirm the tension post position.  
(Refer to item 1-2 of MECHANICAL ADJUSTMENTS)

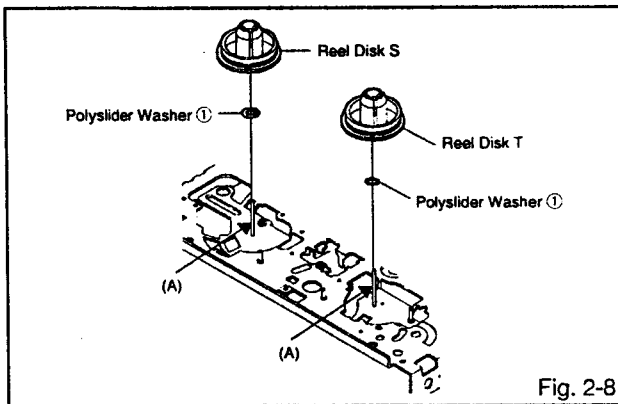


Fig. 2-8

## 2-9: PINCH ROLLER / CASSETTE OPENER (Refer to Fig. 2-9)

1. Unlock the support ①.
2. Remove the Pinch Roller.
3. Remove the screw ②.
4. Unlock the 2 supports ③.
5. Remove the Cassette Opener.
6. Remove the Spring P5 and Arm P5 Ass'y.
7. Remove the Cam Gear and Cam Pinch Roller.
8. Remove the polyslider washer and Cam P5.

## NOTES

1. Do not touch the Pinch Roller. (Use gloves.)
2. When installing the Cam P5, Cam Pinch Roller and Cam Gear, align the timing marks.

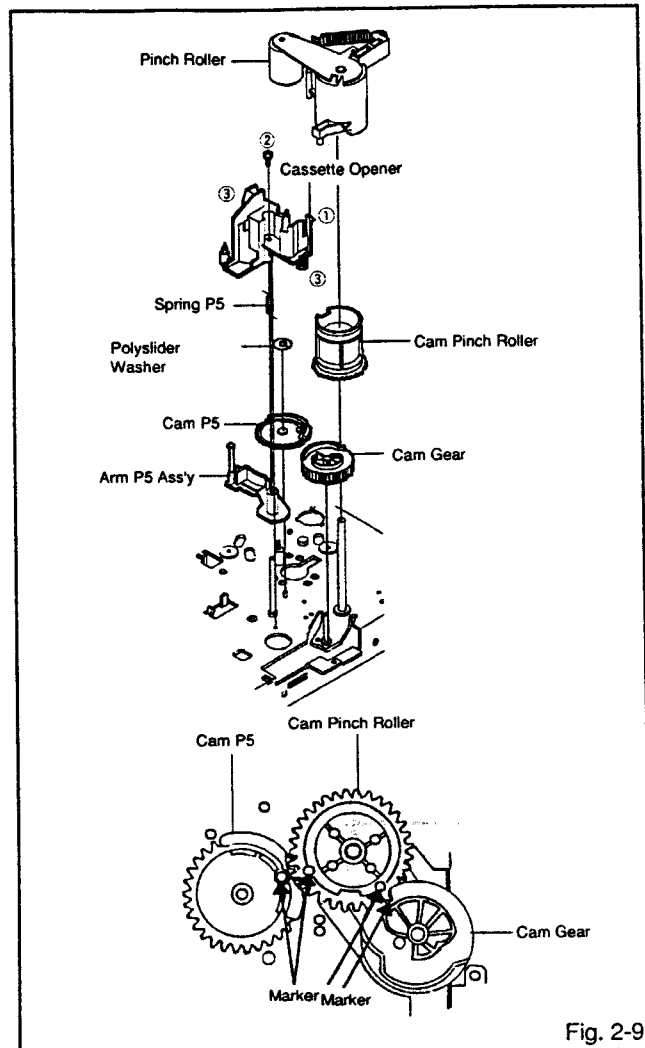


Fig. 2-9

## 2-10: AUDIO CONTROL HEAD (Refer to Fig. 2-10)

1. Disconnect the conector (CD5001 6 pins) on the Audio Control Head PCB.
2. Remove the 3 screws ①.
3. Remove the 3 Audio Control Head Springs.
4. Remove the Audio Control Head.

## NOTES

1. Do not touch the head by any means when replacing the Audio Control Head. (Use gloves.)
2. After replacement, confirm the following adjustment.
  - a. MECHANICAL ADJUSTMENTS: ITEM 2-2
  - b. MECHANICAL ADJUSTMENTS: ITEM 2-3

# DISASSEMBLY INSTRUCTIONS

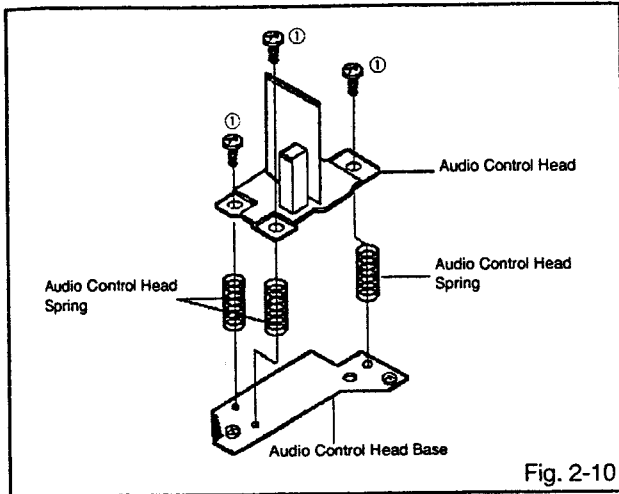


Fig. 2-10

## 2-11: CYLINDER UNIT (Refer to Fig. 2-11)

1. Disconnect the following connectors.  
(CD2001 7 pins and CP4101 4 pins)
2. Remove the Joint Screw, then remove the Azimuth Spring.
3. Remove the 2 screws ①, then remove the Polyslider Washer and Cylinder Unit from the Main Chassis.

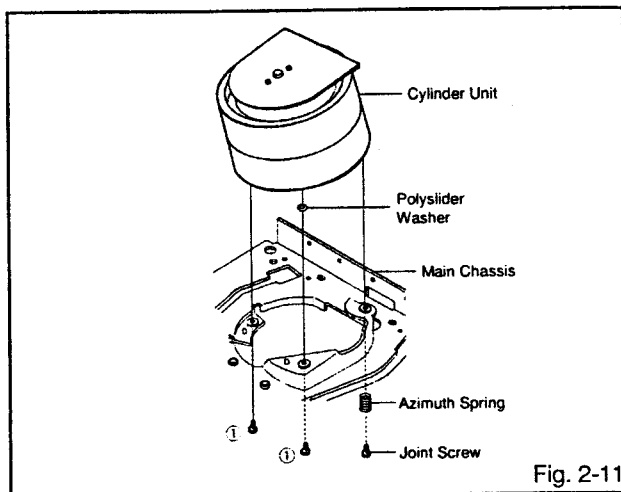


Fig. 2-11

## 2-12: PLATE BOTTOM (Refer to Fig. 2-12)

1. Remove the Capstan Belt.
2. Remove the 2 screws ①.
3. Remove the 3 screws ②.
4. Remove the Tension Lever Spring.
5. Remove the Plate Bottom.
6. Remove the Rotary Switch.

### NOTE

When installing the Rotary SW, align the timing position.

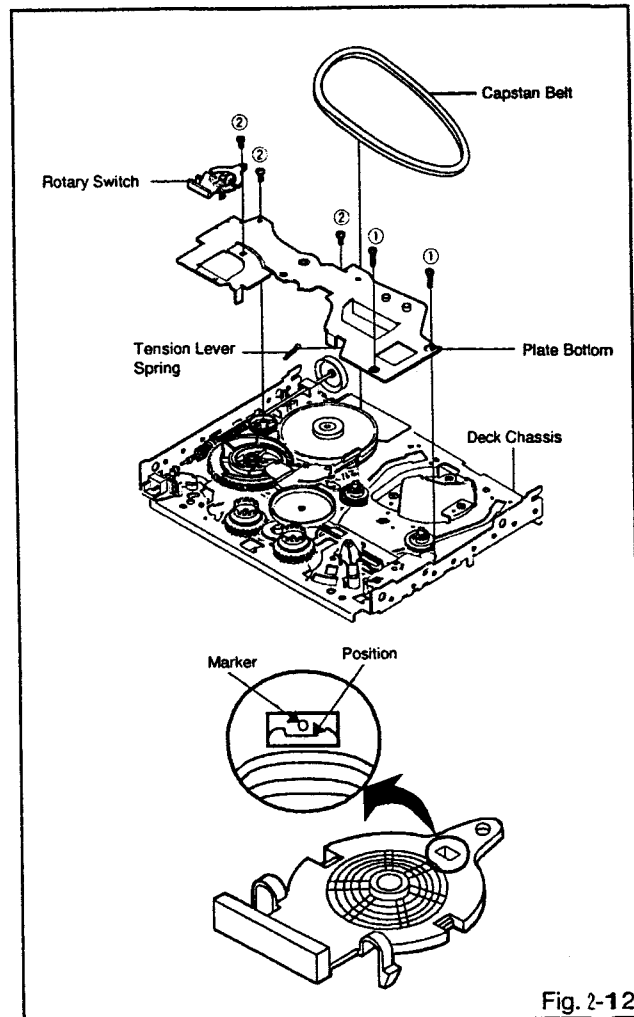


Fig. 2-12

## 2-13: CENTER PULLEY (Refer to Fig. 2-13)

1. Remove the polyslider washer ①.
2. Remove the Center Pulley.
3. Remove the polyslider washer ②.
4. Remove the Center Pulley Spring.
5. Remove the Idler Arm Ass'y.
6. Remove the 2 polyslider washers ③.
7. Remove the Clutch Gear T Ass'y and Clutch Gear S Ass'y.

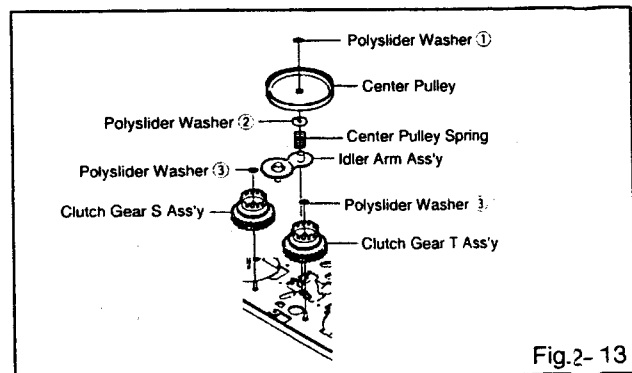


Fig. 2-13

## DISASSEMBLY INSTRUCTIONS

### 2-14: MAIN CAM (Refer to Fig. 2-14)

1. Remove the Loading Lever.
2. Remove the Main Brake Lever.
3. Remove the Capstan Brake Spring.
4. Remove the Capstan Brake Ass'y.
5. Remove the Main Rod Spring.
6. Remove the Tension Holder.
7. Remove the Tension Lever Spring.
8. Remove the Tension Lever.
9. Remove the Main Cam.
10. Remove the Middle Gear.
11. Remove the Main Rod Ass'y.

#### NOTES

1. When installing the Main Rod ASS'Y, install side (B) first, then install side (A).
2. When installing the Loading Lever, align the timing marks.

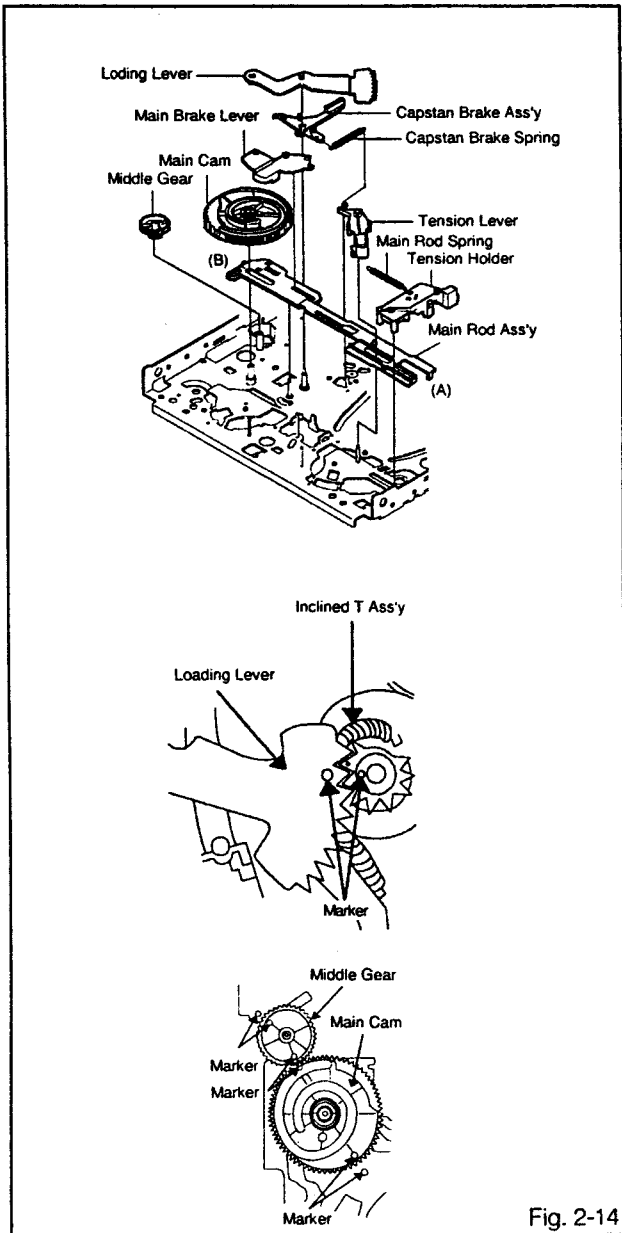


Fig. 2-14

### 2-15: CAPSTAN DD UNIT (Refer to Fig. 2-15)

1. Remove the Capstan Motor Belt.
2. Remove the screw ①.
3. Disconnect the CX4003 9 pins.
4. Remove the screw ②.
5. Remove the Deck Relay PCB.
6. Remove the 3 screws ③.
7. Remove the Capstan DD Unit.

#### NOTE

Use the specified screw to hold the Capstan DD Unit.

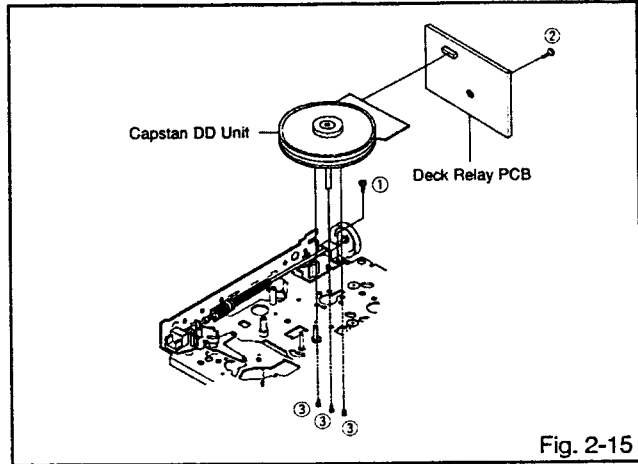


Fig. 2-15

### 2-16: INCLINED T ASS'Y, INCLINED S ASS'Y (Refer to Fig. 2-16)

1. Remove the 2 CS-Rings.
2. Remove the Inclined T Ass'y and Inclined S Ass'y.
3. Remove the Loading Gear T Ass'y.
4. Remove the Loading Gear S Ass'y.

#### NOTE

When installing the Inclined T ASS'Y and Inclined S ASS'Y, align the timing marks.

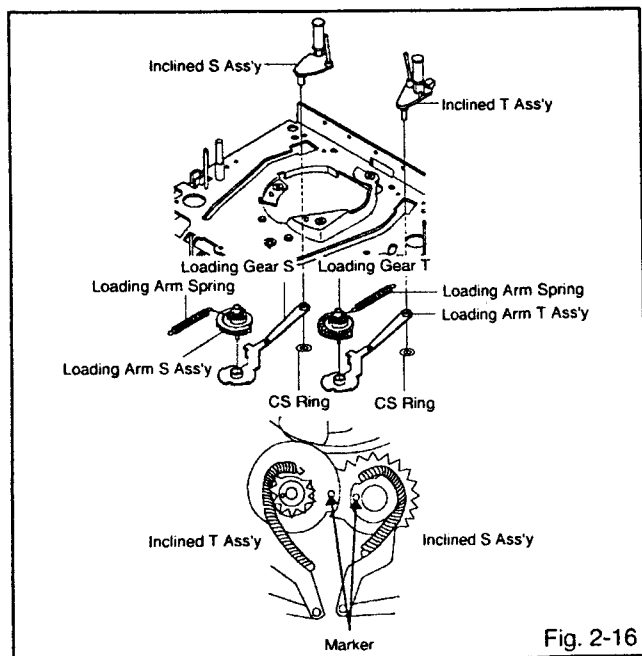


Fig. 2-16

## KEY TO ABBREVIATIONS

<b>A</b>	<b>A/C</b>	: Audio/Control	<b>H.SW</b>	: Head Switch	
	<b>ACC</b>	: Automatic Color Control	<b>Hz</b>	: Hertz	
	<b>AE</b>	: Audio Erase	<b>I</b>	<b>IC</b>	: Integrated Circuit
	<b>AFC</b>	: Automatic Frequency Control		<b>IF</b>	: Intermediate Frequency
	<b>AFT</b>	: Automatic Fine Tuning		<b>IND</b>	: Indicator
	<b>AFT DET</b>	: Automatic Fine Tuning Detect		<b>INV</b>	: Inverter
	<b>AGC</b>	: Automatic Gain Control	<b>K</b>	<b>KIL</b>	: Killer
	<b>AMP</b>	: Amplifier	<b>L</b>	<b>L</b>	: Left
	<b>ANT</b>	: Antenna		<b>LED</b>	: Light Emitting Diode
	<b>A.PB</b>	: Audio Playback		<b>LIMIT AMP</b>	: Limiter Amplifier
	<b>APC</b>	: Automatic Phase Control		<b>LM, LDM</b>	: Loading Motor
	<b>ASS'Y</b>	: Assembly		<b>LP</b>	: Long Play
	<b>AT</b>	: All Time		<b>L.P.F</b>	: Low Pass Filter
	<b>AUTO</b>	: Automatic		<b>LUMI.</b>	: Luminance
	<b>A/V</b>	: Audio/Video	<b>M</b>	<b>M</b>	: Motor
<b>B</b>	<b>BGP</b>	: Burst Gate Pulse		<b>MAX</b>	: Maximum
	<b>BOT</b>	: Beginning of Tape		<b>MINI</b>	: Minimum
	<b>BPF</b>	: Bandpass Filter		<b>MIX</b>	: Mixer, mixing
	<b>BRAKE SOL</b>	: Brake Solenoid		<b>MM</b>	: Monostable Multivibrator
	<b>BUFF</b>	: Buffer		<b>MOD</b>	: Modulator, Modulation
	<b>B/W</b>	: Black and White		<b>MPX</b>	: Multiplexer, Multiplex
<b>C</b>	<b>C</b>	: Capacitance, Collector		<b>MS SW</b>	: Mech State Switch
	<b>CASE</b>	: Cassette	<b>N</b>	<b>NC</b>	: Non Connection
	<b>CAP</b>	: Capstan		<b>NR</b>	: Noise Reduction
	<b>CARR</b>	: Carrier	<b>O</b>	<b>OSC</b>	: Oscillator
	<b>CH</b>	: Channel		<b>OPE</b>	: Operation
	<b>CLK</b>	: Clock	<b>P</b>	<b>PB</b>	: Playback
	<b>CLOCK (SY-SE)</b>	: Clock (Syscon to Servo)		<b>PB CTL</b>	: Playback Control
	<b>COMB</b>	: Combination, Comb Filter		<b>PB-C</b>	: Playback-Chrominance
	<b>CONV</b>	: Converter		<b>PB-Y</b>	: Playback-Luminance
	<b>CPM</b>	: Capstan Motor		<b>PCB</b>	: Printed Circuit Board
	<b>CTL</b>	: Control		<b>P. CON</b>	: Power Control
	<b>CYL</b>	: Cylinder		<b>PD</b>	: Phase Detector
	<b>CYL-M</b>	: Cylinder-Motor		<b>PG</b>	: Pulse Generator
	<b>CYL SENS</b>	: Cylinder-Sensor		<b>P-P</b>	: Peak-to Peak
<b>D</b>	<b>DATA (SY-CE)</b>	: Data (Syscon to Servo)	<b>R</b>	<b>R</b>	: Right
	<b>dB</b>	: Decibel		<b>REC</b>	: Recording
	<b>DC</b>	: Direct Current		<b>REC-C</b>	: Recording-Chrominance
	<b>DD Unit</b>	: Direct Drive Motor Unit		<b>REC-Y</b>	: Recording-Luminance
	<b>DEMOD</b>	: Demodulator		<b>REEL BRK</b>	: Reel Brake
	<b>DET</b>	: Detector		<b>REEL S</b>	: Reel Sensor
	<b>DEV</b>	: Deviation		<b>REF</b>	: Reference
<b>E</b>	<b>E</b>	: Emitter		<b>REG</b>	: Regulated, Regulator
	<b>EF</b>	: Emitter Follower		<b>REW</b>	: Rewind
	<b>EMPH</b>	: Emphasis		<b>REV, RVS</b>	: Reverse
	<b>ENC</b>	: Encoder		<b>RF</b>	: Radio Frequency
	<b>ENV</b>	: Envelope		<b>RMC</b>	: Remote Control
	<b>EOT</b>	: End of Tape		<b>RY</b>	: Relay
	<b>EQ</b>	: Equalizer	<b>S</b>	<b>S. CLK</b>	: Serial Clock
	<b>EXT</b>	: External		<b>S. COM</b>	: Sensor Common
<b>F</b>	<b>F</b>	: Fuse		<b>S. DATA</b>	: Serial Data
	<b>FBC</b>	: Feed Back Clamp		<b>SEG</b>	: Segment
	<b>FE</b>	: Full Erase		<b>SEL</b>	: Select, Selector
	<b>FF</b>	: Fast Forward, Flipflop		<b>SENS</b>	: Sensor
	<b>FG</b>	: Frequency Generator		<b>SER</b>	: Search Mode
	<b>FL SW</b>	: Front Loading Switch		<b>SI</b>	: Serial Input
	<b>FM</b>	: Frequency Modulation		<b>SIF</b>	: Sound Intermediate Frequency
	<b>FSC</b>	: Frequency Sub Carrier		<b>SO</b>	: Serial Output
	<b>FWD</b>	: Forward		<b>SOL</b>	: Solenoid
<b>G</b>	<b>GEN</b>	: Generator		<b>SP</b>	: Standard Play
	<b>GND</b>	: Ground		<b>STB</b>	: Serial Strobe
<b>H</b>	<b>H.P.F</b>	: High Pass Filter		<b>SW</b>	: Switch

## KEY TO ABBREVIATIONS

<b>S</b>	<b>SYNC</b>	: Synchronization
	<b>SYNC SEP</b>	: Sync Separator, Separation
<b>T</b>	<b>TR</b>	: Transistor
	<b>TRAC</b>	: Tracking
	<b>TRICK PB</b>	: Trick Playback
	<b>TP</b>	: Test Point
<b>U</b>	<b>UNREG</b>	: Unregulated
<b>V</b>	<b>V</b>	: Volt
	<b>VCO</b>	: Voltage Controlled Oscillator
	<b>VIF</b>	: Video Intermediate Frequency
	<b>VP</b>	: Vertical Pulse, Voltage Display
	<b>V.PB</b>	: Video Playback
	<b>VR</b>	: Variable Resistor
	<b>V.REC</b>	: Video Recording
	<b>VSF</b>	: Visual Search Fast Forward
	<b>VSR</b>	: Visual Search Rewind
	<b>VSS</b>	: Voltage Super Source
	<b>V-SYNC</b>	: Vertical-Synchronization
	<b>VT</b>	: Voltage Tuning
<b>X</b>	<b>XTAL</b>	: Crystal
<b>Y</b>	<b>Y/C</b>	: Luminance/Chrominance

# PREVENTIVE CHECKS AND SERVICE INTERVALS

The following standard table depends on environmental conditions and usage. Unless maintenance is properly carried out, the following service intervals may be quite shortened as harmful effects may be had on other parts. Also, long term storage or misuse may cause transformation and aging of rubber parts.

