Service Manual

VIDEO CASSETTE RECORDER

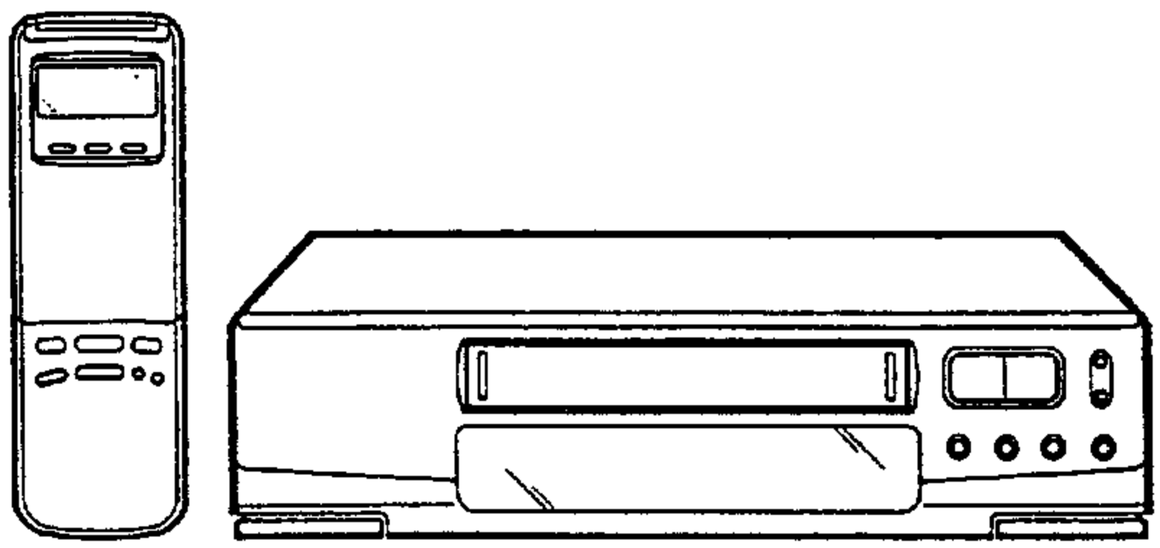
VHS
PAL

ORION

MODEL VH-1406 HY

universum.

VR 29460 A



Chassis Code:

A

Bestell-Nr.

5681

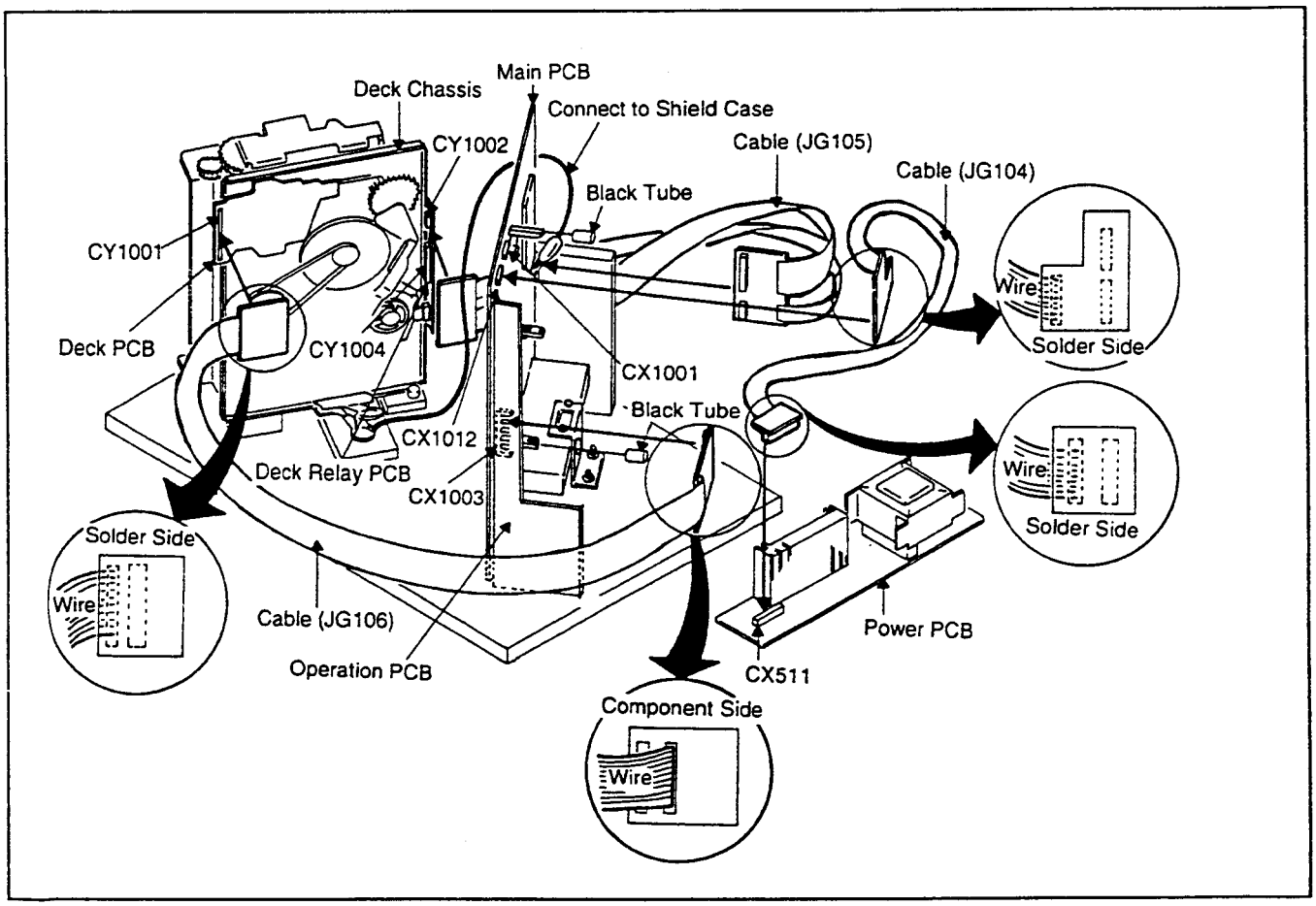
ADDENDUM SHEET

PREPARATION FOR SERVICING

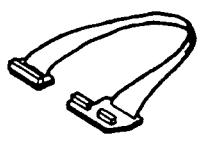
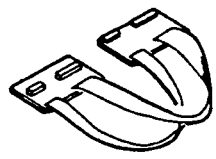
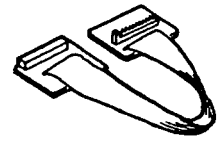
How to use Service Fixture

1. Remove the Power PCB while the MAIN PCB is attached to the DECK Chassis. If it is necessary, remove the MAIN PCB from the DECK Chassis.
2. Connect as shown in the below figure using the SERVICE FIXTURE.
   - ● Connect the MAIN PCB to the Power PCB with the cable of JG104.
   - ● Connect the MAIN PCB to the Deck Relay PCB with the cable of JG105.
   - ● Connect the MAIN PCB to the Deck PCB with the cable of JG106.

   NOTE: In case of insertion of cables for JG104 and JG106, observe the insertion direction.
   (Refer to the circled illustrations below.)
   When you operate the Deck, cover the sensors Q1001and Q1002 with a black tube.
3. When you operate only the Main PCB, connect Pin 13 and Pin 17 of the CX1003 to make a short circuit.



SERVICING FIXTURES AND TOOLS

JG104 Cable	JG105 Cable	JG106 Cable
		

HOW TO ORDER PARTS

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

A. MODEL NUMBER and CHASSIS CODE
   You can find it in the back of your unit.

B. PART NO. and DESCRIPTION
   You can find it in your SERVICE MANUAL.

SPECIFICATIONS

Power Source :	AC230V/50Hz
Power Consumption :	Approx. 29W
Operating Temperature :	5℃ to 40℃
Television System :	CCIR : 625 lines,50 fields PAL color signal
Video Recording System :	2 rotary heads, helical scanning system Luminance : FM azimuth recording Color signal :Converted subcarrier phase shift recording
Audio Track :	1 track
Tape Format :	12.7mm high density tape
RF Output Channel :	36 (±4) channel
Tape Speed :	23.39mm/s
Heads :	Video : 2 rotary heads Audio/Control : 1 stationary head Erase : 1 full track erase head
Input Level :	Video : VIDEO IN socket 1.0Vp-p, 75 ohm unbalanced Audio : AUDIO IN socket 500mV, 50K ohm unbalanced
Output Level :	Video : VIDEO OUT socket 1.0Vp-p, 75 ohm unbalanced Audio : AUDIO OUT socket 500mV, 1K ohm unbalanced
Weight :	4.5 Kg
Dimension :	380(W) × 92(H) × 280(D) mm

CONTENTS

HQ FEATURE

This video recorder is equipped with HQ (High Quality) recording capability. A built-in detail enhancer is used to boost the recorded signal for cleaner, sharper images and maximum picture quality in playback.

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 5 screws ①.
2. Remove the Top Cabinet in the direction of arrow (A).
3. Unlock the 4 supports ②.
4. Remove the Front Cabinet in the direction of arrow (B).

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

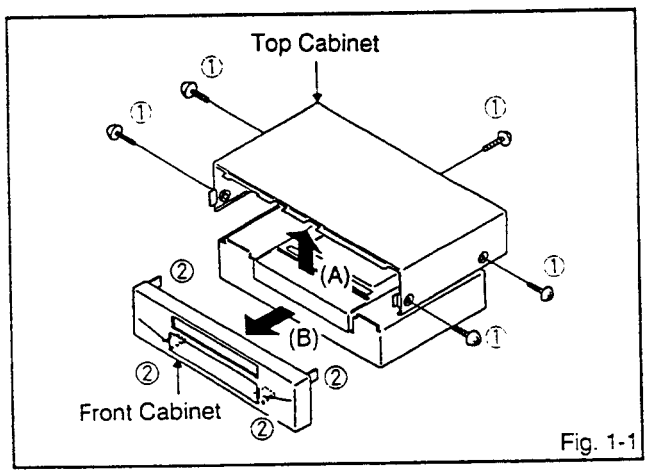


Fig. 1-1

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

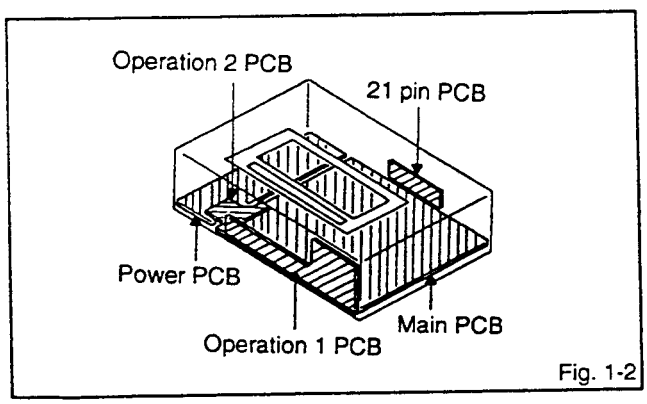


Fig. 1-2

1-3: OPERATION 1 PCB (Refer to Fig. 1-3)

1. Remove the screw ①.
2. Unlock the 3 supports ②.
3. Remove the Operation 1 PCB in the direction of arrow (A).

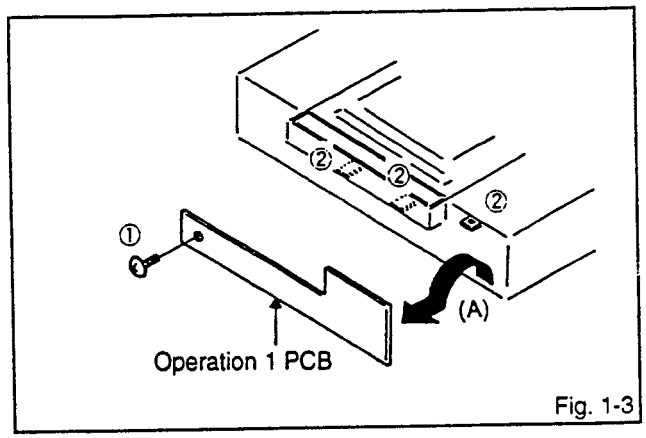


Fig. 1-3

1-4: BOTTOM CABINET (Refer to Fig. 1-4)

1. Remove the screw ①.
2. Remove the screw ②.
3. Unlock the support ③.
4. Remove the Bottom Cabinet in the direction of arrow (A).

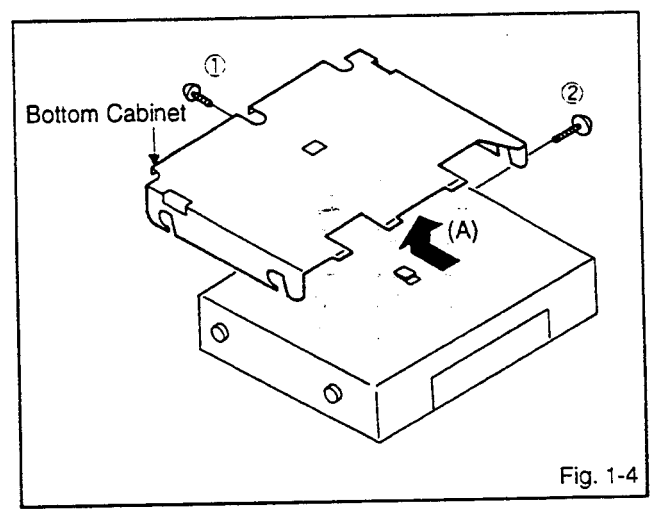


Fig. 1-4

1-5: MAIN PCB AND DECK CHASSIS (Refer to Fig. 1-5)

1. Remove the screw ①.
2. Remove the 3 screws ②.
3. Remove the Pully Shaft.
4. Remove the screw ③ and release the Wire Ground.
5. Unlock the 2 supports ④.
6. Unlock the 2 supports ⑤.
7. Remove the Main PCB with the Deck Chassis in the direction of arrow (A).

DISASSEMBLY INSTRUCTIONS

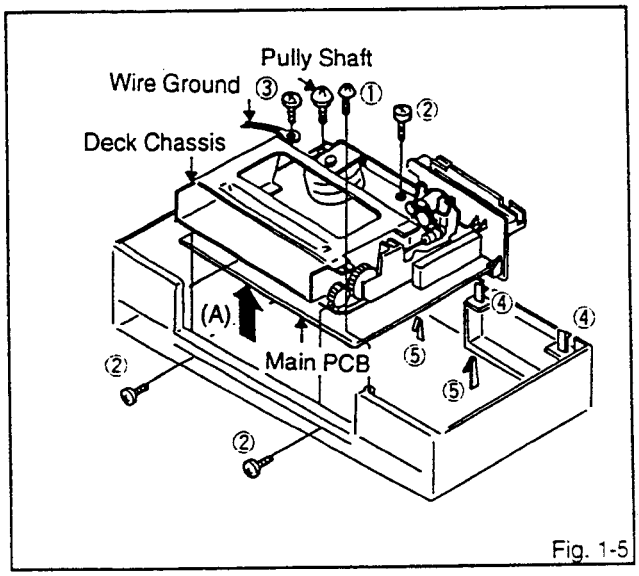


Fig. 1-5

1-6: POWER PCB AND OPERATION 2 PCB (Refer to Fig. 1-6)

1. Remove the Operation 2 PCB in the direction of arrow (A).
2. Remove the screw ①.
3. Unlock the 2 supports ②.
4. Remove the Power PCB in the direction of arrow (B).

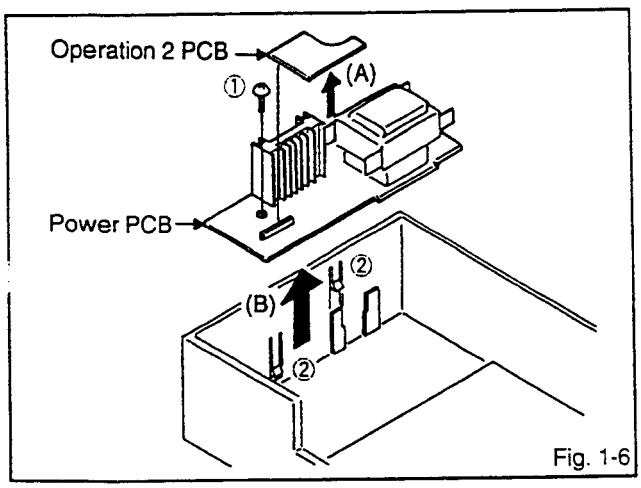


Fig. 1-6

1-7: MAIN PCB, FRONT LOADING UNIT, CHASSIS SECTION AND JACK PLATE (Refer to Fig. 1-7)

1. Remove the 2 screws ①.
2. Remove the Front Loading Belt 2.
3. Remove the Front Loading Unit in the direction of arrow (A).
4. Remove the screw ②.
5. Remove the Chassis Section in the direction of arrow (B).
6. Remove the 2 screws ③.
7. Unlock the 2 supports ④.
8. Remove the Jack Plate in the direction of arrow (C).
9. If 21 pin needs to be removed from Main PCB, desoldering is necessary.

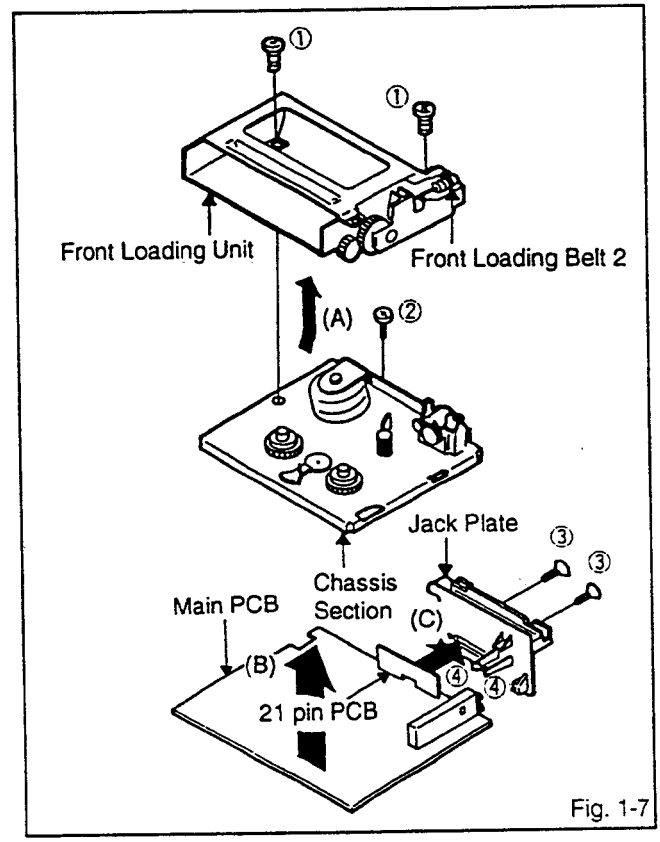


Fig. 1-7

1-8: FLAP (Refer to Fig. 1-8)

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).

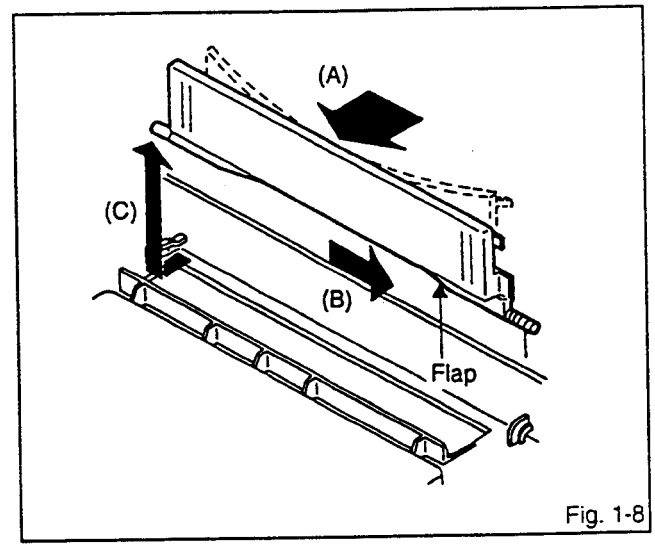


Fig. 1-8

DISASSEMBLY INSTRUCTIONS

2. REMOVAL OF DECK PARTS

2-1: ACTUATOR SUB BRAKE / IDLER ASS'Y (Refer to Fig. 2-1)

1. Remove the polyslider washer ①.
2. Remove the Idler Ass'y.
3. Remove the TS Brake Spring.
4. Remove the Actuator Sub Brake.

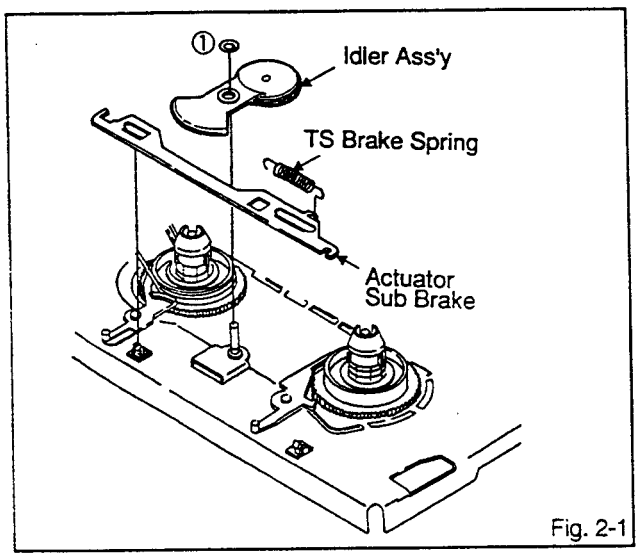


Fig. 2-1

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

1. Remove the Actuator Sub Brake.
2. Remove the SS Brake Spring, then remove the SS Brake Arm.
3. Remove the screw ①.
4. Remove the Tension Band Ass'y from the Tension Arm Ass'y.

NOTES

1. Install the Tension Band Ass'y without twisting it.
2. Adjust the placement of the Tension Post. **(Refer to item 1-2 of MECHANICAL ADJUSTMENTS)**
3. Adjust and confirm the back tension during playback. **(Refer to item 1-3 of MECHANICAL ADJUSTMENTS)**

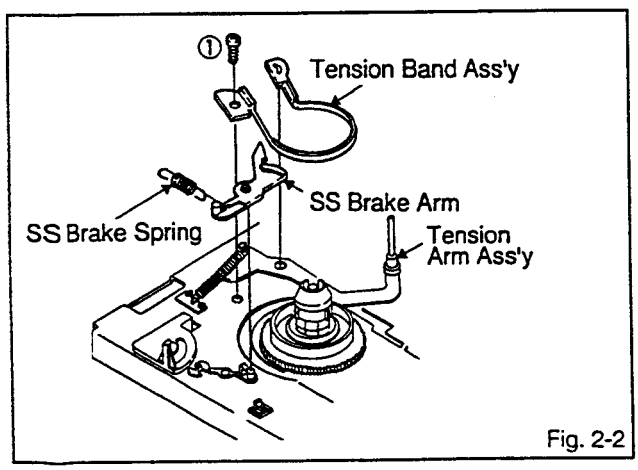


Fig. 2-2

2-3: REEL DISK (Refer to Fig. 2-3)

(Reel Disk S Ass'y)

1. Remove the Actuator Sub Brake.
2. Remove the SS Brake Spring, then remove the SS Brake Arm.
3. Remove the Tension Band Ass'y from the Tension Arm Ass'y.
4. Remove the polyslider washer ①.
5. Pull the Reel Disk S Ass'y upward and replace it.

(Reel Disk T Ass'y)

1. Remove the TS Brake Spring.
2. Remove the Actuator Sub Brake.
3. Move the TS Brake Ass'y in the direction of arrow.
4. Remove the polyslider washer ②.
5. Pull the Reel Disk T Ass'y upward and replace it.

