

# **SERVICE MANUAL**

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## **ORION** **VH-2907 HiFi**

VIDEO CASSETTE RECORDER



ORIGIN AL  
CHASSIS CODE A

Best. Nr. SM2907

## 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  $\triangle$  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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# ORION

## VH-2907 HIFI SI

# SERVICE MANUAL

VIDEO CASSETTE RECORDER

REVISION 1  
CHASSIS CODE B



CHASSIS CODE	IC1001
A	OEC7070A
B	OEC7070B

### NOTE FOR THE REPLACEMENT PARTS LIST

ADDRESS	CHASSIS CODE A	CHASSIS CODE B
	DATA	DATA
D8	71	7D
FC	99	00

## Change of IC

### ELECTRICAL REPLACEMENT PARTS LIST

REF. NO.	CHASSIS CODE A		CHASSIS CODE B	
	PART NO.	DESCRIPTION	PART NO.	DESCRIPTION
IC1001	I56F57070A	IC OEC7070A	I56F57070B	IC OEC7070B
PCB010	A4F509B010K	SYSCON PCB ASS'Y (VERSION A) VMA234A	A4F509B010K	SYSCON PCB ASS'Y (VERSION B) VMA234A

SYSCON PCB's are interchangeable.

SPEC.NO.	M4F5-09B
O/R NO.	U244519

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## GENERAL SPECIFICATIONS

G-1	VCR System	System		VHS Player / Recorder	
		Video System		PAL	
		Hi-Fi STEREO		Yes	
		NTSC PB(PAL60Hz)		Yes	
		Deck	DECK	OVD-7	
			Loading System	Front	
		Heads	Video Head	3	
			FM Audio Head	4Head	
		Audio /Control		Mono / Yes	
		Erase(Full Track Erase)		Yes	
		Tape Speed	Rec	PAL	SP/LP
			Play	NTSC	-
		Fast Forward / Rewind Time (Approx.)	PAL	SP/LP	
			NTSC	SP	
with Cassette		FF:1'12"/REW:1'12" E-180			
Forward/Reverse	NTSC or PAL-M	SP=3x, 5x			
Picture Search	PAL or SECAM	SP/LP=5x, 7x/7x, 13x			
Frame Advance		1/10			
Slow Speed		1/5-1/30			
G-2	Tuning System	Broadcasting System		CCIR System BG	
		Tuner and Receive CH	System	1Tuner	
			Destination	Oscar(W/ HYPER)	
		Tuning System		F-Synth	
		Input Impedance		VHF/UHF 75 OHM	
		CH Coverage		E2-E4, X-Z+2, S1-S10, E5-E12,S11-S41,E21-E69	
		Intermediate Frequency	Picture(FP)	38.9 MHz	
			Sound(FS)	33.4 MHz	
			FP-FS	5.5 MHz	
		Preset CH		80CH	
		RF Converter Output		Yes	
		Channel		36 ch 23 ~ 69ch	
		Level/Impedance		73 dBu / 75 Ohm	
		Sound Selector		No	
Stereo/Dual TV Sound		G-ST			
Tuner Sound Muting		Yes			
G-3	Power	Power Source	AC	230V 50Hz	
			DC	-	
		Power Consumption	(at AC)	11W at 230 V 50 Hz	
			Stand by (at AC)	3W at 230 V 50 Hz	
	Per Year	-			
Protector	Power Fuse	Yes			
	Dew Sensor	No			
G-4	Regulation	Safety	CE		
		Radiation	CE		
G-5	Temperature	Operation	+5°C - +40°C		
		Storage	-20°C - +60°C		
G-6	Operating Humidity		Less than 80% RH		
G-7	Signal	Video Signal	Input Level	1 V p-p/75 ohm	
			Output Level	1 V p-p/75 ohm	
			S/N Ratio (Weighted)	53dB	
			Horizontal Resolution at SP Mode	240Lines	
		Audio Signal (0dB=0.775Vrms)	Input Level	-3.8dB/50Kohm	
			Output Level	-3.8dB/1Kohm	
			S/N Ratio at SP (Weighted)	42 dB	
			Harmonic Distortion (1KHz)	1.5 %	
			Frequency Response at SP	100Hz - 10kHz	
			at LP	100Hz - 5kHz	
			at SLP	-	
		Hi-Fi Audio Signal	Dynamic Range : More than	75 dB	
			Frequency Response	20Hz - 20kHz	
			Wow And Flutter : Less than	0.01 %Wrms	
Channel Separation : More than	60 dB				
	Harmonic Distortion : Less than	1.0 %			
G-8	On Screen Display	Menu		Yes	
		Menu Type	Character		
		ATS	Yes		
		Timer Rec Set	Yes		
		VCR Extension	Yes		
		Auto Repeat On/Off	Yes		
		Scene Repeat	Yes		
		Audio Dubbing	Yes		
		VCR Set-Up	Yes		
		NICAM Auto/Off	No		

## GENERAL SPECIFICATIONS

		Audio Mix On/Off	Yes	
		Color System		No
		Sharpness	Yes	
		BBE On/Off	Yes	
	CH Set-Up	CH Set-Up	Yes	
		CH Tuning	Yes	
		Auto Tuning		No
		CH Mapping	Yes	
		Guide CH Set		No
	Pin Code Registration	Pin Code Registration		No
	System Set-Up	System Set-Up	Yes	
		Clock Set	Yes(Calendar 24H)	
		Language	Yes	
		AV2 DEC/AV	Yes	
		G-CODE(or SHOWVIEW or PLUSCODE)No. Entry	Yes	
		NICAM 1/2,NICAM Off,Audio Output		No
		Stereo,Audio Output,Bilingual	Yes	
		Play/Stop/FF/Rew/Rec/OTR/T-Rec/Pause/Eject/Tape In (Symbol Mark)	Yes	
	Others	CH/AV	Yes	
		Clock/Date	Yes	
		Repeat		No
		Pin Code		No
		Tape Counter	Yes	
		Index	Yes	
		Hotel Lock		No
		Tape Speed	Yes	
		Manual Tracking (Bar Setting)	Yes	
		Hi-Fi	Yes	
		S-Repeat/SR-R/SR-Play	Yes	
		VPS	Yes	
		PDC		No
		TEST Signal	Yes	
G-9	OSD Language	OSD Language Setting	Eng Ger Fre Spa Ita Germany	
G-10	Clock,Timer and Timer Back-up	Calendar	1990/1/1 - 2081/12/31	
		Timer Events	8 Program/ 1 Month	
		One Touch Recording Max Time	SP:5Hours LP:10 Hours	
		OTPB Valid Time		No
		Timer Back-up (at Power Off Mode)	30	Min
G-11	Display	Indicator	Yes	
		Indicator Type	LED Module	
		Clock/Counter,CH,Timer Rec,OTR, Play Rec,FF(Cue),Rew(Rev),Stop,ATR,Eject	Yes	
		Pause	Yes	
		Still	Yes	
		Slow	Yes	
		WKL,Y,M,D,Start,End		No
		AFT		No
		Repeat		No
		A-DUB	Yes	
		VCR	Yes	
		Memory		No
		Index		No
		VPS	Yes	
		PDC		No
		SP		No
		LP		No
		SLP		No
		AM		No
		PM		No
		F1,F2		No
		RF Output CH	Yes	
		Tape In	Yes	
G-12	Remote Control	Unit	RC-ED	
		Glow in Dark Remocon		No
		Power Source	Voltage(D.C) UM size x pcs	3V UM-4 x 2 pcs
		Total Keys	33 Keys	
		Keys	Power	Yes
			1	Yes
			2	Yes
			3	Yes
			4	Yes
			5	Yes
			6	Yes
			7	Yes
			8	Yes

## GENERAL SPECIFICATIONS

		9	Yes
		0 / AV	Yes
		CH / Tracking Up	Yes
		CH / Tracking Down	Yes
		Input Select	No
		Play	No
		Play / Up	No
		Play / Up / Slow	Yes
		F.Fwd / Right	Yes
		Rew / Left	Yes
		Pause	No
		Pause/Still	Yes
		Stop/Down	Yes
		Rec/OTR	Yes
		Eject	Yes
		Counter Reset	Yes
		Speed	Yes
		Timer Rec	Yes
		Index	Yes
		TV / VCR	Yes
		Program	No
		Program / Video Plus+	Yes
		Auto Tracking	No
		Set/Tracking+	No
		Set/ Tracking -	No
		Menu	Yes
		Enter	Yes
		Cancel/Ch Skip	Yes
		Call	Yes
		Zero Return	Yes
		Clock/Counter	Yes
		CM Skip	No
		Audio Select	Yes
G-13	Features	Auto Head Cleaning	Yes
		Auto Tracking	Yes
		Index Search	Yes
		HQ (VHS Standard High Quality)	Yes
		Auto Power On, Auto Play, Auto Rewind, Auto Eject	Yes
		Auto Repeat	Yes
		Auto Power Off	Yes
		VIDEO PLUS+(SHOWVIEW,G-CODE)	Yes
		ATS	Yes
		PDC	No
		VPS	Yes
		Reverse Slow	Yes
		One Touch Playback	No
		Picture Control(Sharpness)	Yes
		Channel Lock	No
		Hotel Lock	No
		Anti Theft	No
		Audio Dubbing	Yes
		Remote Control Code 1/2	No
		BBE Audio	Yes
		Rec END Search	No
		SQPB	No
		CATV	Yes
		CM Skip(30sec x 6 Times)	No
G-14	Accessories	Owner's Manual	Yes
		Language	German
		w/Guarantee Card	Yes
		Remote Control Unit	Yes
		Dew Cation Sheet	No
		Battery	Yes
		UM size x pcs	UM-4 x 2 pcs
		Tape Rewinder	No
		Safety Tip	No
		Toll Free Insert Sheet	No
		Quick Set-Up Sheet	Yes
		Information Sheet (Buyer Supply)	Yes
		75 Ohm Coaxial Cable	Yes
		type	Double shield
		U/V Mixer	No
		DC Car Cord (Center+)	No
		Guarantee Card	No
		Warning Sheet	No
		Circuit Diagram	No
		Antenna Change Plug	No



## GENERAL SPECIFICATIONS

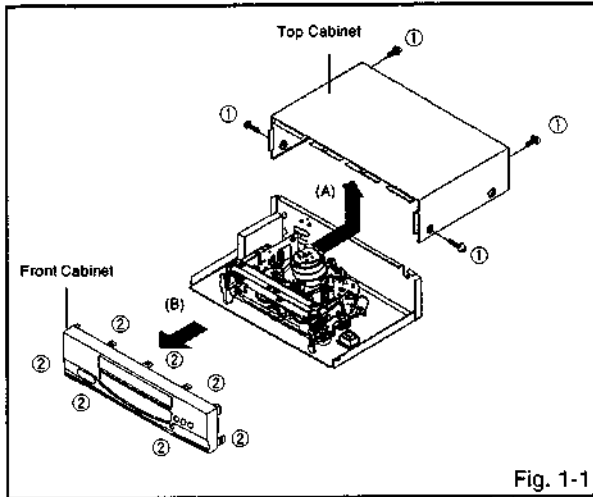
		Service Facility List		No	
		Important Safeguard		No	
		Dew/AHC Caution Sheet		No	
		AC Plug Adapter		No	
		AC Cord		No	
		AV Cord (2Pin-1Pin)		No	
		Registration Card		No	
		21pin Cable		No	
		300 ohm to 75 ohm Antenna Adapter		No	
G-15	Interface	Switch	Power	Yes	
			Play	Yes	
			Pause/Still	No	
			System Select	No	
			One Touch Playback	No	
			Channel Up	Yes	
			Channel Down	Yes	
			F.FWD/Cue	Yes	
			Rew/Rev	Yes	
			Eject/Stop	Yes	
			Rec/OTR	Yes	
			Main Power SW	No	
			Indicator	Power	No
		Stand by		No	
		Rec/OTR		No	
		Repeat		No	
		Tape In		No	
		Kurupika Guide		No	
		One Touch Playback		No	
		Terminals	Front	Video Input	RCA x1
				Audio Input	RCA x 2(Stereo)
				Other Terminal	No
			Rear	Video Input	No
				Audio Input	No
				Video Output	No
				Audio Output	RCA x 2(Stereo)
				Euro Scart	2SCART
Ext Speaker	No				
DC Jack 12V(Center +)	No				
VHF/UHF Antenna Input/Output	DIN Type				
AC Inlet	No				
G-16	Set Size			Approx. W x D x H (mm)	360 x 226 x 95
G-17	Weight	Net (Approx.)	3.2 kg ( - lbs)		
		Gross (Approx.)	3.8 kg ( - lbs)		
G-18	Carton	Master Carton		No	
			Content	-	
			Material	-	
			Dimensions W x D x H(mm)	-	
			Description of Origin	-	
		Gift Box		Yes	
			Material	Single/White	
			Dimensions W x D x H(mm)	429 x 292 x 168	
			Pulp Package	Yes	
			Design	As Per BUYER 's	
			Description of Origin	No	
Drop Test	Natural Dropping	1 Corner / 3 Edges / 6 Surfaces			
	Height (cm)	80cm			
G-19	Cabinet Material	Cabinet Front	PS - 94HB		
		Container Stuffing(40' container)	2992 Sets		

# DISASSEMBLY INSTRUCTIONS

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

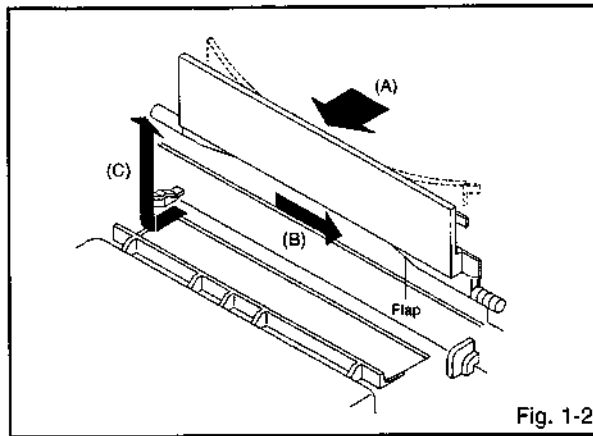
### 1-1: TOP CABINET AND FRONT CABINET (Refer to Fig. 1-1)

1. Remove the 4 screws ①.
2. Remove the Top Cabinet in the direction of arrow (A).
3. Unlock the 7 supports ②.
4. Remove the Front Cabinet in the direction of arrow (B).



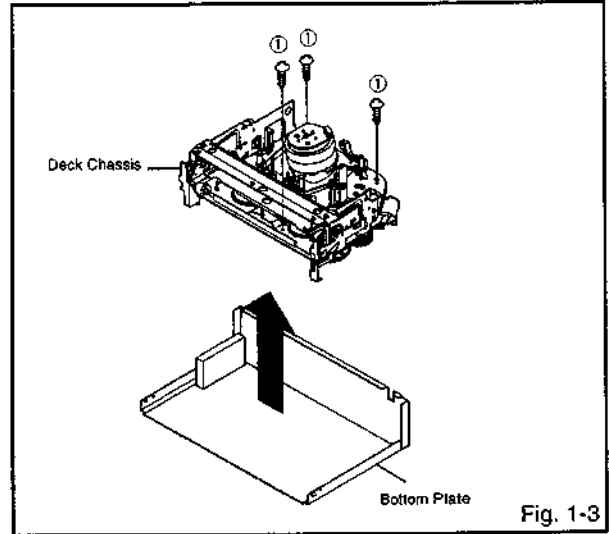
### 1-2: FLAP (Refer to Fig. 1-2)

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).



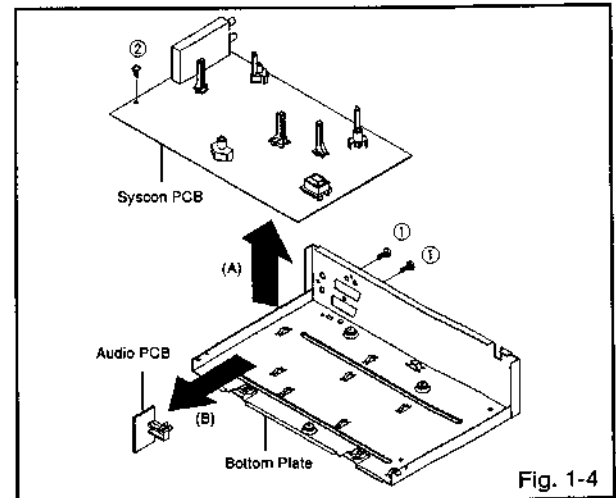
### 1-3: DECK CHASSIS (Refer to Fig. 1-3)

1. Remove the 3 screws ①.
2. Disconnect the following connectors: (CP1001, CP4001, CP4002 and CP4003).
3. Remove the Deck Chassis in the direction of arrow.



### 1-4: SYSCON PCB AND AUDIO PCB (Refer to Fig. 1-4)

1. Remove the 2 screws ①.
2. Remove the screw ②.
3. Remove the Syscon PCB in the direction of arrow (A).
4. Remove the Audio PCB in the direction of arrow (B).



# DISASSEMBLY INSTRUCTIONS

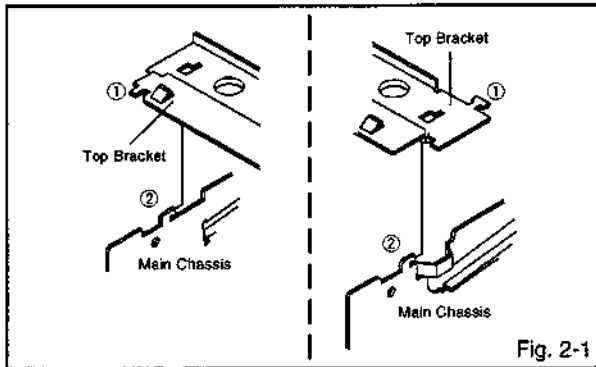
## 2. REMOVAL OF DECK PARTS

### 2-1: TOP BRACKET (Refer to Fig. 2-1)

1. Extend the 2 supports ①.
2. Slide the 2 supports ② and remove the Top Bracket.

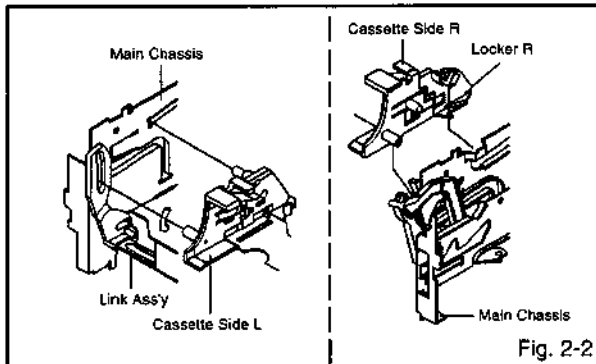
#### NOTE

1. After the installation of the Top Bracket, bend the support ① so that the Top Bracket is fixed.



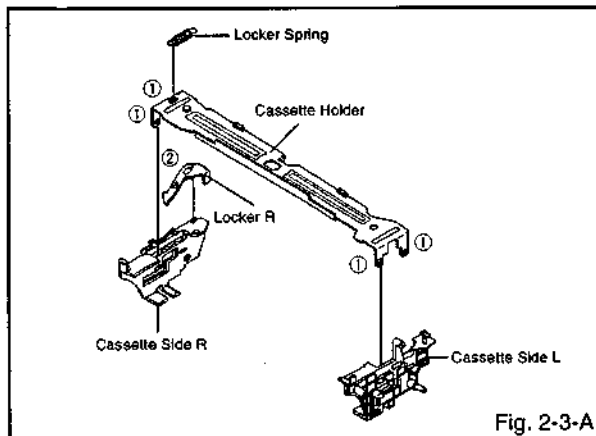
### 2-2: CASSETTE HOLDER ASS'Y (Refer to Fig. 2-2)

1. Move the Cassette Holder Ass'y to the front side.
2. Push the Locker R to remove the Cassette Side R.
3. Remove the Cassette Side L.



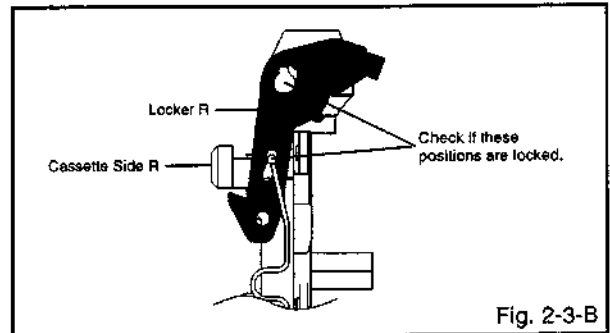
### 2-3: CASSETTE SIDE L/R (Refer to Fig. 2-3-A)

1. Remove the Locker Spring.
2. Unlock the 4 supports ① and then remove the Cassette Side L/R.
3. Unlock the support ② and then remove the Locker R.



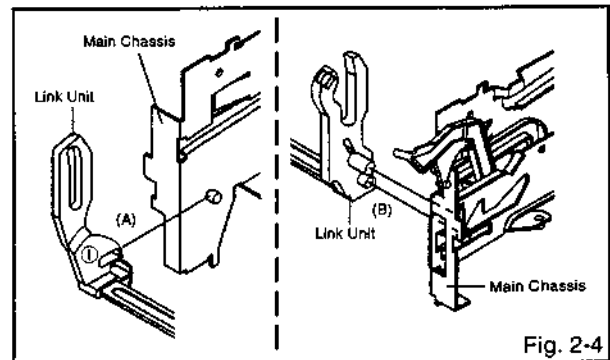
#### NOTE

1. In case of the Locker R installation, check if the two positions of Fig.2-3-B are correctly locked.
2. When you install the Cassette Side R, be sure to move the Locker R after installing.



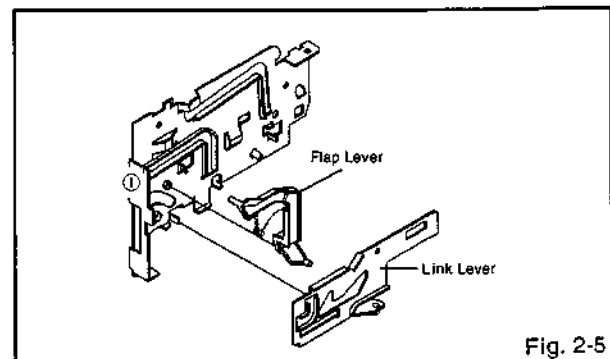
### 2-4: LINK UNIT (Refer to Fig. 2-4)

1. Set the Link Unit to the Eject position.
2. Unlock the support ①.
3. Remove the (A) side of the Link Unit first, then remove the (B) side.