Parts Name \ Time	500 hours	1,000 hours	1,500 hours	2,000 hours	3,000 hours	Notes
Audio Control Head	■	■	■	■	■	Clean those parts in contact with the tape.
Full Erase Head	■	■	■	■	■	
Roding Motor Belt		■		●		Clean the rubber, and parts which the rubber touches.
Reel Belt		■		●		
Pinch Roller	■	■	■	■	■ ●	
Capstan DD Unit					●	
Loading Motor					●	
Tension Band					●	
Capstan Shaft	■	■	■	■	■	
Tape Running Guide Post	■	■	■	■	■	Replace when rolling becomes abnormal.
Cylinder Unit	■	■ ●	■	■ ●	■ ●	Clean the Head.

● : Replace    ■ : Clean

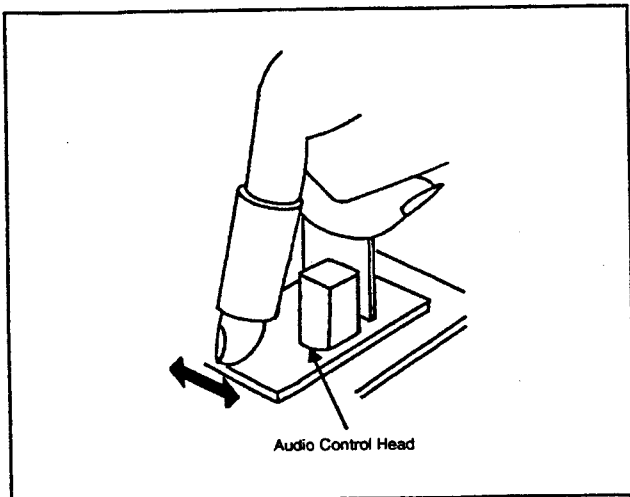
## CLEANING

### NOTE

- After cleaning the heads with isopropyl alcohol, do not run a tape until the heads dry completely. If the heads are not completely dry and alcohol gets on the tape, damage may occur.

### 1. AUDIO CONTROL HEAD

- Wrap a piece of chamois around your finger. Dip it in isopropyl alcohol and clean the audio control head by wiping it horizontally. Clean the full erase head in the same manner. (Refer to the figure below)



### 2. TAPE RUNNING SYSTEM

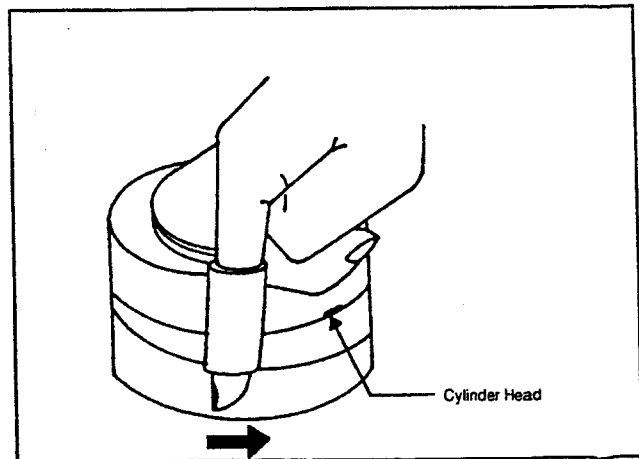
- When cleaning the tape transport system, use the gauze moistened with isopropyl alcohol.

### 3. CYLINDER

- Wrap a piece of chamois around your finger. Dip it in isopropyl alcohol. Hold it to the cylinder head softly. Turn the cylinder head counterclockwise to clean it (in the direction of the arrow). (Refer to the figure below)

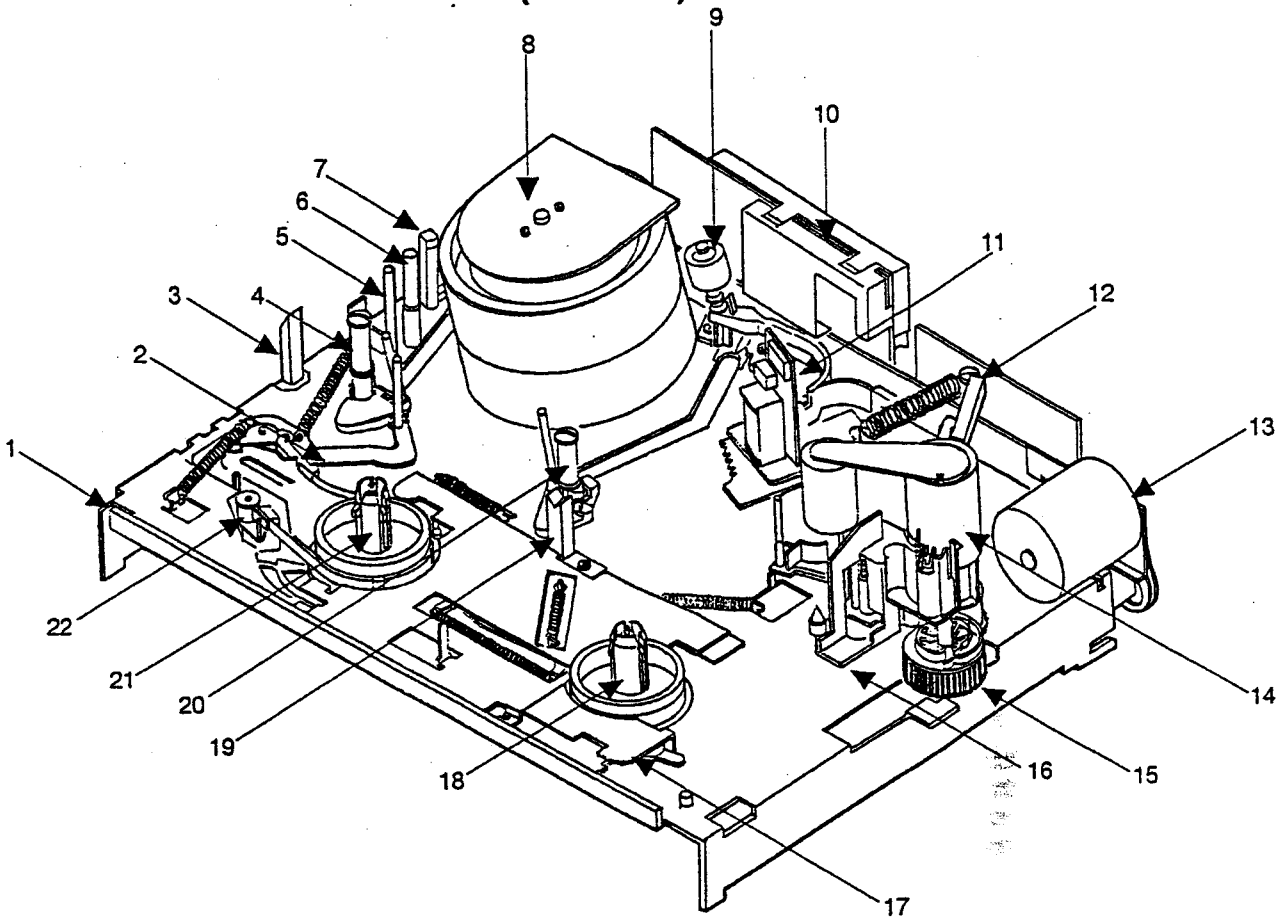
### NOTE

Do not exert force against the cylinder head. Do not move the chamois up or down since this can damage the head. Always use a piece of chamois for cleaning.



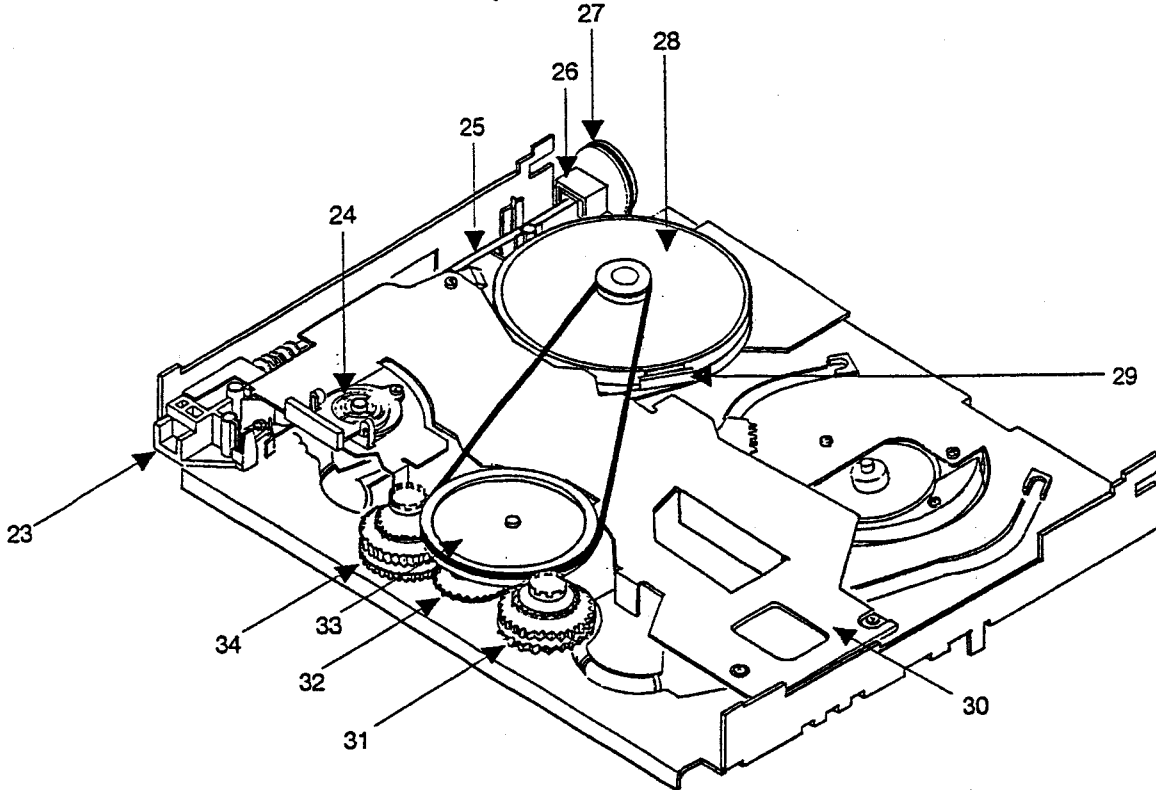
# DECK PARTS LOCATIONS

(TOP VIEW)



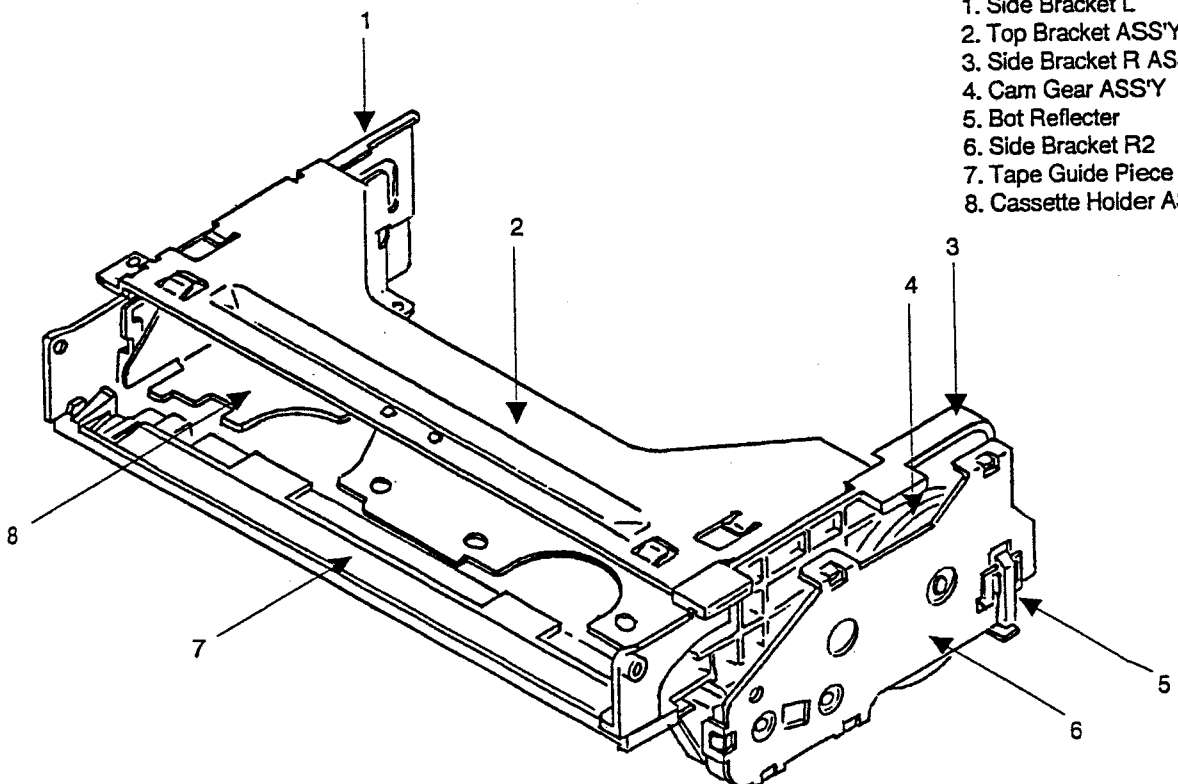
- |                         |                          |
|-------------------------|--------------------------|
| 1. Main Chassis         | 13. Loading Motor        |
| 2. Tension Arm ASS'Y    | 14. Pinch Roller Block   |
| 3. EOT Reflector        | 15. Cam Gear             |
| 4. Guide Roller S ASS'Y | 16. Cassette Opener      |
| 5. P0 Post              | 17. Brake Bracket        |
| 6. P1 Post              | 18. Reel                 |
| 7. FE Head              | 19. LED Reflector        |
| 8. Cylinder Unit        | 20. Guide Roller T ASS'Y |
| 9. Auto Head Cleaning   | 21. Reel                 |
| 10. Head Amp PCB        | 22. Tension Band ASS'Y   |
| 11. Audio/Control Head  |                          |
| 12. Deck Relay PCB      |                          |

## DECK PARTS LOCATIONS (BOTTOM VIEW)



- |                          |                         |
|--------------------------|-------------------------|
| 23. Worm Bracket F ASS'Y | 29. Capstan Brake ASS'Y |
| 24. Mecha State SW       | 30. Bottom Plate        |
| 25. Worm ASS'Y           | 31. Clutch Gear S ASS'Y |
| 26. Worm Bracket R ASS'Y | 32. Idler Arm ASS'Y     |
| 27. Loading Motor Belt   | 33. Center Pully        |
| 28. Capstan DD Unit      | 34. Clutch Gear T ASS'Y |

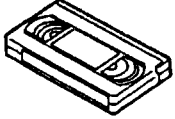

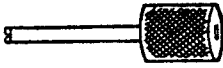

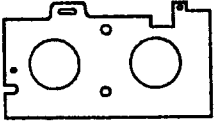
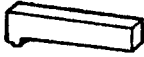
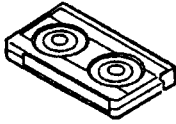

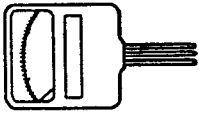
## (FRONT LOADING UNIT)



1. Side Bracket L
2. Top Bracket ASS'Y
3. Side Bracket R ASS'Y
4. Cam Gear ASS'Y
5. Bot Reflector
6. Side Bracket R2
7. Tape Guide Piece
8. Cassette Holder ASS'Y



## SERVICING FIXTURES AND TOOLS

VHS Alignment Tape JG001E (VP-S-LI6 <sup>3</sup> ) JG001F (VP-S-C01 <sup>3</sup> ) 	JG002B Adapter JG002F Dial Torque Gauge (60~600gr/cm) JG002G (100~1200gr/cm) 	JG005 Post Adjustment Screwdriver 	JG153 X Value Adjustment Screwdriver 
JG022 Master Plane 	JG024 Reel Disk Height Adjustment Jig 	JG100A Torque Tape (VHT-063) 	JG155 Remote Control 
Tentelometer 			

## SERVICING FIXTURES AND TOOLS

Part No.	Remarks
JG001E	Monoscope, 6KHz
JG001F	Color Bar, 1KHz,
JG002F	Playback Take Up Torque
JG002G	Fast Forward Torque, Rewind Torque, Brake Torque(Take up Reel/Supply Reel)
JG005	Guide Roller Adjustment
JG153	X-Value Adjustment
JG022/JG024	Reel Disk Height Adjustment
JG100A	Playback Back Tension Torque
JG155	Used to PG SHIFTER Adjustment

## PREPARATION FOR SERVICING

1. Remove the Main PCB from the DECK Chassis.
2. If it is necessary, remove the Main PCB from the DECK Chassis.
3. Connect as shown in the below.
  - Connect the Main PCB to the Mecha State SW(SW101).
  - Connect the Main PCB to the Deck Relay PCB.
  - Connect the Main PCB to the Head Amp PCB.
4. Short circuit between TP1010 and TP1011.  
 (Refer to MAJOR COMPONENT LOCATION GUIDE)
5. At that time, the STOP/EJECT button is available to insert and eject the Cassette Tape.

# MECHANICAL ADJUSTMENTS

## 1. CONFIRMATION AND ADJUSTMENT

Read the following NOTED items before starting work.

- \* Place an object which weighs between 350g and 500g on the Cassette Tape to keep it steady when you want to make the tape run without the front loading unit. (Do not place an object which weighs over 500g.)
- \* When you activate the deck without the front loading unit, short circuit between TP1010 and TP1011. In this condition the BOT/EOT sensor will not function.

### 1-1: CONFIRMATION AND ADJUSTMENT OF REEL DISK HEIGHT

1. Turn on the power and set to the STOP mode.
2. Set the master plane (JG022) and reel disk height adjustment jig (JG024) on mechanism framework, taking care not to scratch the drum, as shown in Fig. 1-1-A.
3. Confirm that the reel disk is lower than "A" of the reel disk height adjustment jig (JG024) on the master plane and higher than "B" as shown in Fig. 1-1-B. If it is not, adjust to less than  $7.5\text{mm} \pm 0.2\text{mm}$  with the height adjustment washer.
4. Perform the same adjustment for other reel.