NOTES

1. The height adjustment washers ③ are sometimes attached to the back of the Reel Disk.
2. Clean the Reel Disk Shaft and put in height adjusting washers ③.
3. Be careful not to damage the Tension Band Ass'y at the time of removal and installation.
4. Be careful not to scratch the Reel Disk Shaft with the polyslider washer or the tool at the time of removal and installation.
5. After oiling (Cosmo Oil Hydro HV100) the Reel Disk shaft, install the new Reel Disk S Ass'y and Reel Disk T Ass'y again.
6. After installation, adjust the height of the Reel Disk. **(Refer to item 1-1 of MECHANICAL ADJUSTMENTS)**
7. After installation, adjust and confirm the tension post position. **(Refer to item 1-2 of MECHANICAL ADJUSTMENTS)**

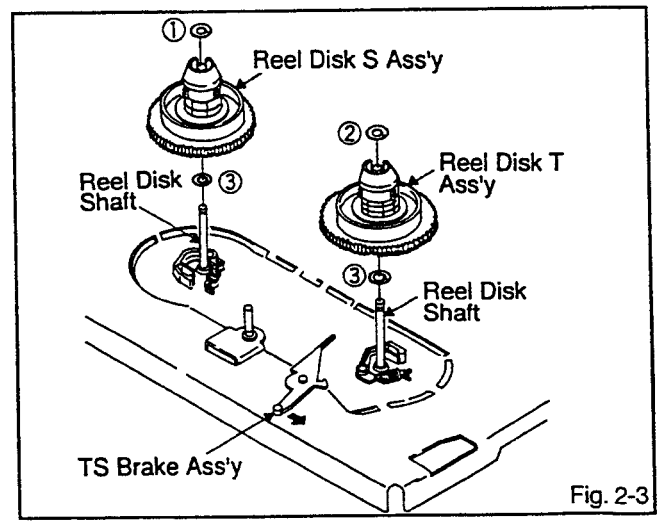


Fig. 2-3

2-4: A/C HEAD (Refer to Fig. 2-4)

1. Disconnect the 2 connectors (2 pin and 6 pin) on the A/C Head PCB.
2. Remove the screws ①, ② and ③.

DISASSEMBLY INSTRACTIONS

NOTE

1. Do not touch the heads by any means when replacing A/C Head.
2. After replacement, confirm the following adjustments.

   a. MECHANICAL ADJUSTMENTS : ITEM 2-2
   b. MECHANICAL ADJUSTMENTS : ITEM 2-3

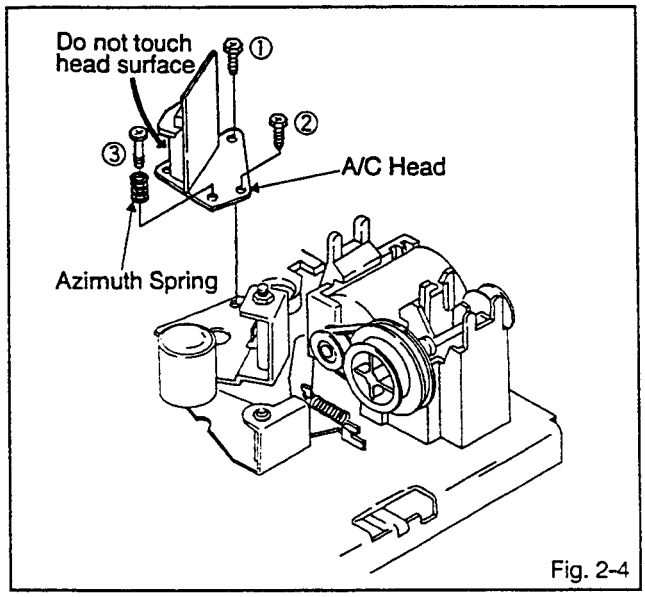


Fig. 2-4

2-5: LOADING MOTOR (Refer to Fig. 2-5)

1. Remove the lead wire in the hook of the Loading Motor Box.
2. Remove the Loading Motor Belt.
3. Remove the 2 screws ①, then remove the Loading Motor Box.
4. Remove the Front Loading Belt.
5. Remove the 2 screws ②, then lift the Loading Motor upward.
6. Remove the 2 wires soldered to the Loading Motor.

NOTES

1. Clean the pulley when replacing Front Loading Belt and Loading Motor Belt.
2. Avoid getting grease on the Loading Motor Belt and Front Loading Belt.

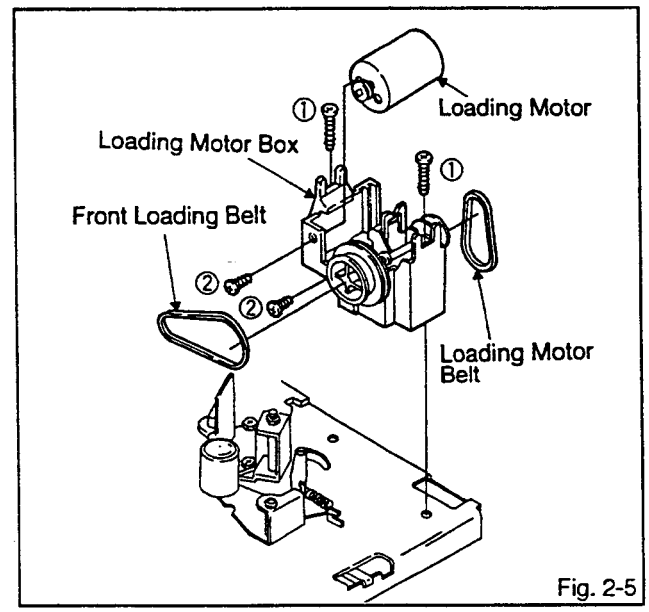


Fig. 2-5

2-6: PINCH ROLLER ARM (Refer to Fig. 2-6)

1. Remove the Pinch Roller Arm Spring.
2. Remove the polyslider washer ①.
3. Remove the Pinch Roller Arm.

NOTE

Do not touch the Pinch Roller.(Use gloves.)

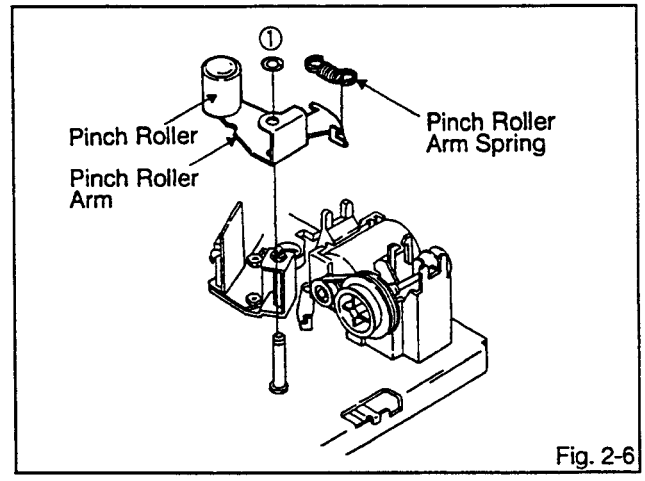


Fig. 2-6

2-7: CYLINDER UNIT (Refer to Fig. 2-7)

1. Disconnect the connector ① from Deck Relay PCB.
2. Disconnect the connector ②.
3. Remove the 3 screws ③, then remove the Cylinder Unit from the Main Chassis.

NOTES

1. Do not touch the surface of the Cylinder Head.
2. After replacement, confirm the following adjustments.

a. MECHANICAL ADJUSTMENTS : ITEM 2-1
b. ELECTRICAL ADJUSTMENTS : ITEM 3-1
c. ELECTRICAL ADJUSTMENTS : ITEM 3-2

DISASSEMBLY INSTRUCTIONS

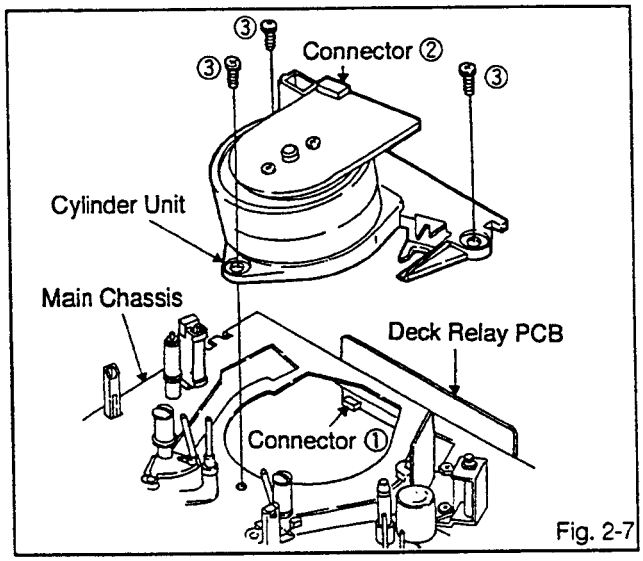


Fig. 2-7

2-8: DECK PCB (Refer to Fig. 2-8)

1. Remove the connector (9 pin) on the Capstan DD Unit.
2. Remove the solder (A) positions, remove the 2 screws ①.
3. Remove the Deck PCB.

NOTES

1. When installing the Deck PCB, be sure to set the Rotary Switch to the EJECT position.
   The EJECT position is the point where the (B) tooth is aligned to (C).
2. Avoid getting grease on the Reel Belt.

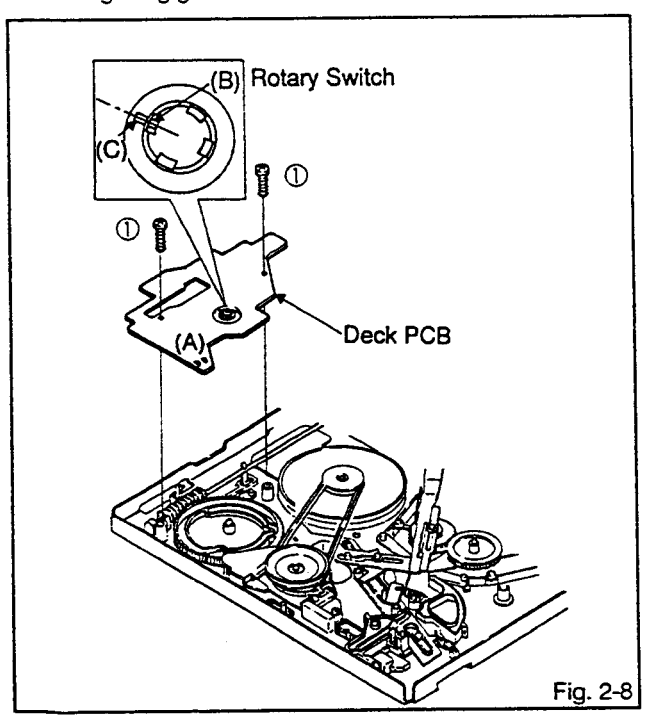


Fig. 2-8

2-9: CAPSTAN DD UNIT (Refer to Fig. 2-9-A, B)

1. Remove the Loading Motor Belt.
2. Remove the screw ①, then remove the Bracket Worm 3.
3. Remove the Worm.
4. Remove the 3 screws ①. **(Refer to Fig. 2-9-A)**
5. Remove the Capstan DD Unit.

NOTE

1. Do not bend the Limiter Post.
2. Use the specified screw to hold the Capstan DD Unit.
3. Install in the position where the Capstan DD Unit PCB gets up to the (A) position.

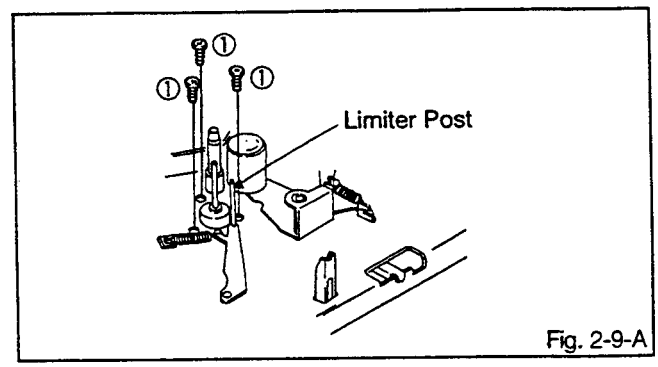


Fig. 2-9-A

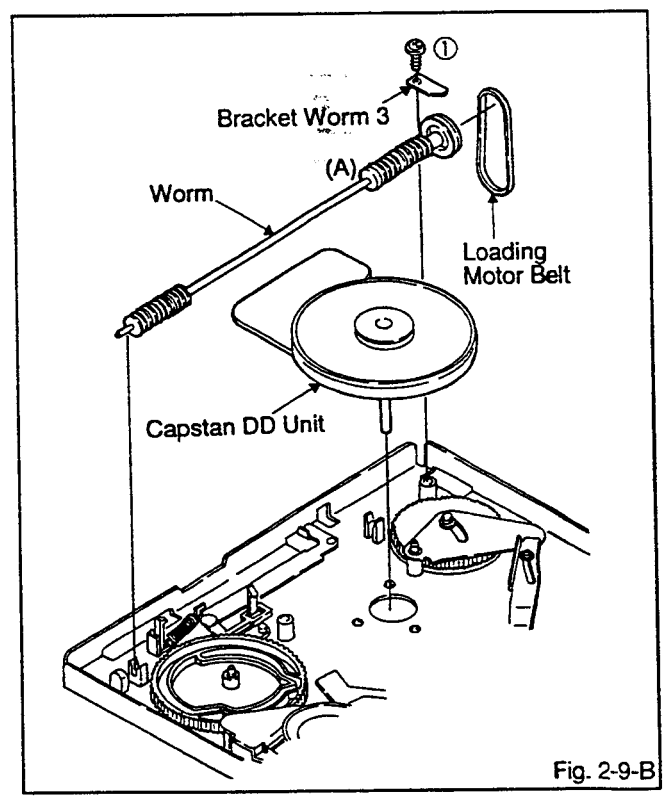


Fig. 2-9-B

DISASSEMBLY INSTRUCTIONS

2-I0: CAM 1 / CAM 2 (Refer to Fig. 2-10-A, B, C)

1. Remove the E-ring ①, then remove the washer ② .
2. Remove the E-ring ③, then remove the washer ④.
3. Remove the Slide Loading 2.
4. Remove the E-ring ⑤, then remove the washer⑥ .
5. Remove the polyslider washer ⑦.
6. Remove the Loading Lever 2 Ass'y, then remove the Cam 1.
7. Remove the polyslider washer⑧, then remove the Lever Clutch Actuator.
8. Remove the polyslider washer ⑨, then remove the Cam 2.

NOTE

Be sure to install in the EJECT position.
(Refer to Fig. 2-10-B, C)

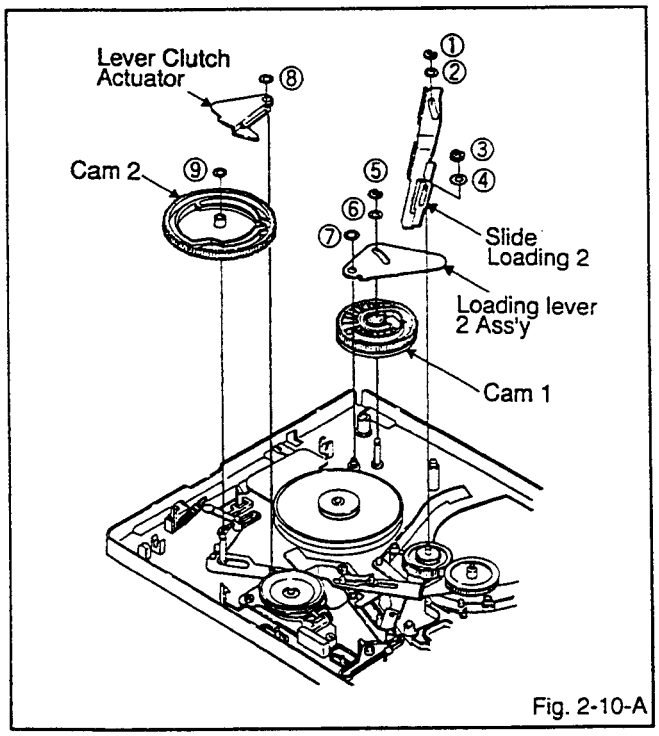


Fig. 2-10-A

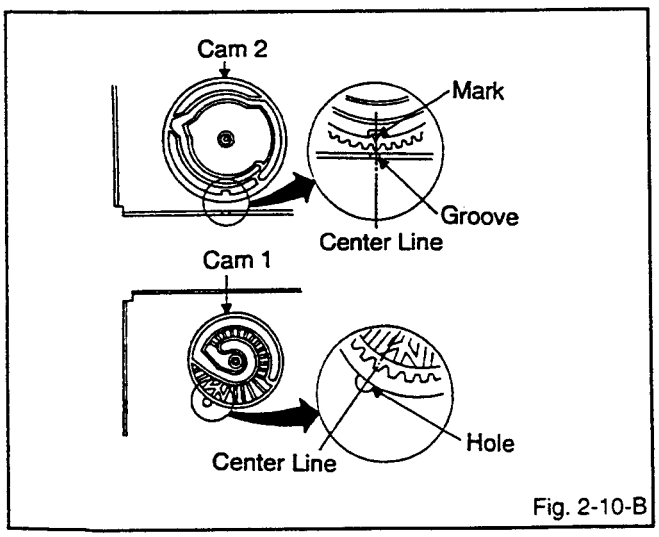


Fig. 2-10-B

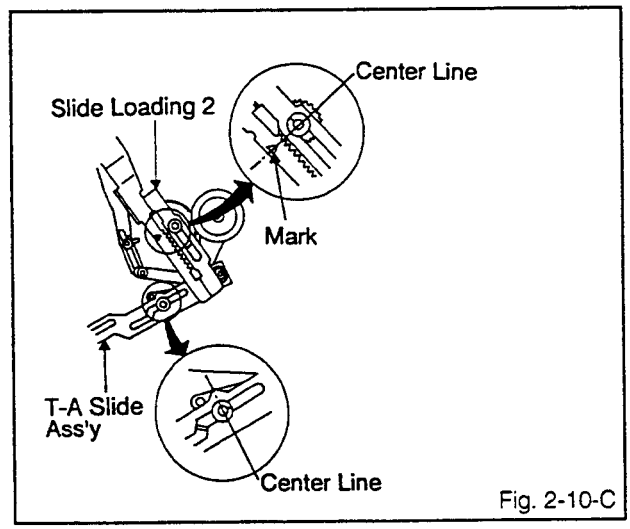


Fig. 2-10-C

2-11: LINK GEAR (R) / CLUTCH GEAR (Refer to Fig. 2-11)

1. Remove the 2 screws on the Side Bracket R2 Ass'y and remove the Side Bracket. **(Refer to FRONT LOADING EXPLODED VIEW)**
2. Remove the Link Gear (R) and Clutch Gear.

NOTES

1. When installing the Link Gear Spring R2 to the Link Gear (R), proceed in order ①, ②, ③ as shown in **Fig. 2-11.**
2. When installing the Link Gear (R), match the position of the Link Gear (R) so that the line over the two ribs on the Synchro Gear goes through the marking hole on the Link Gear (R).

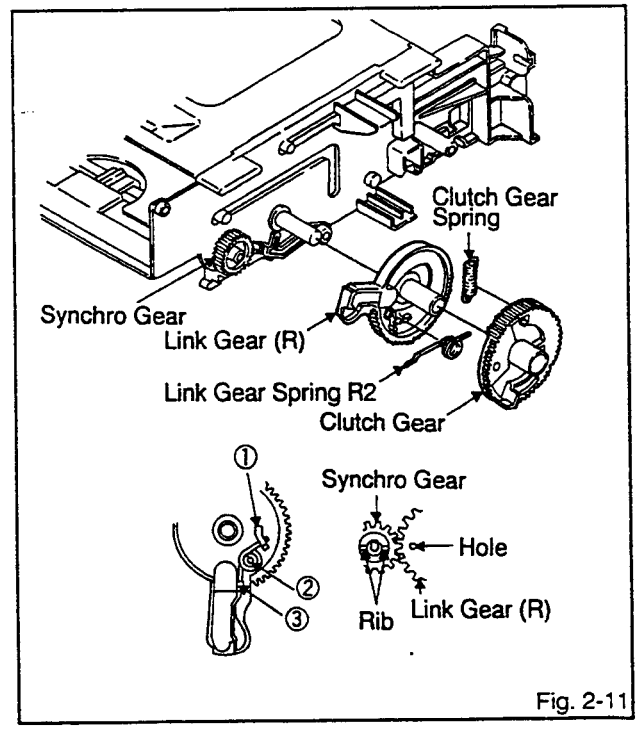


Fig. 2-11

DISASSEMBLY INSTRUCTIONS

2-12: LINK GEAR (L) (Refer to Fig. 2-12)

1. Remove the Synchro Gear.
2. Remove the Link Gear (L).

NOTES

1. When installing the Link Gear Spring (L) on the Link Gear (L), proceed in order ①, ②, ③ as shown in **Fig. 2-12.**
2. When installing the Synchro Gear, match the position of the Synchro Gear so that the line over the two ribs on the Synchro Gear goes between the marking bosses on the Link Gear (L).