### 2-5: LINK LEVER/FLAP LEVER (Refer to Fig. 2-5)

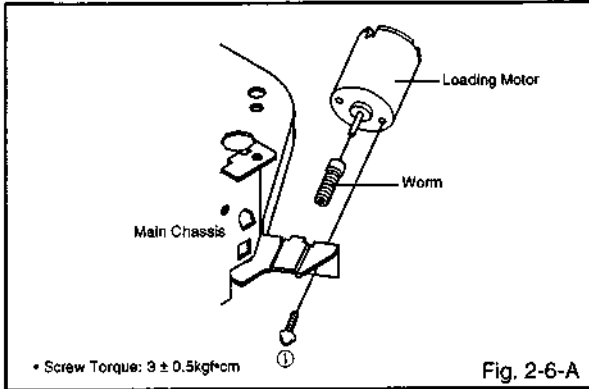
1. Extend the support ①.
2. Remove the Link Lever.
3. Remove the Flap Lever.



## DISASSEMBLY INSTRUCTIONS

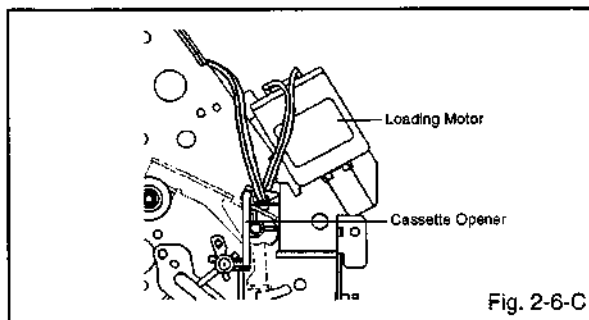
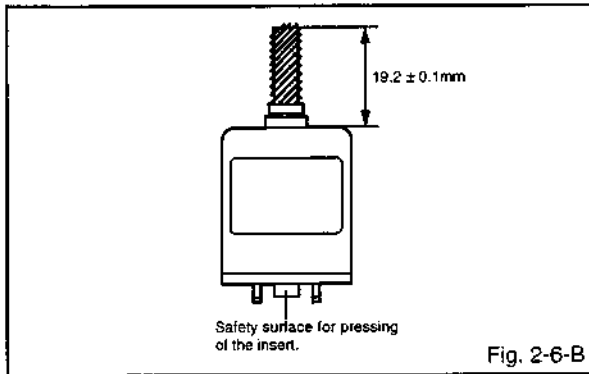
### 2-6: LOADING MOTOR/WORM (Refer to Fig. 2-6-A)

1. Remove the screw ①.
2. Remove the Loading Motor.
3. Remove the Worm.



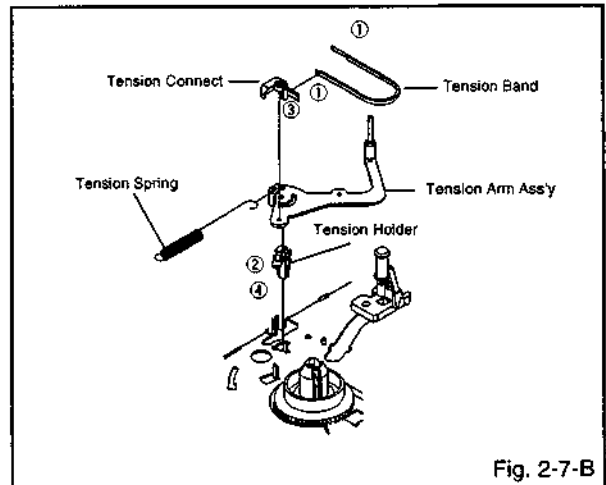
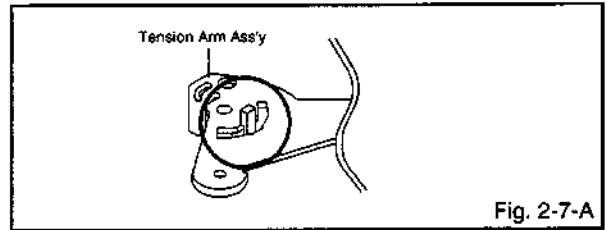
#### NOTE

1. In case of the Worm installation, check if the value of the Fig. 2-6-B is correct.
2. In case of the Loading Motor installation, hook the wire on the Cassette Opener as shown Fig. 2-6-C.



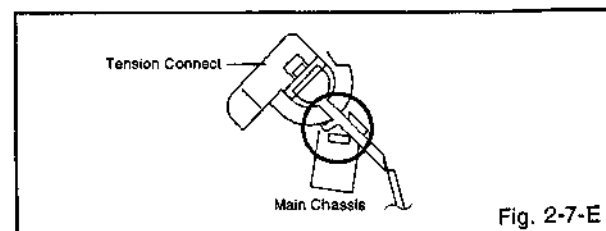
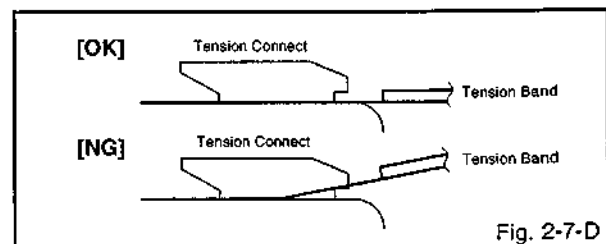
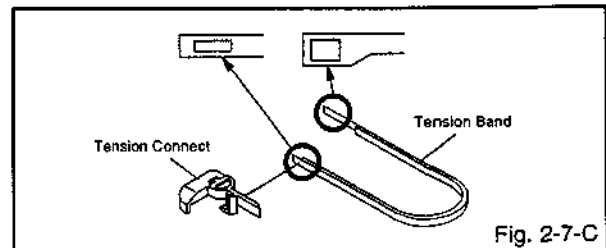
### 2-7: TENSION ASS'Y (Refer to Fig. 2-7-B)

1. Turn the Pinch Roller Cam clockwise so that the Tension Holder hook is set to the position of Fig. 2-7-A to move the Tension Arm Ass'y.
2. Remove the Tension Spring.
3. Unlock the 2 supports ① and remove the Tension Band.
4. Unlock the support ② and remove the Tension Arm Ass'y.
5. Unlock the support ③ and remove the Tension Connect.
6. Float the hook ④ and turn it clockwise then remove the Tension Holder.



#### NOTE

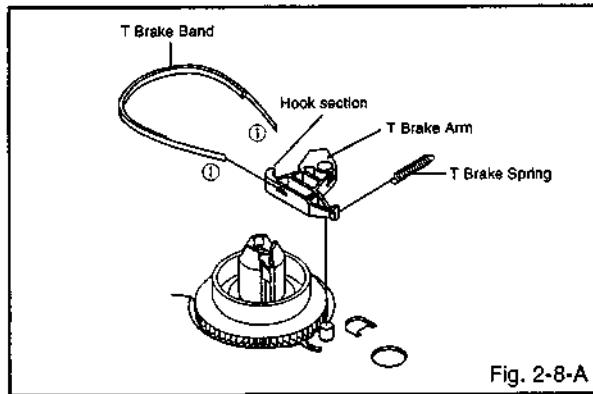
1. In case of the Tension Band installation, note the direction of the installation. (Refer to Fig. 2-7-C)
2. In case of the Tension Band installation, install correctly as Fig. 2-7-D.
3. In case of the Tension Connect installation, install as the circled section of Fig. 2-7-E.



## DISASSEMBLY INSTRUCTIONS

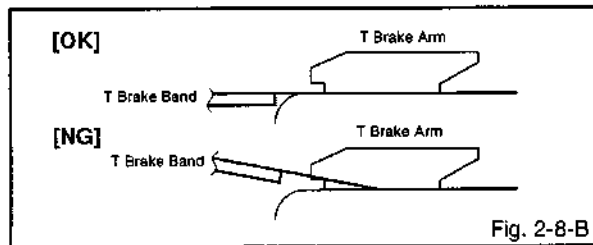
### 2-8: T BRAKE ARM/T BRAKE BAND (Refer to Fig. 2-8-A)

1. Remove the T Brake Spring.
2. Turn the T Brake Arm clockwise and bend the hook section to remove it.
3. Unlock the 2 supports ① and remove the T Brake Band.



#### NOTE

1. In case of the T Brake Band installation, install correctly as Fig. 2-8-B.

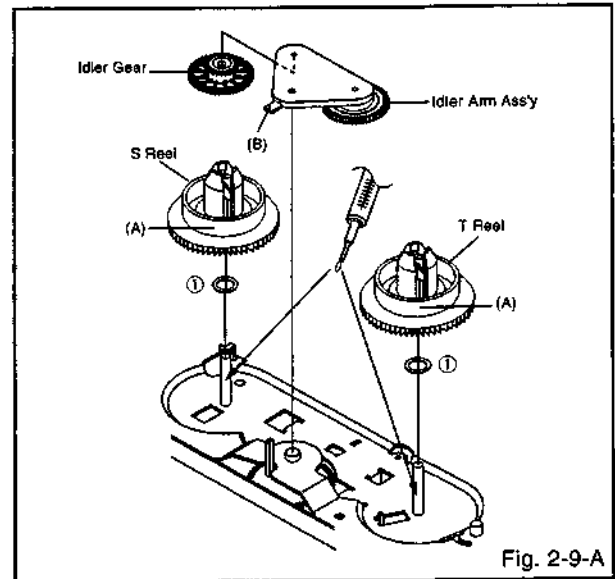


### 2-9: S REEL/T REEL/IDLER ARM ASS'Y/IDLER GEAR (Refer to Fig. 2-9-A)

1. Remove the S Reel and T Reel.
2. Remove the 2 Polyslider Washers ①.
3. Remove the Idler Arm Ass'y and Idler Gear.

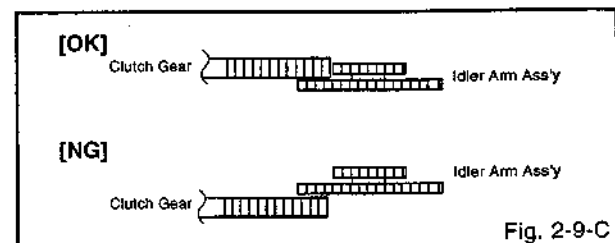
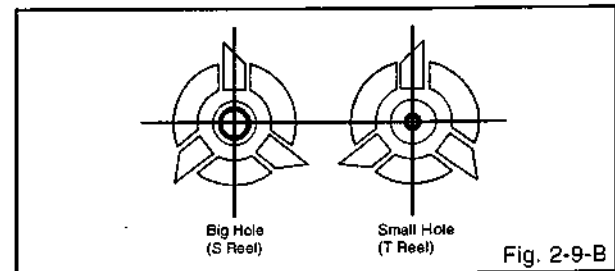
#### NOTE

1. Take care not to damage the gears of the S Reel and T Reel.
2. The Polyslider Washer may be remained on the back of the reel.
3. Take care not to damage the shaft.
4. Do not touch the section "A" of S Reel and T Reel. (Use gloves.) (Refer to Fig. 2-9-A) Do not adhere the stains on it.
5. When you install the reel, clean the shaft and grease it (FG-84M). (If you do not grease, noise may be heard in FF/REW mode.)
6. After installing the reel, adjust the height of the reel. (Refer to MECHANICAL ADJUSTMENT)



#### NOTE

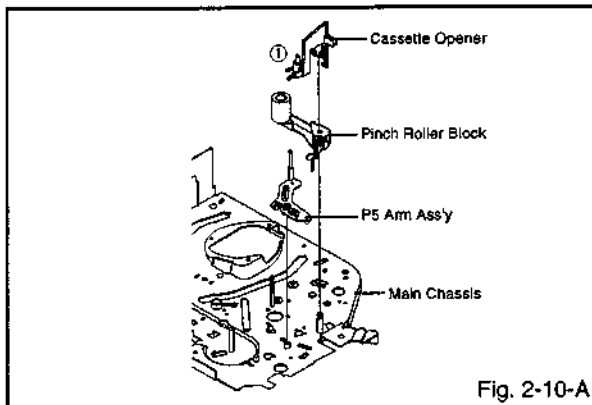
1. In case of the S Reel and T Reel installation, check if the correct parts are installed. (Refer to Fig. 2-9-B)
2. In case of the Idler Arm Ass'y installation, install correctly as Fig. 2-9-C. And also set it so that the section "B" of Fig. 2-9-A is placed under the Main Chassis tab.



## DISASSEMBLY INSTRUCTIONS

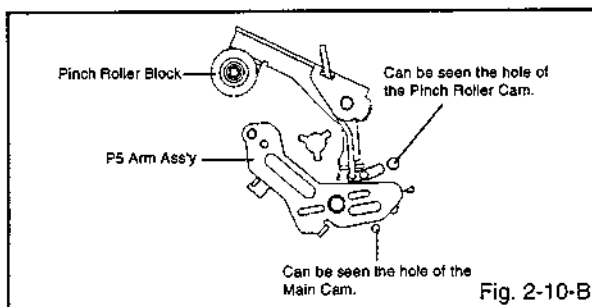
### 2-10: CASSETTE OPENER/PINCH ROLLER BLOCK/ P5 ARM ASS'Y (Refer to Fig. 2-10-A)

1. Unlock the support ① and remove the Cassette Opener.
2. Remove the Pinch Roller Block and P5 Arm Ass'y.



#### NOTE

1. Do not touch the Pinch Roller. (Use gloves.)
2. In case of the Pinch Roller Block and the Pinch Roller Cam installation, install correctly as Fig. 2-10-B.

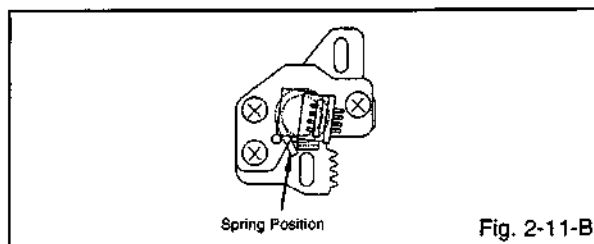
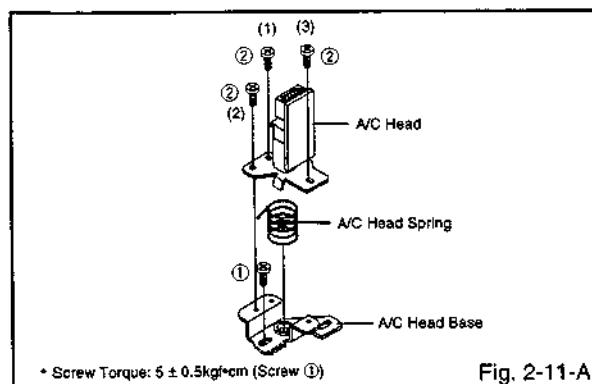


### 2-11: A/C HEAD (Refer to Fig. 2-11-A)

1. Remove the screw ①.
2. Remove the A/C Head Base.
3. Remove the 3 screws ②.
4. Remove the A/C Head and A/C Head Spring.

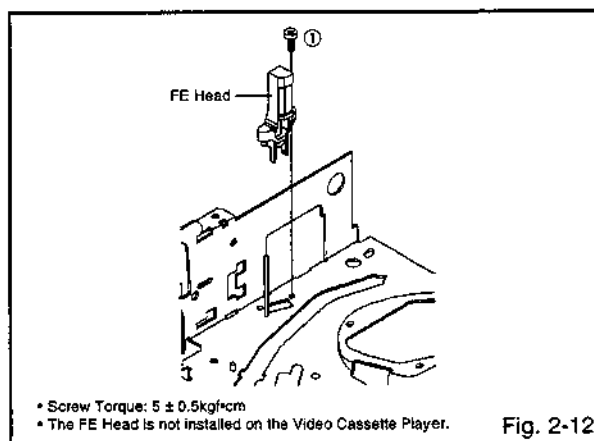
#### NOTE

1. Do not touch the A/C Head. (Use gloves.)
2. When you install the A/C Head Spring, install as shown in Fig. 2-11-B.
3. When you install the A/C Head, tighten the screw (1) first, then tighten the screw (2), finally tighten the screw (3).



### 2-12: FE HEAD (RECORDER ONLY) (Refer to Fig. 2-12)

1. Remove the screw ①.
2. Remove the FE Head.

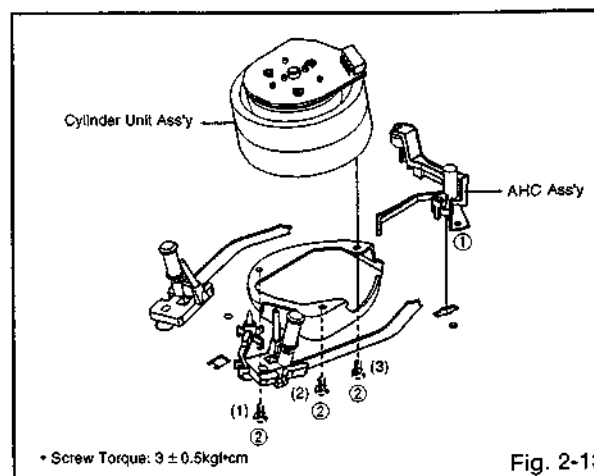


### 2-13: AHC ASS'Y/CYLINDER UNIT ASS'Y (Refer to Fig. 2-13)

1. Unlock the support ① and remove the AHC Ass'y.
2. Disconnect the following connector: (CD2001)
3. Remove the 3 screws ②.
4. Remove the Cylinder Unit Ass'y.

#### NOTE

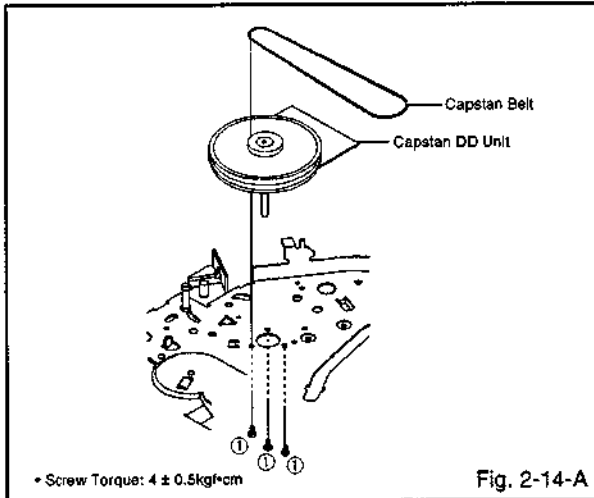
1. When you install the Cylinder Unit Ass'y, tighten the screws from (1) to (3) in order while pulling the Ass'y toward the left front direction.



## DISASSEMBLY INSTRUCTIONS

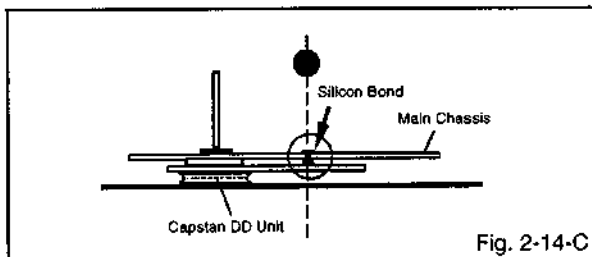
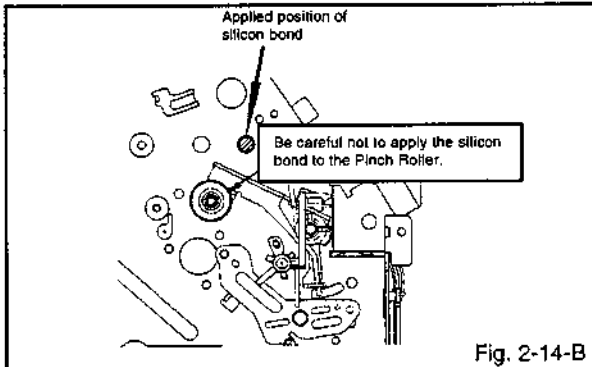
### 2-14: CAPSTAN DD UNIT (Refer to Fig. 2-14-A)

1. Remove the Capstan Belt.
2. Remove the 3 screws ①.
3. Remove the Capstan DD Unit.



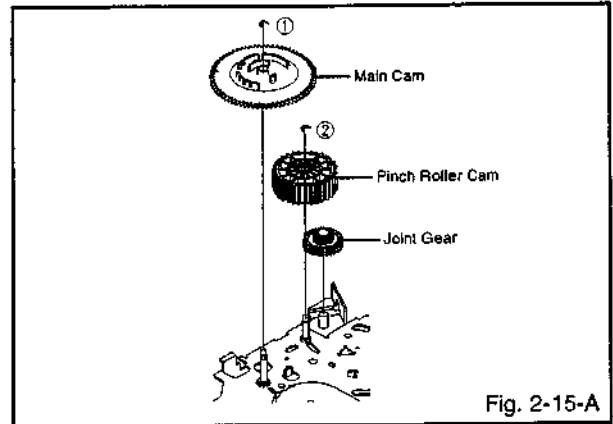
#### NOTE

1. In case of the Capstan DD Unit installation, apply the silicon bond (TSE3843-W) on the position Fig. 2-14-B correctly. (If no silicon bond applied, abnormal noise will be heard on the deck operation.) (Refer to Fig. 2-14-B, C)



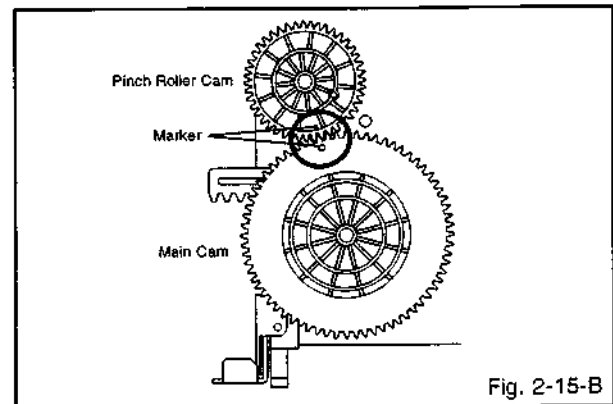
### 2-15: MAIN CAM/PINCH ROLLER CAM/JOINT GEAR (Refer to Fig. 2-15-A)

1. Remove the E-Ring ①, then remove the Main Cam.
2. Remove the E-Ring ②, then remove the Pinch Roller Cam and Joint Gear.



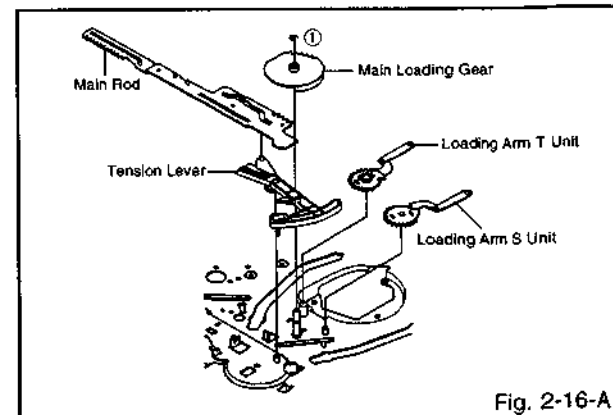
#### NOTE

1. In case of the Pinch Roller Cam and Main Cam installation, install them as the circled section of Fig. 2-15-B so that the each markers are met. (Refer to Fig. 2-15-B)



### 2-16: LOADING GEAR S/T UNIT (Refer to Fig. 2-16-A)

1. Remove the E-Ring ① and remove the Main Loading Gear.
2. Remove the Main Rod, Tension Lever, Loading Arm S Unit and Loading Arm T Unit.