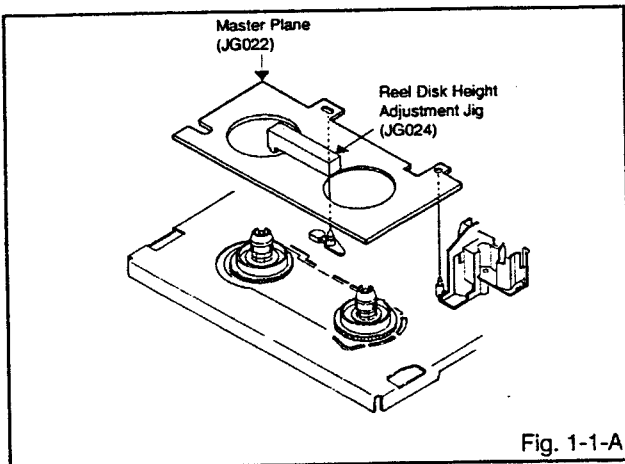


Fig. 1-1-A

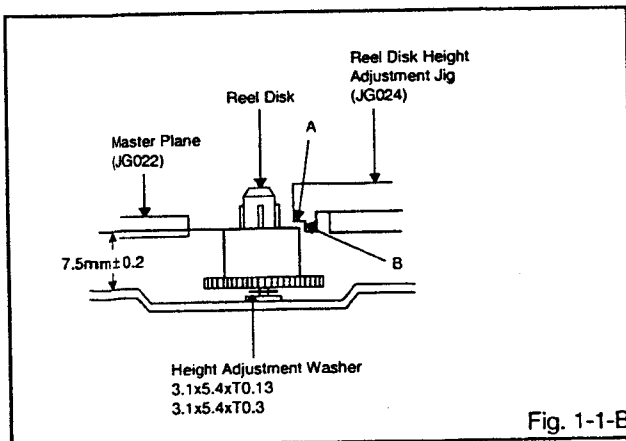


Fig. 1-1-B

### 1-2: CONFIRMATION AND ADJUSTMENT OF TENSION POST POSITION

1. Turn on the power and set to the PLAY mode adjust the Tension Adjust so that the Tension Post is at the position of 0.3mm~0.5mm from the Rib. (Refer to Fig. 1-2)
2. Confirm that the video tape is not curling at the flange of P1 post or is not running on flanges.

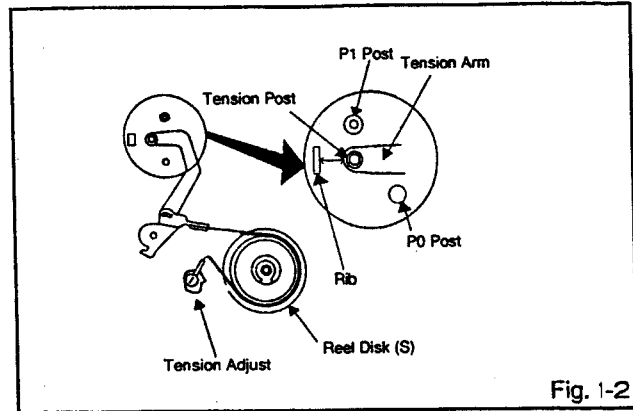


Fig. 1-2

### 1-3: CONFIRMATION AND ADJUSTMENT OF BACK TENSION ON PLAYBACK

1. Load a video tape recorded in standard speed mode. Set the unit to the PLAY mode.
2. Install the tentelometer as shown in Fig. 1-3. Confirm the value is within 20~27gr/cm at this time.

※ IN CASE OF USING A CASSETTE TYPE TORQUE TAPE.

1. After adjustment, confirm and adjust the tension post position (Refer to item 1-2) for the tension arm, install the cassette type torque tape (JG100A) and set to the PLAY mode.
2. Confirm that the left hand side tension value of the torque tape is 25~38gr/cm for the standard mode tape.

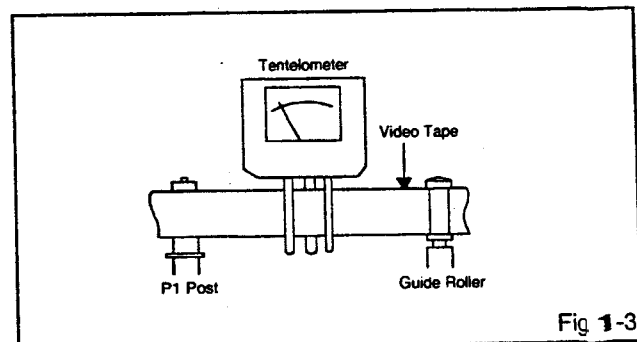


Fig. 1-3

## MECHANICAL ADJUSTMENTS

### 1-4: CONFIRMATION OF FAST FORWARD TORQUE

1. Set torque gauge (JG002G) on take-up reel disk, and place unit in FAST FORWARD mode. (Refer to Fig. 1-4)
2. Confirm that torque is more than 400gf/cm.

#### NOTE

After setting the torque gauge on the reel disk, hold the gauge in place.  
Push the FAST FORWARD button and the reel disk will begin to turn.

### 1-5: CONFIRMATION OF REWIND TORQUE

1. Operate within 4 or 5 seconds after the reel disk begins to turn.
2. Set torque gauge (JG002G) on supply reel disk, and place the unit in REWIND mode. (Refer to Fig 1-4).
3. Confirm that torque is more than 400gf/cm.

#### NOTE

After setting the torque gauge on the reel disk, hold the gauge in place.  
Push the REWIND button and the reel disk will begin to turn.

### 1-6: CONFIRMATION OF REEL BRAKE TORQUE

(Take-Up Reel Brake) (Refer to Fig. 1-4)

1. Set to STOP mode.
2. Set the torque gauge (JG002G) to the take-up reel and turn it counterclockwise.
3. Confirm that it is than 200gf/cm at that time.

(Supply Reel Brake) (Refer to Fig. 1-4)

1. Set to STOP mode.
2. Set the torque gauge (JG002G) to the supply reel and turn it clockwise.
3. Confirm that it is more than 200gf/cm at that time.

#### NOTE

Separate the idler from the reel and confirm the brake torque.

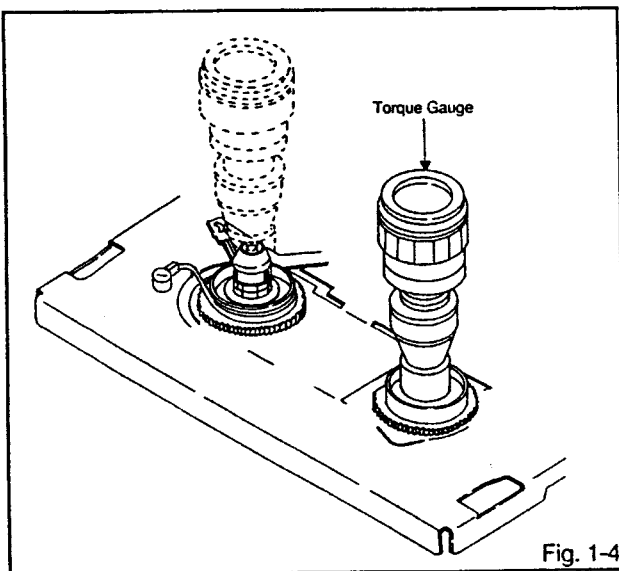


Fig. 1-4

#### NOTE

If the torque value checked is out of tolerance, replace the appropriate parts as follows.

Check Items	Replace Parts
1-4	Idler Ass'y or Clutch ASS'Y
1-5	Idler Ass'y or Clutch ASS'Y
1-6	Main Brake T Ass'y or Main Brake S Ass'y

## 2. TAPE RUNNING CONFIRMATION AND ADJUSTMENT

Tape running is adjusted precisely at the factory. Normally, it is not necessary to make adjustments. It is necessary to confirm and make adjustments when the parts of the tape running mechanism are replaced because of extensive usage or failure.

### 2-1: GUIDE ROLLER

1. Connect CH-1 on the oscilloscope to TP4001 (PB Envelope) and CH-2 to TP1003 (SW Pulse).
2. Set the tracking to manual center position in the following way. Hold and press the tracking auto button more than 2 seconds to set the tracking to center position.
3. Trigger with SW pulse and observe the envelope. (Refer to Fig. 2-1-A)
4. Adjust the guide roller height while observing the envelope, and make the envelope flat. Adjust the envelope so that the flatness will not be affected even when the tracking control button is pressed. (Use the adjustment screwdriver JG005).
5. Press and hold the tracking control button and (at the point that the envelope waveform starts to reduce) adjust the envelope so that the A : B ratio is better than 3 : 2. (Refer to Fig. 2-1-B)
6. Adjust the PG shifter (ELECTRICAL ADJUSTMENTS : ITEM 3-1) in the PLAY mode.

#### NOTE

After adjustment, confirm and adjust A/C head tilt. (Refer to item 2-2)

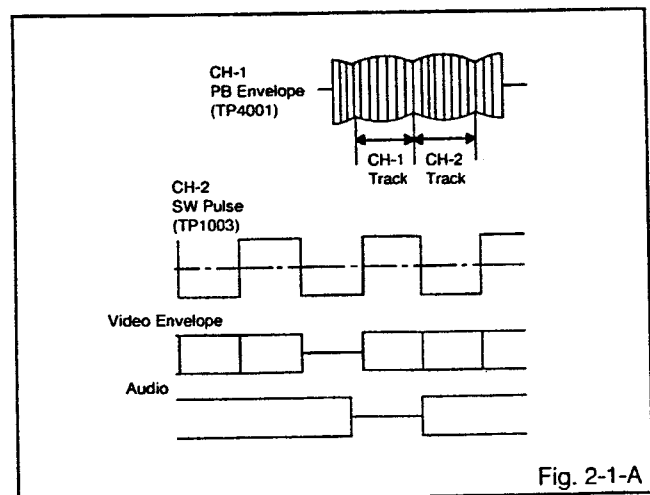


Fig. 2-1-A

## MECHANICAL ADJUSTMENTS

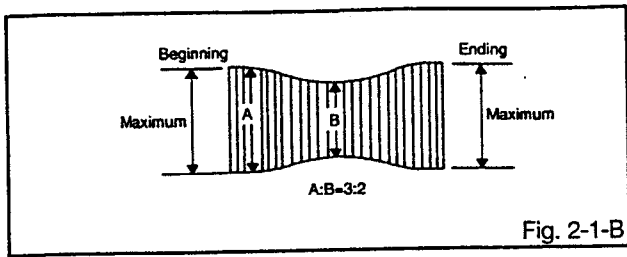


Fig. 2-1-B

### 2-2: CONFIRMATION AND ADJUSTMENT OF A/C HEAD TILT

When the tape is running abnormally, perform the following adjustments.

1. Insert a new tape and play it back.
2. Confirm that there is no crease on the tape between the P4 post and guide roller (R) and the tape is running smoothly. (It is absolutely impossible to get satisfactory sound if the tape is distorted between the A/C head and P4 post.)
3. If the tape still does not run smoothly, turn the screw ① and adjust the tilt of the A/C head. (Refer to Fig. 2-2)

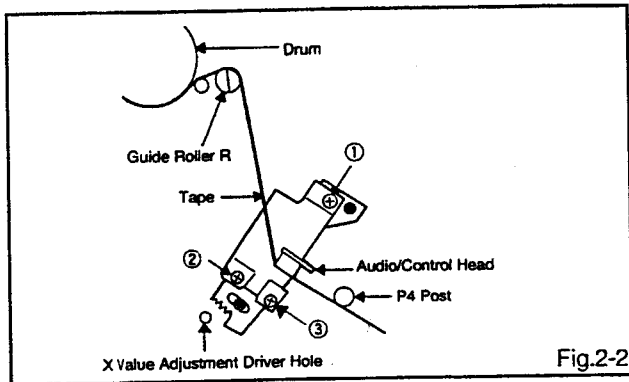


Fig.2-2

### 2-3: ADJUSTMENT OF A/C HEAD HEIGHT AND AZIMUTH

1. Playback a VHS alignment tape (JG001E) and observe the waveform at the audio output terminal.
2. Turn the screw ② slowly to change the azimuth of the A/C head. Adjust the height so that the audio output becomes maximum. (Refer to Fig. 2-2)
3. Adjust the screw ③, (Refer to Fig. 2-2) until the height of the A/C head reaches the position against the tape as shown in Fig. 2-3.
4. When the control head height is not fit. (When you must turn the screw more than 45 degrees), Turn all of the screws ①, ② and ③ to the same degrees. Then confirm the angle of the audio/control head and adjust again.

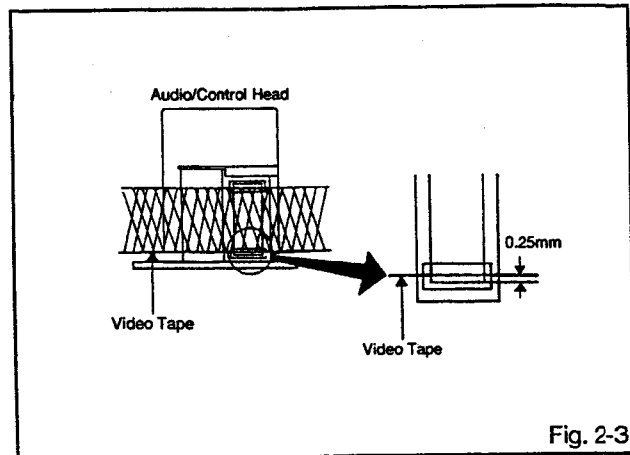
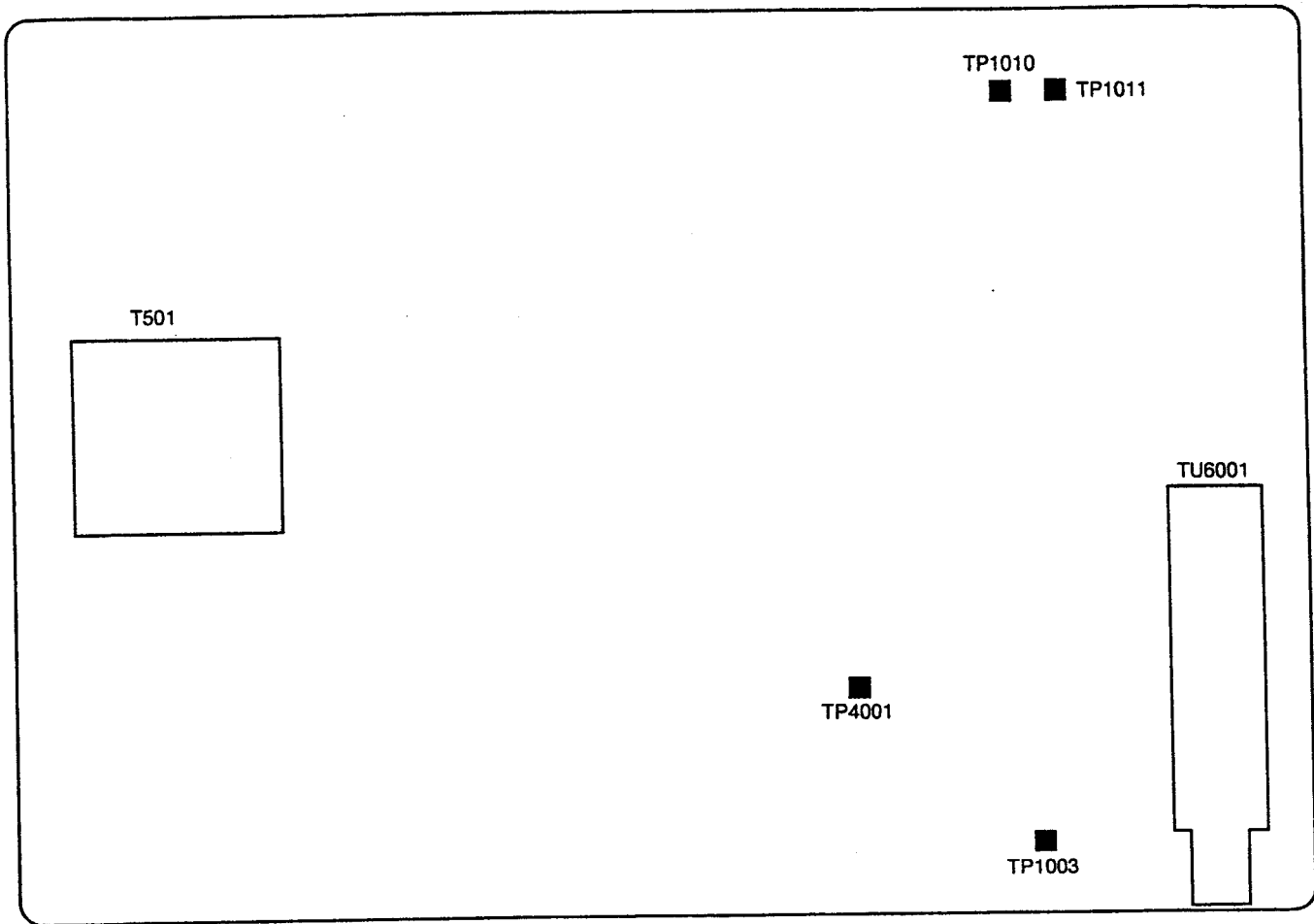


Fig. 2-3

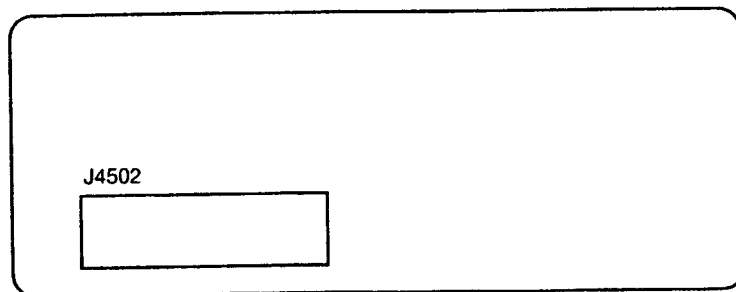
### 2-4: TAPE RUNNING ADJUSTMENT

1. Adjust the height of reel disk. (Refer to item 1-1)
2. Confirm and adjust tension post position. (Refer to item 1-2)
3. Adjust the guide roller. (Refer to item 2-1)
4. Adjust the A/C head tilt. (Refer to item 2-2)
5. Adjust the A/C head height and azimuth. (Refer to item 2-3)
6. Connect CH-1 on the oscilloscope to TP4001 and CH-2 to TP1003. Playback the VHS alignment tape (JG001E). Set the tracking to manual center. Adjust X with the screw driver for X (JG153) as the Fig. 2-1-A and Fig. 2-1-B. (Refer to No. 2 of the item 2-1).

# MAJOR COMPONENTS LOCATION GUIDE



MAIN



21 PIN

# ELECTRICAL ADJUSTMENTS

## 3. ADJUSTMENT PROCEDURE

Read and perform these adjustments when repairing the circuits or replacing electrical parts or PCB assemblies.

### CAUTION

When replacing IC's or transistors, use only specified silicon grease (YG6260M).  
(To prevent the damage to IC's and transistors.)