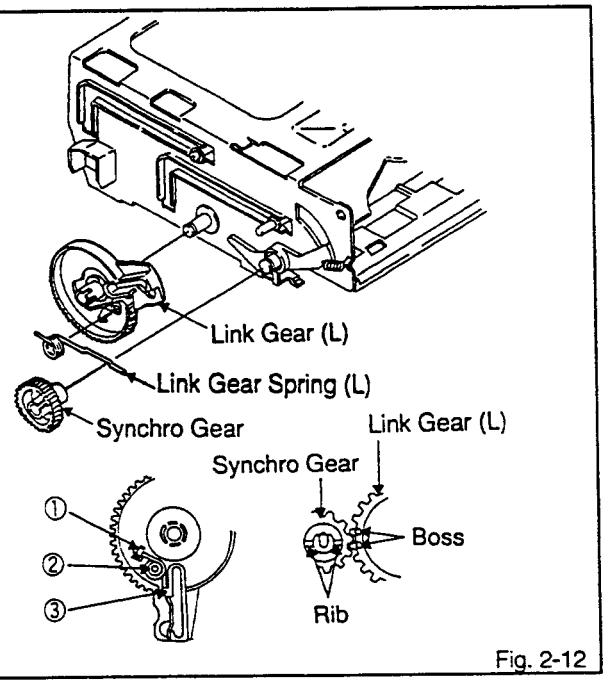


Fig. 2-12

KEY TO ABBREVIATIONS

A	AC	: Alternating Current
	A/C	: Audio/Control
	ACC	: Automatic Color Control
	AE	: Audio Erase
	AFC	: Automatic Frequency Control
	AFT	: Automatic Fine Tuning
	AFT DET	: Automatic Fine Tuning Detect
	AGC	: Automatic Gain Control
	AMP	: Amplifier
	ANT	: Antenna
	A.PB	: Audio Playback
	APC	: Automatic Phase Control
	ASS'Y	: Assembly
	AT	: All Time
	ATT	: Attenuator
	AUTO	: Automatic
	A/V	: Audio/Video
B	BGP	: Burst Gate Pulse
	BOT	: Beginning of Tape
	BPF	: Bandpass Filter
	BRAKE SOL	: Brake Solenoid
	BUFF	: Buffer
	B/W	: Black and White
C	C	: Capacitance, Collector
	CASE	: Cassette
	CAP	: Capstan
	CARR	: Carrier
	CCD	: Carged Coupled Device
	CE	: Chip Enable
	CH	: Channel
	CLK	: Clock
	CLOCK(SY-SE)	: Clock(Syscon to Servo)
	COMB	: Combination, Comb Filter
	CONV	: Converter
	CPM	: Capstan Motor
	CTL	: Control
	CYL	: Cylinder
	CYL-M	: Cylinder-Motor
	CYL SENS	: Cylinder Sensor
D	DATA(SY-SE)	: Data(Syscon to Servo)
	dB	: Decibel
	DC	: Direct Current
	DD UNIT	: Direct Drive Motor Unit
	DEMOD	: Demodulator
	DET	: Detector
	DEV	: Deviation
E	E	: Emitter
	EE	: Electric to Electric
	EF	: Emitter Follower
	EMPH	: Emphasis
	ENC	: Encoder
	ENV	: Envelope
	EOT	: End of Tape
	EQ	: Equalizer
	EXT	: External
F	F	: Fuse
	FBC	: Feed Back Clamp
	FE	: Full Erase
	FF	: Fast Forward, Flipflop
	FG	: Frequency Generator
	FL SW	: Front Loading Switch
	FM	: Frequency Modulation
	FSC	: Frequency Sub Carrier
	FWD	: Forward
G	GEN	: Generator
	GND	: Ground
H	H	: High
	H.P.F	: High Pass Filter
	H.SW	: Head Switch
	Hz	: Hertz
I	IC	: Integrated Circuit
	IF	: Intermediate Frequency
	IND	: Indicator
	INT	: Interrupt
	INV	: Inverter
K	KIL	: Killer
L	L	: Left
	LED	: Ligh Emitting Diode
	LIMIT AMP	: Limiter Amplifier
	LM, LDM	: Loading Motor
	LOAD	: Loading
	LP	: Long Play
	L.P.F	: Low Pass Filter
	LUMI	: Luminance
M	M	: Motor
	MAX	: Maximum
	MIN	: Minimum
	MIX	: Mixer, Mixing
	MM	: Monostable, Multivibrator
	MOD	: Modulator, Modulation
	MPX	: Multiplexer, Multiplex
	MS SW	: Mech State Switch
N	NC	: Non Connection
	NR	: Noise Reduction
O	OSC	: Oscillator
	OPE	: Operation
	OR EQ	: Or Equivalent
P	PB	: Playback
	PB CTL	: Playback Control
	PB-C	: Playback-Chrominance
	PB-Y	: Playback-Luminance
	PCB	: Printed Circuit Board
	P.CON	: Power Control
	PD	: Phase Detector
	PG	: Pulse Generator
	p-p	: Peak-to-Peak
	PWM	: Pulse Width Modulation
	PWM TV	: Pulse Width Modulated Tuning Voltage
R	R	: Right
	REC	: Recording
	REC-C	: Recording-Chrominance
	REC-Y	: Recording-Luminance
	REEL BRK	: Reel Brake
	REEL S	: Reel Sensor
	REF	: Reference
	REG	: Regulated, Regulator
	REW	: Rewind
	REV	: Reverse
	RF	: Radio Frequency
	RMC	: Remote Control
	RVS	: Reverse
	RY	: Relay
S	S.CLK	: Serial Clock
	S.COM	: Sensor Common
	S.DATE	: Serial Date
	SEG	: Segment
	SEL	: Select, Selector
	SENS	: Sensor
	SER	: Search Mode
	SI	: Serial Input
	SIF	: Sound Intermediate Frequency
	SO	: Serial Output
	SOL	: Solenoid
	SP	: Standard Play
	STB	: Serial Strobe
	SW	: Switch
	SYNC	: Synchronization
	SYNC SEP	: Sync Separator, Separation
T	TR	: Transistor
	TRAC	: Tracking
	TRIC PB	: Trick Playback
	TP	: Test Point
U	UNREG	: Unregulated
V	V	: Volt
	VCO	: Voltage Controlled Oscillator
	VIF	: Video Intermediate Frequency
	VP	: Vertical Pulse, Voltage Display
	V.PB	: Video Playback
	VR	: Variable Resistor
	V.REC	: Video Recording
	VSS	: Voltage Super Source
	V-SYNC	: Vertical-Synchronization
	VT	: Voltage Tuning
X	X'TAL	: Crystal
Y	Y	: Luminance
	Y/C	: 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 againg of rubber parts.

Time / Parts Name	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	■	■	■	■	■	
Reel Belt		■		●		Clean the rubber, and parts which the rubber touches.
Front Loading Belt		■		●		
Pinch Roller	■	■	■	■	■●	
Capstan DD Unit					●	
Loading Motor					●	
Tension Band Ass'y					●	
Capstan Shaft	■	■	■	■	■	
Tape Running Guide Post	■	■	■	■	■	Replace when rolling becomes abnormal.
Cylinder Unit	■	■●	■●	■●	■●	Clean the head.

●: Replace, ■: Clean

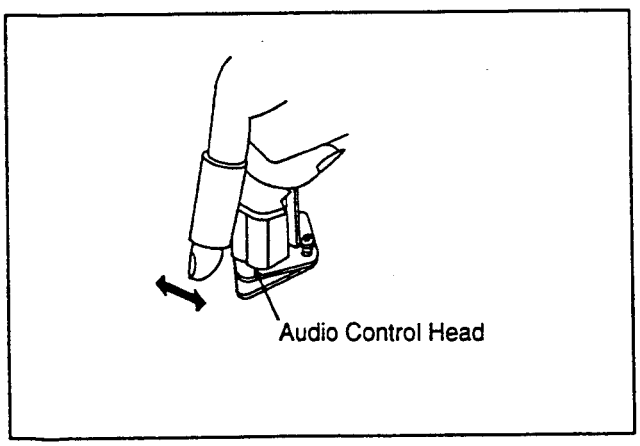
CLEANING

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

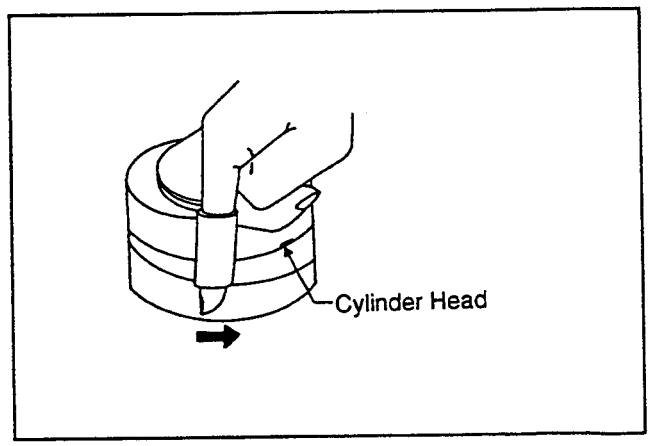
When cleaning the tape transport system, use a chamois moistened with isopropyl alcohol.

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)**

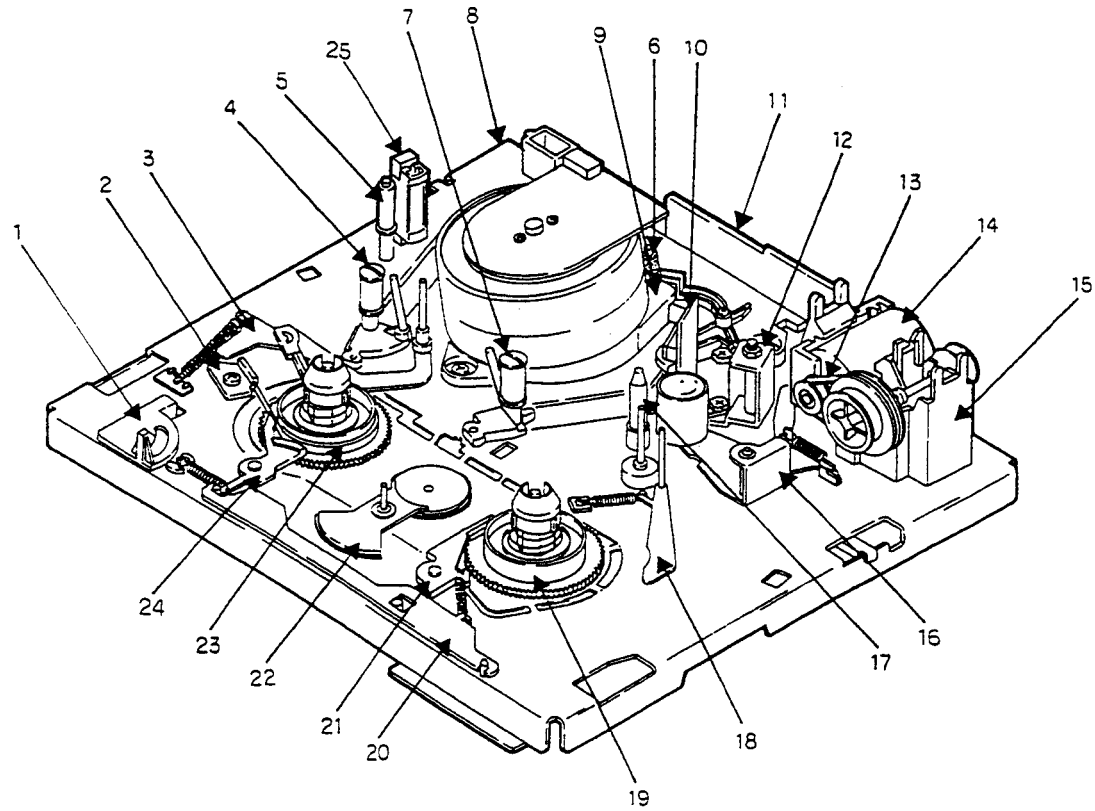
NOTE

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 PART LOCATIONS

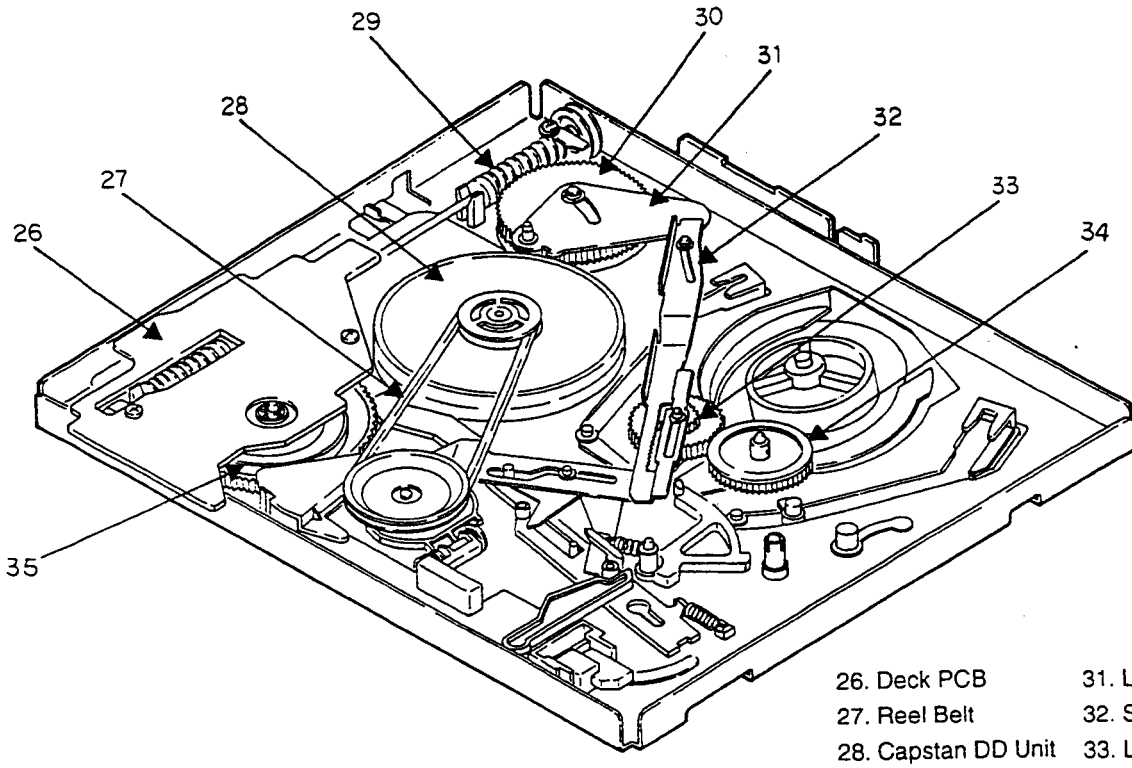
(TOP VIEW)



1. REC SW Lever
2. Tension Band Ass'y
3. Tension Arm Ass'y
4. Guide Roller Ass'y
5. P1 Post
6. Auto Head Cleaner
7. Guide Roller Ass'y
8. Main Chassis
9. Cylinder Unit
10. A/C Head
11. Deck Relay PCB
12. A/C Head Base
13. Front Loading Belt
14. Loading Motor
15. Loading Motor Box Ass'y
16. Pinch Roller Arm Ass'y
17. P4 Post
18. Limiter Post Arm Ass'y
19. Reel Disk T Ass'y
20. Actuator Sub Brake
21. TS Brake 2 Ass'y
22. Idler Ass'y
23. Reel Disk S Ass'y
24. SS Brake Arm
25. Full Erase Head

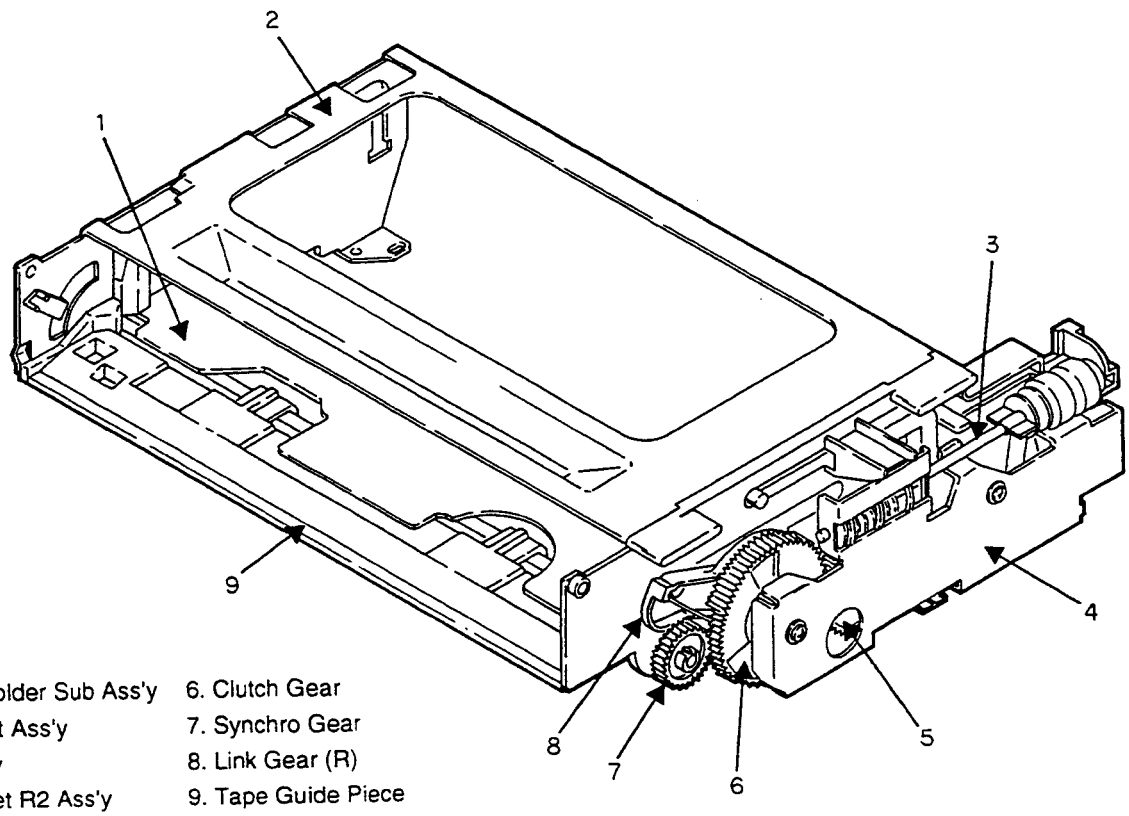
DECK PART LOCATIONS

(BOTTOM VIEW)



26. Deck PCB
27. Reel Belt
28. Capstan DD Unit
29. Worm Ass'y
30. Cam 1
31. Loading Lever 2 Ass'y
32. Slide Loading 2
33. Loading Gear T Ass'y
34. Loading Gear S Ass'y
35. Cam 2

(FRONT LOADING UNIT)



1. Cassette Holder Sub Ass'y
2. Top Bracket Ass'y
3. Worm Ass'y
4. Side Bracket R2 Ass'y
5. Wheel
6. Clutch Gear
7. Synchro Gear
8. Link Gear (R)
9. Tape Guide Piece

Part No.	Remarks
JG001E	Monoscope, 6 KHz
JG001F	Color Bar, 1KHz
JG002F	Playback Take Up Torque
JG002G	Fast Forwar Torque, Rewind Torque, Brake Torque (Take up Reel/Supply Reel)
JG005	Guide Roller Adjustment
JG021	X-Nut Adjustment
JG022/JG024	Reel Disk Height Adjustment
JG036	Tension Post Adjustment
JG100	Playback Back Tension Torque

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 loadingunit, place a black tube over Q1002 (BOT) and Q1001 (EOT). EOT/BOT sensor will not function in this condition. Be sure to return the deck to it's original after repairs are completed.

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 7.5mm ± 0.2mm with the height adjustment washer.
4. Perform the same adjustment for the other reel.

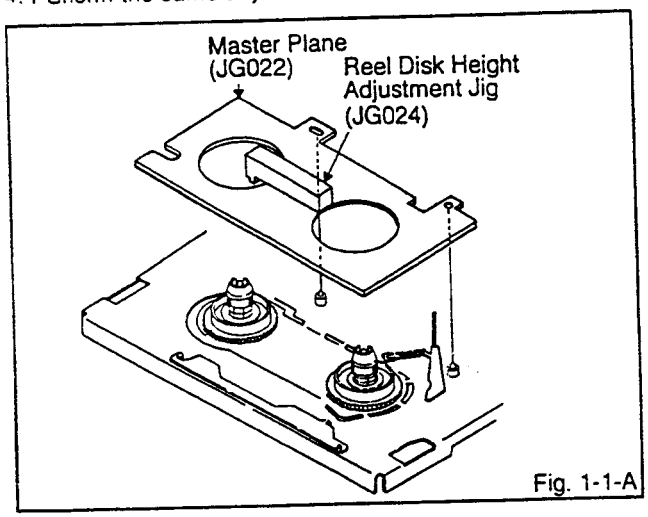


Fig. 1-1-A

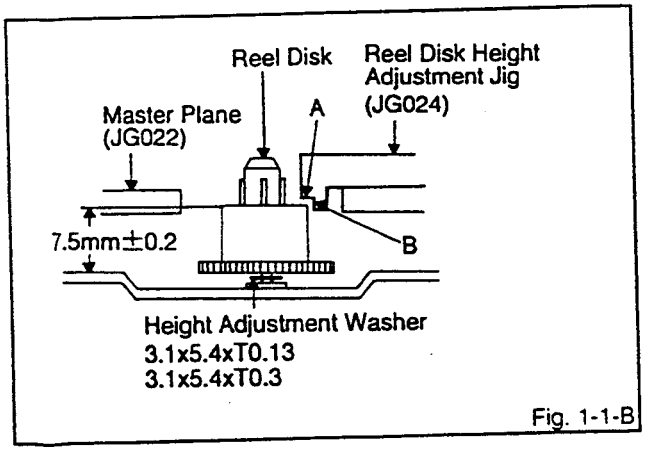


Fig. 1-1-B

1-2: CONFIRMATION AND ADJUSTMENT OF TENSION POST POSITION

1. Turn on the power and set to the PLAY mode by using the tension post adjustment jig **(JG036)**.
2. Move the tension band adjuster to the "A" or the "B" direction to set tension post adjustment jig red line to the round center of the tension post. **(Refer to Fig. 1-2)** When you don't use the jig **(JG036)**, adjust tension arm so that the measurement from the round center of the P1 post to the round center of the tension post is 2.5mm± 0.5mm. **(Refer to Fig. 1-2)**
3. Confirm that the video tape is not curling at the flange of P1 post or is not running on flanges.

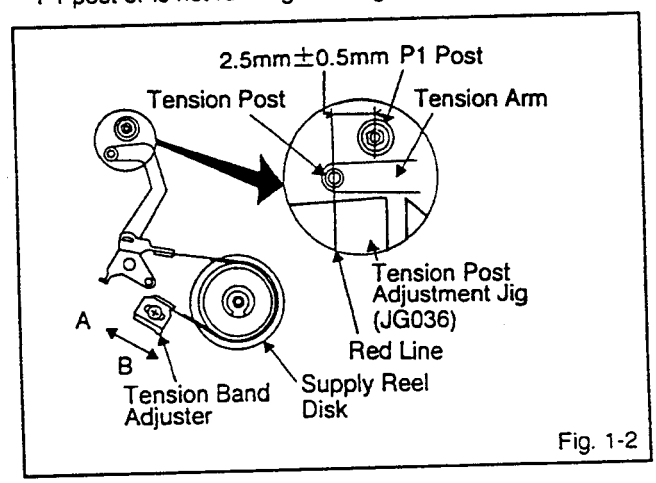


Fig. 1-2

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-A**. Confirm the value is within 25~35gr/cm at this time.
3. Adjust when it does not satisfy the above items. Set the tension arm spring to "A" direction when the torque meter indicates more than 35gr/cm. **(Refer to Fig. 1-3-B)** Set the tension arm spring to "B" direction when the torque meter indicates less than 25gr/cm. **(Refer to Fig. 1-3-B)**

※ 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 **(JG100)** and set to the PLAY mode.
2. Confirm that the left hand side tension value of the torque tape is 45~60gr/cm for the standard mode tape.

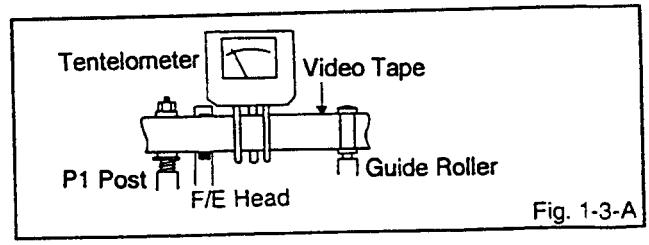


Fig. 1-3-A

MECHANICAL ADJUSTMENTS

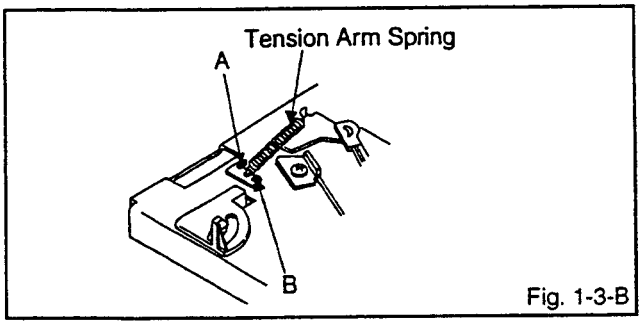


Fig. 1-3-B

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 800gr/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 800gr/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 PLAYBACK TAKE-UP TORQUE

1. Set the torque gauge **(JG002F)** on the rewind reel disk, then check PB mode.
   Or
   Load the cassette type torque tape **(JG100)**, then set it to PB mode.
2. Make sure that the torque covers the range, 60~150gr/cm.

1-7: 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 more than 200gr/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 200gr/cm at that time.