## DISASSEMBLY INSTRUCTIONS

### NOTE

1. When you install the Loading Arm S Unit, Loading Arm T Unit and Main Loading Gear, align each marker. (Refer to Fig. 2-16-B)

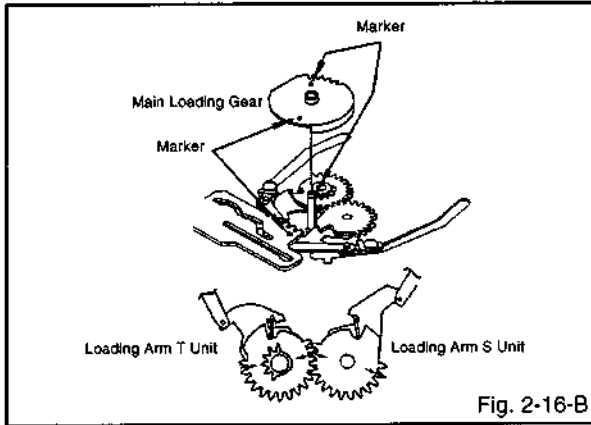


Fig. 2-16-B

### 2-17: CLUTCH ASS'Y/RING SPRING/CLUTCH LEVER/CLUTCH GEAR (Refer to Fig. 2-17-A)

1. Remove the Polyslider Washer ①.
2. Remove the Clutch Ass'y and Ring Spring.
3. Remove the Clutch Lever.
4. Remove the Coupling Gear, Coupling Spring and Clutch Gear.

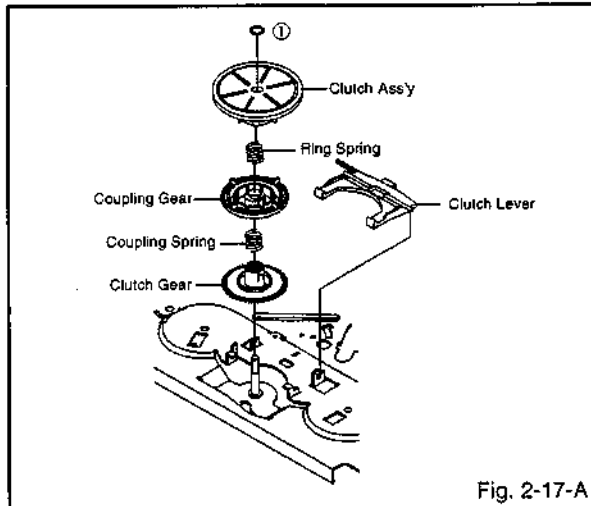


Fig. 2-17-A

### NOTE

1. In case of the Clutch Ass'y installation, install it with inserting the spring of the Clutch Ass'y into the dent of the Coupling Gear. (Refer to Fig. 2-17-B)

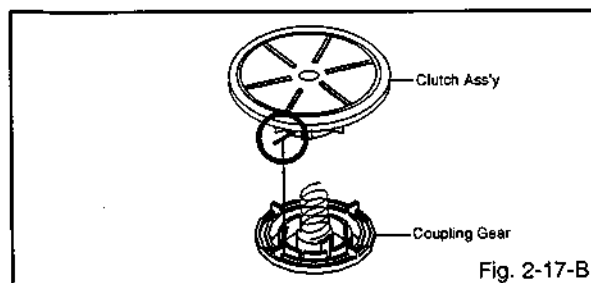


Fig. 2-17-B

### 2-18: CASSETTE GUIDE POST/INCLINED BASE S/T UNIT/P4 CAP (Refer to Fig. 2-18-A)

1. Remove the P4 Cap.
2. Unlock the support ① and remove the Cassette Guide Post.
3. Remove the Inclined Base S Unit and Inclined Base T Unit.

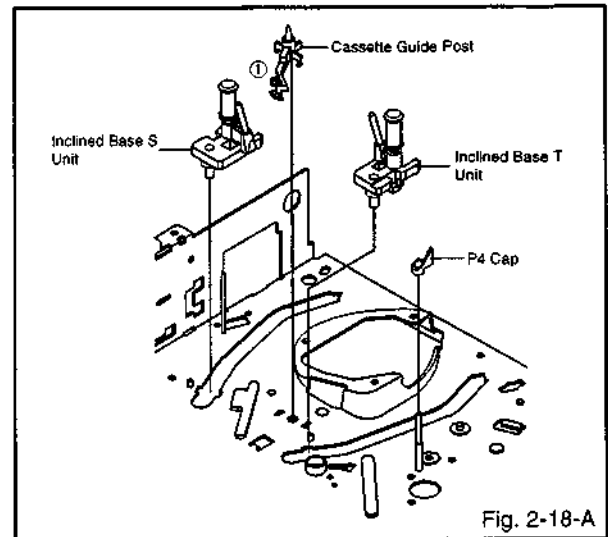


Fig. 2-18-A

### NOTE

1. Do not touch the roller of Guide Roller.
2. In case of the P4 Cap installation, install it with parallel for "A" and "B" of Fig. 2-18-B.
3. In case of the Cassette Guide Post installation, install correctly as the circled section of Fig. 2-18-C.

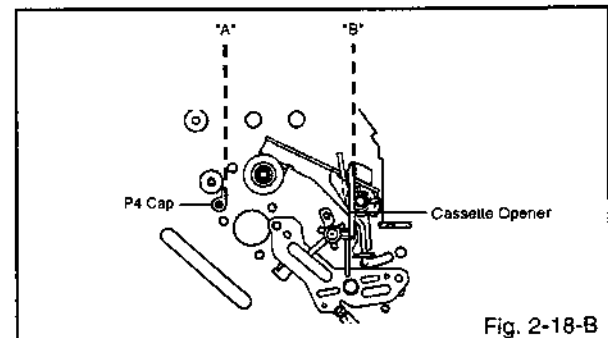


Fig. 2-18-B

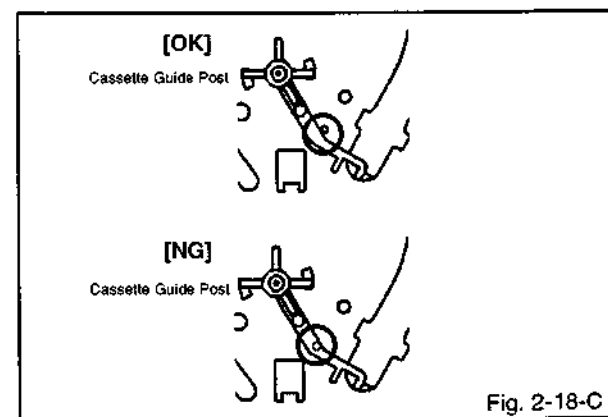


Fig. 2-18-C



# DISASSEMBLY INSTRUCTIONS

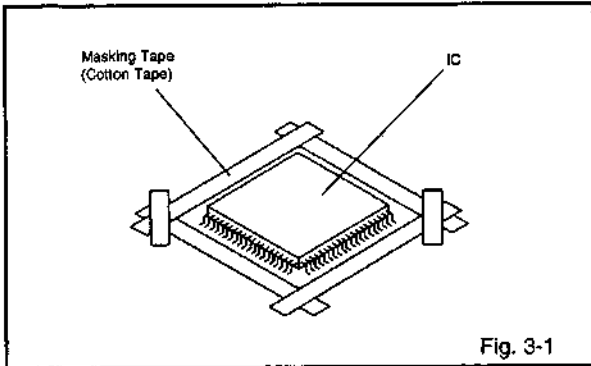
## 3. REMOVAL AND INSTALLATION OF FLAT PACKAGE IC

### REMOVAL

1. Put the Masking Tape (cotton tape) around the Flat Package IC to protect other parts from any damage. (Refer to Fig. 3-1.)

#### NOTE

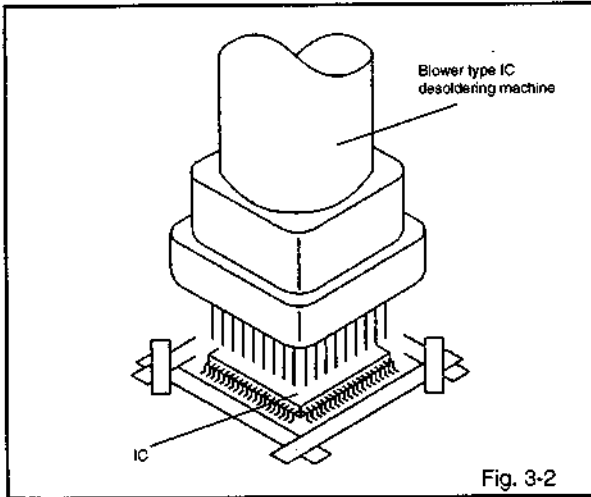
Masking is carried out on all the parts located within 10 mm distance from IC leads.



2. Heat the IC leads using a blower type IC desoldering machine. (Refer to Fig. 3-2.)

#### NOTE

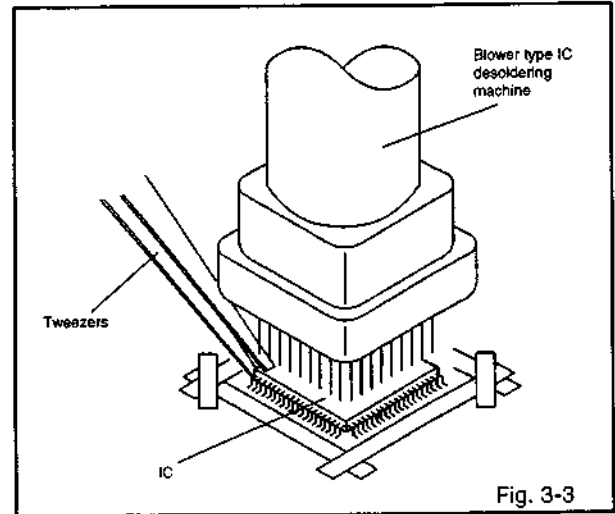
Do not add the rotating and the back and forth directions force on the IC, until IC can move back and forth easily after desoldering the IC leads completely.



3. When IC starts moving back and forth easily after desoldering completely, pickup the corner of the IC using a tweezers and remove the IC by moving with the IC desoldering machine. (Refer to Fig. 3-3.)

#### NOTE

Some ICs on the PCB are affixed with glue, so be careful not to break or damage the foil of each IC leads or solder lands under the IC when removing it.

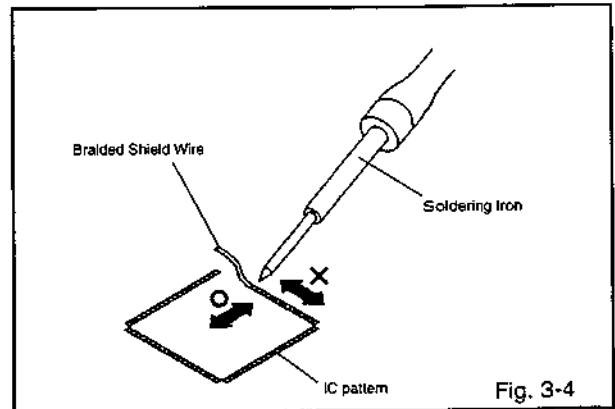


4. Peel off the Masking Tape.

5. Absorb the solder left on the pattern using the Braided Shield Wire. (Refer to Fig. 3-4.)

#### NOTE

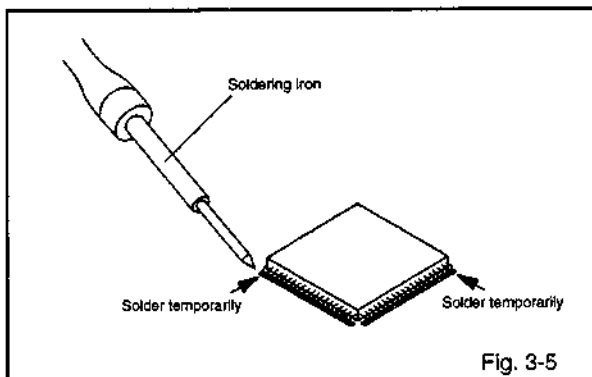
Do not move the Braided Shield Wire in the vertical direction towards the IC pattern.



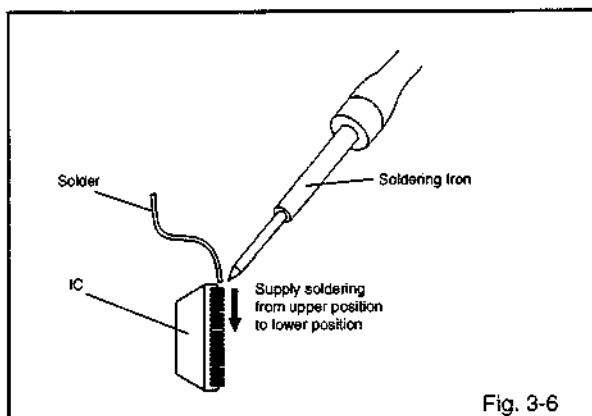
## DISASSEMBLY INSTRUCTIONS

### INSTALLATION

1. Take care of the polarity of new IC and then install the new IC fitting on the printed circuit pattern. Then solder each lead on the diagonal positions of IC temporarily. (Refer to Fig. 3-5.)



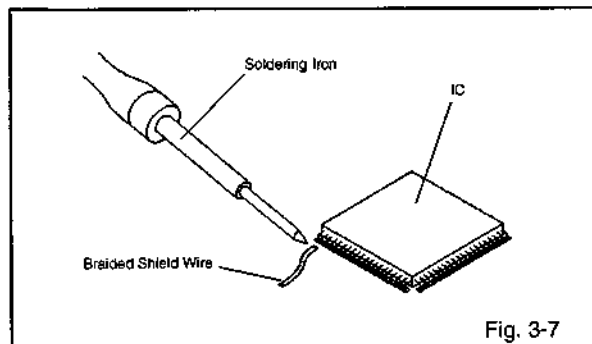
2. Supply the solder from the upper position of IC leads sliding to the lower position of the IC leads. (Refer to Fig. 3-6.)



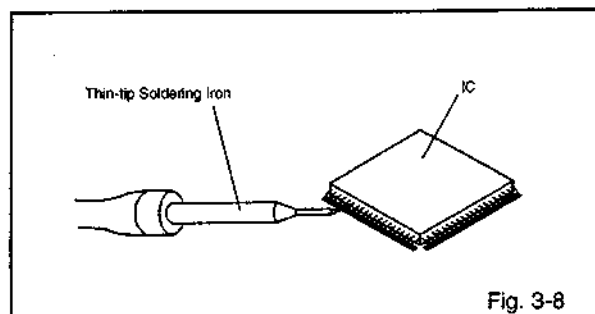
3. Absorb the solder left on the lead using the Braided Shield Wire. (Refer to Fig. 3-7.)

#### NOTE

Do not absorb the solder to excess.



4. When bridge-soldering between terminals and/or the soldering amount are not enough, resolder using a Thin-tip Soldering Iron. (Refer to Fig. 3-8.)



5. Finally, confirm the soldering status on four sides of the IC using a magnifying glass. Confirm that no abnormality is found on the soldering position and installation position of the parts around the IC. If some abnormality is found, correct by resoldering.

#### NOTE

When the IC leads are bent during soldering and/or repairing, do not repair the bending of leads. If the bending of leads are repaired, the pattern may be damaged. So, be always sure to replace the IC in this case.

## 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>	: Mecha 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>X'TAL</b>	:	Crystal
<b>Y</b>	<b>Y/C</b>	:	Luminance/Chrominance

## ERROR CODE LIST

If the error indications are appeared on the FIP, check the abnormal points by using the table below.

Indications	Error contents
Error : 00	Remocon code error
Error : 01	Reel mecha error
Error : 02	Cylinder mecha error
Error : 03	Mecha state error
Error : 04	Capstan mecha error

## SERVICE MODE LIST

This unit provided with the following SERVICE MODES so you can repair, examine and adjust easily.

Method	Operations
Press both PLAY button and CH UP button on the set for more than 2 seconds.	Initialization of the factory. NOTE: Do not use this for the normal servicing. If you set a factory initialization, the memories are reset such as the clock setting, the channel setting, the POWER ON total hours, and PLAY/REC total hours.
While pressing the CH UP key on the set, press the FF key on the set for more than 2 seconds.	PLAY/REC total hours are displayed on the TV Monitor. Refer to the "PREVENTIVE CHECKS AND SERVICE INTERVALS" (CONFIRMATION OF HOURS USED).  Can be checked of the INITIAL DATA of MEMORY IC. Refer to the "WHEN REPLACING EEPROM (MEMORY) IC".
Press the ATR button on the remote control for more than 2 seconds during PLAY.	Adjusting of the Tracking to the center position. Refer to the "MECHANICAL ADJUSTMENT" (GUIDE ROLLER) and "ELECTRICAL ADJUSTMENT" (PG SHIFTER).
While pressing the CH UP button on the set, press the STOP button on the set for more than 2 seconds during PLAY.	Adjust the PG SHIFTER automatically. Refer to the "ELECTRICAL ADJUSTMENT" (PG SHIFTER).
Make the short circuit between the test point of SERVICE and the GND.	The BOT, EOT and the Reel sensor do not work and the deck can be operated without a cassette tape. Refer to the "PREPARATION FOR SERVICING".

## PREVENTIVE CHECKS AND SERVICE INTERVALS

The following standard table depends on environmental conditions and usage.  
 Parts replacing time does not mean the life span for individual parts.  
 Also, long term storage or misuse may cause transformation and aging of rubber parts.  
 The following list means standard hours, so the checking hours depends on the conditions.

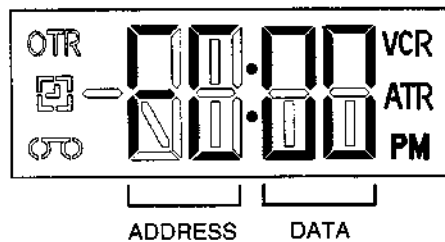
Parts Name \ Time	500 hours	1,000 hours	1,500 hours	2,000 hours	2,500 hours	Notes	
Audio Control Head	■	■	■	●	●	Clean those parts in contact with the tape.	
Full Erase Head (Recorder only)	■	■	■	●	●		
Capstan Belt		●	●	●	●	Clean the rubber, and parts which the rubber touches.	
Pinch Roller	■	●	●	●	●		
Capstan DD Unit		●	●	●	●		
Loading Motor					●		
Tension Band		●	●	●	●		
T Brake Band		●	●	●	●		
Clutch Ass'y		●	●	●	●		
Idler Arm Ass'y		●	●	●	●		
Capstan Shaft	■	■	■	■	■		
Tape Running Guide Post	■	■	■	■	■		Replace when rolling becomes abnormal.
Cylinder Unit	■	●	●	●	●		Clean the Head

■ : Clean  
 ● : Check it and if necessary, replace it.

### CONFIRMATION OF HOURS USED

PLAY/REC total hours can be checked on the display.  
 Total hours are displayed in 16 system of notation.

1. Turn on the POWER.
2. While pressing the CH UP button on the set, press the FF button on the set for more than 2 seconds.
3. Adjust the ADDRESS to "FD" by FF or REW button and read the DATA.  
 (This DATA becomes the thousands digit and hundreds digit value of the following formula.)
4. Adjust the ADDRESS to "FE" by FF or REW button and read the DATA.  
 (This DATA becomes the tens digit and ones digit value of the following formula.)
5. After the confirmation of using hours, turn off the power.



$(16 \times 16 \times 16 \times \text{thousands digit value}) + (16 \times 16 \times \text{hundreds digit value}) + (16 \times \text{tens digit value}) + (\text{ones digit value})$

# PREVENTIVE CHECKS AND SERVICE INTERVALS

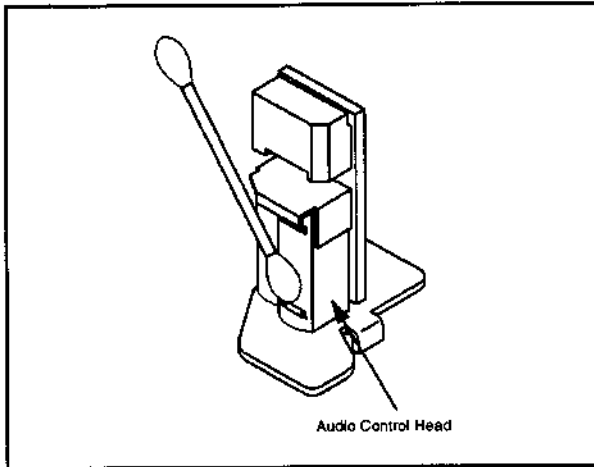
## CLEANING

### 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

Clean the Audio Control Head with the cotton stick soaked by alcohol. Clean the full erase head in the same manner. (Refer to the figure below.)



### 2. TAPE RUNNING SYSTEM

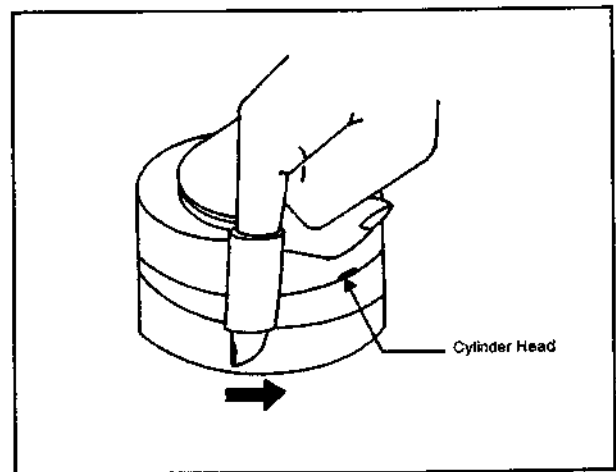
When cleaning the tape transport system, use the gauze moistened with isopropyl alcohol.

### 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 upward or downward on the head. Use the chamois one by one.



## WHEN REPLACING EEPROM (MEMORY) IC

If a service repair is undertaken where it has been required to change the MEMORY IC, the following steps should be taken to ensure correct data settings while making reference to TABLE 1.

INI	+0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+A	+B	+C	+D	+E	+F
C0	B2	1A	00	00	00	F1	44	51	00	51	B2	9F	97	8E	0A	8A
D0	AB	E2	06	04	00	FF	00	00	71	9F	82	0A	42	35	63	56
E0	76	5E	08	F0	01	F3	00	00	00	00	00	5F	09	F0	0A	F3
F0	50	2F	DF	41	41	00	00	00	00	80	04	00	99	--	--	--

Table 1

1. Turn on the POWER.
2. While pressing the CH UP button on the set, press the FF button on the set for more than 2 seconds. ADDRESS and DATA should appear as FIG 1.