### 3-1: PG SHIFTER

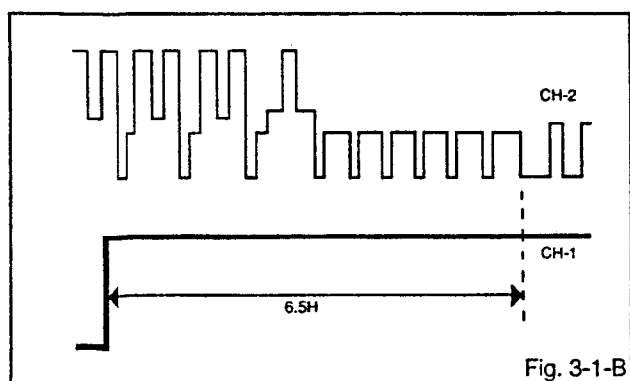
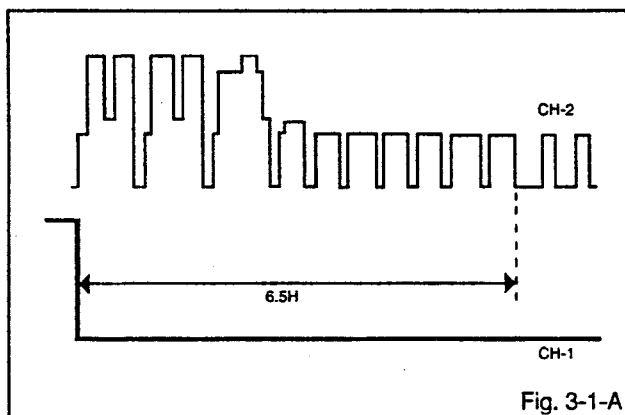
#### CONDITIONS

MODE-PLAYBACK

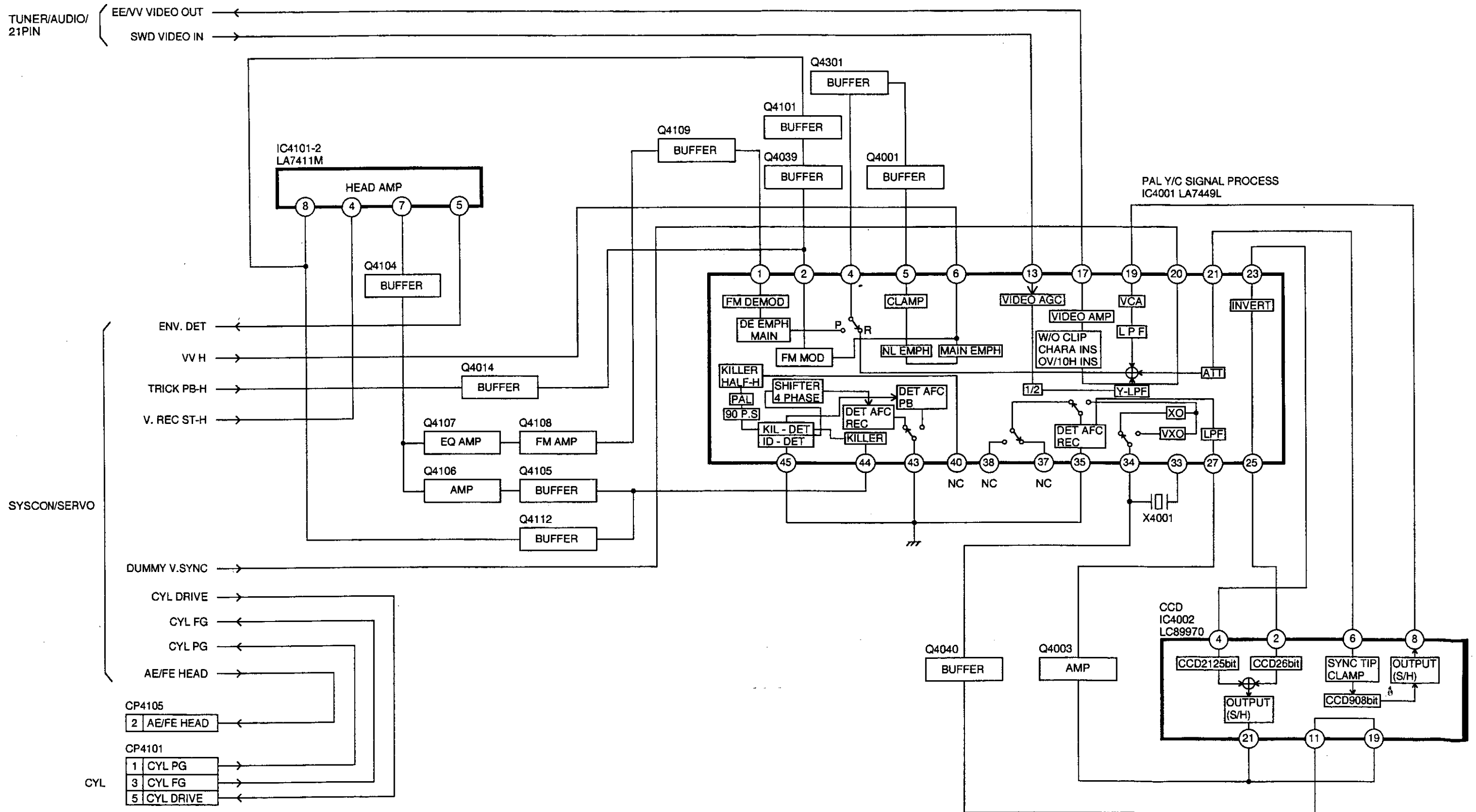
Input Signal-Alignment Tape (JG001F)

#### INSTRUCTIONS

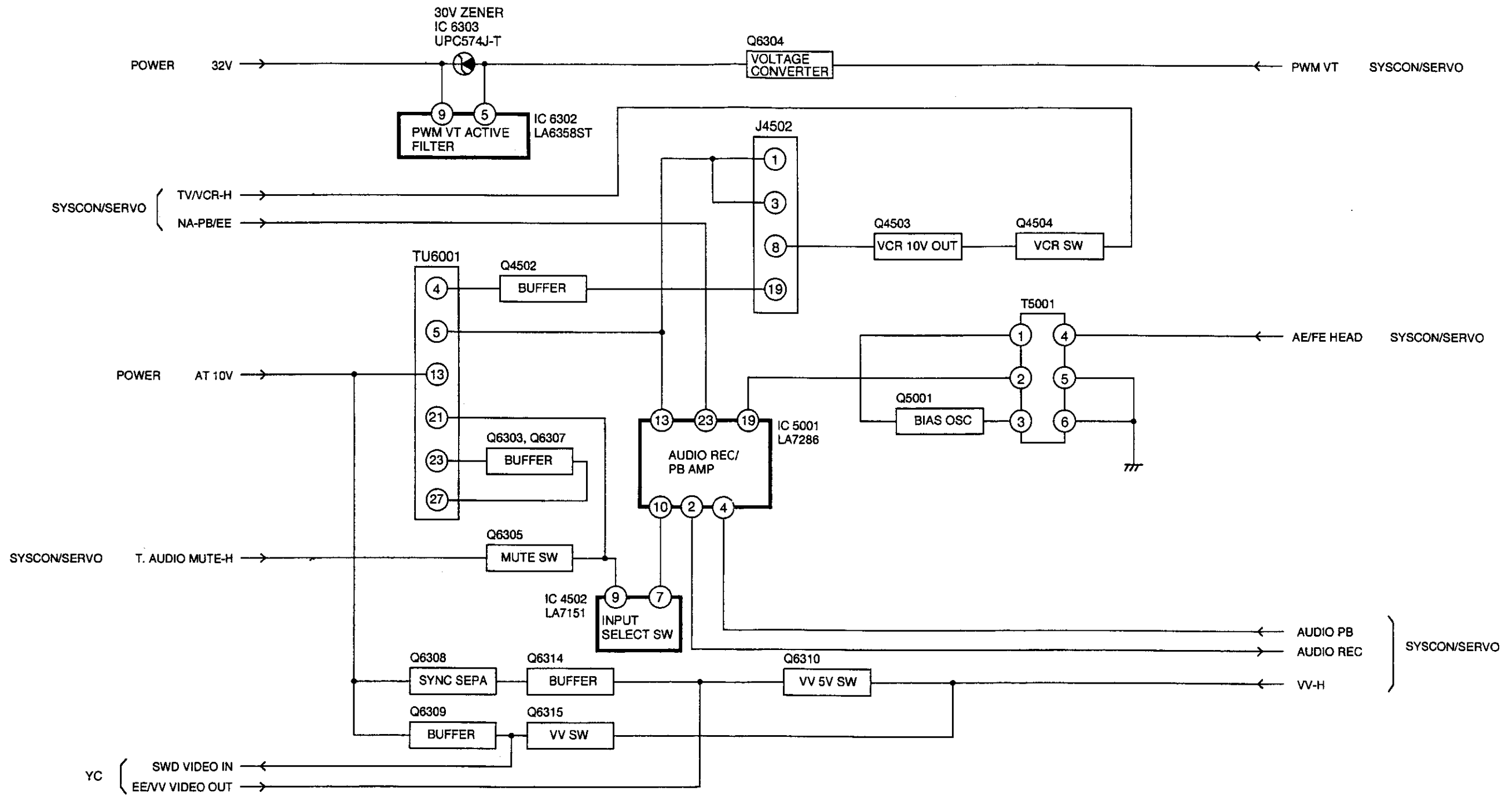
1. Connect CH-1 on the oscilloscope to TP1003 and CH-2 to J4502.
2. Playback the alignment tape. (JG001F)
3. Press the PG AUTO key. (JG103B)
4. While the ATR indicator is flashing, press the PG MANU key. (JG103B)
5. Press the Tracking +/- key until the beginning of the switching pulse is  $6.5 \pm 0.5$  as shown in the Fig. 3-1.
6. Press the Tracking Auto key.