NOTE

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

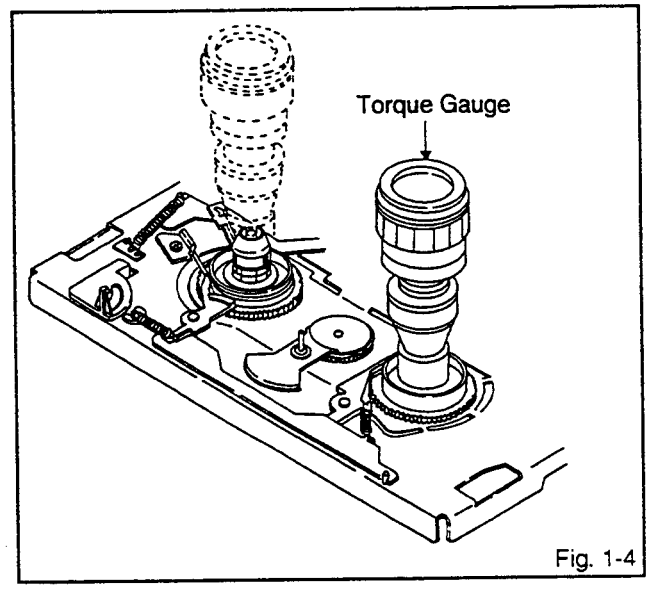


Fig. 1-4

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 Reel Belt
1-5	Idler Ass'y or Reel Belt
1-6	Idler Ass'y or Reel Belt or Clutch Ass'y
1-7	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 **TP4005 (PB Envelope)** and CH-2 to **TP1001 (SW Pulse)**.
2. Insert the VHS alignment tape **(JG001E)** into the unit.
3. Carry out this adjustment in PLAY mode.
4. Trigger with SW pulse and observe the envelope. **(Refer to Fig. 2-1-A)**
5. 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**.)
6. Press and hold the tracking control button and (at the point that the envelope waveform starts to reduce) adjust the envelope so that its A : B ratio is better than 3 : 2. **(Refer to Fig. 2-1-B)**
7. Adjust the PG shifter **(ELECTRICAL ADJUSTMENTS: ITEM 3-1)** in the PLAY mode.

MECHANICAL ADJUSTMENTS

NOTE

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

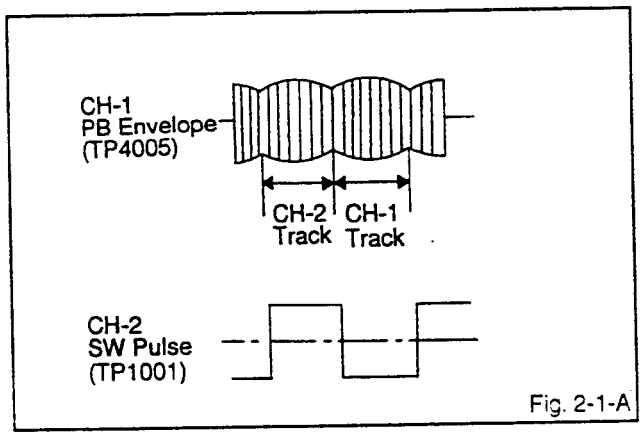


Fig. 2-1-A

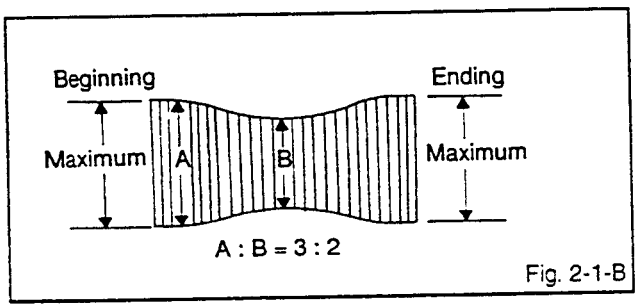


Fig. 2-1-B

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)**

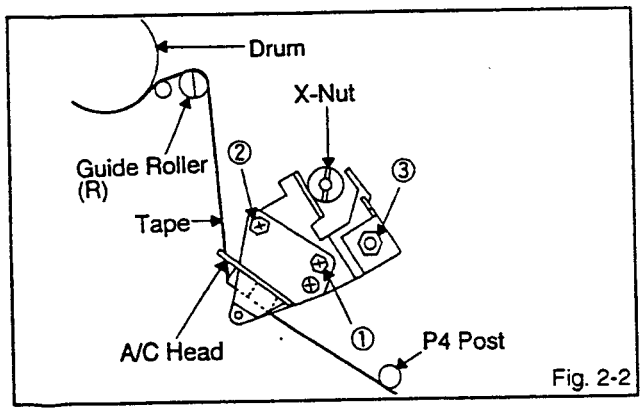


Fig. 2-2

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

1. Play back a VHS alignment tape **(JG001E)** and observe the waveform at the audio output terminal.
2. Turn the screw ② slowly to change the height of the A/C head. Adjust the height so that the audio output becomes maximum. **(Refer to Fig. 2-2)**
3. Adjust the nut 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.**

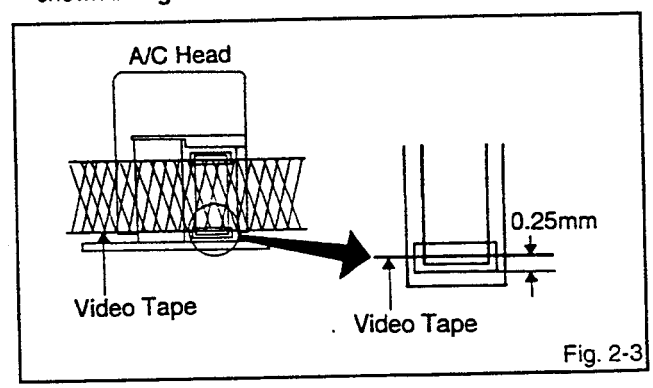


Fig. 2-3

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 **TP4005** and CH-2 to **TP1001**. Insert the VHS alignment tape **(JG001F)** into the unit. Set the tracking control to the center position. Turn the X-nut using the X-nut adjustment screwdriver **(JG021) (Refer to Fig. 2-2)**. Adjust the X-nut for the envelope to be maximum. **(Refer to Fig. 2-1-A)**

ELECTRICAL ADJUSTMENTS

3. ADJUSTMENT PROCEDURE

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

CAUTION

Inferior silicon grease can damage IC's and transistors. When replacing IC's or transistors, use only specified silicon grease (YG6260M).
Remove all old silicon before applying new silicon.

3-1: PB. SWITCHING POSITION

CONDITIONS

MODE-PLAYBACK
Input signal-Alignment Tape **(JG001E)**

INSTRUCTIONS

1. Connect CH-1 on the oscilloscope to **TP1001** and CH-2 to **pin 19 of J4501**.
2. Playback the tape.
3. Adjust **VR1001** so that the waveform of the oscilloscope measures 6.5±0.5(H) at both leading and trailing edges. **(Refer to Fig. 3-1-A, B)**

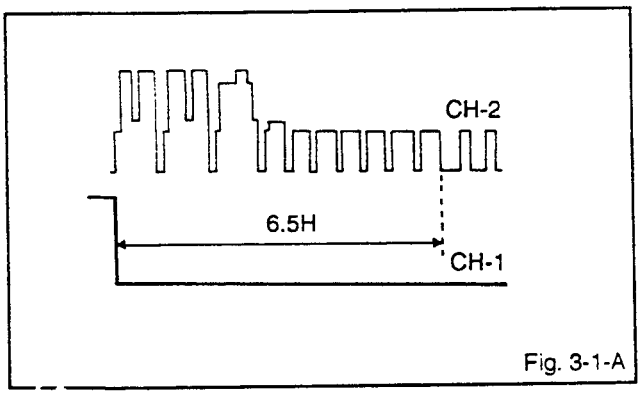


Fig. 3-1-A

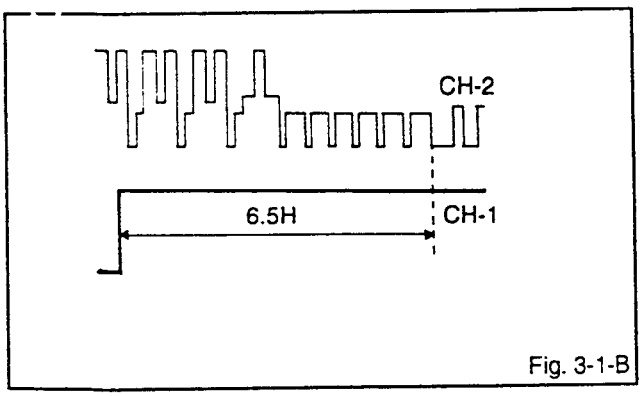


Fig. 3-1-B

3-2: PB Y LEVEL

CONDITIONS

MODE-PLAYBACK
Input signal-Alignment Tape **(JG001F)**

NOTE

VIDEO OUT (pin 19 of J4501) of the unit should be terminated with 75 ohm load.

INSTRUCTINOS

1. Connect the oscilloscope to **pin 19 of J4501**.
2. Playback the tape.
3. Adjust **VR4001** so that the signal becomes 1.0±0.05Vp-p as shown in **Fig. 3-2.**

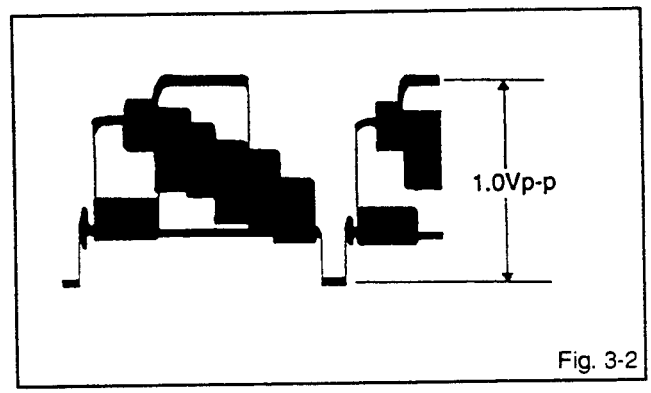


Fig. 3-2

3-3: E-E LEVEL

CONDITIONS

MODE-STOP
Input signal-PAL Color Bar

NOTE

VIDEO OUT (pin 19 of J4501) of the unit should be terminated with 75 ohm load.

INSTRUCTIONS

1. Input the color bar signal to the **pin 20 of J4501**.
2. Connect the oscilloscope to **TP4001**.
3. Adjust **VR4002** so that the waveform measures 0.5±0.01Vp-p. **(Refer to Fig. 3-3)**

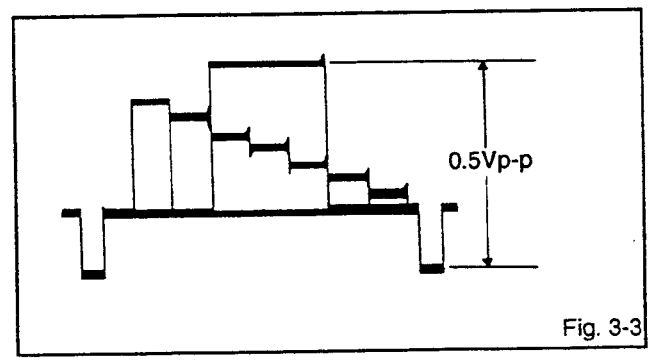


Fig. 3-3

ELECTRICAL ADJUSTMENTS

3-4: CARRIER AND DEVIATION

(CARRIER)

CONDITIONS

MODE-STOP
Input signal-No signal

INSTRUCTIONS

1. Connect the frequency counter to **TP4003**.
2. Adjust **VR4003** so that the carrier frequency 3.8MHz ±20KHz.

(DEVIATION)

CONDITIONS

MODE-Self (RECORD and PLAYBACK)
Input Signal-PAL Color Bar

INSTRUCTIONS

1. VIDEO OUT (pin 19 of J4501) of the unit should be terminated with 75 ohm load.
2. Input the color bar (with the white 100% level) to the pin 20 of J4501.
3. Connect the oscilloscope to **pin 19 of J4501**.
4. Record the color bar as indicated above and then play back the recorded part.
5. Check that the playback output level is 1.0±0.05Vp-p. **(Refer to Fig. 3-4)**
6. When it is out of the specification, adjust **VR4004** and repeat (4) and (5).

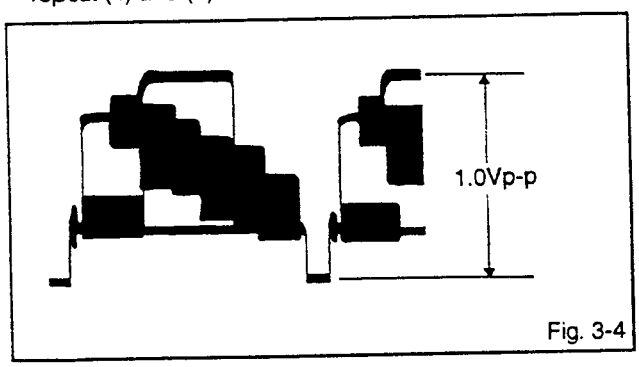


Fig. 3-4

3-5: PB AUDIO LEVEL

CONDITIONS

MODE-Self (RECORD and PLAYBACK)
Input Signal-Audio Signal : 1KHz, 500mVrms
Video Signal : PAL Color Bar

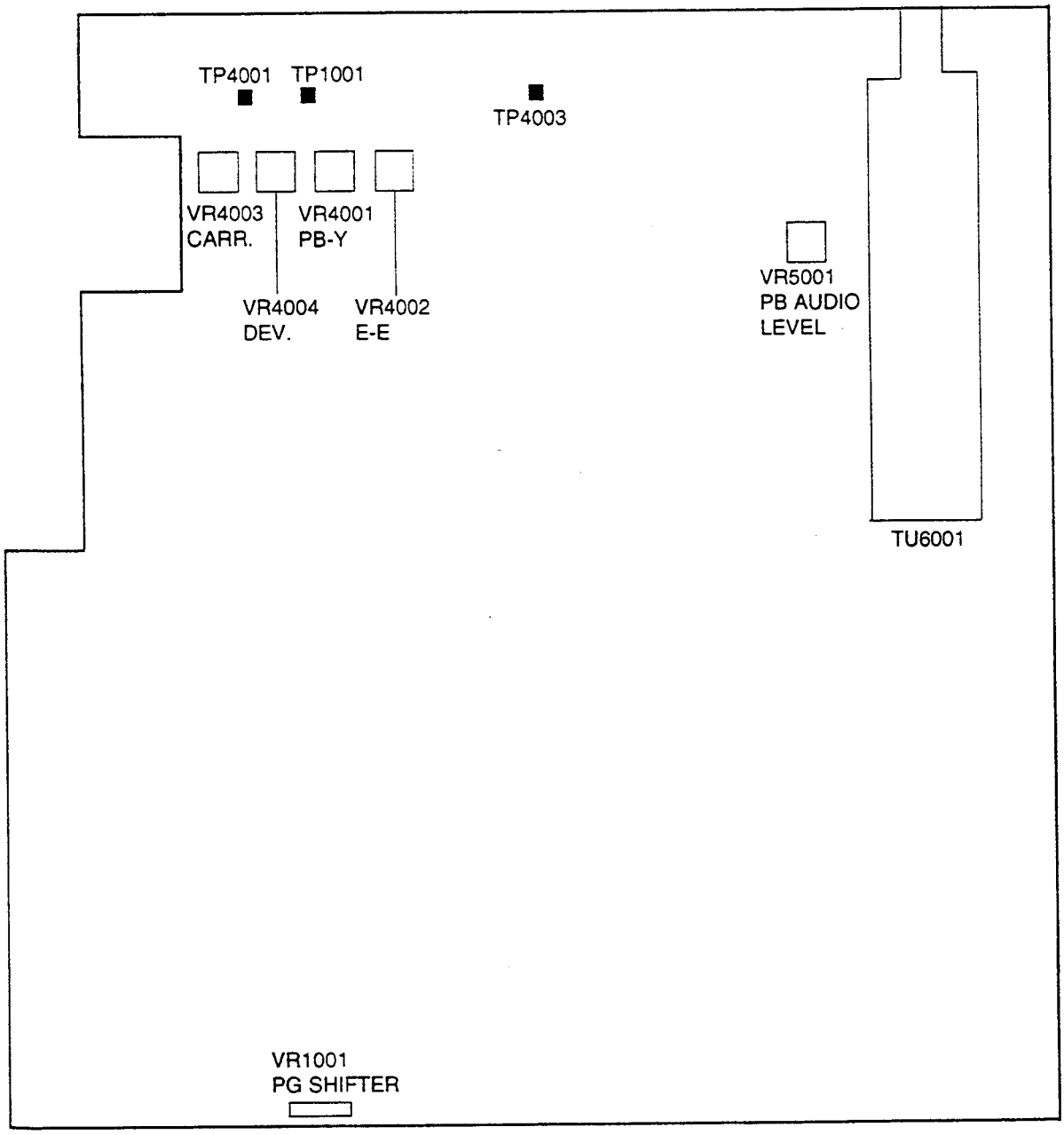
NOTE

AUDIO OUT (pins 1 and 3 of J4501) of the unit should be terminated with 47K ohm load.

INSTRUCTIONS

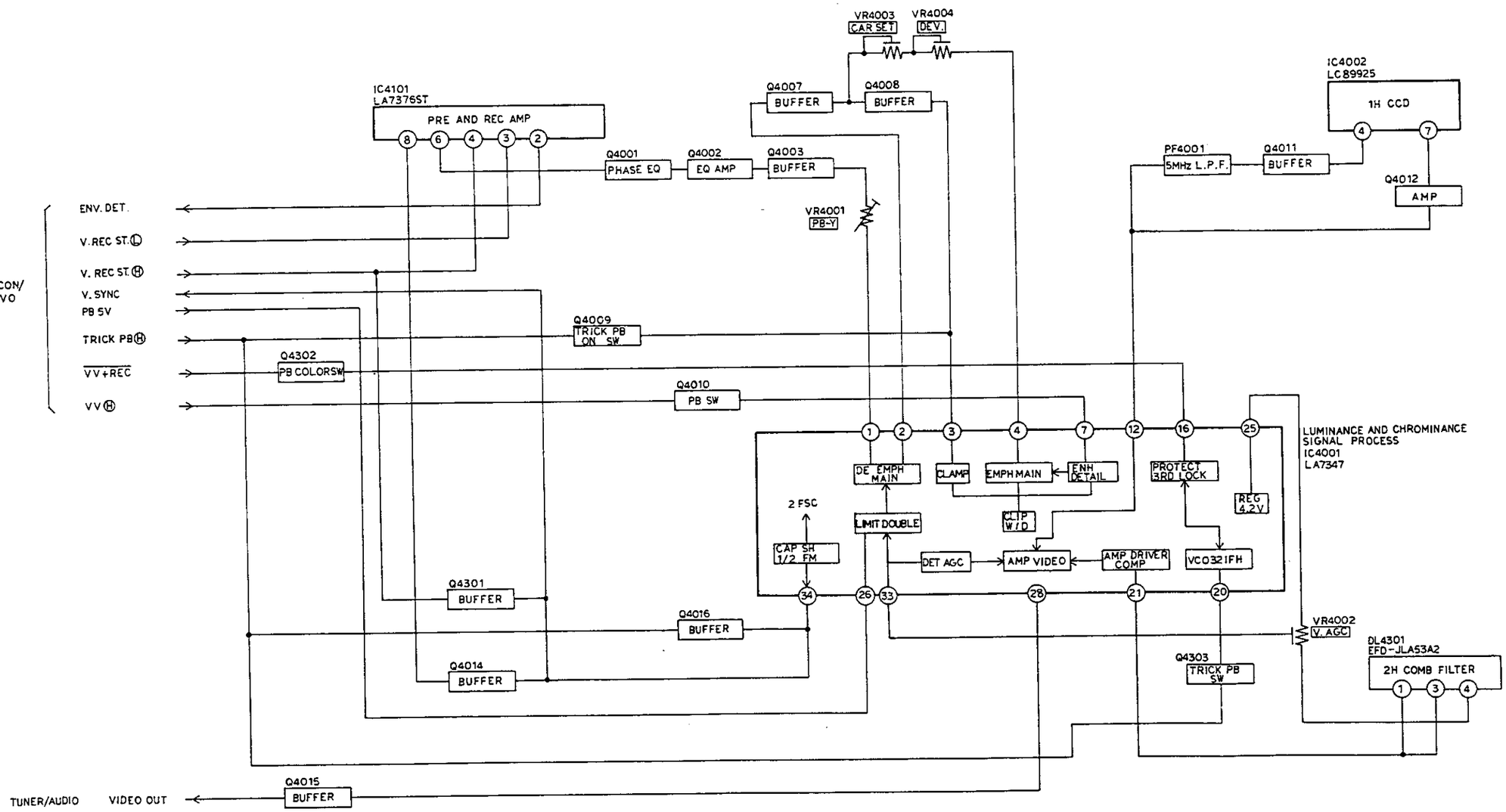
1. Connect the color bar generator to **pin 20 of J4501.**
2. Connect the audio generator to **pins 2 and 6 of J4501.**
3. Connect the AC voltmeter to **pins 1 and 3 of J4501.**
4. After the input of audio signal and video signal, proceed with the recording.
5. Play back the recorded section and adjust **VR5001** so that the AC voltmeter value is 500±10mVrms.