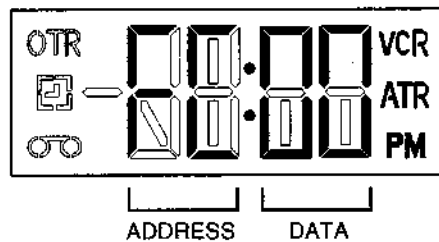



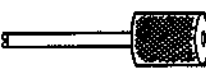
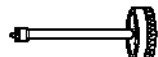
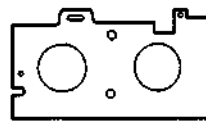






Fig. 1

3. ADDRESS is now selected and should "blink". Using the FF or REW button on the remote, step through the ADDRESS until required ADDRESS to be changed is reached.
4. Press ENTER to select DATA. When DATA is selected, it will "blink".
5. Again, step through the DATA using FF or REW button until required DATA value has been selected.
6. Pressing ENTER will take you back to ADDRESS for further selection if necessary.
7. Repeat steps 3 to 6 until all data has been checked.
8. When satisfied correct DATA has been entered, turn POWER off (return to STANDBY MODE) to finish DATA input. The unit will now have the correct DATA for the new MEMORY IC.



## SERVICING FIXTURES AND TOOLS

<p><b>(For 2 head 1 speed model, 4 head model)</b>  VHS Alignment Tape  JG001E (VP<sub>1</sub>S-LI6<sup>3</sup>)  JG001F (VP<sub>1</sub>S-CO1<sup>3</sup>)  JG001R (VP<sub>1</sub>S-LI6<sup>3</sup>H)  JG001U (VP<sub>1</sub>S-X6<sup>3</sup>)</p> 	<p><b>(For 2 head 2 speed model)</b>  VHS Alignment Tape  JG001C (VP<sub>2</sub>S-LI6<sup>3</sup>)  JG001D (VP<sub>2</sub>S-CO1<sup>3</sup>)  JG001V (VP<sub>2</sub>S-X6<sup>3</sup>)</p> 	<p>JG002B Adapter  JG002E Dial Torque Gauge (10~90gf*cm)  JG002F (60~600gf*cm)</p> 	<p>JG005 Post Adjustment Screwdriver  Part No. SV-TG0-030-000 (small)</p> 
<p>JG153 X Value Adjustment Screwdriver</p> 	<p>JG022 Master Plane</p> 	<p>JG024A Reel Disk Height Adjustment Jig</p> 	<p>JG100A Torque Tape (VHT-063)</p> 
<p>JG154 Cable</p> 	<p>Tentelometer</p> 		

Ref. No.	Part No.	Parts Name	Remarks
JG001E	APJG001E00	VHS Alignment Tape	Monoscope, 6KHz (For 2 head 1 speed model, 4 head model)
JG001F	APJG001F00	VHS Alignment Tape	Color Bar, 1KHz (For 2 head 1 speed model, 4 head model)
JG001R	APJG001R00	VHS Alignment Tape	Hi-Fi Audio (For Hi-Fi model)
JG001U	APJG001U00	VHS Alignment Tape	X Value Adjustment (For 2 head 1 speed model, 4 head model)
JG001C	APJG001C00	VHS Alignment Tape	Monoscope, 6KHz (For 2 head 2 speed model)
JG001D	APJG001D00	VHS Alignment Tape	Color Bar, 1KHz (For 2 head 2 speed model)
JG001V	APJG001V00	VHS Alignment Tape	X Value Adjustment (For 2 head 2 speed model)
JG002B	APJG002B00	Adapter	VSR Torque, Brake Torque (S Reel/T Reel Ass'y)
JG002E	APJG002E00	Dial Torque Gauge (10~90gf*cm)	Brake Torque (T Reel Ass'y)
JG002F	APJG002F00	Dial Torque Gauge (60~600gf*cm)	VSR Torque, Brake Torque (S Reel)
JG005	APJG005000	Post Adjustment Screwdriver	Guide Roller Adjustment
JG153	APJG153000	X Value Adjustment Screwdriver	X Value Adjustment
JG022	APJG022000	Master Plane	Reel Disk Height Adjustment
JG024A	APJG024A00	Reel Disk Height Adjustment Jig	Reel Disk Height Adjustment
JG100A	APJG100A00	Torque Tape (VHT-063)	Playback Torque, Back Tension Torque During Playback
JG154	APJG154000	Cable	Used to connect the test point of SERVICE and GROUND

## PREPARATION FOR SERVICING

### How to use the Servicing Fixture

1. Short circuit between TP1001 and Ground with the cable JG154.  
(The BOT, EOT and the Reel Sensor do not work and the deck can be operated without a cassette tape.)
2. In case of using a cassette tape, press the STOP/EJECT button to insert or eject a cassette tape.  
Turn on the power and re-check the cable before checking the trouble points.

# MECHANICAL ADJUSTMENTS

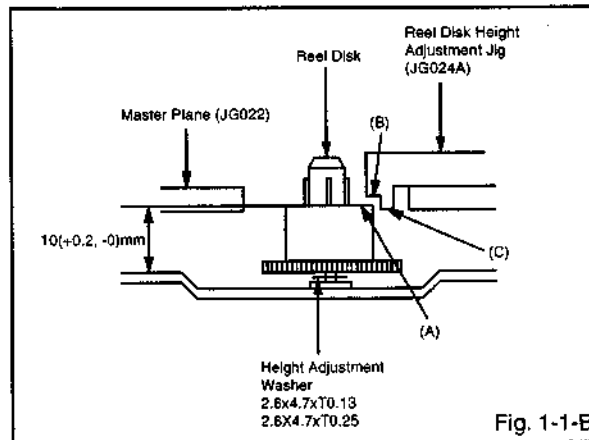
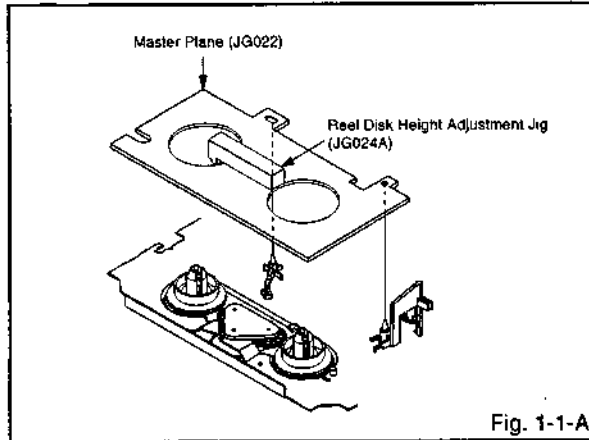
## 1. CONFIRMATION AND ADJUSTMENT

Read the following NOTES before starting work.

- Place an object which weighs between 450g-500g on the Cassette Tape to keep it steady when you want to make the tape run without the Cassette Holder. (Do not place an object which weighs over 500g.)

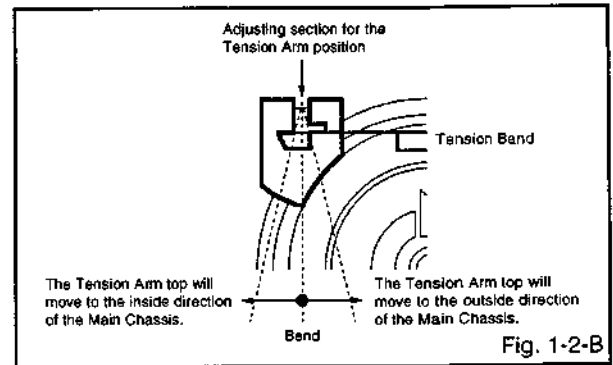
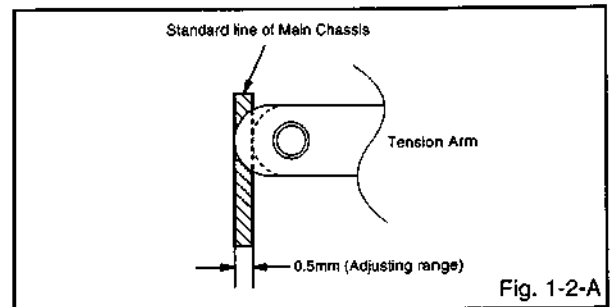
### 1-1: CONFIRMATION AND ADJUSTMENT OF REEL DISK HEIGHT

- Turn on the power and set to the STOP mode.
- Set the master plane (JG022) and reel disk height adjustment jig (JG024A) on the mechanism framework, taking care not to scratch the drum, as shown in Fig. 1-1-A.
- While turning the reel and confirm the following points. Check if the surface "A" of reel disk is lower than the surface "B" of reel disk height adjustment jig (JG024A) and is higher than the surface "C". If it is not passed, place the height adjustment washers and adjust to  $10(+2, -0)$ mm.
- Adjust the other reel in the same way.



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

- Set to the PLAY mode.
- Adjust the adjusting section for the Tension Arm position so that the Tension Arm top is within the standard line of Main Chassis.
- While turning the S Reel clockwise, confirm that the edge of the Tension Arm is located in the position described above.

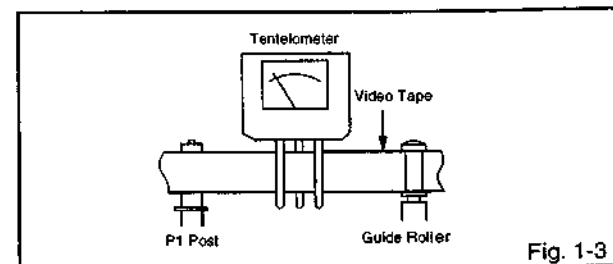


### 1-3: CONFIRMATION OF PLAYBACK TORQUE AND BACK TENSION TORQUE DURING PLAYBACK

- Load a video tape (E-180) recorded in standard speed mode. Set the unit to the PLAY mode.
- Install the tentelometer as shown in Fig. 1-3. Confirm that the meter indicates  $20 \pm 2$ gf in the beginning of playback.

#### • USING A CASSETTE TYPE TORQUE TAPE (JG100A)

- After confirmation and adjustment of Tension Post position (Refer to item 1-2), load the cassette type torque tape (JG100A) and set to the PLAY mode.
- Confirm that the right meter of the torque tape indicates  $50-90$ gf·cm during playback in SP mode.
- Confirm that the left meter of the torque tape indicates  $25-40$ gf·cm during playback in SP mode.



## MECHANICAL ADJUSTMENTS

### 1-4: CONFIRMATION OF VSR TORQUE

1. Install the Torque Gauge (JG002F) and Adapter (JG002B) on the S Reel. Set to the Picture Search (Rewind) mode. (Refer to Fig.1-4-B)
2. Then, confirm that it indicates 120~180gf\*cm.

#### NOTE

Install the Torque Gauge on the reel disk firmly. Press the REW button to turn the reel disk.

### 1-5: CONFIRMATION OF REEL BRAKE TORQUE

(S Reel Brake) (Refer to Fig. 1-4-B)

1. Once set to the Fast Forward mode then set to the Stop mode. While, unplug the AC cord when the Pinch Roller Block is on the position of Fig. 1-4-A.
2. Move the Idler Ass'y from the S Reel.
3. Install the Torque Gauge (JG002F) and Adapter (JG002B) on the S Reel. Turn the Torque Gauge (JG002F) clockwise.
4. Then, confirm that it indicates 60~100gf\*cm.

(T Reel Brake) (Refer to Fig. 1-4-B)

1. Once set to the Fast Forward mode then set to the Stop mode. While, unplug the AC cord when the Pinch Roller Block is on the position of Fig. 1-4-A.
2. Move the Idler Ass'y from the T Reel.
3. Install the Torque Gauge (JG002E) and Adapter (JG002B) on the T reel. Turn the Torque Gauge (JG002E) counterclockwise.
4. Then, confirm that it indicates 30~50gf\*cm.

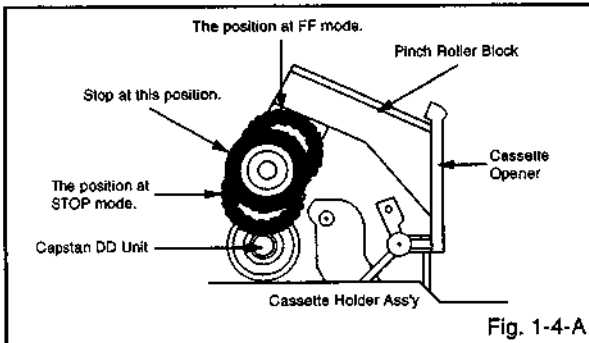


Fig. 1-4-A

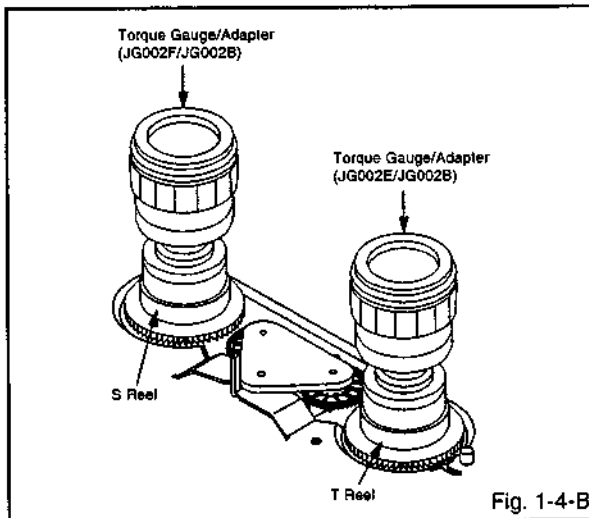


Fig. 1-4-B

#### NOTE

If the torque is out of the range, replace the following parts.

Check item	Replacement Part
1-4	Idler Ass'y/Clutch Ass'y
1-5	S Reel side: S Reel/Tension Band/Tension Connect/Tension Arm Ass'y T Reel side: T Reel/T Brake Band//T Brake Spring/T Brake Arm

## 2. CONFIRMATION AND ADJUSTMENT OF TAPE RUNNING MECHANISM

Tape Running Mechanism is adjusted precisely at the factory. Adjustment is not necessary as usual. When you replace the parts of the tape running mechanism because of long term usage or failure, the confirmation and adjustment are necessary.

### 2-1: GUIDE ROLLER

1. Playback the VHS Alignment Tape (JG001C or JG001E). (Refer to SERVICING FIXTURE AND TOOLS)
2. Connect CH-1 of the oscilloscope to TP4002 (Envelope) and CH-2 to TP4001 (SW Pulse).
3. Press and hold the Tracking-Auto button on the remote control more than 2 seconds to set tracking to center.
4. Trigger with SW Pulse and observe the envelope. (Refer to Fig. 2-1-A)
5. When observing the envelope, adjust the Adjusting Driver (JG005) slightly until the envelope will be flat. Even if you press the Tracking Button, adjust so that flatness is not moved so much.
6. Adjust so that the A : B ratio is better than 3 : 2 as shown in Fig. 2-1-B, even if you press the Tracking Button to move the envelope (The envelope waveform will begin to decrease when you press the Tracking Button).
7. Adjust the PG shifter during playback. (Refer to the ELECTRICAL ADJUSTMENTS)

#### NOTE

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

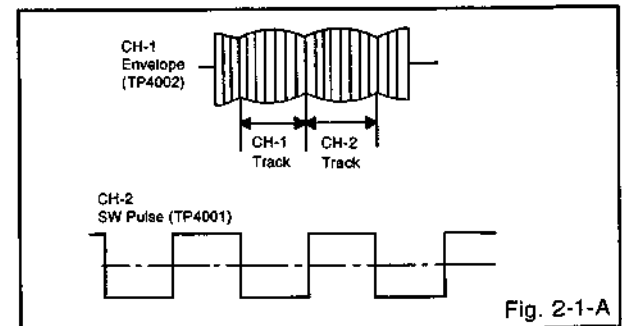


Fig. 2-1-A

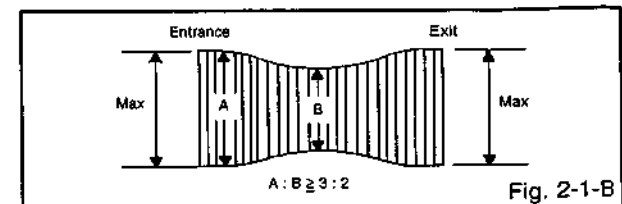


Fig. 2-1-B

## MECHANICAL ADJUSTMENTS

### 2-2: CONFIRMATION AND ADJUSTMENT OF AUDIO/CONTROL HEAD

When the Tape Running Mechanism does not work well, adjust the following items.

1. Playback the VHS Alignment Tape (JG001C or JG001E). (Refer to **SERVICING FIXTURE AND TOOLS**)
2. Confirm that the reflected picture of stamp mark is appeared on the tape prior to P4 Post as shown in Fig. 2-2-A.
  - a) When the reflected picture is distorted, turn the screw ① clockwise until the distortion is disappeared.
  - b) When the reflected picture is not distorted, turn the screw ① counterclockwise until little distortion is appeared, then adjust the a).
3. Turn the screw ② to set the audio level to maximum.
4. Confirm that the bottom of the Audio/ Control Head and the bottom of the tape is shown in Fig. 2-2-C.
  - c) When the height is not correct, turn the screw ③ to adjust the height. Then, adjust the 1-3 again.

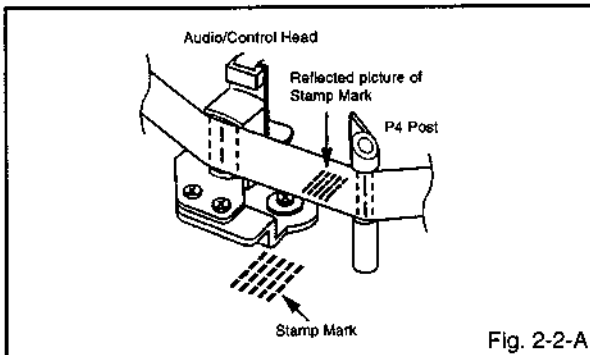


Fig. 2-2-A

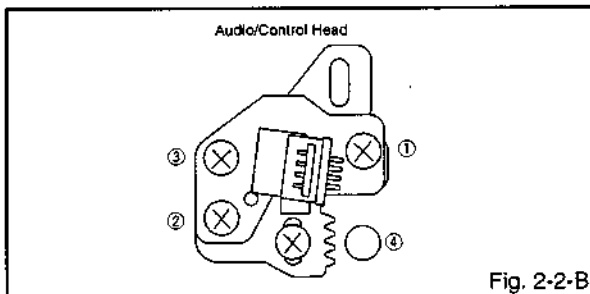


Fig. 2-2-B

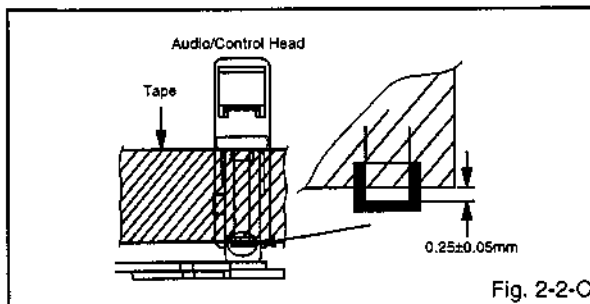


Fig. 2-2-C

### 2-3: TAPE RUNNING ADJUSTMENT (X VALUE ADJUSTMENT)

1. Confirm and adjust the height of the Reel Disk. (Refer to item 1-1)
2. Confirm and adjust the position of the Tension Post. (Refer to item 1-2)
3. Adjust the Guide Roller. (Refer to item 2-1)
4. Confirm and adjust the Audio/Control Head. (Refer to item 2-2)
5. Connect CH-1 of the oscilloscope to TP4002, CH-2 to TP4001 and CH-3 to **HOT side of Audio Out Jack**.
6. Playback the VHS Alignment Tape (JG001U or JG001V). (Refer to **SERVICING FIXTURE AND TOOLS**)
7. Press and hold the Tracking-Auto button on the remote control more than 2 seconds to set tracking to center.
8. Set the X Value adjustment driver (JG153) to the ④ of Fig. 2-2-B. Adjust X value so that the envelope waveform output becomes maximum. Check if the relation between Audio and Envelope waveform becomes (1) or (2) of Fig. 2-3.

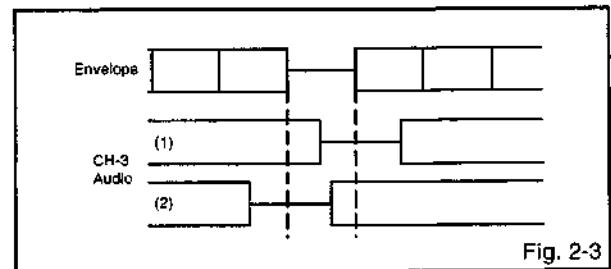


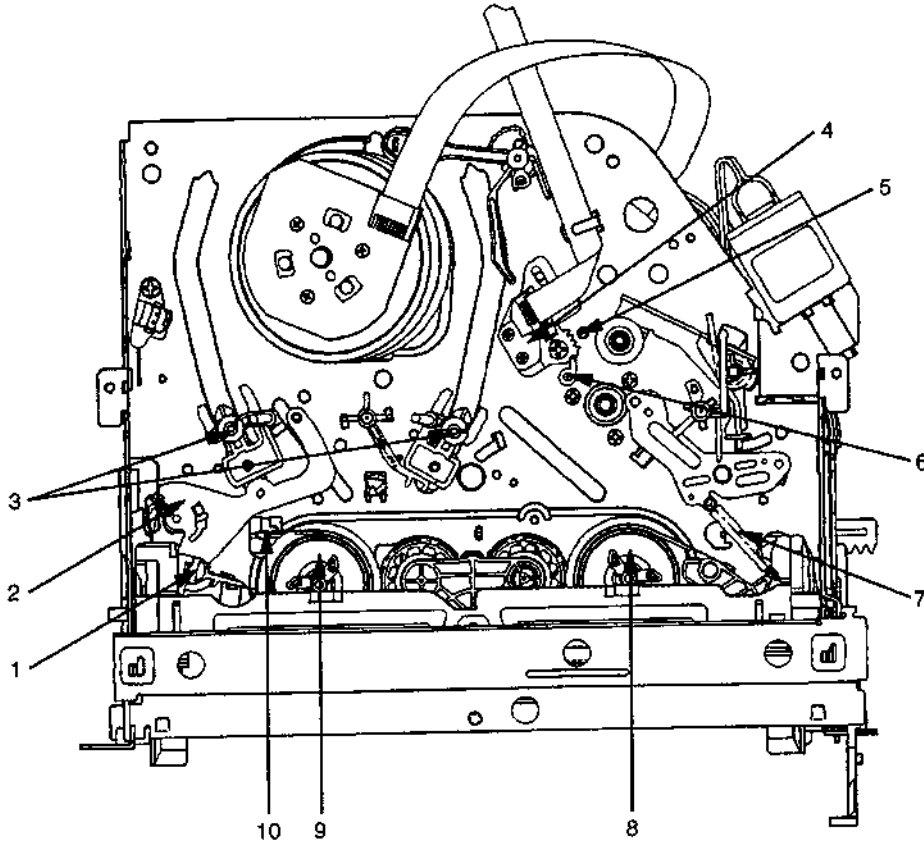
Fig. 2-3

### 2-4: CONFIRM HI-FI AUDIO (Hi-Fi model only)

1. Connect CH-1 of the oscilloscope to TP4002 and CH-2 to the **Hi-Fi Audio Out Jack**.
2. Playback the VHS Alignment Tape (JG001R). (Refer to **SERVICING FIXTURE AND TOOLS**)
3. Press and hold the Tracking-Auto button on the remote control more than 2 seconds to set tracking to center.
4. Press the Tracking Up button and count number of steps which the audio output is changed from Hi-Fi (10KHz) to MONO (6KHz).
5. Press and hold the Tracking-Auto button on the remote control more than 2 seconds to set tracking to center.
6. Press the Tracking Down button and count number of steps which the audio output is changed from Hi-Fi (10KHz) to MONO (6KHz).
7. If the difference are more than 3 steps, set the X Value adjustment driver (JG153) to ④ of Fig. 2-2-B. Change the X Value and adjust it so that the value becomes within 2 steps.