# Y.C./HEAD AMP BLOCK DIAGRAM

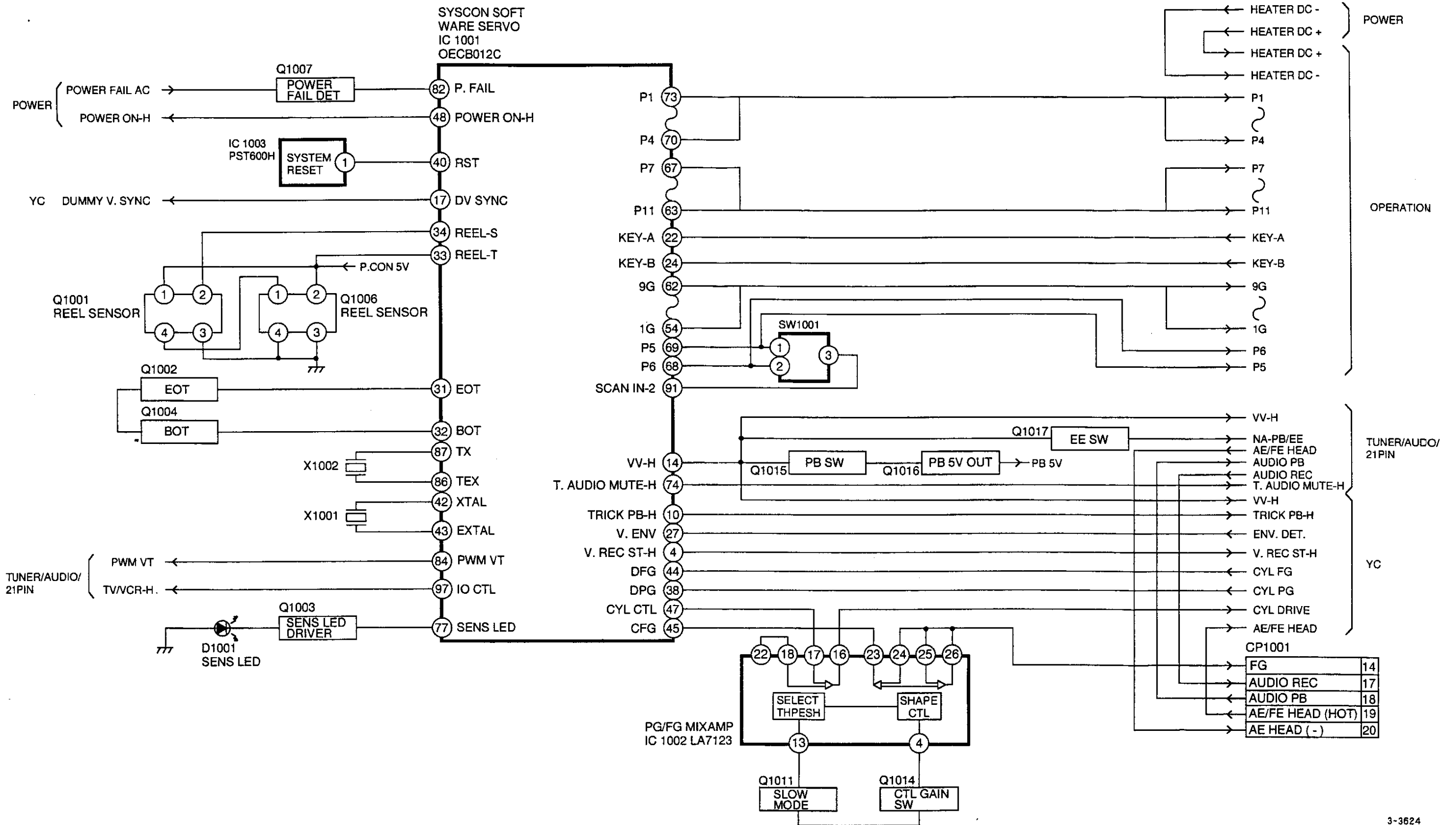


# TUNER/AUDIO/21PIN BLOCK DIAGRAM

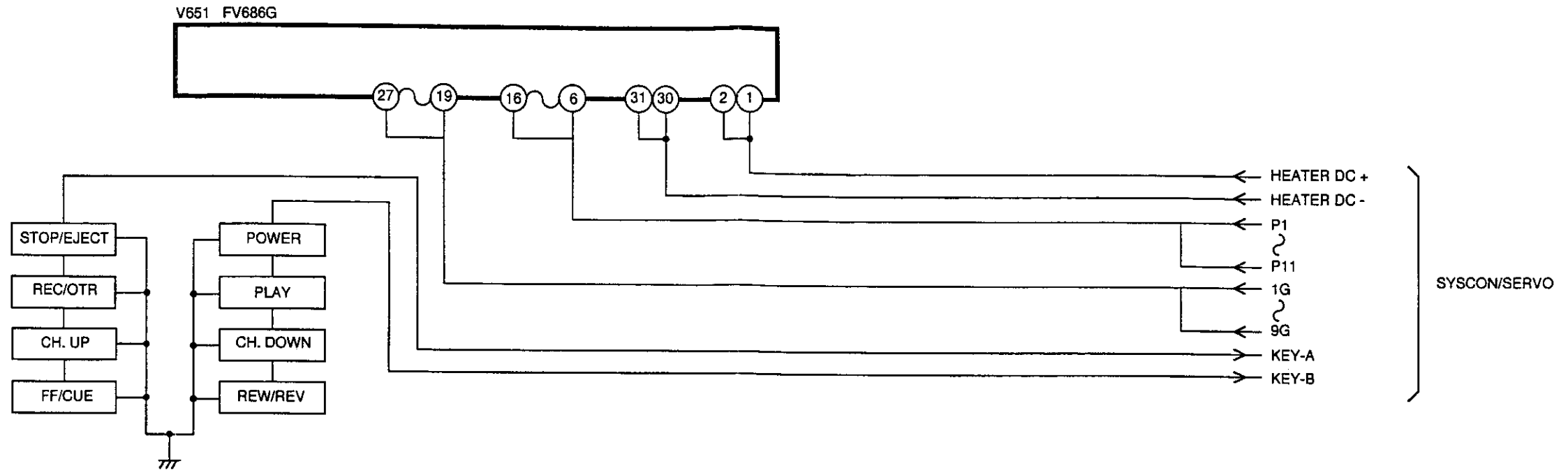




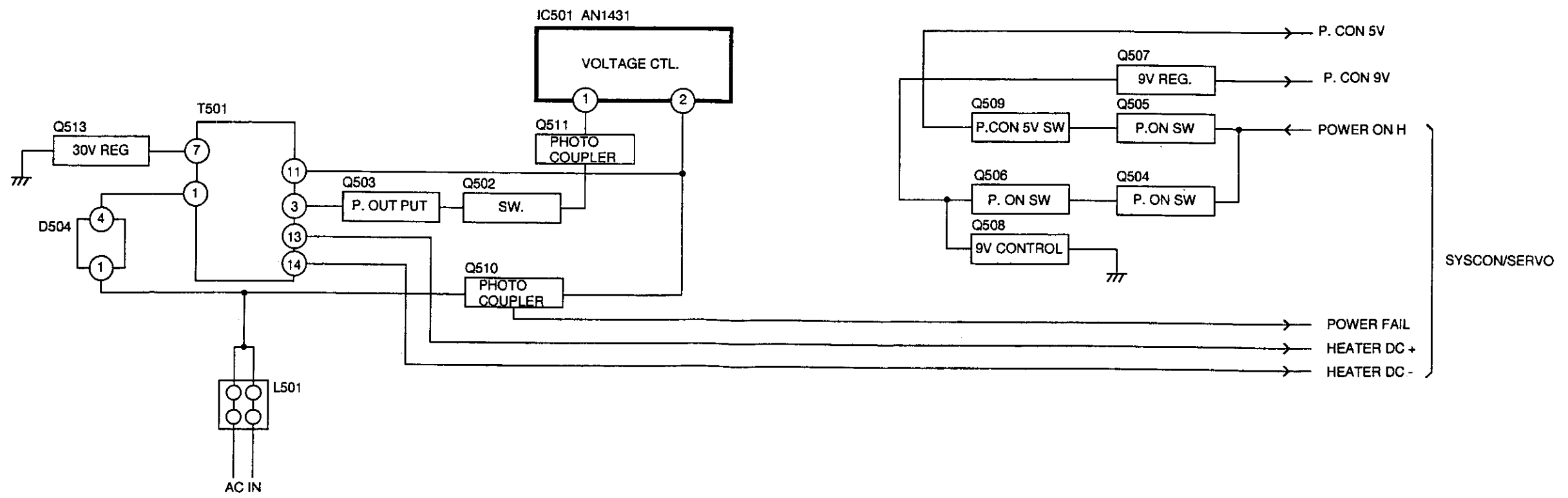
# SYSTEM CONTROL/SERVO BLOCK DIAGRAM



### OPERATION BLOCK DIAGRAM



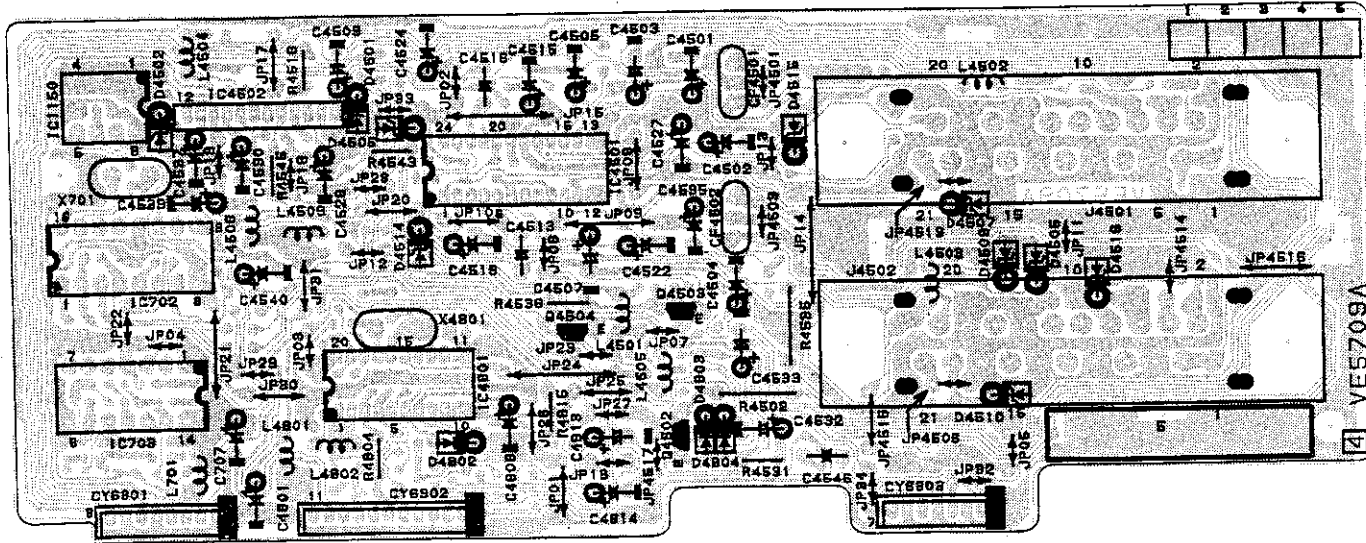
### POWER BLOCK DIAGRAM



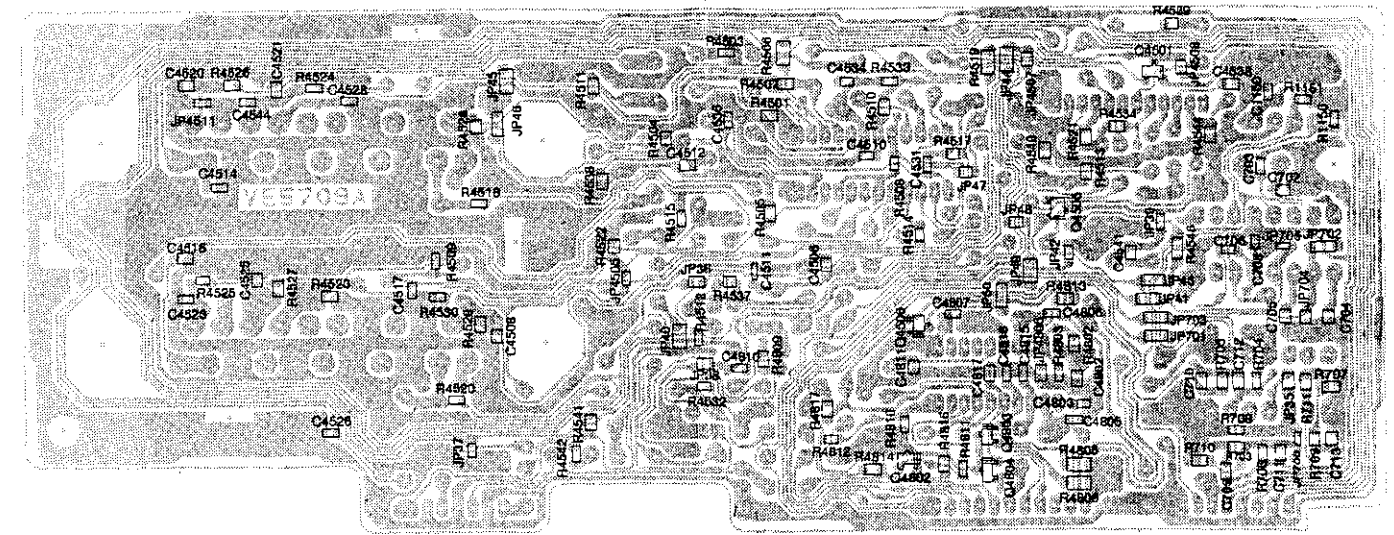
PRINTED CIRCUIT BOARDS

21PIN

COMPONENT SIDE

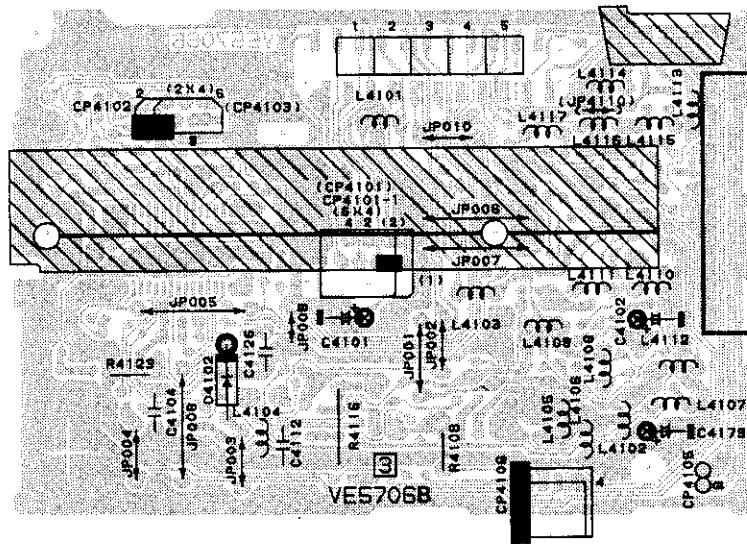


SOLDER SIDE

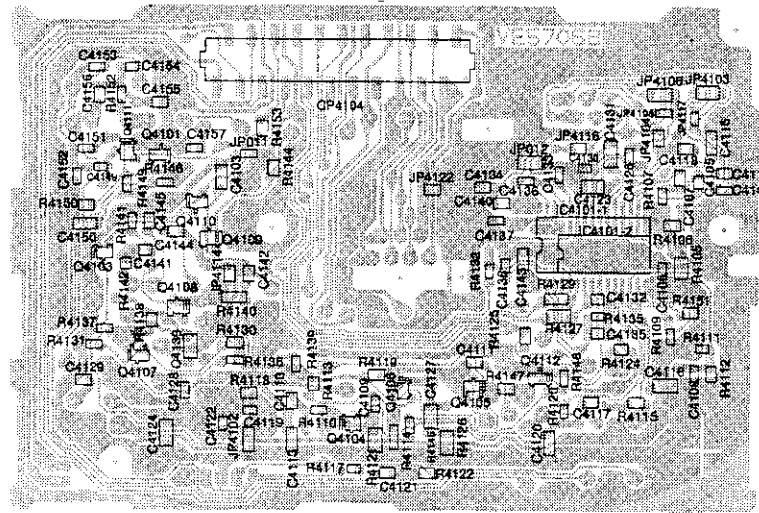


HEAD AMP

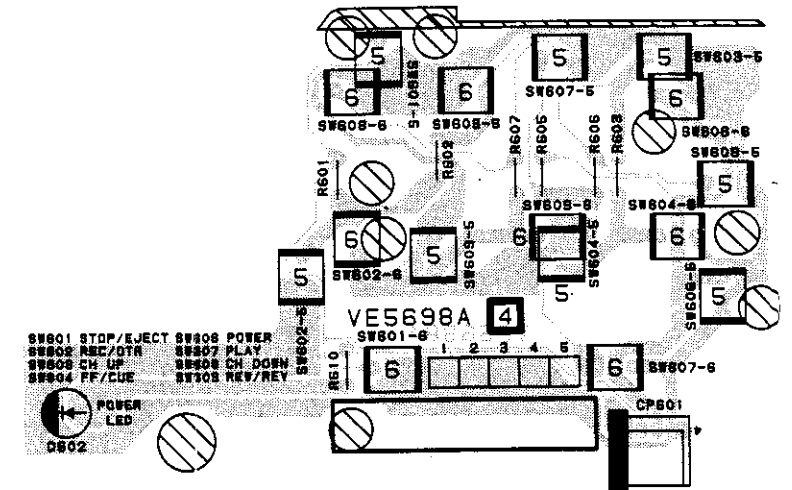
COMPONENT SIDE



SOLDER SIDE

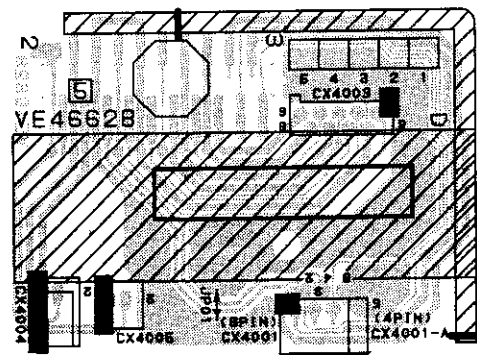


OPERATION

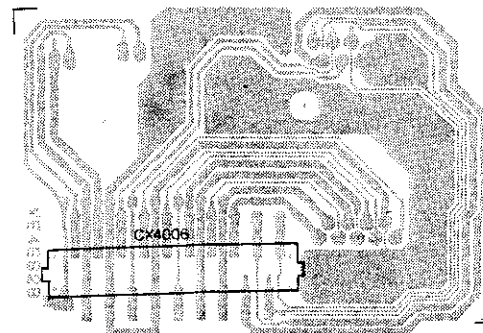


DECK RELAY

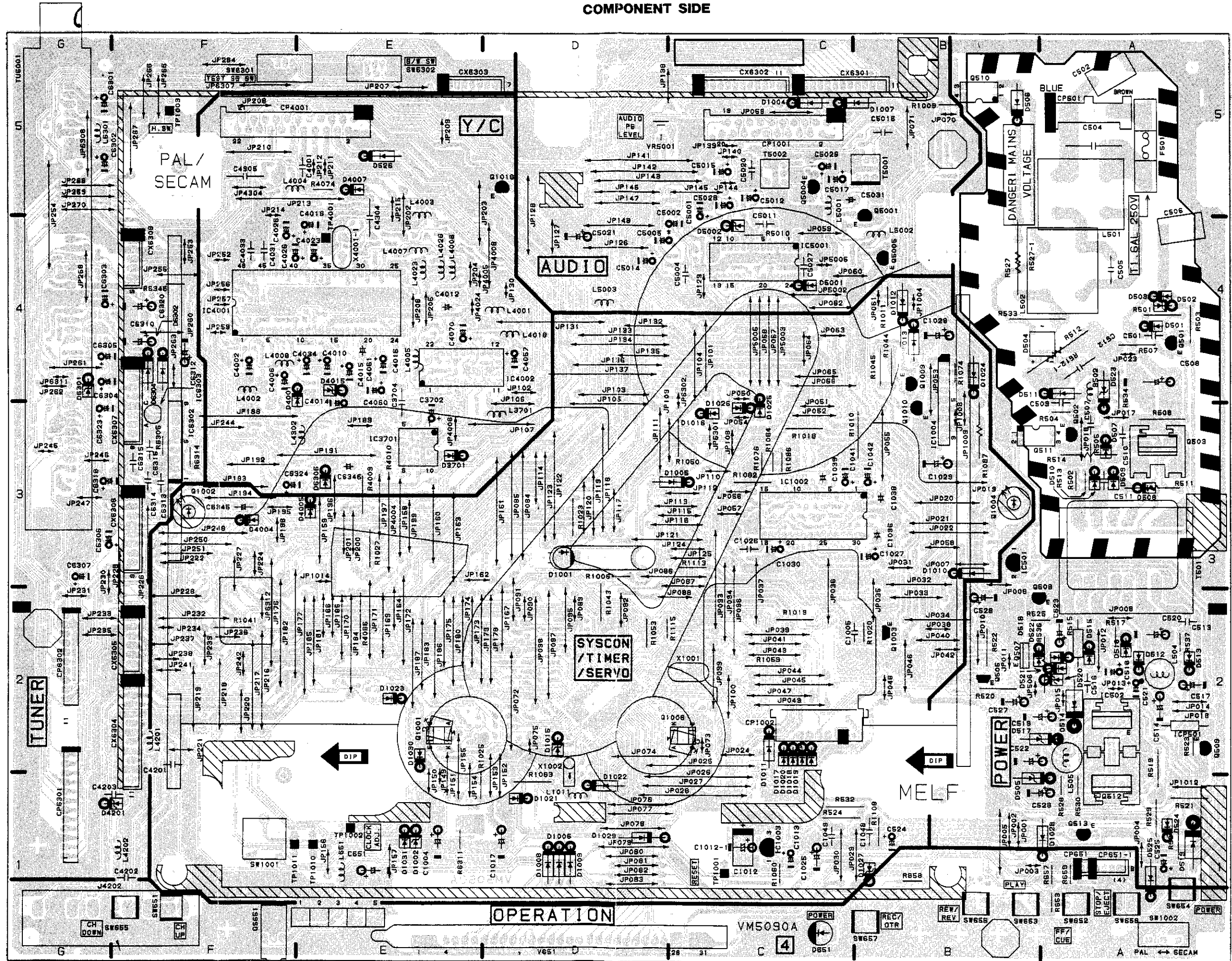
COMPONENT SIDE



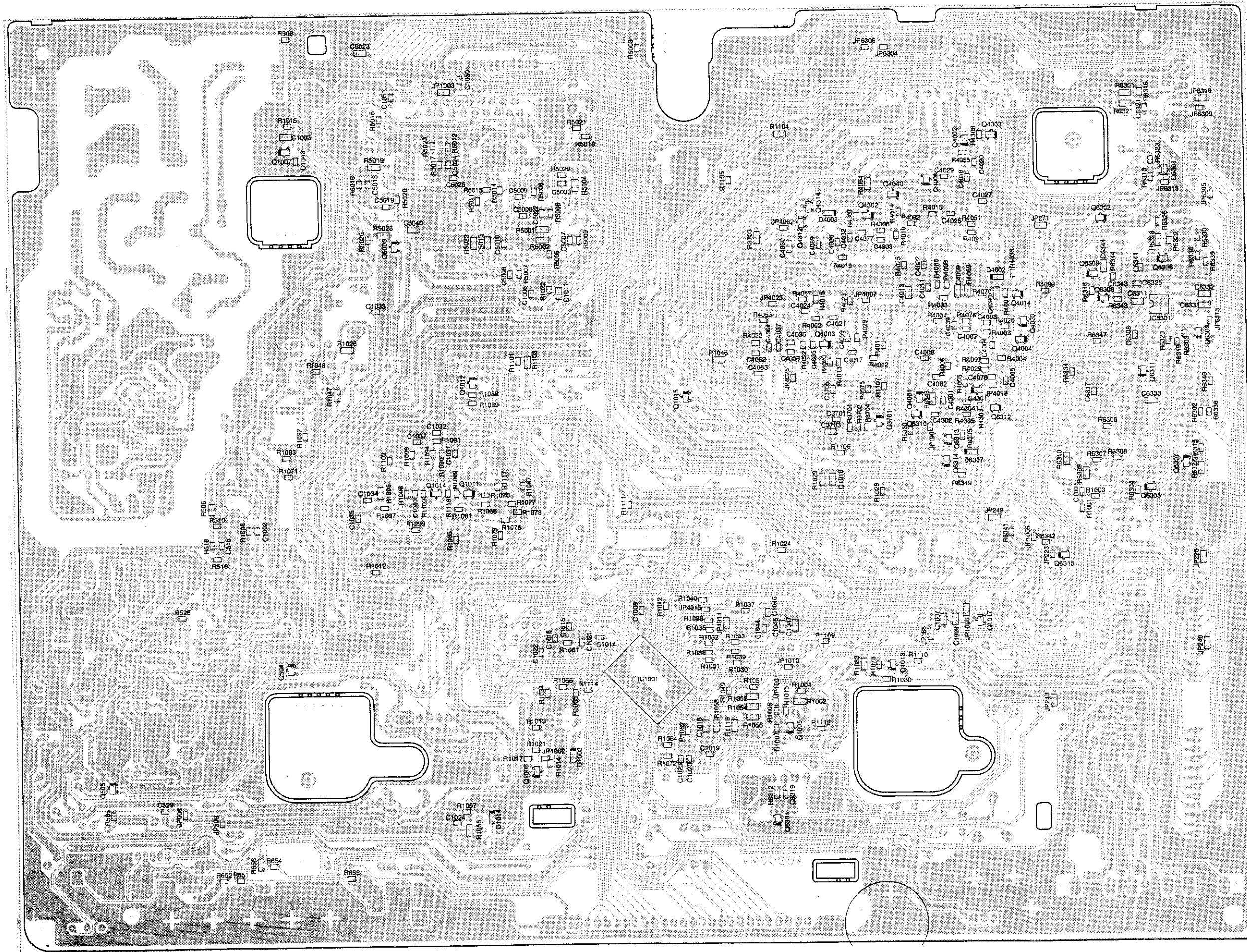
SOLDER SIDE



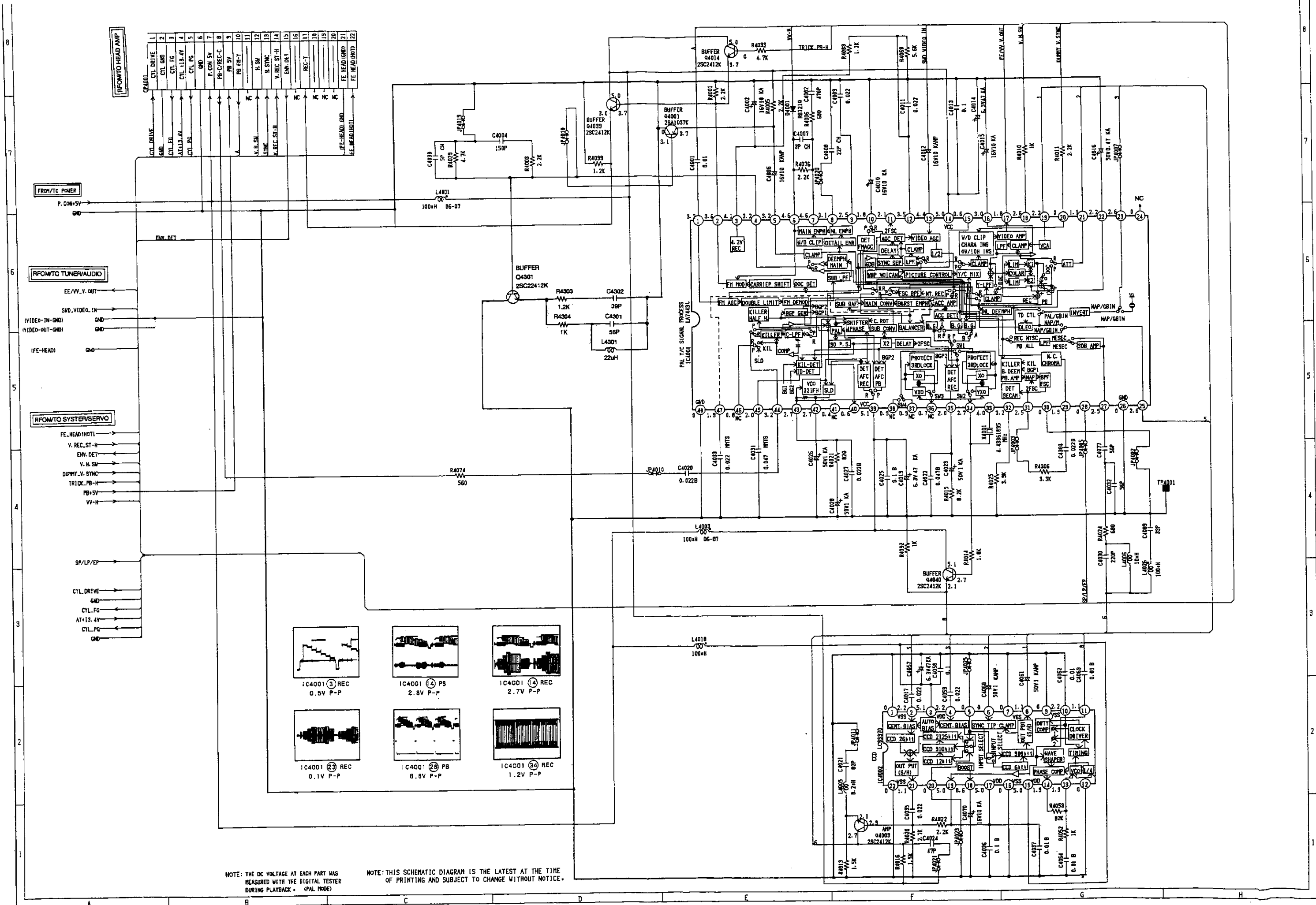
**PRINTED CIRCUIT BOARDS  
MAIN  
COMPONENT SIDE**



PRINTED CIRCUIT BOARDS  
MAIN  
SOLDER SIDE



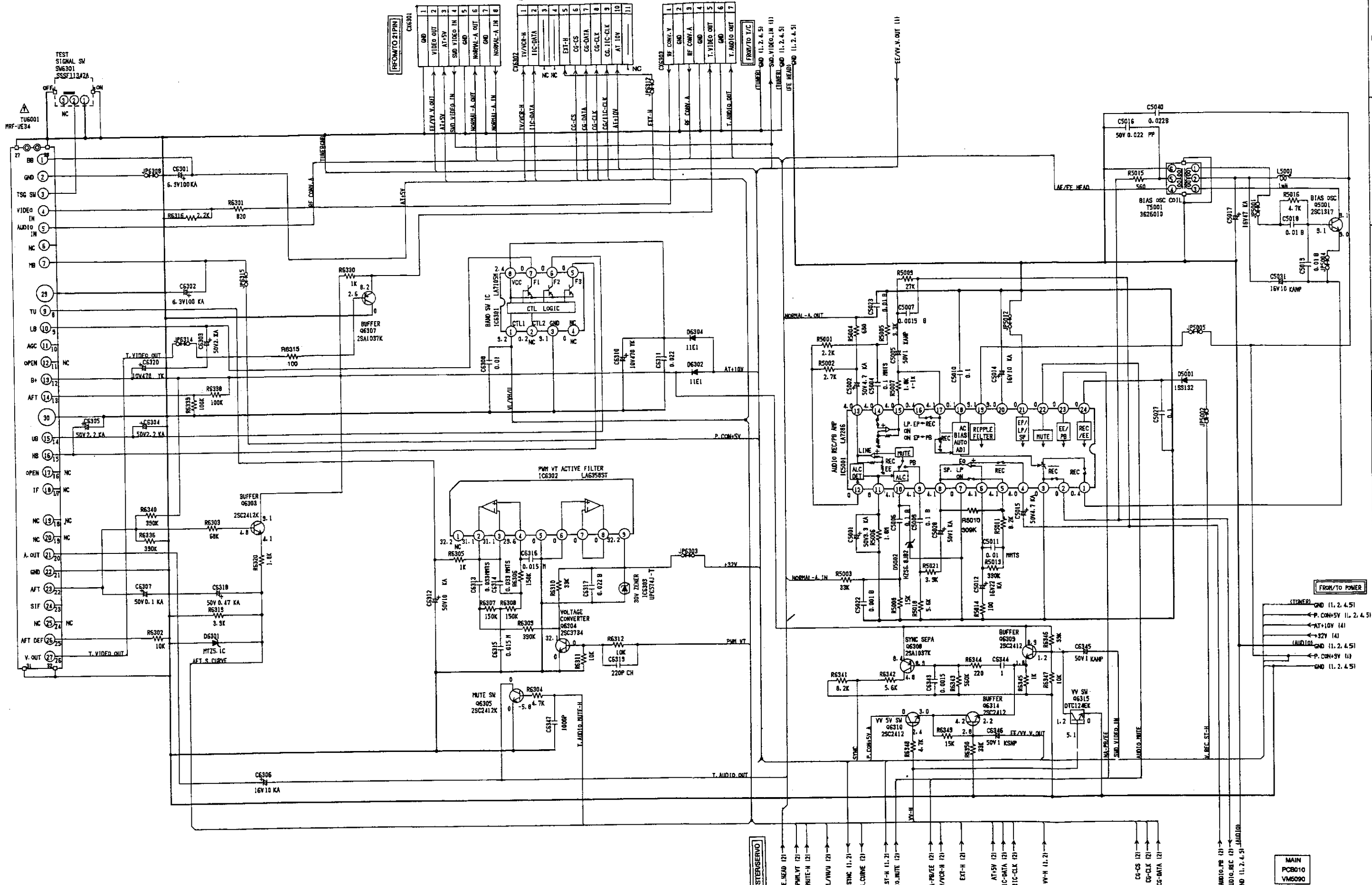
# Y.C. SCHEMATIC DIAGRAM



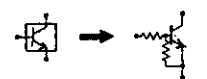
NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER DURING PLAYBACK - (PAL MODE)

NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE.

# TUNER/AUDIO SCHEMATIC DIAGRAM



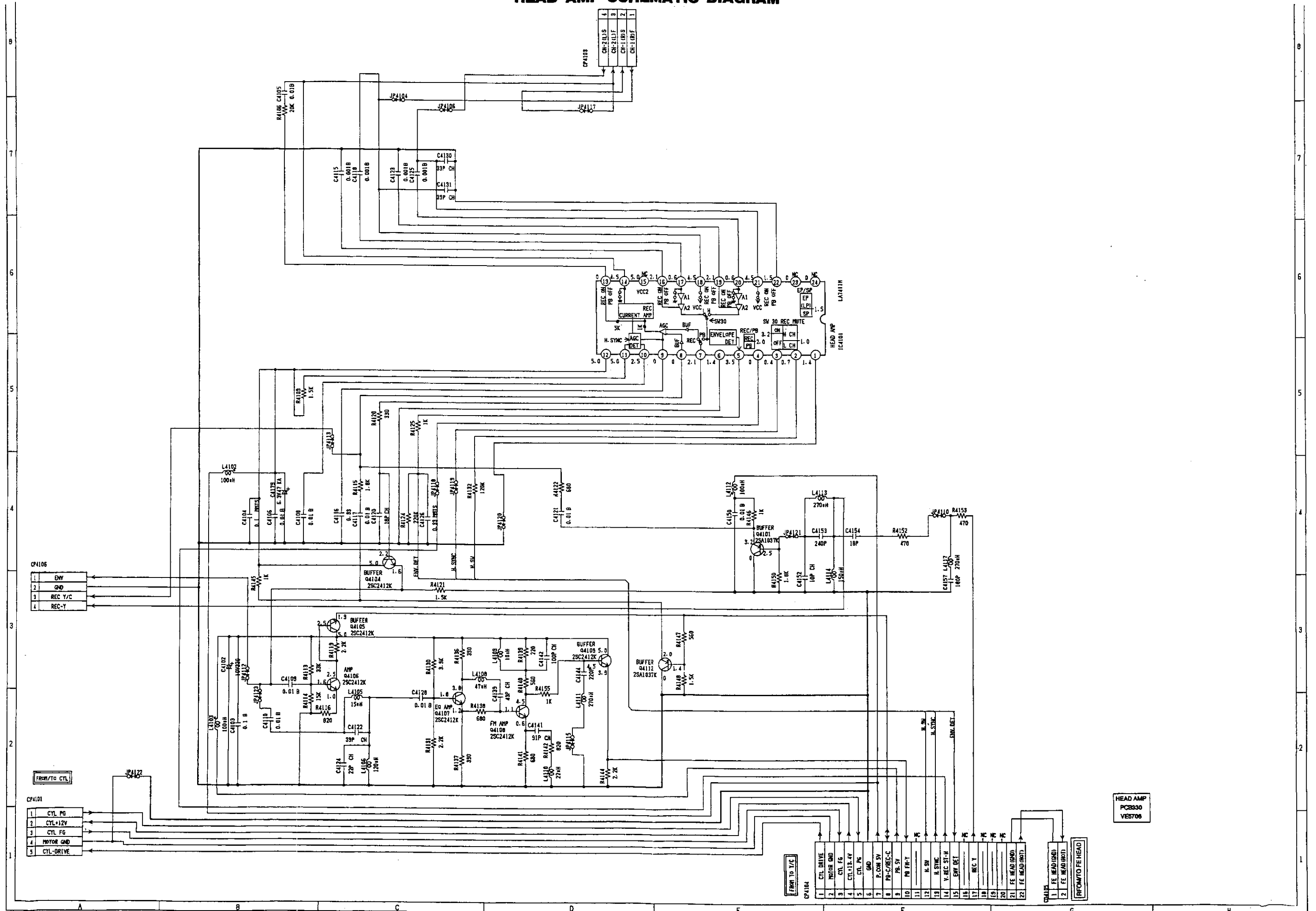
CAUTION: DIGITAL TRANSISTOR



NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE.