MAJOR COMPONENTS LOCATION GUIDE



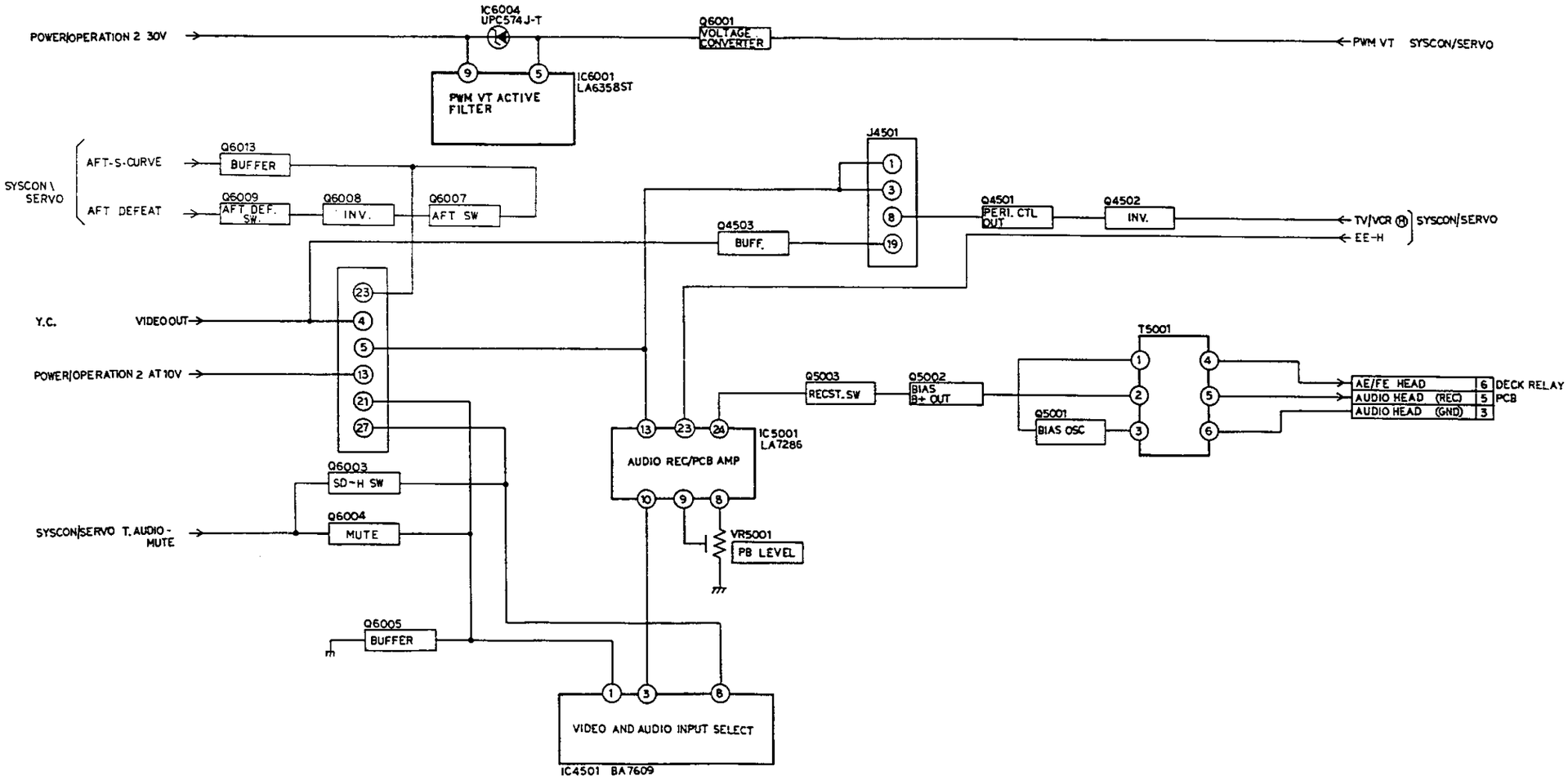
MAIN

Y.C. BLOCK DIAGRAM



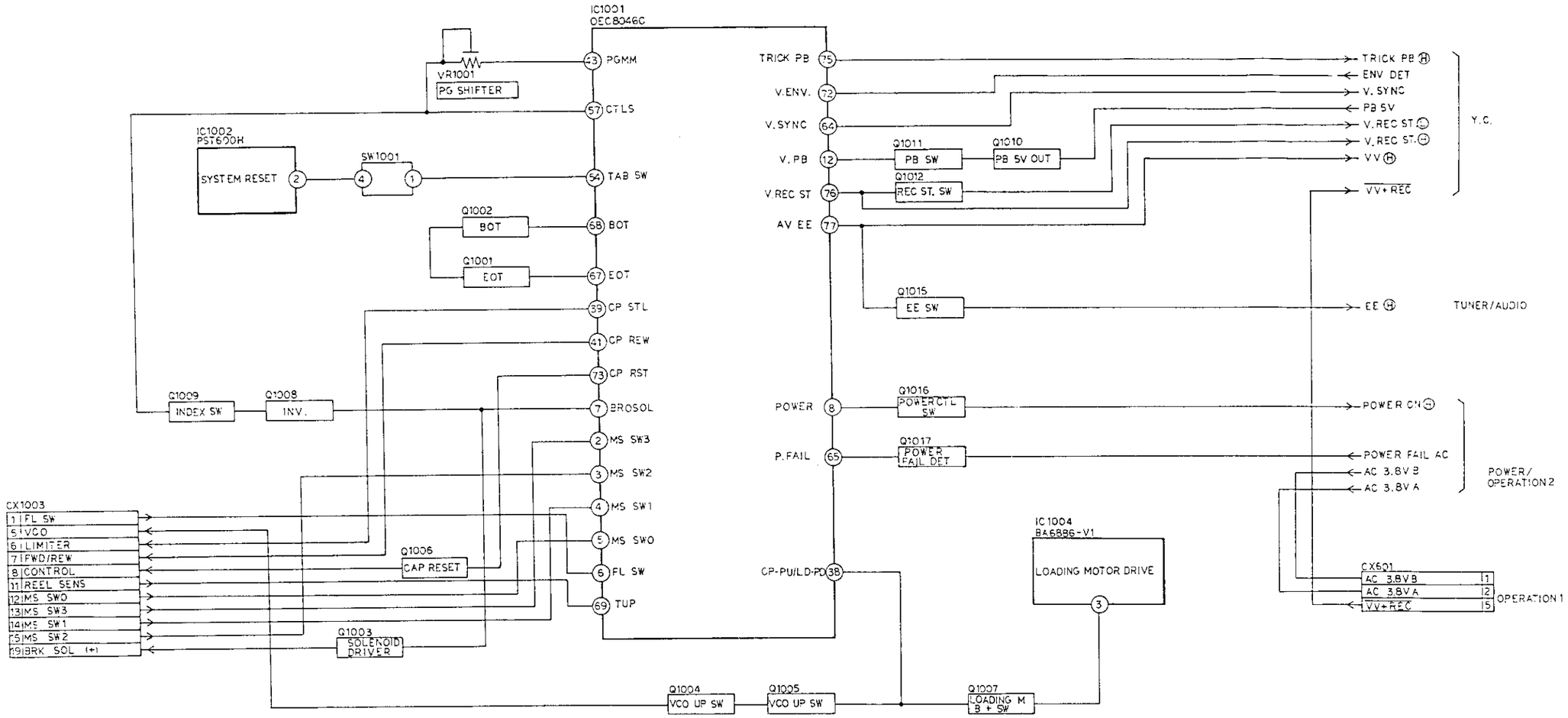
2-4703

TUNER/AUDIO/21PIN BLOCK DIAGRAM



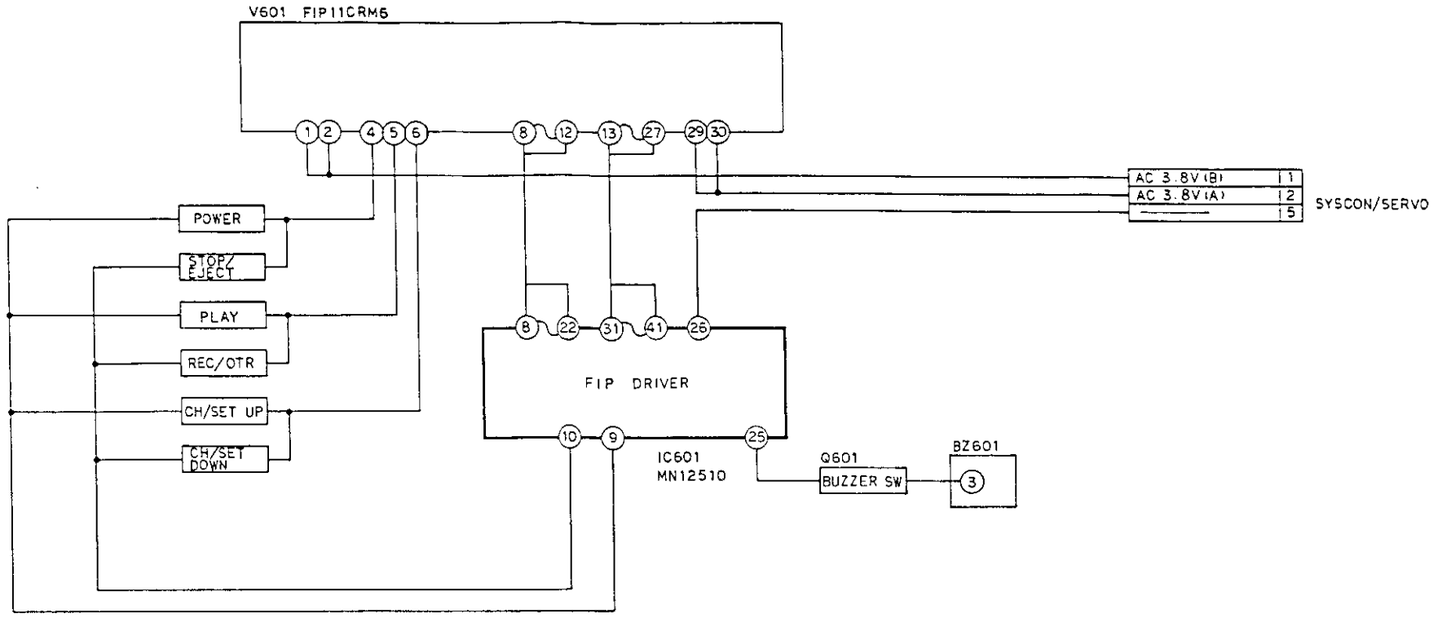
2-4836

SYSTEM CONTROL/SERVO BLOCK DIAGRAM

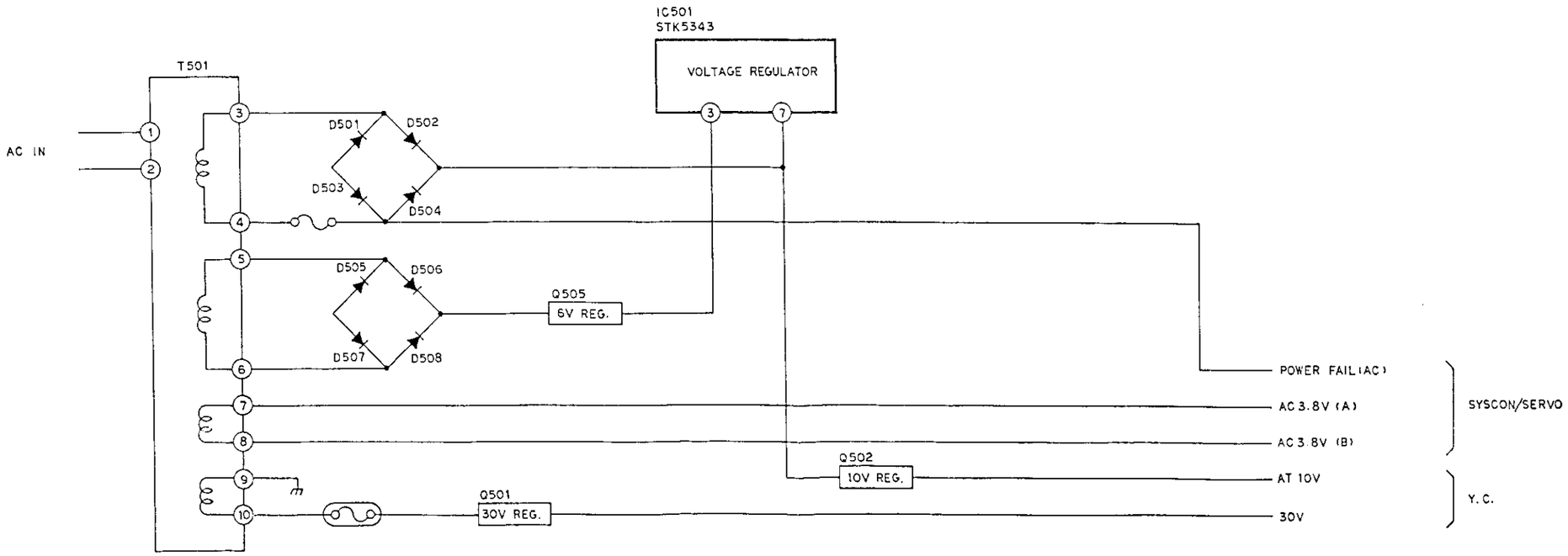


2-4729

OPERATION 1 BLOCK DIAGRAM



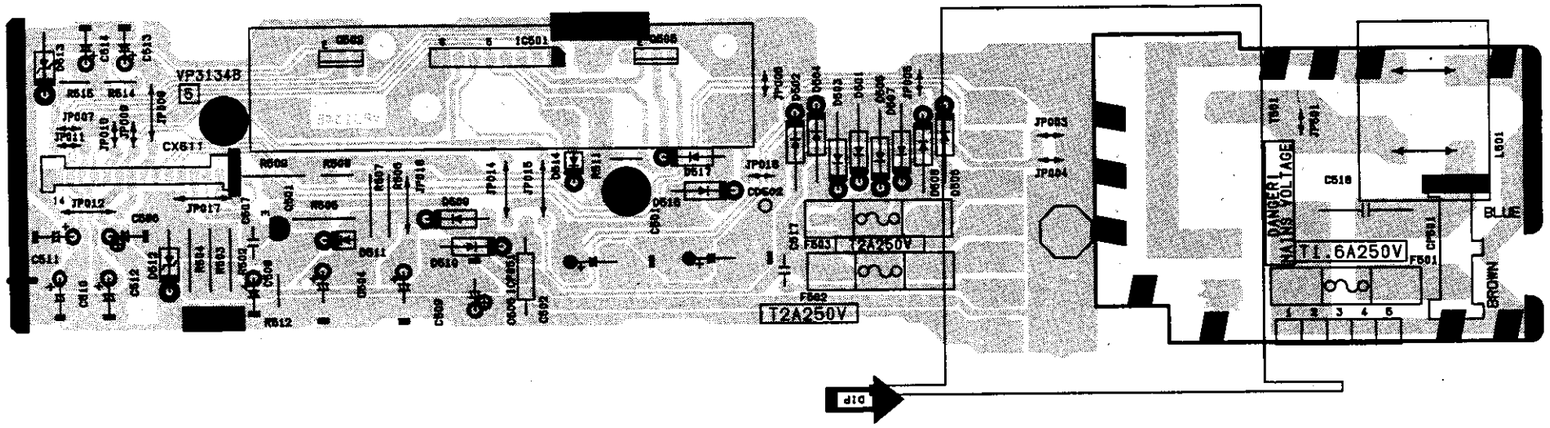
POWER/OPERATION 2 BLOCK DIAGRAM



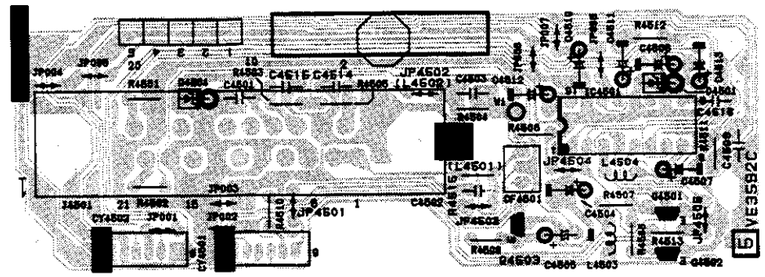
2-4730

PRINTED CIRCUIT BOARDS

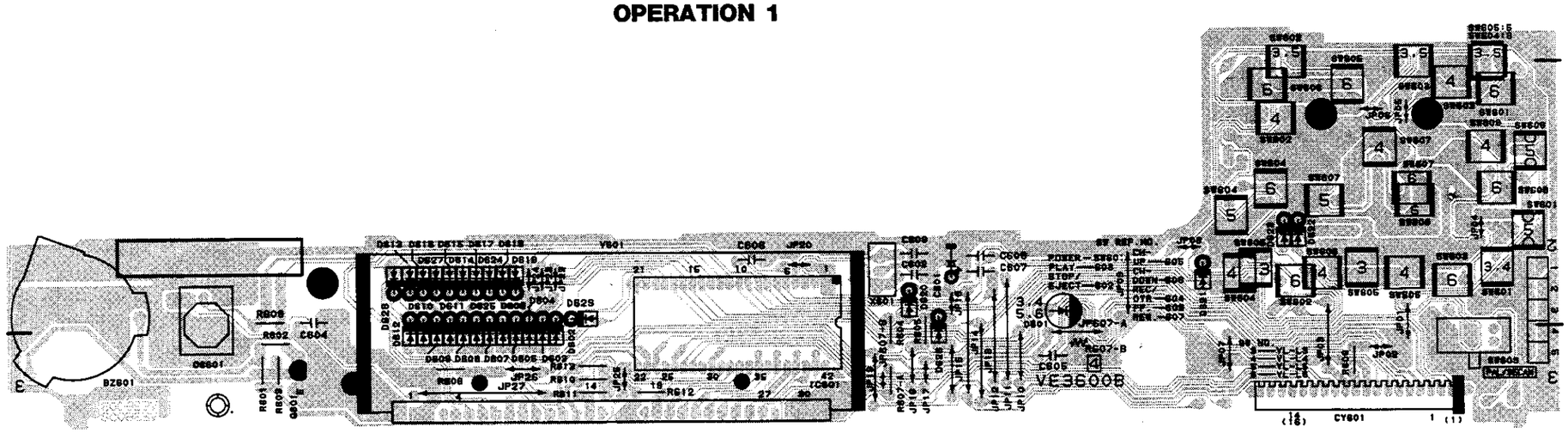
POWER



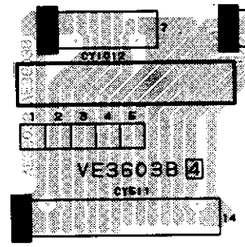
21PIN



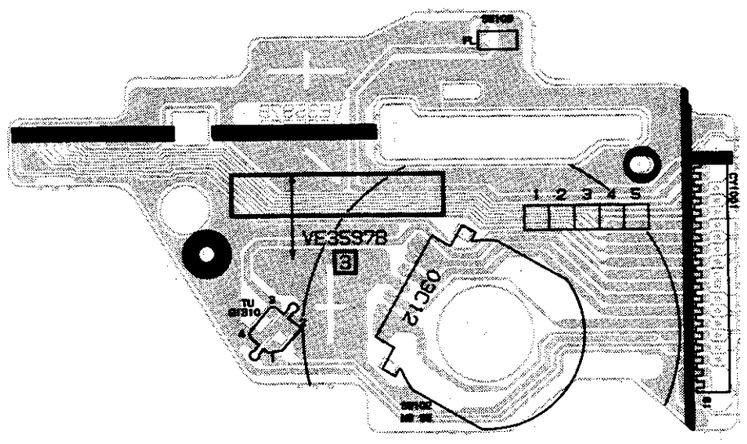
OPERATION 1



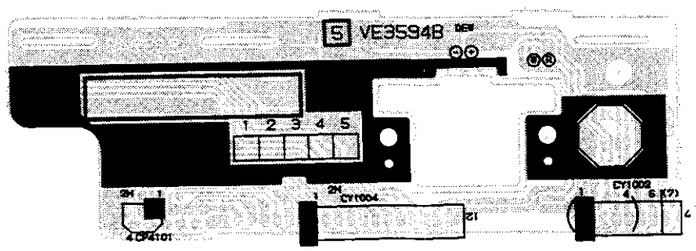
OPERATION 2



DECK



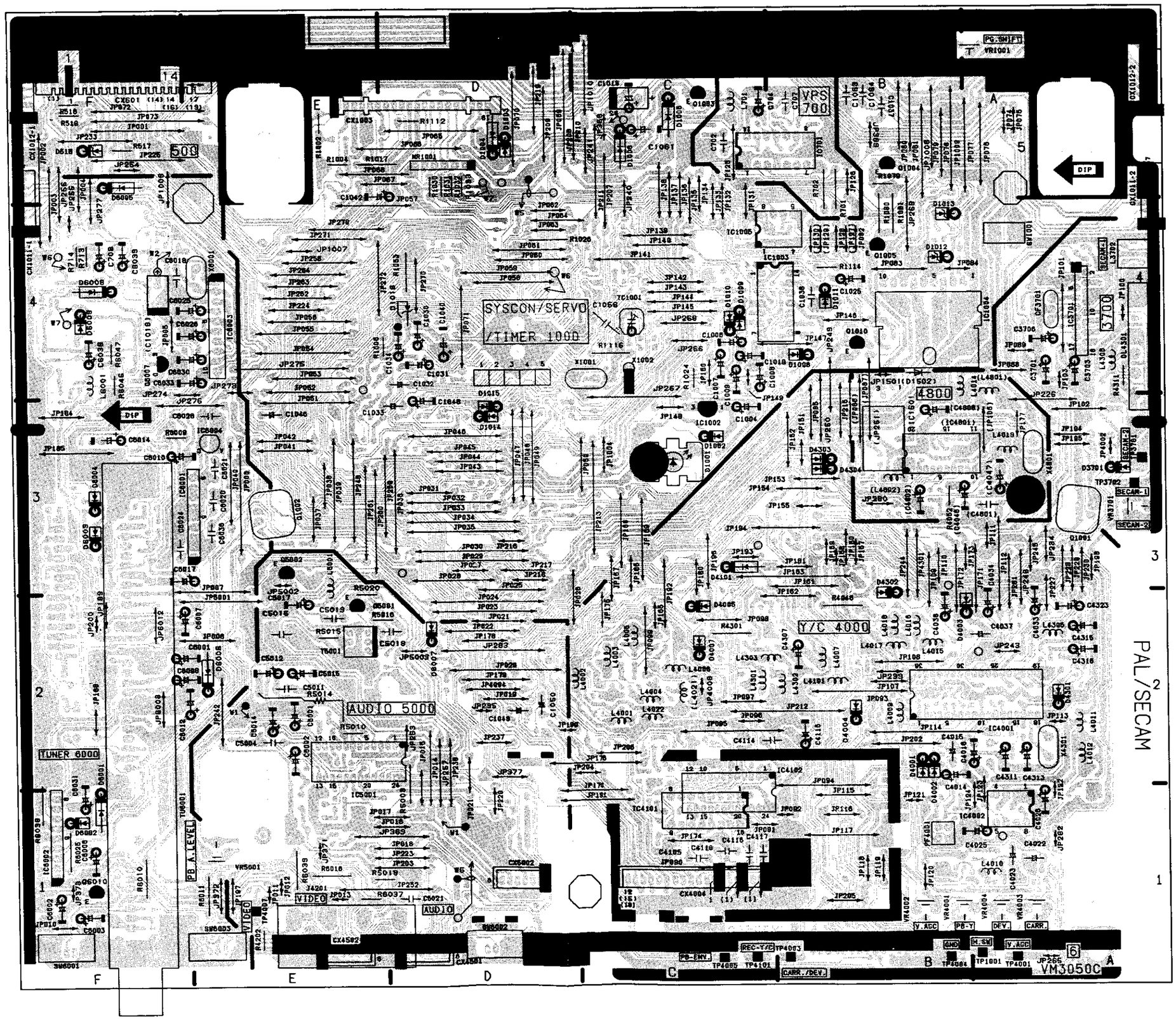
DECK RELAY



PRINTED CIRCUIT BOARD

MAIN

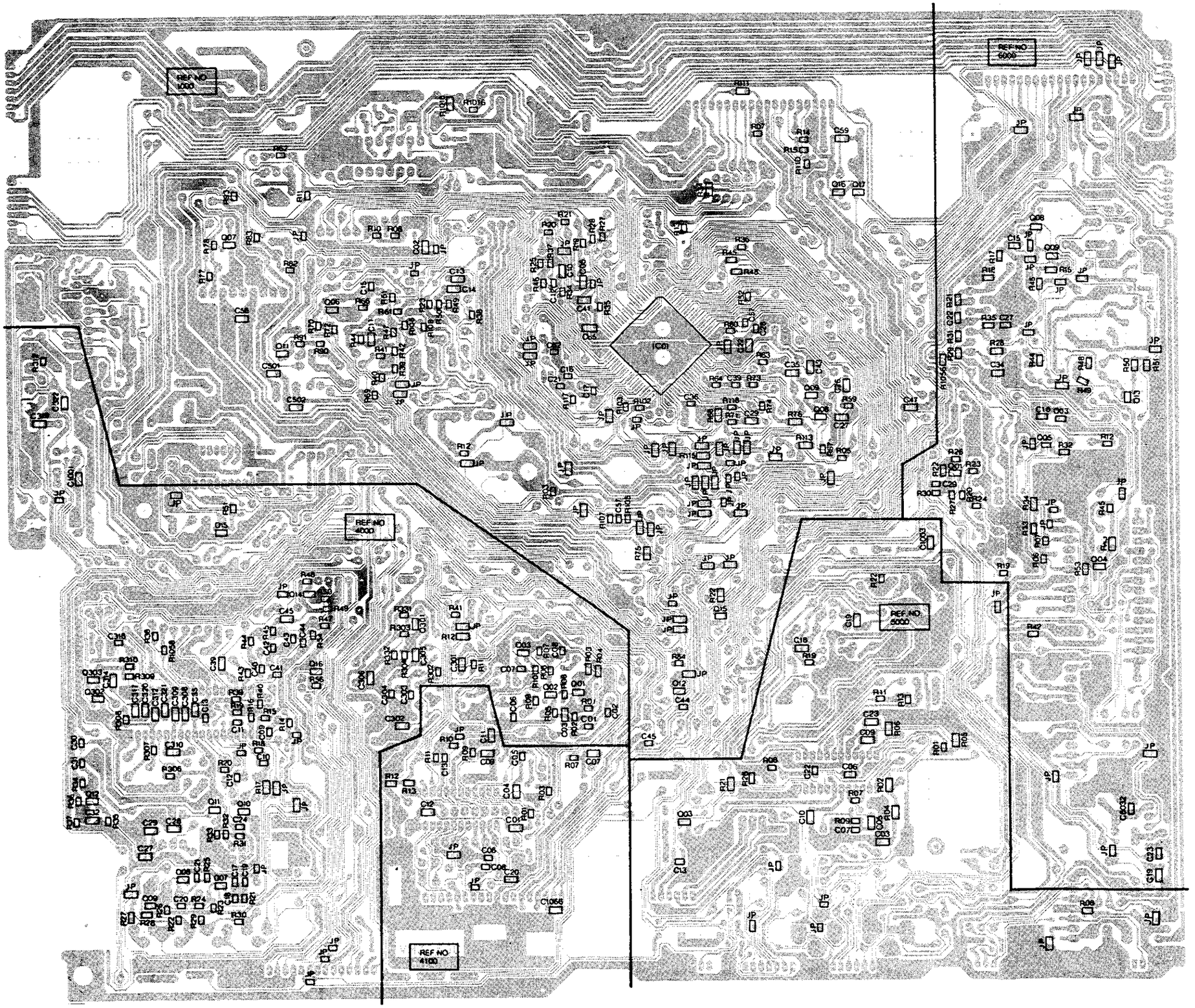
COMPONENT SIDE



PRINTED CIRCUIT BOARD

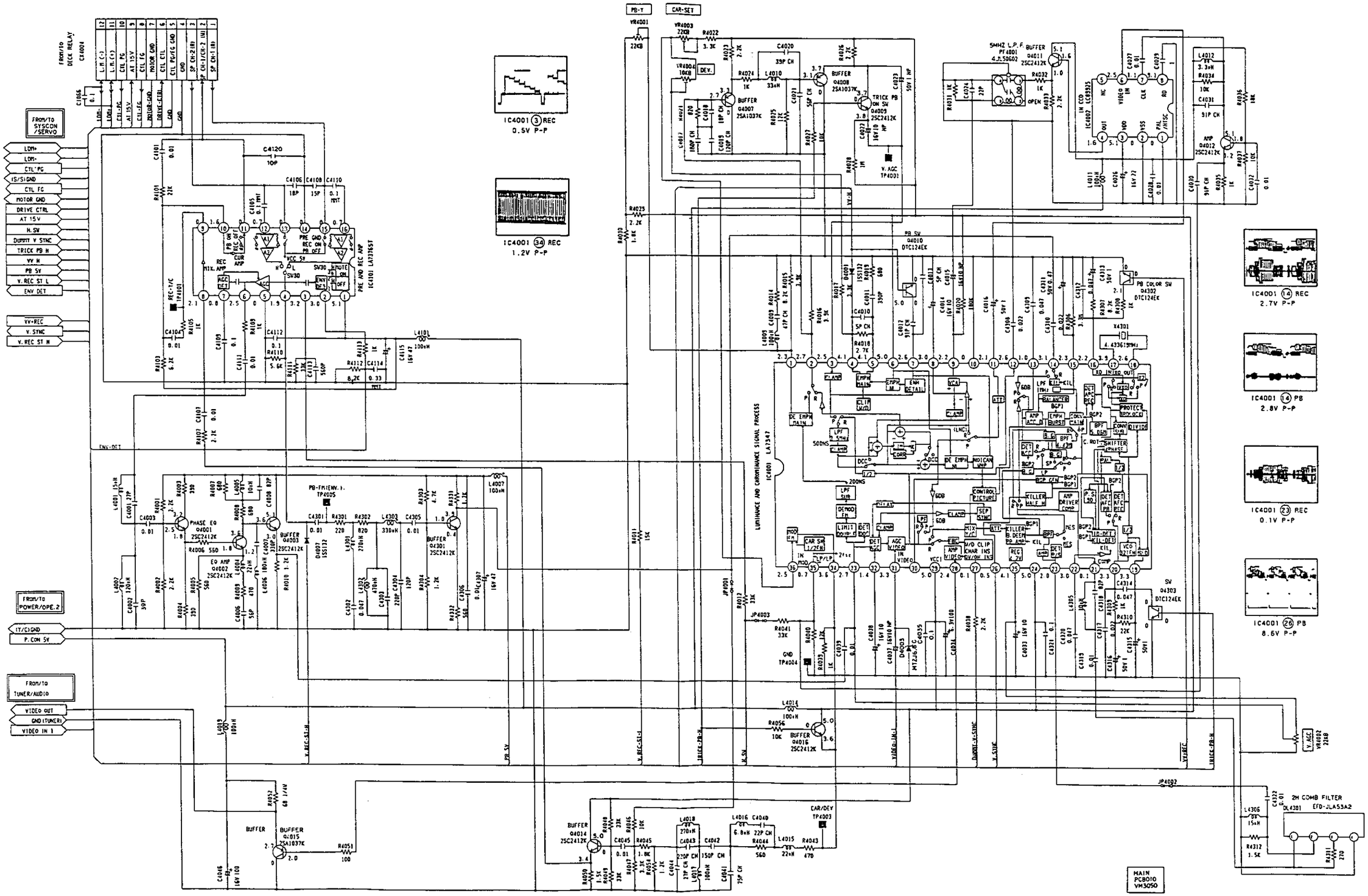
MAIN

SOLDER SIDE



JP ..... JUMPER

Y.C. SCHEMATIC DIAGRAM



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