# MECHANICAL ADJUSTMENTS

## 3. MECHANISM ADJUSTMENT PARTS LOCATION GUIDE



- |                                   |  |
|-----------------------------------|--|
| 1. Tension Connect                | 6. P4 Post   |
| 2. Tension Arm                    | 7. T Brake Spring                                  |
| 3. Guide Roller                   | 8. T Reel  |
| 4. Audio/Control Head             | 9. S Reel  |
| 5. X value adjustment driver hole | 10. Adjusting section for the Tension Arm position |

## ELECTRICAL ADJUSTMENTS

Read and perform this adjustment when repairing the circuits or replacing electrical parts or PCB assemblies.

### 1. BASIC ADJUSTMENT

#### CAUTION

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

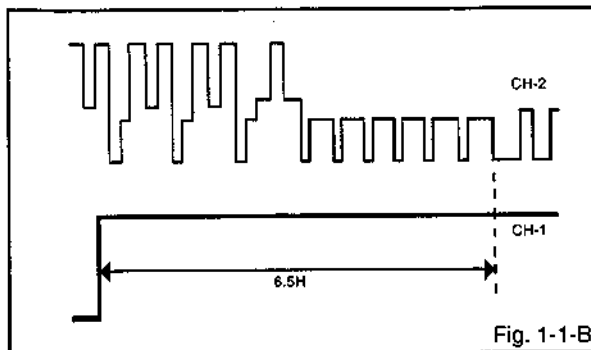
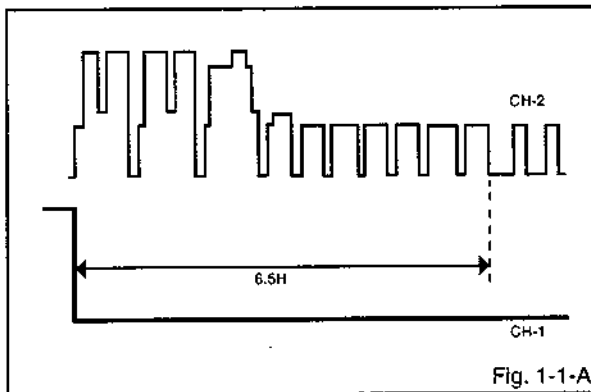
#### 1-1: PG SHIFTER

##### CONDITIONS

MODE-PLAYBACK  
Input Signal-Alignment Tape (JG001R)

##### INSTRUCTIONS

1. Connect CH-1 on the oscilloscope to TP4001 and CH-2 to pin 19 of J4501.
2. Playback the alignment tape. (JG001R)
3. Press and hold the Tracking-Auto button on the remote control more than 2 seconds to set tracking to center.
4. Press both CH UP button and STOP button on the set for more than 2 seconds. If the indicator ATR disappears, the adjustment is finished. (Refer to Fig. 1-1-A, B)



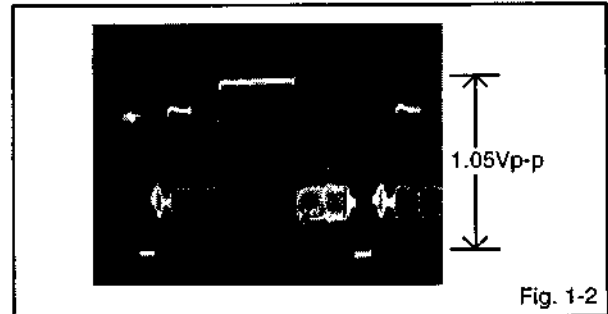
#### 1-2: PB-Y LEVEL

##### CONDITIONS

MODE-PLAYBACK  
Input Signal-Alignment Tape (JG001F)

##### INSTRUCTIONS

1. Connect the oscilloscope to pin 19 of J4501 through 75 ohm resistor.
2. Playback the alignment tape. (JG001F)
3. Check if the VIDEO OUTPUT LEVEL is  $1.05 \pm 0.15V_{p-p}$ . (Refer to Fig. 1-2)



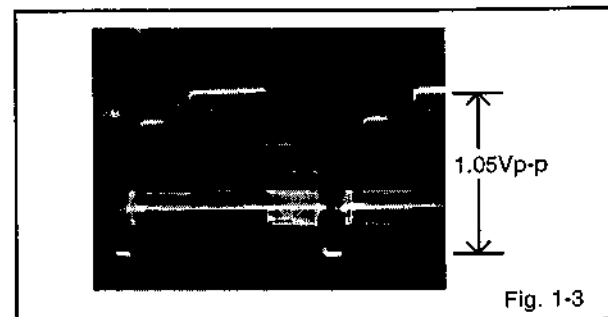
#### 1-3: E-E LEVEL

##### CONDITIONS

MODE-STOP  
Input Signal-PAL Color Bar

##### INSTRUCTIONS

1. Connect the color bar generator to pin 20 of J4501.
2. Connect the oscilloscope to pin 19 of J4501 through 75 ohm resistor.
3. Check if the VIDEO OUTPUT LEVEL is  $1.05 \pm 0.15V_{p-p}$ . (Refer to Fig. 1-3)



#### 1-4: E-E AUDIO LEVEL

##### CONDITIONS

MODE-STOP  
Input Signal-Audio Signal: 1KHz, 500mVrms  
Input Select-AV

##### INSTRUCTIONS

1. Connect the audio generator to pins 2 and 6 of J4501.
2. Connect the AC voltmeter to pins 1 and 3 of J4501 through 47K ohm resistor.
3. Check if the AUDIO OUTPUT LEVEL is  $500(mV_{rms}) \pm 2(dB)$ .

# ELECTRICAL ADJUSTMENTS

## 1-5: PB AUDIO LEVEL

### CONDITIONS

MODE-Self (RECORD and PLAYBACK)

Input Signal-Audio Signal: 1KHz, 500mVrms

Video Signal: PAL Color Bar

Input Select-AV

### 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** through 47K ohm resistor.
4. After the input of audio signal and video signal, proceed with the recording.
5. Playback the recorded section and check if the **AUDIO OUTPUT LEVEL** is 500(mVrms)  $\pm$  2(dB).

## 1-6: SEPARATION

### CONDITIONS

MODE-STOP

AUDIO OUTPUT SW: STEREO POSITION

Input Signal-RF Signal

### INSTRUCTIONS

1. Receive the audio signal (L ch: No Signal, R ch: 1KHz).
2. Connect the AC voltmeter to **AUDIO OUT (L ch)**.
3. Press both CH UP button and STOP button on the set for more than 3 seconds.  
The fluorescent display on the set displays as below.



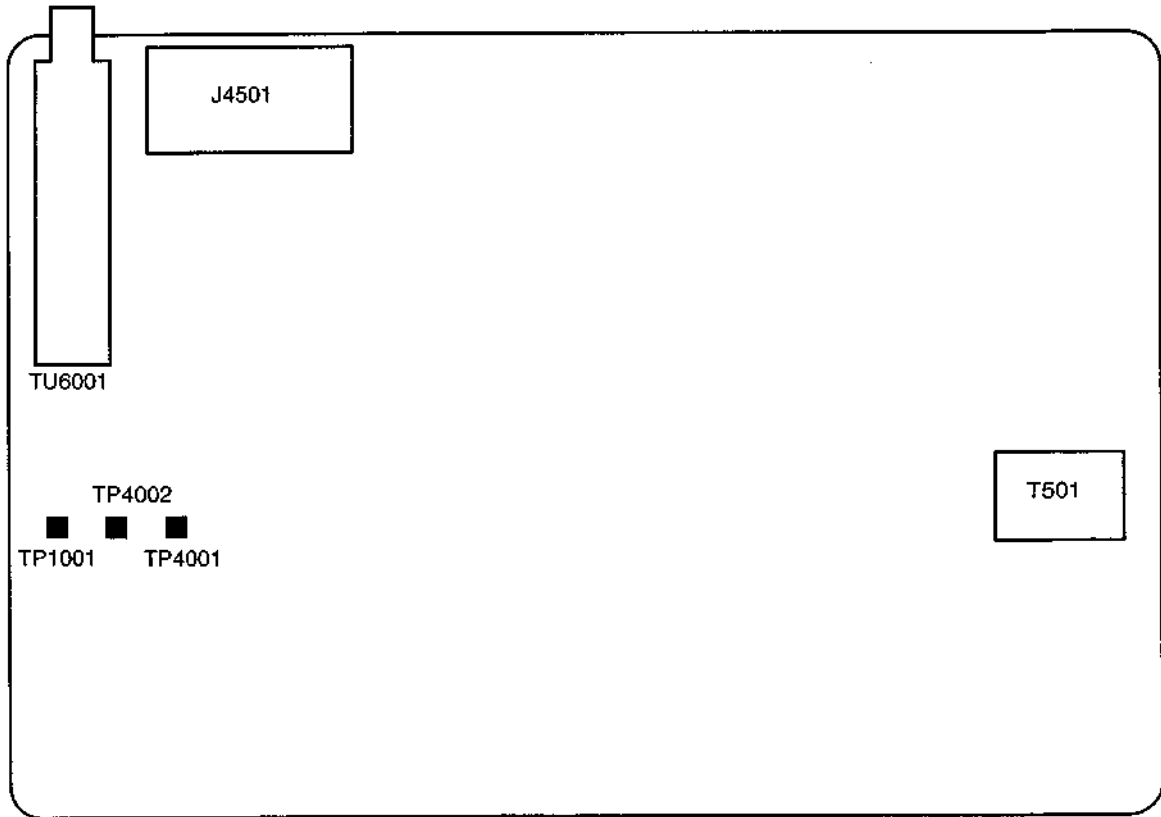
4. Press the F.FWD or REW button on the remote control.  
The fluorescent display on the set displays as below.



5. Adjust the F.FWD and REW button on the remote control until output signal is minimum. (more than 25dB)
6. Press both CH UP button and STOP button of the set together to complete the adjustment.
7. Receive the audio signal (L ch: 1KHz, R ch: No Signal).
8. Connect the AC voltmeter to **AUDIO OUT (R ch)**.
9. Repeat steps 3-6.