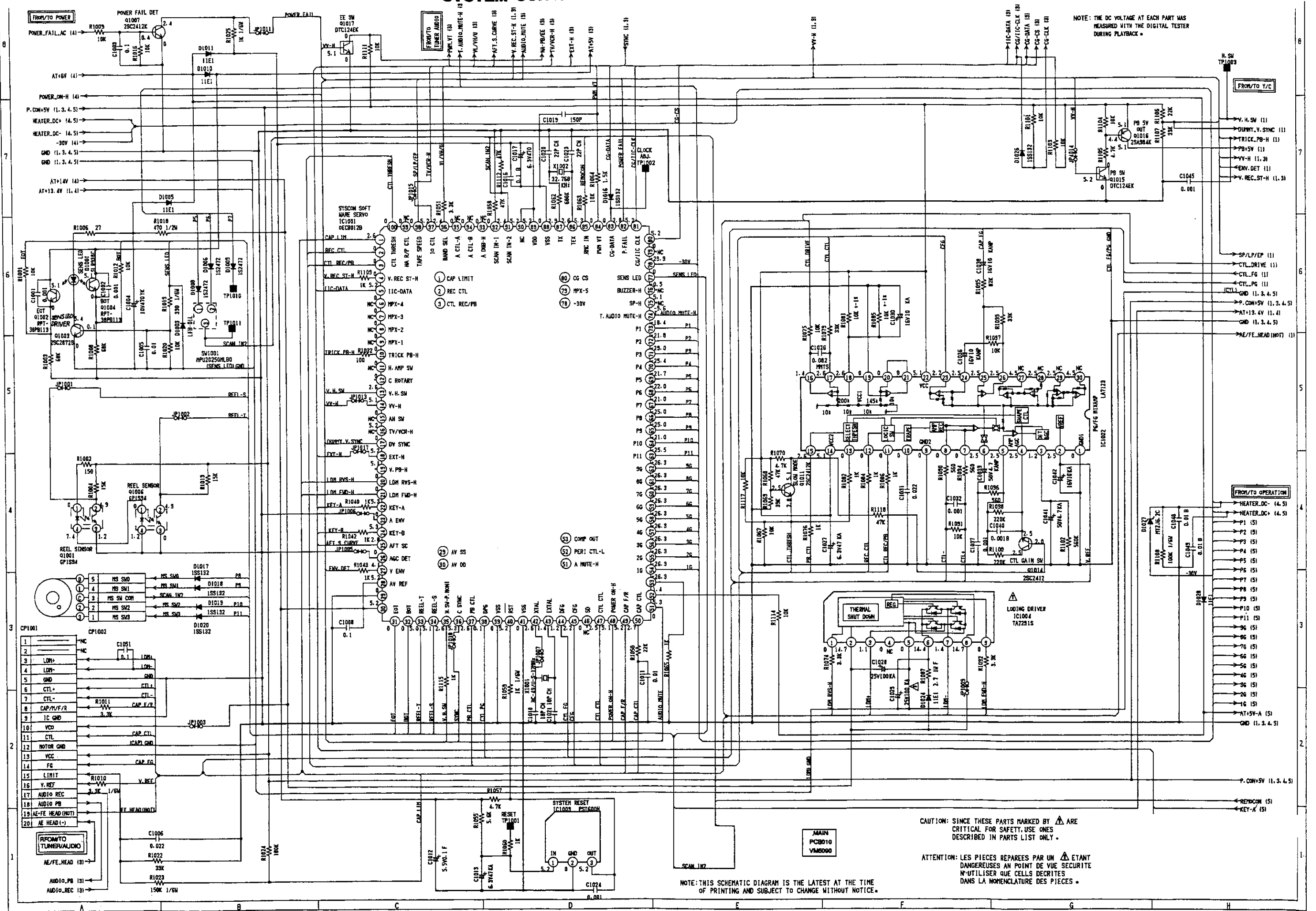
NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER DURING PLAYBACK.

# HEAD AMP SCHEMATIC DIAGRAM





# SYSTEM CONTROL/SERVO SCHEMATIC DIAGRAM



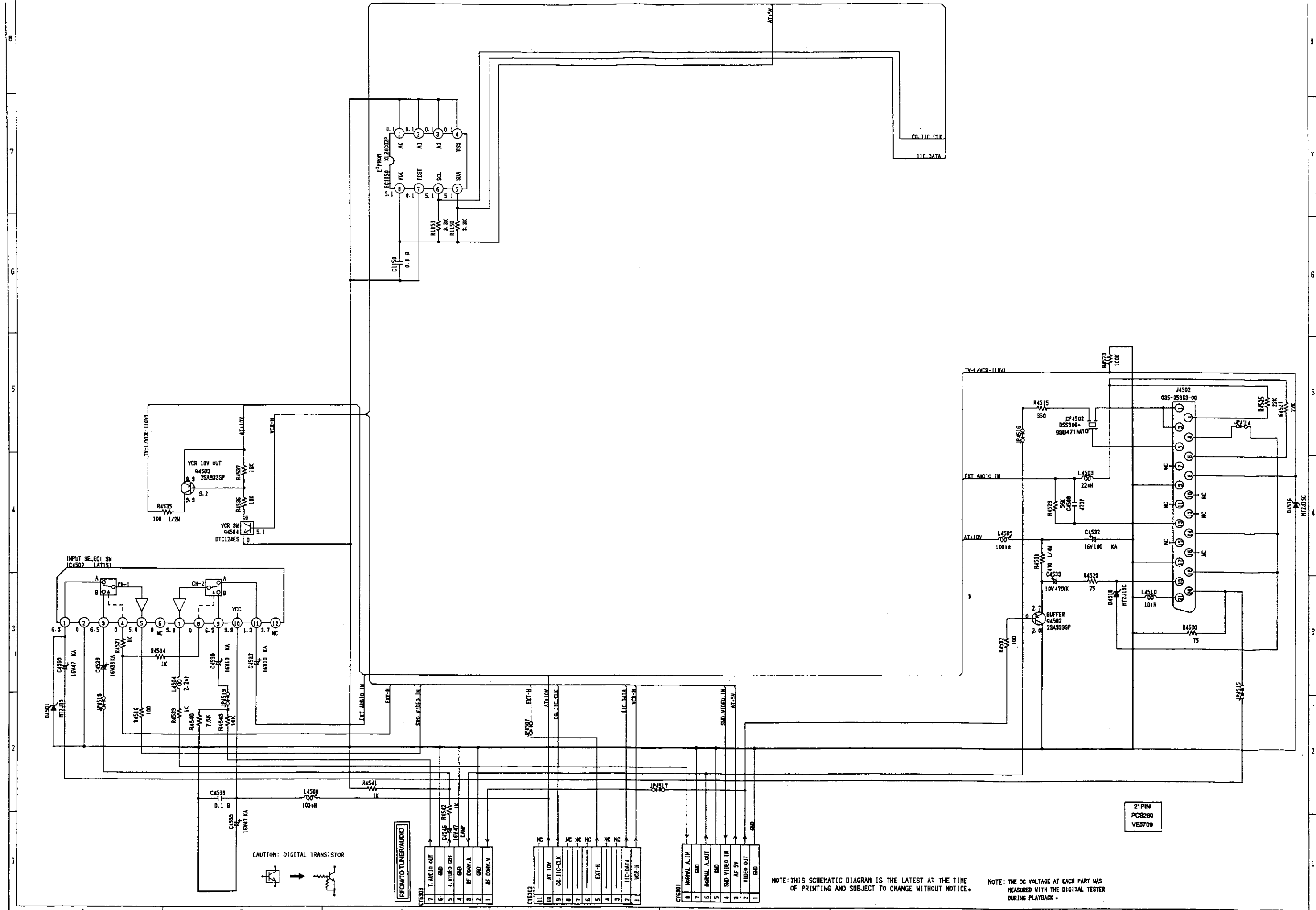
NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER DURING PLAYBACK.

CAUTION: SINCE THESE PARTS MARKED BY  $\Delta$  ARE CRITICAL FOR SAFETY, USE ONES DESCRIBED IN PARTS LIST ONLY.

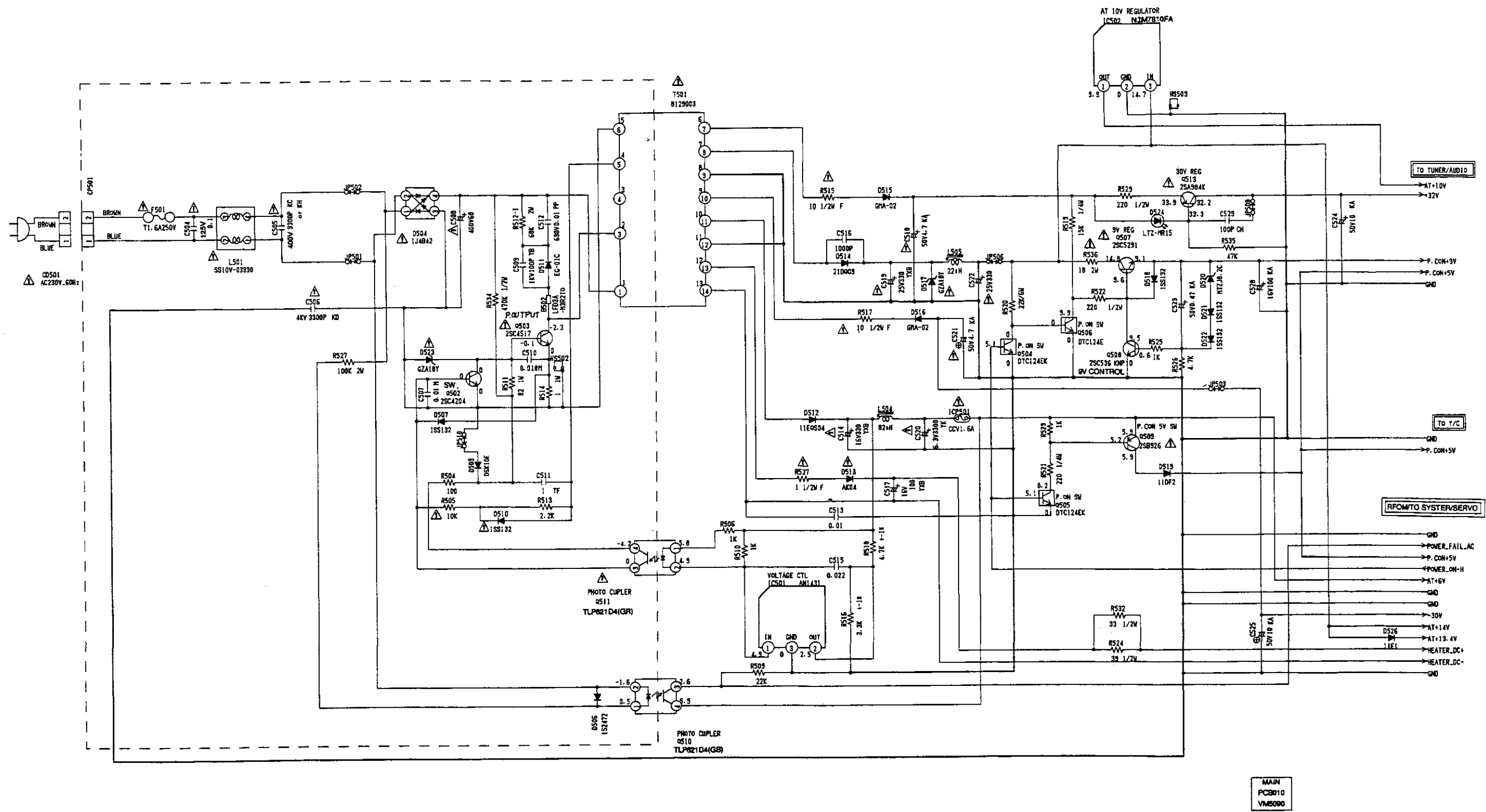
ATTENTION: LES PIÈCES RÉPARÉES PAR UN  $\Delta$  ÉTANT DANGEREUSES AN POINT DE VUE SÉCURITÉ N'UTILISER QUE CELLES DÉCRITES DANS LA NOMENCLATURE DES PIÈCES.

NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE.

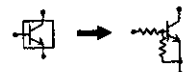
# 21PIN SCHEMATIC DIAGRAM



# POWER SCHEMATIC DIAGRAM



CAUTION: DIGITAL TRANSISTOR



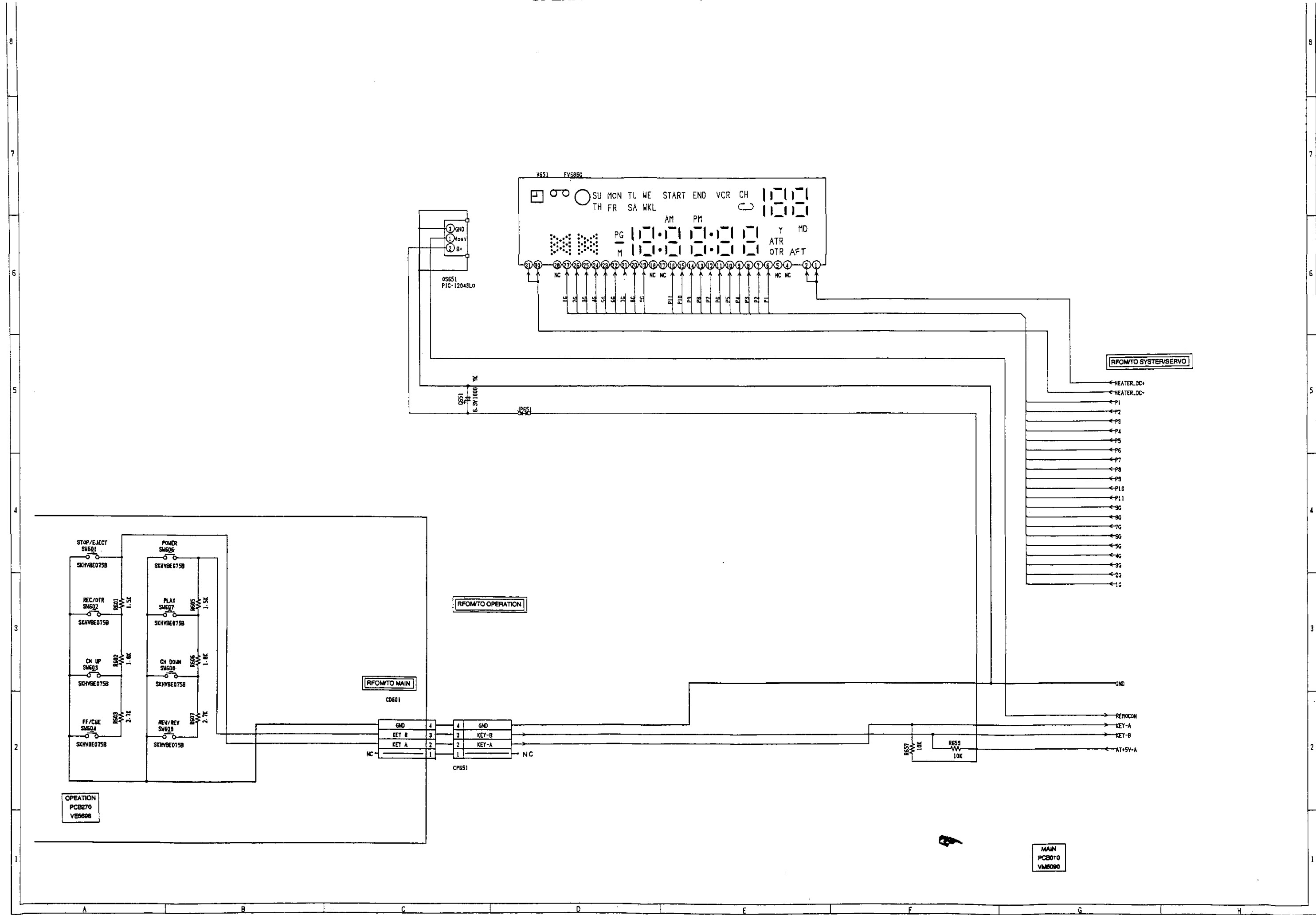
ATTENTION: LES PIÉCES REPARÉES PAR UN  $\Delta$  ÉTANT DANGEREUSES AU POINT DE VUE SÉCURITÉ N'UTILISER QUE CELLES DÉCRITES DANS LA NOMÉNCLATURE DES PIÉCES.

CAUTION: SINCE THESE PARTS MARKED BY  $\Delta$  ARE CRITICAL FOR SAFETY, USE ONES DESCRIBED ON PARTS LIST ONLY.

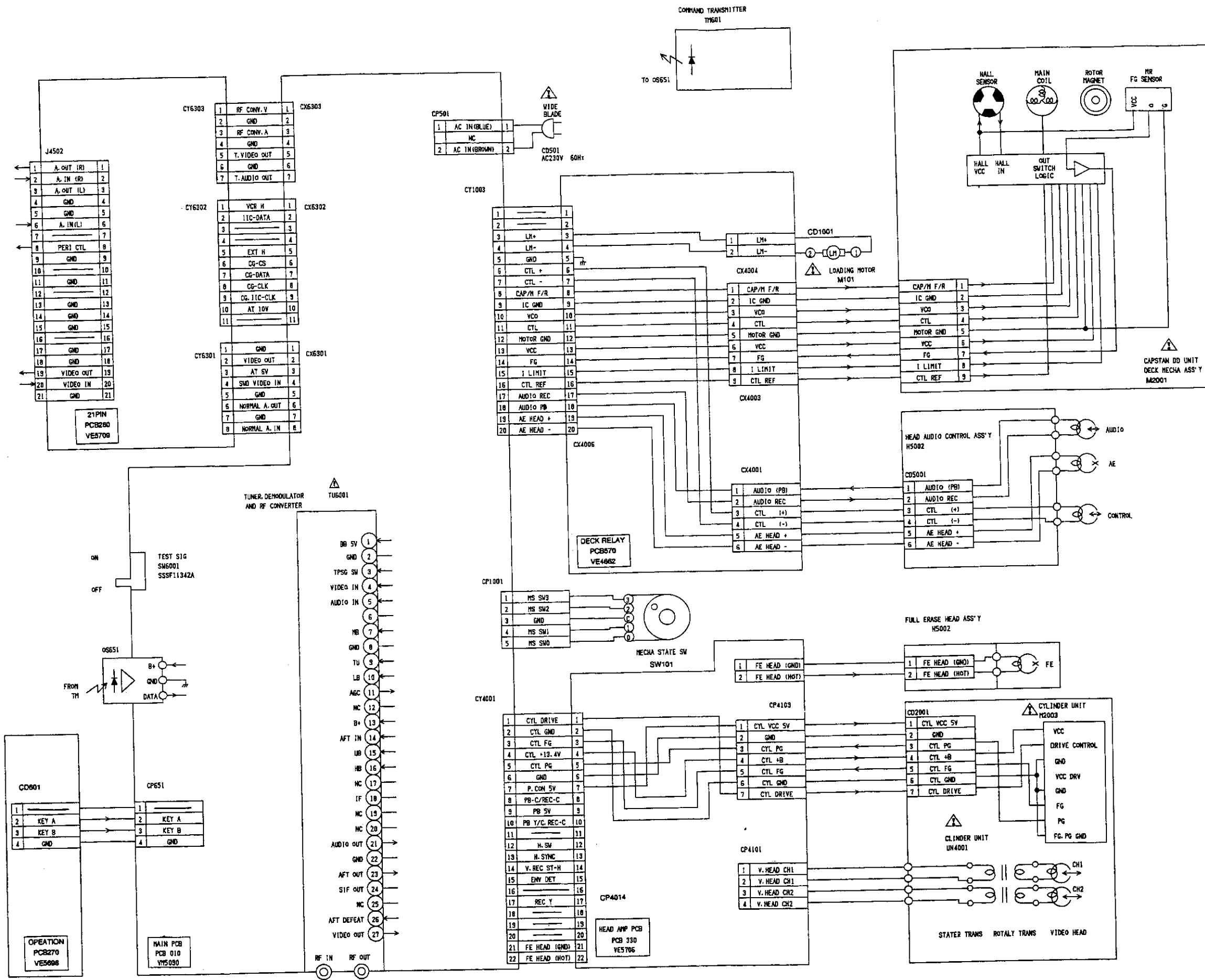
NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER DURING PLAYBACK.

NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE.

# OPERATION SCHEMATIC DIAGRAM



# INTERCONNECTION DIAGRAM

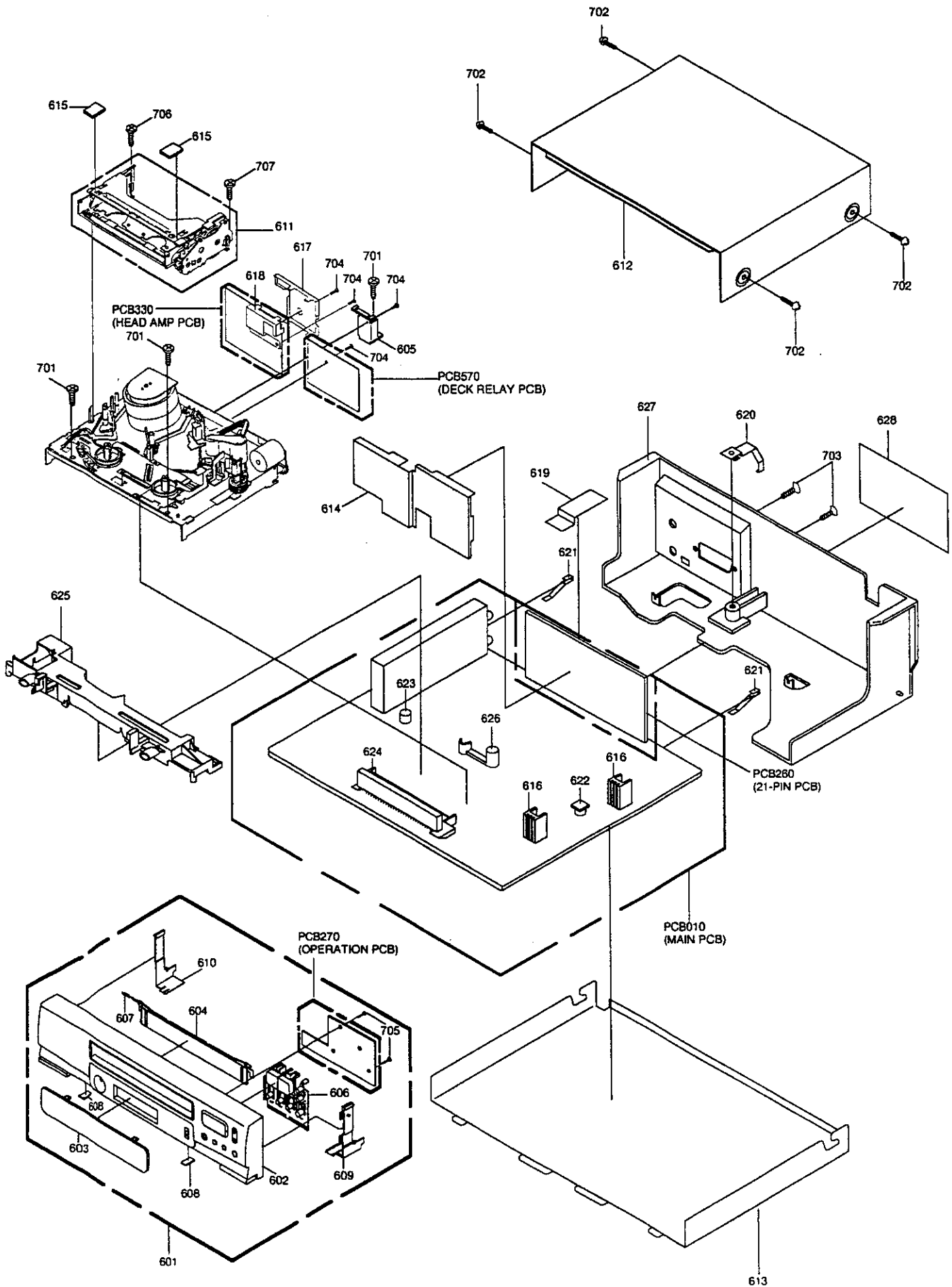


CAUTION: SINCE THESE PARTS MARKED BY ARE CRITICAL FOR SAFETY, USE ONES DESCRIBED IN PARTS LIST ONLY.

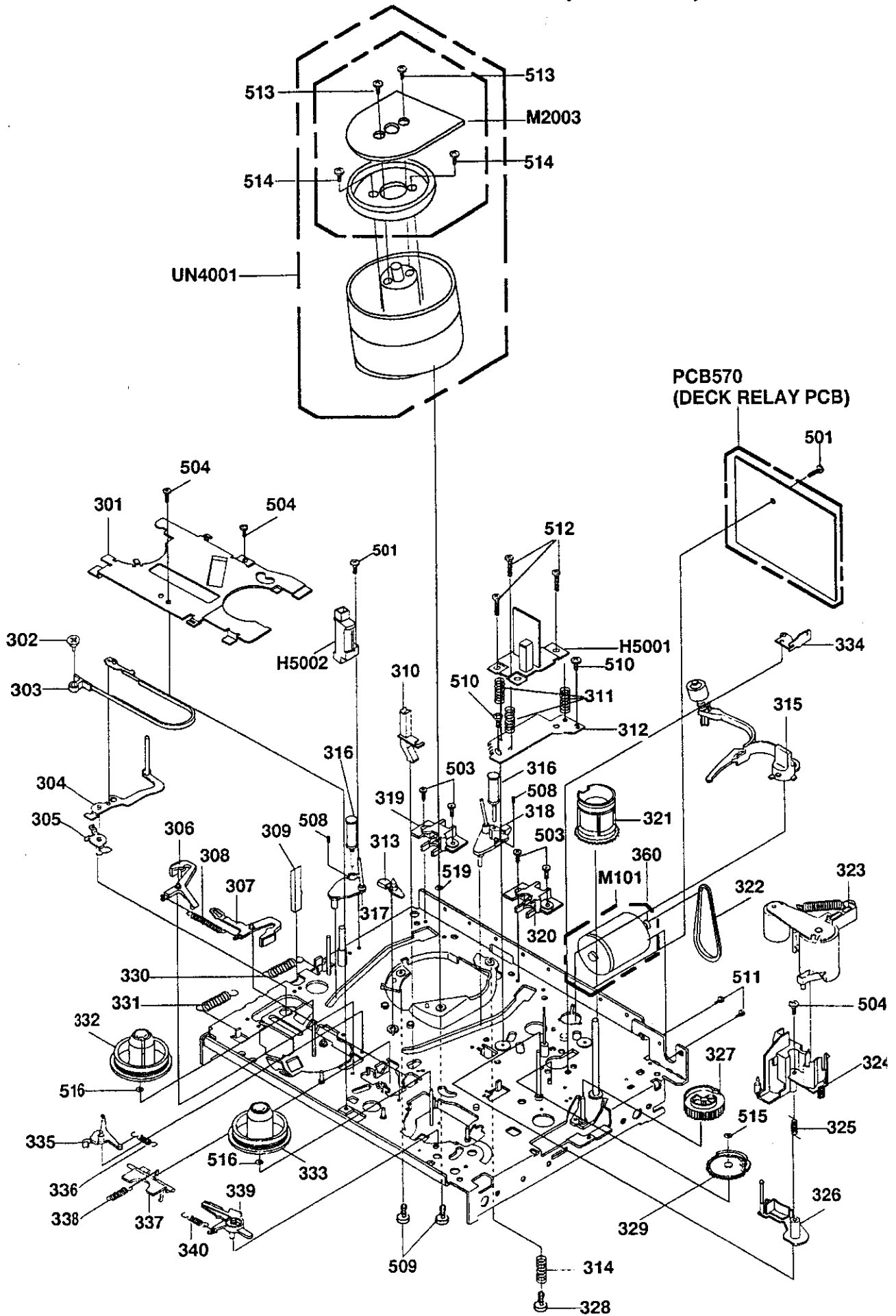
ATTENTION: LES PIÈCES RÉPARÉES PAR UN ÉTANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLES DÉCRITES DANS LA NOMENCLATURE DES PIÈCES.

NOTE: THIS INTERCONNECTION DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE.

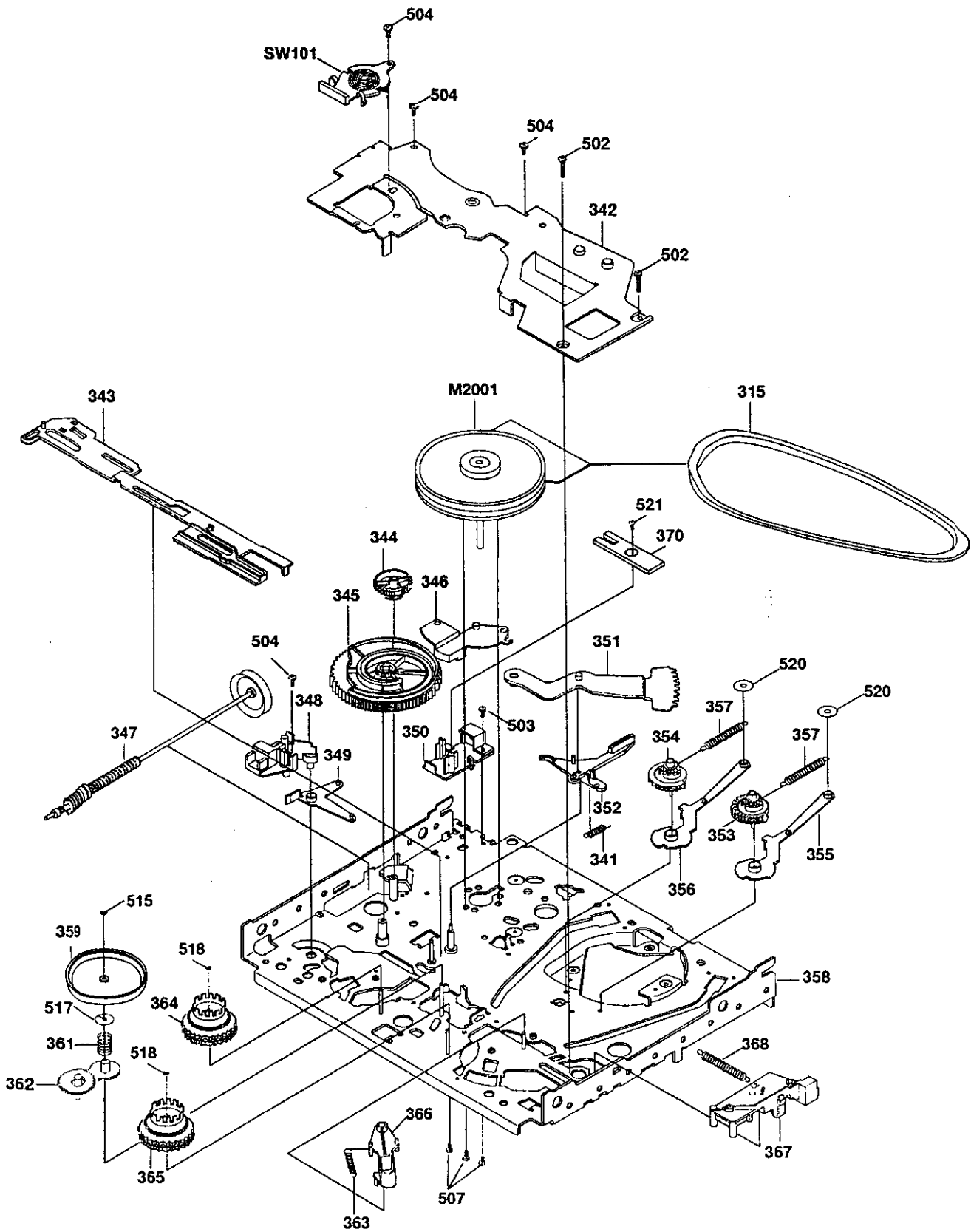
# MECHANICAL EXPLODED VIEW



# CHASSIS EXPLODED VIEW (TOP VIEW)

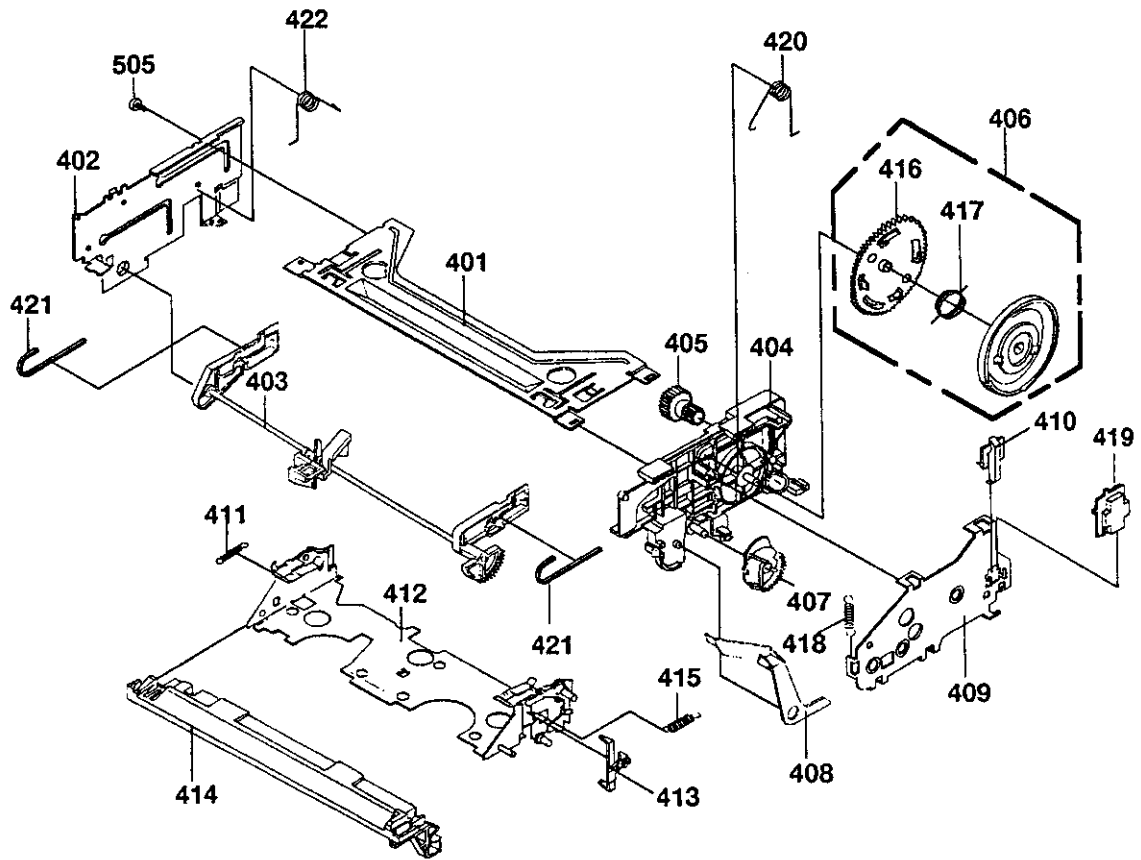


# CHASSIS EXPLODED VIEW (BOTTOM VIEW)





# FRONT LOADING EXPLODED VIEW



MECHANICAL REPLACEMENT PARTS LIST

REF. NO.	PART NO.	DESCRIPTION
601	A4A720B720	CABINET.FRONT ASS'Y
602	701WPJ0563	CABINET.FRONT
603	711WPD0276	PLATE.DISPLAY
604	712WPJ0343	FLAP
605	762WSA0024	ANGLE.DECK BACK
606	735WPD0190	BUTTON.DECK
607	743WKA0006	SPRING.FLAP
608	800WFA0001	CUSHION.LEG
609	761WPA0057	HOLDER.FRONT(R)
610	761WPA0058	HOLDER.FRONT(L)
611	A4A601A650	FRONT LOADING UNIT(FL-7A)
612	702USS0021	CABINET.TOP
613	702WSA0029	PLATE.BOTTOM
614	753WSA0072	SHIELD.PLATE 21PIN
615	----	CUSHION 10*15*T3
616	----	HEAT SINK
617	753WSA0068	SHIELD.CASE HEAD AMP
618	753WSA0069	SHIELD.COVER HEAD AMP
619	753WSA0068	PLATE.EARTH SYSCON
620	753WSA0063	PLATE.EARTH BOTTOM
621	753WUA0025	SPRING.EARTH M-PCB
622	754WPA0012	COVER.LED(R)
623	754WPA0013	COVER.LED(L)
624	756WPA0014	HOLDER.CLOCK
625	761WPA0046	HOLDER.DECK
626	850PT00031	HOLDER.LED
627	702WPA0302	PANEL.BACK
628	7222022129	SHEET.RATING
701	8117140A24	SCREW.TAPPING(B0) PAN 4*12
702	8117540A02	SCREW.TAPPING(B0) TRUSS 4*10
703	8117430A02	SCREW.TAPPING(B0) OVAL 3*10
704	8107230604	SCREW.TAP TITE(S) BIND 3*6
705	8110226084	SCREW.TAP TITE(P) BIND 2.6*8
706	8107226504	SCREW.TAP TITE(S) BIND 2.6*8
707	8107226804	SCREW.TAP TITE(S) BIND 2.6*5
----	JB5V0500	POLYBAG
----	J3A20702V	GUARANTEE CARD
----	J4A72001V	INSTRUCTION BOOK
----	J4A72007V	QUICK SET-UP SHEET
----	J4374228V	WARNING SHEET
----	J4802020V	DEW CAUTION SHEET
----	791UHA0005	GIFT SHEET
----	792UHA0072	PACKAGE
----	793UCD0801	GIFT BOX

CHASSIS/FRONT LOADING REPLACENT PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION
301	850P600471	BRACKET, BRAKE	369	850P200215	BELT, CAPSTAN
302	850P400358	ADJUST, TENSION	370	850P600519	STOPPER, CAPSTAN
303	850A400122	TENSION BAND ASS'Y	401	850P900542	BRACKET, TOP
304	850A400124	TENSION ARM ASS'Y	402	850P900556	BRACKET, SIDE L
305	850A400123	TENSION LEVER 2 ASS'Y	403	850A900149	LINK ASS'Y (VR)
306	850A600155	MAIN BRAKE S ASS'Y	404	850P900566	BRACKET, SIDE R1
307	850A600156	MAIN BRAKE T ASS'Y	405	850P900561	GEAR, JOINT
308	850P800252	SPRING, MAIN BRAKE	406	850A900159	GEAR, CAM ASS'Y
309	850P900564	REFLECTOR, EOT	407	850P900562	GEAR, LINK R
310	850P400347	REFLECTOR, LED	408	850P900594	LEVER, FLAP 2
311	850P800269	SPRING, AC HEAD	409	850P900568	BRACKET, SIDE R2
312	850P500060	BASE, AC HEAD	410	850P900570	REFLECTOR, BOT
313	850P000394	POST, CASS GUIDE L	411	850P800267	SPRING, LOCKER L
314	850P800245	SPRING, AZIMUTH 2	412	850A900147	CASS HOLDER ASS'Y
315	850A500013	AHC ASS'Y	413	850P900552	REMOVING
316	850A400129	GUIDE ROLLER ASS'Y	414	850P900567	TAPE GUIDE, PIECE
317	850A400126	BASE, S INCLINED ASS'Y	415	850P800268	SPRING, LOCKER R
318	850A400127	BASE, T INCLINED ASS'Y	416	850P900559	GEAR, CLUTCH
319	850P400400	CATCHER S	417	850P900560	SPRING, CLUTCH
320	850P400401	CATCHER T	418	850P800293	SPRING, LEVER FLAP 2
321	850P400343	CAM, PINCH ROLLER	419	850P900586	COVER, SENSOR (BOT)
322	850P600487	BELT, LOADING	420	850P800290	SPRING, EARTH
323	850A400117	PINCH ROLLER BLOCK	421	850P900557	SPRING, LINK
324	850P900541	CASS, OPENER	422	850P800272	SPRING, BRACKET L
325	850P800264	SPRING, P5	501	810T230604	SCREW, TAP TITE(S) BIND 3*6
326	850A400120	P5 ARM ASS'Y	502	8109226A64	SCREW, TAP TITE(B) BIND 2.6*16
327	850P400342	CAM GEAR	503	810T226804	SCREW, TAP TITE(S) BIND 2.6*8
328	8146230A14	JOINT SCREW BIND	504	810T226604	SCREW, TAP TITE(S) BIND 2.6*6
329	850P400344	CAM, P5	505	810T226504	SCREW, TAP TITE(S) BIND 2.6*6
330	850P400356	SPRING, TENSION ARM 2	506	810T226404	SCREW, TAP TITE(S) BIND 2.6*4
331	850P400357	SPRING, TENSION ARM 1	507	8110126604	SCREW, TAP TITE(P) PAN 2.6*6
332	850P200216	REEL S	508	815DJ20302	SET SCREW 6 CUP POINT M2*3
333	850P200217	REEL T	509	810A130604	SCREW/WASHER(A) M3*6
334	850P400402	CATCHER, P5 2	510	810B126604	SCREW/WASHER(B) M2.6*6.0
335	850P800465	SUB BRAKE S	511	8102130304	SCREW, PAN M3.0*3.0
336	850P800253	SPRING, S-S BRAKE	512	8102126A04	SCREW, PAN M2.6*10
337	850P200214	ARM, JOINT	513	810A123504	SEMS A M2.3*5.0
338	850P800262	SPRING, JOINT ARM	514	850PAA0197	SCREW, MOTOR M3*5
339	850A600157	SUB BRAKE T ASS'Y	515	82P266005N	POLYSLIDER WASHER(CUT) 2.6*6.0*TO.5
340	850P800254	SPRING, T-S BRAKE	516	82Q264713N	POLYSLIDER WASHER 2.6*4.7*TO.13
341	850P800255	SPRING, CAP BRAKE	517	82P26A005N	POLYSLIDER WASHER(CUT) 2.6*10*TO.5
342	850P600485	PLATE, BOTTOM	518	82P166005N	POLYSLIDER WASHER(CUT) 1.6*6.0*TO.5
343	850A600160	ROD, MAIN ASS'Y	519	82Q315483N	POLYSLIDER WASHER 3.1*5.4*TO.13
344	850P400341	GEAR, MIDDLE	520	83CST40000	CS-RING 4.0
345	850P600472	CAM, MAIN	521	8190226A84	SCREW, TAP TITE(B) BIND 2.6*18
346	850P600468	LEVER, MAIN BRAKE	CD1001	068722058A	CORD EIS CONNECTOR 8722058A
347	850A600159	WORM ASS'Y	CD2001	122W060803	CORD JUMPER 2W060803
348	850P600483	BRACKET, WORM F	CD5001	122B050901	CORD JUMPER 2B050901
349	850P600474	LEVER, RATCHET	CX4001	0694760509	CONNECTOR PCB SIDE 177640-6
350	850P600484	BRACKET, WORM R	CX4003	069779M010	CONNECTOR PCB SIDE TKC-F09X-L1
351	850P300151	LEVER, LOADING	CX4004	0694220139	CONNECTOR PCB SIDE 173979-2
352	850A600174	CAPSTAN BRAKE ASS'Y (M.J)	CX4006	0697FK0080	CONNECTOR PCB SIDE TMC-N20X-B1
353	850P300152	GEAR, LOADING S	H5001	1523D91020	HEAD AUDIO CONTROL HVMZA1210A
354	850P300153	GEAR, LOADING T	H5002	1543D02008	HEAD FULL ERASE HVFHF0053A
355	850A300053	LOADING ARM S ASS'Y	M101	1596P58008	MOTOR, LOADING MXN-13FB12F
356	850A300054	LOADING ARM T ASS'Y	M2001	1594J98001	CAPSTAN, DD UNIT SP398A
357	850P800263	SPRING, LOADING GEAR	M2003	1589V11003	MICRO MOTOR EP13CC
358	850A000173	MAIN CHASSIS ASS'Y	SW101	0520244003	SWITCH ROTARY SRZ20B064A
359	850P200213	CENTER PULLEY	PCB570	A4A702A570	DECK RELAY PCB ASS'Y VE4662
360	850P600486	PULLEY, LDM 5	UN4001	A4A705A500	CYLINDER UNIT ASS'Y A4A705A500
361	850P800261	SPRING, C-PULLEY			
362	850A200051	ARM IDLER ASS'Y			
363	850P800270	SPRING, LEVER TENSION			
364	850A200050	CLUTCH GEAR T ASS'Y			
365	850A200049	CLUTCH GEAR S ASS'Y			
366	850P400360	LEVER, TENSION			
367	850P400359	HOLDER, TENSION			
368	850P800256	SPRING, MAIN ROD			