ATTENTION: LES PIECES REPAREES PAR UN ⚠ ETANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLS DECRITES DANS LA NOMENCLATURE DES PIECES.

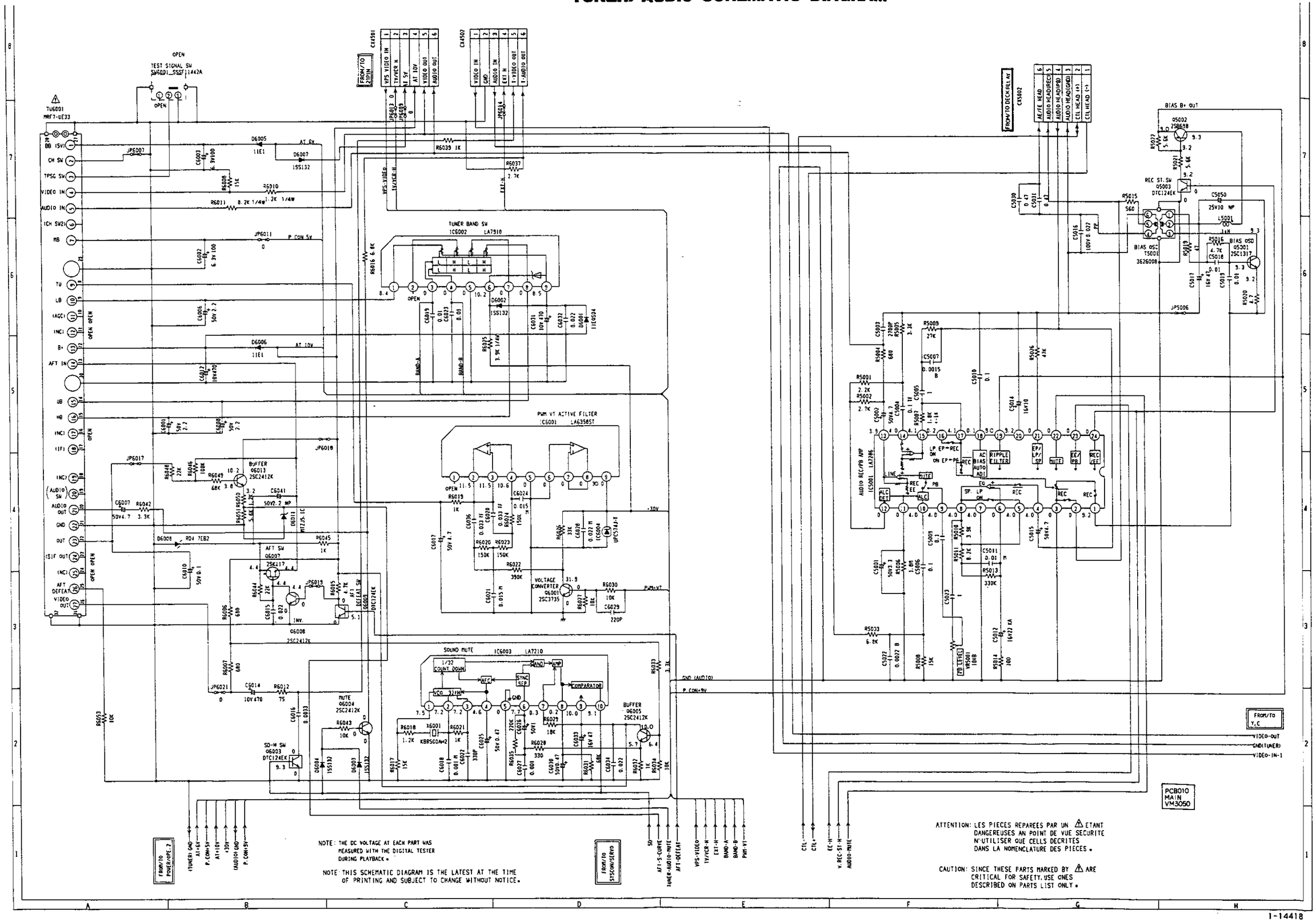
CAUTION: SINCE THESE PARTS MARKED BY ⚠ ARE CRITICAL FOR SAFETY. USE ONES DESCRIBED ON PARTS LIST ONLY.

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

CAUTION: DIGITAL TRANSISTOR

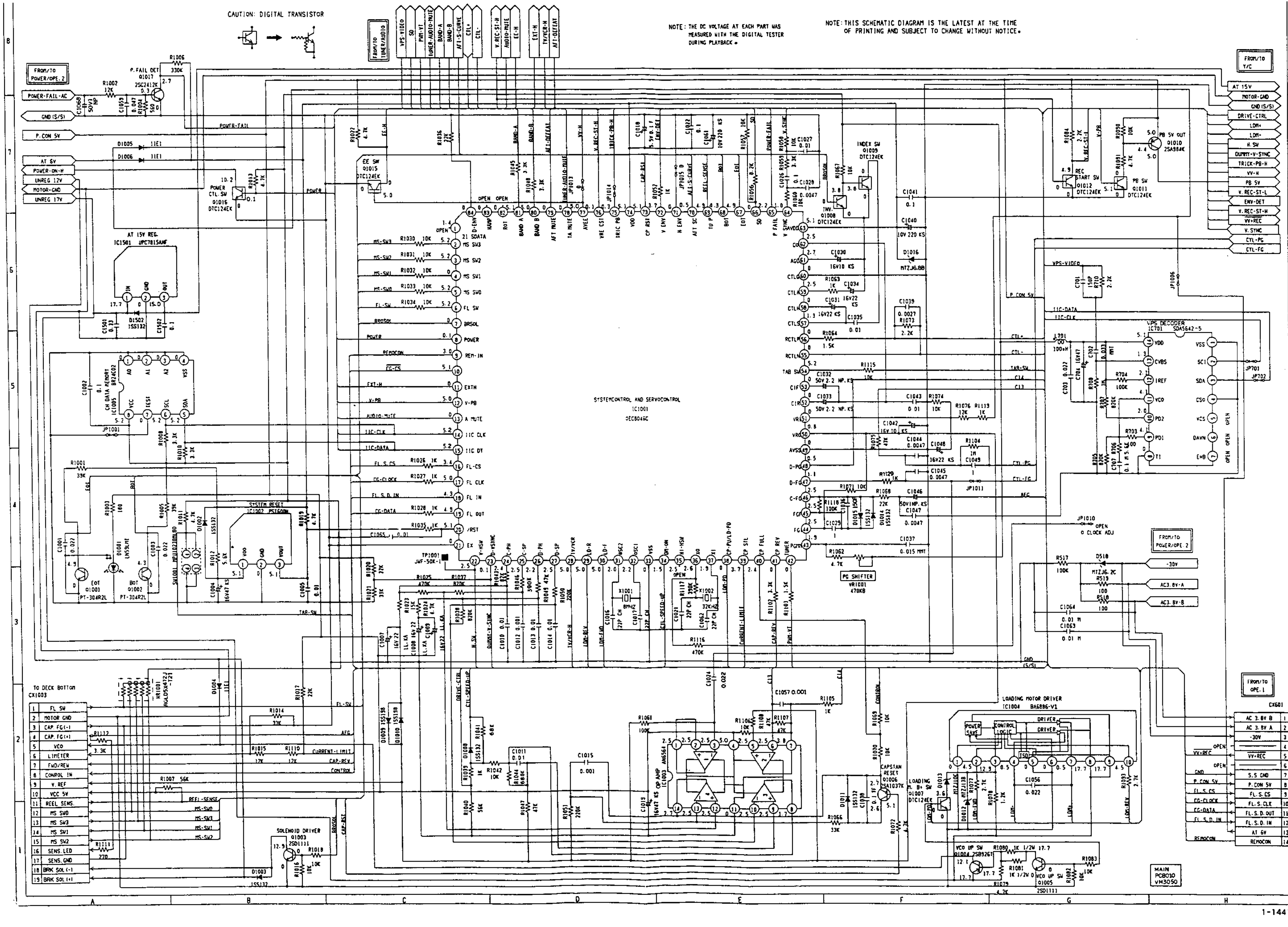
CAUTION: DIGITAL TRANSISTOR

TUNER/AUDIO SCHEMATIC DIAGRAM

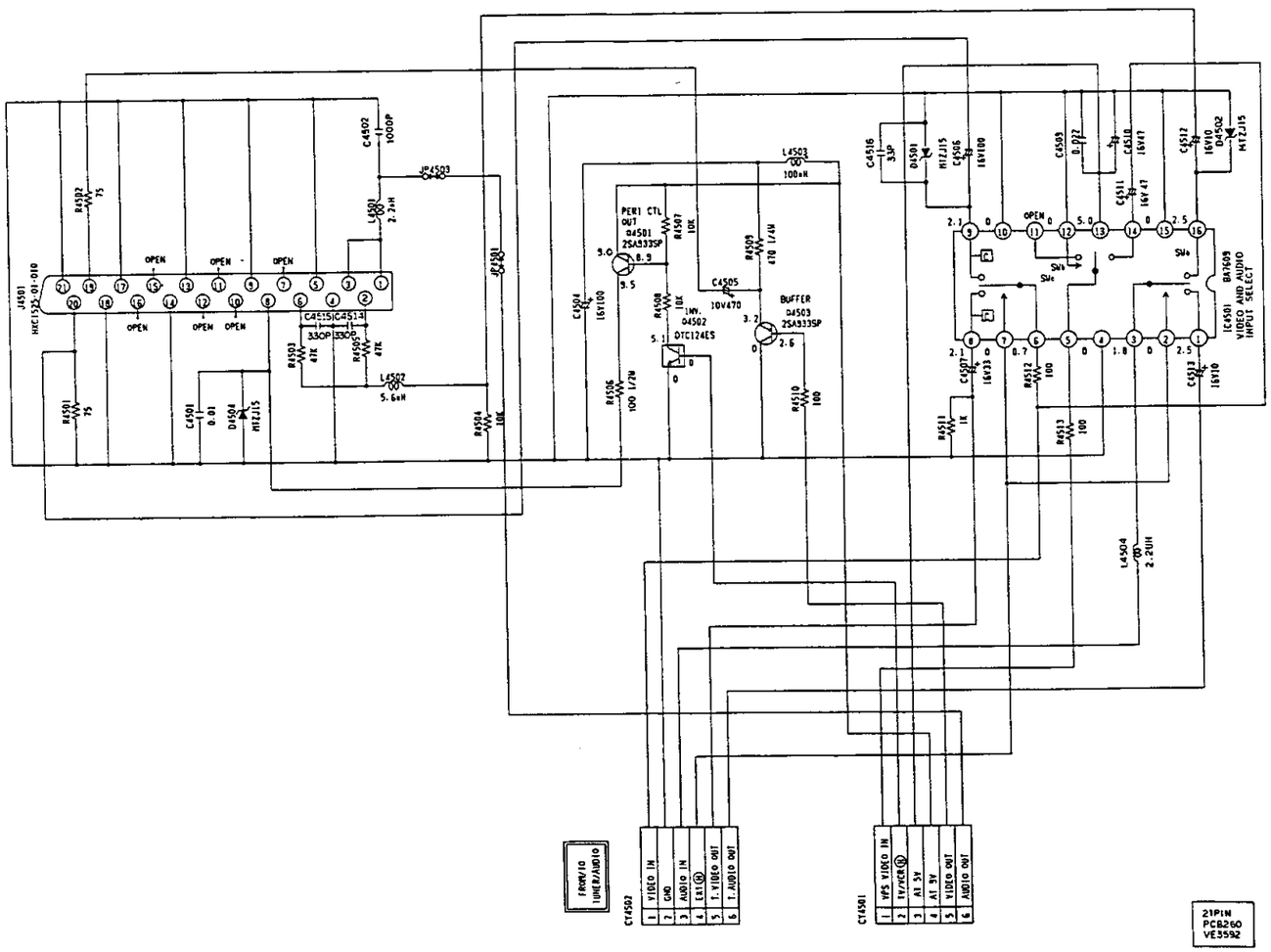


1-14418

SYSTEM CONTROL/SERVO SCHEMATIC DIAGRAM



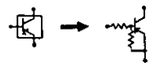
21PIN SCHEMATIC DIAGRAM



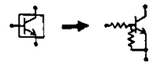
NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE.

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

CAUTION: DIGITAL TRANSISTOR

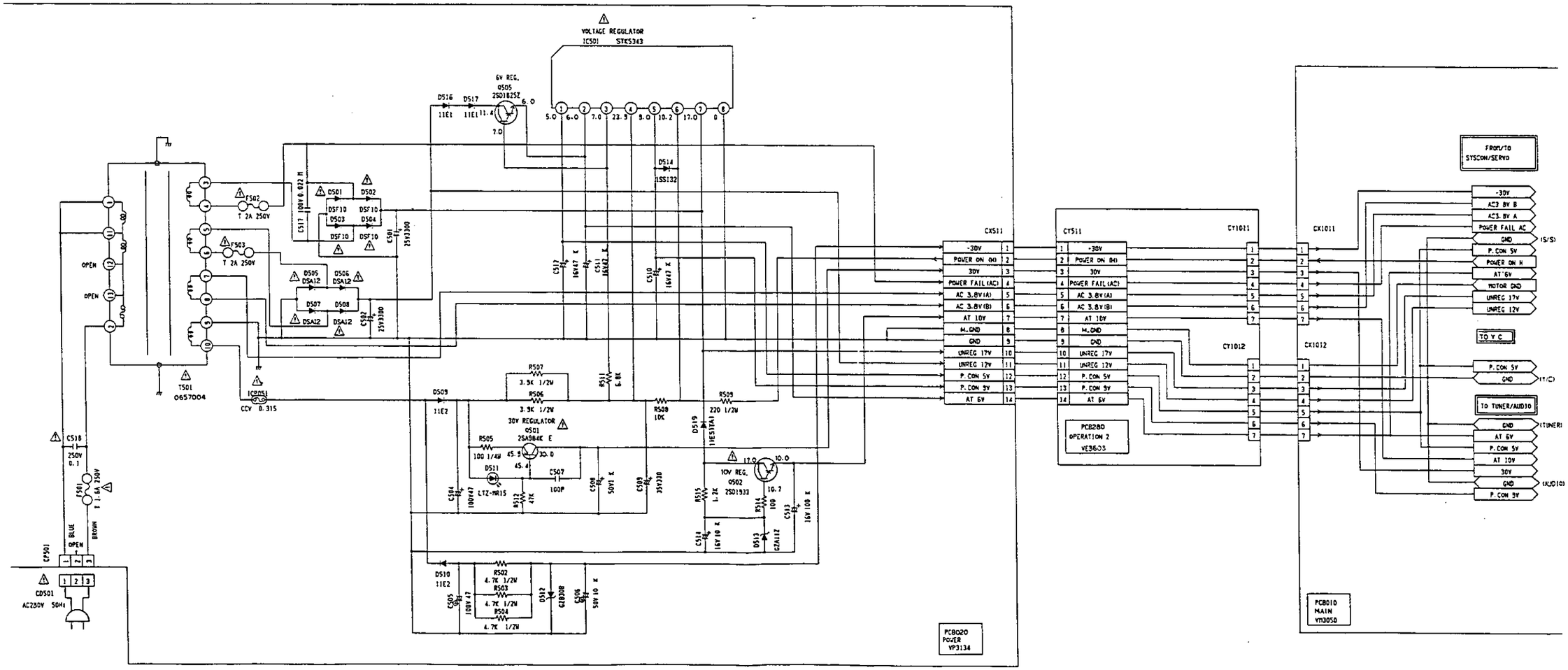


CAUTION: DIGITAL TRANSISTOR



1-13629

POWER/OPERATION 2 SCHEMATIC DIAGRAM



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

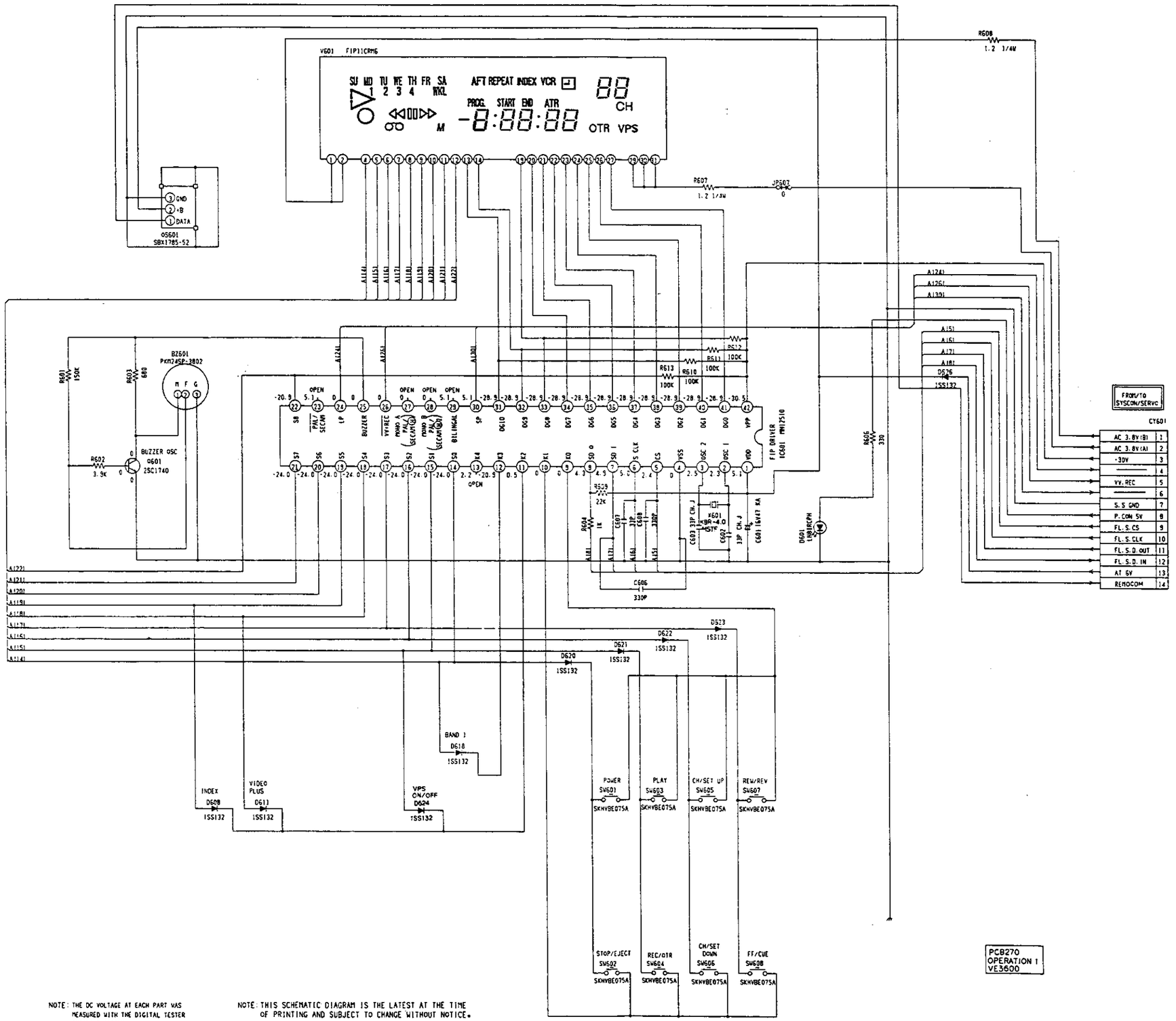
ATTENTION: LES PIECES REPAREES PAR UN ⚠ ETANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLS DECRITES DANS LA NOMENCLATURE DES PIECES.