# ELECTRICAL ADJUSTMENTS

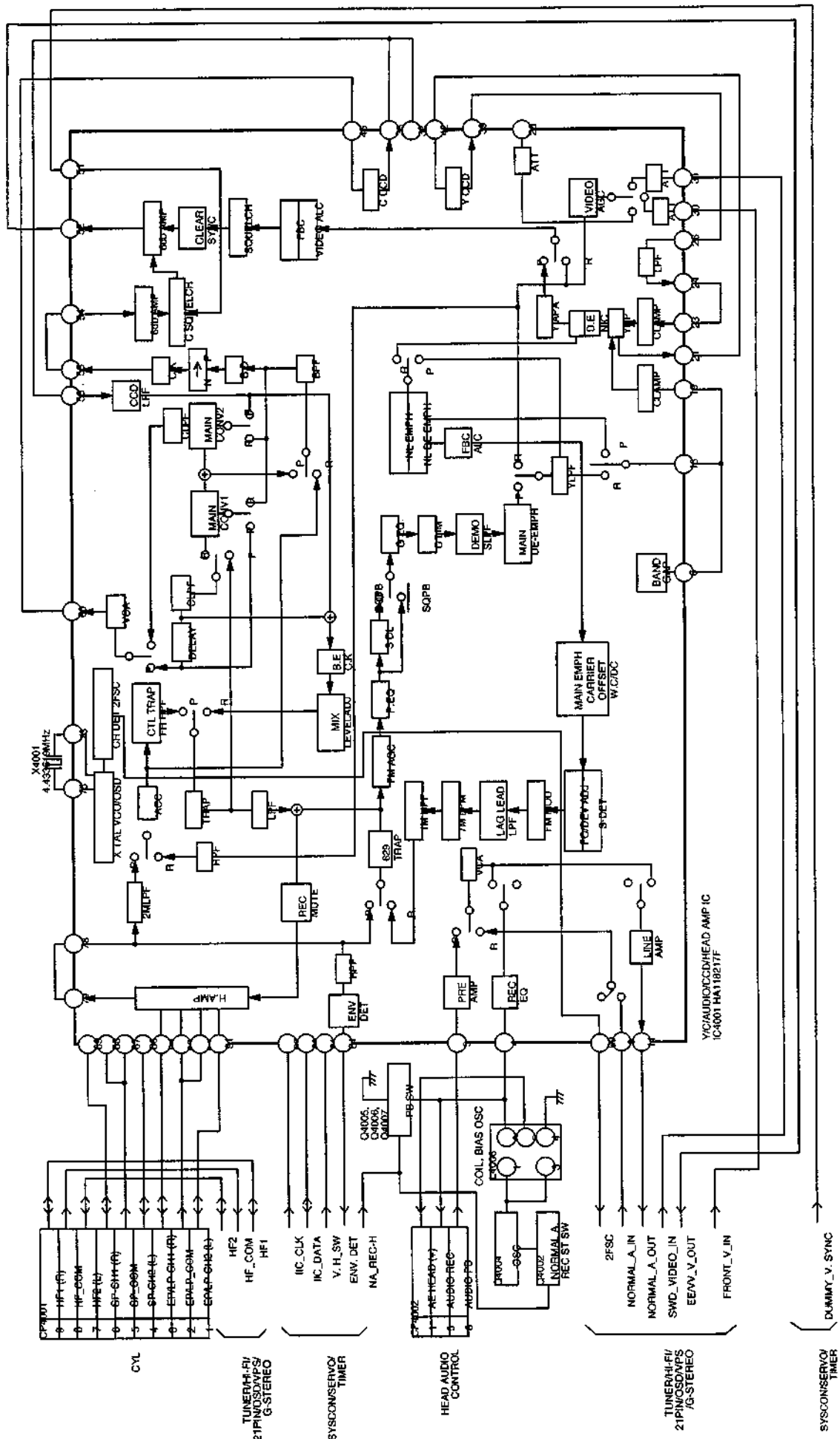
## 2. ELECTRICAL ADJUSTMENT PARTS LOCATION GUIDE



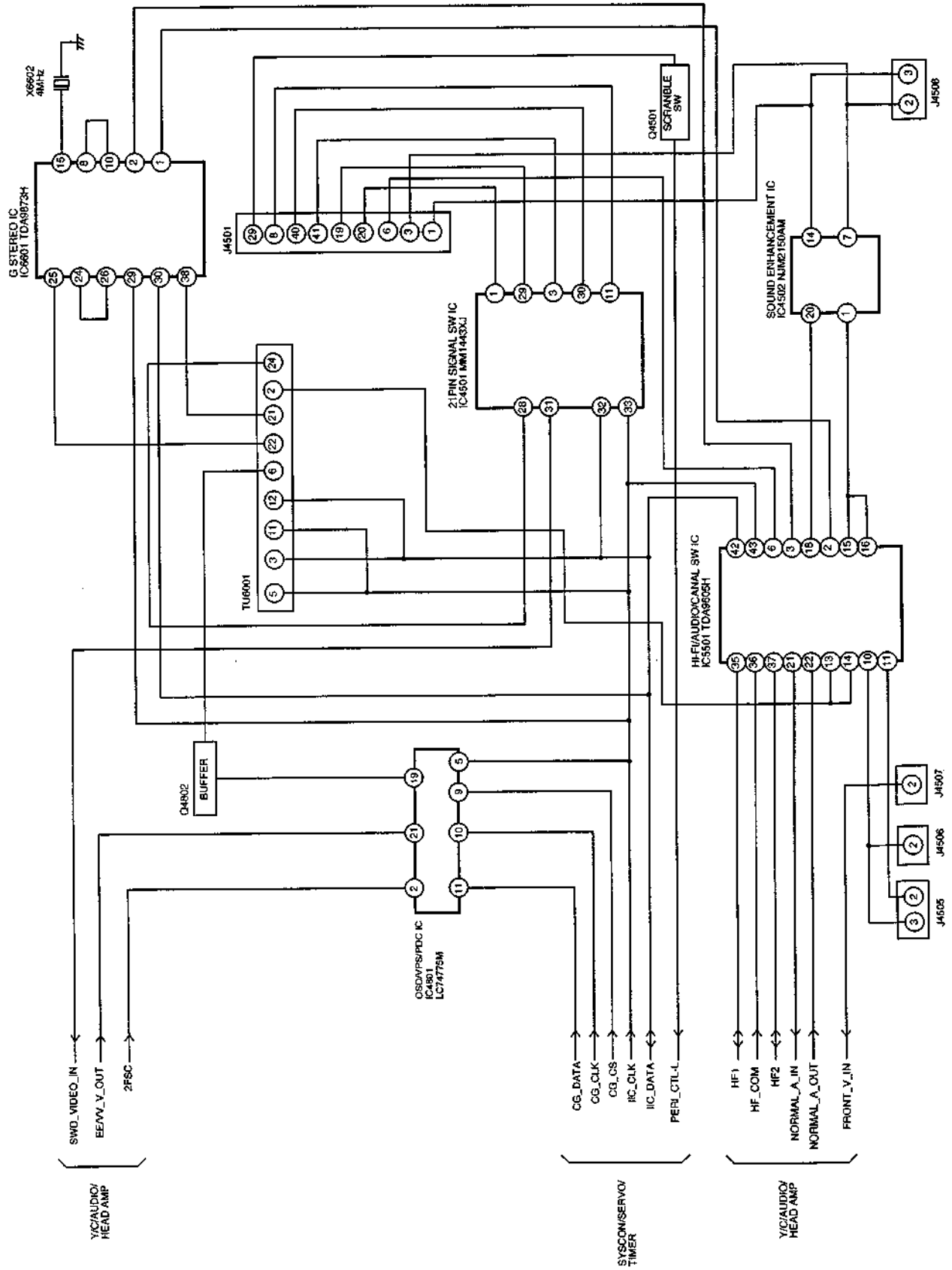
**SYSCON PCB**



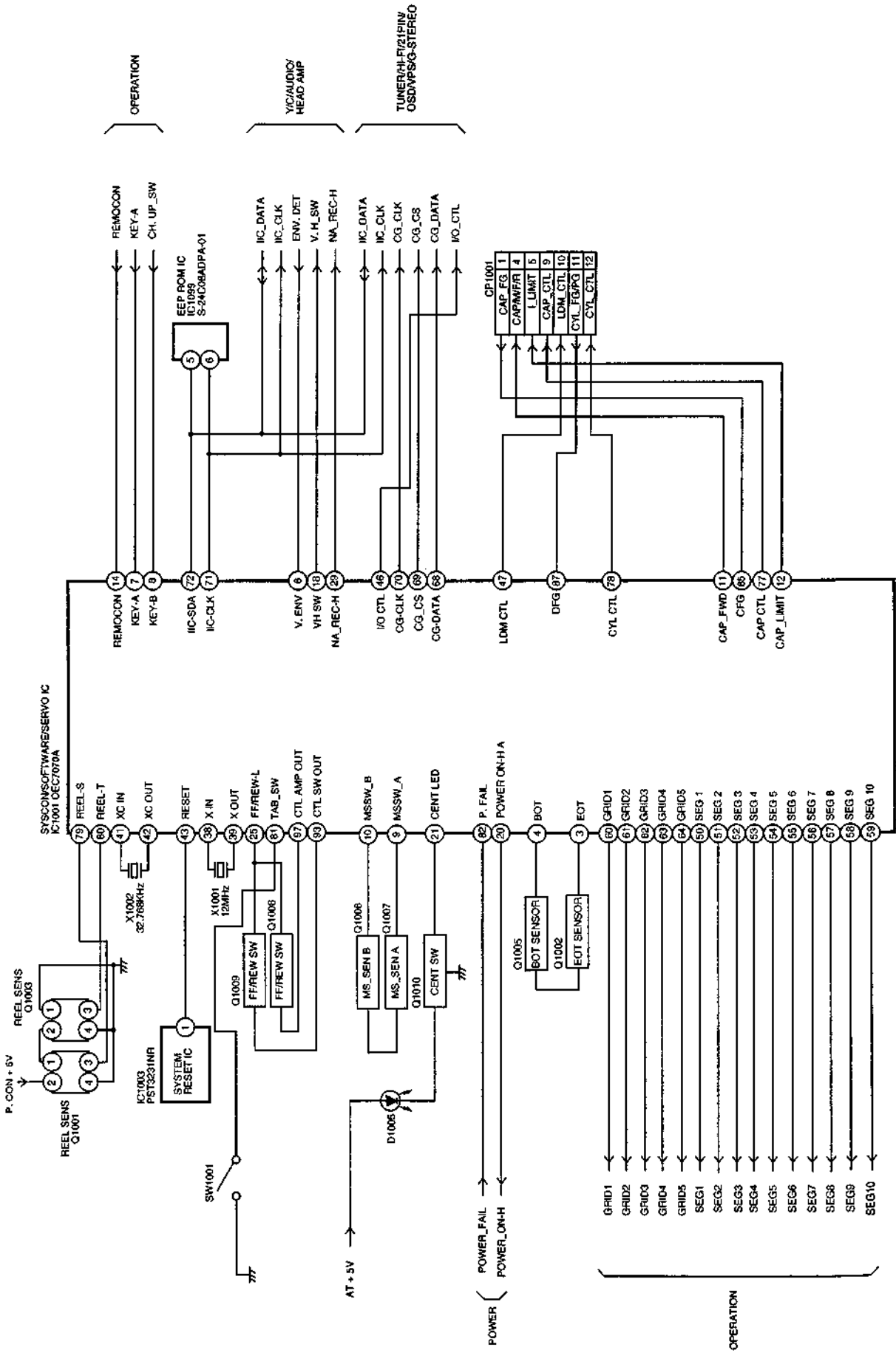
# Y/C AUDIO/HEAD AMP BLOCK DIAGRAM



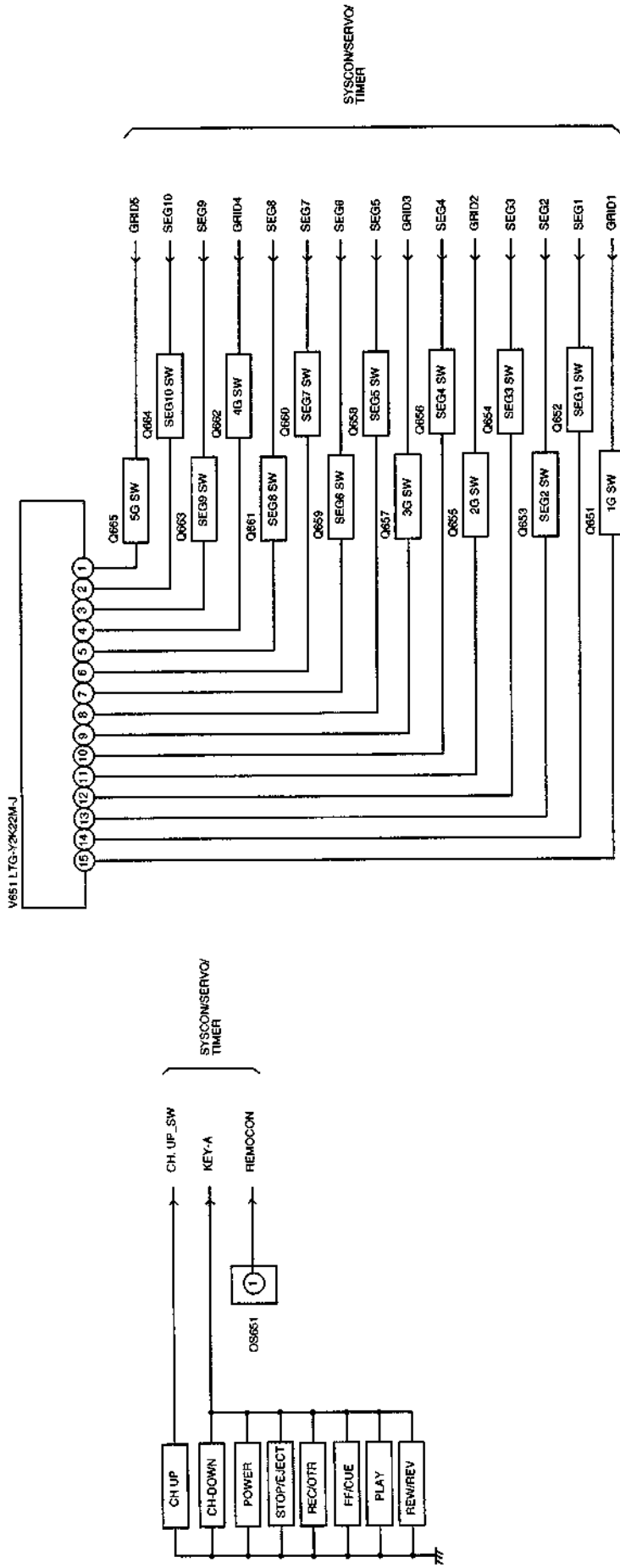
# TUNER/HI-FI/21PIN/OSD/MP/S/G-STEREO BLOCK DIAGRAM



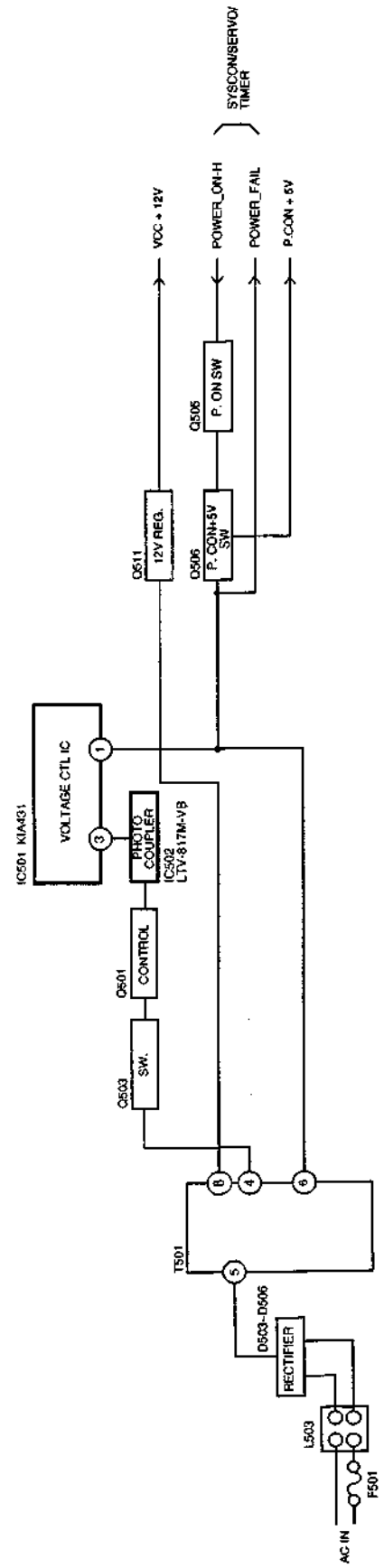
# SYSTEM CONTROL/SERVO/TIMER BLOCK DIAGRAM



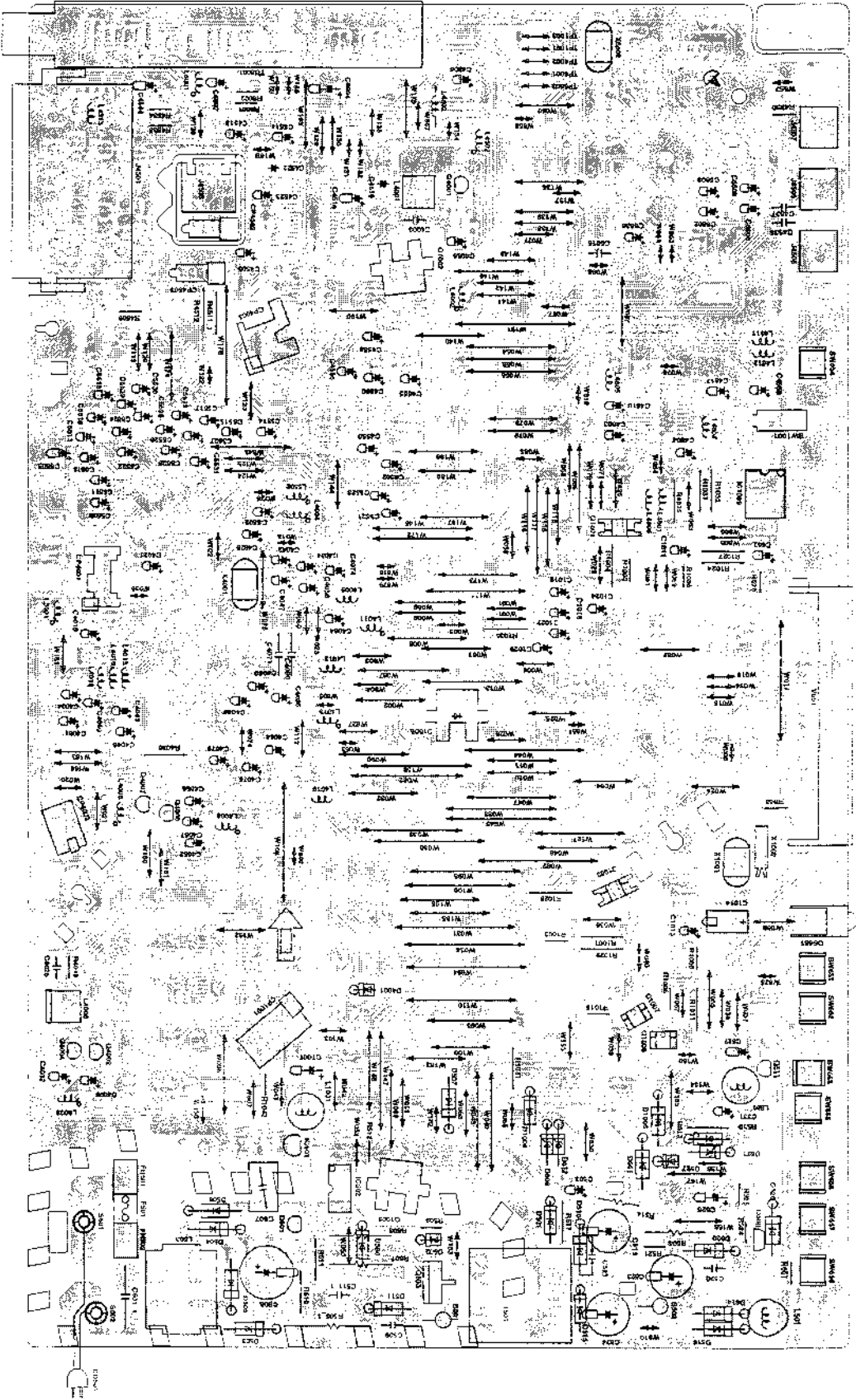
# OPERATION BLOCK DIAGRAM



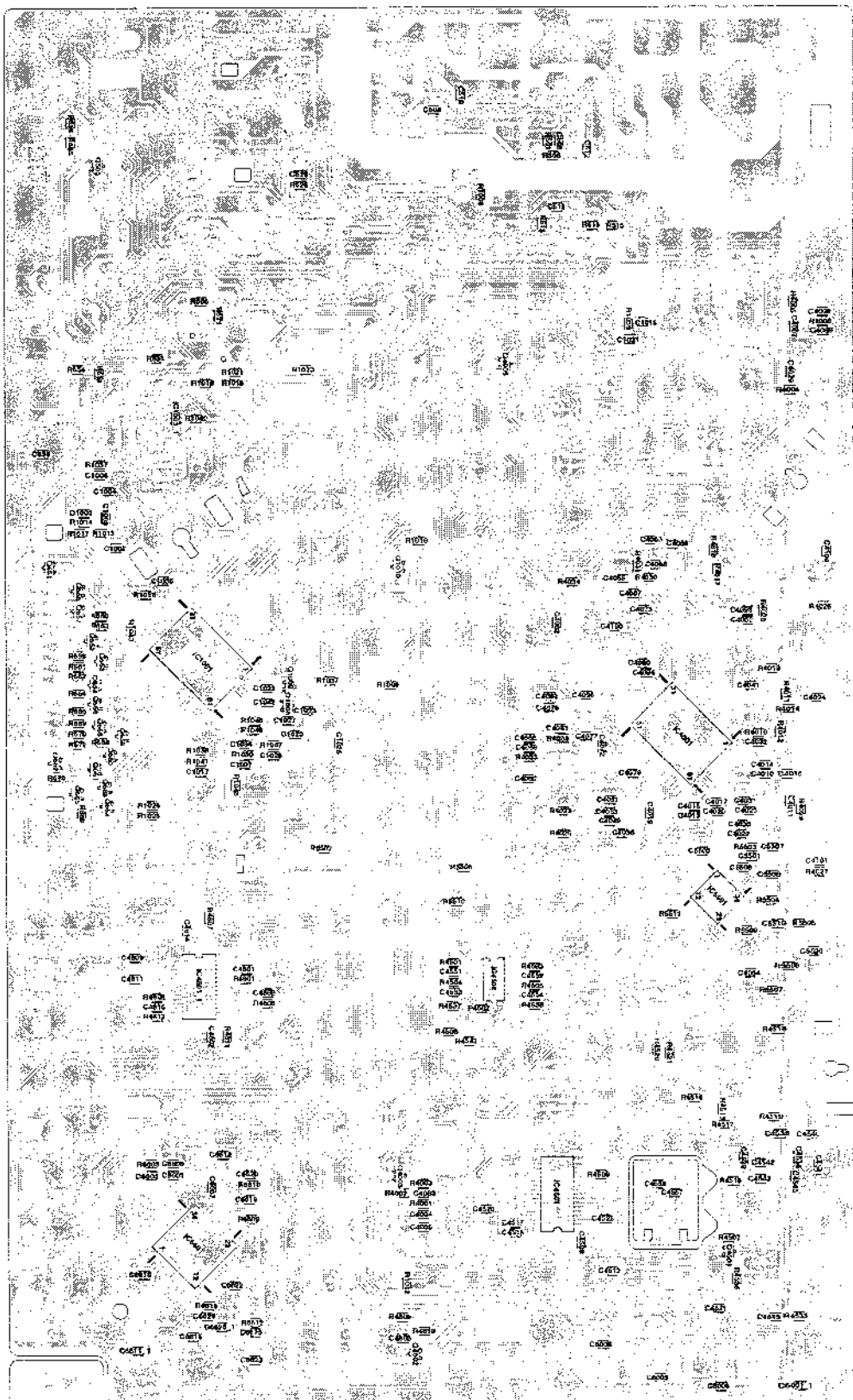
# POWER BLOCK DIAGRAM



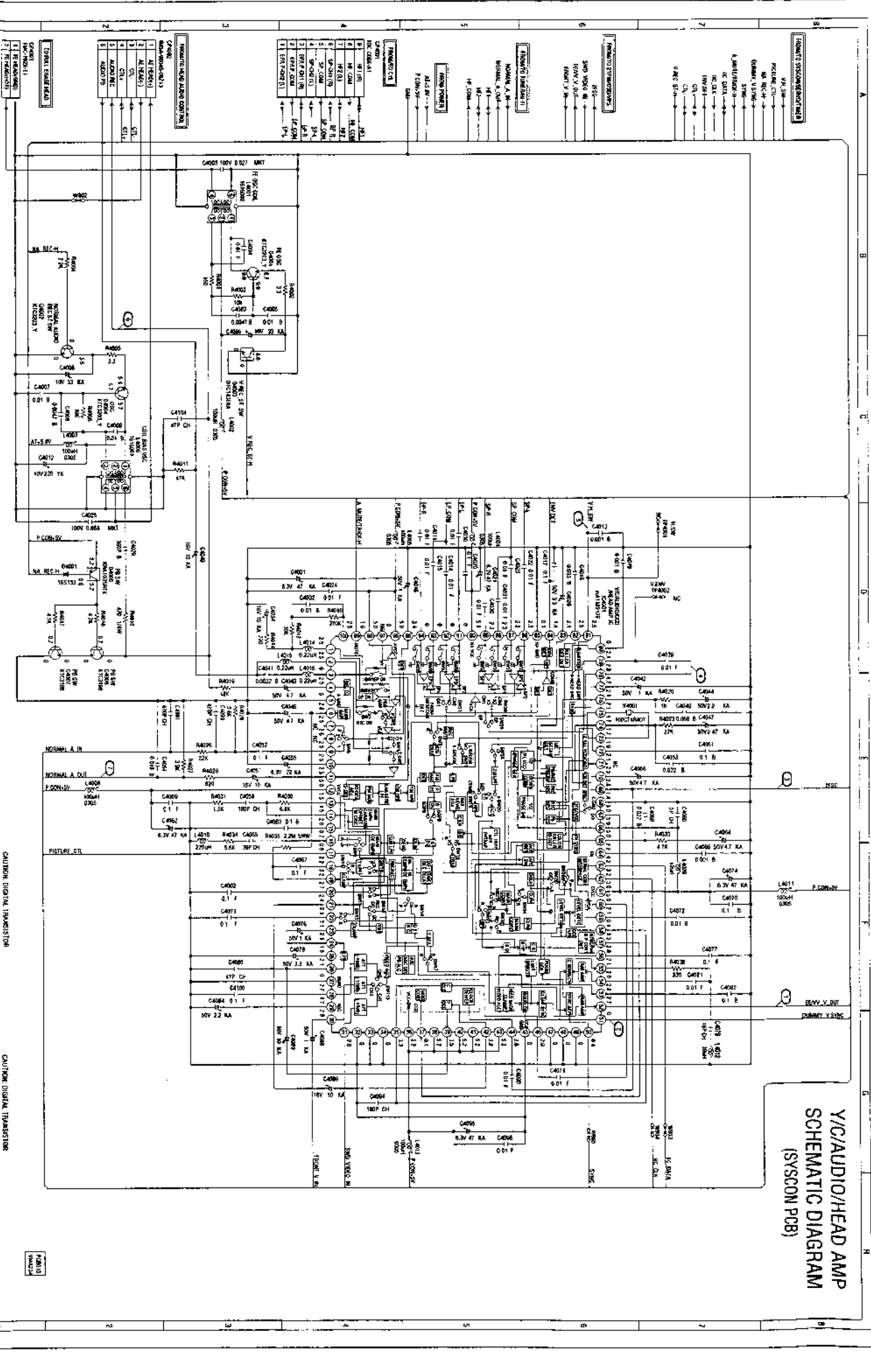
PRINTED CIRCUIT BOARDS  
SYSCOM/AUDIO (INSERTED PARTS)  
SOLDER SIDE



PRINTED CIRCUIT BOARDS  
SYSCOM/AUDIO (CHIP MOUNTED PARTS)  
SOLDER SIDE



# Y/C/AUDIO/HEAD AMP SCHEMATIC DIAGRAM (SYSCON PCB)



NOTE: THE SCHEMATIC ATTACHED WAS  
REPLACED WITH THE ORIGINAL  
ON THE BOARD.

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

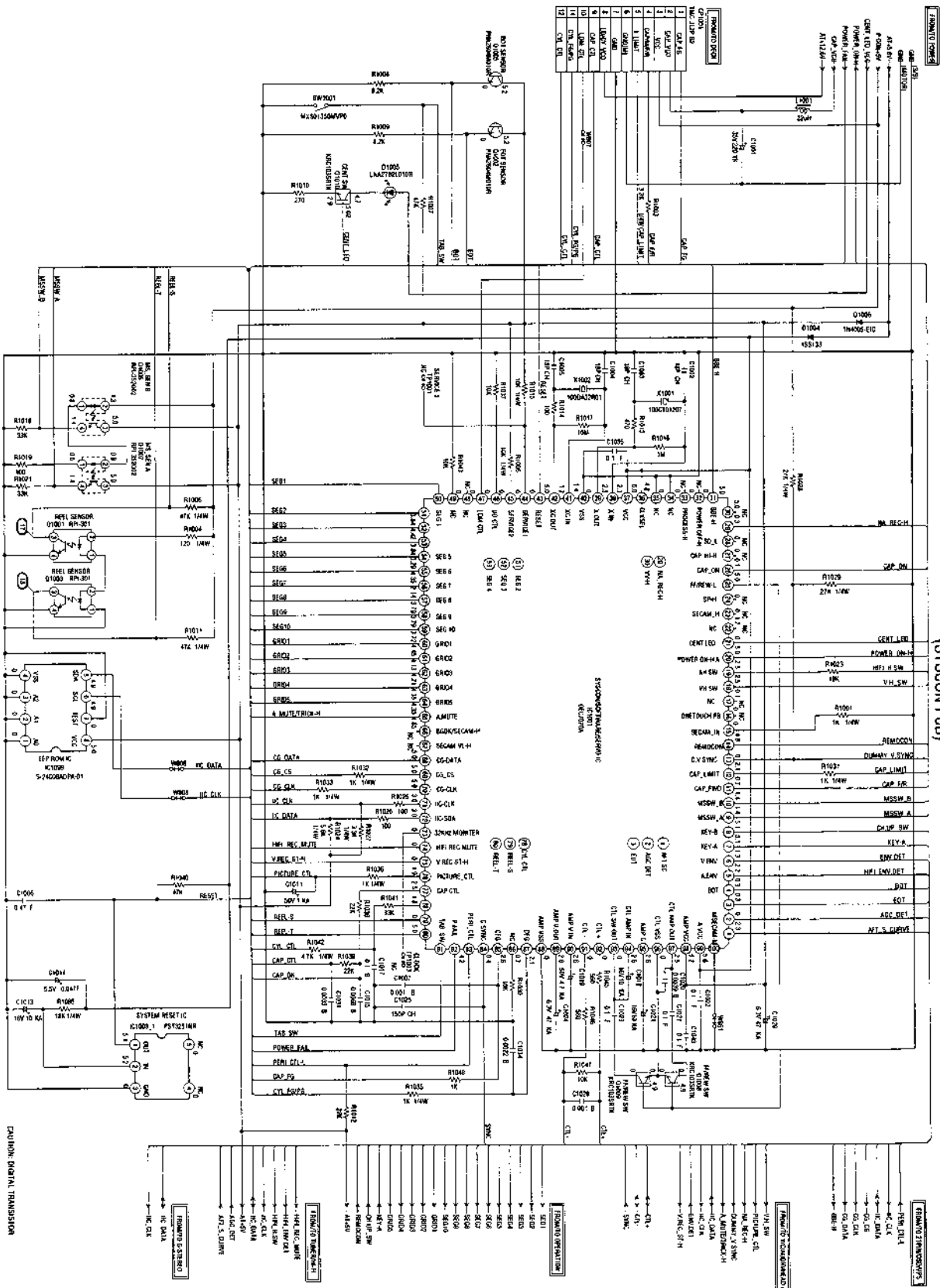
CAUTION: DIGITAL TRANSISTOR

CAUTION: DIGITAL TRANSISTOR

FRONT HEAD AMP

Grid lines: 1-9 (vertical), A-I (horizontal)

# SYSTEM CONTROL/SERVO/TIMER SCHEMATIC DIAGRAM (SYSCON PCB)



NOTE: THE ACTUAL VALUE OF EACH PART WAS MANUFACTURED WITHIN THE DIGITAL TOLERANCE. CAUTION: DIGITAL TRANSMISSION.