THIS ELECTRICAL PARTS LIST IS STANDARD PART LIST. BUT INTERCHANGEABLE PARTS MAY BE USED IN THE UNIT. SEE THE INTERCHANGEABLE PARTS LIST AFTER THE STANDARD PARTS LIST.

ELECTRICAL REPLACEMENT PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION
RESISTORS			SEMICONDUCTORS (CONT.)		
▲ R505	R001T6103J	RC 10K OHM 1/6W	IC4502	103S071510	IC LA7151
▲ R511	R3K181820J	R.METAL 82 OHM 1W	IC6001	103D772860	IC LA7286
▲ R512	R3K28A683J	R.METAL OXIDE 68K OHM 2W	IC6301	103F071050	IC LA7105M-TP-T1
▲ R514	R3K181010J	R.METAL 1.0 OHM 1W	IC6302	103S06358T	IC LA6358ST
▲ R515	R61582100J	R.FUSE 10 OHM 1/2W	IC6303	10M190574J	IC UPC574J-T
▲ R517	R63502100J	R.FUSE 10 OHM 1/2W	Q502	TC3T042040	TRANSISTOR.SILICON 2SC4204-AA
▲ R527	R3K28A104J	R.METAL OXIDE 100K OHM 2W	Q503	TCB0045170	TRANSISTOR.SILICON 2SC4517
▲ R536	R3K28A180J	R.METAL OXIDE 18 OHM 2W	Q504	TNYTC05001	COMPOUND TRANSISTOR DTC124EKT147
▲ R537	R63502010J	R.FUSE 1 OHM 1/2W	Q505	TNYTC05001	COMPOUND TRANSISTOR DTC124ESTP
▲ R1087	R635812R7J	R.FUSE 2.7 OHM 1W	Q506	TNYTC03001	COMPOUND TRANSISTOR DTC124ESTP
CAPACITORS			Q507	TC3T052910	TRANSISTOR.SILICON 2SC5291-AY
▲ C504	P2470A104M	CMP 0.1 UF 125V	Q508	TC3T0536K0	TRANSISTOR.SILICON 2SC536K-NP
▲ C505	CA3PF0KL3M	CC 0.0033UF 400V	Q509	TBWT009260	TRANSISTOR.SILICON 2SB926-AA
▲ C506	CA30309L3M	CC 0.0033UF 4KV	Q510	0002500470	PHOTO COUPLER TLP621D4(GB)
▲ C508	E02TFH680M	CE 68 UF 400V	Q511	0002500480	PHOTO COUPLER TLP621D4(GR)
▲ C509	COJ0B0612K	CC 100 PF 1KV B	Q513	TAWT0984K0	TRANSISTOR.SILICON 2SA984K-AA
▲ C512	P312F5103J	CCP 0.01 UF 630V	Q1001	0002G00490	PHOTO COUPLER GP1394
▲ C514	E02RT2331M	CE 330 UF 16V	Q1002	0000700320	TRANSISTOR PHOTO RPT-38PB113
▲ C517	E02RT0101M	CE 100 UF 16V	Q1003	TCYT2872S0	TRANSISTOR.SILICON 2SC2872S
▲ C518	E50HU54R7M	CE 4.7 UF 50V	Q1004	0000700320	TRANSISTOR PHOTO RPT-38PB113
▲ C519	E02RT3331M	CE 330 UF 25V	Q1006	0002G00490	PHOTO COUPLER GP1394
▲ C520	EOELF0332M	CE 3300 UF 6.3V	Q1007	T8YA2412K0	TRANSISTOR.SILICON 2SC2412KT147
▲ C521	E50HU54R7M	CE 4.7 UF 50V	Q1011	T8YA2412K0	TRANSISTOR.SILICON 2SC2412KT147
▲ C522	E02RT3331M	CE 330 UF 25V	Q1014	T8YA2412K0	TRANSISTOR.SILICON 2SC2412KT147
▲ C6347	CHG0B0413J	CC 0.001 UF 50V B	Q1015	TNYTC05001	COMPOUND TRANSISTOR DTC124EKT147
SEMICONDUCTORS			Q1016	TAWT0984K0	TRANSISTOR.SILICON 2SA984K-AA
▲ D504	D2501J4B42	DIODE 1J4B42	Q1017	TNYTC05001	COMPOUND TRANSISTOR DTC124EKT147
D506	D1VT024720	DIODE.SILICON 1S2472T-77	Q4001	T6YA1037K0	TRANSISTOR.SILICON 2SA1037KT147
D507	D1VT001320	DIODE.SILICON 1SS132T-77	Q4003	T8YA2412K0	TRANSISTOR.SILICON 2SC2412KT147
D509	D23T0SK10E	DIODE.RECTIFIER DSK10E-BT	Q4014	T8YA2412K0	TRANSISTOR.SILICON 2SC2412KT147
▲ D510	D1VT001320	DIODE.SILICON 1SS132T-77	Q4039	T8YA2412K0	TRANSISTOR.SILICON 2SC2412KT147
D511	D2BTE0G01C	DIODE.RECTIFIER EG-01C	Q4040	T8YA2412K0	TRANSISTOR.SILICON 2SC2412KT147
D512	D28TEG0S040	DIODE.SCHOTTKY 11EQS04TA1	Q4101	T6YA1037K0	TRANSISTOR.SILICON 2SA1037KT147
▲ D513	D2BTOAK040	DIODE.SCHOTTKY BARRIER AK04V0	Q4104	T8YA2412K0	TRANSISTOR.SILICON 2SC2412KT147
D514	D28T1D0090	DIODE.RECTIFIER 21D009-TA2B1	Q4105	T8YA2412K0	TRANSISTOR.SILICON 2SC2412KT147
D515	D13TGMA020	DIODE.SILICON GMA-02-BT	Q4106	T8YA2412K0	TRANSISTOR.SILICON 2SC2412KT147
▲ D516	D13TGMA020	DIODE.SILICON GMA-02-BT	Q4107	T8YA2412K0	TRANSISTOR.SILICON 2SC2412KT147
D517	D93T01800Y	DIODE.ZENER GZA18 Y BT	Q4108	T8YA2412K0	TRANSISTOR.SILICON 2SC2412KT147
D518	D1VT001320	DIODE.SILICON 1SS132T-77	Q4109	T8YA2412K0	TRANSISTOR.SILICON 2SC2412KT147
D519	D28T11DF20	DIODE.SILICON 11DF2-TA2B2	Q4112	T6YA1037K0	TRANSISTOR.SILICON 2SA1037KT147
D520	D97U08R21C	DIODE.ZENER MTZJ8.2C T-77	Q4301	T8YA2412K0	TRANSISTOR.SILICON 2SC2412KT147
D521	D1VT001320	DIODE.SILICON 1SS132T-77	Q4502	TAYT0933S0	TRANSISTOR.SILICON 2SA933STP(R.S)
D522	D1VT001320	DIODE.SILICON 1SS132T-77	Q4503	TAYT0933S0	TRANSISTOR.SILICON 2SA933STP(R.S)
▲ D523	D93T01800Y	DIODE.ZENER GZA18 Y BT	Q4504	TNYTC03001	COMPOUND TRANSISTOR DTC124ESTP
D524	D87T2MR150	SEALED LED LTZ-MR15-T77	Q5001	TCCKT013170	TRANSISTOR.SILICON 2SC1317-T
D526	D28T011E10	DIODE.SILICON 11E1TA1	Q6303	T8YA2412K0	TRANSISTOR.SILICON 2SC2412KT147
D1001	0001300030	LED SLR-938C-4-AB	Q6304	T8A037340	TRANSISTOR.SILICON 2SC3734
D1003	OD3RLF0B1L	DIODE.SILICON LFB-01L	Q6305	T8YA2412K0	TRANSISTOR.SILICON 2SC2412KT147
D1005	D28T011E10	DIODE.SILICON 11E1TA1	Q6307	T6YA1037K0	TRANSISTOR.SILICON 2SA1037KT147
D1006	D1VT024720	DIODE.SILICON 1S2472T-77	Q6308	T6YA1037K0	TRANSISTOR.SILICON 2SA1037KT147
D1008	D1VT024720	DIODE.SILICON 1S2472T-77	Q6309	T8YA2412K0	TRANSISTOR.SILICON 2SC2412KT147
D1009	D1VT024720	DIODE.SILICON 1S2472T-77	Q6310	T8YA2412K0	TRANSISTOR.SILICON 2SC2412KT147
D1010	D28T011E10	DIODE.SILICON 11E1TA1	Q6314	T8YA2412K0	TRANSISTOR.SILICON 2SC2412KT147
D1011	D28T011E10	DIODE.SILICON 11E1TA1	Q6315	TNYTC05001	COMPOUND TRANSISTOR DTC124EKT147
D1016	D1VT001320	DIODE.SILICON 1SS132T-77	COILS & TRANSFORMERS		
D1017	D1VT001320	DIODE.SILICON 1SS132T-77	▲ L501	029X000070	COIL.LINE FILTER SSI0V-03330
D1018	D1VT001320	DIODE.SILICON 1SS132T-77	L504	021W66620K	COIL.CHOKE 82 UH
D1019	D1VT001320	DIODE.SILICON 1SS132T-77	L505	021W66220K	COIL.CHOKE 22 UH
D1020	D1VT001320	DIODE.SILICON 1SS132T-77	L4001	02167D101K	COIL 100 UH
D1024	D28T011E10	DIODE.SILICON 11E1TA1	L4003	02167D101K	COIL 100 UH
D1026	D1VT001320	DIODE.SILICON 1SS132T-77	L4005	021LA68R2K	COIL 8.2 UH
D1027	D97U06R21C	DIODE.ZENER MTZJ6.2C T-77	L4006	021LA6100K	COIL 16 UH
D1028	D28T011E10	DIODE.SILICON 11E1TA1	L4018	021673101K	COIL 100 UH
D4001	D1VT872100	DIODE.SCHOTTKY R87210	L4026	021673101K	COIL 100 UH
D4501	D97U015010	DIODE.ZENER MTZJ15 T-77	L4102	021673101K	COIL 100 UH
D4510	D97U01301C	DIODE.ZENER MTZJ13C T-77	L4103	021673101K	COIL 10 UH
D4516	D97U01501C	DIODE.ZENER MTZJ15C T-77	L4105	021LA6150K	COIL 10 UH
D5001	D1VT001320	DIODE.SILICON 1SS132T-77	L4106	021LA6121K	COIL 10 UH
D5002	D94TA6R8J2	DIODE.ZENER HZS6R8JB2-TE	L4108	021LA6470K	COIL 4 UH
D6301	D97U06R11C	DIODE.ZENER MTZJ5.1C T-77	L4109	021LA6100K	COIL 11 UH
D6302	D28T011E10	DIODE.SILICON 11E1TA1	L4110	021LA6220K	COIL 2 UH
D6304	D28T011E10	DIODE.SILICON 11E1TA1	L4111	021LA6271K	COIL 20 UH
IC501	101J914310	IC AN1431T-(TA)	L4112	021673101K	COIL 10 UH
IC502	100A97810F	IC NJM7810FA	L4113	021LA6271K	COIL 20 UH
IC1001	150F58012B	IC QECB012B	L4114	021LA6151K	COIL 10 UH
IC1002	193J407123	IC LA7123	L4117	021LA6271K	COIL 20 UH
IC1003	19UJ0T600H	IC PST600H	L4302	021LA6220K	COIL 22 UH
IC1004	105S07291S	IC TA7291S	L4503	021LA6220K	COIL 2 UH
IC1150	IC4D04C020	IC XL24C02P	L4504	021LA62R2K	COIL 2.2 UH
IC4001	103D37449L	IC LA7449L	L4505	021673101K	COIL 100 UH
IC4002	153D399700	IC LC89970	L4508	021673101K	COIL 100 UH
IC4101	103FG7411M	IC LA7411M-TP-T	L4510	021LA6100K	COIL 10 UH
			L5001	021673102K	COIL 100 UH

ELECTRICAL REPLACEMENT PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	
COILS & TRANSFORMERS (CONT.)			
△ T501	0481290036	TRANSFORMER, SWITCHING	8129003
T5001	033626010R	COIL, BIAS OSC	3626010
JACKS			
J4502	063G100035	SOCKET, 21PIN	035 0 5363 00
SWITCHES			
SW601	0504201T31	SWITCH, TACT	SKHVBE075B
SW602	0504201T31	SWITCH, TACT	SKHVBE075B
SW603	0504201T31	SWITCH, TACT	SKHVBE075B
SW604	0504201T31	SWITCH, TACT	SKHVBE075B
SW606	0504201T31	SWITCH, TACT	SKHVBE075B
SW607	0504201T31	SWITCH, TACT	SKHVBE075B
SW608	0504201T31	SWITCH, TACT	SKHVBE075B
SW609	0504201T31	SWITCH, TACT	SKHVBE075B
SW1001	0501A02002	PUSH SWITCH	MPU20250MLB0
SW6301	0510U21022	SWITCH, SLIDE	SSSF11342A
P. C. BOARD ASSEMBLIES			
PCB010	A4A720801A	PCB ASS'Y	VM5090A
PCB260	A4A720826A	PCB ASS'Y	VE5709A
PCB270	A4A720827A	PCB ASS'Y	VE5698A
PCB330	A52101A33A	PCB ASS'Y	VE5706B
PCB570	A4A702A570	SEE CHASSIS/FRONT LOADING REPLACEMENT PARTS LIST	
MISCELLANEOUS			
B502	024DT03582	CORE, BEADS	LFD3A-M3R2T0
BT601	1412004004	BATTERY, MANGAN	UM-4(GR)
△ CD501	1206655806	CORD, AC BUSH E2N 6FEET	06655806
CD601	06CE24049A	CORD, EIS CONNECTOR	CE24049A
CP501	0694430100	CORD, UX CONNECTOR	2-173270-3
CP651	069E240529	CONNEC. PCB SIDE	8283 0412 00 000
CU012	800WF00020	CUSHION-B	
CD6002	06CZL05015	RF CABLE PAL FTZ	D-2070
CF4502	1162LTQ2M1	FILTER EMI	DSS306-93B471M10
CP1001	06979K0040	CONNECTOR PCB SIDE	TMC-N20P-E1
CP1002	0697150310	CONNECTOR PCB SIDE	TAS-X05X-D1
CP4001	06979M0040	CONNECTOR PCB SIDE	TMC-N22P-E1
CP4101	069R750499	CONNECTOR PCB SIDE	52492-0520
CP4103	069J740109	CONNECTOR PCB SIDE	IMSA-9603S-04C
CP4104	0697FM0080	CONNECTOR PCB SIDE	TMC-N22X-B1
CP4106	0694240139	CONNECTOR PCB SIDE	173979-4
CX6301	069J280028	CONNECTOR PCB SIDE	IMSA-9115B-08
CX6302	069J280028	CONNECTOR PCB SIDE	IMSA-9115B-11
CX6303	069J270028	CONNECTOR PCB SIDE	IMSA-9115B-07
CY6301	069J280038	CONNECTOR PCB SIDE	IMSA-9115S-08L
CY6302	069J280038	CONNECTOR PCB SIDE	IMSA-9115S-11L
△ CY6303	069J270038	CONNECTOR PCB SIDE	IMSA-9115S-07L
F501	080PT1R602	FUSE	1.6A 250V
FH501	06710T0006	HOLDER, FUSE	EYF-52BC
FH502	06710T0006	HOLDER, FUSE	EYF-52BC
△ 1CP501	083PC1R602	MICRO FUSE	CCV1.6A
OS651	077Q000010	REMOTE RECEIVER	PLC-12043LO
TU601	076607224B	TRANSMITTER	SBEG20058B
△ TU6001	0162701004	RF UNIT (MD+TU+1F)	MRF7-UE34
V651	096775R701	TUBE FLUORSCENT DISPLAY	FV686G
X1001	100CA01203	CRYSTAL HC-49/U-S	12.0MHZ
X1002	100C32R803	CRYSTAL DSVT-200	32.768KHZ
X4001	100WA4R303	CRYSTAL HC-49/U	4.43361895MHZ

RESISTOR

RC..... CARBON RESISTOR

CAPACITORS

CC..... CERAMIC CAPACITOR  
 CE..... ALUMI ELECTROLYTIC CAPACITOR  
 CP..... POLYESTER CAPACITOR  
 CPP..... POLYPROPYLENE CAPACITOR  
 CPL..... PLASTIC CAPACITOR  
 CMP..... METAL POLYESTER CAPACITOR  
 CMPL..... METAL PLASTIC CAPACITOR  
 CMPP..... METAL POLYPROPYLENE CAPACITOR  
 CST..... STYROL CAPACITOR

INTERCHANGEABLE PARTS LIST

NOTE: THE FOLLOWING PART(S) MAY BE SUBSTITUTED FOR PARTS INDICATED IN THE ELECTRICAL REPLACEMENT PARTS LIST (WITH THE SAME REF.NO.). THESE PARTS SHARE THE SAME ELECTRICAL CHARACTERISTICS AND OTHER ELEMENTS FOR COMMON USAGE. EITHER PART NUMBER MAY BE USED IN THIS UNIT.

REF.NO.	BASE		REPLACEMENT	
	PART NO.	DESCRIPTION	PART NO.	DESCRIPTION
D1005	D28T011E10	11E1TA1	D2WXN40020	1N4002
D1010	D28T011E10	11E1TA1	D2WXN40020	1N4002
D1011	D28T011E10	11E1TA1	D2WXN40020	1N4002
D1024	D28T011E10	11E1TA1	D2WXN40020	1N4002
D1028	D28T011E10	11E1TA1	D2WXN40020	1N4002
D520	D97U08R21C	1SS132T-77	D94TA8R2J2	HZS8R2JB2-TE
D526	D28T011E10	11E1TA1	D2WXN40020	1N4002
D6302	D28T011E10	11E1TA1	D2WXN40020	1N4002
D6304	D28T011E10	11E1TA1	D2WXN40020	1N4002
IC1150	IC4D04C020	XL24C02P	157D04C020	BR24C02
IC501	I01J914310	AN1431T-(TA)	I02J910930	UPC1093J-T
△R1087	R635812R7J	2.7 OHM 1W	R615812R7J	S 2.7 OHM 1W