CAUTION: SINCE THESE PARTS MARKED BY ⚠ 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.

1-14361

OPERATION 1 SCHEMATIC DIAGRAM

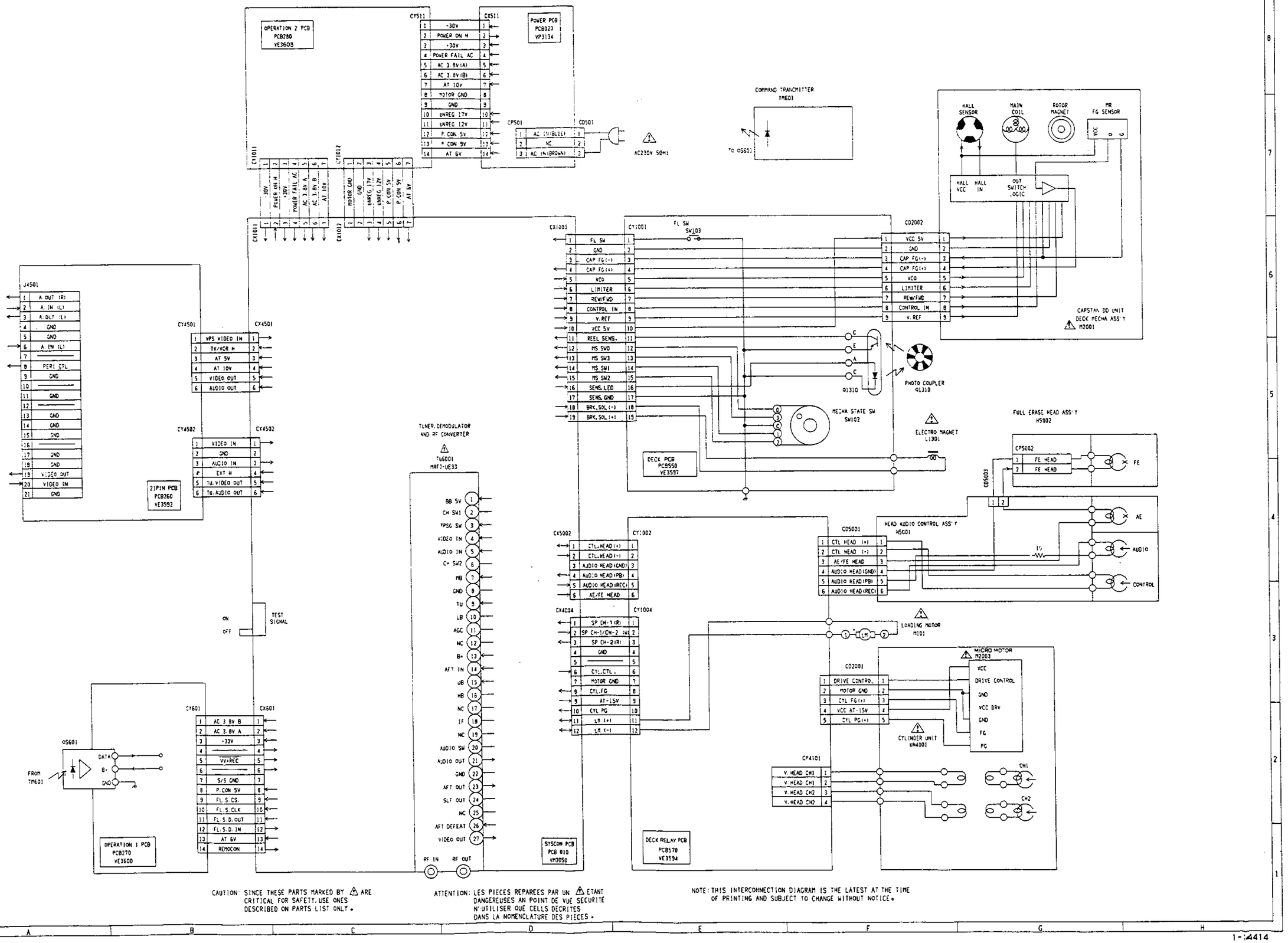


NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER DURING PLAYBACK.

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

1-1441

INTERCONNECTION DIAGRAM

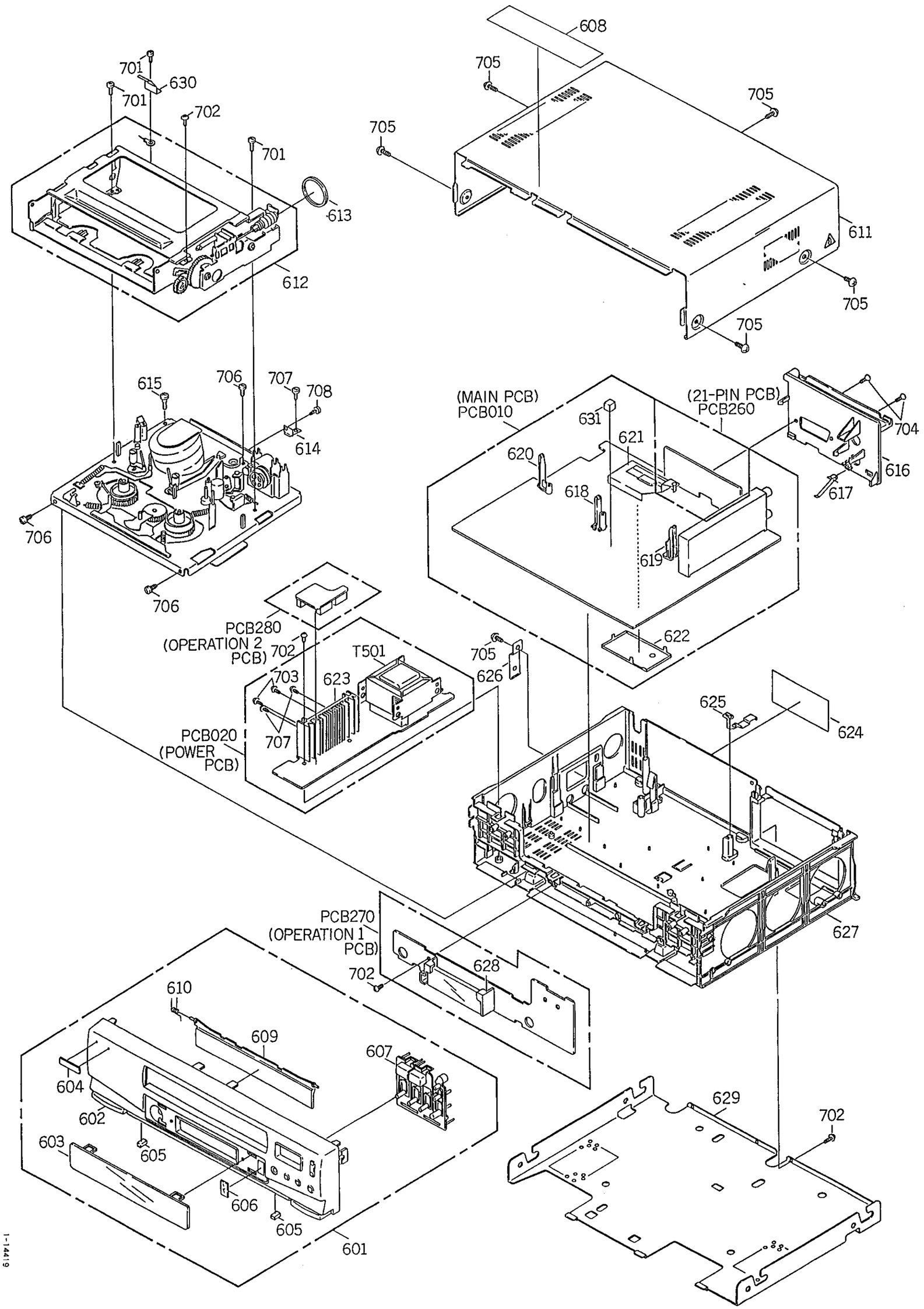


CAUTION: SINCE THESE PARTS MARKED BY ⚠ ARE CRITICAL FOR SAFETY. USE ONES DESCRIBED ON PARTS LIST ONLY.

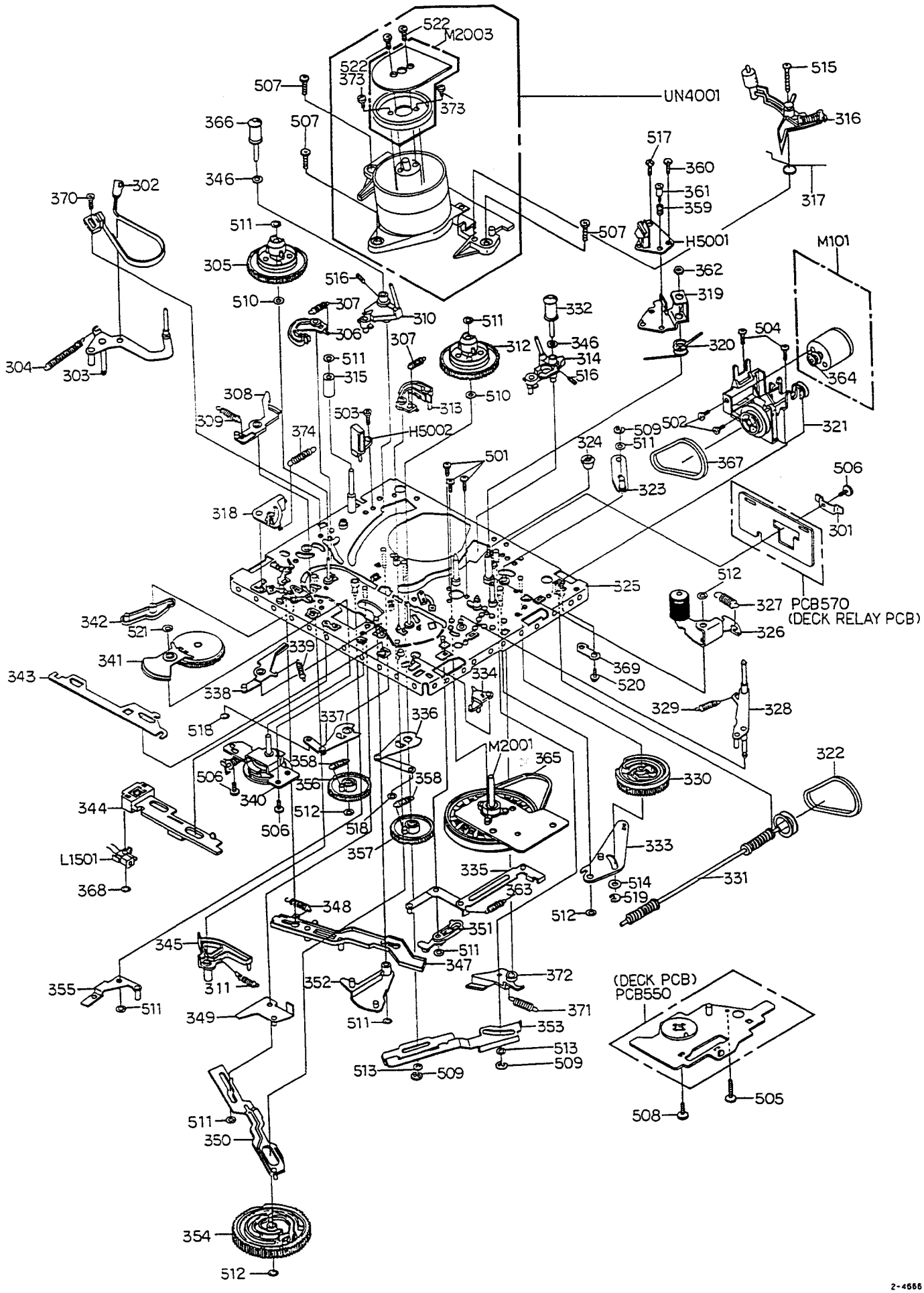
ATTENTION: LES PIECES REPAREES PAR UN ⚠ ETANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLS DECRITES DANS LA NOMENCLATURE DES PIECES.

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

1-14414

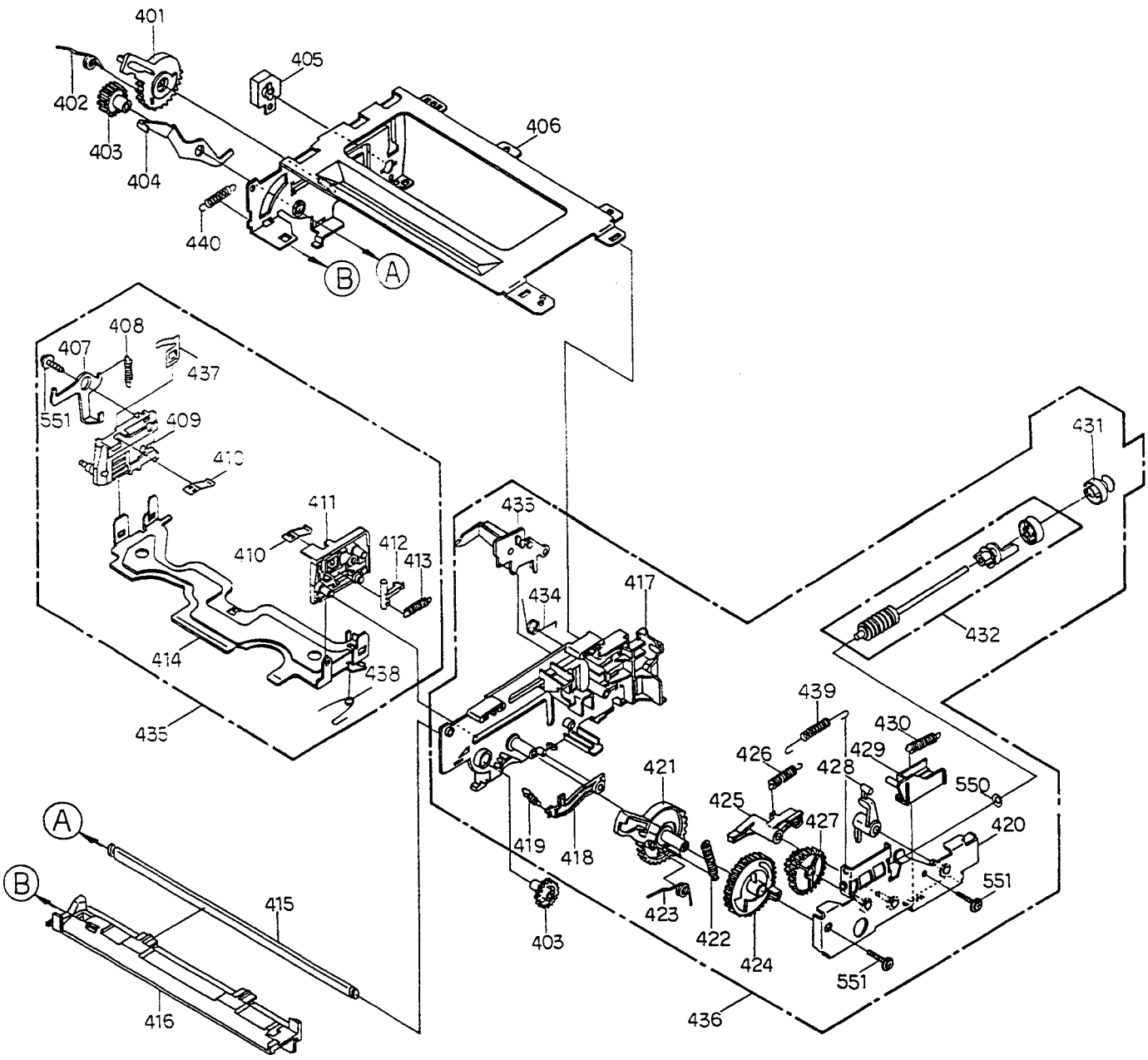

608
705
705
705
611
705
705
701
630
701
702
701
613
612
615
706
707
708
614
706
706
(MAIN PCB)
PCB010
(21-PIN PCB)
PCB260
631
621
620
618
619
622
704
616
617
PCB280
(OPERATION 2
PCB)
702
703
623
T501
705
626
PCB020
(POWER
PCB)
707
625
624
627
PCB270
(OPERATION 1
PCB)
702
628
610
609
607
604
602
603
605
606
605
601
629
702

CHASSIS EXPLODED VIEW



2-4566

FRONT LOADING EXPLODED VIEW



MECHANICAL REPLACEMENT PARTS LIST

REF.NO.	PART NO.	DESCRIPTION	
601	A4A071B720	CABINET,FRONT ASS'Y	
602	701WPJ0371	CABINET,FRONT	
603	711WPD0155	PLATE,DISPLAY	
604	7232020176	BADGE,BRAND	
605	800WFA0001	CUSHION,LEG	
606	7230005155	PLATE,LED	
607	735WPD0164	BUTTON,DECK	
608	7230005174	FILM,DECORATION	
609	712WPJ0209	FLAP	
610	743WKA0006	SPRING,FLAP	
611	702USS0020	CABINET,TOP	
612	A48901A650	FRONT LOADING UNIT(FL-6B)	
613	850P600438	BELT,FRONT LOADING 2	
614	753WUA0013	PLATE EARTH,HEAD AMP	
615	788JSE0018	PULLEY SHAFT	
616	771WPA0133	PLATE,JACK	
617	753WUA0001	SPRING,EARTH M-PCB	
618	850P600448	HOLDER,LED(H)	
619	850P600451	HOLDER,START SENSOR	
620	850P600449	HOLDER,END SENSOR	
621	753WSA0047	SHIELD CASE,HEAD AMP	
622	753WSA0038	SHIELD COVER,HEAD AMP	
623	----	HEAT SINK	
624	7222021870	SHEET,RATING	
625	753WSA0039	PLATE,DECK EARTH	
626	753WSA0040	PLATE,TRANS EARTH	
627	702UPA0082	CABINET,INSIDE	
628	715WPA0012	HOLDER,CLOCK	
629	702WSA0025	PLATE,BOTTOM	
630	753WUA0008	SPRING,EARTH	
631	800JF00095	CUSHION	10*10*T9
701	8107230804	SCREW,TAP TITE(S) BIND	3*8
702	8110630604	SCREW,TAP TITE(P) BRAZIER	3*6
703	8110230A44	SCREW,TAP TITE(P) BIND	3*14
704	8117430A02	SCREW,TAPPING(BO) OVAL	3*10
705	8117540A02	SCREW,TAPPING(BO) TRUSS	4*10
706	8117140A24	SCREW,TAPPING(BO) PAN	4*12
707	8110630804	SCREW,TAP TITE(P) BRAZIER	3*8
708	8900001DTP	SCREW,LAMI TITE(A) PAN	3*6
---	JB5X0600	POLYBAG + ASSEMBLY CHARGE	
---	J3A20702	GUARANTEE CARD	
---	J4A07201	INSTRUCTION BOOK	
---	J4A07207	QUICK SET-UP SHEET	
---	J4374228Z	WARNING SHEET	
---	J4710139	VPS CAUTION SHEET	
---	J4802020	DEW CAUTION SHEET	
---	791UHA0005	GIFT SHEET	
---	792UHA0062	PACKAGE	
---	793UCD0696	GIFT BOX	

CHASSIS/FRONT LOADING REPLACEMENT PARTS LIST

REF.NO.	PART NO.	DESCRIPTION
301	762WSA0015	PLATE,DECK ANGLE
302	850A600139	TENSION,BAND ASS'Y
303	850A400077	TENSION,ARM ASS'Y
304	850P800141	SPRING,TENSION ARM
305	850A200036	S REEL ASS'Y
306	850A600136	MAIN BRAKE S ASS'Y
307	850P800187	SPRING,MAIN BRAKE
308	850P600446	ARM,S-S BRAKE 1
309	850P800164	SPRING,SS BRAKE
310	850A400108	BASE,S INCLINED ASS'Y
311	850P800190	SPRING,M-B 3
312	850A200035	T REEL ASS'Y
313	850A600135	MAIN BRAKE T ASS'Y
314	850A400109	BASE,T INCLINED ASS'Y
315	850P600432	ROLLER IMPEDANCE
316	850A400112	ARM,AHC UNIT
317	850P800236	SPRING,AHC 1
318	850P600306	LEVER,REC SW
319	850P500042	BASE,AC HEAD 2
320	850P800233	SPRING,AC HEAD BASE 2
321	850A600148	LOADING MOTOR BOX A ASS'Y
322	850P600317	BELT,LOADING MOTOR
323	850A500008	P-R,LEVER ASS'Y
324	850P600459	NUT,ADJUST X2
325	850A000142	MAIN CHASSIS Z4 ASS'Y
326	850A400073	PINCH ROLLER ARM ASS'Y
327	850P800149	SPRING,P-R ARM
328	850A400105	LIMITER POST ARM 2 ASS'Y
329	850P800148	SPRING,L-P ARM
330	850P600305	CAM 1
331	850A600114	WORM ASS'Y
332	850A400102	G-ROLLER ASS'Y
333	850A300031	LOADING,LEVER 2 ASS'Y
334	850P600311	LEVER,SUB BRAKE
335	850A900083	LEVER,FL ASS'Y
336	850A300030	LOADING,ARM T ASS'Y
337	850A300029	LOADING,ARM S ASS'Y
338	850A600137	T-S BRAKE 2 ASS'Y
339	850P800165	SPRING,TS BRAKE
340	850A200043	CLUTCH ASS'Y
341	850A200038	IDLER JS ASS'Y
342	850P600410	LEVER,MAIN BRAKE 1
343	850P600310	ACTUATOR,SUB BRAKE
344	850A600129	CLUTCH ACTUATOR JS ASS'Y
345	850P600303	LEVER,TENSION
346	850P400326	O-RING
347	850P600381	SLIDE MAIN BRAKE
348	850P800188	SPRING,M-B SLIDE
349	850A600109	M-B 2 LEVER ASS'Y
350	850A600108	T-A SLIDE ASS'Y
351	850P600416	LEVER,LIMITER POST
352	850P600409	LEVER,CLUTCH ACTUATOR
353	850P300112	SLIDE,LOADING 2
354	850P600304	CAM 2
355	850A600099	M-B 3 LEVER ASS'Y
356	850A300043	GEAR LOADING S ASS'Y
357	850A300044	GEAR LOADING T ASS'Y
358	850P800191	SPRING,LOADING GEAR
359	850P800245	SPRING,AZIMUTH 2
360	8144J30604	CONEHEAD SCREW M3*6
361	8146130A31	JOINT SCREW PAN M3*13
362	850P500010	ADJUST NUT
363	850P800189	SPRING,FL LEVER
364	850P600319	PULLEY,LOADING MOTOR
365	850P600316	BELT,REEL
366	850A400088	G-ROLLER ASS'Y
367	850P600315	BELT,FL
368	850P000285	CS-RING 2.6*5.4*0.1
369	850P000262	BRACKET,WORM 3
370	868501H804	SCREW,TAP TITE(S) PAN W6 3*8
371	850P800145	SPRING,CAPSTAN BRAKE
372	850A600140	CAPSTAN BRAKE ASS'Y
373	850PAA0197	SCREW,MOTOR M3*5
374	850P800251	SPRING,LEVER REC
401	850P900430	GEAR,LINK L
402	850P800175	SPRING,LINK GEAR L
403	850P900525	GEAR,SYNCHRO
404	850P900451	LEVER,FLAP 2
405	850P900537	COVER,SENSOR 2
406	850A900128	TOP BRACKET ASS'Y
407	850P900458	LOCKER
408	850P800154	SPRING,LOCKER
409	850A900138	CASS,SIDE L ASS'Y