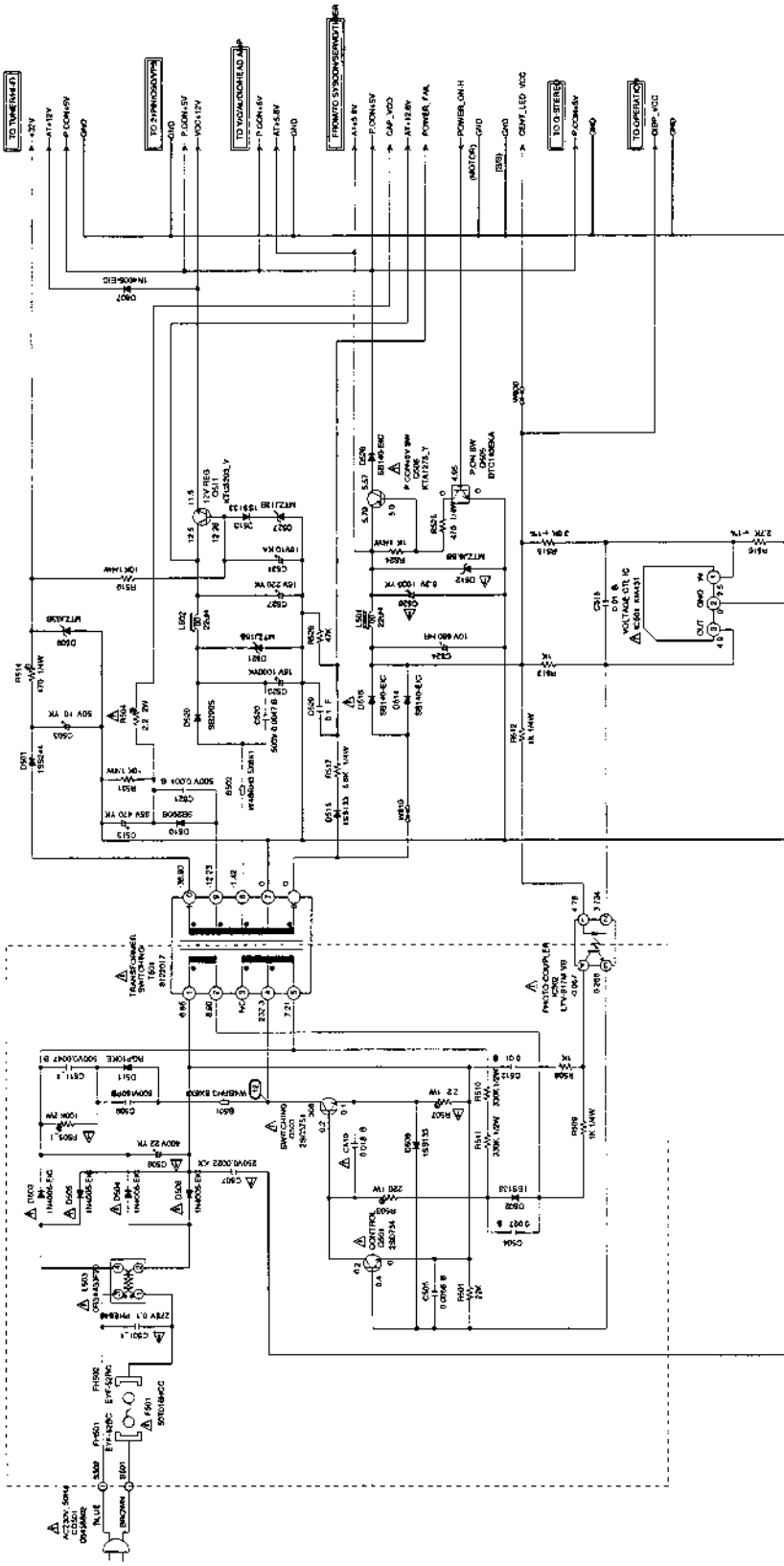
NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND IS SUBJECT TO CHANGE WITHOUT NOTICE.

CAUTION: DIGITAL TRANSMISSION

SYSCON PCB



# POWER SCHEMATIC DIAGRAM (SYSCON PCB)



CAUTION: DIGITAL TRANSISTOR

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

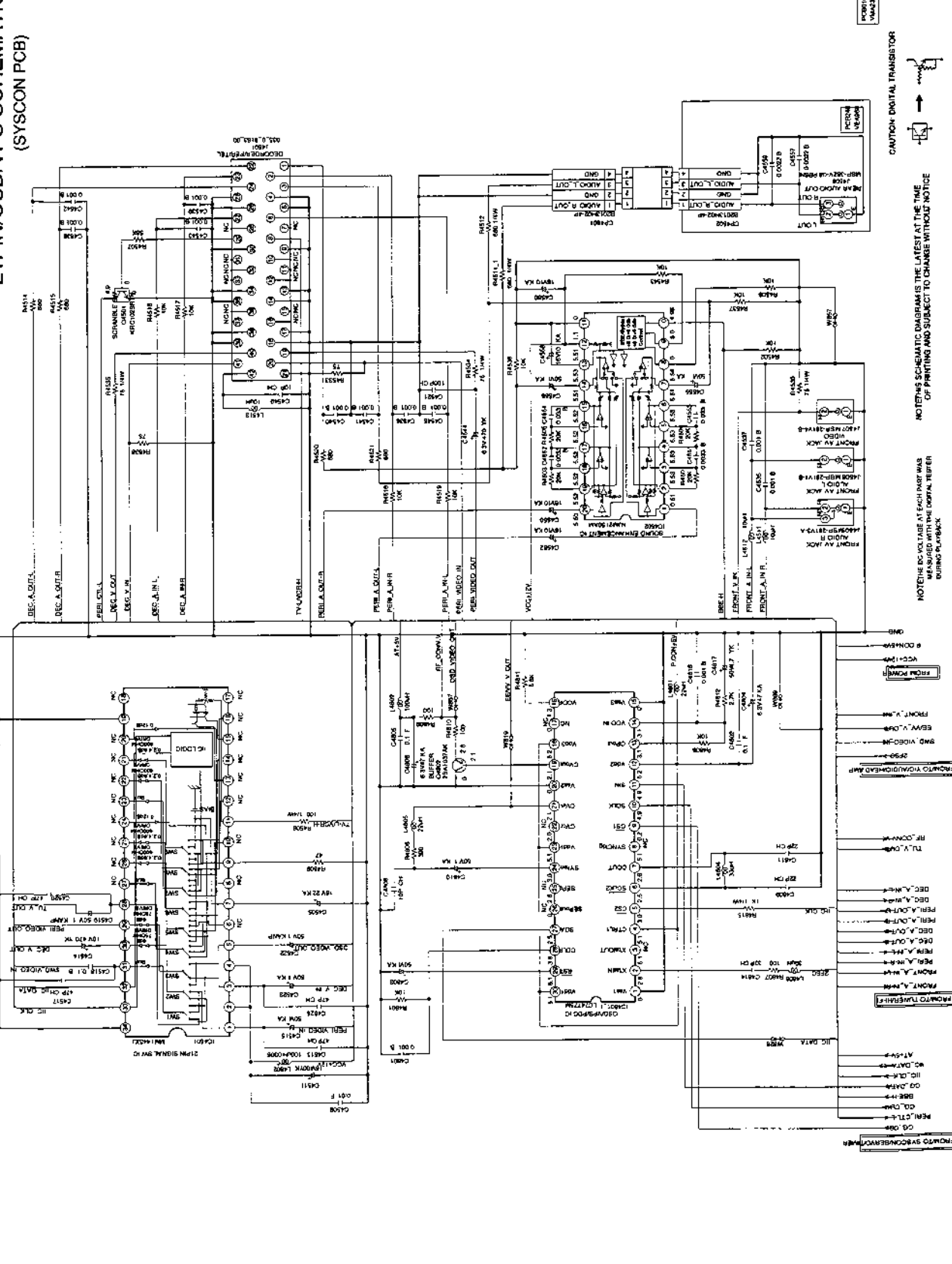
NOTES: DO NOT USE AT EACH PART WAS MEASURED WITH THE OPTICAL TESTER DURING PL. WORK

ATTENTION: CESSEZ DE RÉPARER PASSEZ À LA  
CHANGÉZ-LES AU POINT DE VUE SÉCURITÉ  
UTILISER QUE CELLES DÉCRITES  
DANS LA NOMÉCLATURE DES PIÈCES

CAUTION: THESE PARTS MARKED WITH  
"M" IN THE SAFETY USE ONLY  
DESCRIBED IN PARTS LIST ONLY



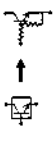
# 21PIN/OSD/WPS SCHEMATIC DIAGRAM (SYSCON PCB)



NOTE THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE SCOPAL REFER DURING PLACEMENT

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

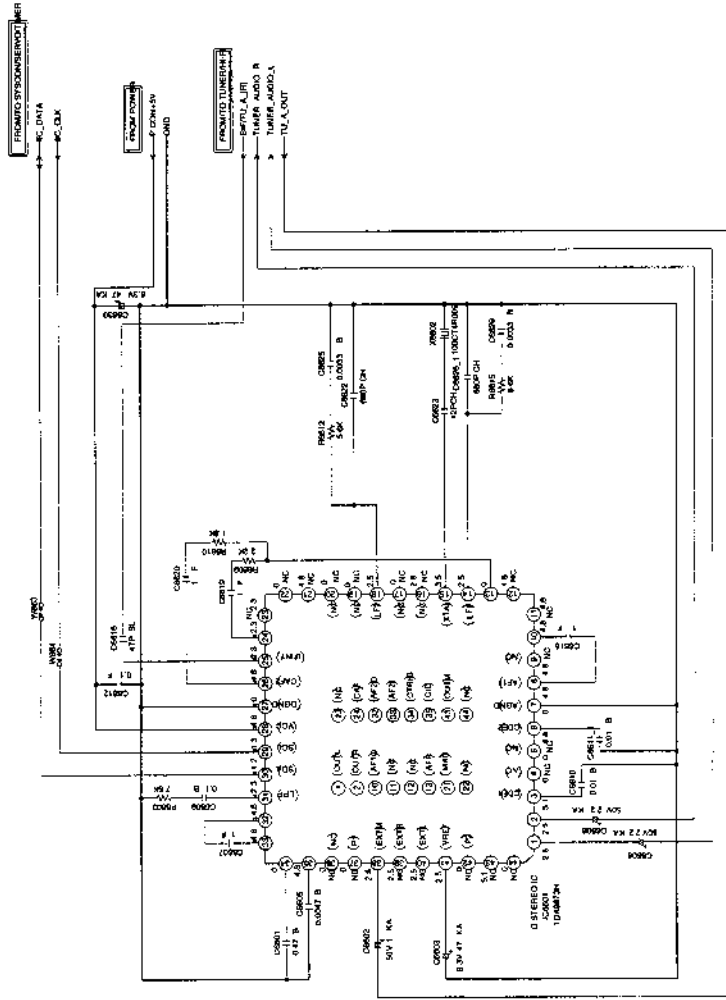
CAUTION: DIGITAL TRANSISTOR



G-12

G-11

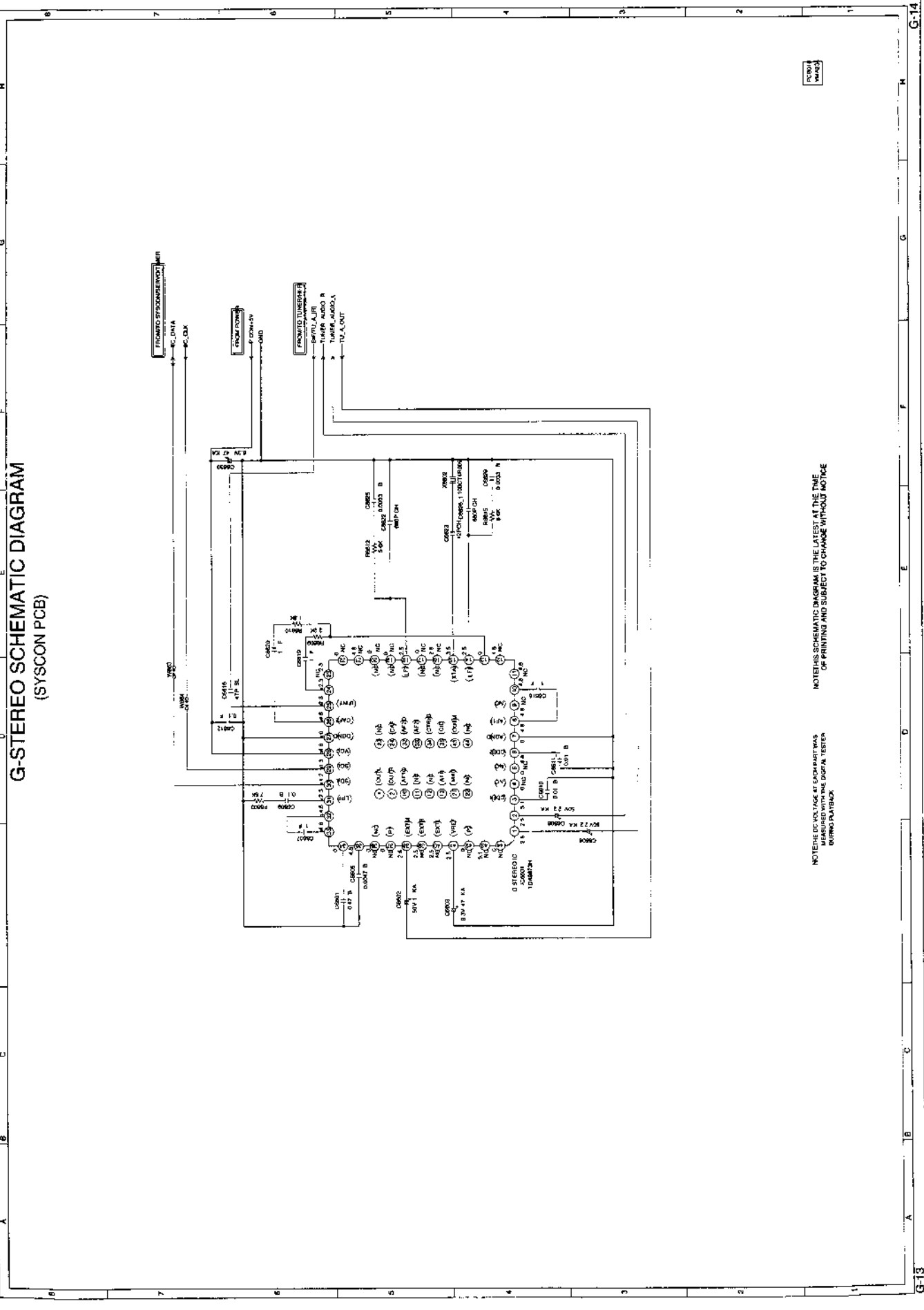
# G-STEREO SCHEMATIC DIAGRAM (SYS-CON PCB)



NO. 1000  
REV. 10/68

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

NOTE: THE VOLTAGE AT EACH PART WAS MEASURED WITH THE DORAN TESTER BURRO PLYMOUTH

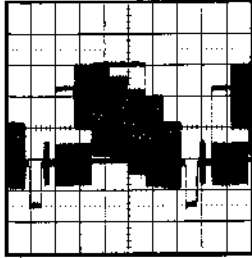


A B C D E F G H  
1 2 3 4 5 6 7

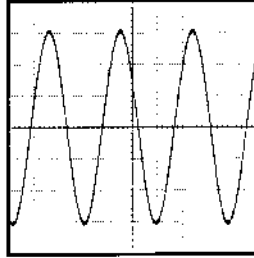


# WAVEFORMS

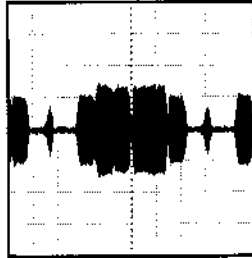
## Y/C/AUDIO/HEAD AMP



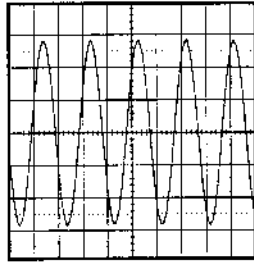
① REC  
0.5V 10 $\mu$ s/div



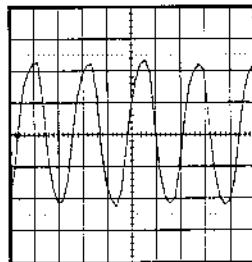
⑥ REC  
10V 5 $\mu$ s/div



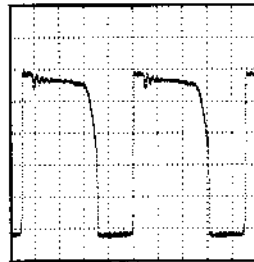
② PB  
200mV 10 $\mu$ s/div



⑦ REC, PB  
200mV 0.5ms/div

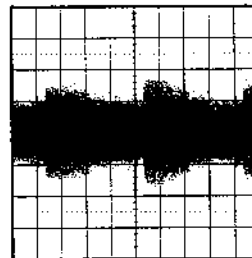


③ POWER ON  
100mV 50ns/div

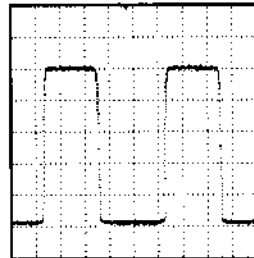


⑫ PB  
2 $\mu$ s 50.0V/div

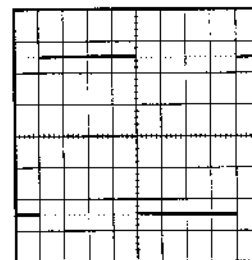
## POWER



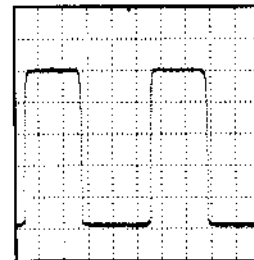
④ PB  
100mV 5ms/div



⑰ PB  
200ms 1.0V/div



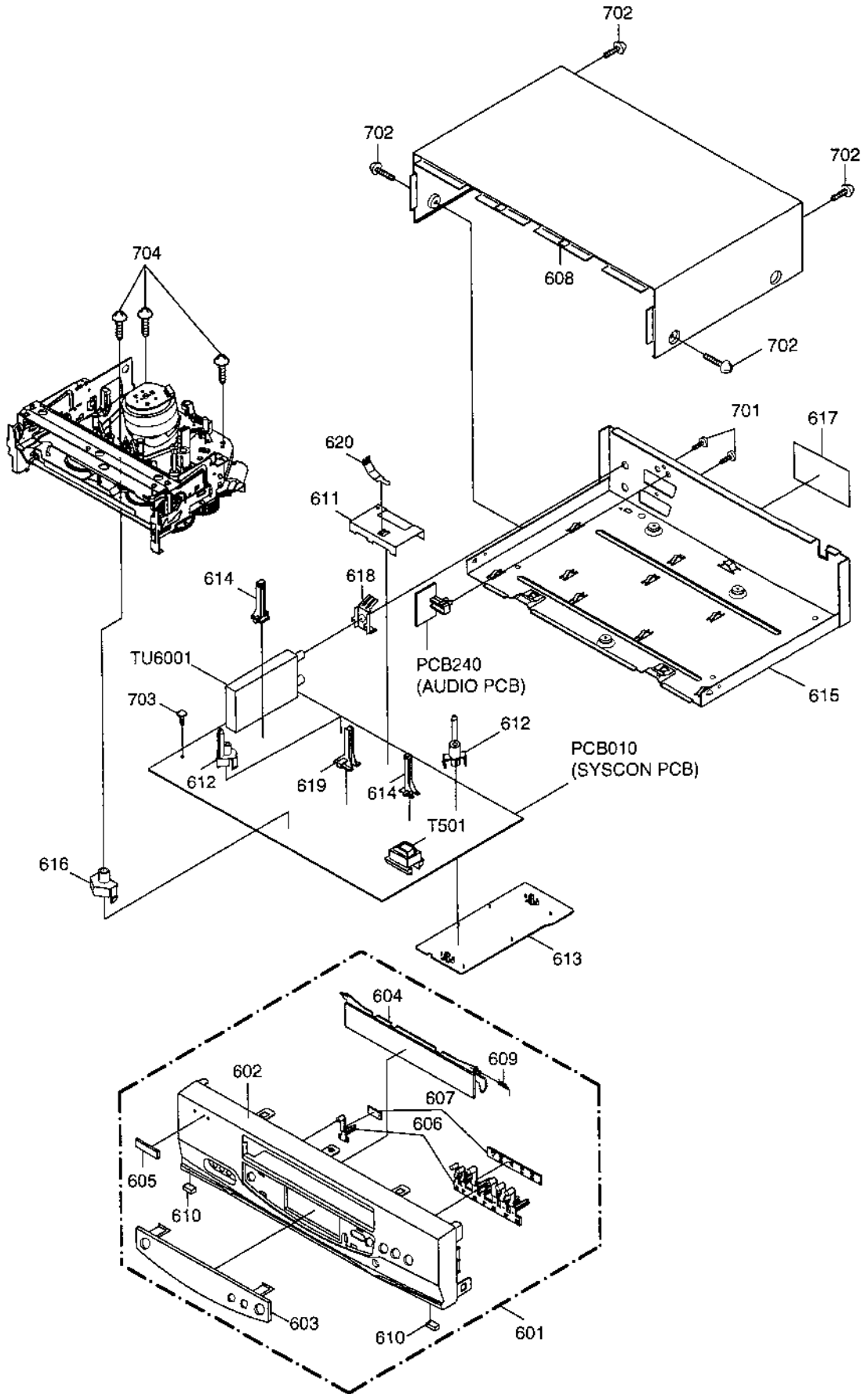
⑤ REC, PB  
1V 5ms/div



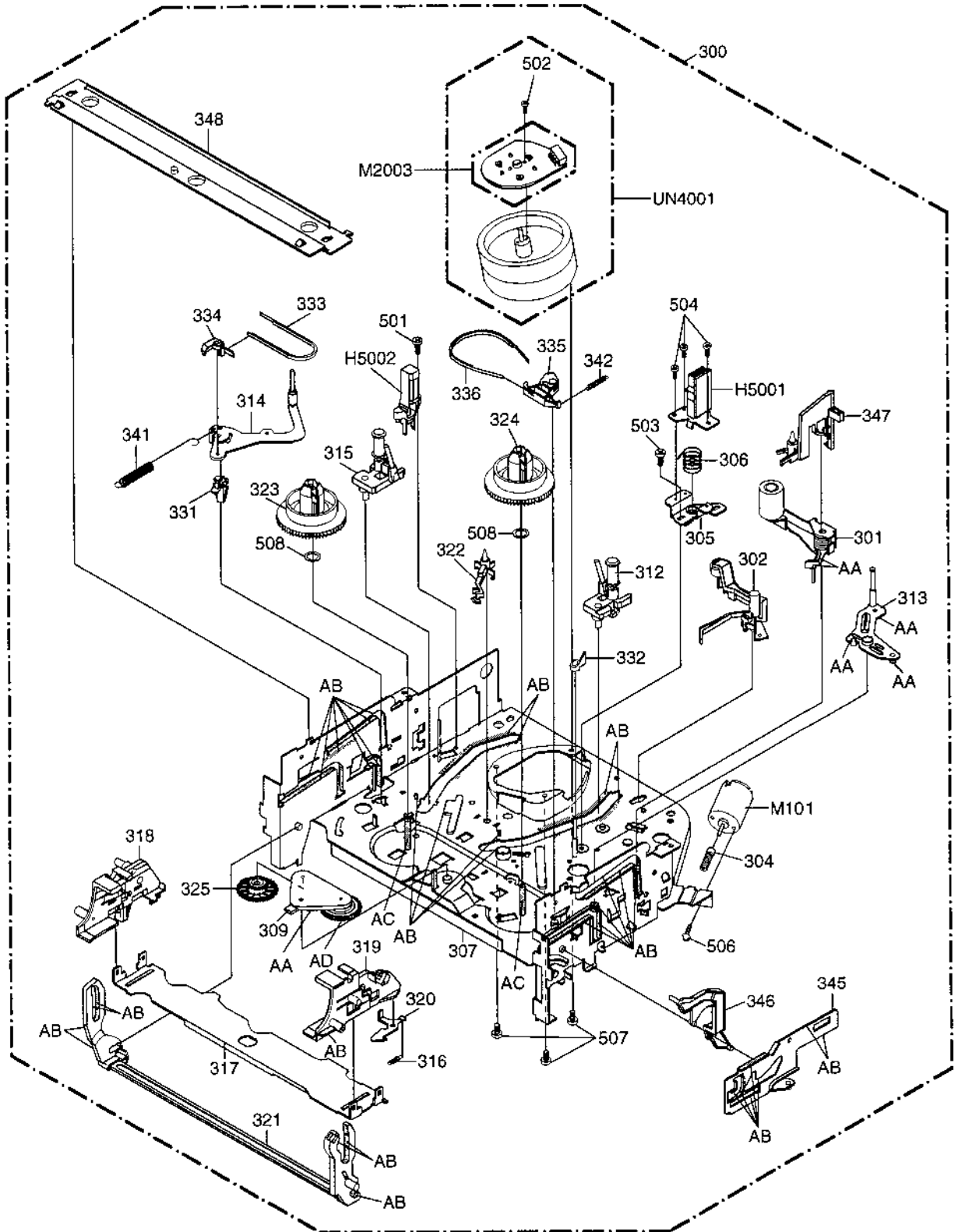
⑱ PB200ms 1.0V/div

NOTE: The following waveforms were measured at the point of the corresponding balloon number in the schematic diagram.

# MECHANICAL EXPLODED VIEW



# CHASSIS EXPLODED VIEW (TOP VIEW)

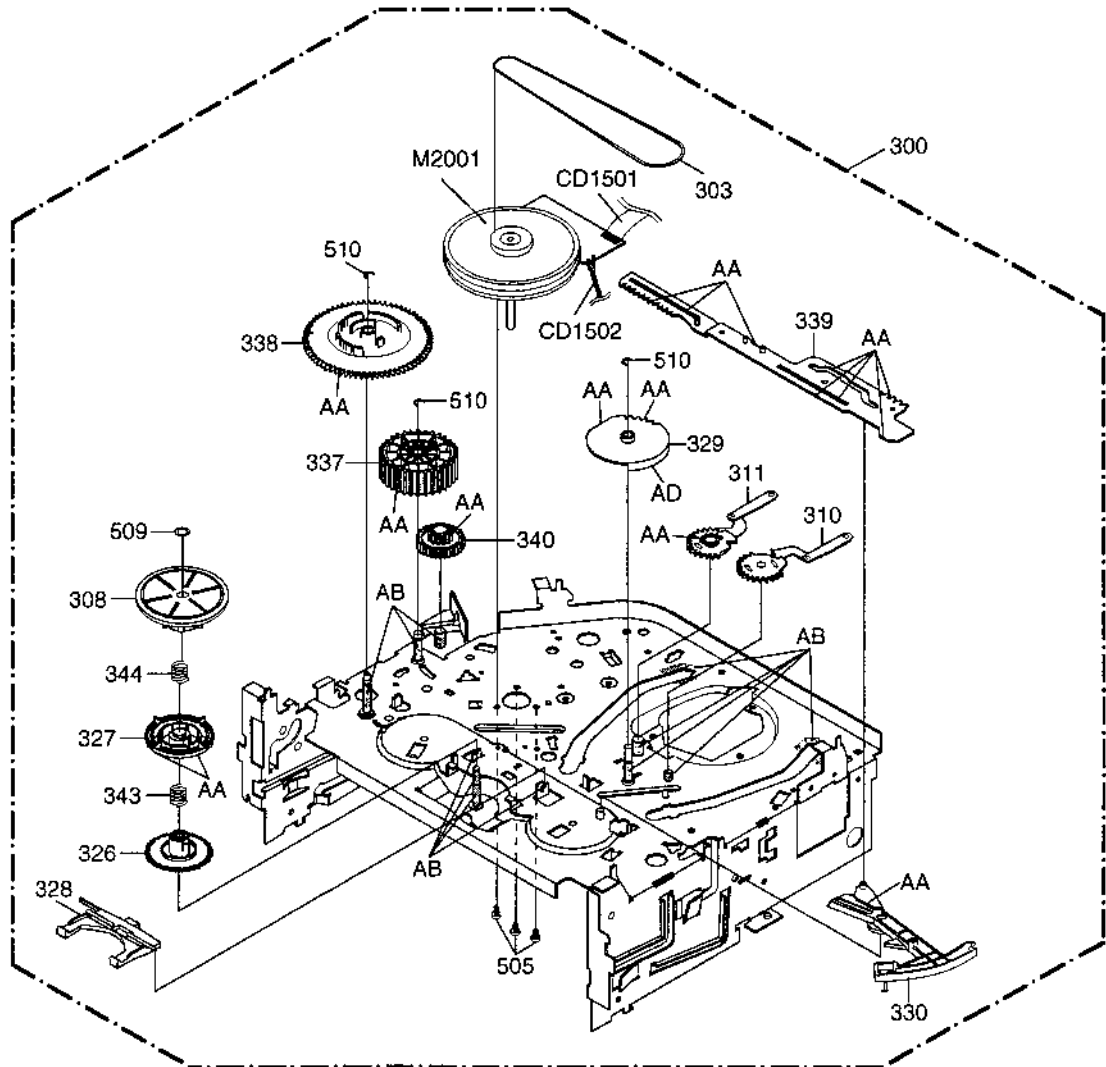


CLASS	PART NO.	MARK
GREASE	G-555G	AA
	MG-33	AB
	FG-84M	AC
	FL-721	AD

**NOTE:** Applying positions AA, AB, AC and AD for the grease are displayed for this section. Check if the correct grease is applied for each position.



## CHASSIS EXPLODED VIEW (BOTTOM VIEW)



CLASS	PART NO.	MARK
GREASE	G-555G	AA
	MG-33	AB
	FG-84M	AC
	FL-721	AD

**NOTE:** Applying positions AA, AB, AC and AD for the grease are displayed for this section. Check if the correct grease is applied for each position.

## MECHANICAL REPLACEMENT PARTS LIST

REF. NO.	PART NO.	DESCRIPTION		
601	A4F509B720K	CABINET,FRONT ASS'Y		
602	701WPJB440	CABINET,FRONT		
603	711WPDA410	PLATE,DISPLAY		
604	712WPJB185	FLAP		
605	711WPC0005	BADGE,BRAND		
606	735WPAA362	BUTTON,HOLDER		
607	735WPBA297	BUTTON,FRAME		
608	702WSB0060	CABINET, TOP		
609	743WKA0032	SPRING,FLAP(COMBO)		
610	800WFA0045	CUSHION,LEG		
611	752WSA0230	SHIELD,CASE HEAD AMP		
612	701WPA0717	HOLDER,DECK		
613	755WPA0024	PLATE,COVER POWER		
614	850P700036	HOLDER EOT SENSOR		
615	702WSA0091	PLATE,BOTTOM		
616	701WPA0686	HOLDER,DECK		
617	722202A540	SHEET,RATING		
618	753WUA0057	SPRING,EARTH TUNER		
619	850P700037	HOLDER,LED		
620	753WUAA006	SPRING,EARTH HEAD AMP		
701	8110230804	SCREW,TAP TITE(P)	BIND	3x8
702	8109230801	SCREW,TAP TITE(B)		3x8
703	8109230704	SCREW,TAP TITE(B)R	BIND	3x7
704	8109130B94	SCREW,TAP TITE(B)R	PAN	3x29
---	791UHA0014	GIFT,SHEET		
---	792UCA0004	PULP,PACKAGE		
---	793UCDA855	GIFT BOX		
---	JB5X0300	POLYBAG		
---	J4E00129	INFORMATION SHEET		
---	J4F50901	INSTRUCTION BOOK		
---	J4F50907	QUICK SET-UP SHEET		
---	A4F509B975	INSTRUCTION BOOK KIT		

## CHASSIS REPLACEMENT PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION
300	A4F509B420A	DECK ASSY A4F509B420A	501	8107226804	SCREW,TAP TITE(S) BIND 2.6x8
301	85OA400234	PINCH ROLLER BLOCK	502	8107226504	SCREW,TAP TITE(S) BIND 2.6x5
302	85OA500026	AHC ASS'Y	503	8107226404	SCREW,TAP TITE(S) BIND 2.6x4
303	85OP200290	BELT,CAPSTAN (S)	504	8102120604	SCREW,PAN M2x6
304	85OP600581	WORM	505	8109126604	SCREW,TAP TITE(B) PAN 2.6x6
305	85OP500083	BASE,AC HEAD	506	810A130404	SCREW/WASHER(A) M3x4
306	85OP800324	SPRING,AC HEAD	507	810A126504	SCREW/WASHER(A) M2.6x5
307	85OA000459	MAIN CHASSIS ASS'Y	508	82Q264713N	POLYSLIDER WASHER 2.6x4.7xT0.13
308	85OA200089	CLUTCH ASS'Y	509	82P184505N	POLYSLIDER WASHER(CUT) 1.8x4.5xT0.5
309	85OA200090	ARM IDLER ASS'Y	510	83ETW30000	E-RING 3
310	85OA300065	LOADING ARM S UNIT	CD1501	122H071603	CORD JUMPER SMCD-7X151
311	85OA300086	LOADING ARM T UNIT	CD1502	122Y021902	CORD JUMPER 2Y021902
312	85OA400223	INCLINED BASE T UNIT 3S	H5001	1523D91034	HEAD (AUDIO CONTROL) HVMXA1072A
313	85OA400232	PS ARM ASS'Y 2	H5002	1543D02013	HEAD (FULL ERASE) HVFHP0032A
314	85OA400233	TENSION ARM ASS'Y (WT)	▲ M101	1596S98001	MOTOR (LOADING) MDB2B66
315	85OA400231	INCLINED BASE S UNIT	▲ M2001	1510S98036	CAPSTAN DD UNIT F2QVB08
316	85OP800358	SPRING,LOCKER	▲ M2003	1589S11015	MICRO MOTOR I2OAL01
317	85OP900736	CASS,HOLDER	▲ UN4001	A4F501B500	CYLINDER UNIT ASSY A4F501B500
318	85OP900748	CASS,SIDE L			
319	85OP900749	CASS,SIDE R			
320	85OP900739	LOCKER,R			
321	85OA900228	LINK UNIT			
322	85OP000496	POST,CASS GUIDE			
323	85OP200291	REEL,S (S)			
324	85OP200292	REEL,T (S)			
325	85OP200308	GEAR,IDLER			
326	85OP200311	GEAR,CLUTCH			
327	85OP200312	GEAR,COUPLING			
328	85OP200313	LEVER,CLUTCH			
329	85OP300194	GEAR,MAIN LOADING			
330	85OP400490	LEVER,TENSION			
331	85OP400492	HOLDER,TENSION			
332	85OP400520	CAP,P4			
333	85OP400532	BAND,TENSION			
334	85OP400533	CONNECT,TENSION			
335	85OP600573	ARM,BRAKE T			
336	85OP600574	BAND,BRAKE T			
337	85OP600577	CAM,PINCH ROLLER			
338	85OP600578	CAM,MAIN			
339	85OP600579	ROD,MAIN			
340	85OP600582	GEAR,JOINT			
341	85OP800322	SPRING,TENSION			
342	85OP800350	SPRING,BRAKE T			
343	85OP800355	SPRING,COUPLING			
344	85OP800356	SPRING,RING			
345	85OP900743	LEVER,LINK			
346	85OP900744	LEVER,FLAP			
347	85OP900745	CASS,OPENER			
348	85OP900746	BRACKET, TOP 3V			

# ELECTRICAL REPLACEMENT PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION
<b>RESISTORS</b>			<b>TRANSISTORS</b>		
▲ R503	R3X181221J	R,METAL OXIDE 220 OHM 1W	Q1008	TNAAC05002	COMPOUND TRANSISTOR KRC103SRTK
R504	R3X28A2R2J	R,METAL OXIDE 2.2 OHM 2W	Q1009	TNAAC05002	COMPOUND TRANSISTOR KRC103SRTK
▲ R505	R3X28A104J	R,METAL OXIDE 100K OHM 2W	Q1010	TNAAC05002	COMPOUND TRANSISTOR KRC103SRTK
R507	R3X1812R2J	R,METAL OXIDE 2.2 OHM 1W	Q4001	TCAT032034	TRANSISTOR, SILICON KTC3203_Y-AT
R514	R65584471J	R,FUSE 470 OHM 1/4W	Q4002	TCAT032034	TRANSISTOR, SILICON KTC3203_Y-AT
<b>CAPACITORS</b>			<b>TRANSISTORS</b>		
▲ C501	P2472B104M	CMP 0.1 UF 275V PHE840	Q4003	TNYJA05001	COMPOUND TRANSISTOR DTC143EKAT146
C507	CB3930MH3M	CC 0.0022UF 250V	Q4004	TCAT032034	TRANSISTOR, SILICON KTC3203_Y-AT
▲ C508	E02LFH220M	CE 22 UF 400V	Q4005	TPAAC05002	COMPOUND TRANSISTOR KRA103SRTK
C521	C0J0B0513K	CC 0.001 UF 500V B or	Q4006	TCATC31980	TRANSISTOR,SILICON KTC3198-AT(Y,GR)
	C13VB0713K	CC 0.001 UF 2KV B	Q4007	TCATC31980	TRANSISTOR,SILICON KTC3198-AT(Y,GR)
<b>DIODES</b>			<b>TRANSISTORS</b>		
D501	D17T002440	DIODE SILICON 1SS244T-77	Q4501	TNAAB05003	COMPOUND TRANSISTOR KRC102SRTK
D502	D1VT001330	DIODE,SILICON 1SS133T-77	Q4802	T6YJ1037K0	TRANSISTOR,SILICON 2SA1037AKT146R,S
D503	D2WXN40050	DIODE,SILICON 1N4005-EIC	<b>COILS &amp; TRANSFORMER</b>		
D504	D2WXN40050	DIODE,SILICON 1N4005-EIC	L501	021W7A220K	COIL 22 UH
D505	D2WXN40050	DIODE,SILICON 1N4005-EIC	L502	021W7A220K	COIL 22 UH
D506	D2WXN40050	DIODE,SILICON 1N4005-EIC	▲ L503	029T000083	COIL,LINE FILTER 0R3A433F20
D507	D2WXN40050	DIODE,SILICON 1N4005-EIC	L1001	021W7A220K	COIL 22 UH
D508	D1VT001330	DIODE,SILICON 1SS133T-77	L4001	0316160028	COIL,BIAS OSC 1616002
D509	D97U03301B	DIODE,ZENER MTZJ33B T-77	L4002	02167F101J	COIL 100 UH
D510	D2WXB290S0	DIODE SILICON SB290S	L4003	02167F101J	COIL 100 UH
D511	D2LTP10KE0	DIODE,RECTIFIER RGP10KE-G3	L4004	02167F101J	COIL 100 UH
D512	D97U06R81B	DIODE,ZENER MTZJ6.8B T-77	L4005	02167F101J	COIL 100 UH
D513	D1VT001330	DIODE,SILICON 1SS133T-77	▲ L4006	0316160018	COIL,BIAS OSC 1616001
D514	D2WXS81400	DIODE SCHOTTKY SB140-EIC	L4008	02167F101J	COIL 100 UH
D515	D1VT001330	DIODE,SILICON 1SS133T-77	L4009	021LA6120K	COIL 12 UH
D516	D2WXS81400	DIODE SCHOTTKY SB140-EIC	L4010	021LA6221K	COIL 220 UH
D520	D2WXB290S0	DIODE SILICON SB290S	L4011	02167F101J	COIL 100 UH
D521	D97U01601B	DIODE ZENER MTZJ16B T-77	L4012	021LA6390K	COIL 39 UH
D526	D2WXS81400	DIODE SCHOTTKY SB140-EIC	L4013	02167F101J	COIL 100 UH
D527	D97U01201B	DIODE,ZENER MTZJ12B T-77	L4014	021LA6R22M	COIL 0.22 UH
D851	D2WXN40050	DIODE SILICON 1N4005-EIC	L4015	021LA6R22M	COIL 0.22 UH
D1004	D1VT001330	DIODE,SILICON 1SS133T-77	L4016	021LA6R22M	COIL 0.22 UH
D1005	0010100320	INFRARED LED LNA2702L010R	L4502	02167F101J	COIL 100 UH
D1006	D2WXN40050	DIODE SILICON 1N4005-EIC	L4511	021LA6100J	COIL 10 UH
D4001	D1VT001330	DIODE,SILICON 1SS133T-77	L4512	021LA6100J	COIL 10 UH
<b>ICs</b>			L4513	021LA6100J	COIL 10 UH
▲ IC501	11KJ9A4310	IC KIA431 or	L4801	021LA6220J	COIL 22 UH
	I0UJ014310	IC MM1431ATT	L4802	021LA6101J	COIL 100 UH
IC502	0002E00610	PHOTO COUPLER LTV-817M-VB	L4804	021LA6330K	COIL 33 UH
IC1001	I56F57070A	IC OEC7070A	L4806	021LA6220J	COIL 22 UH
IC1003	I9UF032310	IC PST3231NR	L4806	021LA6390K	COIL 39 UH
IC1099	A4F509B015	IC S-24C08ADPA-01	L5501	02167F101J	COIL 100 UH
IC4001	I04F38217F	IC HA118217F	L5502	02167F101J	COIL 100 UH
IC4501	I0UF014430	IC MM1443XJ	L6001	02167F220J	COIL 22 UH
IC4502	I0QF021500	IC NJM2150AM	▲ T501	0481220174	TRANSFORMER,SWITCHING 8122017
IC4801	I53F4775M	IC LC74775M	<b>JACKS</b>		
IC5501	I0KF79605H	IC TDA9605H	J4501	063G000072	SOCKET,21PIN 035_0_8183_00
IC6601	I0KFA9873H	IC TDA9873H	J4505	060J421023	RCA JACK MSP-281V3-A
<b>TRANSISTORS</b>			J4506	060J401080	RCA JACK MSP-281V1-B
Q501	TD3T007340	TRANSISTOR,SILICON 2SD734(E,F)-AA	J4507	060J401079	RCA JACK MSP-281V4-B
Q503	TC3U037510	TRANSISTOR SILICON 2SC3751	J4508	060J411023	RCA JACK MSP-382V-08 PPSN
Q505	TNYJA05001	COMPOUND TRANSISTOR DTC143EKAT146	<b>SWITCHES</b>		
Q506	TAAT01273Y	TRANSISTOR SILICON KTA1273_Y	SW651	0504201T31	SWITCH,TACT SKHVBD010
Q511	TCAT032034	TRANSISTOR, SILICON KTC3203_Y-AT	SW652	0504201T31	SWITCH,TACT SKHVBD010
Q651	T6YJ1037K0	TRANSISTOR,SILICON 2SA1037AKT146R,S	SW653	0504201T31	SWITCH,TACT SKHVBD010
Q652	TNAAC05002	COMPOUND TRANSISTOR KRC103SRTK	SW654	0504201T31	SWITCH,TACT SKHVBD010
Q653	TNAAC05002	COMPOUND TRANSISTOR KRC103SRTK	SW655	0504201T31	SWITCH,TACT SKHVBD010
Q654	TNAAC05002	COMPOUND TRANSISTOR KRC103SRTK	SW656	0504201T31	SWITCH,TACT SKHVBD010
Q655	T6YJ1037K0	TRANSISTOR,SILICON 2SA1037AKT146R,S	SW657	0504201T31	SWITCH,TACT SKHVBD010
Q656	TNAAC05002	COMPOUND TRANSISTOR KRC103SRTK	SW658	0504201T31	SWITCH,TACT SKHVBD010
Q657	T6YJ1037K0	TRANSISTOR,SILICON 2SA1037AKT146R,S	SW1001	0508A11001	SWITCH(LEAF) MXS013050MVPO
Q658	TNAAC05002	COMPOUND TRANSISTOR KRC103SRTK	<b>P.C. BOARD ASSEMBLIES</b>		
Q659	TNAAC05002	COMPOUND TRANSISTOR KRC103SRTK	PCB010	A4F509B010K	PCB ASS'Y VMA234A
Q660	TNAAC05002	COMPOUND TRANSISTOR KRC103SRTK	PCB240	A4F509B240K	PCB ASS'Y VEA968A
Q661	TNAAC05002	COMPOUND TRANSISTOR KRC103SRTK	<b>MISCELLANEOUS</b>		
Q662	T6YJ1037K0	TRANSISTOR,SILICON 2SA1037AKT146R,S	B501	024HT03564	CORE,BEADS W4BRH3.5X6X1
Q663	TNAAC05002	COMPOUND TRANSISTOR KRC103SRTK	B502	024HT03564	CORE,BEADS W4BRH3.5X6X1
Q664	TNAAC05002	COMPOUND TRANSISTOR KRC103SRTK	BT601	1412004013	BATTERY,MANGAN R03(AB)2PXP6I
Q665	T6YJ1037K0	TRANSISTOR,SILICON 2SA1037AKT146R,S	▲ CD501	1206458802	CORD AC BUSH 06458802
Q1001	0002700590	PHOTO COUPLER RPI-301	CD1002	122F061501	CORD JUMPER 2F061501
Q1002	0000100380	PHOTO TRANSISTOR PNA2604M010R	CD4501	WBL6012038	FLAT CABEL AWG26 4C BLACK 120MM
Q1003	0002700590	PHOTO COUPLER RPI-301	CD6002	06CDL02002	RF CABLE PAL FTZ CDL02002
Q1005	0000100380	PHOTO TRANSISTOR PNA2604M010R	CP1001	06972C0010	CONNECTOR PCB SIDE TMC-J12P-B2
Q1006	0002700670	PHOTO COUPLER RPI-352Q02	CP4001	0697290620	CONNECTOR PCB SIDE TOC-C09X-A1
Q1007	0002700670	PHOTO COUPLER RPI-352Q02	CP4002	069J760019	CONNECTOR PCB SIDE IMSA-9604S-06Z13
			CP4003	0697120320	CONNECTOR PCB SIDE TMC-T02X-E1
			CP4501	067U004029	WIRE HOLDER B2013HO2-4P

## ELECTRICAL REPLACEMENT PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	
<b>MISCELLANEOUS</b>			
CP4502	067U004029	WIRE HOLDER	B2013H02-4P
EL002	124120301A	EYE LET	XRY20X30BD
▲ F501	080NT1R603	FUSE	50T016HCC
FH501	06710T0006	HOLDER,FUSE	EYF-52BC
FH502	06710T0006	HOLDER,FUSE	EYF-52BC
OS651	077Q037001	REMOTE RECEIVER	PIC-37043LO
TM601	076N0ED150	TRANSMITTER	RC-ED150
▲ TU6001	0162K01026	RF UNIT	TCMB0601PD13D
V651	0040E94001	LED DISPLAY	LTG-Y2K22M-J
X1001	100CT01207	CRYSTAL	HC-49/U-S
X1002	100DA32R01	CRYSTAL	DT-26
X4001	100CT4R407	CRYSTAL	HC-49/U
X6602	100CT4R009	CRYSTAL	HC-49/U

### 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

SPEC.NO.	M4F5-09B
O/R NO.	U1Z4516