REF.NO.	PART NO.	DESCRIPTION
410	850P900354	SPRING,PACK
411	850P900536	CASS,SIDE RA
412	850P900474	REMOVING 2
413	850P800198	SPRING,REMOVING 2
414	850A900122	CASS,HOLDER SUB ASS'Y
415	850P900267	SHAFT,SYNCHRO
416	850P900529	TAPE GUIDE PIECE
417	850P900532	BRACKET,SIDE RIA
418	850P900416	LEVER,FL SW.
419	850P800158	SPRING,FL SW,LEVER
420	850A900129	SIDE BRACKET R2 ASS'Y
421	850P900431	GEAR,LINK R
422	850P800153	SPRING,CLUTCH GEAR
423	850P800181	SPRING,LINK GEAR R2
424	850P900432	GEAR,CLUTCH
425	850P900417	LEVER,LOCK
426	850P800159	SPRING,LOCK LEVER
427	850P900438	WHEEL
428	850P900435	LEVER,CLUTCH
429	850P900434	LEVER,SLIDE
430	850P800180	SPRING,SLIDE LEVER 2
431	850P900531	JOINT,PULLEY 2
432	850A900089	WORM ASS'Y
433	850P900450	OPENER A
434	850P800172	SPRING,OPENER A
435	A45101A690	CASSETTE HOLDER ASS'Y
436	A44802A640	SIDE BRACKET R ASS'Y
437	850P900523	SPRING,FL EARTH
438	850P800230	SPRING,LOCKER R
439	850P800243	SPRING,EARTH
440	850P800157	SPRING,FLAP FRONT LOADING
501	8107126604	SCREW,TAP TITE(S) PAN 2.6*6
502	8102130404	SCREW,PAN M3*4
503	8107226804	SCREW,TAP TITE(S) BIND 2.6*8
504	8107230A44	SCREW,TAP TITE(S) BIND 3*14
505	8107230A64	SCREW,TAP TITE(S) BIND 3*16
506	8107230604	SCREW,TAP TITE(S) BIND 3*6
507	8107230804	SCREW,TAP TITE(S) BIND 3*8
508	8110230804	SCREW,TAP TITE(P) BIND 3*8
509	83ETW25000	E-RING 2.5
510	82Q3154B3N	POLYSLIDER WASHER 3.1*5.4*T0.13
	82Q315403N	POLYSLIDER WASHER 3.1*5.4*T0.3
511	82P255504N	POLYSLIDER WASHER(CUT) 2.5*5.5*T0.4
512	82P306005N	POLYSLIDER WASHER(CUT) 3.1*6.0*T0.5
513	82A3270054	WASHER 3.1*7.0*T0.5
514	82A4080054	WASHER 4.3*8.0*T0.5
515	8107126144	SCREW TAP TITE(S) PAN 2.6*14
516	815DJ20302	SET SCREW 6 CUP POINT M2*3
517	8145J30601	SCREW,+UPSET M3*6
518	83CST35050	CS-RING 3.5
519	83ETW30060	E-RING 3.0
520	8117B26804	SCREW,TAPPING(B0) WH6 2.6*8
521	82P2660C5N	POLYSLIDER WASHER(CUT) 2.6*6.0*T0.25
522	810A123504	SEMS A M2.3*5
550	82Q315405N	POLYSLIDER WASHER 3.1*5.4*T0.5
551	86817CGA04	TAPPING(B0) BIND WH6.5 2.6*10
552	8107220504	SCREW,TAP TITE(S) BIND 2*5
CD2001	122L050601	CORD JUMPER 2L050601
CD2002	122L090601	CORD JUMPER 2L090601
CD5001	122L061204	CORD JUMPER 2L061204
CD5003	06CT23027A	CORD EIS CONNECTOR C723027A
CP4101	069J740109	CONNECTOR PCB SIDE IMSA-9603S-04C
CY1001	069J2J0480	CONNECTOR PCB SIDE 9117S-19A
CY1002	069R260439	CONNECTOR PCB SIDE 52418-0610
CY1004	069R2C0439	CONNECTOR PCB SIDE 52418-1210
H5001	1523D91017	HEAD,AUDIO CONTROL HVMZA1183A
H5002	1543D02006	HEAD,FULL ERASE HVFHF0028A
⚠ L1301	02BH000006	ELECTRO MAGNET JTM1012-010100
⚠ M101	1596P58008	MOTOR,LOADING MXN-13FB12F
⚠ M2001	1510S98024	CAPSTAN DD UNIT F2QTB02
⚠ M2003	1589V11002	MICRO MOTOR EP13CB
PCB550	A4A002A550	DECK PCB ASS'Y VE3597
PCB570	A4A002A570	DECK RELAY PCB ASS'Y VE3594
Q1310	0002300140	PHOTO COUPLER SPI-315-04
SW102	0520U44002	SWITCH,ROTARY SRZZ0B047A
SW103	0501211001	PUSH SWITCH SPPB51096A
⚠ UN4001	A4A006A500	CYLINDER UNIT ASS'Y A4A006A500

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	
RESISTORS			
R1001	R00106393J	RC	39K OHM 1/6W
R4506	R00202101J	RC	100 OHM 1/2W
R5014	R00106101J	RC	100 OHM 1/6W
CAPACITORS			
C501	E001F3332M	CE	3300 UF 25 V
C502	E001F3332M	CE	3300 UF 25 V
⚠ C518	P2162B104M	CMP	0.1 UF AC125V/250V
SEMICONDUCTORS			
⚠ D501	D23TDSF10T	DIODE,RECTIFIER	DSF10TB-BT-A
⚠ D502	D23TDSF10T	DIODE,RECTIFIER	DSF10TB-BT-A
⚠ D503	D23TDSF10T	DIODE,RECTIFIER	DSF10TB-BT-A
⚠ D504	D23TDSF10T	DIODE,RECTIFIER	DSF10TB-BT-A
⚠ D505	D23TDSA12B	DIODE,RECTIFIER	DSA12TB-AT1
⚠ D506	D23TDSA12B	DIODE,RECTIFIER	DSA12TB-AT1
⚠ D507	D23TDSA12B	DIODE,RECTIFIER	DSA12TB-AT1
⚠ D508	D23TDSA12B	DIODE,RECTIFIER	DSA12TB-AT1
D509	D28T011E20	DIODE,SILICON	11E2TA1
D510	D28T011E20	DIODE,SILICON	11E2TA1
D511	DB7T2MR150	SEALED LED	LTZ-MR15-T77
D512	D93013001B	DIODE,ZENER	GZB30B
D513	D93T01100Z	DIODE,ZENER	GZA11 Z BT
D514	D1VT001320	DIODE,SILICON	1SS132T-77
D516	D28T011E10	DIODE,SILICON	11E1TA1
D517	D28T011E10	DIODE,SILICON	11E1TA1
D518	D97U06R21C	DIODE,ZENER	MTZJ6.2C T-77
D519	D28T011ES1	DIODE,SILICON	11ES1TA1
D601	002112Q050	LED	LN81RCPH-(TA2)
D608	D1VT001320	DIODE,SILICON	1SS132T-77
D611	D1VT001320	DIODE,SILICON	1SS132T-77
D618	D1VT001320	DIODE,SILICON	1SS132T-77
D620	D1VT001320	DIODE,SILICON	1SS132T-77
D621	D1VT001320	DIODE,SILICON	1SS132T-77
D622	D1VT001320	DIODE,SILICON	1SS132T-77
D623	D1VT001320	DIODE,SILICON	1SS132T-77
D624	D1VT001320	DIODE,SILICON	1SS132T-77
D626	D1VT001320	DIODE,SILICON	1SS132T-77
D1001	0010100310	INFRARED LED	LN59LMI
D1002	D1VT001320	DIODE,SILICON	1SS132T-77
D1003	D1VT001320	DIODE,SILICON	1SS132T-77
D1004	D28T011E10	DIODE,SILICON	11E1TA1
D1005	D28T011E10	DIODE,SILICON	11E1TA1
D1006	D28T011E10	DIODE,SILICON	11E1TA1
D1008	D1VT001320	DIODE,SILICON	1SS132T-77
D1009	D14T0S1980	DIODE,SILICON	1SS198TE
D1010	D14T0S1980	DIODE,SILICON	1SS198TE
D1011	D1VT001320	DIODE,SILICON	1SS132T-77
D1012	D97U01301B	DIODE,ZENER	MTZJ13B T-77
D1013	D97U01001C	DIODE,ZENER	MTZJ10C T-77
D1014	D1VT001320	DIODE,SILICON	1SS132T-77
D1015	D1VT001320	DIODE,SILICON	1SS132T-77
D1016	D97006R81B	DIODE,ZENER	MTZJ6.8B
D1017	D1VT001320	DIODE,SILICON	1SS132T-77
D1502	D1VT001320	DIODE,SILICON	1SS132T-77
D4001	D1VT001320	DIODE,SILICON	1SS132T-77
D4003	D97U06R81C	DIODE,ZENER	MTZJ6.8C T-77
D4007	D1VT001320	DIODE,SILICON	1SS132T-77
D4501	D97U015010	DIODE,ZENER	MTZJ15 T-77
D4502	D97U015010	DIODE,ZENER	MTZJ15 T-77
D4504	D97U015010	DIODE,ZENER	MTZJ15 T-77
D6001	D28TEQS040	DIODE,SCHOTTKY	11EQS04TA1
D6002	D1VT001320	DIODE,SILICON	1SS132T-77
D6003	D1VT001320	DIODE,SILICON	1SS132T-77
D6004	D1VT001320	DIODE,SILICON	1SS132T-77
D6005	D28T011E10	DIODE,SILICON	11E1TA1
D6006	D28T011E10	DIODE,SILICON	11E1TA1
D6007	D1VT001320	DIODE,SILICON	1SS132T-77
D6008	D92T04R7B2	DIODE,ZENER	RD4.7EB 2 TA11R
D6011	D97U05R11C	DIODE,ZENER	MTZJ5.1C T-77
⚠ IC501	123S953430	IC	STK5343
IC601	151D025100	IC	MN12510
IC701	13ED656425	IC	SDA5642-5
IC1001	151F58046C	IC	OEC8046C
IC1002	19UJ0T600H	IC	PST600H
IC1003	101D065640	IC	AN6564
IC1004	107S0886V1	IC	BA6886-V1
IC1005	157D04C020	IC	BR24C02
IC1501	102K978150	IC	UPC78L05AHF
IC4001	103D373470	IC	LA7347
IC4002	103D389925	IC	LC89925
IC4101	103DG7376S	IC	LA7376ST

REF.NO.	PART NO.	DESCRIPTION	
SEMICONDUCTORS (CONT.)			
IC4501	107D076090	IC	BA7609
IC5001	103D772860	IC	LA7286
IC6001	103S06358T	IC	LA6358ST
IC6002	103S079100	IC	LA7910
IC6003	103S072100	IC	LA7210
IC6004	10MI90574J	IC	UPC574J-T
⚠ Q501	TAWT0984K0	TRANSISTOR,SILICON	2SA984K-AA
⚠ Q502	TD70019330	TRANSISTOR,SILICON	2SD1933
⚠ Q505	TD30018250	TRANSISTOR,SILICON	2SD1825Z
Q601	TCYT1740S0	TRANSISTOR,SILICON	2SC1740SP TP
Q1001	0000M00010	PHOTO TRANSISTOR	PT-304R2L
Q1002	0000M00010	PHOTO TRANSISTOR	PT-304R2L
Q1003	TDWT011110	TRANSISTOR,SILICON	2SD1111-AA
Q1004	TBWT00926T	TRANSISTOR,SILICON	2SB926T-AA
Q1005	TDWT011110	TRANSISTOR,SILICON	2SD1111-AA
Q1006	T6YA1037K0	TRANSISTOR,SILICON	2SA1037KT147
Q1007	TNYTC05001	COMPOUND TRANSISTOR	DTC124EKT147
Q1008	TNYTC05001	COMPOUND TRANSISTOR	DTC124EKT147
Q1009	TNYTC05001	COMPOUND TRANSISTOR	DTC124EKT147
Q1010	TAWT0984K0	TRANSISTOR,SILICON	2SA984K-AA
Q1011	TNYTC05001	COMPOUND TRANSISTOR	DTC124EKT147
Q1012	TNYTC05001	COMPOUND TRANSISTOR	DTC124EKT147
Q1015	TNYTC05001	COMPOUND TRANSISTOR	DTC124EKT147
Q1016	TNYTC05001	COMPOUND TRANSISTOR	DTC124EKT147
Q1017	T8YA2412K0	TRANSISTOR,SILICON	2SC2412KT147
Q1018	TCYT1740S0	TRANSISTOR,SILICON	2SC1740SP TP
Q4001	T8YA2412K0	TRANSISTOR,SILICON	2SC2412KT147
Q4002	T8YA2412K0	TRANSISTOR,SILICON	2SC2412KT147
Q4003	T8YA2412K0	TRANSISTOR,SILICON	2SC2412KT147
Q4007	T6YA1037K0	TRANSISTOR,SILICON	2SA1037KT147
Q4008	T6YA1037K0	TRANSISTOR,SILICON	2SA1037KT147
Q4009	T8YA2412K0	TRANSISTOR,SILICON	2SC2412KT147
Q4010	TNYTC05001	COMPOUND TRANSISTOR	DTC124EKT147
Q4011	T8YA2412K0	TRANSISTOR,SILICON	2SC2412KT147
Q4012	T8YA2412K0	TRANSISTOR,SILICON	2SC2412KT147
Q4014	T8YA2412K0	TRANSISTOR,SILICON	2SC2412KT147
Q4015	T6YA1037K0	TRANSISTOR,SILICON	2SA1037KT147
Q4016	T8YA2412K0	TRANSISTOR,SILICON	2SC2412KT147
Q4301	T8YA2412K0	TRANSISTOR,SILICON	2SC2412KT147
Q4302	TNYTC05001	COMPOUND TRANSISTOR	DTC124EKT147
Q4303	TNYTC05001	COMPOUND TRANSISTOR	DTC124EKT147
Q4501	TAYT0933S0	TRANSISTOR,SILICON	2SA933STP
Q4502	TNYTC03001	COMPOUND TRANSISTOR	DTC124ESTP
Q4503	TAYT0933S0	TRANSISTOR,SILICON	2SA933STP
Q5001	TCKT013170	TRANSISTOR,SILICON	2SC1317-T
Q5002	TBWT006980	TRANSISTOR,SILICON	2SB698-AA
Q5003	TNYTC05001	COMPOUND TRANSISTOR	DTC124EKT147
Q6001	T82A037350	TRANSISTOR,SILICON	2SC3735-T1
Q6003	TNYTC05001	COMPOUND TRANSISTOR	DTC124EKT147
Q6004	T8YA2412K0	TRANSISTOR,SILICON	2SC2412KT147
Q6005	T8YA2412K0	TRANSISTOR,SILICON	2SC2412KT147
Q6007	T25T117GR5	FET	2SK117-GR
Q6008	T8YA2412K0	TRANSISTOR,SILICON	2SC2412KT147
Q6009	TNYTC05001	COMPOUND TRANSISTOR	DTC124EKT147
Q6013	T8YA2412K0	TRANSISTOR,SILICON	2SC2412KT147
COILS & TRANSFORMERS			
L701	021B73101K	COIL	100 UH
L4001	021LA6150K	COIL	15 UH
L4002	021LA6121K	COIL	120 UH
L4004	021LA6220K	COIL	22 UH
L4005	021LA6100K	COIL	10 UH
L4006	021LA6181K	COIL	180 UH
L4007	021B73101K	COIL	100 UH
L4009	021LA6101K	COIL	100 UH
L4010	021LA6330K	COIL	33 UH
L4011	021B73101K	COIL	100 UH
L4012	021LA63R3K	COIL	3.3 UH
L4014	02167D101K	COIL	100 UH
L4015	021LA6220K	COIL	22 UH
L4016	021LA66R8K	COIL	6.8 UH
L4017	021LA6101K	COIL	100 UH
L4018	021LA6271K	COIL	270 UH
L4019	021B73101K	COIL	100 UH
L4101	021B73101K	COIL	100 UH
L4301	021LA6271K	COIL	270 UH
L4302	021J79471J	COIL	470 UH
L4303	021J79331J	COIL	330 UH
L4305	021LA6100K	COIL	10 UH
L4306	021LA6150K	COIL	15 UH
L4501	021LA62R2K	COIL	2.2 UH
L4502	021LA65R6K	COIL	5.6 UH
L4503	021B73101K	COIL	100 UH

ELECTRICAL REPLACEMENT PARTS LIST

REF.NO.	PART NO.	DESCRIPTION	
		COILS & TRANSFORMERS (CONT.)	
L4504	021LA62R2K	COIL	2.2 UH
L5001	021B73102K	COIL	1000 UH
⚠ T501	0406570045	TRANSFORMER.POWER AC	0657004
T5001	033626008R	COIL.BIAS OSC	3626008
		JACK	
J4501	0632100029	SOCKET.21PIN	HXC1525-01-010
		SWITCHES	
SW601	0504201T31	SWITCH.TACT	SKHVBE075A
SW602	0504201T31	SWITCH.TACT	SKHVBE075A
SW603	0504201T31	SWITCH.TACT	SKHVBE075A
SW604	0504201T31	SWITCH.TACT	SKHVBE075A
SW605	0504201T31	SWITCH.TACT	SKHVBE075A
SW606	0504201T31	SWITCH.TACT	SKHVBE075A
SW607	0504201T31	SWITCH.TACT	SKHVBE075A
SW608	0504201T31	SWITCH.TACT	SKHVBE075A
SW1001	0500A01026	PUSH LEVER SWITCH	MPU10230MLB0
SW6001	0510221030	SWITCH.SLIDE	SSSF11442A
		VARIABLE RESISTORS	
VR1001	V1262Q5BT1	VR.SEMIFIXED	RH0632CS5R01
VR4001	V1263H4BTC	VR.SEMIFIXED	RH063MCJ4R07A
VR4002	V1263H4BTC	VR.SEMIFIXED	RH063MCJ4R07A
VR4003	V1263H4BTC	VR.SEMIFIXED	RH063MCJ4R07A
VR4004	V126314BTC	VR.SEMIFIXED	RH063MC14R07A
VR5001	V1M6314BT6	VR.SEMIFIXED	RH0638C14R0TA
		P.C. BOARD ASSEMBLIES	
PCB010	A4A072B01A	PCB ASS'Y	VM3050C
PCB020	A4A072B02A	PCB ASS'Y	VP3134B
PCB260	A4A072B26A	PCB ASS'Y	VE3592C
PCB270	A4A072B27A	PCB ASS'Y	VE3600B
PCB280	A4A072B28A	PCB ASS'Y	VE3603B
PCB550	A4A002A550	SEE DECK REPLACEMENT PARTS LIST	
PCB570	A4A006A570	SEE DECK REPLACEMENT PARTS LIST	
		MISCELLANEOUS	
BT601	1412004004	BATTERY.MANGAN	UM-4(GR)
BZ601	071X000007	BUZZER.PIEZOELECTRIC	PKM24SP-3805
⚠ CD501	120T655802	CORD.AC	E2N
CD502	068101361A	CORD.EIS CONNECTOR	8101361A
CP501	0694430100	CORD.UX CONNECTOR	2-173270-3
CX511	06972E0540	CONNECTOR PCB SIDE	TKC-J14X-A1
CX601	069J2E0520	CONNECTOR PCB SIDE	IMSA-6053B-14A
CY511	06972E0530	CONNECTOR PCB SIDE	TKC-J14P-A1
CY601	069J2E0480	CONNECTOR PCB SIDE	9117S-14A
CD4501	068101382A	CORD.EIS CONNECTOR	8101382A
CD4502	068101406A	CORD.EIS CONNECTOR	8101406A
CD6002	06CZL05015	RF CABLE PAL FTZ	D-2070
CUS011	800WF00004	CUSHION-A	
CUS013	800JF00166	CUSHION-A	
CX1003	069J2J0490	CONNECTOR PCB SIDE	6077B-1-19A-T
CX1011	0697270540	CONNECTOR PCB SIDE	TKC-J07X-A1
CX1012	0697270540	CONNECTOR PCB SIDE	TKC-J07X-A1
CX4004	069R2C0449	CONNECTOR PCB SIDE	53290-1210
CX4501	069J260028	CONNECTOR PCB SIDE	IMSA-9115B-06
CX4502	069J260028	CONNECTOR PCB SIDE	IMSA-9115B-06
CX5002	069R260449	CONNECTOR PCB SIDE	53290-0610
CY1011	0697270530	CONNECTOR PCB SIDE	TKC-J07P-A1
CY1012	0697270530	CONNECTOR PCB SIDE	TKC-J07P-A1
CY4501	069J260038	CONNECTOR PCB SIDE	IMSA-9115S-06L
CY4502	069J260038	CONNECTOR PCB SIDE	IMSA-9115S-06L
DL4301	104W24R436	DELAY LINE	ADL-SE2244R
⚠ F501	080PT1R602	FUSE	T 1.6A 250V
⚠ F502	080PT02002	FUSE	T 2 A 250V
⚠ F503	080PT02002	FUSE	T 2 A 250V
FH501	06710T0006	HOLDER.FUSE	EYF-52BC
FH502	06710T0006	HOLDER.FUSE	EYF-52BC
⚠ ICP051	0832FR3101	MICRO FUSE	CCV 0.315
NR1001	1102547ZT1	R.NETWORK	RGLD5X472J-T21
OS601	0778000002	REMOTE RECEIVER	SBX1785-52
PF4001	114JL50602	FILTER.LOW PASS	4JL50602
TM601	076G0AF010	TRANSMITTER	EUR-531702
⚠ TU6001	0162701001	RF UNIT	MRF7-UE33
V601	096J70R201	TUBE FLUORESCENT DISPLAY	FIP11CRM6
X601	1003T4R001	CERAMIC OSCILLATOR	KBR-4.0MSTF
X1001	100CA8R005	CRYSTAL HC-49/U-S	8.0MHZ
X1002	100C32R803	CRYSTAL DSVT-200	32.768KHZ
X4301	100WA4R303	CRYSTAL HC-49/U	4.433619MHZ
X6001	1003R50001	CERAMIC OSCILLATOR	KBR-500AH2

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.

	BASE		REPLACEMENT	
REF.NO.	PART NO.	DESCRIPTION	PART NO.	DESCRIPTION
C501	E001F3332M	3300 UF 25V	E0ELF3332M	3300 UF 25V
			E01VF3332M	3300 UF 25V
			E53JF3332M	3300 UF 25V
			E02SF3332M	3300 UF 25V
			E02LF3332M	3300 UF 25V
			E031F3332M	3300 UF 25V
C502	E001F3332M	3300 UF 25V	E0ELF3332M	3300 UF 25V
			E01VF3332M	3300 UF 25V
			E53JF3332M	3300 UF 25V
			E02SF3332M	3300 UF 25V
			E02LF3332M	3300 UF 25V
			E031F3332M	3300 UF 25V
C510	E50HT2470M	47 UF 16V	E50HT3470M	47 UF 25V
C511	E50HT2470M	47 UF 16V	E50HT3470M	47 UF 25V
C512	E50HT2470M	47 UF 16V	E50HT3470M	47 UF 25V
CX1003	069J2J0490	6077B-1-19A-T	069J2J0550	6077B-1-19B-T